

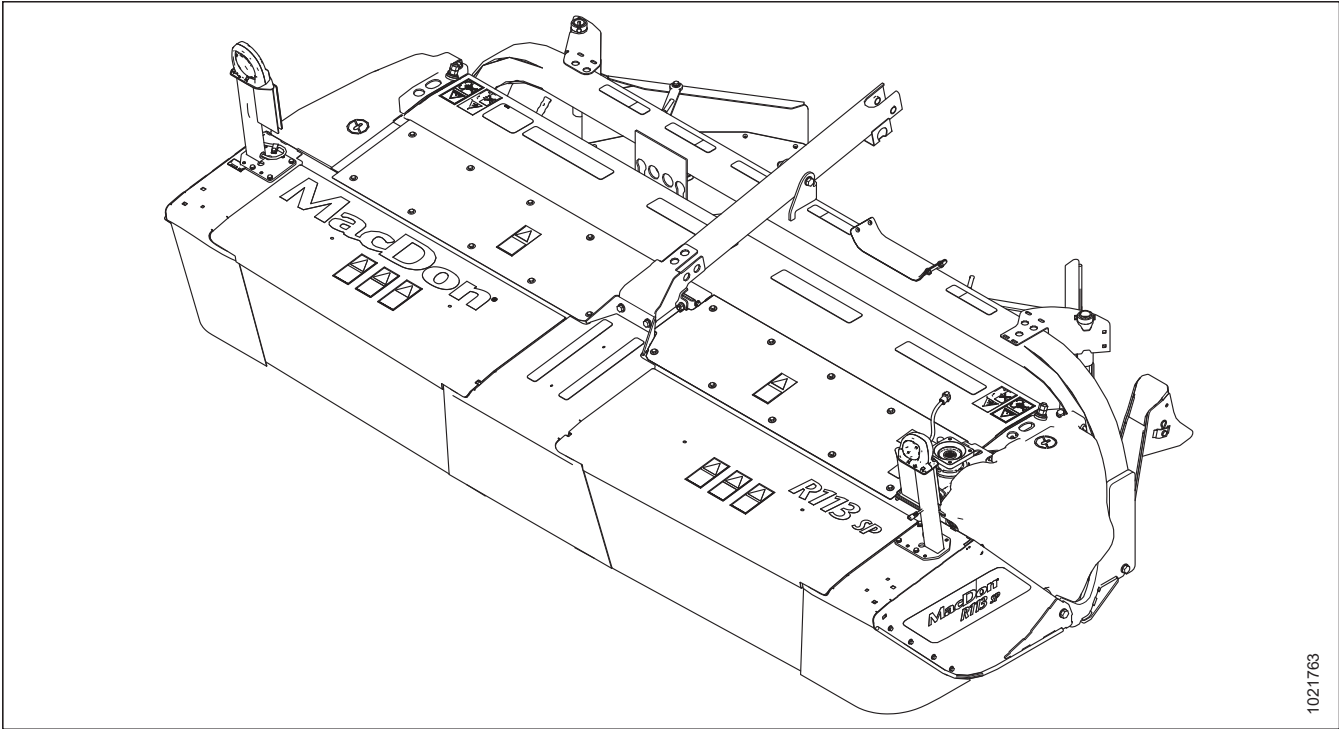
# **R1 Series Rotary Disc Header**

Operator's Manual

215367 Revision A

Original Instruction

## R113 Rotary Disc Header



Published June 2020.

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### Noise Levels

The A-weighted sound pressure level inside the operator's station of a typical self-propelled vehicle (e.g., M1170), when operated in conjunction with this R1 Series Rotary Disc Header, is **70 dBA**. This measurement was taken in accordance with ISO 5131. The sound pressure level depends upon the rotary disc speed, crop conditions, as well the exact type of self-propelled vehicle used to power the R1 Series Rotary Disc Header.



# Declaration of Conformity



## EC Declaration of Conformity

[1] **MacDon**

MacDon Industries Ltd.  
680 Moray Street,  
Winnipeg, Manitoba, Canada  
R3J 3S3

[4] As per Shipping Document

[5] June 8, 2020

[2] Rotary Disc Header

[3] MacDon R1 Series

[6] \_\_\_\_\_

Christoph Martens  
Product Integrity

EN	BG	CZ	DA
<p>We, [1] Declare, that the product: Machine Type: [2] Name &amp; 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</p>	<p>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 Рийдезел Управител, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Германия) bvonriedesel@macdon.com</p>	<p>My, [1] Prohlášíjeme, že produkt: Typ zařízení: [2] Název a model: [3] Sériové(á) číslo(a): [4] splňuje všechna relevantní ustanovení směrnice 2006/42/EC. Byly použity harmonizované standardy, jak je uvedeno v článku 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Místo a datum prohlášení: [5] Identita a podpis osoby oprávněné k vydání prohlášení: [6] Jméno a adresa osoby oprávněné k vyplnění technického souboru: Benedikt von Riedesel generální ředitel, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Německo) bvonriedesel@macdon.com</p>	<p>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</p>
<p>Wir, [1] Erklären hiermit, dass das Produkt: Maschinentyp: [2] Name &amp; 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 befugt ist, die technischen Unterlagen zu erstellen: Benedikt von Riedesel General Manager, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden bvonriedesel@macdon.com</p>	<p>Nosotros [1] declaramos que el producto: Tipo de máquina: [2] Nombre y modelo: [3] Números de serie: [4] cumple con todas las disposiciones pertinentes de la directriz 2006/42/EC. Se utilizaron normas armonizadas, según lo dispuesto en el artículo 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Lugar y fecha de la declaración: [5] Identidad y firma de la persona facultada para draw redactar la declaración: [6] Nombre y dirección de la persona autorizada para elaborar el expediente técnico: Benedikt von Riedesel Gerente general - MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Alemania) bvonriedesel@macdon.com</p>	<p>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 allkiri: [6] Tehnilise dokumendi koostamiseks volitatud isiku nimi ja aadress: Benedikt von Riedesel Peadirektor, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Saksamaa) bvonriedesel@macdon.com</p>	<p>Nous soussignés, [1] Déclarons que le produit : Type de machine : [2] Nom et modèle : [3] Numéro(s) de série : [4] Est conforme à toutes les dispositions pertinentes de la directive 2006/42/EC. Utilisation des normes harmonisées, comme indiqué dans l'Article 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Lieu et date de la déclaration : [5] Identité et signature de la personne ayant reçu le pouvoir de rédiger cette déclaration : [6] Nom et adresse de la personne autorisée à constituer le dossier technique : Benedikt von Riedesel Directeur général, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Allemagne) bvonriedesel@macdon.com</p>

The Harvesting Specialists

MacDon

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## EC Declaration of Conformity

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

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## Introduction

This instructional manual contains safety, operating, and maintenance procedures for the MacDon R113 and R116 Rotary Disc Headers. The rotary disc header when attached to a MacDon Windrower, is designed to cut, condition, and lay a wide variety of grasses and hay crops in windrows. The following is a list of compatible windrowers.

Rotary Disc Header Model	Compatible Windrower Model
R113 SP	M155 Self-Propelled Windrower
	M155E4 Self-Propelled Windrower
	M205 Self-Propelled Windrower
	M1170 Windrower
	M1240 Windrower
R116 SP	M155 Self-Propelled Windrower
	M155E4 Self-Propelled Windrower
	M1170 Windrower

**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 rotary disc header 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

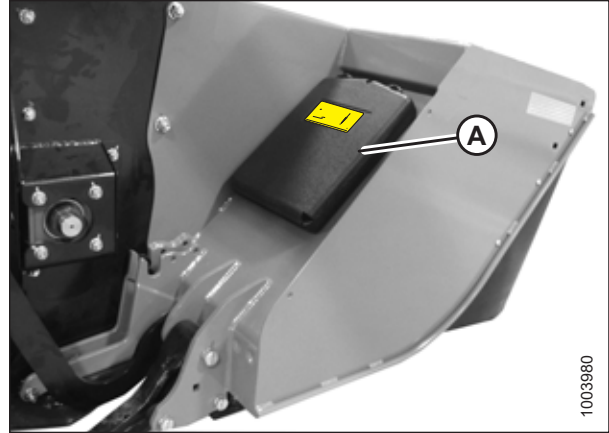
The following conventions are used in this document:

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

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

**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).

This document is currently available in Chinese, English, and Russian.



**Manual Storage Case**

## Summary of Changes

The following list provides an account of major changes from the previous version of this document.

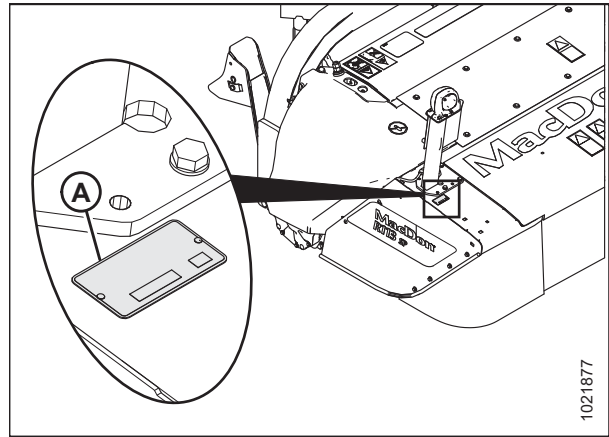
Section	Summary of Change	Internal Use Only
Throughout manual	Added R116 SP-specific content to book.	Tech Pubs
<i>Introduction, page iii</i>	Added compatibility chart.	Product Support
<i>Introduction, page iii</i>	Added M205 SP Windrower.	ECN 59429
<i>1.8 Locating Safety Decals, page 9</i>	Replaced image to show No Lift decal (MD #304865).	ECN 58722
<i>1.9 Understanding Safety Signs, page 11</i>	Added No Lift decal (MD #304865).	ECN 58722
<i>2.1 Specifications, page 15</i>	Added M205 SP Windrower to the list of windrowers compatible with the R113 SP.	ECN 59429
<i>3.4.4 Attaching Hydraulic and Electrical Components, page 42</i>	Added link to M205 SP Windrower procedure.	ECN 59429
<i>Connecting R113 Rotary Disc Header Hydraulics and Electrical – M205 Self-Propelled Windrower, page 52</i>	Added topic.	ECN 59429
<i>3.5.3 Detaching R113 SP from M205 Self-Propelled Windrower, page 70</i>	Added topic.	ECN 59429
<i>Disconnecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower with Quick Couplers, page 71</i>	Added topic.	ECN 59429
<i>Disconnecting R113 Rotary Disc Header Electrical – M205 Self-Propelled Windrower, page 73</i>	Added topic.	ECN 59429
<i>4.3.1 Maintenance Schedule/Record, page 108</i>	Added forming shield pivot grease zerk.	ECN 60028
<i>First 50 Hours, page 115</i>	Added topic.	Tech Pubs
<i>Every 100 Hours or Annually, page 116</i>	Added topic.	Tech Pubs
<i>Every 250 Hours, page 117</i>	Added topic.	Tech Pubs
<i>Installing Cutterbar Spindle Shear Pin, page 182</i>	Revised important note on shear pin orientation.	Product Support
<i>5.2.1 R1 to M1170 Hydraulic Drive Kit, page 226</i>	Added R113 SP and M1170 Windrower to the list.	Product Support
<i>5.2.4 M205 Compatibility Kit, page 227</i>	Added topic.	ECN 59429

## Model and Serial Number

Record the model number, serial number, and model year of the header on the lines below.

Rotary Disc  
Header Model: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Year: \_\_\_\_\_

The serial number plate (A) is located near the base of the right side hazard/signal light on the right edge of the rotary disc header.



**Figure 1: Right Side of Header – R113 SP Shown, R116 SP Similar**

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# Chapter 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. Two signal words, **IMPORTANT** and **NOTE**, identify non-safety related information. Signal words are selected using the following guidelines:

### **DANGER**

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

### **WARNING**

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

### **CAUTION**

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

### **IMPORTANT:**

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

### **NOTE:**

Provides additional information or advice.

## 1.3 General Safety

### CAUTION

The following general farm safety precautions 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 the job at hand. Do **NOT** take chances. You may need the following:

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

In addition, take the following precautions:

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



Figure 1.2: Safety Equipment



Figure 1.3: Safety Equipment

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

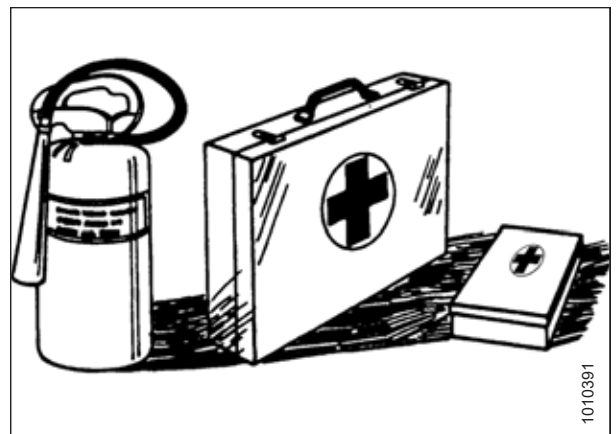


Figure 1.4: Safety Equipment

## 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 the engine is running.
- Do **NOT** modify the machine. Unauthorized modifications may impair machine function and/or safety. It may also shorten the machine's life.
- To avoid 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.

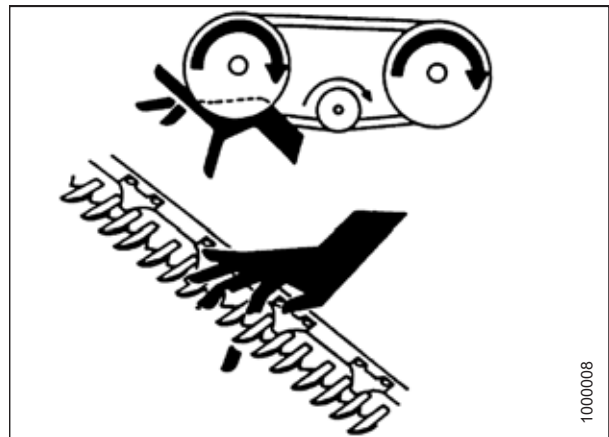


Figure 1.6: Safety around Equipment

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



Figure 1.8: Safety around Equipment



Figure 1.9: Equipment NOT Safe for Children



Figure 1.10: Safety Equipment

## 1.5 Hydraulic Safety

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

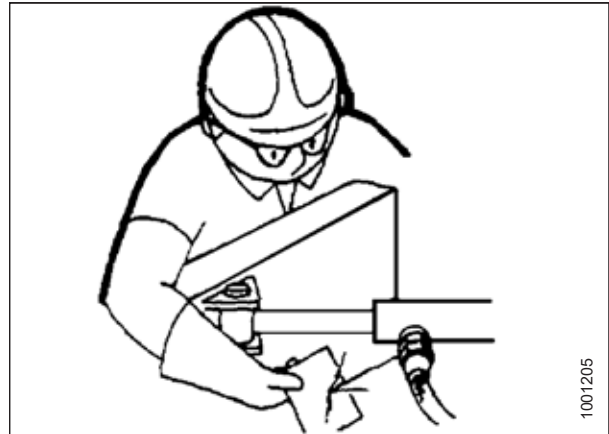


Figure 1.11: Testing for Hydraulic Leaks

- 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.



Figure 1.12: Hydraulic Pressure Hazard

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

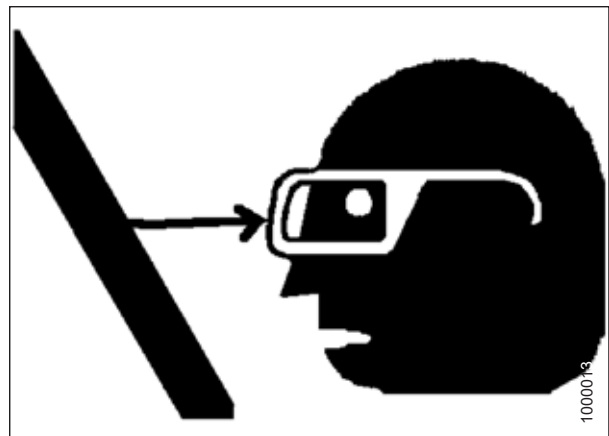


Figure 1.13: Safety around Equipment

## 1.6 Welding Precaution

Welding should never be attempted on the rotary disc header while it is connected to a windrower.



### **WARNING**

**Severe damage to sensitive, expensive electronics can result from welding on the header while it is connected to the windrower. It can be impossible to know what effect high current could have with regard to future malfunctions or shorter lifespan. It is very important that welding on the header is not attempted while the header is connected to the windrower.**

connect the rotary disc header and removed it from the windrower before doing any welding.

If it is unfeasible to disconnect the rotary disc header from the windrower before welding, contact your MacDon Dealer for welding precautions detailing all electrical components that must be disconnected first for safe welding.

## 1.7 Safety Signs

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

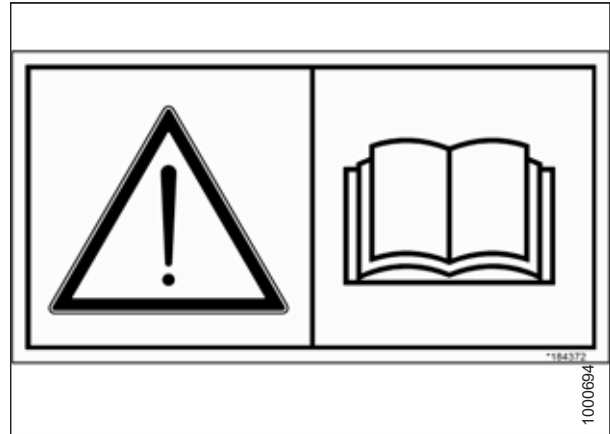


Figure 1.14: Operator's Manual Decal

### 1.7.1 Installing Safety Decals

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

## 1.8 Locating Safety Decals

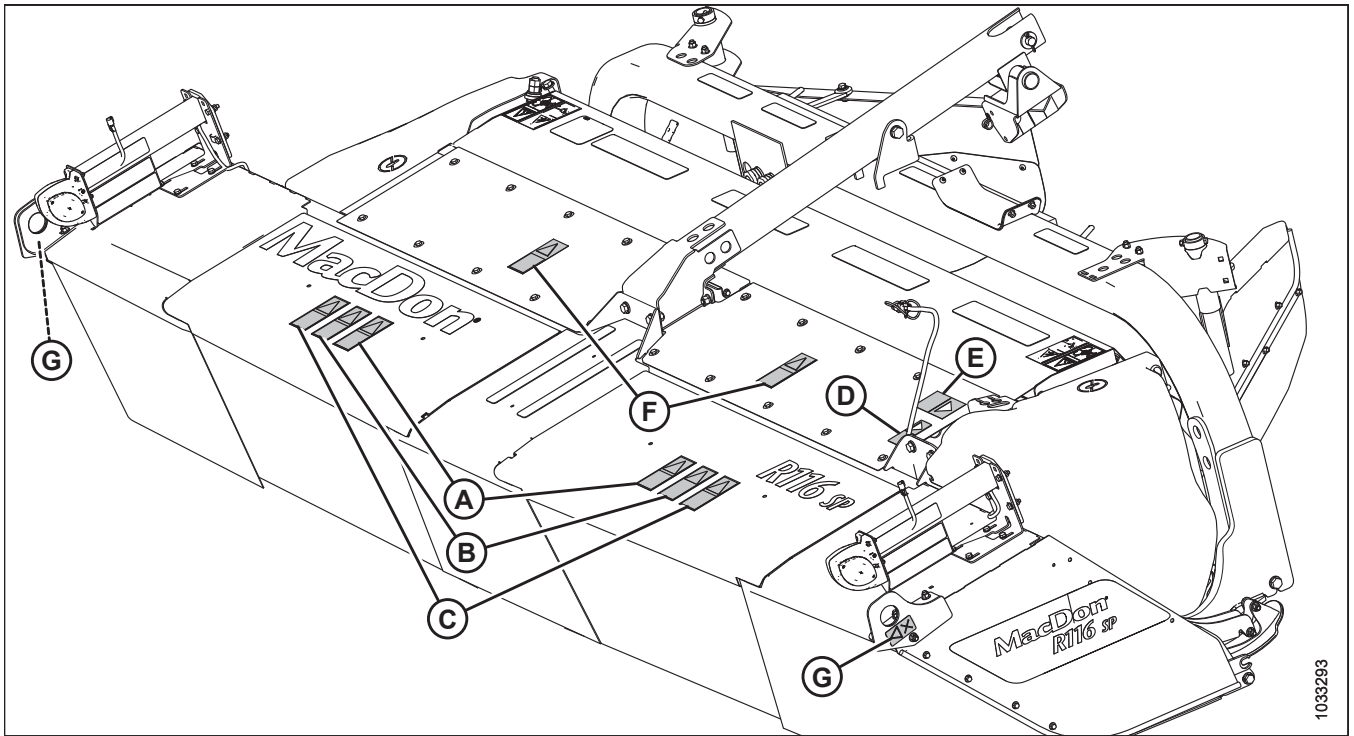


Figure 1.15: Safety Sign Decal Locations – R116 SP Shown, R113 SP Similar

A - MD #194466  
 D - MD #166466  
 G - MD #304865

B - MD #247167  
 E - MD #113482

C - MD #194465  
 F - MD #190546

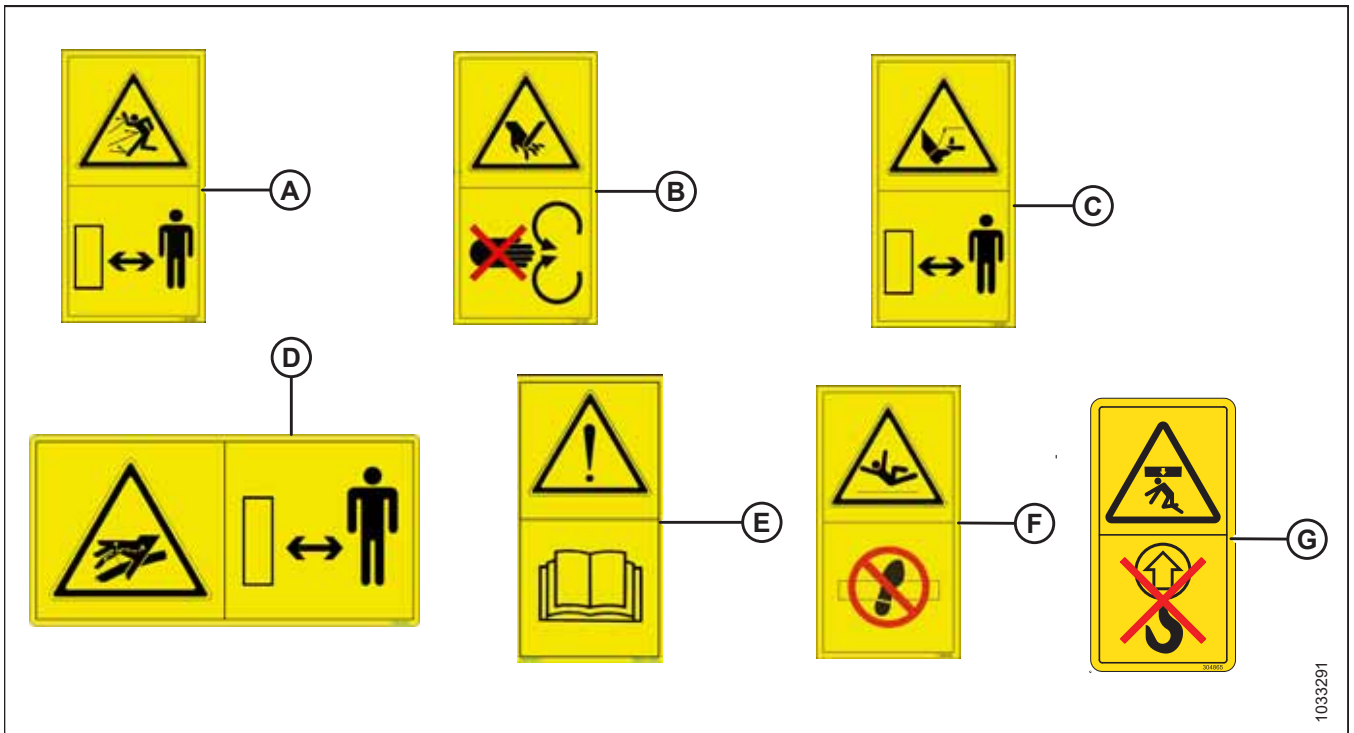
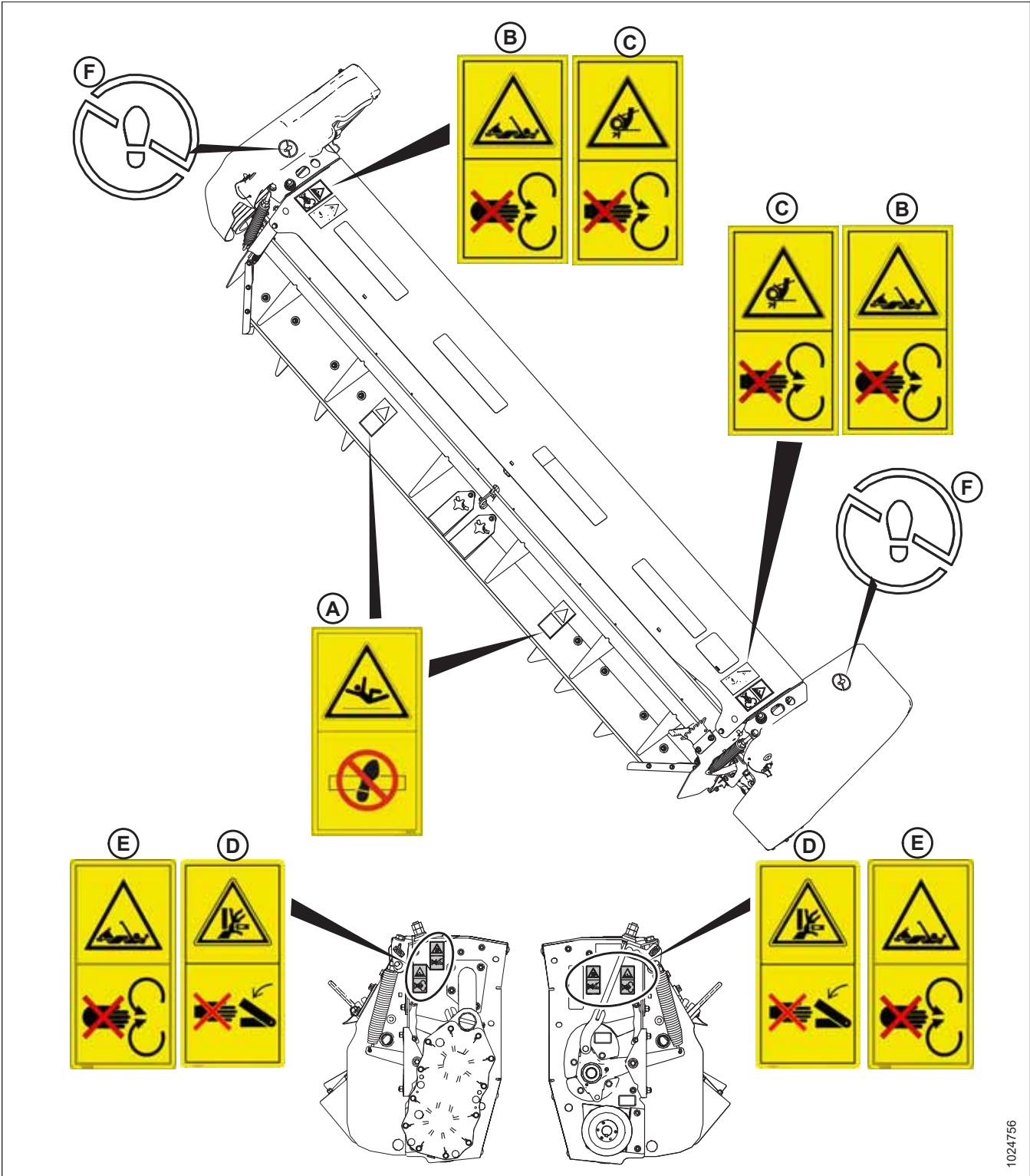


Figure 1.16: Safety Sign Decals

SAFETY



1024756

Figure 1.17: 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)

## 1.9 Understanding Safety Signs

**NOTE:**

This is a general list of safety sign definitions and the decals listed may not necessarily be applicable 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 the machine before starting the engine, and during operation.
- Keep riders off the machine.
- Keep all shields in place and stay clear of moving parts.
- Disengage the rotary disc header drive, put the transmission in Neutral, and wait for all movement to stop before leaving the operator’s position.
- Shut off the engine and remove the key from the ignition before servicing, adjusting, lubricating, cleaning, or unplugging the machine.
- Engage locks to prevent lowering of rotary disc header before servicing in the raised position.
- Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.



Figure 1.18: MD #113482

**MD #166832**

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 a finger or skin to check for leaks.
- Lower load or relieve hydraulic pressure before loosening fittings.



Figure 1.19: MD #166832

## SAFETY

### MD #184371

Open drive hazard

#### WARNING

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



Figure 1.20: MD #184371

### MD #184385

Entanglement hazard

#### CAUTION

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



Figure 1.21: MD #184385

### MD #190546

Slippery surface

#### WARNING—DO NOT STEP ON SURFACE

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



Figure 1.22: MD #190546



## 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 1.23: 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 1.24: 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 1.25: MD #246956

## SAFETY

### MD #246959

Pinch hazard

#### WARNING—KEEP AWAY

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



Figure 1.26: MD #246959

### MD #247167

Rotating blades

#### WARNING

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



Figure 1.27: MD #247167

### MD #304865

Header crushing hazard

#### WARNING

To prevent injury or death from fall of raised machine:

- Do **NOT** lift header at marked locations.
- Only use marked locations to lower header from vertical to horizontal position.



Figure 1.28: MD #304865

## Chapter 2: Product Overview

### 2.1 Specifications

**NOTE:**

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

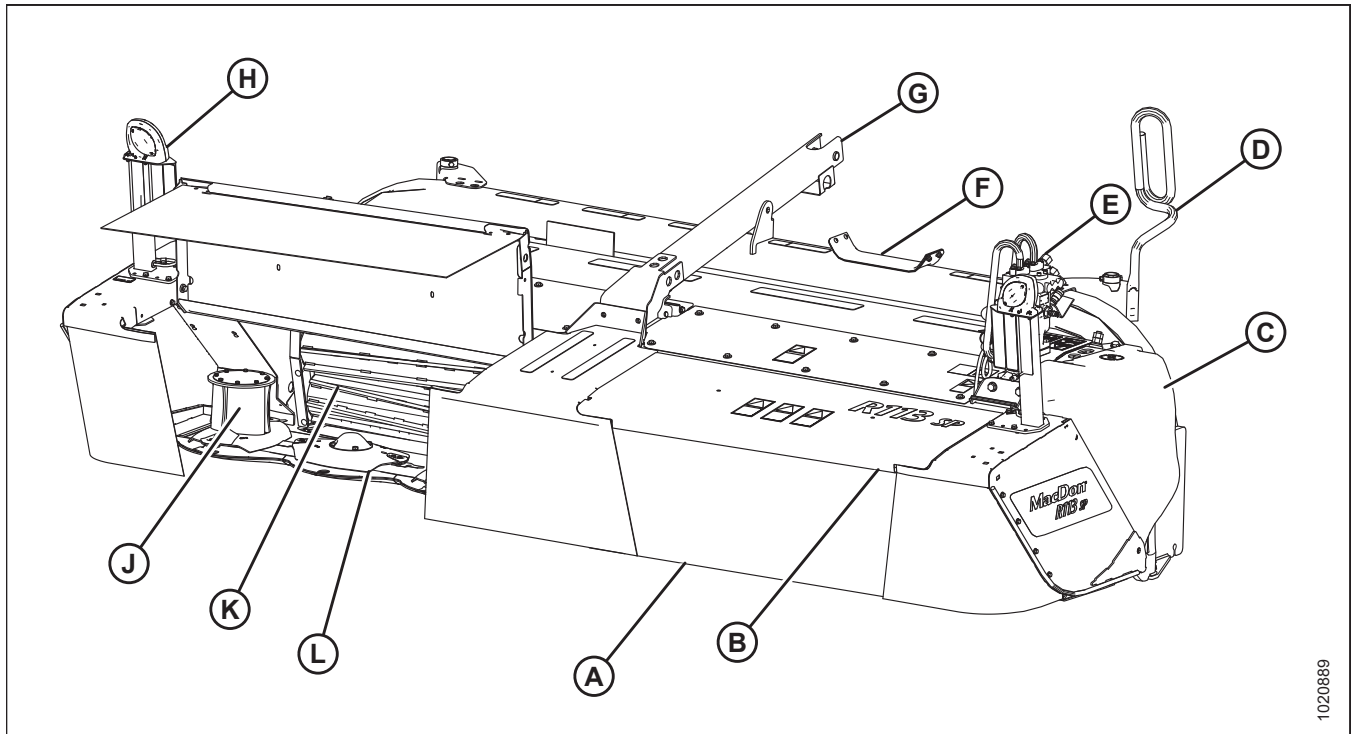
	R113 SP	R116 SP
<b>Frame and Structure</b>		
Width (transport)	4063 mm (160 in.)	5027 mm (198 in.)
Weight: base machine and adapter frame	1364 kg (3007 lb.)	1495 kg (3297 lb.)
Weight: base machine, adapter frame, and steel conditioner	1850 kg (4079 lb.)	1982 kg (4369 lb.)
Weight: base machine, adapter frame, and polyurethane conditioner	1868 kg (4118 lb.)	1999 kg (4408 lb.)
Compatible windrowers	MacDon M155, M155E4, M205, M1170, or M1240 Windrower	MacDon M155, M155E4, or M1170 Windrower
Lighting	Left and right turn signals	
Manual storage	Plastic case on header right driveshield	
<b>Cutterbar</b>		
Number of cutting discs	Eight	Ten
Blades per disc	Two 18° bevel down	
Disc speed (full engine speed)	2500 rpm	
Blade max tip speed	80.5 m/s (180 mph)	
Effective cutting width	3978 mm (13 ft.)	4942 mm (16 ft. 2 in.)
Minimum Cutting height	27 mm (1 1/16 in.)	
Cutting angle range	0–8° below horizontal	
Adjustable shoes	Standard	
Gear train protection	Shearpin (safecut)	
Converging Drums	Two-drum type	Four-drum type
<b>Drives</b>		
Hydraulic motor	Piston type into 90° gearbox	
Cutterbar	Direct drive through 90° gearbox and universal shaft	
Conditioner drive	Belt drive (4HB) from 90° gearbox to conditioner	
Conditioner roll timing	Timing gearbox	

**PRODUCT OVERVIEW**

	<b>R113 SP</b>	<b>R116 SP</b>
<b>Hay Conditioner Options</b>		
Steel rolls	Optional	
Roll type	Steel on steel chevron conditioner rolls	
Roll length	3275 mm (129 in.)	
Roll diameter	229 mm (9.0 in.) / 179 mm (7.0 in.) OD tube	
Roll speed	1009 rpm	
Polyurethane rolls	Optional	
Roll type	Polyurethane intermeshing conditioner rolls	
Roll length	3275 mm (129 in.)	
Roll diameter	254 mm (10.0 in.) / 203 mm (8.0 in.) OD tube	
Roll speed	1009 rpm	
Swath width <sup>1</sup>	915–2540 mm (36–102 in.)	
Forming shields	Full width adjustable baffle on conditioner with adjustable side deflectors on support frame	
No conditioner	Optional (includes rear curtain)	

1. Actual swath width may vary based upon conditioner type, crop type, and crop volume.

## 2.2 Component Identification



1020889

Figure 2.1: R1 SP Series – R13 SP Shown, R16 SP Similar

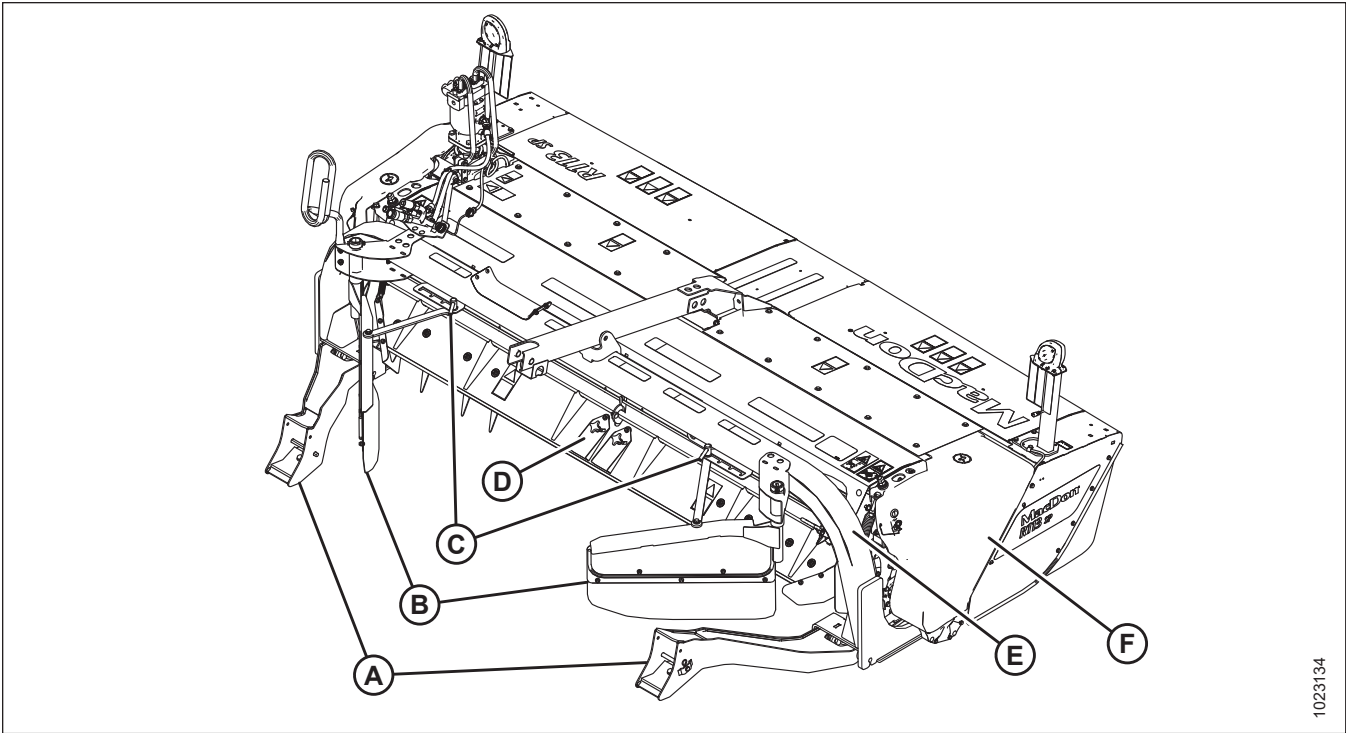
- A - Front Curtains
- D - Hose Support<sup>2</sup>
- G - Center-Link Tube
- K - Conditioner Rolls

- B - Cutterbar Doors
- E - Hydraulic Motor<sup>3</sup>
- H - Hazard/Brake Lights
- L - 8-Disc Cutterbar

- C - Drive Shield (Left)
- F - Hose Support
- J - Disc Drum (Right)

2. M155/M155E4 SP Windrower only  
 3. M155/M155E4 SP Windrower motor shown

## PRODUCT OVERVIEW



1023134

**Figure 2.2: R1 SP Series – R113 SP Shown, R116 SP Similar**

A - Header Supports  
D - Rear Crop Baffle

B - Side Deflectors  
E - Adapter Frame

C - Side Deflector Adjuster Handles  
F - Drive Shield

## 2.3 Definitions

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

Term	Definition
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut
Cab-forward	Windrower operation with Operator and cab facing in direction of travel
Center-link	A hydraulic cylinder link between the header and machine used to change header angle
CGVW	Combined gross vehicle weight
Export header	Header 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	A machine that cuts and lays crop into a windrow and is attached to a windrower
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
M Series windrower	MacDon M100, M105, M150, M155, M155E4, M200, and M205 windrowers
M1 Series	MacDon M1170 and M1240 Windrowers
n/a	Not applicable
North American header	Header configuration typical in North America
NPT	National Pipe Thread: A style of fitting used for low-pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit
Nut	An internally threaded fastener that is designed to be paired with a bolt
ORB	O-ring boss: A style of fitting commonly used in port openings on manifolds, pumps, and motors
ORFS	O-ring face seal: A style of fitting commonly used for connecting hoses and tubes. This style of fitting is also commonly called ORS, which stands for O-ring seal
R1 SP Series	MacDon R113 and R116 Rotary Disc Headers for windrowers
rpm	Revolutions per minute
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread into a mating part

## PRODUCT OVERVIEW

Term	Definition
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 (lb·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
Washer	A thin cylinder with a hole or slot located in the center that is to be used as a spacer, load distribution element, or locking mechanism
Windrower	Power unit for a header



## Chapter 3: Operation

### 3.1 Break-In Period

After attaching the header to the windrower for the first time, operate the machine slowly for five minutes, watching and listening from the operator's seat for binding or interfering parts.

**NOTE:**

Until you become familiar with the sound and feel of your new header, be extra alert and attentive.



**CAUTION**

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

**NOTE:**

Perform the items specified in [4.3.2 Break-In Inspections, page 111](#).

## 3.2 Daily Start-Up Check

### CAUTION

- Ensure the windrower and the header are properly attached, all controls are in neutral, and the windrower brakes are engaged.
- Clear the area of other persons, pets etc. Keep children away from machinery. Walk around the header 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 3.1: 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 3.2: Safety Equipment

## OPERATION

Perform the following checks each day before startup:

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

**NOTE:**

Use proper procedure when searching for pressurized fluid leaks. For instructions, refer to [4.12.1 Checking Hydraulic Hoses and Lines, page 224](#).

2. Clean all lights and reflective surfaces on the machine, and check lights for proper operation.
3. Perform all daily maintenance. For instructions, refer to [4.3.1 Maintenance Schedule/Record, page 108](#).

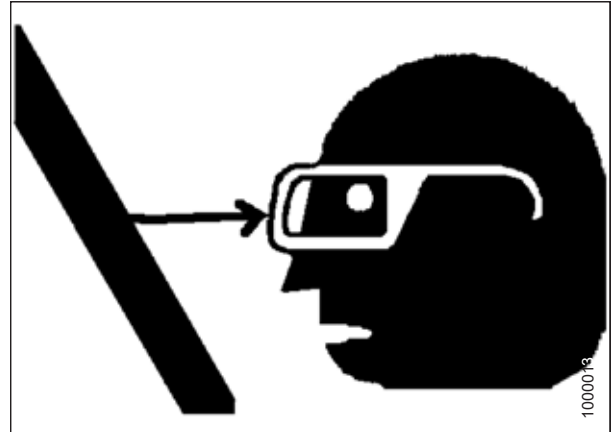


Figure 3.3: Safety around Equipment

### 3.3 Engaging and Disengaging Header Safety Props

Safety props are located on both header lift cylinders on the windrower.

Refer to the relevant procedure for your windrower:

- For M Series Self-Propelled Windrowers, refer to *3.3.2 Engaging and Disengaging Header Safety Props – M155, M155E4, or M205 Self-Propelled Windrower, page 25*
- For M1 Series Windrowers, refer to *3.3.1 Engaging and Disengaging Header Safety Props – M1 Series Windrower, page 24*

#### 3.3.1 Engaging and Disengaging Header Safety Props – M1 Series Windrower

Safety props are located on both header lift cylinders on the windrower. Follow these steps to engage or disengage the header safety props:

#### DANGER

To avoid bodily injury from fall of raised header, always engage safety props when working on or around raised header, and before going under header for any reason.

1. Start the engine.
2. Press HEADER UP switch (A) to raise the header to maximum height.

**NOTE:**

If one end of the header does **NOT** fully raise, rephase the lift cylinders as follows:

- a. Press and hold HEADER UP switch (A) until both cylinders stop moving.
  - b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.
3. Shut down the engine, and remove the key from the ignition.



Figure 3.4: Ground Speed Lever

4. Engage the safety props on both lift cylinders as follows:
  - a. Pull lever (A) toward you to release, and then rotate toward header to lower the safety prop onto the cylinder.
  - b. Repeat for the opposite lift cylinder.

**IMPORTANT:**

Ensure the safety props engage over the cylinder piston rods. If the safety prop does **NOT** engage properly, raise the header until the safety prop fits over the rod.

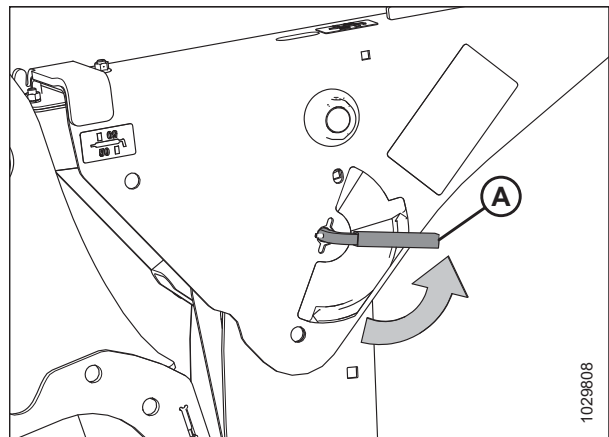


Figure 3.5: Safety Prop Lever

## OPERATION

5. Disengage the safety props on both lift cylinders as follows:
  - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
  - b. Repeat for the opposite cylinder.

### NOTE:

If the safety prop will **NOT** disengage, raise the header to release the prop.



## WARNING

Check to be sure all bystanders have cleared the area.

6. Start the engine.
7. Lower the header fully.
8. Shut down the engine, and remove the key from the ignition.

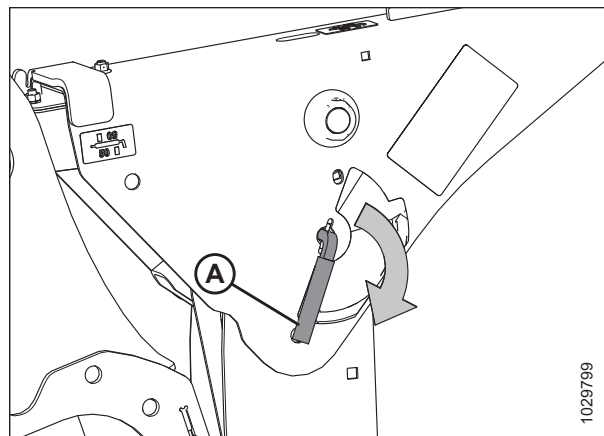


Figure 3.6: Safety Prop Lever

### 3.3.2 Engaging and Disengaging Header Safety Props – M155, M155E4, or M205 Self-Propelled Windrower

Safety props are located on both header lift cylinders on the windrower. Follow these steps to engage or disengage the header safety props:



## DANGER

To avoid bodily injury from fall of raised header, always engage safety props when working on or around raised header, and before going under header for any reason.

*Engage safety props as follows:*

1. Start engine and press HEADER UP switch (A) to raise header to maximum height.
2. Rephase cylinders if one end of the header does not raise fully. If rephasing is required, proceed as follows:
  - a. Press and hold the HEADER UP switch (A) until both cylinders stop moving.
  - b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.



Figure 3.7: Ground Speed Lever (GSL)

## OPERATION

3. Pull lever (A) and rotate it toward the header to lower safety prop (B) onto the cylinder. Repeat for the opposite cylinder.

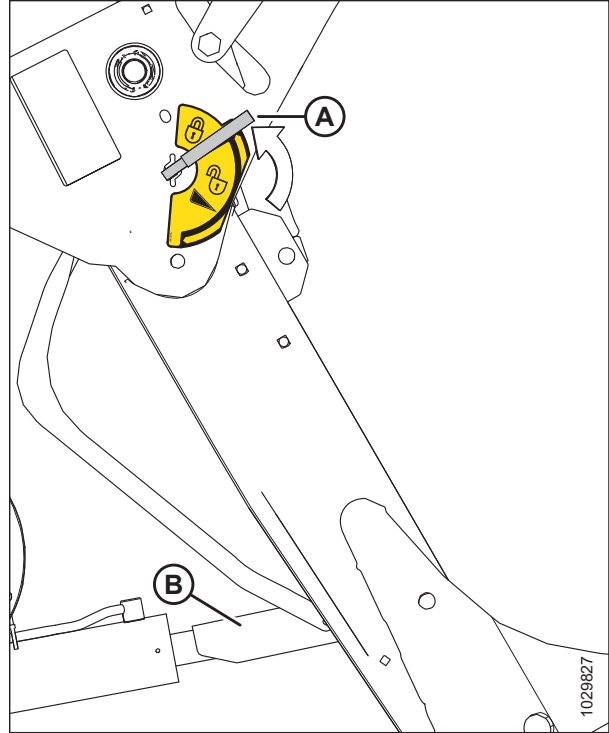


Figure 3.8: Safety Prop

*Disengage safety props as follows:*

### WARNING

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. Turn lever (A) away from header to raise safety prop until lever locks into vertical position. Repeat for opposite cylinder.
2. Start the engine, choose a level area, and lower the header to the ground.
3. Shut down the engine, and remove the key from the ignition.

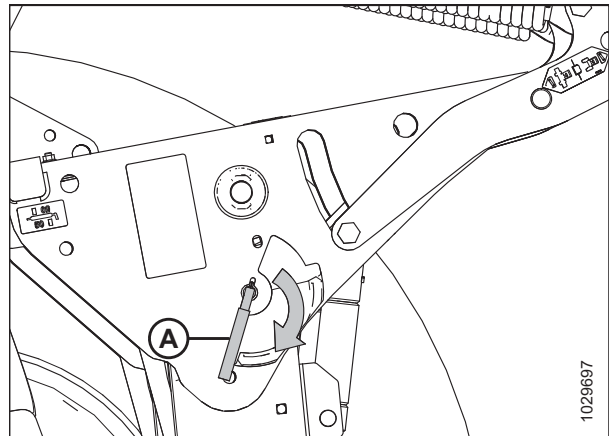


Figure 3.9: Safety Prop

## 3.4 Attaching Rotary Disc Header to Windrower

### 3.4.1 Attaching R1 Series Rotary Disc Header to M1 Series Windrower

The windrower may have an optional self-aligning hydraulic center-link that allows vertical position control of the center-link from the cab.

#### WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. **Hydraulic Center-Link without Self-Alignment:** Remove pin (A) and raise center-link (B) until hook is above the attachment pin on header. Replace pin (A) to hold center-link in place.

#### IMPORTANT:

If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

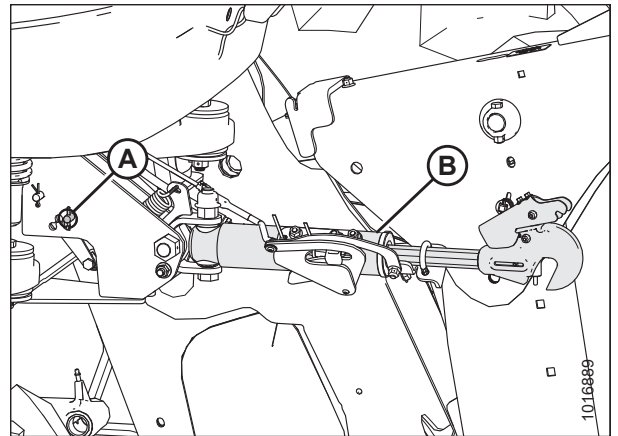


Figure 3.10: Hydraulic Center-Link

3. Remove hairpin (A) from clevis pin (B), and remove pin from header support (C) on both sides of the header.

#### WARNING

Check to be sure all bystanders have cleared the area.

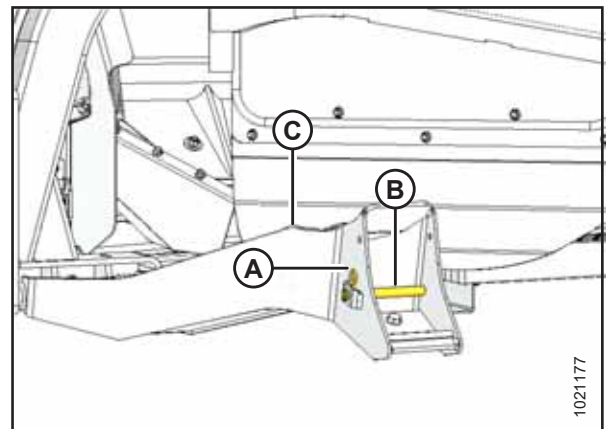


Figure 3.11: Header Support

## OPERATION

### CAUTION

When lowering header lift legs without a header or weight box attached to the windrower, ensure the float springs tension is fully released to prevent damage to the header lift linkages.

#### NOTE:

If not prompted by the Harvest Performance Tracker (HPT) display to remove float, remove float manually. For instructions, refer to the windrower operator's manual.

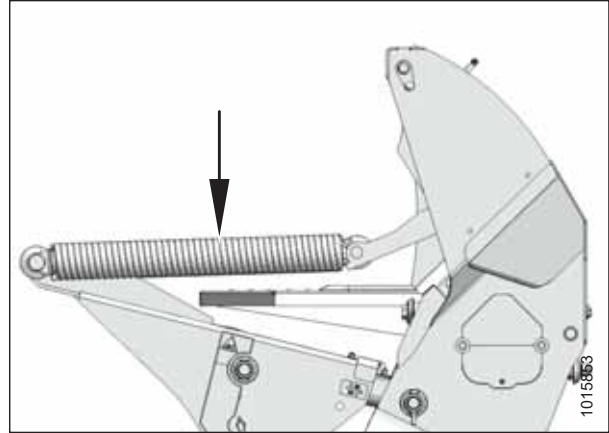


Figure 3.12: Header Float Spring

4. Press rotary scroll knob (A) on the display to highlight the QuickMenu options.
5. Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B), and press the scroll knob to select. The FLOAT ADJUST page displays.



Figure 3.13: HPT Display

6. Press soft key 3 (A) to remove the header float.

#### NOTE:

If the header float is active, the icon at soft key 3 will display REMOVE FLOAT; if header float has been removed, the icon will display RESUME FLOAT.



Figure 3.14: HPT Display



## OPERATION

7. Press HEADER DOWN switch (E) on ground speed lever (GSL) to fully retract the header lift cylinders.
8. **Self-Aligning Hydraulic Center-Link:** Press REEL UP switch (B) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

### IMPORTANT:

If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

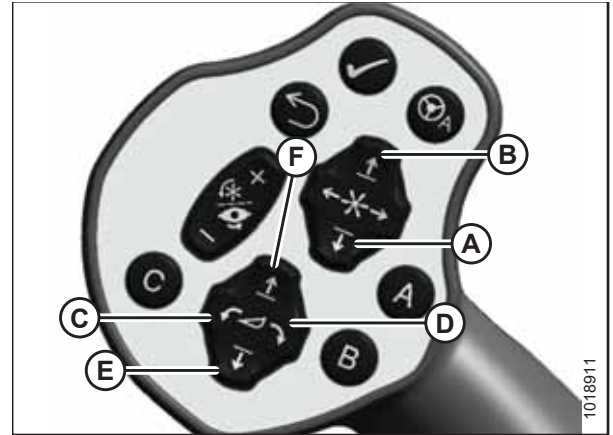


Figure 3.15: GSL

A - Reel Down	B - Reel Up
C - Header Tilt Down	D - Header Tilt Up
E - Header Down	F - Header Up

9. Drive the windrower slowly forward until feet (A) enter supports (B). Continue to drive slowly forward until feet engage the supports and header nudges forward.
10. Ensure feet (A) are properly engaged in supports (B).

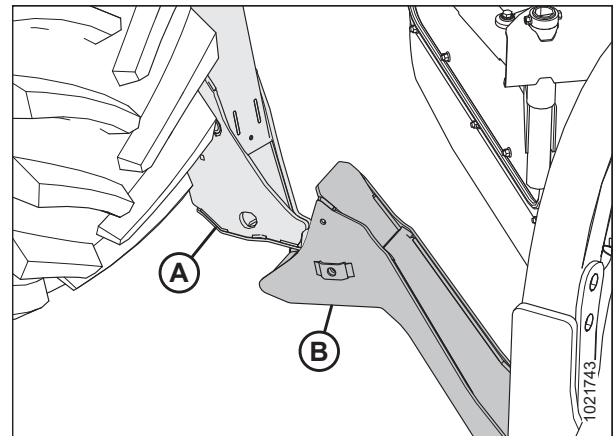


Figure 3.16: Header Support

### 11. Self-Aligning Hydraulic Center-Link:

- a. Adjust the position of center-link cylinder (A) with the switches on the GSL until hook (B) is above the header attachment pin.

### IMPORTANT:

Hook release (C) must be down to enable the self-locking mechanism.

- b. If hook release (C) is open (up), shut down the engine, and remove the key from the ignition. Manually push hook release (C) down after the hook engages the header pin.
- c. Lower center-link (A) onto the header with REEL DOWN switch on the GSL until the center-link locks into position and hook release (C) is down.
- d. Check that center-link is locked onto header by pressing the REEL UP switch on the GSL.

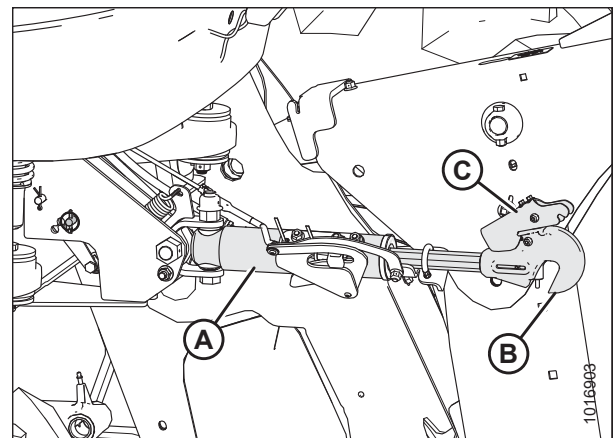


Figure 3.17: Hydraulic Center-Link

## OPERATION

### 12. Hydraulic Center-Link without Self-Alignment:

- Press HEADER TILT UP or HEADER TILT DOWN cylinder switches on the GSL to extend or retract center-link cylinder until the hook is aligned with the header attachment pin.
- Shut down the engine, and remove the key from the ignition.
- Push down on rod end of link cylinder (B) until hook engages and locks onto header pin.

#### IMPORTANT:

Hook release must be down to enable self-locking mechanism. If the hook release is open (up), manually push it down after hook engages pin.

- Check that center-link (A) is locked onto header by pulling upward on rod end (B) of cylinder.



### WARNING

Check to be sure all bystanders have cleared the area.

- Start the engine.

- Press HEADER UP switch (A) to raise the header to maximum height.

#### NOTE:

If one end of the header does **NOT** fully raise, rephase the lift cylinders as follows:

- Press and hold HEADER UP switch (A) until both cylinders stop moving.
- Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

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

- Engage the safety props on both lift cylinders as follows:

- Pull lever (A) toward you to release, and then rotate toward header to lower the safety prop onto the cylinder.
- Repeat for the opposite lift cylinder.

#### IMPORTANT:

Ensure the safety props engage over the cylinder piston rods. If the safety prop does **NOT** engage properly, raise the header until the safety prop fits over the rod.

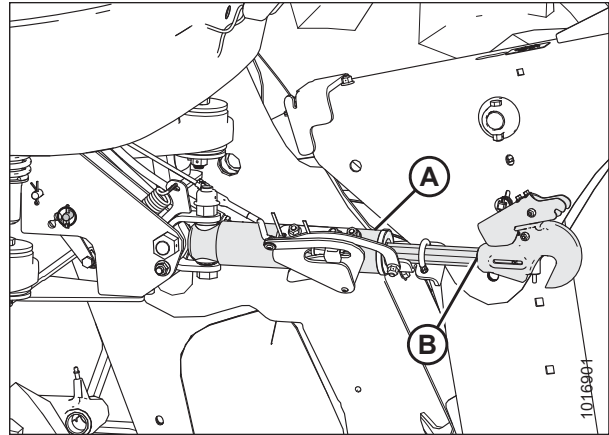


Figure 3.18: Hydraulic Center-Link



Figure 3.19: GSL

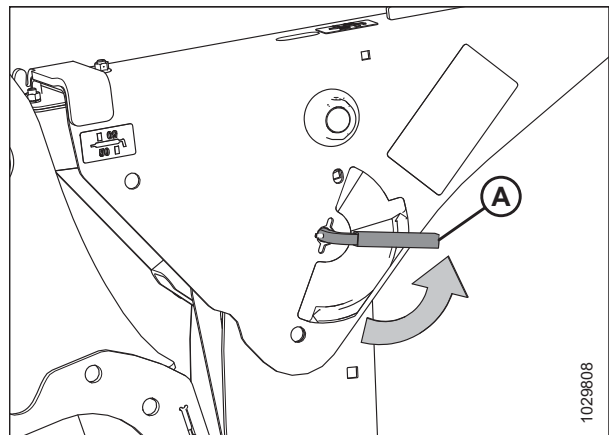


Figure 3.20: Safety Prop Lever

## OPERATION

16. Install clevis pin (A) through support and windrower lift arm and secure with hairpin (B). Repeat for the opposite side of the header.

**IMPORTANT:**

Ensure clevis pin (A) is fully inserted, and hairpin is installed behind bracket.

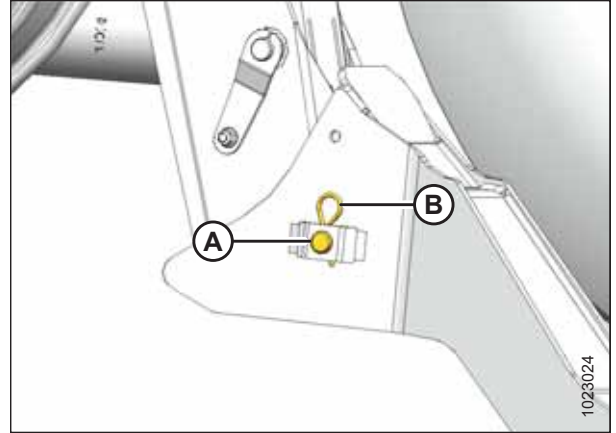


Figure 3.21: Header Support

17. Disengage the safety props on both lift cylinders as follows:
  - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
  - b. Repeat for the opposite cylinder.

**NOTE:**

If the safety prop will **NOT** disengage, raise the header to release the prop.

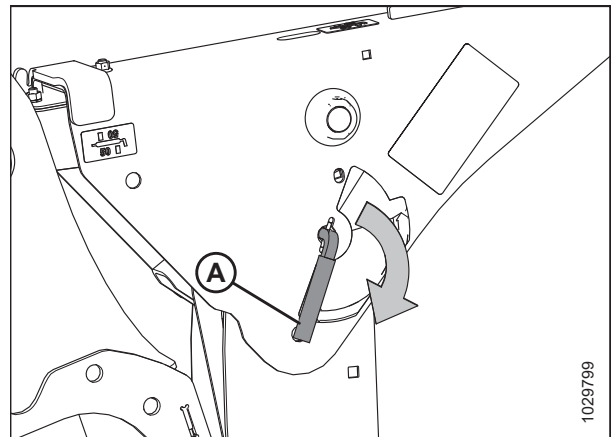


Figure 3.22: Safety Prop Lever

18. Start the engine and press HEADER DOWN switch (A) on GSL to fully lower header.

**NOTE:**

If not prompted by the HPT display to restore float, restore float manually.

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

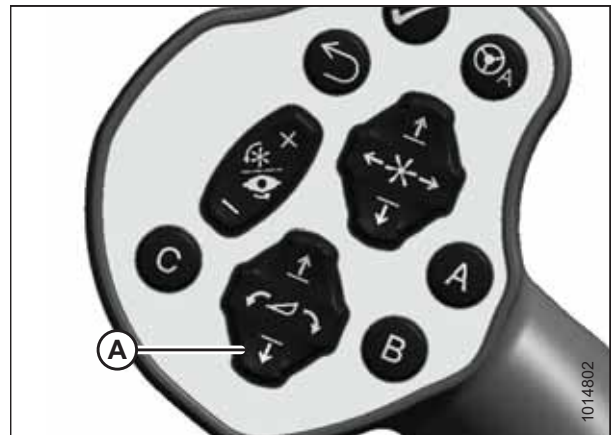


Figure 3.23: GSL

### 3.4.2 Attaching R1 Series Rotary Disc Header to M155, M155E4, or M205 Self-Propelled Windrower – Hydraulic Center-Link with Optional Self-Alignment

#### WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Remove hairpin (B) from clevis pin (A) and remove the clevis pin from header support (C) on both sides of the header.

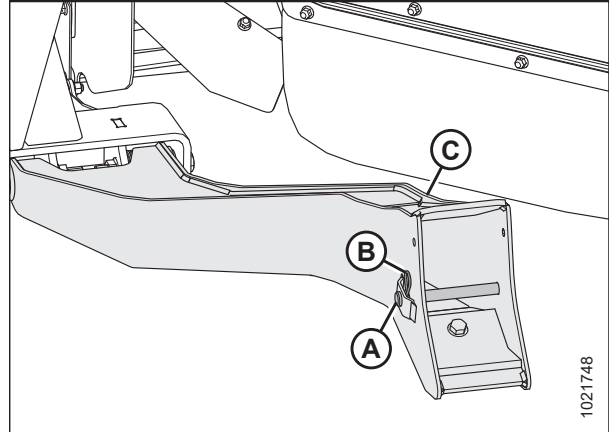


Figure 3.24: Header Support

3. Remove the float engagement pin from hole (A) to disengage float springs, and insert the float engagement pin into storage hole (B). Secure with lynch pin. Repeat for the opposite linkage.

#### IMPORTANT:

To prevent damage to the lift system when lowering the header lift linkages without a header or weight box attached to the windrower, ensure the float engagement pin is installed in storage hole (B) and **NOT** in engaged position (A).

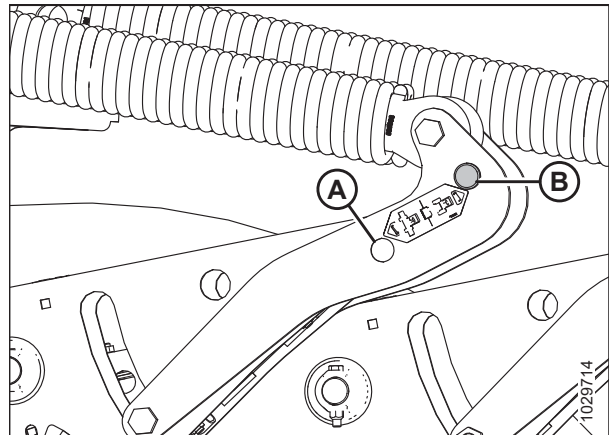


Figure 3.25: Float Linkage

#### WARNING

Check to be sure all bystanders have cleared the area.

4. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.

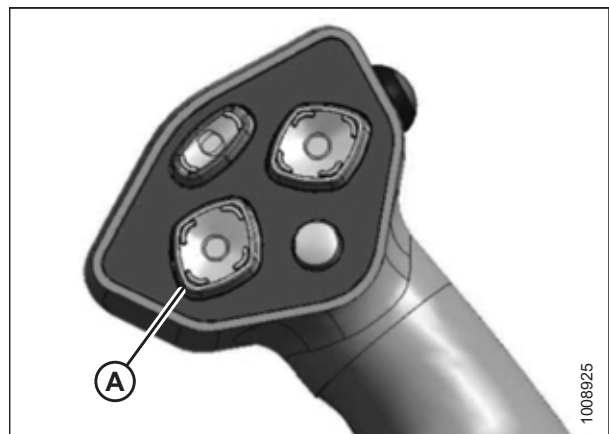


Figure 3.26: Ground Speed Lever

## OPERATION

5. Press REEL UP switch (A) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

**IMPORTANT:**

If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

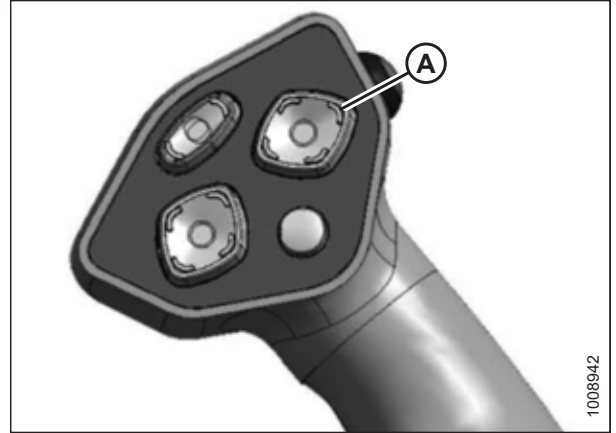


Figure 3.27: Ground Speed Lever

6. Slowly drive the windrower forward until windrower feet (A) enter header supports (B). Continue driving slowly forward until the feet engage the supports and the header nudges forward.

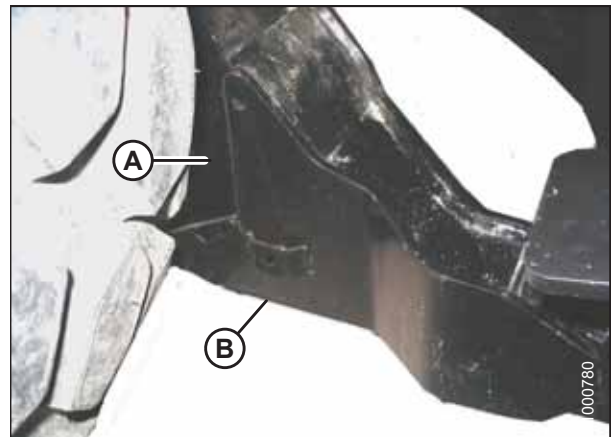


Figure 3.28: Header Support

7. Use the following GSL functions to position the center-link hook above the header attachment pin:
  - REEL UP (A) to raise the center-link
  - REEL DOWN (B) to lower the center-link
  - HEADER TILT UP (C) to retract the center-link
  - HEADER TILT DOWN (D) to extend the center-link

**IMPORTANT:**

The hook release must be down to enable the self-locking mechanism. If the release is open (up), manually push it down after hook engages header pin.

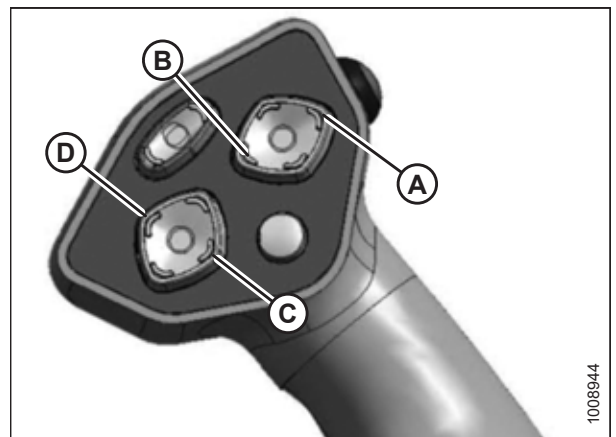


Figure 3.29: Ground Speed Lever

## OPERATION

- Adjust center-link cylinder (A) position with the REEL UP and REEL DOWN switches on the GSL until the hook is positioned above the header attachment pin.

### IMPORTANT:

Hook release (B) must be down to enable the self-locking mechanism. If the release is open (up), manually push it down after hook engages header pin.

- Lower center-link (A) onto the header with the REEL DOWN switch until the center-link locks into position and hook release (B) is down.
- Check that center-link is locked onto the header by pressing the REEL UP switch on the GSL.

### WARNING

Check to be sure all bystanders have cleared the area.

