MacDon

R1 FR Series
Front Mount Rotary Disc

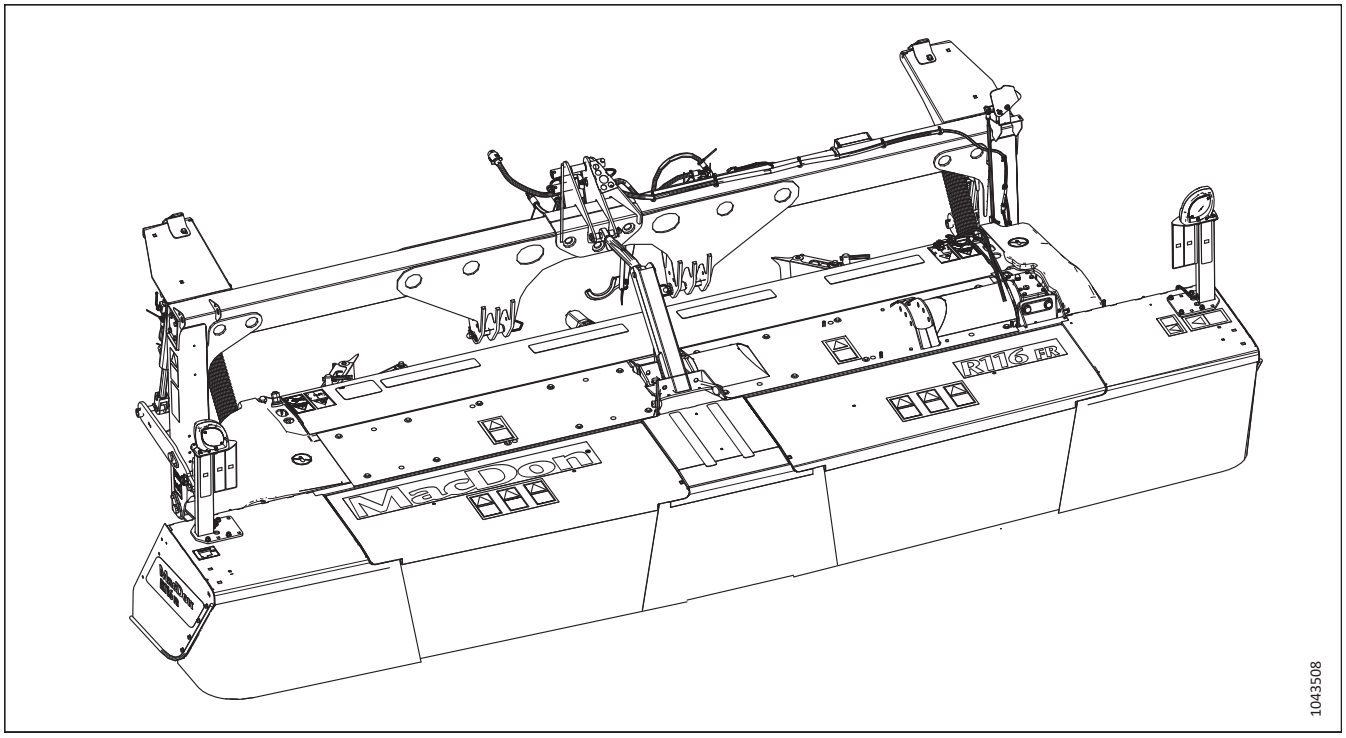
Operator's Manual

262391 Revision A

Original Instruction

The Harvesting Specialists.

R1 FR Series



Published: February 2024

Introduction

This instructional manual contains safety, operating, and maintenance procedures for the MacDon R1 FR Series Rotary Disc.

Your machine

The MacDon R113 and R116 Front Mounted Rotary Disc Headers, when mounted to the front of a suitable agricultural tractor, are designed to cut, condition, and lay a wide variety of grasses and hay crops in windrows.

Your warranty

MacDon provides warranty for Customers who operate and maintain their equipment as described in this manual. A copy of the MacDon Industries Limited Warranty Policy, which explains this warranty, should have been provided to you by your Dealer. Damage resulting from any of the following conditions will void the warranty:

- Accident
- Misuse
- Abuse
- Improper maintenance or neglect
- Abnormal or extraordinary use of the machine
- Failure to use the machine, equipment, component, or part in accordance with the manufacturer's instructions

Your manual

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, and use MacDon parts when repair is necessary, the rotary disc header will work well for many years.

Use the Table of Contents and the 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. If the machine is sold or transferred, pass this manual on to the new Owners. Call your Dealer if you need any additional assistance, information, or additional copies of this manual.

When setting up the machine or making adjustments, review and follow the recommended machine settings in all relevant MacDon publications. Failure to do so may compromise the functionality of the machine, reduce its service life, and may result in a hazardous situation for the Operator or bystanders.

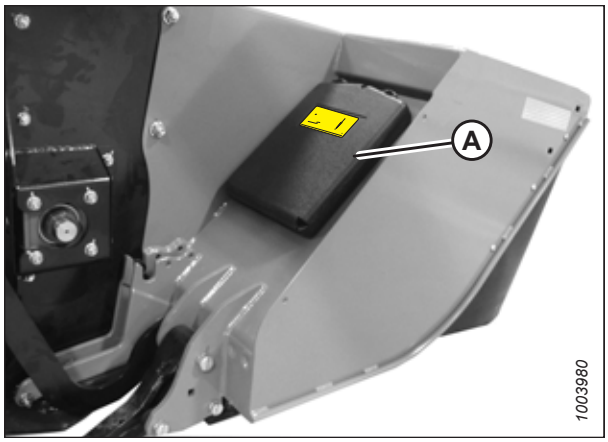
Conventions

The following conventions are used in this document:

- Right and left are determined from the operator's position. The front of the header faces the crop.
- Unless otherwise noted, use the standard torque values provided in this manual.

Store the operator’s manual and the parts catalog in the plastic manual case (A) at the right side of the rotary disc header.

This document is currently available in English.



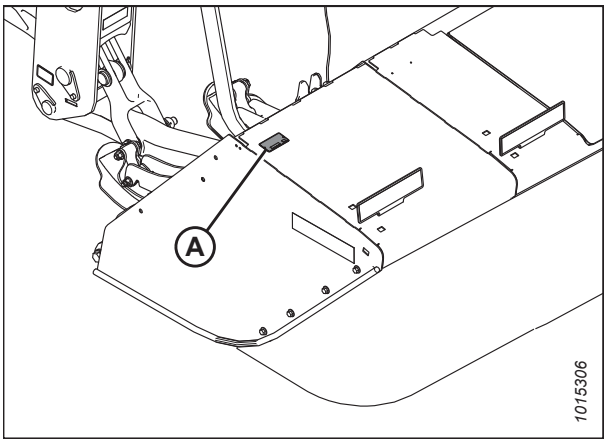
Manual Storage Case

Serial Numbers

Record the serial number of the header, the carrier frame, in the spaces provided below., the hitch, and the transport option (if equipped) provided below.

Rotary disc header serial number (A): _____

Model year: _____



Rotary Disc Header Serial Number Location

Chapter 1: Safety

Understanding and consistently following these safety procedures will help to ensure the safety of those operating the machine and of bystanders.

1.1 Safety Alert Symbols

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

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. Two signal words, **IMPORTANT** and **NOTE**, identify non-safety related information.

Signal words are selected using the following guidelines:

DANGER

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

WARNING

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

CAUTION

Indicates a potentially hazardous situation that, if it is not prevented, may result in minor or moderate injury. It may also be used to alert you to unsafe practices.

IMPORTANT:

Indicates a situation that, if not prevented, could result in a malfunction or damage to the machine.

NOTE:

Provides additional information or advice.

1.3 General Safety

Operating, servicing, and assembling machinery presents several safety risks. These risks can be reduced or eliminated by following the relevant safety procedures and wearing the appropriate personal protective equipment.

CAUTION

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

Wear all protective clothing and personal safety devices that could be necessary for the job at hand. Do **NOT** take chances. You may need the following:

- Hard hat
- Protective footwear with slip-resistant soles
- Protective glasses or goggles
- Heavy gloves
- Wet weather gear
- Respirator or filter mask

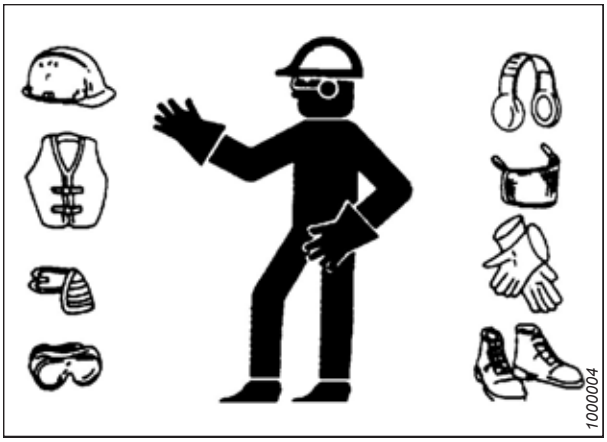


Figure 1.2: Safety Equipment

In addition, take the following precautions:

- Be aware that exposure to loud noises can cause hearing impairment. Wear suitable hearing protection devices such as earmuffs or earplugs to help protect against loud noises.

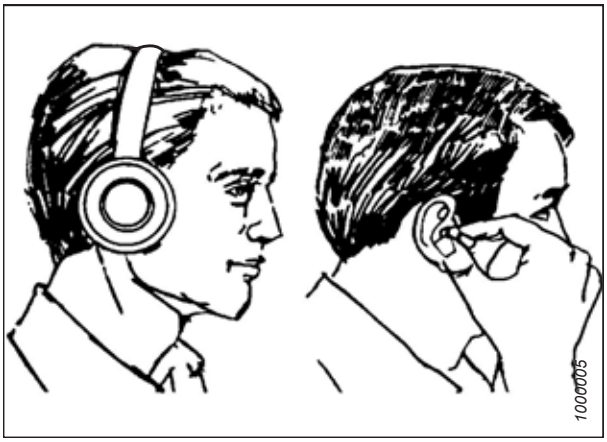


Figure 1.3: Safety Equipment

- Provide a first aid kit in case of emergencies.
- Keep a properly maintained fire extinguisher on the machine. Familiarize yourself with its use.
- Keep young children away from machinery at all times.
- Be aware that accidents often happen when Operators are fatigued or in a hurry. Take time to consider the safest way to accomplish a task. **NEVER** ignore the signs of fatigue.

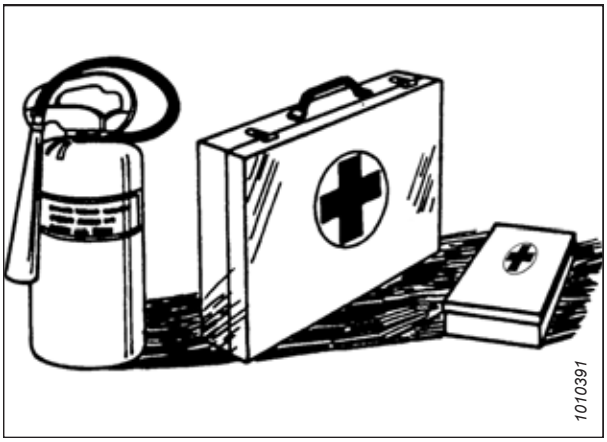


Figure 1.4: Safety Equipment

- Wear close-fitting clothing and cover long hair. **NEVER** wear dangling items such as hoodies, scarves, or bracelets.
- Keep all shields in place. **NEVER** alter or remove safety equipment. Ensure that the driveline guards can rotate independently of their shaft, and that they can telescope freely.
- Use only service and repair parts made or approved by the equipment manufacturer. Parts from other manufacturers may not meet the correct 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. Unauthorized modifications may impair the functionality and/or safety of the machine. It may also shorten the machine's service life.
- To avoid injury or death from the unexpected startup of the machine, **ALWAYS** stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

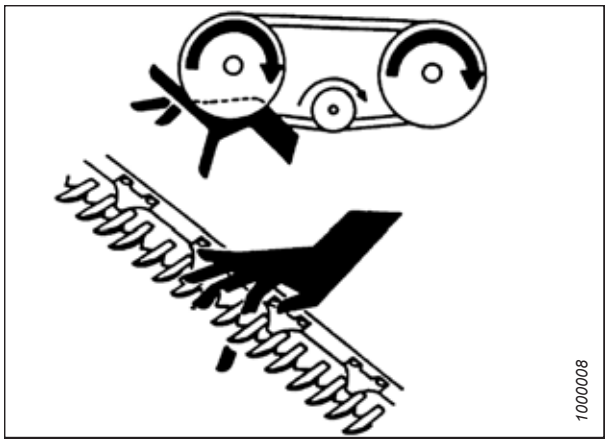


Figure 1.6: Safety around Equipment

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

Figure 1.7: Safety around Equipment

1.4 Hydraulic Safety

Because hydraulic fluid is under extreme pressure, hydraulic fluid leaks can be very dangerous. Follow the proper safety procedures when inspecting hydraulic fluid leaks and servicing hydraulic equipment.

- Always place all hydraulic controls in **NEUTRAL** before leaving the operator's seat.
- Ensure that all of the 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 hydraulic lines, fittings, or hoses by using tapes, clamps, cements, or welding. The hydraulic system operates under extremely high pressure. Makeshift repairs can fail suddenly and create hazardous conditions.

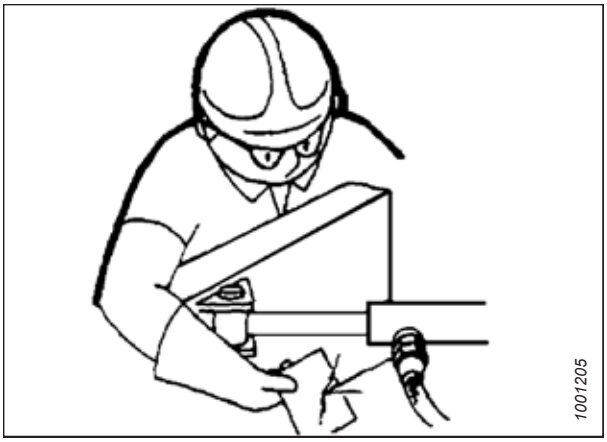


Figure 1.8: Testing for Hydraulic Leaks

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

Figure 1.9: Hydraulic Pressure Hazard

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

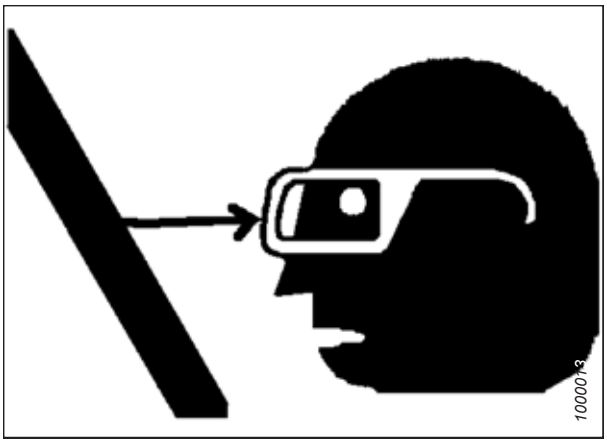


Figure 1.10: Safety around Equipment

1.5 Decommissioning and Disposing of Agricultural Equipment

When agricultural equipment is no longer serviceable and needs to be decommissioned and disposed of, recyclable materials including ferrous and non-ferrous metals, rubber, and plastics; fluids such as lubricants, refrigerants, and fuels; and hazardous materials found in batteries, some light bulbs, and electronic equipment must be handled safely and not introduced into the environment.

Comply with local regulations and authorities.

Products with symbol (A) should **NOT** be disposed of with domestic waste.

Figure 1.11: Symbol for Do NOT Dispose with Domestic Waste

Materials with symbol (B) should be recycled as labelled.

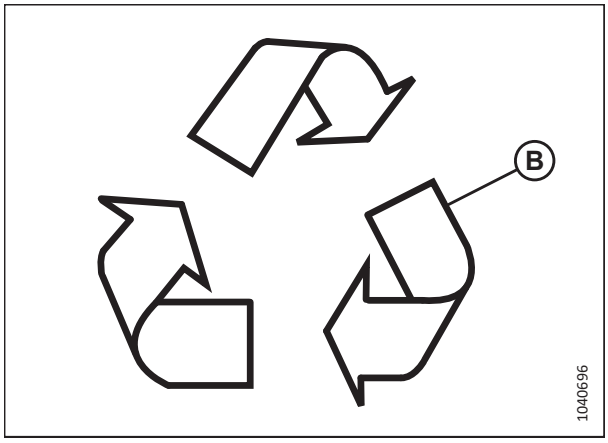


Figure 1.12: Symbol for Recycle as Labelled

- Use appropriate personal protective equipment when removing and handling objects and materials.
- Use appropriate personal protective equipment when handling objects with residue from pesticides, fertilizers, or other agricultural chemicals. Follow local regulations when handling and disposing of these objects.
- Safely release stored energy from suspension components, springs, hydraulic, and electrical systems.
- Recycle or reuse packaging material.
- Recycle or reuse plastics that are labelled with specifications for a material such as PP TV 20. Do **NOT** dispose of them with domestic waste.
- Return batteries to the vendor or take them to a collection point. Batteries contain hazardous substances. Do **NOT** dispose of batteries with domestic waste.
- Follow local regulations to correctly dispose of hazardous materials such as oils, hydraulic fluids, brake fluids, and fuels.
- Take refrigerants to qualified people at specialized facilities for disposal. Refrigerants must **NEVER** be released into the atmosphere.

1.6 Safety Signs

Safety signs are decals placed on the machine where there is a risk of personal injury, or where the Operator should take extra precautions before operating the controls. They are usually yellow.

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or illegible.
- If the original part on which a safety sign was installed is replaced, ensure that the repair part displays the current safety sign.
- Replacement safety signs are available from your Dealer.

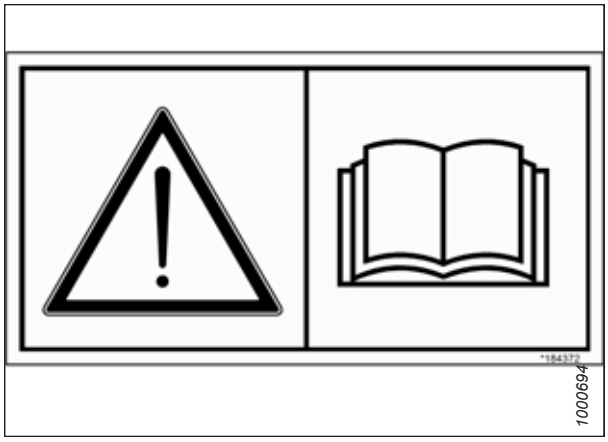


Figure 1.13: Operator's Manual Decal

1.6.1 Installing Safety Decals

Worn or damaged safety decals will need to be removed and replaced.

1. Decide exactly where you are going to place the decal.
2. Clean and dry the installation area.
3. Remove the smaller portion of the split backing paper.
4. Place the decal in position and slowly peel back the remaining paper, smoothing the decal as it is applied.
5. Prick small air pockets with a pin and smooth them out.

1.7 Safety Sign Locations

Safety signs are installed in several locations on the header. Replace any missing or damaged decals on the machine with identical parts.

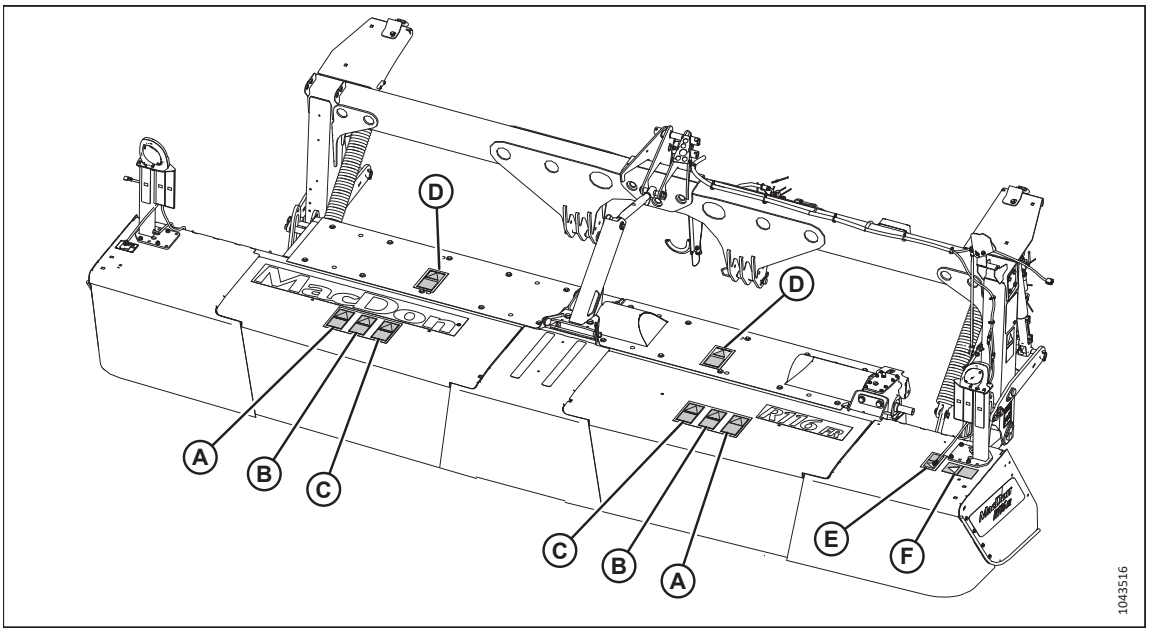


Figure 1.14: Safety Sign Decal Locations – Top

A - MD #194465 **B - MD #247167** **C - MD #194466**
D - MD #190546 **E - MD #166466** **F - MD #113482**

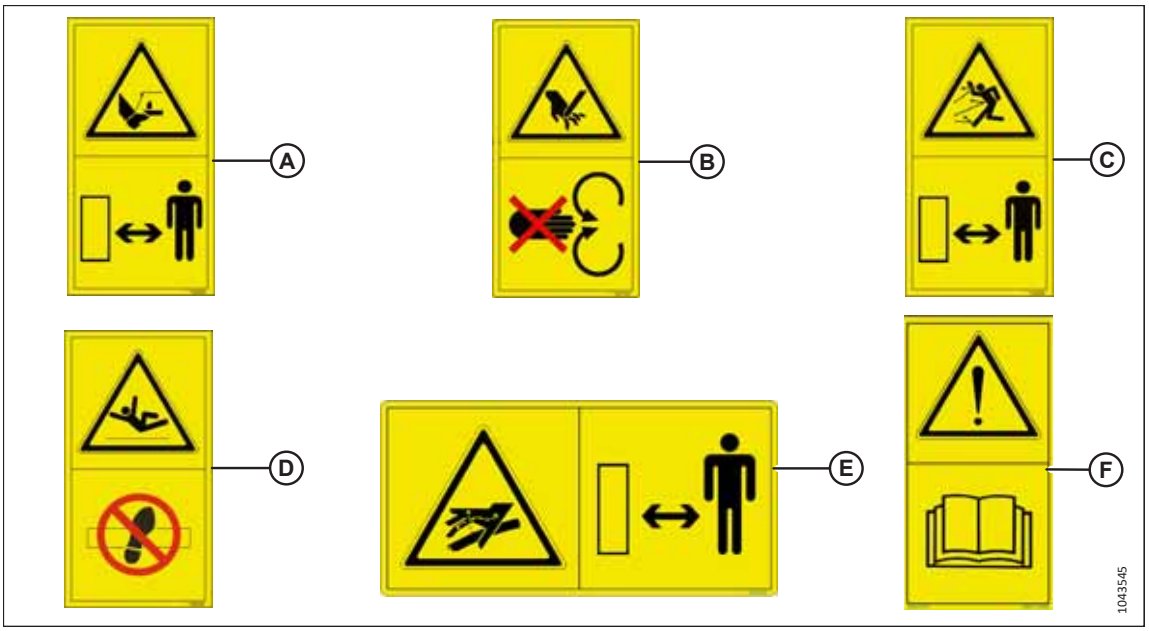


Figure 1.15: Safety Sign Decals – Top

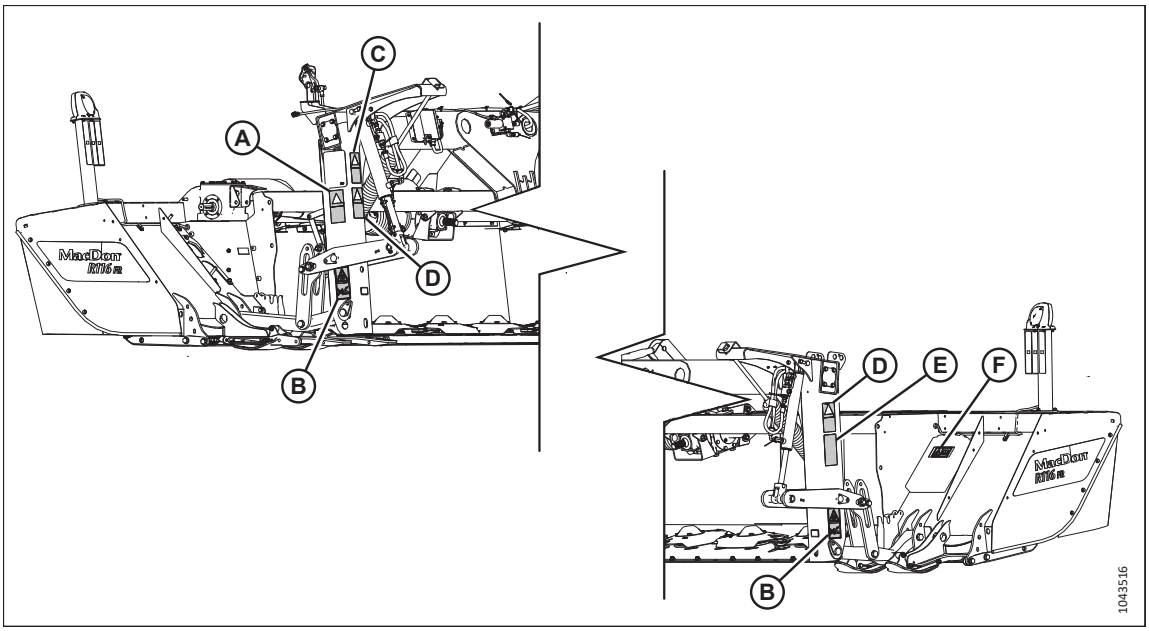


Figure 1.16: Safety Sign Decal Locations – Back and Sides

A - MD #113482 **B - MD #167502** **C - MD #174436**
D - MD #171287 **E - MD #247166** **F - MD #184372**

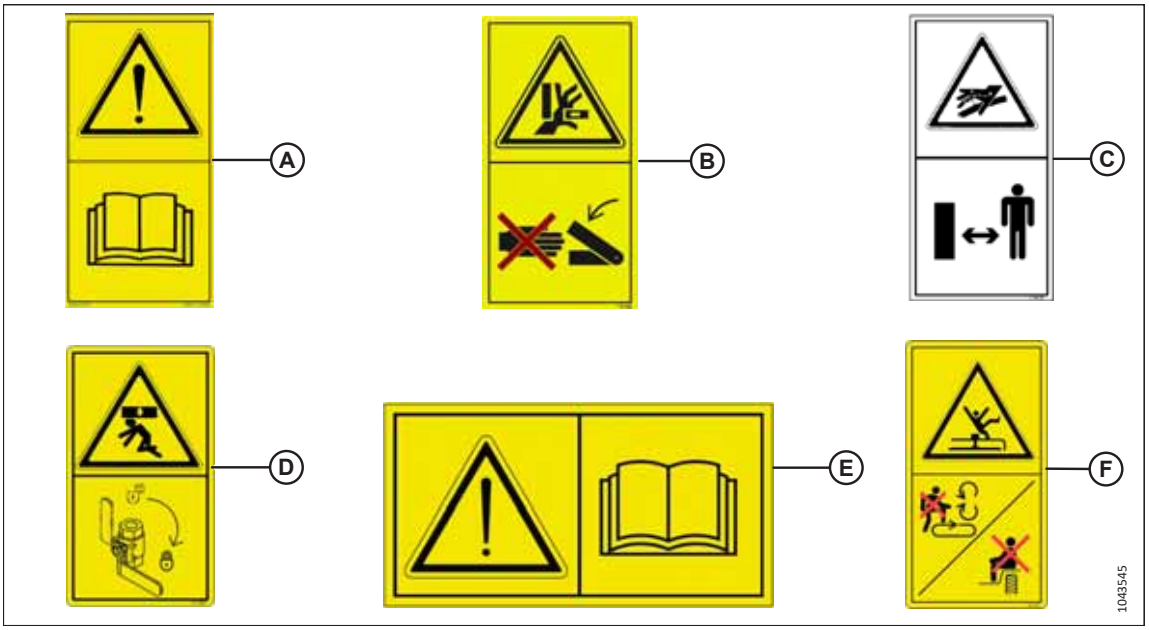


Figure 1.17: Safety Sign Decals – Back and Sides

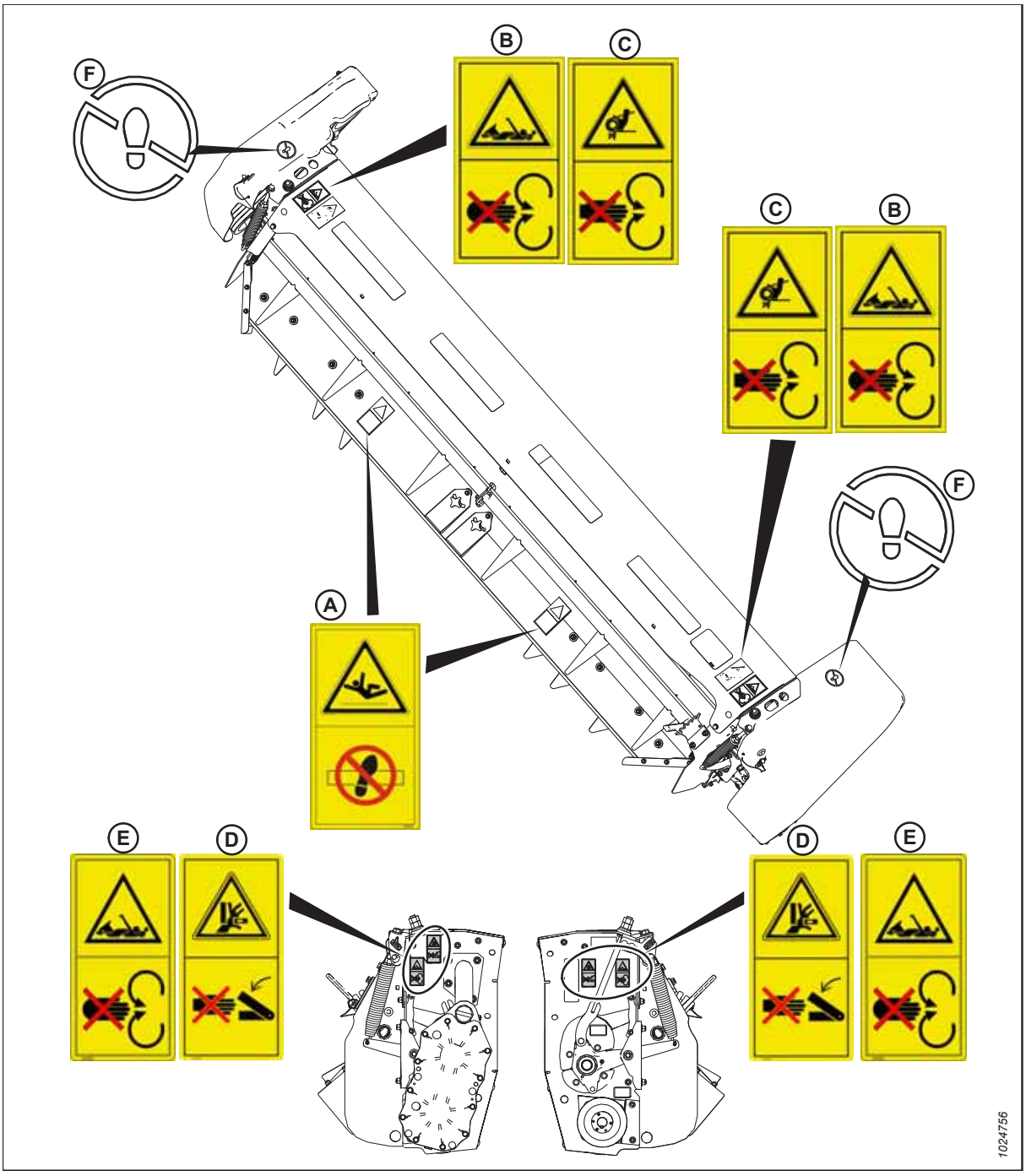


Figure 1.18: Safety Sign Decal Locations – Roll Conditioner

A - MD #190546
B - MD #184385
C - MD #184371
D - MD #246959
E - MD #246956
F - NO STEP Symbol (Imprinted on Shield)

NOTE:

The roller conditioner for R1 FR Front Mount Disc has a split baffle for the driveline. The safety decal locations are correct.

Chapter 2: Product Overview

Refer to this section to learn about the machine's dimensions, weights, and specifications.

2.1 Definitions

The following terms, abbreviations, and acronyms are used in this manual.

Table 2.1 Definitions

Term	Definition
API	American Petroleum Institute
Bolt	A headed and externally threaded fastener designed to be paired with a nut
FFFT	Flats from finger tight
Finger tight	A reference position in which the given sealing surfaces or components are making contact with each other. The fitting has been tightened by hand to a point where the fitting is no longer loose and cannot be tightened further by hand
n/a	Not applicable
Nut	An internally threaded fastener designed to be paired with a bolt
ORB	O-ring boss: A style of fitting commonly used in port openings 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 is also commonly called ORS, which stands for O-Ring Seal
R1 FR Series	R113 and R116 Rotary Disc Front Mount for Agricultural Tractors
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread when it is inserted into a mating part
Tension	An axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.). This term can also be used to describe the force a belt exerts on a pulley or sprocket
TFFT	Turns from finger tight
Torque	The product of a force * the length of a lever arm, usually measured in Newton-meters (Nm), foot-pounds (lbf·ft), or inch-pounds (lbf·in)
Torque angle	A tightening procedure in which a fitting is assembled to a specified tightness (usually finger tight) and then the nut is turned farther by a specified number of degrees until it achieves its final position
Torque-tension	The relationship between the assembly torque applied to a piece of hardware and the axial load it induces in a bolt or screw
Tractor	Agricultural-type power unit which provides motive force to a front mounted header
Washer	A thin cylinder with a hole or a slot located in the center, used as a spacer, a load distribution element, or a locking mechanism

2.2 Component Identification

Being able to identify the parts and systems of your front mount rotary disc header will help to find content in reference manuals.

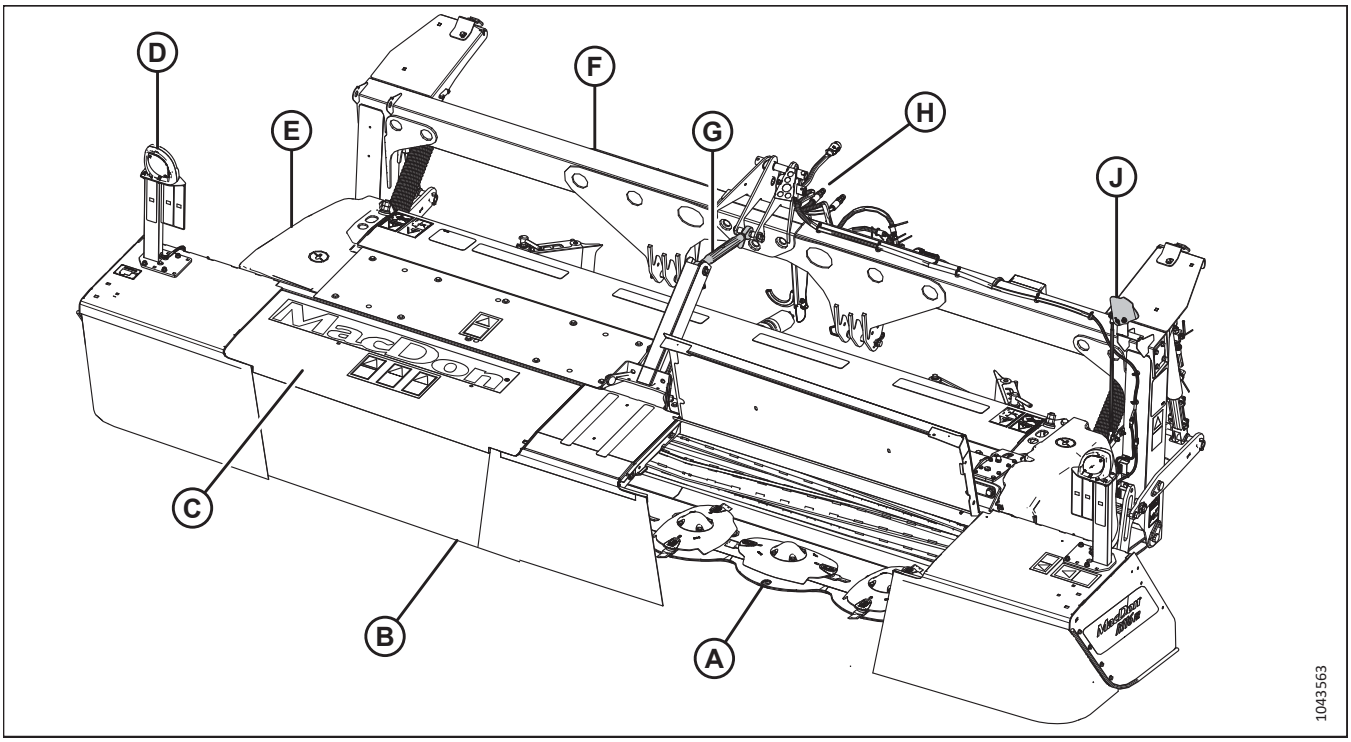


Figure 2.1: R116 FR with Conditioner

A - Cutterbar
B - Curtains
C - Cutterbar Door
D - Clearance Lights
E - Roll Conditioner
F - Carrier Frame
G - Center-Link
H - Hydraulic and Electrical Connections
J - Float Indicator

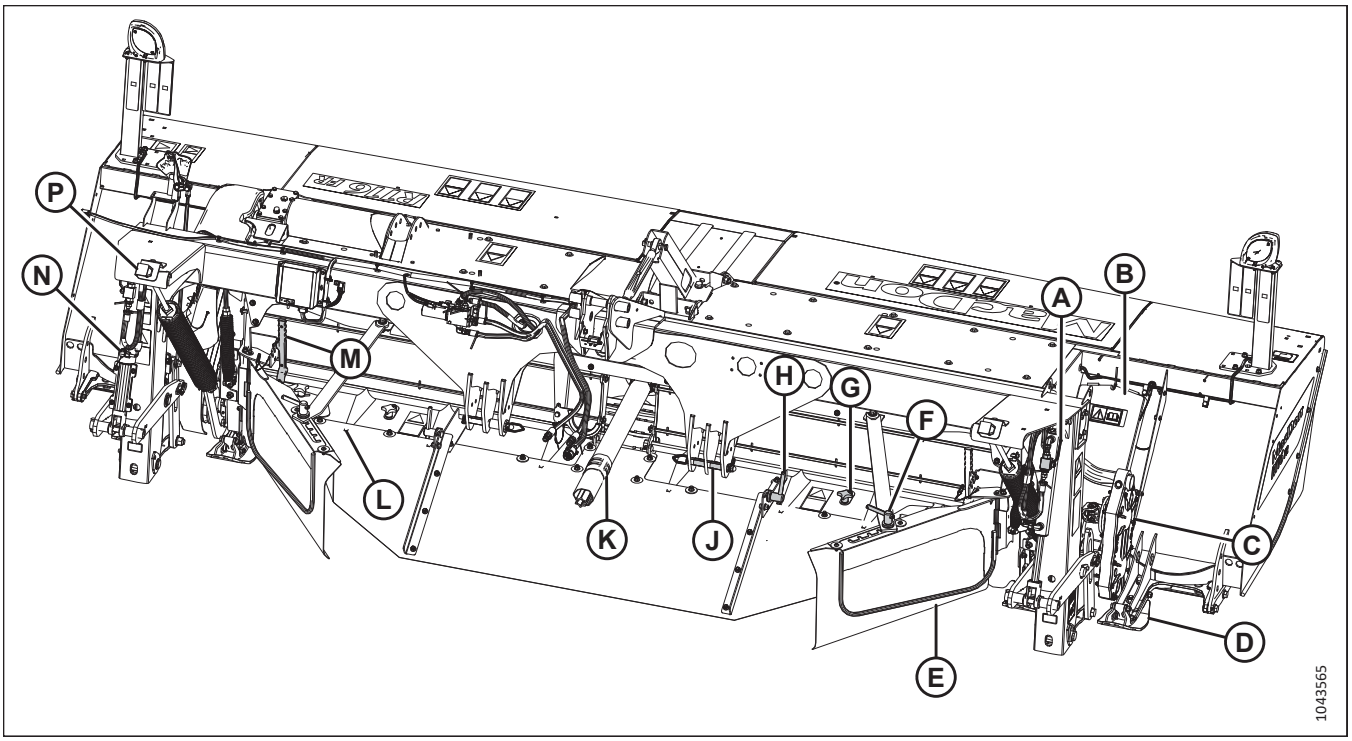


Figure 2.2: R116 FR with Conditioner

A - Auxiliary Lift Cylinder Lock-Out Valve
B - Manual Case
C - Conditioner Gearbox (Guard Removed)
D - Skid Shoe
E - Side Deflector
F - Side Deflector Adjuster
G - Baffle Fin Adjuster
H - Crop Shield Adjuster
J - Hitch Point
K - PTO Shaft (Half Shown)
L - Rear Baffle and Crop Shield
M - Rear Baffle Adjuster
N - Auxiliary Lift Cylinder
P - Float Spring

2.3 Product Specifications

Consult this section to learn about dimensions, weight, and equipment specifications.

NOTE:

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

Table 2.2 R1 FR Series Specifications

Components		R113 FR	R116 FR
Frame and Structure			
Transport width [1]		4063 mm (160 in.)	5027 mm (198 in.)
Transport length		7117 mm (23 ft. 4 in.)	8580 mm (28 ft. 2 in.)
Estimated weight (with steel roll conditioner)		3084 kg (6800 lb.)	3420 kg (7540 lb.)
Carrier		Front Mount	
Lighting		Two amber clearance lights	
Manual storage		Plastic case on right backsheet	
Cutterbar			
Effective cutting width		3978 mm (156 5/8 in.)	4942 mm (194 5/8 in.)
Quantity of cutting discs		8	10
Blades per disc		Two 18 degrees bevel down reversible	
Disc speed		2652 rpm	
Blade tip speed range		303 km/h (188 mph)	
Minimum Cutting height		27 mm (1 1/16 in.)	
Cutting angle range	with hydraulic tilt	0–7 degrees below horizontal	
Cutting angle range	with mechanical center-link	0–5 degrees below horizontal	
Skid shoes		Two adjustable	Four adjustable
Geartrain protection		Shearable disc spindles	
Deflectors		Two drum-type converging	Four drum-type converging
Drives			
1000 RPM Tractor Power Take-Off (PTO)		35 mm (1 3/8 in.) diameter, 21T spline 44 mm (1 3/4 in.) diameter, 20 spline 35 mm (1 3/8 in.) diameter, 6 spline	
Mechanical		Gearbox and driveline	
Conditioner – Roll Type			
Drive		4HB belt driven enclosed timing gearbox and driveline	
Conditioner system		Intermeshing rolls (steel)	
Conditioner speed		900 rpm	
Length of rolls		3275 mm (10 ft. 9 in.)	
Roll diameter	Steel on steel chevron	229 mm (9 in.) / 179 mm (7 in.) O.D. tube	
Intermeshing steel bars		229 mm (9 in.) / 179 mm (7 in.) O.D. tube	
Swath width		915–2896 mm (36–114 in.)	

1. Without crop dividers.

Table 2.2 R1 FR Series Specifications (continued)

Components		R113 FR	R116 FR
Forming shields		Conditioner mounted assembly with adjustable side deflectors	
Ground Speed			
Recommended cutting		8–15 km/h (5–10 mph)	
Tractor Requirements			
Power Take-Off (PTO) power – minimum		74 kW (100 hp)	93 kW (125 hp)
Hydraulic	Pressure	13.7 MPa (2000 psi)	
Hydraulics (front)	Couplers (pair)	Base model header: 1; Base plus hydraulic header angle option: 2	
3-point hitch		Category 2, 3, or 3N	

NOTE:

Tractor must be equipped with a cab.

Chapter 3: Operation

Safely operating your machine requires familiarizing yourself with its capabilities.

3.1 Auxiliary Lift Lock Pins

Auxiliary lift linkage lock pins ensure the carrier frame does not move when the header is disconnected from the tractor.

3.1.1 Installing Auxiliary Lift Lock Pins

Auxiliary lift linkage lock pins are used to lock the auxiliary lift linkage to prevent the carrier frame from moving when the header is not attached to a tractor.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Before starting the machine, check to be sure all bystanders have cleared the area.

IMPORTANT:

Do **NOT** disconnect the header before installing the auxiliary lift locking pins. When disconnected from a tractor without the auxiliary lift lock pins installed, the carrier frame may move and contact the machine.

1. Park the machine on a flat, level surface.
2. Lower the header fully.
3. Shut down the engine, and remove the key from the ignition.

4. Retrieve the auxiliary lift lock straight pins, washers, and Lynch pins from storage location (B) on the left side of the carrier frame, and install the straight pins into the holes (A) in auxiliary lift linkage on both sides of the header.

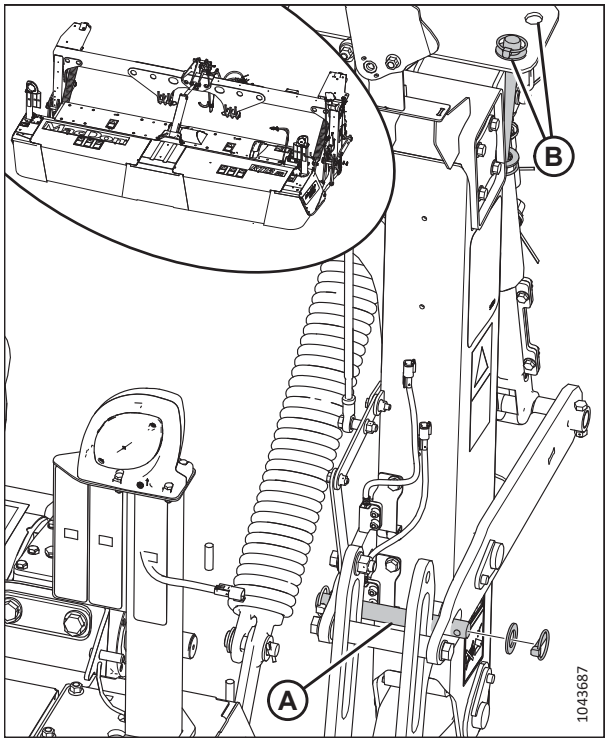


Figure 3.1: Auxiliary Lift Lock Pins – Left Side

3.1.2 Removing Auxiliary Lift Locking Pins

The auxiliary lift lock pins prevent the carrier frame from moving when the header is not attached to a tractor. Auxiliary lift lock pins must be removed before raising the header with a tractor.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Ensure that all bystanders have cleared the area.

1. Connect the tractor's 3-point hitch to the header. For instructions, refer to *3.7.1 Connecting the Tractor to the Rotary Disc Header, page 30*.

   IMPORTANT:

   Do **NOT** raise the header when the auxiliary lift lock pins are installed. Doing so engages the hydraulic lift cylinders and can damage the float system linkage.

2. Remove auxiliary lift lock straight pins (A) from holes in auxiliary lift linkage on both sides of the header. Store the auxiliary lift lock straight pins, washers, and Lynch pins in storage location (B) on the left side of the carrier frame.

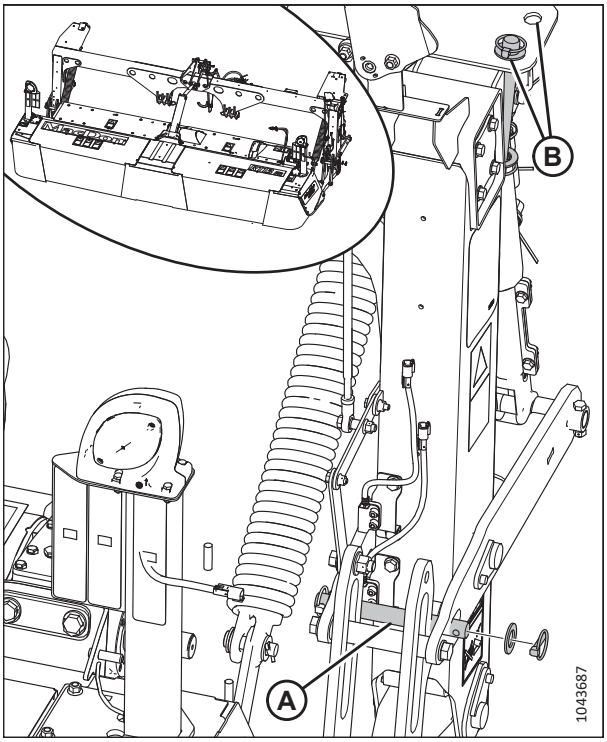


Figure 3.2: Auxiliary Lift Lock Pins – Left Side

3.2 Auxiliary Lift Cylinder Lock-Out Valves

To prevent unintended header movement, engage the auxiliary lift cylinder lock-out valves before disconnecting, servicing, or transporting your machine. The lock-out valves are located on the auxiliary lift cylinders at the back of the header.

3.2.1 Locking and Unlocking Auxiliary Lift Cylinders

The auxiliary lift cylinders provide additional lift range when raising the 3-point hitch.

Auxiliary lift cylinders at both ends of the header use a shut-off valve to prevent movement during transport, service, or when disconnecting from the tractor. When operating in the field, the shut-off valves must be open for header raise and lower functions to work correctly.

1. **To unlock auxiliary lift cylinder (A)**, rotate lock-out valve (B) parallel with the cylinder. Repeat for the lock-out valve on the opposite side.

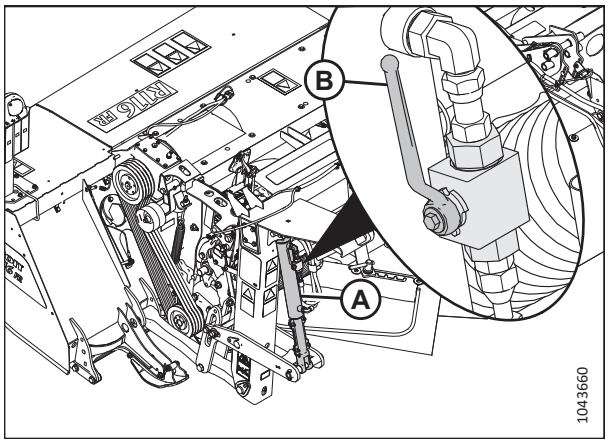


Figure 3.3: Auxiliary Lift Cylinders – Unlocked (Open)

2. **To lock auxiliary lift cylinder (A)**, rotate lock-out valve (B) perpendicular with the cylinder. Repeat for the lock-out valve on the opposite side.

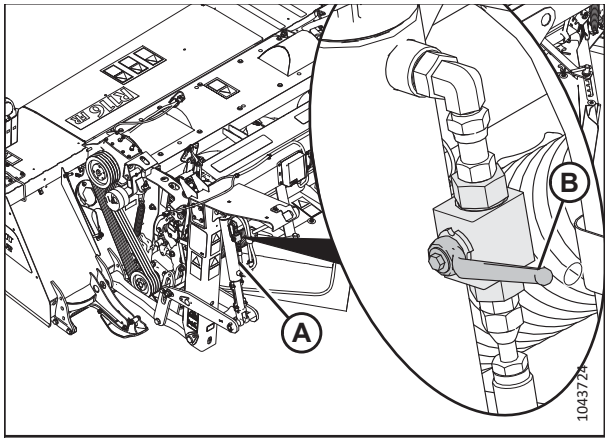


Figure 3.4: Auxiliary Lift Cylinders – Locked (Closed)

3.3 Driveshields

Driveshields offer protection from the rotating belts and drives. The header has two driveshields: one on the left side, and one on the right side.

3.3.1 Opening Driveshields

The driveshields offer protection for its sensitive components. Open them only when you intend to service the header.

DANGER

To prevent bodily injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before making adjustments to the machine.

WARNING

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations in this procedure show left driveshield (A); the right driveshield is similar.

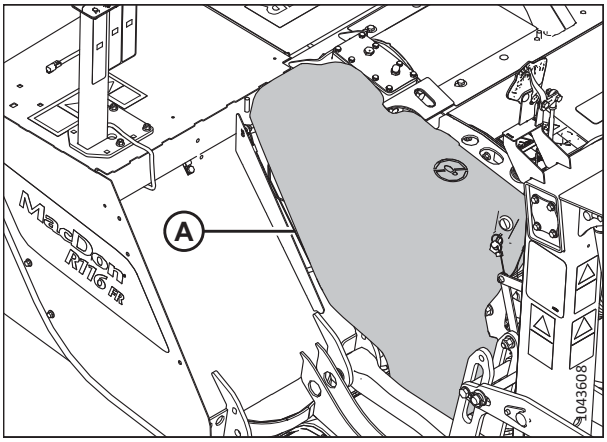


Figure 3.5: Left Driveshield

1. Shut down the engine, and remove the key from the ignition.
2. Remove lynch pin (A) and tool (B) from pin (C).

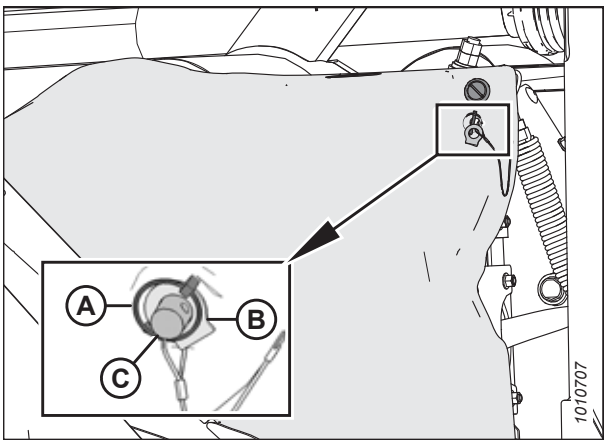


Figure 3.6: Left Driveshield

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

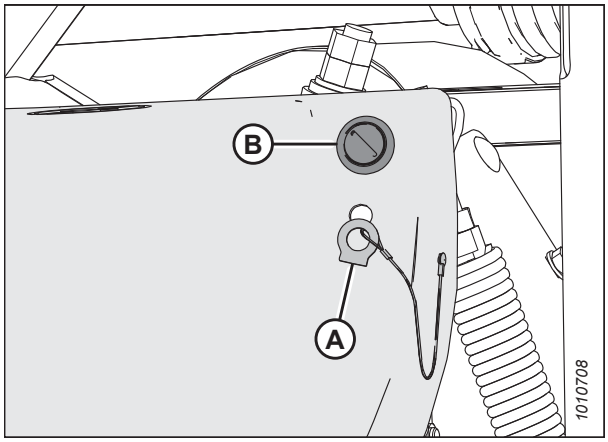


Figure 3.7: Driveshield Latch

4. Pull the top of driveshield (A) away from the header to open it.

   NOTE:

   For improved access, lift the driveshield off the pins at the base of the shield, and lay the shield on the header.

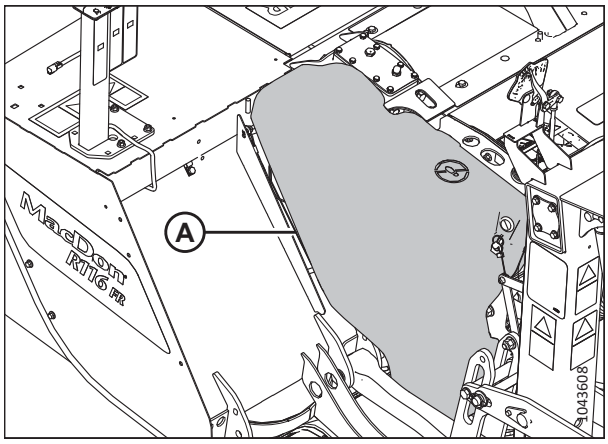


Figure 3.8: Left Driveshield

3.3.2 Closing Driveshields

Close the driveshields when your maintenance or repair tasks are complete.

WARNING

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown in this procedure apply to the left driveshield; the right driveshield is similar.

1. Position the driveshield onto the pins, if necessary.
2. Push driveshield (A) to engage latch (B).
3. Ensure that the driveshield is properly secured.

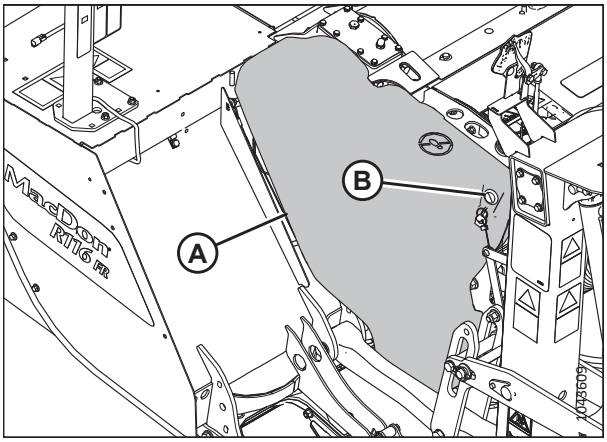


Figure 3.9: Left Driveshield

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

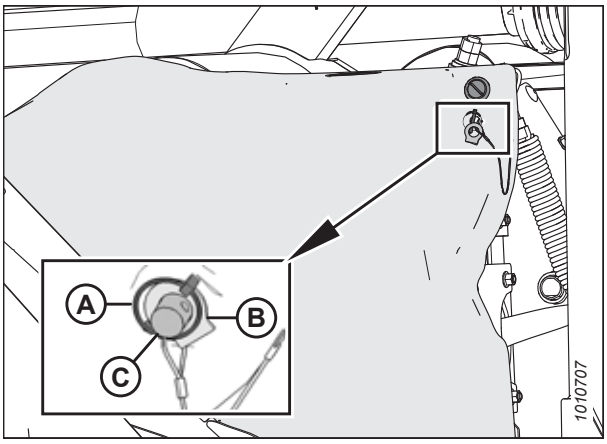


Figure 3.10: Left Driveshield

3.4 Cutterbar Doors

Two doors with rubber curtains provide access to the cutterbar area.

WARNING

To reduce the risk of personal injury and machine damage, do NOT operate the machine installed and in good condition. Objects in the path of the blades can be ejected with considerable force when the machine is started.

Curtains are attached to cutterbar doors (A), each front corner (B), and at center (C). Keep the curtains lowered when operating the rotary disc header.

IMPORTANT:

Replace the curtains if they become worn or damaged. For instructions, refer to *4.4.2 Maintaining Curtains, page 84*.

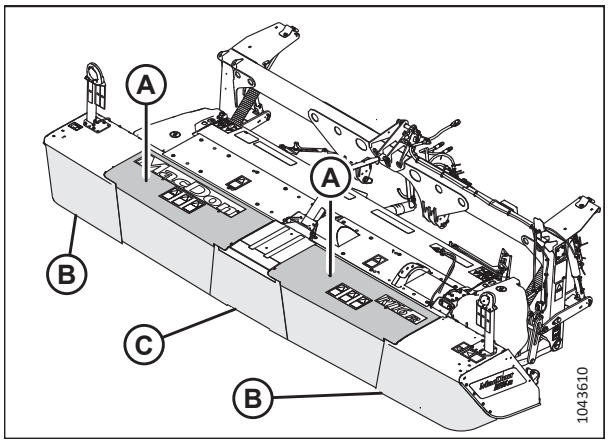


Figure 3.11: Cutterbar Doors and Curtains

3.4.1 Opening Cutterbar Doors

You will need to open the cutterbar doors to access the cutterbar.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

1. Shut down the engine, and remove the key from the ignition.
2. Lift up doors (A) at the front of the machine.

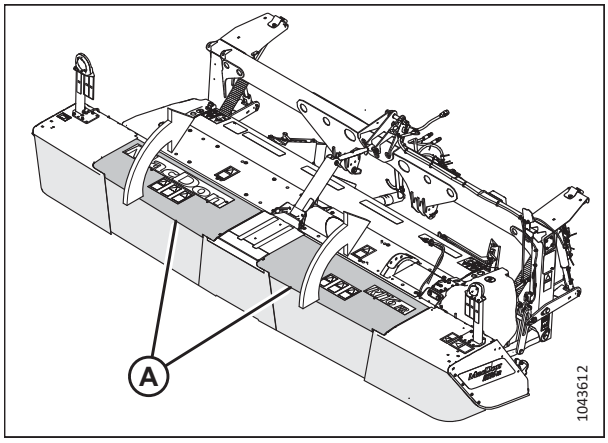


Figure 3.12: Cutterbar Doors and Curtains

3.4.2 Closing Cutterbar Doors

Do **NOT** operate the machine without closing the cutterbar doors.

CAUTION

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

1. Pull down on door (A) from the top to close.
2. Ensure that the curtains hang properly and completely enclose the cutterbar area.

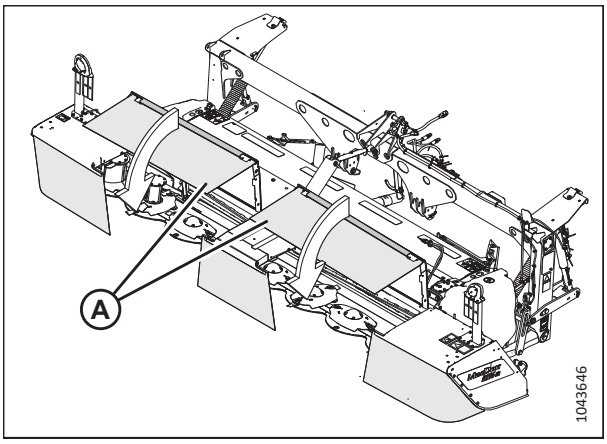


Figure 3.13: Cutterbar Doors and Curtains

3.5 Daily Start-Up Check

Perform this procedure before operating the machine.

