

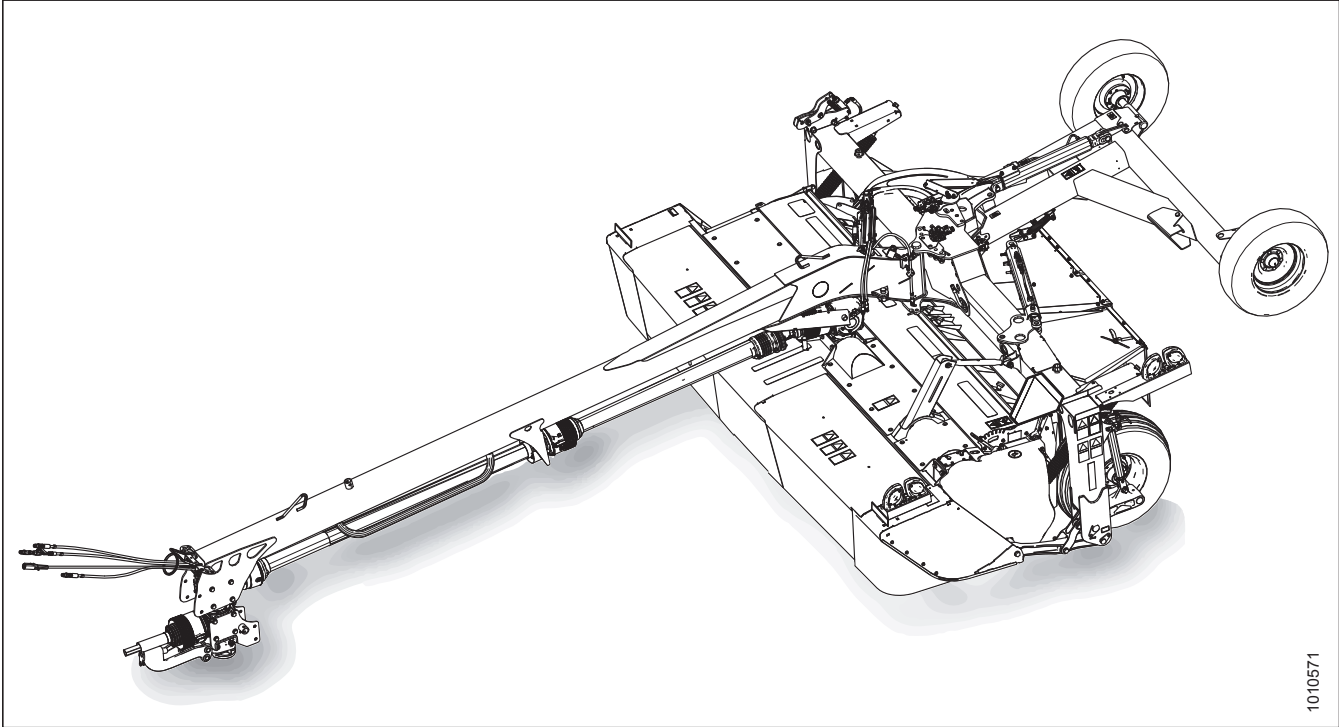
R1 Series Rotary Disc Pull-Type

Operator's Manual

215582 Revision A

Original Instruction

R1 Series Rotary Disc Pull-Type




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Declaration of Conformity

 <h2 style="margin: 0;">EC Declaration of Conformity</h2>	
<p>[1] MacDon MacDon Industries Ltd. 680 Moray Street, Winnipeg, Manitoba, Canada R3J 3S3</p>	<p>[4] As per Shipping Document</p> <p>[5] May 12, 2021</p>
<p>[2] Rotary Disc Pull-Type</p> <p>[3] MacDon R113/R116</p>	<p>[6] _____ Adrienne Tankeu Product Integrity</p>

EN	BG	CZ	DA
<p>We, [1] Declare, that the product: Machine Type: [2] Name & Model: [3] Serial Number(s): [4] fulfils all the relevant provisions of the Directive 2006/42/EC. Harmonized standards used, as referred to in Article 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Place and date of declaration: [5] Identity and signature of the person empowered to draw up the declaration: [6] Name and address of the person authorized to compile the technical file: Benedikt von Riedesel General Manager, MacDon Europe GmbH Hagenuauer Straße 59 65203 Wiesbaden (Germany) bvonriedesel@macdon.com</p>	<p>Ние, [1] декларираме, че следният продукт: Тип машина: [2] Наименование и модел: [3] Серийен номер(а) [4] отговаря на всички приложими разпоредби на директива 2006/42/ЕО. Използвани са следните хармонизирани стандарти според чл. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Място и дата на декларацията: [5] Име и подпис на лицето, упълномощено да изготви декларацията: [6] Име и адрес на лицето, упълномощено да състави техническия файл: Бенедикт фон Рийдесел Управител, MacDon Europe GmbH Hagenuauer Straße 59 65203 Wiesbaden (Германия) bvonriedesel@macdon.com</p>	<p>My, [1] Prohláňujeme, že produkt: Typ zařizení: [2] Název a model: [3] Sériové(á) číslo(a): [4] splňuje všechna relevantní ustanovení směrnice 2006/42/EC. Byly použity harmonizované standardy, jak je uvedeno v článku 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Místo a datum prohlášení: [5] Identita a podpis osoby oprávněné k vydání prohlášení: [6] Jméno a adresa osoby oprávněné k vyplnění technického souboru: Benedikt von Riedesel generální ředitel, MacDon Europe GmbH Hagenuauer Straße 59 65203 Wiesbaden (Německo) bvonriedesel@macdon.com</p>	<p>Vi, [1] erklærer, at prduktet: Maskintype [2] Navn og model: [3] Serienummer (-numre): [4] Opfylder alle bestemmelser i direktiv 2006/42/EF. Anvendte harmoniserede standarder, som henviser til i paragraf 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Sted og dato for erklæringen: [5] Identitet på og underskrift fra den person, som er bemyndiget til at udarbejde erklæringen: [6] Navn og adresse på den person, som er bemyndiget til at udarbejde den tekniske fil: Benedikt von Riedesel Direktør, MacDon Europe GmbH Hagenuauer Straße 59 D-65203 Wiesbaden (Tyskland) bvonriedesel@macdon.com</p>

DE	ES	ET	FR
<p>Wir, [1] Erklären hiermit, dass das Produkt: Maschinentyp: [2] Name & Modell: [3] Seriennummer (n): [4] alle relevanten Vorschriften der Richtlinie 2006/42/EG erfüllt. Harmonisierte Standards wurden, wie in folgenden Artikeln angegeben, verwendet 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Ort und Datum der Erklärung: [5] Name und Unterschrift der Person, die dazu befugt ist, die Erklärung auszustellen: [6] Name und Anschrift der Person, die dazu berechtigt ist, die technischen Unterlagen zu erstellen: Benedikt von Riedesel General Manager, MacDon Europe GmbH Hagenuauer Straße 59 65203 Wiesbaden bvonriedesel@macdon.com</p>	<p>Nosotros [1] declaramos que el producto: Tipo de máquina: [2] Nombre y modelo: [3] Números de serie: [4] cumple con todas las disposiciones pertinentes de la directriz 2006/42/EC. Se utilizaron normas armonizadas, según lo dispuesto en el artículo 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Lugar y fecha de la declaración: [5] Identidad y firma de la persona facultada para draw redactar la declaración: [6] Nombre y dirección de la persona autorizada para elaborar el expediente técnico: Benedikt von Riedesel Gerente general - MacDon Europe GmbH Hagenuauer Straße 59 65203 Wiesbaden (Alemania) bvonriedesel@macdon.com</p>	<p>Meie, [1] deklareerime, et toode Seadme tüüp: [2] Nimi ja mudel: [3] Seerianumberid: [4] vastab kõigile direktiivi 2006/42/EÜ asjakohastele sätetele. Kasutatud on järgnevaid harmoniseeritud standardeid, millele on viidatud ka punktis 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Deklaratsiooni koht ja kuupäev: [5] Deklaratsiooni koostamiseks volitatud isiku nimi ja allkiri: [6] Tehnilise dokumendi koostamiseks volitatud isiku nimi ja aadress: Benedikt von Riedesel Peadirektor, MacDon Europe GmbH Hagenuauer Straße 59 65203 Wiesbaden (Saksamaa) bvonriedesel@macdon.com</p>	<p>Nous soussignés, [1] Déclarons que le produit : Type de machine : [2] Nom et modèle : [3] Numéro(s) de série : [4] Est conforme à toutes les dispositions pertinentes de la directive 2006/42/EC. Utilisation des normes harmonisées, comme indiqué dans l'Article 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Lieu et date de la déclaration : [5] Identité et signature de la personne ayant reçu le pouvoir de rédiger cette déclaration : [6] Nom et adresse de la personne autorisée à constituer le dossier technique : Benedikt von Riedesel Directeur général, MacDon Europe GmbH Hagenuauer Straße 59 65203 Wiesbaden (Allemagne) bvonriedesel@macdon.com</p>

EC Declaration of Conformity

IT	HU	LT	LV
<p>Noi, [1] Dichiariamo che il prodotto: Tipo di macchina: [2] Nome e modello: [3] Numero(i) di serie: [4] soddisfa tutte le disposizioni rilevanti della direttiva 2006/42/CE.</p> <p>Utilizzo degli standard armonizzati, come indicato nell'Articolo 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Luogo e data della dichiarazione: [5] Nome e firma della persona autorizzata a redigere la dichiarazione: [6] Nome e persona autorizzata a compilare il file tecnico: Benedikt von Riedesel General Manager, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Germania) bvonriedesel@macdon.com</p>	<p>Mi, [1] Ezennel kijelentjük, hogy a következő termék: Gép típusa: [2] Név és modell: [3] Szériaszám(ok): [4] teljesíti a következő irányelv összes vonatkozó előírásait: 2006/42/EK.</p> <p>Az alábbi harmonizált szabványok kerültek alkalmazásra a 7(2) cikkely szerint:</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>A nyilatkozattétel ideje és helye: [5] Azon személy kiléte és aláírása, aki jogosult a nyilatkozat elkészítésére: [6] Azon személy neve és aláírása, aki felhatalmazott a műszaki dokumentáció összeállítására: Benedikt von Riedesel Vezérigazgató, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Németország) bvonriedesel@macdon.com</p>	<p>Mes, [1] Pareiškiami, kad šis produktas: Mašinos tipas: [2] Pavadinimas ir modelis: [3] Serijos numeris (-iai): [4] atitinka taikomus reikalavimus pagal Direktyvą 2006/42/EB.</p> <p>Naudojami harmonizuoti standartai, kai nurodoma straipsnyje 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Deklaracijos vieta ir data: [5] Asmens tapatybės duomenys ir parašas asmens, atliotio sudaryti šią deklaraciją: [6] Vardas ir pavardė asmens, kuris įgaliotas sudaryti šį techninį failą: Benedikt von Riedesel Generalinis direktorius, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Vokietija) bvonriedesel@macdon.com</p>	<p>Mēs, [1] Deklarējam, ka produkts: Mašīnas tips: [2] Nosaukums un modelis: [3] Sērijas numurs(-i): [4] Atbilst visām būtiskajām Direktīvas 2006/42/EK prasībām.</p> <p>Piemēroti šādi saskaņotie standarti, kā minēts 7. panta 2. punktā:</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Deklarācijas parakstīšanas vieta un datums: [5] Tās personas vārds, uzvārds un paraksts, kas ir pilnvarota sagatavot šo deklarāciju: [6] Tās personas vārds, uzvārds un adrese, kas ir pilnvarota sastādīt tehnisko dokumentāciju: Benedikts fon Rīdzelis Ģenerāldirektors, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Vācija) bvonriedesel@macdon.com</p>
<p>Wij, [1] Verklaren dat het product: Machinetype: [2] Naam en model: [3] Serienummer(s): [4] voldoet aan alle relevante bepalingen van de Richtlijn 2006/42/EC.</p> <p>Geharmoniseerde normen toegepast, zoals vermeld in Artikel 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Plaats en datum van verklaring: [5] Naam en handtekening van de bevoegde persoon om de verklaring op te stellen: [6] Naam en adres van de geautoriseerde persoon om het technisch dossier samen te stellen: Benedikt von Riedesel Algemeen directeur, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Duitsland) bvonriedesel@macdon.com</p>	<p>My niżej podpisani, [1] Oświadczamy, że produkt: Typ urządzenia: [2] Nazwa i model: [3] Numer serijny/numery seryjne: [4] spełnia wszystkie odpowiednie przepisy dyrektywy 2006/42/WE.</p> <p>Zastosowaliśmy następujące (zharmonizowane) normy zgodnie z artykułem 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Data i miejsce oświadczenia: [5] Imię i nazwisko oraz podpis osoby upoważnionej do przygotowania deklaracji: [6] Imię i nazwisko oraz adres osoby upoważnionej do przygotowania dokumentacji technicznej: Benedikt von Riedesel Dyrektor generalny, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Niemcy) bvonriedesel@macdon.com</p>	<p>Nós, [1] Declaramos, que o produto: Tipo de máquina: [2] Nome e Modelo: [3] Número(s) de Série: [4] cumpre todas as disposições relevantes da Directiva 2006/42/CE.</p> <p>Normas harmonizadas aplicadas, conforme referido no Artigo 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Local e data da declaração: [5] Identidade e assinatura da pessoa autorizada a elaborar a declaração: [6] Nome e endereço da pessoa autorizada a compilar o ficheiro técnico: Benedikt von Riedesel Gerente Geral, MacDon Europa Ltda. Hagenauer Straße 59 65203 Wiesbaden (Alemanha) bvonriedesel@macdon.com</p>	<p>Noi, [1] Declarăm, că următorul produs: Tipul mașinii: [2] Denumirea și modelul: [3] Număr (numere) serie: [4] corespunde tuturor dispozițiilor esențiale ale directivei 2006/42/EC.</p> <p>Au fost aplicate următoarele standarde armonizate conform articolului 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Data și locul declarației: [5] Identitatea și semnătura persoanei împuternicite pentru întocmirea declarației: [6] Numele și semnătura persoanei autorizate pentru întocmirea cărții tehnice: Benedikt von Riedesel Manager General, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Germania) bvonriedesel@macdon.com</p>
<p>Mi, [1] Izjavljujemo da proizvod Tip mašine: [2] Naziv i model: [3] Serijski broj(ovi): [4] Ispunjava sve relevantne odredbe direktive 2006/42/EC.</p> <p>Korišćeni su usklađeni standardi kao što je navedeno u članu 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Datum i mesto izdavanja deklaracije: [5] Identitet i potpis lica ovlašćenog za sastavljanje deklaracije: [6] Ime i adresa osobe ovlašćene za sastavljanje tehničke datoteke: Benedikt von Riedesel Generalni direktor, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Nemačka) bvonriedesel@macdon.com</p>	<p>Mi, [1] Intygat att produkten: Maskintyp: [2] Namn och modell: [3] Serienummer: [4] uppfyller alla relevanta villkor i direktivet 2006/42/EG.</p> <p>Harmonierade standarder används, såsom anges i artikel 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Plats och datum för intyget: [5] Identitet och signatur för person med befogenhet att upprätta intyget: [6] Namn och adress för person behörig att upprätta den tekniska dokumentationen: Benedikt von Riedesel Administrativ chef, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Tyskland) bvonriedesel@macdon.com</p>	<p>Mi, [1] izjavljamo, da izdelek: Vrsta stroja: [2] Ime in model: [3] Serijska/-e številka/-e: [4] ustreza vsem zadevnim določbam Direktive 2006/42/ES.</p> <p>Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Kraj in datum izjave: [5] Istovetnost in podpis osebe, opolnomočene za pripravo izjave: [6] Ime in naslov osebe, pooblaščenca za pripravo dokumentacije: Benedikt von Riedesel Generalni direktor, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Nemčija) bvonriedesel@macdon.com</p>	<p>My, [1] týmto prehlasujeme, že tento výrobok: Typ zariadenia: [2] Názov a model: [3] Výrobné číslo: [4] splňa príslušné ustanovenia a základné požiadavky smernice č. 2006/42/ES.</p> <p>Použitie harmonizované normy, ktoré sa uvádzajú v článku č. 7(2):</p> <p style="text-align: center;">EN ISO 4254-1:2013 EN ISO 4254-7:2009</p> <p>Miesto a dátum prehlásenia: [5] Meno a podpis osoby oprávnenej vypracovať toto prehlásenie: [6] Meno a adresa osoby oprávnenej zostaviť technický súbor: Benedikt von Riedesel Generálny riaditeľ MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Nemecko) bvonriedesel@macdon.com</p>

Introduction

This instructional manual contains safety, operating, and maintenance procedures for the MacDon R113 4.0 m (13 ft.) and R116 4.9 m (16 ft.) Rotary Disc Pull-Types. The rotary disc pull-type is designed to cut, condition, and lay a wide variety of grasses and hay crops in windrows.

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

Use this manual as your first source of information about the machine. If you follow the instructions provided in this manual, and use MacDon parts when repair is necessary, the rotary disc pull-type will work well for many years. If you require more detailed service information, contact your MacDon Dealer.

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, be sure to pass this manual on to the new Operators or 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.

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

Conventions

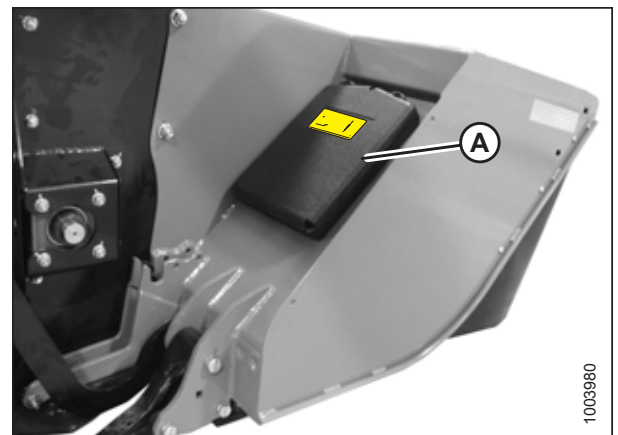
The following conventions are used in this document:

- Right and left are determined from the operator's position. The front of the rotary disc pull-type 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 pull-type.

NOTE: Keep your MacDon publications up-to-date. The most current version can be downloaded from our website www.macdon.com or from our Dealer-only site (<https://portal.macdon.com>) (login required).

This document is currently available in English and French.



Manual Storage Case

Summary of Changes

At MacDon, we're continuously making improvements: occasionally these improvements affect product documentation. The following list provides an account of major changes from the previous version of this document.

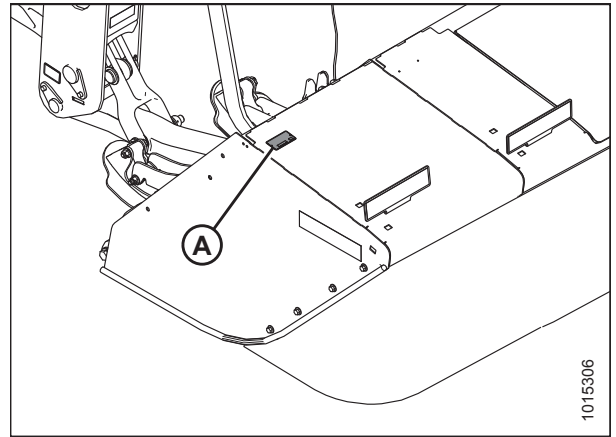
Section	Summary of Change	Internal Use Only
<i>3.15 Operating the Rotary Disc Pull-Type, page 87</i>	Removed the words rotary disc pull-type from the Variables table and added the word cutterbar to the table.	Technical Publications
—	Replaced driveline clutch MD #22400 with MD #239007. Deleted the Adjusting Clutch topic as the new clutch is not adjustable.	ECN 60892
<i>Inspecting Retaining Bolts, page 177</i>	Added steps.	Technical Publications

Serial Numbers

Record the serial numbers of the pull-type, the hitch, and the transport option (if equipped) in the spaces provided below.

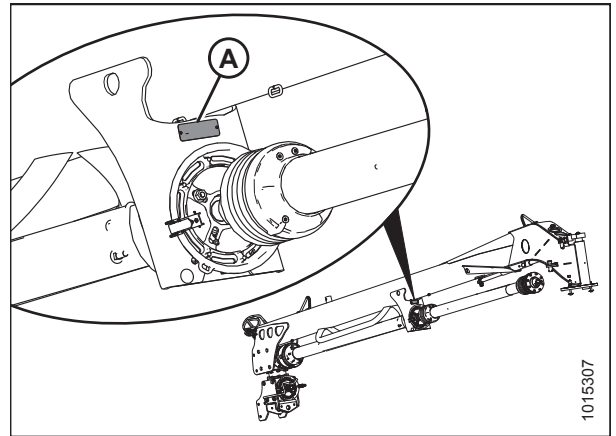
Rotary disc pull-type serial number (A):

Model year:



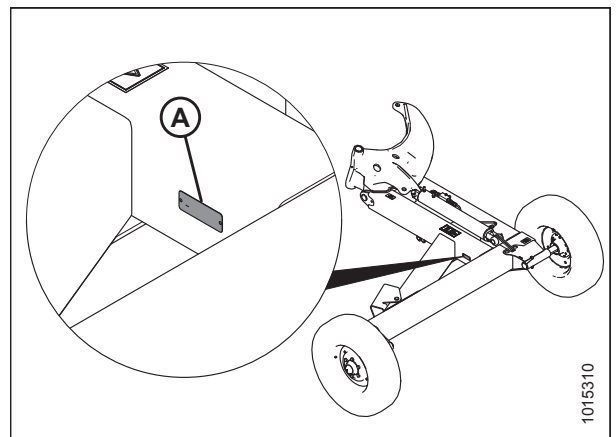
Rotary Disc Pull-Type Serial Number Location (A)

Hitch serial number (A):



Hitch Serial Number Location (A) – R113 Shown, R116 Similar

Optional transport system serial number (A):



Optional Transport Serial Number Location (A)

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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 not avoided, will result in death or serious injury.

WARNING

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

CAUTION

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

IMPORTANT:

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

NOTE:

Provides additional information or advice.

1.3 General Safety

Protect yourself when assembling, operating, and servicing machinery.

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

In addition, take the following precautions:

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



Figure 1.2: Safety Equipment



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.

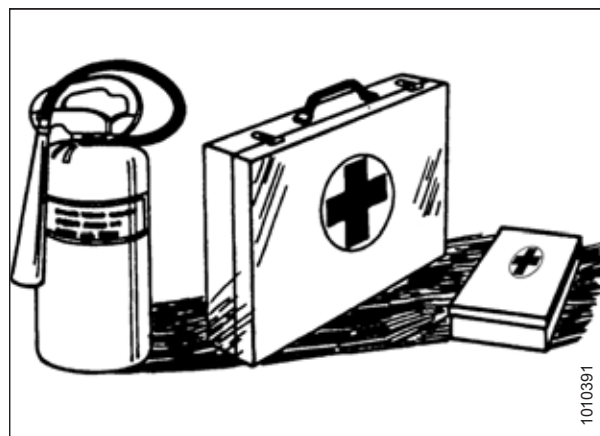


Figure 1.4: Safety Equipment

SAFETY

- Wear close-fitting clothing and cover long hair. **NEVER** wear dangling items such as scarves or bracelets.
- Keep all shields in place. **NEVER** alter or remove safety equipment. 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.

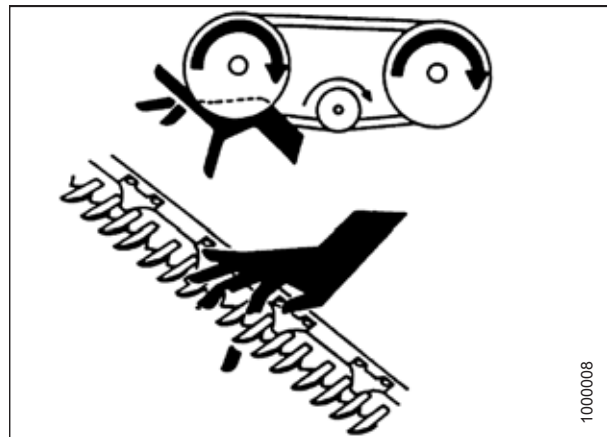


Figure 1.6: Safety around Equipment

- 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 Maintenance Safety

Protect yourself when servicing machinery.

To ensure your safety while maintaining the machine:

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



Figure 1.8: Safety around Equipment

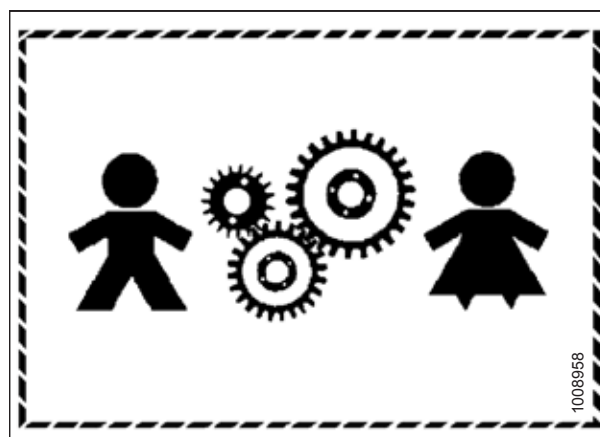


Figure 1.9: Equipment is NOT Safe for Children

of driven components at all times.



Figure 1.10: Safety Equipment

1.5 Hydraulic Safety

Protect yourself when assembling, operating, and servicing hydraulic components.

- Always place all hydraulic controls in Neutral before leaving the operator's seat.
- Make sure that all components in the hydraulic system are kept clean and in good condition.
- Replace any worn, cut, abraded, flattened, or crimped hoses and steel lines.
- Do **NOT** attempt any makeshift repairs to 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.

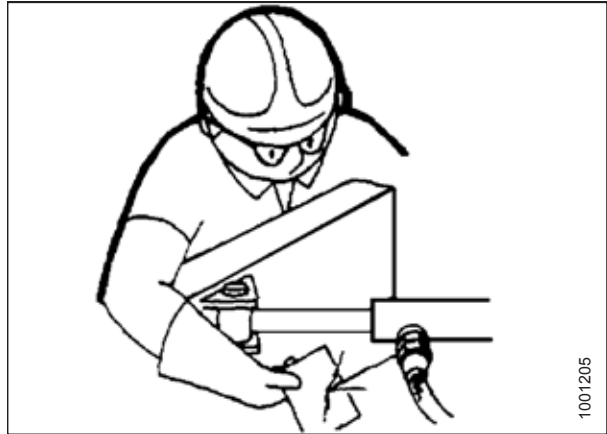


Figure 1.11: Testing for Hydraulic Leaks

- 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 injured by a concentrated, high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin.



Figure 1.12: Hydraulic Pressure Hazard

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

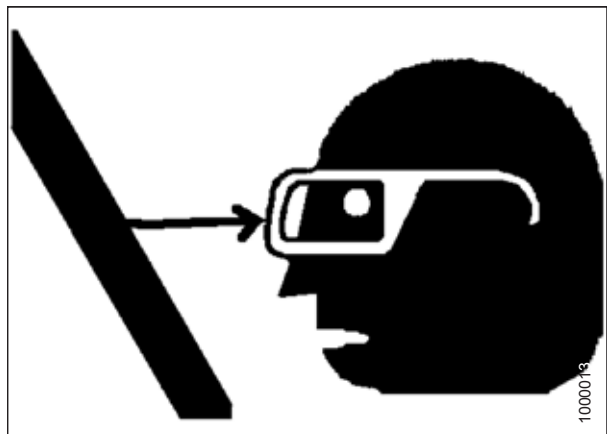


Figure 1.13: Safety around Equipment

1.6 Tire Safety

Service tires safely.

WARNING

- A tire can explode during inflation, which could cause serious injury or death.
- Follow proper procedures when mounting a tire on a wheel or rim. Failure to do so can produce an explosion that may result in serious injury or death.

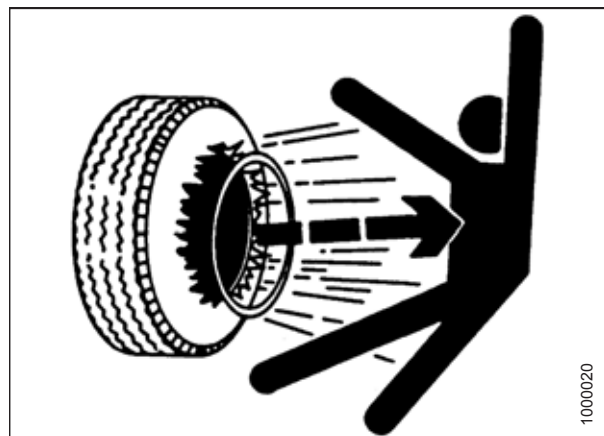


Figure 1.14: Overinflated Tire

WARNING

- Do NOT remove, install, or repair a tire on a rim unless you have proper equipment and experience to perform job. Take the tire and rim to a qualified tire repair shop.
- Make sure the tire is correctly seated before inflating to operating pressure. If the tire is not correctly positioned on the rim or is overinflated, the tire bead can loosen on one side causing air to escape at high speed and with great force. An air leak of this nature can thrust the tire in any direction, endangering anyone in area.
- Do NOT stand over tire when inflating. Use a clip-on chuck and extension hose.
- Do NOT exceed maximum inflation pressure indicated on tire label.
- Never use force on an inflated or partially inflated tire.
- Make sure all air is removed from the tire before removing the tire from the rim.
- Never weld a wheel rim.
- Replace tires that have defects and replace wheel rims that are cracked, worn, or severely rusted.

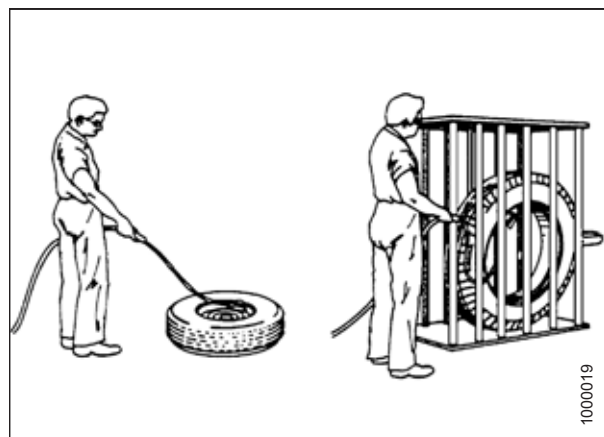


Figure 1.15: Safely Inflating Tire

1.7 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. Operator manuals and technical manuals list the location and explain the meaning of all safety signs placed on the machine.

- 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 MacDon Dealer Parts Department.

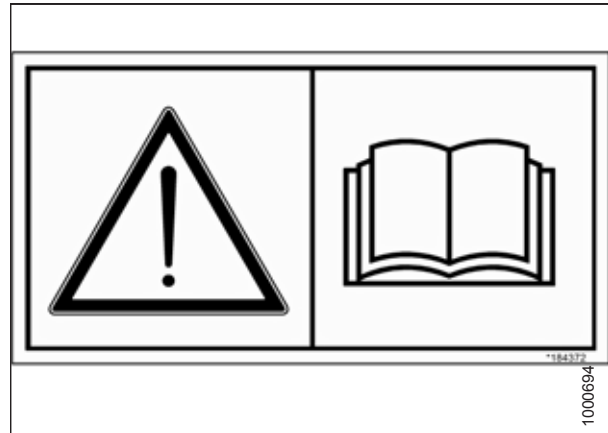


Figure 1.16: Operator's Manual Decal

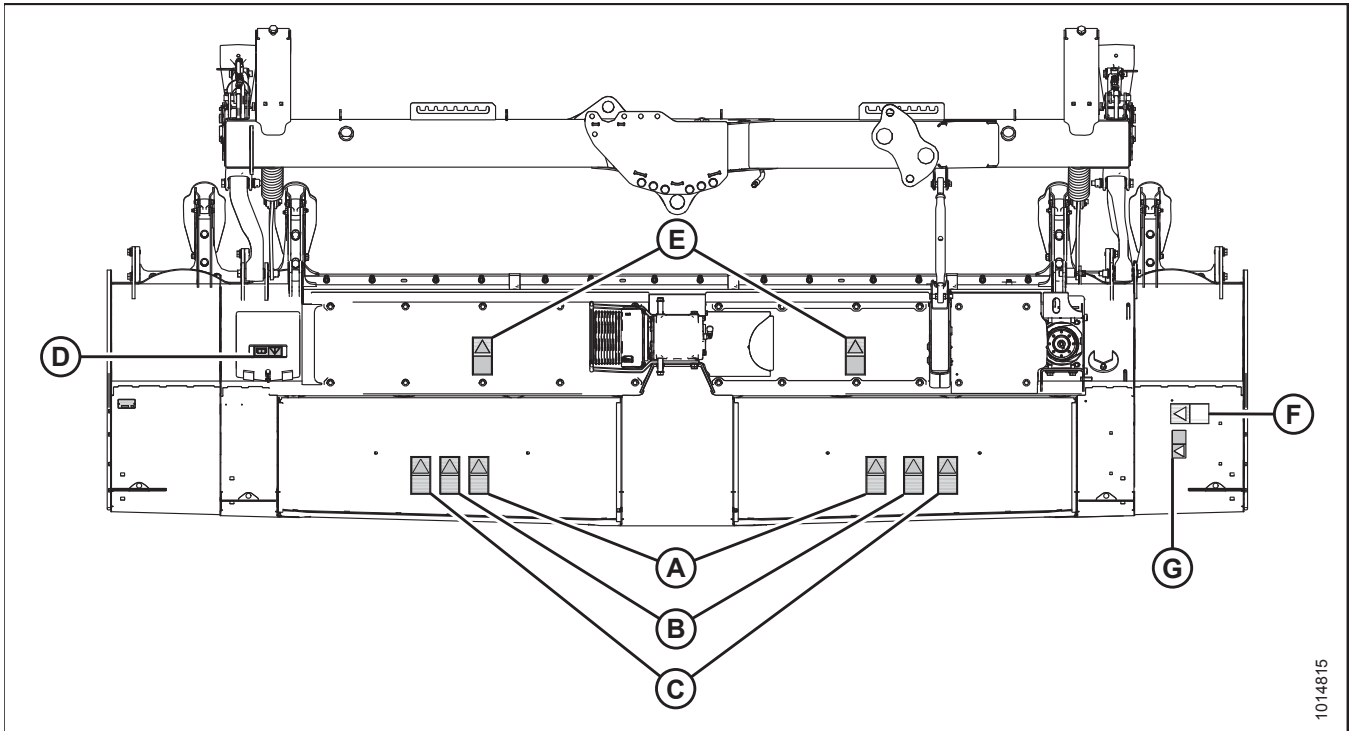
1.7.1 Installing Safety Decals

If a safety decal is damaged it should be 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.

1.8 Safety Sign Decal Locations

Replace missing or damaged decals.



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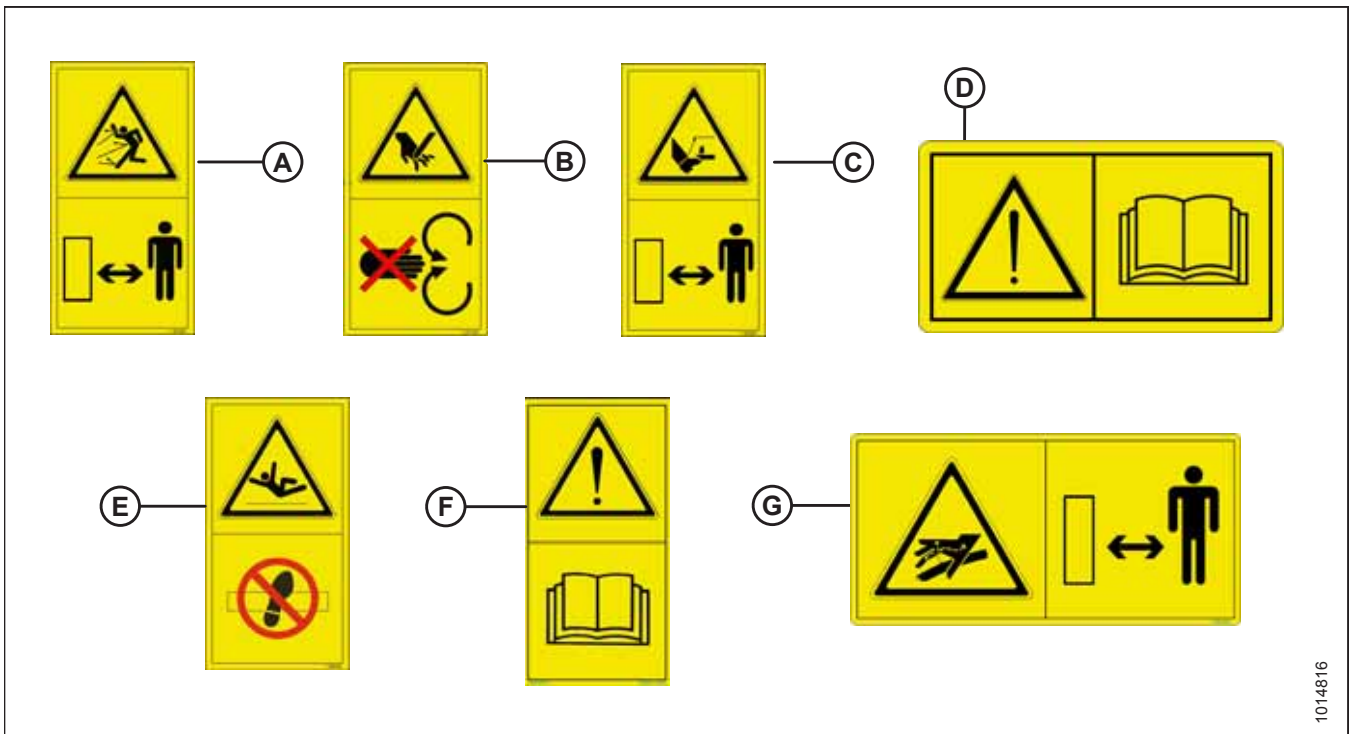
Figure 1.17: Safety Sign Decal Locations – Top View

A - MD #194466
E - MD #190546

B - MD #247167
F - MD #113482

C - MD #194465
G - MD #166466

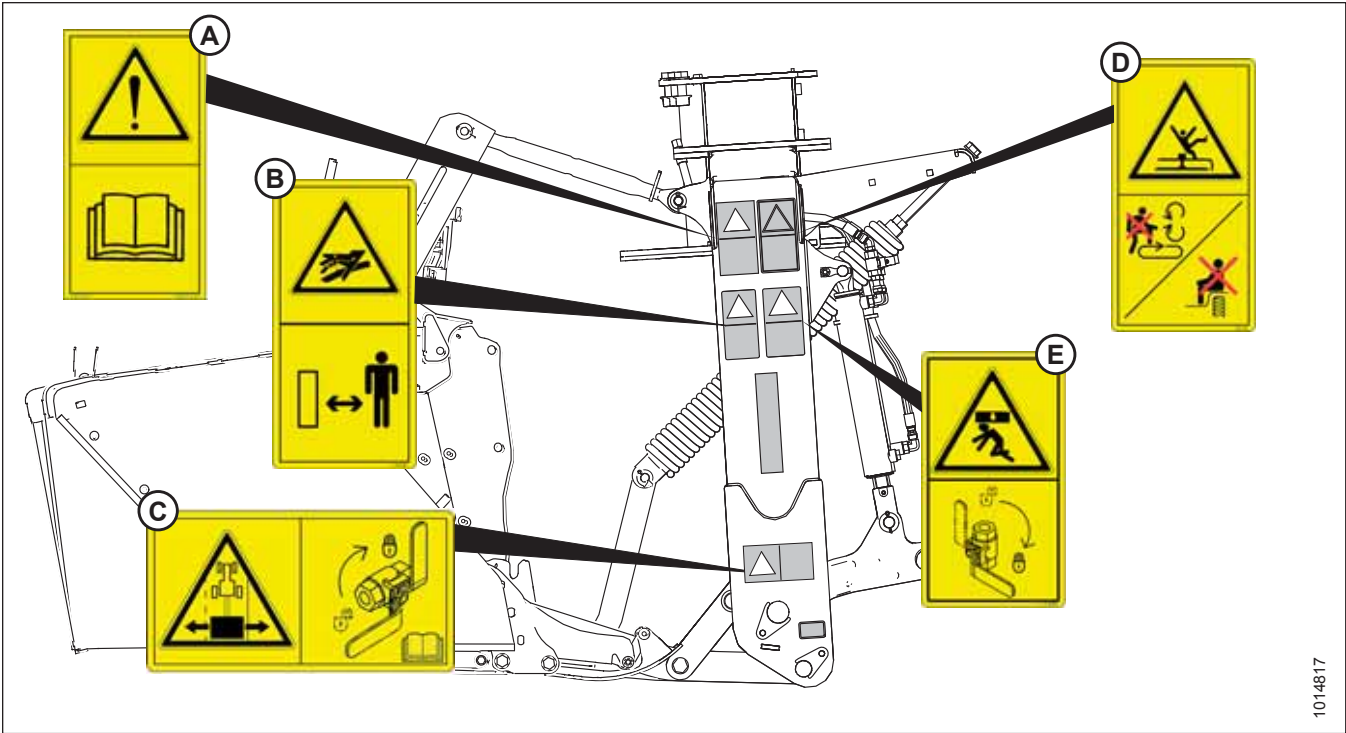
D - MD #184372



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Figure 1.18: Safety Sign Decals

SAFETY



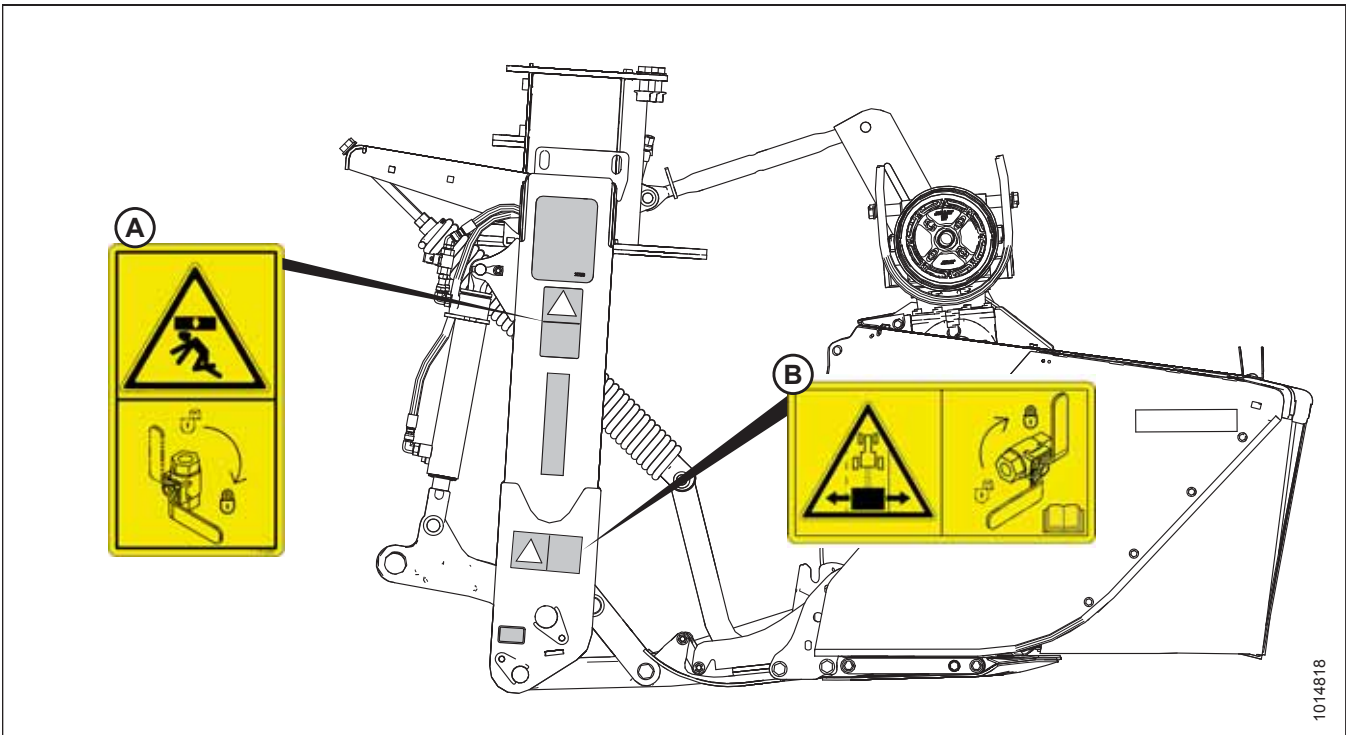
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Figure 1.19: Safety Sign Decal Locations – Left Side

A - MD #113482
D - MD #247166

B - MD #174436
E - MD #171287

C - MD #259058



1014818

Figure 1.20: Safety Sign Decal Locations – Right Side

A - MD #171287

B - MD #259058

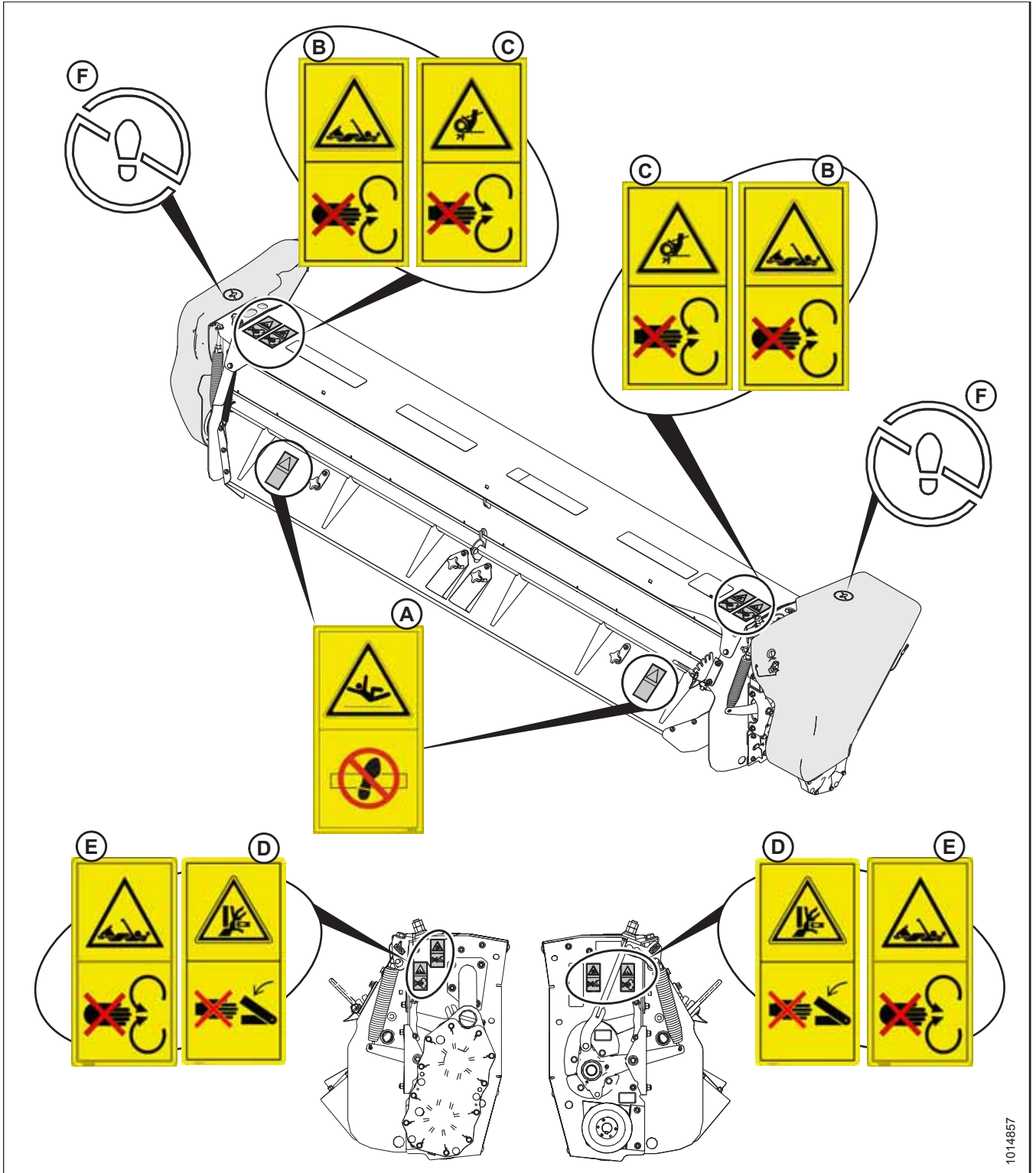


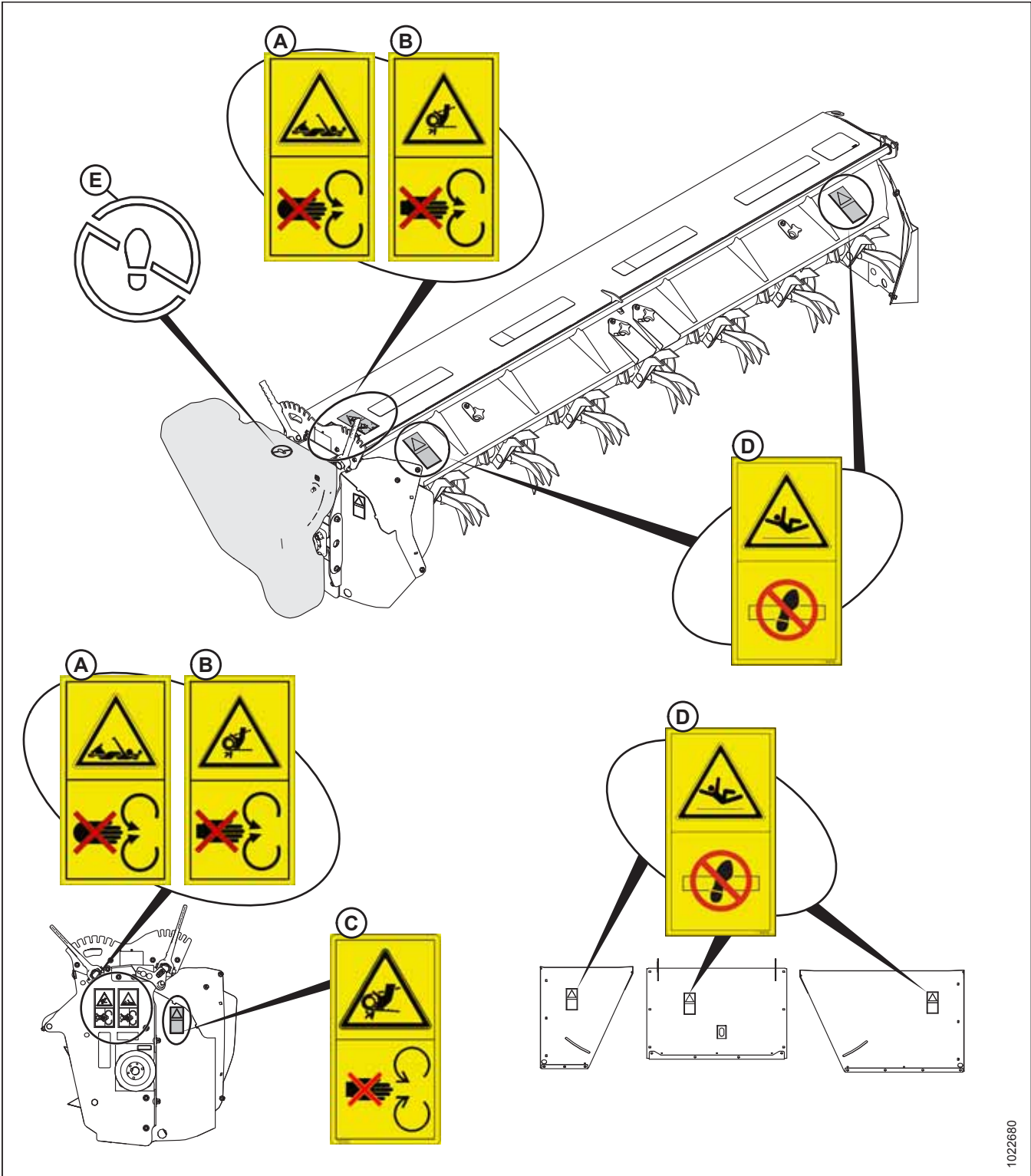
Figure 1.21: Safety Sign Decal Locations – Roll Conditioner

A - MD #190546
D - MD #246959

B - MD #184385
E - MD #246956

C - MD #184371
F - NO STEP Symbol (Imprinted on Shield)

1014857



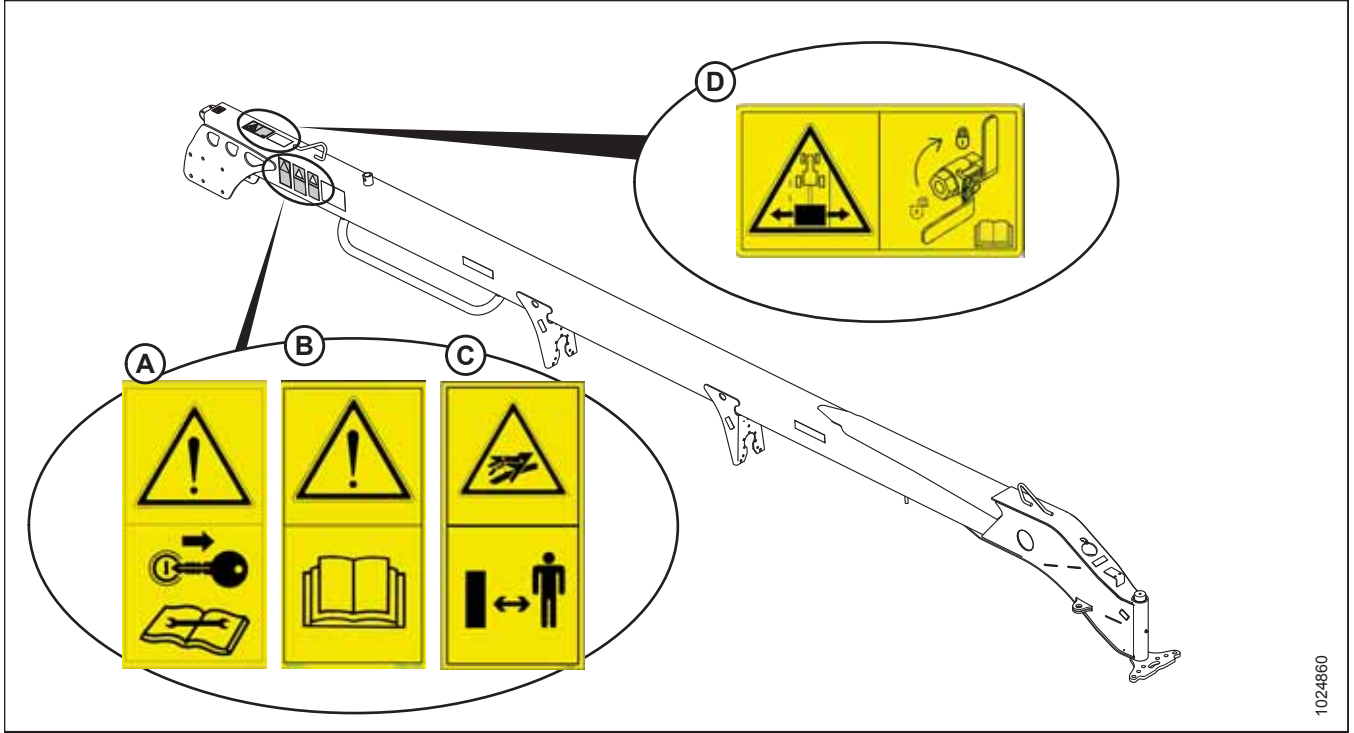
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Figure 1.22: Safety Sign Decal Locations – Finger Conditioner

A - MD #184385
D - MD #190546

B - MD #184371
E - NO STEP Symbol (Imprinted on Shield)

C - MD #184422



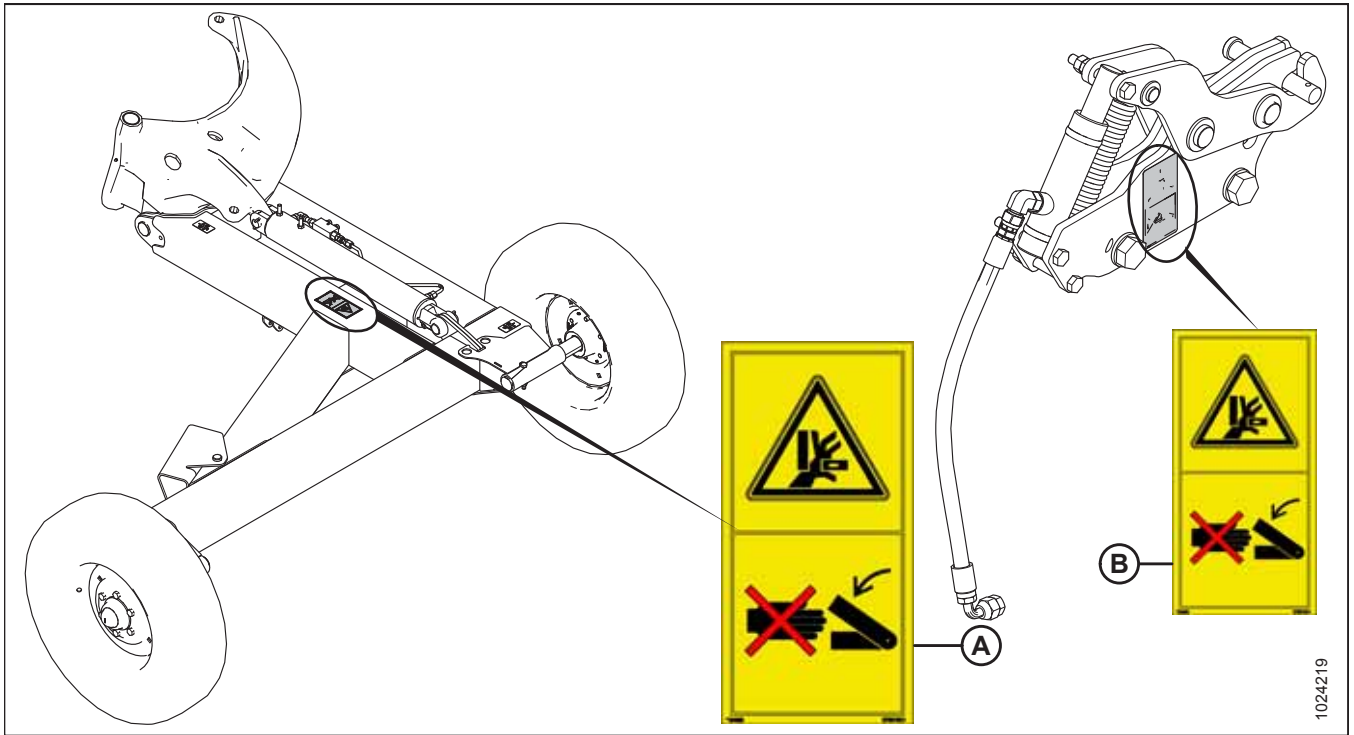
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Figure 1.23: Safety Sign Decal Locations – Hitch, R116 PT Shown, R113 PT Similar

A - MD #194464
D - MD #259058

B - MD #113482

C - MD #174436



1024219

Figure 1.24: Safety Sign Decal Locations – Transport

A - MD #184386

B - MD #246959

1.9 Understanding Safety Signs

Make sure you understand the meanings of all safety signs placed on the machine.

MD #113482

General hazard pertaining to machine operation and servicing

DANGER

To prevent injury or death from improper or unsafe machine operation:

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

MD #166466

High-pressure oil hazard

WARNING

To prevent serious injury, gangrene, or death:

- Do **NOT** go near hydraulic fluid leaks.
- Do **NOT** use a finger or skin to check for hydraulic fluid leaks.
- Lower the load or relieve hydraulic pressure before loosening any hydraulic fittings.
- High-pressure oil can easily puncture the skin, which can cause serious injury, gangrene, or death.



Figure 1.25: MD #113482



Figure 1.26: MD #166466

SAFETY

- If you are injured, seek emergency medical help. **Immediate** surgery is required to remove hydraulic fluid which has penetrated the skin.

MD #166832

High-pressure oil hazard

WARNING

To prevent serious injury, gangrene, or death:

- High-pressure oil can easily puncture skin, and can cause serious injury, gangrene, or death.
- Do **NOT** go near leaks.
- Do **NOT** use fingers or skin to check for leaks.
- Lower the load or relieve hydraulic pressure before loosening fittings.
- If injured, seek emergency medical help. Immediate surgery is required to remove oil.



Figure 1.27: MD #166832

MD #171287

Rotary disc pull-type crushing hazard

DANGER

To prevent injury or death from fall of raised pull-type:

- Fully raise pull-type, stop the engine, remove the key, and engage hydraulic safety lock before going under pull-type.
- Alternatively, rest pull-type on ground, stop the engine, and remove the key before servicing.



Figure 1.28: MD #171287

MD #174436

High-pressure oil hazard

WARNING

To prevent serious injury, gangrene, or death:

- Do **NOT** go near leaks.
- Do **NOT** use a finger or skin to check for leaks.
- Lower the load or relieve hydraulic pressure before loosening fittings.
- High-pressure oil can easily puncture skin, and can cause serious injury, gangrene, or death.
- If injured, seek emergency medical help. Immediate surgery is required to remove oil.



Figure 1.29: MD #174436

SAFETY

MD #184371

Hand entanglement hazard

WARNING

To prevent injury:

- Stop engine and remove key before opening shield.
- Do **NOT** operate without shields in place.



Figure 1.30: MD #184371

MD #184372

General hazard pertaining to machine operation and servicing

DANGER

To prevent injury or death from the improper or unsafe operation of the machine:

- Read the operator's manual and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
- Do **NOT** allow untrained persons to operate the machine.
- Review these safety instructions with all machine Operators every year.
- Ensure that all safety signs are installed and are legible.
- Make certain that bystanders are clear of the header before starting the engine and during operation of the header.
- Keep riders off of the machine.
- Keep all shields in place. Stay clear of moving parts.
- Disengage the header drive, put the transmission into Neutral, and wait for all movement to stop before leaving the operator's position.
- Stop the engine and remove the key from the ignition before servicing, adjusting, lubricating, cleaning, or unplugging the machine.
- Before servicing a header in the raised position, engage the combine's cylinder safety props.
- Display a slow-moving vehicle emblem and activate the header's warning lights when operating the header on roadways (unless these actions are prohibited by law).

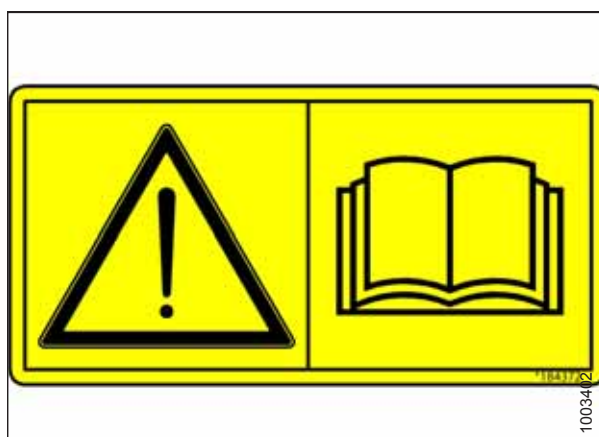


Figure 1.31: MD #184372

SAFETY

MD #184385

Auger entanglement hazard

DANGER

To prevent injury:

- Stop engine and remove key before opening shield.
- Do **NOT** operate without shields in place.



1000922

Figure 1.32: MD #184385

MD #184386

Pinch point hazard

CAUTION

To prevent injury:

- Do **NOT** reach into pinch area.



1004137

Figure 1.33: MD #184386

MD #184422

Hand and arm entanglement hazard

WARNING

To prevent injury:

- Stop the engine and remove the key before opening any shielding.
- Do **NOT** operate the header without the shields in place.



1000923

Figure 1.34: MD #184422

SAFETY

MD #190546

Slipping hazard

WARNING

To prevent injury:

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



Figure 1.35: MD #190546

MD #194464

General hazard

DANGER

To prevent injury or death:

- Stop engine and remove key before service.
- Read tractor and pull-type manufacturer's manuals for inspection and maintenance instructions.



Figure 1.36: MD #194464

MD #194465

Blade cutting hazard

WARNING

To prevent injury from sharp cutting blades:

- Do **NOT** operate without shields in place.
- Stand clear of rotary disc pull-type while machine is running.
- Disengage PTO, stop engine, and remove key before opening shield.
- Stop engine and remove key before opening shield.
- Blades may continue to rotate after power is shut off.
- Listen and look for evidence of rotation before opening shield.



Figure 1.37: MD #194465

SAFETY

MD #194466

Thrown objects hazard

WARNING

To prevent injury or death from thrown objects:

- Stand clear of rotary disc pull-type while machine is running.
- Crop materials exiting at high speed.
- Stop machine, look, listen, and wait for all movement to stop before approaching.



Figure 1.38: MD #194466

MD #246956

Driveline entanglement hazard

DANGER

To prevent injury:

- Stop engine and remove key before opening shield.
- Do **NOT** operate without shields in place.



Figure 1.39: MD #246956

MD #246959

Pinch point hazard

CAUTION

To prevent injury:

- Do **NOT** reach into pinch area.



Figure 1.40: MD #246959

SAFETY

MD #247166

Falling hazard

WARNING

To prevent injury:

- Do **NOT** mount or ride machine while the machine is in motion.



Figure 1.41: MD #247166

MD #247167

Blade cutting hazard

WARNING

To prevent injury from sharp cutting blades:

- Do **NOT** operate without shields in place.
- Disengage power take-off, stop engine and remove key before opening covers.
- Blades may continue to rotate after power is shut off.
- Listen and look for evidence of rotation before opening shield.



Figure 1.42: MD #247167

MD #259058

Off-center tracking hazard

WARNING

To prevent serious injury or death from off-center tracking, follow these steps before towing the pull-type in transport mode:

- Charge cylinder with oil.
- Rotate valve handle to lock in transport position.
- Maximum towing speed 32 km/h (20 mph).

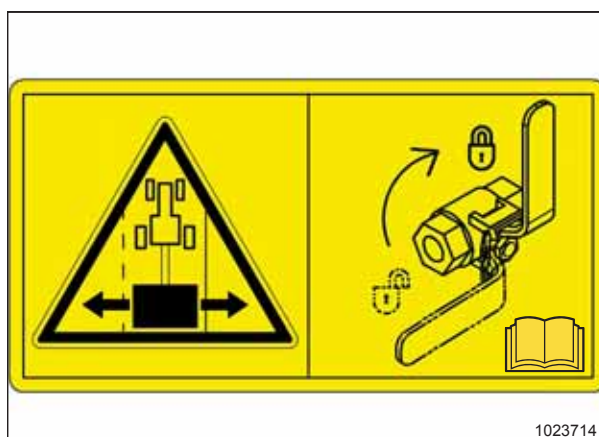


Figure 1.43: MD #259058

1.10 Operational Safety

Follow all the safety and operational instructions given in this manual.

CAUTION

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

CAUTION

- Never start or move the machine until you are sure all bystanders have cleared the area.
- Avoid travelling over loose fill, rocks, ditches, or holes.
- Drive slowly through gates and doorways.
- If possible, travel uphill or downhill when working on inclines. Be sure to keep transmission in gear while travelling downhill.
- Never attempt to get on or off a moving machine.
- Do NOT get off the tractor while the pull-type is in operation. Stop forward movement of the tractor, and stop the power take-off.
- To avoid bodily injury or death from unexpected startup of machine, always stop tractor engine, and remove key before adjusting or removing plugged material from the machine.
- Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect the machine. Follow proper shutdown procedure shown in [3.12 Shutdown Procedure, page 64](#).
- Operate only in daylight or good artificial light.

CAUTION

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



Figure 1.44: MD #194466

1.11 Owner/Operator Responsibilities

Owning and operating heavy equipment comes with certain duties.

CAUTION

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

Chapter 2: Product Overview

Refer to this section to learn about the dimensions, weights, and equipment specifications for your machine and its systems.

2.1 Definitions

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

Term	Definition
API	American Petroleum Institute
APT	Articulated Power Turn
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut
Center-link	A hydraulic cylinder link between the header and machine used to change header angle
CGVV	Combined gross vehicle weight
Export rotary disc pull-type	Machine configuration typical outside North America
FFFT	Flats from finger tight
Finger tight	Finger tight is a reference position where sealing surfaces or components are making contact with each other, and fitting has been tightened to a point where fitting is no longer loose
GVW	Gross vehicle weight
Hard joint	A joint made with use of a fastener where joining materials are highly incompressible
Header or rotary header	The part of the rotary disc pull-type that cuts and conditions the crop
Hex key	A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive); also known as an Allen key and various other synonyms
hp	Horsepower
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting
n/a	Not applicable
North American rotary disc pull-type	Rotary disc pull-type configuration typical in North America
NPT	National Pipe Thread: A style of fitting used for low-pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit
Nut	An internally threaded fastener that is designed to be paired with a bolt
ORB	O-ring boss: A style of fitting commonly used in port 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
PTO	Power take-off
R1 PT Series	R113 and R116 Rotary Disc Pull-Types
RoHS (Reduction of Hazardous Substances)	A directive by the European Union to restrict use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc platings)
Rotary disc pull-type	A machine that cuts and conditions hay and is pulled by an agricultural tractor
rpm	Revolutions per minute
SAE	Society of Automotive Engineers

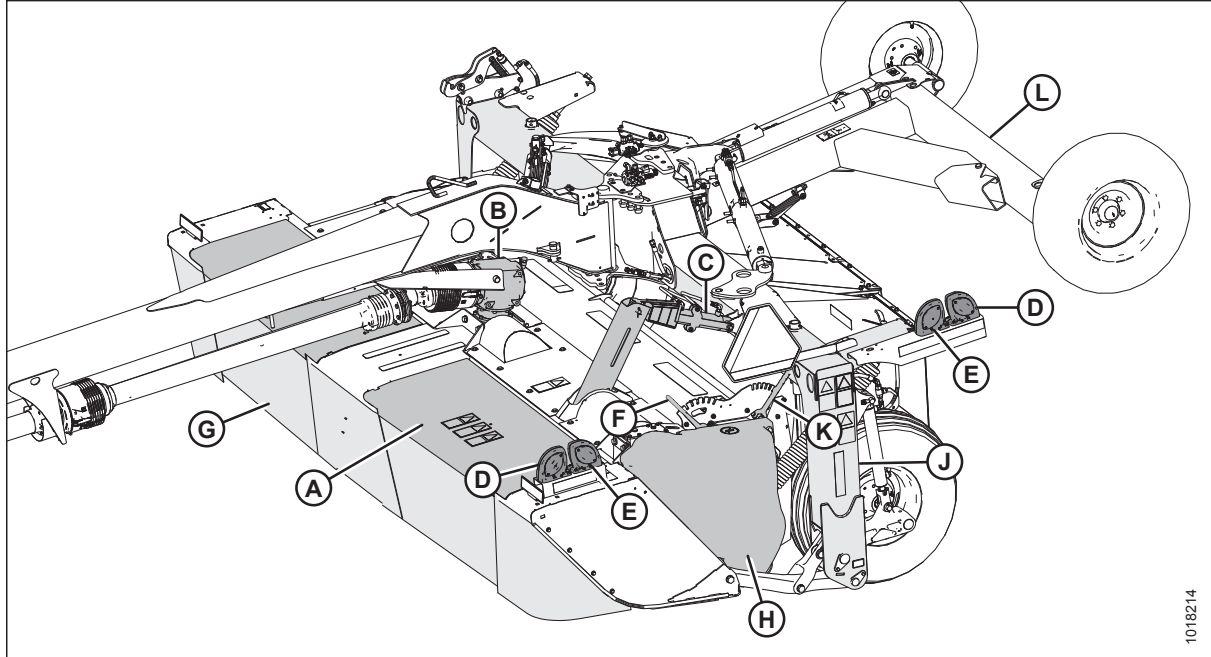
PRODUCT OVERVIEW

Term	Definition
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread into a mating part
Soft joint	A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time
Tension	Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)
TFFT	Turns from finger tight
Torque	The product of a force X lever arm length, usually measured in Newton-meters (Nm) or foot-pounds (lbf-ft)
Torque angle	A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned farther a number of degrees to achieve its final position
Torque-tension	The relationship between assembly torque applied to a piece of hardware and axial load it induces in bolt or screw
Tractor	Agricultural-type tractor
Washer	A thin cylinder with a hole or slot located in the center that is to be used as a spacer, load distribution element, or locking mechanism

2.2 Component Identification

Being able to identify the parts and systems of your rotary disc pull-type will make looking up content in its reference manuals much easier.

Figure 2.1: Rotary Disc Pull-Type with Finger Conditioner



A - Cutterbar Door

D - Amber Hazard/Turn Signal Light (x2)

G - Front Curtains

K - Rear Deflector Control

B - Header Swivel Gearbox

E - Red Tail/Brake Light (x2)

H - Driveshield

L - Optional Transport System

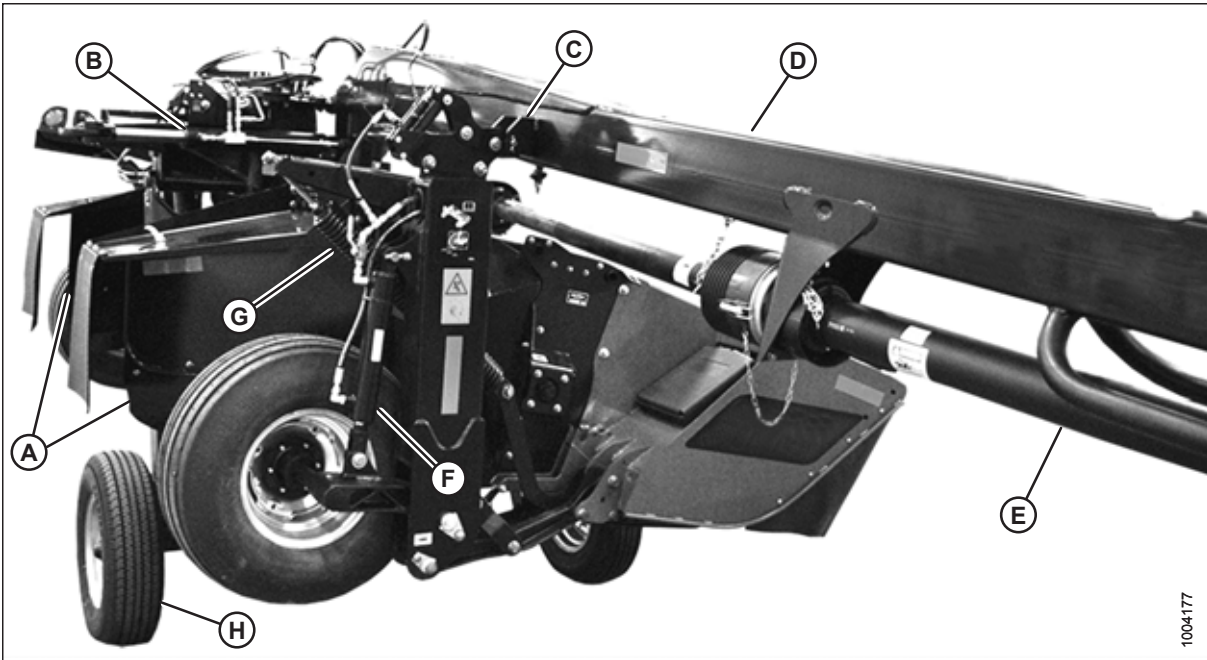
C - Center-Link

F - Forward Baffle Control

J - Carrier Frame

PRODUCT OVERVIEW

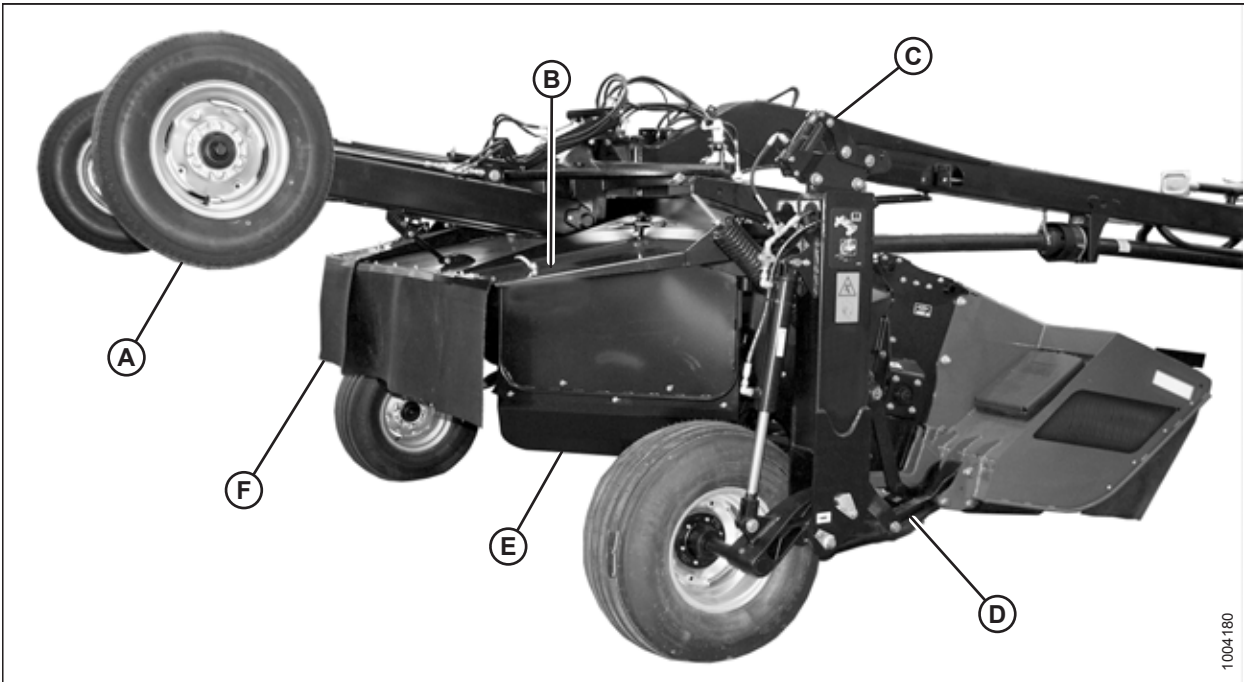
Figure 2.2: Rotary Disc Pull-Type with Finger Conditioner



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

Figure 2.3: Rotary Disc Pull-Type with Finger Conditioner

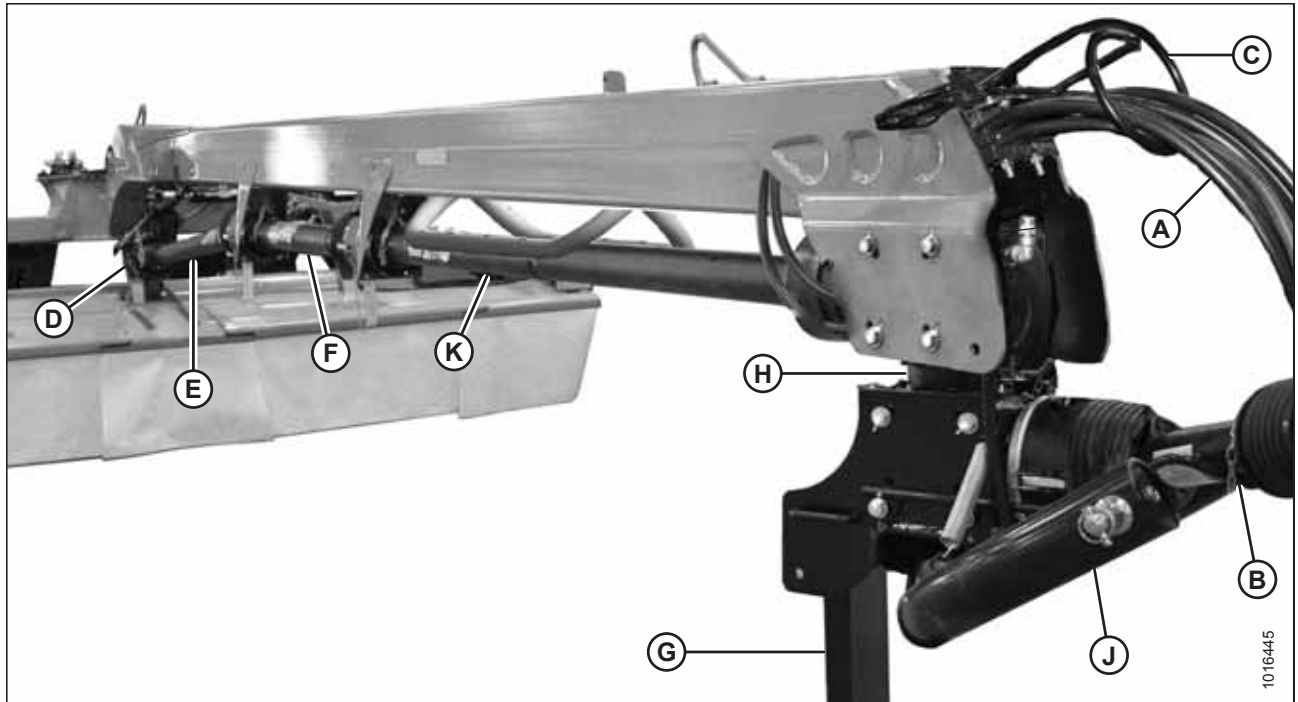


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- | | | |
|------------------------|--------------------------|--------------------------------|
| A - Optional Transport | B - Forming Shield Cover | C - Transport Locking Cylinder |
| D - Skid Shoe | E - Side Deflector | F - Rear Curtain |

PRODUCT OVERVIEW

Figure 2.4: Hitch and Driveline — R116 Shown, R113 Similar

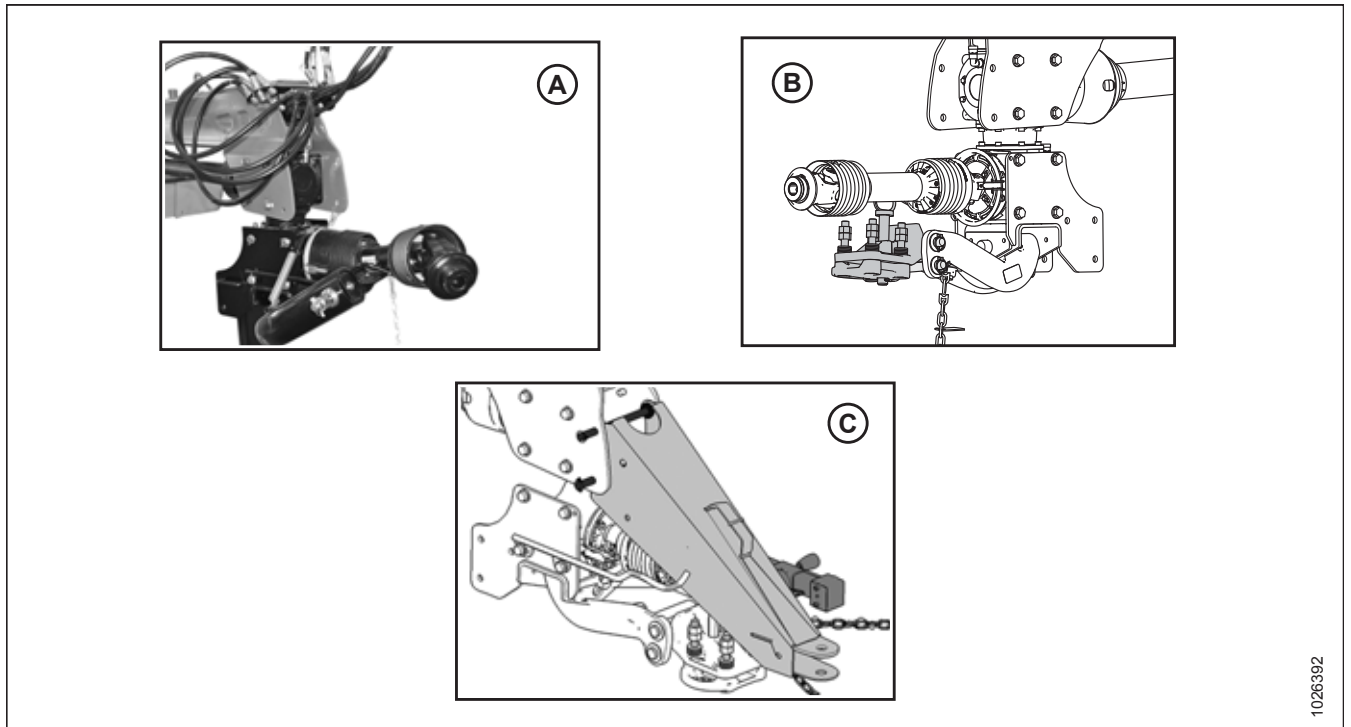


A - Control Hoses
 D - Header Swivel Gearbox
 G - Hitch Stand
 K - Hitch Driveline

B - Primary Driveline
 E - Clutch Driveline
 H - Hitch Swivel Gearbox

C - Hose Support
 F - Hitch Driveline (R116 only)
 J - Two-Point Hitch

Figure 2.5: Hitch Options



A - Tractor Two-Point Hitch Adapter

B - Tractor Drawbar Hitch Adapter

C - Tractor Utility Hitch Adapter

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 2.1 Rotary Disc Pull-Type Specifications

Components		R113	R116
Frame and Structure			
Transport width without Road-Friendly Transport™ Option (RFT) ¹		4063 mm (13 ft. 4 in.)	5027 mm (16 ft. 6 in.)
Transport width with RFT		2743 mm (8 ft. 9 in.)	
Transport length	without RFT	7117 mm (23 ft. 4 in.)	8580 mm (28 ft. 2 in.)
Transport length	with RFT	8407 mm (27 ft. 7 in.)	9856 mm (32 ft. 4 in.)
Estimated weight (with steel roll conditioner)	without RFT	2409 kg (5300 lb.)	2740 kg (6040 lb.)
Estimated weight (with steel roll conditioner)	with RFT	3084 kg (6800 lb.)	3420 kg (7540 lb.)
Carrier		Pull-type	
Lighting		Two red taillights and two amber signal/hazard lights	
Tires	Carrier	15 in. / 31 x 13.5–15 NHS 8 ply field tires	
Tires	RFT	ST235/80 R16 LR E	
Tread width	without RFT	3682 mm (12 ft. 1 in.)	
Tread width	with RFT	2413 mm (7 ft. 11 in.)	
Manual storage		Plastic case on rotary disc pull-type right end backsheet	

1. Without crop dividers.

PRODUCT OVERVIEW

Table 2.1 Rotary Disc Pull-Type Specifications (continued)

Components		R113	R116
Cutterbar			
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)	
Effective cutting width		3978 mm (156 5/8 in.)	4942 mm (194 5/8 in.)
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			
Tractor Power Take-Off (PTO)		35 mm (1 3/8 in.) dia. 21 spline, or 44 mm (1 3/4 in.) dia. 20 spline	
Mechanical		Gearbox and driveline	
Conditioner – Roll Type			
Drive		4HB belt driven enclosed timing gearbox and driveline	
Conditioner system		Intermeshing rolls (steel or polyurethane)	
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	
Roll diameter	Polyurethane intermeshing	254 mm (10 in.) / 203 mm (8 in.) O.D. tube	
Intermeshing steel bars		229 mm (9 in.) / 179 mm (7 in.) O.D. tube	
Intermeshing polyurethane bars		254 mm (10 in.) / 203 mm (8 in.) O.D. tube	
Swath width		915–2896 mm (36–114 in.)	
Forming shields		Carrier mounted assembly with adjustable side deflectors	

PRODUCT OVERVIEW

Table 2.1 Rotary Disc Pull-Type Specifications (continued)

Components		R113	R116
Conditioner – Finger Type			
Drive		4HB belt driven	
Conditioner system		V-shaped tines on rotating drum	
Conditioner speed		896 ² rpm	
Rotor length		3275 mm (10 ft. 9 in.)	
Rotor diameter		648 mm (25 1/2 in.) / 152 mm (6 in.) O.D. tube	
Swath width		915–2896 mm (36–114 in.)	
Forming shields		Carrier mounted assembly with adjustable side deflectors	
Ground Speed			
Recommended cutting		8–15 km/h (5–10 mph)	
Recommended transport ³		30 km/h (20 mph)	
Tractor Requirements			
Power Take-Off (PTO) power – minimum		74 kW (100 hp)	93 kW (125 hp)
Hydraulics ⁴	Pressure	13.71 MPa (2000 psi)	
Hydraulics ⁴	Controls	Two double-acting / one single-acting ⁵	
Hitch		Drawbar, two-point, or quick attach	

NOTE:

Tractor must be equipped with a cab.

2. Can be set to 600 rpm by interchanging the pulleys.
3. Do **NOT** exceed maximum transport speed of 32 km/h (20 mph).
4. Transport system option uses the same hydraulic circuit as the hitch swing.
5. Single-acting header lift circuit is converted to double-acting when the transport system option is installed.

Chapter 3: Operation

Safely operating your rotary disc pull-type requires familiarizing yourself with its capabilities.

3.1 Lift Cylinder Lock-Out Valves

To prevent unintentional raising or lowering of the rotary disc pull-type, engage the lift cylinder lock-out valves before servicing, repairing, or unplugging your machine. The lift cylinder lock-out valves are located on the lift cylinders at the back of the rotary disc pull-type.

3.1.1 Engaging Locks

Hydraulic lock-out valves are provided for safely transporting and servicing machinery.

DANGER

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

IMPORTANT:

Connect hoses so that moving the cylinder control lever backward raises the rotary disc pull-type, and moving the cylinder control lever forward lowers the rotary disc pull-type. Refer to [3.7.3 Connecting Hydraulics, page 51](#) for more information.

1. Shut down the engine, and remove the key from the ignition.
2. Move cylinder control lever (A) backward to position (B) to fully raise machine.

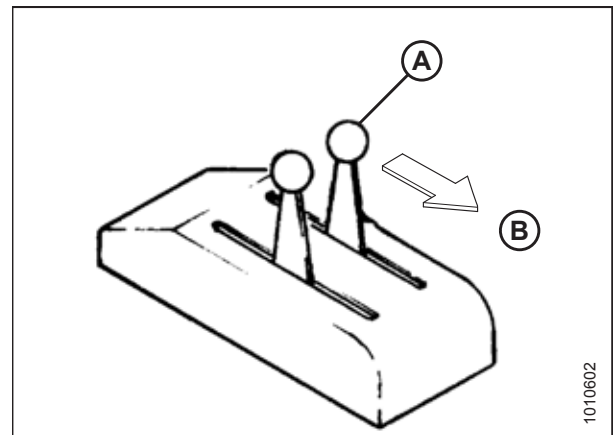


Figure 3.1: Tractor Cylinder Control Lever

OPERATION

3. Close lock-out valve (A) on each lift cylinder by turning the handle to the closed position (90° angle to the hose).

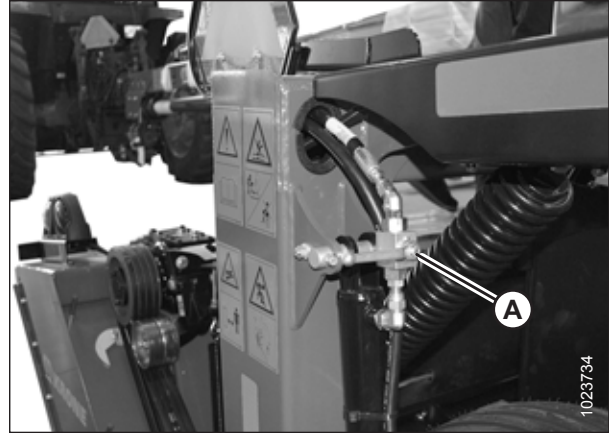


Figure 3.2: Lift Cylinder Lock-Out Valve in Closed Position

3.1.2 Disengaging Locks

Hydraulic lock-out valves are provided for safely transporting and servicing machinery.

DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. Open lock-out valve (A) on each lift cylinder by turning the handle to the open position (in line with the hose).

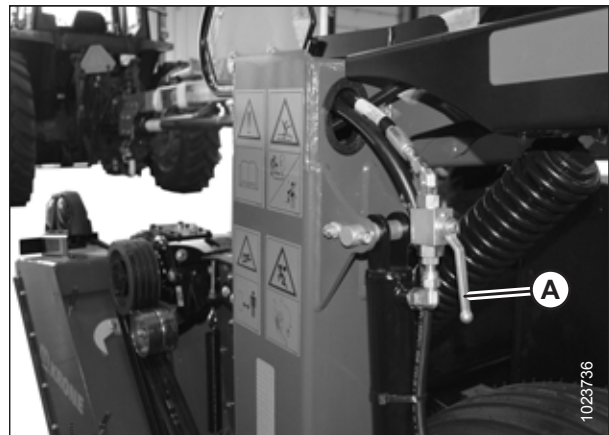


Figure 3.3: Lift Cylinder Lock-Out Valve in Open Position

OPERATION

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

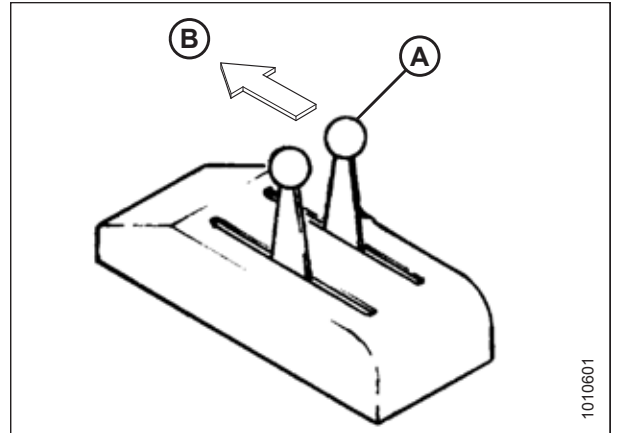


Figure 3.4: Tractor Cylinder Control Lever

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3.2 Driveshields

Driveshields protect people from rotating belts and drives.

3.2.1 Opening Driveshields

The driveshields protect sensitive components from damage. Open them only when you intend to service the header.

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.

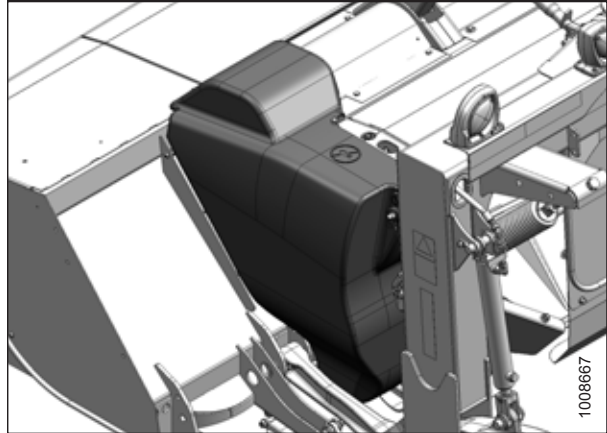


Figure 3.5: Left Driveshield

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

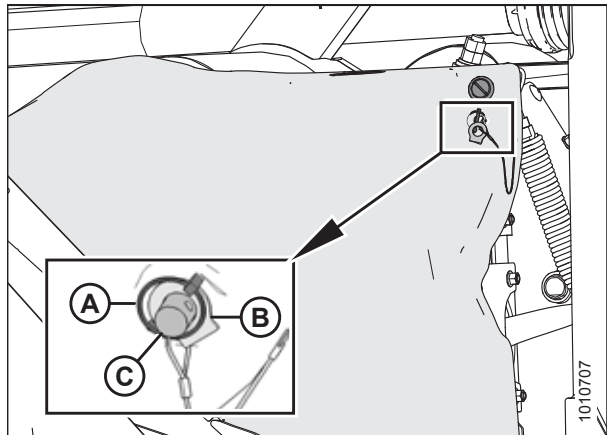


Figure 3.6: Left Driveshield

OPERATION

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

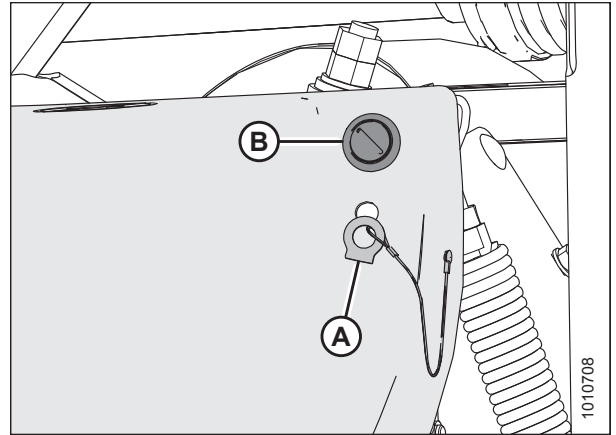


Figure 3.7: Driveshield Latch

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

NOTE:

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

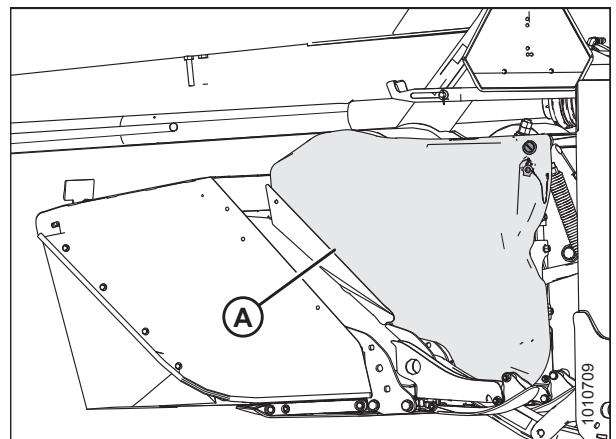


Figure 3.8: Driveshield

3.2.2 Closing Driveshields

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

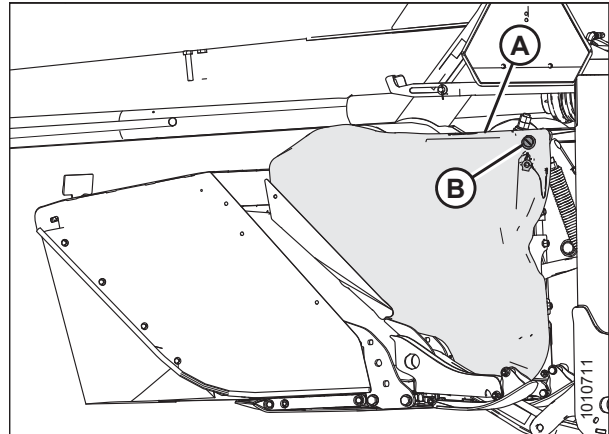


Figure 3.9: Driveshield and Latch

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

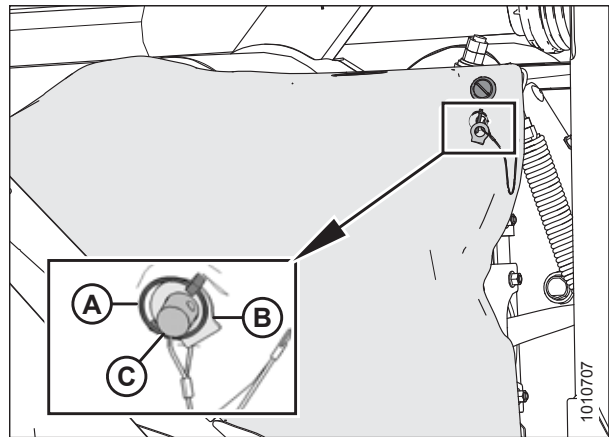


Figure 3.10: Left Driveshield

3.3 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 without all the cutterbar doors down or without curtains installed and in good condition. Objects in the path of the blades can be ejected with considerable force when the machine is started.