- Press HEADER UP switch (A) to raise the header to maximum height.
- If one end of the header does **NOT** fully raise, rephase the lift cylinders as follows:
  - Press and hold the HEADER UP switch until both cylinders stop moving.
  - Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

### NOTE:

It may be necessary to repeat this procedure if there is air in the system.

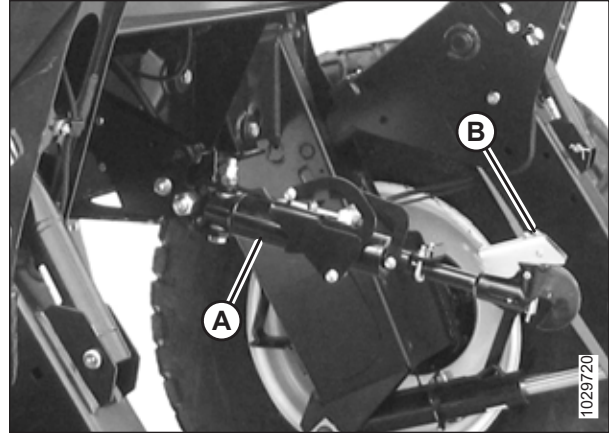


Figure 3.30: Hydraulic Center-Link



Figure 3.31: Ground Speed Lever



## OPERATION

13. Engage the safety props on both lift cylinders as follows:
  - a. Shut down the engine, and remove the key from the ignition.
  - b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.
  - c. Repeat for the opposite lift cylinder.

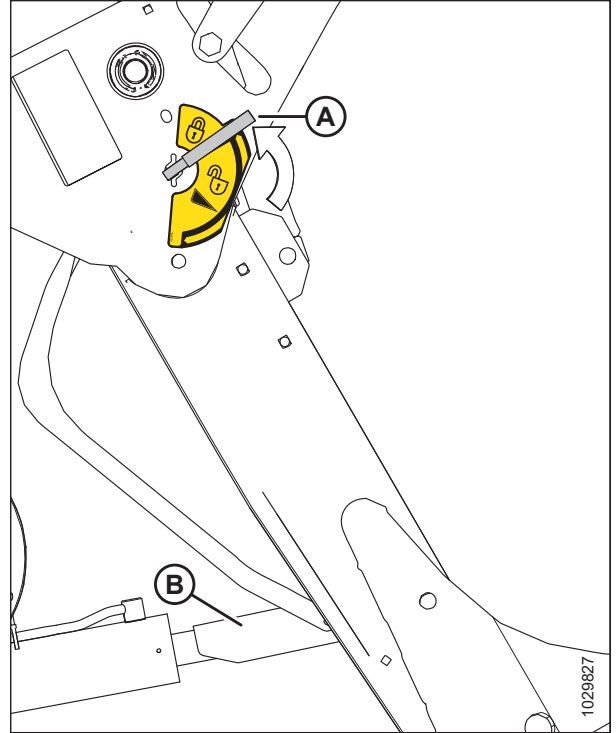


Figure 3.32: Safety Prop

14. Install clevis pin (A) through the support and windrower lift member, and secure with hairpin (B). Repeat for the opposite side of the machine.

**IMPORTANT:**

Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.

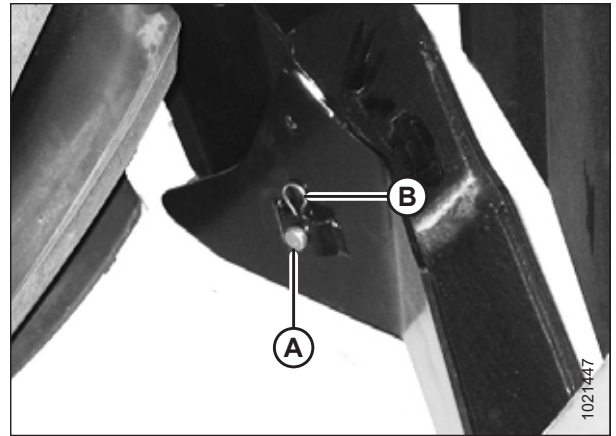


Figure 3.33: Header Support

## OPERATION

15. Remove the clevis pin from storage position (B) in the linkage and insert into hole (A) to engage the float springs. Secure with hairpin.

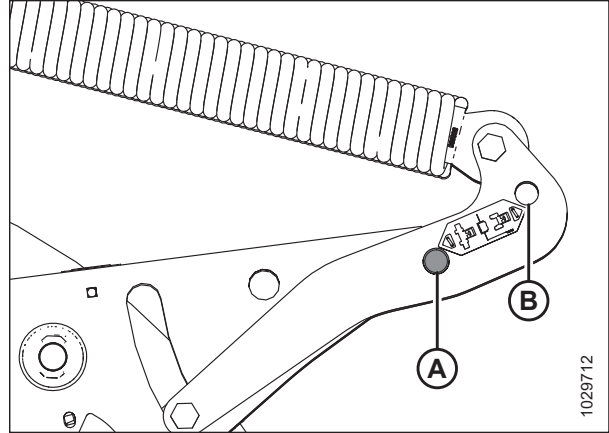


Figure 3.34: Header Float Linkage

16. Disengage the safety prop by turning lever (A) downwards until the lever locks into vertical position.
17. Repeat for the opposite safety prop.

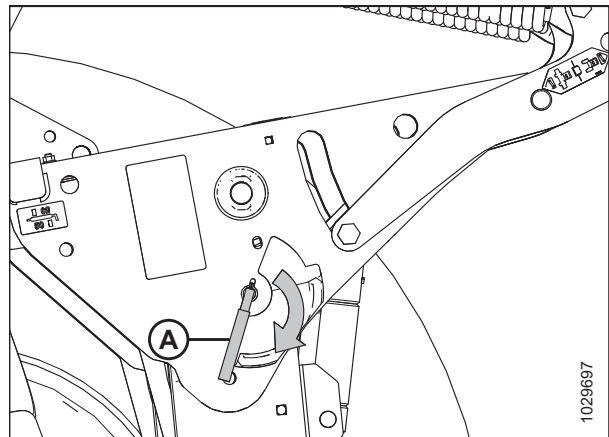


Figure 3.35: Safety Prop Lever

## WARNING

Check to be sure all bystanders have cleared the area.

18. Start the engine and press HEADER DOWN switch (A) on the GSL to fully lower the header.
19. Stop the engine and remove the key from the ignition.

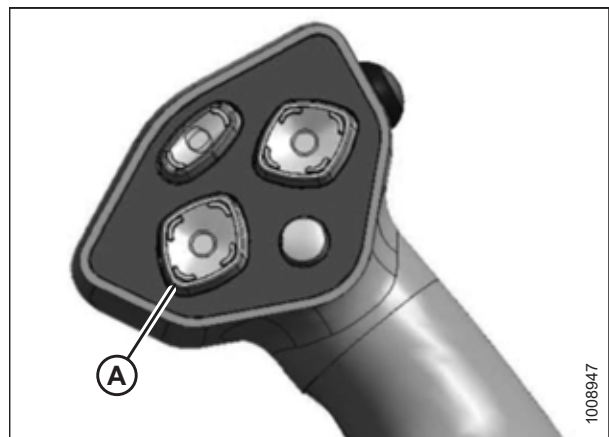


Figure 3.36: Ground Speed Lever



### 3.4.3 Attaching R1 Series Rotary Disc Header to M155, M155E4, or M205 Self-Propelled Windrower – Hydraulic Center-Link without Optional Self-Alignment

#### **WARNING**

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

1. Shut down the engine, and remove the key from the ignition.
2. Remove hairpin (B) from clevis pin (A), and then remove the clevis pin from header support (C) on both sides of the header.

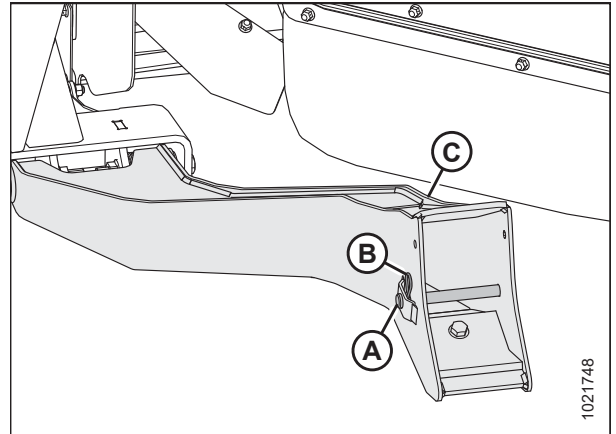


Figure 3.37: Header Support

3. To disengage the float springs, move the float engagement pin from engaged position (A) and insert the pin into storage hole (B). Secure the float engagement pin with a lynch pin. Repeat for opposite linkage.

#### **IMPORTANT:**

To prevent damage to the lift system when lowering the header lift linkages without a header or weight box attached to the windrower, ensure the float engagement pin is installed in storage position (B) and **NOT** in engaged position (A).

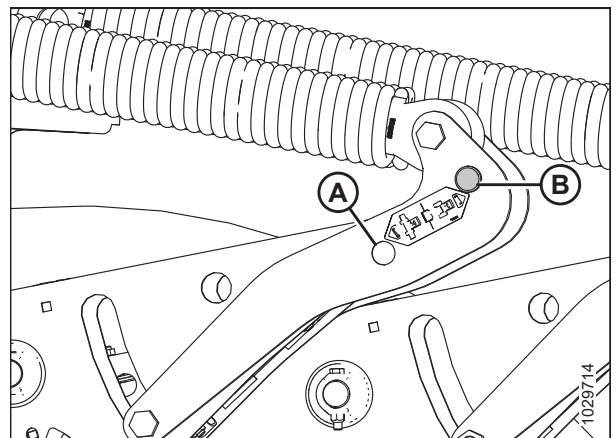


Figure 3.38: Header Float Linkage

#### **WARNING**

Check to be sure all bystanders have cleared the area.

4. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.

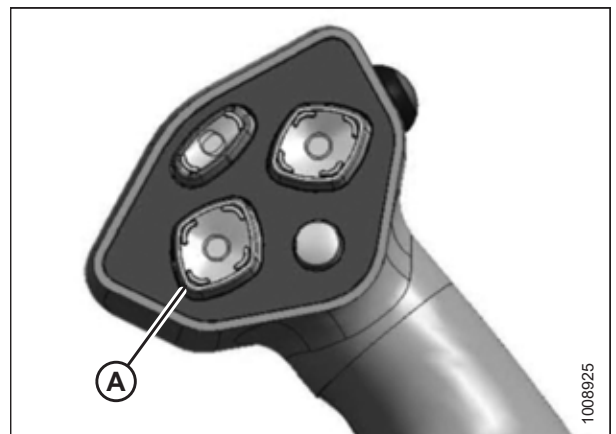


Figure 3.39: Ground Speed Lever

## OPERATION

- Remove pin (A) from the frame linkage and raise center-link (B) until the hook is above the attachment pin on the header. Replace pin (A) to hold the center-link in place.

### IMPORTANT:

If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.

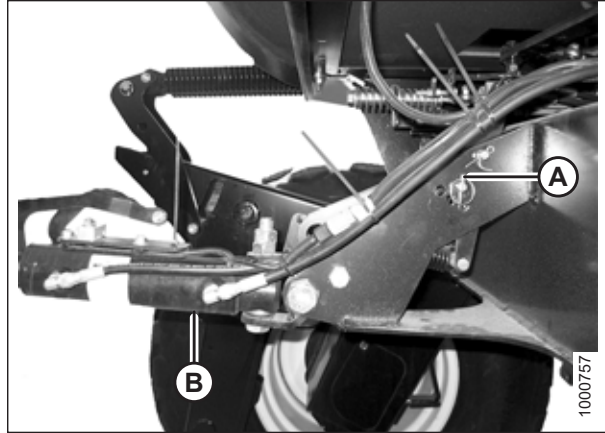


Figure 3.40: Hydraulic Center-Link

- Slowly drive the windrower forward until windrower feet (A) enter header supports (B). Continue driving slowly forward until the feet engage the supports and the header nudges forward.

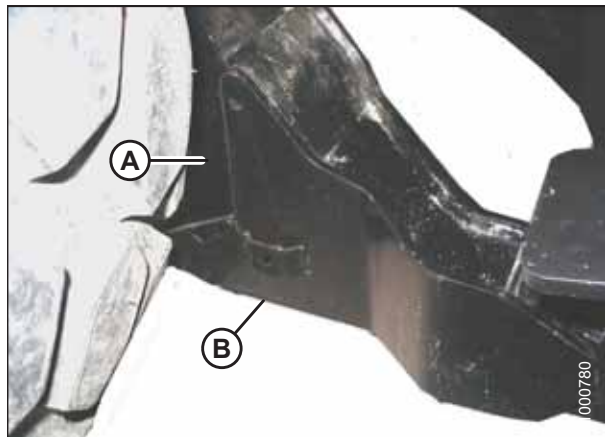


Figure 3.41: Header Support

- Use the following GSL functions to position the center-link hook above the header attachment pin:
  - HEADER TILT UP (A) to retract the center-link
  - HEADER TILT DOWN (B) to extend the center-link
- Stop the engine, and remove the key from the ignition.

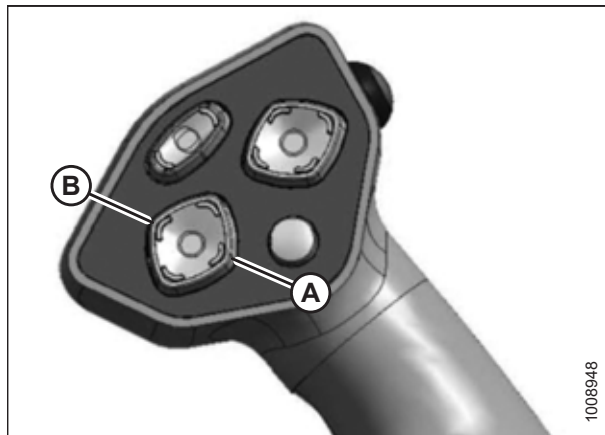


Figure 3.42: Ground Speed Lever

## OPERATION

9. Push down on the rod end of link cylinder (A) until hook (B) engages and locks onto header pin.

### IMPORTANT:

The hook release must be down to enable the self-locking mechanism. If the release is open (up), manually push it down after hook engages the header pin.

10. Check that center-link (A) is locked onto the header by pulling upward on rod end of cylinder.

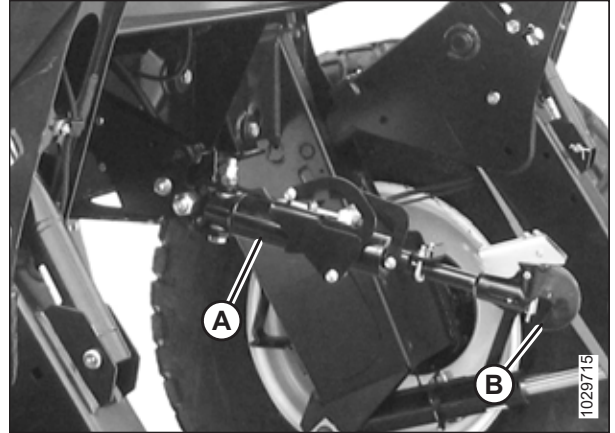


Figure 3.43: Hydraulic Center-Link

### WARNING

Check to be sure all bystanders have cleared the area.

11. Start the engine.
12. Press HEADER UP switch (A) to raise the header to maximum height.
13. If one end of the header does **NOT** fully raise, rephase the lift cylinders as follows:
  - a. Press and hold the HEADER UP switch until both cylinders stop moving.
  - b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

### NOTE:

It may be necessary to repeat this procedure if there is air in the system.

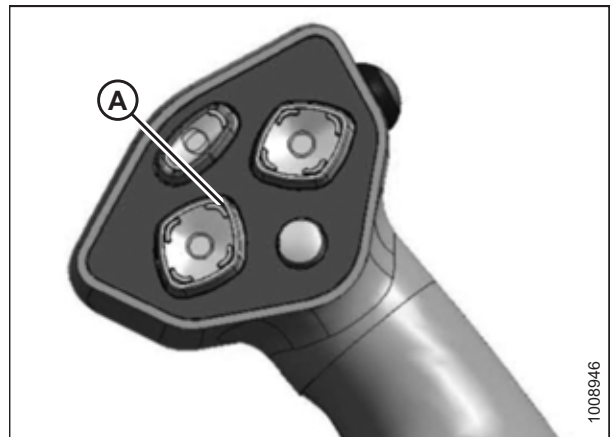


Figure 3.44: Ground Speed Lever

## OPERATION

14. Engage the safety props on both lift cylinders as follows:
  - a. Shut down the engine, and remove the key from the ignition.
  - b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.
  - c. Repeat for the opposite lift cylinder.

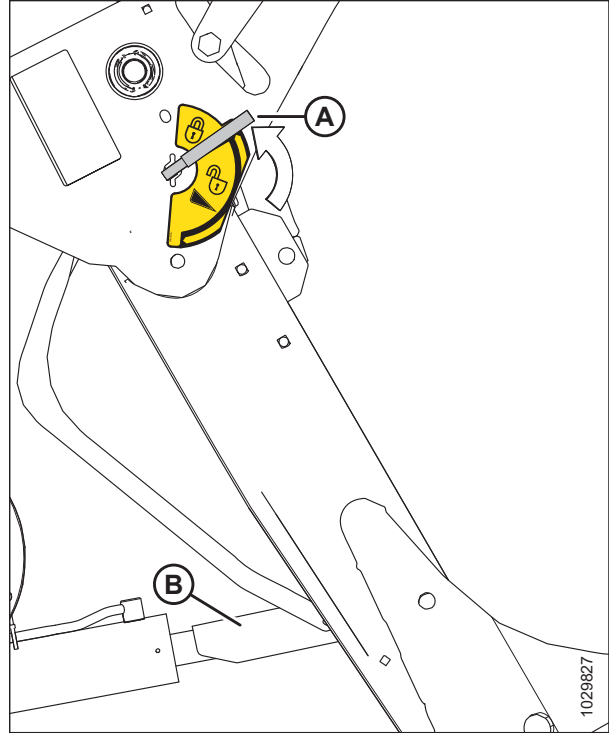


Figure 3.45: Safety Prop

15. Install clevis pin (A) through the support and windrower lift member, and secure with hairpin (B). Repeat for the opposite side of the machine.

**IMPORTANT:**

Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.

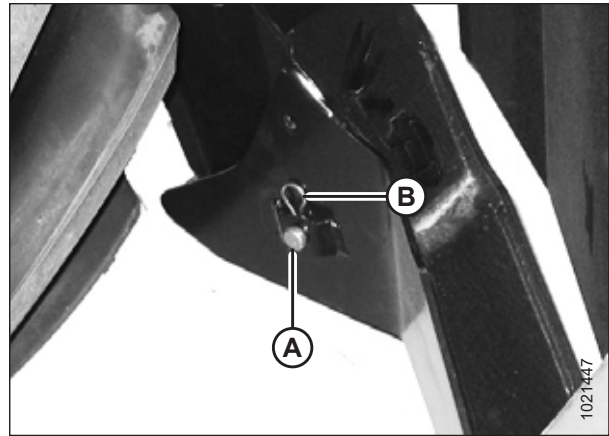


Figure 3.46: Header Support

## OPERATION

16. Remove the clevis pin from storage position (B) in the linkage and insert into hole (A) to engage the float springs. Secure with hairpin.

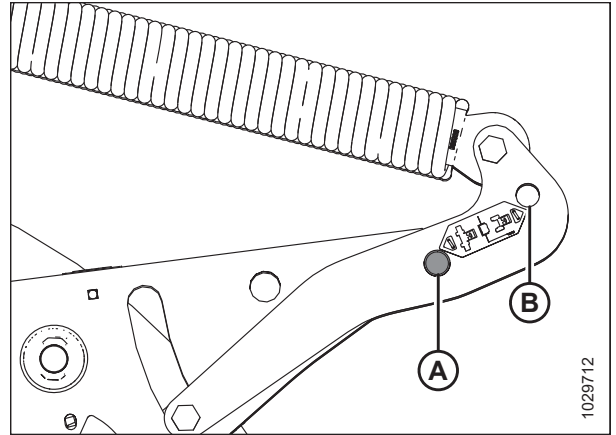


Figure 3.47: Header Float Linkage

17. Disengage the safety prop by turning lever (A) downwards until the lever locks into vertical position.
18. Repeat for the opposite safety prop.

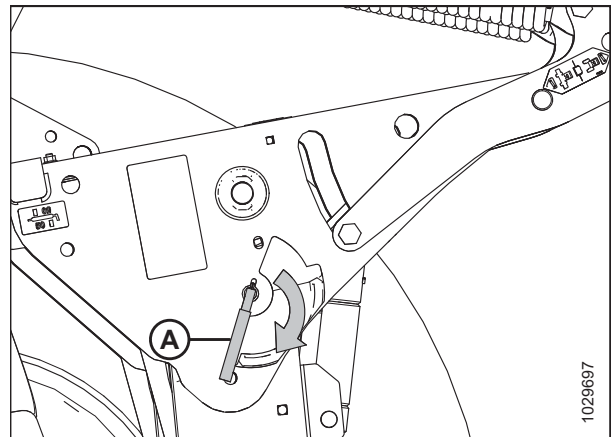


Figure 3.48: Safety Prop Lever



### WARNING

Check to be sure all bystanders have cleared the area.

19. Start the engine and press HEADER DOWN switch (A) on the GSL to fully lower the header.
20. Stop the engine and remove the key from the ignition.

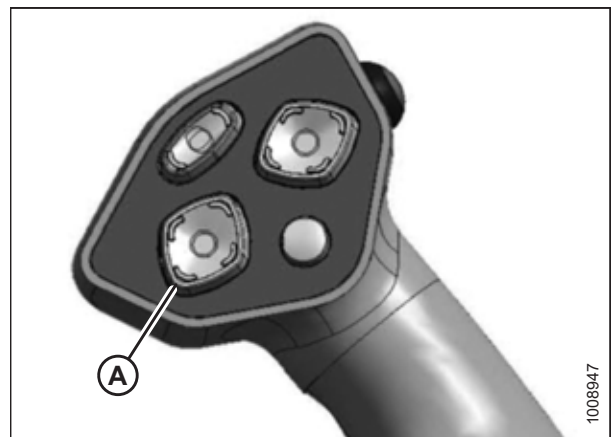


Figure 3.49: Ground Speed Lever

### 3.4.4 Attaching Hydraulic and Electrical Components

The procedure for attaching the header hydraulic and electrical components depends on the windrower model. Refer to the appropriate procedure for instructions:

**NOTE:**

Headers are factory-configured for either M Series or M1 Series windrowers. M1-configured headers have a bent axis motor while M-configured headers are fitted with a straight in-line motor.

Hydraulic conversion kits are available (motors, hoses, etc.) to convert a factory configured header from M1 to M series application and vice versa. If required, order Header Drive Conversion Kit.

- [Connecting R1 Series Rotary Disc Header Hydraulics and Electrical – M1 Series Windrowers, page 42](#)
- [Connecting R1 Series Rotary Disc Header Hydraulics and Electrical – M155 or M155E4 Self-Propelled Windrower, page 45](#)
- [Connecting R113 Rotary Disc Header Hydraulics and Electrical – M205 Self-Propelled Windrower, page 52](#)

#### Connecting R1 Series Rotary Disc Header Hydraulics and Electrical – M1 Series Windrowers

**NOTE:**

Hydraulic drive kit (A) (MD #B6845) is required for an R1 SP that is originally configured for use with an M155 or M155E4 to operate correctly on an M1 Series Windrower. To order this kit, contact your MacDon Dealer.

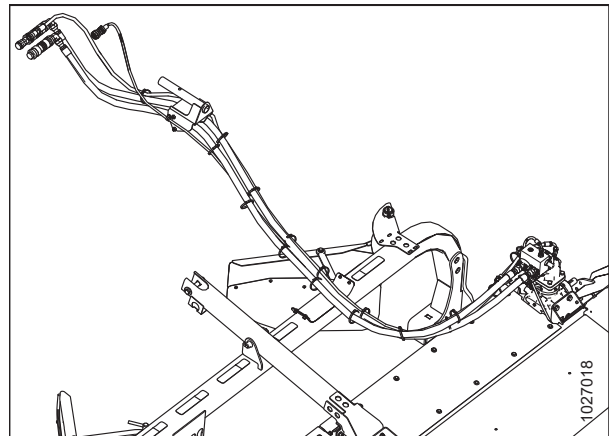


Figure 3.50: Hydraulic Drive Kit (MD #B6845)

**NOTE:**

When connecting the R113 SP to an M1240 windrower, the Low Pressure Case Drain kit (MD #B6698) (A) must be installed onto the M1240. This kit contains an alternative case drain line which is routed directly to the hydraulic reservoir via unique set of 1/2 in. hydraulic couplers.

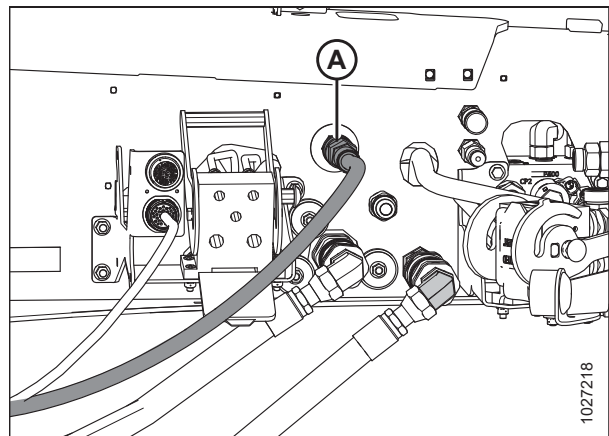


Figure 3.51: Low Pressure Case Drain Kit (MD #B6698)

1. Move the windrower’s left (cab-forward) platform to the OPEN position. Refer to your windrower operator’s manual for instructions.
2. Retrieve hydraulic hoses from header.

## OPERATION

3. Attach hose support (A) to the windrower frame near the left cab-forward leg, and route the hose bundle under frame.

**NOTE:**

Route hoses as straight as possible and avoid rub/wear points that could damage hydraulic hoses.

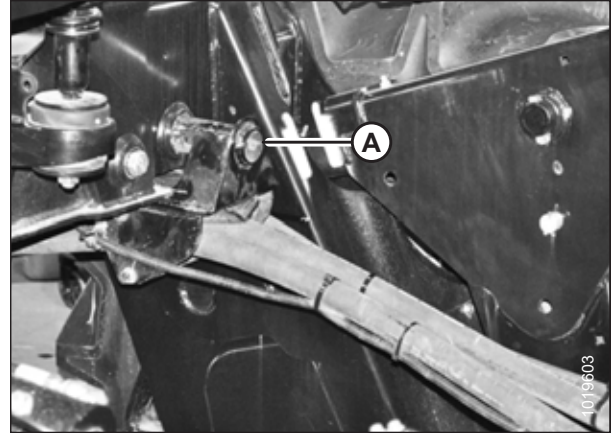


Figure 3.52: Hose Support Attachment

4. Rest the hose bundle routed from the windrower on the header's hose support (A).
5. If necessary, use a clean rag to remove dirt and moisture from the couplers.

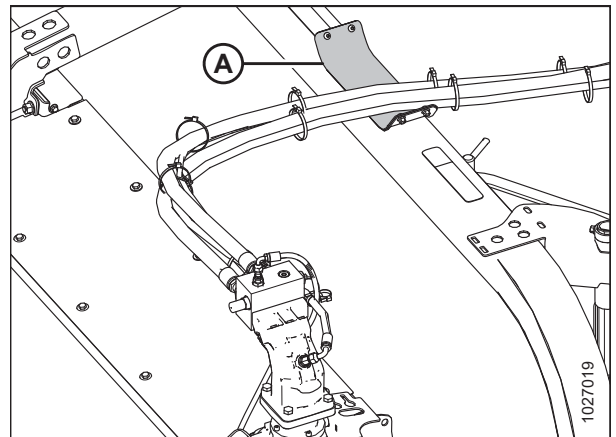


Figure 3.53: Hose Support

6. Connect the header hydraulic hoses and electrical harness as follows:
  - a. Connect pressure hose to receptacle (A).
  - b. Connect return hose to receptacle (B).
  - c. Connect case drain hose to receptacle (C).
  - d. Connect electrical harness to windrower electrical harness (D).

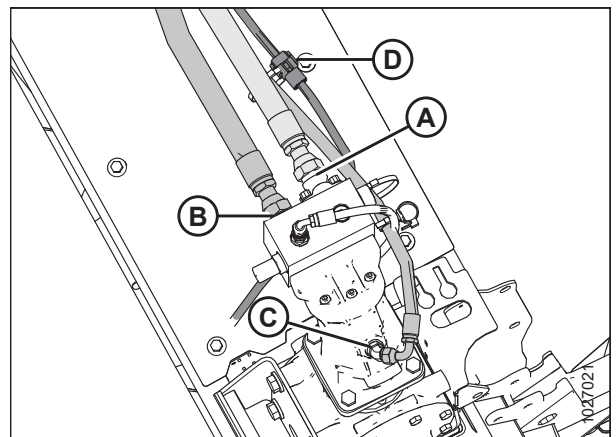


Figure 3.54: Header Drive Motor Hydraulic Connections

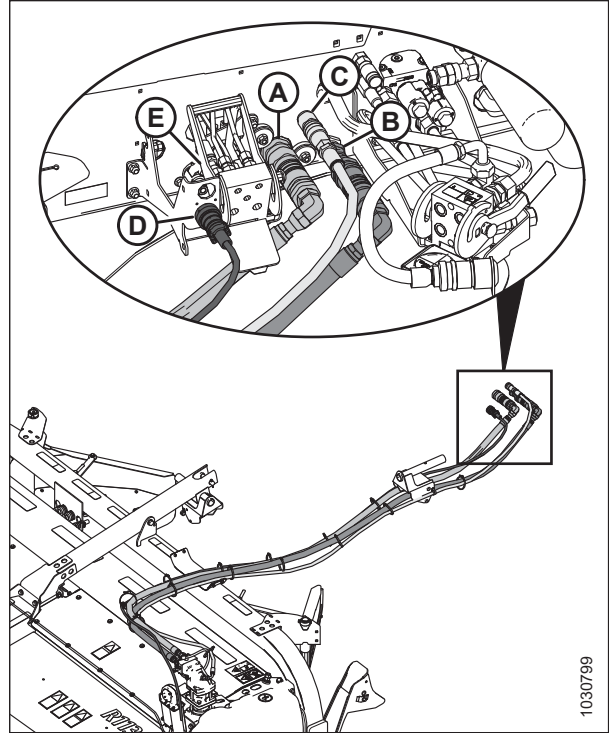


## OPERATION

7. **For M1170:** Connect the hydraulic hoses and electrical harness to receptacles on the windrower as follows:
- Connect the pressure hose to receptacle (A).
  - Connect the return hose to receptacle (B).
  - Connect the case drain hose to receptacle (C).
  - Connect the electrical harness to receptacle (D).

**NOTE:**

The hydraulic hoses should have enough slack to pass by multicoupler (E) without coming into contact with it. This will protect the hoses from rubbing against the multicoupler and becoming damaged. You can increase slack in the hoses by loosening and adjusting the hose holder on the front windrower leg, and pulling the hoses backward toward the windrower.



**Figure 3.55: M1170 Hydraulic and Electrical Connections**

8. **For M1240:** Connect the hydraulic hoses and electrical harness to receptacles on the windrower as follows:
- Connect the pressure hose to receptacle (A).
  - Connect the return hose to receptacle (B).
  - Connect the case drain hose non-flat face coupler to receptacle (C).

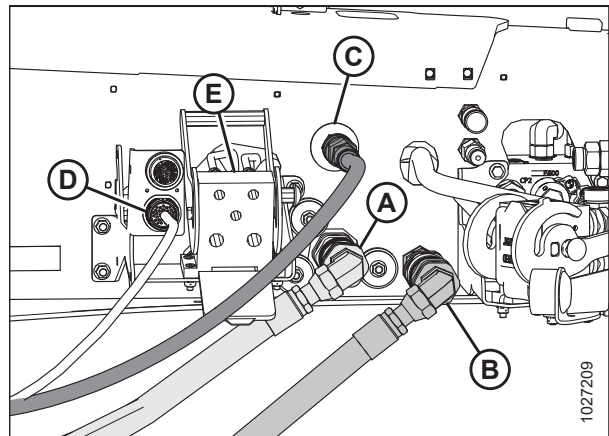
**NOTE:**

The R113 SP when attached to an M1240 requires a different set of low pressure case drain couplers with a different hose connection to the hydraulic tank.

- Connect the electrical harness to receptacle (D).

**NOTE:**

The hydraulic hoses should have enough slack to pass by multicoupler (E) without coming into contact with it. This will protect the hoses from rubbing against the multicoupler and becoming damaged. You can increase slack in the hoses by loosening and adjusting the hose holder on the front windrower leg, and pulling the hoses backward toward the windrower.



**Figure 3.56: M1240 Hydraulic and Electrical Connections (Draper Ready Configuration)**

9. Close the windrower's left side platform. For instructions, refer to windrower operator's manual for procedure.



## OPERATION

### Connecting R1 Series Rotary Disc Header Hydraulics and Electrical – M155 or M155E4 Self-Propelled Windrower

#### **WARNING**

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:**

Hydraulic drive kit (A) (MD #B6272) is required for an R1 Series Rotary Disc Header to operate correctly on M155 and M155E4 Self-Propelled Windrowers. To order this kit, contact your MacDon Dealer.

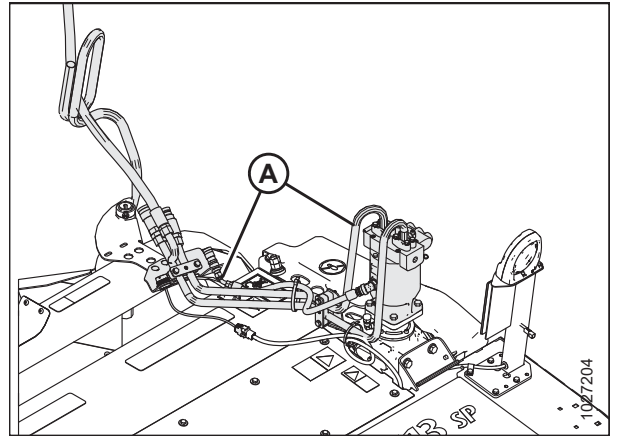


Figure 3.57: Hydraulic Drive Kit (MD #B6272)

1. Disengage and rotate lever (A) counterclockwise to FULLY UP position.
2. Remove cap (B) securing the electrical connector to the frame.

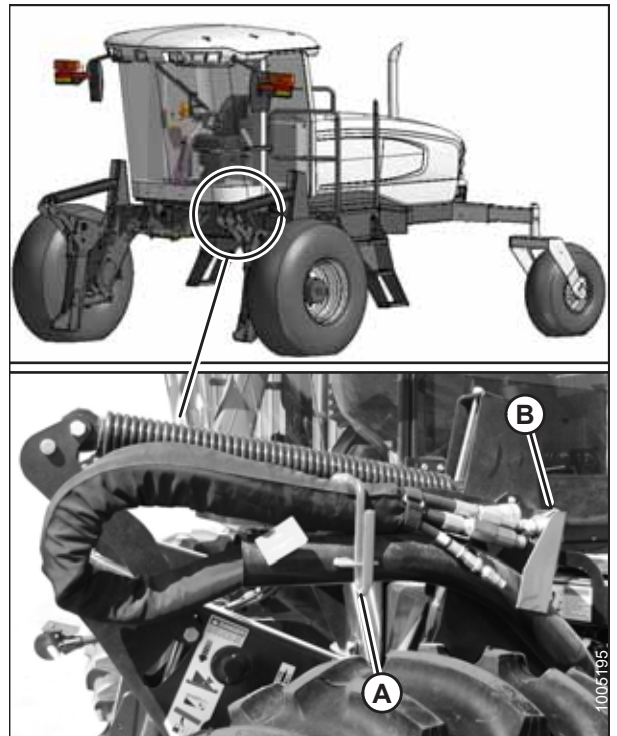


Figure 3.58: Hose Bundle

## OPERATION

3. Move hose bundle (A) from the windrower and rest the bundle on the header.

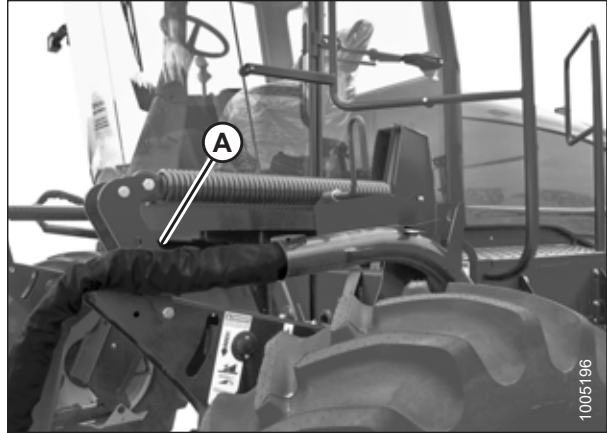


Figure 3.59: Hose Bundle

4. Position the hose support with lower bolt (A) in the forward hole as shown in the illustration at right. Loosen both bolts and adjust as required.

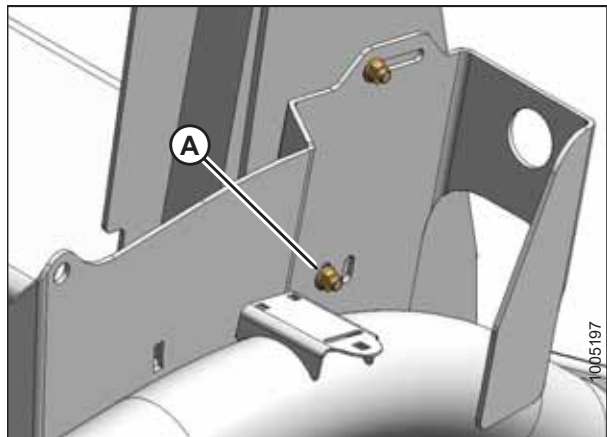


Figure 3.60: Hose Support

5. Install hose support (A) from kit with supplied hardware (B) onto header.

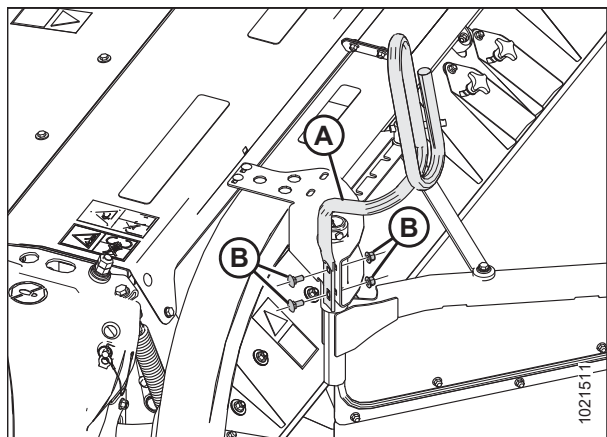


Figure 3.61: Hose Support

## OPERATION

6. Move the windrower's left (cab-forward) platform (A) to the OPEN position. Refer to your windrower operator's manual for instructions.

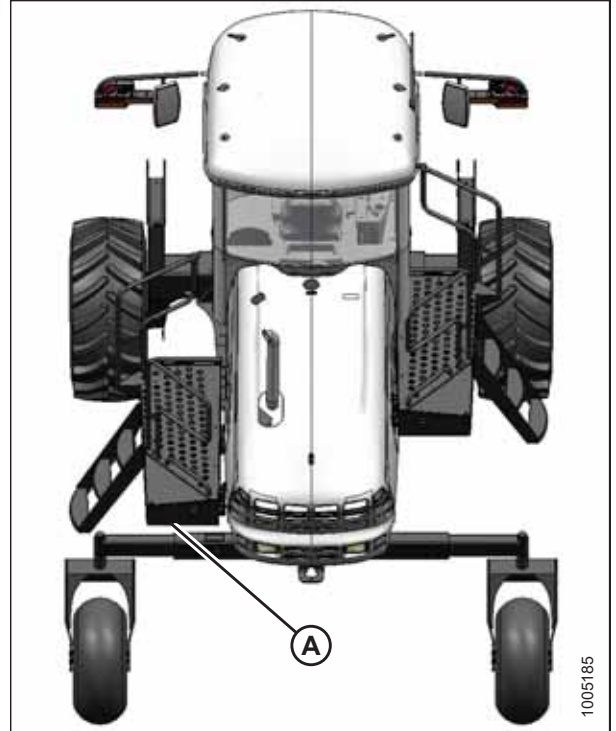


Figure 3.62: Windrower Left Platform in Open Position

7. Route windrower hose bundle (A) through hose support (B) on the header.

**NOTE:**

Keep hoses as straight as possible and avoid rub/wear points that could damage hydraulic hoses.

8. Route pressure hose (C) from the header through support (B) to the windrower.

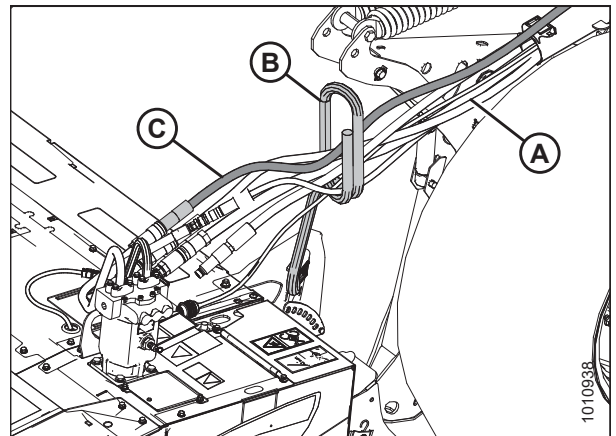


Figure 3.63: Hose Bundle

## OPERATION

9. Connect pressure hose (A) routed from the header to the hydraulic coupler at port M2 (B) on the windrower's auxiliary disc drive manifold (middle valve block).

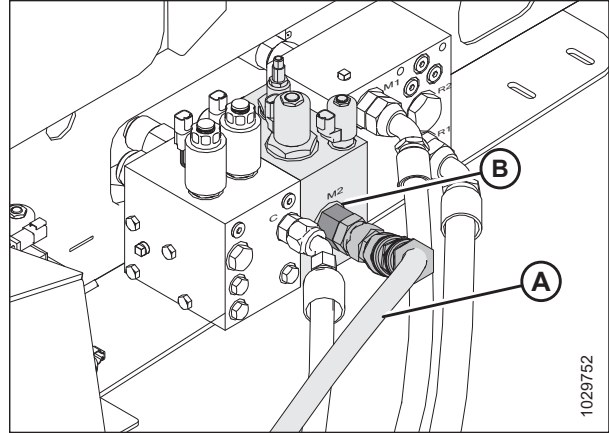


Figure 3.64: Hydraulic Connections

10. Remove caps and plugs from hoses on windrower and lines on header.
11. Connect pressure hose (B) from port M1 (C) on the windrower's drive manifold to the female coupler at the steel line attached to port (A) on the header motor.

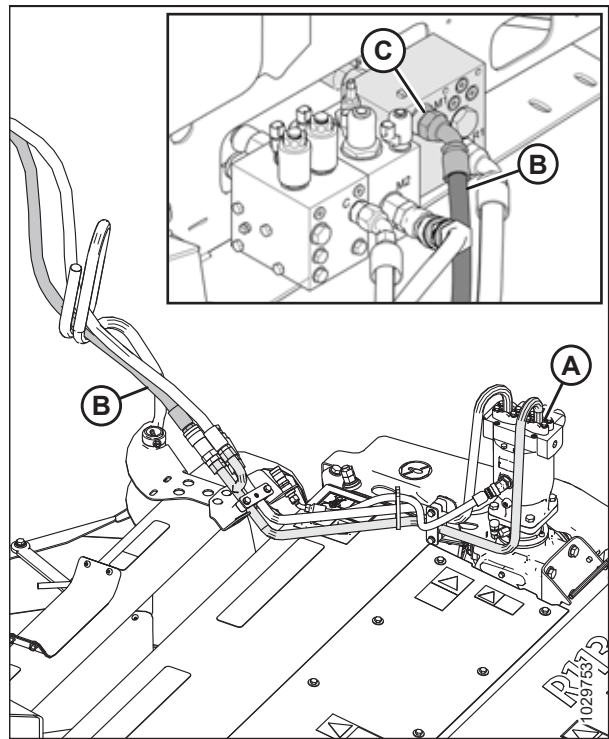


Figure 3.65: Hydraulic Connections

## OPERATION

12. Connect return hose (A) from port R1 (C) on the windrower's drive manifold to the coupler on steel line (B) attached to the aft port on the header motor.

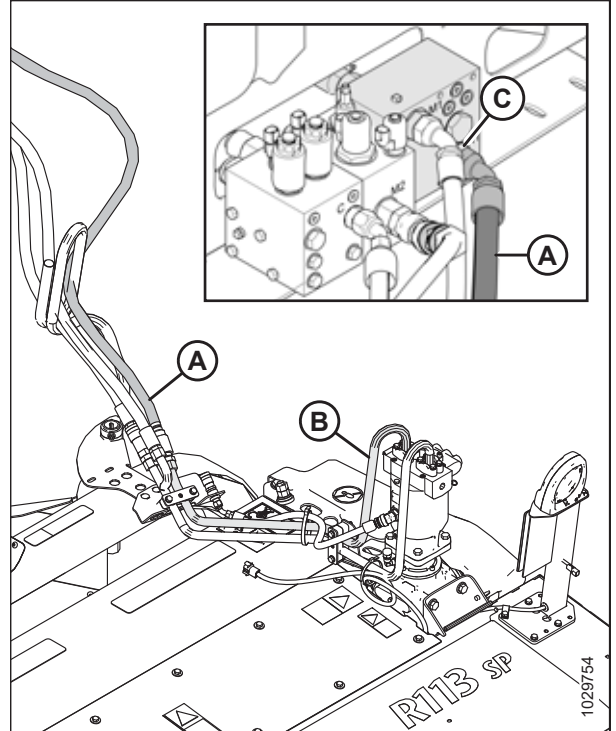


Figure 3.66: Hydraulic Connections

### NOTE:

If the windrower is equipped with a reverser manifold (A) for an auger header, route return hose (B) from port R1 (D) on the windrower's reverser manifold to steel line (C) attached to the aft port on the header motor.

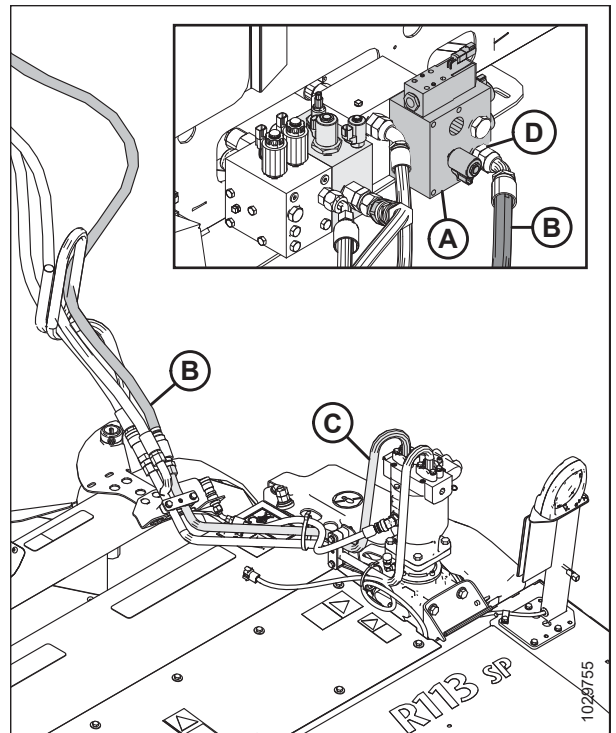


Figure 3.67: Windrower Hose Connections with Reverser

## OPERATION

13. Connect case drain hose (A) from lift manifold port T3 (C) to the 1/2 in. female coupler at the bulkhead, which is attached to motor port (B).

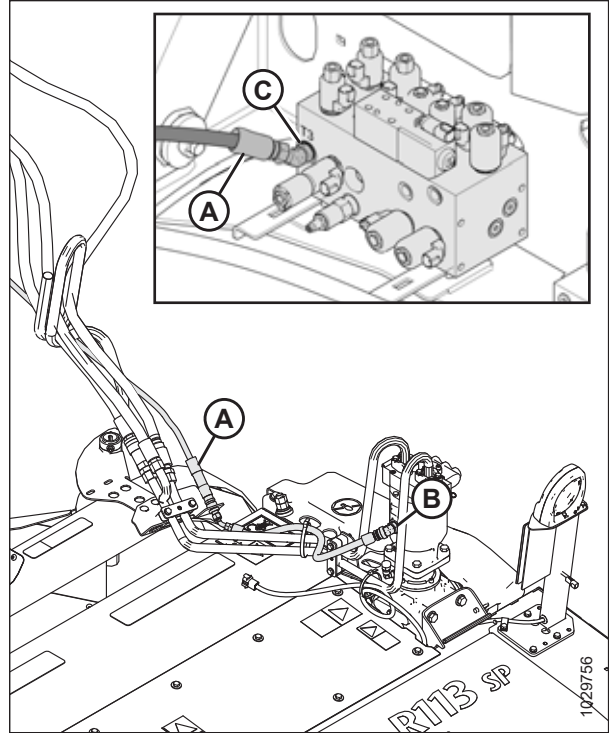


Figure 3.68: Hydraulic Connections

14. Connect electrical harness (A) from the windrower to electrical connector (B) on the header.

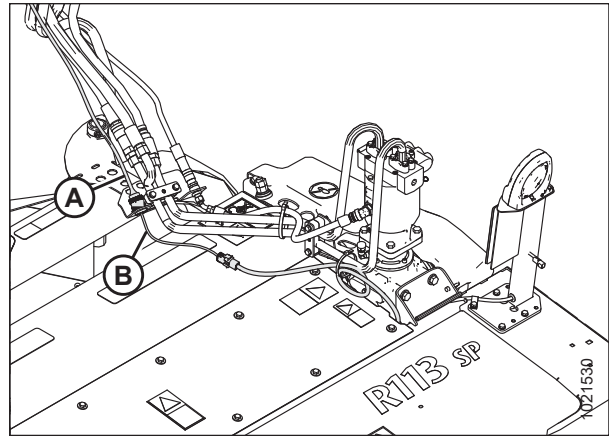


Figure 3.69: Electrical Connection

## OPERATION

15. Lower and lock lever (A).
16. Secure hose (B) with three adjustable straps (C).

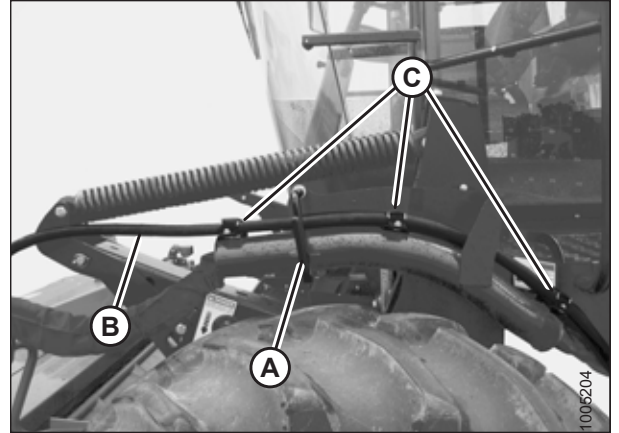


Figure 3.70: Hose Bundle

17. Move platform (A) to the CLOSED position.

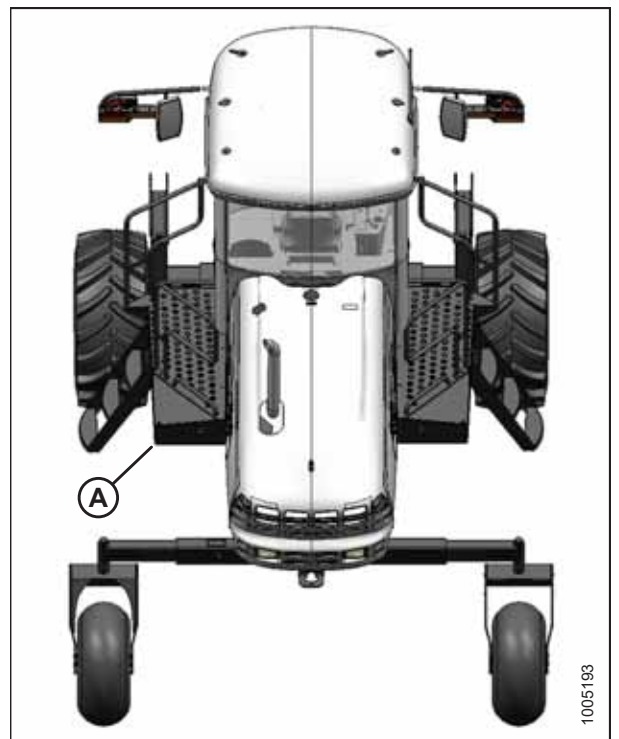


Figure 3.71: Top View of Windrower

## OPERATION

### *Connecting R113 Rotary Disc Header Hydraulics and Electrical – M205 Self-Propelled Windrower*

#### **⚠ WARNING**

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:**

The M205 Self-Propelled Windrower require the compatibility kit (MD #257188) to connect to the R113 SP. The R113 SP must be configured for an M1170 windrower before installing this kit.

- If the header does not have a hydraulic motor, install M1170 compatibility kit (MD #B6845) before proceeding.
- If the header is configured for M155E4 windrower, remove the hydraulic motor from the rotary disc header and install M1170 compatibility kit (MD #B6845) before proceeding. However, do NOT reposition the conditioner drive speed sensor on the rotary disc header as described in the M1170 kit instructions.

#### **NOTE:**

The Compatibility Kit (A) (MD #257188) is required for an R113 Rotary Disc Header to operate correctly on M205 Self-Propelled Windrowers. To order this kit, contact your MacDon Dealer.

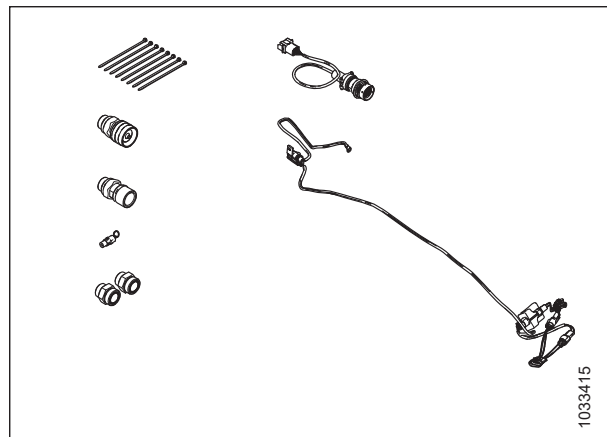
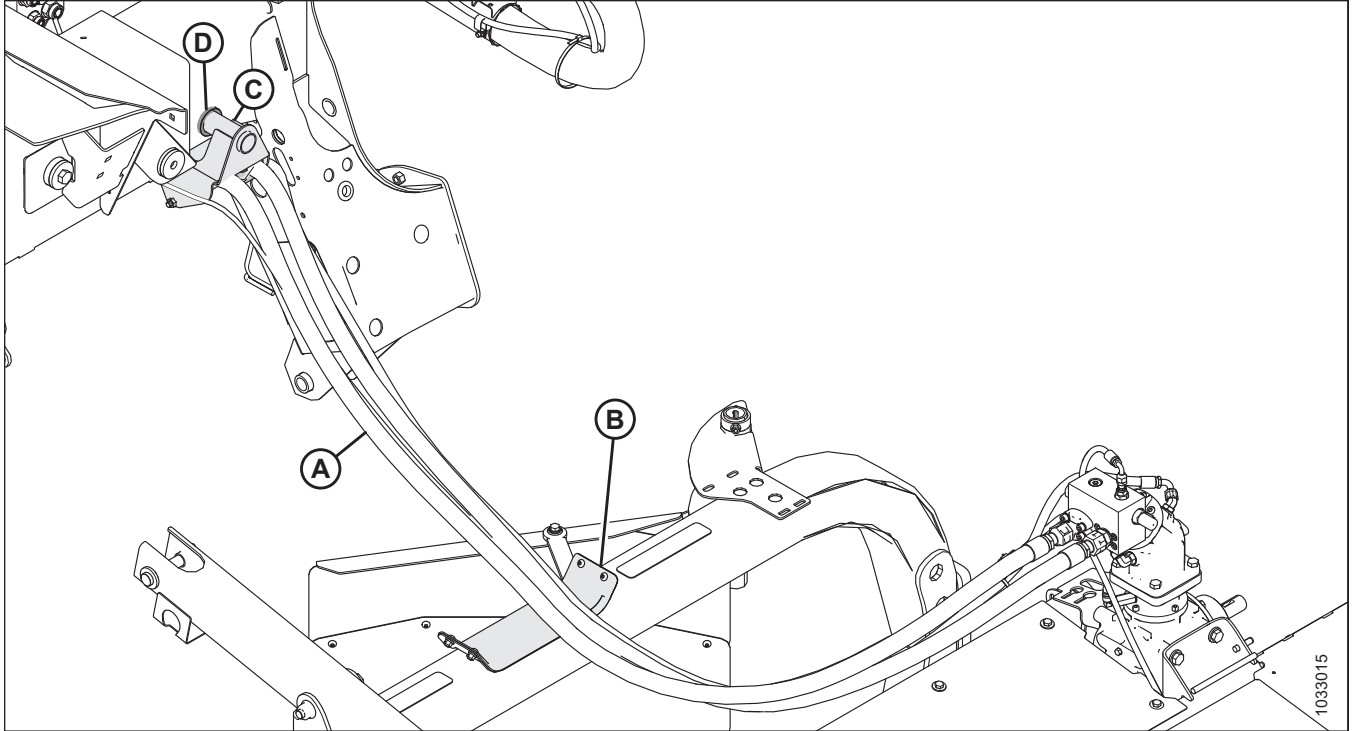


Figure 3.72: M205 Compatibility Kit (MD #257188)



## OPERATION



**Figure 3.73: Hose Routing from Header to Windrower**

1. Route header hose bundle (A) from the header over support (B) and under the windrower frame. Insert pin on hose support (C) into hole (D) in windrower frame near left cab-forward leg.

**IMPORTANT:**

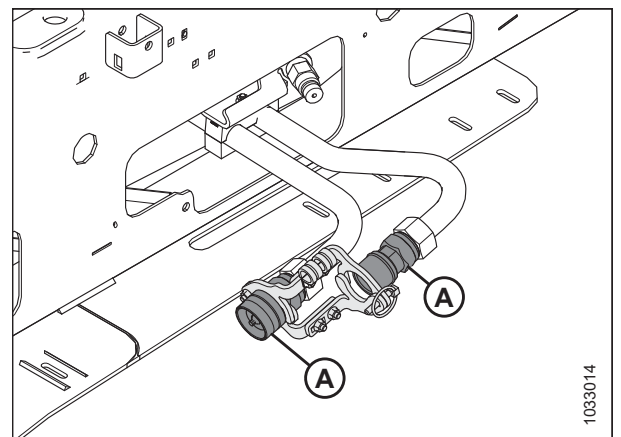
Route hoses as straight as possible and avoid rub/wear points that could damage hydraulic hoses.

**NOTE:**

The pressure hose crosses on top of the return hose once routed past support (B).

2. Proceed according to the type of hydraulic couplers or fittings used on the M205:

- If the M205 is equipped with quick couplers (A) to connect to the header, proceed to [Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower with Quick Couplers](#), page 54.



**Figure 3.74: Pressure and Return Steel Lines with Quick Couplers**

## OPERATION

- If the M205 uses union fittings (A) instead of quick couplers to connect to the header, remove union fittings (A) from the steel lines, and proceed to *Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers*, page 57.

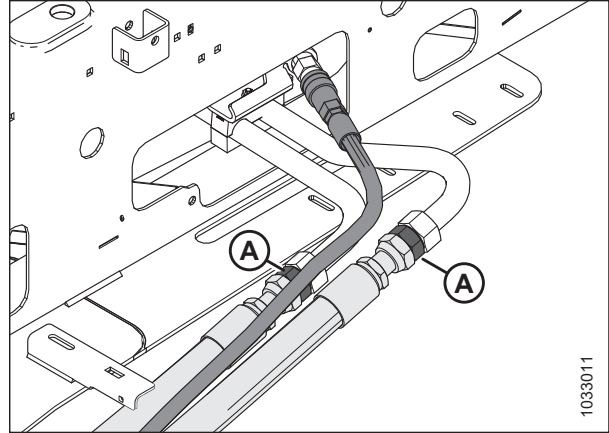


Figure 3.75: Pressure and Return Steel Lines with Union Fittings

- If the M205 has plugs (A) installed in the steel lines then proceed to *Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers*, page 57.

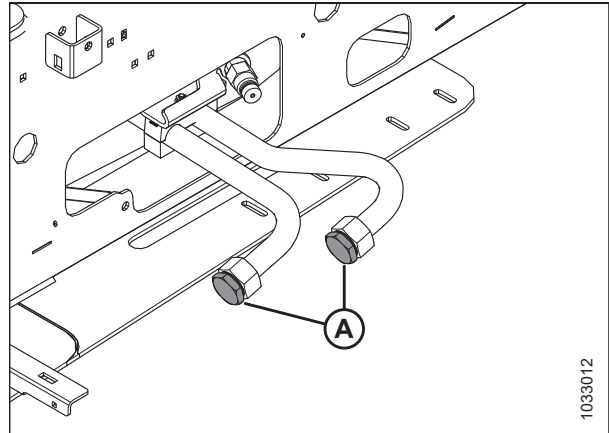


Figure 3.76: Pressure and Return Steel Lines with Plugs

### Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower with Quick Couplers

1. Install female coupler (A) onto header **PRESSURE** hose (B).
2. Install male coupler (C) onto header **RETURN** hose (D).

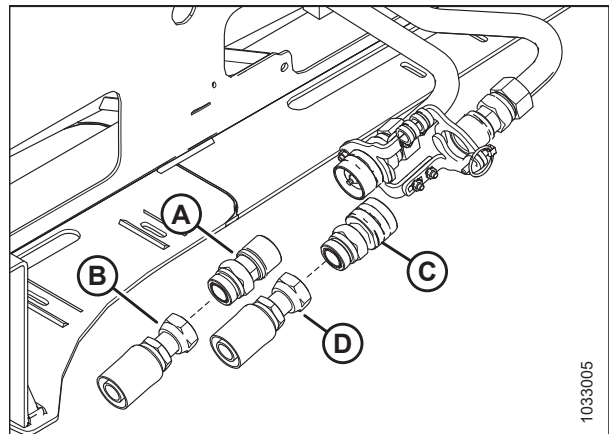


Figure 3.77: M205 equipped with Quick Couplers

## OPERATION

3. Connect **PRESSURE** coupler (A) to inboard steel line coupler (B).

**NOTE:**

For reference, the other end of the pressure hose is connected to split flange clamp (C) on the hydraulic motor.

4. Connect **RETURN** coupler (D) to outboard steel line coupler (E).

**NOTE:**

For reference, the other end of the return hose is connected to fitting (F) on the hydraulic motor.

5. Close coupler lock assembly (G) over couplers and secure with pin (H).

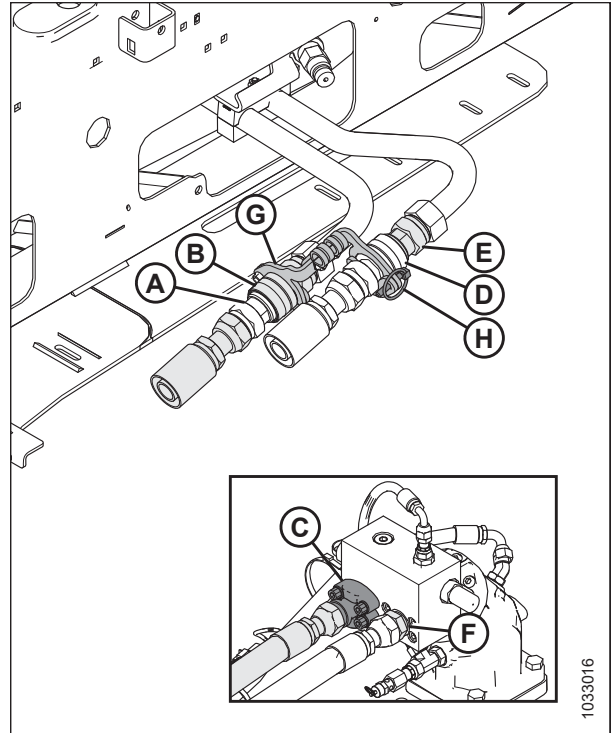


Figure 3.78: Header Pressure and Return Connections

6. Confirm quick couplers are connected properly. Couplers will restrict oil flow if they are not fully mated (O-ring [A] will be visible). This will generate excessive heat, damaging the drive components and the couplers themselves. Couplers (B) at right are fully mated, and couplers (C) at right are not fully mated.

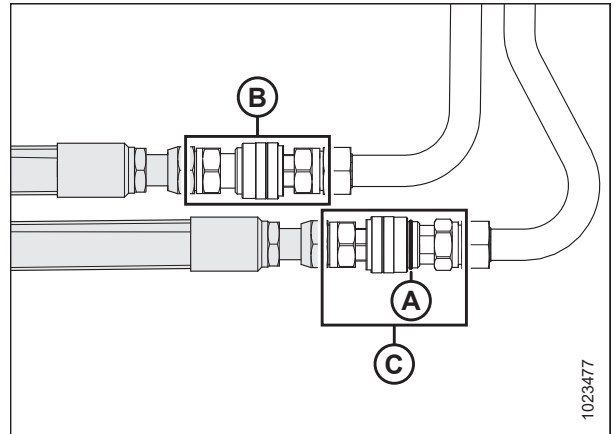
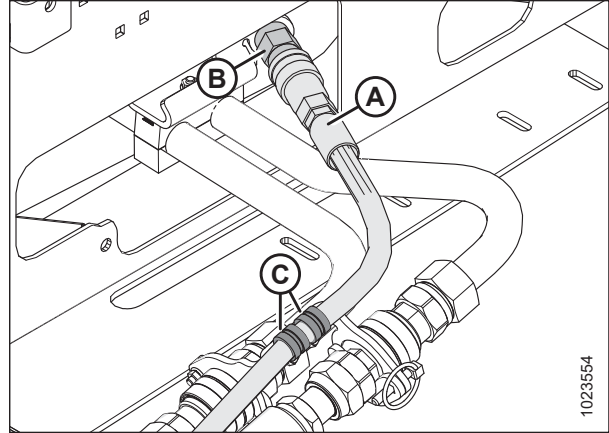


Figure 3.79: Quick Couplers – View from Top

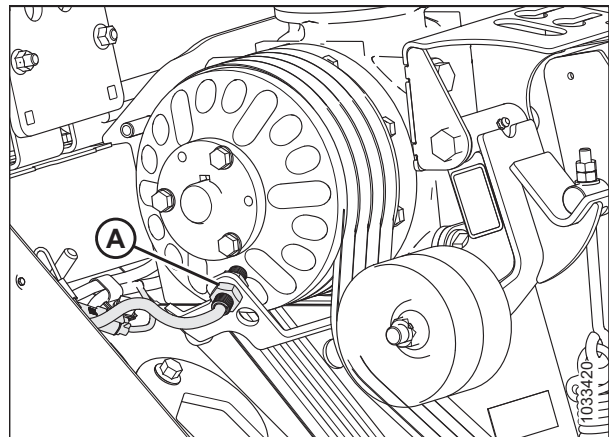
## OPERATION

7. Connect case drain hose (A) to 1/2 in. male flat face fitting (B).
8. Secure case drain hose to coupler lock assembly with two clamps (C).
9. Open the left driveshield. For instructions, refer to [3.6.1 Opening Driveshields, page 76](#).



**Figure 3.80: Case Drain Connection**

10. Ensure the speed sensor is installed correctly for the windrower – use top hole (A) for M205 SP Windrower.
11. Close the left endshield. For instructions, refer to [3.6.2 Closing Driveshields, page 77](#).



**Figure 3.81: Speed Sensor**

## OPERATION

### Connecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers

1. Install union fitting (A) onto header pressure hose (B).
2. Install union fitting (C) onto header return hose (D).

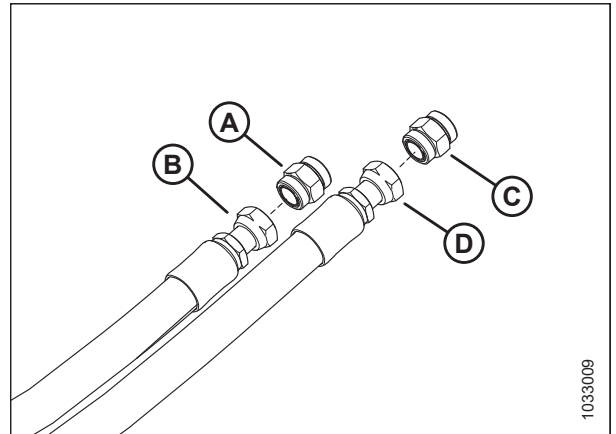


Figure 3.82: Header Hoses and Union Fittings

3. Connect **PRESSURE** hose with union fitting (A) to inboard steel line (B).

**NOTE:**

For reference, the other end of the pressure hose is connected to split flange clamp (C) on the hydraulic motor.

4. Connect **RETURN** hose with union fitting (D) to outboard steel line (E).

**NOTE:**

For reference, the other end of the return hose is connected to fitting (F) on the hydraulic motor.

5. Connect case drain hose (G) to 1/2 in. male flat face fitting (H).
6. Open the left driveshield. For instructions, refer to [3.6.1 Opening Driveshields, page 76](#).

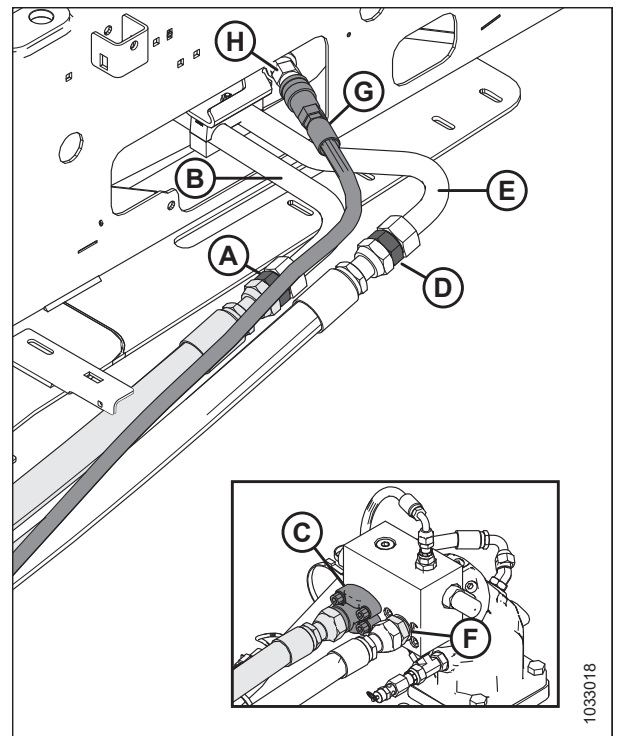


Figure 3.83: Header Hydraulic Connections

## OPERATION

7. Ensure the speed sensor is installed correctly for the windrower – use top hole (A) for M205 SP Windrower.
8. Close the left endshield. For instructions, refer to [3.6.2 Closing Driveshields, page 77](#).