CAUTION

- **Ensure that the tractor and the header are properly attached, all controls are in neutral, and the tractor brakes are engaged.**
- **Clear the area of bystanders, pets, etc. Keep children away from the machinery. Walk around the header confirm that no one is under, on, or close to it.**
- **Wear close-fitting clothing and protective shoes with slip-resistant soles. Have at hand any protective clothing and personal safety devices that MIGHT be necessary throughout the day. Don't take chances when it comes to safety.**
- **Remove any foreign objects from the machine. Clear any obstacles that might interfere with the operation of the machine.**

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

   NOTE:

   Use the proper procedure when searching for pressurized fluid leaks. For instructions, refer to *4.6.1 Checking Hydraulic Hoses and Lines, page 198*.

2. Clean all lights and reflective surfaces on the machine, and check the lights to ensure that they are operating correctly.
3. Perform all daily maintenance procedures. For instructions, refer to *4.3.1 Maintenance Schedule/Record, page 72*.

3.6 Preparing Tractor for Rotary Disc Header

To attach the rotary disc header to a tractor, the tractor must meet the power and hydraulic requirements.

3.6.1 Tractor Requirements

The tractor used to run the rotary disc header must meet the requirements outlined in the table.

Table 3.1 Tractor Requirements

Model Number	Minimum Power	Minimum Hydraulics	Electrical Supply	Hitch
R113 FR	75 kW (100 hp)	Front remote[2] 13.7 MPa (2000 psi)	12 V, 7-pin	3-point type 2, 3, or 3N; 1815 Kg (4000 lbs) capacity
R116 FR	93 kW (125 hp)	Front remote[2] 13.7 MPa (2000 psi)	12 V, 7-pin	3-point type 2, 3, or 3N; 1815 Kg (4000 lbs) capacity

NOTE:

The hydraulic flow control for the tractor's front hydraulic circuit should be set to 10–20 %. For instructions, refer to the tractor operator's manual.

2. Two channels required for optional hydraulic center link.

3.7 Attaching Rotary Disc Header to Tractor

The rotary disc header can be attached to the tractor with a 3-point hitch.

3.7.1 Connecting the Tractor to the Rotary Disc Header

Connecting the header to the tractor involves connecting the hydraulic and electrical systems. The R1 FR Series can attach to 3-point hitch categories 2, 3, and 3N.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Ensure that all bystanders have cleared the area.

1. Ensure the machine is set on a flat level surface.
2. Connect your tractor's 3-point hitch to the following locations on the header frame according to the hitch type.
   - Category 3: connect to upper linkage (A) and lower linkages (D).
   - Category 3N: connect to upper linkage (A) and lower linkages (C).
   - Category 2: connect upper linkage (B) and lower linkages (C).

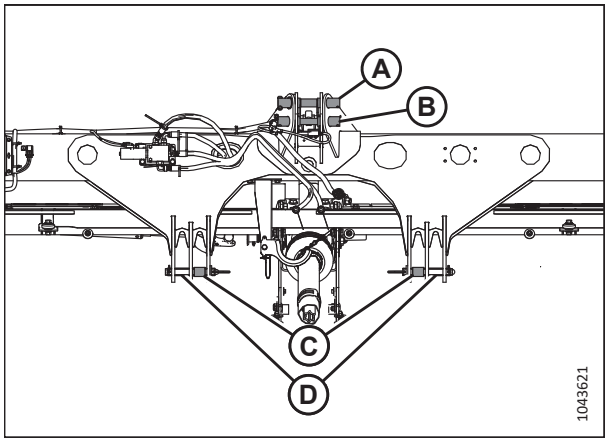


Figure 3.14: Front Linkage Connections

3. Attach 3-point hitch (A) to carrier frame linkage (B). Refer to your tractor hitch instructions to properly secure the connections.
4. Lower the header fully.
5. Shut down the engine, and remove the key from the ignition.

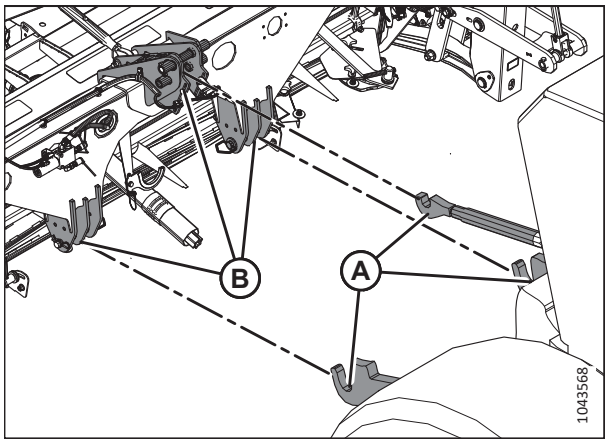


Figure 3.15: Alignment with Header Carrier Frame

6. Remove auxiliary lift lock straight pins (A) from holes in lift linkage on both sides of the header. Store the auxiliary lift lock straight pins, washers, and Lynch pins in storage location (B) on the left side of the carrier frame.

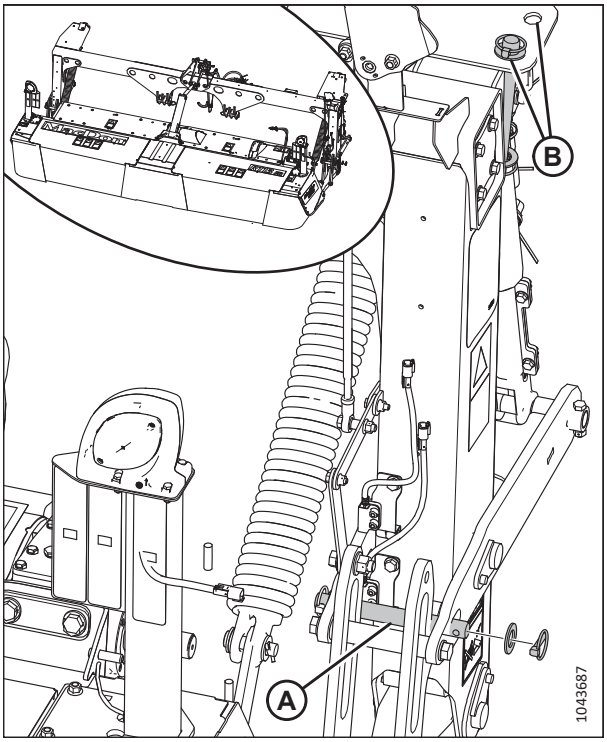
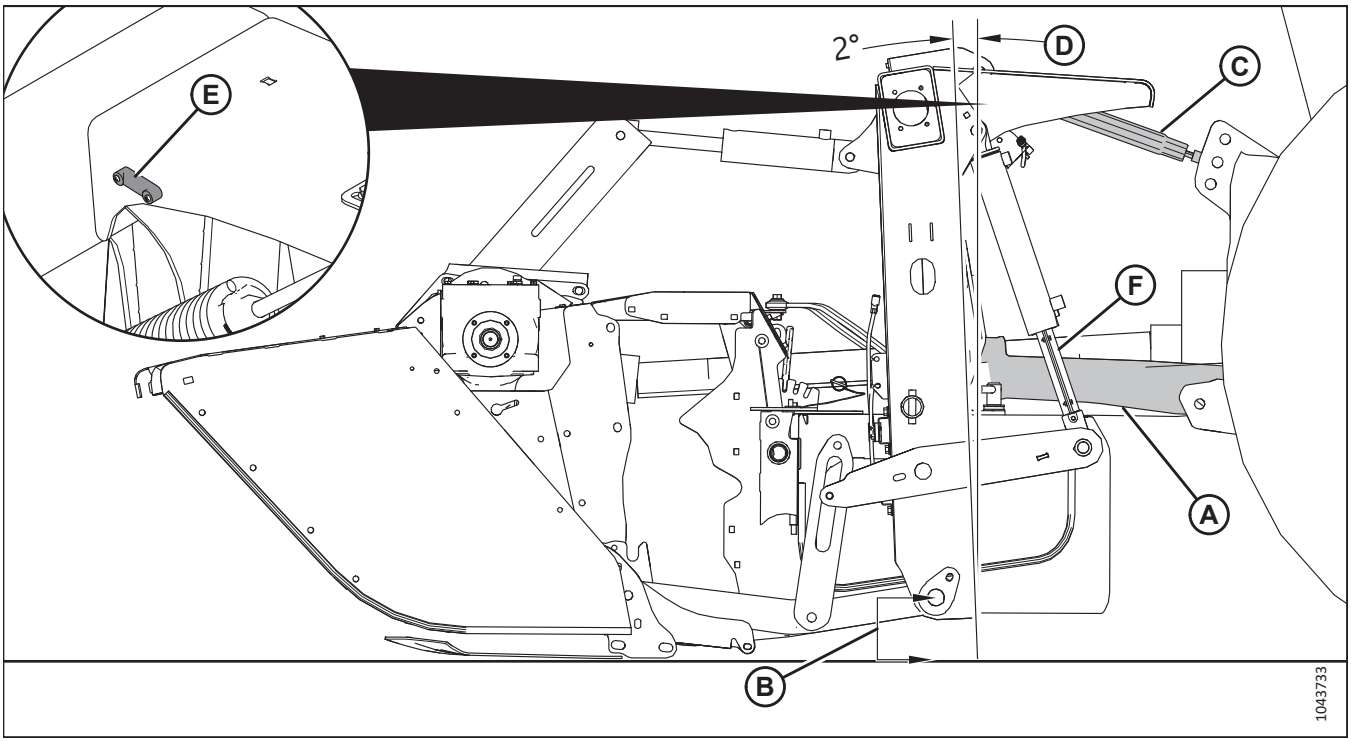


Figure 3.16: Auxiliary Lift Lock Pins – Left Side

Figure 3.17: Alignment with Header Carrier Frame



7. Adjust lower link arms (A) on the 3-point hitch until dimension (B) between the bottom of the carrier frame and the ground is 184 mm (7.25 in).

NOTE:

The lift assist cylinders must be lowered onto downstops (F) before aligning the carrier frame.

8. Adjust the length of top link (C) on the 3-point hitch until carrier frame angle (D) is approximately 2° forward. Use bubble level (E), located on the right side of the carrier frame to set the angle.

9. Position the driveline onto the tractor's PTO shaft.

10. Pull back collar (A) on the driveline and push the driveline onto the PTO shaft until it locks. Release the collar.

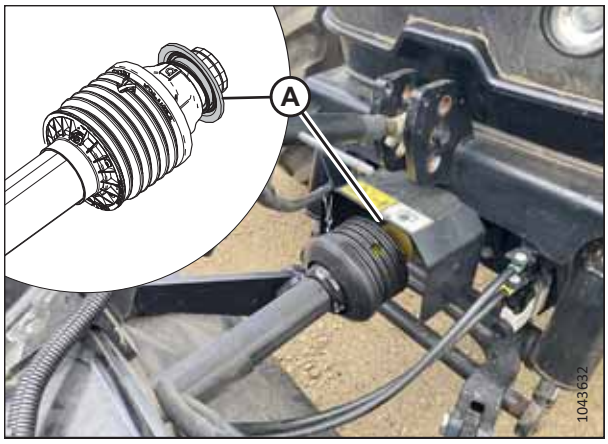


Figure 3.18: Tractor Front PTO Connection

11. Locate pressure and return hoses (A):
    - Pressure (yellow tie)
    - Return (green tie)

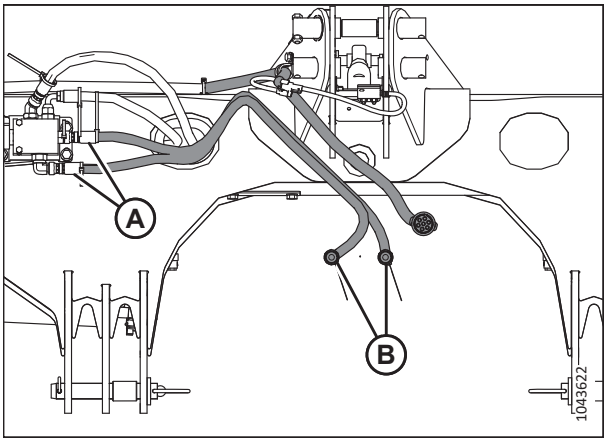


Figure 3.19: Hydraulic Control Hoses

12. Connect pressure hose (A) (yellow tie) and return hose (B) (green tie) to the tractor's front selective control valve.

    NOTE:

    Ensure the hoses are connected to the same remote set.

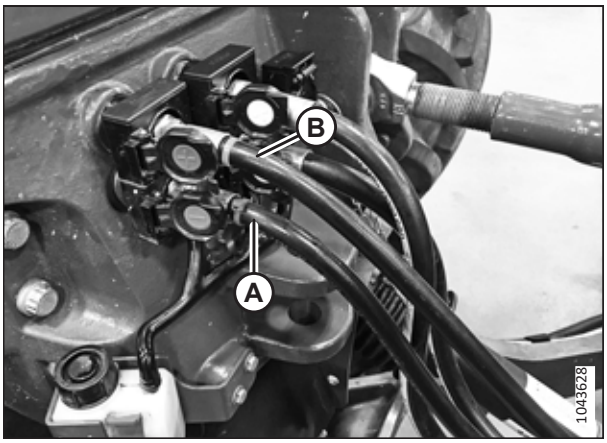


Figure 3.20: Hydraulic Connections

13. Connect the 7-pin electrical connector (A) on the header to the tractor's front electrical plug.
14. Set the tractor's front hydraulic channel to ON, and adjust flow to 15–20 %. For instructions, refer to the tractor operator's manual.

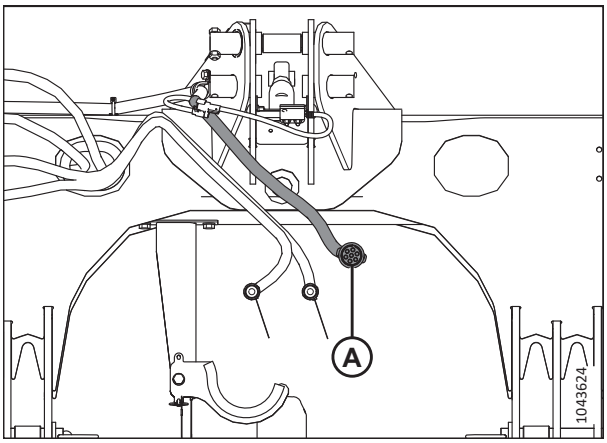


Figure 3.21: Header Electrical Harness

3.8 Detaching Rotary Disc Header from Tractor

Detach the rotary disc header from the tractor for servicing or storing.

3.8.1 Disconnecting the Tractor from Rotary Disc Header

The following procedure explains how to disconnect the tractor from the rotary disc header.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, stop the engine, remove the key and engage the lift cylinder stops before going under the machine for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Park the machine on a flat, level surface.
2. Shut down the engine, and remove the key from the ignition.
3. Place blocks under each end, or just inside each end, of the cutterbar.
4. Lower the header onto blocks.
5. Ensure the auxiliary lift cylinders are fully retracted.
6. Shut down the engine, and remove the key from the ignition.
7. Turn the auxiliary lift cylinder lock-out valves to the closed position. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
8. Retrieve the lift lock straight pins, washers, and Lynch pins from storage location (B) on the left side of the carrier frame, and install the straight pins into the holes (A) in lift linkage on both sides of the header.
9. Secure the straight pins with washers, and Lynch pins (2 per pin) on both sides of the header carrier frame.

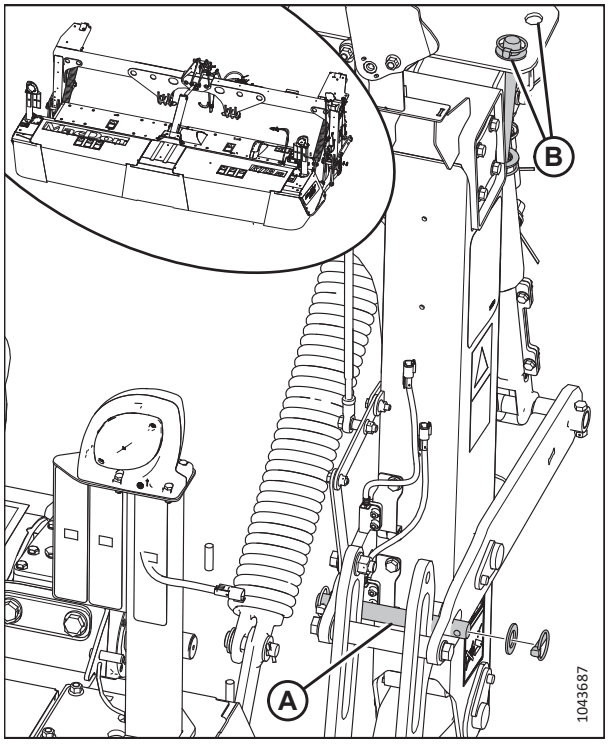


Figure 3.22: Auxiliary Lift Lock Pins – Left Side

10. Disconnect pressure hose (A) (yellow tie) and return hose (B) (green tie) from the tractor's front selective control valve and store hoses on the header.

    IMPORTANT:

    Install caps and plugs on open hydraulic hoses and lines to prevent buildup of dirt and debris while in storage.

11. Disconnect the header power plug from the tractor's 7-pin outlet, and store the power cable on the header.

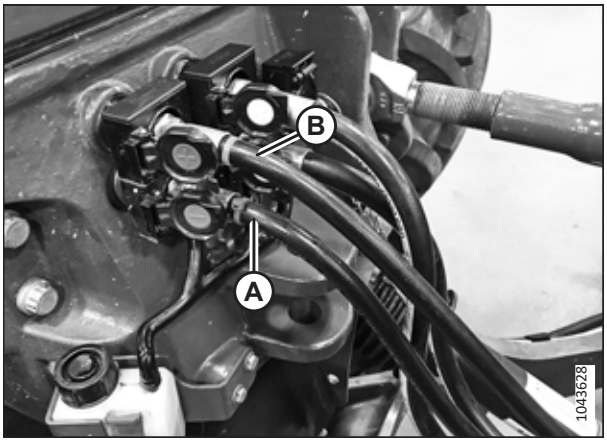


Figure 3.23: Hydraulic Connections

12. Disconnect the power take-off (PTO) driveline chain from the tractor.
13. Pull back on collar (A) and pull the driveline off the tractor's PTO shaft.

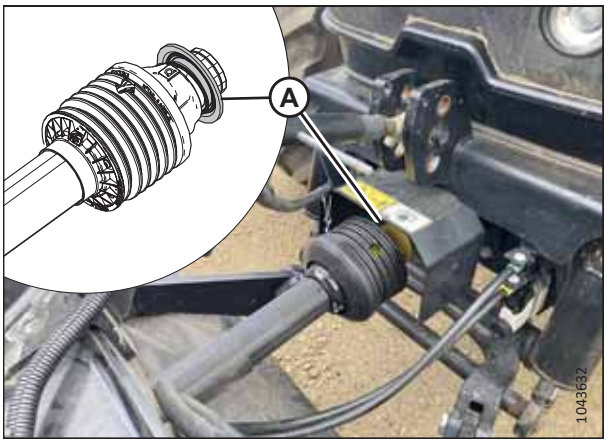


Figure 3.24: Tractor Front PTO Connection

14. Set the PTO driveline (A) on storage bracket and secure the driveline with chain and Lynch pin (B).

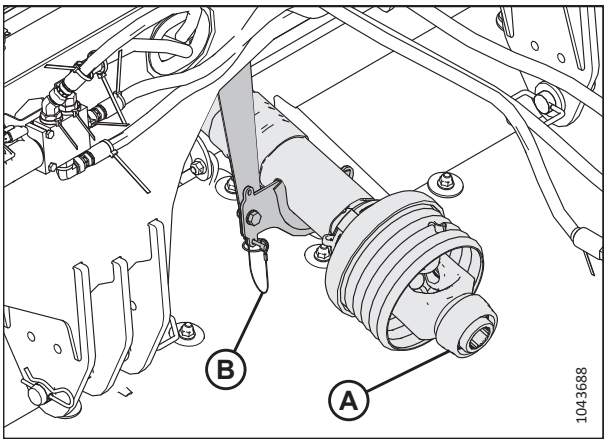


Figure 3.25: PTO Storage

15. Disconnect 3-point hitch (A) from carrier frame linkage (B). Ensure all clevis and hair pins are stored securely on the header frame.

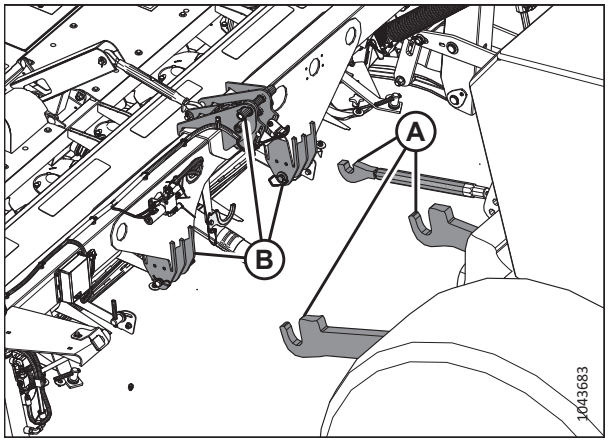


Figure 3.26: Tractor Alignment with Header Carrier Frame

3.9 Breaking in Rotary Disc Header

After attaching the rotary disc header to the tractor for the first time, operate the machine at low speed for 5 minutes while watching and listening **FROM THE OPERATOR'S SEAT** for binding or interfering parts.

DANGER

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

IMPORTANT:

Be especially alert until you become familiar with the sound and feel of your new rotary disc header.

Refer to *4.3.2 Break-in Inspections, page 74* to determine the service interval for your header, and complete the scheduled break-in inspection procedures.

3.10 Engaging Power Take-Off

The power take-off transfers power from the tractor to the rotary disc header.

DANGER

Ensure that all bystanders are clear of the machine before engaging the power take-off (PTO). Never leave tractor seat with the PTO engaged.

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

3.11 Shutdown Procedure

Follow all the safety procedure and operational instructions given in this manual and in your tractor operator's manual.

DANGER

Before leaving the tractor seat for any reason:

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

3.12 Transporting Rotary Disc Header

You can transport the rotary disc header using a tractor.

CAUTION

- **Obey all highway traffic regulations in your area when transporting on public roads. Use flashing amber lights unless prohibited by law.**
- **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 32 km/h (20 mph). Reduce speed for corners and slippery conditions.**
- **Use tractor lights and rotary disc header flashing amber lights when transporting on roads in order to provide adequate warning to operators of other vehicles.**
- **Do NOT transport the rotary disc header on a road or highway at night or in reduced visibility conditions such as rain or fog.**
- **Do NOT transport with any highway-capable vehicle. Use only an agricultural tractor with a sufficient weight such that the fully loaded implement weighs no more than 1.5 times the weight of the tractor.**

3.12.1 Transport Lighting

Light assemblies provide position, hazard, and turning direction information.

3.13 Operating Rotary Disc Header

Operating the rotary disc header properly, results in less crop lost and increased productivity during harvest. This includes making proper adjustments while operating the machine to suit various crops and harvest conditions. Regular maintenance and operating the machine safely and properly increases the machine's length of service.

The variables listed in Table *3.2, page 41* and detailed on the following pages will affect the performance of your rotary disc header. 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, settings can be changed to suit your crop conditions.

Table 3.2 Rotary Disc Header Performance Variables

Variable	Refer to
Float	*3.13.2 Float, page 43*
Cutterbar angle	*3.13.4 Cutterbar Angle, page 48*
Cutting height	*3.13.3 Cutting Height, page 46*
Ground speed	*3.13.5 Ground Speed, page 49*
Conditioning: roll type	*3.14 Roll Conditioner, page 55*

3.13.1 Raising and Lowering Rotary Disc Header

The rotary disc header can be raised or lowered to clear obstacles, for maintenance, or for storage and transport.

Header Raise / Lower – Auxiliary Lift System

The auxiliary lift system uses position sensors, an electronically controlled valve, and hydraulic cylinders to automatically adjust the header position when the Operator adjusts header raise/lower position with the 3-point hitch.

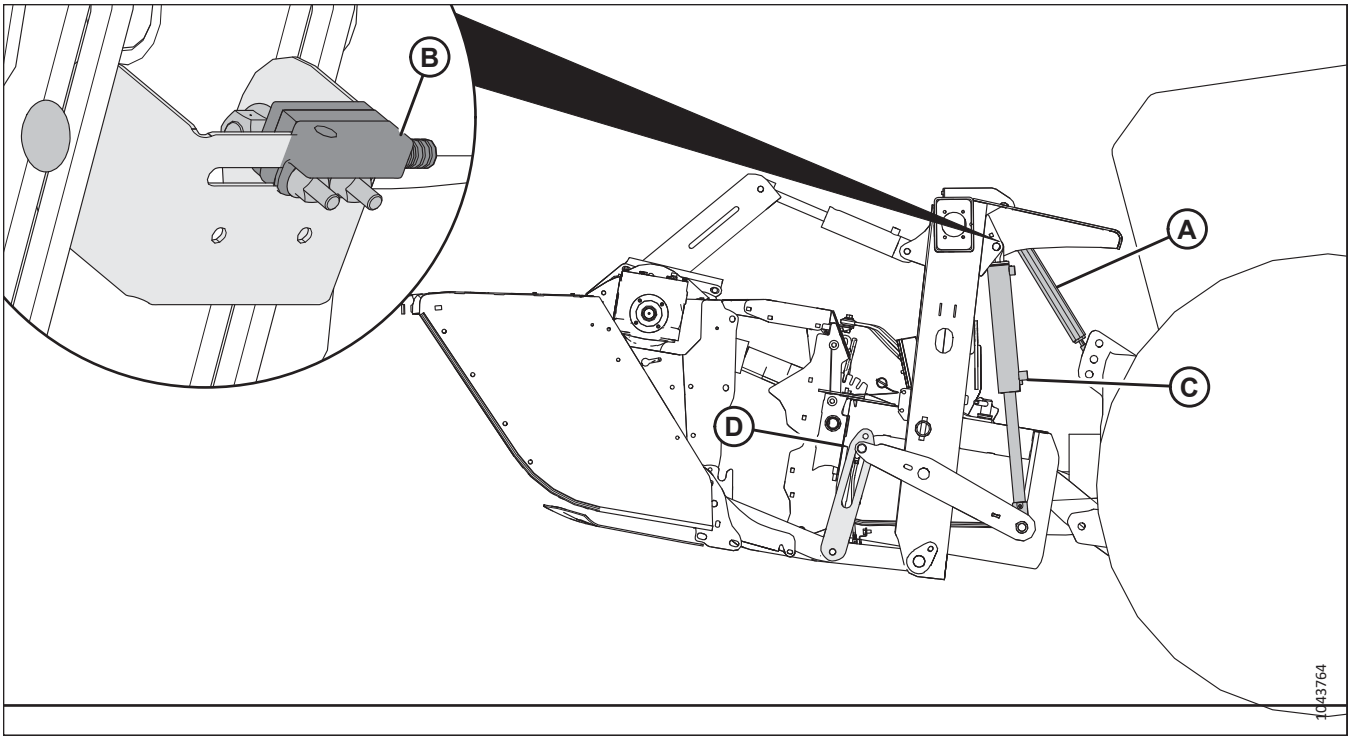
DANGER

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

DANGER

Ensure that all bystanders have cleared the area.

Figure 3.27: R1 FR – Fully Raised Position



When the 3-point hitch is fully raised, top link (A) moves to within 1–3 mm (1/32–1/8 in.) of upper proximity sensor (B) (inset); the hydraulic system extends auxiliary lift cylinders (C) to lift linkage (D). The header will raise to clear obstacles and windrows during field operation, and provide positioning options for maintenance, storage, or transport. The extended cylinders also reduce pressure on the float springs.

NOTE:

For the auxiliary lift system to function, the tractor's front hydraulic circuit must be ON, and the hydraulic flow rate adjusted to 15–20 %. For instructions, refer to the tractor operator's manual.

To raise or lower the 3-point hitch, activate cylinder control lever (A) as follows:

- Move the lever **FORWARD** to position (B) to lower the header.
- Move the lever **BACKWARD** to position (C) to raise the header.

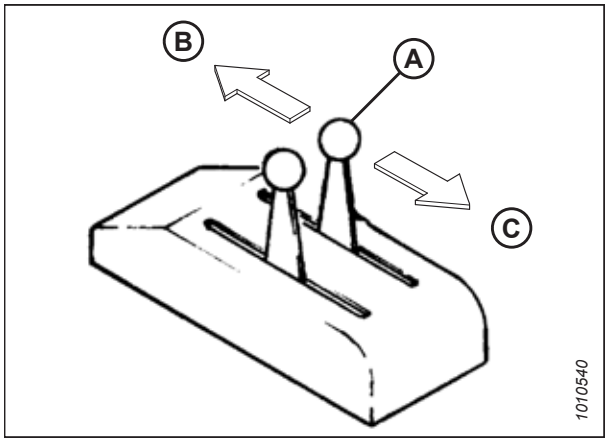


Figure 3.28: Tractor Control Lever

3.13.2 Float

Float springs are normally set so a weight of approximately 43–47 kg (95–105 lb.) is required to lift either end of the rotary disc header.

From the tractor's operator position, pointer (A) provides a visible indicator of the ground pressure communicated through rod (B).

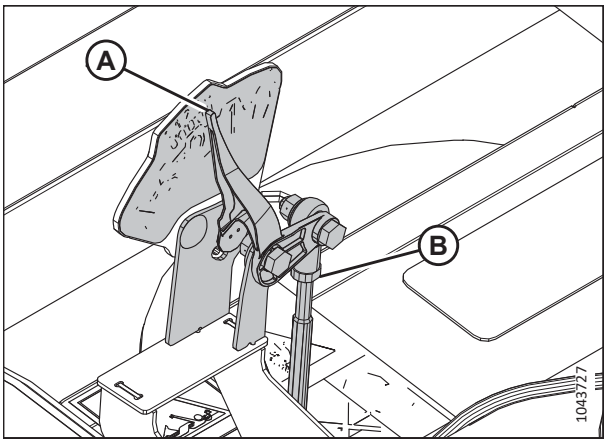


Figure 3.29: Float Indicator – Left Side

When calibrated properly, the float indicator pointer will react to ground pressure as follows:

- **Pointer centered on number 2 (A):** header on level ground in cutting position, normal ground pressure
- **Pointer above number 2:** header on ground, increased ground pressure
- **Pointer below number 2:** header off the ground, decreased ground pressure

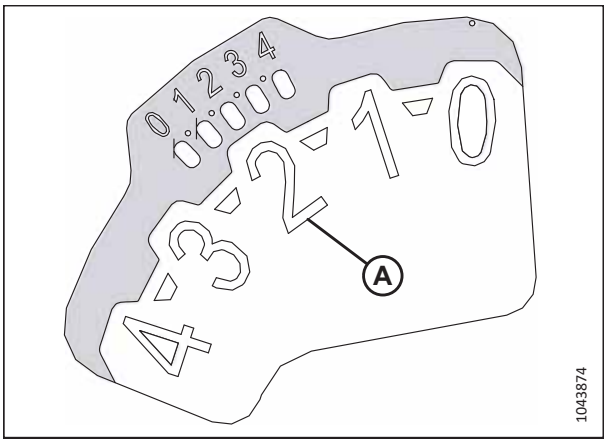


Figure 3.30: Float Indicator

Adjusting Float

The float setting (or lifting force) changes depending on the conditioner type and options. The setting must be the same at both ends of the rotary disc header.

DANGER

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

DANGER

Ensure that all bystanders have cleared the area.

NOTE:

Changing the rotary disc header's operating position can affect the float settings. After adjusting the cutting height or the cutterbar angle, check the float and adjust as necessary.

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Close the rotary disc header's auxiliary lift cylinder lock-out valve (A) on each lift cylinder by turning the handle to the horizontal position (90° to the hose). Repeat this step on the opposite side.

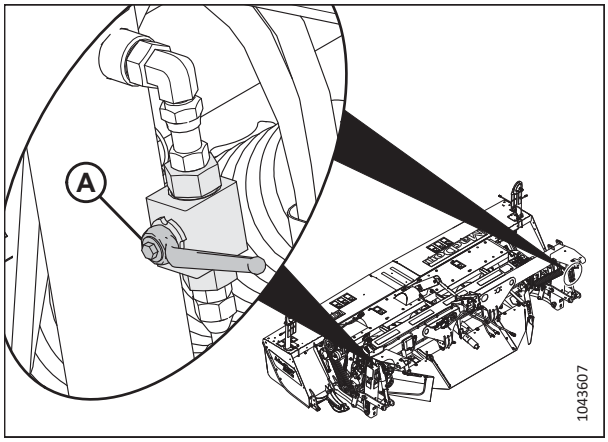


Figure 3.31: Cylinder Lock-Out Valve – Closed Position

4. Loosen retaining bolt (A) and rotate cover plate (B) away from float spring bolt (C). Repeat this step on the opposite side.
5. Fully loosen float spring bolt (C). Repeat on opposite side.

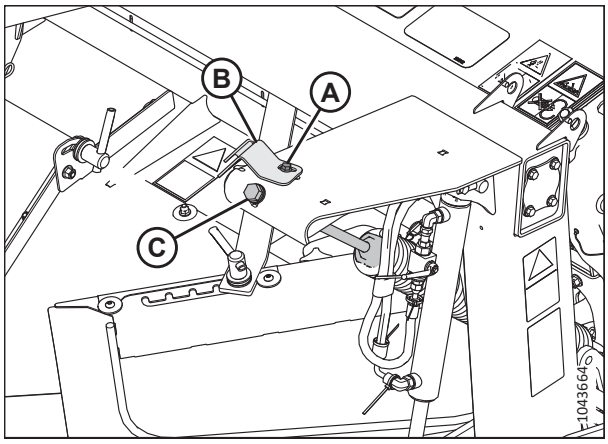


Figure 3.32: Float Spring – Right Side

6. Turn adjuster bolt (A) to achieve the recommended measurement (B) for the conditioner type. Refer to Table *3.3, page 45* for measurements.

   NOTE:

   Float settings indicated in the table are starting points. Float force should be checked with header float and cutting angle set as planned for use in the field.

   - Turn bolt (A) clockwise (towards the spring) to increase float.
   - Turn bolt (A) counterclockwise (away from the spring) to decrease float.

   Repeat this step on the opposite side.

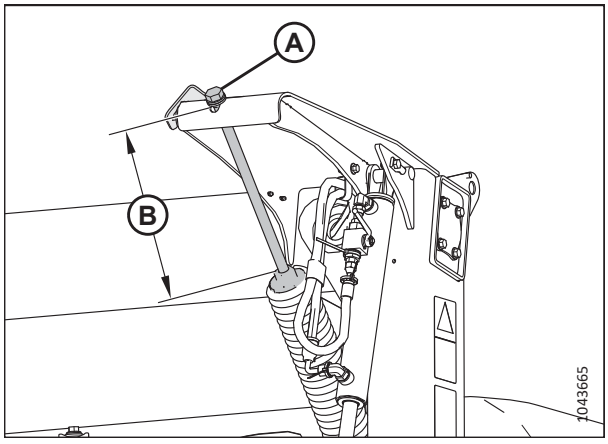


Figure 3.33: Adjuster Bolt

Table 3.3 Float Setting Starting Point

Model	Conditioner Type	Length of Exposed Thread
R113 FR	Roll	120–130 mm (4 3/4–5 1/8 in.)
R116 FR	Roll	70–80 mm (2 3/4–3 1/8 in.)

7. Reposition cover plate (A) over the float spring adjuster bolt as shown. Secure cover plate (A) by tightening bolt (B). Repeat this step on the opposite side.

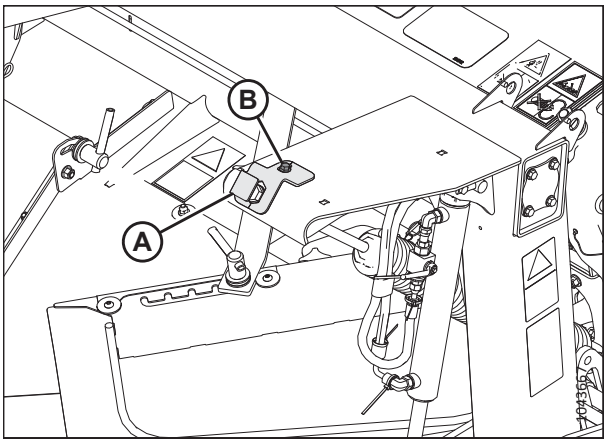


Figure 3.34: Adjuster Bolt Cover Plate

8. Open auxiliary lift cylinder lock-out valve (A) on each cylinder by turning the handle to the open position (in line with the hose).

9. Lower the rotary disc header to cutting position, grasp the front corner of the header, and lift; the weight should feel approximately like 45 kg (100 lb.) at both ends.

   NOTE:

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

   NOTE:

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

10. Repeat the adjustment procedures until the desired weight is achieved at both ends of the header.

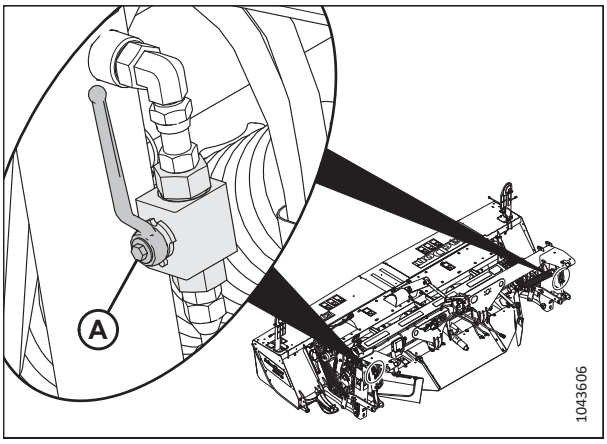


Figure 3.35: Lock-Out Valve – Open Position

11. With the header on level ground in cutting position, calibrate float indicator (A) by loosening jam nut (B), and turning the adjustable rod until the needle is centered on the number “2”.

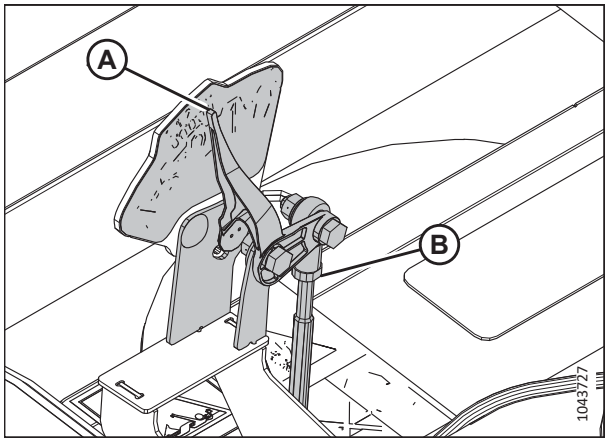


Figure 3.36: Float Indicator – Left Side

3.13.3 Cutting Height

The cutting height is determined by a combination of the cutterbar angle and the skid shoe settings. Adjust the cutting height for optimum cutting performance while preventing the excessive build-up of mud and soil inside the rotary disc header, which can lead to poor crop flow and increased wear on cutting components.

Lowering the skid shoes and decreasing the cutterbar angle increases the cutting height, resulting in higher stubble 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 the cutterbar angle decreases the cutting height, resulting in a shorter stubble. For instructions, refer to *Adjusting Cutting Height, page 46*.

To choose a cutterbar angle that maximizes performance for your crop and field conditions, refer to *3.13.4 Cutterbar Angle, page 48*.

To minimize cutterbar damage, scooping soil, and soil build-up at the cutterbar in damp conditions, the float should be set as light as possible without causing excessive bouncing. For instructions, refer to *Adjusting Float, page 43*.

Adjusting Cutting Height

Lowering the skid shoes and decreasing the cutterbar angle increases the cutting height, resulting in taller stubble that helps material dry faster. Raising the skid shoes and increasing the cutterbar angle decreases the cutting height, resulting in shorter stubble.

DANGER

Ensure that all bystanders have cleared the area.

NOTE:

There are two skid shoes on the R113 FR and four on the R116 FR.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Loosen bolts (C).
5. Remove bolts, nuts, and washers (D).
6. Raise or lower the skid shoe.

   NOTE:

   Skid shoes have two adjustment settings: fully raised (A) and fully lowered (B).
7. Install bolts, nuts, and washers (D).
8. Tighten bolts (C).
9. Adjust the cutterbar angle to the desired working position. If the angle is not critical, set it to the mid-position. For instructions, refer to *3.13.4 Cutterbar Angle, page 48*.
10. Check the header float. For instructions, refer to *Adjusting Float, page 43*.

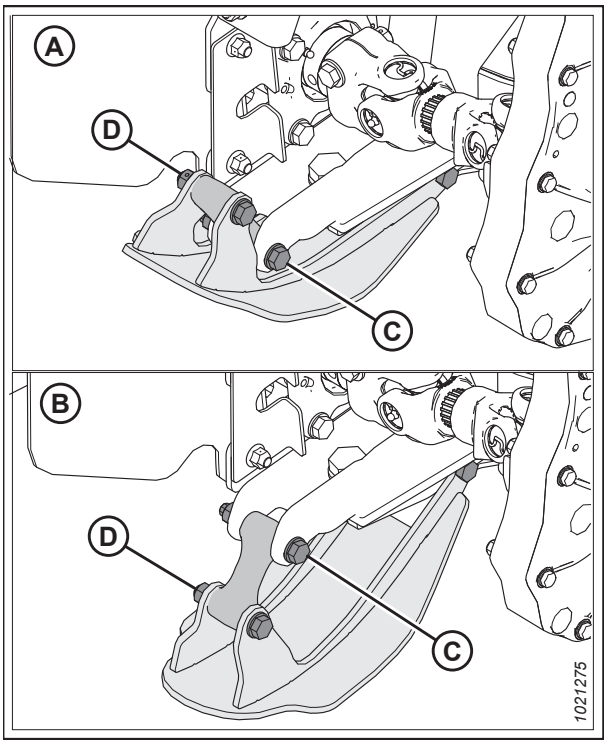


Figure 3.37: Skid Shoes – R113 FR

3.13.4 Cutterbar Angle

The cutterbar angle (sometimes called header angle) is the angle at which the cutterbar approaches the crop relative to the ground. It is one of the variables that impact the cutting height and quality.

Cutterbar angle (A) adjustment ranges from 0° to 7° below the horizontal plane. Choose an angle that maximizes the performance for your crop and field conditions. A flatter angle provides better clearance in stony conditions, whereas a steeper angle is required in lodged crops for better lifting action.

Check the float after significantly adjusting the cutterbar angle. Adjusting the cutterbar angle affects the header float, because the header's center of gravity shifts when the cutterbar angle is changed.

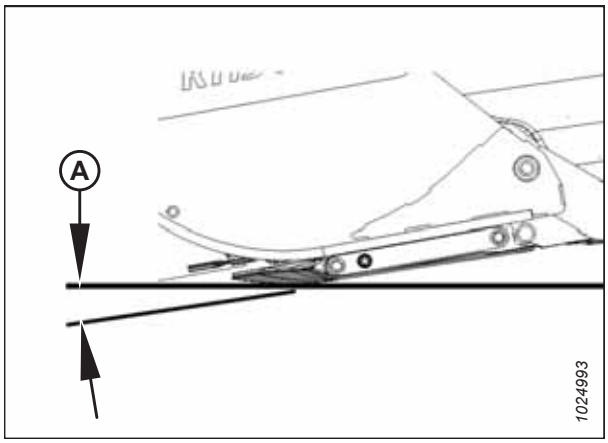


Figure 3.38: Cutterbar Angle

Adjusting Cutterbar Angle – Mechanical Center-Link

Cutterbar angle is one of the settings that affects cutting height. On machines equipped with mechanical center-links, you can adjust the cutterbar angle manually.

To adjust the cutterbar angle on a machine with a mechanical center-link, follow these steps:

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Loosen nut (A).
4. Decrease (flatten) cutterbar angle by rotating turnbuckle sleeve (B) to decrease the turnbuckle length.
5. Increase (steepen) cutterbar angle by rotating turnbuckle sleeve (B) to increase the turnbuckle length.
6. Tighten nut (A) but do **NOT** overtighten. A slight tap with a small hammer is sufficient.
7. Check cutting height and adjust if required.
8. Check the float and adjust if required. For adjustment instructions, refer to *Adjusting Float, page 43*.

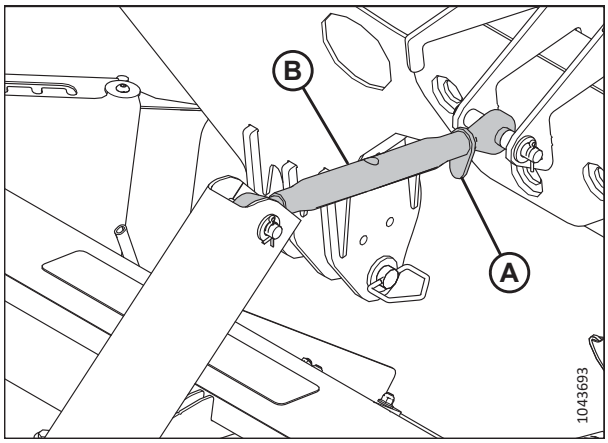


Figure 3.39: Mechanical Center-Link

Adjusting Cutterbar Angle – Optional Hydraulic Center-Link

Cutterbar angle is one of the settings that affects cutting height. On machines equipped with the optional hydraulic center-link, you can adjust the cutterbar angle from the tractor cab.

To adjust the cutterbar angle on a machine equipped with a hydraulic center-link, follow these steps:

NOTE:

The cutterbar angle can be adjusted from the tractor without shutting down the header.

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Lower the header fully.
3. Decrease (flatten) the cutterbar angle by operating the tractor hydraulic control so that cylinder (A) retracts
4. Increase (steepen) the cutterbar angle by operating the tractor hydraulic control so that cylinder (A) extends.

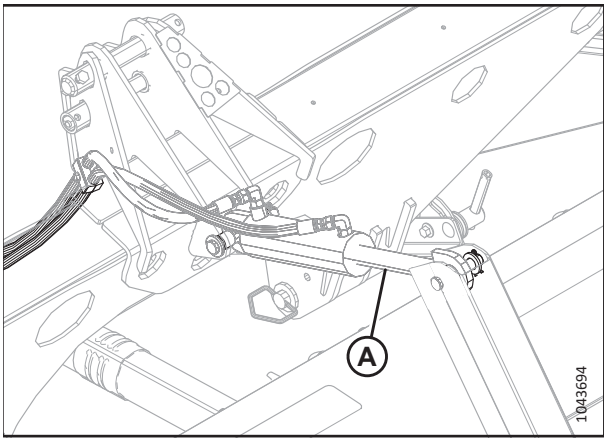


Figure 3.40: Hydraulic Center-Link

3.13.5 Ground Speed

Choose a ground speed that allows the cutterbar to cut the crop smoothly and evenly. Try different combinations of disc speed and ground speed to suit your specific crop.

CAUTION

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

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

In light crops, reduce the disc speed while maintaining the same ground speed.

NOTE:

Refer to your tractor operator's manual for instructions on changing ground speed.

NOTE:

Operating the header at the minimum disc speed will extend the service life of the cutting components.

The example shown in Figure *3.41, page 50* illustrates the relationship between ground speed and cut area for R113 and R116 rotary disc headers. The chart demonstrates that a ground speed of 21 km/h (13 mph) would produce a cut area of approximately 8 hectares (20 acres) per hour.

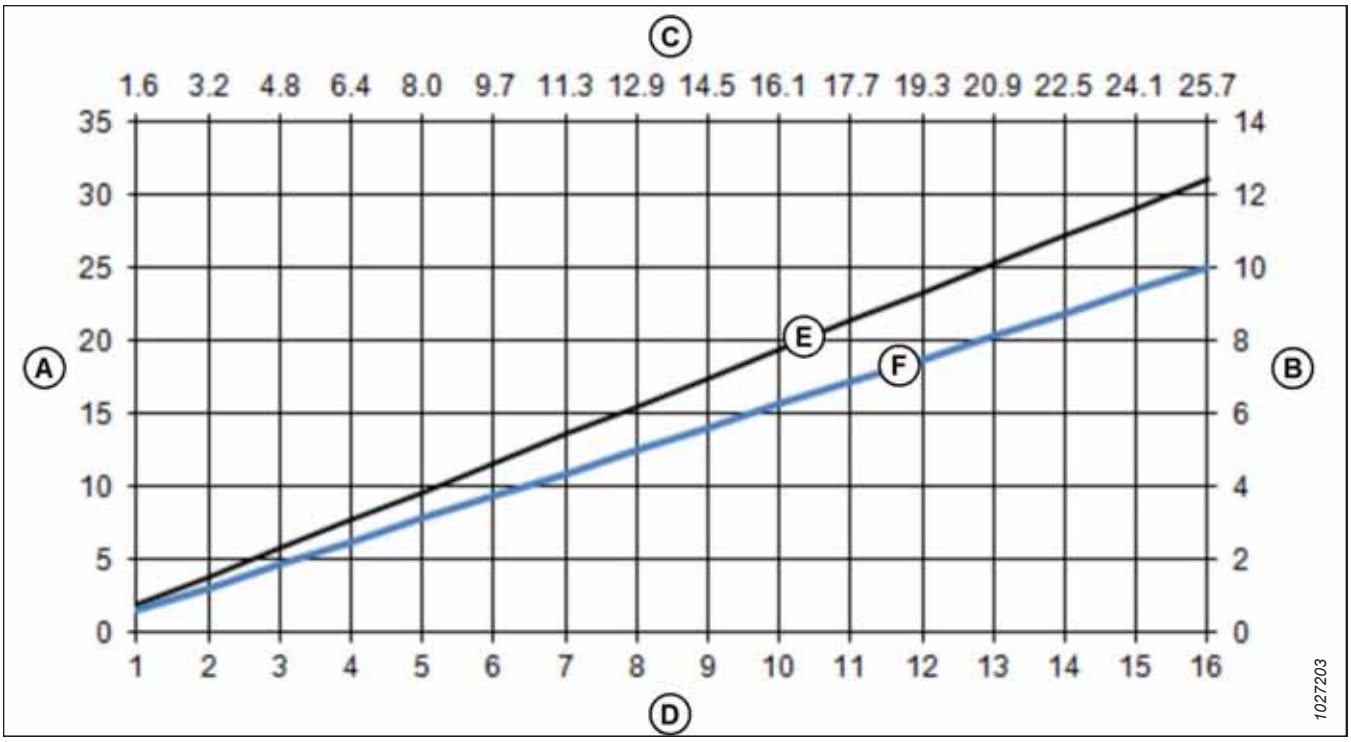


Figure 3.41: Ground Speed for R113 and R116 Rotary Disc Headers

A - Acres/Hour **B - Hectares/Hour** **C - Kilometers/Hour** **D - Miles/Hour**
E - R116 FR **F - R113 FR**

3.13.6 Cutterbar Deflectors

A two-piece cutterbar deflector is attached to the cutterbar just below the conditioner rolls. Deflectors provide improved feeding into the conditioner rolls and prevent long-stemmed crop from feeding under the rolls.

Cutterbar deflectors may not be well-suited for some types of crops and certain field conditions. Refer to the following table:

Table 3.4 Conditions for Using Cutterbar Deflectors

Crop/Field Condition	Use Deflector
Average crop/normal field conditions	No
Long-stemmed and heavy/normal field conditions	Yes
Long-stemmed and heavy/sandy soil	No
Long-stemmed and heavy/gopher mounds or rocks[3]	No

3. Removing the deflector helps feed dirt/rocks through the header and prevents debris buildup, wear and damage from rocks.

Removing Cutterbar Deflectors

When cutting a short-stemmed crop in normal field conditions, the cutterbar deflectors may not be necessary and can be removed.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Locate deflector (A) behind the cutterbar.
5. Clean debris from the deflector area.
6. Remove and retain bolt (B) securing the outboard end of the deflector to the cutterbar.
7. On the left side of the cutterbar, remove and retain three bolts (C).
8. Repeat Step *7, page 51* on the right side.
9. Remove cutterbar deflector (A).
10. If the cutterbar is being replaced, install the deflectors on the new cutterbar. For instructions, refer to *Installing Cutterbar Deflectors, page 52*.

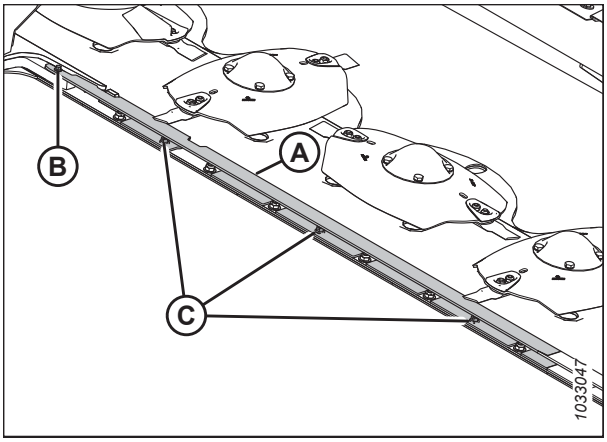


Figure 3.42: Cutterbar Deflector – Left Side

Installing Cutterbar Deflectors

When cutting long-stemmed crops in certain field conditions, installing cutterbar deflectors is recommended.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Clean any debris from the ledge and the six mounting holes along the aft edge of the cutterbar.
5. Position left deflector (A) on the back edge of the cutterbar, and align the slots in the deflector with the existing fasteners and cutterbar plug.
6. Secure the outboard end of the deflector to the cutterbar using M8 x 20 mm hex flange bolt (B). Apply medium-strength threadlocker (Loctite® 243 or equivalent) to the bolt threads.
7. To secure the left cutterbar deflector, install three button socket head M10 bolts and lock nuts (C). The bolts are inserted into the cutterbar from the bottom.
8. Tighten bolts (C) to 54 Nm (40 lbf·ft).
9. Tighten bolt (B) to 29 Nm (21 lbf·ft [257 lbf·in]).
10. Repeat Steps *4, page 52* to *9, page 52* to secure the right cutterbar deflector.

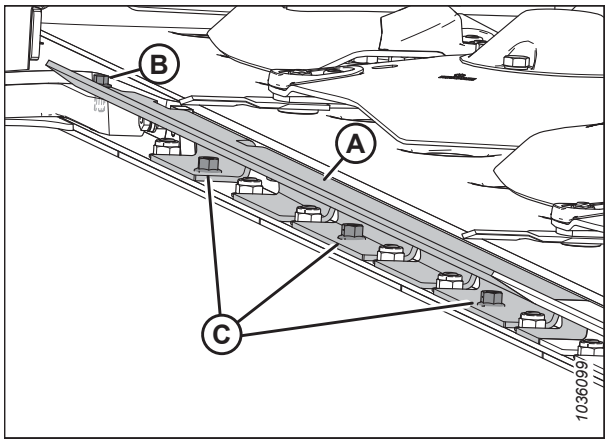


Figure 3.43: Cutterbar Deflector – Left Side

3.13.7 Tall Crop Divider Option

Tall crop dividers (one on each end of the header) help divide tall crops cleanly, and improve crop flow to the cutterbar. Tall crop dividers are not adjustable, but they are removable.

Installing Tall Crop Divider

Tall crop dividers can provide a cleaner cut in some crop conditions.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove three bolts (A) and nuts where divider (B) will be mounted.
4. Position divider (B) on the header, and reinstall three bolts (A) and nuts. Tighten nuts.
5. Repeat for opposite side.
6. Close cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

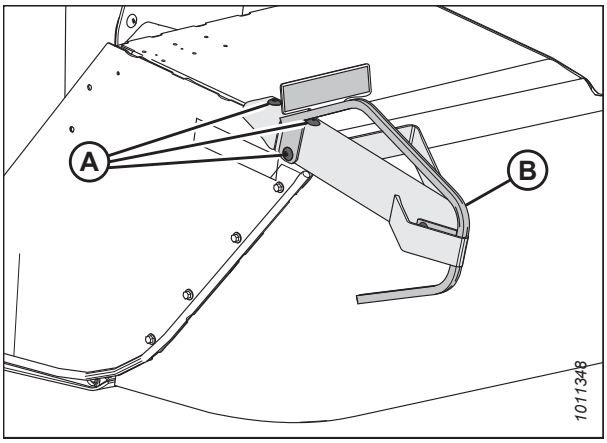


Figure 3.44: Divider and Hardware

Removing Tall Crop Divider

Tall crop dividers can be removed for transport, or when not suitable for terrain or crop conditions.

DANGER

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving Operator's seat for any reason.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.

3. Remove three bolts (A), and remove deflector (B).
4. Reinstall three bolts (A).
5. Repeat for opposite side.
6. Close cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

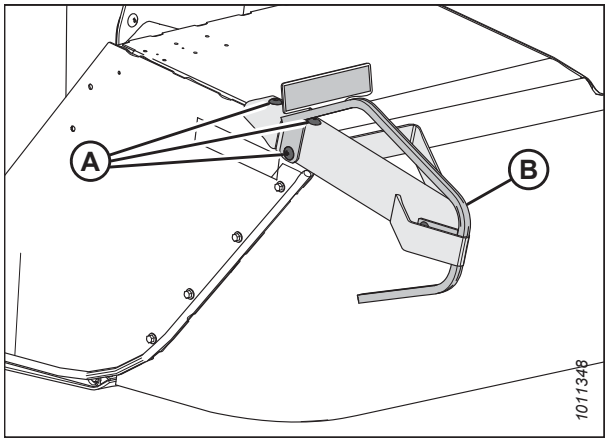


Figure 3.45: Deflector and Hardware

3.14 Roll Conditioner

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

3.14.1 Conditioner Roll Gap

The roll gap is the distance between the two conditioner rolls. The roll gap controls the degree to which crop is conditioned as it passes through the rolls. The roll gap is factory-set at approximately 6 mm (1/4 in.).

Steel rolls can be operated over a larger range of roll gap settings, since they are able to intermesh, and are therefore suited to a wider range of crops, from alfalfa to thicker-stemmed cane-type crops. They are capable of a roll gap of up to 25 mm (1 in.); however, too large a gap may cause crop feeding problems.

Grass-type crops may require a smaller gap for the proper feeding and conditioning of cut crop.

Checking Roll Gap

To prevent equipment damage, check the size of the roll gap when you are using a roll gap setting smaller than that set at the factory.

IMPORTANT:

Choose the roll gap setting that is suitable for your crop conditions. Refer to *3.14.1 Conditioner Roll Gap, page 55* for factory and custom roll gap settings.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. **Steel rolls:** The length of thread (A) extending above the jam nut on the adjustment rods can be used as an approximation of the roll gap. However, this method does **NOT** provide consistent roll gap measurements. The roll gap factory setting for steel rolls is 6 mm (1/4 in.). If adjustments are required, refer to *Adjusting Roll Gap – Steel Rolls, page 56* for adjustment instructions.

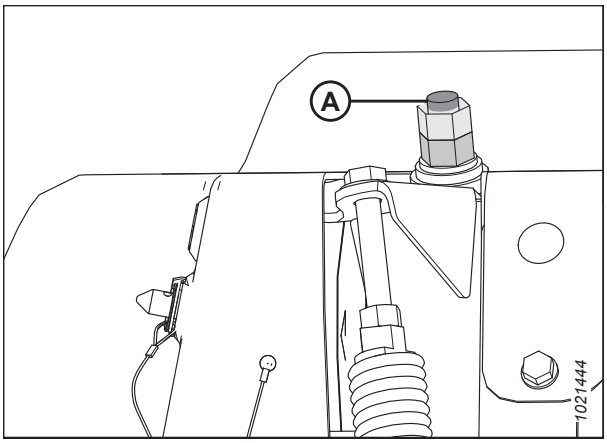


Figure 3.46: Roll Gap Adjustment

Adjusting Roll Gap – Steel Rolls

The length of thread extending above the jam nut on the adjustment rods can be used as an approximation of roll gap but does **NOT** provide consistent roll gap measurements.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

To ensure the roll gap is at the factory setting, follow the procedure below:

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Loosen jam nut (A) on both sides of the conditioner.
4. Turn lower nut (B) counterclockwise until the upper roll rests on the lower roll. Ensure the rolls intermesh.
5. Turn lower nut (B) two and a half full turns clockwise to raise the upper roll and achieve a 6 mm (1/4 in.) roll gap.
6. Hold nut (B) and tighten jam nut (A) on both sides of the conditioner.

   IMPORTANT:

   Make sure the roll gap adjustment nuts are adjusted equally on both sides to achieve a consistent gap across the rolls.
7. If further adjustment to roll gap is required:
   - Turn lower nut (B) clockwise to increase the roll gap.
   - Turn lower nut (B) counterclockwise to decrease the roll gap.

   NOTE:

   Make further adjustments to the roll gap based on cutting performance and crop conditions.

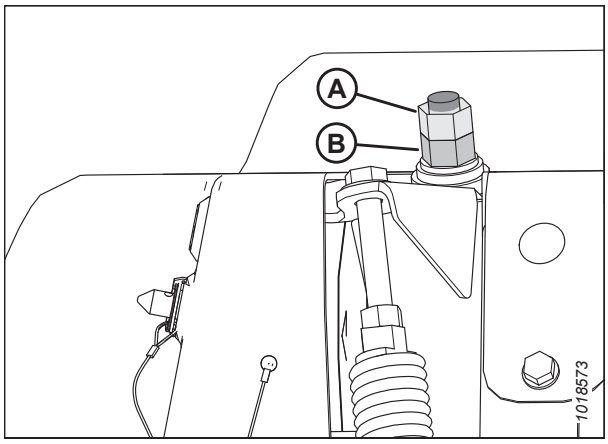


Figure 3.47: Roll Gap Adjustment

3.14.2 Roll Tension

Roll tension refers to the tension holding the rolls together. It is factory-set to maximum and should rarely require adjustment. Heavy crops or tough forage can, however, cause the rolls to separate. In such conditions, maximum roll tension is required to ensure that the cut crop is crimped sufficiently.

Adjusting Roll Tension

The amount of pressure that is applied to the crop as it passes through the roll conditioner is adjusted by changing the roll tension setting. Generally, maximum roll tension is desirable.

