MacDon

R1 Series
Rotary Disc Pull-Type

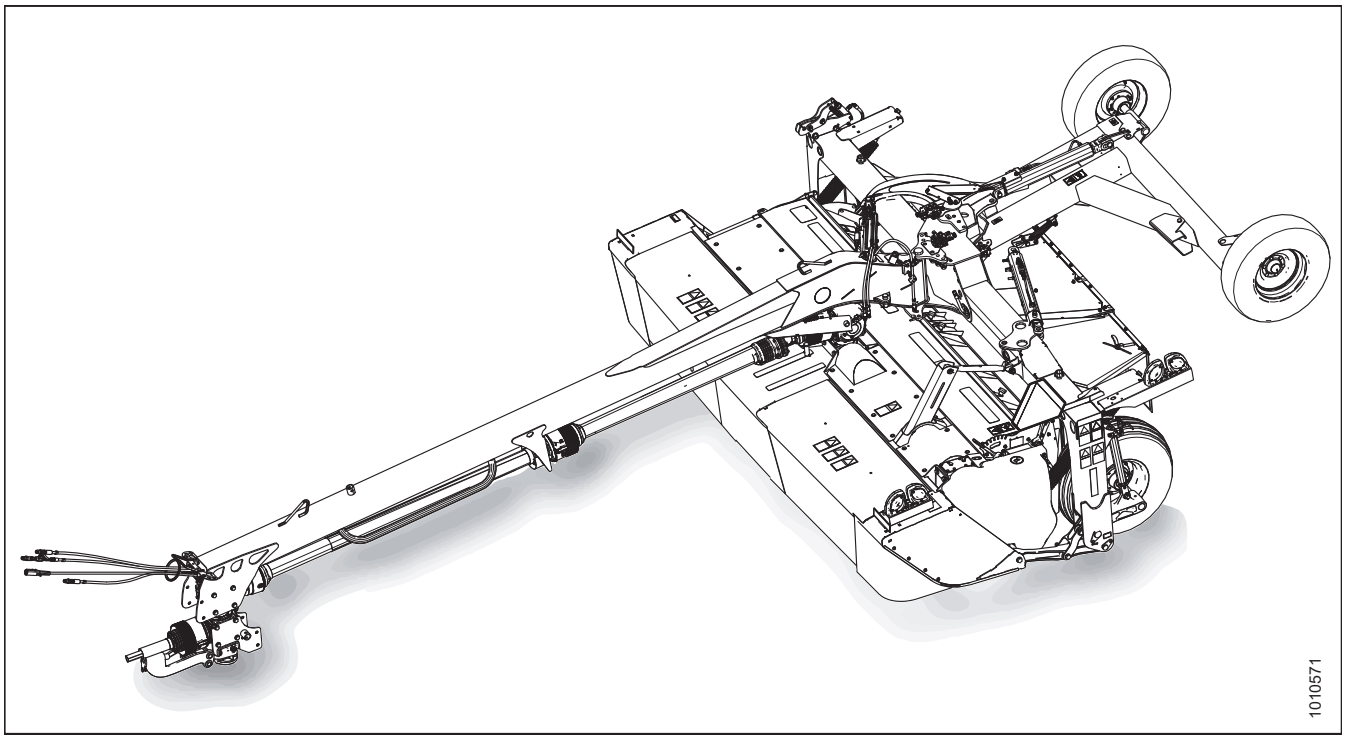
Operator's Manual

215333 Revision A

Original Instruction

The Harvesting Specialists.

R1 Series Rotary Disc Pull-Type



Published: May 2020

Declaration of Conformity

EC Declaration of Conformity

[1] MacDon

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

[2] Rotary Disc Pull-Type

[3] MacDon R113/R116

[4] As per Shipping Document

[5] May 6, 2020

[6] _____
Christoph Martens
Product Integrity

EN

We, [1]

Declare, that the product:

Machine Type: [2]

Name & Model: [3]

Serial Number(s): [4]

fulfils all the relevant provisions of the Directive 2006/42/EC.

Harmonized standards used, as referred to in Article 7(2):

EN ISO 4254-1:2013
EN ISO 4254-7:2009

Place and date of declaration: [5]

Identity and signature of the person empowered to draw up the declaration: [6]

Name and address of the person authorized to compile the technical file:

Benedikt von Riedesel
General Manager, MacDon Europe GmbH
Hagenauer Straße 59
65203 Wiesbaden (Germany)
bvonriedesel@macdon.com

BG

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

CZ

My, [1]

Prohlašujeme, 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

DA

Vi, [1]

erklærer, at prduktet:

Maskintype [2]

Navn og model: [3]

Serienummer (-numre): [4]

Opfylder alle bestemmelser i direktiv 2006/42/EF.

Anvendte harmoniserede standarder, som henvist til i paragraf 7(2):

EN ISO 4254-1:2013
EN ISO 4254-7:2009

Sted og dato for erklæringen: [5]

Identitet på og underskrift fra den person, som er bemyndiget til at udarbejde erklæringen: [6]

Navn og adresse på den person, som er bemyndiget til at udarbejde den tekniske fil:

Benedikt von Riedesel
Direktør, MacDon Europe GmbH
Hagenauer Straße 59
D-65203 Wiesbaden (Tyskland)
bvonriedesel@macdon.com

DE

Wir, [1]

Erklären hiermit, dass das Produkt:

Maschinentyp: [2]

Name & Modell: [3]

Seriennummer (n): [4]

alle relevanten Vorschriften der Richtlinie 2006/42/EG erfüllt.

Harmonisierte Standards wurden, wie in folgenden Artikeln angegeben, verwendet 7(2):

EN ISO 4254-1:2013
EN ISO 4254-7:2009

Ort und Datum der Erklärung: [5]

Name und Unterschrift der Person, die dazu befugt ist, die Erklärung auszustellen: [6]

Name und Anschrift der Person, die dazu berechtigt ist, die technischen Unterlagen zu erstellen:

Benedikt von Riedesel
General Manager, MacDon Europe GmbH
Hagenauer Straße 59
65203 Wiesbaden
bvonriedesel@macdon.com

ES

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

ET

Meie, [1]

deklareerime, et toode

Seadme tüüp: [2]

Nimi ja mudel: [3]

Seerianumbrid: [4]

vastab kõigile direktiivi 2006/42/EÜ asjakohastele sätetele.

Kasutatud on järgnevaid harmoniseeritud standardeid, millele on viidatud ka punktis 7(2):

EN ISO 4254-1:2013
EN ISO 4254-7:2009

Deklaratsiooni koht ja kuupäev: [5]

Deklaratsiooni koostamiseks volitatud isiku nimi ja allkiri: [6]

Tehnilise dokumendi koostamiseks volitatud isiku nimi ja aadress:

Benedikt von Riedesel
Peadirektor, MacDon Europe GmbH
Hagenauer Straße 59
65203 Wiesbaden (Saksamaa)
bvonriedesel@macdon.com

FR

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

EC Declaration of Conformity

IT

Noi, [1]

Dichiariamo che il prodotto:

Tipo di macchina: [2]

Nome e modello: [3]

Numero(i) di serie: [4]

soddisfa tutte le disposizioni rilevanti della direttiva 2006/42/CE.

Utilizzo degli standard armonizzati, come indicato nell'Articolo 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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

HU

Mi, [1]

Ezennel kijelentjük, hogy a következő termék:

Gép típusa: [2]

Név és modell: [3]

Szériaszám(ok): [4]

teljesíti a következő irányelv összes vonatkozó előírásait: 2006/42/EK.

Az alábbi harmonizált szabványok kerültek alkalmazásra a 7(2) cikkely szerint:

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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

LT

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.

Naudojami harmonizuoti standartai, kai nurodoma straipsnyje 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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

LV

Mēs, [1]

Deklarējam, ka produkts:

Mašīnas tips: [2]

Nosaukums un modelis: [3]

Sērijas numurs(-i): [4]

Atbilst visām būtiskajām Direktīvas 2006/42/EK prasībām.

Piemēroti šādi saskaņotie standarti , kā minēts 7. panta 2. punktā:

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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 Rīdīzels
Ģenerāldirektors, MacDon Europe GmbH
Hagenauer Straße 59
65203 Wiesbaden (Vācija)
bvonriedesel@macdon.com

NL

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.

Geharmoniseerde normen toegepast, zoals vermeld in Artikel 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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

PO

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.

Zastosowaliśmy następujące (zharmonizowane) normy zgodnie z artykułem 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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

PT

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.

Normas harmonizadas aplicadas, conforme referido no Artigo 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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

RO

Noi, [1]

Declarăm, că următorul produs:

Tipul mașinii: [2]

Denumirea și modelul: [3]

Număr (numere) serie: [4]

corespunde tuturor dispozițiilor esențiale ale directivei 2006/42/EC.

Au fost aplicate următoarele standarde armonizate conform articolului 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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

SR

Mi, [1]

Izjavljujemo da proizvod

Tip mašine: [2]

Naziv i model: [3]

Serijski broj(evi): [4]

Ispunjava sve relevantne odredbe direktive 2006/42/EC.

Korišæeni su usklađeni standardi kao što je navedeno u èlanu 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

Datum i mesto izdavanja deklaracije: [5]

Identitet i potpis lica ovlašæenog za sastavljanje deklaracije: [6]

Ime i adresa osobe ovlašæene za sastavljanje tehniène datoteke:

Benedikt von Riedesel
Generalni direktor, MacDon Europe GmbH
Hagenauer Straße 59
65203 Wiesbaden (Nemačka)
bvonriedesel@macdon.com

SV

Vi, [1]

Intygar att produkten:

Maskintyp: [2]

Namn och modell: [3]

Serienummer: [4]

uppfyller alla relevanta villkor i direktivet 2006/42/EG.

Harmonierade standarder används, såsom anges i artikel 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

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

SL

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.

Uporabljeni usklajeni standardi, kot je navedeno v členu 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

Kraj in datum izjave: [5]

Istovetnost in podpis osebe, opolnomočene za pripravo izjave: [6]

Ime in naslov osebe, pooblaščene za pripravo tehnične datoteke:

Benedikt von Riedesel
Generalni direktor, MacDon Europe GmbH
Hagenauer Straße 59
65203 Wiesbaden (Nemčija)
bvonriedesel@macdon.com

SK

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.

Použité harmonizované normy, ktoré sa uvádzajú v Článku č. 7(2):

EN ISO 4254-1:2013

EN ISO 4254-7:2009

Miesto a dátum prehlásenia: [5]

Meno a podpis osoby oprávnenej vypracovať toto prehlásenie: [6]

Meno a adresa osoby oprávnenej zostaviť technický súbor:

Benedikt von Riedesel
Generálny riaditeľ MacDon Europe GmbH
Hagenauer Straße 59
65203 Wiesbaden (Nemecko)
bvonriedesel@macdon.com

Introduction

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

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

Use this manual as your first source of information about the machine. If you follow the instructions provided in this manual, and use MacDon parts, the rotary disc pull-type 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

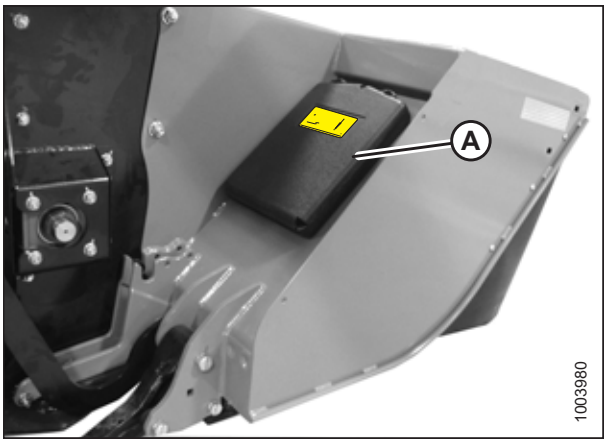
The following conventions are used in this document:

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

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

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

This document is currently available in English and French.



Manual Storage Case

Summary of Changes

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

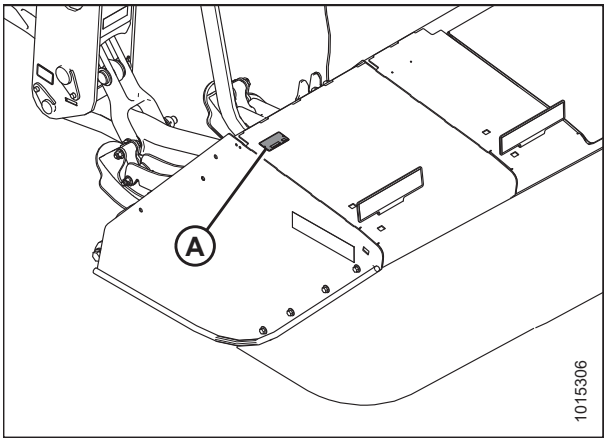
Section	Summary of Change	Internal Use Only
Throughout	Name "Rotary Disc Pull-Type" was "Pull-Type".	Marketing
Throughout	Profiled out technical manual content.	Pubs
Removing Cutterbar Deflectors, page 93	Revised illustrations for new cutterbar deflectors.	ECN 59346
4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox, page 267	Added important note that gearboxes are NOT interchangeable.	Product Support
5.2.3 Finger Conditioner, page 302	Added description of finger conditioner.	Product Support

Serial Numbers

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

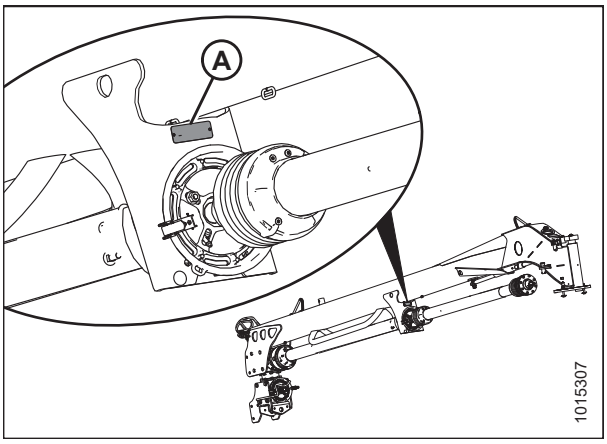
Rotary disc pull-type serial number (A): _____

Model year: _____



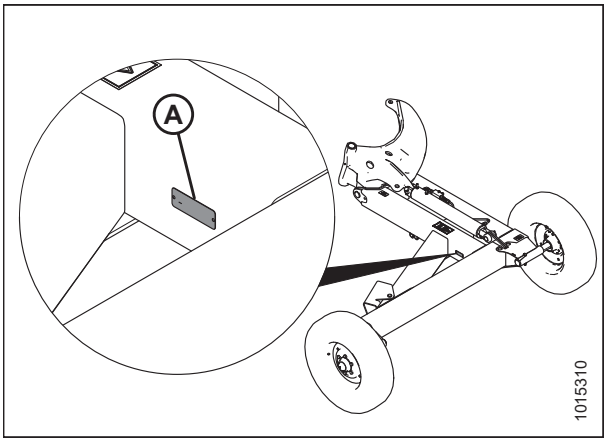
Rotary Disc Pull-Type Serial Number Location (A)

Hitch serial number (A): _____



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

Optional transport system serial number (A): _____



Optional Transport Serial Number Location (A)

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

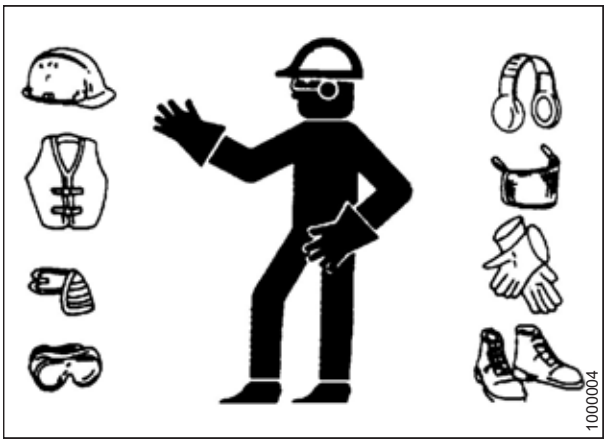


Figure 1.2: Safety Equipment

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.

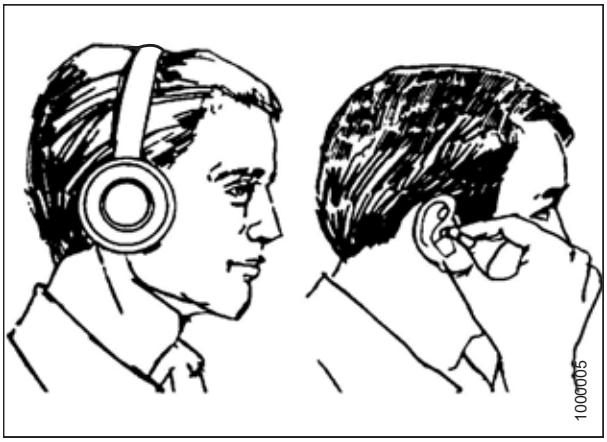


Figure 1.3: Safety Equipment

- 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.

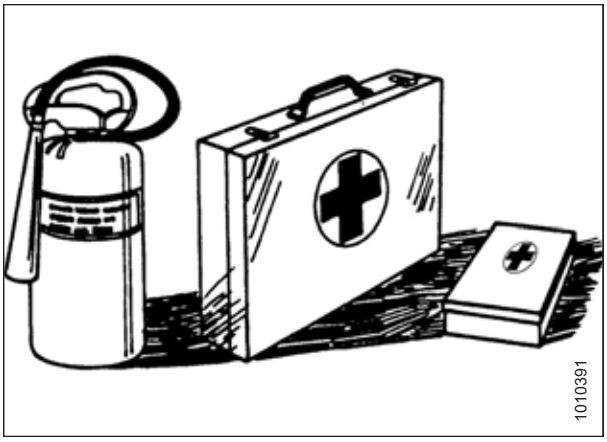


Figure 1.4: Safety Equipment

- 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.

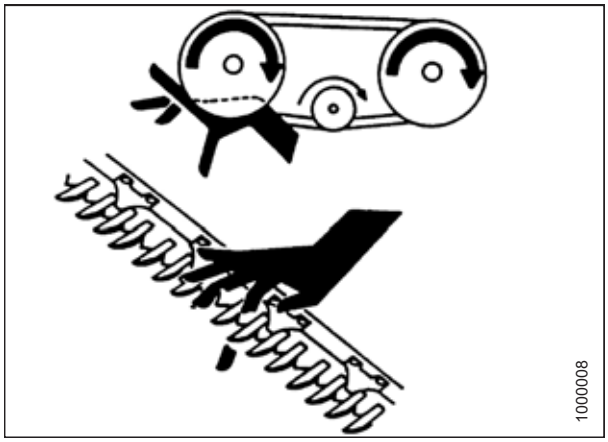


Figure 1.6: Safety around Equipment

- 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

Figure 1.8: Safety around Equipment

- 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.

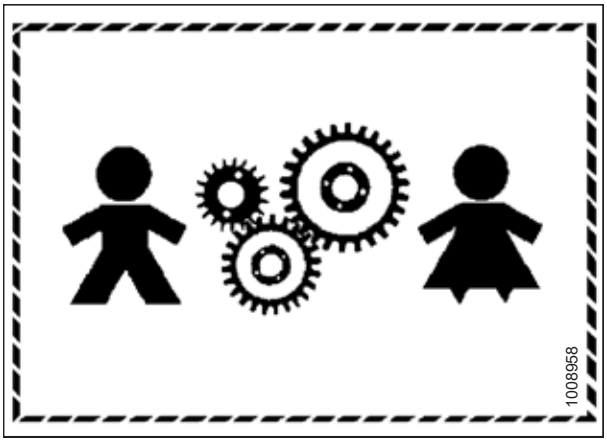


Figure 1.9: Equipment NOT Safe for Children

- Wear protective gear when working on the machine.
- Wear heavy gloves when working on knife components.

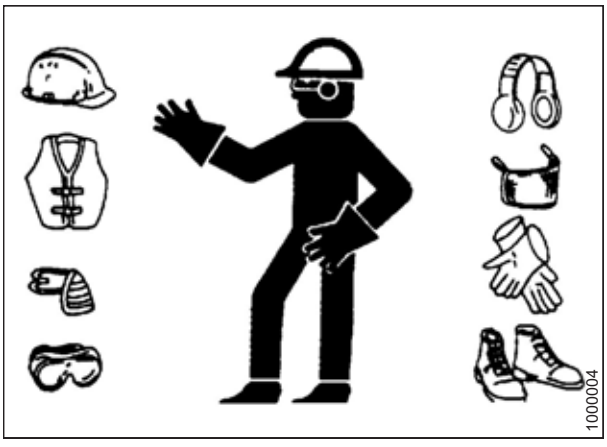


Figure 1.10: Safety Equipment

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.

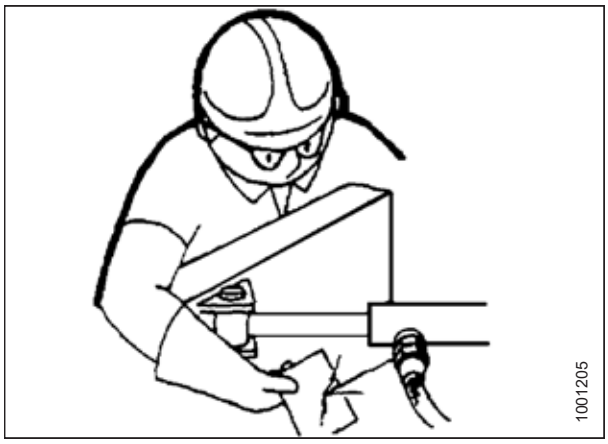


Figure 1.11: Testing for Hydraulic Leaks

- 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.

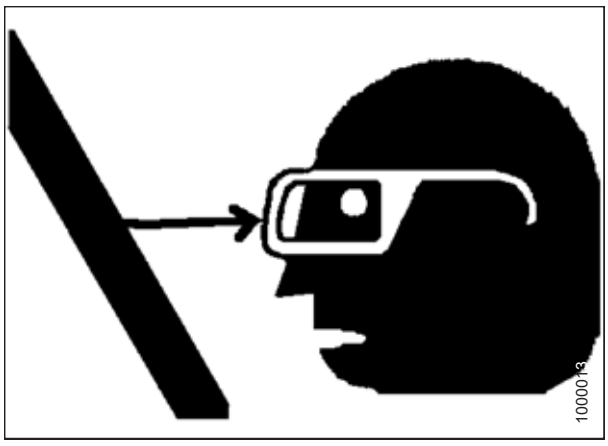


Figure 1.13: Safety around Equipment

1.6 Tire Safety

Service tires safely.

WARNING

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

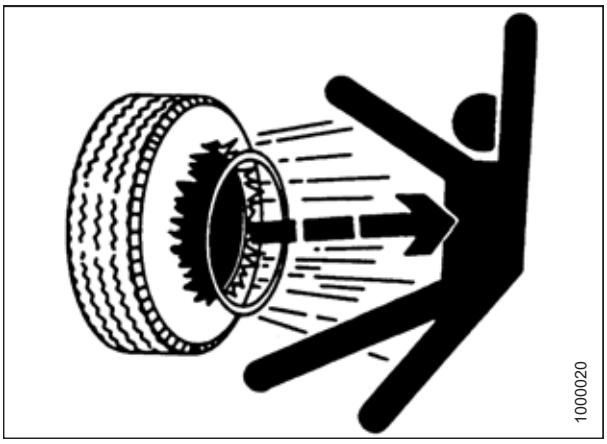


Figure 1.14: Overinflated Tire

WARNING

- **Do NOT remove, install, or repair a tire on a rim unless you have proper equipment and experience to perform job. Take the tire and rim to a qualified tire repair shop.**
- **Make sure the tire is correctly seated before inflating to operating pressure. If the tire is not correctly positioned on the rim or is overinflated, the tire bead can loosen on one side causing air to escape at high speed and with great force. An air leak of this nature can thrust the tire in any direction, endangering anyone in area.**
- **Do NOT stand over tire when inflating. Use a clip-on chuck and extension hose.**
- **Do NOT exceed maximum inflation pressure indicated on tire label.**

Figure 1.15: Safely Inflating Tire

- **Never use force on an inflated or partially inflated tire.**
- **Make sure all air is removed from the tire before removing the tire from the rim.**
- **Never weld a wheel rim.**
- **Replace tires that have defects and replace wheel rims that are cracked, worn, or severely rusted.**

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.

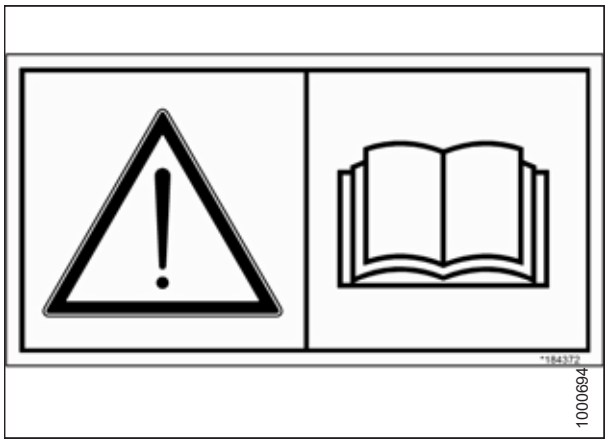


Figure 1.16: Operator's Manual Decal

1.7.1 Installing Safety Decals

1. Clean and dry the installation area.
2. Decide exactly where you are going to place the decal.
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 Safety Sign Decal Locations

