

# **R113/R116 Pull-Type Disc Mower**

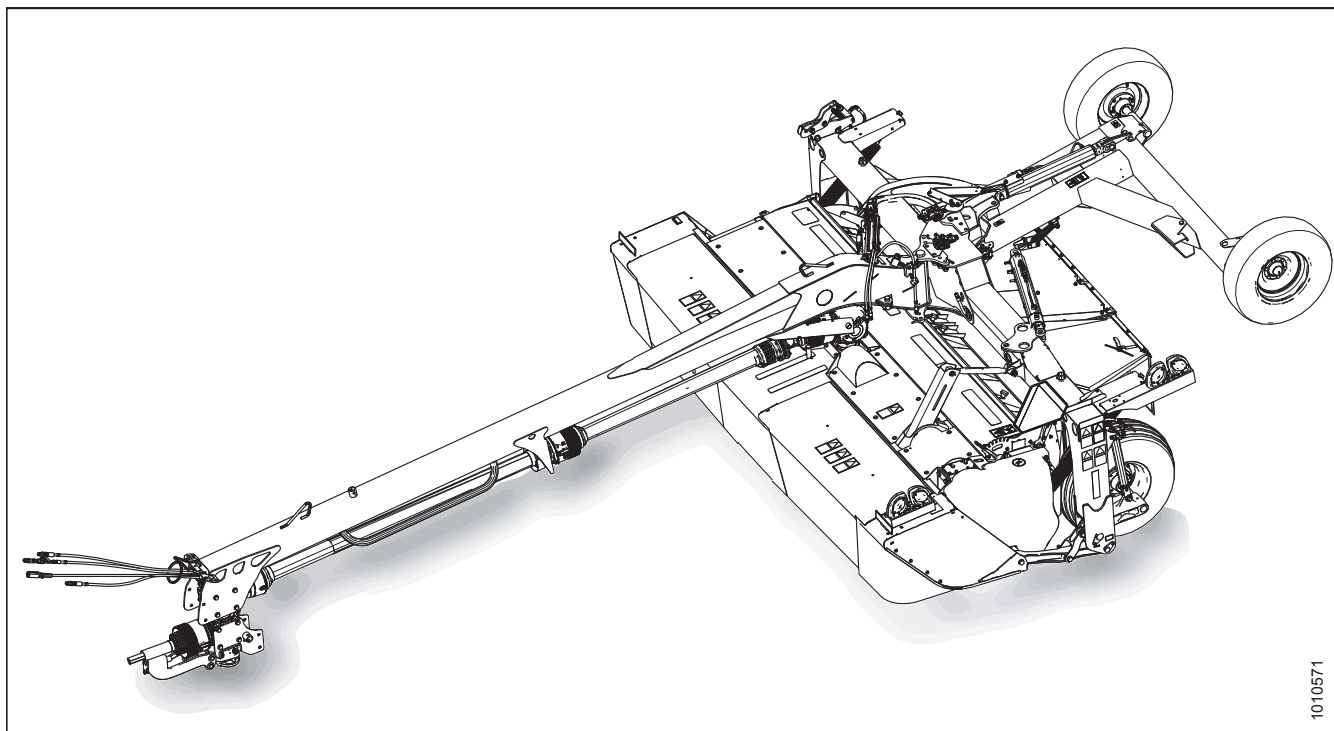
**Operator's Manual**

**214630 Revision A**

2018 Model Year

Original Instruction


## R113/R116 Pull-Type Disc Mower



Published: February, 2018

# Declaration of Conformity

Figure 1. EC Declaration of Conformity

EC Declaration of Conformity			
			
<b>[1] MacDon</b> MacDon Industries Ltd. 680 Moray Street, Winnipeg, Manitoba, Canada R3J 3S3		<b>[4] As Per Shipping Document</b>	
<b>[2] Disc Header</b>		<b>[5] January 17, 2018</b>	
<b>[3] MacDon R1 Series</b>		<b>[6] Christoph Martens Product Integrity</b>	

EN	BG	CZ	DA
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 Hagenauer Straße 59 65203 Wiesbaden (Germany) bvonriedesel@macdon.com	Ние, [1] декларираме, че следният продукт: Тип машина: [2] Наименование и модел: [3] Сериен 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 Hagenauer Straße 59 65203 Wiesbaden (Германия) bvonriedesel@macdon.com	My, [1] Prohlašujeme, že produkt: Typ zařízení: [2] Název a model: [3] Sériové(a) 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 Hagenauer Straße 59 65203 Wiesbaden (Německo) bvonriedesel@macdon.com	Vi, [1] erklærer, at produktet: 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 Hagenauer Straße 59 D-65203 Wiesbaden (Tyskland) bvonriedesel@macdon.com

DE	ES	ET	FR
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 Hagenauer Straße 59 65203 Wiesbaden bvonriedesel@macdon.com	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 Hagenauer Straße 59 65203 Wiesbaden (Alemania) bvonriedesel@macdon.com	Meie, [1] deklareerime, et toode Seadme tüüp: [2] Nimi ja mudel: [3] Seerianumbrid: [4] vastab kõigile direktiivi 2006/42/EÜ asjakohastele sätetele. Kasutatud on järgnevald 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 aadress: Benedikt von Riedesel Peadirektor, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Saksamaa) bvonriedesel@macdon.com	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 Hagenauer Straße 59 65203 Wiesbaden (Allemagne) bvonriedesel@macdon.com

**The Harvesting Specialists****MacDon**

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Figure 2. EC Declaration of Conformity

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

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

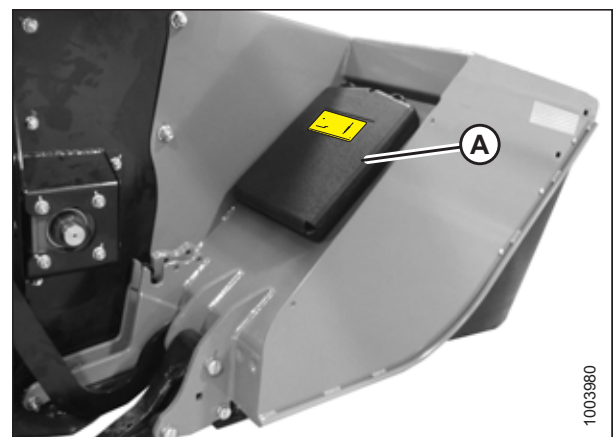
## Conventions

The following conventions are used in this document:

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

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



**Manual Storage Case**

## List of Revisions

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.

Summary of Change	Location
Replaced outdated terminology (disc mower drive gearbox) with updated terminology (cutterbar-conditioner drive gearbox).	Throughout manual.
Updated safety sign decal location illustration (Figure 1.23).	<a href="#">1.8 Locating Safety Sign Decals, page 9</a>
Updated option names in hitch options illustration.	<a href="#">2.2 Component Identification, page 25</a>
Updated towing description to only detail transporting disc mower using a tractor.	<a href="#">3.14 Transporting the Disc Mower, page 72</a>
Updated procedure to only include mention of transporting disc mower using a tractor.	<a href="#">3.14.1 Preparing Disc Mower for Transport, page 73</a>
Updated procedure to only include mention of transporting disc mower using a tractor.	<a href="#">Converting from Transport to Field Mode (Without Road Friendly Transport™), page 75</a>
Updated procedure to only include mention of transporting disc mower using a tractor.	<a href="#">Converting from Field Mode to Transport (Without Road Friendly Transport™), page 76</a>
Updated procedure to only include mention of transporting disc mower using a tractor.	<a href="#">Converting from Field to Transport Mode (with Road Friendly Transport™), page 77</a>
Added illustration to topic.	<a href="#">3.15.3 Cutterbar Angle, page 92</a>
Added new topic.	<a href="#">4.4.10 Replacing Small Drums, page 182</a>
Added new topic.	<a href="#">Inspecting Small Drums, page 182</a>
Added new topic.	<a href="#">Removing Small Driven Drums and Driveline, page 184</a>
Added new topic.	<a href="#">Removing Small Non-Driven Drums, page 191</a>
Added new topic.	<a href="#">Installing Small Non-Driven Drums, page 192</a>
Edited topic to focus on large drums only.	<a href="#">4.4.11 Replacing Large Drums, page 193</a>
Updated bundle numbers and descriptions.	<a href="#">5.1.3 Driveline Extension Kit, page 298</a>
Updated bundle name and option description.	<a href="#">5.1.4 Tractor Utility Hitch Adapter, page 298</a>

# Serial Numbers

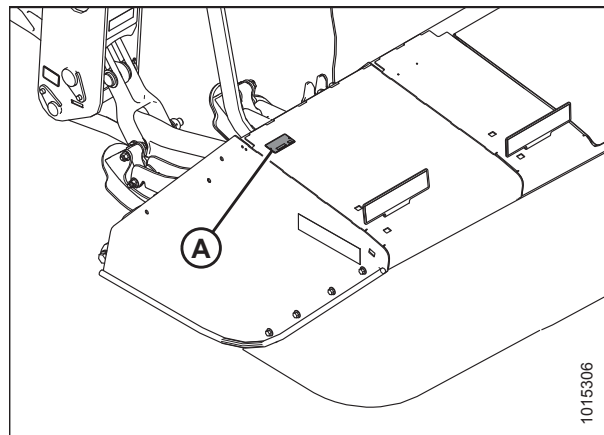
Record the serial numbers of the disc mower, the hitch, and the Road Friendly Transport™ option (if equipped) in the spaces provided below.

Disc mower serial  
number (A):

\_\_\_\_\_

Model year:

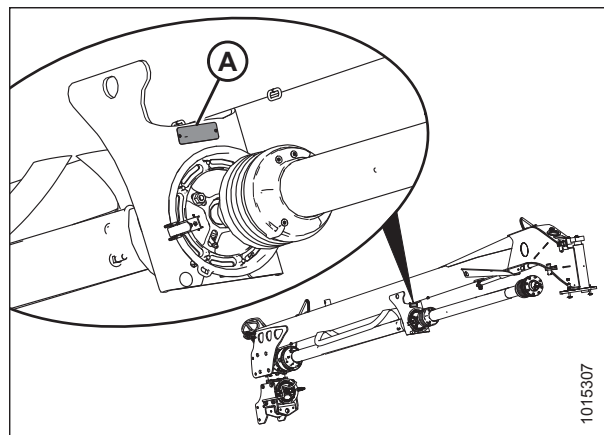
\_\_\_\_\_



**Disc Mower Serial Number Location (A)**

Hitch serial number (A):

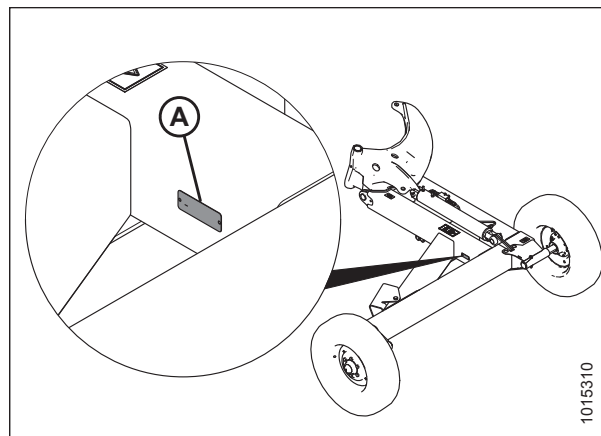
\_\_\_\_\_



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

Optional transport system  
serial number (A):

\_\_\_\_\_



**Road Friendly Transport™ (Optional) Serial  
Number Location (A)**

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# 1 Safety

## 1.1 Safety Alert Symbols

This 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. 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.

## 1.3 General Safety

### CAUTION

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

Protect yourself.

- When assembling, operating, and servicing machinery, wear all protective clothing and personal safety devices that could be necessary for 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
- 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 for use in case of emergencies.
- Keep a fire extinguisher on the machine. Be sure fire extinguisher is properly maintained. Be familiar with its proper use.
- Keep young children away from machinery at all times.
- Be aware that accidents often happen when Operator is tired or in a hurry. Take time to consider safest way. Never ignore warning signs of fatigue.

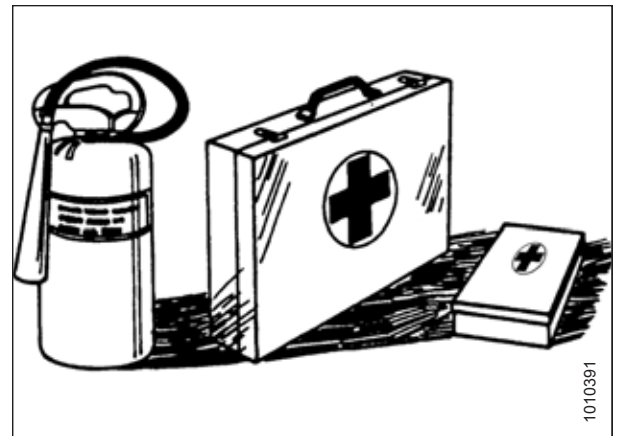


Figure 1.4: Safety Equipment

## 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. Make sure driveline guards can rotate independently of shaft and can telescope freely.
- Use only service and repair parts made or approved by equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.



Figure 1.5: Safety around Equipment

- Keep hands, feet, clothing, and hair away from moving parts. **NEVER** attempt to clear obstructions or objects from a machine while engine is running.
- Do **NOT** modify machine. Unauthorized modifications may impair machine function and/or safety. It may also shorten machine's life.
- To avoid bodily injury or death from unexpected startup of machine, **ALWAYS** stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

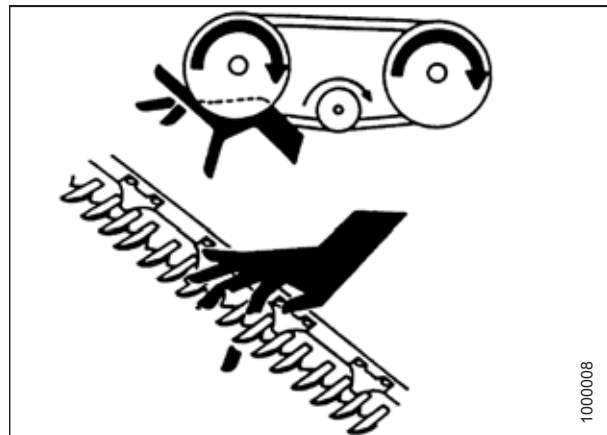


Figure 1.6: Safety around Equipment

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



Figure 1.7: Safety around Equipment

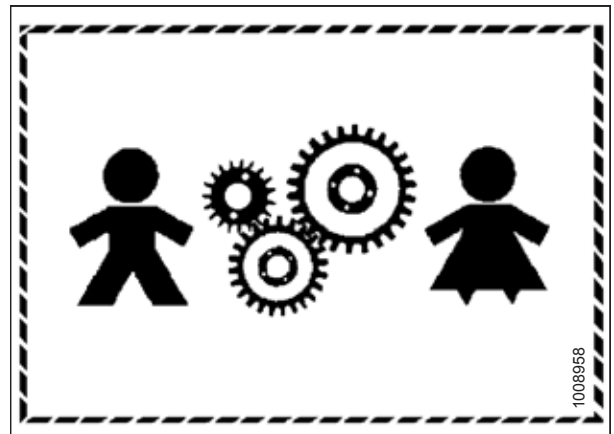
## 1.4 Maintenance Safety

To ensure your safety while maintaining machine:

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



**Figure 1.8: Safety around Equipment**



**Figure 1.9: Equipment NOT Safe for Children**



**Figure 1.10: Safety Equipment**

## 1.5 Hydraulic Safety

- Always place all hydraulic controls in Neutral before dismounting.
  - Make sure that all components in 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 will fail suddenly and create hazardous and unsafe conditions.
- 
- Wear proper hand and eye protection when searching for high-pressure hydraulic leaks. Use a piece of cardboard as a backstop instead of hands to isolate and identify a leak.
  - If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin.
- 
- Make sure all components are tight and steel lines, hoses, and couplings are in good condition before applying pressure to a hydraulic system.

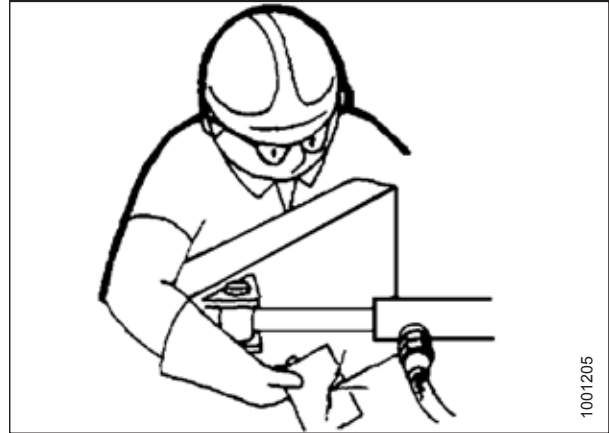


Figure 1.11: Testing for Hydraulic Leaks



Figure 1.12: Hydraulic Pressure Hazard

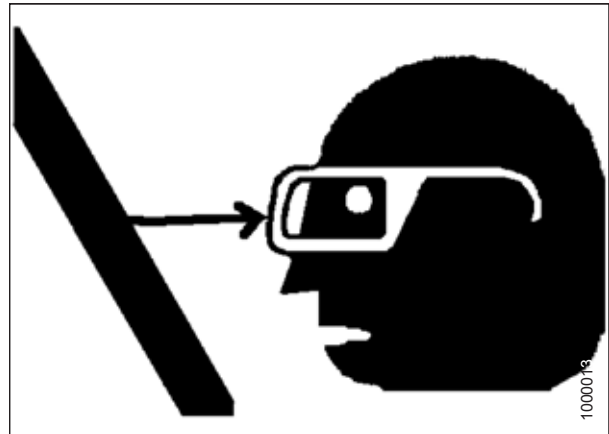


Figure 1.13: Safety around Equipment

## 1.6 Tire Safety

### WARNING

- Service tires safely.
- 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.

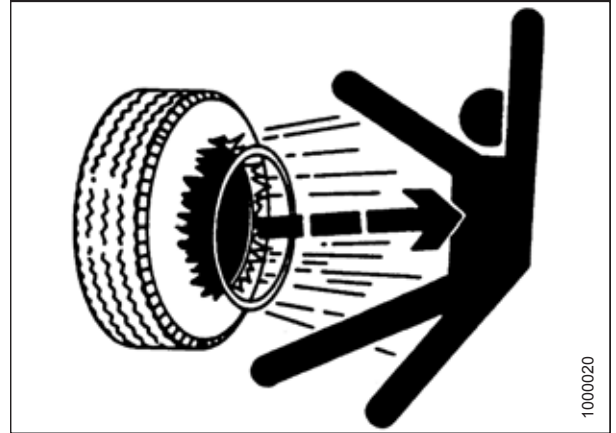


Figure 1.14: Overinflated Tire

### WARNING

- Do NOT stand over tire. Use a clip-on chuck and extension hose.
- Do NOT exceed maximum inflation pressure indicated on tire label.
- Replace tires that have defects.
- Replace wheel rims that are cracked, worn, or severely rusted.
- Never weld a wheel rim.
- Never use force on an inflated or partially inflated tire.
- Make sure tire is correctly seated before inflating to operating pressure.
- If tire is not correctly positioned on rim or is overinflated, 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 tire in any direction endangering anyone in area.
- Make sure all air is removed from tire before removing tire from rim.
- Do NOT remove, install, or repair a tire on a rim unless you have proper equipment and experience to perform job.
- Take tire and rim to a qualified tire repair shop.



Figure 1.15: Safely Inflating Tire

### 1.7 Safety Signs

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

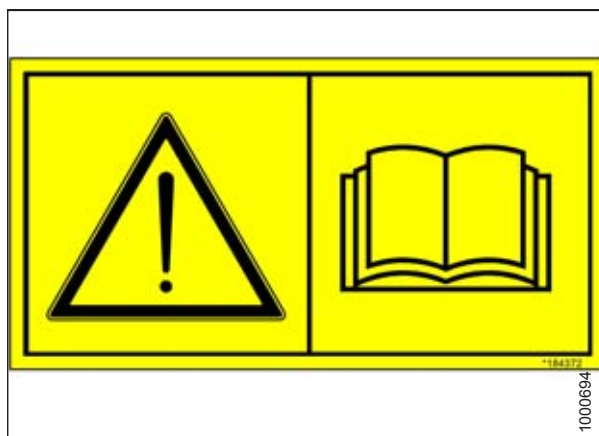


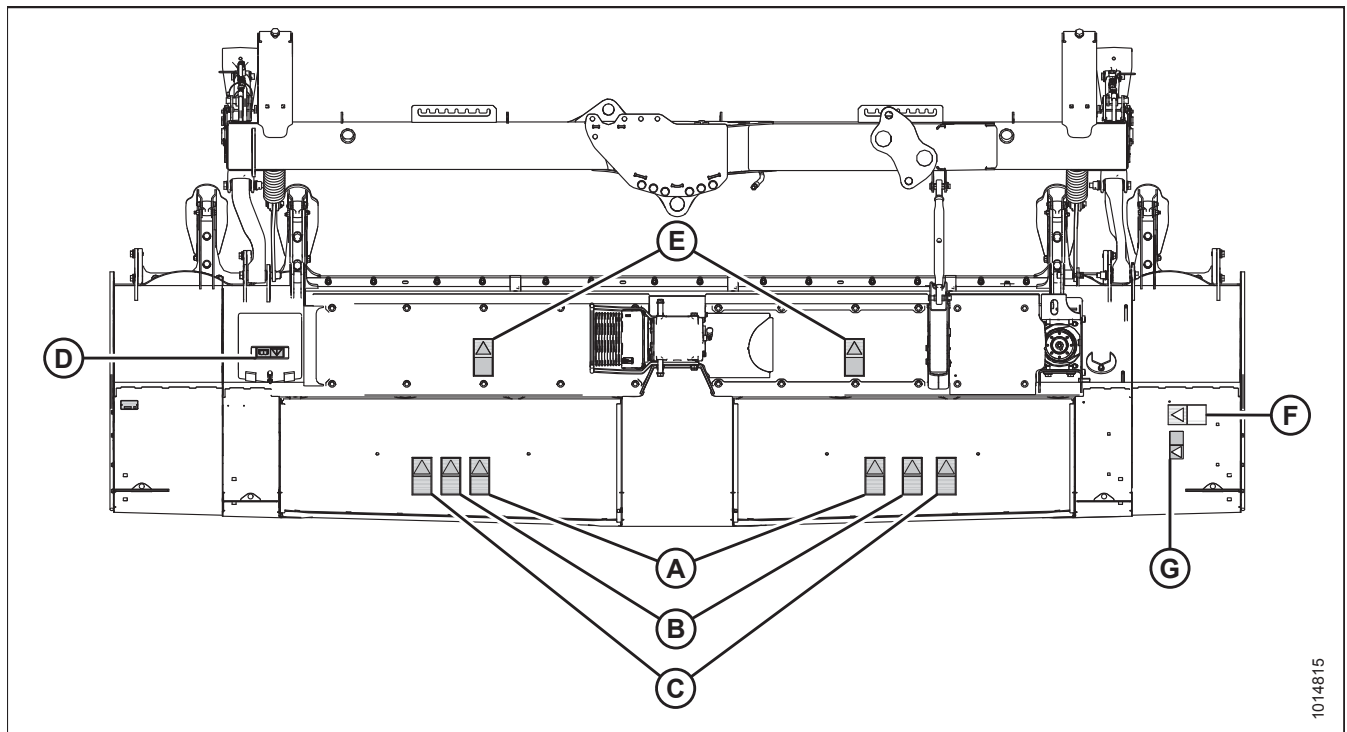
Figure 1.16: Operator's Manual Decal

#### 1.7.1 Installing Safety Decals

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

## 1.8 Locating Safety Sign Decals

Figure 1.17: Safety Sign Decal Locations Top View



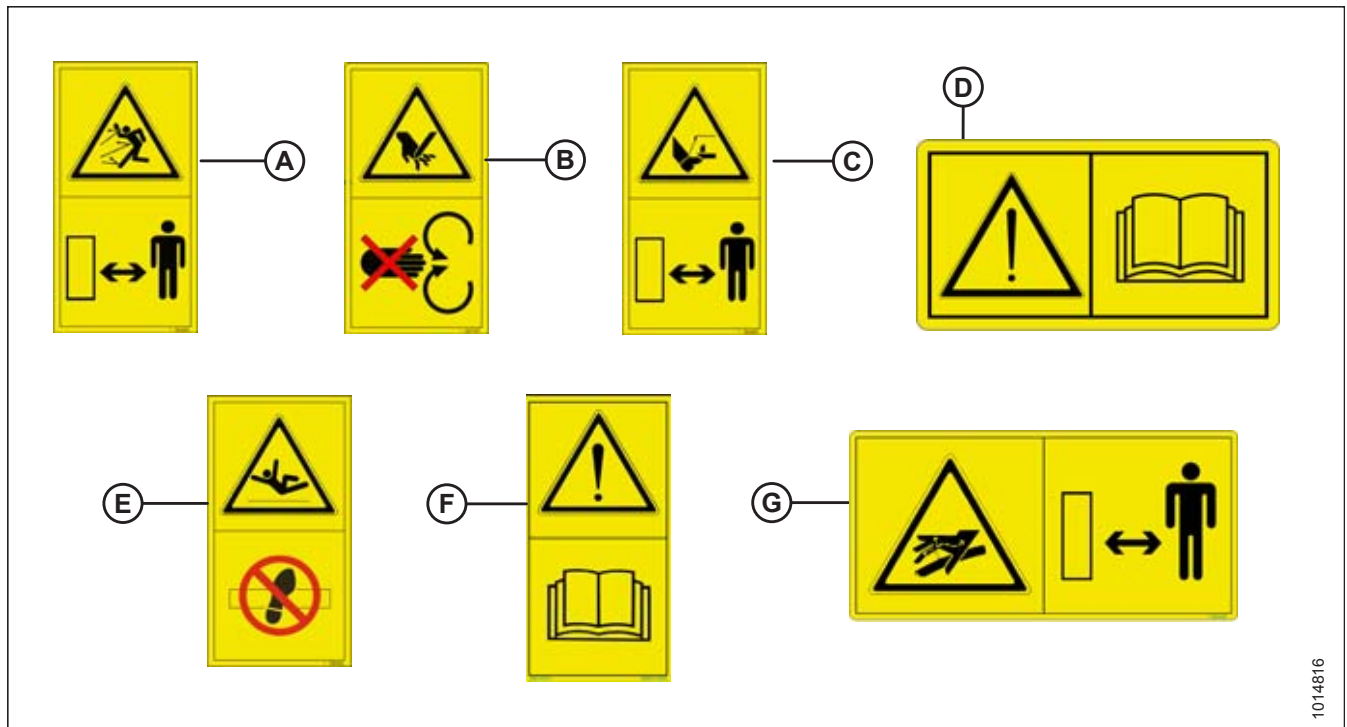
A - MD #194466  
E - MD #190546

B - MD #247167  
F - MD #113482

C - MD #194465  
G - MD #166466

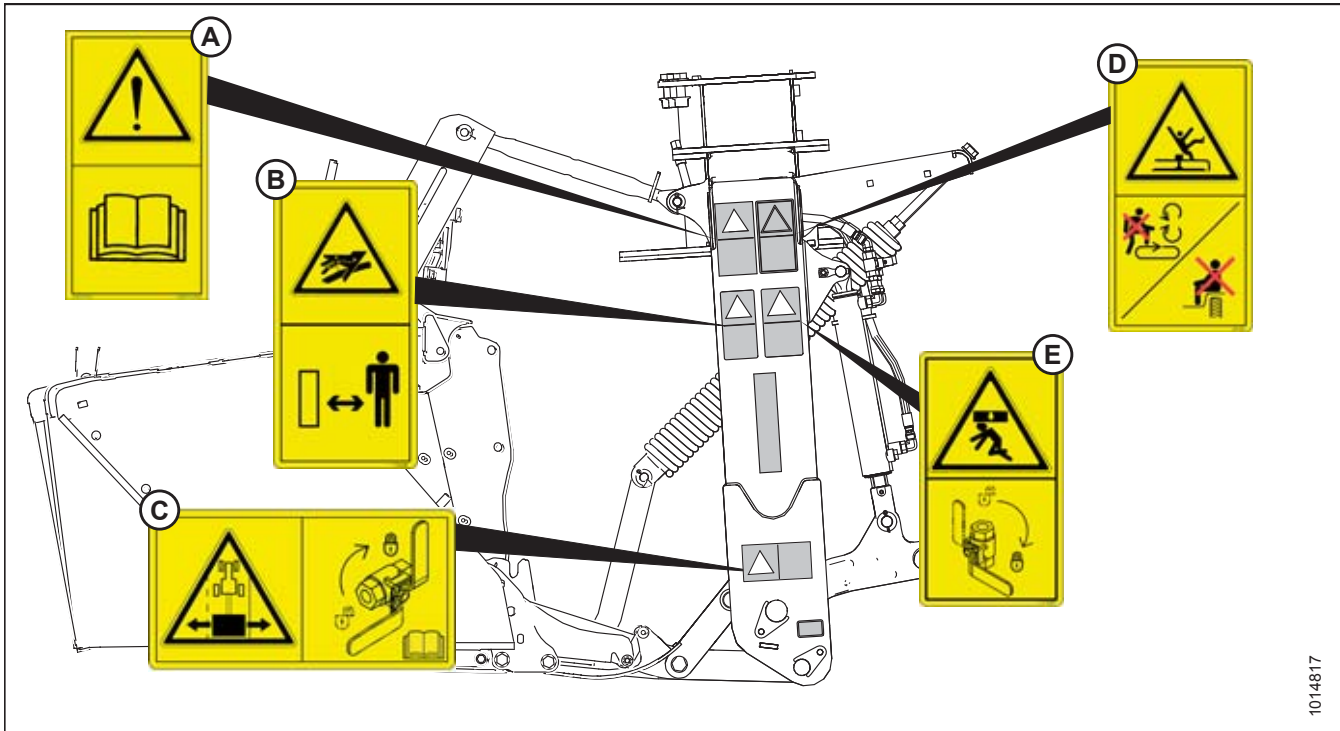
D - MD #184372

Figure 1.18: Safety Sign Decals



## SAFETY

Figure 1.19: Safety Sign Decal Locations Left Side

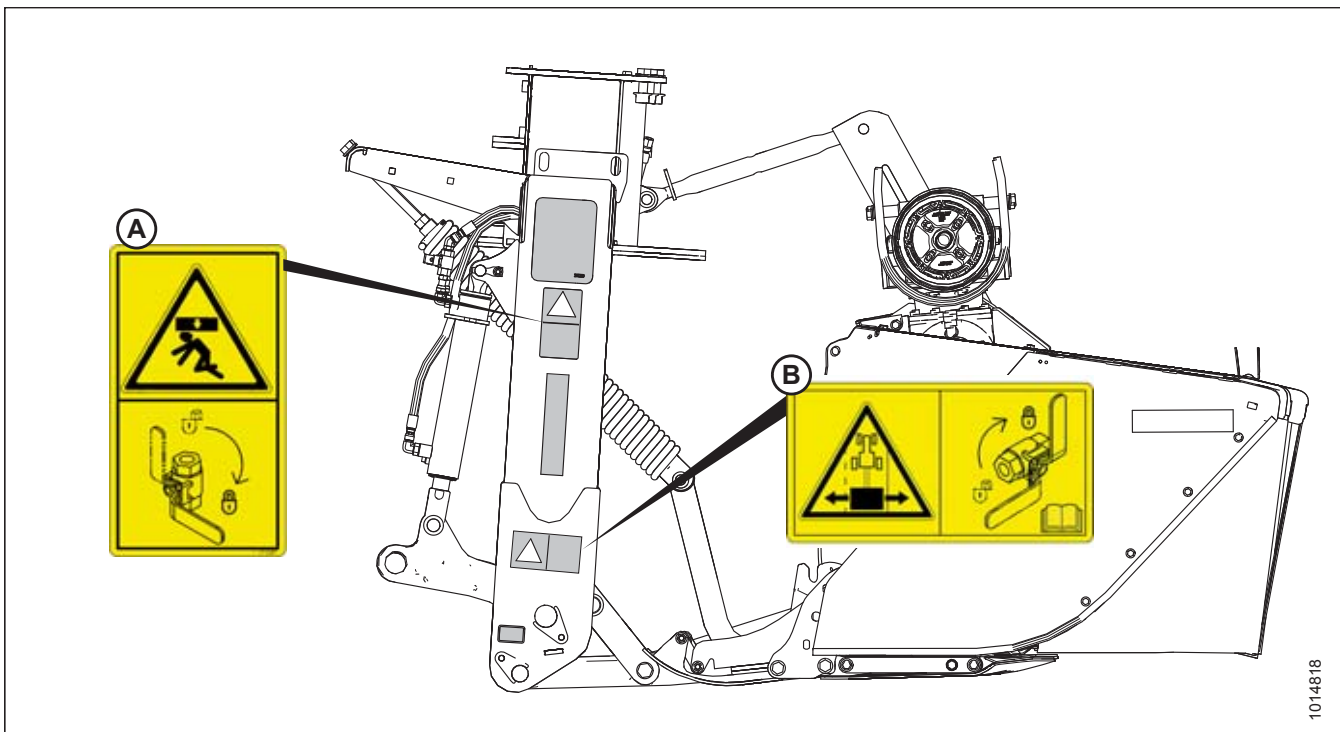


A - MD #113482  
D - MD #247166

B - MD #174436  
E - MD #171287

C - MD #259058

Figure 1.20: Safety Sign Decal Locations Right Side

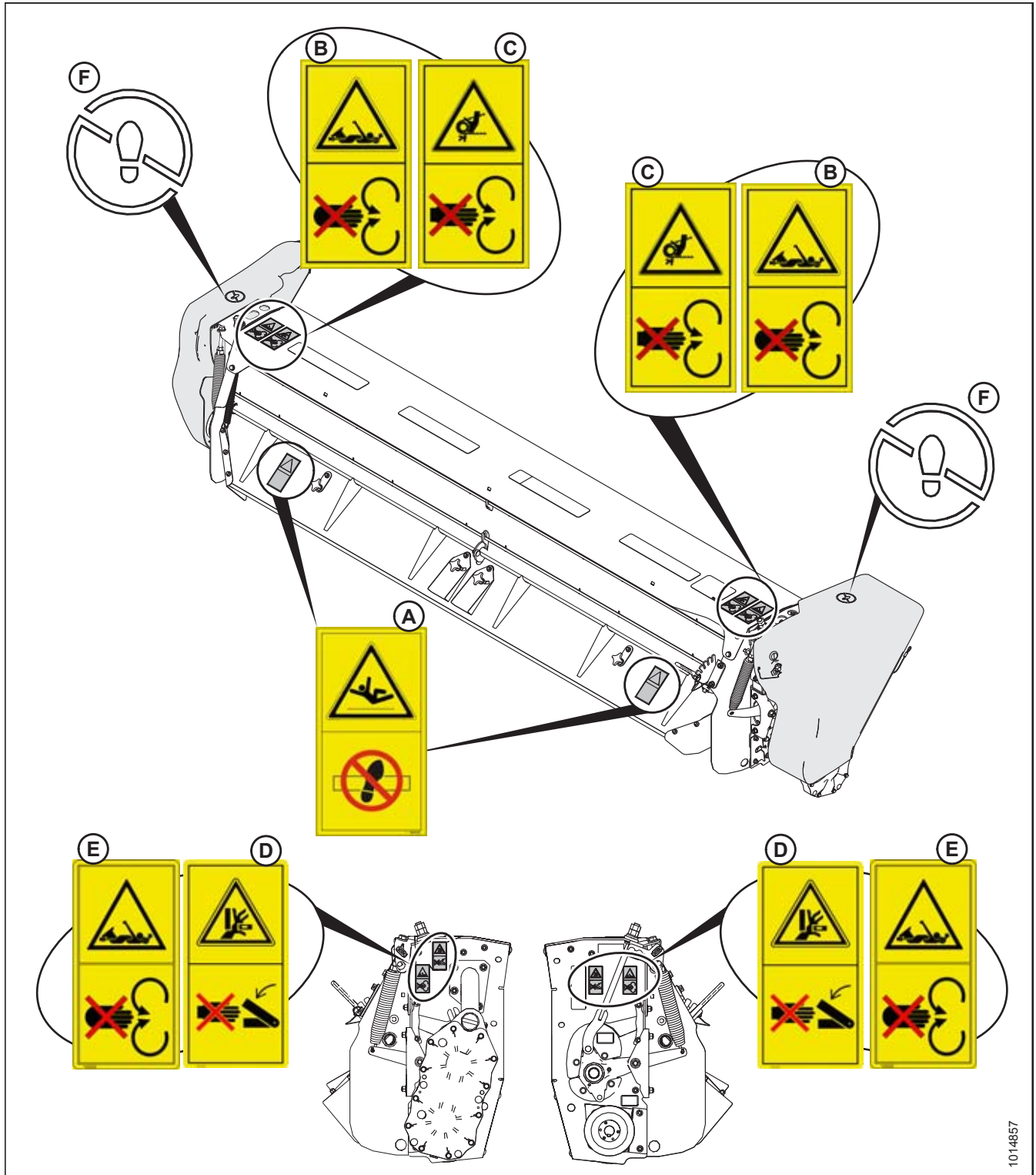


A - MD #171287

B - MD #259058

## SAFETY

**Figure 1.21: Safety Sign Decal Locations Roll Conditioner**



A - MD #190546  
D - MD #246959

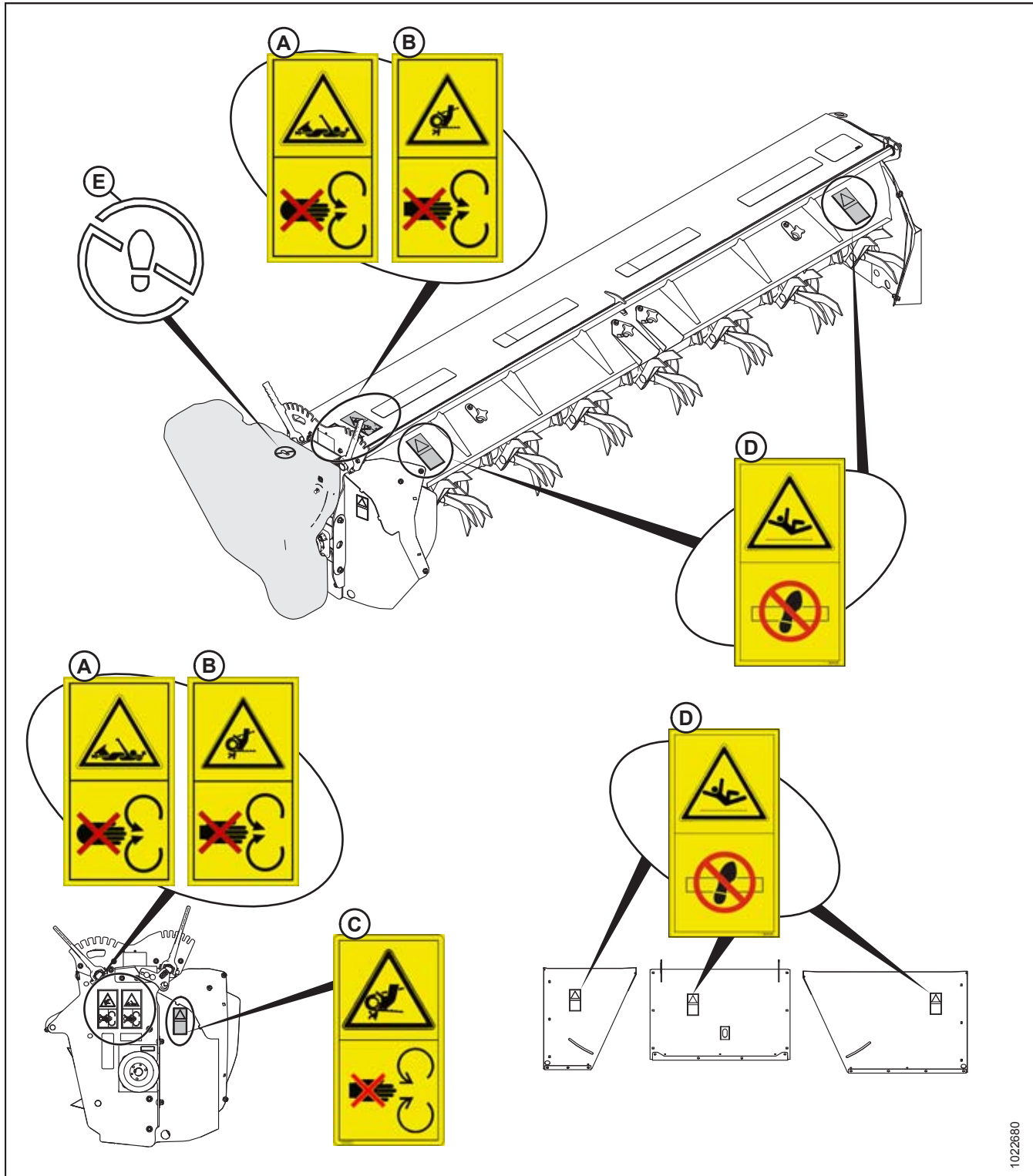
B - MD #184385  
E - MD #246956

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

1014857

## SAFETY

**Figure 1.22: Safety Sign Decal Locations Finger Conditioner**



A - MD #184385  
D - MD #190546

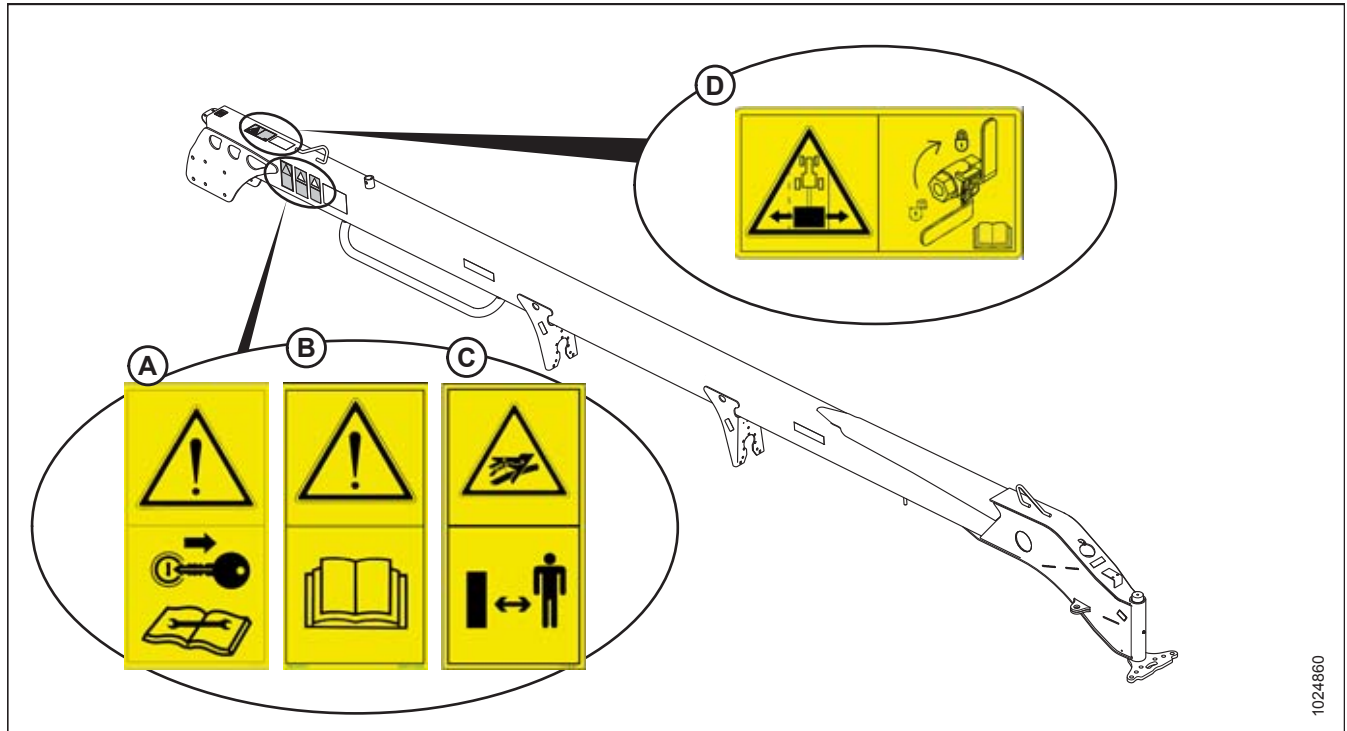
B - MD #184371  
E - NO STEP Symbol (Imprinted on Shield)

C - MD #184422

1022680

## SAFETY

**Figure 1.23: Safety Sign Decal Locations Hitch (R116 Shown, R113 Similar)**

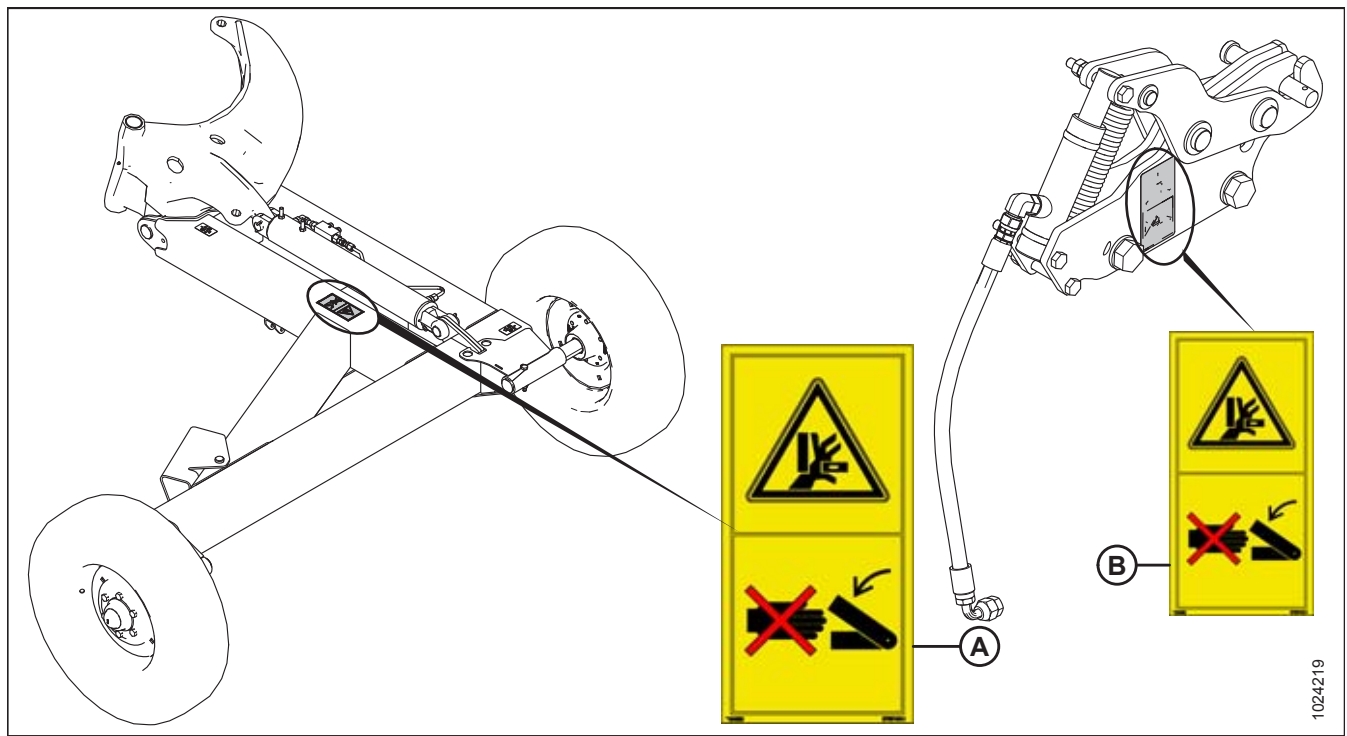


A - MD #194464  
D - MD #259058

B - MD #113482

C - MD #174436

**Figure 1.24: Safety Sign Decal Locations Transport**



A - MD #184386

B - MD #246959

## 1.9 Understanding Safety Signs

### NOTE:

This is a general list of safety sign definitions and the decals listed may not necessarily be applied to your machine.

#### MD #113482

General hazard pertaining to machine operation and servicing.

### CAUTION

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



Figure 1.25: MD #113482

#### MD #166466

Hydraulic pressure oil hazard

### WARNING

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



Figure 1.26: MD #166466

## SAFETY

### MD #171287

Crushing hazard

#### WARNING

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



Figure 1.27: MD #171287

### MD #174436

High pressure oil hazard

#### WARNING

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



Figure 1.28: MD #174436

### MD #184371

Open drive hazard

#### WARNING

- Guard missing. Do **NOT** operate.
- Keep all shields in place.



Figure 1.29: MD #184371

## SAFETY

### MD #184372

General hazard pertaining to machine operation and servicing.

#### CAUTION

- Read the operator's manual, and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
- Do **NOT** allow untrained persons to operate the machine.
- Review safety instructions with all Operators annually.



Figure 1.30: MD #184372

### MD #184385

Entanglement hazard

#### CAUTION

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



Figure 1.31: MD #184385

### MD #184386

Pinch hazard

#### WARNING—KEEP AWAY

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



Figure 1.32: MD #184386

## SAFETY

### MD #184422

Open drive hazard

#### WARNING

- Guard missing. Do **NOT** operate.
- Keep all shields in place.



Figure 1.33: MD #184422

### MD #190546

Slippery surface

#### WARNING—DON'T PLACE FOOT

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



Figure 1.34: MD #190546

### MD #194464

Shut down for service

#### WARNING

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



Figure 1.35: MD #194464

## SAFETY

### MD #194465

Rotating cutters

#### WARNING—STAND CLEAR

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



Figure 1.36: MD #194465

### MD #194466

Rotating fingers under hood

#### WARNING—STAND CLEAR

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



Figure 1.37: MD #194466

### MD #246956

Keep shields in place

#### WARNING

- Do **NOT** operate without shields/guards in place.
- Failure to comply will result in death or serious injury.



Figure 1.38: MD #246956

## SAFETY

### MD #246959

Pinch hazard

#### WARNING—KEEP AWAY

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



Figure 1.39: MD #246959

### MD #247165

Moving into working/transport position hazard

#### WARNING

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

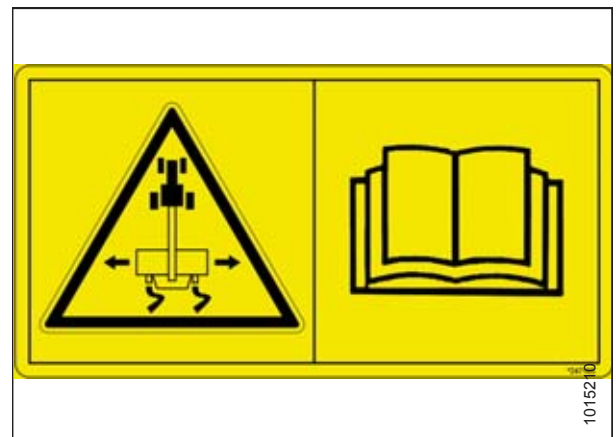


Figure 1.40: MD #247165

### MD #247166

Moving implement hazard

#### WARNING

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



Figure 1.41: MD #247166

## SAFETY

### MD #247167

Rotating blades

#### WARNING

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



Figure 1.42: MD #247167

### MD #259058

Off-center tracking hazard

#### WARNING

- Rotate valve handle to lock when in transport position.
- Failure to comply could result in death or serious injury.
- To avoid hazard, review the disc mower operator's manual before moving into transport or working position.

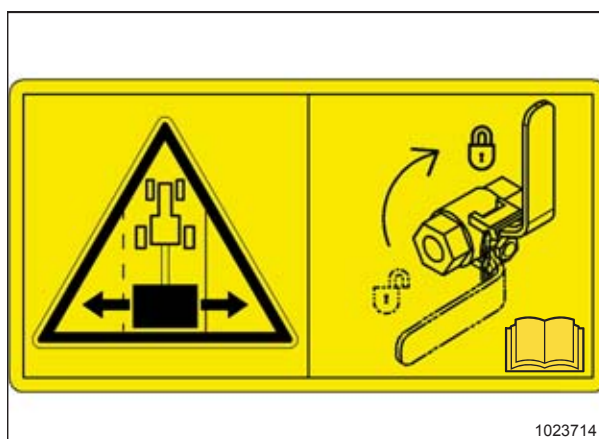


Figure 1.43: MD #259058

## 1.10 Operational Safety

### CAUTION

Follow these safety precautions:

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

### CAUTION

- Never start or move the machine until you are sure all bystanders have cleared the area.
- Avoid travelling over loose fill, rocks, ditches, or holes.
- Drive slowly through gates and doorways.
- If possible, travel uphill or downhill when working on inclines. Be sure to keep transmission in gear while travelling downhill.
- Never attempt to get on or off a moving machine.
- Do NOT get off the tractor while the disc mower 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 65](#).
- 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

### CAUTION

- It is your responsibility to read and understand this manual completely before operating the disc mower. 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 disc mower, 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 disc mower. This may include adding ballast according to tractor operator's manual requirements for attachments of this size and mass.

## 2 Product Overview

### 2.1 Definitions

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

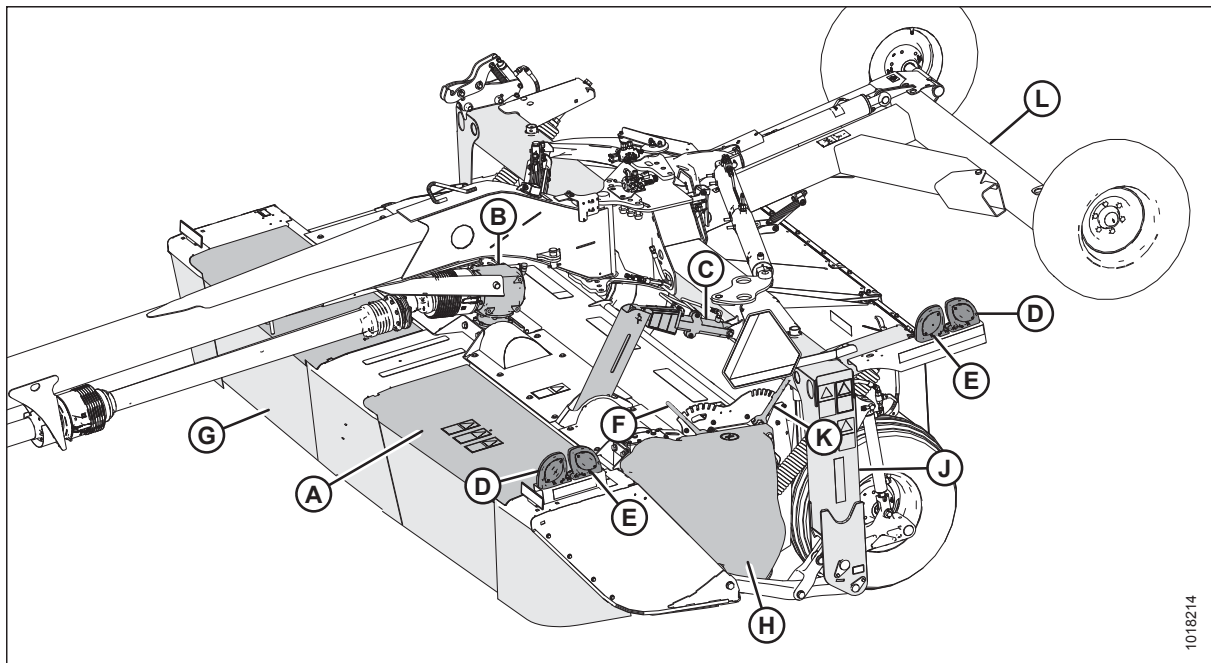
Term	Definition
API	American Petroleum Institute
APT	Articulated Power Turn
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut
Center-link	A hydraulic cylinder link between header and machine used to change header angle
CGVW	Combined gross vehicle weight
Disc mower	A machine that cuts and conditions hay and is pulled by an agricultural tractor
Export disc mower	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 disc mower 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 disc mower	Machine 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 opening on manifolds, pumps, and motors
ORFS	O-ring face seal: A style of fitting commonly used for connecting hoses and tubes. This style of fitting is also commonly called ORS, which stands for O-ring seal
PTO	Power take-off

## PRODUCT OVERVIEW

Term	Definition
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)
rpm	Revolutions per minute
R1 Series header	MacDon R113 SP disc headers for windrowers
SAE	Society of Automotive Engineers
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 a locking mechanism

## 2.2 Component Identification

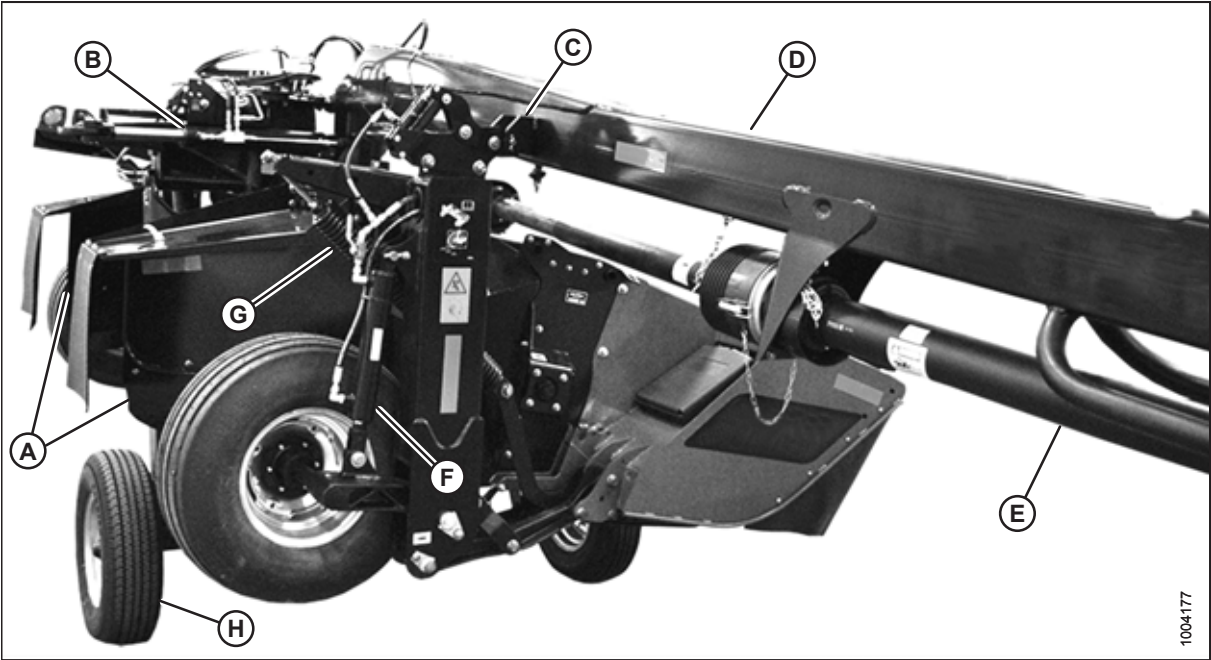
Figure 2.1: Disc Mower with Finger Conditioner



- |   |  |                            |
|---|--|----------------------------|
| A - Cutterbar Door                      | B - Header Swivel Gearbox                    | C - Center-Link            |
| D - Amber Hazard/Turn Signal Light (x2) | E - Red Tail/Brake Light (x2)                | F - Forward Baffle Control |
| G - Front Curtains                      | H - Driveshield                              | J - Carrier Frame          |
| K - Rear Deflector Control              | L - Optional Road Friendly Transport™ System |                            |

PRODUCT OVERVIEW

Figure 2.2: Disc Mower with Finger Conditioner



- A - Side Deflector

D - Articulated Power Turn (APT) Hitch

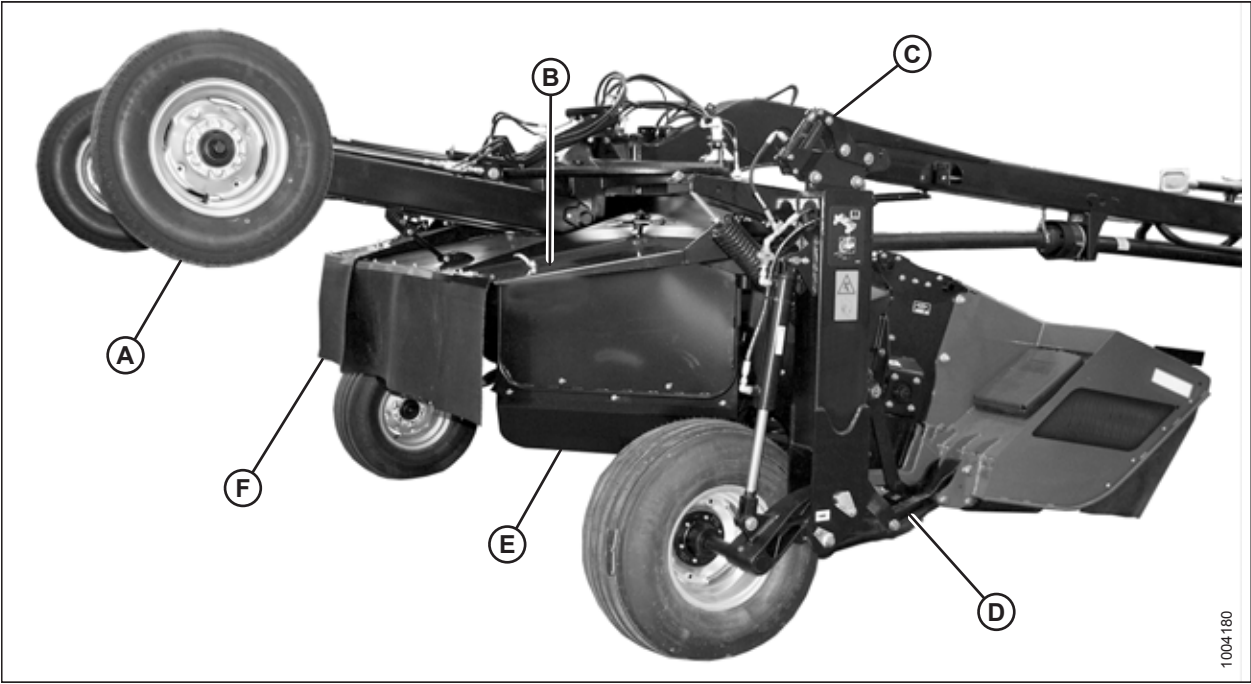
G - Float Spring
- B - Hitch Swing Cylinder

E - Driveline

H - Optional Road Friendly Transport™
- C - Transport Latch

F - Lift Cylinder

Figure 2.3: Disc Mower with Finger Conditioner



- A - Optional Road Friendly Transport™

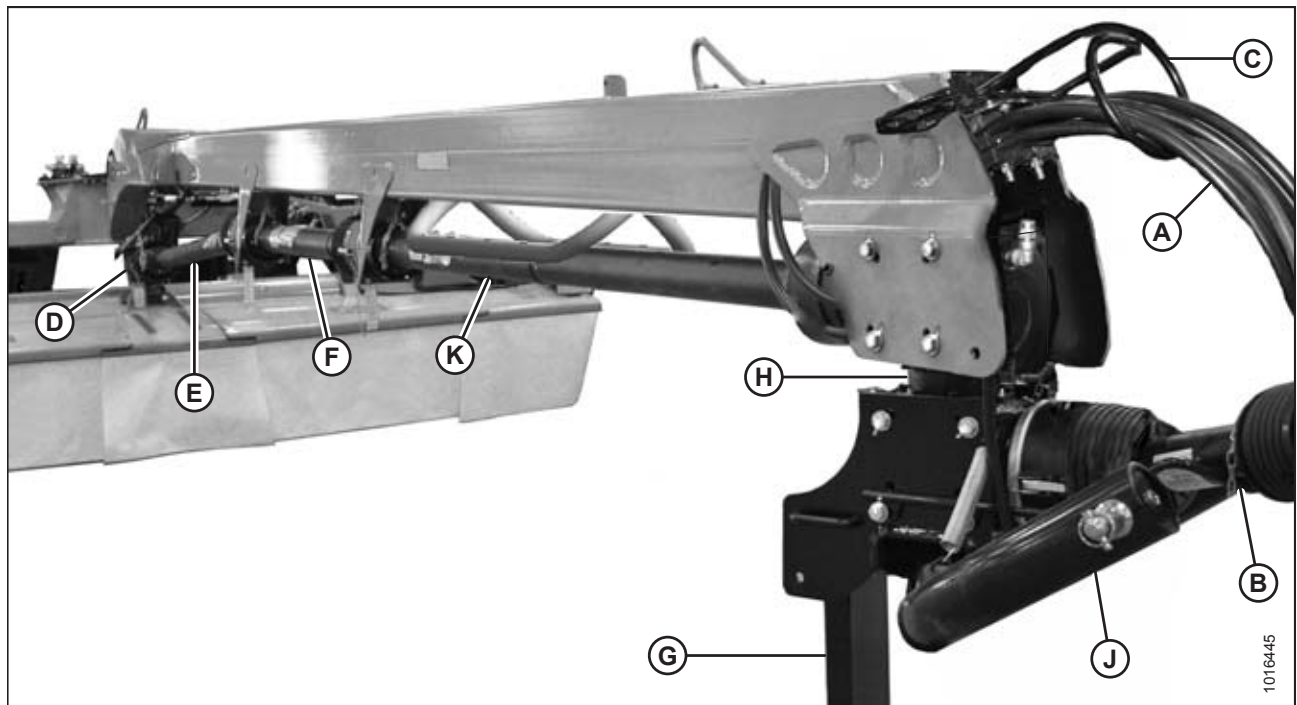
D - Skid Shoe
- B - Forming Shield Cover

E - Side Deflector
- C - Road Friendly Transport™ Locking Cylinder

F - Rear Curtain

## PRODUCT OVERVIEW

Figure 2.4: Hitch and Driveline (R116 Shown, R113 Similar)



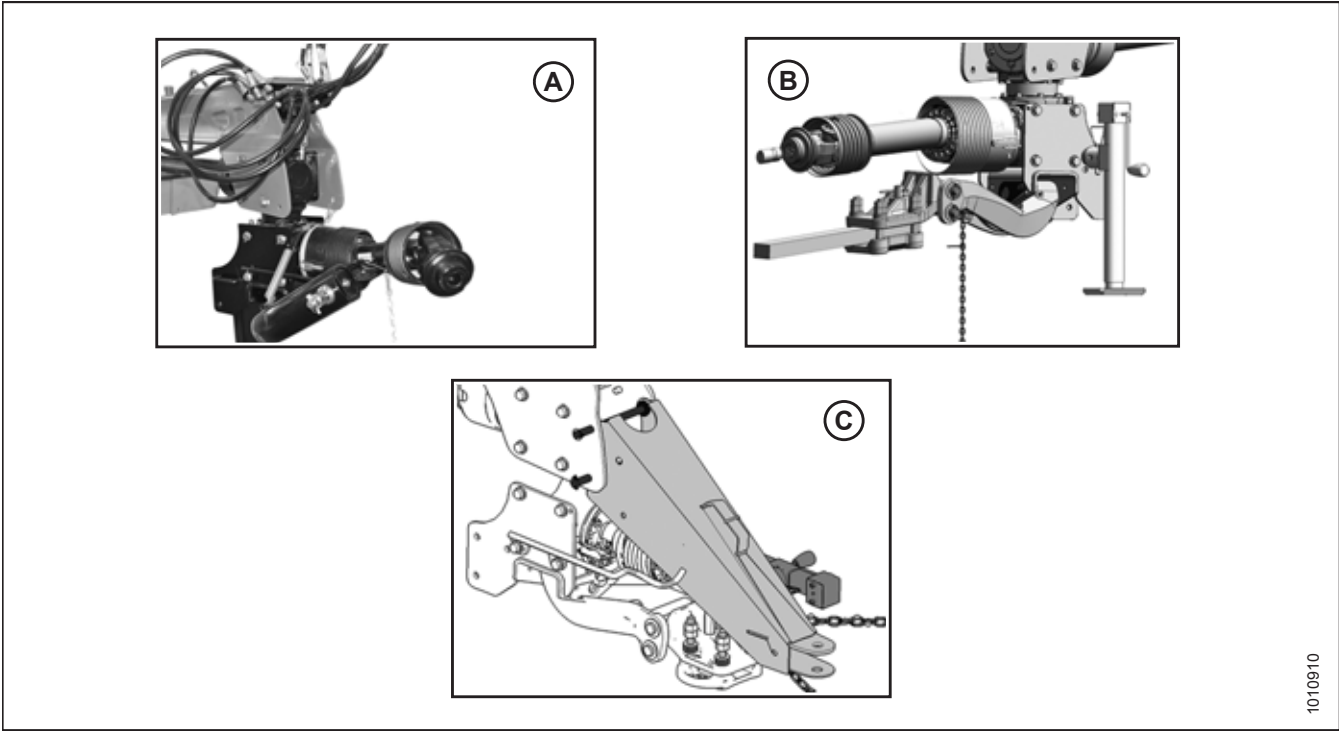
A - Control Hoses  
D - Header Swivel Gearbox  
G - Hitch Stand  
K - Hitch Driveline

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

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

PRODUCT OVERVIEW

Figure 2.5: Hitch Options



A - Tractor Two-Point Hitch Adapter

B - Tractor Drawbar Hitch Adapter

C - Tractor Utility Hitch Adapter

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## 2.3 Product Specifications

**NOTE:**

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

**Table 2.1 Disc Mower Specifications**

Components		R113	R116
<b>Frame and Structure</b>			
Transport width without RFT <sup>1</sup>		4063 mm (13 ft.-4 in.)	5027 mm (16 ft.-6 in.)
Transport width with RFT <sup>2</sup>		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 tail-lights 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 disc mower right end backsheet	

1. Road Friendly Transport™ Option.

2. Without crop dividers.

## PRODUCT OVERVIEW

**Table 2.1 Disc Mower Specifications (continued)**

Components		R113	R116
<b>Cutterbar</b>			
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

## PRODUCT OVERVIEW

**Table 2.1 Disc Mower Specifications (continued)**

Components		R113	R116
Drives			
Tractor 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	
Conditioner: Finger Type			
Drive		4HB belt driven	
Conditioner system		V-shaped tines on rotating drum	
Conditioner speed		896 <sup>3</sup> 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 <sup>4</sup>		30 km/h (20 mph)	

3. Can be set to 600 rpm by interchanging the pulleys.

4. Do **NOT** exceed maximum transport speed of 32 km/h (20 mph).

## PRODUCT OVERVIEW

**Table 2.1 Disc Mower Specifications (continued)**

Components		R113	R116
<b>Tractor Requirements</b>			
PTO power - minimum		74 kW (100 hp)	93 kW (125 hp)
Hydraulics <sup>5</sup>	Pressure	13.71 MPa (2000 psi)	
Hydraulics <sup>5</sup>	Controls	Two double-acting / one single-acting <sup>6</sup>	
Hitch		Drawbar, two-point, or quick attach	

**NOTE:**

Tractor must be equipped with a cab.

---

5. Road Friendly Transport™ system option uses same hydraulic circuit as hitch swing.

6. Single-acting header lift circuit is converted to double-acting when Road Friendly Transport™ system option is installed.

## 3 Operation

### 3.1 Lift Cylinder Lock-Out Valves

To prevent unintentional raising or lowering of the disc mower, 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 disc mower.

#### 3.1.1 Engaging Locks

##### **WARNING**

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

##### **IMPORTANT:**

Connect hoses so that moving the cylinder control lever backward raises the disc mower, and moving the cylinder control lever forward lowers the disc mower. Refer to [3.7.3 Connecting Hydraulics, page 52](#) for more information.

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

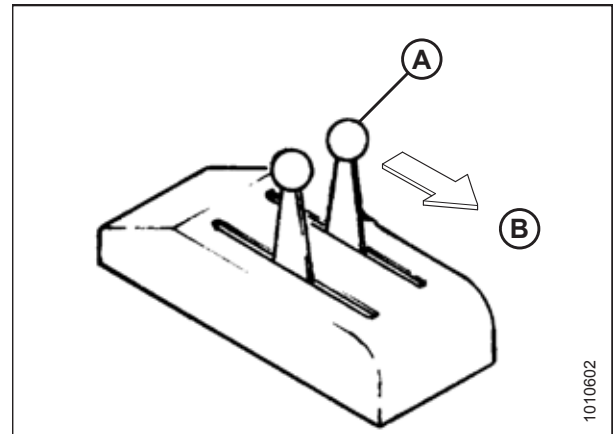


Figure 3.1: Tractor Cylinder Control Lever

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

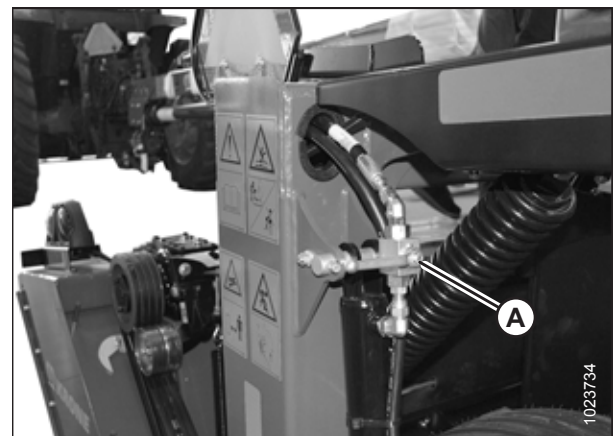


Figure 3.2: Lift Cylinder Lock-Out Valve

### 3.1.2 Disengaging Locks

#### DANGER

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

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

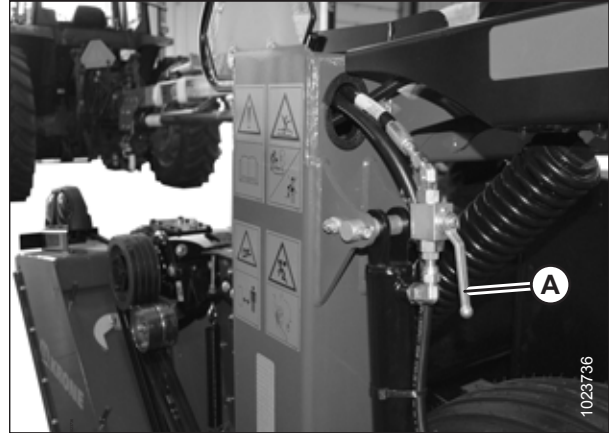


Figure 3.3: Lift Cylinder Lock-Out Valve

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

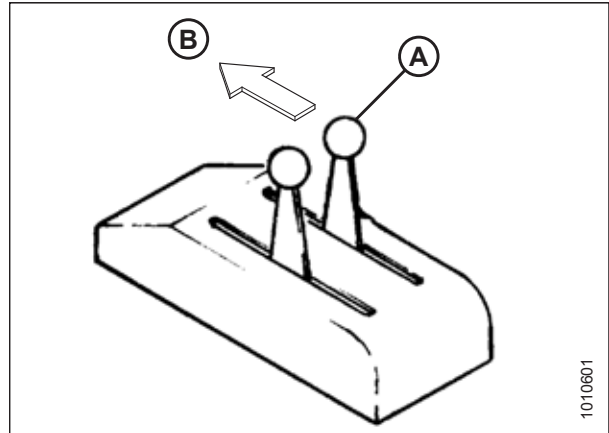


Figure 3.4: Tractor Cylinder Control Lever

## 3.2 Opening/Closing Driveshields

### 3.2.1 Opening Driveshields

#### CAUTION

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

#### NOTE:

Images shown in this procedure are for left driveshield—right driveshield is similar.

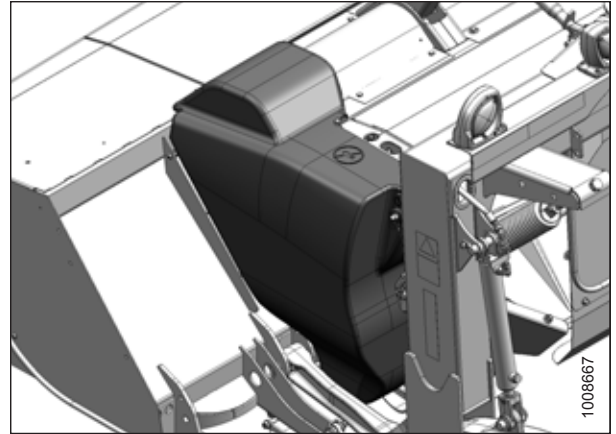


Figure 3.5: Left Driveshield

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

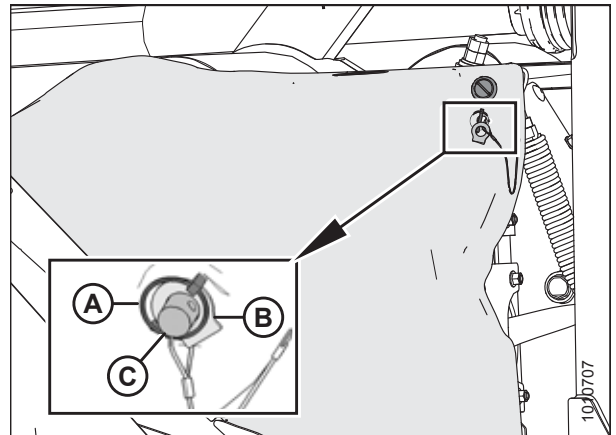


Figure 3.6: Left Driveshield

## OPERATION

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

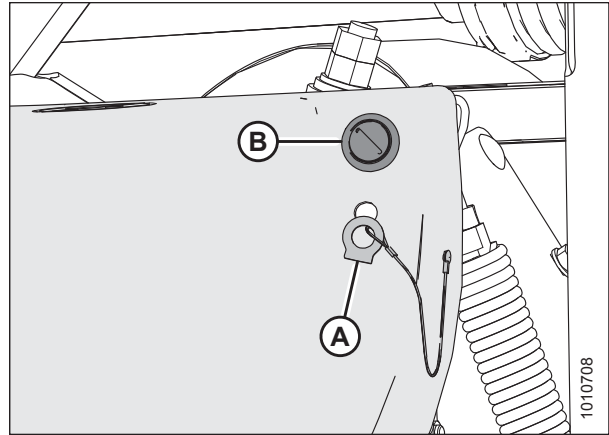


Figure 3.7: Driveshield Latch

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

**NOTE:**

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

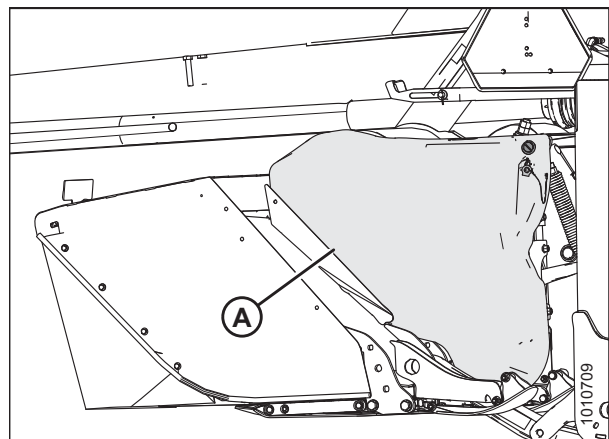


Figure 3.8: Driveshield

### 3.2.2 Closing Driveshields

#### CAUTION

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

#### NOTE:

Images shown in this procedure are for left driveshield—right driveshield is similar.

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

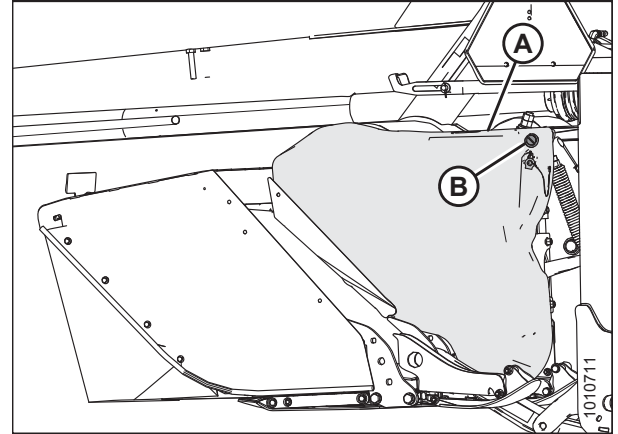


Figure 3.9: Driveshield and Latch

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

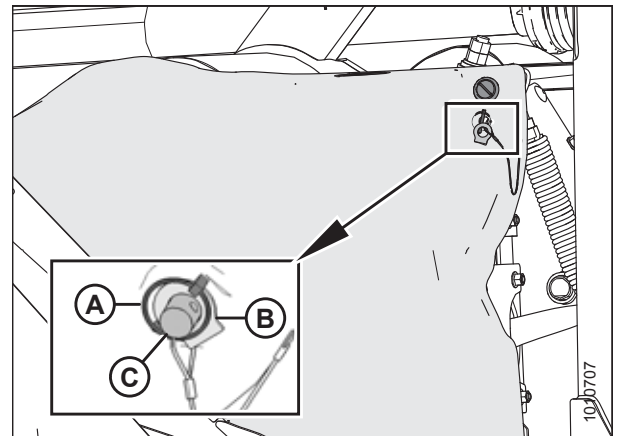


Figure 3.10: Left Driveshield

### 3.3 Cutterbar Doors

#### WARNING

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

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

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

Rotary disc mowers sold outside of North America have latches on the cutterbar door.

#### IMPORTANT:

Replace curtains if they become worn or damaged. Refer to [4.4.2 Replacing Curtains, page 144](#).

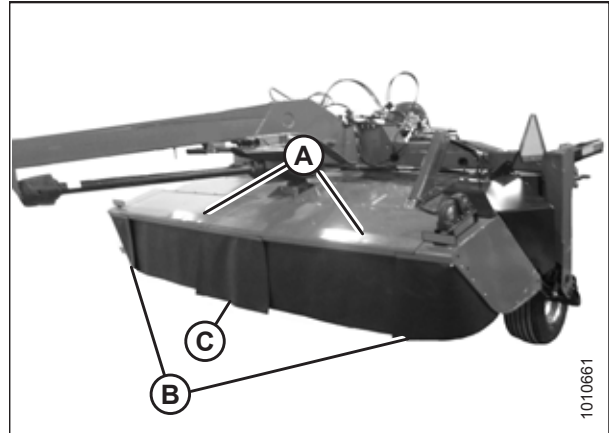


Figure 3.11: R113 Pull-Type Disc Mower

#### 3.3.1 Opening Cutterbar Doors

To open cutterbar doors on a disc mower with export latches, refer to [3.3.2 Opening Cutterbar Doors: Export Latches, page 39](#).

#### 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. Center mower beneath hitch to open both doors.
2. Lift door at front to open.

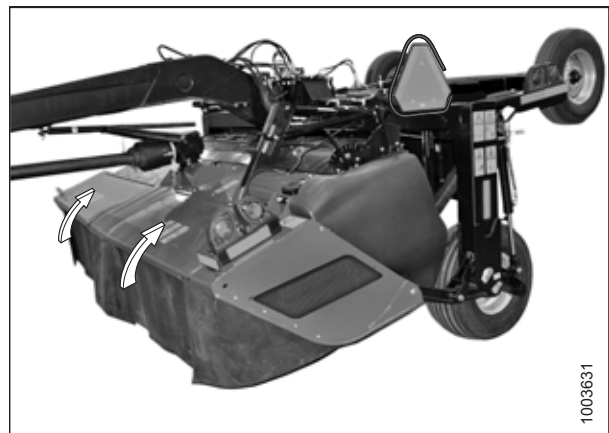


Figure 3.12: R113 Pull-Type Disc Mower

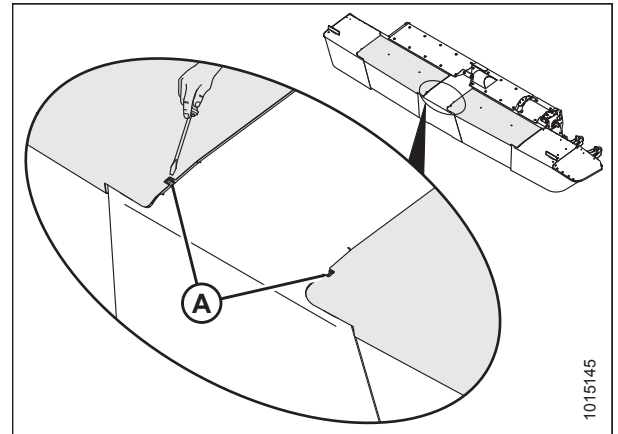
### 3.3.2 Opening Cutterbar Doors: Export Latches

Headers sold outside North America require a tool-operated latch on the cutterbar doors. Follow these steps to open cutterbar doors with export latches:

#### **DANGER**

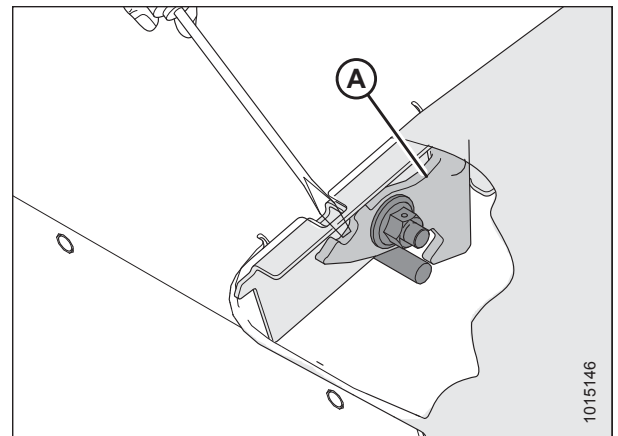
To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.