DANGER

To avoid bodily injury or death from unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

To adjust the roll tension back to factory setting, follow these steps:

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Loosen jam nut (A) on both sides of the conditioner.
4. Turn spring drawbolt (B) clockwise to tighten spring (C) and increase the roll tension.
5. Turn spring drawbolt (B) counterclockwise to loosen spring (C) and decrease the roll tension.
6. Measure the amount of exposed thread on spring drawbolt (B) at each end of the conditioner. Measurement (D) should be 12–15 mm (1/2–9/16 in.).

   IMPORTANT:

   Turn each bolt equally. Each turn of the bolt changes the roll tension by approximately 32 N (7.2 lbf).
7. Tighten jam nuts (A) on each end of the conditioner.

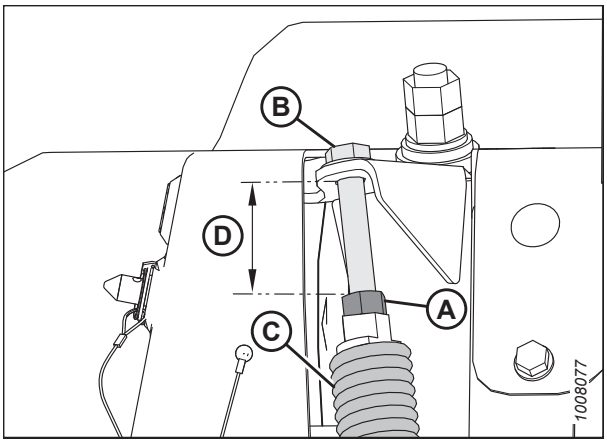


Figure 3.48: Adjusting Roll Tension

3.14.3 Roll Timing

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

IMPORTANT:

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

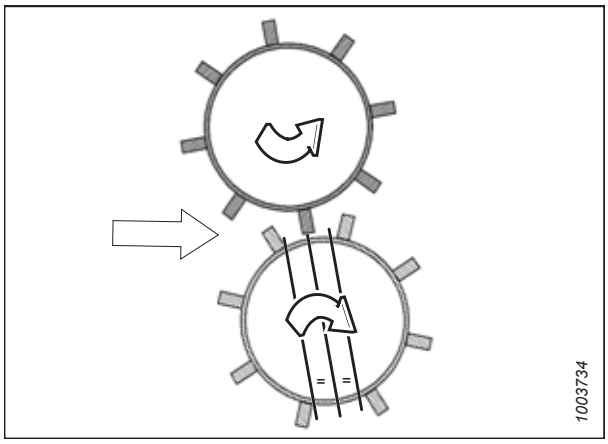


Figure 3.49: Properly Timed Rolls

Adjusting Roll Timing

The roll timing is factory-set and should not require adjustment. However, if there is excessive noise coming from the conditioner rolls, the timing will need to be adjusted.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. On the upper roll, loosen four bolts (A) securing yoke plate (B).

   NOTE:

   Only three of the four bolts are shown in the illustration.

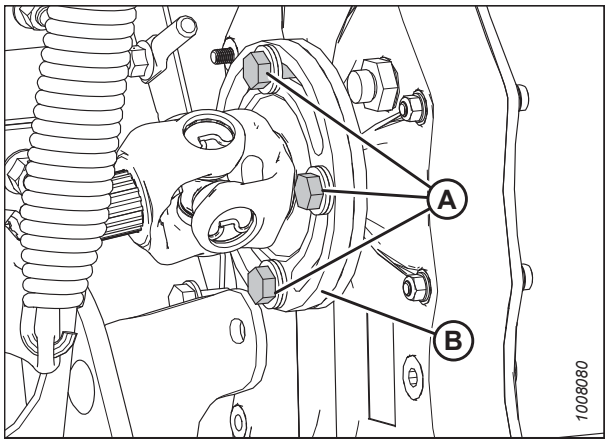


Figure 3.50: Conditioner Drive

3. Secure bottom roll (A).
4. Rotate upper roll (B) in a counterclockwise direction until it stops.
5. Make a mark (C) across yoke (D) and gearbox flange (E).

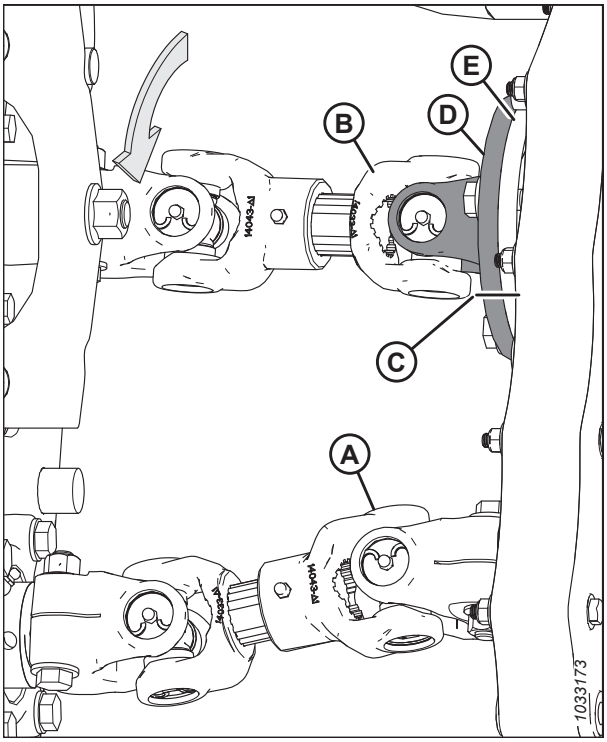


Figure 3.51: Conditioner Drive

6. Secure bottom roll (A).
7. Rotate upper roll (B) in a clockwise direction until it stops.
8. Make a mark (C) across yoke (D) and gearbox flange (E).

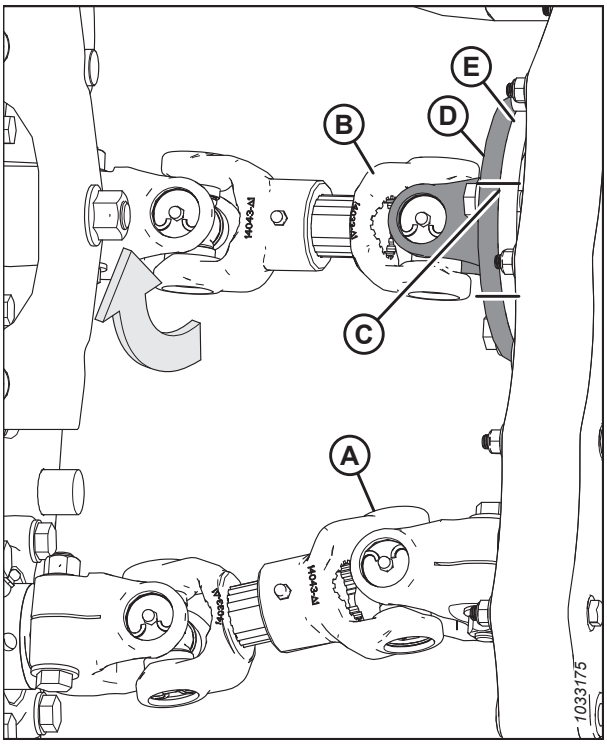


Figure 3.52: Conditioner Drive

9. Determine center point (A) between the two marks on the yoke plate, and place a third mark.
10. Rotate upper roll (B) counterclockwise until the mark on the gearbox flange lines up with the third (center) mark.

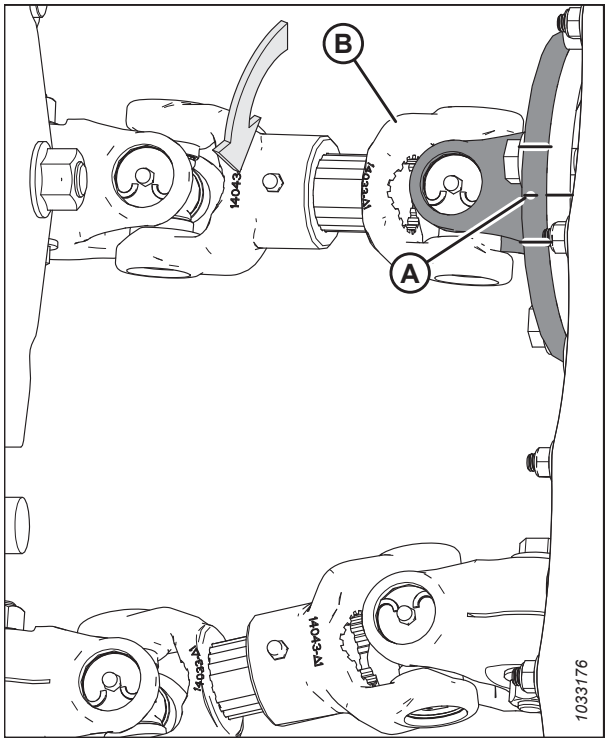


Figure 3.53: Conditioner Drive

11. Ensure that the threads on four bolts (A) are clean and free of lubricant.

    NOTE:

    Only three of the four bolts are shown in the illustration.

12. Apply medium-strength threadlocker (Loctite® 242 or equivalent) to bolts (A), and tighten them. Torque the bolts to 95 Nm (70 lbf·ft).

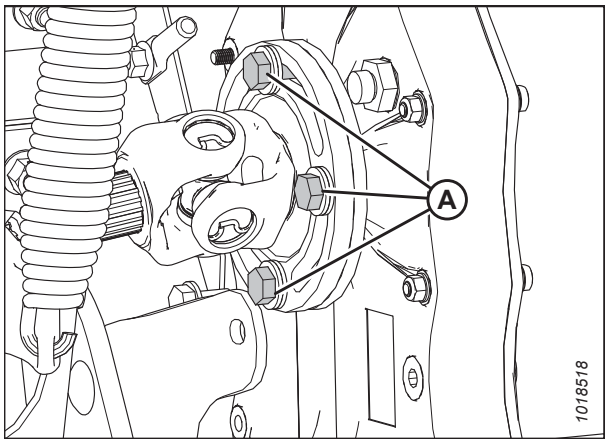


Figure 3.54: Conditioner Drive

3.14.4 Forming Shields – Roll Conditioner

The forming shield position controls the width and placement of the windrow.

Consider the following factors when setting the forming shield position:

- Weather conditions (rain, sun, humidity, and wind)
- Type and yield of crop
- Available drying time
- Method of processing (bales, silage, and 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. 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 Forming Shield Side Deflectors – Roll Conditioner

The position of the side deflectors controls the width and placement of the windrow. To ensure that windrow placement is centered between the tractor wheels, adjust the left and right deflectors to the same position.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

1. Shut down the engine, and remove the key from the ignition.
2. Loosen locking handle (A).
3. Slide adjuster bar (B) along adjuster plate (C) to the desired deflector position and engage bar (B) into a notch in the adjuster plate.
4. Tighten locking handle (A).
5. Repeat the adjustment on the opposite side.

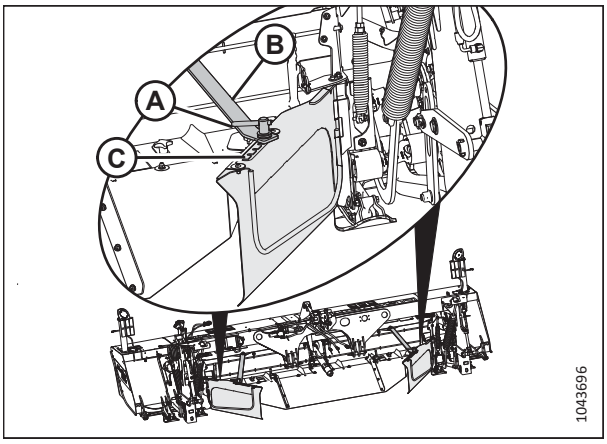


Figure 3.55: Side Deflector and Adjuster Bar

Adjusting Conditioner Baffle Position

The conditioner baffle is used in conjunction with the side deflectors to determine the height and width of the windrow.

The conditioner baffle is located immediately behind and above the conditioner rolls and can be positioned to do the following:

- Raise the baffle and direct crop flow into the forming shields for a fluffier, narrower windrow.
- Lower the baffle and direct crop downward to form a flatter, wider windrow.

To adjust the conditioner baffle position, follow these steps:

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.

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

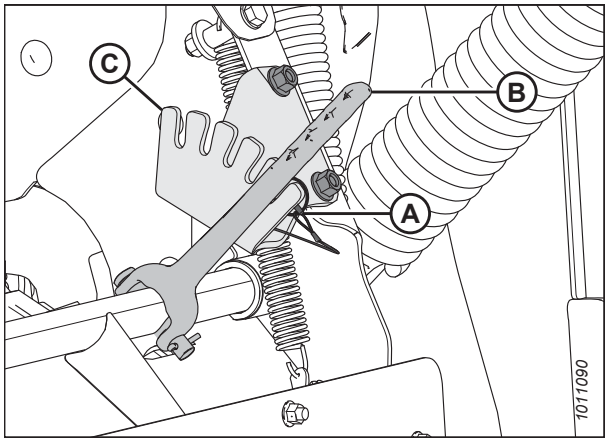


Figure 3.56: Right End of Conditioner

3.15 Haying Tips

Follow the recommendations in this section to ensure the highest quality hay production.

3.15.1 Curing

Curing crops quickly helps maintain the highest quality of crop material. Approximately 5% of protein is lost from hay for each day that it lays on the ground after cutting.

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

3.15.2 Topsoil Moisture

Topsoil moisture is an important consideration when determining the timing of hay cutting and the type of windrow needed.

Table 3.5 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, do **NOT** create a wide and thin windrow. A narrower, thicker windrow will dry faster than hay left flat on wet ground.
- When the ground is wetter than the hay, the moisture from the soil is absorbed by the hay above it. Determine the moisture level of the toposil before you begin cutting. Use a soil moisture tester or estimate the level.
- If the ground is wet due to irrigation, wait until the soil moisture level drops below 45%.
- If the ground is wet due to frequent rains, cut the hay when the weather allows. Let the hay 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.

3.15.3 Weather and Topography

Time your hay cutting so that the cut hay is able to cure as rapidly as possible.

- Cut as much hay as possible by midday. Drying conditions are best in the afternoon.
- Sun-facing slopes receive up to 100% more exposure to the sun's heat than slopes that do not face the sun. If the hay is to be baled and chopped, consider baling sun-facing slopes and chopping slopes that do not face the sun.
- When the relative humidity is high, the evaporation rate is low and so hay dries slowly.
- Humid air is trapped around the windrow in calm conditions. Raking or tedding will expose the hay to fresher and drier air.
- Cut hay perpendicular to the direction of the prevailing winds, if possible.

3.15.4 Windrow Characteristics

The shape and density of the windrow is an important factor with respect to how rapidly the hay cures.

Refer to *3.13 Operating Rotary Disc Header, page 413 Operation, page 19* for instructions on adjusting the header.

Table 3.6 Recommended Windrow Characteristics

Characteristic	Advantage
High and fluffy	Enables airflow through the 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

3.15.5 Driving on Windrow

Driving on previously cut windrows that will not be raked can lengthen the drying time by a full day. If practical, set the machine's forming shields to produce a narrower windrow which the machine can straddle. However, driving on the windrow in high-yield crops may be unavoidable if a full width windrow is necessary.

3.15.6 Raking and Tedding

Raking or tedding speeds up the drying process; 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 the moisture levels reach 40–50%. Hay should not be raked or tedded at moisture levels below 25% or excessive yield loss will result.

3.15.7 Using Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces, allowing moisture to escape from cut crop and evaporate faster. However, treated hay lying on wet ground will absorb ground moisture faster, even if a hay drying agent is used.

Before deciding to use a drying agent, carefully compare the costs and benefits of doing so.

3.16 Unplugging Rotary Disc Header

The cutterbar and conditioner can get plugged with crop and may require unplugging.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Wear heavy gloves when working around cutterbar.

1. Stop forward movement of the tractor and stop the power take-off (PTO).
2. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
5. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
6. Clean off the cutterbar and conditioner rolls by hand.

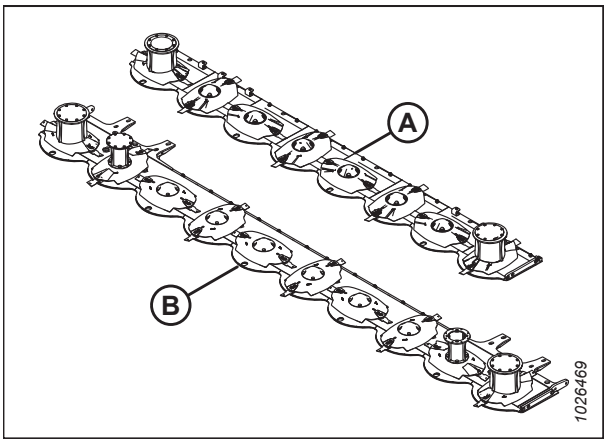


Figure 3.57: Cutterbars

A -Eight Disc Cutterbar
B - Ten Disc Cutterbar

7. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

Chapter 4: Maintenance and Servicing

This section provides information about routine servicing for the header. A parts catalog is located in a plastic case at the right end of the header.

Log the machine's hours of operation and use the maintenance record provided (refer to *4.3.1 Maintenance Schedule/ Record, page 72*) to keep track of maintenance procedures as they are performed.

4.1 Recommended Safety Procedures

These procedures will minimize the chances of injury when maintaining or repairing the machine.

- Park on a level surface when possible. Follow all recommendations in your windrower operator's manual.
- Wear close-fitting clothing and cover any 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, as needed.

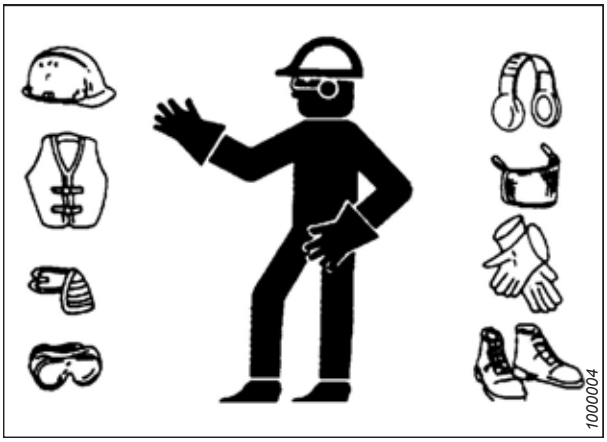


Figure 4.2: Safety Equipment

- 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 lubrication fitting) will cause drive components in other areas (belts, pulleys, and discs) to move. Stay clear of driven components at all times. Communicate regularly with your co-workers.

Figure 4.3: Safety Around Equipment

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

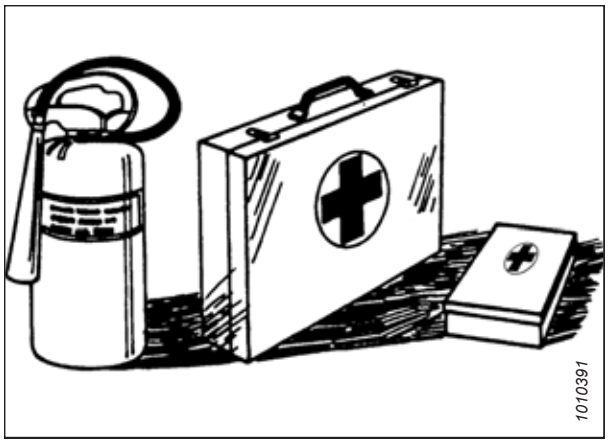


Figure 4.4: Safety Equipment

- Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Ensure that 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.

4.2 Preparing Machine for Servicing

Follow these steps to safely prepare your equipment for maintenance or repair.

DANGER

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

1. Disengage power take-off (PTO).
2. Position the rotary disc header at an appropriate height for the task.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the parking brake.
5. Wait for all moving parts to stop moving.
6. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4.3 Maintenance Requirements

Regular maintenance is the best insurance against early wear and untimely breakdowns. Following the maintenance schedule will increase your machine's service life. Periodic maintenance requirements are organized according to service intervals.

IMPORTANT:

The recommended intervals are based on typical operating conditions. Service the machine more often if the machine is operated regularly under adverse conditions, for example. severe dust, extra heavy loads, etc.

If more than one interval is specified for a service item, for example. 100 hours or annually, service the machine at whichever interval is reached first.

When servicing the machine, refer to the specific headings in this section. Use only the fluids and lubricants specified in the inside back cover of this book.

Log the hours of machine operation. Use the maintenance record provided in this manual, and keep extra copies of these maintenance records. Refer to *4.3.1 Maintenance Schedule/Record, page 72*.

CAUTION

Carefully follow all safety messages. For more information, refer to *4.1 Recommended Safety Procedures, page 67*.

4.3.1 Maintenance Schedule/Record

Keep a record of maintenance as evidence of a properly maintained machine. Daily maintenance records are not required to meet normal warranty conditions.

✎	Hour meter reading												
✎	Service date												
✎	Serviced by												
First use	Refer to *4.3.2 Break-in Inspections, page 74*.												
End of season	Refer to *4.3.4 End-of-Season Servicing, page 75*.												
Action	✓ Check			♦ Lubricate				▲ Change					
First Hour[4]													
✓	Check for loose hardware. Refer to *7.1 Torque Specifications, page 211*.												
First 5 Hours													
✓	Check for loose hardware. Refer to *7.1 Torque Specifications, page 211*.												
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 182*.												
First 10 Hours, Then Daily													
✓	Check hydraulic hoses and lines. Refer to *4.6.1 Checking Hydraulic Hoses and Lines, page 198*.												
✓	Check cutterbar discs. Refer to *Inspecting Cutterbar Discs, page 97*.												
✓	Check cutterbar discblades. Refer to *Inspecting Disc Blades, page 114*.												
✓	Check cutterbar drums. Refer to *Inspecting Large Drums, page 151*.												
✓	Check auxiliary lift system sensors. Refer to *4.7.3 Inspecting Auxiliary Lift System Sensors, page 199*												
First 25 Hours													
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 182*.												
✓	Check cutterbar lubricant. Refer to *Checking and Adding Lubricant – Cutterbar, page 92*.												
✓	Check cutterbar-conditioner drive gearbox lubricant. Refer to *Checking and Adding Lubricant – Cutterbar / Conditioner Drive Gearbox , page 193*.												
✓	Check conditioner roll timing gearbox oil. Refer to *Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 188*.												

4. Begins from first use of machine.

Every 25 Hours													
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 182*.												
♦	Lubricate idler pivot. Refer to *4.3.5 Lubrication, page 76*.												
♦	Lubricate upper and lower driveline universal joints. Refer to *4.3.5 Lubrication, page 76*.												
♦	Lubricate roller conditioner bearings. Refer to *4.3.5 Lubrication, page 76*.												
♦	Lubricate conditioner roll driveline slip joints. Refer to *4.3.5 Lubrication, page 76*.												
First 50 Hours													
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 182*.												
▲	Change cutterbar lubricant. Refer to *Draining Cutterbar, page 94* and *Filling Cutterbar with Lubricant, page 95*.												
▲	Change roll timing gearbox lubricant. Refer to *Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 188*.												
▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to *Draining Lubricant from Cutterbar – Conditioner Drive Gearbox (T-Gearbox) , page 194* and *Checking and Adding Lubricant – Cutterbar / Conditioner Drive Gearbox , page 193*.												
▲	Change header drive gearbox lubricant. Refer to *Draining Lubricant – Header Drive Gearbox , page 192* and *Checking and Adding Lubricant – Header Drive Gearbox , page 191*.												
Every 100 Hours or Annually[5]													
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 182*.												
✓	Check cutterbar lubricant. Refer to *Checking and Adding Lubricant – Cutterbar, page 92*.												
✓	Check cutterbar-conditioner drive gearbox lubricant. Refer to *Checking and Adding Lubricant – Cutterbar / Conditioner Drive Gearbox , page 193*.												

5. Change all gearbox and cutterbar lubricants annually.

✓	Check roll timing gearbox lubricant. Refer to *Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 188*.												
✓	Check header drive gearbox lubricant. Refer to *Checking and Adding Lubricant – Header Drive Gearbox , page 191*.												
Every 250 Hours or Annually[6]													
▲	Change cutterbar lubricant. Refer to *Draining Cutterbar, page 94* and *Filling Cutterbar with Lubricant, page 95*.[7].												
▲	Change roll timing gearbox lubricant. Refer to *Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 188*.												
▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to *Draining Lubricant from Cutterbar – Conditioner Drive Gearbox (T-Gearbox) , page 194* and *Checking and Adding Lubricant – Cutterbar / Conditioner Drive Gearbox , page 193*.												
▲	Change header drive gearbox lubricant. Refer to *Draining Lubricant – Header Drive Gearbox , page 192* and *Checking and Adding Lubricant – Header Drive Gearbox , page 191*.												

4.3.2 Break-in Inspections

From the factory the header is ready for normal operation. However, there are several maintenance tasks to complete during the early operating hours of the machine's service life.

Table 4.1 Break-In Inspection Schedule

Inspection Interval	Item	Refer to
1 Hour	Check for loose hardware and tighten to required torque	*7.1 Torque Specifications, page 211*
5 Hours	Check for loose hardware and tighten to required torque	*7.1 Torque Specifications, page 211*
5 Hours	Check conditioner drive belt tension	*Inspecting Conditioner Drive Belt, page 182*
25 Hours	Check conditioner drive belt tension	*Inspecting Conditioner Drive Belt, page 182*
50 Hours	Check conditioner drive belt tension	*Inspecting Conditioner Drive Belt, page 182*
50 Hours	Change conditioner roll timing gearbox lubricant	*Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 188*

6. Change all gearbox and cutterbar lubricants annually.
7. Use only the specified amount. Do **NOT** overfill.

Table 4.1 Break-In Inspection Schedule (continued)

Inspection Interval	Item	Refer to
50 Hours	Change header drive gearbox lubricant	*Draining Lubricant – Header Drive Gearbox , page 192* and
50 Hours	Check cutterbar lubricant	*4.4.3 Lubricating Cutterbar, page 92*
50 Hours	Check and change conditioner roll timing gearbox lubricant	*Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 188*
50 Hours	Check and change the conditioner drive gearbox lubricant	*4.5.9 Cutterbar / Conditioner Drive Gearbox, page 193*
150 Hours	Check conditioner drive belt tension	*Inspecting Conditioner Drive Belt, page 182*
250 Hours	Check and change the conditioner drive gearbox lubricant	*4.5.9 Cutterbar / Conditioner Drive Gearbox, page 193*
250 Hours	Change header drive gearbox lubricant	*Draining Lubricant – Header Drive Gearbox , page 192* and

4.3.3 Preseason Servicing

Perform these procedures when taking the machine out of storage.

CAUTION

- **Review the operator's manual to refresh your memory on safety and operating recommendations.**
- **Review all safety signs and other decals on the rotary disc header and note any potential hazard areas.**
- **Ensure that all shields and guards are properly installed and secured. Never alter or remove safety equipment.**
- **Ensure that 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 the machine completely. For instructions, refer to *4.3.5 Lubrication, page 76* and *4.4.3 Lubricating Cutterbar, page 92*.
2. Perform all annual maintenance as listed in *4.3.1 Maintenance Schedule/Record, page 72*.

4.3.4 End-of-Season Servicing

Perform these procedures when storing the machine at the end of the season.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator’s seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

CAUTION

Cover the cutterbar to prevent injury from accidental contact with the blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Clean the header thoroughly.
5. Check for worn components and repair them as necessary.
6. Check for any broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at beginning of the next season.
7. Replace or tighten any missing or loose hardware. For information, refer to *7.1 Torque Specifications, page 211*.
8. Lubricate the header thoroughly, leaving excess grease on the fittings to keep moisture out of the lubricated component.
9. Apply grease to any exposed threads, cylinder rods, and sliding surfaces of components.
10. Oil the cutterbar components to prevent rust.
11. Loosen the drive belt.
12. Remove the divider rods (if equipped) to reduce the space required for inside storage.
13. Repaint all worn or chipped painted surfaces to prevent rust.
14. Store the machine in a dry, protected place if possible. If it is to be stored outside, always cover the header with a waterproof canvas or other protective material.

4.3.5 Lubrication

Proper lubrication is essential to ensuring the service life of the machine.

WARNING

To avoid personal injury, before servicing header or opening drive covers, refer to *4.2 Preparing Machine for Servicing, page 70*.

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

Log the hours of machine operation. Use the maintenance schedule provided in this manual to keep a record of scheduled maintenance. For details, refer to *4.3.1 Maintenance Schedule/ Record, page 72*.

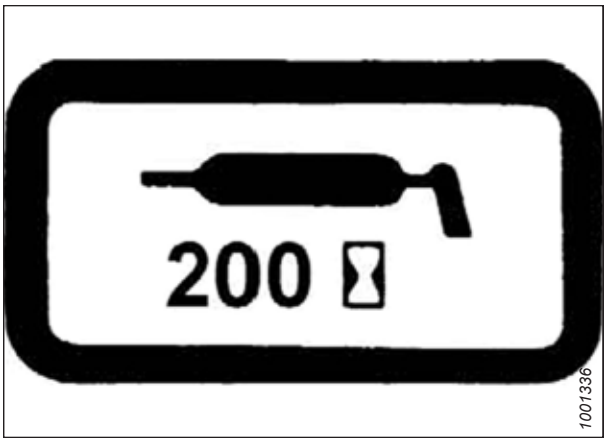


Figure 4.6: Grease Interval Decal

Greasing Procedure

This is a general procedure used any time a component requires grease.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

1. Open driveshields at the ends of the header to access greasing points. For instructions, refer to *3.3.1 Opening Driveshields, page 23*.
2. Wipe the grease fitting with a clean cloth before greasing it to avoid injecting dirt and grit into the component.
3. Replace any loose or broken fittings immediately.
4. Inject grease through the fitting with a grease gun until grease overflows the fitting, unless the instructions specify otherwise.
5. Leave excess grease on the fitting to keep out dirt.
6. Remove and thoroughly clean any fitting that will not take grease and clean the lubricant passageway. Replace the fitting if necessary.

Service Intervals

Regular maintenance is required to keep your machine operating at peak performance.

NOTE:

Use high temperature, extreme pressure (EP2) performance grease with 1% max. molybdenum disulphide (NLGI Grade 2) lithium base unless otherwise specified.

Every 25 Hours

Regular maintenance is required to keep your machine operating at peak performance.

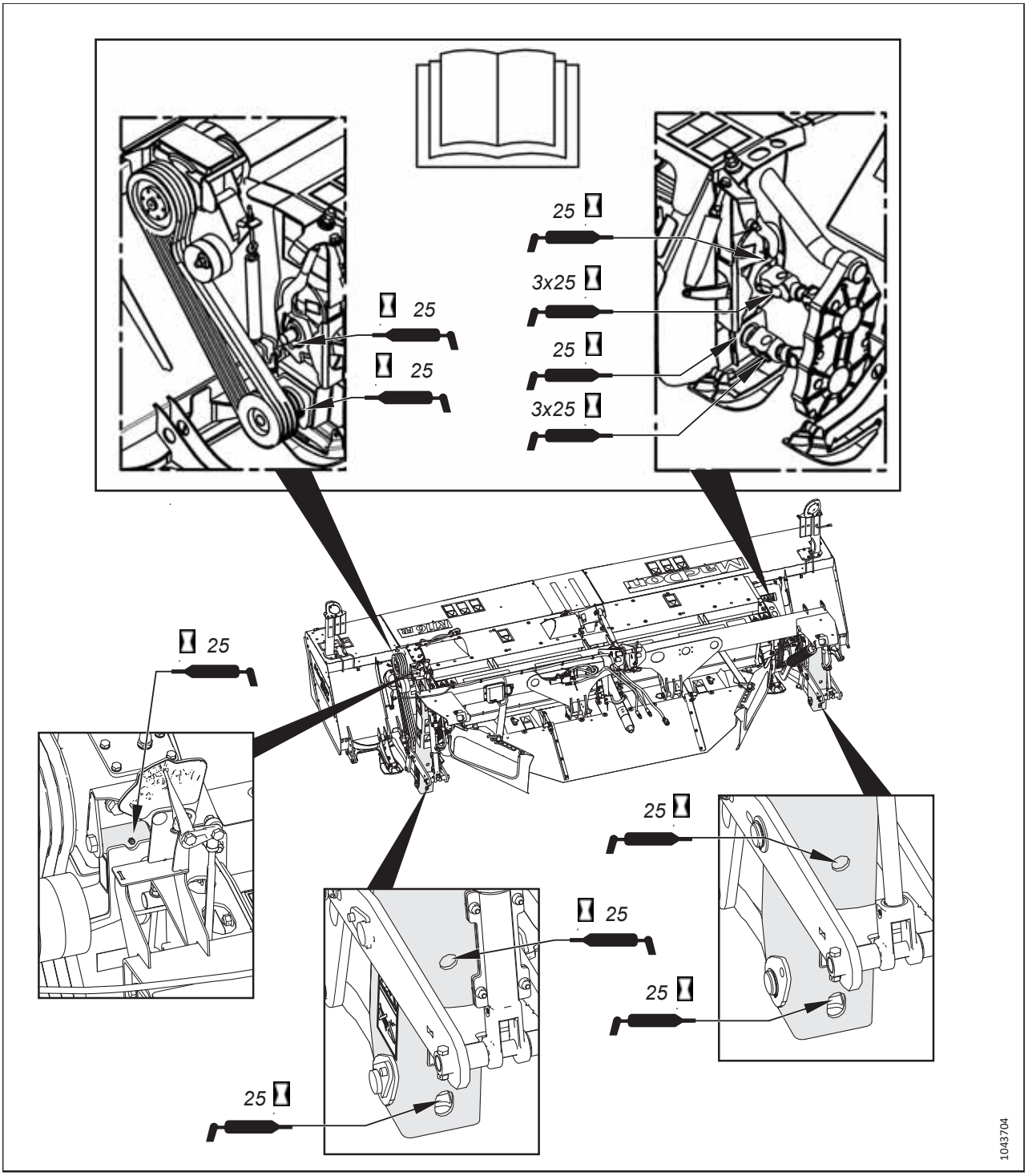


Figure 4.7: Grease Locations (Every 25 Hours)

NOTE:

Use high temperature extreme pressure (EP2) performance with 1% max. molybdenum disulphide (NLGI Grade 2) lithium base unless otherwise specified.

Every 50 Hours

Regular maintenance is required to keep your machine operating at peak performance.

NOTE:

Use high temperature extreme pressure (EP2) performance with 1% max. molybdenum disulphide (NLGI grade 2) lithium base unless otherwise specified.

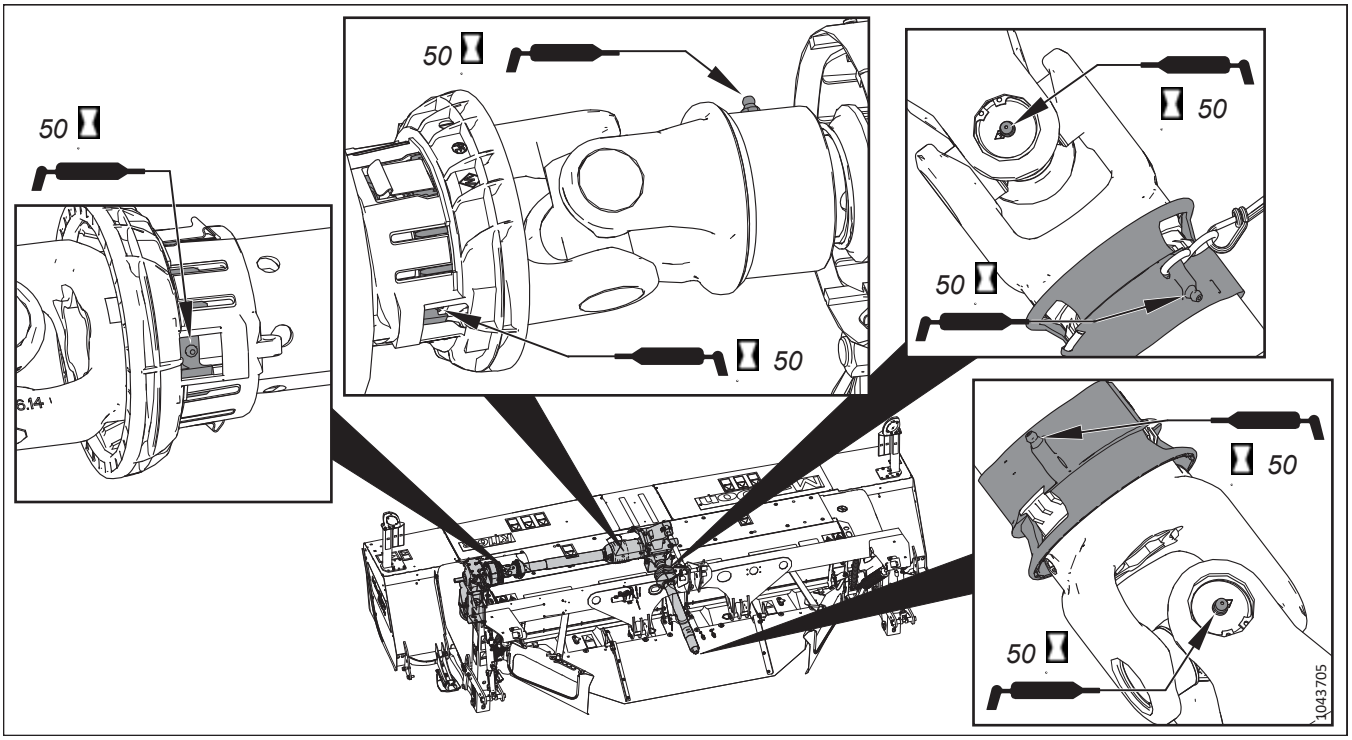


Figure 4.8: Grease Locations (Every 50 Hours)

Every 100 Hours

Regular maintenance is required to keep your machine operating at peak performance.

NOTE:

Ensure the top of the header is horizontal, and verify oil levels.

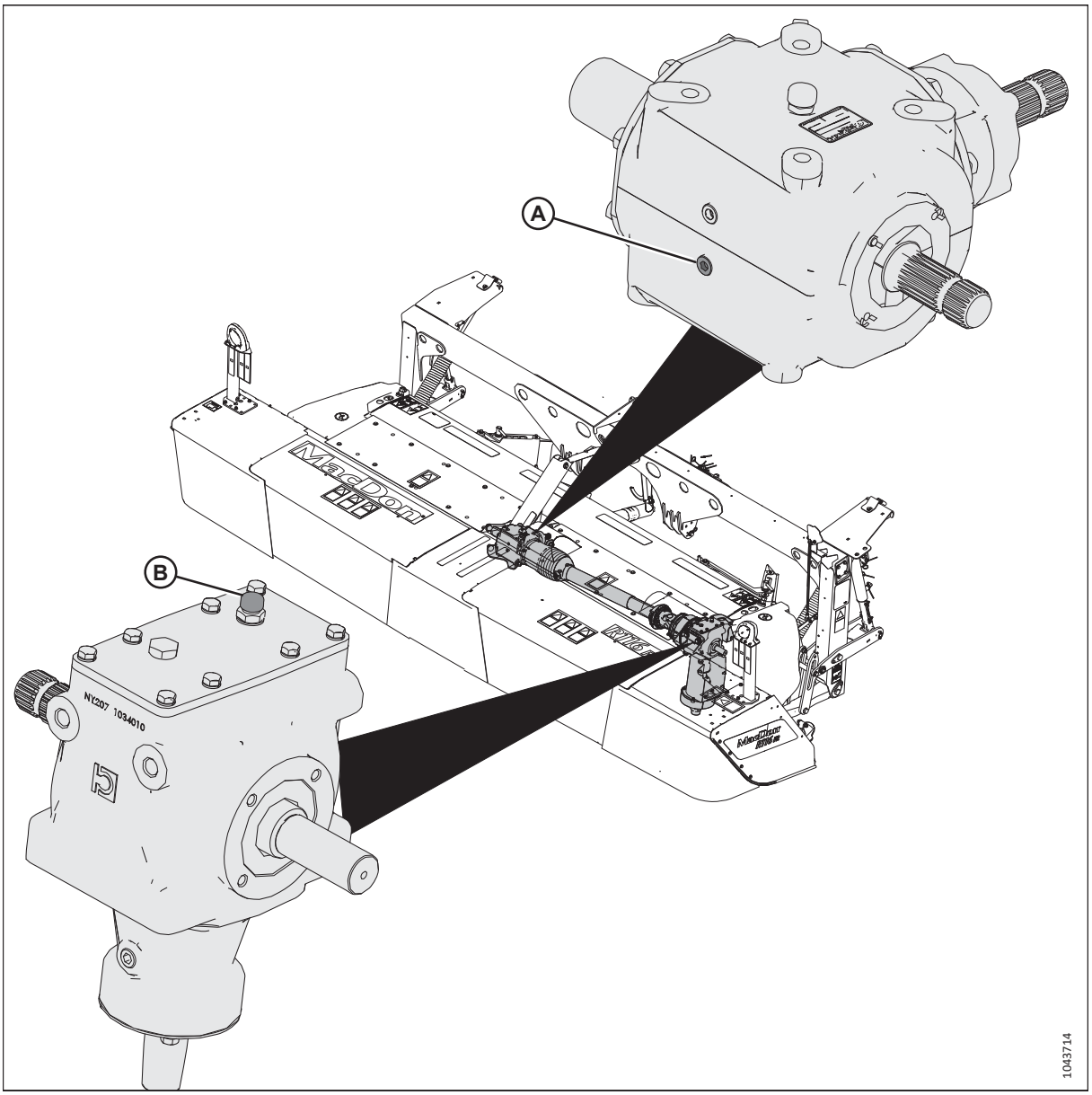


Figure 4.9: Lubrication Check (Every 100 Hours)

A - Check Plug - Header Drive Gearbox

B - Breather/Dipstick - Cutterbar/Conditioner Drive Gearbox

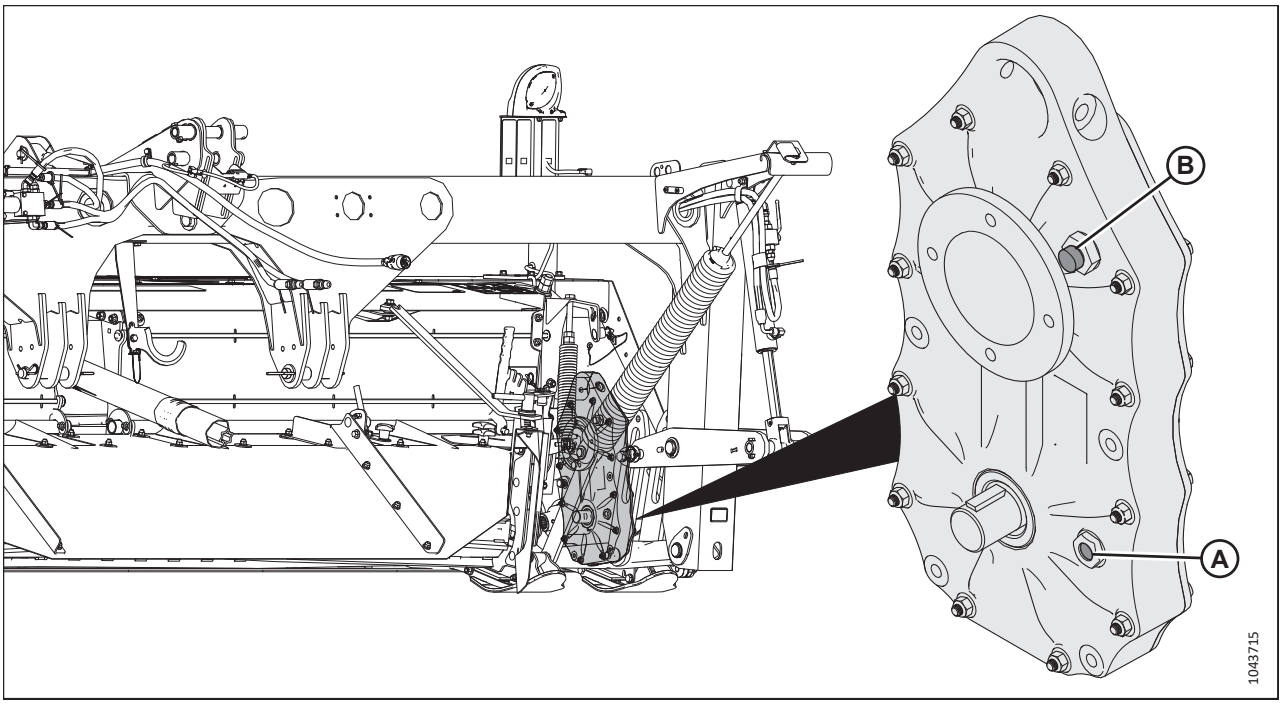


Figure 4.10: Lubrication Check (Every 100 Hours)

A - Sight Glass - Conditioner Roll Timing Gearbox

B - Breather - Conditioner Roll Timing Gearbox[8]

8. Refer to the inside back cover for lubricant specifications.

Every 250 Hours

Regular maintenance is required to keep your machine operating at peak performance.

1. Change lubricant in locations (A), (B), (C), and (D). Refer to the following sections for more information:
   - *4.4.3 Lubricating Cutterbar, page 92*.
   - *Checking and Adding Lubricant – Header Drive Gearbox , page 191*.
   - *Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 188*

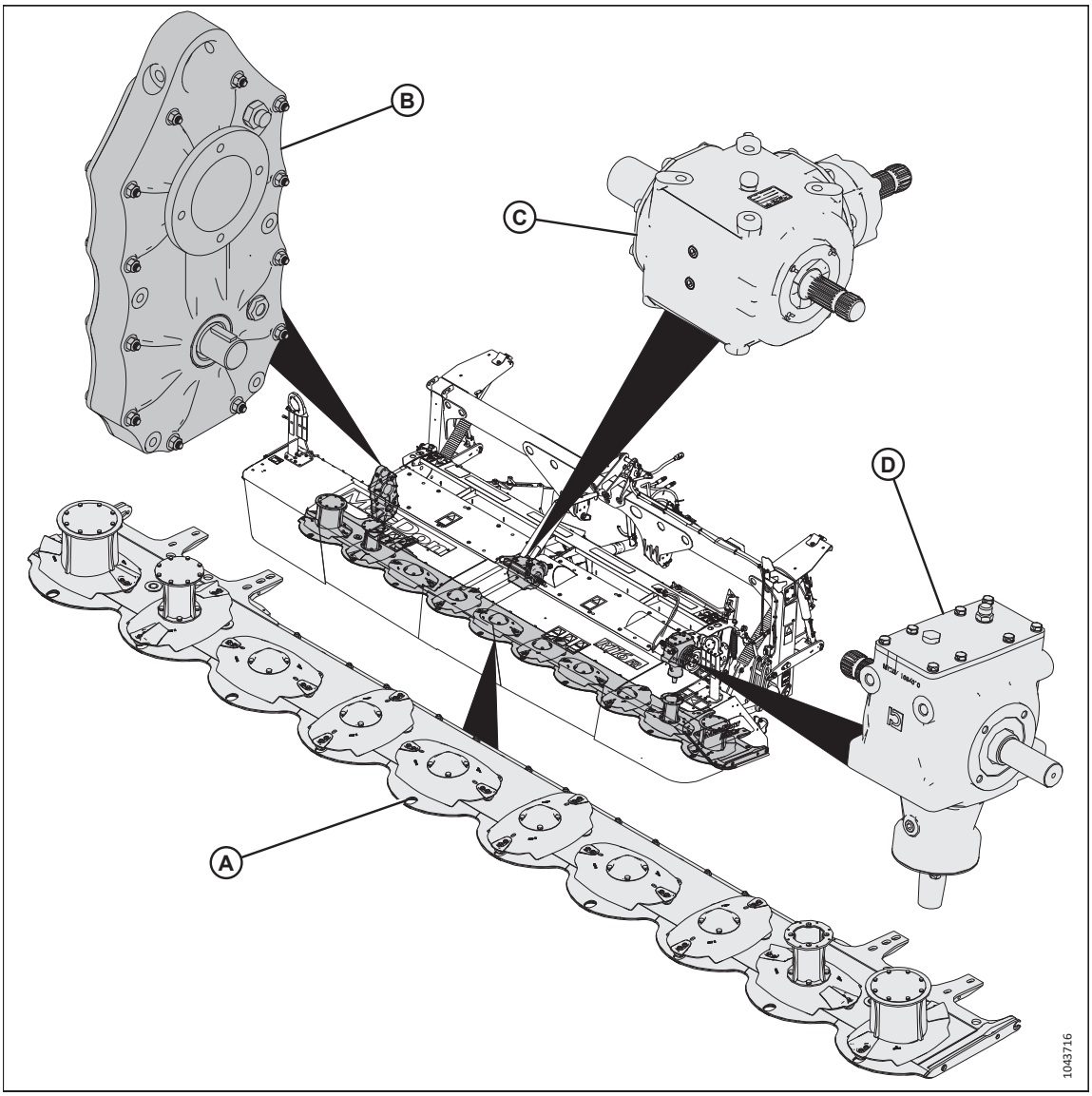


Figure 4.11: Lubrication Location (Every 250 Hours)

A - Cutterbar
B - Conditioner Roll Timing Gearbox
C - Header Drive Gearbox
D - Cutterbar/Conditioner Drive Gearbox

4.4 Cutterbar System

The cutterbar (A) comes in two cutting widths: 3.9 m (13 ft.) and 4.9 m (16 ft.). The 3.9 m (13 ft.) holds eight discs and the 4.9 m (16 ft.) holds ten discs that rotate to a maximum of 2500 rpm at full speed. Each disc carries two cutting blades.

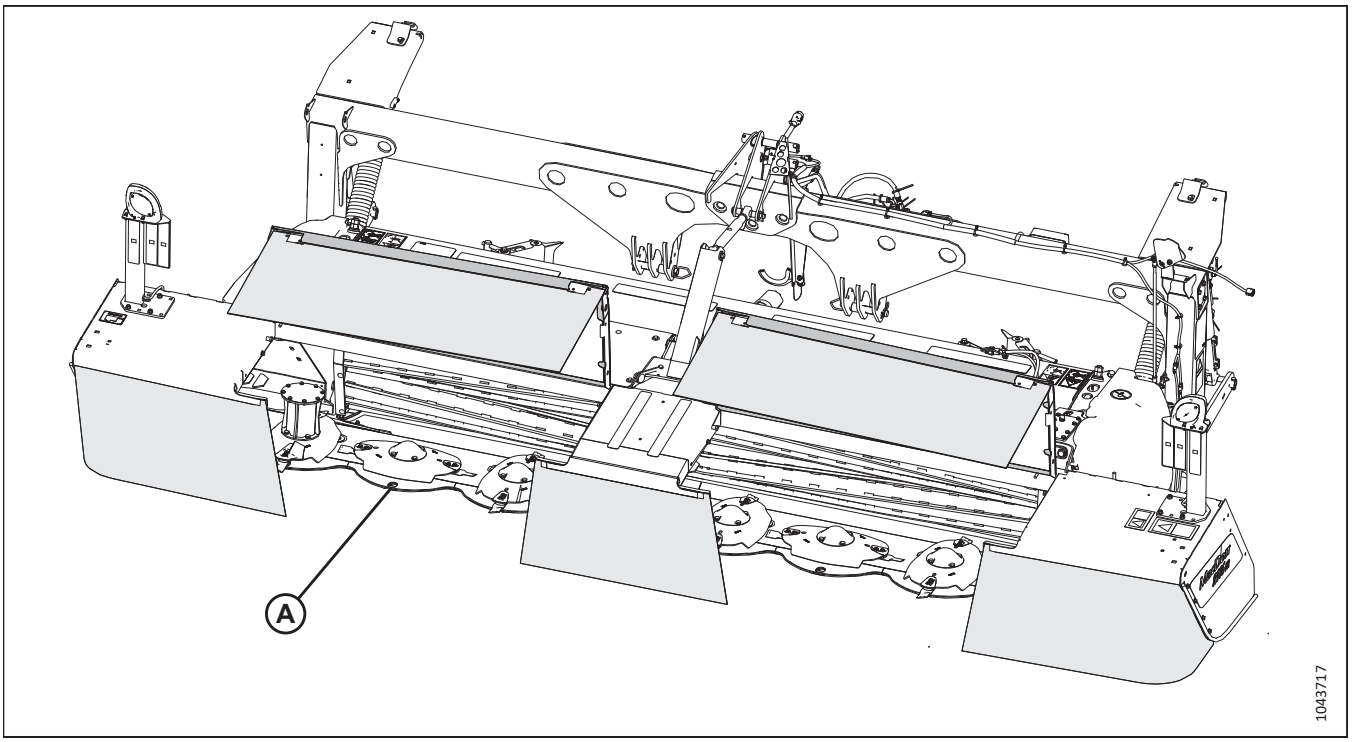


Figure 4.12: Cutterbar – R116 FR Shown

A - 4.9 m (16 ft.) Cutterbar

NOTE:

Discs are factory-installed to produce three crop streams; however, the disc rotation pattern can be changed by changing the spindle and its disc to suit crop conditions. For more information, refer to *4.4.6 Reconfiguring Cutterbar Crop Stream, page 111*.

4.4.1 Cutterbar Doors

Two doors with rubber curtains provide access to the cutterbar area, and reduce the risk of objects being ejected. Always keep doors closed during operation.

Inspecting Cutterbar Doors

The cutterbar doors protect bystanders from flung objects and protect the blades from obstacles. They should be inspected periodically.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. Ensure that the door operates smoothly and lies flat when closed. Adjust the doors if necessary.

3. Inspect hinge pin bolts (A) and tighten them to 69 Nm (51 lbf·ft) if they are loose.
4. Check the door for cracks. Repair the door if any cracks are found.
5. Check the door for exposed metal and surface rust. Repair and repaint the door if necessary.
6. Check shield/curtain bolts (B) and replace them if they are missing. If they are loose, tighten them.

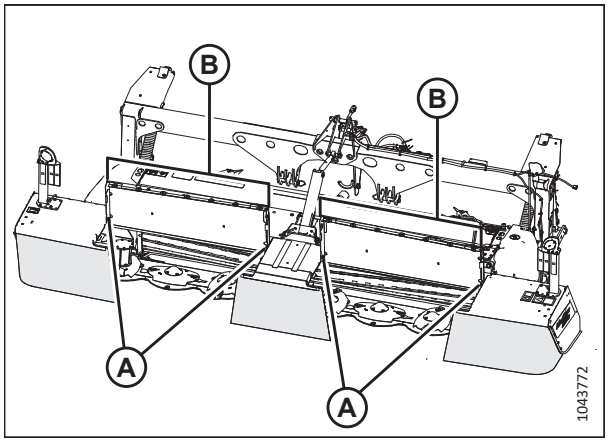


Figure 4.13: Cutterbar Doors

4.4.2 Maintaining Curtains

The curtains form a barrier that minimizes the risk of thrown objects being ejected from the cutterbar area. Always keep the curtains down when the machine is being operated.

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

Replace the curtains if they become worn or damaged.

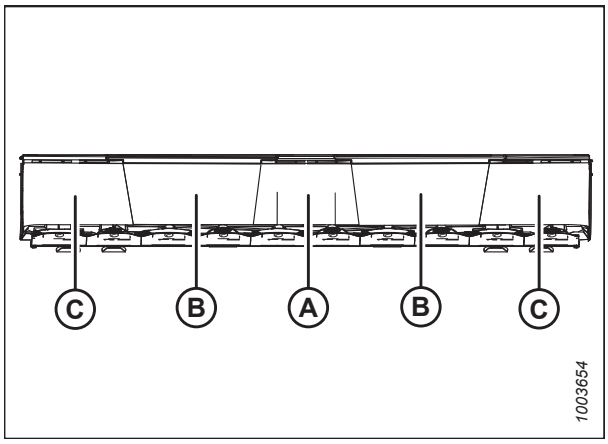


Figure 4.14: Cutterbar Curtains

Inspecting Curtains

The cutterbar curtains should be inspected periodically for damage and loose or missing hardware.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

WARNING

To reduce the risk of personal injury and machine damage, do NOT operate the machine installed and in good condition. Objects in the path of the blades can be ejected with considerable force when the machine is started.

CAUTION

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

1. Shut down the engine, and remove the key from the ignition.
2. Check cutterbar curtains (A) for the following conditions:
   - Rips and tears. If any are found, replace the curtain.
   - Cracking. While the curtain may look whole, this is an indicator that failure is imminent, and so the curtain should be replaced.
   - Missing bolts. Replace any missing hardware before operating the machine.

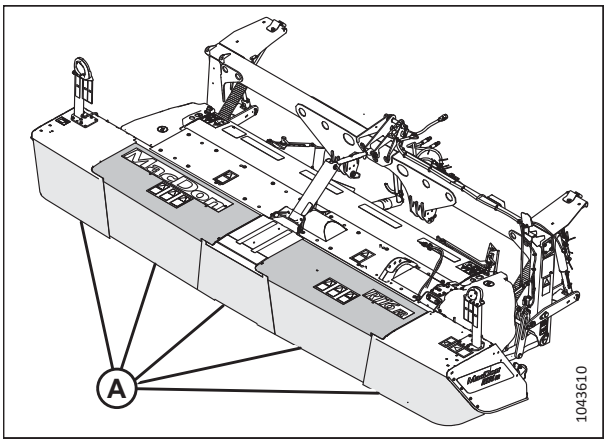


Figure 4.15: Cutterbar Curtains

Removing Cutterbar Door Curtains

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

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.

5. Remove seven nuts (A) from the bolt studs.
6. Remove aluminum liner (B).
7. Remove curtain (C).

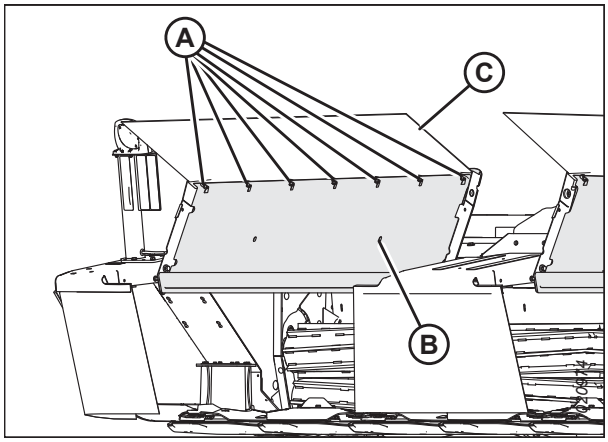


Figure 4.16: Cutterbar Door

Installing Cutterbar Door Curtains

Be sure not to overtighten the nuts when installing the cutterbar door curtains.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Insert seven cutterbar door stud bolts (B) into the precut holes on curtain (A).

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.

5. Install seven large washers (C).

6. Install liner panel (D) against the washers.

7. Install seven nuts (E) onto the bolt studs. Torque the nuts to 28 Nm (248 lbf in).

   IMPORTANT:

   To avoid damaging the bolt studs, do **NOT** overtighten the nuts.

8. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

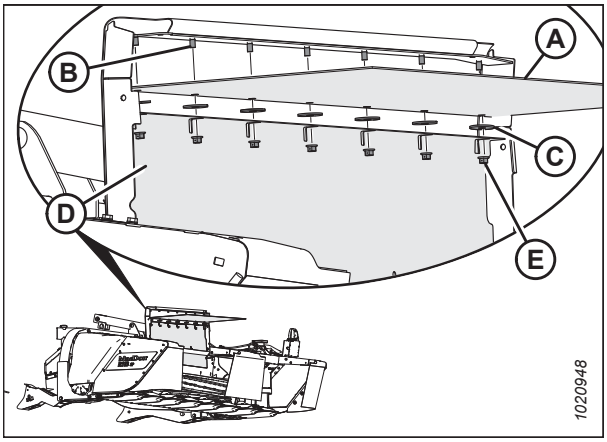


Figure 4.17: Cutterbar Curtain

Removing Cutterbar Inboard Curtain

Remove the cutterbar inboard curtain if it is torn or cracked.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.

2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:

   a. Place blocks under each end, or just inside each end, of the cutterbar.

   b. Lower the rotary disc header onto the blocks.

   c. Shut down the engine, and remove the key from the ignition.

   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.

5. Remove two M10 carriage head bolts (A) and nuts securing curtain assembly (B) to the rotary disc header, and remove the curtain assembly.

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.

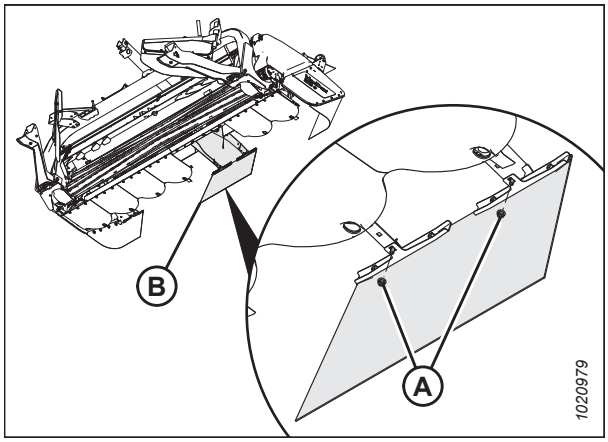


Figure 4.18: Inboard Curtain

6. Remove four nuts (A) from the studs on the center shield.
7. Remove two curtain brackets (B). Remove the curtain.

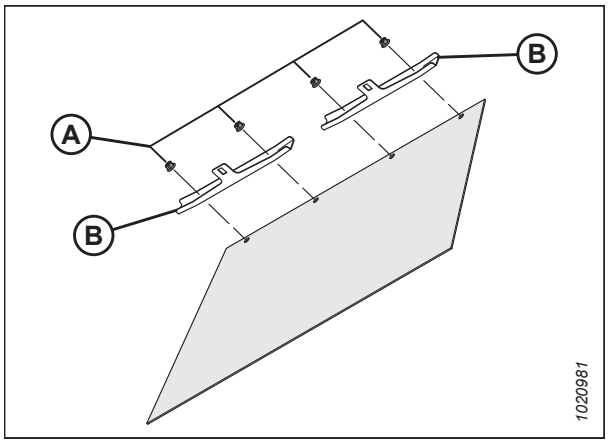


Figure 4.19: Inboard Curtain

Installing Cutterbar Inboard Curtain

Be sure not to overtighten the nuts when the inboard curtain is installed.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Install the curtain onto the studs on the center shield. Install two curtain brackets (B) and secure the curtain with four nuts (A).

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.
6. Torque the hardware to 28 Nm (248 lbf·in).