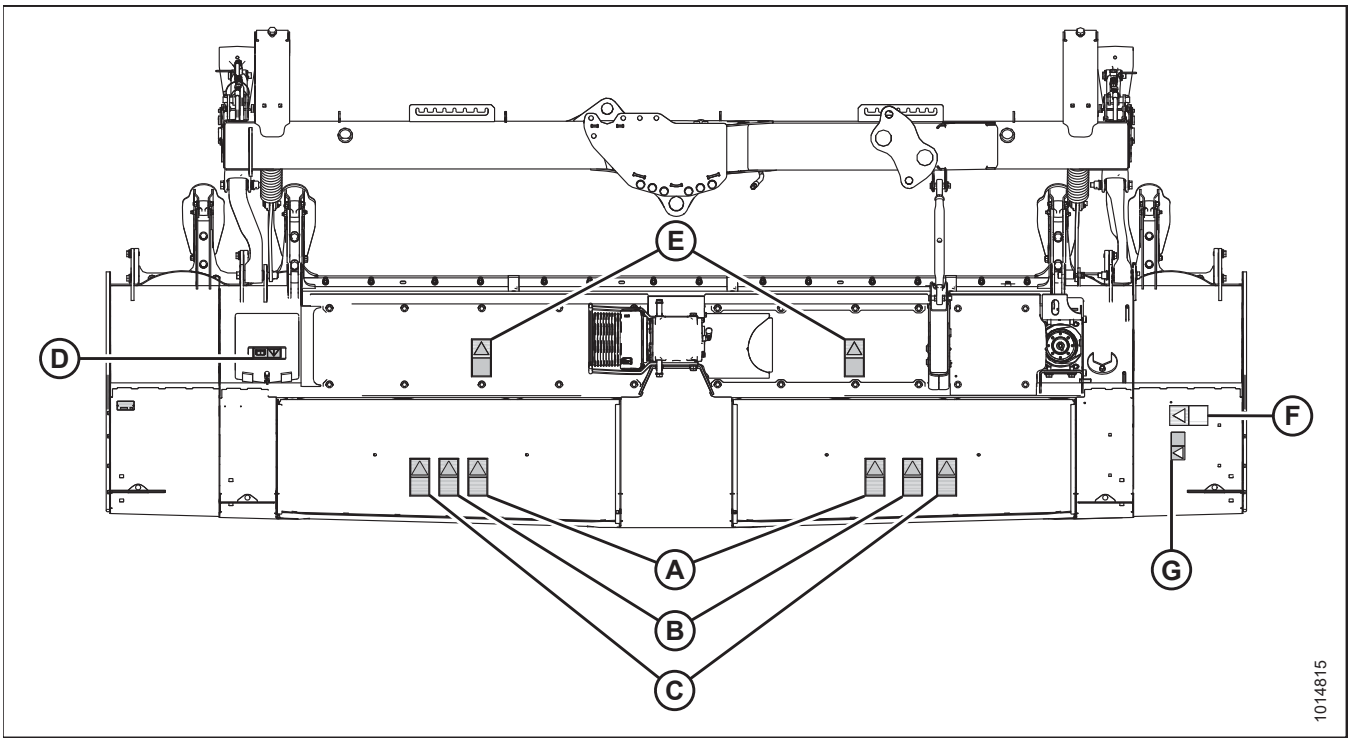


Figure 1.17: Safety Sign Decal Locations – Top View

A - MD #194466
B - MD #247167
C - MD #194465
D - MD #184372
E - MD #190546
F - MD #113482
G - MD #166466

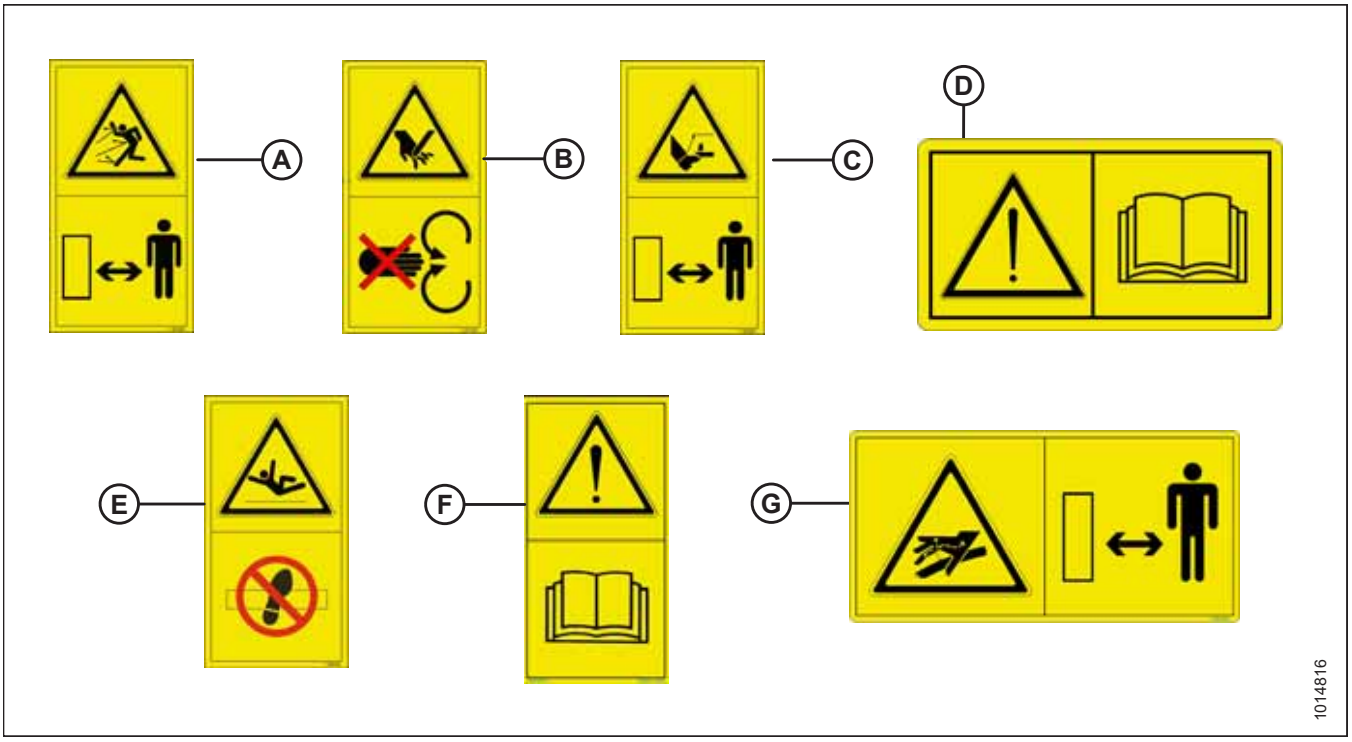


Figure 1.18: Safety Sign Decals

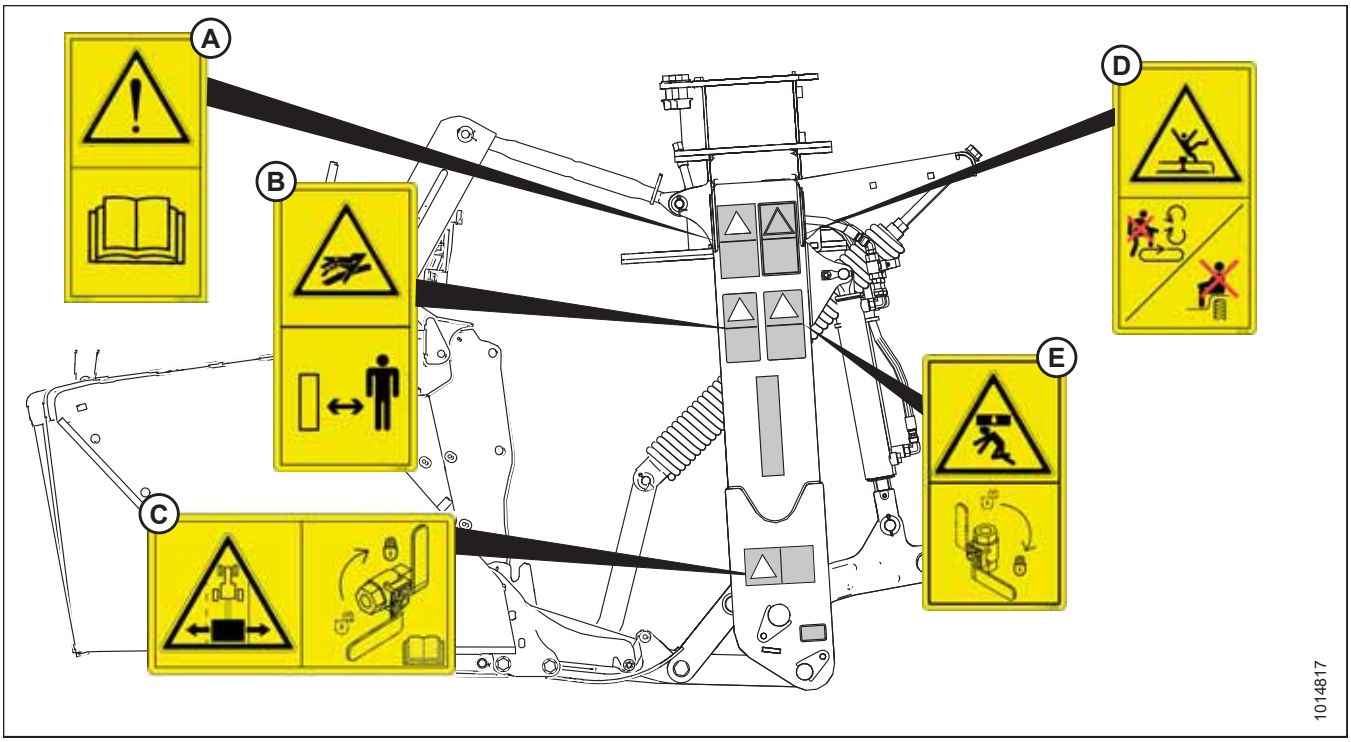


Figure 1.19: Safety Sign Decal Locations – Left Side

A - MD #113482 **B - MD #174436** **C - MD #259058**
D - MD #247166 **E - MD #171287**

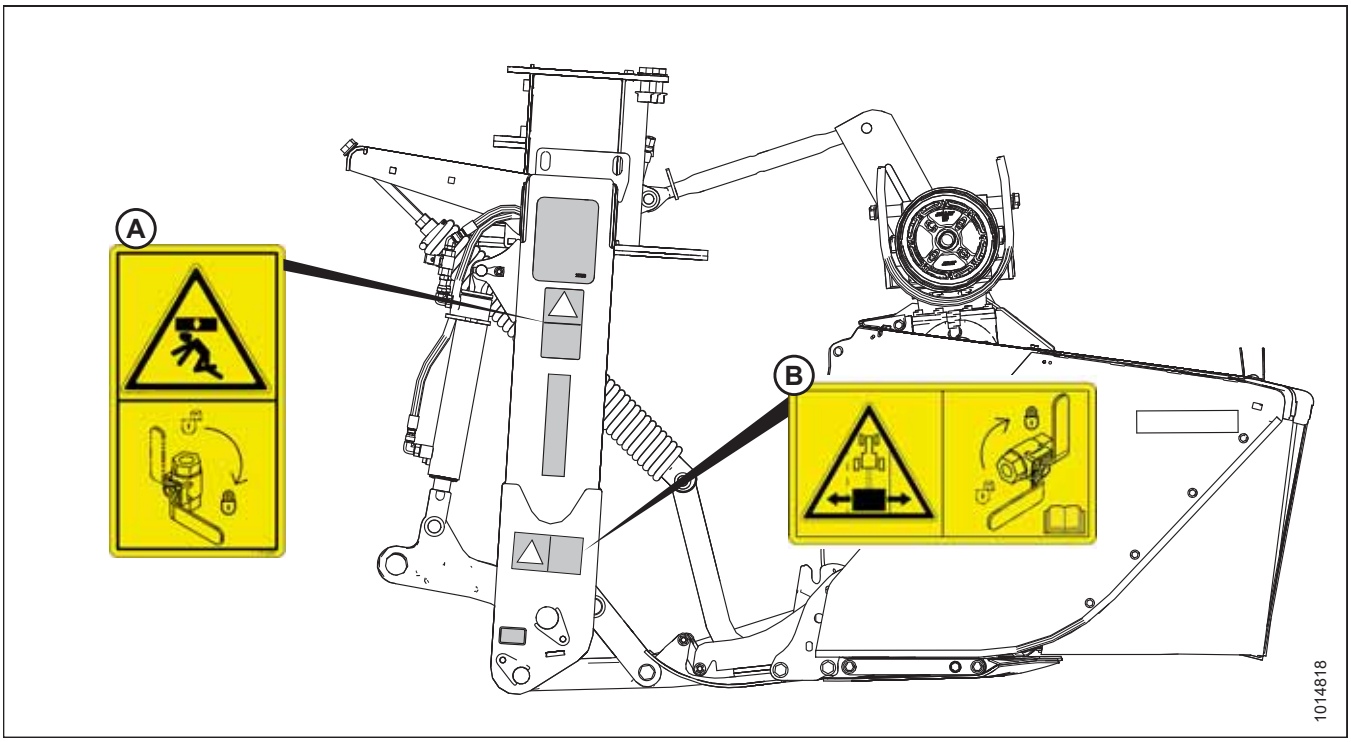


Figure 1.20: Safety Sign Decal Locations – Right Side

A - MD #171287 **B - MD #259058**

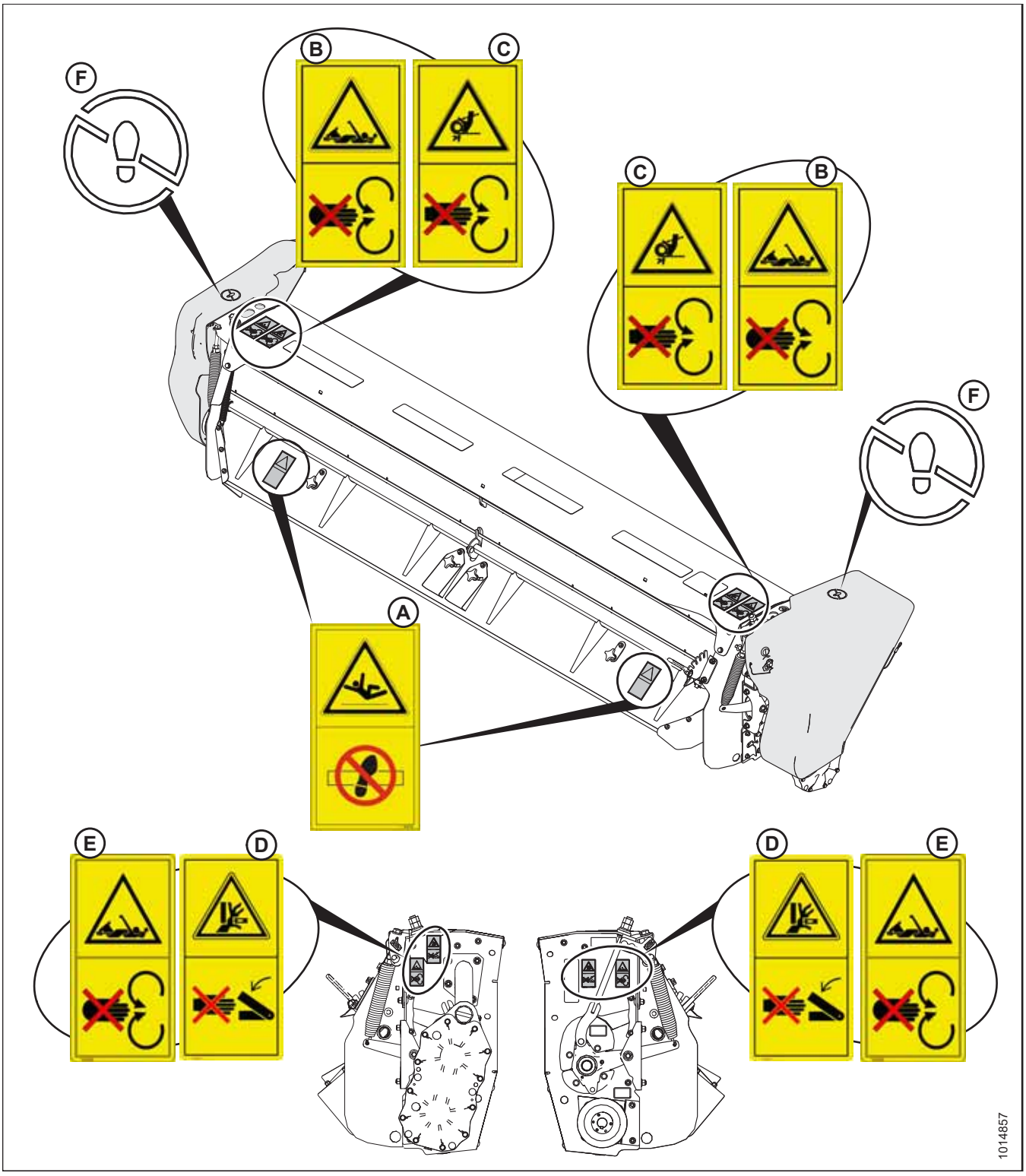


Figure 1.21: Safety Sign Decal Locations – Roll Conditioner

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

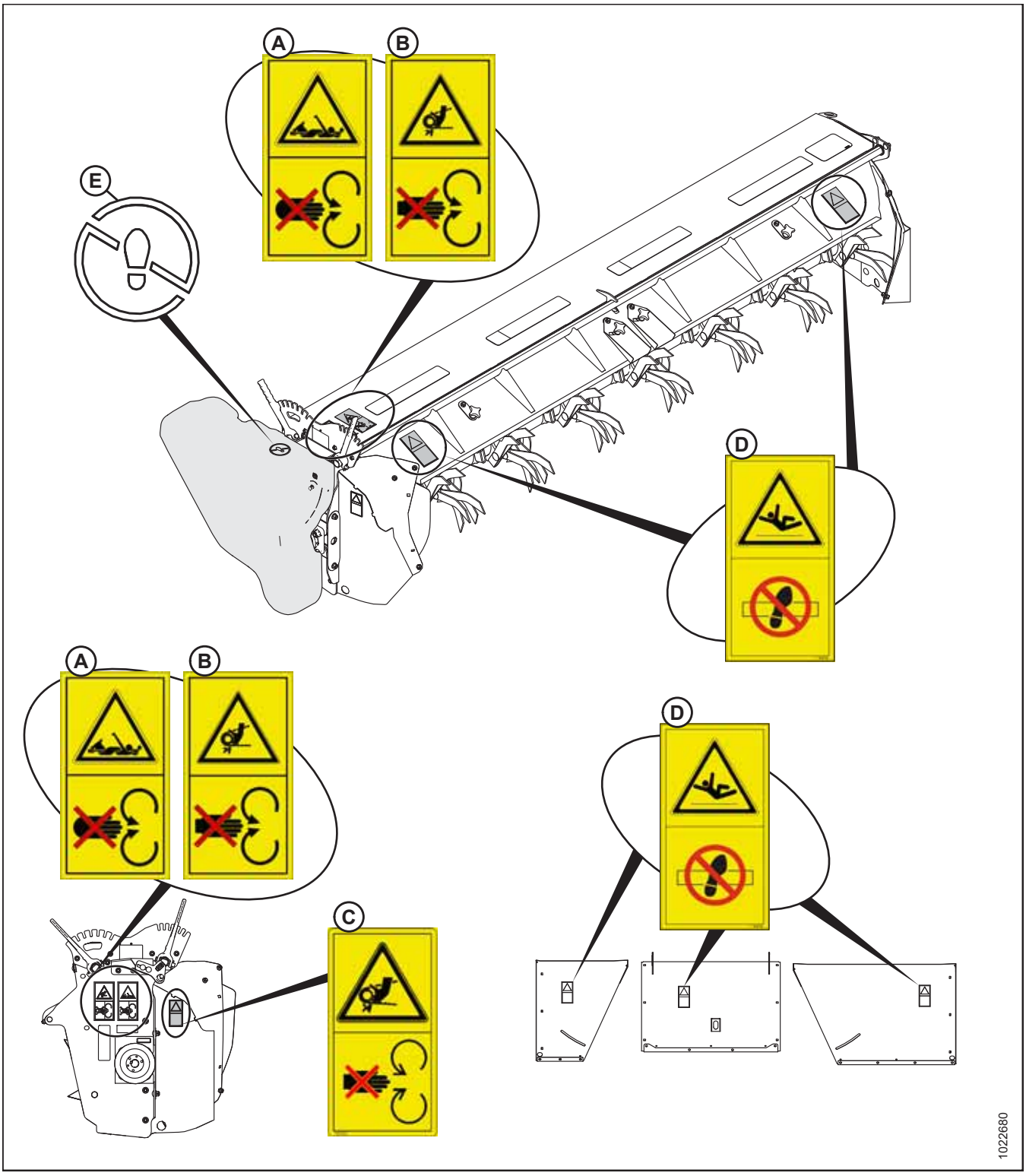


Figure 1.22: Safety Sign Decal Locations – Finger Conditioner

A - MD #184385
B - MD #184371
C - MD #184422
D - MD #190546
E - NO STEP Symbol (Imprinted on Shield)

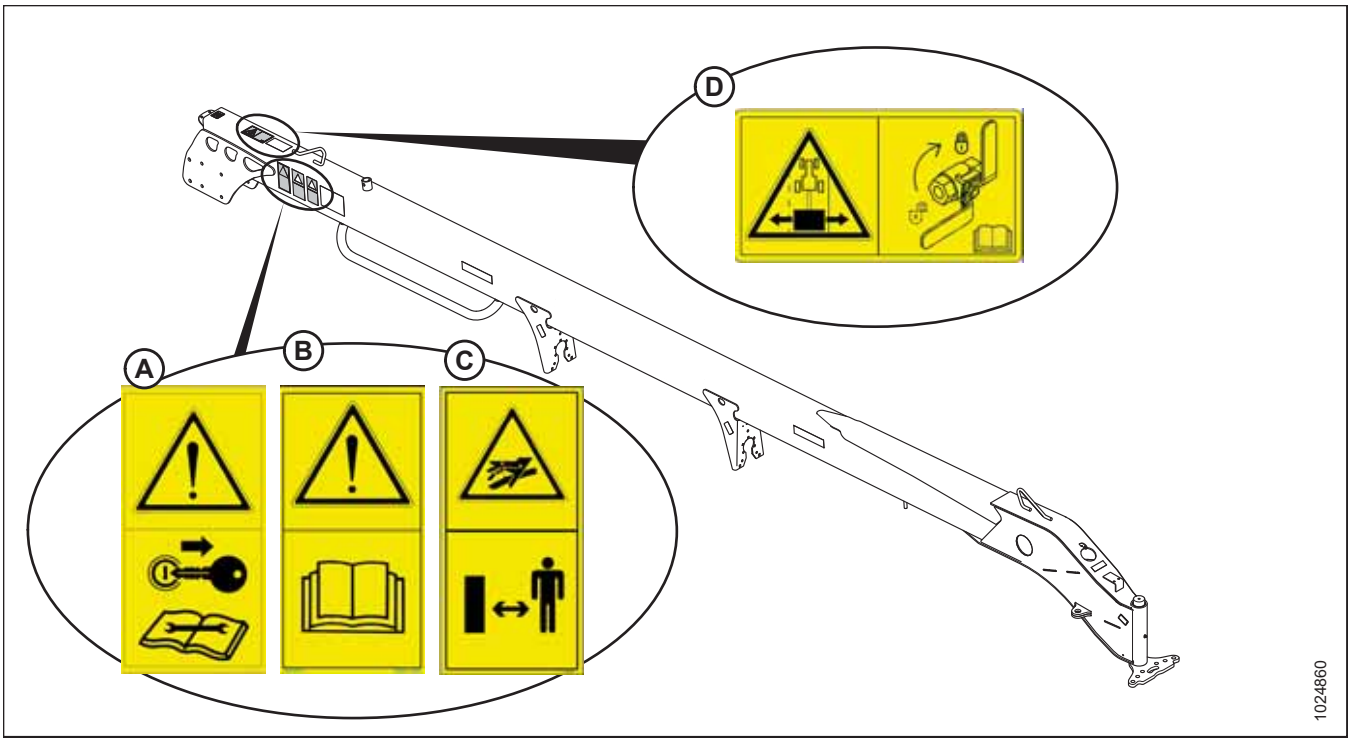


Figure 1.23: Safety Sign Decal Locations – Hitch, R116 PT Shown, R113 PT Similar

A - MD #194464 **B - MD #113482** **C - MD #174436**
D - MD #259058

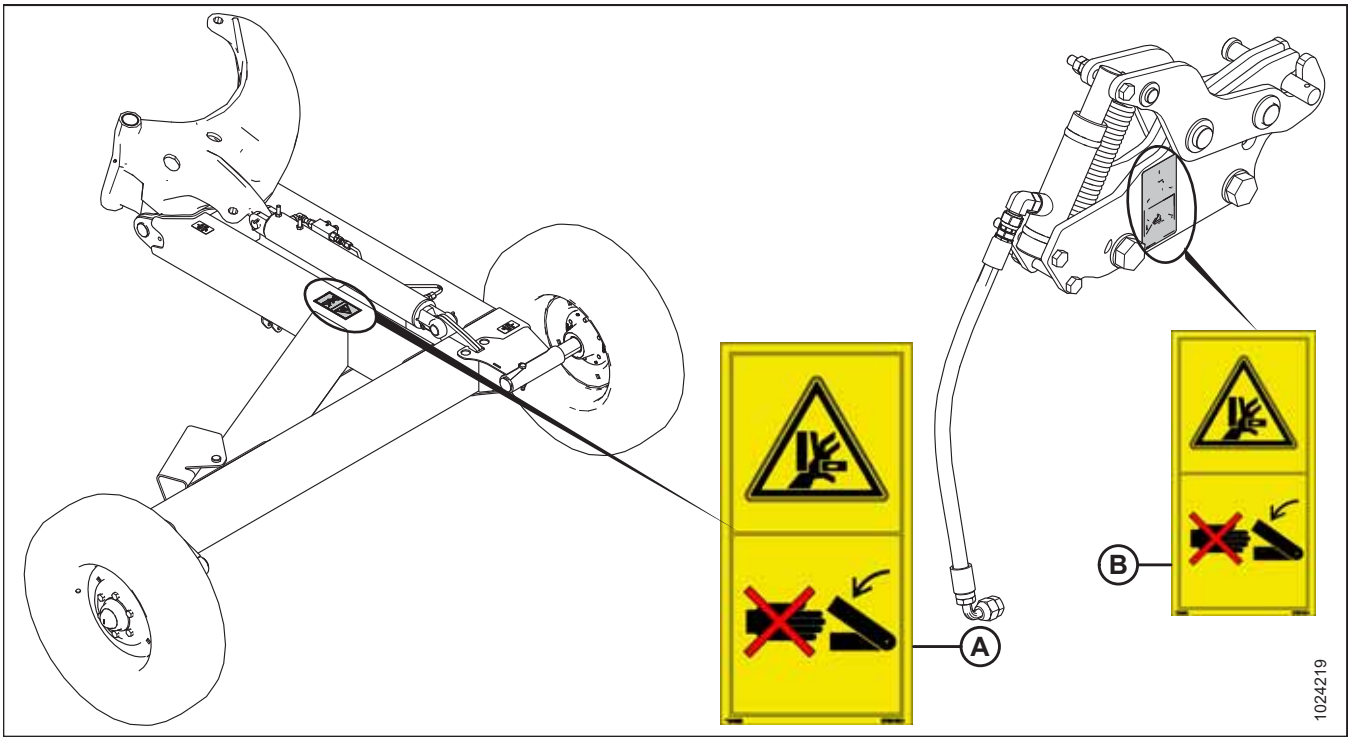


Figure 1.24: Safety Sign Decal Locations – Transport

A - MD #184386 **B - MD #246959**

1.9 Understanding Safety Signs

MD #113482

General hazard pertaining to machine operation and servicing

DANGER

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

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

Figure 1.25: MD #113482

MD #166466

High-pressure oil hazard

WARNING

To prevent serious injury, gangrene, or death:

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

Figure 1.26: MD #166466

MD #171287

Rotary disc pull-type crushing hazard

DANGER

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

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

Figure 1.27: MD #171287

MD #174436

High-pressure oil hazard

WARNING

To prevent serious injury, gangrene, or death:

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

Figure 1.28: MD #174436

MD #184371

Hand entanglement hazard

WARNING

To prevent injury:

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

Figure 1.29: MD #184371

MD #184372

General hazard pertaining to machine operation and servicing

DANGER

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

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

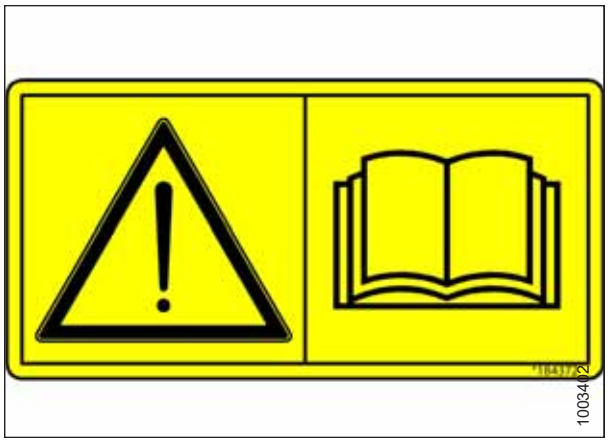


Figure 1.30: MD #184372

MD #184385

Auger entanglement hazard

DANGER

To prevent injury:

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

Figure 1.31: MD #184385

MD #184386

Pinch point hazard

CAUTION

To prevent injury:

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

Figure 1.32: MD #184386

MD #184422

Hand and arm entanglement hazard

WARNING

To prevent injury:

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

Figure 1.33: MD #184422

MD #190546

Slipping hazard

WARNING

To prevent injury:

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

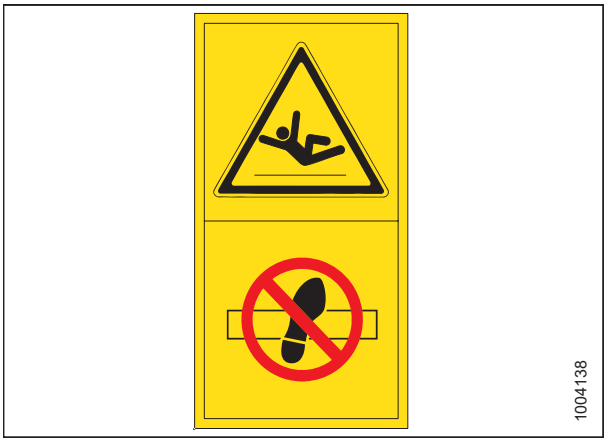


Figure 1.34: MD #190546

MD #194464

General hazard

DANGER

To prevent injury or death:

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

Figure 1.35: MD #194464

MD #194465

Blade cutting hazard

WARNING

To prevent injury from sharp cutting blades:

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

Figure 1.36: MD #194465

MD #194466

Thrown objects hazard

WARNING

To prevent injury or death from thrown objects:

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

Figure 1.37: MD #194466

MD #246956

Driveline entanglement hazard

DANGER

To prevent injury:

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

Figure 1.38: MD #246956

MD #246959

Pinch point hazard

CAUTION

To prevent injury:

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

Figure 1.39: MD #246959

MD #247166

Falling hazard

WARNING

To prevent injury:

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

Figure 1.40: MD #247166

MD #247167

Blade cutting hazard

WARNING

To prevent injury from sharp cutting blades:

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

Figure 1.41: MD #247167

MD #259058

Off-center tracking hazard

WARNING

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

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

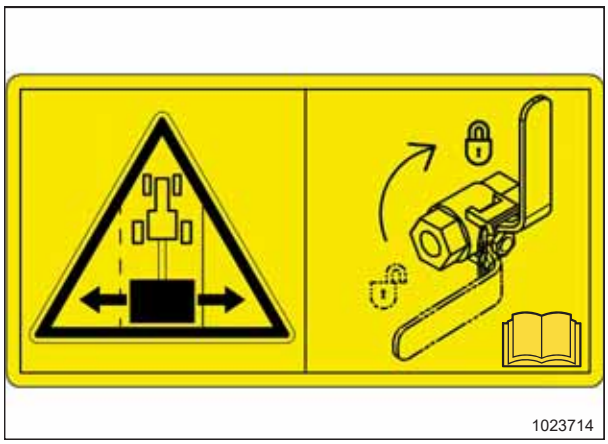


Figure 1.42: MD #259058

1.10 Operational Safety

Follow these safety precautions:

CAUTION

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

CAUTION

- **Never start or move the machine until you are sure all bystanders have cleared the area.**
- **Avoid travelling over loose fill, rocks, ditches, or holes.**
- **Drive slowly through gates and doorways.**
- **If possible, travel uphill or downhill when working on inclines. Be sure to keep transmission in gear while travelling downhill.**
- **Never attempt to get on or off a moving machine.**
- **Do NOT get off the tractor while the pull-type is in operation. Stop forward movement of the tractor, and stop the power take-off.**
- **To avoid bodily injury or death from unexpected startup of machine, always stop tractor engine, and remove key before adjusting or removing plugged material from the machine.**
- **Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect the machine. Follow proper shutdown procedure shown in *3.12 Shutdown Procedure, page 61*.**
- **Operate only in daylight or good artificial light.**

CAUTION

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

Figure 1.43: MD #194466

1.11 Owner/Operator Responsibilities

CAUTION

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

Chapter 2: Product Overview

2.1 Definitions

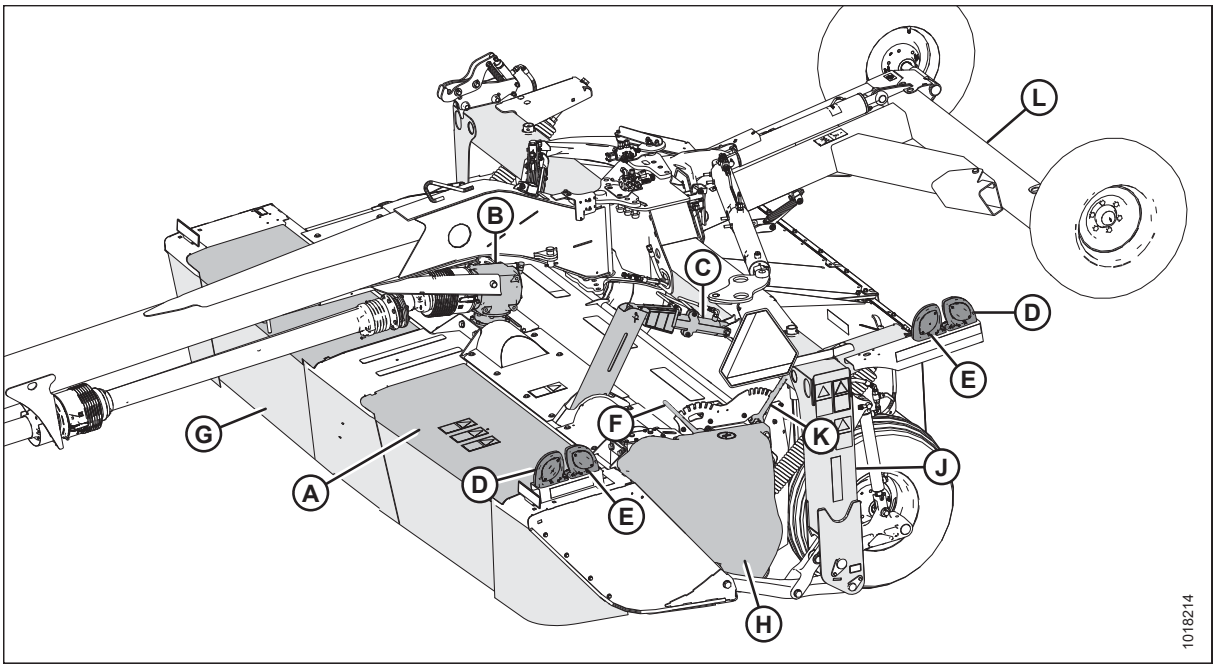
The following terms and acronyms may be used in this manual:

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

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

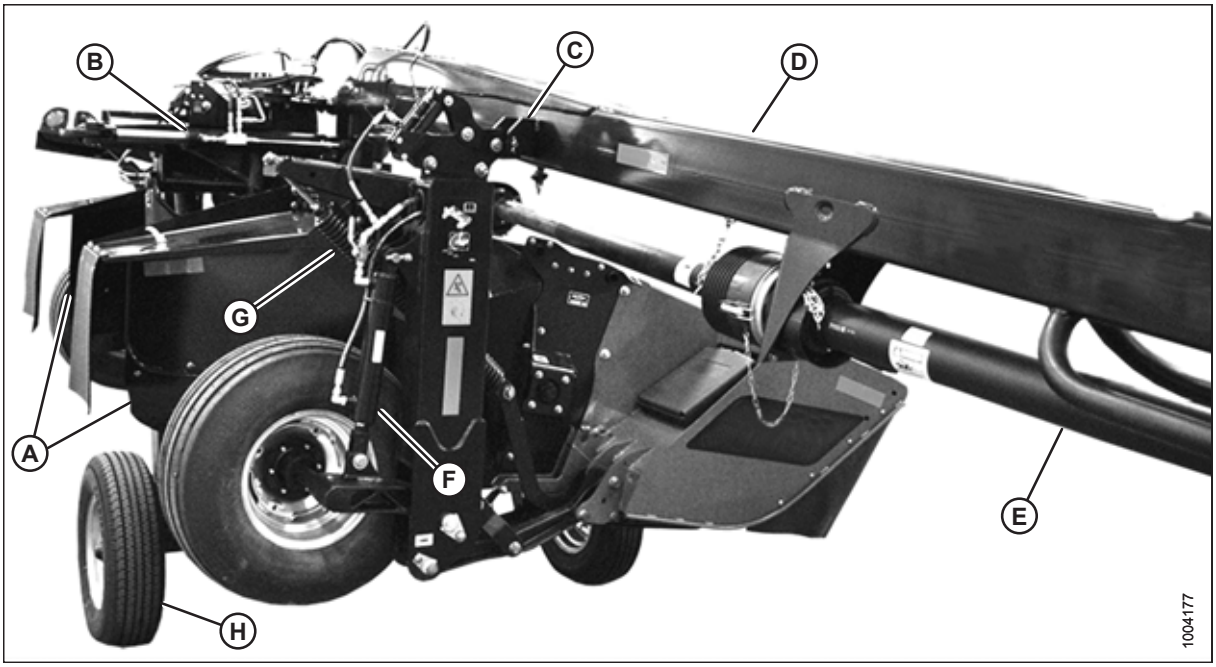
2.2 Component Identification

Figure 2.1: Rotary Disc Pull-Type with Finger Conditioner



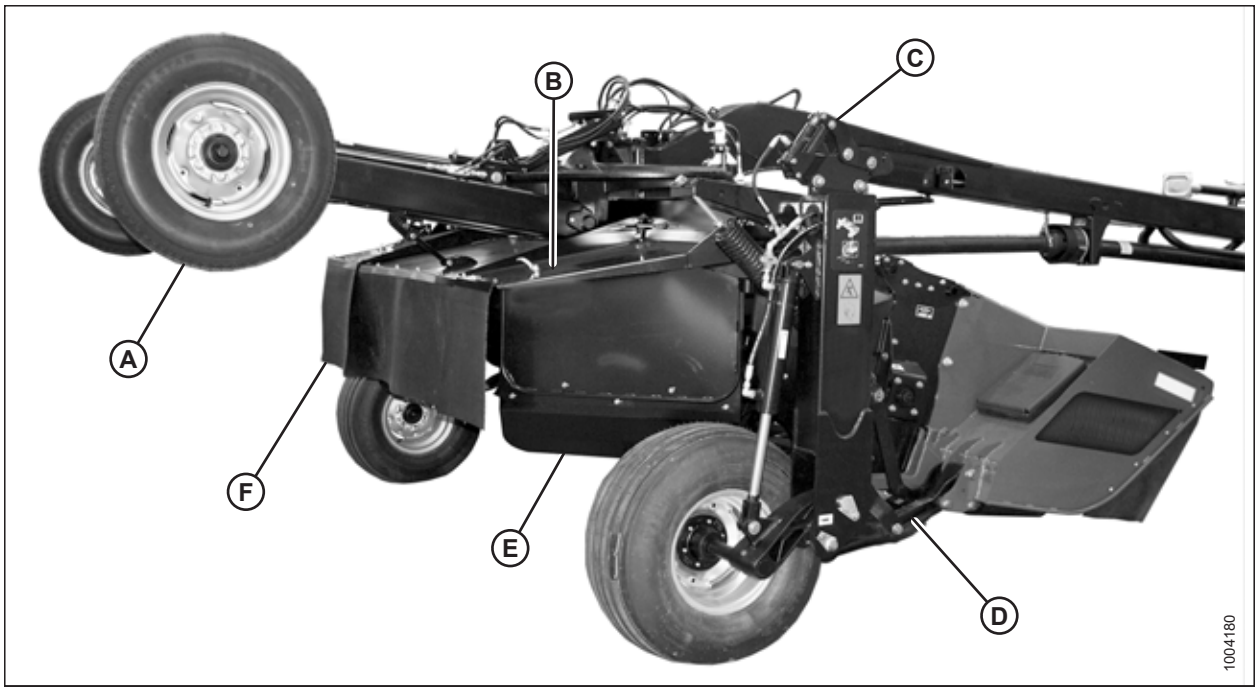
A - Cutterbar Door
B - Header Swivel Gearbox
C - Center-Link
D - Amber Hazard/Turn Signal Light (x2)
E - Red Tail/Brake Light (x2)
F - Forward Baffle Control
G - Front Curtains
H - Driveshield
J - Carrier Frame
K - Rear Deflector Control
L - Optional Transport System

Figure 2.2: Rotary Disc Pull-Type with Finger Conditioner



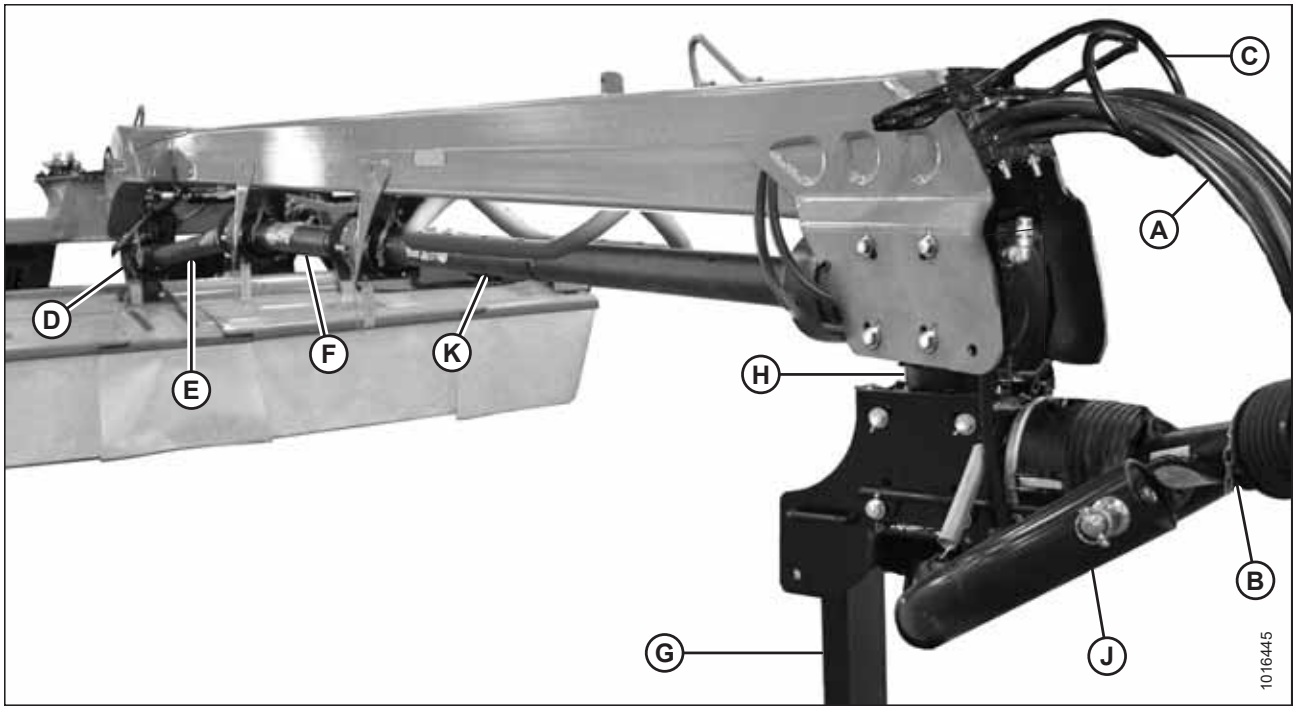
A - Side Deflector
B - Hitch Swing Cylinder
C - Transport Latch
D - Articulated Power Turn (APT) Hitch
E - Driveline
F - Lift Cylinder
G - Float Spring
H - Optional Transport

Figure 2.3: Rotary Disc Pull-Type with Finger Conditioner



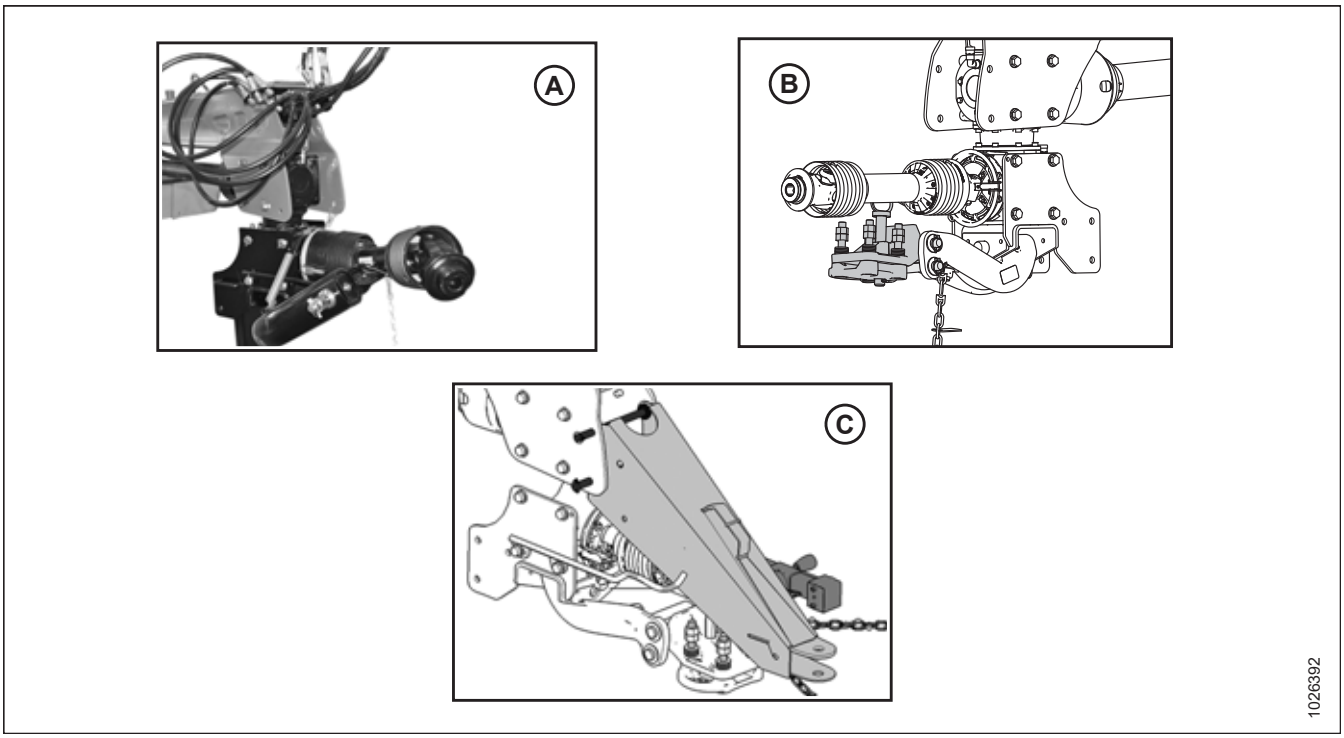
A - Optional Transport
B - Forming Shield Cover
C - Transport Locking Cylinder
D - Skid Shoe
E - Side Deflector
F - Rear Curtain

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



A - Control Hoses
B - Primary Driveline
C - Hose Support
D - Header Swivel Gearbox
E - Clutch Driveline
F - Hitch Driveline (R116 only)
G - Hitch Stand
H - Hitch Swivel Gearbox
J - Two-Point Hitch
K - Hitch Driveline

Figure 2.5: Hitch Options



A - Tractor Two-Point Hitch Adapter **B - Tractor Drawbar Hitch Adapter** **C - Tractor Utility Hitch Adapter**

2.3 Product Specifications

NOTE:

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

Table 2.1 Rotary Disc Pull-Type Specifications

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

1. Without crop dividers.

Table 2.1 Rotary Disc Pull-Type Specifications (continued)

Components		R113	R116
Cutterbar			
Quantity of cutting discs		8	10
Blades per disc		Two 18 degrees bevel down reversible	
Disc speed		2652 rpm	
Blade tip speed range		303 km/h (188 mph)	
Effective cutting width		3978 mm (156 5/8 in.)	4942 mm (194 5/8 in.)
Cutting height		27 mm (1 1/16 in.)	
Cutting angle range	with hydraulic tilt	0–7 degrees below horizontal	
Cutting angle range	with mechanical center-link	0–5 degrees below horizontal	
Skid shoes		Two adjustable	Four adjustable
Geartrain protection		Shearable disc spindles	
Deflectors		Two drum-type converging	Four drum-type converging
Drives			
Tractor Power Take-Off (PTO)		35 mm (1 3/8 in.) dia. 21 spline, or 44 mm (1 3/4 in.) dia. 20 spline	
Mechanical		Gearbox and driveline	
Conditioner – Roll Type			
Drive		4HB belt driven enclosed timing gearbox and driveline	
Conditioner system		Intermeshing rolls (steel or polyurethane)	
Conditioner speed		900 rpm	
Length of rolls		3275 mm (10 ft. 9 in.)	
Roll diameter	Steel on steel chevron	229 mm (9 in.) / 179 mm (7 in.) O.D. tube	
Roll diameter	Polyurethane intermeshing	254 mm (10 in.) / 203 mm (8 in.) O.D. tube	
Intermeshing steel bars		229 mm (9 in.) / 179 mm (7 in.) O.D. tube	
Intermeshing polyurethane bars		254 mm (10 in.) / 203 mm (8 in.) O.D. tube	
Swath width		915–2896 mm (36–114 in.)	
Forming shields		Carrier mounted assembly with adjustable side deflectors	

Table 2.1 Rotary Disc Pull-Type Specifications (continued)

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

NOTE:

Tractor must be equipped with a cab.