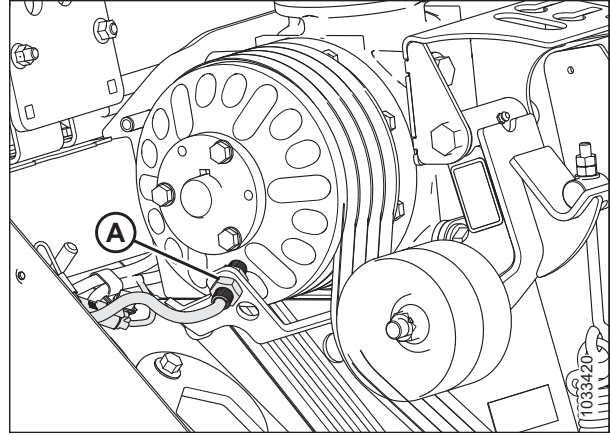


Figure 3.84: Speed Sensor

### Connecting R113 Rotary Disc Header Electrical – M205 Self-Propelled Windrower

1. If M205 is equipped with a draper/auger header drive, disconnect hose bundle connectors (not shown) from chassis harness connectors labeled HC-2 (A) and HC-1 (B).

**NOTE:**

If M205 was connected to an R80/R85 rotary disc header, the header was disconnected from the chassis harness when the header was detached from the windrower.

2. Connect adapter harness as follows:
  - Connect 8-pin female connector (C) to chassis harness connector HC-2 (A).
  - Route harness between frame channel and protrusion (D) (shown partly cutoff), and on top of the front axle.
  - Connect 29-pin round male connector (E) to R113 header connector (F).

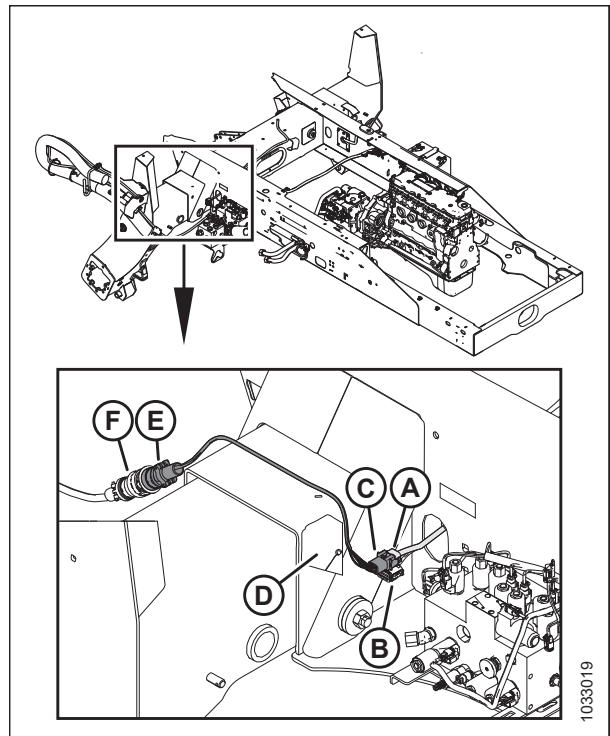


Figure 3.85: Adapter Harness Installation

## OPERATION

### *Installing Header Drive Pump Power Width Modulation (PWM) Module*

3. Disconnect 4-pin female piston pump connector (A) from header pump relay harness (B).

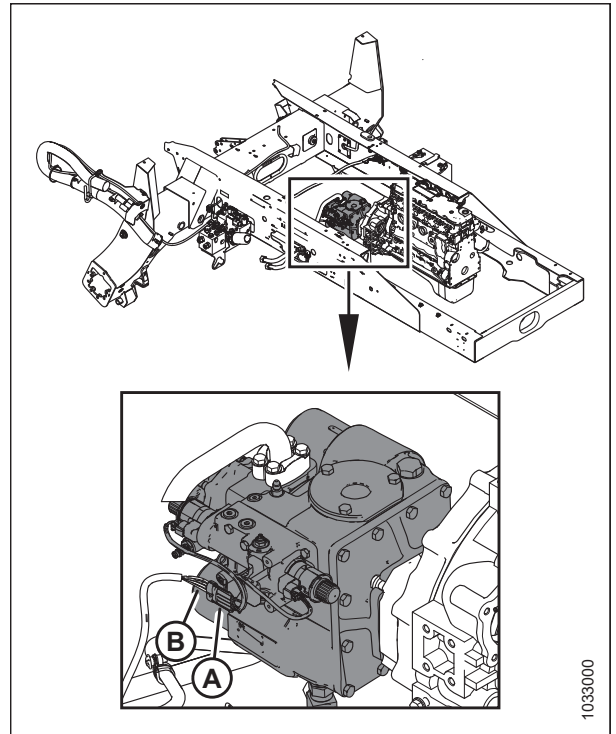
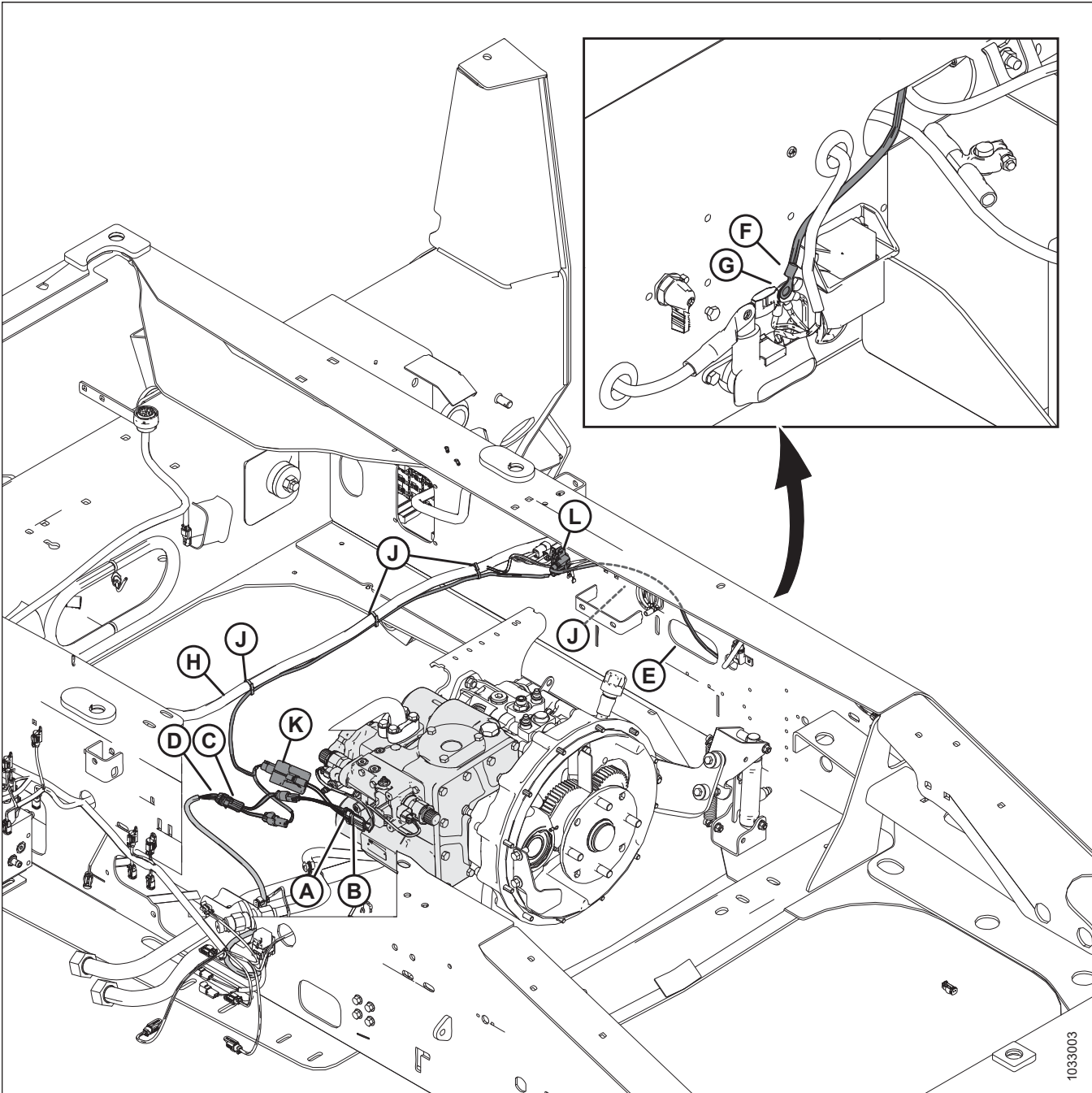


Figure 3.86: Piston Pump

## OPERATION



**Figure 3.87: Power Limiter Harness Installation**

4. Connect the power limiter harness (MD #256651) as follows:

- Connect 4-pin male connector (A) to piston pump (B).
- Connect 4-pin female connector (C) to header pump relay harness (D).
- Route power wire with terminal (F) through frame channel hole (E) and connect to bus bar stud (G) beside battery. Tighten terminal nut to 11 Nm (100 lbf-in).
- Secure harness to chassis harness (H) using cable ties (J) Locations of module (K) and fuse (L) are approximate.



## OPERATION

5. Confirm the power limiter harness is functional by checking the red LED light on module (A):
  - If the light is solid, the harness is functioning correctly.
  - If the light is flashing, the connection is incorrect:
    - The power supply might be reversed.
    - The polarity of the 4-pin connections to the header pump relay harness or to the piston pump might be reversed.
6. Confirm the adapter harness is functional:
  - Depending on the cab display module (CDM) software version, the header ID might appear as a “Disc” during the initial engine start , or displayed as binary code “0001” in the upper right portion of the HEADER CUT WIDTH screen. Both of these header ID’s are correct.
  - Confirm the 4-way hazard lights and turn signals operate correctly.

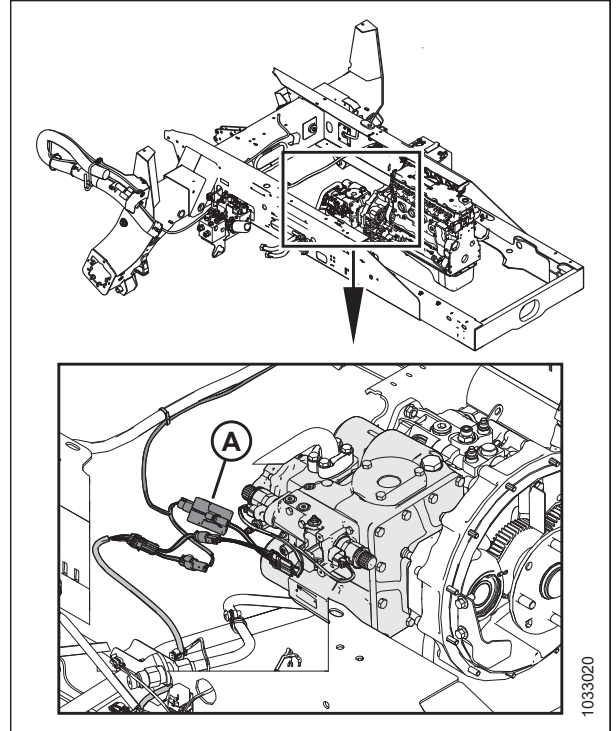


Figure 3.88: Power Limiter Harness Module

1033020

## 3.5 Detaching Header from Windrower

### 3.5.1 Detaching R1 Series Rotary Disc Header from M1 Series Windrower

#### WARNING

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

#### WARNING

Check to be sure all bystanders have cleared the area.

1. Start the engine.
2. Press switch (A) to raise the header to the maximum height.
3. Shut down the engine, and remove the key from the ignition.



Figure 3.89: GSL

4. Engage the safety props on both lift cylinders as follows:
  - a. Pull lever (A) toward you to release, and then rotate toward header to lower the safety prop onto the cylinder.
  - b. Repeat for the opposite lift cylinder.

#### IMPORTANT:

Ensure the safety props engage over the cylinder piston rods. If the safety prop does **NOT** engage properly, raise the header until the safety prop fits over the rod.

5. Open the platform. For instructions, refer to the windrower operator's manual.

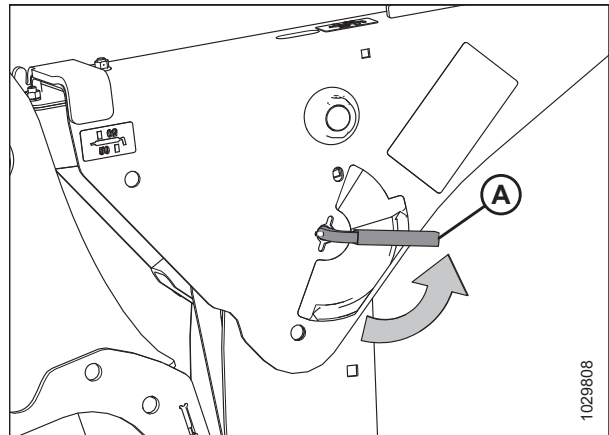


Figure 3.90: Safety Prop Lever

## OPERATION

6. Disconnect electrical harness (A) and hydraulic hoses (B), (C), and (D) from the windrower.

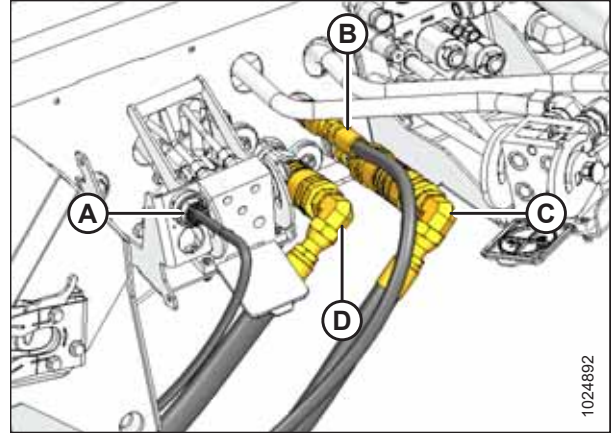


Figure 3.91: Header Drive Hydraulics

7. Remove hose support (A) and the hose bundle from the windrower frame.

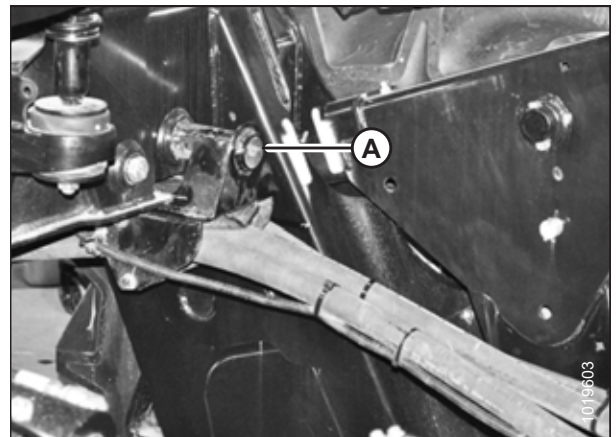


Figure 3.92: Hoses on Windrower

8. Slide support (A) into center-link support (B) and secure with hardware (C).

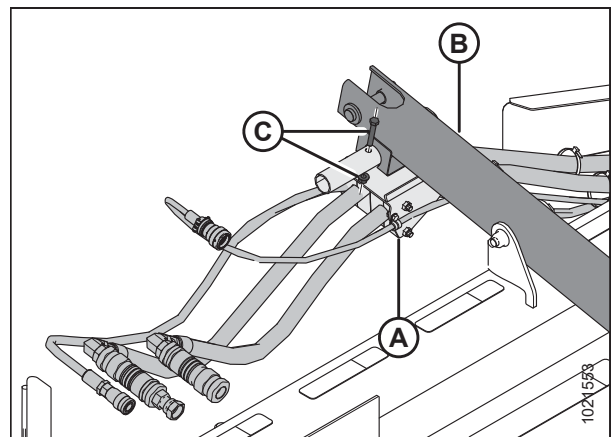


Figure 3.93: Hose Storage Position

## OPERATION

9. Store hoses (A) and electrical harness (B) disconnected from the windrower in Step 6, page 63 into storage plate (C).

**NOTE:**

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

**NOTE:**

Some parts removed from the illustration for clarity.

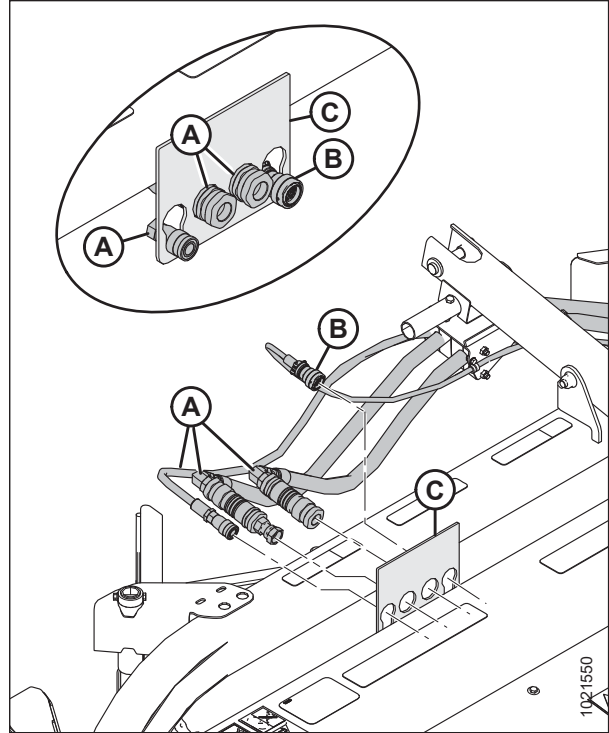


Figure 3.94: Hydraulic Storage Plate

10. Remove hairpin (B) from clevis pin (A). Remove clevis pin from header support (C) on both sides of the header.

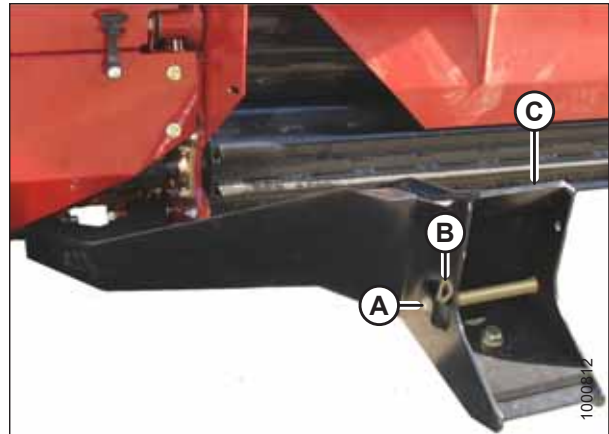


Figure 3.95: Header Supports

## OPERATION

### *Windrowers with center-link self-alignment kit only:*

11. Release center-link latch (A) before returning to the cab.

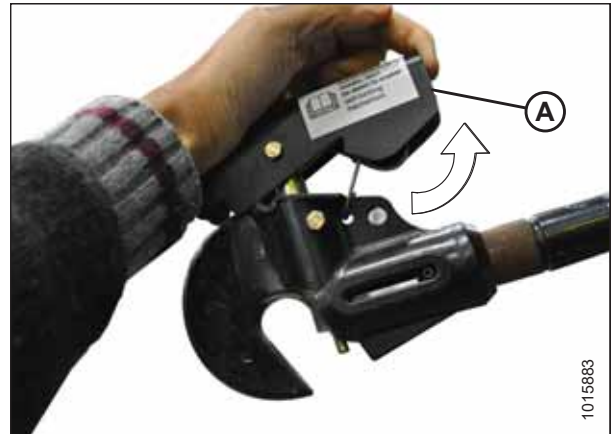


Figure 3.96: Center-Link

12. Disengage the safety props on both lift cylinders as follows:
  - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
  - b. Repeat for the opposite cylinder.

**NOTE:**

If the safety prop will **NOT** disengage, raise the header to release the prop.

13. Repeat for the opposite side.



### **WARNING**

Check to be sure all bystanders have cleared the area.

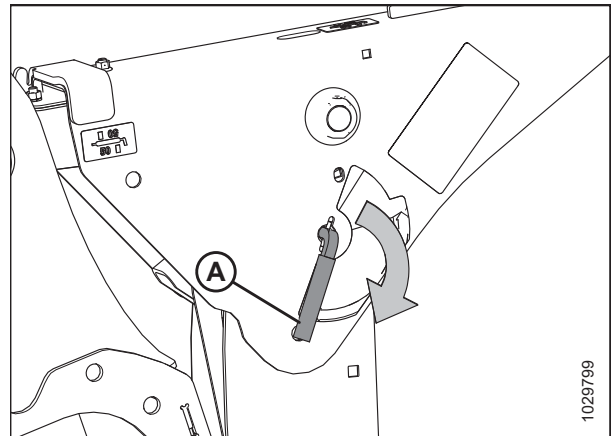


Figure 3.97: Safety Prop Lever

14. Start the engine.
15. Remove header float when prompted by the Harvest Performance Tracker (HPT).

**NOTE:**

If not prompted by the HPT to remove float, remove float manually.

16. Lower the header fully.

## OPERATION

### *Self-aligning center-link (if installed):*

17. Use HEADER TILT cylinder switches (A) on the GSL to release the load on the center-link cylinder.
18. Operate the link lift cylinder with REEL UP switch (B) to disengage the center-link from the header.

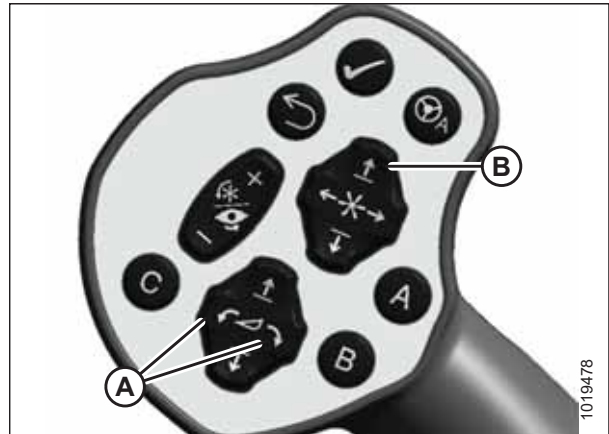


Figure 3.98: GSL

### *Non-self-aligning center-link:*

19. Shut down the engine, and remove the key from the ignition.
20. Lift hook release (A) and lift hook (B) off header pin.



## WARNING

Check to be sure all bystanders have cleared the area.

21. Start the engine.

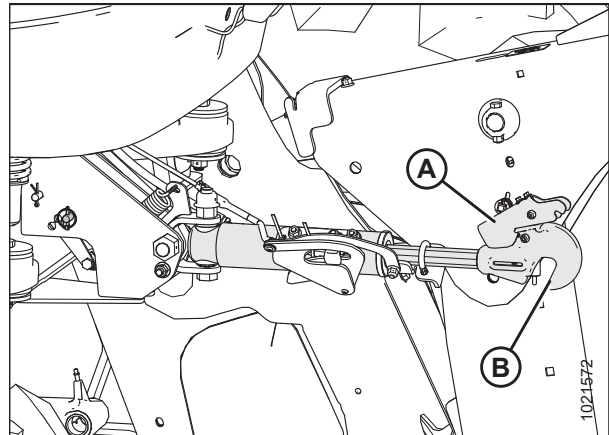


Figure 3.99: Hydraulic Center-Link

22. Back the windrower slowly away from the header.
23. Reinstall clevis pin (A) through support (C) and secure with hairpin (B). Repeat for opposite side.

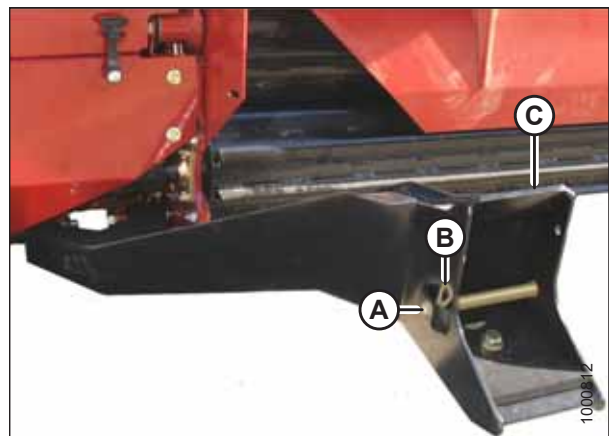


Figure 3.100: Header Support

### 3.5.2 Detaching R1 Series Rotary Disc Header from M155 or M155E4 Self-Propelled Windrower

**⚠ WARNING**

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 header to the ground. If the ground is soft, place blocks under the header.
2. Stop the engine, and remove the key from the ignition.
3. Move the left side (cab-forward) platform (A) to the open position.

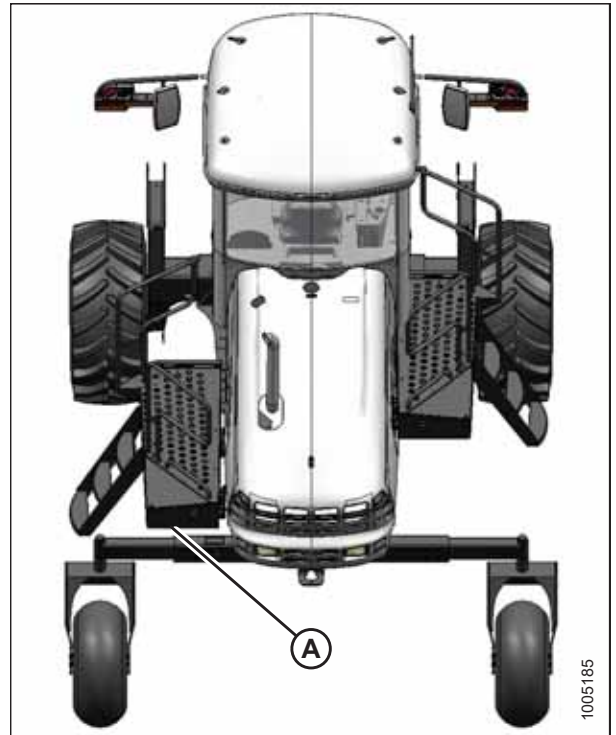


Figure 3.101: Windrower Left Side Platform

4. Disconnect hose (A) from port M2 on the disc drive valve.

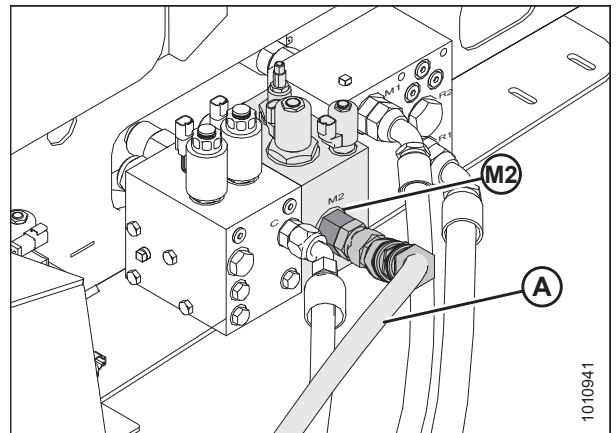


Figure 3.102: Hydraulic Connections



## OPERATION

5. Raise lever (A) and undo the three cinch straps (C).
6. Move hose (B) to store on the header.

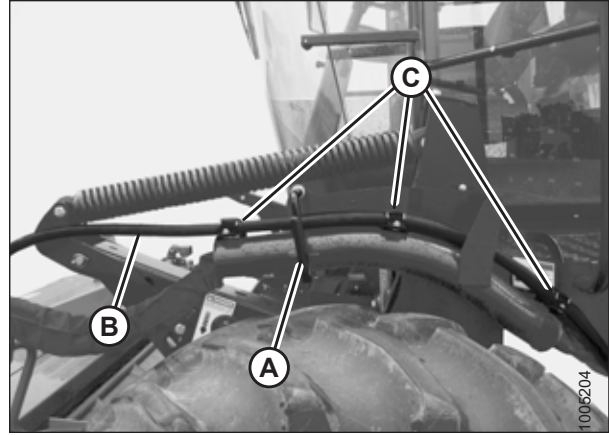


Figure 3.103: Hose Bundle

7. Disconnect the following hoses from the hydraulic motor:
  - Pressure hose (A)
  - Return hose (B)
  - Case drain hose (C)
8. Install caps on the connectors and hose ends (if equipped) to prevent buildup of dirt and debris.

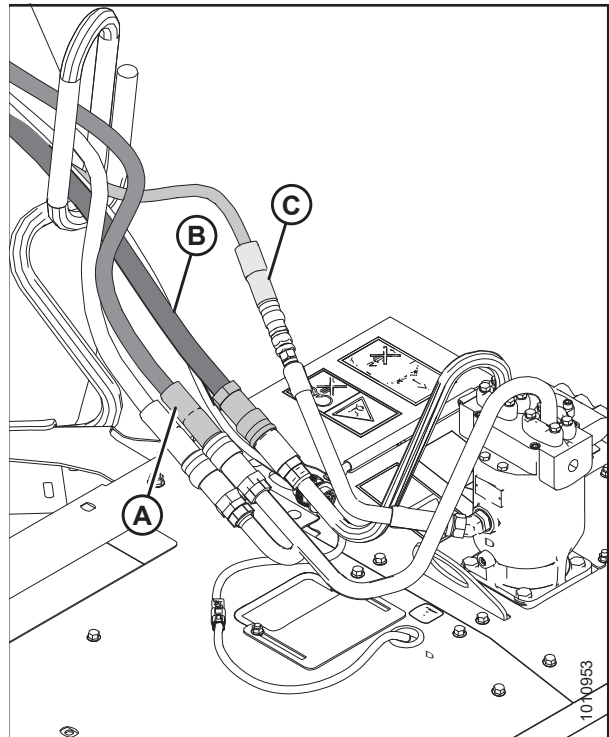


Figure 3.104: Hose Bundle



## OPERATION

- Disconnect electrical connector (A) by turning the collar counterclockwise and pulling connector to disengage.

**NOTE:**

Hydraulic lines and hoses hidden on illustration to show the electrical connection.

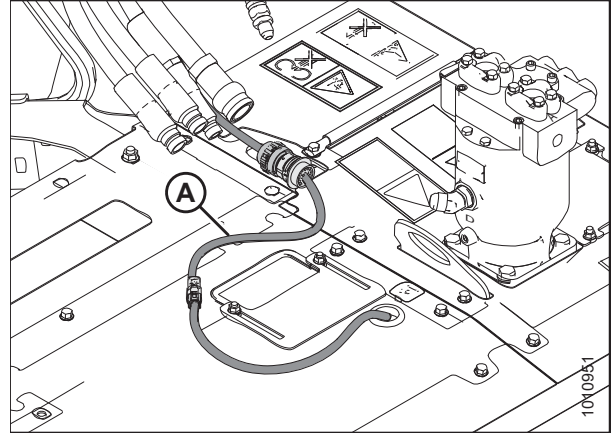


Figure 3.105: Electrical Connection

- Move the hose bundle from the header to the left (cab-forward) hose support (B).
- Rotate lever (A) clockwise and push to engage bracket.
- Route the electrical harness through hose support (B) and attach cap to electrical connector (C).

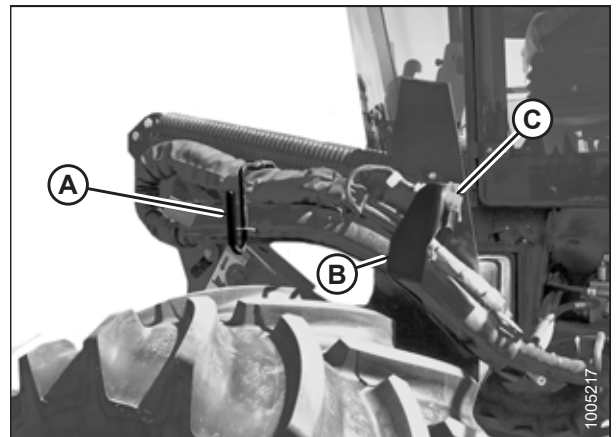


Figure 3.106: Hose Bundle

## OPERATION

13. Move windrower platform (A) to the CLOSED position.
14. Refer to the windrower operator's manual to mechanically detach the header from the windrower.

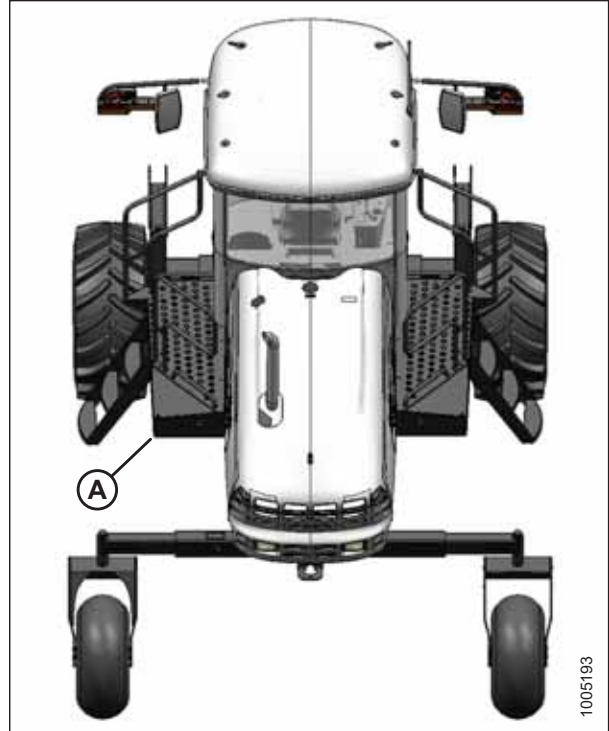


Figure 3.107: M155 Windrower

### 3.5.3 Detaching R113 SP from M205 Self-Propelled Windrower

#### **WARNING**

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 header to the ground. If the ground is soft, place blocks under the header.
2. Stop the engine, and remove the key from the ignition.

## OPERATION

3. Move the left side (cab-forward) platform (A) to the open position.
4. To disconnect an R113 SP from M205 equipped with quick couplers, refer to *Disconnecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower with Quick Couplers*, page 71.
5. To disconnect an R113 SP from M205 not equipped with quick couplers, refer to *Disconnecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers*, page 72.

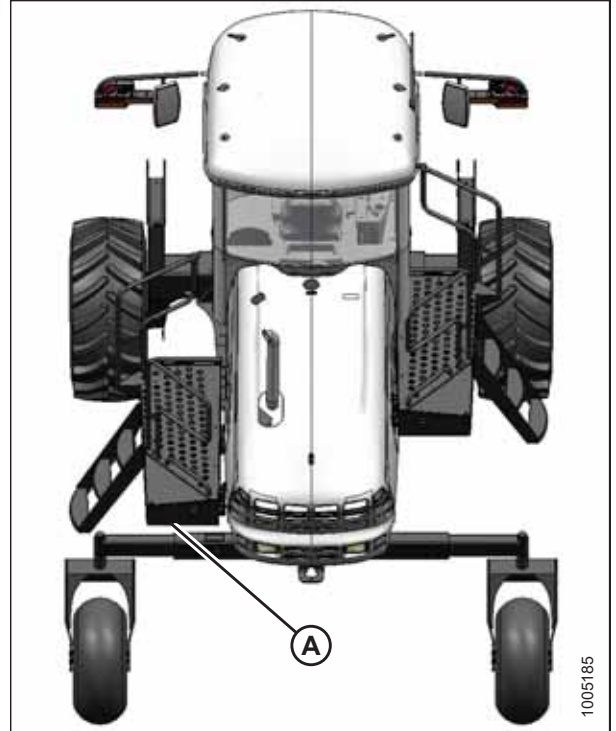


Figure 3.108: Windrower Left Side Platform

### *Disconnecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower with Quick Couplers*

1. Disconnect case drain hose (A) from 1/2 in. male flat face fitting (B).
2. Remove two clamps (C) securing case drain hose to coupler lock assembly.

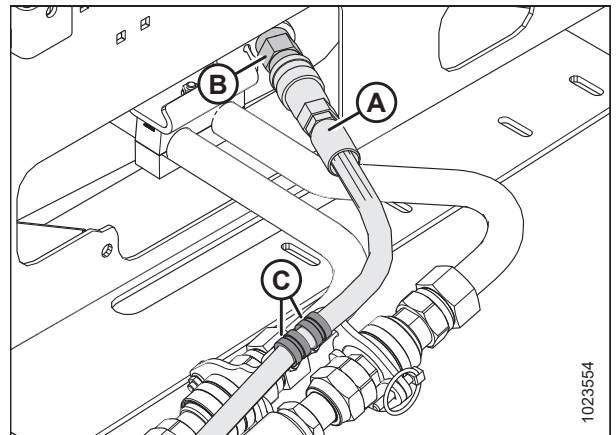


Figure 3.109: Case Drain Connection

## OPERATION

3. Disconnect **PRESSURE** coupler (A) from inboard steel line coupler (B).
4. Disconnect **RETURN** coupler (C) from outboard steel line coupler (D).
5. Remove pin (E) and open coupler lock assembly (F) over couplers.
6. Disconnect electrical connections. For instructions, refer to *Disconnecting R113 Rotary Disc Header Electrical – M205 Self-Propelled Windrower*, page 73.

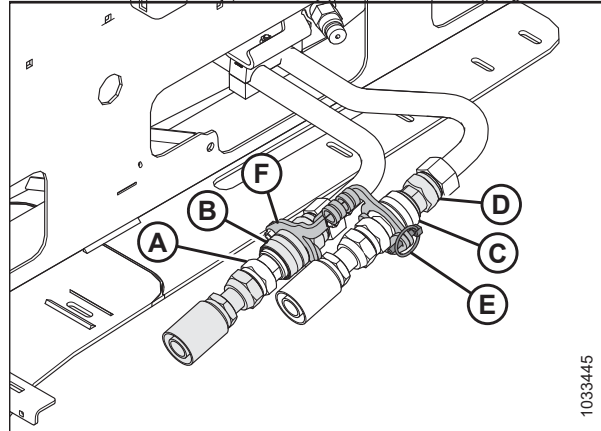


Figure 3.110: Header Pressure and Return Connections

### *Disconnecting R113 Rotary Disc Header Hydraulics – M205 Self-Propelled Windrower without Quick Couplers*

1. Disconnect **PRESSURE** hose with union fitting (A) from inboard steel line (B).  
**NOTE:**  
For reference, the other end of the pressure hose is connected to split flange clamp (C) on the hydraulic motor.
2. Disconnect **RETURN** hose with union fitting (D) from outboard steel line (E).  
**NOTE:**  
For reference, the other end of the return hose is connected to fitting (F) on the hydraulic motor.
3. Disconnect case drain hose (G) from 1/2 in. male flat face fitting (H).
4. Disconnect electrical connections. For instructions, refer to *Disconnecting R113 Rotary Disc Header Electrical – M205 Self-Propelled Windrower*, page 73.

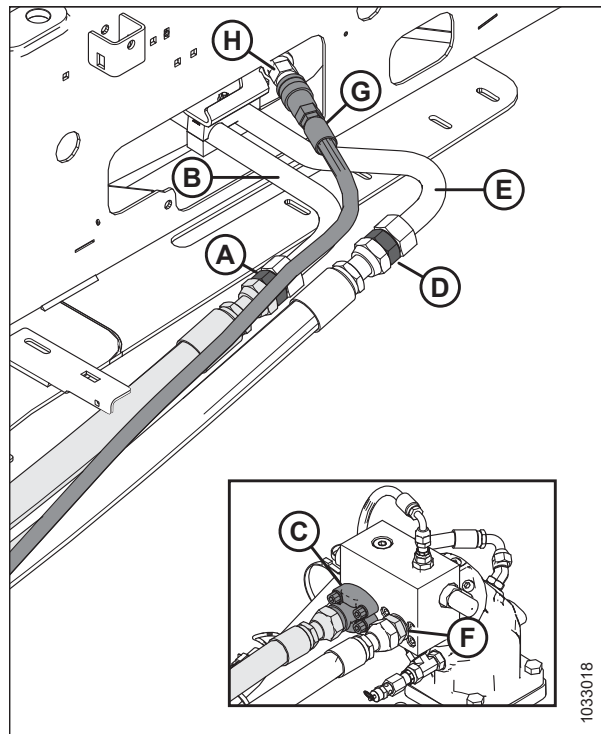


Figure 3.111: Header Hydraulic Connections

## OPERATION

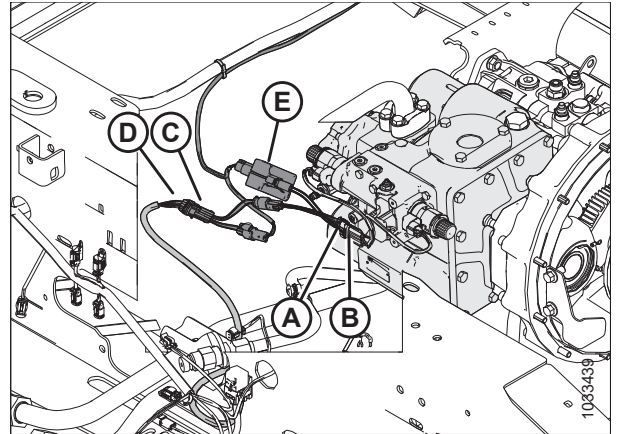
### *Disconnecting R113 Rotary Disc Header Electrical – M205 Self-Propelled Windrower*

#### **IMPORTANT:**

Ensure module (E) is disconnected at header pump relay harness (D) when operating with any other header to ensure that full hydraulic header drive performance is achieved.

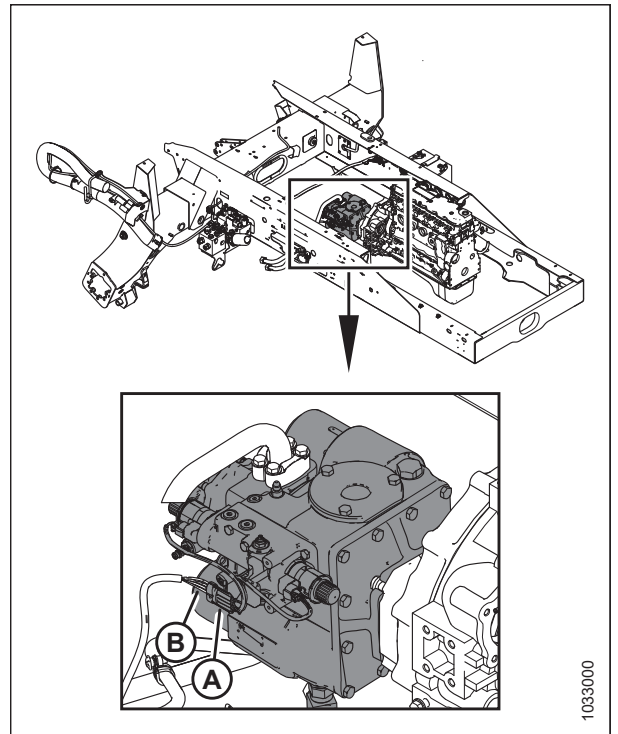
#### ***Disconnect the following when switching headers:***

1. Disconnect the power limiter harness as follows:
  - Disconnect 4-pin male connector (A) from piston pump (B).
  - Disconnect 4-pin female connector (C) from header pump relay harness (D).



**Figure 3.112: Power Limiter Harness Removal**

2. Disconnect 4-pin female piston pump connector (A) from header pump relay harness (B).



**Figure 3.113: Piston Pump**

## OPERATION

3. Disconnect adapter harness as follows:
  - Disconnect 8-pin female connector (B) from chassis harness connector HC-2 (A).
  - Disconnect 29-pin round male connector (C) from R113 SP header connector (D).
4. Proceed to Step 6, [page 75](#).

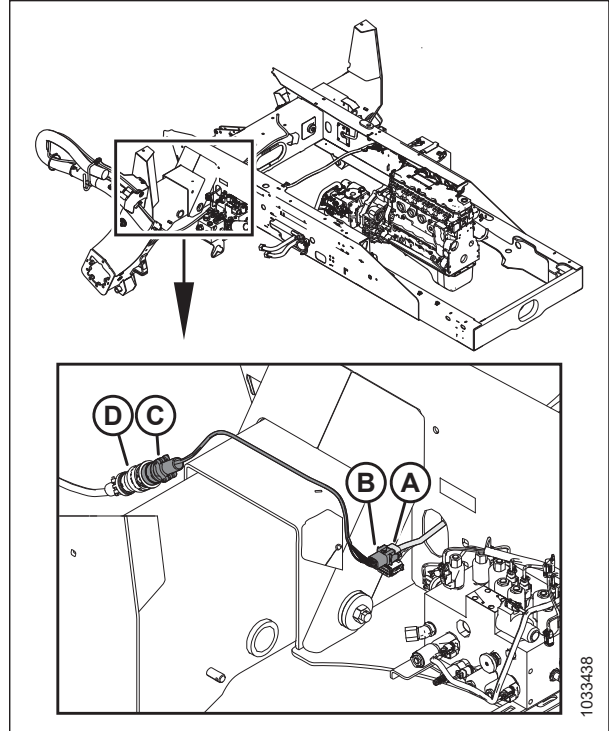


Figure 3.114: M205 Adapter Harness

***Disconnect the following when storing or servicing headers:***

5. Disconnect 29-pin round male connector (A) from R113 SP header connector (B).

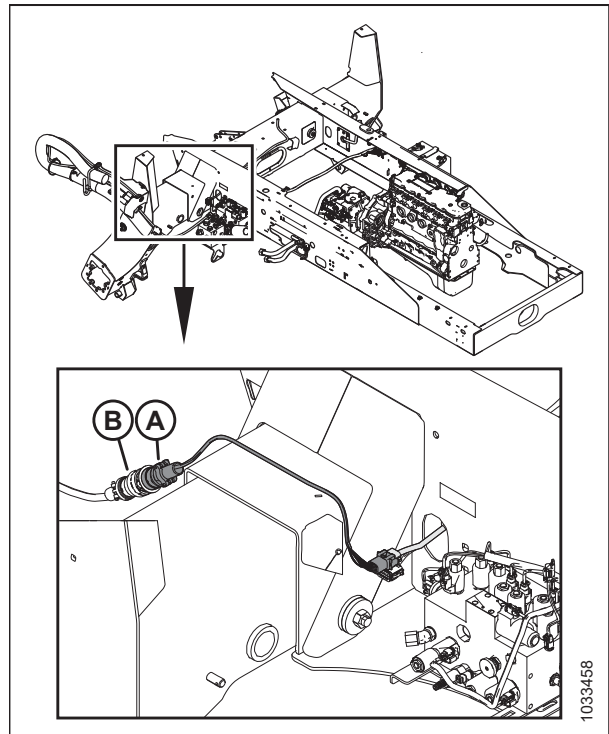
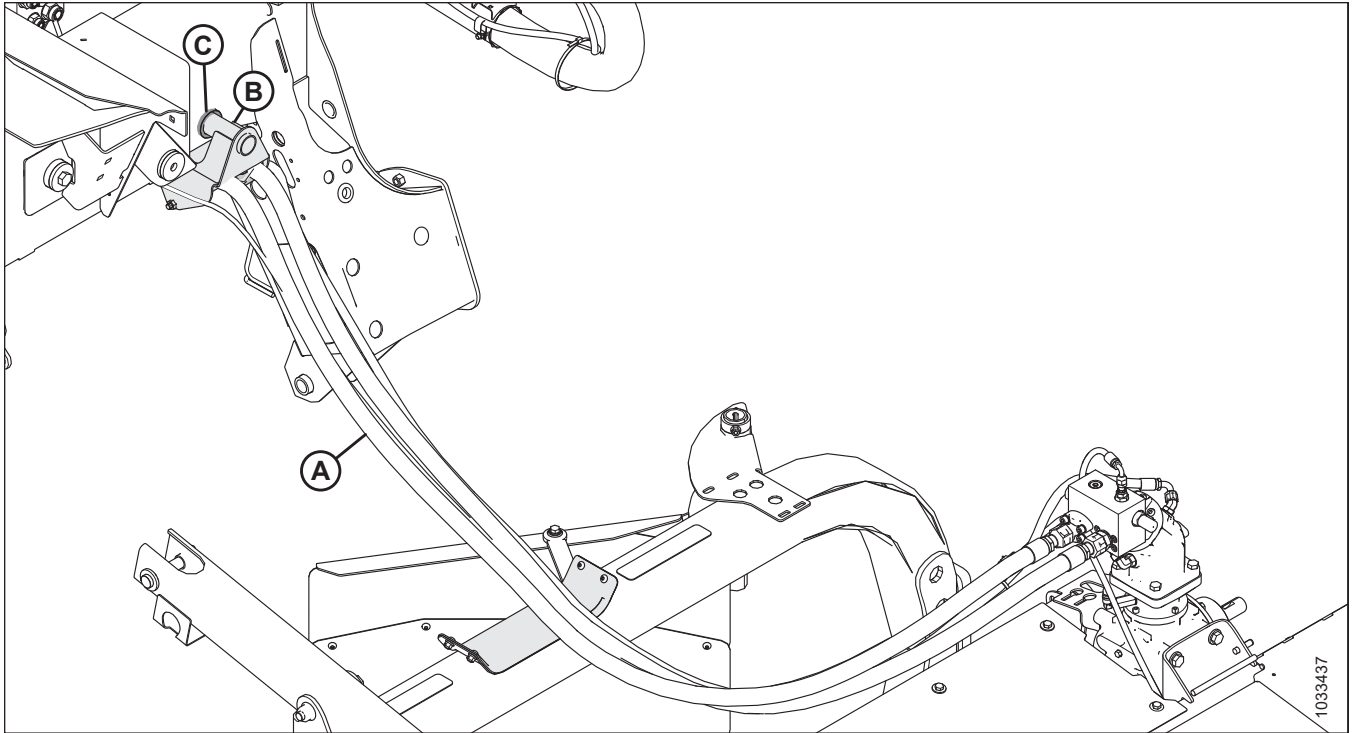


Figure 3.115: M205 Adapter Harness

## OPERATION



**Figure 3.116: Detaching Header Hose from Windrower**

6. Remove hose support pin (B) from hole (C) in windrower frame.
7. Place header hose bundle (A) on top of rotary disc header.

## 3.6 Driveshields

### 3.6.1 Opening Driveshields

**⚠ CAUTION**

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

**NOTE:**

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

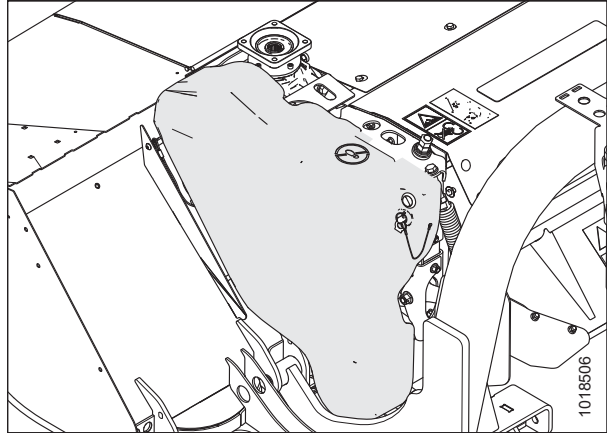


Figure 3.117: Left Driveshield

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

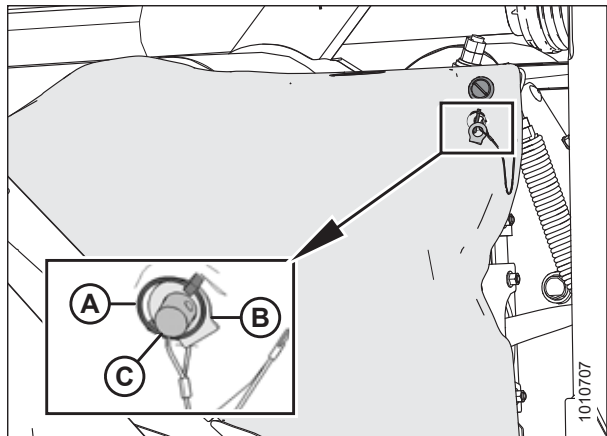


Figure 3.118: Left Driveshield

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

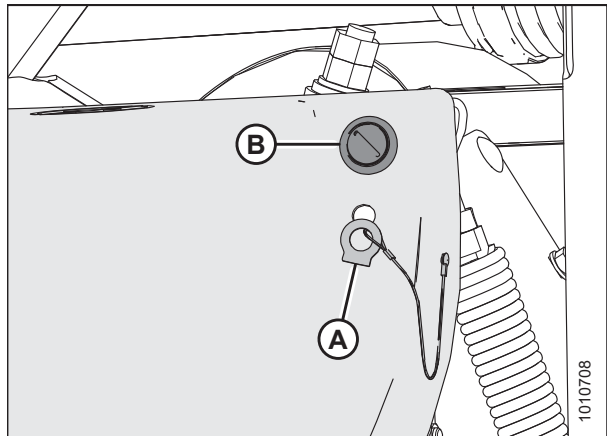


Figure 3.119: Driveshield Latch



## OPERATION

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

**NOTE:**

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

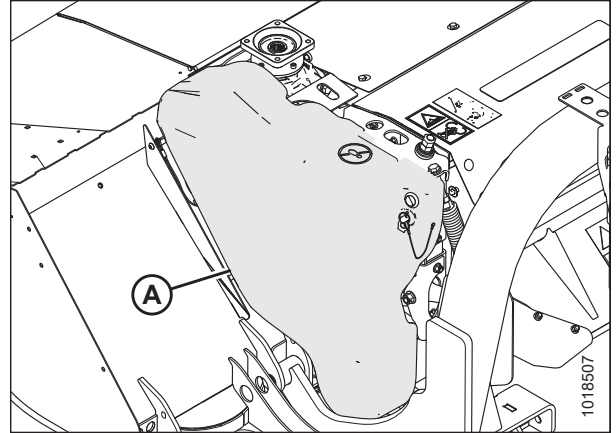


Figure 3.120: Left Driveshield

### 3.6.2 Closing Driveshields

**CAUTION**

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

**NOTE:**

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

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

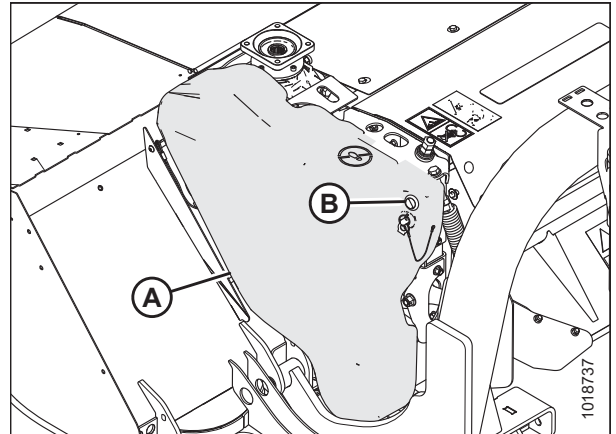


Figure 3.121: Left Driveshield

## OPERATION

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

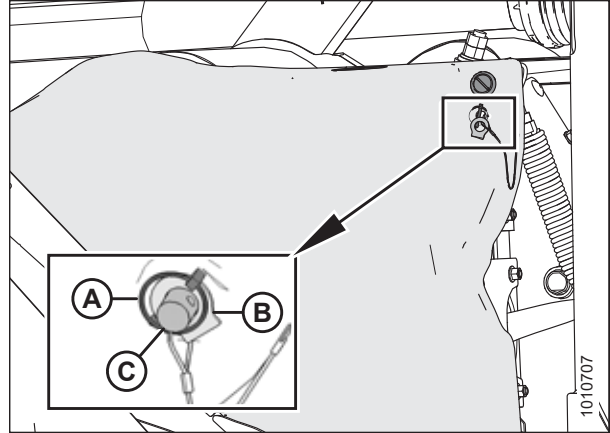


Figure 3.122: Left Driveshield

### 3.7 Cutterbar Doors

#### WARNING

To reduce the risk of personal injury and machine damage, do NOT operate the machine without all the cutterbar doors down or without curtains installed and in good condition. Foreign objects can be ejected with considerable force when the machine is started.

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

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

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

#### IMPORTANT:

Replace curtains if they become worn or damaged. For instructions, refer to [4.9 Maintaining Curtains, page 192](#).

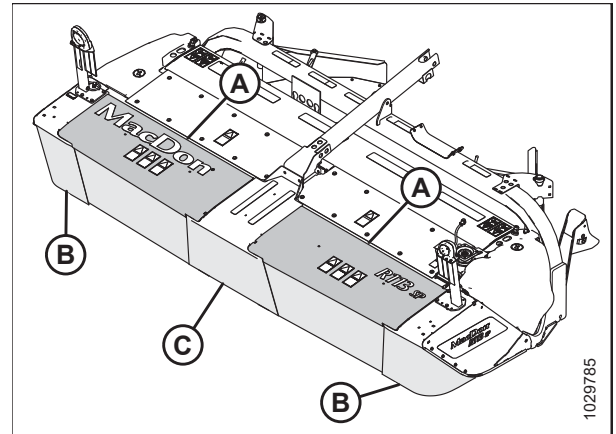


Figure 3.123: Cutterbar Doors and Curtains

#### 3.7.1 Opening Cutterbar Doors – North America

To open cutterbar doors on a header with export latches, refer to [3.7.2 Opening Cutterbar Doors – Export Latches, page 80](#).

#### WARNING

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

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

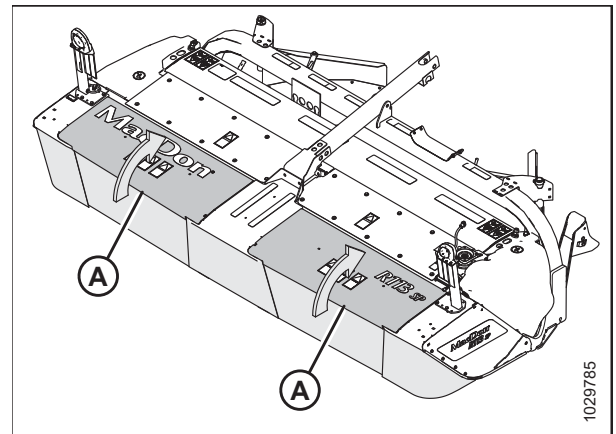


Figure 3.124: R113 SP Cutterbar Doors Shown, R116 SP Similar

### 3.7.2 Opening Cutterbar Doors – Export Latches

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

#### WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Locate latch access holes (A) for each door.

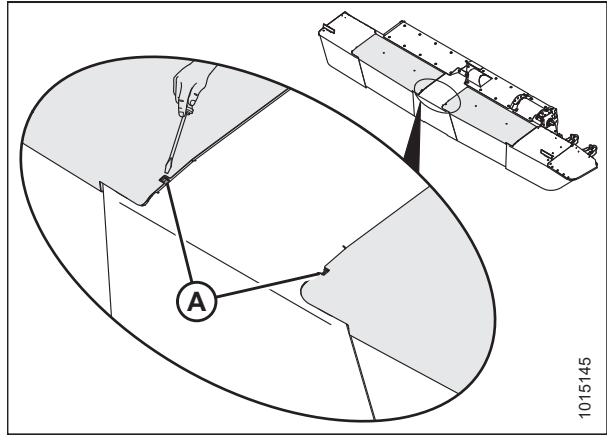


Figure 3.125: Cutterbar Door Latch Access Hole – Export Only

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

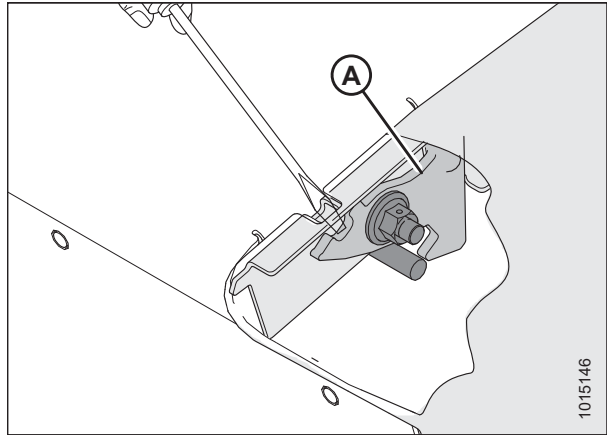


Figure 3.126: Cutterbar Door Latch – Cutaway View

## OPERATION

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

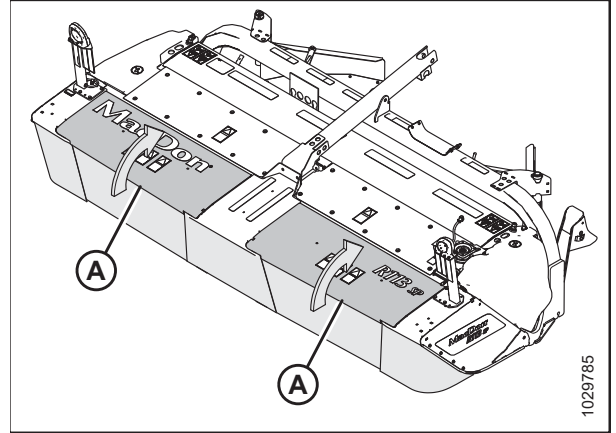


Figure 3.127: R113 SP Cutterbar Doors Shown, R116 SP Similar

### 3.7.3 Closing Cutterbar Doors

#### CAUTION

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

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

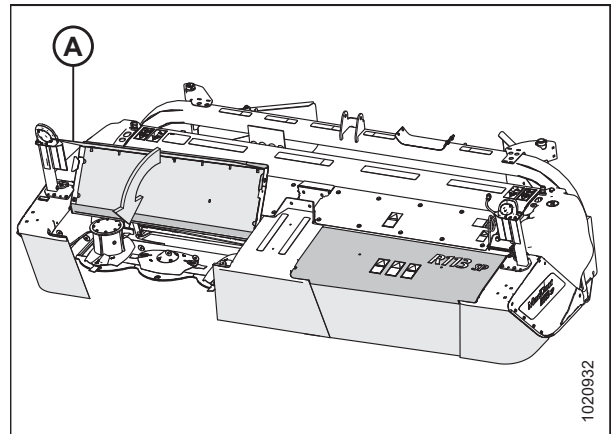


Figure 3.128: Cutterbar Doors and Curtains

### 3.8 Header Settings

Satisfactory operation of the rotary disc header in all situations requires making proper adjustments to suit various crops and conditions.

Correct operation reduces crop loss and increases productivity. Proper adjustments and timely maintenance increases the length of service of the machine.

The variables listed in the following table and detailed in this manual, affect the performance of the rotary disc header. Most of the adjustments have been set at the factory, but settings can be changed to suit your crop conditions.

**Table 3.1 Header Operating Variables**

Variable	Refer to
Float	<a href="#">3.8.3 Header Float, page 85</a>
Header angle	<a href="#">3.8.2 Adjusting Cutterbar Angle, page 84</a>
Cutting height	<a href="#">3.8.1 Cutting Height, page 82</a>
Ground speed	<a href="#">3.8.4 Ground Speed, page 85</a>
Conditioner settings	<a href="#">3.10 Conditioner, page 90</a>
Crop Stream configuration	<a href="#">3.9 Reconfiguring Cutterbar Crop Stream, page 87</a>
Cutterbar deflectors	<a href="#">3.11 Cutterbar Deflectors, page 99</a>

#### 3.8.1 Cutting Height

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

Lowering the skid shoes and decreasing the cutterbar angle increases the cutting height, resulting in higher stubble that helps material dry faster. This may be desirable in stony conditions to help reduce damage to cutting components.

Raising the skid shoes and increasing the cutterbar angle decreases the cutting height, resulting in a shorter stubble. For instructions, refer to [Adjusting Cutting Height, page 83](#).

To choose a cutterbar angle that maximizes performance for your crop and field conditions, refer to [3.8.2 Adjusting Cutterbar Angle, page 84](#).

To minimize cutterbar damage, scooping soil, and soil build-up at the cutterbar in damp conditions, the float should be set as light as possible without causing excessive bouncing. For instructions, refer to [3.8.3 Header Float, page 85](#).

*Adjusting Cutting Height*

**⚠ DANGER**

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

**NOTE:**

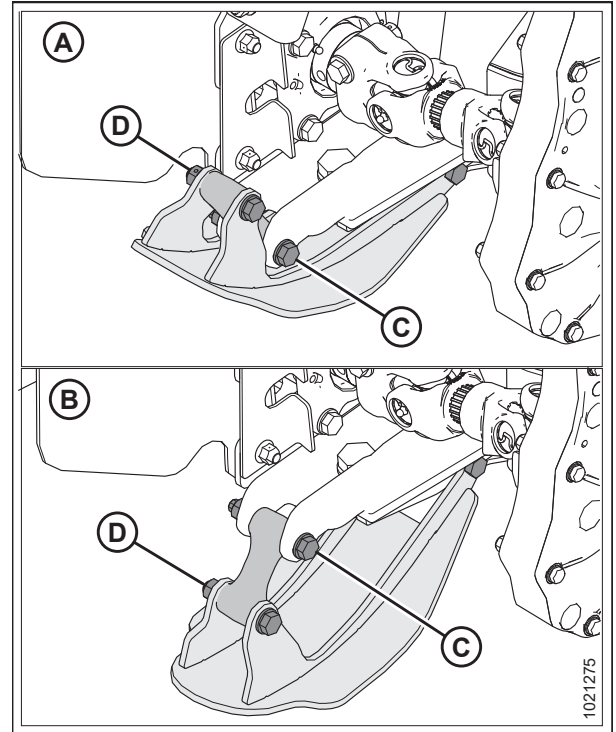
There are two skid shoes on the R113 SP, and four on the R116 SP.

1. Raise the rotary disc header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
4. Loosen bolts (C).
5. Remove bolts, nuts, and washers (D).
6. Raise or lower the skid shoe.

**NOTE:**

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

7. Install bolts, nuts, and washers (D), and then tighten.
8. Tighten bolts (C).
9. Adjust the cutterbar angle to the desired working position. If the angle is not critical, set it to the mid-position. For instructions, refer to [3.8.2 Adjusting Cutterbar Angle, page 84](#).
10. Check the rotary disc header float. For instructions, refer to the windrower operator's manual.



**Figure 3.129: Skid Shoes – R113 SP**

## OPERATION

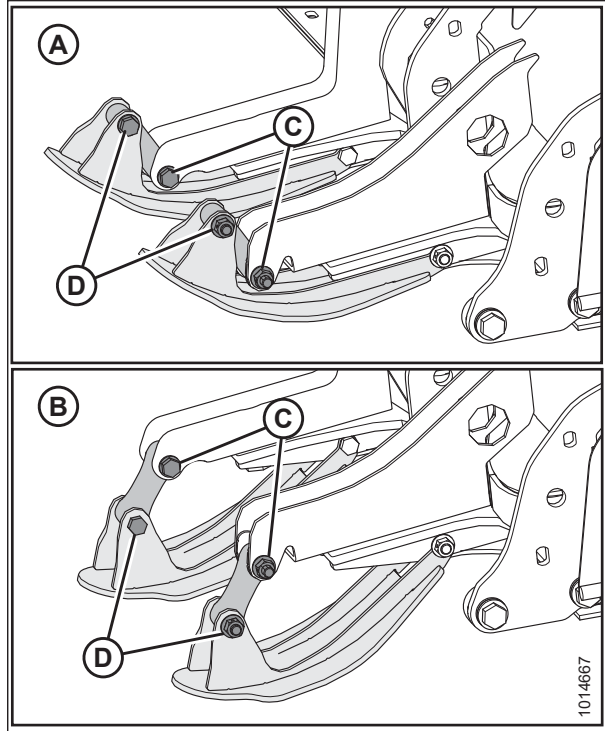


Figure 3.130: Skid Shoes – R116 SP

### 3.8.2 Adjusting Cutterbar Angle

The cutterbar angle (A) adjustment ranges from 0° to 8° below horizontal. Choose an angle that maximizes performance for your crop and field conditions. A flatter angle provides better clearance in stony conditions, while a steeper angle is required in downed crops for better lifting action.

Check the float after significantly adjusting the cutterbar angle because the adjustments affect the header float due to shifting the header center of gravity. Refer to your windrower operator's manual for instructions.

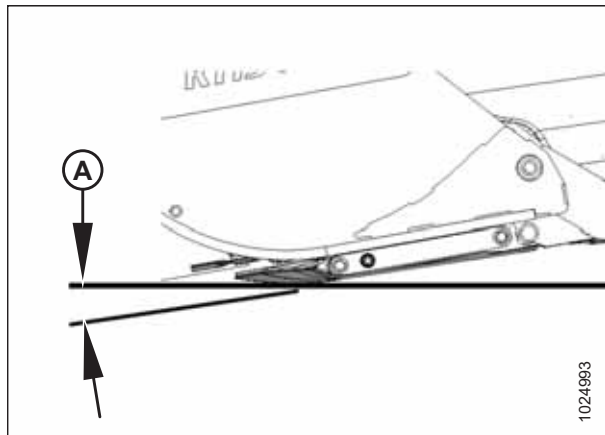


Figure 3.131: Cutterbar Angle



### 3.8.3 Header Float

The M1 Series, M155, M155E4, and M205 Windrowers have different float adjustments. Although they all have float springs, the M1 Series are completely adjustable from the cab through the Harvest Performance Tracker (HPT), the M155, M155E4, and M205 have coarse adjustment done at the spring drawbolt and fine adjustment done through the Cab Display Module (CDM) in the windrower cab.

The header float feature allows the header to closely follow ground contours and respond quickly to sudden changes or obstacles. The float setting is ideal when the cutterbar is on the ground with minimal bouncing, scooping, or pushing soil.

#### IMPORTANT:

- Set header float as light as possible—without excessive bouncing—to avoid frequent breakage of knife components, scooping soil, or soil build-up at the cutterbar in wet conditions.
- Avoid excessive bouncing (resulting in a ragged cut) by operating at a slower ground speed when the float setting is light.
- Install applicable header options (crop dividers, etc.) before setting header float.
- Adjust the float when adding or removing optional attachments that affect the weight of the header.
- Changing header angle affects the float. Check the float after making appropriate changes to header angle for crop type and conditions, field conditions, and speed settings.

For instructions on setting and adjusting the header float, refer to your windrower operator's manual.

### 3.8.4 Ground Speed

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

#### NOTE:

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

The example shown in Figure 3.132, page 86 illustrates the relationship between ground speed and cut area for an R113 and an R116 Rotary Disc Headers. The chart demonstrates that a ground speed of 21 km/h (13 mph) would produce a cut area of approximately 8 hectares (20 acres) per hour.