   IMPORTANT:

   To avoid damaging bolt studs, do **NOT** overtighten the nuts.

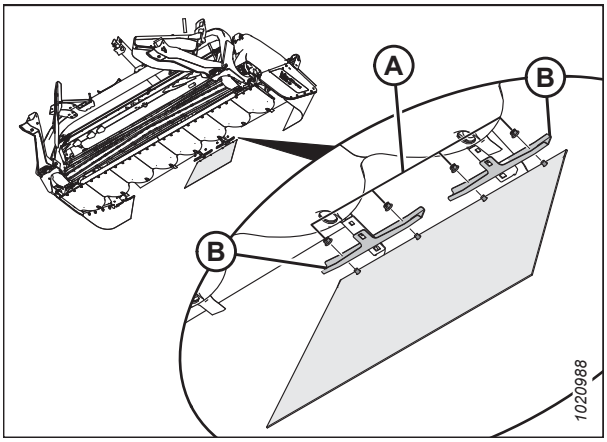


Figure 4.20: Inboard Curtain

7. Secure two curtain brackets (A) to the center shield using two M10 carriage head bolts and nuts (B).

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.
8. Torque bolts (B) to 39 Nm (29 lbf·ft).

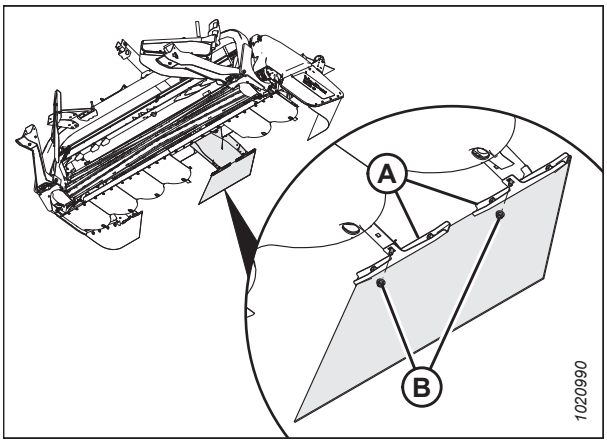


Figure 4.21: Inboard Curtain

Removing Outboard Curtains

Remove the outboard curtains if they are damaged or cracked.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Remove four bolts, large washers, and nuts (A) securing outboard curtain (B) to the endsheet.

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.

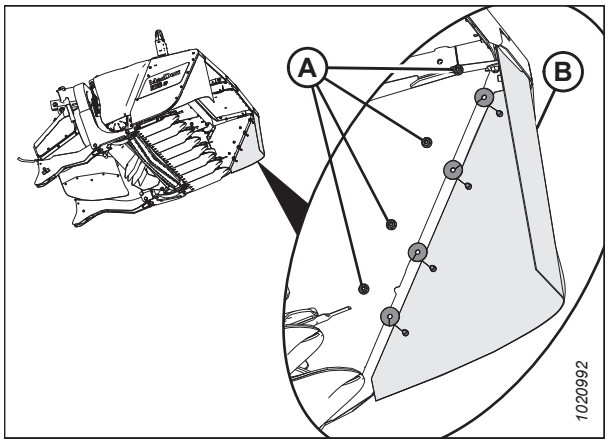


Figure 4.22: Left Endsheet

6. Remove two nuts (A) from the bolt studs.

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.

7. Remove nut (B) from the carriage head bolt, remove bracket (C), and remove curtain (D).

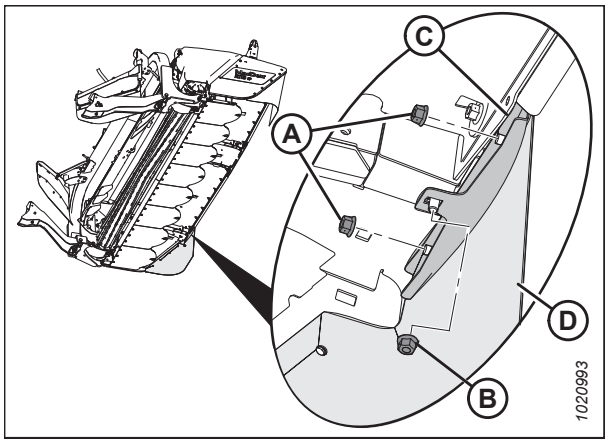


Figure 4.23: Outboard Curtain

Installing Outboard Curtains

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

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Install curtain (A) into bracket (B).

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.
6. Install two nuts (D) and tighten them.
7. Slide bracket (B) into position and install square neck carriage head bolt and flange nut (C).
8. Torque flange nut (C) to 39 Nm (29 lbf·ft).

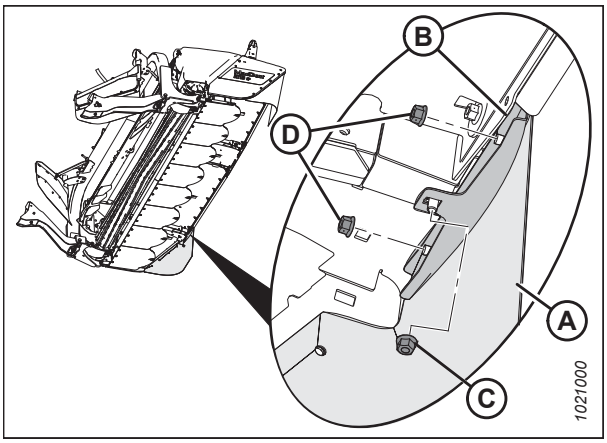


Figure 4.24: Outboard Curtain

9. Install four bolts, large washers, and nuts (A) to secure outboard curtain (B) to the endsheet. Torque the bolts to 39 Nm (29 lbf·ft).

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.

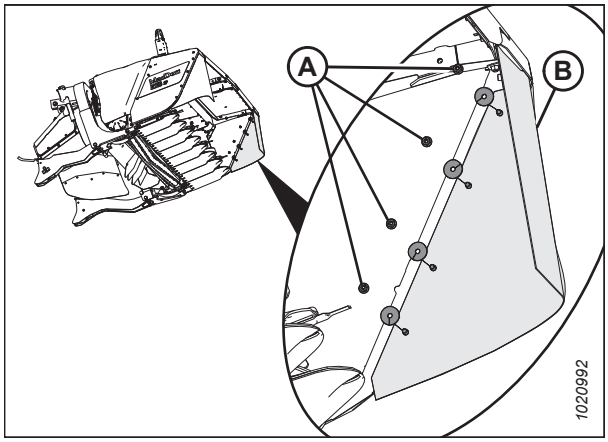


Figure 4.25: Left Endsheet

4.4.3 Lubricating Cutterbar

Correct lubricant and levels are essential to the performance and longevity of the cutterbar.

Checking and Adding Lubricant – Cutterbar

Correct lubricant and levels are essential to the performance and longevity of the cutterbar.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Park the machine on a flat, level surface.
2. Shut down the engine, and remove the key from the ignition.
3. Place blocks under each end, or just inside each end, of the cutterbar.
4. Lower the onto the blocks.
5. Shut down the engine, and remove the key from the ignition.
6. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.

7. Use spirit level (A) to ensure that the cutterbar is level in both directions. Adjust the cutterbar position accordingly.

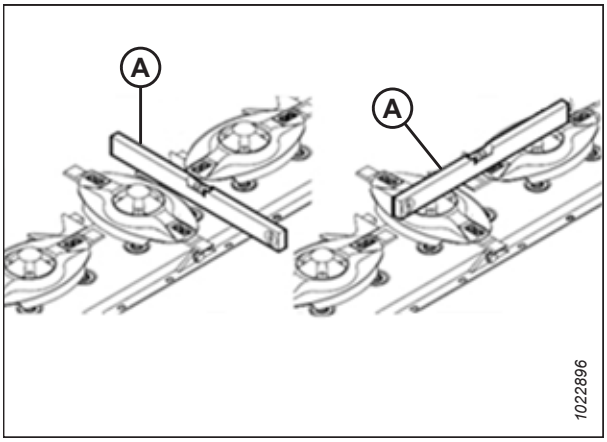


Figure 4.26: Spirit Level on Cutterbar

8. Clean the area around plug (A). Place a 5 liter (5.2 US qts) capacity container under the plug.
9. Remove plug (A) and O-ring (B) from the cutterbar. The oil level must be up to the inspection plug hole.

   NOTE:

   If additional lubricant is required, proceed to Step *10, page 93*. If additional lubricant is **NOT** required, proceed to Step *16, page 94*.

   IMPORTANT:

   Do **NOT** overfill the cutterbar. Overfilling can cause overheating, damage, and failure of the cutterbar components.

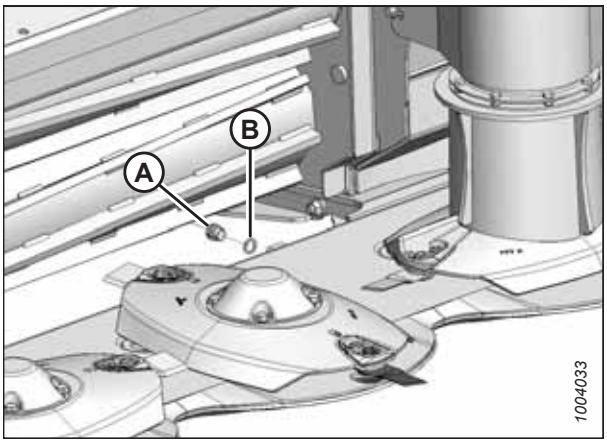


Figure 4.27: Cutterbar Oil Inspection Plug

10. Reinstall the inspection plug.
11. Start the engine, and raise the header slightly.
12. Lower the header onto blocks, so that the left end is slightly higher than the right end.
13. Shut down the engine, and remove the key from the ignition.
14. Add lubricant through the inspection hole used to check the oil level.

    IMPORTANT:

    Do **NOT** overfill the cutterbar. Overfilling can cause overheating, damage, and failure of cutterbar components.

    NOTE:

    Refer to the inside back cover of this manual for lubricant specifications.

15. Recheck the oil level.
16. Check O-ring (B) for breaks or cracks, and replace it if necessary.
17. Install plug (A) and O-ring (B).
18. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

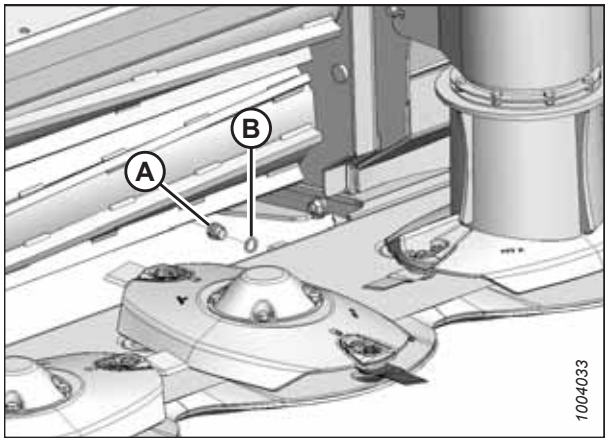


Figure 4.28: Cutterbar Oil Inspection Plug

Draining Cutterbar

In order to change the cutterbar lubricant, the cutterbar will first need to be drained.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Remove the right outboard rock guard. This will improve access to the drain plug located in the end cap of the cutterbar. To remove the outboard rock guard, refer to *Removing Outboard Rock Guards, page 136*.
2. Start the engine and raise the rotary disc header.
3. Shut down the engine, and remove the key from the ignition.
4. Place a block under each end of the rotary disc header so the right end is lower than the left end.

   IMPORTANT:

   Always drain lubricant from the right end of the rotary disc header. Draining lubricant from the left end of the rotary disc header may lead to breather contamination or failure.
5. Lower the rotary disc header onto the blocks.
6. Shut down the engine, and remove the key from the ignition.

7. Place a 10 liter (10.5 US qts) capacity container under the lower end of the cutterbar. Clean the area around plug (A) and remove the plug.

   IMPORTANT:

   Do **NOT** remove hex head bolts (B) securing the cutterbar end plate to the cutterbar, or lubricant leaks may result.

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.

8. Allow sufficient time for the lubricant to drain. Reinstall cutterbar plug (A) when the lubricant has been fully drained.

   NOTE:

   Do **NOT** flush the cutterbar.

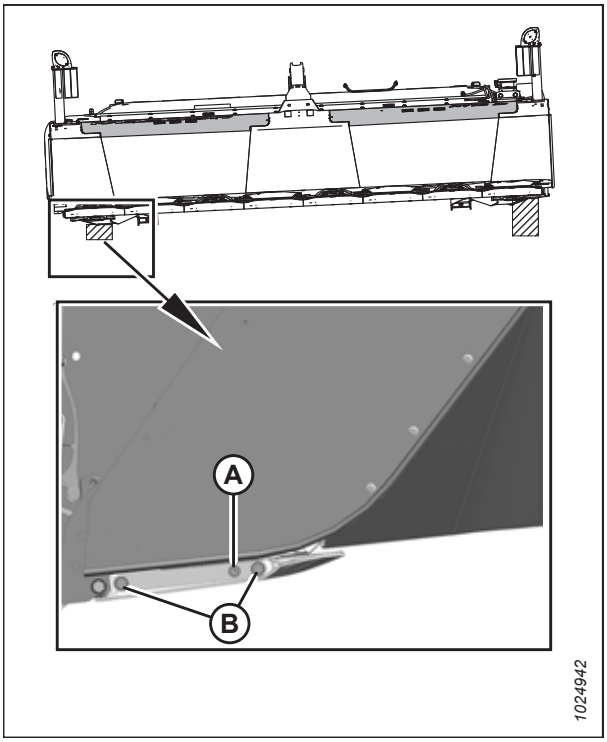


Figure 4.29: Front View of Header on Blocks

9. Fill the cutterbar with lubricant before operating the rotary disc header. For instructions, refer to *Filling Cutterbar with Lubricant, page 95*.

   IMPORTANT:

   Dispose of used lubricant responsibly.

10. Reinstall the right outboard rock guard. For instructions, refer to *Installing Outboard Rock Guards, page 137*.

Filling Cutterbar with Lubricant

This procedure should be used when the cutterbar has been completely drained of oil.

If you are checking the oil level or topping it up. Proceed to *Checking and Adding Lubricant – Cutterbar, page 92*.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

IMPORTANT:

The cutterbar should be completely empty of oil before filling it. For instructions, refer to *Draining Cutterbar, page 94*.

1. Start the engine.
2. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Place a block under the right end of the rotary disc header, so the right end is higher than the left end.

   NOTE:

   R1 Pull-Type shown in the illustration; R1 FR similar.
5. Lower the rotary disc header onto the blocks.
6. Shut down the engine, and remove the key from the ignition.
7. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
8. Remove the right outboard rock guard. This will improve access to the drain plug located in the end cap of the cutterbar. To remove the outboard rock guard, refer to *Removing Outboard Rock Guards, page 136*.
9. Remove access plug (A) from the raised end of the cutterbar and add the **EXACT** amount of lubricant specified. Refer to the inside back cover of this manual for lubricant types and quantities.

   IMPORTANT:

   Do **NOT** overfill the cutterbar. Overfilling can cause overheating, damage, or failure of cutterbar components.
10. Reinstall access plug (A). Torque the plug to 30 Nm (266 lbf·in).

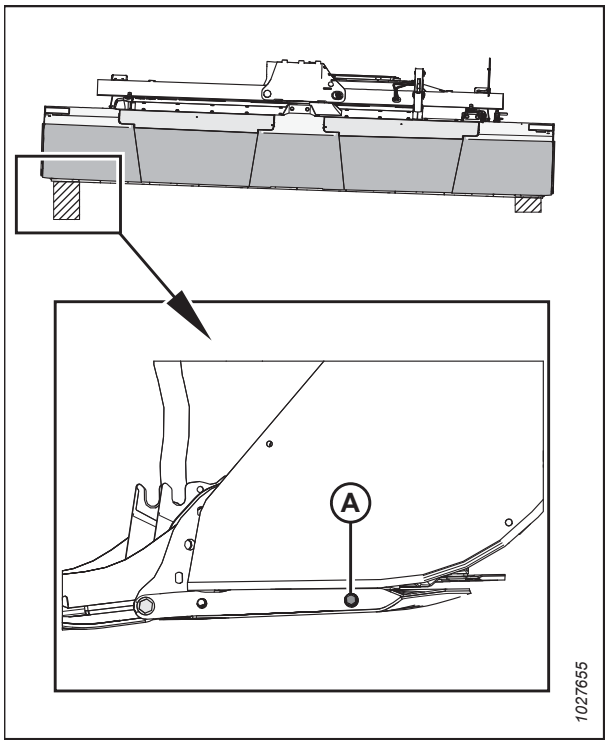


Figure 4.30: Filling Cutterbar

11. Open the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
12. Start the engine, and raise the header fully.
13. Shut down the engine, and remove the key from the ignition.
14. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
15. Remove the block from under the cutterbar.
16. Check the lubricant level. For instructions, refer to *Checking and Adding Lubricant – Cutterbar, page 92*.
17. Reinstall the right outboard rock guard. For instructions, refer to *Installing Outboard Rock Guards, page 137*.

4.4.4 Cutterbar Discs

The cutterbar discs provide rotary cutting action. They may need to be replaced from time to time.

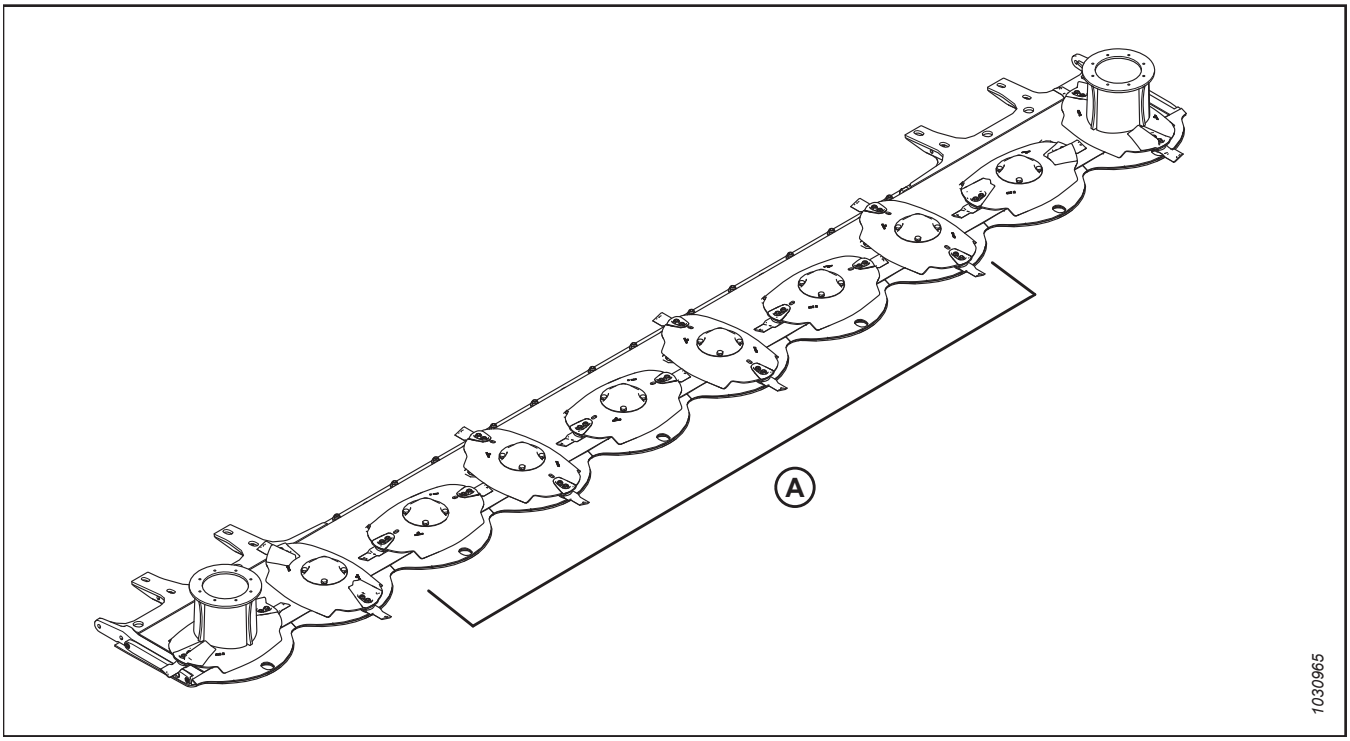


Figure 4.31: Interchangeable Cutterbar Discs

Cutterbar discs (A) are interchangeable and can be moved to a spindle that rotates in the opposite direction, so long as the disc is in usable condition and the blades are oriented to cut in the correct direction.

Perform daily inspections to ensure that the cutterbar discs are not damaged or deformed.

The cutterbar discs are **NOT** repairable and must be replaced if they are 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

Damaged blades may damage the cutterbar. They also cut poorly. Replace damaged blades immediately.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Inspect the cutterbar disc for any deformity on the side of the disc blades. Dimension (A) must not exceed 48 mm (1 7/8 in.). Replace any damaged discs immediately.

   IMPORTANT:

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

   NOTE:

   Dimension (A) is between the cutterbar and the edge of the disc as shown.

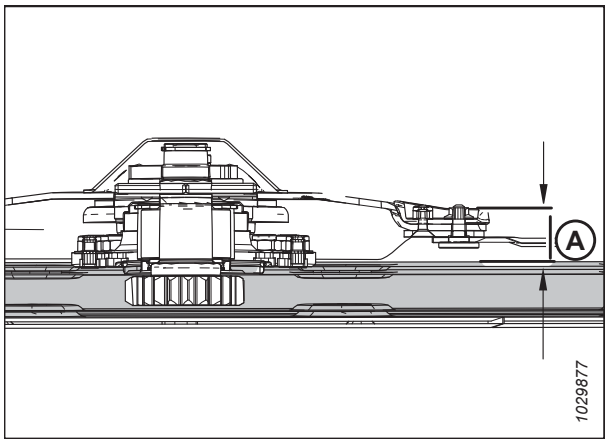


Figure 4.32: Cutterbar Disc

5. Inspect the discs for abrasion (A) at the cutting blade sides. Replace the disc if the material thickness is less than 3 mm (1/8 in.).

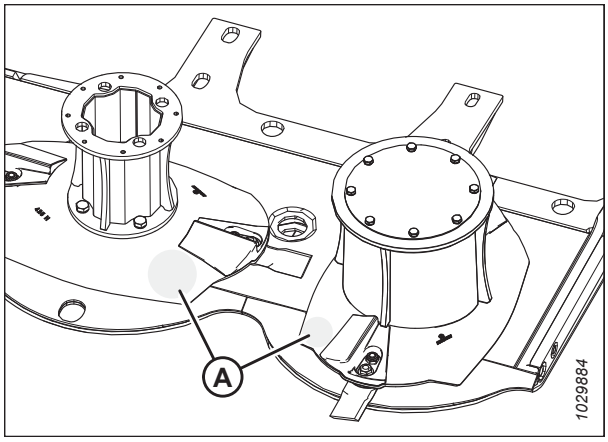


Figure 4.33: Cutterbar Disc

6. Inspect cutterbar disc surface (D) for cracks, excessive wear, and check if the disc is distorted. Replace any damaged discs immediately.
7. Inspect cutterbar disc edges (E) for cracks, excessive wear, and check if the edge is distorted. Replace any damaged components immediately.
8. Ensure that disc blade fasteners (A) are securely attached to the cutterbar disc and that nut shields (B) are present and undamaged. Replace any damaged components immediately.
9. Check that cutterbar disc bolts (C) are securely attached to the spindles. Tighten the bolts as needed.

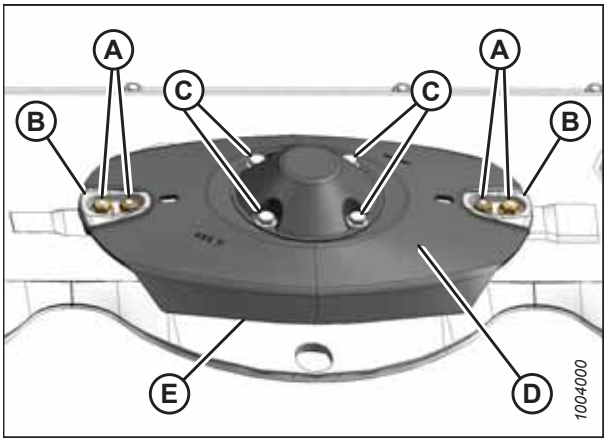


Figure 4.34: Cutterbar Disc

Removing Cutterbar Discs

Cutterbar discs may need to be removed for replacement or so they can be swapped to change the type of crop stream.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.

5. Place a pin (or equivalent) in front hole (B) of the rock guard to prevent the discs from rotating while you are loosening the bolts.
6. Remove four M12 bolts and washers (A).

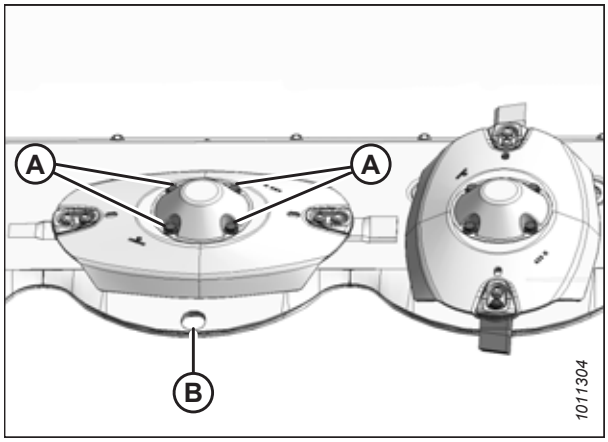


Figure 4.35: Cutterbar Disc Bolts

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

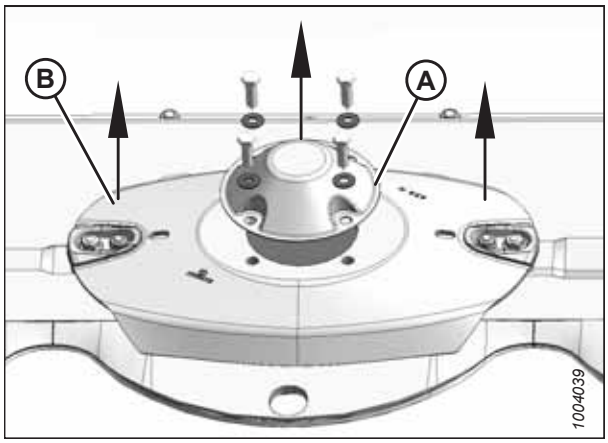


Figure 4.36: Cutterbar Disc and Cap

Installing Cutterbar Discs

Ensure that the blades of the installed disc are perpendicular to those on the adjacent discs.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Install spacer plate (A) on the spindle.

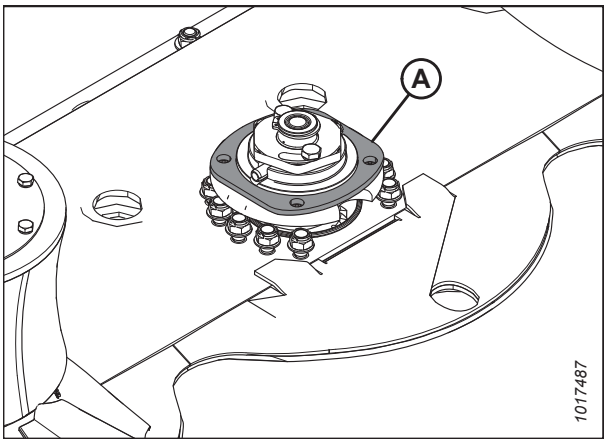


Figure 4.37: Disc Spindle

5. Place a pin (or equivalent) in front hole (D) of the rock guard to prevent the disc from rotating while you are tightening the bolts.
6. Position new disc (A) on the spindle so that the blades are perpendicular to those on the adjacent discs.
7. Install cutter disc cap (B), and secure the assembly with four M12 bolts and washers (C). Torque the bolts to 85 Nm (63 lbf·ft).

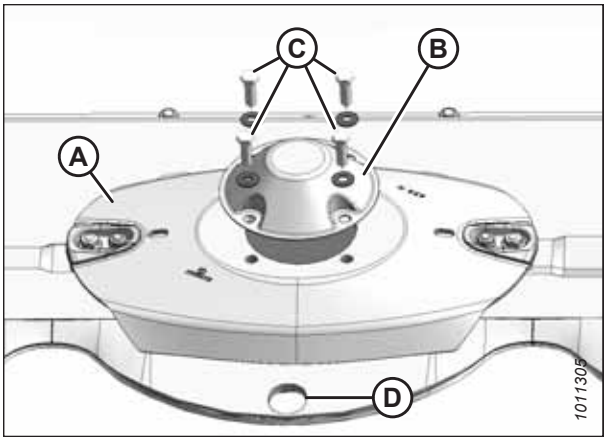


Figure 4.38: Cutterbar Disc and Cap

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

8. Remove the pin (or equivalent) from the front hole of the rock guard.
9. Close cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

4.4.5 Replacing Cutterbar Spindles

Cutterbar spindles allow for the rotation of the cutterbar discs. They have either right or left-handed threads, and are equipped with a shear pin.

A shear pin (A) is installed on each disc in order to prevent damage to the cutterbar if the disc collides with an obstacle.

If the disc contacts a large object such as a stone or stump, the pin will shear and the disc will stop rotating and move upwards. The disc will remain attached to the spindle because of snap ring (B).

NOTE:

Once the spindle has risen due to shear pin failure, the spindle's bearing will become unloaded. Do **NOT** replace the spindle simply because the spindle exhibits excessive play. Check the play of the spindle after torquing the spindle nut and replacing any damaged shear pins.

Refer to *4.4.13 Replacing Cutterbar Spindle Shear Pin, page 164* for instructions on replacing the shear pin.

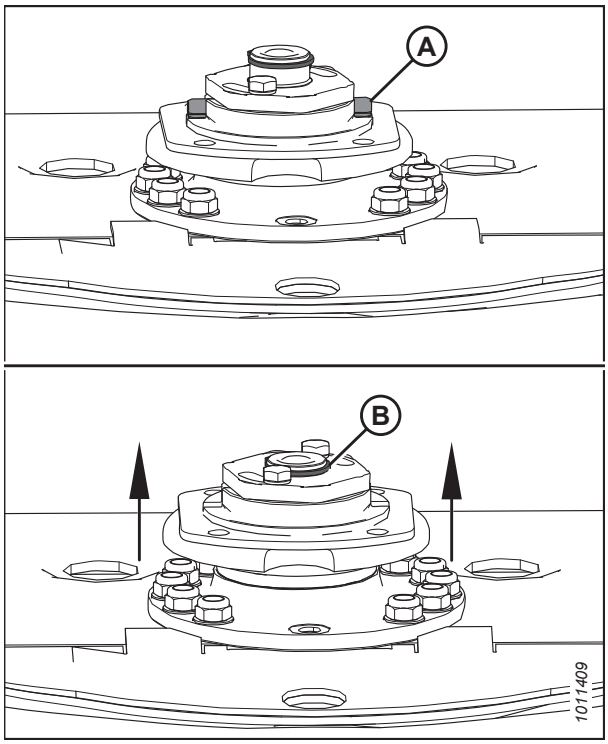


Figure 4.39: Cutterbar Spindles

IMPORTANT:

- Spindles that rotate clockwise have right-leading threading and are identified by a smooth top on spindle gear shaft (A).
- Spindles that rotate counterclockwise have left-leading threading and are identified by machined grooves on spindle gear shaft (B) and nut (C).
- If the spindle position in the cutterbar has changed, the rotational direction of that spindle **MUST** remain the same (that is, a clockwise spindle must maintain its clockwise rotation).
- Failure to maintain the rotation pattern can result in damage to the spindle and/or to the cutterbar components.
- The shear pin will not perform properly if the spindles used are in the wrong orientation.

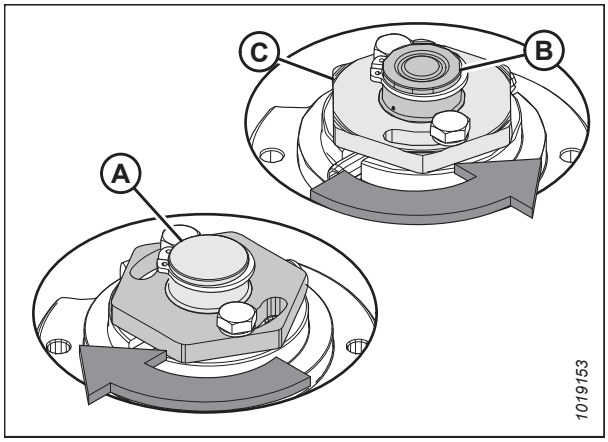


Figure 4.40: Cutterbar Spindles

Removing Cutterbar Spindles

The cutterbar spindles are secured to the cutterbar frame with 11 nuts and washers.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Park the machine on a flat, level surface.
2. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
3. Place a pin (or equivalent) in front hole (B) of the rock guard to prevent the disc from rotating while you are loosening the bolts.
4. Remove four M12 bolts and washers (A).

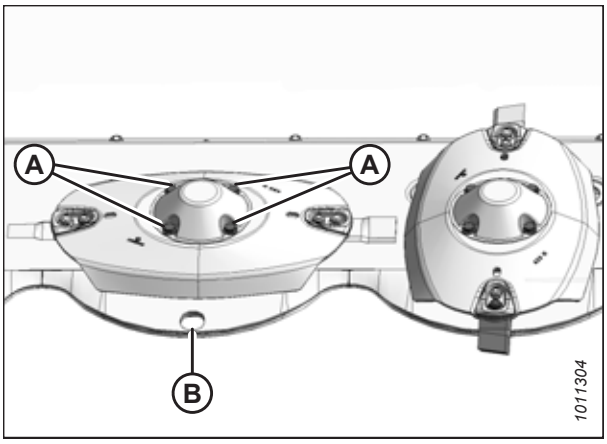


Figure 4.41: Cutterbar Disc Bolts

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

   IMPORTANT:

   The blades are oriented to cut in one direction or the other. Therefore, swap the entire disc when swapping spindles.

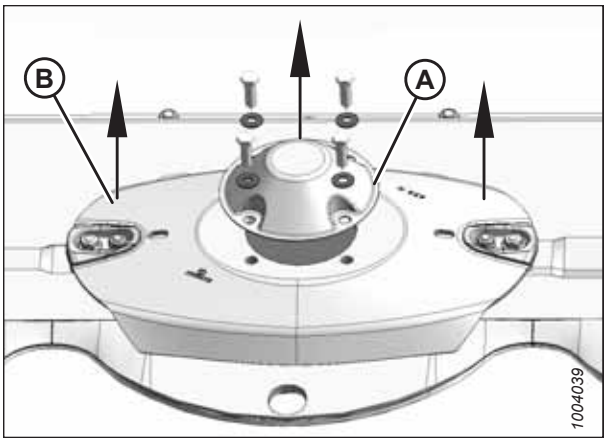


Figure 4.42: Cutterbar Disc and Cap

7. Remove spacer plate (A).

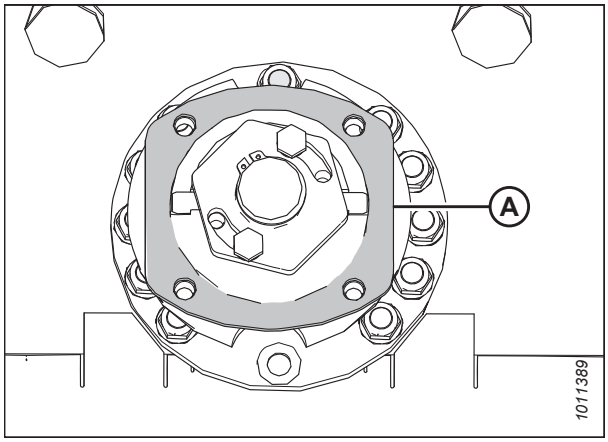


Figure 4.43: Spacer Plate

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

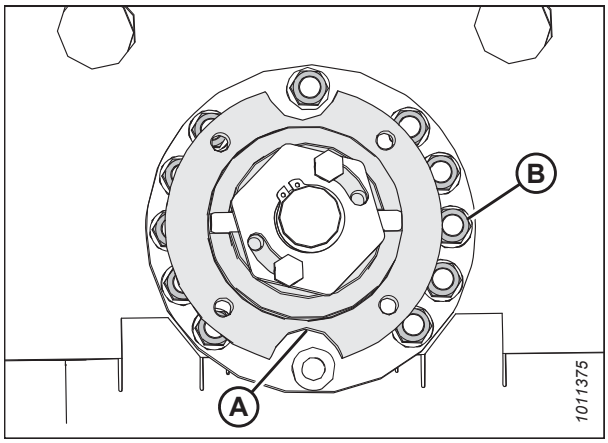


Figure 4.44: Left Spindle Hub and Hardware

9. Remove spindle (A) from the cutterbar.

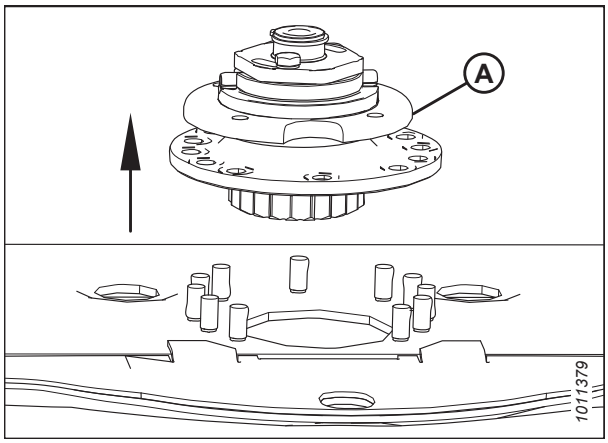


Figure 4.45: Left Spindle

Installing Cutterbar Spindles

Ensure that the discs are timed correctly when installing the cutterbar spindles, or damage to the cutterbar may result.

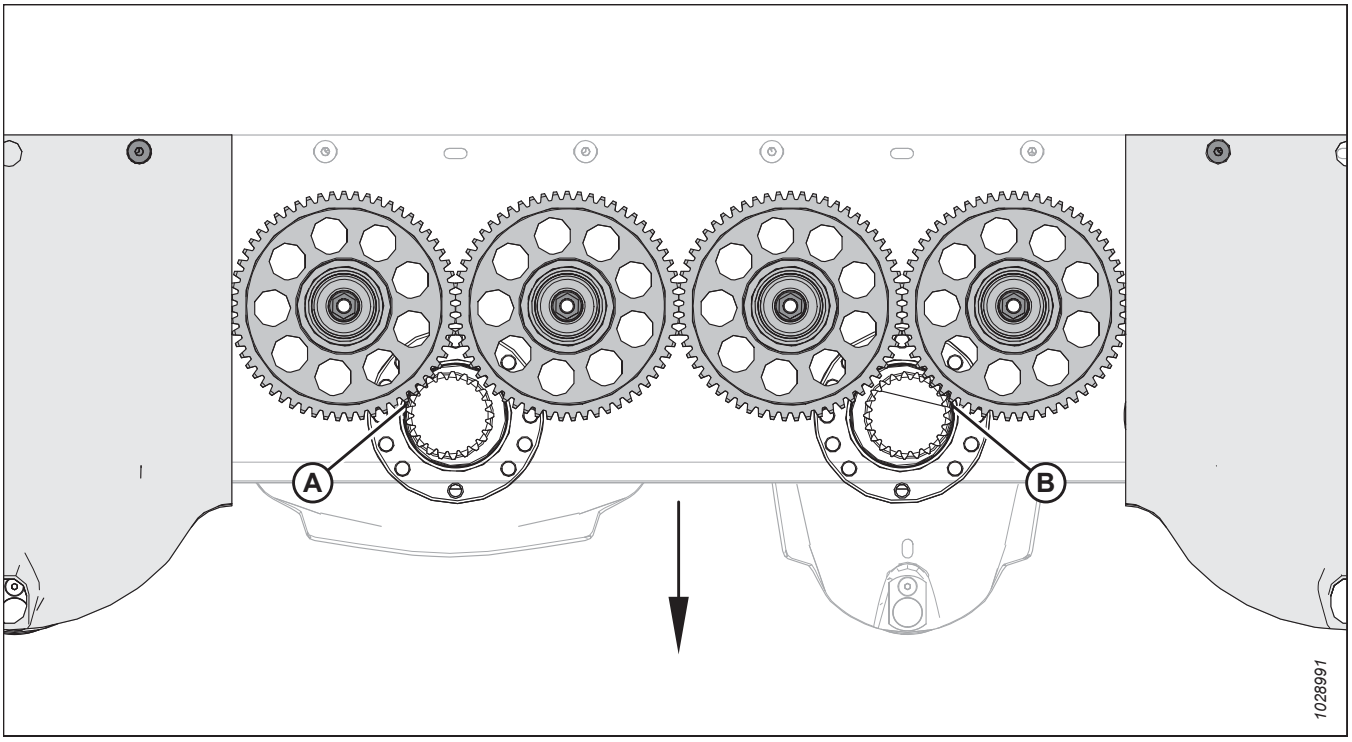


Figure 4.46: Underside of Cutterbar Spindles

NOTE:

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

- Spindles that rotate clockwise have left-leading threading
- Spindles that rotate counterclockwise have right-leading threading

IMPORTANT:

Right discs (A) and left discs (B) are timed and must be installed at a 90° angle relative to the neighboring discs. Misaligned discs could result in the following:

- Disc blades of co-rotating discs hitting each other
- Disc blades of diverging discs hitting adjacent discs

Inspect the disc timing using the disc timing tool before securing the spindle to the cutterbar. The disc is correctly timed if the spindle hub is aligned with the disc timing tool as shown in Figure *4.49, page 107*. Turn the disc by hand to ensure that the disc blades do **NOT** contact each other or those of adjacent discs. If the alignment is incorrect, lift the spindle clear of the mounting bolts, rotate the spindle 180° while ensuring that the base does not turn, and reinstall the spindle. Recheck the timing before securing the hub. Spindles do **NOT** need to be bolted to the disc timing tool; visual confirmation of the alignment is sufficient.

NOTE:

Remove the shield and retrieve disc timing tools (A) from the left rear side of the header.

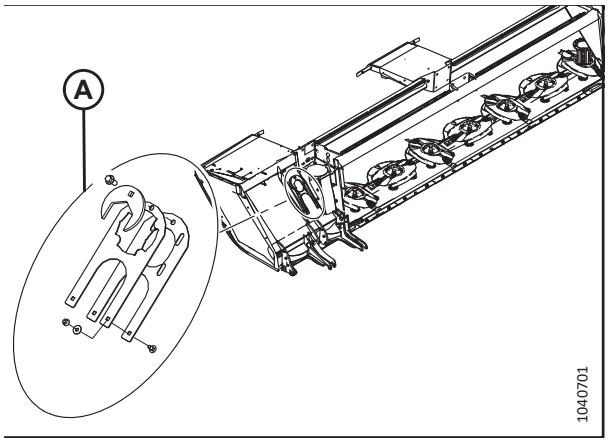


Figure 4.47: R1 Series Disc Timing Tool Location – Left Rear Side

NOTE:

Align disc timing tools (A) and (B) and secure them with M8 carriage head bolt (C), washer (D), and M8 flange hex nut (E).

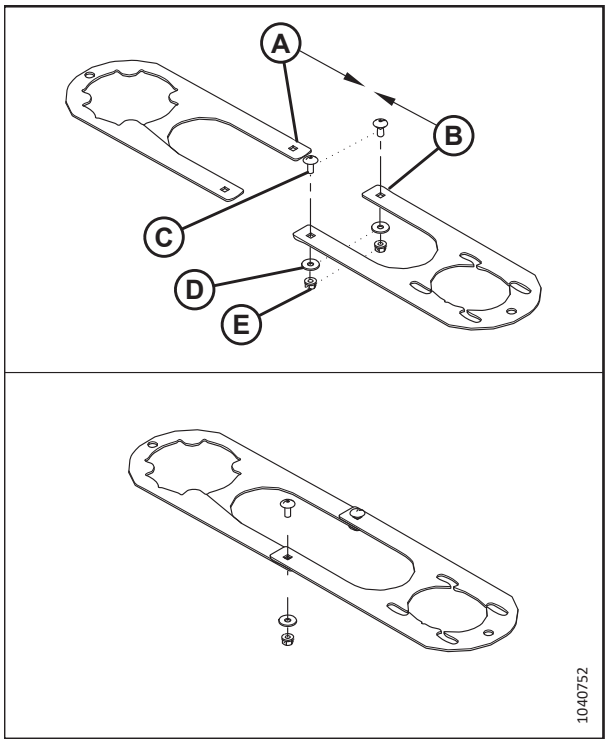


Figure 4.48: R1 Series Disc Timing Tool

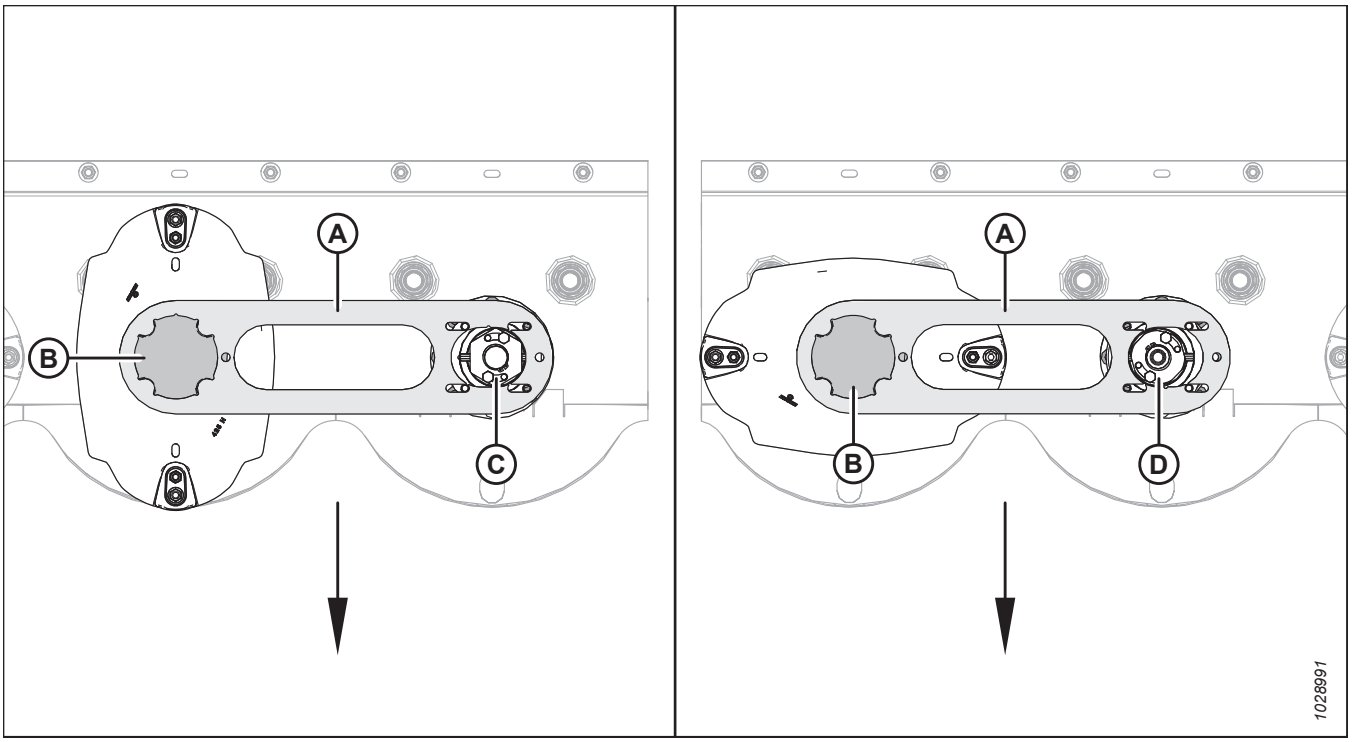


Figure 4.49: Checking Timing with Disc Timing Tool – View from Above

A - Disc Timing Tool
B - Cutter Disc Cap
C - Right Disc, Correct Timing
D - Left Disc, Correct Timing

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Park the machine on a flat, level surface.

   NOTE:

   To prevent oil spilling from the cutterbar while you are removing the disc spindles, ensure that the rotary disc header is on a flat, level surface and is tilted all the way back.

2. Position the rotary disc header at an appropriate height for the task.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.

5. Choose a suitable spindle rotation pattern. For more information, refer to *4.4.5 Replacing Cutterbar Spindles, page 102*.

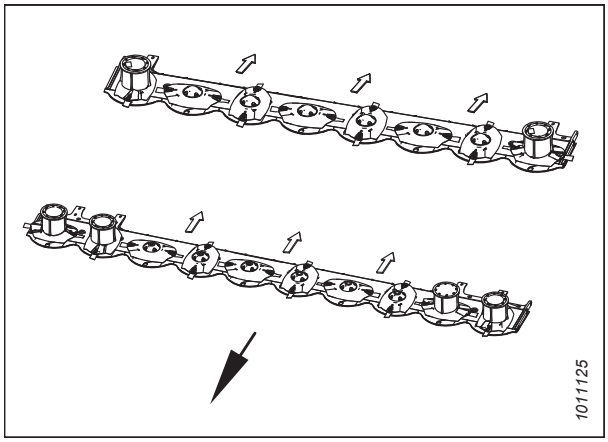


Figure 4.50: Cutterbars

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

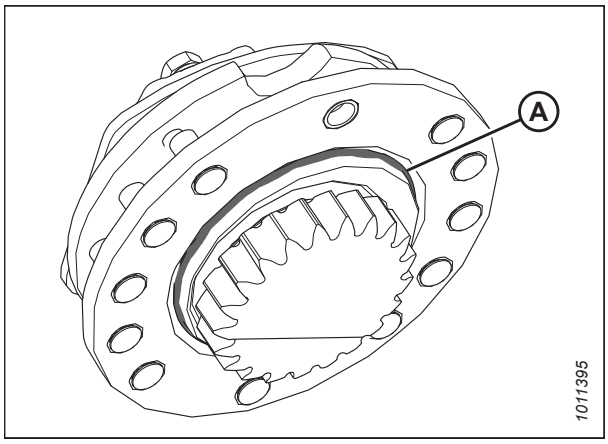


Figure 4.51: Left Spindle O-Ring

7. Insert spindle (A) into the cutterbar.

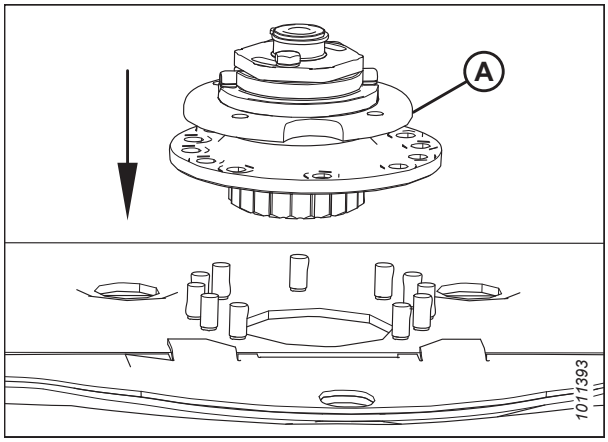


Figure 4.52: Left Spindle

8. Insert studs (A) into the spindle as shown.

   NOTE:

   The plugs are factory-installed as shown in position (B), but may loosen over time. Ensure that the studs are inserted into the proper location.

   IMPORTANT:

   Ensure that the clockwise spindles rotate clockwise and that the counterclockwise spindles (with machined grooves) rotate counterclockwise.

   IMPORTANT:

   The offset gear design of the cutterbar makes it possible to install spindles that rotate in the wrong direction. This will prevent discs from spinning up after impact, resulting in cutterbar component damage.

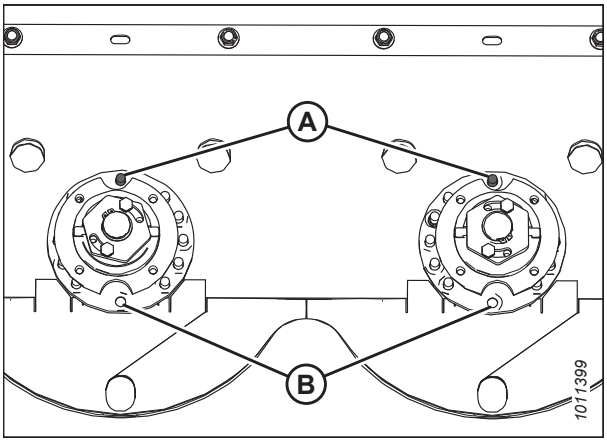


Figure 4.53: Spindle Orientation

9. Check and adjust the disc timing as follows:

   NOTE:

   There are an odd number of teeth on the cutterbar gears; this can make aligning the spindle hub challenging.

   a. Place one end of disc timing tool (A) on adjacent disc (B) and the other end on the left spindle as shown.

   b. Check bolt hole alignment (C) as shown.

   c. If the alignment is slightly off, lift the spindle and rotate it one tooth in either direction to try and line up the bolt holes.

   d. Recheck the timing using the disc timing tool. If the discs are still not lining up, lift the spindle and rotate the hub 1/4 turn at a time. Recheck the timing using the disc timing tool.

   e. Repeat the disc alignment procedure until the bolt holes are aligned.

      NOTE:

      The arrow in the illustration points to the front of the header.

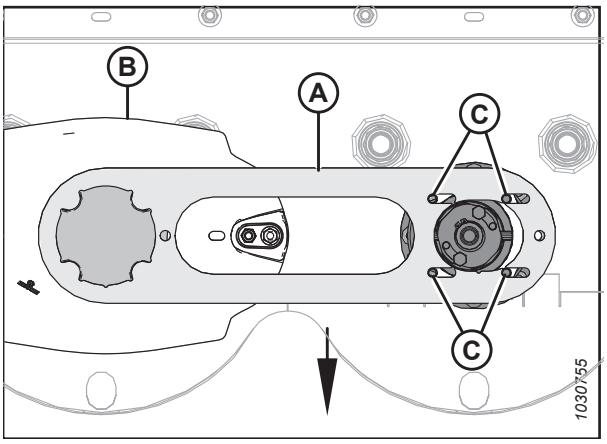


Figure 4.54: Alignment Tool

10. Ensure that hub (A) is fully seated into the cutterbar before tightening nuts (B).

11. Rotate spindle hub (A) to access the studs, and install 11 M12 lock nuts (B) and washers.

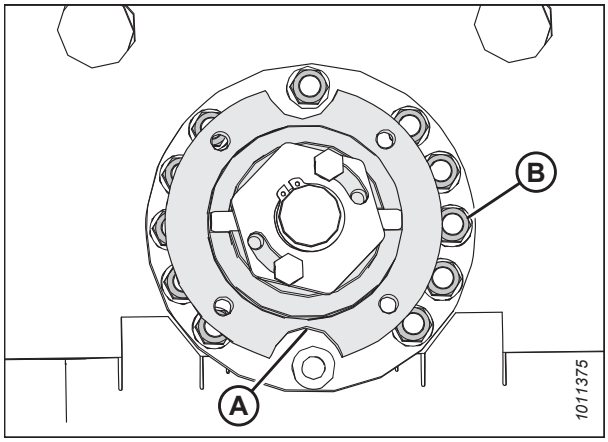


Figure 4.55: Left Spindle Hub

12. Torque the bolts to 50 Nm (37 lbf·ft), following the tightening pattern shown.

    NOTE:

    The hub has been removed from the illustration for clarity.

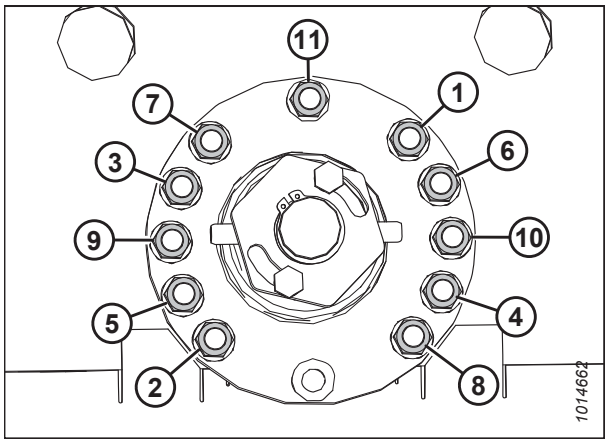


Figure 4.56: Tightening Pattern

13. Install spacer plate (A).

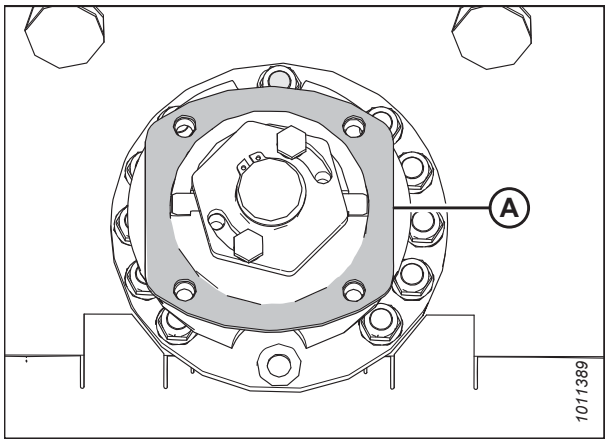


Figure 4.57: Spacer Plate

14. Place a pin (or equivalent) in front hole (D) of the rock guard to prevent the disc from rotating while you are tightening the bolts.

    IMPORTANT:

    The blades are oriented to cut in one direction or the other. Therefore, swap the entire disc when swapping spindles.

15. Position disc (A) on the spindle, ensuring that it is positioned at a 90° angle relative to the adjacent discs.

    NOTE:

    Turn disc (A) by hand to ensure that the disc blades do not contact each other or adjacent discs.

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

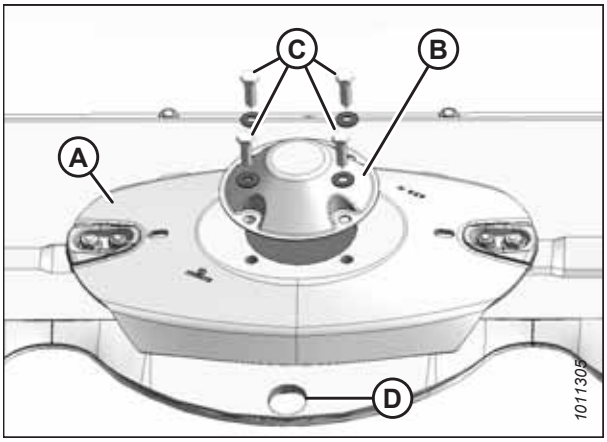


Figure 4.58: Cutterbar Disc and Cap

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

17. Remove the pin (or equivalent) from the front hole of the rock guard.

18. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

4.4.6 Reconfiguring Cutterbar Crop Stream

Discs are factory-installed to produce three crop streams; however, the disc rotation pattern can be changed by changing the spindle and its disc to suit crop conditions. Each spindle and disc pair is designed to rotate in one direction, and must be changed as a set when the crop flow is altered.

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. This may negatively affect the quality of the cutting.

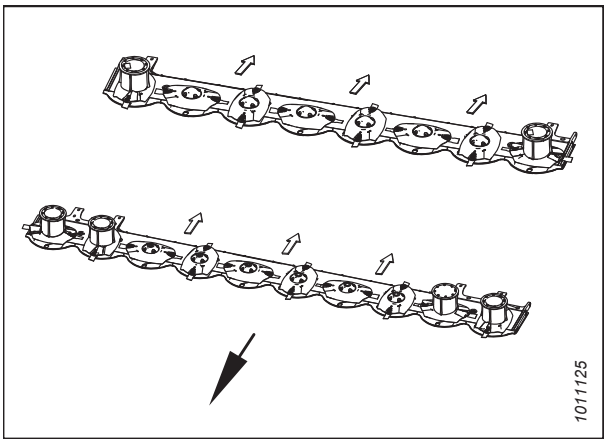


Figure 4.59: Cutterbars

IMPORTANT:

- Spindles that rotate clockwise have right-leading threading and are identified by a smooth top on spindle gear shaft (A).
- Spindles that rotate counterclockwise have left-leading threading and are identified by machined grooves on spindle gear shaft (B) and nut (C).
- If the spindle position in the cutterbar has changed, the rotational direction of that spindle **MUST** remain the same (that is, a clockwise spindle must maintain its clockwise rotation).
- Failure to maintain the rotation pattern can result in damage to the spindle and/or to the cutterbar components.
- The shear pin will not perform properly if the spindles used are in the wrong orientation.