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

Chapter 3: Operation

3.1 Lift Cylinder Lock-Out Valves

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

3.1.1 Engaging Locks

DANGER

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

IMPORTANT:

Connect hoses so that moving the cylinder control lever backward raises the rotary disc pull-type, and moving the cylinder control lever forward lowers the rotary disc pull-type. Refer to *3.7.3 Connecting Hydraulics, page 48* for more information.

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

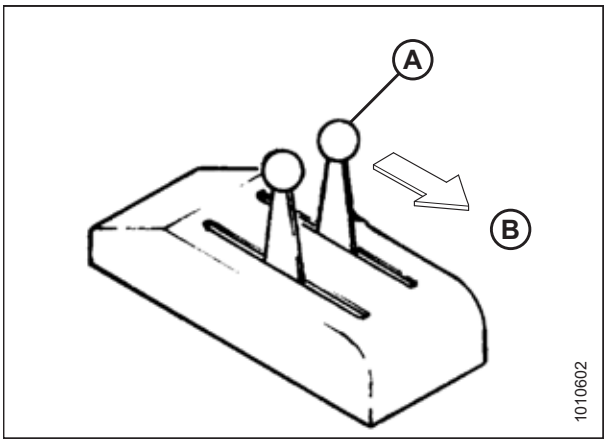


Figure 3.1: Tractor Cylinder Control Lever

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

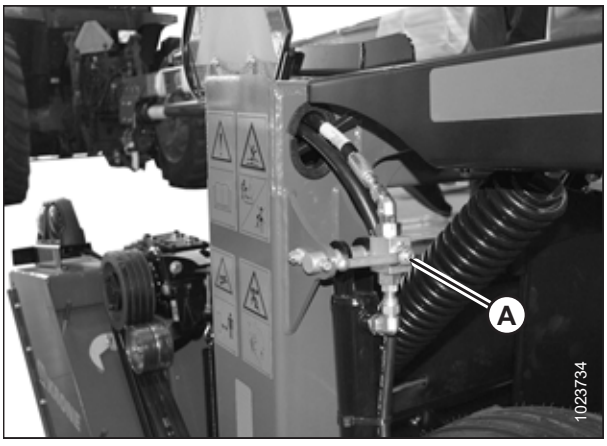


Figure 3.2: Lift Cylinder Lock-Out Valve in Closed Position

3.1.2 Disengaging Locks

DANGER

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

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

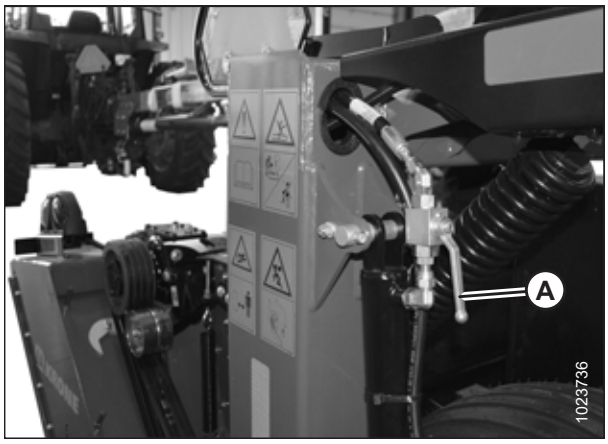


Figure 3.3: Lift Cylinder Lock-Out Valve in Open Position

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

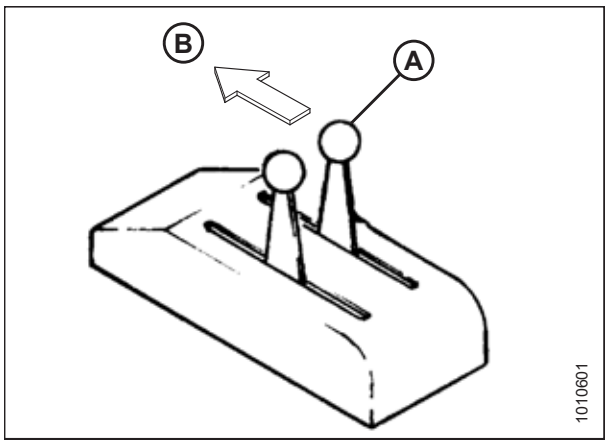


Figure 3.4: Tractor Cylinder Control Lever

3.2 Driveshields

3.2.1 Opening Driveshields

CAUTION

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.

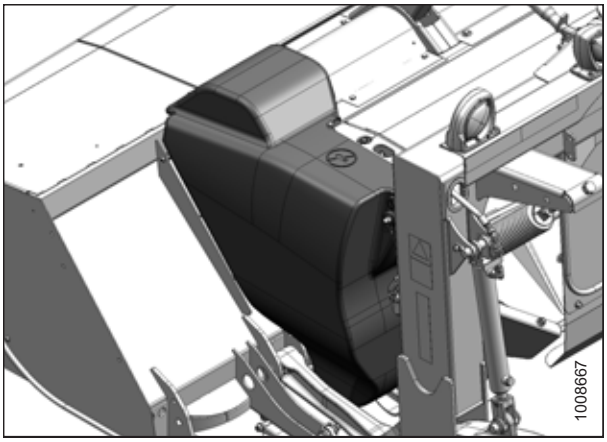


Figure 3.5: Left Driveshield

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

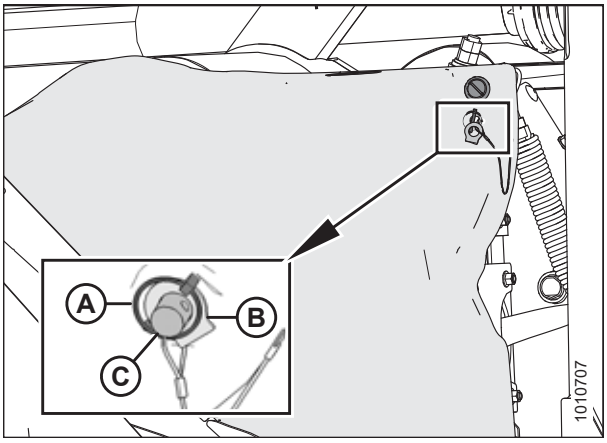


Figure 3.6: Left Driveshield

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

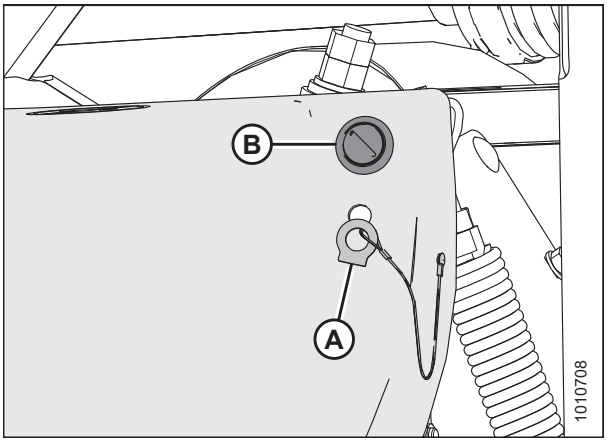


Figure 3.7: Driveshield Latch

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

   NOTE:

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

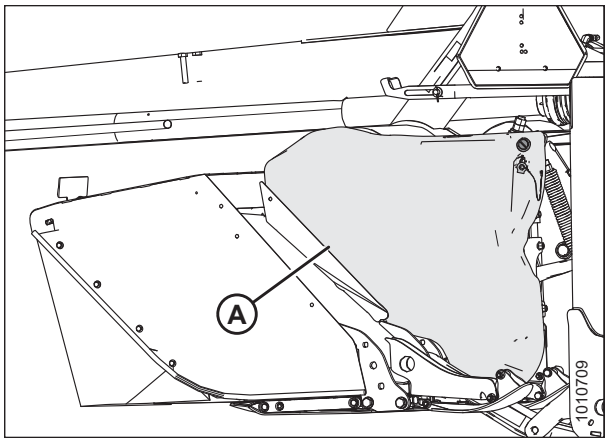


Figure 3.8: Driveshield

3.2.2 Closing Driveshields

CAUTION

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

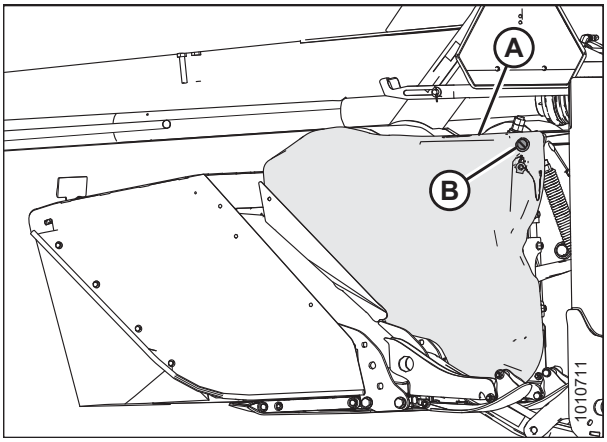


Figure 3.9: Driveshield and Latch

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

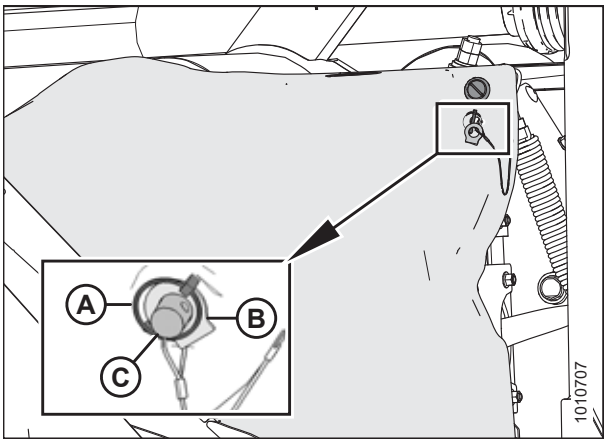


Figure 3.10: Left Driveshield

3.3 Cutterbar Doors

WARNING

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.

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

Rotary disc pull-types sold outside of North America have latches on the cutterbar door.

IMPORTANT:

Replace curtains if they become worn or damaged. For instructions, refer to *4.4.2 Maintaining Curtains, page 140*.

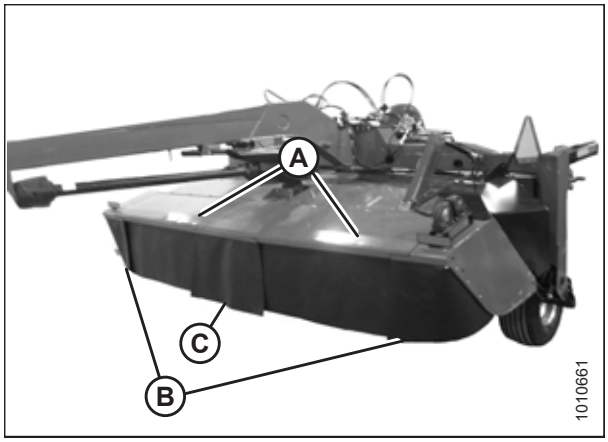


Figure 3.11: Front View of the Rotary Disc Pull-Type

3.3.1 Opening Cutterbar Doors – North America

To open cutterbar doors on a rotary disc pull-type with export latches, refer to *3.3.2 Opening Cutterbar Doors – Export Latches, page 37*.

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. If both doors need to be opened, center the pull-type beneath the hitch.
2. Shut down the engine, and remove the key from the ignition.
3. Lift up on doors (A) at the front of the machine.

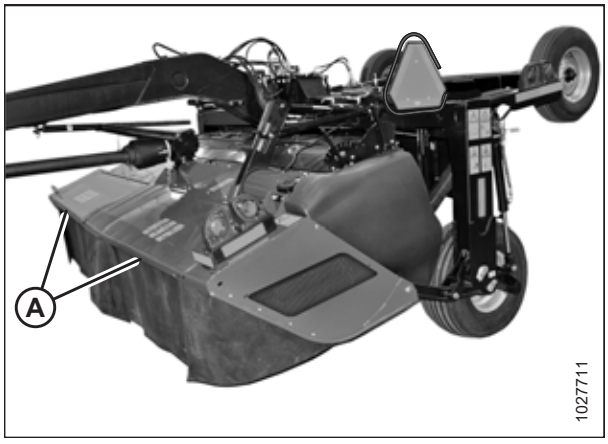


Figure 3.12: Cutterbar Doors and Curtains

3.3.2 Opening Cutterbar Doors – Export Latches

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

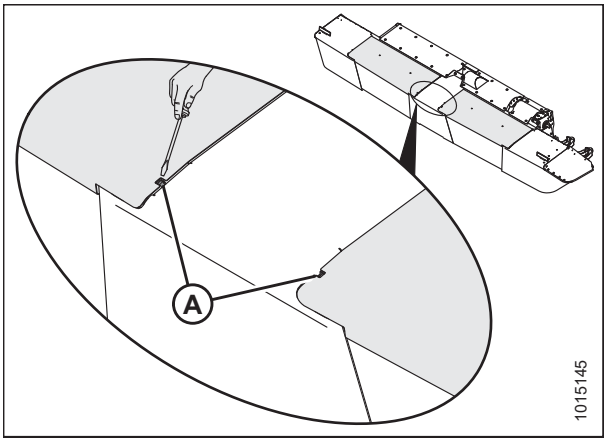


Figure 3.13: Cutterbar Door Latch Access Hole – Export Only

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

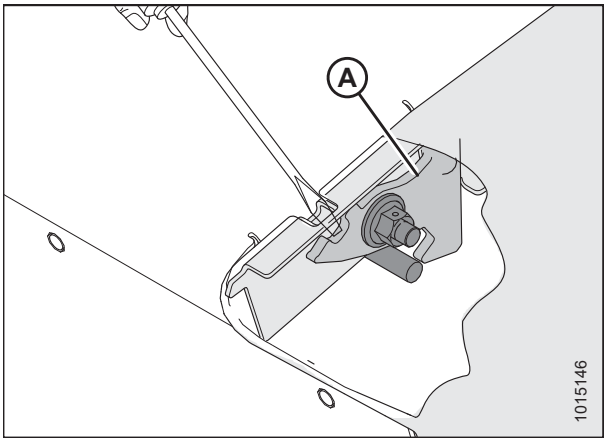


Figure 3.14: Cutterbar Door Latch – Cutaway View

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

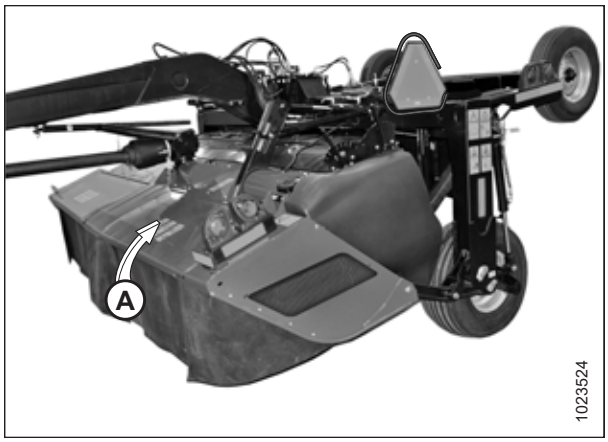


Figure 3.15: Cutterbar Doors and Curtains

3.3.3 Closing Cutterbar Doors

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.

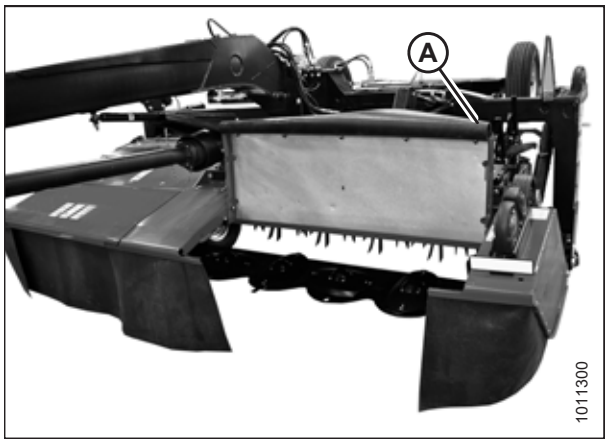


Figure 3.16: Cutterbar Doors and Curtains

3.4 Daily Start-Up Check

CAUTION

- **Ensure the tractor and the rotary disc pull-type are properly attached, all controls are in neutral, and the tractor brakes are engaged.**
- **Clear the area of other persons, pets etc. Keep children away from machinery. Walk around the rotary disc pull-type 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

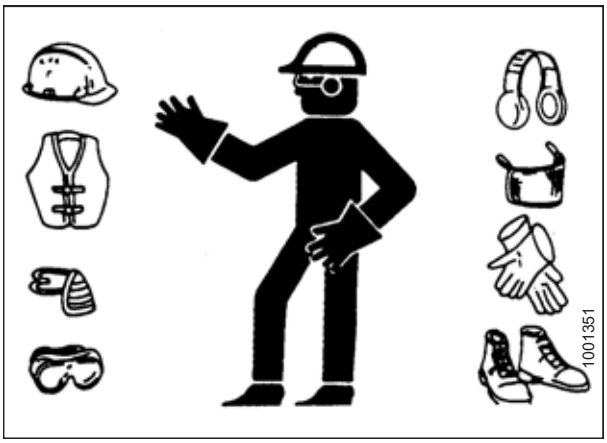


Figure 3.17: Safety Equipment

Use proper hearing protection:

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

Figure 3.18: Safety Equipment

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. Refer to *4.6.1 Checking Hydraulic Hoses and Lines, page 274*.

2. Clean all lights and reflective surfaces on the machine, and check lights for proper operation.

3. Perform all daily maintenance. Refer to *4.3.1 Maintenance Schedule/Record, page 123*.

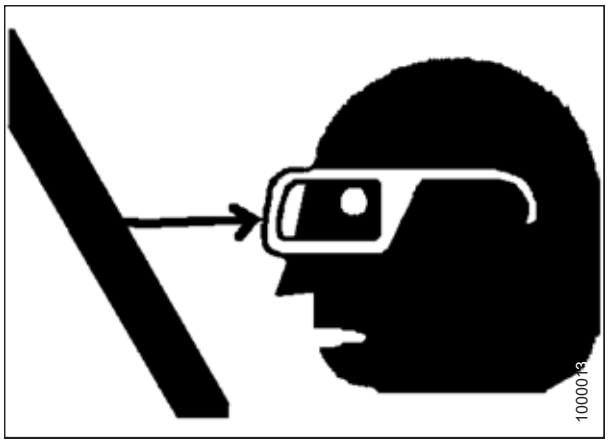


Figure 3.19: Safety around Equipment

3.5 Preparing Tractor for Rotary Disc Pull-Type

3.5.1 Tractor Requirements

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

Table 3.1 Tractor Requirements

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

NOTE:

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

NOTE:

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

3.5.2 Adjusting the Drawbar

WARNING

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

1. Shut down the engine, and remove the key from the ignition.
2. Adjust the tractor drawbar to meet the specifications listed in Table *3.2, page 41*.
3. Secure the tractor drawbar so the hitch pinhole is directly below the driveline.

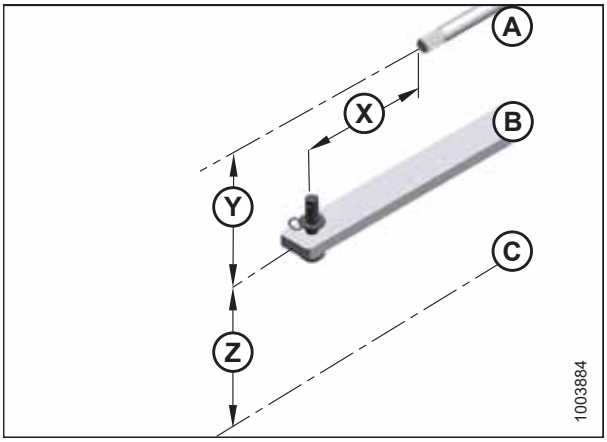


Figure 3.20: Tractor Drawbar Adjustments

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

Table 3.2 SAE Standard A482 Specifications

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

3.6 Setting up the Rotary Disc Pull-Type Hitch

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

3.6.1 Installing Drawbar Hitch Adapter

IMPORTANT:

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

WARNING

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

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

   NOTE:

   Ensure hardened washers and Class 10 nuts (supplied with adapter) are used.
6. Tighten four jam nuts (C).

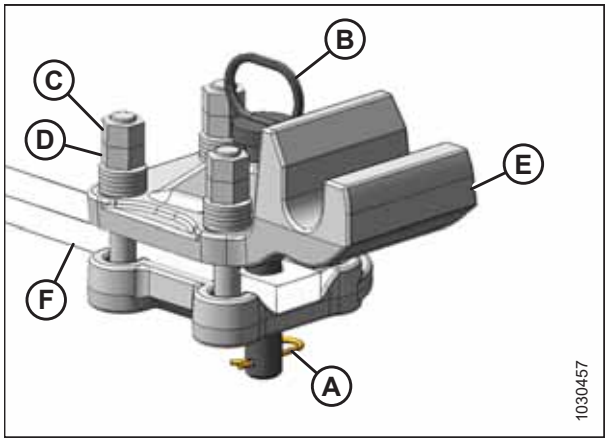


Figure 3.21: Drawbar Hitch Adapter

3.7 Attaching Rotary Disc Pull-Type to the Tractor

Refer to the attachment procedure that applies to your tractor:

- *3.7.1 Attaching with Drawbar Hitch, page 43*
- *3.7.2 Attaching with Two-Point Hitch, page 45*

3.7.1 Attaching with Drawbar Hitch

WARNING

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

1. Remove lynch pin (A) from clevis pin (B), and remove the clevis pin from the rotary disc pull-type hitch.

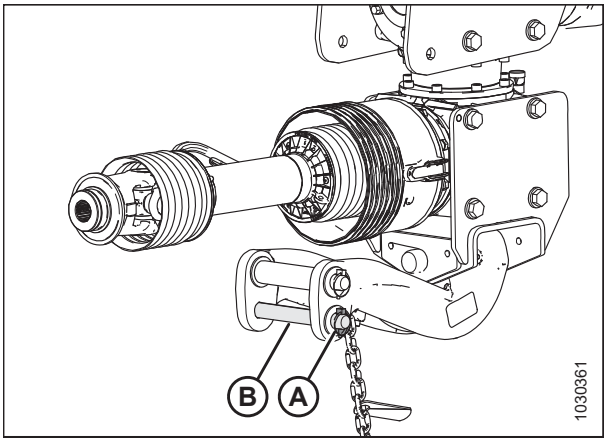


Figure 3.22: Rotary Disc Pull-Type Hitch

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

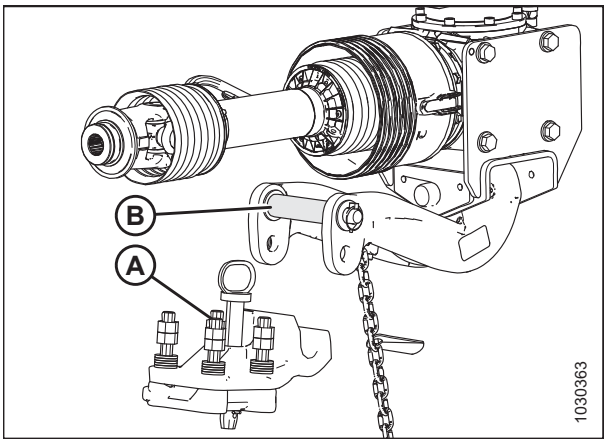


Figure 3.23: Rotary Disc Pull-Type Hitch

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

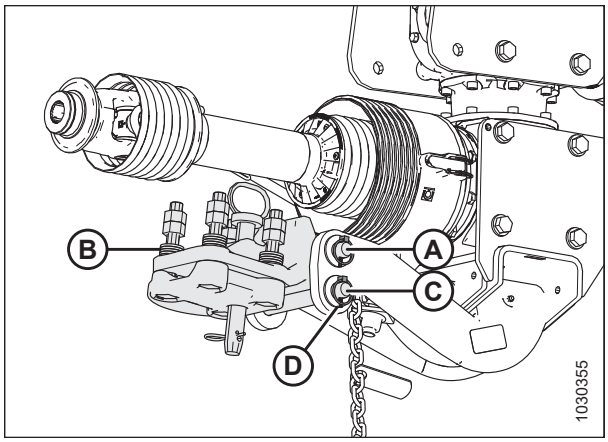


Figure 3.24: Rotary Disc Pull-Type Hitch

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

   IMPORTANT:

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

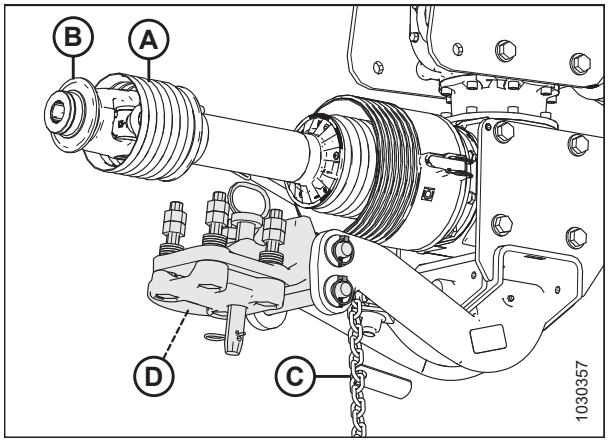


Figure 3.25: Primary Driveline

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

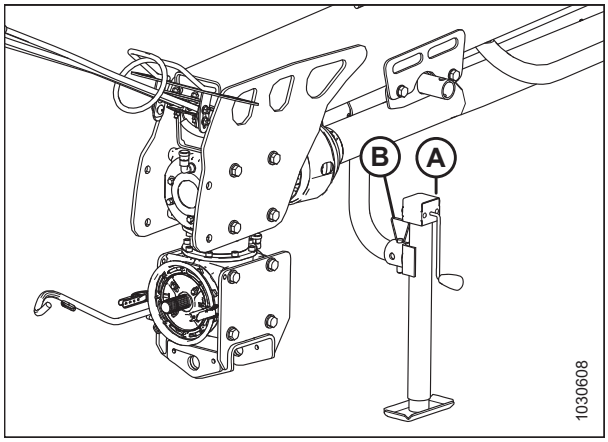


Figure 3.26: Hitch Jack

10. Move jack (A) to storage position on top of hitch, and secure with pin (B).
11. Proceed to *3.7.3 Connecting Hydraulics, page 48*.

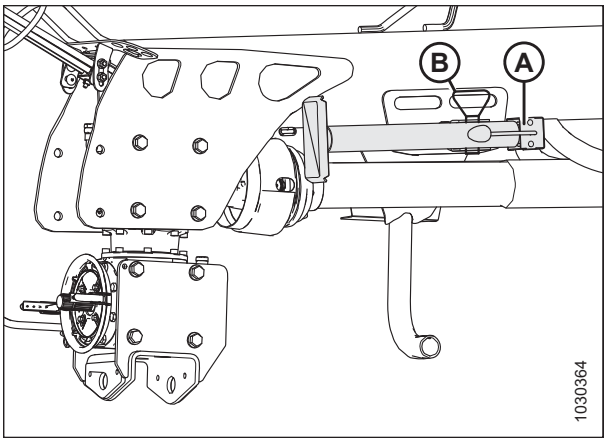


Figure 3.27: Drawbar Jack Storage

3.7.2 Attaching with Two-Point Hitch

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

WARNING

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

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

   NOTE:

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

   NOTE:

   If using a category III hitch, a longer driveshaft may be required. Refer to *5.1 Performance Kits, page 299* to order.
5. Install anti-sway bars (not shown) on the tractor hitch to stabilize lateral movement of hitch arms (A). For instructions, refer to your tractor operator's manual.

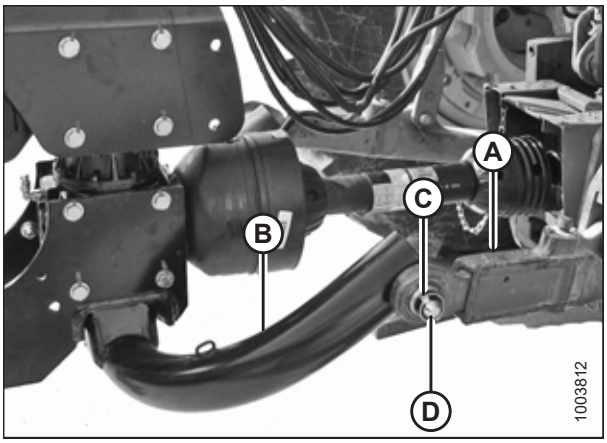


Figure 3.28: Two-Point Hitch Configuration

6. Check distance (C) between tractor primary power take-off (PTO) shaft (A) and rotary disc pull-type hitch gearbox shaft (B) without the front half of the driveline attached.
7. Ensure that distance (C) does **NOT** exceed the dimensions listed in Table *3.3, page 46*.

Table 3.3 Distance between Hitch Gearbox and Tractor PTO

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

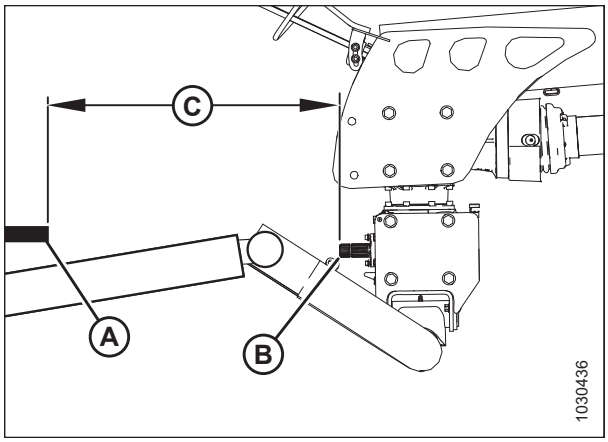


Figure 3.29: Allowable Driveline Length

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

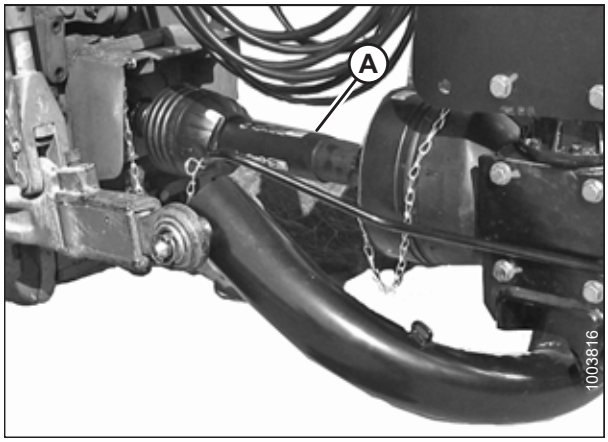


Figure 3.30: Driveline Attached to Tractor PTO

CAUTION

Check to be sure all bystanders have cleared the area.