OPERATION

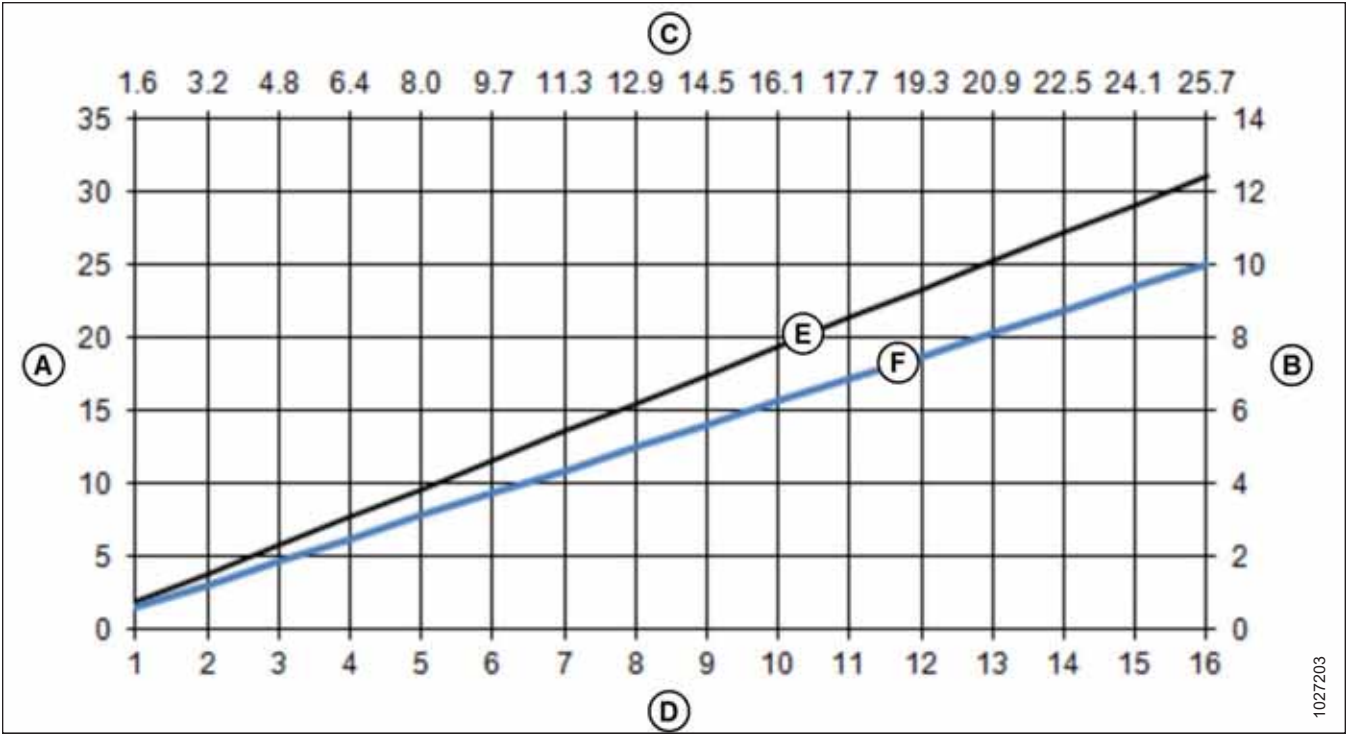


Figure 3.132: Ground Speed for R113 and R116 Rotary Disc Headers

A - Acres/Hour  
E - R116 SP

B - Hectares/Hour  
F - R113 SP

C - Kilometers/Hour

D - Miles/Hour

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### 3.9 Reconfiguring Cutterbar Crop Stream

Discs are factory-installed to produce three crop streams, but the disc rotation pattern can be changed by substituting the 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.

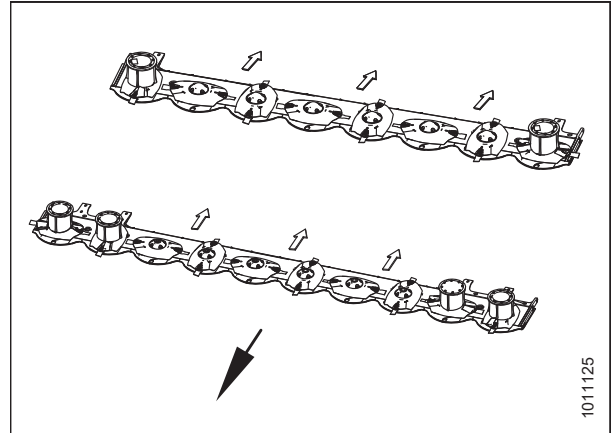


Figure 3.133: R113 and R16 SP Cutterbars

**IMPORTANT:**

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

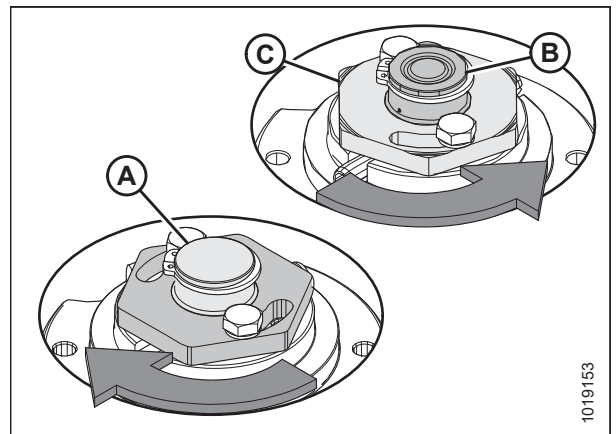
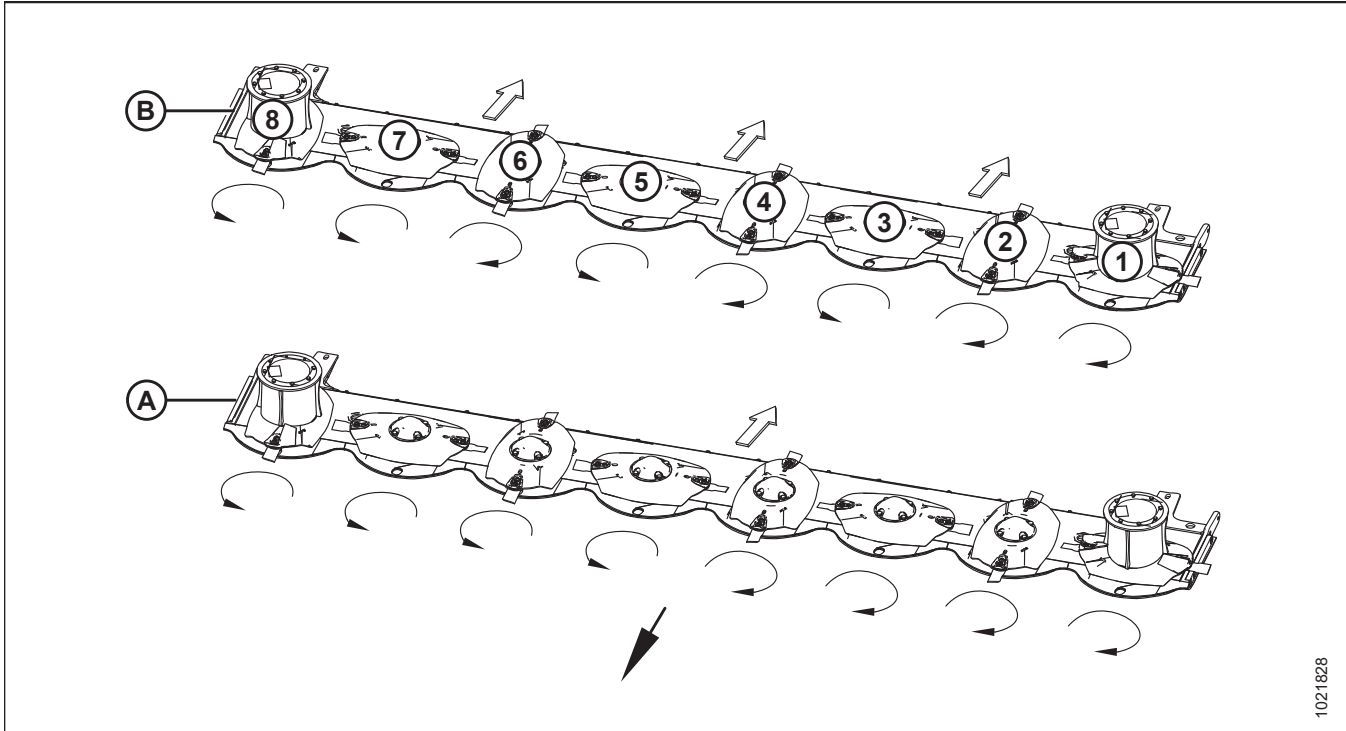


Figure 3.134: Cutterbar Spindles

## OPERATION

### 3.9.1 Changing R113 SP Cutterbar Crop Stream Configuration

Figure 3.135: R113 SP (8 Disc) Spindle Rotation Pattern and Crop Streams



A - One Crop Stream

B - Three Crop Streams

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

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

For instructions, refer to [Removing Cutterbar Spindles, page 129](#) and [Installing Cutterbar Spindles, page 131](#).

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### 3.9.2 Changing R116 SP Cutterbar Crop Stream Configuration

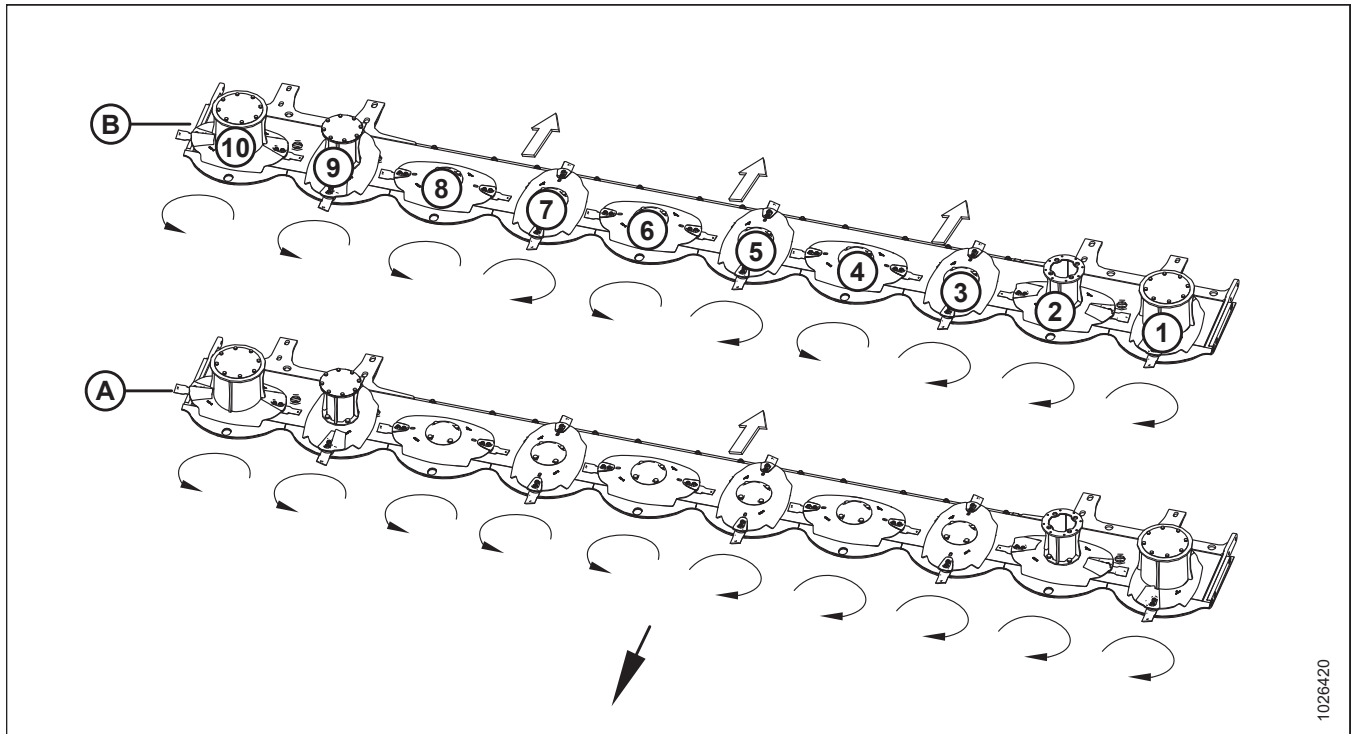


Figure 3.136: R116 SP (10 Disc) Spindle Rotation Pattern and Crop Streams

A - One Crop Stream

B - Three Crop Streams

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

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

For instructions, refer to [Removing Cutterbar Spindles, page 129](#) and [Installing Cutterbar Spindles, page 131](#).

## 3.10 Conditioner

Rolls condition the crop by crimping and crushing the stem in several places, which allows the release of moisture resulting in faster drying times. Both steel and polyurethane conditioner rolls are available. Refer to *5 Options and Attachments, page 225* for ordering information.

### 3.10.1 Roll Gap

The roll gap is the distance between the two conditioner rolls. The roll gap controls the degree to which crop is conditioned as it passes through the rolls. Roll gap is factory-set at approximately 3 mm (1/8 in.) for polyurethane rolls, and at 6 mm (1/4 in.) for steel rolls.

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

Steel rolls can be operated over a larger range of roll gap settings (intermesh) and are therefore suited to a wider range of crops (alfalfa to thicker-stemmed cane-type crops) using a roll gap of up to 25 mm (1 in.); however, too large of 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*



**WARNING**

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

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

## OPERATION

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

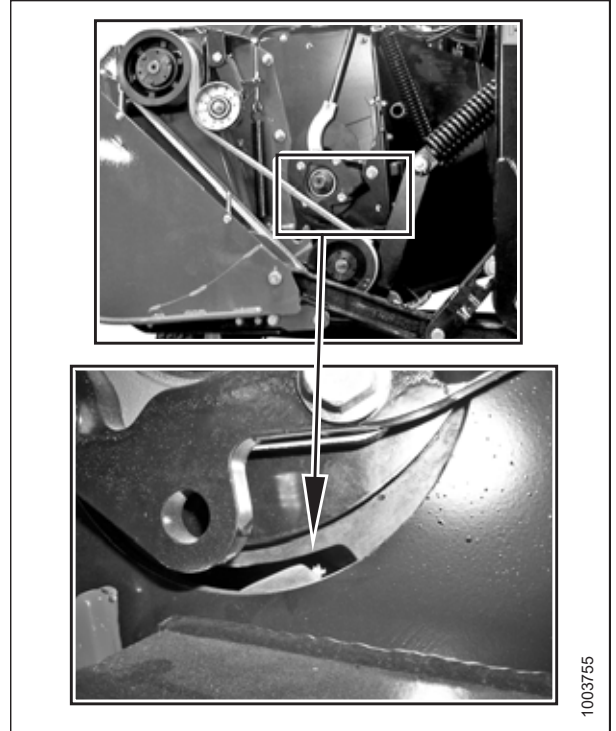


Figure 3.137: Polyurethane Roll Conditioner

4. **Steel rolls:** The length of thread (A) extending above the jam nut on the adjustment rods can be used as an approximation of roll gap but does **NOT** provide consistent roll gap measurements. Roll gap factory setting is 6 mm (1/4 in.). If adjustments are required, refer to [Adjusting Roll Gap – Steel Rolls, page 92](#) for adjustment instructions.

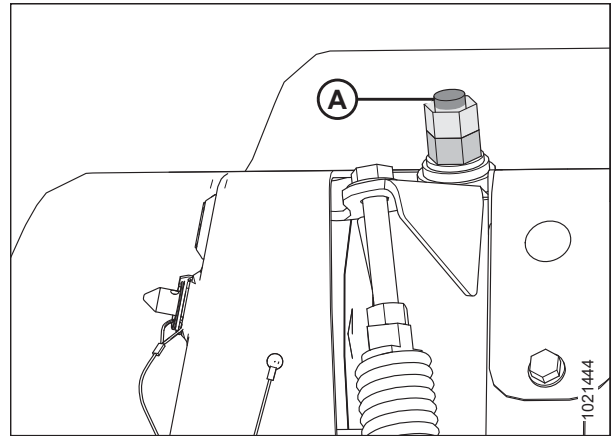


Figure 3.138: Roll Gap Adjustment

### *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:

#### **WARNING**

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

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

## OPERATION

- Loosen upper jam nut (A) on both sides of the conditioner attachment.
- Turn lower nut (B) counterclockwise until the upper roll rests on the lower roll.
- Turn lower nut (B) one full turn clockwise to raise the upper roll and achieve a 3 mm (1/8 in.) roll gap.
- Hold nut (B) and tighten jam nut (A) on both sides of the conditioner attachment.

### IMPORTANT:

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

- 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.).

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



### WARNING

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

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

### IMPORTANT:

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

- 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 performance and crop conditions.

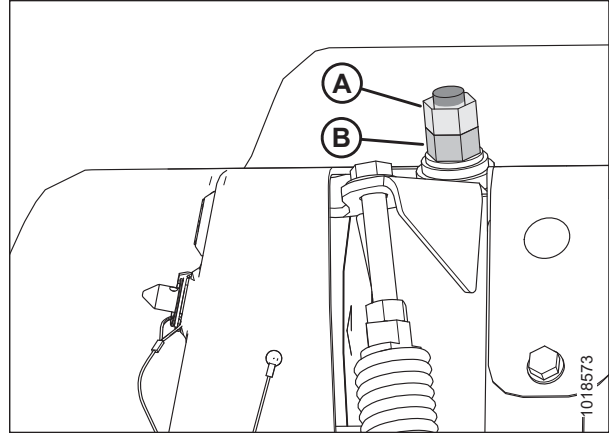


Figure 3.139: Roll Gap Adjustment

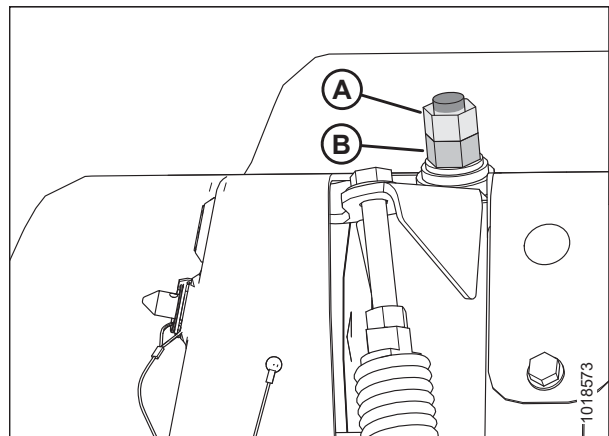


Figure 3.140: Roll Gap Adjustment



### 3.10.2 Roll Tension

Roll tension (the pressure holding the rolls together) is factory-set to maximum and should rarely require adjustment.

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

#### Adjusting Roll Tension

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



#### WARNING

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 header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Loosen jam nut (A) on both sides of conditioner.
4. Turn spring drawbolt (B) clockwise to tighten spring (C) and **INCREASE** roll tension.
5. Turn 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.

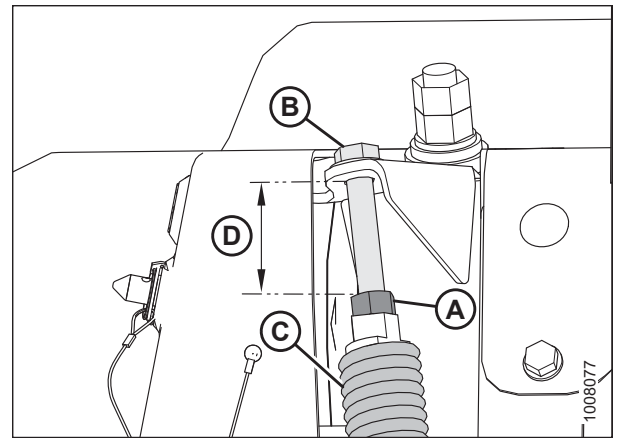


Figure 3.141: Adjusting Roll Tension

### 3.10.3 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.

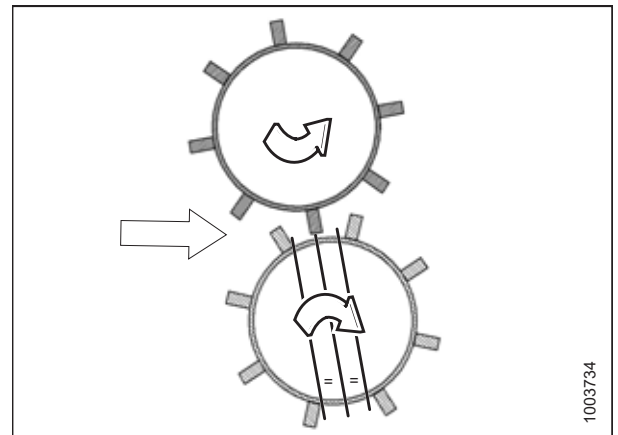


Figure 3.142: Properly Timed Rolls

## OPERATION

### Checking Roll Timing

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

Roll timing is factory-set and should not require adjustment; however, if there is excessive noise coming from the conditioner rolls, the timing will need to be adjusted. For instructions, refer to [Adjusting Roll Timing, page 94](#).

### Adjusting Roll Timing

#### **WARNING**

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

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

#### **NOTE:**

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

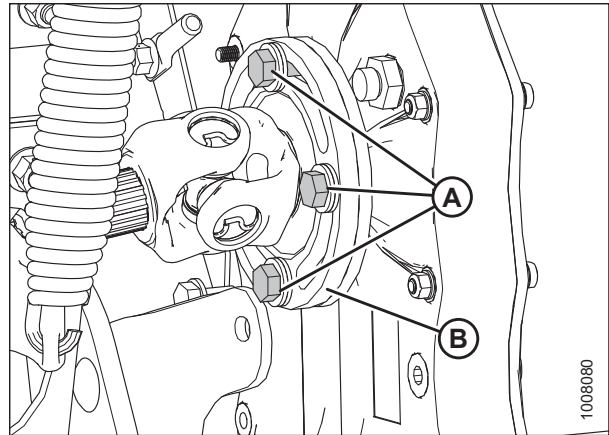


Figure 3.143: Conditioner Drive

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

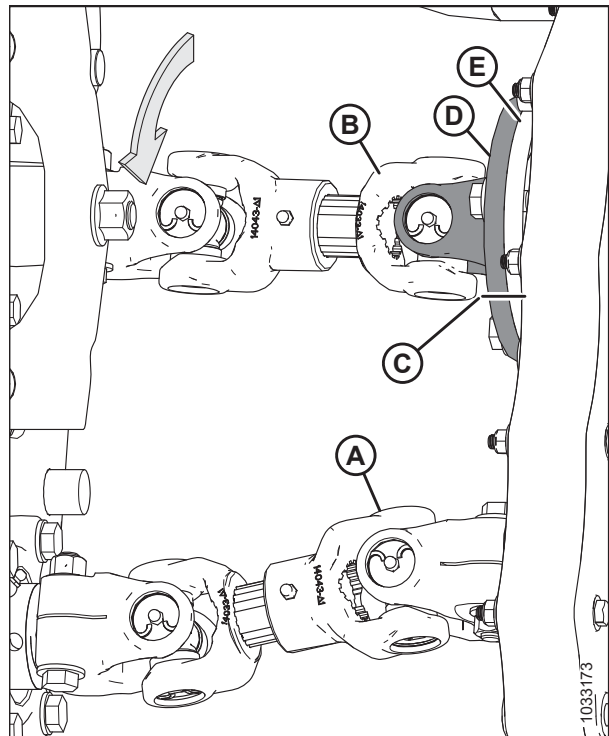


Figure 3.144: Conditioner Drive

## OPERATION

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

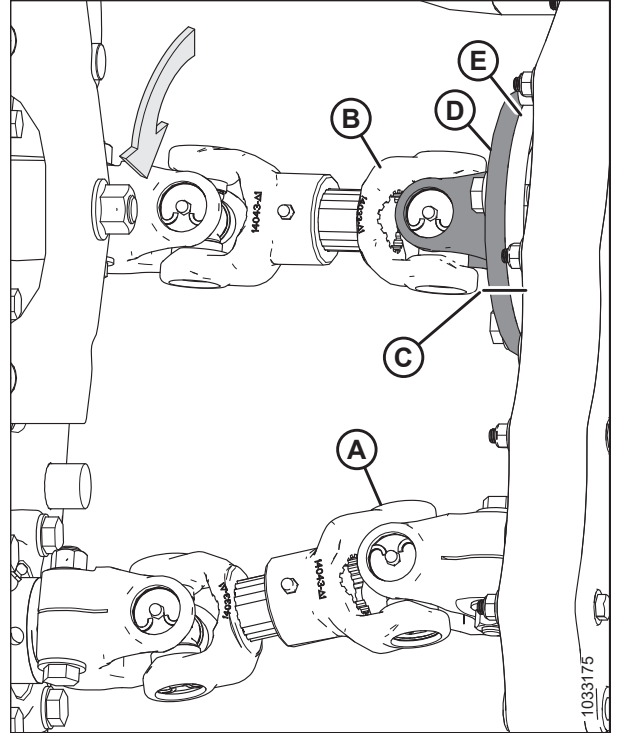


Figure 3.145: Conditioner Drive

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

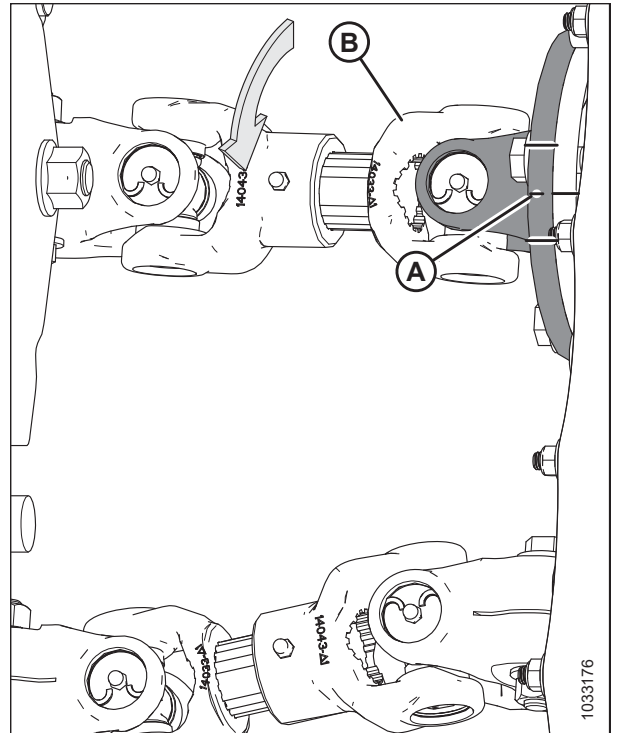


Figure 3.146: Conditioner Drive

## OPERATION

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

**NOTE:**

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

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

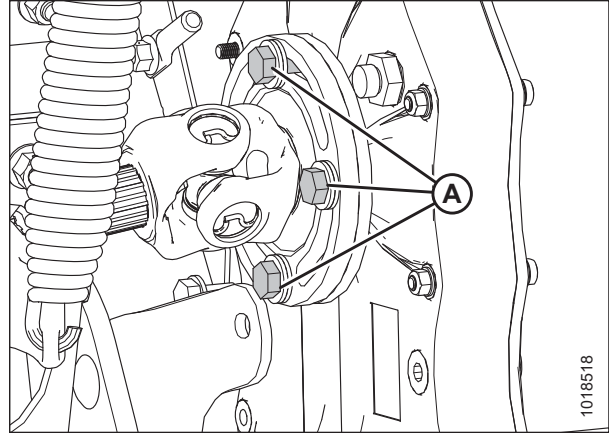


Figure 3.147: Conditioner Drive

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

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

A wider windrow will generally dry faster and more evenly, resulting in less protein loss. Fast drying is especially important in areas where the weather allows only a few days to cut and bale. A narrower windrow may be preferable for ease of pick-up and when drying is not critical (for example, when cutting for silage or green feed).

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

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

#### **WARNING**

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

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

## OPERATION

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

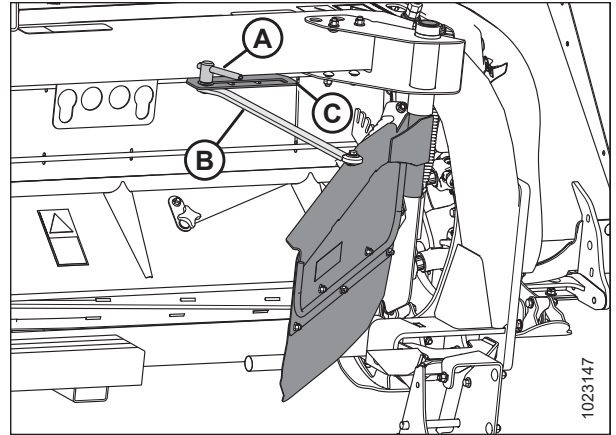


Figure 3.148: Forming Shield Side Deflector and Adjuster Bar

### Positioning Rear Baffle – Roll Conditioner

The rear baffle is used in conjunction with the forming shield side deflectors to determine the height and width of the windrow. It is located immediately behind and above the conditioning rolls and can be positioned to do the following:

- Raise the baffle and direct crop flow into forming shields for a fluffier, narrower or moderate-width windrow.
- Lower the baffle and direct crop downward to form a flatter, wider windrow.
- Provide even material distribution across windrow with adjustable fins under rear baffle. For instructions, refer to [Positioning Rear Baffle Deflector Fins, page 98](#).

To position the rear baffle, follow these steps:

### WARNING

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

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

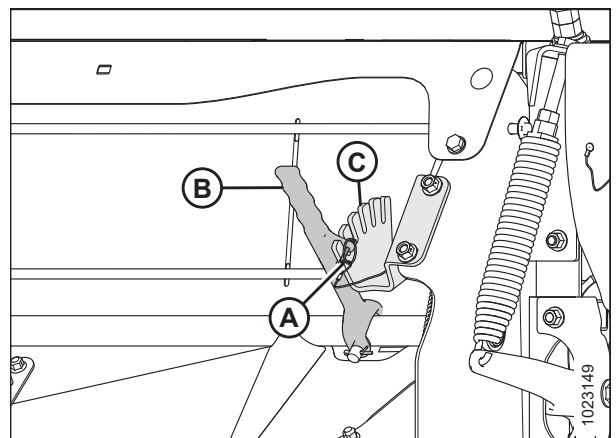


Figure 3.149: Right End of Conditioner

## OPERATION

### Positioning Rear Baffle Deflector Fins

The additional rear baffle deflector fins are stored on top of the baffle, but can be moved under the baffle when a narrower windrow is desired.

To install fins, follow these steps:

#### **WARNING**

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 two deflector fins (A) from rear baffle (B).

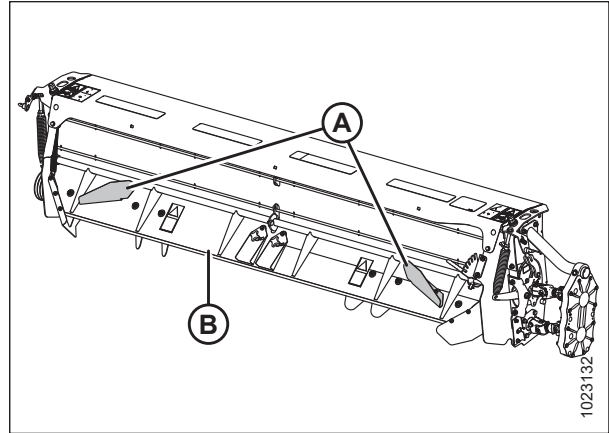


Figure 3.150: Deflector Fins in Storage Position

2. Position deflector fin (A) under the baffle and secure with the existing bolt and nut (B). Install bolt with bolt head facing down. Adjust to approximately 60° as shown, and torque nut to 69 Nm (51 lbf·ft).
3. Repeat for the opposite deflector fin.

#### **NOTE:**

Adjusting the angle of the fins can be useful to spread crop within the desired windrow width.

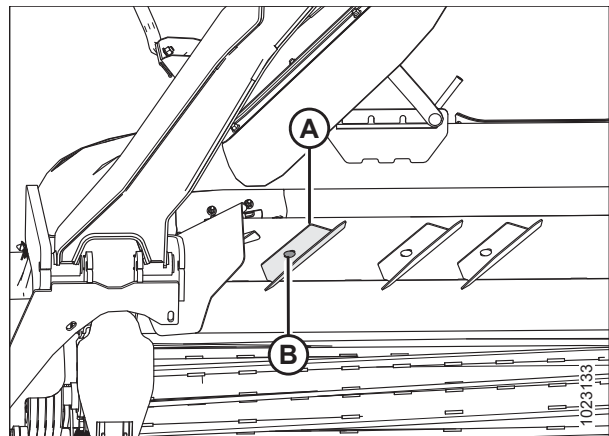


Figure 3.151: Left Deflector Fins in Field Position under Baffle

### 3.11 Cutterbar Deflectors

A two-piece cutterbar deflector is attached to the cutterbar just below the conditioner rolls. Deflectors provide improved feeding into the conditioner rolls and prevent 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 3.2 Conditions for Using Cutterbar Deflectors**

Crop/Field Condition	Use Deflector
Average crop/normal field conditions	No
Long-stemmed and heavy/normal field conditions	Yes
Long-stemmed and heavy/sandy soil	No
Long-stemmed and heavy/gopher mounds or rocks <sup>4</sup>	No

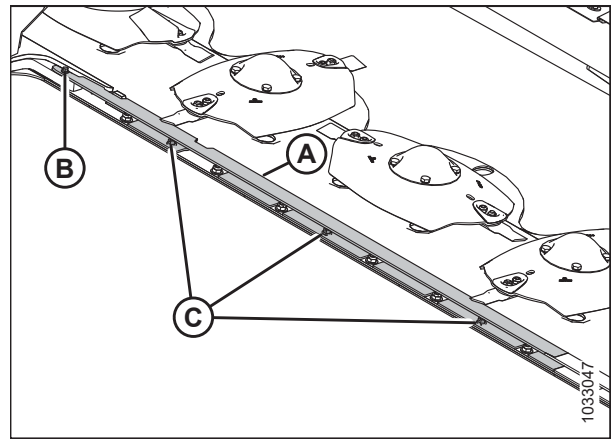
#### 3.11.1 Removing Cutterbar Deflectors

The cutterbar deflectors are used with roll conditioners only.

#### DANGER

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

1. Raise the rotary disc header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the windrower lift cylinder safety props. For instructions, refer to [3.3.1 Engaging and Disengaging Header Safety Props – M1 Series Windrower, page 24](#).
4. Engage the header safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
5. Locate deflector (A) behind the cutterbar.
6. Clean debris from the deflector area.
7. Remove bolt (B) shared with the rock guard on the outboard end of deflector. Retain the hardware.
8. Remove three bolts (C) and nuts securing deflector (A) to the cutterbar using an 8 mm hex key and a 17 mm socket. Remove deflector (A) and retain the hardware.
9. Repeat previous steps on the opposite side.
10. If the conditioner is going to be completely removed, reinstall bolt (B) through the rock guard and secure it with an M12 washer and locking nut. Torque hardware to 68 Nm (50 lbf-ft). Store the deflectors and hardware in a safe place.
11. If the cutterbar is being replaced, install the deflectors on the new cutterbar. For instructions, refer to [3.11.2 Installing Cutterbar Deflectors, page 100](#).



**Figure 3.152: Left Deflector – Behind the Cutterbar**

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

### 3.11.2 Installing Cutterbar Deflectors

The cutterbar deflectors are used with roll conditioners only.

#### DANGER

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

1. Raise the rotary disc header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
4. Clean debris from the ledge and the six mounting holes along the aft edge of the cutterbar.
5. Position deflector (A) (left shown) on the back edge of the cutterbar, and align slots in deflector with the existing fasteners and cutterbar plug.
6. Install bolt (B) shared with the rock guard at the outboard end of deflector.
7. Secure the deflector to the cutterbar with three button socket head M10 bolts (C) and lock nuts. Bolts are inserted into the cutterbar from the bottom.
8. Tighten bolts (C) to 54 Nm (40 lbf-ft) with a 17 mm socket and an 8 mm hex key.
9. If necessary, repeat the above steps on the opposite side.

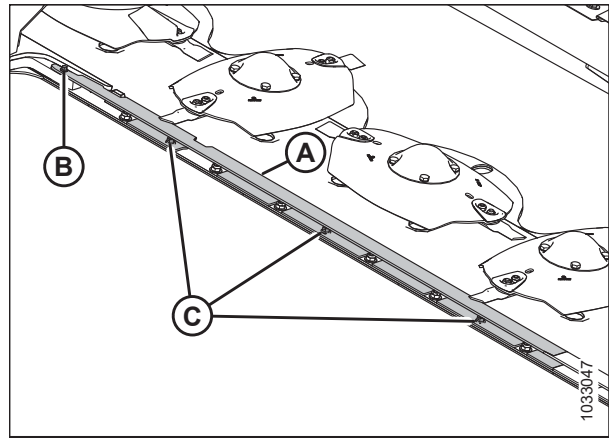


Figure 3.153: Left Cutterbar Deflector – Behind Cutterbar



## 3.12 Haying Tips

### 3.12.1 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.

### 3.12.2 Topsoil Moisture

**Table 3.3 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.

### 3.12.3 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.

### 3.12.4 Windrow Characteristics

Producing windrows with the recommended characteristics will achieve the best results. For instructions, refer to [3 Operation, page 21](#) for instructions on adjusting the header.

**Table 3.4 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

### 3.12.5 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.

### 3.12.6 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.

### 3.13 Transporting the Header

For information on transporting the header when attached to the windrower, refer to your windrower operator's manual.

**IMPORTANT:**

For cab-forward road travel, the M155 and M155E4 windrower must have the lighting and marking bundle installed (MD #B5412).



## Chapter 4: Maintenance and Servicing

The following instructions provide information about routine servicing for the header. A parts catalog is located in a plastic case at the right end of the header.

Log hours of operation and use the maintenance record provided (refer to [4.3.1 Maintenance Schedule/Record, page 108](#)) to keep track of your scheduled maintenance.

### 4.1 Preparing Machine for Servicing



#### CAUTION

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

1. Lower the rotary disc header fully. If you need to perform service in the raised position, and always engage safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
2. Shut down the engine and remove the key from the ignition.
3. Engage park brake.
4. Wait for all moving parts to stop.

## 4.2 Recommended Safety Procedures

- Park on level surface when possible. Follow all recommendations in your windrower operator's manual.
- Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.



Figure 4.1: Safety Around Equipment

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



Figure 4.2: Safety Equipment

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



Figure 4.3: Safety Around Equipment

## MAINTENANCE AND SERVICING

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

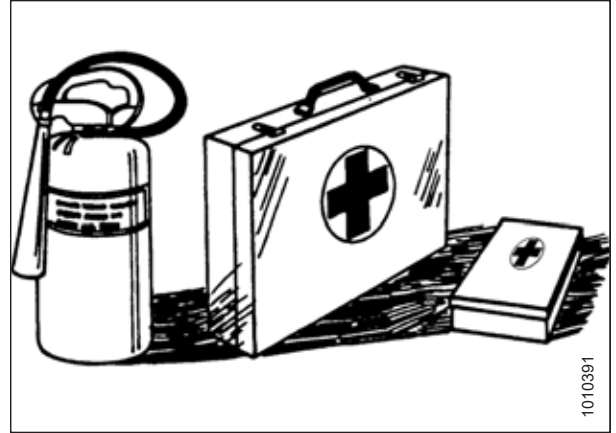


Figure 4.4: Safety Equipment

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



Figure 4.5: Safety Around Equipment

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

### 4.3 Maintenance 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 108](#).

 **CAUTION**

Carefully follow all safety messages. For more information, refer to [4.2 Recommended Safety Procedures, page 106](#).

#### 4.3.1 Maintenance Schedule/Record

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

	Hour meter reading																
	Service date																
	Serviced by																
First use		For instructions, refer to <a href="#">4.3.2 Break-In Inspections, page 111</a> .															
End of season		For instructions, refer to <a href="#">4.3.4 End-of-Season Servicing, page 112</a> .															
Action		✓ Check					⬇ Lubricate					▲ Change					
<b>At First 10 Hours and then Daily</b>																	
✓	Inspect cutterbar discs. For instructions, refer to <a href="#">Inspecting Cutterbar Discs, page 123</a> .	<b>Daily maintenance records are not required to meet normal warranty conditions.</b>															
✓	Inspect discblades. For instructions, refer to <a href="#">Inspecting Disc Blades, page 135</a> .																
✓	Inspect accelerators. For instructions, refer to <a href="#">Inspecting Accelerators, page 142</a> .																
✓	Inspect rock guards. For instructions, refer to <a href="#">Inspecting Rock Guards, page 146</a> .																
✓	Inspect drums. For instructions, refer to <a href="#">Inspecting Large Drums – R113 or R116 SP, page 164</a> .																
✓	Check hydraulic hoses and lines. For instructions, refer to <a href="#">4.12.1 Checking Hydraulic Hoses and Lines, page 224</a> .																



**MAINTENANCE AND SERVICING**

At First 25 Hours <sup>5</sup>												
✓	Check conditioner drive belt tension. For instructions, refer to <i>Inspecting Conditioner Drive Belt, page 202.</i>											
✓	Check roll timing gearbox lubricant level. For instructions, refer to <i>4.6.1 Checking and Changing Oil in Conditioner Roll Timing Gearbox, page 186.</i>											
●	Lubricate idler pivot. For instructions, refer to <i>4.4 Lubrication, page 113.</i>											
●	Lubricate upper and lower driveline universal joints. For instructions, refer to <i>4.4 Lubrication, page 113.</i>											
●	Lubricate roller conditioner bearings. For instructions, refer to <i>4.4 Lubrication, page 113.</i>											
●	Lubricate conditioner roll driveline slip joints. For instructions, refer to <i>4.4 Lubrication, page 113.</i>											
At First 50 Hours												
▲	Change roll timing gearbox lubricant. For instructions, refer to <i>4.6.1 Checking and Changing Oil in Conditioner Roll Timing Gearbox, page 186.</i>											
▲	Change header drive gearbox oil. For instructions, refer to <i>4.7.1 Changing Header Drive Gearbox Oil, page 189</i>											
✓	Check cutterbar lubricant. For instructions, refer to <i>4.5.1 Lubricating Cutterbar, page 118.</i>											
Every 100 Hours or Annually <sup>6</sup>												
✓	Check conditioner drive belt tension. For instructions, refer to <i>Inspecting Conditioner Drive Belt, page 202.</i>											
✓	Check roll timing gearbox lubricant. For instructions, refer to <i>4.6.1 Checking and Changing Oil in Conditioner Roll Timing Gearbox, page 186.</i>											
✓	Check rotary disc header drive gearbox lubricant. For instructions, refer to <i>4.7.1 Changing Header Drive Gearbox Oil, page 189.</i>											
●	Lubricate forming shield pivot tube. For instructions, refer to <i>4.4 Lubrication, page 113.</i>											

5. The driveline inside the driven drum is lubricated for life and does not require any routine lubrication.

6. 100-hour check intervals continue after 250 hours.

**MAINTENANCE AND SERVICING**

Every 250 Hours or Annually												
▲	Change roll timing gearbox lubricant. For instructions, refer to <i>4.6.1 Checking and Changing Oil in Conditioner Roll Timing Gearbox, page 186.</i>											
▲	Change rotary disc header drive gearbox lubricant. For instructions, refer to <i>4.7.1 Changing Header Drive Gearbox Oil, page 189.</i>											
▲	Change cutterbar lubricant. For instructions, refer to <i>4.5.1 Lubricating Cutterbar, page 118.</i>											

### 4.3.2 Break-In Inspections

Table 4.1 Break-In Inspection Schedule

Inspection Interval	Item	Refer to
1 Hour	Check for loose hardware and tighten to required torque	<i>7.1 Torque Specifications, page 237</i>
5 Hours	Check for loose hardware and tighten to required torque	<i>7.1 Torque Specifications, page 237</i>
5 Hours	Check conditioner drive belt tension	<i>Inspecting Conditioner Drive Belt, page 202</i>
25 Hours	Check conditioner drive belt tension	<i>Inspecting Conditioner Drive Belt, page 202</i>
50 Hours	Check conditioner drive belt tension	<i>Inspecting Conditioner Drive Belt, page 202</i>
50 Hours	Change conditioner roll timing gearbox lubricant	<i>4.6.1 Checking and Changing Oil in Conditioner Roll Timing Gearbox, page 186</i>
50 Hours	Change header drive gearbox lubricant	<i>4.7.1 Changing Header Drive Gearbox Oil, page 189</i>
150 Hours	Check conditioner drive belt tension	<i>Inspecting Conditioner Drive Belt, page 202</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 self-propelled rotary disc header 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. For instructions, refer to *4.4 Lubrication, page 113* and *4.5.1 Lubricating Cutterbar, page 118*.
2. Perform all annual maintenance as listed in *4.3.1 Maintenance Schedule/Record, page 108*.

#### 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 the rotary disc header and engage the lift cylinder safety props.
2. Clean the header 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. For information, refer to [7.1 Torque Specifications, page 237](#).
6. Lubricate the header 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.
12. Store in a dry, protected place if possible. If stored outside, always cover header with a waterproof canvas or other protective material.

## 4.4 Lubrication

### WARNING

To avoid personal injury, before servicing header or opening drive covers, refer to [4.1 Preparing Machine for Servicing, page 105](#).

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 108](#).

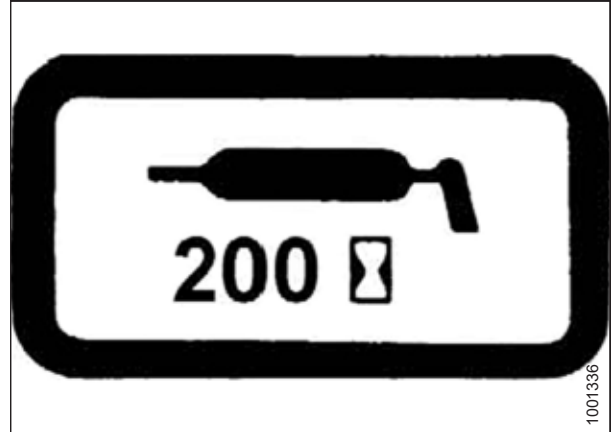


Figure 4.6: Grease Interval Decal

### 4.4.1 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.

### WARNING

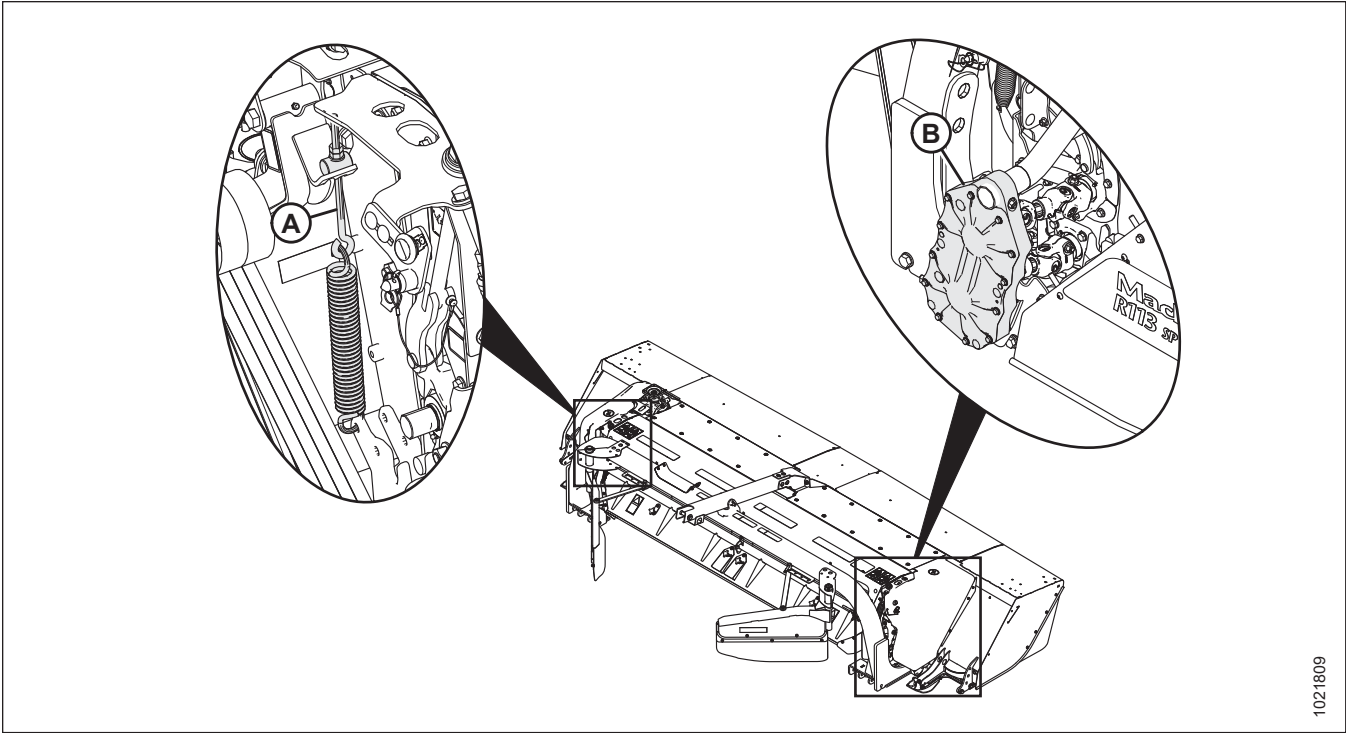
To avoid bodily injury or death from unexpected startup of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Open driveshields at the ends of the header to access greasing points. For instructions, refer to [3.6.1 Opening Driveshields, page 76](#).
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

### First 25 Hours

To check conditioner roll timing gearbox oil level, refer to [4.6.1 Checking and Changing Oil in Conditioner Roll Timing Gearbox](#), page 186.



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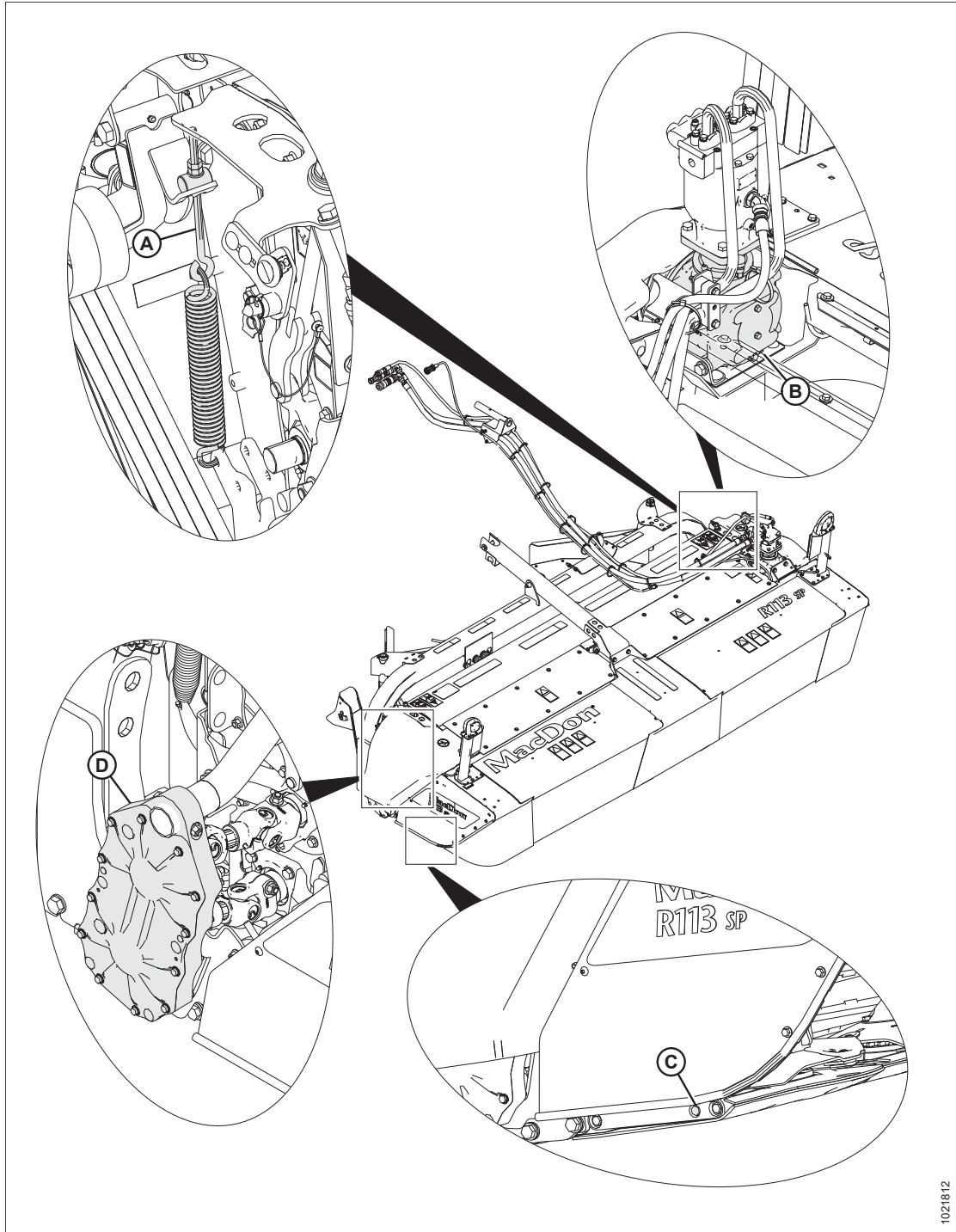
**Figure 4.7: First 25 Hours**

A - Conditioner Drive Belt Tensioner

B - Conditioner Roll Timing Gearbox

*First 50 Hours*

To change conditioner roll timing gearbox oil level, refer to [4.6.1 Checking and Changing Oil in Conditioner Roll Timing Gearbox](#), page 186.



**Figure 4.8: First 50 Hours**

A - Conditioner Drive Belt Tensioner  
C - Cutterbar

B - Header Drive Gearbox  
D - Conditioner Roll Timing Gearbox

MAINTENANCE AND SERVICING

Every 100 Hours or Annually

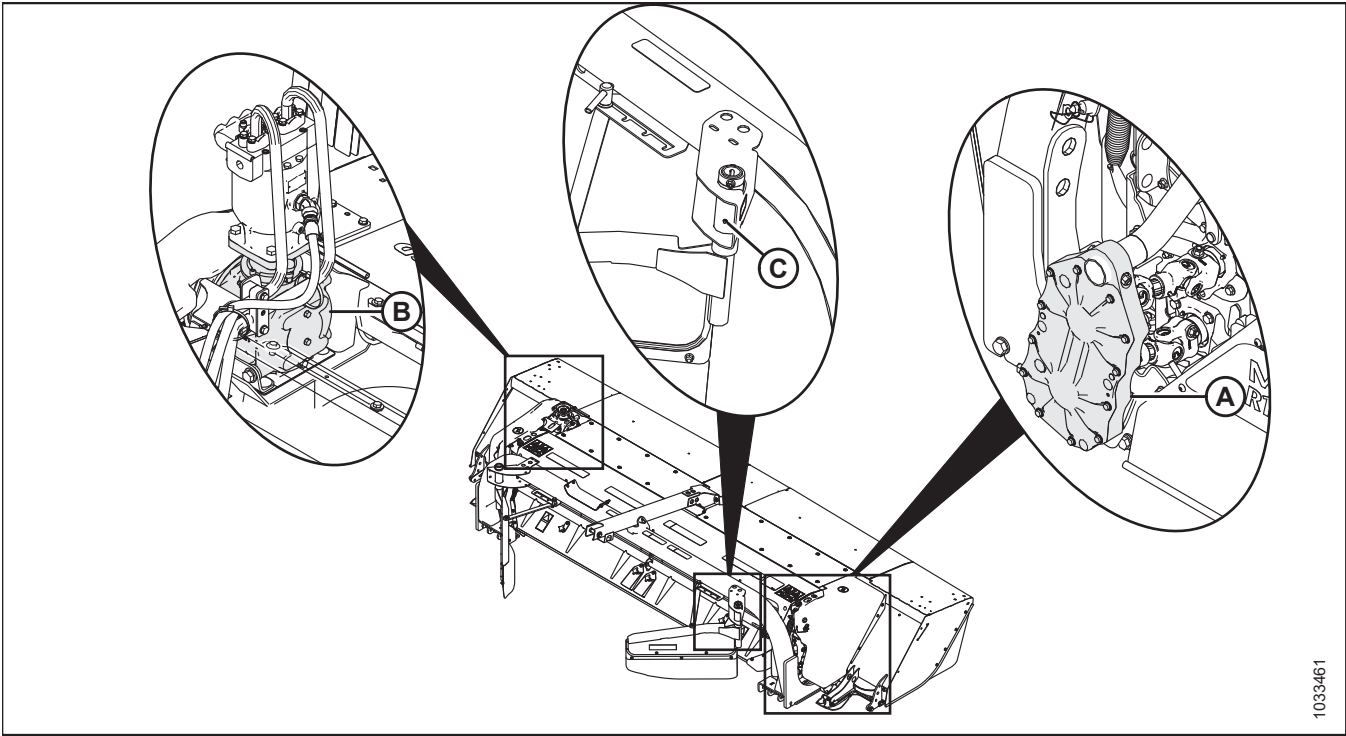


Figure 4.9: Every 100 Hours

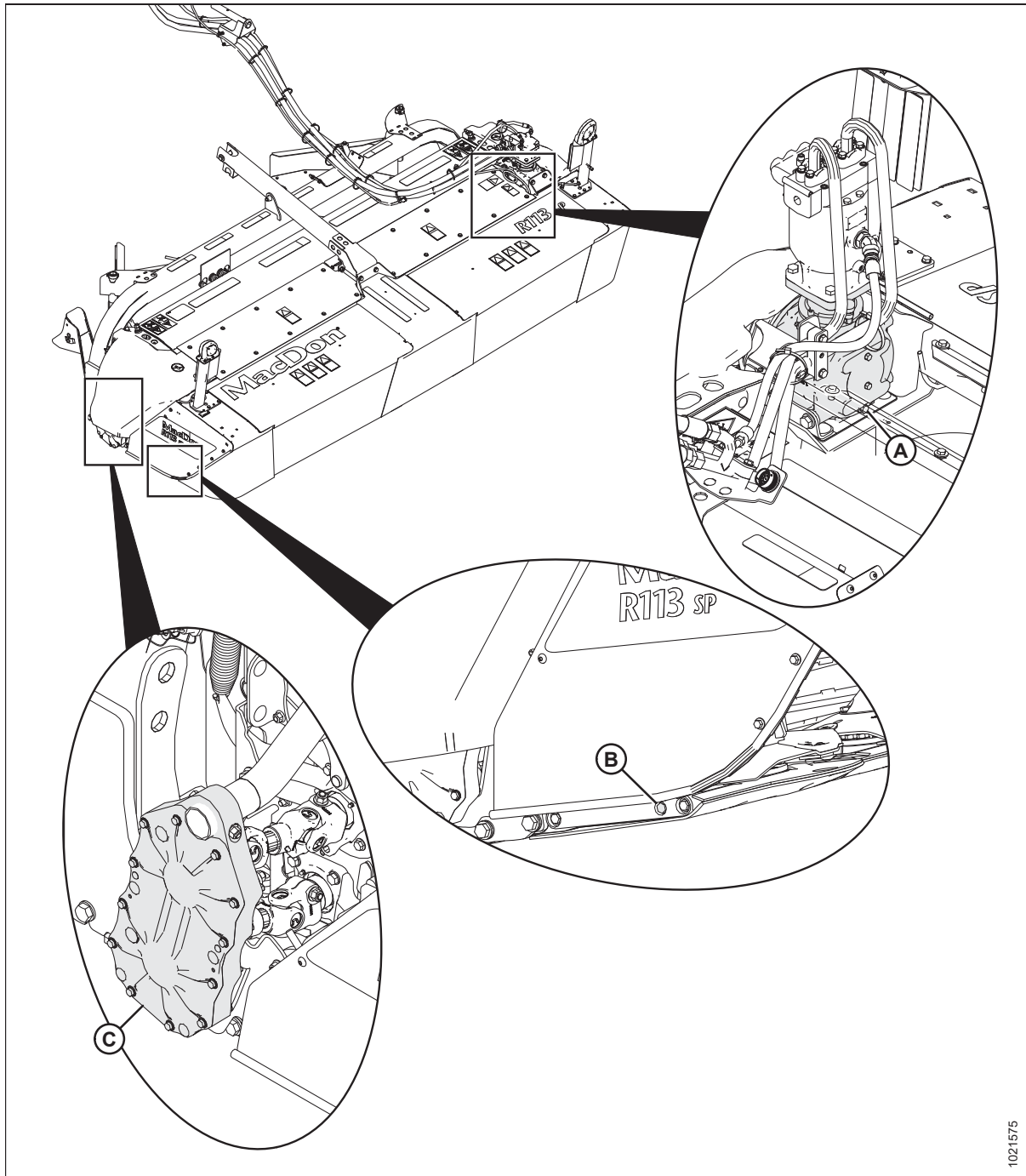
A - Conditioner Roll Timing Gearbox

B - Header Drive Gearbox

C - Forming Shield Pivot Point Tube (Two Places)



Every 250 Hours



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Figure 4.10: Every 250 Hours

A - Header Drive Gearbox

B - Cutterbar

C - Conditioner Roll Timing Gearbox

## 4.5 Cutterbar System

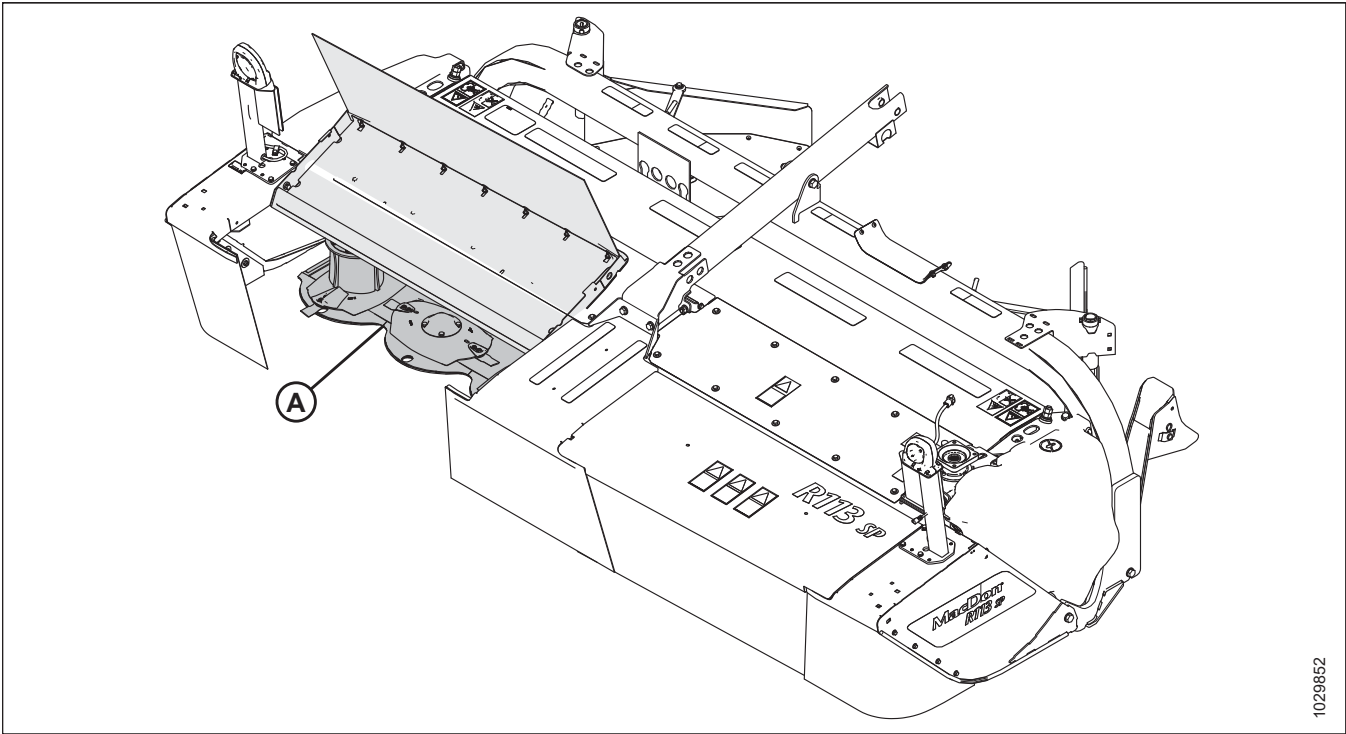


Figure 4.11: Cutterbar – R113 SP Shown, R116 SP Similar

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

### 4.5.1 Lubricating Cutterbar

#### Checking and Adding Lubricant – Cutterbar

#### WARNING

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

#### WARNING

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

1. Park the machine on a flat, level surface.
2. Lower the rotary disc header onto 25 cm (10 in.) blocks under both ends of the cutterbar.
3. Shut down the engine, and remove the key from the ignition.
4. Open the cutterbar doors. For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#) or [3.7.2 Opening Cutterbar Doors – Export Latches, page 80](#).

## MAINTENANCE AND SERVICING

5. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

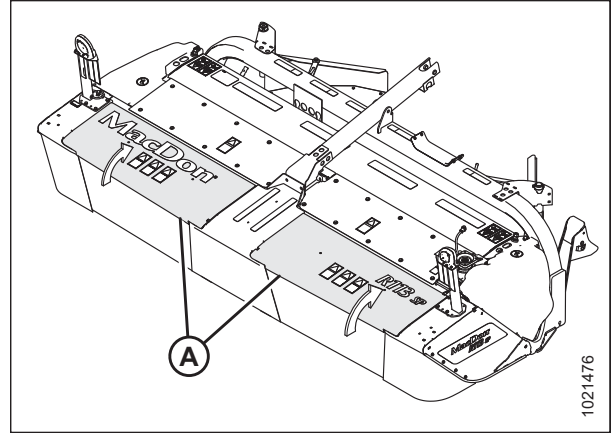


Figure 4.12: Cutterbar Doors – R113 SP Shown, R116 SP Similar

6. Use a spirit (bubble) level (A) to ensure the cutterbar is level in both directions. Adjust position accordingly.

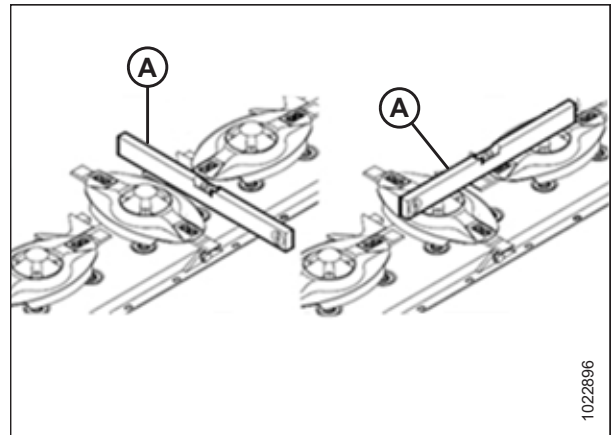


Figure 4.13: Spirit Level on Cutterbar

7. Clean area around plug (A). Place a 5 liter (5.2 US qts) capacity container under plug (A).
8. Use a 17 mm socket to remove plug (A) and O-ring (B) from the cutterbar. The oil level must be up to the inspection plug hole.

**NOTE:**

If additional lubricant is required, proceed to [Step 9, page 119](#). If additional lubricant is **NOT** required, proceed to [Step 16, page 120](#).

**IMPORTANT:**

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

9. Reinstall the inspection plug.

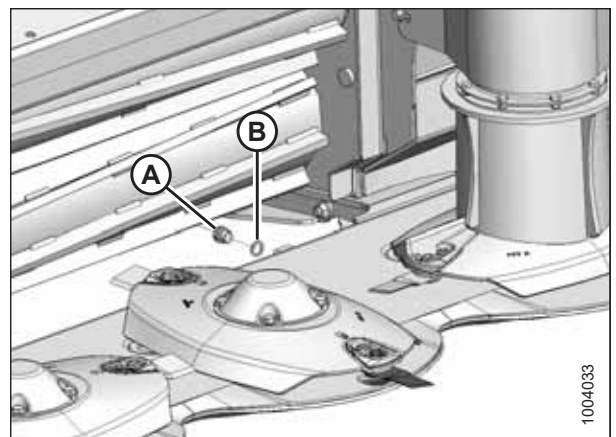


Figure 4.14: Cutterbar Oil Inspection Plug



**CAUTION**

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

## MAINTENANCE AND SERVICING

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

**IMPORTANT:**

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

**NOTE:**

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

15. Recheck the oil level.
16. Check O-ring (B) for breaks or cracks, and replace if necessary.
17. Install plug (A) and O-ring (B). Tighten securely.

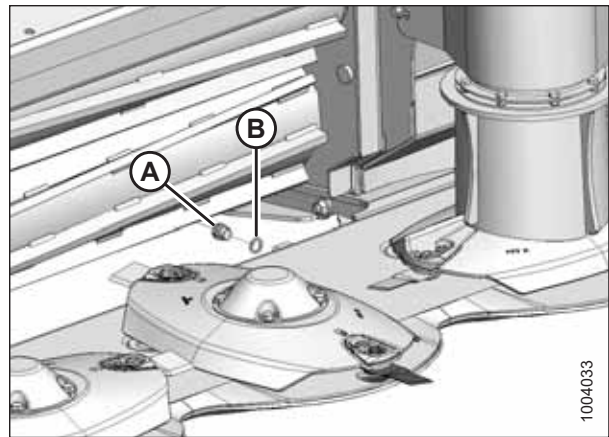


Figure 4.15: Cutterbar Oil Inspection Plug

18. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

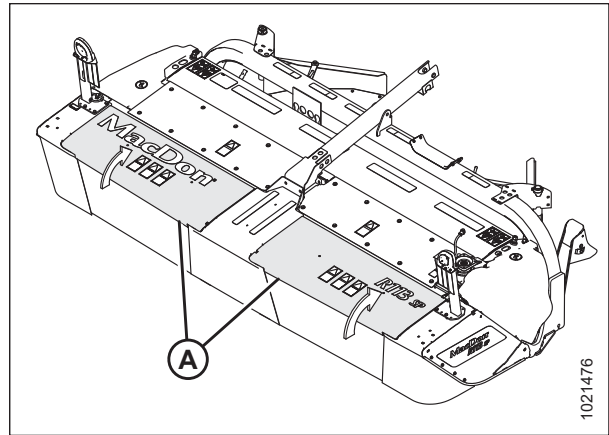


Figure 4.16: Cutterbar Doors – R113 SP Shown, R116 SP Similar

*Draining Cutterbar*

**⚠ WARNING**

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

**⚠ WARNING**

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

1. Remove the right outboard rock guard. This will improve access to the drain plug located in the end cap of the cutterbar. To remove the outboard rock guard, refer to [Removing Outboard Rock Guards, page 149](#).

**NOTE:**

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

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

**IMPORTANT:**

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

4. Lower the rotary disc header onto the blocks.
5. Shut down the engine, and remove the key from the ignition.
6. Place a 10 liter (10.5 US qts) capacity container under 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.

7. Allow sufficient time for lubricant to drain, then reinstall cutterbar plug (A).

**NOTE:**

Do **NOT** flush the cutterbar.

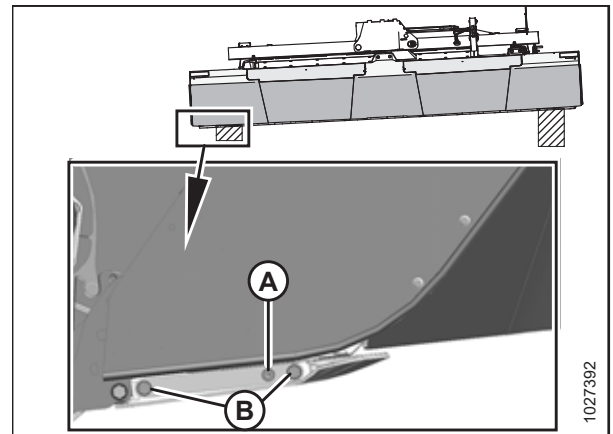


Figure 4.17: Draining Cutterbar

8. Fill the cutterbar with lubricant before operating the rotary disc header. For instructions, refer to [Adding Lubricant into a Repaired Cutterbar, page 122](#).

**IMPORTANT:**

Dispose of used lubricant responsibly.

9. Reinstall the right outboard rock guard. For instructions, refer to [Installing Outboard Rock Guards, page 150](#).

### Adding Lubricant into a Repaired Cutterbar

This procedure should be used when the cutterbar has been completely drained of oil. If you are checking the oil level or topping it up, refer to [Checking and Adding Lubricant – Cutterbar, page 118](#).

#### **WARNING**

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

#### **WARNING**

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

#### **IMPORTANT:**

The cutterbar should be completely empty of oil before filling it. For instructions, refer to [Draining Cutterbar, page 121](#).