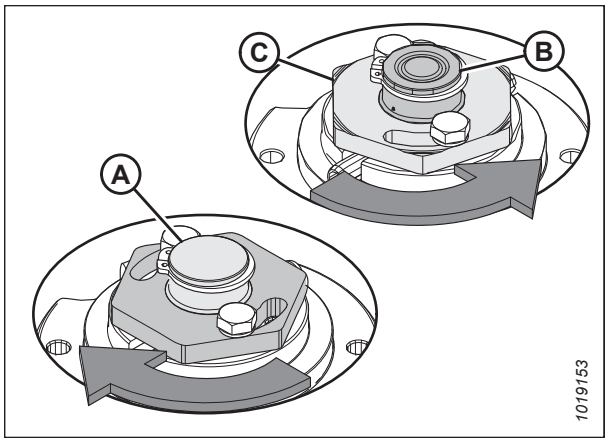
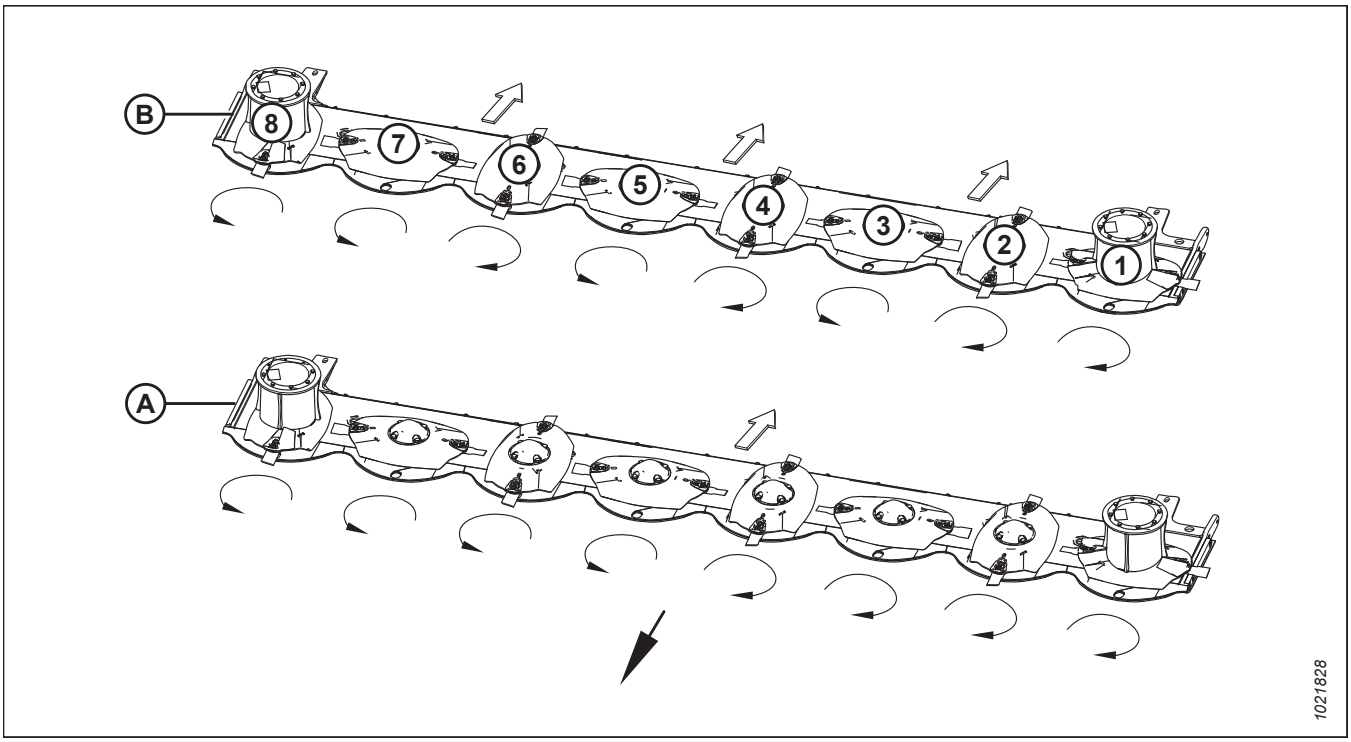


Figure 4.60: Cutterbar Spindles

Changing Eight Disc Cutterbar Crop Stream Configuration

Two crop stream settings are possible: one stream and three streams.

Figure 4.61: Spindle Rotation Pattern and Crop Streams (8 Disc)



A - One Crop Stream **B - Three Crop Streams**

To change (8 disc) spindle rotation from three crop streams (B) to one crop stream (A):

- Swap disc/spindle (3) with disc/spindle (6)

To change (8 disc) spindle rotation from one crop stream (A) to three crop streams (B):

- Swap disc/spindle (6) with disc/spindle (3)

For instructions, refer to *Removing Cutterbar Spindles, page 102* and *Installing Cutterbar Spindles, page 105*.

Changing Ten Disc Cutterbar Crop Stream Configuration

Multiple crop stream settings are possible.

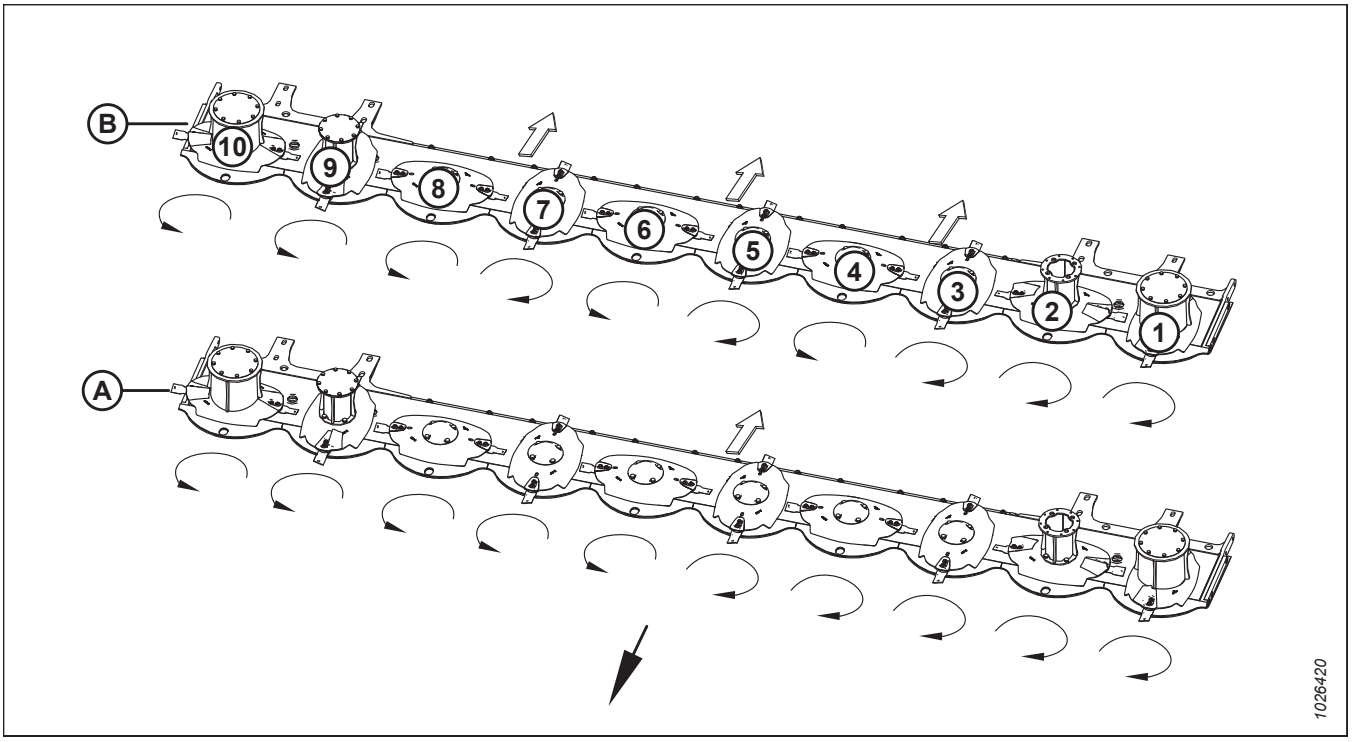


Figure 4.62: Spindle Rotation Pattern and Crop Streams (10 Disc)

A - One Crop Stream **B - Three Crop Streams**

To change (10 disc) spindle rotation from one crop stream (A) to three crop streams (B),

- Swap disc/spindle (7) with disc/spindle (4)

To change (10 disc) spindle rotation from three crop streams (B) to one crop stream (A),

- Swap disc/spindle (4) with disc/spindle (7)

For instructions, refer to *Removing Cutterbar Spindles, page 102* and *Installing Cutterbar Spindles, page 105*.

4.4.7 Maintaining Disc Blades

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

Each blade (A) 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 worn or damaged.

IMPORTANT:

Always use factory replacement parts.

NOTE:

Discs are equipped with 18° bevel-down blades; 11° bevel-down blades are offered as a non-standard option. For more information, refer to the header parts catalog.

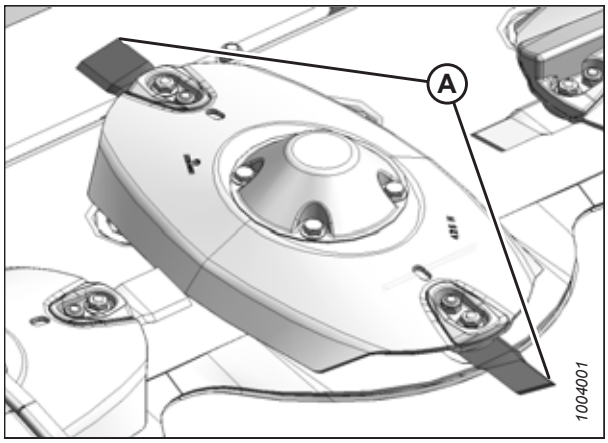


Figure 4.63: Disc blades

Inspecting Disc Blades

The blades on the rotary disc header's discs should be inspected daily and flipped or replaced as needed.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

WARNING

Damaged or loose disc blades or blade attachment hardware can be ejected during machine operation and may cause personal injury or machine damage.

IMPORTANT:

Damaged blades cut poorly and may damage the cutterbar. Replace damaged blades immediately.

1. Position the rotary disc header at an appropriate height for the task.
2. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
3. On a daily basis, check that the disc blades are securely attached to the disc.
4. Inspect the blades for cracks, blade wear (A), and holes (B), which may have widened beyond safe operating limits (C).
5. Replace any potentially damaged blades immediately.

IMPORTANT:

Blades should be replaced in pairs so that the disc remains balanced.

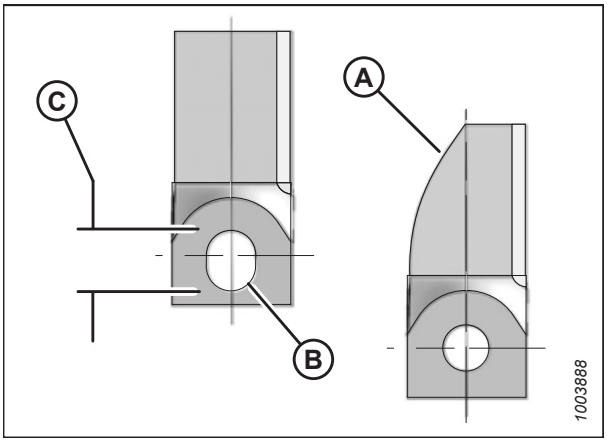


Figure 4.64: Disc Blades

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

IMPORTANT:

The disc blades have cutting edges on both sides so that the blades can be turned over and reused. The twist in each blade determines the cutting direction. If you are unsure which direction the spindles rotate, refer to for instructions.

- *Changing Eight Disc Cutterbar Crop Stream Configuration, page 112*
- *Changing Ten Disc Cutterbar Crop Stream Configuration, page 113*

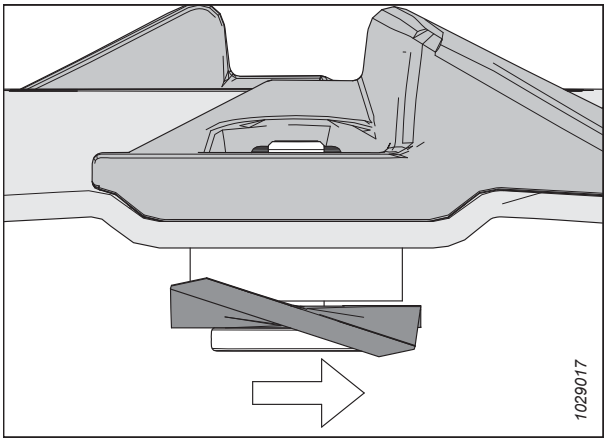


Figure 4.65: Counterclockwise Disc Rotation

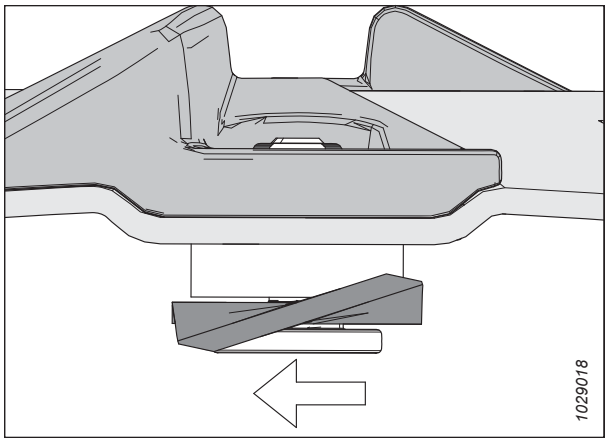


Figure 4.66: Clockwise Disc Rotation

Inspecting Disc Blade Hardware

Inspect the blade attachment hardware each time the blades are changed.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

WARNING

Damaged or loose disc blades or blade attachment hardware can be ejected during machine operation and may cause personal injury or machine damage.

For hardware replacement instructions, refer to *Removing Disc Blades, page 118* and *Installing Disc Blades, page 119*.

1. Shut down the engine, and remove the key from the ignition.

2. When inspecting the blades, check each blade-attachment bolt and replace it if:
   - The bolt has been removed and installed five times
   - Head (A) is worn flush with the bearing surface of the blade
   - Diameter (B) of the bolt neck is 3 mm (1/8 in.) or less
   - The bolt is cracked (C)
   - The bolt is visibly distorted (D)
   - The bolt shows evidence of interference (E) with adjacent parts

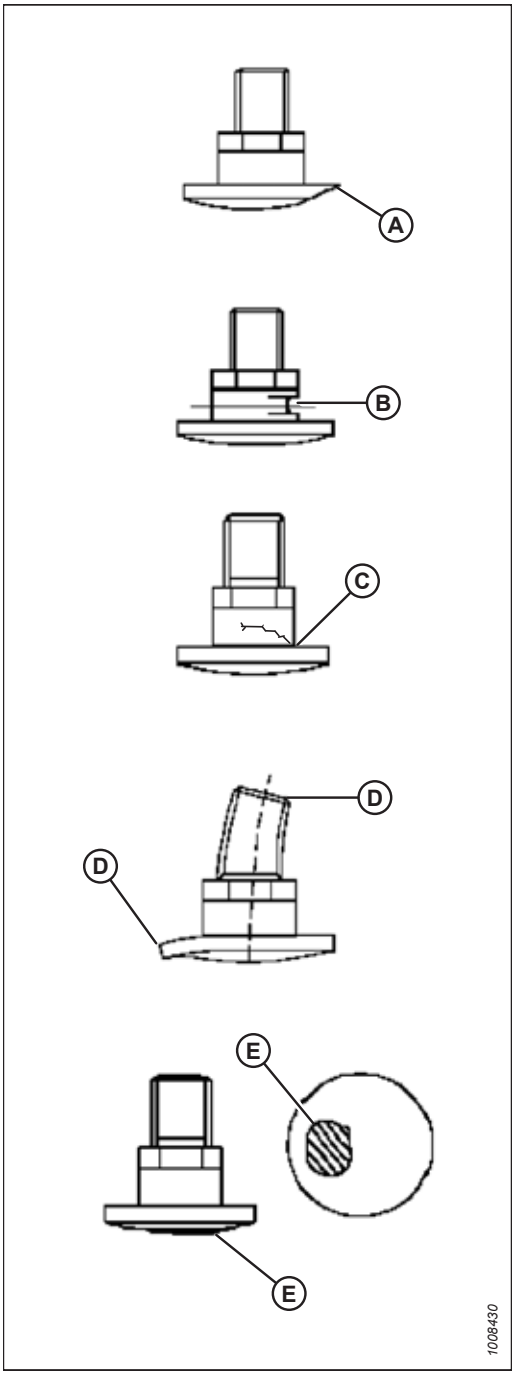


Figure 4.67: Disc Blade Bolts

3. Check the nuts holding the disc blades. Replace the nuts if:
   - The nut has been previously installed; nuts are one-time-use items only.
   - The nut shows signs of wear (A) such that the nut has lost more than half the original height (B) in one or more areas.
   - The nut is cracked.

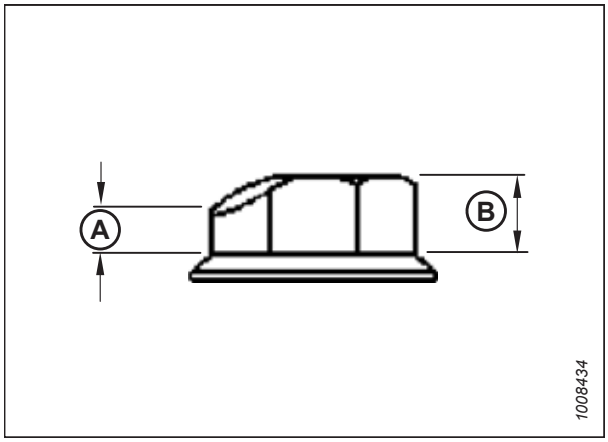


Figure 4.68: Disc Blade Nut

Removing Disc Blades

Be sure to use new nuts whenever you are replacing or flipping disc blades.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

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

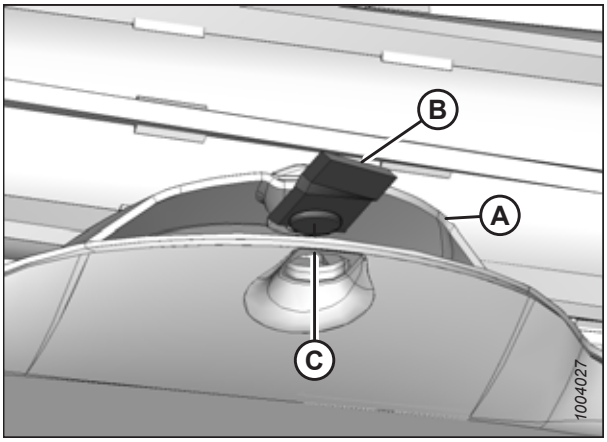


Figure 4.69: Disc Blade Aligned with Hole in Rock Guard

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

   IMPORTANT:

   Nuts are one-time use items. When flipping or replacing a blade, replace it using a **NEW** nut.
8. Remove shoulder bolt (B) and blade (C).

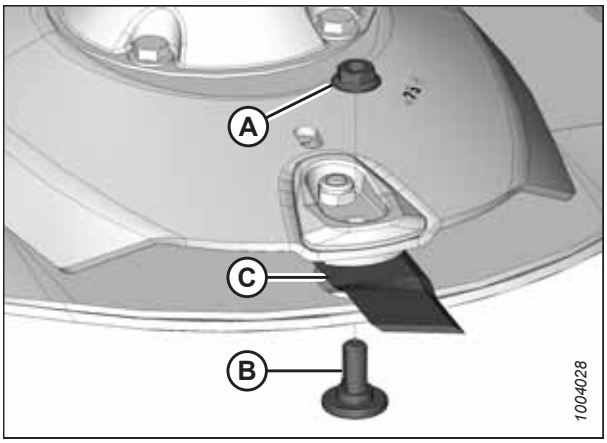


Figure 4.70: Disc Blade

Installing Disc Blades

Check the disc blade hardware for damage while you are installing the disc blades. Be sure to always use new nuts when installing disc blades.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

IMPORTANT:

If you are unsure in which direction the spindles rotate, refer to *4.4.6 Reconfiguring Cutterbar Crop Stream, page 111*.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Place a pin (or equivalent) in the front hole of the rock guard to prevent the disc from rotating while you are tightening the blade bolts.
5. Install new or reversed blade (A) with shoulder bolt (B) onto disc (C).

   IMPORTANT:

   Nuts are one-time use items. When flipping or replacing a blade, replace it with a **NEW** nut.
6. Install new nut (D) and torque it to 125 Nm (92 lbf·ft).

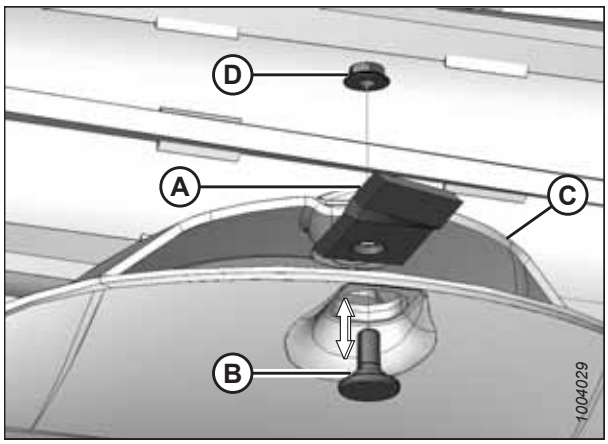


Figure 4.71: Disc Blade

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

7. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

4.4.8 Maintaining Quick Change Blade System – Option

The following topics outline maintenance procedures for the optional Quick Change Blade (QCB) system.

Inspecting Retaining Bolts

Check the thickness of the retaining bolts and the quick change plate using the supplied gauge.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

DANGER

To avoid serious injuries or death due to insufficient thickness of material on the retaining bolts, check the thickness (A) of the retaining bolts every time a blade is changed. Damaged or worn retaining bolts must always be replaced in pairs at each cutting disc.

- Material thickness of retaining bolts (A) must **NOT** be less than 14 mm (9/16 in.) (C) at the narrowest point.
- Material thickness at the quick change plate must **NOT** be less than 3 mm (1/8 in.) (D) at the narrowest point.

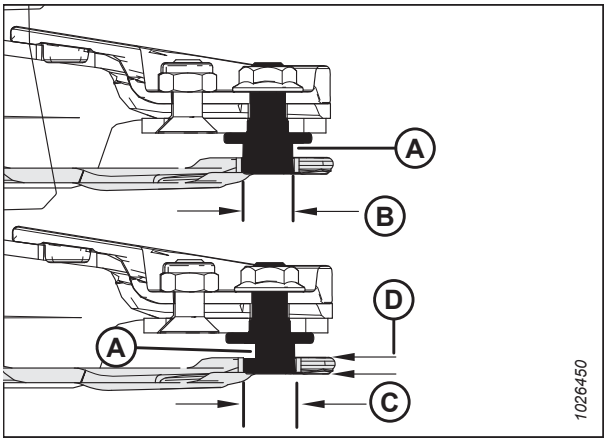


Figure 4.72: Retaining Bolt and Quick Change Plate

A - Retaining Bolt
B - 17 mm (11/16 in.)
C - 14 mm (9/16 in.)
D - 3 mm (1/8 in.)

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Remove hairpin clip (A).
5. Remove pin (B).
6. Remove change tool (C).

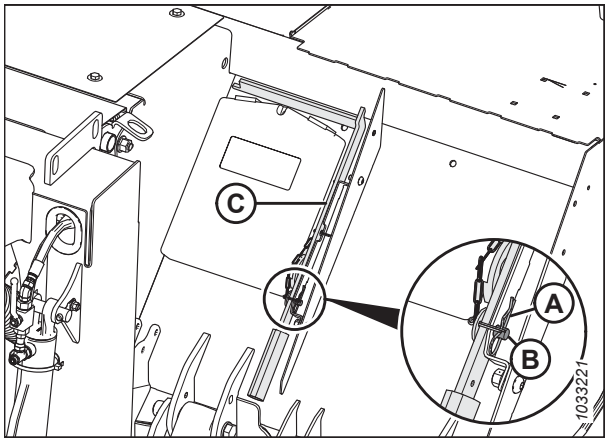


Figure 4.73: Installing Quick Change Blade

7. Remove gauge (A) on change tool (B).

   NOTE:

   Section (C) of the gauge is used to check the material thickness of the retaining bolts; section (D) of the gauge is used to check the outer radius of the quick change plate.

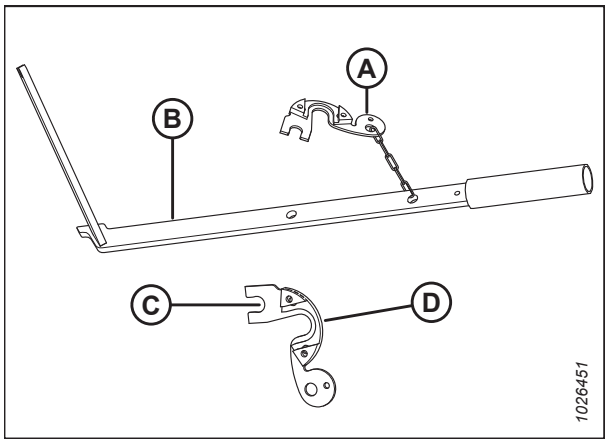


Figure 4.74: Change Tool and Gauge

8. Thoroughly clean the area around and between the retaining bolts and the quick change plate.
9. Remove the blade. For instructions, refer *Replacing Quick Change Blades, page 125*.
10. Place gauge (A) over the retaining bolt and rotate 90°.
    - If it is **NOT** possible to slide the gauge over the retaining bolt during the rotation, then the retaining bolt is still in working order.
    - If it **IS** possible to slide the gauge over the retaining bolt during rotation, then the retaining bolt must be replaced immediately.

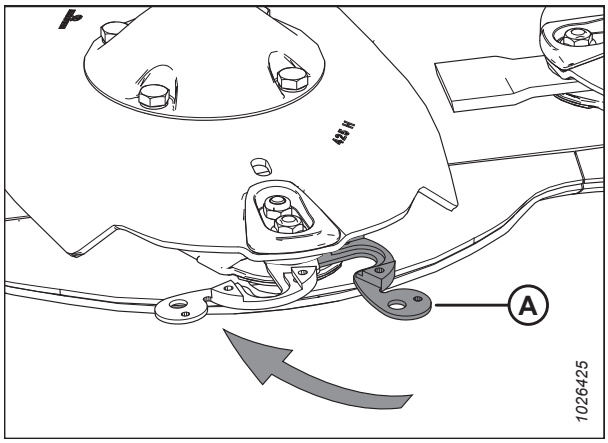


Figure 4.75: Checking Retaining Bolts

Inspecting Quick Change Plates

Check the thickness of the retaining bolts and the quick change plate using the supplied gauge.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

DANGER

To avoid serious injury or death due to worn quick change plate, check the plates for damage before and after each use. The wear limit of the quick change plate is reached when the application seam is worn away at one point. The wear limit must be checked with a gauge.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Remove hairpin clip (A).
5. Remove pin (B).
6. Remove change tool (C).

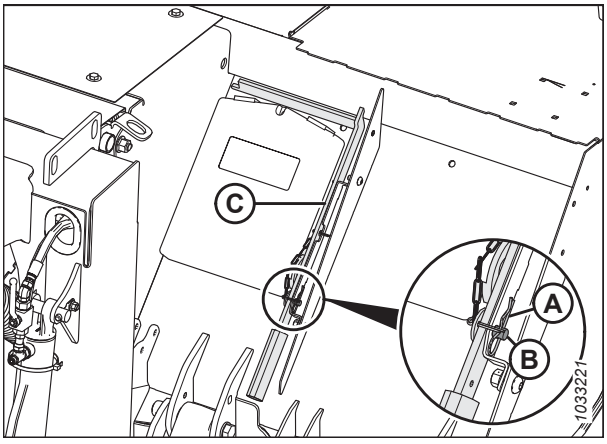


Figure 4.76: Installing Quick Change Blade

7. Remove gauge (A) from change tool (B).

   NOTE:

   Section (C) of the gauge is used to check the material thickness of the retaining bolts; section (D) of the gauge is used to check the outer radius of the quick change plate.

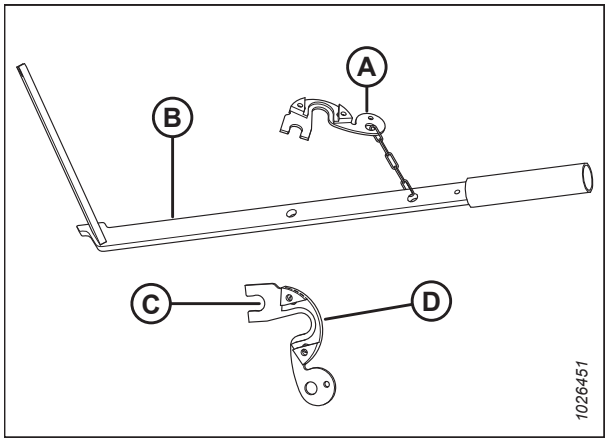


Figure 4.77: Change Tool and Gauge

8. Thoroughly clean the area around and between the retaining bolt and the quick change plate.

9. Place gauge (A) against the retaining bolt of the quick change plate (B) as far as it will go.

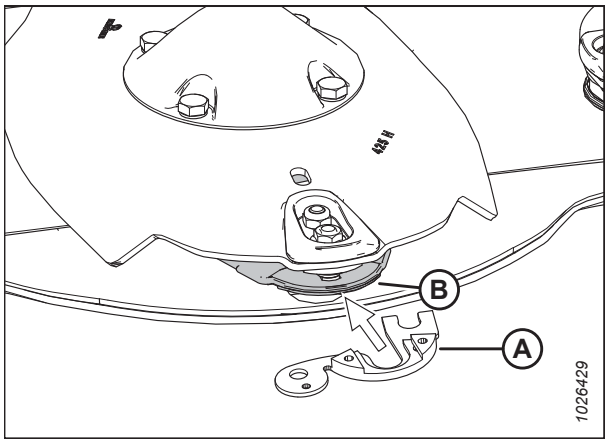


Figure 4.78: Gauge and Quick Change Plate

- If the outer radius of quick change plate (B) aligns with or is outside the outer radius of gauge (A), the quick change plate has not yet reached its wear limit.
- If the outer radius of the quick change plate (B) does **NOT** align with the outer radius of gauge (A), the quick change plate must be replaced.

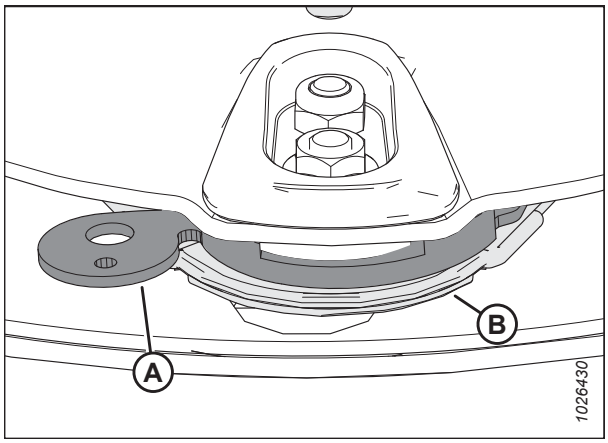


Figure 4.79: Gauge and Change Plate Aligned

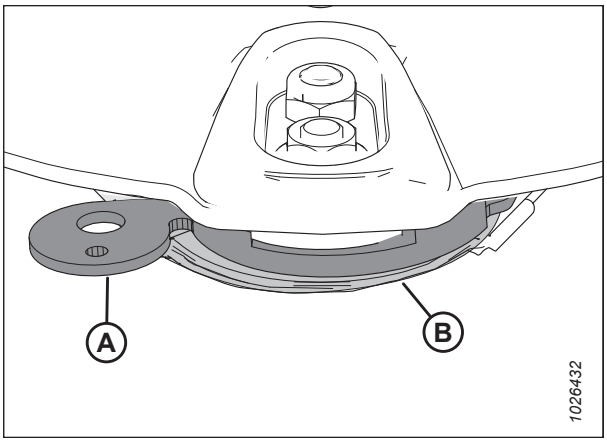


Figure 4.80: Gauge and Change Plate Unaligned

Replacing Quick Change Blades

If the optional quick change blade kit is installed, replace blades as required.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Remove hairpin clip (A).
5. Remove pin (B).
6. Remove blade change tool (C) from the storage location.
7. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.

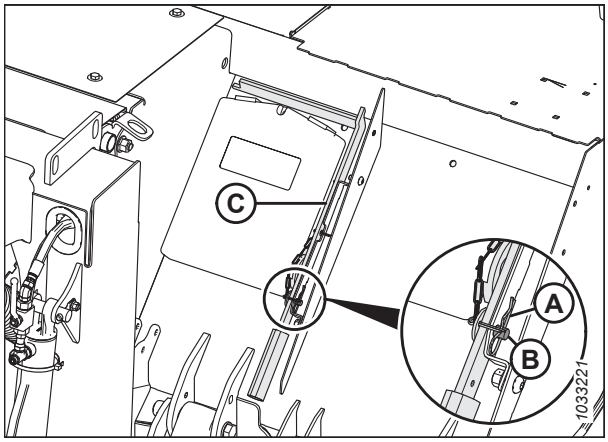


Figure 4.81: Blade Change Tool Storage Location

8. Slide the flat bar on quick blade change tool (A) between disc (B) and quick change plate (C) from the side.

   NOTE:

   If required, remove any material that has collected between quick change plate (C) and the rock guard.

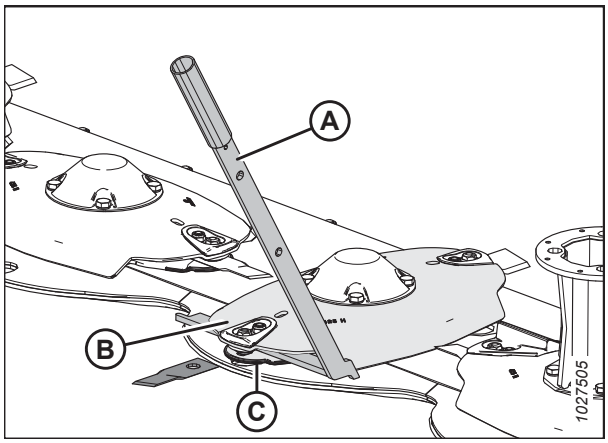


Figure 4.82: Blade Change Tool

IMPORTANT:

Check that the flat bar on blade change tool (A) is touching on both sides of the disc at location (B).

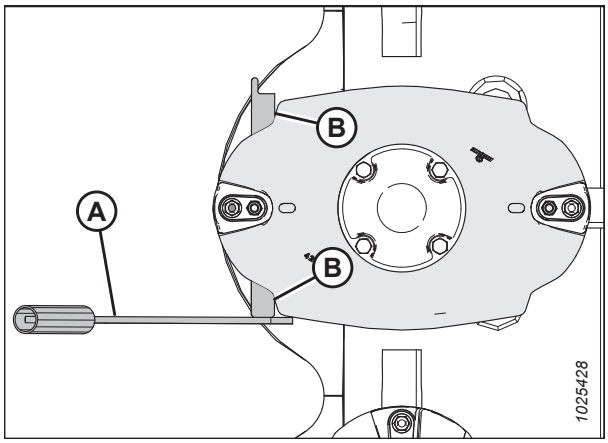


Figure 4.83: Correct Positioning of Blade Change Tool

9. Pull down on blade change tool (A), separate disc (B) from quick change plate (C), and remove old blade (D) from blade bolt (E). Push blade change tool (A) upward to return quick change plate (C) to the closed position.

10. Pull down on blade change tool (A) and separate disc (B) from quick change plate (C). Insert new blade (D) on blade bolt (E).

11. Push blade change tool (A) upward, enclosing new blade (D) in the disc assembly.

12. Return the blade change tool to the storage location.

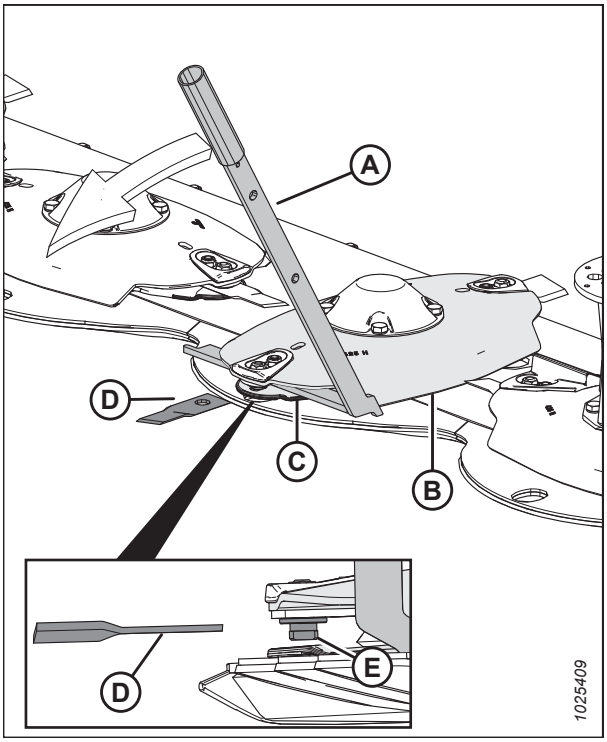


Figure 4.84: Installing Quick Change Blade

4.4.9 Accelerators

Accelerators are mounted on each outboard disc and are designed to quickly move cut material off the disc and into the conditioner.

A pair of accelerators (A) is installed on each disc which is topped with a drum:

- Two pairs of accelerators are installed on an 8 disc cutterbar (one pair on the outboard disc at each end of the cutterbar)
- Four pairs of accelerators are installed on a ten disc cutterbar (one pair on each of the two outboard discs at each end of the cutterbar)

Periodically inspect the accelerators for damage and loose or missing fasteners. Replace damaged components as necessary.

IMPORTANT:

Always replace accelerators in pairs to ensure that the discs remain balanced.

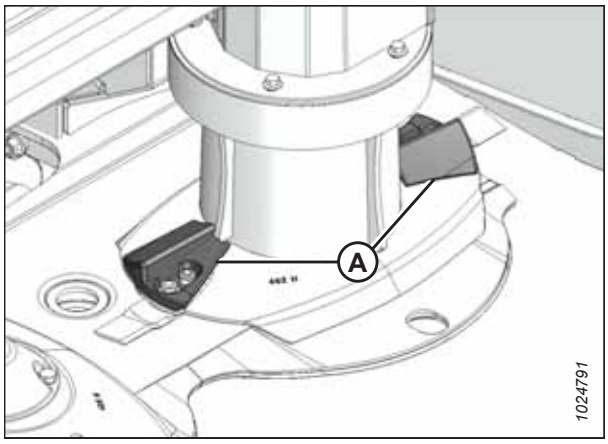


Figure 4.85: Eight Disc Cutterbar Accelerators

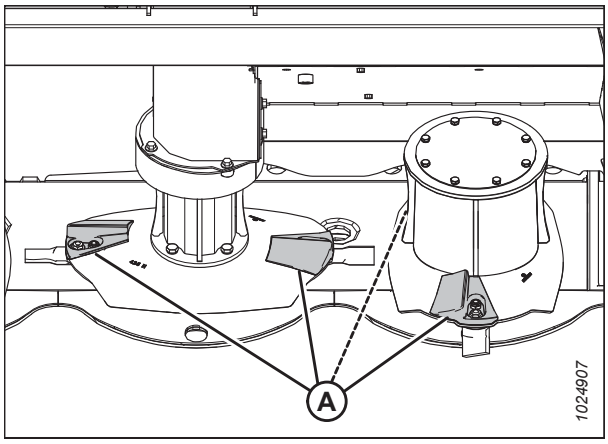


Figure 4.86: Ten Disc Cutterbar Accelerators

Inspecting Accelerators

Accelerators should be inspected regularly to ensure that they are in good condition and can effectively move crop off the disc and into the conditioner.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Inspect accelerators (A) for damage and wear. Replace accelerators if they are worn to 50% or more of their original height or if they are no longer effectively moving crop.

   IMPORTANT:

   Always replace accelerators in pairs to ensure that the discs remain balanced.
6. Tighten or replace loose or missing fasteners.

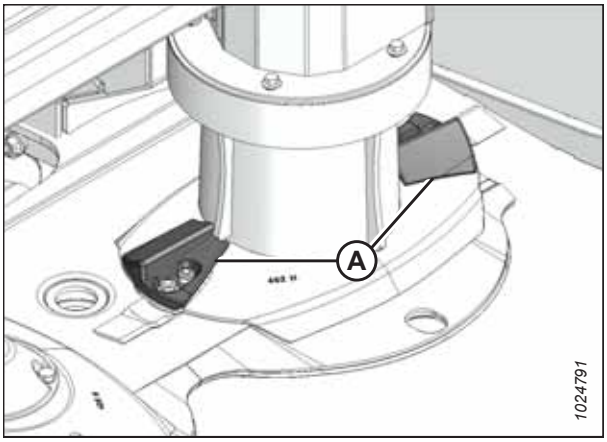


Figure 4.87: Eight Disc Cutterbar Accelerators

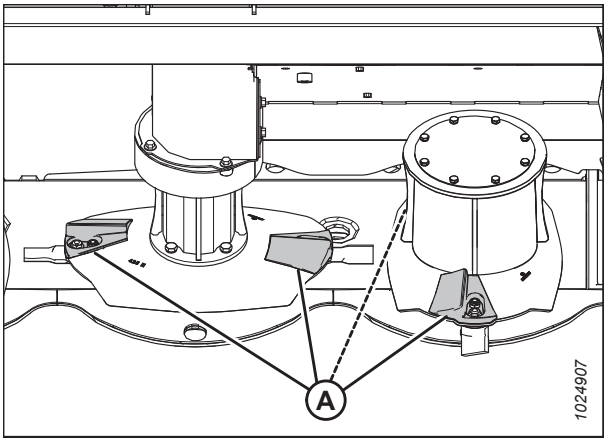


Figure 4.88: Ten Disc Cutterbar Accelerators

Removing Accelerators

Accelerators need to be removed from cutterbar discs when they are damaged, or when they become worn out and can't effectively move crop from the discs to the conditioner.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

IMPORTANT:

Always replace accelerators in pairs to ensure that the discs remain balanced.

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Remove nut (A), flange bolt (B), and disc blade (C) from the disc. Discard the nut.

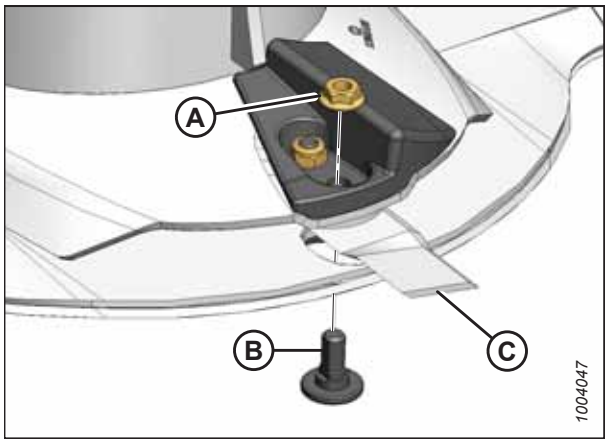


Figure 4.89: Accelerator Removal

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

7. Repeat Steps *5, page 130* and *6, page 131* to remove the second accelerator.

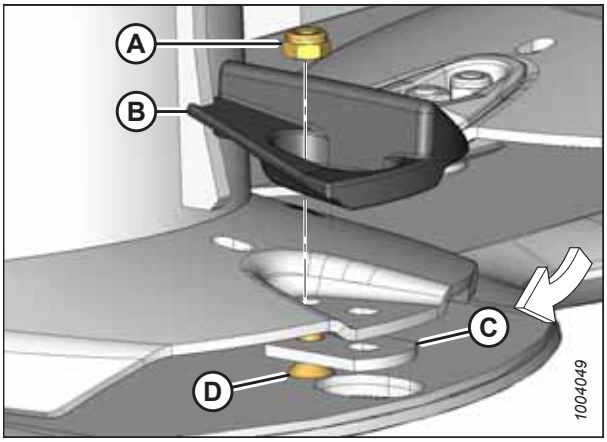


Figure 4.90: Accelerator Removal

Installing Accelerators

A new pair of accelerators should be installed on a cutterbar disc whenever the old ones are damaged or worn to the extent that they can no longer effectively move crop off the disc and into the conditioner.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with, or near, blades.

IMPORTANT:

Always replace accelerators in pairs to ensure that the discs remain balanced.

1. Position the rotary disc header at an appropriate height for the task.

2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:

   a. Place blocks under each end, or just inside each end, of the cutterbar.

   b. Lower the rotary disc header onto the blocks.

   c. Shut down the engine, and remove the key from the ignition.

   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Place a wooden block between two cutterbar discs to prevent the discs from rotating while you are tightening the blade bolts.

   IMPORTANT:

   Accelerators are unidirectional: both clockwise and counterclockwise accelerators are used on the cutterbar. Verify the direction of the disc before installing any accelerators. If you are unsure in which direction the spindle rotates, refer to *4.4.5 Replacing Cutterbar Spindles, page 102*.

5. Install lock nut (A), accelerator (B), blade holder (C), and hex-socket bolt (D). Do **NOT** tighten the hardware yet.

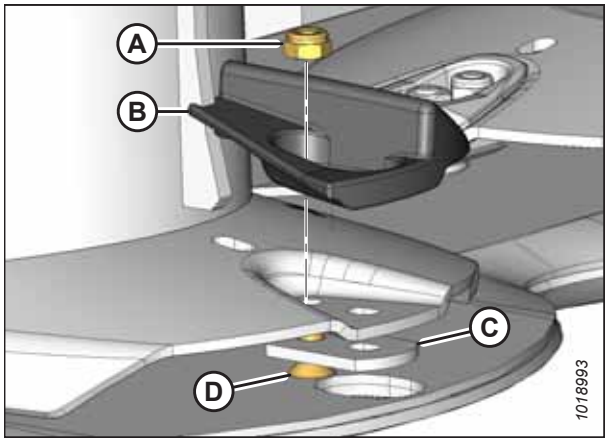


Figure 4.91: Accelerator Install

6. Install new nut (A), flange bolt (B), and disc blade (C) onto the disc.

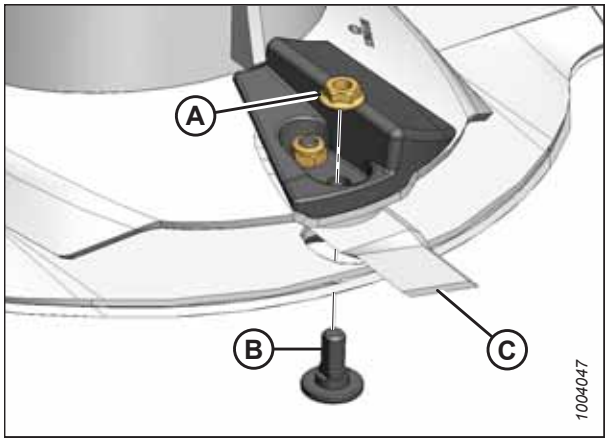


Figure 4.92: Accelerator Install

7. Torque inside nut (A) to 58 Nm (43 lbf·ft).
8. Torque outside nut (B) (closest to the blade) to 125 Nm (92 lbf·ft).
9. Repeat Steps *4, page 132* to *8, page 132* to replace the second accelerator.

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

10. Remove the wooden block.
11. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

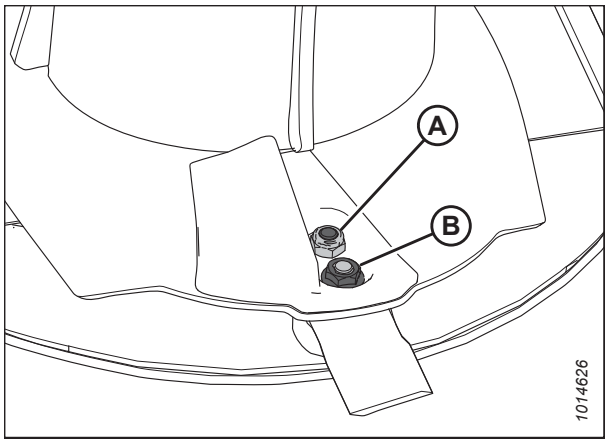


Figure 4.93: Accelerator Install

4.4.10 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 into contact with stones and other debris. Periodically inspect the rock guards for damage. Replace them as necessary.

Inspecting Rock Guards

Rock guards protect the cutting blades from damage. Inspect them periodically to ensure they are not damaged or worn out.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Inspect the rock guards for wear, cracks, damage, or distortion. Replace any rock guard if it is worn to 75% or less of its original thickness.

   NOTE:

   The factory thickness of the rock guards is 5 mm (0.2 in.).
5. Check the guards for loose or missing fasteners. Tighten or replace the fasteners as needed.

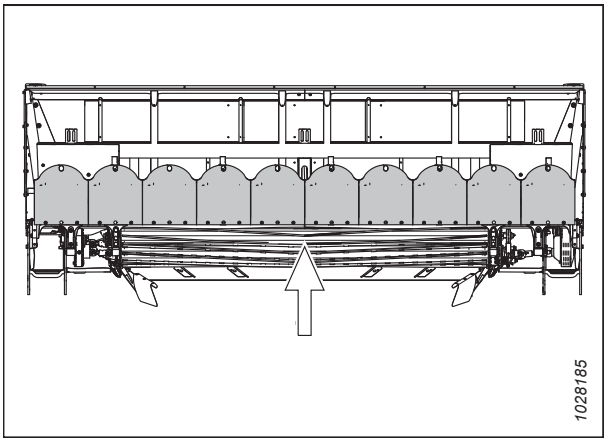


Figure 4.94: Rock Guards

Removing Inboard Rock Guards

Remove any damaged or worn rock guards to maximize the life of the cutting blades.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Remove two hex head screws, washers, and lock nuts (A).

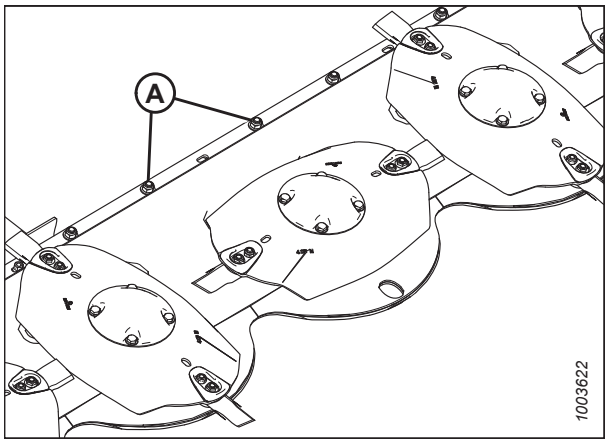


Figure 4.95: Inboard Rock Guards

5. Slide inboard rock guard (A) forward (in the direction of arrow [B]) and remove it.

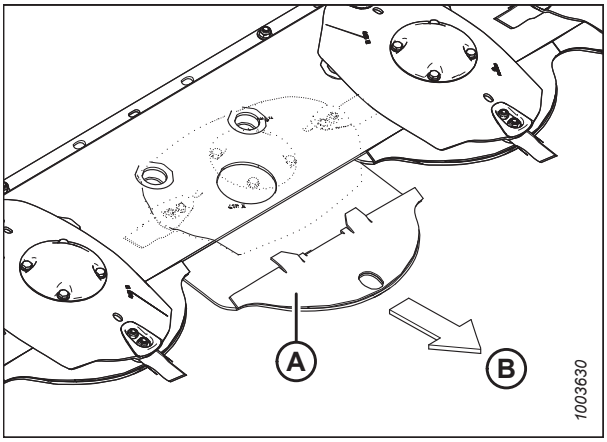


Figure 4.96: Inboard Rock Guards

Installing Inboard Rock Guards

Ensure that the nuts securing the rock guards are installed on top of the cutterbar when installing an inboard rock guard.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Guide the inboard rock guard onto the cutterbar until tabs (A) sit on top of the cutterbar, and the bottom back bolt holes in the rock guard line up with the holes in the cutterbar.

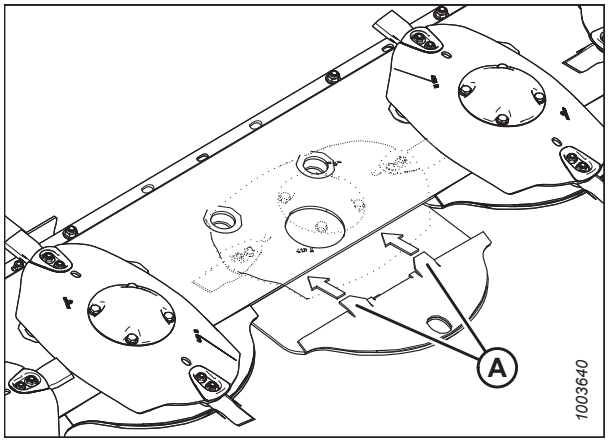


Figure 4.97: Inboard Rock Guards

5. Install two hex head screws, washers, and lock nuts (A). Torque the hardware to 68 Nm (50 lbf·ft).

   NOTE:

   Lock nuts (A) must be installed on top of the cutterbar.

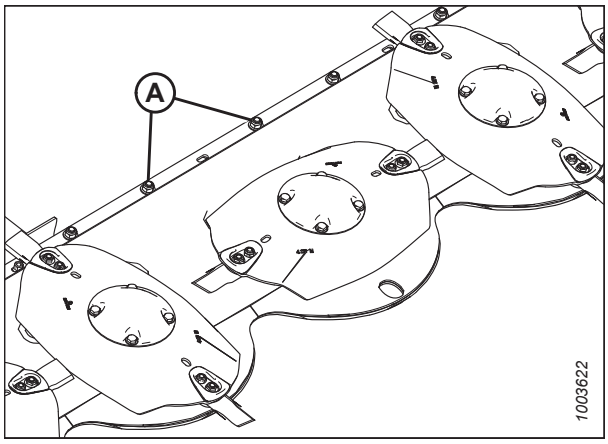


Figure 4.98: Inboard Rock Guards

Removing Outboard Rock Guards

The outboard rock guards are secured to the cutterbar with more hardware than the inboard rock guards.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Locate rock guard (B) on the bottom outboard end of the cutterbar. There is one guard on each end of the cutterbar.
5. Remove two hex head screws (A).
6. Remove washers and lock nuts (C) securing rock guard (B) to the cutterbar assembly.

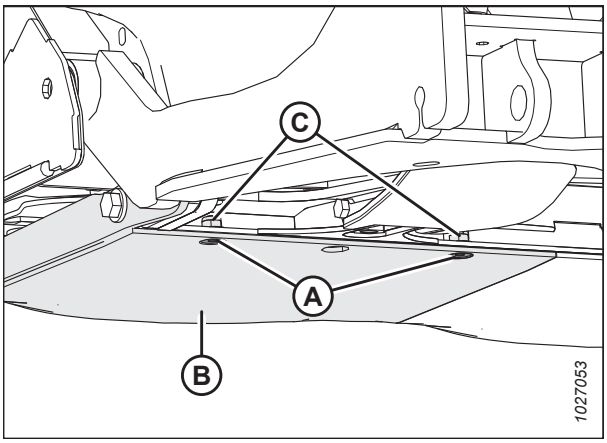


Figure 4.99: Left Outboard Rock Guard – Rear View

7. Remove bolt and washers (A).
8. Loosen bolt (B).
9. Remove rock guard (C) by sliding it forward.
10. Repeat Step *4, page 137* to Step *9, page 137* at the opposite side of the cutterbar.

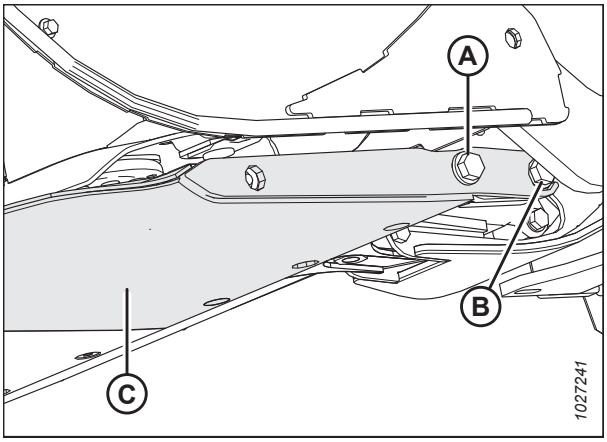


Figure 4.100: Left Outboard Rock Guard – Side View

Installing Outboard Rock Guards

You will need a rubber mallet to properly seat the outboard rock guard when it is installed.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Remove any debris on the cutterbar which could obstruct the installation of the outboard rock guard.
5. Apply medium-strength threadlocker (Loctite® 242 or equivalent) to bolt (B).

   NOTE:

   Some parts have been removed for clarity.
6. Install bolt (B) with a washer onto the cutterbar.
7. Angle rock guard (A) outward as shown. Align the slot in the side plate between the washer and the cutterbar on rear M16 bolt (B).
8. Rotate the rock guard towards the center of the header until the tabs on the front of the rock guard are supported by the cutterbar.
9. Using a rubber mallet, tap rock guard (A) so it is parallel and flush against cutterbar (B).

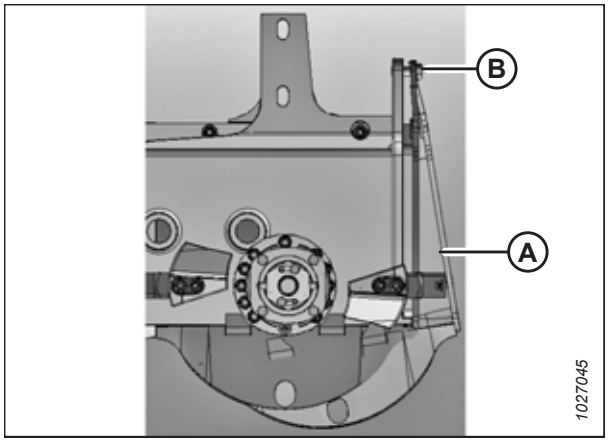


Figure 4.101: Left Outboard Rock Guard – Angled

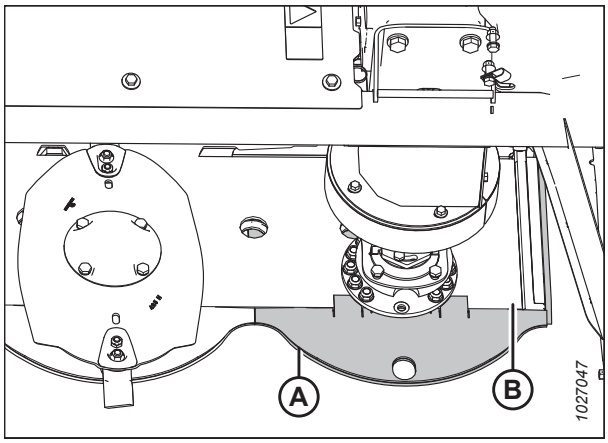


Figure 4.102: Outboard Rock Guard

10. Ensure that rock guards (B) and (C) are parallel to one another.

    NOTE:

    A parallel gap (for example, gap [A]) of 5–7 mm (3/16–1/4 in.) between outboard (B) and inboard (C) rock guards is acceptable. You may need to loosen the next one or two rock guards to change the gap.

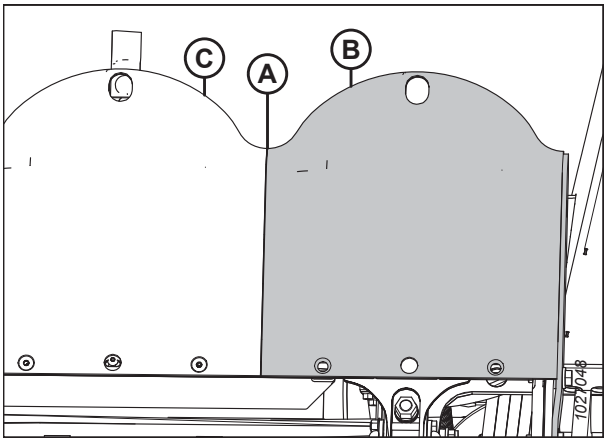


Figure 4.103: Outboard Rock Guard Installed

11. **Eight Disc Only:** Apply medium-strength threadlocker (Loctite® 242 or equivalent) on two hex head screws (C). Loosely install the screws with lock nuts.

12. Install M16 x 60 bolt (A) and one washer (B) as shown. Torque bolts (A) and (D) to 251 Nm (185 lbf·ft).

13. **Eight Disc Only:** Torque screws (C) to 54 Nm (40 lbf·ft).

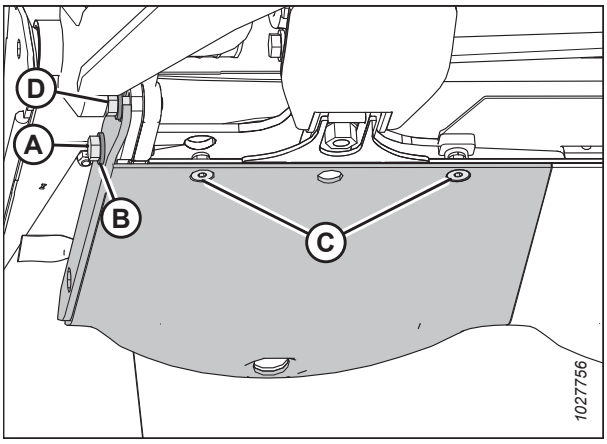


Figure 4.104: Left Outboard Rock Guard – Rear View

4.4.11 Maintaining Small Drums – Ten Disc Cutterbar

Drums deliver cut material from the ends of the cutterbar and help maintain an even crop flow into the conditioner. The small drums are found on the 10 disc cutterbar are attached to the two discs inboard of the large drums.

Inboard drums (B) and (C) are approximately 73 mm (2 3/8 in.) smaller in diameter than outboard drums (A).

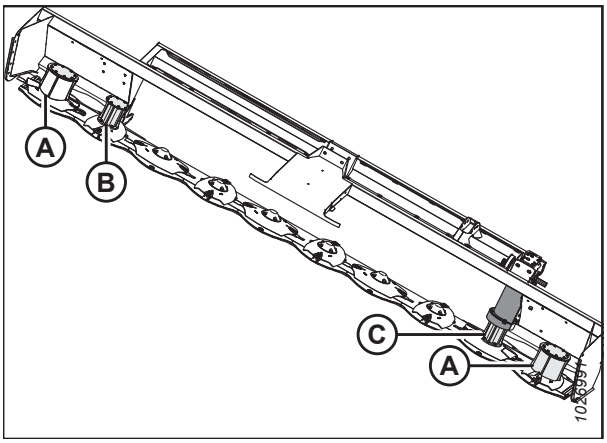


Figure 4.105: Ten Disc Cutterbar

A - Large Drums **B - Small Non-Driven Drum**

C - Small Driven Drum

Inspecting Small Drums – Ten Disc Cutterbar

Inspect the drums daily for signs of damage or wear.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.

5. Inspect small drums (B) and (C) for damage and wear. Replace the drums if they are worn at the center to 50% or less of their original thickness. Do **NOT** repair damaged drums; they must be replaced.