1. Center mower beneath hitch to open both doors.
2. Locate the latch access holes (A) for each door.



**Figure 3.13: Cutterbar Door Latch Access Hole (Export Only)**

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



**Figure 3.14: Cutterbar Door Latch (Cutaway View)**

## OPERATION

4. Lift up on door (A) while pressing down on latch.

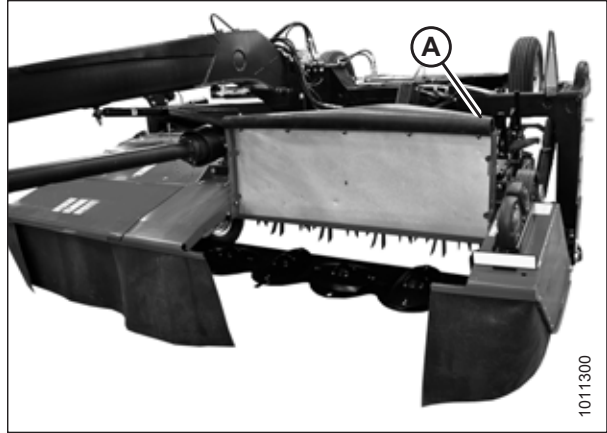


Figure 3.15: Left Side Cutterbar Door Open

### 3.3.3 Closing Cutterbar Doors

#### CAUTION

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

1. Pull door (A) at top to close.

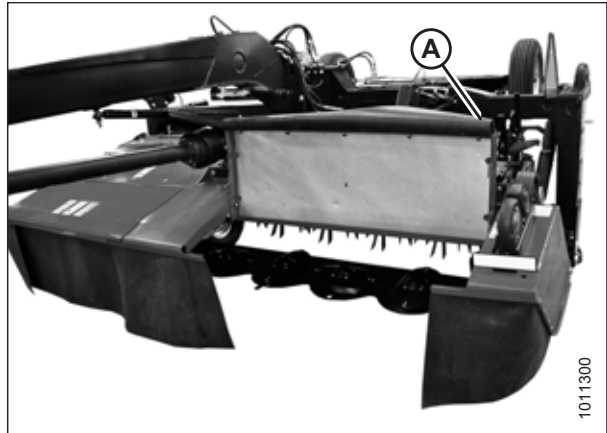


Figure 3.16: Left Side Cutterbar Door in Open Position

## OPERATION

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



**Figure 3.17: R113 Pull-Type Disc Mower**

### 3.4 Daily Start-Up Check

Perform the following checks each day before startup:

#### CAUTION

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

**Protect yourself. You may need the following:**

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



Figure 3.18: Safety Equipment

**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 3.19: Safety Equipment

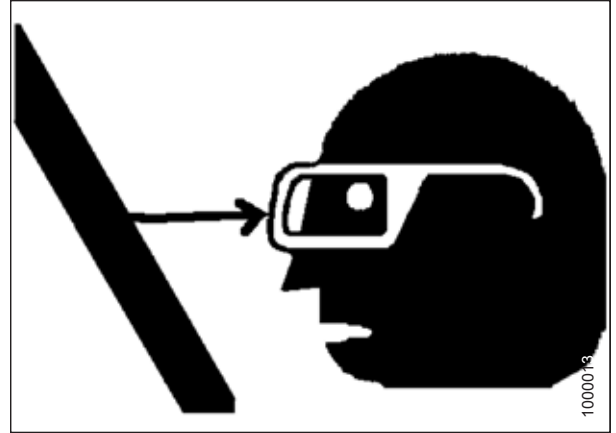
## OPERATION

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

**NOTE:**

Use proper procedure when searching for pressurized fluid leaks. Refer to [4.6.1 Checking Hydraulic Hoses and Lines, page 273](#).

2. Clean all lights and reflective surfaces on the machine, and check lights for proper operation.
3. Perform all daily maintenance. Refer to [4.3.1 Maintenance Schedule/Record, page 126](#).



**Figure 3.20: Safety around Equipment**

## 3.5 Preparing Tractor for Disc Mower

### 3.5.1 Tractor Requirements

The tractor used to pull the disc mower must meet the requirements outlined in the following table:

**Table 3.1 Tractor Requirements**

Mower Width	Minimum Power	Minimum Drawbar Capacity	Minimum Hydraulics
4.0 m (13 ft.)	75 kW (100 hp)	In accordance with ASAE	13.7 MPa (2000 psi)
4.9 m (16 ft.)	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 disc mower's hazard lights.

**NOTE:**

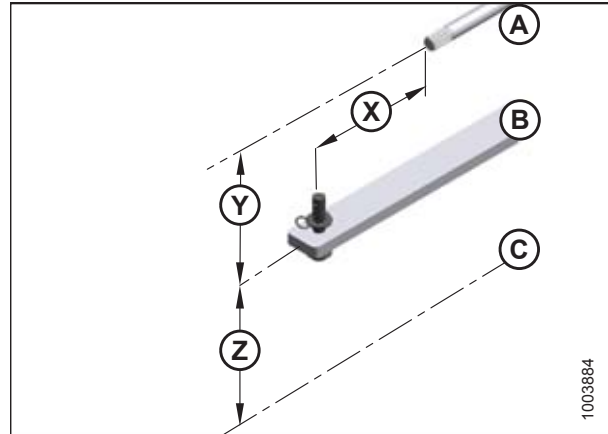
Static vertical load on drawbar is 907 kg (2000 lb.).

### 3.5.2 Adjusting the Drawbar

#### CAUTION

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

1. Adjust tractor drawbar to meet the specifications listed in Table 3.2, page 45.
2. Secure the tractor drawbar so the hitch pinhole is directly below the driveline.



**Figure 3.21: Tractor Drawbar Adjustments**

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

## OPERATION

**Table 3.2 SAE Standard A482 Specifications**

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

## 3.6 Setting up the Disc Mower Hitch

MacDon R113 and R116 Pull-Type Disc Mowers are factory fitted for either a drawbar or two-point hitch. Your Dealer will have installed the proper hitch adapter for your tractor.

### 3.6.1 Installing Drawbar Hitch Adapter

**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.



**CAUTION**

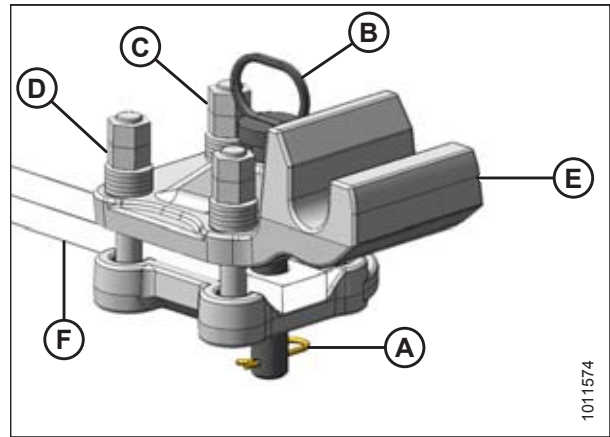
**Shut off tractor, engage parking brake, and remove key before working around hitch.**

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

**NOTE:**

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

5. Tighten four jam nuts (C).



**Figure 3.22: Drawbar Hitch Adapter**

## 3.7 Attaching Disc Mower to the Tractor

Refer to the attachment procedure that applies to your tractor:

- [3.7.1 Attaching with Drawbar Hitch, page 47](#)
- [3.7.2 Attaching with Two-Point Hitch, page 49](#)

### 3.7.1 Attaching with Drawbar Hitch

#### CAUTION

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

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

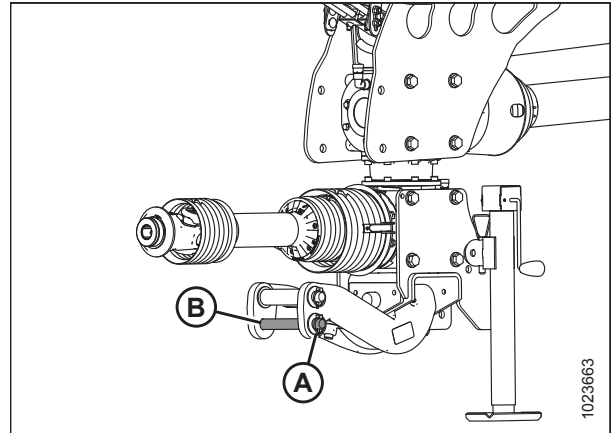


Figure 3.23: Disc Mower Hitch

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

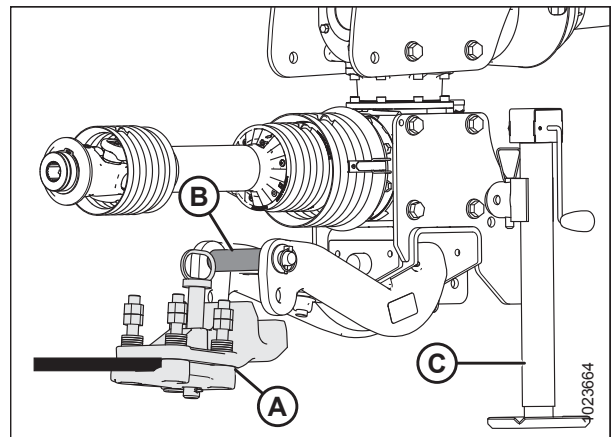


Figure 3.24: Disc Mower Hitch

## OPERATION

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

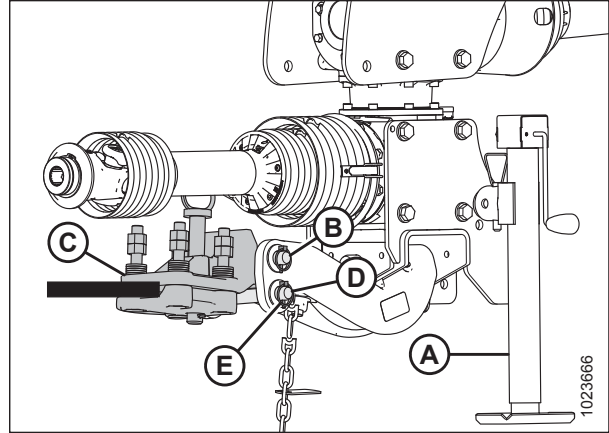


Figure 3.25: Disc Mower Hitch

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

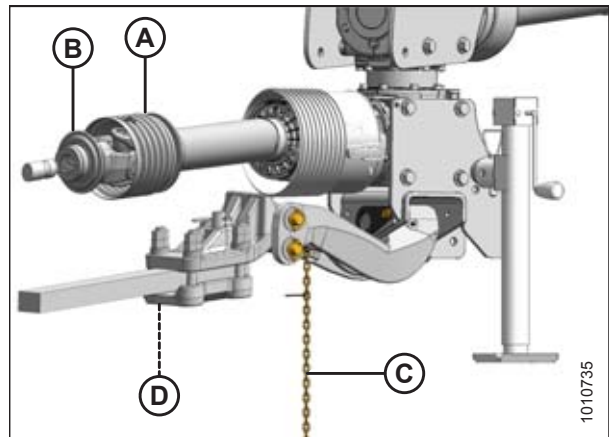


Figure 3.26: Primary Driveline

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

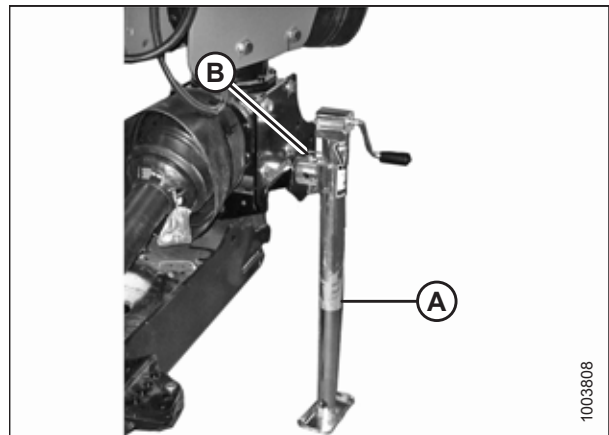


Figure 3.27: Hitch Jack

## 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 52](#).

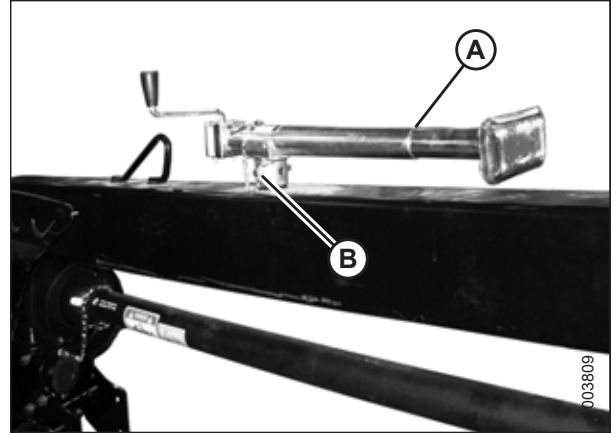


Figure 3.28: Jack Storage

### 3.7.2 Attaching with Two-Point Hitch

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



#### CAUTION

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

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

**NOTE:**

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

**NOTE:**

If using a Category III hitch, a longer driveshaft may be required. Refer to [5.1 Optional Kits, page 297](#) to order.

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

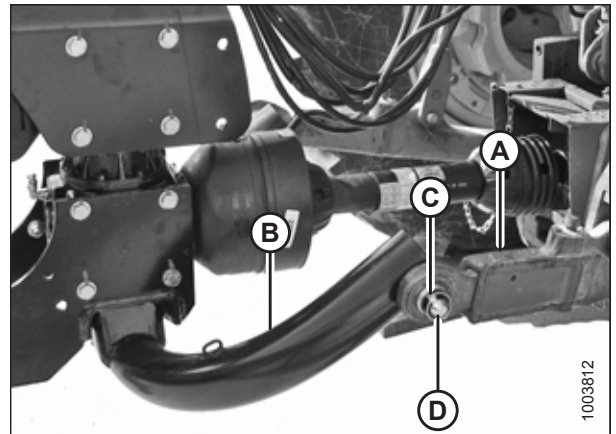


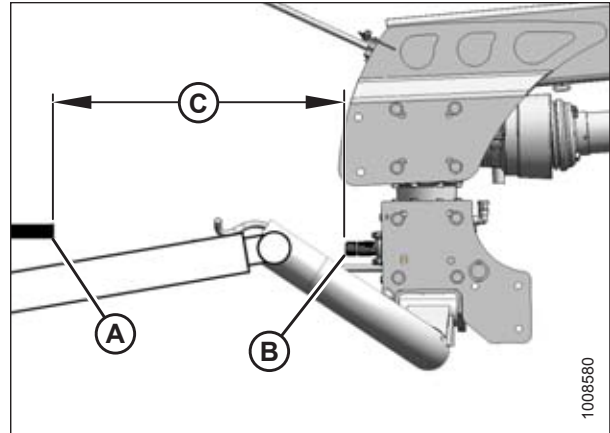
Figure 3.29: Two-Point Hitch Configuration

## OPERATION

6. Check distance (C) between tractor primary power take-off (PTO) shaft (A) and disc mower hitch gearbox shaft (B) (without the front half of the driveline attached).
7. Ensure that distance measurement (C) does **NOT** exceed the dimensions listed in Table 3.3, page 50.

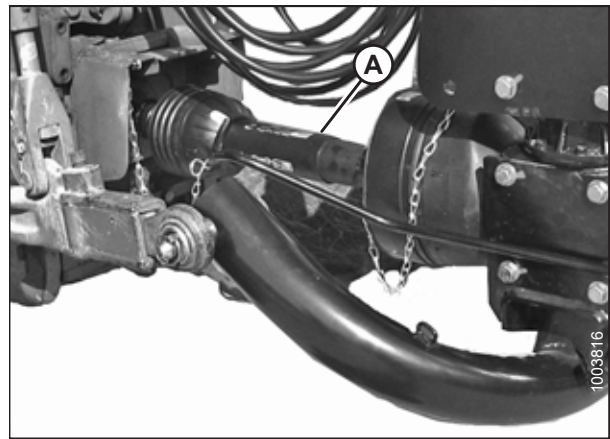
**Table 3.3 Distance between Hitch Gearbox and Tractor PTO**

Driveline Shaft Size	Distance (C) <sup>7</sup>
34 mm (1-3/8 in.)	650 mm (25-9/16 in.)
43 mm (1-3/4 in.)	750 mm (29-1/2 in.)



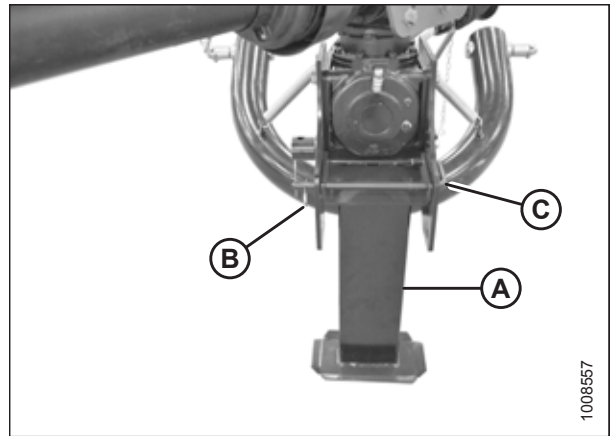
**Figure 3.30: Allowable Driveline Length**

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



**Figure 3.31: Disc Mower Driveline Attached to Tractor PTO**

10. Clear bystanders from the area and start tractor. Do **NOT** operate the disc mower.
11. Start tractor and raise hitch so that stand (A) is off the ground. Shut down tractor and remove key from ignition.
12. Remove inner hairpin (B) and pull lock (C) to release stand.

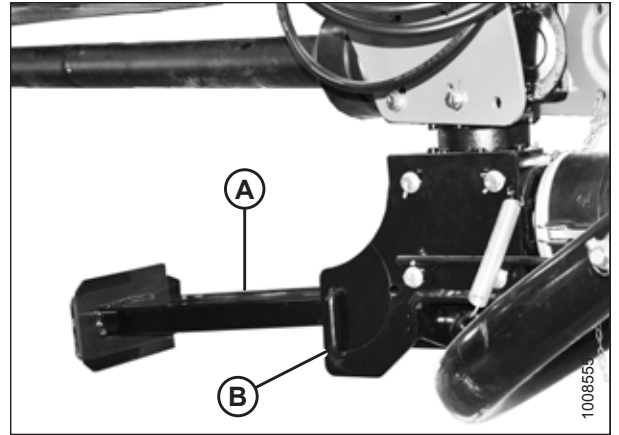


**Figure 3.32: Hitch Stand**

7. If distance (C) is greater than the values shown, a longer driveline is required. Refer to for ordering information.

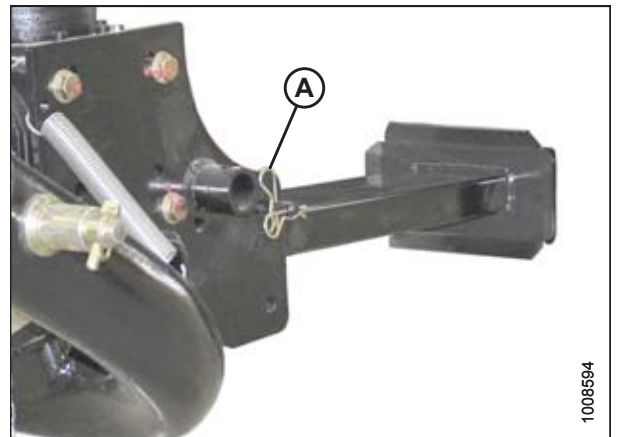
## OPERATION

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



**Figure 3.33: Hitch Stand**

14. Secure lock with lynch pin (A).



**Figure 3.34: Hitch Stand**

### 3.7.3 Connecting Hydraulics

#### **⚠ WARNING**

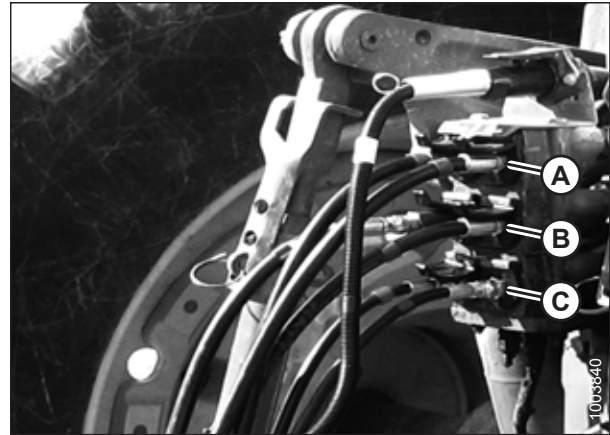
Do NOT use remote hydraulic system pressures over 20,684 kPa (3000 psi). Check your tractor operator's manual for remote system pressure.

#### **NOTE:**

Refer to numbered/colored bands on 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 Road Friendly Transport™ installed)	Control 1
Swing/Transport (B)	Red #2 - pressure Blue #2 - return	Control 2
Tilt (C) <sup>8</sup>	Red #3 - pressure Blue #3 - return	Control 3



**Figure 3.35: Hydraulic Connections**

1. Connect the lift cylinder hose (red collar with #1) to the tractor's hydraulic receptacle. The second hose (blue collar with #1) is required only when the Road Friendly Transport™ is installed. Refer to Table 3.5, [page 52](#) to confirm 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 52](#) to confirm system is functioning correctly.
3. For machines with hydraulic center-link only, connect the two disc mower tilt cylinder hoses (collars with #3) to the tractor hydraulic receptacles. Refer to Table 3.7, [page 52](#) to confirm system is functioning correctly.

**Table 3.5 Lift System**

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

**Table 3.6 Hitch Swing and Transport System**

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

**Table 3.7 Disc Mower Tilt System**

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

8. Available with hydraulic tilt option installed.

### 3.7.4 Connecting Electrical Wiring Harness

1. Ensure that pin #4 (A) in the tractor receptacle is **NOT** continuously energized (refer to your tractor operator's manual). 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 disc mower brake lights.

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

**NOTE:**

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

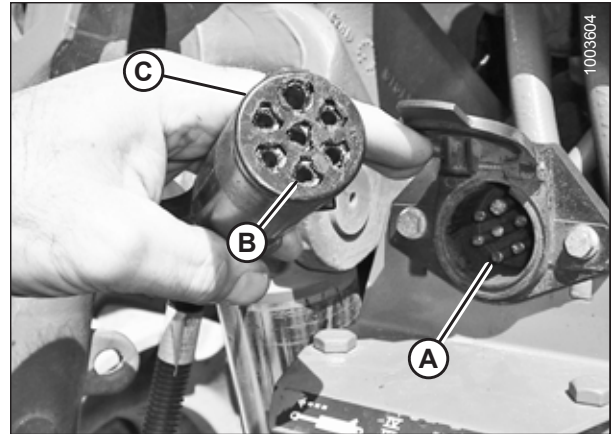


Figure 3.36: Electrical Wiring Harness and Receptacle

***If equipped with the Road Friendly Transport™ system:***

3. Retrieve Road Friendly Transport™ system control box (A) and place in tractor cab. Route harness through hose support.

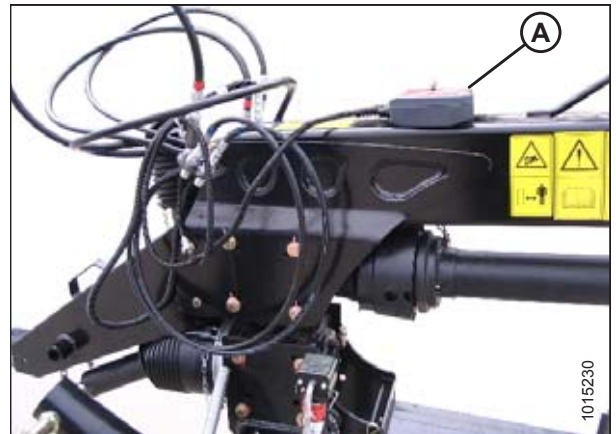


Figure 3.37: Remote Control

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

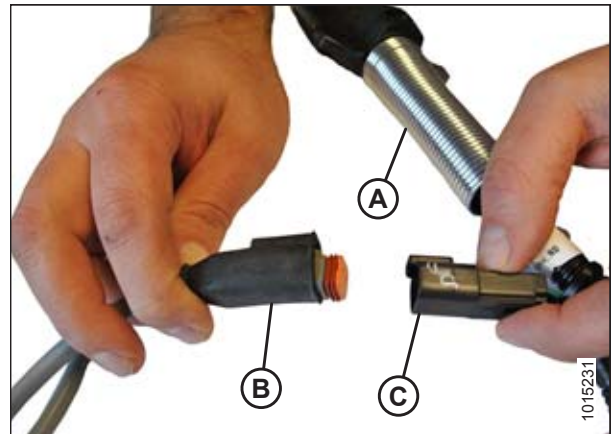


Figure 3.38: Transport Harness

## OPERATION

### *If your tractor has a 3-pin auxiliary power connection (A):*

5. Connect the two wires (B) from the 3-pin auxiliary connector to the power wires (C) on the remote control, wrap connections with electrical tape, and skip to Step 7, page 55.

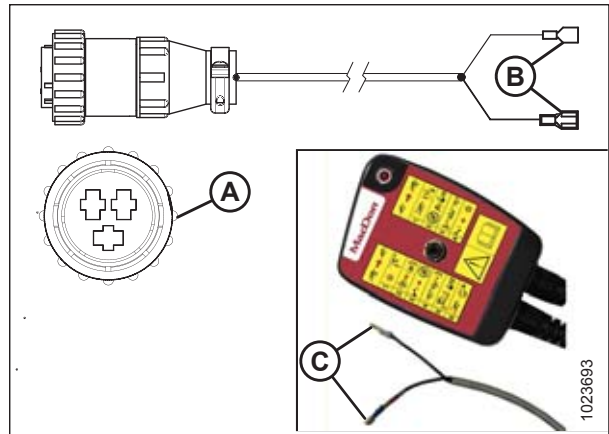


Figure 3.39: Three-Pin Auxiliary Connector

### *If your tractor does not have a 3-pin auxiliary power connection:*

6. Connect the remote control power wire (A) to the tractor's power supply.
  - 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, identify the power by locating the wire with the number one printed on it. The ground wire has a number two printed on it.

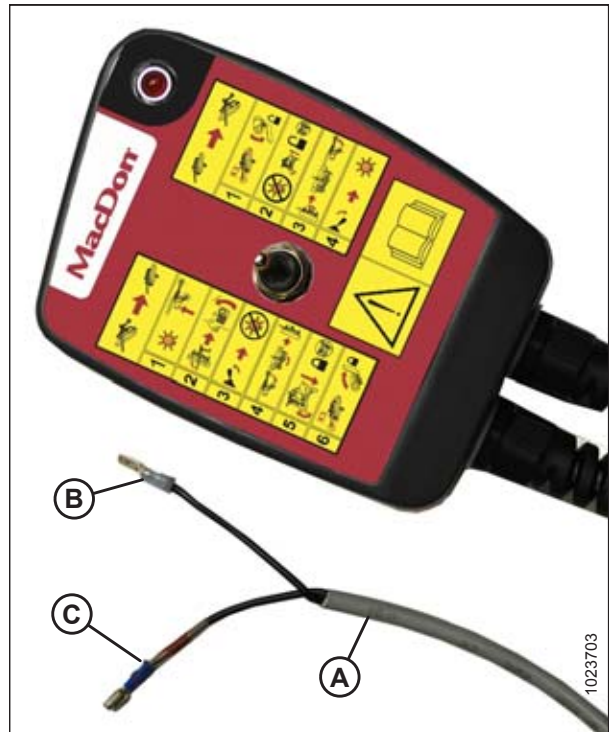
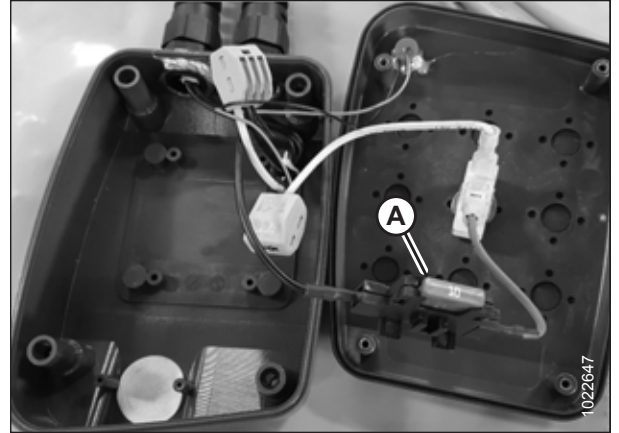


Figure 3.40: Remote Control

## OPERATION

**NOTE:**

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



**Figure 3.41: Remote Control Interior**

7. Place the remote control inside the tractor cab.

## 3.8 Detaching Disc Mower from Tractor

### 3.8.1 Detaching from Drawbar

#### CAUTION

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

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

#### **IMPORTANT:**

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

3. Shut off engine and remove key.
4. Move remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.

#### ***If Road Friendly Transport™ is installed:***

5. Disconnect power wires (C) and (D) from the 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.

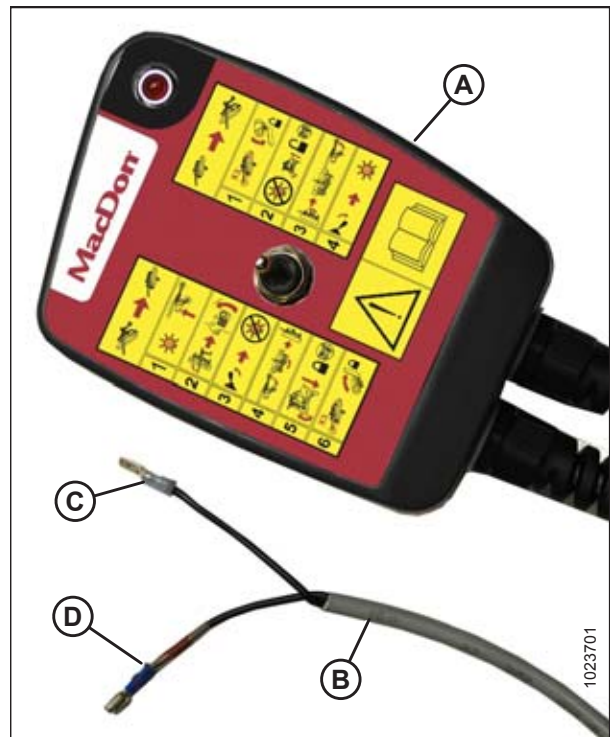


Figure 3.42: Remote Control

## OPERATION

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

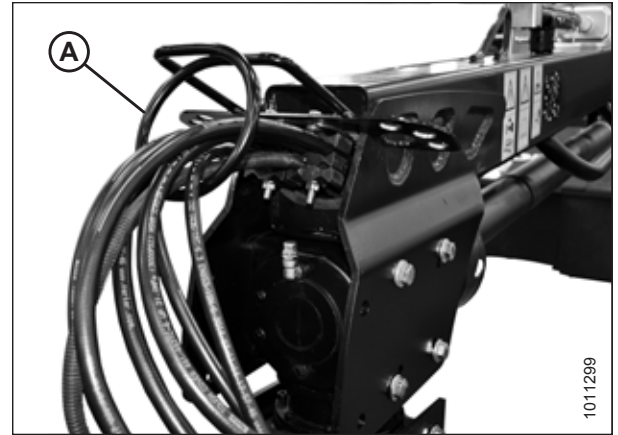


Figure 3.43: Hose Support

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

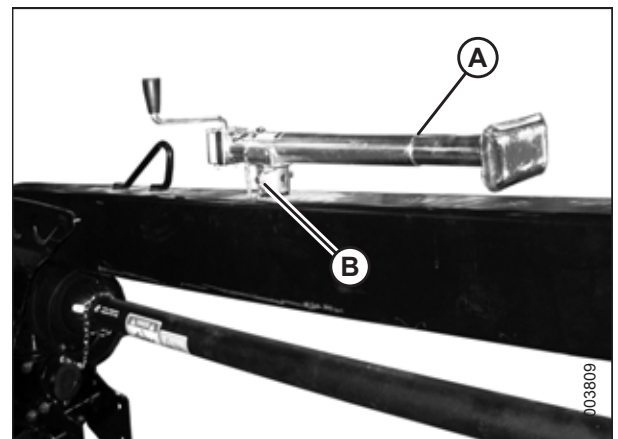


Figure 3.44: Jack Storage

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

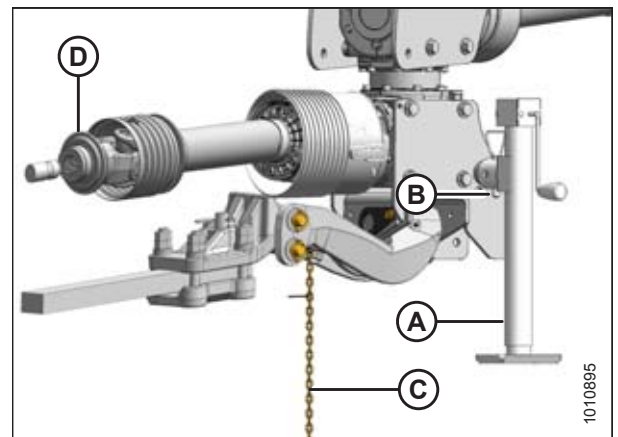


Figure 3.45: Driveline and Jack

## OPERATION

13. Remove lynch pin (E) and clevis pin (D).
14. Raise disc mower hitch using jack (A) until pin (B) disengages and clears drawbar hitch adapter (C).

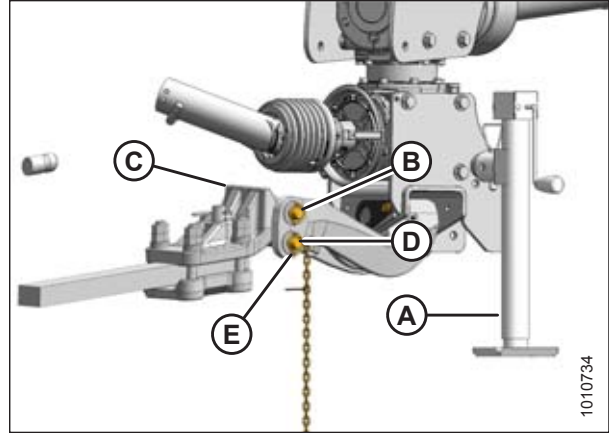


Figure 3.46: Disc Mower Hitch

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

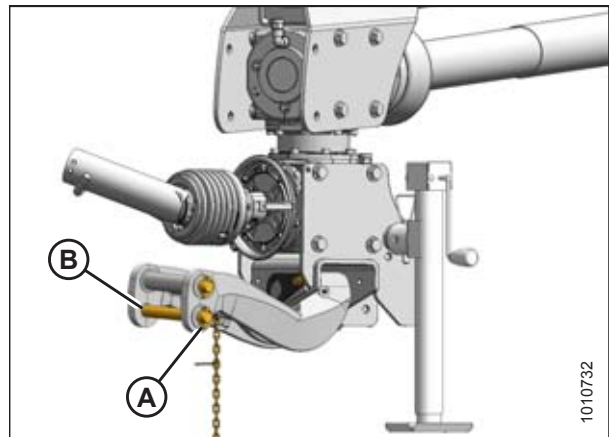


Figure 3.47: Disc Mower Hitch

### 3.8.2 Detaching from Two-Point Hitch

#### CAUTION

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

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

#### **IMPORTANT:**

If leaving disc mower in raised position, close steering valve and both left and right lift cylinder lock-out valves.

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

## OPERATION

### *If Road Friendly Transport™ is installed:*

5. Disconnect the power wires from the 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 3.48: Remote Control

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

#### **NOTE:**

Remote control (A) is also stored at front of hitch.

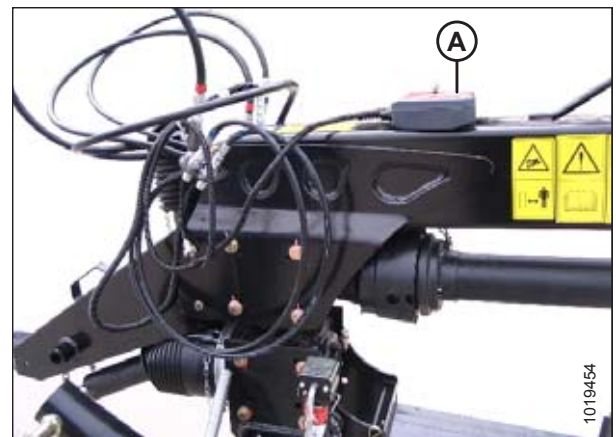
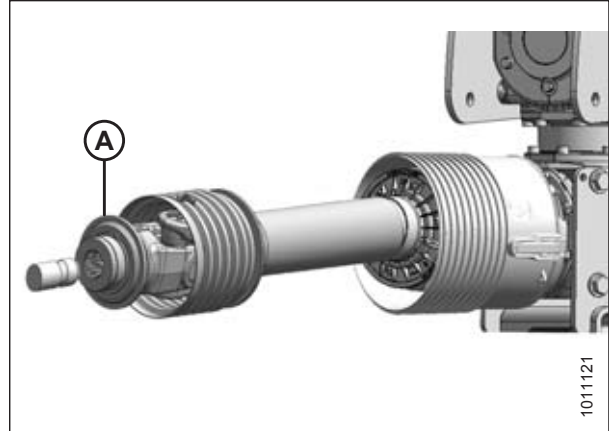


Figure 3.49: Front of Hitch

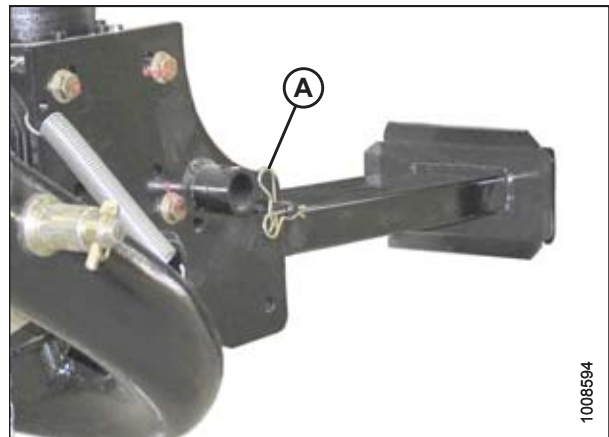
## OPERATION

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



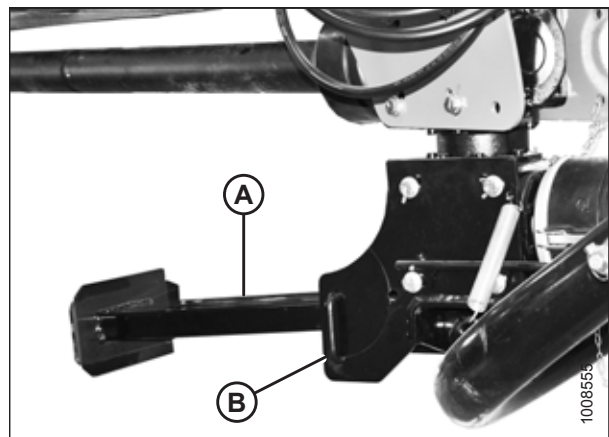
**Figure 3.50: Driveline**

9. Remove inboard hairpin (A) from lock.



**Figure 3.51: Inboard Hairpin**

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



**Figure 3.52: Hitch Stand and Lock**

## OPERATION

11. Lower stand (A), rotate lock (C) counterclockwise to horizontal position, and push lock to engage stand.
12. Check that stand (A) is locked.
13. Secure lock (C) with hairpin (B).
14. Clear bystanders from the area and start tractor. Do **NOT** operate the disc mower.
15. Start tractor and lower hitch to take weight off tractor hitch points.
16. Shut down tractor and remove key from ignition.

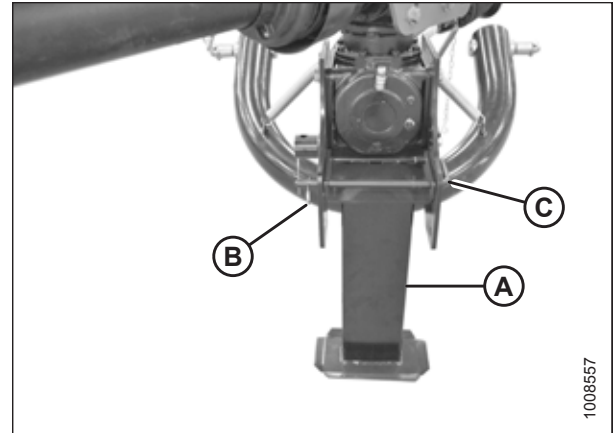


Figure 3.53: Hitch Stand in Lowered Position

17. Remove lynch pins (A) and washers. Swing tractor arms (B) away from 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 disc mower hitch.
19. Slowly drive tractor away from disc mower.

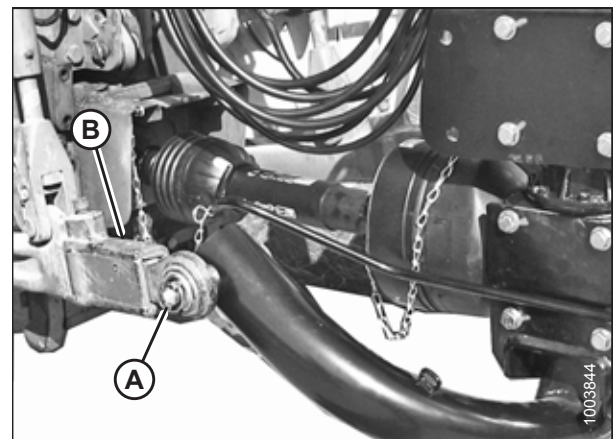


Figure 3.54: Lynch Pins and Tractor Arms

### 3.9 Breaking in the Disc Mower

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



#### **CAUTION**

**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 disc mower.

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

### 3.10 Engaging the Power Take-Off (PTO)

#### **DANGER**

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

1. Move the disc mower 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 disc mower.

## 3.11 Raising and Lowering Disc Mower

### 3.11.1 Lift Cylinders

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

The lift system is equipped with a lock-out valve (B) at each cylinder which prevents the cylinder from extending or retracting due to accidental movement of the lift control. Refer to [3.1.1 Engaging Locks, page 33](#).

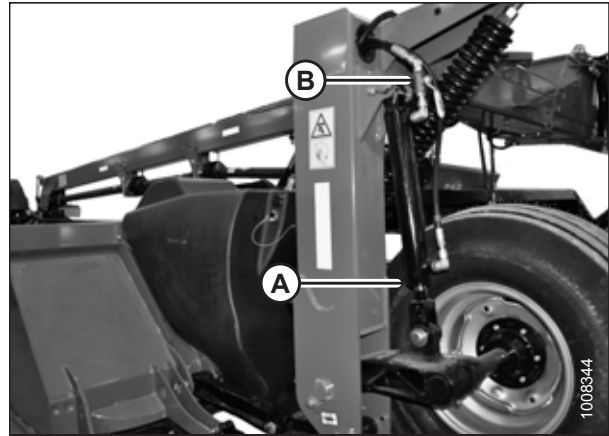


Figure 3.55: Lift Cylinder

### 3.11.2 Lift Control

The disc mower 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 disc mower to clear obstacles and windrows during field operation, to adjust the disc mower height for maintenance, and to raise the disc mower for storage or for transport behind a tractor.

#### DANGER

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

Activate the cylinder control lever (A) to raise or lower the disc mower.

- Move lever **forward** to position (B) to lower disc mower.
- Move lever **backward** to position (C) to raise disc mower.

#### IMPORTANT:

Connect hydraulic hoses so that moving control lever (A) backward raises the disc mower. Refer to [3.7.3 Connecting Hydraulics, page 52](#) for more information.

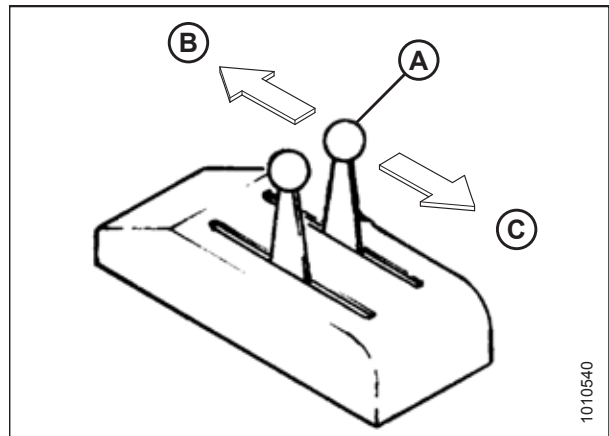


Figure 3.56: Tractor Cylinder Control Lever

## 3.12 Shutdown Procedure



### CAUTION

Before leaving the tractor seat for any reason:

- Disengage the power take-off.
- Park on level ground if possible.
- Lower the disc mower 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.

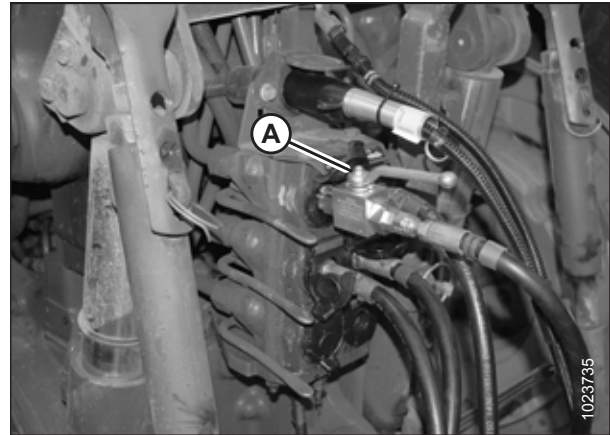
### 3.13 Steering the Disc Mower

**IMPORTANT:**

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

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

- Move the disc mower 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**

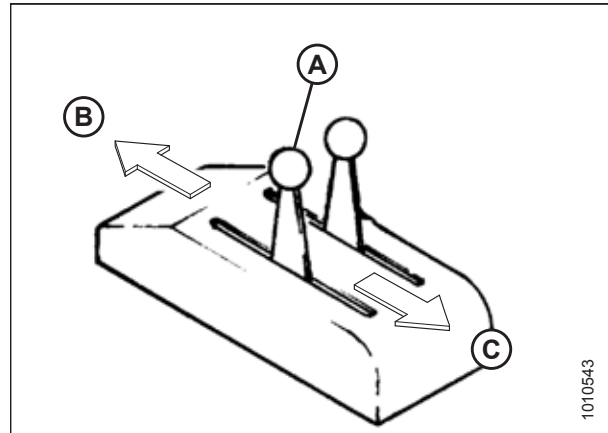
1. Activate steering control lever (A) to steer disc mower into the desired path of travel.
  - Move lever **forward** to position (B) to steer the disc mower to the right.
  - Move lever **backward** to position (C) to steer the disc mower to the left.

**IMPORTANT:**

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

**IMPORTANT:**

Connect hydraulic hoses so that moving the steering control lever (A) backward steers the disc mower to the left and moving lever forward steers the disc mower to the right. Refer to [3.7.3 Connecting Hydraulics, page 52](#) for more information.



**Figure 3.58: Tractor Steering Control Lever Positions**

### 3.13.1 Operating on the Right Side of the Tractor

Follow the step below to steer the disc mower to the right side of the tractor.

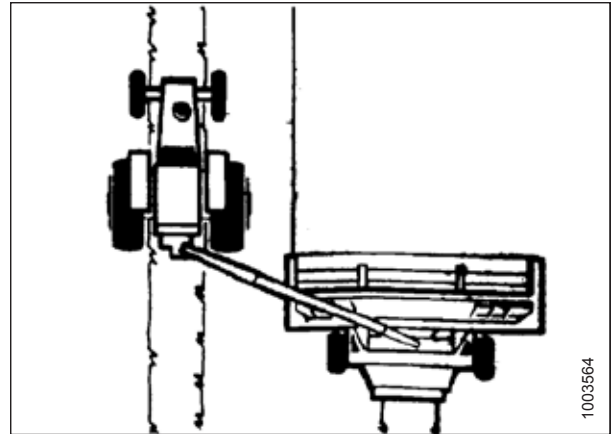


Figure 3.59: Right-Side Operation

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

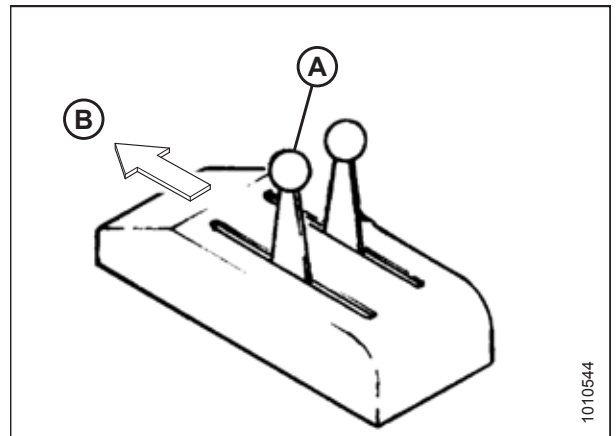


Figure 3.60: Tractor Steering Control Lever

### 3.13.2 Operating on the Left Side of the Tractor

Follow the step below to steer the disc mower to the left side of the tractor.

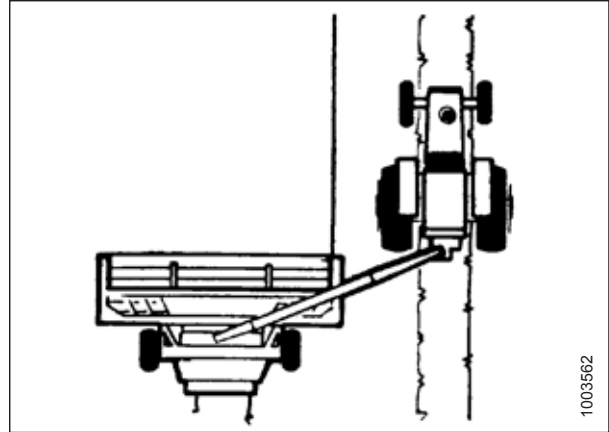


Figure 3.61: Left-Side Operation

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

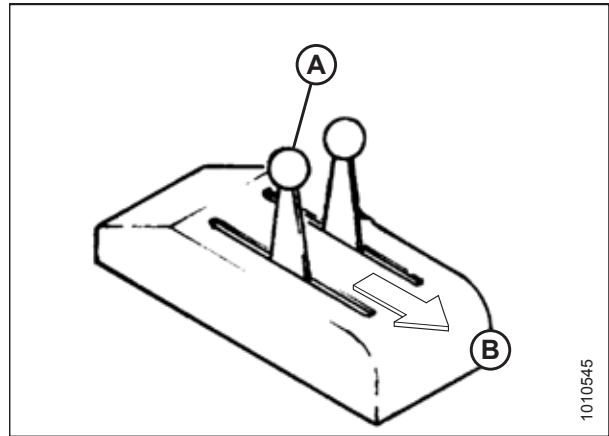


Figure 3.62: Tractor Steering Control Lever

### 3.13.3 Avoiding Obstacles

Follow the steps below to steer the disc mower around an obstacle.

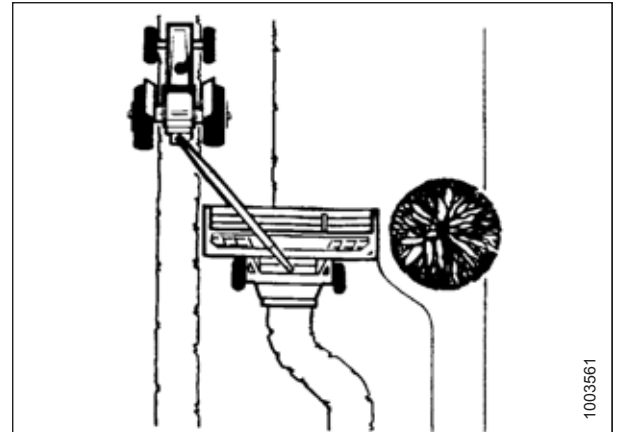


Figure 3.63: Disc Mower Steered around Obstacle

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

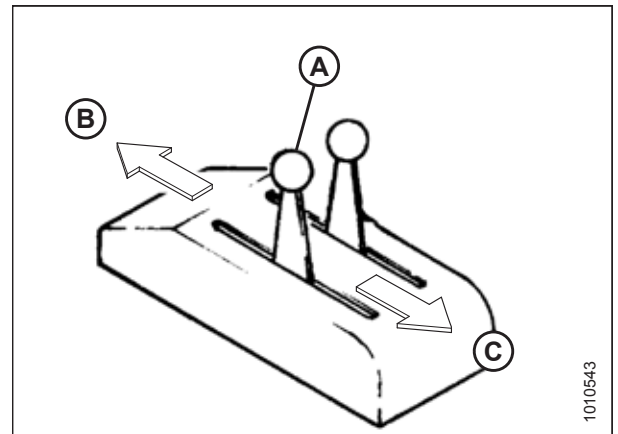


Figure 3.64: Tractor Steering Control Lever

### 3.13.4 Turning Square Corners

The following procedure is intended as a guide for developing a turning procedure for your tractor and disc mower. 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 disc mower to maintain a straight cut as the tractor moves away from the crop.
2. Ensure the disc mower cuts past where the new corner will begin, and immediately raise the disc mower until the skid shoes clear the ground. Steer the disc mower 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 disc mower's hitch.

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

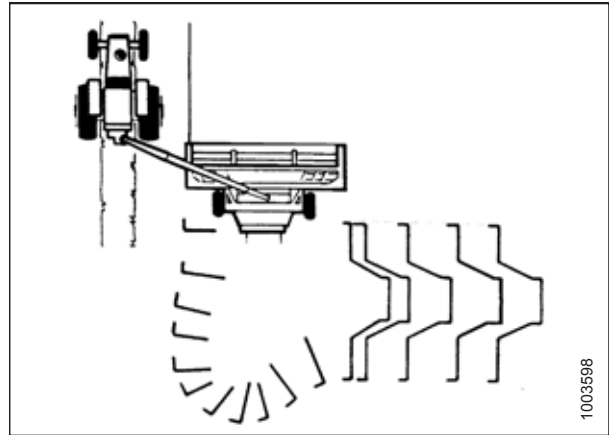


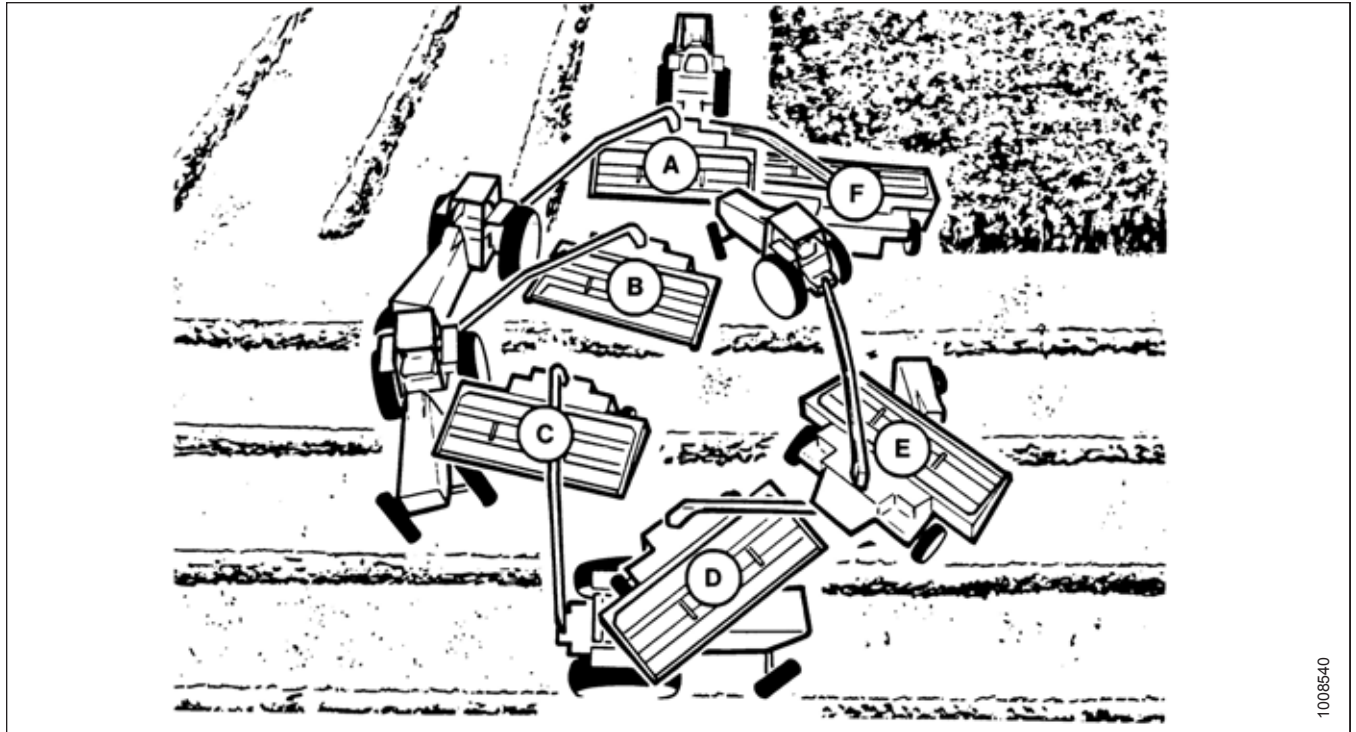
Figure 3.65: Square Corners

### 3.13.5 Turning 180 Degrees

**NOTE:**

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 disc mower in a straight line until it cuts through the end of the row.
2. Ensure the disc mower cuts past the end of the row, and immediately raise the disc mower until the skid shoes clear the ground. Steer the disc mower 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 disc mower's hitch.

4. Continue turning towards the uncut crop as shown in positions (C) and (D) while steering the disc mower 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 disc mower with the edge of the uncut crop.
6. Proceed to position (F), lower disc mower to cutting height, and begin a new cut through the field.

## 3.14 Transporting the Disc Mower

You can transport the disc mower using a tractor in either field mode or Road Friendly Transport™ mode.

- To prepare a disc mower for towing with a tractor in field mode without using the Road Friendly Transport™ option, refer to [3.14.1 Preparing Disc Mower for Transport, page 73](#).
- To prepare a disc mower for towing with a tractor using the Road Friendly Transport™ option, refer to [Converting from Field to Transport Mode \(with Road Friendly Transport™\), page 77](#).



### 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 disc mower flashing amber and red taillights when transporting on roads in order to provide adequate warning to operators of other vehicles.
- Do NOT transport the disc mower 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 Disc Mower for Transport

Follow these instructions to prepare the disc mower for transport without deploying the optional Road Friendly Transport™ system.

#### **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.

#### **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. Connect the disc mower hitch to the tractor. Refer to [3.7 Attaching Disc Mower to the Tractor, page 47](#).
2. Move jack (A) to storage position on side of hitch, and secure with pin (B).

**NOTE:**

If unit is equipped with a two-point hitch, rotate the hitch stand to the storage position.

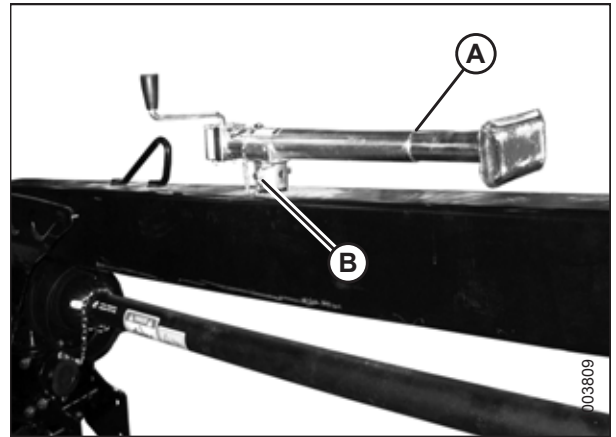


Figure 3.67: Jack in Storage Position

3. Connect the hitch swing cylinder hoses (collars with #2) to the tractor's hydraulic circuit (A). Refer to [3.7.3 Connecting Hydraulics, page 52](#).
4. Swing the disc mower completely to the left, then completely to the right. Repeat three or four times to charge the hitch swing circuit.
5. Swing the disc mower so that it is centered behind the tractor.

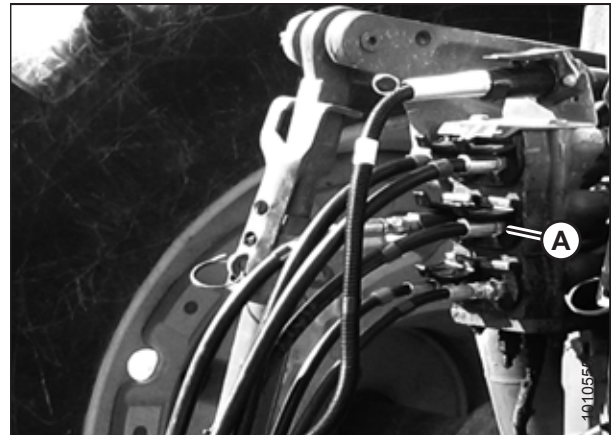
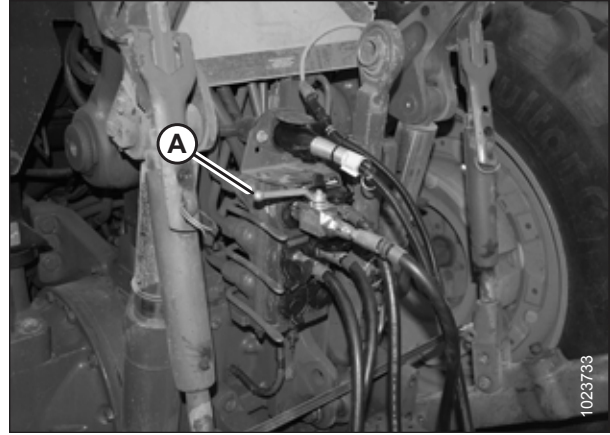


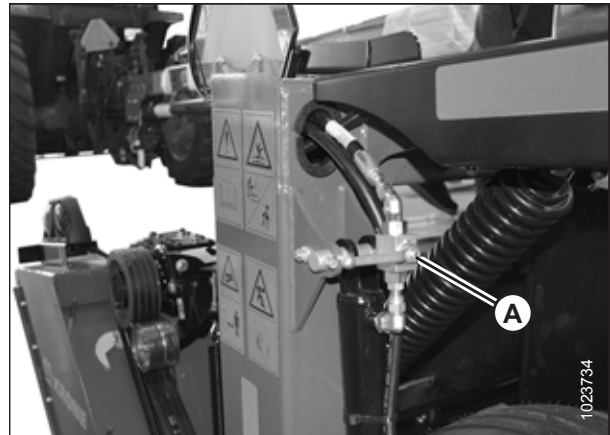
Figure 3.68: Hydraulic Connection

## OPERATION

6. Close the hitch swing lock-out valve by turning handle (A) to the closed position (90 degree angle to the hose).
7. Raise the disc mower fully and close the lift cylinder lock-out valve by turning handle (A) to the closed position (90 degree angle to the hose). Repeat on opposite side.
8. Ensure tires are properly inflated.
9. Ensure the slow moving vehicle (SMV) sign, reflectors, and lights are clean and visible at rear of disc mower.
10. Refer to [3.14.3 Transporting with a Tractor, page 86](#) for transport instructions.



**Figure 3.69: Hitch Swing Lock-Out Valve Shown in Closed Position**



**Figure 3.70: Cylinder Lock-Out Valve**

### 3.14.2 Converting Between Field and Transport Modes

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

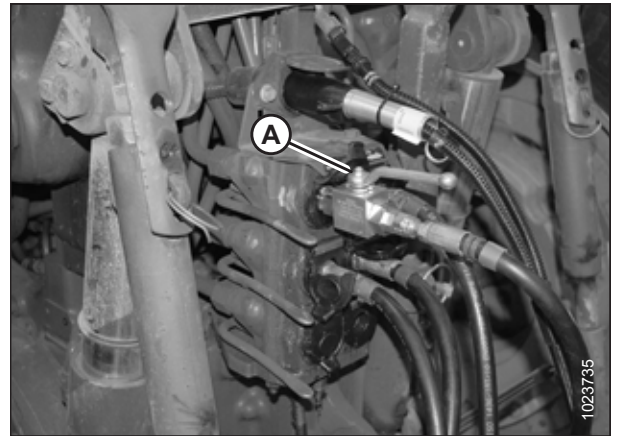
- *Converting from Transport to Field Mode (Without Road Friendly Transport™), page 75*
- *Converting from Field Mode to Transport (Without Road Friendly Transport™), page 76*
- *Converting from Field to Transport Mode (with Road Friendly Transport™), page 77*
- *Converting from Transport to Field Mode (with Road Friendly Transport™), page 82*

*Converting from Transport to Field Mode (Without Road Friendly Transport™)*

#### **DANGER**

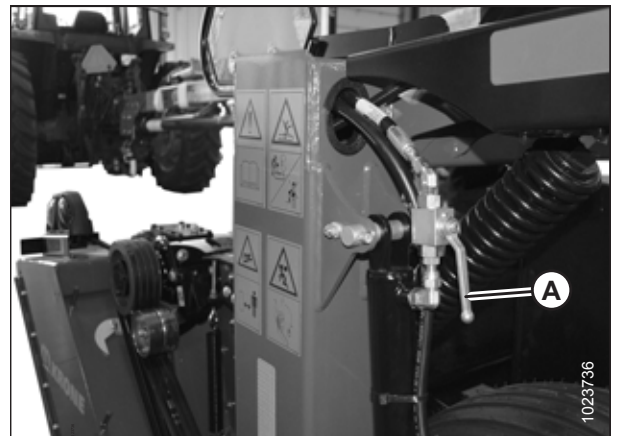
**To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.**

1. Stop engine and remove key from ignition.
2. Connect all hydraulic hoses (refer to [3.7.3 Connecting Hydraulics, page 52](#)), and connect electrical wiring harness.
3. Open the steering lock-out valve by turning the handle (A) to the open position (in line with hose).



**Figure 3.71: Steering Lock-Out Valve in Open Position**

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



**Figure 3.72: Lift Cylinder Lock-Out Valve**

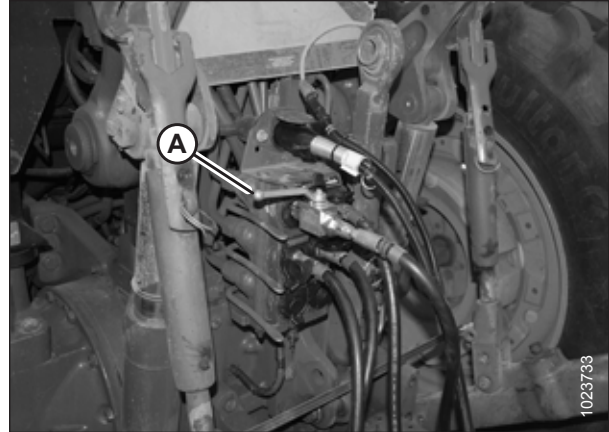
## OPERATION

### *Converting from Field Mode to Transport (Without Road Friendly Transport™)*

#### **DANGER**

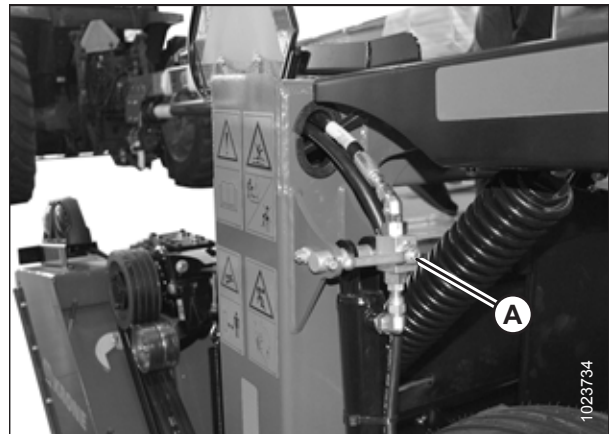
To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.

1. Stop engine and remove key from ignition.
2. Disconnect all hydraulic hoses (refer to [3.7.3 Connecting Hydraulics, page 52](#)), and disconnect electrical wiring harness.
3. Close the steering lock-out valve by turning handle (A) to the closed position (90 degree angle to the hose).



**Figure 3.73: Steering Lock-Out Valve**

4. Close the lift cylinder lock-out valve by turning handle (A) to the closed position (90 degree angle to the hose). Repeat on opposite side.



**Figure 3.74: Lift Cylinder Lock-Out Valve**

## Converting from Field to Transport Mode (with Road Friendly Transport™)

### 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.

### WARNING

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

#### IMPORTANT:

In some jurisdictions, having tall crop dividers installed can make the disc mower too wide for public roads when in Road Friendly Transport™ mode. If necessary, remove the dividers, and reinstall them after the machine is transported. Refer to [3.15.6 Tall Crop Divider Option, page 97](#).

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



Figure 3.75: Remote Control

## OPERATION

3. While light is illuminated, raise the disc mower fully.

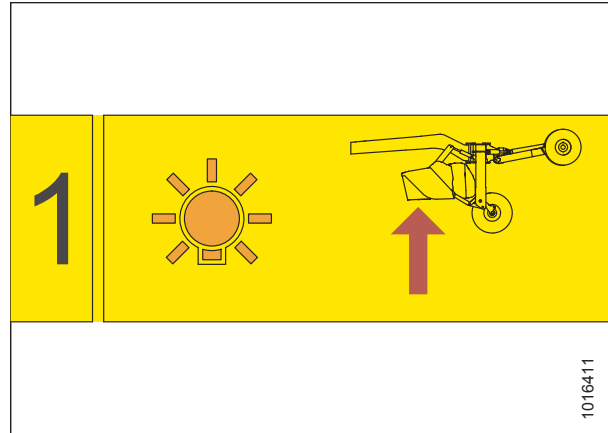


Figure 3.76: Raising Disc Mower

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

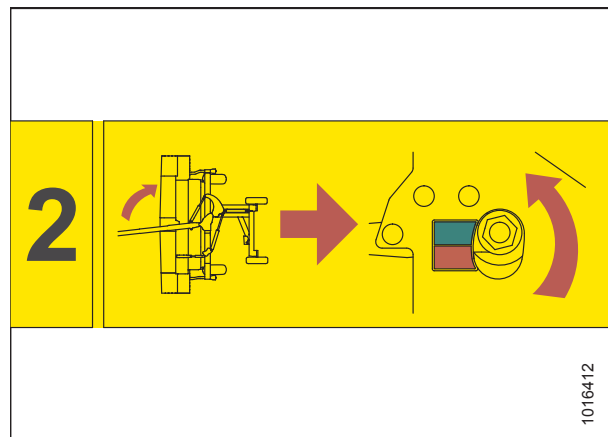


Figure 3.77: Disc Mower Rotation

5. Move 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.

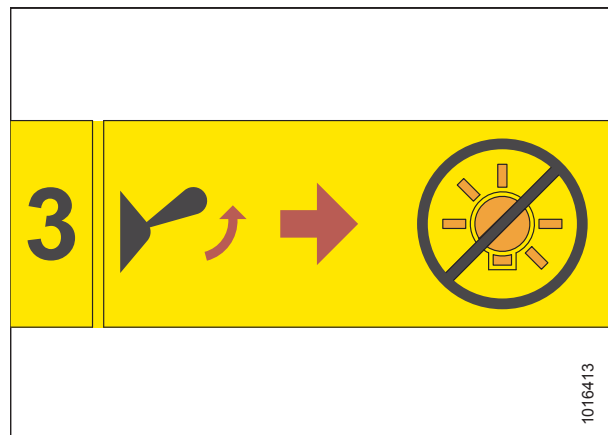


Figure 3.78: Transport Switch

## OPERATION

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

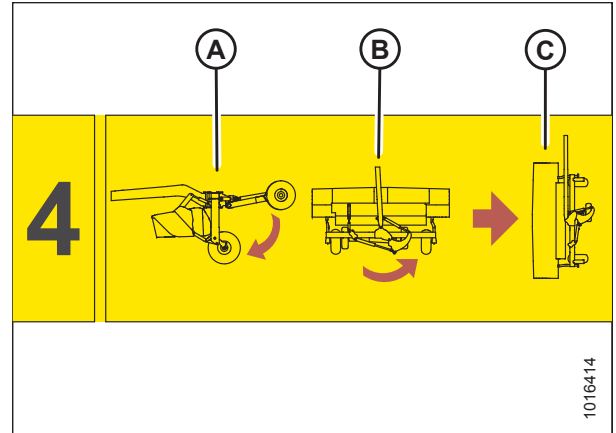


Figure 3.79: Transport Assembly Rotation

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

**IMPORTANT:**

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

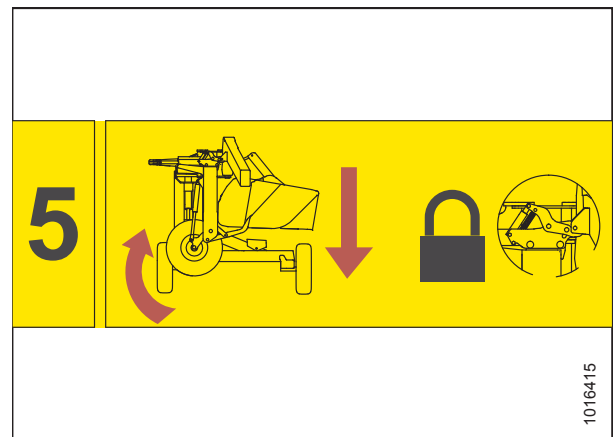


Figure 3.80: Transport Assembly Lowering

10. Close the steering lock-out valve and the two lift cylinder lock-out valves by turning the handles to the closed position. Refer to Figure 3.82, page 80 and Figure 3.83, page 80.

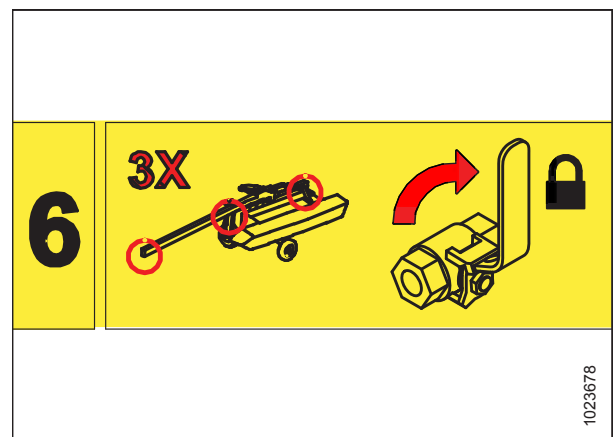


Figure 3.81: Hydraulic Lockout

## OPERATION

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

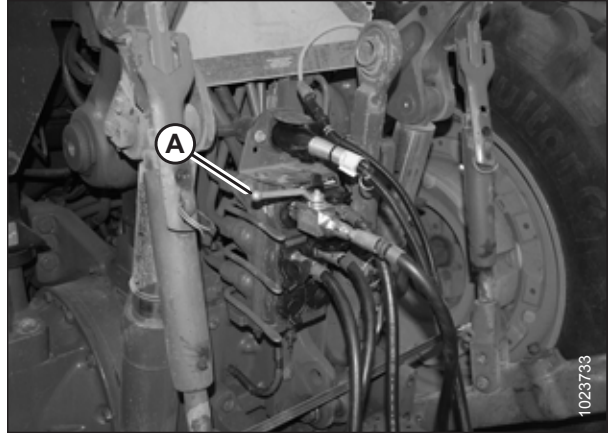


Figure 3.82: Steering Lock-Out Valve

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

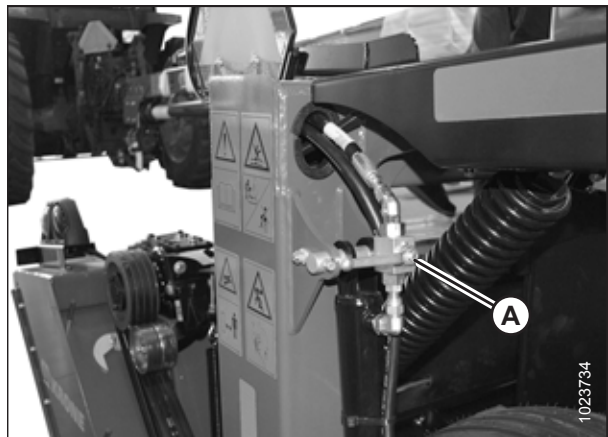


Figure 3.83: Lift Cylinder Lock-Out Valve

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

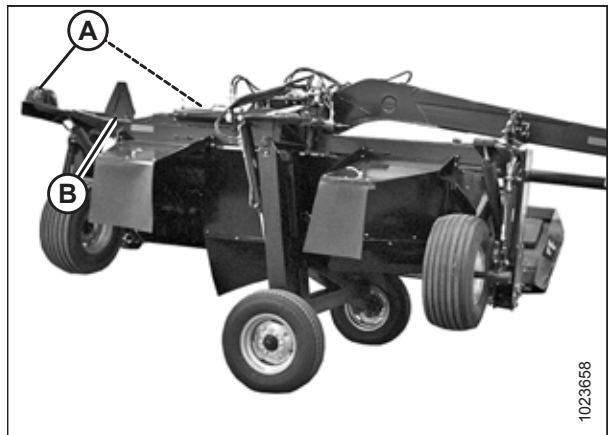


Figure 3.84: Transport Mode

## OPERATION

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



Figure 3.85: Remote Control

## OPERATION

### *Converting from Transport to Field Mode (with Road Friendly Transport™)*

#### **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.

#### **WARNING**

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

1. Following the steps on the transport-to-field decal (A), move transport switch to the upper position (C) and ensure that light (B) is **NOT** illuminated.



Figure 3.86: Remote Control

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

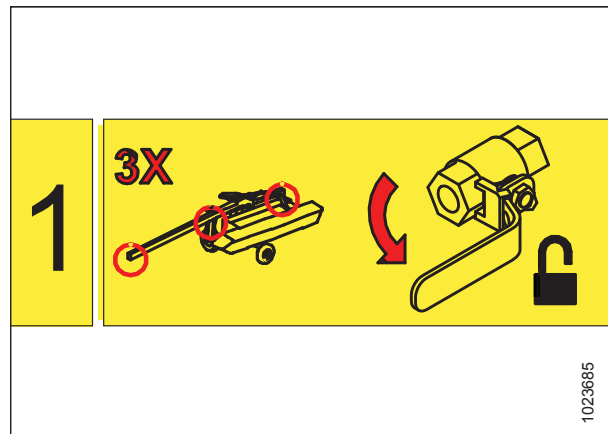


Figure 3.87: Hydraulic Lockout

## OPERATION

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

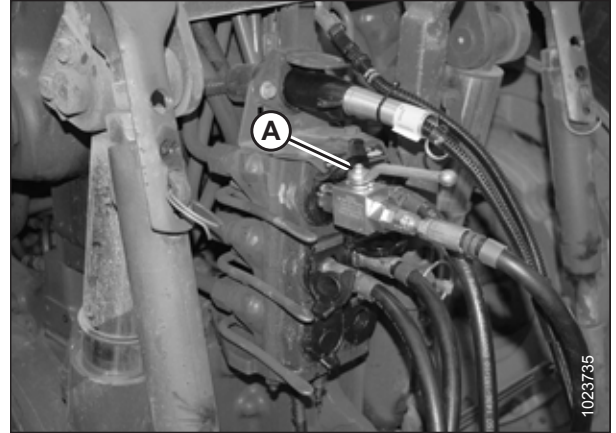


Figure 3.88: Steering Lock-Out Valve

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

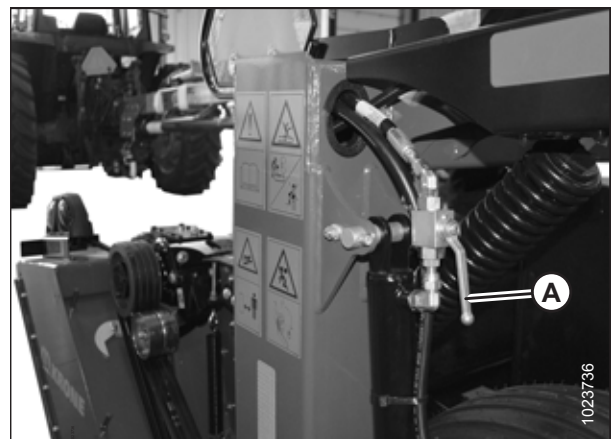


Figure 3.89: Lift Cylinder Lock-Out Valve

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

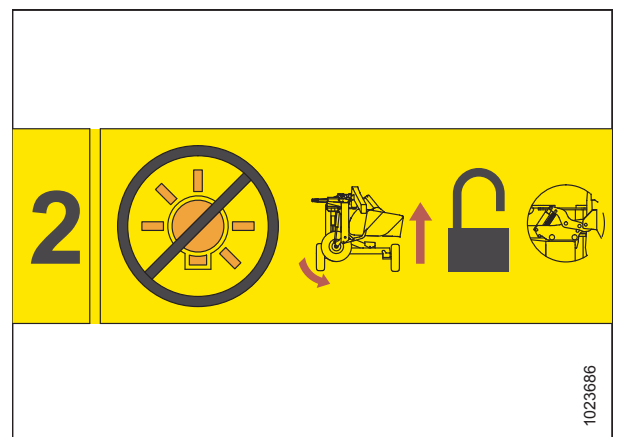
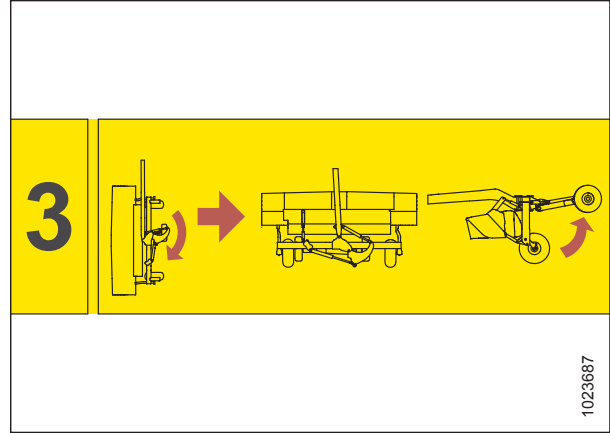


Figure 3.90: Raising Disc Mower

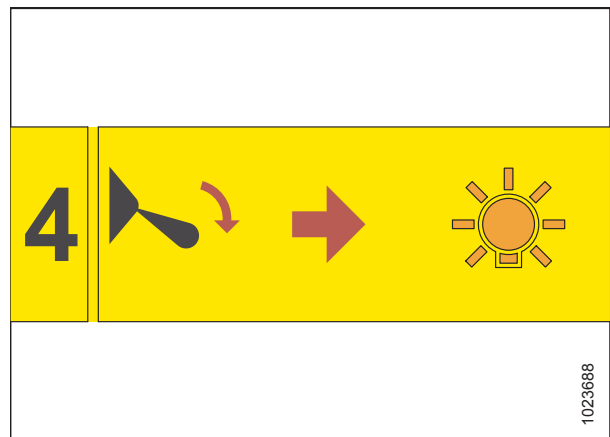
## OPERATION

4. Operate the hitch swing control lever to rotate the disc mower to the right. The disc mower will stop when it reaches operating position.



**Figure 3.91: Disc Mower Rotation**

5. Continue operating the hitch swing control lever to fully raise the transport assembly and lower the disc mower onto the field wheels.
6. Move transport switch to the lower position and ensure that the light on the remote control is illuminated. Transport conversion is now complete and the hitch swing circuit is active.



**Figure 3.92: Transport Switch**

## OPERATION

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



Figure 3.93: Remote Control

### 3.14.3 Transporting with a Tractor

If towing endwise with the optional Road Friendly Transport™ system, refer to *Converting from Field to Transport Mode (with Road Friendly Transport™)*, page 77.

1. Before transporting the disc mower with a tractor, ensure the machine is prepared for transport. Refer to *3.14.1 Preparing Disc Mower for Transport*, page 73.
2. Ensure hitch safety chain is properly attached to towing tractor. Provide only enough slack in chain to permit turning.
3. Move jack (A) to storage position on side of hitch, and secure with pin (B).

**NOTE:**

If unit is equipped with a two-point hitch, rotate the stand to the storage position.

4. 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.

5. Ensure the hitch swing lock-out and the two lift-cylinder lock-out valves are closed (handle 90 degree to the hose).
6. Keep the slow moving vehicle (SMV) sign, reflectors, and lights clean and visible at rear of disc mower.
7. Ensure tires are properly inflated.
8. Do **NOT** exceed 32 km/h (20 mph).

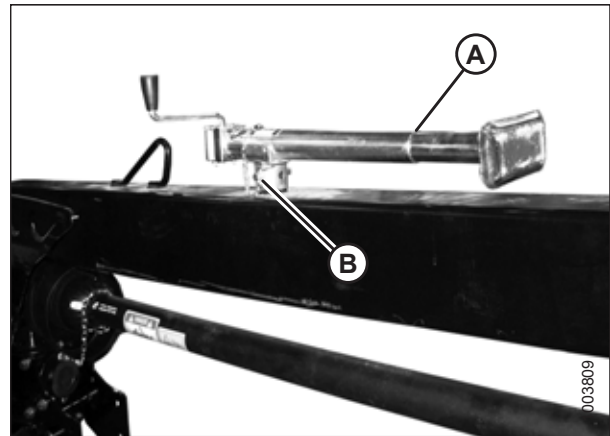


Figure 3.94: Jack in Storage Position

### 3.14.4 Transport Lighting

The position of the lighting depends on the transport configuration.

- If the disc mower includes the Road Friendly Transport™ system, refer to Figure 3.95, page 87.
- If the disc mower does **NOT** include the Road Friendly Transport™ system, refer to Figure 3.96, page 87.

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

The red lights (B) located on the inboard side of the amber lights function as both tail and brake lights. Refer to [3.7.4 Connecting Electrical Wiring Harness, page 53](#) for information about connecting the disc mower's electrical harness to the tractor.

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

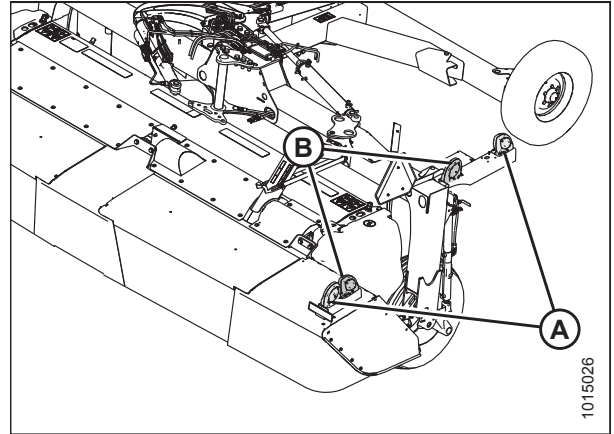


Figure 3.95: Lighting Locations (with Road Friendly Transport™)

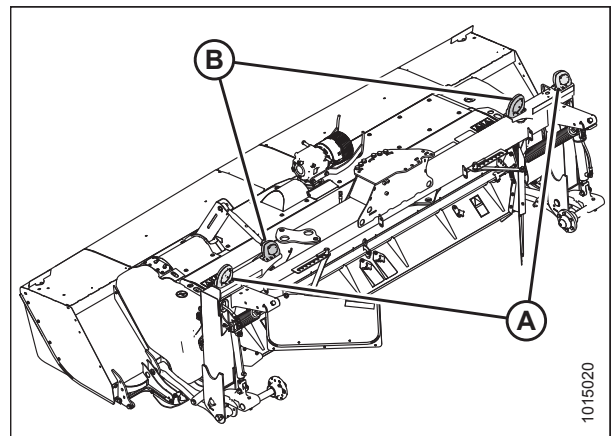


Figure 3.96: Lighting Locations

## 3.15 Operating the Disc Mower

Operating the disc mower 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 88](#) and detailed on the following pages will affect the performance of your disc mower. 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 Disc Mower Performance Variables**

Variable	Refer to
Disc mower float	<a href="#">3.15.1 Float, page 88</a>
Disc mower angle	<a href="#">3.15.3 Cutterbar Angle, page 92</a>
Cutting height	<a href="#">3.15.2 Cutting Height, page 90</a>
Ground speed	<a href="#">3.15.4 Ground Speed, page 94</a>
Conditioning: roll type	<a href="#">3.16 Conditioning: Roll Type, page 99</a>
Conditioning: finger type	<a href="#">3.17 Conditioning: Finger Type, page 109</a>

### 3.15.1 Float

Disc mower float springs are normally set so a force of approximately 43–47 kg (95–105 lb.) is required to lift either end of the disc mower 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 cutting components.

**NOTE:**

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

## Adjusting Disc Mower Float

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

### 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.

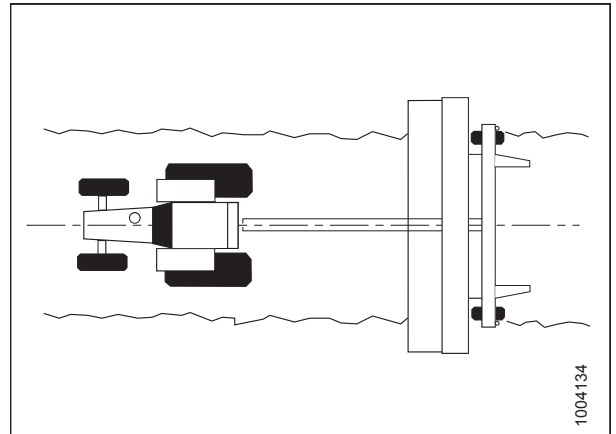
#### NOTE:

Changes to the disc mower operating position can affect the float settings. After adjusting the cutting height or the cutting angle, check float and adjust as necessary.