Rotary disc pull-types sold outside of North America have latches on cutterbar doors (A).

Curtains (B) and (C) are attached to each front corner and at the center respectively. Always keep the curtains lowered when operating the rotary disc pull-type.

IMPORTANT:

Replace the curtains if they become worn or damaged. For instructions, refer to [4.4.2 Maintaining Curtains, page 142](#).

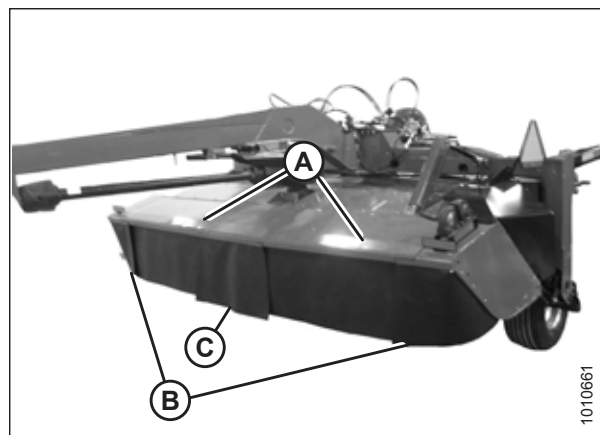


Figure 3.11: Front View of the Rotary Disc Pull-Type

3.3.1 Opening Cutterbar Doors – North America

Opening the cutterbar doors on North American models is a simple procedure; ensure that the machine is shut down before you attempt it.

If the machine was sold outside of North America, it will have export-style latches. For instructions, refer to [3.3.2 Opening Cutterbar Doors – Export Latches, page 38](#).

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.

1. If both doors need to be opened, center the pull-type beneath the hitch.
2. Shut down the engine, and remove the key from the ignition.

OPERATION

3. Lift up doors (A) at the front of the machine.

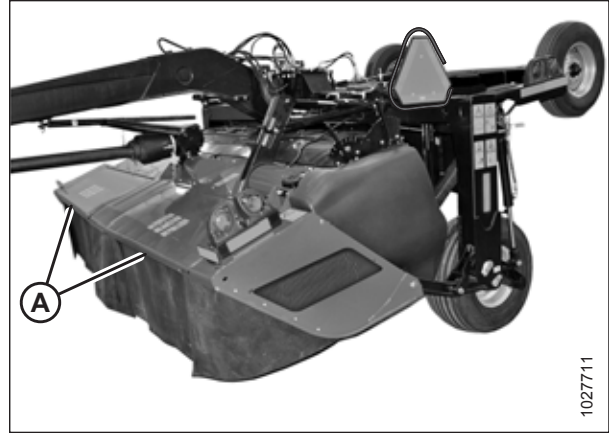


Figure 3.12: Cutterbar Doors and Curtains

3.3.2 Opening Cutterbar Doors – Export Latches

Machines sold outside North America have a tool-operated latch on the cutterbar doors.

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.

1. If both doors need to be opened, center the pull-type beneath the hitch.
2. Shut down the engine, and remove the key from the ignition.
3. Locate latch access holes (A) for each door.

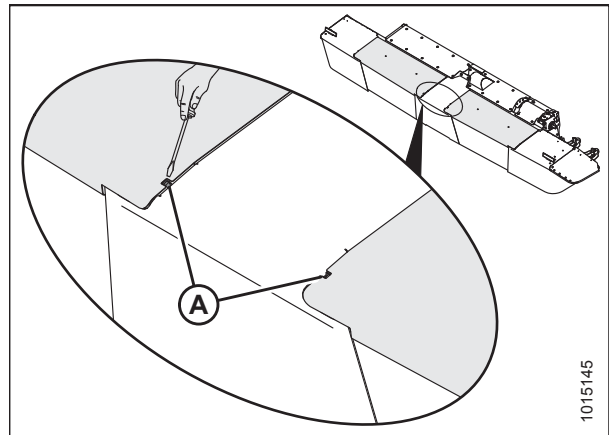


Figure 3.13: Cutterbar Door Latch Access Hole – Export Only

OPERATION

4. Use a rod or screwdriver to press down on latch (A) to release the cutterbar door.

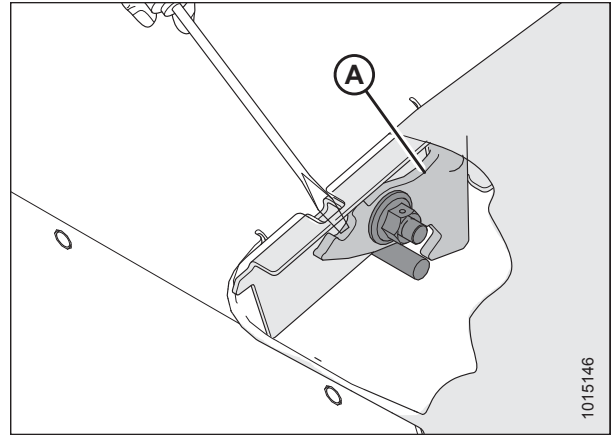


Figure 3.14: Cutterbar Door Latch – Cutaway View

5. Lift up on doors (A) while pressing down on the latch.

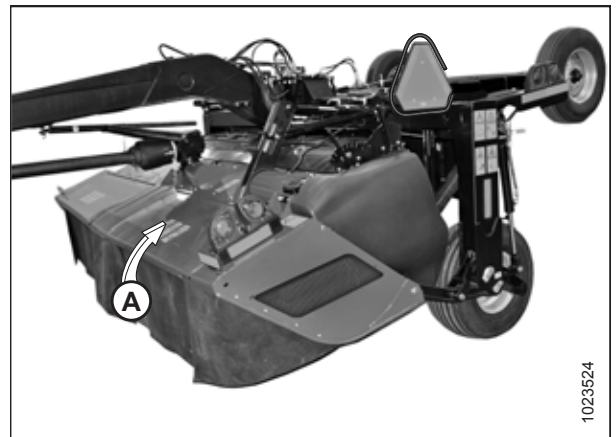


Figure 3.15: Cutterbar Doors and Curtains

3.3.3 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.

OPERATION

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

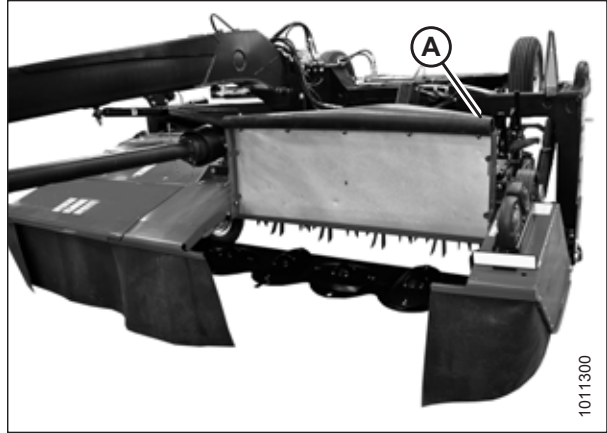


Figure 3.16: Cutterbar Doors and Curtains

3.4 Daily Start-Up Check

Perform this procedure before operating the machine..

CAUTION

- Ensure that the tractor and the rotary disc pull-type 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 rotary disc pull-type 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.

Protect yourself. 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

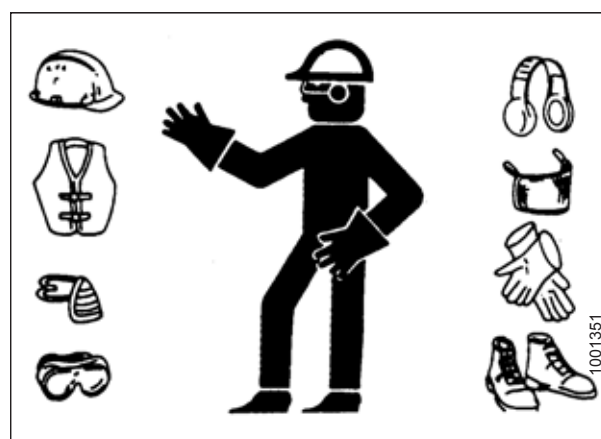


Figure 3.17: Safety Equipment

Use proper hearing protection:

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



Figure 3.18: Safety Equipment

OPERATION

Perform the following checks each day before startup:

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 279](#).

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 125](#).

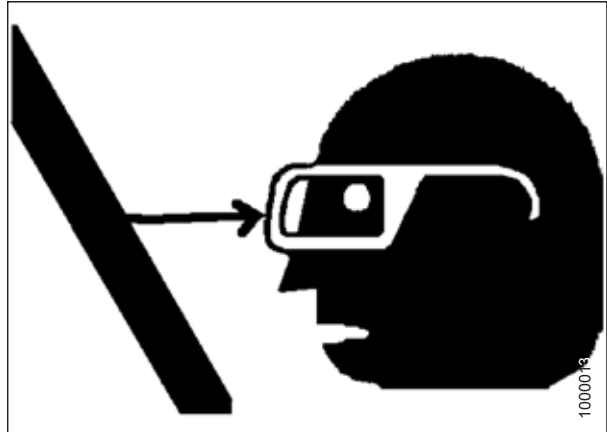


Figure 3.19: Safety around Equipment

3.5 Preparing Tractor for Rotary Disc Pull-Type

To attach the rotary disc pull-type to a tractor, meet the tractor requirements and adjust the drawbar.

3.5.1 Tractor Requirements

The tractor used to pull the rotary disc pull-type must meet the requirements outlined in the table.

Table 3.1 Tractor Requirements

Model Number	Minimum Power	Minimum Drawbar Capacity	Minimum Hydraulics
R113 PT	75 kW (100 hp)	In accordance with ASAE	13.7 MPa (2000 psi)
R116 PT	93 kW (125 hp)	In accordance with ASAE	13.7 MPa (2000 psi)

NOTE:

Tractor must be equipped with a seven-terminal outlet to supply power to the rotary disc pull-type's hazard lights.

NOTE:

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

3.5.2 Adjusting the Drawbar

When attaching the pull-type to a tractor with a drawbar type connection, the distance between the PTO shaft and the hitch connection must be adjusted correctly.



DANGER

To avoid bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key before making adjustments to the machine.

1. Shut down the engine, and remove the key from the ignition.
2. Adjust the tractor drawbar to meet the specifications listed in Table 3.2, page 44.
3. Secure the tractor drawbar so the hitch pinhole is directly below the driveline.

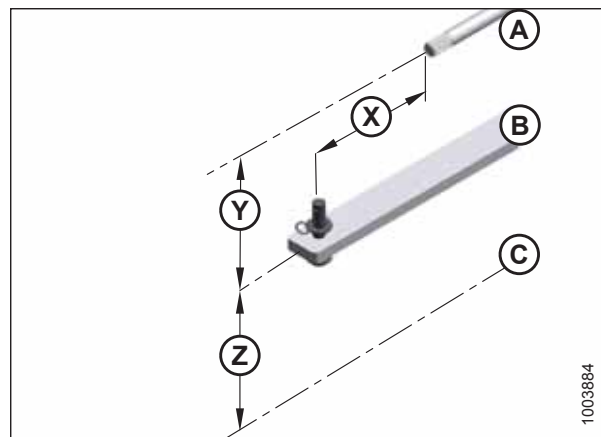


Figure 3.20: Tractor Drawbar Adjustments

A - Power Take-Off (PTO)
 B - Tractor Drawbar
 C - Ground
 X - Dimension X
 Y - Dimension Y
 Z - Dimension Z

OPERATION

Table 3.2 SAE Standard A482 Specifications

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

3.6 Setting up the Rotary Disc Pull-Type Hitch

MacDon R1 Series Rotary Disc Pull-Types are factory fitted with either a drawbar or a two-point hitch. Your Dealer will have installed the proper hitch adapter for your tractor.

3.6.1 Installing Drawbar Hitch Adapter

The hitch adapter allows the drawbar to connect with the hitch casting.

IMPORTANT:

The hitch adapter is compatible with Class 2 and Class 3 hitches only. Class 4 hitches are too big. Do **NOT** attempt to modify a Class 4 hitch or hitch adapter to make them fit together.

DANGER

To avoid bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key before making adjustments to the machine.

1. Shut down the engine, and remove the key from the ignition.
2. Remove hairpin (A) and pin (B).
3. If necessary, loosen four top jam nuts (C), and then loosen four lower nuts (D) so that hitch adapter (E) will slide onto tractor drawbar (F).
4. Align the hole in adapter (E) with the hole in drawbar (F) and install pin (B). Secure with hairpin (A).
5. Gradually tighten four nuts (D) to 540 Nm (400 lbf·ft).

NOTE:

Ensure hardened washers and Class 10 nuts (supplied with adapter) are used.

6. Tighten four jam nuts (C).

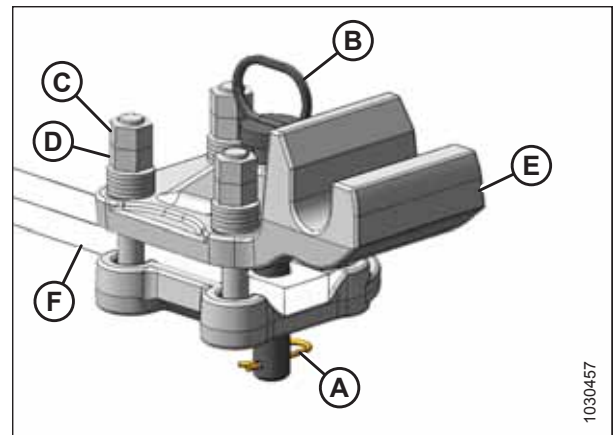


Figure 3.21: Drawbar Hitch Adapter

3.7 Attaching Rotary Disc Pull-Type to the Tractor

The rotary disc pull-type can be attached to the tractor with a drawbar hitch or a two-point hitch.

Refer to the attachment procedure that applies to your tractor:

- [3.7.1 Attaching with Drawbar Hitch, page 46](#)
- [3.7.2 Attaching with Two-Point Hitch, page 48](#)

3.7.1 Attaching with Drawbar Hitch

If the pull-type was configured for a tractor with a drawbar hitch, and the tractor's hitch has been adjusted correctly, then the pull-type can now be attached to the tractor.

DANGER

To avoid bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key before making adjustments to the machine.

1. Shut down the engine, and remove the key from the ignition.
2. Remove lynch pin (A) from clevis pin (B), and remove the clevis pin from the rotary disc pull-type hitch.

DANGER

Never start or move the machine until you are sure all bystanders have cleared the area.

3. Move the tractor to position drawbar hitch adapter (A) under pin (B) in the hitch. Adjust height as necessary with jack.

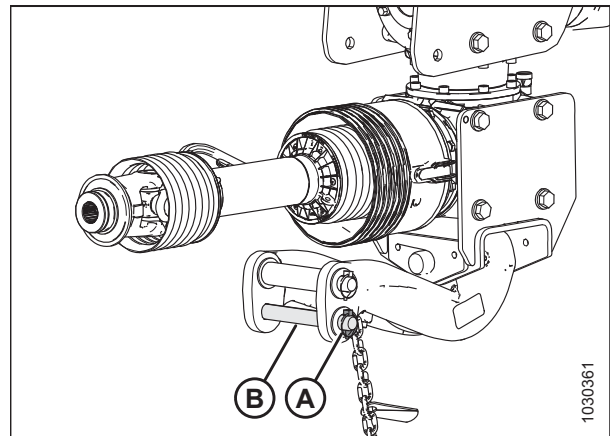


Figure 3.22: Rotary Disc Pull-Type Hitch

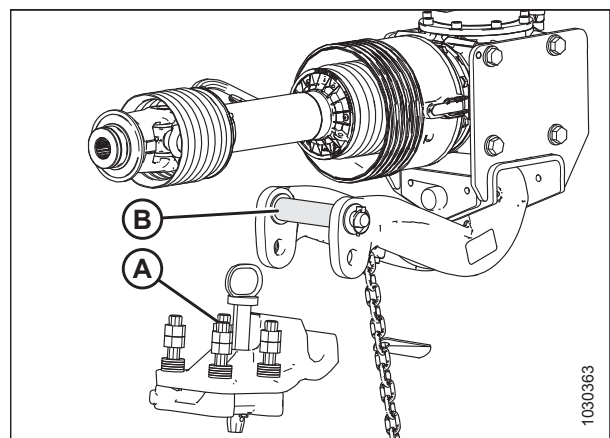


Figure 3.23: Rotary Disc Pull-Type Hitch

OPERATION

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

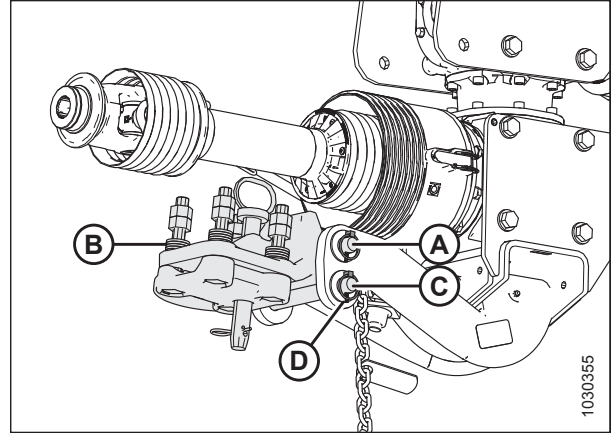


Figure 3.24: Rotary Disc Pull-Type Hitch

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

IMPORTANT:

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

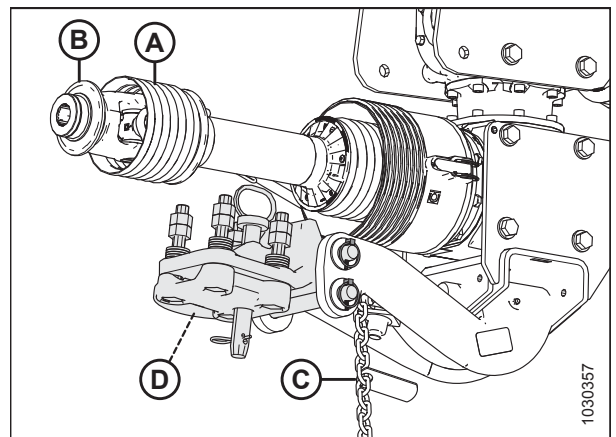


Figure 3.25: Primary Driveline

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

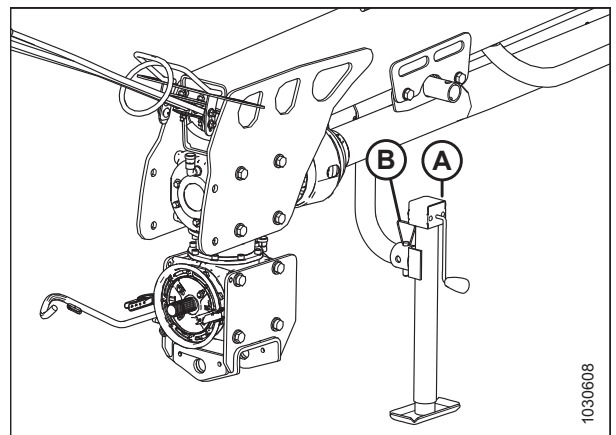


Figure 3.26: Hitch Jack

OPERATION

10. Move jack (A) to storage position on top of hitch, and secure with pin (B).
11. Proceed to [3.7.3 Connecting Hydraulics, page 51](#).

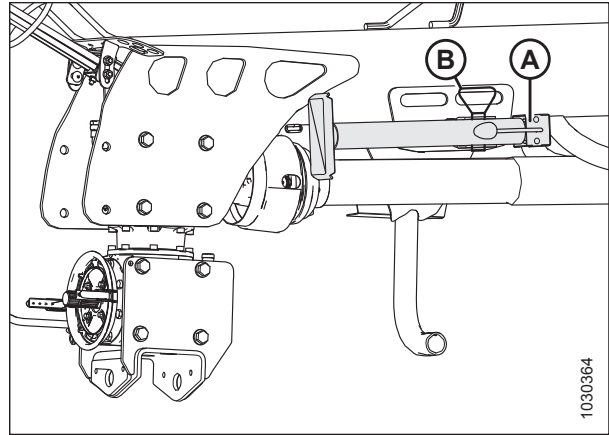


Figure 3.27: Drawbar Jack Storage

3.7.2 Attaching with Two-Point Hitch

If the pull-type was configured for a tractor with a two-point hitch, then the pull-type can now be attached to the tractor.

DANGER

To avoid bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key before making adjustments to the machine.

1. Position the tractor and align hitch arms (A) with hitch adapter (B).
2. Shut down the engine, and remove the key from the ignition.
3. Remove lynch pins (C) and washers from the hitch adapter.
4. Secure hitch arms (A) onto adapter pins (D) with lynch pins (C).

NOTE:

If the tractor is equipped with a category III hitch, use a bushing (MD #224322) on each hitch pin (D). Two bushings (MD #224322) are included with the two-point hitch assembly.

NOTE:

If using a category III hitch, a longer driveshaft may be required. Refer to [5.1 Performance Kits, page 307](#) to order.

5. Install anti-sway bars (not shown) on the tractor hitch to stabilize lateral movement of hitch arms (A). For instructions, refer to your tractor operator's manual.

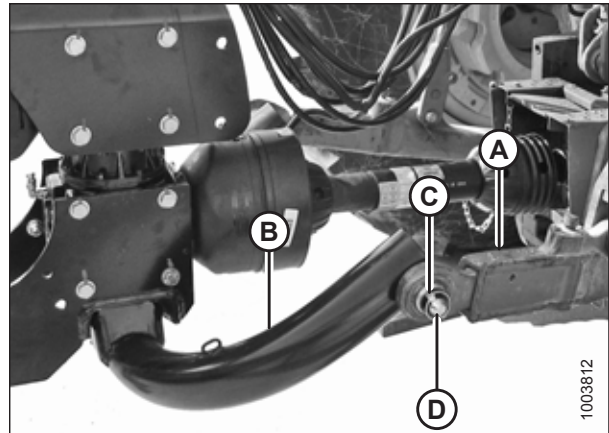


Figure 3.28: Two-Point Hitch Configuration

OPERATION

6. Check distance (C) between tractor primary power take-off (PTO) shaft (A) and rotary disc pull-type hitch gearbox shaft (B) without the front half of the driveline attached.
7. Ensure that distance (C) does **NOT** exceed the dimensions listed in Table 3.3, page 49.

Table 3.3 Distance between Hitch Gearbox and Tractor PTO

Driveline Shaft Size	Distance (C) ⁶
34 mm (1 3/8 in.)	650 mm (25 9/16 in.)
43 mm (1 3/4 in.)	750 mm (29 1/2 in.)

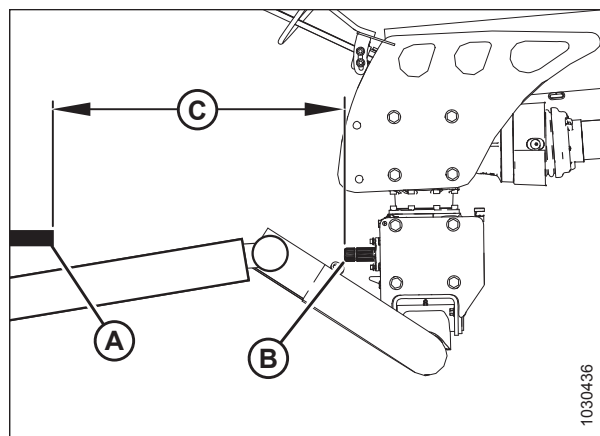


Figure 3.29: Allowable Driveline Length

8. Position primary driveline (A) onto the tractor's PTO shaft, making sure that the driveline is approximately level.
9. Pull back the collar on driveline (A) and push the driveline until it locks. Release the collar.

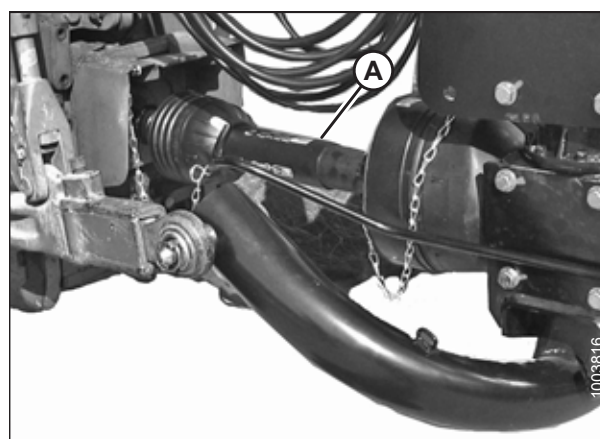


Figure 3.30: Driveline Attached to Tractor PTO

CAUTION

Check to be sure all bystanders have cleared the area.

10. Clear bystanders from the area and start the tractor. Do **NOT** operate the rotary disc pull-type.
11. Raise the hitch so that stand (A) is off the ground.
12. Shut down the engine, and remove the key from the ignition.
13. Remove inner hairpin (B) to release stand (A).

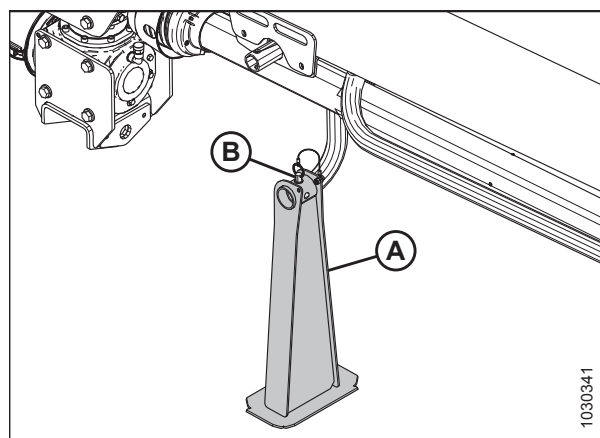


Figure 3.31: Hitch Stand in Working Position

-
6. If distance (C) is greater than the values shown, a longer driveline is required.

OPERATION

14. Rotate stand (A) upward and into storage position.

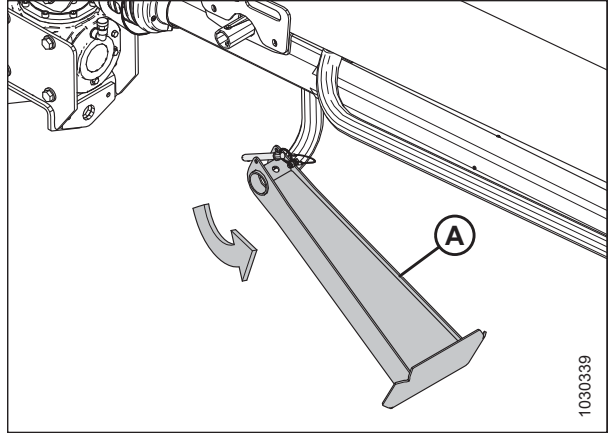


Figure 3.32: Repositioning Hitch Stand

15. Insert pin (A) and secure stand (B) in storage position.

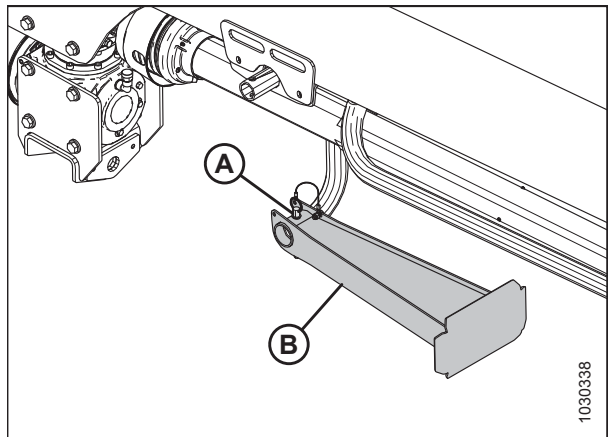


Figure 3.33: Hitch Stand in Storage Position

3.7.3 Connecting Hydraulics

Hydraulic hoses and lines distribute hydraulic fluid to the various components on the rotary disc pull-type.

WARNING

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

NOTE:

Refer to the numbered/colored bands on the hoses to identify lift, swing/transport, and tilt hose sets.

Table 3.4 Hydraulic System Hoses

System	Hose Identification	Tractor Hydraulics
Lift (A)	Red #1 - pressure Blue #1 - return (only with transport installed)	Control 1
Swing/ Transport (B)	Red #2 - pressure Blue #2 - return	Control 2
Tilt (C) ⁷	Red #3 - pressure Blue #3 - return	Control 3



Figure 3.34: Hydraulic Connections

1. Connect the lift cylinder hose (red collar with #1) to the tractor's hydraulic receptacle. Connect the second hose (blue collar with #1) only when the transport is installed. Refer to Table 3.5, page 51 to confirm the system is functioning correctly.
2. Connect the two hitch swing cylinder hoses (collars with #2) to the tractor hydraulic receptacles. Refer to Table 3.6, page 51 to confirm the system is functioning correctly.
3. For machines with hydraulic center-link only, connect the two tilt cylinder hoses (collars with #3) to the tractor hydraulic receptacles. Refer to Table 3.7, page 51 to confirm the system is functioning correctly.

Table 3.5 Lift System

Control Lever Position	Cylinder Movement	Rotary Disc Pull-Type Movement
Forward	Retract	Lower
Backward	Extend	Raise

Table 3.6 Hitch Swing and Transport System

Control Lever Position	Cylinder Movement	Rotary Disc Pull-Type Direction
Forward	Extend	Right
Backward	Retract	Left

Table 3.7 Tilt System

Control Lever Position	Cylinder Movement	Rotary Disc Pull-Type Movement
Forward	Retract	Lower
Backward	Extend	Raise

7. Available with hydraulic tilt option installed.

3.7.4 Connecting Electrical Wiring Harness

The electrical wiring harness allows the tractor to control the rotary disc pull-type's electrical components.

1. Ensure that pin #4 (A) in the tractor receptacle is **NOT** continuously energized (for instructions, refer to your tractor operator's manual). If necessary, remove the appropriate fuse.

IMPORTANT:

Older model tractors may have pin #4 (A) energized as an accessory circuit; however, pin position (B) is used to supply power to the rotary disc pull-type brake lights.

2. Connect rotary disc pull-type wiring harness connector (C) to the tractor receptacle.

NOTE:

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

If equipped with the transport system:

3. Retrieve transport system control box (A) and place in the tractor cab. Route the harness through the hose support.

4. Locate connector (C) that branches off the seven pole trailer plug (A) and attach it to remote wiring harness (B).

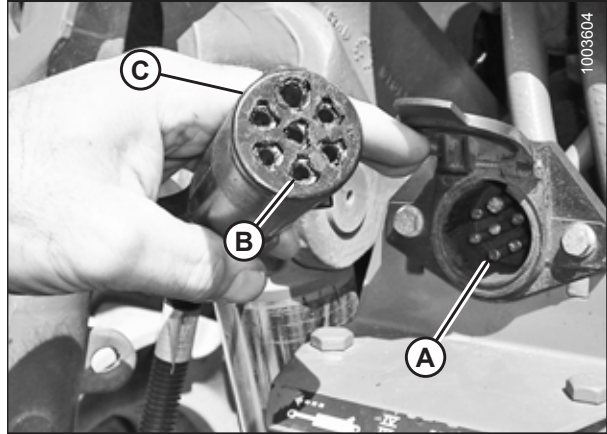


Figure 3.35: Electrical Wiring Harness and Receptacle

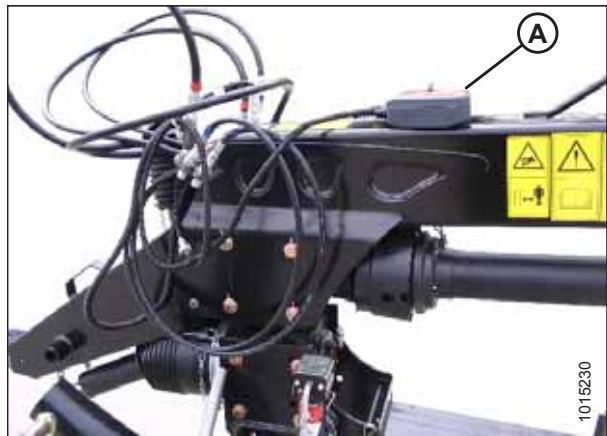


Figure 3.36: Control Box

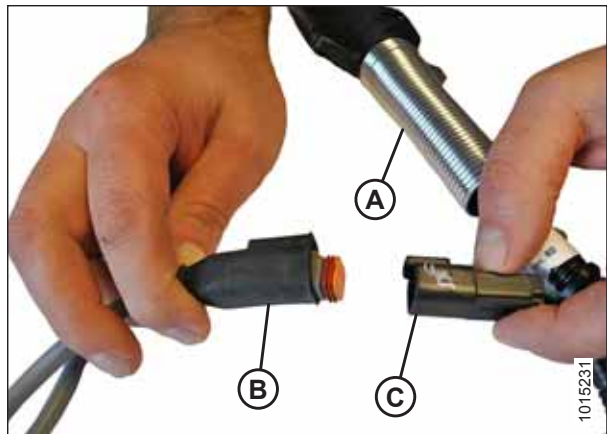


Figure 3.37: Transport Harness

OPERATION

If your tractor has a three-pin auxiliary power connection (A):

5. Connect the two wires (B) from the three-pin auxiliary connector to power wires (C) on the control box, wrap connections with electrical tape, and skip to Step 7, page 54.

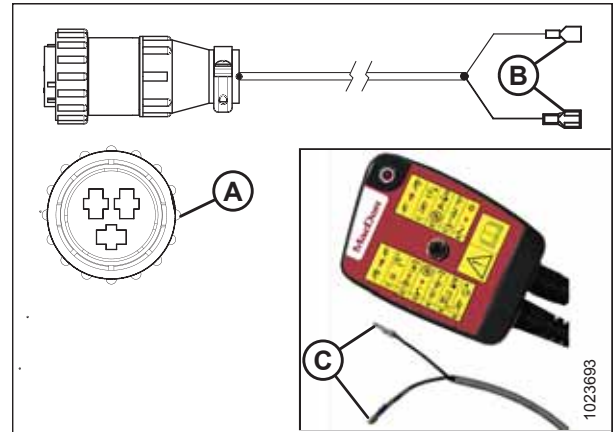


Figure 3.38: Three-Pin Auxiliary Connector

If your tractor does not have a three-pin auxiliary power connection:

6. Connect control box power wire (A) to the tractor's power supply as follows:
 - Connect wire (C) with the red tag to tractor power.
 - Connect wire (B) with no tag to tractor ground.

NOTE:

If the red tag is missing, look for the wire with the number one printed on it; this is the power wire. The ground wire has a number two printed on it.

NOTE:

If the red light does not illuminate when the switch is in field mode, check for correct polarity of power and ground wire connection. The control box includes reverse polarity protection.

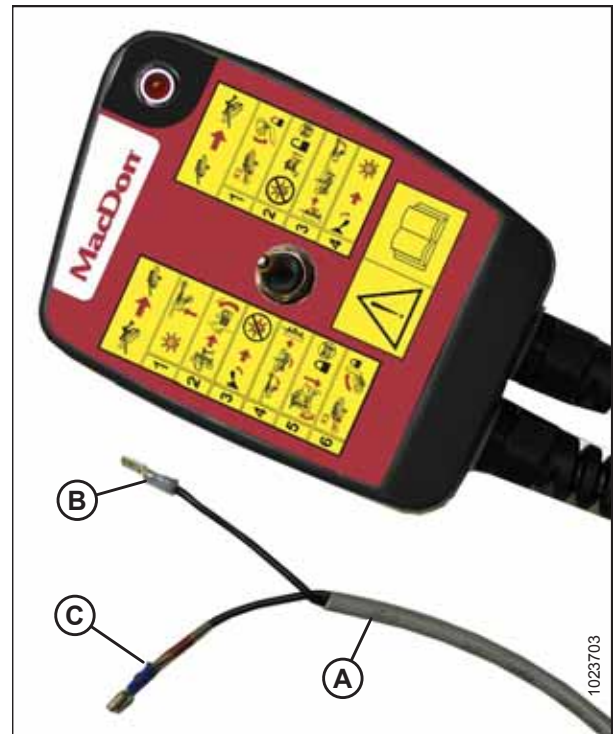


Figure 3.39: Control Box

OPERATION

NOTE:

The transport control box has a 10 amp fuse (A) inside. If this fuse fails, the transport function will not activate.

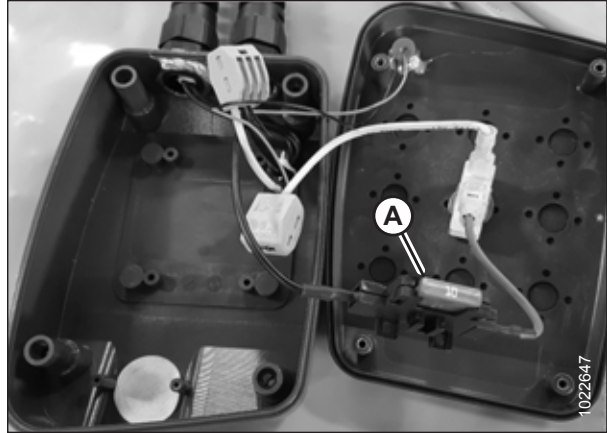


Figure 3.40: Control Box Interior

7. Place the control box inside the tractor cab.

3.8 Detaching Rotary Disc Pull-Type from Tractor

Detach the rotary disc pull-type from the tractor for servicing or storing.

3.8.1 Detaching from Drawbar

Detach the rotary disc pull-type from the tractor for servicing or storing.

CAUTION

- To prevent accidental movement of the tractor, shut off the engine, engage the parking brake, and remove the key.
- To maintain stability, always lower the machine completely. Block the rotary disc pull-type's wheels before detaching from tractor.

1. Park the machine on a flat, level surface.
2. Lower the pull-type onto blocks or leave it raised.

IMPORTANT:

If leaving the rotary disc pull-type in the raised position, close steering valve and both (left/right) lift cylinder lock-out valves.

3. Shut down the engine, and remove the key from the ignition.
4. Move the remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.

If the transport option is installed:

5. Disconnect power wires (C) and (D) from remote control (A).
6. Roll up cable (B) and attach remote control (A) to the hitch with the magnet on the back of the remote control box.

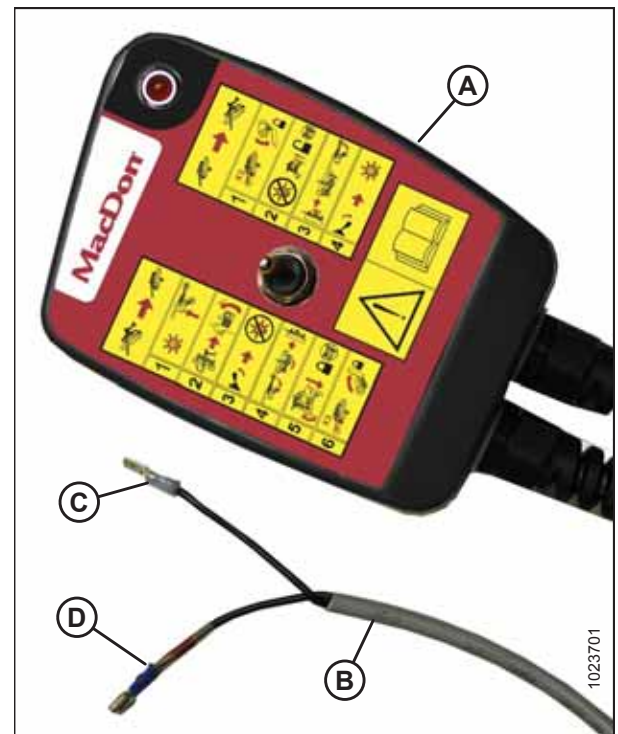


Figure 3.41: Remote Control

OPERATION

7. Disconnect the hydraulic hoses and electrical harness from the tractor and store the hose ends and electrical connector in hose support (A) at front of hitch as shown.

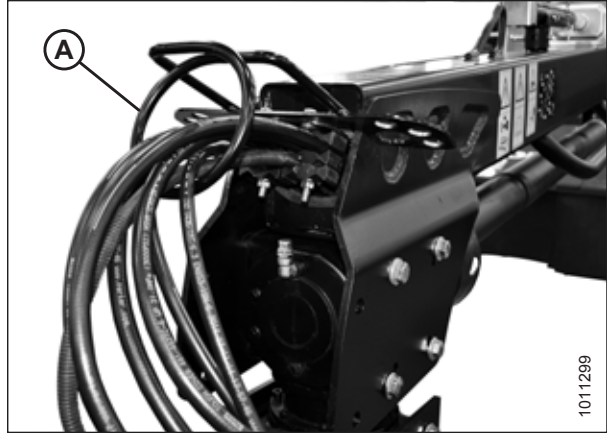


Figure 3.42: Hose Support

8. Pull pin (B) securing jack (A) at storage location and remove the jack.

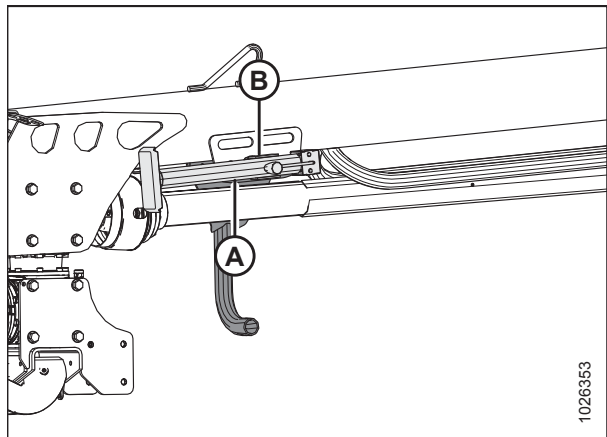


Figure 3.43: Jack Storage

9. Move jack (A) to working position and secure with pin (B).
10. Lower the jack to remove the weight from the tractor drawbar.

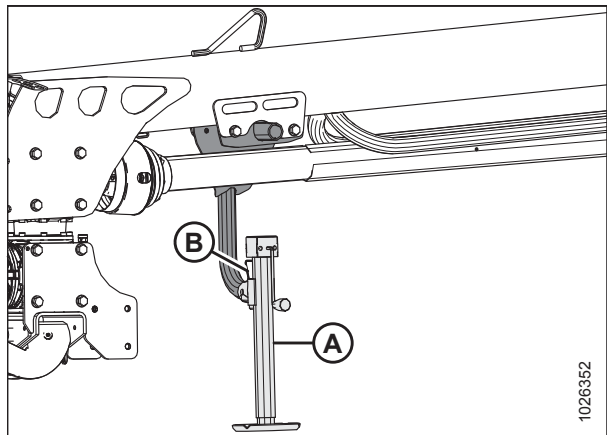


Figure 3.44: Jack Storage

OPERATION

12. Disconnect safety chain (B) from drawbar and store on the hitch.
13. Pull back collar (A) on the driveline, slide the coupler off the tractor power take-off shaft, and rest the driveline on the hook (not shown).

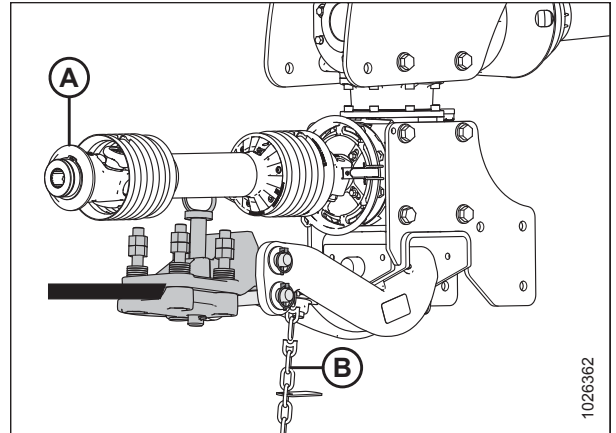


Figure 3.45: Driveline and Jack

14. Remove lynch pin (D) and clevis pin (C).
15. Raise the hitch using the jack until pin (A) disengages and clears drawbar hitch adapter (B).

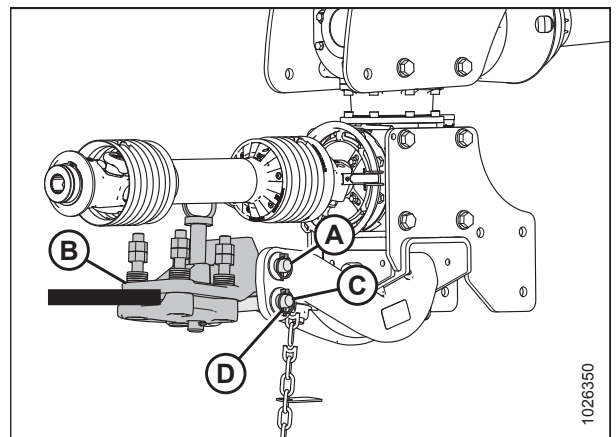


Figure 3.46: Rotary Disc Pull-Type Hitch

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

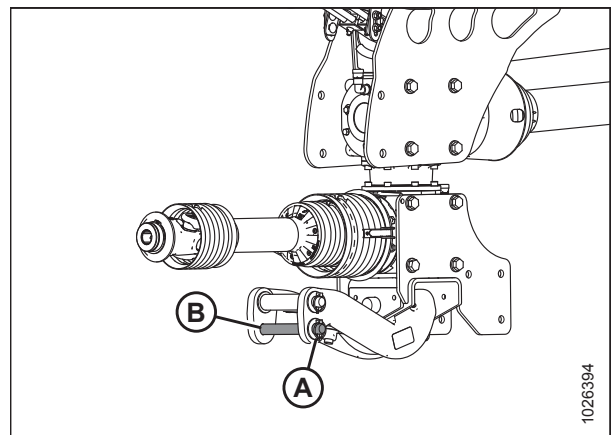


Figure 3.47: Rotary Disc Pull-Type Hitch

3.8.2 Detaching from Two-Point Hitch

Detach the rotary disc pull-type from the tractor for servicing or storing.

WARNING

- To prevent accidental movement of tractor, shut off the engine, engage the parking brake, and remove the key.
 - To maintain stability, always lower the machine completely. Block the Rotary Disc Pull-Type wheels before detaching from tractor.
1. Park the machine on a flat, level surface.
 2. Lower the pull-type onto blocks or leave the pull-type raised. If leaving the pull-type in the raised position, close the lift cylinder safety valves. Refer to [3.1.1 Engaging Locks, page 31](#).
 3. Shut down the engine, and remove the key from the ignition.
 4. Move remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.

If the transport is installed:

5. Disconnect the power wires from control (A).
6. Roll up cable (B) and attach control box (A) to the hitch with the magnet on the back of the control box.



Figure 3.48: Control Box

OPERATION

7. Disconnect the hydraulic hoses and the electrical harness. Store the hose ends and the electrical connector at the front of the hitch as shown.

NOTE:

Control box (A) is also stored at the front of the hitch.

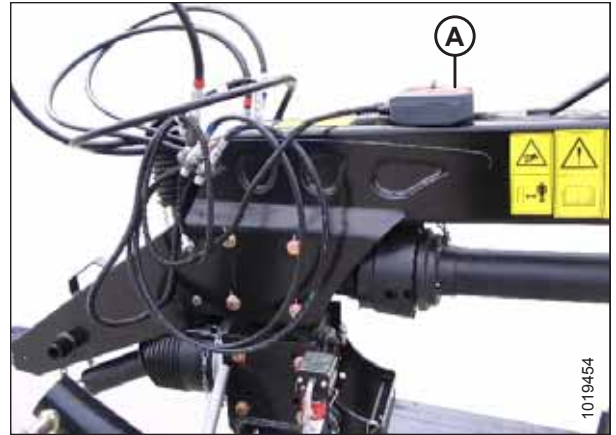


Figure 3.49: Front of Hitch

8. Pull back collar (A) on the driveline, slide the coupler off of the tractor's power take-off shaft, and rest the driveline on the hook (not shown).

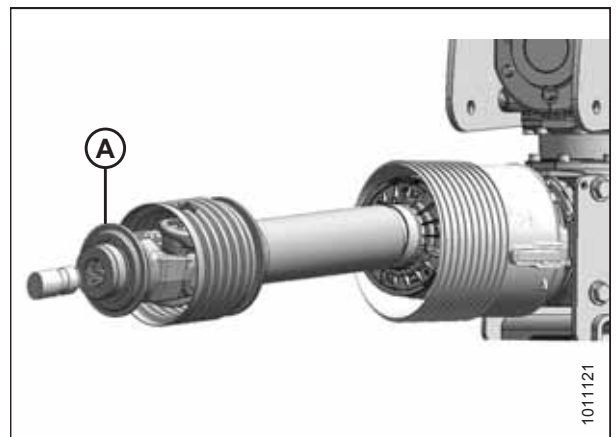


Figure 3.50: Driveline

9. Remove inboard hairpin (A) from the lock.

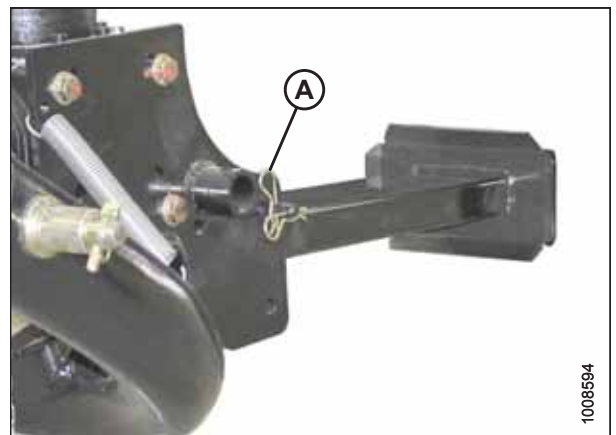


Figure 3.51: Inboard Hairpin

OPERATION

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

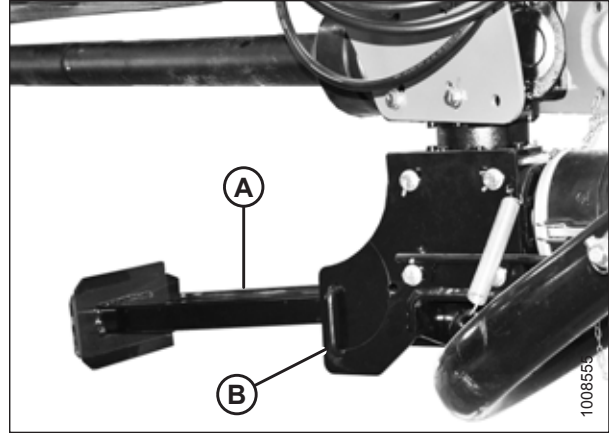


Figure 3.52: Hitch Stand and Lock

11. Lower stand (A), rotate lock (C) counterclockwise to horizontal position, and push the lock to engage the stand.

12. Check that stand (A) is locked.

13. Secure lock (C) with hairpin (B).

14. Clear bystanders from the area and start the tractor. Do **NOT** operate the rotary disc pull-type.

15. Start the tractor and lower the hitch to take the weight off the tractor hitch points.

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

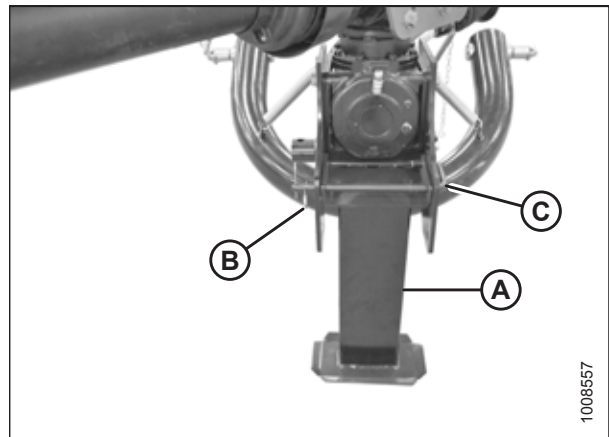


Figure 3.53: Hitch Stand in Lowered Position

17. Remove lynch pins (A) and washers. Swing tractor arms (B) away from the hitch adapter.

NOTE:

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

18. Replace lynch pins (A) and washers in the rotary disc pull-type's hitch.

19. Slowly drive the tractor away from the rotary disc pull-type.

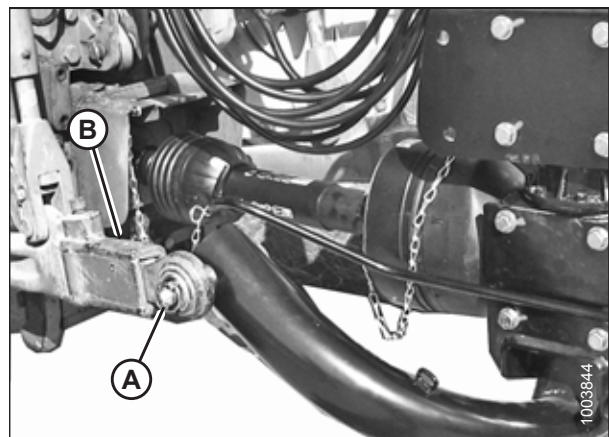


Figure 3.54: Lynch Pins and Tractor Arms

3.9 Breaking in the Rotary Disc Pull-Type

After attaching the rotary disc pull-type 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.



WARNING

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

IMPORTANT:

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

Refer to [4.3.2 Break-In Inspections, page 129](#) to determine the service interval for your rotary disc pull-type, and complete the scheduled break-in inspection procedures.

3.10 Engaging the Power Take-Off

 **WARNING**

Be sure 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 rotary disc pull-type up to the standing crop, and slowly engage the PTO.
2. Ensure tractor PTO is running at 1000 rpm before starting to cut.
3. Disengage the PTO when not operating the rotary disc pull-type.

3.11 Raising and Lowering the Rotary Disc Pull-Type

3.11.1 Lift Cylinders

Two hydraulic cylinders, one at each end of the carrier, raise or lower the rotary disc pull-type when the tractor's cylinder control lever is activated.

The lift system is equipped with a lock-out valve (B) at each cylinder (A) which prevents the cylinder from extending or retracting due to accidental movement of the lift control. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).

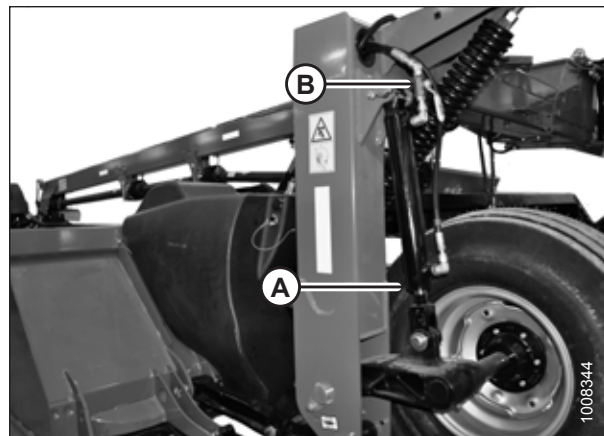


Figure 3.55: Lift Cylinder

3.11.2 Lift Control

The lift control is not normally used to control cutting height because cutting is usually performed with the cutterbar on the ground. This control is used to raise the rotary disc pull-type to clear obstacles and windrows during field operation, to adjust the rotary disc pull-type height for maintenance, and to raise the rotary disc pull-type for storage or for transport behind a tractor.

WARNING

Be sure all bystanders are clear of the machine before raising or lowering the rotary disc pull-type.

Activate cylinder control lever (A) to raise or lower the rotary disc pull-type.

- Move lever **forward** to position (B) to lower the rotary disc pull-type.
- Move lever **backward** to position (C) to raise the rotary disc pull-type.

IMPORTANT:

Connect the hydraulic hoses so that moving control lever (A) backward raises the rotary disc pull-type. Refer to [3.7.3 Connecting Hydraulics, page 51](#) for more information.

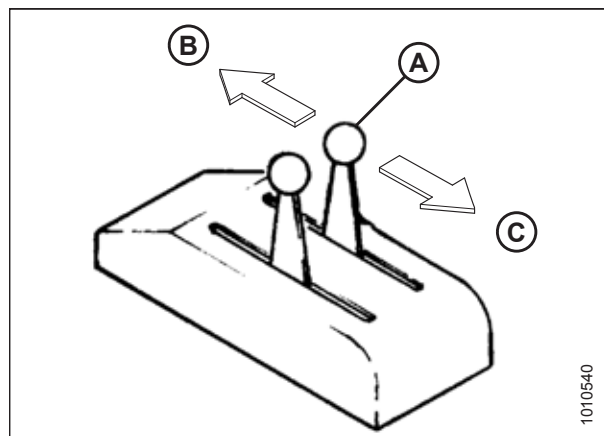


Figure 3.56: Tractor Cylinder Control Lever

3.12 Shutdown Procedure

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

CAUTION

Before leaving the tractor seat for any reason:

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

3.13 Steering the Rotary Disc Pull-Type

Steering is controlled by the tractor's remote hydraulic system.

IMPORTANT:

Valve (A) on the steering line must be in the open position (handle in line with hose) for the steering system to operate.

The hitch provides the ability to do the following:

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

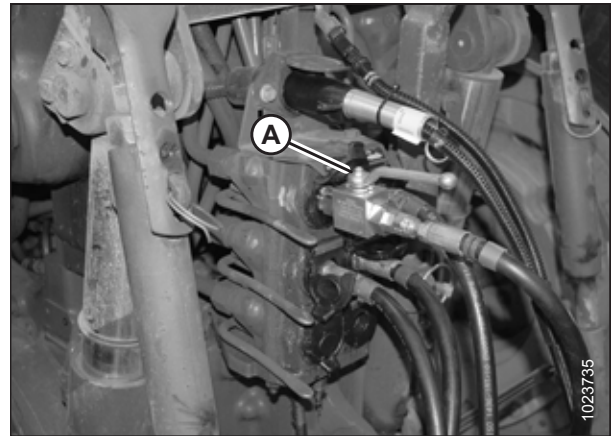


Figure 3.57: Steering Line Valve in Working (Open) Position

1. Activate steering control lever (A) to steer the rotary disc pull-type into the desired path of travel.
 - Move lever **forward** to position (B) to steer the rotary disc pull-type to the right.
 - Move lever **backward** to position (C) to steer the rotary disc pull-type to the left.

IMPORTANT:

Connect the hydraulic hoses so that moving the steering control lever (A) backward steers the rotary disc pull-type to the left and moving lever forward steers the rotary disc pull-type to the right. Refer to [3.7.3 Connecting Hydraulics, page 51](#) for more information.

NOTE:

Operate the steering control lever (A) only briefly, and return it to the NEUTRAL or OFF position as soon as the rotary disc pull-type reaches the desired path of travel.

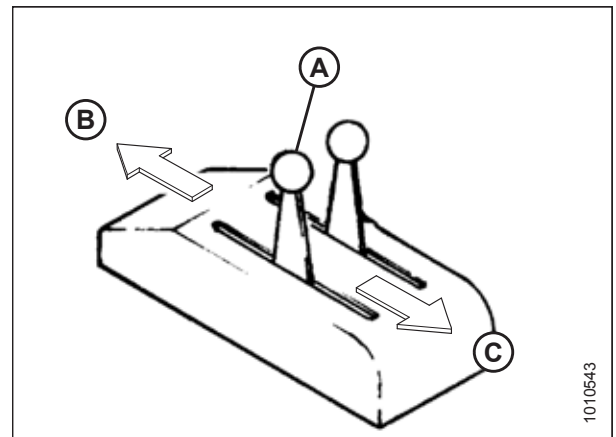


Figure 3.58: Tractor Steering Control Lever Positions

OPERATION

3.13.1 Operating on the Right Side of the Tractor

The rotary disc pull-type can be steered to operate on the right side of the tractor.

Follow the step below to steer the rotary disc pull-type to the right side of the tractor.

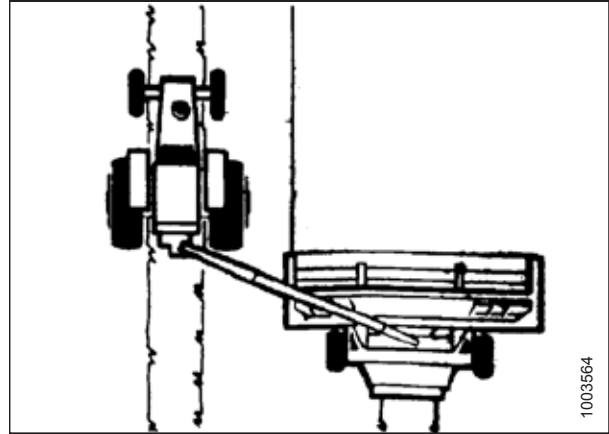


Figure 3.59: Right-Side Operation

1. Move steering control lever (A) forward to position (B) until the rotary disc pull-type reaches the desired path of travel on the right side of the tractor.

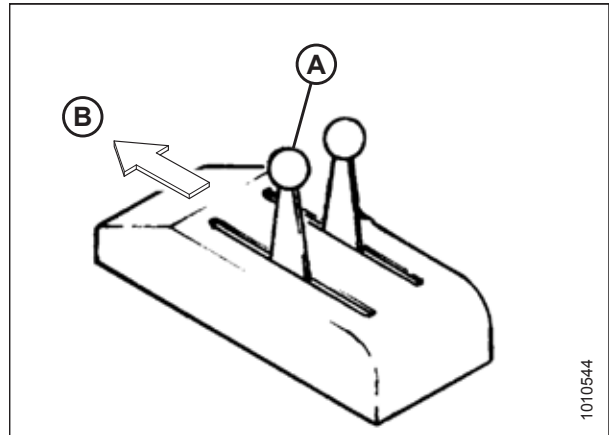


Figure 3.60: Tractor Steering Control Lever

3.13.2 Operating on the Left Side of the Tractor

The rotary disc pull-type can be steered to operate on the left side of the tractor.

Follow the step below to steer the rotary disc pull-type to the left side of the tractor.

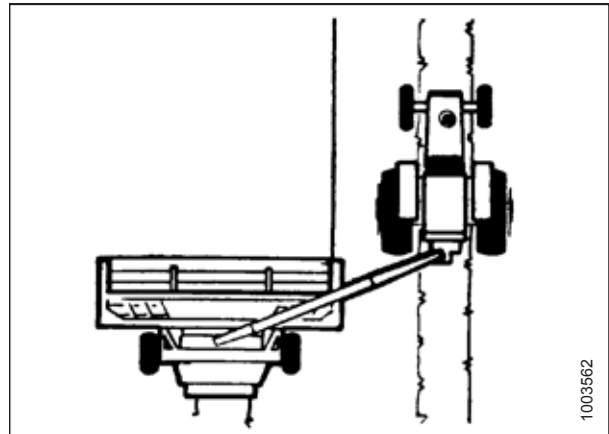


Figure 3.61: Left-Side Operation

OPERATION

1. Move steering control lever (A) backward to position (B) until the rotary disc pull-type reaches the desired path of travel on the left side of the tractor.

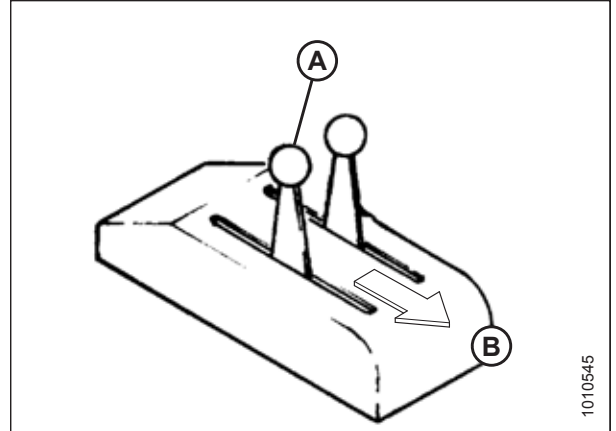


Figure 3.62: Tractor Steering Control Lever

3.13.3 Avoiding Obstacles

Avoid obstacles by using the steering control lever.

Follow the steps below to steer the rotary disc pull-type around an obstacle.

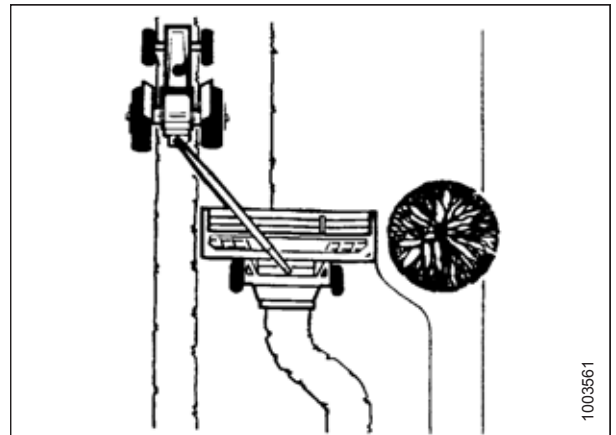


Figure 3.63: Rotary Disc Pull-Type Steered around Obstacle

1. Activate steering control lever (A) to steer rotary disc pull-type into the desired path of travel.
 - Move lever **forward** to position (B) to steer the rotary disc pull-type to the right.
 - Move lever **backward** to position (C) to steer the rotary disc pull-type to the left.

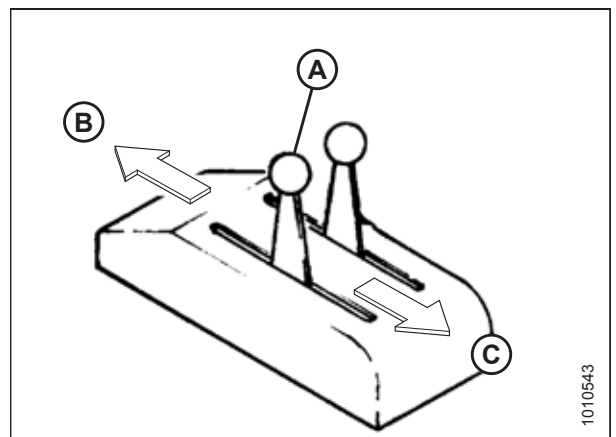


Figure 3.64: Tractor Steering Control Lever

3.13.4 Turning Square Corners

The following procedure is intended as a guide for developing a turning procedure for your tractor and rotary disc pull-type. Specific distances are not given due to the different steering capabilities of various tractors.

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

IMPORTANT:

Ensure that the inside tractor tire does **NOT** contact the hitch.

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

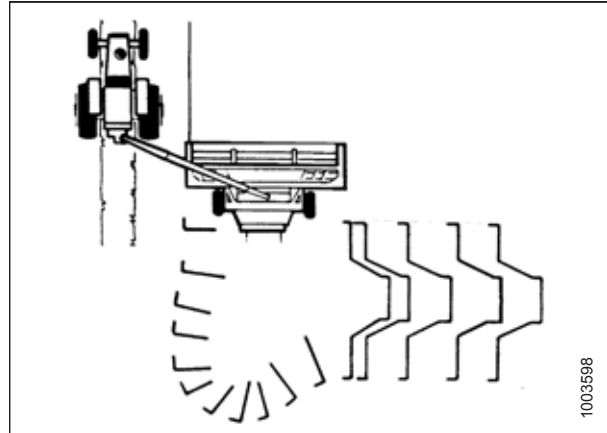


Figure 3.65: Square Corners

3.13.5 Turning 180 Degrees

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

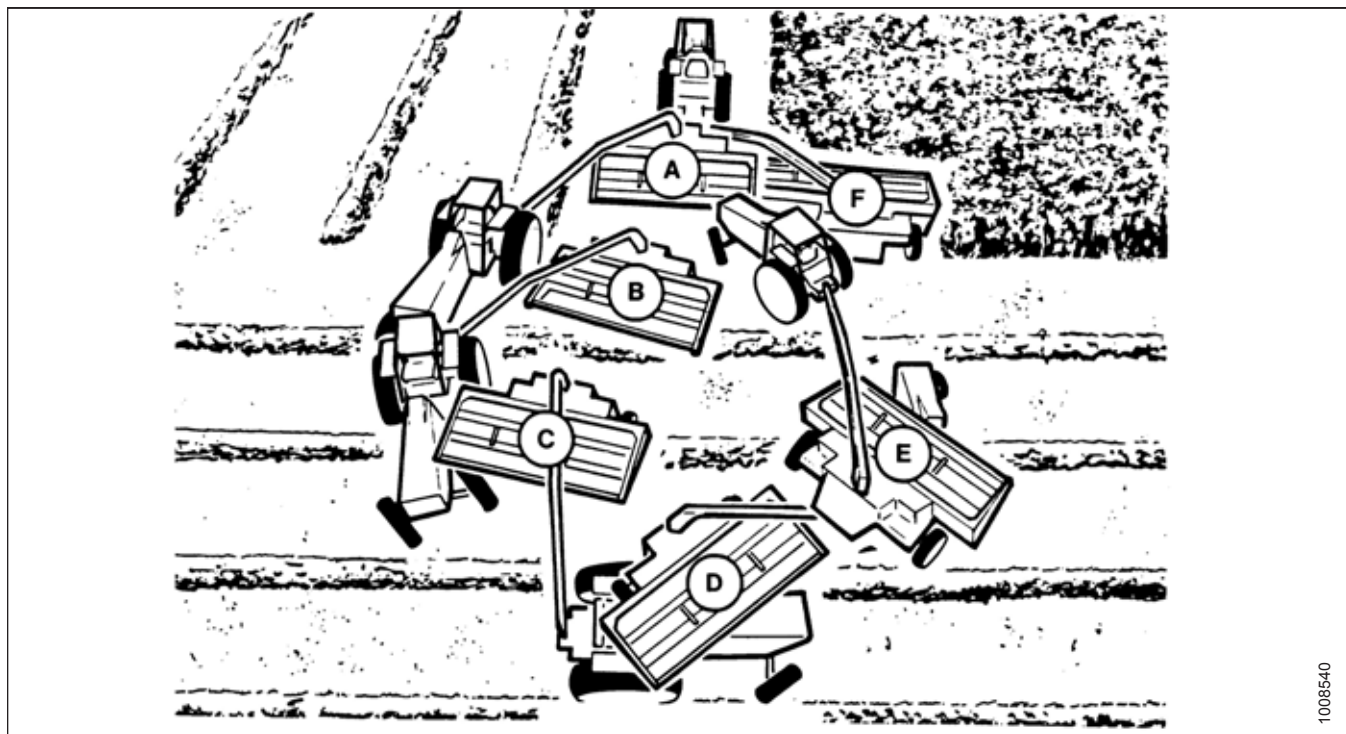


Figure 3.66: 180 Degree Turn

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

NOTE:

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

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

IMPORTANT:

Ensure that the inside tractor tire does **NOT** contact the rotary disc pull-type's hitch.

4. Continue turning towards the uncut crop as shown in positions (C) and (D) while steering the rotary disc pull-type towards the outside of the turning circle. Maintain hitch-to-tire clearance throughout the turn.
5. Complete the tractor turn as shown in position (E), and position the tractor so it is straddling the last cut windrow. Align the rotary disc pull-type with the edge of the uncut crop.
6. Proceed to position (F), lower rotary disc pull-type to cutting height, and begin a new cut through the field.

3.14 Transporting the Rotary Disc Pull-Type

You can transport the rotary disc pull-type using a tractor in either field mode or transport mode.

- To prepare a rotary disc pull-type for towing with a tractor in field mode without using the transport option, refer to [3.14.1 Preparing Rotary Disc Pull-Type for Transport, page 70](#).
- To prepare a rotary disc pull-type for towing with a tractor using the transport option, refer to [Converting from Field to Transport Mode – with Transport, page 75](#).

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 pull-type flashing amber and red taillights when transporting on roads in order to provide adequate warning to operators of other vehicles.
- Do NOT transport the rotary disc pull-type on a road or highway at night or in reduced visibility conditions such as rain or fog.
- Ensure that hitch on transporting vehicle is capable of handling a 907 kg (2000 lb.) static vertical load.
- Do NOT tow 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.

3.14.1 Preparing Rotary Disc Pull-Type for Transport

The rotary disc pull-type can be transported without deploying the optional transport system.

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.

WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Connect the rotary disc pull-type hitch to the tractor, and store the jack stand. For instructions, refer to [3.7 Attaching Rotary Disc Pull-Type to the Tractor, page 46](#).

OPERATION

3. **If equipped with a drawbar hitch:** Turn the handle on jack stand (A) to raise the stand. Remove pin (B) and stand (A).

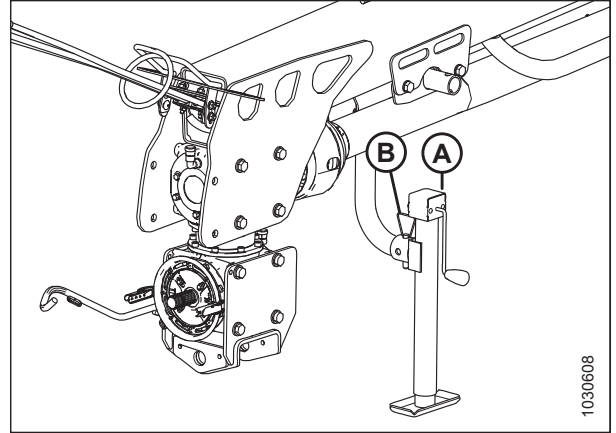


Figure 3.67: Drawbar Jack in Working Position

4. **If equipped with a drawbar hitch:** Move jack (A) to the storage position on the side of the hitch, align the mounting holes, and secure with pin (B).

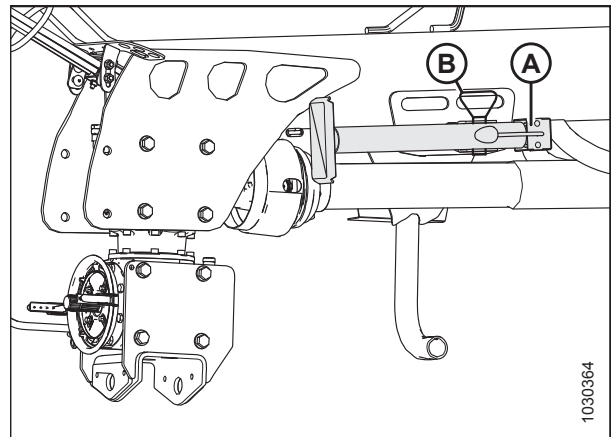


Figure 3.68: Drawbar Jack in Storage Position

5. **If equipped with a two-point hitch:** Raise the rotary disc pull-type slightly off the ground using the tractor. Remove pin (B) and stand (A).

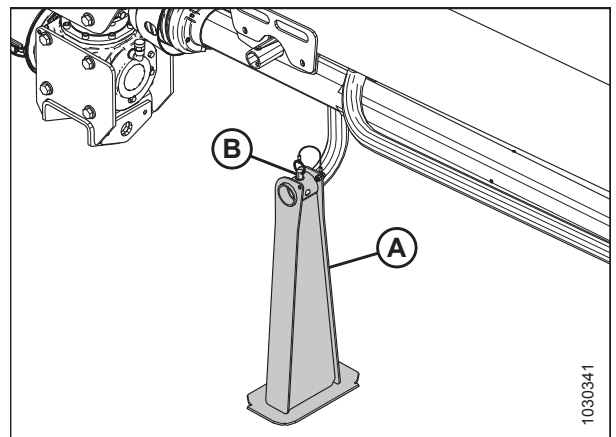


Figure 3.69: Two-Point Hitch Jack in Working Position

OPERATION

6. **If equipped with a two-point hitch:** Insert pin (A) and secure stand (B) in storage position.

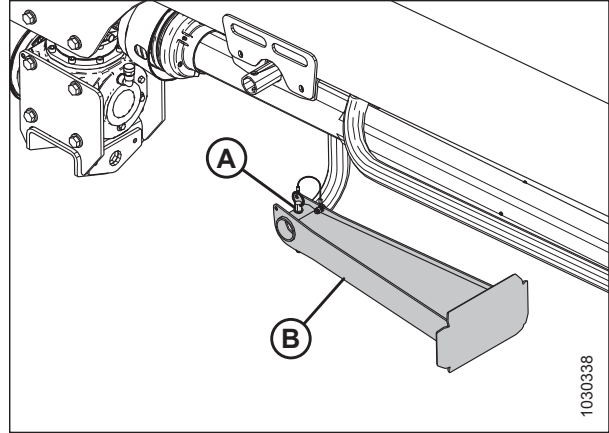


Figure 3.70: Two-Point Hitch Jack in Storage Position

7. Connect the hitch swing cylinder hoses (collars with #2) to tractor's hydraulic circuit (A). For instructions, refer to [3.7.3 Connecting Hydraulics, page 51](#).

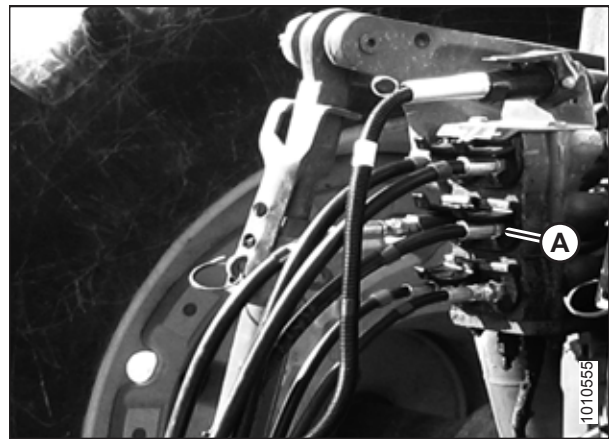


Figure 3.71: Hydraulic Connection

8. Raise the rotary disc pull-type fully and close the lift cylinder lock-out valve by turning handle (A) to the closed position (90° to the hose). Repeat on the opposite side.
9. Swing the rotary disc pull-type completely to the left, then completely to the right. Repeat three or four times to charge the hitch swing circuit.
10. Swing the rotary disc pull-type so that it is centered behind the tractor.

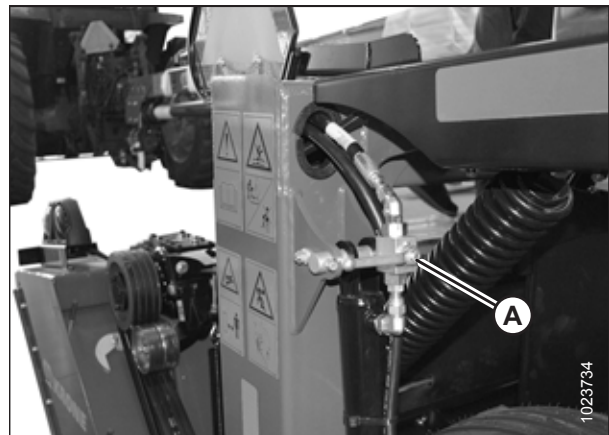


Figure 3.72: Cylinder Lock-Out Valve in Closed Position

OPERATION

11. Close the hitch swing lock-out valve by turning handle (A) to the closed position (90° angle to the hose).
12. Ensure the hydraulic hoses are securely stored on the hitch.

NOTE:

The primary driveline and hydraulic hoses do **NOT** need to be attached to the tractor for towing.

13. Ensure tires are properly inflated.

IMPORTANT:

Do **NOT** exceed 32 km/h (20 mph).

14. Ensure the slow moving vehicle (SMV) sign, reflectors, and lights are clean and visible at rear of rotary disc pull-type.

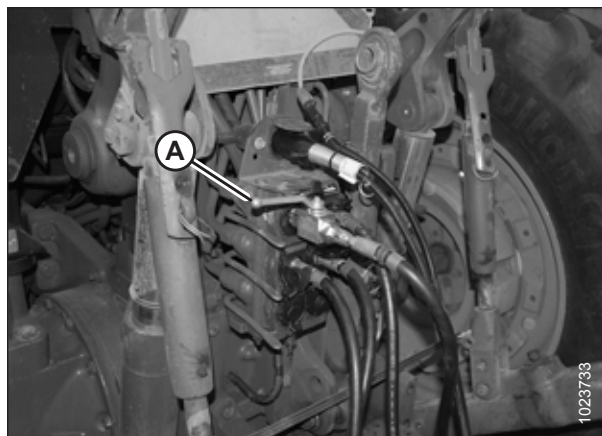


Figure 3.73: Hitch Swing Lock-Out Valve Shown in Closed Position

3.14.2 Converting between Field and Transport Modes

The rotary disc pull-type can be operated in the field or on the road.

Refer to the procedure that suits your equipment and desired transport mode:

- *Converting from Transport to Field Mode – Without Transport, page 73*
- *Converting from Field to Transport Mode – Without Transport, page 74*
- *Converting from Field to Transport Mode – with Transport, page 75*
- *Converting from Transport to Field Mode – with Transport, page 81*

Converting from Transport to Field Mode – Without Transport

Before operating in the field, the hydraulic steering and lift cylinders must be enabled.



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.

1. Shut down the engine, and remove the key from the ignition.
2. Connect all hydraulic hoses (refer to [3.7.3 Connecting Hydraulics, page 51](#) for instructions), and connect electrical wiring harness.

OPERATION

3. Open the steering lock-out valve by turning handle (A) to the open position (in line with hose).

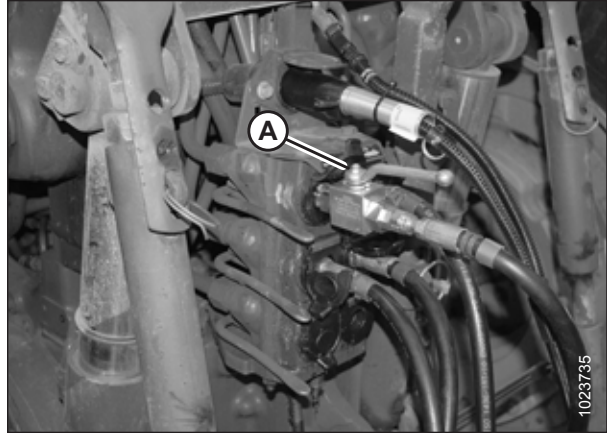


Figure 3.74: Steering Lock-Out Valve in Open Position

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

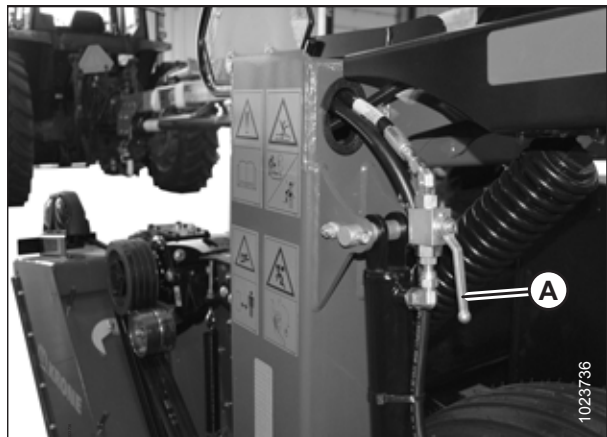


Figure 3.75: Lift Cylinder Lock-Out Valve in Open Position

Converting from Field to Transport Mode – Without Transport

Before operating on the road, the hydraulic steering and lift cylinders must be disabled.

⚠ 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.

1. Raise rotary disc pull-type.
2. Move rotary disc pull-type fully to the left, then fully to the right. Repeat this a couple times.
3. Center the rotary disc pull-type.
4. Shut down the engine, and remove the key from the ignition.

OPERATION

5. Close the steering lock-out valve by turning handle (A) to the closed position (90° angle to the hose).

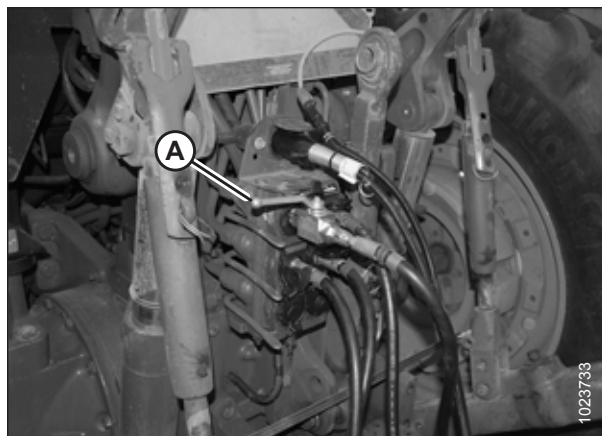


Figure 3.76: Steering Lock-Out Valve in Closed Position

6. Close the lift cylinder lock-out valve by turning handle (A) to the closed position (90° angle to the hose). Repeat on opposite side.
7. Disconnect all hydraulic hoses (refer to [3.7.3 Connecting Hydraulics, page 51](#) for instructions), and disconnect electrical wiring harness.

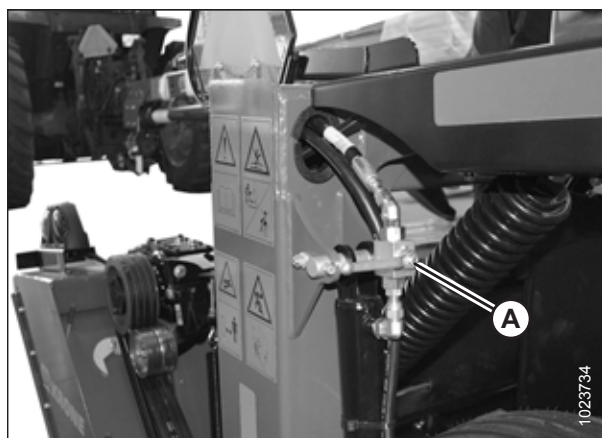


Figure 3.77: Lift Cylinder Lock-Out Valve in Closed Position

Converting from Field to Transport Mode – with Transport

In transport mode, the pull-type is rotated into its narrowest position to comply with road width restrictions. Steering and lift functions are disabled.

DANGER

To prevent serious injury or death, do NOT convert the machine into, or from transport mode until all people, animals, and objects are clear of the unit's rotational range.

DANGER

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

CAUTION

To prevent injury or equipment damage, ensure cutterbar doors are properly closed before converting the machine from field to transport mode.

OPERATION

IMPORTANT:

In some jurisdictions, having tall crop dividers installed can make the rotary disc pull-type too wide for public roads when in transport mode. If necessary, remove the dividers, and reinstall them after the machine is transported. For instructions, refer to [3.15.6 Tall Crop Divider Option, page 97](#).

1. Clear bystanders from the area and start tractor. Do **NOT** operate the rotary disc pull-type.
2. Following the steps on field-to-transport decal (A), move transport switch to lower position (C) and ensure that light (B) is illuminated.



Figure 3.78: Control Box

3. While the light is illuminated, raise the rotary disc pull-type fully by extending the field wheel cylinders.

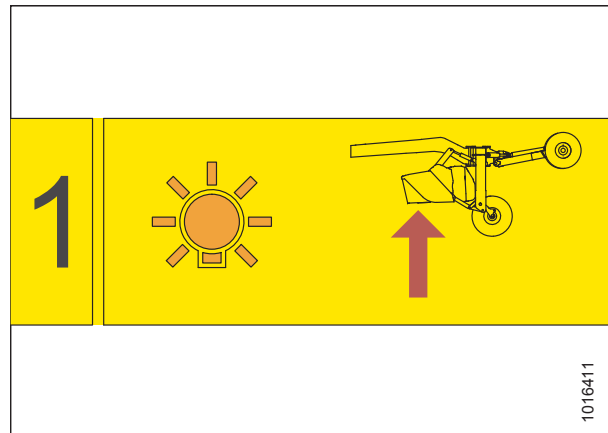


Figure 3.79: Raising Rotary Disc Pull-Type

OPERATION

4. Operate the hitch swing control lever to rotate the rotary disc pull-type to the right until the cam bearing nut is aligned with the green section of the transport alignment gauge decal.

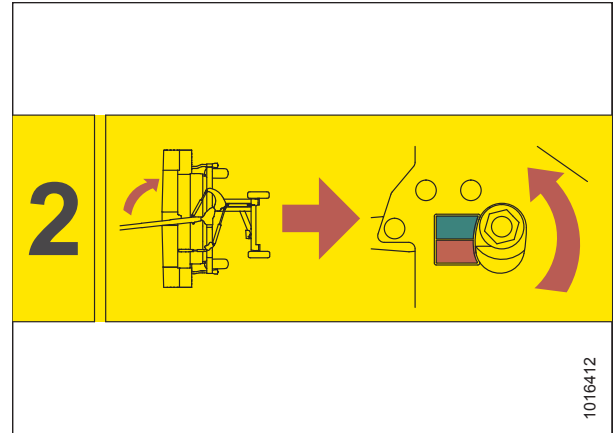


Figure 3.80: Rotary Disc Pull-Type Rotation

5. Move the transport switch to the upper position and ensure that the light is **NOT** illuminated. The hitch swing circuit is now deactivated and the transport circuit is active.

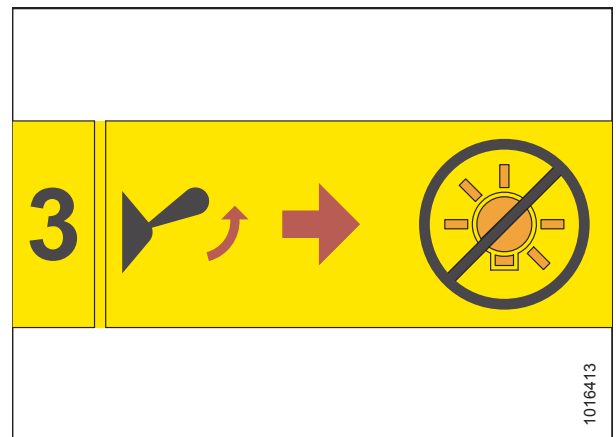


Figure 3.81: Transport Switch

6. Operate the hitch swing control lever to lower transport wheels (A) and hold the lever until the rotary disc pull-type is lifted off the ground.
7. Continue to hold the hitch swing control lever so that rotary disc pull-type (B) rotates to the left and under the hitch.
8. Release the hitch swing control lever when rotary disc pull-type (C) stops rotating.

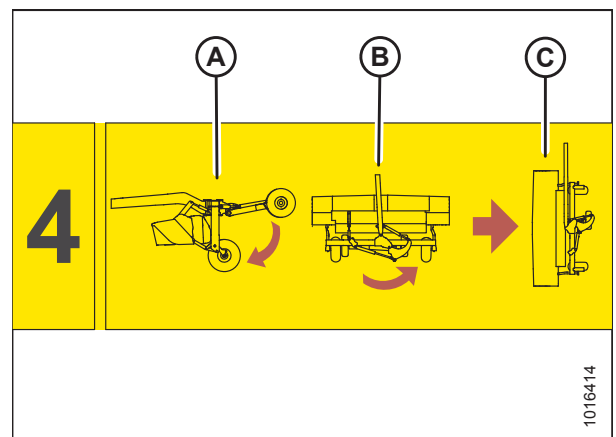


Figure 3.82: Transport Assembly Rotation

OPERATION

9. Operate the lift control lever to lower the rotary disc pull-type onto the transport assembly, raise the field wheels, and engage the transport latch onto the hitch.

IMPORTANT:

Once the latch has engaged, do **NOT** operate any hydraulic circuits.

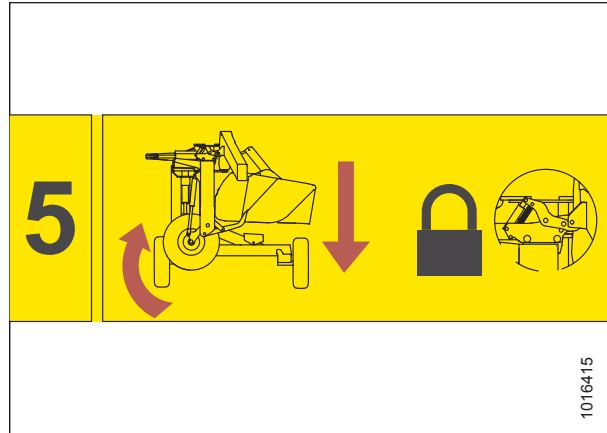


Figure 3.83: Transport Assembly Lowering

10. Close the steering lock-out valve and the two lift cylinder lock-out valves by turning the handles to the closed position. For instructions, refer to Figure 3.85, page 78 and Figure 3.86, page 79.

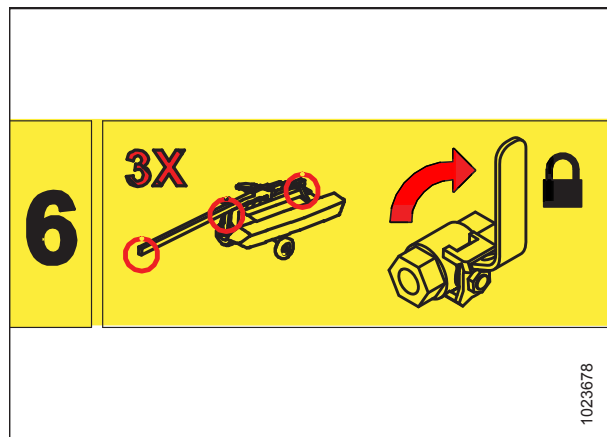


Figure 3.84: Hydraulic Lockout

Steering lock-out: Close the valve by turning handle (A) to the closed position (90° to the hose).

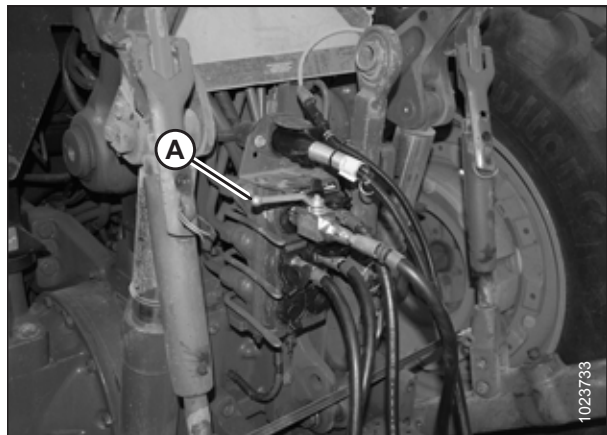


Figure 3.85: Steering Lock-Out Valve

OPERATION

Lift cylinder lock-out: Close the valve by turning handle (A) to the closed position (90° to the hose). Repeat on opposite side.

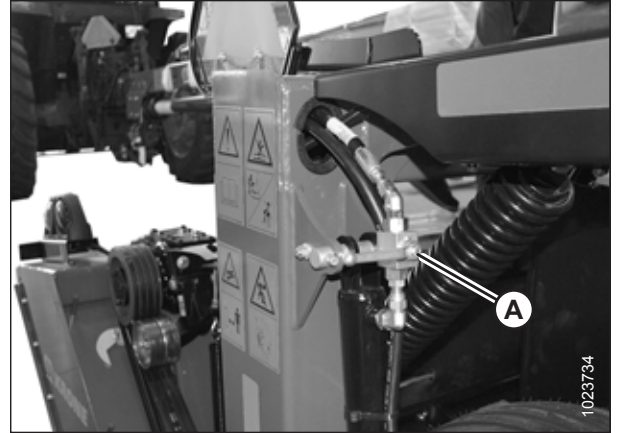


Figure 3.86: Lift Cylinder Lock-Out Valve

11. Activate hazard lights (A) on the rotary disc pull-type. Ensure all lights are working.
12. Ensure that slow moving vehicle sign (B) is visible from behind the rotary disc pull-type.