6. Examine drums (B) and (C) for large dents. Replace any dented drums to ensure that the cutterbar remains balanced.

7. Tighten or replace any loose or missing fasteners.

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

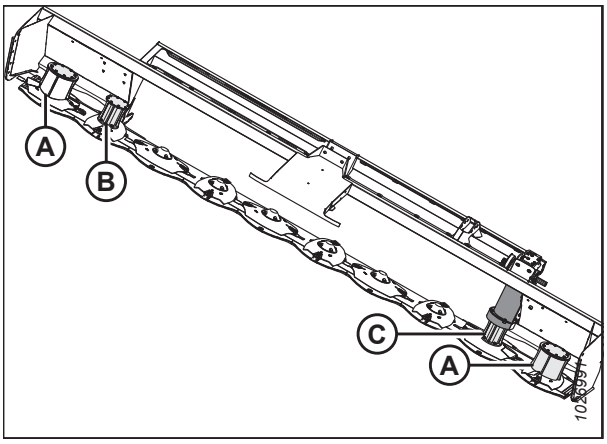


Figure 4.106: Cutterbar

A - Large Non-Driven Drums **B - Small Non-Driven Drum**

C - Small Driven Drum

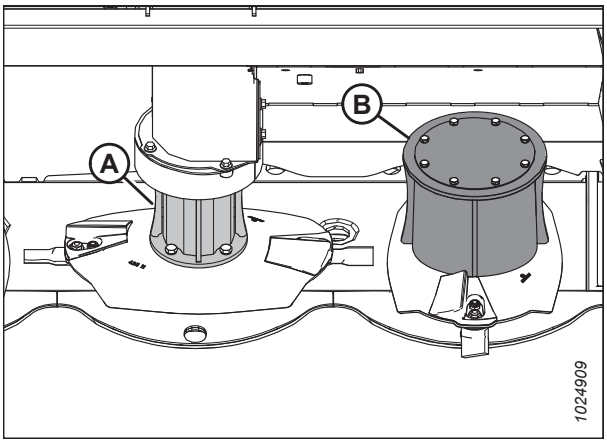


Figure 4.107: Ten Disc Cutterbar Drums

A - Small Driven Drum **B - Large Non-Driven Drum**

8. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

Removing Small Driven Drum and Driveline – Ten Disc Cutterbar

The small driven drum is the second drum from the end on the left side of the cutterbar.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Remove four M10 hex flange head bolts (A) and remove vertical driveshield (B).

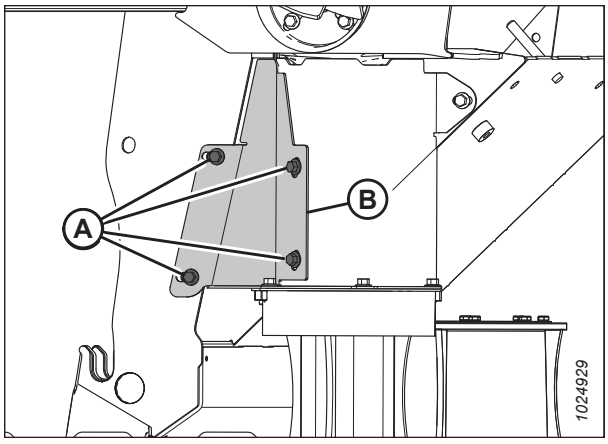


Figure 4.108: Driveline Shield

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

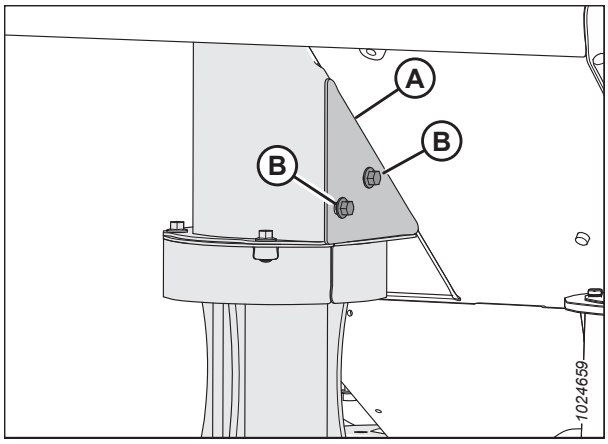


Figure 4.109: Driveline Shield

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

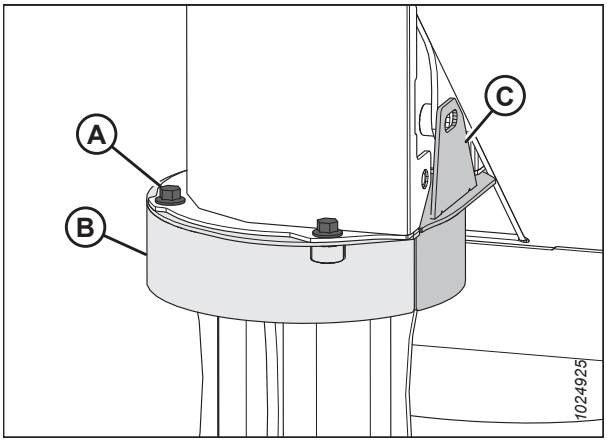


Figure 4.110: Driveline Shield

8. Remove one 20 mm M10 hex flange head bolt (B), two 16 mm M10 hex flange head bolts (C), and vertical shield (A).

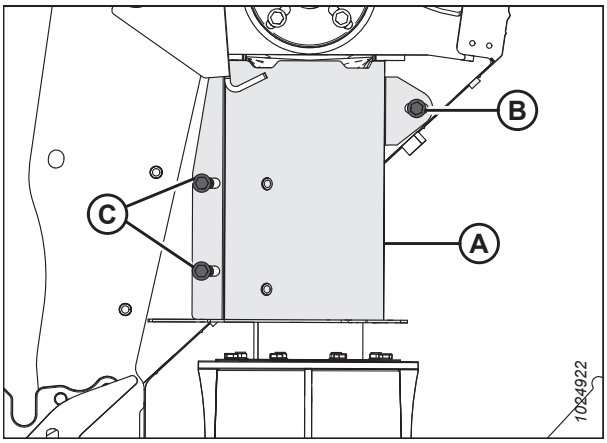


Figure 4.111: Driveline Shield

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

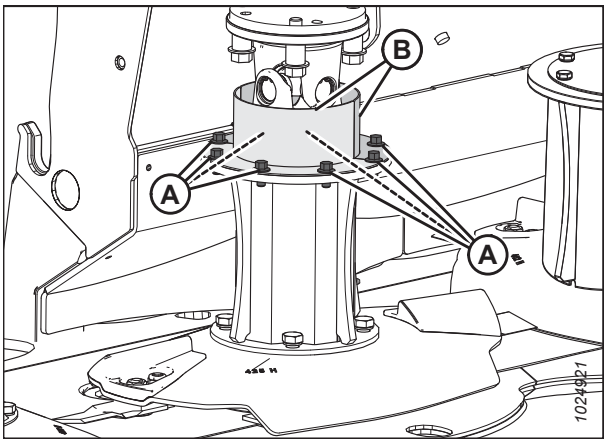


Figure 4.112: Driveline Shield

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

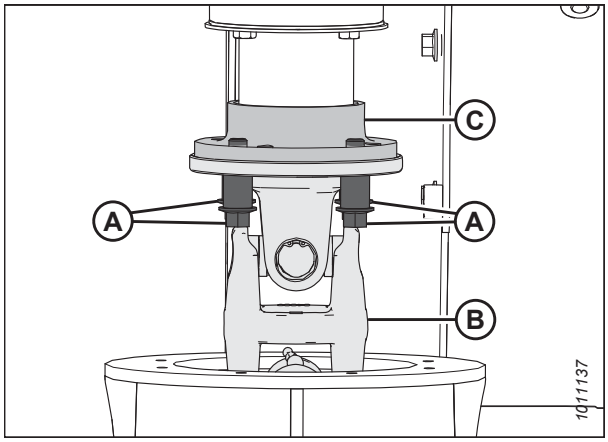


Figure 4.113: Hub Drive to Driveline Connection

11. Slide driveline (A) downwards, tilt it to the side, and pull the driveline up and out of drum.

    NOTE:

    For clarity, the illustration shows a cutaway view of the drum and the tube shield.

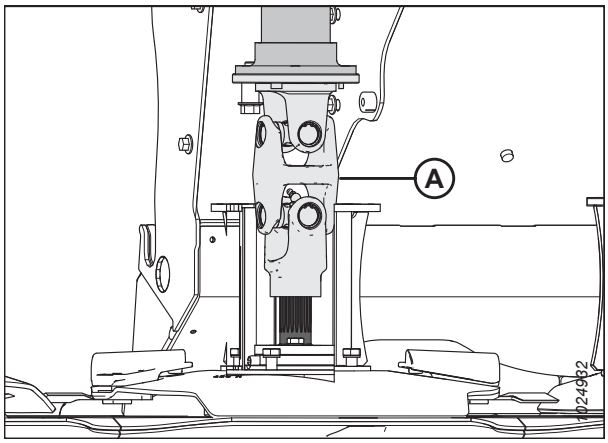


Figure 4.114: Hub Drive to Driveline Connection

12. Remove four M12 bolts and washers (A) holding the drum disc in place.

13. Remove drum disc assembly (B).

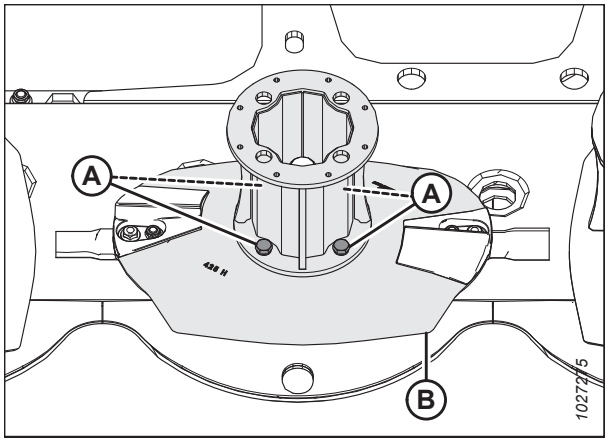


Figure 4.115: Driven Drum

Installing Small Driven Drum and Driveline – Ten Disc Cutterbar

The small driven drum is the second drum from the end on the left side of the cutterbar.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Position drum disc assembly (B) as shown.
5. Install four M12 bolts (A) along with the washers that hold the drum disc in place. Torque the hardware to 85 Nm (63 lbf·ft).

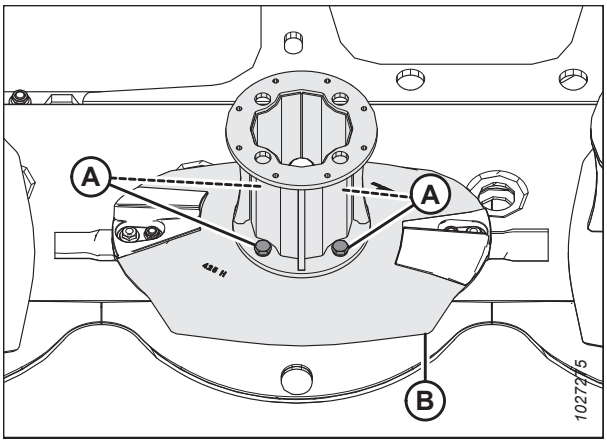


Figure 4.116: Drum Disc

6. Lubricate spindle splines (A). For specifications, refer to the inside back cover of this manual.

   NOTE:

   For clarity, the illustration shows a cutaway view of the drum and tube shield.

7. Insert driveline (B) at an angle and guide it past hub drive (C) and drum (D).

8. Insert splined spindle end (A) into the splined bore of driveline (B).

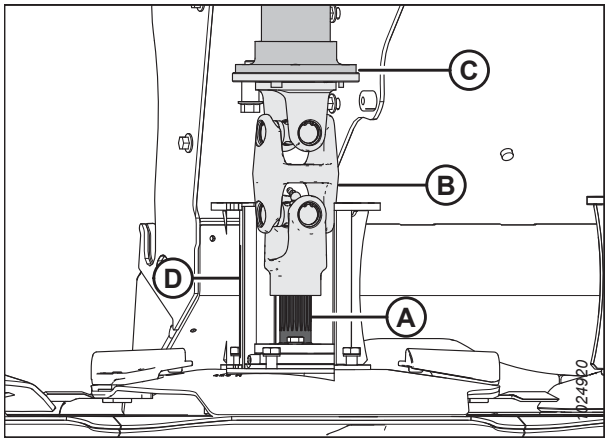


Figure 4.117: Hub Drive to Driveline Connection

9. Place a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of four M12 hex flange head bolts (A). Use the bolts and spacers to secure driveline assembly (B) to hub drive (C). Torque the bolts to 102 Nm (75 lbf·ft).

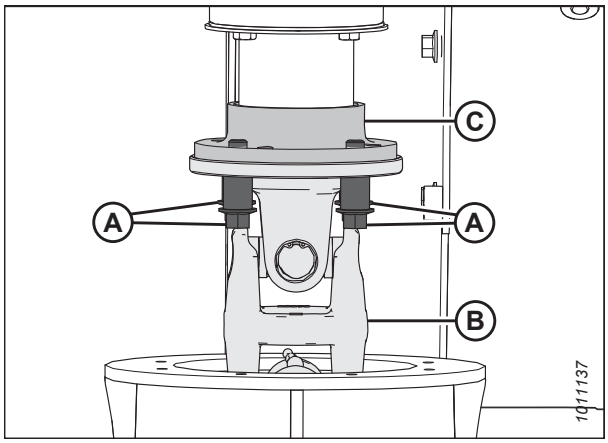


Figure 4.118: Hub Drive to Driveline Connection

10. Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of eight M8 hex flange head bolts (A). Use the bolts to secure the drum shields. Torque the hardware to 27 Nm (239 lbf·in).

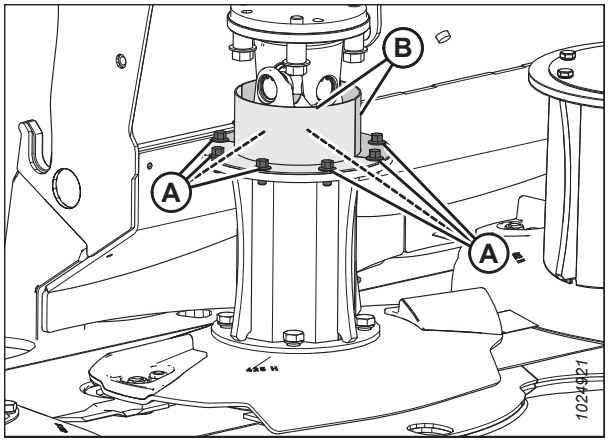


Figure 4.119: Driven Drum

11. Position vertical shield (A) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of one M10 hex flange head bolt (B) and two M10 hex flange head bolts (C). Use bolts (B) and (C) to secure the vertical shield. Torque the hardware to 61 Nm (45 lbf·ft).

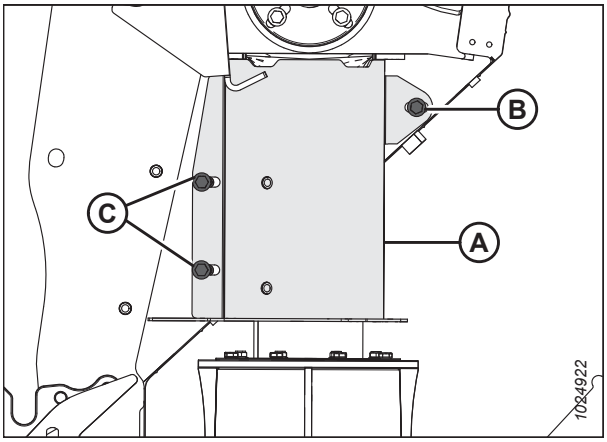


Figure 4.120: Driveline Shield

12. Position top plate (B) and drum top (C) onto the drum as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of four M10 hex flange head bolts (A). Use the bolts to secure the top plate and the drum top. Torque the hardware to 61 Nm (45 lbf·ft).

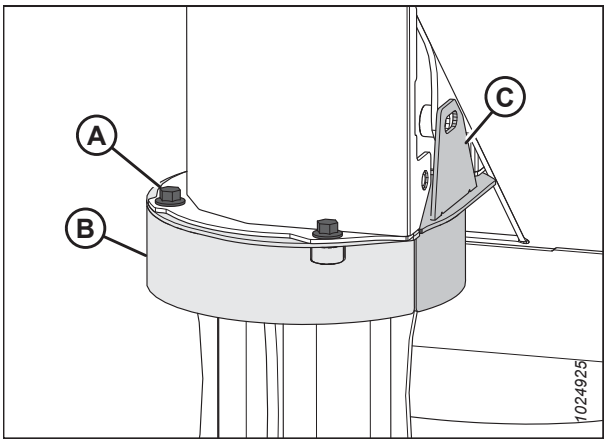


Figure 4.121: Driveline Shield

13. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of M10 hex flange head bolt (B). Install bolt (B) through cover plate (A) and top plate (C). Torque the hardware to 61 Nm (45 lbf·ft).

14. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of M10 hex flange head bolt (D). Install bolt (D) through cover plate (A) and vertical shield (E). Torque the hardware to 61 Nm (45 lbf·ft).

15. Tighten bolts (B) and (D).

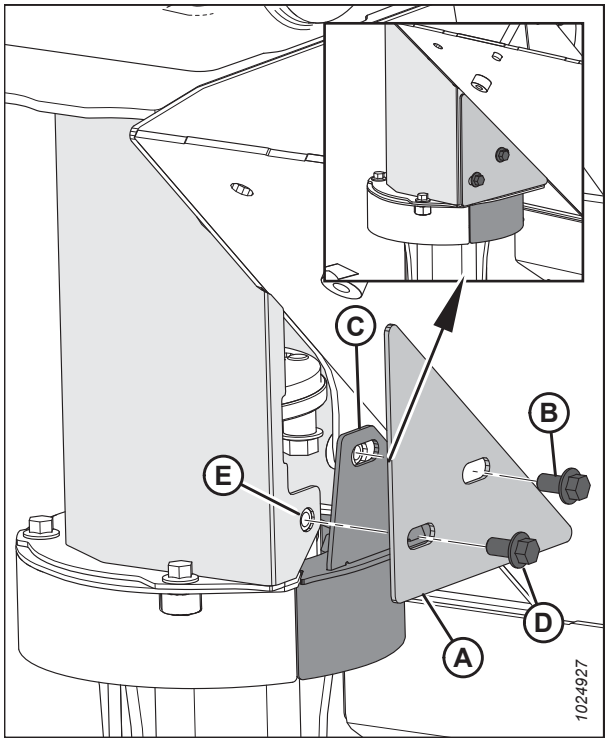


Figure 4.122: Driveline Shield

16. Position vertical driveshield (B) as shown at right. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of four M10 hex flange head bolts (A). Use bolts (A) to secure the vertical driveshield. Torque the hardware to 61 Nm (45 lbf·ft).

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

17. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

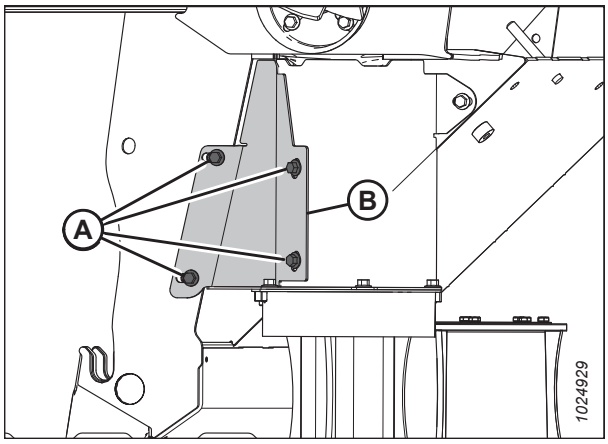


Figure 4.123: Driveline Shield

Removing Small Non-Driven Drum – Ten Disc Cutterbar

The small non-driven drum is the second from the end on the right side of the cutterbar.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Remove four M12 bolts (A) outside the drum.
6. Remove disc assembly (B).

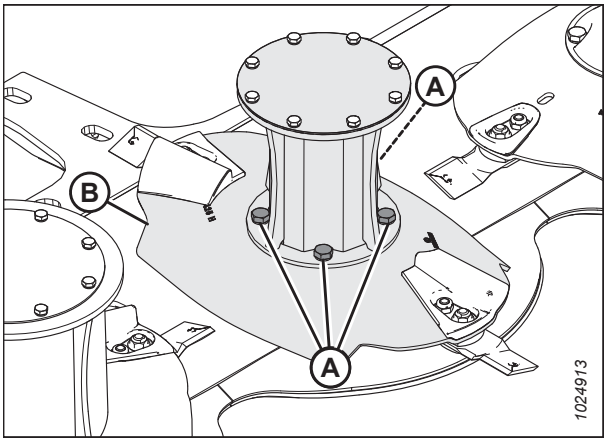


Figure 4.124: Non-Driven Drum

Installing Small Non-Driven Drum – Ten Disc Cutterbar

Remember to replace the spacer when installing the small non-driven drum.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Ensure spacer (A) is on the spindle.

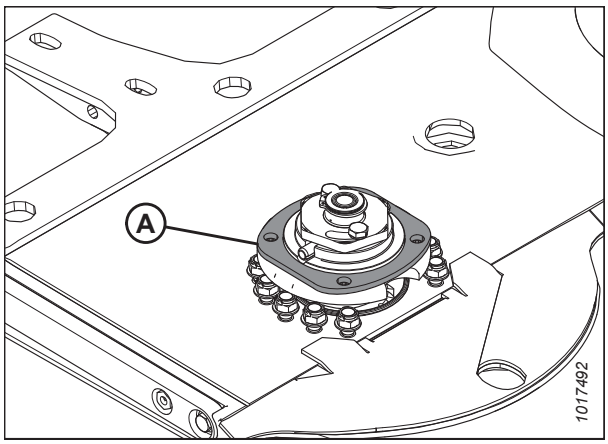


Figure 4.125: Non-Driven Spindle

5. Position non-driven disc assembly (B) onto the spindle as shown.
6. Install four M12 bolts (A) and the washers securing the disc assembly to the spindle. Torque the hardware to 55 Nm (40 lbf·ft).

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

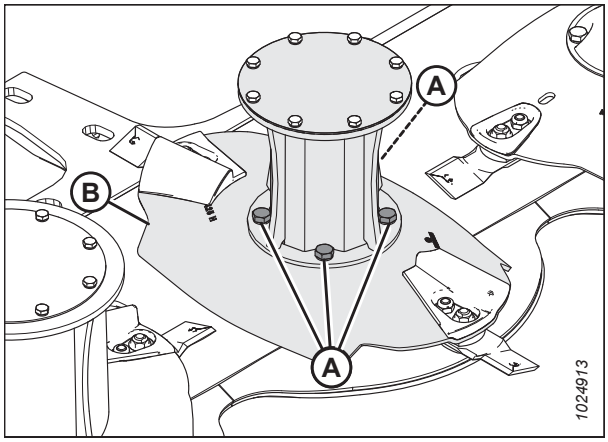


Figure 4.126: Non-Driven Drum

7. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

4.4.12 Maintaining Large Drums

Drums deliver cut material from the ends of the cutterbar and help maintain an even crop flow into the conditioner. Large drums are attached to the two outboard discs on 8 and 10 disc cutterbars.

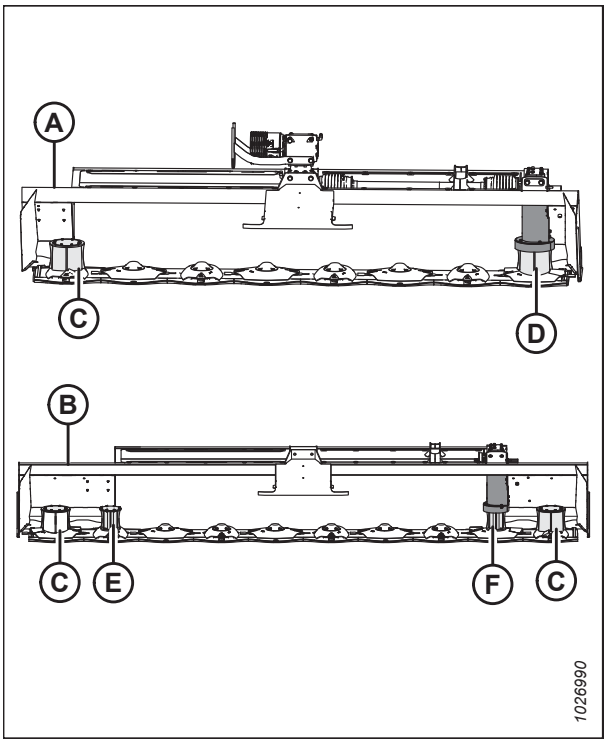


Figure 4.127: Cutterbars

A - Eight Disc Cutterbar
B - Ten Disc Cutterbar
C - Large Drums
D - Large Driven Drum
E - Small Drum
F - Small Driven Drum

Inspecting Large Drums

Inspect the large drums daily for signs of damage or wear.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Inspect large drums (C) and (D) for signs of damage or wear. Replace the large drums if the drum feed bars are 50% or less of their original thickness. Do **NOT** repair drums.
6. Examine the drums for large dents. Replace dented drums to prevent an imbalance in the cutterbar.
7. Tighten or replace loose or missing fasteners.

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

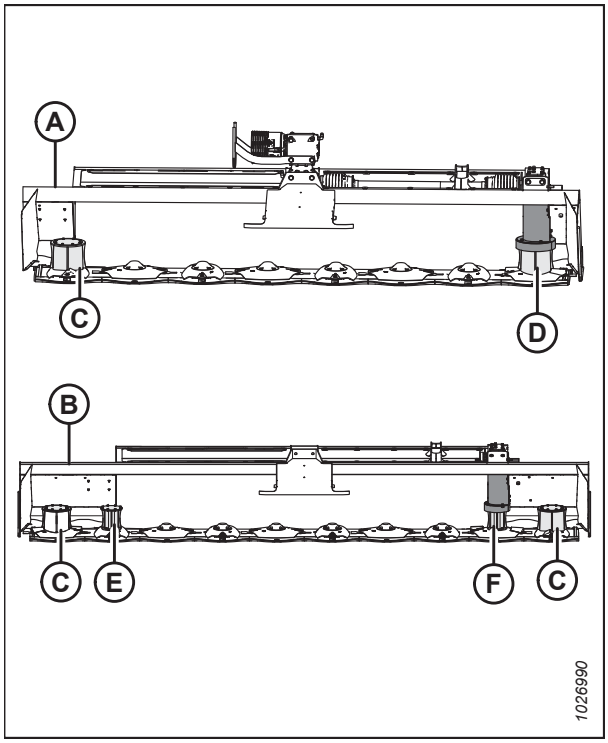


Figure 4.128: Cutterbars

A - Eight Disc Cutterbar
B - Ten Disc Cutterbar
C - Large Drums
D - Large Driven Drum
E - Small Drum
F - Small Driven Drum

8. Inspect drums (A) and (B) for damage and wear, and replace if drums are worn at the center to 50% or more of their original thickness. Do **NOT** repair drums.
9. Examine drums for large dents. Replace dented drums to prevent an imbalance in the cutterbar.
10. Tighten any loose fasteners. Replace any missing fasteners.

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

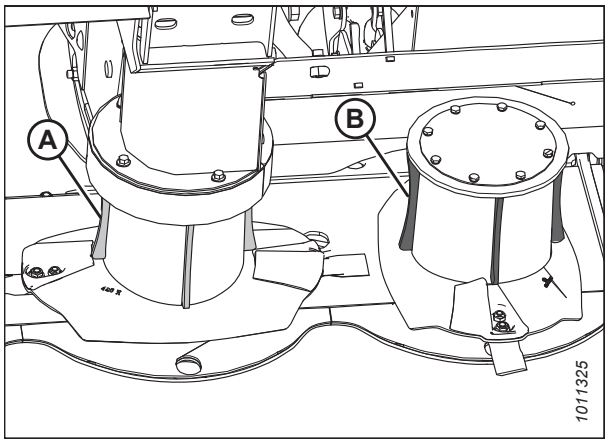


Figure 4.129: Cutterbar Drums – Ten Disc

11. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

Removing Large Driven Drums and Driveline

The large driven drum is on the left end of the cutterbar.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Remove four M10 hex flange head bolts (A) and remove vertical driveshield (B).

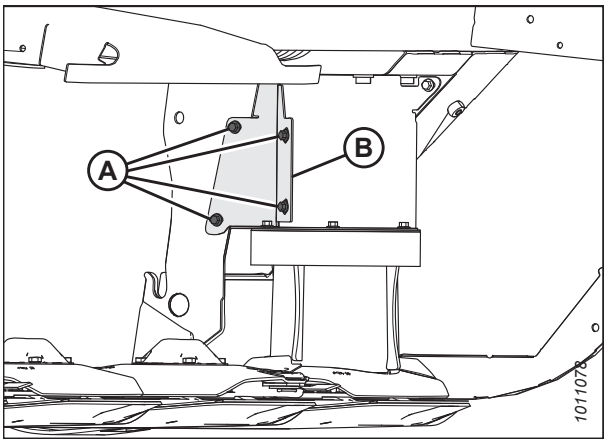


Figure 4.130: Vertical Drive Shield

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

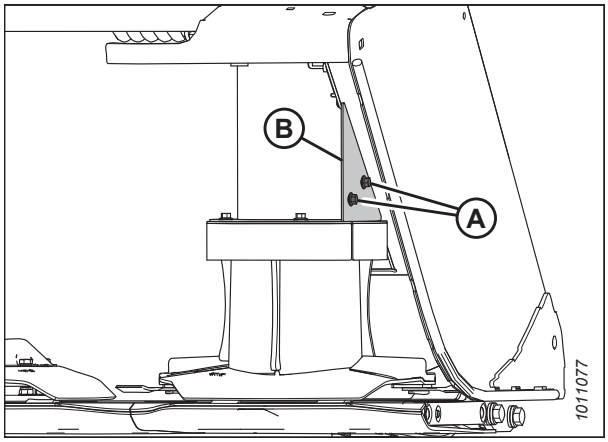


Figure 4.131: Cover Plate

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

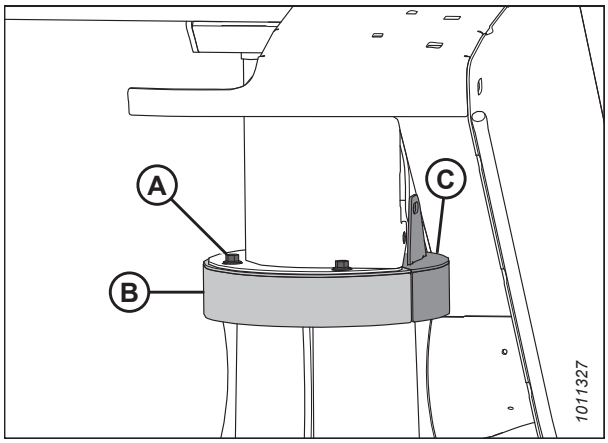


Figure 4.132: Top Plate and Drum Top

8. Remove one M10 x 20 hex flange head bolt (A), two M10 x 16 hex flange head bolts (B), and vertical shield (C).

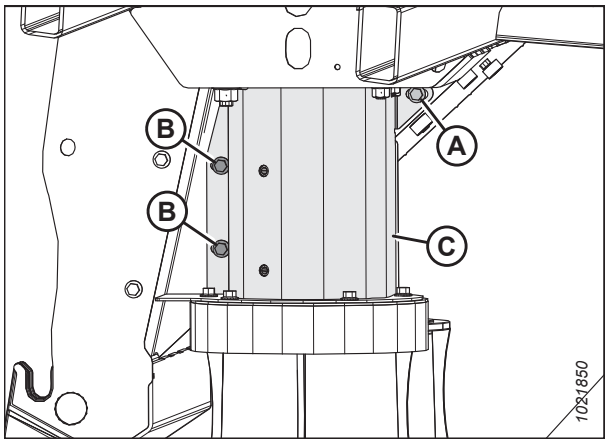


Figure 4.133: Vertical Shield

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

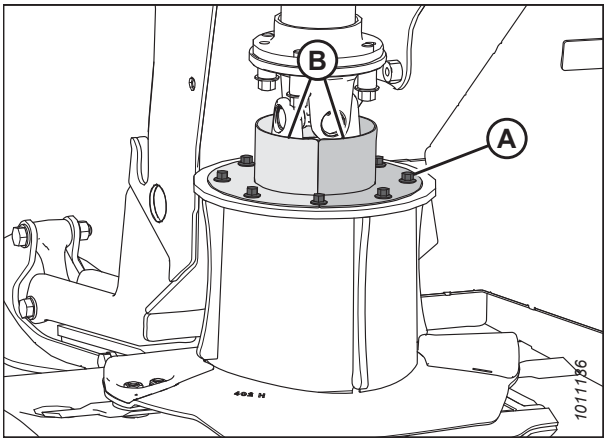


Figure 4.134: Drum Shields

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

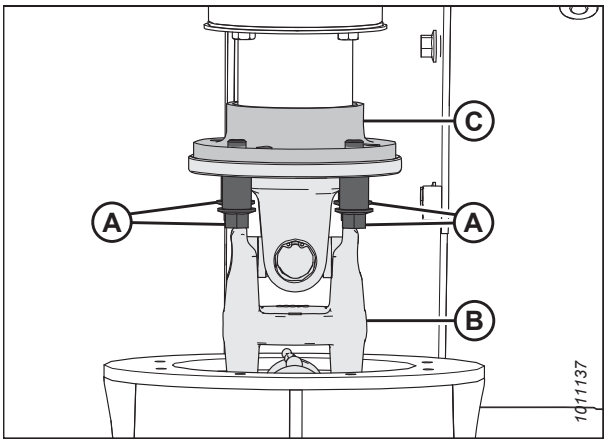


Figure 4.135: Hub Drive to Driveline Connection

11. Slide driveline (A) downwards, and tilt it to the side. Pull the driveline up and out of the drum.

    NOTE:

    The illustration shows a cutaway view of the drum and tube shield.

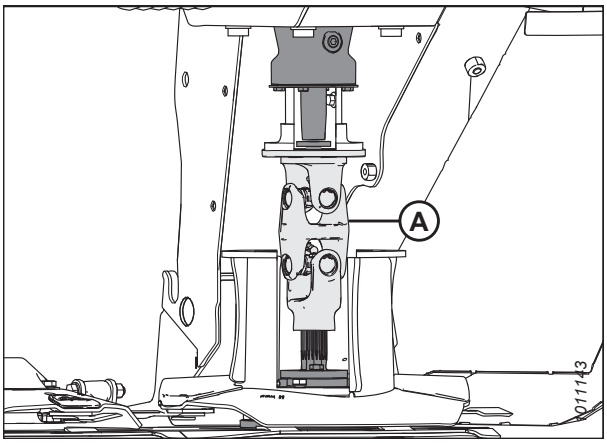


Figure 4.136: Hub Drive to Driveline Connection

12. Inside the drum, remove four M12 bolts and washers (A) holding the drum disc in place.

13. Remove the drum disc assembly.

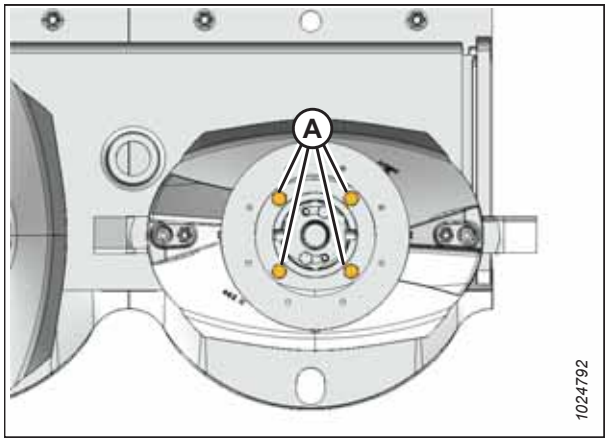


Figure 4.137: Driven Drum – 8 Disc

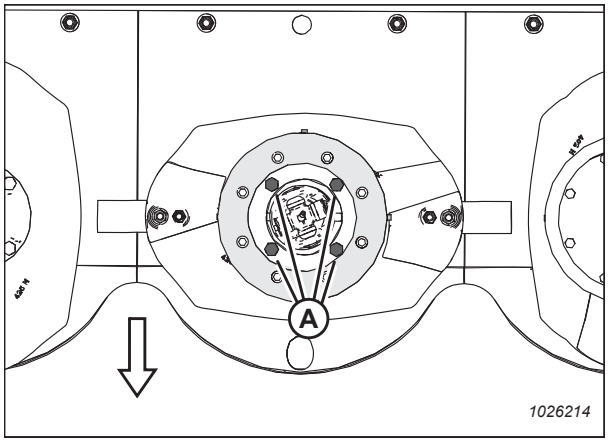


Figure 4.138: Driven Drum – 10 Disc

Installing Large Driven Drums and Driveline

The large driven drum is on the left end of the cutterbar.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.

2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.

4. Ensure that spacer plate (A) is on the spindle.

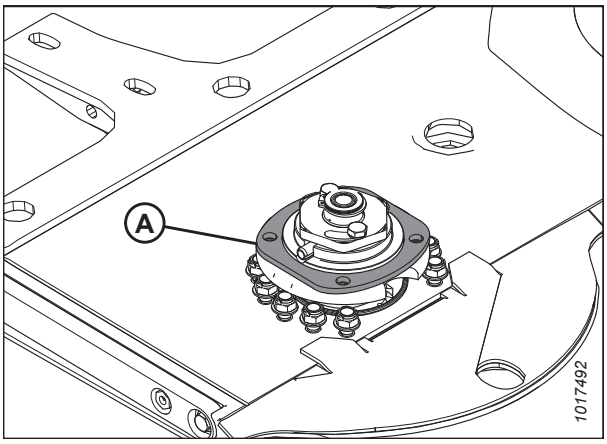


Figure 4.139: Spacer Plate

5. Position the drum disc assembly as shown.

   NOTE:

   Orient the disc so that the blades are perpendicular to those on the adjacent disc.

6. Install four M12 bolts and washers (A) that hold the drum disc in place. Torque the hardware to 85 Nm (63 lbf·ft).

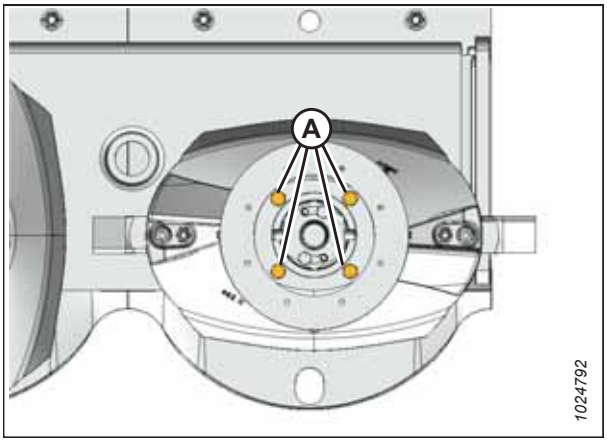


Figure 4.140: Drum – 8 Disc Cutterbar

7. Lubricate spindle splines (A). For specifications, refer to the inside back cover of this manual.

   NOTE:

   The driveline U-joints were greased at the factory and are considered to be lubricated for life. No further lubrication is required.

   NOTE:

   The illustration shows a cutaway view of the drum and the tube shield.

8. Insert driveline (B) at an angle and guide it past hub drive (C) and drum (D).

9. Insert splined spindle end (A) into the splined bore on driveline (B).

10. Place a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of four M12 hex flange head bolts (A). Use the bolts and spacers to secure driveline assembly (B) to hub drive (C). Torque the bolts to 102 Nm (75 lbf·ft).

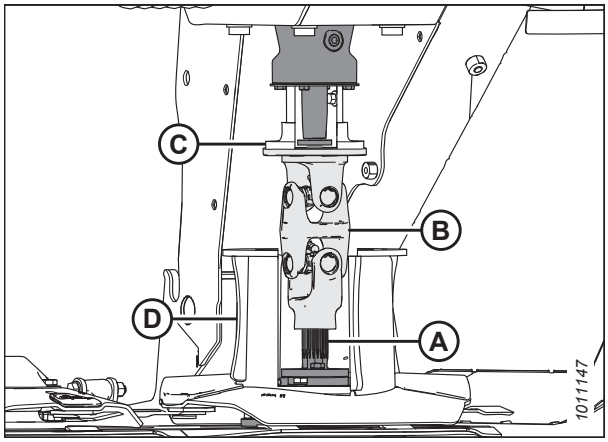


Figure 4.141: Hub Drive to Driveline Connection

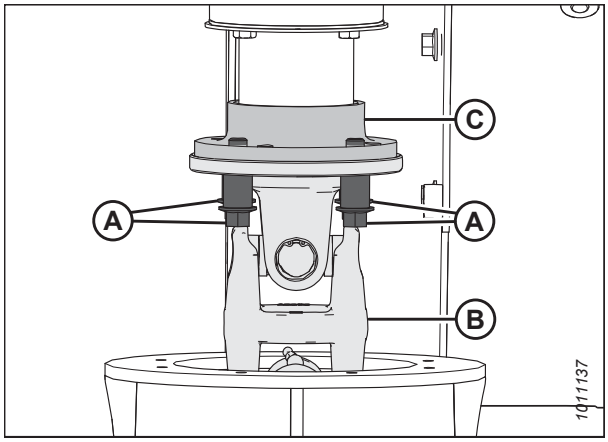


Figure 4.142: Hub Drive to Driveline Connection

11. Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of eight M8 hex flange head bolts (A). Use the bolts to secure the drum shields. Torque the bolts to 27 Nm (239 lbf in).

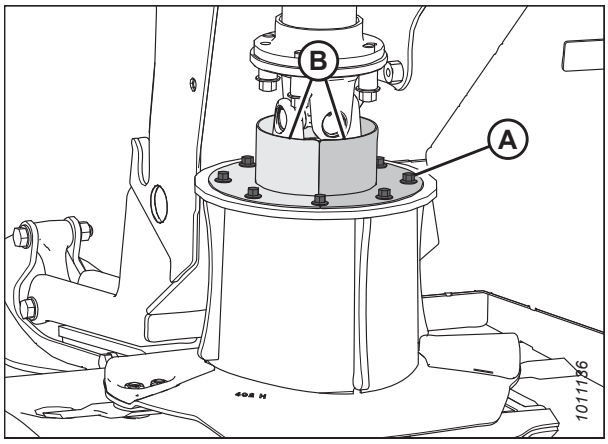


Figure 4.143: Drum Shield

12. Position vertical shield (A) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of one M10 hex flange head bolt (B) and two M10 hex flange head bolts (C). Use bolts (B) and (C) to secure the vertical shield. Torque the bolts to 61 Nm (45 lbf·ft).

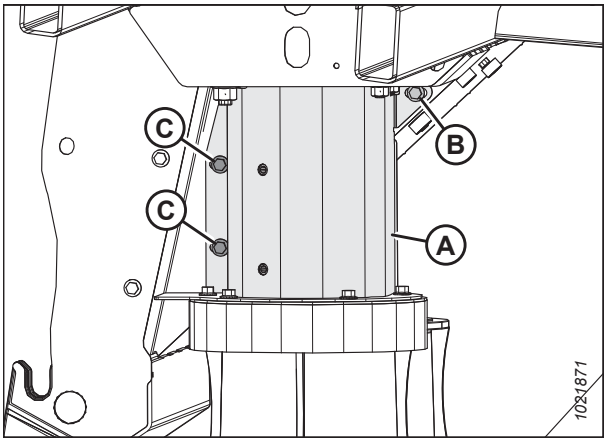


Figure 4.144: Vertical Shield

13. Position top plate (B) and drum top (C) onto the drum as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of four M10 hex flange head bolts (A). Use the bolts to secure the top plate and drum top. Torque the hardware to 61 Nm (45 lbf·ft).

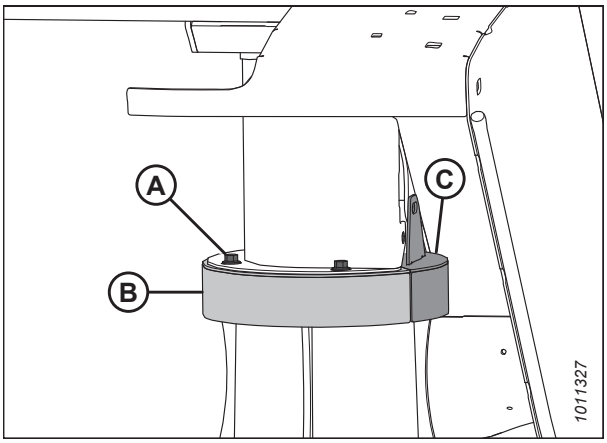


Figure 4.145: Top Plate and Drum Top

14. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of M10 hex flange head bolt (B). Install bolt (B) through cover plate (A) and top plate (C). Torque the hardware to 61 Nm (45 lbf·ft).

15. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of M10 hex flange head bolt (D). Install bolt (D) through cover plate (A) and vertical shield (E). Torque the hardware to 61 Nm (45 lbf·ft).

16. Tighten bolts (B) and (D).

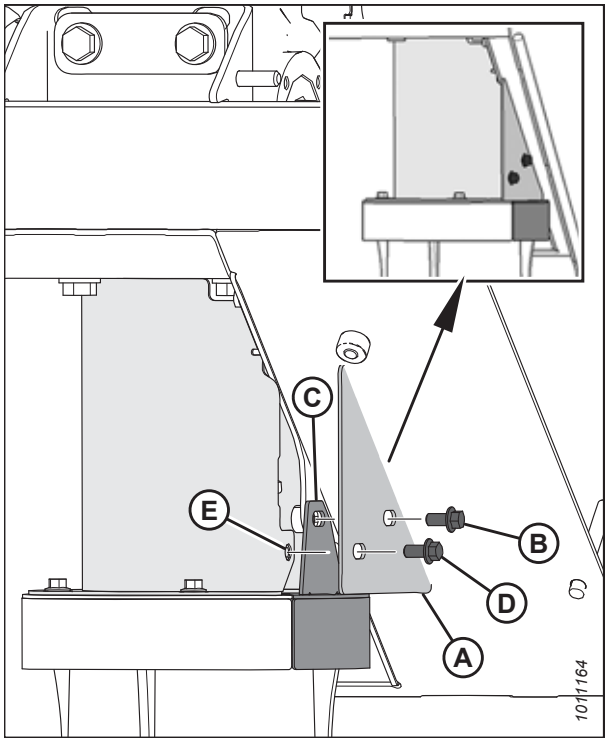


Figure 4.146: Cover Plate and Top Plate

17. Position vertical driveshield (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of four M10 hex flange head bolts (A). Use bolts (A) to secure the vertical driveshield. Torque the bolts to 61 Nm (45 lbf·ft).

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

18. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

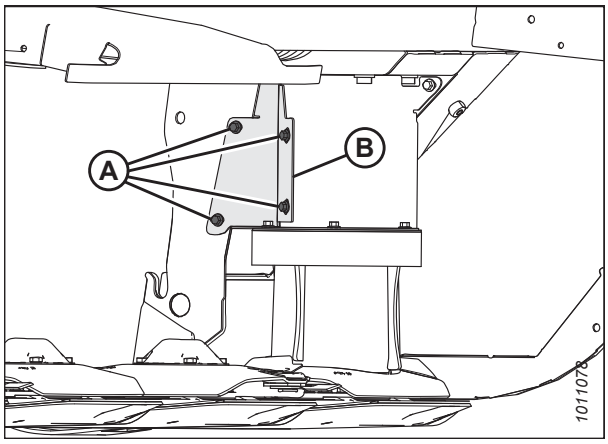


Figure 4.147: Vertical Shield

Removing Large Non-Driven Drums

The non-driven large drums are held in place with four bolts.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Place a wooden block between the two cutterbar discs to prevent the disc from rotating while you are loosening the blade bolts.
6. Remove eight M8 bolts and washers (A) securing cover (B) to the non-driven drum. Remove the cover.

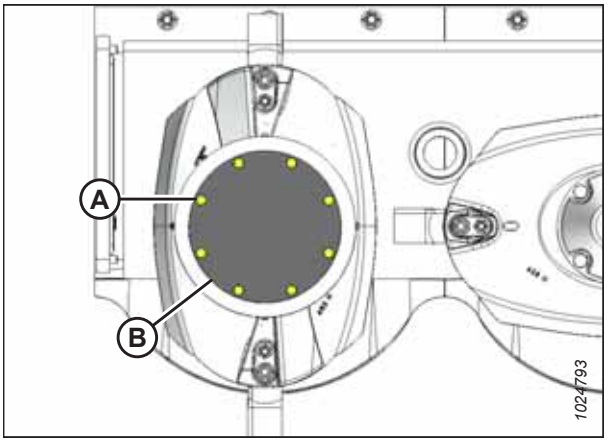


Figure 4.148: Non-Driven Drum

7. Remove four M10 bolts (A) from inside the drum.
8. Remove the wooden block.
9. Remove drum/disc (B).

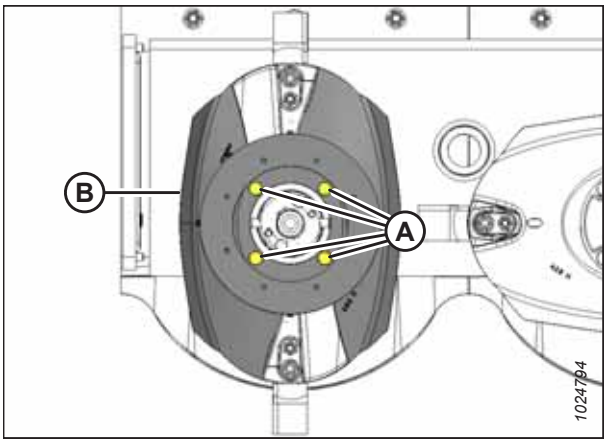


Figure 4.149: Non-Driven Drum

Installing Large Non-Driven Drums

Ensure that the spacer is in place before installing the large non-driven drum.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.
3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Ensure that spacer (A) is on the spindle.

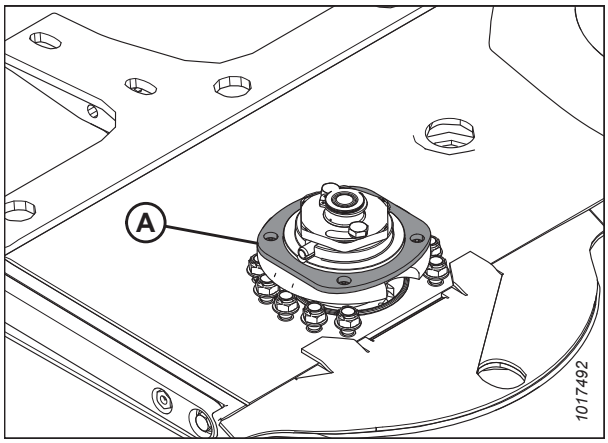


Figure 4.150: Non-Driven Spindle

5. Position non-driven drum/disc (B) onto the spindle as shown.

6. Install four M12 bolts and washers (A) to secure the drum and disc assembly to the spindle. Torque the hardware to 85 Nm (63 lbf·ft).

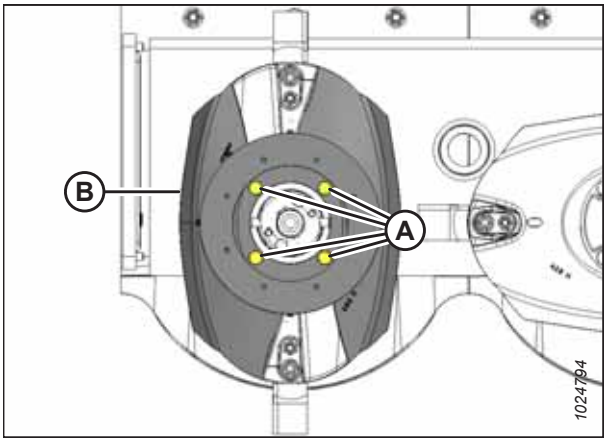


Figure 4.151: Non-Driven Drum

7. Install eight M8 bolts and washers (A) to secure cover (B) to the non-driven drum. Torque the bolts to 28 Nm (248 lbf·in).

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

8. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

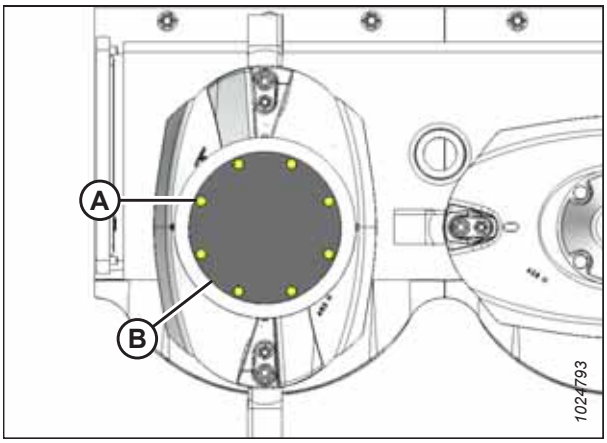


Figure 4.152: Non-Driven Drum

4.4.13 Replacing Cutterbar Spindle Shear Pin

To prevent damage to the cutterbar and drive systems, each disc is attached to a spindle containing a shear pin.

If the disc contacts a large object such as a stone or stump, pin (A) will shear and the disc will stop rotating and move upwards. The presence of snap ring (B) ensures that the disc will remain attached to the spindle.

IMPORTANT:

- Ensure that the slots on both shear pins (A) are aligned horizontally.
- Spindles that rotate clockwise have right-leading threading.
- Spindles that rotate counterclockwise have left-leading threading.

NOTE:

Once the spindle has risen due to the failure of the shear pin, the spindle's bearing will become unloaded. The spindle will appear to be damaged. Do **NOT** replace the spindle simply because it has excessive play. Check the play of the spindle **AFTER** torquing the spindle nut and replacing the damaged shear pin.

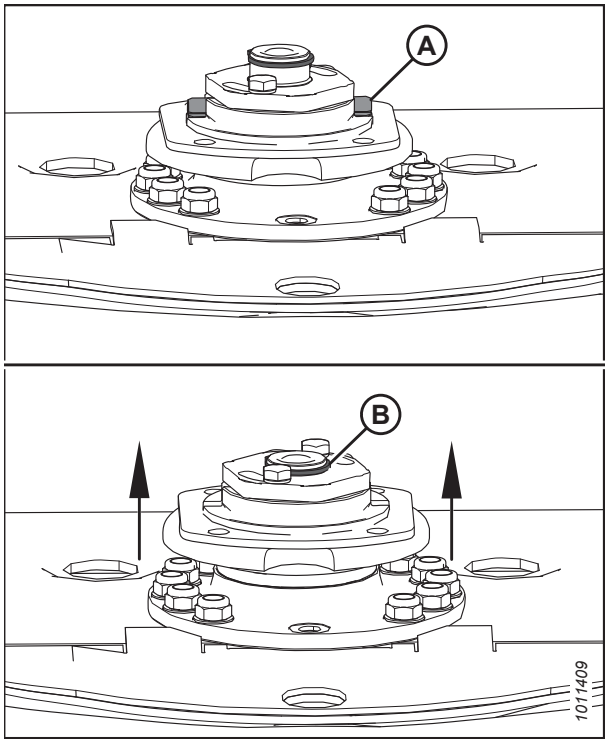


Figure 4.153: Cutterbar Spindles

Removing Cutterbar Spindle Shear Pin

Once the shear pin on a cutterbar spindle has broken, it will need to be removed.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.
2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
5. Clean any debris from the work area.
6. Remove cutterbar disc (A). For instructions, refer to *Removing Cutterbar Discs, page 99*.
7. Remove the drum. The procedure to remove the drum depends on whether you are removing a driven drum or a non-driven drum:
   - To remove a driven drum (B), refer to *Removing Large Driven Drums and Driveline, page 153*.
   - To remove a non-driven drum (C), refer to *Removing Large Non-Driven Drums, page 160*.

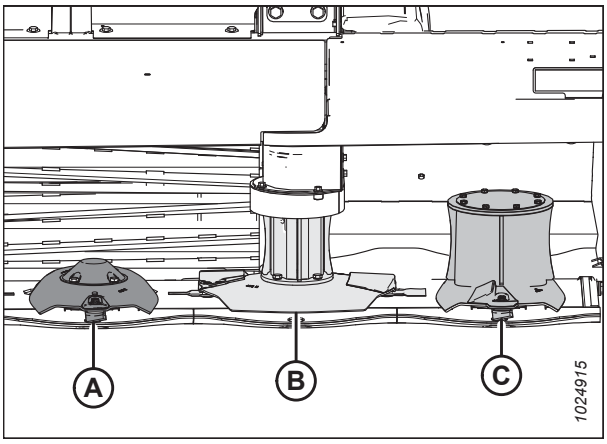


Figure 4.154: Disc Assemblies – 10 Disc Shown, 8 Disc Similar

8. Remove retaining ring (A).

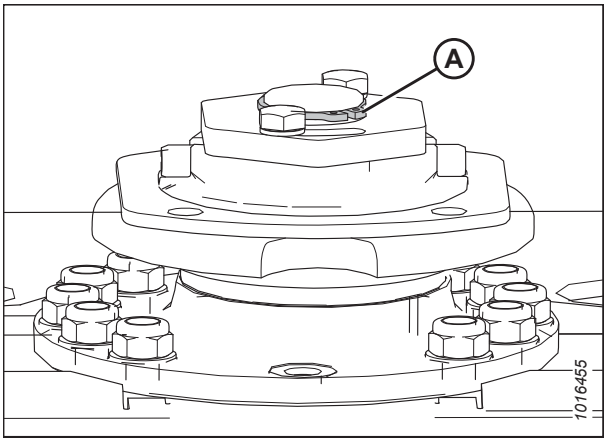


Figure 4.155: Cutterbar Spindle

9. Remove the M12 bolt securing Safecut spindle-nut wrench (A) to its storage location. Remove the Safecut spindle-nut wrench.

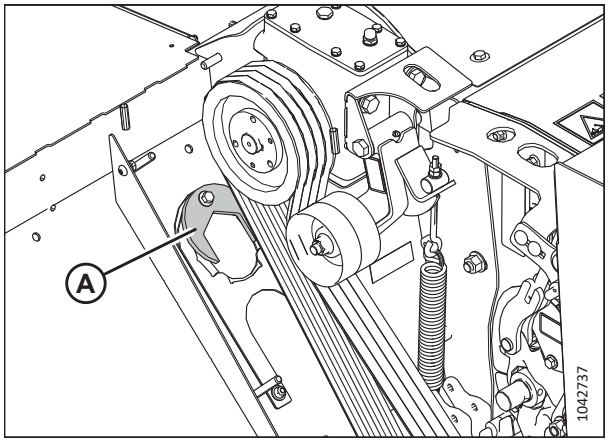


Figure 4.156: Safecut Spindle-Nut Wrench Location

IMPORTANT:

- Spindles that rotate clockwise have right-leading threading and a smooth top on the spindle gear shaft (A).
- Spindles that rotate counterclockwise have left-leading threading and machined grooves on the spindle gear shaft (B) and nut (C).
- If the spindle position in the cutterbar has changed, the rotational direction of that spindle **MUST** remain the same (that is, a clockwise spindle must maintain its clockwise rotation). Failure to maintain the rotation pattern can result in damage to the spindle and/or to the cutterbar components.

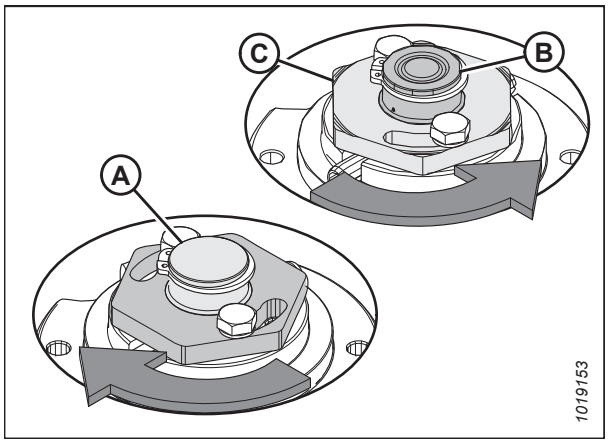


Figure 4.157: Cutterbar Spindles

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

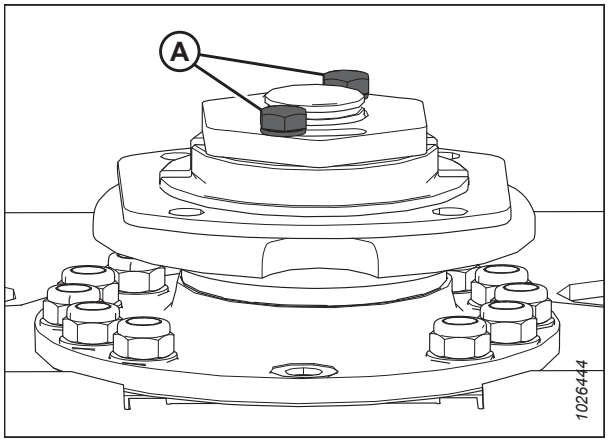


Figure 4.158: Cutterbar Spindle

11. Use the Safecut spindle-nut wrench to remove nut (A).

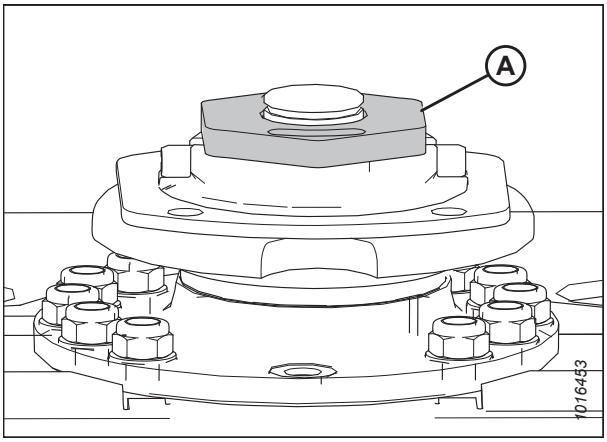


Figure 4.159: Cutterbar Spindle

12. Remove shear pins (B).

    IMPORTANT:

    Do **NOT** damage the pin bore on the pinion.

13. Remove hub (A).

14. Check the nut and the hub for damage. Replace them if necessary.

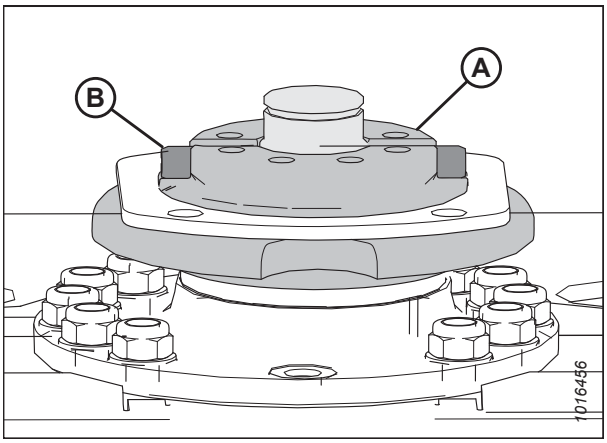


Figure 4.160: Cutterbar Spindle

Installing Cutterbar Spindle Shear Pin

Ensure that the grooves in the shear pin are parallel to the cutterbar when it is installed into the spindle.