1. Start the engine.
2. Raise the header fully.
3. Place a block under the right end of the rotary disc header, so the right end is higher than the left end.
4. Lower the rotary disc header onto the blocks.
5. Shut down the engine, and remove the key from the ignition.
6. Remove the right outboard rock guard. This will improve access to the drain plug located in the end cap of the cutterbar. To remove the outboard rock guard, refer to [Removing Outboard Rock Guards, page 149](#).

#### **NOTE:**

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

7. Remove access plug (A) from the raised end of the cutterbar and add the **EXACT** amount of lubricant specified. Refer to the inside back cover of this manual for lubricant types and quantities.

#### **IMPORTANT:**

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

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

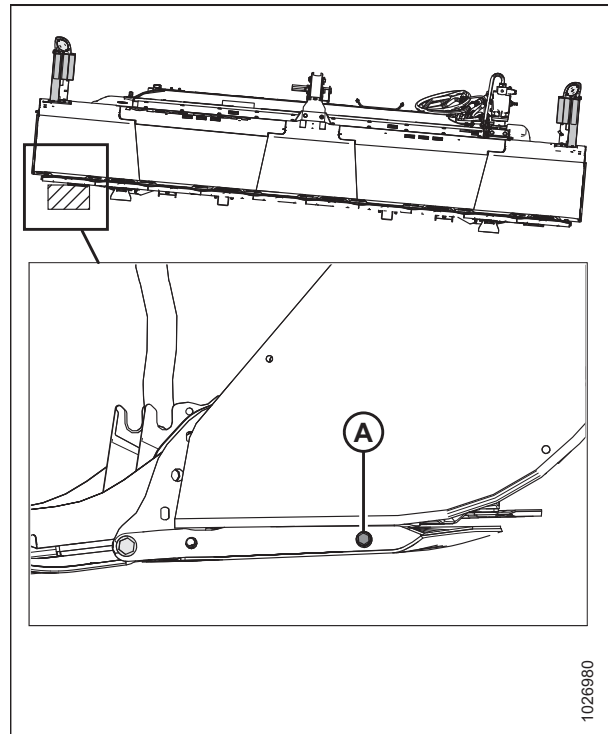


Figure 4.18: Filling Cutterbar

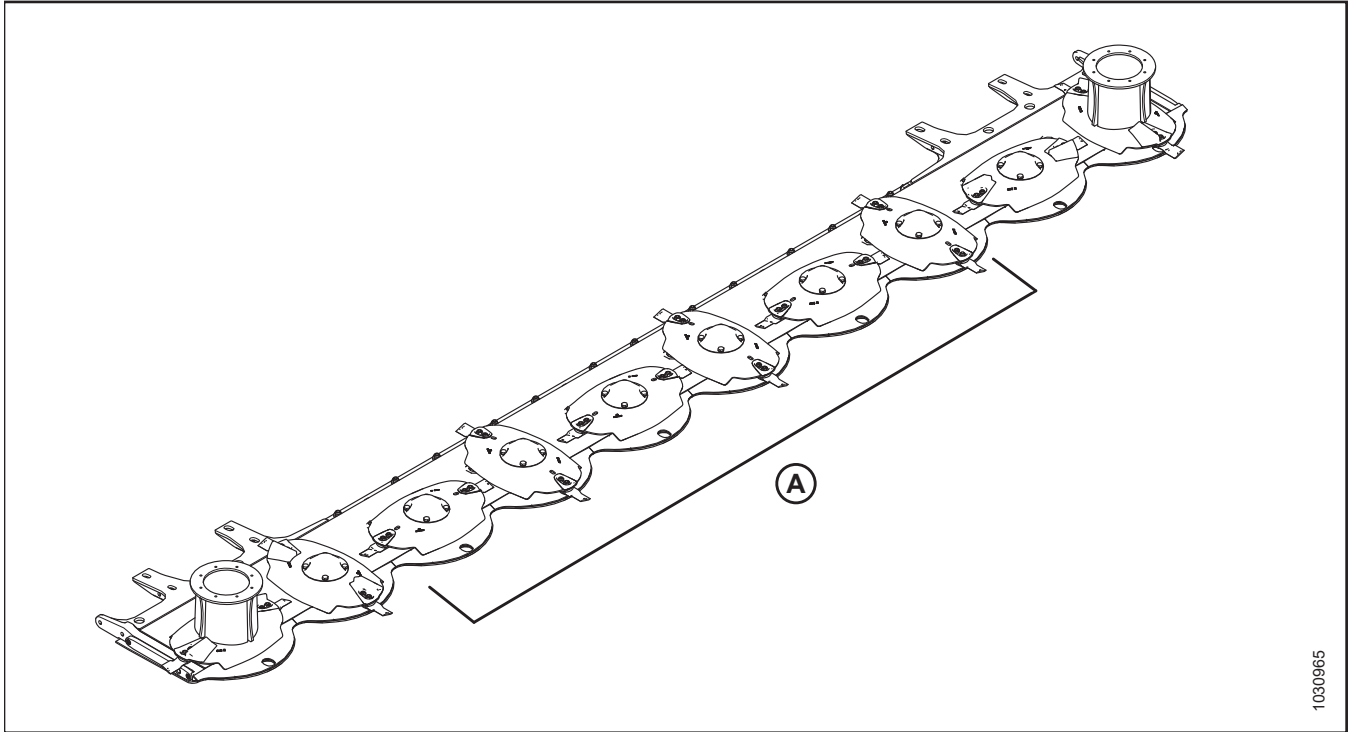
#### **CAUTION**

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

9. Start the engine, and raise the header fully.
10. Engage the windrower lift cylinder safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
11. Shut down the engine, and remove the key from the ignition.

12. Remove the block from under the cutterbar.
13. Check the lubricant level. For instructions, refer to *Checking and Adding Lubricant – Cutterbar*, page 118.
14. Reinstall the right outboard rock guard. For instructions, refer to *Installing Outboard Rock Guards*, page 150.

#### 4.5.2 Cutterbar Discs



**Figure 4.19: Interchangeable Cutterbar Discs**

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

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

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*

**! WARNING**

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**

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

**IMPORTANT:**

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



## MAINTENANCE AND SERVICING

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

**NOTE:**

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

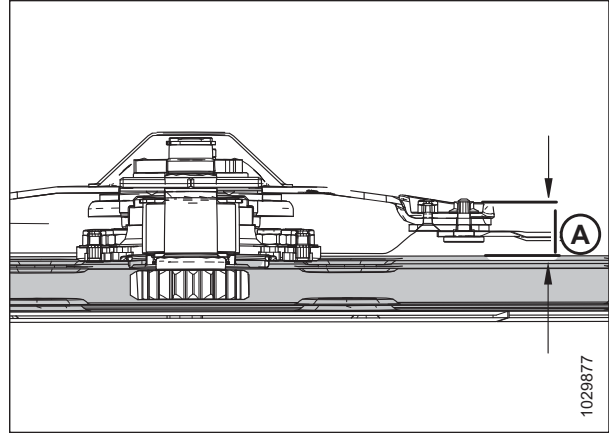


Figure 4.20: Cutterbar Disc

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

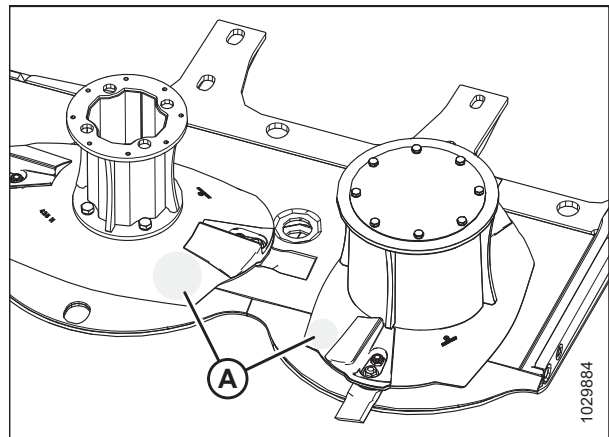


Figure 4.21: Cutterbar Disc

3. Inspect cutterbar disc surface (D) for cracks, excessive wear, and disc distortion. Replace as required.
4. Inspect 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.

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

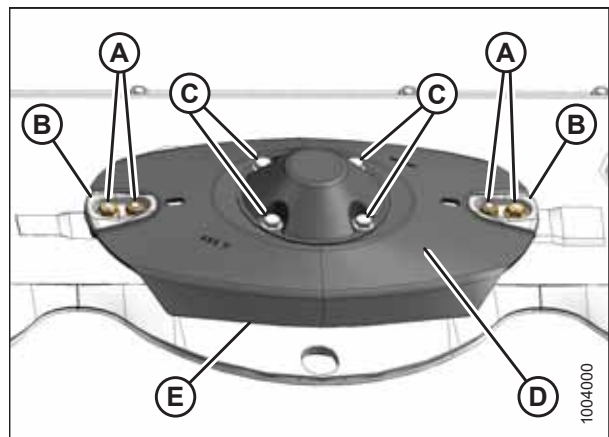


Figure 4.22: Cutterbar Disc



Removing Cutterbar Discs

**DANGER**

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

**CAUTION**

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage windrower lift cylinder safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props](#), page 24.
4. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America](#), page 79.

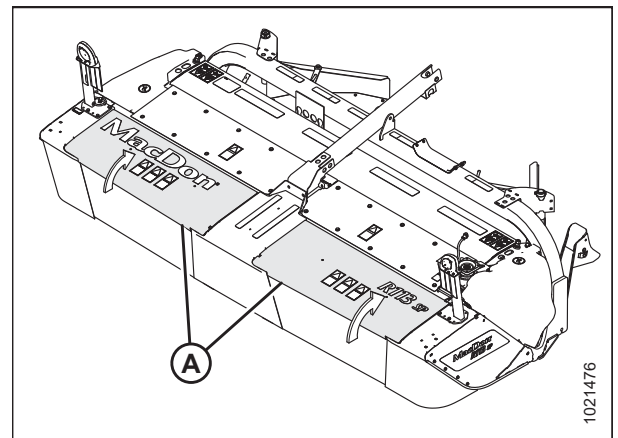


Figure 4.23: Cutterbar Doors – R113 SP

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

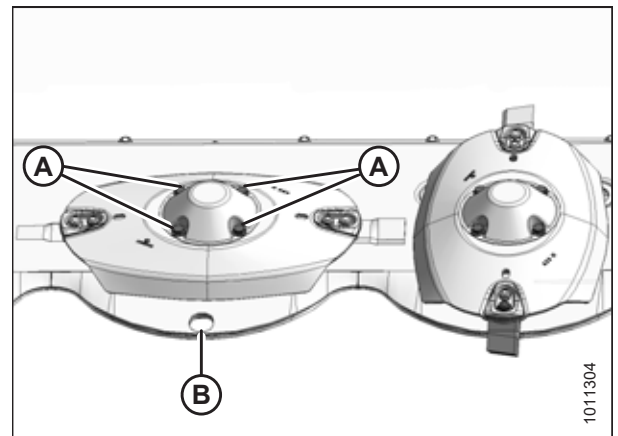


Figure 4.24: Cutterbar Disc Bolts

## MAINTENANCE AND SERVICING

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

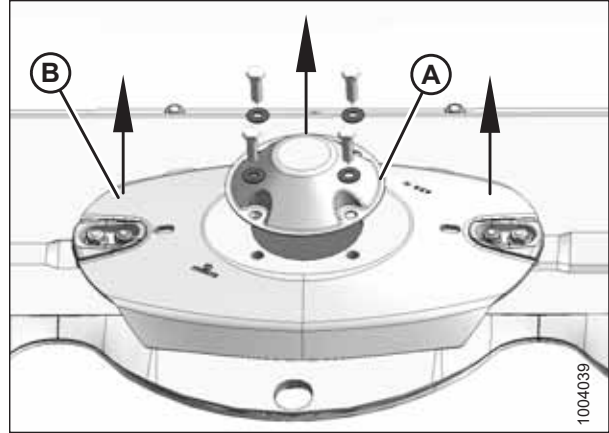


Figure 4.25: Cutterbar Disc and Cap

### *Installing Cutterbar Discs*

#### **DANGER**

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

#### **WARNING**

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

1. Shut down the engine, and remove the key from the ignition.
2. Install spacer plate (A) on spindle.

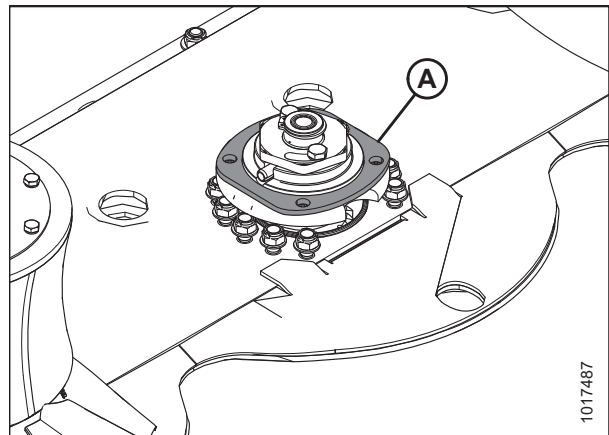


Figure 4.26: Disc Spindle

## MAINTENANCE AND SERVICING

3. Place a pin (or equivalent) in front hole (D) of the rock guard to prevent the disc from rotating while tightening bolts.
4. Position new disc (A) on the spindle at a 90° angle in relation to the adjacent discs.
5. Install cutter disc cap (B), and secure assembly with four M12 bolts and washers (C). Torque bolts to 85 Nm (63 lbf-ft).

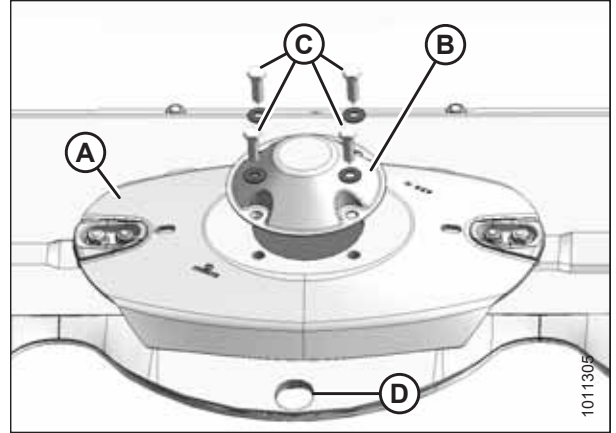


Figure 4.27: Cutterbar Disc and Cap

### **WARNING**

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

6. Remove pin (or equivalent) from front hole of rock guard.
7. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

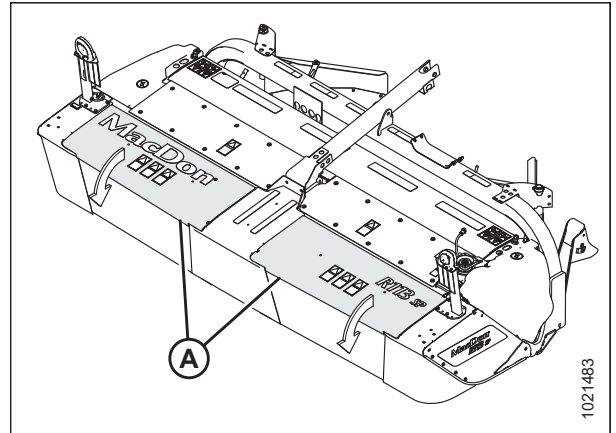


Figure 4.28: Cutterbar Doors – R13 SP Shown

### 4.5.3 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 the 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 torquing spindle nut and replacing damaged shear pins.

Refer to [4.5.9 Replacing Cutterbar Spindle Shear Pin, page 177](#) to replace shear pin.

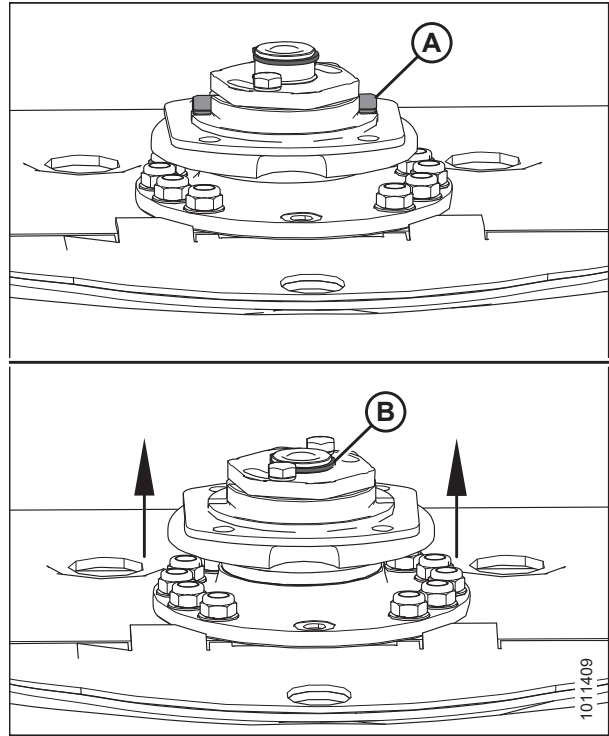


Figure 4.29: Cutterbar Spindles

**IMPORTANT:**

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

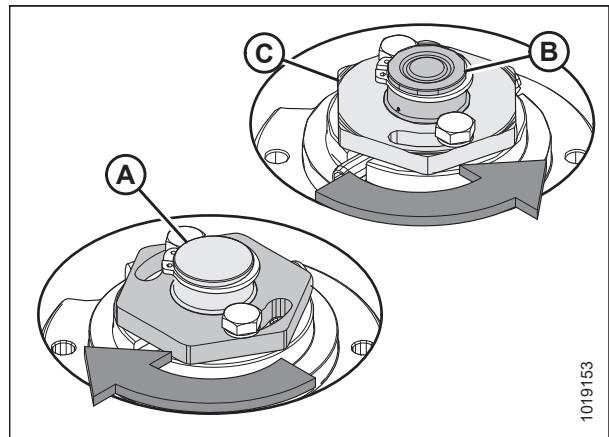


Figure 4.30: Cutterbar Spindles

Removing Cutterbar Spindles

**DANGER**

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

**CAUTION**

Disc blades 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 the rotary disc header fully.

**NOTE:**

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

3. Shut down the engine, and remove the key from the ignition.
4. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

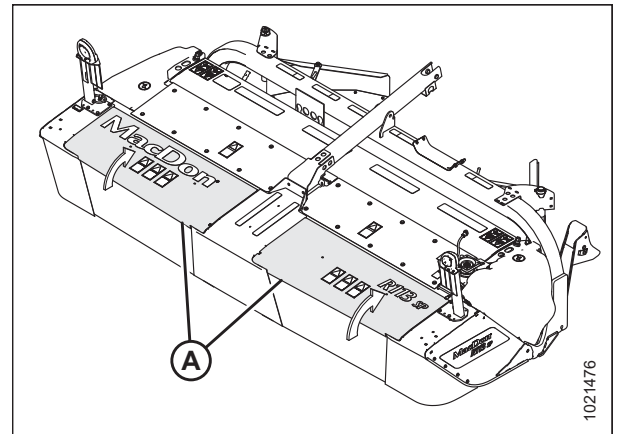


Figure 4.31: Cutterbar Doors – R113 SP Shown

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

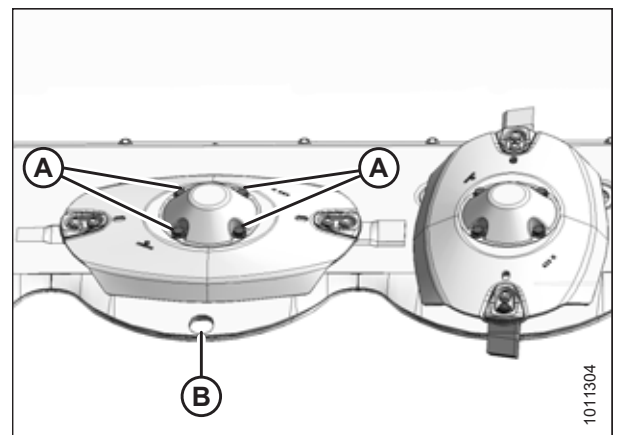


Figure 4.32: Cutterbar Disc Bolts

## MAINTENANCE AND SERVICING

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

**IMPORTANT:**

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

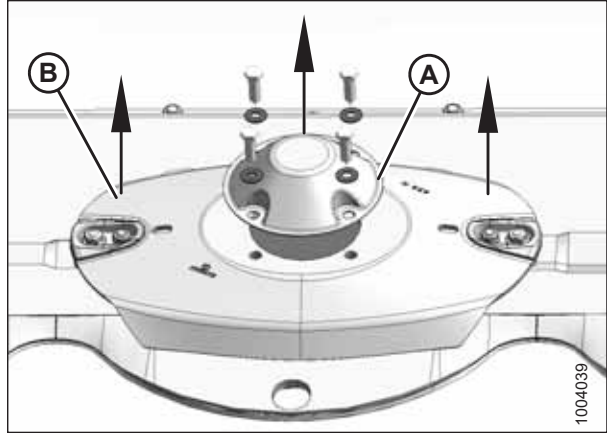


Figure 4.33: Cutterbar Disc and Cap

9. Remove spacer plate (A).

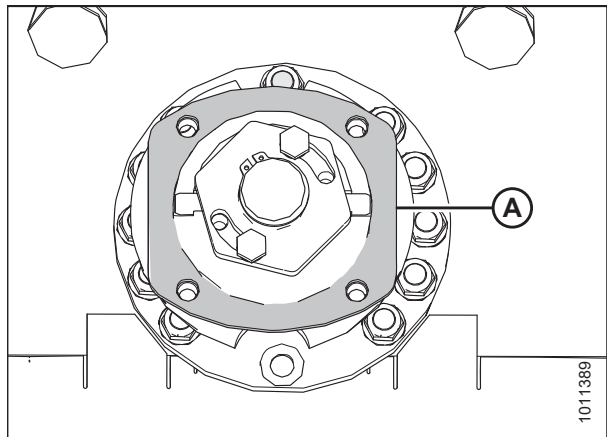


Figure 4.34: Spacer Plate

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

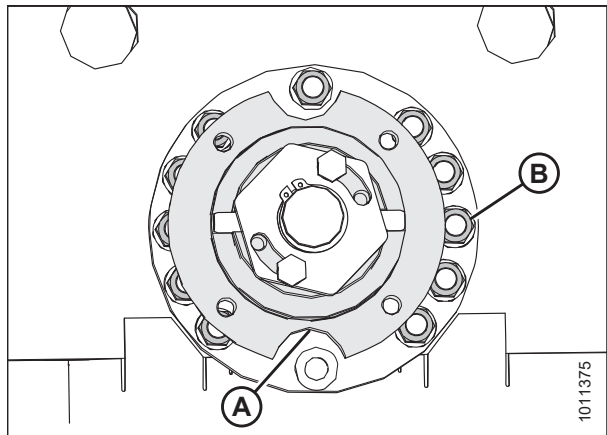


Figure 4.35: Left Spindle Hub and Hardware

11. Remove spindle (A) from cutterbar.

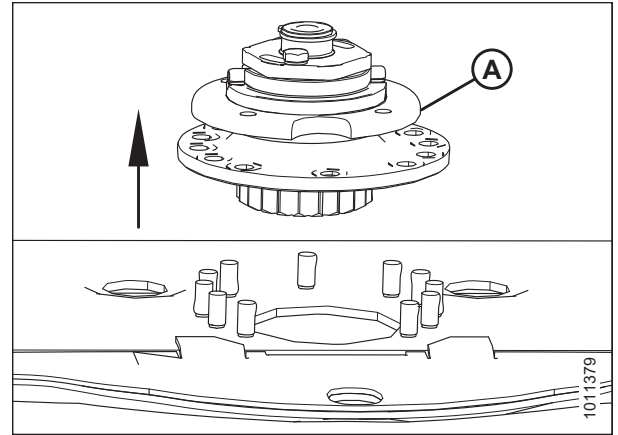


Figure 4.36: Left Spindle

### Installing Cutterbar Spindles

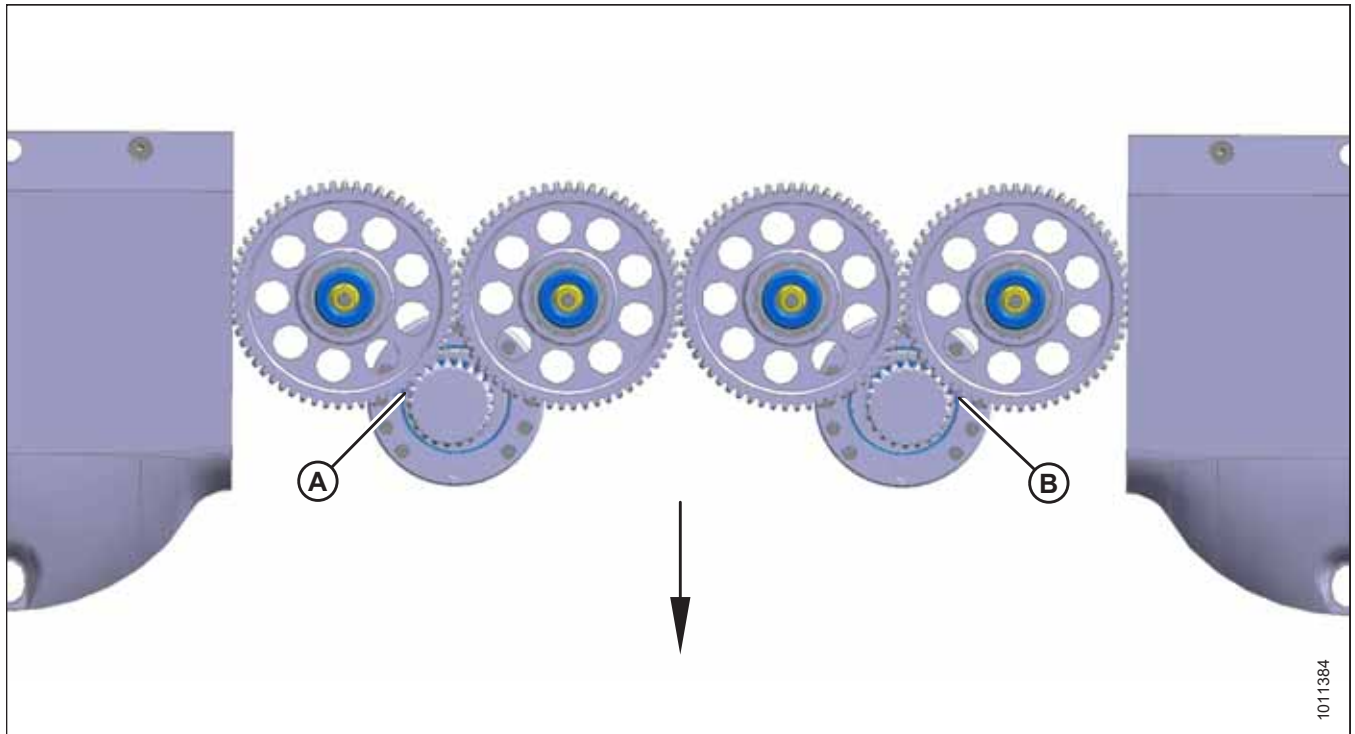


Figure 4.37: Underside of Cutterbar Spindles

#### IMPORTANT:

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

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

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

## MAINTENANCE AND SERVICING

### NOTE:

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

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

### DANGER

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

### CAUTION

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

1. Park the machine on a flat, level surface.
2. Lower the header fully.

#### NOTE:

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

3. Shut down the engine, and remove the key from the ignition.
4. Determine suitable spindle rotation pattern for crop conditions. For instructions, refer to [4.5.3 Replacing Cutterbar Spindles, page 128](#).
5. Ensure that spindle O-ring (A) is properly seated, cleaned, and undamaged.

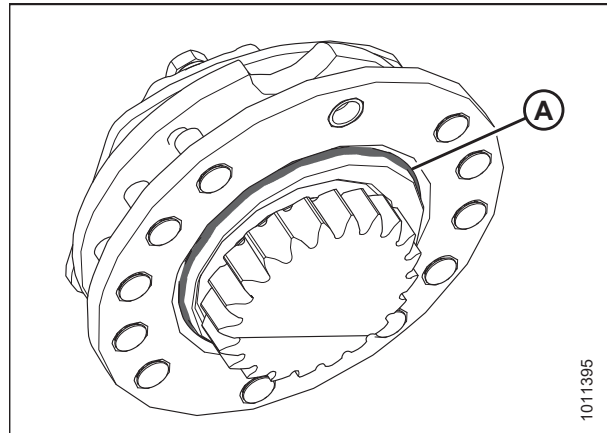


Figure 4.38: Left Spindle O-Ring

1011395



6. Insert spindle (A) into cutterbar.

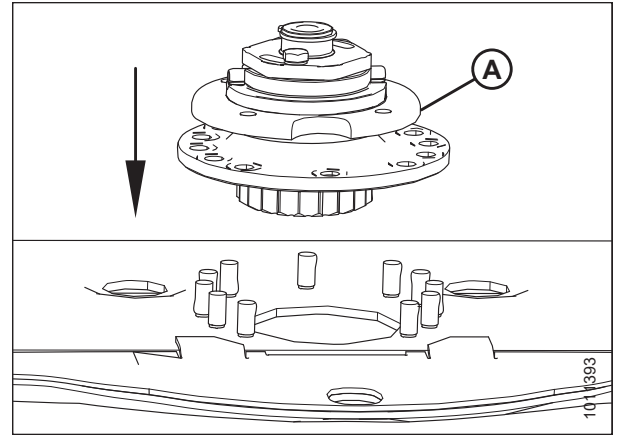


Figure 4.39: Left Spindle

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 the 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.

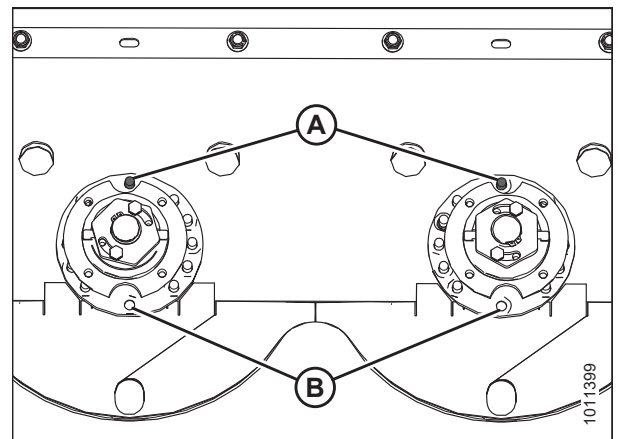


Figure 4.40: Spindle Orientation

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

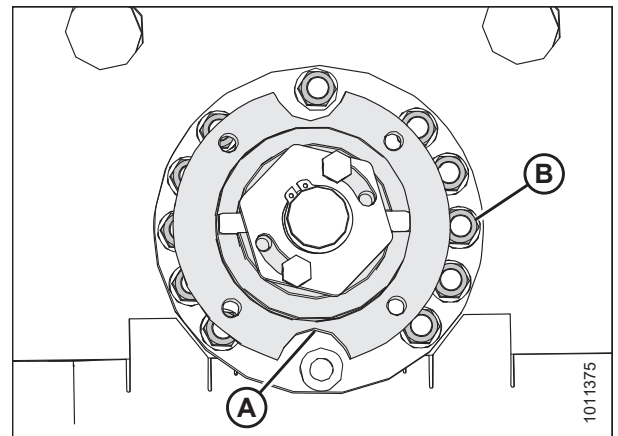


Figure 4.41: Left Spindle Hub

## MAINTENANCE AND SERVICING

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

**NOTE:**

Hub removed from illustration for clarity.

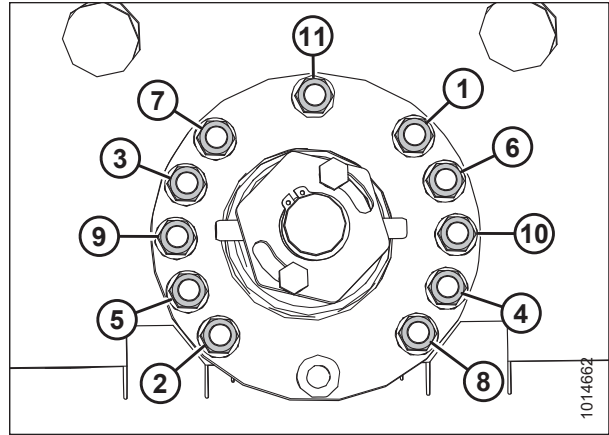


Figure 4.42: Tightening Pattern

- Install spacer plate (A).

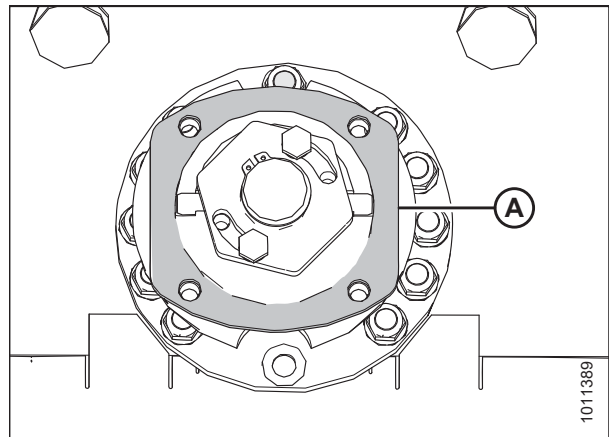


Figure 4.43: Spacer Plate

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

**IMPORTANT:**

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

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

**NOTE:**

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

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

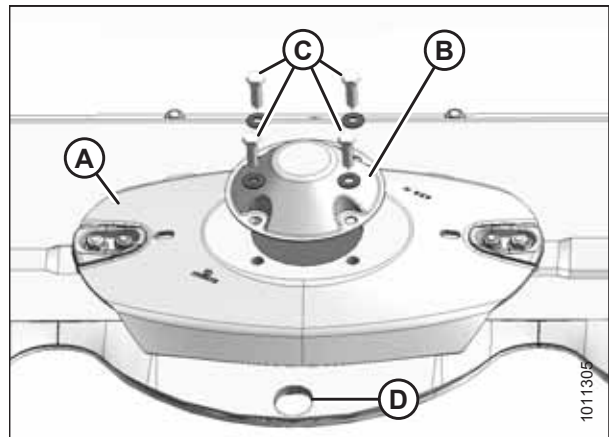


Figure 4.44: Cutterbar Disc and Cap

**⚠ WARNING**

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

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

16. Close cutterbar doors (A). For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 81.*

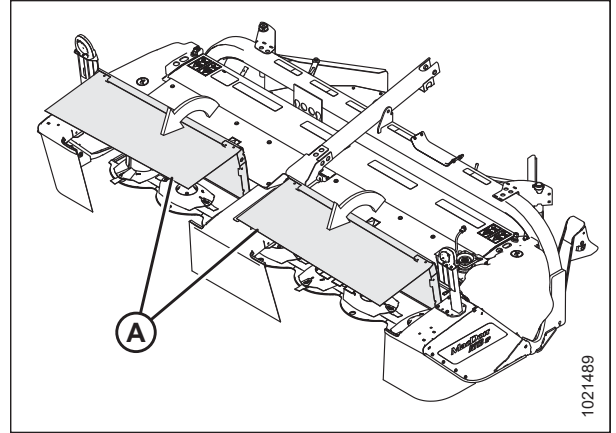


Figure 4.45: Cutterbar Doors – R13 SP Shown, R116 SP Similar

#### 4.5.4 Maintaining Disc Blades

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

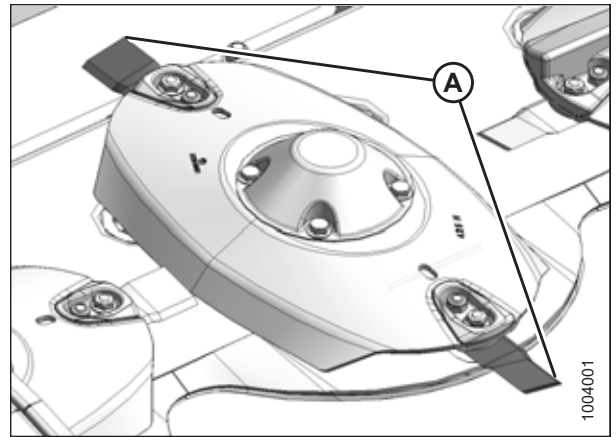


Figure 4.46: Disc blades

#### *Inspecting Disc Blades*



**WARNING**

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**

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



**CAUTION**

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

**IMPORTANT:**

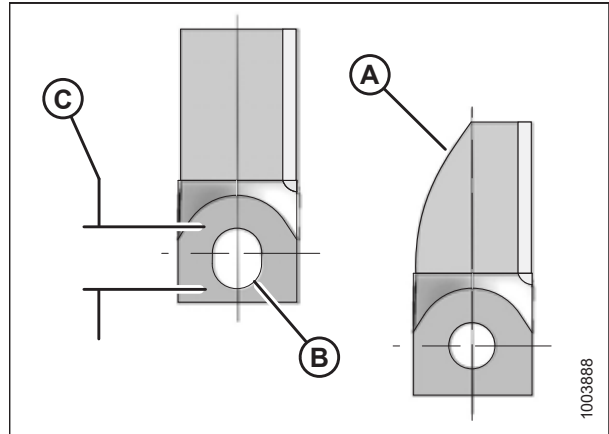
Damaged blades may damage the cutterbar and result in poor cutting performance. Replace damaged blades immediately.

## MAINTENANCE AND SERVICING

1. Shut down the engine, and remove the key from the ignition.
2. Check daily that the disc blades are securely attached to the disc.
3. Inspect blades for cracks, blade wear (A), and/or elongated holes (B) beyond safe operating limits (C).
4. Replace blades immediately when problems are noticed.

### IMPORTANT:

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



**Figure 4.47: Disc Blades**

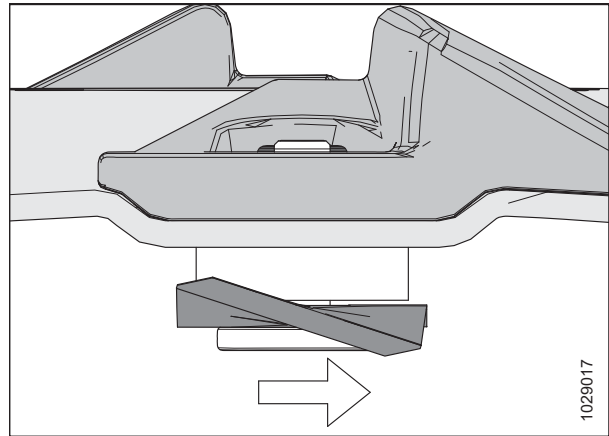
A - Blade Wear to Center Line

B - Elongated Hole

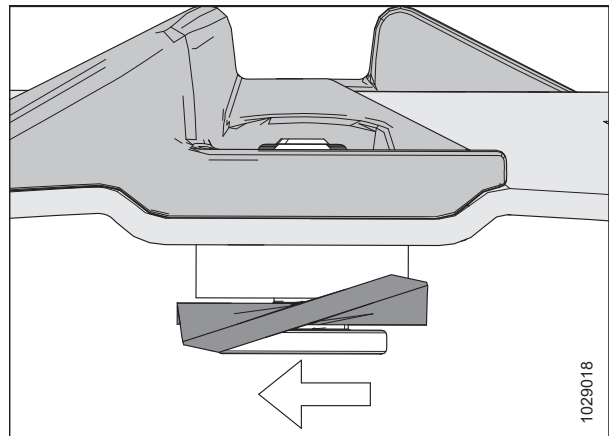
C - Maximum Elongation 21 mm (13/16 in.)

### IMPORTANT:

The disc blades have cutting edges on both sides so 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: [3.9.1 Changing R113 SP Cutterbar Crop Stream Configuration, page 88](#) for instructions.



**Figure 4.48: Counterclockwise Disc Rotation**



**Figure 4.49: Clockwise Disc Rotation**

*Inspecting Disc Blade Hardware*

 **WARNING**

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**

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

 **CAUTION**

Damaged or loose disc blades 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. For instructions, refer to [Removing Disc Blades, page 139](#) and [Installing Disc Blades, page 140](#) for hardware replacement procedure.

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

## MAINTENANCE AND SERVICING

2. Check each blade-attachment bolt and replace 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

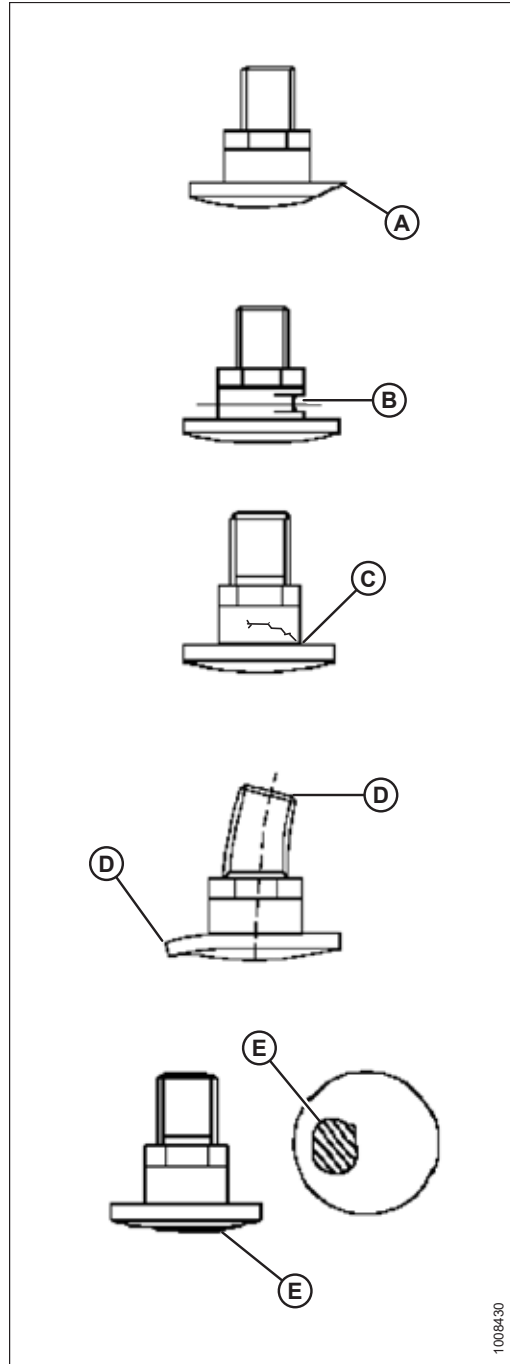


Figure 4.50: Disc Blade Bolts

## MAINTENANCE AND SERVICING

3. 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

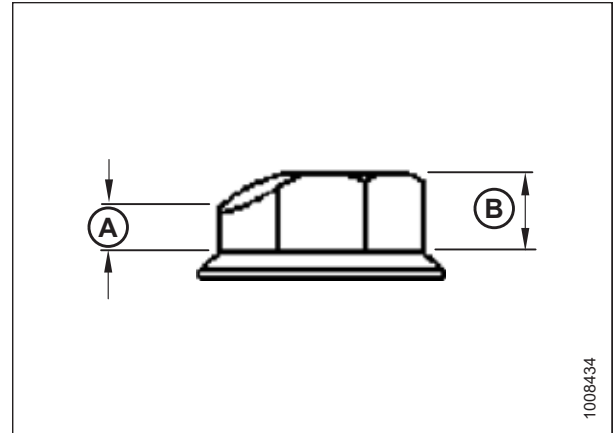


Figure 4.51: Disc Blade Nut

### Removing Disc Blades

#### DANGER

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

#### CAUTION

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

1. Raise rotary disc header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage windrower lift cylinder safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
4. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

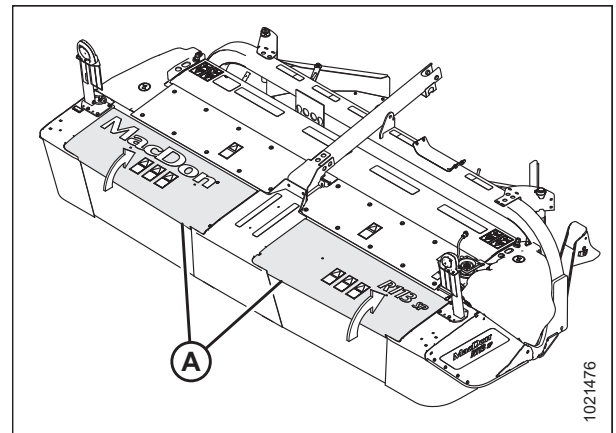


Figure 4.52: Cutterbar Doors – R113 SP Shown, R116 SP Similar





## MAINTENANCE AND SERVICING

2. Place a pin (or equivalent) in the front hole of the rock guard to prevent disc rotation while tightening blade bolts.
3. 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.

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



### WARNING

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

5. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

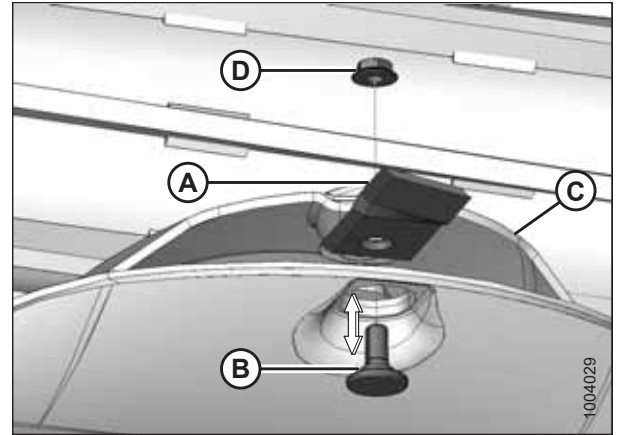


Figure 4.55: Disc Blade

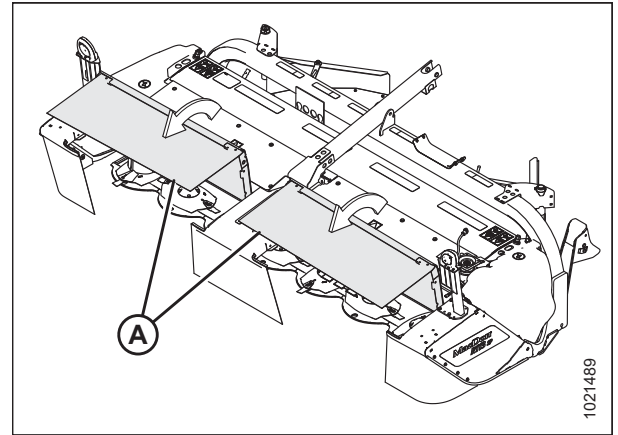


Figure 4.56: Cutterbar Doors – R113 SP Shown, R116 SP Similar

### 4.5.5 Maintaining Accelerators

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

A pair of accelerators are installed on each disc topped with a drum as shown in the illustrations at right. Two pairs of accelerators are installed on an R113 SP (one pair on the outboard disc at each end of the cutterbar) and two pairs are installed on an R116 SP (one pair on each of the two outboard discs at each end of the cutterbar).

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.

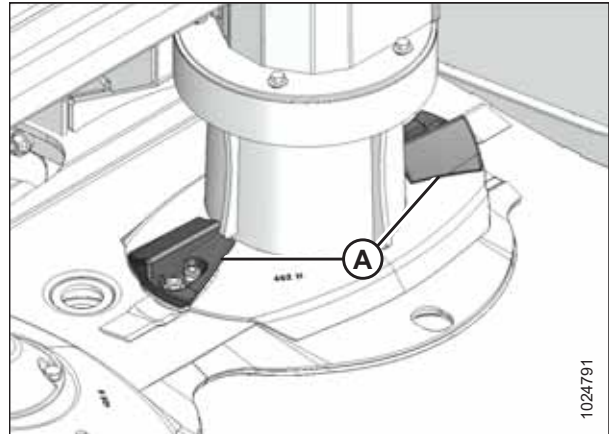


Figure 4.57: R113 SP Cutterbar Accelerators

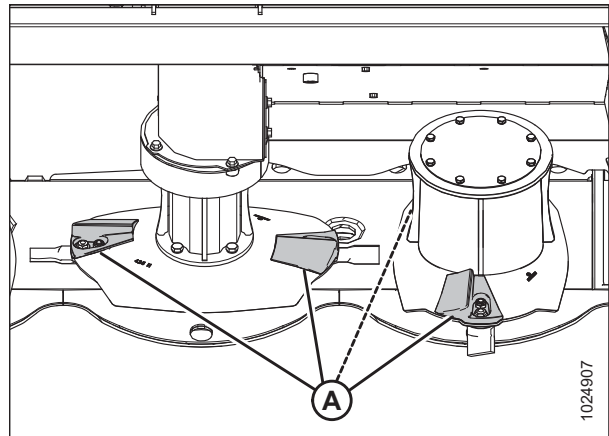


Figure 4.58: R116 SP Cutterbar Accelerators

#### Inspecting Accelerators

**⚠ DANGER**

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the windrower lift cylinder safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
4. Open the cutterbar doors. For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

**⚠ CAUTION**

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

## MAINTENANCE AND SERVICING

5. Inspect accelerators (A) 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.
6. Tighten or replace loose or missing fasteners.

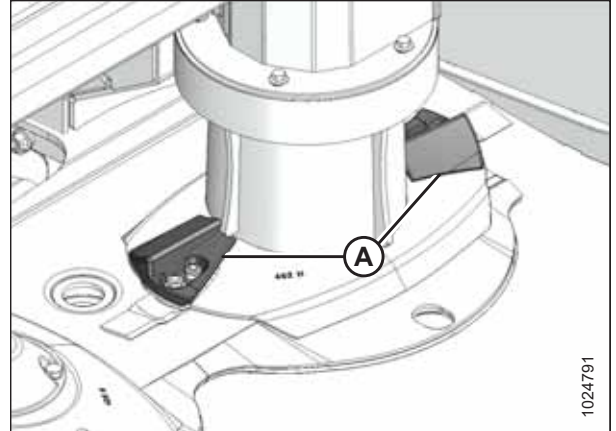


Figure 4.59: R113 SP Cutterbar Accelerators

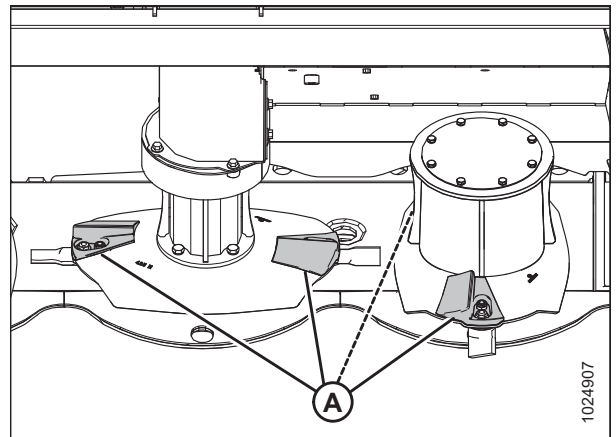


Figure 4.60: R116 SP Cutterbar Accelerators

### 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 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 the rotary disc header fully.
2. Shut off the engine, and remove the key from the ignition.
3. Engage windrower lift cylinder safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).

## MAINTENANCE AND SERVICING

4. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

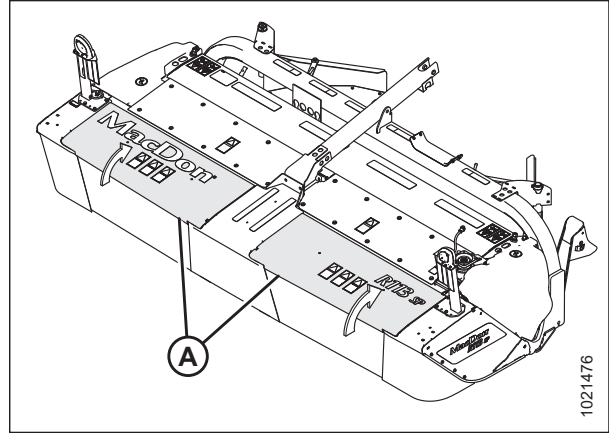


Figure 4.61: Cutterbar Doors – R113 SP Shown, R116 SP Similar

### CAUTION

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

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

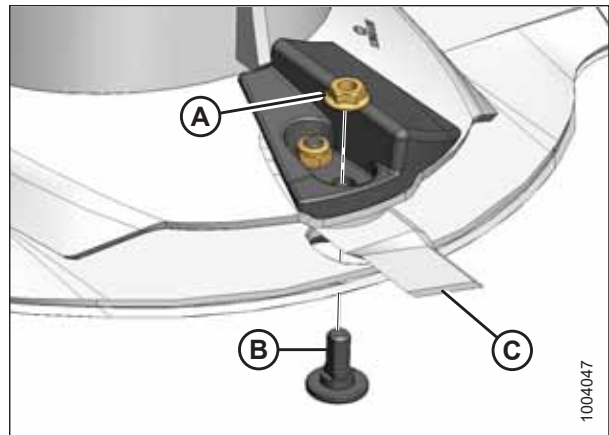


Figure 4.62: Accelerator Removal

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

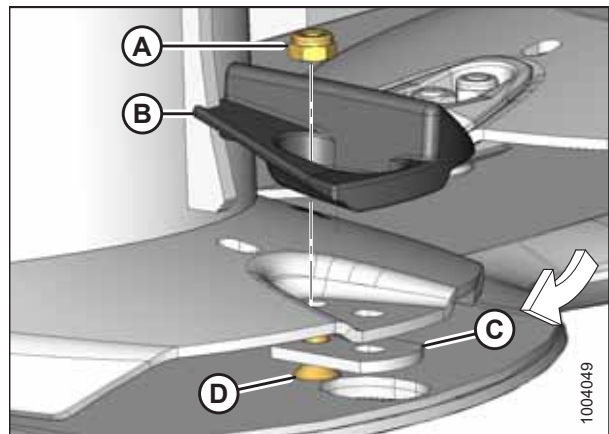


Figure 4.63: Accelerator Removal

*Installing Accelerators*

**CAUTION**

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

**IMPORTANT:**

Always replace accelerators in pairs to ensure proper disc balance.

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

**IMPORTANT:**

Accelerators are unidirectional; both clockwise and counterclockwise accelerators are used on the cutterbar. Verify the direction of the disc before installing accelerators.

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

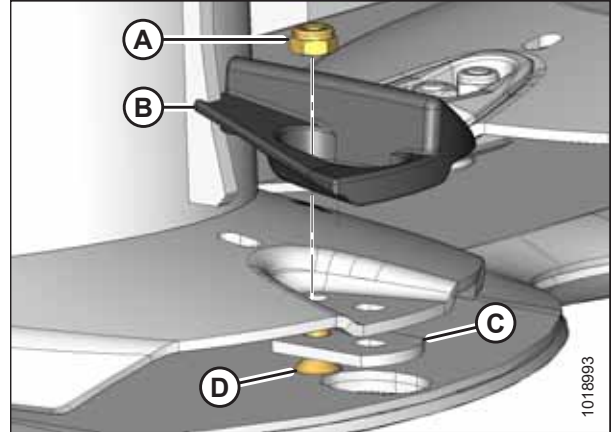


Figure 4.64: Accelerator Install

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

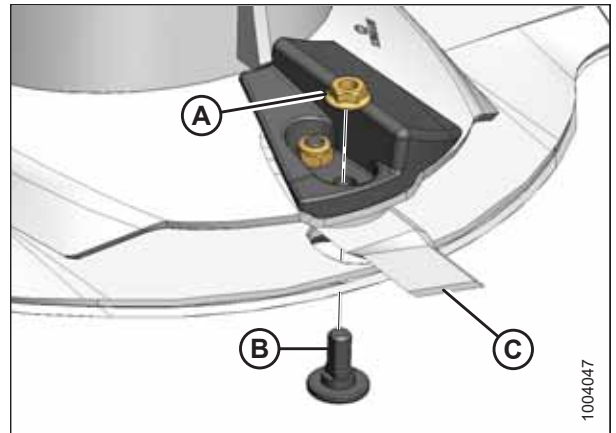


Figure 4.65: Accelerator Install

## MAINTENANCE AND SERVICING

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

### **WARNING**

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

7. Remove the wooden block.
8. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

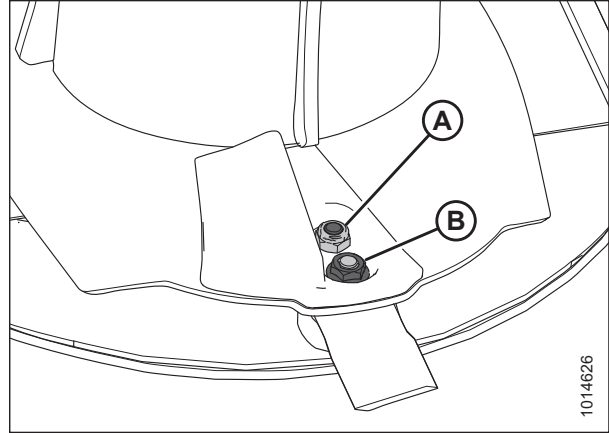


Figure 4.66: Accelerator Install

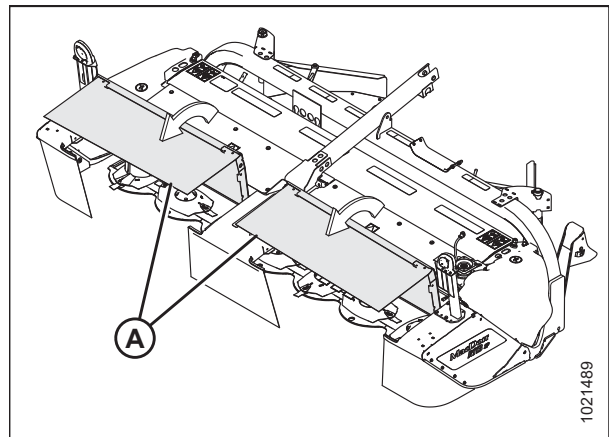


Figure 4.67: R113 SP Cutterbar Doors

### 4.5.6 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. Periodically inspect rock guards for damage and replace as necessary.

#### *Inspecting Rock Guards*

### **DANGER**

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

### **WARNING**

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage windrower lift cylinder safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).

## MAINTENANCE AND SERVICING

4. Inspect rock guards for wear, cracks, damage, or distortion. Replace if worn to 75% or less of their original thickness.
5. Check for loose or missing fasteners; tighten or replace fasteners as needed.

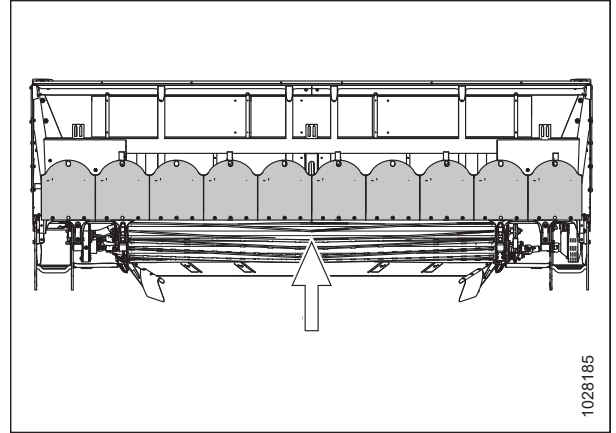


Figure 4.68: Rock Guards

### Removing Inboard Rock Guards

#### **WARNING**

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

1. Raise the rotary disc header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
4. Remove two hex head screws, washers, and lock nuts (A).

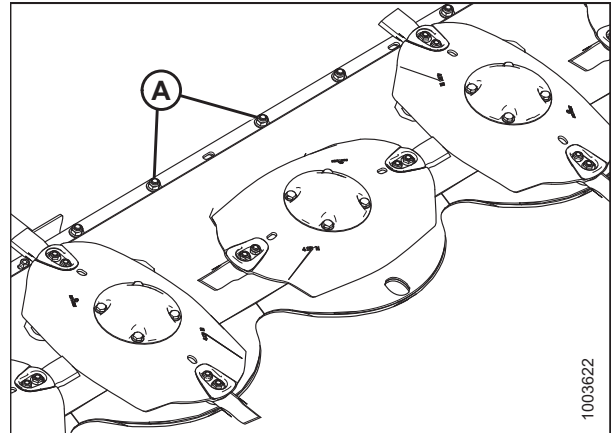


Figure 4.69: Inboard Rock Guards

## MAINTENANCE AND SERVICING

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

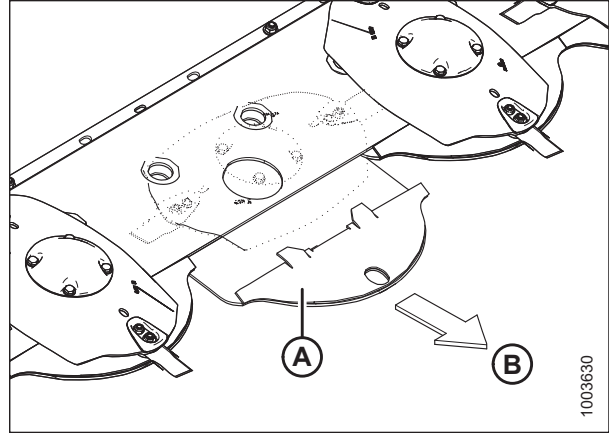


Figure 4.70: Inboard Rock Guards

### *Installing Inboard Rock Guards*

- Raise the rotary disc header fully.
- Shut down the engine, and remove the key from the ignition.
- Engage the header safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
- Guide inboard rock guard onto cutterbar until tabs (A) sit on top of the cutterbar and bottom back bolt holes line up.

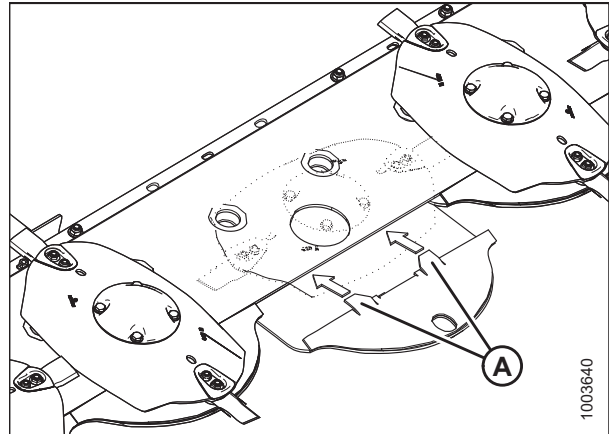


Figure 4.71: Inboard Rock Guards

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

**NOTE:**

Lock nuts (A) are installed on top.

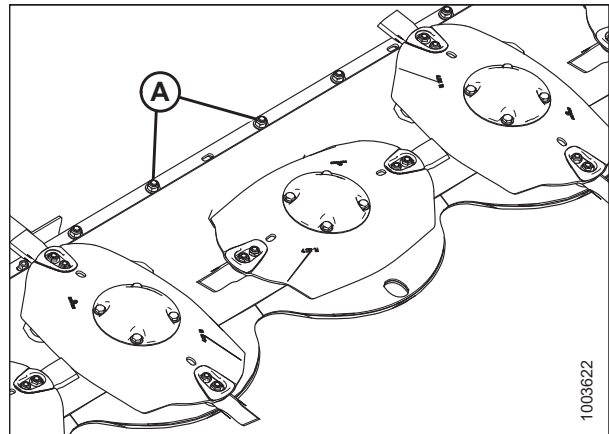


Figure 4.72: Inboard Rock Guards



*Removing Outboard Rock Guards*

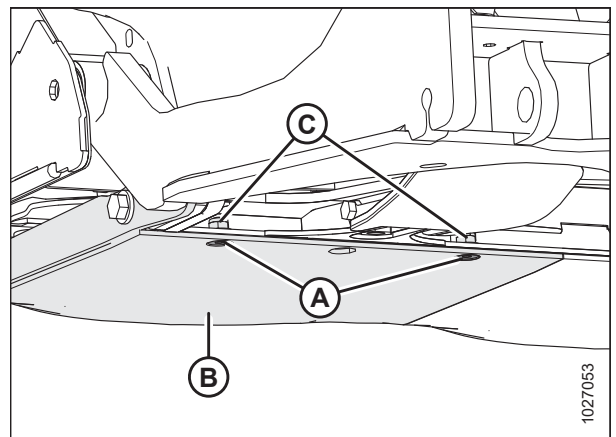
**⚠ DANGER**

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

**⚠ WARNING**

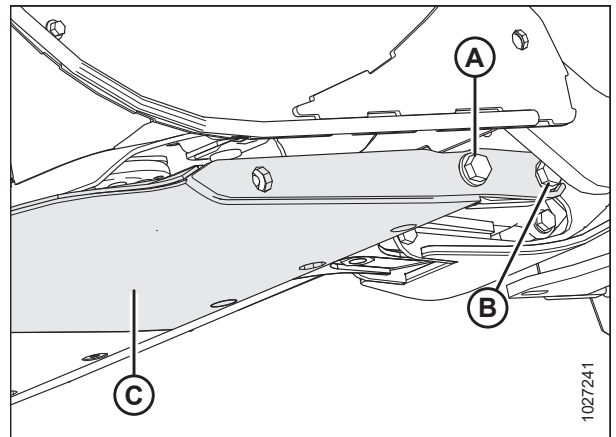
Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
4. Locate rock guard (B) on the bottom outboard end of the cutterbar. There is one guard on each end of the cutterbar.
5. Remove the two hex head screws (A), washers, and lock nuts (C) securing rock guard (B) to the cutterbar assembly.



**Figure 4.73: Left Outboard Rock Guard – Rear View**

6. Remove bolt and washers (A).
7. Loosen bolt (B).
8. Remove rock guard (C) by sliding it forward.
9. Repeat Step 4, [page 149](#) to Step 8, [page 149](#) at the opposite side of the cutterbar.



**Figure 4.74: Left Outboard Rock Guard – Side View**

*Installing Outboard Rock Guards*

**⚠ DANGER**

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

**⚠ WARNING**

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

1. Check and remove any cutterbar debris that could obstruct installation of the outboard rock guard.
2. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the header safety props. For instructions, refer to *3.3 Engaging and Disengaging Header Safety Props, page 24*.
5. Apply medium-strength threadlocker (Loctite® 242 or equivalent) to bolt (B).

**NOTE:**

Some parts removed for clarity.

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

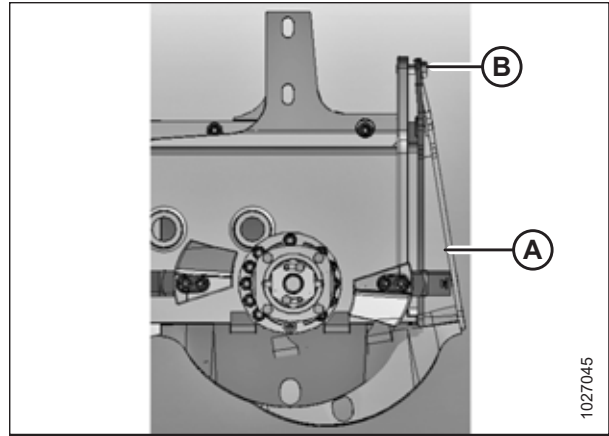


Figure 4.75: Left Outboard Rock Guard – Angled

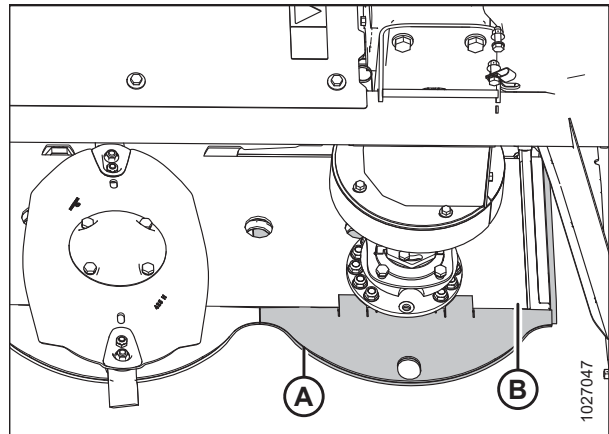


Figure 4.76: Outboard Rock Guard

## MAINTENANCE AND SERVICING

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

**NOTE:**

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

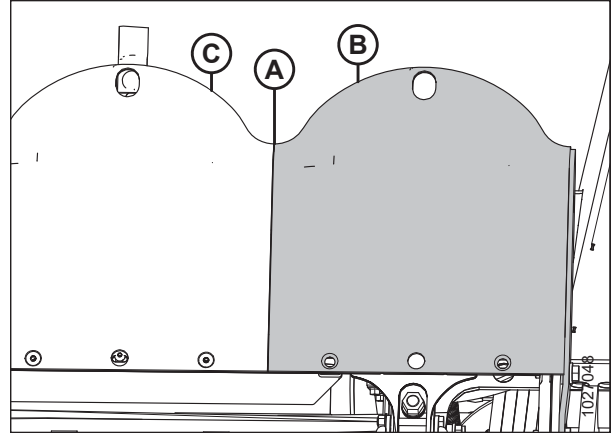


Figure 4.77: Outboard Rock Guard Installed

11. **For R113 SP Only:** Apply medium-strength threadlocker (Loctite® 242 or equivalent) on two hex head screws (C). Loosely install with lock nuts.
12. Install the M16 x 60 bolt (A) and one washer (B) as shown. Torque bolts (A) and (D) to 251 Nm (185 lbf-ft).
13. **For R113 SP Only:** Torque screws (C) to 54 Nm (40 lbf-ft).
14. Repeat at the opposite side of the cutterbar.

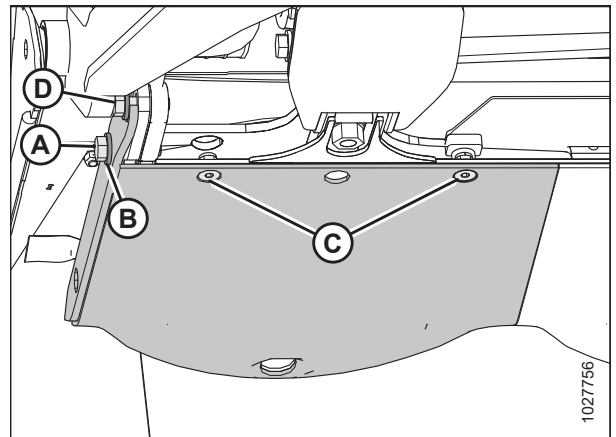


Figure 4.78: Left Outboard Rock Guard – Rear View

### 4.5.7 Maintaining Small Drums – R116 SP

Drums deliver cut material from the ends of the cutterbar and help maintain an even crop flow into the conditioner. The small drums are only found on an R116 SP header and are attached to the two discs inboard of the large drums.

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

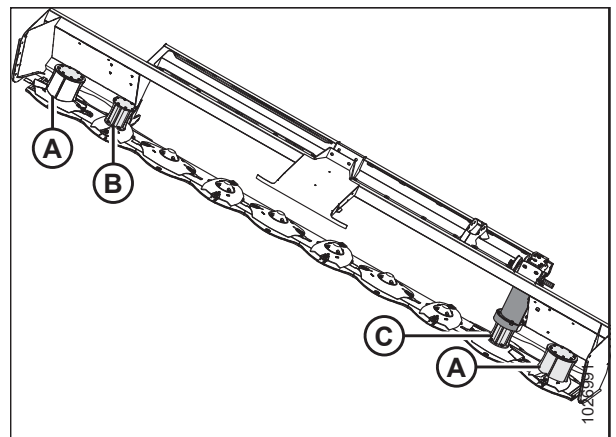


Figure 4.79: Cutterbar

A - Large Drums

B - Small Non-Driven Drum

C - Small Driven Drum

*Inspecting Small Drums – R116 SP*

Inspect drums daily for signs of damage or wear.