1. Center the disc mower directly behind the tractor and set the cutterbar to an orientation and tilt appropriate for the crop type and cutting conditions. Refer to [3.15.3 Cutterbar Angle](#), page 92.

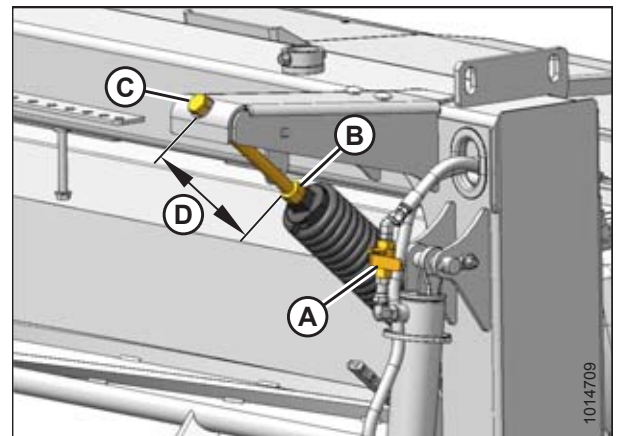
#### NOTE:

Ensure skid shoes are in correct position before setting disc mower angle, float, and tilt.



**Figure 3.97: Disc Mower Centered behind Tractor**

2. Raise the disc mower fully. Shut off the engine, and remove the key.
3. Close lift cylinder lock-out valve (A) on each lift cylinder by turning the handle to the closed position (90 degree angle to the hose).
4. Loosen jam nut (B) away from the spring.
5. Turn adjuster bolt (C) to achieve the recommended measurement (D) for the conditioner type. Refer to Table [3.9](#), page 90.
  - Turn bolt clockwise (towards spring) to increase float.
  - Turn bolt counterclockwise (away from spring) to decrease float.
6. Tighten jam nut (B) against spring.



**Figure 3.98: Lift Cylinder Lock-Out Valve, Jam Nut, and Adjuster Bolt**

## OPERATION

7. Measure the length of exposed thread (D) on the float spring tension bolts.

**NOTE:**

Float settings indicated in the table at right are starting point settings only. Float force should still be checked with disc mower float and cutting angle set as planned for use in the field.

8. Repeat Steps [4, page 89](#) to [7, page 90](#) on the opposite side of the disc mower.
9. Open lift cylinder lock-out valve (A) on each lift cylinder by turning the handle to the open position (in line with the hose).
10. To check float, lower the disc mower to cutting position, grasp the front corner of mower, 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 disc mower.

**Table 3.9 Float Setting Starting Point**

Header Size	Conditioner Type	Length of Exposed Thread
4.0 meter (13 foot)	None	280–290 mm (11–11-5/32 in.)
	Roll	120–130 mm (4-3/4–5-1/8 in.)
	Finger	Right side: 145–155 mm (5-3/4–6-1/8 in.)
	Finger	Left side: 15–125 mm (4-1/2–4-15/16 in.)
4.9 meter (16 foot)	None	230–240 mm (9–9-1/2 in.)
	Roll	70–80 mm (2-3/4–3-1/8 in.)
	Finger	Right side: 95–105 mm (3-3/4–4-1/8 in.)
	Finger	Left side: 65–75 mm (2-1/2–3 in.)

### 3.15.2 Cutting Height

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

Lowering the skid shoes and decreasing the disc mower 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 disc mower angle decreases the cutting height, resulting in a shorter stubble. Refer to [Adjusting Cutting Height, page 91](#).

To choose a disc mower angle that maximizes performance for your crop and field conditions, refer to [3.15.3 Cutterbar Angle, page 92](#).

To minimize cutterbar damage, scooping soil, and soil build-up at the cutterbar in damp conditions, the disc mower float should be set as light as possible without causing excessive bouncing. Refer to [Adjusting Disc Mower Float, page 89](#).

## Adjusting Cutting Height

### **DANGER**

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

1. Raise disc mower fully, stop engine, and remove key. Engage lift cylinder lock-out valves.
2. Loosen bolts (C).
3. Remove bolts, nuts, and washers (D).
4. Raise or lower skid shoe.

**NOTE:**

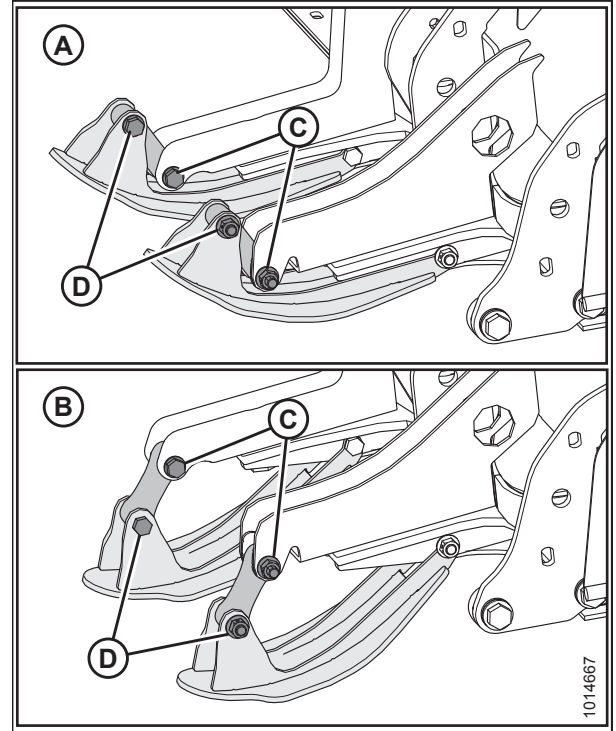
Skid shoes have two adjustment settings: fully raised (A) and fully lowered (B).

5. Install bolts, nuts, and washers (D), and then tighten.
6. Tighten bolts (C).

**NOTE:**

- One skid shoe per side for 4.0 m (13-ft.) disc mowers.
- Two skid shoes per side for 4.9 m (16-ft.) disc mowers.

7. Check disc mower float. Refer to [Adjusting Disc Mower Float, page 89](#).
8. Adjust cutterbar angle to desired working position using the disc mower angle controls. If angle is not critical, set it to mid-position. Refer to [3.15.3 Cutterbar Angle, page 92](#).



**Figure 3.99: Skid Shoes (4.9 m [16 ft.] Shown)**

### 3.15.3 Cutterbar Angle

The header angle (A) adjustment ranges from 0 to 5 degrees below horizontal using the mechanical center-link and from 0 to 7 degrees below horizontal using the hydraulic center-link.

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

**NOTE:**

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

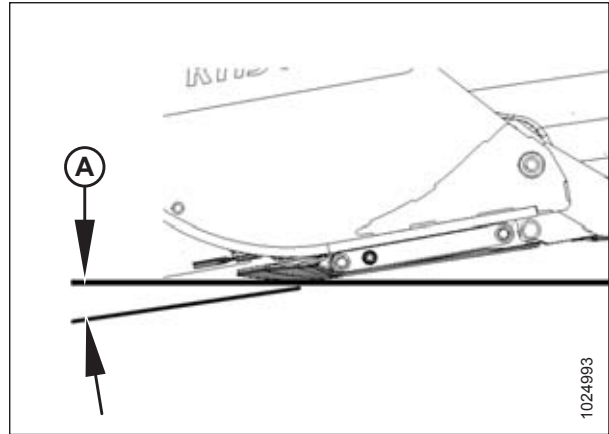


Figure 3.100: Header/Cutterbar Angle

## Adjusting Cutterbar Angle: Mechanical Center-Link

### **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 disc mower so cutterbar is resting on the ground.
2. Loosen nut (A).
3. Decrease (flatten) cutterbar angle by rotating the turnbuckle sleeve (B) to decrease the turnbuckle length.
4. Increase (steepen) cutterbar angle by rotating the turnbuckle sleeve (B) to increase the turnbuckle length.
5. Tighten nut (A) but do **NOT** overtighten. A slight tap with a small hammer is sufficient.
6. Check cutting height and adjust if required.
7. Check disc mower float and adjust if required. Refer to [3.15.1 Float, page 88](#).

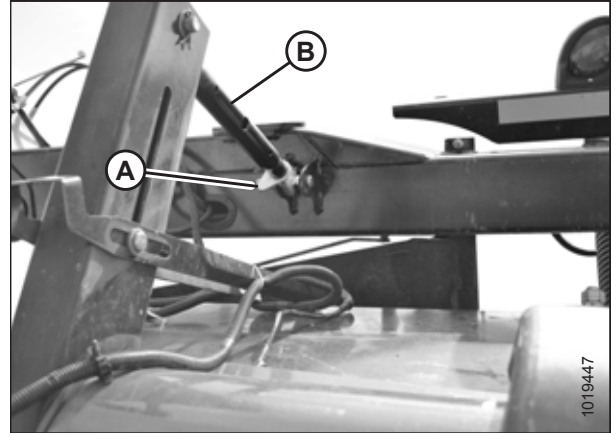


Figure 3.101: Mechanical Center-Link

## Adjusting Cutterbar Angle: Hydraulic Center-Link

### **NOTE:**

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

1. Decrease (flatten) cutterbar angle by operating the tractor hydraulic control so that cylinder (C) retracts and moves gauge (D) toward the green zone (A).
2. Increase (steepen) cutterbar angle by operating the tractor hydraulic control so that cylinder (C) extends and moves gauge (D) toward the red zone (B).

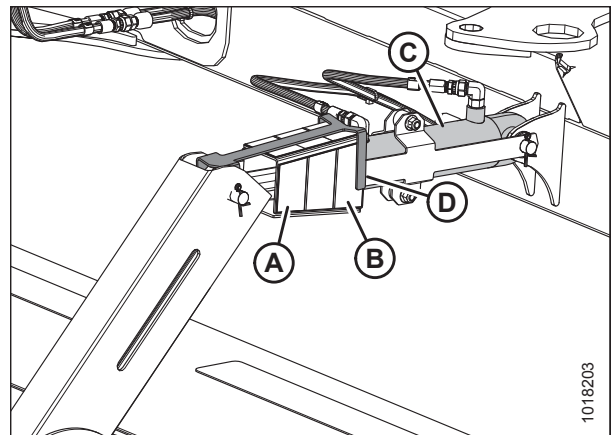


Figure 3.102: Hydraulic Center-Link

### 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 mower 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 native grasses), set the disc speed to MAXIMUM.

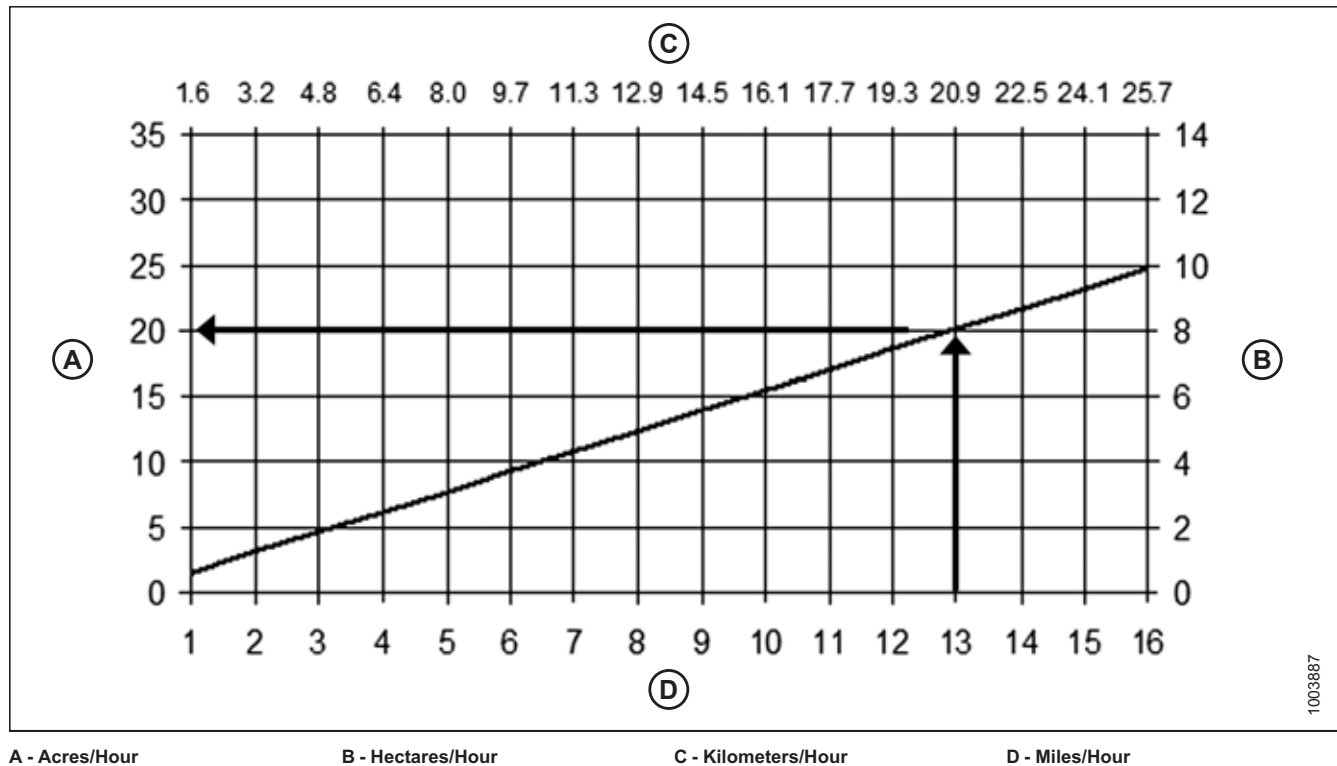
In light crops, reduce the disc mower's disc speed while maintaining ground speed.

#### **NOTE:**

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

The example shown in Figure 3.103, page 94 illustrates the relationship between ground speed and cut area for a 4.0 m (13 ft.) disc mower. The chart demonstrates that a ground speed of 21 km/h (13 mph) would produce a cut area of approximately 8 hectares (20 acres) per hour.

**Figure 3.103: Ground Speed for 4.0 m (13 ft.) Disc Mower**



A - Acres/Hour

B - Hectares/Hour

C - Kilometers/Hour

D - Miles/Hour

### 3.15.5 Cutterbar Deflectors

Cutterbar deflectors attach to the cutterbar just below the header's conditioner rolls. Deflectors provide improved feeding into the conditioner rolls and prevent heavy crop with long stems from feeding under the rolls.

Cutterbar deflectors may not be well-suited for some crop and 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	Yes
Long stemmed and heavy/normal field conditions	Yes
Long stemmed and heavy/sandy soil	No
Long stemmed and heavy/gopher mounds or rocks (refer to note below table)	No
Using finger conditioner	No

**NOTE:**

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

#### Removing Cutterbar Deflectors



### DANGER

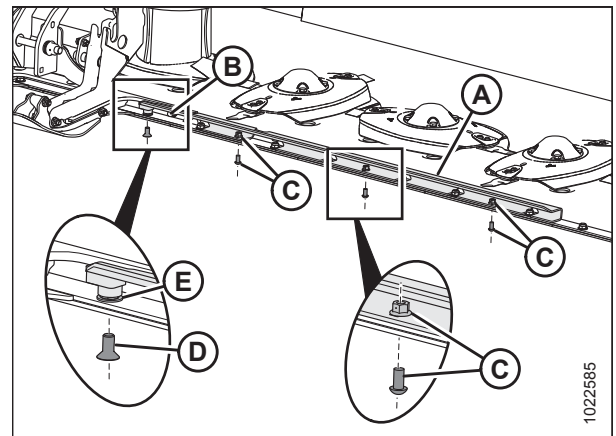
To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

1. Raise mower fully, shut down tractor, and remove key from ignition.
2. Close lift cylinder lock-out valves. Refer to [3.1.1 Engaging Locks](#), page 33.
3. Clean debris from deflectors and deflector area.

**IMPORTANT:**

Do **NOT** remove cutterbar level plug (B).

4. Remove three bolts and nuts (C) securing deflector to cutterbar using a 6 mm hex key and a 15 mm socket.
5. Remove bolt (D) from outboard end of deflector with 8 mm hex key. Retain bolt.
6. Remove deflector (A). Replace retained bolt (D) through skid shoe and secure with M12 washer and lock nut (E).
7. Repeat for deflector on opposite side of disc mower.
8. Store deflectors and hardware in a safe place.



**Figure 3.104: Left Cutterbar Deflector**

## OPERATION

### Installing Cutterbar Deflectors

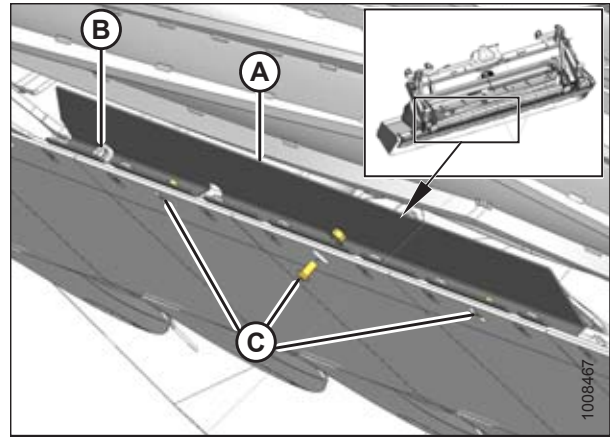
#### **DANGER**

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

#### **IMPORTANT:**

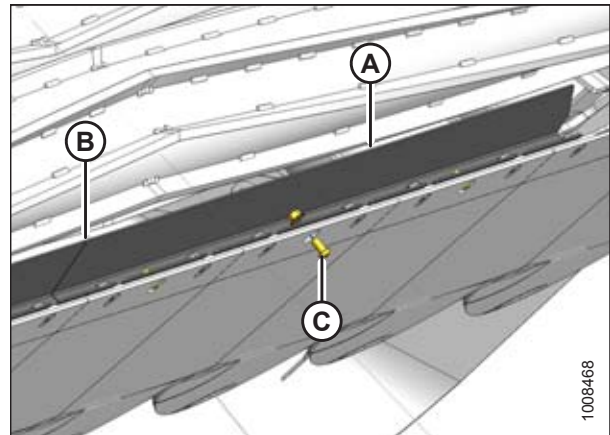
To avoid damage, cutterbar deflectors must **NOT** be used with the finger conditioner option.

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



**Figure 3.105: Left Cutterbar Deflector Viewed from Underside of Cutterbar**

6. Repeat Steps 3, page 96 through Step 5, page 96 to install right deflector (A).
7. Align deflectors at position (B) and tighten bolts (C) to 54 Nm (40 lbf·ft) with a 16 mm socket and an 8 mm hex key.



**Figure 3.106: Right Cutterbar Deflector Viewed from Underside of Cutterbar**

### 3.15.6 Tall Crop Divider Option

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

#### *Removing Tall Crop Divider*

#### **DANGER**

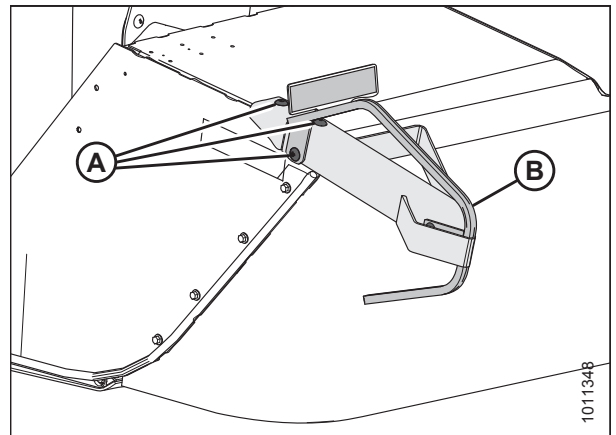
**To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving Operator's seat for any reason.**

1. Lower disc mower fully, shut down tractor and disc mower, and remove key.
2. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors, page 38](#).



**Figure 3.107: Cutterbar Doors**

3. Remove three bolts (A), and remove deflector (B).
4. Reinstall three bolts (A).
5. Repeat for opposite side.
6. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors, page 40](#).



**Figure 3.108: Deflector and Hardware**

## Installing 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.

#### IMPORTANT:

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

1. Lower the disc mower fully.
2. Shut down the tractor and disc mower and remove key.
3. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

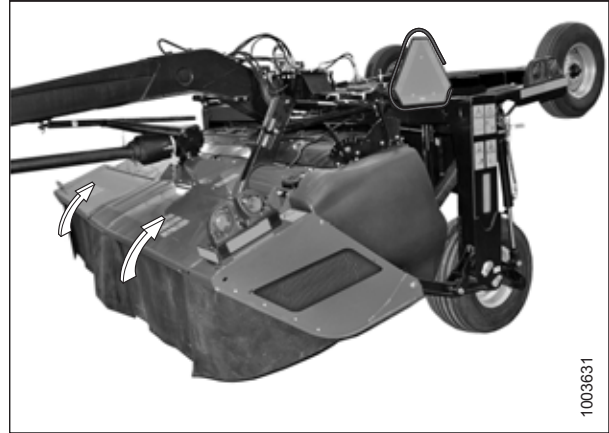


Figure 3.109: Cutterbar Doors

4. Remove three bolts (A) and nuts where the divider (B) will be mounted.
5. Position the divider (B) on disc mower, and reinstall three bolts (A) and nuts. Tighten nuts.
6. Repeat for opposite side.
7. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors, page 40](#).

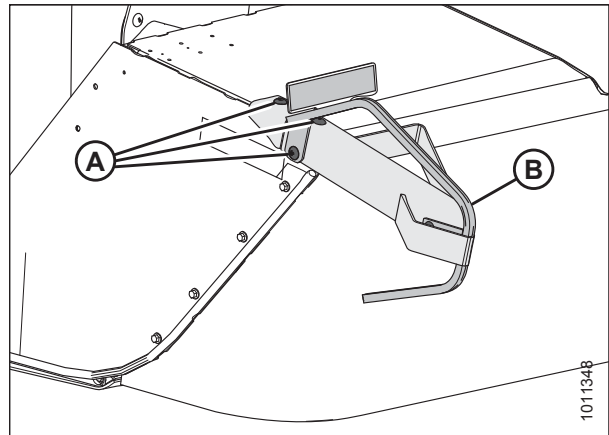


Figure 3.110: Divider and Hardware

## 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 controls the degree to which crop is conditioned as it passes through the rolls. Roll gap is factory-set at approximately 3 mm (1/8 in.) for polyurethane rolls, and 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 conditioning of crops is achieved when 90% of the stems show cracking, but no more than 5% of the leaves are damaged. Set roll gap to produce these results.

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

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

**IMPORTANT:**

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

## Checking Roll Gap

### DANGER

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

1. Lower the disc mower fully.
2. Stop engine, and remove key from ignition.
3. **Polyurethane Roll:** Insert a feeler gauge through the inspection hole in the conditioner endsheet to check roll gap on polyurethane roll conditioners. Factory setting is 3 mm (1/8 in.). If adjustments are required, refer to [Adjusting Roll Gap: Polyurethane Rolls, page 101](#).

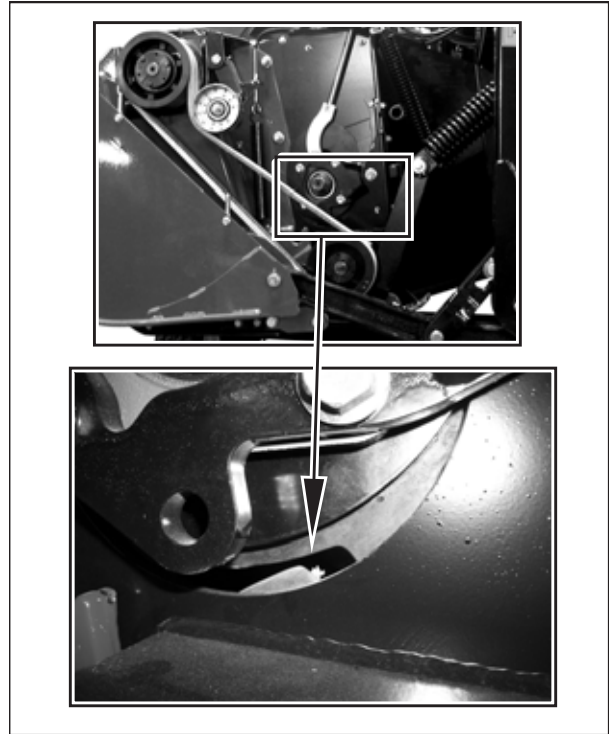


Figure 3.111: Polyurethane Roll Conditioner

4. **Steel Roll:** The length of thread (A) 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. Roll gap factory setting is 6 mm (1/4 in.). Refer to [Adjusting Roll Gap: Steel Rolls, page 102](#).

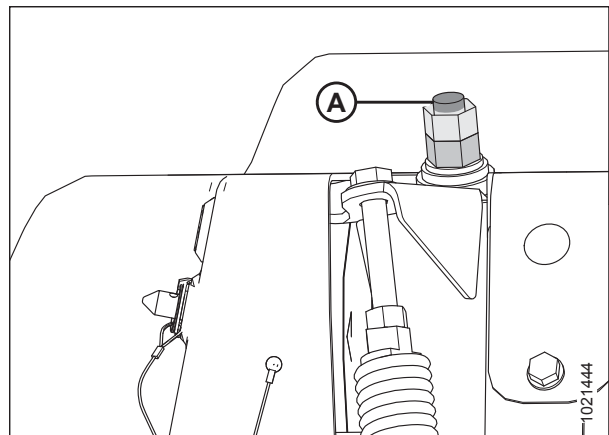


Figure 3.112: Roll Gap Adjustment

## 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. To return roll gap to the factory setting, follow the procedure below:

### **DANGER**

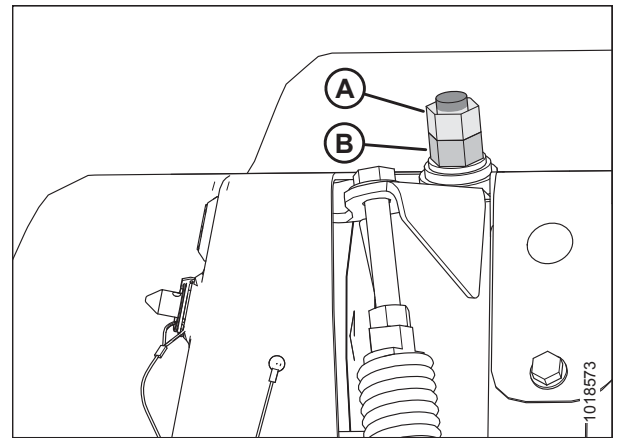
**To avoid bodily injury or death from unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.**

1. Lower the disc mower to the ground.
2. Stop the engine, and remove the key from the ignition.
3. Loosen upper jam nut (A) on both sides of conditioner.
4. Turn lower nut (B) counterclockwise until upper roll rests on 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 header.

#### **IMPORTANT:**

Make sure roll gap adjustment nuts are adjusted equally on both sides of the header 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 3.113: Roll Gap Adjustment**

## OPERATION

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

#### **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 disc mower to the ground.
2. Stop the engine, and remove the key from the ignition.
3. Loosen jam nut (A) on both sides of conditioner.
4. Turn lower nut (B) counterclockwise until upper roll rests on lower roll. Ensure rolls intermesh.
5. Turn lower nut (B) two and a half full turns clockwise to raise 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 header.

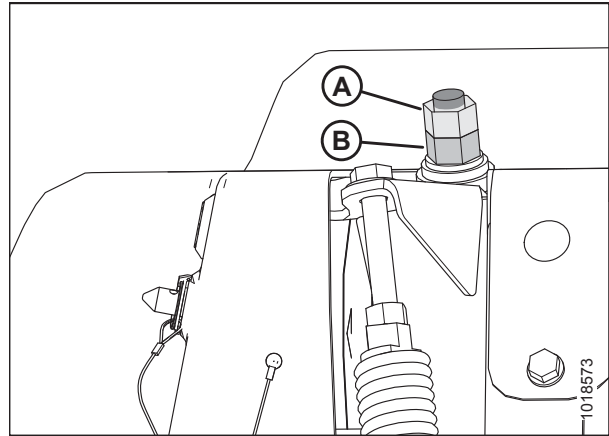
#### **IMPORTANT:**

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

7. If further adjustment to roll gap is required:
  - Turn lower nut (B) clockwise to increase roll gap.
  - Turn lower nut (B) counterclockwise to decrease roll gap.

#### **NOTE:**

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



**Figure 3.114: Roll Gap Adjustment**

### 3.16.2 Roll Tension

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

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

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

#### *Adjusting Roll Tension*

To adjust roll tension, follow these steps:

#### **DANGER**

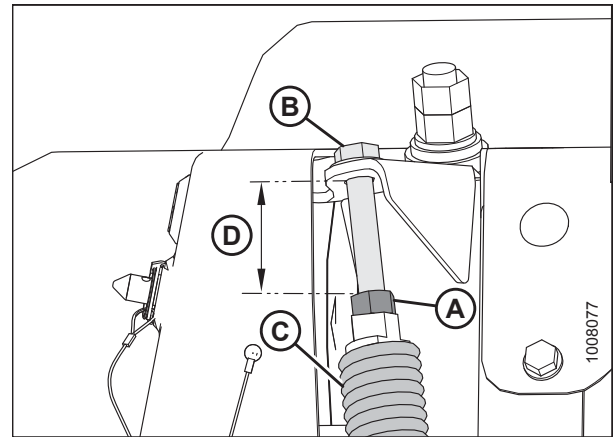
**To avoid bodily injury or death from unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.**

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

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



**Figure 3.115: Left Side Shown – Right Side Opposite**

### 3.16.3 Roll Timing

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

**IMPORTANT:**

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

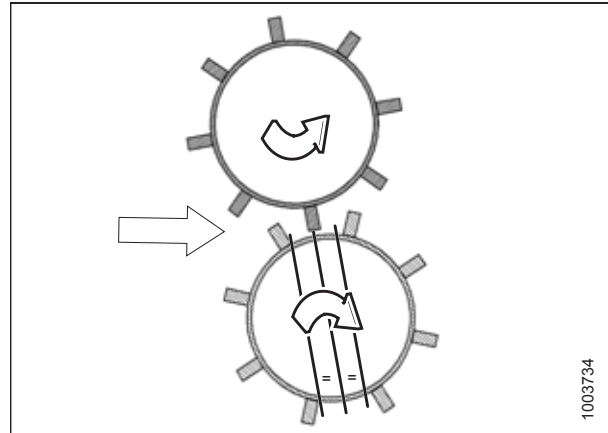


Figure 3.116: Properly Timed Rolls

#### Checking Roll Timing

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



#### **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.**

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. Refer to [Adjusting Roll Timing, page 104](#).

#### Adjusting Roll Timing

1. Shut down the engine and remove the key.
2. Loosen four bolts (A) in slots of yoke plate (B) on upper roll universal shaft.

**NOTE:**

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

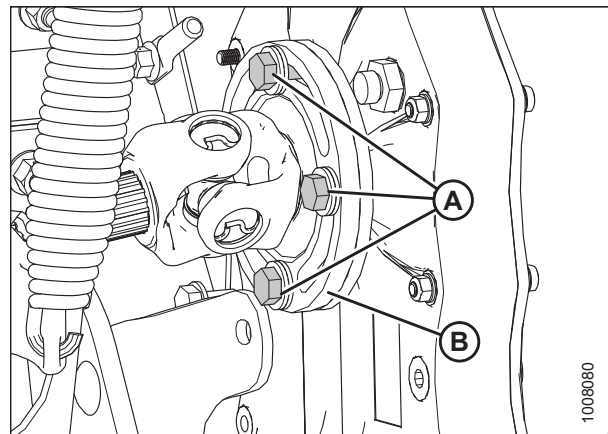
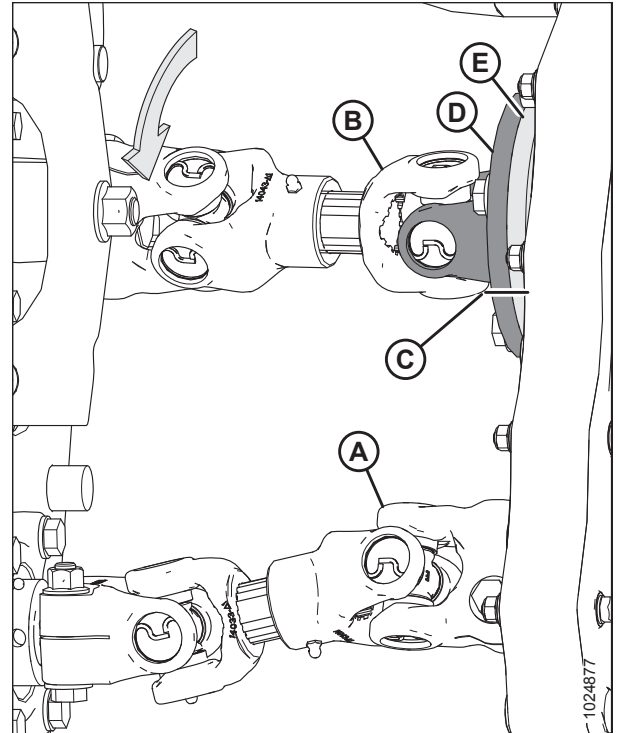


Figure 3.117: Conditioner Drive

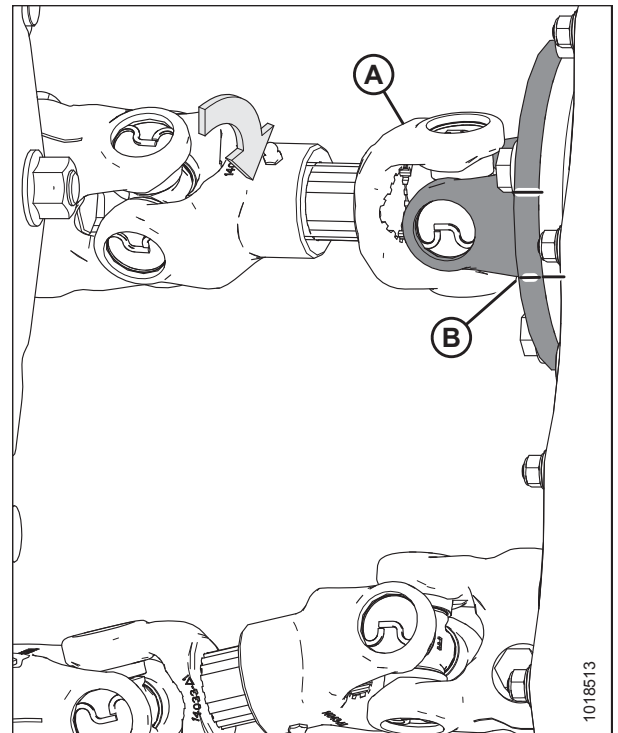
## OPERATION

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 3.118: Conditioner Drive**

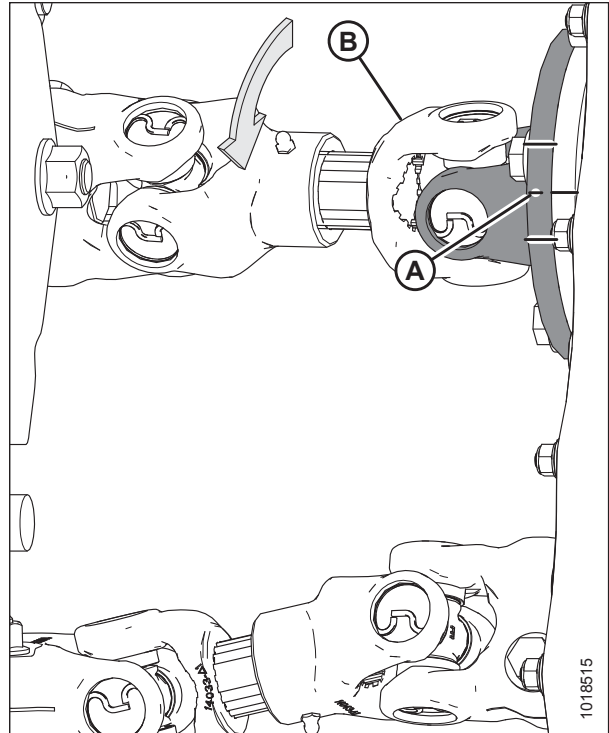
6. Manually rotate upper roll (A) in a clockwise direction until it stops. Make a second mark (B) on the yoke flange, and align it with the mark on the gearbox flange.



**Figure 3.119: Conditioner Drive**

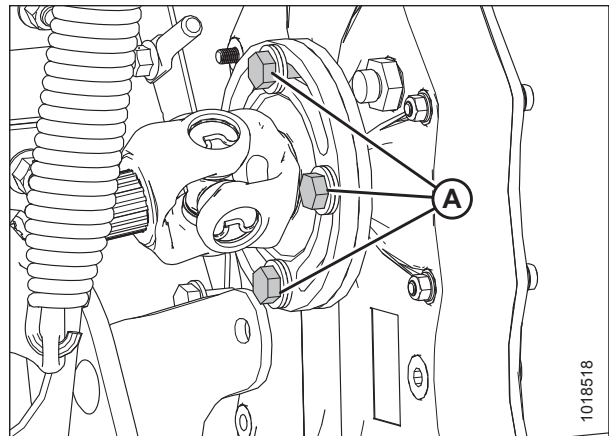
## OPERATION

7. Determine the center point (A) between the two marks on the yoke plate, and place a third mark.
8. Rotate upper roll (B) in the counterclockwise direction until the bolt lines up with the third (center) mark.



**Figure 3.120: Conditioner Drive**

9. Ensure threads on four bolts (A) are clean and free of lubricant (fourth bolt not shown in illustration at right).
10. Apply medium-strength threadlocker (Loctite® 242 or equivalent), and tighten bolts (A). Torque to 95 Nm (70 lbf·ft).



**Figure 3.121: Conditioner Drive**

### 3.16.4 Adjusting Forming Shields: Roll Conditioner

#### **WARNING**

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

The position of the forming shields controls the width and placement of the windrow. Consider the following factors when setting the forming shield position:

- 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. 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).

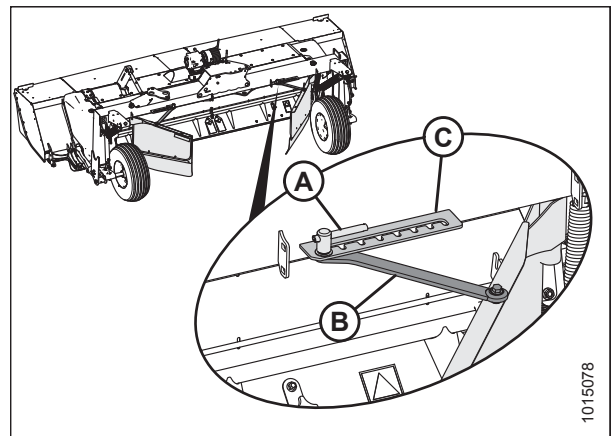
#### *Positioning Forming Shield Side Deflectors: Roll Conditioner*

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

#### **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. Loosen the locking handle (A).
2. Slide the adjuster bar (B) along adjuster plate (C) to the desired deflector position and engage the bar (B) into a notch in the adjuster plate.
3. Tighten locking handle (A).
4. Repeat for other side.



**Figure 3.122: Side Deflector and Adjuster Bar**

## OPERATION

### *Positioning Forming Shield Rear Baffle: Roll Conditioner*

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

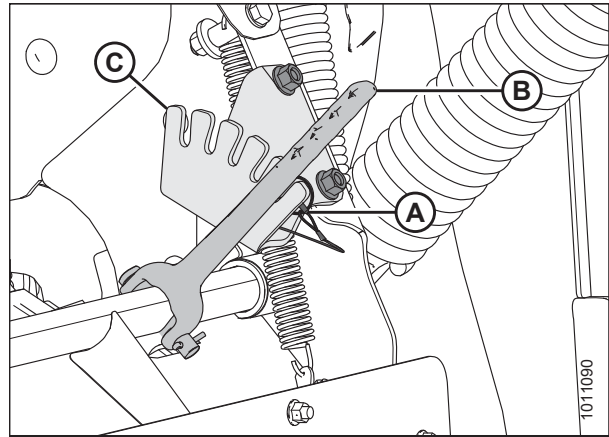
- Direct crop flow into forming shield for narrow and moderate width windrows.
- Direct crop downward to form a wide swath.

To position rear baffle, follow these steps:

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



**Figure 3.123: Right Side of Conditioner**

## 3.17 Conditioning: Finger Type

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

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

### 3.17.1 Internal Intensity Baffle

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

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

The baffle is located in front of and above the finger rotor. Set 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

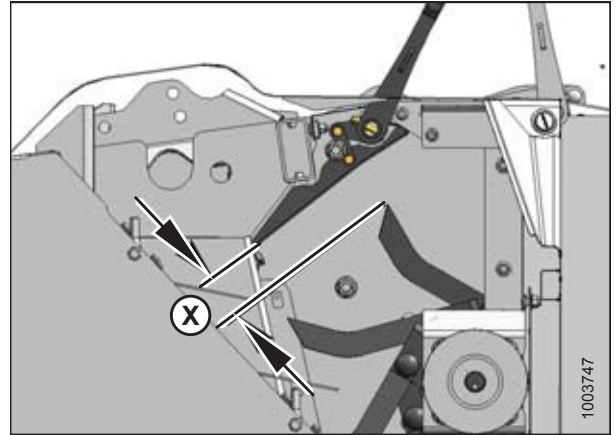


Figure 3.124: Internal Intensity Baffle

#### *Adjusting Internal Intensity Baffle Clearance*



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

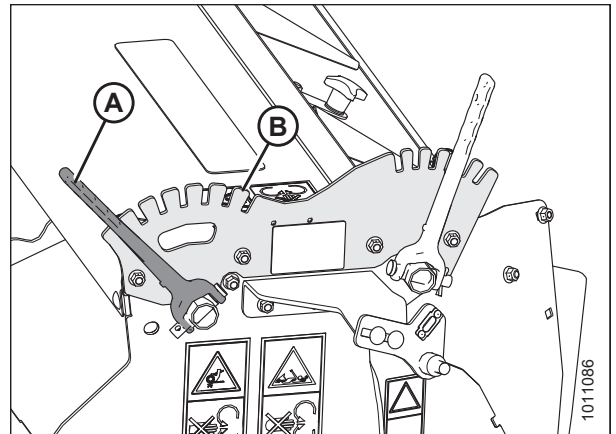


Figure 3.125: Internal Intensity Baffle Adjustment Lever

### 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**

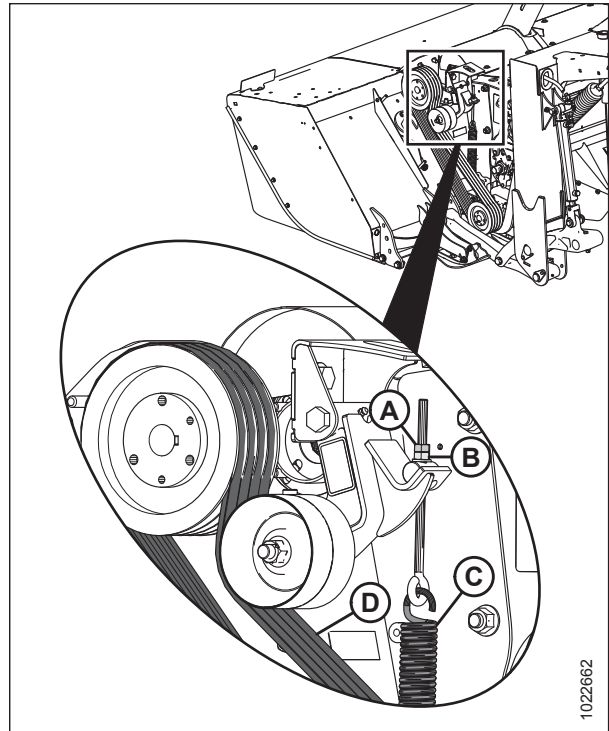
**To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.**

#### **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.

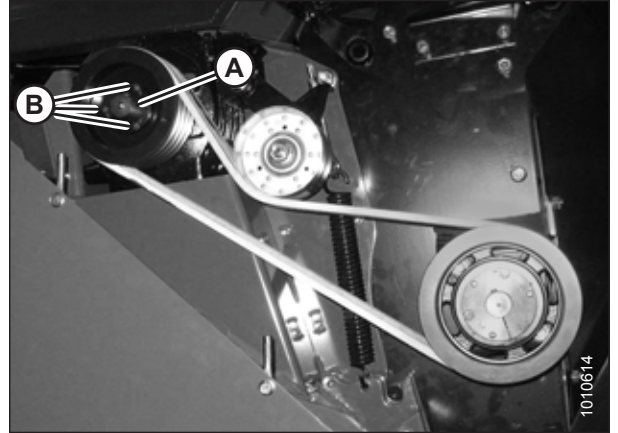
1. Turn jam nut (A) counterclockwise to unlock tension adjustment.
2. Turn jam nut (A) and adjuster nut (B) counterclockwise to fully collapse tensioner spring (C) and release the tension from conditioner drive belt (D).
3. Remove drive belt (D).



**Figure 3.126: Drive Belt and Pulleys on Left Side of Mower**

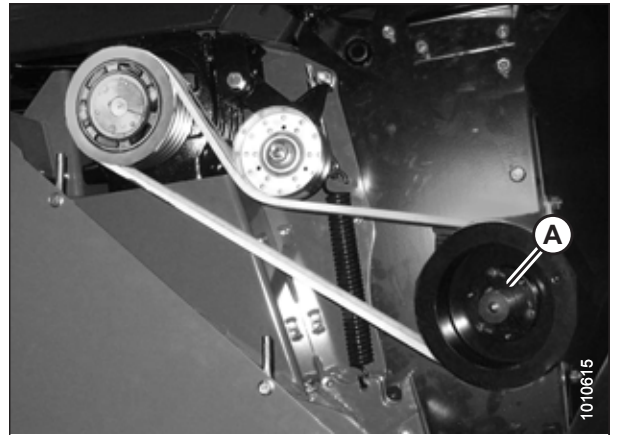
## OPERATION

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



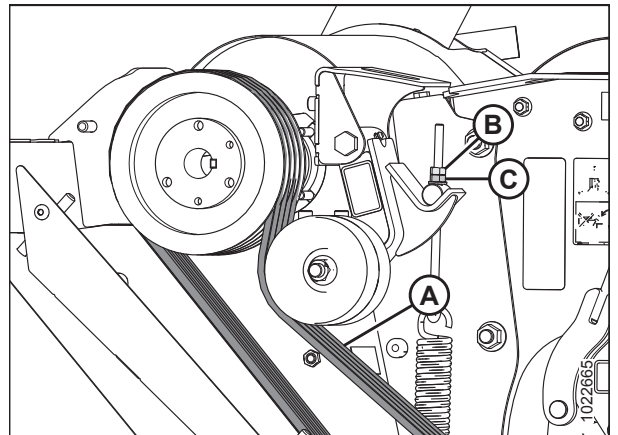
**Figure 3.127: Drive Belt and Pulleys on Left Side of Mower**

9. Slip the taper lock bushing (A) onto the shaft at the same depth measurement recorded in Step 4, [page 111](#). Pulley will be drawn into taper lock when tightening.
10. Repeat Step 9, [page 111](#) for the second pulley.
11. 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 3.128: Drive Belt and Pulleys on Left Side of Mower**

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



**Figure 3.129: Jam Nut and Adjuster Nut on Left Side of Mower**

## OPERATION

15. Measure the length of tensioner spring (A), and turn adjuster nut (B) to adjust spring length to 36.5 cm (14-3/8 in.) to conform with spring tension decal (C).

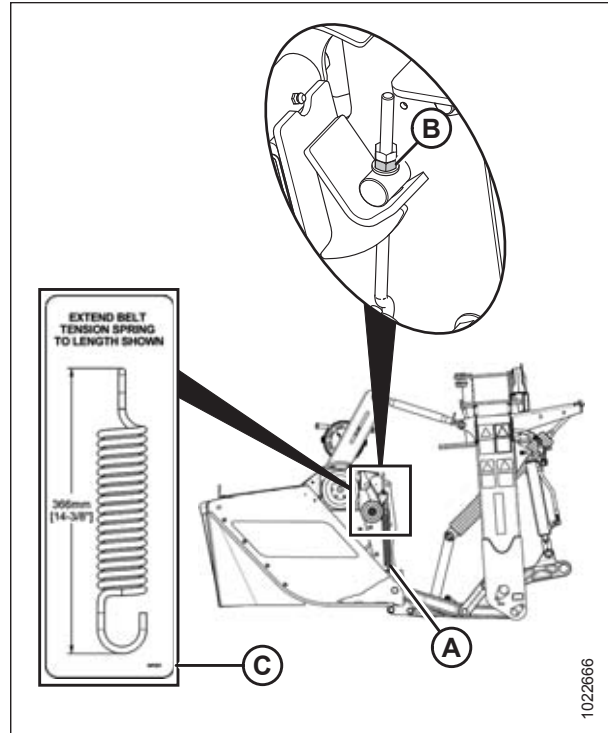


Figure 3.130: Spring Tension Decal

16. Install jam nut (A).
17. Hold a wrench on adjuster nut (B) and turn jam nut (A) clockwise into adjuster nut to lock tension adjustment.
18. Verify that pulleys run true and if any of the pulleys wobble, proceed to Step 1, page 110 and repeat procedure to reinstall taper locks on the affected pulleys.

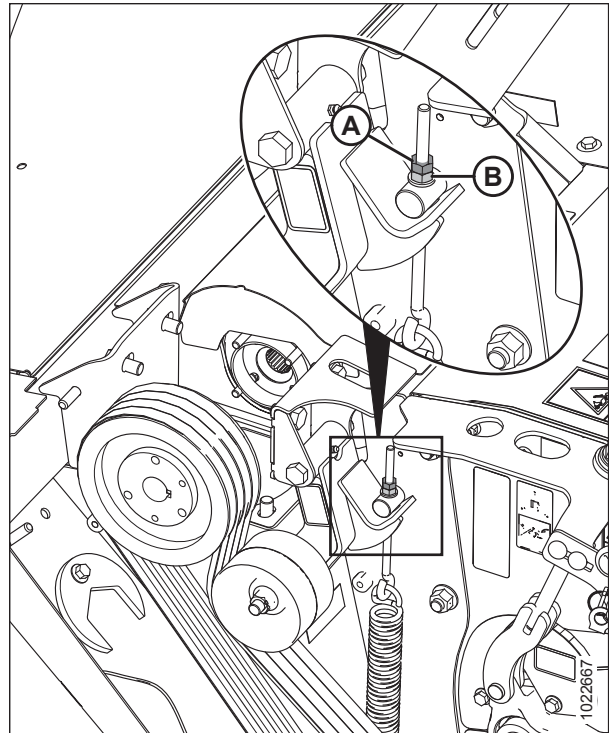


Figure 3.131: Conditioner Drive

### 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).

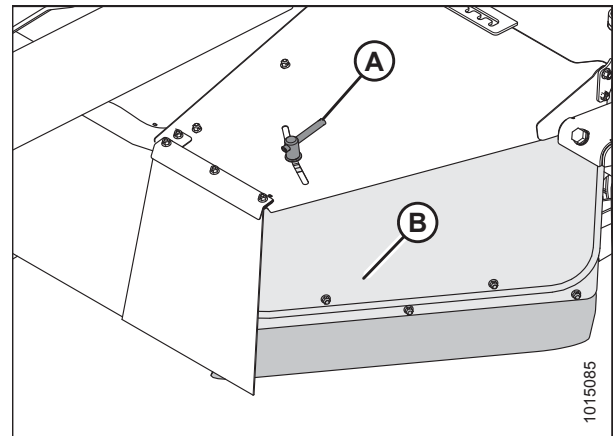
#### *Positioning Side Deflectors: Finger Conditioner*

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 machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.**

1. Loosen handle (A) on top cover.
2. Move side deflector (B) to desired position.
3. Tighten the handle.
4. Repeat for other side.

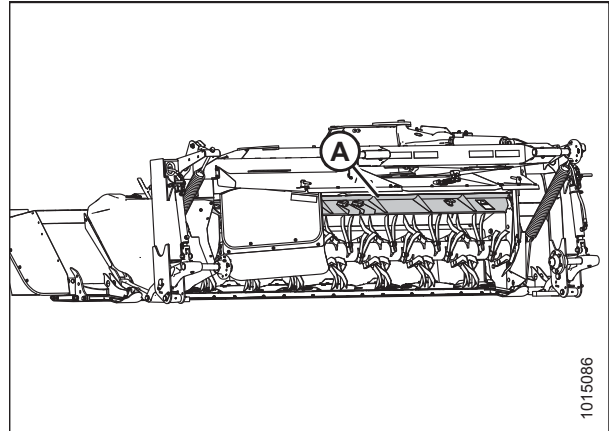


**Figure 3.132: Right Side Shown – Left Side Opposite**

## OPERATION

### *Positioning Rear Baffle: Finger Conditioner*

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



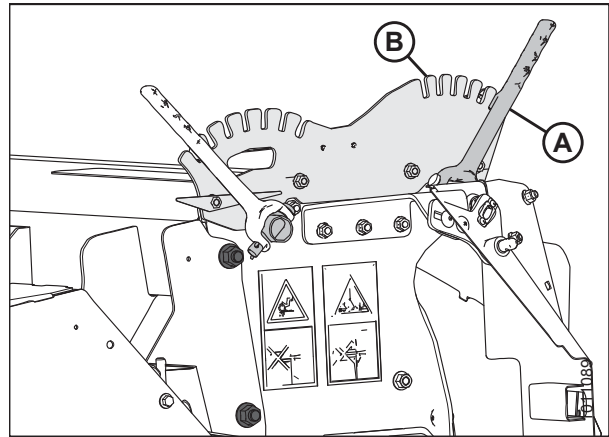
**Figure 3.133: Rear Baffle Finger Conditioner**

### **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.**

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

1. Pull rear baffle adjustment lever (A) outboard to disengage tab from adjustment plate (B).
2. Position rear baffle adjustment lever (A) as follows:
  - a. To raise baffle, move lever forward.
  - b. To lower baffle, move lever backward.
3. Release rear baffle adjustment lever (A) so that tab engages hole in adjustment plate (B).



**Figure 3.134: Rear Baffle Adjustment Lever**

## 3.18 Haying Tips

### 3.18.1 Curing

Curing crops quickly helps maintain the highest quality of crop material as 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

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

### 3.18.3 Weather and Topography

- Cut as much hay as possible by midday when drying conditions are best.
- Slopes that face the sun receive up to 100% more exposure to the sun's heat than slopes that do not face the sun. If hay is baled and chopped, consider baling sun facing slopes and chopping slopes that do not.
- When relative humidity is high, the evaporation rate is low and 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

Producing windrows with the recommended characteristics will achieve the best results. Refer to [3.15 Operating the Disc Mower, page 88](#) for instructions on adjusting the pull-type disc mower.

**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 forming shields to produce a narrower windrow that the machine can straddle.

**NOTE:**

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

### 3.18.6 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 tilled 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 and allowing moisture to escape cut crop and evaporate faster; however, treated hay lying on wet ground will absorb ground moisture faster.

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

### 3.19 Checking Level of the Disc Mower

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

If the disc mower is **NOT** level, check the tire pressure and ensure proper inflation. Refer to [Inflating Tires, page 271](#).

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

## 3.20 Unplugging the Disc Mower

The cutterbar or the conditioner rolls (if installed) can get plugged with crop. Do the following steps to safely unplug the cutterbar:

### DANGER

To avoid bodily injury or death from unexpected startup of machine, always stop tractor engine and remove key before removing plugged material from disc mower.

1. Stop forward movement of the tractor and stop the power take-off (PTO).
2. Raise the disc mower fully, shut down the tractor engine, and remove the key.
3. Engage lift cylinder lock-out valves. For instructions, refer to [3.1.1 Engaging Locks, page 33](#).

### WARNING

Wear heavy gloves when working around cutterbar.

4. Open cutterbar doors. For instructions, refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

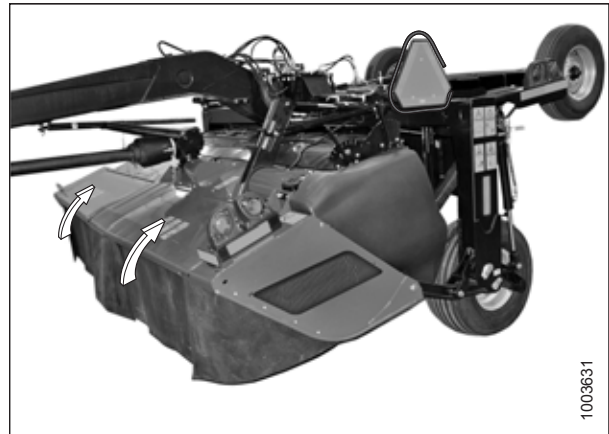


Figure 3.135: Cutterbar Doors

5. Clean off cutterbar or rolls by hand.

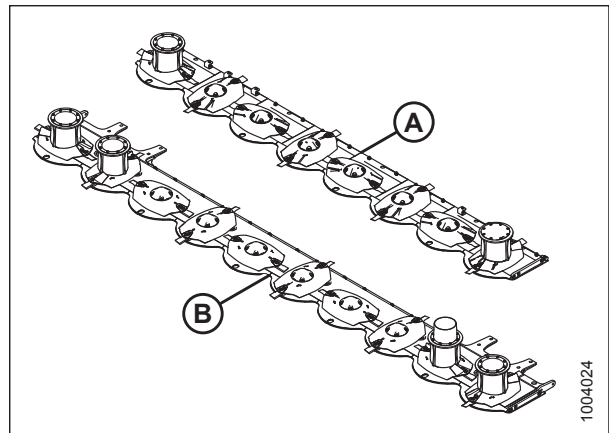


Figure 3.136: R113 and R116 Cutterbars

A - 4.0 m (13-ft.) Cutterbar

B - 4.9 m (16-ft.) Cutterbar

## OPERATION

6. Close cutterbar doors. For instructions, refer to [3.3.3 Closing Cutterbar Doors, page 40](#).



**Figure 3.137: Cutterbar Doors in Closed Position**



## 4 Maintenance and Servicing

The following instructions provide information about routine disc mower service. A parts catalog is located in a plastic case at the right end of the disc mower.

Log hours of operation and use the maintenance record provided (refer to [4.3.1 Maintenance Schedule/Record](#), [page 126](#)) to keep track of your scheduled maintenance.

### 4.1 Recommended Safety Procedures

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



Figure 4.1: Safety Around Equipment

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



Figure 4.2: Safety Equipment

## 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 lube fitting) will cause drive components in other areas (belts, pulleys, and discs) to move. Stay clear of driven components at all times.



Figure 4.3: Safety Around Equipment

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

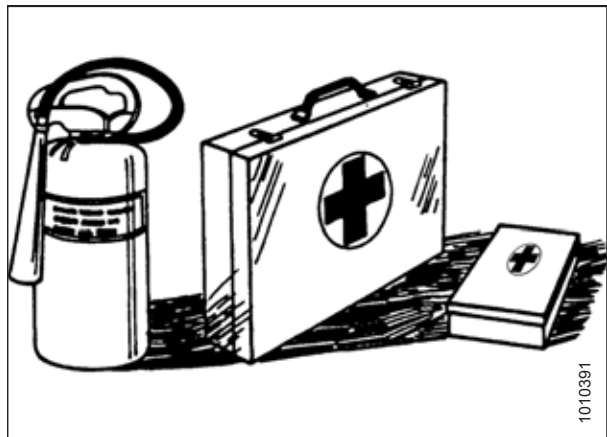


Figure 4.4: Safety Equipment

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



Figure 4.5: Safety Around Equipment

## MAINTENANCE AND SERVICING

- 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

### CAUTION

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

1. Lower the disc mower fully. If you need to perform service in the raised position, always close lift cylinder lock-out valves. For instructions, refer to [3.1 Lift Cylinder Lock-Out Valves, page 33](#).
2. Disengage power take-off (PTO).
3. Stop engine and remove key.
4. Engage park brake.
5. Wait for all moving parts to stop.

## 4.3 Maintenance Requirements

### IMPORTANT:

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

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

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. Refer to this manual's inside back cover and use only the specified fluids and lubricants.

Log hours of operation, use the maintenance record, and keep copies of your maintenance records. Refer to [4.3.1 Maintenance Schedule/Record, page 126](#).






### CAUTION

Carefully follow all safety messages. 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.

Action		✓ Check					⬇ Lubricate					▲ Change				
	Hour meter reading															
	Service date															
	Serviced by															
First use		Refer to <a href="#">4.3.2 Break-In Inspections, page 129</a> .														
End of season		Refer to <a href="#">4.3.4 End-of-Season Servicing, page 130</a> .														
<b>First Hour<sup>9</sup></b>																
✓	Check for loose hardware. Refer to <a href="#">7.1 Torque Specifications, page 307</a> .															
✓	Check clutch operation and slippage. Refer to <a href="#">Checking Clutch Operation, page 240</a> .															
<b>First 5 Hours</b>																
✓	Check for loose hardware. Refer to <a href="#">7.1 Torque Specifications, page 307</a> .															
✓	Check conditioner drive belt tension. Refer to <a href="#">Inspecting Conditioner Drive Belt, page 253</a> .															
<b>First 10 Hours, Then Daily</b>																
✓	Check hydraulic hoses and lines. Refer to <a href="#">4.6.1 Checking Hydraulic Hoses and Lines, page 273</a> .															
✓	Check cutterbar discs. Refer to <a href="#">Inspecting Cutterbar Discs, page 155</a> .															
✓	Check cutterbar disclades. Refer to <a href="#">Inspecting Disclades, page 170</a> .															
✓	Check cutterbar drums. Refer to <a href="#">Inspecting Large Drums, page 194</a> .															
<b>First 25 Hours</b>																
✓	Check conditioner drive belt tension. Refer to <a href="#">Inspecting Conditioner Drive Belt, page 253</a> .															
▲	Change conditioner roll timing gearbox oil. Refer to <a href="#">Checking and Changing Conditioner Roll Timing Gearbox Oil, page 258</a> .															

9. Begins from first use of machine.

# MAINTENANCE AND SERVICING

Action		✓ Check		⬇ Lubricate				▲ Change					
Every 25 Hours													
✓	Check conditioner drive belt tension. Refer to <i>Inspecting Conditioner Drive Belt, page 253.</i>												
⬇	Lube idler pivot. Refer to <i>4.3.5 Lubricating the Disc Mower, page 132.</i>												
⬇	Lube upper and lower driveline universal joints. Refer to <i>4.3.5 Lubricating the Disc Mower, page 132.</i>												
⬇	Lube roller conditioner bearings. Refer to <i>4.3.5 Lubricating the Disc Mower, page 132.</i>												
⬇	Lube conditioner roll driveline slip joints. Refer to <i>4.3.5 Lubricating the Disc Mower, page 132.</i>												
First 50 Hours													
✓	Check conditioner drive belt tension. Refer to <i>Inspecting Conditioner Drive Belt, page 253.</i>												
▲	Change roll timing gearbox lubricant. Refer to <i>Checking and Changing Conditioner Roll Timing Gearbox Oil, page 258.</i>												
▲	Change mower drive gearbox lubricant. Refer to <i>Checking and Adding Cutterbar-Conditioner Drive Gearbox (T-Gearbox) (MD #224211) Lubricant, page 260.</i>												
Every 100 Hours or Annually													
✓	Check conditioner drive belt tension. Refer to <i>Inspecting Conditioner Drive Belt, page 253.</i>												
✓	Check roll timing gearbox lubricant. Refer to <i>Checking and Changing Conditioner Roll Timing Gearbox Oil, page 258.</i>												
✓	Check mower drive gearbox lubricant. Refer to <i>Checking and Adding Cutterbar-Conditioner Drive Gearbox (T-Gearbox) (MD #224211) Lubricant, page 260.</i>												

# MAINTENANCE AND SERVICING

Action		✓ Check		⬇ Lubricate				▲ Change					
First 150 Hours													
▲	Change cutterbar lubricant. Refer to <a href="#">4.4.3 Lubricating Cutterbar, page 151<sup>10</sup></a> .												
▲	Change roll timing gearbox lubricant. Refer to <a href="#">Checking and Changing Conditioner Roll Timing Gearbox Oil, page 258</a> .												
▲	Change mower drive gearbox lubricant. Refer to <a href="#">Checking and Adding Cutterbar-Conditioner Drive Gearbox (T-Gearbox) (MD #224211) Lubricant, page 260</a> .												
Every 250 Hours <sup>11</sup>													
▲	Change cutterbar lubricant. Refer to <a href="#">4.4.3 Lubricating Cutterbar, page 151<sup>10</sup></a> .												
▲	Change roll timing gearbox lubricant. Refer to <a href="#">Checking and Changing Conditioner Roll Timing Gearbox Oil, page 258</a> .												
▲	Change mower drive gearbox lubricant. Refer to <a href="#">Checking and Adding Cutterbar-Conditioner Drive Gearbox (T-Gearbox) (MD #224211) Lubricant, page 260</a> .												

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

11. Begins after the first 150 hour service.

### 4.3.2 Break-In Inspections

Table 4.1 Break-In Inspection Schedule

Inspection Interval	Item	Refer to
<b>1 Hour</b>	Check wheel bolts	<i>Checking Wheel Bolts, page 269</i>
<b>1 Hour</b>	Check clutch operation and slippage	<i>Checking Clutch Operation, page 240</i>
<b>5 Hours</b>	Check for loose hardware and tighten to required torque	<i>7.1 Torque Specifications, page 307</i>
<b>5 Hours</b>	Check conditioner drive belt tension	<i>Inspecting Conditioner Drive Belt, page 253</i>
<b>25 Hours</b>	Check drive belt tension	<i>Inspecting Conditioner Drive Belt, page 253</i>
<b>25 Hours</b>	Check driveline taper pin torque	<i>4.5.8 Inspecting Driveline Taper Pins, page 247</i>
<b>50 Hours</b>	Check conditioner drive belt tension	<i>Inspecting Conditioner Drive Belt, page 253</i>
<b>50 Hours</b>	Check cutterbar lubricant	<i>4.4.3 Lubricating Cutterbar, page 151</i>
<b>50 Hours</b>	Check and change conditioner roll timing gearbox lubricant	<i>4.5.11 Servicing Conditioner Roll Timing Gearbox , page 257</i>
<b>50 Hours</b>	Check and change swivel gearbox (4) lubricant	<i>4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox , page 265</i>
<b>50 Hours</b>	Check and change mower drive gearbox lubricant	<i>4.5.12 Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 259</i>
<b>250 Hours</b>	Check and change swivel gearbox (4) lubricant	<i>4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox , page 265</i>
<b>250 Hours</b>	Check and change mower drive gearbox lubricant	<i>4.5.12 Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 259</i>

### 4.3.3 Preseason Servicing

#### CAUTION

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

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

1. Lubricate machine completely. Refer to [4.3.5 Lubricating the Disc Mower, page 132](#) and [4.4.3 Lubricating Cutterbar, page 151](#).
2. Check tire pressure and adjust as required. Refer to [Inflating Tires, page 271](#).
3. Perform all annual maintenance. Refer to [4.3.1 Maintenance Schedule/Record, page 126](#).

### 4.3.4 End-of-Season Servicing

#### CAUTION

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

#### CAUTION

**Cover cutterbar to prevent injury from accidental contact.**

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

1. Raise disc mower and engage lift cylinder lock-out valves.
2. Clean the disc mower thoroughly.
3. Check for worn components and repair as necessary.
4. Check for broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at beginning of next season.
5. Replace or tighten any missing or loose hardware. Refer to [7.1 Torque Specifications, page 307](#).
6. Lubricate the disc mower thoroughly leaving excess grease on fittings to keep moisture out of bearings.
7. Apply grease to exposed threads, cylinder rods, and sliding surfaces of components.
8. Oil cutterbar components to prevent rust.
9. Loosen drive belt.
10. Remove divider rods (if equipped) to reduce space required for inside storage.
11. Repaint all worn or chipped painted surfaces to prevent rust.

## **MAINTENANCE AND SERVICING**

12. Store in a dry, protected place if possible. If stored outside, always cover disc mower with a waterproof canvas or other protective material.
13. Use blocks to take the weight off the disc mower's tires if possible.

### 4.3.5 Lubricating the Disc Mower

#### **WARNING**

To avoid personal injury, before servicing disc mower or opening drive covers, refer to [4.2 Preparing Machine for Servicing, page 124](#).

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

Log hours of operation and use the maintenance schedule provided to keep a record of scheduled maintenance. Refer to [4.3.1 Maintenance Schedule/Record, page 126](#).

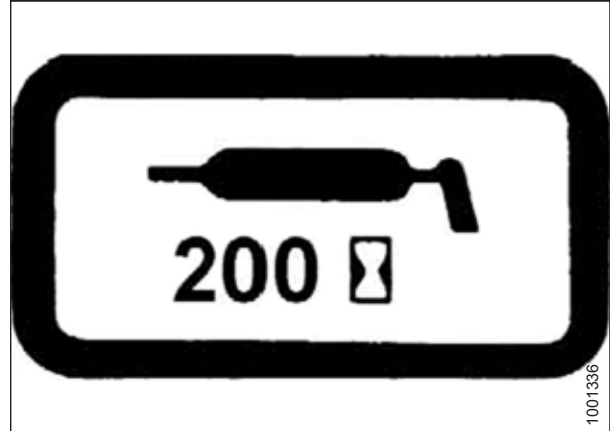


Figure 4.6: Grease Interval Decal

#### *Greasing Procedure*

Only use clean, high temperature, extreme pressure grease. Refer to this manual's inside back cover for a list of recommended fluids and lubricants.

#### **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. Open driveshields at the ends of the disc mower to access greasing points. Refer to [3.2.1 Opening Driveshields, page 35](#).
2. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
3. Replace any loose or broken fittings immediately.
4. Inject grease through fitting with grease gun until grease overflows fitting (except where noted).
5. Leave excess grease on fitting to keep out dirt.
6. Remove and thoroughly clean any fitting that will not take grease and clean lubricant passageway. Replace fitting if necessary.

## MAINTENANCE AND SERVICING

### *Service Intervals*

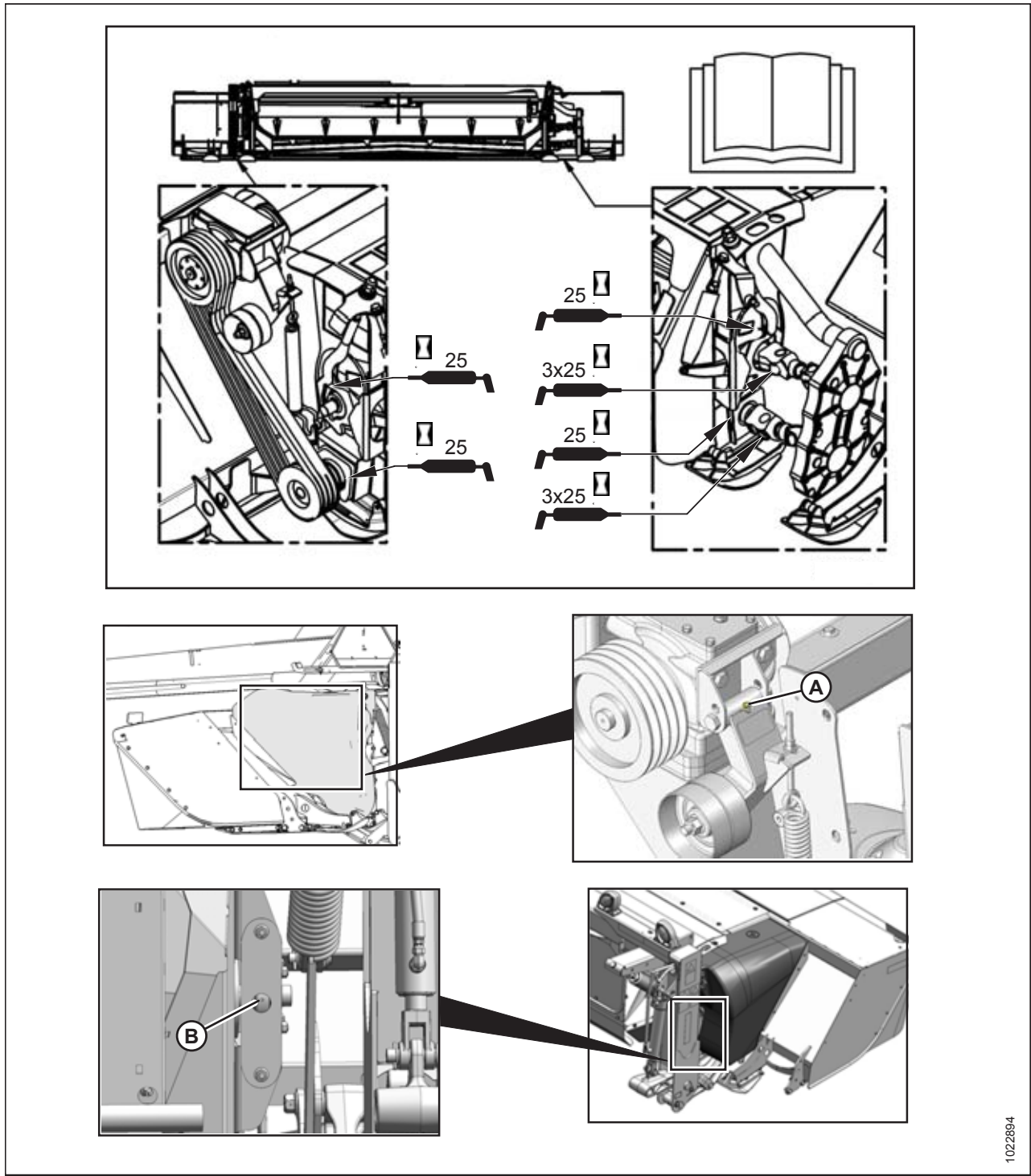
**NOTE:**

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

Figure 4.7: Grease Location (Every 25 Hours)

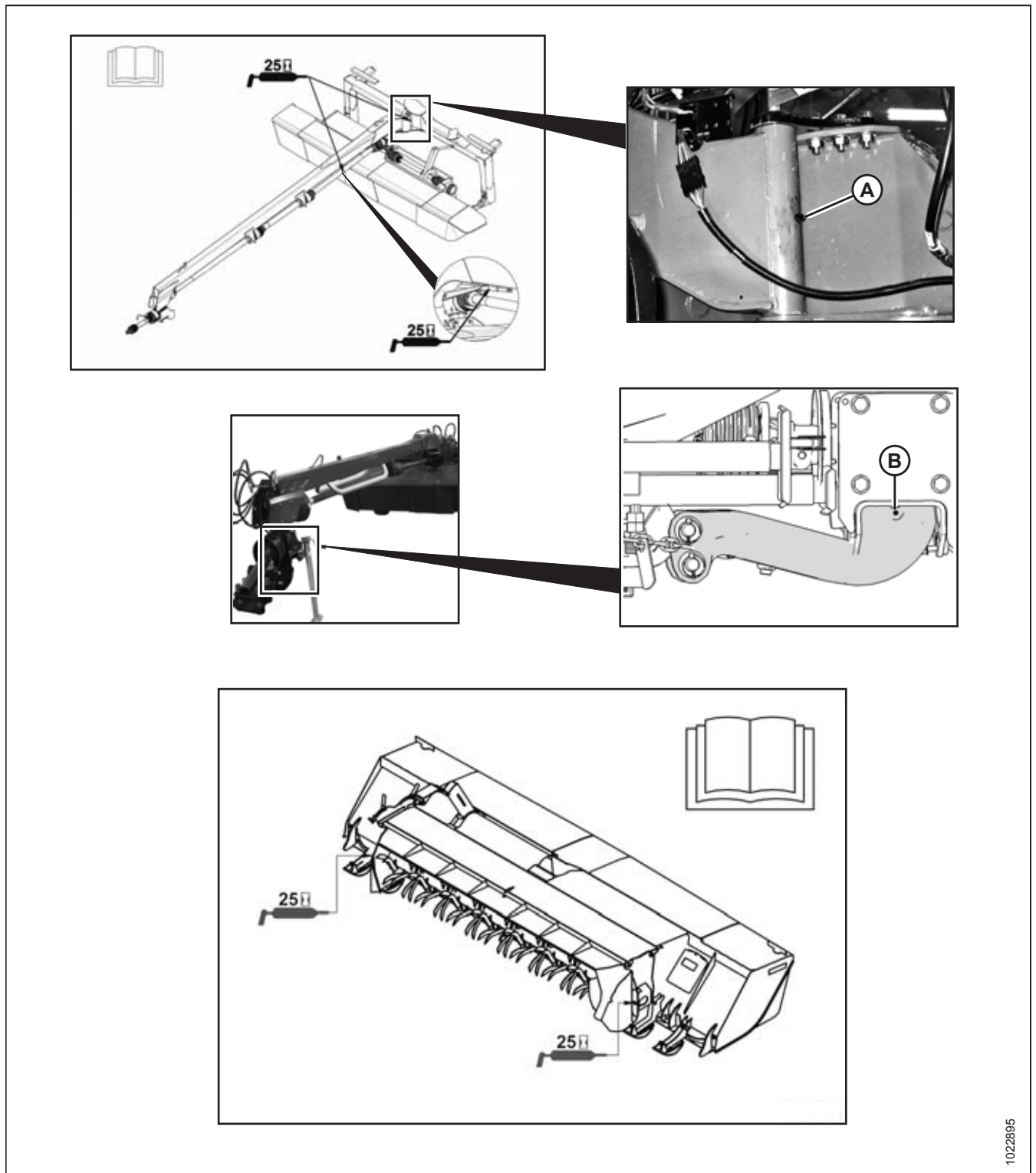


A - Conditioner Drive Idler

B - Bearing for Finger-Type Conditioner

## MAINTENANCE AND SERVICING

Figure 4.8: Grease Location (Every 25 Hours)



A - Hitch Steering Pivot

B - Tractor Hitch Pivot

1022895

## MAINTENANCE AND SERVICING

### NOTE:

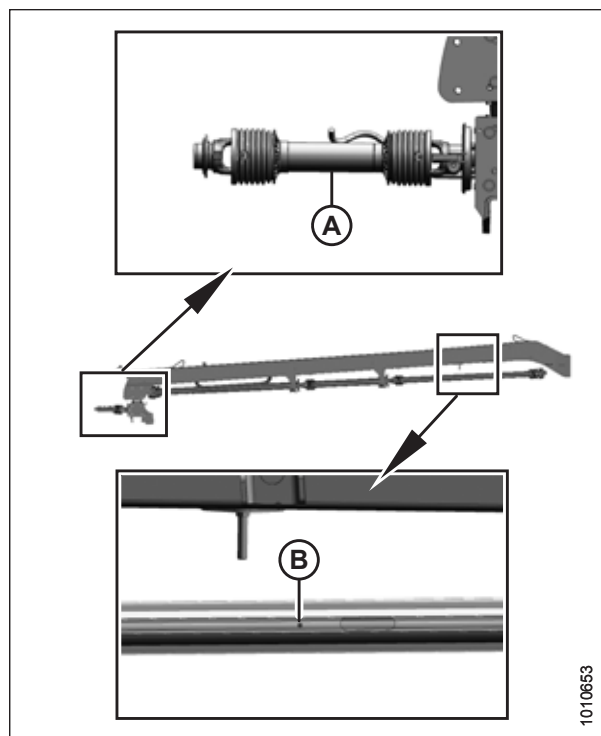
It may be necessary to remove and replace the driveline shield cones during the greasing procedure. Refer to [4.5.2 Driveline Shield Cone, page 219](#) for more information.