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Position the rotary disc header at an appropriate height for the task.

2. Shut down the engine, and remove the key from the ignition.

3. If the rotary disc header is raised:
   a. Place blocks under each end, or just inside each end, of the cutterbar.
   b. Lower the rotary disc header onto the blocks.
   c. Shut down the engine, and remove the key from the ignition.
   d. Close the auxiliary lift cylinder lock-out valves. For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
4. Fill the space above the bearing with grease.
5. Place hub (A) on spindle (C).
6. Install shear pins (B) so that both shear pin grooves are parallel to the cutterbar.

   NOTE:

   Ensure that the ends of shear pins (B) do not protrude past the step in hub (A).

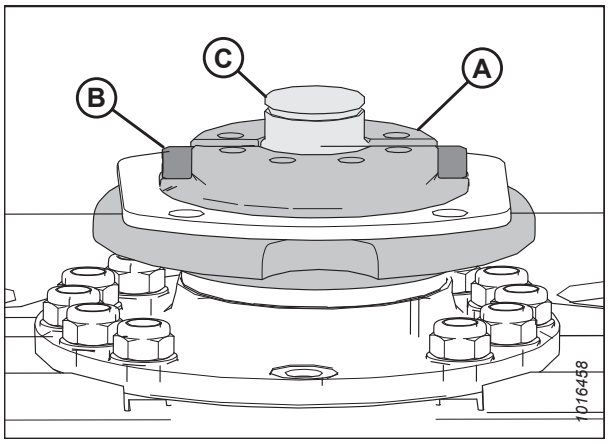


Figure 4.161: Cutterbar Spindle

7. Observe the orientation of the grooves in shear pins (A).

   IMPORTANT:

   Correct shear pin orientation is critical. Both shear pin grooves (A) must be parallel to the cutterbar. They do not need to be facing in the same direction.

   NOTE:

   The shaft has been removed from the illustration for clarity.

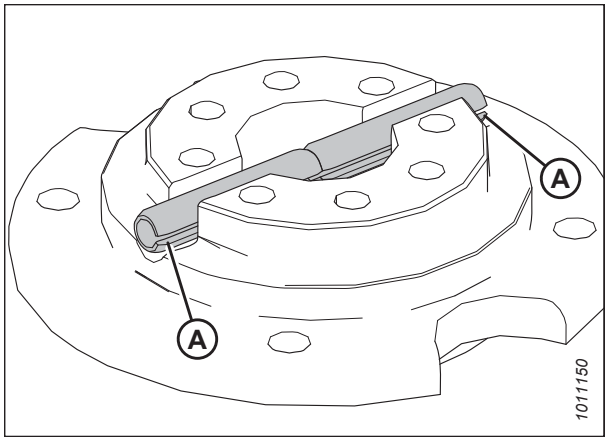


Figure 4.162: Shear Pin Orientation

8. Install nut (A).

9. Retrieve the Safecut spindle-nut wrench from the left shield plate.

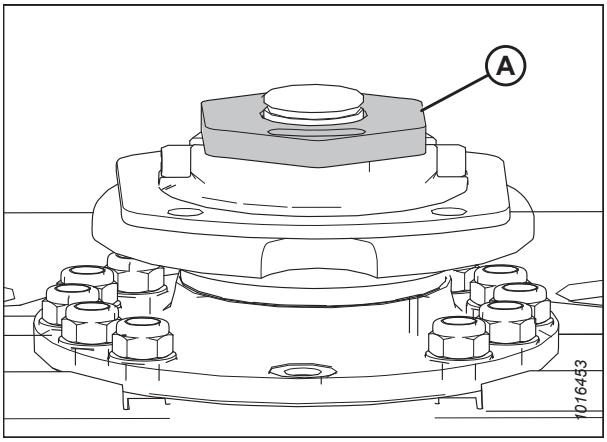


Figure 4.163: Cutterbar Spindle

10. Attach Safecut spindle-nut wrench (B) 90° (D) to torque wrench (A).

    IMPORTANT:

    The Safecut spindle-nut wrench **MUST** be used with a torque wrench.

11. Position Safecut spindle-nut wrench (B) on spindle nut (C). Torque the nut to 300 Nm (221 lbf·ft).

12. Return Safecut spindle-nut wrench (B) to the left shield plate.

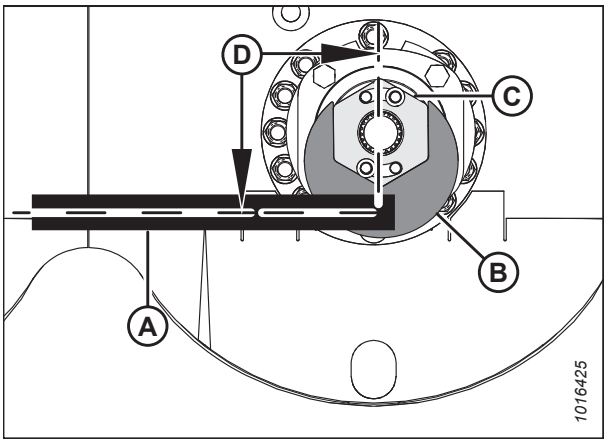


Figure 4.164: Spindle Nut

13. Inspect the threads of two M10 bolts (A) and replace them if they are damaged.

14. Install two M10 bolts and washers (A). Torque the hardware to 55 Nm (40 lbf·ft).

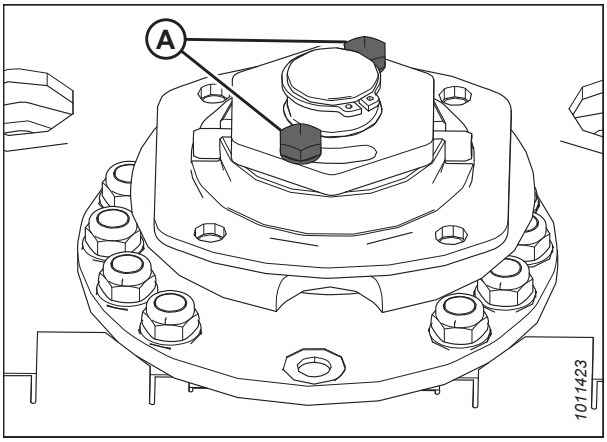


Figure 4.165: Cutterbar Spindle

15. Install retaining ring (A).

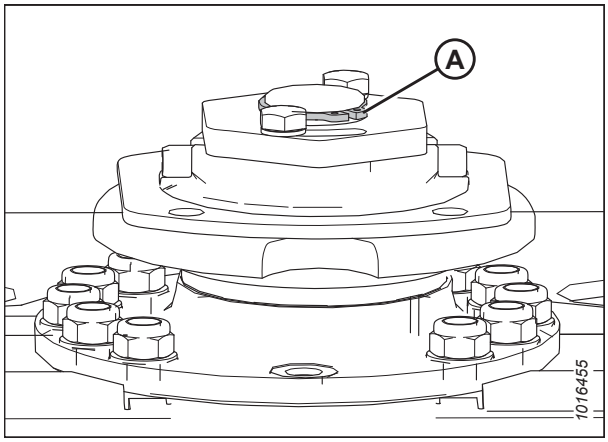


Figure 4.166: Cutterbar Spindle

16. Install the disc or drum. Refer to the relevant procedure:
    - Install cutterbar disc (A). For instructions, refer to *Installing Cutterbar Discs, page 100*.
    - Install driven drum (B). For instructions, refer to *Installing Large Driven Drums and Driveline, page 156*.
    - Install non-driven drum (C). For instructions, refer to *Installing Large Non-Driven Drums, page 162*.

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

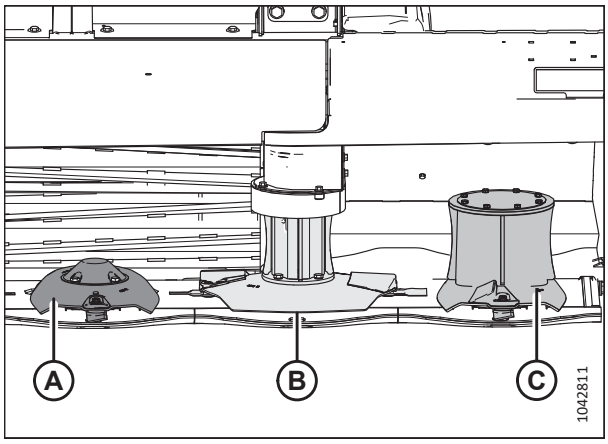


Figure 4.167: Cutterbar – 10 Disc Shown, 8 Disc Similar

17. Close cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

4.5 Drive Systems

4.5.1 Driveshields

Driveshields protect people from rotating belts and drives.

Removing Driveshields

No additional tools are needed to remove the driveshields.

WARNING

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown in this procedure depict the left driveshield (A); the right driveshield is similar.

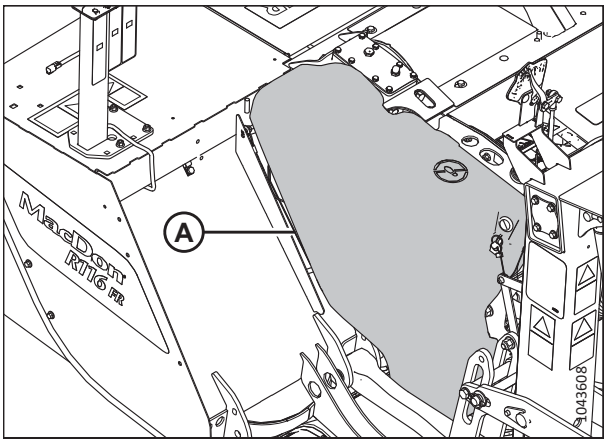


Figure 4.168: Left Driveshield

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

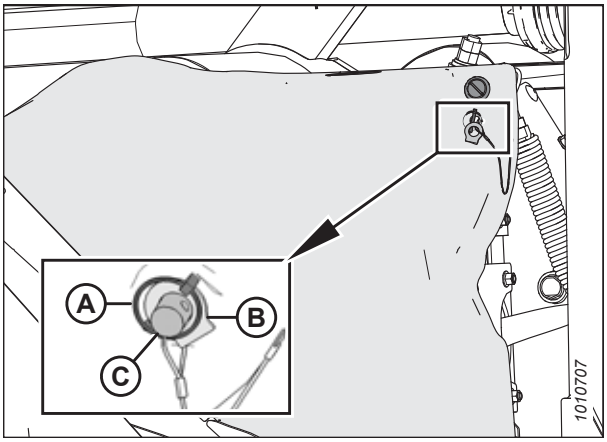


Figure 4.169: Tool to Unlock Driveshield

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

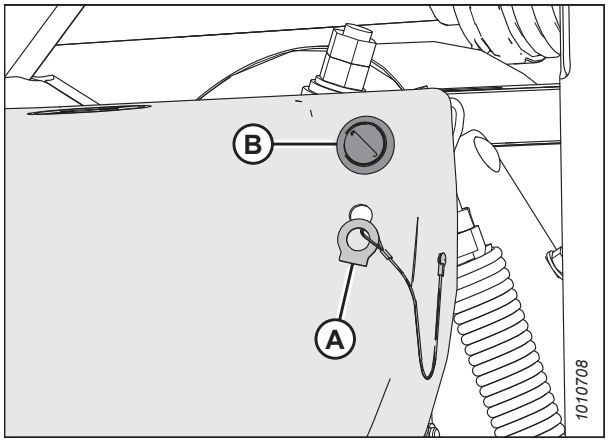


Figure 4.170: Tool to Unlock Driveshield and Latch

3. Pull the top of driveshield (A) away from the header and lift the driveshield off of the pins at the base of the shield.

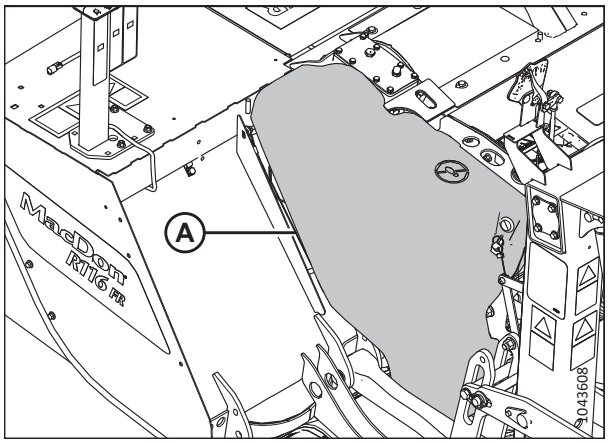


Figure 4.171: Left Driveshield

Installing Driveshields

No additional tools are needed to remove the driveshields.

WARNING

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown in this procedure depict the left driveshield; the right driveshield is similar.

1. Position driveshield (A) onto pins (B) at the base of the driveshield.

   NOTE:

   R1 SP for windrowers shown in the illustration; R1 FR similar.

2. Push the driveshield so that latch (C) is engaged.

3. Check that driveshield (A) is properly secured.

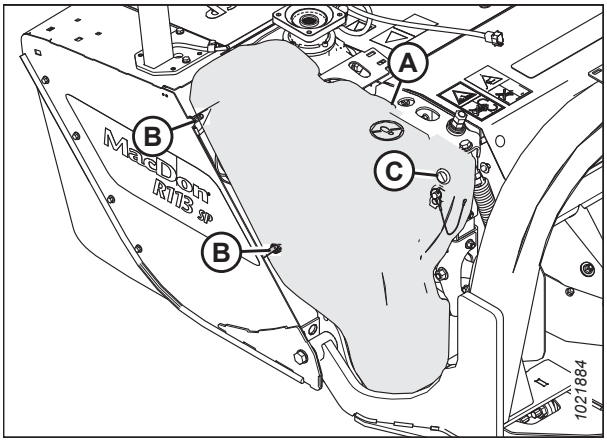


Figure 4.172: Driveshield and Latch

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

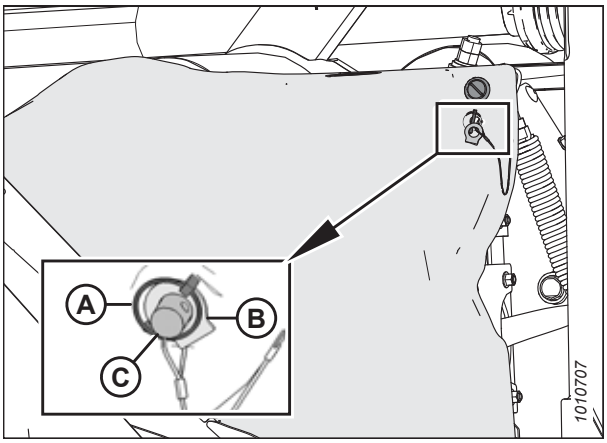


Figure 4.173: Tool to Unlock Driveshield

Replacing Driveshield Latch

The driveshield is an important safety component. If the latch is not holding the driveshield securely, it will need to be replaced.

WARNING

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

NOTE:

The illustrations shown depict the left driveshield; the right driveshield is similar.

1. Remove driveshield (A). For instructions, refer to *Removing Driveshields, page 171*.

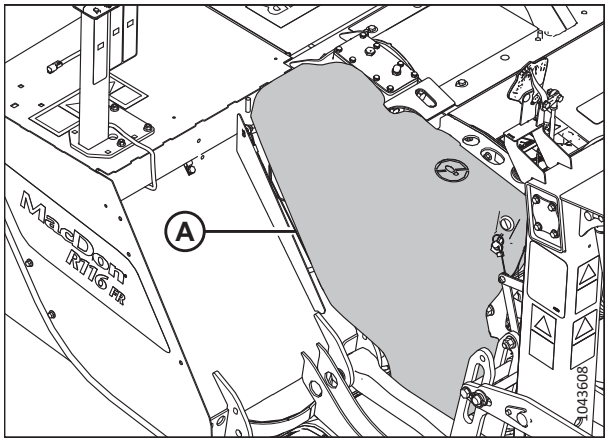


Figure 4.174: Left Driveshield

2. Remove and retain hex nut and flat washer (A) securing the latch to the backside of the driveshield.
3. Remove the latch and replace it with the new part.
4. Reinstall retained hex nut and flat washer (A).

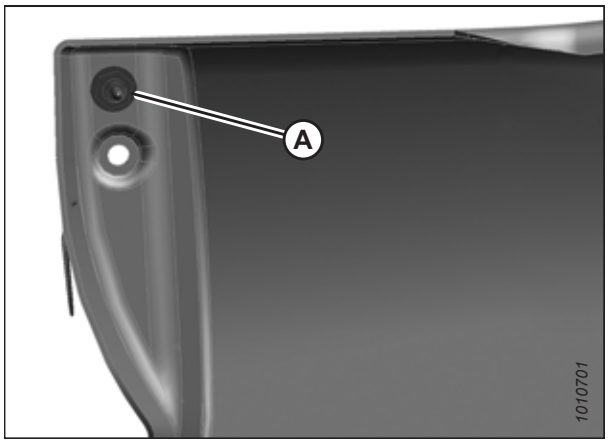


Figure 4.175: Backside of Driveshield

5. Remove two carriage bolts (A), replace stud and clip assembly (B) if it is worn or damaged, and reinstall the carriage bolts.

   NOTE:

   R1 Pull-Type shown in the illustration; R1 FR similar.

6. Reinstall the driveshield. For instructions, refer to *Installing Driveshields, page 172*.

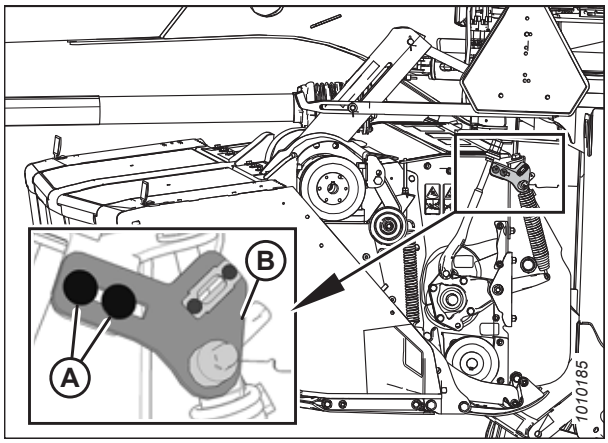


Figure 4.176: Stud and Clip Assembly

4.5.2 Driveline Guards

Removing Driveline Guards

Driveline guards protect components from dirt and debris, and protect operators from moving components. Driveline guards need to be removed before drivelines can be serviced or removed.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

WARNING

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

Driveline guards protect both ends of the cross driveline and the primary driveline. To remove the driveline guards, follow these steps:

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.

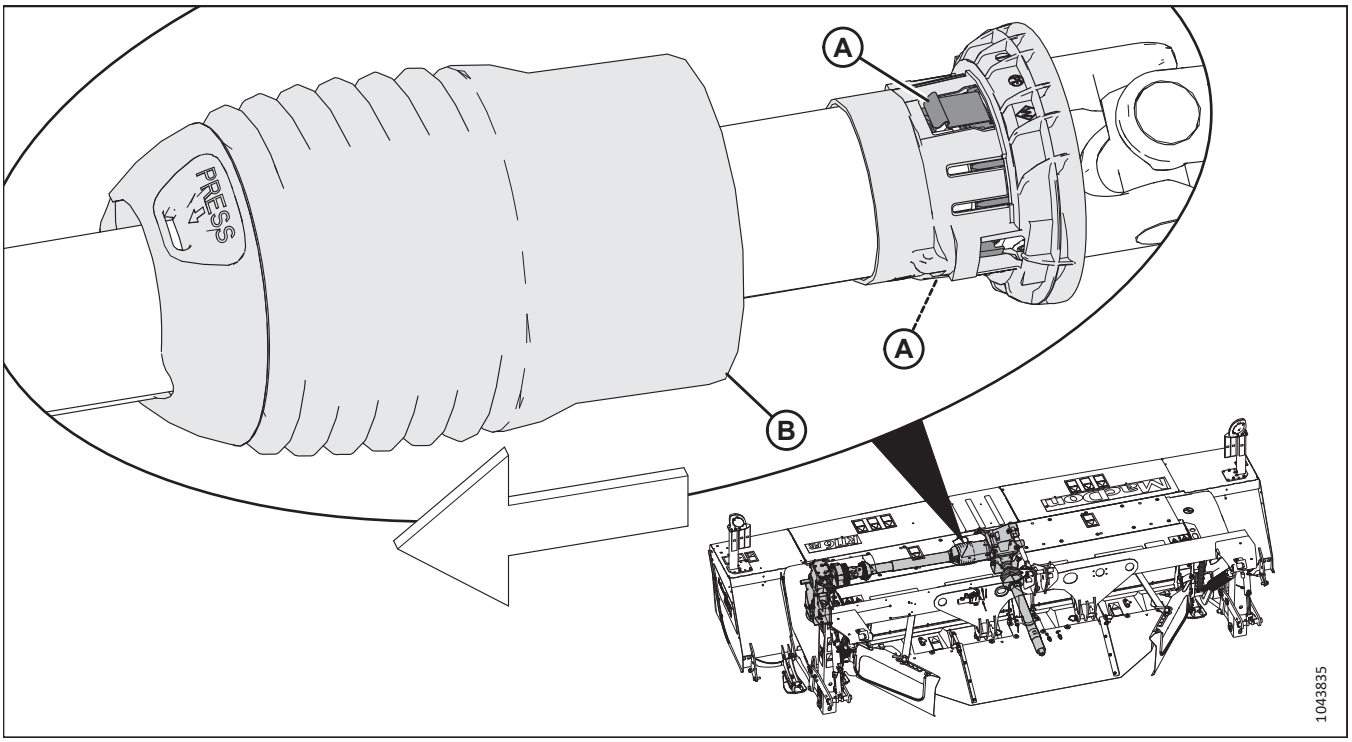


Figure 4.177: Driveline Guards

3. To remove driveline guards, press clips (A) on either side of the guard while pulling guard (B) backward on the driveline shaft.

Installing Driveline Guards

Driveline guards protect components from dirt and debris, and protect operators from moving components. Driveline guards must installed before operating the machine.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

WARNING

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

Driveline guards protect both ends of the cross driveline and the primary driveline. To install the driveline guards, follow these steps:

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.

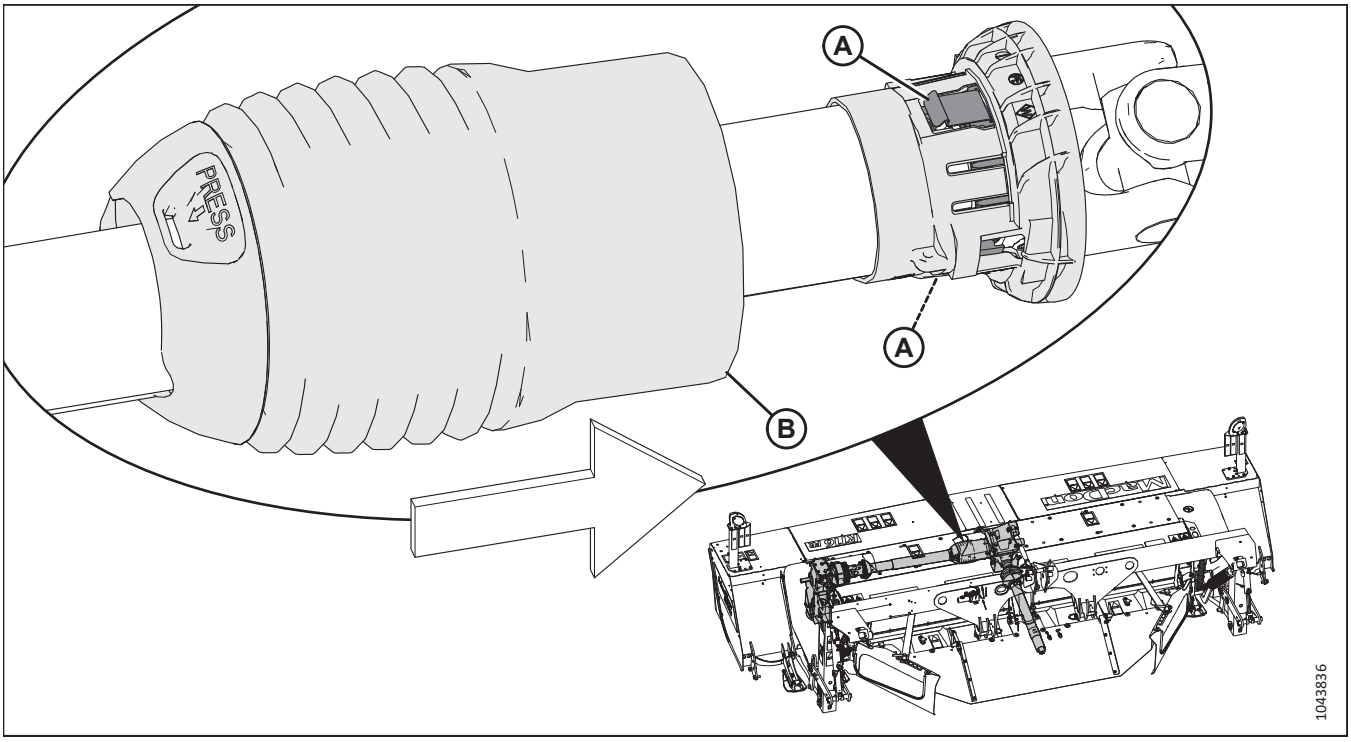


Figure 4.178: Driveline Guard

3. Slide guard (B) toward the driveline ring until both spring clips (A) lock both sides of the guard in place on the driveline shaft.

   IMPORTANT:

   If installing a replacement guard, ensure chain is short enough and does **NOT** wrap around the driveline guard.

4.5.3 Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the header drive gearbox.

Follow regular lubrication procedures and ensure all drivelines are installed as instructed. For instructions, refer to *4.3.1 Maintenance Schedule/Record, page 72*.

Removing Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the header drive gearbox. These instructions describe the procedure for removing the driveline.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Unhook the header from the tractor. For instructions, refer to *3.8.1 Disconnecting the Tractor from Rotary Disc Header, page 34*.
3. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
4. Disconnect driveline chain (A) from the header frame.
5. Remove the driveline guard. For instructions, refer to *Removing Driveline Guards, page 175*.

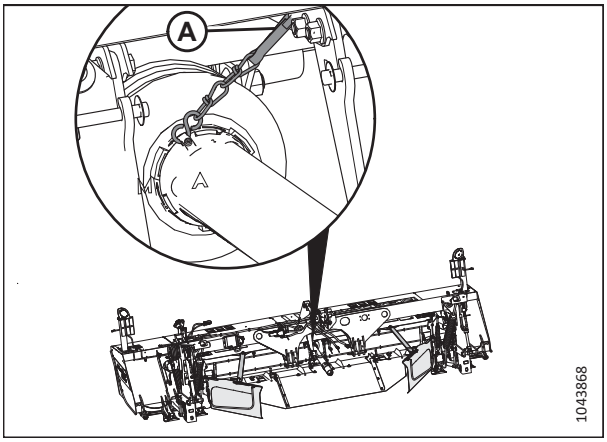


Figure 4.179: Primary Driveline

6. At the inboard end of primary driveline (A), pull back collar (B) while pulling driveline away from the splined shaft of the header drive gearbox.

   NOTE:

   The cutterbar and the drive gearbox support bracket are shown transparent in the illustration.

7. Lower primary driveline down and remove it from below the header.

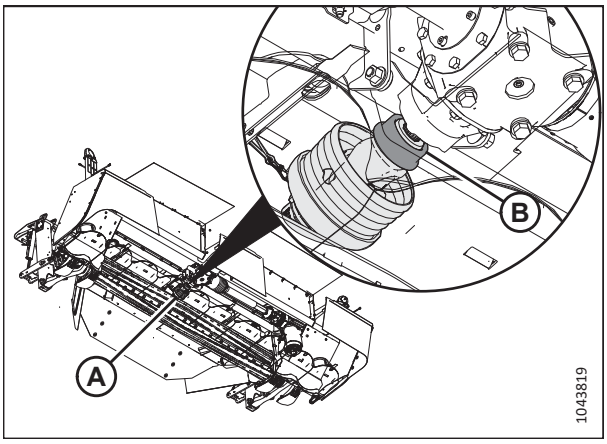


Figure 4.180: Primary Driveline – Viewed Below Header

Installing Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the header drive gearbox. These instructions describe the procedure for installing the driveline.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

WARNING

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

This procedure is continued from *Removing Primary Driveline, page 177* and assumes the header is lowered to the ground and disconnected from the tractor.

1. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
2. From below the header, install primary driveline (A) onto the splined shaft of the header drive gearbox until collar (B) locks onto the shaft.

   NOTE:

   The cutterbar and the drive gearbox support bracket are shown transparent in the illustration.
3. Install the driveline guard. For instructions, refer to *Installing Driveline Guards, page 176*.

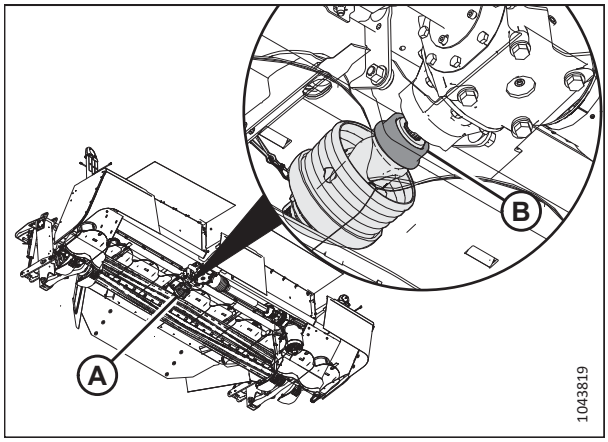


Figure 4.181: Primary Driveline – View from Below Header

4. Reconnect driveline chain (A) to the header frame.

   IMPORTANT:

   Ensure chain is short enough and does **NOT** wrap around the driveline guard.

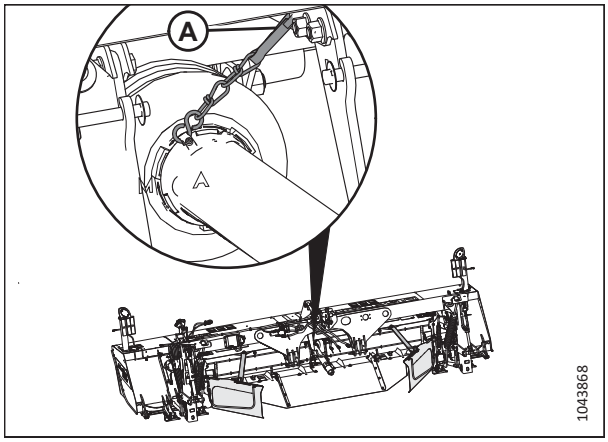


Figure 4.182: Primary Driveline Chain

4.5.4 Cross Driveline

The cross driveline transfers power from the tractor's power take-off (PTO) to the cutterbar-conditioner drive gearbox (T-gearbox).

Follow the regular lubrication schedule for cross driveline (A). For instructions, refer to *4.3.5 Lubrication, page 76*.

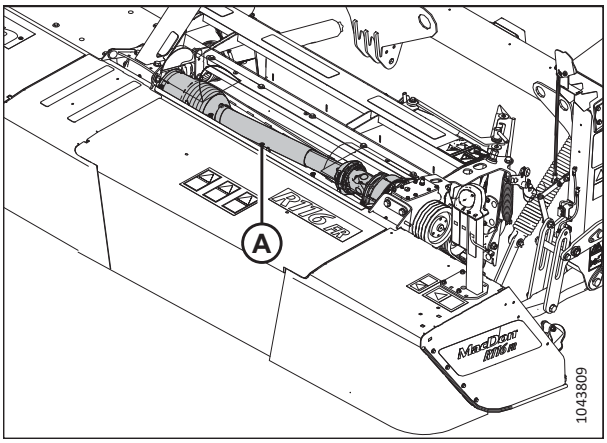


Figure 4.183: Cross Driveline

Removing Cross Driveline

The cross driveline transfers power from the tractor's power take-off (PTO) to the cutterbar-conditioner drive gearbox (T-gearbox).

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

1. Shut down the engine, and remove the key from the ignition.
2. Remove 10 bolts (B) securing top shield (A) and remove top shield to access the cross driveline. Retain bolts for installation.
3. Remove the driveline guards. For instructions, refer to *Removing Driveline Guards, page 175*.

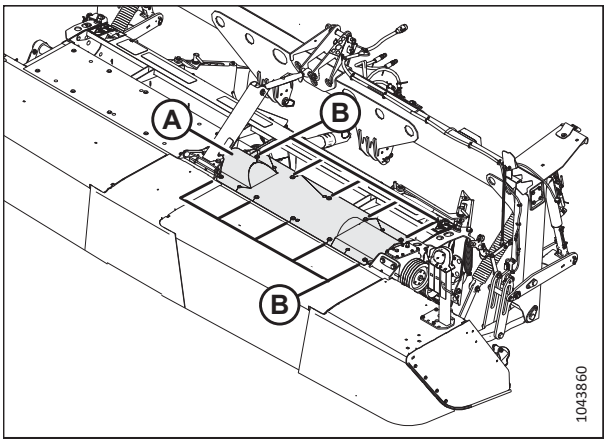


Figure 4.184: Top Shield – Left Side

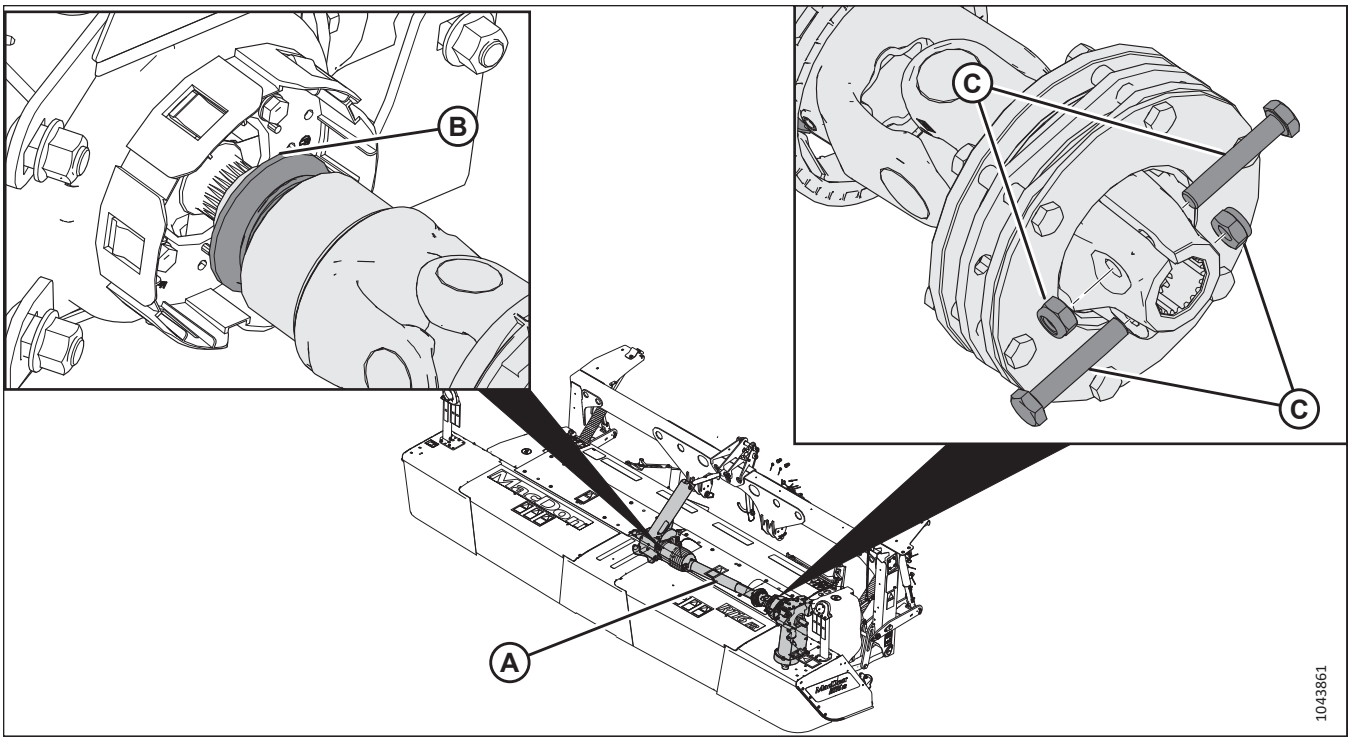


Figure 4.185: Cross Driveline

4. At the inboard end of cross driveline (A), pull back collar (B) while pulling driveline away from the splined shaft of the header drive gearbox.

5. At the outboard end of cross driveline (A), remove nuts (C) and bolts securing the driveline to the splined shaft of the cutterbar/conditioner drive gearbox. Retain nuts and bolts for installation.

6. Remove the cross driveline.

Installing Cross Driveline

The cross driveline transfers power from the tractor's power take-off (PTO) to the cutterbar-conditioner drive gearbox (T-gearbox).

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

1. Shut down the engine, and remove the key from the ignition.

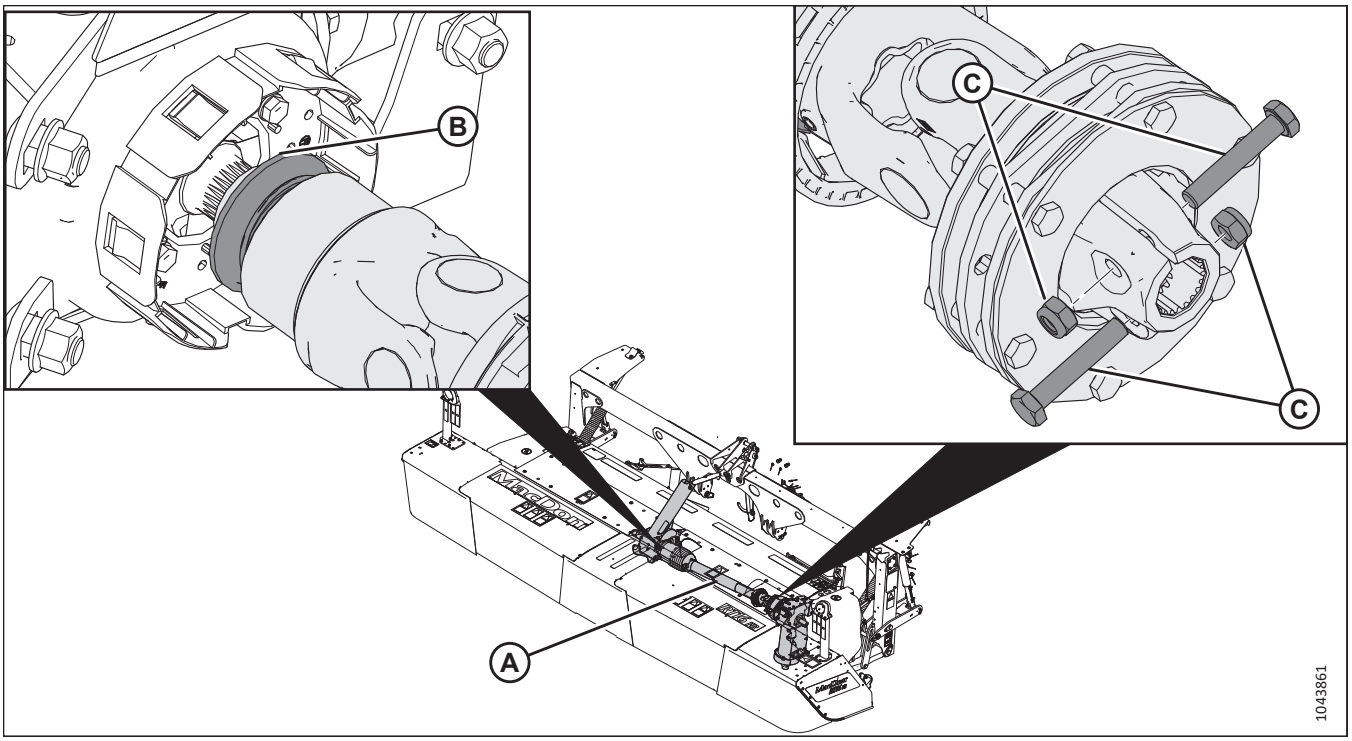


Figure 4.186: Cross Driveline

2. At the outboard end of cross driveline (A), install the driveline onto the splined shaft of the cutterbar/conditioner drive gearbox.

3. Secure the driveline to the splined shaft with existing nuts and bolts (C) configured as shown in *4.186, page 181*. Torque the nuts to 88 Nm (65 lbf·ft).

4. At the inboard end of cross driveline (A), install the driveline onto the splined shaft of the gearbox until collar (B) engages the shaft.

5. Install the driveline guards. For instructions, refer to *Installing Driveline Guards, page 176*.

6. Install top shield (A) and secure with 10 bolts (B).

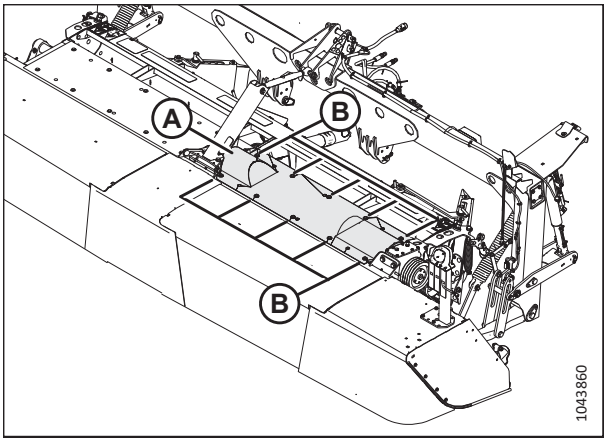


Figure 4.187: Top Shield – Left Side

4.5.5 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

The belt tension must be checked and inspected for damage or wear according to the intervals specified.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open left driveshield (A). For instructions, refer to *3.3.1 Opening Driveshields, page 23*.

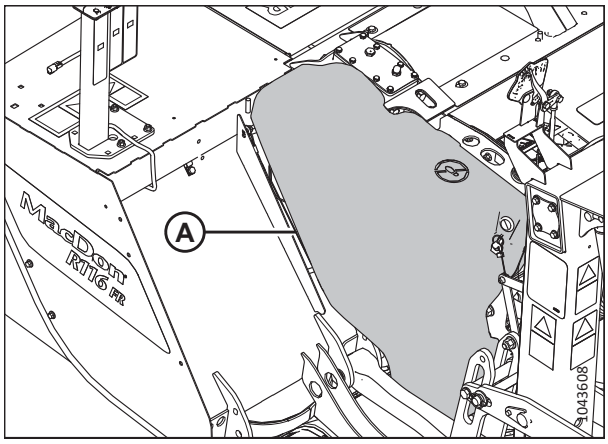


Figure 4.188: Left Driveshield

4. Inspect drive belt (A). Replace it if it is torn or cracked.
5. Check that jam nut (B) and adjuster nut (C) are tight.

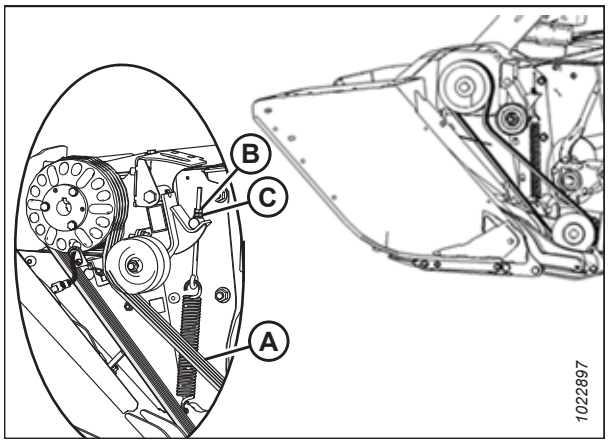


Figure 4.189: Conditioner Drive

6. Measure the length of tensioner spring (A). Spring length (B) should be 366 mm (14 3/8 in.) in accordance with spring tension decal (B). If the spring length requires adjustment, refer to *Installing Conditioner Drive Belt, page 184*.
7. Close the driveshield. For instructions, refer to *3.3.2 Closing Driveshields, page 24*.

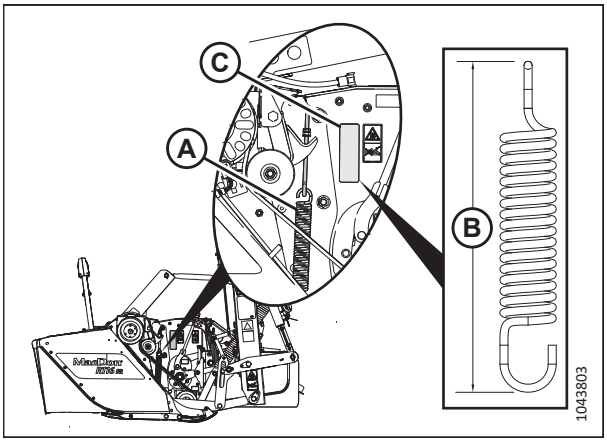


Figure 4.190: Belt Tensioner Spring

Removing Conditioner Drive Belt

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove the left driveshield. For instructions, refer to *Removing Driveshields, page 171*.

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

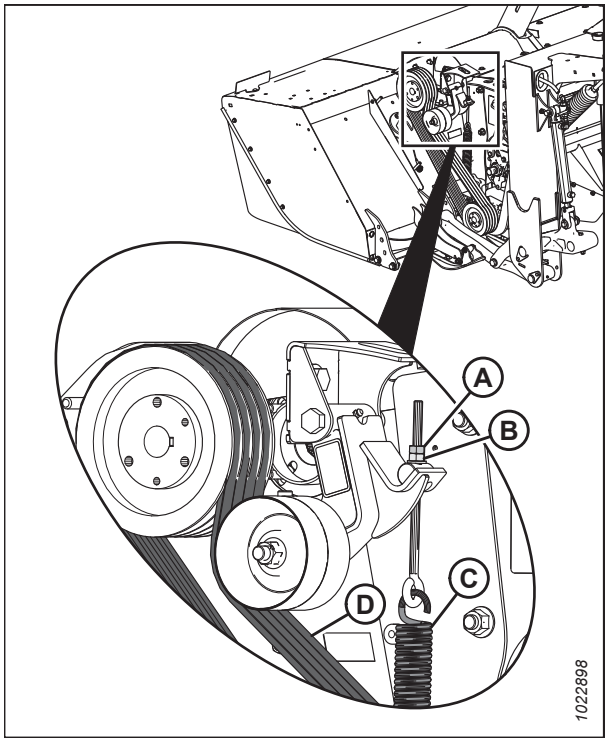


Figure 4.191: Conditioner Drive

Installing Conditioner Drive Belt

DANGER

To avoid bodily injury or death from unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove the left driveshield. For instructions, refer to *Removing Driveshields, page 171*.

4. Install drive belt (A) onto driven pulley (C), and then onto drive pulley (B). Ensure the belt is in the pulley grooves.

   NOTE:

   If it is necessary, loosen the jam nut and adjuster nut (D) to relieve spring tension.

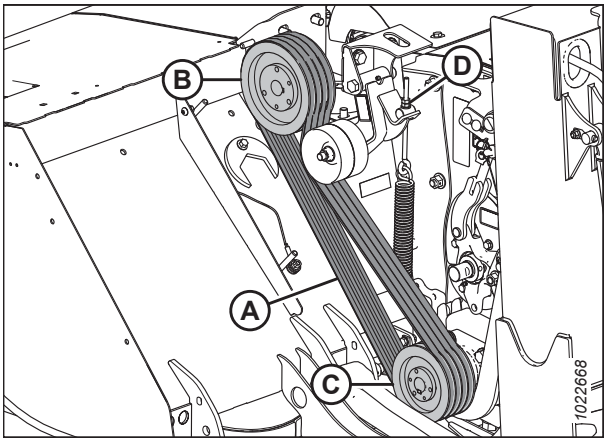


Figure 4.192: Conditioner Drive

5. Measure the length of tensioner spring (A), and adjust spring length to 366 mm (14 3/8 in.) to match spring tension decal (B).

   NOTE:

   R1 Pull-Type shown in the illustration; R1 FR similar.

6. Increase the spring length (tension) by turning adjuster nut (D) clockwise.

7. Once the correct spring measurement has been achieved, hold adjuster nut (D) and tighten jam nut (C) against it.

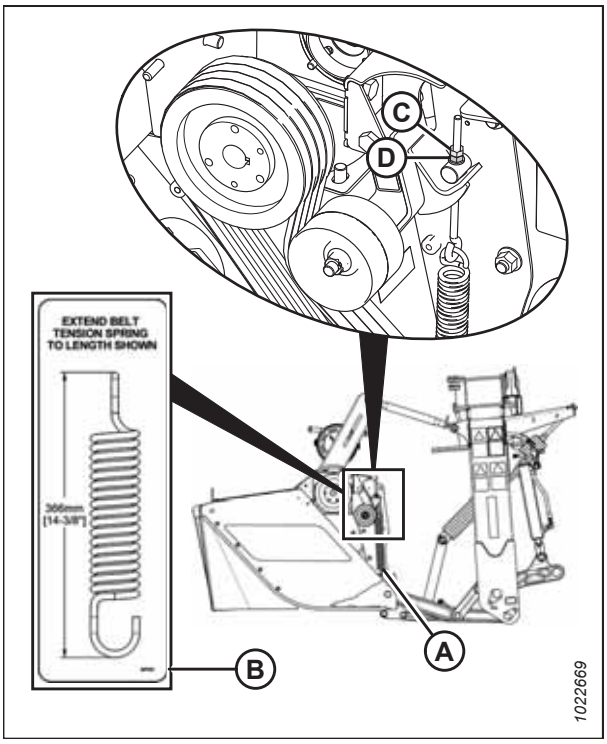


Figure 4.193: Spring Tension Decal

8. Install left driveshield (A). For instructions, refer to *Installing Driveshields, page 172*.

4.5.6 Conditioner System

The conditioner system is intended to crimp and crush crop stems, helping the crop to dry faster. The conditioner system is attached to the rear of the header.

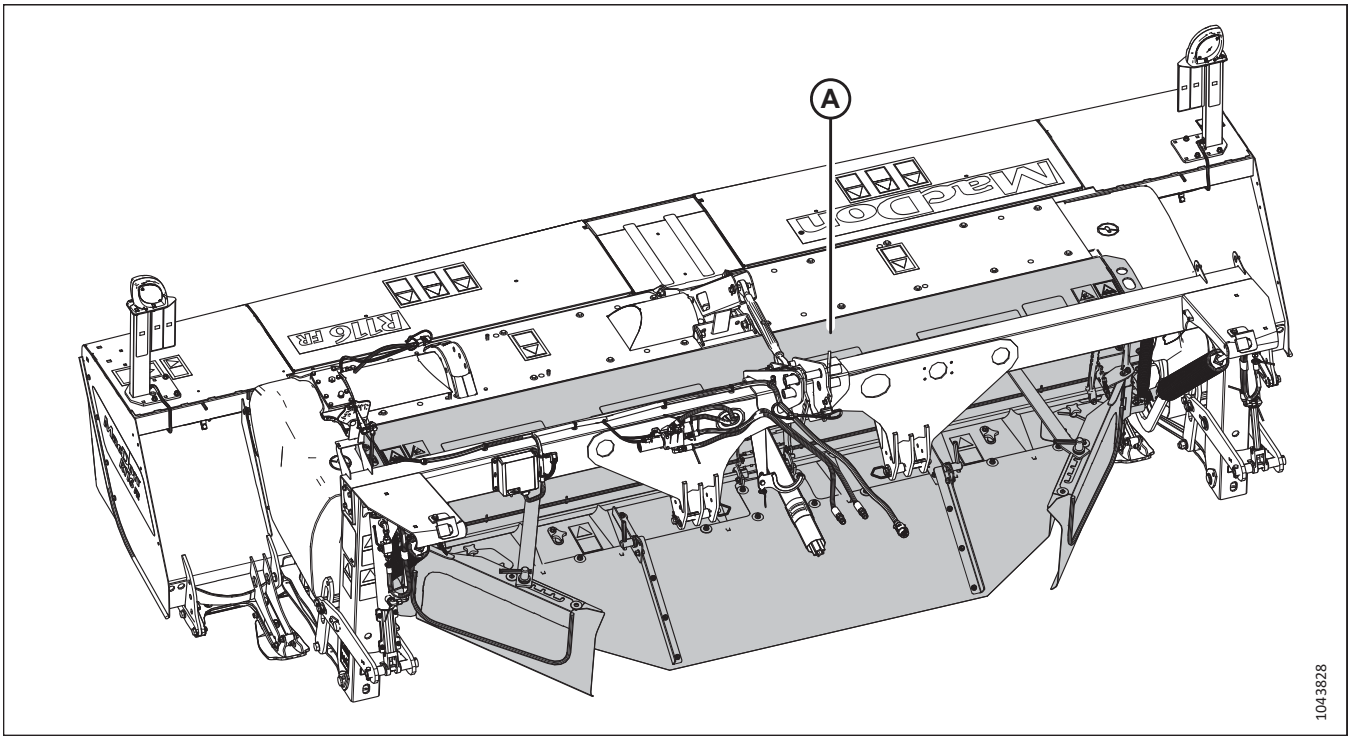


Figure 4.194: R1 FR Series Rotary Disc

A — Roll Conditioner System

Inspecting Roll Conditioner

The conditioner bearings, U-joints, and roll timing gearbox should be inspected periodically for signs of wear or damage.

DANGER

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

WARNING

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

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove left and right driveshields (A). For instructions, refer to *3.3.1 Opening Driveshields, page 23*.

4. Inspect conditioner roll left bearing (A) for signs of wear or damage. If the bearing needs replacing, contact your Dealer.

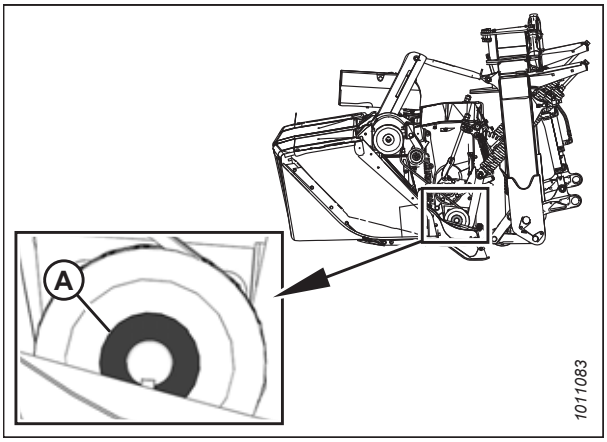


Figure 4.195: Conditioner Roll Left Bearing

5. Inspect conditioner drive U-joints (A) for signs of wear or damage. If the U-joints need replacing, contact your Dealer.

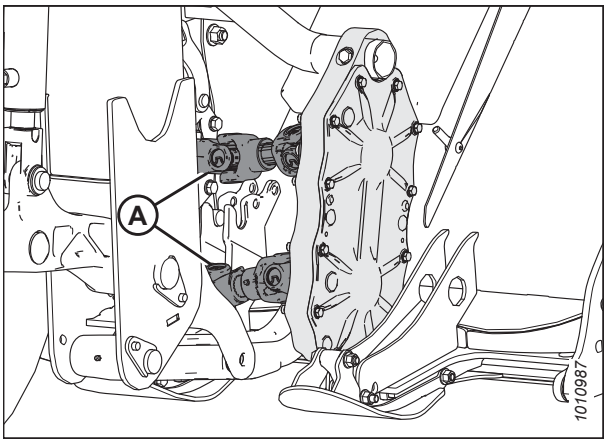


Figure 4.196: Conditioner Drive U-Joints

6. Inspect roll timing gearbox bearings (A) for signs of wear or damage. If the bearings need replacing, contact your Dealer.

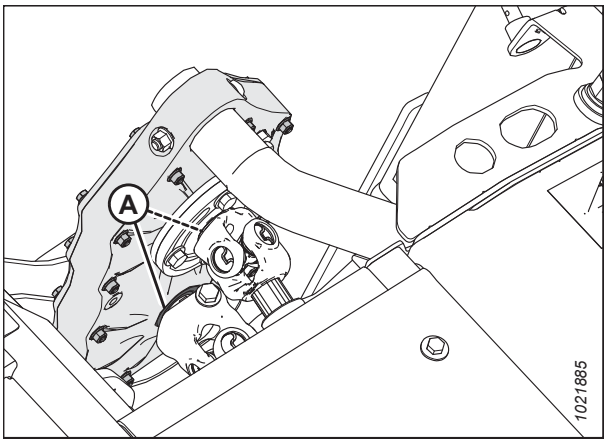


Figure 4.197: Roll Timing Gearbox Bearings

4.5.7 Conditioner Roll Timing Gearbox

The conditioner roll timing gearbox transfers power from the gearbox-driven lower roll to the upper roll.

Conditioner roll timing gearbox (A) is located inside the drive compartment at the right of the header.

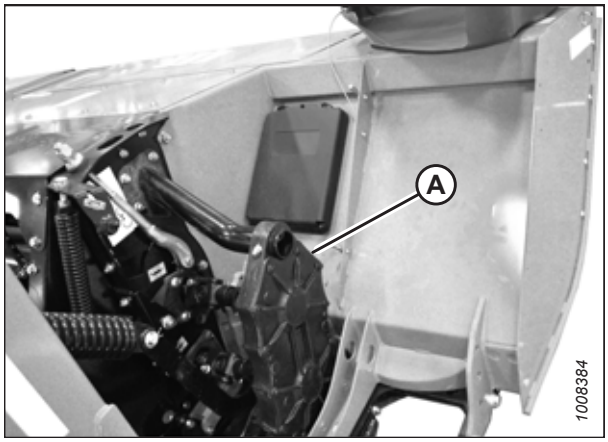


Figure 4.198: Conditioner Roll Timing Gearbox

Checking and Changing Lubricant in Conditioner Roll Timing Gearbox

The lubricant in the conditioner roll timing gearbox must be serviced regularly to ensure performance.

DANGER

To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

For information on oil change intervals, refer to *4.3.1 Maintenance Schedule/Record, page 72*.

IMPORTANT:

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

1. Adjust the header angle (tilt) so that the top of the conditioner is parallel with the ground.

   NOTE:

   To help ensure an accurate lubricant level reading for the conditioner roll timing gearbox, set the header's skid shoes in the fully raised position. For instructions, refer to *Adjusting Cutting Height, page 46*.

2. Lower the header to the ground.

3. Shut down the engine, and remove the key from the ignition.

4. Open right driveshield (A). For instructions, refer to *3.3.1 Opening Driveshields, page 23*.

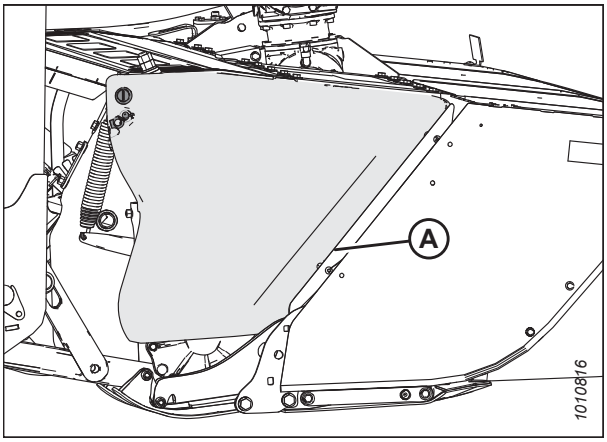


Figure 4.199: Right Driveshield

Checking the conditioner roll timing gearbox lubricant level:

5. Clean any dirt from around lubricant level sight glass (A) and breather (B) on the inboard side of the gearbox.
6. Ensure that the lubricant is level at the top of the sight glass. If necessary, add lubricant through breather (B).
7. Add lubricant to the gearbox if necessary. Refer to this manual's inside back cover for a list of recommended fluids, lubricants, and capacities.

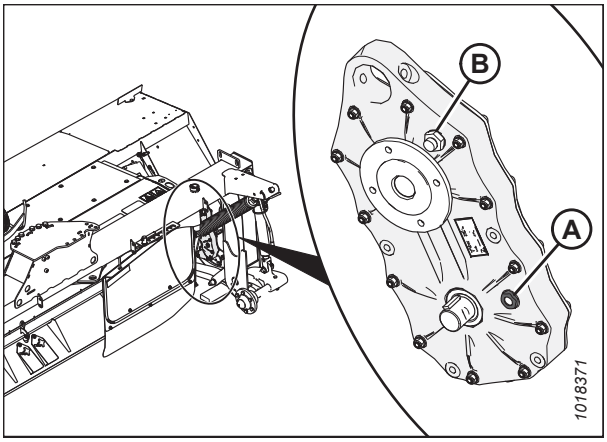


Figure 4.200: Roll Timing Gearbox

Changing the conditioner roll timing gearbox lubricant:

DANGER

To prevent injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key from the ignition before leaving the operator's seat or making adjustments to the machine. If the rotary disc header is raised, always close the lock-out valves, and place blocks under the header. Never work on or beneath an unsupported header.

8. Raise the header to provide sufficient access to lubricant drain plug (A).
9. Shut down the engine, and remove the key from the ignition.
10. Shut down the engine, and remove the key from the ignition.
11. Close the cylinder lock-out valve on each auxiliary lift cylinder by turning the handle to the closed position (the valve handle should be perpendicular to the hose). For instructions, refer to *3.2.1 Locking and Unlocking Auxiliary Lift Cylinders, page 22*.
12. Clean around lubricant drain plug (A) on the bottom of the gearbox and around lubricant level plug (B) on the inboard side of the gearbox.
13. Place a 1 liter (1.05 qts [US]) container underneath the conditioner gearbox.
14. Remove lubricant drain plug (A) using a hex key.
15. Let the lubricant drain.
16. Replace lubricant drain plug (A) and tighten it.
17. Fill the gearbox with the volume of lubricant specified on the inside back cover of this manual or until the lubricant is visible in sight glass (B).
18. Properly dispose of the old lubricant.