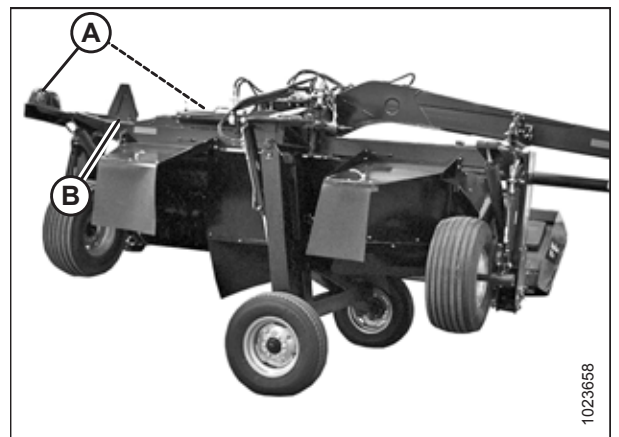


Figure 3.87: Transport Mode

OPERATION

13. Once field-to-transport conversion (A) is complete, leave the switch in upper position (C). Ensure that light (B) is **NOT** illuminated.



Figure 3.88: Control Box

OPERATION

Converting from Transport to Field Mode – with Transport

In field mode, the pull-type is rotated from the narrow road position to full width field position. Steering and lift functions are operational.

DANGER

To prevent serious injury or death, do **NOT** convert the machine into, or from transport mode until all people, animals, and objects are clear of the unit's rotational range.

CAUTION

To prevent injury or equipment damage, ensure cutterbar doors are properly closed before converting the machine from field to transport mode.

1. Clear bystanders from the area and start tractor. Do **NOT** operate the rotary disc pull-type.
2. Following the steps on transport-to-field decal (A), move the transport switch to upper position (C) and ensure that light (B) is **NOT** illuminated.



Figure 3.89: Control Box

3. Open the steering lock-out valve and the two lift cylinder lock-out valves by turning the handles to the open position.

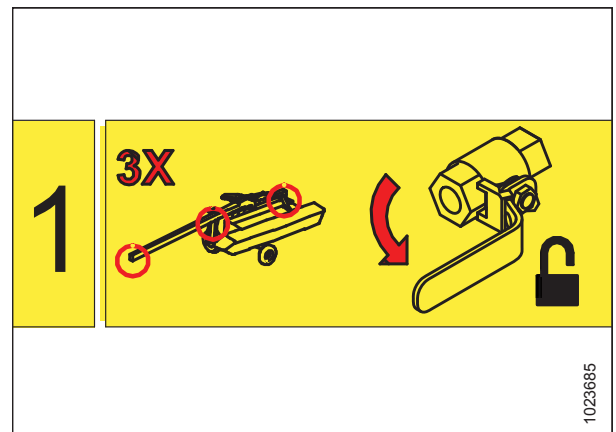


Figure 3.90: Hydraulic Lockout

OPERATION

Steering lock-out: Open the valve by turning handle (A) to the open position (in line with the hose).

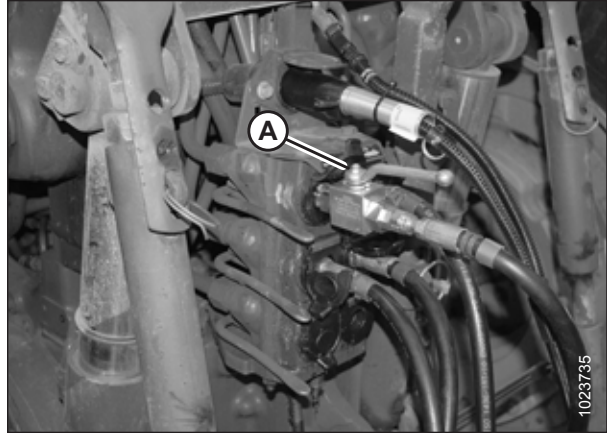


Figure 3.91: Steering Lock-Out Valve

Lift cylinder lock-out: Open the valve by turning handle (A) to the open position (in line with the hose). Repeat on opposite side.

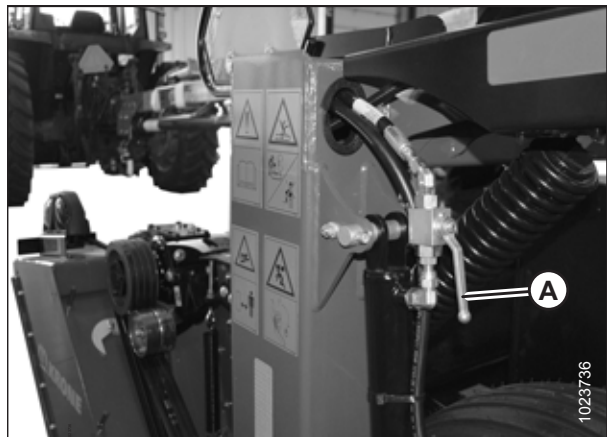


Figure 3.92: Lift Cylinder Lock-Out Valve

4. While the light is **NOT** illuminated, operate the lift control lever (as if raising the rotary disc pull-type) to fully extend the lift cylinders and raise the cutterbar off the transport assembly support. The carrier frame latch will automatically open.

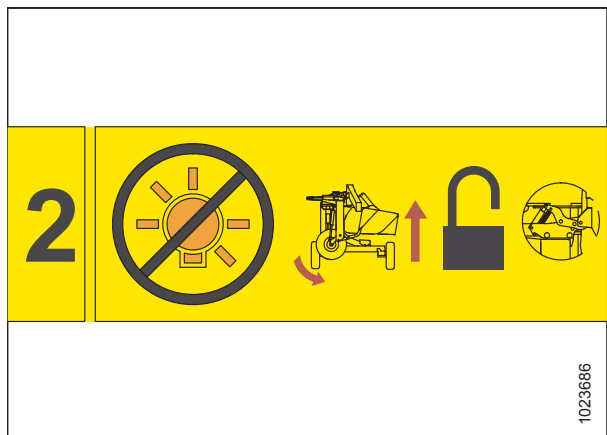


Figure 3.93: Raising Rotary Disc Pull-Type

OPERATION

5. Operate the hitch swing control lever to rotate the rotary disc pull-type to the right. The rotary disc pull-type will stop when it reaches operating position.

NOTE:

A sequenced movement transitions the rotary disc pull-type from transport to field mode. This is accomplished by the rear transport swing cylinder, and the transport deploy cylinder. During the transition, continue to hold the hitch swing lever in the active position to allow oil to be supplied to the two cylinders sequentially.

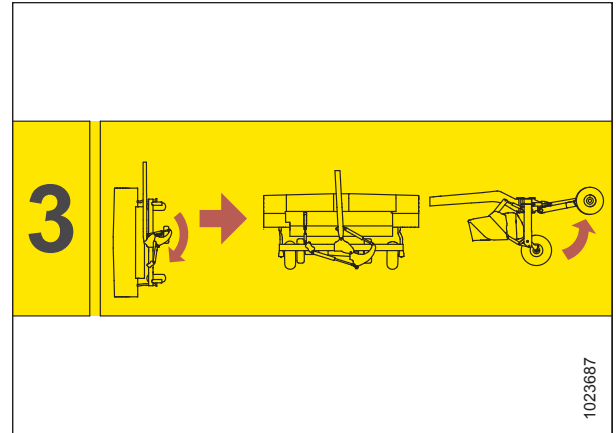


Figure 3.94: Rotary Disc Pull-Type Rotation

6. Continue operating the hitch swing control lever to fully raise the transport assembly and lower the rotary disc pull-type onto the field wheels.
7. Move transport switch to the lower position and ensure that the light on the control box is illuminated. Transport conversion is now complete and the hitch swing circuit is active.

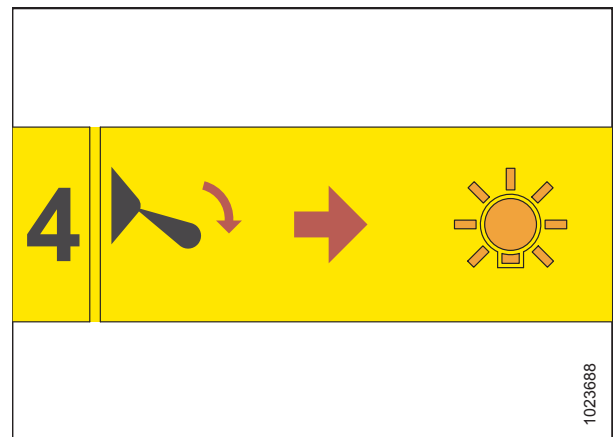


Figure 3.95: Transport Switch

OPERATION

- Once transport-to-field conversion (A) is complete, leave the switch in lower position (C). Ensure that light (B) is illuminated.



Figure 3.96: Control Box

3.14.3 Transporting with a Tractor

If towing endwise with the optional transport system, refer to *Converting from Field to Transport Mode – with Transport*, page 75.

- Before transporting the rotary disc pull-type with a tractor, ensure the machine is prepared for transport. Refer to *3.14.1 Preparing Rotary Disc Pull-Type for Transport*, page 70 for instructions.
- Ensure hitch safety chain is properly connected to the tractor. Provide only enough slack in chain to permit turning.
- If equipped with a drawbar hitch:** Move jack (A) to the storage position on the side of the hitch, align the mounting holes, and secure with pin (B).

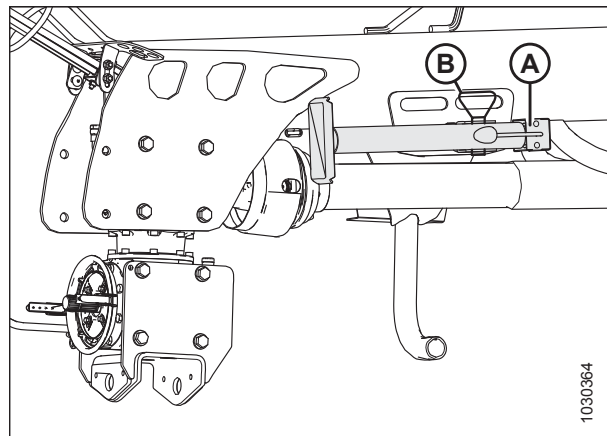


Figure 3.97: Drawbar Jack in Storage Position

OPERATION

4. **If equipped with a two-point hitch:** Insert pin (A) and secure stand (B) in storage position.

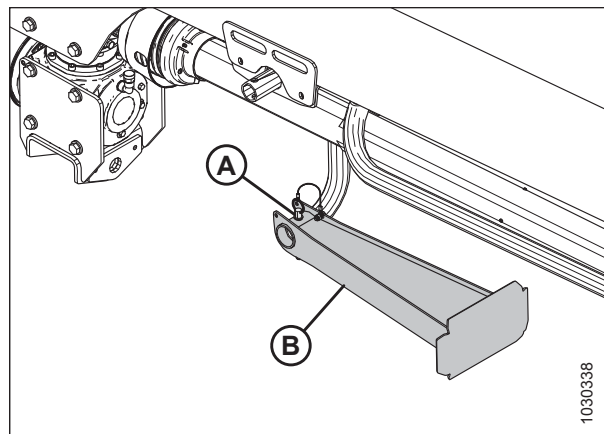


Figure 3.98: Two-Point Hitch Jack in Storage Position

5. Ensure the hydraulic hoses are securely stored on the hitch.

NOTE:

The primary driveline and hydraulic hoses do **NOT** need to be attached to the tractor for towing.

6. Ensure the hitch swing lock-out and the two lift-cylinder lock-out valves are closed (handle 90° to the hose).

NOTE:

Keep the slow moving vehicle (SMV) sign, reflectors, and lights clean and visible at rear of rotary disc pull-type.

7. Ensure tires are properly inflated.

IMPORTANT:

Do **NOT** exceed 32 km/h (20 mph).

3.14.4 Transport Lighting

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

Lighting – With Transport Option

When the optional transport system is installed, the lights mount to the left side of the machine.

The rotary disc pull-type is equipped with two bidirectional amber lights (A) that function as flashing hazard lights and turn signals.

Red lights (B) located on the inboard side of the amber lights function as both tail and brake lights. For information about connecting the rotary disc pull-type's electrical harness to the tractor, refer to [3.7.4 Connecting Electrical Wiring Harness, page 52](#).

Amber reflective tape is applied to various locations on the front and sides of the rotary disc pull-type, hitch, and carrier frame. Red reflective tape is applied to the rear of the rotary disc pull-type.

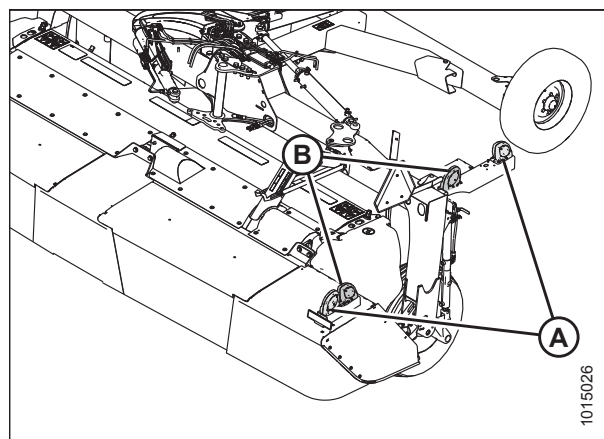


Figure 3.99: Lighting Locations – with Transport

OPERATION

Lighting – Without Transport Option

When no optional transport system is installed, the lights mount to the left and right corners of the carrier frame.

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

Red lights (B) located on the inboard side of the amber lights function as both tail and brake lights. Refer to [3.7.4 Connecting Electrical Wiring Harness, page 52](#) for information about connecting the rotary disc pull-type's electrical harness to the tractor.

Amber reflective tape is applied to various locations on the front and sides of the rotary disc pull-type, hitch, and carrier frame. Red reflective tape is applied to various locations on the rotary disc pull-type.

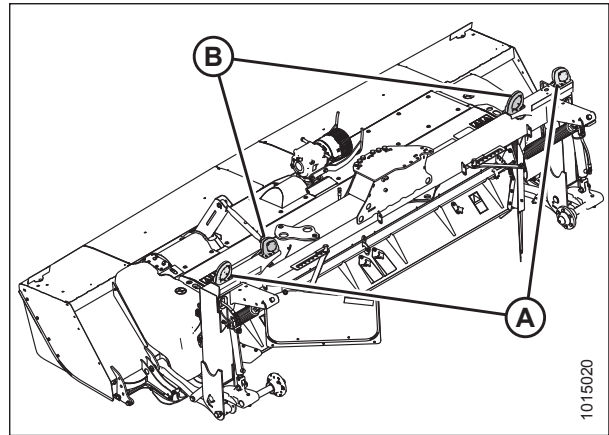


Figure 3.100: Lighting Locations

3.15 Operating the Rotary Disc Pull-Type

Operating the rotary disc pull-type 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 3.8, page 87 and detailed on the following pages will affect the performance of your rotary disc pull-type. 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 3.8 Rotary Disc Pull-Type Performance Variables

Variable	Refer to
Float	3.15.1 Float, page 87
Cutterbar angle	3.15.3 Cutterbar Angle, page 93
Cutting height	3.15.2 Cutting Height, page 90
Ground speed	3.15.4 Ground Speed, page 94
Conditioning: roll type	3.16 Conditioning: Roll Type, page 100
Conditioning: finger type	3.17 Conditioning – Finger Type, page 109

3.15.1 Float

Float springs are normally set so a force of approximately 43–47 kg (95–105 lb.) is required to lift either end of the rotary disc pull-type just off the ground when the hitch is centered.

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.

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 pull-type.



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.

NOTE:

Changes to the rotary disc pull-type operating position can affect the float settings. After adjusting the cutting height or the cutterbar angle, check the float and adjust as necessary.

OPERATION

1. Center the rotary disc pull-type directly behind the tractor and set the cutterbar to an appropriate orientation and tilt for the crop type and cutting conditions. Refer to [3.15.3 Cutterbar Angle, page 93](#) for instructions.

NOTE:

Ensure skid shoes are in correct position before setting rotary disc pull-type angle, float, and tilt.

2. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.

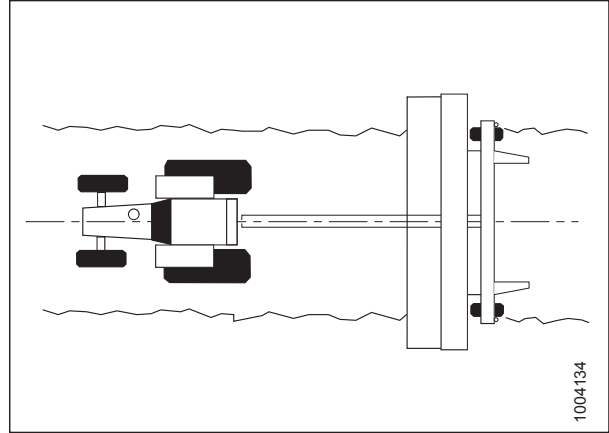


Figure 3.101: Rotary Disc Pull-Type Centered behind Tractor

4. Close the rotary disc pull-type's lift cylinder lock-out valve (A) on each lift cylinder by turning the handle to the horizontal position (90° to the hose). Repeat on opposite side.

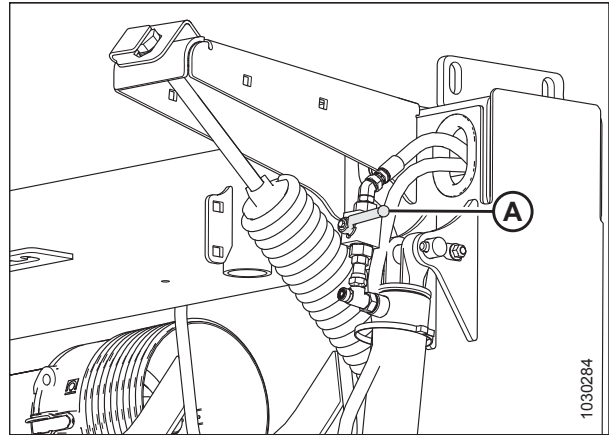


Figure 3.102: Cylinder Lock-Out Valve – Closed Position

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

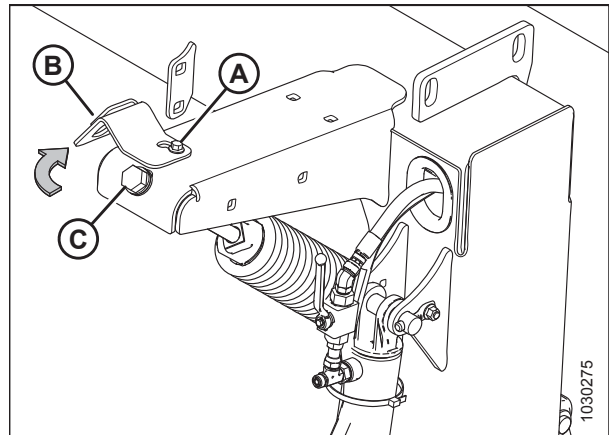


Figure 3.103: Float Spring – Right Side

OPERATION

- Turn adjuster bolt (A) to achieve the recommended measurement (B) for the conditioner type. Refer to Table 3.9, page 89 for measurements.

NOTE:

Float settings indicated in the table are starting points only. Float force should still be checked with the rotary disc pull-type float and cutting angle set as planned for use in the field.

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

Repeat on opposite side.

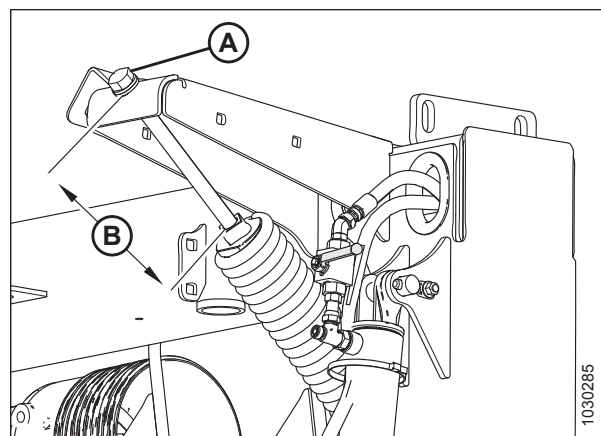


Figure 3.104: Adjuster Bolt

Table 3.9 Float Setting Starting Point

Model	Conditioner Type	Length of Exposed Thread
R113 PT	None	280–290 mm (11 – 11 5/32 in.)
	Roll	120–130 mm (4 3/4 – 5 1/8 in.)
	Finger	Right: 145–155 mm (5 3/4 – 6 1/8 in.)
	Finger	Left: 15–125 mm (4 1/2 – 4 15/16 in.)
R116 PT	None	230–240 mm (9 – 9 1/2 in.)
	Roll	70–80 mm (2 3/4 – 3 1/8 in.)
	Finger	Right: 95–105 mm (3 3/4 – 4 1/8 in.)
	Finger	Left: 65–75 mm (2 1/2 – 3 in.)

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

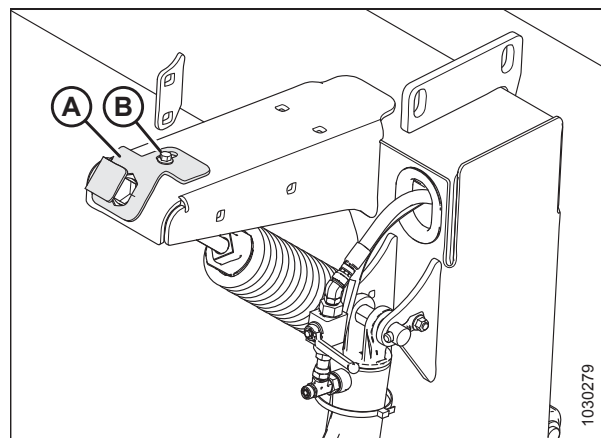


Figure 3.105: Adjuster Bolt Cover Plate

OPERATION

9. Open lift cylinder lock-out valve (A) on each cylinder by turning the handle to the open position (in line with the hose).
10. To check float, lower the rotary disc pull-type to cutting position, grasp the front corner of the rotary disc pull-type, and lift; the weight should feel like approximately 45 kg (100 lb.) at both ends.
11. Repeat adjustment procedures until the desired weight is achieved at both ends of the rotary disc pull-type.

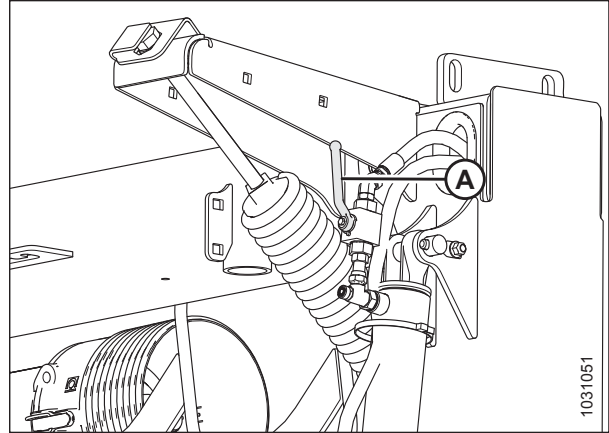


Figure 3.106: Cylinder Lock-Out Valve – Open Position

3.15.2 Cutting Height

Cutting height is determined by a combination of the cutterbar angle and skid shoe settings. Adjust the cutting height for optimum cutting performance while preventing excessive build-up of mud and soil inside the rotary disc pull-type, 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 91](#).

To choose a cutterbar angle that maximizes performance for your crop and field conditions, refer to [3.15.3 Cutterbar Angle, page 93](#).

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 87](#).

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

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

NOTE:

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
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 [3.15.3 Cutterbar Angle, page 93](#).
10. Check the rotary disc pull-type float. For instructions, refer to [Adjusting Float, page 87](#).

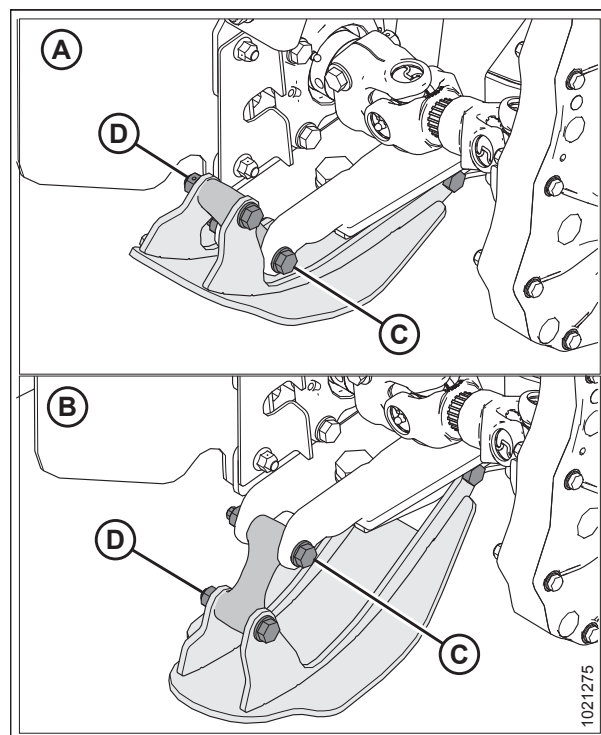


Figure 3.107: Skid Shoes – R113 PT

OPERATION

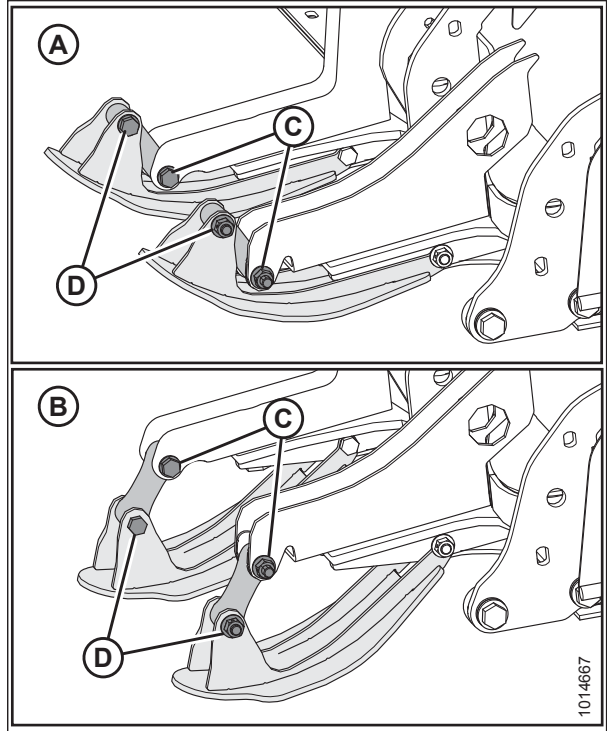


Figure 3.108: Skid Shoes – R116 PT

3.15.3 Cutterbar Angle

Cutterbar angle is the angle at which the cutterbar approaches the crop relative to the ground. It is one of the variables which impact cutting height and quality.

Cutterbar angle (A) adjustment ranges from 0° to 5° below the horizontal plane when the mechanical center-link is used, and from 0° to 7° below the horizontal plane when the hydraulic center-link is used.

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

NOTE:

In most cases, cut quality is improved by keeping the cutterbar angle as close to 0° as possible.

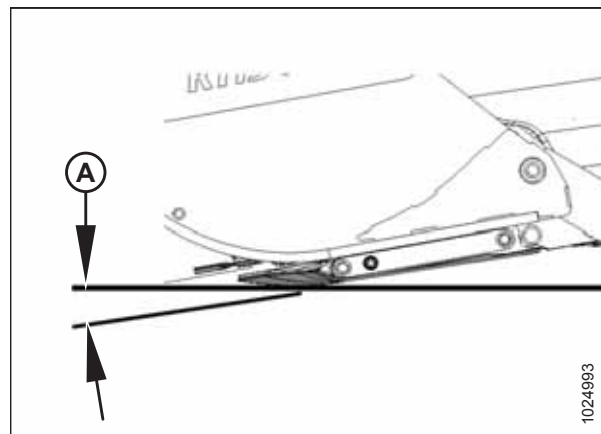


Figure 3.109: Cutterbar Angle

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 avoid injury or death from 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. Lower the rotary disc pull-type 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 87](#).

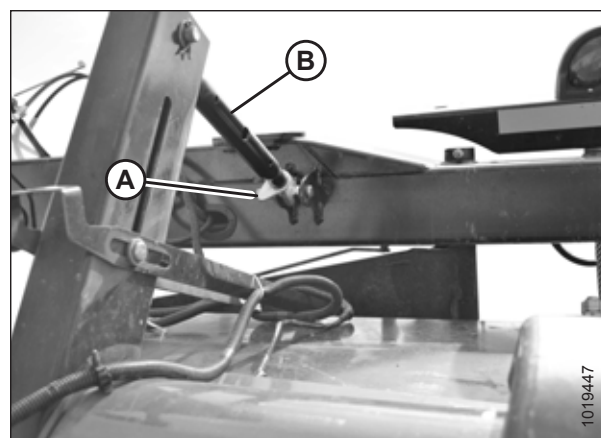


Figure 3.110: Mechanical Center-Link

OPERATION

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 rotary disc pull-type.

⚠ DANGER

To avoid injury or death from 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. Start the engine.
2. Lower the rotary disc pull-type fully.
3. Decrease (flatten) the cutterbar angle by operating the tractor hydraulic control so that cylinder (C) retracts and moves gauge (D) toward the green zone (A).
4. Increase (steepen) the cutterbar angle by operating the tractor hydraulic control so that cylinder (C) extends and moves gauge (D) toward the red zone (B).

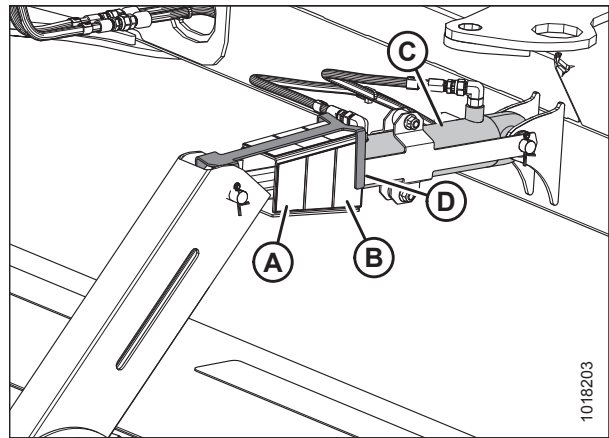


Figure 3.111: Hydraulic Center-Link

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

⚠ CAUTION

Reduce 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:

Operating the rotary disc pull-type at the minimum disc speed will extend the service life of the cutting components.

The example shown in Figure 3.112, page 95 illustrates the relationship between ground speed and cut area for an R113 and an R116 rotary disc pull-type. 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.

OPERATION

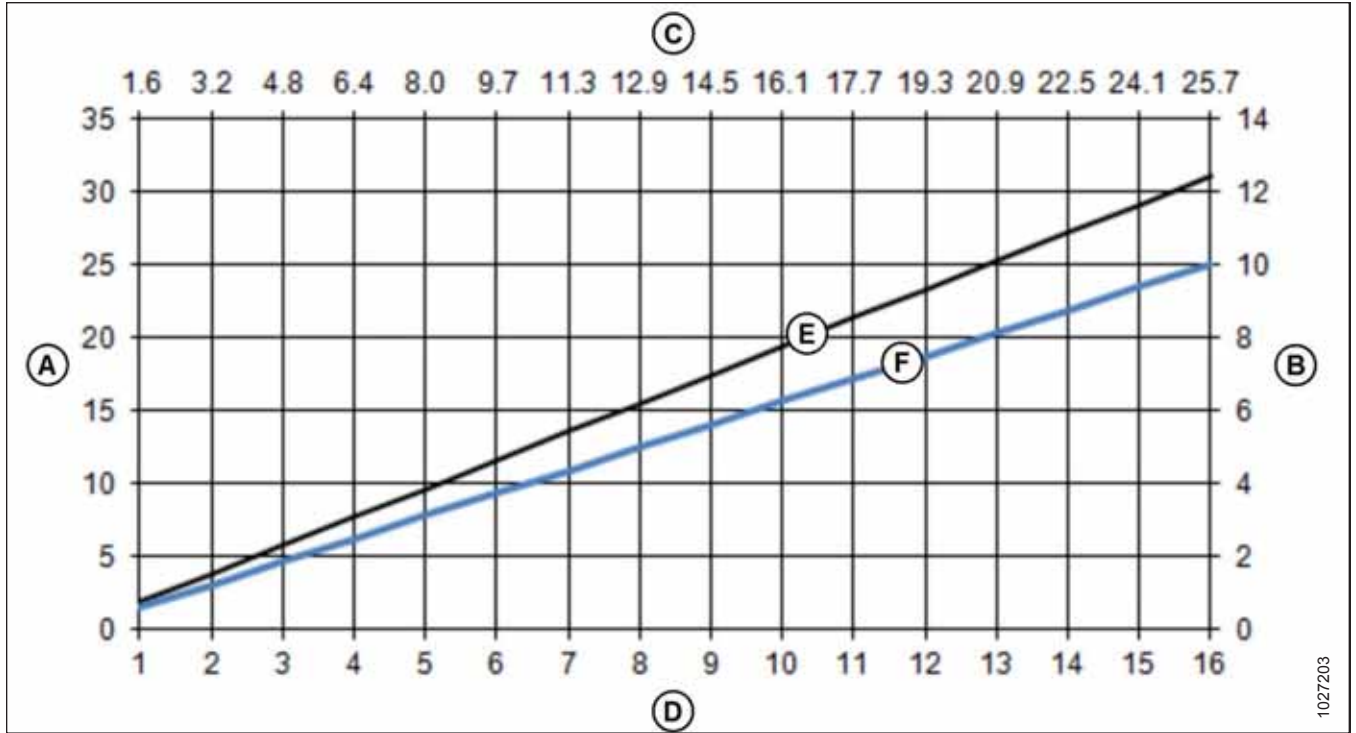


Figure 3.112: Ground Speed for R113 and R116 PT

A - Acres/Hour
E - R116 PT

B - Hectares/Hour
F - R113 PT

C - Kilometers/Hour

D - Miles/Hour

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3.15.5 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 3.10 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 ⁸	No
Using finger conditioner	No

Removing Cutterbar Deflectors – R116

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

DANGER

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

IMPORTANT:

To avoid damage, the cutterbar deflectors must **NOT** be used with the finger conditioner option.

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
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 96](#) on the right side.
9. Remove cutterbar deflector (A).

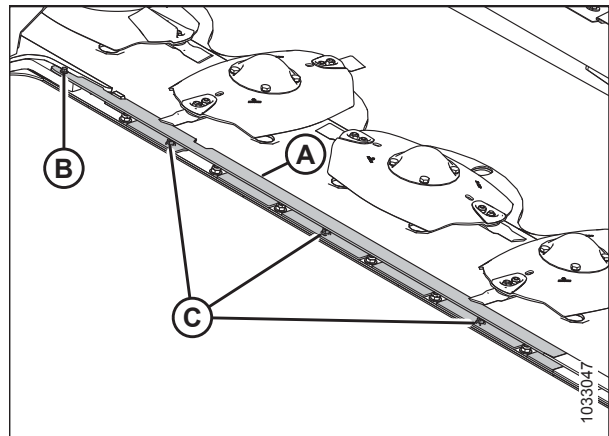


Figure 3.113: Cutterbar Deflector – Left Side

10. If the cutterbar is being replaced, install the deflectors on the new cutterbar. For instructions, refer to [Installing Cutterbar Deflectors – R116, page 97](#).

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

OPERATION

Installing Cutterbar Deflectors – R116

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

DANGER

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
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).
10. Repeat Steps [4, page 97](#) to [9, page 97](#) to secure the right cutterbar deflector.

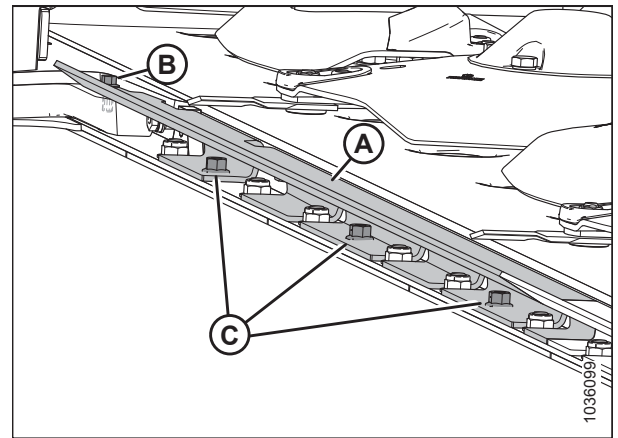


Figure 3.114: Cutterbar Deflector – Left Side

3.15.6 Tall Crop Divider Option

Tall crop dividers (one on each end of the rotary disc pull-type) 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

In some jurisdictions, having tall crop dividers installed can make the rotary disc pull-type too wide for public roads when in Road Friendly Transport™ mode. If necessary, install the dividers after the machine is transported.

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.

OPERATION

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#) or [3.3.2 Opening Cutterbar Doors – Export Latches, page 38](#).

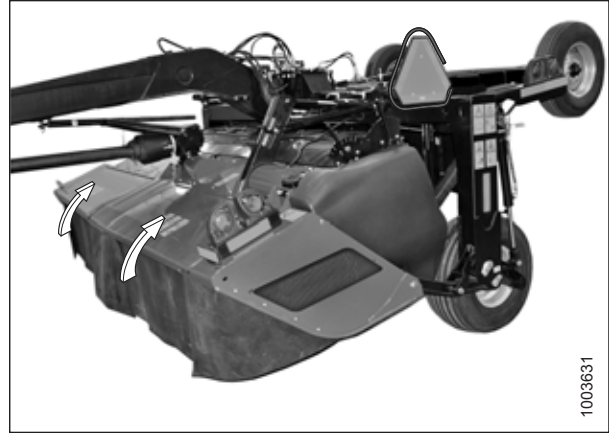


Figure 3.115: Cutterbar Doors

4. Remove three bolts (A) and nuts where the divider (B) will be mounted.
5. Position the divider (B) on rotary disc pull-type, and reinstall three bolts (A) and nuts. Tighten nuts.
6. Repeat for opposite side.
7. Close cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors, page 39](#).

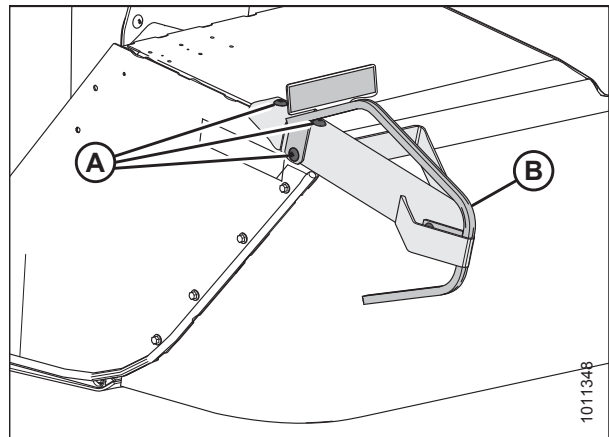


Figure 3.116: Divider and Hardware

Removing Tall Crop Divider

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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#) or [3.3.2 Opening Cutterbar Doors – Export Latches, page 38](#).

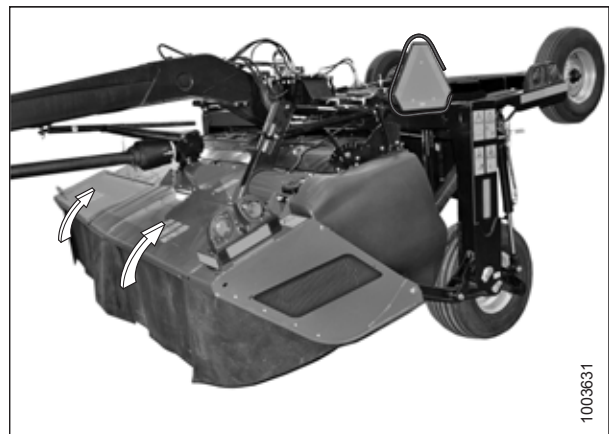


Figure 3.117: Cutterbar Doors

OPERATION

4. Remove three bolts (A), and remove deflector (B).
5. Reinstall three bolts (A).
6. Repeat for opposite side.
7. Close cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.

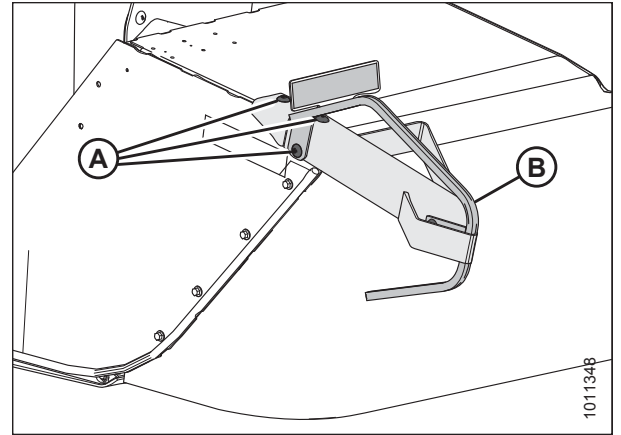


Figure 3.118: Deflector and Hardware

3.16 Conditioning: Roll Type

Rolls condition the crop by crimping and crushing the stem in several places allowing the release of moisture, resulting in faster drying times. Both steel and polyurethane conditioner rolls are available.

3.16.1 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 3 mm (1/8 in.) for polyurethane rolls, and at 6 mm (1/4 in.) for steel rolls.

Polyurethane rolls are better suited for crushing stems while providing reduced crimping and are recommended for alfalfa, clover, legumes, and similar crops. Correct crop conditioning is achieved when 90% of the stems show cracking, but no more than 5% of the leaves are damaged. Set the roll gap appropriately to achieve these results.

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.

IMPORTANT:

If the roll gap you've selected is smaller than the factory setting, it is recommended to visually inspect the roll gap.

Checking Roll Gap

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



DANGER

To avoid injury or death from 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. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.

OPERATION

3. **Polyurethane rolls:** Insert a feeler gauge through the inspection hole in the conditioner endsheet to check the roll gap on polyurethane roll conditioners. The factory setting is 3 mm (1/8 in.).

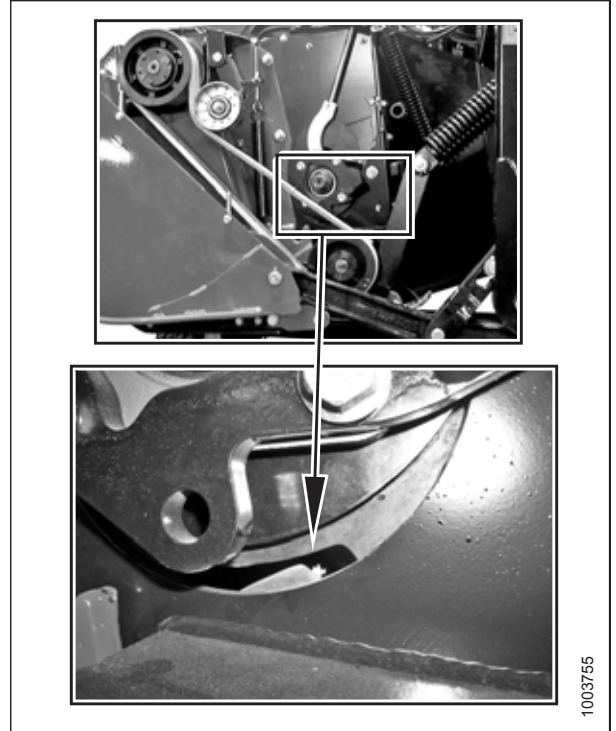


Figure 3.119: Polyurethane Roll Conditioner

4. **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 102](#) for adjustment instructions.

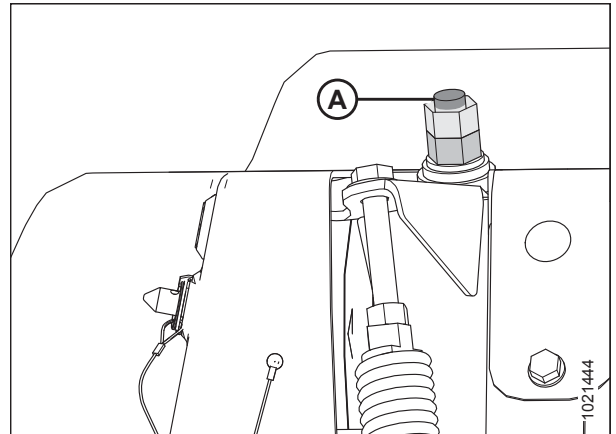


Figure 3.120: Roll Gap Adjustment

OPERATION

Adjusting Roll Gap – Polyurethane Rolls

Because polyurethane rolls operate at smaller gaps and the conditioning is less aggressive, the roll gap setting is more sensitive than on steel rolls.

DANGER

To avoid injury or death from 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. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Loosen upper jam nut (A) on both sides of the conditioner attachment.
4. Turn lower nut (B) counterclockwise until the upper roll rests on the lower roll.
5. Turn lower nut (B) one full turn clockwise to raise the upper roll and achieve a 3 mm (1/8 in.) roll gap.
6. Hold nut (B) and tighten jam nut (A) on both sides of the conditioner attachment.

IMPORTANT:

Make sure the roll gap adjustment nuts are adjusted equally on both sides to achieve a consistent gap across the rolls.

7. Rotate the rolls manually and use a feeler gauge at the ends of the rolls to check that the actual gap is no less than 2 mm (5/64 in.) and no more than 4 mm (5/32 in.).

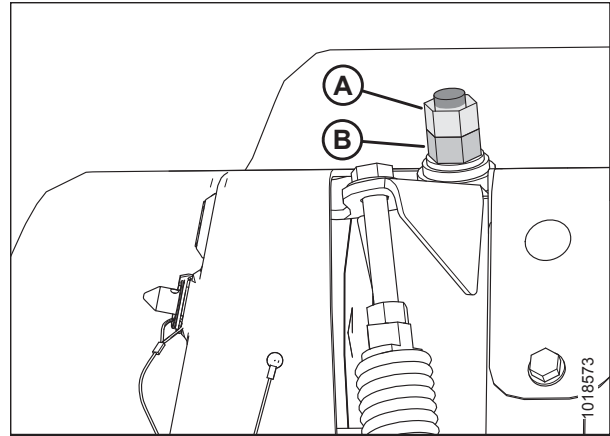


Figure 3.121: Roll Gap Adjustment

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 avoid injury or death from 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.

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.

OPERATION

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.

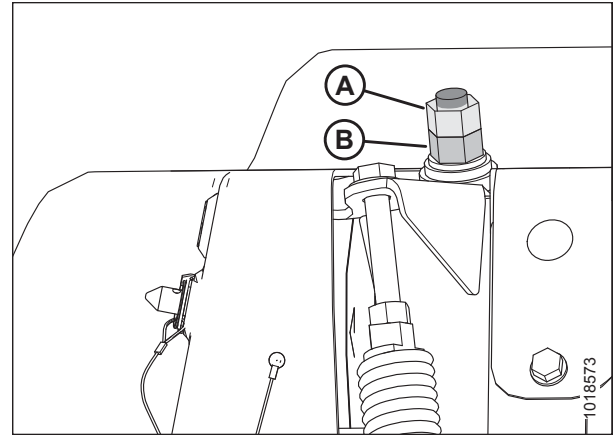


Figure 3.122: Roll Gap Adjustment

3.16.2 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.

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.

OPERATION

- Loosen jam nut (A) on both sides of the conditioner.
- Turn spring drawbolt (B) clockwise to tighten spring (C) and increase the roll tension.
- Turn spring drawbolt (B) counterclockwise to loosen spring (C) and decrease the roll tension.
- 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.) for both the polyurethane and steel roll conditioners.

IMPORTANT:

Turn each bolt equally. Each turn of the bolt changes the roll tension by approximately 32 N (7.2 lbf).

- Tighten jam nuts (A) on each end of the conditioner.

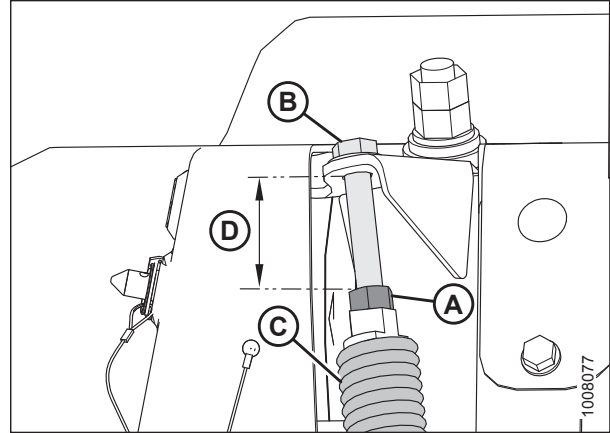


Figure 3.123: Adjusting Roll Tension

3.16.3 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.

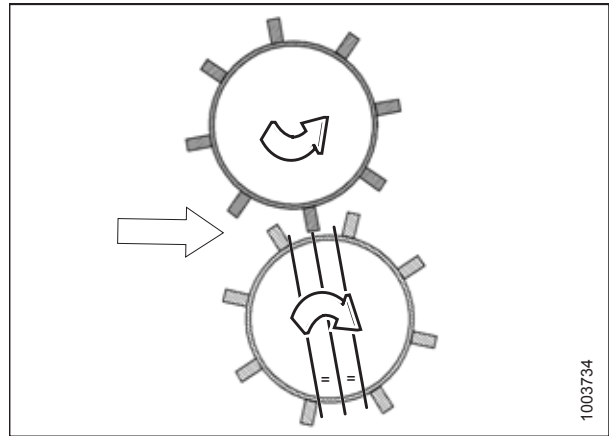


Figure 3.124: Properly Timed Rolls

Checking Roll Timing

Check the roll timing if excessive noise is coming from the conditioner rolls.

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. For instructions, refer to [Adjusting Roll Timing, page 104](#).

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 avoid injury or death from 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.

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

OPERATION

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.

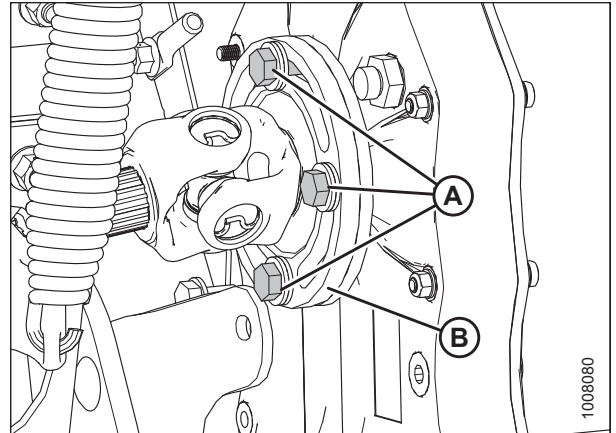


Figure 3.125: Conditioner Drive

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

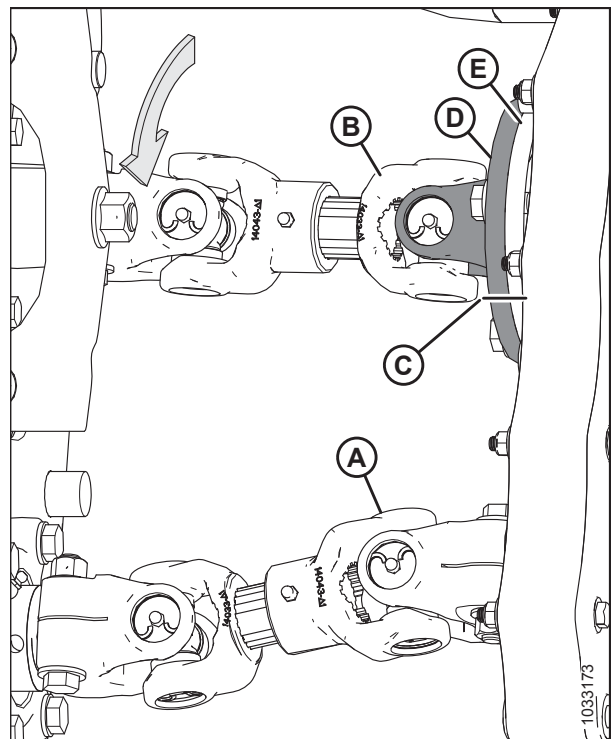


Figure 3.126: Conditioner Drive

OPERATION

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

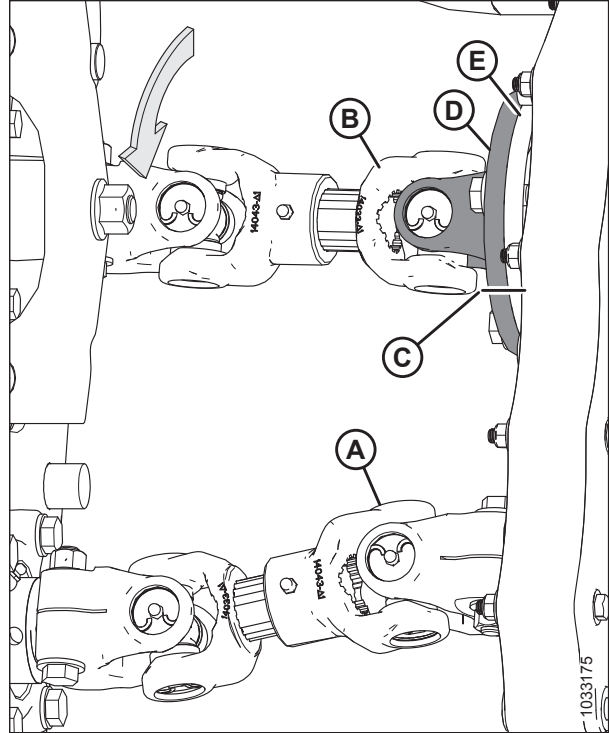


Figure 3.127: Conditioner Drive

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.

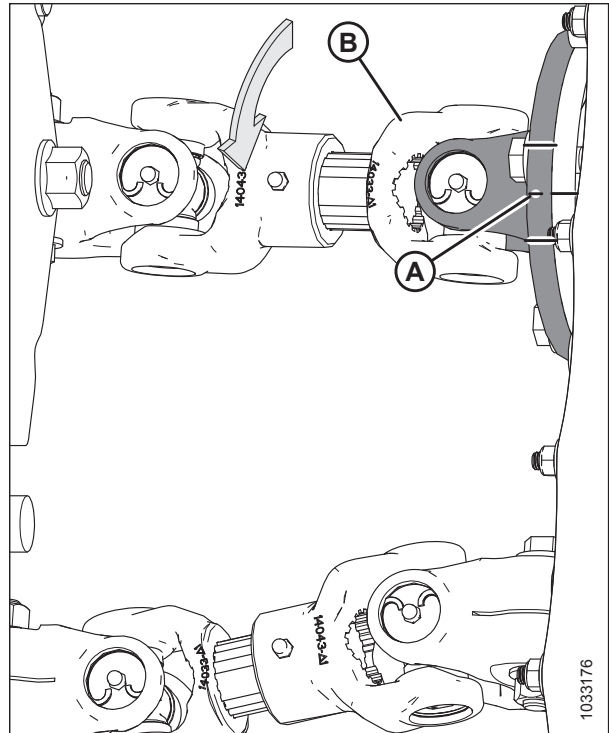


Figure 3.128: Conditioner Drive

OPERATION

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), and tighten bolts (A). Torque to 95 Nm (70 lbf-ft).

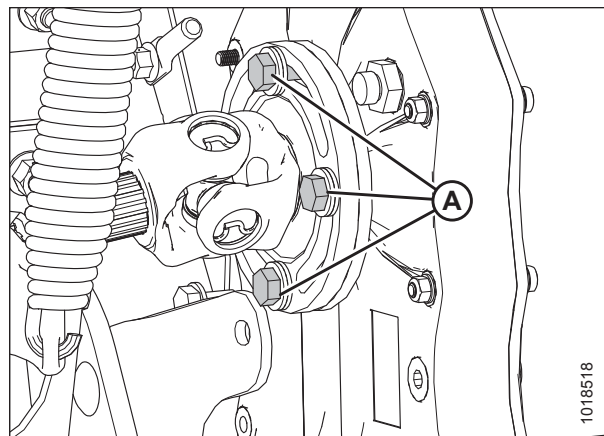


Figure 3.129: Conditioner Drive

3.16.4 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 carrier wheels, adjust the left and right deflectors to the same position.

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.

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

OPERATION

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 Steps to 4, [page 108](#) for the other side.

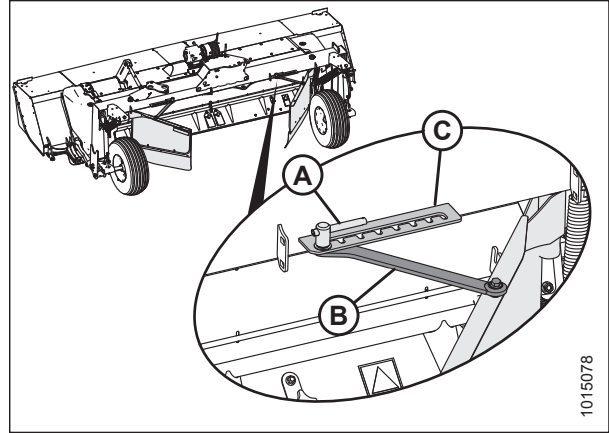


Figure 3.130: Side Deflector and Adjuster Bar

Positioning Rear Baffle – Roll Conditioner

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

The rear 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 position the rear baffle, follow these steps:

⚠ DANGER

To avoid injury or death from 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).

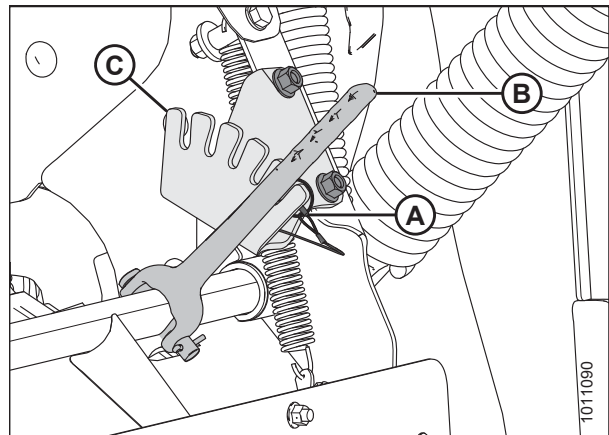


Figure 3.131: Right End of Conditioner

3.17 Conditioning – Finger Type

The finger type conditioner is used to harvest light grass crops. The finger type rotor moves the crop across the conditioning baffle which strips away the waxy coating from the plants. Do not use the finger type conditioner for thick-stemmed crops such as sudan and milo, or for heavy crops.

The degree to which the crop is conditioned as it passes through the conditioner is controlled by the clearance between the fingers and the internal intensity baffle and by the rotational speed of the fingers (refer to [Changing Finger Rotor Speed, page 110](#) for adjustment instructions).

3.17.1 Internal Intensity Baffle

Conditioning intensity is controlled by adjusting clearance between the finger rotor and the baffle.

There are seven clearance settings (A) from 8 to 71 mm (5/16 to 2 3/4 in.).

Set the clearance depending on crop volume and the desired level of conditioning:

- Use the highest clearance setting for lighter conditioning in heavy crops
- Use the lowest clearance setting for maximum conditioning in average crops

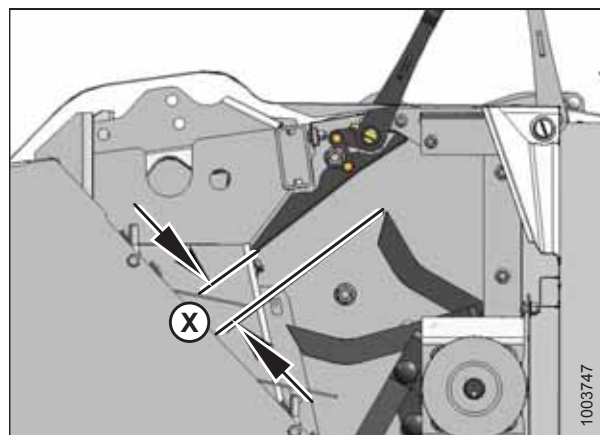


Figure 3.132: Internal Intensity Baffle

Adjusting Internal Intensity Baffle Clearance

The baffle is located in front of and above the finger rotor. There are seven clearance settings from 8 to 71 mm (5/16 to 2 3/4 in.).

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.

1. Pull internal intensity baffle adjustment lever (A) outboard to disengage the tab from adjustment plate (B).
2. Move lever (A) forward to lower the baffle and decrease clearance.
3. Move lever (A) rearward to raise the baffle and increase clearance.
4. Release internal intensity baffle adjustment lever (A) so that the tab engages hole in adjustment plate (B).

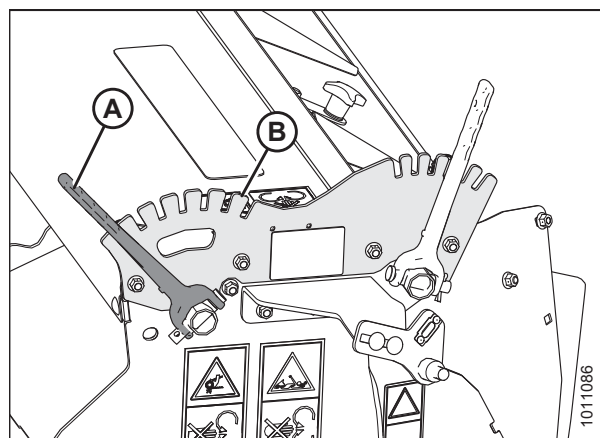


Figure 3.133: Internal Intensity Baffle Adjustment Lever

3.17.2 Finger Rotor Speed

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

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

Changing Finger Rotor Speed

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.

NOTE:

For **900 rpm**, mount the larger pulley on the conditioner roll timing gearbox, and the smaller pulley to the input shaft on the conditioner assembly.

For **600 rpm**, mount the smaller pulley on the conditioner roll timing gearbox, and the larger pulley to the input shaft on the conditioner assembly.

1. Shut down the engine, and remove the key from the ignition.
2. Turn jam nut (A) counterclockwise to unlock tension adjustment.
3. Turn jam nut (A) and adjuster nut (B) counterclockwise to fully collapse tensioner spring (C) and release the tension from conditioner drive belt (D).
4. Remove drive belt (D).

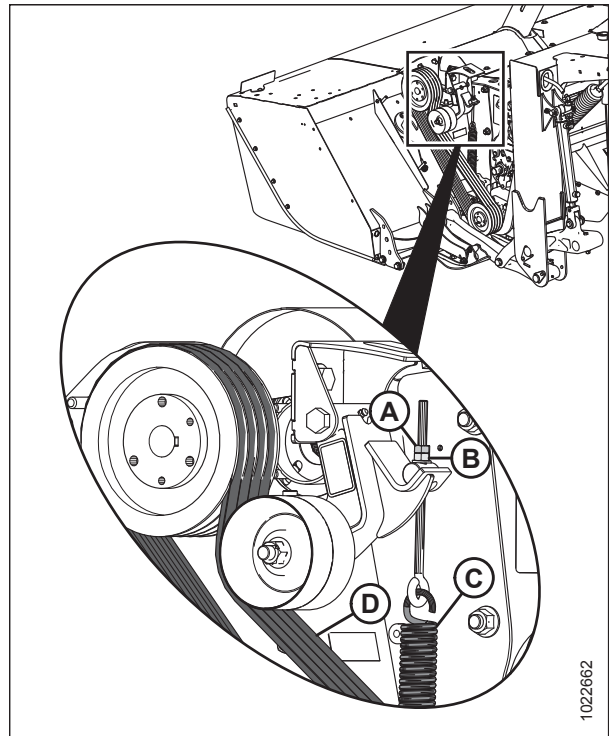


Figure 3.134: Drive Belt and Pulleys on Left Side
– Rotary Disc Pull-Type

OPERATION

5. Measure and record the distance from the shaft end to taper lock bushing face (A) on both pulleys.
6. Remove three bolts (B) and insert them into the three threaded bores.
7. Apply uniform pressure to the taper lock bushing by slightly tightening each bolt in a circular pattern until the taper lock bushing comes free.
8. Repeat Step 6, [page 111](#) and Step 7, [page 111](#) on the second pulley.
9. Swap the pulleys.

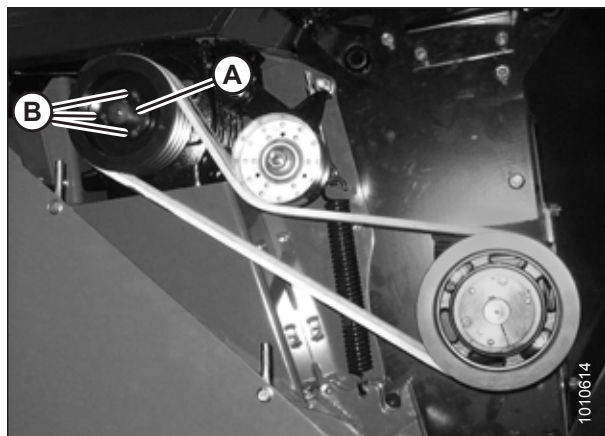


Figure 3.135: Drive Belt and Pulleys on Left Side – Rotary Disc Pull-Type

10. Slip taper lock bushing (A) onto the shaft at the same depth measurement recorded in Step 5, [page 111](#). The pulley will be drawn into the taper lock when tightening.
11. Repeat Step 10, [page 111](#) for the second pulley.
12. Verify pulley face alignment by using a long, verified straight edge, and bridge both faces to a tolerance of 5 mm (3/16 in.).

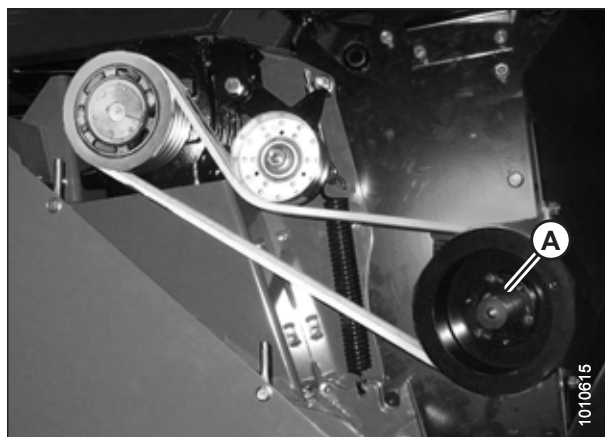


Figure 3.136: Drive Belt and Pulleys on Left Side – Rotary Disc Pull-Type

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

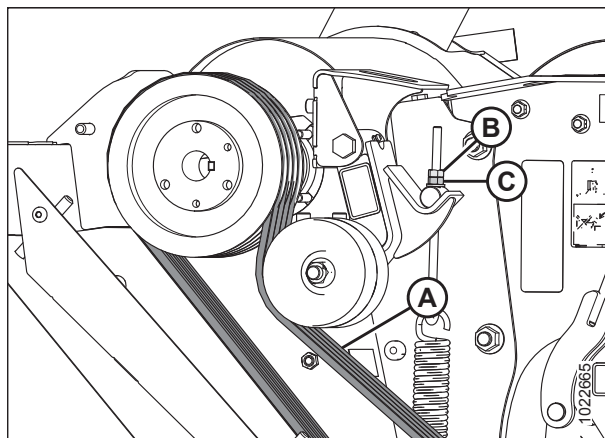


Figure 3.137: Jam Nut and Adjuster Nut on Left Side of Rotary Disc Pull-Type

OPERATION

16. Measure the length of tensioner spring (A), and turn adjuster nut (B) to adjust spring length to 366 mm (14 3/8 in.) to conform with spring tension decal (C).

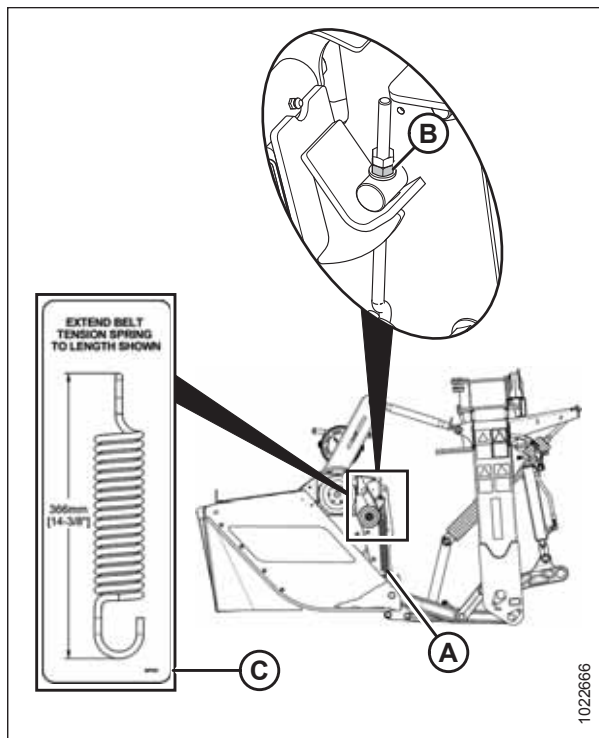


Figure 3.138: Spring Tension Decal

17. Install jam nut (A).
18. Hold a wrench on adjuster nut (B) and turn jam nut (A) clockwise into adjuster nut to lock the tension adjustment.
19. Verify that the pulleys run true and if any of the pulleys wobble, return to Step 2, page 110 and repeat the procedure to reinstall the taper locks on the affected pulleys.

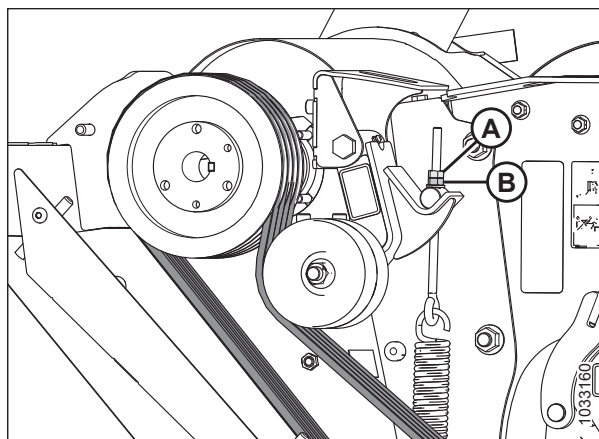


Figure 3.139: Conditioner Drive

3.17.3 Forming Shields – Finger Conditioner

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

Decide which forming shield position to use based on the following factors:

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

A wider windrow will generally dry faster and more evenly, resulting in less protein loss. Fast drying is especially important in areas where the weather allows only a few days to cut and bale. For more information, refer to [3.18 Haying Tips, page 115](#).

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

Positioning Side Deflectors – Finger Conditioner

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

⚠ 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.

1. Shut down the engine, and remove the key from the ignition.
2. Loosen handle (A) on the top cover.
3. Move side deflector (B) to the desired position.
4. Tighten the handle.
5. Repeat for the other side.

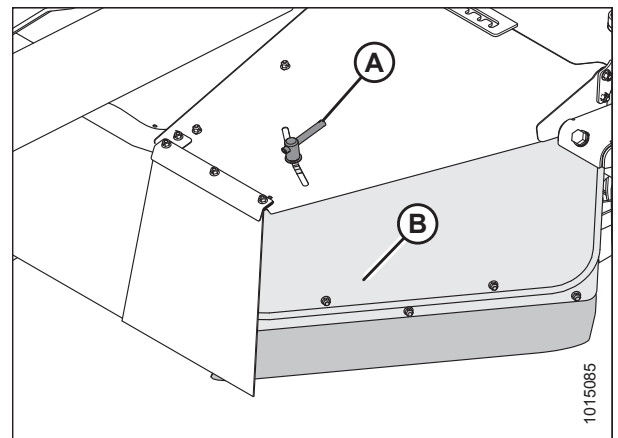


Figure 3.140: Right Top Cover

OPERATION

Positioning Rear Baffle – Finger Conditioner

Baffle can be used to direct crop into the forming shields for narrow and moderate width windrows or to direct crop downward to form a wide swath.

The rear baffle (A) is located immediately behind and above the finger conditioner.

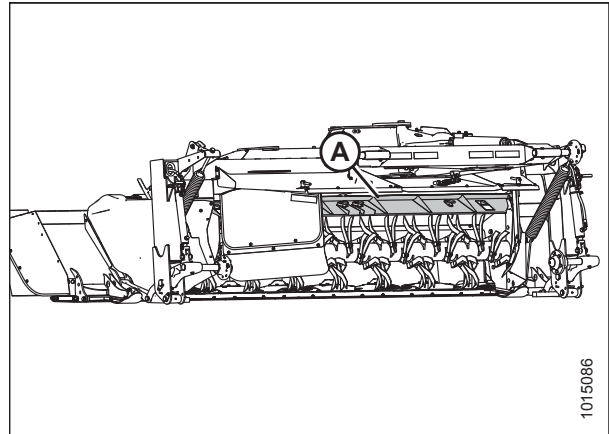


Figure 3.141: Rear Baffle Finger Conditioner

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.

To adjust the position of the rear baffle, follow these steps:

1. Shut down the engine, and remove the key from the ignition.
2. Pull rear baffle adjustment lever (A) outboard to disengage tab from adjustment plate (B).
3. Position rear baffle adjustment lever (A) as follows:
 - a. To raise the baffle, move the lever forward.
 - b. To lower the baffle, move the lever backward.
4. Release rear baffle adjustment lever (A) so that the tab engages the slot in adjustment plate (B).

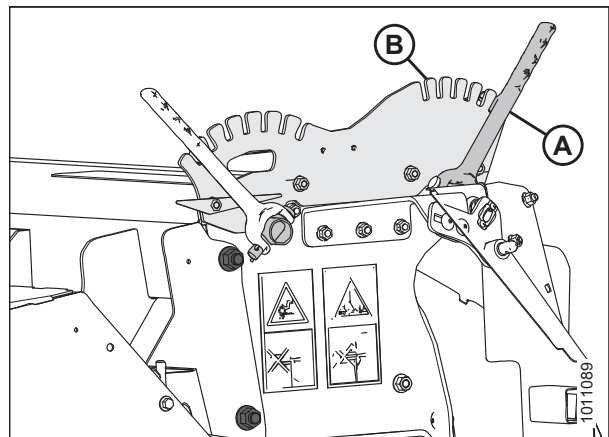


Figure 3.142: Rear Baffle Adjustment Lever

3.18 Haying Tips

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

3.18.1 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.

3.18.2 Topsoil Moisture

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

Table 3.11 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, moisture from the soil is absorbed by the hay above it. Determine the moisture level of the toposil before beginning 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 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.

3.18.3 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.
- 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.

3.18.4 Windrow Characteristics

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

For instructions, refer to [3.15 Operating the Rotary Disc Pull-Type, page 87](#) for instructions on adjusting the rotary disc pull-type.

OPERATION

Table 3.12 Recommended Windrow Characteristics

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

3.18.5 Driving on Windrow

Driving on previously cut windrows that will not be raked can lengthen drying time by a full day. If practical, set 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.

3.18.6 Raking and Tedding

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

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

3.18.7 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.

3.19 Checking Level of the Rotary Disc Pull-Type

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

If the rotary disc pull-type is **NOT** level, check the tire pressure and ensure proper inflation. For inflation instructions refer to [Inflating Tires, page 278](#).

Component damage in the rotary disc pull-type support system may occur if the rotary disc pull-type cannot be leveled. Contact your MacDon Dealer.

3.20 Unplugging the Rotary Disc Pull-Type

The cutterbar or the conditioner rolls (if installed) can get plugged with crop.

DANGER

To avoid injury or death from 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. Stop forward movement of the tractor and stop the power take-off (PTO).
2. Raise the rotary disc pull-type fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).

WARNING

Wear heavy gloves when working around cutterbar.

5. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

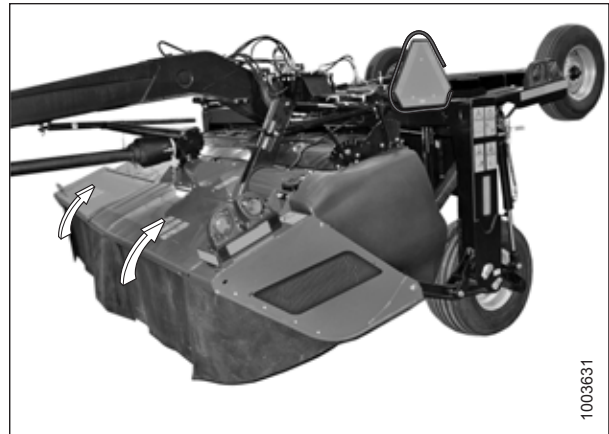


Figure 3.143: Cutterbar Doors

6. Clean off cutterbar or rolls by hand.

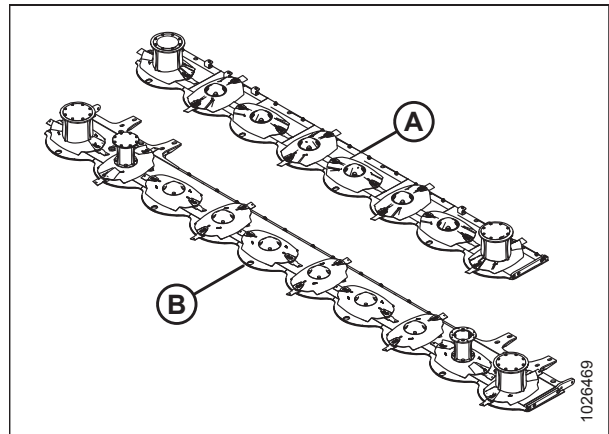


Figure 3.144: R113 and R116 Cutterbars

A - R113 PT Cutterbar
B - R116 PT Cutterbar

OPERATION

7. Close cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors, page 39](#).



Figure 3.145: Cutterbar Doors in Closed Position

Chapter 4: Maintenance and Servicing

This section provides information about routine servicing for the rotary disc pull-type. A parts catalog is located in a plastic case at the right end of the rotary disc pull-type.

Log the machine's hours of operation and use the maintenance record provided (refer to [4.3.1 Maintenance Schedule/Record, page 125](#)) 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. Securely block the wheels if the rotary disc pull-type is parked on an incline. 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

MAINTENANCE AND SERVICING

- 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.

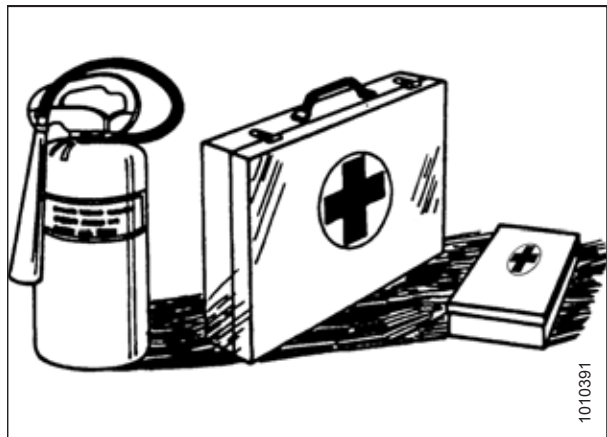


Figure 4.4: Safety Equipment

- 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.

CAUTION

To avoid personal injury, perform the following procedures before servicing the rotary disc pull-type or opening the drive covers:

1. Lower the rotary disc pull-type fully. If you need to perform service in the raised position, and always close lift cylinder lock-out valves. For instructions, refer to [3.1 Lift Cylinder Lock-Out Valves, page 31](#).
2. Disengage power take-off (PTO).
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.

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, e.g. severe dust, extra heavy loads, etc.

If more than one interval is specified for a service item, e.g. 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 125](#).






CAUTION

Carefully follow all safety messages. For more information, refer to [4.1 Recommended Safety Procedures, page 121](#).

MAINTENANCE AND SERVICING

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 <i>4.3.2 Break-In Inspections, page 129.</i>																	
End of season		Refer to <i>4.3.4 End-of-Season Servicing, page 130.</i>																	
Action		✓ Check					🔧 Lubricate					▲ Change							
First Hour⁹																			
✓	Check for loose hardware. Refer to <i>7.1 Torque Specifications, page 317.</i>																		
✓	Check clutch operation and slippage. Refer to <i>Checking Clutch Operation, page 248.</i>																		
First 5 Hours																			
✓	Check for loose hardware. Refer to <i>7.1 Torque Specifications, page 317.</i>																		
✓	Check conditioner drive belt tension. Refer to <i>Inspecting Conditioner Drive Belt, page 260.</i>																		
First 10 Hours, Then Daily																			
✓	Check hydraulic hoses and lines. Refer to <i>4.6.1 Checking Hydraulic Hoses and Lines, page 279.</i>																		
✓	Check cutterbar discs. Refer to <i>Inspecting Cutterbar Discs, page 155.</i>																		
✓	Check cutterbar disclades. Refer to <i>Inspecting Disc Blades, page 170.</i>																		
✓	Check cutterbar drums. Refer to <i>Inspecting Large Drums – R113 or R116 PT, page 206.</i>																		
First 25 Hours																			
✓	Check conditioner drive belt tension. Refer to <i>Inspecting Conditioner Drive Belt, page 260.</i>																		
✓	Check cutterbar lubricant. Refer to <i>Checking and Adding Lubricant – Cutterbar, page 150.</i>																		
✓	Check header swivel gearbox and hitch swivel gearbox lubricant. Refer to <i>Checking Lubricant Levels in the Header Swivel Gearbox and Hitch Swivel Gearbox, page 272.</i>																		

9. Begins from first use of machine.

MAINTENANCE AND SERVICING

✓	Check cutterbar-conditioner drive gearbox lubricant. Refer to <i>Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)</i> , page 266.													
✓	Check conditioner roll timing gearbox oil. Refer to <i>Checking and Changing Lubricant in Conditioner Roll Timing Gearbox</i> , page 264.													
Every 25 Hours														
✓	Check conditioner drive belt tension. Refer to <i>Inspecting Conditioner Drive Belt</i> , page 260.													
⬇️	Lubricate idler pivot. Refer to <i>4.3.5 Lubricating the Rotary Disc Pull-Type</i> , page 130.													
⬇️	Lubricate upper and lower driveline universal joints. Refer to <i>4.3.5 Lubricating the Rotary Disc Pull-Type</i> , page 130.													
⬇️	Lubricate roller conditioner bearings. Refer to <i>4.3.5 Lubricating the Rotary Disc Pull-Type</i> , page 130.													
⬇️	Lubricate conditioner roll driveline slip joints. Refer to <i>4.3.5 Lubricating the Rotary Disc Pull-Type</i> , page 130.													
First 50 Hours														
✓	Check conditioner drive belt tension. Refer to <i>Inspecting Conditioner Drive Belt</i> , page 260.													
▲	Change cutterbar lubricant. Refer to <i>Draining Cutterbar</i> , page 152 and <i>Adding Lubricant into a Repaired Cutterbar</i> , page 154.													
▲	Change roll timing gearbox lubricant. Refer to <i>Checking and Changing Lubricant in Conditioner Roll Timing Gearbox</i> , page 264.													
▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to <i>Draining Cutterbar-Conditioner Drive Gearbox (T-Gearbox) Lubricant</i> , page 267 and <i>Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)</i> , page 266.													
▲	Change header swivel gearbox and hitch swivel gearbox lubricant. Refer to <i>Draining Lubricant from the Header Swivel Gearbox and Hitch Swivel Gearbox</i> , page 274 and <i>Adding Lubricant to the Header Swivel Gearbox and Hitch Swivel Gearbox</i> , page 275.													

MAINTENANCE AND SERVICING

▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to <i>Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)</i> , page 266.																		
Every 100 Hours or Annually¹⁰																			
✓	Check conditioner drive belt tension. Refer to <i>Inspecting Conditioner Drive Belt</i> , page 260.																		
✓	Check cutterbar lubricant. Refer to <i>Checking and Adding Lubricant – Cutterbar</i> , page 150.																		
✓	Check cutterbar-conditioner drive gearbox lubricant. Refer to <i>Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)</i> , page 266.																		
✓	Check roll timing gearbox lubricant. Refer to <i>Checking and Changing Lubricant in Conditioner Roll Timing Gearbox</i> , page 264.																		
✓	Check header swivel gearbox and hitch swivel gearbox lubricant. Refer to <i>Checking Lubricant Levels in the Header Swivel Gearbox and Hitch Swivel Gearbox</i> , page 272.																		
✓	Check cutterbar-conditioner drive gearbox lubricant. Refer to <i>Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)</i> , page 266.																		
Every 250 Hours or Annually¹⁰																			
▲	Change cutterbar lubricant. Refer to <i>Draining Cutterbar</i> , page 152 and <i>Adding Lubricant into a Repaired Cutterbar</i> , page 154 ¹¹ .																		
▲	Change roll timing gearbox lubricant. Refer to <i>Checking and Changing Lubricant in Conditioner Roll Timing Gearbox</i> , page 264.																		
▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to <i>Draining Cutterbar-Conditioner Drive Gearbox (T-Gearbox) Lubricant</i> , page 267 and <i>Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)</i> , page 266.																		

10. Change all gearbox and cutterbar lubricants annually.

11. Use only the specified amount. Do **NOT** overfill.

MAINTENANCE AND SERVICING

▲	<p>Change header swivel gearbox and hitch swivel gearbox lubricant. Refer to <i>Draining Lubricant from the Header Swivel Gearbox and Hitch Swivel Gearbox</i>, page 274 and <i>Adding Lubricant to the Header Swivel Gearbox and Hitch Swivel Gearbox</i>, page 275.</p>												
▲	<p>Change cutterbar-conditioner drive gearbox lubricant. Refer to <i>Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)</i>, page 266.</p>												

4.3.2 Break-In Inspections

From the factory the pull-type 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 wheel bolts	<i>Checking Wheel Bolts, page 275</i>
1 Hour	Check clutch operation and slippage	<i>Checking Clutch Operation, page 248</i>
5 Hours	Check for loose hardware and tighten to required torque	<i>7.1 Torque Specifications, page 317</i>
5 Hours	Check conditioner drive belt tension	<i>Inspecting Conditioner Drive Belt, page 260</i>
25 Hours	Check drive belt tension	<i>Inspecting Conditioner Drive Belt, page 260</i>
25 Hours	Check driveline taper pin torque	<i>4.5.8 Inspecting Driveline Taper Pins, page 254</i>
50 Hours	Check conditioner drive belt tension	<i>Inspecting Conditioner Drive Belt, page 260</i>
50 Hours	Check cutterbar lubricant	<i>4.4.3 Lubricating Cutterbar, page 150</i>
50 Hours	Check and change conditioner roll timing gearbox lubricant	<i>4.5.11 Conditioner Roll Timing Gearbox, page 263</i>
50 Hours	Check and change swivel gearbox lubricant	<i>4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox , page 271</i>
50 Hours	Check and change pull-type drive gearbox lubricant	<i>4.5.12 Cutterbar-Conditioner Drive Gearbox(T-Gearbox), page 265</i>
250 Hours	Check and change swivel gearbox lubricant	<i>4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox , page 271</i>
250 Hours	Check and change pull-type drive gearbox lubricant	<i>4.5.12 Cutterbar-Conditioner Drive Gearbox(T-Gearbox), page 265</i>

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 pull-type 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:

MAINTENANCE AND SERVICING

1. Lubricate the machine completely. For instructions, refer to [4.3.5 Lubricating the Rotary Disc Pull-Type, page 130](#) and [4.4.3 Lubricating Cutterbar, page 150](#).
2. Check the tire pressure and adjust it as required. For information, refer to [Inflating Tires, page 278](#).
3. Perform all annual maintenance as listed in [4.3.1 Maintenance Schedule/Record, page 125](#).

4.3.4 End-of-Season Servicing

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

CAUTION

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. Raise the rotary disc pull-type and engage the lift cylinder lock-out valves.
2. Clean the rotary disc pull-type thoroughly.
3. Check for worn components and repair them as necessary.
4. 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.
5. Replace or tighten any missing or loose hardware. For information, refer to [7.1 Torque Specifications, page 317](#).
6. Lubricate the rotary disc pull-type thoroughly, leaving excess grease on the fittings to keep moisture out of the lubricated component.
7. Apply grease to any exposed threads, cylinder rods, and sliding surfaces of components.
8. Oil the cutterbar components to prevent rust.
9. Loosen the drive belt.
10. Remove the divider rods (if equipped) to reduce the space required for inside storage.
11. Repaint all worn or chipped painted surfaces to prevent rust.
12. Store the machine in a dry, protected place if possible. If it is to be stored outside, always cover the rotary disc pull-type with a waterproof canvas or other protective material.
13. Use blocks to take the weight off the rotary disc pull-type's tires, if possible.

4.3.5 Lubricating the Rotary Disc Pull-Type

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

WARNING

To avoid personal injury, before servicing rotary disc pull-type or opening drive covers, refer to [4.2 Preparing Machine for Servicing, page 123](#).

MAINTENANCE AND SERVICING

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 125.

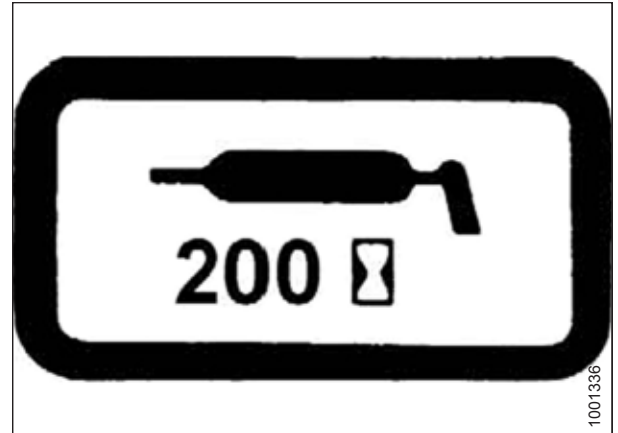


Figure 4.6: Grease Interval Decal

Greasing Procedure

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

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.

1. Open driveshields at the ends of the rotary disc pull-type to access greasing points. For instructions, refer to [3.2.1 Opening Driveshields](#), page 34.
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:

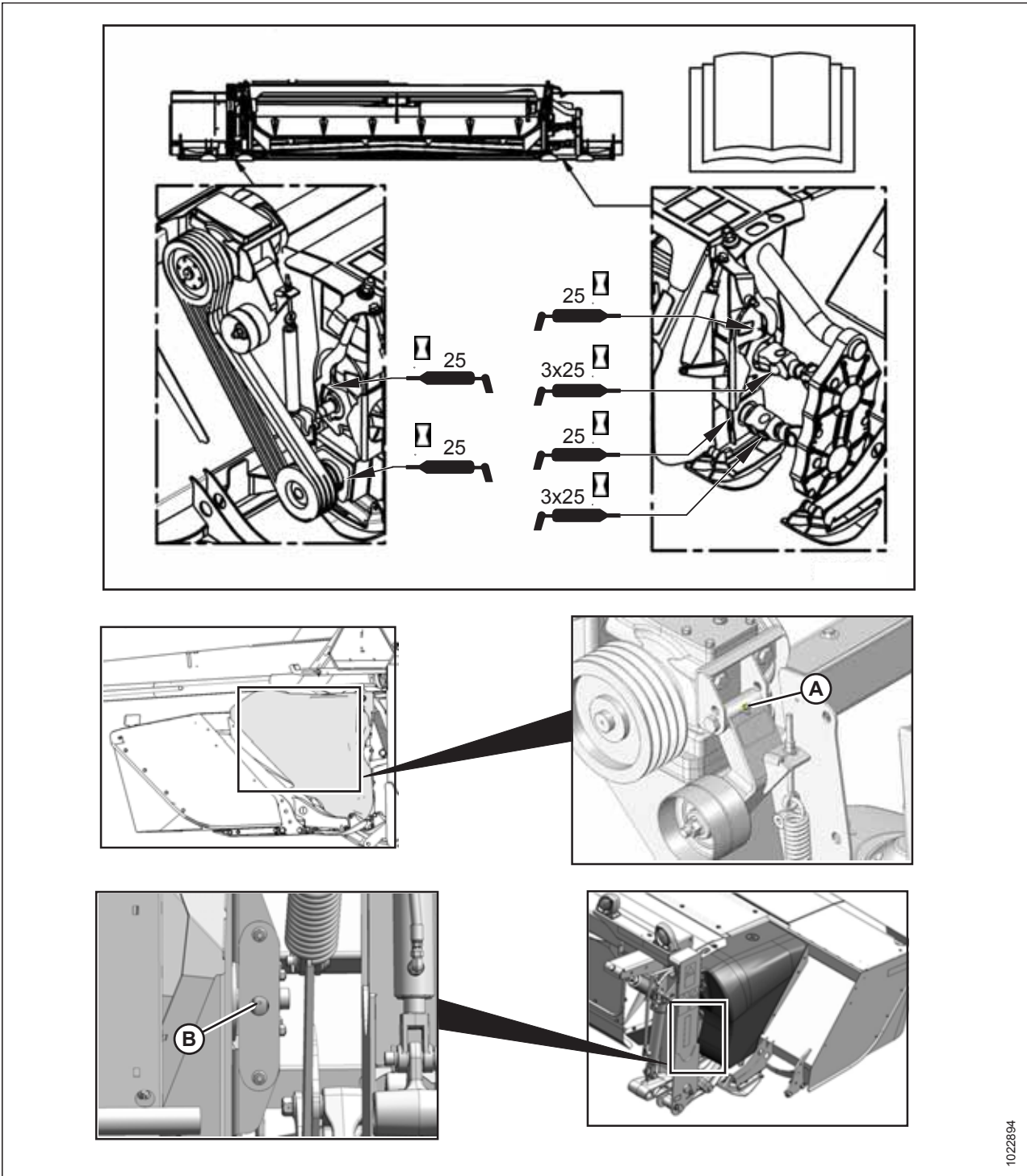
Use high temperature, extreme pressure (EP2) performance grease with 1% max molybdenum disulphide (NLGI Grade 2) lithium base unless otherwise specified.

MAINTENANCE AND SERVICING

Every 25 Hours

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

Figure 4.7: Grease Location (Every 25 Hours)

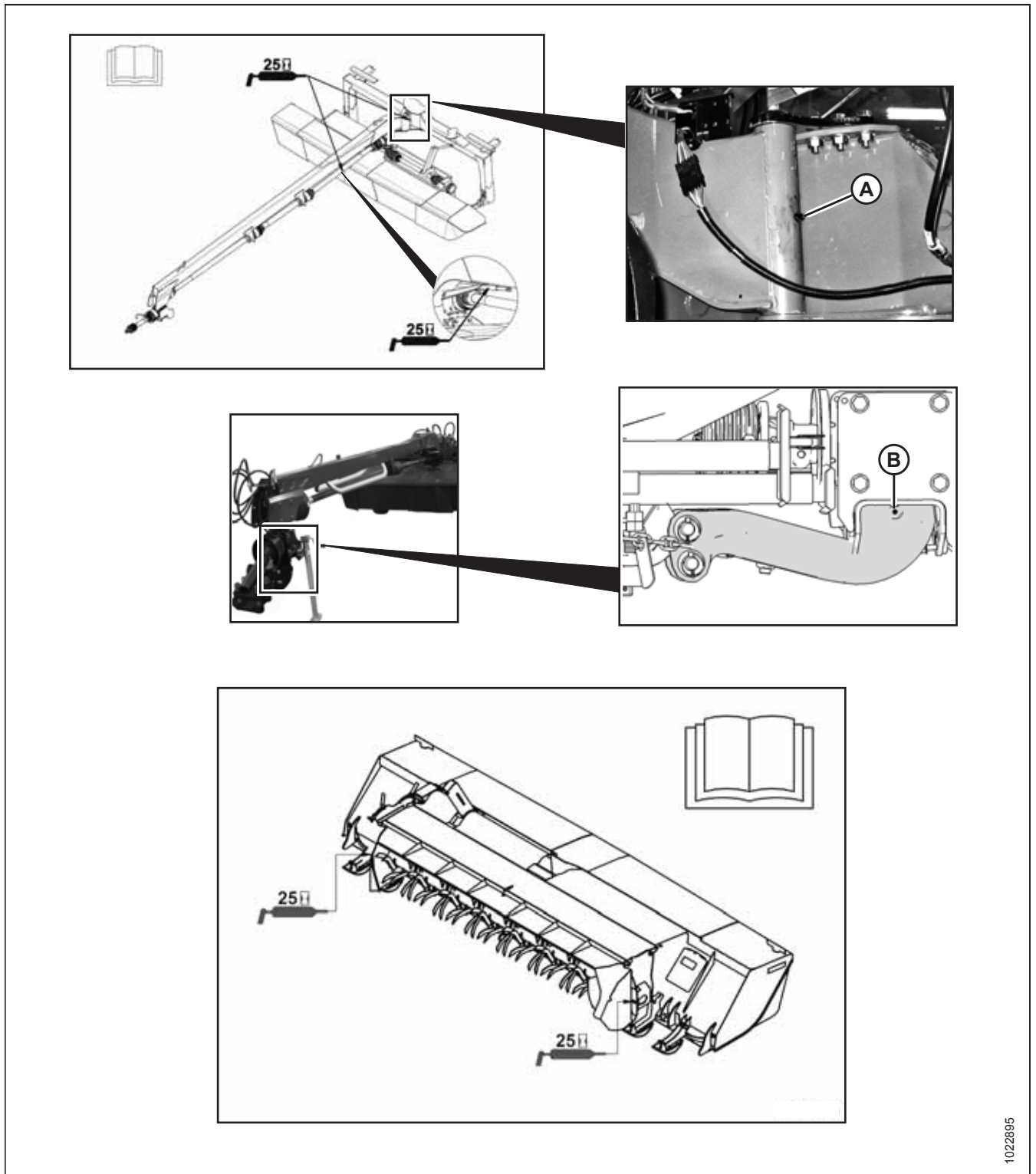


A - Conditioner Drive Idler

B - Bearing for Finger-Type Conditioner

1022894

Figure 4.8: Grease Location (Every 25 Hours)



A - Hitch Steering Pivot

B - Tractor Hitch Pivot

1022895

MAINTENANCE AND SERVICING

NOTE:

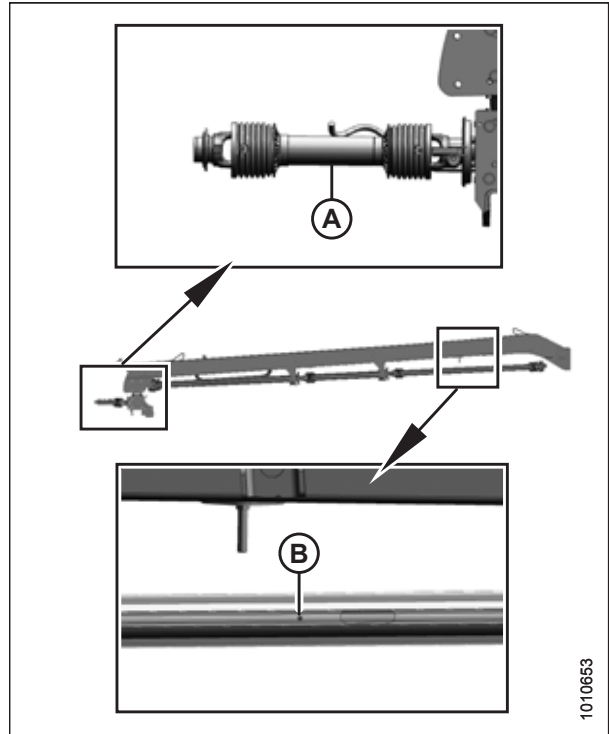
It may be necessary to remove and replace the driveline shield cones during the greasing procedure. Refer to [4.5.2 Driveline Shield Cone, page 230](#) for more information.