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

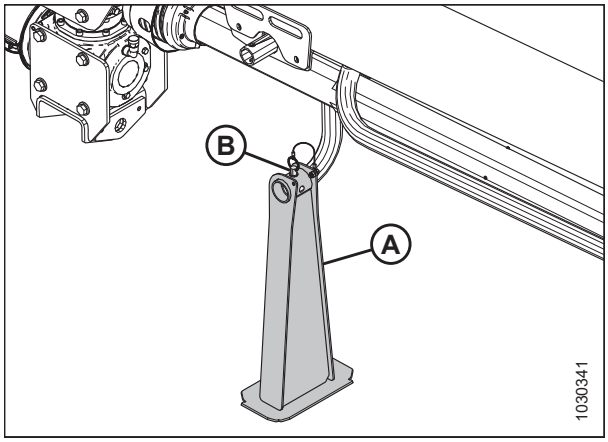


Figure 3.31: Hitch Stand in Working Position

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

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

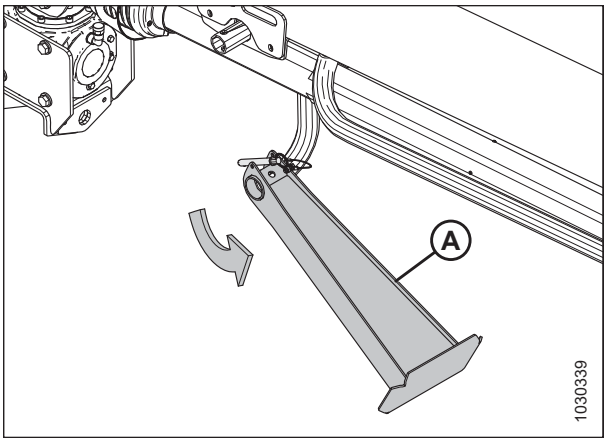


Figure 3.32: Repositioning Hitch Stand

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

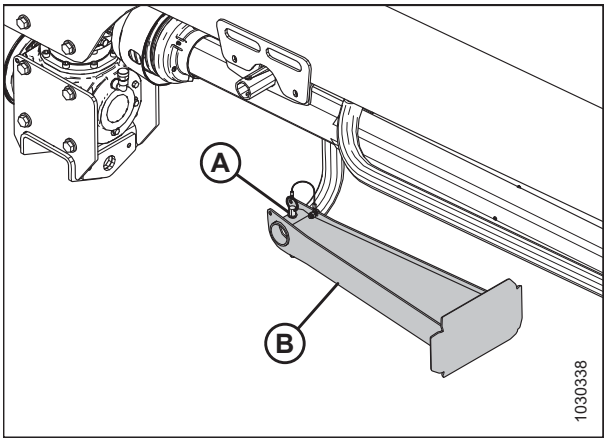


Figure 3.33: Hitch Stand in Storage Position

3.7.3 Connecting Hydraulics

WARNING

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

NOTE:

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

Table 3.4 Hydraulic System Hoses

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

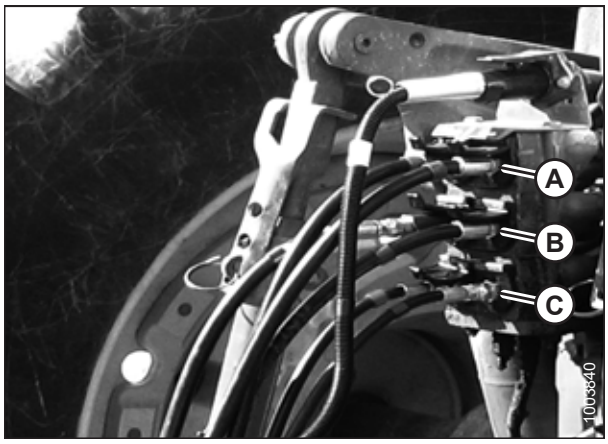


Figure 3.34: Hydraulic Connections

1. Connect the lift cylinder hose (red collar with #1) to the tractor's hydraulic receptacle. Connect the second hose (blue collar with #1) only when the transport is installed. Refer to Table *3.5, page 48* to confirm the system is functioning correctly.

2. Connect the two hitch swing cylinder hoses (collars with #2) to the tractor hydraulic receptacles. Refer to Table *3.6, page 48* to confirm the system is functioning correctly.

3. For machines with hydraulic center-link only, connect the two tilt cylinder hoses (collars with #3) to the tractor hydraulic receptacles. Refer to Table *3.7, page 48* to confirm the system is functioning correctly.

Table 3.5 Lift System

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

Table 3.6 Hitch Swing and Transport System

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

Table 3.7 Tilt System

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

7. Available with hydraulic tilt option installed.

3.7.4 Connecting Electrical Wiring Harness

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

   IMPORTANT:

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

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

   NOTE:

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

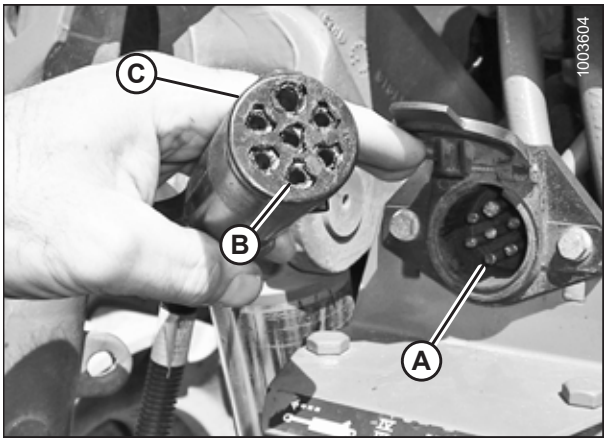


Figure 3.35: Electrical Wiring Harness and Receptacle

If equipped with the transport system:

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

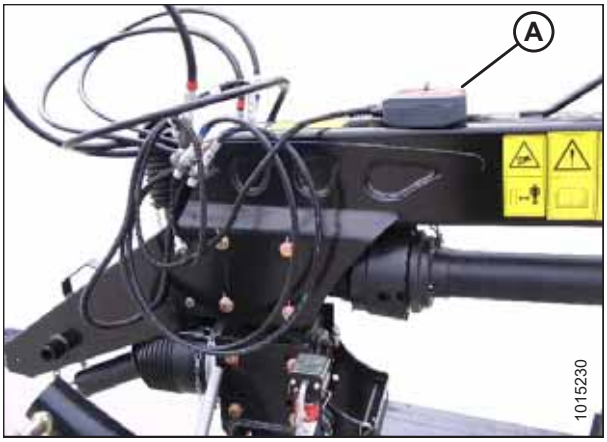


Figure 3.36: Control Box

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

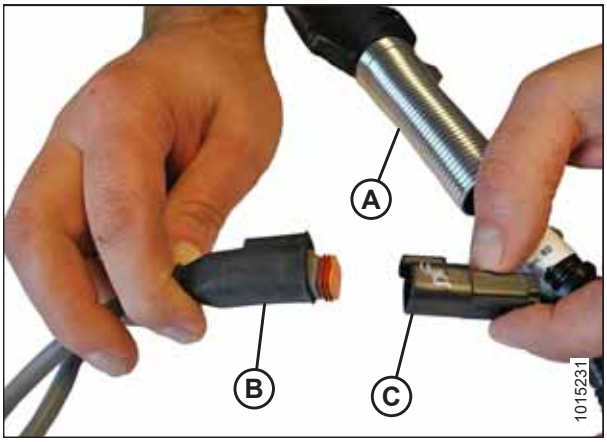


Figure 3.37: Transport Harness

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

5. Connect the two wires (B) from the three-pin auxiliary connector to power wires (C) on the control box, wrap connections with electrical tape, and skip to Step *7, page 51*.

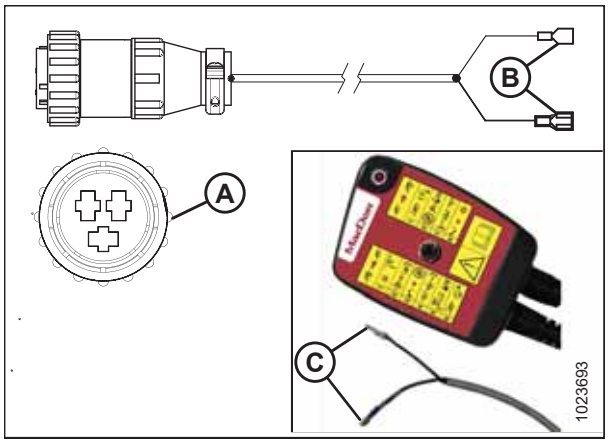


Figure 3.38: Three-Pin Auxiliary Connector

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

6. Connect control box power wire (A) to the tractor's power supply as follows:

   - Connect wire (C) with the red tag to tractor power.
   - Connect wire (B) with no tag to tractor ground.

   NOTE:

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

   NOTE:

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

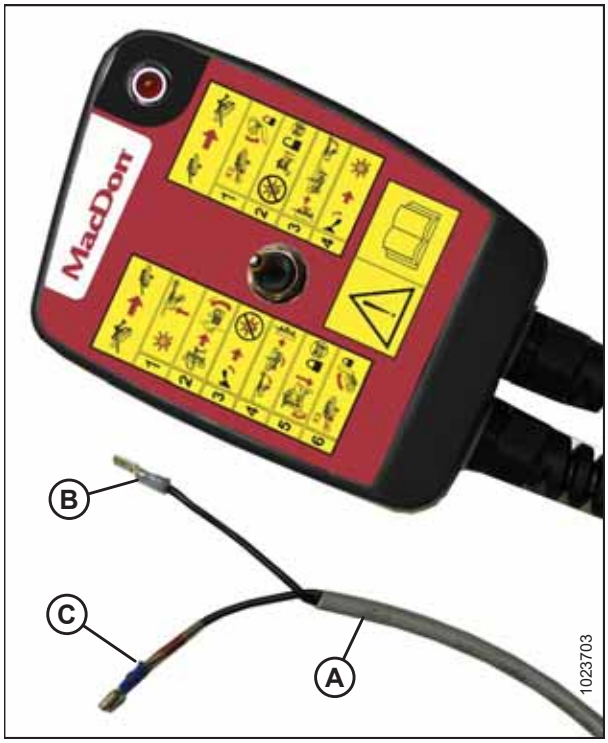


Figure 3.39: Control Box

NOTE:

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

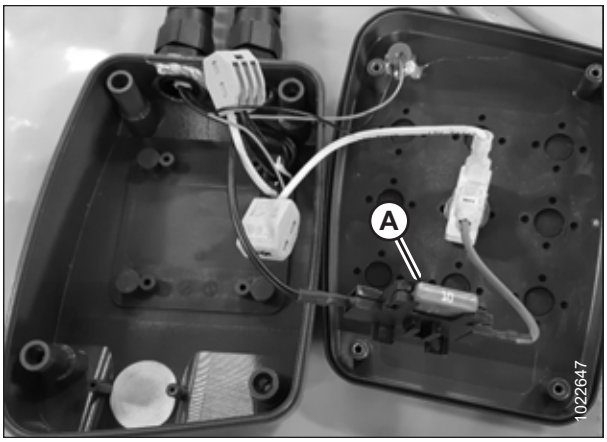


Figure 3.40: Control Box Interior

7. Place the control box inside the tractor cab.

3.8 Detaching Rotary Disc Pull-Type from Tractor

3.8.1 Detaching from Drawbar

CAUTION

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

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

   IMPORTANT:

   If leaving the rotary disc pull-type in the raised position, close steering valve and both (left/right) lift cylinder lock-out valves.
3. Shut down the engine, and remove the key from the ignition.
4. Move the remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.

If the transport option is installed:

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

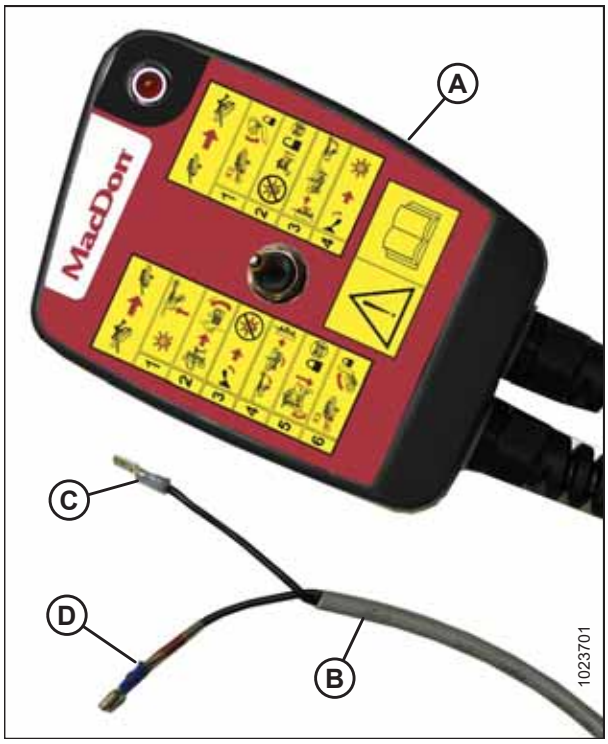


Figure 3.41: Remote Control

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

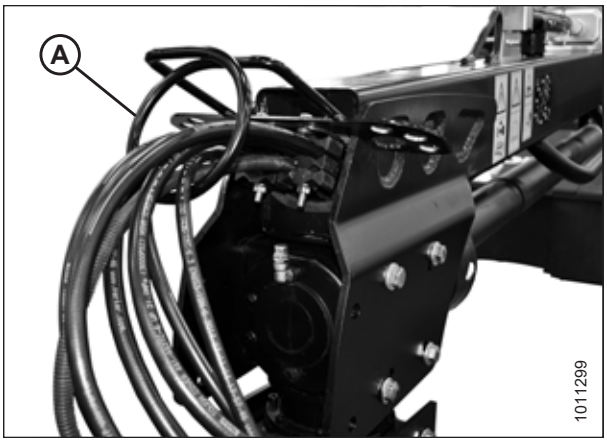


Figure 3.42: Hose Support

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

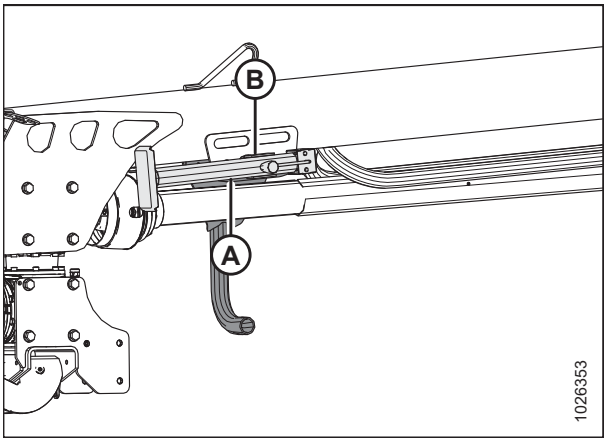


Figure 3.43: Jack Storage

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

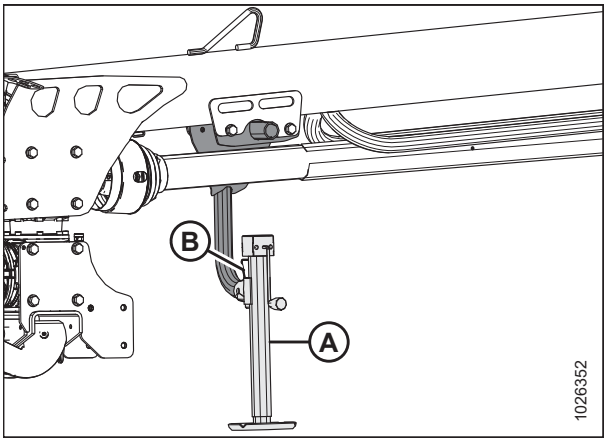


Figure 3.44: Jack Storage

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

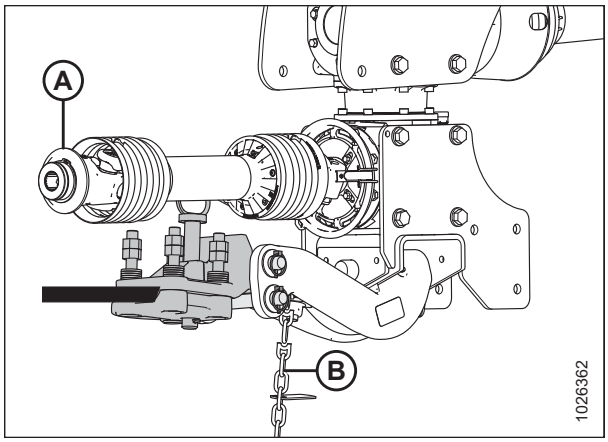


Figure 3.45: Driveline and Jack

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

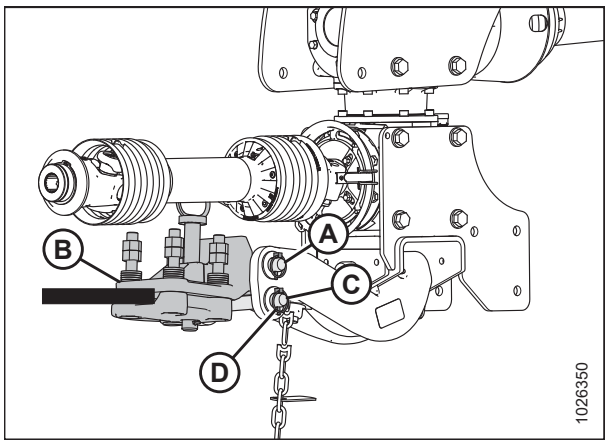


Figure 3.46: Rotary Disc Pull-Type Hitch

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

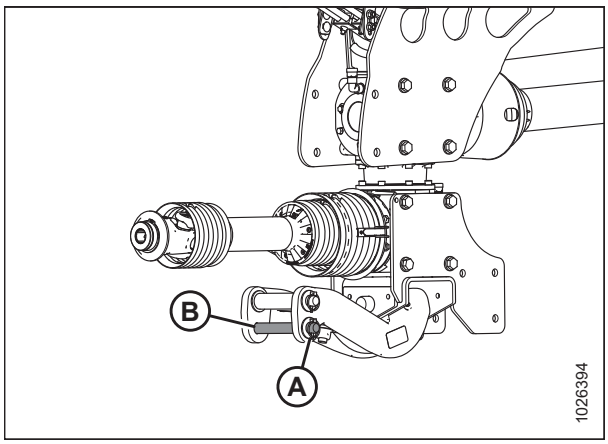


Figure 3.47: Rotary Disc Pull-Type Hitch

3.8.2 Detaching from Two-Point Hitch

WARNING

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

1. Park the machine on a flat, level surface.
2. Lower the pull-type onto blocks or leave the pull-type raised. If leaving the pull-type in the raised position, close the lift cylinder safety valves. Refer to *3.1.1 Engaging Locks, page 31*.
3. Shut down the engine, and remove the key from the ignition.
4. Move remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.

If the transport is installed:

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

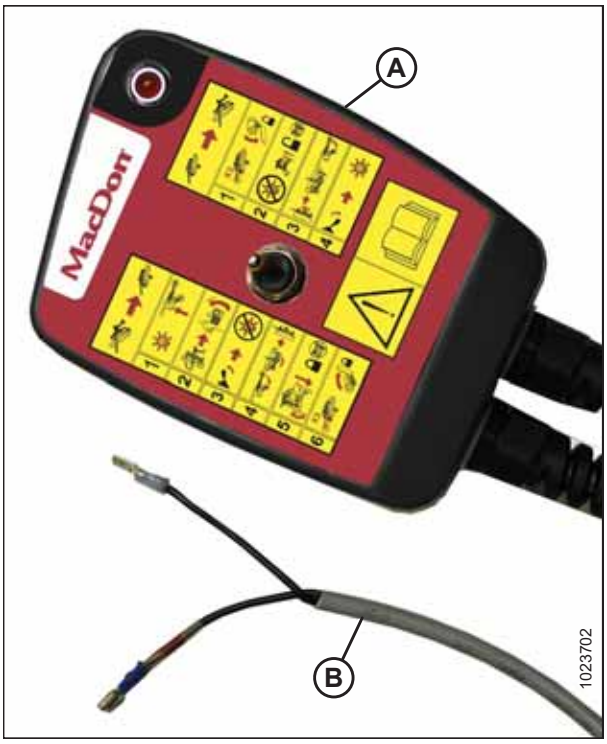


Figure 3.48: Control Box

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

   NOTE:

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

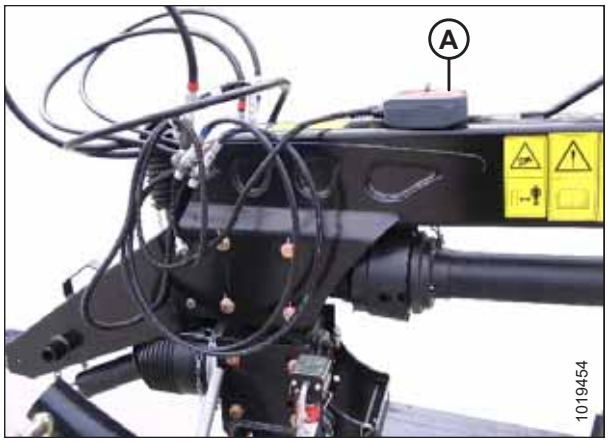


Figure 3.49: Front of Hitch

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

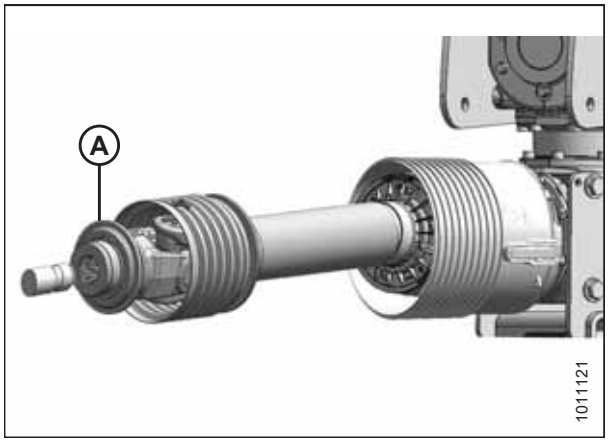


Figure 3.50: Driveline

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

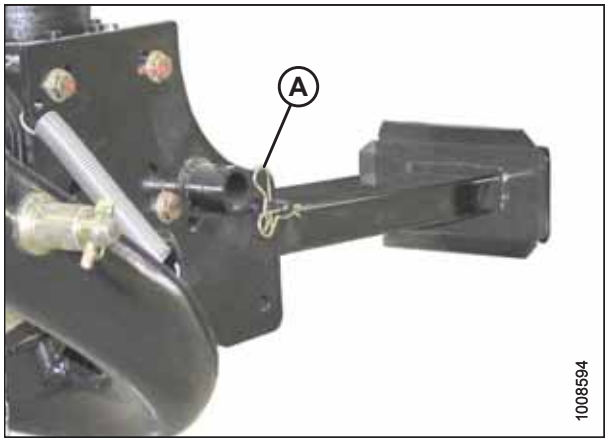


Figure 3.51: Inboard Hairpin

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

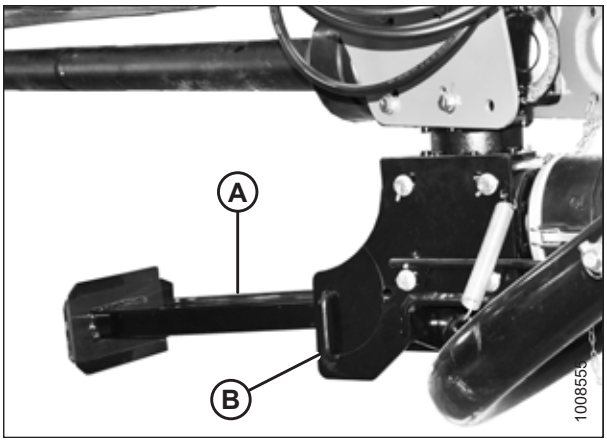


Figure 3.52: Hitch Stand and Lock

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

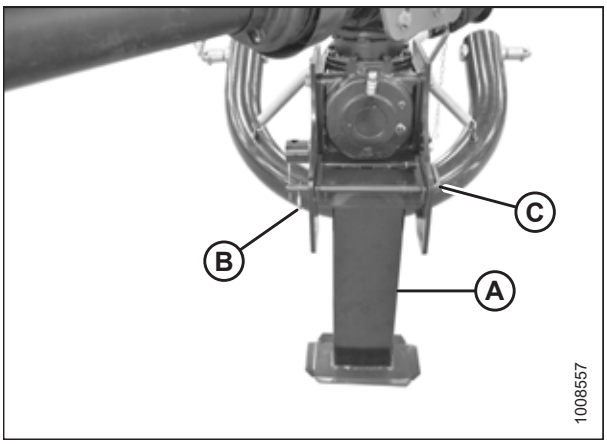


Figure 3.53: Hitch Stand in Lowered Position

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

    NOTE:

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

18. Replace lynch pins (A) and washers in the rotary disc pull-type's hitch.
19. Slowly drive the tractor away from the rotary disc pull-type.

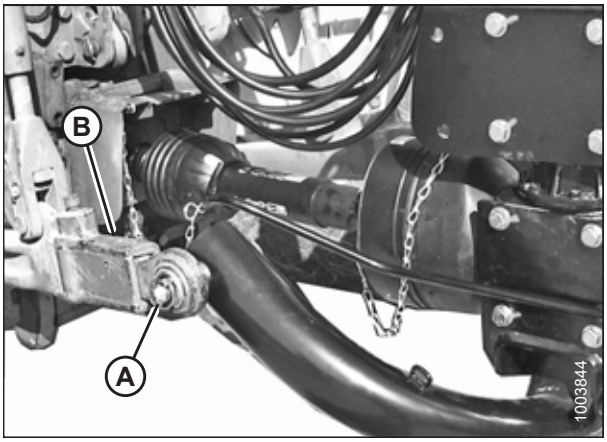


Figure 3.54: Lynch Pins and Tractor Arms

3.9 Breaking in the Rotary Disc Pull-Type

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

WARNING

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

IMPORTANT:

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

Refer to *4.3.2 Break-In Inspections, page 127* to determine the service interval for your rotary disc pull-type, and complete the scheduled break-in inspection procedures.

3.10 Engaging the Power Take-Off

WARNING

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

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

3.11 Raising and Lowering the Rotary Disc Pull-Type

3.11.1 Lift Cylinders

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

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

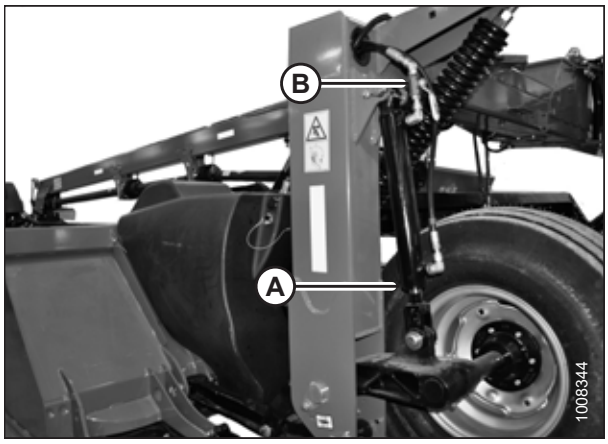


Figure 3.55: Lift Cylinder

3.11.2 Lift Control

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

WARNING

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

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

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

IMPORTANT:

Connect the hydraulic hoses so that moving control lever (A) backward raises the rotary disc pull-type. Refer to *3.7.3 Connecting Hydraulics, page 48* for more information.

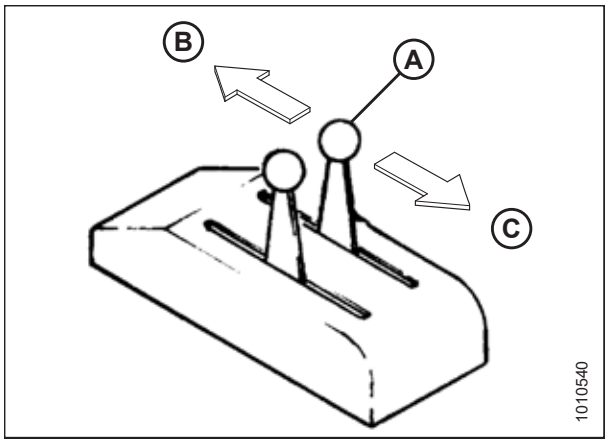


Figure 3.56: Tractor Cylinder Control Lever

3.12 Shutdown Procedure

CAUTION

Before leaving the tractor seat for any reason:

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

3.13 Steering the Rotary Disc Pull-Type

IMPORTANT:

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

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

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

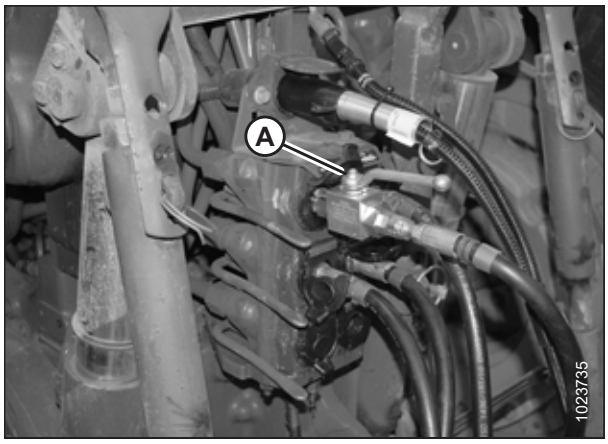


Figure 3.57: Steering Line Valve in Working (Open) Position

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

   IMPORTANT:

   Connect the hydraulic hoses so that moving the steering control lever (A) backward steers the rotary disc pull-type to the left and moving lever forward steers the rotary disc pull-type to the right. Refer to *3.7.3 Connecting Hydraulics, page 48* for more information.

   NOTE:

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

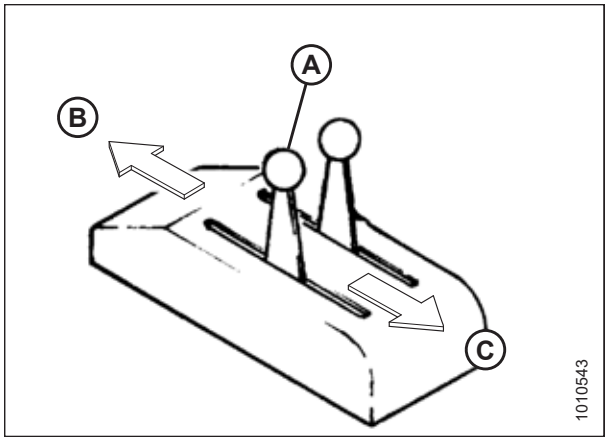


Figure 3.58: Tractor Steering Control Lever Positions

3.13.1 Operating on the Right Side of the Tractor

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

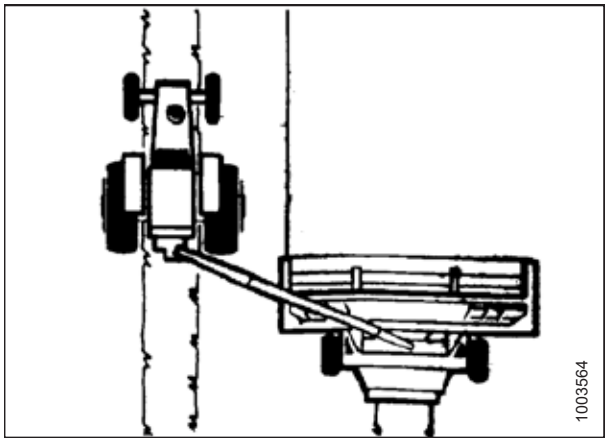


Figure 3.59: Right-Side Operation

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

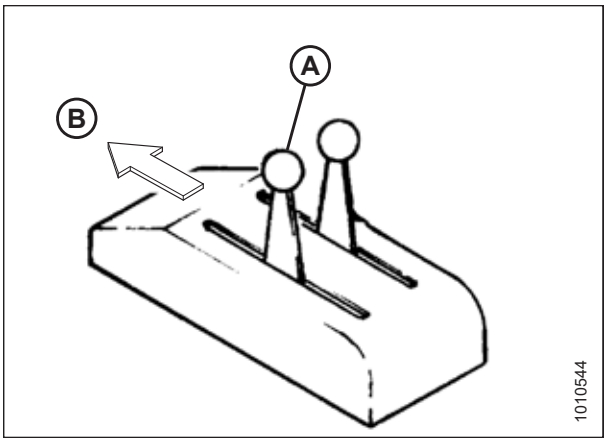


Figure 3.60: Tractor Steering Control Lever

3.13.2 Operating on the Left Side of the Tractor

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

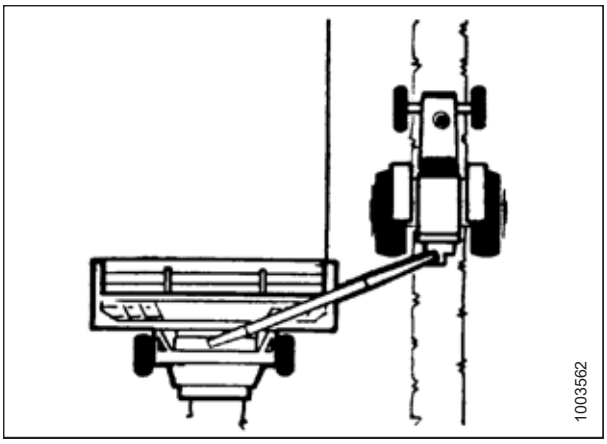


Figure 3.61: Left-Side Operation

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

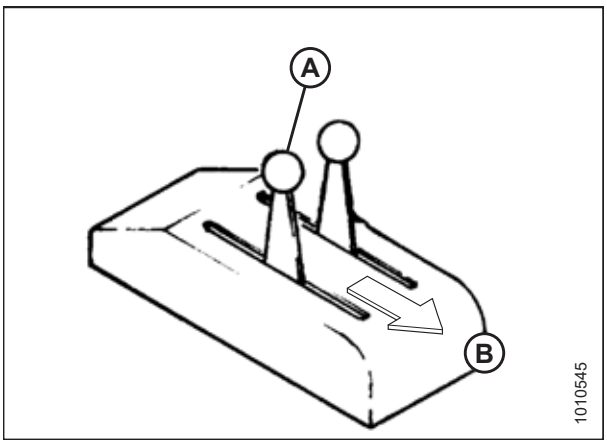


Figure 3.62: Tractor Steering Control Lever

3.13.3 Avoiding Obstacles

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

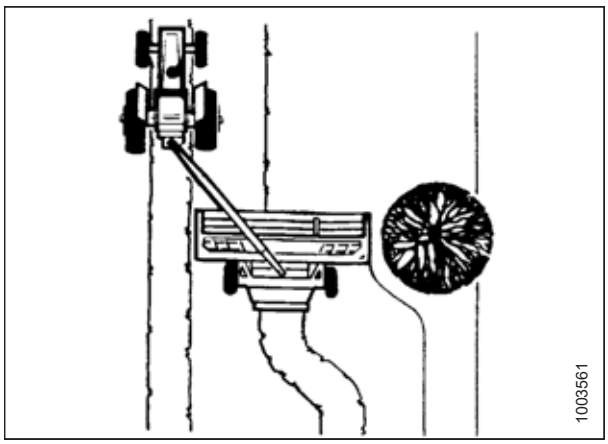


Figure 3.63: Rotary Disc Pull-Type Steered around Obstacle

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

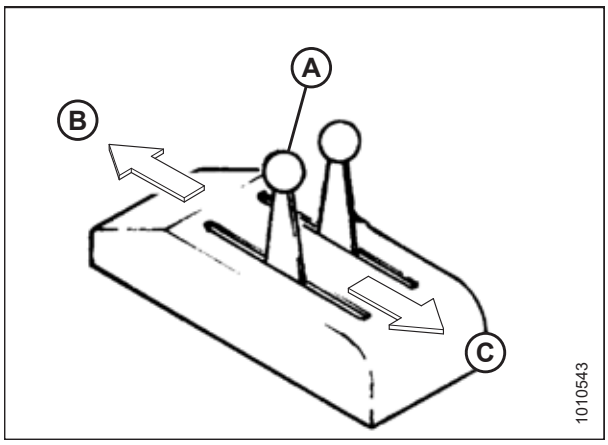


Figure 3.64: Tractor Steering Control Lever

3.13.4 Turning Square Corners

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

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

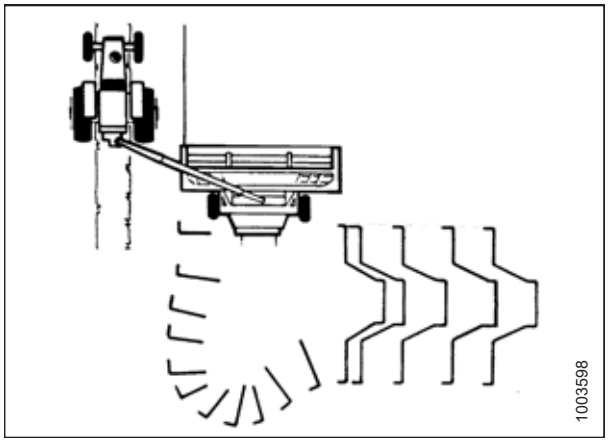


Figure 3.65: Square Corners

IMPORTANT:

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

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

3.13.5 Turning 180 Degrees

NOTE:

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

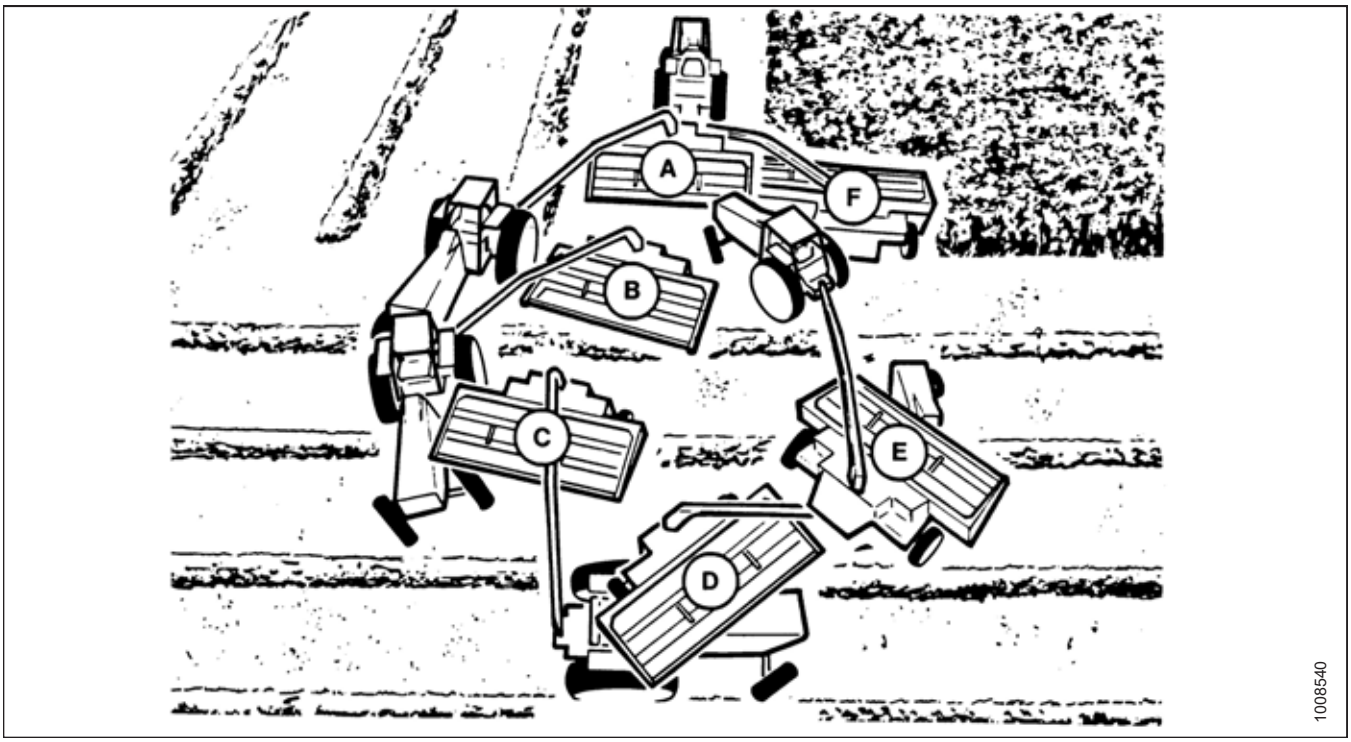


Figure 3.66: 180 Degree Turn

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

   NOTE:

   For ease of operation, both steering control levers can be activated with one hand and held until the steering cylinder completes its stroke.
3. Proceed to position (B), and start turning the tractor back towards the uncut crop.