### 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 zerks.

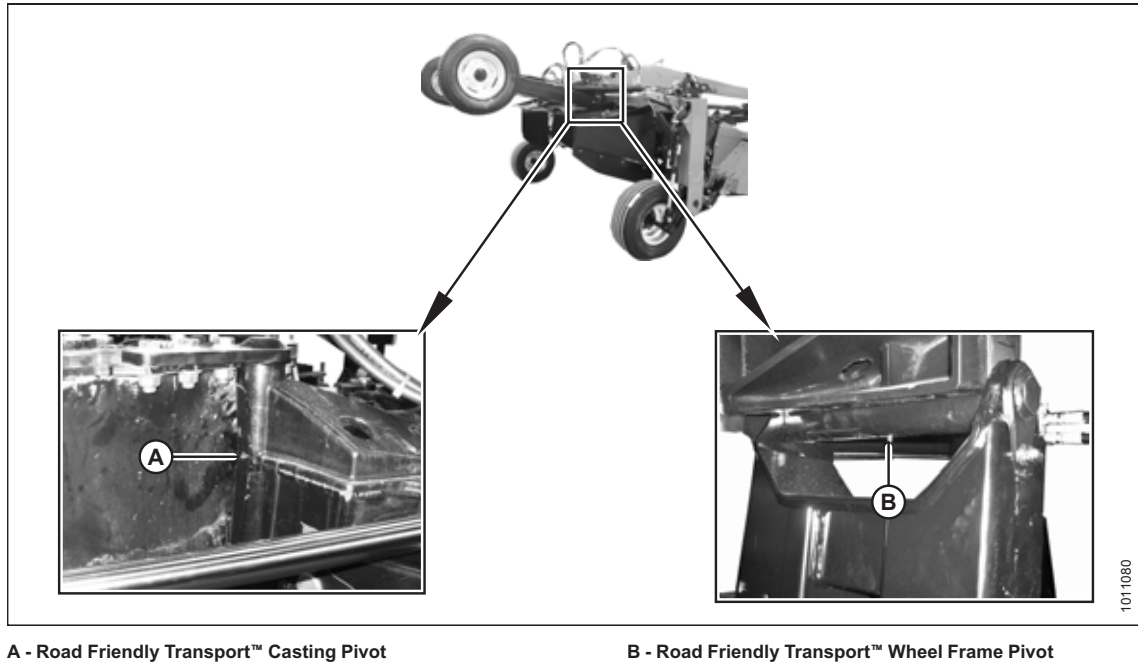


**Figure 4.9: Driveline Grease Location  
(Every 25 Hours)**

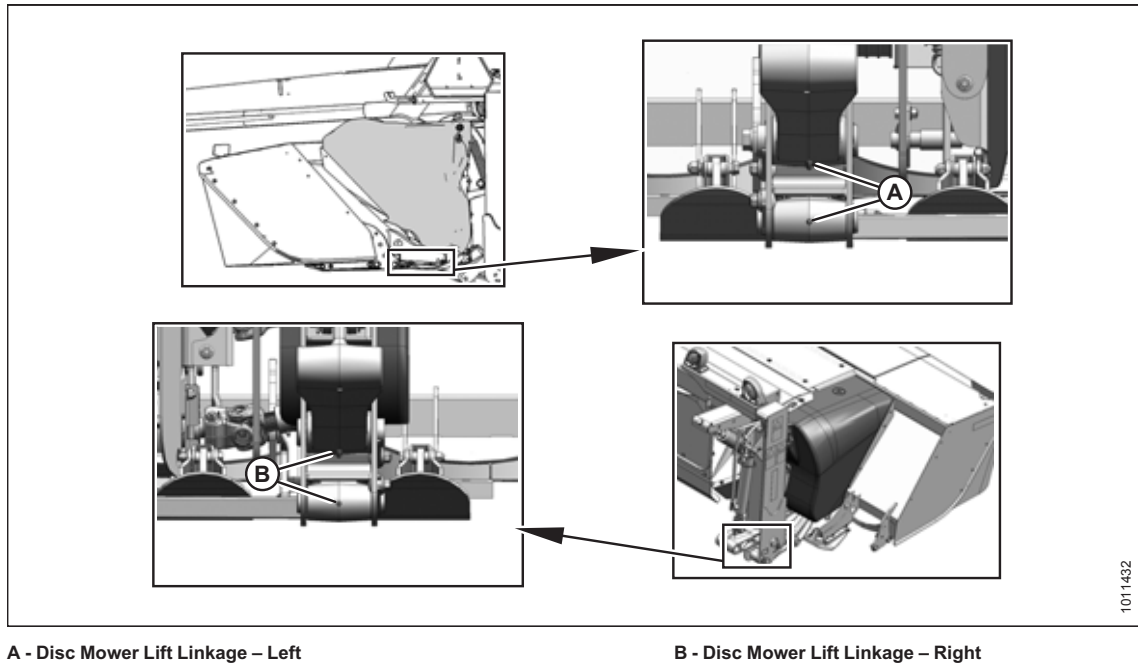
A - Primary Driveline Slip-Joint    B - Driveline Slip-Joint

## MAINTENANCE AND SERVICING

**Figure 4.10: Grease Location (Every 25 Hours)**



**Figure 4.11: Grease Location (Every 25 Hours)**



**NOTE:**

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

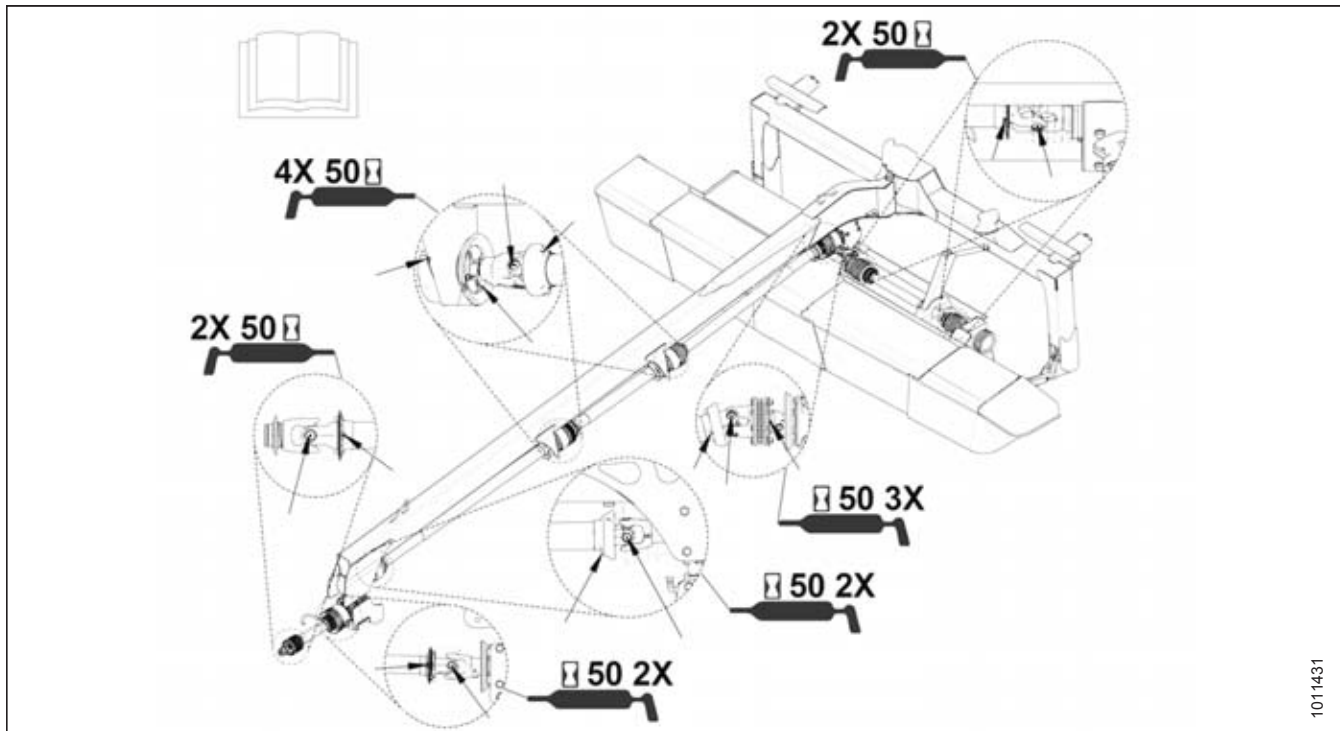
## MAINTENANCE AND SERVICING

### Every 50 Hours

#### 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)**



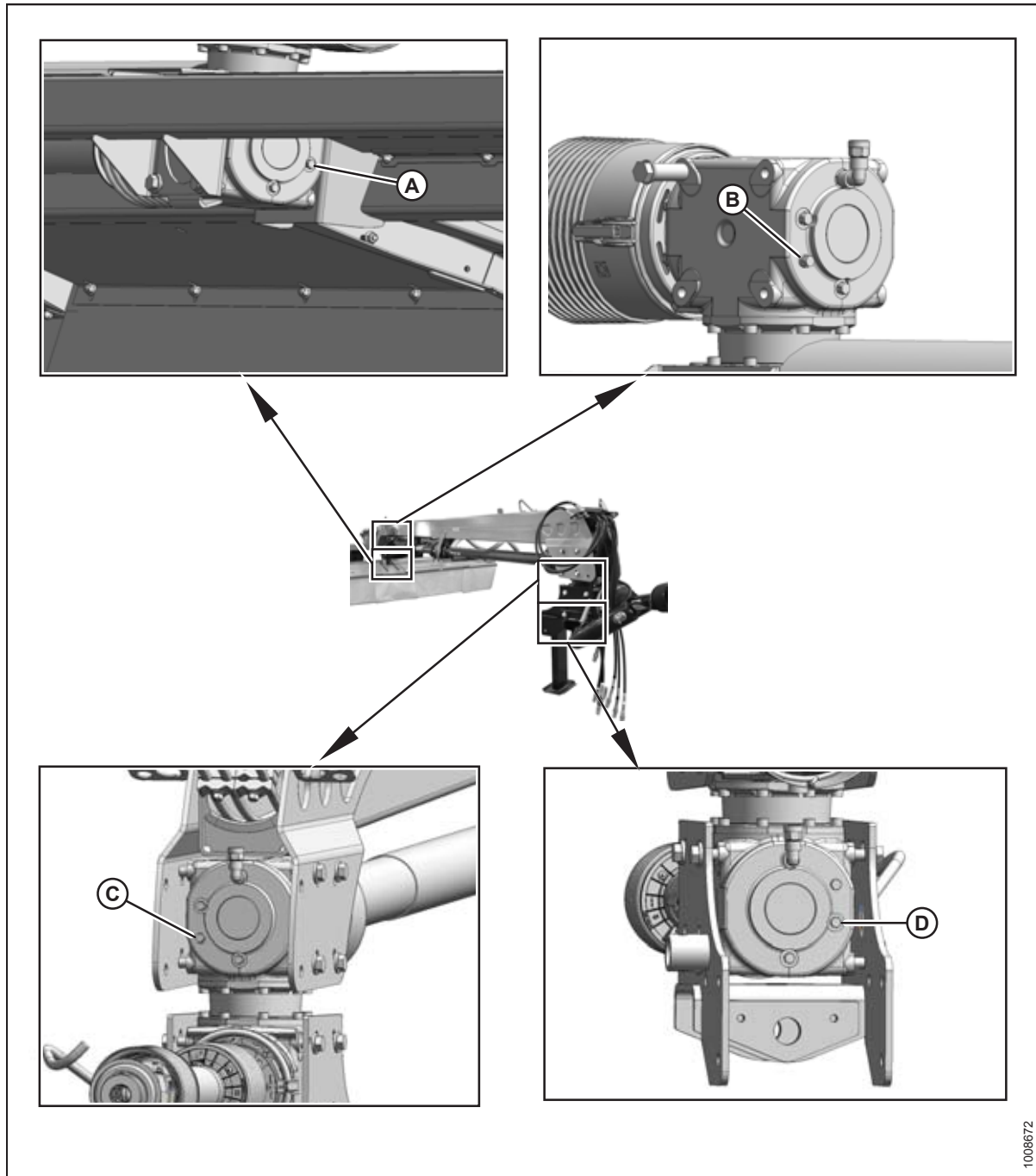
## MAINTENANCE AND SERVICING

### Every 100 Hours

#### NOTE:

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

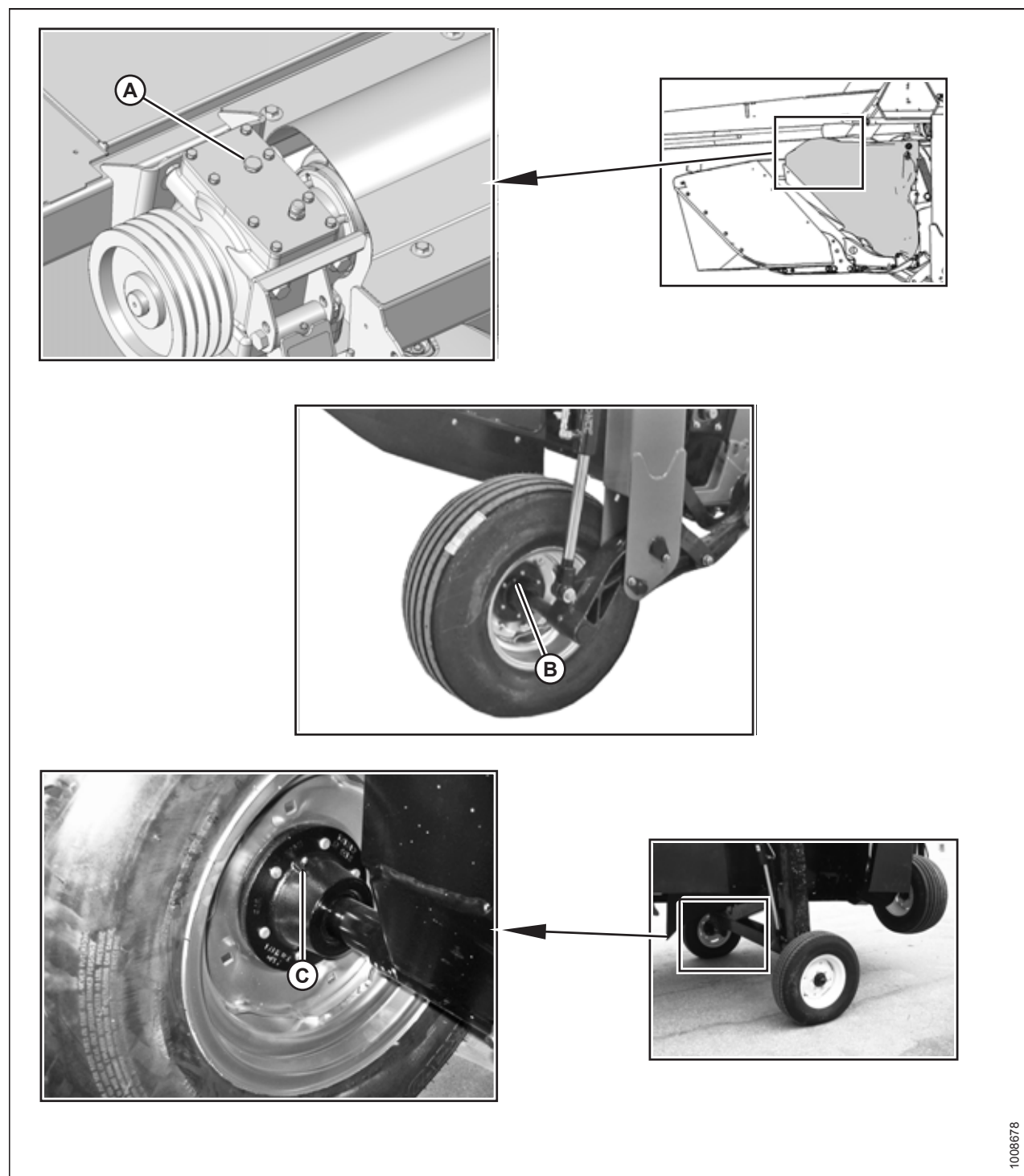
**Figure 4.13: Lubrication Location (Every 100 Hours)**



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)<sup>12</sup>  
C - Bearing - Road Friendly Transport™ Option (2 Places)

B - Bearing - Field Wheel (2 Places)<sup>13</sup>

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.

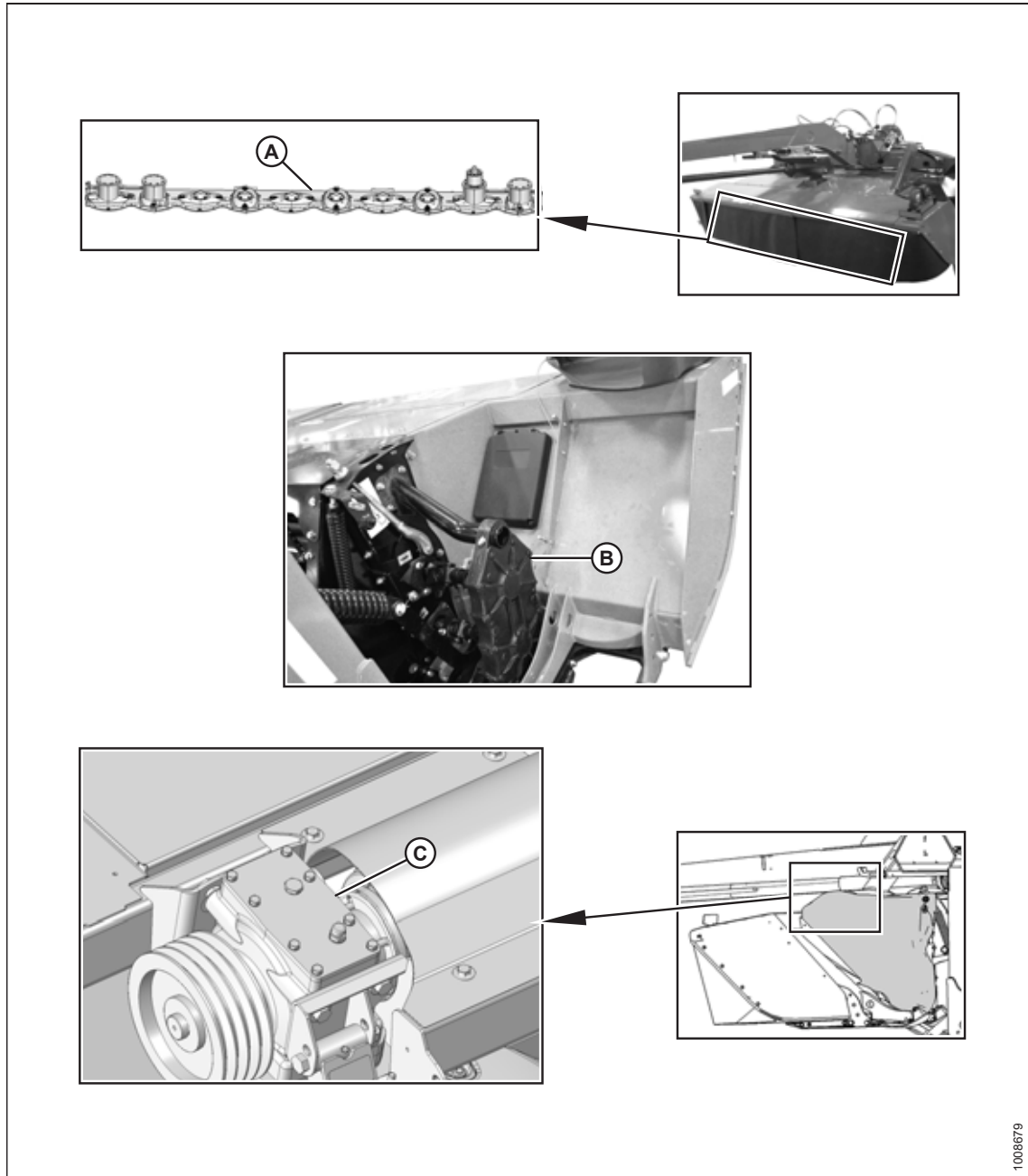
## MAINTENANCE AND SERVICING

### Every 250 Hours

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

- [4.4.3 Lubricating Cutterbar, page 151.](#)
- [Checking and Changing Conditioner Roll Timing Gearbox Oil, page 258.](#)

**Figure 4.15: Lubrication Location (Every 250 Hours)**



A - Cutterbar Lubrication Location

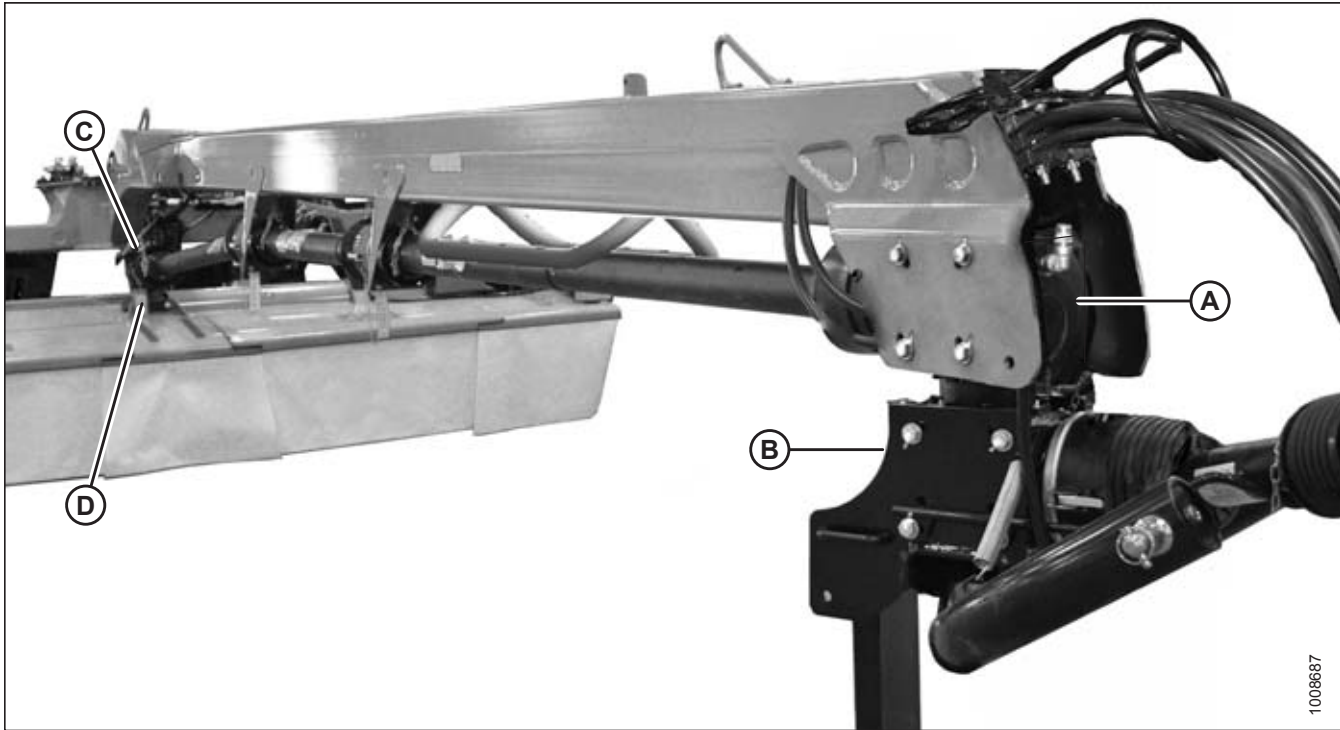
B - Conditioner Roll Timing Gearbox

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

## MAINTENANCE AND SERVICING

2. Change lubricant in hitch swivel gearboxes (A), (B), (C), and (D). Refer to [4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox](#), page 265.

**Figure 4.16: Lubrication Location (Every 250 Hours)**



A - Upper Forward Gearbox

B - Lower Forward Gearbox

C - Upper Rear Gearbox

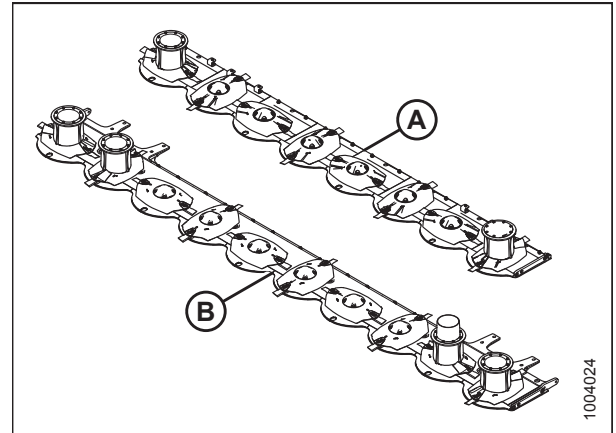
D - Lower Rear Gearbox

## 4.4 Servicing Cutterbar

Check and change the lubricant at regular intervals. Refer to [4.3.1 Maintenance Schedule/Record, page 126](#).

### IMPORTANT:

Warm cold lubricant by idling the machine for 10 minutes prior to checking level.



**Figure 4.17: R113 and R116 Cutterbars**

A - 4.0 m (13 ft.) Cutterbar

B - 4.9 m (16 ft.) Cutterbar

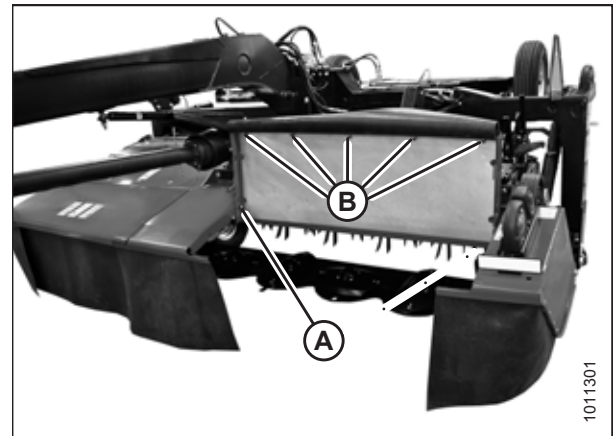
### 4.4.1 Cutterbar Doors

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*

1. Ensure that door operates smoothly and lies flat when closed. Adjust if necessary.
2. Inspect hinge pin bolts (A) and tighten to 68.5 Nm (50.5 lbf·ft) if loose.
3. Check door for cracks, and repair if required.
4. Check for exposed metal surfaces and surface rust. Repair and repaint if necessary.
5. Check shield/curtain bolts (B) and replace if missing, or tighten if loose.



**Figure 4.18: R113 Pull-Type Disc Mower**

## 4.4.2 Replacing Curtains

Rubber curtains are installed at the following locations:

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

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

Replace the curtains if they become worn or damaged.

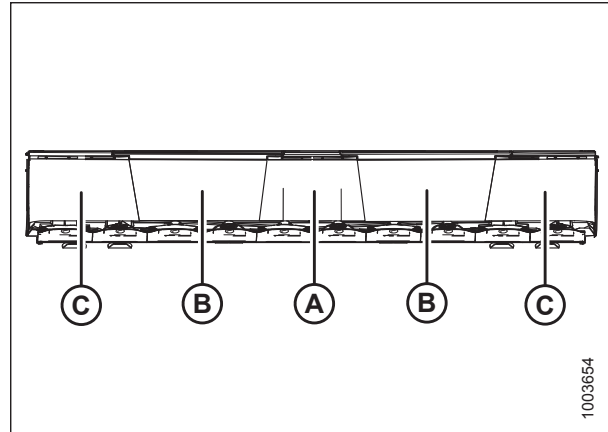


Figure 4.19: Cutterbar Curtains

### Inspecting Curtains

The cutterbar curtains are important safety features that reduce the potential for thrown objects. Always keep these curtains down when operating the disc mower.

#### WARNING

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

#### CAUTION

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

Check cutterbar curtains (A) for the following conditions:

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

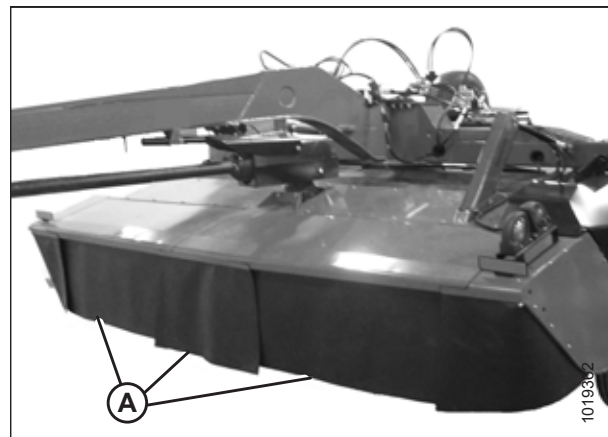


Figure 4.20: Cutterbar Curtains

### Removing Cutterbar Door Curtains

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

1. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.

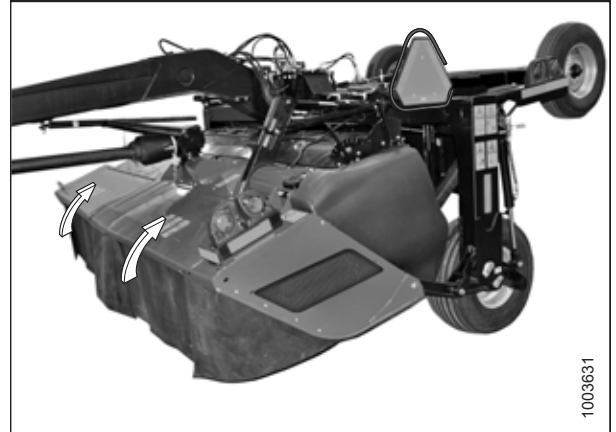


Figure 4.21: R113 Pull-Type Disc Mower

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

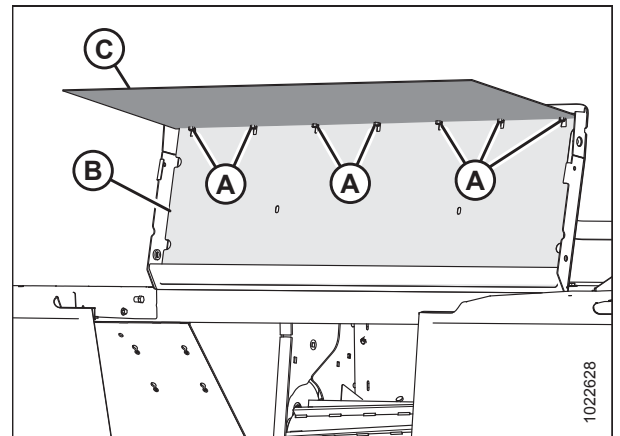


Figure 4.22: Cutterbar Door

### Installing Cutterbar Door Curtains

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

1. Insert the seven cutterbar door stud bolts (B) into the precut holes on curtain (A).
2. Install seven large washers (C).
3. Install liner panel (D) against washers.
4. Install seven nuts (E) onto bolt studs and torque to 28 Nm (21 lbf·ft).

**IMPORTANT:**

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

5. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.

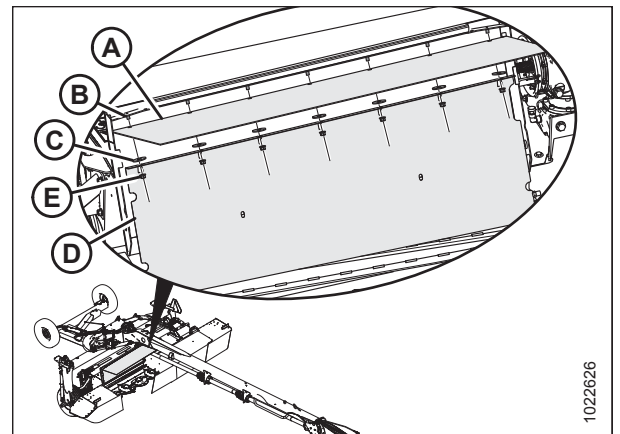
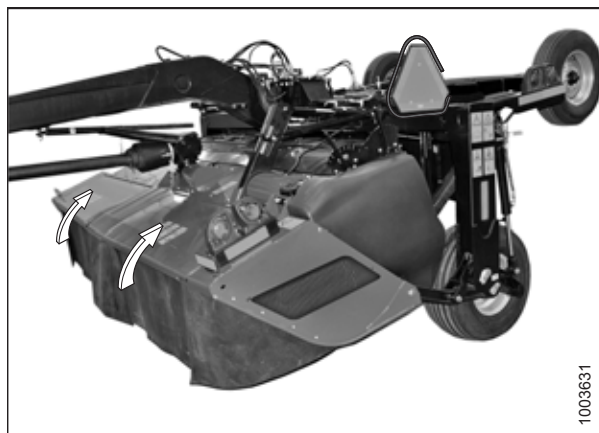


Figure 4.23: Cutterbar Curtain

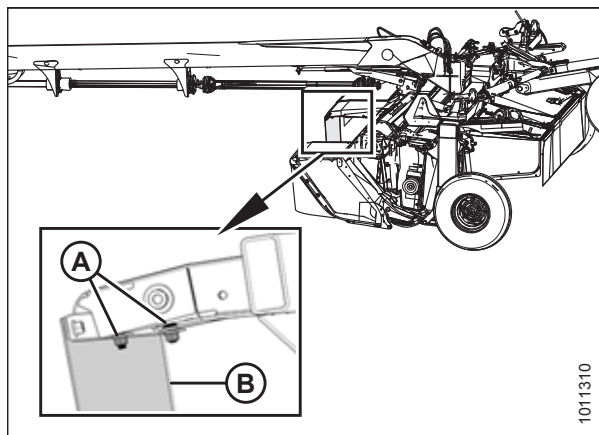
## *Removing Cutterbar Inboard Curtain*

1. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.



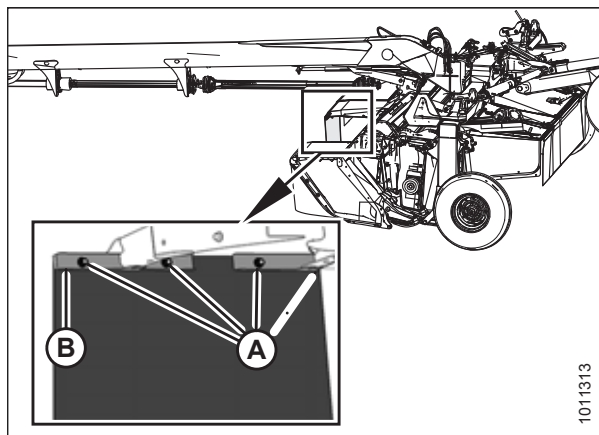
**Figure 4.24: R113 Pull-Type Disc Mower**

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



**Figure 4.25: Inboard Curtain**

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



**Figure 4.26: Inboard Curtain**

## Installing Cutterbar Inboard Curtain

1. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

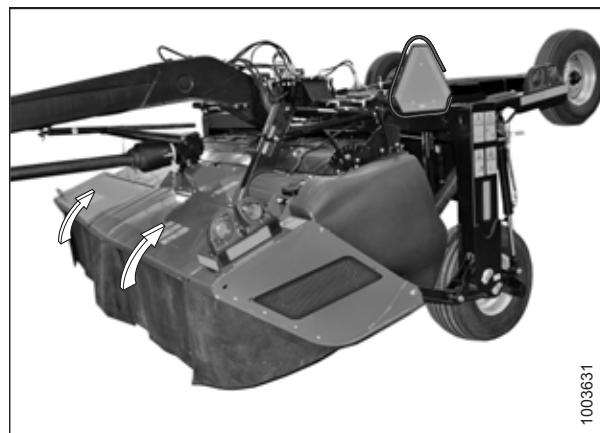


Figure 4.27: R113 Pull-Type Disc Mower

2. Install curtain onto weld and bolt studs on center shield, install two curtain brackets (B), and secure with four nuts (A).
3. Torque to 28 Nm (21 lbf·ft).

### IMPORTANT:

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

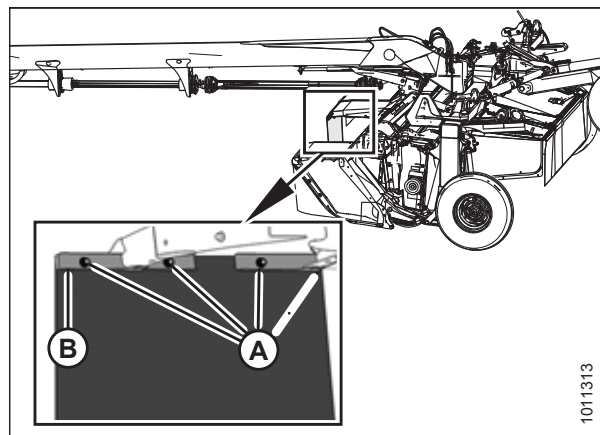


Figure 4.28: Inboard Curtain and Brackets

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

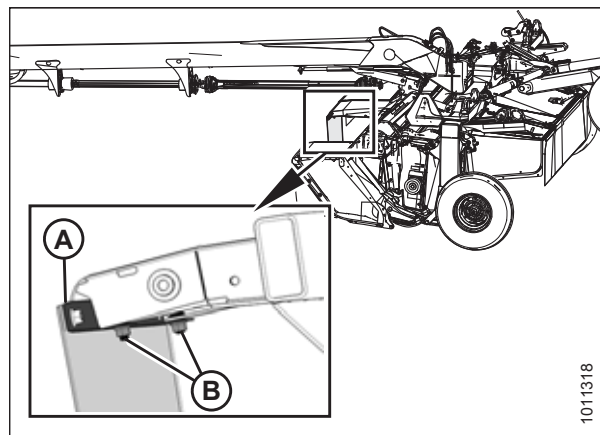
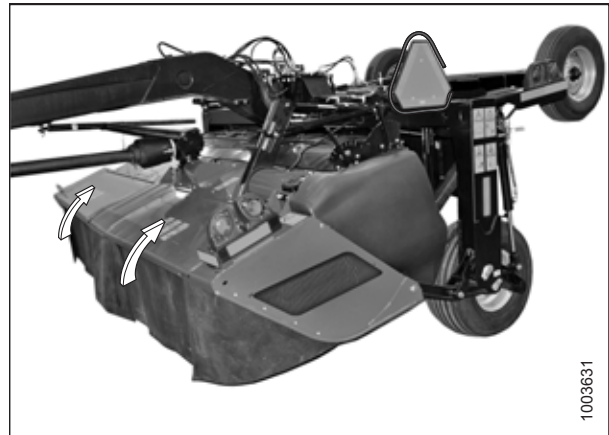


Figure 4.29: Inboard Curtain Attached to Disc Mower

### *Removing Outboard Curtains*

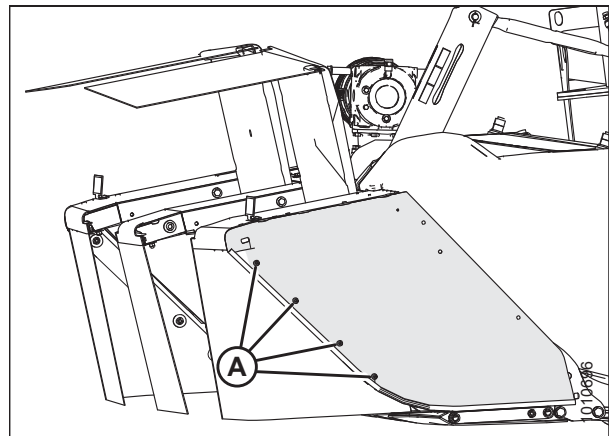
The procedure for removing outboard curtains is the same for both sides.

1. Open cutterbar door. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.



**Figure 4.30: R113 Pull-Type Disc Mower**

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



**Figure 4.31: Left Endsheat**

## MAINTENANCE AND SERVICING

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

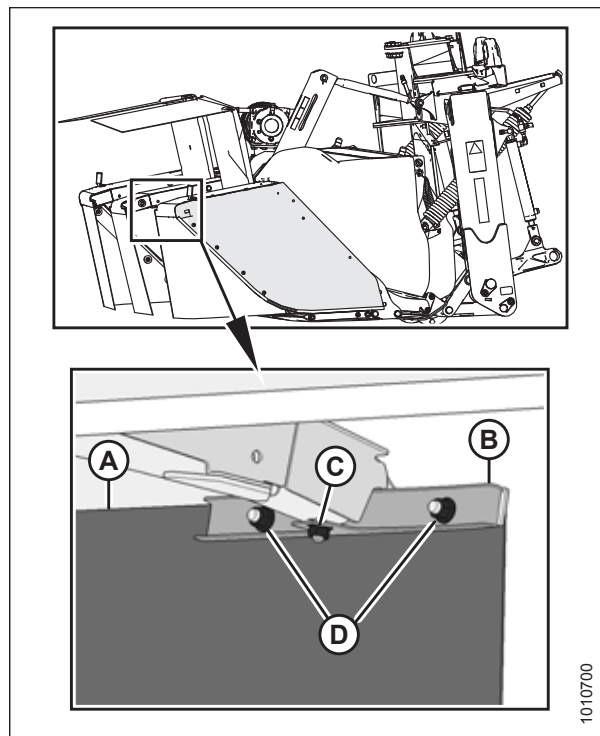


Figure 4.32: Outboard Curtain

### *Installing Outboard Curtains*

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

1. Open cutterbar door. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.

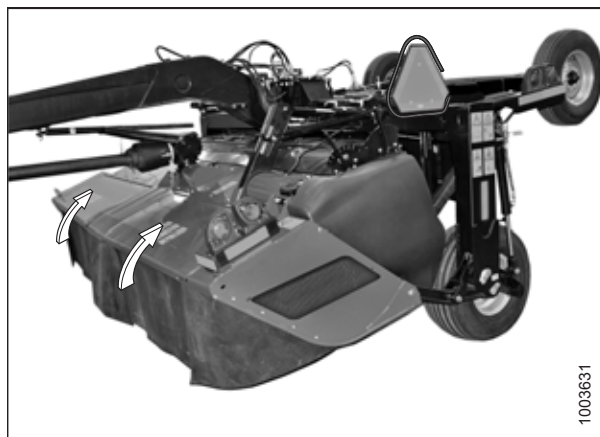
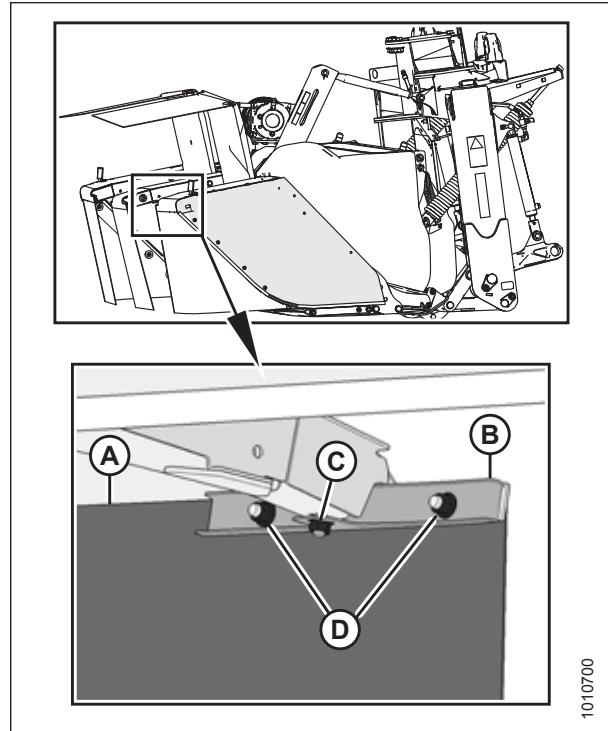


Figure 4.33: R113 Pull-Type Disc Mower

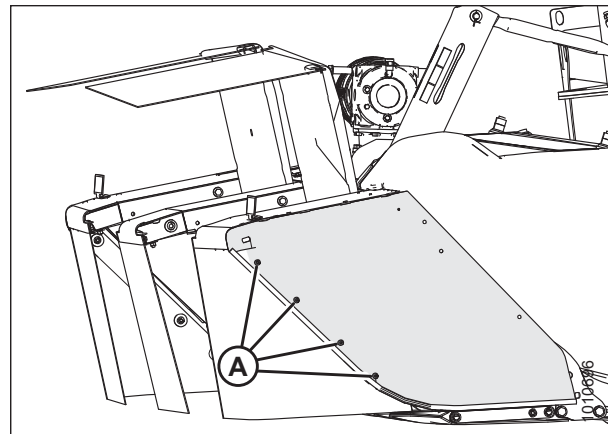
## MAINTENANCE AND SERVICING

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



**Figure 4.34: Outboard Curtain**

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



**Figure 4.35: Left Endsheets**

### 4.4.3 Lubricating Cutterbar

#### *Checking and Adding Cutterbar Lubricant*

#### **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.

#### **CAUTION**

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

1. Park machine on level ground.
2. Position disc mower so that the cutterbar is approximately level.
3. Shut down engine, and remove key.
4. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

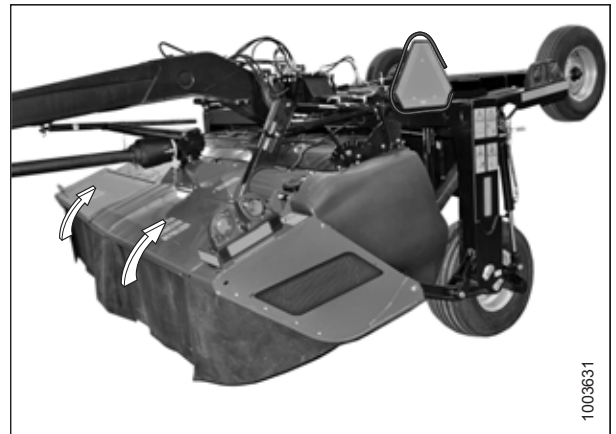


Figure 4.36: R113 Pull-Type Disc Mower

5. Use a spirit (bubble) level (A) to ensure the cutterbar is level in both directions. Raise or lower the disc mower accordingly.

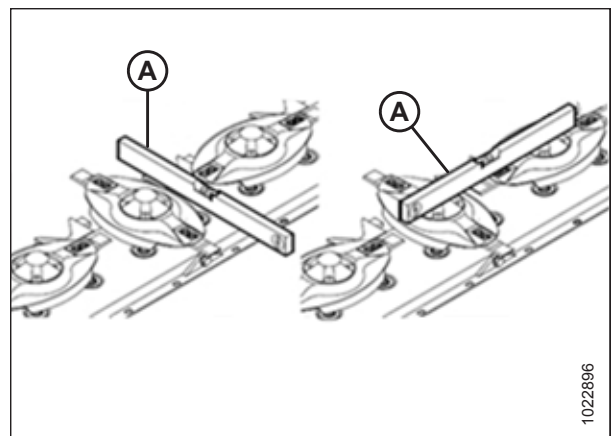


Figure 4.37: Spirit Level on Cutterbar

## MAINTENANCE AND SERVICING

6. Remove oil level inspection plug (A) and O-ring (B) from cutterbar. Oil level must be up to the bore.

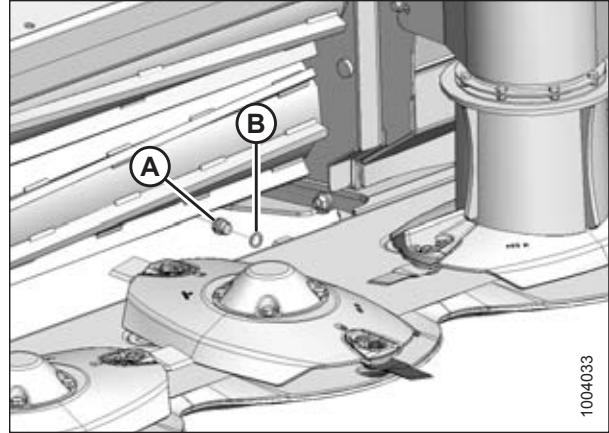


Figure 4.38: Cutterbar Oil Inspection Plug

7. If additional lubricant is required, add lubricant as follows (otherwise, proceed to Step 8, [page 153](#)):
  - a. Replace inspection plug removed in Step 6, [page 152](#).

### CAUTION

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

- b. Start windrower engine, and raise header slightly.
- c. Lower header onto blocks so that left end is slightly higher than right end.
- d. Remove breather (A) at left end, and add sufficient lubricant to required level.

#### IMPORTANT:

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

#### IMPORTANT:

Do **NOT** remove bolts (B).

#### NOTE:

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

- e. Replace breather (A) and torque to 30 Nm (22 lbf·ft), and recheck oil level.

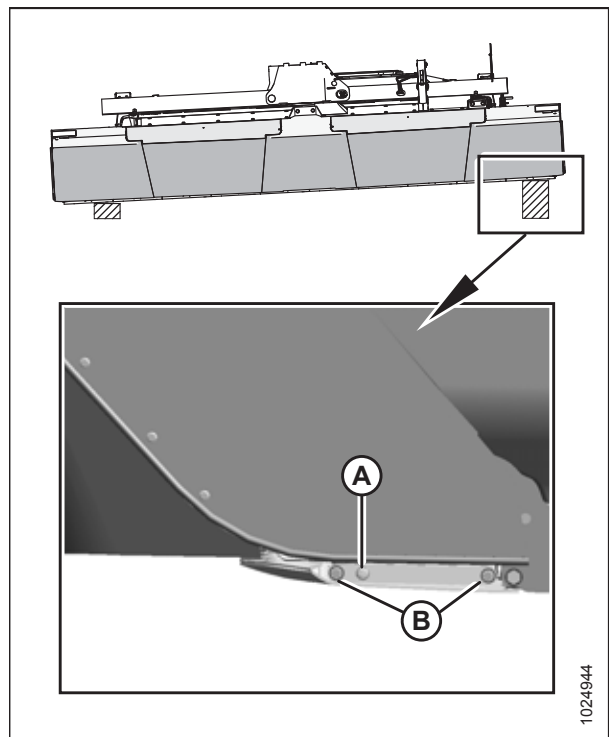


Figure 4.39: Adding Lubricant

## MAINTENANCE AND SERVICING

8. Check O-ring (B) for breaks or cracks, and replace if necessary.
9. Install plug (A) and O-ring (B). Tighten securely.

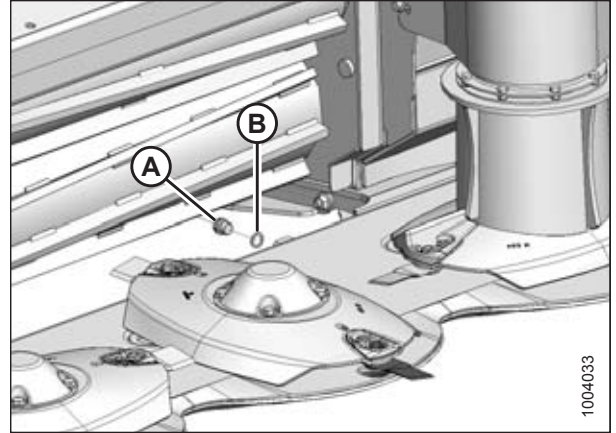


Figure 4.40: Cutterbar Oil Inspection Plug

### Draining 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.

#### CAUTION

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

1. Start engine and raise disc mower.
2. Place a block under each end of the disc mower so the right end is lower than the left end.

#### IMPORTANT:

Always drain lubricant from the right end of the disc mower. Draining lubricant from the left end of the disc mower may lead to breather contamination or failure.

3. Lower disc mower onto blocks, shut down engine, and remove key.
4. Place a 10 liter (10.5 US qts) capacity container under lower end of cutterbar, clean area around plug (A), and remove plug.

#### IMPORTANT:

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

5. Allow sufficient time for lubricant to drain, and install M18 cutterbar plug (A). Torque plug to 30 Nm (22 lbf·ft).

#### NOTE:

Do **NOT** flush the cutterbar.

6. Dispose of used lubricant responsibly.

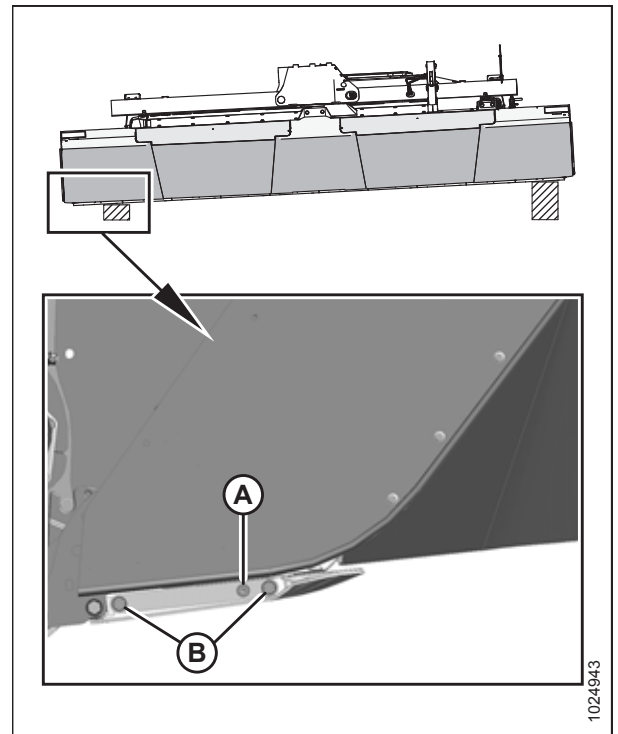


Figure 4.41: Draining Cutterbar

## Filling 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.

### CAUTION

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

1. Remove breather (A) from raised end of cutterbar and add **EXACT** amount of lubricant specified. Refer to inside back cover of this manual for list of recommended fluids and lubricants.

#### IMPORTANT:

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

#### IMPORTANT:

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

2. Install the breather (A). Torque breather to 30 Nm (22 lbf·ft).

### CAUTION

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

3. Start engine, and raise disc mower.
4. Stop engine, remove key, and engage disc mower lift cylinder lock-out valves.
5. Remove blocks.
6. Check lubricant level. Refer to [Checking and Adding Cutterbar Lubricant, page 151](#).

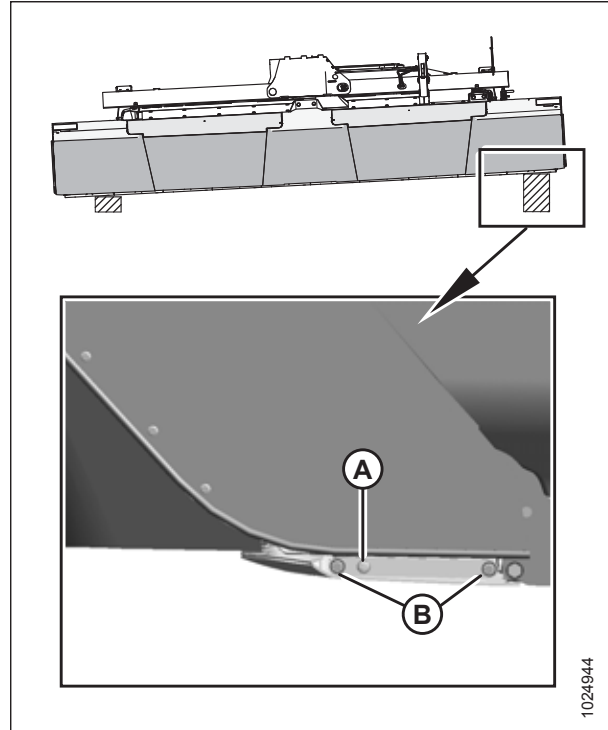


Figure 4.42: Filling Cutterbar

#### 4.4.4 Replacing Cutterbar Discs

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

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

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

**IMPORTANT:**

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

##### *Inspecting Cutterbar Discs*

**⚠ DANGER**

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.

**⚠ CAUTION**

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

**⚠ CAUTION**

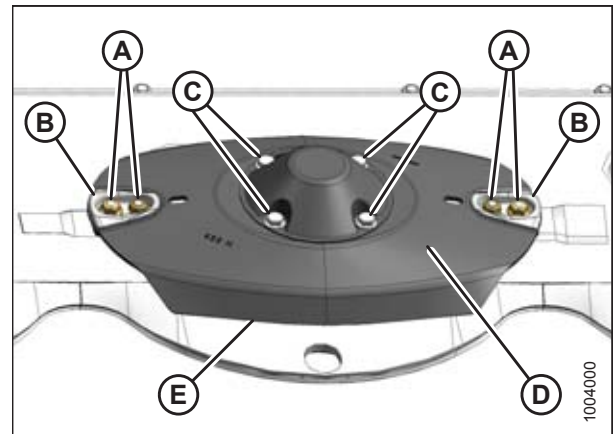
Damaged blades may damage the cutterbar and result in poor cutting performance. Replace damaged blades immediately.

1. Inspect the cutterbar disc surface (D) for cracks, excessive wear, and disc distortion. Replace as required.
2. Inspect the cutterbar disc edges (E) for cracks, excessive wear, and edge distortion. Replace as required.

**NOTE:**

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

3. Ensure that the disclade fasteners (A) are securely attached to the cutterbar disc and that nut shields (B) are present and undamaged. Replace as required.
4. Check that the cutterbar disc bolts (C) are securely attached to the spindles. Tighten as required.



**Figure 4.43: Cutterbar Disc**

## Removing Cutterbar Discs

### DANGER

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

### CAUTION

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

1. Raise disc mower fully, shut off engine, and remove key.
2. Engage lift cylinder lock-out valves. Refer to [3.1.1 Engaging Locks, page 33](#).
3. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

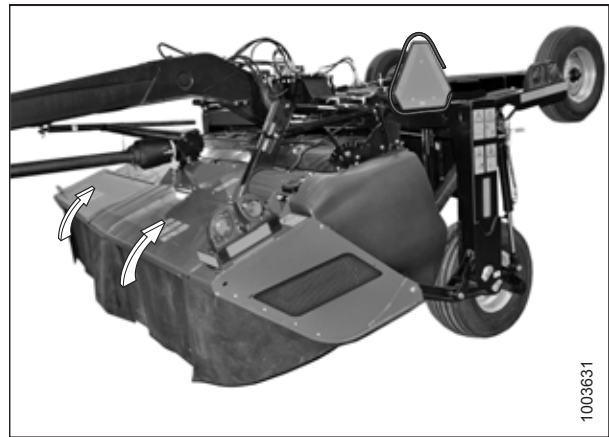


Figure 4.44: R113 Pull-Type Disc Mower

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

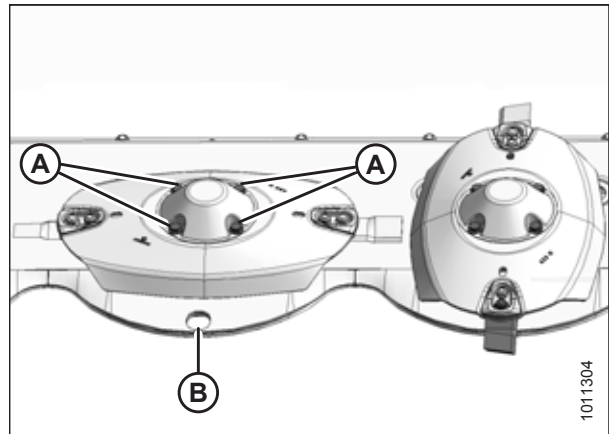


Figure 4.45: Cutterbar Disc Bolts

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

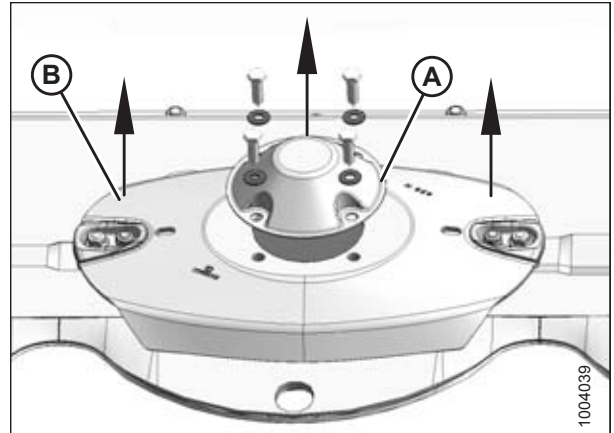


Figure 4.46: Cutterbar Disc and Cap

### *Installing Cutterbar Discs*

#### **DANGER**

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

#### **CAUTION**

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

1. Install spacer plate (A) on spindle.

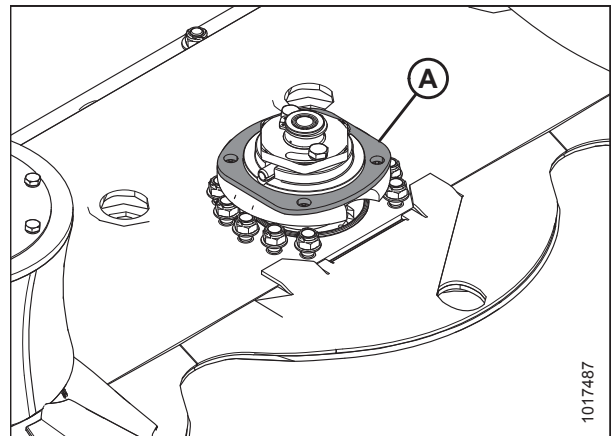


Figure 4.47: Disc Spindle

## MAINTENANCE AND SERVICING

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

### **WARNING**

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

5. Remove pin (or equivalent) from front hole of rock guard.
6. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.

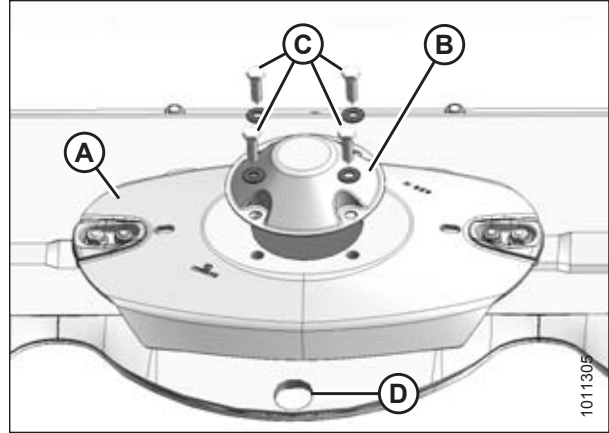


Figure 4.48: Cutterbar Disc and Cap



Figure 4.49: R113 Pull-Type Disc Mower

### 4.4.5 Replacing Cutterbar Spindles

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

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

**NOTE:**

Once spindle has risen due to shear pin failure, the spindle's bearing will become unloaded. Do **NOT** replace the spindle due to excessive play. Check play after replacing damaged shear pins.

Refer to [4.4.12 Replacing Cutterbar Spindle Shear Pin](#), [page 208](#) to replace shear pin.

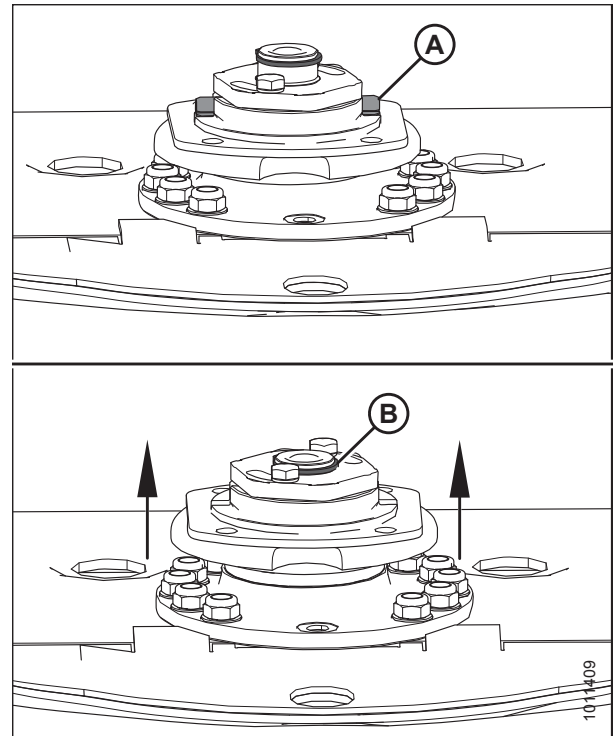


Figure 4.50: Cutterbar Spindles

**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 spindle position in 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 rotation pattern can result in damage to spindle and/or cutterbar components.

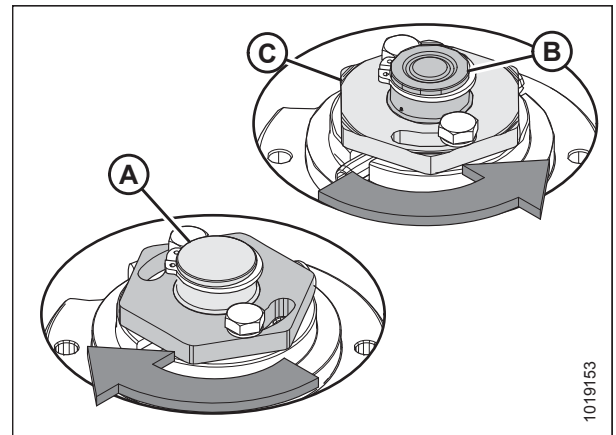


Figure 4.51: Cutterbar Spindles

## Removing Cutterbar Spindles

### DANGER

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

### CAUTION

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

1. Park on a flat, level surface.
2. Lower disc mower fully, shut off engine, and remove key.

#### NOTE:

To prevent oil from spilling from the cutterbar when removing disc spindles, ensure disc mower is on a flat, level surface and is tilted all the way back.

3. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).



Figure 4.52: R113 Pull-Type Disc Mower

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

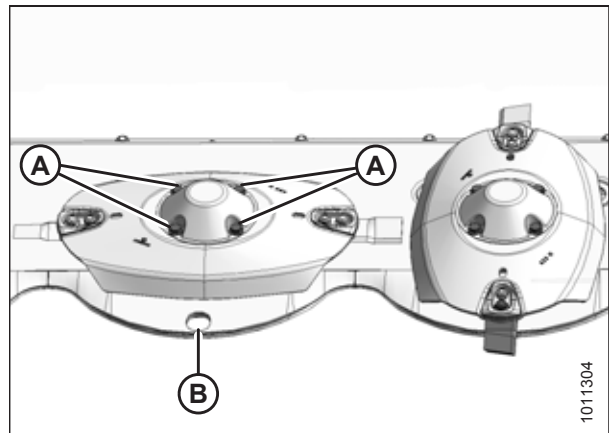


Figure 4.53: Cutterbar Disc Bolts

## MAINTENANCE AND SERVICING

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

**IMPORTANT:**

Blades are rotation specific. Switch entire disc when swapping spindles.

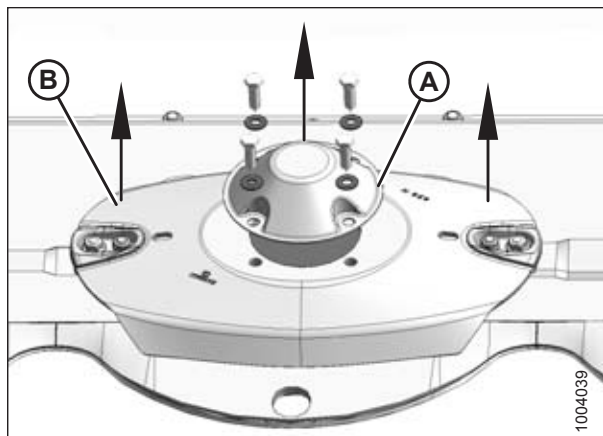


Figure 4.54: Cutterbar Disc and Cap

8. Remove spacer plate (A).

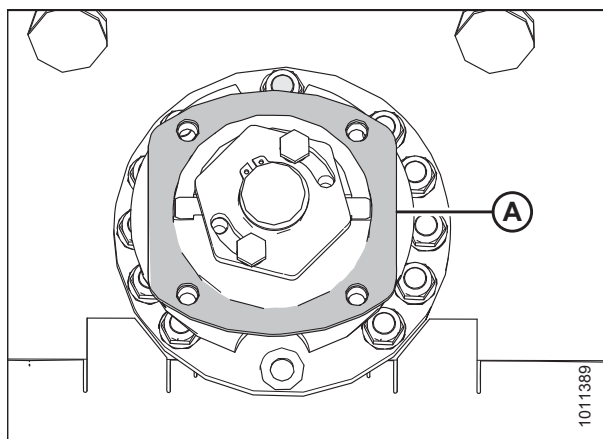


Figure 4.55: Spacer Plate

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

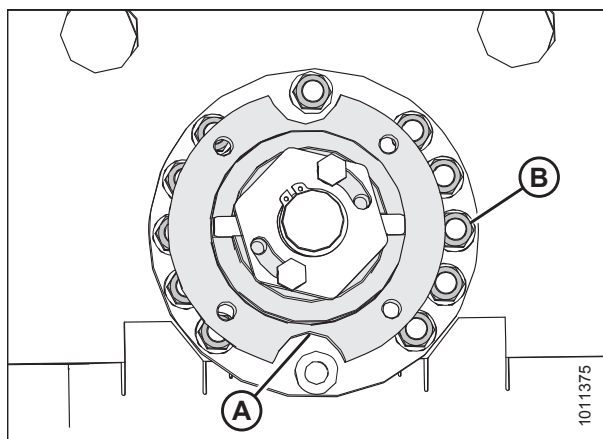
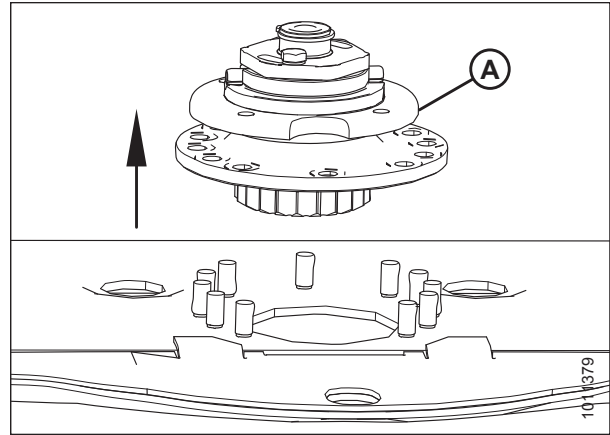


Figure 4.56: Left Spindle Hub and Hardware

## MAINTENANCE AND SERVICING

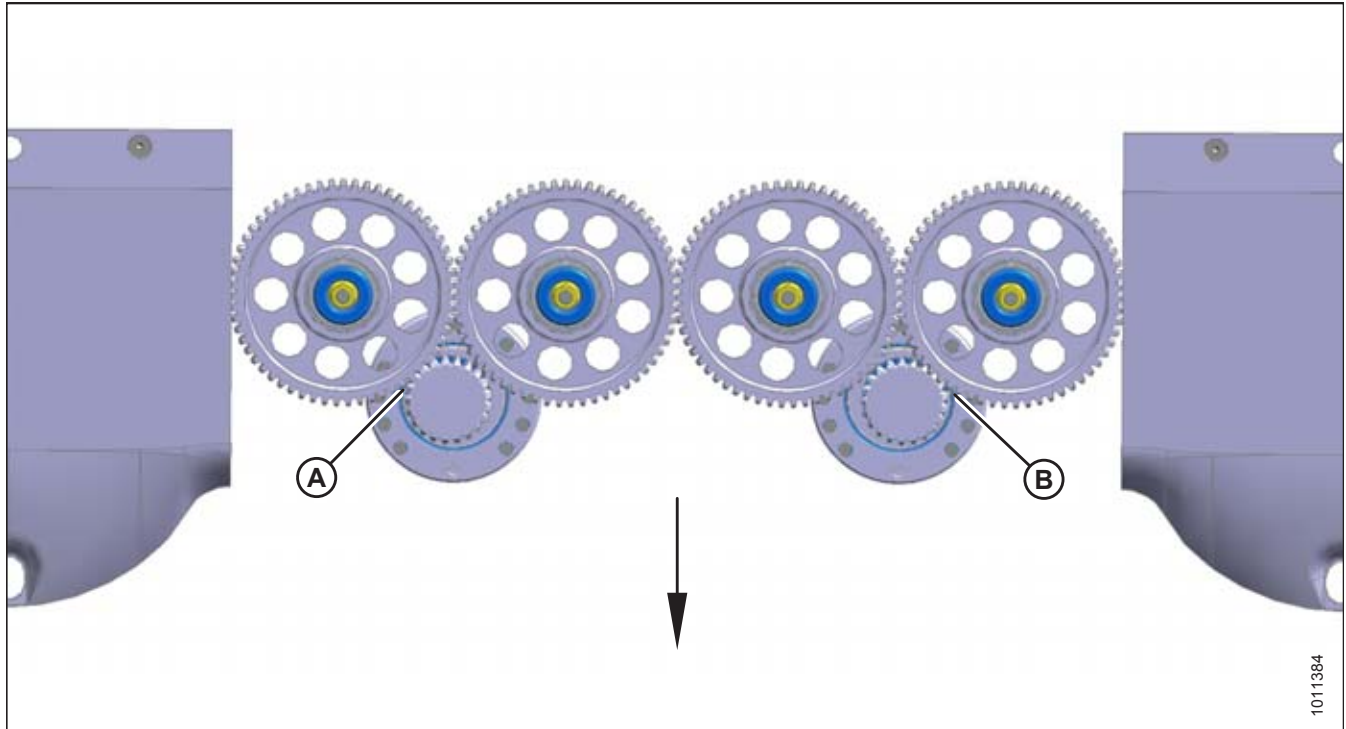
10. Remove spindle (A) from cutterbar.



**Figure 4.57: Left Spindle**

## Installing Cutterbar Spindles

Figure 4.58: Underside of Cutterbar Spindles



### IMPORTANT:

Right discs (A) and left discs (B) are timed and must be at a 90 degree angle from adjacent discs when reinstalled. Misaligned discs could result in the following:

- Discblades of co-rotating discs hitting each other
- Discblades of diverging discs hitting adjacent discs

Check clearance before tightening spindle to the cutterbar. Turn disc by hand to ensure discblades do not contact each other or adjacent discs. If contact occurs or alignment is incorrect, lift spindle to clear mounting bolts, rotate spindle 90 degrees (ensuring that base does not turn), and reinstall. It may take two 90 degree adjustments (for a total of 180 degrees) to get the correct timing.

### 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 header lift cylinder lock-out valves before going under machine for any reason.



### CAUTION

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

## MAINTENANCE AND SERVICING

1. Park on a flat, level surface.
2. Lower the disc mower fully, shut off engine, and remove key.

### NOTE:

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

3. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.



Figure 4.59: R113 Pull-Type Disc Mower

4. Determine suitable spindle rotation pattern for crop conditions. Refer to [4.4.5 Replacing Cutterbar Spindles](#), page 159.

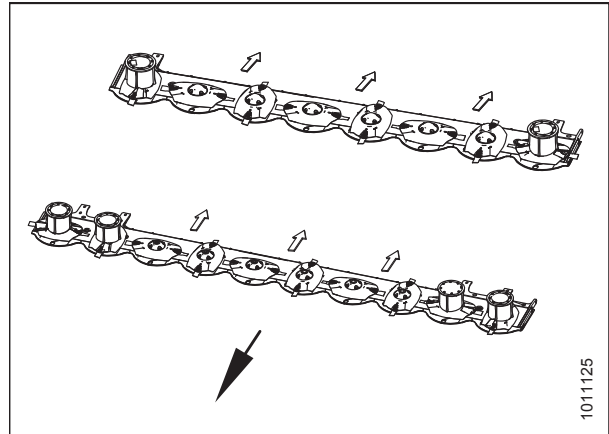


Figure 4.60: R113 and R116 Cutterbars

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

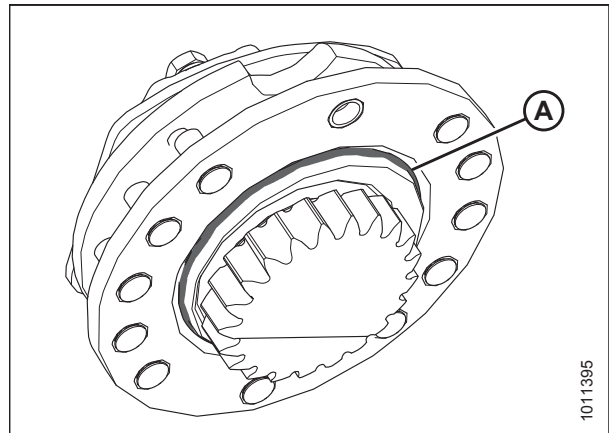


Figure 4.61: Left Spindle O-Ring

## MAINTENANCE AND SERVICING

6. Insert spindle (A) into cutterbar.

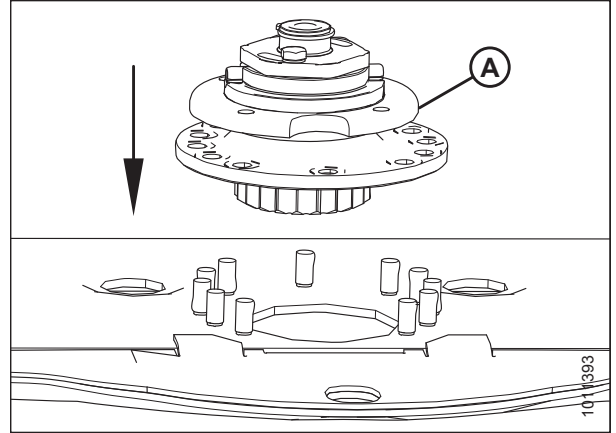


Figure 4.62: Left Spindle

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

**NOTE:**

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

**IMPORTANT:**

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

**IMPORTANT:**

The offset gear design 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.

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

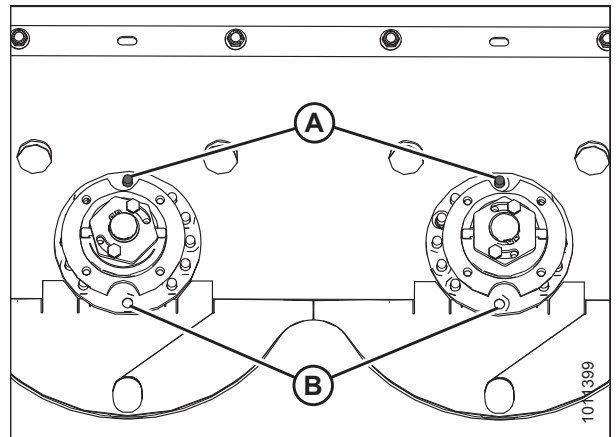


Figure 4.63: Spindle Orientation

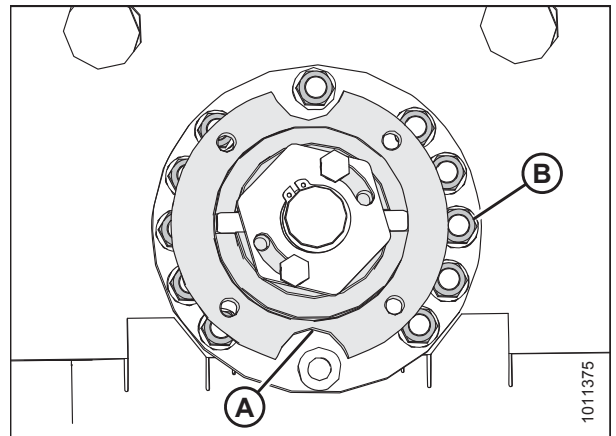


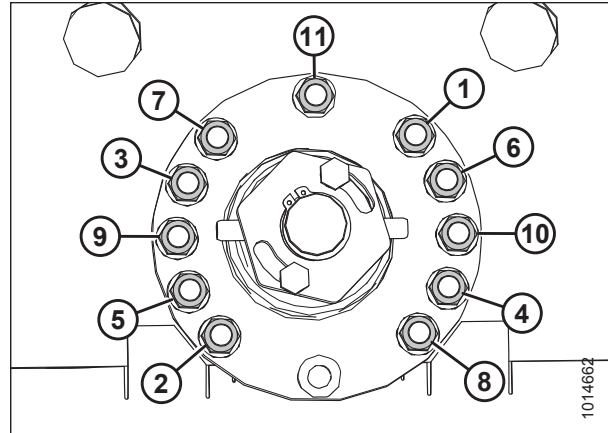
Figure 4.64: Left Spindle Hub

## MAINTENANCE AND SERVICING

9. Torque bolts to 50 Nm (37 lbf·ft) following the tightening pattern shown at right.

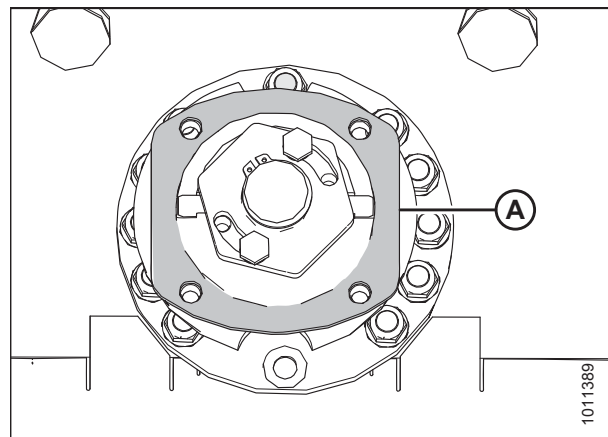
**NOTE:**

Hub removed from illustration for clarity.



**Figure 4.65: Tightening Pattern**

10. Install spacer plate (A).



**Figure 4.66: Spacer Plate**

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

**IMPORTANT:**

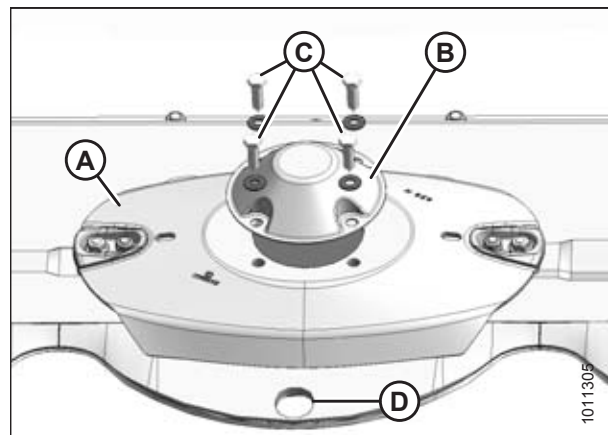
Blades are rotation specific. It is necessary to switch entire disc when swapping spindles.

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

**NOTE:**

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

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



**Figure 4.67: Cutterbar Disc and Cap**

### **WARNING**

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

14. Remove pin (or equivalent) from front hole of rock guard.
15. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.



Figure 4.68: R113 Pull-Type Disc Mower

## 4.4.6 Reconfiguring Cutterbar Crop Stream

Discs are factory-installed to produce three crop streams, but disc rotation pattern can be changed by substitution of spindle and corresponding disc to suit crop conditions. Each spindle and disc pair is designed to rotate in one direction and must be changed as sets when altering crop flows.

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

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

### NOTE:

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

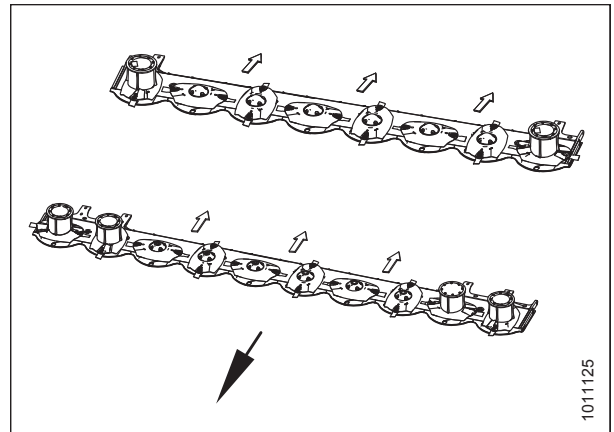


Figure 4.69: R113 and R116 Cutterbars

### 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 spindle position in 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 rotation pattern can result in damage to spindle and/or cutterbar components.

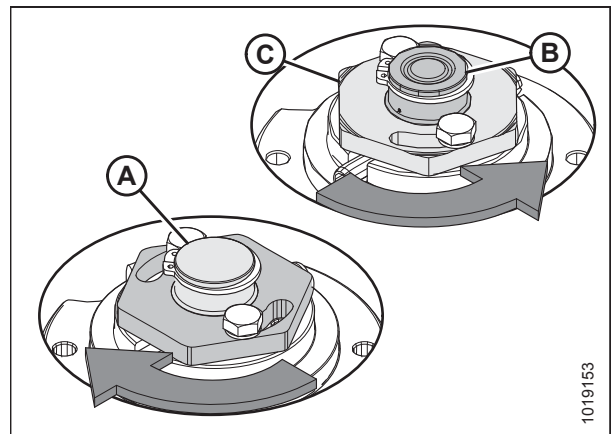
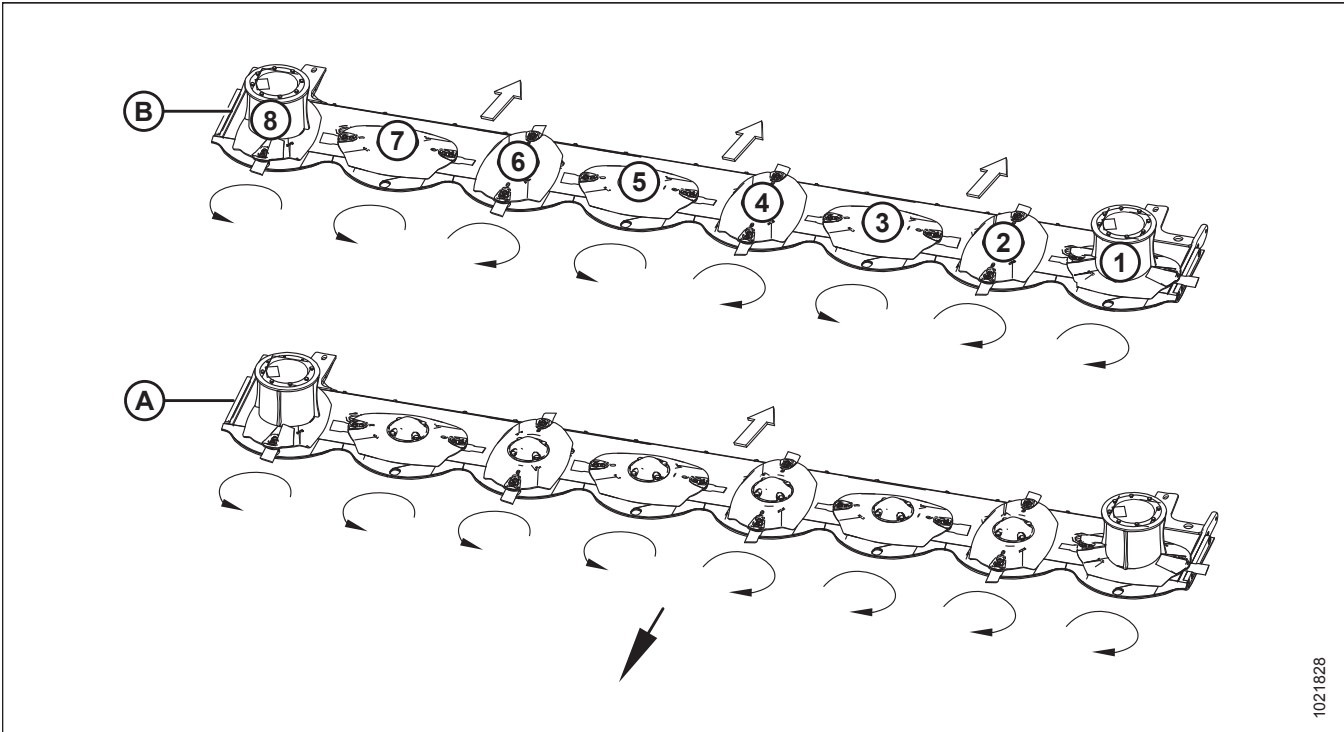


Figure 4.70: Cutterbar Spindles

## MAINTENANCE AND SERVICING

### Changing R113 Cutterbar Crop Stream Configuration

Figure 4.71: R113 (8 Disc) Spindle Rotation Pattern and Crop Streams



A - One Crop Stream

B - Three Crop Streams

#### NOTE:

Refer to [Removing Cutterbar Spindles, page 160](#) and [Installing Cutterbar Spindles, page 163](#).

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

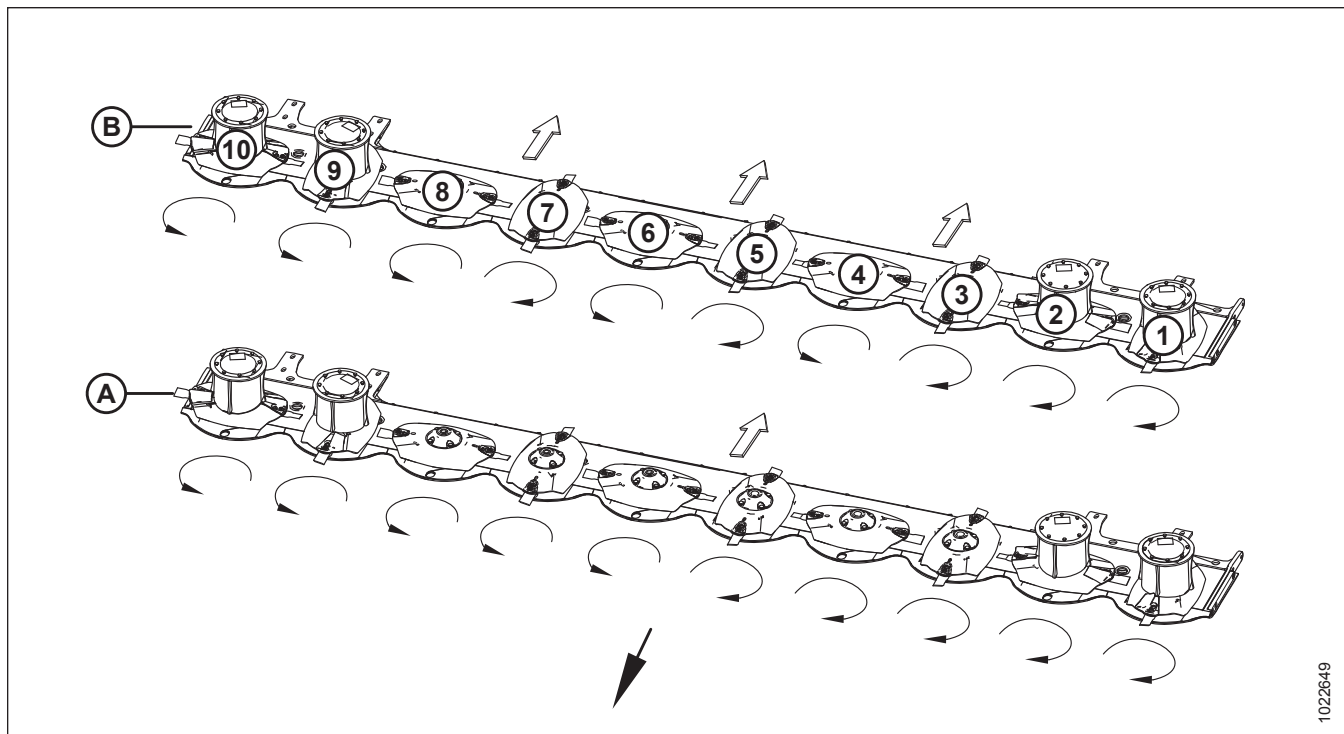
- Swap disc/spindle (3) with disc/spindle (6)

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

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

# Changing R116 Cutterbar Crop Stream Configuration

Figure 4.72: R116 (10 Disc) Spindle Rotation Pattern and Crop Streams



A - One Crop Stream

B - Three Crop Streams

## NOTE:

Refer to [Removing Cutterbar Spindles, page 160](#) and [Installing Cutterbar Spindles, page 163](#).

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

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

### 4.4.7 Replacing Discblades

Each disc has two blades (A) 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-degree bevel-down blades; 11-degree bevel-down blades are offered as a non-standard option. Refer to the R113/R116 Pull-Type Disc Mower Parts Catalog.

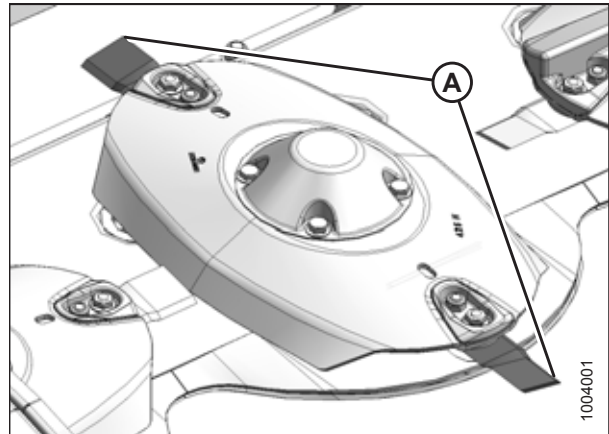


Figure 4.73: Discblades

#### *Inspecting Discblades*



#### **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.



#### **CAUTION**

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



#### **CAUTION**

Damaged blades may damage the cutterbar and result in poor cutting performance. Replace damaged blades immediately.



#### **CAUTION**

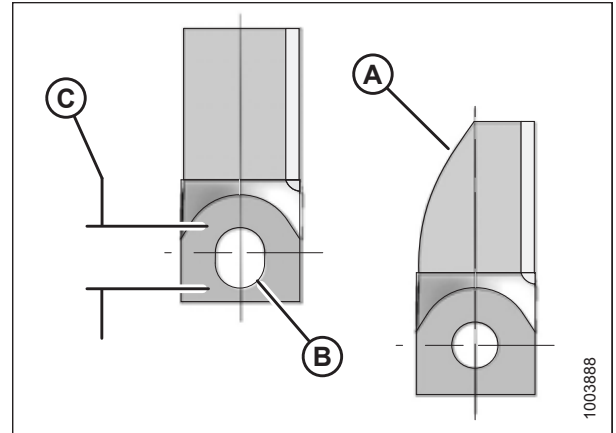
Damaged or loose discblades or blade attachment hardware can be ejected during machine operation and may cause personal injury or machine damage.

## MAINTENANCE AND SERVICING

1. Check daily that the discblades are securely attached to the disc.
2. Inspect blades for cracks, blade wear (A), or and elongated hole (B) beyond safe operating limits (C).
3. Replace blades immediately when problems are noticed.