NOTE:

Use high temperature extreme pressure (EP2) performance with 10% max molybdenum disulphide (NLGI Grade 2) lithium base unless otherwise specified.

IMPORTANT:

Apply grease to driveline slip-joint grease fittings.

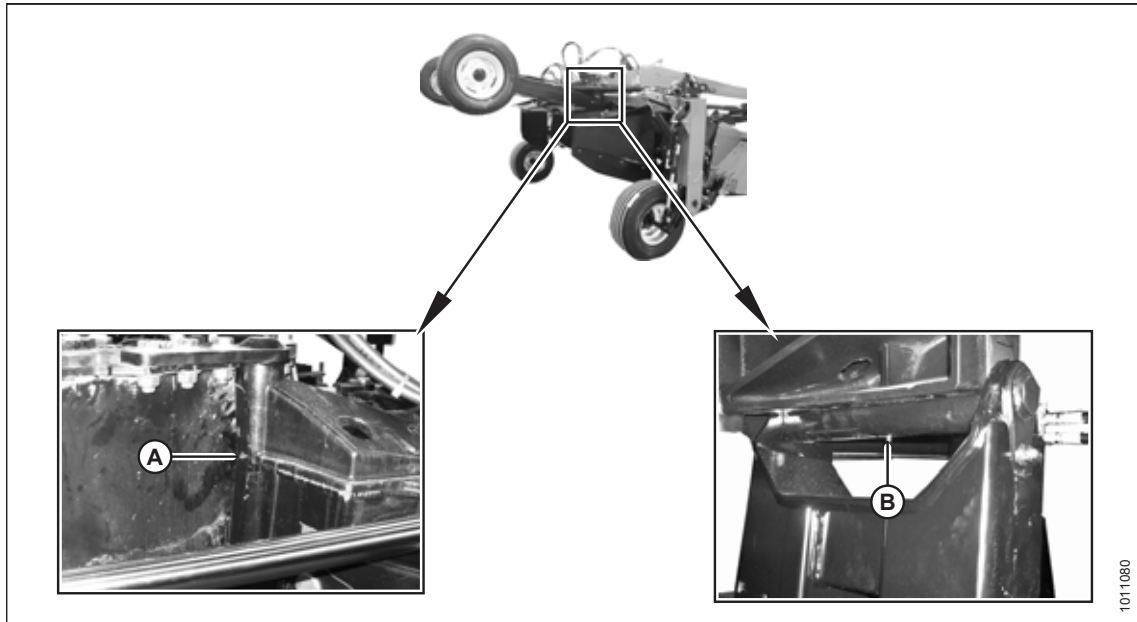


**Figure 4.9: Driveline Grease Location
(Every 25 Hours)**

A - Primary Driveline Slip-Joint

B - Driveline Slip-Joint

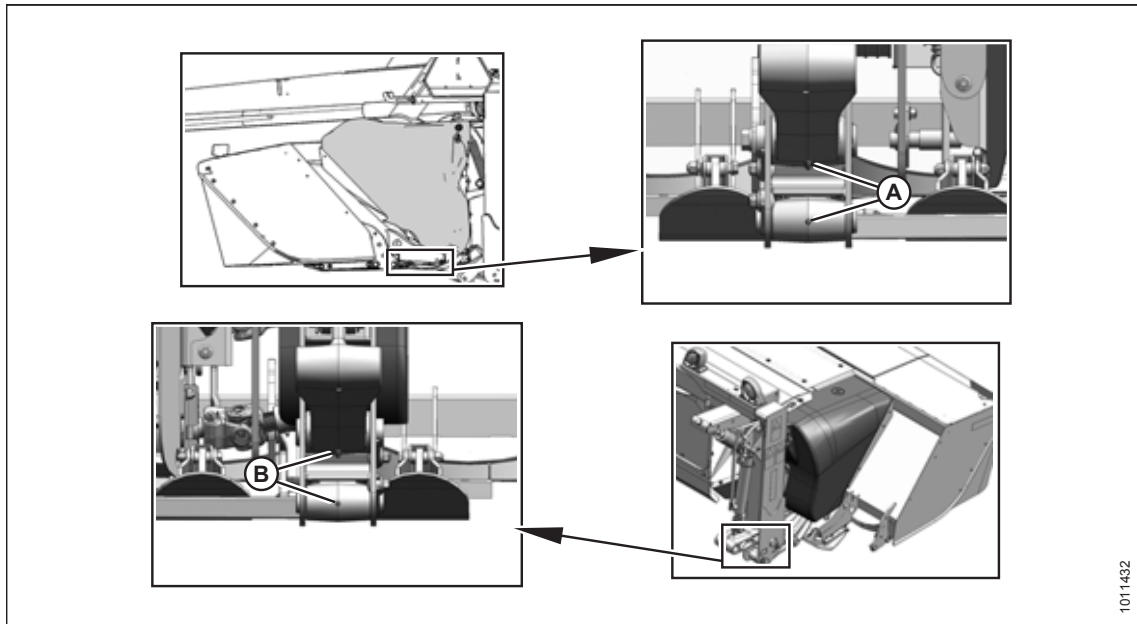
Figure 4.10: Grease Location (Every 25 Hours)



A - Road Friendly Transport™ Casting Pivot

B - Road Friendly Transport™ Wheel Frame Pivot

Figure 4.11: Grease Location (Every 25 Hours)



A - Pull-Type Lift Linkage – Left

B - Pull-Type Lift Linkage – Right

NOTE:

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

MAINTENANCE AND SERVICING

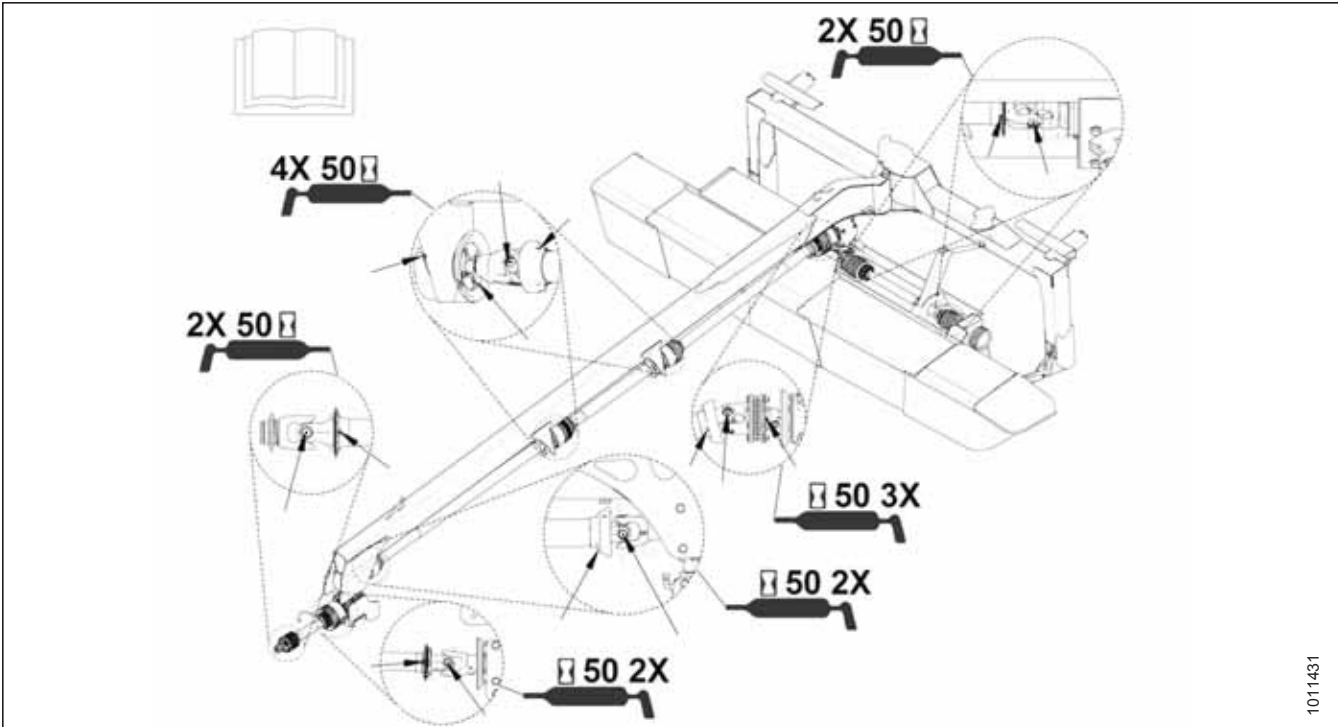
Every 50 Hours

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 4.12: Grease Location (Every 50 Hours)



MAINTENANCE AND SERVICING

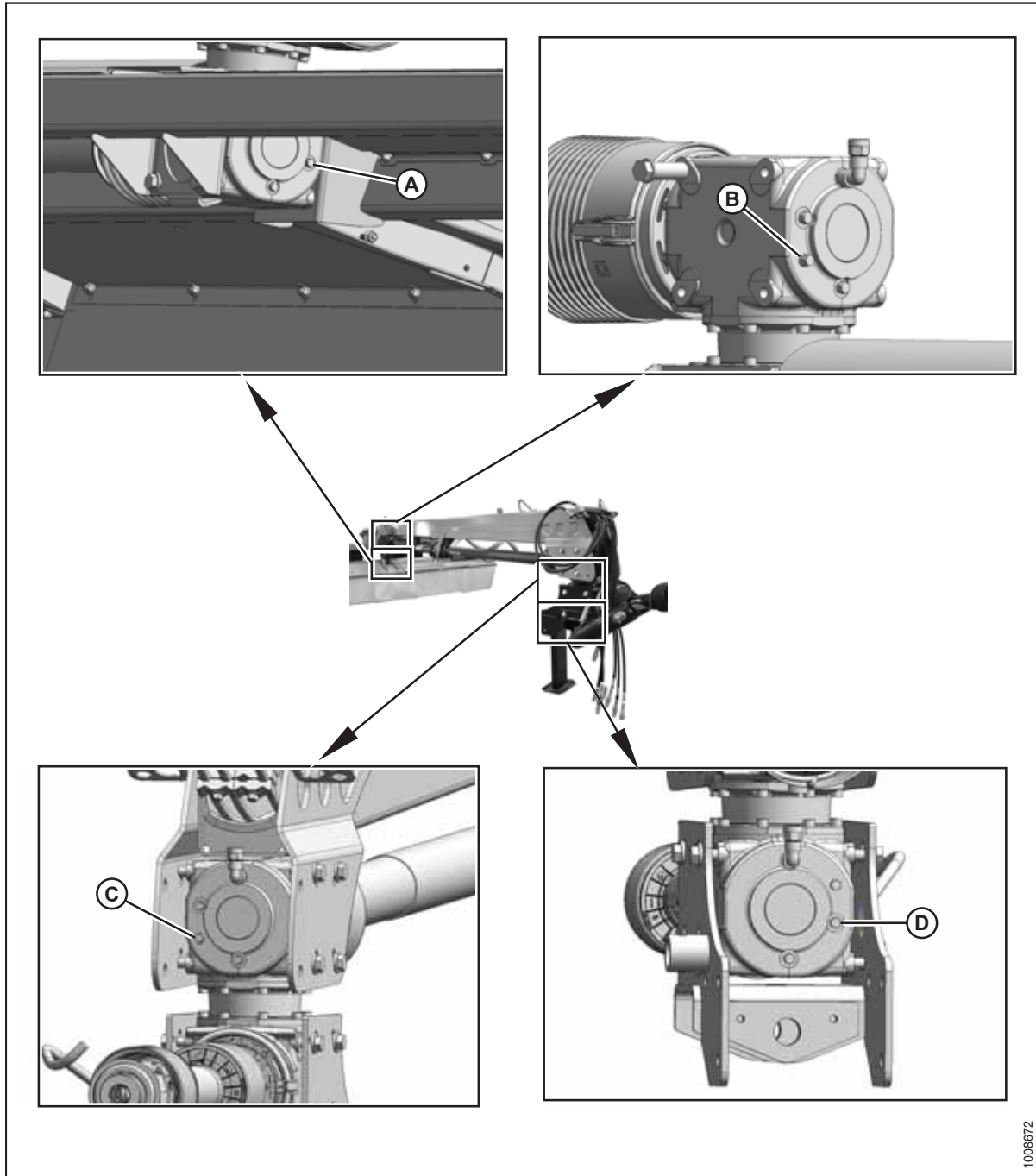
Every 100 Hours

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

NOTE:

Ensure top of hitch and rotary disc pull-type are horizontal, remove check plug from swivel gearbox, and verify that oil slightly runs out when removed.

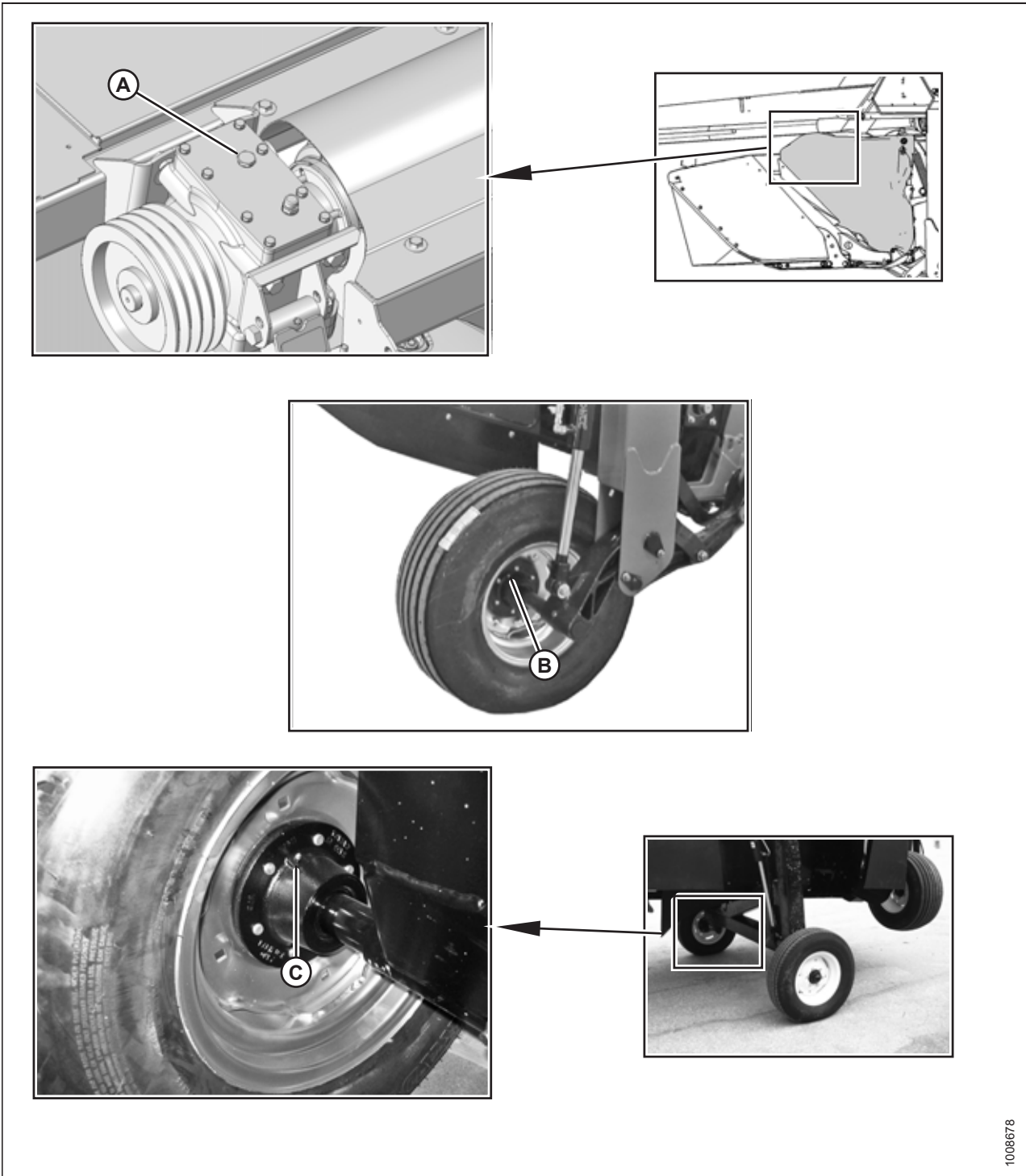
Figure 4.13: Lubrication Location (Every 100 Hours)



A - Check Plug - Swivel Gearbox
C - Check Plug - Swivel Gearbox

B - Check Plug - Swivel Gearbox
D - Check Plug - Swivel Gearbox

Figure 4.14: Lubrication Location (Every 100 Hours)



A - Check Plug - Cutterbar-Conditioner Drive Gearbox (T-Gearbox)¹²
C - Bearing - Road Friendly Transport™ Option (2 Places)

B - Bearing - Field Wheel (2 Places)¹³

12. Remove check plug from conditioner drive gearbox as shown and check oil level.

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

MAINTENANCE AND SERVICING

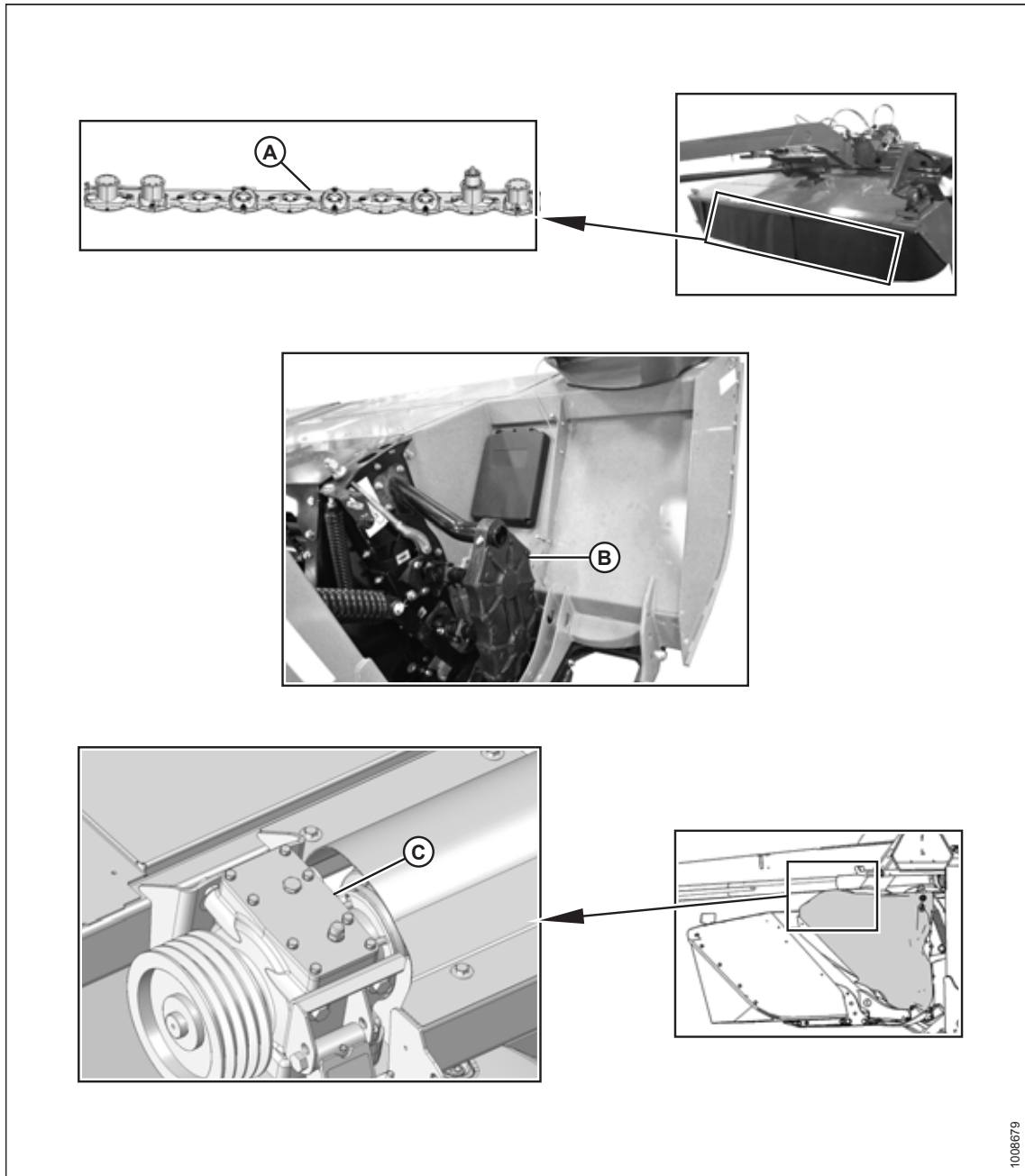
Every 250 Hours

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

1. Change lubricant in locations (A), (B), and (C). Refer to the following sections for more information:

- [4.4.3 Lubricating Cutterbar, page 150.](#)
- [Checking and Changing Lubricant in Conditioner Roll Timing Gearbox, page 264.](#)

Figure 4.15: Lubrication Location (Every 250 Hours)



A - Cutterbar Lubrication Location

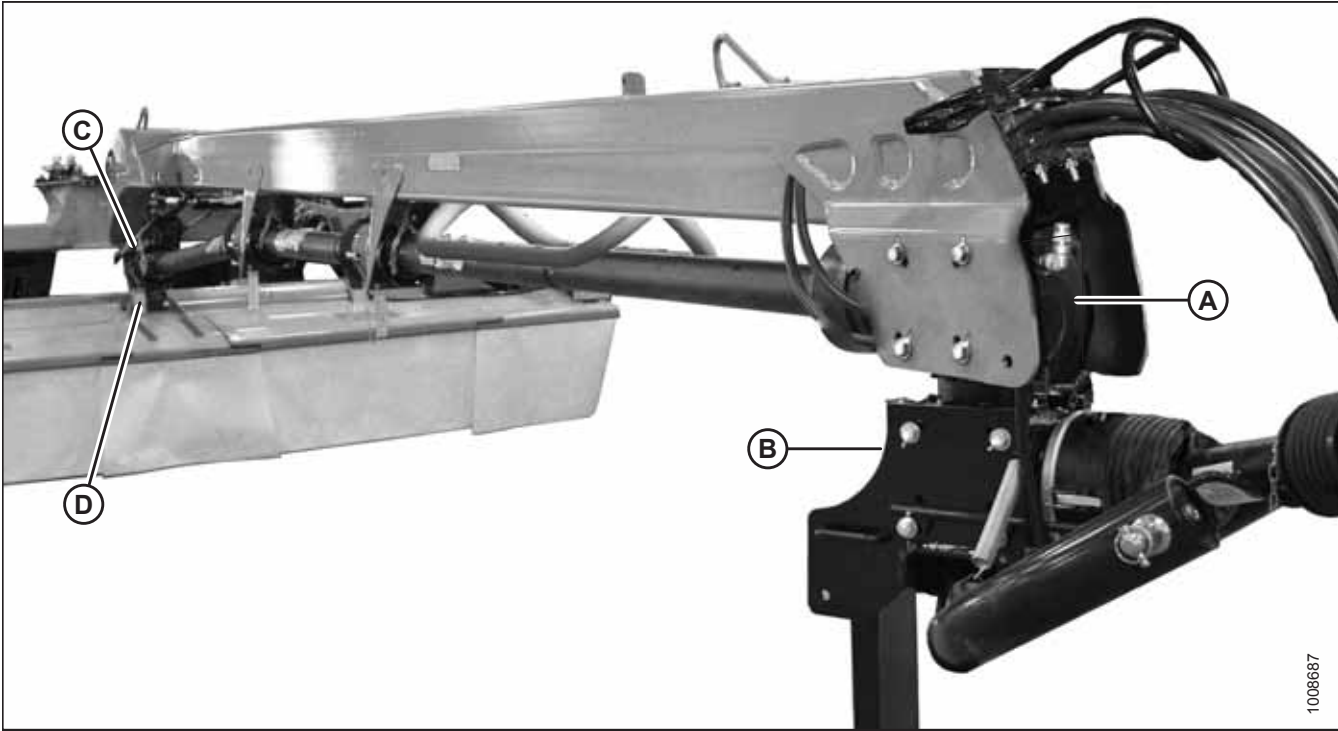
B - Conditioner Roll Timing Gearbox

C - Cutterbar-Conditioner Drive Gearbox (T-Gearbox)

MAINTENANCE AND SERVICING

2. Change lubricant in hitch swivel gearboxes (A), (B), (C), and (D). For information, refer to [4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox](#), page 271.

Figure 4.16: Lubrication Location (Every 250 Hours)



A - Upper Forward Gearbox

B - Lower Forward Gearbox

C - Upper Rear Gearbox

D - Lower Rear Gearbox

4.4 Cutterbar System

The cutterbar 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 engine speed. Each disc carries two cutting blades.

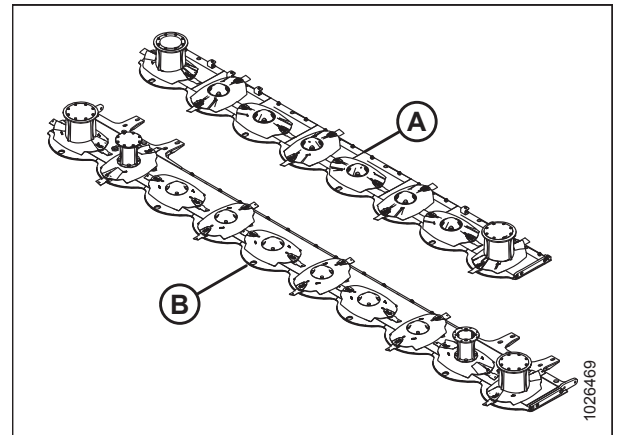


Figure 4.17: R113 and R116 PT Cutterbars

A - 4.0 m (13 ft.) Cutterbar
B - 4.9 m (16 ft.) Cutterbar

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.

1. Ensure that the door operates smoothly and lies flat when closed. Adjust the doors if necessary.
2. Inspect hinge pin bolts (A) and tighten them to 69 Nm (51 lbf-ft) if they are loose.
3. Check the door for cracks. Repair the door if any cracks are found.
4. Check the door for exposed metal and surface rust. Repair and repaint the door if necessary.
5. Check shield/curtain bolts (B) and replace them if they are missing. If they are loose, tighten them.

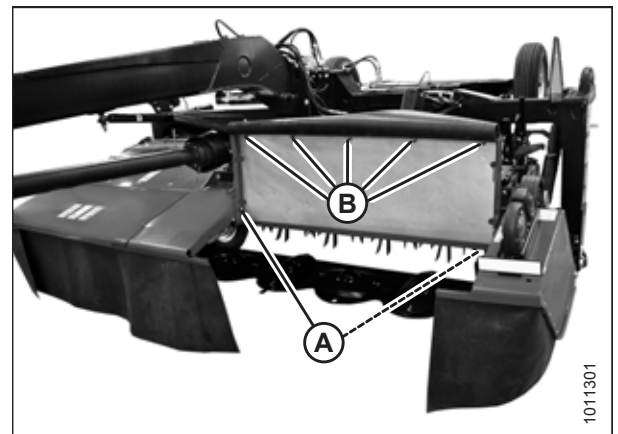


Figure 4.18: Left Cutterbar Door in Open Position

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
- Top cover (not shown) on finger conditioners only

Replace the curtains if they become worn or damaged.

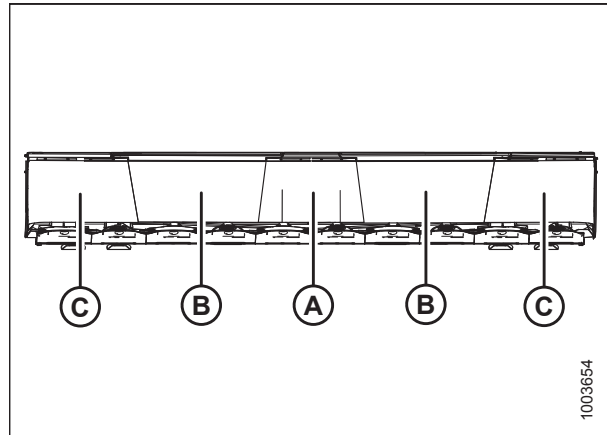


Figure 4.19: Cutterbar Curtains

Inspecting Curtains

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

WARNING

To reduce the risk of personal injury and machine damage, do NOT operate the machine without all the cutterbar doors down or without curtains 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.

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.

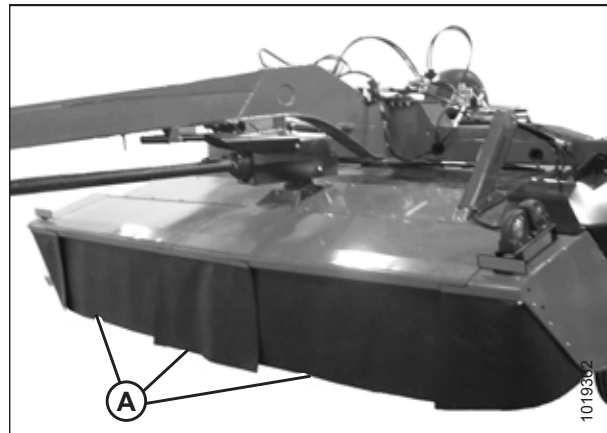


Figure 4.20: Cutterbar Curtains

Removing Cutterbar Door Curtains

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

DANGER

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

WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#) or [3.3.2 Opening Cutterbar Doors – Export Latches, page 38](#).

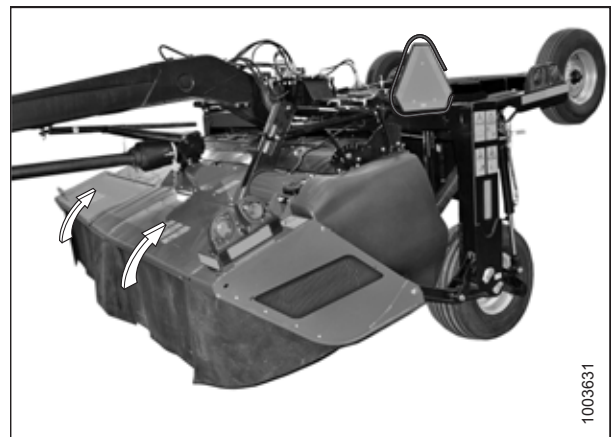


Figure 4.21: R1 Series Rotary Disc Pull-Type

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

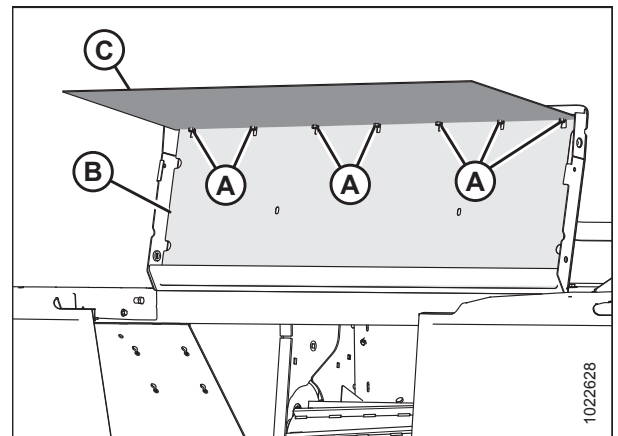


Figure 4.22: Cutterbar Door

Installing Cutterbar Door Curtains

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

DANGER

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

WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Insert seven cutterbar door stud bolts (B) into the precut holes on curtain (A).
3. Install seven large washers (C).
4. Install liner panel (D) against the washers.
5. Install seven nuts (E) onto the bolt studs. Torque the nuts to 28 Nm (21 lbf-ft).

IMPORTANT:

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

6. Close the cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.

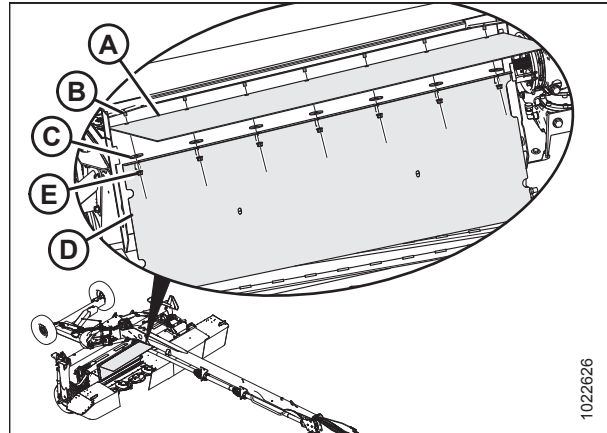


Figure 4.23: Cutterbar Curtain

Removing Cutterbar Inboard Curtain

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

DANGER

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

WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America](#), page 37.

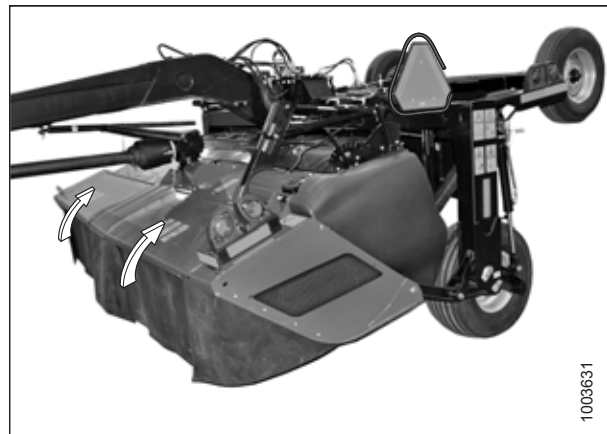


Figure 4.24: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

MAINTENANCE AND SERVICING

3. Remove two M10 carriage head bolts (A) and nuts securing curtain assembly (B) to the pull-type, and remove the curtain assembly.

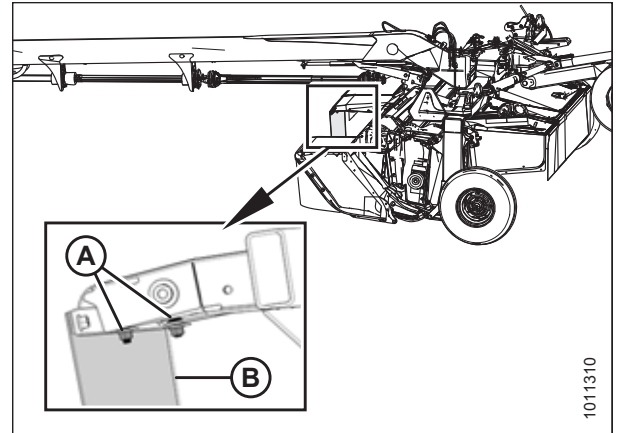


Figure 4.25: Inboard Curtain

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

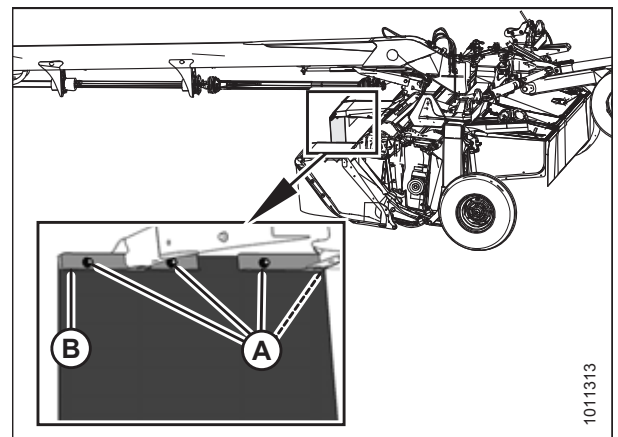


Figure 4.26: Inboard Curtain

Installing Cutterbar Inboard Curtain

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

! DANGER

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

! WARNING

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

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

MAINTENANCE AND SERVICING

2. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

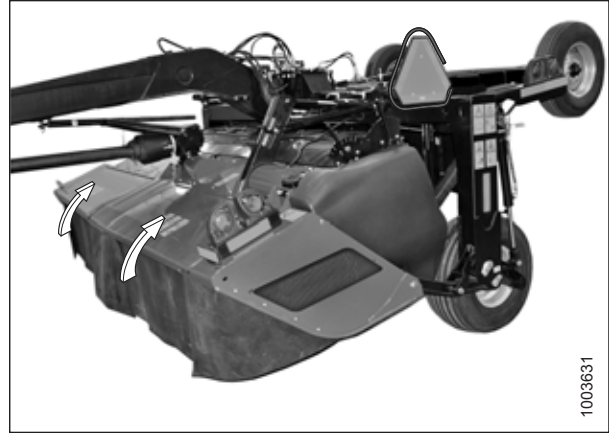


Figure 4.27: Cutterbar Doors

3. Install the curtain onto the studs on the center shield. Install two curtain brackets (B) and secure the curtain with four nuts (A).
4. Torque the hardware to 28 Nm (21 lbf-ft).

IMPORTANT:

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

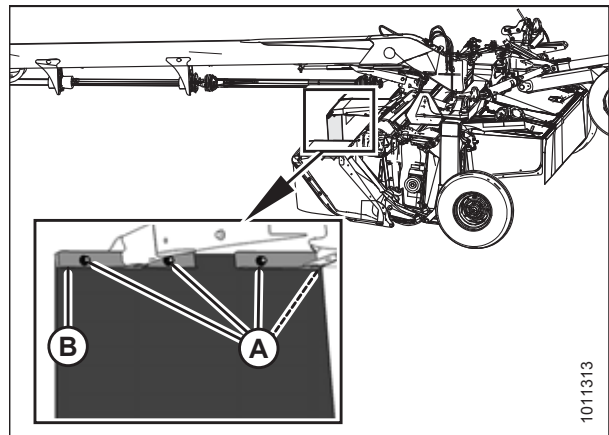


Figure 4.28: Inboard Curtain and Brackets

5. Secure two curtain brackets (A) to the center shield using two M10 carriage head bolts and nuts (B).
6. Torque bolts (B) to 39 Nm (29 lbf-ft).

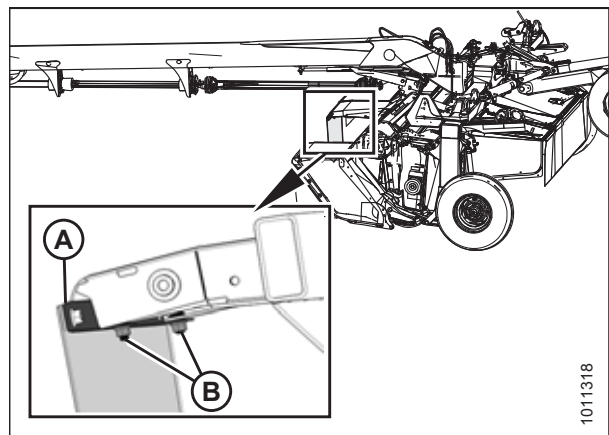


Figure 4.29: Inboard Curtain

Removing Outboard Curtains

Remove the outboard curtains if they are damaged or cracked.

DANGER

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

WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

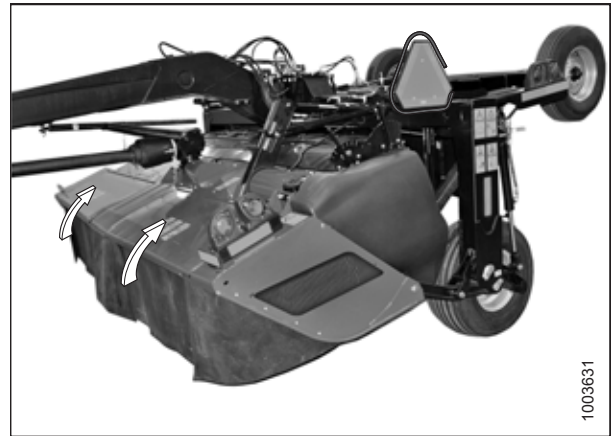


Figure 4.30: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

3. Remove four nuts, bolts, and large washers (A) securing the outboard curtain to the endsheet.

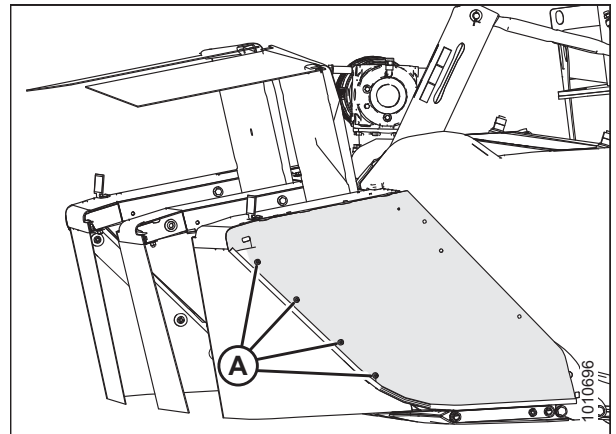


Figure 4.31: Left Endsheet

MAINTENANCE AND SERVICING

4. Remove two nuts (D) from the bolt studs.
5. Remove nut (C) from the carriage head bolt, remove bracket (B), and remove curtain (A).

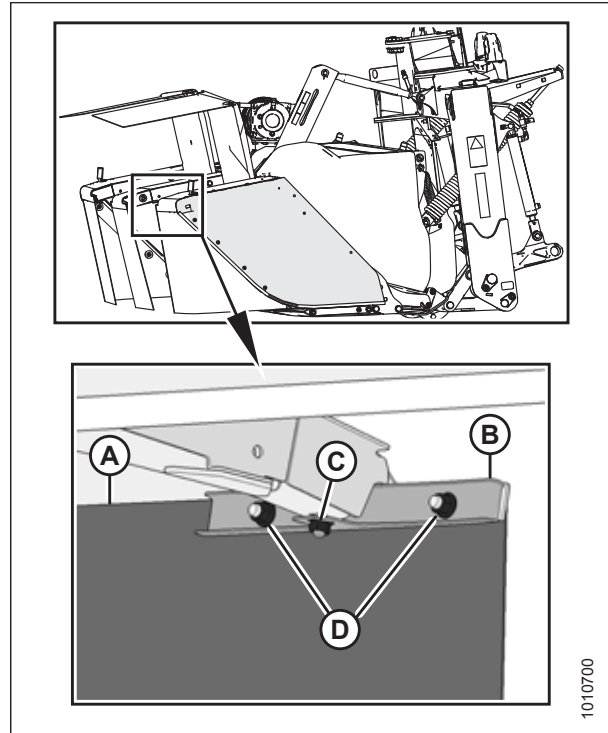


Figure 4.32: Outboard Curtain

Installing Outboard Curtains

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

DANGER

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

WARNING

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

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

MAINTENANCE AND SERVICING

2. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

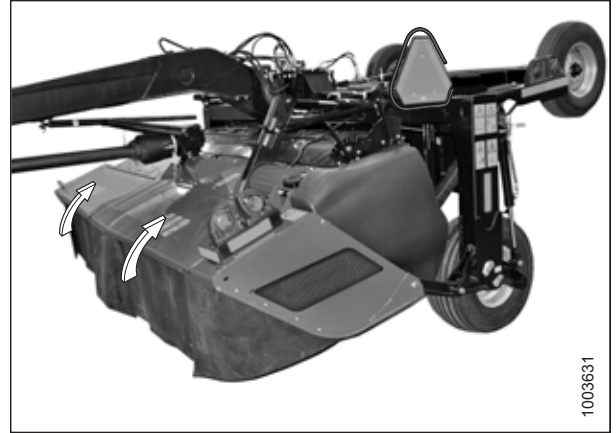


Figure 4.33: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

3. Install curtain (A) into bracket (B).
4. Install two nuts (D) and tighten them .
5. Slide bracket (B) into position and install square neck carriage head bolt and flange nut (C).
6. Torque flange nut (C) to 39 Nm (29 lbf·ft).

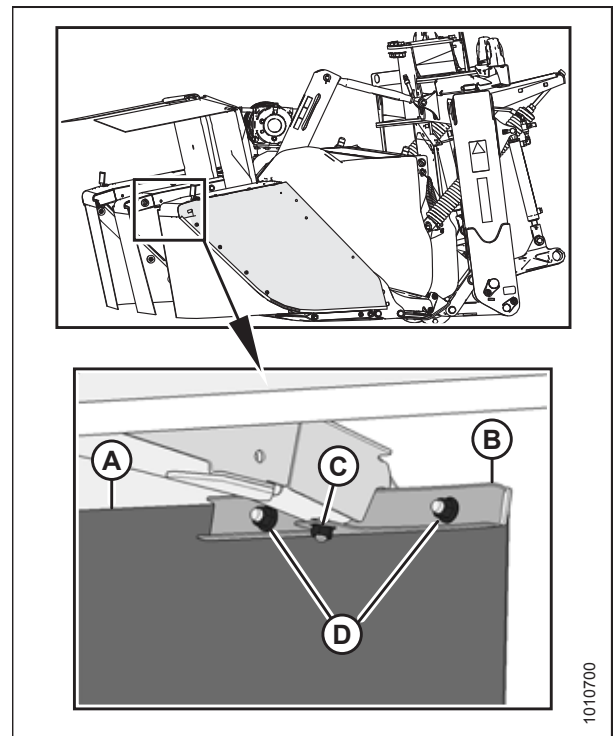


Figure 4.34: Outboard Curtain

MAINTENANCE AND SERVICING

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

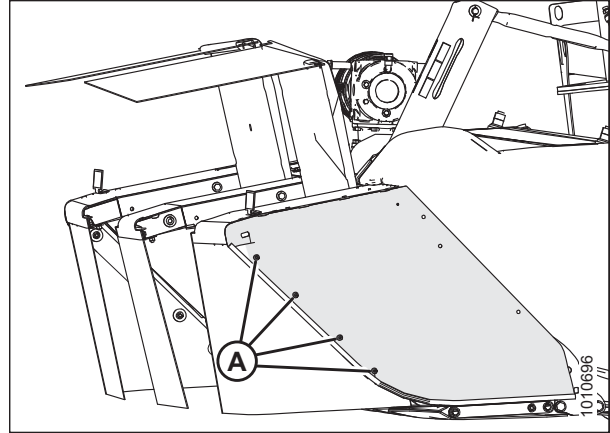


Figure 4.35: Left Endsheets

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 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.

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 rotary disc pull-type onto 25 cm (10 in.) blocks under both ends of the cutterbar.
3. Shut down the engine, and remove the key from the ignition.
4. Open the cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#) or [3.3.2 Opening Cutterbar Doors – Export Latches, page 38](#).

- Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).



Figure 4.36: Cutterbar Doors – R1 Series Rotary Disc Pull-Type

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

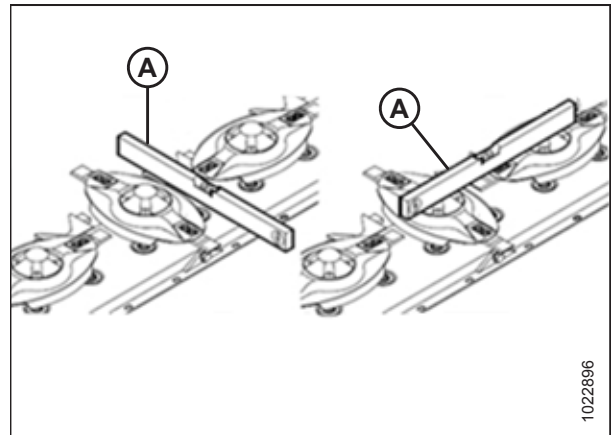


Figure 4.37: Spirit Level on Cutterbar

- Clean the area around plug (A). Place a 5 liter (5.2 US qts) capacity container under plug (A).
- 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 9, page 151](#). If additional lubricant is **NOT** required, proceed to [Step 18, page 152](#).

IMPORTANT:

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

- Reinstall the inspection plug.

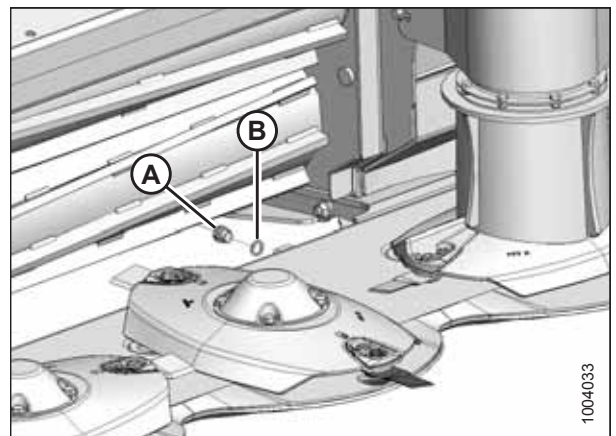


Figure 4.38: Cutterbar Oil Inspection Plug

⚠ WARNING

Check to be sure all bystanders have cleared the area.

MAINTENANCE AND SERVICING

10. Clear all bystanders from the area.
11. Start the engine, and raise the rotary disc pull-type fully.
12. Shut down the engine, and remove the key from the ignition.
13. Close the lift cylinder lock-out valves on both sides of the rotary disc pull-type. Valve handles should be in the closed position (90° angle to the hose). For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
14. Remove the inspection plug, and add some oil. Loosely install the inspection plug.
15. Open the lift cylinder lock-out valves on both sides of the rotary disc pull-type. Valve handles should be in the open position (parallel to the hose). For instructions, refer to [3.1.2 Disengaging Locks, page 32](#).
16. Lower the rotary disc pull-type onto the blocks, then repeat Step [6, page 151](#).
17. Recheck the oil level.
18. Check O-ring (B) for breaks or cracks, and replace it if necessary.
19. Install plug (A) and O-ring (B).

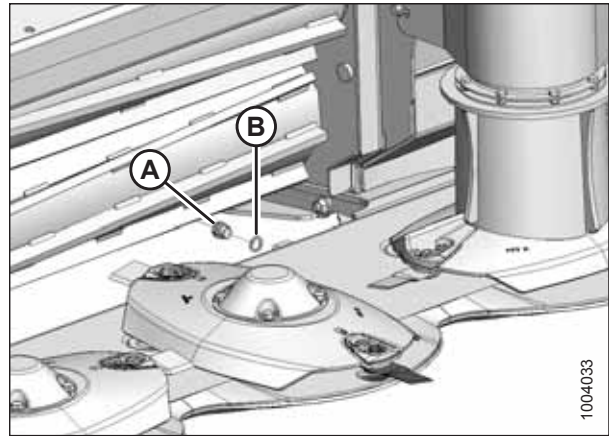


Figure 4.39: Cutterbar Oil Inspection Plug

20. Close cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors, page 39](#).

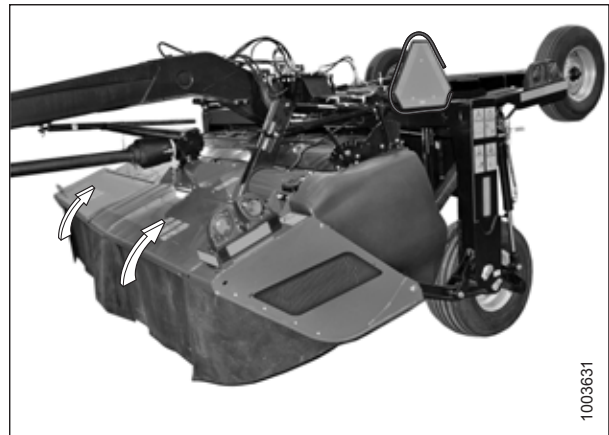


Figure 4.40: Cutterbar Doors

Draining Cutterbar

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

DANGER

To avoid injury or death from 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

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 190*.

NOTE:

The reinforced rock guards are used on model year 2019 and later machines.

2. Start the engine and raise the rotary disc pull-type.
3. Place a block under each end of the rotary disc pull-type so the right end is lower than the left end.

IMPORTANT:

Always drain lubricant from the right end of the rotary disc pull-type. Draining lubricant from the left end of the rotary disc pull-type may lead to breather contamination or failure.

4. Lower the rotary disc pull-type onto the blocks.
5. Shut down the engine, and remove the key from the ignition.
6. 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.

7. 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.

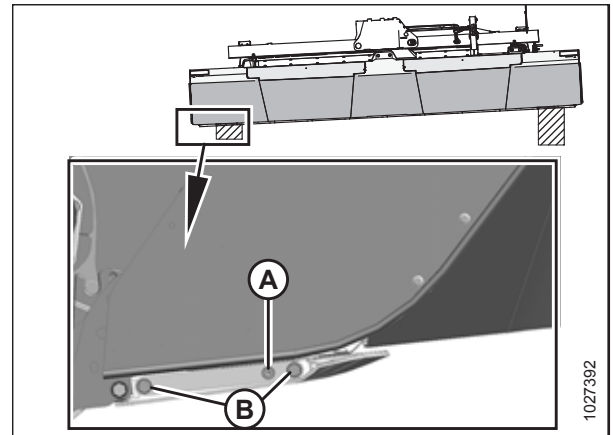


Figure 4.41: Draining Cutterbar

8. Fill the cutterbar with lubricant before operating the rotary disc pull-type. For instructions, refer to *Adding Lubricant into a Repaired Cutterbar, page 154*.

IMPORTANT:

Dispose of used lubricant responsibly.

9. Reinstall the right outboard rock guard. For instructions, refer to *Installing Outboard Rock Guards, page 192*.

Adding Lubricant into a Repaired Cutterbar

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, refer to [Checking and Adding Lubricant – Cutterbar, page 150](#).

DANGER

To avoid injury or death from 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

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 152](#).

1. Start the engine.
 2. Raise the rotary disc pull-type fully.
 3. Place a block under the right end of the rotary disc pull-type, so the right end is higher than the left end.
 4. Lower the rotary disc pull-type onto the blocks.
 5. Shut down the engine, and remove the key from the ignition.
 6. 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 190](#).
- NOTE:**
The reinforced rock guards are used on model year 2019 and later.
7. 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.

8. Reinstall access plug (A). Torque to 30 Nm (22 lbf-ft).

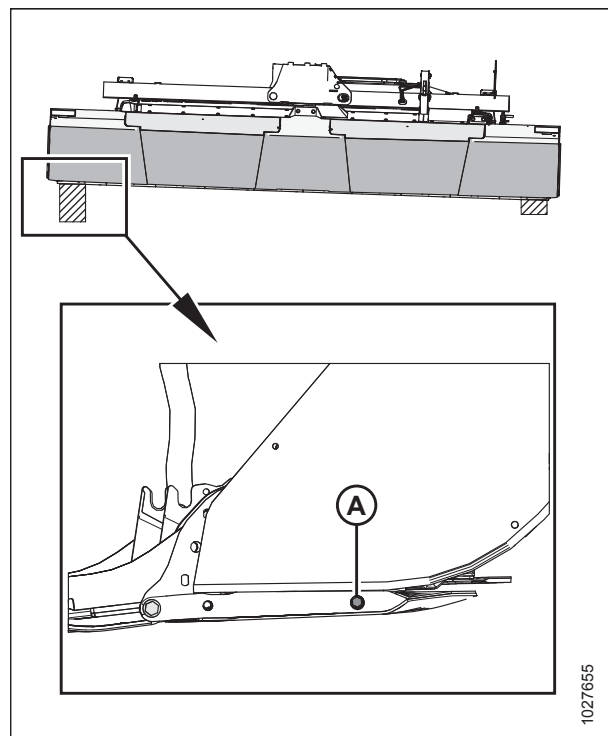


Figure 4.42: Filling Cutterbar

WARNING

Never start or move the machine until you are sure all bystanders have cleared the area.

9. Start the engine, and raise the header fully.
10. Engage the rotary disc pull-type lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
11. Shut down the engine, and remove the key from the ignition.
12. Remove the block from under the cutterbar.

13. Check the lubricant level. For instructions, refer to *Checking and Adding Lubricant – Cutterbar*, page 150.
14. Reinstall the right outboard rock guard. For instructions, refer to *Installing Outboard Rock Guards*, page 192.

4.4.4 Cutterbar Discs

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

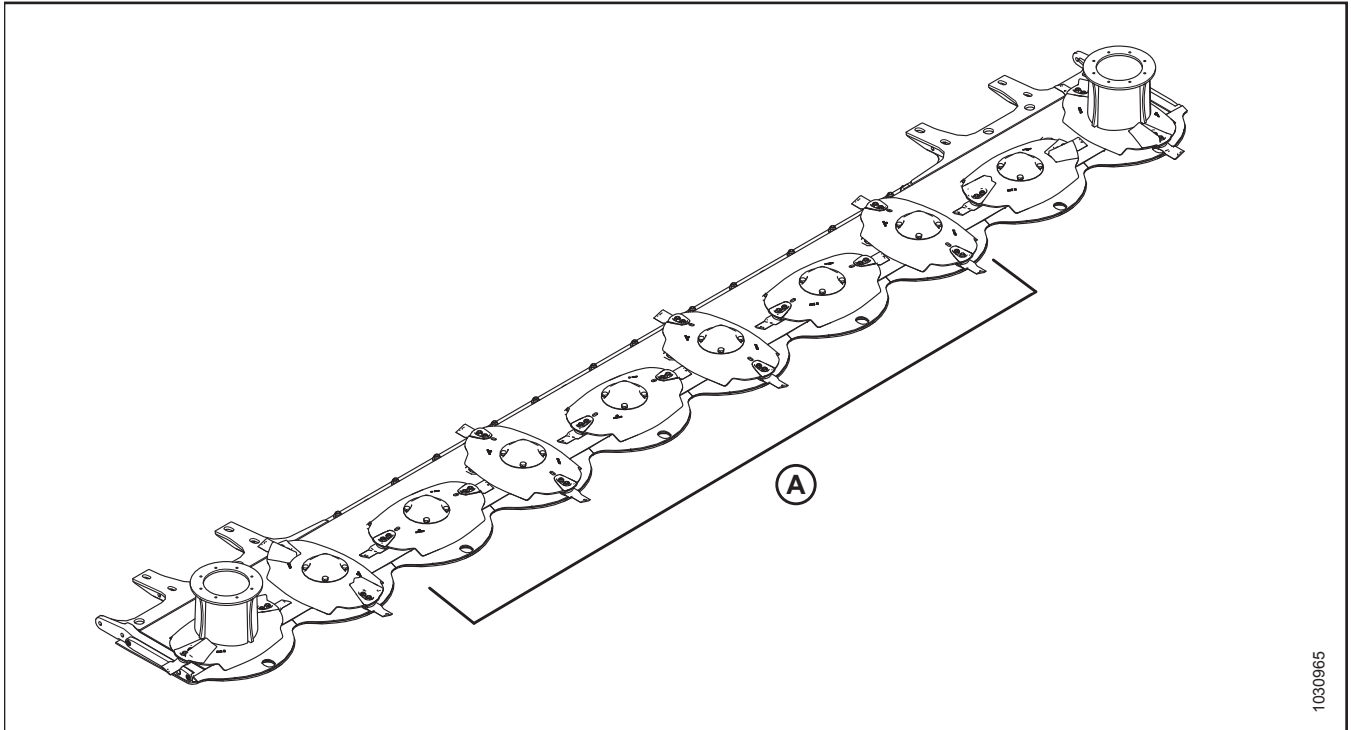


Figure 4.43: Interchangeable Cutterbar Discs

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

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.

! WARNING

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

MAINTENANCE AND SERVICING

1. 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.

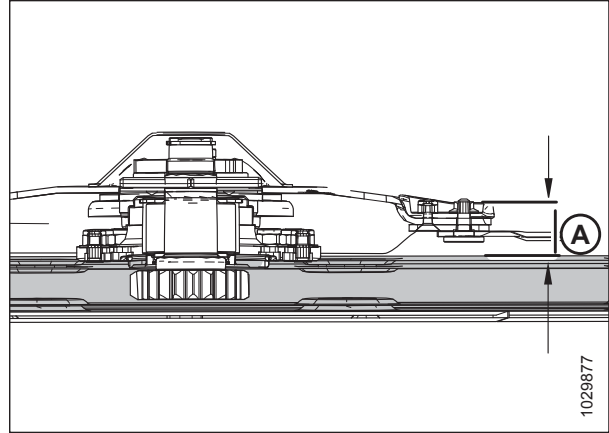


Figure 4.44: Cutterbar Disc

2. 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.)

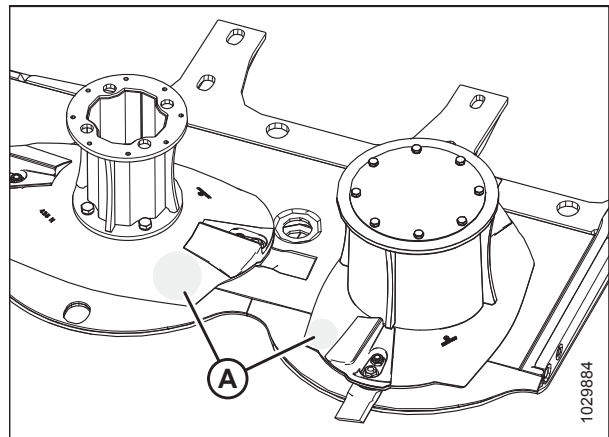


Figure 4.45: Cutterbar Disc

3. Inspect cutterbar disc surface (D) for cracks, excessive wear, and check if the disc is distorted. Replace any damaged discs immediately.
4. Inspect cutterbar disc edges (E) for cracks, excessive wear, and check if the edge is distorted. Replace any damaged components immediately.
5. 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.
6. Check that cutterbar disc bolts (C) are securely attached to the spindles. Tighten the bolts as needed.

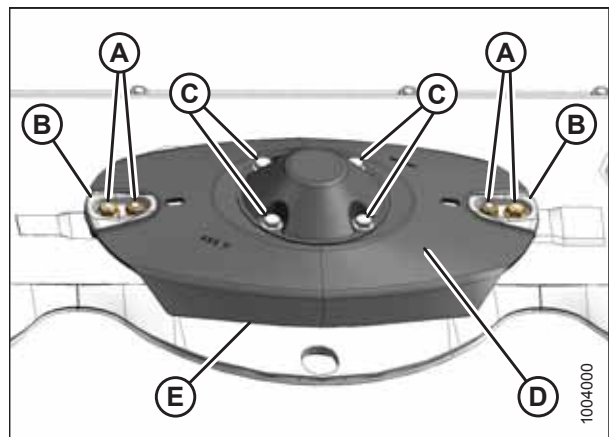


Figure 4.46: Cutterbar Disc

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

WARNING

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
4. Open the cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

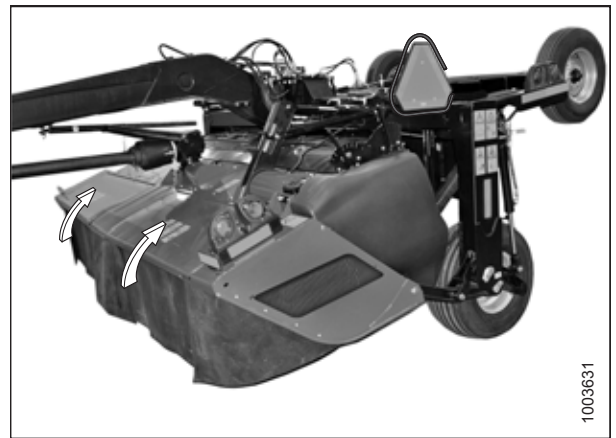


Figure 4.47: Cutterbar Doors – R1 Series Rotary Disc Pull-Type

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).

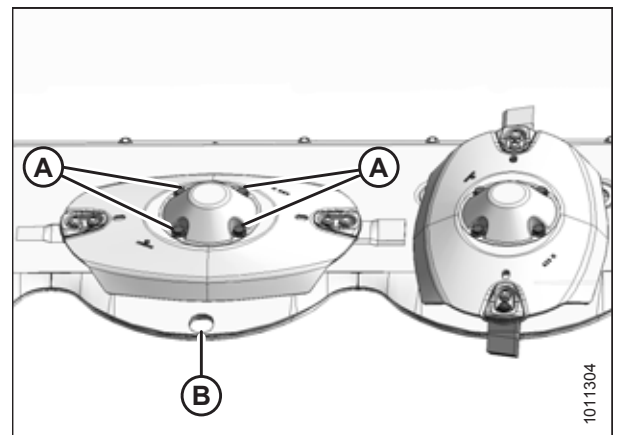


Figure 4.48: Cutterbar Disc Bolts

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

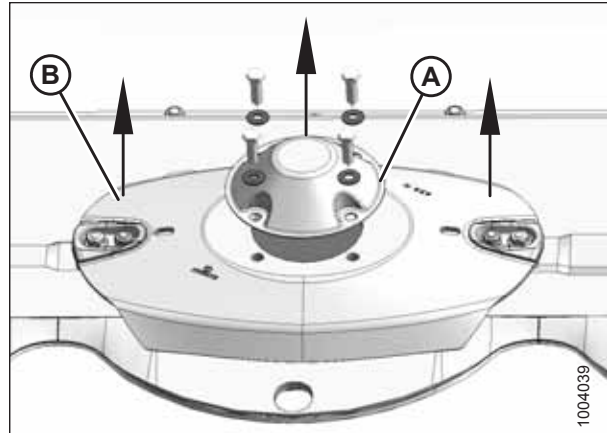


Figure 4.49: Cutterbar Disc and Cap

Installing Cutterbar Discs

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

DANGER

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

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. Install spacer plate (A) on the spindle.

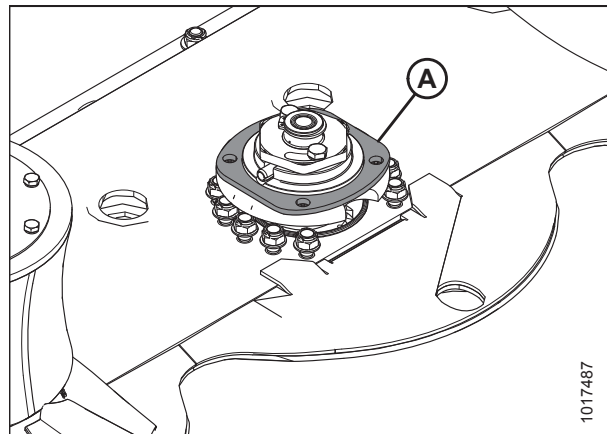


Figure 4.50: Disc Spindle

MAINTENANCE AND SERVICING

3. 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.
4. Position new disc (A) on the spindle so that the blades are perpendicular to those on the adjacent discs.
5. 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).

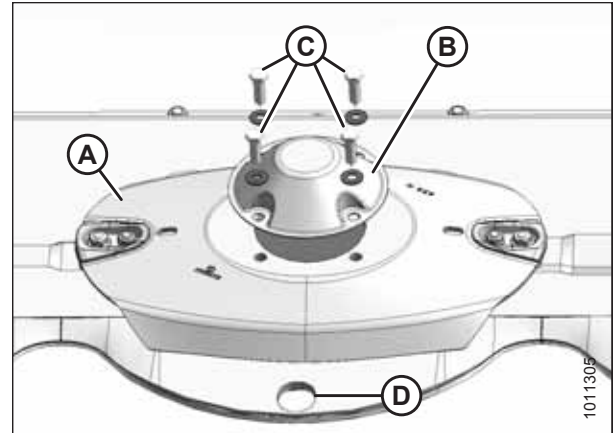


Figure 4.51: Cutterbar Disc and Cap

WARNING

Ensure 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.

6. Remove the pin (or equivalent) from the front hole of the rock guard.
7. Close the cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors, page 39](#).



Figure 4.52: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

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 (as shown by [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 thanks to 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 219](#) for instructions on replacing the shear pin.

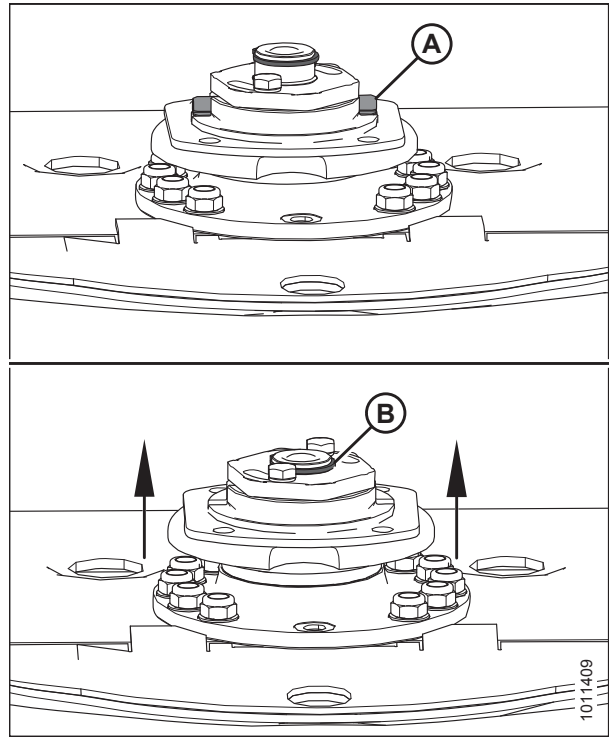


Figure 4.53: Cutterbar Spindles

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.

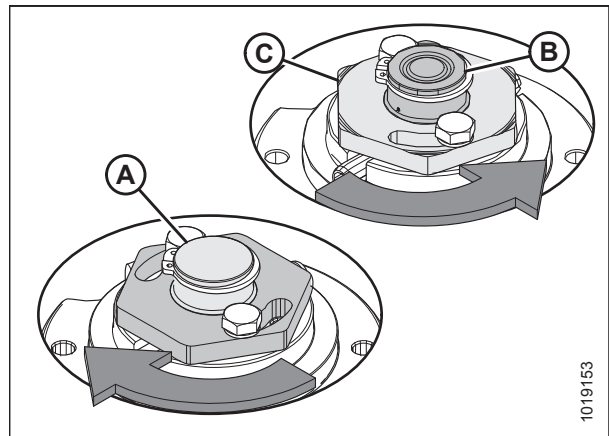


Figure 4.54: Cutterbar Spindles

Removing Cutterbar Spindles

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

DANGER

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

WARNING

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

1. Park the machine on a flat, level surface.
2. Lower the rotary disc pull-type fully.

NOTE:

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

3. Shut down the engine, and remove the key from the ignition.
4. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

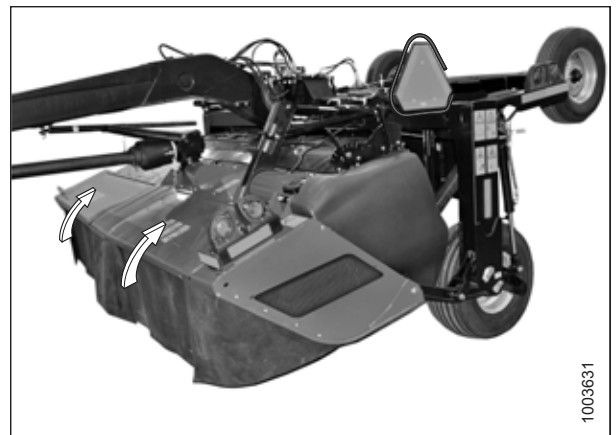


Figure 4.55: Cutterbar Doors – R1 Series Rotary Disc Pull-Type

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

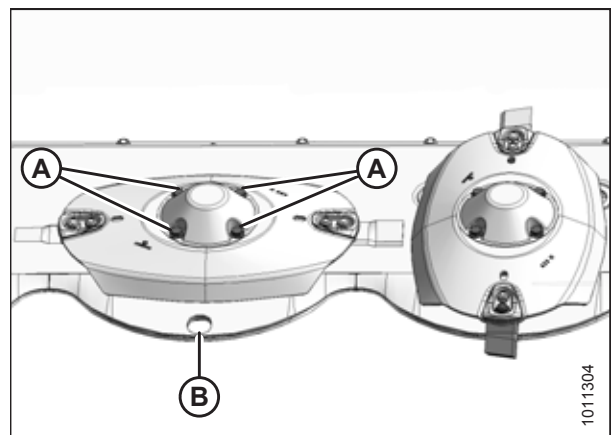


Figure 4.56: Cutterbar Disc Bolts

MAINTENANCE AND SERVICING

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

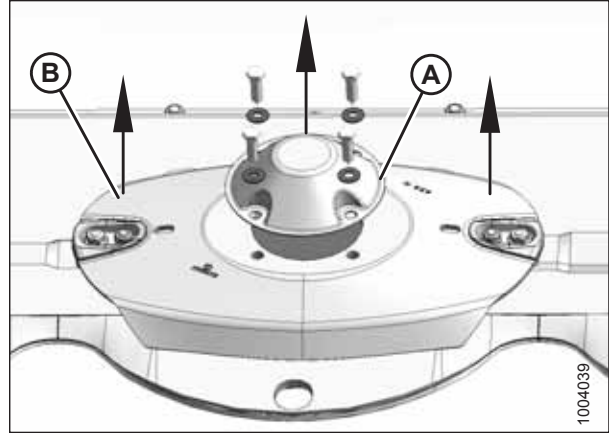


Figure 4.57: Cutterbar Disc and Cap

9. Remove spacer plate (A).

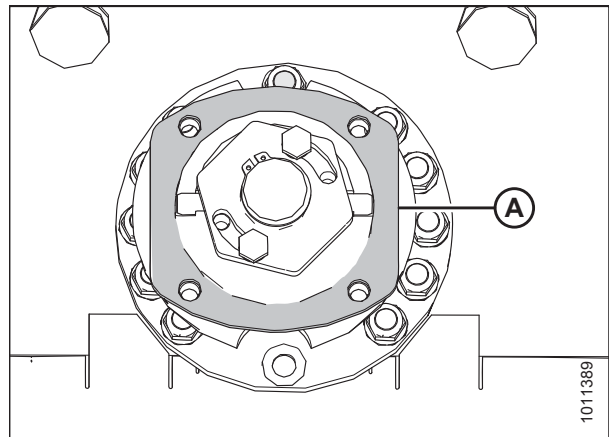


Figure 4.58: Spacer Plate

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

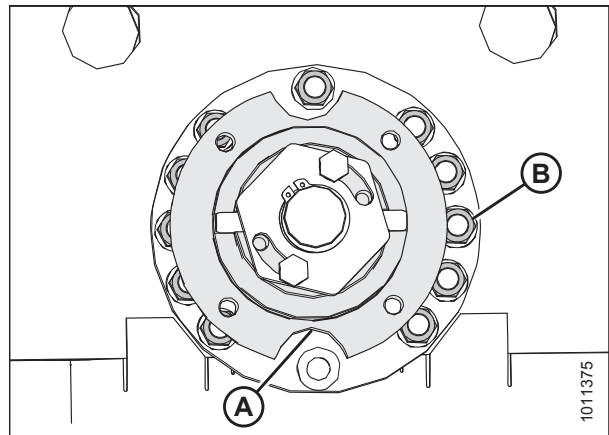


Figure 4.59: Left Spindle Hub and Hardware

11. Remove spindle (A) from the cutterbar.

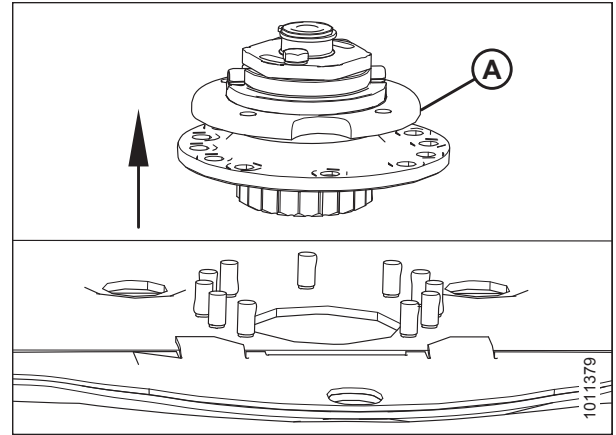


Figure 4.60: Left Spindle

Installing Cutterbar Spindles

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

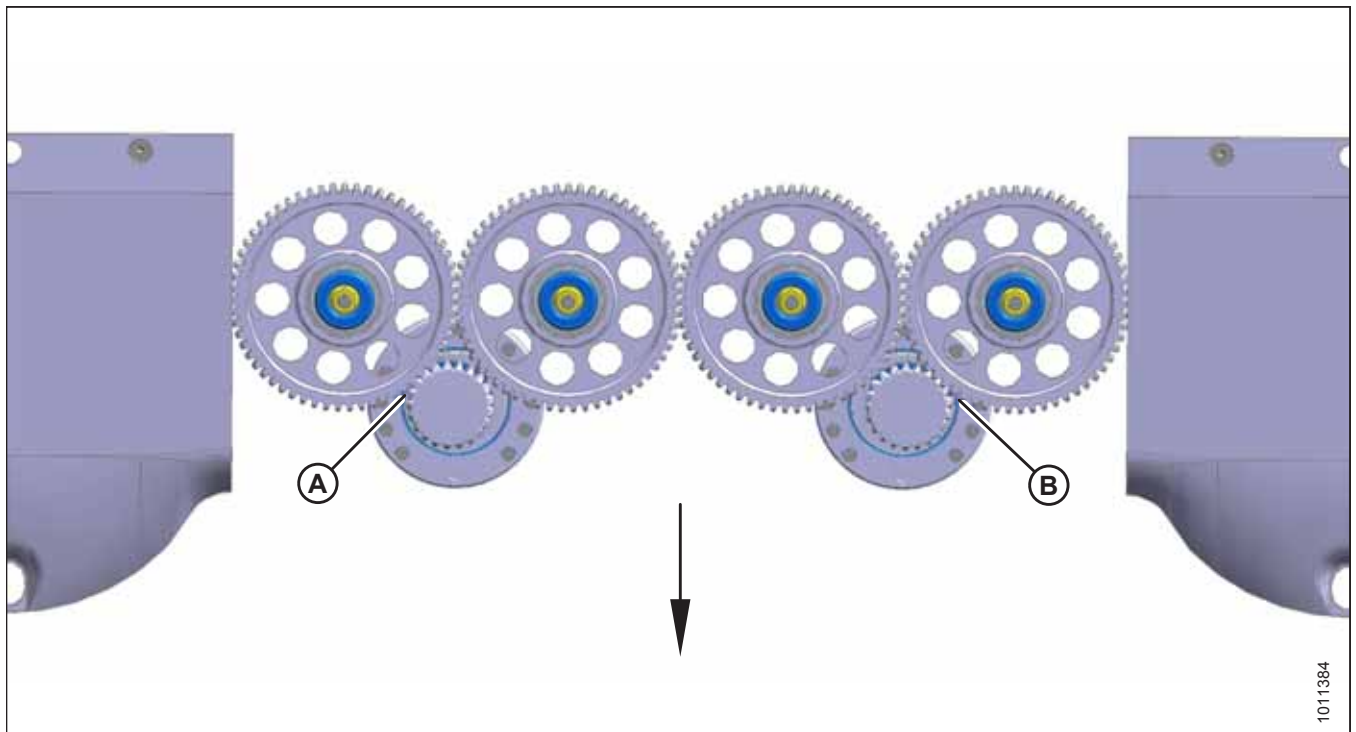


Figure 4.61: Underside of Cutterbar Spindles

IMPORTANT:

Right discs (A) and left discs (B) are timed and must be perpendicular to adjacent discs when they are reinstalled. Misaligned discs could result in the following:

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

Check the clearance between blades of adjacent discs before tightening the spindle to the cutterbar. Turn the disc by hand to ensure that the disc blades do not contact each other or adjacent discs. If contact occurs or if the alignment is incorrect, lift the spindle to clear the mounting bolts, rotate the spindle 180° while ensuring that the base does not turn, and reinstall the disc. Recheck the timing before bolting the hub down and tightening all of the nuts.

MAINTENANCE AND SERVICING

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

DANGER

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

WARNING

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

1. Park the machine on a flat, level surface.
2. Lower the rotary disc pull-type fully.

NOTE:

To prevent oil from spilling from the cutterbar while installing disc spindles, ensure the rotary disc pull-type is on a flat, level surface and is tilted all the way back.

3. Shut down the engine, and remove the key from the ignition.
4. Choose a suitable spindle rotation pattern. For more information, refer to [4.4.5 Replacing Cutterbar Spindles](#), page 160.

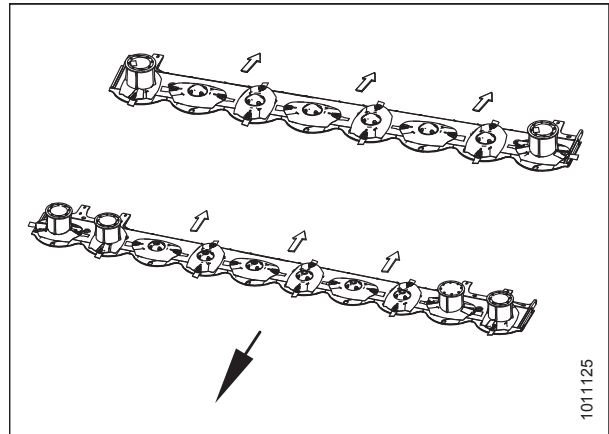


Figure 4.62: R113 and R16 PT Cutterbars

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

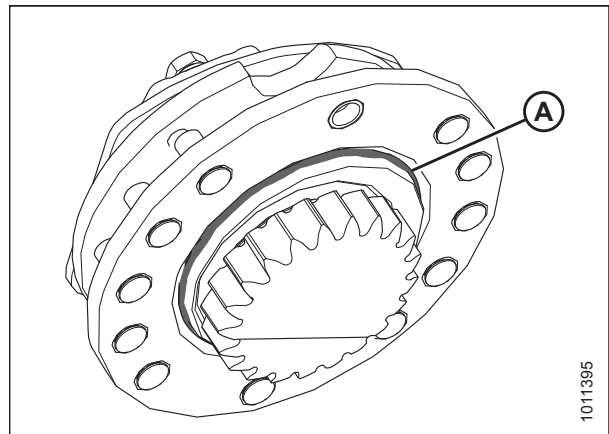


Figure 4.63: Left Spindle O-Ring

6. Insert spindle (A) into the cutterbar.

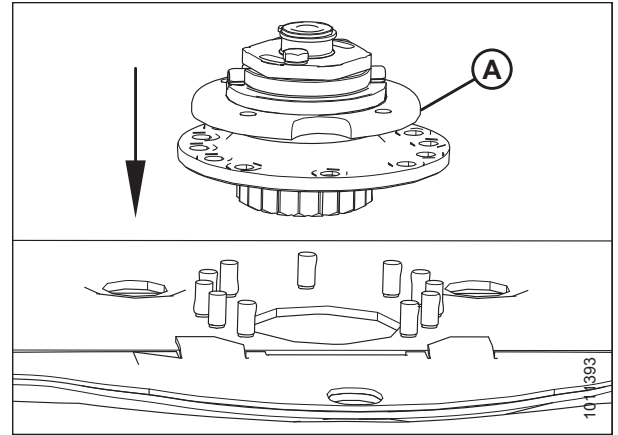


Figure 4.64: Left Spindle

7. 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.

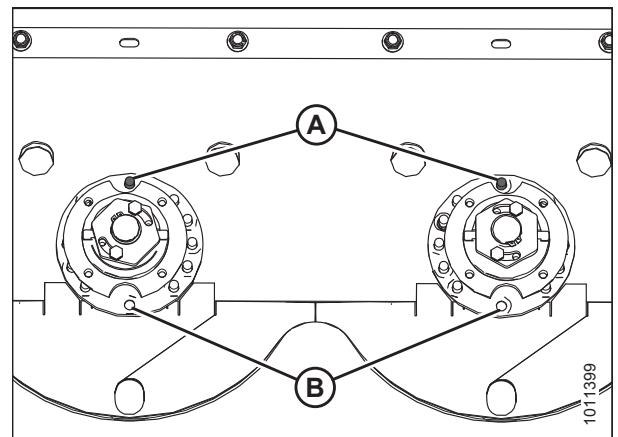


Figure 4.65: Spindle Orientation

8. Ensure that hub (A) is fully seated into the cutterbar before tightening nuts (B).
9. Rotate spindle hub (A) to access the studs, and install 11 M12 lock nuts (B) and washers.

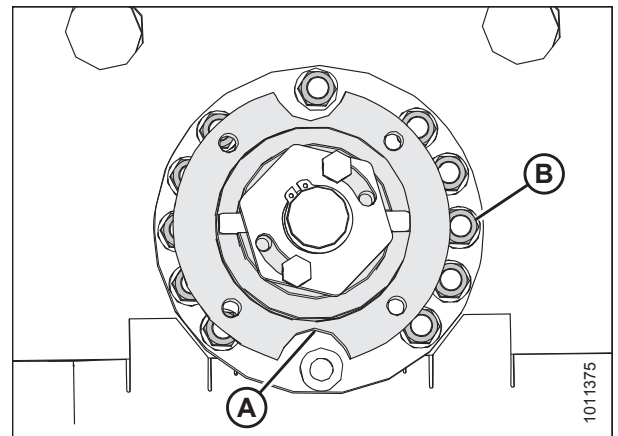


Figure 4.66: Left Spindle Hub

MAINTENANCE AND SERVICING

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

NOTE:

The hub has been removed from the illustration for the sake of clarity.

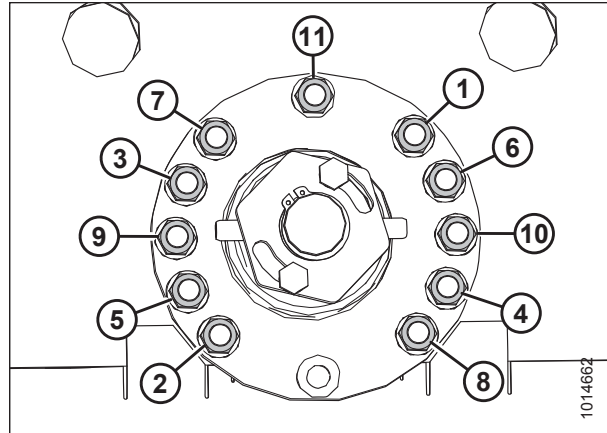


Figure 4.67: Tightening Pattern

- Install spacer plate (A).

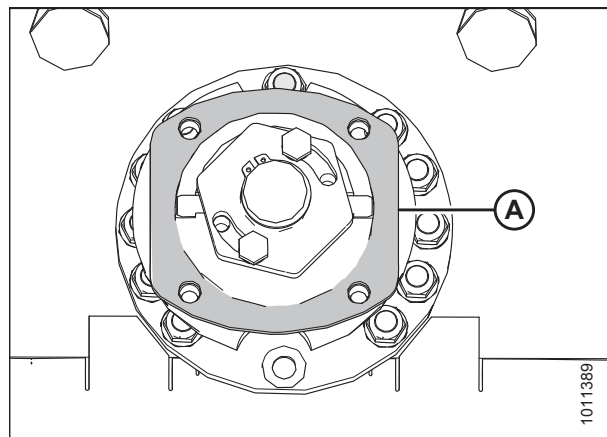


Figure 4.68: Spacer Plate

- 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.

- 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.

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

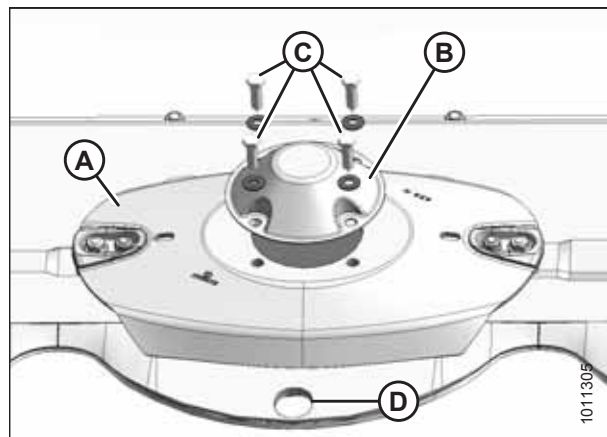


Figure 4.69: Cutterbar Disc and Cap

WARNING

Ensure 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.

15. Remove the pin (or equivalent) from the front hole of the rock guard.
16. Close cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.



Figure 4.70: R1 Series Rotary Disc Pull-Type

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.

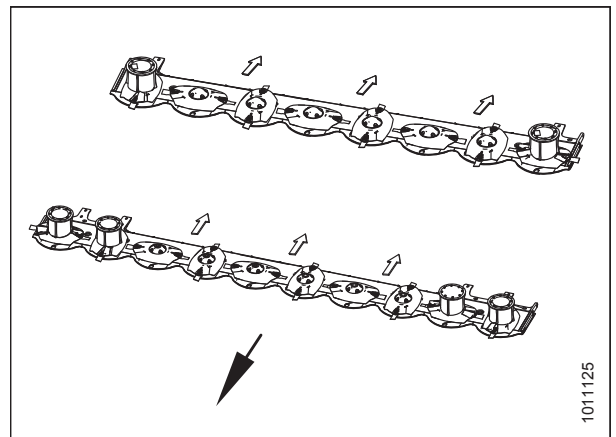


Figure 4.71: R113 and R116 PT Cutterbars

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.

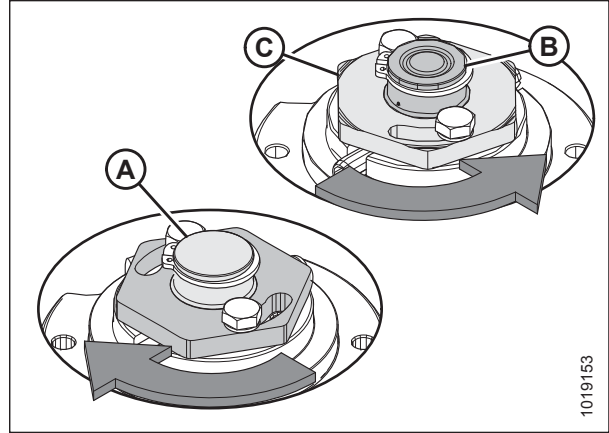
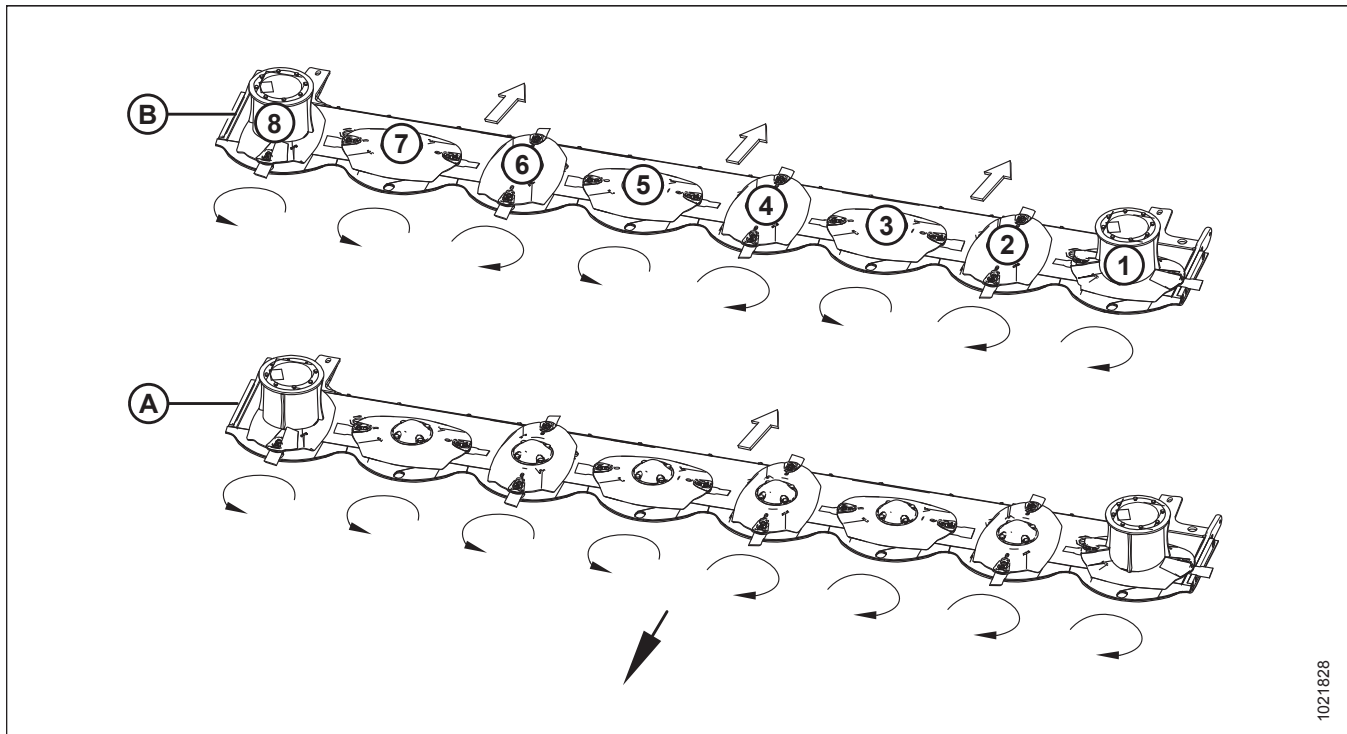


Figure 4.72: Cutterbar Spindles

Changing R113 PT Cutterbar Crop Stream Configuration

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

Figure 4.73: R113 PT (8 Disc) Spindle Rotation Pattern and Crop Streams



A - One Crop Stream

B - Three Crop Streams

To change R113 PT (8 disc) spindle rotation from three crop streams (B) to one crop stream (A):

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

To change R113 PT (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 161* and *Installing Cutterbar Spindles, page 163*.

Changing R116 PT Cutterbar Crop Stream Configuration

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

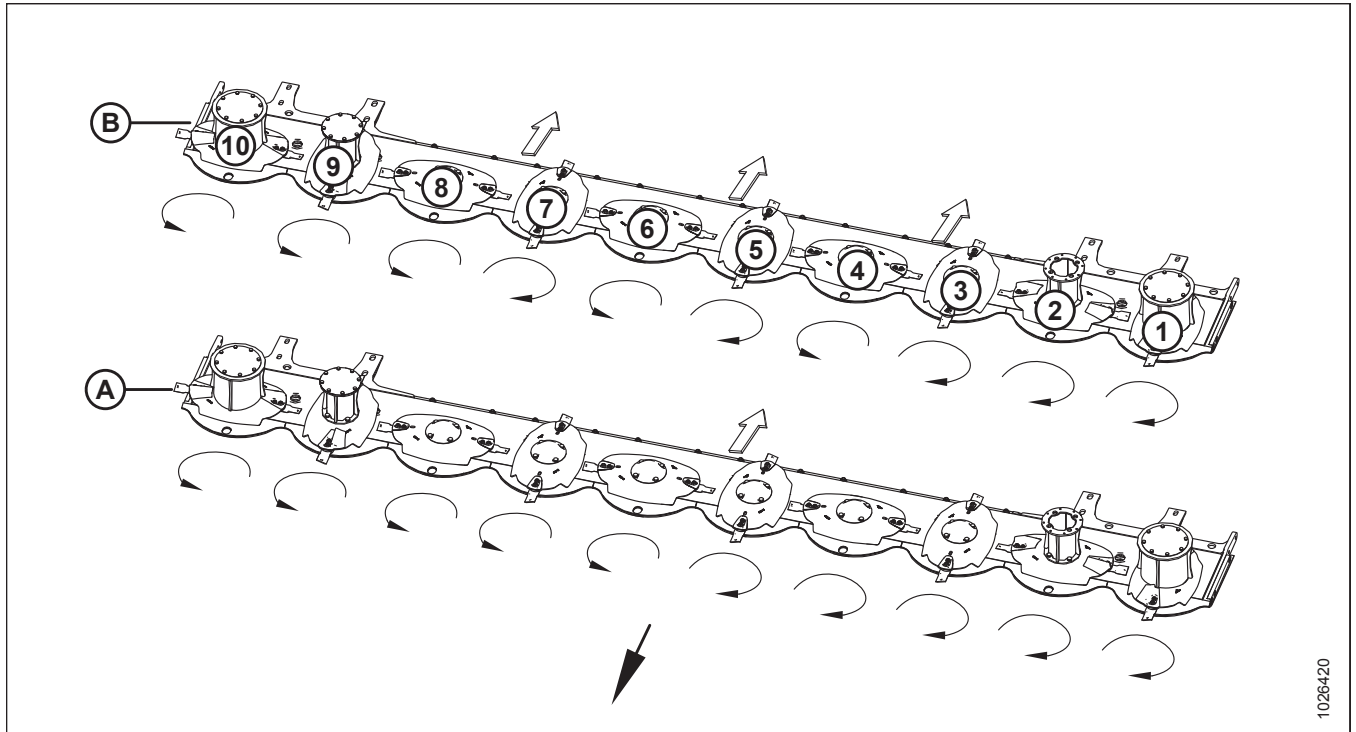


Figure 4.74: R116 PT (10 Disc) Spindle Rotation Pattern and Crop Streams

A - One Crop Stream

B - Three Crop Streams

To change R116 PT (10 disc) spindle rotation from one crop stream (A) to three crop streams (B):

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

To change R116 PT (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 161](#) and [Installing Cutterbar Spindles, page 163](#).