   IMPORTANT:

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

3.14 Transporting the Rotary Disc Pull-Type

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

- To prepare a rotary disc pull-type for towing with a tractor in field mode without using the Road-Friendly Transport™ option, refer to *3.14.1 Preparing Rotary Disc Pull-Type for Transport, page 67*.
- To prepare a rotary disc pull-type for towing with a tractor using the Road-Friendly Transport™ option, refer to *Converting from Field to Transport Mode – with Road-Friendly Transport™, page 72*.

CAUTION

- **Obey all highway traffic regulations in your area when transporting on public roads. Use flashing amber lights unless prohibited by law.**
- **Be aware of roadside obstructions, oncoming traffic, and bridges.**
- **Travel at safe speeds to ensure complete machine control and stability at all times. Do NOT exceed 32 km/h (20 mph). Reduce speed for corners and slippery conditions.**
- **Use tractor lights and rotary disc pull-type flashing amber and red taillights when transporting on roads in order to provide adequate warning to operators of other vehicles.**
- **Do NOT transport the rotary disc pull-type on a road or highway at night or in reduced visibility conditions such as rain or fog.**
- **Ensure that hitch on transporting vehicle is capable of handling a 907 kg (2000 lb.) static vertical load.**
- **Do NOT tow with any highway-capable vehicle. Use only an agricultural tractor with a sufficient weight such that the fully loaded implement weighs no more than 1.5 times the weight of the tractor.**

3.14.1 Preparing Rotary Disc Pull-Type for Transport

Follow these instructions to prepare the rotary disc pull-type for transport without deploying the optional Road-Friendly Transport™ system.

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

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

1. Shut down the engine, and remove the key from the ignition.
2. Connect the rotary disc pull-type hitch to the tractor, and store the jack stand. For instructions, refer to *3.7 Attaching Rotary Disc Pull-Type to the Tractor, page 43*.

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

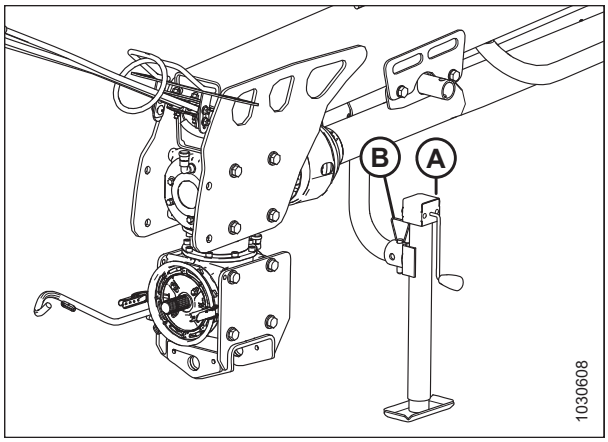


Figure 3.67: Drawbar Jack in Working Position

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

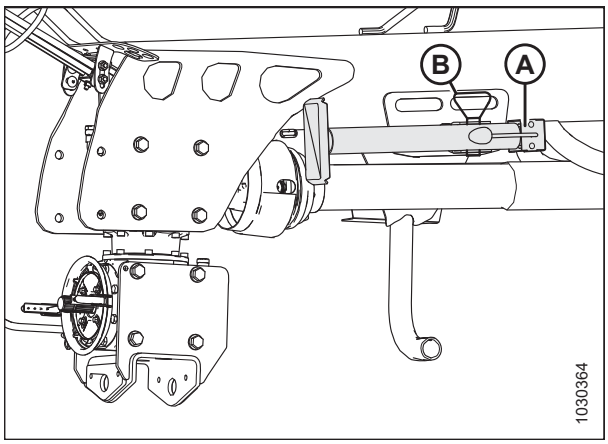


Figure 3.68: Drawbar Jack in Storage Position

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

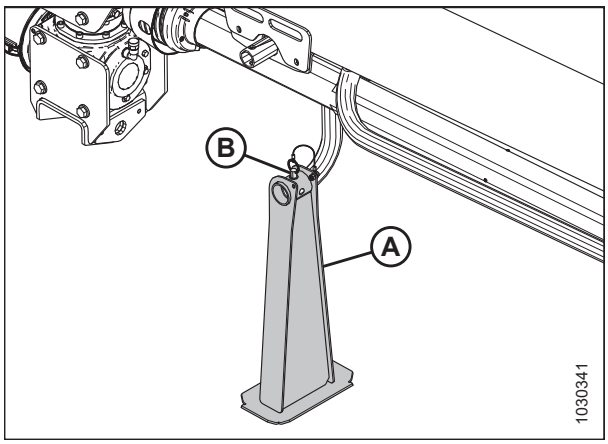


Figure 3.69: Two-Point Hitch Jack in Working Position

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

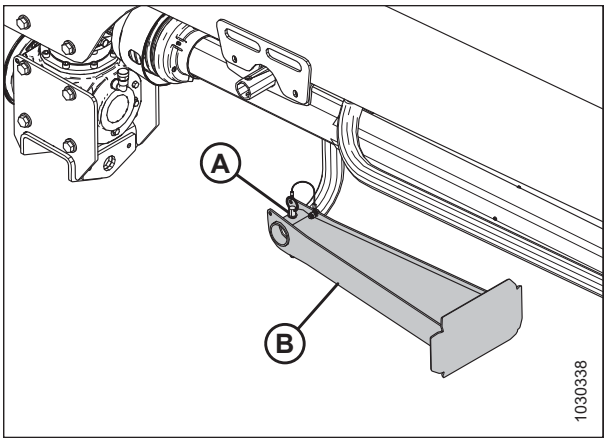


Figure 3.70: Two-Point Hitch Jack in Storage Position

7. Connect the hitch swing cylinder hoses (collars with #2) to tractor's hydraulic circuit (A). For instructions, refer to *3.7.3 Connecting Hydraulics, page 48*.

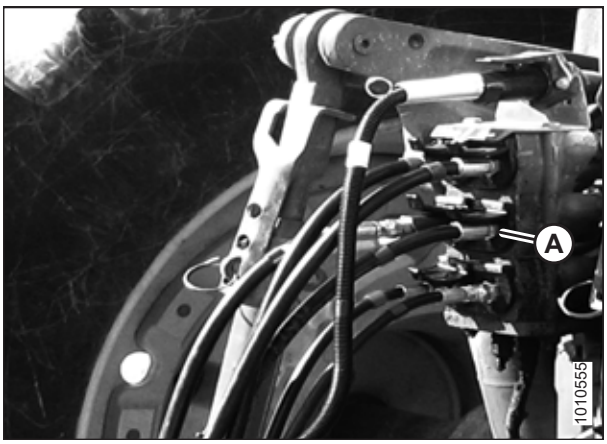


Figure 3.71: Hydraulic Connection

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

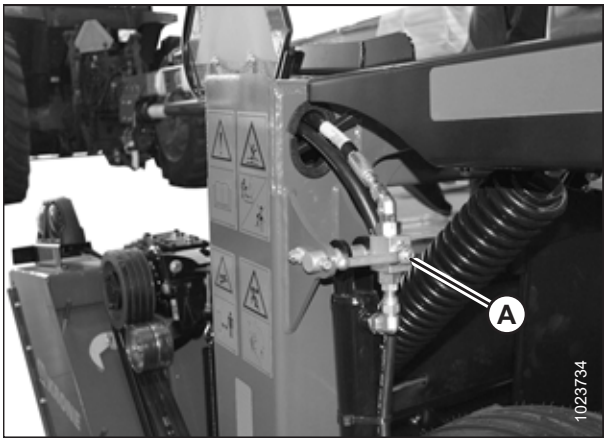


Figure 3.72: Cylinder Lock-Out Valve in Closed Position

11. Close the hitch swing lock-out valve by turning handle (A) to the closed position (90° angle to the hose).
12. Ensure tires are properly inflated.
13. Ensure the slow moving vehicle (SMV) sign, reflectors, and lights are clean and visible at rear of rotary disc pull-type.
14. Refer to *3.14.3 Transporting with a Tractor, page 81* for transport instructions.

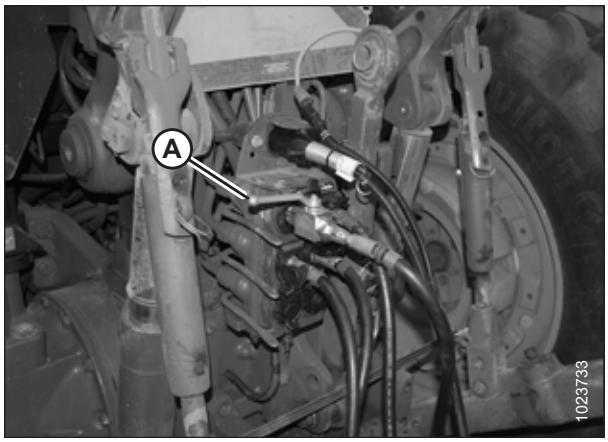


Figure 3.73: Hitch Swing Lock-Out Valve Shown in Closed Position

3.14.2 Converting between Field and Transport Modes

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

- *Converting from Transport to Field Mode – Without Road-Friendly Transport™, page 70*
- *Converting from Field to Transport Mode – Without Road-Friendly Transport™, page 71*
- *Converting from Field to Transport Mode – with Road-Friendly Transport™, page 72*
- *Converting from Transport to Field Mode – with Road-Friendly Transport™, page 78*

Converting from Transport to Field Mode – Without Road-Friendly Transport™

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. Connect all hydraulic hoses (refer to *3.7.3 Connecting Hydraulics, page 48* for instructions), and connect electrical wiring harness.
3. Open the steering lock-out valve by turning handle (A) to the open position (in line with hose).

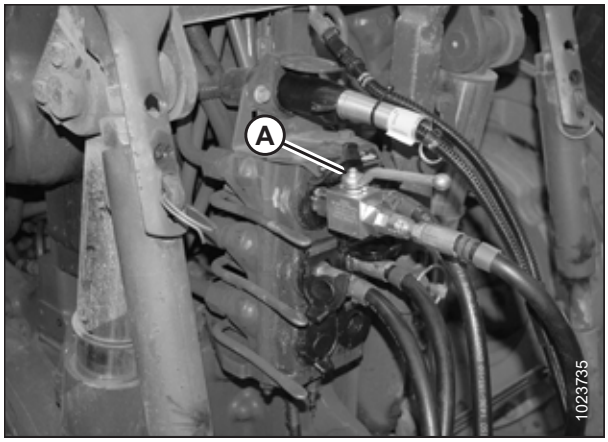


Figure 3.74: Steering Lock-Out Valve in Open Position

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

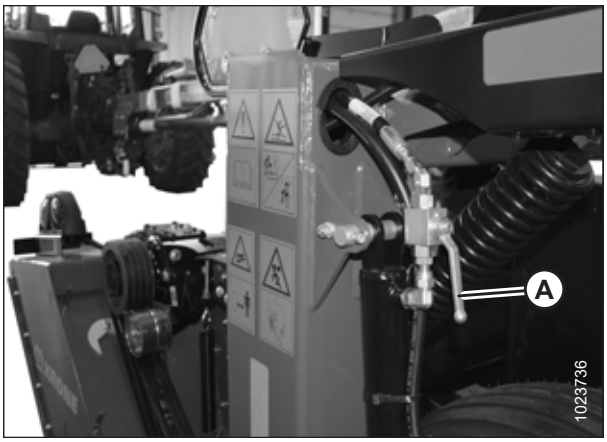


Figure 3.75: Lift Cylinder Lock-Out Valve in Open Position

Converting from Field to Transport Mode – Without Road-Friendly Transport™

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. Raise rotary disc pull-type.
2. Move rotary disc pull-type fully to the left, then fully to the right. Repeat this a couple times.
3. Center the rotary disc pull-type.
4. Shut down the engine, and remove the key from the ignition.
5. Close the steering lock-out valve by turning handle (A) to the closed position (90° angle to the hose).

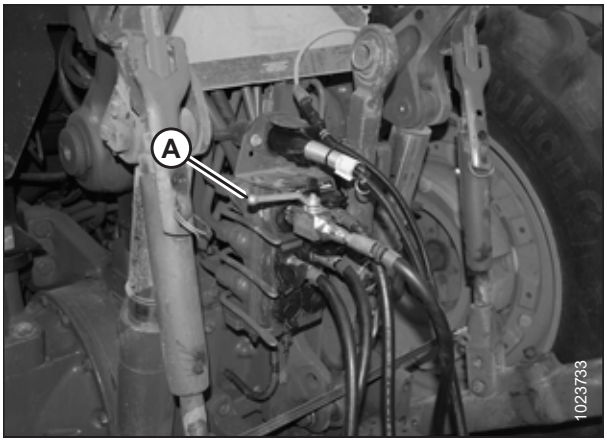


Figure 3.76: Steering Lock-Out Valve in Closed Position

6. Close the lift cylinder lock-out valve by turning handle (A) to the closed position (90° angle to the hose). Repeat on opposite side.
7. Disconnect all hydraulic hoses (refer to *3.7.3 Connecting Hydraulics, page 48* for instructions), and disconnect electrical wiring harness.

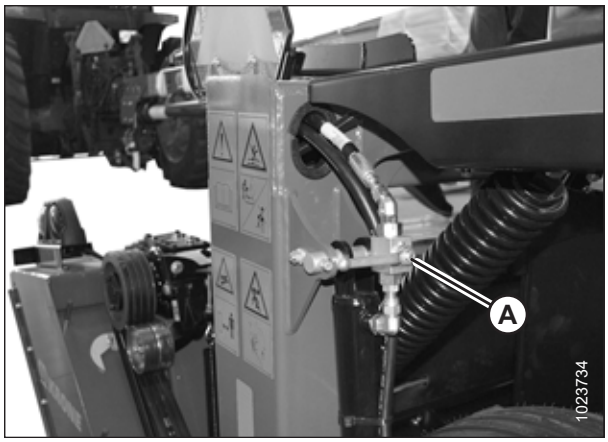


Figure 3.77: Lift Cylinder Lock-Out Valve in Closed Position

Converting from Field to Transport Mode – with Road-Friendly Transport™

DANGER

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

DANGER

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

CAUTION

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

IMPORTANT:

In some jurisdictions, having tall crop dividers installed can make the rotary disc pull-type too wide for public roads when in transport mode. If necessary, remove the dividers, and reinstall them after the machine is transported. For instructions, refer to *3.15.6 Tall Crop Divider Option, page 94*.

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

Figure 3.78: Control Box

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

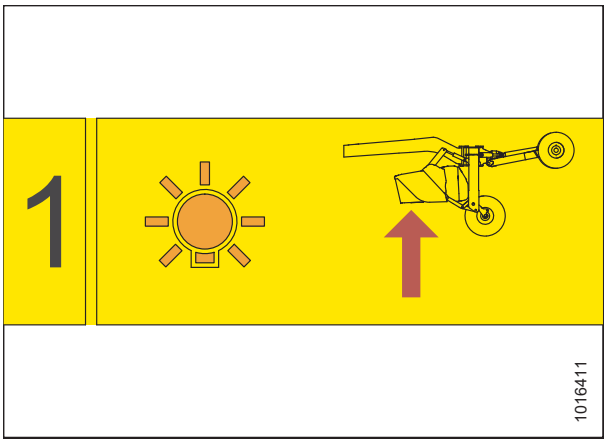


Figure 3.79: Raising Rotary Disc Pull-Type

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

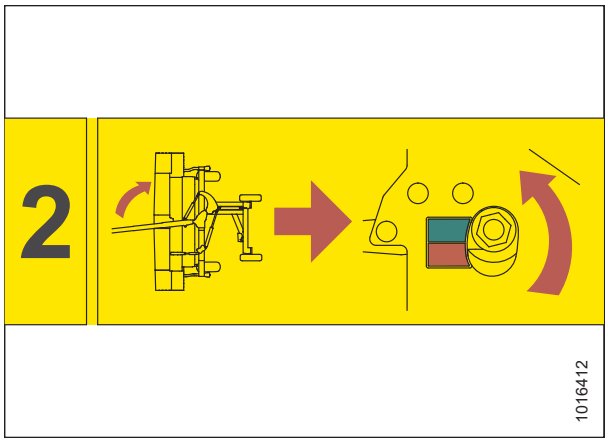


Figure 3.80: Rotary Disc Pull-Type Rotation

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

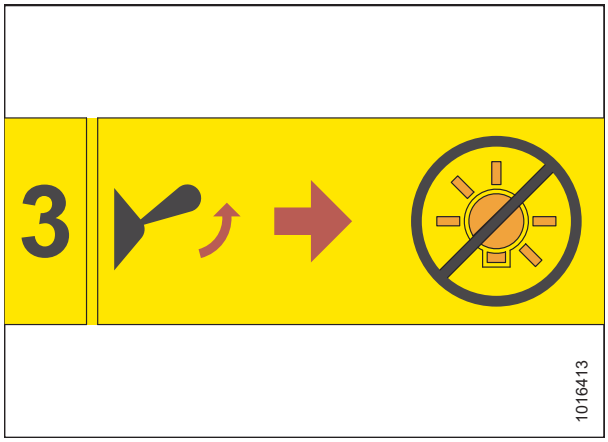


Figure 3.81: Transport Switch

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

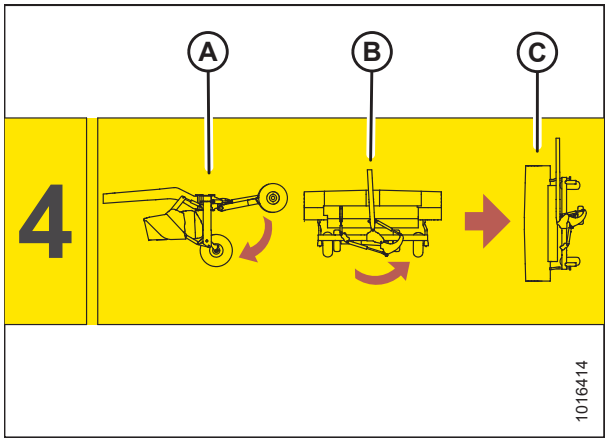


Figure 3.82: Transport Assembly Rotation

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

   IMPORTANT:

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

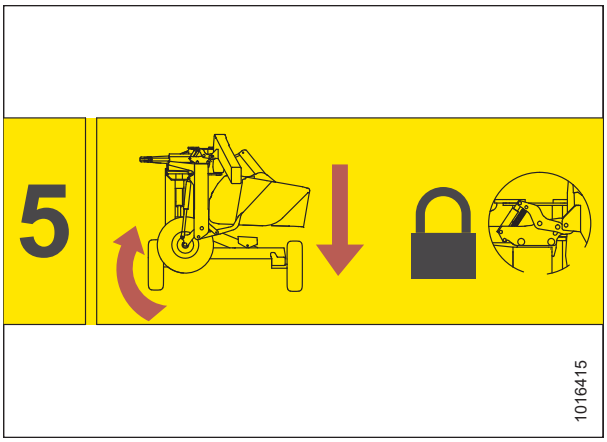


Figure 3.83: Transport Assembly Lowering

10. Close the steering lock-out valve and the two lift cylinder lock-out valves by turning the handles to the closed position. For instructions, refer to Figure *3.85, page 75* and Figure *3.86, page 76*.

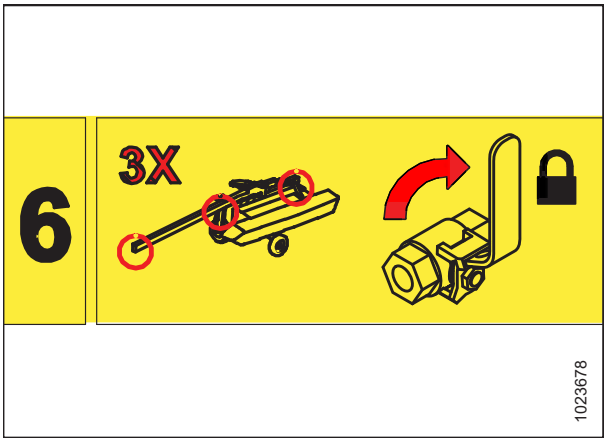


Figure 3.84: Hydraulic Lockout

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

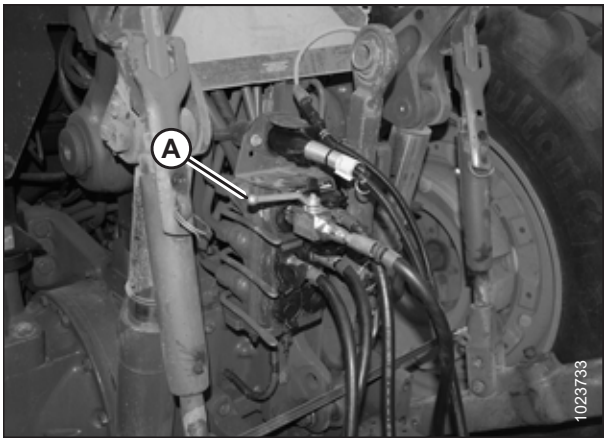


Figure 3.85: Steering Lock-Out Valve

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

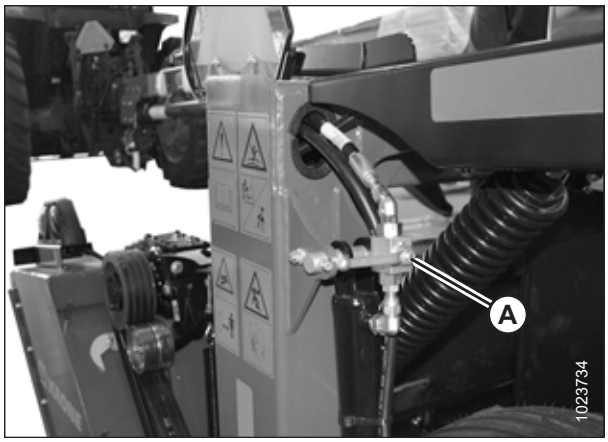


Figure 3.86: Lift Cylinder Lock-Out Valve

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

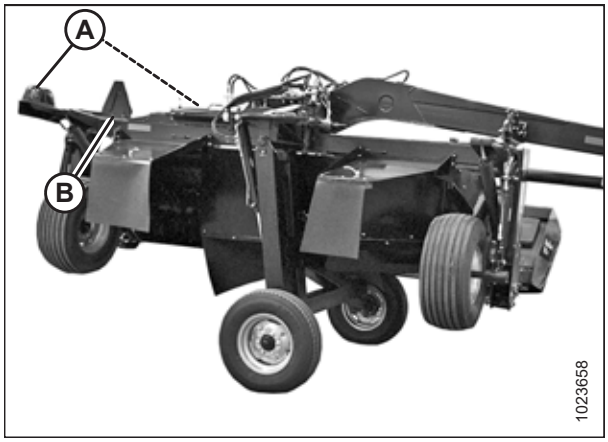


Figure 3.87: Transport Mode

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

Figure 3.88: Control Box

Converting from Transport to Field Mode – with Road-Friendly Transport™

DANGER

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

CAUTION

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

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

Figure 3.89: Control Box

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

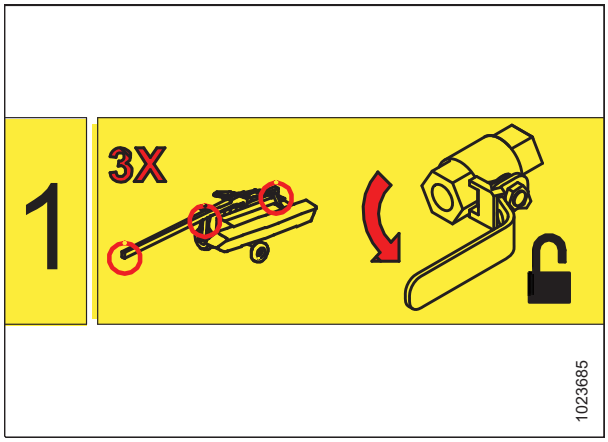


Figure 3.90: Hydraulic Lockout

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

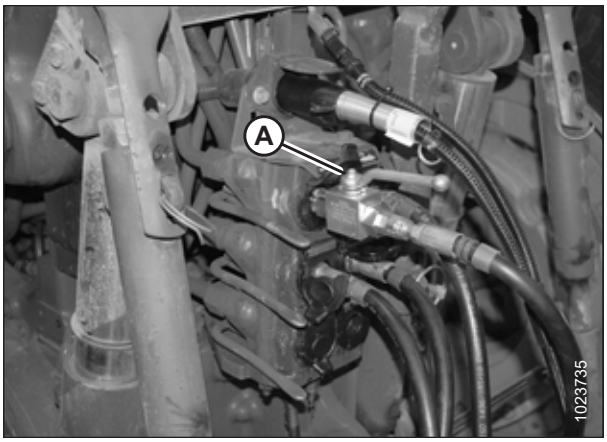


Figure 3.91: Steering Lock-Out Valve

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

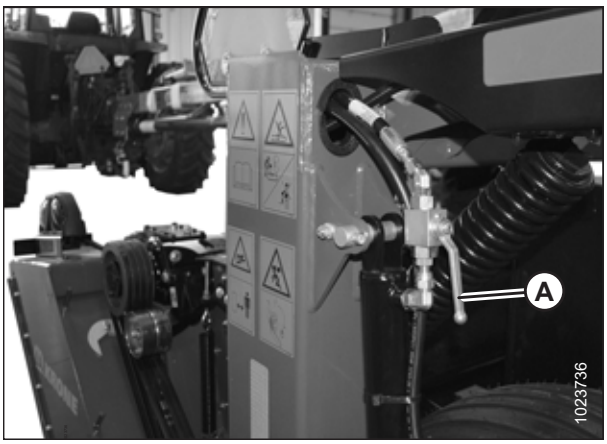


Figure 3.92: Lift Cylinder Lock-Out Valve

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

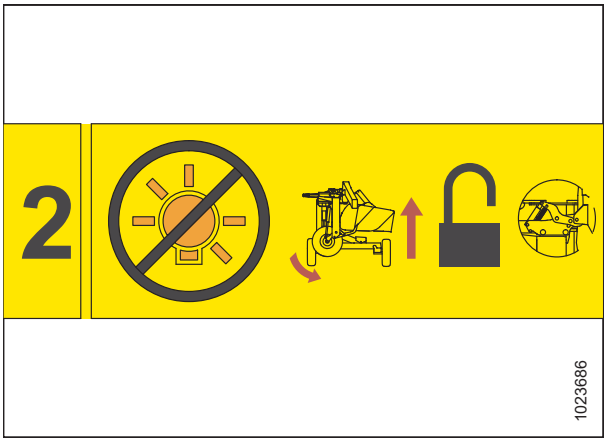


Figure 3.93: Raising Rotary Disc Pull-Type

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

   NOTE:

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

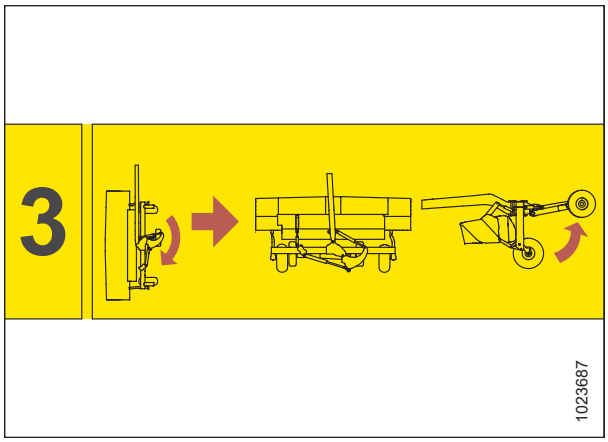


Figure 3.94: Rotary Disc Pull-Type Rotation

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

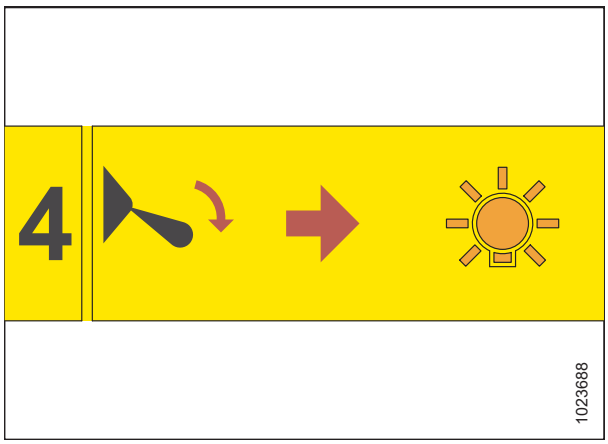


Figure 3.95: Transport Switch

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

Figure 3.96: Control Box

3.14.3 Transporting with a Tractor

If towing endwise with the optional Road-Friendly Transport™ system, refer to *Converting from Field to Transport Mode – with Road-Friendly Transport™, page 72*.

1. Before transporting the rotary disc pull-type with a tractor, ensure the machine is prepared for transport. Refer to *3.14.1 Preparing Rotary Disc Pull-Type for Transport, page 67* for instructions.
2. Ensure hitch safety chain is properly connected to the tractor. Provide only enough slack in chain to permit turning.
3. **If equipped with a drawbar hitch:** Move jack (A) to the storage position on the side of the hitch, align the mounting holes, and secure with pin (B).

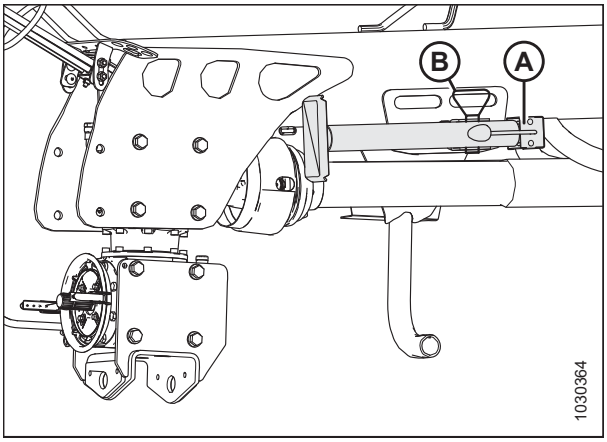


Figure 3.97: Drawbar Jack in Storage Position

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

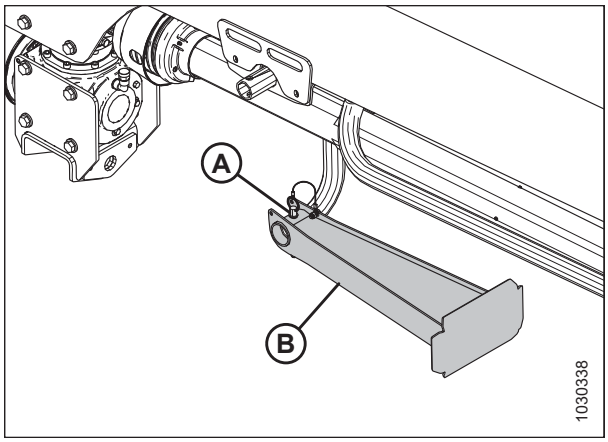


Figure 3.98: Two-Point Hitch Jack in Storage Position

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

   NOTE:

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

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

   NOTE:

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

7. Ensure tires are properly inflated.

   IMPORTANT:

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

3.14.4 Transport Lighting

Lighting – With Road-Friendly Transport™ Option

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

Red lights (B) located on the inboard side of the amber lights function as both tail and brake lights. For information about connecting the rotary disc pull-type's electrical harness to the tractor, refer to *3.7.4 Connecting Electrical Wiring Harness, page 49*.

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

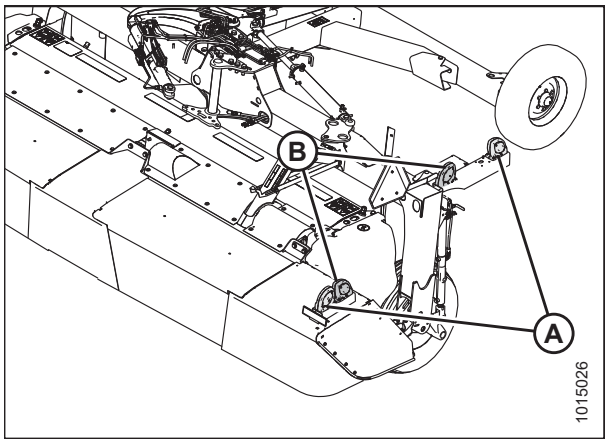


Figure 3.99: Lighting Locations – with Road-Friendly Transport™

Lighting – Without Road-Friendly Transport™ Option

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

Red lights (B) located on the inboard side of the amber lights function as both tail and brake lights. Refer to *3.7.4 Connecting Electrical Wiring Harness, page 49* for information about connecting the rotary disc pull-type's electrical harness to the tractor.