**WARNING**

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

**WARNING**

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

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

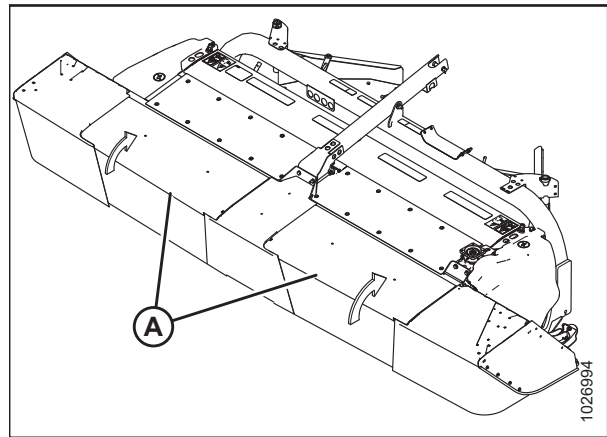


Figure 4.80: Cutterbar Doors

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

**WARNING**

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

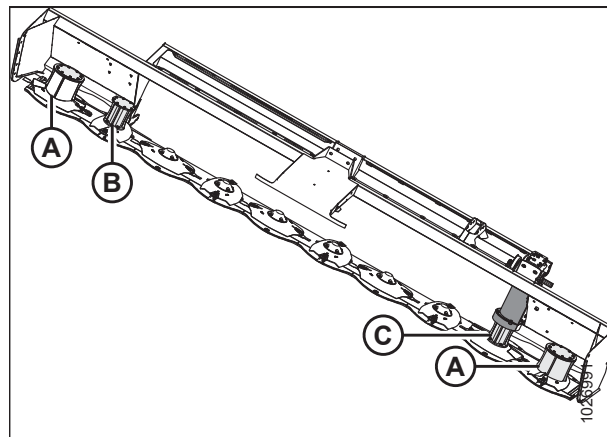


Figure 4.81: Cutterbar

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

## MAINTENANCE AND SERVICING

7. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

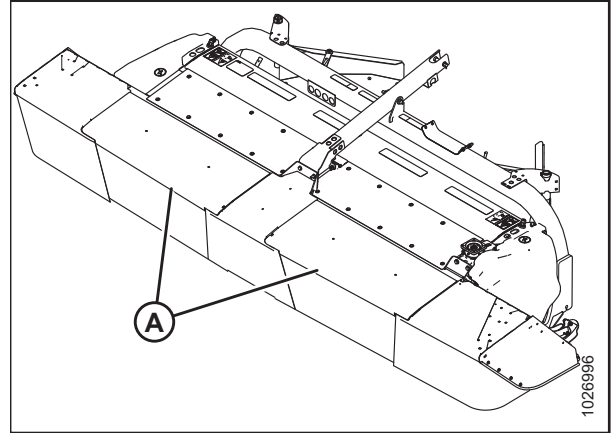


Figure 4.82: Cutterbar Doors

### Removing Small Driven Drum and Driveline – R116 SP

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

#### **WARNING**

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

#### **WARNING**

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

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

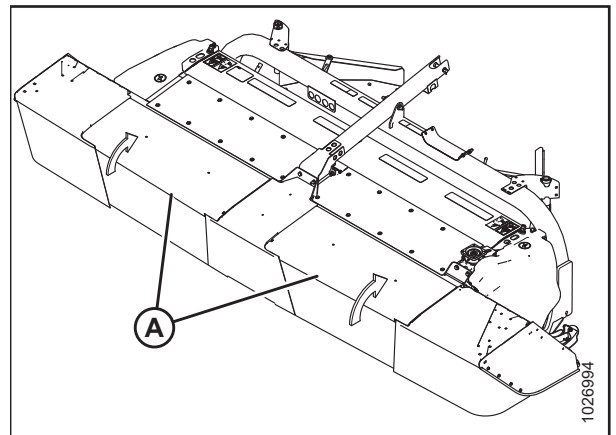


Figure 4.83: Cutterbar Doors

## MAINTENANCE AND SERVICING

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

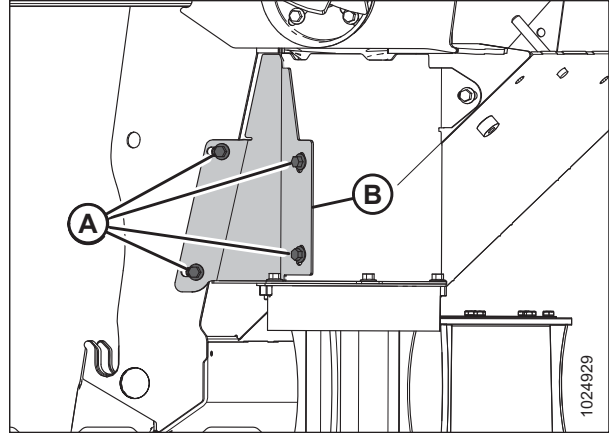


Figure 4.84: Driveline Shield

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

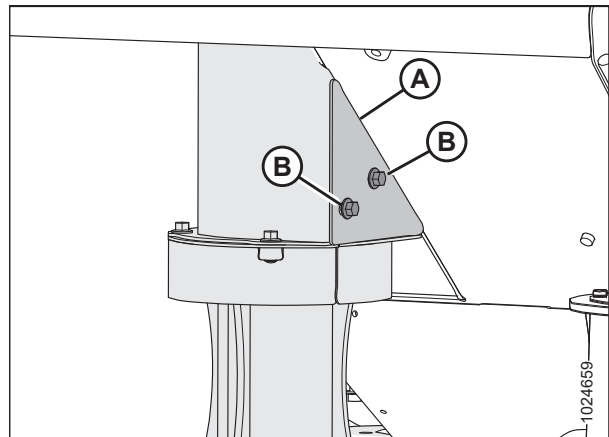


Figure 4.85: Driveline Shield

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

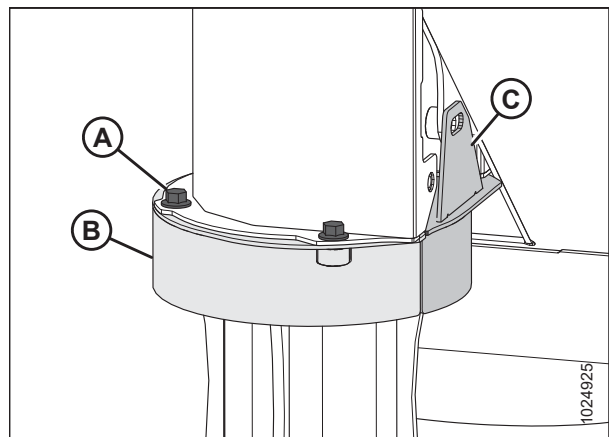


Figure 4.86: Driveline Shield

## MAINTENANCE AND SERVICING

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

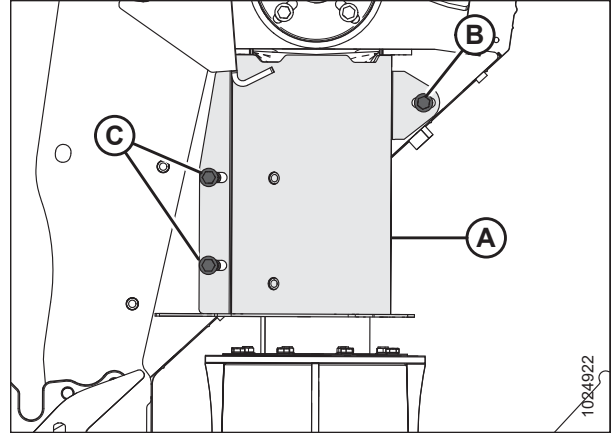


Figure 4.87: Driveline Shield

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

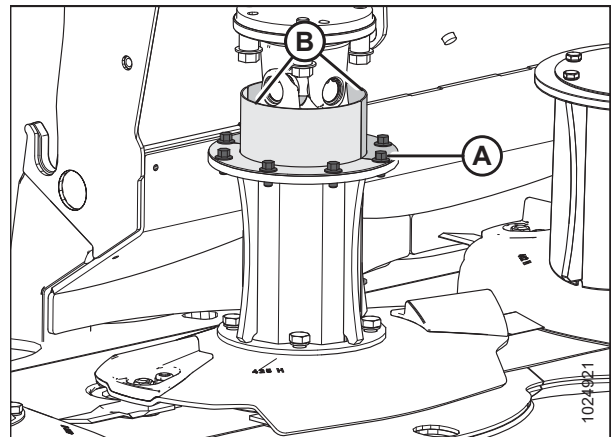


Figure 4.88: Driveline Shield

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

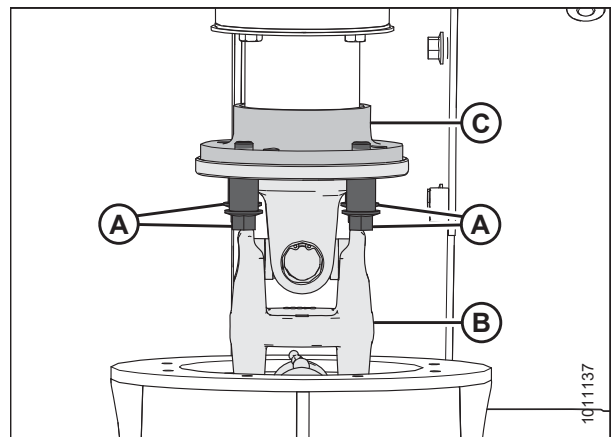


Figure 4.89: Hub Drive to Driveline Connection

## MAINTENANCE AND SERVICING

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

**NOTE:**

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

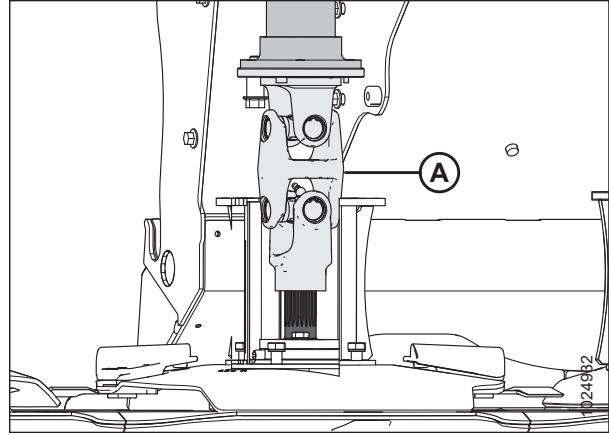


Figure 4.90: Hub Drive to Driveline Connection

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

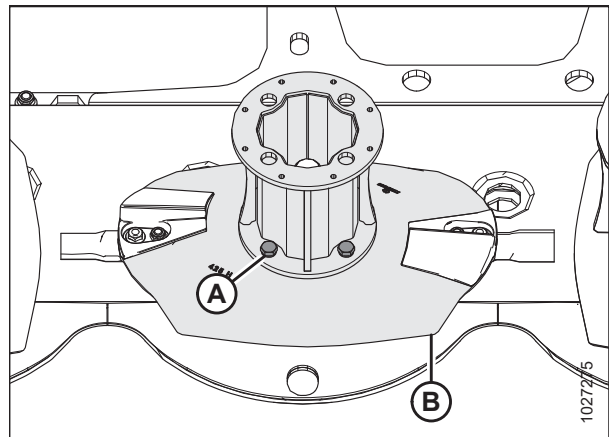


Figure 4.91: Driven Drum



*Installing Small Driven Drum and Driveline – R116 SP*

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

**⚠ WARNING**

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

**⚠ WARNING**

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

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Position the drum disc assembly (B) as shown.
4. Use an 18 mm deep socket to install four M12 bolts (A) and washers that hold the drum disc in place. Torque hardware to 85 Nm (63 lbf·ft).

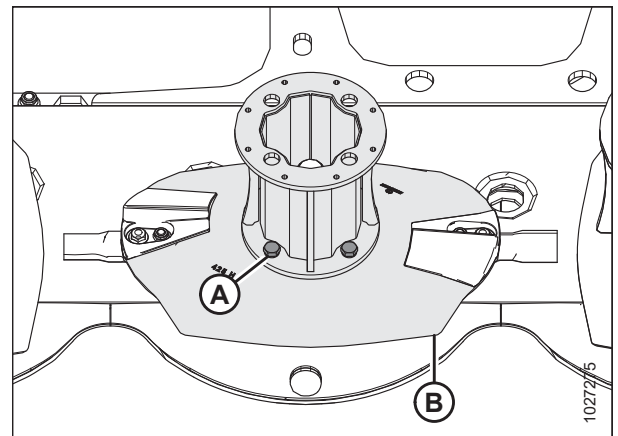


Figure 4.92: Drum Disc

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

**NOTE:**

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

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

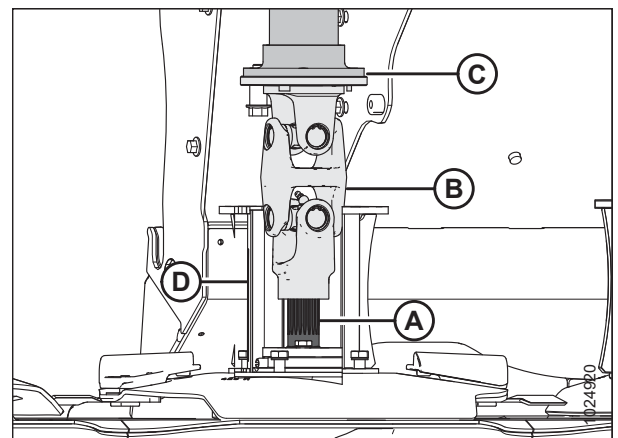


Figure 4.93: Hub Drive to Driveline Connection

## MAINTENANCE AND SERVICING

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

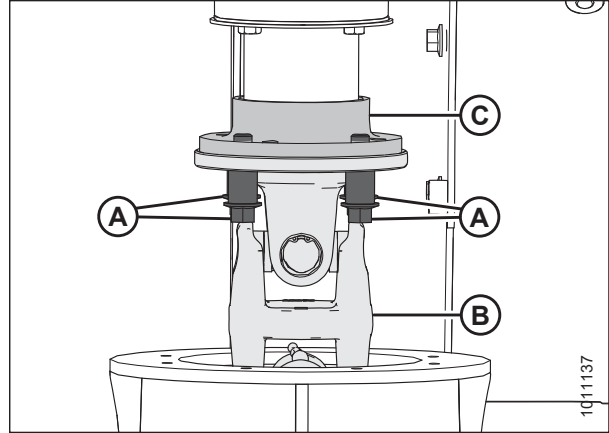


Figure 4.94: Hub Drive to Driveline Connection

- Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of eight M8 hex flange head bolts (A). Use the bolts to secure the drum shields in place. Torque hardware to 27 Nm (20 lbf·ft).

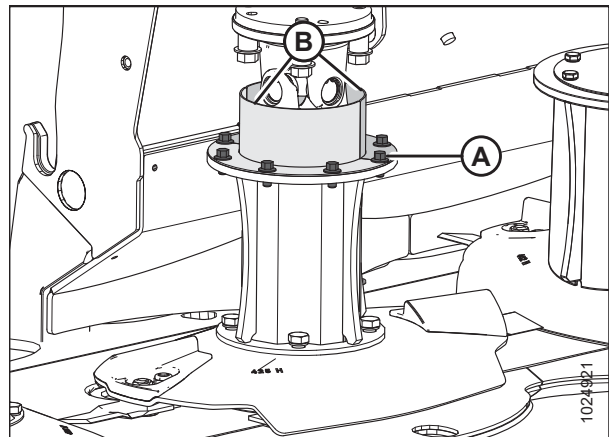


Figure 4.95: Driven Drum

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

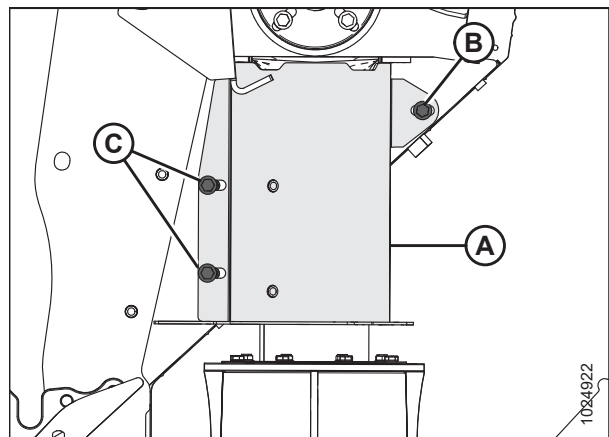


Figure 4.96: Driveline Shield

## MAINTENANCE AND SERVICING

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

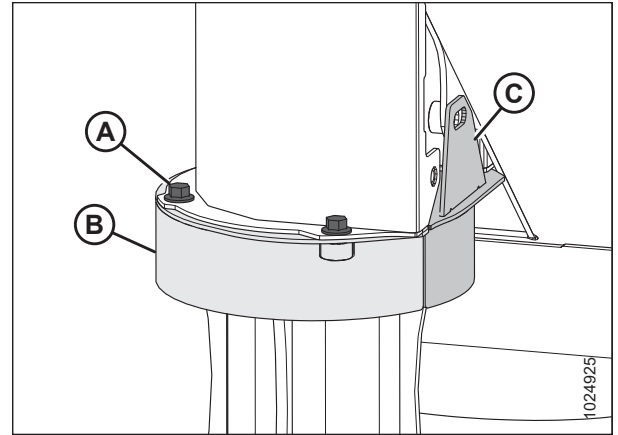


Figure 4.97: Driveline Shield

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

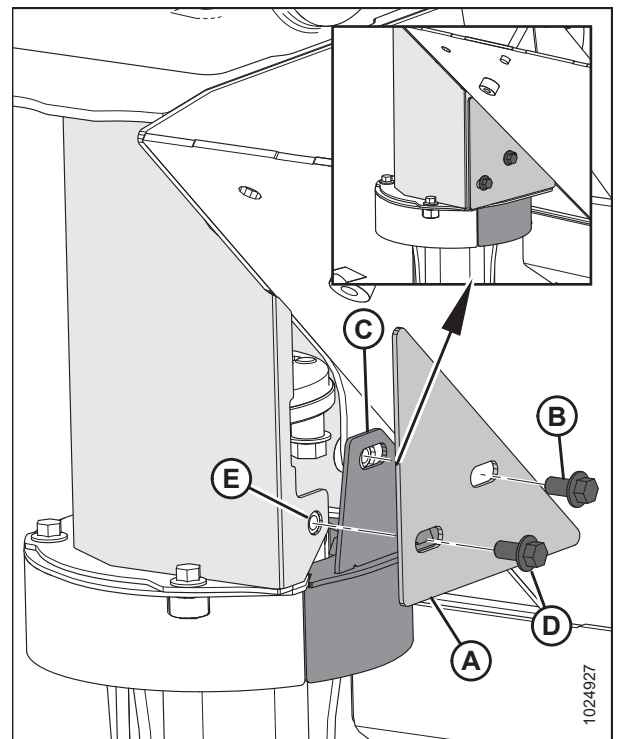


Figure 4.98: Driveline Shield

## MAINTENANCE AND SERVICING

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

### WARNING

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

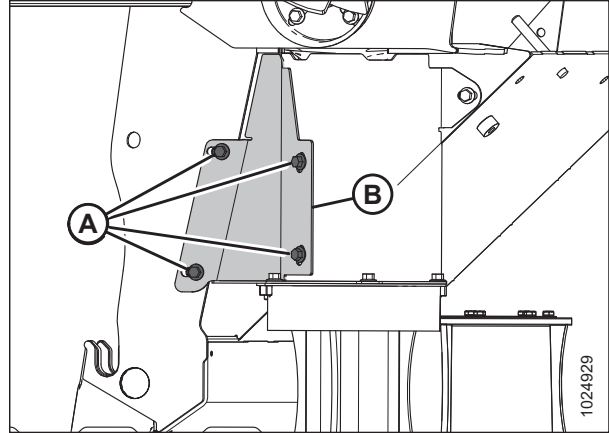


Figure 4.99: Driveshield

16. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors](#), page 81.

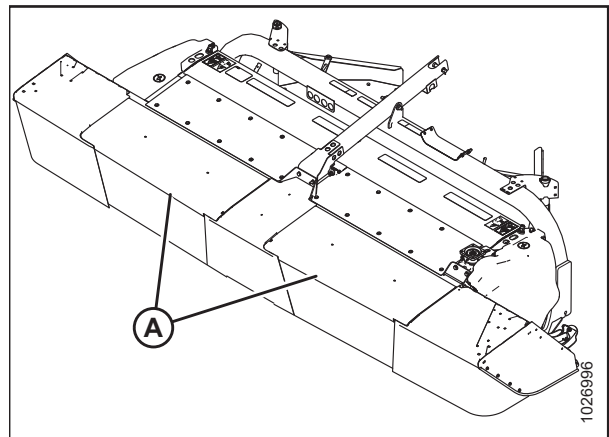


Figure 4.100: Cutterbar Doors and Curtains

### Removing Small Non-Driven Drum – R116 SP

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

#### **WARNING**

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

#### **WARNING**

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

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

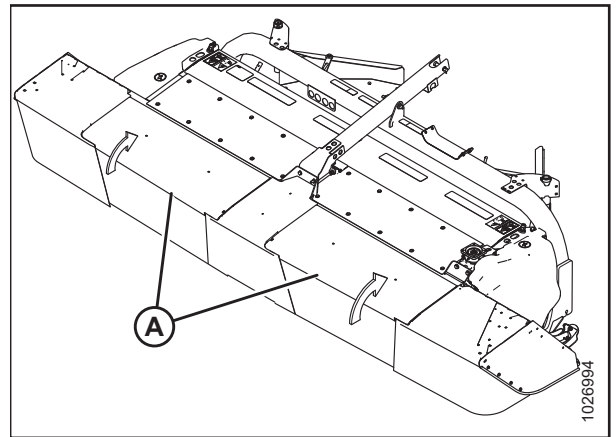


Figure 4.101: Cutterbar Doors

4. Remove the four M12 bolts (A) outside the drum using an 18 mm socket.
5. Remove disc assembly (B).

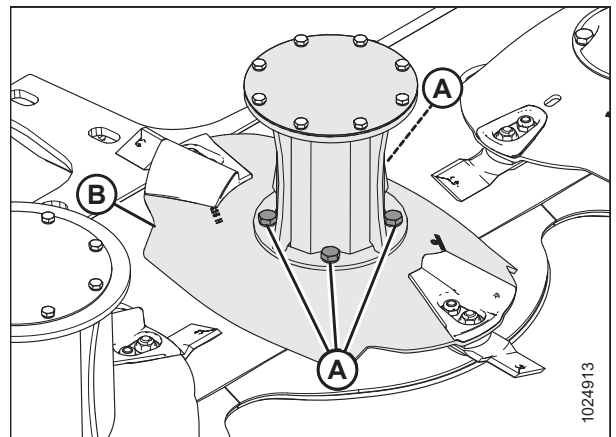


Figure 4.102: Non-Driven Drum

*Installing Small Non-Driven Drum – R116 SP*

**⚠ WARNING**

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

**⚠ WARNING**

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

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

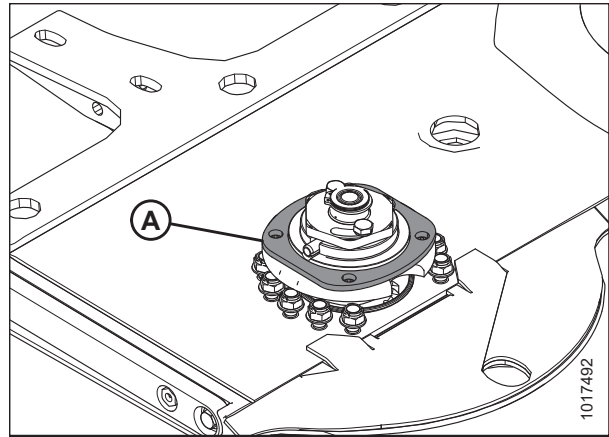


Figure 4.103: Non-Driven Spindle

4. Position non-driven disc assembly (B) onto spindle as shown.
5. Use an 18 mm deep socket to install four M12 bolts (A) and washers securing disc assembly to spindle. Torque hardware to 55 Nm (40 lbf·ft).

**⚠ WARNING**

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

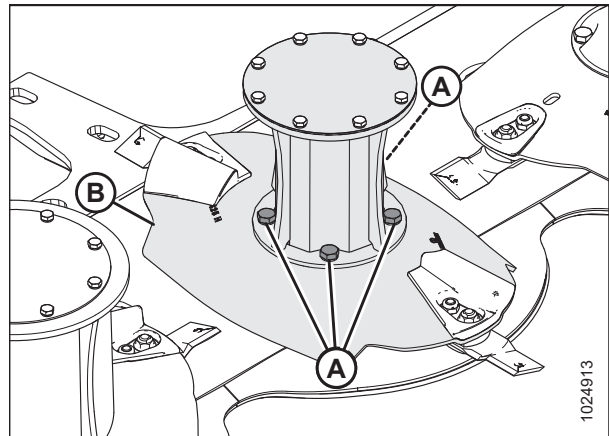


Figure 4.104: Non-Driven Drum

## MAINTENANCE AND SERVICING

6. Close cutterbar doors (A). For instructions, refer to 3.7.3 *Closing Cutterbar Doors, page 81.*

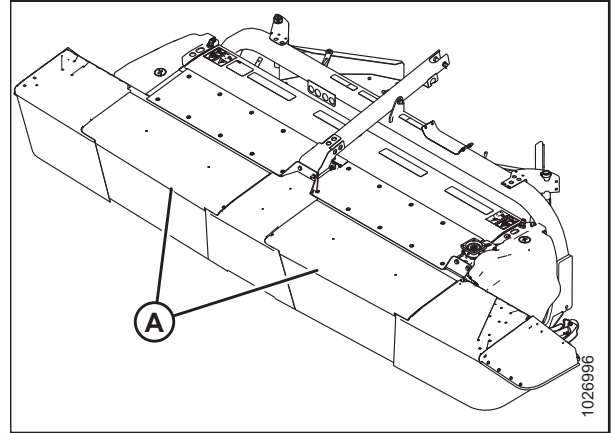


Figure 4.105: Cutterbar Doors

### 4.5.8 Maintaining Large Drums – R113 or R116 SP

Drums deliver cut material from the ends of the cutterbar and help maintain an even crop flow into the conditioner. Large drums are attached to the two outboard discs on R113 SP and R116 SP headers.

**NOTE:**

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

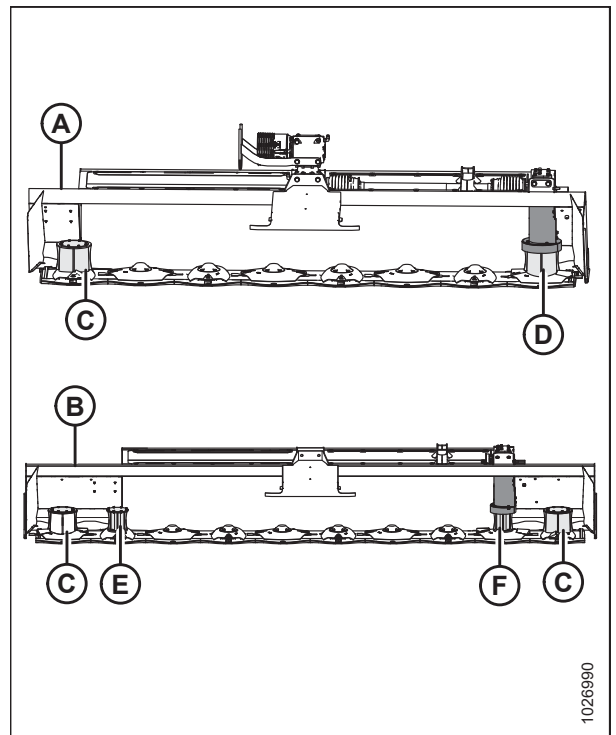


Figure 4.106: Cutterbars

A - R113

C - Large Drums

E - Small Drum

B - R116

D - Large Driven Drum

F - Small Driven Drum

## MAINTENANCE AND SERVICING

### *Inspecting Large Drums – R113 or R116 SP*

Inspect drums daily for signs of damage or wear.

#### **WARNING**

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

#### **WARNING**

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

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

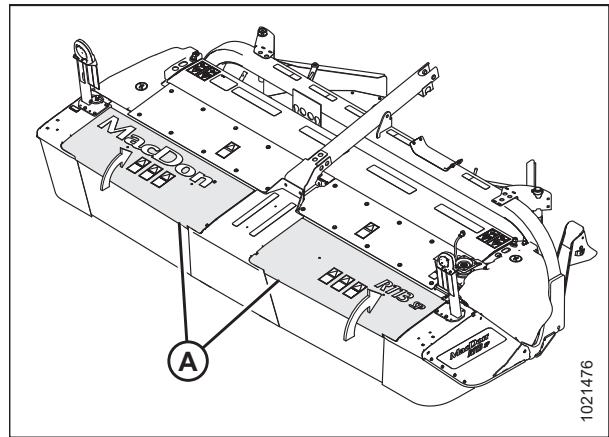


Figure 4.107: Cutterbar Doors – R113 SP Shown



## MAINTENANCE AND SERVICING

4. Inspect drums (C) and (D) for damage and wear, and replace if drum feed bars are worn at the center to 50% or more of their original thickness. Do **NOT** repair drums.
5. Examine drums for large dents. Replace dented drums to prevent an imbalance in the cutterbar.
6. Tighten or replace loose or missing fasteners.



### WARNING

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

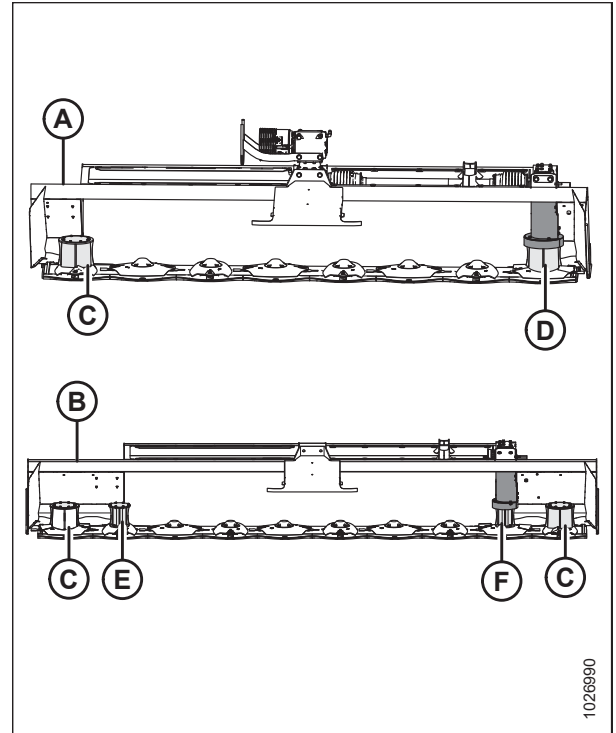


Figure 4.108: Cutterbars

A - R113 SP  
C - Large Drums  
E - Small Drum

B - R116 SP  
D - Large Driven Drum  
F - Small Driven Drum

7. Close cutterbar doors (A).

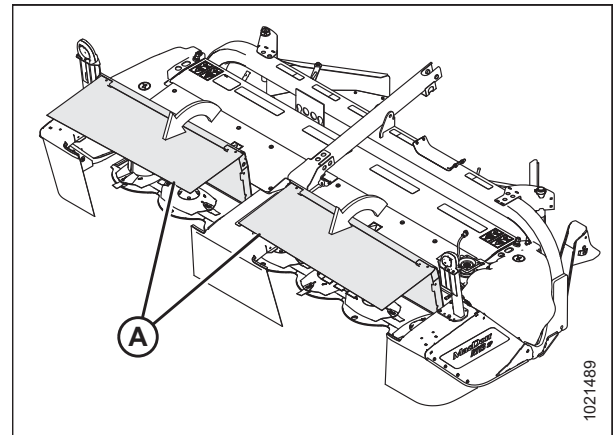


Figure 4.109: Cutterbars – R113 SP Shown, R116 SP Similar

## MAINTENANCE AND SERVICING

### Removing Large Driven Drums and Driveline – R113 or R116 SP

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

#### DANGER

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

#### WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors (A). Refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#) for instructions.

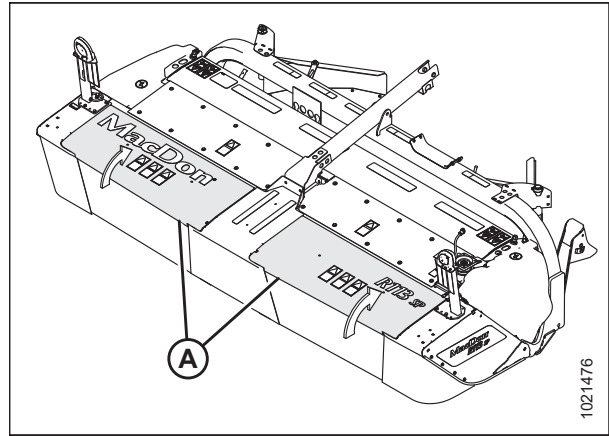


Figure 4.110: Cutterbar Doors – R113 SP Shown, R116 SP Similar

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

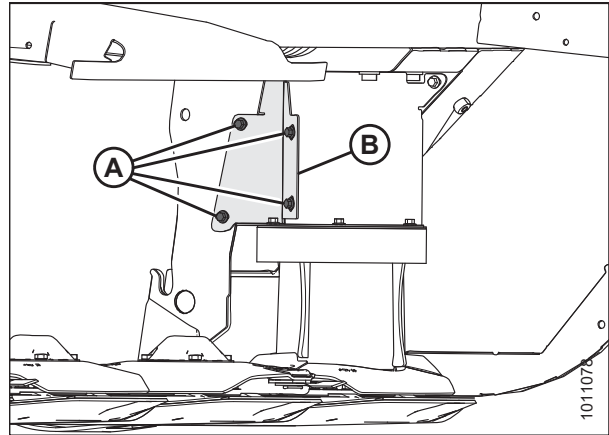


Figure 4.111: Vertical Drive Shield

## MAINTENANCE AND SERVICING

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

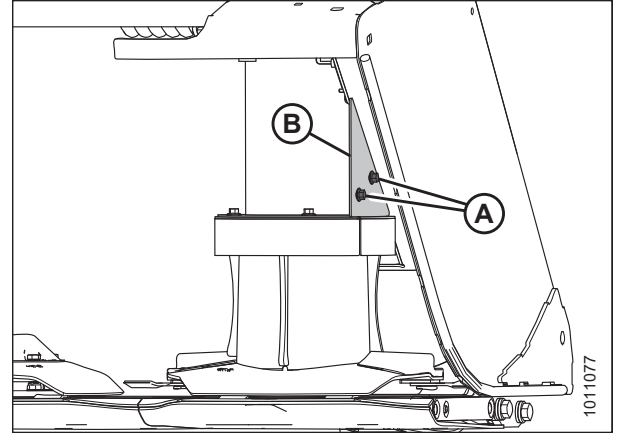


Figure 4.112: Cover Plate

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

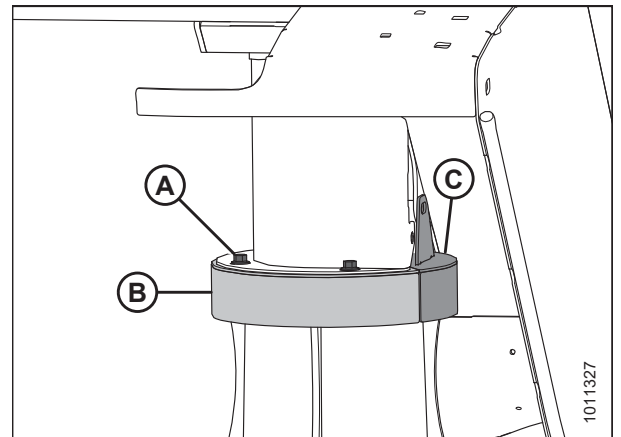


Figure 4.113: Top Plate and Drum Top

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

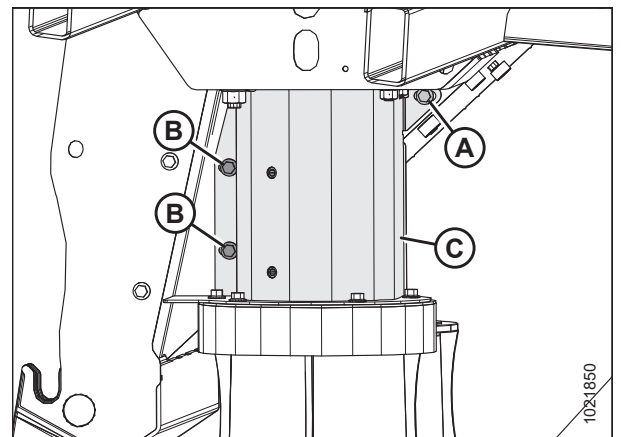


Figure 4.114: Vertical Shield

## MAINTENANCE AND SERVICING

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

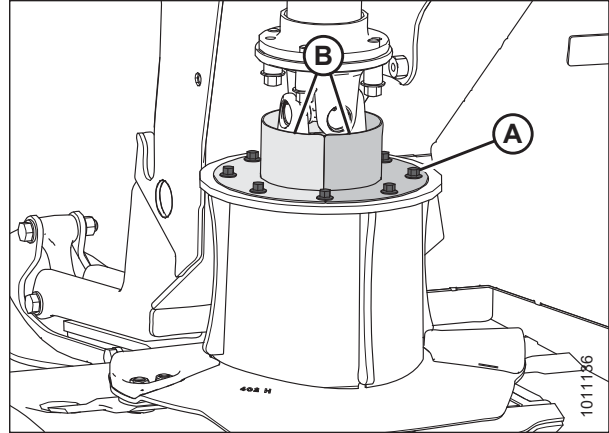


Figure 4.115: Drum Shields

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

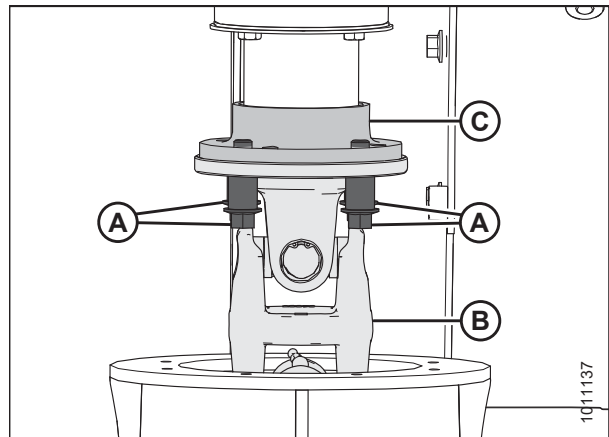


Figure 4.116: Hub Drive to Driveline Connection

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

**NOTE:**

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

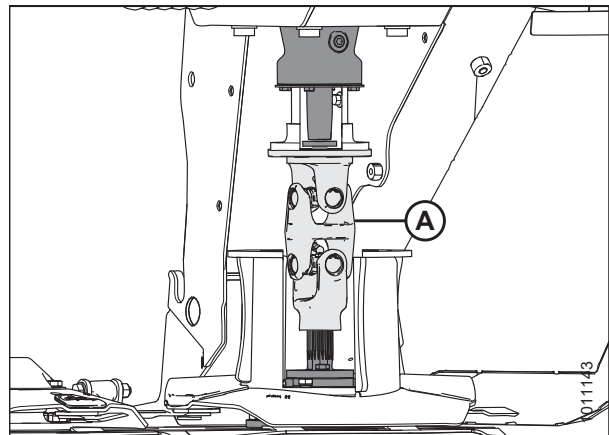


Figure 4.117: Hub Drive to Driveline Connection

## MAINTENANCE AND SERVICING

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

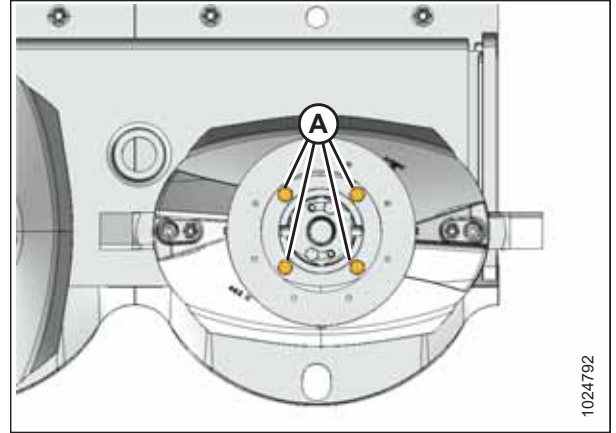


Figure 4.118: R113 SP Driven Drum

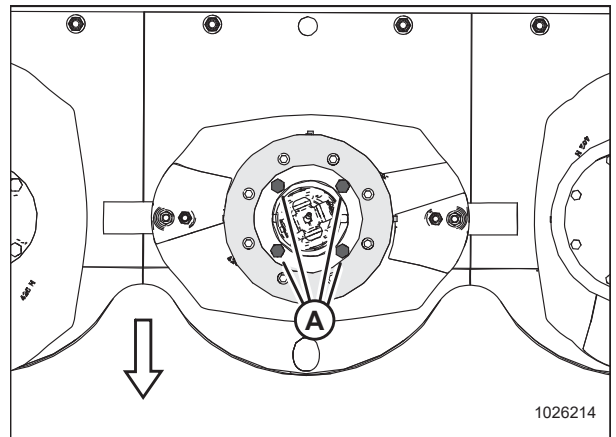


Figure 4.119: R116 SP Driven Drum

### *Installing Large Driven Drums and Driveline – R113 or R116 SP*

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

#### **!** DANGER

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

#### **!** WARNING

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

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

## MAINTENANCE AND SERVICING

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

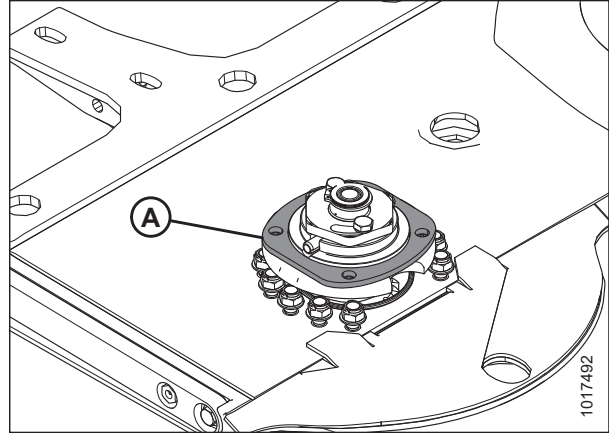


Figure 4.120: Spacer Plate

3. Position the drum disc assembly as shown.

**NOTE:**

Orient the disc so that the blades are at 90° (1/4 turn) to the adjacent disc.

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

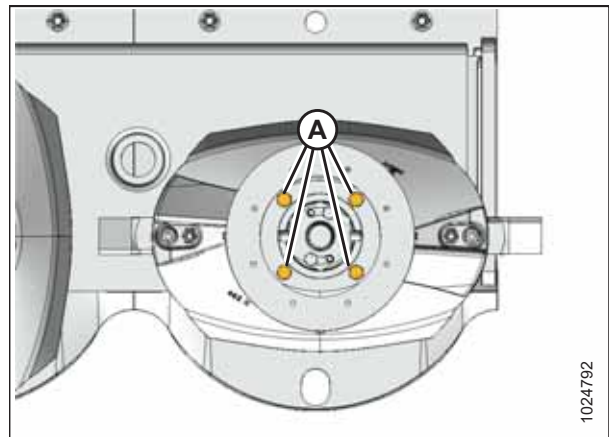


Figure 4.121: Drum Disc

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

**NOTE:**

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

**NOTE:**

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

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

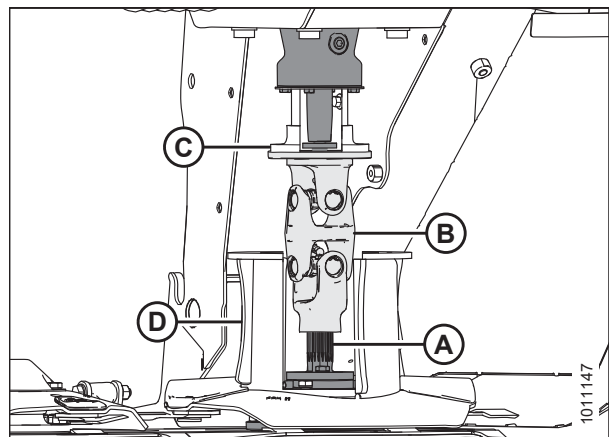


Figure 4.122: Hub Drive to Driveline Connection

## MAINTENANCE AND SERVICING

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

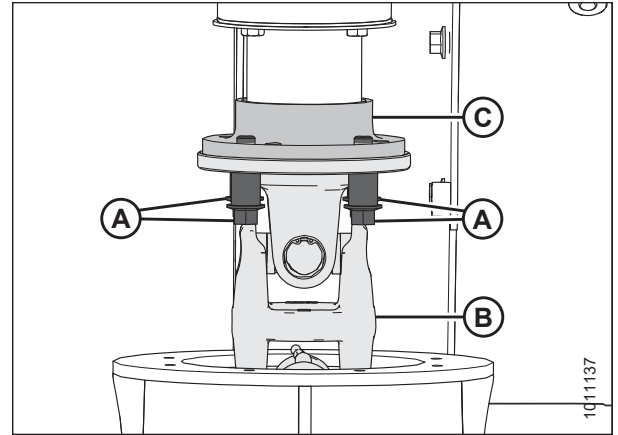


Figure 4.123: Hub Drive to Driveline Connection

- Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of eight M8 hex flange head bolts (A). Use the bolts to secure the drum shields in place. Torque to 27 Nm (20 lbf-ft).

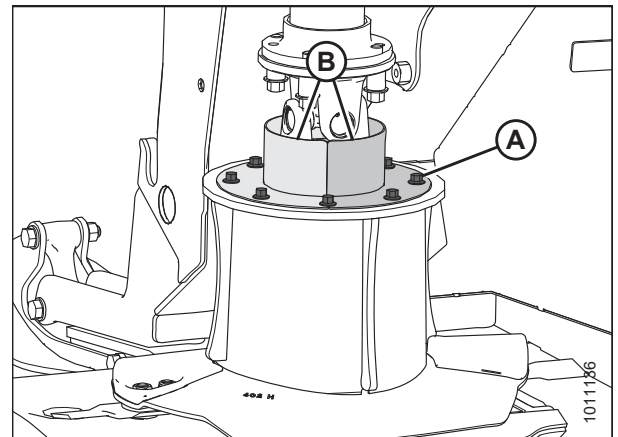


Figure 4.124: Drum Shield

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

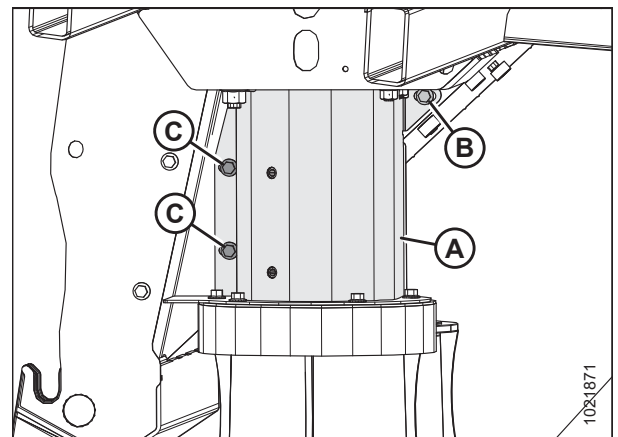


Figure 4.125: Vertical Shield

## MAINTENANCE AND SERVICING

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

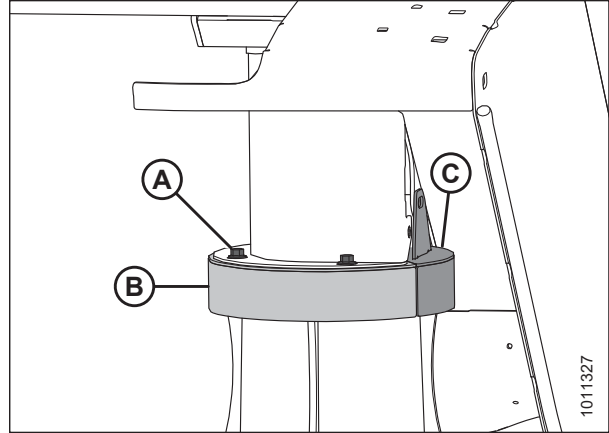


Figure 4.126: Top Plate and Drum Top

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

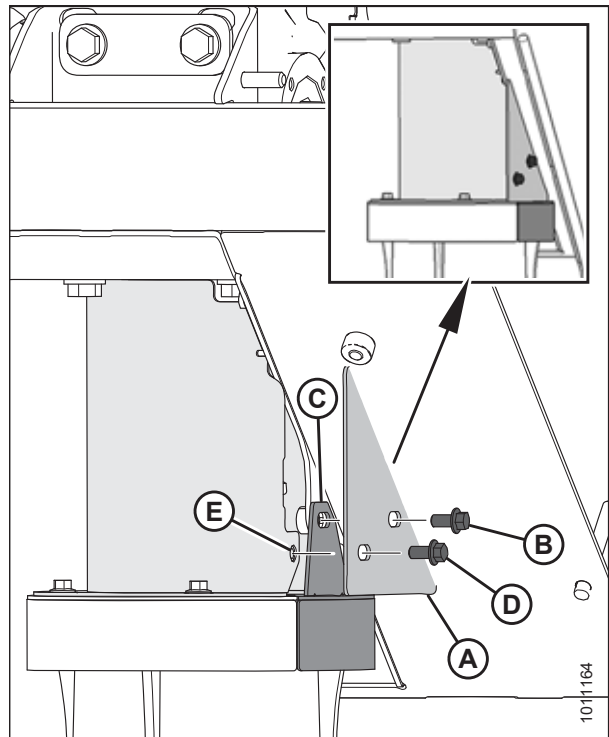


Figure 4.127: Cover Plate and Top Plate



## MAINTENANCE AND SERVICING

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

### **WARNING**

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

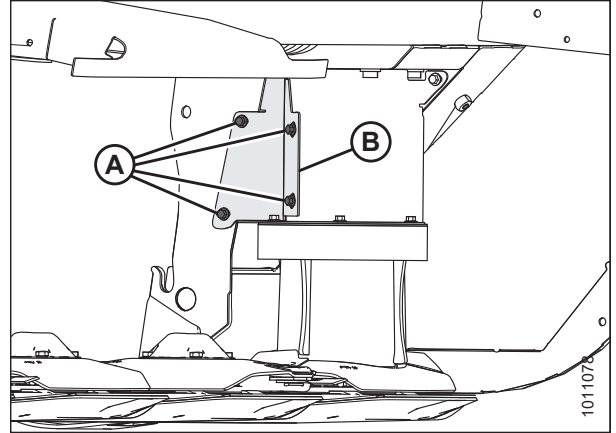


Figure 4.128: Vertical Shield

16. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors](#), page 81.

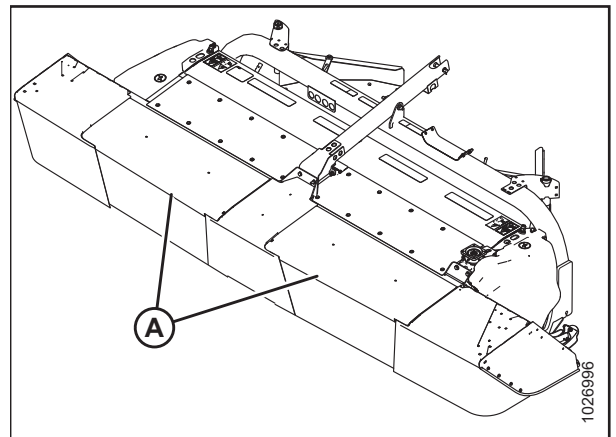


Figure 4.129: Cutterbar Doors and Curtains

### *Removing Large Non-Driven Drums – R113 or R116 SP*

### **WARNING**

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

### **WARNING**

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

### **NOTE:**

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

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

## MAINTENANCE AND SERVICING

- Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#) or [3.7.2 Opening Cutterbar Doors – Export Latches, page 80](#).

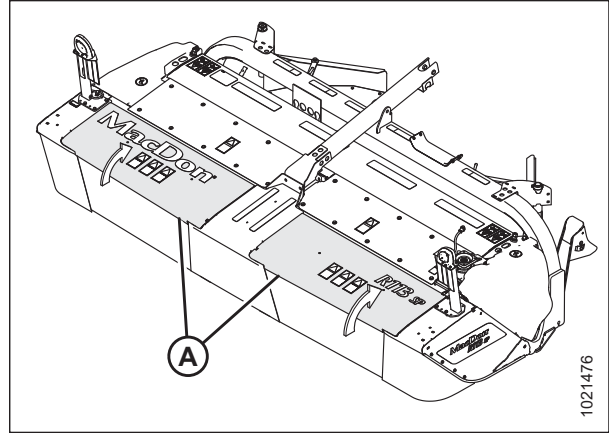


Figure 4.130: Cutterbar Doors – R113 SP Shown, R116 SP Similar

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

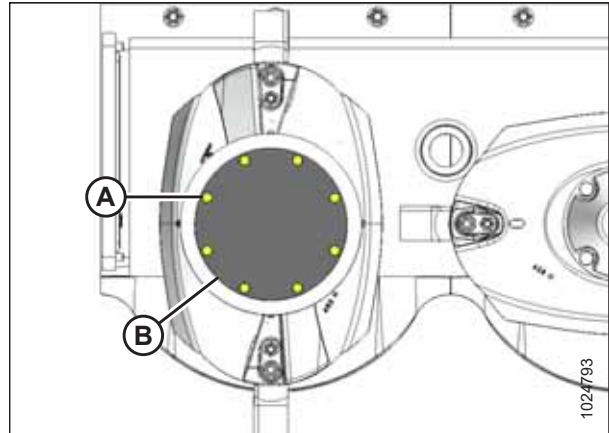


Figure 4.131: Non-Driven Drum

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

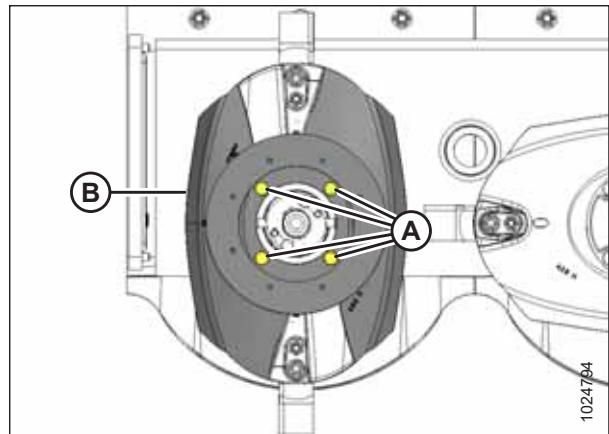


Figure 4.132: Non-Driven Drum

*Installing Large Non-Driven Drums – R113 or R116 SP*

**⚠ WARNING**

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

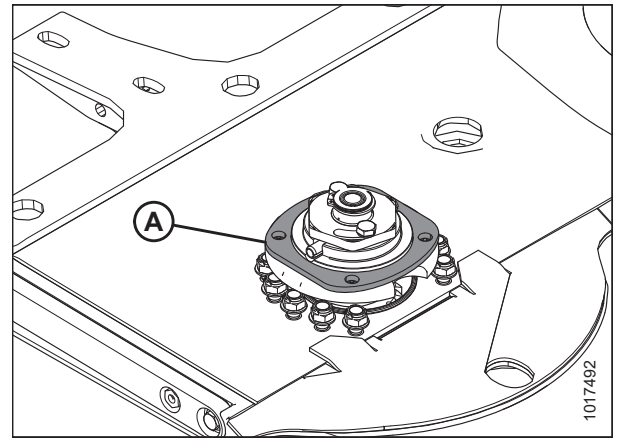
**⚠ WARNING**

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

**NOTE:**

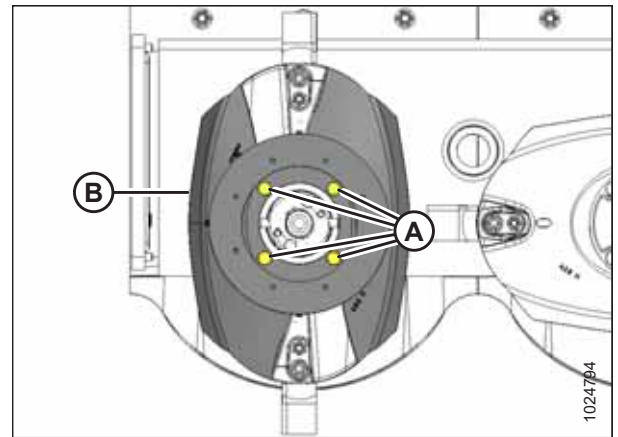
The images used in the procedure are from an R113 SP, the R116 SP is similar.

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



**Figure 4.133: Non-Driven Spindle**

3. Position non-driven drum/disc (B) onto spindle as shown.
4. Use a 305 mm (12 in.) extension and 16 mm deep socket to install four M12 bolts (A) and washers securing drum/disc to spindle. Torque hardware to 85 Nm (63 lbf-ft).



**Figure 4.134: Non-Driven Drum**

## MAINTENANCE AND SERVICING

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

### WARNING

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

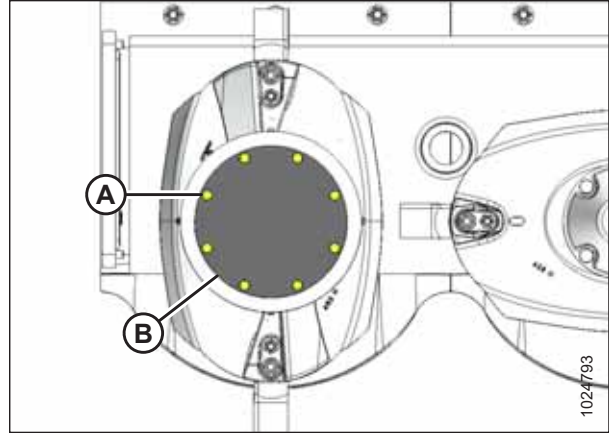


Figure 4.135: Non-Driven Drum

6. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

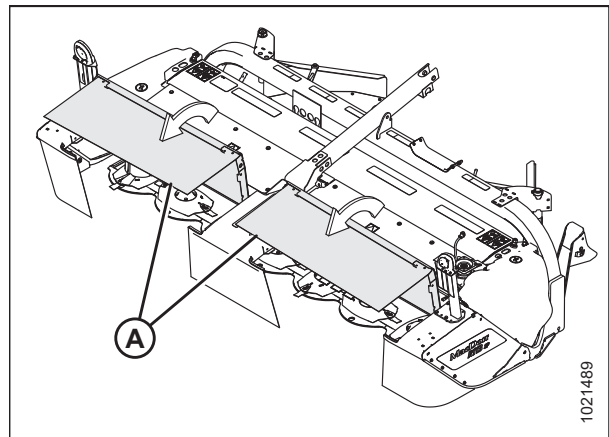


Figure 4.136: Cutterbar Doors — R113 SP Shown, R116 SP Similar

### 4.5.9 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 slots on both shear pins are aligned horizontally.
- 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 torquing spindle nut and replacing damaged shear pins.

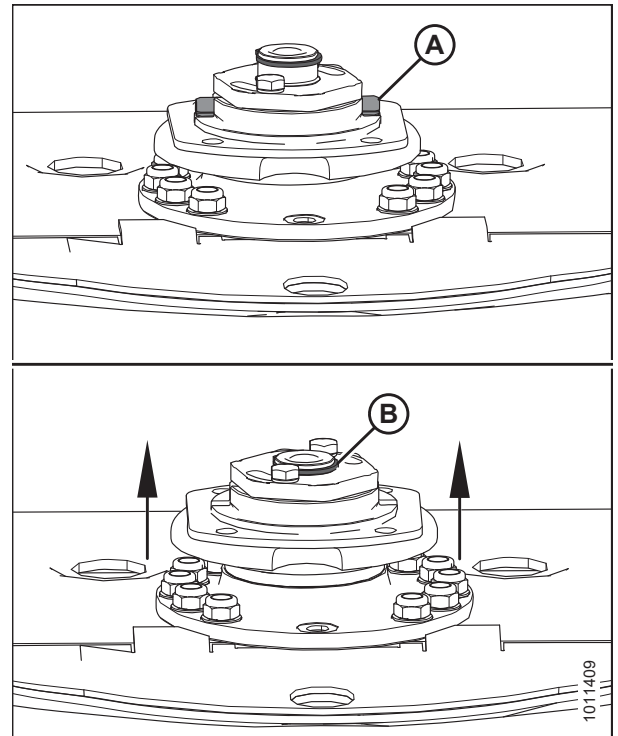


Figure 4.137: Cutterbar Spindles

### Removing Cutterbar Spindle Shear Pin

**WARNING**

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

**WARNING**

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage windrower lift safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
4. Open the cutterbar doors. For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#) or [3.7.2 Opening Cutterbar Doors – Export Latches, page 80](#).
5. Clean any debris from the work area.

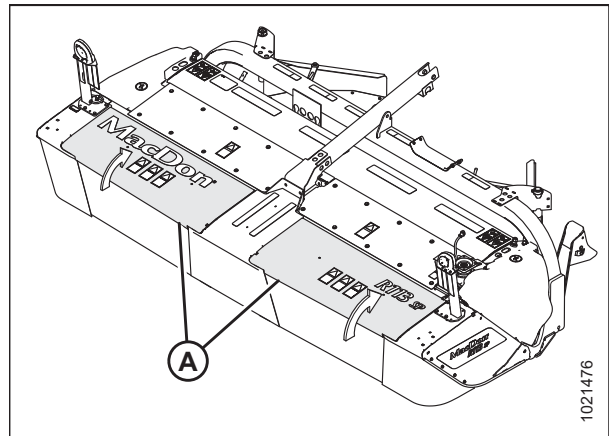


Figure 4.138: Cutterbar Doors – R113 SP Shown, R116 SP Similar

## MAINTENANCE AND SERVICING

6. 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 125*.
  - To remove driven drum (B), refer to *Removing Large Driven Drums and Driveline – R113 or R116 SP, page 166*.
  - To remove non-driven drum (C), refer to *Removing Large Non-Driven Drums – R113 or R116 SP, page 173*.

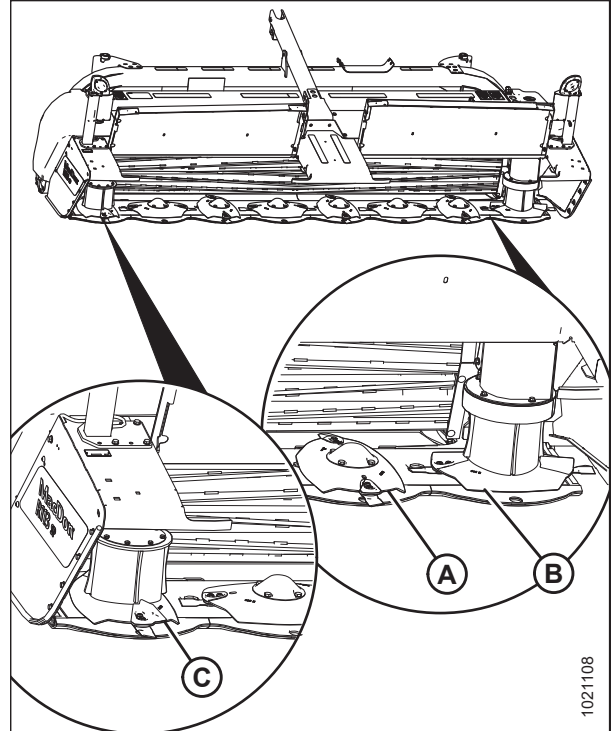


Figure 4.139: Cutterbar – R113 SP Shown, R116 SP Similar

7. Remove retaining ring (A).

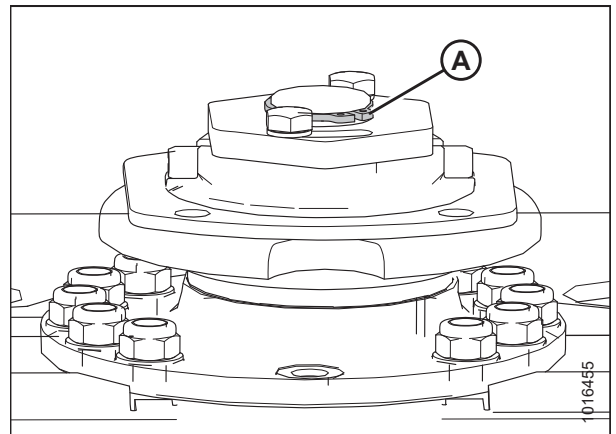


Figure 4.140: Cutterbar Spindle

## MAINTENANCE AND SERVICING

- Remove the M12 bolt and remove safecut spindle-nut wrench (A) from its storage location.

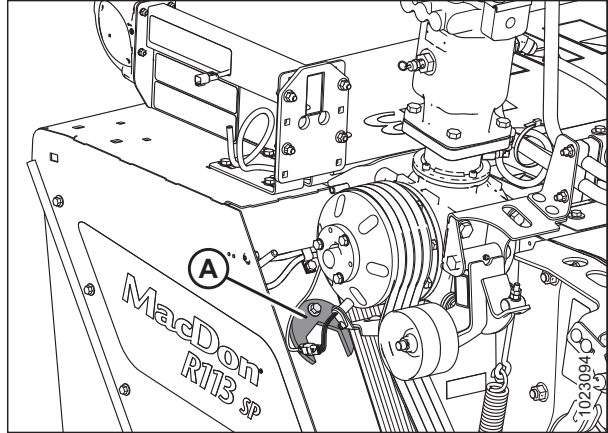


Figure 4.141: Safecut Spindle-Nut Wrench Location

### IMPORTANT:

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

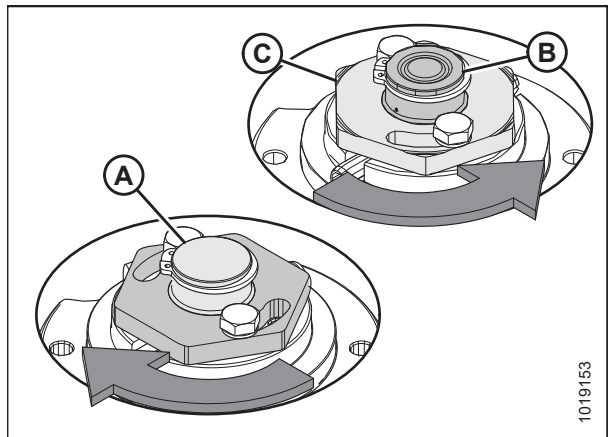


Figure 4.142: Cutterbar Spindles

- Remove two M10 bolts and washers (A).

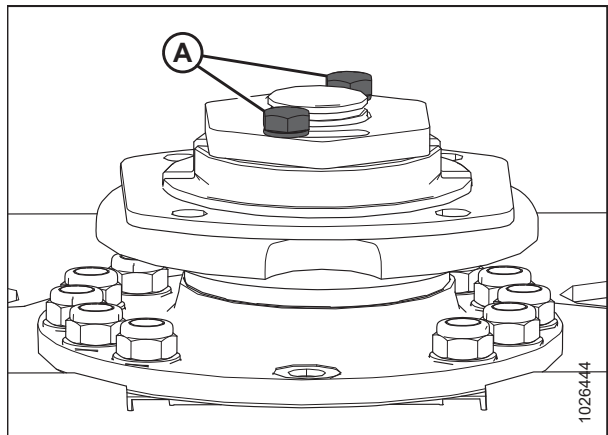


Figure 4.143: Cutterbar Spindle



## MAINTENANCE AND SERVICING

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

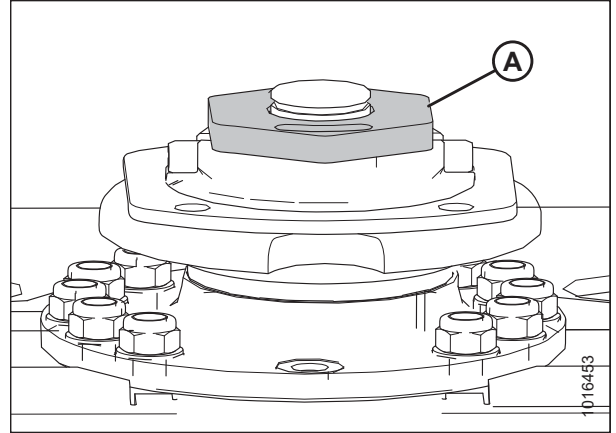


Figure 4.144: Cutterbar Spindle

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

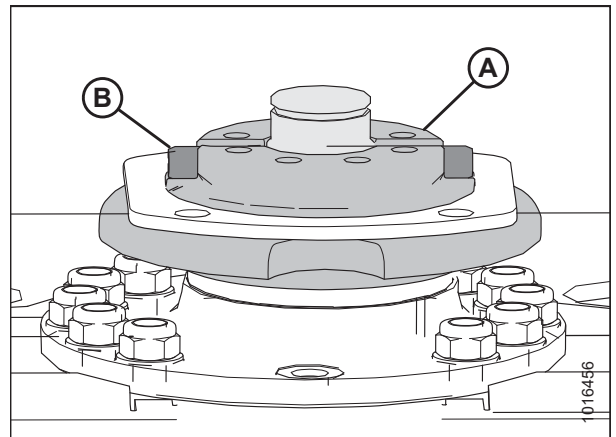


Figure 4.145: Cutterbar Spindle

*Installing Cutterbar Spindle Shear Pin*

**⚠ WARNING**

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

**⚠ WARNING**

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

1. Shut down the engine, and remove the key from the ignition.
2. Fill the space above the bearing with grease.
3. Place hub (A) on spindle (C).
4. Install shear pins (B), so both shear pin grooves are parallel to the cutterbar.

**NOTE:**

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

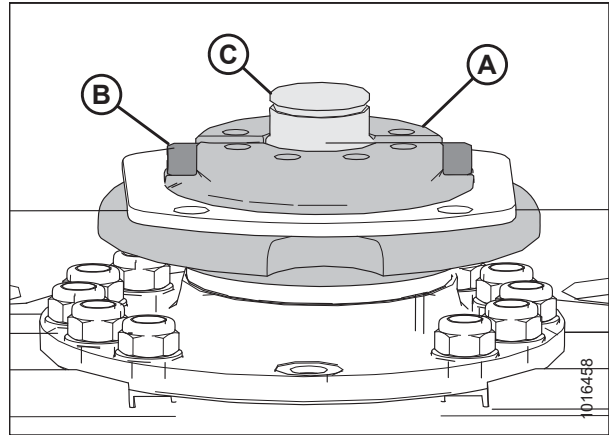


Figure 4.146: Cutterbar Spindle

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

**IMPORTANT:**

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

**NOTE:**

Shaft removed from the illustration for clarity.