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.

The 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. Refer to the R113 and R116 Rotary Disc Pull-Type Parts Catalog.

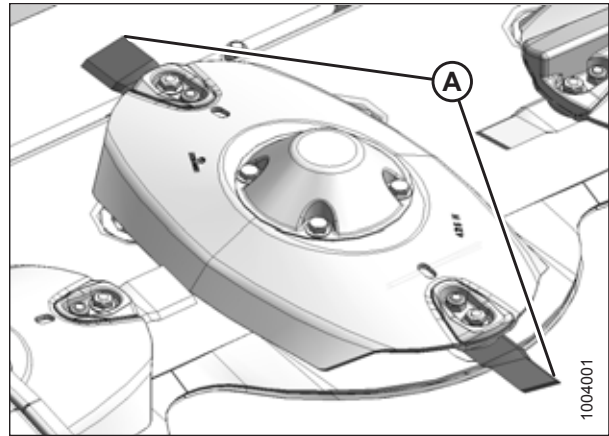


Figure 4.75: Disc blades

Inspecting Disc Blades

Inspect the discs regularly for damage and wear. Replace damaged blades immediately.

⚠ DANGER

To avoid bodily injury or death from 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. Never work on or beneath an unsupported header. If the header is fully raised, always engage safety props. If the header is off the ground and not fully raised, place blocks under the header.

⚠ WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with 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. Place the header in a position where you can access the component that will be serviced.
2. Shut down the engine, and remove the key from the ignition.
3. Lower the pull-type onto blocks or leave the pull-type raised. If leaving the pull-type in the raised position, close the lift cylinder safety valves. Refer to [3.1.1 Engaging Locks, page 31](#).

MAINTENANCE AND SERVICING

4. Check daily that the disc blades are securely attached to the disc.
5. Inspect blades for cracks, blade wear (A), and/or elongated holes (B) beyond safe operating limits (C).
6. Replace blades immediately when problems are noticed.

IMPORTANT:

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

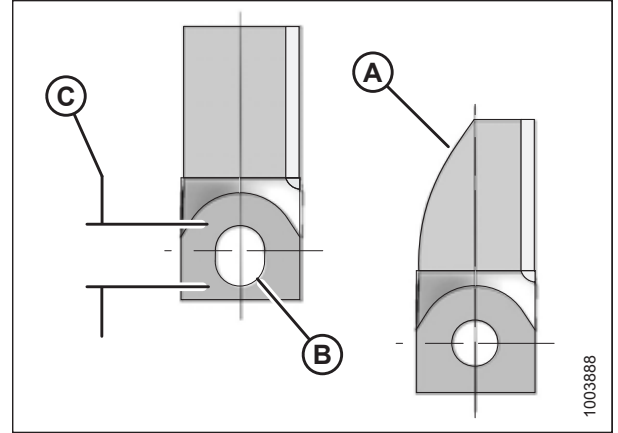


Figure 4.76: Disc Blades

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

- [Changing R113 PT Cutterbar Crop Stream Configuration, page 168](#)
- [Changing R116 PT Cutterbar Crop Stream Configuration, page 169](#)

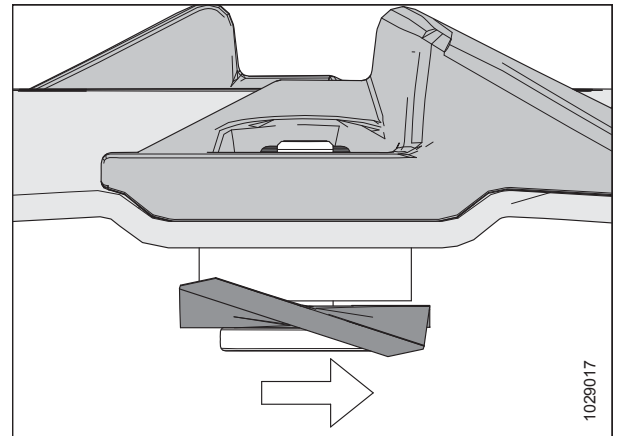


Figure 4.77: Counterclockwise Disc Rotation

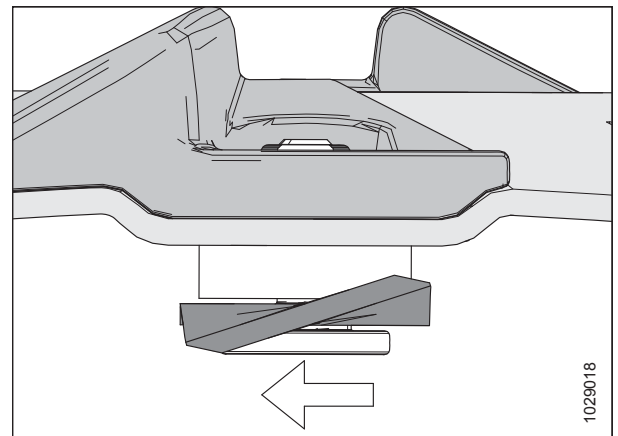


Figure 4.78: Clockwise Disc Rotation

MAINTENANCE AND SERVICING

Inspecting Disc Blade Hardware

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

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.

WARNING

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

Refer to *Removing Disc Blades, page 174* and *Installing Disc Blades, page 176* for hardware replacement procedure.

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

MAINTENANCE AND SERVICING

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

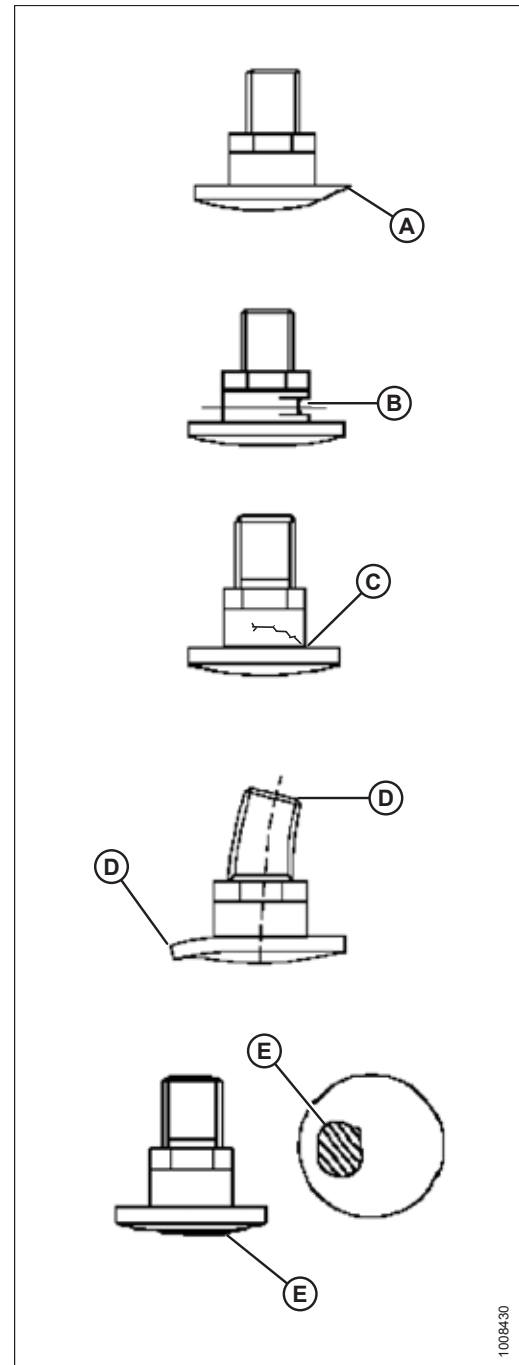


Figure 4.79: Disc Blade Bolts

MAINTENANCE AND SERVICING

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

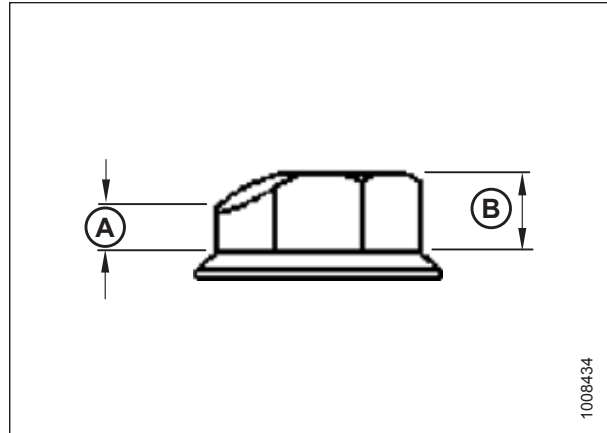


Figure 4.80: Disc Blade Nut

Removing Disc Blades

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

DANGER

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

WARNING

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
4. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

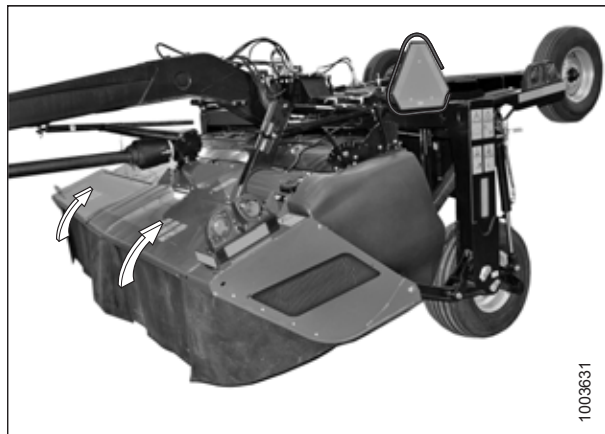


Figure 4.81: R1 Series Rotary Disc Pull-Type

MAINTENANCE AND SERVICING

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

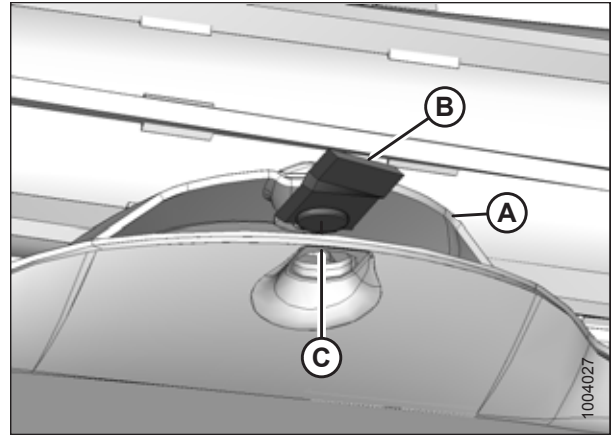


Figure 4.82: Disc Blade Aligned with Hole in Rock Guard

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

IMPORTANT:

Nuts are one-time use items. When you are flipping or replacing a blade, replace it using a **NEW** nut.

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

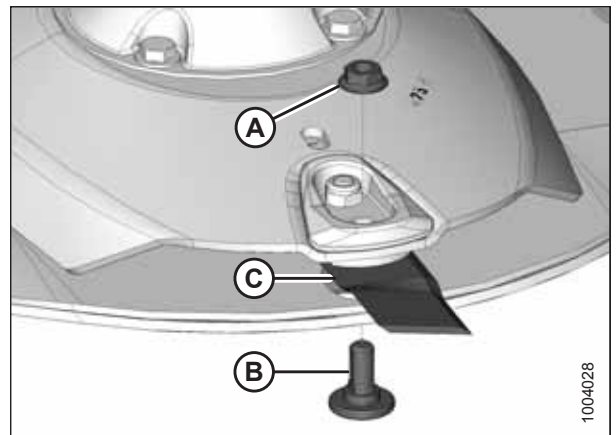


Figure 4.83: Disc Blade

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

! WARNING

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

IMPORTANT:

If you are unsure in which direction the spindles rotate, refer to [4.4.6 Reconfiguring Cutterbar Crop Stream, page 167](#).

1. Shut down the engine, and remove the key from the ignition.
2. 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.
3. Install new or reversed blade (A) with shoulder bolt (B) onto disc (C).

IMPORTANT:

Nuts are one-time use items. When flipping or changing a blade, replace it using a **NEW** nut.

4. Install new nut (D) and torque it to 125 Nm (92 lbf-ft).

! WARNING

Ensure 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.

5. Close cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors, page 39](#).

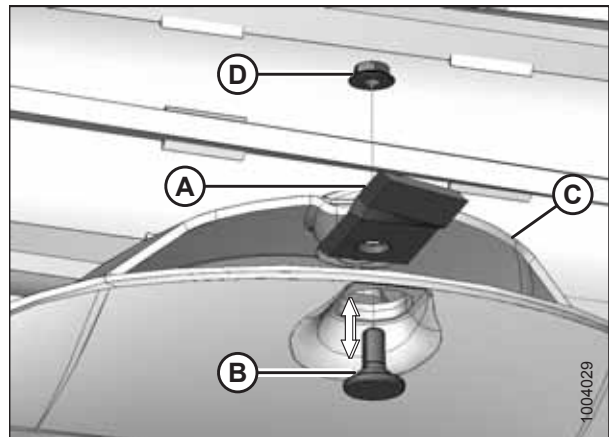


Figure 4.84: Disc Blade



Figure 4.85: R1 Series Rotary Disc Pull-Type

4.4.8 Maintaining Quick Change Blade System

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

WARNING

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

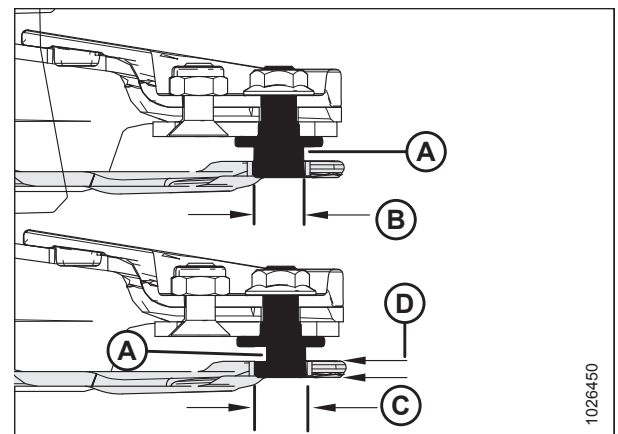


Figure 4.86: Retaining Bolt and Quick Change Plate

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

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

MAINTENANCE AND SERVICING

2. Remove hairpin clip (A).
3. Remove pin (B).
4. Remove change tool (C).

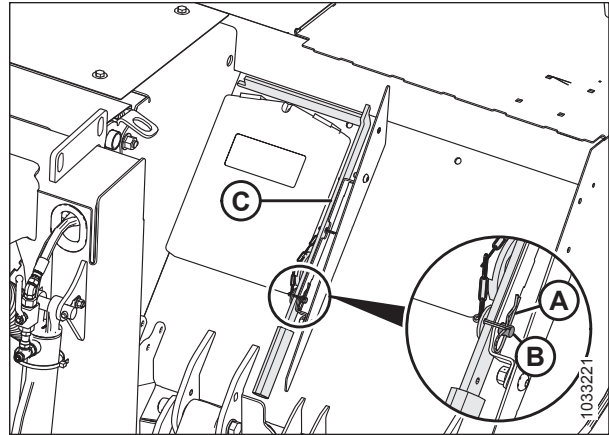


Figure 4.87: Installing Quick Change Blade

5. 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.

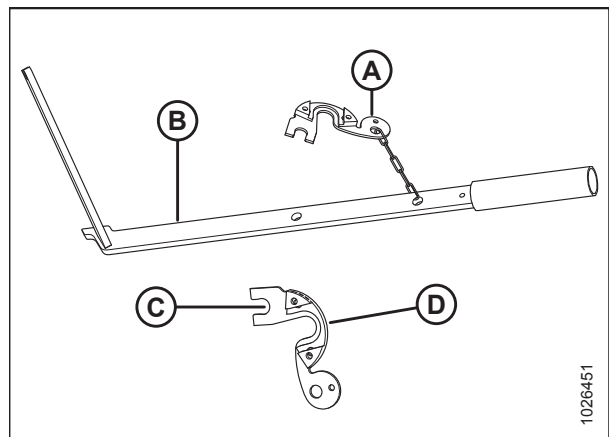


Figure 4.88: Change Tool and Gauge

6. Thoroughly clean the area around and between the retaining bolts and the quick change plate.
7. Remove the blade. For instructions, refer [Replacing Quick Change Blades, page 180](#).
8. 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.

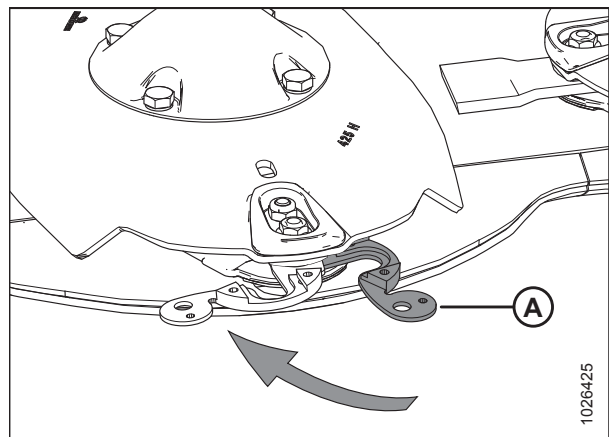


Figure 4.89: Checking Retaining Bolts

Inspecting Quick Change Plates

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

⚠ DANGER

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

⚠ WARNING

Disc blades have two sharp cutting edges that can cause serious injury. Exercise caution and wear gloves when working with 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 gauge (A).

1. Shut down the engine, and remove the key from the ignition.
2. Remove hairpin clip (A).
3. Remove pin (B).
4. Remove change tool (C).

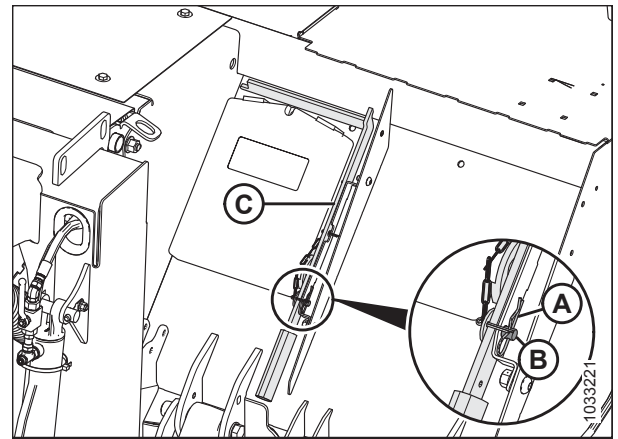


Figure 4.90: Installing Quick Change Blade

5. 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.

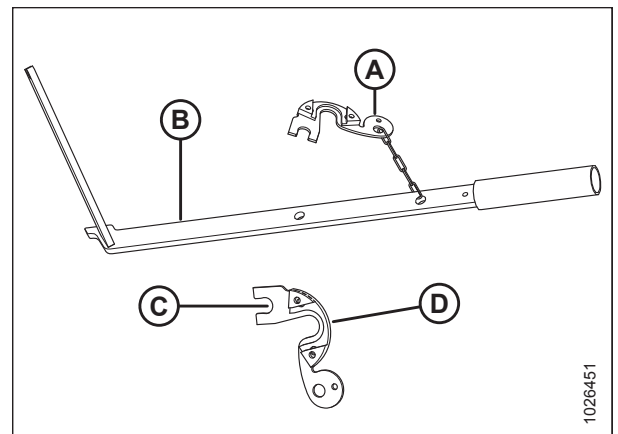


Figure 4.91: Change Tool and Gauge

MAINTENANCE AND SERVICING

6. Thoroughly clean the area around and between the retaining bolt and the quick change plate.
7. Place gauge (A) against the retaining bolt of the quick change plate (B) as far as it will go.

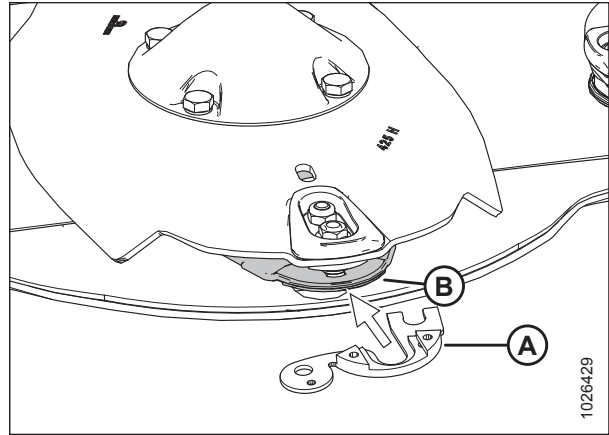


Figure 4.92: Gauge and Quick Change Plate

- 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.

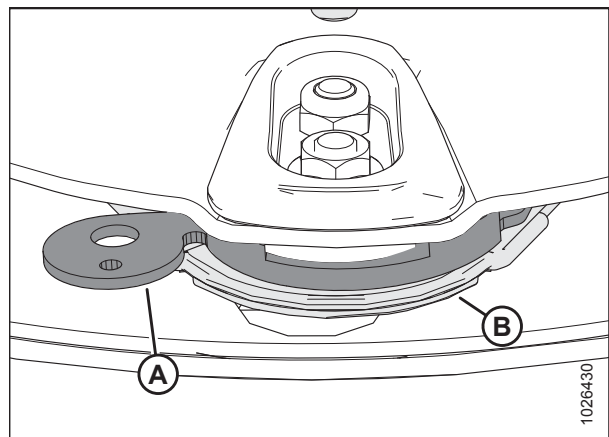


Figure 4.93: Gauge and Change Plate Aligned

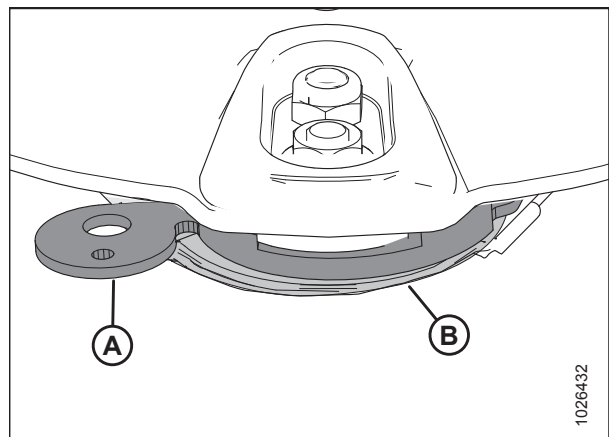


Figure 4.94: Gauge and Change Plate Unaligned

Replacing Quick Change Blades

DANGER

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

⚠ WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Remove hairpin clip (A).
3. Remove pin (B).
4. Remove blade change tool (C) from the storage location.

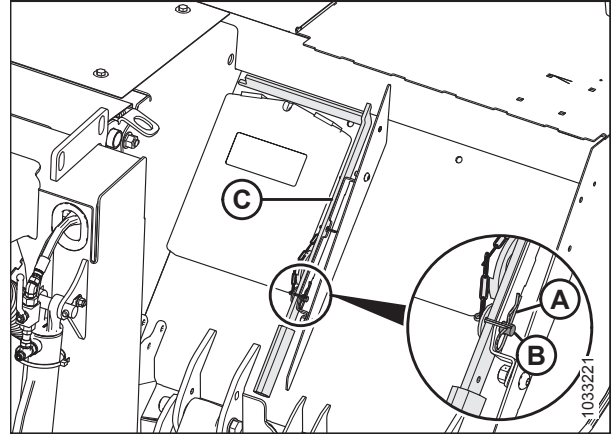


Figure 4.95: Blade Change Tool Storage Location

5. Open the cutterbar doors. Refer to your operator's or technical manual.

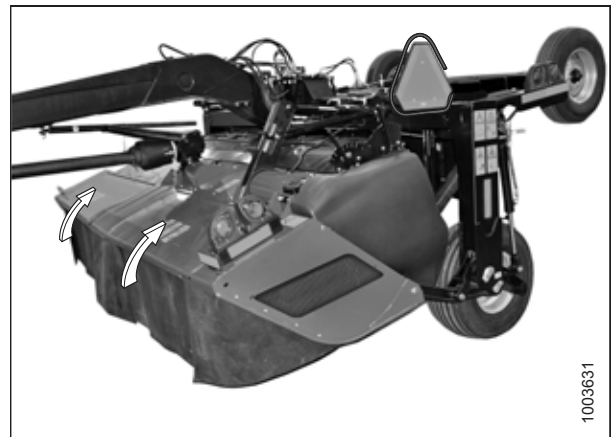


Figure 4.96: Pull-Type Disc Mower

6. 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.

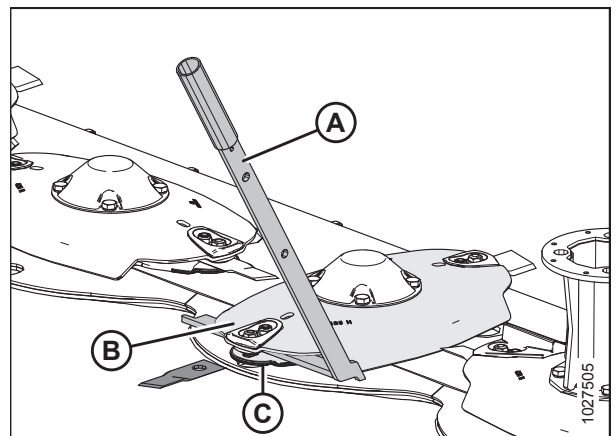


Figure 4.97: Blade Change Tool

MAINTENANCE AND SERVICING

IMPORTANT:

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

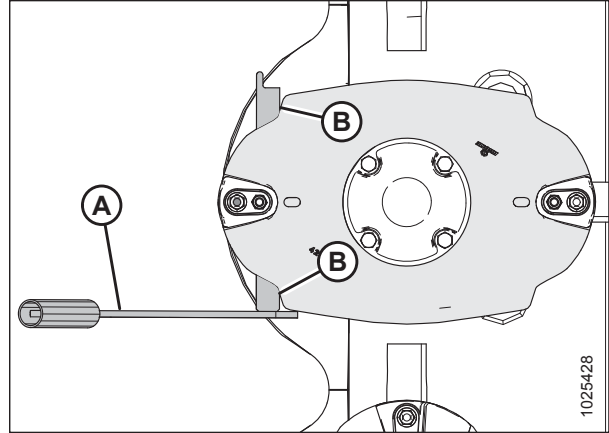


Figure 4.98: Correct Positioning of Blade Change Tool

8. 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.
9. Pull down on blade change tool (A) and separate disc (B) from quick change plate (C). Insert new blade (D) on blade bolt (E).
10. Push blade change tool (A) upward, enclosing new blade (D) in the disc assembly.
11. Return blade change tool to the storage location.

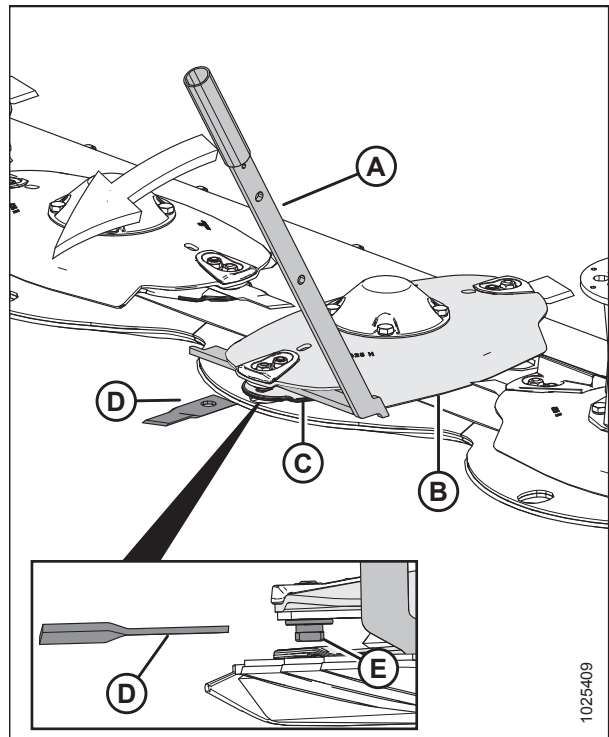


Figure 4.99: Installing Quick Change Blade

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 (indicated by [A] in the illustration) is installed on each disc which is topped with a drum. Two pairs of accelerators are installed on an R113 PT (one pair on the outboard disc at each end of the cutterbar) and two pairs are installed on an R116 PT (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.

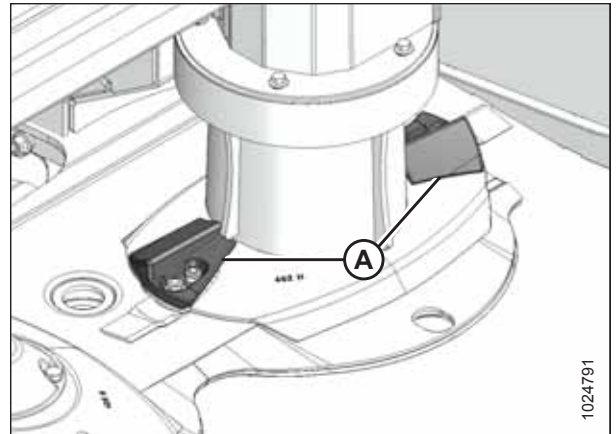


Figure 4.100: R113 PT Cutterbar Accelerators

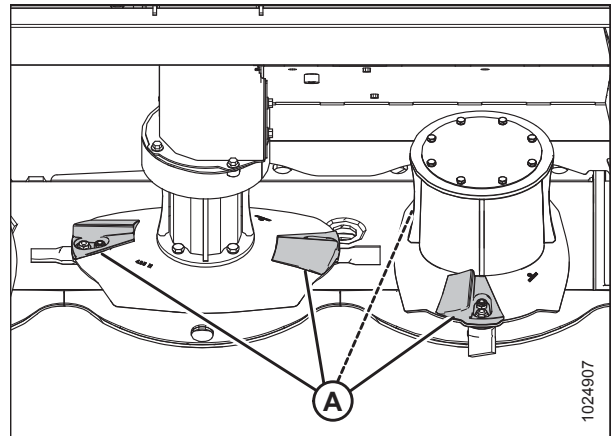


Figure 4.101: R116 PT Cutterbar Accelerators

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
4. Open the cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#) or [3.3.2 Opening Cutterbar Doors – Export Latches, page 38](#).

⚠ WARNING

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

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.

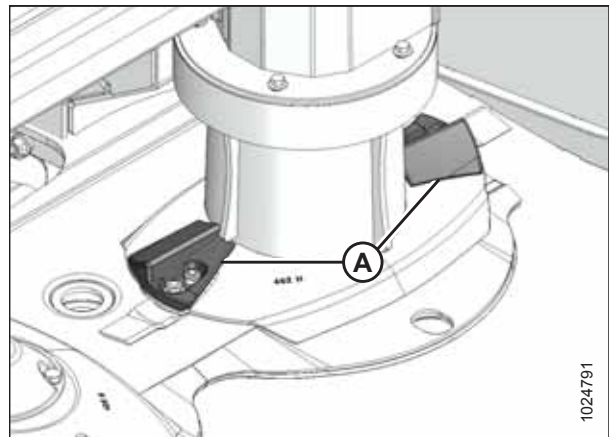


Figure 4.102: R113 PT Cutterbar Accelerators

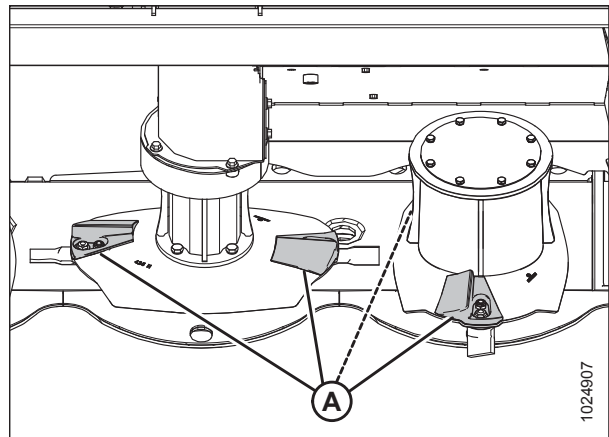


Figure 4.103: R116 PT Cutterbar Accelerators

Removing Accelerators

Accelerators need to be removed from cutterbar discs when they are damaged, or else when they are so worn that they can no longer effectively move crop from the discs to the conditioner.

⚠ DANGER

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

IMPORTANT:

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

1. Raise the rotary pull-type fully.
2. Shut off the engine, and remove the key from the ignition.
3. Engage lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).

MAINTENANCE AND SERVICING

4. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).



Figure 4.104: R1 Series Rotary Disc Pull-Type

WARNING

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

5. Remove nut (A), flange bolt (B), and disc blade (C) from the disc. Discard the nut.

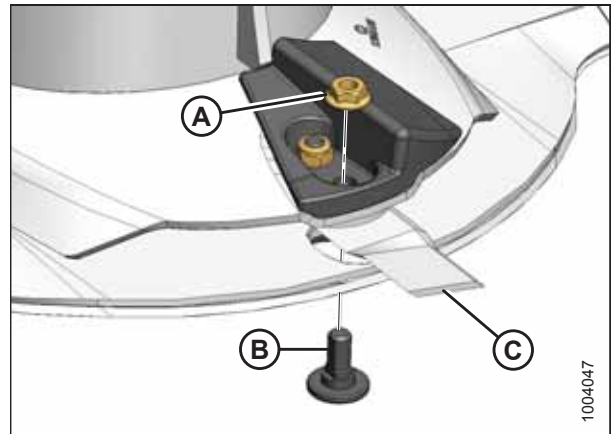


Figure 4.105: Accelerator Removal

6. Remove lock nut (A), accelerator (B), blade holder (C), and hex-socket bolt (D).
7. Repeat Steps [5, page 185](#) and [6, page 185](#) to remove the second accelerator.

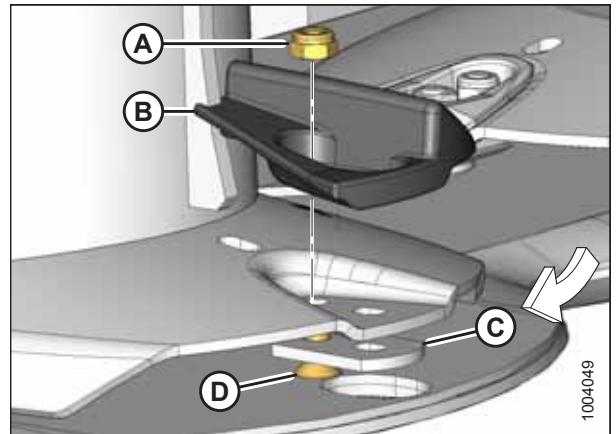


Figure 4.106: Accelerator Removal

Installing Accelerators

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

⚠ DANGER

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

⚠ WARNING

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

IMPORTANT:

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

1. 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 160](#).

2. Install lock nut (A), accelerator (B), blade holder (C), and hex-socket bolt (D). Do **NOT** tighten the hardware yet.
3. Install new nut (A), flange bolt (B), and disc blade (C) onto the disc.

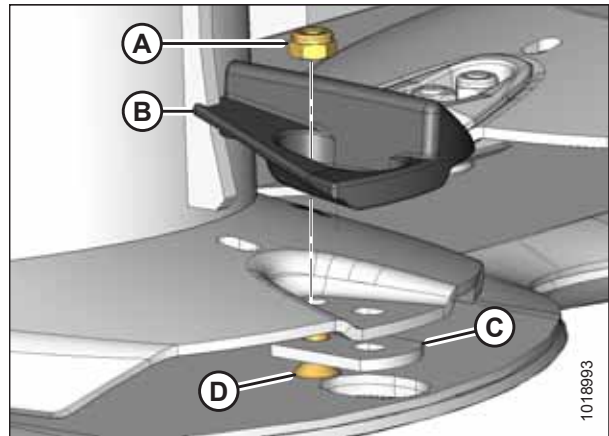


Figure 4.107: Accelerator Install

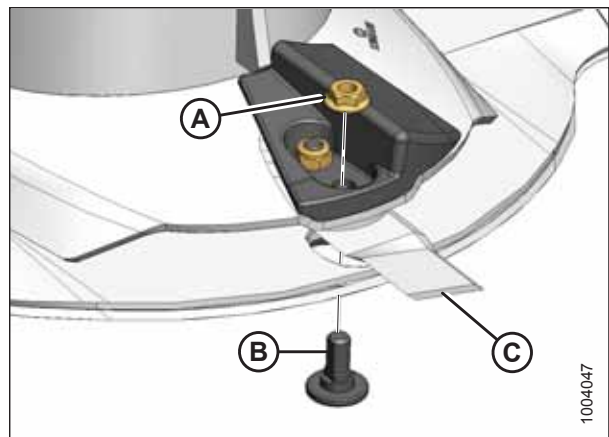


Figure 4.108: Accelerator Install

4. Torque inside nut (A) to 58 Nm (43 lbf-ft).
5. Torque outside nut (B) (closest to the blade) to 125 Nm (92 lbf-ft).
6. Repeat Steps 1, page 186 to 5, page 187 to replace the second accelerator.

WARNING

Ensure 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. Remove the wooden block.
8. Close the cutterbar doors. For instructions, refer to 3.3.3 *Closing Cutterbar Doors, page 39.*

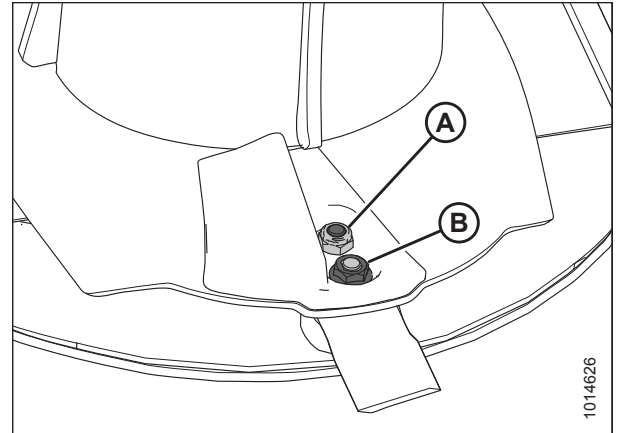


Figure 4.109: Accelerator Install

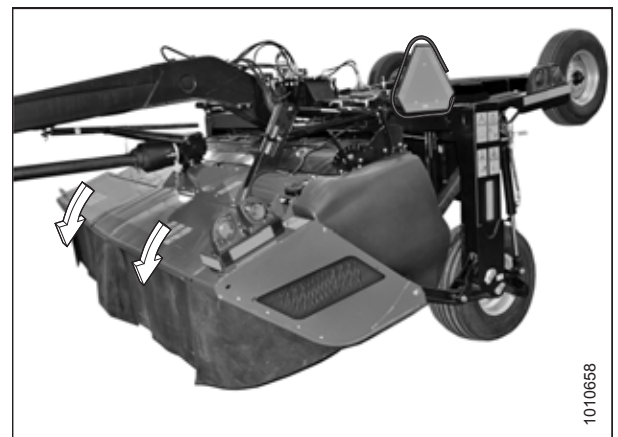


Figure 4.110: R1 Series Rotary Disc Pull-Type

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

WARNING

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.

MAINTENANCE AND SERVICING

3. Engage lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
4. Inspect the rock guards for wear, cracks, damage, or distortion. Replace rock guards if they are worn to 75% or less of their original thickness.
5. Check for loose or missing fasteners. Tighten or replace fasteners as needed.

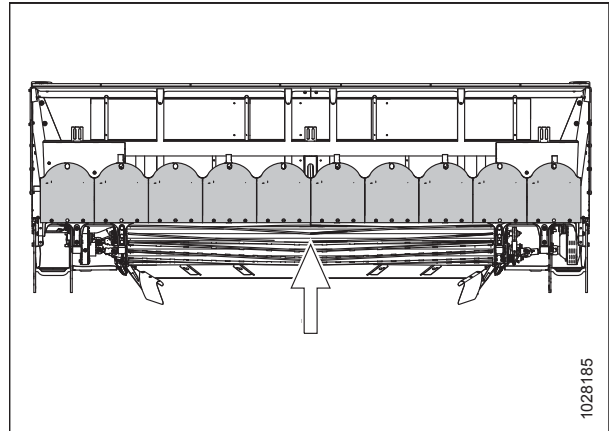


Figure 4.111: Rock Guards

Removing Inboard Rock Guards

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

WARNING

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
4. Remove two hex head screws, washers, and lock nuts (A).

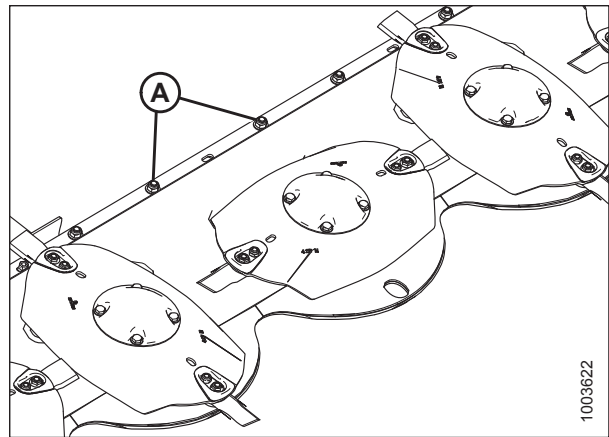


Figure 4.112: Inboard Rock Guards

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

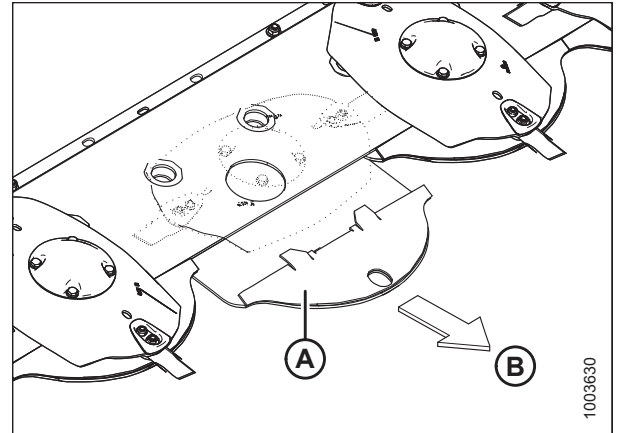


Figure 4.113: Inboard Rock Guards

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

- Raise the rotary disc pull-type fully.
- Shut down the engine, and remove the key from the ignition.
- Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
- 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.

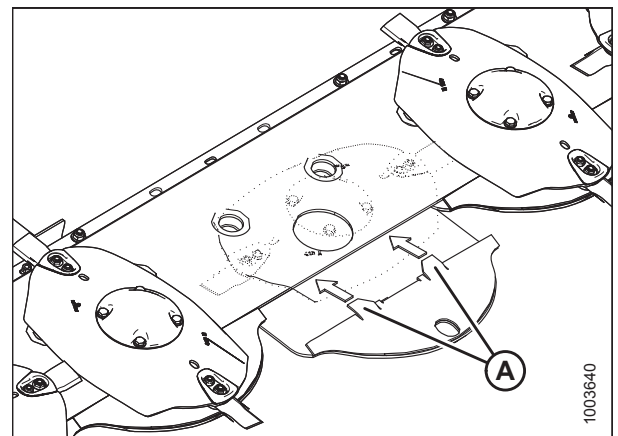


Figure 4.114: Inboard Rock Guards

MAINTENANCE AND SERVICING

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.

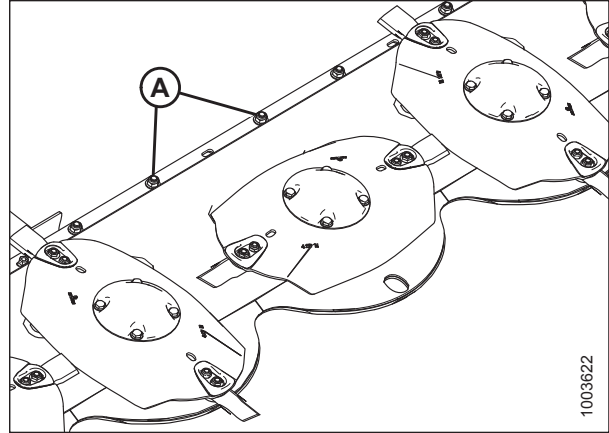


Figure 4.115: Inboard Rock Guards

Removing Outboard Rock Guards

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

! DANGER

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

! WARNING

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
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.

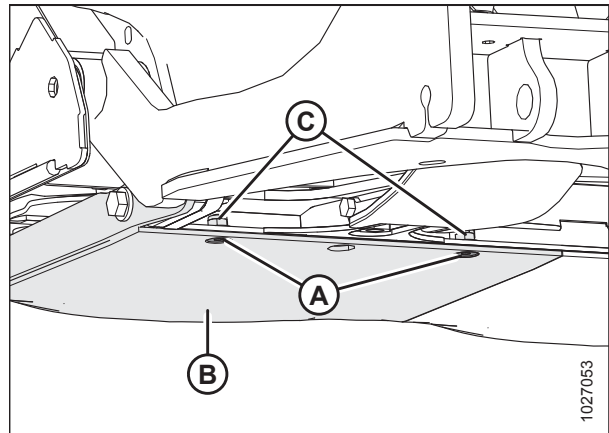


Figure 4.116: Left Outboard Rock Guard – Rear View

MAINTENANCE AND SERVICING

7. Remove bolt and washers (A).
8. Loosen bolt (B).
9. Remove rock guard (C) by sliding it forward.
10. Repeat Step 4, [page 190](#) to Step 9, [page 191](#) at the opposite side of the cutterbar.

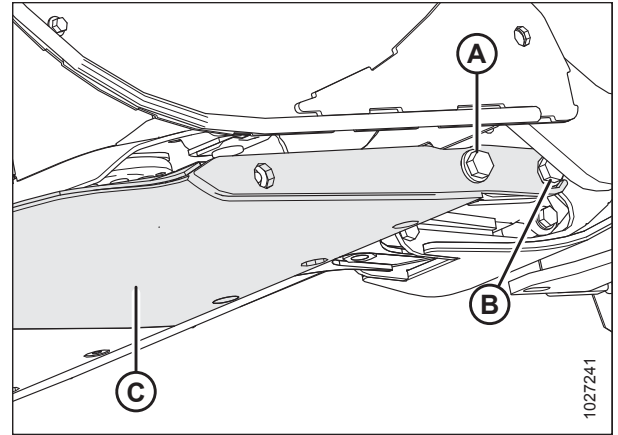


Figure 4.117: Left Outboard Rock Guard – Side View

Installing Outboard Rock Guards

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

DANGER

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

WARNING

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

1. Remove any debris on the cutterbar which could obstruct the installation of the outboard rock guard.
2. Raise the rotary disc pull-type 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 [3.1.1 Engaging Locks, page 31](#).
5. Apply medium-strength threadlocker (Loctite® 242 or equivalent) to bolt (B).

NOTE:

Some parts have been removed for the sake of 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 rotary pull-type 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).

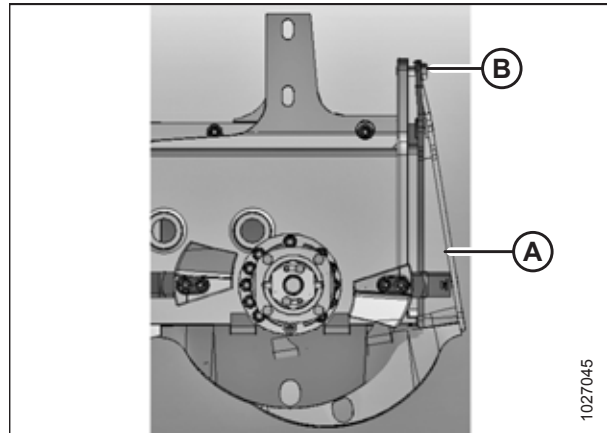


Figure 4.118: Left Outboard Rock Guard – Angled

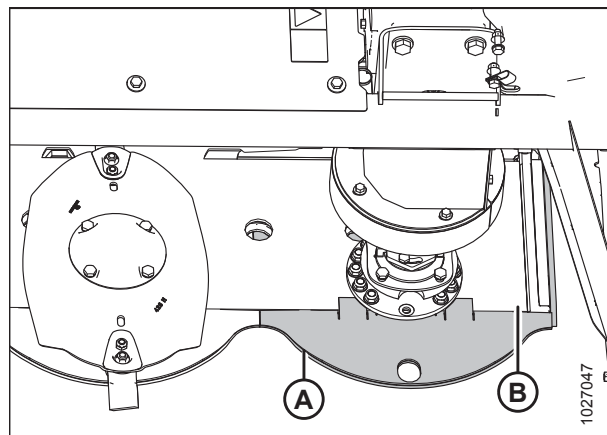


Figure 4.119: Outboard Rock Guard

MAINTENANCE AND SERVICING

10. Ensure 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.

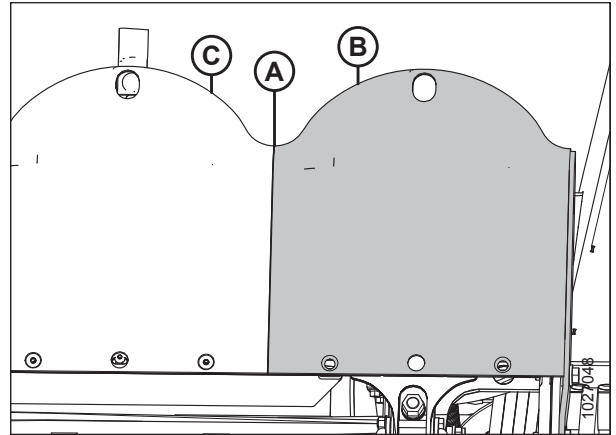


Figure 4.120: Outboard Rock Guard Installed

11. **For R113 PT 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. **For R113 PT Only:** Torque screws (C) to 54 Nm (40 lbf-ft).

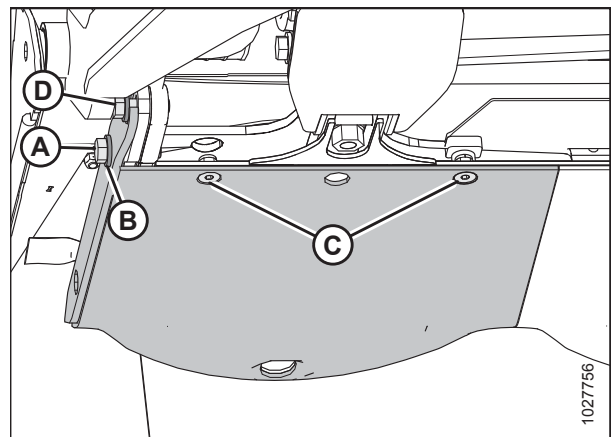


Figure 4.121: Left Outboard Rock Guard – Rear View

4.4.11 Maintaining Small Drums – R116 PT

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 an R116 PT and 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).

IMPORTANT:

Measure the size of the drums to determine if small or large drums are installed on your rotary disc pull-type. The diameter of the large drum is 250 mm (9 7/8 in.). The diameter of the small drum is 187 mm (7 3/8 in.). If your rotary disc pull-type has large drums, refer to [4.4.12 Maintaining Large Drums – R113 or R116 PT, page 206](#).

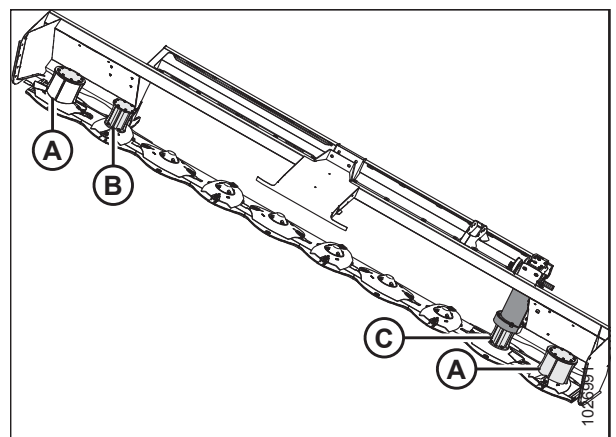


Figure 4.122: Cutterbar

A - Large Drums

B - Small Non-Driven Drum

C - Small Driven Drum

Inspecting Small Drums – R116 PT

Inspect the drums daily for signs of damage or wear.

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.

WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

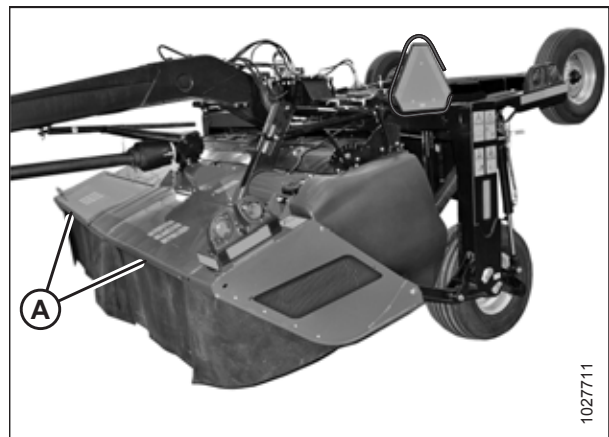


Figure 4.123: Cutterbar Doors

MAINTENANCE AND SERVICING

4. 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.
5. Examine drums (B) and (C) for large dents. Replace any dented drums to ensure that the cutterbar remains balanced.
6. Tighten or replace any loose or missing fasteners.



WARNING

Ensure 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.

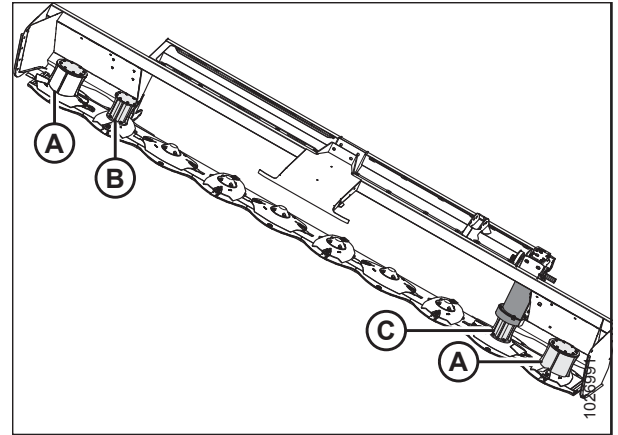


Figure 4.124: Cutterbar

A - Large Non-Driven Drums

B - Small Non-Driven Drum

C - Small Driven Drum

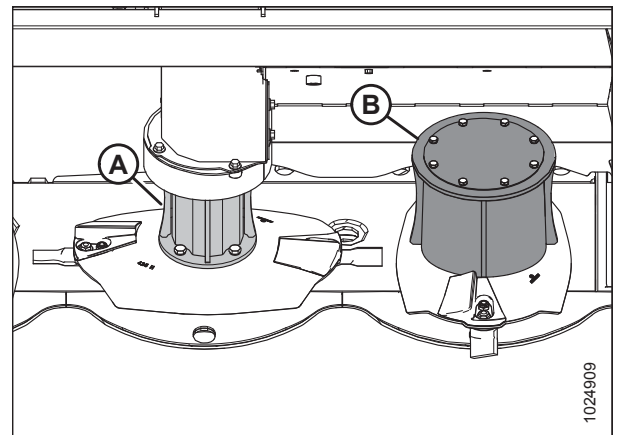


Figure 4.125: R116 PT Drums

A - Small Driven Drum

B - Large Non-Driven Drum

7. Close cutterbar doors (A). For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.

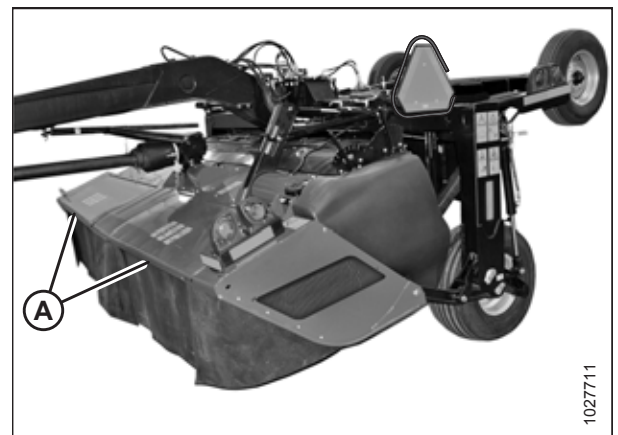


Figure 4.126: Cutterbar Doors

Removing Small Driven Drum and Driveline – R116 PT

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

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.

WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

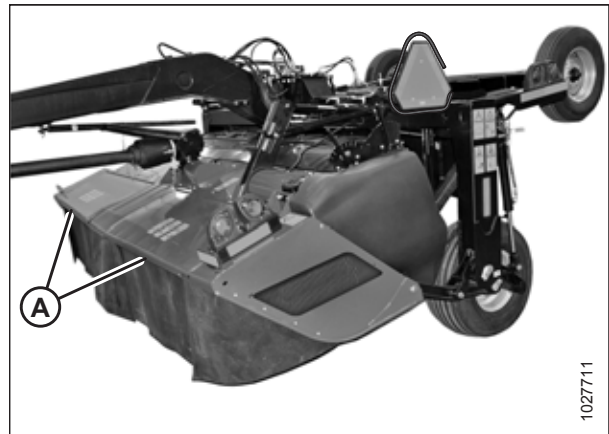


Figure 4.127: Cutterbar Doors

4. Remove four M10 hex flange head bolts (A) and remove vertical driveshield (B).

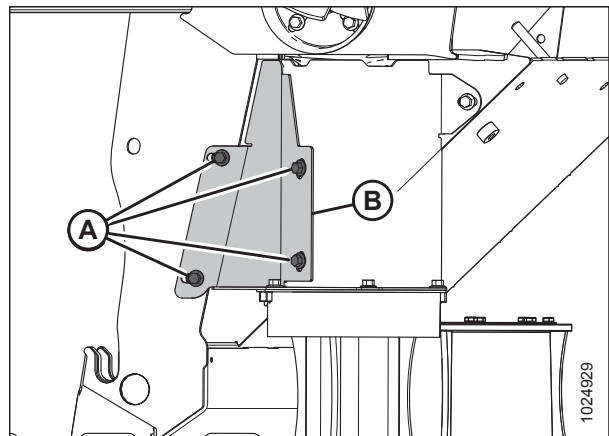


Figure 4.128: Driveline Shield

MAINTENANCE AND SERVICING

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

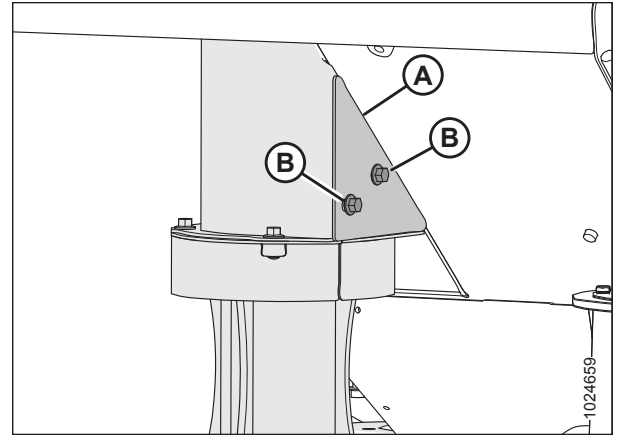


Figure 4.129: Driveline Shield

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

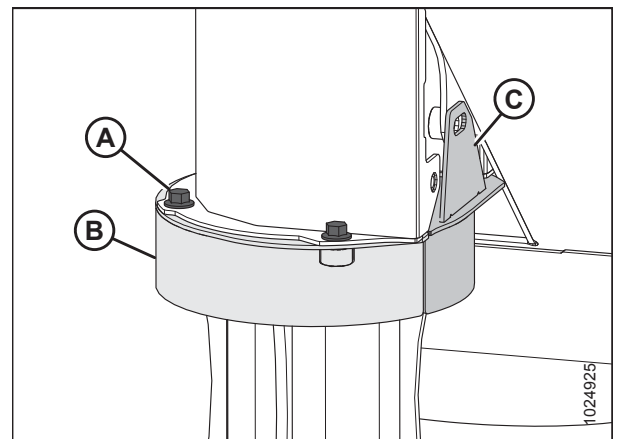


Figure 4.130: Driveline Shield

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

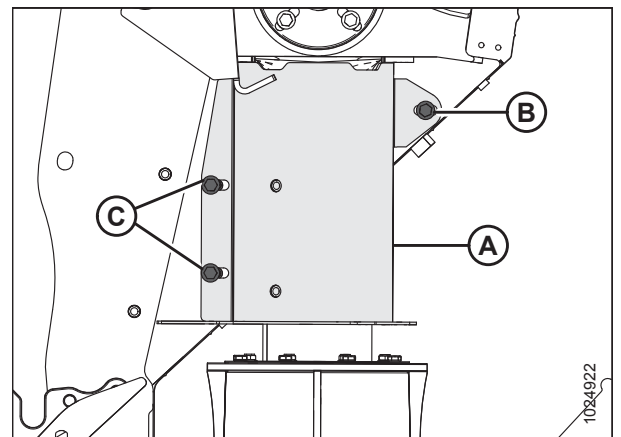


Figure 4.131: Driveline Shield

MAINTENANCE AND SERVICING

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

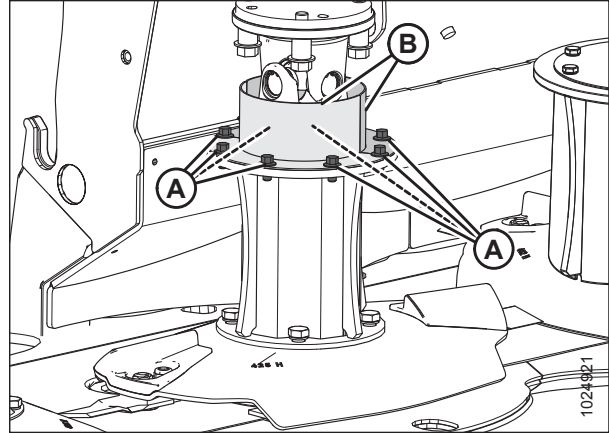


Figure 4.132: Driveline Shield

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

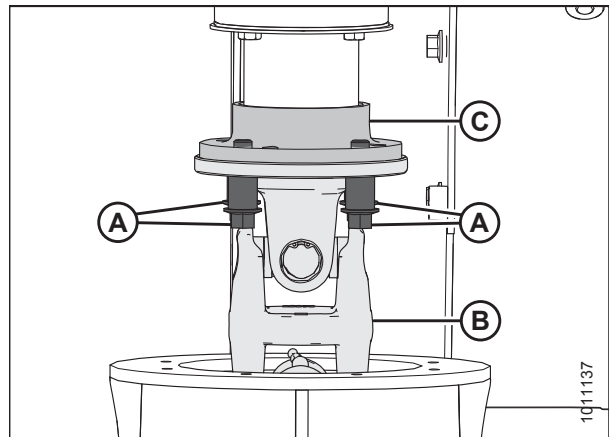


Figure 4.133: Hub Drive to Driveline Connection

- 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.

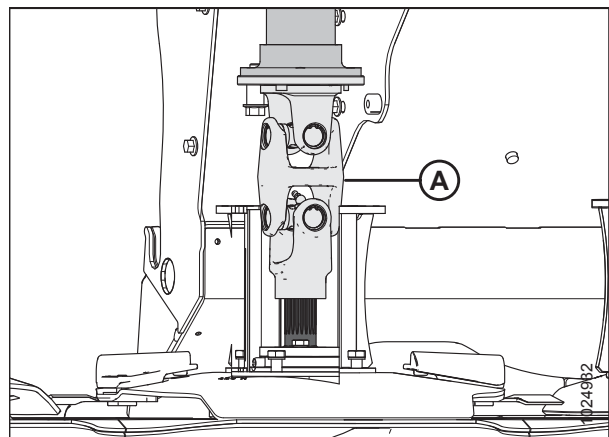


Figure 4.134: Hub Drive to Driveline Connection

MAINTENANCE AND SERVICING

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

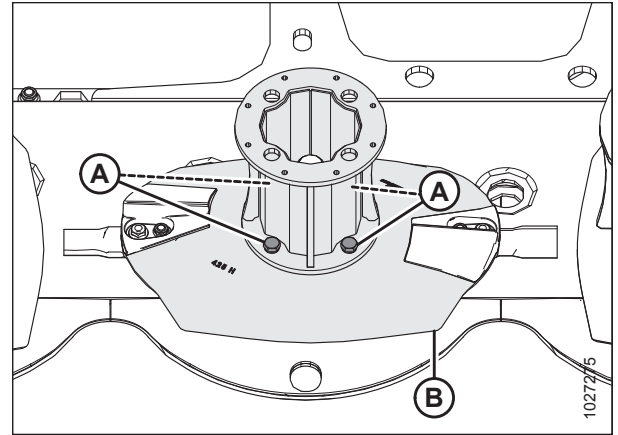


Figure 4.135: Driven Drum

Installing Small Driven Drum and Driveline – R116 PT

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

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.

WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Position drum disc assembly (B) as shown.
4. 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).

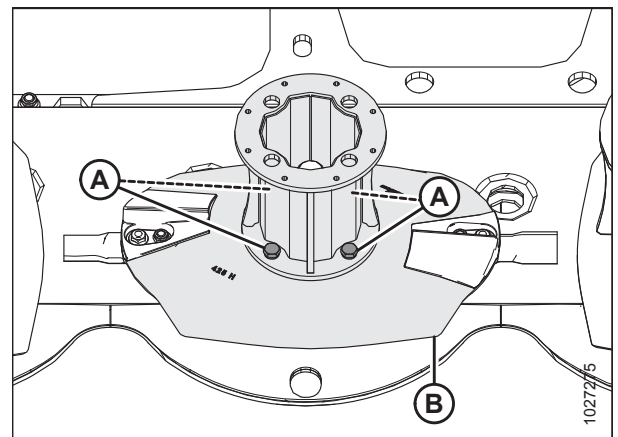


Figure 4.136: Drum Disc

MAINTENANCE AND SERVICING

5. 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.

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

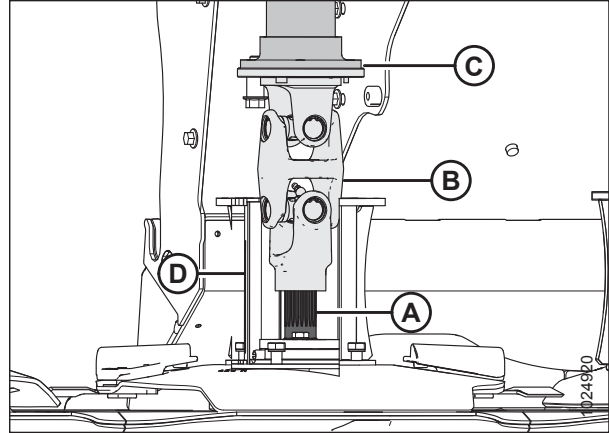


Figure 4.137: Hub Drive to Driveline Connection

8. 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).

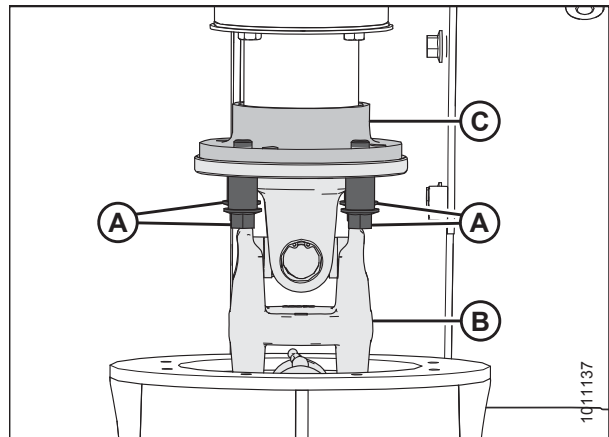


Figure 4.138: Hub Drive to Driveline Connection

9. 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 (20 lbf·ft).

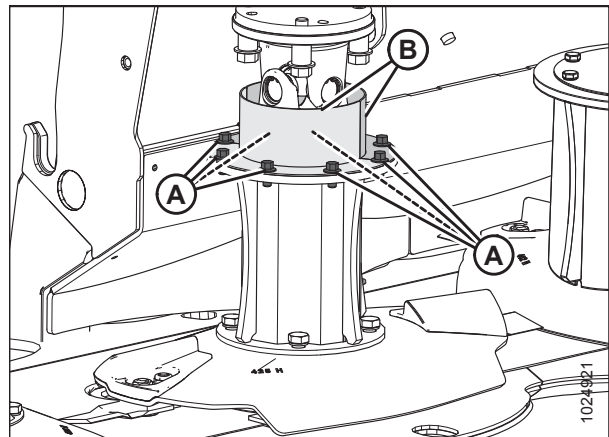


Figure 4.139: Driven Drum

MAINTENANCE AND SERVICING

10. 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).

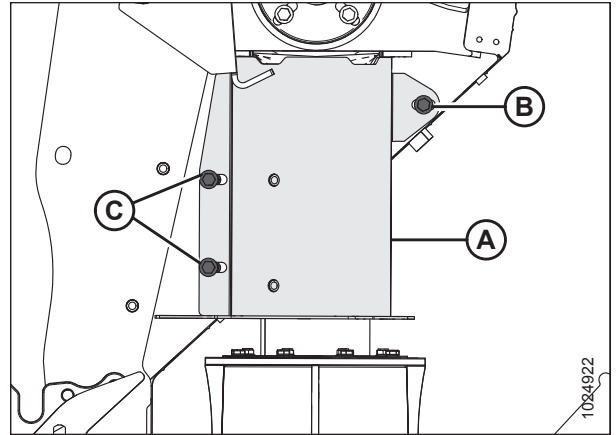


Figure 4.140: Driveline Shield

11. 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).

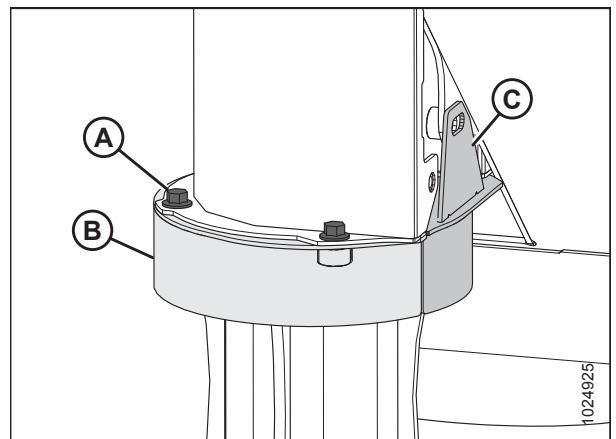


Figure 4.141: Driveline Shield

MAINTENANCE AND SERVICING

12. 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).
13. 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).
14. Tighten bolts (B) and (D).

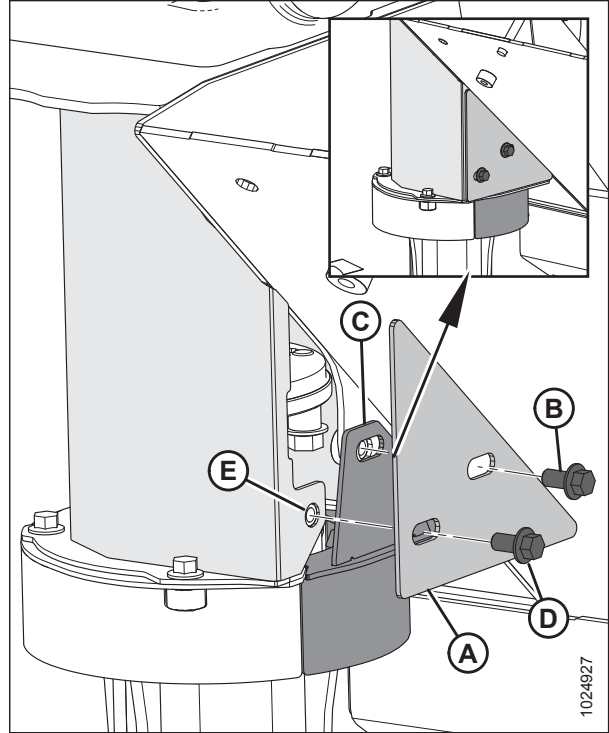


Figure 4.142: Driveline Shield

15. 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 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.

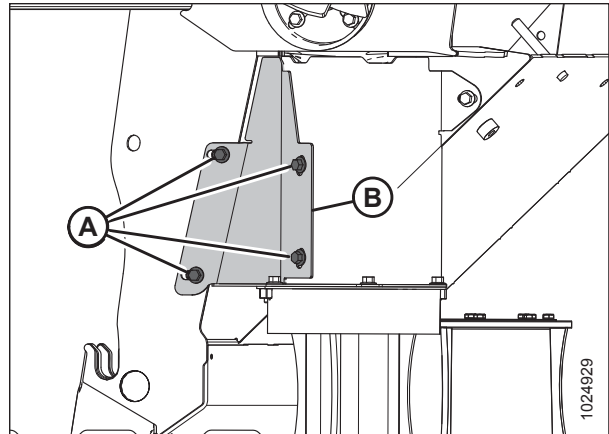


Figure 4.143: Driveline Shield

16. Close cutterbar doors (A). For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.

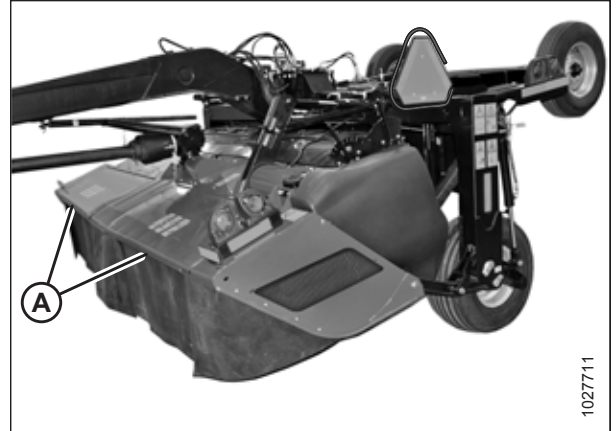


Figure 4.144: Cutterbar Doors and Curtains

Removing Small Non-Driven Drum – R116 PT

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

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.

WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America](#), page 37.

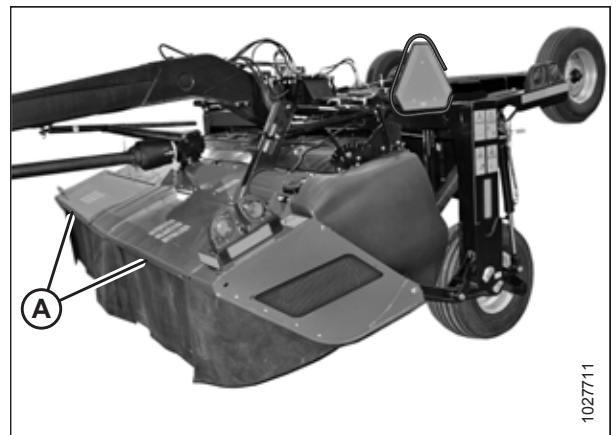


Figure 4.145: Cutterbar Doors

MAINTENANCE AND SERVICING

4. Remove four M12 bolts (A) outside the drum.
5. Remove disc assembly (B).

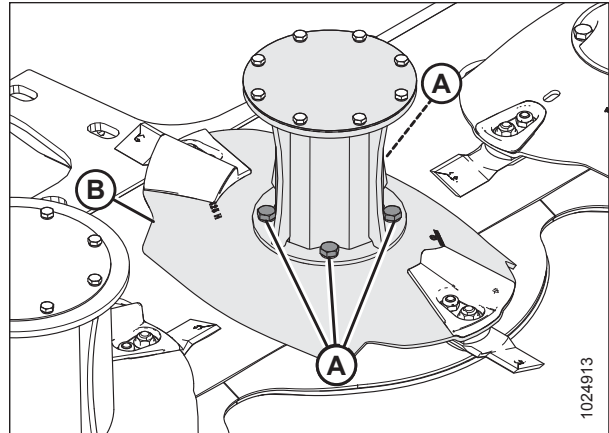


Figure 4.146: Non-Driven Drum

Installing Small Non-Driven Drum – R116 PT

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

! 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.

! WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Ensure spacer (A) is on the spindle.

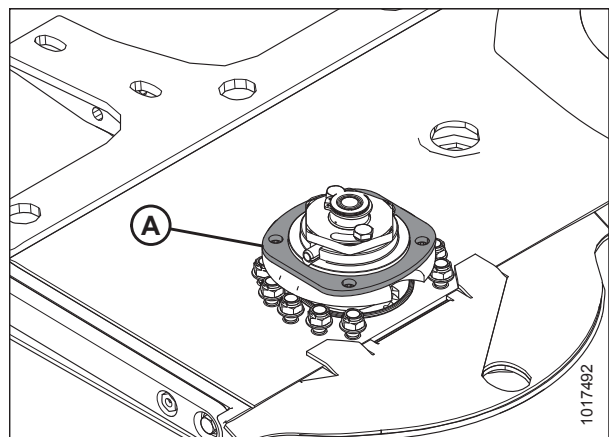


Figure 4.147: Non-Driven Spindle

MAINTENANCE AND SERVICING

4. Position non-driven disc assembly (B) onto the spindle as shown.
5. 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 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.

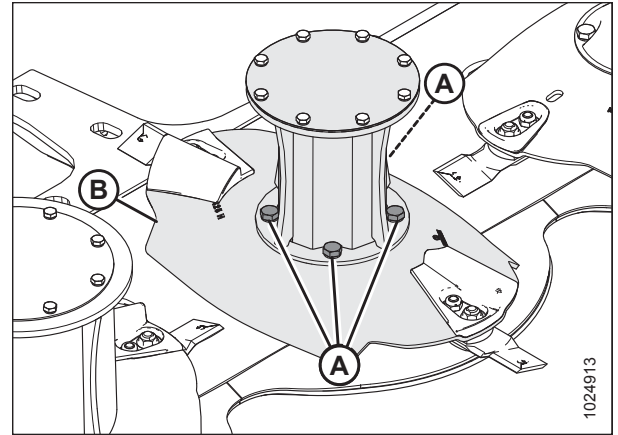


Figure 4.148: Non-Driven Drum

6. Close cutterbar doors (A). For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.

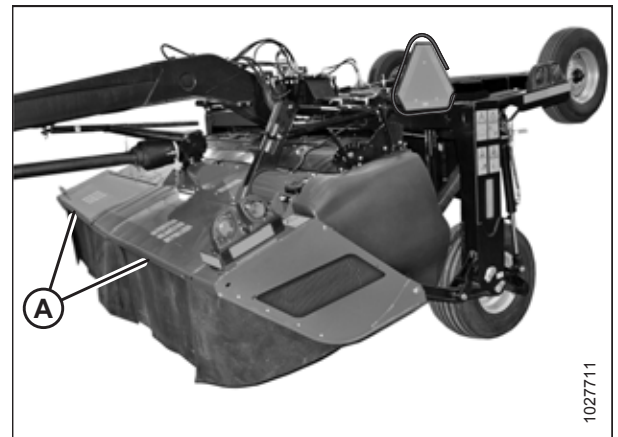


Figure 4.149: Cutterbar Doors

4.4.12 Maintaining Large Drums – R113 or R116 PT

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 R113 and R116 pull-types.

NOTE:

On an R116 PT, small (inboard) drums (E) and (F) are approximately 73 mm (2 3/8 in.) smaller in diameter than large (outboard) drums (C) and (D). Large drums measure 250 mm (9 7/8 in.) in diameter. Small drums measure 187 mm (7 3/8 in.) in diameter.

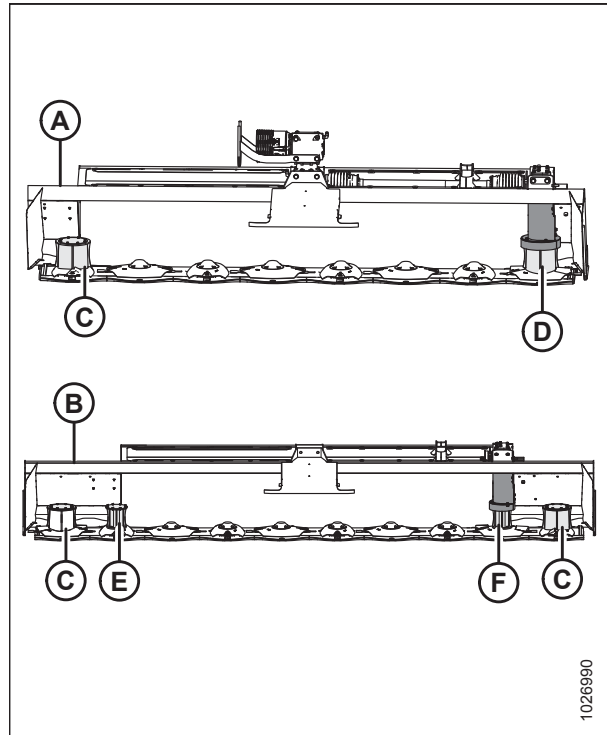


Figure 4.150: Cutterbars

- | | |
|-----------------|-----------------------|
| A - R113 | B - R116 |
| C - Large Drums | D - Large Driven Drum |
| E - Small Drum | F - Small Driven Drum |

Inspecting Large Drums – R113 or R116 PT

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

⚠ 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.

⚠ WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.

MAINTENANCE AND SERVICING

3. Open cutterbar doors (A). For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

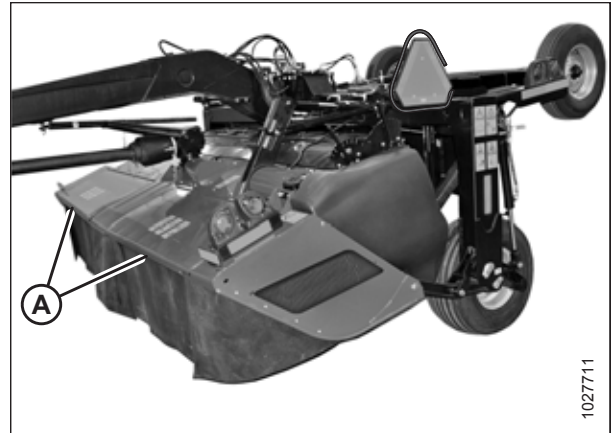


Figure 4.151: Cutterbar Doors – R113 PT Shown, R116 PT Similar

4. 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.
5. Examine drums for large dents. Replace dented drums to prevent an imbalance in the cutterbar.
6. Tighten any loose fasteners. Replace any missing fasteners.

WARNING

Ensure 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.

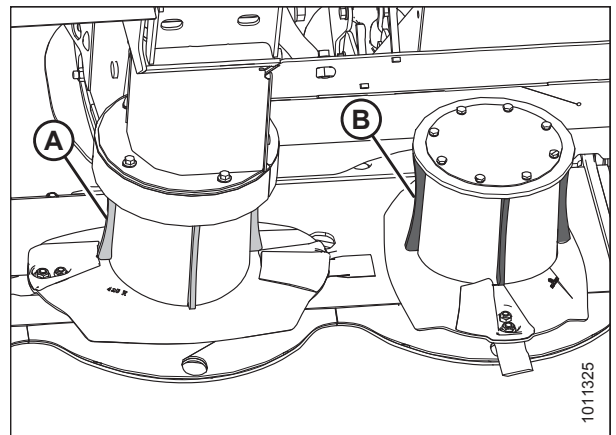


Figure 4.152: R116 PT Drums

7. Close cutterbar doors (A).

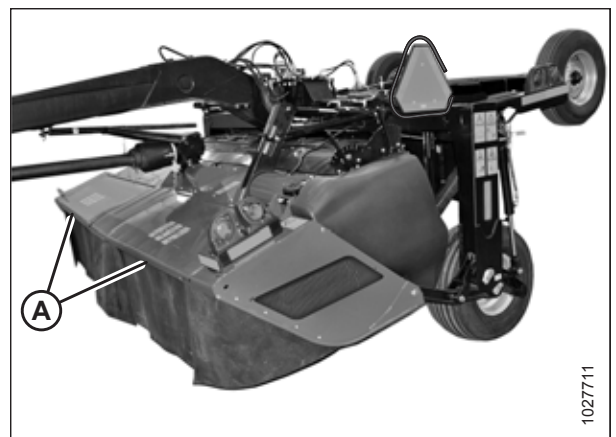


Figure 4.153: Cutterbar Doors – R113 PT Shown, R116 PT Similar

Removing Large Driven Drums and Driveline – R113 or R116 PT

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

⚠ 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.

⚠ 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. Open cutterbar doors (A). Refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#) for instructions.

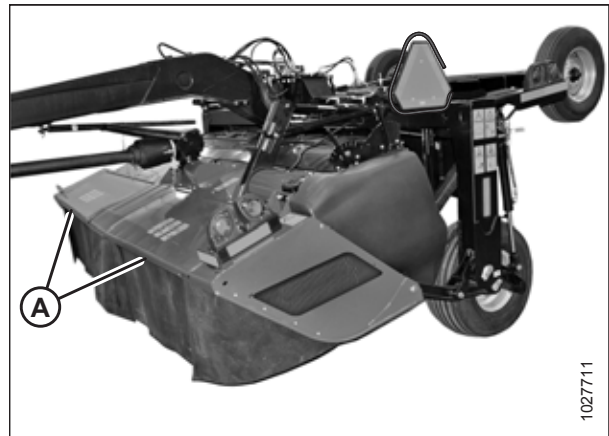


Figure 4.154: Cutterbar Doors

3. Remove four M10 hex flange head bolts (A) and remove vertical driveshield (B).

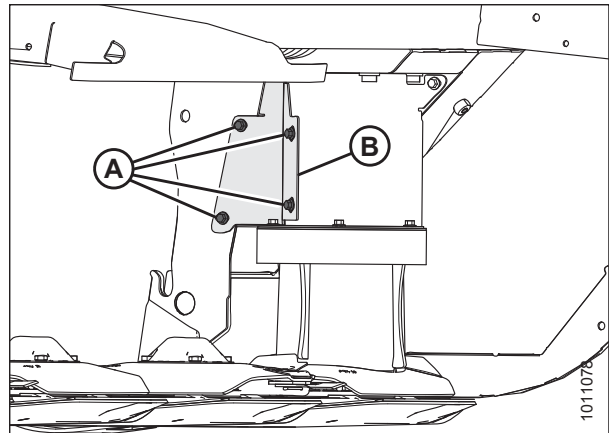


Figure 4.155: Vertical Drive Shield

MAINTENANCE AND SERVICING

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

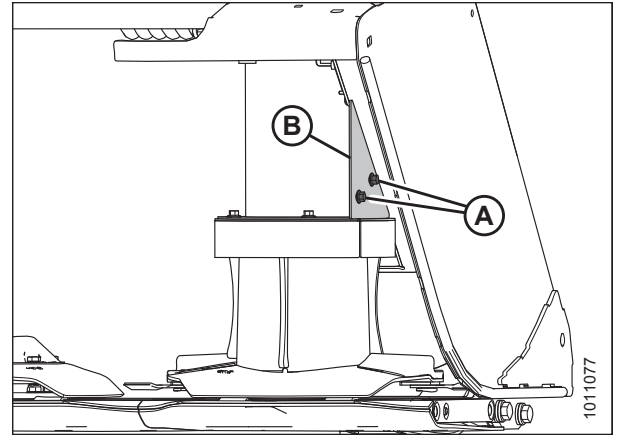


Figure 4.156: Cover Plate

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

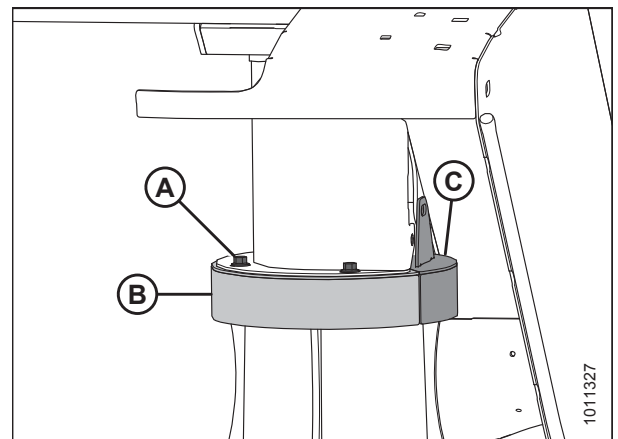


Figure 4.157: Top Plate and Drum Top

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

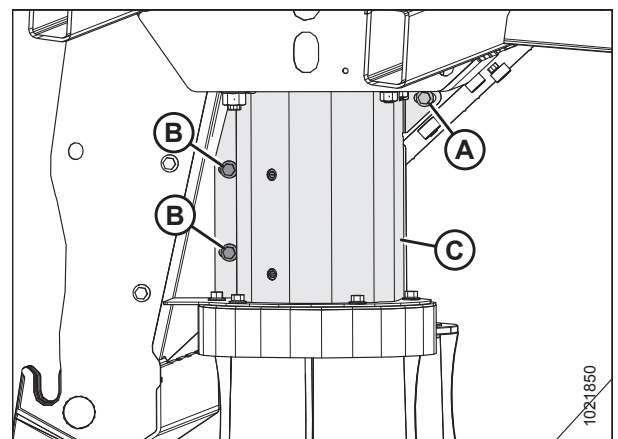


Figure 4.158: Vertical Shield

MAINTENANCE AND SERVICING

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

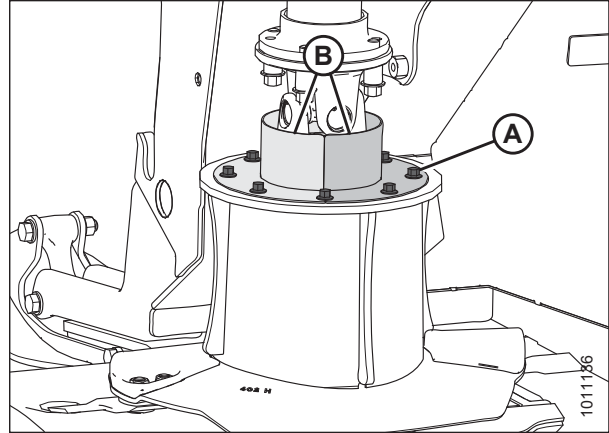


Figure 4.159: Drum Shields

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

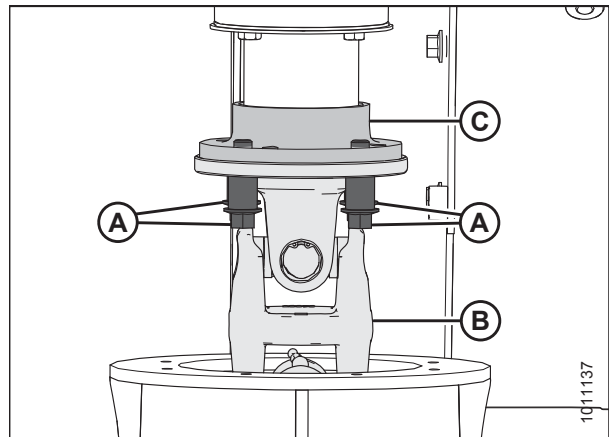


Figure 4.160: Hub Drive to Driveline Connection

- 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.

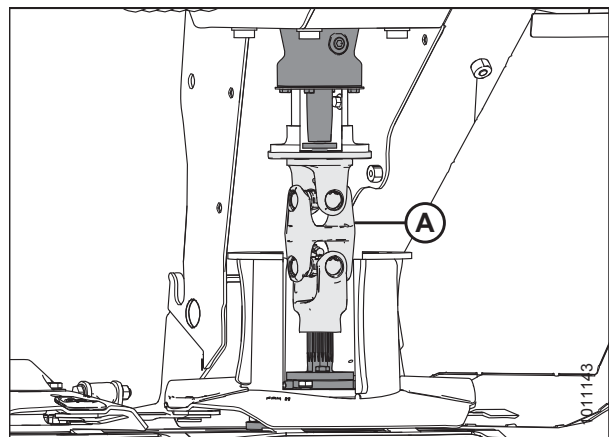


Figure 4.161: Hub Drive to Driveline Connection

MAINTENANCE AND SERVICING

10. Inside the drum, remove four M12 bolts and washers (A) holding the drum disc in place.
11. Remove the drum disc assembly.

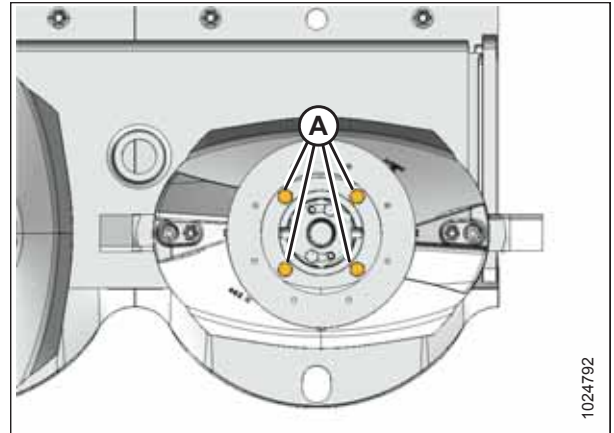


Figure 4.162: Driven Drum

Installing Large Driven Drums and Driveline – R113 or R116 PT

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

DANGER

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

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

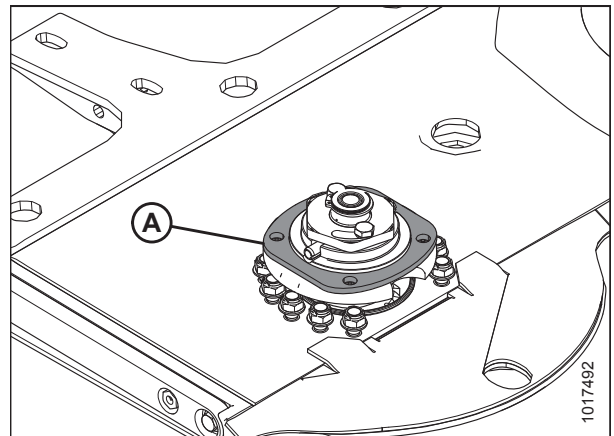


Figure 4.163: Spacer Plate

MAINTENANCE AND SERVICING

3. Position the drum disc assembly as shown.

NOTE:

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

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

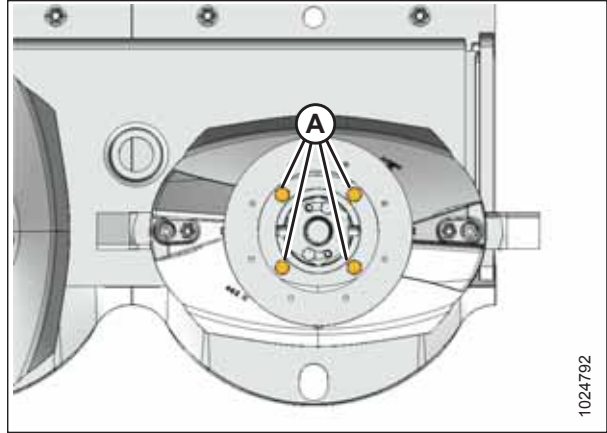


Figure 4.164: Drum Disc

5. 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.

6. Insert driveline (B) at an angle and guide it past hub drive (C) and drum (D).
7. Insert splined spindle end (A) into the splined bore on driveline (B).
8. 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).

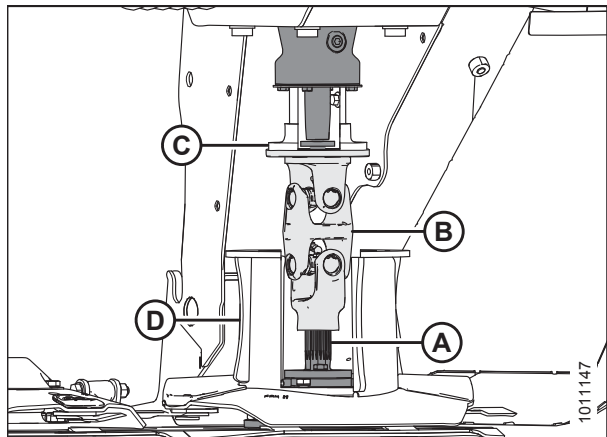


Figure 4.165: Hub Drive to Driveline Connection

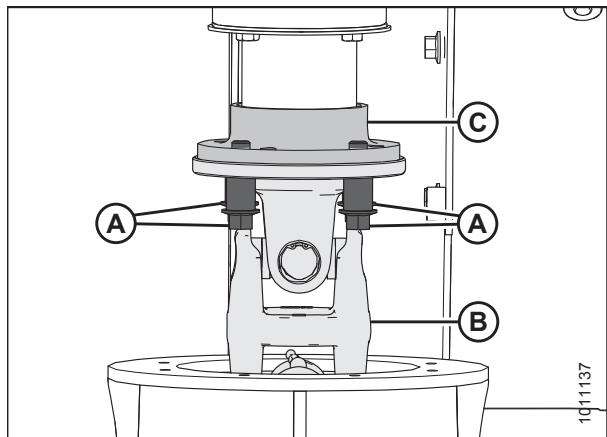


Figure 4.166: Hub Drive to Driveline Connection

MAINTENANCE AND SERVICING

- 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 (20 lbf·ft).