### IMPORTANT:

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



**Figure 4.74: Discblades**

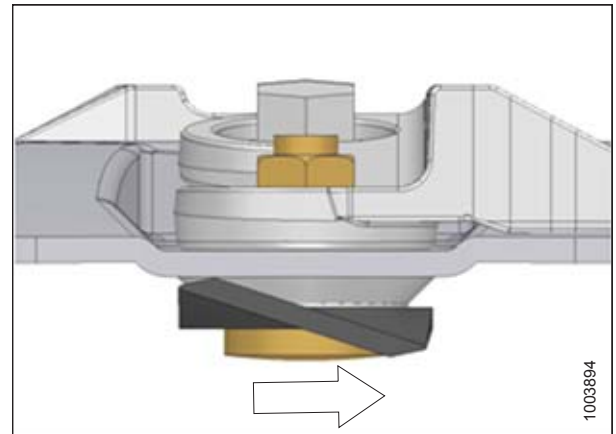
A - Blade Wear to Center Line

B - Elongated Hole

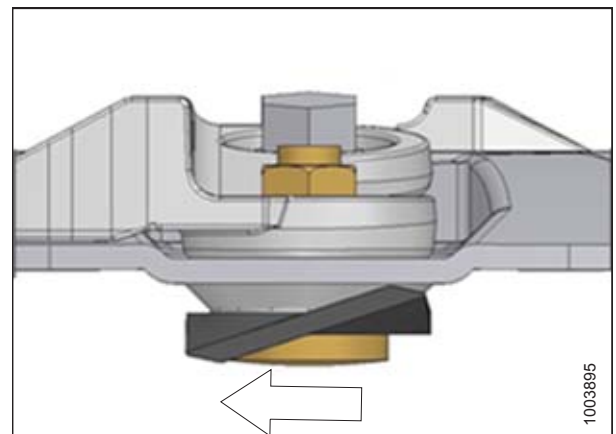
C - Maximum Elongation 21 mm (13/16 in.)

### IMPORTANT:

The discblades have cutting edges on both sides so 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 [4.4.6 Reconfiguring Cutterbar Crop Stream](#), page 167.



**Figure 4.75: Counterclockwise Disc Rotation Direction**



**Figure 4.76: Clockwise Disc Rotation Direction**

## Inspecting Discblade Hardware

### CAUTION

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

Inspect blade attachment hardware each time blades are changed. Refer to [Removing Discblades, page 173](#) and [Installing Discblades, page 175](#) for hardware replacement procedure.

#### 1. Check and replace bolt if

- Bolt has been removed and installed five times
- Head (A) is worn flush with bearing surface of blade
- Diameter of bolt neck is worn (B) 3 mm (1/8 in.)
- Bolt is cracked (C)
- Bolt is visibly distorted (D)
- Bolt shows evidence of interference (E) with adjacent parts

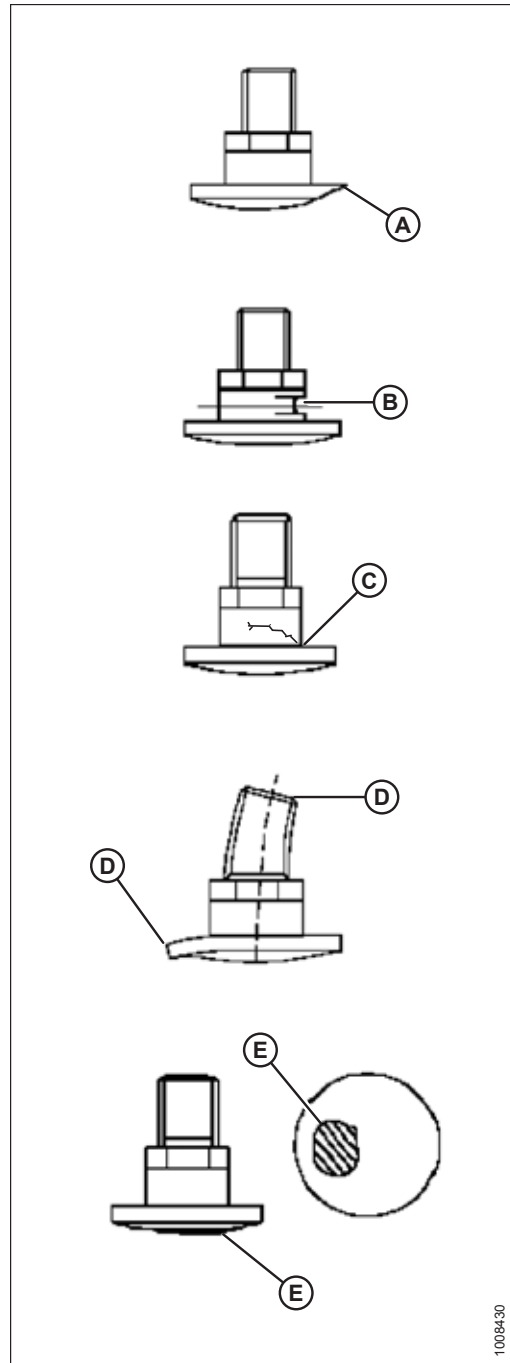


Figure 4.77: Discblade Bolts

## MAINTENANCE AND SERVICING

2. Check and replace nuts under the following conditions:

- Nut has been previously installed—nuts are one-time use only
- Nut shows signs of wear (A) that is more than half the original height (B)
- Nut is cracked

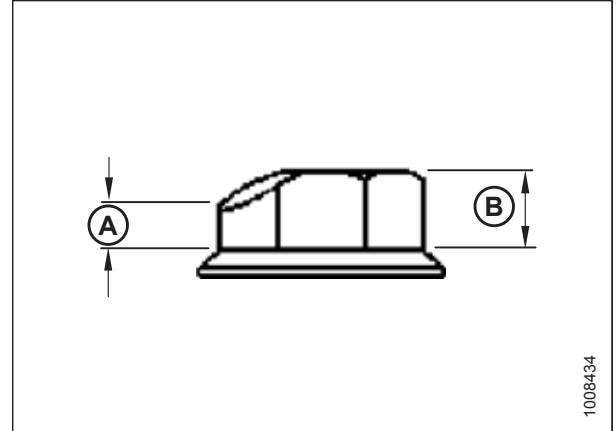


Figure 4.78: Discblade Nut

### Removing Discblades

#### **DANGER**

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

#### **CAUTION**

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

1. Raise disc mower fully, shut off engine, and remove key.
2. Engage lift cylinder lock-out valves. Refer to [3.1.1 Engaging Locks, page 33](#).
3. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

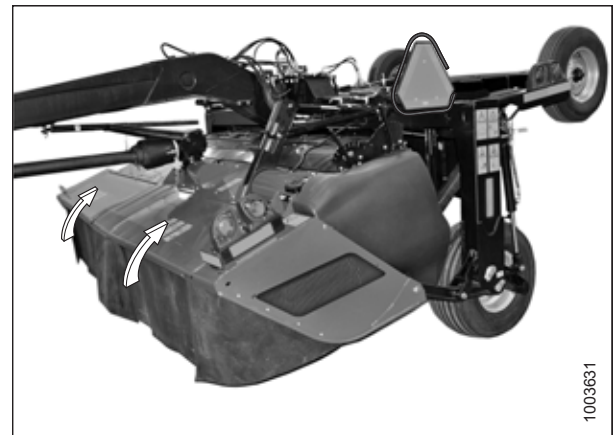


Figure 4.79: R113 Pull-Type Disc Mower

## MAINTENANCE AND SERVICING

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

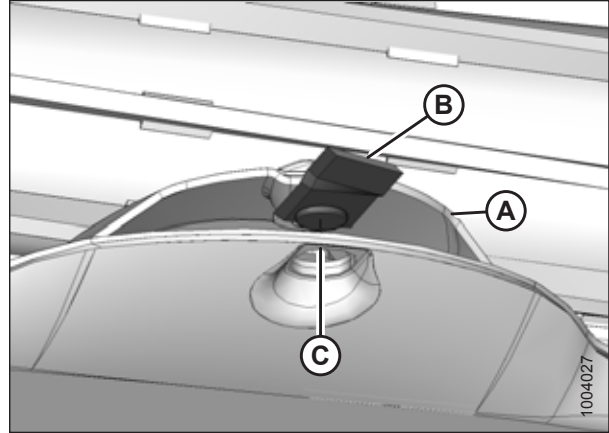


Figure 4.80: Discblade Aligned with Hole in Rock Guard

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

### IMPORTANT:

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

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

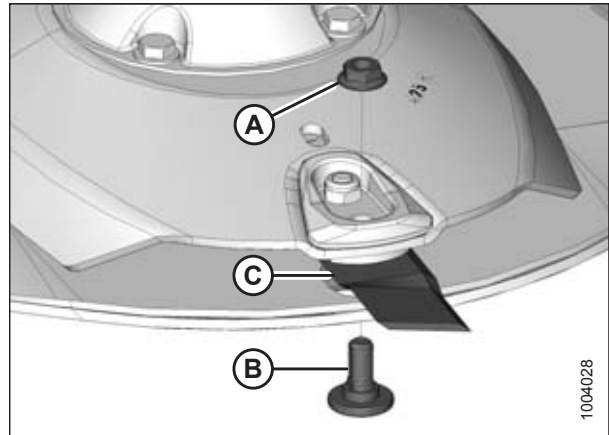


Figure 4.81: Discblade

### Installing Discblades

#### CAUTION

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

#### IMPORTANT:

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

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

#### IMPORTANT:

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

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

#### WARNING

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

4. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors, page 40](#).

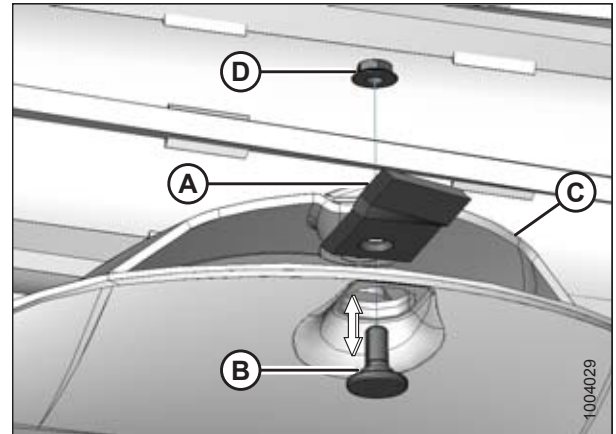


Figure 4.82: Discblade

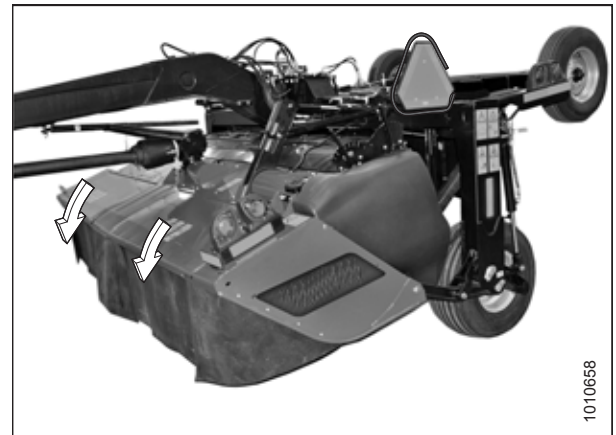


Figure 4.83: R113 Pull-Type Disc Mower

### 4.4.8 Replacing Accelerators

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

One pair of accelerators is installed at each outboard end of a 4.0 m (13 ft.) disc mower, whereas a 4.9 m (16 ft.) disc mower has two pairs at each end.

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

**IMPORTANT:**

Always replace accelerators in pairs to ensure proper disc balance.

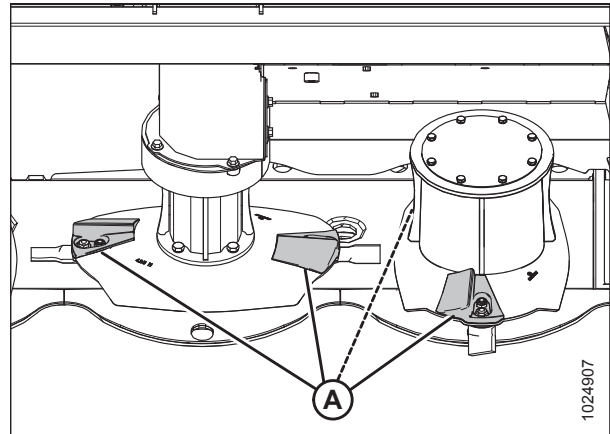


Figure 4.84: R116 Cutterbar Accelerators

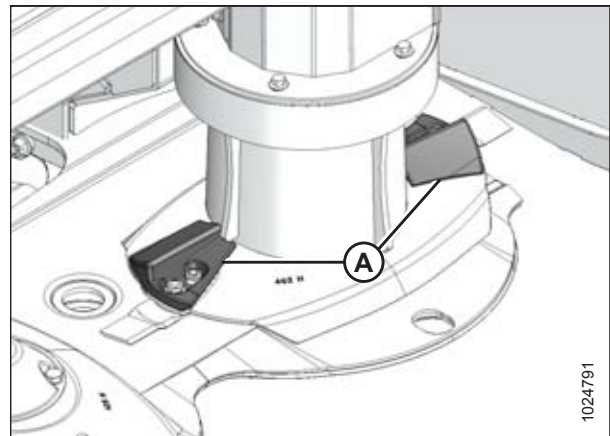


Figure 4.85: Cutterbar Accelerators

### *Inspecting Accelerators*

#### **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. Raise disc mower fully, stop engine, and remove key.
2. Engage lift cylinder lock-out valves. Refer to [3.1.1 Engaging Locks, page 33](#).
3. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

#### **CAUTION**

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

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



**Figure 4.86: R113 Pull-Type Disc Mower**

## Removing Accelerators

### DANGER

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

### IMPORTANT:

Always replace accelerators in pairs to ensure proper disc balance.

1. Raise disc mower fully, shut off engine, and remove key.
2. Engage lift cylinder lock-out valves. Refer to [3.1.1 Engaging Locks, page 33](#).

### CAUTION

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

3. Remove nut (A), flange bolt (B), and discblade (C) from disc. Discard nut.

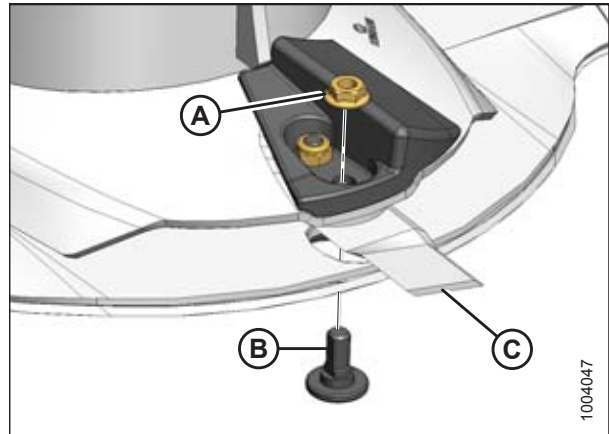


Figure 4.87: Accelerator Removal

4. Remove lock nut (A), accelerator (B), blade holder (C), and hex-socket bolt (D).
5. Repeat the removal procedure for the second accelerator.

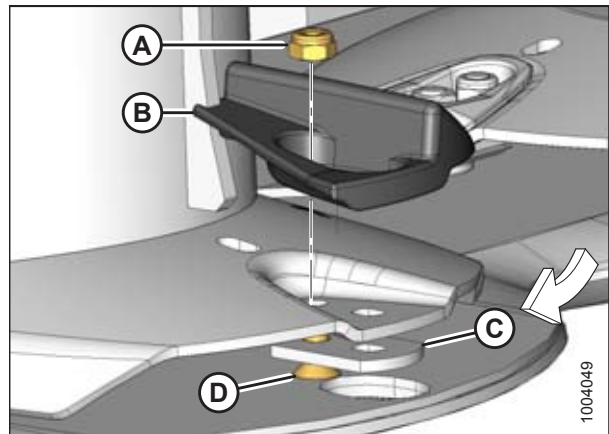


Figure 4.88: Accelerator Removal

### Installing Accelerators

#### **DANGER**

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

#### **CAUTION**

Discblades 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 proper disc balance.

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

#### **IMPORTANT:**

Accelerators can operate in a clockwise or counterclockwise direction. Verify the direction of the disc before installing accelerators. If you are unsure which direction the spindle rotates, refer to [4.4.5 Replacing Cutterbar Spindles, page 159](#).

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

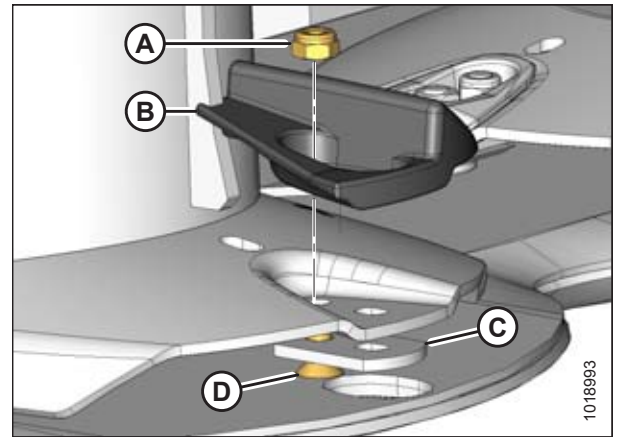


Figure 4.89: Accelerator Install

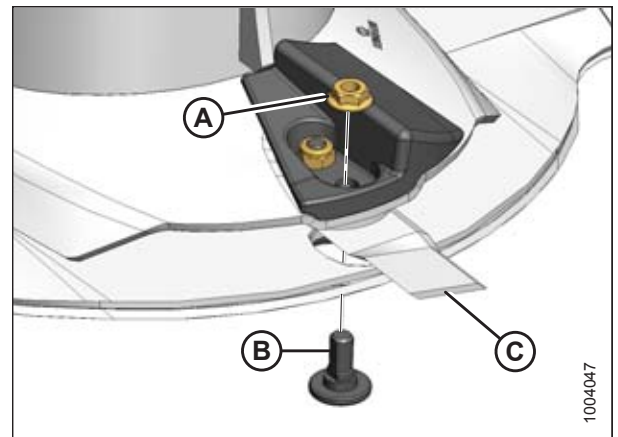
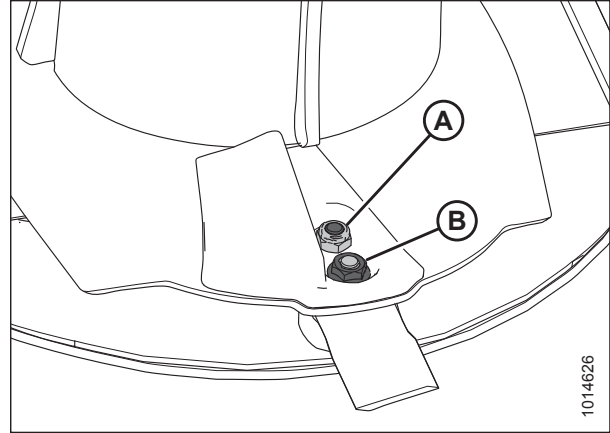


Figure 4.90: Accelerator Install

4. Torque the inside nut (A) to 58 Nm (43 lbf·ft).
5. Torque the outside nut (B) (closest to the blade) to 125 Nm (92 lbf·ft).
6. Repeat the installation procedure for the second accelerator.

### **WARNING**

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



**Figure 4.91: Accelerator Install**

7. Remove wooden block.
8. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.

### 4.4.9 Replacing Rock Guards

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

#### *Inspecting Rock Guards*

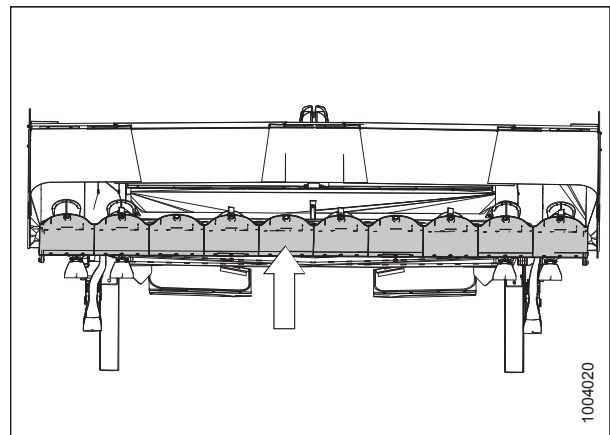
### **DANGER**

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

### **CAUTION**

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

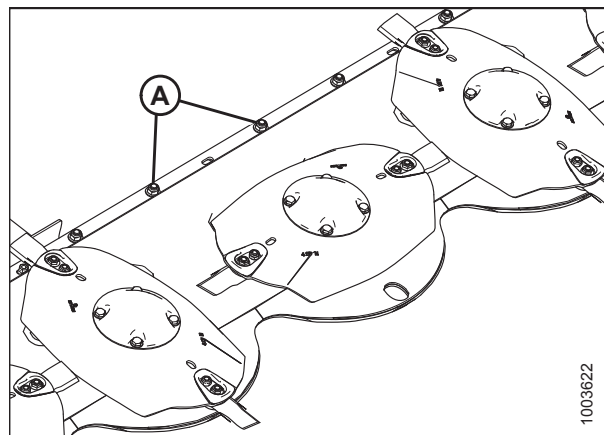
1. Raise disc mower fully, stop engine, and remove key.
2. Engage lift cylinder lock-out valves. Refer to [3.1.1 Engaging Locks](#), page 33.
3. Inspect rock guards for wear, cracks, damage, or distortion. Replace if worn to 75% or more of their original thickness.
4. Check for loose or missing fasteners; tighten or replace fasteners as needed.



**Figure 4.92: Rock Guards**

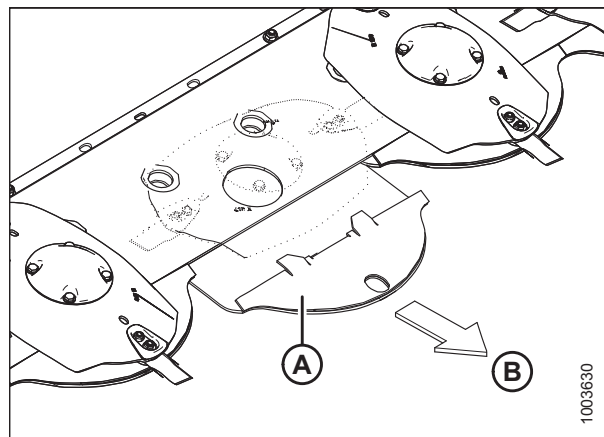
### *Removing Rock Guards*

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



**Figure 4.93: Rock Guards**

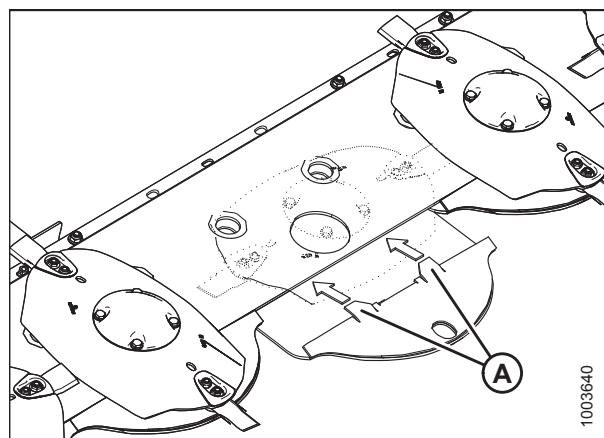
2. Slide rock guard (A) forward in the direction of arrow (B) and remove.



**Figure 4.94: Rock Guards**

### *Installing Rock Guards*

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



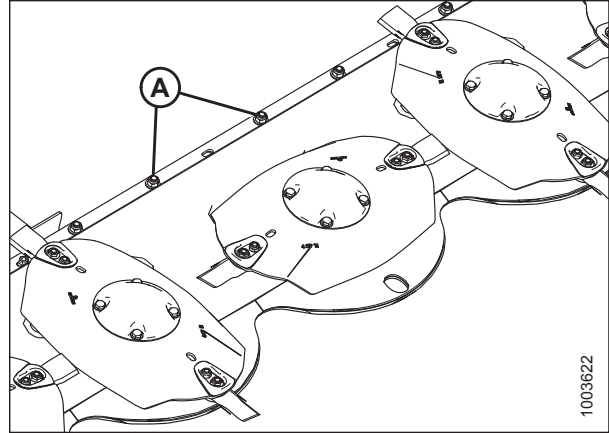
**Figure 4.95: Rock Guards**

## MAINTENANCE AND SERVICING

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

**NOTE:**

Lock nuts (A) are installed on top.



**Figure 4.96: Rock Guards**

### 4.4.10 Replacing Small Drums

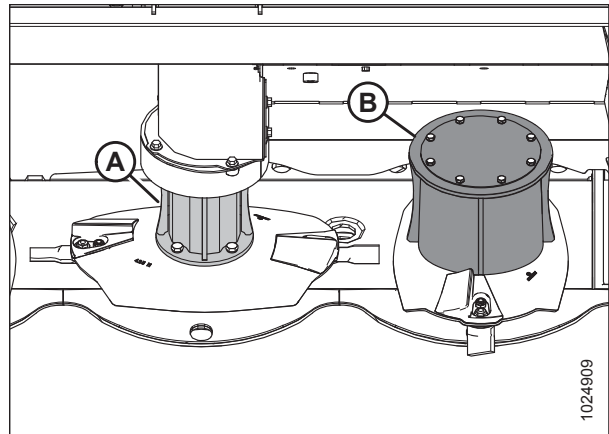
Drums deliver cut material from the ends of the cutterbar and help maintain an even crop flow into the conditioner. Drums are attached to the outboard discs at each end of the cutterbar on a 4.0 m (13 ft.) disc mower, and to the two outboard discs on a 4.9 m (16 ft.) disc mower.

**IMPORTANT:**

The outboard drums (B) are approximately 73 mm (2-3/8 in.) smaller in diameter than the inboard drums (A).

**IMPORTANT:**

Measure drum size to determine if small or large drums are installed on your disc mower. Large drums measure 250 mm (9-7/8 in.) across. Small drums measure 187 mm (7-3/8 in.) across. If your disc mower has large drums, refer to [4.4.11 Replacing Large Drums, page 193](#).



**Figure 4.97: 4.9 m (16 ft.) Drums**

A - Driven Drum

B - Non-Driven Drum

#### *Inspecting Small Drums*

Inspect drums daily for signs of damage or wear.



### **DANGER**

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



### **CAUTION**

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

## MAINTENANCE AND SERVICING

1. Lower disc mower fully, shut off engine, and remove key.
2. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

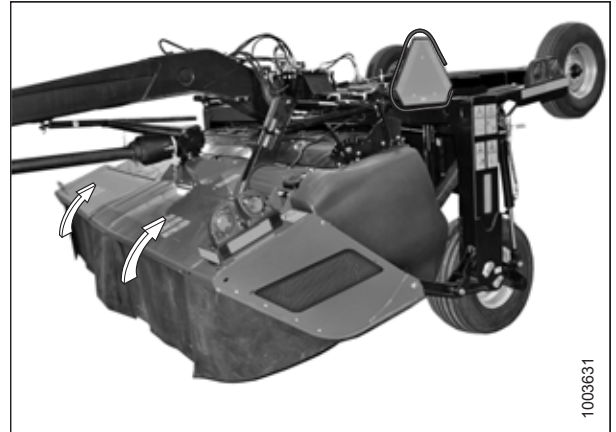


Figure 4.98: R113 Pull-Type Disc Mower

3. 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.
4. Examine drums for large dents. Replace dented drums to prevent an imbalance in the cutterbar.
5. Tighten or replace loose or missing fasteners.



### WARNING

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

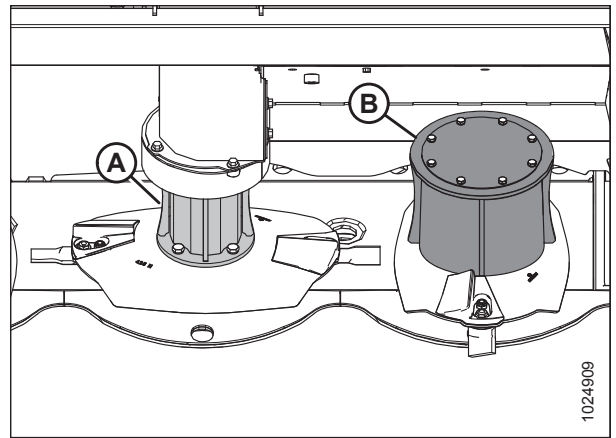


Figure 4.99: R116 PT Disc Mower Drums

6. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors, page 40](#).



Figure 4.100: R113 Pull-Type Disc Mower

### Removing Small Driven Drums and Driveline

#### DANGER

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

#### CAUTION

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

#### NOTE:

Illustrations show left side drum and driveline—right side drum and driveline are similar.

1. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.

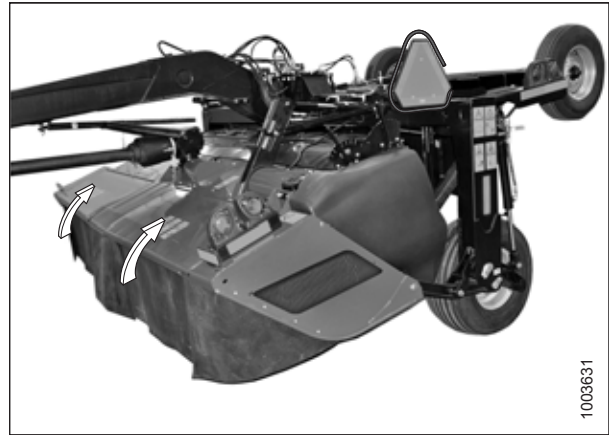


Figure 4.101: R113 Pull-Type Disc Mower

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

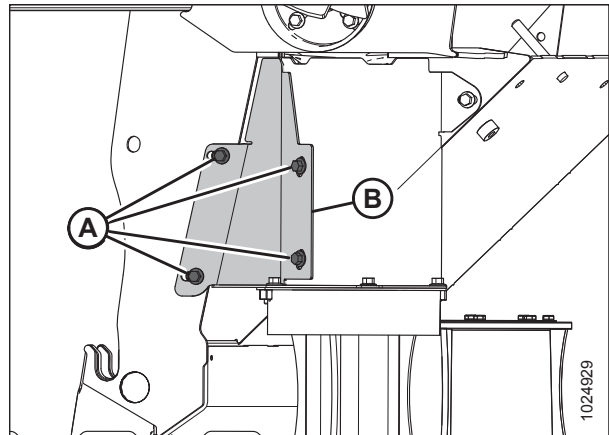


Figure 4.102: Driven Drum

## MAINTENANCE AND SERVICING

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

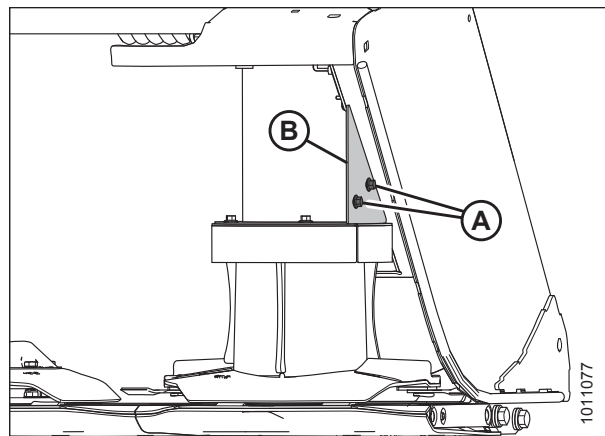


Figure 4.103: Driven Drum

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

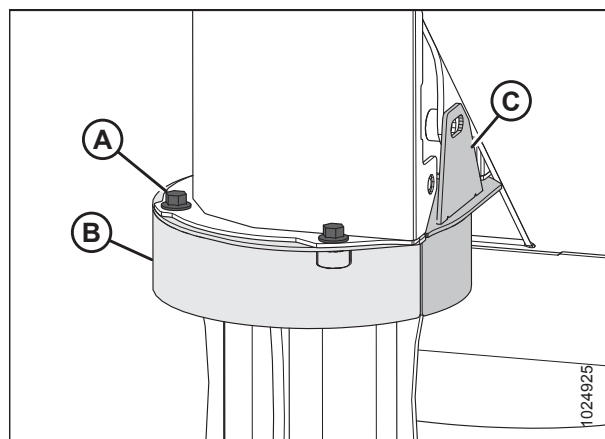


Figure 4.104: Driven Drum

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

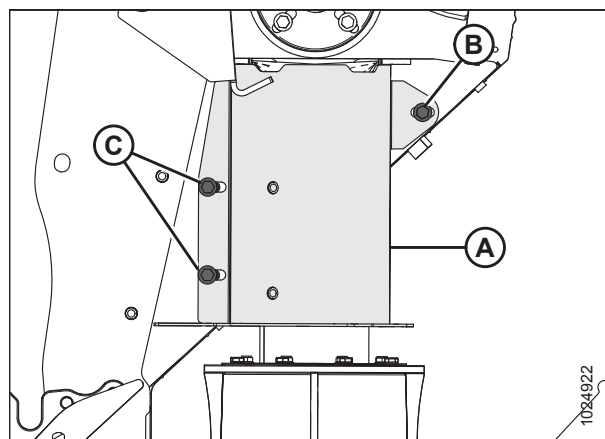


Figure 4.105: Driven Drum

## MAINTENANCE AND SERVICING

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

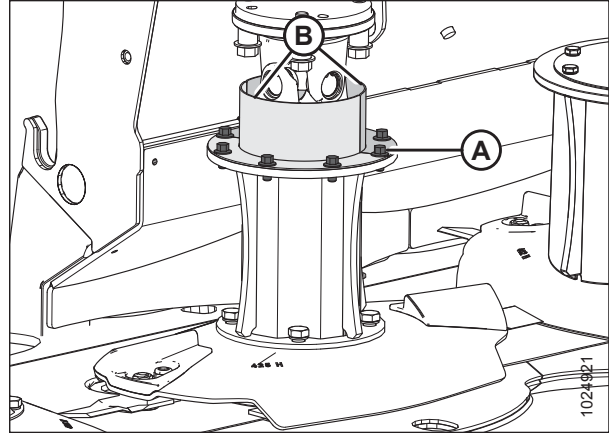


Figure 4.106: Driven Drum

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

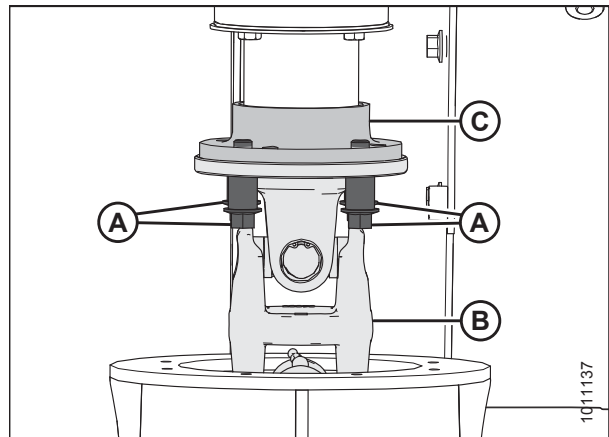


Figure 4.107: Driven Drum

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

**NOTE:**

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

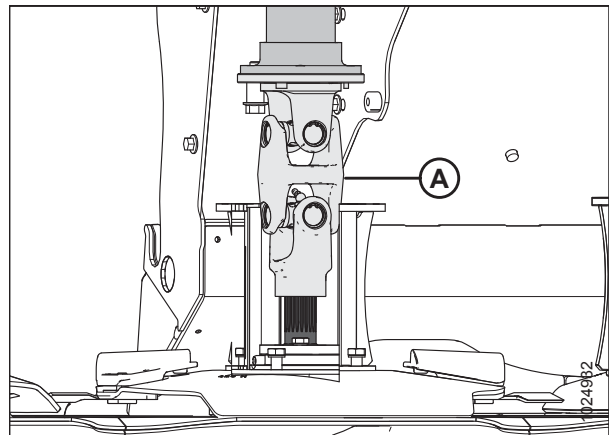


Figure 4.108: Driven Drum

## MAINTENANCE AND SERVICING

9. Use a 18 mm deep socket to remove the four M12 bolts (A) and washers holding the drum disc in place.
10. Remove drum disc assembly.

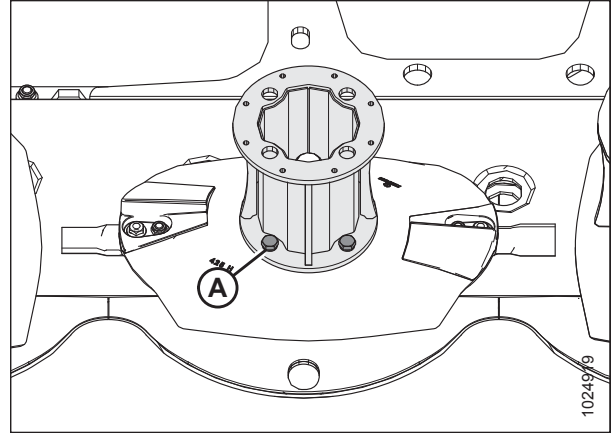


Figure 4.109: Driven Drum

### *Installing Small Driven Drums and Driveline*

#### **⚠ DANGER**

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

#### **⚠ CAUTION**

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

#### **NOTE:**

Illustrations show left side drum and driveline—right side drum and driveline are similar.

1. Position the drum disc assembly as shown.
2. Use a 18 mm deep socket to install the four M12 bolts (A) and washers that hold the drum disc in place. Torque to 85 Nm (63 lbf·ft).

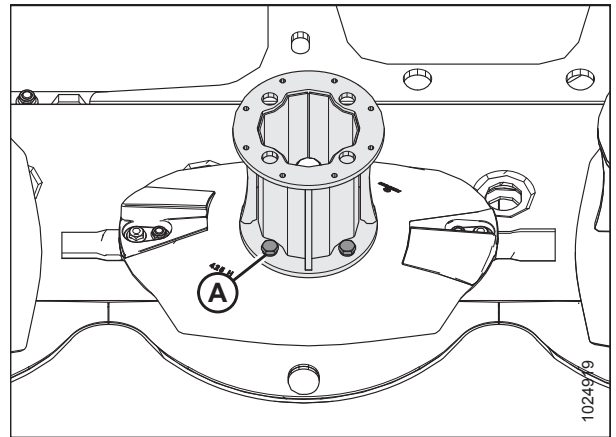


Figure 4.110: Drum Disc

## MAINTENANCE AND SERVICING

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

### NOTE:

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

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

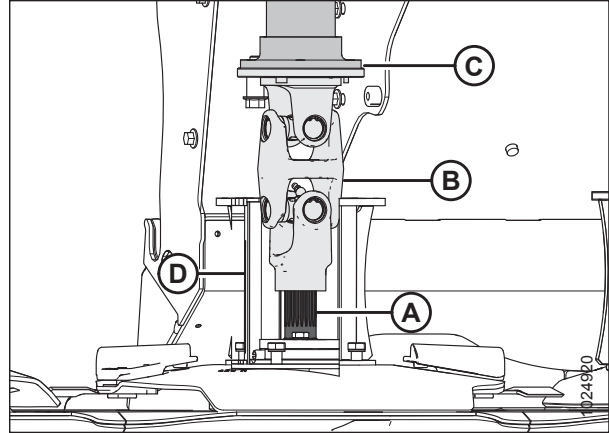


Figure 4.111: Driven Drum

6. Place a bead of medium-strength threadlocker (Loctite® 242 or equivalent) around threads, and install four M12 hex flange head bolts (A) and spacers to secure driveline assembly (B) to hub drive (C). Torque bolts to 95 Nm (70 lbf·ft).

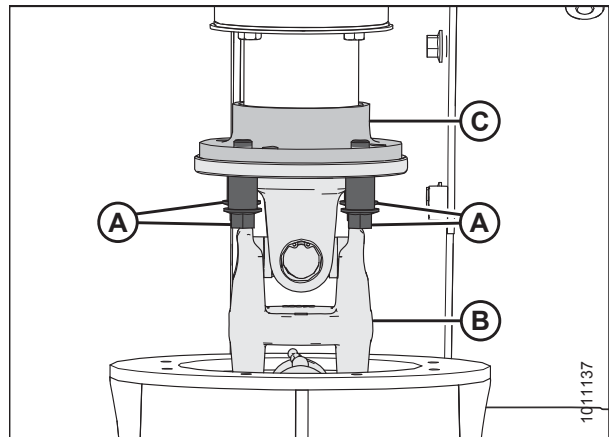


Figure 4.112: Driven Drum

7. Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and use eight M8 hex flange head bolts (A) to secure drum shields in place. Torque to 29 Nm (21 lbf·ft).

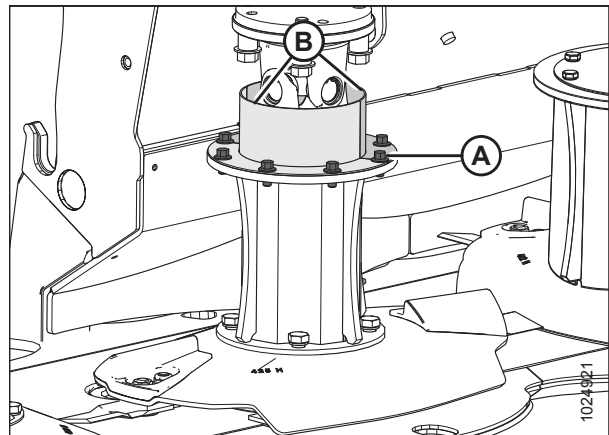


Figure 4.113: Driven Drum

## MAINTENANCE AND SERVICING

8. Position vertical shield (A) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use one M10 hex flange head bolt (B) and two M10 hex flange head bolts (C) to secure vertical shield in place. Torque to 57.5 Nm (42 lbf·ft).

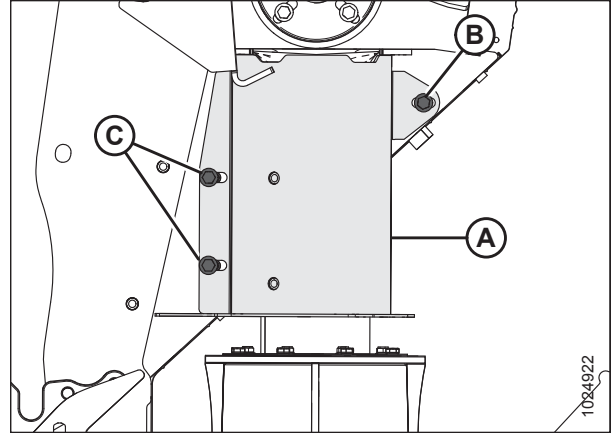


Figure 4.114: Driven Drum

9. Position top plate (B) and drum top (C) onto drum as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use four M10 hex flange head bolts (A) to secure the top plate and drum top in place.

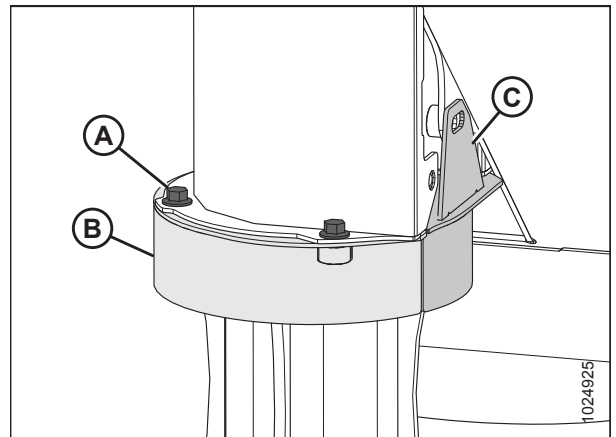


Figure 4.115: Driven Drum

## MAINTENANCE AND SERVICING

10. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then install top M10 hex flange head bolt (B) through cover plate (A) and top plate (C).
11. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then install lower M10 hex flange head bolt (D) through cover plate (A) and vertical shield (E).
12. Tighten bolts (B) and (D).

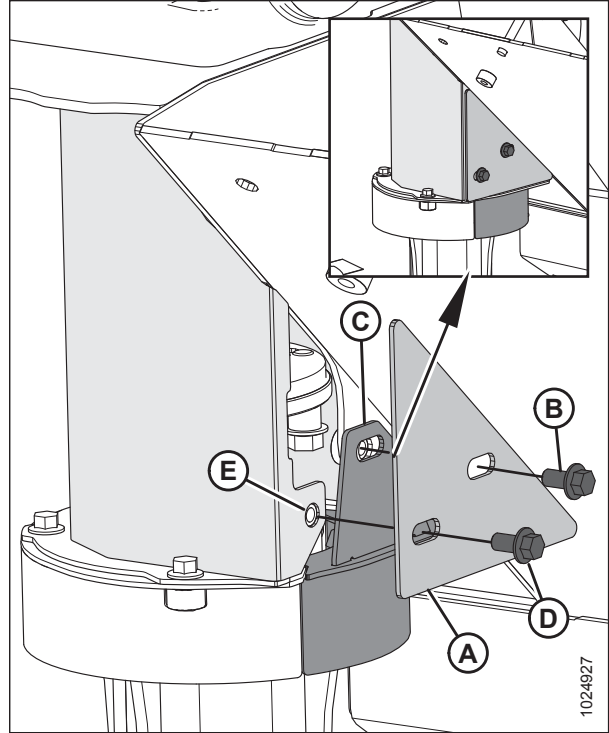


Figure 4.116: Driven Drum

13. Position vertical drive shield (B) as shown at right. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use four M10 hex flange head bolts (A) to secure vertical drive shield in place.



### WARNING

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

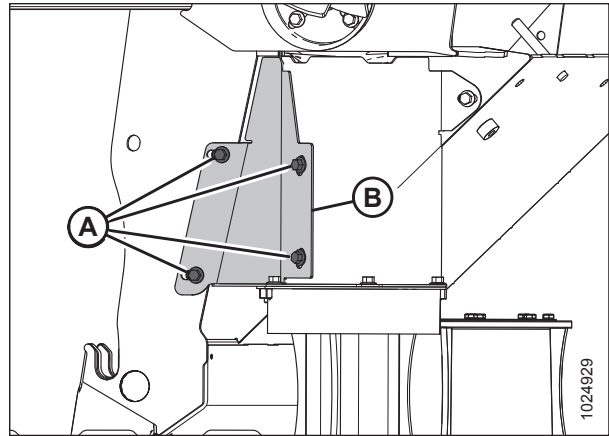


Figure 4.117: Driven Drum

14. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.



Figure 4.118: R113 Pull-Type Disc Mower

### *Removing Small Non-Driven Drums*



#### **DANGER**

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



#### **CAUTION**

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

1. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.

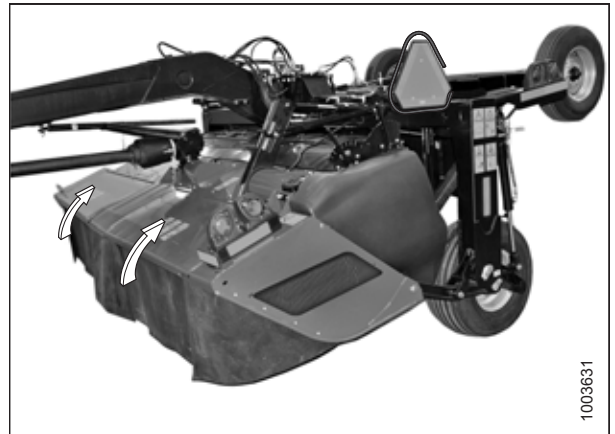


Figure 4.119: R113 Pull-Type Disc Mower

## MAINTENANCE AND SERVICING

2. Remove the four M12 bolts (A) outside the drum using a 18 mm socket.
3. Remove wooden block.
4. Remove drum/disc (B).

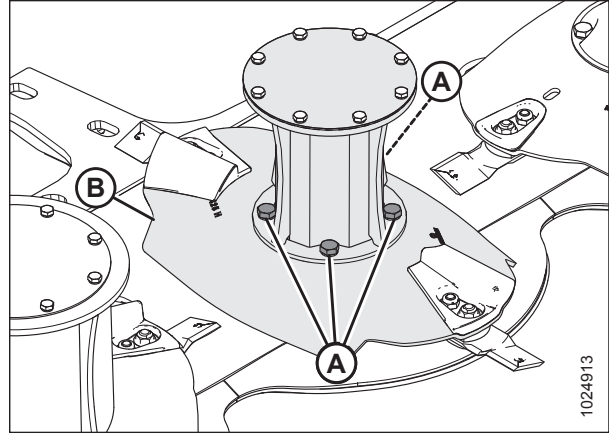


Figure 4.120: Non-Driven Drum

### *Installing Small Non-Driven Drums*

#### **⚠ DANGER**

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

#### **⚠ CAUTION**

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

1. Ensure spacer (A) is on spindle.

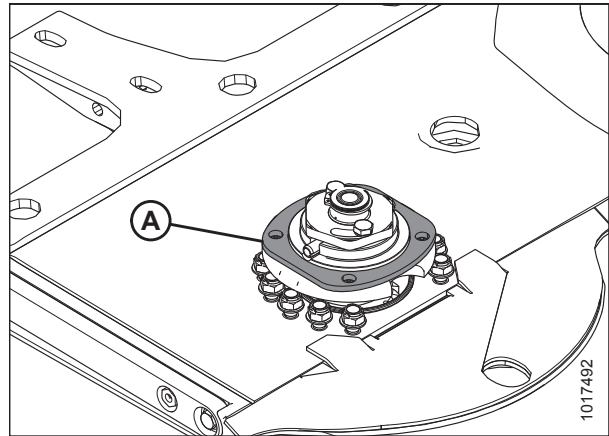


Figure 4.121: Non-Driven Spindle

2. Position the non-driven drum/disc (B) onto spindle as shown.
3. Use a 18 mm deep socket to install the four M12 bolts (A) and washers securing drum/disc to spindle. Torque to 55 Nm (40 lbf·ft).

**⚠ WARNING**

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

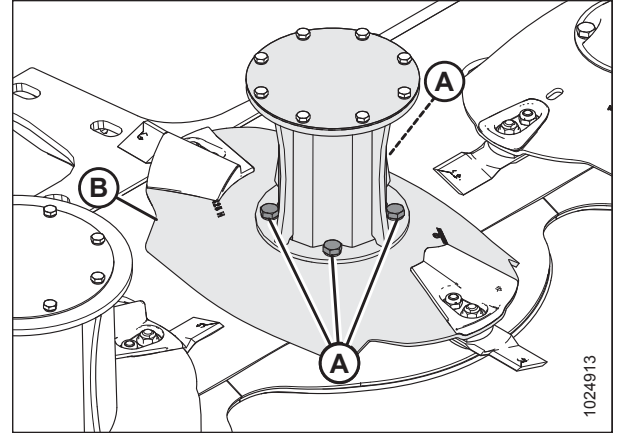


Figure 4.122: Non-Driven Drum

4. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.

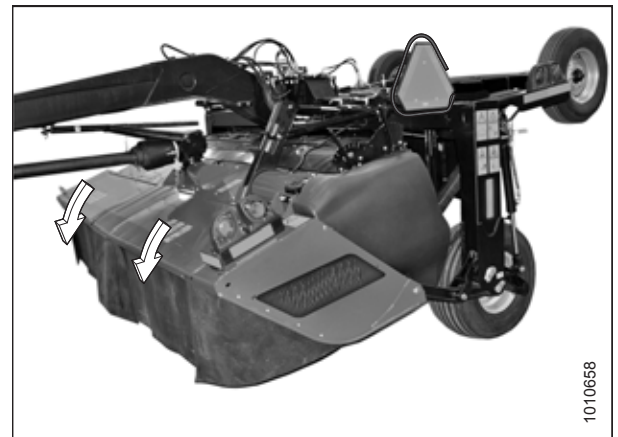


Figure 4.123: R113 Pull-Type Disc Mower

## 4.4.11 Replacing Large Drums

Drums deliver cut material from the ends of the cutterbar and help maintain an even crop flow into the conditioner. Drums are attached to the outboard discs at each end of the cutterbar on a 4.0 m (13 ft.) disc mower, and to the two outboard discs on a 4.9 m (16 ft.) disc mower.

**IMPORTANT:**

The outboard drums (B) are approximately 23 mm (7/8 in.) smaller in diameter than the inboard drums (A).

**IMPORTANT:**

Measure drum size to determine if small or large drums are installed on your disc mower. Large drums measure 250 mm (9-7/8 in.) across. Small drums measure 187 mm (7-3/8 in.) across. If your disc mower has small drums, refer to [4.4.10 Replacing Small Drums](#), page 182.

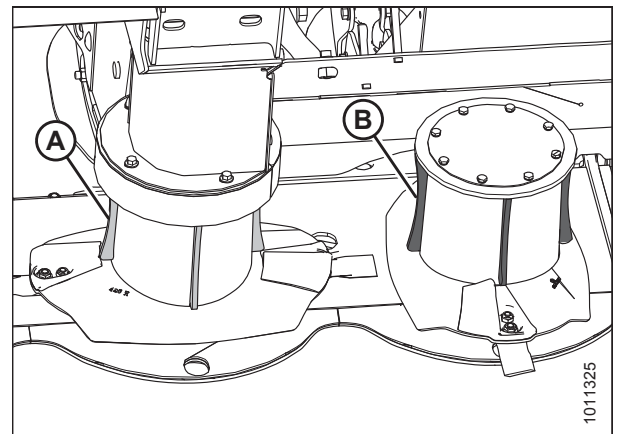


Figure 4.124: 4.9 m (16 ft.) Drums

A - Driven Drum

B - Non-Driven Drum

## Inspecting Large Drums

Inspect drums daily for signs of damage or wear.

### DANGER

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

### CAUTION

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

1. Lower disc mower fully, shut off engine, and remove key.
2. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.

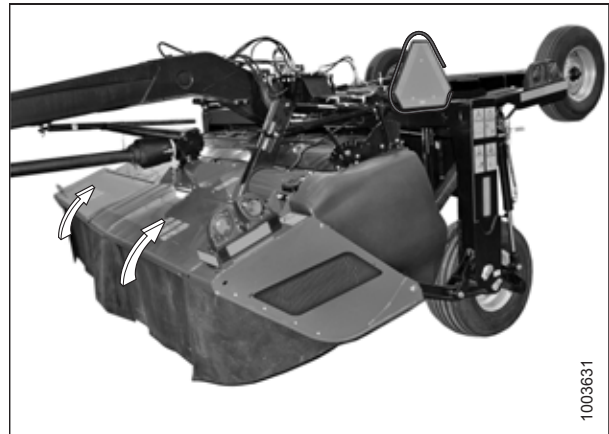


Figure 4.125: R113 Pull-Type Disc Mower

3. 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.
4. Examine drums for large dents. Replace dented drums to prevent an imbalance in the cutterbar.
5. Tighten or replace loose or missing fasteners.

### WARNING

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

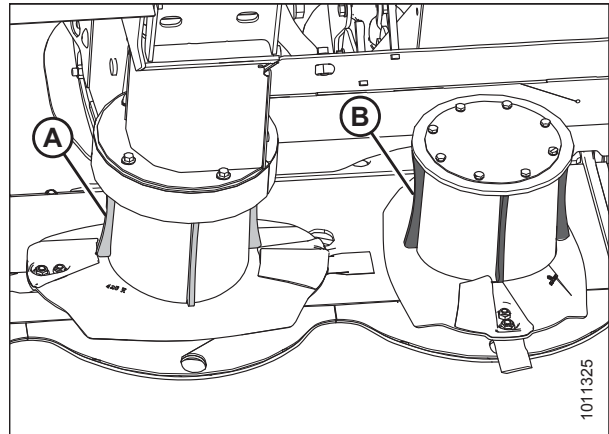


Figure 4.126: R116 PT Disc Mower Drums

## MAINTENANCE AND SERVICING

6. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors, page 40](#).



Figure 4.127: R113 Pull-Type Disc Mower

### *Removing Large Driven Drums and Driveline*

#### **DANGER**

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

#### **CAUTION**

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

#### **NOTE:**

Illustrations show left side drum and driveline—right side drum and driveline are similar.

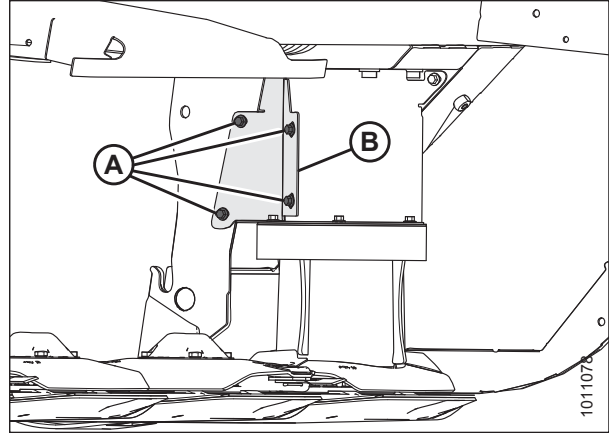
1. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).



Figure 4.128: R113 Pull-Type Disc Mower

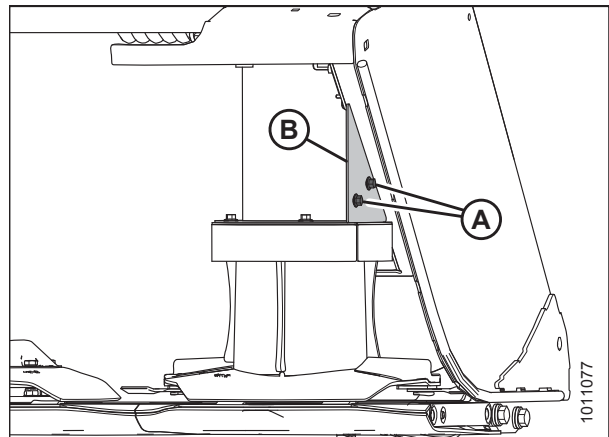
## MAINTENANCE AND SERVICING

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



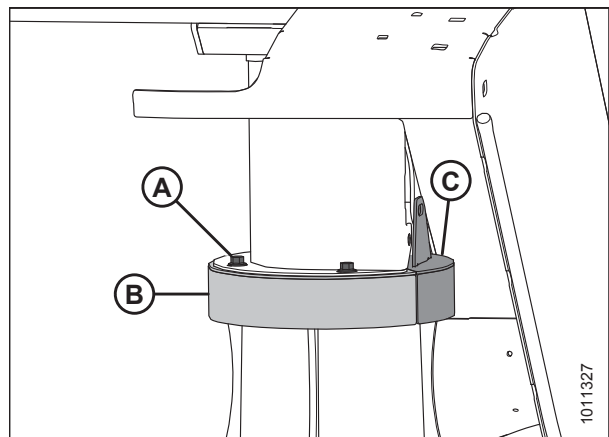
**Figure 4.129: Driven Drum**

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



**Figure 4.130: Driven Drum**

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



**Figure 4.131: Driven Drum**

## MAINTENANCE AND SERVICING

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

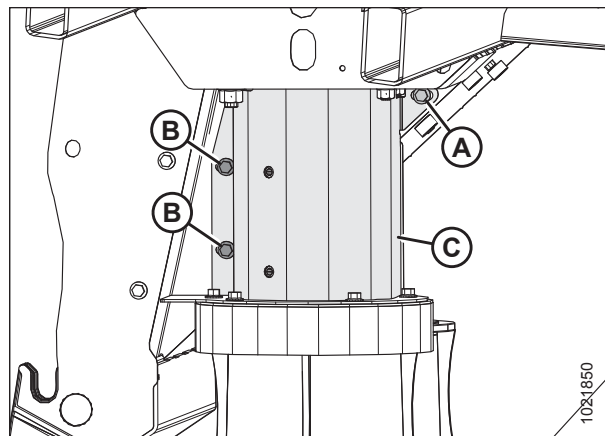


Figure 4.132: Driven Drum

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

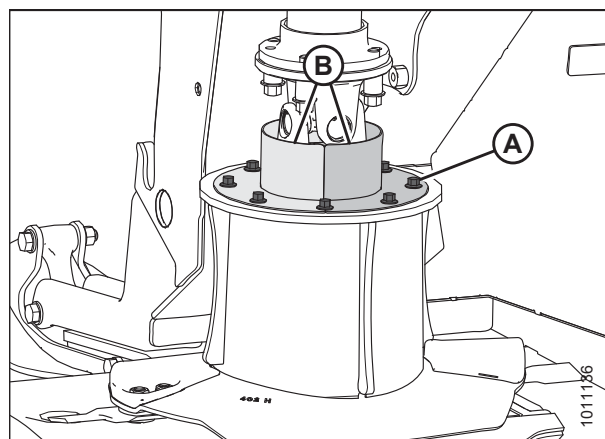


Figure 4.133: Driven Drum

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

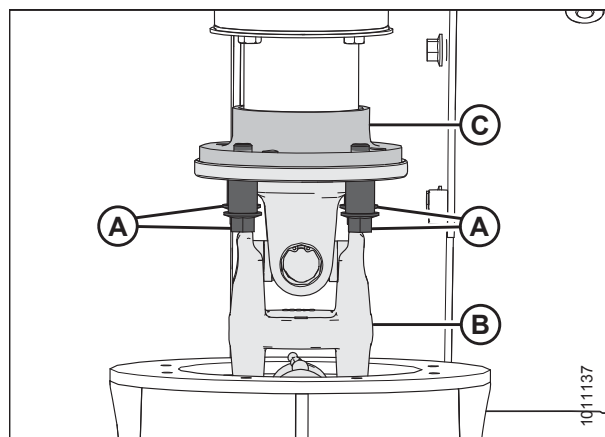


Figure 4.134: Driven Drum

## MAINTENANCE AND SERVICING

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

**NOTE:**

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

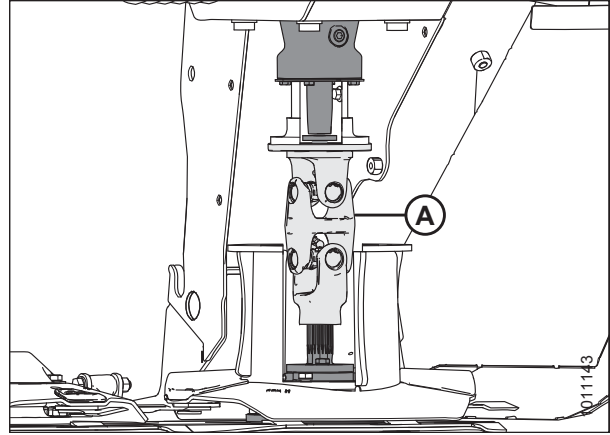


Figure 4.135: Driven Drum

9. Look down into the drum, and use a 305 mm (12 in.) extension and 18 mm deep socket to remove the four M12 bolts (A) and washers holding the drum disc in place.
10. Remove drum disc assembly.

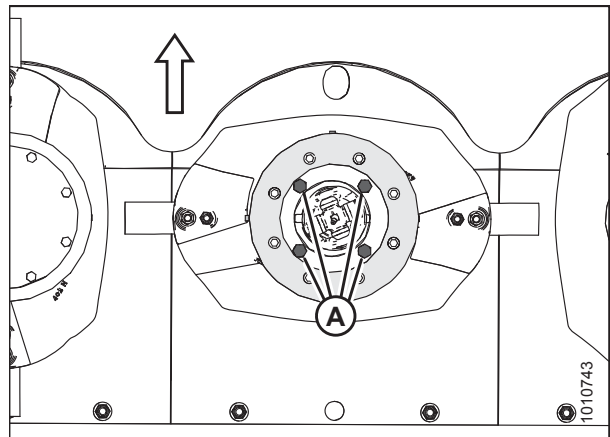


Figure 4.136: 4.9 m (16 Ft.) Driven Drum

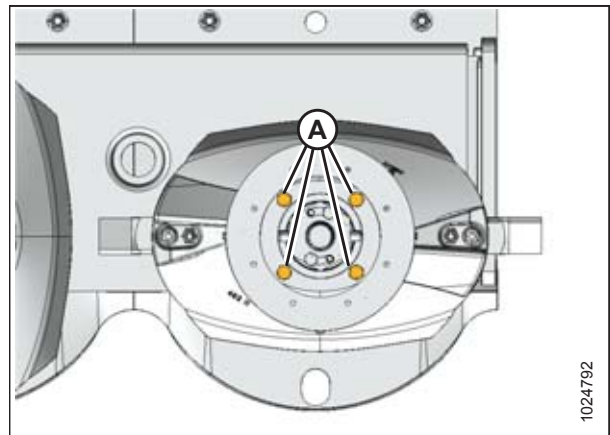


Figure 4.137: 4.0 m (13 Ft.) Driven Drum

### Installing Large Driven Drums and Driveline

#### **DANGER**

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

#### **CAUTION**

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

#### **NOTE:**

Illustrations show left side drum and driveline—right side drum and driveline are similar.

1. Position the drum disc assembly as shown.

#### **NOTE:**

Disc oriented so that blades are at 90 degrees (1/4 turn) to the adjacent disc.

2. Use a 305 mm (12 in.) extension and 16 mm deep socket to install the four M12 bolts (A) and washers that hold the drum disc in place. Torque to 85 Nm (63 lbf·ft).

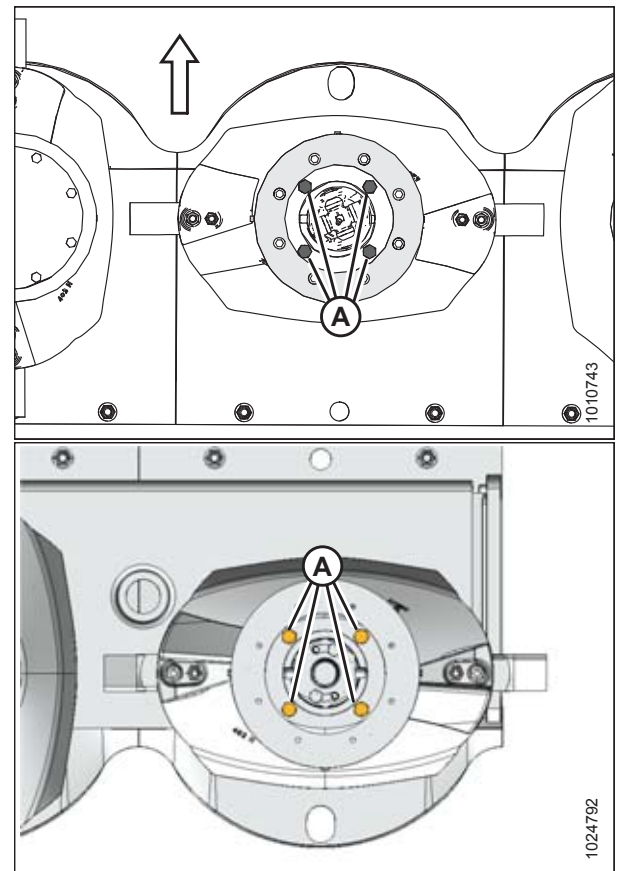


Figure 4.138: Drum Disc

## MAINTENANCE AND SERVICING

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

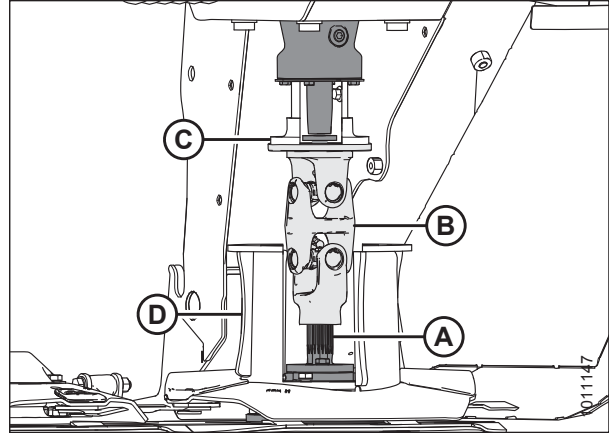
**NOTE:**

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

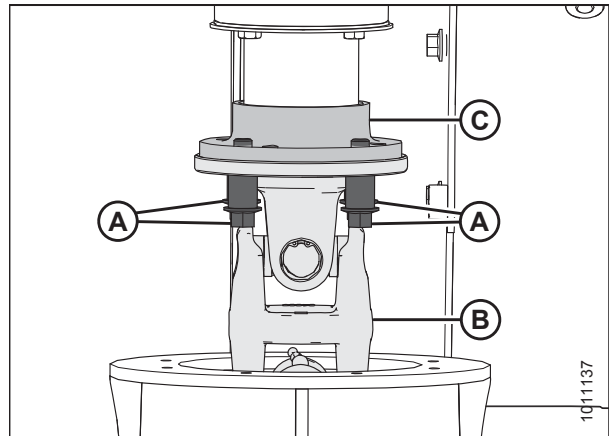
**NOTE:**

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

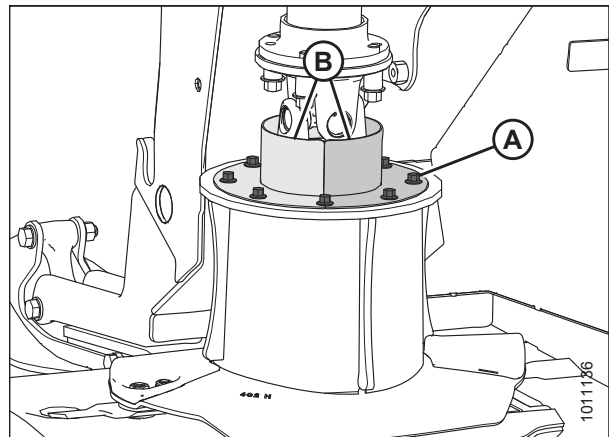
4. Insert driveline (B) at an angle and guide it past hub drive (C) and drum (D).
5. Insert splined spindle end (A) into splined bore of driveline (B).
6. Place a bead of medium-strength threadlocker (Loctite® 242 or equivalent) around threads, and install four M12 hex flange head bolts (A) and spacers to secure driveline assembly (B) to hub drive (C). Torque bolts to 95 Nm (70 lbf·ft).
7. Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and use eight M8 hex flange head bolts (A) to secure drum shields in place. Torque to 29 Nm (21 lbf·ft).



**Figure 4.139: Driven Drum**



**Figure 4.140: Driven Drum**



**Figure 4.141: Driven Drum**

## MAINTENANCE AND SERVICING

8. Position vertical shield (A) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use one M10 hex flange head bolt (B) and two M10 hex flange head bolts (C) to secure vertical shield in place. Torque to 57.5 Nm (42 lbf·ft).

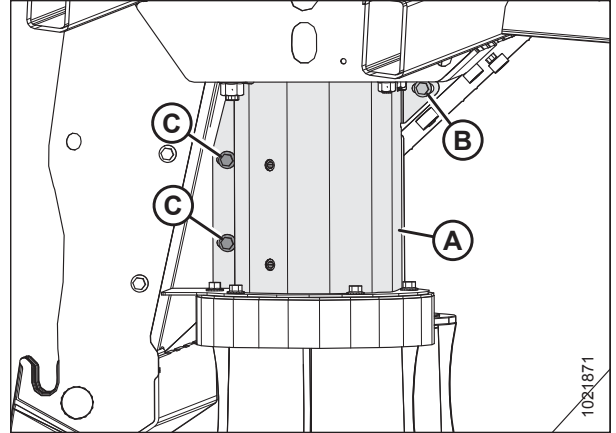


Figure 4.142: Driven Drum

9. Position top plate (B) and drum top (C) onto drum as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use four M10 hex flange head bolts (A) to secure the top plate and drum top in place.

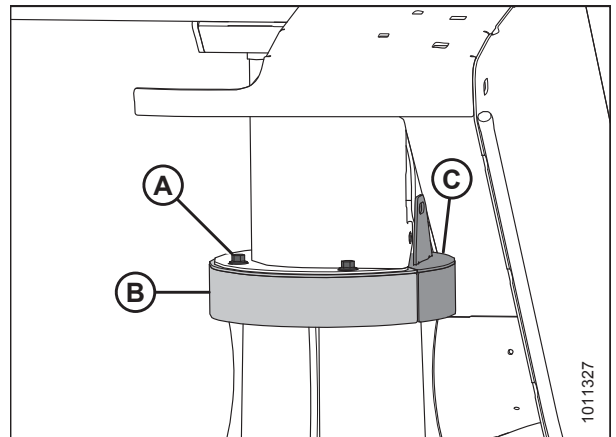


Figure 4.143: Driven Drum

## MAINTENANCE AND SERVICING

10. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then install top M10 hex flange head bolt (B) through cover plate (A) and top plate (C).
11. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then install lower M10 hex flange head bolt (D) through cover plate (A) and vertical shield (E).
12. Tighten bolts (B) and (D).

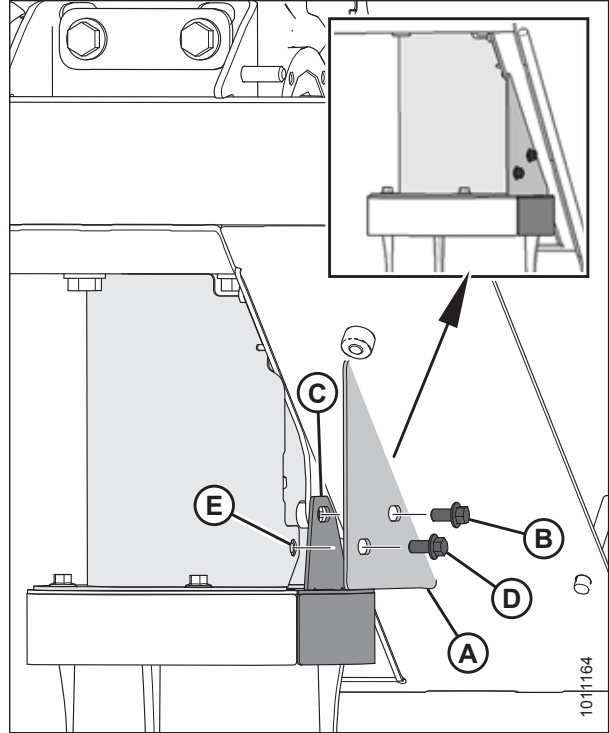


Figure 4.144: Driven Drum

13. Position vertical drive shield (B) as shown at right. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use four M10 hex flange head bolts (A) to secure vertical drive shield in place.



### WARNING

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

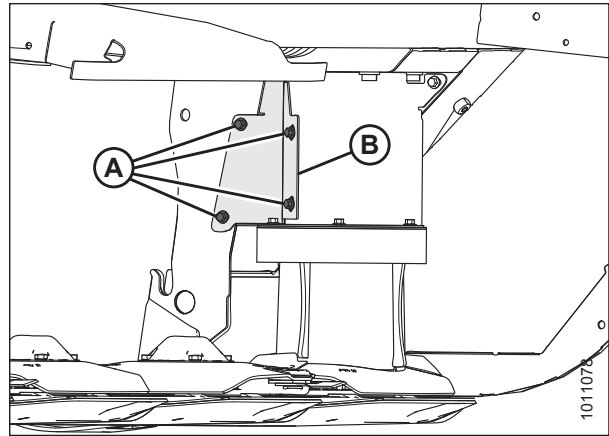


Figure 4.145: Driven Drum

## MAINTENANCE AND SERVICING

14. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors, page 40](#).

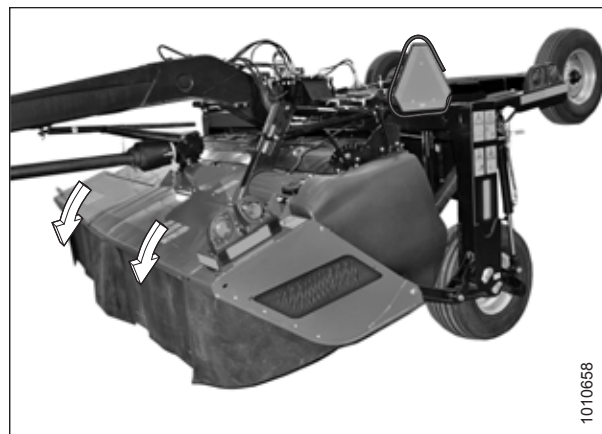


Figure 4.146: R113 Pull-Type Disc Mower

## Removing Large Non-Driven Drums

### DANGER

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

### CAUTION

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

1. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.

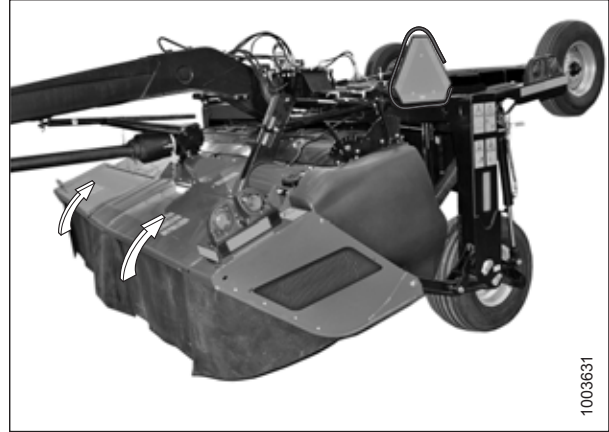


Figure 4.147: R113 Pull-Type Disc Mower

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

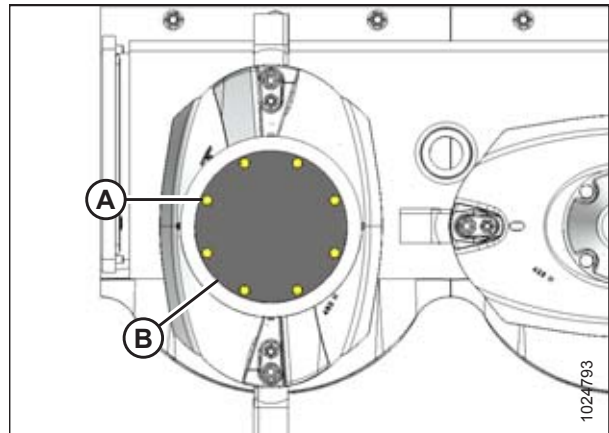
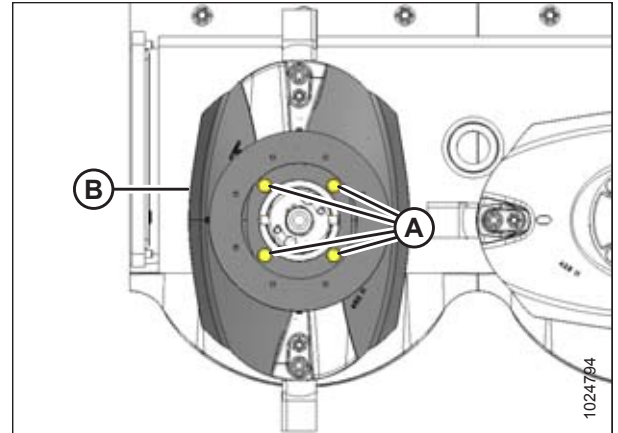


Figure 4.148: Non-Driven Drum

## MAINTENANCE AND SERVICING

4. Remove the four M10 bolts (A) inside the drum using a 305 mm (12 in.) extension and 16 mm socket.
5. Remove wooden block.
6. Remove drum/disc (B).



**Figure 4.149: Non-Driven Drum**

### Installing Large Non-Driven Drums

#### **DANGER**

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

#### **CAUTION**

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

1. Ensure spacer (A) is on spindle.

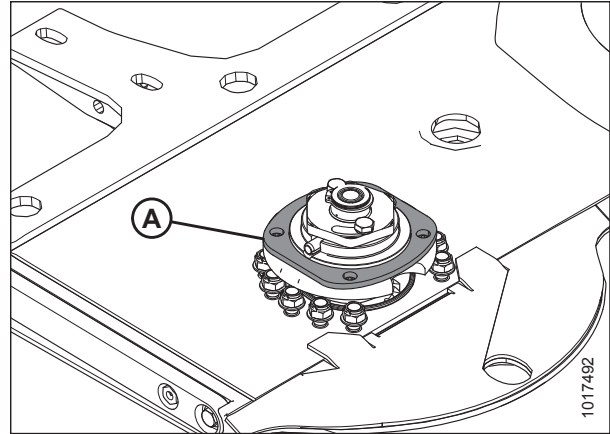


Figure 4.150: Non-Driven Spindle

2. Position the non-driven drum/disc (B) onto spindle as shown.
3. Use a 305 mm (12 in.) extension and 16 mm deep socket to install the four M10 bolts (A) and washers securing drum/disc to spindle. Torque to 55 Nm (40 lbf·ft).

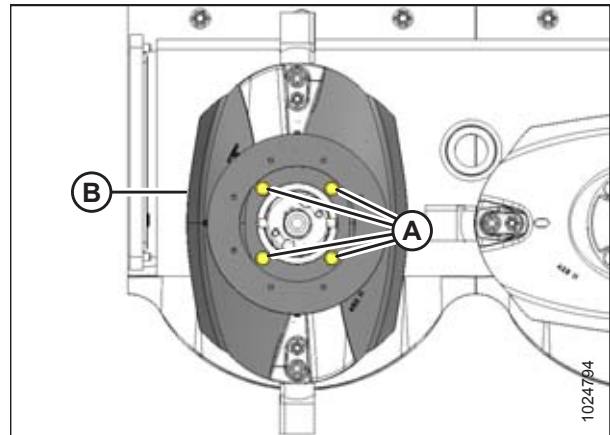


Figure 4.151: Non-Driven Drum

## MAINTENANCE AND SERVICING

4. Install eight M8 bolts (A) and washers to secure cover to non-driven drum, and torque to 28 Nm (20 lbf·ft).



### WARNING

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

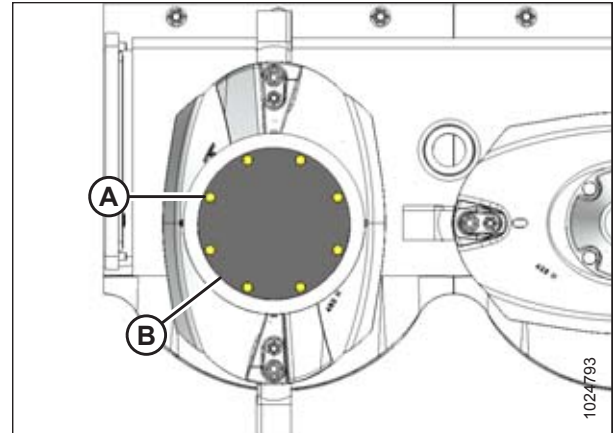


Figure 4.152: Non-Driven Drum

5. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.

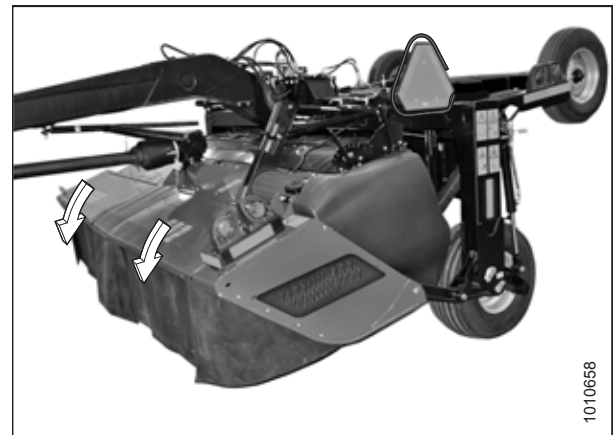


Figure 4.153: R113 Pull-Type Disc Mower

#### 4.4.12 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 (A).

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 while remaining attached to the spindle with a snap ring (B).

**IMPORTANT:**

Ensure correct orientation of the shear pins during replacement.

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

**NOTE:**

Once spindle has risen due to shear pin failure, the spindle's bearing will become unloaded. Do **NOT** replace the spindle due to excessive play. Check play after replacing damaged shear pins.

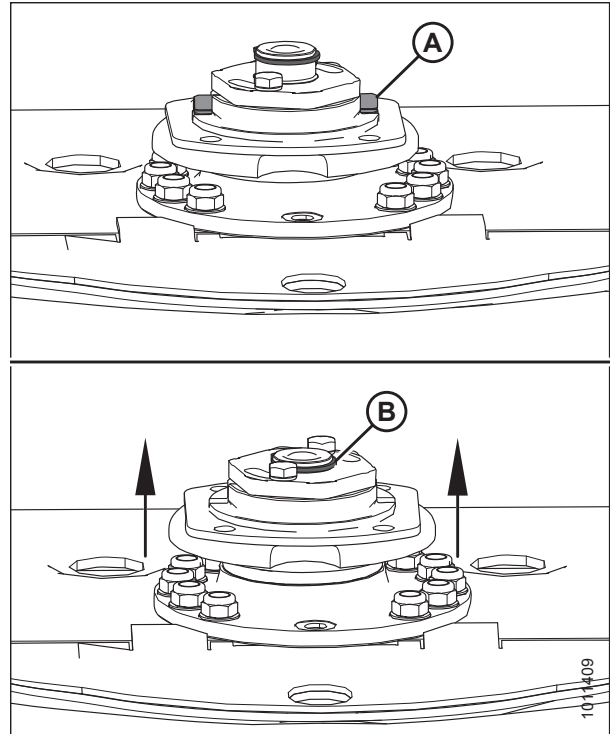


Figure 4.154: Cutterbar Spindles

#### Removing Cutterbar Spindle Shear Pin

**⚠ 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.

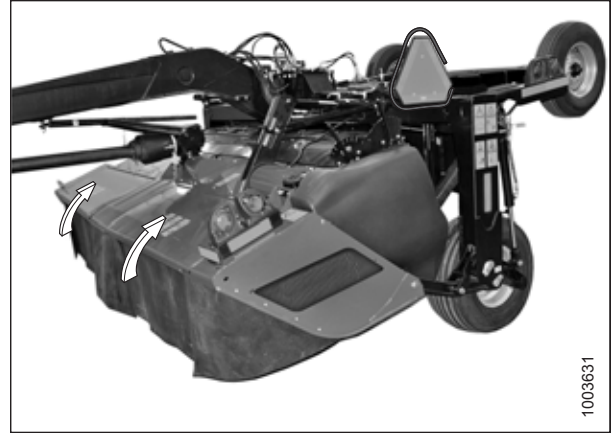
**⚠ CAUTION**

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

1. Raise disc mower fully, shut off engine, and remove key.
2. Engage lift lock-out valves. Refer to [3.1.1 Engaging Locks, page 33](#).

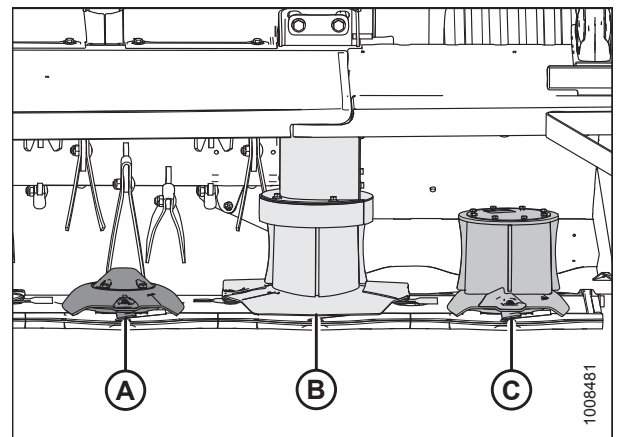
## MAINTENANCE AND SERVICING

3. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).
4. Clean debris from work area.



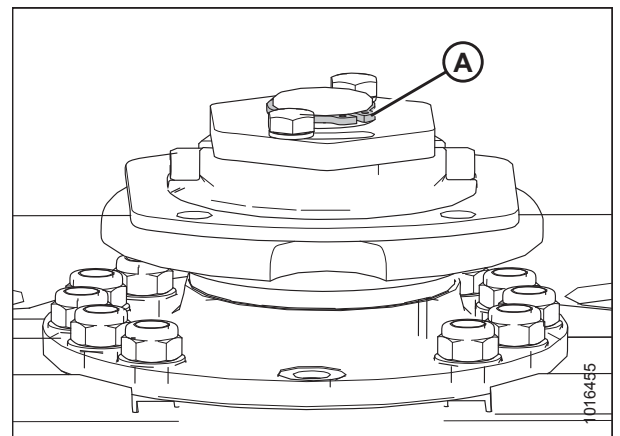
**Figure 4.155: R113 Pull-Type Disc Mower**

5. Depending on the type of disc with a broken shear pin, refer to the applicable disc removal procedure.
  - To remove cutterbar disc (A). Refer to [Removing Cutterbar Discs, page 156](#).
  - To remove driven drum (B). Refer to [Removing Large Driven Drums and Driveline, page 195](#).
  - To remove non-driven drum (C). Refer to [Removing Large Non-Driven Drums, page 204](#).