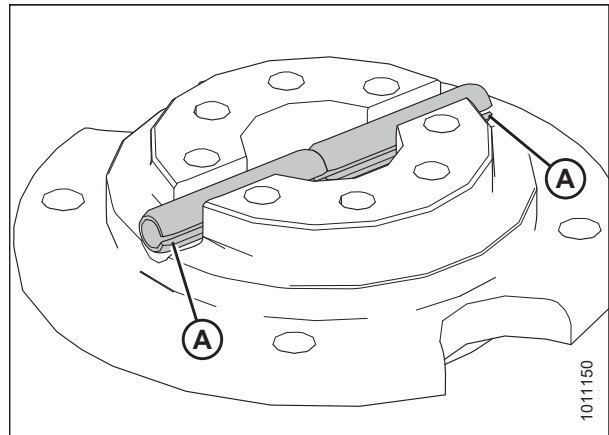


Figure 4.147: Shear Pin Orientation

## MAINTENANCE AND SERVICING

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

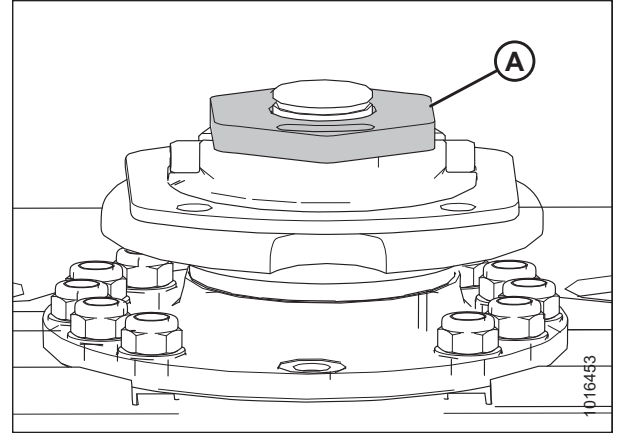


Figure 4.148: Cutterbar Spindle

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

**IMPORTANT:**

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

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

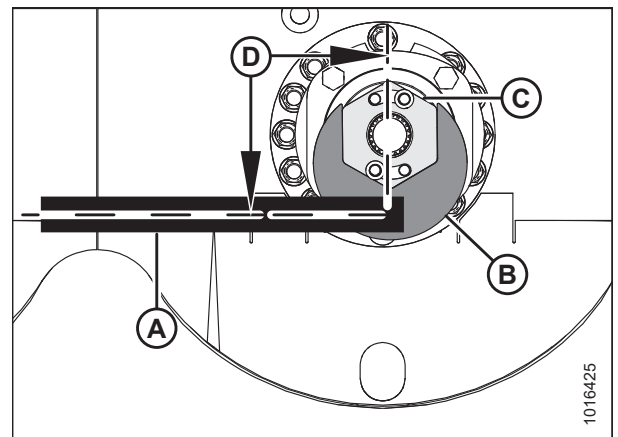


Figure 4.149: Spindle Nut

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

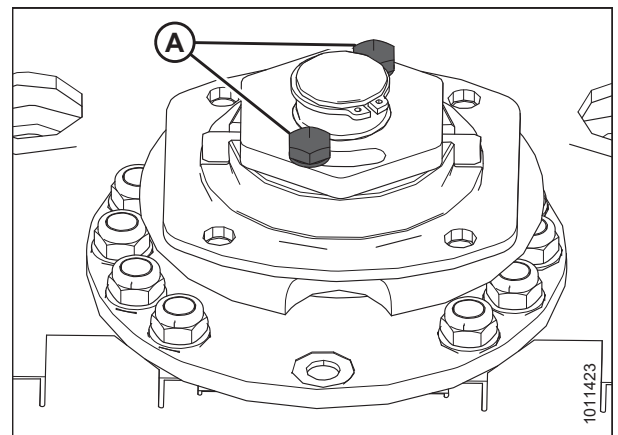


Figure 4.150: Cutterbar Spindle

13. Install retaining ring (A).

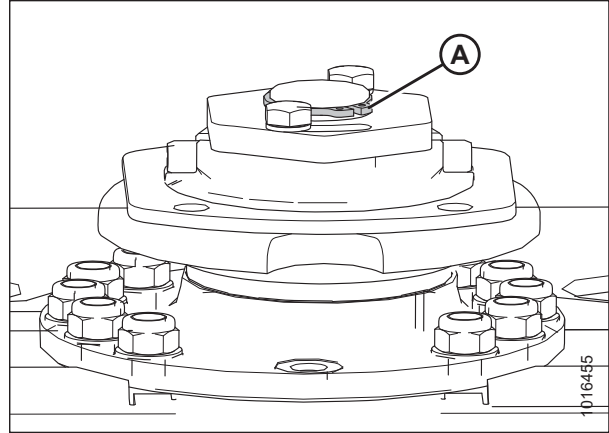


Figure 4.151: Cutterbar Spindle

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

- Install cutterbar disc (A). For instructions, refer to *Installing Cutterbar Discs, page 126*.
- Install driven drum (B). For instructions, refer to *Installing Large Driven Drums and Driveline – R113 or R116 SP, page 169*.
- Install non-driven drum (C). For instructions, refer to *Installing Large Non-Driven Drums – R113 or R116 SP, page 175*.

**WARNING**

Ensure the 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.

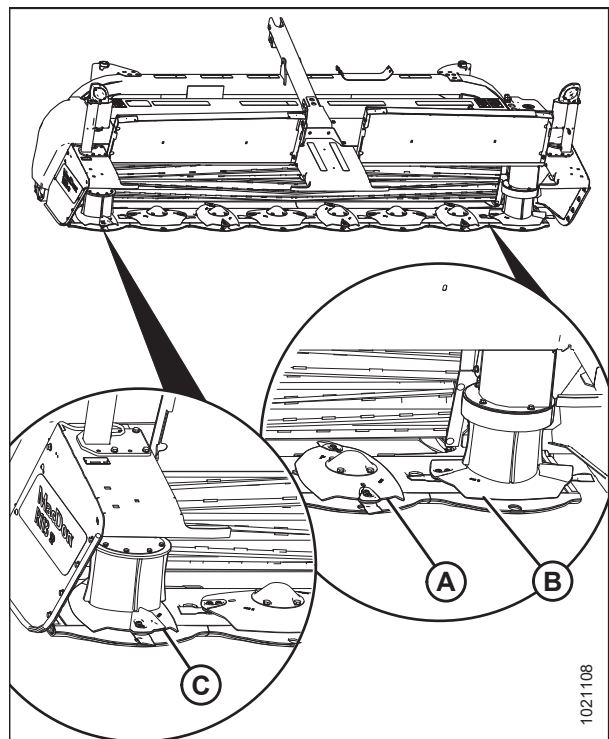


Figure 4.152: R113 SP Cutterbar

## MAINTENANCE AND SERVICING

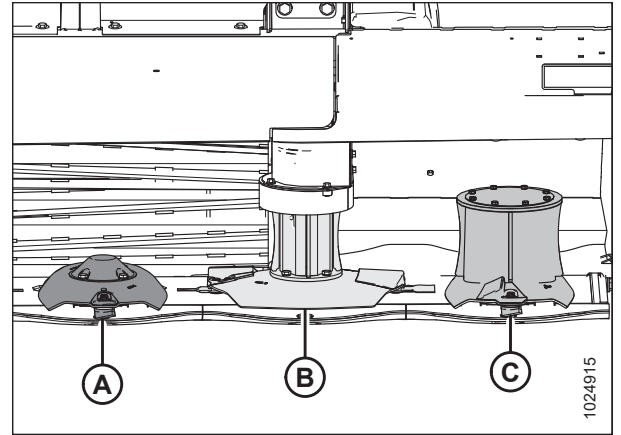


Figure 4.153: R116 SP Cutterbar

15. Close cutterbar doors (A). For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

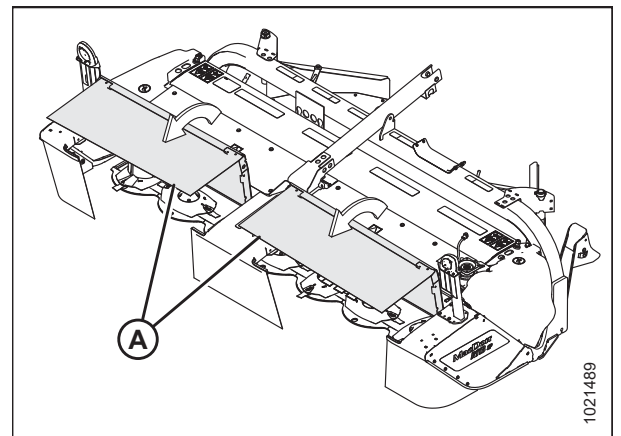


Figure 4.154: Cutterbar Doors – R113 SP Shown, R116 SP Similar

## 4.6 Conditioner Roll Timing Gearbox

Conditioner roll timing gearbox (A) is located inside the drive compartment at the right of the header and transfers power from the gearbox-driven lower roll to the upper roll.

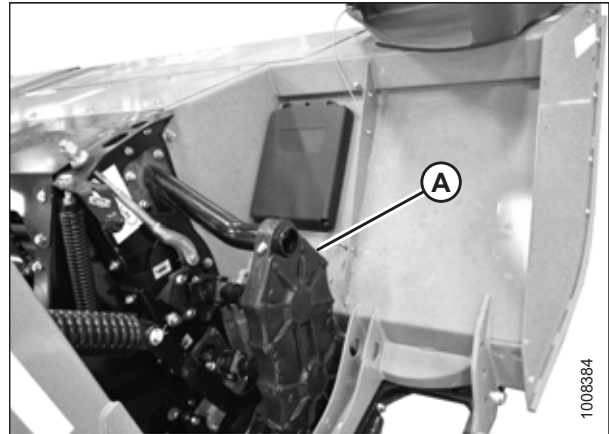


Figure 4.155: Conditioner Roll Timing Gearbox

### 4.6.1 Checking and Changing Oil in Conditioner Roll Timing Gearbox

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). Refer to the inside back cover for a list of recommended fluids, lubricants, and capacities.

#### **WARNING**

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

#### **IMPORTANT:**

Check the gearbox oil level when the oil is warm. If the oil is cold, idle the machine for approximately 10 minutes prior to checking.

1. Lower the header to the ground and adjust the header angle (tilt) so that the top of the conditioner is level (parallel) with the ground.

#### **NOTE:**

To help ensure an accurate oil level reading for the conditioner roll timing gearbox, set the rotary disc pull-type's skid shoes in the fully raised position. For instructions, refer to [Adjusting Cutting Height, page 83](#) for instructions.

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

## MAINTENANCE AND SERVICING

3. Open right driveshield (A). For instructions, refer to [3.6.1 Opening Driveshields, page 76](#).

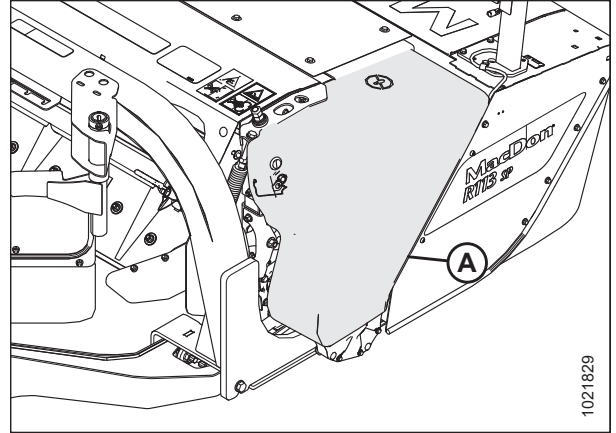


Figure 4.156: Right Driveshield

### **Checking conditioner roll timing gearbox oil level:**

4. Clean around oil level sight glass (A) and breather (B) on the inboard side of the gearbox.
5. Ensure that the lubricant is level at the top of the sight glass. If necessary, add lubricant through breather (B).
6. 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 capacities.

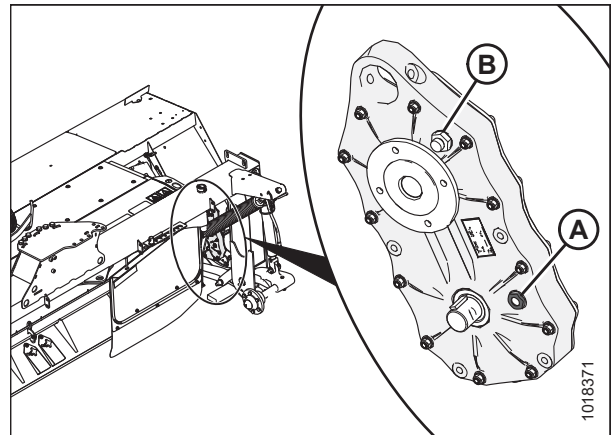


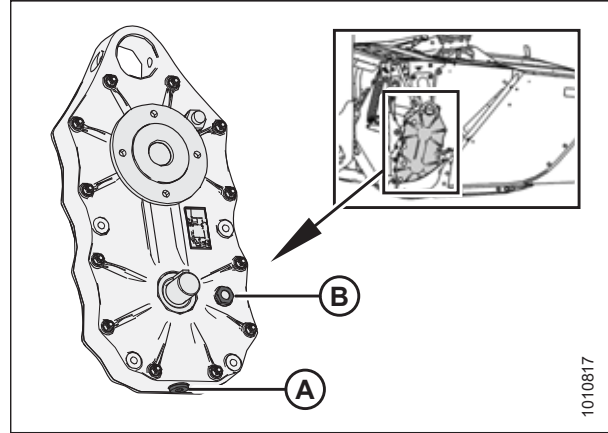
Figure 4.157: Roll Timing Gearbox

**Changing conditioner roll timing gearbox oil:**

**⚠ WARNING**

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

7. Raise the header to provide sufficient access to oil drain plug (A).
8. Shut down the engine, and remove the key from the ignition.
9. Engage the windrower lift cylinder safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).
10. Clean around oil drain plug (A) on the bottom of the gearbox and around oil level plug (B) on the inboard side of the gearbox.
11. Place a 1 liter (1.05 qts [US]) container underneath the conditioner gearbox.
12. Remove oil drain plug (A) using a hex key.
13. Allow sufficient time for the oil to drain, replace oil drain plug (A), and tighten.
14. Fill the gearbox with the specified volume of oil as listed on the inside back cover of this manual or until level is visible in sight glass (B).
15. Properly dispose of oil.



**Figure 4.158: Roll Timing Gearbox**



## 4.7 Servicing Header Drive Gearbox

The header drive gearbox (A), transfers power from the hydraulic motor to the cutterbar and conditioner. It is located inside the drive compartment at the left end of the header.

The only regular servicing required is maintaining the lubricant level and changing the lubricant according to the intervals specified in this manual. For more information, refer to [4.3.1 Maintenance Schedule/Record, page 108](#).

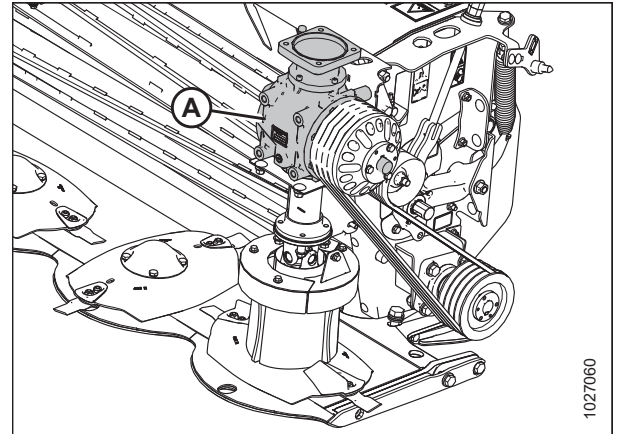


Figure 4.159: Header Drive Gearbox

### 4.7.1 Changing Header Drive 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).



#### **WARNING**

**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 header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the left cutterbar door. For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

## MAINTENANCE AND SERVICING

4. Clean around oil drain plug (A) on the bottom of the gearbox and around oil level plug (B) on the inboard side of the gearbox.
5. Place a 4 liter (1 gal. [US]) container under drain (A).
6. Remove hex plug (A).
7. Allow sufficient time for oil to drain, replace oil drain plug (A), and tighten.
8. Remove the oil level plug from bore hole (B).
9. Remove the plug from fill hole (C).
10. Add lubricant through fill hole (C) until the oil level is even with bore hole (B). For a list of recommended fluid and lubricant types and amounts, refer to this manual's inside back cover.
11. Replace plugs in bore hole (B) and fill hole (C). Tighten plugs.
12. Clean up any spilled oil and properly dispose of any used oil and wipes.
13. Close the cutterbar door. For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

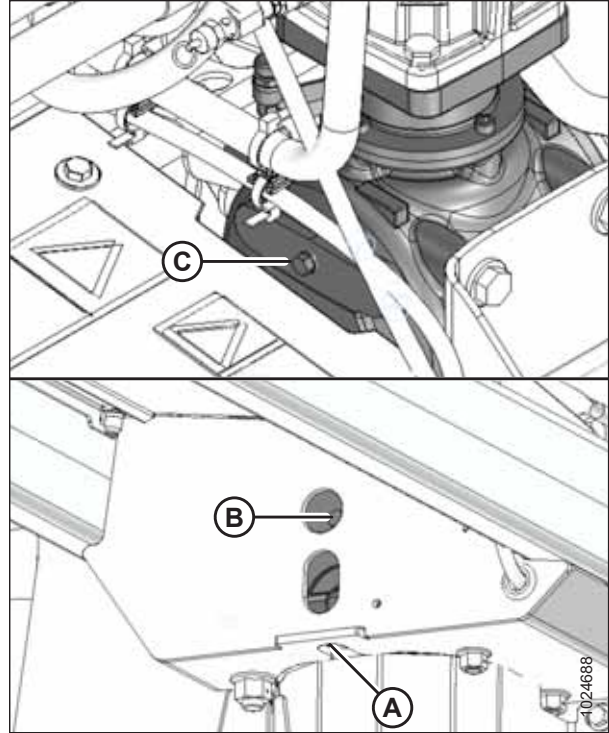


Figure 4.160: Header Drive Gearbox

## 4.8 Inspecting Cutterbar Doors

1. Ensure that the door operates smoothly and lies flat when closed. Adjust if necessary.
2. Inspect hinge pin bolts (A) and tighten to 69 Nm (51 lbf-ft) if loose.
3. Check the 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.

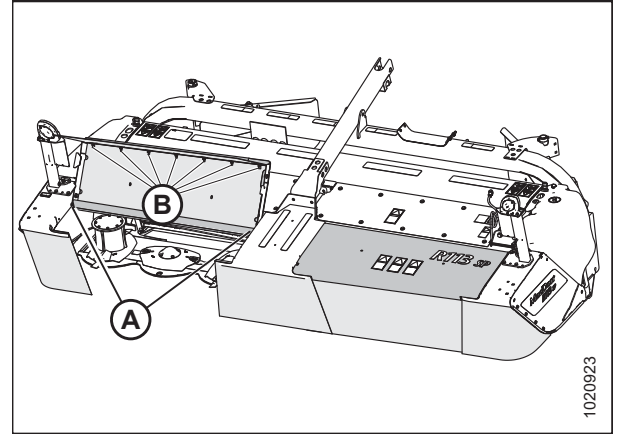


Figure 4.161: Right Cutterbar Door in Open Position – R113 SP Shown, R116 SP Similar

## 4.9 Maintaining 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

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.

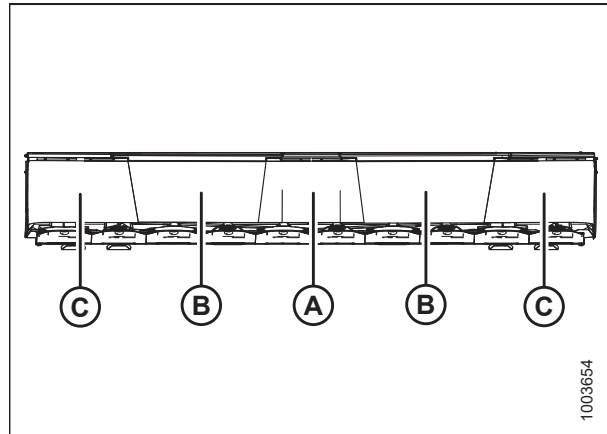


Figure 4.162: Cutterbar Curtains

### 4.9.1 Inspecting Curtains

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

#### WARNING

To reduce the risk of personal injury and machine damage, do NOT operate the machine without all the cutterbar doors down or without curtains installed and in good condition. Foreign objects can be ejected with considerable force when the machine is started.

#### CAUTION

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

Check cutterbar curtains (A) for the following conditions:

- Rips and tears: 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.

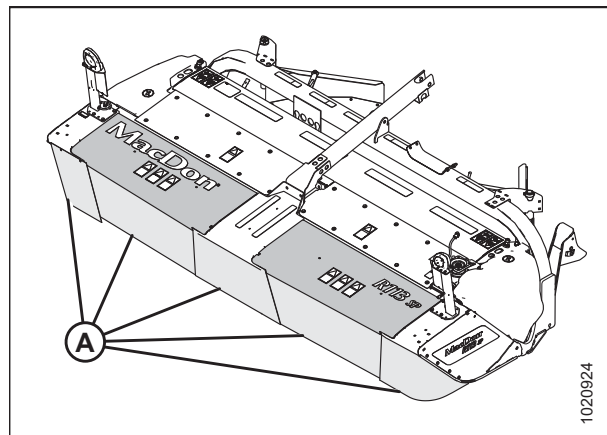


Figure 4.163: Cutterbar Curtains

## 4.9.2 Removing Cutterbar Door Curtains

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

### WARNING

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

### CAUTION

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

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#) or [3.7.2 Opening Cutterbar Doors – Export Latches, page 80](#).

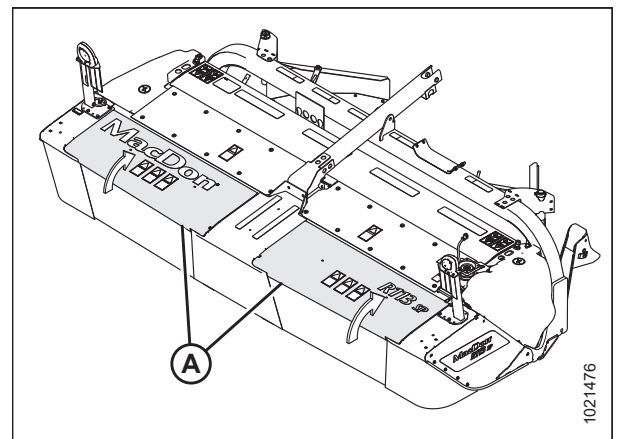


Figure 4.164: R113 SP

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

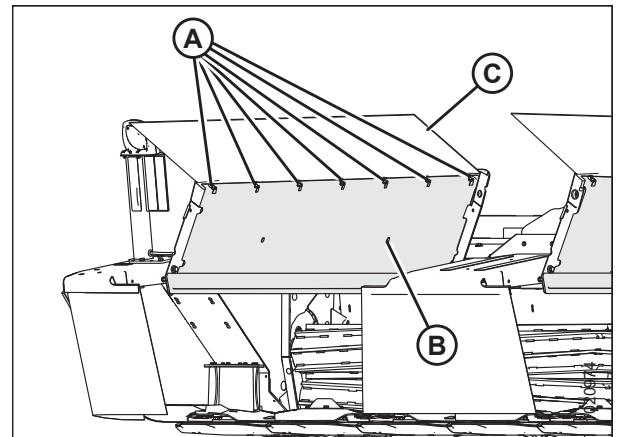


Figure 4.165: Cutterbar Door

### 4.9.3 Installing Cutterbar Door Curtains

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

#### WARNING

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

#### CAUTION

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

1. Shut down the engine, and remove the key from the ignition.
2. Insert seven cutterbar door stud bolts (B) into the precut holes on curtain (A).
3. Install seven large washers (C).
4. Install liner panel (D) against washers.
5. 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.

6. Close cutterbar doors. For instructions, refer to [3.7.3 Closing Cutterbar Doors, page 81](#).

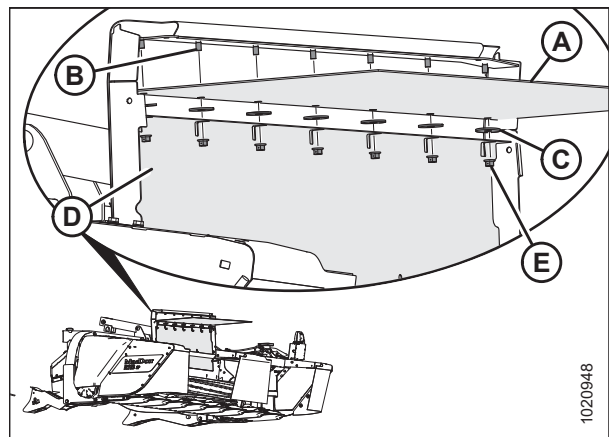


Figure 4.166: Cutterbar Curtain

### 4.9.4 Removing Cutterbar Inboard Curtain

#### WARNING

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

#### CAUTION

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

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

2. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

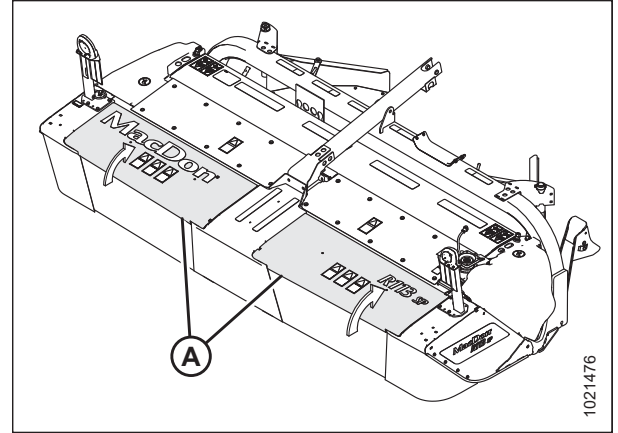


Figure 4.167: Cutterbar Doors – R113 SP Shown

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

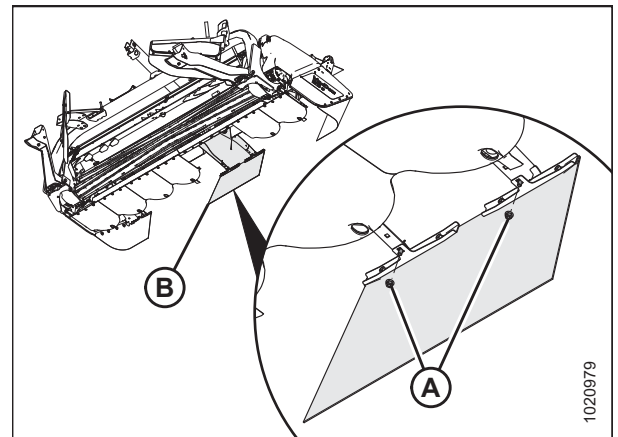


Figure 4.168: Inboard Curtain

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

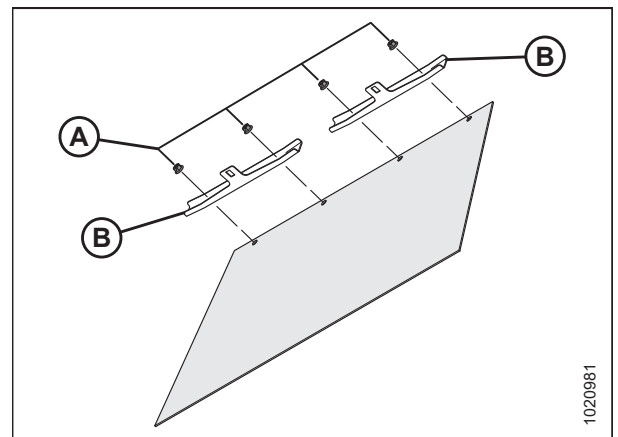


Figure 4.169: Inboard Curtain

### 4.9.5 Installing Cutterbar Inboard Curtain

#### **WARNING**

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

**CAUTION**

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

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

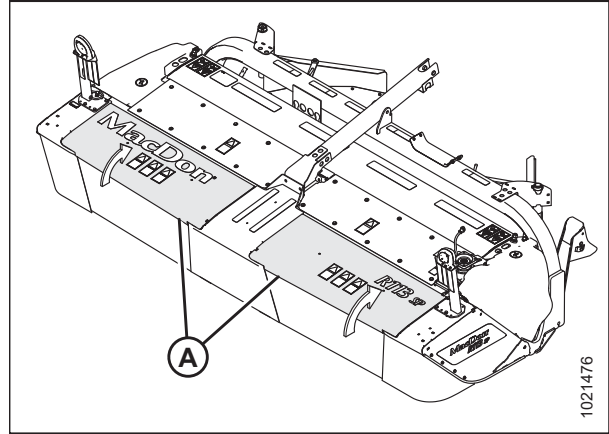


Figure 4.170: Cutterbar Doors – R113 SP Shown

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

**IMPORTANT:**

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

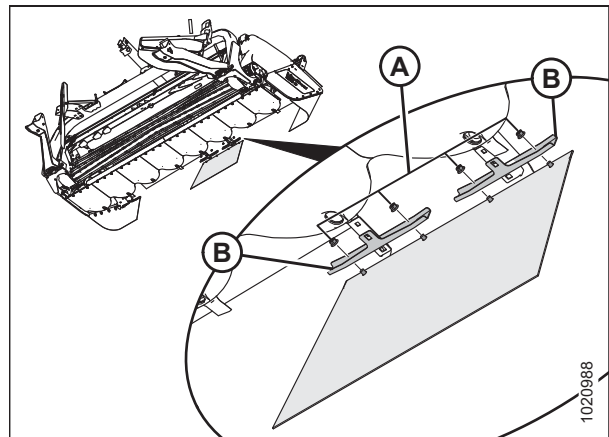


Figure 4.171: Inboard Curtain

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

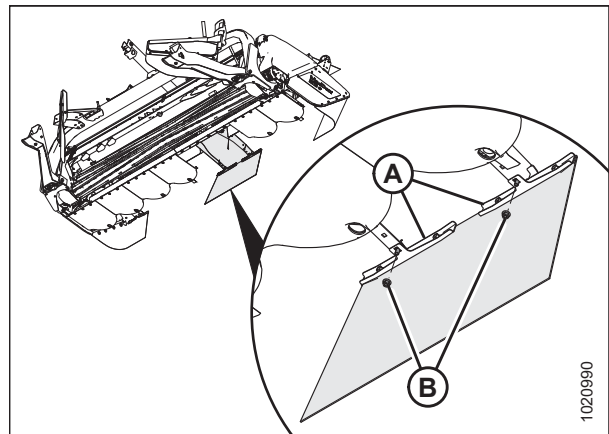


Figure 4.172: Inboard Curtain



### 4.9.6 Removing Outboard Curtains

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

#### WARNING

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

#### CAUTION

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

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

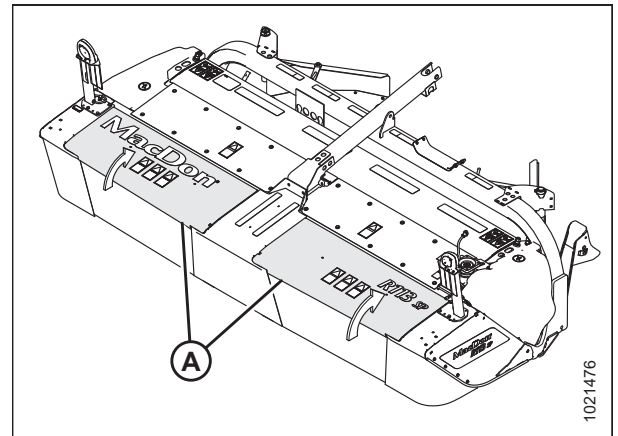


Figure 4.173: Cutterbar Doors – R113 SP Shown

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

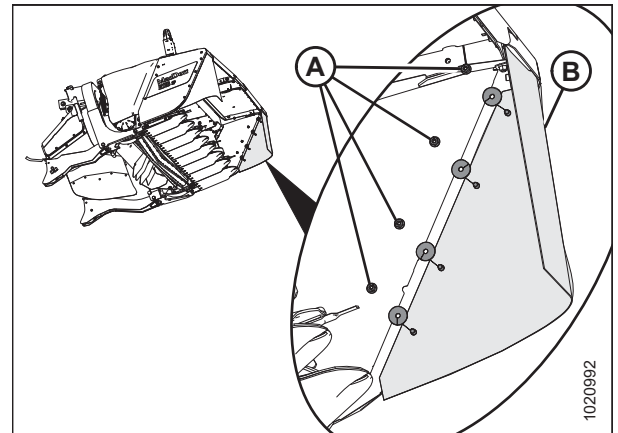


Figure 4.174: Left Endsheets

## MAINTENANCE AND SERVICING

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

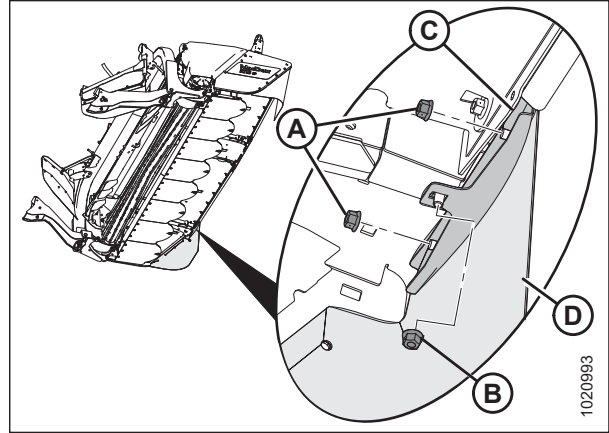


Figure 4.175: Outboard Curtain

### 4.9.7 Installing Outboard Curtains

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

#### WARNING

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

#### CAUTION

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

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors (A). For instructions, refer to [3.7.1 Opening Cutterbar Doors – North America, page 79](#).

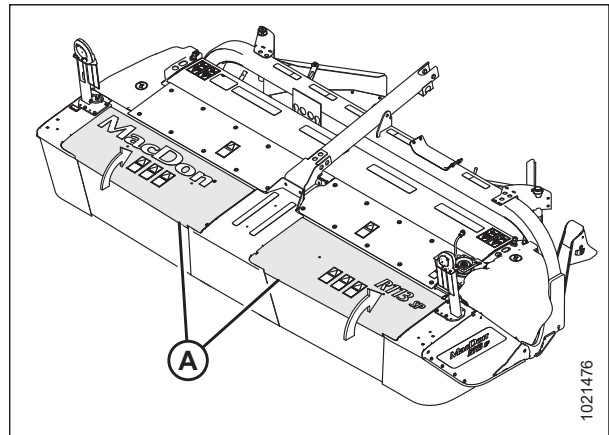


Figure 4.176: Cutterbar Doors – R113 SP Shown

## MAINTENANCE AND SERVICING

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

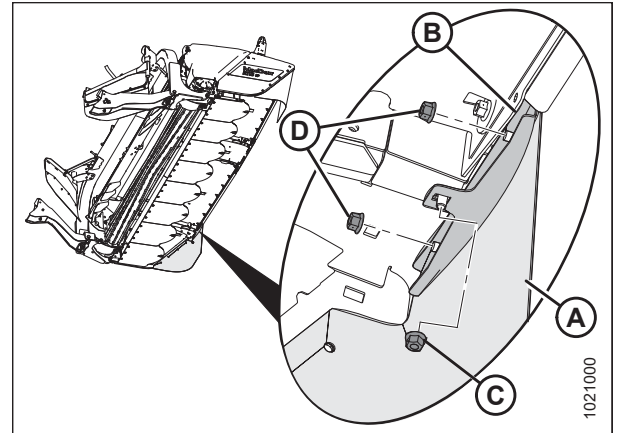


Figure 4.177: Outboard Curtain

7. Install four bolts, large washers, and nuts (A) to secure outboard curtain (B) to endsheet.

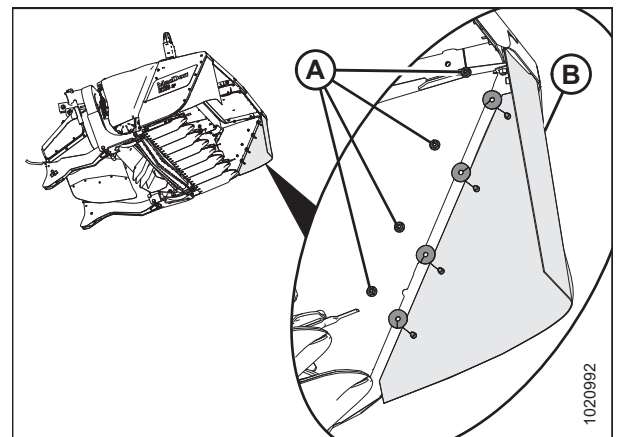
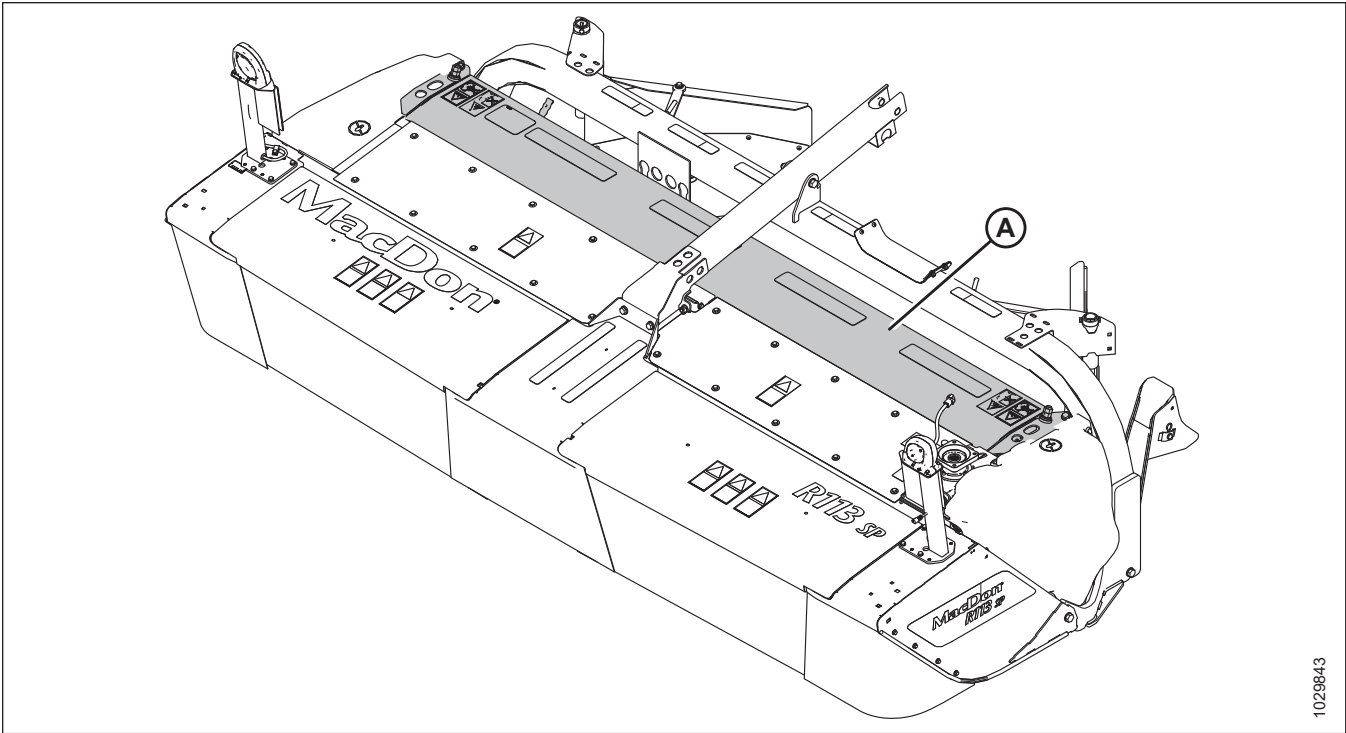


Figure 4.178: Left Endsheets

## 4.10 Conditioner System

The conditioner system (A) is intended to crimp and crush crop stems, helping the crop to dry faster; it is attached to the rear of the header.



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Figure 4.179: R1 Series Rotary Disc Header – R113 SP Shown, R116 SP Similar

### 4.10.1 Inspecting Roll Conditioner

#### DANGER

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

#### WARNING

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

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props. For instructions, refer to [3.3 Engaging and Disengaging Header Safety Props, page 24](#).

## MAINTENANCE AND SERVICING

4. Remove left and right driveshields (A). For instructions, refer to [Removing Driveshields](#), page 217.

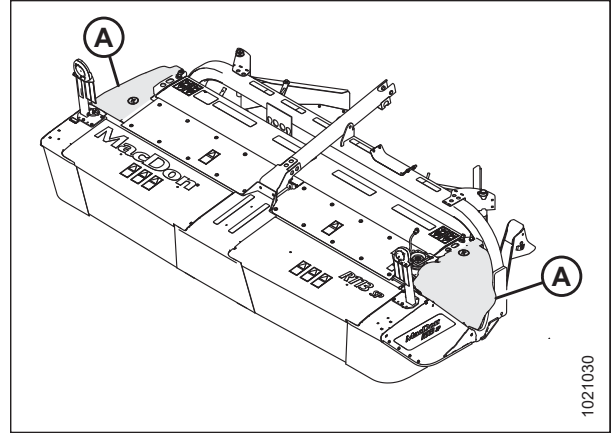


Figure 4.180: Driveshields

5. Inspect conditioner roll left bearing (A) for signs of wear or damage. If the bearing needs replacing, contact your Dealer.

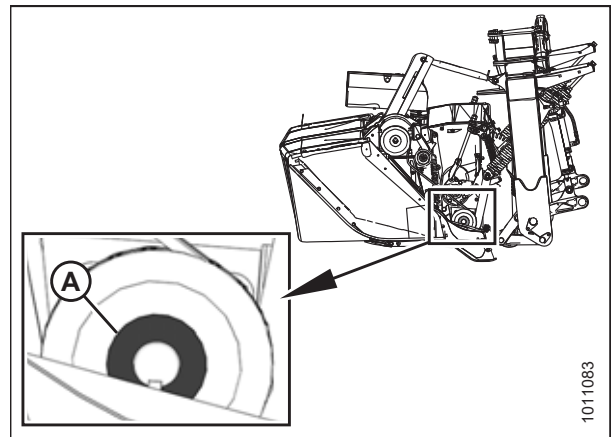


Figure 4.181: Conditioner Roll Left Bearing

6. Inspect conditioner drive U-joints (A) for signs of wear or damage. If the U-joints need replacing, contact your Dealer.

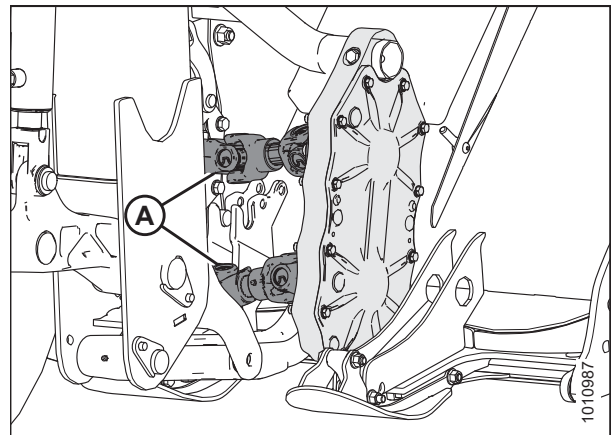


Figure 4.182: Conditioner Drive U-Joints

## MAINTENANCE AND SERVICING

7. Inspect roll timing gearbox bearings (A) for signs of wear or damage. If the bearings need replacing, contact your Dealer.

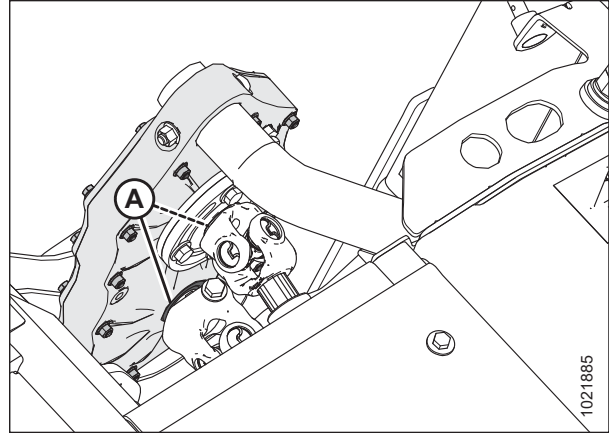


Figure 4.183: Roll Timing Gearbox Bearings

### 4.10.2 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).

#### **! WARNING**

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 header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open left driveshield (A). For instructions, refer to [3.6.1 Opening Driveshields, page 76](#).

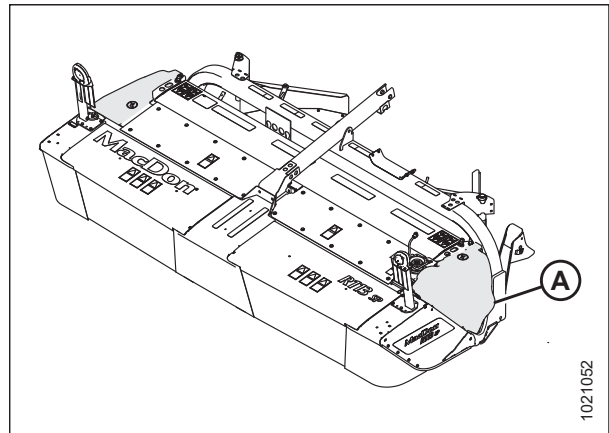


Figure 4.184: Left Driveshield – R113 SP Shown, R116 SP Similar

## MAINTENANCE AND SERVICING

4. Inspect drive belt (A) and replace if damaged or cracked.
5. Check that jam nut (B) and adjuster nut (C) are tight.

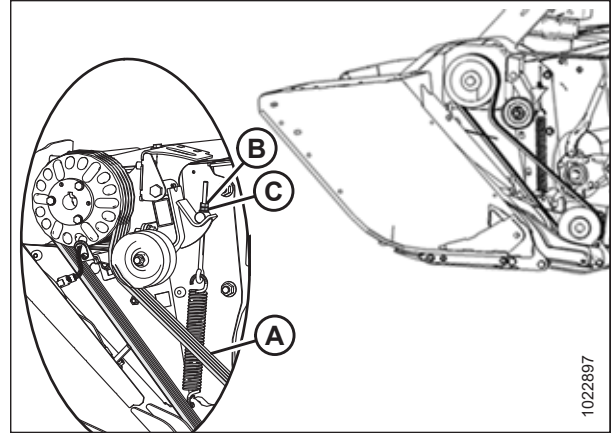


Figure 4.185: Conditioner Drive

6. Measure the length of belt tensioner spring (A). The spring length (B) should be 366 mm (14 3/8 in.) in accordance with spring tension decal (C). If spring length requires adjustment, refer to *Installing Conditioner Drive Belt*, page 204.
7. Close the driveshield. For instructions, refer to *3.6.2 Closing Driveshields*, page 77.

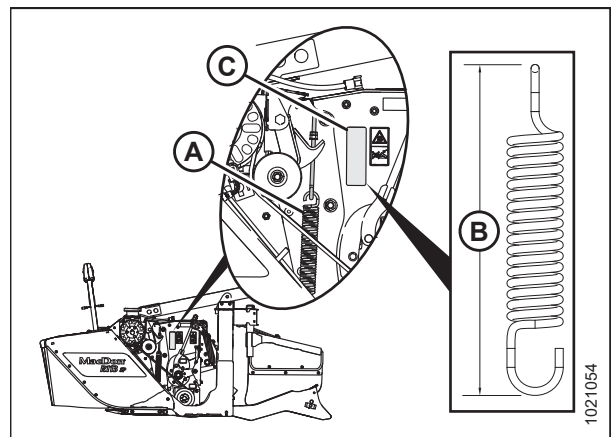


Figure 4.186: Belt Tensioner Spring

### Removing Conditioner Drive Belt

#### **WARNING**

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 header fully.
2. Shut down the engine, and remove key from the ignition.
3. Open the left driveshield. For instructions, refer to *3.6.1 Opening Driveshields*, page 76.

## MAINTENANCE AND SERVICING

4. Disconnect wire harness (A) from speed sensor (B).

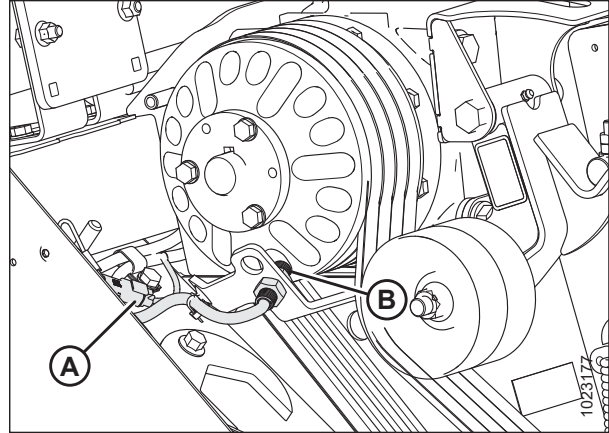


Figure 4.187: Speed Sensor Assembly

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

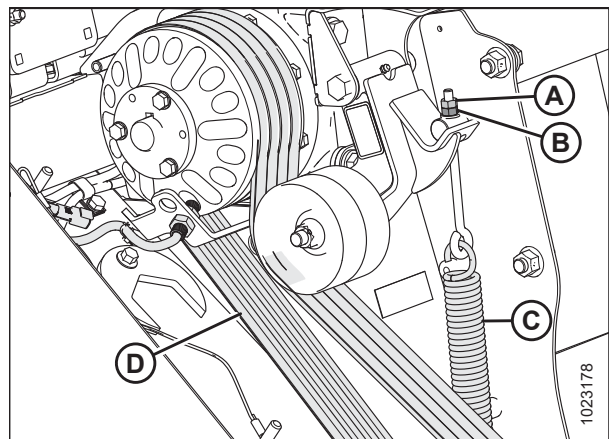


Figure 4.188: Conditioner Drive

### *Installing Conditioner Drive Belt*

#### **WARNING**

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



## MAINTENANCE AND SERVICING

3. Install drive belt (A) onto driven pulley (C) first, and then onto drive pulley (B), ensuring that the belt is in the pulley grooves.

**NOTE:**

If necessary, loosen the jam nut and adjuster nut to relieve the spring tension.

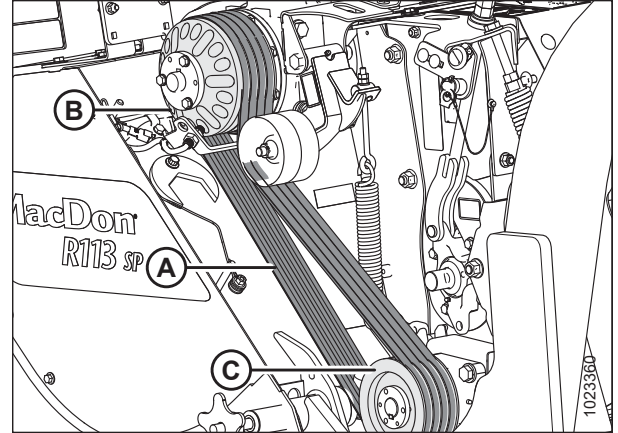


Figure 4.189: Conditioner Drive

4. Measure the length of tensioner spring (C); dimension (D) should be set to 365 mm (14 3/8 in.) for proper belt tension.
5. To adjust spring tension, loosen jam nut (A).
6. Turn adjuster nut (B) clockwise to increase spring/belt tension, or turn adjuster nut (B) counterclockwise to decrease spring/belt tension.
7. Once the correct spring measurement has been achieved, hold adjuster nut (B) and tighten jam nut (A) against it.

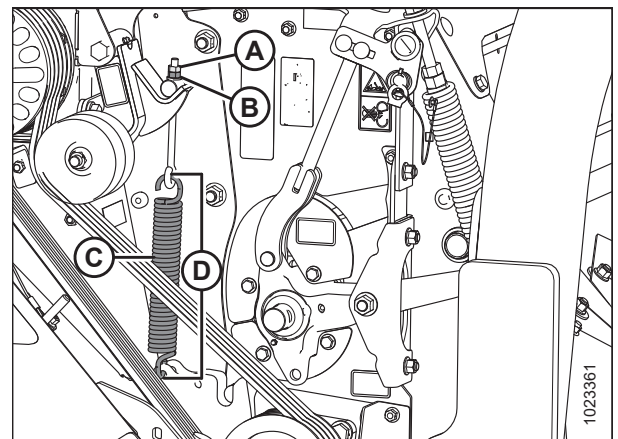


Figure 4.190: Conditioner Drive

8. Reconnect speed sensor (B) to wiring harness (A).

**NOTE:**

Ensure the speed sensor is installed correctly for the windrower: use the bottom hole for M1 Series Windrower; use the top hole for M155E4 SP Windrower.

9. Close the left driveshield. For instructions, refer to [3.6.2 Closing Driveshields, page 77](#).

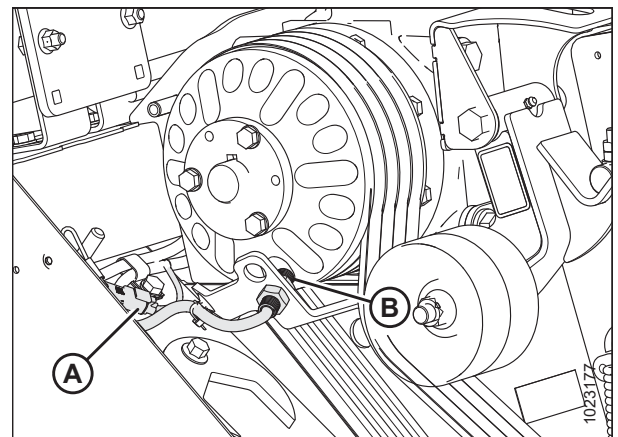


Figure 4.191: Speed Sensor

### 4.10.3 Changing the Conditioner

The R1 SP Rotary Disc Header can be operated either with no conditioner, with a polyurethane roll conditioner, or with a steel roll conditioner. If the rotary disc header is not conditioner-equipped, a shield must be installed.

**NOTE:**

These instructions apply to all conditioners. Exceptions are identified where applicable.

#### Removing the Conditioner

This procedure is applicable when the header is not attached to the windrower. If necessary, detach the header from the windrower before proceeding.

1. Open the driveshields. For instructions, refer to [3.6.1 Opening Driveshields, page 76](#).
2. Remove the conditioner drive belt. For instructions, refer to [Removing Conditioner Drive Belt, page 203](#).
3. **M1 Series:** Move hose bundle (A) clear of the frame and lay it on the header.

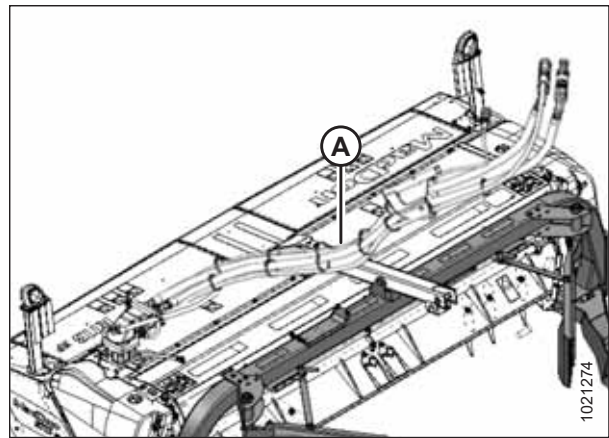


Figure 4.192: M1 Series Hose Bundle

4. **M155 and M155E4 SP Windrower:** Remove two bolts (A) attaching hose bracket (B) to the header frame. Place the hose bundle and bracket onto the header. Do **NOT** disconnect the hoses from the motor.

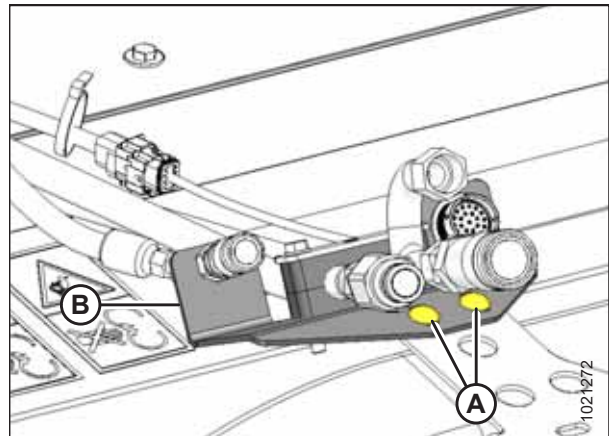


Figure 4.193: M155 and M155E4 SP Windrower Hoses

**WARNING**

To prevent frame from slipping off forks, ensure frame is secured to forks. Failure to do so could result in death or serious injury.

5. Support and secure the adapter frame for lifting using one of the two methods below:

**Method 1:**

- a. Attach straps (A) to adapter frame (B) and the forklift forks. Use straps with a minimum working load of 454 kg (1000 lb.).

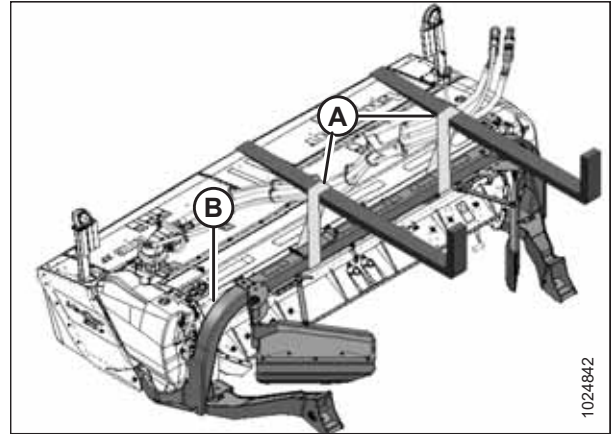


Figure 4.194: Supporting Frame Using Straps

**Method 2:**

- a. To protect the finish on the frame, wrap packing foam (A) (or equivalent) around the frame at approximately the locations shown.
- b. Position forks (B) under the packing foam on the frame as shown at right. Raise forks and lift the frame slightly. The forks should **NOT** directly contact the frame.
- c. To secure the frame to the forks, wrap chain (C) around the end of the forks and attach the other end to the forklift.

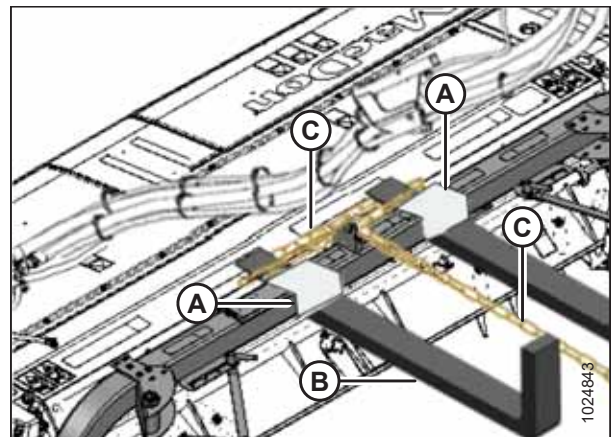


Figure 4.195: Supporting Frame Using Chain

- 6. Lift the header with the forklift and place 150 mm (6 in.) wooden blocks (A) under the skid shoes. Lower the header onto the blocks and allow the header to tilt forward.

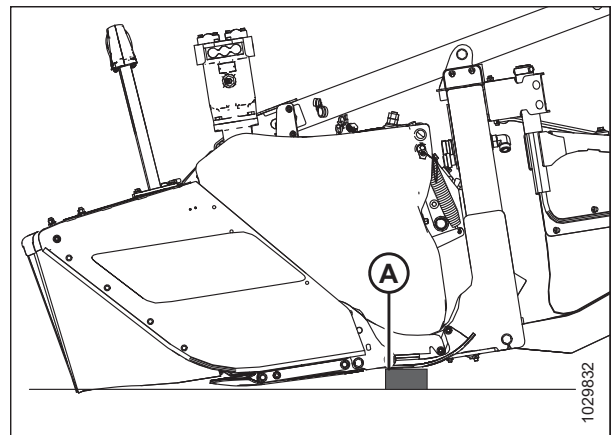


Figure 4.196: Header on Blocks

## MAINTENANCE AND SERVICING

- Remove nut (A) securing bolt (B), washer (C), and washer shims (D) from the center-link support. If necessary, adjust the height of the forks lifting the frame. Retain the hardware for reinstallation.

### NOTE:

Some transparencies are used in the illustration to help clarify the position of shims (D).

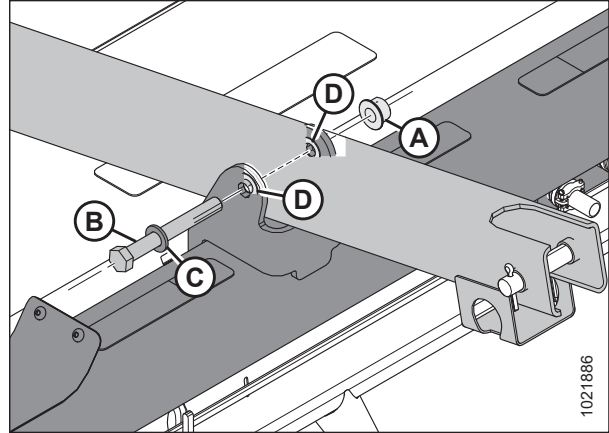


Figure 4.197: Center-Link Support

- Remove nut (B).

### WARNING

To prevent straps from slipping off forks, ensure straps are securely attached to forks. Failure to do so could result in death or serious injury.

### CAUTION

Stand clear when detaching frame as frame may shift when bolts are removed.

- Remove bolt (A) from frame (C). If necessary, adjust the height of the forks to improve access to bolt (A). Repeat at the opposite side of the frame. Retain the hardware for reinstallation.
- Slowly and carefully back the forklift away from the header until the frame is clear of the header. Move the frame away from the work area, lower it to the ground and disconnect it from the forklift.
- Attach spreader bar (A) to a forklift or equivalent lifting device, and attach chains to lugs (B) on conditioner (C). Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).

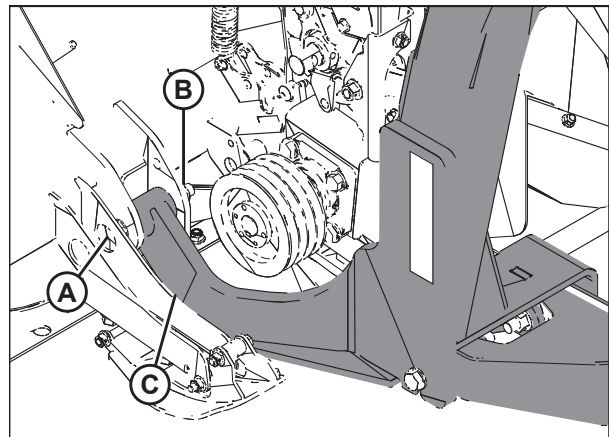


Figure 4.198: Left Side of Adapter Frame

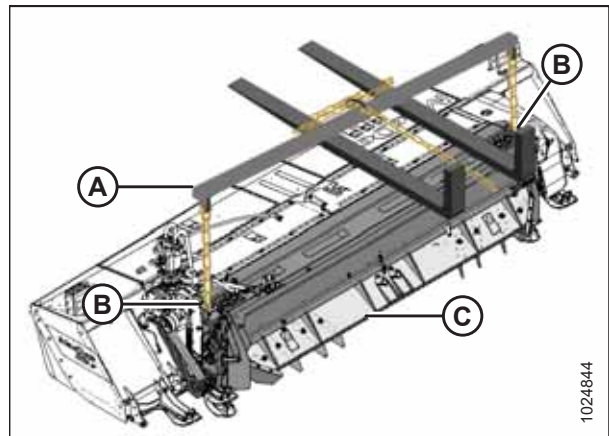


Figure 4.199: Spreader Bar

## MAINTENANCE AND SERVICING

- Loosen two M16 hex head bolts (A) at each side of the conditioner that secure it to the header.

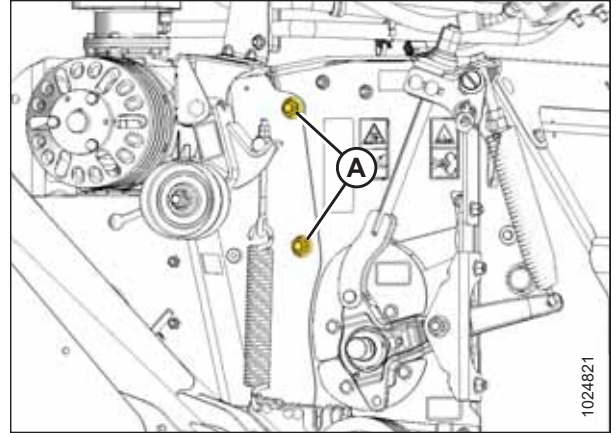


Figure 4.200: Left Side of Conditioner – Right Side Similar

- Loosen two carriage bolts (A) securing conditioner gearbox support (B) to the header.

### **WARNING**

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.

### **CAUTION**

Stand clear when detaching frame as frame may shift when bolts are removed.

- Adjust the height of the forks to raise the conditioner slightly. Remove the loosened bolts and retain hardware for reinstallation.

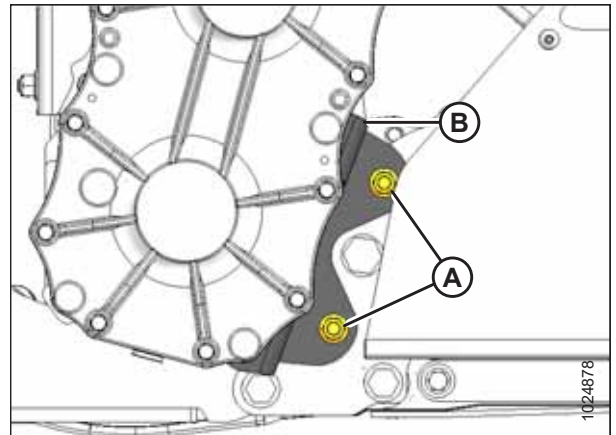


Figure 4.201: Conditioner Gearbox

### **WARNING**

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the header. Failure to do so could result in death or serious injury.

- Using the forklift, lift conditioner (A) off header (B). Avoid contact between the top of the conditioner and center-link anchor (C).
- Move the frame away from the work area, set it on the ground, and remove the chains securing the conditioner to the spreader bar.

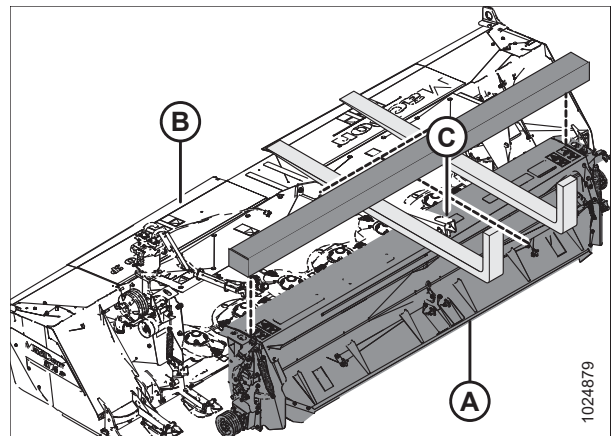


Figure 4.202: Lifting Conditioner



*Installing the Conditioner*

This procedure is applicable when the header is not attached to the windrower. If necessary, detach the header from the windrower before proceeding. Refer to header operator’s manual for instructions.

1. Attach spreader bar (A) to the forklift (or an 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.).

**WARNING**

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the header while attaching the conditioner to the header. Failure to do so could result in death or serious injury.

2. Lift conditioner (C) and align it with the header opening.

3. Carefully align pin (B) at each end of conditioner (A) with lug (C) on the header. Lower conditioner (A) until pins (B) engage lugs (C) on the header. Avoid contact between the top of the conditioner and the center-link anchor.

4. Align the mounting holes and install four M16 x 40 hex head bolts (A) with the heads facing inboard (two per side). Secure with M16 center lock flanged nuts. Do **NOT** tighten.

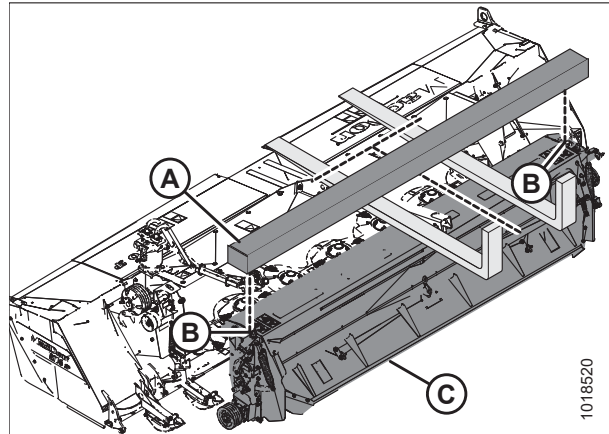


Figure 4.203: Lifting Conditioner

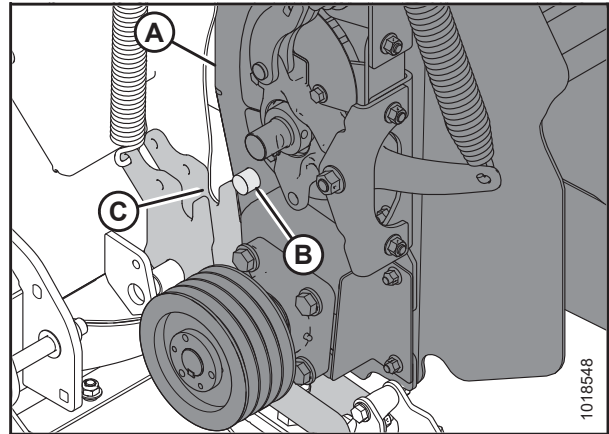


Figure 4.204: Installing Conditioner

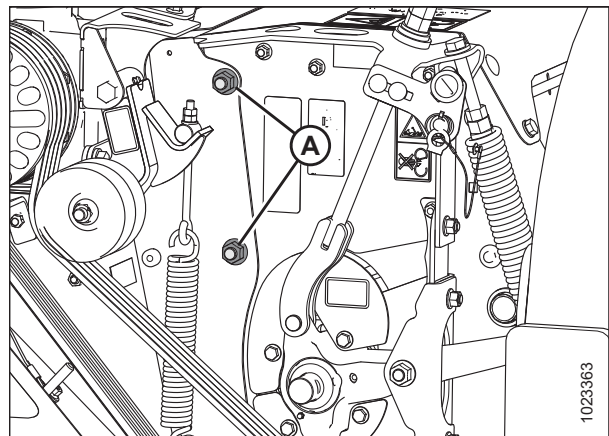


Figure 4.205: Left Side of Conditioner – Right Side Similar

## MAINTENANCE AND SERVICING

- Align the holes in support (B) with the mounting holes in the header frame and install two carriage bolts (A) to secure conditioner gearbox support (B) to the header. Bolt heads face inboard. Torque nuts to 69 Nm (51 lbf·ft).

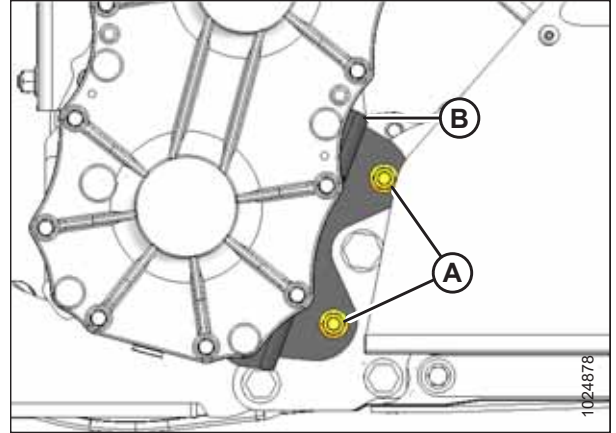


Figure 4.206: Conditioner Gearbox

- Torque nuts (A) to 170 Nm (126 lbf·ft).
- Remove the lifting chains from the conditioner and move the lifting device clear of the work area.
- If necessary, install conditioner drive components. For instructions, refer to [Installing Conditioner Drive, page 214](#).