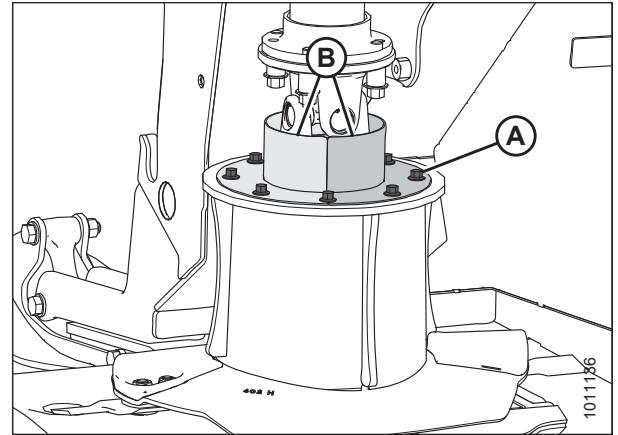


Figure 4.167: Drum Shield

- 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).

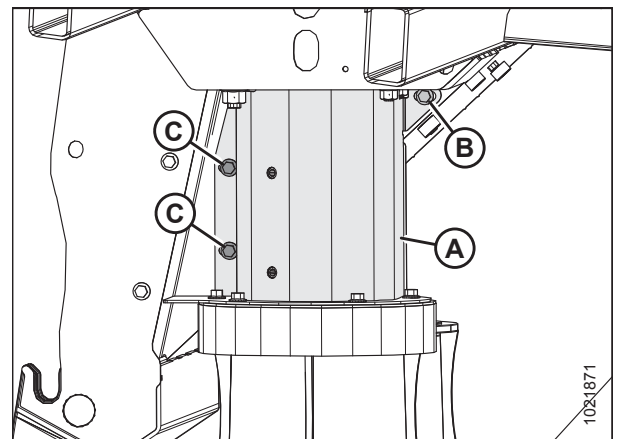


Figure 4.168: Vertical Shield

- 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).

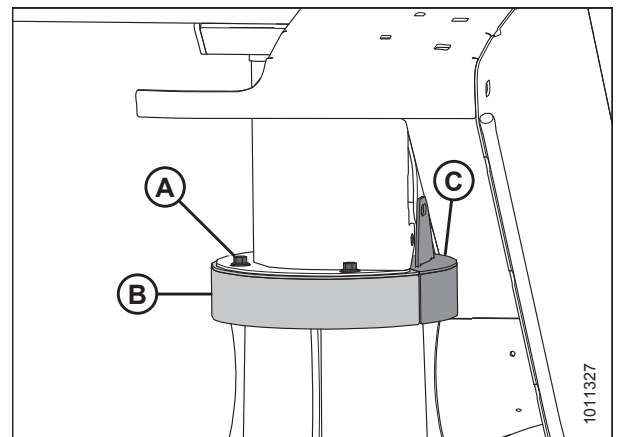


Figure 4.169: Top Plate and Drum Top

MAINTENANCE AND SERVICING

12. 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).
13. 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).
14. Tighten bolts (B) and (D).

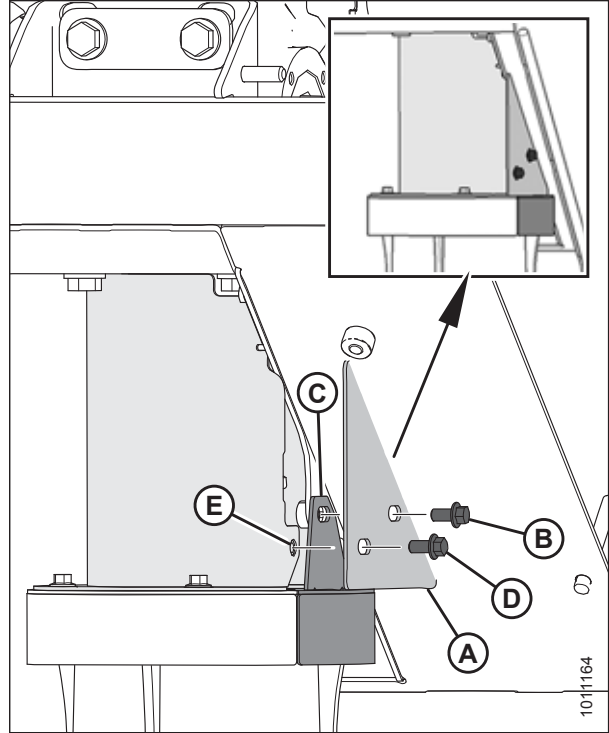


Figure 4.170: Cover Plate and Top Plate

15. 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 bolts to 61 Nm (45 lbf·ft).

WARNING

Ensure 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.

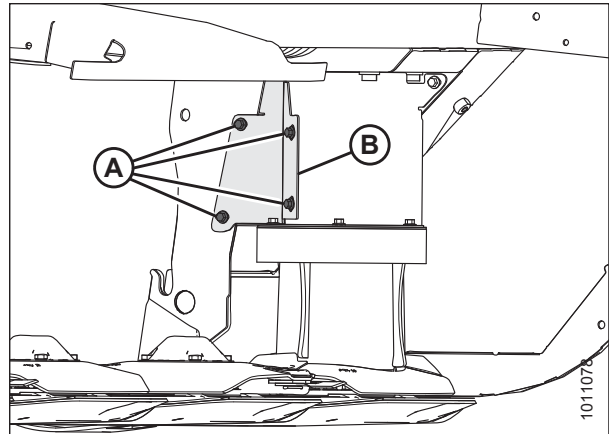


Figure 4.171: Vertical Shield

16. Close cutterbar doors (A). For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.

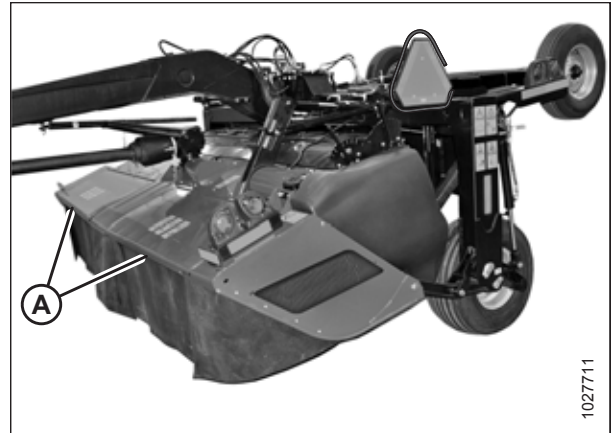


Figure 4.172: Cutterbar Doors and Curtains

Removing Large Non-Driven Drums – R113 or R116 PT

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

DANGER

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

WARNING

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

NOTE:

The illustrations in this procedure depict the R113 SP; the R116 SP is similar.

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America](#), page 37 or [3.3.2 Opening Cutterbar Doors – Export Latches](#), page 38.

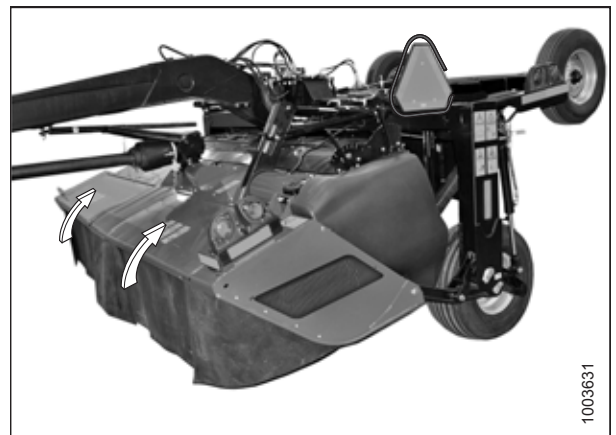


Figure 4.173: Cutterbar Doors – R1 Series Rotary Disc Pull-Type

MAINTENANCE AND SERVICING

3. Place a wooden block between the two cutterbar discs to prevent the disc from rotating while you are loosening the blade bolts.
4. Remove eight M8 bolts and washers (A) securing cover (B) to the non-driven drum. Remove the cover.

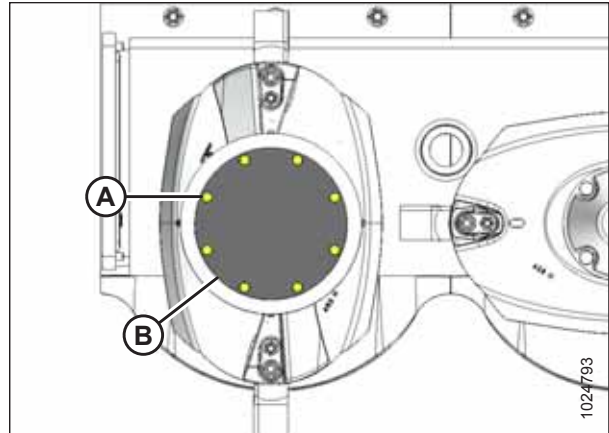


Figure 4.174: Non-Driven Drum

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

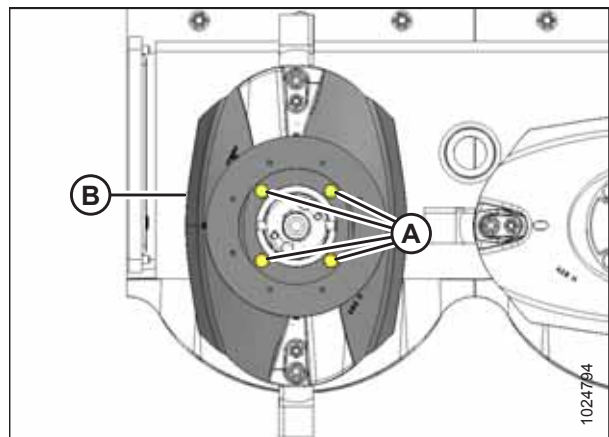


Figure 4.175: Non-Driven Drum

Installing Large Non-Driven Drums – R113 or R116 PT

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

⚠ DANGER

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

⚠ WARNING

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

NOTE:

The images used in the procedure are from an R113 SP, the R116 SP is similar.

1. Shut down the engine, and remove the key from the ignition.
2. Ensure that spacer (A) is on the spindle.

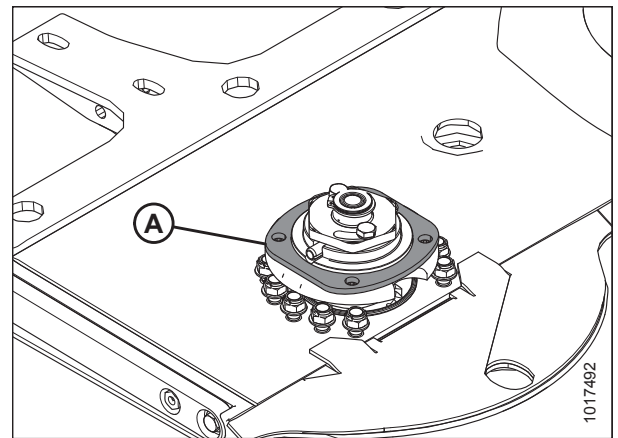


Figure 4.176: Non-Driven Spindle

3. Position non-driven drum/disc (B) onto the spindle as shown.
4. 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).

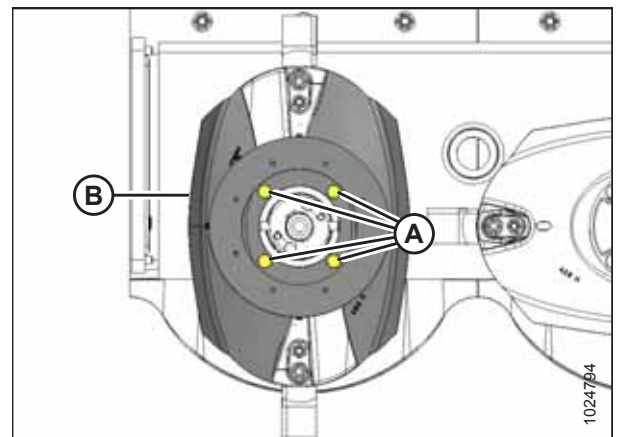


Figure 4.177: Non-Driven Drum

MAINTENANCE AND SERVICING

5. Install eight M8 bolts and washers (A) to secure cover (B) to the non-driven drum. Torque the bolts to 28 Nm (20 lbf-ft).

WARNING

Ensure 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.

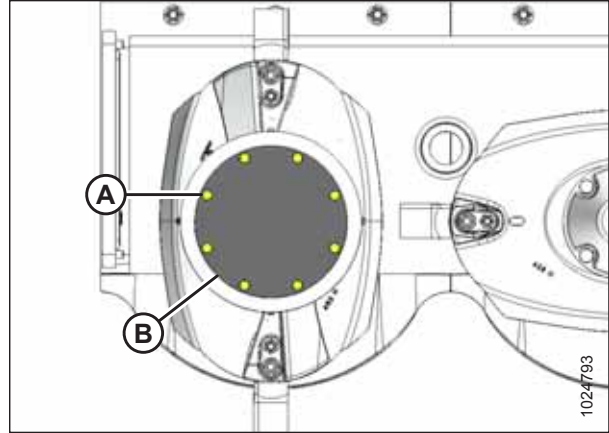


Figure 4.178: Non-Driven Drum

6. Close cutterbar doors (A). For instructions, refer to [3.3.3 Closing Cutterbar Doors, page 39](#).

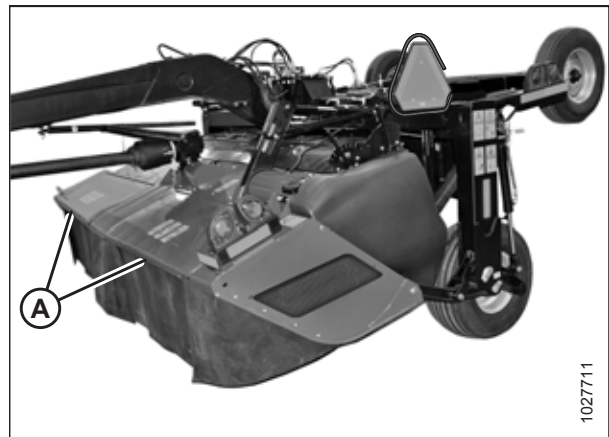


Figure 4.179: Cutterbar Doors

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.

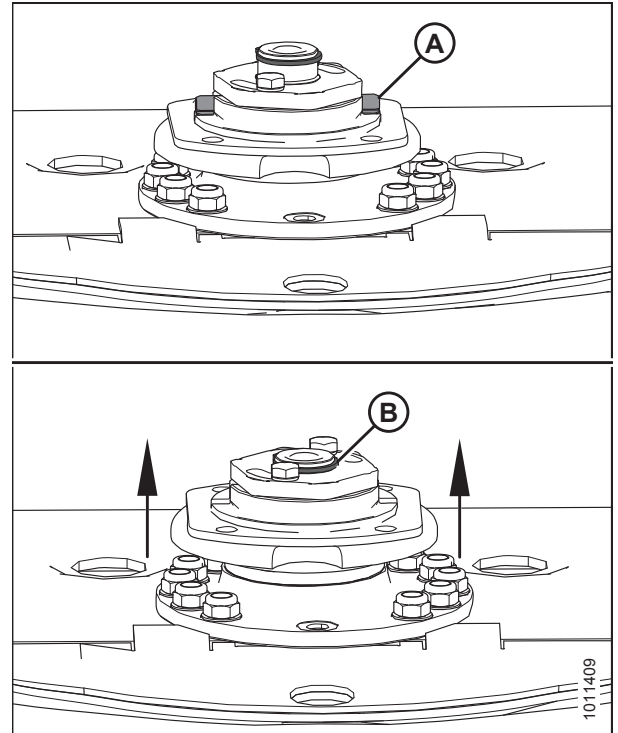


Figure 4.180: Cutterbar Spindles

Removing Cutterbar Spindle Shear Pin

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

! DANGER

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

! WARNING

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).

MAINTENANCE AND SERVICING

4. Open the cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#) or [3.3.2 Opening Cutterbar Doors – Export Latches, page 38](#).
5. Clean any debris from the work area.

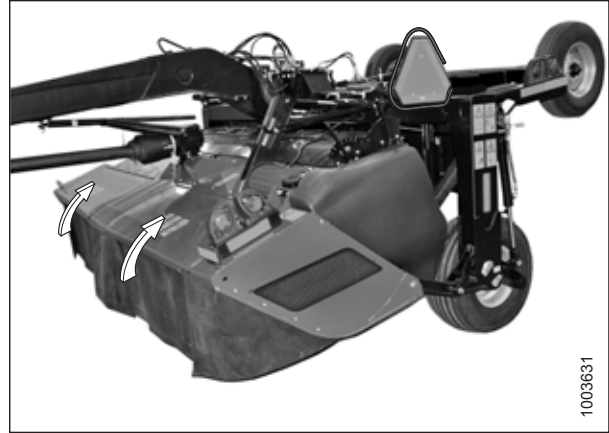


Figure 4.181: Cutterbar Doors

6. Remove cutterbar disc (for example, disc [A]). For instructions, refer to: [Removing Cutterbar Discs, page 157](#)
7. Remove the drum. The procedure to remove the drum depends on whether you are removing a large drum or a small drum:
 - To remove a driven drum (for example, driven drum [B]), refer to [Removing Large Driven Drums and Driveline – R113 or R116 PT, page 208](#).
 - To remove a non-driven drum (for example, non-driven drum [C]), refer to [Removing Large Non-Driven Drums – R113 or R116 PT, page 215](#).

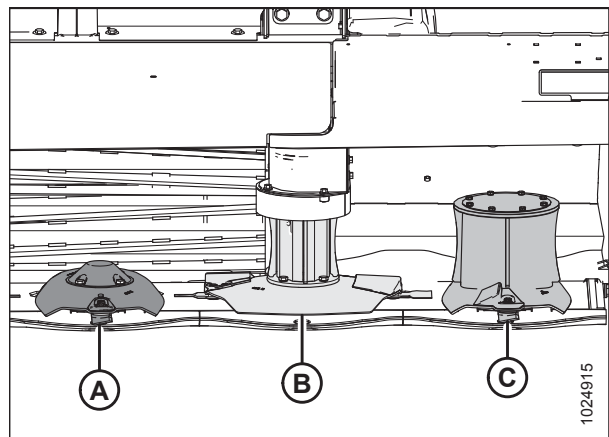


Figure 4.182: Cutterbar Disc Assemblies – R116 PT Shown, R113 PT similar

8. Remove retaining ring (A).

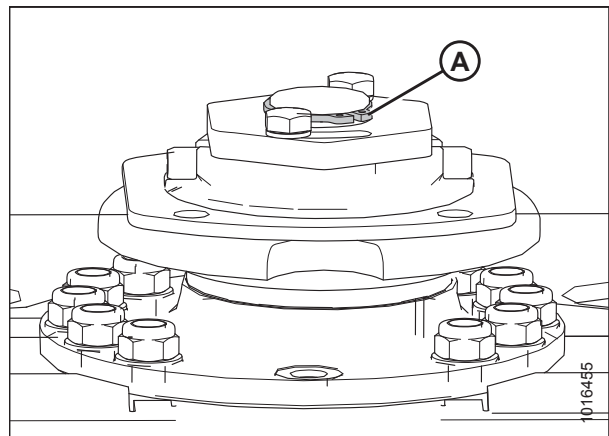


Figure 4.183: Cutterbar Spindle

MAINTENANCE AND SERVICING

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

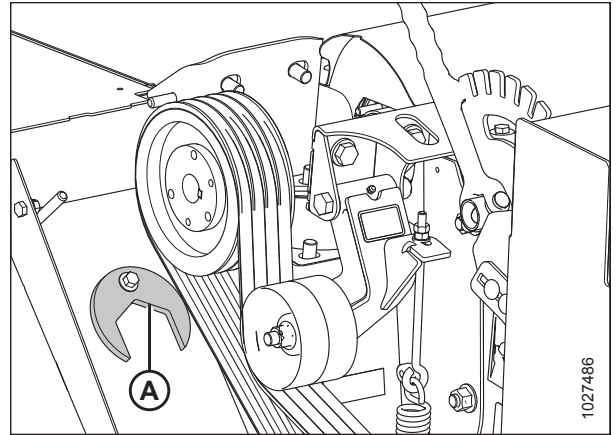


Figure 4.184: Safecut Spindle-Nut Wrench Location

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.

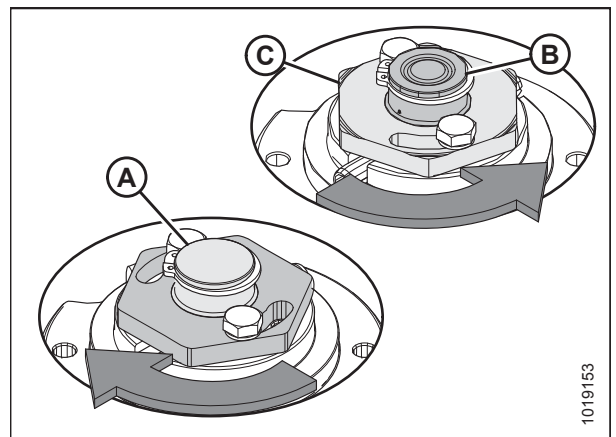


Figure 4.185: Cutterbar Spindles

- Remove two M10 bolts and washers (A).

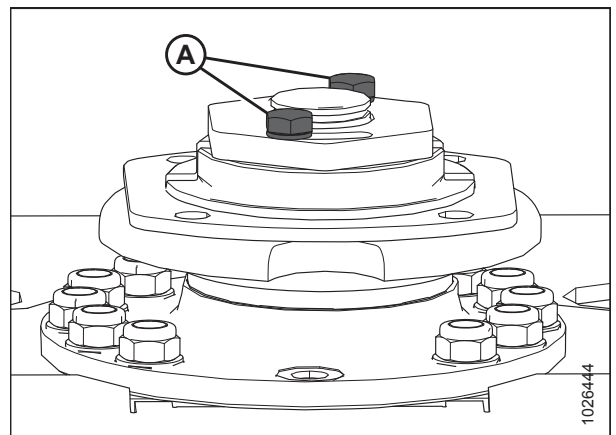


Figure 4.186: Cutterbar Spindle

MAINTENANCE AND SERVICING

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

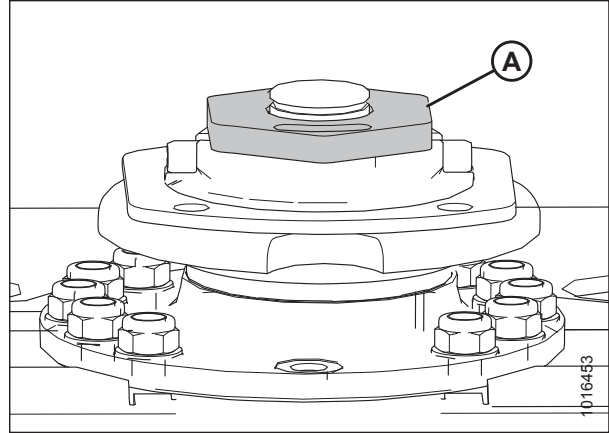


Figure 4.187: Cutterbar Spindle

12. Remove shear pins (B).

IMPORTANT:

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

13. Remove hub (A).
14. Check the nut and hub for damage. Replace them if necessary.

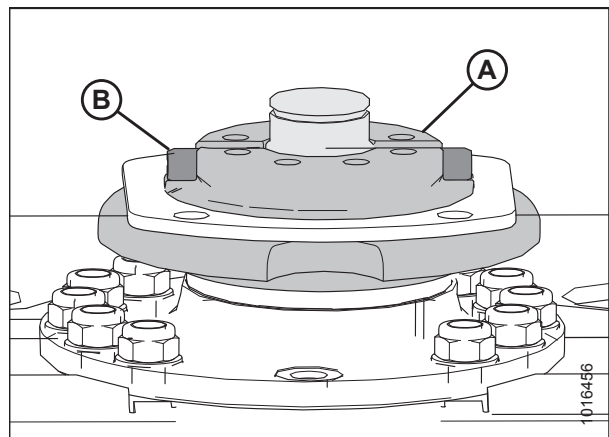


Figure 4.188: Cutterbar Spindle

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 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.

⚠ 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. Fill the space above the bearing with grease.
3. Place hub (A) on spindle (C).
4. 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).

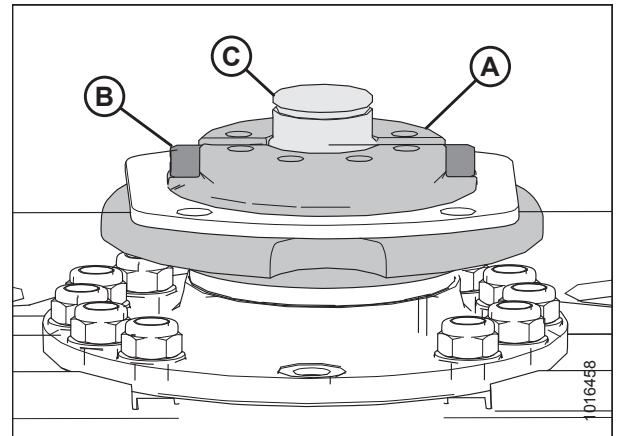


Figure 4.189: Cutterbar Spindle

5. 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 the sake of clarity.

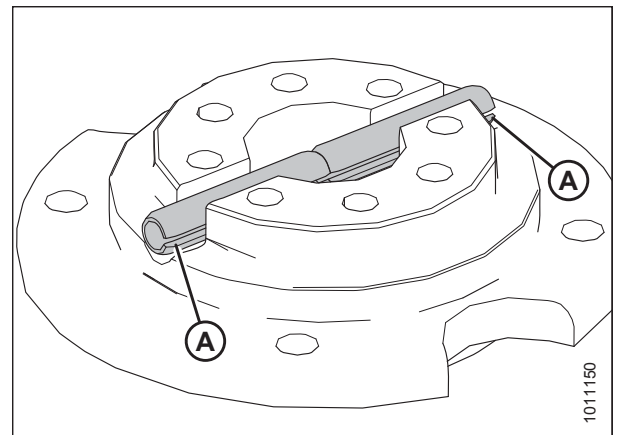


Figure 4.190: Shear Pin Orientation

MAINTENANCE AND SERVICING

6. Install nut (A).
7. Retrieve the safecut spindle-nut wrench from the left shield plate.

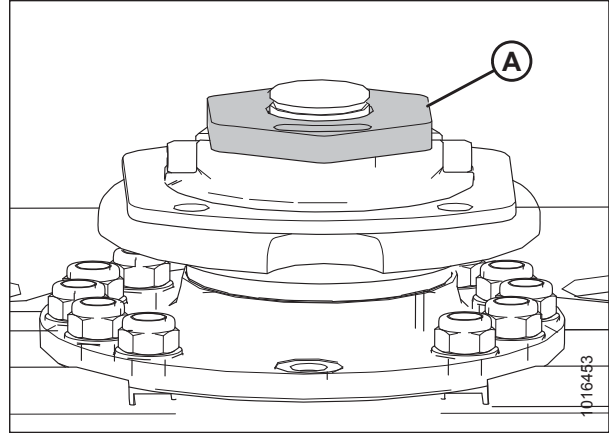


Figure 4.191: Cutterbar Spindle

8. 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.

9. Position safecut spindle-nut wrench (B) on spindle nut (C). Torque the nut to 300 Nm (221 lbf-ft).
10. Return safecut spindle-nut wrench (B) to the left shield plate.

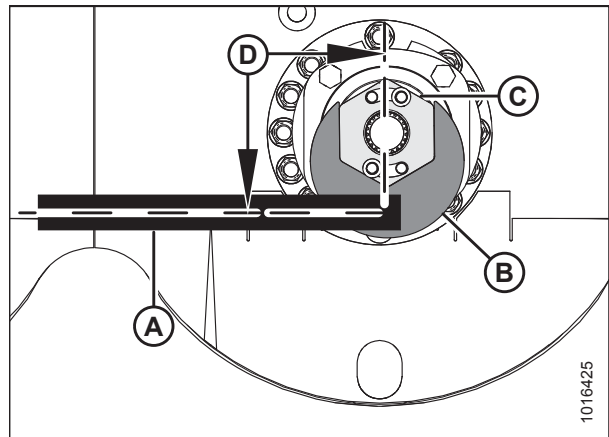


Figure 4.192: Spindle Nut

11. Inspect the threads of two M10 bolts (A) and replace them if they are damaged.
12. Install two M10 bolts and washers (A). Torque the hardware to 55 Nm (40 lbf-ft).

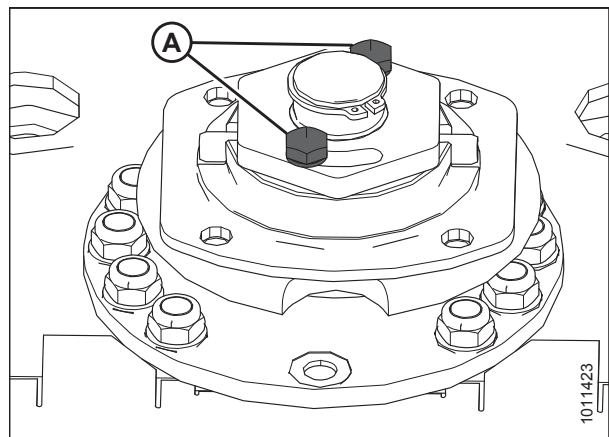


Figure 4.193: Cutterbar Spindle

13. Install retaining ring (A).

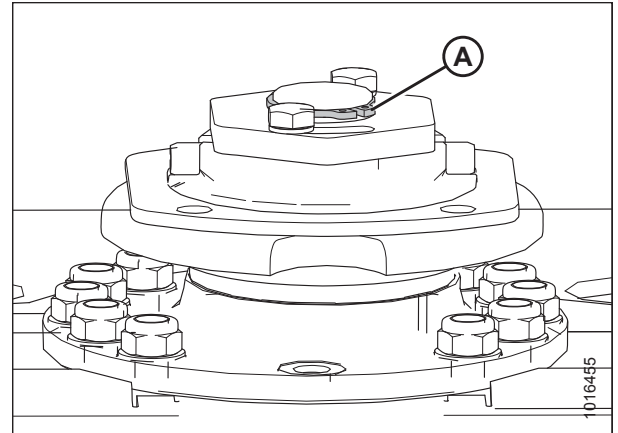


Figure 4.194: Cutterbar Spindle

14. Depending on the type of disc with the new shear pin, refer to the applicable disc installation procedure:

- Install cutterbar disc (A). For instructions, refer to *Installing Cutterbar Discs, page 158*.
- Install driven drum (B). For instructions, refer to *Installing Large Driven Drums and Driveline – R113 or R116 PT, page 211*.
- Install non-driven drum (C). For instructions, refer to *Installing Large Non-Driven Drums – R113 or R116 PT, page 217*.

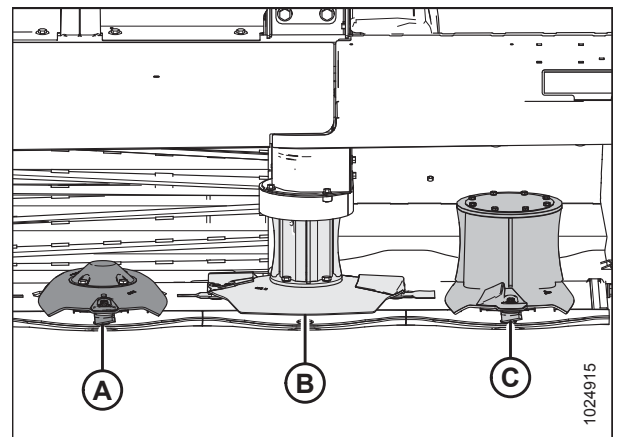


Figure 4.195: R116 PT Cutterbar

WARNING

Ensure 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.

15. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 39*.

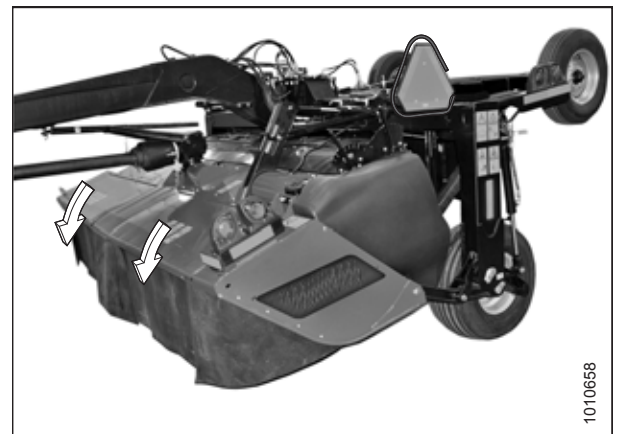


Figure 4.196: R1 Series Rotary Disc Pull-Type

4.5 Drive Systems

4.5.1 Driveshields

Driveshields protect people from rotating belts and drives.

Removing Driveshields

The driveshields can be removed without the use of tools.

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.

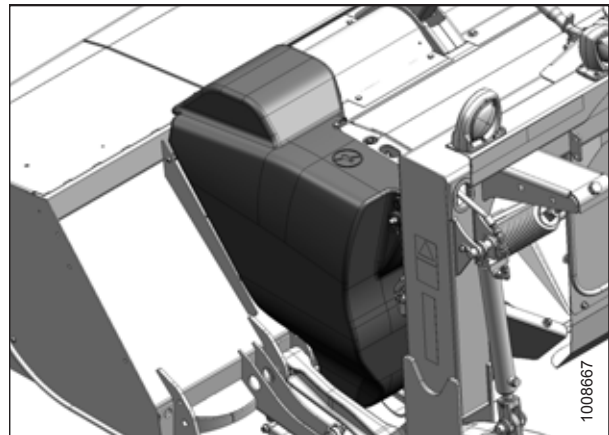


Figure 4.197: Left Driveshield

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

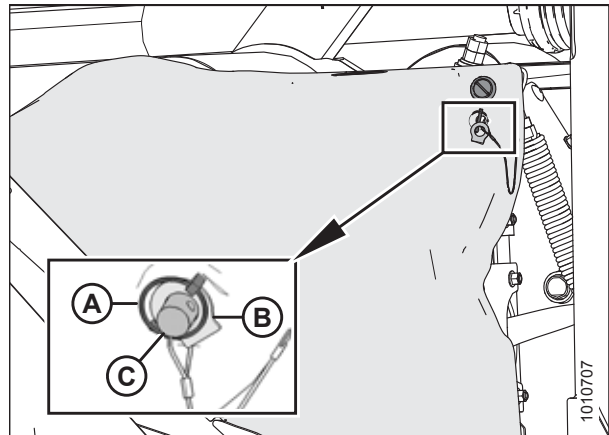


Figure 4.198: Tool to Unlock Driveshield

MAINTENANCE AND SERVICING

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

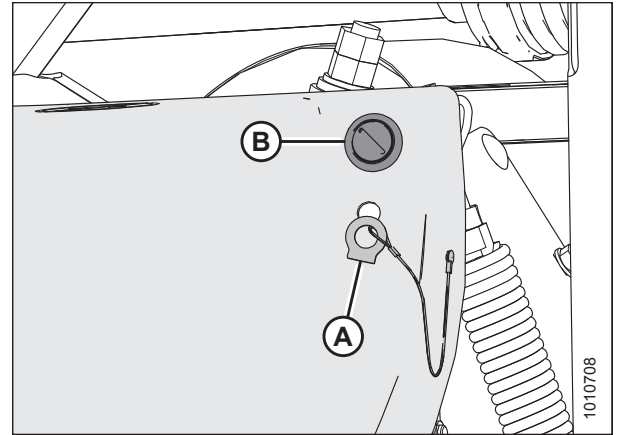


Figure 4.199: Tool to Unlock Driveshield and Latch

3. Pull the top of driveshield (A) away from the pull-type and lift the driveshield off of the pins at the base of the shield.

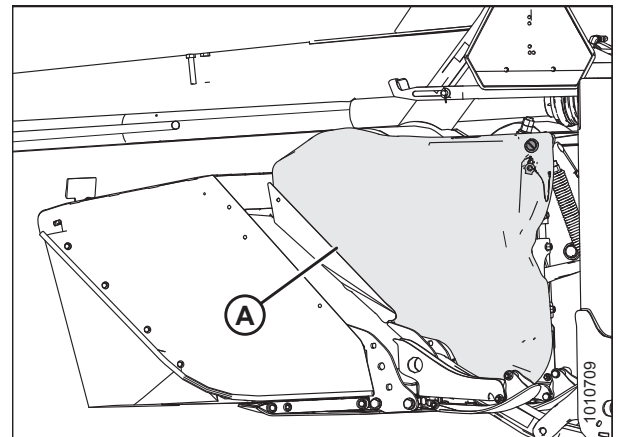


Figure 4.200: Driveshield

Installing Driveshields

The driveshields can be installed without the use of tools.

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.
2. Push the driveshield so that latch (C) is engaged.
3. Check that driveshield (A) is properly secured.

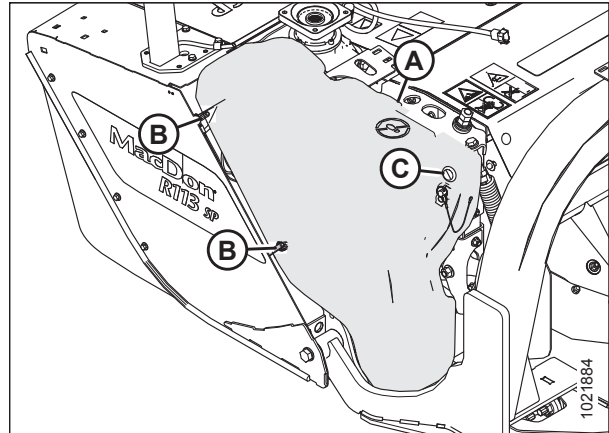


Figure 4.201: Driveshield and Latch

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

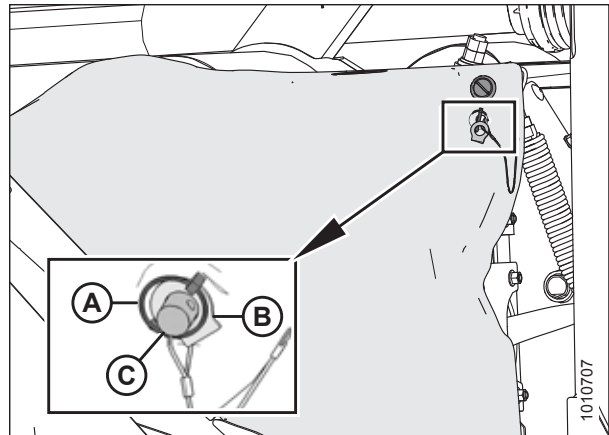


Figure 4.202: Tool to Unlock Driveshield

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 226](#).

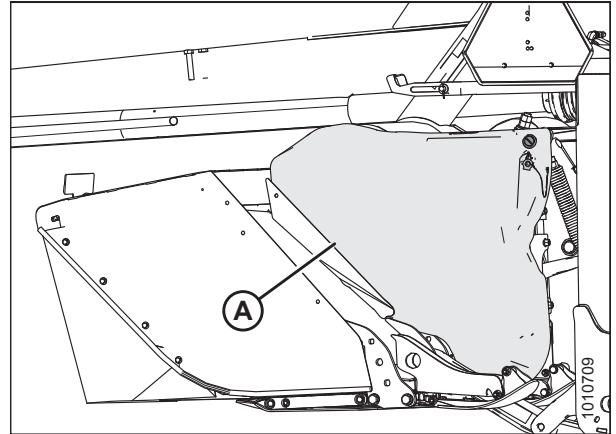


Figure 4.203: Driveshield

2. Remove and retain hex nut and flat washer (A) securing the latch to the backside of the driveshield.
3. Remove the existing latch and replace it with the new part.
4. Reinstall retained hex nut and flat washer (A).

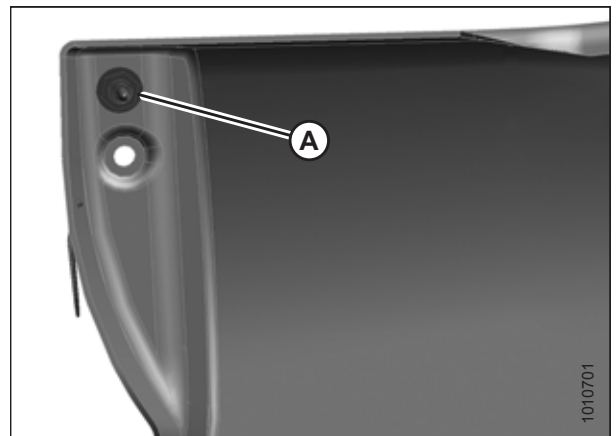


Figure 4.204: Backside of Driveshield

5. Remove two carriage bolts (A), replace stud and clip assembly (B) if it is worn or damaged, and reinstall the carriage bolts.
6. Reinstall the driveshield. For instructions, refer to *Installing Driveshields*, page 228.

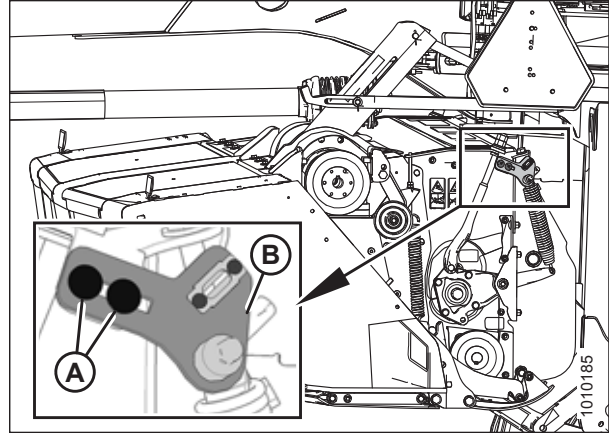


Figure 4.205: Stud and Clip Assembly

4.5.2 Driveline Shield Cone

Removing Driveline Shield Cone

⚠ WARNING

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

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

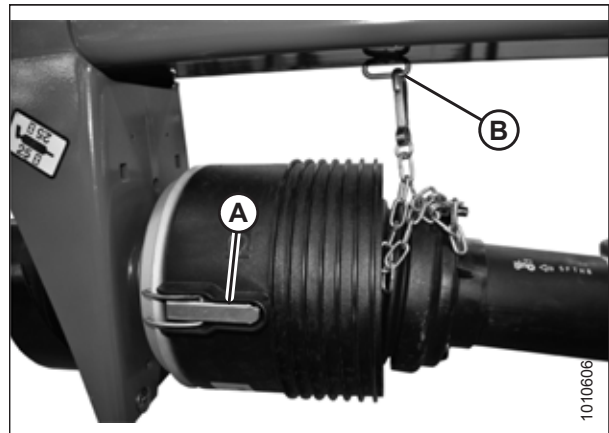


Figure 4.206: Driveline Shield Cone and Lever Clamp

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

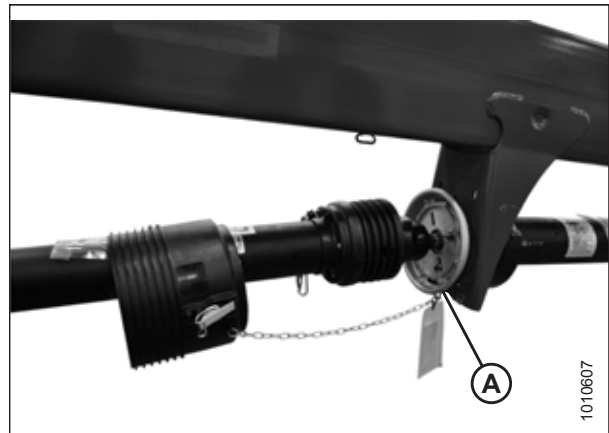


Figure 4.207: Driveline Shield Cone Removed from Metal Plate

Installing Driveline Shield Cone

⚠ WARNING

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

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

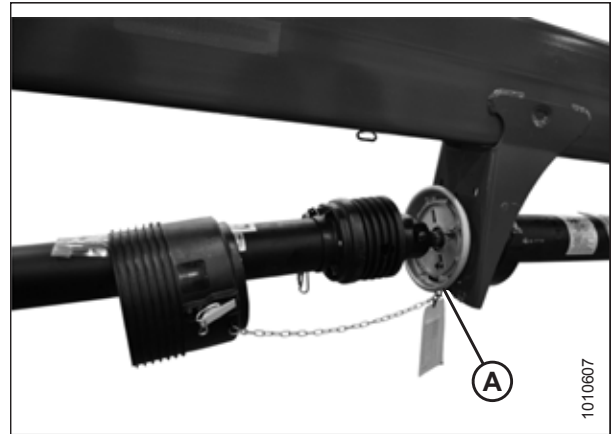


Figure 4.208: Driveline Shield Cone Removed from Metal Plate

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

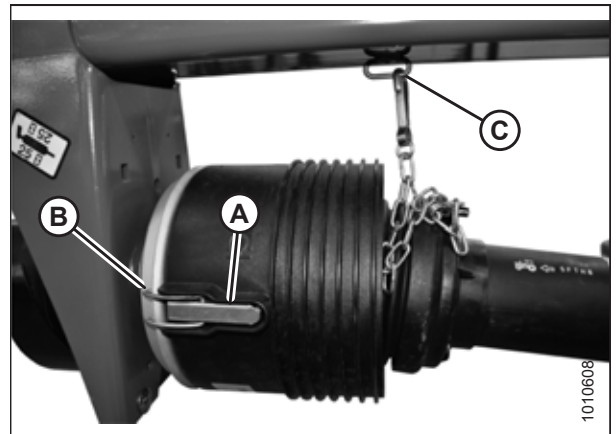
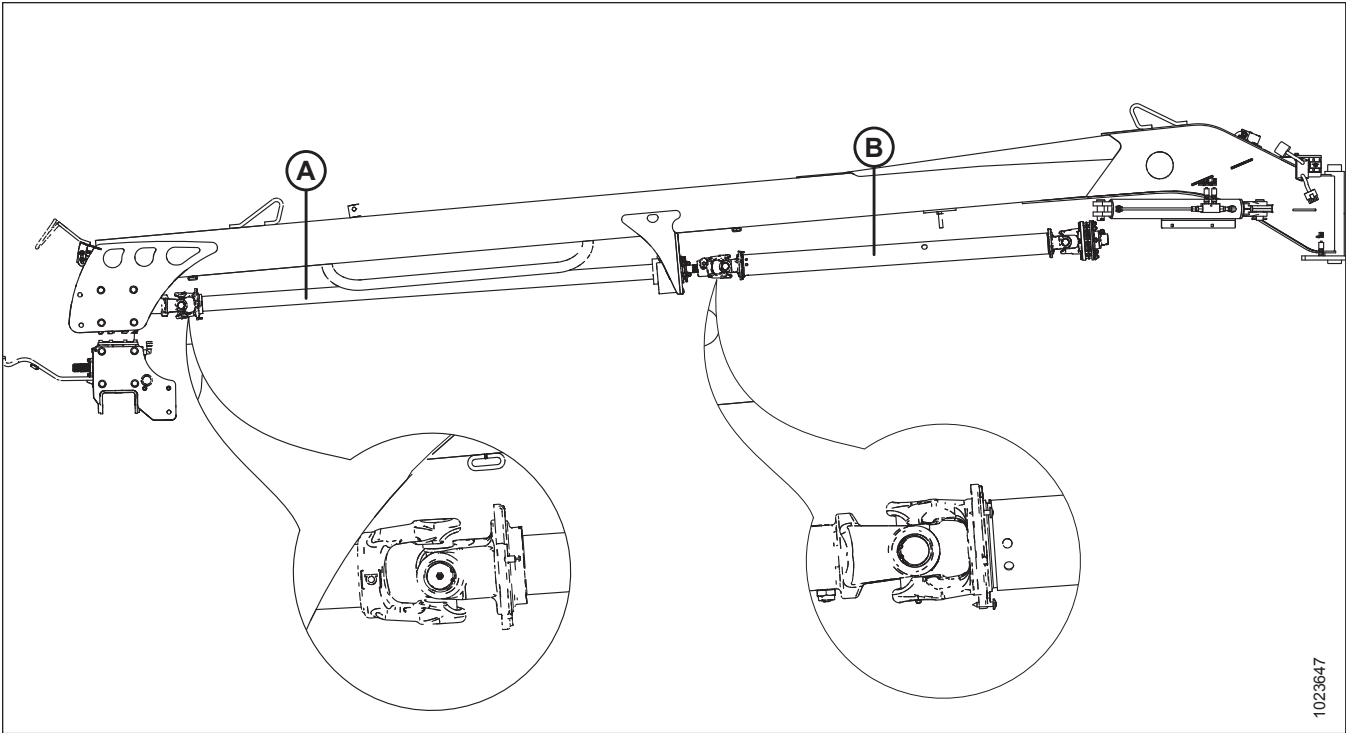


Figure 4.209: Driveline Shield Cone and Lever Clamp

4.5.3 Hitch Driveline Phasing

To reduce hitch driveline vibration, the drivelines should be installed in a specific orientation. If repairing or replacing, ensure the following orientations are used.

On the R113 Rotary Disc Pull-Type (refer to Figure 4.210, page 232), the U-joint on clutch driveline (B) must be aligned 90° to the U-joint on front driveline (A).



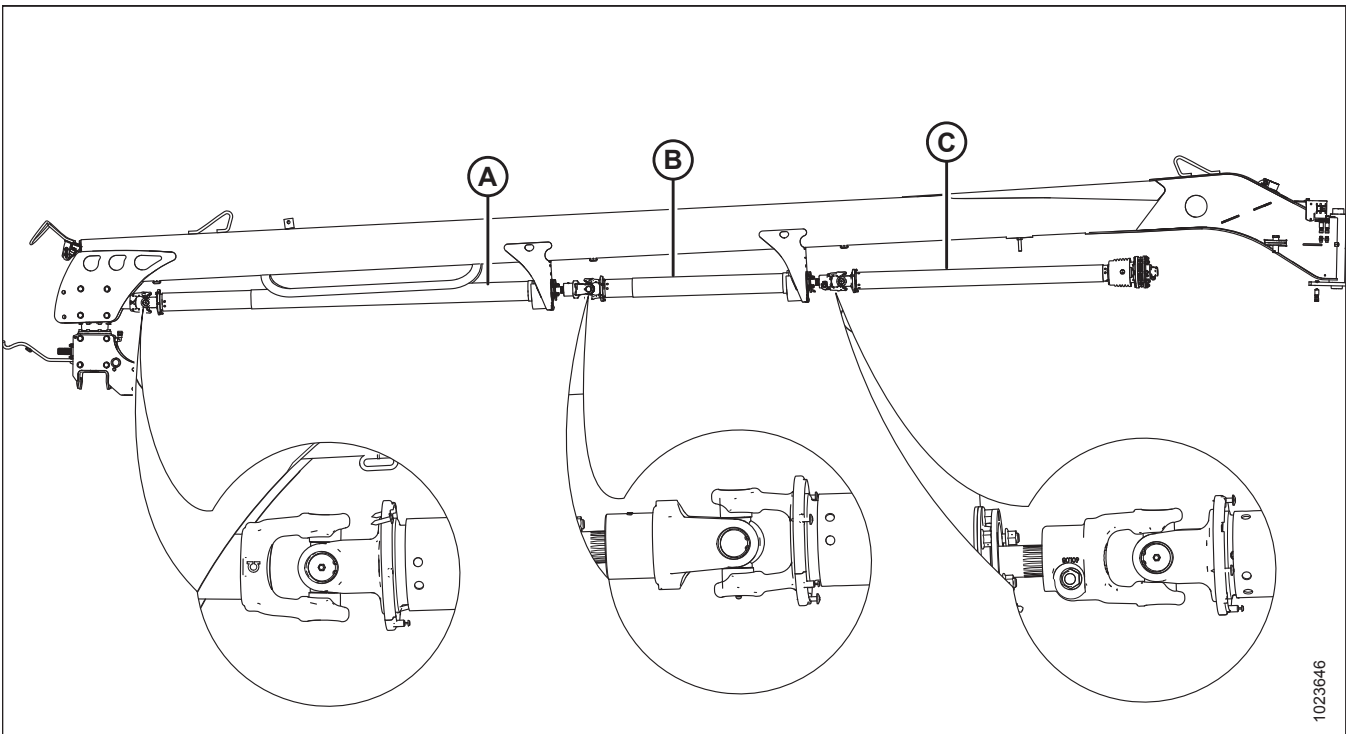
1023647

Figure 4.210: R113 Rotary Disc Pull-Type Driveline Phasing

A - Front Driveline (U-Joint 0°)

B - Clutch Driveline (U-Joint 90°)

On the R116 Rotary Disc Pull-Type (refer to Figure 4.211, page 232), the U-joint on middle driveline (B) must be aligned 90° to the U-joints on front driveline (A) and clutch driveline (C).



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Figure 4.211: R116 Rotary Disc Pull-Type Driveline Phasing

A - Front Driveline (U-Joint 0°)

B - Middle Driveline (U-Joint 90°)

C - Clutch Driveline (U-Joint 0°)

4.5.4 Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the pull-type's hitch swivel gearbox.

Follow regular lubrication procedures and ensure all driveline taper pins are torqued as instructed. For instructions, refer to [4.4.3 Lubricating Cutterbar, page 150](#).

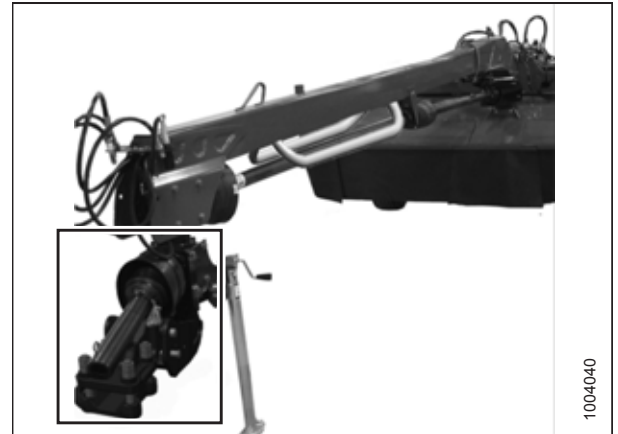


Figure 4.212: Primary Driveline

Removing Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the pull-type's hitch swivel gearbox.

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.

1. Shut down the engine, and remove the key from the ignition.
2. Unhook the rotary disc pull-type from the tractor. For instructions, refer to [3.8 Detaching Rotary Disc Pull-Type from Tractor, page 55](#).
3. Release two lever clamps (A) using a screwdriver or similar prying tool.

NOTE:

Only one lever clamp is shown in the illustration at right.



Figure 4.213: Driveline Shield Cone and Lever Clamp

MAINTENANCE AND SERVICING

- Slide driveline shield cone away from gearbox.
- Loosen nut (A) so that taper pin threads are recessed inside the nut.
- Tap nut (A) with a hammer to loosen the taper pin and release driveline yoke from the shaft.
- Pull driveline off gearbox.
- Remove driveline guard if necessary. For instructions, refer to [Removing Driveline Guards, page 256](#).

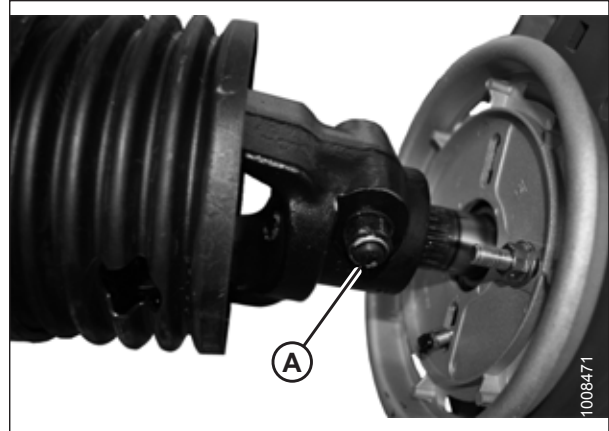


Figure 4.214: Bolt Securing Driveline to Gearbox

Installing Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the pull-type's hitch swivel gearbox.

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.

- Shut down the engine, and remove the key from the ignition.
- Install driveline guard onto driveline (if previously removed). For instructions, refer to [Installing Driveline Guards, page 257](#).

NOTE:

Before installing the driveline, refer to [4.5.3 Hitch Driveline Phasing, page 231](#) to ensure proper orientation.

- Position U-joint (A) and grease fitting (B) as shown.

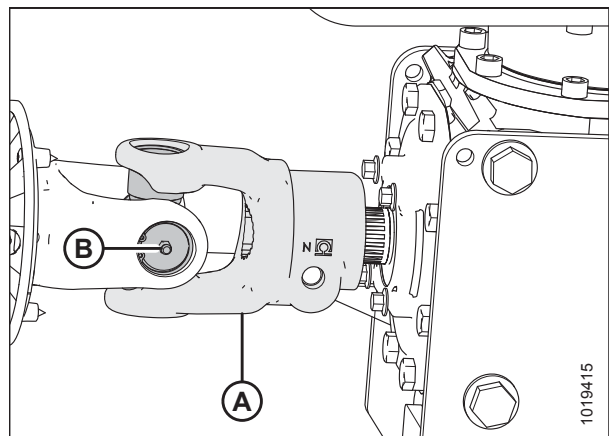


Figure 4.215: Primary Driveline

MAINTENANCE AND SERVICING

4. Install taper pin (A) so groove on pin is aligned with groove on shaft.
5. Ensure there is no grease on taper pin threads after installing into yoke.
6. Torque the taper pin nut (A) to 150 Nm (110 lbf-ft). Clutch taper pin must be recessed approximately 0–2 mm (0–5/64 in.) inside the yoke.

IMPORTANT:

Do **NOT** use an impact tool to install or torque nut.

IMPORTANT:

Check taper pin and torque every 25 hours until it stops moving, then check before start of every season.

NOTE:

For all other joints that use the taper pin, the pin must be recessed approximately 9–11 mm (3/8–7/16 in.).

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

NOTE:

Only one of the two lever clamps is visible in the illustration at right.

8. Attach male half (A) of the driveline to the female half, and position onto storage hook (B) or connect to tractor power take-off (PTO). To attach unit to tractor, refer to [3.7 Attaching Rotary Disc Pull-Type to the Tractor, page 46](#).

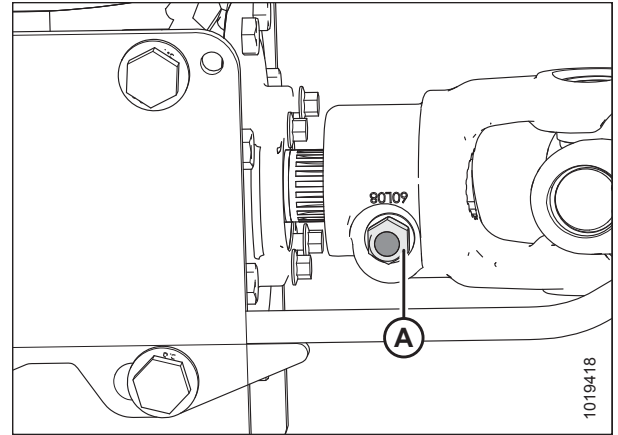


Figure 4.216: Taper Pin Installed in Yoke



Figure 4.217: Shield Clipped to Driveline

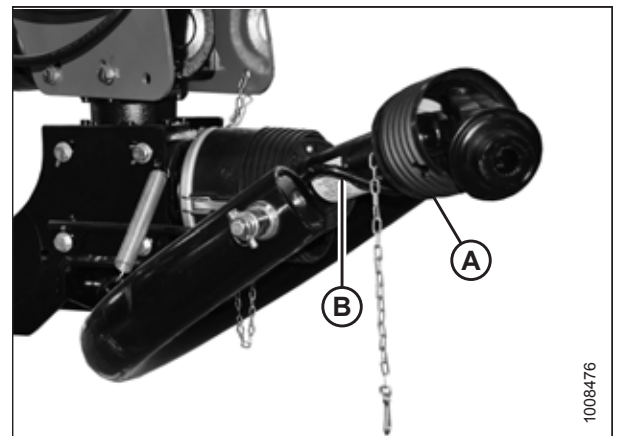


Figure 4.218: Primary Driveline

4.5.5 Hitch Driveline

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

Other than regular lubrication, no maintenance is required. For lubrication instructions, refer to [4.4.3 Lubricating Cutterbar](#), page 150.

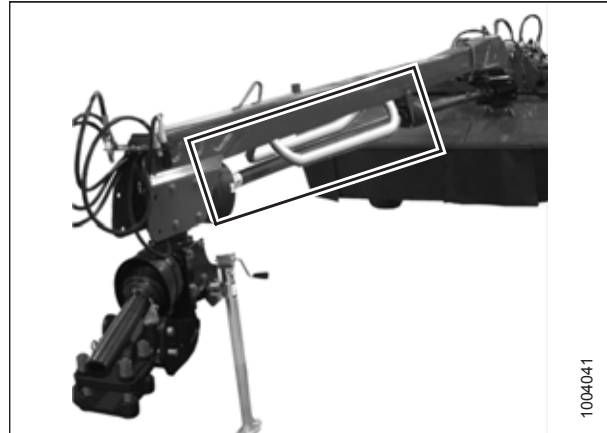


Figure 4.219: Hitch Driveline

Removing Hitch Driveline

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

⚠ 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.

1. Shut down the engine, and remove the key from the ignition.
2. Disconnect clutch driveline (A) at the center support. Do not remove entire driveline. For instructions, refer to [Removing Clutch Driveline](#), page 244.

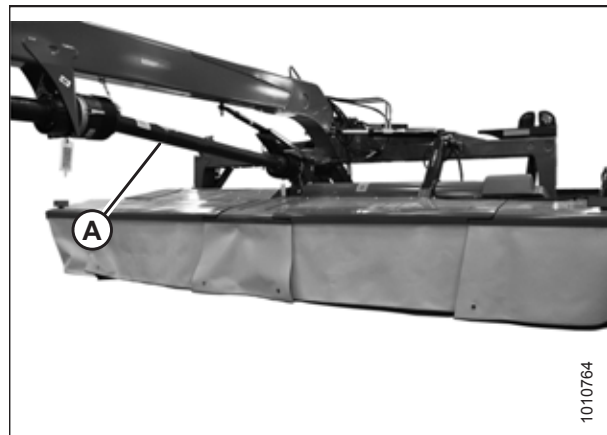


Figure 4.220: Clutch Driveline

MAINTENANCE AND SERVICING

3. Remove two bolts (A), and slide metal shield (B) away from center support.

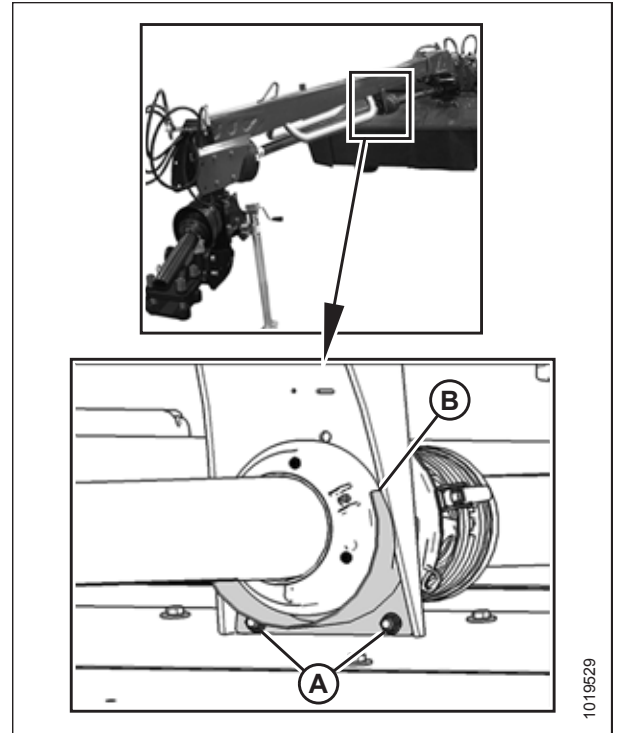


Figure 4.221: Driveline Cover and Shield Installed at Center Support

4. Remove mid-drive yoke (A) from the hitch driveshaft.

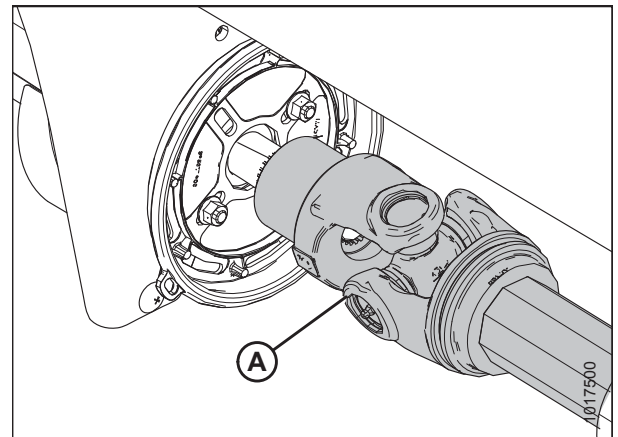


Figure 4.222: Mid-Driveshaft Yoke

MAINTENANCE AND SERVICING

- Remove two nuts (A) that secure metal plate (B) to the center support. Then remove metal plate (B).

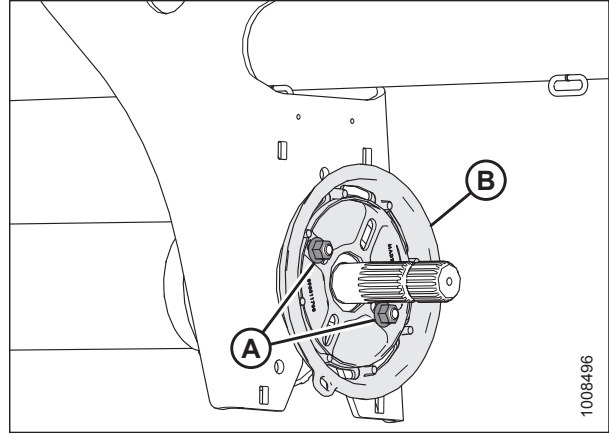


Figure 4.223: Metal Plate

- Remove spacer (A).

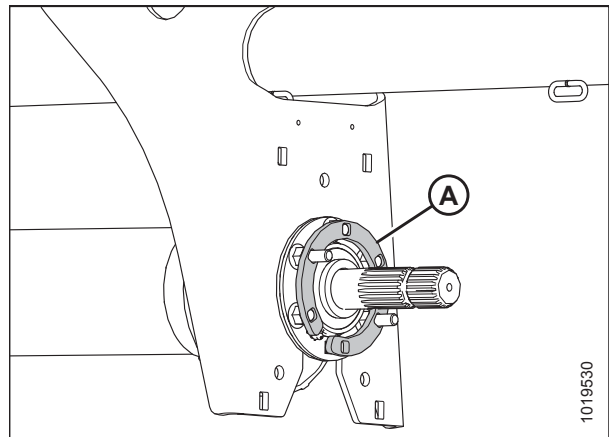


Figure 4.224: Spacer

- Support driveline and remove five nuts (A), flange (B) with grease fitting, ball bearing (C), and second flange (D).

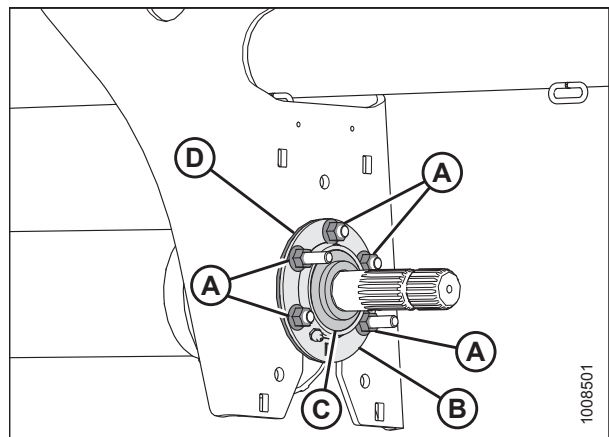


Figure 4.225: Ball Bearing and Flanges

MAINTENANCE AND SERVICING

8. Unlock bearing lock collar (A) by rotating it in the direction opposite to the rotation of the shaft.
9. Slide the bearing lock collar off the driveline shaft.
10. Lower the driveline from the center support.

NOTE:

If removing bolts, note position of long bolts (B) and short bolts (C).

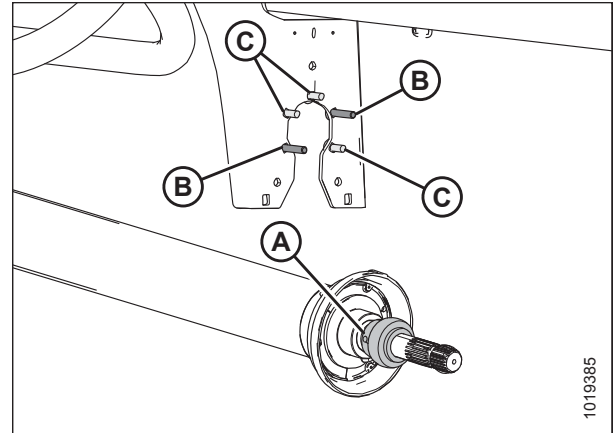


Figure 4.226: Bearing Lock Collar

11. Slide the forward end of hitch driveline (A) away from swivel gearbox shaft.
12. Remove driveline guard if necessary. For instructions, refer to [Removing Driveline Guards, page 256](#).

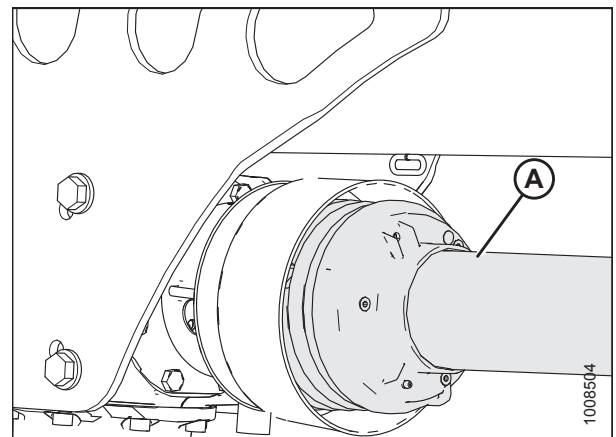


Figure 4.227: Forward End of Hitch

Installing Hitch Driveline

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

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.

1. Shut down the engine, and remove the key from the ignition.
2. Install driveline guard onto driveline (if previously removed). For instructions, refer to [Installing Driveline Guards, page 257](#).

MAINTENANCE AND SERVICING

NOTE:

Before installing the driveline, refer to [4.5.3 Hitch Driveline Phasing, page 231](#) to ensure proper orientation.

3. Orient U-joint (A) and grease fitting (B) as shown.
4. Position forward end of hitch driveline (C) onto the hitch swivel gearbox shaft and push it onto the shaft.

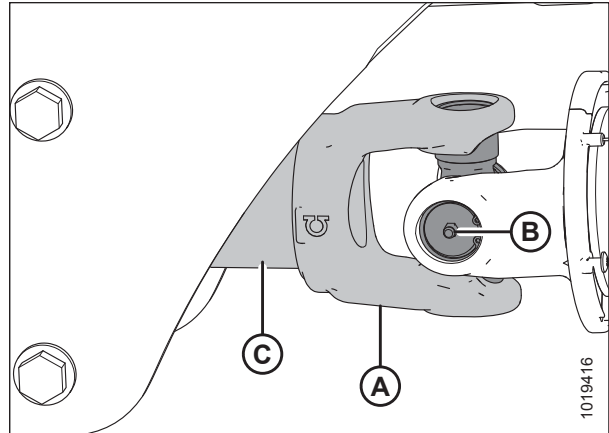


Figure 4.228: Forward End of Hitch

IMPORTANT:

If installing a replacement guard, ensure chain (A) is short enough that it does **NOT** wrap around the driveline guard.

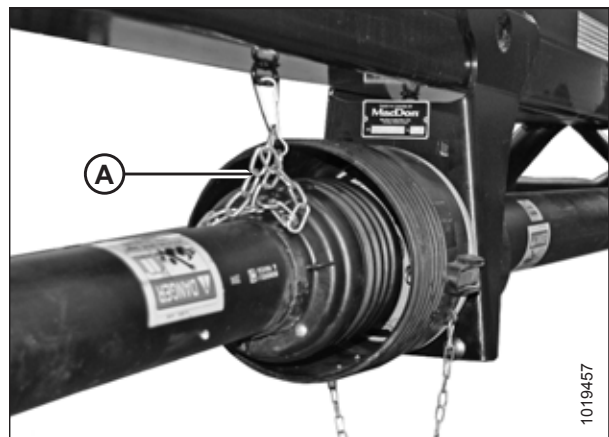


Figure 4.229: Driveline Guard

5. Slide lock collar (A) on the shaft.
6. Position shaft end of the driveline onto the hitch support bracket, and support the driveline to hold it in place.

IMPORTANT:

Ensure locking collar (A) is on the backside of the support bracket.

7. Install two long bolts (B) and three short bolts (C) exactly as shown.

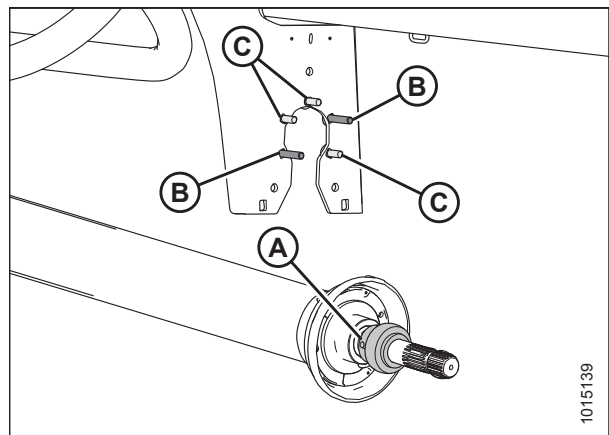


Figure 4.230: Long and Short Bolts

MAINTENANCE AND SERVICING

8. Install flange (A).
9. Ensure distance (B) between the tip of the shaft and the front face of the center support is 136 mm to 144 mm (5 3/8 in. to 5 11/16 in.).

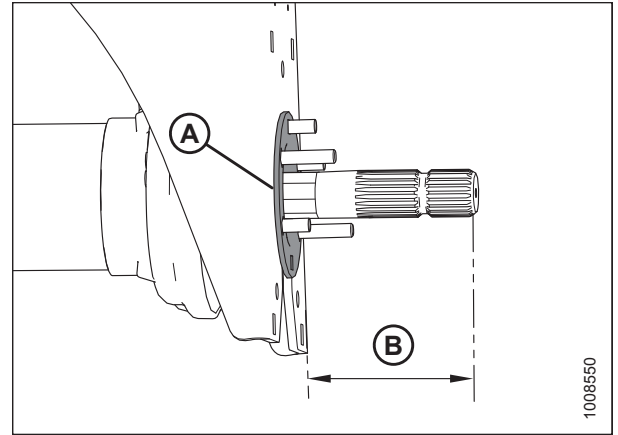


Figure 4.231: Flange Installed at Center Support

10. Install ball bearing (C).
11. Tighten the locking collar in the direction of the shaft rotation.
12. Install flange (B) with grease fitting (D), and five nuts (A).

IMPORTANT:

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

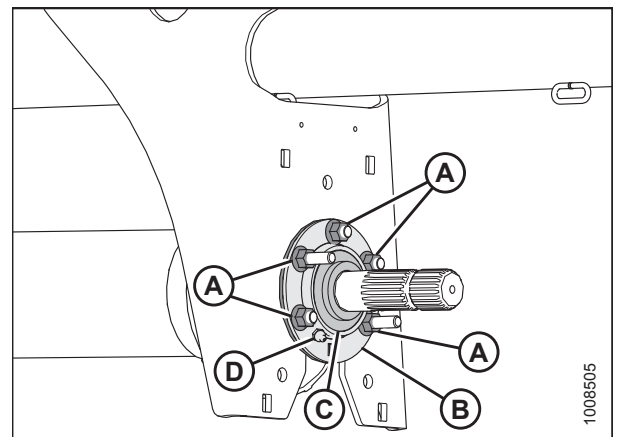


Figure 4.232: Flange, Bearing, and Grease Fitting

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

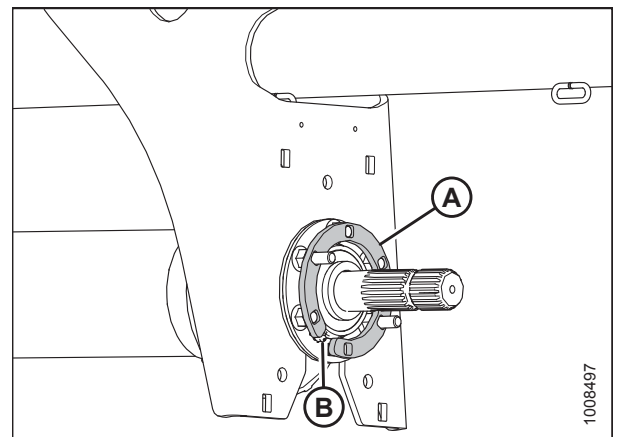


Figure 4.233: Spacer Installed at Center Support

MAINTENANCE AND SERVICING

14. Position metal plate (B) on center support.
15. Apply medium-strength threadlocker (Loctite® 243 or equivalent) to two nuts (A), and then use them to secure metal plate (B) while ensuring loop on metal plate (C) is positioned on lower side as shown.
16. Torque nuts (A) to 20 Nm (15 lbf-ft).

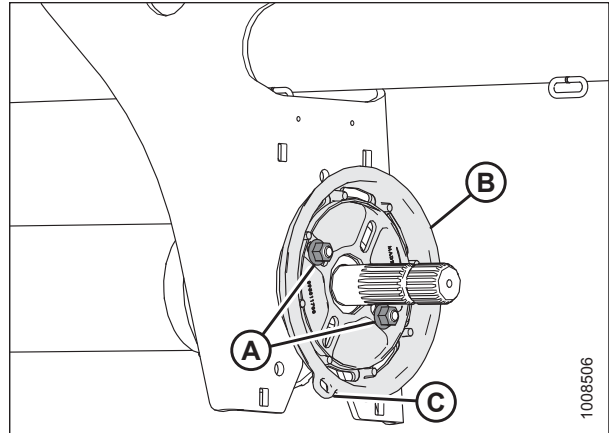


Figure 4.234: Metal Plate Attached to Center Support

17. Position driveshield cover on center support and secure with three screws (A).
 18. Install metal shield (C) with two bolts (B).
- NOTE:**
There are two hitch drivelines for installation on the R116.

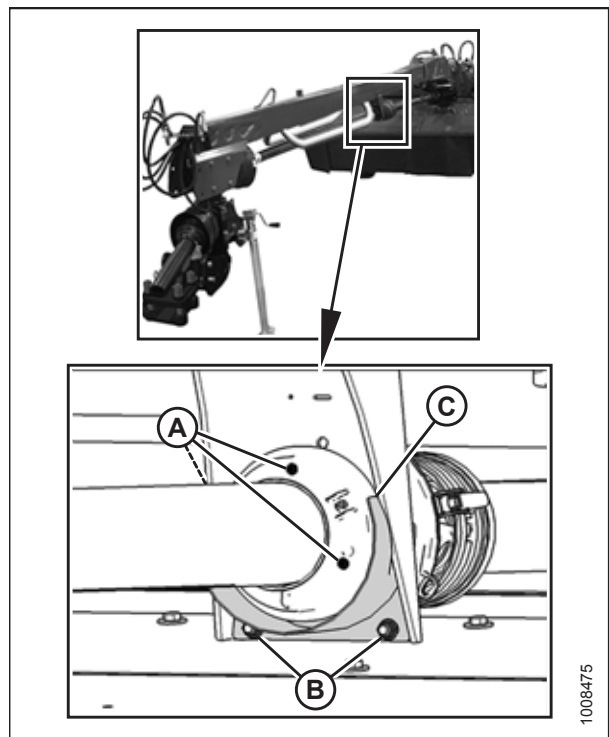


Figure 4.235: Driveline Cover and Shield Installed at Center Support

19. Install clutch driveline (A) at center support. For instructions, refer to [Installing Clutch Driveline, page 246](#).

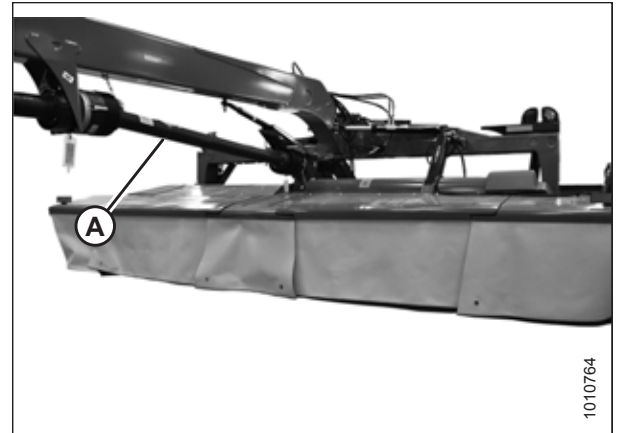


Figure 4.236: Clutch Driveline Installed at Center Support

4.5.6 Clutch Driveline

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

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

Follow regular lubrication procedures and ensure all driveline taper pins are torqued as instructed. For instructions, refer to [4.4.3 Lubricating Cutterbar, page 150](#) and [4.5.8 Inspecting Driveline Taper Pins, page 254](#).

Perform run-in procedure as part of the rotary disc pull-type's initial break-in procedure, when clutch friction linings have been replaced, or when the unit has not been operated in 6 months. For instructions, refer to [Checking Clutch Operation, page 248](#).

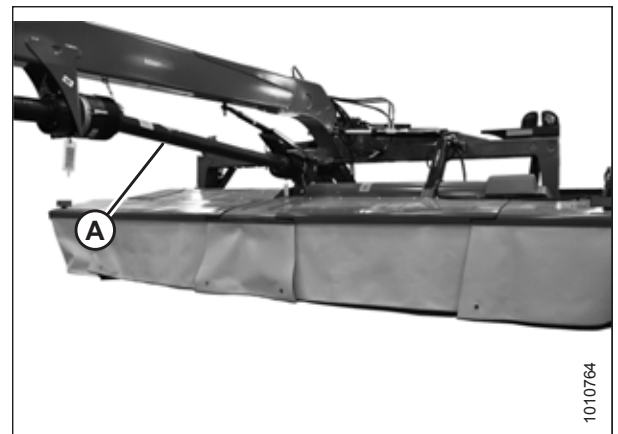


Figure 4.237: Clutch Driveline

Removing Clutch Driveline

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

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.

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

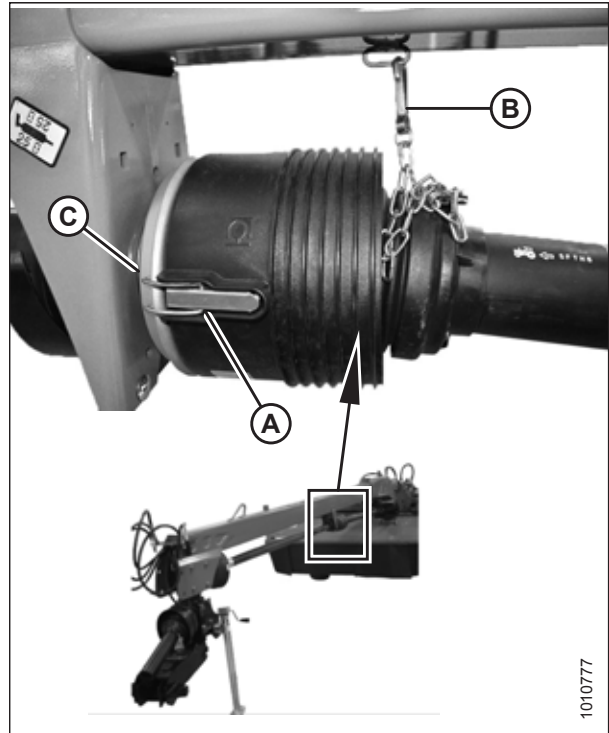


Figure 4.238: Driveline Shield Cone

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

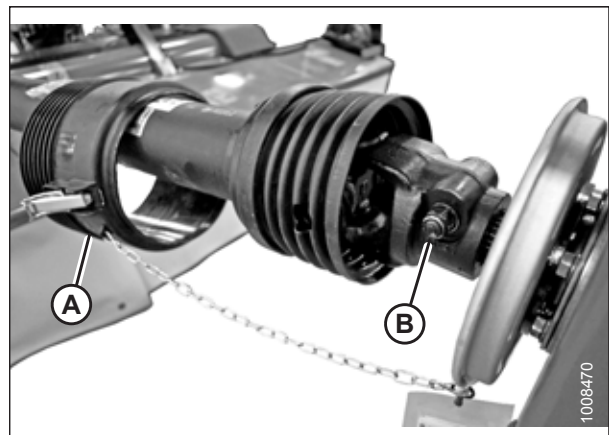


Figure 4.239: U-Joint

MAINTENANCE AND SERVICING

- Slide clutch driveline (A) off the hitch driveline.
- Separate clutch driveline (A).



Figure 4.240: Driveline

- Release two lever clamps (A) on the shield cone installed at the header swivel gearbox.
- Remove driveline guard if necessary. For instructions, refer to [Removing Driveline Guards](#), page 256.

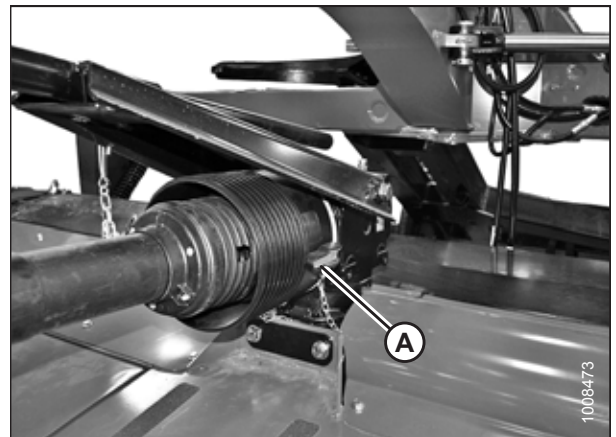


Figure 4.241: Driveline Shield Cone

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



Figure 4.242: Driveline and Gearbox

Installing Clutch Driveline

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

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.

1. Shut down the engine, and remove the key from the ignition.
2. Install driveline guard onto driveline (if previously removed). For instructions, refer to [Installing Driveline Guards, page 257](#).
3. Position driveline onto the gearbox shaft as shown at right.
4. Clean the taper pin threads.
5. Install taper pin into yoke with groove on pin aligned with groove in shaft. Ensure there is no grease on threads after inserting pin through yoke.
6. Secure pin with nut (A). Torque to 150 Nm (110 lbf·ft). Pin should be flush with yoke.

IMPORTANT:

Check taper pin torque every 25 hours until it stops moving, then check before every season.

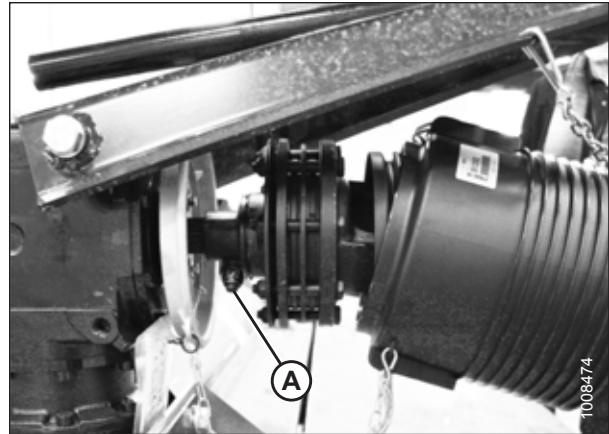


Figure 4.243: Driveline and Gearbox

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

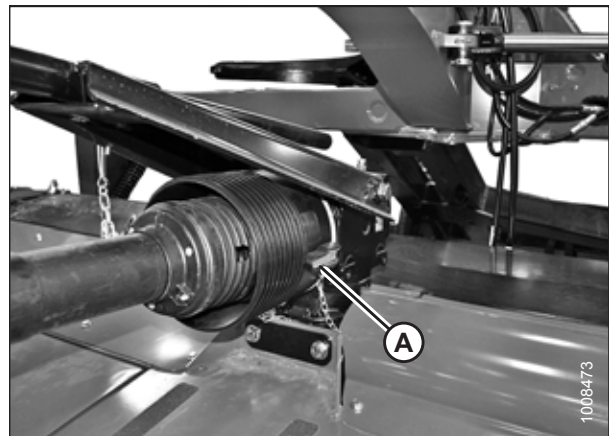


Figure 4.244: Driveline Shield Cone

MAINTENANCE AND SERVICING

8. For R113 PT clutch driveline:

- a. Assemble forward half (A) of clutch driveline onto female half and attach to shaft on hitch driveline (B).
- b. Position U-joint (C) as shown.

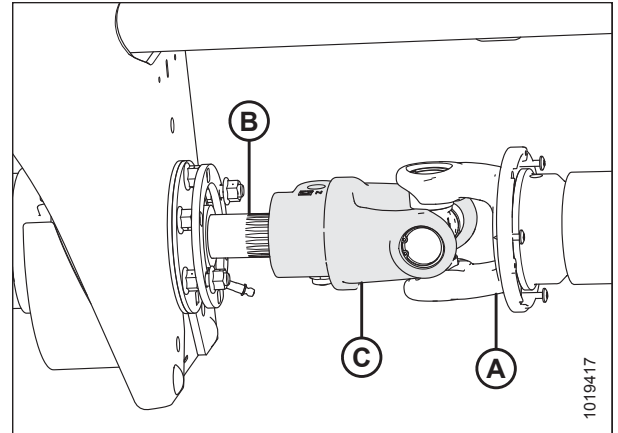


Figure 4.245: R113 PT Clutch Driveline

9. For R116 PT clutch driveline:

- a. Assemble forward half (A) of clutch driveline onto female half and attach to shaft on hitch driveline (B).
- b. Position the U-joint (C) and grease fitting (D) as shown.

NOTE:

Before installing the driveline, refer to [4.5.3 Hitch Driveline Phasing, page 231](#) to ensure proper orientation.

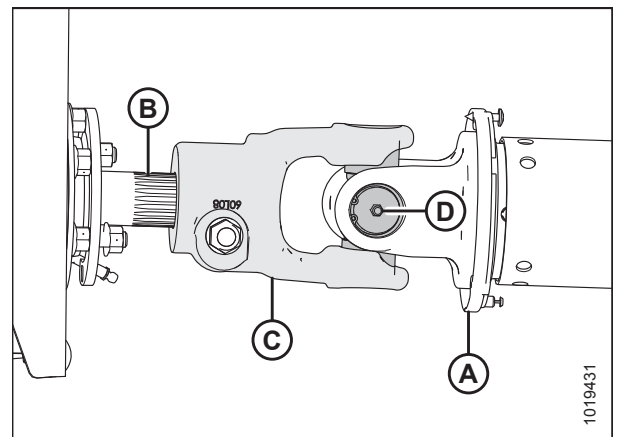


Figure 4.246: R116 PT Clutch Driveline

10. Move the shield cone to expose the U-joint.

NOTE:

Shield cone not shown in illustration at right.

11. Clean the taper pin threads.
12. Install taper pin so groove on pin is aligned with groove on shaft. Ensure there is no grease on taper pin threads after installing into yoke.
13. Torque taper pin nut (A) to 150 Nm (110 lbf-ft). Pin should be recessed 9–11 mm (3/8–7/16 in.) into yoke.

IMPORTANT:

Check taper pin torque every 25 hours until it stops moving, then check before every season.

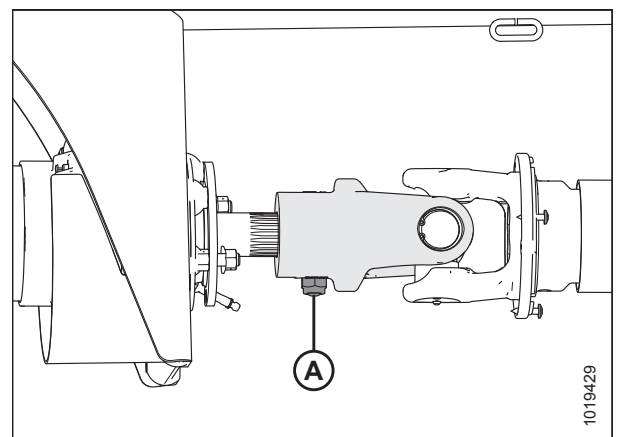


Figure 4.247: R113 PT Clutch Driveline

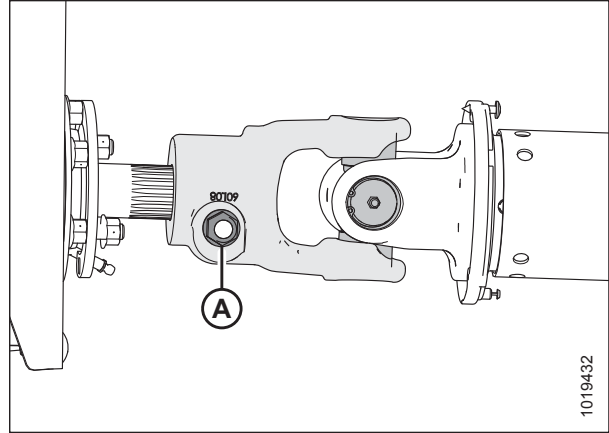


Figure 4.248: R116 PT Clutch Driveline

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

IMPORTANT:

If installing a replacement guard, ensure chain (B) is short enough that it does **NOT** wrap around the driveline guard.

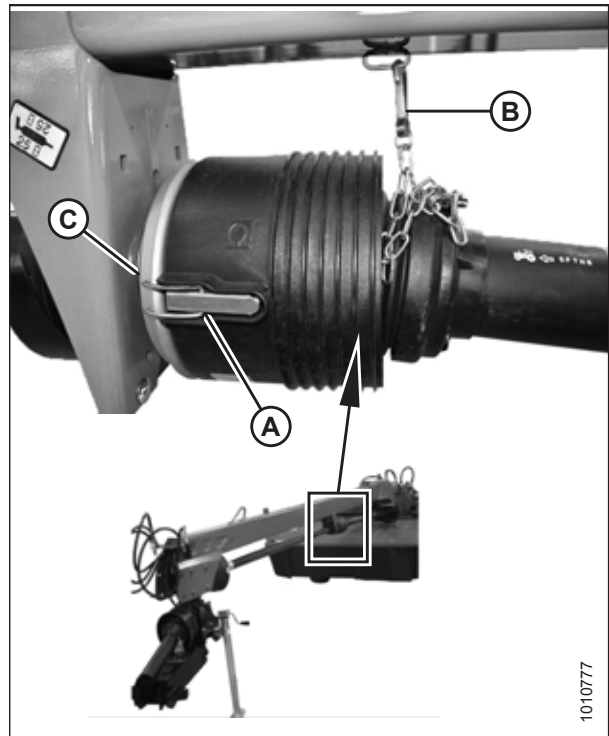


Figure 4.249: Driveline Shield Cone

Checking Clutch Operation

The driveline clutch requires an initial break-in procedure otherwise the clutch may slip prematurely. As part of the break-in procedure, the clutch spring pressure should be released and the header engaged. This intentional slippage of the clutch will wear in and seat the friction linings against the metal drive plates and remove any oxidization.

Perform the following run-in procedure during the rotary disc pull-type's initial break-in, whenever the clutch friction linings have been replaced, or when the unit has not been operated for 6 months or more.

⚠ DANGER

To avoid injury or death from 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.

MAINTENANCE AND SERVICING

1. Shut down the engine, and remove the key from the ignition.
2. Release two lever clamps (A) on the shield cone installed at the header swivel gearbox.
3. Slide the shield away from the gearbox.

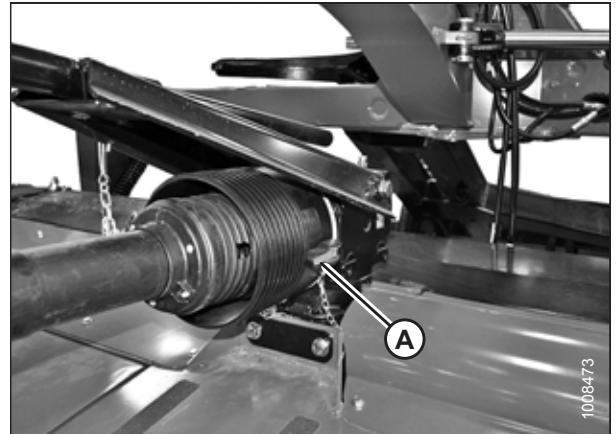


Figure 4.250: Driveline Shield Cone

4. Mark horizontal line (A) across the friction discs and the drive plates with a paint marker.
5. Back off all pressure plate tensioning nuts (B) one and a half revolutions.
6. Reattach the shield cone to the header swivel gearbox.
7. Start the tractor and adjust the engine speed to 1000 rpm.
8. Engage the tractor's power take-off (PTO) for 3–5 seconds. Repeat three times.

NOTE:

The clutch will slip with a torque of 1350 Nm (995 lbf·ft) at 1000 rpm.