**Figure 4.156: Cutterbar Disc Assemblies (4.9 m [16 ft.] Shown)**

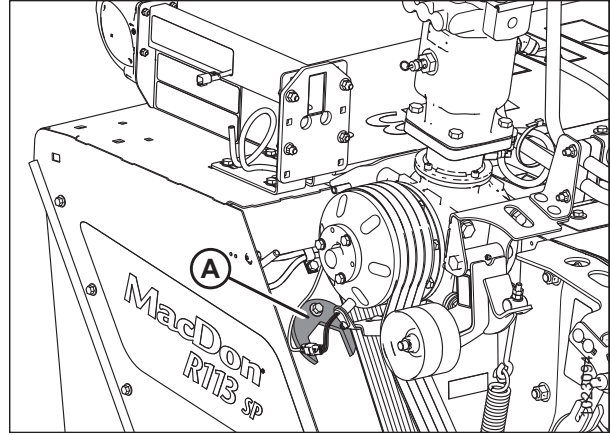
6. Remove retaining ring (A).



**Figure 4.157: Cutterbar Spindle**

## MAINTENANCE AND SERVICING

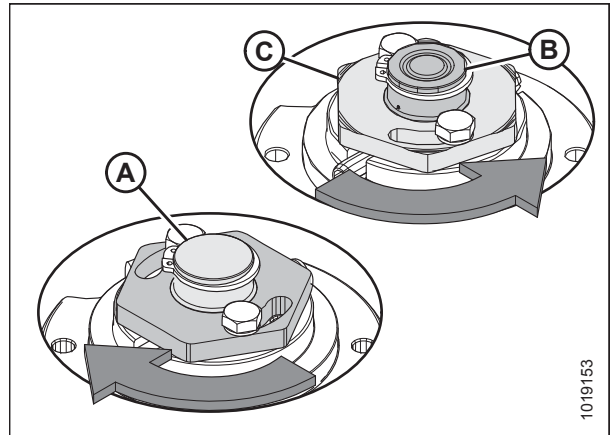
7. Remove M12 bolt and remove safecut spindle-nut wrench (A) from left side shield plate.



**Figure 4.158: Safecut Spindle-Nut Wrench Location**

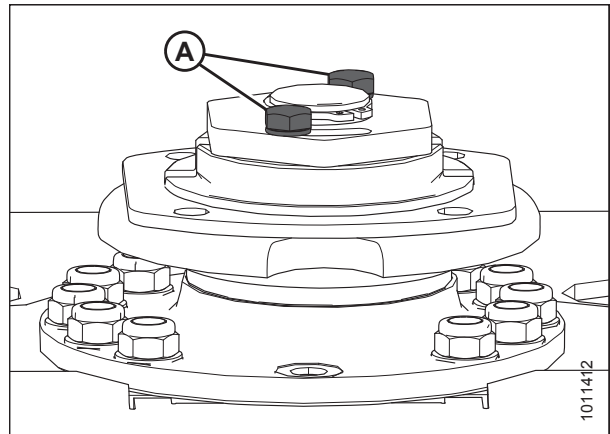
### IMPORTANT:

- 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 spindle position in 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 rotation pattern can result in damage to spindle and/or cutterbar components.



**Figure 4.159: Cutterbar Spindles**

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



**Figure 4.160: Cutterbar Spindle**

## MAINTENANCE AND SERVICING

9. Use the safecut spindle-nut wrench and remove nut (A).

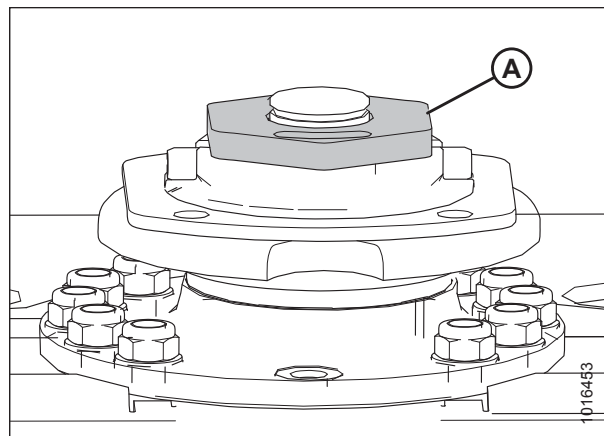


Figure 4.161: Cutterbar Spindle

10. Remove shear pins (B). Do **NOT** damage the pin bore on the pinion.
11. Remove the hub (A).
12. Check the nut and hub for damage. Replace if necessary.

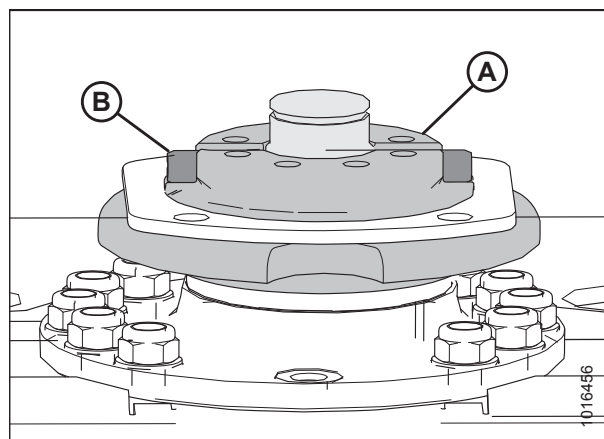


Figure 4.162: Cutterbar Spindle

## Installing Cutterbar Spindle Shear Pin

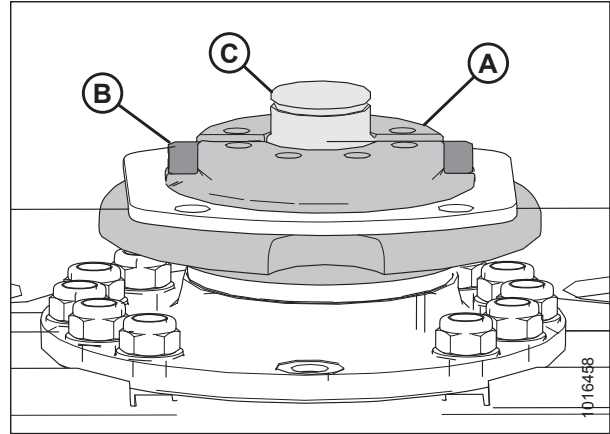
### **DANGER**

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.

### **CAUTION**

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

1. Fill the space above the bearing with grease.
2. Place the hub (A) on the spindle (C).
3. Install shear pins (B).



**Figure 4.163: Cutterbar Spindle**

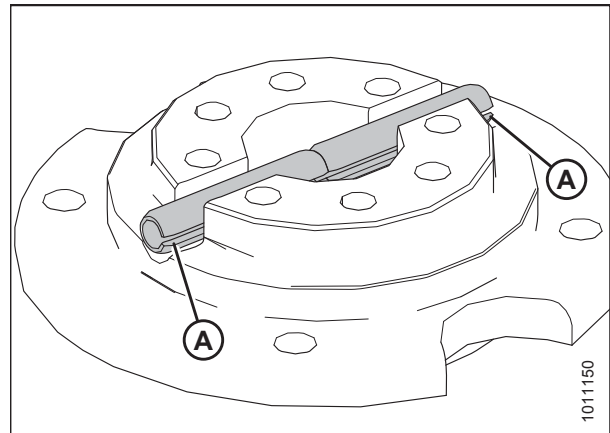
4. Observe orientation of groove in shear pin (A).

#### **IMPORTANT:**

The correct shear pin orientation is critical. Both shear pin grooves (A) must be facing the same direction and parallel to the cutterbar.

#### **NOTE:**

Shaft removed from illustration for clarity.



**Figure 4.164: Shear Pin Orientation**

## MAINTENANCE AND SERVICING

5. Install nut (A).

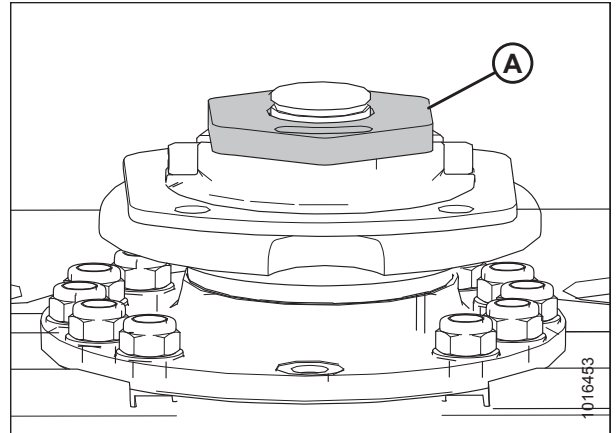


Figure 4.165: Cutterbar Spindle

6. Attach the safecut spindle-nut wrench (B) 90 degrees (D) to the torque wrench (A).

**IMPORTANT:**

If this is not done, the proper torque will **NOT** be applied to the nut.

7. Locate the safecut spindle-nut wrench (B) on spindle nut (C) and torque to 300 Nm (221 lbf·ft).
8. Return safecut spindle-nut wrench to left side shield plate.

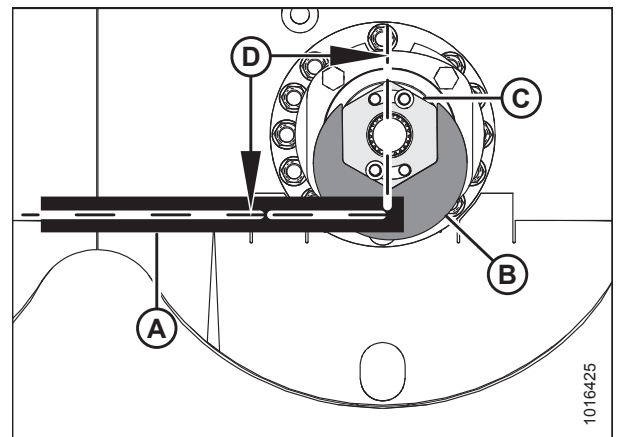


Figure 4.166: Spindle Nut

9. Inspect the threads of the two M10 bolts (A) and replace if damaged.
10. Install two M10 bolts (A) and washers. Torque to 55 Nm (40 lbf·ft).

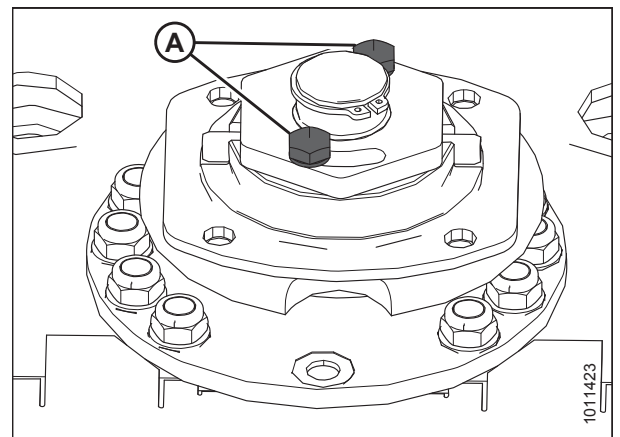


Figure 4.167: Cutterbar Spindle

## MAINTENANCE AND SERVICING

11. Install retaining ring (A).

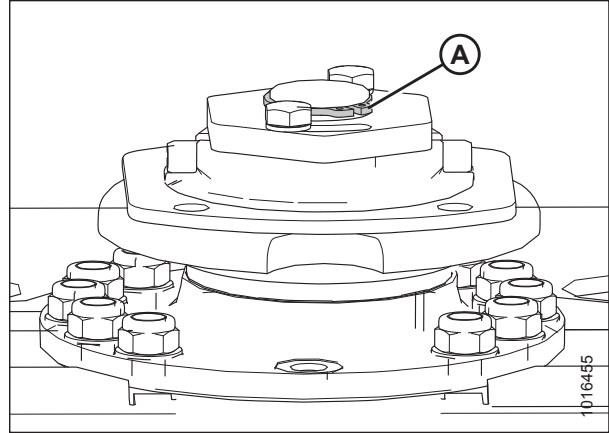


Figure 4.168: Cutterbar Spindle

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

- Install cutterbar disc (A). Refer to *Installing Cutterbar Discs*, page 157.
- Install driven drum (B). Refer to *Installing Large Driven Drums and Driveline*, page 199.
- Install non-driven drum (C). Refer to *Installing Large Non-Driven Drums*, page 206.

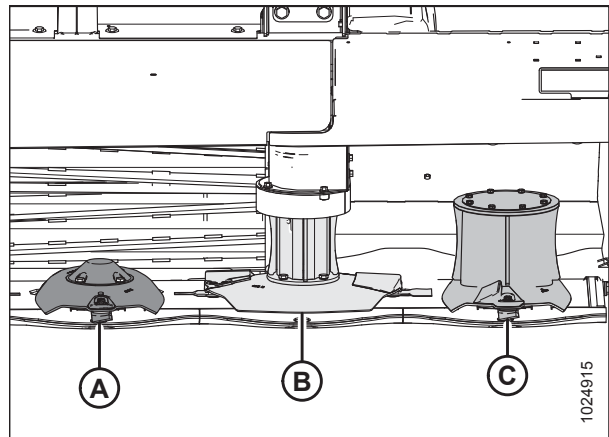


Figure 4.169: 4.9 m [16 ft.] Cutterbar

### WARNING

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

13. Close cutterbar doors. Refer to *3.3.3 Closing Cutterbar Doors*, page 40.

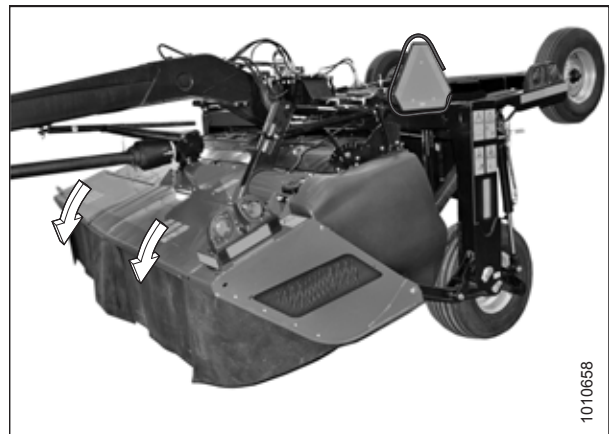


Figure 4.170: R113 Pull-Type Disc Mower

## 4.5 Drive Systems

### 4.5.1 Driveshields

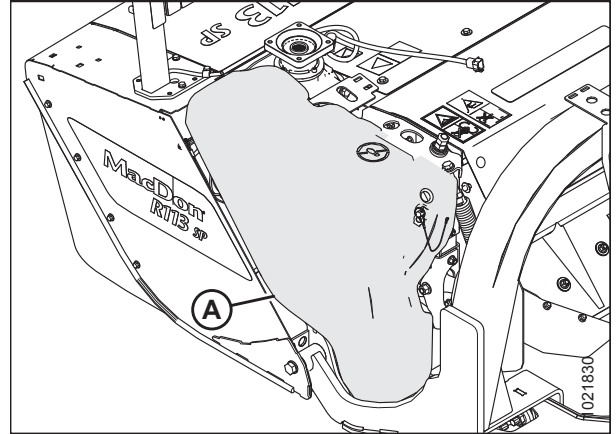
#### *Removing Driveshields*

#### **CAUTION**

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

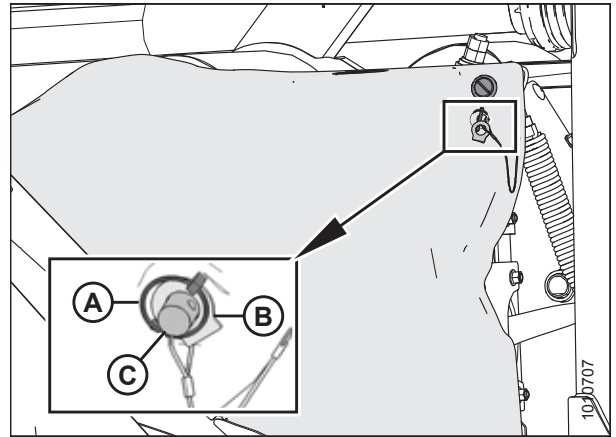
#### **NOTE:**

Images shown in procedure are for left side driveshield (A). Right side driveshield is similar.



**Figure 4.171: Left Driveshield**

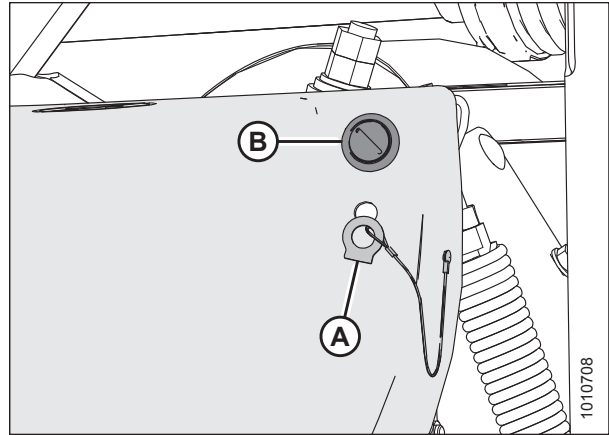
1. Remove lynch pin (A) and tool (B) from pin (C).



**Figure 4.172: Tool to Unlock Driveshield**

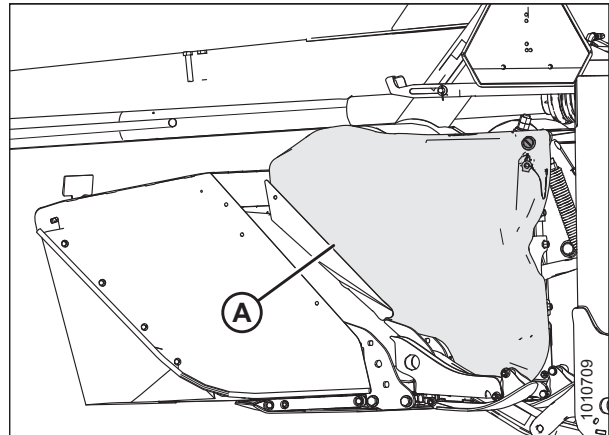
## MAINTENANCE AND SERVICING

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



**Figure 4.173: Tool to Unlock Driveshield and Latch**

3. Pull top of driveshield (A) away from the disc mower and lift off the pins at the base of the shield to remove.



**Figure 4.174: Driveshield**

## Installing Driveshields

### CAUTION

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

#### NOTE:

Images shown in procedure are for left side driveshield—right side driveshield is similar.

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

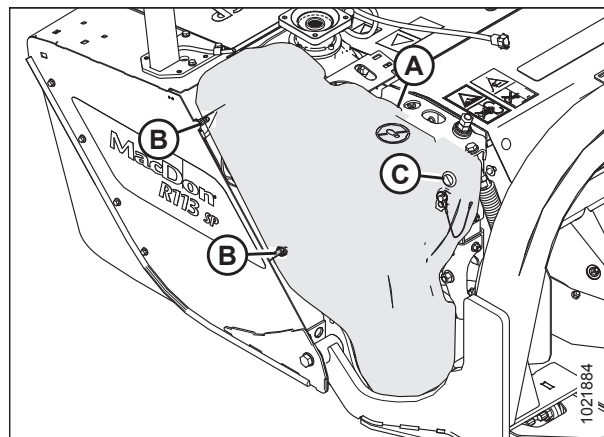


Figure 4.175: Driveshield and Latch

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

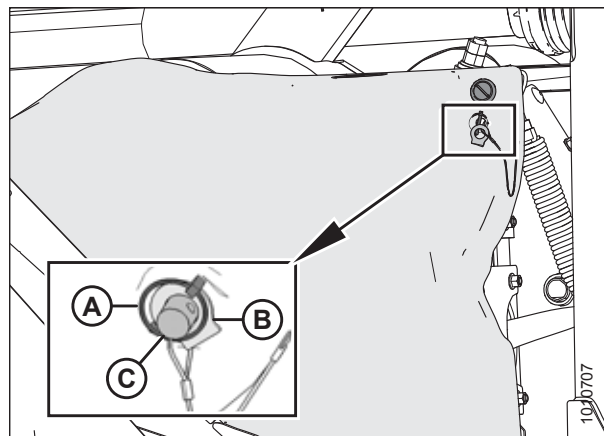


Figure 4.176: Tool to Unlock Driveshield

## Replacing Driveshield Latch

### CAUTION

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

### NOTE:

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

1. Remove driveshield (A). Refer to [Removing Driveshields, page 215](#).

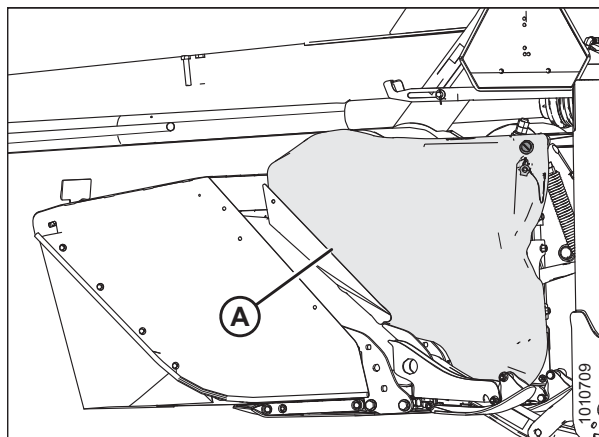


Figure 4.177: Driveshield

2. Remove hex nut (A) and flat washer securing latch to backside of driveshield, replace latch if worn or damaged, and reinstall nut and washer.

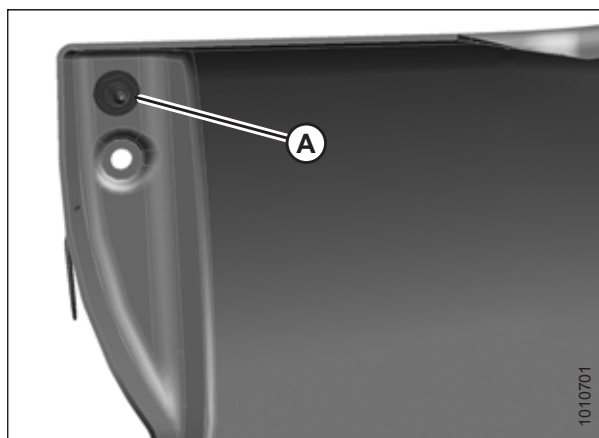


Figure 4.178: Backside of Driveshield

3. Remove two carriage bolts (A), replace stud and clip assembly (B) if worn or damaged, and reinstall carriage bolts.
4. Install driveshield. Refer to [Installing Driveshields, page 217](#).

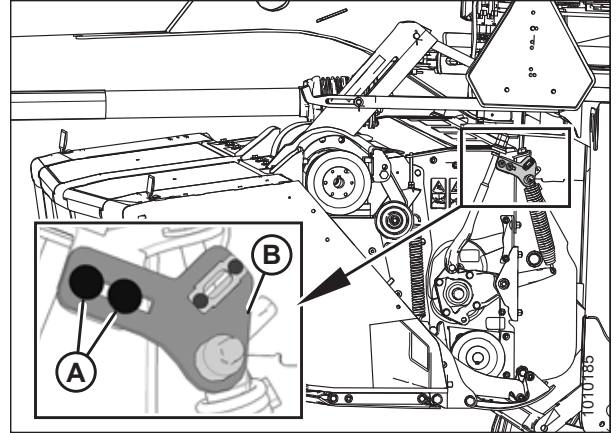


Figure 4.179: Stud and Clip Assembly

### 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.

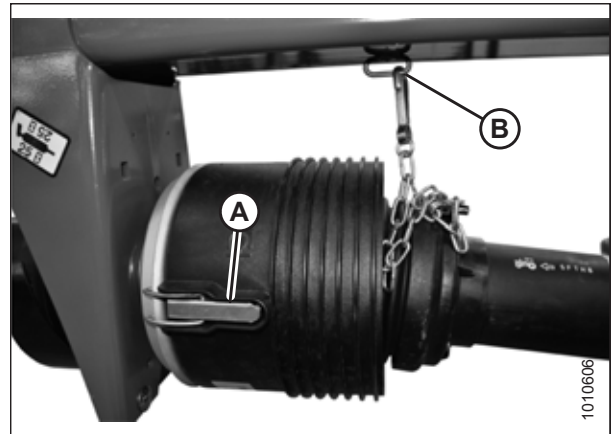
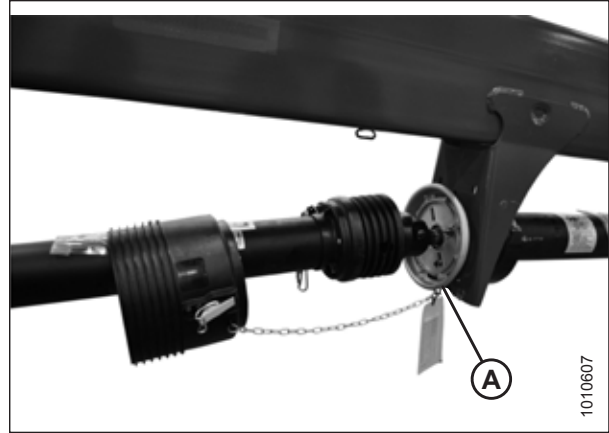


Figure 4.180: Driveline Shield Cone and Lever Clamp

## MAINTENANCE AND SERVICING

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



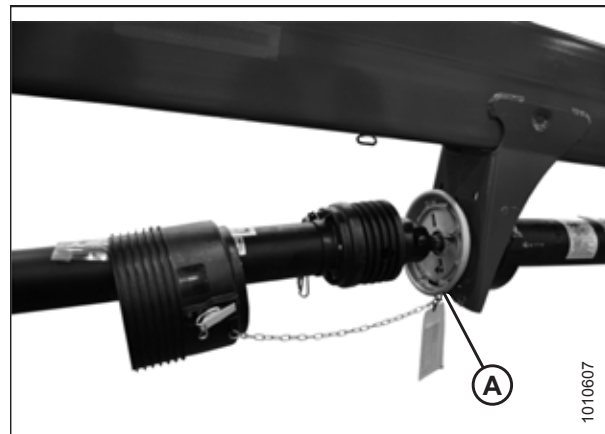
**Figure 4.181: Driveline Shield Cone Removed from Metal Plate**

### Installing Driveline Shield Cone

#### **WARNING**

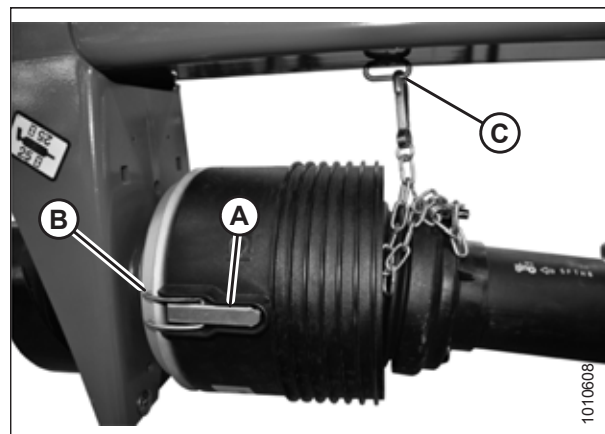
**Do NOT** operate the machine without the driveline shield cones in place and the lever clamps securely fastened.

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



**Figure 4.182: 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 4.183: Driveline Shield Cone and Lever Clamp**

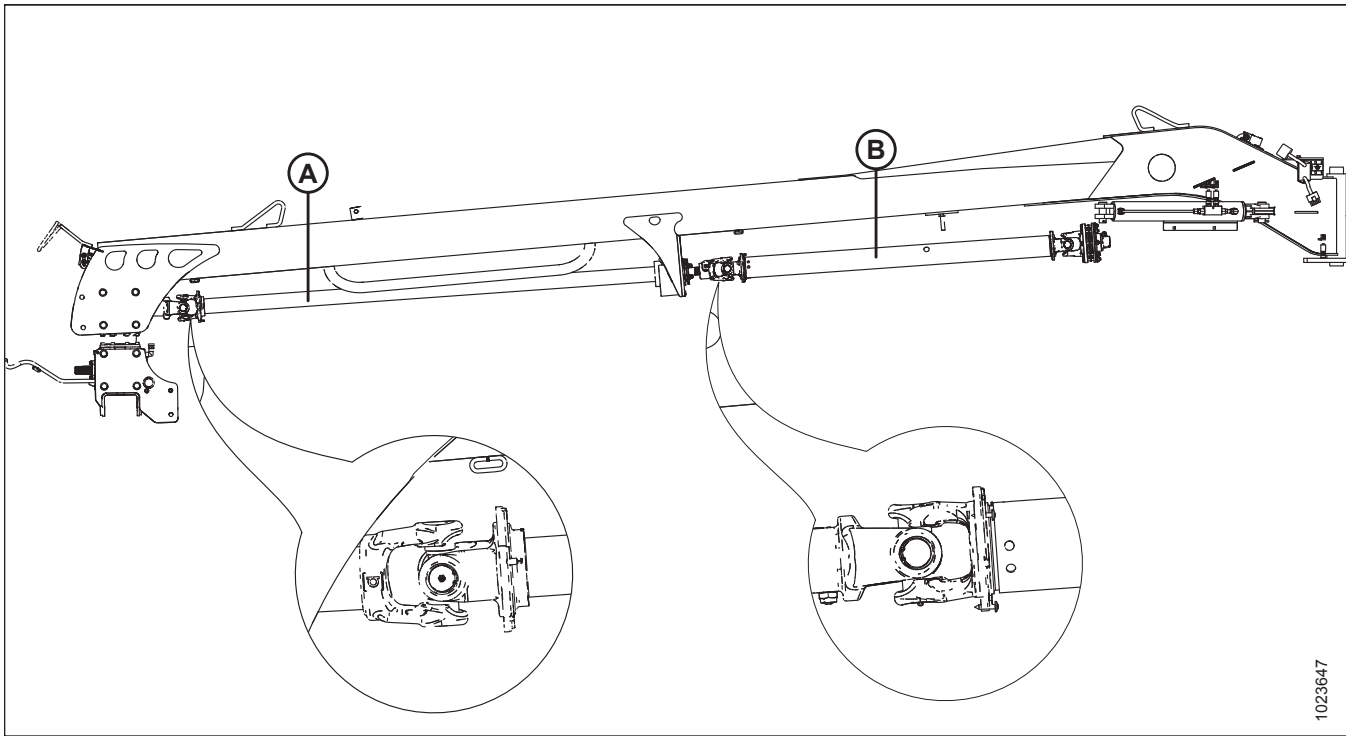
### 4.5.3 Hitch Driveline Phasing

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

To minimize vibrations, the hitch drivelines on the R113 and R116 must be phased correctly.

- On the R113 disc mower (refer to Figure 4.184, page 222), the U-joint on the clutch driveline (B) must be aligned 90° to the U-joint on front driveline (A).
- On the R116 disc mower (refer to Figure 4.185, page 223), the U-joint on the middle driveline (B) must be aligned 90° to the U-joints on the front driveline (A) and the clutch driveline (C).

**Figure 4.184: 4.0 m (13 ft.) Disc Mower Driveline Phasing**

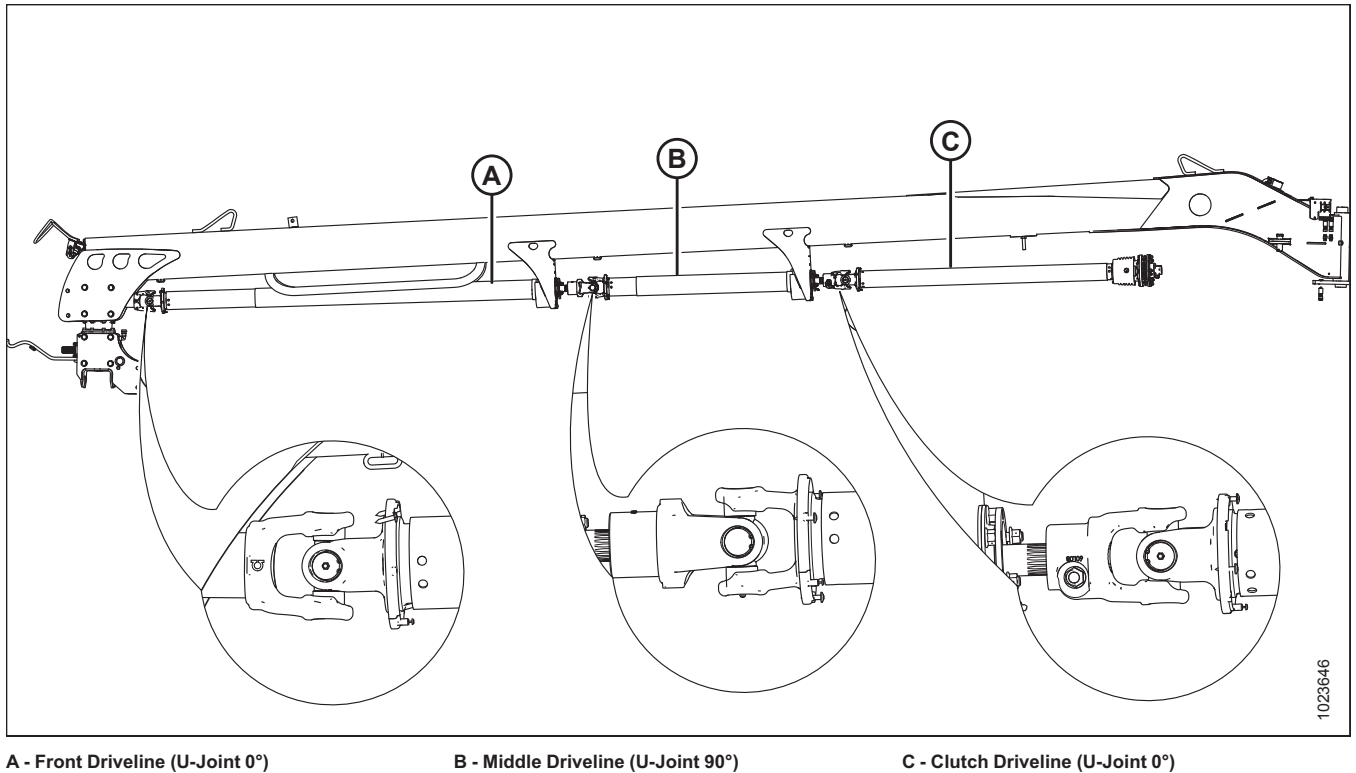


A - Front Driveline (U-Joint 0°)

B - Clutch Driveline (U-Joint 90°)

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Figure 4.185: 4.9 m (16 ft.) Disc Mower Driveline Phasing



#### 4.5.4 Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the disc mower's hitch swivel gearbox. Follow regular lubrication procedures and ensure all driveline taper pins are torqued as instructed. Refer to [4.4.3 Lubricating Cutterbar, page 151](#).

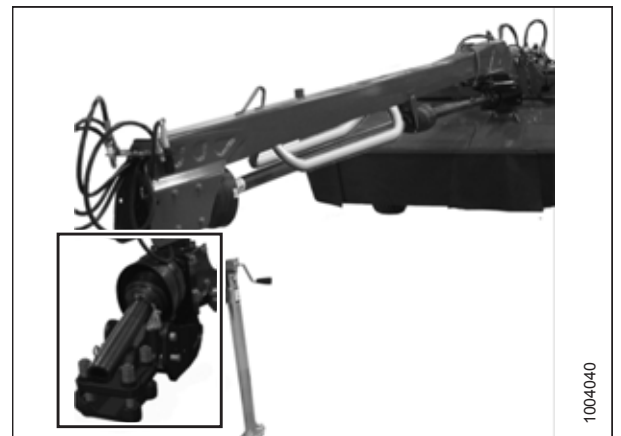


Figure 4.186: Primary Driveline

### Removing Primary Driveline

#### 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. Stop engine, and remove key from ignition.
2. Unhook the mower from the tractor. Refer to [3.8 Detaching Disc Mower from Tractor, page 56](#).
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 4.187: Driveline Shield Cone and Lever Clamp

4. Slide driveline shield cone away from gearbox.
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 from the shaft.
7. Pull driveline off gearbox.
8. Remove driveline guard if necessary. Refer to [Removing Driveline Guards, page 249](#).

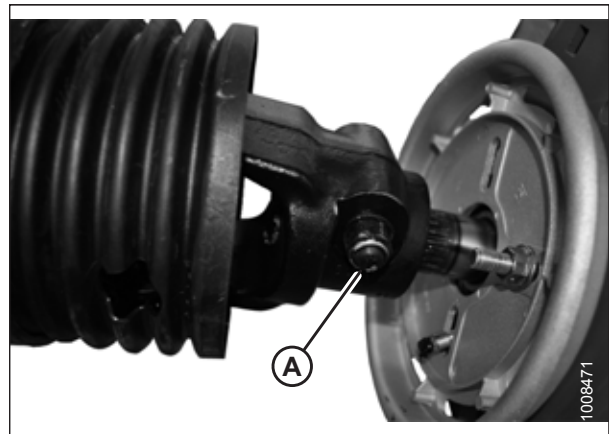


Figure 4.188: Bolt Securing Driveline to Gearbox

## Installing Primary Driveline

### 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. Stop engine, and remove the key from ignition.
2. Install driveline guard onto driveline (if previously removed). Refer to *Installing Driveline Guards, page 251*.

#### NOTE:

Before installing the driveline, refer to *4.5.3 Hitch Driveline Phasing, page 222* to ensure proper orientation.

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

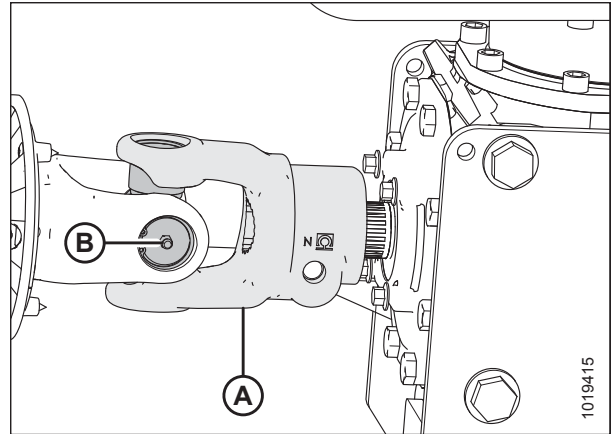


Figure 4.189: Primary Driveline

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.).

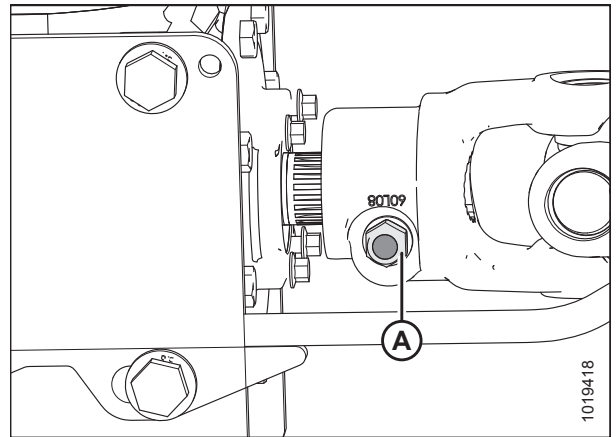


Figure 4.190: Taper Pin Installed in Yoke

## MAINTENANCE AND SERVICING

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

**NOTE:**

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



Figure 4.191: Shield Clipped to Driveline

- Attach the 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 Disc Mower to the Tractor, page 47](#).

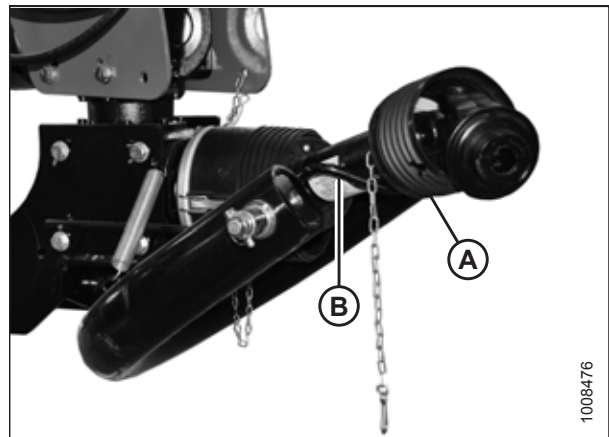


Figure 4.192: Primary Driveline

### 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. Refer to [4.4.3 Lubricating Cutterbar, page 151](#).

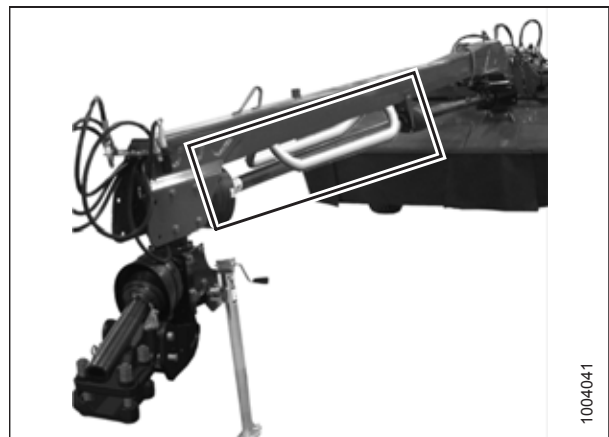


Figure 4.193: Hitch Driveline

### Removing Hitch Driveline

#### **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. Stop engine, and remove key from ignition.
2. Disconnect clutch driveline (A) at the center support. Do not remove entire driveline. Refer to [Removing Clutch Driveline, page 235](#).

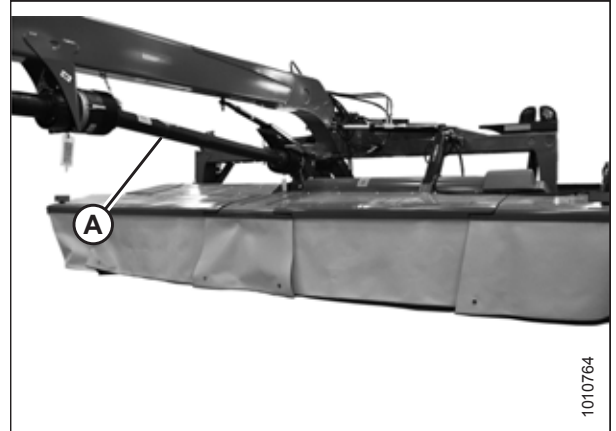


Figure 4.194: Clutch Driveline

3. Remove two bolts (A), and slide the metal shield (B) away from center support.

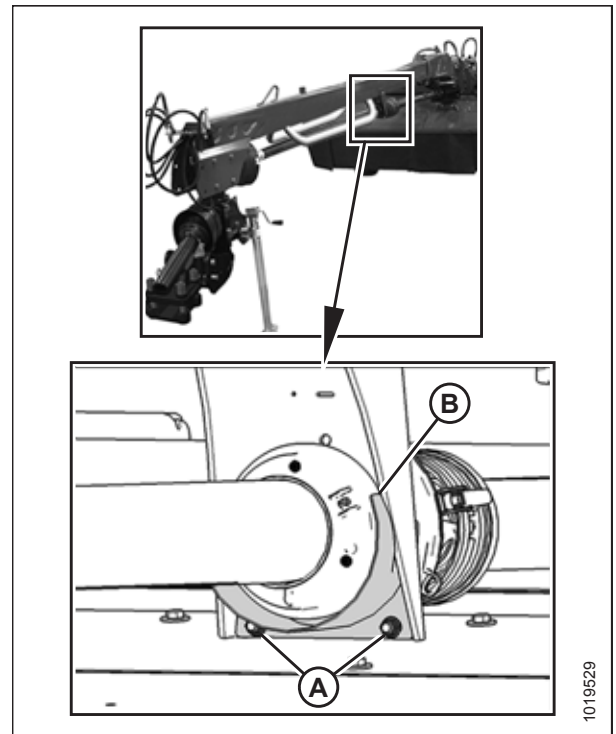
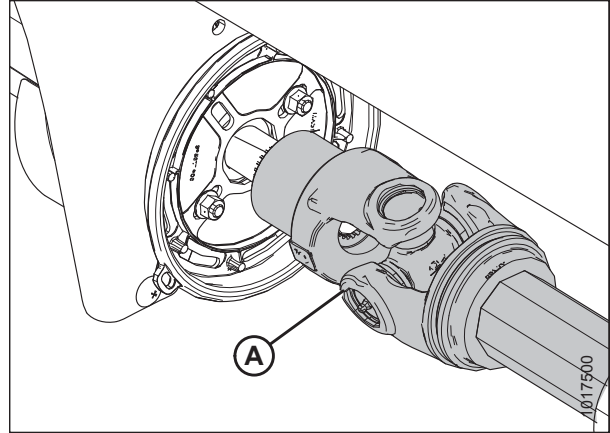


Figure 4.195: Driveline Cover and Shield Installed at Center Support

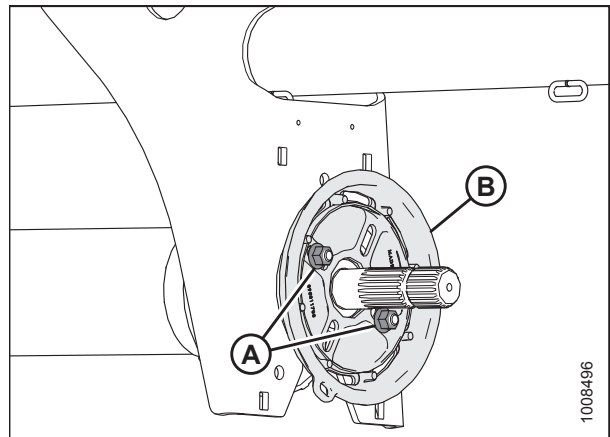
## MAINTENANCE AND SERVICING

4. Remove mid-drive yoke (A) from hitch driveshaft.



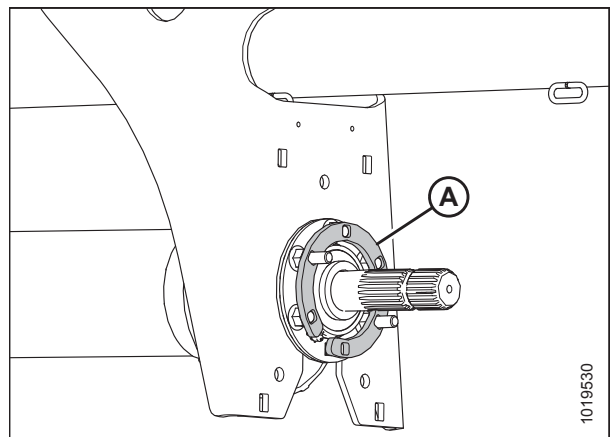
**Figure 4.196: Mid-Driveshaft Yoke**

5. Remove two nuts (A) that secure metal plate (B) to the center support, and then remove metal plate (B).



**Figure 4.197: Metal Plate**

6. Remove spacer (A).



**Figure 4.198: Spacer**

## MAINTENANCE AND SERVICING

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

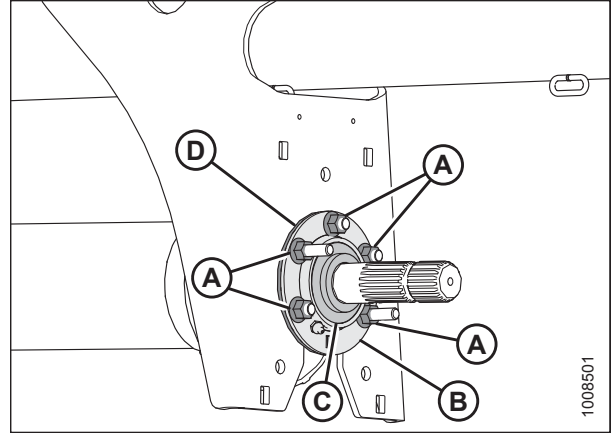


Figure 4.199: Ball Bearing and Flanges

8. Unlock the 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 the long bolts (B) and short bolts (C).

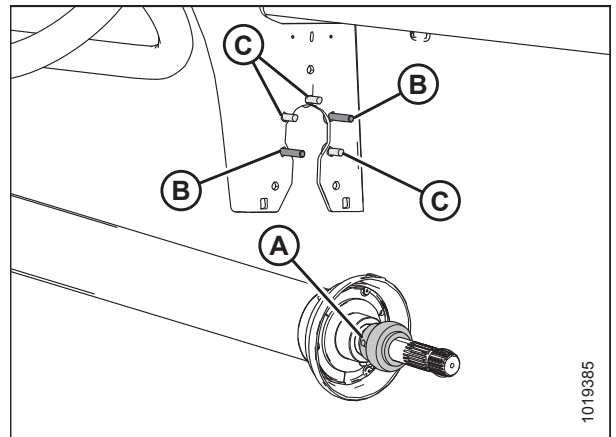


Figure 4.200: Bearing Lock Collar

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

**NOTE:**

There are three hitch drivelines installed on R116 disc mowers.

12. Remove driveline guard if necessary. Refer to [Removing Driveline Guards, page 249](#).

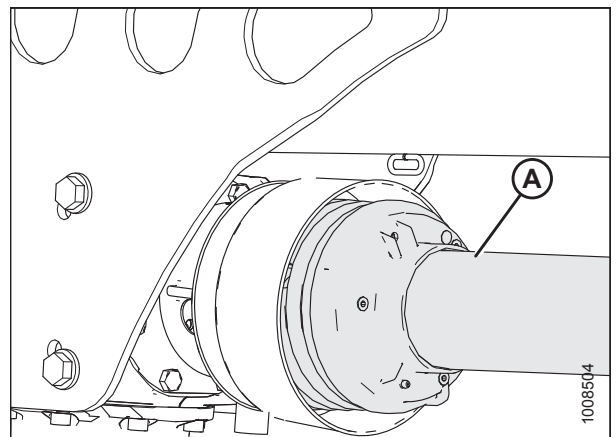


Figure 4.201: Forward End of Hitch

## Installing Hitch Driveline

### 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. Install driveline guard onto driveline (if previously removed). Refer to [Installing Driveline Guards, page 251](#).

#### NOTE:

Before installing the driveline, refer to [4.5.3 Hitch Driveline Phasing, page 222](#) to ensure proper orientation.

2. Orient U-joint (A) and grease fitting (B) as shown.
3. Position forward end of hitch driveline (C) onto hitch swivel gearbox shaft and push onto shaft.

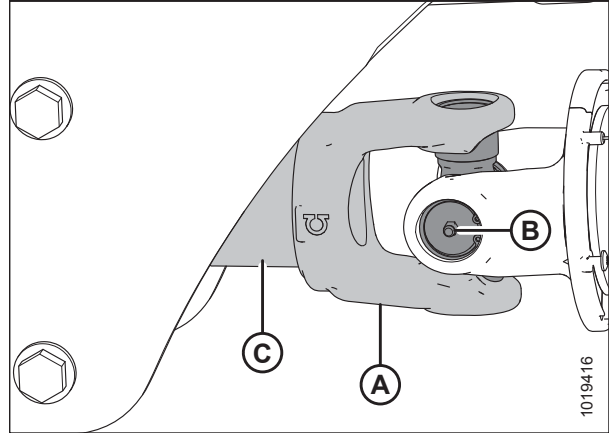


Figure 4.202: Forward End of Hitch

#### IMPORTANT:

If installing a replacement guard, ensure chain (A) is short enough that it does **NOT** wrap around the driveline guard.

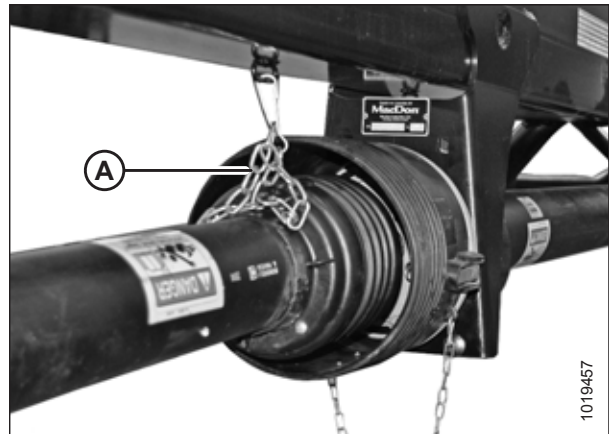


Figure 4.203: Driveline Guard

## MAINTENANCE AND SERVICING

5. Slide lock collar (A) on shaft.
6. Position shaft end of the driveline onto the hitch support bracket, and support the driveline to hold it in place.

**IMPORTANT:**

Ensure the 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.

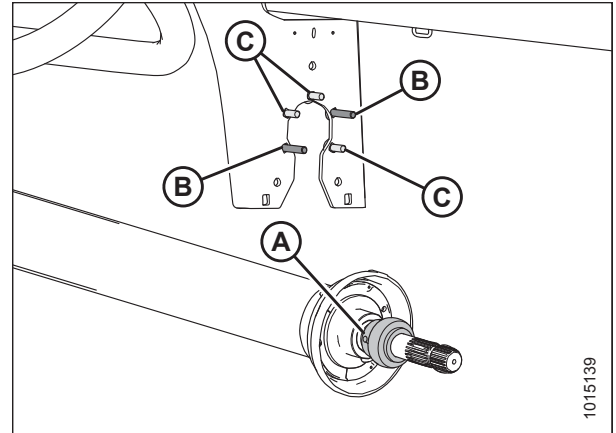


Figure 4.204: Long and Short Bolts

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.).

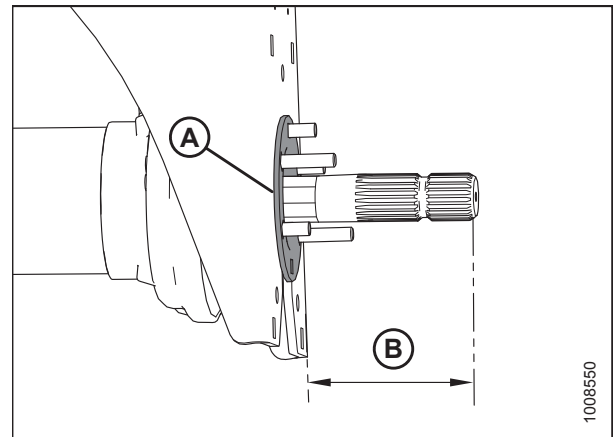


Figure 4.205: Flange Installed at Center Support

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 degrees from long bolts as shown.

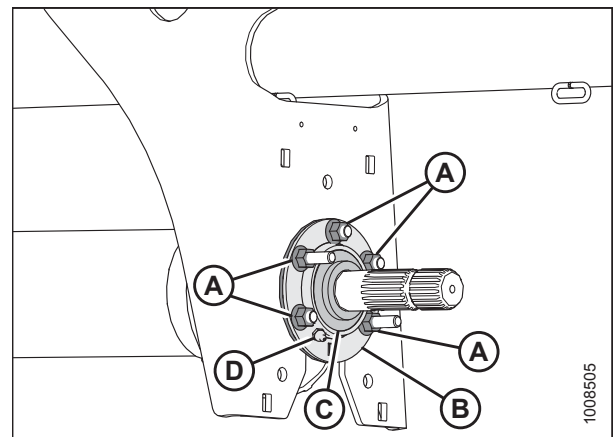
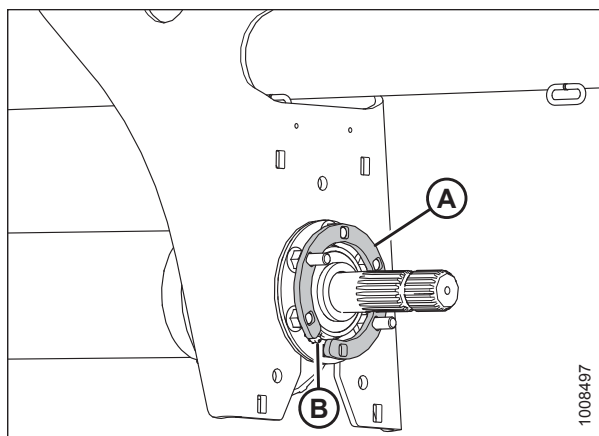


Figure 4.206: Flange

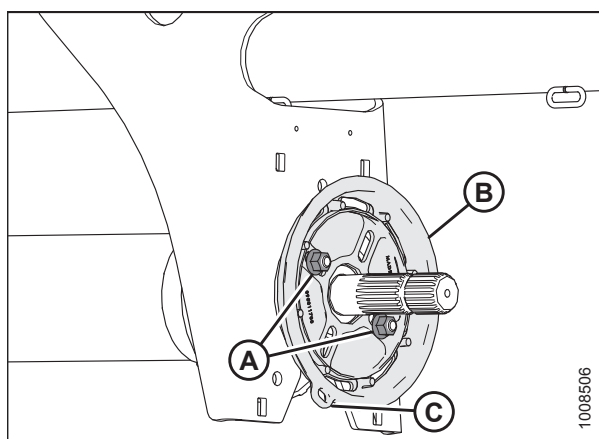
## MAINTENANCE AND SERVICING

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



**Figure 4.207: Spacer Installed at Center Support**

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 (C) on metal plate is positioned on lower side as shown.
16. Torque nuts (A) to 20 Nm (15 lbf·ft).



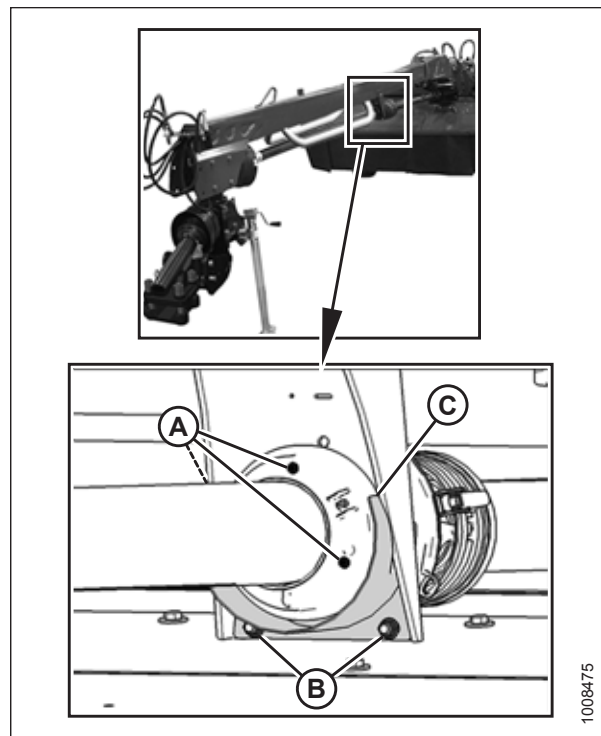
**Figure 4.208: Metal Plate Attached to Center Support**

## MAINTENANCE AND SERVICING

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

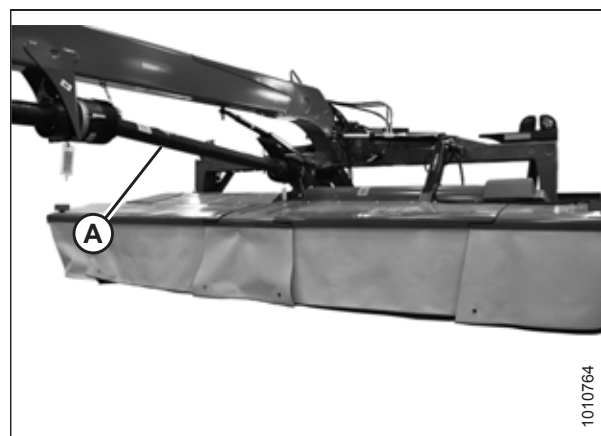
**NOTE:**

There are three hitch drivelines for installation on the R1116 disc mower.



**Figure 4.209: Driveline Cover and Shield Installed at Center Support**

19. Install clutch driveline (A) at center support. Refer to [Installing Clutch Driveline, page 237](#).



**Figure 4.210: Clutch Driveline Installed at Center Support**

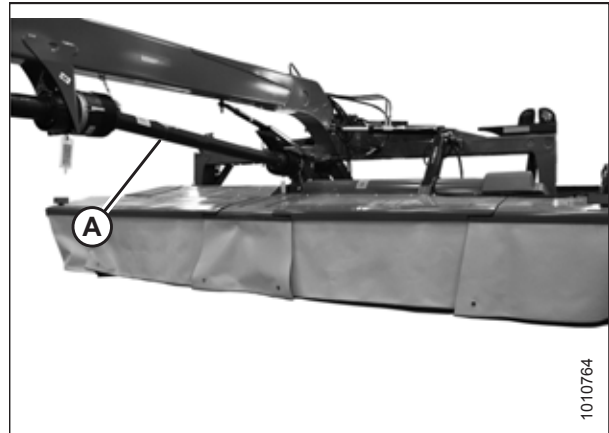
### 4.5.6 Clutch Driveline

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

Replace the driveline 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. Refer to [4.4.3 Lubricating Cutterbar, page 151](#) and [4.5.8 Inspecting Driveline Taper Pins, page 247](#).

Perform run-in procedure as part of the mower's initial break-in procedure, when clutch friction linings have been replaced, or when the unit has not been operated in 6 months. Refer to [Checking Clutch Operation, page 240](#).



**Figure 4.211: Clutch Driveline**

### Removing Clutch Driveline

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

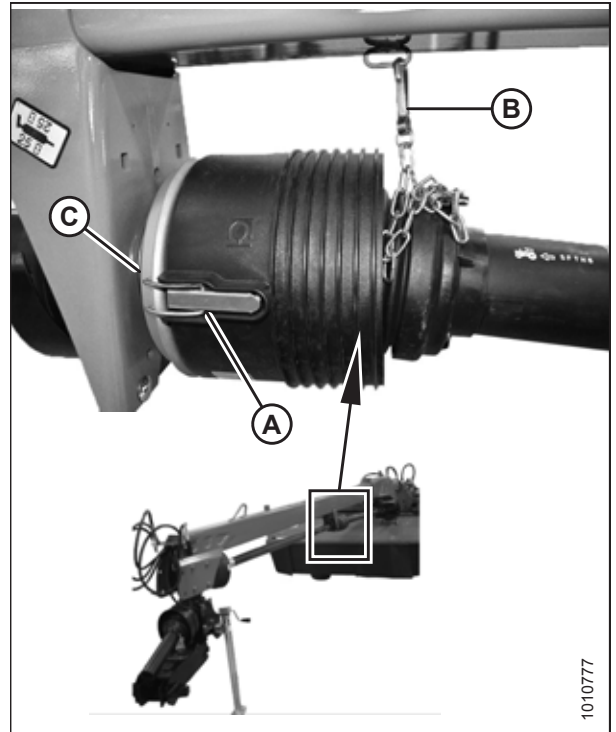


Figure 4.212: Driveline Shield Cone

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.

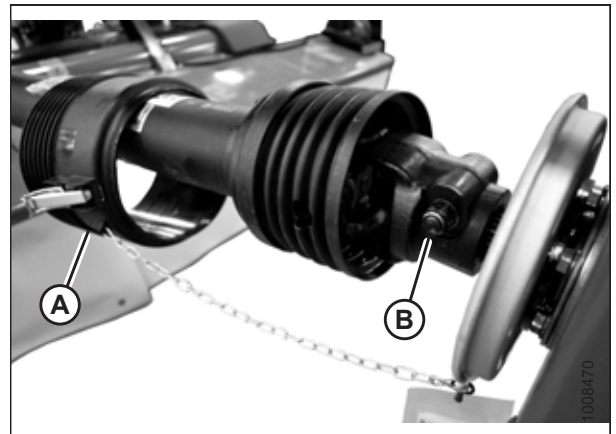


Figure 4.213: U-Joint

## MAINTENANCE AND SERVICING

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

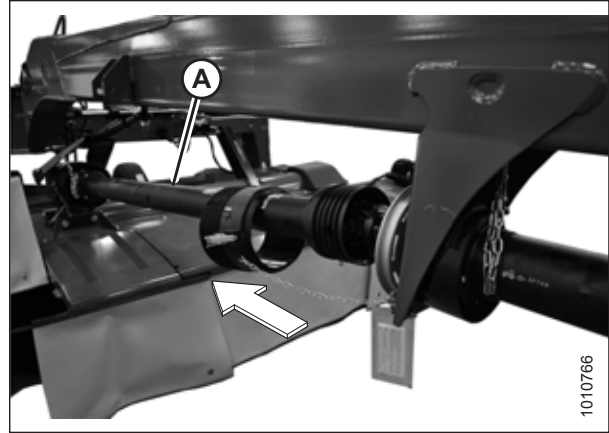


Figure 4.214: Driveline

8. Release two lever clamps (A) on the shield cone installed at the header swivel gearbox.
9. Remove driveline guard if necessary. Refer to [Removing Driveline Guards, page 249](#).

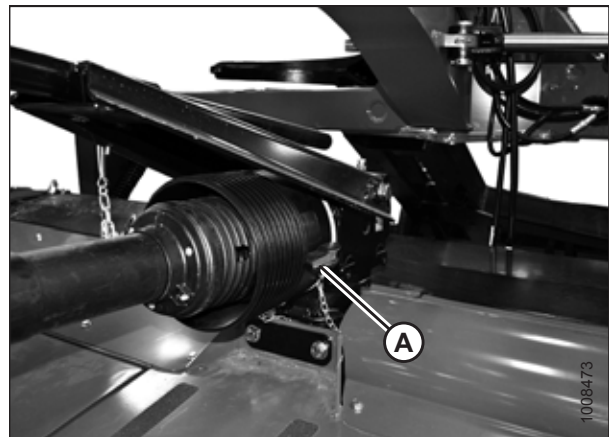


Figure 4.215: Driveline Shield Cone

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



Figure 4.216: Driveline and Gearbox

## Installing Clutch Driveline

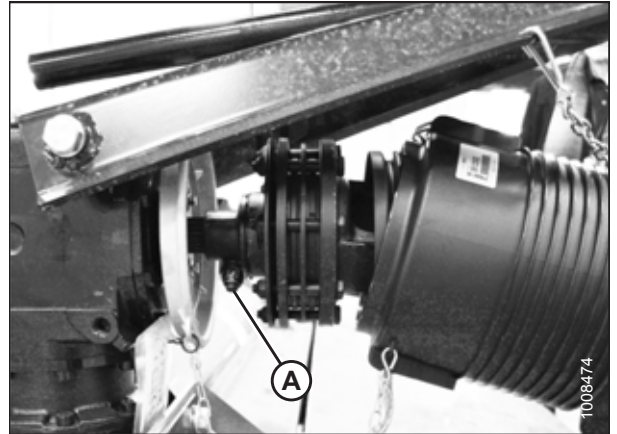
### **DANGER**

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. Stop engine, and remove key from ignition.
2. Install driveline guard onto driveline (if previously removed). Refer to *Installing Driveline Guards*, page 251.
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.

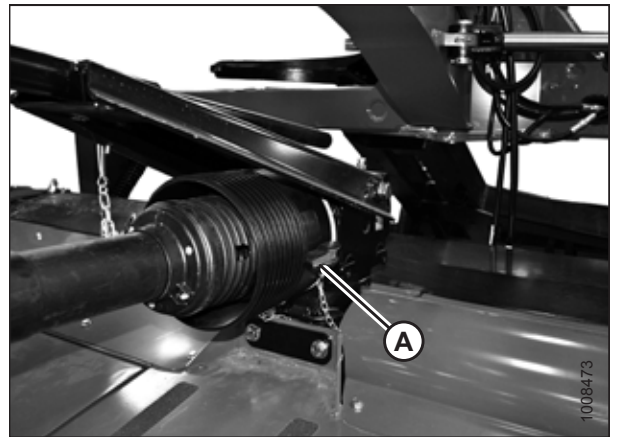
#### **IMPORTANT:**

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



**Figure 4.217: Driveline and Gearbox**

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



**Figure 4.218: Driveline Shield Cone**

## MAINTENANCE AND SERVICING

### 8. For R113 disc mower clutch driveline:

- Assemble forward half (A) of clutch driveline onto female half and attach to shaft on hitch driveline (B).
- Position the U-joint (C) as shown.

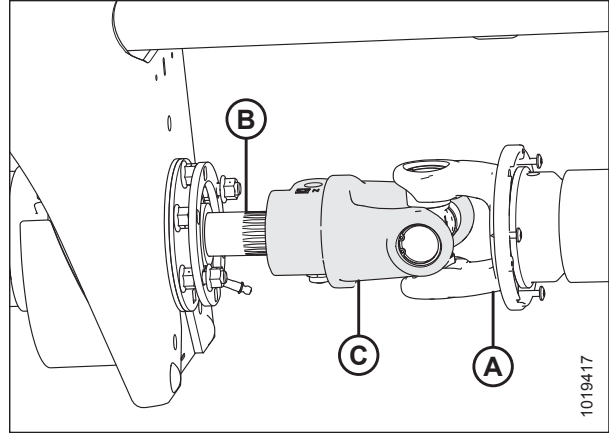


Figure 4.219: R113 Disc Mower Clutch Driveline

### 9. For R116 disc mower clutch driveline:

- Assemble forward half (A) of clutch driveline onto female half and attach to shaft on hitch driveline (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 222](#) to ensure proper orientation.

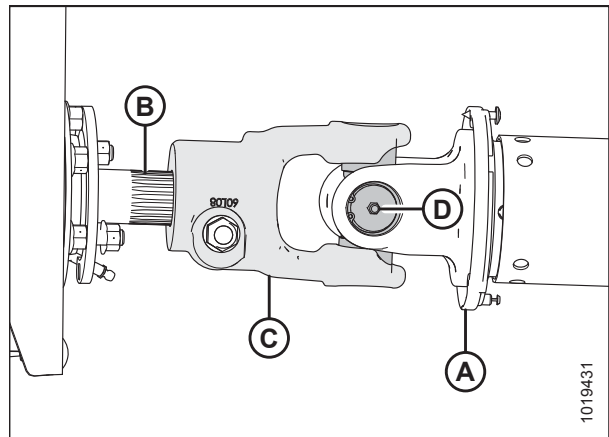


Figure 4.220: R116 Disc Mower Clutch Driveline

### 10. Move the shield cone to expose the U-joint.

#### NOTE:

Shield cone not shown in illustration at right.

- Clean the taper pin threads.
- 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.
- Torque the 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.

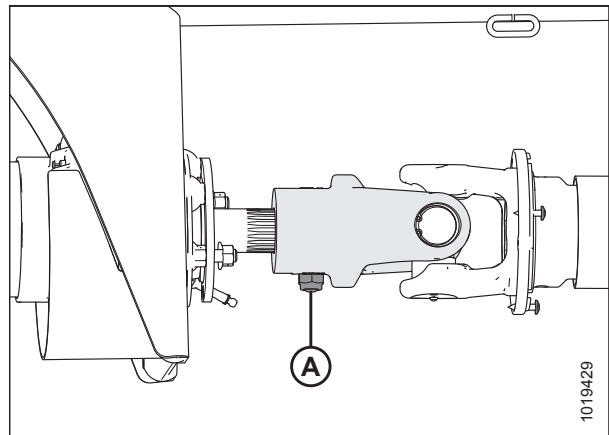


Figure 4.221: R113 Disc Mower Clutch Driveline

## MAINTENANCE AND SERVICING

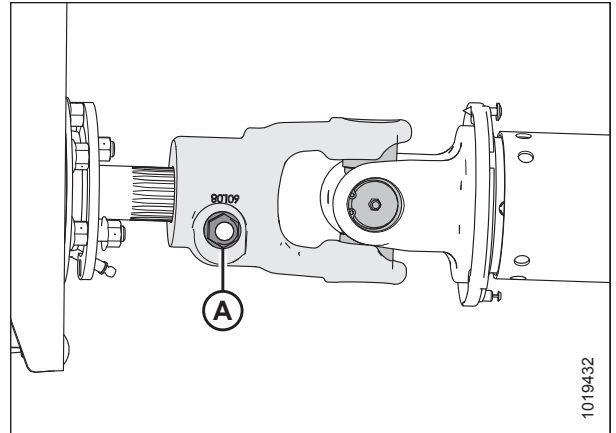


Figure 4.222: R116 Disc Mower Clutch Driveline

14. Slide 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.

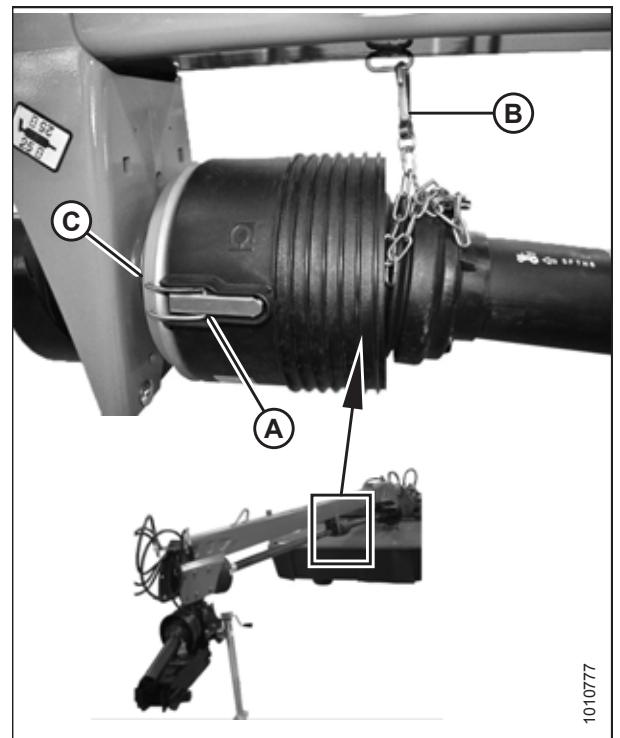


Figure 4.223: Driveline Shield Cone

### 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 disc mower'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.

1. Release two lever clamps (A) on the shield cone installed at the header swivel gearbox.
2. Slide shield away from gearbox.

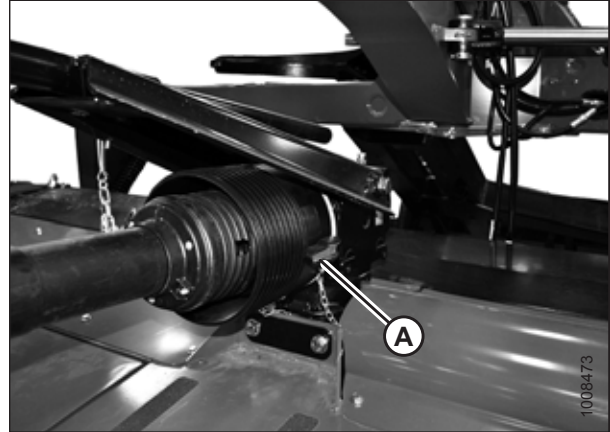


Figure 4.224: Driveline Shield Cone

3. Mark a horizontal line (A) across friction discs and drive plates with a paint marker.
4. Back off all pressure plate tensioning nuts (B) one and a half revolutions.
5. Start tractor and adjust engine speed to 1000 rpm.
6. Engage the tractor's power take-off (PTO) for 3–5 seconds. Repeat three times.

**NOTE:**

The clutch will slip with a force of 1350 Nm (995 lbf·ft) at 1000 rpm.

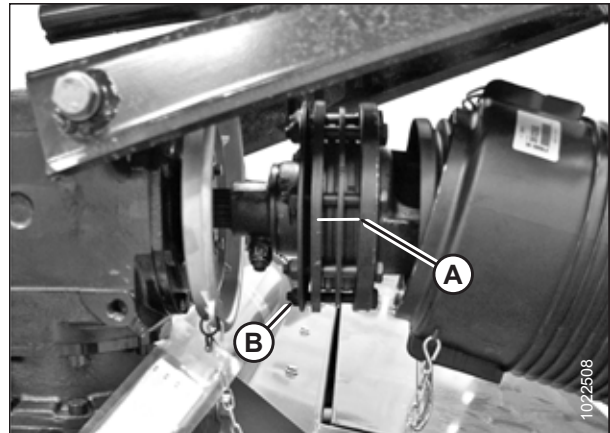


Figure 4.225: Driveline and Gearbox

## MAINTENANCE AND SERVICING

7. Shut down engine and inspect clutch. The 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 drives plates on both sides of the disc. The friction discs are not splined to any component and will likely only slip on one surface.

8. If acceptable slippage is detected, retighten clutch spring adjustment nuts (B). Refer to [Adjusting Clutch](#), page 241.
9. If acceptable slippage is not detected, the clutch should be removed and disassembled for inspection/repair. Contact your MacDon Dealer.
10. Slide the shield cone to the gearbox and secure with the two lever clamps (A).

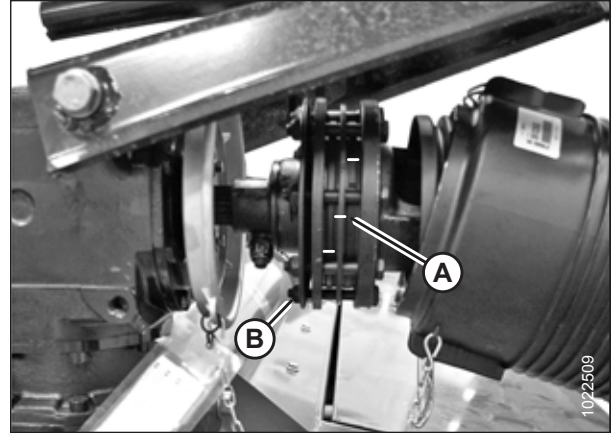


Figure 4.226: Driveline and Gearbox

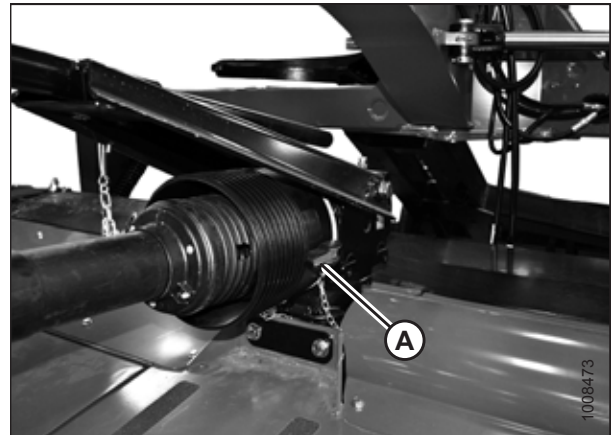


Figure 4.227: Driveline Shield Cone

### Adjusting Clutch

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

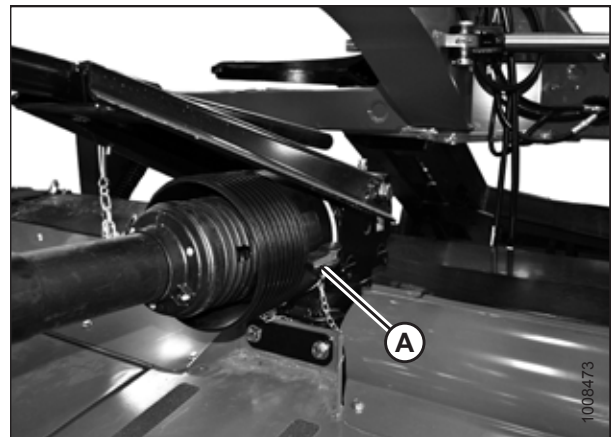


Figure 4.228: Driveline Shield Cone

## MAINTENANCE AND SERVICING

2. Back off all pressure plate tensioning nuts (A) one and a half revolutions.

**NOTE:**

If this has already been done, you are not required to do it again.

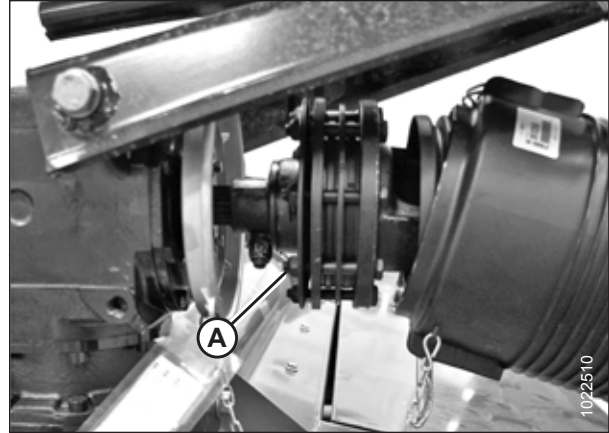


Figure 4.229: Clutch Bolts

3. Measure the distance (A) between Belleville washer (B) and plate (C) using a caliper. The distance must be 17.75 mm (0.70 in.) and must be consistent all around.

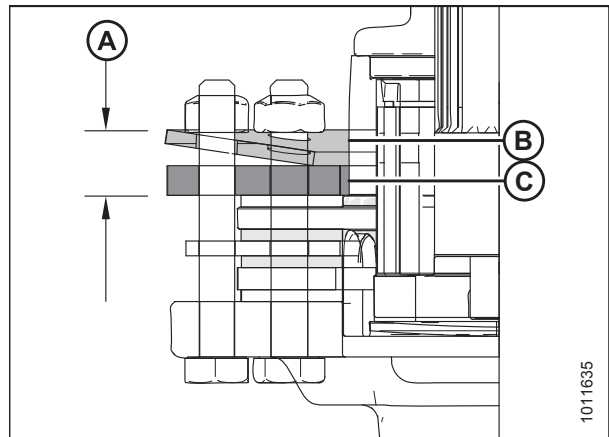


Figure 4.230: Initial Setup Measurement

4. Tighten nuts using the sequence shown at right. Once the discs are nearing the 17.75 mm (0.70 in.) dimension, check discs for looseness. Do **NOT** tighten the discs excessively. Try to achieve a balance between the clutch **slipping** during excessive loading and/or shock loading and **not slipping** during normal operation.
5. Test the clutch operation, and adjust evenly as required. Refer to [Checking Clutch Operation, page 240](#).

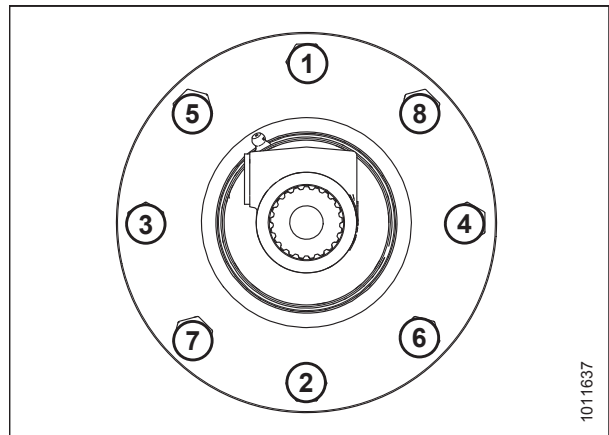


Figure 4.231: Tightening Sequence

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

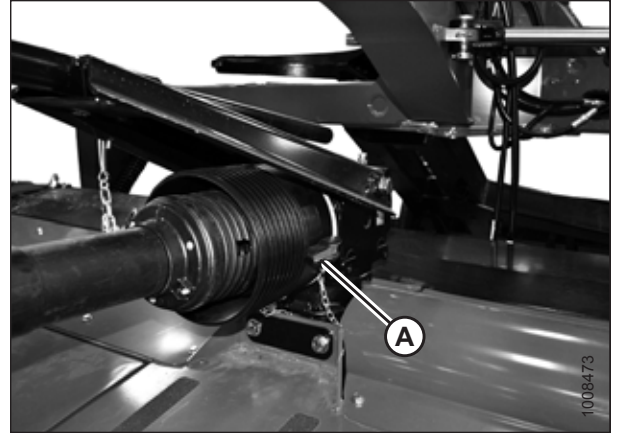


Figure 4.232: Driveline Shield Cone

### 4.5.7 Cross Driveline

The 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 this component. Refer to [4.3.5 Lubricating the Disc Mower, page 132](#).

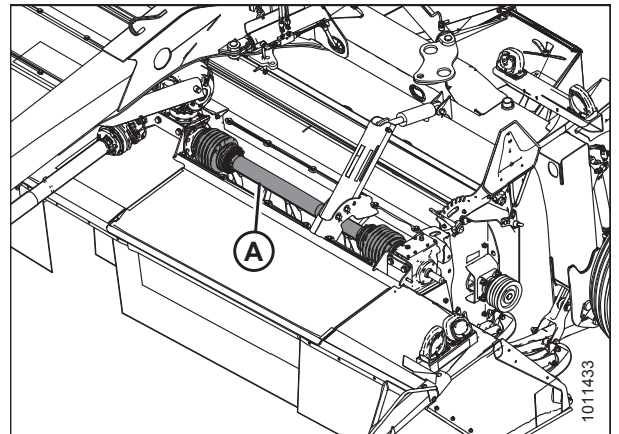


Figure 4.233: Cross Driveline

## Removing Cross Driveline

### 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. Stop engine and remove key from ignition.
2. Open the cutterbar doors to access the cross driveline (A) from inside the disc mower. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

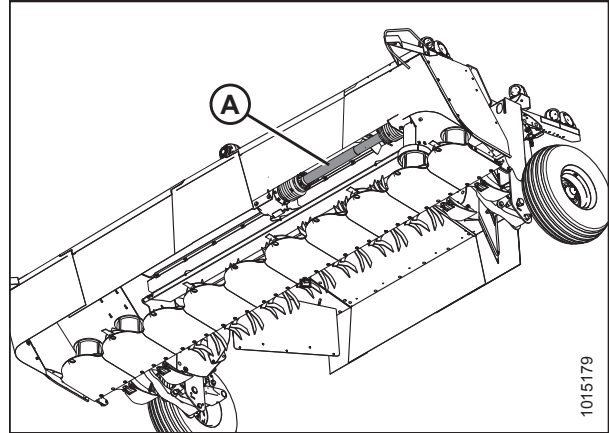


Figure 4.234: Lower Left View of Disc Mower

3. Loosen clamp (A) and slide the driveline shield (B) away from the yoke.
4. Repeat for the opposite end of the driveline.

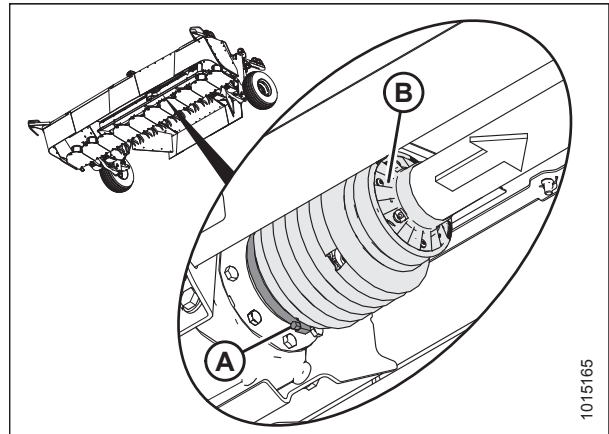


Figure 4.235: Cross Driveline Shield

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.