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

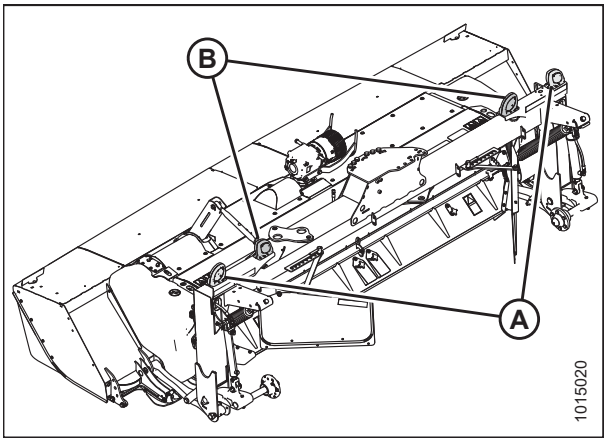


Figure 3.100: Lighting Locations

3.15 Operating the Rotary Disc Pull-Type

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

The variables listed in Table *3.8, page 84* and detailed on the following pages will affect the performance of your rotary disc pull-type. You will quickly become adept at adjusting your machine to produce the desired results. Although most of the adjustments have been set at the factory, settings can be changed to suit your crop conditions.

Table 3.8 Rotary Disc Pull-Type Performance Variables

Variable	Refer to
Rotary Disc Pull-Type float	*3.15.1 Float, page 84*
Rotary Disc Pull-Type angle	*3.15.3 Adjusting Cutterbar Angle, page 90*
Cutting height	*3.15.2 Cutting Height, page 87*
Ground speed	*3.15.4 Ground Speed, page 91*
Conditioning: roll type	*3.16 Conditioning: Roll Type, page 97*
Conditioning: finger type	*3.17 Conditioning – Finger Type, page 107*

3.15.1 Float

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

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

NOTE:

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

Adjusting Float

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

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:

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

1. Center the rotary disc pull-type directly behind the tractor and set the cutterbar to an appropriate orientation and tilt for the crop type and cutting conditions. Refer to *3.15.3 Adjusting Cutterbar Angle, page 90* for instructions.

   NOTE:

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

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

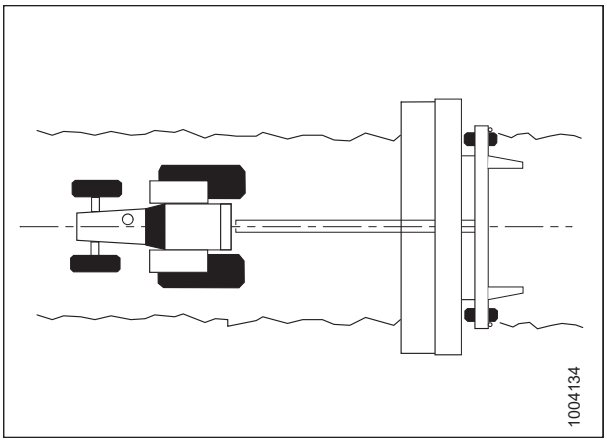


Figure 3.101: Rotary Disc Pull-Type Centered behind Tractor

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

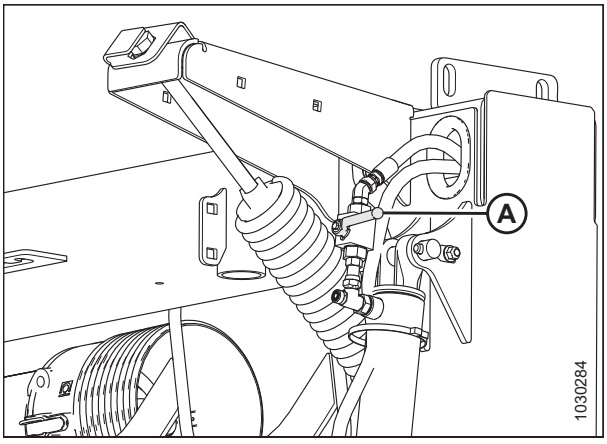


Figure 3.102: Cylinder Lock-Out Valve – Closed Position

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

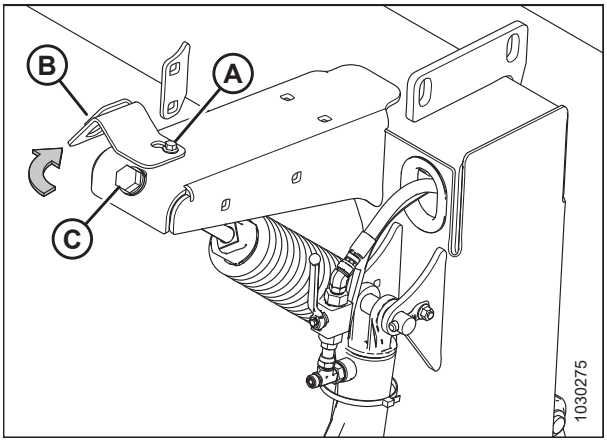


Figure 3.103: Float Spring – Right Side

7. Turn adjuster bolt (A) to achieve the recommended measurement (B) for the conditioner type. Refer to Table *3.9, page 86* for measurements.

   NOTE:

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

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

   Repeat on opposite side.

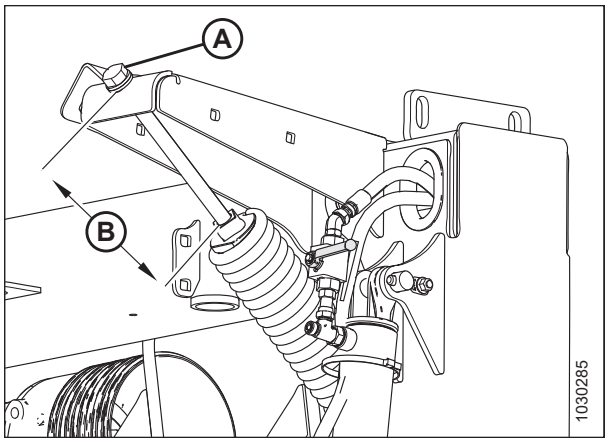


Figure 3.104: Adjuster Bolt

Table 3.9 Float Setting Starting Point

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

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

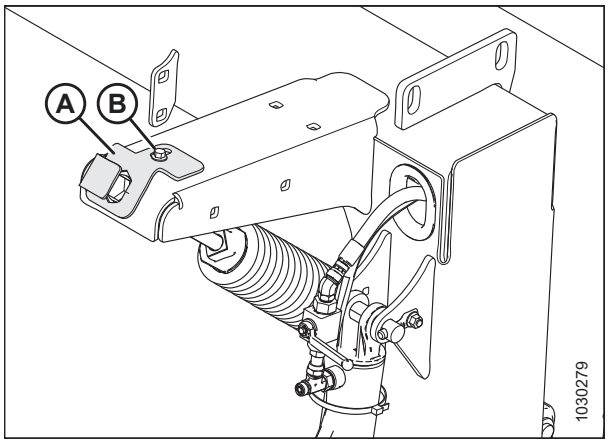


Figure 3.105: Adjuster Bolt Cover Plate

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

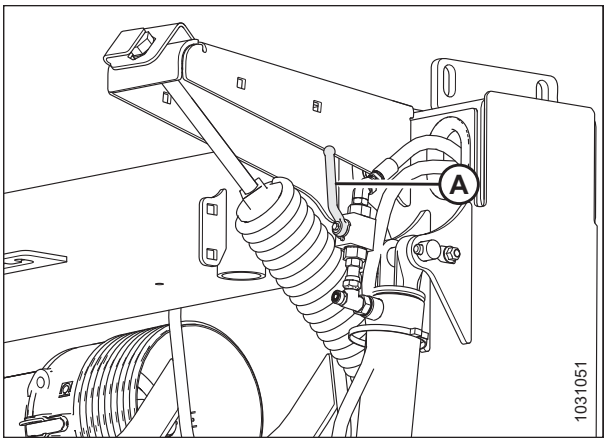


Figure 3.106: Cylinder Lock-Out Valve – Open Position

3.15.2 Cutting Height

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

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

Raising the skid shoes and increasing the cutterbar angle decreases the cutting height, resulting in a shorter stubble. For instructions, refer to *Adjusting Cutting Height, page 88*.

To choose a cutterbar angle that maximizes performance for your crop and field conditions, refer to *3.15.3 Adjusting Cutterbar Angle, page 90*.

To minimize cutterbar damage, scooping soil, and soil build-up at the cutterbar in damp conditions, the float should be set as light as possible without causing excessive bouncing. For instructions, refer to *Adjusting Float, page 84*.

Adjusting Cutting Height

DANGER

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

NOTE:

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
4. Loosen bolts (C).
5. Remove bolts, nuts, and washers (D).
6. Raise or lower the skid shoe.

   NOTE:

   Skid shoes have two adjustment settings: fully raised (A) and fully lowered (B).
7. Install bolts, nuts, and washers (D), 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 *3.15.3 Adjusting Cutterbar Angle, page 90*.
10. Check the rotary disc pull-type float. For instructions, refer to *Adjusting Float, page 84*.

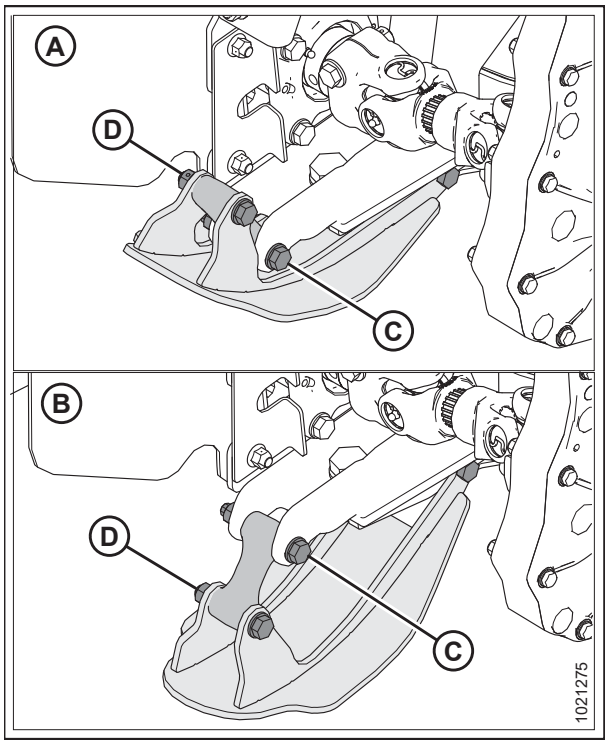


Figure 3.107: Skid Shoes – R113 PT

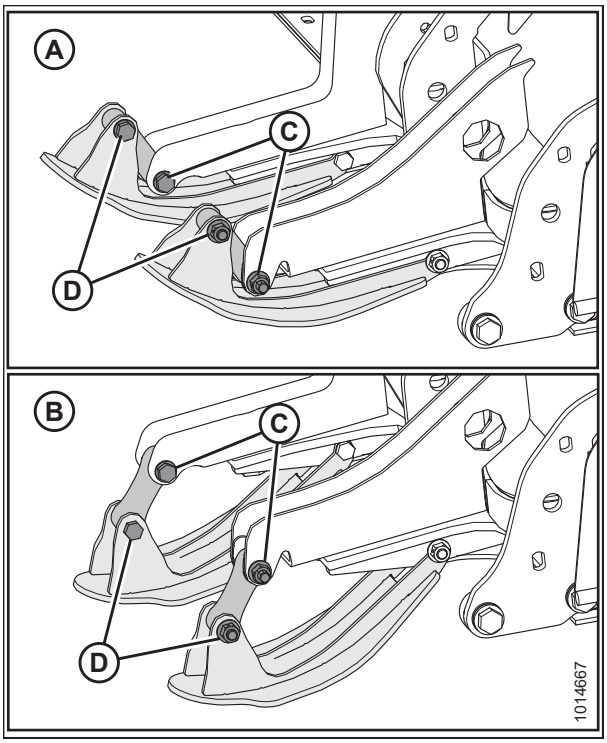


Figure 3.108: Skid Shoes – R116 PT

3.15.3 Adjusting Cutterbar Angle

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

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

NOTE:

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

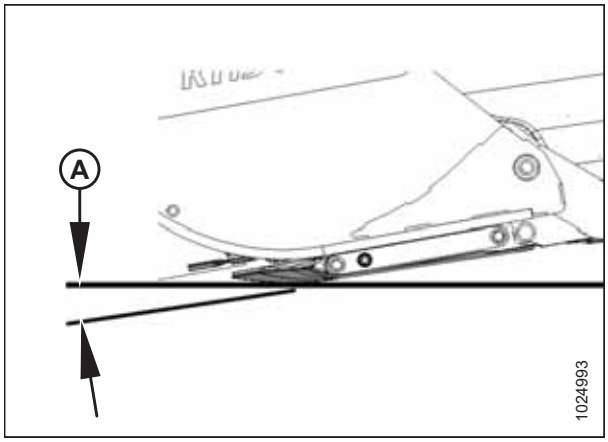


Figure 3.109: Cutterbar Angle

Adjusting Cutterbar Angle – Mechanical Center-Link

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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Loosen nut (A).
4. Decrease (flatten) cutterbar angle by rotating turnbuckle sleeve (B) to decrease the turnbuckle length.
5. Increase (steepen) cutterbar angle by rotating turnbuckle sleeve (B) to increase the turnbuckle length.
6. Tighten nut (A) but do **NOT** overtighten. A slight tap with a small hammer is sufficient.
7. Check cutting height and adjust if required.
8. Check rotary disc pull-type float and adjust if required. For adjustment instructions, refer to *Adjusting Float, page 84*.

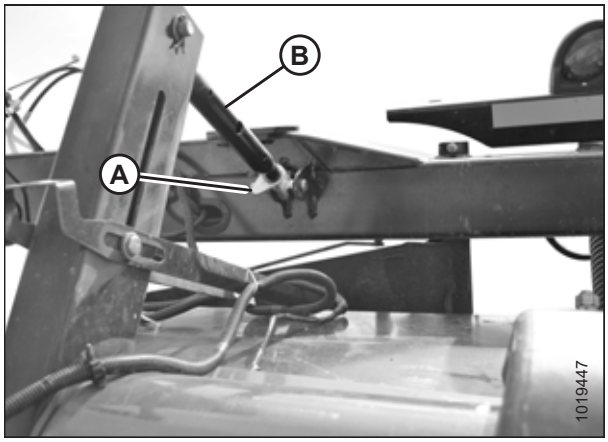


Figure 3.110: Mechanical Center-Link

Adjusting Cutterbar Angle – Optional Hydraulic Center-Link

NOTE:

The cutterbar angle can be adjusted from the tractor without shutting down the rotary disc pull-type.

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

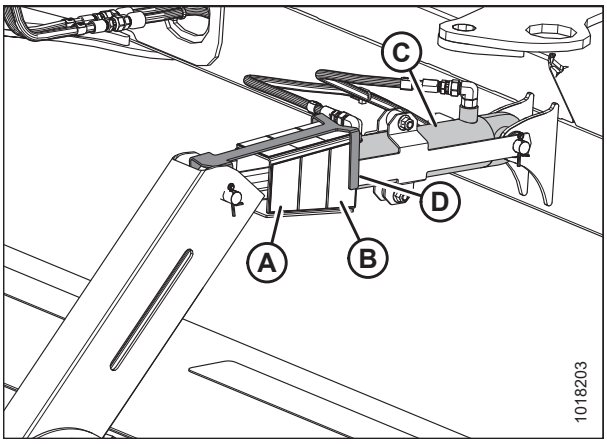


Figure 3.111: Hydraulic Center-Link

3.15.4 Ground Speed

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

CAUTION

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

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

In light crops, reduce the rotary disc pull-type's disc speed while maintaining ground speed.

NOTE:

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

The example shown in Figure *3.112, page 92* illustrates the relationship between ground speed and cut area for an R113 and an R116 rotary disc pull-type. The chart demonstrates that a ground speed of 21 km/h (13 mph) would produce a cut area of approximately 8 hectares (20 acres) per hour.

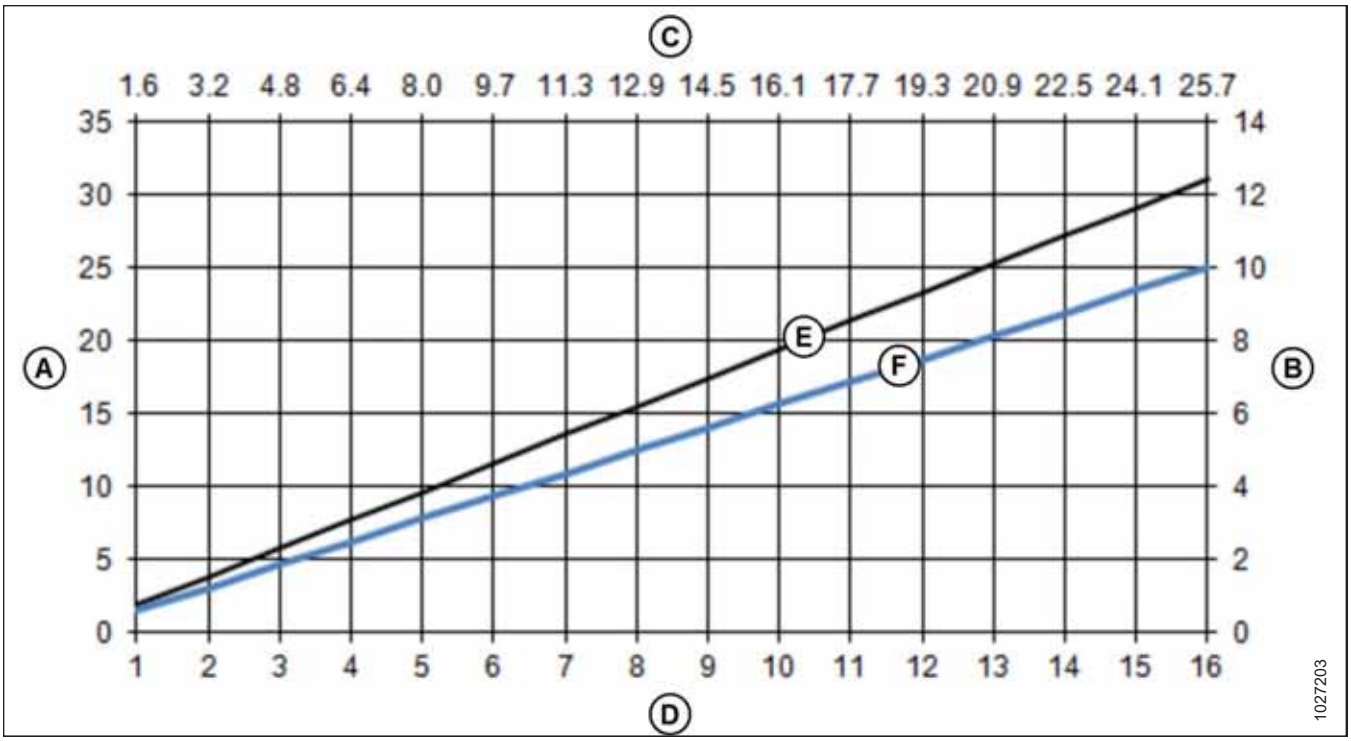


Figure 3.112: Ground Speed for R113 and R116 PT

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

3.15.5 Cutterbar Deflectors

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

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

Table 3.10 Conditions for Using Cutterbar Deflectors

Crop/Field Condition	Use Deflector
Average crop/normal field conditions	No
Long-stemmed and heavy/normal field conditions	Yes
Long-stemmed and heavy/sandy soil	No
Long-stemmed and heavy/gopher mounds or rocks[8]	No
Using finger conditioner	No

Removing Cutterbar Deflectors

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 engine, remove key, and engage lift cylinder lock-out valves before going under machine for any reason.

IMPORTANT:

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

1. Raise the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
4. Locate deflector (A) behind the cutterbar.
5. Clean debris from the deflector area.
6. Remove bolt (B) shared with the rock guard on the outboard end of deflector. Retain the hardware.
7. 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.
8. Repeat previous steps on the opposite side.
9. 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.

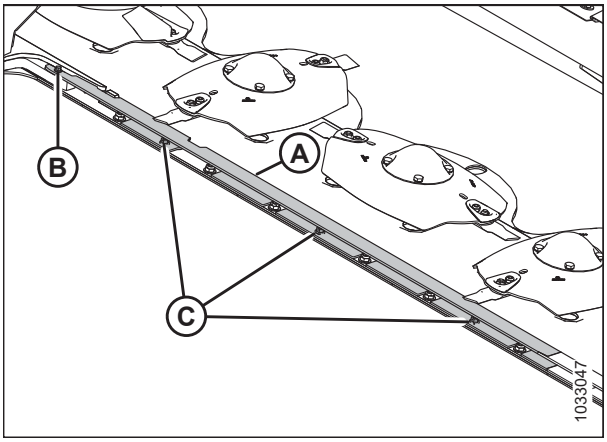


Figure 3.113: Left Deflector – Behind the Cutterbar

10. If the cutterbar is being replaced, install the deflectors on the new cutterbar. For instructions, refer to *Installing Cutterbar Deflectors, page 94*.

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

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 engine, remove key, and engage lift cylinder lock-out valves before going under machine for any reason.

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

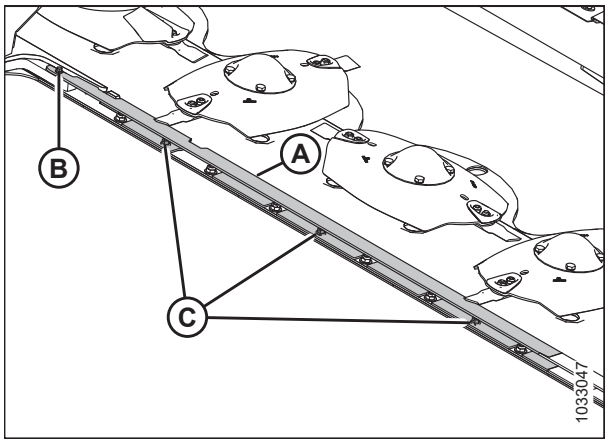


Figure 3.114: Left Cutterbar Deflector – Behind Cutterbar

3.15.6 Tall Crop Divider Option

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

Installing Tall Crop Divider

DANGER

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

IMPORTANT:

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36* or *3.3.2 Opening Cutterbar Doors – Export Latches, page 37*.

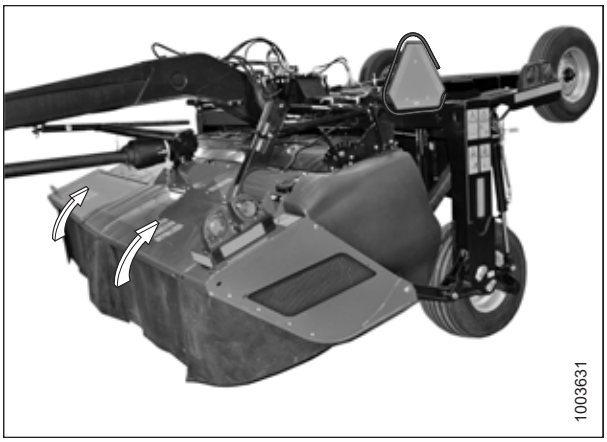


Figure 3.115: Cutterbar Doors

4. Remove three bolts (A) and nuts where the divider (B) will be mounted.
5. Position the divider (B) on rotary disc pull-type, and reinstall three bolts (A) and nuts. Tighten nuts.
6. Repeat for opposite side.
7. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

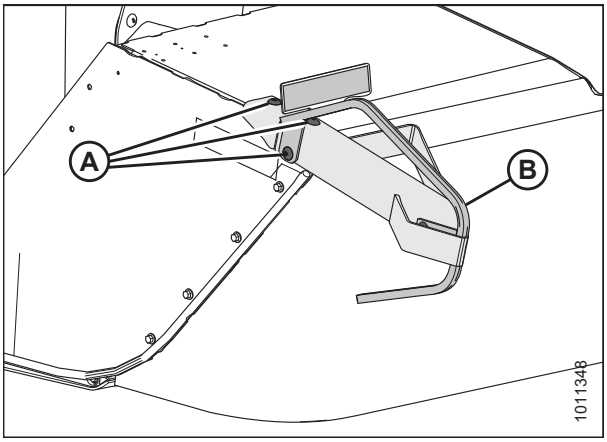


Figure 3.116: Divider and Hardware

Removing Tall Crop Divider

DANGER

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

1. Lower rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36* or *3.3.2 Opening Cutterbar Doors – Export Latches, page 37*.

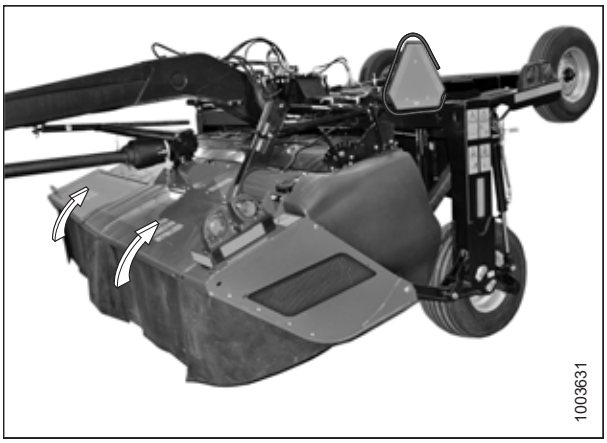


Figure 3.117: Cutterbar Doors

4. Remove three bolts (A), and remove deflector (B).
5. Reinstall three bolts (A).
6. Repeat for opposite side.
7. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

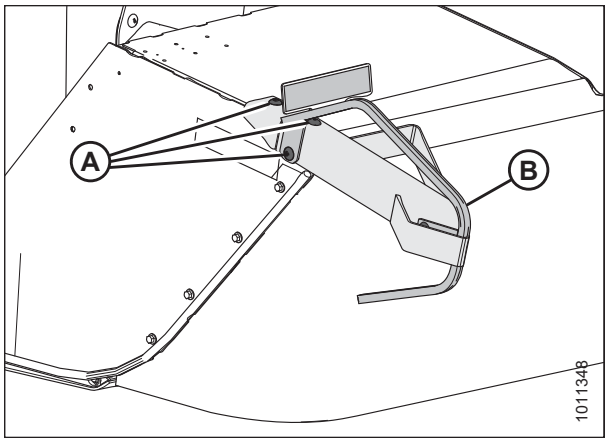


Figure 3.118: Deflector and Hardware

3.16 Conditioning: Roll Type

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

3.16.1 Roll Gap

The roll gap 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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Insert a feeler gauge through the inspection hole in the conditioner endsheet to check roll gap on polyurethane roll conditioners. Factory setting is 3 mm (1/8 in.).

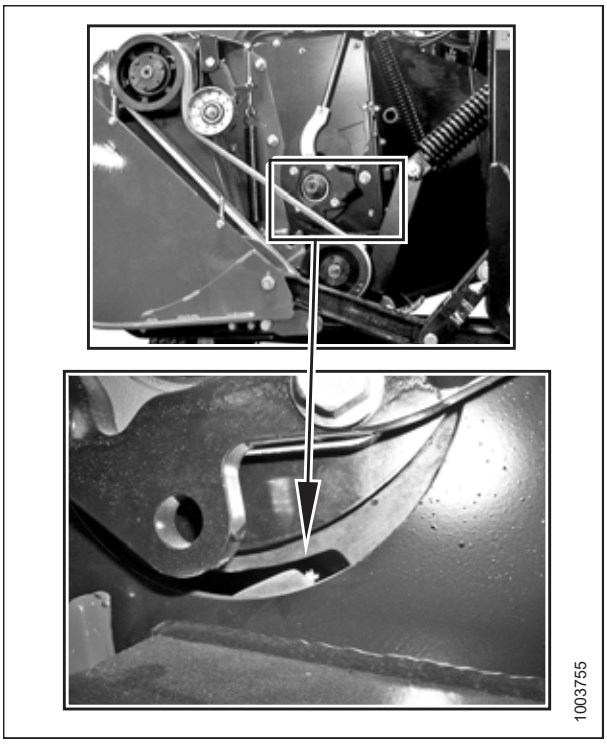


Figure 3.119: Polyurethane Roll Conditioner

4. **Steel Roll:** The length of thread (A) extending above the jam nut on the adjustment rods can be used as an approximation of roll gap but does **NOT** provide consistent roll gap measurements. Roll gap factory setting is 6 mm (1/4 in.). If adjustments are required, refer to *Adjusting Roll Gap – Steel Rolls, page 100* for adjustment instructions.

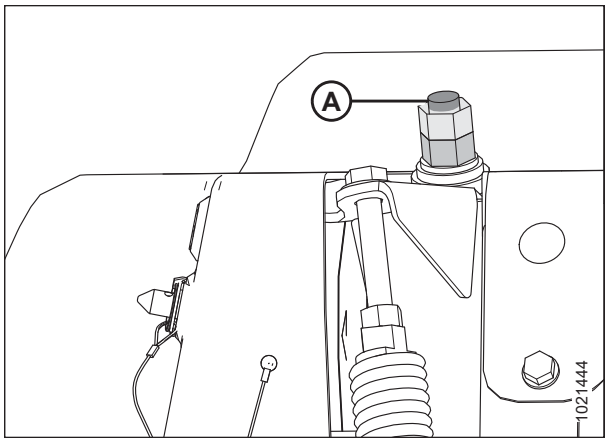


Figure 3.120: Roll Gap Adjustment

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

   IMPORTANT:

   Make sure the roll gap adjustment nuts are adjusted equally on both sides to achieve a consistent gap across the rolls.
7. Rotate the rolls manually and use a feeler gauge at the ends of the rolls to check that the actual gap is no less than 2 mm (5/64 in.) and no more than 4 mm (5/32 in.).

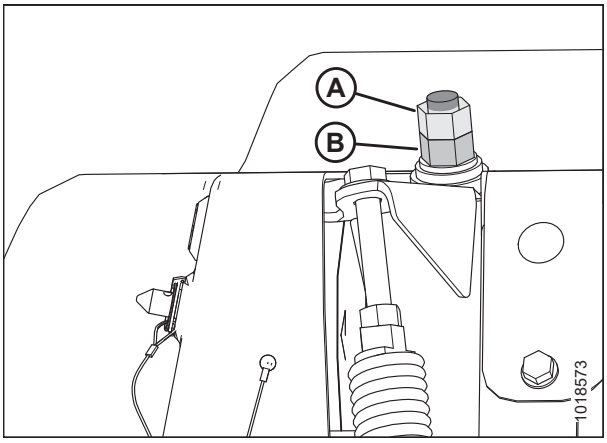


Figure 3.121: Roll Gap Adjustment

Adjusting Roll Gap – Steel Rolls

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

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

   IMPORTANT:

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

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

   NOTE:

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

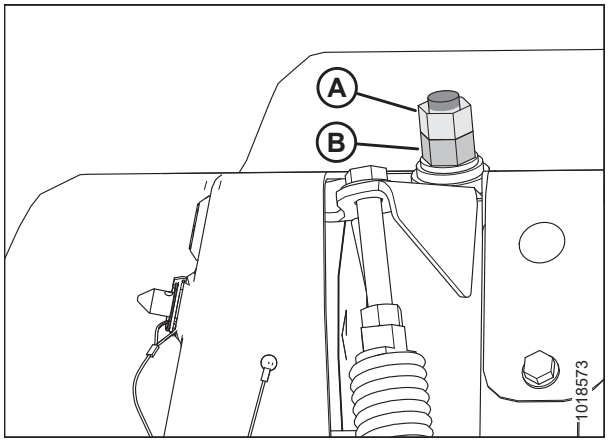


Figure 3.122: Roll Gap Adjustment

3.16.2 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 rotary disc pull-type 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.

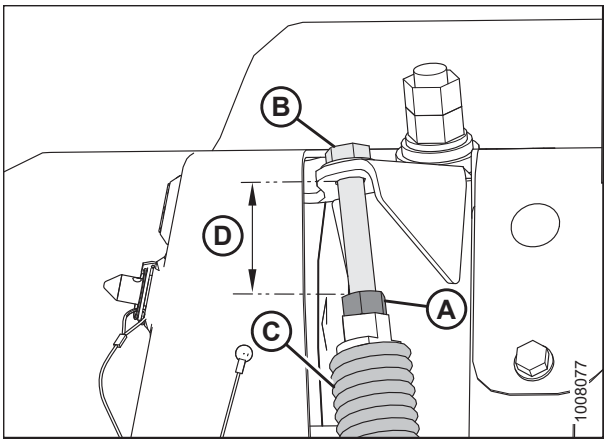


Figure 3.123: Adjusting Roll Tension

3.16.3 Roll Timing

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

IMPORTANT:

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

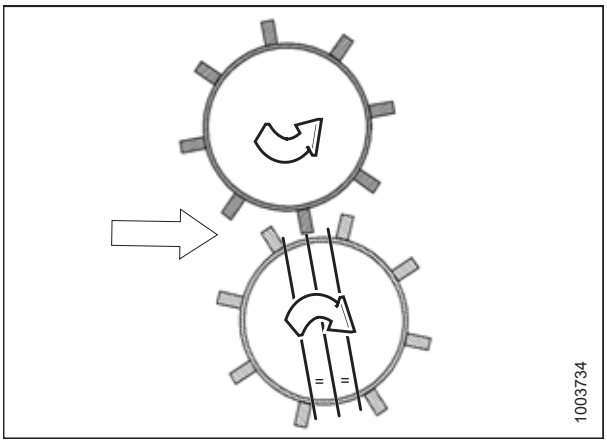


Figure 3.124: Properly Timed Rolls

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 102*.

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.

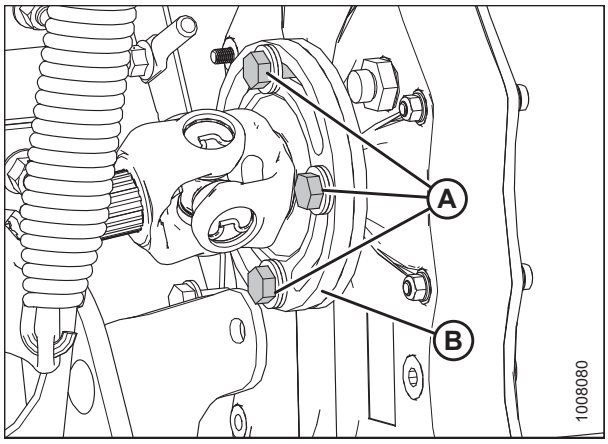


Figure 3.125: Conditioner Drive

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

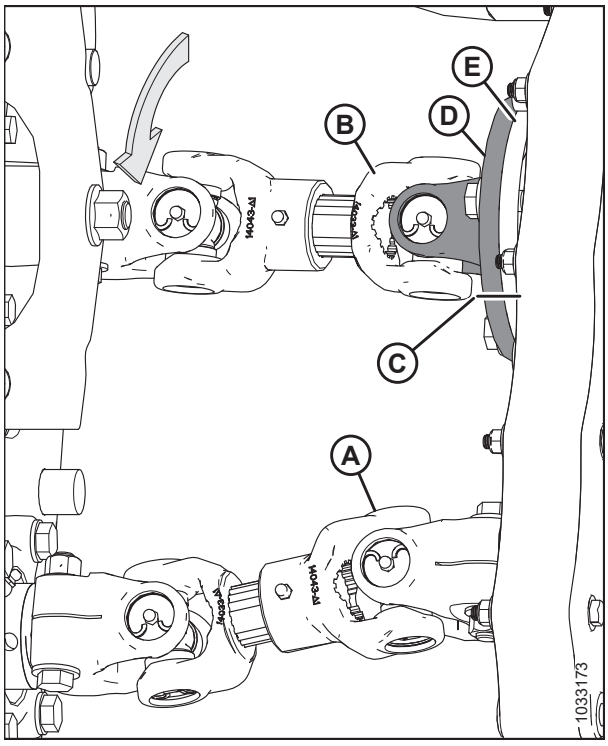


Figure 3.126: Conditioner Drive

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

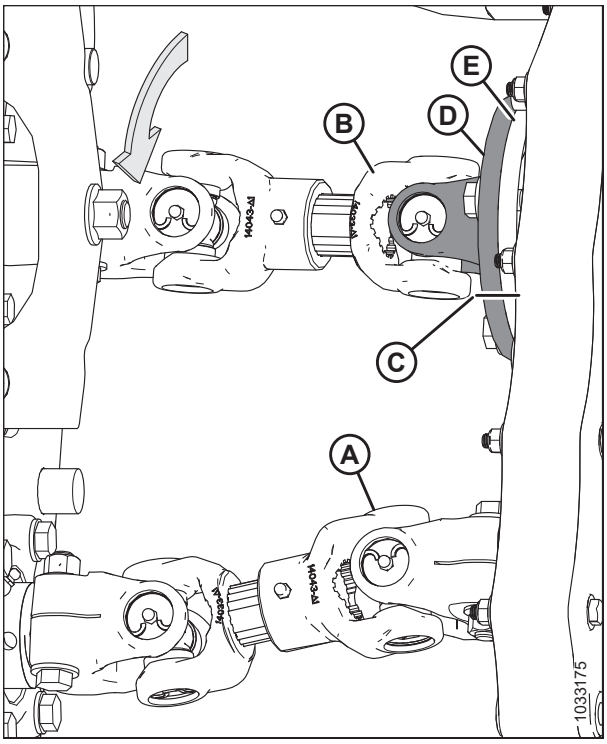


Figure 3.127: Conditioner Drive

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

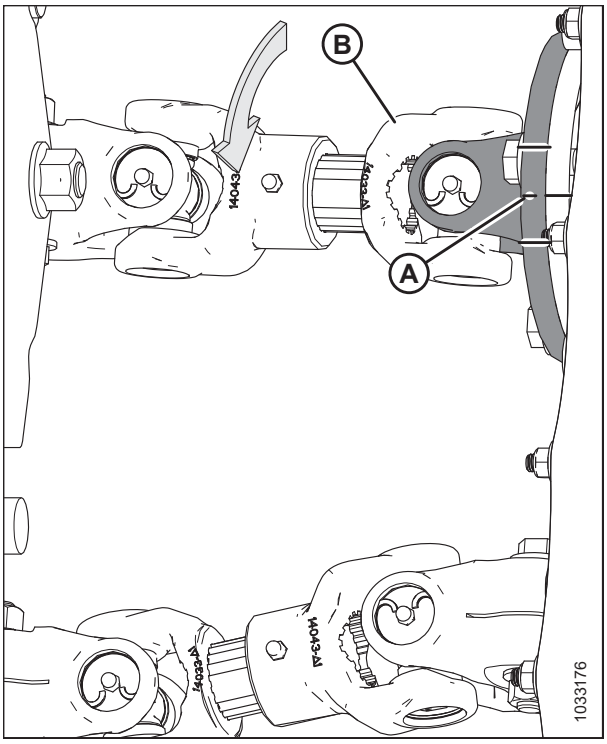


Figure 3.128: Conditioner Drive

9. 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.