9. Shut down the engine, and remove the key from the ignition.
10. Inspect the clutch. Horizontal mark (A) across the friction discs should no longer line up with the metal drive plates. This indicates the clutch was slipping.

NOTE:

It is not necessary for the indicating mark on the friction discs to be misaligned from the metal drive plates on both sides of the disc. The friction discs are not splined to any component and will likely only slip on one surface.

11. Remove the shield cone from the header swivel gearbox.
12. If acceptable slippage is detected, retighten clutch spring adjustment nuts (B). For instructions, refer to .
13. If acceptable slippage is not detected, the clutch should be removed and disassembled for inspection/repair. Contact your MacDon Dealer.

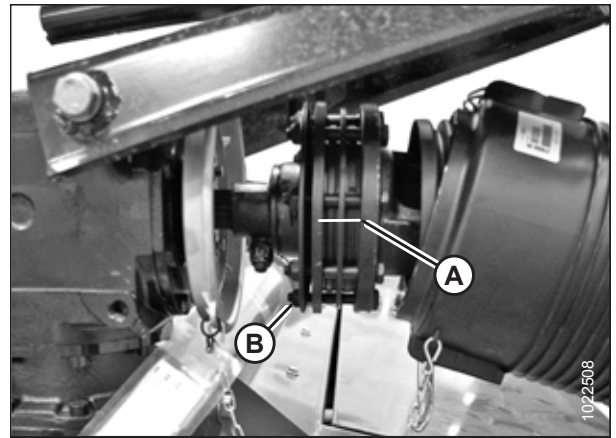


Figure 4.251: Driveline and Gearbox

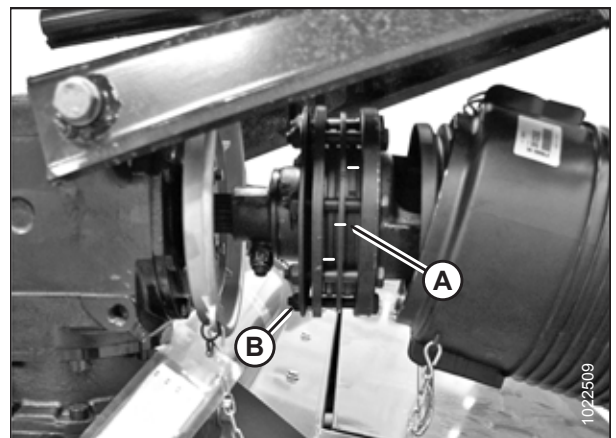


Figure 4.252: Driveline and Gearbox

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

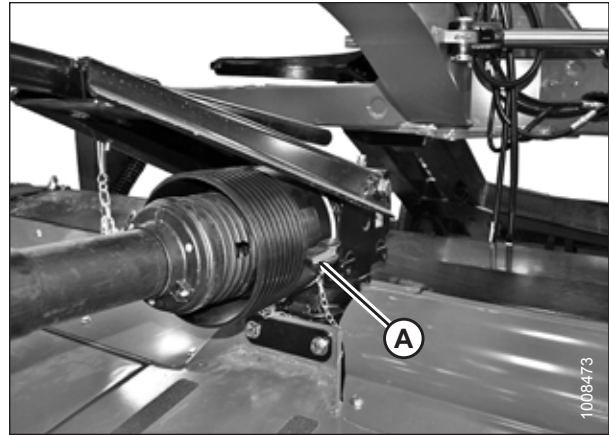


Figure 4.253: Driveline Shield Cone

4.5.7 Cross Driveline

Cross driveline (A) 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 Lubricating the Rotary Disc Pull-Type](#), page 130.

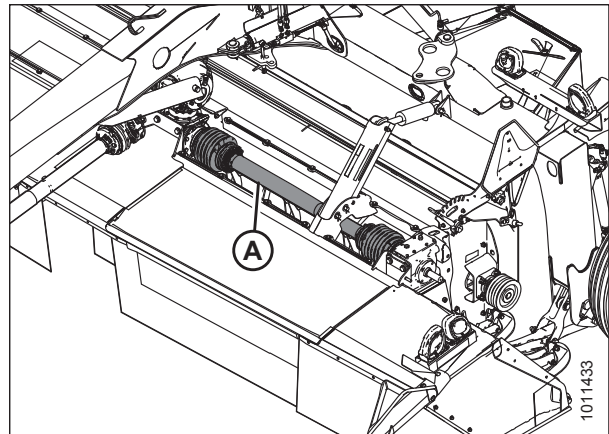


Figure 4.254: Cross Driveline

Removing Cross Driveline

Cross driveline (A) transfers power from the tractor's power take-off (PTO) to the cutterbar-conditioner drive gearbox (T-gearbox).

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.

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

MAINTENANCE AND SERVICING

2. Open the cutterbar doors to access cross driveline (A) from inside the rotary disc pull-type. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#) or [3.3.2 Opening Cutterbar Doors – Export Latches, page 38](#).

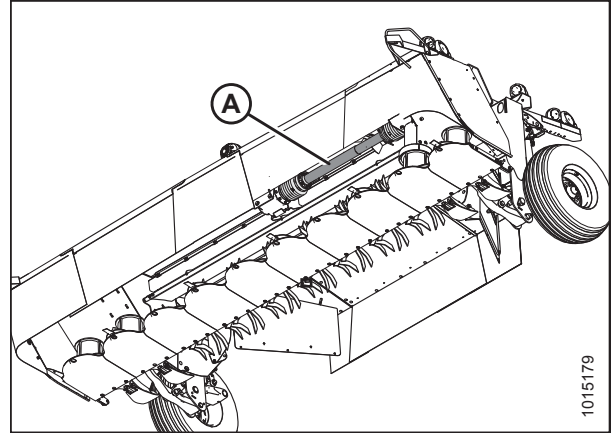


Figure 4.255: Lower Left View of Rotary Disc Pull-Type

3. Loosen clamp (A) and slide driveline shield (B) away from the yoke.
4. Repeat for the opposite end of the driveline.

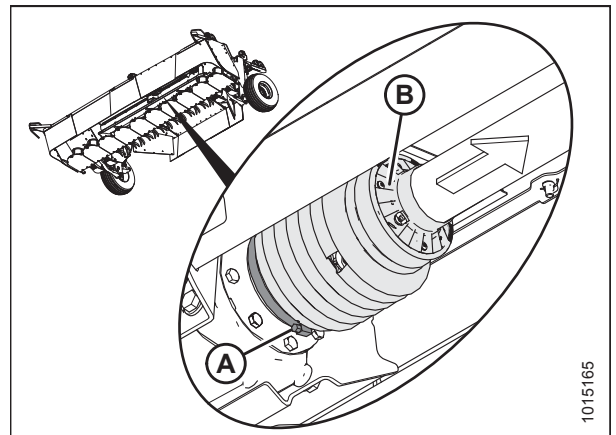


Figure 4.256: Cross Driveline Shield

5. Loosen nut (A) so that taper pin threads are recessed inside the nut.
6. Tap nut (A) with a hammer to loosen the taper pin and release driveline yoke (B) from the shaft.
7. Repeat for the opposite end of the driveline.
8. Remove the cross driveline shaft.

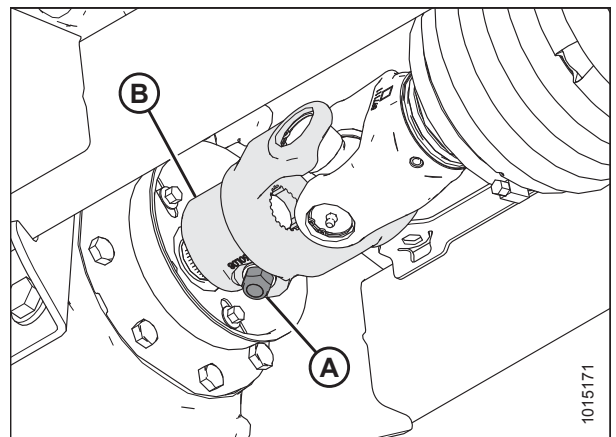


Figure 4.257: Cross Driveline

Installing Cross Driveline

Cross driveline (A) transfers power from the tractor's power take-off (PTO) to the cutterbar-conditioner drive gearbox (T-gearbox).

⚠ 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.

1. Shut down the engine, and remove the key from the ignition.
2. Open the cutterbar doors to install cross driveline (A) from inside the rotary disc pull-type. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

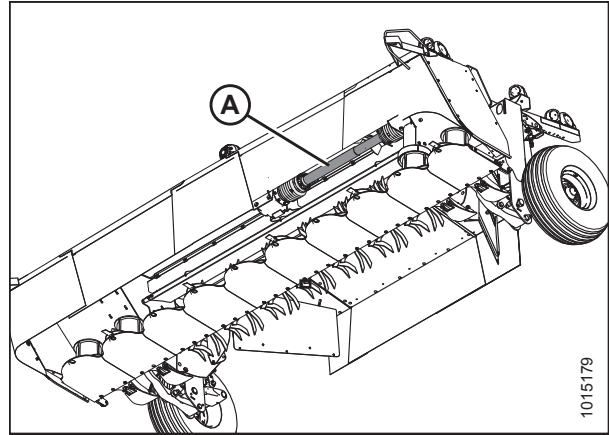


Figure 4.258: Lower Left View of Rotary Disc Pull-Type

3. Position driveline yoke (B) as shown on both ends of the cross driveline.
4. Install taper pin so groove on pin is aligned with groove on shaft.
5. Install nut (A) onto taper pin and torque to 150 Nm (110 lbf-ft). Pin must be recessed 9–11 mm (3/8–7/16 in.) inside the yoke.

IMPORTANT:

Check taper pin torque every 25 hours until it stops moving, then check before every season.

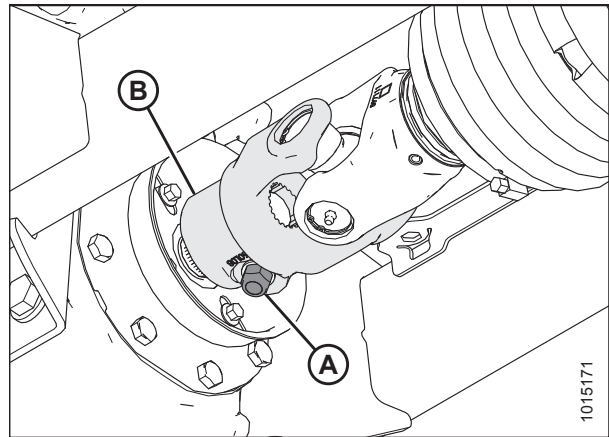


Figure 4.259: Cross Driveline Yoke

MAINTENANCE AND SERVICING

6. Slide driveline shields (B) over the yokes at both ends of the driveline, and secure them with clamps (A).
7. Close the cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.

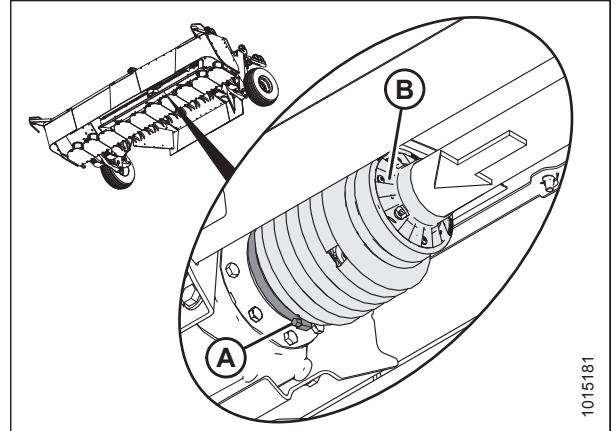
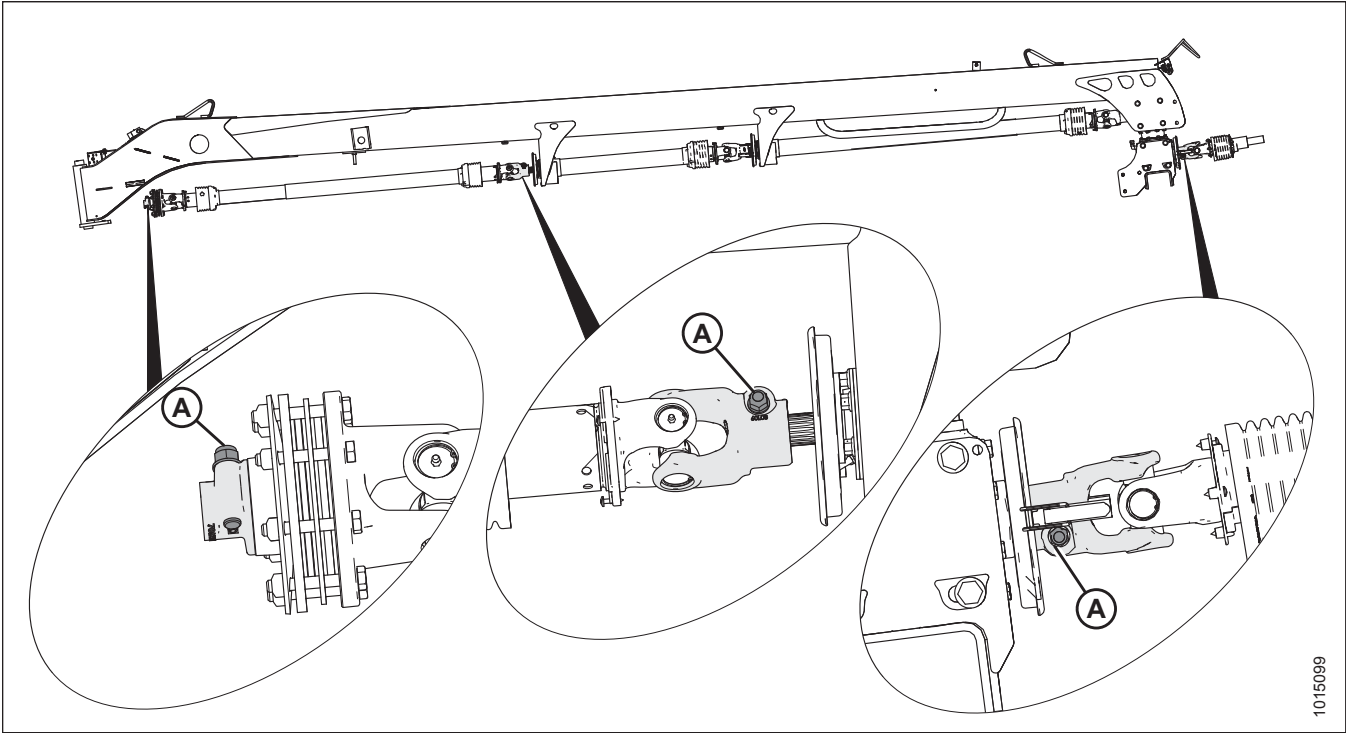


Figure 4.260: Cross Driveline Shield

4.5.8 Inspecting Driveline Taper Pins

Taper pins are located at three places (A) along the **hitch driveshaft**. Torque each pin to 150 Nm (110 lbf·ft) every 25 hours until it no longer moves, and then check at the beginning of every season.



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Figure 4.261: Hitch Taper Pin Locations

MAINTENANCE AND SERVICING

Taper pins are located at two places (B) on the **cross shaft driveline**. Torque each pin to 150 Nm (110 lbf·ft) every 25 hours until it no longer moves, and then check at the beginning of every season.

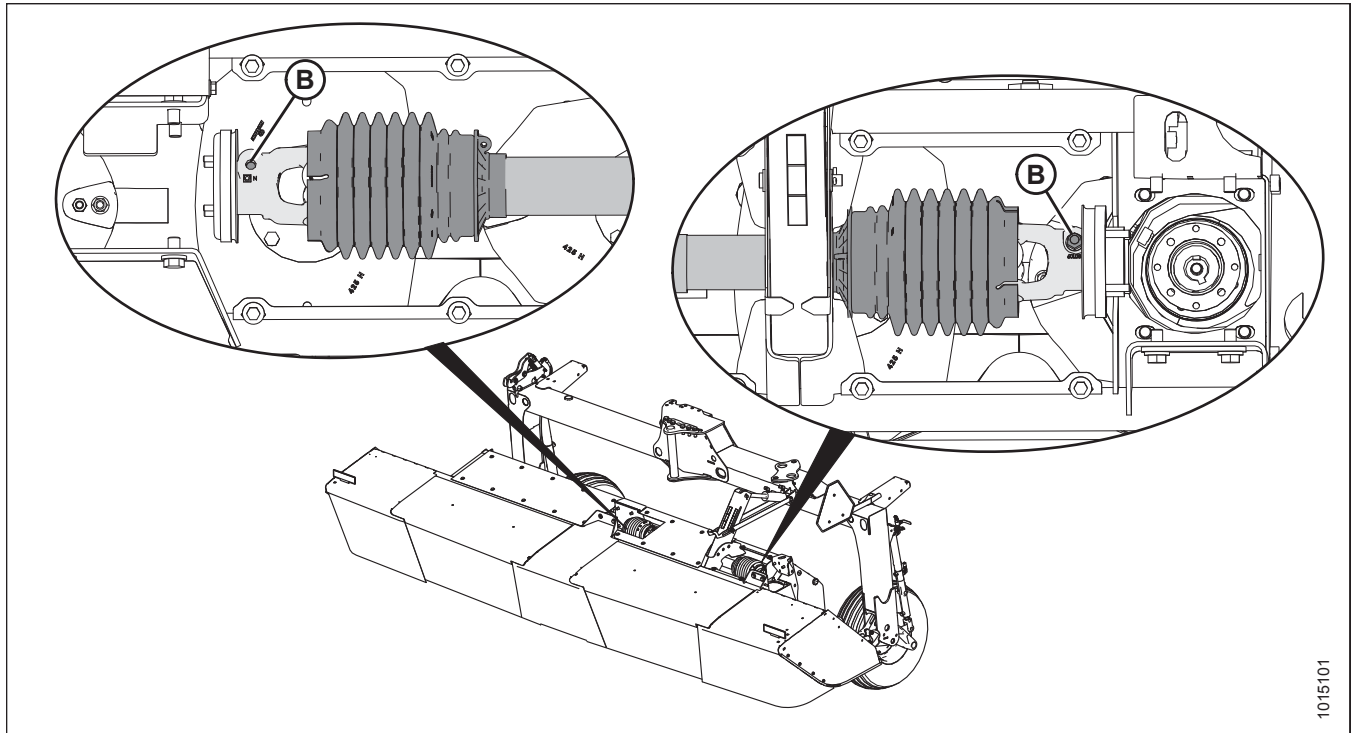


Figure 4.262: Cross Shaft Driveline Taper Pin Locations

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4.5.9 Driveline Guards

Removing Driveline Guards

WARNING

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

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.

1. Shut down the engine, and remove the key from the ignition.
2. Remove driveline (A) from which the guard is going to be removed. For instructions, refer to one of the following procedures:

- [Removing Primary Driveline, page 233](#)
- [Removing Hitch Driveline, page 236](#)
- [Removing Clutch Driveline, page 244](#)

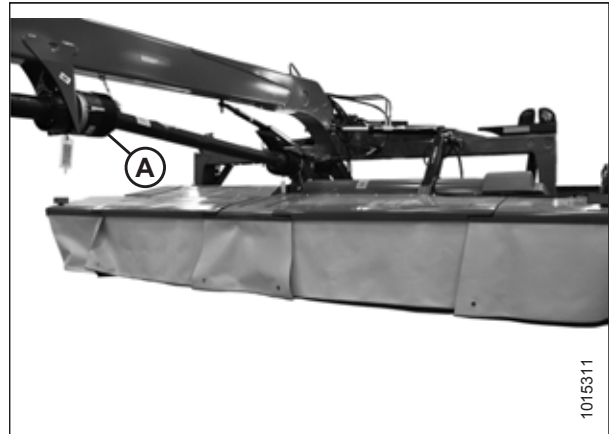


Figure 4.263: Driveline

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

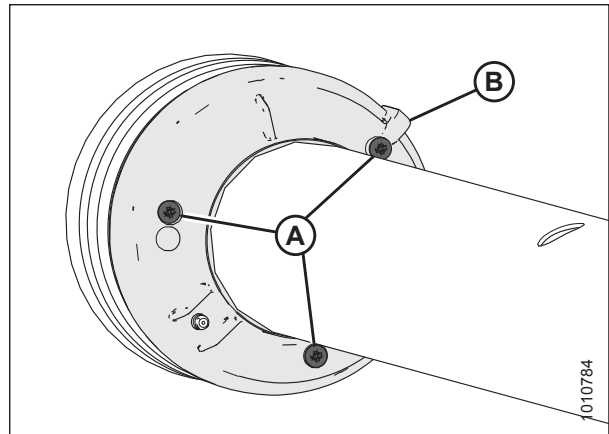


Figure 4.264: Phillips Head Screws Installed in Base Cone

MAINTENANCE AND SERVICING

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

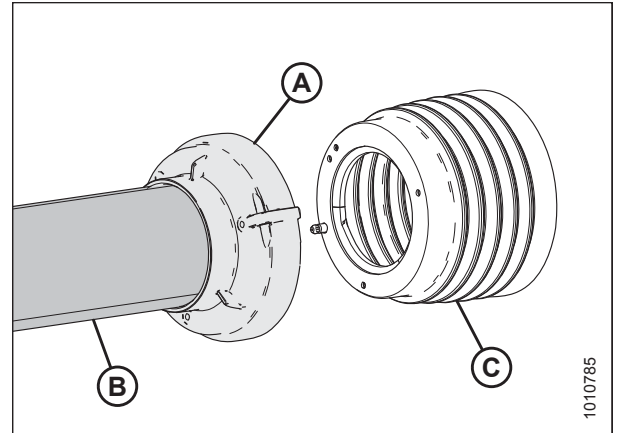


Figure 4.265: Base Cone and Shield Tube Removed from Outer Cone

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

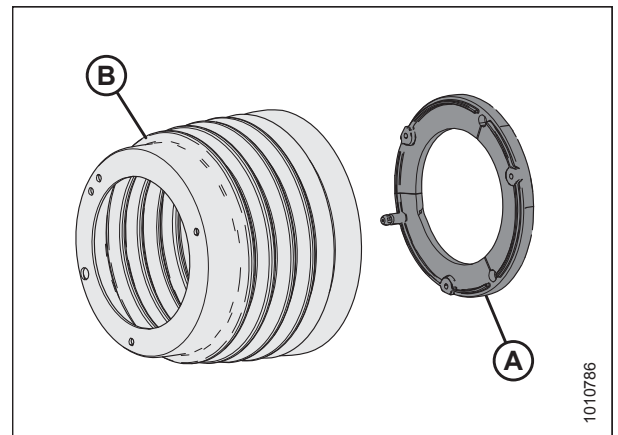


Figure 4.266: Shield Support Removed from Outer Cone

Installing Driveline Guards

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.

WARNING

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

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

MAINTENANCE AND SERVICING

- Grease bearing groove (A) on the inner yokes.
- Fit shield support (B) to bearing groove (A), and ensure that grease fitting (C) faces the drive tube.

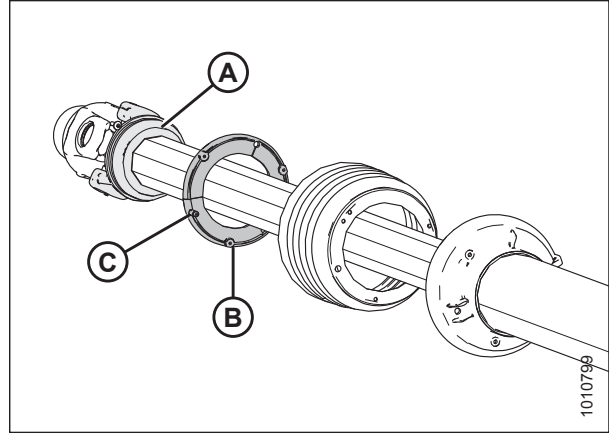


Figure 4.267: Inner Yoke and Shield Support

- Install shield support (A) into outer cone (B), and ensure that grease fitting (C) is inserted into the proper hole.

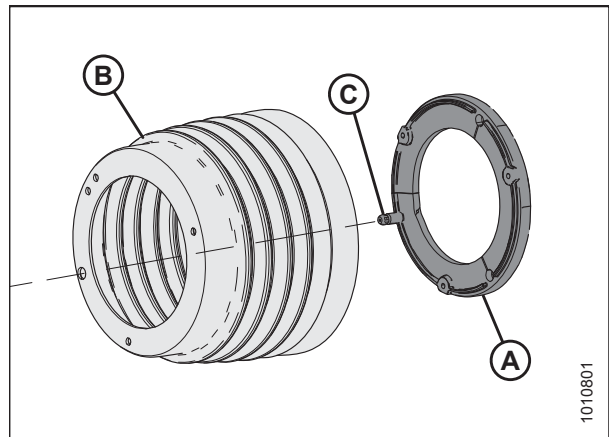


Figure 4.268: Shield Support and Outer Cone

- Attach base cone (A) and shield tube (B) to the outer cone (C).

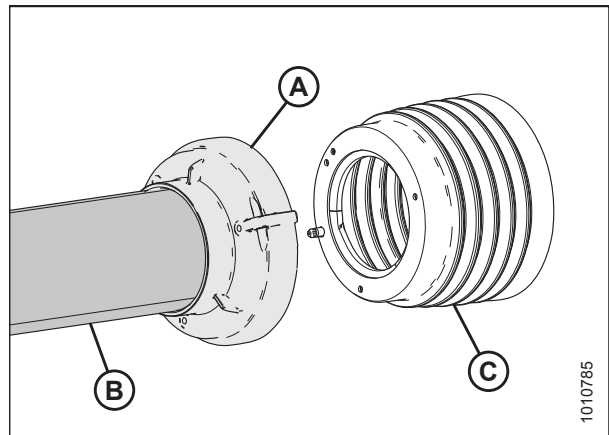


Figure 4.269: Base Cone, Shield Tube, and Outer Cone

MAINTENANCE AND SERVICING

6. Install three self-tapping Phillips head screws (A) into base cone (B).

IMPORTANT:

Hand-tighten only using an appropriate screwdriver. Do **NOT** use a powered tool to tighten screws.

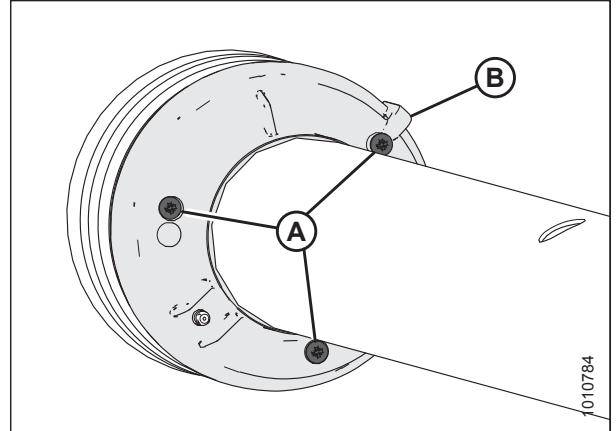


Figure 4.270: Phillips Head Screws Installed in Base Cone

IMPORTANT:

If installing a replacement guard, ensure chain (A) is short enough that it does **NOT** wrap around the driveline guard.

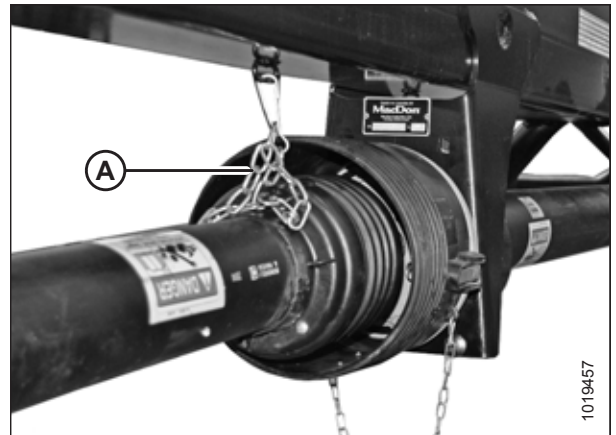


Figure 4.271: Driveline Guard

7. Install driveline (A). For instructions, refer to one of the following:
 - [Installing Clutch Driveline, page 246](#)
 - [Installing Hitch Driveline, page 239](#)
 - [Installing Primary Driveline, page 234](#)

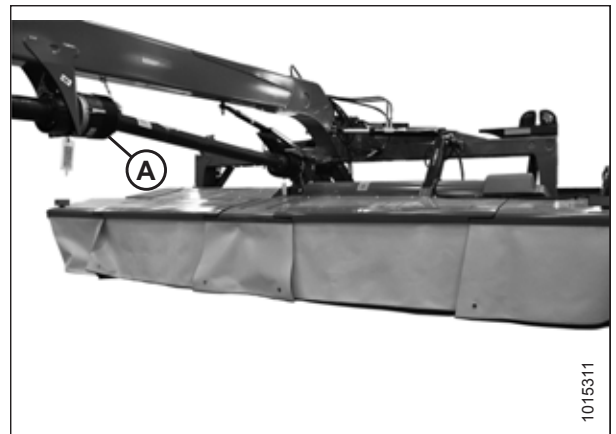


Figure 4.272: Driveline

4.5.10 Conditioner Drive Belt

The conditioner drive belt is located inside the left driveshield and is tensioned with a spring tensioner. The tension is factory-set and should not require adjustment.

Inspecting Conditioner Drive Belt

Check the belt tension and inspect for damage or wear according to the intervals specified in the Maintenance Schedule.

! 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.

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open left driveshield (A). For instructions, refer to [3.2.1 Opening Driveshields, page 34](#).

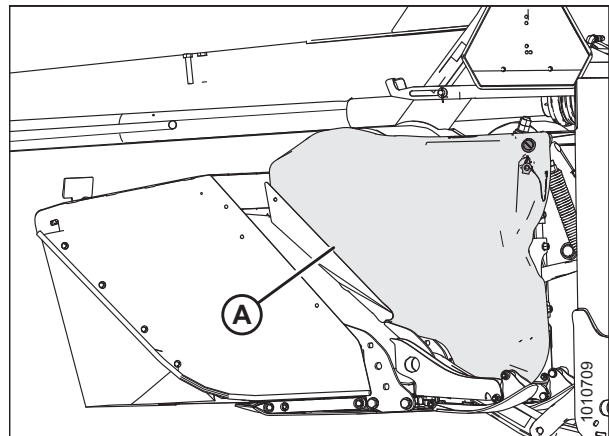


Figure 4.273: Left Driveshield

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.

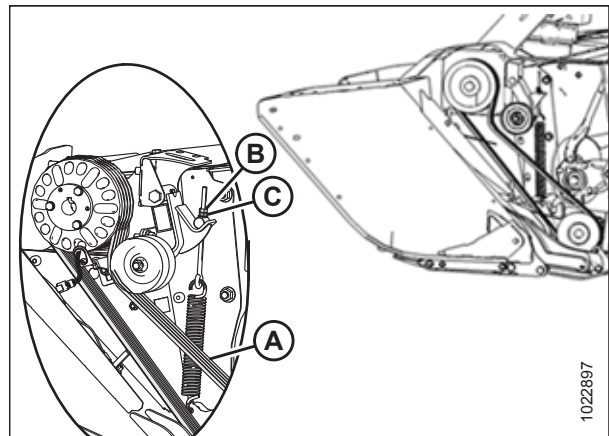


Figure 4.274: Conditioner Drive

6. Measure the length of tensioner spring (A). The 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 262.
7. Close the driveshield. For instructions, refer to 3.2.2 *Closing Driveshields*, page 36.

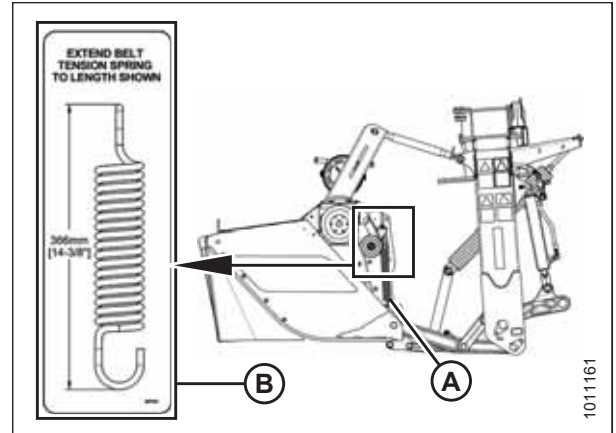


Figure 4.275: Spring Tension Decal

Removing 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.

1. Lower the rotary disc pull-type 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 226.
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).

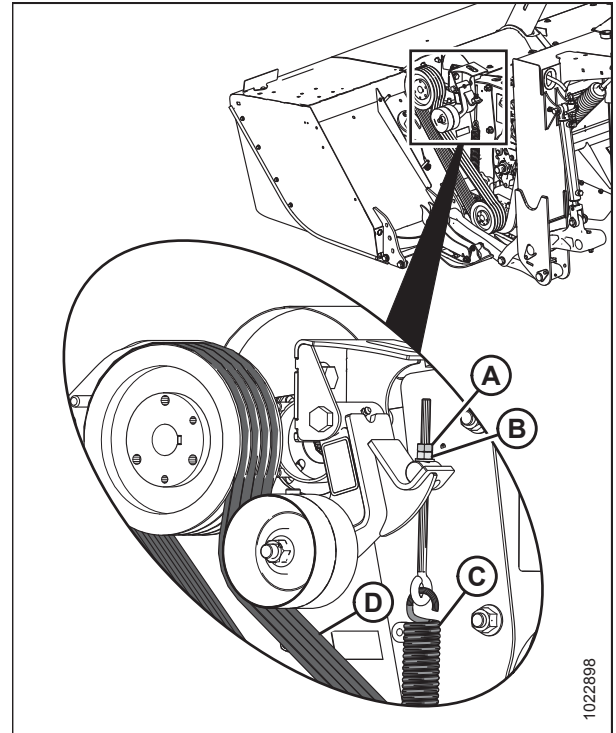


Figure 4.276: Conditioner Drive

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.

1. Lower the rotary disc pull-type 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 226*.
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 necessary, loosen the jam nut and adjuster nut (D) to relieve spring tension.

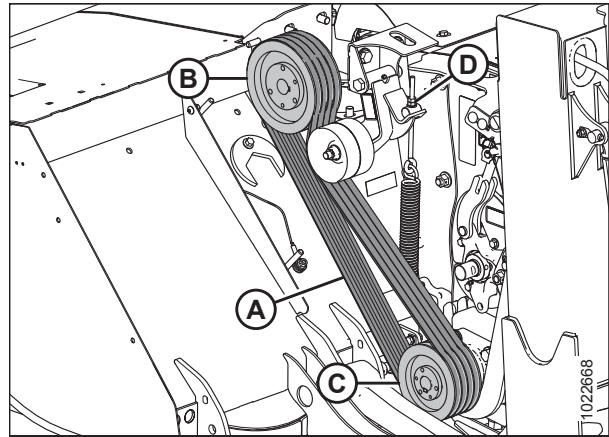


Figure 4.277: Conditioner Drive

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:

Tensioner springs hook into different locations on different types of conditioners.

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.

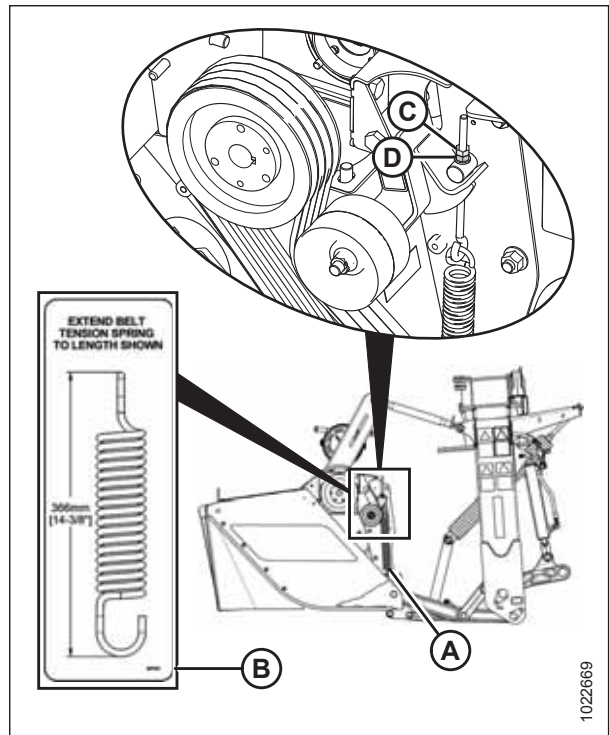


Figure 4.278: Spring Tension Decal

8. Install left driveshield (A). For instructions, refer to *Installing Driveshields, page 228*.

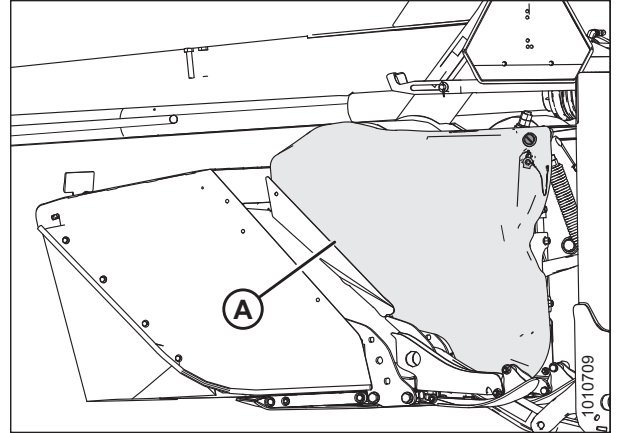


Figure 4.279: Left Driveshield

4.5.11 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 rotary disc pull-type.

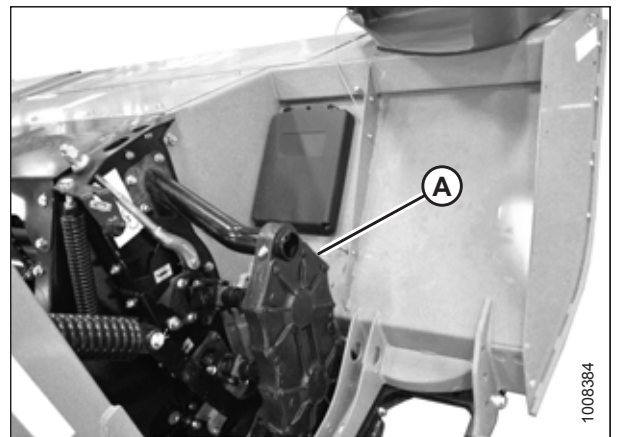


Figure 4.280: Conditioner Roll Timing Gearbox

Checking and Changing Lubricant in Conditioner Roll Timing Gearbox

The conditioner roll timing gearbox will need its lubricant changed from time to time. Refer to the Maintenance Schedule for information on how often this procedure should be performed.

DANGER

To avoid injury or death from 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.

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. Open right driveshield (A). For instructions, refer to [3.2.1 Opening Driveshields, page 34](#).
2. Shut down the engine, and remove the key from the ignition.

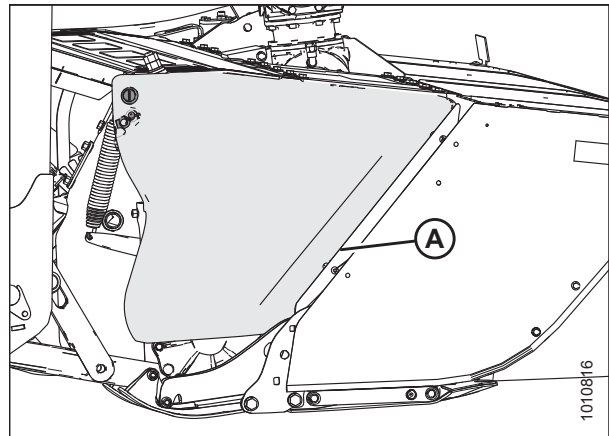


Figure 4.281: Right Driveshield

Checking the conditioner roll timing gearbox lubricant level:

3. Clean any dirt from around lubricant level sight glass (A) and breather (B) on the inboard side of the gearbox.
4. Ensure that the lubricant is level at the top of the sight glass. If necessary, add lubricant through breather (B).
5. Top up the lubricant level with gear lubricant if necessary. Refer to this manual's inside back cover for a list of recommended fluids, lubricants, and capacities.

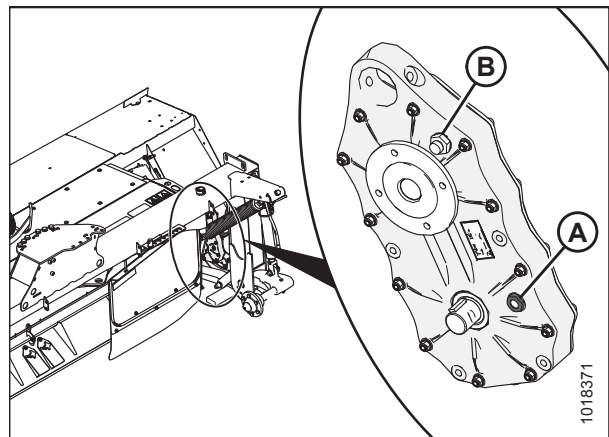


Figure 4.282: Roll Timing Gearbox

Changing the conditioner roll timing gearbox lubricant:

⚠ DANGER

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

6. Raise the rotary disc pull-type to provide sufficient access to lubricant drain plug (A).
7. Shut down the engine, and remove the key from the ignition.
8. Close the cylinder lock-out valve on each lift cylinder by turning the handle to the closed position (the valve handle should be perpendicular to the hose). For instructions, refer to [3.11.1 Lift Cylinders, page 63](#).
9. 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.
10. Place a 1 liter (1.05 qts [US]) container underneath the conditioner gearbox.
11. Remove lubricant drain plug (A) using a hex key.
12. Allow sufficient time for the lubricant to drain.
13. Replace lubricant drain plug (A) and tighten it.
14. Fill the gearbox with the specified volume of lubricant as listed on the inside back cover of this manual or until the lubricant is visible in sight glass (B).
15. Properly dispose of the old lubricant.

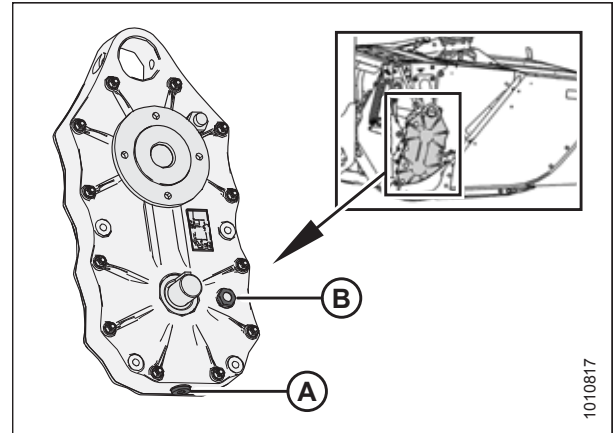


Figure 4.283: Roll Timing Gearbox

4.5.12 Cutterbar-Conditioner Drive Gearbox(T-Gearbox)

The cutterbar-conditioner drive gearbox (T-gearbox) (A), located inside the drive compartment on the left side of the rotary disc pull-type, transfers power from the header swivel 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 125](#).

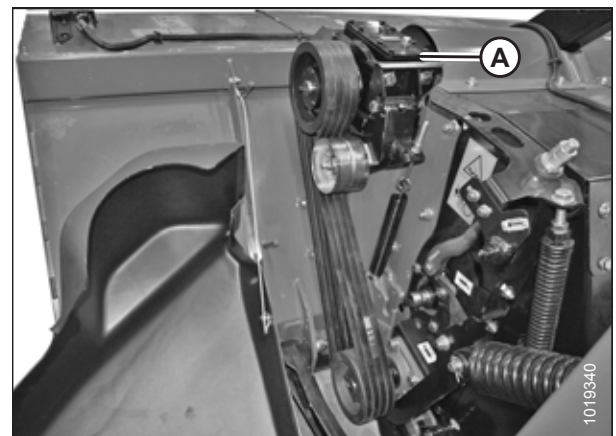


Figure 4.284: Drive Compartment

Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)

The cutterbar-conditioner drive gearbox is located inside the drive compartment at the left side of the rotary disc pull-type.

⚠ 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.

1. Retract the center-link completely.
2. Lower the rotary disc pull-type until it is level with the ground.

NOTE:

To help ensure an accurate oil level reading for the cutterbar-conditioner drive gearbox, set the rotary disc pull-type’s skid shoes in the fully raised position. For instructions, refer to *Adjusting Cutting Height, page 91*.

3. Shut down the engine, and remove the key from the ignition.
4. Detach the tractor from the hitch. For instructions, refer to *3.8 Detaching Rotary Disc Pull-Type from Tractor, page 55*.
5. Open the left driveshield. For instructions, refer to *3.2.1 Opening Driveshields, page 34*.
6. **If equipped with a drawbar hitch:** Install jack (A) and secure with pin (B). Adjust hitch jack (A) until the drive gearbox is parallel to the ground.

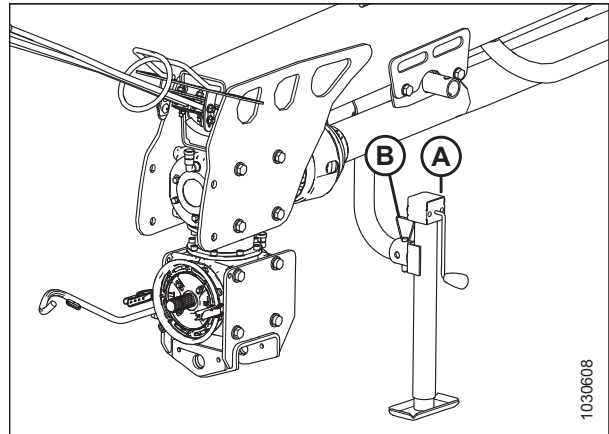


Figure 4.285: Drawbar Hitch Jack

7. **If equipped with a two-point hitch:** Install jack (A). Make sure the drive gearbox is parallel to the ground. Secure jack with pin (B).

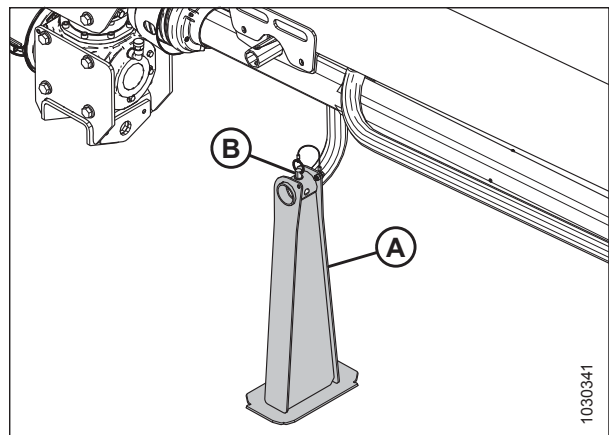


Figure 4.286: Two-Point Hitch Jack

MAINTENANCE AND SERVICING

8. Clean area around dipstick (A).
9. Remove dipstick (A) using a 22 mm socket.
10. Ensure lubricant level is to the line on dipstick.
11. If necessary, add gear lubricant to gearbox through dipstick hole (A). Refer to the manual's inside back cover for lubricant information.
12. Reinstall dipstick and tighten.
13. Close left driveshield. For instructions, refer to [3.2.2 Closing Driveshields, page 36](#).

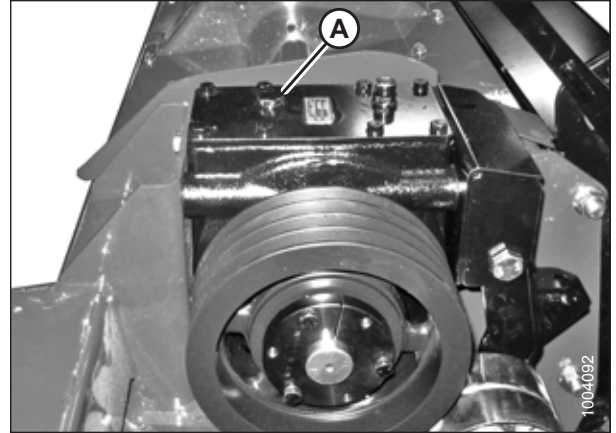


Figure 4.287: Left Side of Rotary Disc Pull-Type

Draining Cutterbar-Conditioner Drive Gearbox (T-Gearbox) Lubricant

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.

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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the left cutterbar door. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

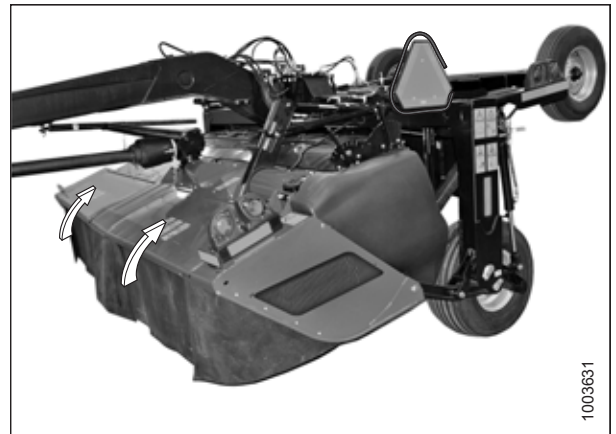


Figure 4.288: Cutterbar Doors

MAINTENANCE AND SERVICING

4. Remove four M10 hex flange head bolts (A) and vertical driveshield (B).

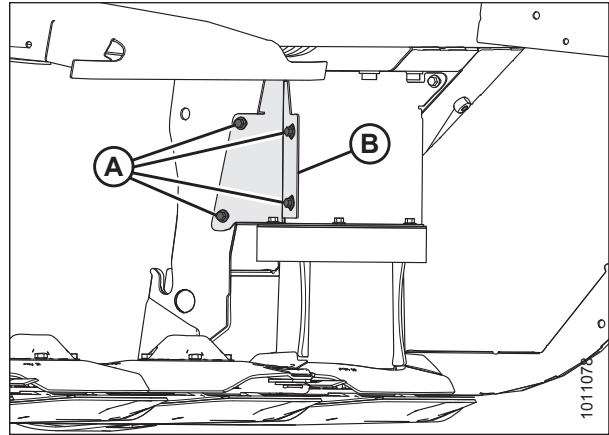


Figure 4.289: Vertical Driveshield

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

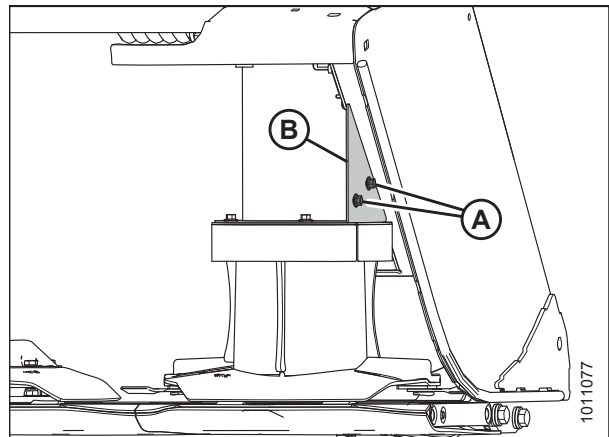


Figure 4.290: Cover Plate

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

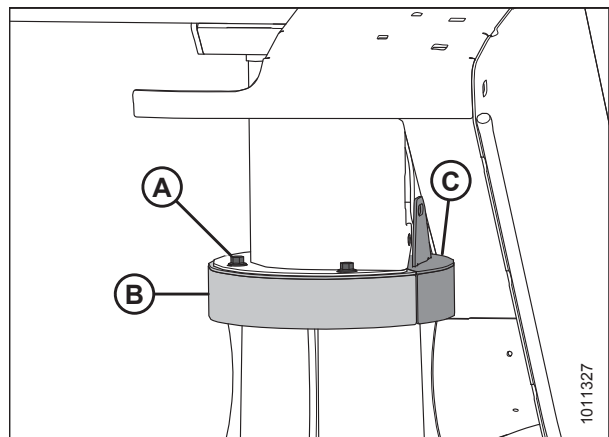


Figure 4.291: Top Plate and Drum Top

MAINTENANCE AND SERVICING

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

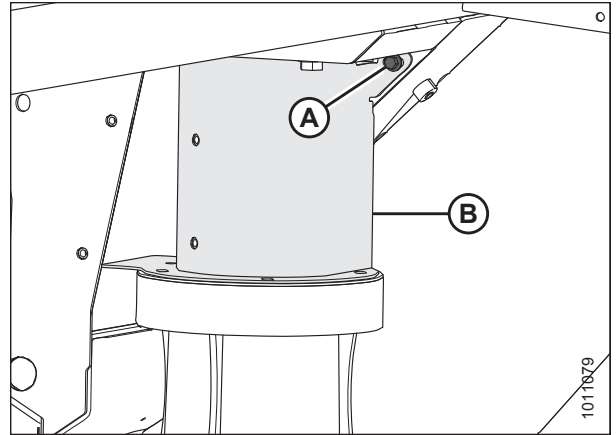


Figure 4.292: Vertical Shield

8. Place a 2 liter (2.11 qts [US]) capacity container under drain plug (A). Remove the plug using a 17 mm socket.
9. Allow sufficient time for lubricant to drain, then replace drain plug (A), and tighten.
10. Properly dispose of used oil.

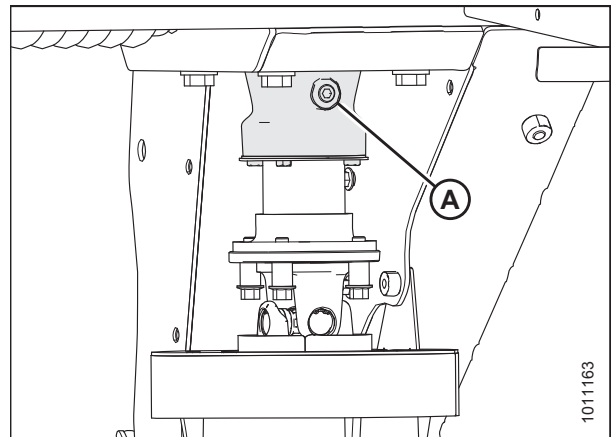


Figure 4.293: Drain Plug

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

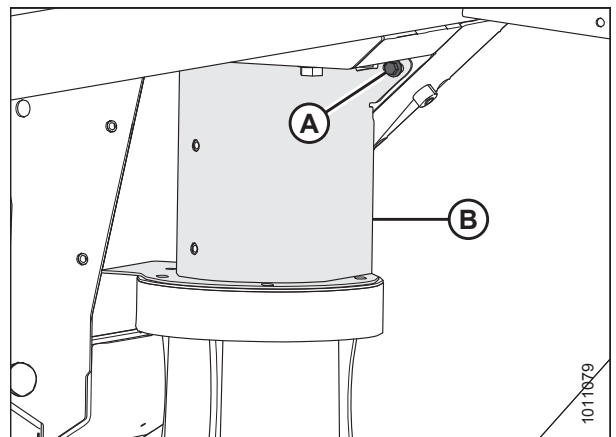


Figure 4.294: Vertical Shield

MAINTENANCE AND SERVICING

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

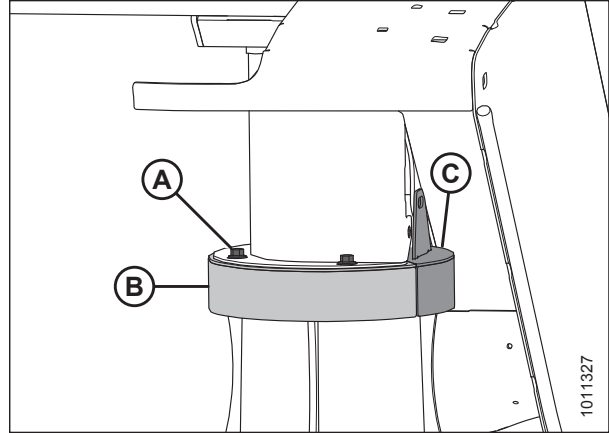


Figure 4.295: Top Plate and Drum Top

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).

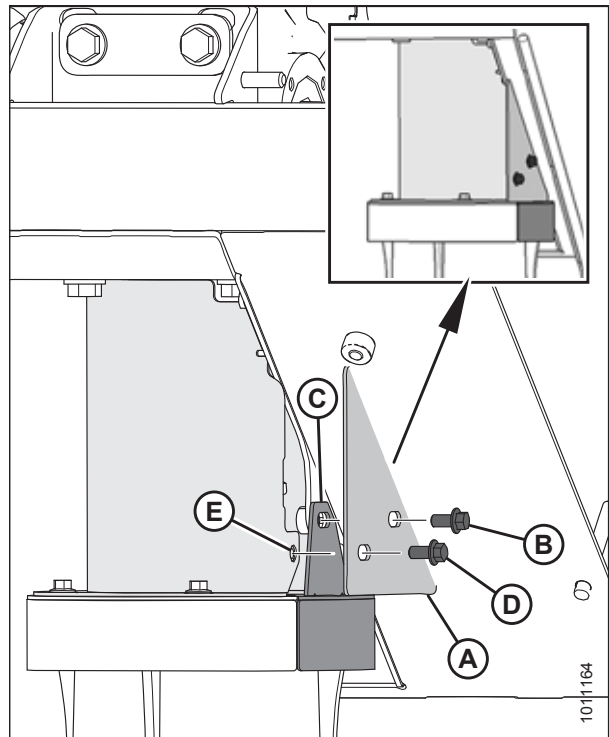


Figure 4.296: Cover Plate, and Vertical Drive Shield

16. Install vertical driveshield (B) using four M10 hex flange head bolts (A).

WARNING

Ensure 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.

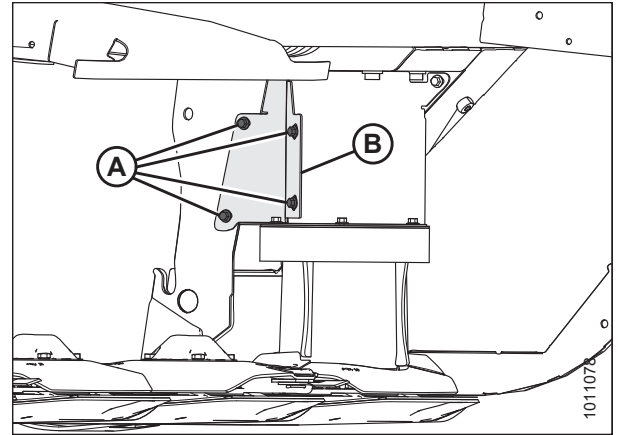


Figure 4.297: Vertical Driveshield

17. Close the cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors](#), page 39.

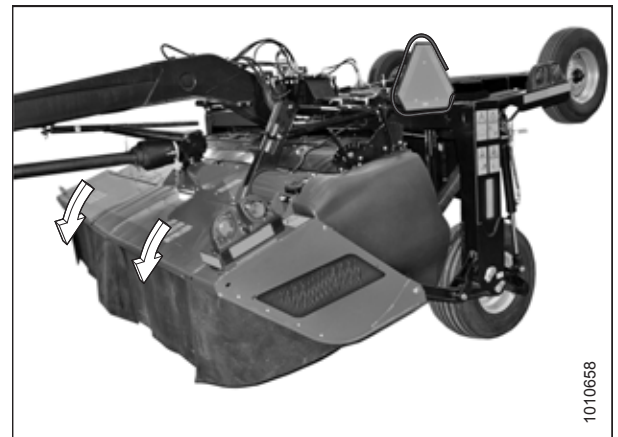


Figure 4.298: Cutterbar Doors in Closed Position

4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox

There are multiple gearboxes on the rotary disc pull-type: the header swivel gearbox transfers power to the cutterbar, conditioner roll timing gearbox, and the hitch swivel gearbox transfers power from the tractor to the header swivel gearbox. Both gearboxes consist of an upper and lower gearbox.

If either of the gearboxes requires repair, remove it and have it serviced at your MacDon Dealer.

IMPORTANT:

The header and hitch swivel gearboxes appear similar but they are **NOT** the same and they are **NOT** interchangeable.

For service intervals, refer to [4.3.1 Maintenance Schedule/Record](#), page 125.

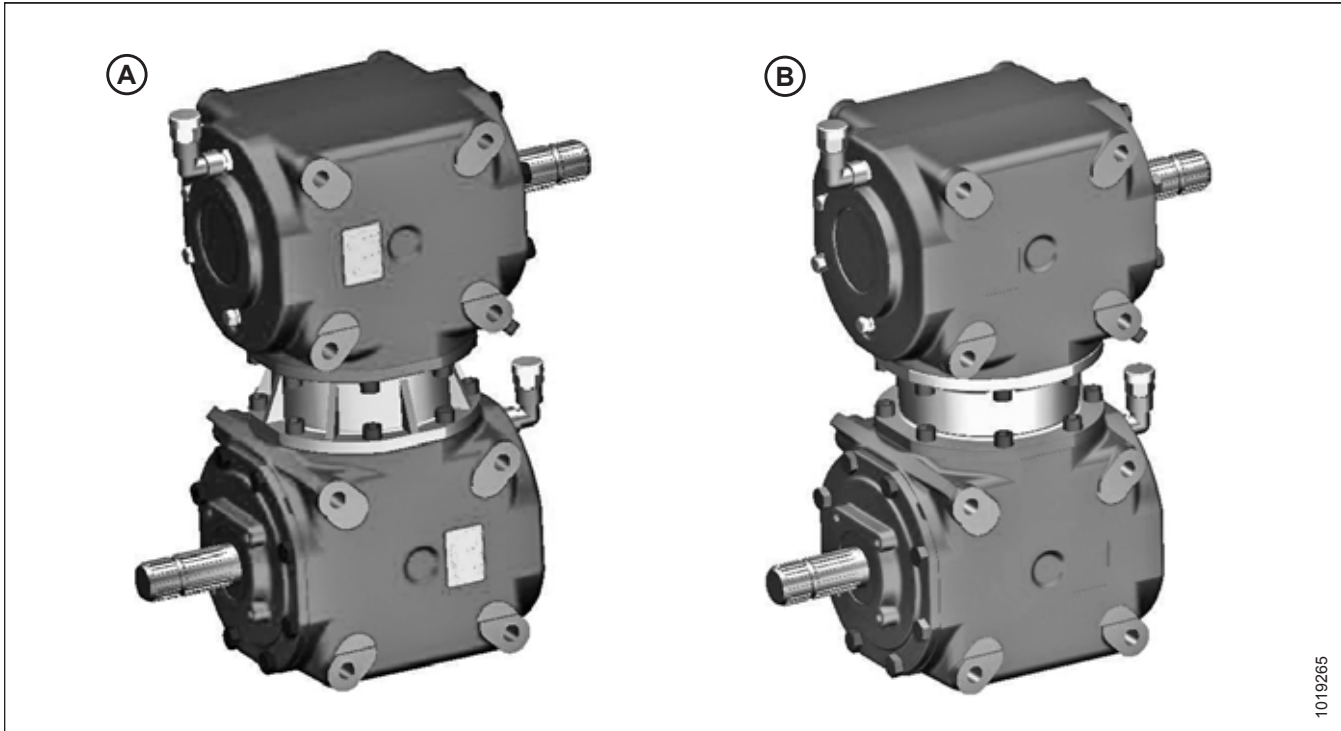


Figure 4.299: Header Swivel and Hitch Swivel Gearboxes

A - Header Swivel Gearbox

B - Hitch Swivel Gearbox

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Checking Lubricant Levels in the Header Swivel Gearbox and Hitch Swivel Gearbox

Check plugs are located at the same position on each gearbox and need to be removed in order to check the lubricant level. Check lubricant level while lubricant is warm. The lubricant should be visible or slightly draining from the port if filled to the correct level. Refer to [4.3.1 Maintenance Schedule/Record, page 125](#) for required service intervals.

DANGER

To avoid injury or death from 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.

NOTE:

This procedure is the same for both header swivel and hitch swivel gearboxes and must be done on both upper and lower gearboxes.

1. Lower rotary disc pull-type fully.

NOTE:

Hitch swivel and header swivel gearbox orientations are not affected by positioning of skid shoes on the rotary disc pull-type, but ideally the pull-type should be level with the ground prior to checking gearbox oil levels.

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

MAINTENANCE AND SERVICING

3. Clean area around check plug (A).
4. Remove plug using a 15 mm socket. Check lubricant level and ensure lubricant is visible or slightly draining from the port.
5. If lubricant is low, you will need to add some. For instructions, refer to [Adding Lubricant to the Header Swivel Gearbox and Hitch Swivel Gearbox](#), page 275.
6. Reinstall check plug (A) and tighten.

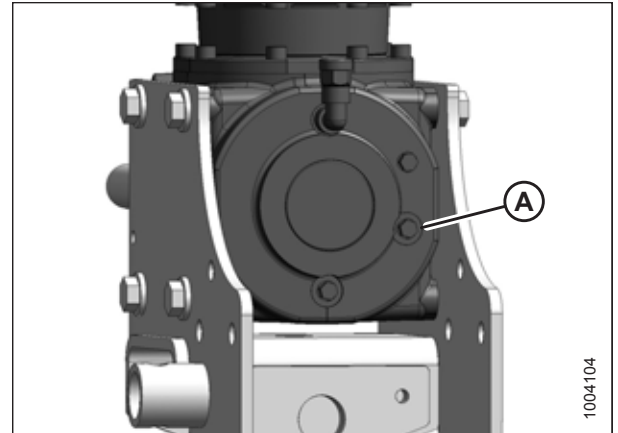


Figure 4.300: Header Swivel or Hitch Swivel Gearbox Check Plug

Draining Lubricant from the Header Swivel Gearbox and Hitch Swivel Gearbox

⚠ 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.

NOTE:

This procedure is the same for both header swivel and hitch swivel gearboxes , and must be done on both upper and lower gearboxes.

1. Shut down the engine, and remove the key from the ignition.
2. Place a 2 liter (2.11 qts [US]) capacity container under drain plug (A), and then remove the plug using a 17 mm socket.

NOTE:

For faster draining, also remove check plug (B).

3. Allow sufficient time for lubricant to drain. Replace drain plug (A) and check plug (B) (if removed), and tighten plugs.
4. Properly dispose of used lubricant and clean up any spills.

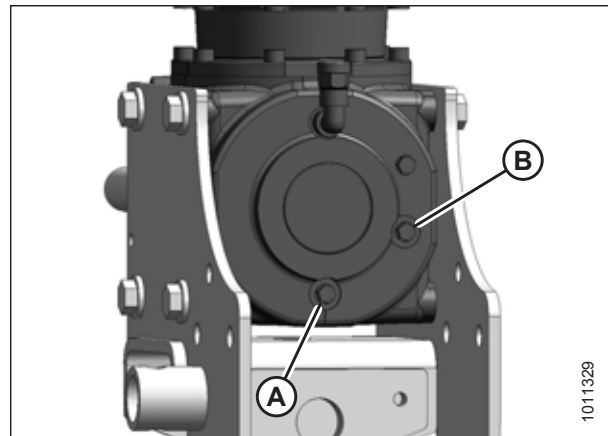


Figure 4.301: Gearbox Drain Plug

Adding Lubricant to the Header Swivel Gearbox and Hitch Swivel Gearbox

⚠ 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.

NOTE:

This procedure is the same for both header swivel and hitch swivel gearboxes and , and must be done on both upper and lower gearboxes.

1. Shut down the engine, and remove the key from the ignition.
2. Clean the area around check plug (A) and breather/filler plug (B).
3. Remove check plug (A) and breather/filler plug (B).
4. Ensure the lubricant level is visible or begins to drain through check port (A), and add gear lubricant to gearbox through port (B) as required. Refer to this manual's inside back cover for lubricant type and quantity.
5. Reinstall check plug (A) and breather/filler plug (B), and tighten.

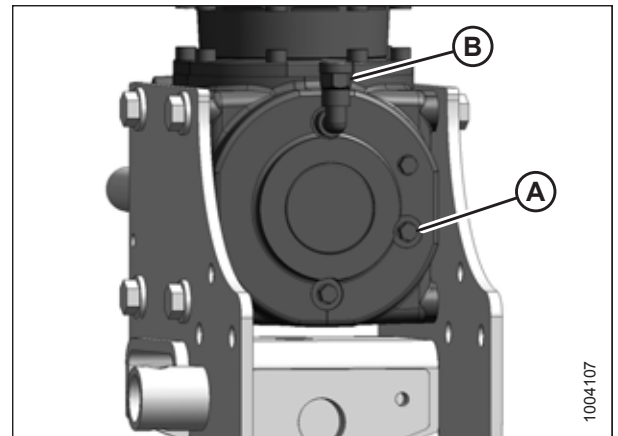


Figure 4.302: Swivel Gearbox

4.5.14 Wheels and Tires

Checking Wheel Bolts

Check wheel bolts on field and optional transport wheels to ensure the required torque.

⚠ 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.

IMPORTANT:

Check and tighten field wheel bolts and transport system wheel bolts (if installed) after the first hour of operation and every 100 hours thereafter.

MAINTENANCE AND SERVICING

1. Shut down the engine, and remove the key from the ignition.
2. Torque wheel bolts to 160 Nm (120 lbf-ft) using the tightening sequence shown at right.

IMPORTANT:

Whenever a wheel is installed, check torque after 1 hour of operation.

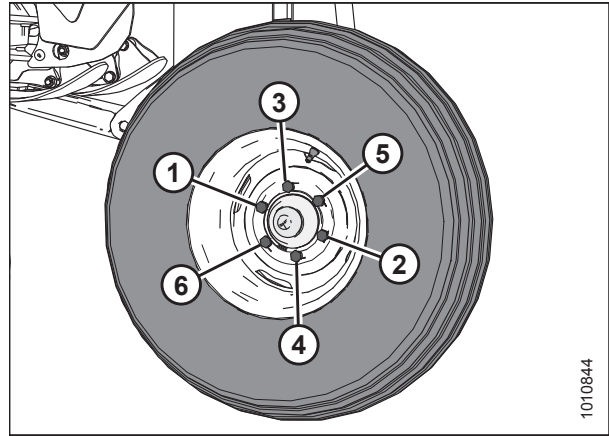


Figure 4.303: Tightening Sequence

Removing Wheels

DANGER

To avoid injury or death from 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. Place blocks (A) under opposite wheel to prevent machine from moving if rotary disc pull-type is not attached to towing vehicle.
3. Position jack under frame leg (B).
4. Loosen wheel bolts slightly.
5. Operate jack to raise wheel off ground.
6. Place blocks or a stand under frame leg.
7. Remove wheel bolts and remove wheel.

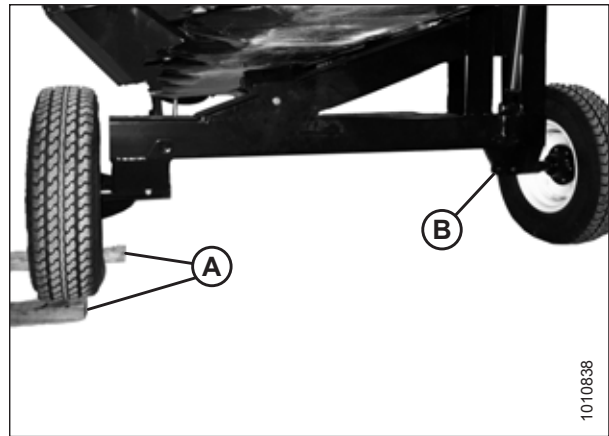


Figure 4.304: Transport Wheel



Figure 4.305: Field Wheel

Installing Field Wheels

The pull-type rolls on the field wheels when in the field position. When transport is deployed (if equipped), field wheels are raised off the road.

1. Position wheel (A) on the spindle, install bolts (B), and partially tighten.

IMPORTANT:

Be sure valve stem (C) points away from the wheel support.

NOTE:

Field wheels must be installed inboard on carrier frame.

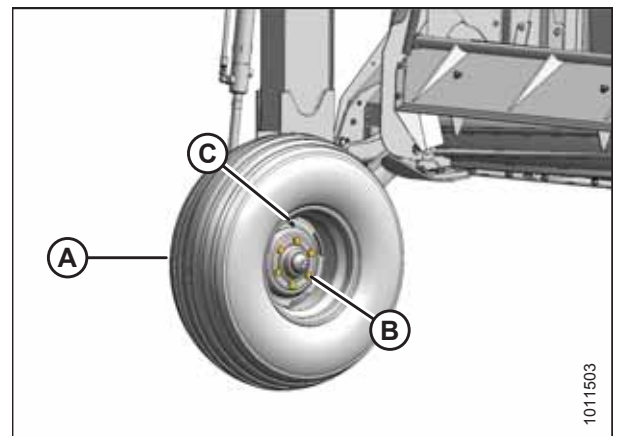


Figure 4.306: Installing Wheel Bolts

2. Lower wheels to the ground and torque wheel bolts to 160 Nm (120 lbf·ft) using the tightening sequence shown at right.

IMPORTANT:

Whenever a wheel is installed, check torque after 1 hour of operation.

3. Check tire pressure and adjust as required. For instructions, refer to [Inflating Tires, page 278](#).

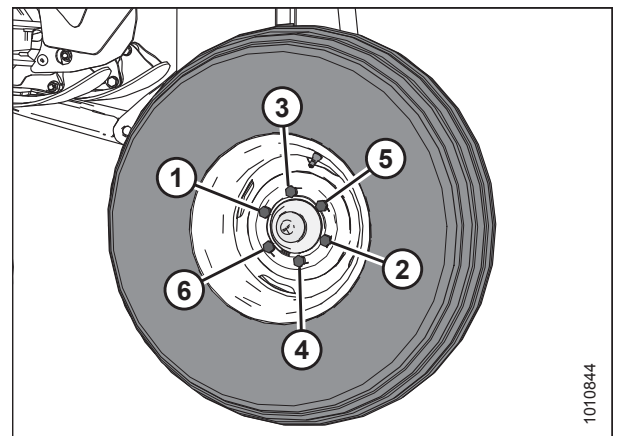


Figure 4.307: Tightening Sequence

Inflating Tires

Ensure proper inflation of field and optional transport tires.

WARNING

- Service tires safely.
- A tire can explode during inflation which could cause serious injury or death.

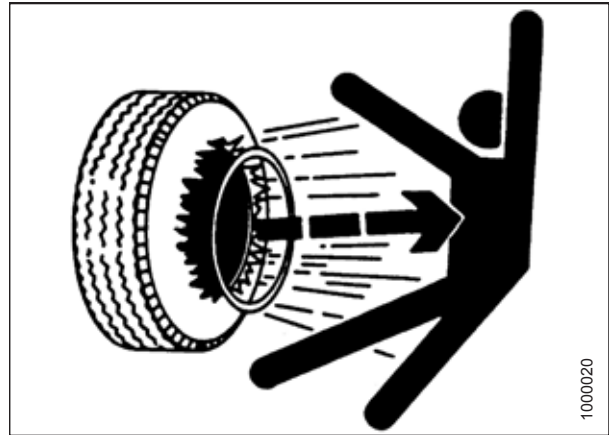


Figure 4.308: Overinflated Tire

Check tire pressure daily:

- Maximum pressure is 310 kPa (45 psi) for field wheels (A).
- Maximum pressure is 552 kPa (80 psi) for optional transport wheels (B).

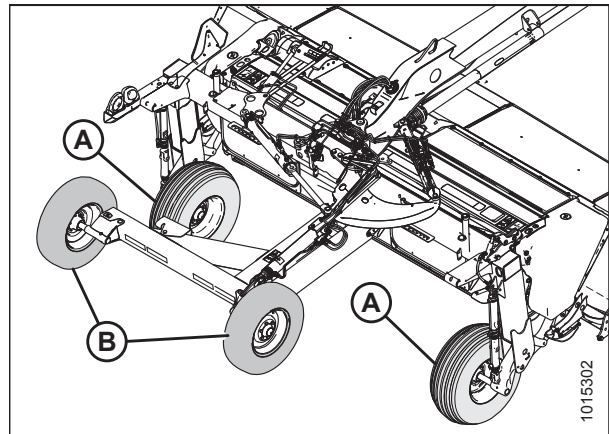


Figure 4.309: Field and Transport Wheels

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 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 4.310: 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 4.311: 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 header's electrical system is powered by the windrower. The electrical harness from the header connects to the windrower, supplying power to the hazard and signal lights. It also receives signals from the header speed sensor.

- Electrical harness (A)
- Speed sensor (B)

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.

4.7.2 Servicing Amber Hazard/Signal Lights

Replacing Amber Hazard/Signal Bulb

Replace the amber hazard or signal bulbs if they are damaged or inoperable.

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.

1. Lower the rotary disc pull-type 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, and reinstall the plastic lens and screws.

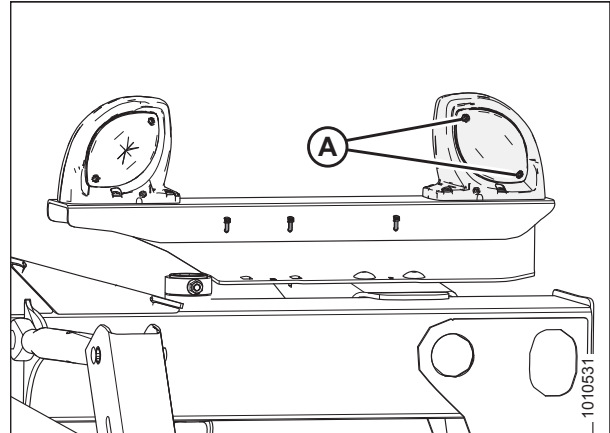


Figure 4.312: Plastic Lens and Screws

Replacing Amber Hazard/Signal Light Fixture

Replace the amber hazard/signal light fixture if they are damaged.

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.

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.

3. Cut cable ties (A) securing the harness covering to the light.
4. Retrieve the connections from inside the harness covering (approximately 150 mm [6 in.] from the light), and disconnect the wires (not shown). If necessary, remove the tape.
5. Remove four nuts (B) (only 3 shown) securing the light to the bracket, and remove the light. Pull the wires through hole in the bracket.
6. Feed the connectors of the new light (not shown) through the hole in the bracket, and position the light onto the bracket.
7. Install four nuts (B) and tighten.
8. Connect the wires to the connectors in the harness, and secure the harness covering with tape and cable ties (A) as required.

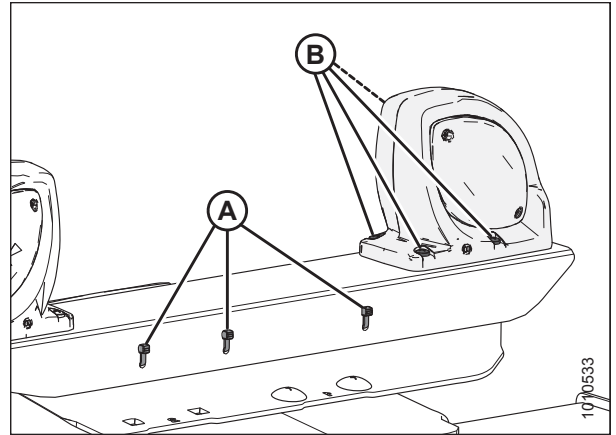


Figure 4.313: Amber Hazard Light and Mounting Bracket

4.7.3 Servicing Red Brake/Tail Lights

Replacing Red Brake/Tail Light Bulb

Replace the red brake/tail light bulb if they are damaged or inoperable.

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.

1. Lower the rotary disc pull-type 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, and reinstall the plastic lens and screws.

NOTE:

Bulb—Trade #1157.

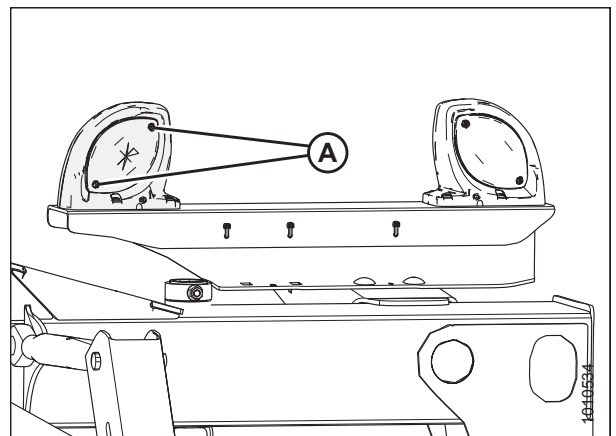


Figure 4.314: Plastic Lens and Screws

Replacing Red Brake/Tail Light Fixture

Replace the red brake/tail light fixture if they are damaged.

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.

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Cut cable ties (A) securing the harness covering to the light.
4. Retrieve the connections from inside the harness covering (approximately 150 mm [6 in.] from light) and disconnect the wires (not shown). If necessary, remove the tape.
5. Remove four nuts (B) securing the light to the bracket. Remove the light, and pull wires through hole in bracket.
6. Feed the connectors of the new light (not shown) through the hole in the bracket, and position the light onto the bracket.
7. Install four nuts (B) and tighten.
8. Connect the wires to the connectors in the harness, and secure the harness covering with tape and cable ties (A) as required.

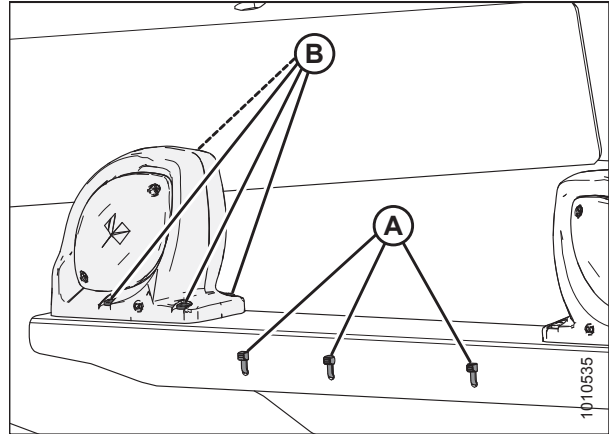


Figure 4.315: Red Hazard Light and Mounting Bracket

4.8 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.

4.8.1 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. Both steel and polyurethane conditioner rolls are available. Refer to Chapter 5 *Options and Attachments*, page 307 for ordering information.

Inspecting Roll Conditioner

The conditioner bearings, U-joints, and the roll timing gearbox should be inspected periodically for signs of wear or damage.

DANGER

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

WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks](#), page 31.
4. Remove left and right driveshields (A). For instructions, refer to [3.2.1 Opening Driveshields](#), page 34.

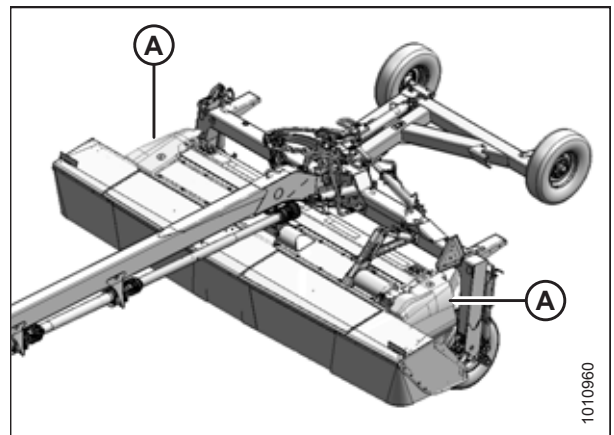


Figure 4.316: Driveshields

MAINTENANCE AND SERVICING

5. Inspect conditioner roll left bearing (A) for signs of wear or damage. If the bearing needs replacing, contact your Dealer.

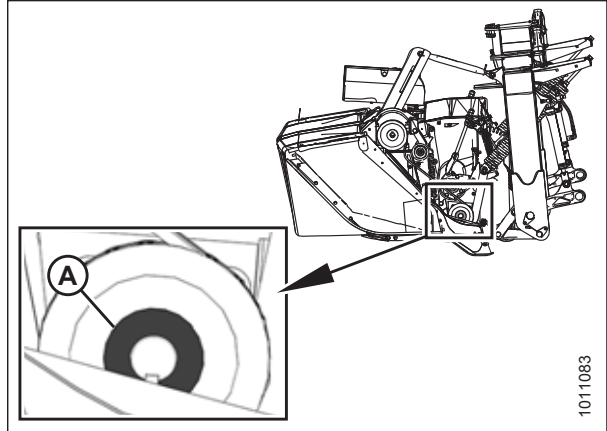


Figure 4.317: Conditioner Roll Left Bearing

6. Inspect conditioner drive U-joints (A) for signs of wear or damage. If the U-joints need replacing, contact your Dealer.

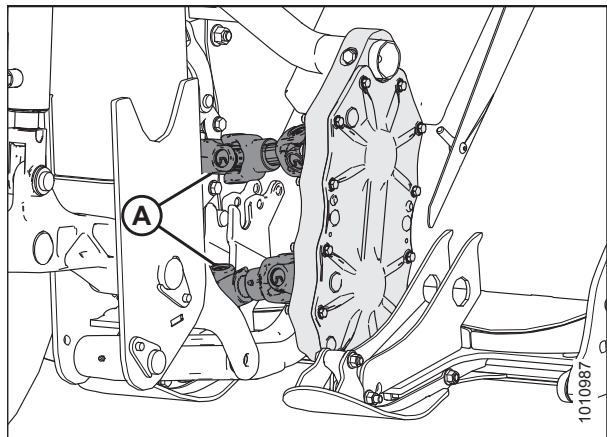


Figure 4.318: Conditioner Drive U-Joints

7. Inspect roll timing gearbox bearings (A) for signs of wear or damage. If the bearings need replacing, contact your Dealer.

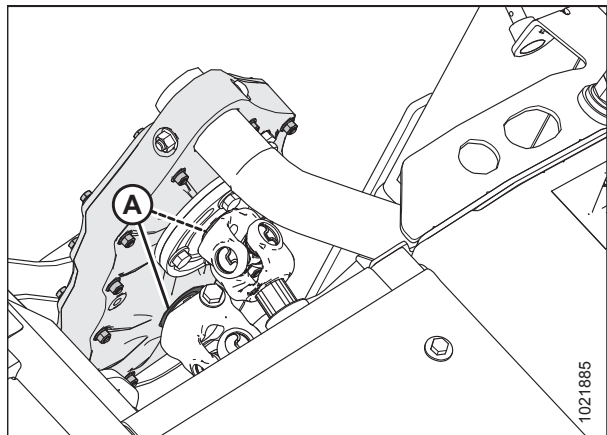


Figure 4.319: Roll Timing Gearbox Bearings

4.8.2 Finger Conditioner

The finger-type conditioner is used to harvest light grass crops. Do **NOT** use the finger type conditioner for thick-stemmed crops such as sudan and milo, or for heavy forage crops. The finger-type rotor moves the crop across the conditioning baffle which strips away the waxy coating from plants.

MAINTENANCE AND SERVICING

The degree to which the crop is conditioned as it passes through the conditioner is controlled by the clearance between the fingers and the internal intensity baffle and by the rotational speed of the fingers. To make adjustments, refer to [Adjusting Internal Intensity Baffle Clearance, page 109](#) and, or, [Changing Finger Rotor Speed, page 110](#).

Inspecting Finger Conditioner

DANGER

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

WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 31](#).
4. Remove left and right driveshields (A). For instructions, refer to [Removing Driveshields, page 226](#).

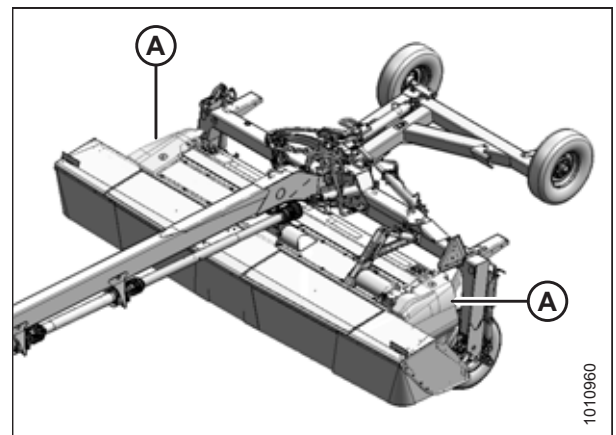


Figure 4.320: Driveshields

5. Open the cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors – North America, page 37](#).

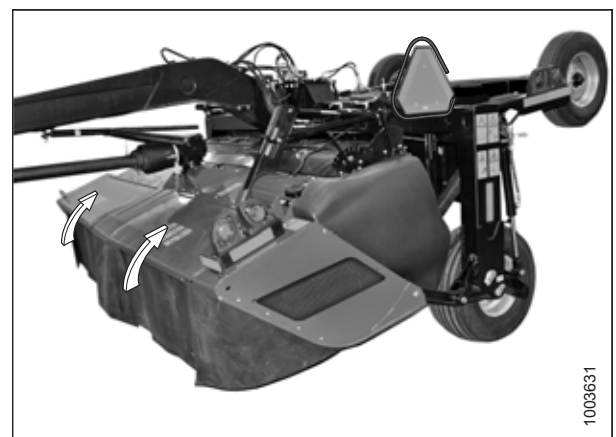


Figure 4.321: Cutterbar Doors

MAINTENANCE AND SERVICING

6. Check rotor fingers (A) for damage and replace any bent fingers to prevent rotor imbalance.

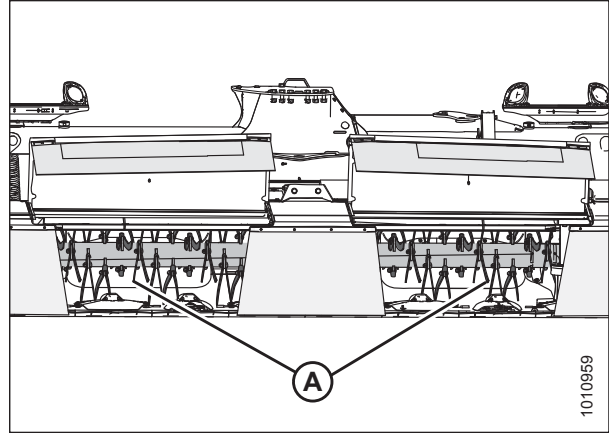


Figure 4.322: Rotor Fingers

7. Remove the left driveshield. For instructions, refer to [Removing Driveshields, page 226](#).

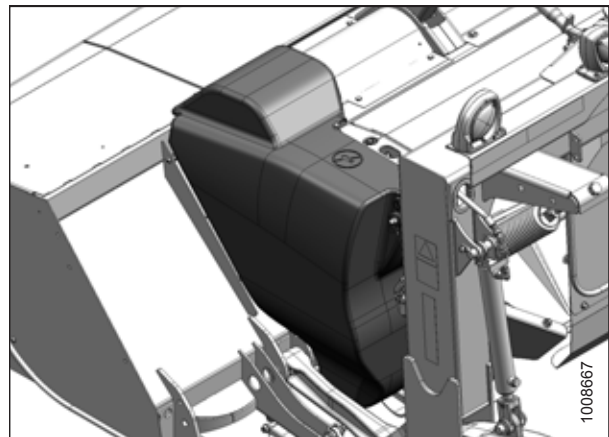


Figure 4.323: Driveshield – Left Side

8. Inspect left rotor bearing (A) for signs of wear or damage. Contact your MacDon dealer if bearing needs to be replaced.

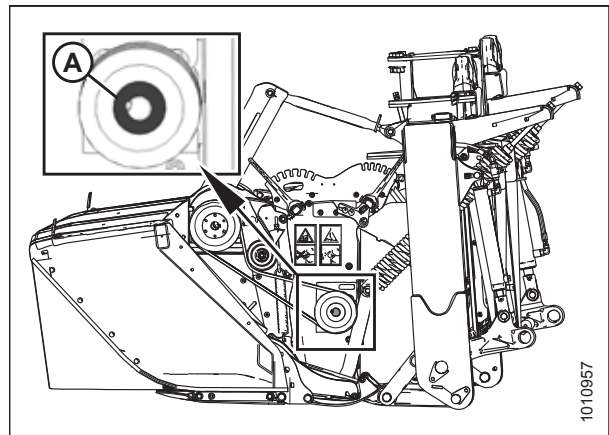


Figure 4.324: Left Side Rotor Bearing

9. Remove the right driveshield. For instructions, refer to [Removing Driveshields, page 226](#).
10. Inspect right rotor bearing (A) for signs of wear or damage. Contact your MacDon dealer if bearing needs to be replaced.

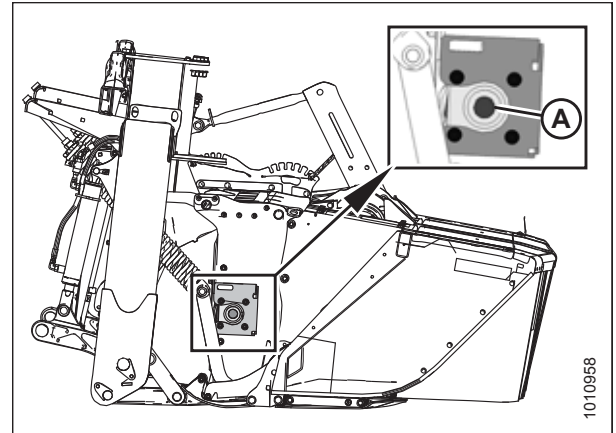


Figure 4.325: Right Side Rotor Bearing

4.8.3 Changing the Conditioner

There are several ways that the conditioner can be configured, depending on your particular machine.

If a conditioner change is **NOT** required, proceed to [Attaching Header and Carrier, page 298](#).

R1 Series Rotary Disc Pull-Types can be equipped with either a finger conditioner, a polyurethane roll conditioner, a steel roll conditioner, or no conditioner at all. Follow these instructions to change conditioners.

NOTE:

These instructions apply to all conditioners. Exceptions are identified where applicable.

Detaching Header from Carrier

The rotary disc pull-type includes a header and conditioner attached to a carrier frame. Before removing or installing the conditioner, the header and carrier must be separated.

 **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**

Never start or move the machine until you are sure all bystanders have cleared the area.

MAINTENANCE AND SERVICING

1. Connect the rotary disc pull-type to the tractor. For instructions, refer to [3.7 Attaching Rotary Disc Pull-Type to the Tractor](#), page 46.
2. Start the tractor and center the rotary disc pull-type behind tractor.
3. Raise the rotary disc pull-type fully, set center-link to mid-position, and shut off the engine. Remove key from ignition.

NOTE:

The float adjuster bolt is easier to turn when the rotary disc pull-type is in the raised position.

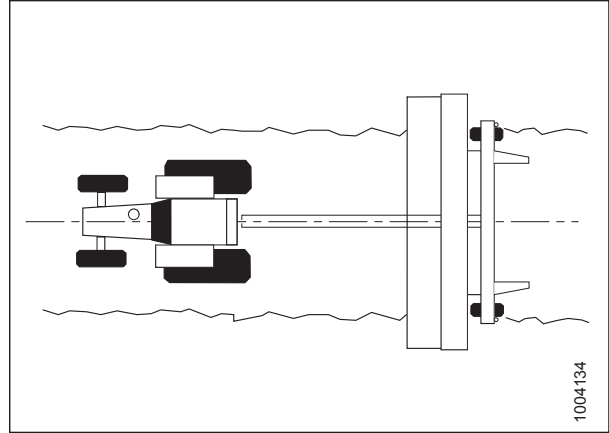


Figure 4.326: Rotary Disc Pull-Type Centered behind Tractor

4. Close the lift cylinder lock-out valves (A). Repeat on opposite side.
5. Loosen retaining bolt (B) and rotate cover plate (C) away from float spring bolt (D). Repeat on opposite side.

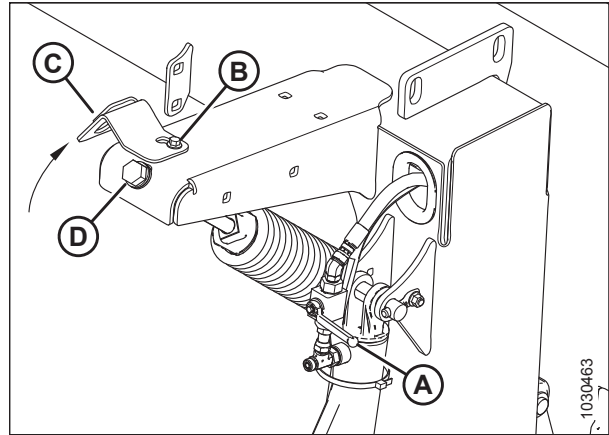


Figure 4.327: Right Float Adjuster

6. Turn out adjuster bolt (A) on each float spring until 400 mm (17 3/4 in.) of thread (B) is exposed. Repeat on opposite side.

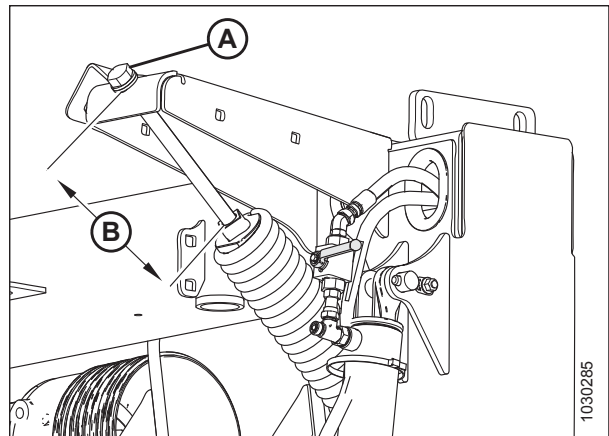


Figure 4.328: Adjuster Bolt

MAINTENANCE AND SERVICING

7. Open lift cylinder lock-out valves (A) (so the handle is in line with the hose). Repeat on opposite side.
8. Start the engine.
9. Lower the rotary disc pull-type fully.
10. Shut down the engine, and remove the key from the ignition.
11. Check that float adjuster bolts (B) are loose. Back off adjuster bolts as required. Repeat on the opposite side.
12. On the **LEFT** of the rotary disc pull-type, remove float adjuster bolt (B) from spring. Do **NOT** allow spring to drop when bolt is removed.