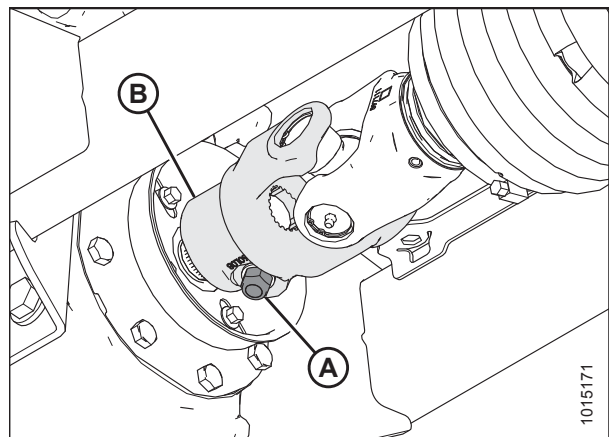


Figure 4.236: Cross Driveline

### Installing Cross Driveline

#### 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. Stop engine and remove key from ignition.
2. Open the cutterbar doors to install the cross driveline (A) from inside the disc mower. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

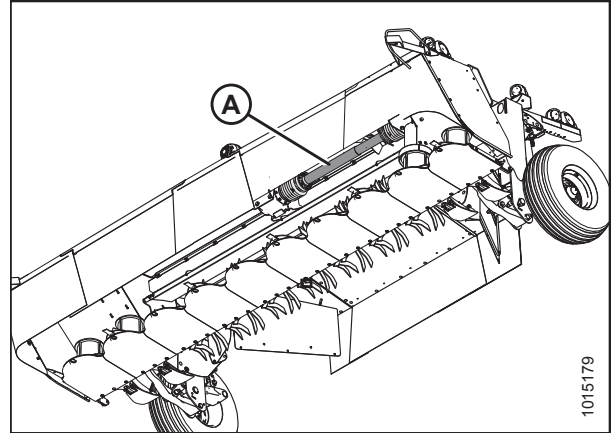


Figure 4.237: Lower Left View of Disc Mower

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.

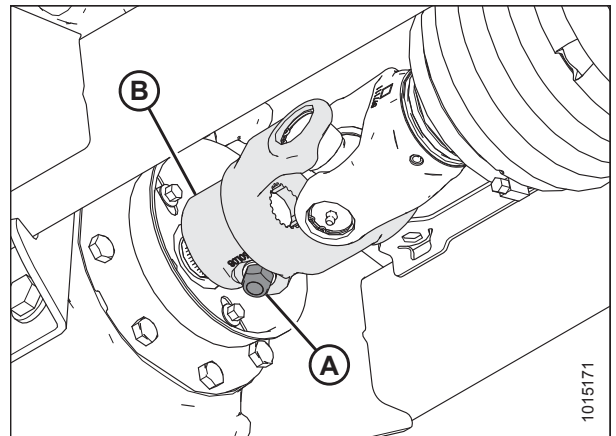
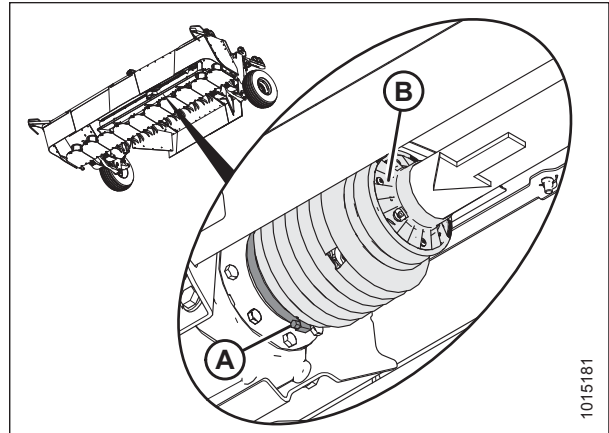


Figure 4.238: Cross Driveline yoke

## MAINTENANCE AND SERVICING

6. Slide the driveline shields (B) over the yokes at both ends of the driveline, and secure them with clamps (A).
7. Close the cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.

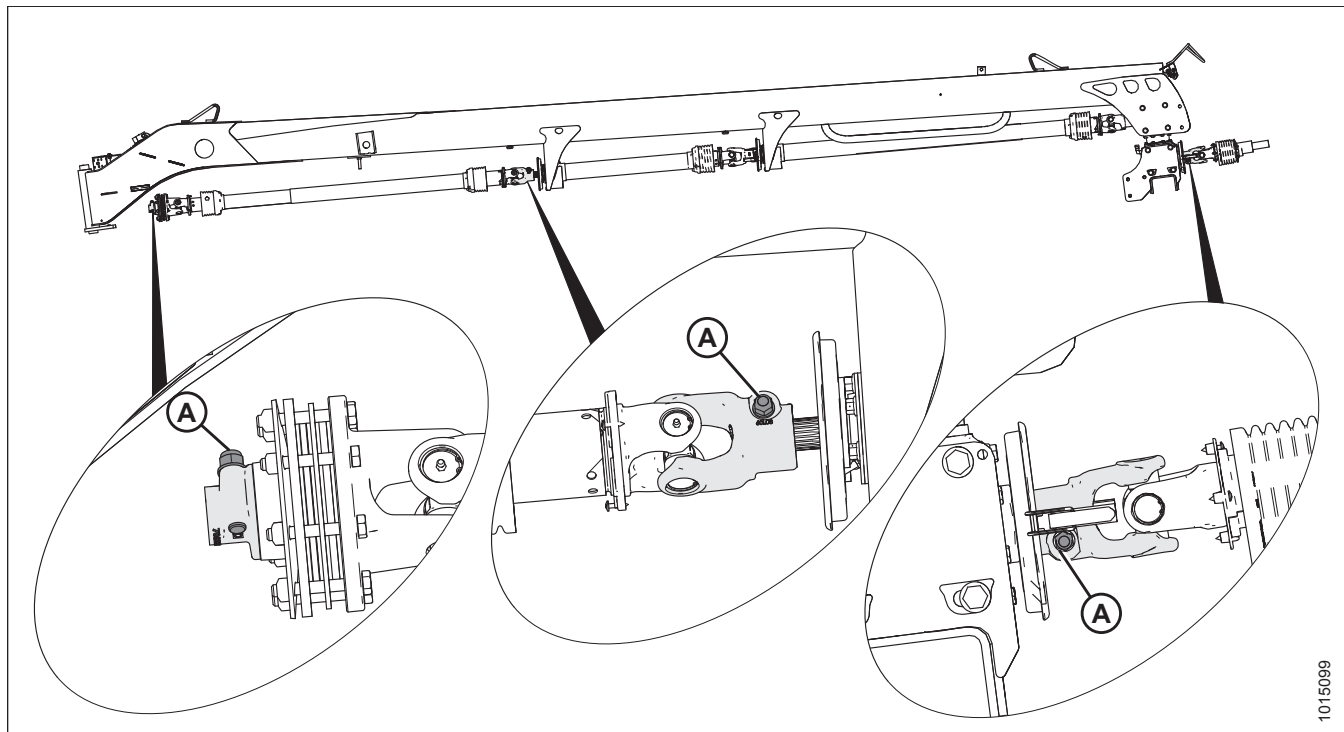


**Figure 4.239: Cross Driveline Shield**

### 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.

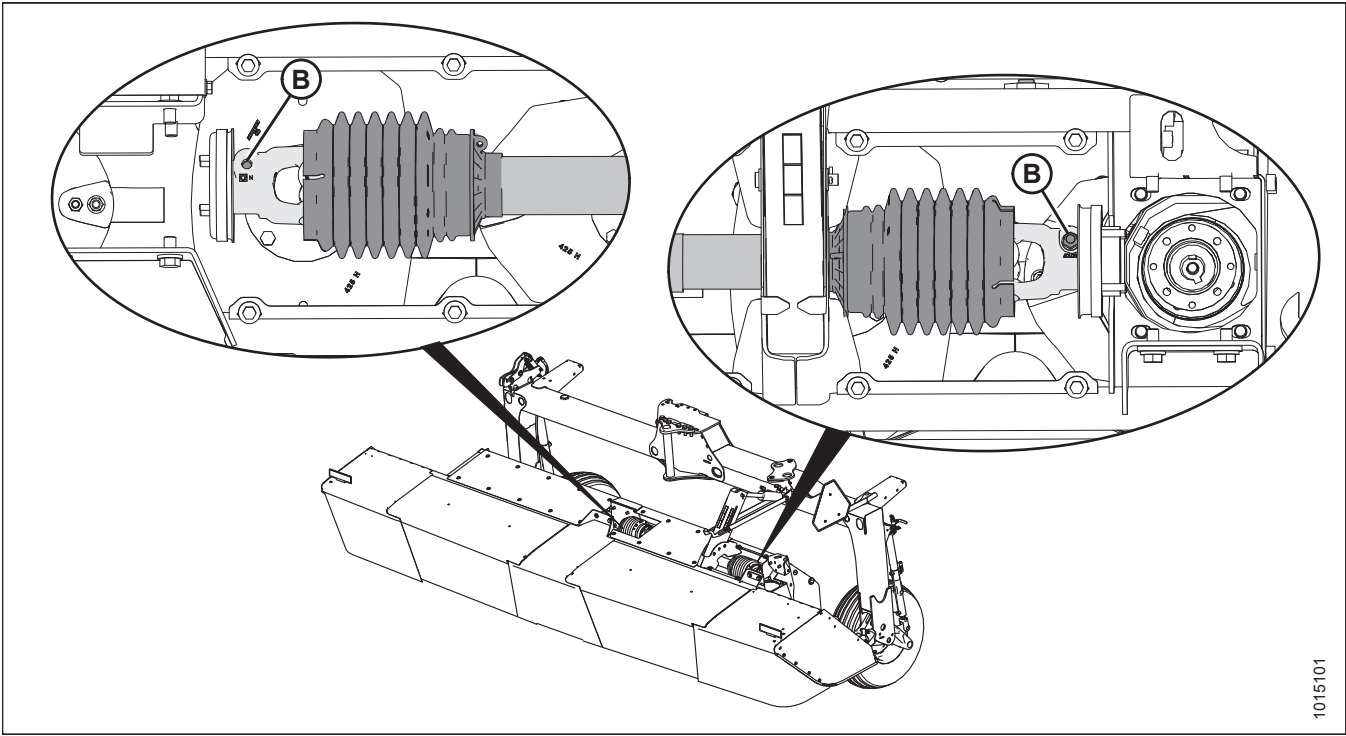
**Figure 4.240: Hitch Taper Pin Locations**



## 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 4.241: Cross Shaft Driveline Taper Pin Locations**



## 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 machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.

1. Stop engine and remove key from ignition.
2. Remove the driveline (A) from which the guard is going to be removed. Refer to one of the following:
  - [Removing Primary Driveline, page 224](#)
  - [Removing Hitch Driveline, page 227](#)
  - [Removing Clutch Driveline, page 235](#)

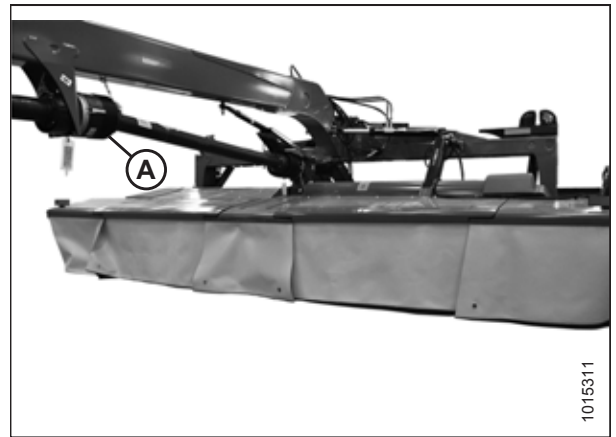


Figure 4.242: Driveline

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

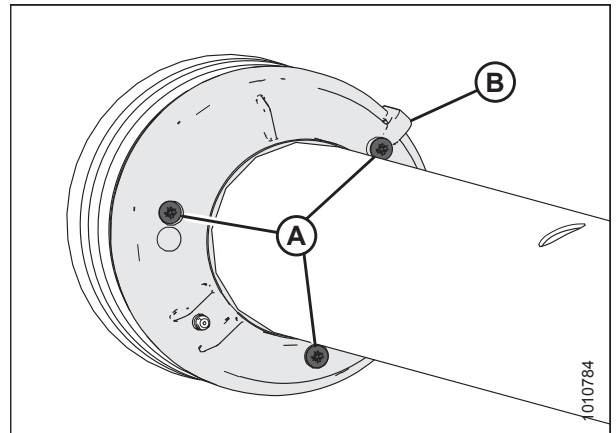
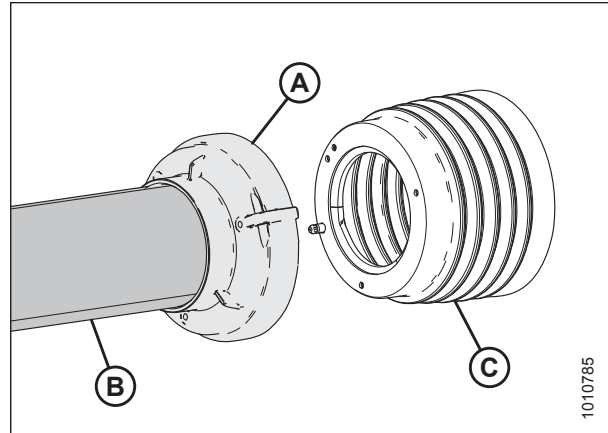


Figure 4.243: Phillips Head Screws Installed in Base Cone

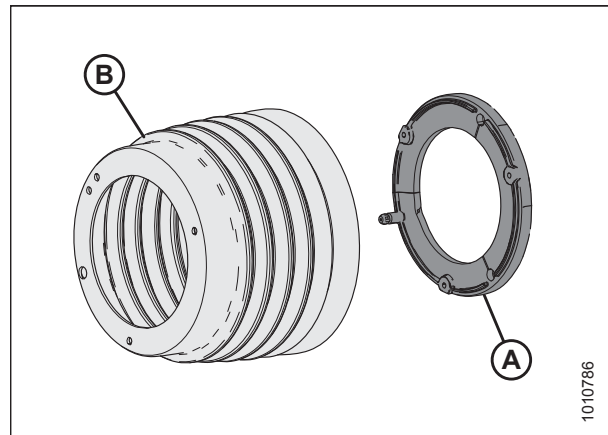
## MAINTENANCE AND SERVICING

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



**Figure 4.244: Base Cone and Shield Tube Removed from Outer Cone**

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



**Figure 4.245: Shield Support Removed from Outer Cone**

## Installing Driveline Guards

### **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.

### **WARNING**

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

1. Stop engine, and remove key from ignition.
2. Grease the bearing groove (A) on the inner yokes.
3. Fit shield support (B) to the bearing groove (A), and ensure that grease fitting (C) faces the drive tube.

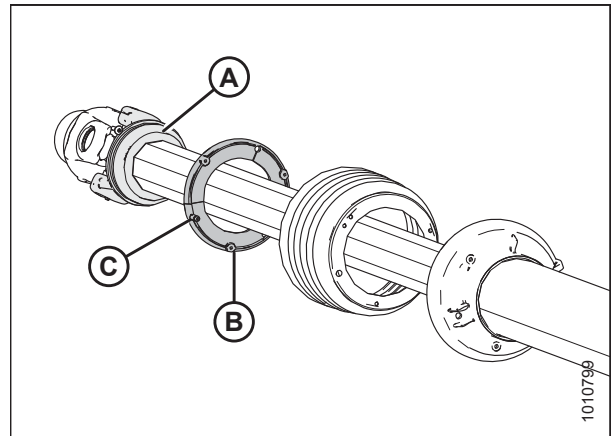


Figure 4.246: Inner Yoke and Shield Support

4. Install shield support (A) into outer cone (B), and ensure that grease fitting (C) is inserted into the proper hole.

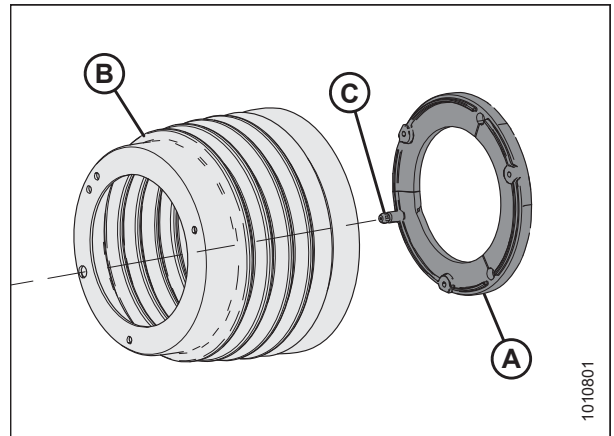


Figure 4.247: Shield Support and Outer Cone

## MAINTENANCE AND SERVICING

5. Attach the base cone (A) and shield tube (B) to the outer cone (C).

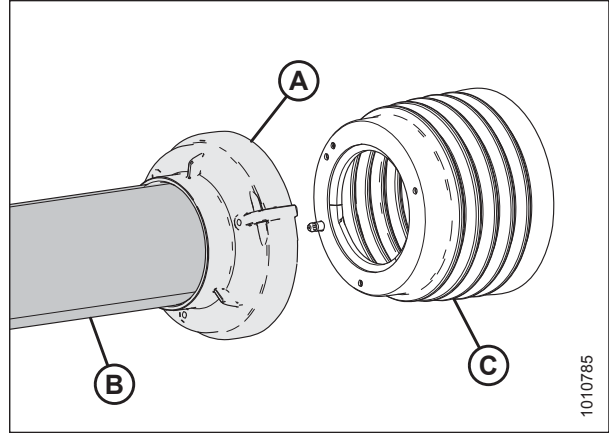


Figure 4.248: Base Cone, Shield Tube, and Outer Cone

6. Install three self-tapping Phillips head screws (A) into base cone (B).

**NOTE:**

Hand-tighten only using an appropriate screwdriver. Do **NOT** use a powered tool to tighten screws.

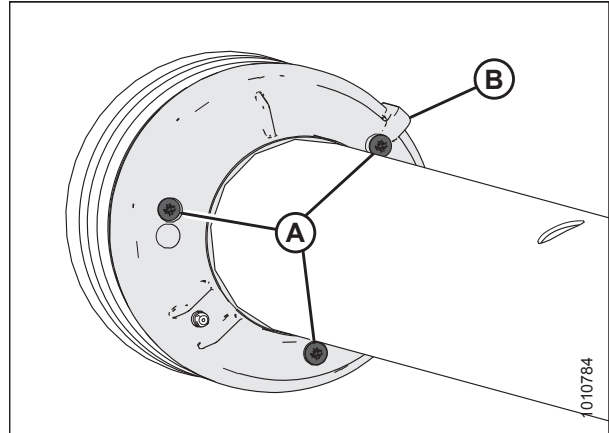


Figure 4.249: Phillips Head Screws Installed in Base Cone

**IMPORTANT:**

If installing a replacement guard, ensure chain (A) is short enough that it does **NOT** wrap around the driveline guard.

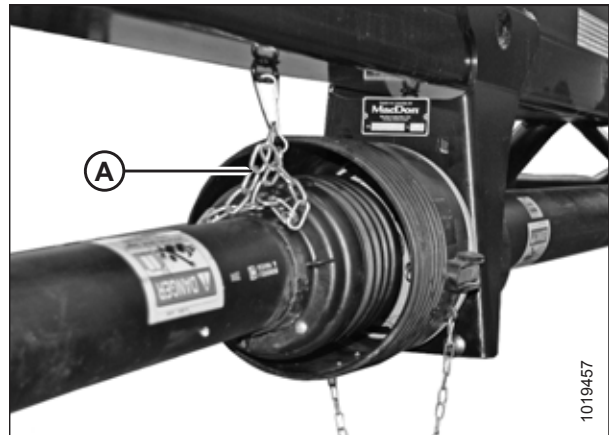


Figure 4.250: Driveline Guard

8. Install the driveline (A). Refer to one of the following:

- [Installing Clutch Driveline, page 237](#)
- [Installing Hitch Driveline, page 230](#)
- [Installing Primary Driveline, page 225](#)

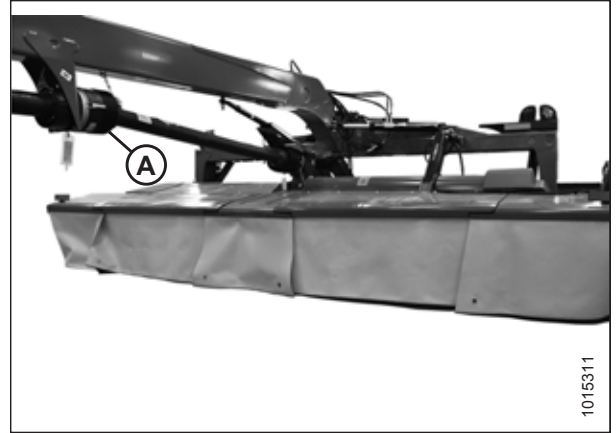


Figure 4.251: Driveline

## 4.5.10 Replacing Conditioner Drive Belt

The conditioner drive belt is located inside the left driveshield and is tensioned with a spring tensioner. The tension is factory-set and should not require adjustment.

### *Inspecting Conditioner Drive Belt*

Check the belt tension and inspect for damage or wear every 100 hours or annually (preferably before the start of the cutting season).



### **DANGER**

**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 disc mower fully, turn off engine, and remove key.
2. Open the left side driveshield (A). Refer to [3.2.1 Opening Driveshields, page 35](#).

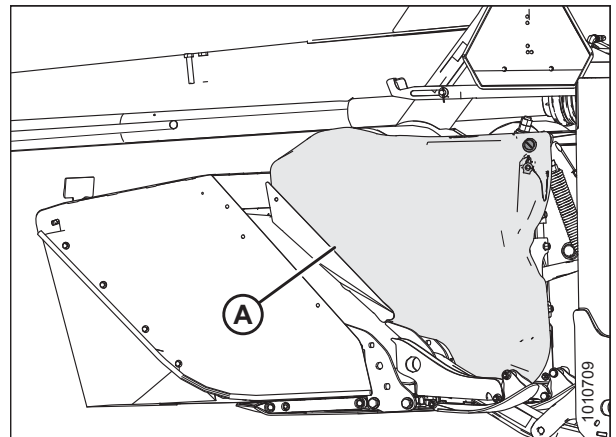


Figure 4.252: Left Driveshield

## MAINTENANCE AND SERVICING

3. Inspect drive belt (A) and replace if damaged or cracked.
4. Check that jam nut (B) and adjuster nut (C) are tight.

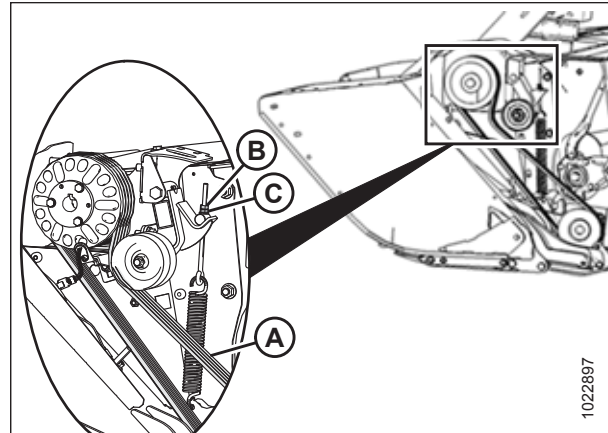


Figure 4.253: Conditioner Drive

5. Measure the length of tensioner spring (A), and ensure spring length is 366 mm (14-3/8 in.) in accordance with spring tension decal (B). If spring length requires adjustment, refer to [Installing Conditioner Drive Belt](#), page 256.
6. Close driveshield. Refer to [3.2.2 Closing Driveshields](#), page 37.

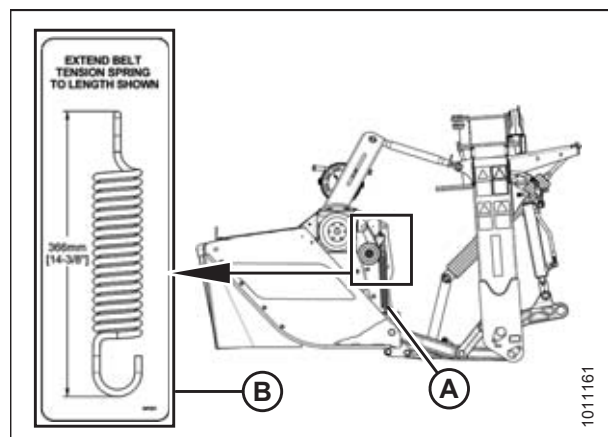


Figure 4.254: Spring Tension Decal

## Removing Conditioner Drive Belt

### 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 disc mower fully, turn off engine, and remove key.
2. Remove the left driveshield (A). Refer to [Removing Driveshields, page 215](#).

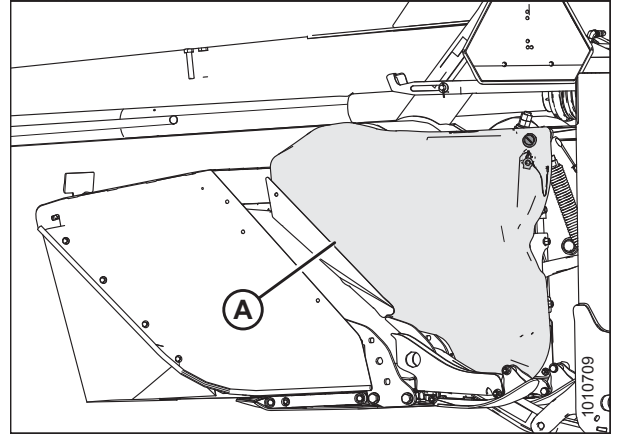


Figure 4.255: Left Driveshield

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

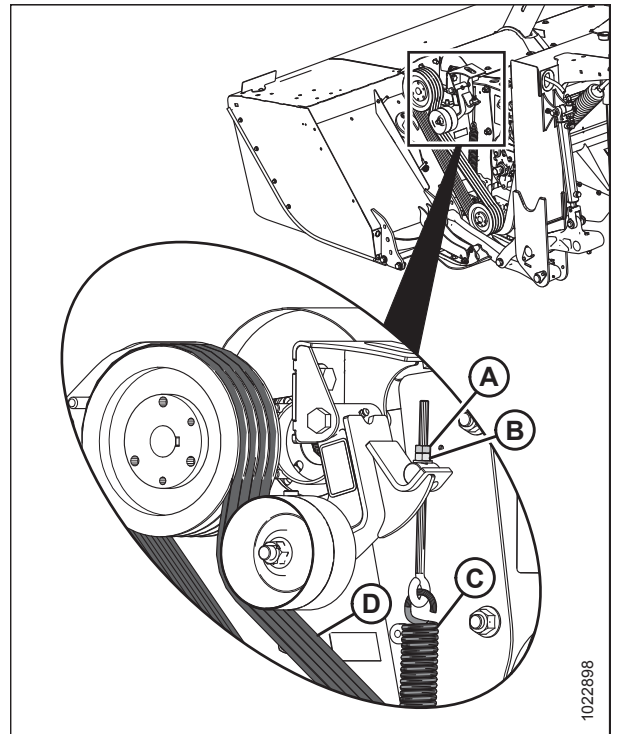


Figure 4.256: Conditioner Drive

## 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 disc mower fully, turn off engine, and remove key.
2. 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 jam nut and adjuster nut (D) to relieve spring tension.

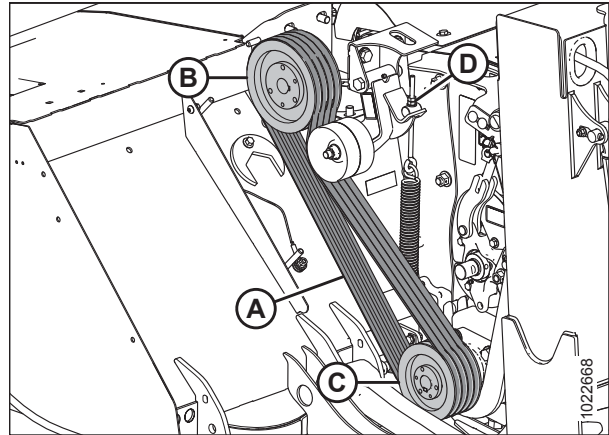


Figure 4.257: Conditioner Drive

3. 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.

4. Increase spring length (tension) by turning adjuster nut (D) clockwise.
5. Once correct spring measurement has been achieved, hold adjuster nut (D) and tighten jam nut (C) against it.

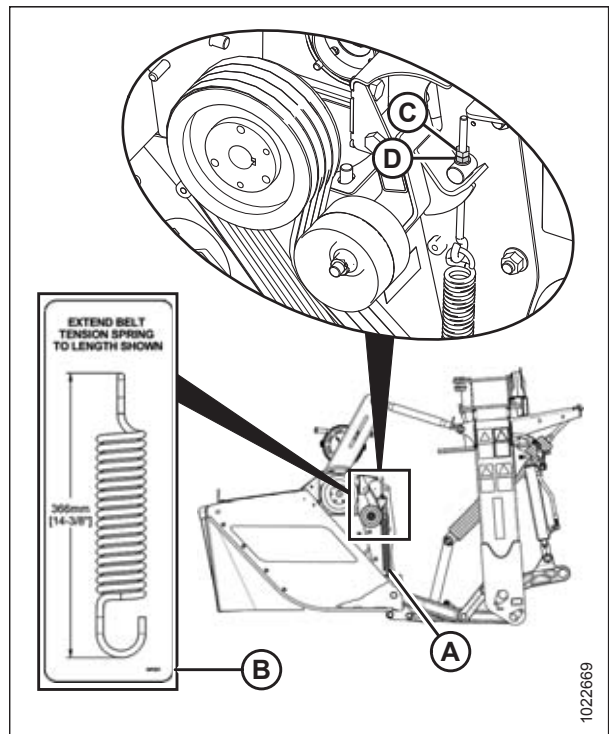


Figure 4.258: Spring Tension Decal

6. Install left driveshield (A). Refer to [Installing Driveshields, page 217](#).

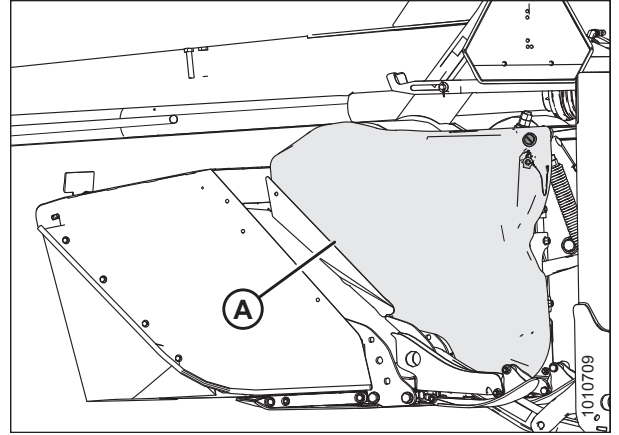


Figure 4.259: Left Driveshield

#### 4.5.11 Servicing Conditioner Roll Timing Gearbox

The conditioner roll timing gearbox, located inside the drive compartment at the right side of the disc mower, transfers power from the gearbox-driven lower roll to the upper roll.

The gearbox (A) does not require routine maintenance or service other than checking and changing the oil.

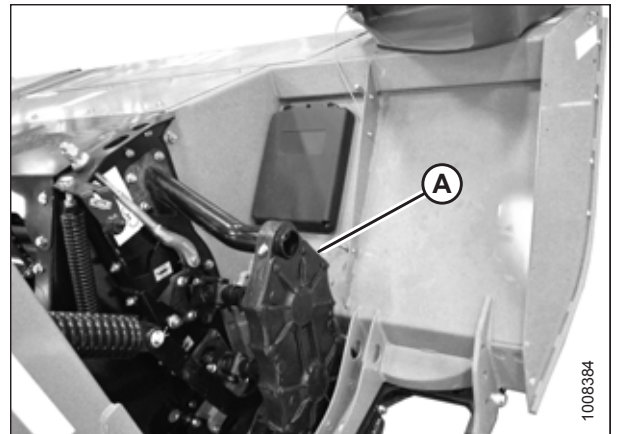


Figure 4.260: Conditioner Roll Timing Gearbox

## *Checking and Changing Conditioner Roll Timing Gearbox Oil*

Change oil after the first 50 hours of operation. Perform subsequent oil changes every 250 hours or annually (preferably before the start of the cutting season).

### **⚠ 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.**

#### **IMPORTANT:**

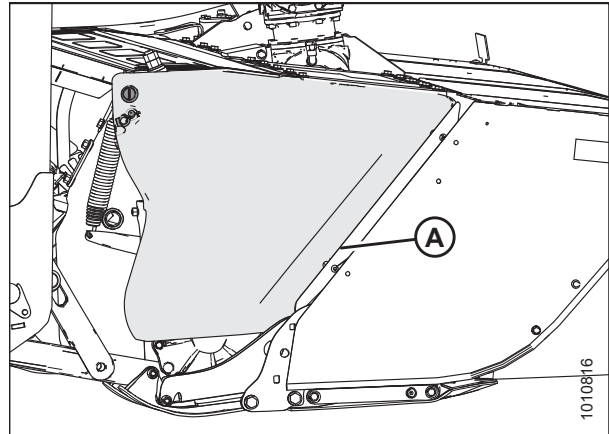
Check the gearbox oil level when the oil is warm. If the oil is cold, idle the machine for approximately 10 minutes prior to checking.

1. Lower mower fully so it is level with the ground, turn off engine, and remove key from ignition.

#### **NOTE:**

To help ensure an accurate oil level reading for the conditioner roll timing gearbox, set the disc mower's skid shoes in the fully raised position. Refer to [Adjusting Cutting Height, page 91](#) for instructions.

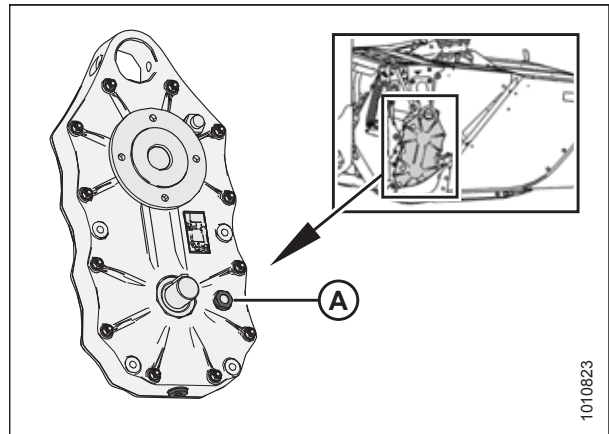
2. Remove the right driveshield (A). Refer to [Removing Driveshields, page 215](#).



**Figure 4.261: Right Driveshield**

#### ***Checking conditioner roll timing gearbox oil level:***

3. Clean around oil level plug (A) on inboard side of gearbox.
4. Remove oil level plug (A), and check that oil level is even with the hole.
5. Top up oil level with gear oil if necessary. Refer to this manual's inside back cover for a list of recommended fluids, lubricants, and capacity.
6. Replace oil level plug (A) and tighten.



**Figure 4.262: Roll Timing Gearbox**

**Changing conditioner roll timing gearbox oil:**

**⚠ WARNING**

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

7. Raise mower to provide sufficient access to oil drain plug (A), shut off engine, and remove key.
8. Close the cylinder lock-out valve on each lift cylinder by turning the handle to the closed position (90° angle to the hose). Refer to [3.11.1 Lift Cylinders, page 64](#).
9. Clean around oil drain plug (A) on bottom of gearbox and around oil level plug (B) on inboard side of gearbox.
10. Place a 1 liter (1.05 qts [US]) container underneath conditioner gearbox.
11. Remove oil drain plug (A) using a hex key.
12. Allow sufficient time for oil to drain, replace oil drain plug (A), and tighten.
13. Remove oil level plug (B) and fill with gear oil until the oil level is even with the bore hole. Refer to this manual's inside back cover for a list of recommended fluid and lubricant types and amounts.
14. Replace oil level plug (B) and tighten.
15. Properly dispose of oil.

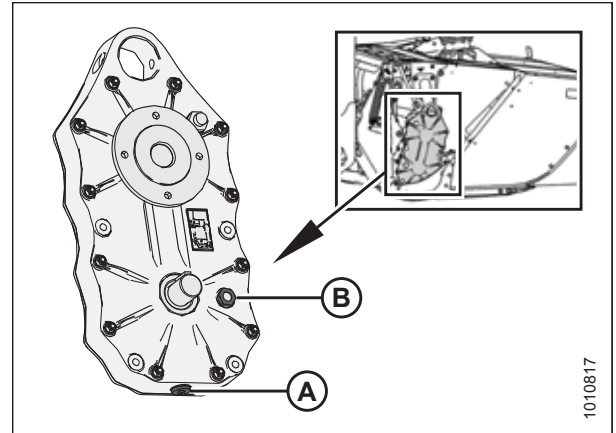


Figure 4.263: Roll Timing Gearbox

#### 4.5.12 Cutterbar-Conditioner Drive Gearbox (T-Gearbox)

The cutterbar-conditioner drive gearbox (T-gearbox) (A), located inside the drive compartment at the left side of the disc mower, transfers power from the header swivel gearbox to the conditioner and cutterbar.

**NOTE:**

Use Kit MD #259021 to service T-gearbox.

If the gearbox requires repair, contact your MacDon dealership.

For service intervals, refer to [4.3.1 Maintenance Schedule/Record, page 126](#).

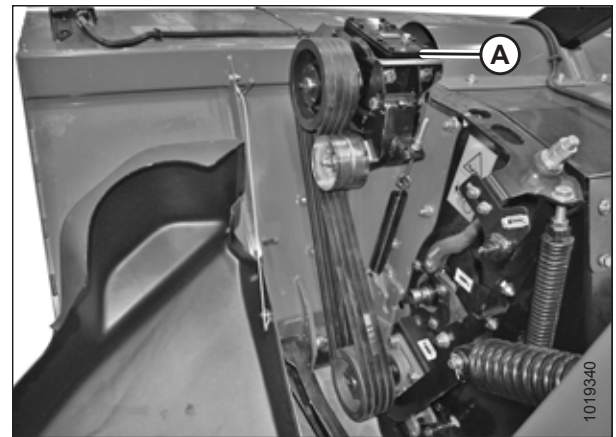


Figure 4.264: Left Side of Disc Mower

### *Checking and Adding Cutterbar-Conditioner Drive Gearbox (T-Gearbox) (MD #224211) Lubricant*

The cutterbar-conditioner drive gearbox is located inside the drive compartment at the left side of the disc mower.

#### **DANGER**

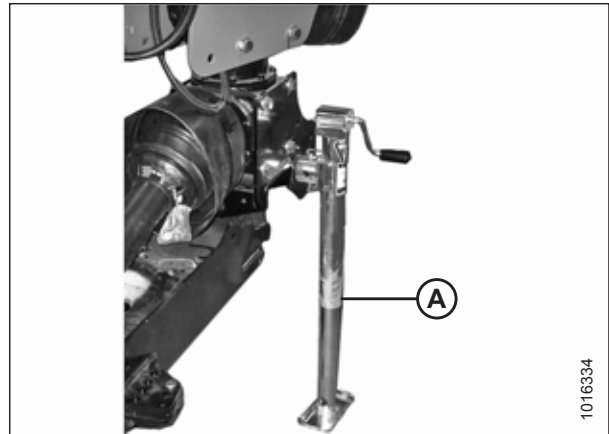
**To avoid bodily injury or death from unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.**

1. Retract the center-link completely.
2. Lower the disc mower until it is level with the ground.

**NOTE:**

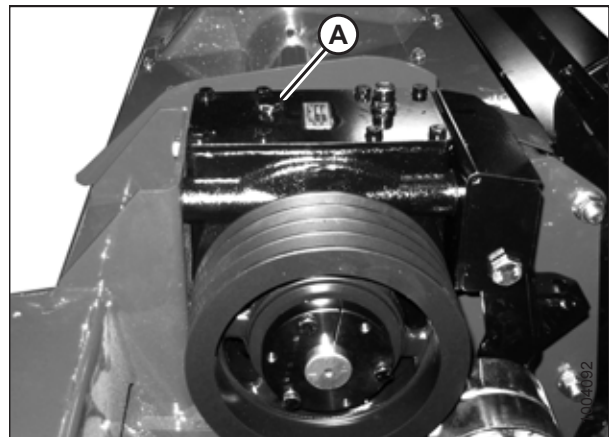
To help ensure an accurate oil level reading for the cutterbar-conditioner drive gearbox, set the disc mower's skid shoes in the fully raised position. Refer to [Adjusting Cutting Height, page 91](#) for instructions.

3. Turn off the engine, and remove the key from the ignition.
4. Detach the tractor from the hitch. Refer to [3.8 Detaching Disc Mower from Tractor, page 56](#).
5. Open the left driveshield. Refer to [3.2.1 Opening Driveshields, page 35](#).
6. Adjust the hitch jack (A) until the drive gearbox is parallel to the ground.



**Figure 4.265: Hitch Jack**

7. Clean area around dipstick (A).
8. Remove dipstick (A) using a 22 mm socket.
9. Ensure lubricant level is to the line on dipstick.
10. If necessary, add gear lubricant to gearbox through dipstick hole (A). Refer to the manual's inside back cover for lubricant information.
11. Reinstall dipstick and tighten.
12. Close left driveshield. For instructions refer to [3.2.2 Closing Driveshields, page 37](#).



**Figure 4.266: Left Side of Disc Mower**

### *Draining Cutterbar-Conditioner Drive Gearbox (T-Gearbox) (MD #224211) Lubricant*

The T-gearbox is serviced using kit MD #259021.

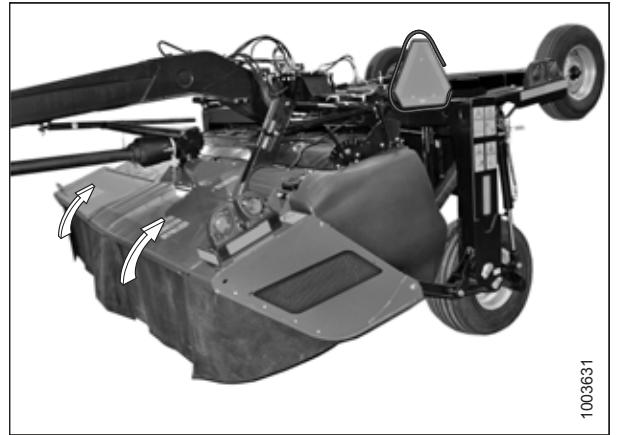
#### **DANGER**

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.

#### **IMPORTANT:**

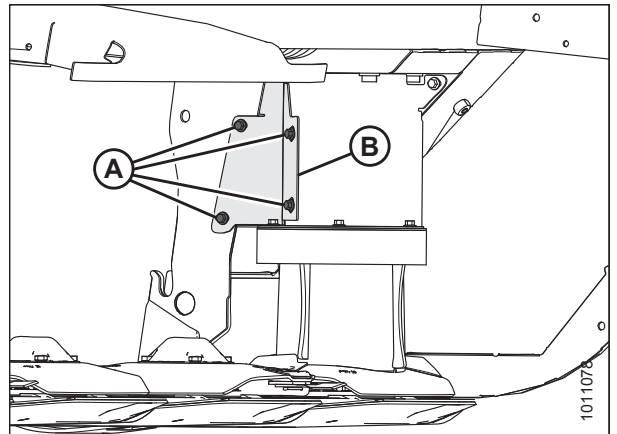
Drain the gearbox lubricant when the lubricant is warm. If the lubricant is cold, idle the machine for approximately 10 minutes prior to draining.

1. Lower disc mower fully, stop engine, and remove key from ignition.
2. Open left side cutterbar door. Refer to [3.3.1 Opening Cutterbar Doors](#), page 38.



**Figure 4.267: Cutterbar Doors**

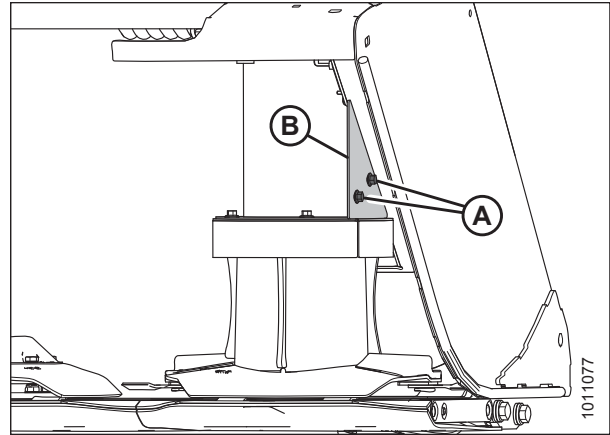
3. Remove four M10 hex flange head bolts (A) and vertical drive shield (B).



**Figure 4.268: Vertical Drive Shield**

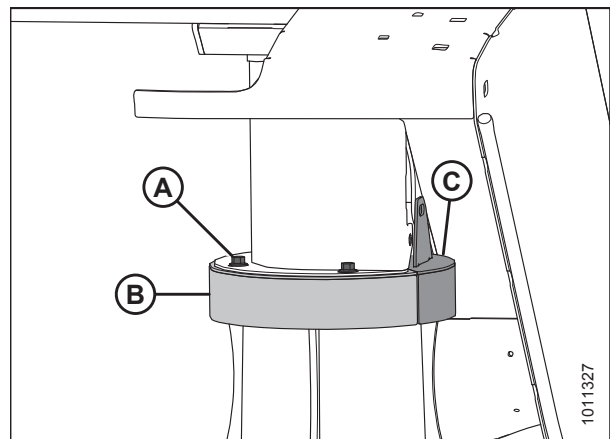
## MAINTENANCE AND SERVICING

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



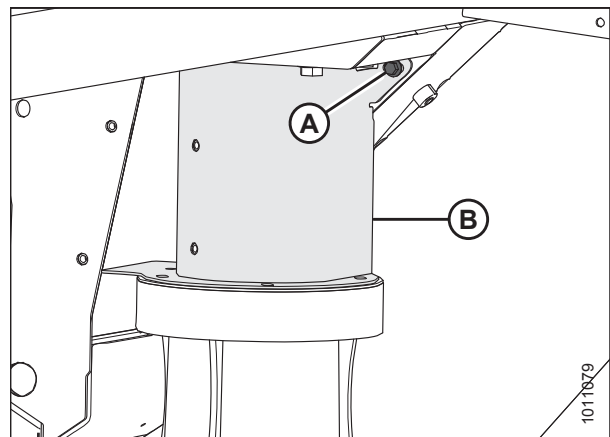
**Figure 4.269: Cover Plate**

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



**Figure 4.270: Top Plate and Drum Top**

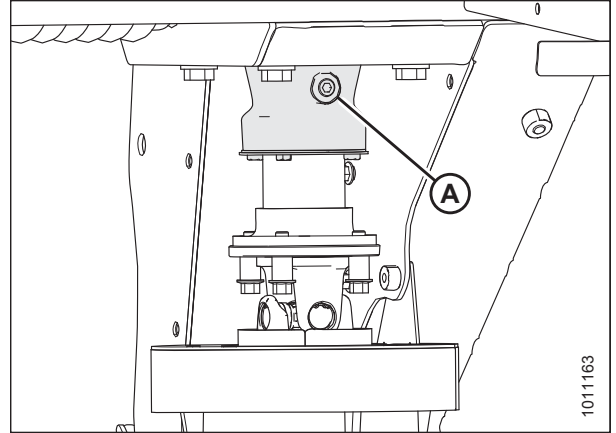
6. Remove M10 hex flange head bolt (A) and vertical shield (B).



**Figure 4.271: Vertical Shield**

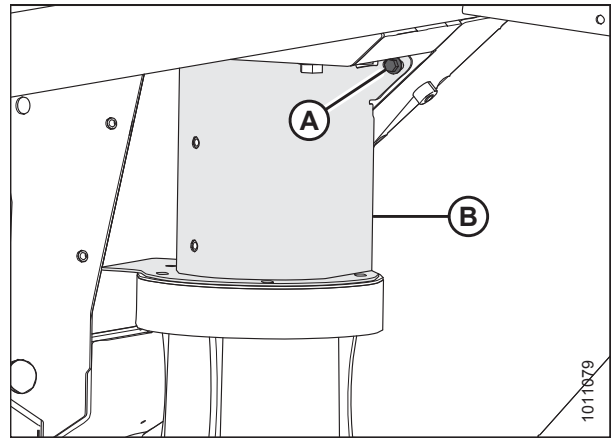
## MAINTENANCE AND SERVICING

7. Place a 2 liter (2.11 qts [US]) capacity container under drain plug (A), and remove plug using a 17 mm socket.
8. Allow sufficient time for lubricant to drain, replace drain plug (A), and tighten.
9. Properly dispose of used oil.



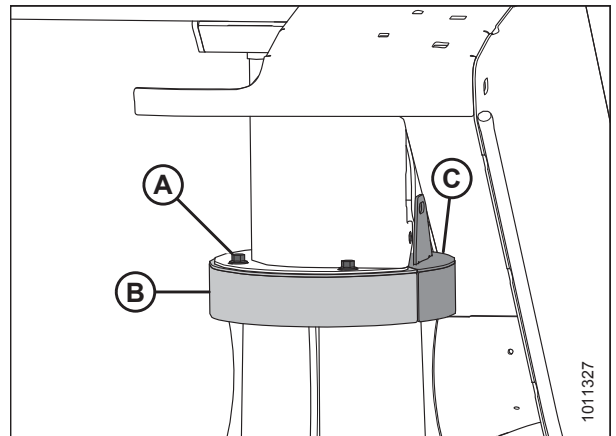
**Figure 4.272: Cutterbar-Conditioner Drive Gearbox (T-Gearbox) Drain Plug**

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



**Figure 4.273: Vertical Shield**

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



**Figure 4.274: Top Plate and Drum Top**

## MAINTENANCE AND SERVICING

12. Install top M10 hex flange head bolt (B) through cover plate (A) and top plate (C).
13. Install lower M10 hex flange head bolt (D) through cover plate (A) and vertical shield (E).
14. Tighten bolts (B) and (D).

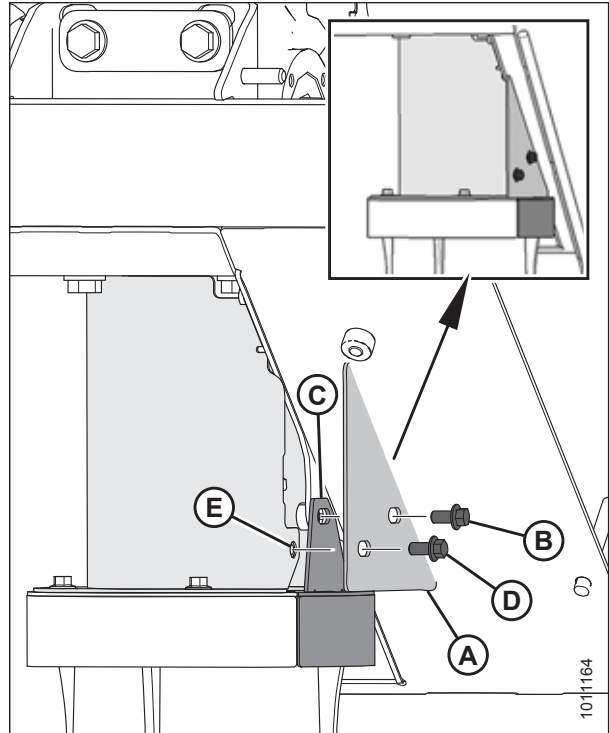


Figure 4.275: Cover Plate

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

### **WARNING**

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

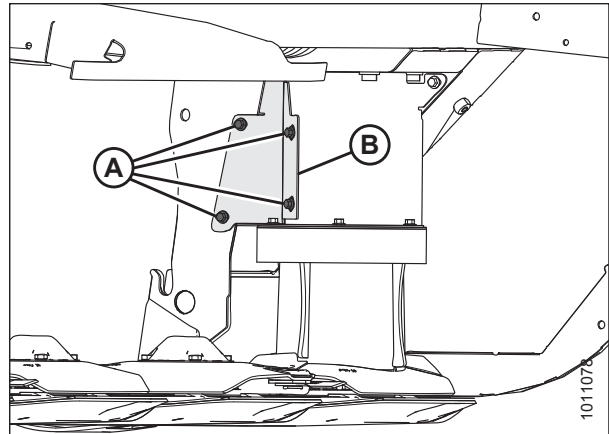


Figure 4.276: Vertical Drive Shield

16. Close cutterbar doors. Refer to [3.3.3 Closing Cutterbar Doors](#), page 40.



**Figure 4.277: Cutterbar Doors in Closed Position**

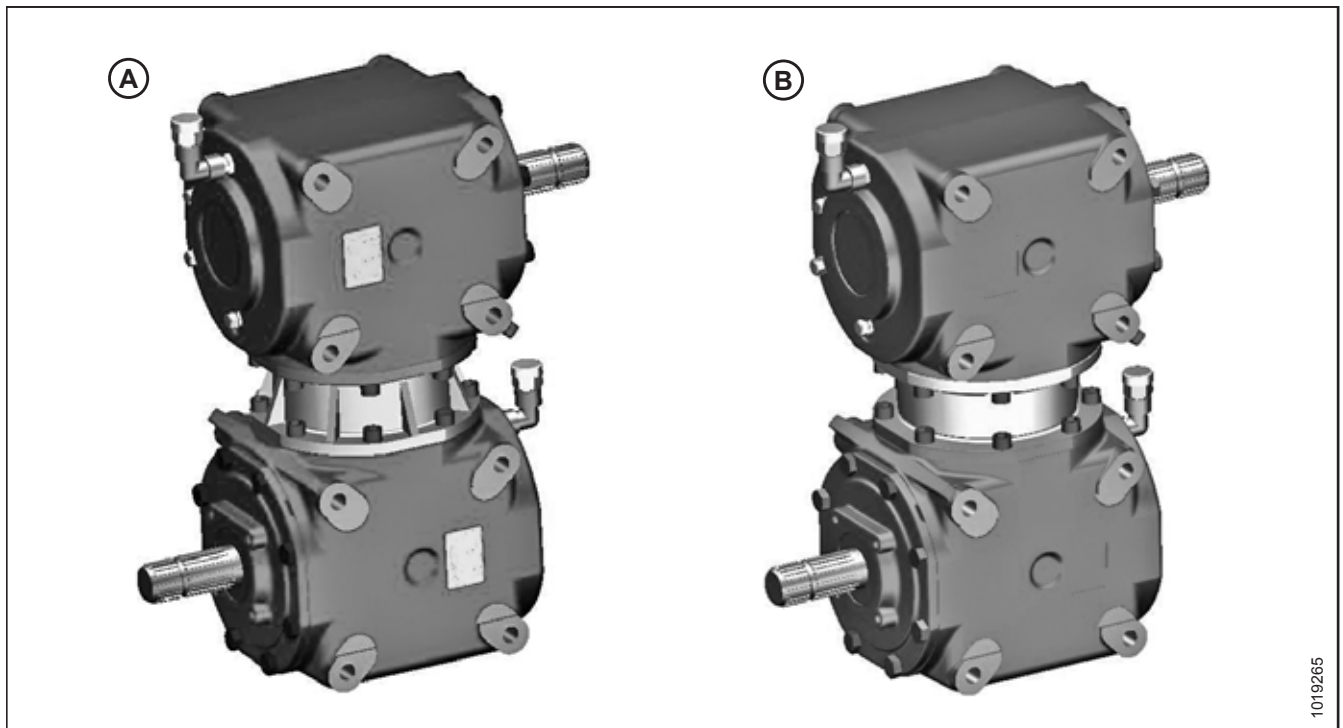
## 4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox

There are two gearboxes located on the disc mower: The header swivel gearbox that transfers power to the disc mower cutterbar and conditioner roll timing gearbox, and the hitch swivel gearbox that transfers power from the tractor to the header swivel gearbox. Both gearboxes consist of upper and lower gearboxes.

If either of the gearboxes requires repair, remove it and have it serviced at your MacDon Dealer.

For service intervals, refer to [4.3.1 Maintenance Schedule/Record](#), page 126.

**Figure 4.278: Header Swivel and Hitch Swivel Gearboxes**



**A - Header Swivel Gearbox (MD #146783)**

**B - Hitch Swivel Gearbox (MD #146784)**

### *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 126](#) for required service intervals.

#### **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:**

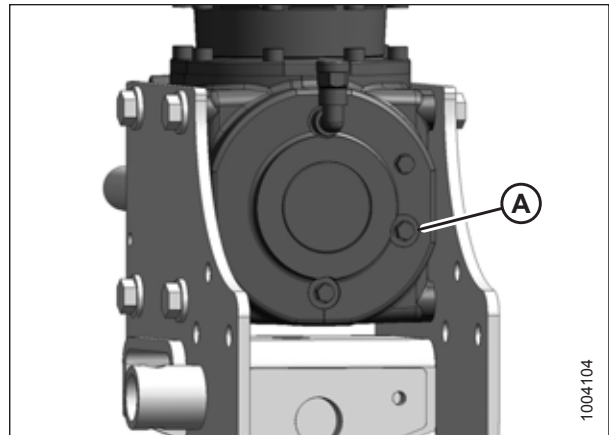
This procedure is the same for both header swivel and hitch swivel gearboxes and must be done on both upper and lower gearboxes.

1. Lower disc mower fully so it is level with the ground, turn off engine, and remove key from ignition.

#### **NOTE:**

Hitch swivel and header swivel gearbox orientations are not affected by positioning of skid shoes on the disc mower, but ideally the disc mower should be level with the ground prior to checking gearbox oil levels.

2. Clean area around check plug (A).
3. Remove plug using a 15 mm socket. Check lubricant level and ensure lubricant is visible or slightly draining from the port.
4. If lubricant is low, you will need to add some. Refer to [Adding Lubricant to the Header Swivel Gearbox \(MD #146783\) and Hitch Swivel Gearbox \(MD #146784\), page 268](#).
5. Reinstall check plug (A) and tighten.



**Figure 4.279: Header Swivel or Hitch Swivel Gearbox Check Plug**

### *Draining Lubricant from the Header Swivel Gearbox (MD #146783) and Hitch Swivel Gearbox (MD #146784)*

#### **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.

#### **NOTE:**

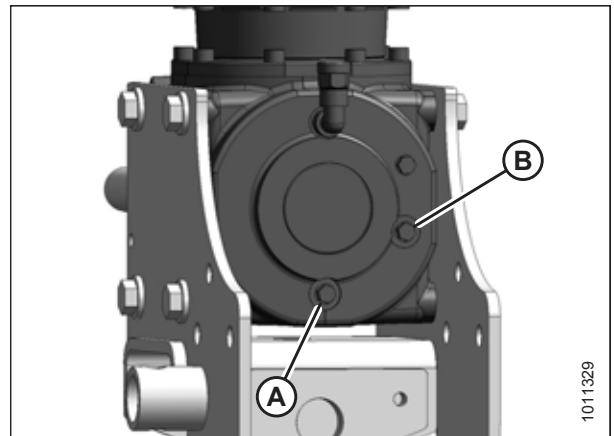
This procedure is the same for both header swivel and hitch swivel gearboxes (MD #146783 and MD #146784), and must be done on both upper and lower gearboxes.

1. Stop engine, and remove key from ignition.
2. Place a 2 liter (2.11 qts [US]) capacity container under drain plug (A), and remove plug using a 17 mm socket.

#### **NOTE:**

For faster draining, 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 4.280: Gearbox Drain Plug**

### *Adding Lubricant to the Header Swivel Gearbox (MD #146783) and Hitch Swivel Gearbox (MD #146784)*

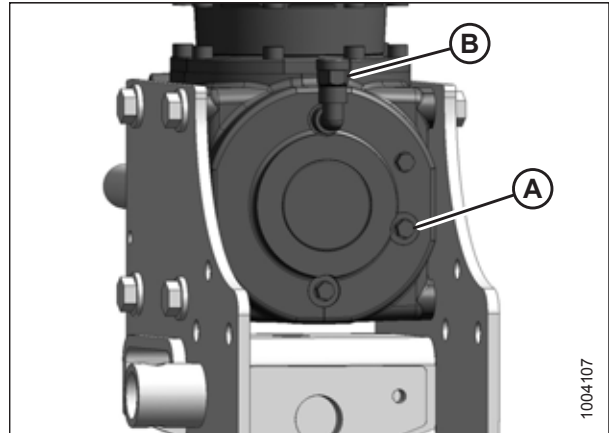
#### **DANGER**

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.

#### **NOTE:**

This procedure is the same for both header swivel and hitch swivel gearboxes (MD #146783 and MD #146784), and must be done on both upper and lower gearboxes.

1. Stop engine, and remove key from ignition.
2. Clean area around check plug (A) and breather/filler plug (B).
3. Remove check plug (A) and breather/filler plug (B).
4. Ensure 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 a list of recommended fluids, lubricants, and capacity.
5. Reinstall check plug (A) and breather/filler plug (B), and tighten.



**Figure 4.281: Swivel Gearbox**

## 4.5.14 Wheels and Tires

### *Checking Wheel Bolts*

#### **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.

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 one hour of operation.

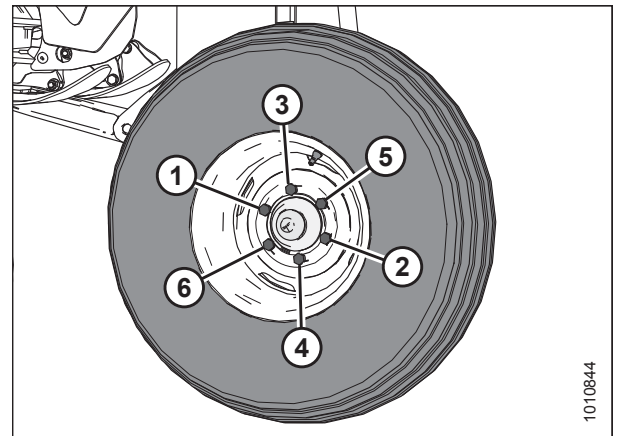


Figure 4.282: Tightening Sequence

### Removing Wheels

#### **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. Place blocks (A) under opposite wheel to prevent machine from moving if disc mower is not attached to towing vehicle.
2. Position jack under frame leg (B).
3. Loosen wheel bolts slightly.
4. Operate jack to raise wheel off ground.
5. Place blocks or a stand under frame leg.
6. Remove wheel bolts and remove wheel.

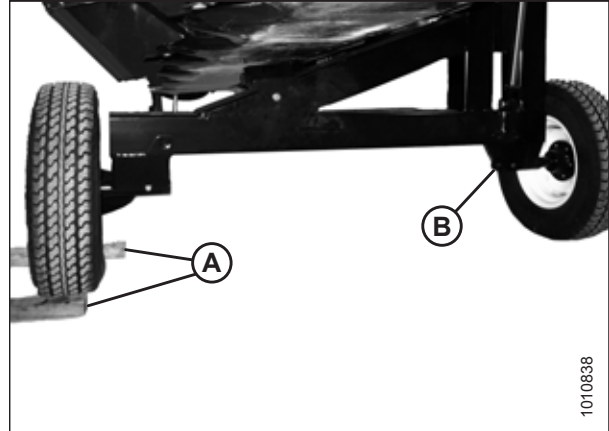


Figure 4.283: Transport Wheel



Figure 4.284: Field Wheel

### Installing Field Wheels

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.

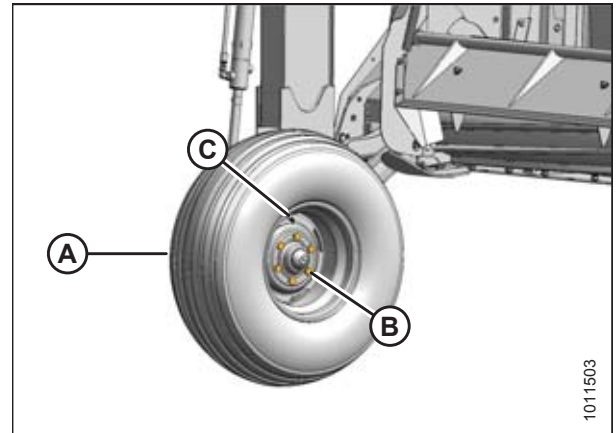


Figure 4.285: Installing Wheel Bolts

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 one hour of operation.

3. Check tire pressure and adjust as required. Refer to [Inflating Tires, page 271](#).

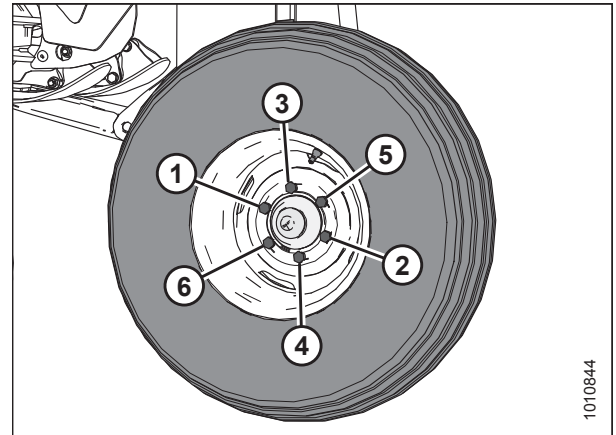


Figure 4.286: Tightening Sequence

### Inflating Tires



**WARNING**

- Service tires safely.
- A tire can explode during inflation which could cause serious injury or death.

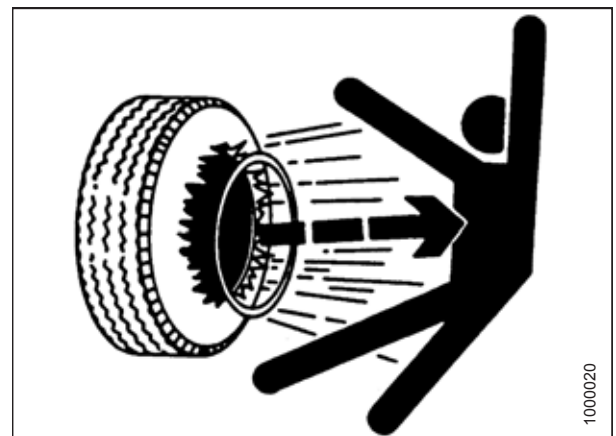
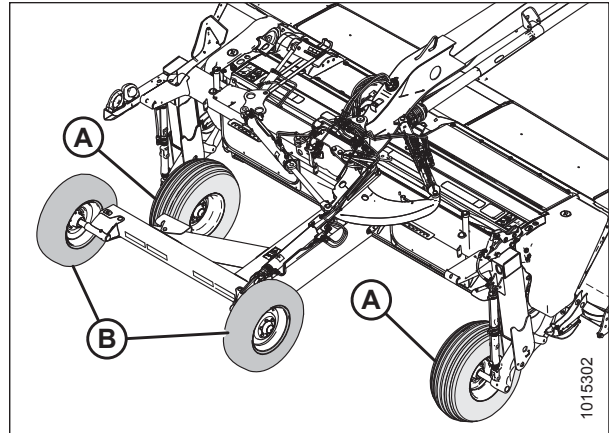


Figure 4.287: Overinflated Tire

## MAINTENANCE AND SERVICING

Check tire pressure daily.

- Maximum pressure is 310 kPa (45 psi) for field wheels (A)
- Maximum pressure is 552 kPa (80 psi) for optional Road Friendly Transport™ wheels (B)



**Figure 4.288: Field and Transport Wheels**

## 4.6 Hydraulics

### 4.6.1 Checking Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

#### **WARNING**

- **Avoid high-pressure fluids.** Escaping fluid can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes and nozzles which eject fluids under high pressure.
- **If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.**



Figure 4.289: Hydraulic Pressure Hazard

- **Use a piece of cardboard or paper to search for leaks.**

#### **IMPORTANT:**

Keep hydraulic coupler tips and connectors clean. Allowing dust, dirt, water, or foreign material to enter the system is the major cause of hydraulic system damage. Do **NOT** attempt to service hydraulic systems in the field. Precision fits require a perfectly clean connection during overhaul.

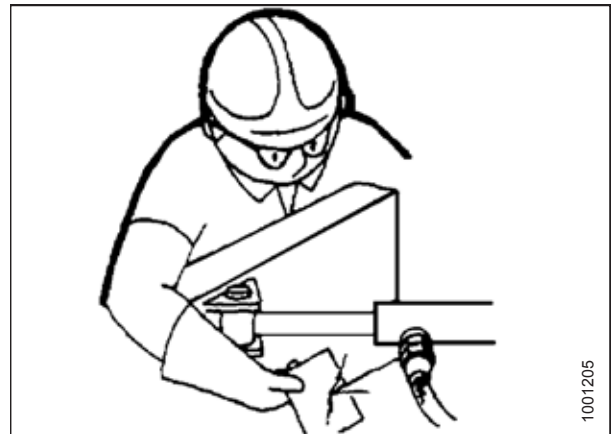


Figure 4.290: Testing for Hydraulic Leaks

### 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 Servicing Electrical System

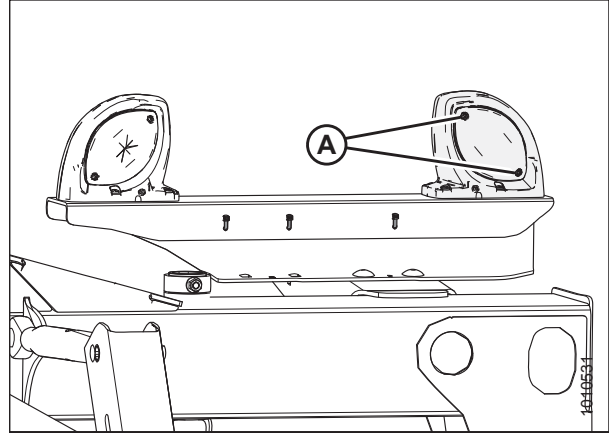
### 4.7.1 Maintaining Electrical System

- Use electrical tape and cable ties as required to prevent wiring harness from dragging or rubbing.
- Keep lights clean and replace defective bulbs.

### 4.7.2 Servicing Amber Hazard/Signal Lights

#### *Replacing Amber Hazard/Signal Bulb*

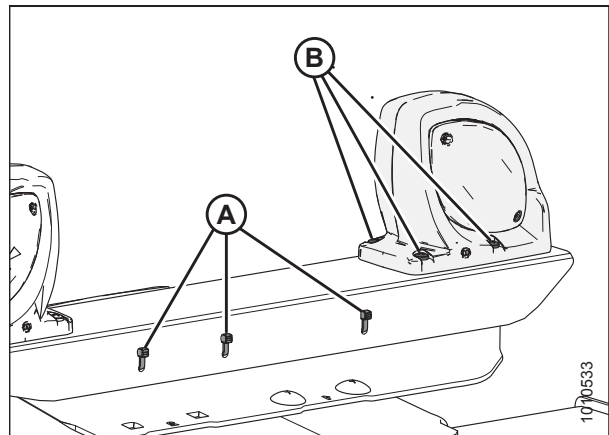
1. Remove two Phillips screws (A) from fixture, and remove the plastic lens.
2. Replace bulb, and reinstall plastic lens and screws.
  - Bulb—Trade #1157



**Figure 4.291: Plastic Lens and Screws**

#### *Replacing Amber Hazard/Signal Light Fixture*

1. Cut cable ties (A) securing harness covering to light.
2. Retrieve connections from inside harness covering (approximately 150 mm [6 in.] from light) and disconnect wires (not shown). If necessary, remove tape.
3. Remove four nuts (B) (only 3 shown) securing light to bracket, and remove light. Pull wires through hole in bracket.
4. Feed connectors of new light (not shown) through hole in bracket, and position light onto bracket.
5. Install four nuts (B) and tighten.
6. Connect wires to connectors in harness, and secure harness covering with tape and cable ties (A) as required.

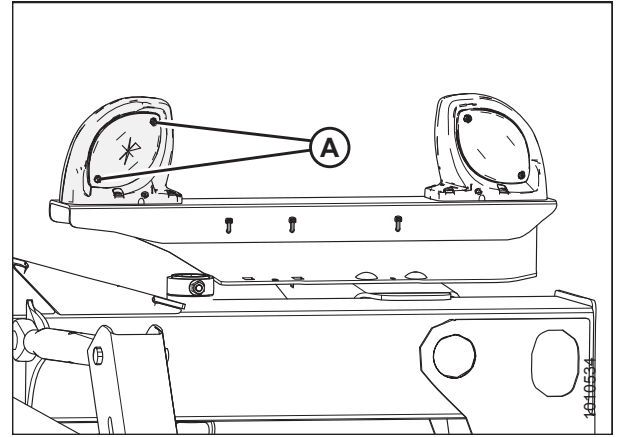


**Figure 4.292: Amber Hazard Light and Mounting Bracket**

### 4.7.3 Servicing Red Brake/Tail Lights

#### *Replacing Red Brake/Tail Light Bulb*

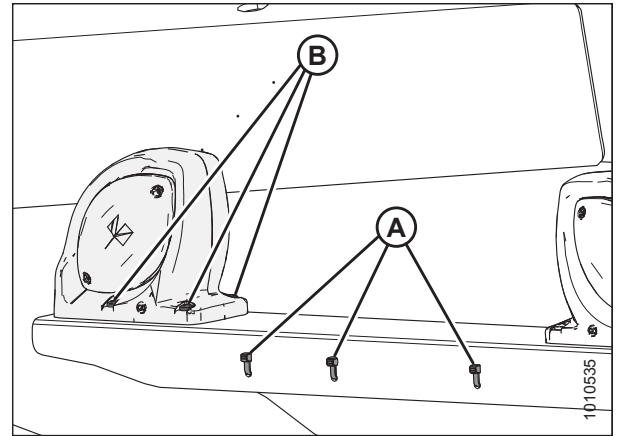
1. Remove two Phillips screws (A) from fixture, and remove the plastic lens.
2. Replace bulb, and reinstall plastic lens and screws. Bulb—Trade #1157.



**Figure 4.293: Plastic Lens and Screws**

#### *Replacing Red Brake/Tail Light Fixture*

1. Cut cable ties (A) securing harness covering to light.
2. Retrieve connections from inside harness covering (approximately 150 mm [6 in.] from light) and disconnect wires (not shown). If necessary, remove tape.
3. Remove the four nuts (B) securing light to bracket, and remove light. Pull wires through hole in bracket.
4. Feed connectors of new light (not shown) through hole in bracket, and position light onto bracket.
5. Install four nuts (B) and tighten.
6. Connect wires to connectors in harness, and secure harness covering with tape and cable ties (A) as required.



**Figure 4.294: Red Hazard Light and Mounting Bracket**

## 4.8 Servicing Conditioner

### 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 297 for ordering information.

#### *Inspecting Conditioner*

#### **DANGER**

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

#### **CAUTION**

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

1. Lower disc mower fully, stop engine, and remove key.
2. Engage lift cylinder lock-out valves. Refer to [3.1.1 Engaging Locks](#), page 33.
3. Remove left and right driveshields (A). Refer to [3.2.1 Opening Driveshields](#), page 35.

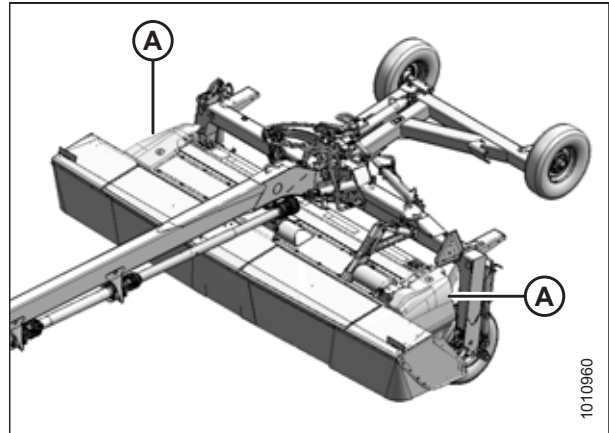
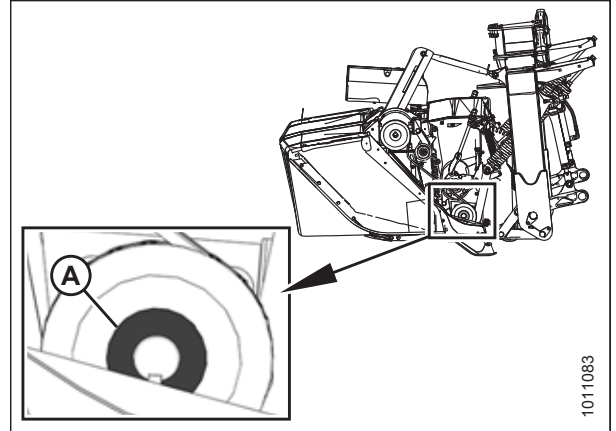


Figure 4.295: Driveshields

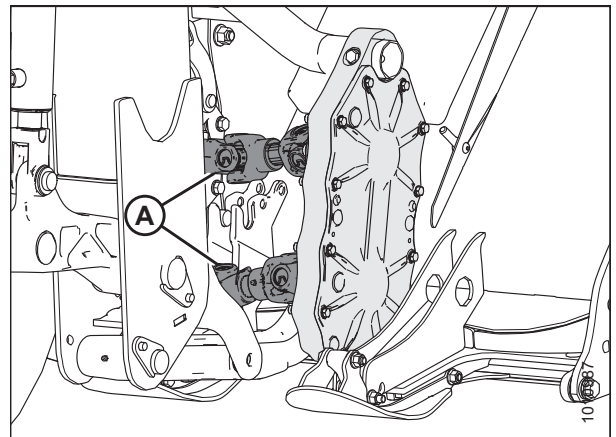
## MAINTENANCE AND SERVICING

4. Inspect conditioner roll left bearing (A) for signs of wear or damage. If bearing needs replacing, refer to the Technical Service Manual.



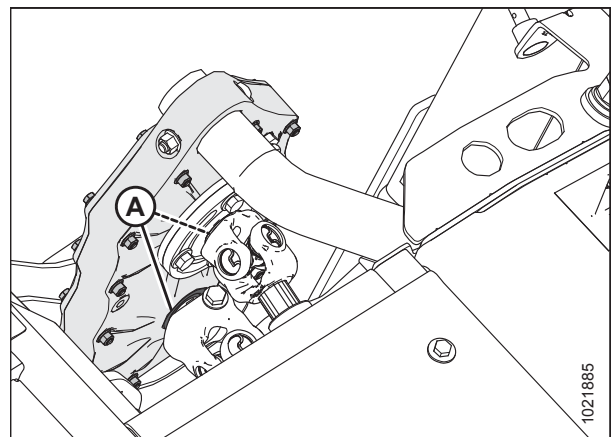
**Figure 4.296: Conditioner Roll Left Bearing**

5. Inspect conditioner drive U-joints (A) for signs of wear or damage. If U-joints needs replacing, refer to the Technical Service Manual.



**Figure 4.297: Conditioner Drive U-Joints**

6. Inspect roll timing gearbox bearings (A) for signs of wear or damage. If bearing needs replacing, refer to the Technical Service Manual.



**Figure 4.298: Roll Timing Gearbox Bearings**

## 4.8.2 Finger Conditioner

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

The degree to which the crop is conditioned as it passes through the conditioner is controlled by the clearance between the fingers and the internal intensity baffle (refer to [Adjusting Internal Intensity Baffle Clearance, page 109](#)) and by the rotational speed of the fingers (refer to [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 header lift cylinder lock-out valves before going under machine for any reason.

#### CAUTION

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

1. Lower disc mower fully, stop engine, and remove key.
2. Engage lift cylinder lock-out valves. Refer to [3.1.1 Engaging Locks, page 33](#).
3. Remove left and right driveshields (A). Refer to [Removing Driveshields, page 215](#).

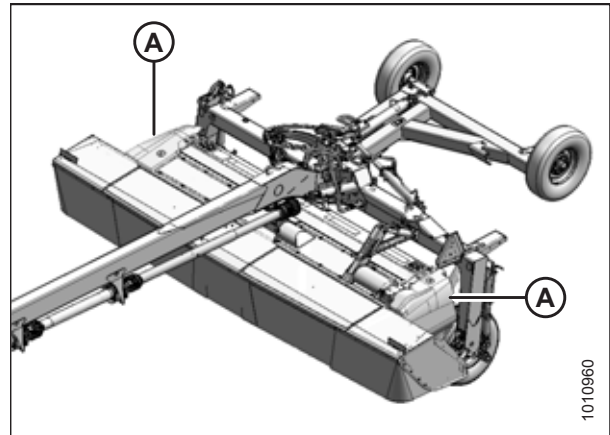


Figure 4.299: Driveshields

4. Open cutterbar doors. Refer to [3.3.1 Opening Cutterbar Doors, page 38](#).

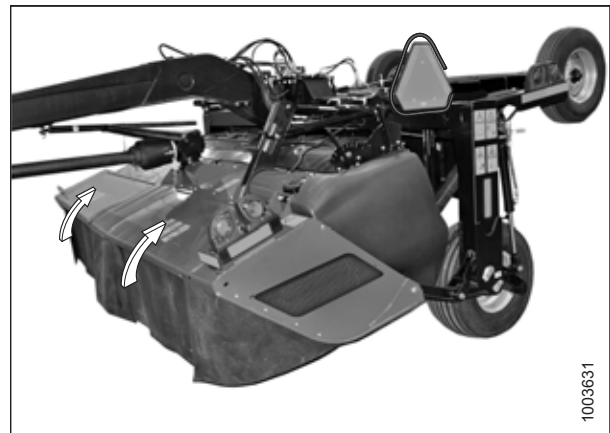


Figure 4.300: Cutterbar Doors

## MAINTENANCE AND SERVICING

5. Check rotor fingers (A) for damage and replace any bent fingers to prevent rotor imbalance.

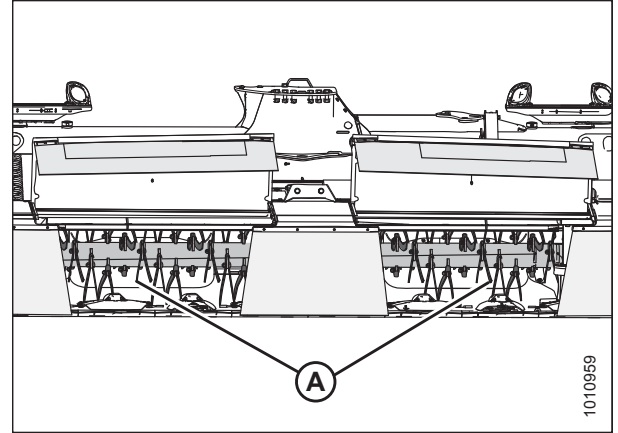


Figure 4.301: Rotor Fingers

6. Remove the left driveshield. Refer to [Removing Driveshields](#), page 215.

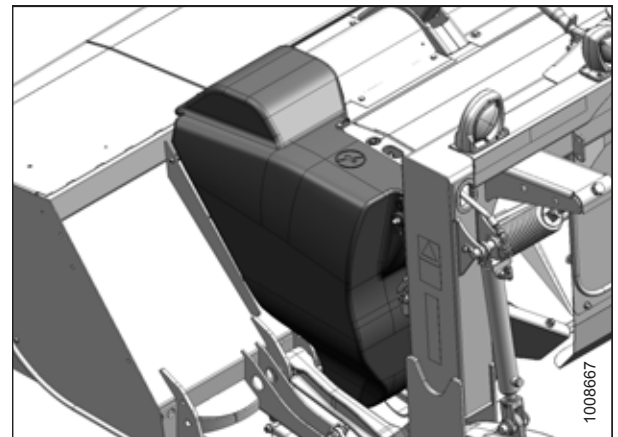


Figure 4.302: Left Driveshield

7. Inspect left side rotor bearing (A) for signs of wear or damage. Contact your MacDon Dealership if bearing needs to be replaced.

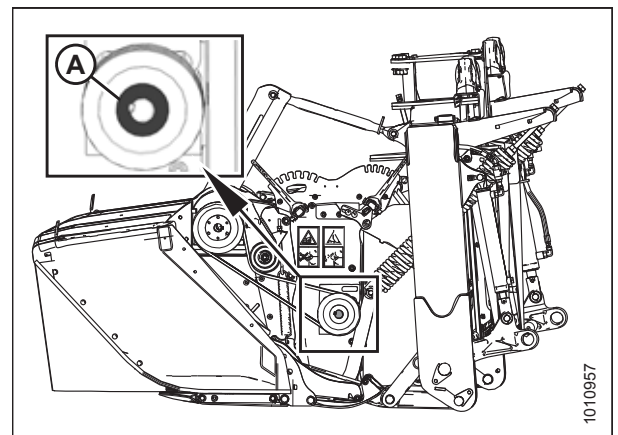
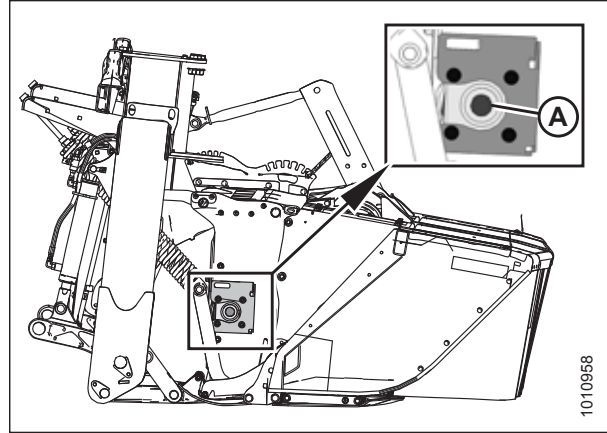


Figure 4.303: Left Rotor Bearing

8. Remove the right driveshield. Refer to [Removing Driveshields, page 215](#).
9. Inspect right side rotor bearing (A) for signs of wear or damage. Contact your MacDon Dealership if bearing needs to be replaced.



**Figure 4.304: Right Side Rotor Bearing**

### 4.8.3 Changing the Conditioner

R113/R116 Pull-Type Disc Mowers 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.

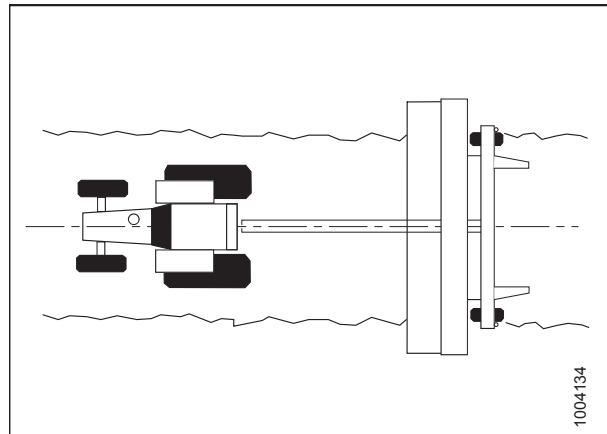
#### *Separating Header from Carrier*

#### **! 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.**

The disc mower includes a header and conditioner attached to a carrier frame. Before removing or installing the conditioner, the header and carrier must be separated.

1. Connect the disc mower to the tractor. Refer to [3.7 Attaching Disc Mower to the Tractor, page 47](#).
2. Start tractor and center disc mower behind tractor.
3. Raise disc mower fully, set center-link to mid-position, and shut off the engine. Remove key from ignition.



**Figure 4.305: Disc Mower Centered behind Tractor**

## MAINTENANCE AND SERVICING

### NOTE:

The float adjuster bolt is easier to turn when the disc mower is in the raised position.

4. Close the disc mower lift cylinder lock-out valves (A).
5. Loosen jam nut (B) on adjuster bolt.
6. Turn out adjuster bolt (C) on each float spring until 400 mm (17-3/4 in.) of thread (D) is exposed.
7. Open lift cylinder lock-out valves (A) (handle in line with the hose).
8. Start the engine and fully lower the disc mower.
9. Stop the engine and remove the key from the ignition.
10. Check that float adjuster bolts (B) are loose. Back off adjuster bolts as required.
11. Remove float adjuster bolt (B) from spring on **LEFT** side only. Do **NOT** allow spring to drop when bolt is removed.
12. Remove left and right driveshields (A). For instructions, refer to [Removing Driveshields, page 215](#).