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

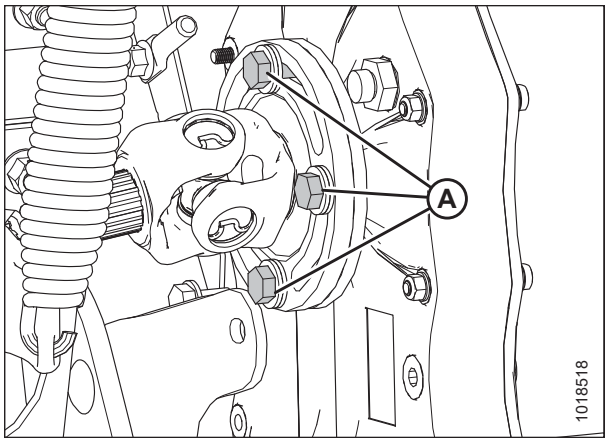


Figure 3.129: Conditioner Drive

3.16.4 Adjusting Forming Shields – Roll Conditioner

WARNING

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

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

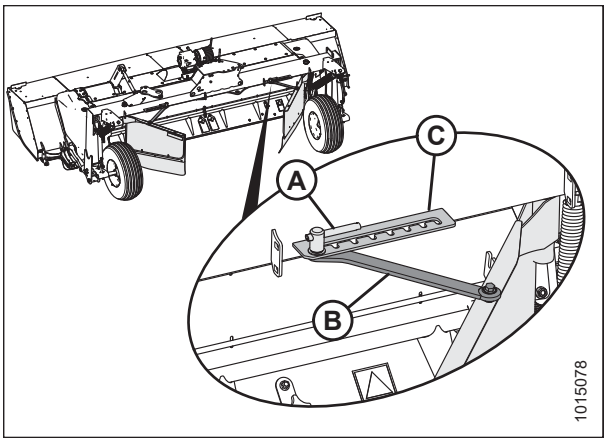


Figure 3.130: Side Deflector and Adjuster Bar

Positioning Rear Baffle – Roll Conditioner

The rear baffle is used in conjunction with the forming shields 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.

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

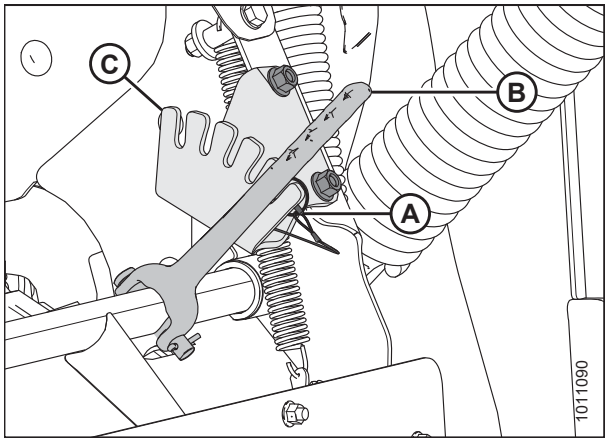


Figure 3.131: Right End of Conditioner

3.17 Conditioning – Finger Type

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

The degree to which the crop is conditioned as it passes through the conditioner is controlled by the clearance between the fingers and the internal intensity baffle and by the rotational speed of the fingers (refer to *Changing Finger Rotor Speed, page 108* for adjustment instructions).

3.17.1 Internal Intensity Baffle

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

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

The baffle is located in front of and above the finger rotor. Set the clearance depending on crop volume and the desired level of conditioning:

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

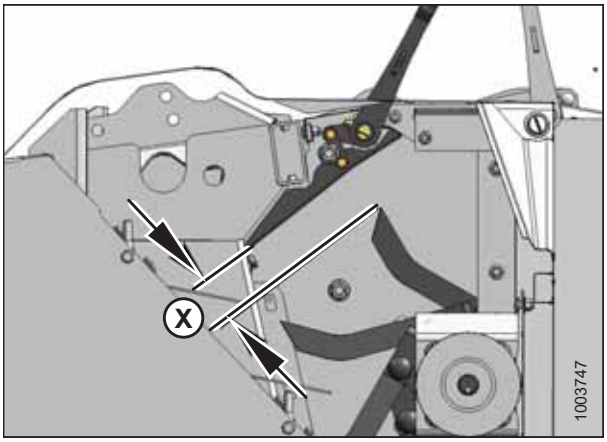


Figure 3.132: Internal Intensity Baffle

Adjusting Internal Intensity Baffle Clearance

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

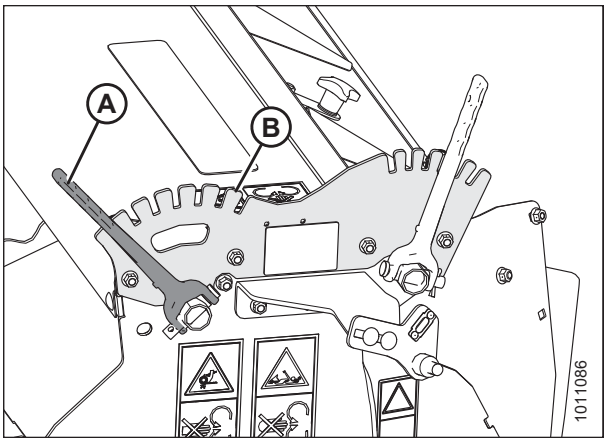


Figure 3.133: Internal Intensity Baffle Adjustment Lever

3.17.2 Finger Rotor Speed

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

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

Changing Finger Rotor Speed

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:

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

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

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

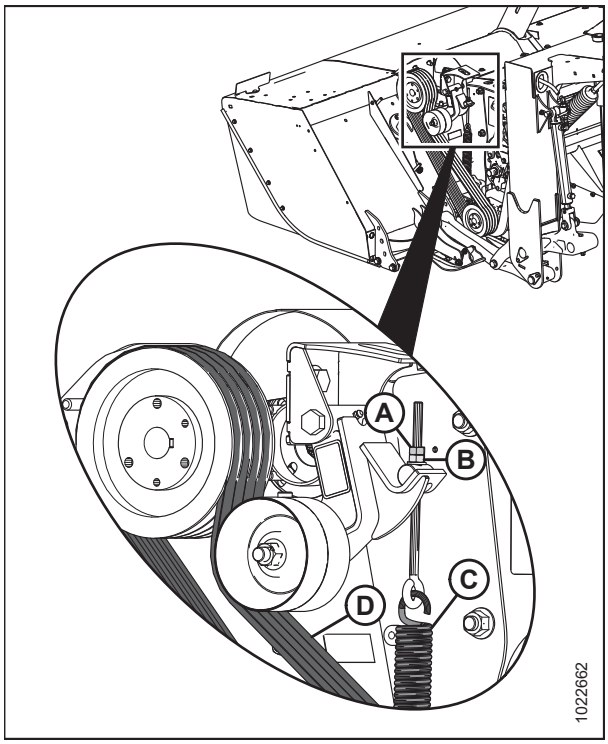


Figure 3.134: Drive Belt and Pulleys on Left Side – Rotary Disc Pull-Type

4. Measure and record the distance from the shaft end to taper lock bushing face (A) on both pulleys.
5. Remove three bolts (B) and insert them into the three threaded bores.
6. Apply uniform pressure to the taper lock bushing by slightly tightening each bolt in a circular pattern until the taper lock bushing comes free.
7. Repeat Step *5, page 109* and Step *6, page 109* on the second pulley.
8. Swap the pulleys.

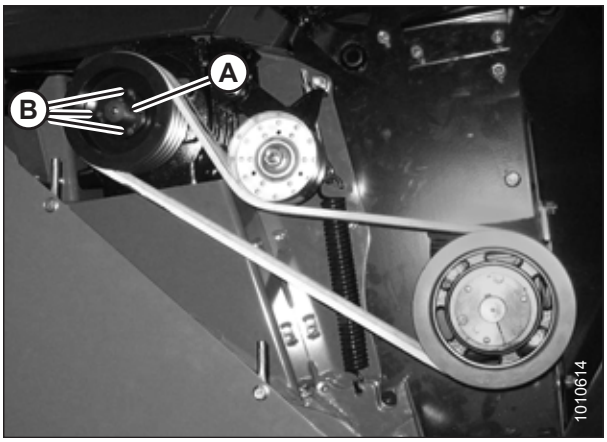


Figure 3.135: Drive Belt and Pulleys on Left Side – Rotary Disc Pull-Type

9. Slip taper lock bushing (A) onto the shaft at the same depth measurement recorded in Step *4, page 109*. The pulley will be drawn into the taper lock when tightening.
10. Repeat Step *9, page 109* for the second pulley.
11. Verify pulley face alignment by using a long, verified straight edge, and bridge both faces to a tolerance of 5 mm (3/16 in.).

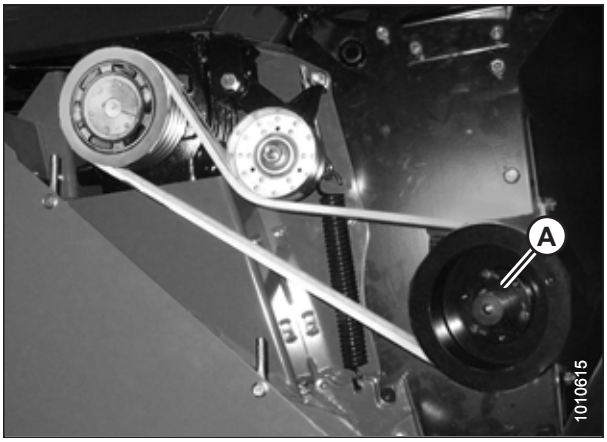


Figure 3.136: Drive Belt and Pulleys on Left Side – Rotary Disc Pull-Type

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

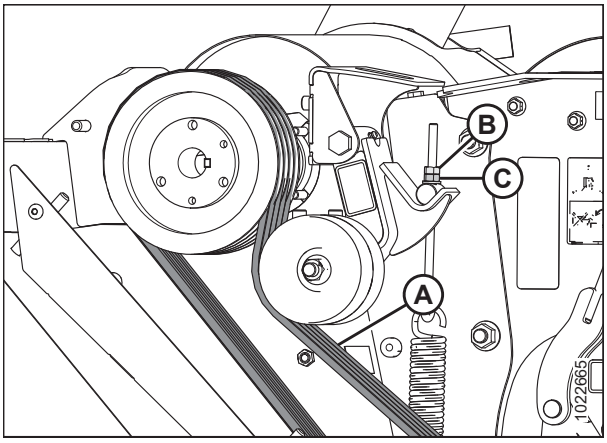


Figure 3.137: Jam Nut and Adjuster Nut on Left Side of Rotary Disc Pull-Type

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

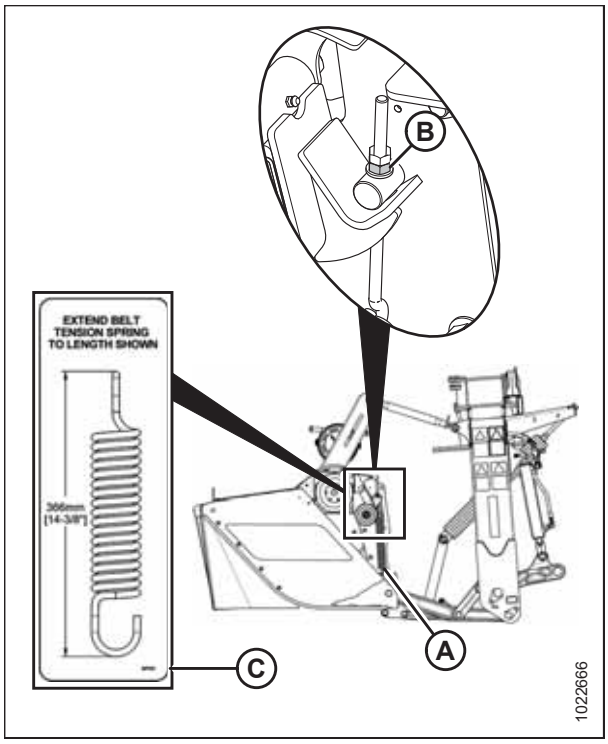


Figure 3.138: Spring Tension Decal

16. Install jam nut (A).
17. Hold a wrench on adjuster nut (B) and turn jam nut (A) clockwise into adjuster nut to lock the tension adjustment.
18. Verify that the pulleys run true and if any of the pulleys wobble, return to Step *1, page 108* and repeat the procedure to reinstall the taper locks on the affected pulleys.

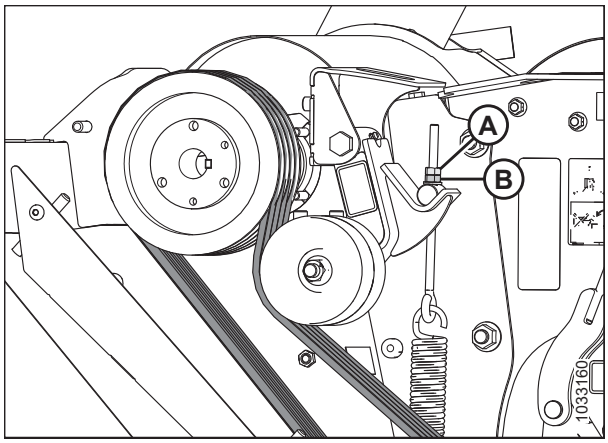


Figure 3.139: Conditioner Drive

3.17.3 Forming Shields – Finger Conditioner

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

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

A wider windrow will generally dry faster and more evenly, resulting in less protein loss. Fast drying is especially important in areas where the weather allows only a few days to cut and bale. For more information, refer to *3.18 Haying Tips, page 113*.

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

Positioning Side Deflectors – Finger Conditioner

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

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

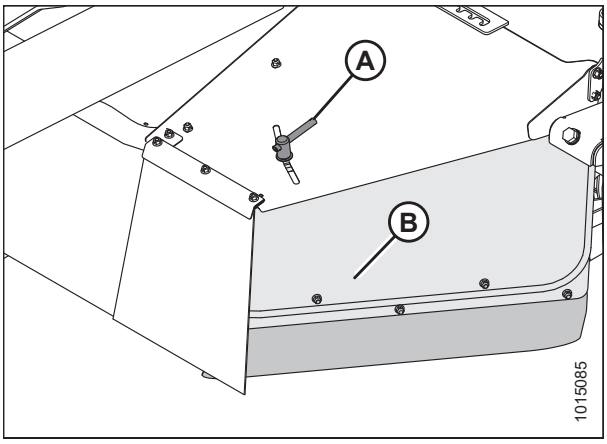


Figure 3.140: Right Top Cover

Positioning Rear Baffle – Finger Conditioner

The rear baffle (A) is located immediately behind and above the finger conditioner. Baffle (A) can be used to direct crop into the forming shields for narrow and moderate width windrows or to direct crop downward to form a wide swath.

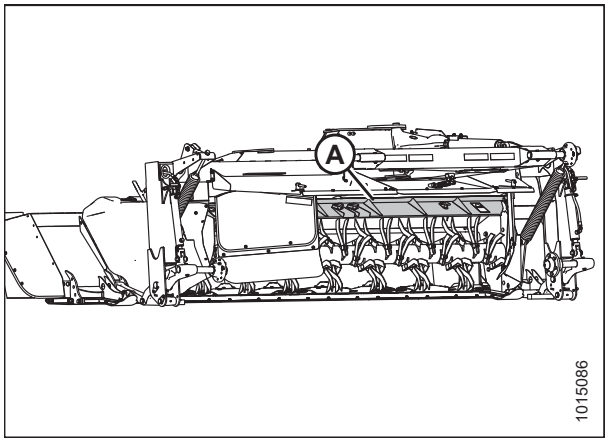


Figure 3.141: Rear Baffle Finger Conditioner

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.

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

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

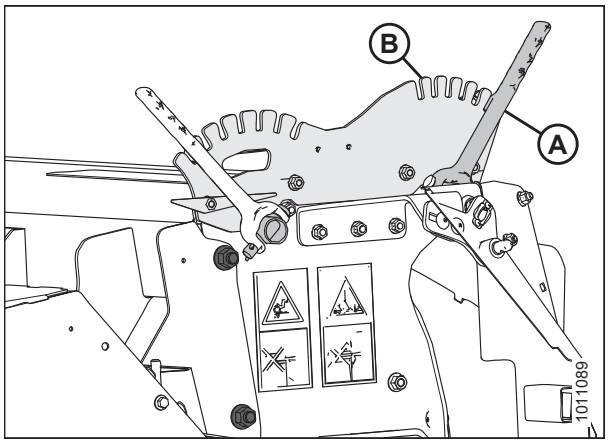


Figure 3.142: Rear Baffle Adjustment Lever

3.18 Haying Tips

3.18.1 Curing

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

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

3.18.2 Topsoil Moisture

Table 3.11 Topsoil Moisture Levels

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

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

3.18.3 Weather and Topography

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

3.18.4 Windrow Characteristics

Producing windrows with the recommended characteristics will achieve the best results. Refer to *3.15 Operating the Rotary Disc Pull-Type, page 84* for instructions on adjusting the rotary disc pull-type.

Table 3.12 Recommended Windrow Characteristics

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

3.18.5 Driving on Windrow

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

NOTE:

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

3.18.6 Raking and Tedding

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

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

3.18.7 Using Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces and allowing moisture to escape cut crop and evaporate faster; however, treated hay lying on wet ground will absorb ground moisture faster.

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

3.19 Checking Level of the Rotary Disc Pull-Type

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

If the rotary disc pull-type is **NOT** level, check the tire pressure and ensure proper inflation. For inflation instructions refer to *Inflating Tires, page 273*.

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

3.20 Unplugging the Rotary Disc Pull-Type

The cutterbar or the conditioner rolls (if installed) can get plugged with crop. To safely unplug the cutterbar, 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. Stop forward movement of the tractor and stop the power take-off (PTO).
2. Raise the rotary disc pull-type fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.

WARNING

Wear heavy gloves when working around cutterbar.

5. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

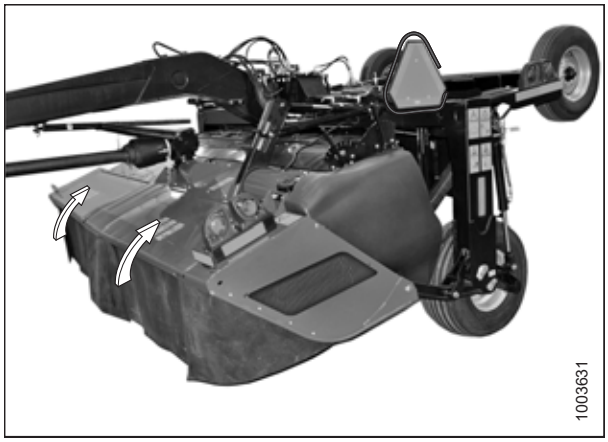


Figure 3.143: Cutterbar Doors

6. Clean off cutterbar or rolls by hand.

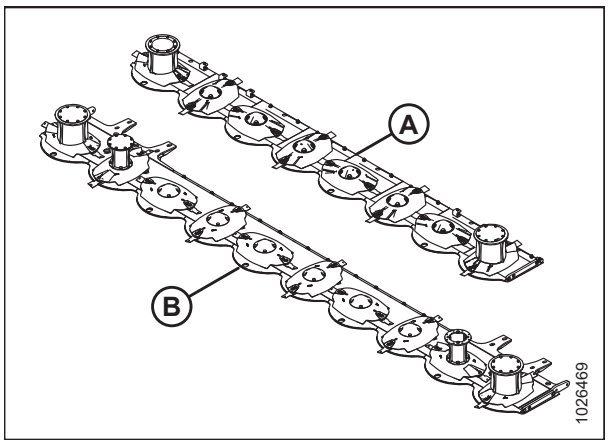


Figure 3.144: R113 and R116 Cutterbars

A - R113 PT Cutterbar
B - R116 PT Cutterbar

7. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

Figure 3.145: Cutterbar Doors in Closed Position

Chapter 4: Maintenance and Servicing

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

Log hours of operation and use the maintenance record provided (refer to *4.3.1 Maintenance Schedule/Record, page 123*) to keep track of your scheduled maintenance.

4.1 Recommended Safety Procedures

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

Figure 4.1: Safety Around Equipment

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

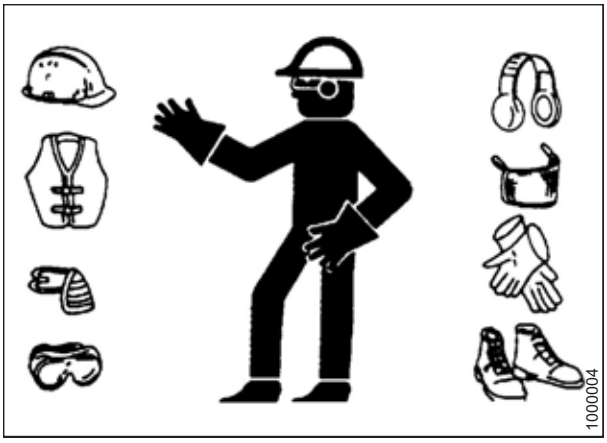


Figure 4.2: Safety Equipment

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

Figure 4.3: Safety Around Equipment

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

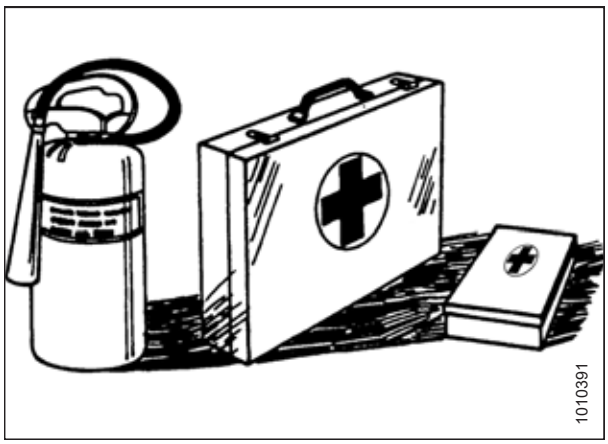


Figure 4.4: Safety Equipment

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

Figure 4.5: Safety Around Equipment

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

4.2 Preparing Machine for Servicing

CAUTION

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

1. Lower the rotary disc pull-type fully. If you need to perform service in the raised position, and always close lift cylinder lock-out valves. For instructions, refer to *3.1 Lift Cylinder Lock-Out Valves, page 31*.
2. Disengage power take-off (PTO).
3. Shut down the engine and remove the key from the ignition.
4. Engage park brake.
5. Wait for all moving parts to stop.

4.3 Maintenance Requirements

IMPORTANT:

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

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

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

When servicing the machine, refer to the specific headings in this section. Refer to this manual's inside back cover and use only the specified fluids and lubricants.

Log hours of operation, use the maintenance record, and keep copies of your maintenance records. Refer to *4.3.1 Maintenance Schedule/Record, page 123*.

CAUTION

Carefully follow all safety messages. Refer to *4.1 Recommended Safety Procedures, page 119*.

4.3.1 Maintenance Schedule/Record

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

✎	Hour meter reading												
✎	Service date												
✎	Serviced by												
First use	Refer to *4.3.2 Break-In Inspections, page 127*.												
End of season	Refer to *4.3.4 End-of-Season Servicing, page 128*.												
Action	✓ Check			♦ Lubricate				▲ Change					
First Hour[9]													
✓	Check for loose hardware. Refer to *7.1 Torque Specifications, page 309*.												
✓	Check clutch operation and slippage. Refer to *Checking Clutch Operation, page 241*.												
First 5 Hours													
✓	Check for loose hardware. Refer to *7.1 Torque Specifications, page 309*.												
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 254*.												
First 10 Hours, Then Daily													
✓	Check hydraulic hoses and lines. Refer to *4.6.1 Checking Hydraulic Hoses and Lines, page 274*.												
✓	Check cutterbar discs. Refer to *Inspecting Cutterbar Discs, page 152*.												
✓	Check cutterbar discblades. Refer to *Inspecting Disc Blades, page 168*.												
✓	Check cutterbar drums. Refer to *Inspecting Large Drums – R113 or R116 PT, page 199*.												
First 25 Hours													
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 254*.												
✓	Check cutterbar lubricant. Refer to *Checking and Adding Lubricant – Cutterbar, page 146*.												

9. Begins from first use of machine.

✓	Check header swivel gearbox and hitch swivel gearbox lubricant. Refer to *Checking Lubricant Levels in the Header Swivel Gearbox and Hitch Swivel Gearbox , page 268*.												
✓	Check cutterbar-conditioner drive gearbox lubricant. Refer to *Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 261*.												
✓	Check conditioner roll timing gearbox oil. Refer to *Checking and Changing Oil in Conditioner Roll Timing Gearbox , page 259*.												
Every 25 Hours													
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 254*.												
♦	Lubricate idler pivot. Refer to *4.3.5 Lubricating the Rotary Disc Pull-Type, page 128*.												
♦	Lubricate upper and lower driveline universal joints. Refer to *4.3.5 Lubricating the Rotary Disc Pull-Type, page 128*.												
♦	Lubricate roller conditioner bearings. Refer to *4.3.5 Lubricating the Rotary Disc Pull-Type, page 128*.												
♦	Lubricate conditioner roll driveline slip joints. Refer to *4.3.5 Lubricating the Rotary Disc Pull-Type, page 128*.												
First 50 Hours													
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 254*.												
▲	Change cutterbar lubricant. Refer to *Draining the Cutterbar, page 149* and *Filling Lubricant into a Repaired Cutterbar, page 151*.												
▲	Change roll timing gearbox lubricant. Refer to *Checking and Changing Oil in Conditioner Roll Timing Gearbox , page 259*.												
▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to *Draining Rotary Disc Pull-Type Gearbox (T-Gearbox) Lubricant, page 263* and *Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 261*.												

▲	Change header swivel gearbox and hitch swivel gearbox lubricant. Refer to *Draining Lubricant from the Header Swivel Gearbox and Hitch Swivel Gearbox , page 269* and *Adding Lubricant to the Header Swivel Gearbox and Hitch Swivel Gearbox , page 270*.												
▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to *Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 261*.												
Every 100 Hours or Annually[10]													
✓	Check conditioner drive belt tension. Refer to *Inspecting Conditioner Drive Belt, page 254*.												
✓	Check cutterbar lubricant. Refer to *Checking and Adding Lubricant – Cutterbar, page 146*.												
✓	Check cutterbar-conditioner drive gearbox lubricant. Refer to *Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 261*.												
✓	Check roll timing gearbox lubricant. Refer to *Checking and Changing Oil in Conditioner Roll Timing Gearbox , page 259*.												
✓	Check header swivel gearbox and hitch swivel gearbox lubricant. Refer to *Checking Lubricant Levels in the Header Swivel Gearbox and Hitch Swivel Gearbox , page 268*.												
✓	Check cutterbar-conditioner drive gearbox lubricant. Refer to *Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 261*.												
Every 250 Hours or Annually[10]													
▲	Change cutterbar lubricant. Refer to *Draining the Cutterbar, page 149* and *Filling Lubricant into a Repaired Cutterbar, page 151*[11].												
▲	Change roll timing gearbox lubricant. Refer to *Checking and Changing Oil in Conditioner Roll Timing Gearbox , page 259*.												

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

▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to *Draining Rotary Disc Pull-Type Gearbox (T-Gearbox) Lubricant, page 263* and *Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 261*.												
▲	Change header swivel gearbox and hitch swivel gearbox lubricant. Refer to *Draining Lubricant from the Header Swivel Gearbox and Hitch Swivel Gearbox , page 269* and *Adding Lubricant to the Header Swivel Gearbox and Hitch Swivel Gearbox , page 270*.												
▲	Change cutterbar-conditioner drive gearbox lubricant. Refer to *Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox), page 261*.												

4.3.2 Break-In Inspections

Table 4.1 Break-In Inspection Schedule

Inspection Interval	Item	Refer to
1 Hour	Check wheel bolts	*Checking Wheel Bolts, page 270*
1 Hour	Check clutch operation and slippage	*Checking Clutch Operation, page 241*
5 Hours	Check for loose hardware and tighten to required torque	*7.1 Torque Specifications, page 309*
5 Hours	Check conditioner drive belt tension	*Inspecting Conditioner Drive Belt, page 254*
25 Hours	Check drive belt tension	*Inspecting Conditioner Drive Belt, page 254*
25 Hours	Check driveline taper pin torque	*4.5.8 Inspecting Driveline Taper Pins, page 248*
50 Hours	Check conditioner drive belt tension	*Inspecting Conditioner Drive Belt, page 254*
50 Hours	Check cutterbar lubricant	*4.4.3 Lubricating Cutterbar, page 146*
50 Hours	Check and change conditioner roll timing gearbox lubricant	*4.5.11 Conditioner Roll Timing Gearbox , page 258*
50 Hours	Check and change swivel gearbox lubricant	*4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox, page 267*
50 Hours	Check and change pull-type drive gearbox lubricant	*4.5.12 Pull-Type Drive Gearbox (T-Gearbox), page 260*
250 Hours	Check and change swivel gearbox lubricant	*4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox, page 267*
250 Hours	Check and change pull-type drive gearbox lubricant	*4.5.12 Pull-Type Drive Gearbox (T-Gearbox), page 260*

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 rotary disc pull-type 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 *4.3.5 Lubricating the Rotary Disc Pull-Type, page 128* and *4.4.3 Lubricating Cutterbar, page 146*.
2. Check tire pressure and adjust as required. For information, refer to *Inflating Tires, page 273*.

3. Perform all annual maintenance as listed in *4.3.1 Maintenance Schedule/Record, page 123*.

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 pull-type and engage lift cylinder lock-out valves.
2. Clean the rotary disc pull-type 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 309*.
6. Lubricate the rotary disc pull-type 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 rotary disc pull-type with a waterproof canvas or other protective material.
13. Use blocks to take the weight off the rotary disc pull-type's tires if possible.

4.3.5 Lubricating the Rotary Disc Pull-Type

WARNING

To avoid personal injury, before servicing rotary disc pull-type or opening drive covers, refer to *4.2 Preparing Machine for Servicing, page 121*.

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 123*.

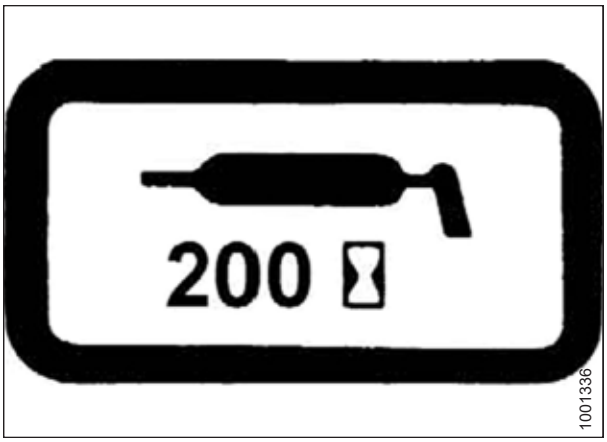


Figure 4.6: Grease Interval Decal

Greasing Procedure

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

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 rotary disc pull-type to access greasing points. For instructions, refer to *3.2.1 Opening Driveshields, page 33*.
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.