### WARNING

To prevent frame from slipping off forks, ensure frame is secured to forks. Failure to do so could result in death or serious injury.

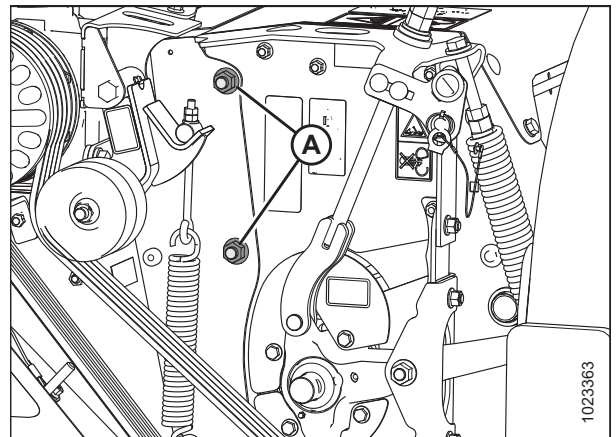


Figure 4.207: Left Side of Conditioner – Right Side Similar

- Support and secure the adapter frame for lifting using one of the two methods below:

#### Method 1:

- Attach straps (A) to adapter frame (B) and the forklift forks. Use straps rated for overhead lifting with a minimum working load of 454 kg (1000 lb.).
- Pick up the frame and position it against the header.

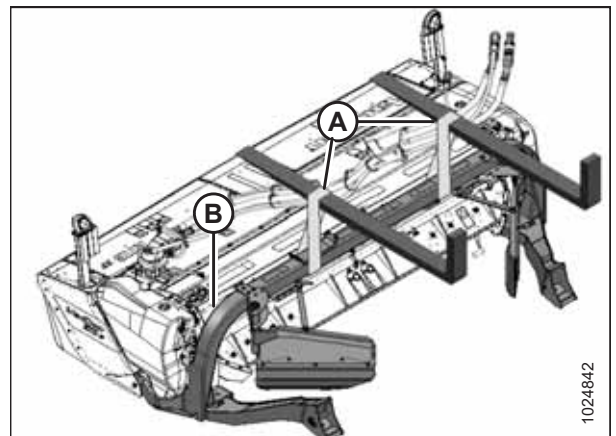


Figure 4.208: Supporting Frame Using Straps

## MAINTENANCE AND SERVICING

### Method 2:

- a. To protect the finish on the frame, wrap packing foam (A) (or equivalent) around the approximate frame locations shown.
- b. Position forks (B) under the packing foam on the frame as shown at right. Raise the forks and lift the frame slightly. The forks should not directly contact the frame.
- c. To secure the frame to the forks, wrap chain (C) around the end of the forks and attach it to the forklift.
- d. Pick up the frame and position it against the header.

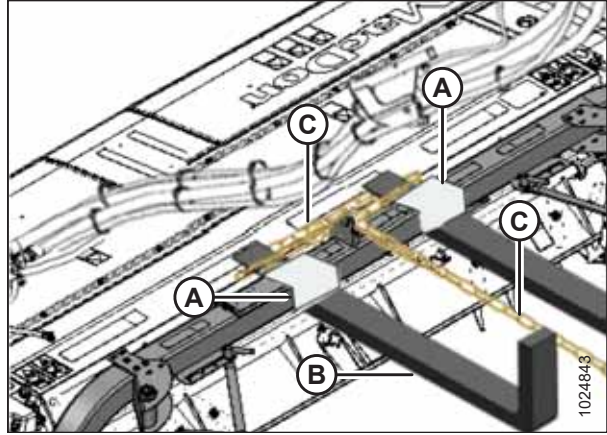


Figure 4.209: Supporting Frame Using Chain

10. Slowly move forward until lift arm (C) is aligned with mounting holes (A) and (B) in the frame.

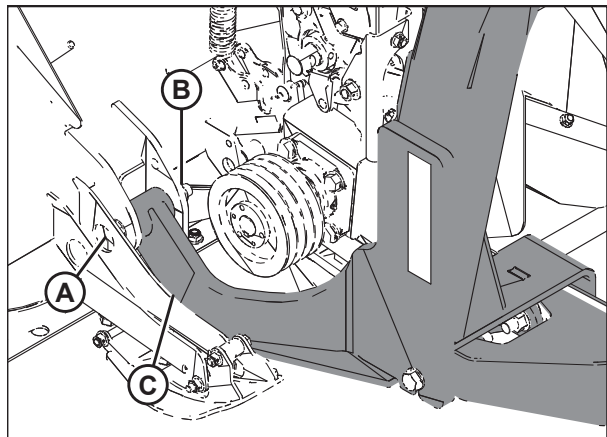


Figure 4.210: Frame – Left Side Shown

11. Install bolt (A) through frame (B) and bushing (D) in the lift arm. Repeat for the opposite side of the machine.
12. Check gaps (C) between the bushing inner steel sleeve (D) and frame (B). If there is a gap, install 1.2 mm thick flat washers (MD #5113) to minimize the gap on both sides of the bushing.
13. Remove bolt (A).

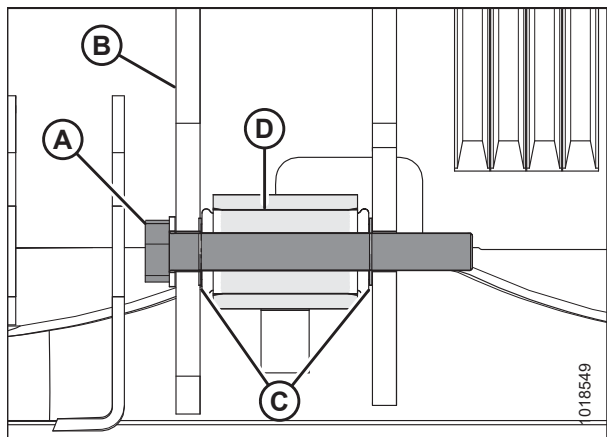


Figure 4.211: Frame Attachment – Left Side Shown



## MAINTENANCE AND SERVICING

14. Install washer (A) onto bolt (B) and apply an anti-seize compound to the bolt shank only. Do **NOT** apply anti-seize to the threads.
15. Install bolt (B) with washers (C) as determined in Step 12, page 212.
16. Install three washers (D) and nut (E) onto bolt. Torque to 339 Nm (250 lbf-ft).
17. Repeat Step 12, page 212 to Step 16, page 213 for the opposite side.

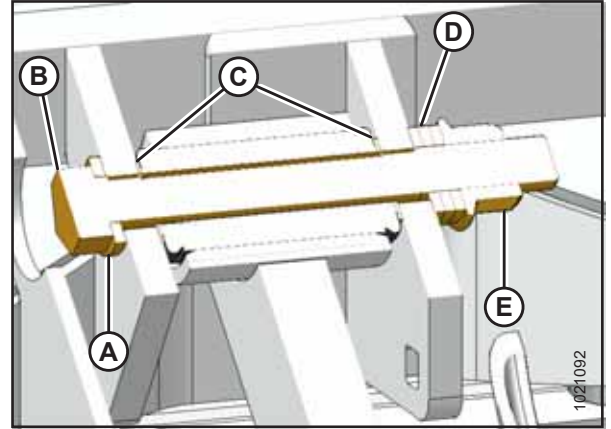


Figure 4.212: Frame Attachment – Cross Section View

18. With flat washer shim (A) on both sides of the center-link support, install securing bolt (B) and washer (C) through the conditioner center-link support bracket and center-link support.
19. Install nut (D) and torque to 339 Nm (250 lbf-ft).

**NOTE:**

Some transparencies are used in the illustration to help clarify the position of shims (A).

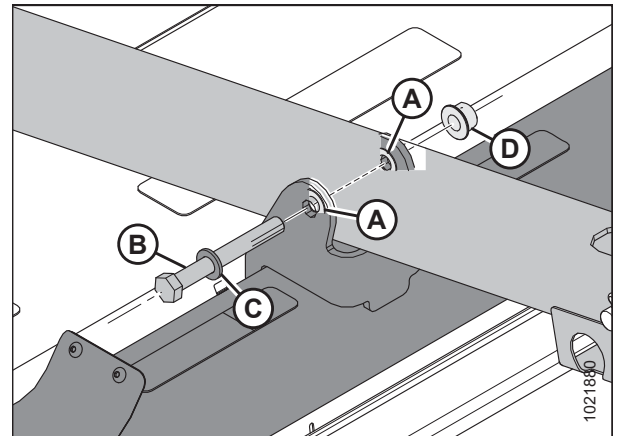


Figure 4.213: Center-Link Support

**⚠ WARNING**

To prevent frame from slipping off forks, ensure frame is secured to forks. Failure to do so could result in death or serious injury.

20. Lift the header and remove wooden blocks (A) under the skid shoes. Lower the header to the ground.
21. Remove any straps or chains securing the frame to the forks, and back the forklift away from the work area.

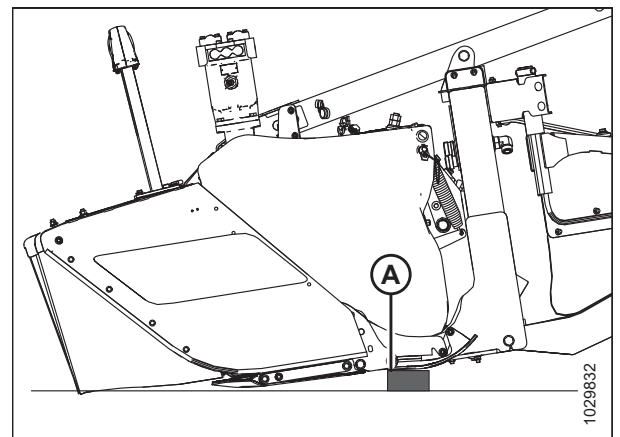


Figure 4.214: Header on Blocks

## MAINTENANCE AND SERVICING

23. **M155 and M155E4 SP Windrowers:** Position the hose bundle and hose support (B) onto the adapter and secure with bolts (A) and nuts.

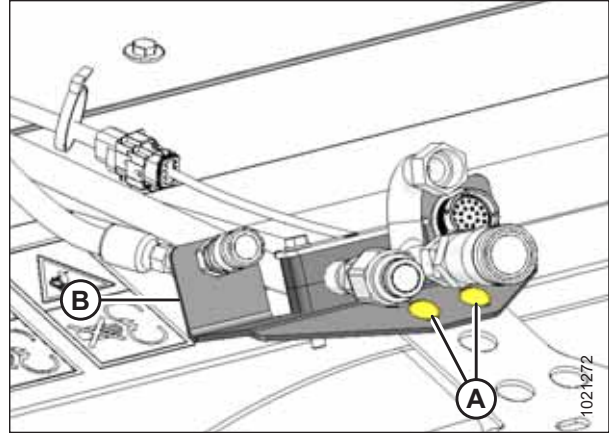


Figure 4.215: Hose Support

23. **M1 Series:** Reposition hose bundle (A) on the frame.
24. Install the conditioner drive belt. For instructions, refer to [Installing Conditioner Drive Belt, page 204](#).
25. Close the driveshields. For instructions, refer to [3.6.2 Closing Driveshields, page 77](#).

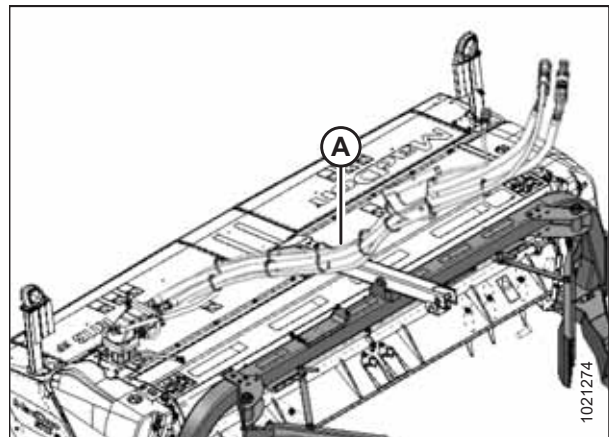


Figure 4.216: Hydraulic Hose Bundle

### Installing Conditioner Drive

This procedure describes the installation of conditioner drive components on a machine that was originally supplied with no conditioner. The procedure is similar for machines that will have a conditioner installed.

If a conditioner is to be installed on the R113 SP, refer to [Installing the Conditioner, page 210](#) and [Installing Conditioner Drive Belt, page 204](#).

1. Remove drive cover (A) from left side of header by removing hex head bolt (B), flat washer (C) and nut (D) and sliding cover off pins (E).

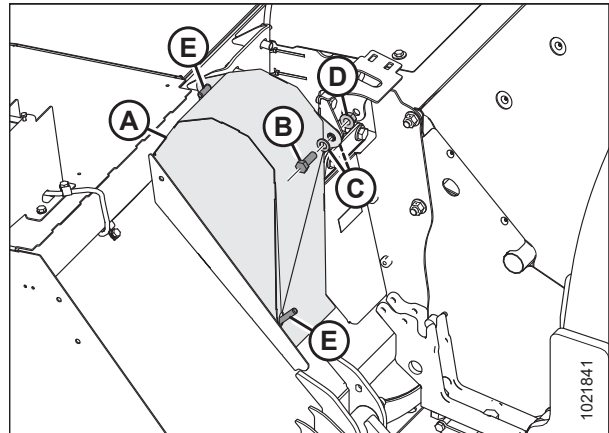


Figure 4.217: Drive Cover

## MAINTENANCE AND SERVICING

2. Position tensioner assembly (A) as shown, and secure with M16 x 120 bolt (B) and nut (C). Torque nut (C) to 50 Nm (37 lbf-ft).

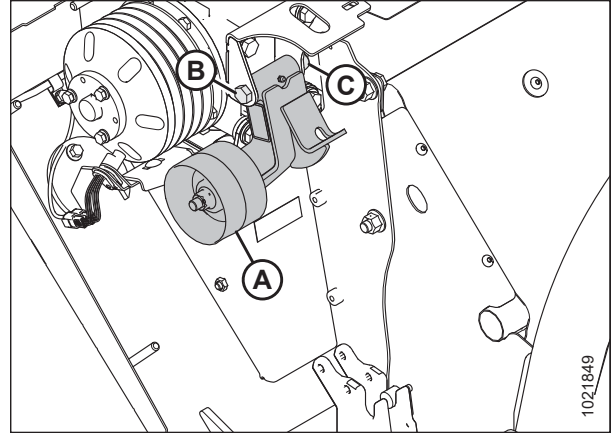


Figure 4.218: Tensioner

3. Install spring (A) into forward hole (B) in the frame.
4. Install eyebolt (C) onto spring (A) and tensioner (D). Secure eyebolt (C) to tensioner (D) with hardened washer (E), and two M10 nuts (F), and straight pin (G).

**NOTE:**

Install the conditioner drive belt after reattaching the header to the adapter.

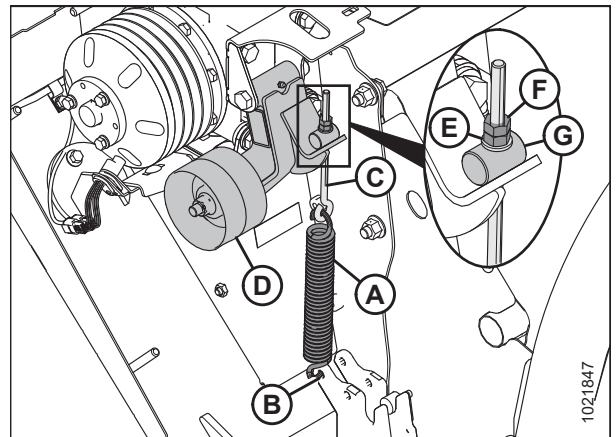


Figure 4.219: Tensioner

### 4.10.4 Replacing Shield – No Conditioner

#### *Removing Discharge Shield – No Conditioner*

Follow these steps to remove the shielding installed on a rotary disc header configured without a conditioner:

1. Disconnect and remove the header from the windrower. For instructions, refer to the header operator's manual.
2. On both ends of the header, remove four M16 hex head bolts (A), nuts, and flat washers that secure shield (B) to header panel (C).

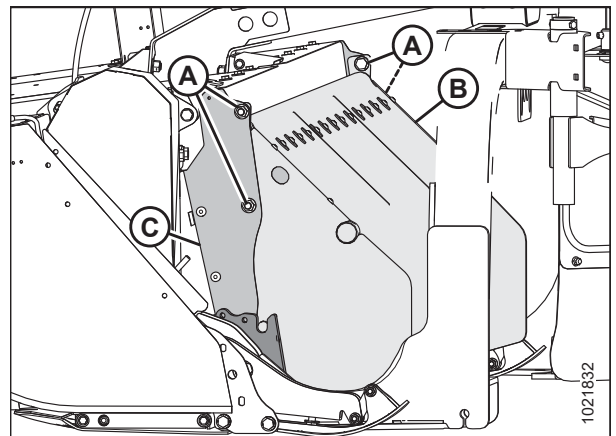


Figure 4.220: Left Side of Header – Right Opposite

## MAINTENANCE AND SERVICING

3. Lift shield (A) until pins (B) (one on each side) disengage from the slots in support (C).

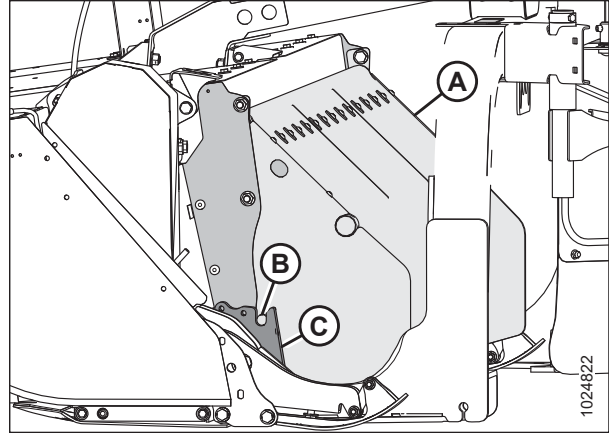


Figure 4.221: Left Side of Header – Right Opposite

### *Installing Discharge Shield – No Conditioner*

Follow these steps to install the shielding on a rotary disc header configured without a conditioner:

1. Position shield (A) until pins (B) (one on each side) engage the slots in support (C) and the bolt holes in shield (A) align with holes (D) in the header.

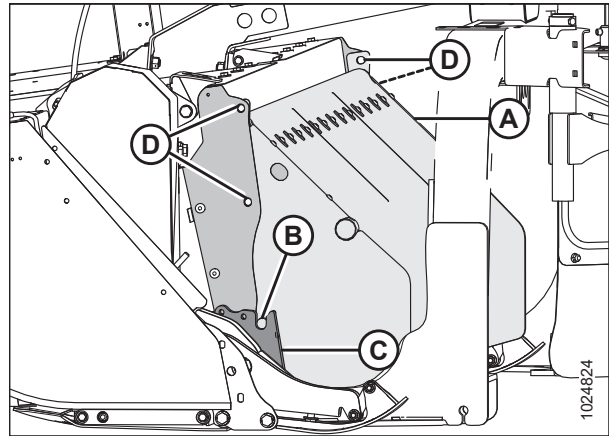


Figure 4.222: Left Side of Header – Right Opposite

2. Secure shield (B) to the header with four M16 hex head bolts (A), nuts, and flat washers.
3. Ensure the bolt heads face inboard and torque the nuts to 261 Nm (193 lbf·ft).

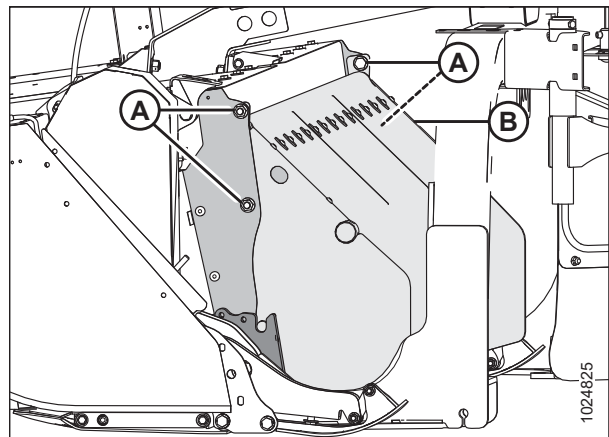


Figure 4.223: Left Side of Header – Right Opposite

### 4.10.5 Replacing Driveshields

If driveshields are missing, severely damaged, or are not securely installed due to damage, they must be replaced.

#### *Removing Driveshields*

 **CAUTION**

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

**NOTE:**

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

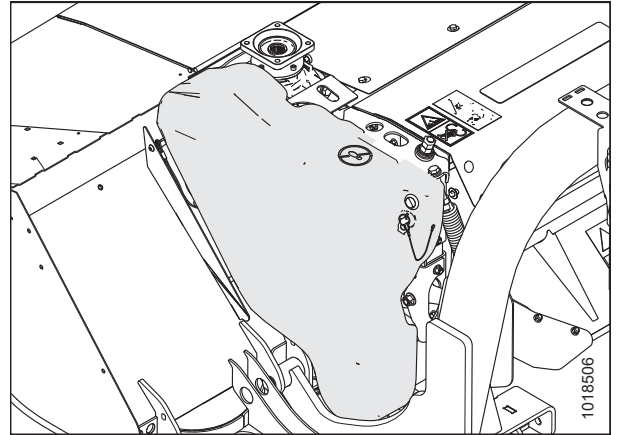


Figure 4.224: Left Driveshield

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

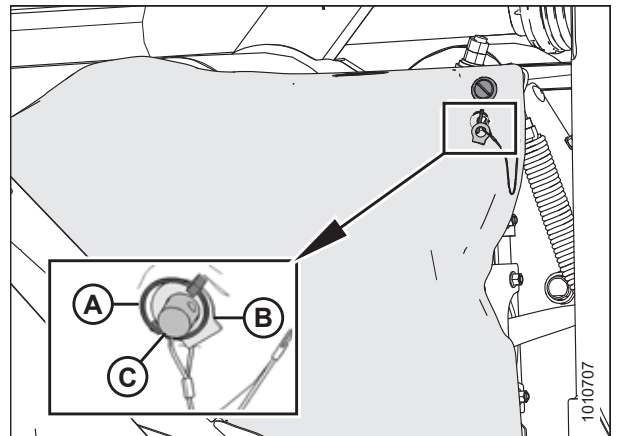


Figure 4.225: Tool to Unlock Driveshield

## MAINTENANCE AND SERVICING

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

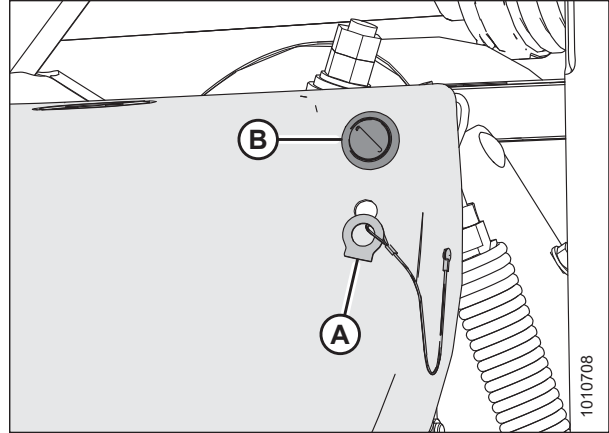


Figure 4.226: Tool to Unlock Driveshield and Latch

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

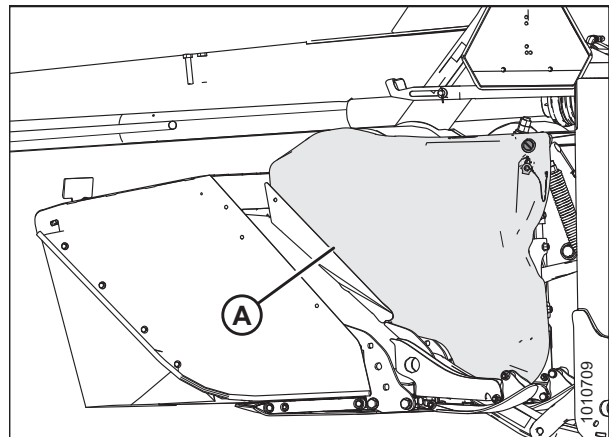


Figure 4.227: Driveshield

*Installing Driveshields*

**CAUTION**

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

**NOTE:**

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

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

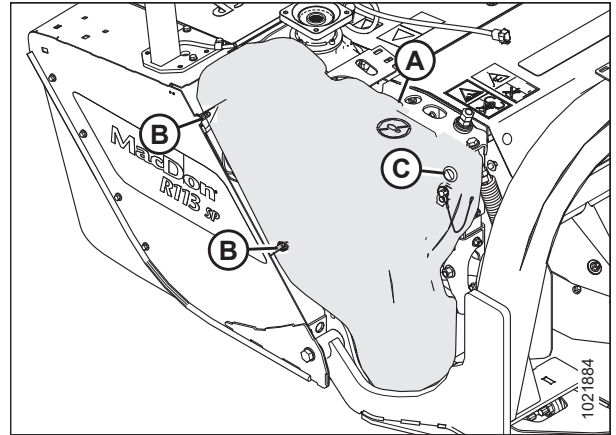


Figure 4.228: Driveshield and Latch

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

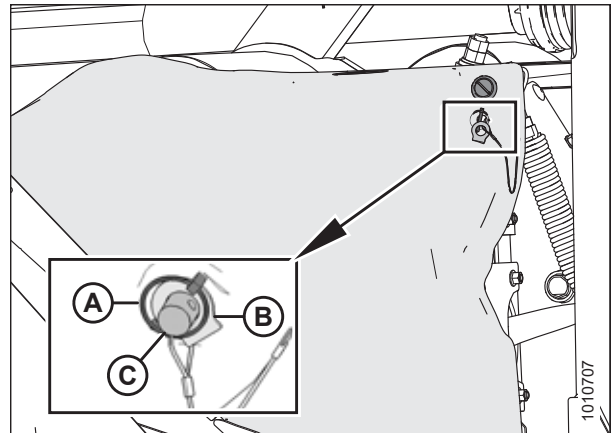


Figure 4.229: Tool to Unlock Driveshield

Replacing Driveshield Latch

**CAUTION**

To reduce the risk of personal injury, 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). For instructions, refer to [Removing Driveshields, page 217](#).

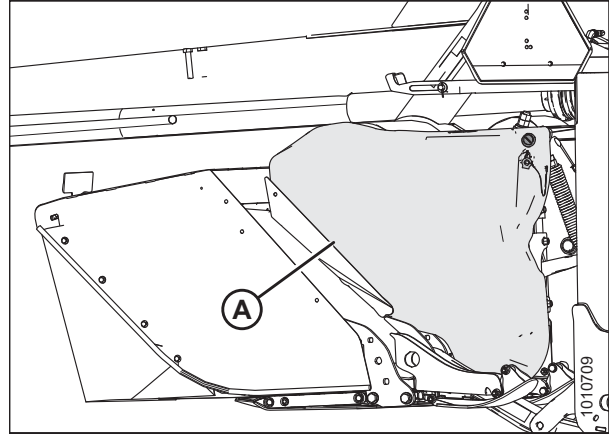


Figure 4.230: Driveshield

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

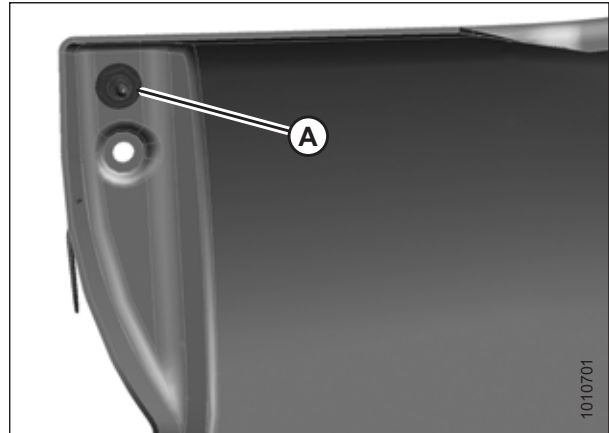


Figure 4.231: Backside of Driveshield

3. Remove two carriage bolts (A), replace stud and clip assembly (B) if worn or damaged, and reinstall carriage bolts.
4. Install driveshield. For instructions, refer to [Installing Driveshields, page 219](#).

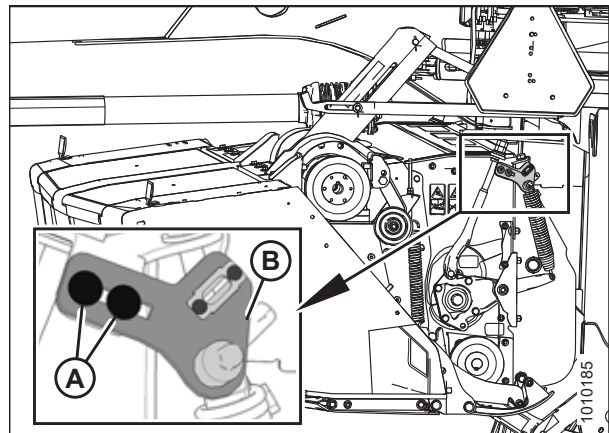


Figure 4.232: Stud and Clip Assembly



## 4.11 Electrical System

The header's electrical system is powered by the windrower. The electrical harness (A) from the header connects to the windrower, and supplies power to hazard/signal lights and receives signal from the speed sensor (B) located on the header.

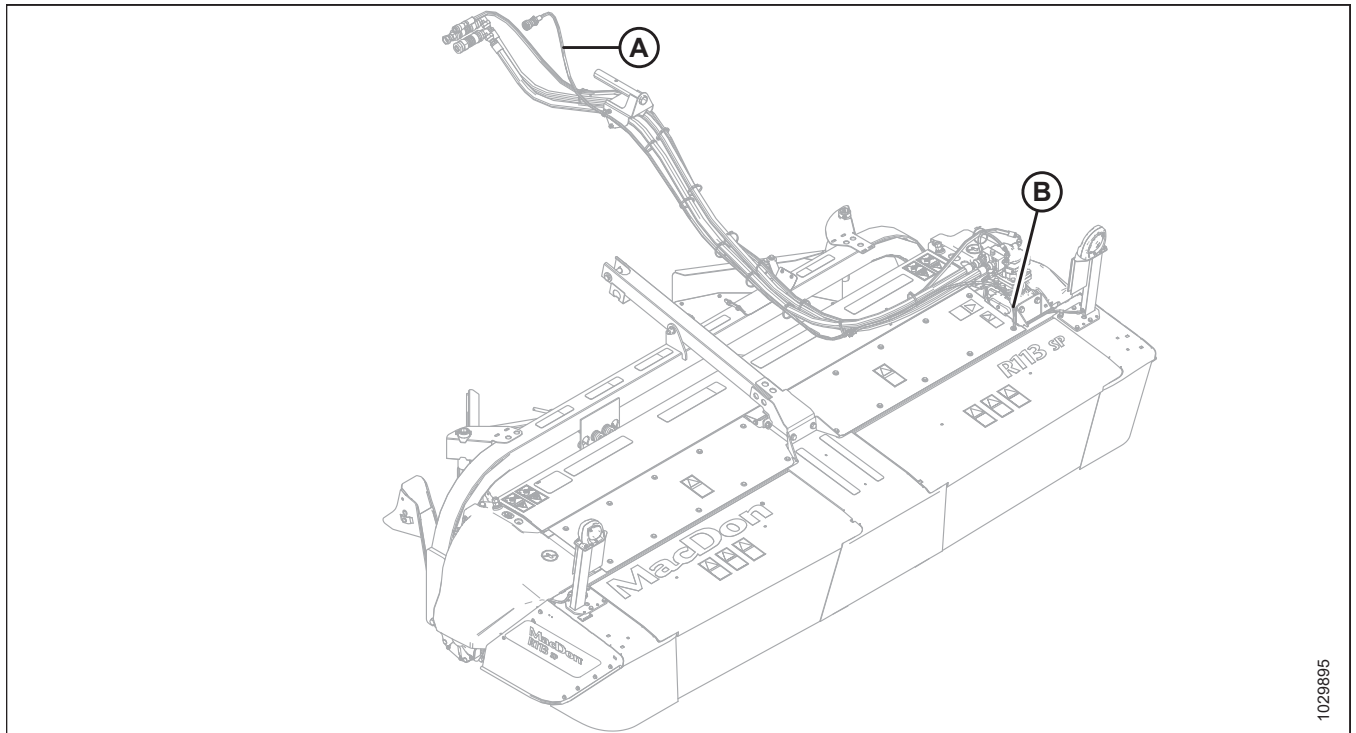


Figure 4.233: Electrical Harness

### 4.11.1 Maintaining Electrical System

- Use electrical tape and cable ties as required to prevent the wiring harness from dragging or rubbing.
- Keep lights clean and replace defective bulbs.

### 4.11.2 Replacing Amber Hazard/Signal Light Fixture

#### WARNING

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

## MAINTENANCE AND SERVICING

3. Remove four nuts (A) and bolts (B) (only three shown) securing the light to the bracket, and remove light. Disconnect the light from the electrical harness.
4. Connect the new light to the electrical harness.
5. Position the new light on bracket with bolts (B), and install and tighten four nuts (A).
6. Check operation of the new light.

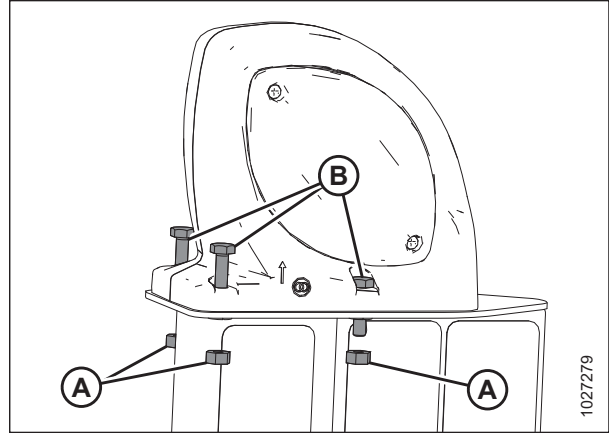


Figure 4.234: Amber Hazard Light

### 4.11.3 Replacing Amber Hazard/Signal Bulb

#### WARNING

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 header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove two Phillips screws (A) from the fixture. Remove the plastic lens.
4. Replace the bulb (trade #1157), and reinstall the plastic lens and screws.

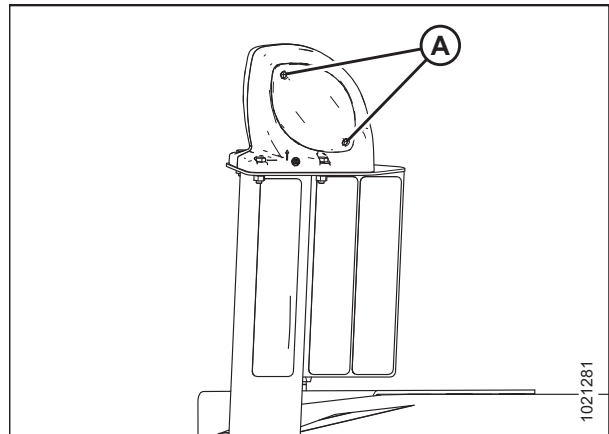


Figure 4.235: Plastic Lens and Screws

### 4.11.4 Replacing Header rpm Sensor

If the header rpm sensor malfunctions or is damaged, use this procedure to replace it.

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the left driveshield. For instructions, refer to [3.6.1 Opening Driveshields, page 76](#).

## MAINTENANCE AND SERVICING

4. Remove plastic fastener (B) from the bracket and cut cable tie (E) securing the sensor wire to the existing harness.
5. Disconnect wire harness (C) from speed sensor connector (D).
6. Remove nut (F) from the end of the sensor and remove the sensor from bracket (A).
7. Remove nut from the end of new sensor, and install the new sensor into bracket (A) securing with nut (F).

**NOTE:**

Ensure the speed sensor is correctly installed for the windrower: use the bottom hole for M1 Series Windrowers; use the top hole for M155E4 or M155 SP Windrowers.

8. Connect sensor wire to harness (C).
9. Install plastic fastener (B) in the small hole in bracket (A). Secure the sensor wire to fastener (B) with a cable tie, allowing 102–104 mm (4 4 3/16 in.) between the fastener and sensor.
10. Secure the sensor wire to header harness (C) with plastic cable tie (E). Ensure the wires are clear of the belt and pulley.
11. Adjust nuts (A) as required to achieve a 2–3 mm (1/16–1/8 in.) gap (B) between sensor (C) and pulley (D). Ensure the sensor face and the pulley face are parallel. Bend bracket (E) as required.
12. Tighten nuts (A) to 12 Nm (9 lbf-ft).
13. Close the driveshield. For instructions, refer to [3.6.2 Closing Driveshields, page 77](#).
14. Start the windrower, engage the header, and check the operation of the speed sensor on the monitor. The sensor may require recalibrating. Refer to the windrower operator's manual for the calibration procedure.

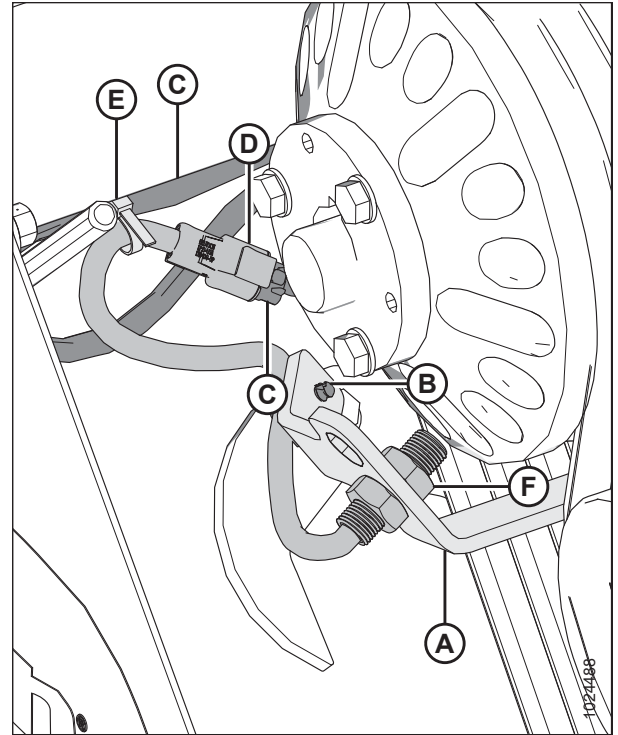


Figure 4.236: Header rpm Sensor

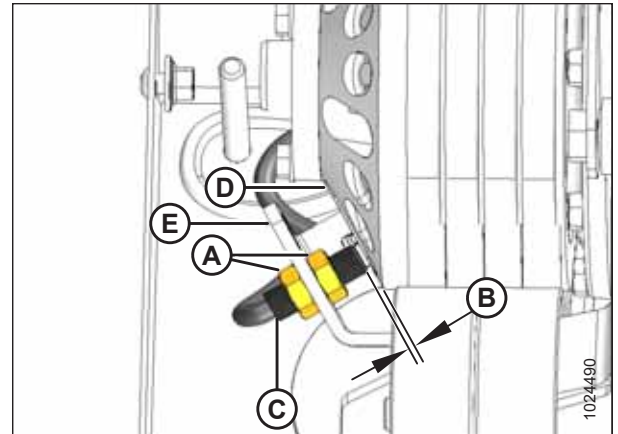


Figure 4.237: Header rpm Sensor

## 4.12 Hydraulics

### 4.12.1 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 4.238: 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 4.239: Testing for Hydraulic Leaks

## Chapter 5: Options and Attachments

### 5.1 Performance 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 rotary disc header for clean crop dividing and cutterbar entry in tall crops. The kit includes left and right dividers and attachment hardware.

MD #B5800

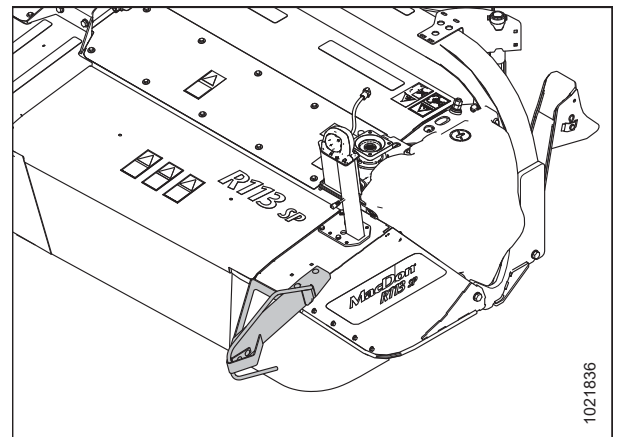


Figure 5.1: Tall Crop Divider — Left Shown, Right Opposite

#### 5.1.2 No Conditioner Kit

The R1 SP Series Rotary Disc Header can be operated without a conditioner. Kit includes required rear windrow shielding and curtain.

MD #B5818

#### 5.1.3 Polyurethane Roll Conditioner Kit

Rolls condition the crop by crimping and crushing the stem in several places, which allows the release of moisture resulting in faster drying times. A polyurethane roll conditioner is better suited for crushing stems while providing reduced crimping and is recommended for alfalfa, clover, legumes, and similar crops. The kit includes the conditioner and installation hardware.

MD #B6557

#### 5.1.4 Steel Roll Conditioner Kit

Rolls condition the crop by crimping and crushing the stem in several places, which allows the release of moisture resulting in faster drying times. 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. Steel rolls are recommended for these types of situations. The kit includes the conditioner and installation hardware.

MD #B6558

## 5.2 Hydraulic Drive Conversion Kits

Headers are factory-configured for use with either M155 and M155E4 SP Windrowers, or M1 Series Windrowers. Headers can be reconfigured for use on the alternative windrower options by using hydraulic conversion kits.

### 5.2.1 R1 to M1170 Hydraulic Drive Kit

Hydraulic Drive kit is required for an R1 Series Rotary Disc Header that is originally configured for use with an M155 or M155E4 SP Windrower to operate correctly on an M1 Series SP Windrower. This is also required to run an R113 SP on an M1240 Windrower and M205 SP Windrower.

MD #B6845

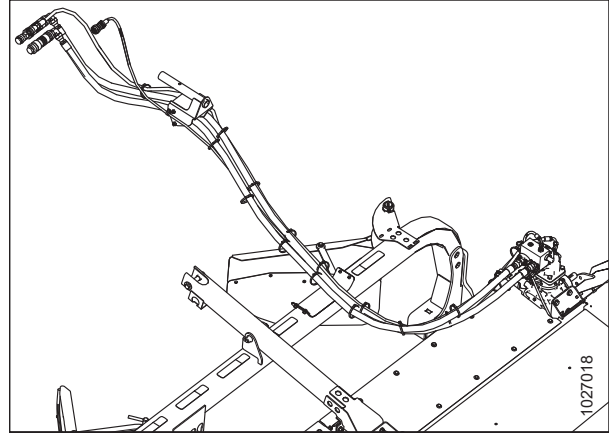


Figure 5.2: Hydraulic Drive Kit (MD #B6845)

### 5.2.2 M1240 Case Drain Kit

When connecting the R113 to an M1240 SP Windrower, the Case Drain kit (A) must be installed onto the M1240. This kit contains an alternative case drain line which is routed directly to the hydraulic reservoir with a unique set of 1/2 in. hydraulic couplers.

MD #B6698

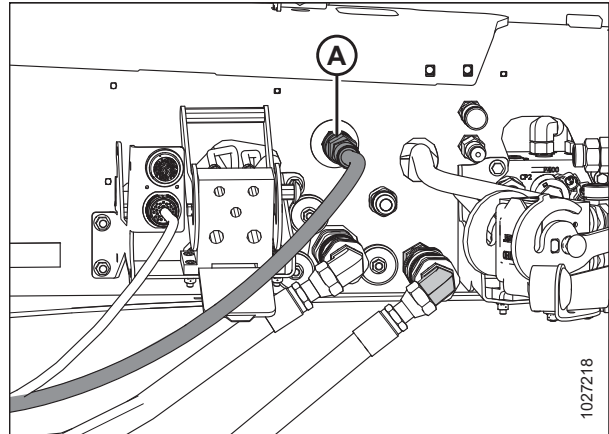


Figure 5.3: Case Drain Kit (MD #B6698)

### 5.2.3 M155 and M155E4 Hydraulic Drive Conversion Kit

Hydraulic Drive kit (A) is required for an R1 Series Rotary Disc Header that is originally configured for use with an M1 Series to operate correctly on M155 or M155E4 Self-Propelled Windrower.

MD #B6272

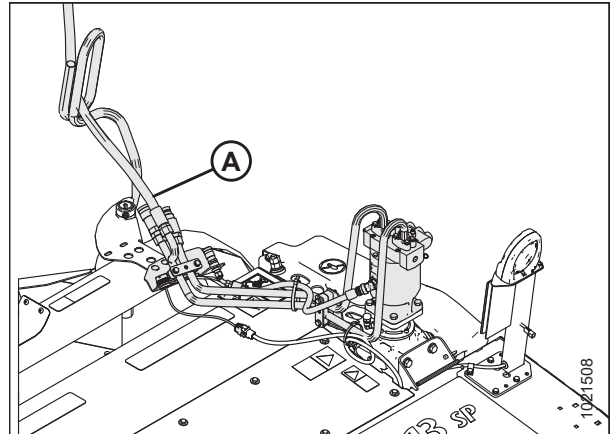


Figure 5.4: Hydraulic Drive Kit (MD #B6272)

### 5.2.4 M205 Compatibility Kit

The M205 Compatibility kit (A) is required for R113 Rotary Disc Header that is originally configured for an M1170 Windrower to operate on an M205 Self-Propelled Windrower.

MD #257188

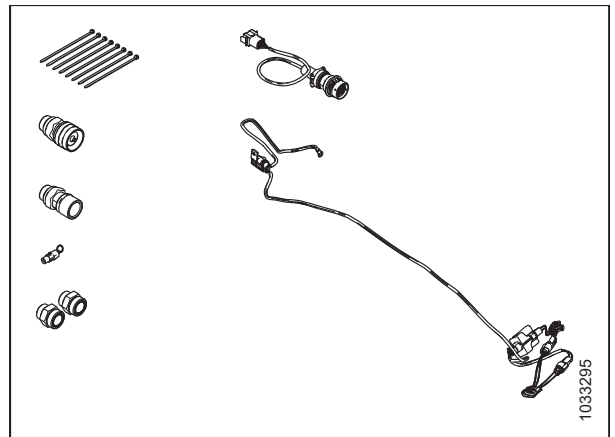


Figure 5.5: Compatibility Kit (MD #257188)





# Chapter 6: Troubleshooting

## 6.1 Performance Problems

Problem	Solution	Refer to
<b>Symptom: Cutterbar plugging</b>		
Dull, bent, or badly worn discblades	Replace discblades.	<ul style="list-style-type: none"> <li>• <i>Removing Disc Blades, page 139</i></li> <li>• <i>Installing Disc Blades, page 140</i></li> </ul>
Build-up of dirt between rock guards	Decrease header angle and increase float. In some conditions, it may be necessary to carry header slightly with header lift cylinders.	<ul style="list-style-type: none"> <li>• <i>3.8.1 Cutting Height, page 82</i></li> <li>• Refer to windrower operator's manual</li> </ul>
Conditioner drive belt slipping	Adjust conditioner drive belt tension.	<i>4.10.2 Conditioner Drive Belt, page 202</i>
<b>Symptom: Ragged or uneven cutting of crop</b>		
Header angle too flat for guards to pick up downed crop	Increase header angle.	<i>3.8.1 Cutting Height, page 82</i>
Downed crop	Adjust header angle to cut closer to ground.	<i>3.8.1 Cutting Height, page 82</i>
Header float too light, causing bouncing	Adjust to heavier float setting.	Refer to windrower operator's manual
Excessive ground speed	Reduce ground speed.	—
<b>Symptom: Strips of uncut crop left on field</b>		
Dull, bent, or badly worn discblades	Replace discblades.	<ul style="list-style-type: none"> <li>• <i>Removing Disc Blades, page 139</i></li> <li>• <i>Installing Disc Blades, page 140</i></li> </ul>
Build-up of dirt between rock guards	Decrease header angle and increase float. In some conditions, it may be necessary to carry header slightly with header lift cylinders.	<ul style="list-style-type: none"> <li>• <i>3.8.1 Cutting Height, page 82</i></li> <li>• Refer to windrower operator's manual</li> </ul>
Excessive header speed	Reduce header disc speed.	—
Foreign object on cutterbar	Disengage header and stop engine. When all moving parts are completely stopped, remove foreign object.	<i>4.5.2 Cutterbar Discs, page 123</i>
Disc not turning	Replace spindle shear pin.	<i>4.5.9 Replacing Cutterbar Spindle Shear Pin, page 177</i>
Ground speed too slow	Increase ground speed.	—
<b>Symptom: Conditioner rolls plugging</b>		
Ground speed too fast	Reduce ground speed.	—
Roll gap too large for proper feeding	Decrease roll gap.	<ul style="list-style-type: none"> <li>• <i>Adjusting Roll Gap – Polyurethane Rolls, page 91</i></li> <li>• <i>Adjusting Roll Gap – Steel Rolls, page 92</i></li> </ul>

## TROUBLESHOOTING

Problem	Solution	Refer to
Roll gap too small in thick-stemmed cane-type crops	Increase roll gap.	<ul style="list-style-type: none"> <li>Adjusting Roll Gap – Polyurethane Rolls, page 91</li> <li>Adjusting Roll Gap – Steel Rolls, page 92</li> </ul>
Swath baffle set too low	Raise swath baffle.	3.10.4 Forming Shields – Roll Conditioner, page 96
Roll speed too low	Increase disc speed.	—
Foreign object between rolls	Disengage header and stop engine. When all moving parts are completely stopped, remove foreign object.	4.5.2 Cutterbar Discs, page 123
Cutting height too low	Decrease header angle to raise cutting height.	3.8.1 Cutting Height, page 82
Backing into windrow	Raise header before backing up.	—
Rolls improperly timed	Adjust roll timing.	Adjusting Roll Timing, page 94
<b>Symptom: Uneven formation and bunching of windrow</b>		
Swath baffle (deflector) bypassing or dragging crop	Adjust rear deflector for proper crop control.	Positioning Rear Baffle – Roll Conditioner, page 97
Forming shields improperly adjusted	Adjust roll conditioner forming shields.	<ul style="list-style-type: none"> <li>Positioning Forming Shield Side Deflectors – Roll Conditioner, page 96</li> <li>Positioning Rear Baffle – Roll Conditioner, page 97</li> </ul>
Roll gap too large	Adjust roll gap.	<ul style="list-style-type: none"> <li>Adjusting Roll Gap – Polyurethane Rolls, page 91</li> <li>Adjusting Roll Gap – Steel Rolls, page 92</li> </ul>
Conditioner rolls running too slow	Maintain rated header speed.	Refer to windrower operator's manual
<b>Symptom: Uneven windrow formation in light crop</b>		
Uneven feeding	Reduce header speed.	Refer to windrower operator's manual
<b>Symptom: Plugging behind end hourglass deflectors</b>		
Ground speed too slow	Increase ground speed.	—
Dirt building up on cutterbar	Remove crop deflectors attached to rear of cutterbar.	3.11.1 Removing Cutterbar Deflectors, page 99
<b>Symptom: Not cutting short enough in down crop</b>		
Ground speed too fast	Reduce ground speed.	—
Broken, bent, or dull blades	Replace blades or turn blades over.	<ul style="list-style-type: none"> <li>Removing Disc Blades, page 139</li> <li>Installing Disc Blades, page 140</li> </ul>
Cutting height too high	Adjust header angle steeper to lower cutting height if field conditions allow.	3.8.1 Cutting Height, page 82

## TROUBLESHOOTING

Problem	Solution	Refer to
<b>Symptom: Material being pulled out by roots when cutting, and tall crop leaning into machine</b>		
Crop in conditioner rolls before crop is cut	Increase roll gap.	<ul style="list-style-type: none"> <li>• <i>Adjusting Roll Gap – Polyurethane Rolls, page 91</i></li> <li>• <i>Adjusting Roll Gap – Steel Rolls, page 92</i></li> </ul>
<b>Symptom: Damaged leaves and broken stems</b>		
Insufficient roll gap	Increase roll gap.	<ul style="list-style-type: none"> <li>• <i>Adjusting Roll Gap – Polyurethane Rolls, page 91</i></li> <li>• <i>Adjusting Roll Gap – Steel Rolls, page 92</i></li> </ul>
Roll timing off	Check roll timing and adjust if necessary.	<ul style="list-style-type: none"> <li>• <i>Checking Roll Timing, page 94</i></li> <li>• <i>Adjusting Roll Timing, page 94</i></li> </ul>
<b>Symptom: Cutting height varies from one side to the other</b>		
Float not properly balanced	Adjust header float.	Refer to windrower operator's manual
<b>Symptom: Slow crop drying</b>		
Crop is bunched in windrow	Adjust forming shields/baffle.	<ul style="list-style-type: none"> <li>• <i>Positioning Forming Shield Side Deflectors – Roll Conditioner, page 96</i></li> <li>• <i>Positioning Rear Baffle – Roll Conditioner, page 97</i></li> </ul>
Rolls not crimping crop sufficiently	Decrease roll gap.	<ul style="list-style-type: none"> <li>• <i>Adjusting Roll Gap – Polyurethane Rolls, page 91</i></li> <li>• <i>Adjusting Roll Gap – Steel Rolls, page 92</i></li> </ul>
<b>Symptom: Excessive drying or bleaching of crop</b>		
Excessive crimping	Increase roll gap.	<ul style="list-style-type: none"> <li>• <i>Adjusting Roll Gap – Polyurethane Rolls, page 91</i></li> <li>• <i>Adjusting Roll Gap – Steel Rolls, page 92</i></li> </ul>
Crop is spread too wide in windrow	Adjust forming shields.	<ul style="list-style-type: none"> <li>• <i>Positioning Forming Shield Side Deflectors – Roll Conditioner, page 96</i></li> <li>• <i>Positioning Rear Baffle – Roll Conditioner, page 97</i></li> </ul>

## TROUBLESHOOTING

Problem	Solution	Refer to
<b>Symptom: Poorly formed or bunchy windrows</b>		
Forming shields not properly positioned	Adjust forming shields.	<ul style="list-style-type: none"> <li>• <i>Positioning Forming Shield Side Deflectors – Roll Conditioner, page 96</i></li> <li>• <i>Positioning Rear Baffle – Roll Conditioner, page 97</i></li> </ul>

## 6.2 Mechanical Problems

Problem	Solution	Refer to
<b>Symptom: Excessive noise</b>		
Bent discblade	Replace blade.	<ul style="list-style-type: none"> <li>• <i>Removing Disc Blades, page 139</i></li> <li>• <i>Installing Disc Blades, page 140</i></li> </ul>
Conditioner roll timing off	Check roll timing and adjust if necessary.	<ul style="list-style-type: none"> <li>• <i>Checking Roll Timing, page 94</i></li> <li>• <i>Adjusting Roll Timing, page 94</i></li> </ul>
Bent drum deflector	Replace drum.	<i>4.5.8 Maintaining Large Drums – R113 or R116 SP, page 163</i>
Conditioner roll gap too small	Check gap and adjust if necessary.	<ul style="list-style-type: none"> <li>• <i>Checking Roll Gap, page 90</i></li> <li>• <i>Adjusting Roll Gap – Polyurethane Rolls, page 91</i></li> <li>• <i>Adjusting Roll Gap – Steel Rolls, page 92</i></li> </ul>
<b>Symptom: Excessive vibration or noise in header</b>		
Mud deposits on conditioner rolls	Clean rolls.	—
Conditioner rolls contacting each other	Increase roll gap.	<ul style="list-style-type: none"> <li>• <i>Adjusting Roll Gap – Polyurethane Rolls, page 91</i></li> <li>• <i>Adjusting Roll Gap – Steel Rolls, page 92</i></li> </ul>
Conditioner rolls contacting each other	Check roll timing.	<i>Checking Roll Timing, page 94</i>
<b>Symptom: Excessive heat in cutterbar</b>		
Incorrect level of lubricant in cutterbar —either too little or too much	Drain lubricant and refill with specified amount.	<i>Draining Cutterbar, page 121</i>
<b>Symptom: Frequent blade damage</b>		
Mud on cutterbar	Remove mud from cutterbar. Do <b>NOT</b> allow mud to dry on cutterbar.	—
Spindle bearing failure	Replace spindle bearing.	<ul style="list-style-type: none"> <li>• <i>Removing Cutterbar Spindles, page 129</i></li> <li>• <i>Installing Cutterbar Spindles, page 131</i></li> </ul>
Header float set too heavy	Increase float.	Refer to windrower operator’s manual
Material wrapped around spindle	Remove disc and remove material.	<ul style="list-style-type: none"> <li>• <i>Removing Disc Blades, page 139</i></li> <li>• <i>Installing Disc Blades, page 140</i></li> </ul>
Cutting too low in rocky field conditions	Decrease header angle, increase float.	<ul style="list-style-type: none"> <li>• <i>3.8.1 Cutting Height, page 82</i></li> <li>• Refer to windrower operator’s manual</li> </ul>

## TROUBLESHOOTING

Problem	Solution	Refer to
Ground speed too high in rocky field conditions. At high ground speed, header tends to dig rocks from ground instead of floating over them	Reduce ground speed.	—
Discblades incorrectly mounted	Check all blade mounting hardware and ensure blades are free to move.	<i>Inspecting Disc Blades, page 135</i>
<b>Symptom: Excessive wear of cutting components</b>		
Header angle too steep	Reduce header angle.	<i>3.8.1 Cutting Height, page 82</i>
Crop residue and dirt deposits on cutterbar	Clean cutterbar.	—
Mud on cutterbar	Remove mud from cutterbar. Do <b>NOT</b> allow mud to dry on cutterbar.	—
<b>Symptom: Machine pulling to one side</b>		
Header dragging on one end and pulling to that side	Adjust header float on both ends.	Refer to windrower operator's manual
<b>Symptom: Breakage of conditioner roll timing belt</b>		
Belt not in proper groove in pulley	Move belt to proper groove.	<i>4.10.2 Conditioner Drive Belt, page 202</i>
Foreign object between rolls	Disengage header and stop the engine. When all moving parts are completely stopped, remove foreign object.	<i>Inspecting Conditioner Drive Belt, page 202</i>
Belt pulleys and idlers misaligned	Align pulleys and idler.	See MacDon Dealer
<b>Symptom: Conditioner roll does not rotate</b>		
Faulty drive belt	Check drive belt pulleys.	<i>Inspecting Conditioner Drive Belt, page 202</i>
<b>Symptom: Disc does not turn when engaging header</b>		
Hoses not connected	Connect hoses.	<i>3.4 Attaching Rotary Disc Header to Windrower, page 27</i>
Poor electrical connection at pump solenoid	Check connection at windrower.	Refer to windrower operator's manual
Faulty header drive 90° gearbox	Check gearbox.	<ul style="list-style-type: none"> <li>• <i>4.7 Servicing Header Drive Gearbox, page 189</i></li> <li>• <i>4.7.1 Changing Header Drive Gearbox Oil, page 189</i></li> </ul>
<b>Symptom: Header slows when going uphill</b>		
Hydraulic oil level in windrower is low	Add oil to windrower reservoir.	Refer to windrower operator's manual
<b>Symptom: Header runs while unloaded, but slows or stops when starting to cut</b>		
Defective hydraulic motor	Repair/replace hydraulic motor.	See MacDon Dealer
Defective hydraulic pump in windrower	Repair/replace pump.	See MacDon Dealer

## TROUBLESHOOTING

Problem	Solution	Refer to
Defective relief valve in windrower	Repair/replace relief valve.	See MacDon Dealer
Cold oil in hydraulic drive system	Reduce ground speed until oil reaches operating temperature.	—





# Chapter 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 Metric Bolt Specifications

Table 7.1 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

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

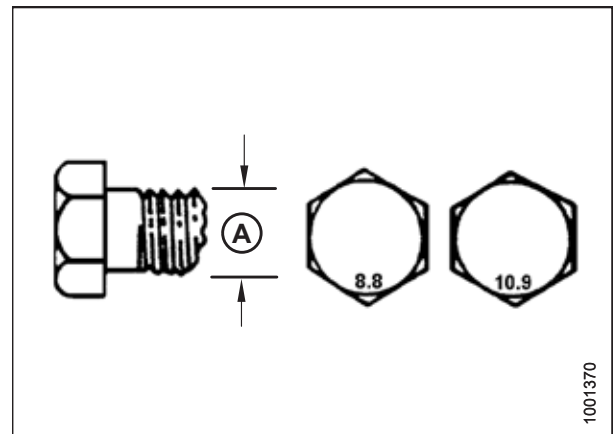


Figure 7.1: Bolt Grades

1001370

REFERENCE

Table 7.2 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

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

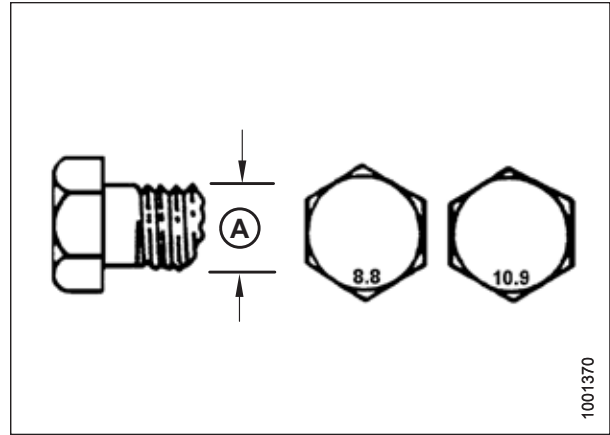


Figure 7.2: Bolt Grades

Table 7.3 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

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

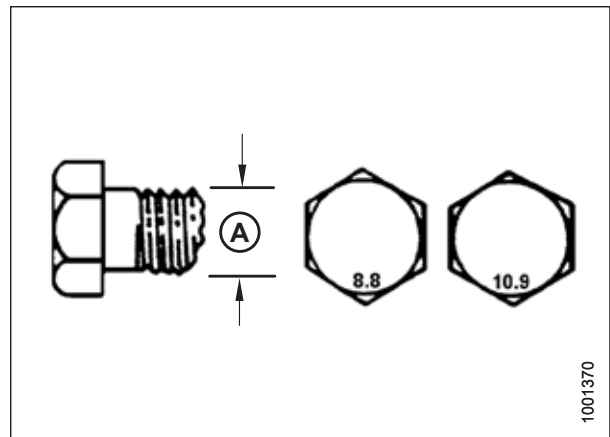


Figure 7.3: Bolt Grades

REFERENCE

Table 7.4 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

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

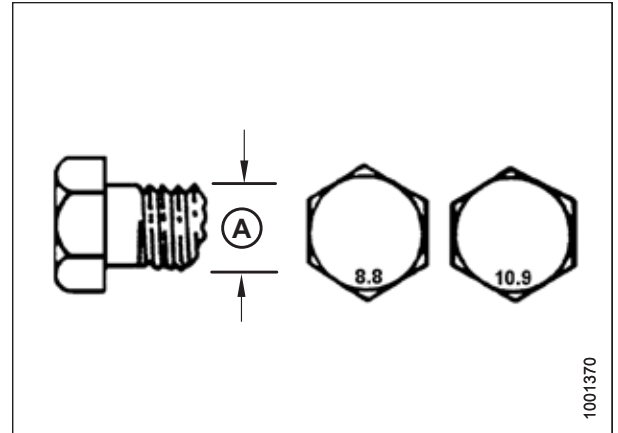


Figure 7.4: Bolt Grades

### 7.1.2 Metric Bolt Specifications Bolting into Cast Aluminum

Table 7.5 Metric Bolt Bolting into Cast Aluminum

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

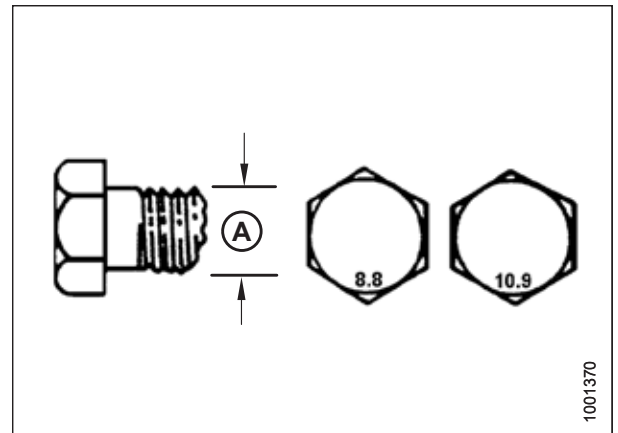


Figure 7.5: Bolt Grades

### 7.1.3 O-Ring Boss Hydraulic Fittings – Adjustable

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).

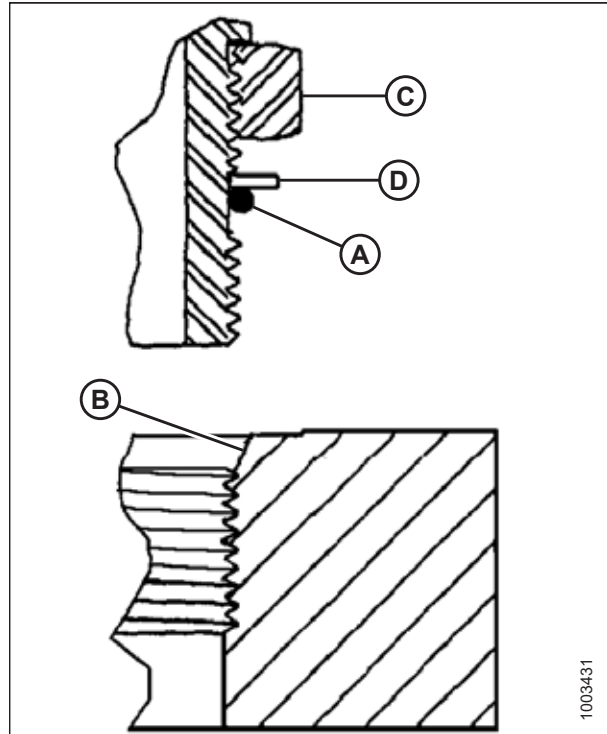


Figure 7.6: Hydraulic Fitting

5. Install fitting (B) into port until backup 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.

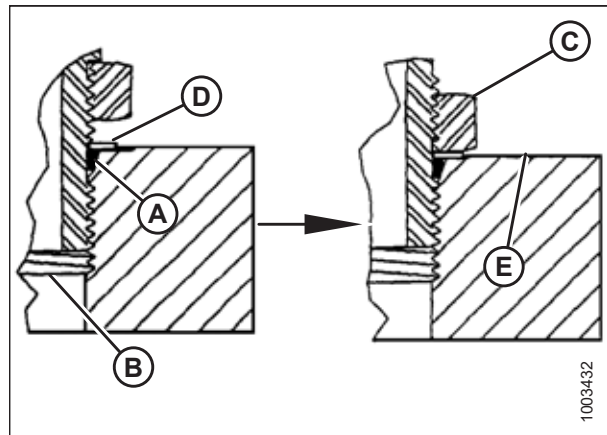


Figure 7.7: Hydraulic Fitting

REFERENCE

**Table 7.6 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable**

SAE Dash Size	Thread Size (in.)	Torque Value <sup>7</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

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

REFERENCE

**7.1.4 O-Ring Boss 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 7.7, page 242.
6. Check final condition of fitting.

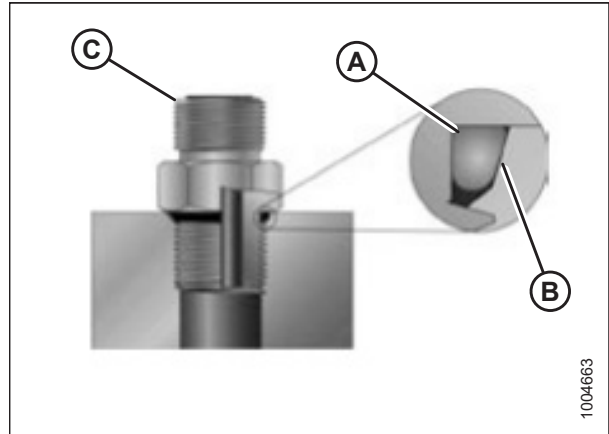


Figure 7.8: Hydraulic Fitting

Table 7.7 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value <sup>8</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

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

REFERENCE

### 7.1.5 O-Ring Face Seal Hydraulic Fittings

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



Figure 7.9: 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 7.8, page 243.

**NOTE:**

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

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

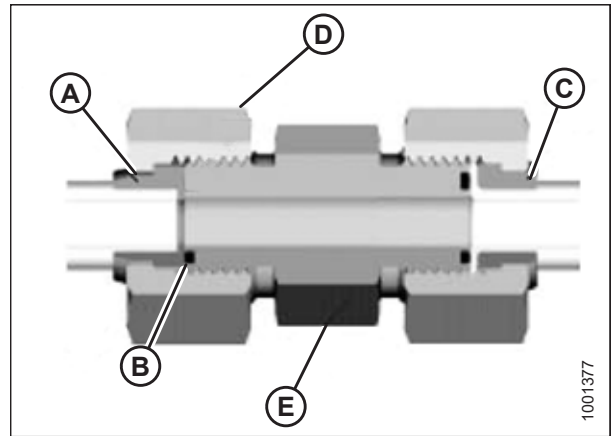


Figure 7.10: Hydraulic Fitting

**Table 7.8 O-Ring Face Seal (ORFS) Hydraulic Fittings**

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>9</sup>	
			Nm	lbf-ft
-3	Note <sup>10</sup>	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note <sup>10</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
-14	Note <sup>10</sup>	7/8	–	–

9. Torque values and angles shown are based on lubricated connection as in reassembly.

10. O-ring face seal type end not defined for this tube size.

**REFERENCE**

**Table 7.8 O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)**

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>11</sup>	
			Nm	lbf-ft
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167
-24	1–2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

### 7.1.6 Tapered Pipe Thread Fittings

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks, 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 (TFFT) and flats from finger tight (FFFT) values are shown in Table 7.9, page 244. 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 7.9 Hydraulic Fitting Pipe Thread**

Tapered Pipe Thread Size	Recommended TFFT	Recommended FFFT
1/8–27	2–3	12–18
1/4–18	2–3	12–18
3/8–18	2–3	12–18
1/2–14	2–3	12–18
3/4–14	1.5–2.5	12–18
1–11 1/2	1.5–2.5	9–15
1 1/4–11 1/2	1.5–2.5	9–15
1 1/2–11 1/2	1.5–2.5	9–15
2–11 1/2	1.5–2.5	9–15

11. Torque values and angles shown are based on lubricated connection as in reassembly.



## 7.2 Conversion Chart

Table 7.10 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.



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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 .11 Recommended Lubricants**

Specification	Description	Use	Capacities
<b>Lubricant: 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	—
SAE Multipurpose	High temperature extreme pressure (EP) performance with 10% max. Molybdenum Disulphide (NLGI Grade 2) lithium base	Driveline slip-joints	—
<b>Lubricant: Gear Lubricant</b>			
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R113 Cutterbar	8 L (8.5 qts [US])
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R116 Cutterbar	10 L (10.5 qts [US])
SAE 85W-140	Fully synthetic oil API GL-5 minimum, SAE J2360 preferred	Conditioner roll timing gearbox	0.7 L (0.75 qts [US])
SAE 80W-140	Fully synthetic oil API GL-5 minimum, SAE J2360 preferred	Header drive 90° gearbox	1.65 L (1.74 qts [US])

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