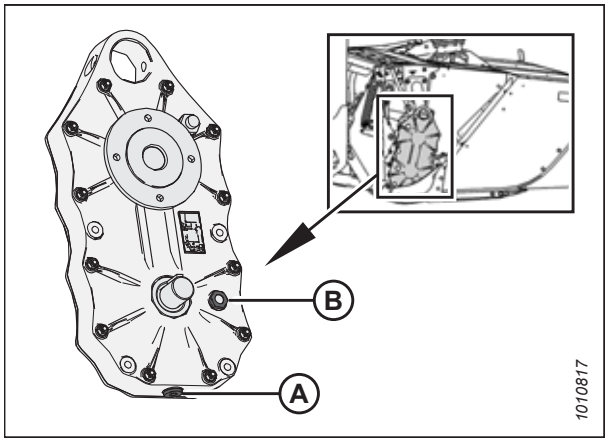


Figure 4.201: Roll Timing Gearbox

4.5.8 Header Drive Gearbox

The header drive gearbox transfers power from the tractors PTO to the cutterbar/conditioner drive gearbox.

The header drive gearbox (A) is located in the center of the machine and receives power from the tractor's PTO via the primary driveline.

NOTE:

If the gearbox requires repair, contact your MacDon dealer.

For service intervals, refer to *4.3.1 Maintenance Schedule/ Record, page 72*.

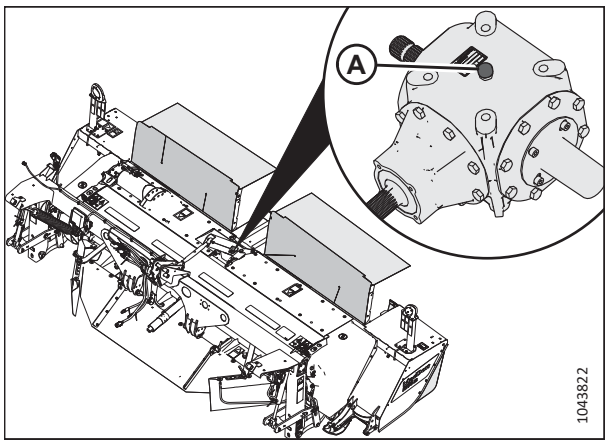


Figure 4.202: Header Drive Gearbox

Checking and Adding Lubricant – Header Drive Gearbox

The header drive gearbox will need lubricant checks according to the Maintenance Schedule. Follow this procedure for checking and added lubricant.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

1. Park the machine on a flat, level surface.
2. Lower the header fully.
3. Adjust the header so gearbox is level to ensure accurate oil level readings.
4. Shut down the engine, and remove the key from the ignition.
5. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
6. Clean around check plug (A) on the forward facing side of the gearbox.
7. Remove (lower) check plug (A). Lubricant should be level with or slightly dripping from the check port.
8. Install check plug and tighten. If lubricant level is low, proceed to the next step.

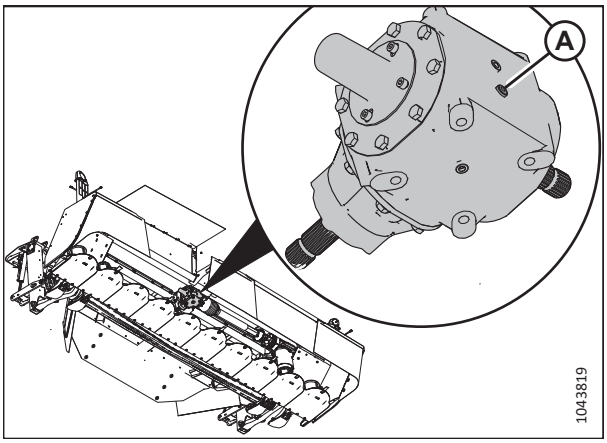


Figure 4.203: Drive Gearbox – Viewed from Below

9. Clean around breather port (A) on the top facing side of the gearbox.
10. Use a 22 mm socket to remove the breather (A) and add lubricant into the breather port.

NOTE:

Refer to the inside back cover for lubrication specifications.

11. Repeat Step *7, page 191* to Step *8, page 191* until lubricant drips slightly from the check port.
12. Reinstall breather into the top of the gearbox.
13. Clean up spilled lubricant.

    IMPORTANT:

    Ensure no objects or tools are left on the cutterbar.

14. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

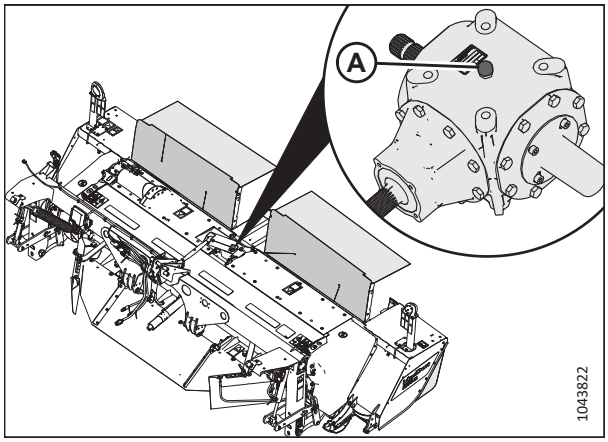


Figure 4.204: Drive Gearbox – Viewed from Above

Draining Lubricant – Header Drive Gearbox

The header drive gearbox lubricant will need to be changed according to the Maintenance Schedule. Follow this procedure to drain the lubricant from the header drive gearbox.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Ensure that all bystanders have cleared the area.

WARNING

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

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.

1. Park the machine on a flat, level surface.
2. Lower the header fully.
3. Adjust the header so gearbox is level.
4. Shut down the engine, and remove the key from the ignition.
5. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.

6. Clean around drain plug (A) on the bottom facing side of the gearbox.
7. Place a 2 liter (2.11 qts [US]) container under drain plug (A).
8. Remove drain plug (A).
9. When lubricant has drained completely, reinstall the drain plug and add lubricant to the gearbox. For instructions, refer to *Checking and Adding Lubricant – Cutterbar / Conditioner Drive Gearbox , page 193*.

   NOTE:

   For lubricant specifications, refer to the inside back cover of this manual.
10. Clean up spilled lubricant.

    IMPORTANT:

    Ensure no objects or tools are left on the cutterbar.

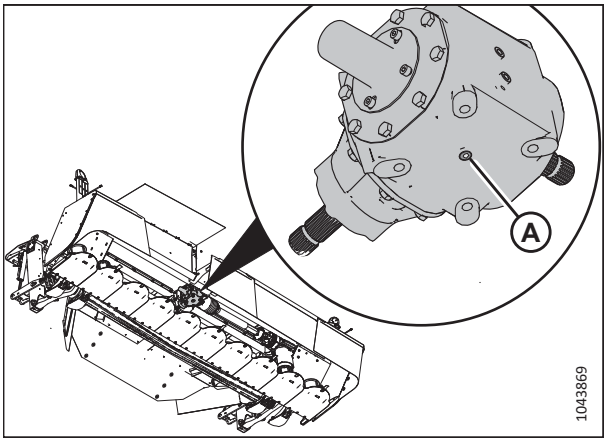


Figure 4.205: Drive Gearbox – Viewed from Below

4.5.9 Cutterbar / Conditioner Drive Gearbox

The cutterbar/conditioner drive gearbox transfers power from the header drive gearbox to the conditioner and cutterbar.

The cutterbar-conditioner drive gearbox (A), located inside the drive compartment on the left side of the header, transfers power from the header drive gearbox to the conditioner and cutterbar.

NOTE:

If the gearbox requires repair, contact your MacDon dealer.

For service intervals, refer to *4.3.1 Maintenance Schedule/ Record, page 72*.

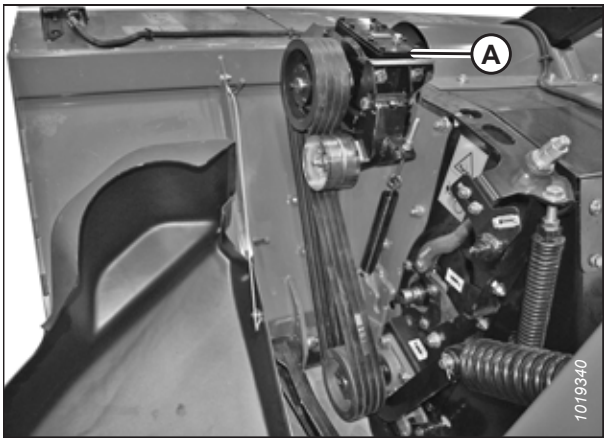


Figure 4.206: Left Drive Compartment

Checking and Adding Lubricant – Cutterbar / Conditioner Drive Gearbox

The cutterbar/conditioner drive gearbox is located inside the drive compartment at the left side of the header.

DANGER

To avoid bodily injury or death from unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header on to level ground.

2. Shut down the engine, and remove the key from the ignition.
3. Open the left driveshield. For instructions, refer to *3.3.1 Opening Driveshields, page 23*.
4. Clean the area around dipstick (A).
5. Remove dipstick using a 22 mm socket.
6. Ensure the lubricant level is to the full line on the dipstick.
7. If necessary, add gear lubricant through dipstick hole (A). Refer to the manual's inside back cover for lubricant information.
8. Reinstall the dipstick and tighten it.
9. Close the left driveshield. For instructions, refer to *3.3.2 Closing Driveshields, page 24*.

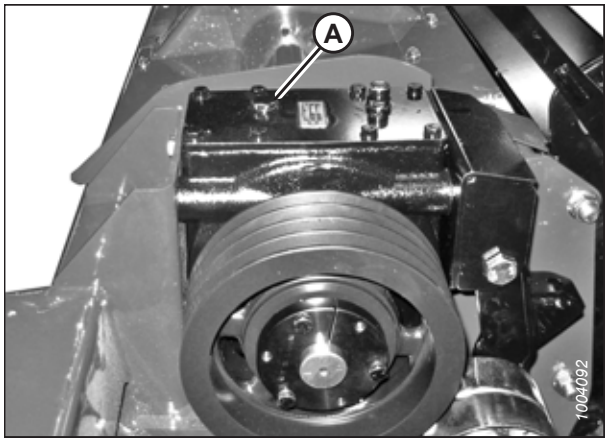


Figure 4.207: Left Side of Rotary Header

Draining Lubricant from Cutterbar – Conditioner Drive Gearbox (T-Gearbox)

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Ensure that all bystanders have cleared the area.

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.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the cutterbar doors. For instructions, refer to *3.4.1 Opening Cutterbar Doors, page 26*.
4. Remove four M10 hex flange head bolts (A) and vertical driveshield (B).

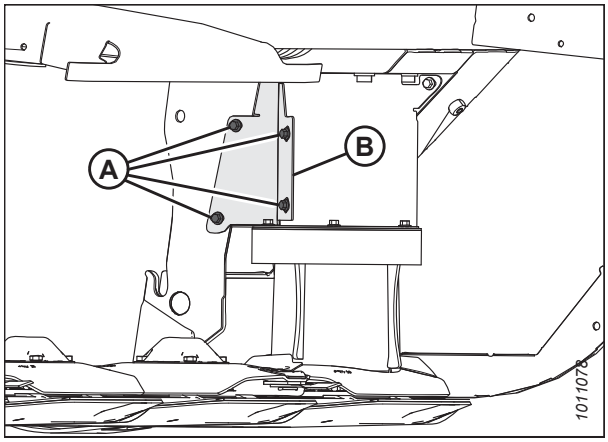


Figure 4.208: Vertical Driveshield

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

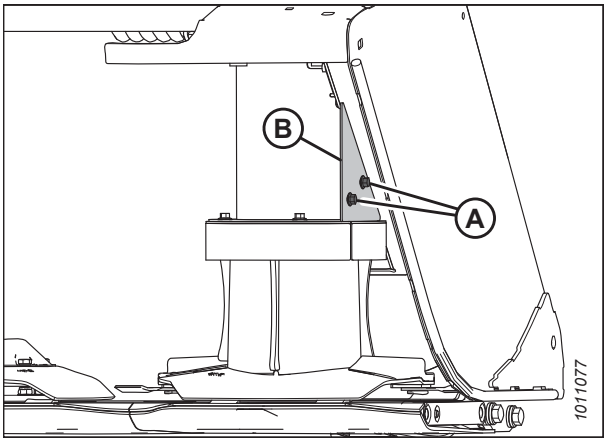


Figure 4.209: Cover Plate

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

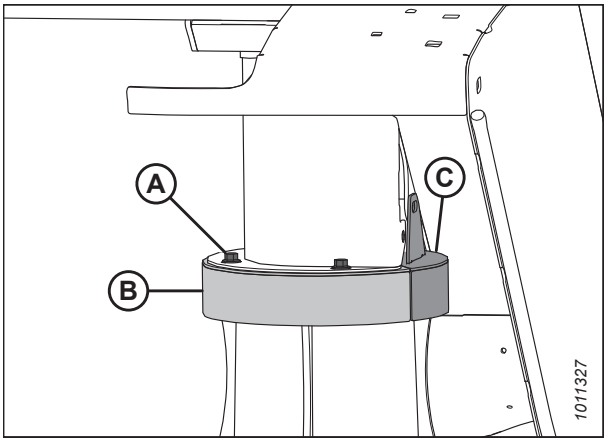


Figure 4.210: Top Plate and Drum Top

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

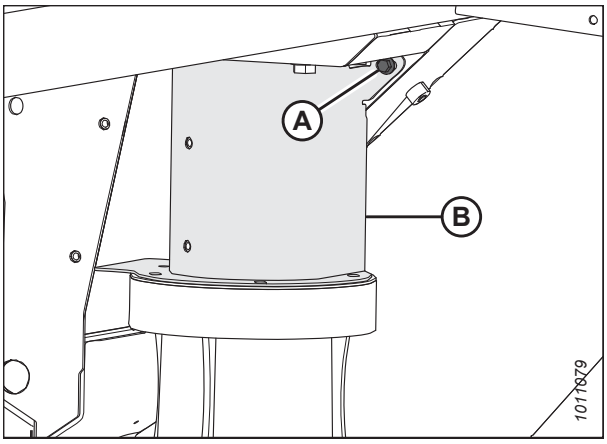


Figure 4.211: Vertical Shield

8. Place a 2 liter (2.11 qts [US]) container under drain plug (A). Remove the plug using a 17 mm socket.
9. Let the lubricant drain, replace drain plug (A), then tighten it.
10. Properly dispose of the used oil.

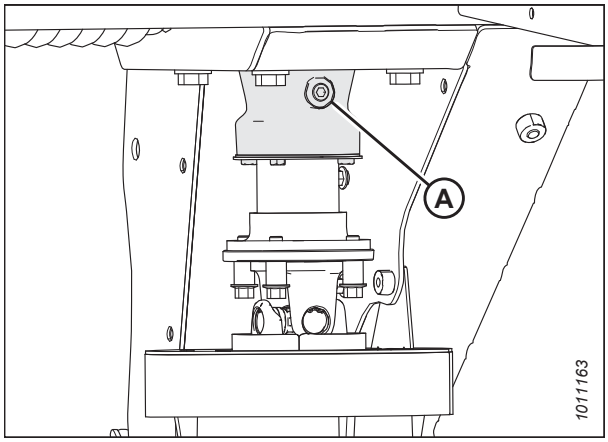


Figure 4.212: Drain Plug

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

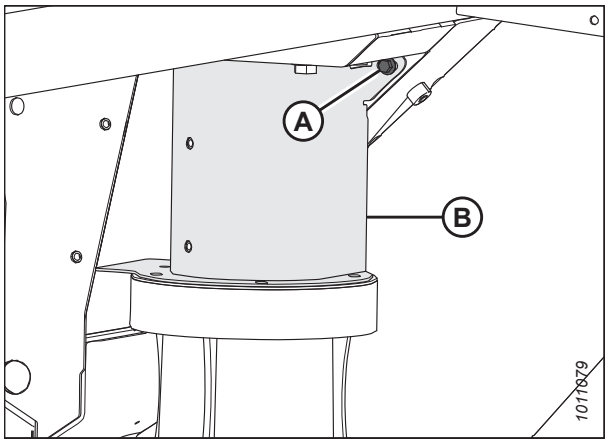


Figure 4.213: Vertical Shield

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

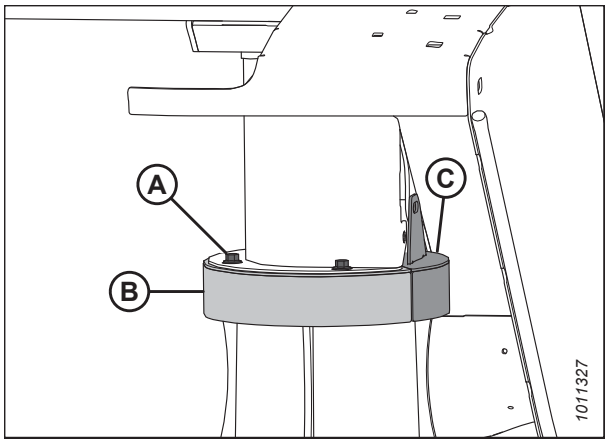


Figure 4.214: Top Plate and Drum Top

13. Install top M10 hex flange head bolt (B) through cover plate (A) and top plate (C).
14. Install lower M10 hex flange head bolt (D) through cover plate (A) and vertical shield (E).
15. Tighten bolts (B) and (D).

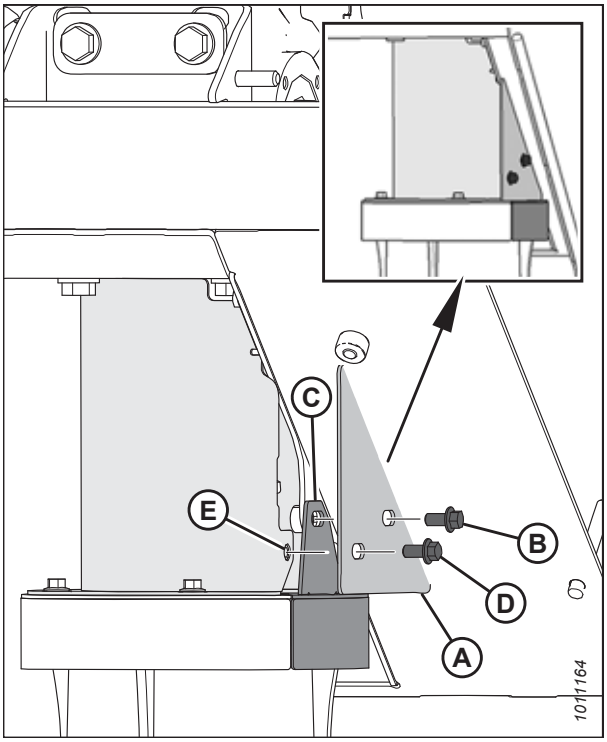


Figure 4.215: Cover Plate and Vertical Drive Shield

16. Install vertical driveshield (B) using four M10 hex flange head bolts (A).

WARNING

Ensure that the cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started, which can result in serious injury or cause damage to the machine.

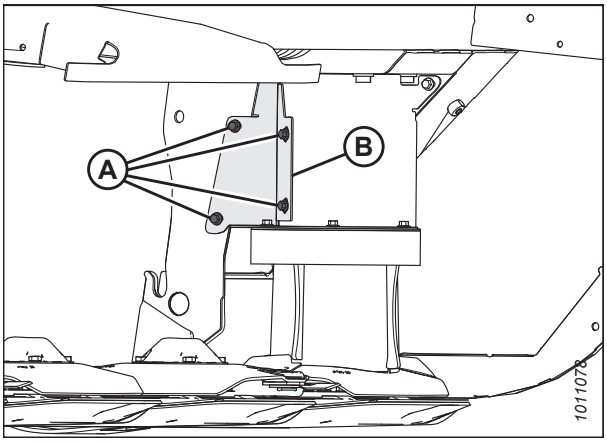


Figure 4.216: Vertical Driveshield

17. Close the cutterbar doors. For instructions, refer to *3.4.2 Closing Cutterbar Doors, page 27*.

4.6 Hydraulics

Consult this section for general information on the hydraulic system. Detailed procedures for maintaining and repairing the hydraulic system are beyond the scope of the operator's manual.

4.6.1 Checking Hydraulic Hoses and Lines

Check the hydraulic hoses and lines daily for signs of damage or leaks. Replace any damaged or leaking hoses immediately. Follow all applicable safety procedures while inspecting and maintaining the hydraulic system.

WARNING

- **Avoid high-pressure fluids. Escaping fluid can penetrate the skin, causing serious injury. Relieve the pressure from the hydraulic system before disconnecting any hydraulic lines. Tighten all hydraulic connections before applying pressure. Keep your limbs away from pin holes and nozzles, which can eject fluids with enormous force.**
- **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 4.217: 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. Overhauls must be performed in an environment free of dust and debris.

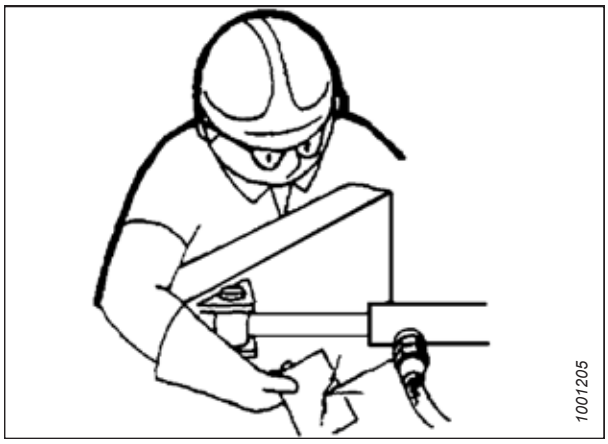


Figure 4.218: Testing for Hydraulic Leaks

4.6.2 Hydraulic Cylinders

The hydraulic cylinders do not require routine maintenance or service. Occasionally visually inspect cylinders for signs of leaks or damage. If repairs are required, remove them and have them serviced by your MacDon Dealer.

4.7 Electrical System

The R1 FR's electrical system is powered by the tractor. The electrical harness from the header connects to the tractor and supplies power to the position lights and the header lift assist system.

4.7.1 Maintaining Electrical System

Proper maintenance of the electrical system helps prevent future problems.

- Use electrical tape and cable ties as required to prevent the wiring harness from dragging or rubbing.
- Keep the lights clean and replace any defective bulbs or LED lights.

4.7.2 Replacing Amber Hazard/Signal Bulb

Replace the amber hazard or signal bulbs if they are damaged or inoperable.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat.

DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove two Phillips screws (A) from the fixture. Remove the plastic lens.
4. Replace the bulb.
5. Reinstall the plastic lens and screws.

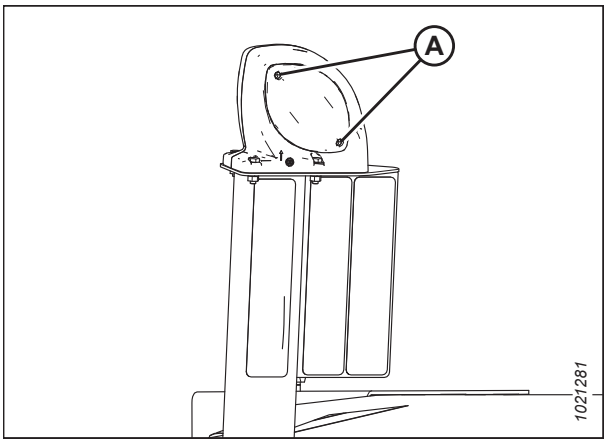


Figure 4.219: Plastic Lens and Screws

4.7.3 Inspecting Auxiliary Lift System Sensors

Sensors are used to determine when the auxiliary lift cylinders are activated to adjust the header position.

DANGER

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

DANGER

Ensure that all bystanders have cleared the area.

1. Remove auxiliary lift lock straight pins (A) from holes in lift linkage on both sides of the header. Store the auxiliary lift lock straight pins, washers, and Lynch pins in storage location (B) on the left side of the carrier frame.
2. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.

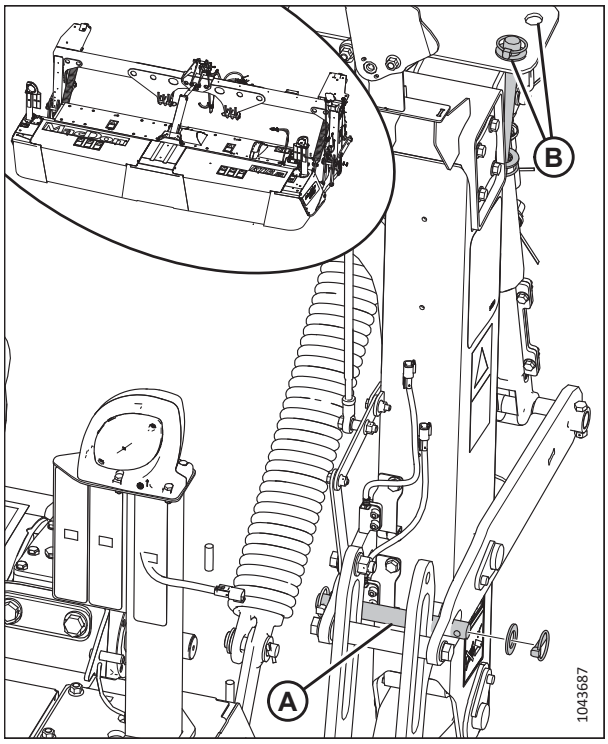


Figure 4.220: Auxiliary Lift Lock Pins – Left Side

4. Close the rotary disc header's auxiliary lift cylinder lock-out valve (A) on each lift cylinder by turning the handle to the horizontal position (90° to the hose). Repeat this step on the opposite side.

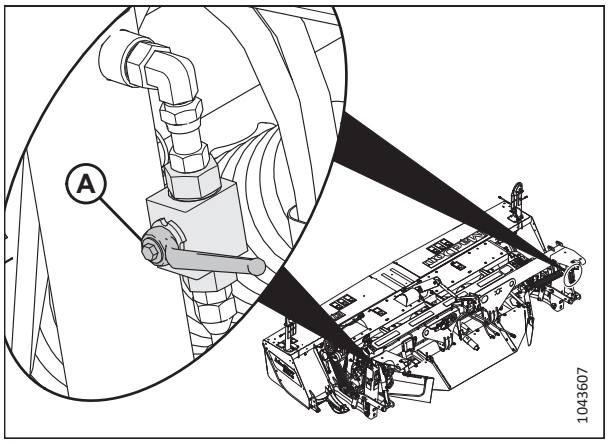


Figure 4.221: Cylinder Lock-Out Valve – Closed Position

5. Ensure that upper proximity sensor (B) (inset) is within 1–3 mm (1/32–1/8 in.) of top link (A) when the 3-point hitch is fully raised.

   NOTE:

   Auxiliary lift cylinders (C) should be fully extended and to assist the 3–point hitch by lifting the header with lift linkage (D).

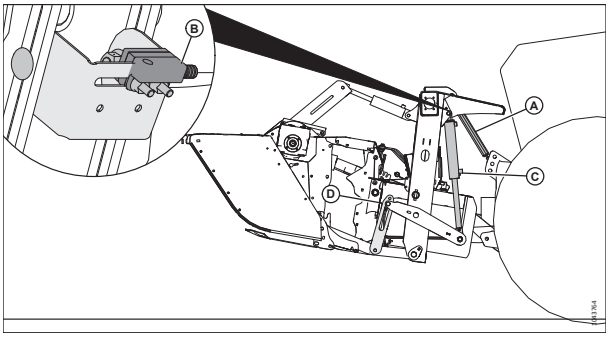


Figure 4.222: R1 FR – Fully Raised Position

6. On the left side of the carrier frame, ensure upper and lower sensors (A) are within 1–3 mm (1/32–1/8 in.) of inboard lift linkage (B).

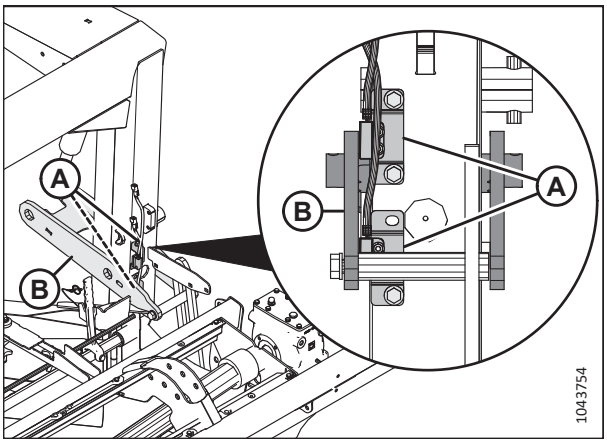


Figure 4.223: Carrier Frame – Left Auxiliary Lift Linkage

4.7.4 Setting Relay Logic Switch

The R1 FR's hydraulic lift assist system uses sensors and electronics for automatic control. The electronic relay logic assembly has three setting options.

The relay logic assembly is located on the left side of the carrier frame at the back of the header. Switch (A) on the bottom of the cover has three positions. Select the position that suits your application:

- Automatic (right): select the automatic setting when operating in normal conditions. The auxiliary lift cylinders will extend or retract according to feedback from the position sensors.
- Off (center): select this mode to turn the lift assist system off when servicing, transporting, or storing the header.
- Manual (left): select this mode to use the tractor's front hydraulic circuit controls to manually extend or retract the auxiliary lift cylinders.

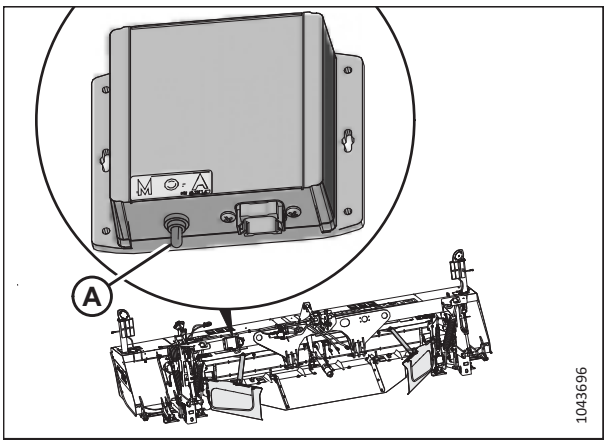


Figure 4.224: Relay Logic Assembly

Chapter 5: Options and Attachments

Consult this section to learn about additional hardware and configuration options for your machine. Contact your Dealer for more information.

5.1 Performance Kits

Performance kits allow your machine to cut different types of crop in different conditions. The following kits are available through your MacDon Dealer. The Dealer will require the bundle number for pricing and availability.

5.1.1 Tall Crop Divider Kit

Tall crop dividers attach to the ends of the machine for clean crop dividing and cutterbar entry in tall crops.

The kit includes left and right dividers and attachment hardware.

B5800

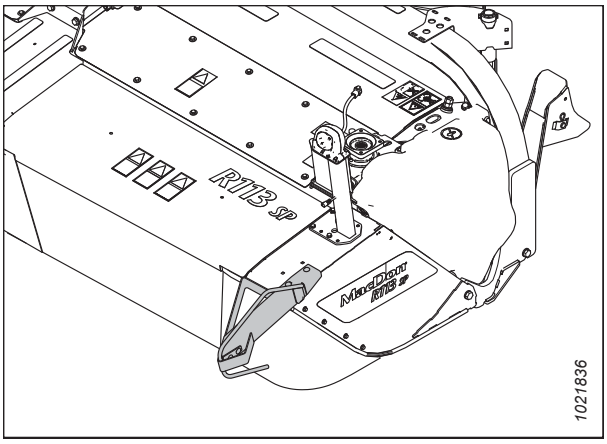


Figure 5.1: Tall Crop Divider — Left Side Shown

5.1.2 Hydraulic Center-Link Kit

The Hydraulic Center-Link kit replaces the standard mechanical link and uses a hydraulic cylinder and separate tractor front hydraulic circuit to adjust the rotary disc header angle.

The kit includes installation instructions.

B7516

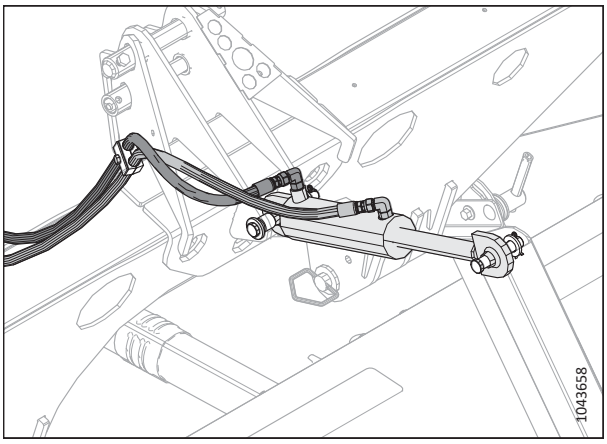


Figure 5.2: Hydraulic Center-Link

5.1.3 Quick Change Blade Kit

The Quick Change Blade kit allows you to change blades quickly using a blade change tool that separates the disc assembly.

Kits include all hardware and installation instructions. Available for factory-configured machines with quick-change-ready discs.

- 10 Disc Kit – B6699
- 8 Disc Kit – B6700

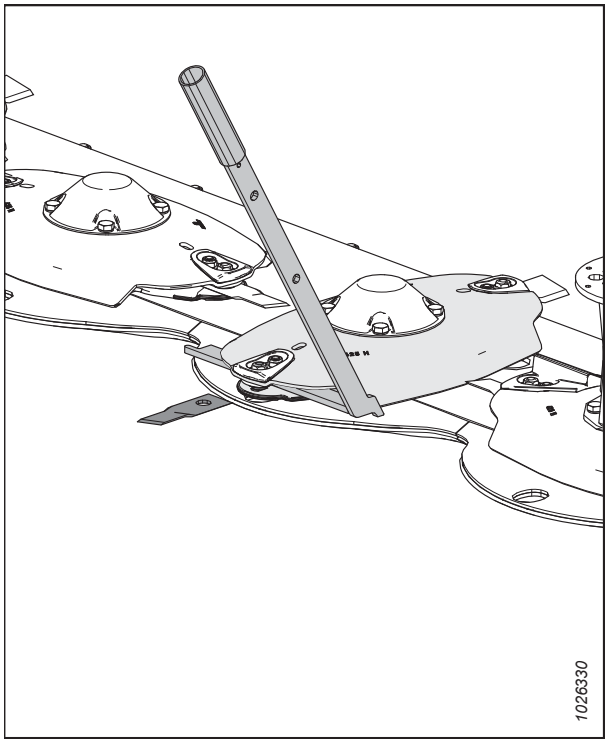


Figure 5.3: Quick Change Blade Kit

5.2 Replacement Conditioners

The following kits are available through your MacDon Dealer. The Dealer will require the bundle number for pricing and availability.

5.2.1 Steel Intermeshing Roller

Steel conditioner rolls are suited to a wide range of crops (including alfalfa and thicker-stemmed cane-type crops).

A replacement steel intermeshing roller conditioner can be ordered for R1 FR Series machines.

B7517

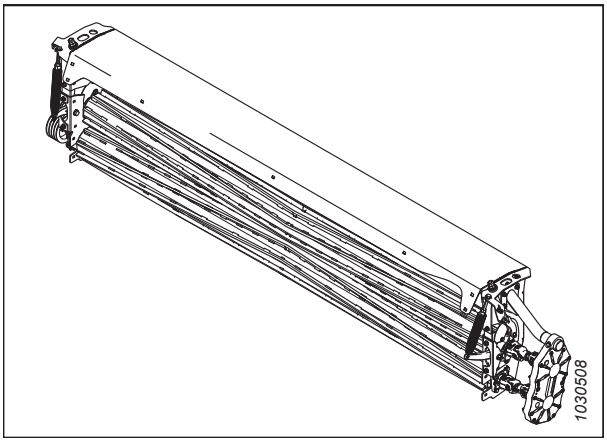


Figure 5.4: Steel Intermeshing Roller

Chapter 6: Troubleshooting

Refer to this table if problems are encountered while operating the machine.

6.1 Troubleshooting Rotary Disc Header Performance

A list of solutions are presented here on how to troubleshoot your rotary header performance.

Problem	Solution	Refer to
Symptom: Cutterbar plugging		
Dull, bent, or badly worn blades	Replace blades.	*4.4.7 Maintaining Disc Blades, page 114*
Build-up of dirt between rock guards	Decrease rotary disc header angle and increase float. In some conditions, it may be necessary to carry rotary disc header slightly with lower skid shoes.	*3.13.3 Cutting Height, page 46*
Conditioner drive belt slipping	Adjust conditioner drive belt tension.	*4.5.5 Conditioner Drive Belt, page 182*
Symptom: Ragged or uneven cutting of crop		
Float too light, causing bouncing	Adjust to heavier float setting.	*3.13.2 Float, page 43*
Ground speed too slow	Increase ground speed.	*3.13.5 Ground Speed, page 49*
Downed crop	Adjust rotary disc header angle or install blade-lowering kit on rotary disc header to cut closer to ground.	*3.13.4 Cutterbar Angle, page 48*
Symptom: Strips of uncut crop left on field		
Bent or dull disc blades	Replace blades.	*4.4.7 Maintaining Disc Blades, page 114*
Build-up of dirt between rock guards	Decrease rotary disc header angle and increase float.	*3.13.4 Cutterbar Angle, page 48*
Build-up of dirt between rock guards	Decrease rotary disc header cutterbar angle and increase float.	*3.13.2 Float, page 43*
Ground speed too slow	Increase ground speed.	*3.13.5 Ground Speed, page 49*
Foreign object on cutterbar	Disengage rotary disc header and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.16 Unplugging Rotary Disc Header, page 65*
Symptom: Conditioner rolls plugging		
Ground speed too fast	Reduce ground speed.	*3.13.5 Ground Speed, page 49*
Roll gap too large for proper feeding	Decrease roll gap.	*3.14.1 Conditioner Roll Gap, page 55*
Roll gap too small in thick-stemmed cane-type crops	Increase roll gap.	*3.14.1 Conditioner Roll Gap, page 55*
Baffle set too low	Raise baffle.	*Adjusting Conditioner Baffle Position, page 61*
Foreign object between rolls	Disengage rotary disc header and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.16 Unplugging Rotary Disc Header, page 65*

Problem	Solution	Refer to
Cutting height too low	Decrease rotary disc header angle to raise cutting height.	*3.13.4 Cutterbar Angle, page 48*
Backing into windrow	Raise rotary disc header before backing up.	*3.13.1 Raising and Lowering Rotary Disc Header, page 41*
Rolls improperly timed	Adjust roll timing.	*3.14.3 Roll Timing, page 58*
Symptom: Uneven formation and bunching of windrow		
Rear deflector bypassing or dragging crop	Adjust rear deflector for proper crop control. Raise baffle 1 notch.	*Adjusting Conditioner Baffle Position, page 61*
Forming shields improperly adjusted	Adjust forming shields.	*Positioning Forming Shield Side Deflectors – Roll Conditioner, page 61*
Roll gap too large	Adjust roll gap.	*3.14.1 Conditioner Roll Gap, page 55*
Symptom: Cutting height varies from one side to the other		
Float not properly balanced	Adjust rotary disc header float.	*3.13.2 Float, page 43*
Symptom: Not cutting short enough in down crop		
Broken, bent, or dull blades	Replace blades, or turn blades over.	*4.4.7 Maintaining Disc Blades, page 114*
Ground speed too fast	Reduce ground speed.	*3.13.5 Ground Speed, page 49*
Cutting height too high	Adjust to steeper rotary disc header cutterbar angle in order to lower cutting height if field conditions allow.	*3.13.4 Cutterbar Angle, page 48*
Symptom: Material being pulled out by roots when cutting, tall crop leaning into machine		
Crop in conditioner rolls before crop is cut	Increase roll gap.	*3.14.1 Conditioner Roll Gap, page 55*
Symptom: Damaged leaves and broken stems		
Insufficient roll gap	Adjust roll spacing.	*3.14.1 Conditioner Roll Gap, page 55*
Roll timing off	Check roll timing and adjust if necessary.	*3.14.3 Roll Timing, page 58*
Symptom: Slow crop drying		
Rolls not crimping crop sufficiently	Decrease roll gap.	*3.14.1 Conditioner Roll Gap, page 55*
Crop is bunched in windrow	Adjust forming shields/baffle.	• *Positioning Forming Shield Side Deflectors – Roll Conditioner, page 61* • *Adjusting Conditioner Baffle Position, page 61*
Symptom: Excessive drying or bleaching of crop		
Excessive crimping	Increase roll gap.	*3.14.1 Conditioner Roll Gap, page 55*
Crop is spread too wide in windrow	Adjust forming shields.	*Positioning Forming Shield Side Deflectors – Roll Conditioner, page 61*
Symptom: Plugging behind end drums		
Ground speed too slow	Increase ground speed.	*3.13.5 Ground Speed, page 49*
Symptom: Bunching or poorly formed windrows		
Forming shields not properly adjusted	Adjust forming shields.	*Positioning Forming Shield Side Deflectors – Roll Conditioner, page 61*

6.2 Troubleshooting Mechanical Issues

A list of solutions are presented here on how to troubleshoot your rotary disc header mechanical issues.

Problem	Solution	Refer to
Symptom: Excessive noise		
Bent disc blade	Replace blade.	*4.4.7 Maintaining Disc Blades, page 114*
Conditioner roll timing off	Check roll timing, and adjust if necessary.	*3.14.3 Roll Timing, page 58*
Conditioner roll gap too small	Check roll gap, and adjust if necessary.	*3.14.1 Conditioner Roll Gap, page 55*
Symptom: Excessive vibration or noise in rotary disc header		
Mud deposits on conditioner rolls	Clean rolls.	*3.16 Unplugging Rotary Disc Header, page 65*
Conditioner rolls contacting each other	Increase roll gap.	*3.14.1 Conditioner Roll Gap, page 55*
Conditioner rolls contacting each other	Check roll timing.	*3.14.3 Roll Timing, page 58*
Symptom: Excessive heat in cutterbar		
Too much oil in cutterbar	Drain oil, and refill with specified amount.	*4.4.3 Lubricating Cutterbar, page 92*
Symptom: Frequent blade damage		
Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	*3.16 Unplugging Rotary Disc Header, page 65*
Material wrapped around spindle	Remove disc and remove material.	*3.16 Unplugging Rotary Disc Header, page 65*
Cutting too low in rocky field conditions	Decrease rotary disc header cutterbar angle.	*3.13.4 Cutterbar Angle, page 48*
Cutting too low in rocky field conditions	Increase float.	*3.13.2 Float, page 43*
Float set too heavy	Increase float.	*3.13.2 Float, page 43*
Ground speed too high in rocky field conditions. At high ground speed, rotary disc header tends to dig rocks from ground instead of floating over them.	Reduce ground speed.	*3.13.5 Ground Speed, page 49*
Blade incorrectly mounted	Check all blade mounting hardware, and ensure blades move freely.	*4.4.7 Maintaining Disc Blades, page 114*
Symptom: Excessive wear of cutting components		
Angle too steep	Reduce rotary disc header cutterbar angle.	*3.13.4 Cutterbar Angle, page 48*
Crop residue and dirt deposits on cutterbar	Clean cutterbar.	*3.16 Unplugging Rotary Disc Header, page 65*
Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	*3.16 Unplugging Rotary Disc Header, page 65*

Problem	Solution	Refer to
Symptom: Breakage of conditioner drive belt		
Improper belt tension	Adjust conditioner drive belt tension.	*4.5.5 Conditioner Drive Belt, page 182*
Belt not in proper groove in pulley	Move belt to proper groove.	*4.5.5 Conditioner Drive Belt, page 182*
Foreign object between rolls	Disengage rotary disc header and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.16 Unplugging Rotary Disc Header, page 65*
Belt pulleys and idlers misaligned	Align pulleys and idler.	*4.5.5 Conditioner Drive Belt, page 182*
Symptom: Machine pulling to one side		
Rotary disc header dragging on one end and pulling to that side	Adjust rotary disc header float on both ends.	*3.13.2 Float, page 43*
Symptom: 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.	*3.16 Unplugging Rotary Disc Header, page 65*
Primary driveline not connected	Connect driveline.	*Installing Primary Driveline, page 178*
Cross driveline not connected	Connect driveline.	*Installing Cross Driveline, page 180*
Symptom: Header does not raise properly		
Auxiliary lift locking pins installed.	Remove auxiliary lift locking pins before attempting to raise header.	*3.1.2 Removing Auxiliary Lift Locking Pins, page 20*
Hydraulic flow setting from tractor to auxiliary lift cylinder valve too high	Set the hydraulic flow rate from the tractor front selective control valve to 15–20 %.	For instructions, refer to the tractor operator's manual.
Header position sensor(s) misaligned	Adjust the header position sensors.	*4.7.3 Inspecting Auxiliary Lift System Sensors, page 199*
Header position sensor(s) damaged	Replace damaged sensors.	Contact your MacDon dealer.
Relay logic switch is set to OFF or MANUAL.	Set relay logic switch to AUTO.	*4.7.4 Setting Relay Logic Switch, page 201*

Chapter 7: Reference

The reference chapter provides additional information such as torque specifications and a unit conversion chart.

7.1 Torque Specifications

The following tables provide torque values for various bolts, cap screws, and hydraulic fittings. Refer to these values only when no other torque value has been specified in a given procedure.

- Tighten all bolts to the torque values specified in the charts below, unless you are directed otherwise in this manual.
- Replace removed hardware with hardware of the same strength and grade.
- Refer to the torque value tables as a guide when periodically checking the tightness of bolts.
- Understand the torque categories for bolts and cap screws by reading the markings on their heads.

Jam nuts

Jam nuts require less torque than nuts used for other purposes. When applying torque to finished jam nuts, multiply the torque applied to regular nuts by 0.65 to obtain the modified torque value.

Self-tapping screws

Refer to the standard torque values when installing the self-tapping screws. Do **NOT** install the self-tapping screws on structural or otherwise critical joints.

7.1.1 Metric Bolt Specifications

Specifications are provided for the appropriate final torque values to secure various sizes of metric bolts.

NOTE:

The torque values provided in the following metric bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** add grease, oil, or threadlocker to bolts or cap screws unless you are directed to do so in this manual.

Table 7.1 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

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

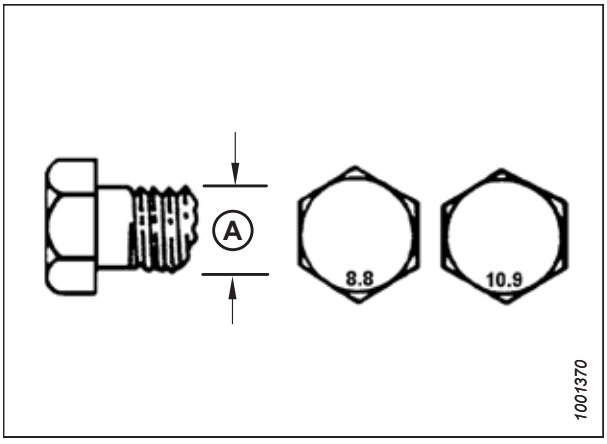


Figure 7.1: Bolt Grades

Table 7.2 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

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

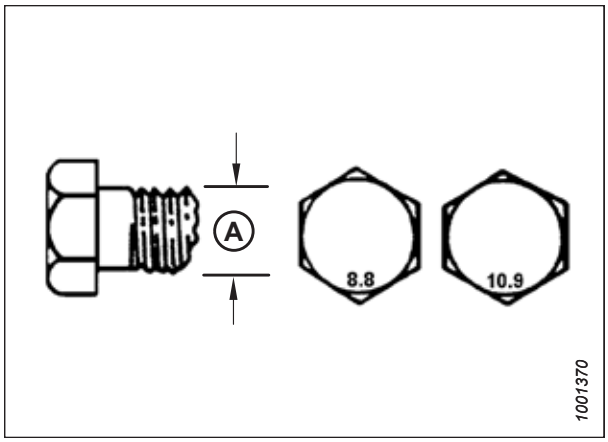


Figure 7.2: Bolt Grades

Table 7.3 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

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

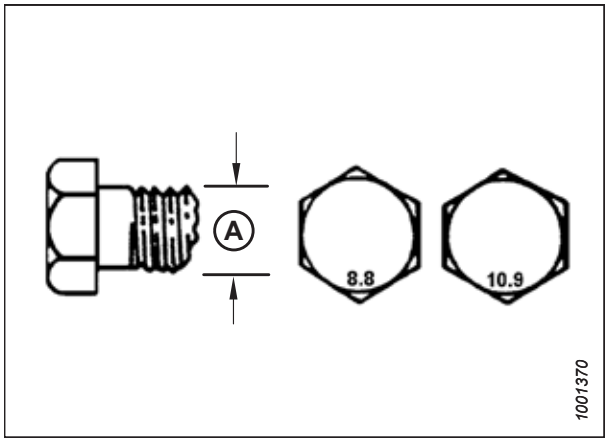


Figure 7.3: Bolt Grades

Table 7.4 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

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

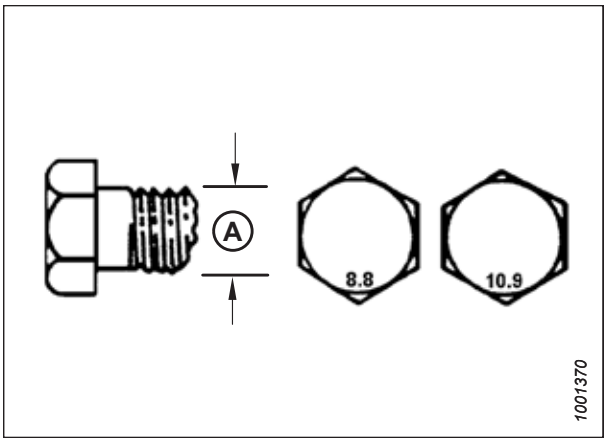


Figure 7.4: Bolt Grades

7.1.2 Metric Bolt Specifications – Cast Aluminum

Specifications are provided for the appropriate final torque values for various sizes of metric bolts in cast aluminum.

NOTE:

The torque values provided in the following metric bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** add grease, oil, or threadlocker to bolts or cap screws unless you are directed to do so in this manual.

Table 7.5 Metric Bolt Bolting into Cast Aluminum

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

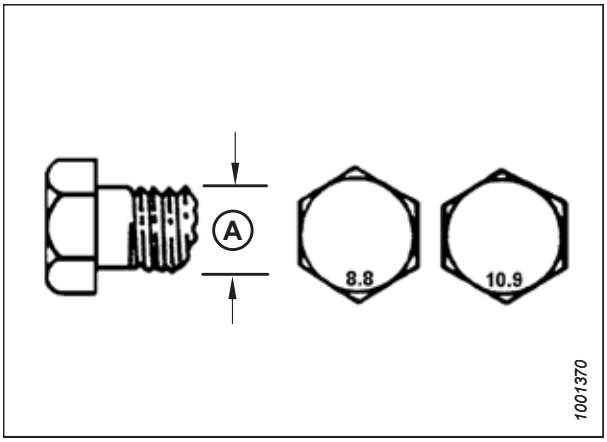


Figure 7.5: Bolt Grades

7.1.3 O-Ring Boss Hydraulic Fittings – Adjustable

The standard torque values are provided for adjustable hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

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

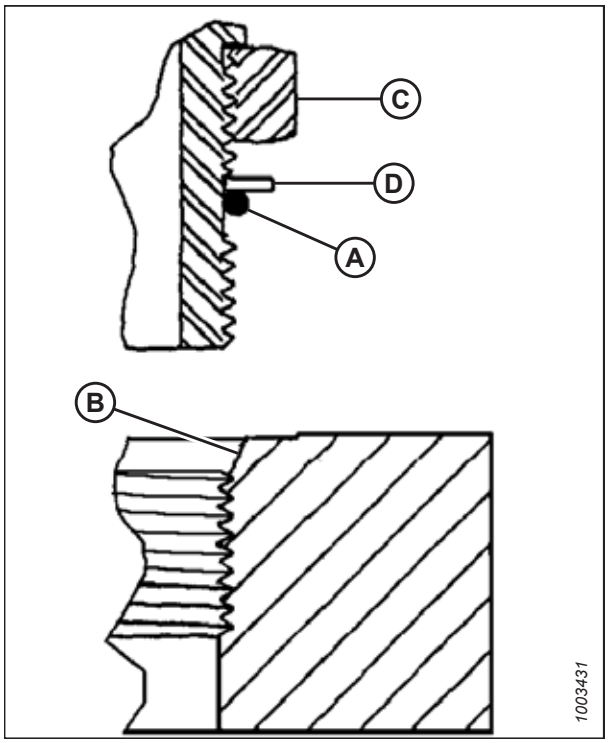


Figure 7.6: Hydraulic Fitting

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

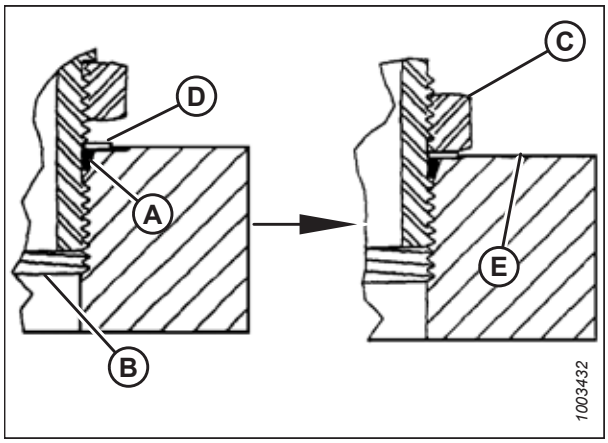


Figure 7.7: Hydraulic Fitting

Table 7.6 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable and Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value[9]	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	10–11	*89–97
-3	3/8–24	18–20	*159–177
-4	7/16–20	29–32	21–24
-5	1/2–20	32–35	24–26
-6	9/16–18	40–44	30–32
-8	3/4–16	70–77	52–57
-10	7/8–14	115–127	85–94
-12	1 1/16–12	183–201	135–148
-14	1 3/16–12	237–261	175–193
-16	1 5/16–12	271–298	200–220
-20	1 5/8–12	339–373	250–275
-24	1 7/8–12	414–455	305–336
-32	2 1/2–12	509–560	375–413

7.1.4 O-Ring Boss Hydraulic Fittings – Non-Adjustable

The standard torque values for non-adjustable hydraulic fittings are provided. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, use the value specified in the procedure instead.

1. Inspect O-ring (A) and seat (B) for dirt or defects.
2. Ensure that O-ring (A) is **NOT** on the threads. Adjust O-ring (A) if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into the port until the fitting is hand-tight.
5. Torque fitting (C) according to values in Table *7.7, page 215*.
6. Verify the final condition of the fitting.

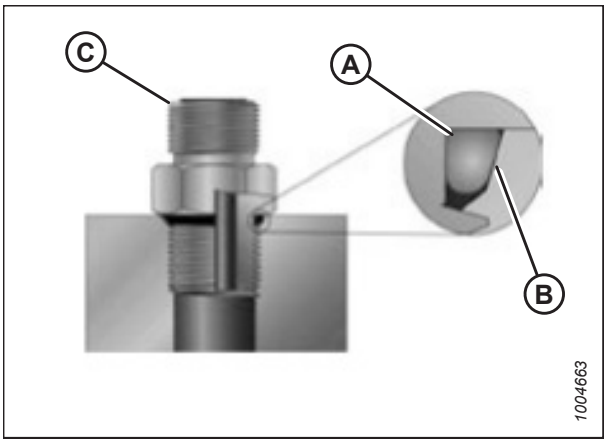


Figure 7.8: Hydraulic Fitting

Table 7.7 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable and Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value[9]	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	10–11	*89–97
-3	3/8–24	18–20	*159–177
-4	7/16–20	29–32	21–24
-5	1/2–20	32–35	24–26

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

Table 7.7 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable and Non-Adjustable (continued)

SAE Dash Size	Thread Size (in.)	Torque Value[10]	
		Nm	lbf·ft (*lbf·in)
-6	9/16–18	40–44	30–32
-8	3/4–16	70–77	52–57
-10	7/8–14	115–127	85–94
-12	1 1/16–12	183–201	135–148
-14	1 3/16–12	237–261	175–193
-16	1 5/16–12	271–298	200–220
-20	1 5/8–12	339–373	250–275
-24	1 7/8–12	414–455	305–336
-32	2 1/2–12	509–560	375–413

7.1.5 O-Ring Face Seal Hydraulic Fittings

The standard torque values are provided for O-ring face seal hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

Torque values are shown in the Table *7.8, page 217*.

1. Ensure that the sealing surfaces and the fitting threads are free of burrs, nicks, scratches, and any foreign material.

Figure 7.9: Hydraulic Fitting

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

2. Apply hydraulic system oil to O-ring (B).
3. Align the tube or hose assembly so that the flat face of sleeve (A) or (C) comes into full contact with O-ring (B).
4. Thread tube or hose nut (D) until it is hand-tight. The nut should turn freely until it bottoms out.
5. Torque the fittings according to values in Table *7.8, page 217*.

   NOTE:

   If applicable, hold the hex flange on fitting body (E) to prevent the rotation of the fitting body and the hose when tightening fitting nut (D).
6. Use three wrenches when assembling unions or joining two hoses together.
7. Verify the final condition of the fitting.

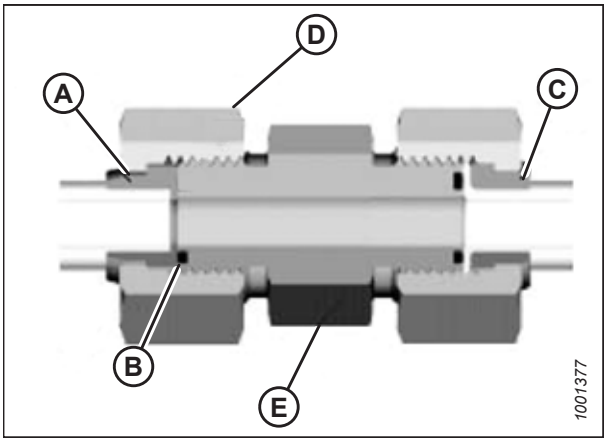


Figure 7.10: Hydraulic Fitting

Table 7.8 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value[11]	
			Nm	lbf·ft
-3	Note[12]	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note[12]	5/16	–	–
-6	11/16	3/8	40–44	30–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1 3/16	3/4	115–127	85–94
-14	Note[12]	7/8	–	–
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167
-24	2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

7.1.6 Tapered Pipe Thread Fittings

The standard torque values are provided for tapered pipe thread fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

Assemble pipe fittings as follows:

1. Ensure that the fitting and the port threads are free of burrs, nicks, scratches, and any other form of contamination.
2. Apply paste-type pipe thread sealant to the external pipe threads.
3. Thread the fitting into the port until it is hand-tight.

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

4. Torque the connector to the appropriate torque angle. The turns from finger tight (TFFT) and flats from finger tight (FFFT) values are shown in Table *7.9, page 218*. Ensure that the tube end of a shaped connector (typically a 45° or 90° elbow) is aligned to receive the incoming tube or hose assembly. Always finish the alignment of the fitting in the direction of tightening. Never loosen the threaded connectors to achieve alignment.

5. Clean all residue and any excess thread conditioner with an appropriate cleaner.

6. Inspect the final condition of the fitting. Pay special attention to the possibility of cracks in the port opening.

7. Mark the final position of the fitting. If a fitting leaks, disassemble the fitting and check it for damage.

   NOTE:

   The failure of fittings due to over-torquing may not be evident until the fittings are disassembled and inspected.

Table 7.9 Hydraulic Fitting Pipe Thread

Tapered Pipe Thread Size	Recommended TFFT	Recommended FFFT
1/8–27	2–3	12–18
1/4–18	2–3	12–18
3/8–18	2–3	12–18
1/2–14	2–3	12–18
3/4–14	1.5–2.5	12–18
1–11 1/2	1.5–2.5	9–15
1 1/4–11 1/2	1.5–2.5	9–15
1 1/2–11 1/2	1.5–2.5	9–15
2–11 1/2	1.5–2.5	9–15

7.2 Conversion Chart

This manual uses both SI units (including metric) and US customary units (sometimes referred to as standard units) of measurement. A list of those units along with their abbreviations and conversion factors is provided here for your reference.

Table 7.10 Conversion Chart

Quantity	SI Units (Metric)		Factor	US Customary Units (Standard)	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectare	ha	x 2.4710 =	acre	acres
Flow	liters per minute	L/min	x 0.2642 =	US gallons per minute	gpm
Force	Newton	N	x 0.2248 =	pound force	lbf
Length	millimeter	mm	x 0.0394 =	inch	in.
Length	meter	m	x 3.2808 =	foot	ft.
Power	kilowatt	kW	x 1.341 =	horsepower	hp
Pressure	kilopascal	kPa	x 0.145 =	pounds per square inch	psi
Pressure	megapascal	MPa	x 145.038 =	pounds per square inch	psi
Pressure	bar (Non-SI)	bar	x 14.5038 =	pounds per square inch	psi
Torque	Newton meter	Nm	x 0.7376 =	pound feet or foot pounds	lbf·ft
Torque	Newton meter	Nm	x 8.8507 =	pound inches or inch pounds	lbf·in
Temperature	degrees Celsius	°C	(°C x 1.8) + 32 =	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	x 3.2808 =	feet per minute	ft/min
Velocity	meters per second	m/s	x 3.2808 =	feet per second	ft/s
Velocity	kilometers per hour	km/h	x 0.6214 =	miles per hour	mph
Volume	liter	L	x 0.2642 =	US gallon	US gal
Volume	milliliter	mL	x 0.0338 =	ounce	oz.
Volume	cubic centimeter	cm^3 or cc	x 0.061 =	cubic inch	$in.^3$
Weight	kilogram	kg	x 2.2046 =	pound	lb.

Index

A

B

C

D

E

F

G

H

I

L

M

O

P

R

S

T

W

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. Overfilling could result in overheating and failure of cutterbar components.

Specification	Description	Use	Capacities
Lubricant: Grease			
SAE Multipurpose	High temperature, extreme pressure (EP) performance with 1% max. molybdenum disulphide (NLGI Grade 2) lithium base	As required unless otherwise specified	—
SAE Multipurpose	High temperature, extreme pressure (EP) performance with 10% max. molybdenum disulphide (NLGI Grade 2) lithium base	Driveline slip-joints	—
Lubricant: Gear Lubricant			
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R113 FR cutterbar	8 L(8.5 qts [US])
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R116 FR cutterbar	10 L(10.5 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Header drive gearbox	1.9 liters (1.8 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Conditioner roll timing gearbox	0.7 L (0.75 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Cutterbar and conditioner drive gearbox	1.8 L (1.9 qts [US])

MacDon

CUSTOMERS
MacDon.com

DEALERS
Portal.MacDon.com

Printed in Canada