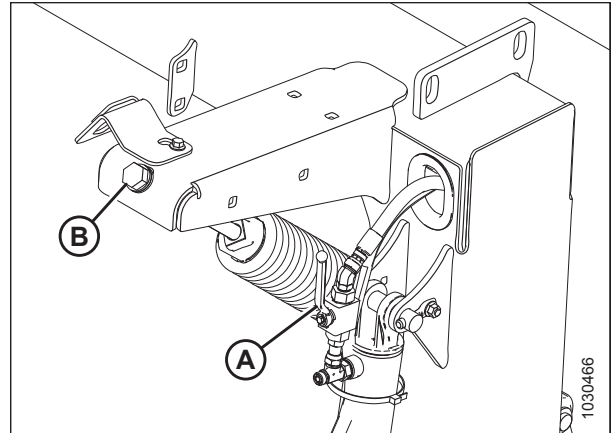


Figure 4.329: Right Float Adjuster

13. Open left and right driveshields (A). For instructions, refer to [3.2.1 Opening Driveshields, page 34](#).

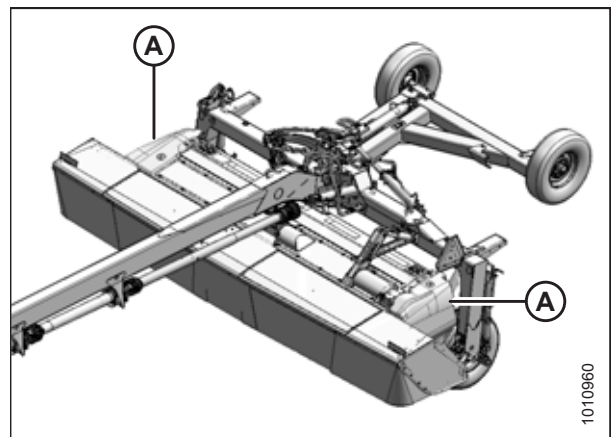


Figure 4.330: Driveshields

14. On the right of the rotary disc pull-type, remove M20 nut (A), washers, and hex head bolt (B) securing carrier leg (C) and float spring arm (D) to the header.
15. Move float spring arm (D) clear of conditioner.

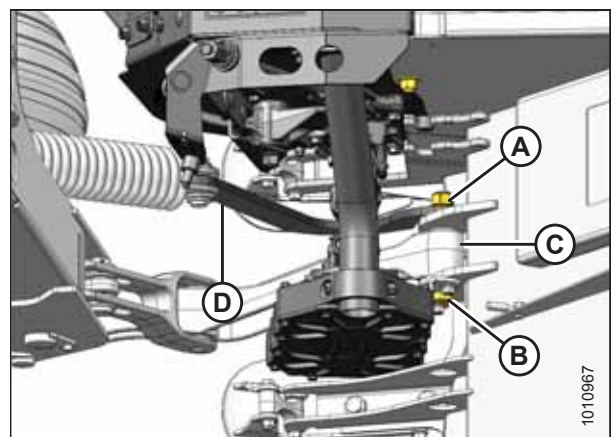


Figure 4.331: Right of Carrier – Top View

MAINTENANCE AND SERVICING

16. Remove M20 nut (A), washers, and hex head bolt (B) securing carrier leg (C) to the left end of the header.

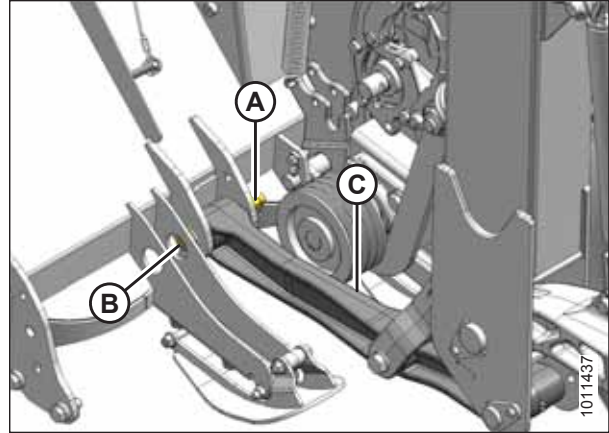


Figure 4.332: Left of Conditioner

17. **If equipped with mechanical center-link:** Remove clevis pin (A) connecting center-link (B) to anchor (C), and separate the center-link from the anchor. Reinstall the pin in the anchor to store.
18. **If equipped with mechanical center-link:** Secure center-link (B) to the carrier frame with a strap or wire to prevent them from contacting the rotary disc pull-type during separation.

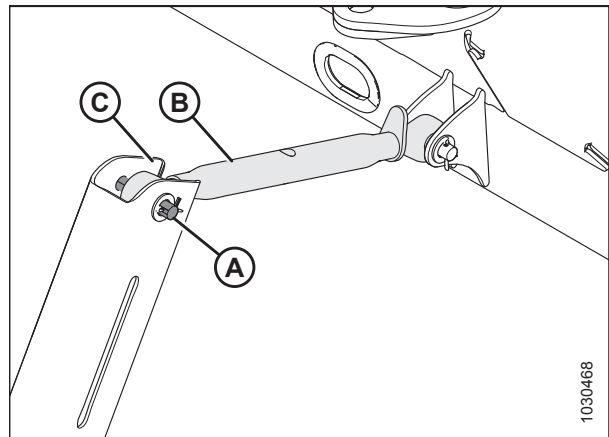


Figure 4.333: Mechanical Center-Link

19. **If equipped with hydraulic center-link:** Remove clevis pin (A) connecting center-link (B) to anchor (C), and separate the center-link from the anchor. Reinstall the pin in the anchor to store.
20. **If equipped with hydraulic center-link:** Secure center-link (B) and indicator (D) to carrier the frame with a strap or wire to prevent them from contacting the rotary disc pull-type during separation.

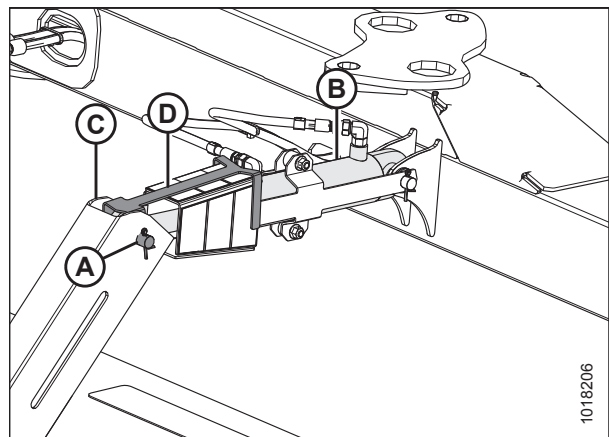


Figure 4.334: Hydraulic Center-Link and Indicator

MAINTENANCE AND SERVICING

21. Remove two hex head bolts (A) and spacers (B) securing steering arm (C) to the gearbox.
22. Lift steering arm (C) off the gearbox and secure the arm to hitch (D) with a strap or wire.
23. Reinstall hex head bolts (A) and spacers (B) into the gearbox.
24. Disconnect aft driveline (E) from the header swivel gearbox. For instructions, refer to [Removing Clutch Driveline, page 244](#).
25. Secure driveline (E) to hitch (D) with a strap or wire.

NOTE:

Ensure that the driveline is secured in such a way that when backing the carrier away from the header, the driveline clears the gearbox and its steering linkage.

26. If the transport system is installed, disconnect wiring harness (A) at light assembly (B).
27. Remove cable ties (E), clamp (D), and clips (C). Retain them for reinstallation.
28. Temporarily attach the harness to the carrier.

29. Start the tractor, and slowly maneuver carrier (A), away from header (B).

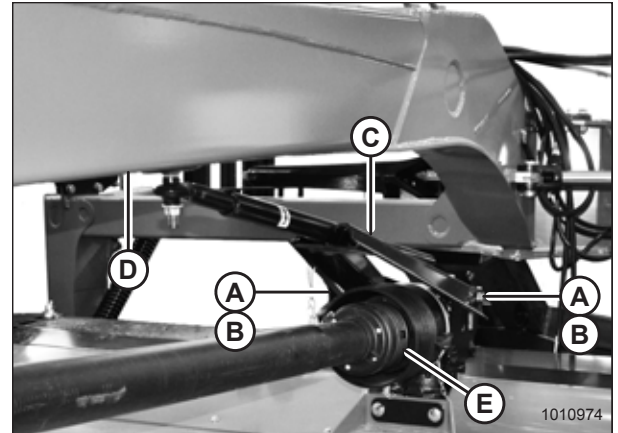


Figure 4.335: Aft Driveline and Hitch

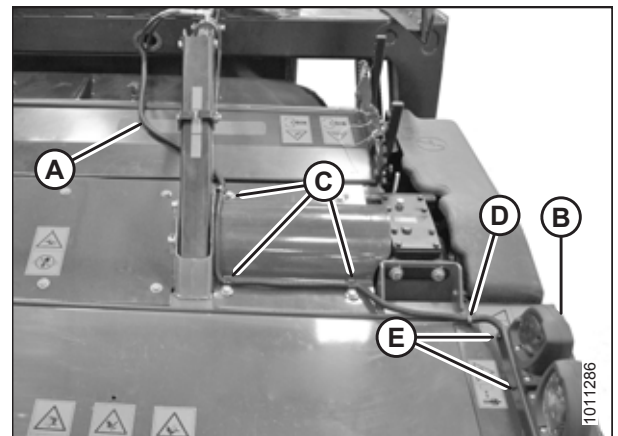


Figure 4.336: Electrical Harness

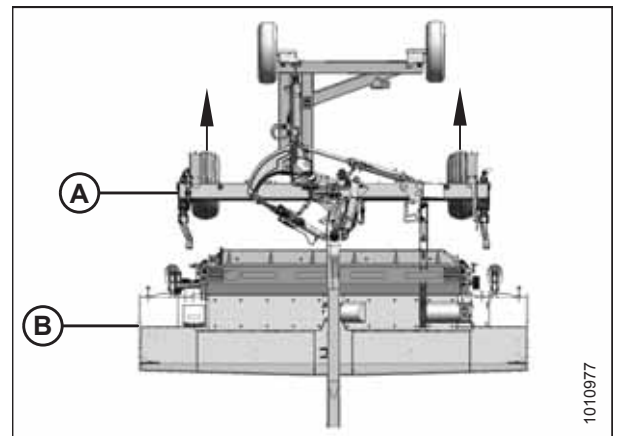


Figure 4.337: Carrier Removed from Header

Removing Conditioner

CAUTION

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast while detaching the conditioner from the rotary disc pull-type.

1. Attach spreader bar (A) to a forklift or equivalent lifting device, and attach chains to lugs (B) on the conditioner. Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).

DANGER

To prevent the conditioner from falling backward, ensure lifting chains are secure and tight. Failure to do so may result in death or serious injury.

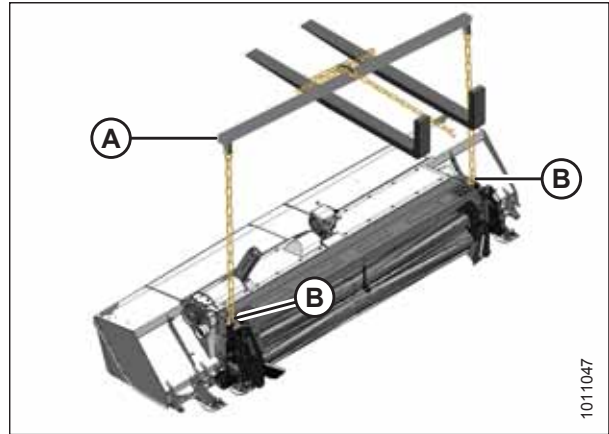


Figure 4.338: Spreader Bar

2. On the left side of the rotary disc pull-type, remove the conditioner drive belt as follows:
 - a. Back off the jam nut and tensioner nut (B) on the belt idler until belts (A) are loose and can be removed.
 - b. Remove the four belts.

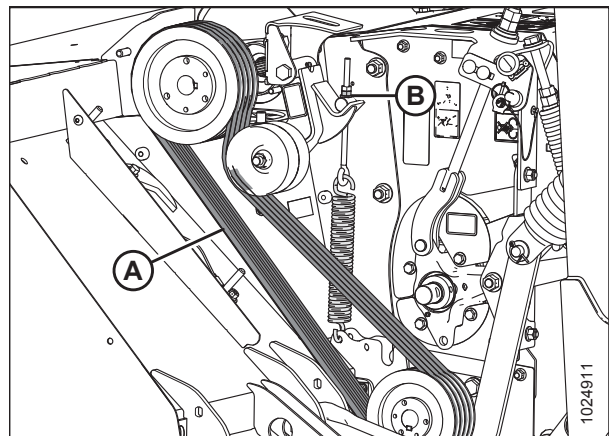


Figure 4.339: Conditioner Drive

3. **For finger conditioner:** Move forward baffle adjustment handle (A) to the fully lowered position, as shown.
4. **For finger conditioner:** Move rear baffle adjustment handle (B) to the fully raised position as shown.

NOTE:

Access to upper bolts (C) is easiest from the rear of the conditioner.

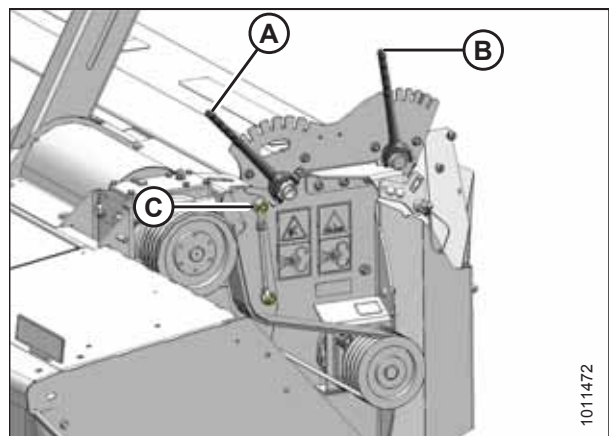


Figure 4.340: Left of Finger Conditioner

MAINTENANCE AND SERVICING

5. **For roll conditioners:** Move baffle adjustment handle (A) to the fully raised position as shown.

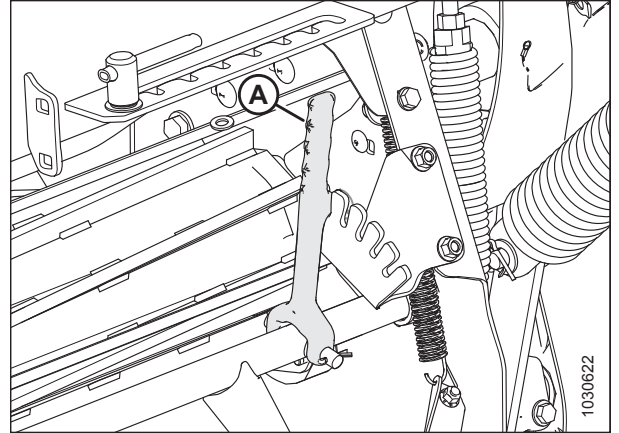


Figure 4.341: Roll Conditioner – Inboard Right Side

6. Lift conditioner slightly forward to take load off bolts (A) and to hold the conditioner after the bolts are removed. Retain hardware for reinstallation.

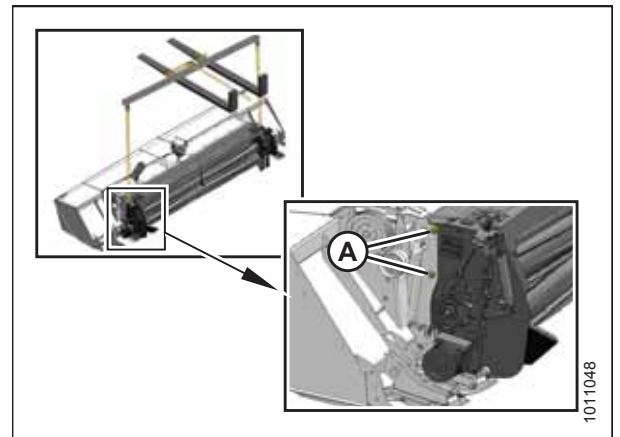


Figure 4.342: Left Side of Conditioner – Right Side is Similar

CAUTION

Stand clear when detaching the conditioner.

7. Remove two M16 hex head bolts (A) from each side of the conditioner.

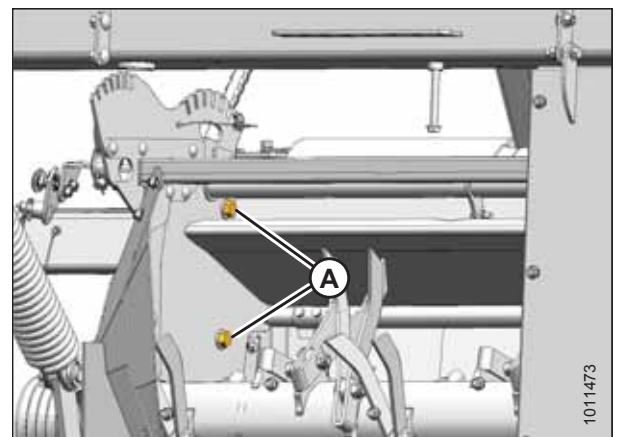


Figure 4.343: Left Side of Finger Conditioner – Right Side is Similar

CAUTION

Stand clear when detaching the conditioner.

- Lift conditioner (A) off rotary disc pull-type header (B), and move the conditioner away from the work area.

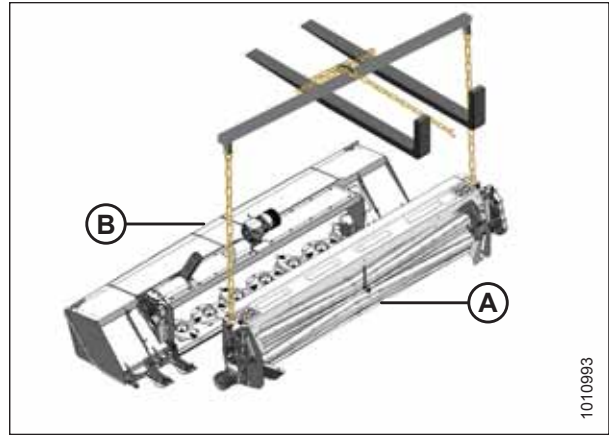


Figure 4.344: Conditioner Lift

NOTE:

If installing a finger conditioner or if deflector plates (A) need to be replaced, remove deflector plates (A). For instructions, refer to [Removing Cutterbar Deflectors – R116, page 96](#).

NOTE:

If you are replacing a roll conditioner, deflector plates (A) need to remain installed on the header. For instructions, proceed to [Installing Conditioner, page 294](#).

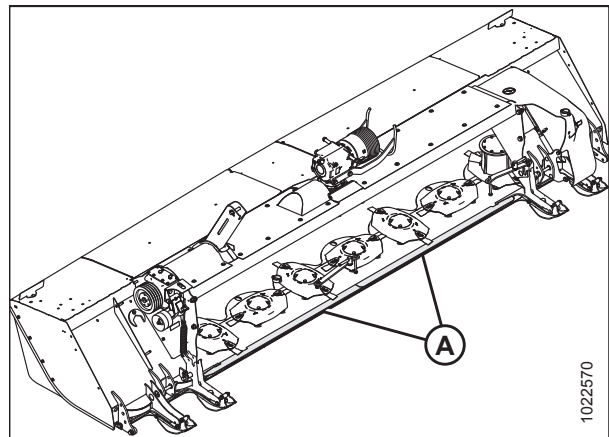


Figure 4.345: Deflector Location

Installing Conditioner

CAUTION

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast while attaching the conditioner to the rotary disc pull-type.

Refer to the following notes before beginning the procedure:

NOTE:

If installing a finger conditioner, deflector plates (A) must be removed. For instructions, refer to [Removing Cutterbar Deflectors – R116, page 96](#).

NOTE:

Install deflector plates (A) when installing a roll conditioner and when replacing faulty or damaged deflector plates. For instructions, refer to [Installing Cutterbar Deflectors – R116, page 97](#).

NOTE:

If you are replacing a roll conditioner and deflector plates (A) are already installed on the machine, proceed to Step 1, [page 295](#).

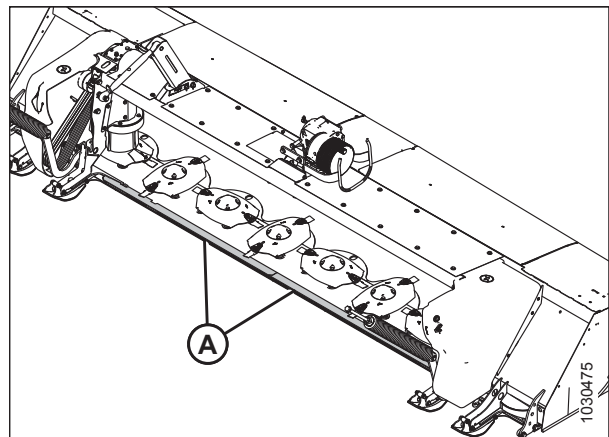


Figure 4.346: Deflector Plates

MAINTENANCE AND SERVICING

1. Attach spreader bar (A) to a forklift or equivalent lifting device and attach the chains to lugs (B) on the conditioner. Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).
2. Lift the conditioner and position it into the opening on the rotary disc pull-type.

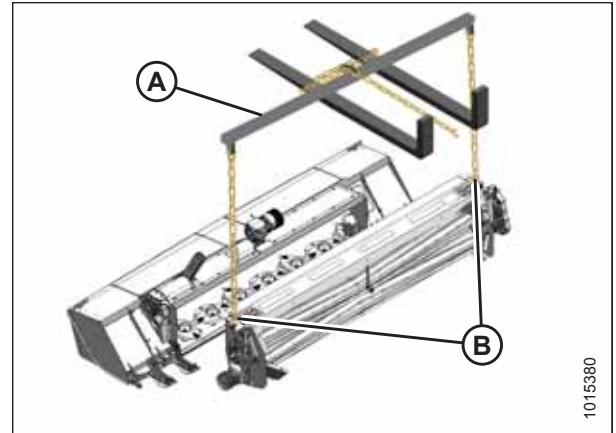


Figure 4.347: Conditioner Lift

3. Carefully align pin (A) at each end of the conditioner with lug (B) on the rotary disc pull-type, and lower the conditioner so that pins (A) engage lugs (B) on both ends of the rotary disc pull-type.

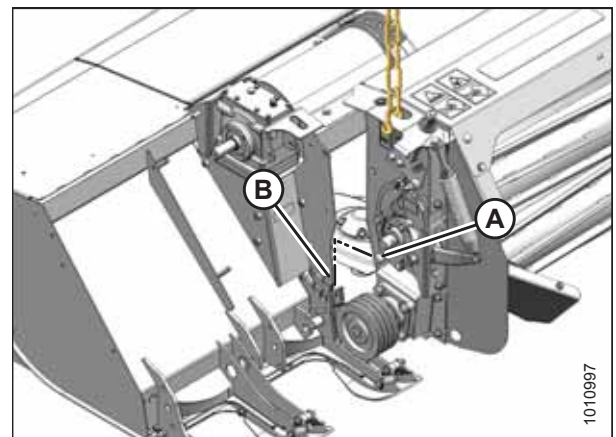


Figure 4.348: Conditioner Pins

4. Align the mounting holes and install four M16 x 40 hex head bolts (A) with the heads facing inboard (two per side). Secure with M16 center lock flanged nuts and torque to 170 Nm (126 lbf·ft).
5. Remove the lifting chains from the conditioner and move the lifting device clear of the work area.
6. If necessary, install the conditioner drive components. For instructions, refer to [Installing Conditioner Drive, page 295](#).

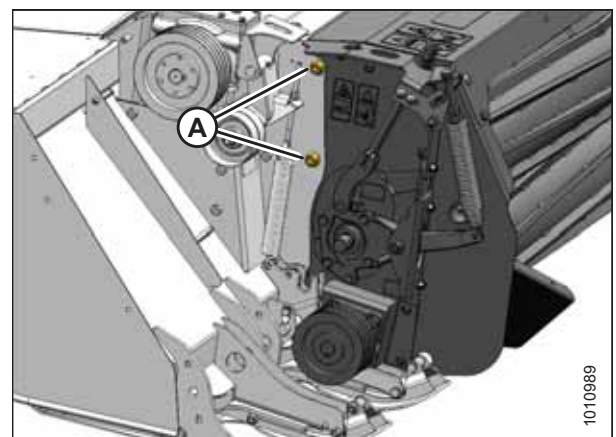


Figure 4.349: Left Side of Conditioner – Right Side Similar

Installing Conditioner Drive

This procedure describes the installation of conditioner drive components.

If installing a conditioner on the R1 Series Rotary Disc Pull-Type, refer to [Installing Conditioner, page 294](#).

MAINTENANCE AND SERVICING

1. Remove two screws (A) from cover (B), and remove the cover from the gearbox shaft. Retain parts for future use.

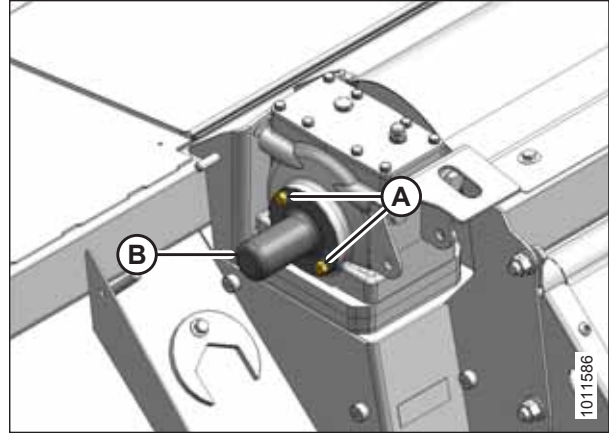


Figure 4.350: Shaft Cover

2. Assemble pulley (A) and bushing (B) onto the gearbox shaft with key (C).
3. Install three M10 hex head bolts (D) through bushing (B) into pulley (A).

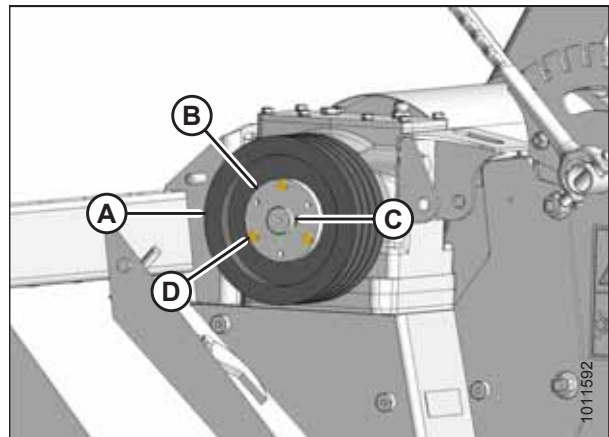


Figure 4.351: Drive Pulley

4. Tighten the three M10 bolts while maintaining 11 mm (7/16 in.) dimension (B) between pulley (A) and gearbox (C). Torque the bolts to 39 Nm (29 lbf-ft).

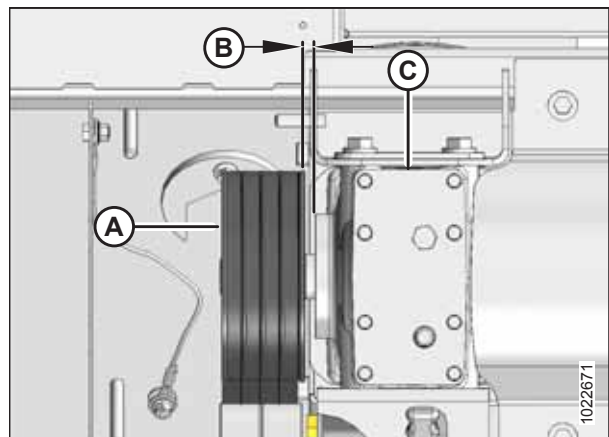


Figure 4.352: Drive Pulley

MAINTENANCE AND SERVICING

5. Position tensioner assembly (A) as shown, and secure with M16 x 120 bolt (B) and nut (C). Torque nut (C) to 51 Nm (38 lbf-ft).

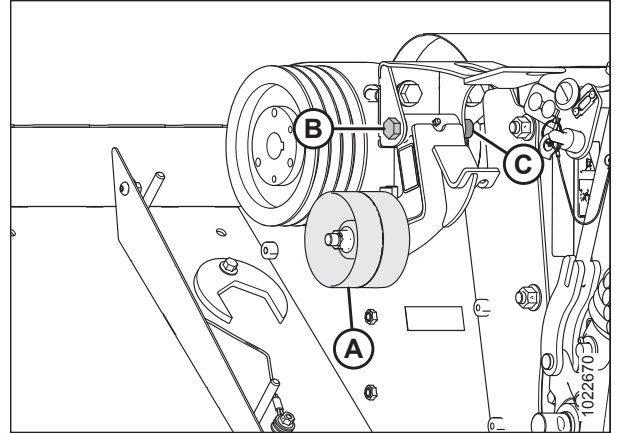


Figure 4.353: Tensioner

6. Install spring (A) into rear hole (B) for a finger conditioner, or forward hole (C) for a roll conditioner.
7. Install eyebolt (D) onto tensioner (E) and spring (A). Secure the eyebolt with hardened washer (F) and two M10 nuts (G).

NOTE:

Install the conditioner drive belt after reattaching the header to the carrier.

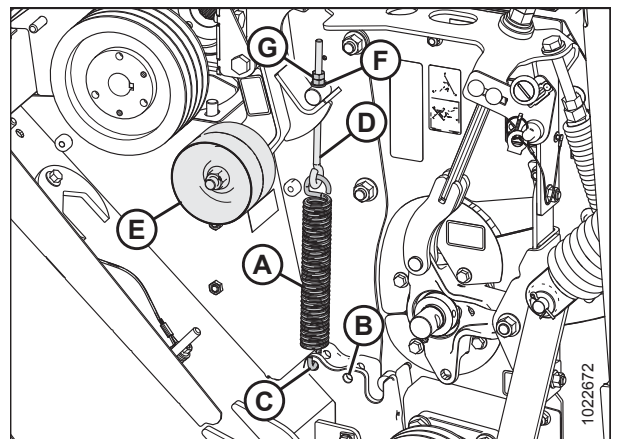


Figure 4.354: Tensioner

Attaching Header and Carrier

The carrier must be attached to a tractor for the header and carrier to be assembled.

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

Never start or move the machine until you are sure all bystanders have cleared the area.

1. Start the tractor and maneuver carrier (A) directly behind header (B) so the carrier legs line up with the header attachment points.
2. Drive slowly forward to engage carrier legs (C) into the header attachment brackets.

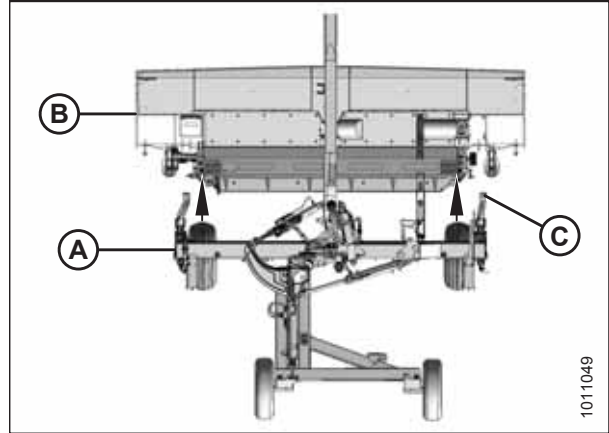


Figure 4.355: Carrier Aligned with Header

3. Inspect left carrier leg (A) for excessive gap between the inner steel sleeve of the bushing and the header brackets. If there is a gap, install washer (1.2 mm [0.047 in.] thick) on both sides of the carrier leg to minimize the gap.
4. Align left carrier leg (A) with header brackets, and install M20 x 40 bolt (B) with hardened washer (C).
5. Install three hardened washers (D) and flanged lock nut (E) on bolt (B).
6. Torque bolt (B) to 339 Nm (250 lbf-ft).

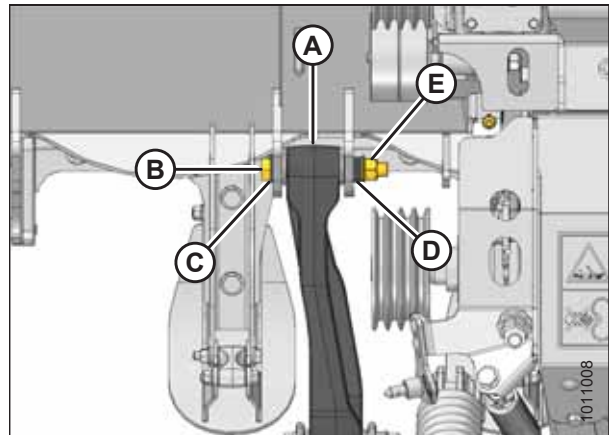


Figure 4.356: Left Leg

MAINTENANCE AND SERVICING

7. Inspect carrier leg (A) for excess gap between the inner steel sleeve of the bushing and the header brackets. If there is a gap, install a washer (1.2 mm [0.047 in.] thick) to both sides of the carrier leg to minimize the gap.
8. Align right carrier leg (A) with the header brackets, and install M20 x 40 bolt (B) with hardened washer (C).
9. Install hardened washer (D), spacer (E), float tension arm (F), and flanged lock nut (G) on bolt (B).
10. Torque bolt (B) to 339 Nm (250 lbf-ft).

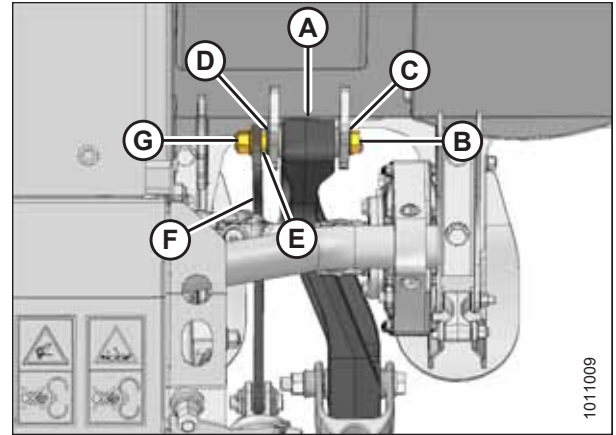


Figure 4.357: Right Leg

11. Undo strapping or wire supporting driveline to hitch (D), and connect driveline (E) to the header swivel gearbox. For instructions, refer to [Installing Clutch Driveline](#), page 246.
12. Remove hex head bolts (A) and spacers (B) from the gearbox.
13. Undo strapping or wire supporting the steering arm to the hitch, and position steering arm (C) on the gearbox.
14. Secure the steering arm to the gearbox with spacers (B) and hex head bolts (A). Apply high-strength threadlocker (Loctite® 262 or equivalent) to the front holes and torque bolts to 203 Nm (150 lbf-ft).

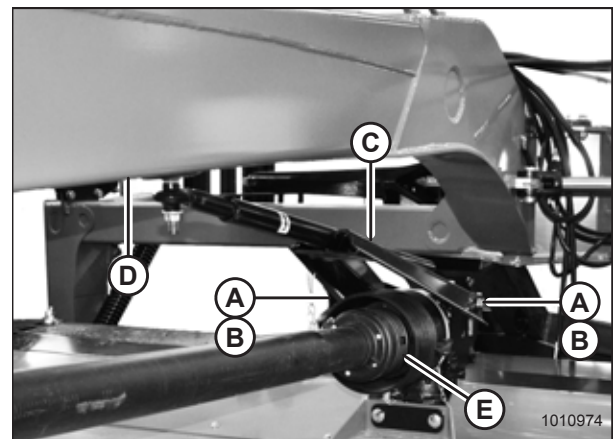


Figure 4.358: Aft Driveline and Steering Arm

15. **If equipped with mechanical center-link:** Undo the strapping or wire securing center-link (B) to the carrier frame.
16. **If equipped with mechanical center-link:** Remove the pins and hardware from anchor (C).
17. **If equipped with mechanical center-link:** Attach center-link (B) to anchor (C) with clevis pin (A) and secure with a cotter pin.

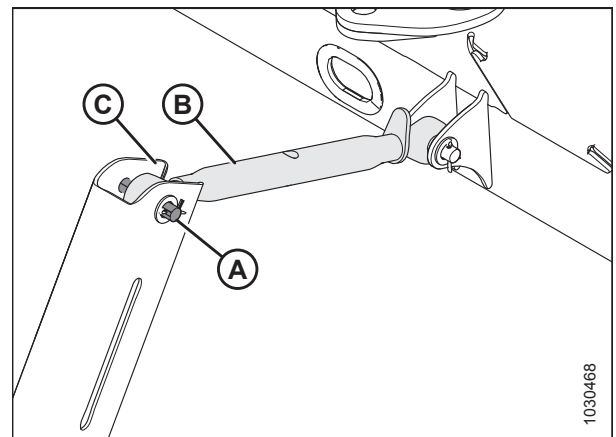


Figure 4.359: Mechanical Center-Link

MAINTENANCE AND SERVICING

18. **If equipped with hydraulic center-link:** Undo the strapping or wire securing center-link (B) and indicator (D) to the carrier frame.
19. **If equipped with hydraulic center-link:** Remove the pins and hardware from anchor (C).
20. **If equipped with hydraulic center-link:** Attach center-link (B) and indicator (D) to anchor (C) with clevis pin (A) and secure with a cotter pin.

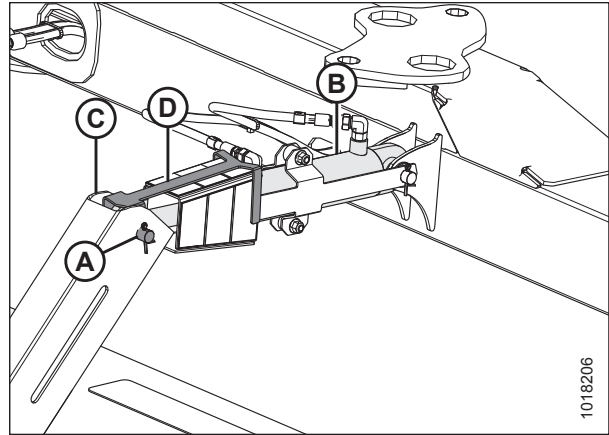


Figure 4.360: Hydraulic Center-Link and Indicator Links

NOTE:

Ensure proper pulley configuration installation—the large pulley is installed onto the gearbox for both roll and finger conditioners.

21. Install conditioner drive belts (A) onto the pulleys.
22. Check that the tensioner spring is installed at the correct location:
 - Hole (D) for a roll conditioner
 - Hole (E) for a finger conditioner
23. Tighten idler tensioner nut (C) until spring length (B) measures 366 mm (14 3/8 in.).
24. Tighten the jam nut.
25. Replace the driveshields. For instructions, refer to [Installing Driveshields, page 228](#).
26. If a transport system is installed, reconnect electrical harness (A) to lights (B), and secure the harness to the shielding using existing clamps (C) and (D).

NOTE:

R113 PT: Harness for rotary disc pull-type is secured with one plastic clamp (D).

NOTE:

R116 PT: Harness for rotary disc pull-type is secured with two plastic clamps.

27. Secure the harness to the light bracket with cable ties (E).

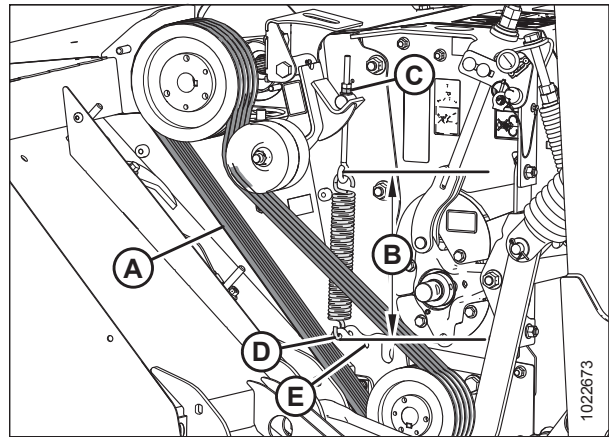


Figure 4.361: Conditioner Drive

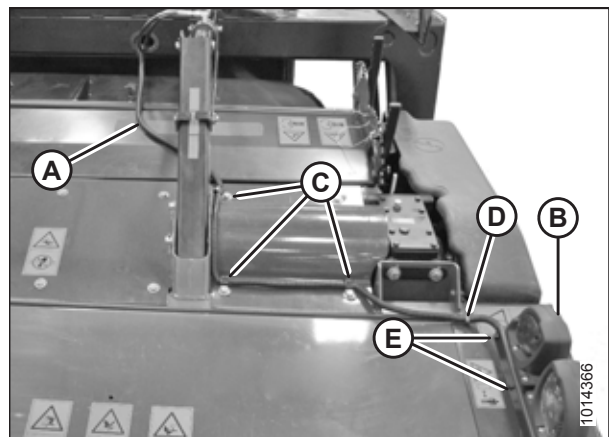


Figure 4.362: Electrical Harness

MAINTENANCE AND SERVICING

28. Tighten four M10 hex head bolts (A) and flat washers. Torque to 29 Nm (21 lbf-ft).
29. Check the float settings. Refer to [Adjusting Float, page 87](#) for float adjustment instructions.

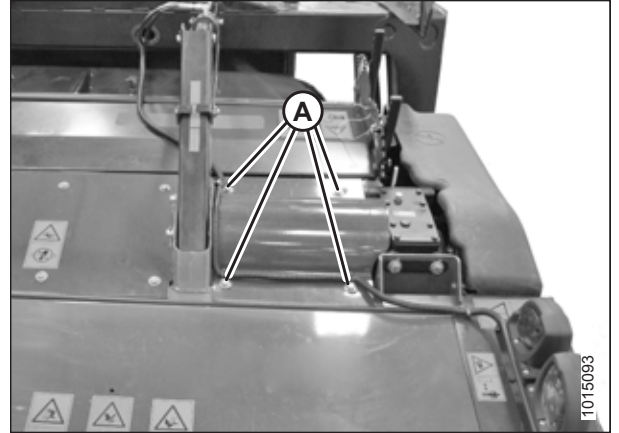


Figure 4.363: Electrical Harness

4.9 Replacing Discharge Shield – No Conditioner

If the discharge shield on a header not equipped with a conditioner is damaged, it will need to be replaced.

4.9.1 Removing Discharge Shield – No Conditioner

Discharge shields may need to be removed for machine service, but a rotary disc pull-type without a conditioner should **NOT** be operated without the discharge shield.

1. Raise the rotary disc pull-type fully and extend the center-link to maximize the space between shield (A) and carrier frame (B).

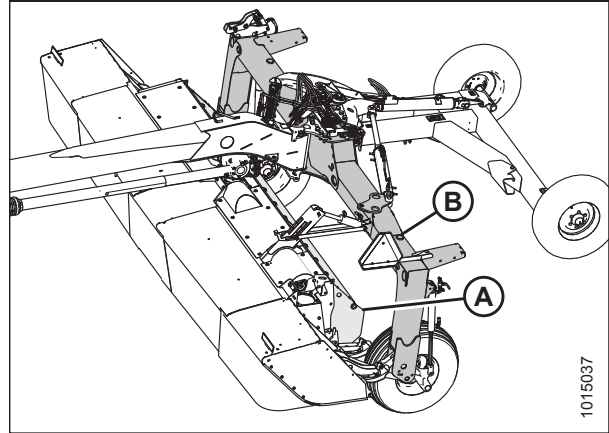


Figure 4.364: Rotary Disc Pull-Type with Transport

2. Close lift cylinder lock-out valves (A) on both sides of the rotary disc pull-type. Valve handles should be in the closed position (90° angle to the hose).

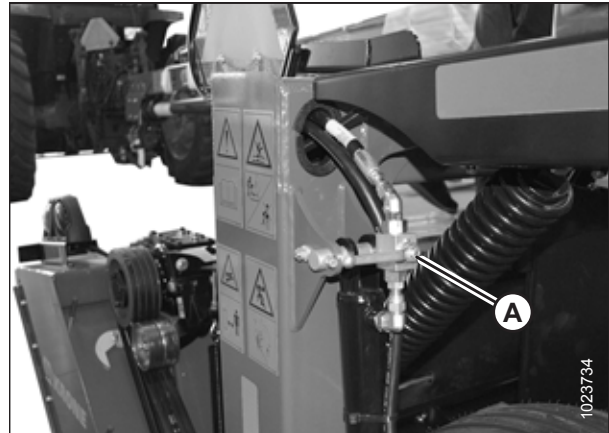


Figure 4.365: Lift Cylinder Lock-Out Valves

3. Remove four M16 hex head bolts (A), nuts, and flat washers securing shield (B) to panel (C) on the rotary disc pull-type.

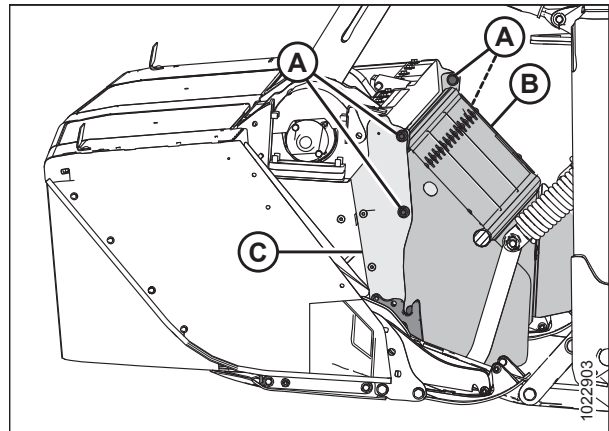


Figure 4.366: Header – View from Left

4. Lift shield (A) until pins (B) (one on each side) disengage from the slots in support (C) and from the shield on panel (D).

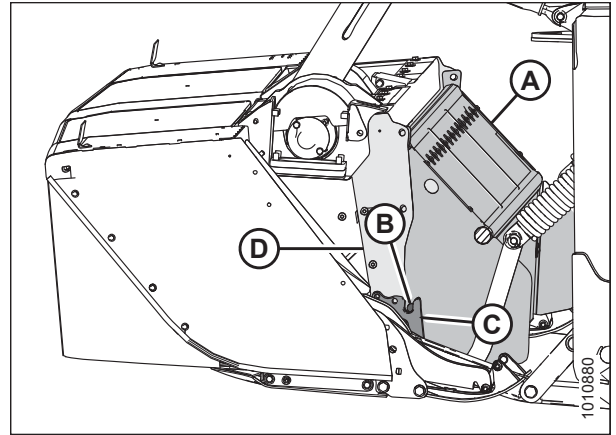


Figure 4.367: Header – View from Left

5. Rotate shield (A) 90° and move it away from the carrier frame.

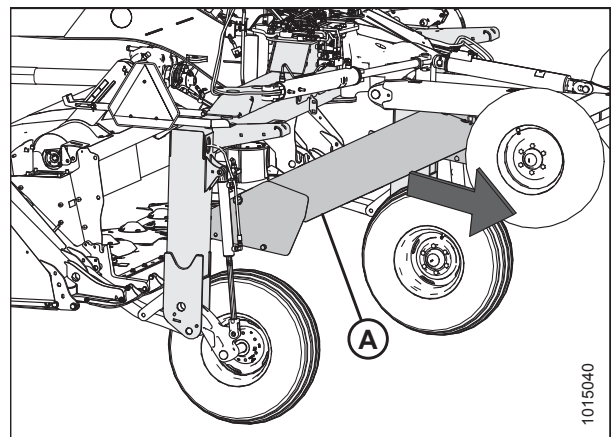


Figure 4.368: Shield Rotated

4.9.2 Installing Discharge Shield – No Conditioner

Discharge shields may need to be removed for machine service, but a rotary disc pull-type without a conditioner should **NOT** be operated without the discharge shield.

1. Raise the rotary disc pull-type fully and extend the center-link to maximize the space between field wheels (A) and carrier frame (B).

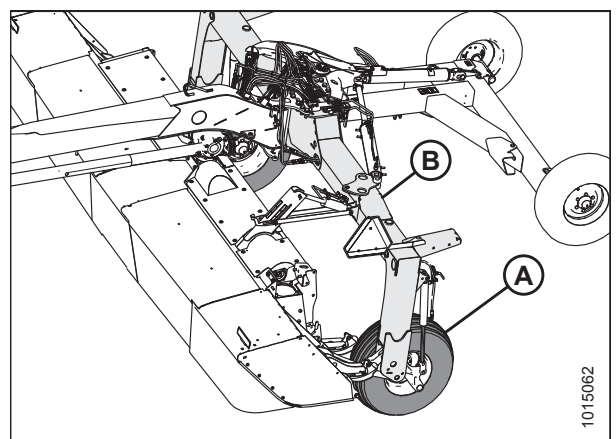


Figure 4.369: Rotary Disc Pull-Type with Transport

MAINTENANCE AND SERVICING

2. Close lift cylinder lock-out valves (A) on both sides of the rotary disc pull-type. Valve handles should be in the closed position (90° angle to the hose).

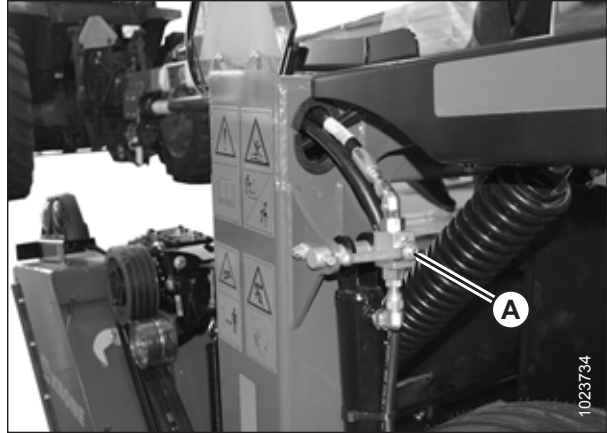


Figure 4.370: Lift Cylinder Lock-Out Valves – Closed Position

3. Rotate shield (A) and pass it between the field wheels and the carrier frame toward the rotary disc pull-type.

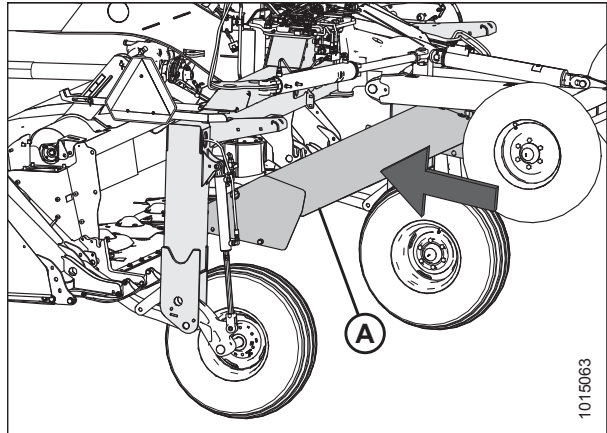


Figure 4.371: Shield Rotated

4. Position shield (A) so that pins (B) (one on each side) engage the slots in cutterbar support (C) and the bolt holes align with panel (D).

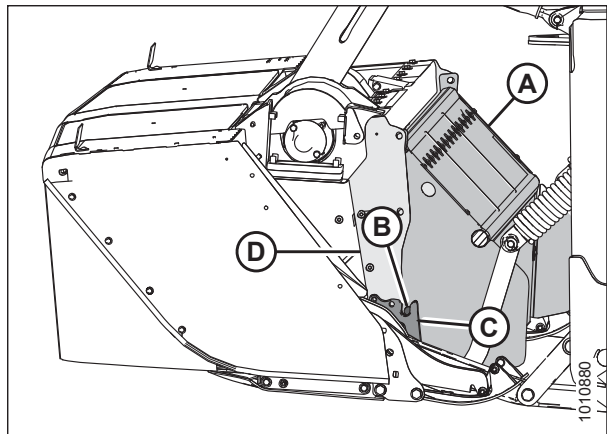


Figure 4.372: Left Side of Header – Right Opposite

MAINTENANCE AND SERVICING

5. Install four M16 hex head bolts (A), nuts, and flat washers to secure shield (B) to panel (C). Ensure the bolt heads face inboard.

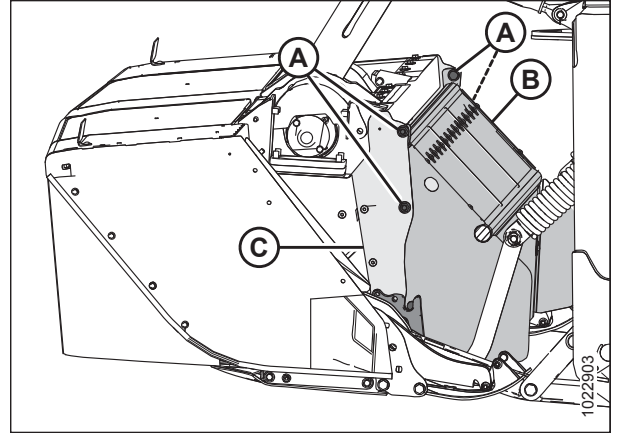


Figure 4.373: Left Side of Header – Right Opposite

6. Open lift cylinder lock-out valves (A) on both sides of the rotary disc pull-type. Valve handles should be in the open position (in line with the hose).

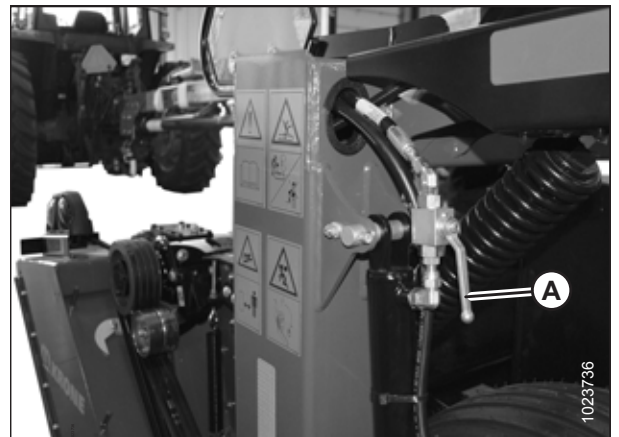


Figure 4.374: Lift Cylinder Lock-Out Valves – Open Position

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 the attachment hardware.

MD #B5800

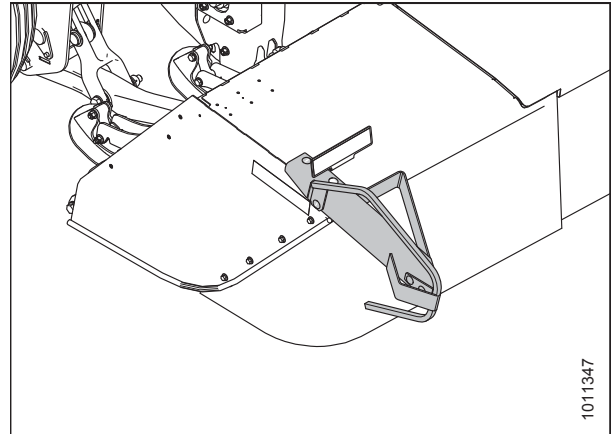


Figure 5.1: Tall Crop Divider — Right Side Shown

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 hydraulic circuit to adjust the rotary disc pull-type angle.

The kit includes installation instructions.

MD #B5810

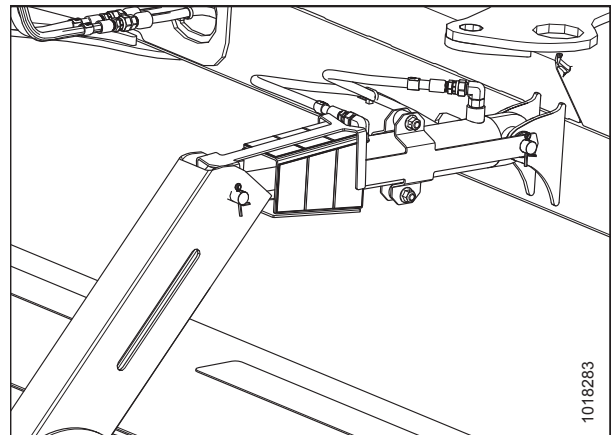


Figure 5.2: Hydraulic Center-Link

5.1.3 Driveline Extension Kit

Some tractor models using a two-point hitch may require a longer primary driveline than the factory-installed driveline on R1 Series Rotary Disc Pull-Types. The Driveline Extension kit can be used to extend the primary driveline length by an additional 152 mm (6 in.).

- B6555 – Full shaft for 1 3/8 in. tractor 1000 RPM PTO Extended Length
- B6556 – Full shaft for 1 3/4 in. tractor 1000 RPM PTO Extended Length

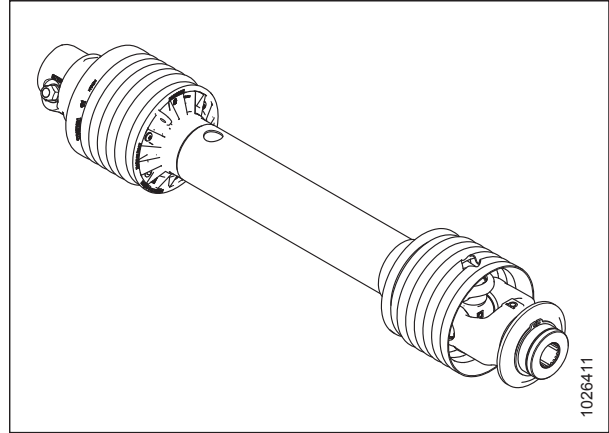


Figure 5.3: Driveline (B6555 Shown, B6556 Similar)

5.1.4 Tractor Utility Hitch Adapter

The Tractor Utility Hitch Adapter allows the rotary disc pull-type to connect to a tractor drawbar regardless of installed hitch option (Tractor Two-Point Hitch Adapter or Tractor Drawbar Hitch Adapter).

The kit includes the transport hitch, attachment hardware, and safety chain.

MD #B5802

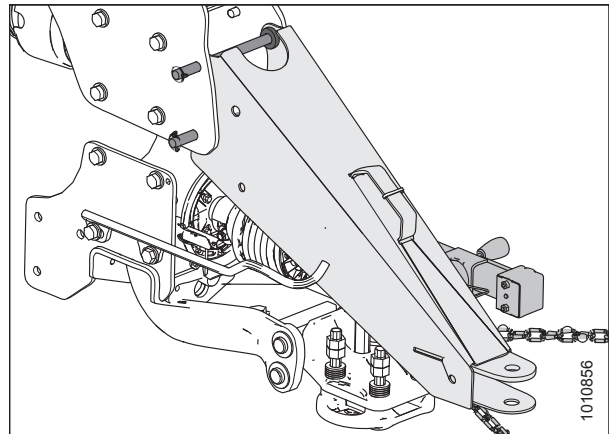


Figure 5.4: Tractor Utility Hitch Adapter

5.1.5 Transport System

The transport system allows the rotary disc pull-type to be towed on roadways while remaining within the legal width restrictions on most roads and highways.

The kit is available as a Dealer-installed option and includes all hardware and installation instructions.

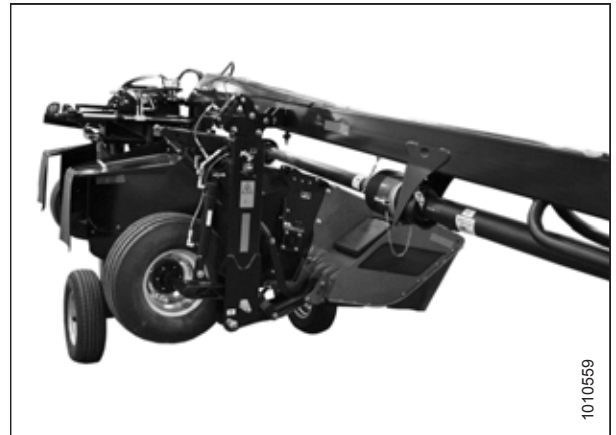


Figure 5.5: Transport System

5.1.6 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 R1 PT Series machines with quick-change-ready discs.

- 10 Disc Kit – MD #257135
- 8 Disc Kit – MD #257136

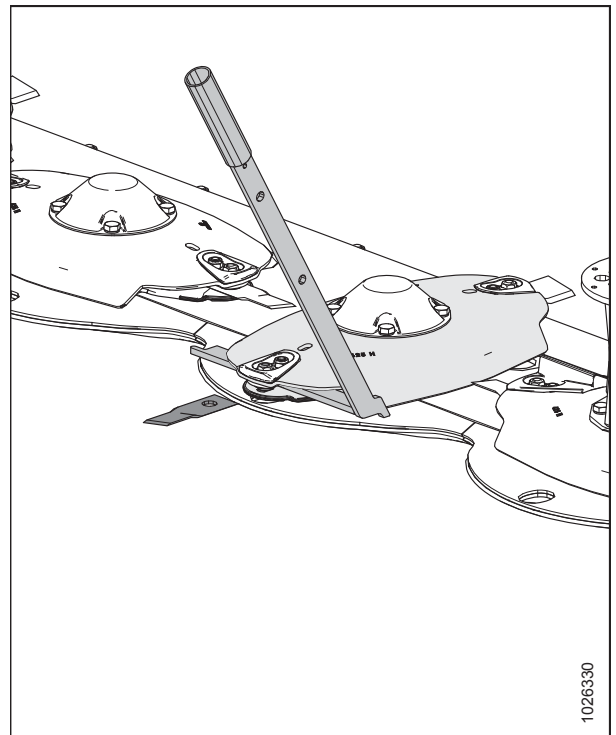


Figure 5.6: Quick Change Blade Kit

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 Polyurethane Intermeshing Roller

Polyurethane rolls are better suited for crushing stems while providing reduced crimping and are recommended for alfalfa, clover, legumes, and similar crops.

A replacement polyurethane intermeshing roller conditioner can be ordered for the R1 Series Rotary Disc Pull-Type.

MD #B5754

5.2.2 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 the R1 Series Rotary Disc Pull-Type.

MD #B5755

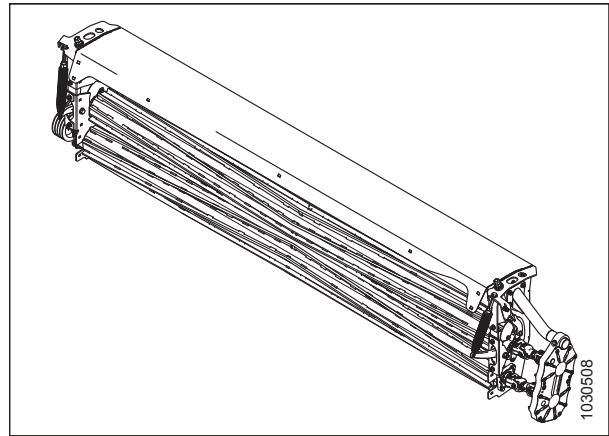


Figure 5.7: Steel Intermeshing Roller

5.2.3 Finger Conditioner

Finger conditioners use rotating fingers to carry crop over the drum and rub against an adjustable conditioning hood. The rubbing action removes the plant's waxy layer and promotes moisture evaporation. Finger conditioners work well in legumes and most all-grass crops, especially alfalfa. Finger conditioners are not recommended for thick-stemmed or cane crops such as Sudan or Sudex, or for crops taller than 1.5 m (5 ft.).

A replacement finger conditioner can be ordered for the R1 Series Rotary Disc Pull-Type.

MD #B5753

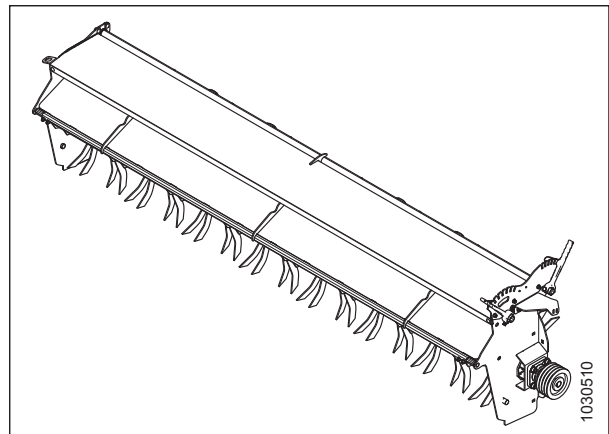


Figure 5.8: Finger Conditioner

Chapter 6: Troubleshooting

Refer to this table if you encounter problems while operating your machine.

6.1 Troubleshooting Rotary Disc Pull-Type Performance

A list of solutions are presented here on how to troubleshoot your rotary disc pull-type performance.

Problem	Solution	Refer to
Symptom: Cutterbar plugging		
Dull, bent, or badly worn blades	Replace blades.	<i>4.4.7 Maintaining Disc Blades, page 170</i>
Build-up of dirt between rock guards	Decrease rotary disc pull-type angle and increase flotation. In some conditions, it may be necessary to carry rotary disc pull-type slightly with lower skid shoes.	<i>3.15.2 Cutting Height, page 90</i>
Conditioner drive belt slipping	Adjust conditioner drive belt tension.	<i>4.5.10 Conditioner Drive Belt, page 260</i>
Symptom: Ragged or uneven cutting of crop		
Float too light, causing bouncing	Adjust to heavier float setting.	<i>3.15.1 Float, page 87</i>
Ground speed too slow	Increase ground speed.	<i>3.15.4 Ground Speed, page 94</i>
Downed crop	Adjust rotary disc pull-type angle or install blade-lowering kit on rotary disc pull-type to cut closer to ground.	<i>3.15.3 Cutterbar Angle, page 93</i>
Symptom: Strips of uncut crop left on field		
Bent or dull disc blades	Replace blades.	<i>4.4.7 Maintaining Disc Blades, page 170</i>
Build-up of dirt between rock guards	Decrease rotary disc pull-type angle and increase flotation.	<i>3.15.3 Cutterbar Angle, page 93</i>
Build-up of dirt between rock guards	Decrease rotary disc pull-type angle and increase flotation.	<i>3.15.1 Float, page 87</i>
Ground speed too slow	Increase ground speed.	<i>3.15.4 Ground Speed, page 94</i>
Foreign object on cutterbar	Disengage rotary disc pull-type and stop engine. When all moving parts have completely stopped, remove foreign object.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>
Symptom: Conditioner rolls plugging		
Ground speed too fast	Reduce ground speed.	<i>3.15.4 Ground Speed, page 94</i>
Roll gap too large for proper feeding	Decrease roll gap.	<i>3.16.1 Roll Gap, page 100</i>
Roll gap too small in thick-stemmed cane-type crops	Increase roll gap.	<i>3.16.1 Roll Gap, page 100</i>
Baffle set too low	Raise baffle.	<i>3.17.1 Internal Intensity Baffle, page 109</i>
Foreign object between rolls	Disengage rotary disc pull-type and stop engine. When all moving parts have completely stopped, remove foreign object.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>
Cutting height too low	Decrease rotary disc pull-type angle to raise cutting height.	<i>3.15.3 Cutterbar Angle, page 93</i>

TROUBLESHOOTING

Problem	Solution	Refer to
Backing into windrow	Raise rotary disc pull-type before backing up.	3.11 Raising and Lowering the Rotary Disc Pull-Type, page 63
Rolls improperly timed	Adjust roll timing.	3.16.3 Roll Timing, page 104
Symptom: Uneven formation and bunching of windrow		
Rear deflector bypassing or dragging crop	Adjust rear deflector for proper crop control. Raise baffle 1 notch.	3.15.5 Cutterbar Deflectors, page 96
Forming shields improperly adjusted	Adjust forming shields.	<ul style="list-style-type: none"> • 3.16.4 Forming Shields – Roll Conditioner, page 107 • 3.17.3 Forming Shields – Finger Conditioner, page 113
Roll gap too large	Adjust roll gap.	3.16.1 Roll Gap, page 100
Symptom: Cutting height varies from one side to the other		
Float not properly balanced	Adjust rotary disc pull-type float.	3.15.1 Float, page 87
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 170
Ground speed too fast	Reduce ground speed.	3.15.4 Ground Speed, page 94
Cutting height too high	Adjust to steeper rotary disc pull-type angle in order to lower cutting height if field conditions allow.	3.15.3 Cutterbar Angle, page 93
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.	3.16.1 Roll Gap, page 100
Symptom: Damaged leaves and broken stems		
Insufficient roll gap	Adjust roll spacing.	3.16.1 Roll Gap, page 100
Roll timing off	Check roll timing and adjust if necessary.	3.16.3 Roll Timing, page 104

TROUBLESHOOTING

Problem	Solution	Refer to
Symptom: Slow crop drying		
Rolls not crimping crop sufficiently	Decrease roll gap.	<i>3.16.1 Roll Gap, page 100</i>
Crop is bunched in windrow	Adjust forming shields/baffle.	<ul style="list-style-type: none"> • <i>3.16.4 Forming Shields – Roll Conditioner, page 107</i> • <i>3.17.3 Forming Shields – Finger Conditioner, page 113</i> • <i>3.17.1 Internal Intensity Baffle, page 109</i>
Symptom: Excessive drying or bleaching of crop		
Excessive crimping	Increase roll gap.	<i>3.16.1 Roll Gap, page 100</i>
Crop is spread too wide in windrow	Adjust forming shields.	<ul style="list-style-type: none"> • <i>3.16.4 Forming Shields – Roll Conditioner, page 107</i> • <i>3.17.3 Forming Shields – Finger Conditioner, page 113</i>
Symptom: Plugging behind end drums		
Ground speed too slow	Increase ground speed.	<i>3.15.4 Ground Speed, page 94</i>
Symptom: Bunching or poorly formed windrows		
Forming shields not properly adjusted	Adjust forming shields.	<ul style="list-style-type: none"> • <i>3.16.4 Forming Shields – Roll Conditioner, page 107</i> • <i>3.17.3 Forming Shields – Finger Conditioner, page 113</i>
Symptom: Windrow too wide (finger conditioner)		
Crop not throwing far enough	Adjust internal intensity baffle, or adjust finger rotor speed.	<ul style="list-style-type: none"> • <i>3.17.1 Internal Intensity Baffle, page 109</i> • <i>3.17.2 Finger Rotor Speed, page 110</i>

6.2 Troubleshooting Mechanical Issues

A list of solutions are presented here on how to troubleshoot your rotary disc pull-type mechanical issues.

Problem	Solution	Refer to
Symptom: Excessive noise		
Bent disc blade	Replace blade.	<i>4.4.7 Maintaining Disc Blades, page 170</i>
Conditioner roll timing off	Check roll timing, and adjust if necessary.	<i>3.16.3 Roll Timing, page 104</i>
Conditioner roll gap too small	Check roll gap, and adjust if necessary.	<i>3.16.1 Roll Gap, page 100</i>
Symptom: Excessive vibration or noise in rotary disc pull-type		
Mud deposits on conditioner rolls	Clean rolls.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>
Conditioner rolls contacting each other	Increase roll gap.	<i>3.16.1 Roll Gap, page 100</i>
Conditioner rolls contacting each other	Check roll timing.	<i>3.16.3 Roll Timing, page 104</i>
Symptom: Excessive heat in cutterbar		
Too much oil in cutterbar	Drain oil, and refill with specified amount.	<i>4.4.3 Lubricating Cutterbar, page 150</i>
Symptom: Frequent blade damage		
Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>
Material wrapped around spindle	Remove disc and remove material.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>
Cutting too low in rocky field conditions	Decrease rotary disc pull-type angle.	<i>3.15.3 Cutterbar Angle, page 93</i>
Cutting too low in rocky field conditions	Increase flotation.	<i>3.15.1 Float, page 87</i>
Float set too heavy	Increase flotation.	<i>3.15.1 Float, page 87</i>
Ground speed too high in rocky field conditions. At high ground speed, rotary disc pull-type tends to dig rocks from ground instead of floating over them.	Reduce ground speed.	<i>3.15.4 Ground Speed, page 94</i>
Blade incorrectly mounted	Check all blade mounting hardware, and ensure blades move freely.	<i>4.4.7 Maintaining Disc Blades, page 170</i>
Symptom: Excessive wear of cutting components		
Angle too steep	Reduce rotary disc pull-type angle.	<i>3.15.3 Cutterbar Angle, page 93</i>
Crop residue and dirt deposits on cutterbar	Clean cutterbar.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>
Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>

TROUBLESHOOTING

Problem	Solution	Refer to
Symptom: Breakage of conditioner drive belt		
Improper belt tension	Adjust conditioner drive belt tension.	<i>4.5.10 Conditioner Drive Belt, page 260</i>
Belt not in proper groove in pulley	Move belt to proper groove.	<i>4.5.10 Conditioner Drive Belt, page 260</i>
Foreign object between rolls	Disengage rotary disc pull-type and stop engine. When all moving parts have completely stopped, remove foreign object.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>
Belt pulleys and idlers misaligned	Align pulleys and idler.	<i>4.5.10 Conditioner Drive Belt, page 260</i>
Symptom: Machine pulling to one side		
Rotary disc pull-type dragging on one end and pulling to that side	Adjust rotary disc pull-type flotation on both ends.	<i>3.15.1 Float, page 87</i>
Low tire pressure on one side	Check and correct tire pressure (207 kPa [30 psi]).	<i>4.5.14 Wheels and Tires, page 275</i>
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.	<i>3.20 Unplugging the Rotary Disc Pull-Type, page 118</i>
Primary driveline not connected	Connect driveline.	<i>4.5.4 Primary Driveline, page 233</i>
Symptom: Transport control box is not working and transport function will not activate		
Control box's 10 amp fuse has failed	Ensure all electrical connections in the control box are secure. If necessary, replace the fuse in the control box.	Contact your Dealer

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.

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

Jam nuts

When applying torque to finished jam nuts, multiply the torque applied to regular nuts by $f=0.65$.

Self-tapping screws

Standard torque is to be used (**NOT** to be used on critical or structurally important joints).

7.1.1 SAE Bolt Torque Specifications

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

Table 7.1 SAE Grade 5 Bolt and Grade 5 Free Spinning Nut

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

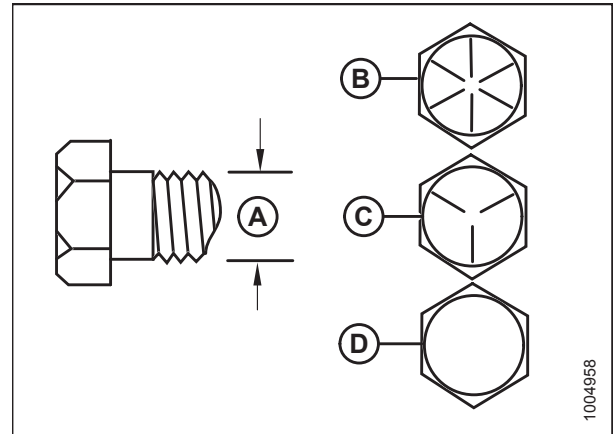


Figure 7.1: Bolt Grades

A - Nominal Size
C - SAE-5

B - SAE-8
D - SAE-2

REFERENCE

Table 7.2 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

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

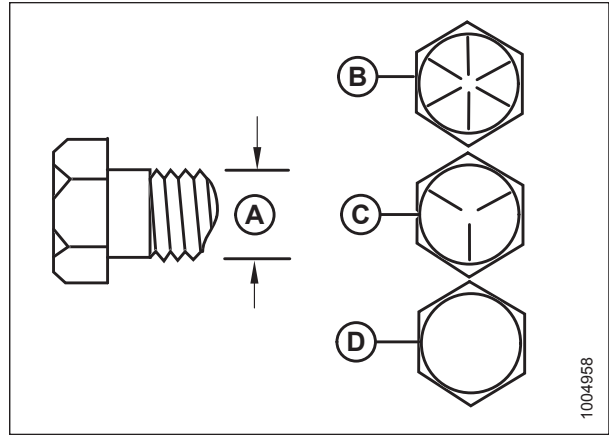


Figure 7.2: Bolt Grades

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

Table 7.3 SAE Grade 8 Bolt and Grade G Distorted Thread Nut

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

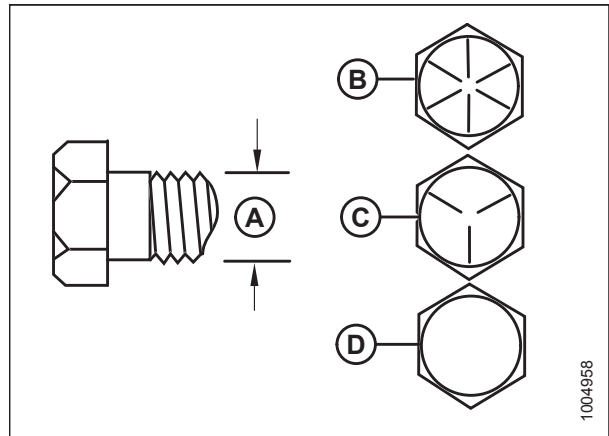


Figure 7.3: Bolt Grades

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

Table 7.4 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

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

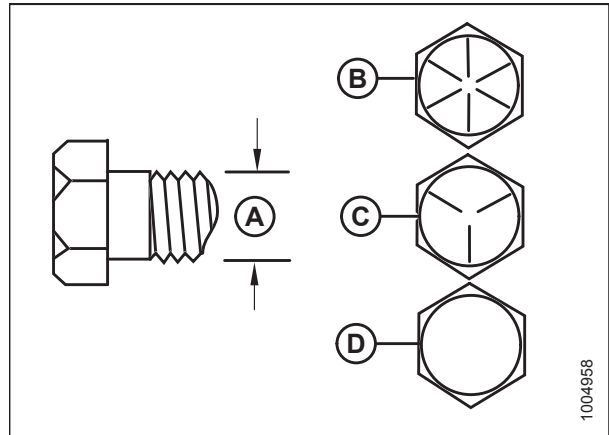


Figure 7.4: Bolt Grades

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

7.1.2 Metric Bolt Specifications

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

Table 7.5 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

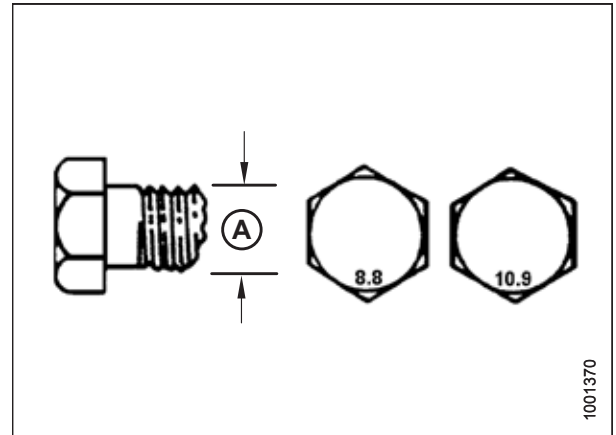


Figure 7.5: Bolt Grades

Table 7.6 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

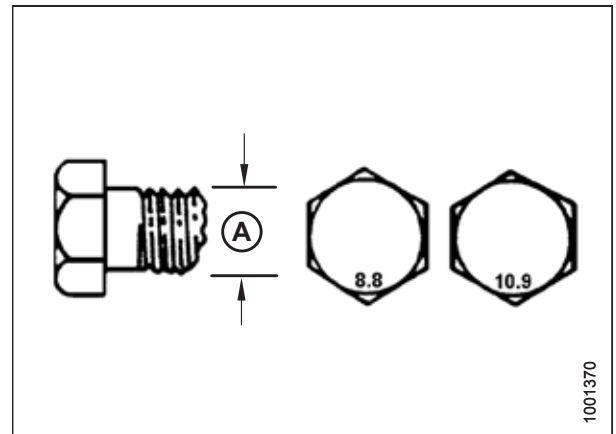


Figure 7.6: Bolt Grades

REFERENCE

Table 7.7 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

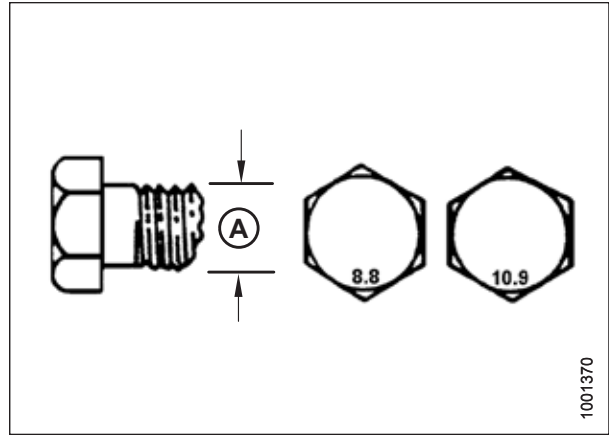


Figure 7.7: Bolt Grades

Table 7.8 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

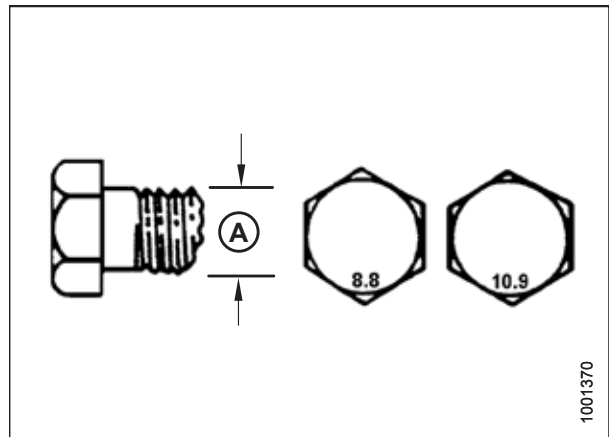


Figure 7.8: Bolt Grades

7.1.3 Metric Bolt Specifications Bolting into Cast Aluminum

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

Table 7.9 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	–	–	–	–

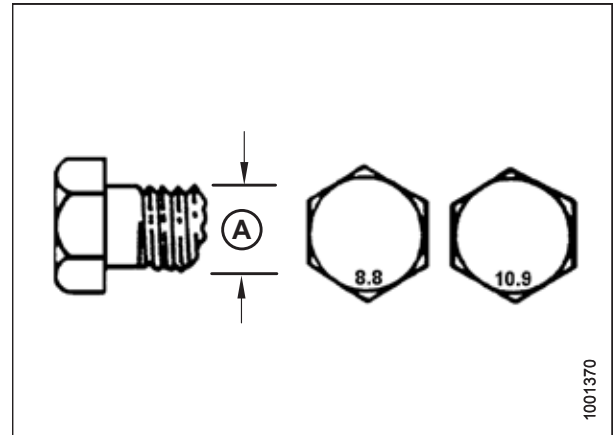


Figure 7.9: Bolt Grades

7.1.4 Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between flared surfaces.
3. Torque fitting nut (E) to specified number of flats from finger tight (FFFT) or to a given torque value in Table 7.10, page 321.
4. Use two wrenches to prevent fitting (D) from rotating. Place one wrench on fitting body (D), and tighten nut (E) with other wrench to torque shown.
5. Assess final condition of connection.

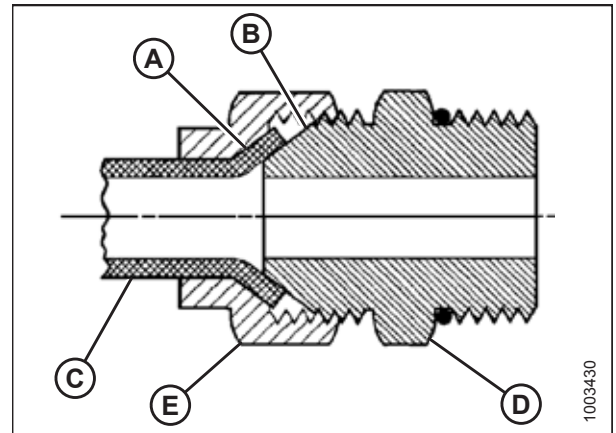


Figure 7.10: Hydraulic Fitting

Table 7.10 Flare-Type Hydraulic Tube Fittings

SAE Dash Size	Thread Size (in.)	Torque Value ¹⁴		Flats from Finger Tight (FFFT)	
		Nm	lbf-ft	Tube	Swivel Nut or Hose
-2	5/16–24	4–5	3–4	–	–
-3	3/8–24	7–8	5–6	–	–
-4	7/16–20	18–19	13–14	2 1/2	2
-5	1/2–20	19–21	14–15	2	2
-6	9/16–18	30–33	22–24	2	1 1/2

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

REFERENCE

Table 7.10 Flare-Type Hydraulic Tube Fittings (continued)

SAE Dash Size	Thread Size (in.)	Torque Value ¹⁵		Flats from Finger Tight (FFFT)	
		Nm	lbf-ft	Tube	Swivel Nut or Hose
-8	3/4-16	57-63	42-46	2	1 1/2
-10	7/8-14	81-89	60-66	1 1/2	1 1/2
-12	1 1/16-12	113-124	83-91	1 1/2	1 1/4
-14	1 3/16-12	136-149	100-110	1 1/2	1 1/4
-16	1 5/16-12	160-176	118-130	1 1/2	1
-20	1 5/8-12	228-250	168-184	1	1
-24	1 7/8-12	264-291	195-215	1	1
-32	2 1/2-12	359-395	265-291	1	1
-40	3-12	—	—	1	1

7.1.5 O-Ring Boss Hydraulic Fittings – Adjustable

Torque values are shown in following table below.

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

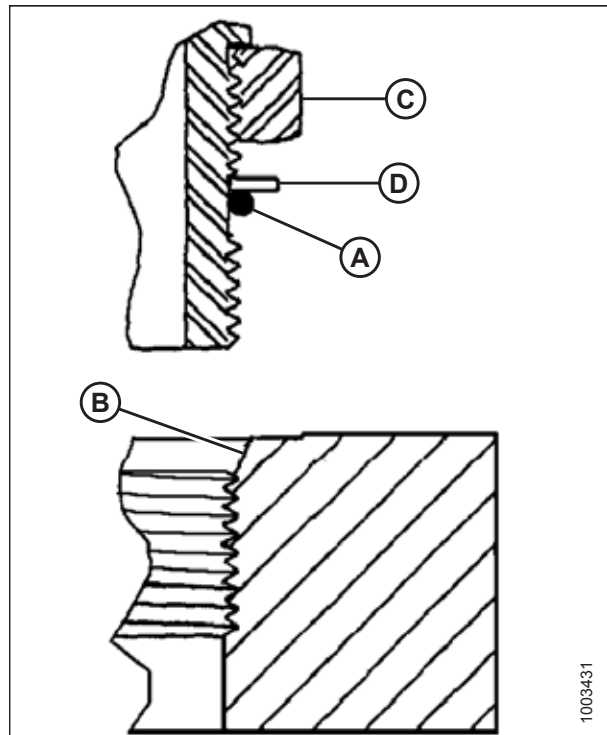


Figure 7.11: Hydraulic Fitting

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

REFERENCE

5. Install fitting (B) into 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 to torque shown. Use two wrenches, one on fitting (B) and other on lock nut (C).
8. Check the final condition of the fitting.

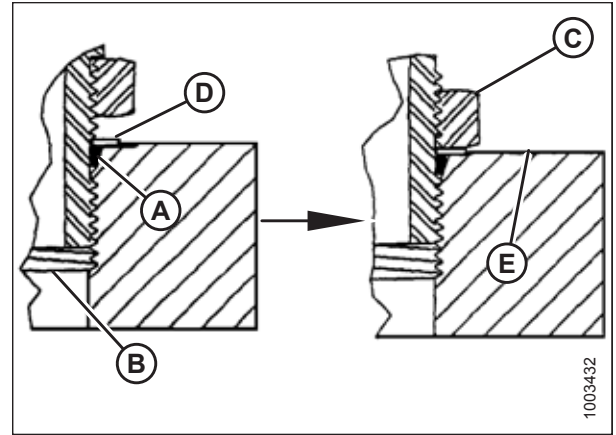


Figure 7.12: Hydraulic Fitting

Table 7.11 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value ¹⁶	
		Nm	lbf·ft (*lbf·in)
-2	5/16-24	6-7	*53-62
-3	3/8-24	12-13	*106-115
-4	7/16-20	19-21	14-15
-5	1/2-20	21-33	15-24
-6	9/16-18	26-29	19-21
-8	3/4-16	46-50	34-37
-10	7/8-14	75-82	55-60
-12	1 1/16-12	120-132	88-97
-14	1 3/8-12	153-168	113-124
-16	1 5/16-12	176-193	130-142
-20	1 5/8-12	221-243	163-179
-24	1 7/8-12	270-298	199-220
-32	2 1/2-12	332-365	245-269

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

7.1.6 O-Ring Boss Hydraulic Fittings – Non-Adjustable

Torque values are shown in following table below.

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on the threads and adjust if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into port until the fitting is hand-tight.
5. Torque fitting (C) according to values in Table 7.12, page 324.
6. Check the final condition of the fitting.

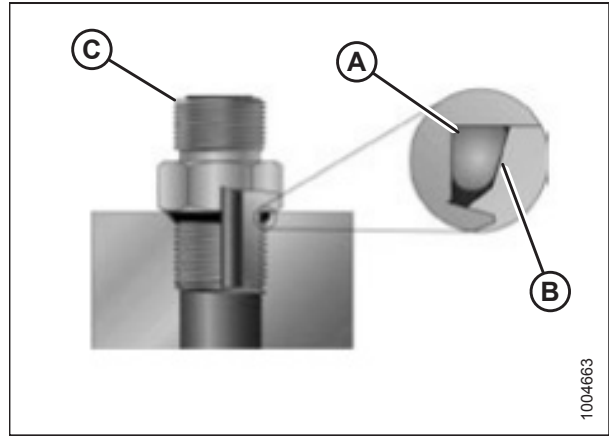


Figure 7.13: Hydraulic Fitting

Table 7.12 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value ¹⁷	
		Nm	lbf·ft (*lbf·in)
-2	5/16-24	6-7	*53-62
-3	3/8-24	12-13	*106-115
-4	7/16-20	19-21	14-15
-5	1/2-20	21-33	15-24
-6	9/16-18	26-29	19-21
-8	3/4-16	46-50	34-37
-10	7/8-14	75-82	55-60
-12	1 1/16-12	120-132	88-97
-14	1 3/8-12	153-168	113-124
-16	1 5/16-12	176-193	130-142
-20	1 5/8-12	221-243	163-179
-24	1 7/8-12	270-298	199-220
-32	2 1/2-12	332-365	245-269

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

7.1.7 O-Ring Face Seal Hydraulic Fittings

Torque values are shown in following table below.

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



Figure 7.14: Hydraulic Fitting

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 in 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 is bottomed out.
5. Torque the fittings according to values in Table 7.13, page 325.

NOTE:

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

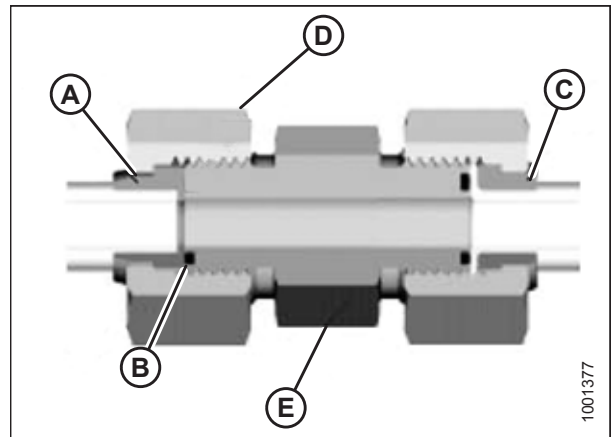


Figure 7.15: Hydraulic Fitting

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

Table 7.13 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value ¹⁸	
			Nm	lbf-ft
-3	Note ¹⁹	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note ¹⁹	5/16	–	–
-6	11/16	3/8	40–44	29–32
-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 ¹⁹	7/8	–	–

18. Torque values and angles shown are based on lubricated connection as in reassembly.

19. O-ring face seal type end not defined for this tube size.

REFERENCE

Table 7.13 O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value ²⁰	
			Nm	lbf-ft
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167
-24	1–2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

7.1.8 Tapered Pipe Thread Fittings

Torque values are shown in following table below.

Assemble pipe fittings as follows:

1. Check components to ensure that the fitting and port threads are free of burrs, nicks, scratches, and any form of contamination.
2. Apply pipe thread sealant (paste type) to the external pipe threads.
3. Thread the fitting into the port until it is hand-tight.
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 7.14, page 326. Make sure that the tube end of a shaped connector (typically 45° or 90°) is aligned to receive the incoming tube or hose assembly. Always finish alignment of fitting in the direction of tightening. Never back off (loosen) the pipe threaded connectors to achieve alignment.
5. Clean all the residue and any excess thread conditioner with an appropriate cleaner.
6. Assess the final condition of the fitting. Pay special attention to the possibility of cracks to port opening.
7. Mark the final position of the fitting. If a fitting leaks, disassemble the fitting and check it for damage.

NOTE:

Overtorque failure of fittings may not be evident until fittings are disassembled.

Table 7.14 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

20. Torque values and angles shown are based on lubricated connection as in reassembly.

7.2 Conversion Chart

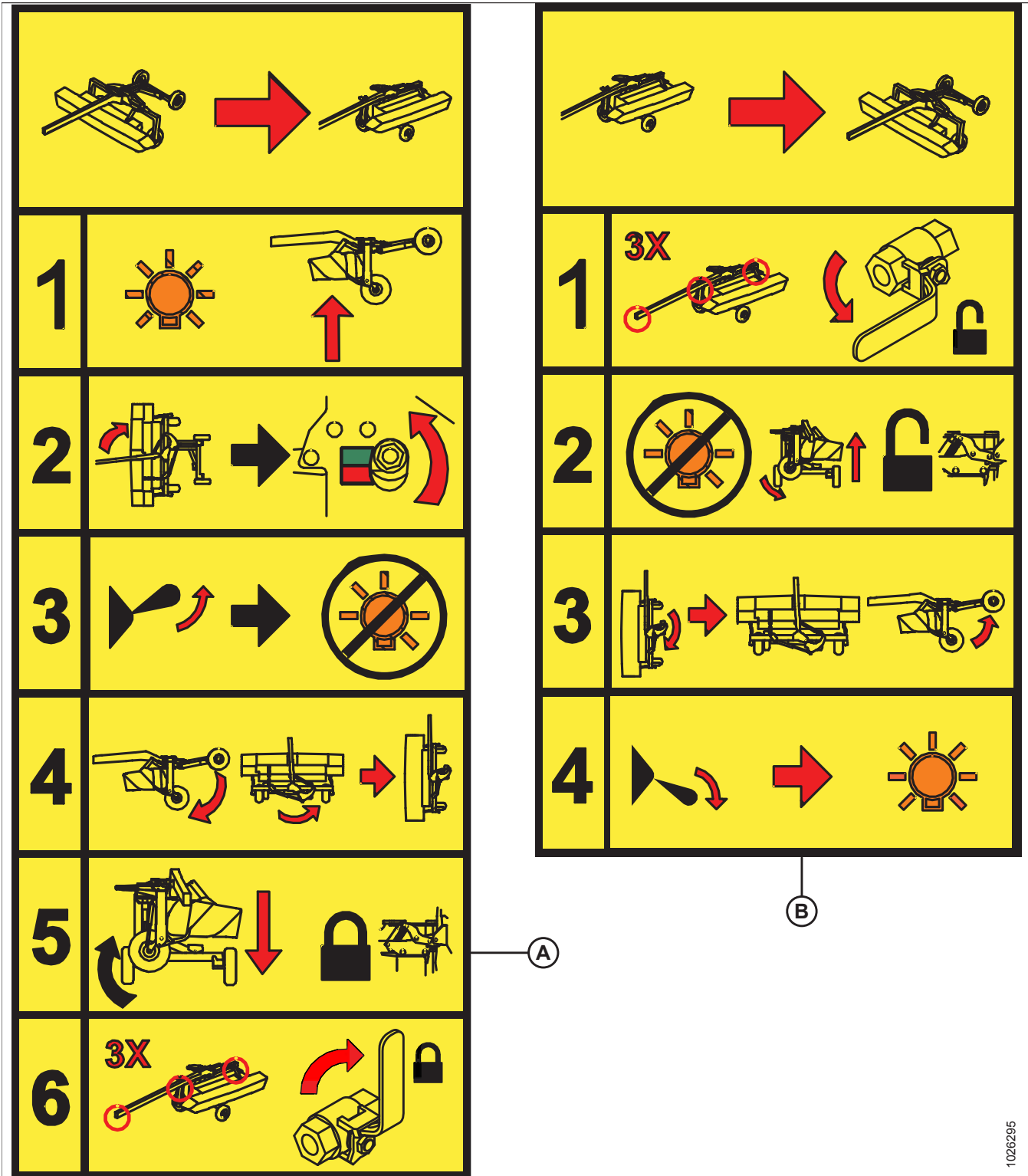
Both SI units (including metric) and US customary units (sometimes referred to as standard units) of measurement are used in this manual. A list of those units along with their abbreviations and conversion factors is provided here for your reference.

Table 7.15 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.

7.3 Converting Transport Decal

The transport decal on the remote control provides a pictorial instruction for operating the optional transport system.



A - Converting From Field to Transport

B - Converting From Transport to Field

1026295

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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.

Table .16 Recommended Lubricants

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 Cutterbar	8 L (8.5 qts [US])
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R116 Cutterbar	10 L (10.5 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	Pull-type roll timing gearbox	1.8 L (1.9 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Hitch (front) swivel gearbox	Upper: 1.2 L (1.3 qts [US]) Lower: 1.7 L (1.8 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Header (rear) swivel gearbox	Upper: 1.2 liters (1.3 qts [US]) Lower: 1.7 L (1.8 qts [US])

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