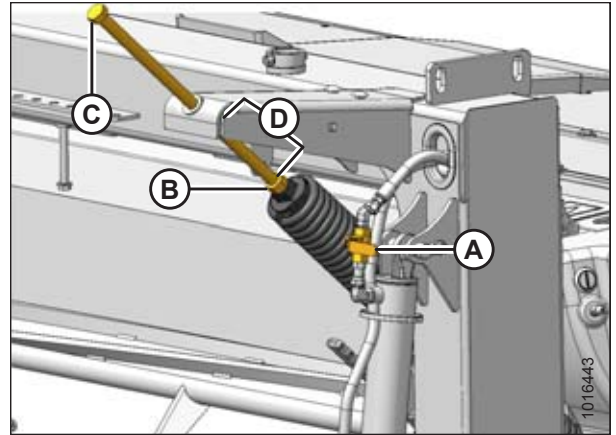


Figure 4.306: Right Side Float Adjuster – Left Side Similar

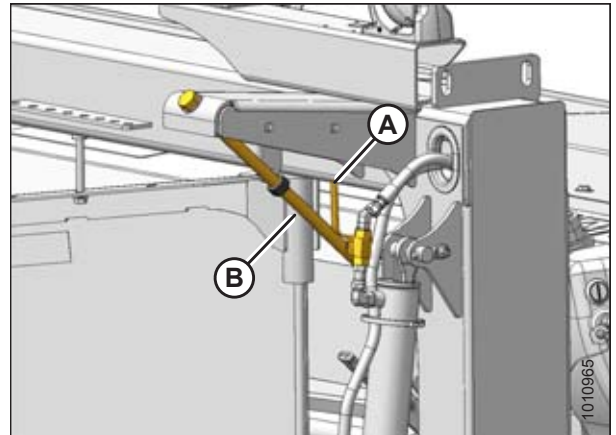


Figure 4.307: Right Side Float Adjuster – Left Side Similar

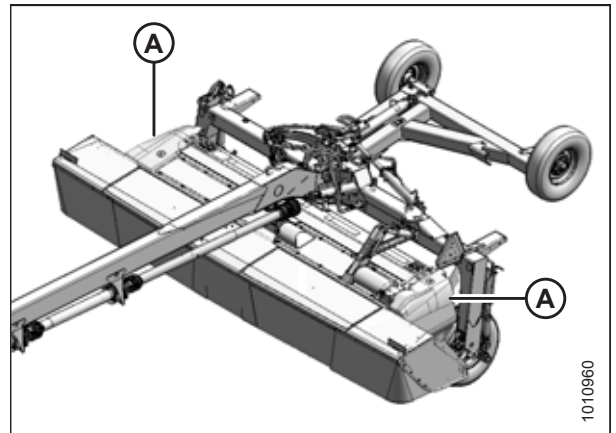
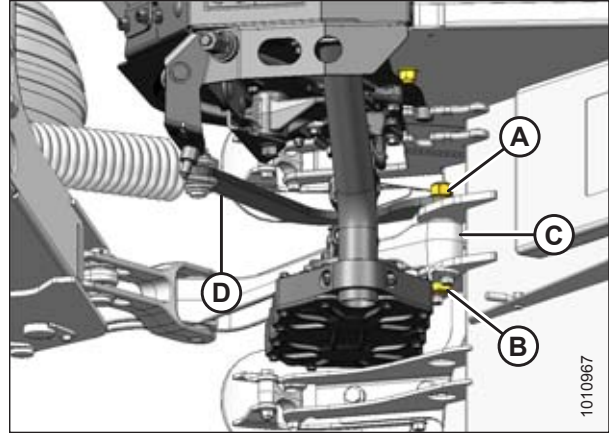


Figure 4.308: Driveshields

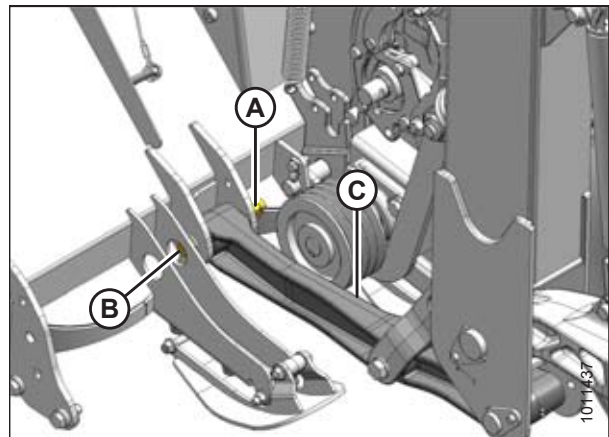
## MAINTENANCE AND SERVICING

13. On the right side of the disc mower, remove the M20 nut (A), washers, and hex head bolt (B) securing the carrier leg (C) and float spring arm (D) to the header.
14. Move float spring arm (D) clear of conditioner.



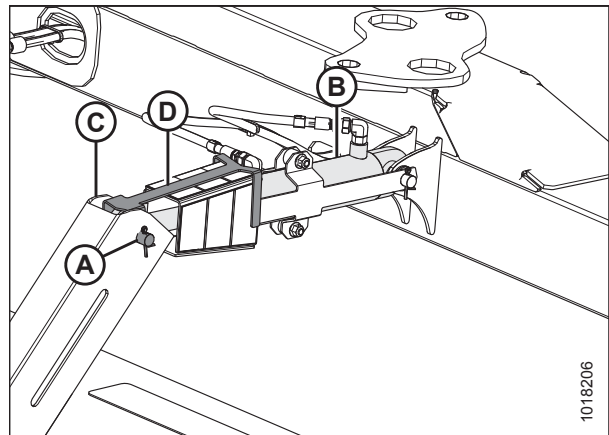
**Figure 4.309: Right Side of Carrier (Top View)**

15. Remove the M20 nut (A), washers, and hex head bolt (B) securing carrier leg (C) to the left end of the header.



**Figure 4.310: Left Side of Conditioner**

16. Remove clevis pin (A) connecting center-link (B) to anchor (C), and separate center-link from anchor. Reinstall pin in anchor to store.
17. Secure center-link (B) and indicator (D) to carrier frame with a strap or wire to prevent them from contacting the disc mower during separation.



**Figure 4.311: Center-Link and Indicator**

## MAINTENANCE AND SERVICING

18. Remove two hex head bolts (A) and spacers (B) securing steering arm (C) to gearbox.
19. Lift steering arm (C) off gearbox and secure arm to hitch (D) with a strap or wire.
20. Reinstall hex head bolts (A) and spacers (B) into gearbox.
21. Disconnect aft driveline (E) from header swivel gearbox. Refer to [Removing Clutch Driveline, page 235](#).
22. Secure driveline (E) to hitch (D) with a strap or wire.

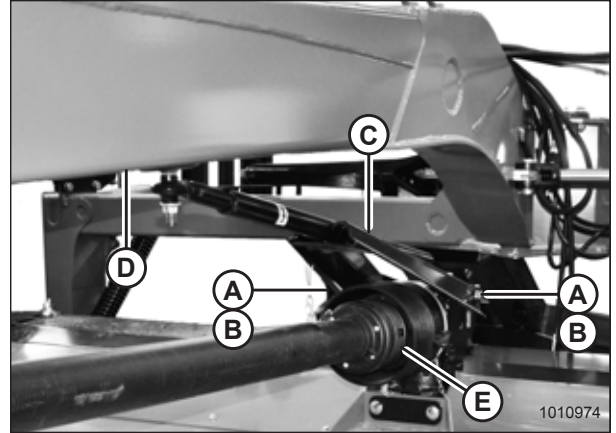


Figure 4.312: Aft Driveline and Hitch

23. If Road Friendly Transport™ system is installed, disconnect wiring harness (A) at light assembly (B).
24. Remove cable ties (E), clamp (D), and clips (C). Retain for reinstallation.
25. Temporarily attach harness to carrier.

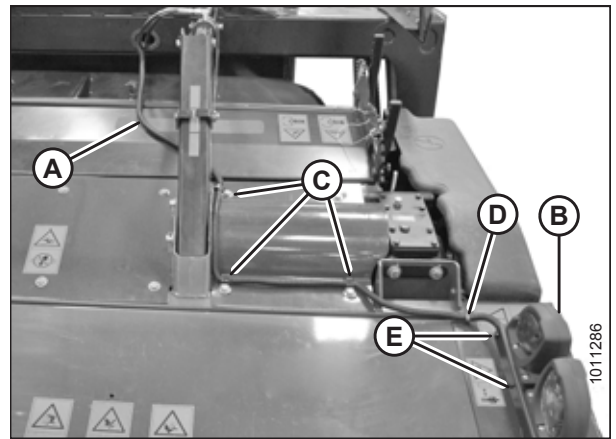


Figure 4.313: Electrical Harness

26. Start tractor, slowly back carrier (A) off header (B), and maneuver carrier away from header.

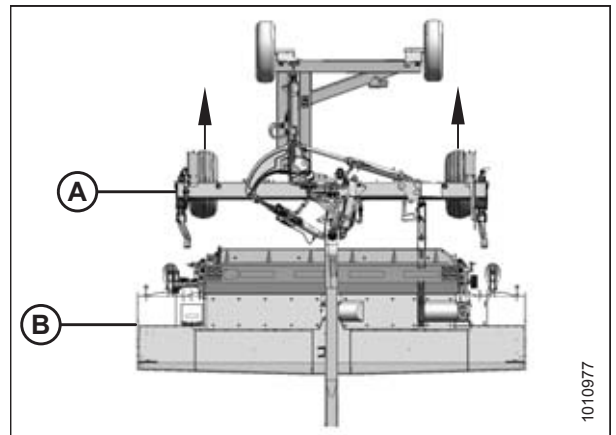


Figure 4.314: Carrier Removed from Header

## Removing the Conditioner

### CAUTION

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast while detaching the conditioner from the mower.

1. Attach a spreader bar (A) to a forklift or equivalent lifting device, and attach chains to lugs (B) on 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.

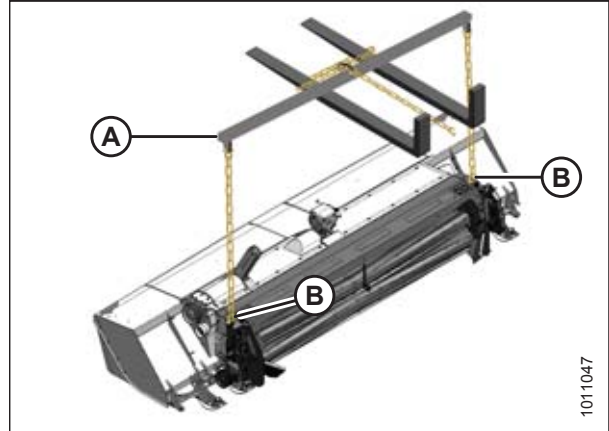


Figure 4.315: Spreader Bar

2. On the left side of the disc mower, remove the conditioner drive belt as follows:
  - a. Back off jam nut and tensioner nut (B) on belt idler until belts (A) are loose and can be removed.
  - b. Remove the four belts.

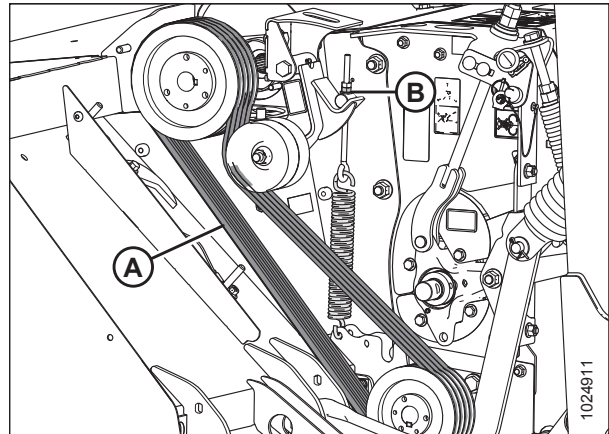


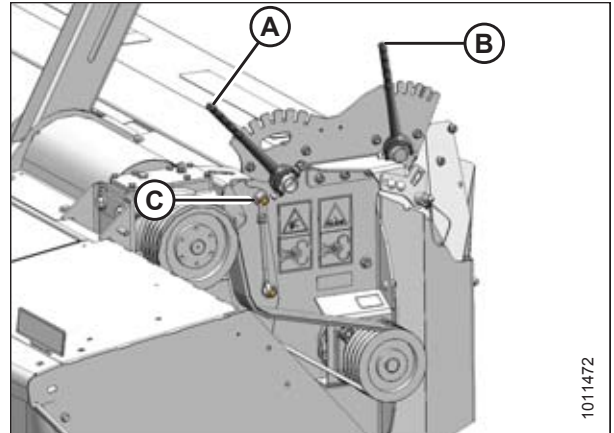
Figure 4.316: Conditioner Drive

## MAINTENANCE AND SERVICING

3. For finger conditioner, move forward baffle adjustment handle (A) to fully lowered position, as shown.
4. Move rear baffle adjustment handle (B) to fully raised position as shown.

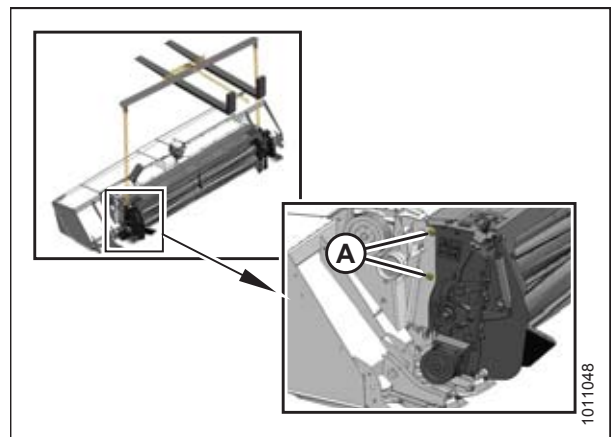
**NOTE:**

Access to upper bolts (C) is easiest from the rear of the conditioner.



**Figure 4.317: Left Side of Finger Conditioner**

5. Lift conditioner slightly forward to take load off bolts (A) and to hold the conditioner after the bolts are removed. Retain hardware for reinstallation.



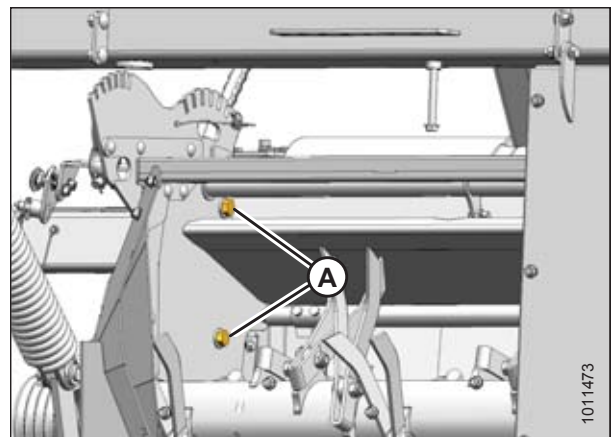
**Figure 4.318: Left Side of Conditioner – Right Side Similar**



### CAUTION

**Stand clear when detaching the conditioner.**

6. Remove two M16 hex head bolts (A) from each side of conditioner that secure it to mower.



**Figure 4.319: Left Side of Finger Conditioner – Right Side Similar**

**CAUTION**

Stand clear when detaching the conditioner.

7. Lift conditioner (A) off disc mower (B), and move it away from work area.

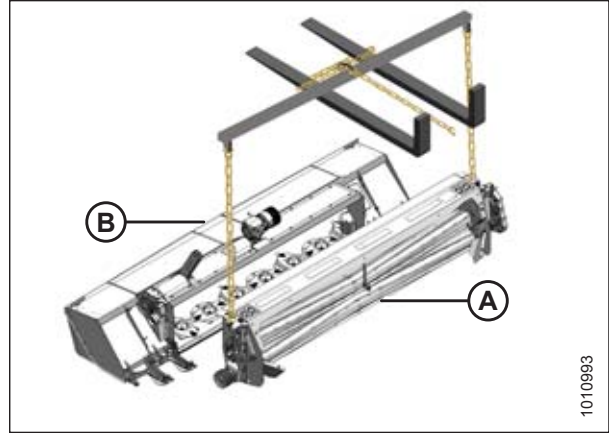


Figure 4.320: Conditioner Lift

**NOTE:**

If installing a finger conditioner or if the deflector plates (A) need to be replaced, remove deflector plates (A). Refer to [Removing Cutterbar Deflectors, page 95](#).

**NOTE:**

If you are replacing a roll conditioner, the deflector plates (A) need to remain installed on the header. Proceed to [Installing the Conditioner, page 286](#).

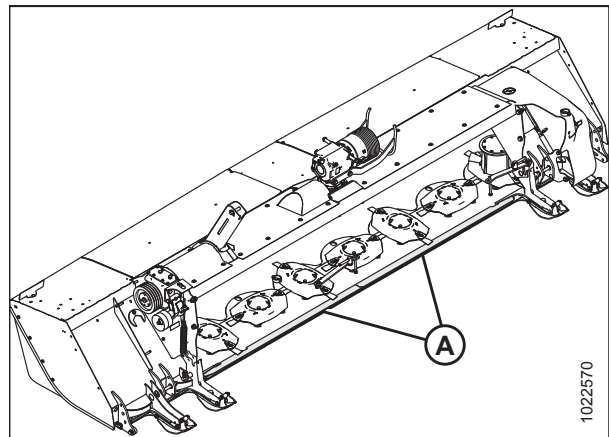


Figure 4.321: Deflector Location

*Installing the Conditioner*

**CAUTION**

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast while detaching the conditioner from the mower.

**NOTE:**

If installing a finger conditioner, deflector plates must be removed. Refer to [Removing Cutterbar Deflectors, page 95](#).

**NOTE:**

Install deflector plates (A) when installing a roll conditioner and when replacing faulty or damaged deflector plates. Refer to [Installing Cutterbar Deflectors, page 96](#)

**NOTE:**

If you are replacing a roll conditioner and the deflector plates (A) are already installed on the machine, proceed to Step 1, [page 287](#).

## MAINTENANCE AND SERVICING

1. Attach a 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.).
2. Lift conditioner and position it into disc mower opening.

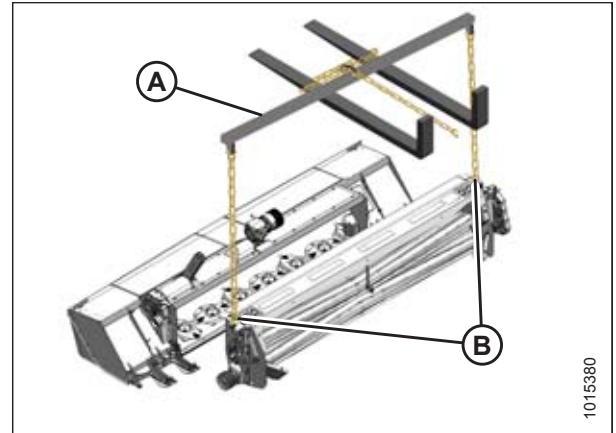


Figure 4.322: Conditioner Lift

3. Carefully align pin (A) at each end of conditioner with lug (B) on disc mower, and lower conditioner so that pins (A) engage lugs (B) on disc mower.

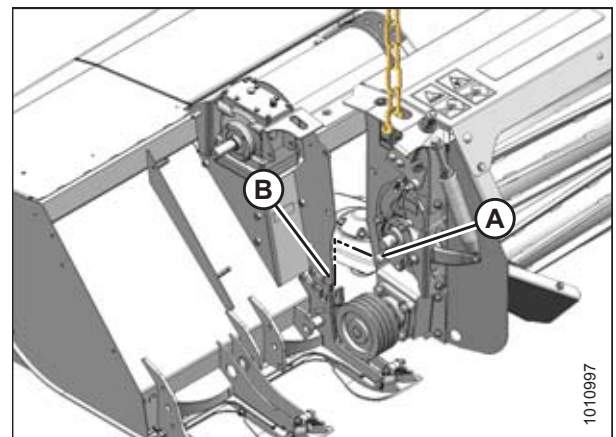


Figure 4.323: Conditioner Pins

4. Align mounting holes and install four M16 x 40 hex head bolts (A) with heads facing inboard (two per side). Secure with M16 center lock flanged nuts and torque to 170 Nm (126 lbf·ft).
5. Remove lifting chains from conditioner and move lifting device clear of work area.
6. If necessary, install conditioner drive components. Refer to [Installing Conditioner Drive, page 288](#).

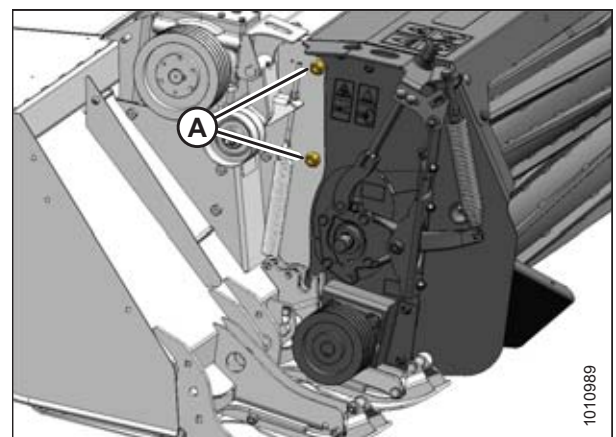


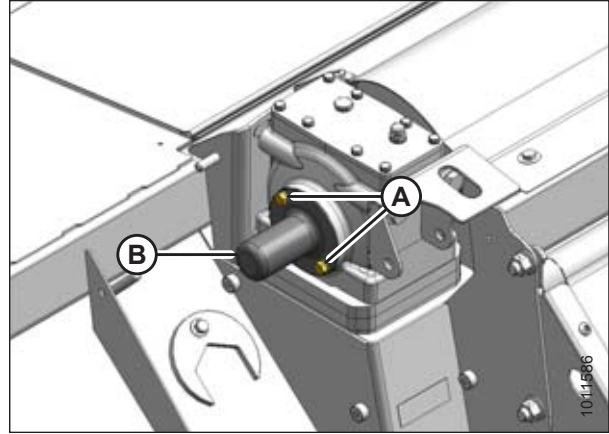
Figure 4.324: Left Side of Conditioner – Right Side Similar

## Installing Conditioner Drive

This procedure describes the installation of conditioner drive components.

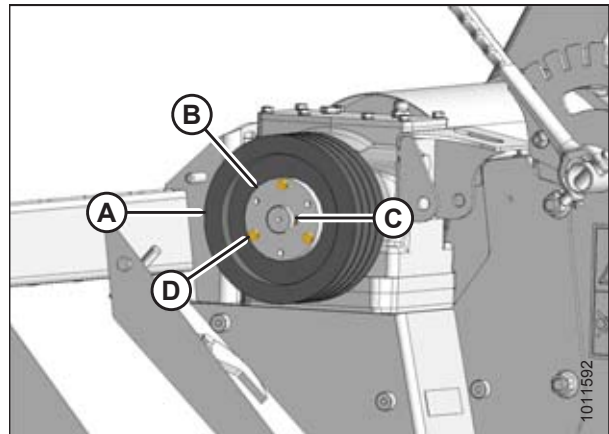
If a conditioner is to be installed on the R1 Series Pull-Type Disc Mower, refer to [Installing the Conditioner, page 286](#).

1. Remove two screws (A) from cover (B), and remove cover from gearbox shaft. Retain parts for future use.



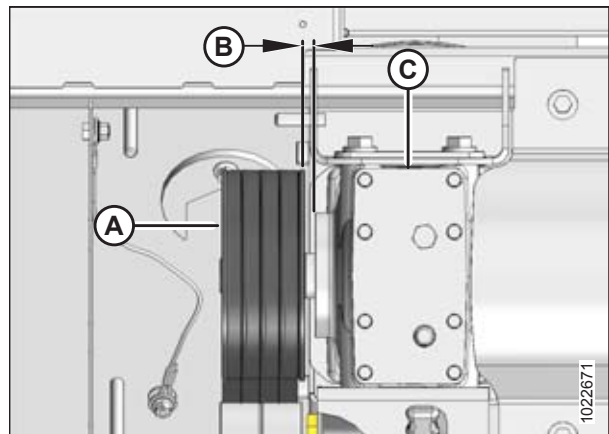
**Figure 4.325: Shaft Cover**

2. Assemble pulley (A) and bushing (B) onto gearbox shaft with key (C).
3. Install three M10 hex head bolts (D) through bushing (B) into pulley (A).



**Figure 4.326: Drive Pulley**

4. Tighten the three M10 bolts while maintaining 11 mm (7/16 in.) dimension (B) between pulley (A) and gearbox (C). Torque bolts to 39 Nm (29 lbf·ft).



**Figure 4.327: 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 47–54 Nm (35–40 lbf·ft).

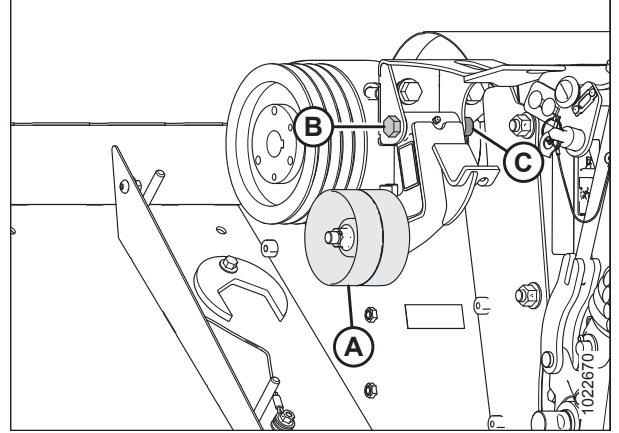


Figure 4.328: Tensioner

6. Install spring (A) into rear hole (B) for finger conditioner, and forward hole (C) for roll conditioner.
7. Install eyebolt (D) onto tensioner (E) and spring (A). Secure eyebolt with hardened washer (F) and two M10 nuts (G).

**NOTE:**

Install conditioner drive belt after reattaching header to carrier.

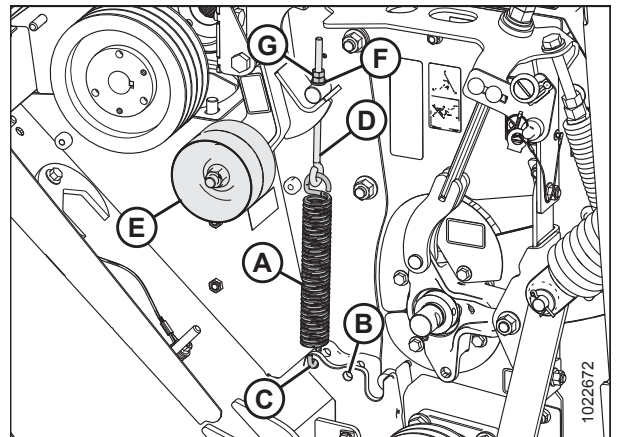


Figure 4.329: Tensioner

## Assembling 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 machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.

1. Start the tractor and maneuver carrier (A) directly behind the header (B) so carrier legs line up with the header attachment points.
2. Drive slowly forward to engage the carrier legs (C) into the header attachment brackets.

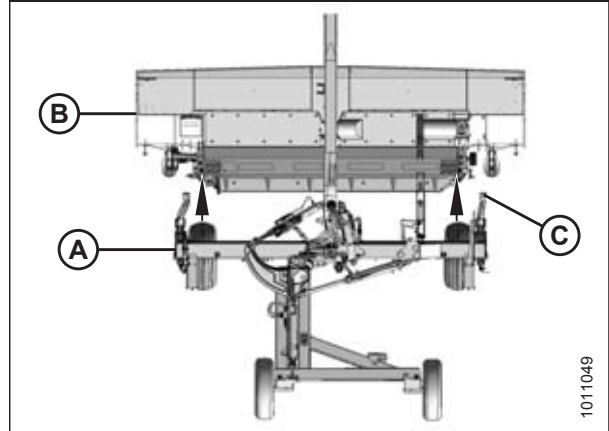


Figure 4.330: Carrier Aligned with Header

3. Inspect carrier leg (A) for excess gap between 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 side 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).

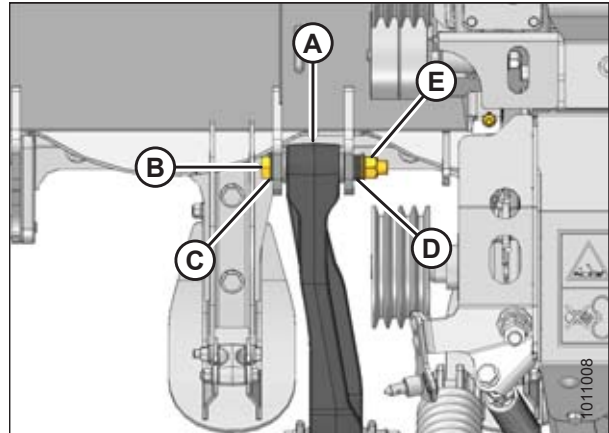


Figure 4.331: Left Leg

## MAINTENANCE AND SERVICING

7. Inspect carrier leg (A) for excess gap between inner steel sleeve of the bushing and the header brackets. If there is a gap, install washer (1.2 mm [0.047 in.] thick) to both sides of the carrier leg to minimize the gap.
8. Align right side carrier leg (A) with 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).

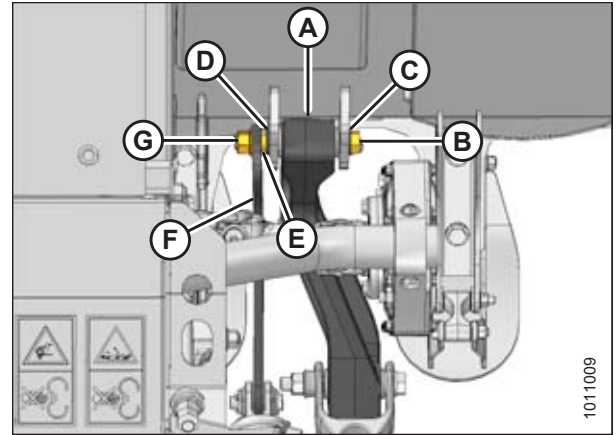


Figure 4.332: Right Leg

11. Undo strapping or wire supporting driveline to hitch (D), and connect driveline (E) to header swivel gearbox. Refer to [Installing Clutch Driveline, page 237](#).
12. Remove hex head bolts (A) and spacers (B) from gearbox.
13. Undo strapping or wire supporting steering arm to hitch, and position steering arm weldment (C) on gearbox.
14. Secure steering arm to gearbox with spacers (B) and hex head bolts (A). Apply high-strength threadlocker (Loctite® 262 or equivalent) to front holes and torque bolts to 203 Nm (150 lbf·ft).

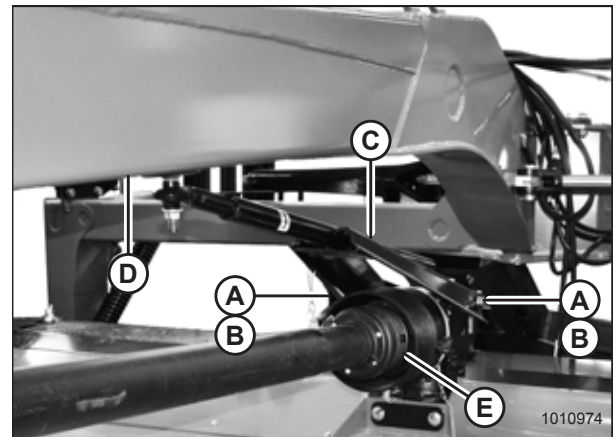


Figure 4.333: Aft Driveline and Steering Arm

15. Undo strapping or wire securing center-link (B) and indicator (D) to carrier frame.
16. Remove pins and hardware from anchor (C).
17. Attach center-link (B) and indicator (D) to anchor (C) with clevis pin (A) and secure with cotter pin.

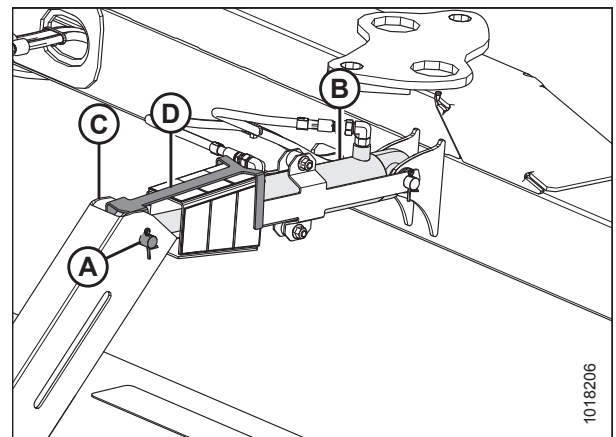


Figure 4.334: Center-Link and Indicator Links

## MAINTENANCE AND SERVICING

### NOTE:

Ensure proper pulley configuration installation—large pulley installed onto gearbox for both roll and finger conditioners.

18. Install conditioner drive belts (A) onto pulleys.
19. Check that tensioner spring is installed at correct location:
  - Hole (D) for roll conditioner
  - Hole (E) for finger conditioner
20. Tighten idler tensioner nut (C) until spring length (B) measures 366 mm (14-3/8 in.).
21. Tighten jam nut.
22. Replace the driveshields. Refer to [3.2.2 Closing Driveshields, page 37](#).
23. If Road Friendly Transport™ system is installed, reconnect electrical harness (A) to lights (B) and secure harness to shielding using existing clips (C) and (D).
24. Secure harness to light bracket with cable ties (E).

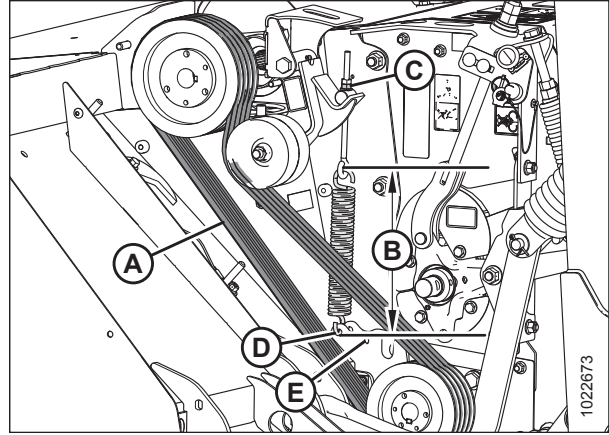


Figure 4.335: Conditioner Drive

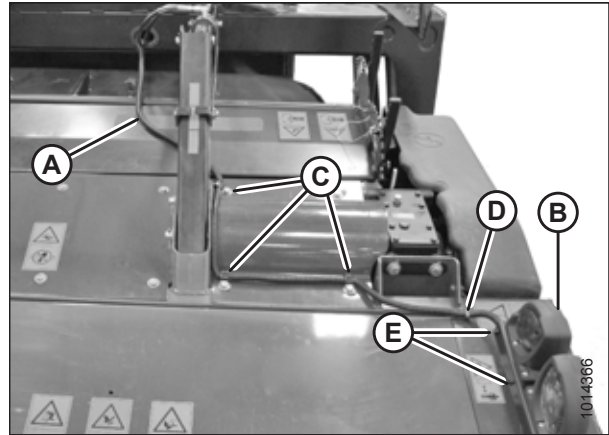


Figure 4.336: Electrical Harness

25. Tighten the four M10 hex head bolts (A) and flat washers. Torque to 27–30 Nm (20–22 lbf·ft).
26. Check float settings. Refer to [Adjusting Disc Mower Float, page 89](#) for float adjustment instructions.

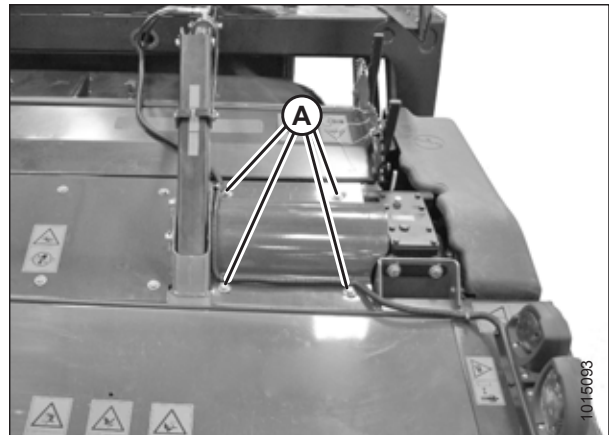


Figure 4.337: Electrical Harness

## 4.9 Replacing Shield (No Conditioner)

### 4.9.1 Removing Discharge Shield (No Conditioner)

Follow these steps to remove the shielding installed on a mower configured without a conditioner:

1. Raise the mower fully and extend the center-link to maximize the space between shield (A) and adapter frame (B).

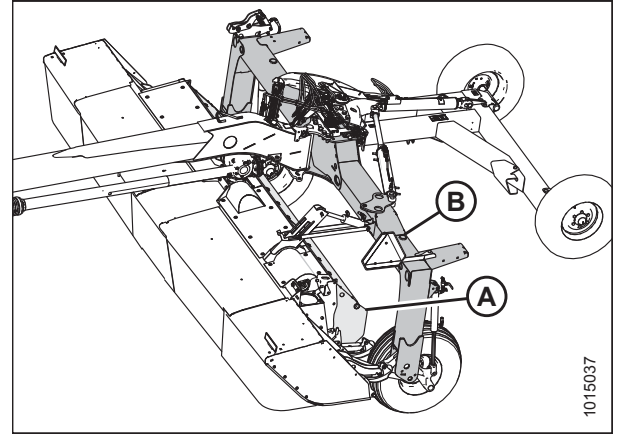


Figure 4.338: Mower with Transport

2. Close lift cylinder lock-out valves (A) on both sides of the mower. Valve handles should be in the closed position (90 degree angle to the hose).

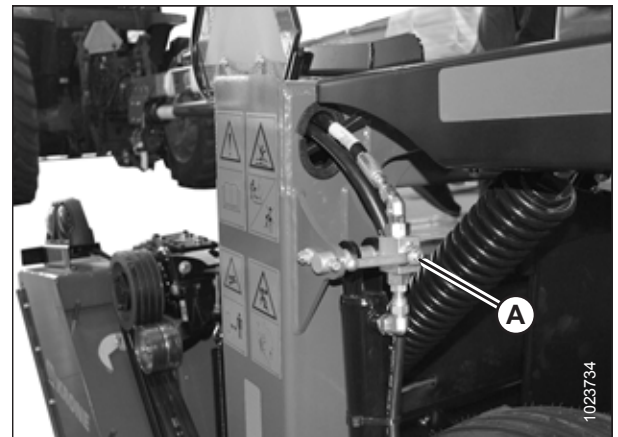


Figure 4.339: Lift Cylinder Lock-Out Valves

3. Remove four M16 hex head bolts (A), nuts, and flat washers securing shield (B) to panel on mower (C).

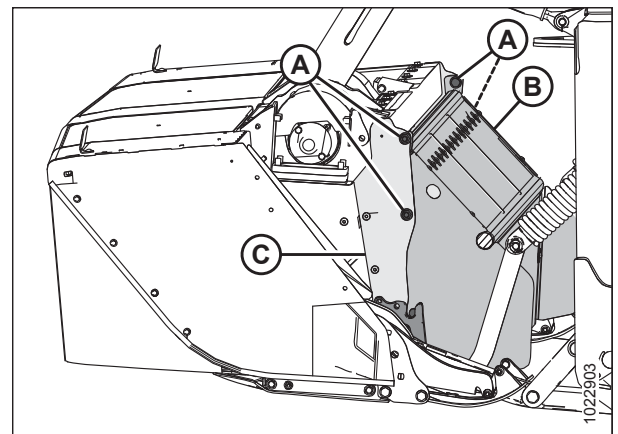


Figure 4.340: Header Side View

## MAINTENANCE AND SERVICING

4. Lift the shield (A) until pins (B) disengage from slots in support (C) and shield on panel (D).

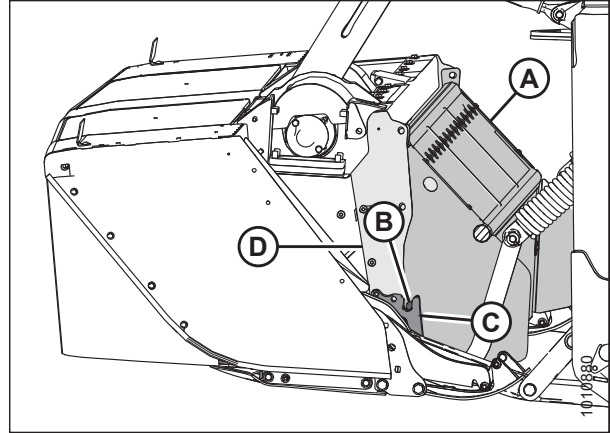


Figure 4.341: Header Side View

5. Rotate shield (A) 90 degrees and move it away from the adapter frame.

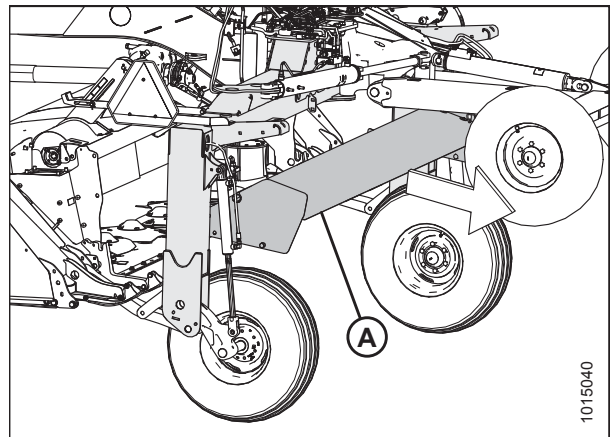


Figure 4.342: Shield Rotated

### 4.9.2 Installing Discharge Shield (No Conditioner)

Follow these steps to install the shielding on a disc mower configured without a conditioner:

1. Raise the mower fully and extend the center-link to maximize the space between field wheels (A) and adapter frame (B).

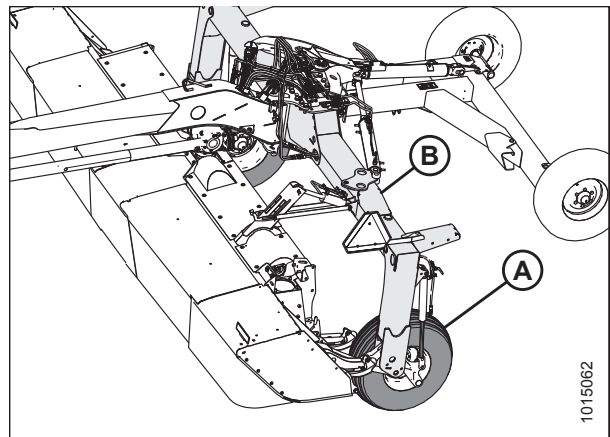
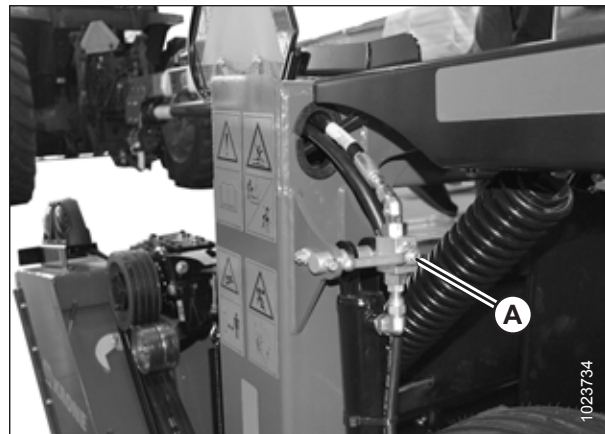


Figure 4.343: Disc Mower with Transport

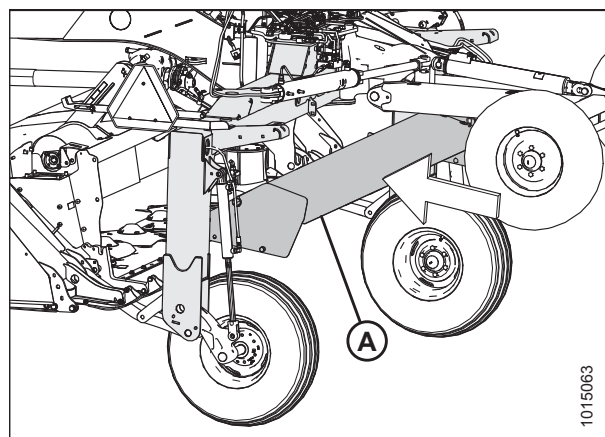
## MAINTENANCE AND SERVICING

2. Close lift cylinder lock-out valves (A) on both sides of the mower. Valve handles should be in the closed position (90 degree angle to the hose).



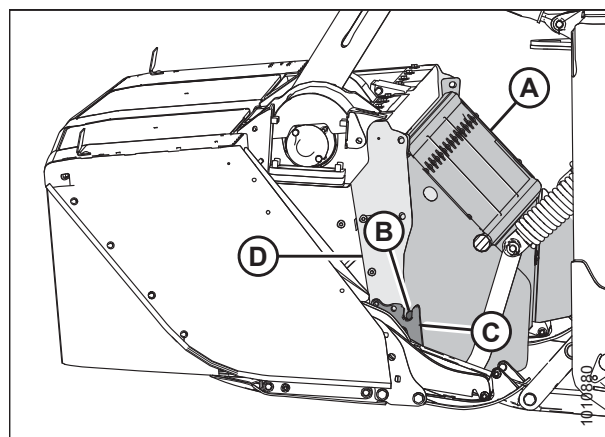
**Figure 4.344: Lift Cylinder Lock-Out Valves**

3. Rotate shield (A) and pass it between the field wheels and the adapter frame toward the mower.



**Figure 4.345: Shield Rotated**

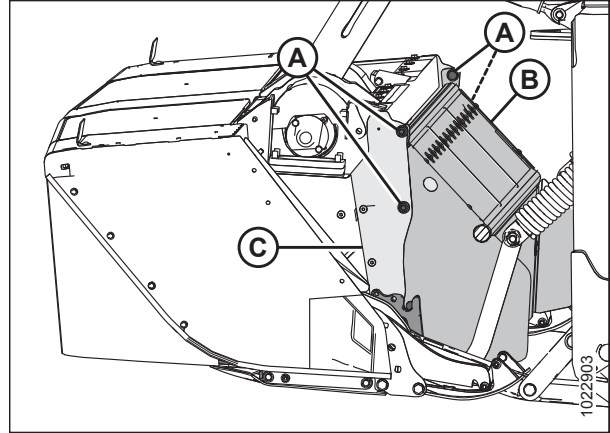
4. Position shield (A) so that pins (B) engage the slots in cutterbar support (C) and the bolt holes align with panel (D).



**Figure 4.346: Left Side of Header (Right Opposite)**

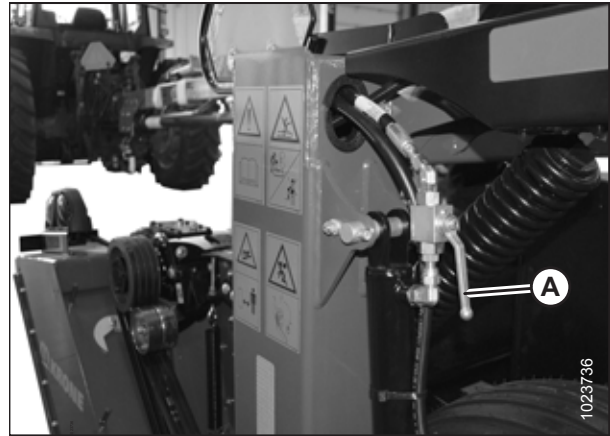
## MAINTENANCE AND SERVICING

5. Install four M16 hex head bolts (A), nuts, and flat washers to secure shield (B) to the panel (C). Ensure bolt heads face inboard.



**Figure 4.347: Left Side of Header (Right Opposite)**

6. Open lift cylinder lock-out valves (A) on both sides of the mower. Valve handles should be in the open position (inline with the hose).



**Figure 4.348: Lift Cylinder Lock-Out Valves**

## 5 Options and Attachments

### 5.1 Optional Kits

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 disc mower for clean crop dividing and cutterbar entry in tall crops. The kit includes left and right dividers and attachment hardware.

MD #B5800

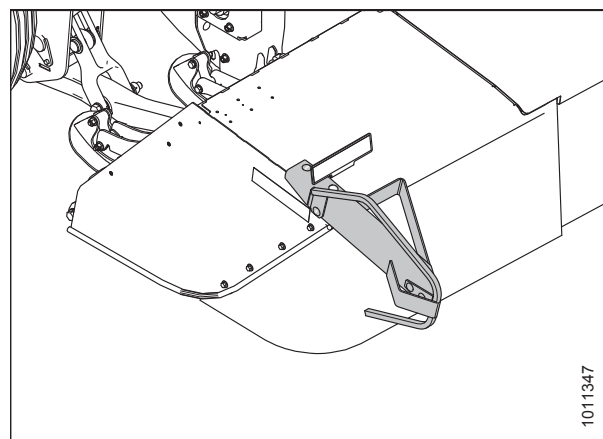


Figure 5.1: Right Side Tall Crop Divider

#### 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 disc mower angle. The kit includes installation instructions.

MD #B5810

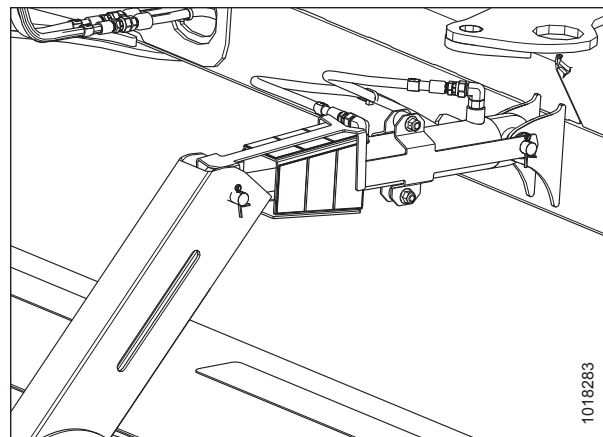


Figure 5.2: Hydraulic Center-Link

### 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 Pull-Type Disc Mowers. 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 1-3/8 in. tractor 1000 RPM PTO Extended Length

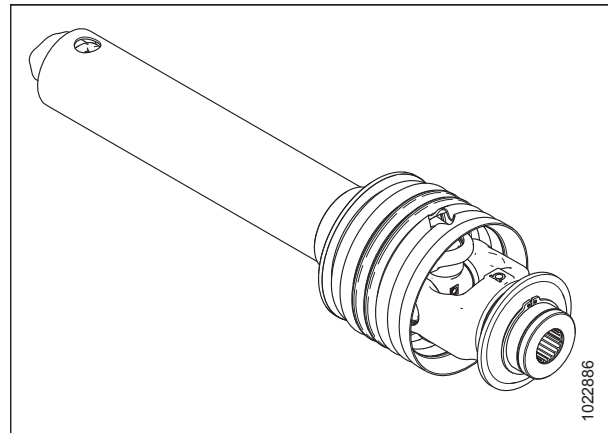


Figure 5.3: Driveline (B6390 Shown, B6391 Similar)

### 5.1.4 Tractor Utility Hitch Adapter

The Tractor Utility Hitch Adapter allows the disc mower to connect to a tractor drawbar regardless of installed hit option (Tractor Two-Point Hitch Adapter or Tractor Drawbar Hitch Adapter). The kit includes the transport hitch, attachment hardware, and safety chain.

MD #B5802

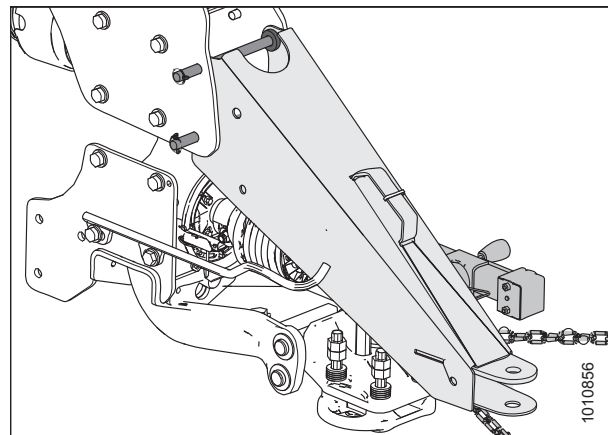


Figure 5.4: Tractor Utility Hitch Adapter

### 5.1.5 Road Friendly Transport™ System

The Road Friendly Transport™ system allows the disc mower 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.

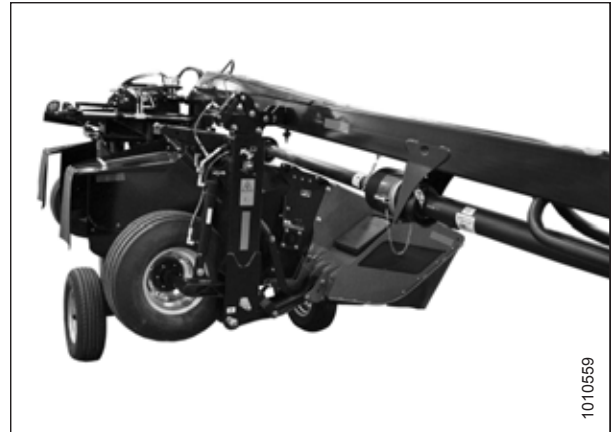


Figure 5.5: Road Friendly Transport™ System



## 6 Troubleshooting

## 6.1 Troubleshooting Mower Performance

Symptom	Problem	Solution	Refer to
Cutterbar plugging	Dull, bent, or badly worn blades	Replace blades.	<a href="#">4.4.7 Replacing Discblades, page 170</a>
Cutterbar plugging	Build-up of dirt between rock guards	Decrease disc mower angle and increase flotation. In some conditions, it may be necessary to carry disc mower slightly with lower skid shoes.	<a href="#">3.15.2 Cutting Height, page 90</a>
Cutterbar plugging	Conditioner drive belt slipping	Adjust conditioner drive belt tension.	<a href="#">4.5.10 Replacing Conditioner Drive Belt, page 253</a>
Ragged or uneven cutting of crop	Disc mower flotation too light, causing bouncing	Adjust to heavier float setting.	<a href="#">3.15.1 Float, page 88</a>
Ragged or uneven cutting of crop	Ground speed too slow	Increase ground speed.	<a href="#">3.15.4 Ground Speed, page 94</a>
Ragged or uneven cutting of crop	Downed crop	Adjust disc mower angle or install blade-lowering kit on disc mower to cut closer to ground.	<a href="#">3.15.3 Cutterbar Angle, page 92</a>
Strips of uncut crop left on field	Bent or dull discblades	Replace blades.	<a href="#">4.4.7 Replacing Discblades, page 170</a>
Strips of uncut crop left on field	Build-up of dirt between rock guards	Decrease disc mower angle and increase flotation.	<a href="#">3.15.3 Cutterbar Angle, page 92</a>
Strips of uncut crop left on field	Build-up of dirt between rock guards	Decrease disc mower angle and increase flotation.	<a href="#">3.15.1 Float, page 88</a>
Strips of uncut crop left on field	Ground speed too slow	Increase ground speed.	<a href="#">3.15.4 Ground Speed, page 94</a>
Strips of uncut crop left on field	Foreign object on cutterbar	Disengage disc mower and stop engine. When all moving parts have completely stopped, remove foreign object.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>
Conditioner rolls plugging	Ground speed too fast	Reduce ground speed.	<a href="#">3.15.4 Ground Speed, page 94</a>
Conditioner rolls plugging	Roll gap too large for proper feeding	Decrease roll gap.	<a href="#">3.16.1 Roll Gap, page 99</a>
Conditioner rolls plugging	Roll gap too small in thick-stemmed cane-type crops	Increase roll gap.	<a href="#">3.16.1 Roll Gap, page 99</a>
Conditioner rolls plugging	Baffle set too low	Raise baffle.	<a href="#">3.17.1 Internal Intensity Baffle, page 109</a>

## TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Conditioner rolls plugging	Foreign object between rolls	Disengage disc mower and stop engine. When all moving parts have completely stopped, remove foreign object.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>
Conditioner rolls plugging	Cutting height too low	Decrease disc mower angle to raise cutting height.	<a href="#">3.15.3 Cutterbar Angle, page 92</a>
Conditioner rolls plugging	Backing into windrow	Raise disc mower before backing up.	<a href="#">3.11 Raising and Lowering Disc Mower, page 64</a>
Conditioner rolls plugging	Rolls improperly timed	Adjust roll timing.	<a href="#">3.16.3 Roll Timing, page 104</a>
Uneven formation and bunching of windrow	Rear deflector bypassing or dragging crop	Adjust rear deflector for proper crop control.	<a href="#">3.15.5 Cutterbar Deflectors, page 95</a>
Uneven formation and bunching of windrow	Forming shields improperly adjusted	Adjust forming shields.	<ul style="list-style-type: none"> <li>• <a href="#">3.16.4 Adjusting Forming Shields: Roll Conditioner, page 107</a></li> <li>• <a href="#">3.17.3 Forming Shields: Finger Conditioner, page 113</a></li> </ul>
Uneven formation and bunching of windrow	Roll gap too large	Adjust roll gap.	<a href="#">3.16.1 Roll Gap, page 99</a>
Cutting height varies from one side to the other	Float not properly balanced	Adjust disc mower float.	<a href="#">3.15.1 Float, page 88</a>
Not cutting short enough in down crop	Broken, bent, or dull blades	Replace blades, or turn blades over.	<a href="#">4.4.7 Replacing Discblades, page 170</a>
Not cutting short enough in down crop	Ground speed too fast	Reduce ground speed.	<a href="#">3.15.4 Ground Speed, page 94</a>
Not cutting short enough in down crop	Cutting height too high	Adjust to steeper disc mower angle in order to lower cutting height if field conditions allow.	<a href="#">3.15.3 Cutterbar Angle, page 92</a>
Material being pulled out by roots when cutting, tall crop leaning into machine	Crop in conditioner rolls before crop is cut	Increase roll gap.	<a href="#">3.16.1 Roll Gap, page 99</a>
Damaged leaves and broken stems	Insufficient roll gap	Adjust roll spacing.	<a href="#">3.16.1 Roll Gap, page 99</a>
Damaged leaves and broken stems	Roll timing off	Check roll timing and adjust if necessary.	<a href="#">3.16.3 Roll Timing, page 104</a>
Slow crop drying	Rolls not crimping crop sufficiently	Decrease roll gap.	<a href="#">3.16.1 Roll Gap, page 99</a>

## TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Slow crop drying	Crop is bunched in windrow	Adjust forming shields/baffle.	<ul style="list-style-type: none"> <li>• <a href="#">3.16.4 Adjusting Forming Shields: Roll Conditioner, page 107</a></li> <li>• <a href="#">3.17.3 Forming Shields: Finger Conditioner, page 113</a></li> <li>• <a href="#">3.17.1 Internal Intensity Baffle, page 109</a></li> </ul>
Excessive drying or bleaching of crop	Excessive crimping	Increase roll gap.	<a href="#">3.16.1 Roll Gap, page 99</a>
Excessive drying or bleaching of crop	Crop is spread too wide in windrow	Adjust forming shields.	<ul style="list-style-type: none"> <li>• <a href="#">3.16.4 Adjusting Forming Shields: Roll Conditioner, page 107</a></li> <li>• <a href="#">3.17.3 Forming Shields: Finger Conditioner, page 113</a></li> </ul>
Plugging behind end drums	Ground speed too slow	Increase ground speed.	<a href="#">3.15.4 Ground Speed, page 94</a>
Bunching or poorly formed windrows	Forming shields not properly adjusted	Adjust forming shields.	<ul style="list-style-type: none"> <li>• <a href="#">3.16.4 Adjusting Forming Shields: Roll Conditioner, page 107</a></li> <li>• <a href="#">3.17.3 Forming Shields: Finger Conditioner, page 113</a></li> </ul>
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"> <li>• <a href="#">3.17.1 Internal Intensity Baffle, page 109</a></li> <li>• <a href="#">3.17.2 Finger Rotor Speed, page 110</a></li> </ul>

## 6.2 Troubleshooting Mechanical Issues

Symptom	Problem	Solution	Refer to
Excessive noise	Bent discblade	Replace blade.	<a href="#">4.4.7 Replacing Discblades, page 170</a>
Excessive noise	Conditioner roll timing off	Check roll timing, and adjust if necessary.	<a href="#">3.16.3 Roll Timing, page 104</a>
Excessive noise	Conditioner roll gap too small	Check roll gap, and adjust if necessary.	<a href="#">3.16.1 Roll Gap, page 99</a>
Excessive vibration or noise in disc mower	Mud deposits on conditioner rolls	Clean rolls.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>
Excessive vibration or noise in disc mower	Conditioner rolls contacting each other	Increase roll gap.	<a href="#">3.16.1 Roll Gap, page 99</a>
Excessive vibration or noise in disc mower	Conditioner rolls contacting each other	Check roll timing.	<a href="#">3.16.3 Roll Timing, page 104</a>
Excessive heat in cutterbar	Too much oil in cutterbar	Drain oil, and refill with specified amount.	<a href="#">4.4.3 Lubricating Cutterbar, page 151</a>
Frequent blade damage	Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>
Frequent blade damage	Material wrapped around spindle	Remove disc and remove material.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>
Frequent blade damage	Cutting too low in rocky field conditions	Decrease disc mower angle.	<a href="#">3.15.3 Cutterbar Angle, page 92</a>
Frequent blade damage	Cutting too low in rocky field conditions	Increase flotation.	<a href="#">3.15.1 Float, page 88</a>
Frequent blade damage	Disc mower float set too heavy	Increase flotation.	<a href="#">3.15.1 Float, page 88</a>
Frequent blade damage	Ground speed too high in rocky field conditions. At high ground speed, disc mower tends to dig rocks from ground instead of floating over them.	Reduce ground speed.	<a href="#">3.15.4 Ground Speed, page 94</a>
Frequent blade damage	Blade incorrectly mounted	Check all blade mounting hardware, and ensure blades move freely.	<a href="#">4.4.7 Replacing Discblades, page 170</a>
Excessive wear of cutting components	Disc mower angle too steep	Reduce disc mower angle.	<a href="#">3.15.3 Cutterbar Angle, page 92</a>
Excessive wear of cutting components	Crop residue and dirt deposits on cutterbar	Clean cutterbar.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>
Excessive wear of cutting components	Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>

## TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Breakage of conditioner drive belt	Improper belt tension	Adjust conditioner drive belt tension.	<a href="#">4.5.10 Replacing Conditioner Drive Belt, page 253</a>
Breakage of conditioner drive belt	Belt not in proper groove in pulley	Move belt to proper groove.	<a href="#">4.5.10 Replacing Conditioner Drive Belt, page 253</a>
Breakage of conditioner drive belt	Foreign object between rolls	Disengage disc mower and stop engine. When all moving parts have completely stopped, remove foreign object.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>
Breakage of conditioner drive belt	Belt pulleys and idlers misaligned	Align pulleys and idler.	<a href="#">4.5.10 Replacing Conditioner Drive Belt, page 253</a>
Machine pulling to one side	Disc mower dragging on one end and pulling to that side	Adjust disc mower flotation on both ends.	<a href="#">3.15.1 Float, page 88</a>
Machine pulling to one side	Low tire pressure on one side	Check and correct tire pressure (207 kPa [30 psi]).	<a href="#">4.5.14 Wheels and Tires, page 269</a>
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.	<a href="#">3.20 Unplugging the Disc Mower, page 118</a>
Disc does not start when engaging power take-off (PTO)	Primary driveline not connected	Connect driveline.	<a href="#">4.5.4 Primary Driveline, page 223</a>
Road Friendly 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 remote control box are secure. If necessary, replace the fuse in the control box.	Contact your Dealer

## 7 Reference

### 7.1 Torque Specifications

The following tables provide correct 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 of bolt.
- 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***

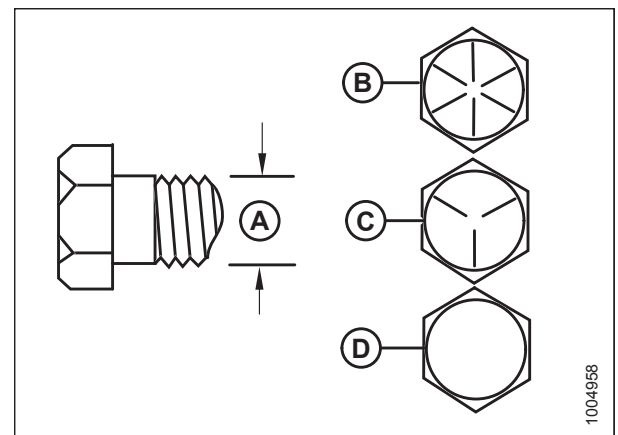
Standard torque is to be used (**NOT** to be used on critical or structurally important joints).

#### 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

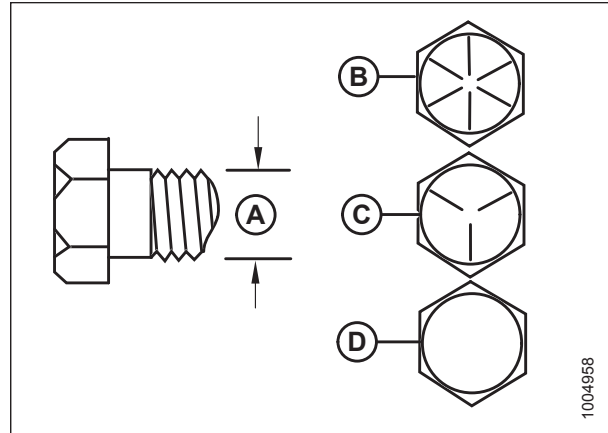
## REFERENCE

**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

**Table 7.3 SAE Grade 8 Bolt and Grade G Distorted Thread Nut**

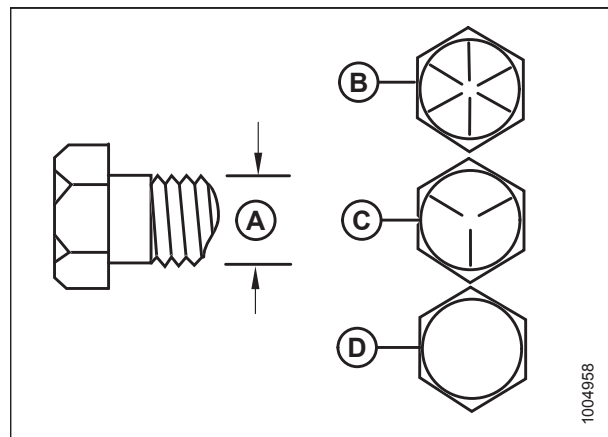
Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
1/4-20	16.8	18.6	*150	*165
5/16-18	24	26	18	19
3/8-16	42	46	31	34
7/16-14	67	74	50	55
1/2-13	102	113	76	84
9/16-12	148	163	109	121
5/8-11	204	225	151	167
3/4-10	362	400	268	296
7/8-9	583	644	432	477
1-8	874	966	647	716



**Figure 7.2: Bolt Grades**

A - Nominal Size  
C - SAE-5

B - SAE-8  
D - SAE-2



**Figure 7.3: Bolt Grades**

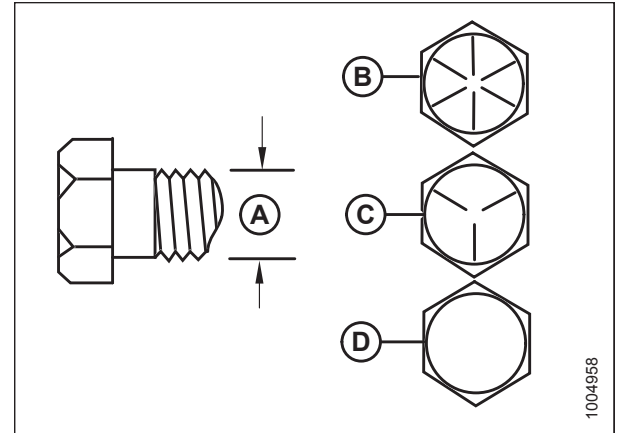
A - Nominal Size  
C - SAE-5

B - SAE-8  
D - SAE-2

## REFERENCE

**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**

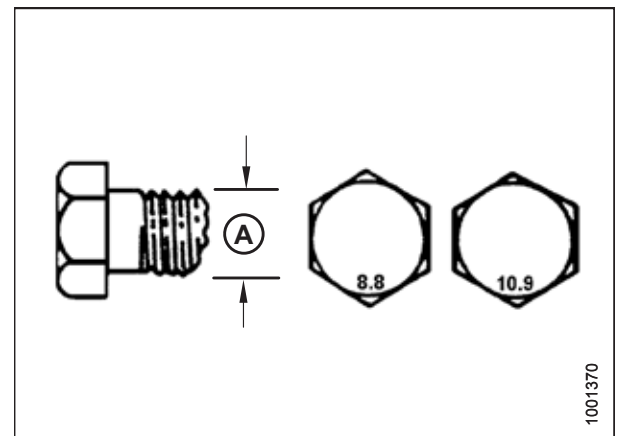
A - Nominal Size  
C - SAE-5

B - SAE-8  
D - SAE-2

## 7.1.2 Metric Bolt Specifications

**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

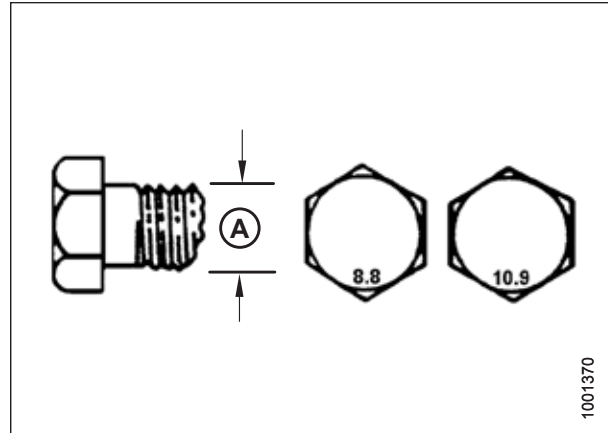


**Figure 7.5: Bolt Grades**

## REFERENCE

**Table 7.6 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut**

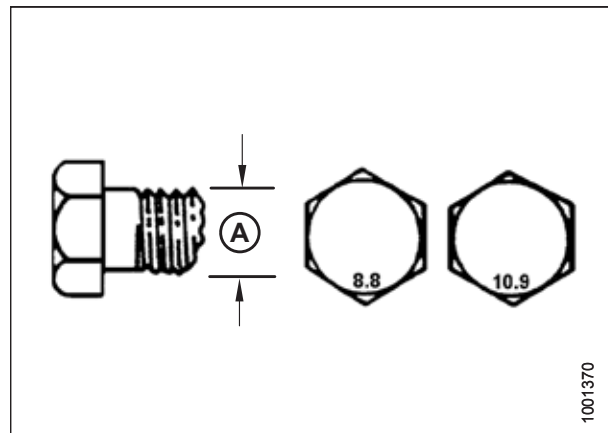
Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1	1.1	*9	*10
3.5-0.6	1.5	1.7	*14	*15
4-0.7	2.3	2.5	*20	*22
5-0.8	4.5	5	*40	*45
6-1.0	7.7	8.6	*69	*76
8-1.25	18.8	20.8	*167	*185
10-1.5	37	41	28	30
12-1.75	65	72	48	53
14-2.0	104	115	77	85
16-2.0	161	178	119	132
20-2.5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



**Figure 7.6: Bolt Grades**

**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

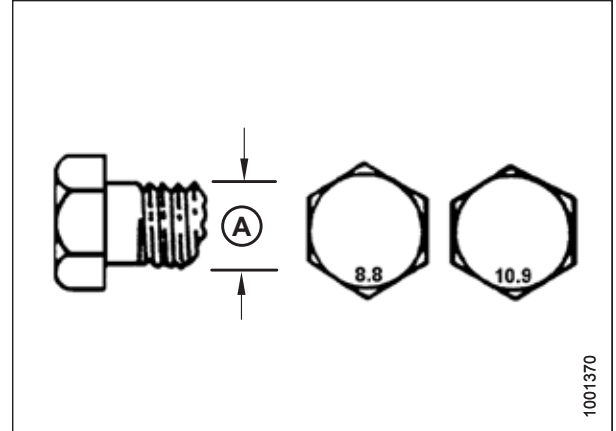


**Figure 7.7: Bolt Grades**

## REFERENCE

**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

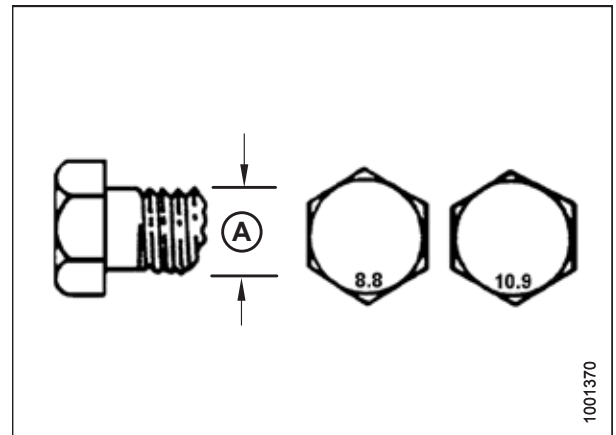


**Figure 7.8: Bolt Grades**

### 7.1.3 Metric Bolt Specifications Bolting into Cast Aluminum

**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 312.
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.

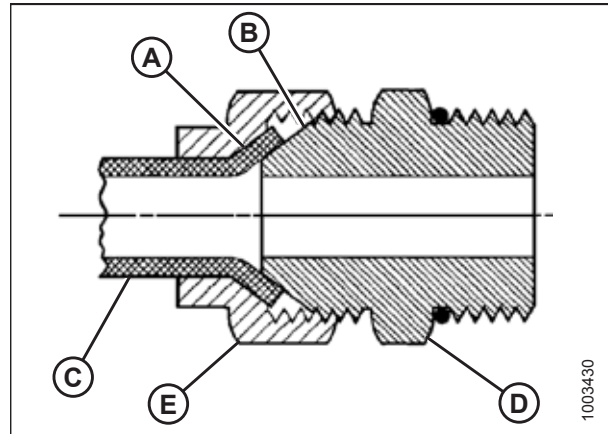


Figure 7.10: Hydraulic Fitting

Table 7.10 Flare-Type Hydraulic Tube Fittings

SAE Dash Size	Thread Size (in.)	Torque Value <sup>14</sup>		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
-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

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

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

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).

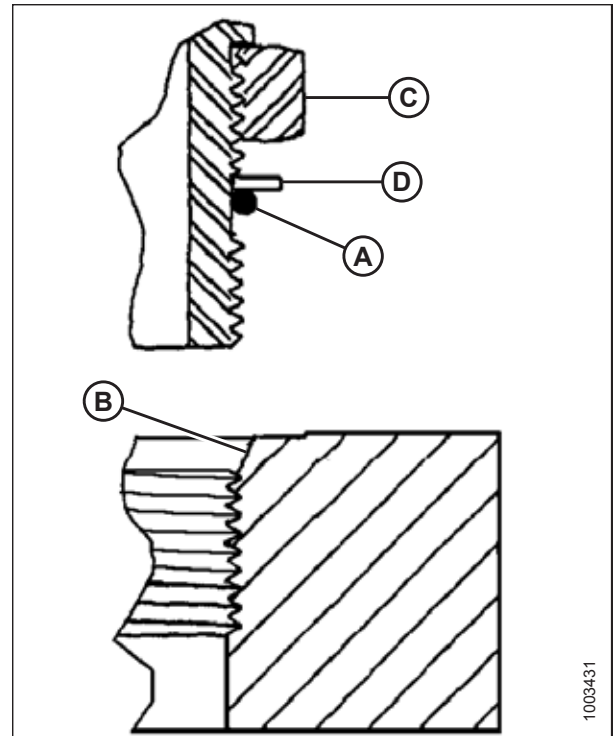


Figure 7.11: Hydraulic Fitting

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

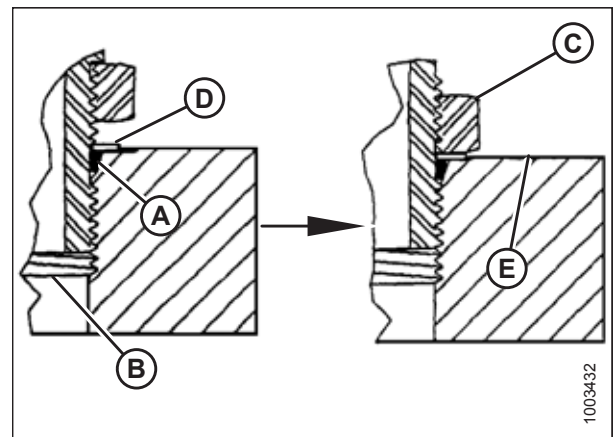


Figure 7.12: Hydraulic Fitting

## REFERENCE

**Table 7.11 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)**

SAE Dash Size	Thread Size (in.)	Torque Value <sup>15</sup>	
		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

---

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

## REFERENCE

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

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on threads and adjust if necessary.
3. Apply hydraulic system oil to O-ring.
4. Install fitting (C) into port until fitting is hand-tight.
5. Torque fitting (C) according to values in Table 7.12, page 315.
6. Check final condition of fitting.

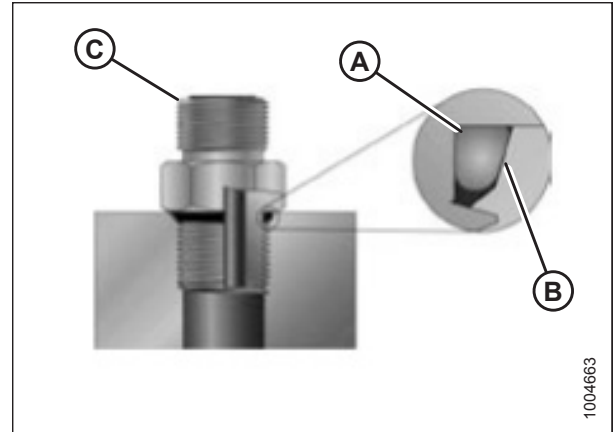


Figure 7.13: Hydraulic Fitting

Table 7.12 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value <sup>16</sup>	
		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.

## 7.1.7 O-Ring Face Seal (ORFS) Hydraulic Fittings

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



Figure 7.14: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to values in Table 7.13, page 316.

**NOTE:**

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

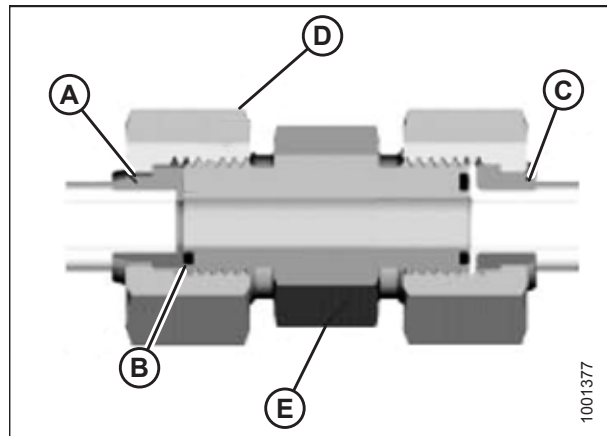


Figure 7.15: Hydraulic Fitting

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

**Table 7.13 O-Ring Face Seal (ORFS) Hydraulic Fittings**

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>17</sup>	
			Nm	lbf·ft
-3	Note <sup>18</sup>	3/16	—	—
-4	9/16	1/4	25–28	18–21
-5	Note <sup>18</sup>	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

17. Torque values and angles shown are based on lubricated connection as in reassembly.

18. 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 <sup>19</sup>	
			Nm	lbf·ft
-14	Note <sup>18</sup>	7/8	—	—
-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

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks and scratches, or any form of contamination.
2. Apply pipe thread sealant (paste type) to external pipe threads.
3. Thread fitting into port until hand-tight.
4. Torque connector to appropriate torque angle. The Turns From Finger Tight (T.F.F.T.) values are shown in Table 7.14, page 317. Make sure that tube end of a shaped connector (typically 45° or 90°) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check 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 T.F.F.T.	Recommended F.F.F.T.
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

19. Torque values and angles shown are based on lubricated connection as in reassembly.

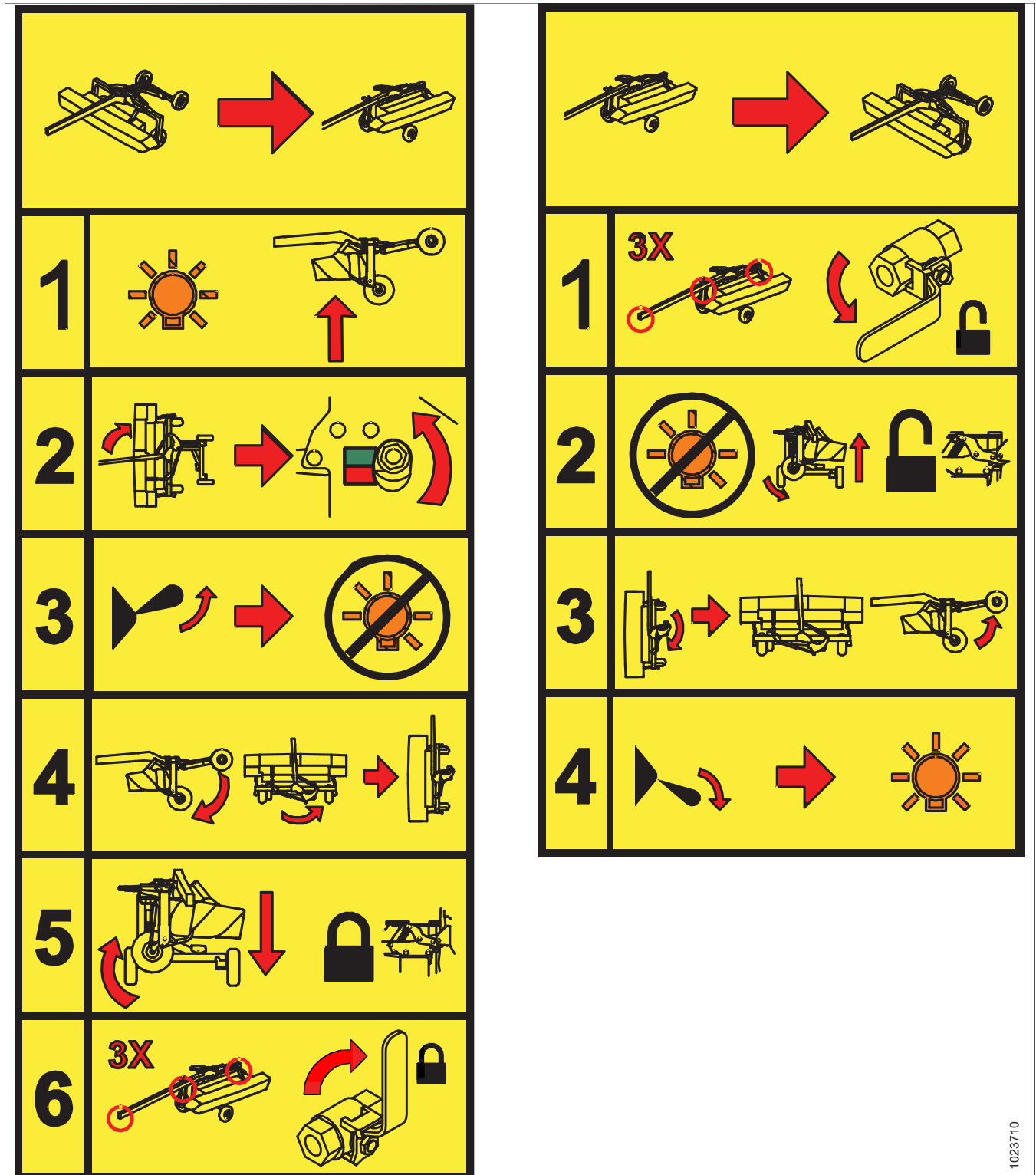
## 7.2 Conversion Chart

Table 7.15 Conversion Chart

Quantity	SI Units (Metric)		Factor	US Customary Units (Standard)	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectare	ha	$\times 2.4710 =$	acre	acres
Flow	liters per minute	L/min	$\times 0.2642 =$	US gallons per minute	gpm
Force	Newton	N	$\times 0.2248 =$	pound force	lbf
Length	millimeter	mm	$\times 0.0394 =$	inch	in.
Length	meter	m	$\times 3.2808 =$	foot	ft.
Power	kilowatt	kW	$\times 1.341 =$	horsepower	hp
Pressure	kilopascal	kPa	$\times 0.145 =$	pounds per square inch	psi
Pressure	megapascal	MPa	$\times 145.038 =$	pounds per square inch	psi
Pressure	bar (Non-SI)	bar	$\times 14.5038 =$	pounds per square inch	psi
Torque	Newton meter	Nm	$\times 0.7376 =$	pound feet or foot pounds	lbf·ft
Torque	Newton meter	Nm	$\times 8.8507 =$	pound inches or inch pounds	lbf·in
Temperature	degrees Celsius	°C	$(^{\circ}\text{C} \times 1.8) + 32 =$	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	$\times 3.2808 =$	feet per minute	ft/min
Velocity	meters per second	m/s	$\times 3.2808 =$	feet per second	ft/s
Velocity	kilometers per hour	km/h	$\times 0.6214 =$	miles per hour	mph
Volume	liter	L	$\times 0.2642 =$	US gallon	US gal
Volume	milliliter	ml	$\times 0.0338 =$	ounce	oz.
Volume	cubic centimeter	cm <sup>3</sup> or cc	$\times 0.061 =$	cubic inch	in. <sup>3</sup>
Weight	kilogram	kg	$\times 2.2046 =$	pound	lb.

## 7.3 Converting Road Friendly Transport™ Decal

Figure 7.16: Converting Road Friendly Transport™ Decal



1023710



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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**

Lubricant	Specification	Description	Use	Capacities
<b>Grease</b>	SAE Multipurpose	High temperature, extreme pressure (EP) performance with 1% max. molybdenum disulphide (NLGI Grade 2) lithium base	As required unless otherwise specified	—
<b>Grease</b>	SAE Multipurpose	High temperature, extreme pressure (EP) performance with 10% max. molybdenum disulphide (NLGI Grade 2) lithium base	Driveline slip-joints	—
<b>Gear Lubricant</b>	SAE 80W-90	High thermal and oxidation stability API service class GL-5	Cutterbar	4.0 m (13 ft.): 8 liters (8.5 qts [US])
<b>Gear Lubricant</b>	SAE 80W-90	High thermal and oxidation stability API service class GL-5	Cutterbar	4.9 m (16 ft.): 10 liters (10.5 qts [US])
<b>Gear Lubricant</b>	SAE 85W-140	Gear lubricant API service class GL-5	Conditioner roll timing gearbox	0.7 liters (0.75 qts [US])
<b>Gear Lubricant</b>	SAE 85W-140	Gear lubricant API service class GL-5	Disc mower roll timing gearbox	1.8 liters (1.9 qts [US])
<b>Gear Lubricant</b>	SAE 85W-140	Gear lubricant API service class GL-5	Hitch (front) swivel gearbox	Upper: 1.2 liters (1.3 qts [US]) Lower: 1.7 liters (1.8 qts [US])
<b>Gear Lubricant</b>	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 liters (1.8 qts [US])



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