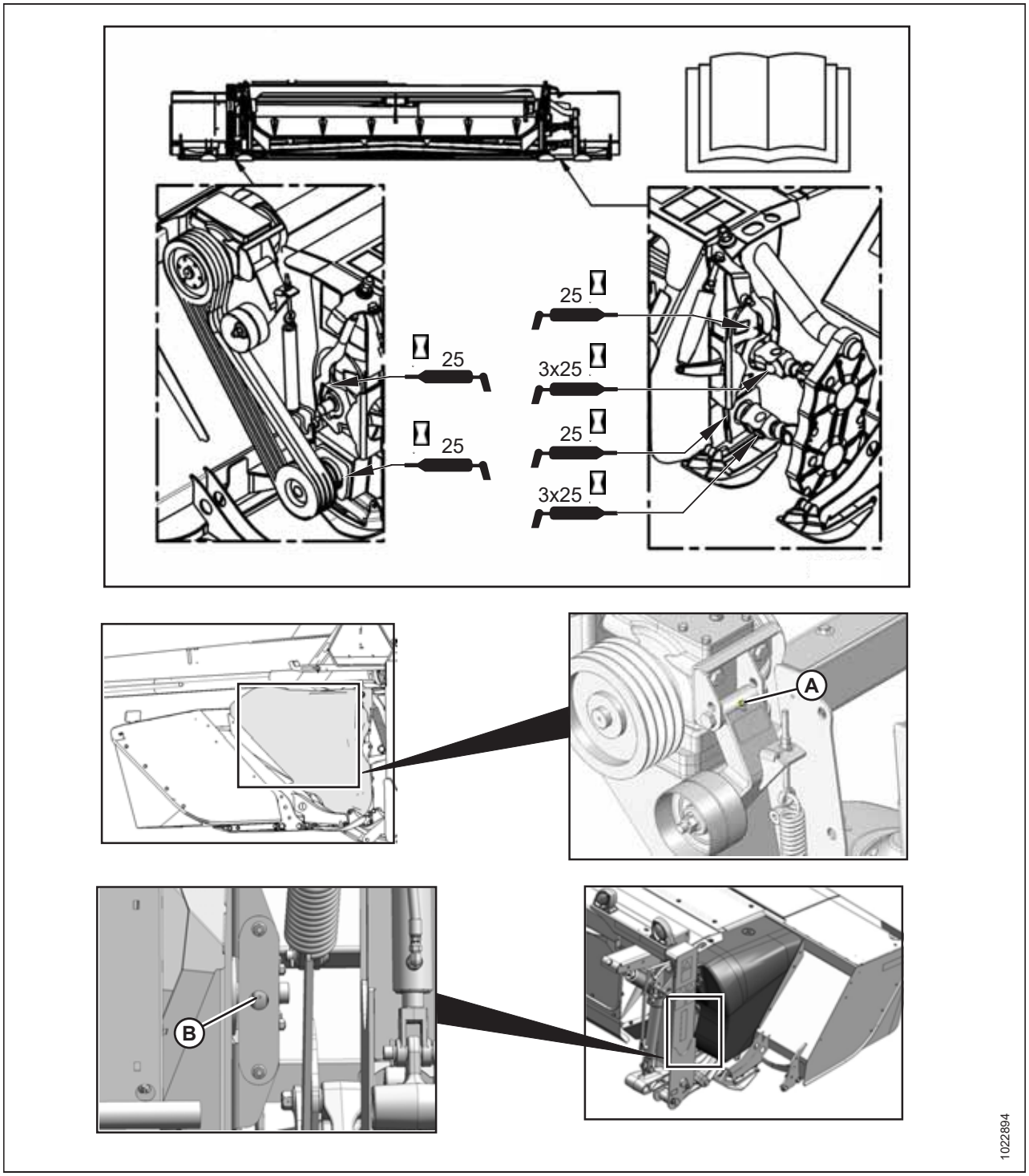
Service Intervals

NOTE:

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

Every 25 Hours

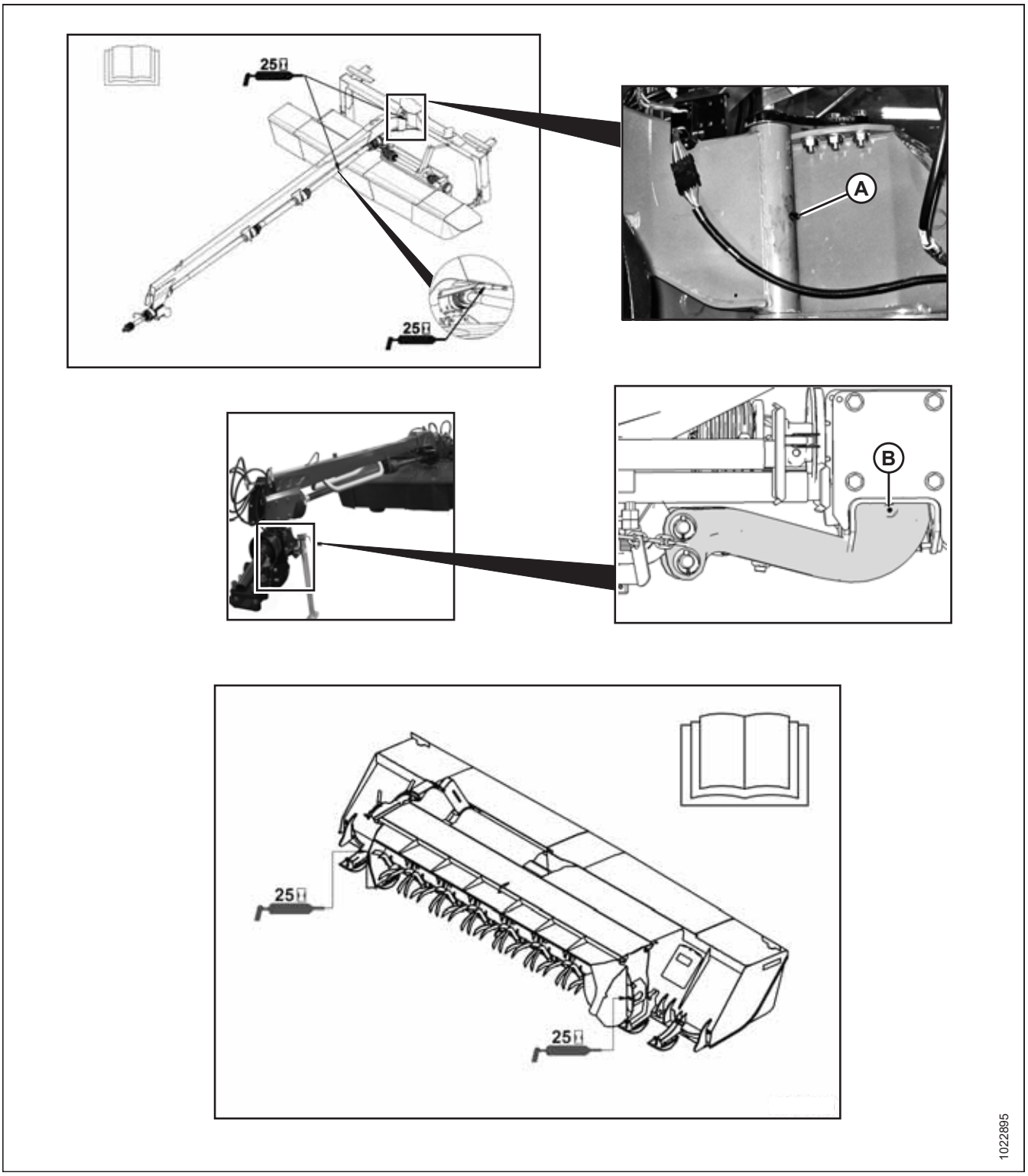
Figure 4.7: Grease Location (Every 25 Hours)



A - Conditioner Drive Idler

B - Bearing for Finger-Type Conditioner

Figure 4.8: Grease Location (Every 25 Hours)



A - Hitch Steering Pivot

B - Tractor Hitch Pivot

NOTE:

It may be necessary to remove and replace the driveline shield cones during the greasing procedure. Refer to *4.5.2 Driveline Shield Cone, page 223* for more information.

NOTE:

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

IMPORTANT:

Apply grease to driveline slip-joint grease fittings.

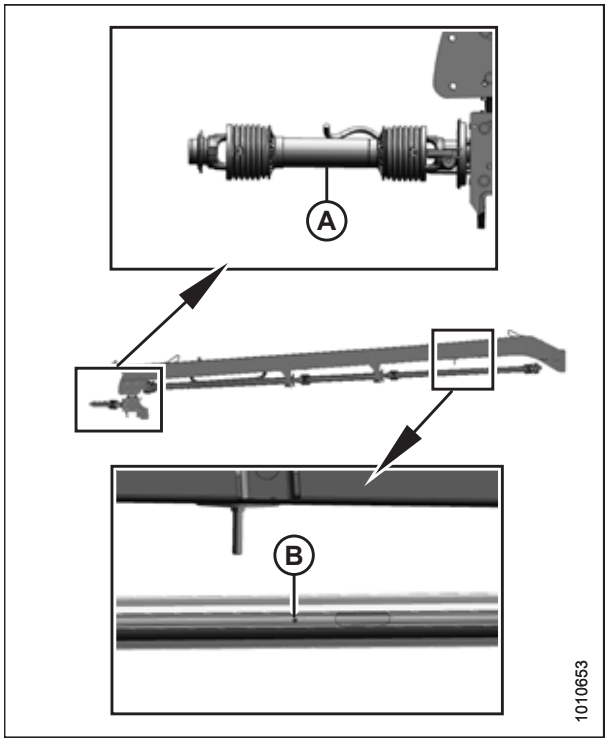
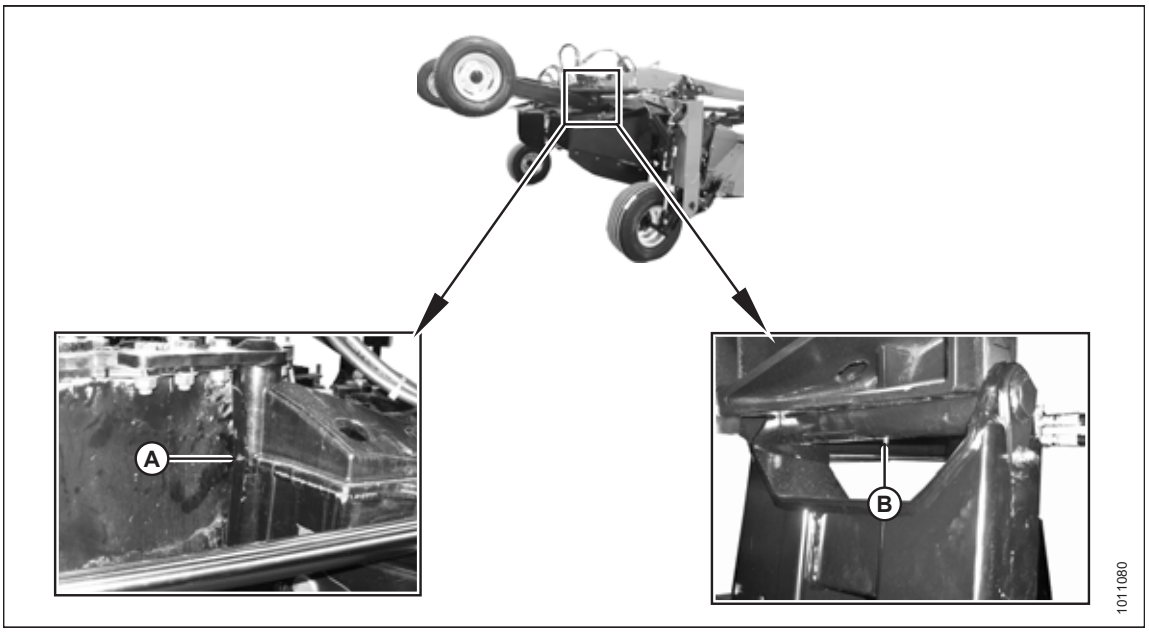


Figure 4.9: Driveline Grease Location (Every 25 Hours)

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

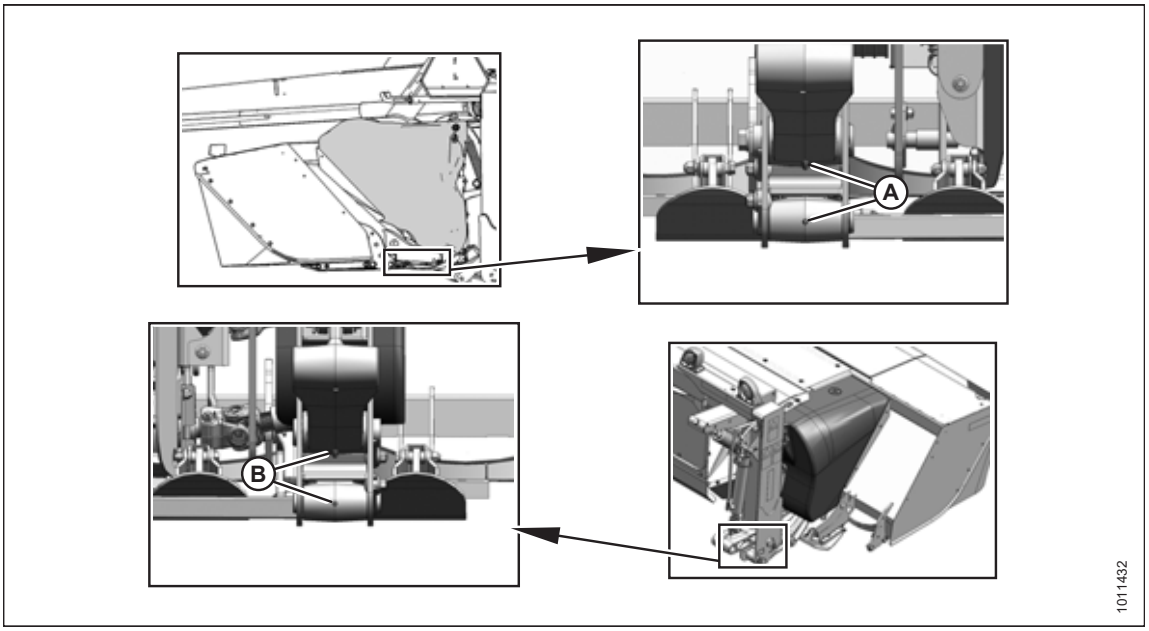
Figure 4.10: Grease Location (Every 25 Hours)



A - Road Friendly Transport™ Casting Pivot

B - Road Friendly Transport™ Wheel Frame Pivot

Figure 4.11: Grease Location (Every 25 Hours)



A - Pull-Type Lift Linkage – Left

B - Pull-Type Lift Linkage – Right

NOTE:

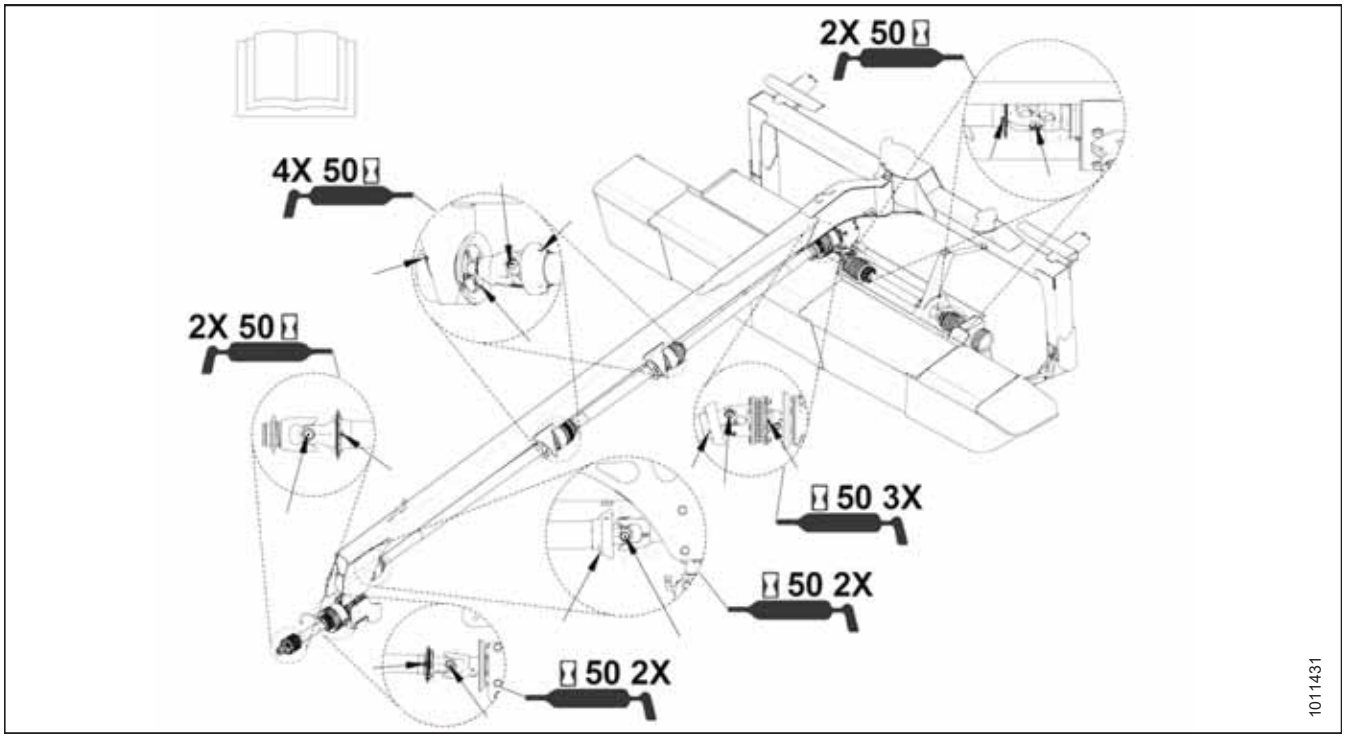
Use high temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2) lithium base unless otherwise specified.

Every 50 Hours

NOTE:

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

Figure 4.12: Grease Location (Every 50 Hours)

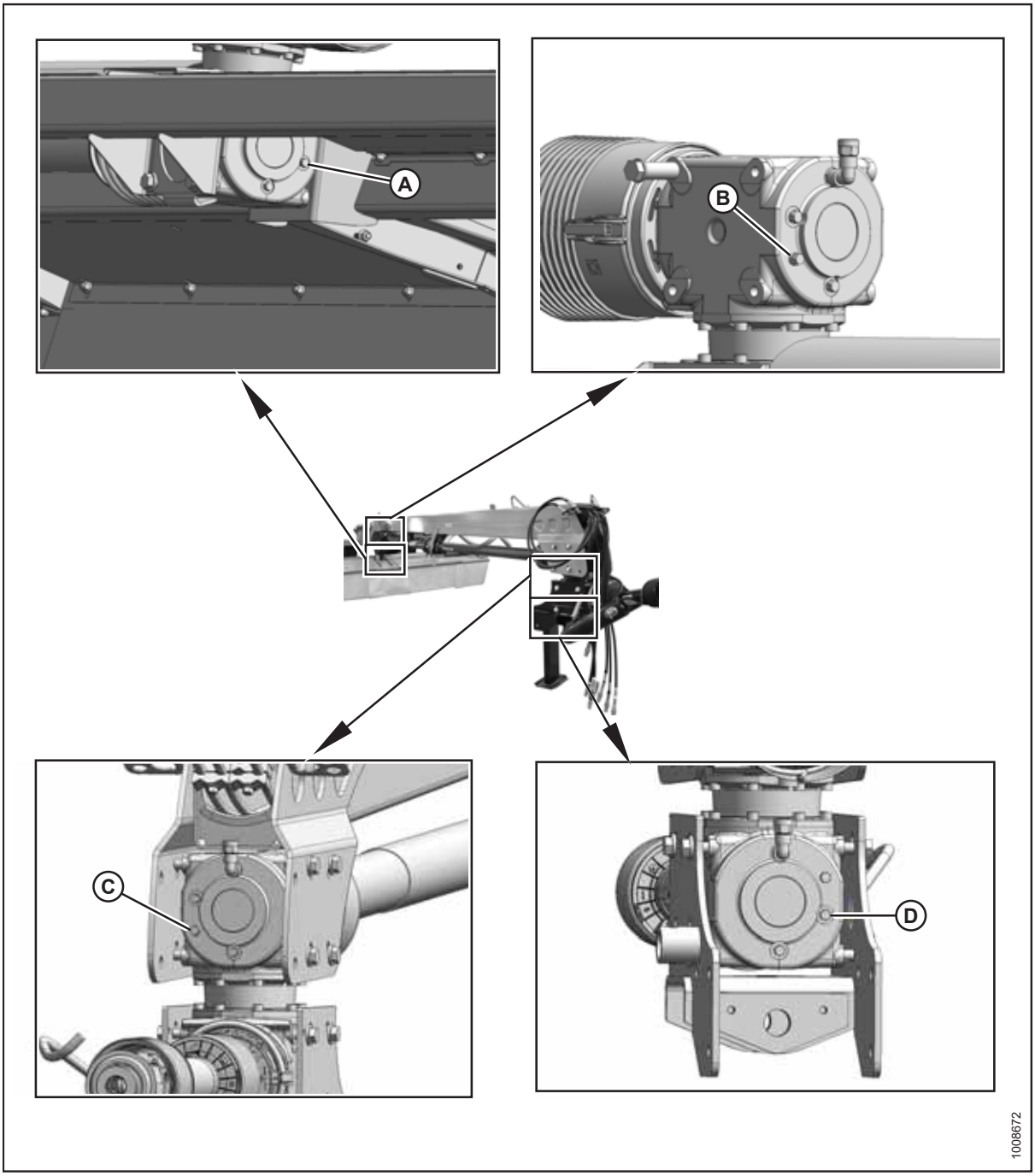


Every 100 Hours

NOTE:

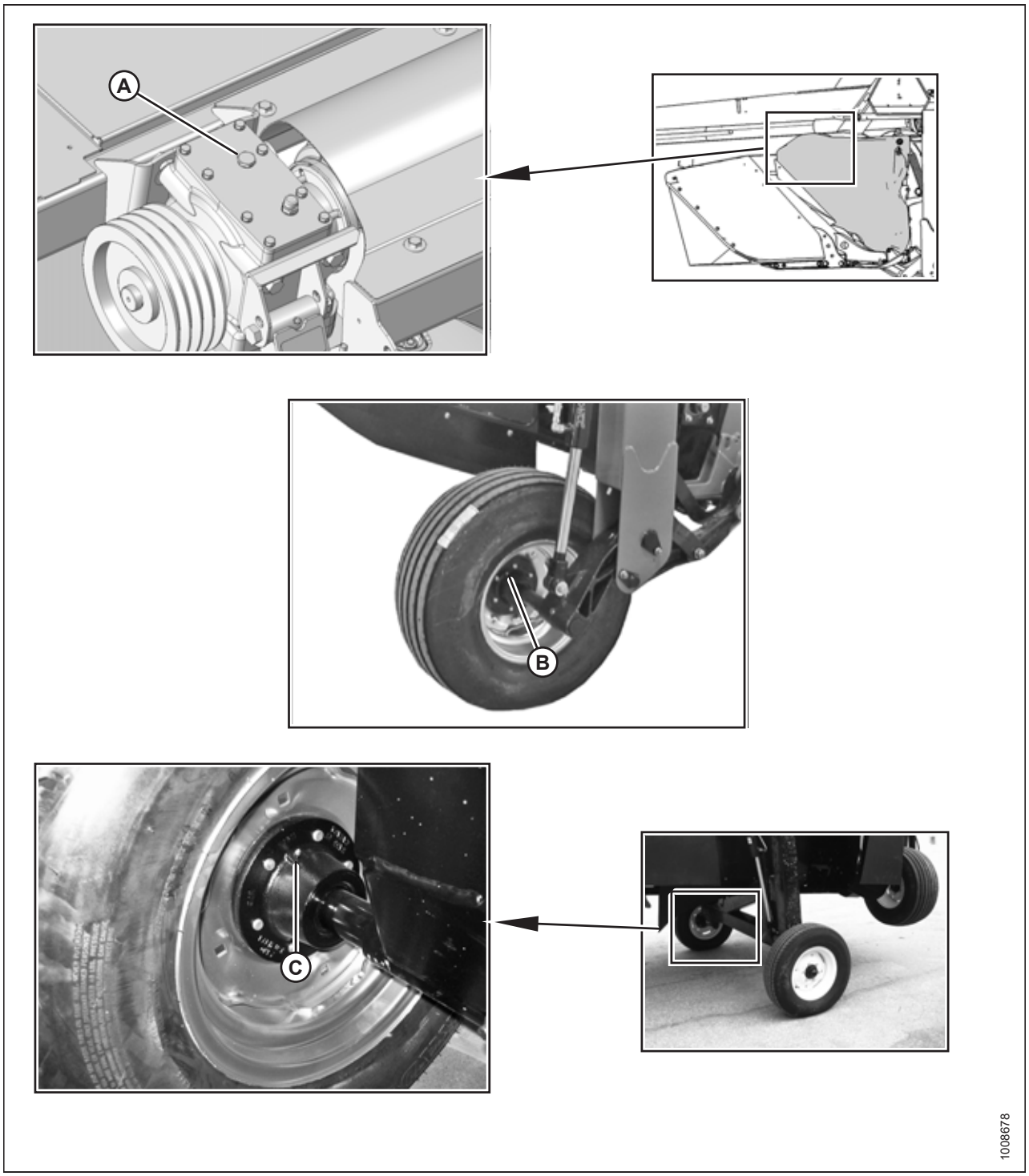
Ensure top of hitch and rotary disc pull-type are horizontal, remove check plug from swivel gearbox, and verify that oil slightly runs out when removed.

Figure 4.13: Lubrication Location (Every 100 Hours)



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

Figure 4.14: Lubrication Location (Every 100 Hours)



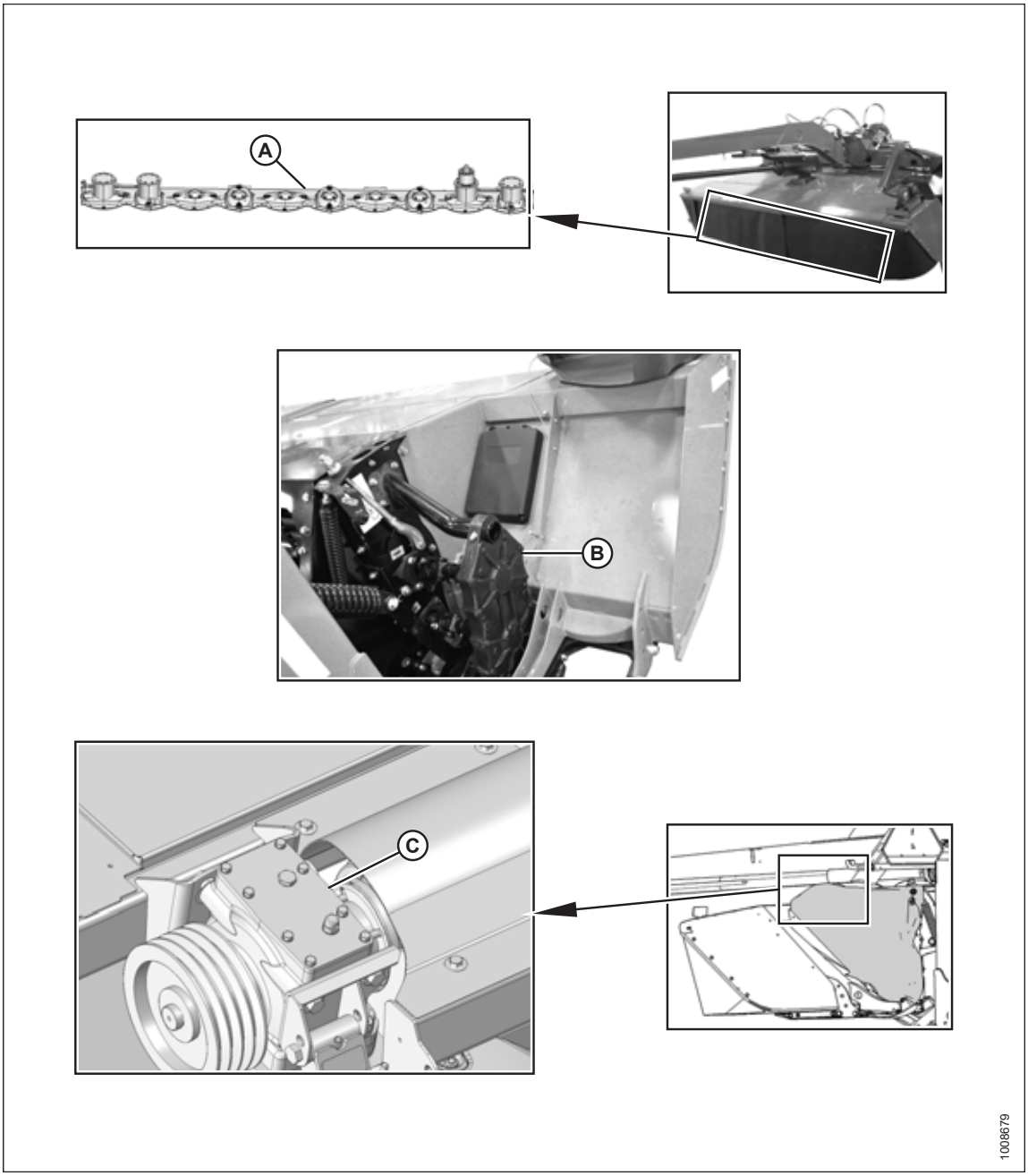
A - Check Plug - Cutterbar-Conditioner Drive Gearbox (T-Gearbox)[12]
B - Bearing - Field Wheel (2 Places)[13]
C - Bearing - Road Friendly Transport™ Option (2 Places)

12. Remove check plug from conditioner drive gearbox as shown and check oil level.
13. Use high temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI grade 2) lithium base.

Every 250 Hours

1. Change lubricant in locations (A), (B), and (C). Refer to the following sections for more information:
   - *4.4.3 Lubricating Cutterbar, page 146*.
   - *Checking and Changing Oil in Conditioner Roll Timing Gearbox , page 259*.

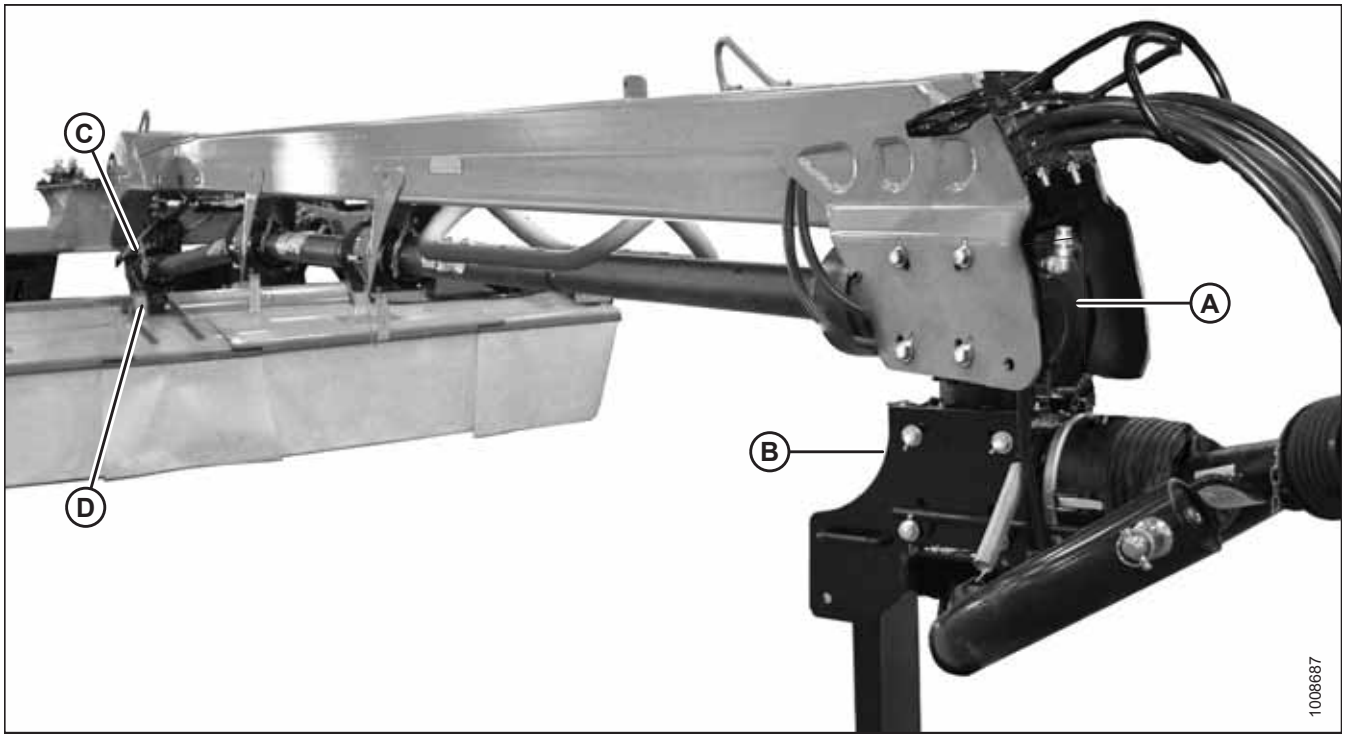
Figure 4.15: Lubrication Location (Every 250 Hours)



A - Cutterbar Lubrication Location | B - Conditioner Roll Timing Gearbox | C - Cutterbar-Conditioner Drive Gearbox (T-Gearbox)

2. Change lubricant in hitch swivel gearboxes (A), (B), (C), and (D). For information, refer to *4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox, page 267*.

Figure 4.16: Lubrication Location (Every 250 Hours)



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

4.4 Cutterbar System

The cutterbar (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.

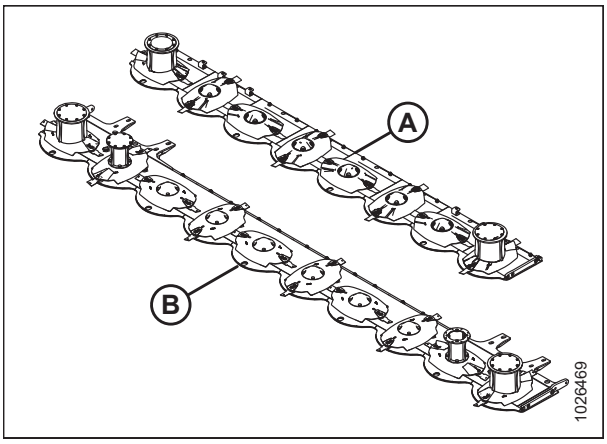


Figure 4.17: R113 and R116 PT Cutterbars

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

4.4.1 Cutterbar Doors

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

Always keep doors closed during operation.

Inspecting Cutterbar Doors

1. Ensure that the door operates smoothly and lies flat when closed. Adjust if necessary.
2. Inspect hinge pin bolts (A) and tighten to 68.5 Nm (50.5 lbf·ft) if loose.
3. Check 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.

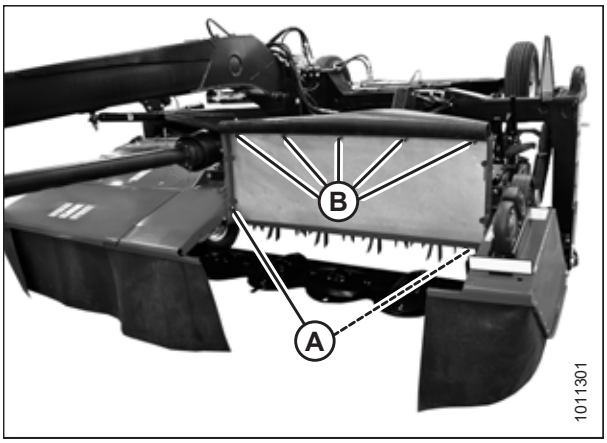


Figure 4.18: Left Cutterbar Door in Open Position

4.4.2 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
- Top cover (not shown) on finger conditioners only

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

Replace the curtains if they become worn or damaged.

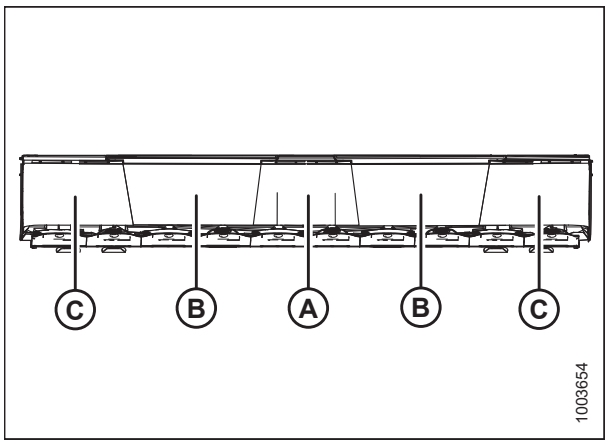


Figure 4.19: Cutterbar Curtains

Inspecting Curtains

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

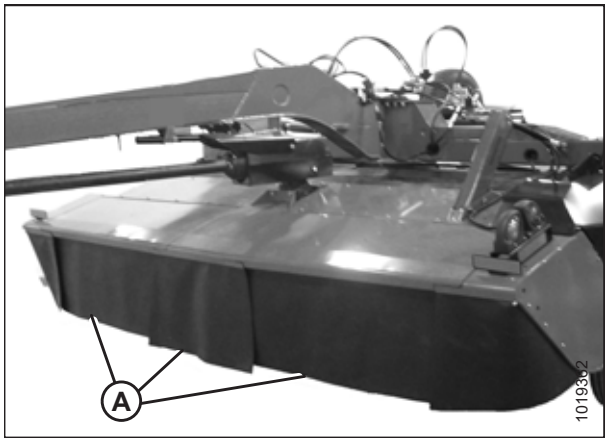


Figure 4.20: Cutterbar Curtains

Removing Cutterbar Door Curtains

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

1. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36* or *3.3.2 Opening Cutterbar Doors – Export Latches, page 37*.

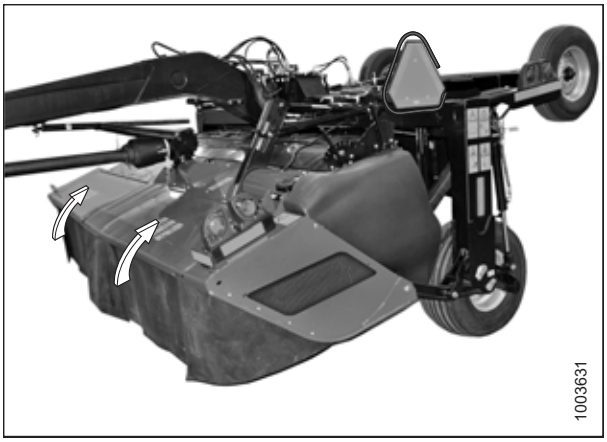


Figure 4.21: R1 Series Rotary Disc Pull-Type

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

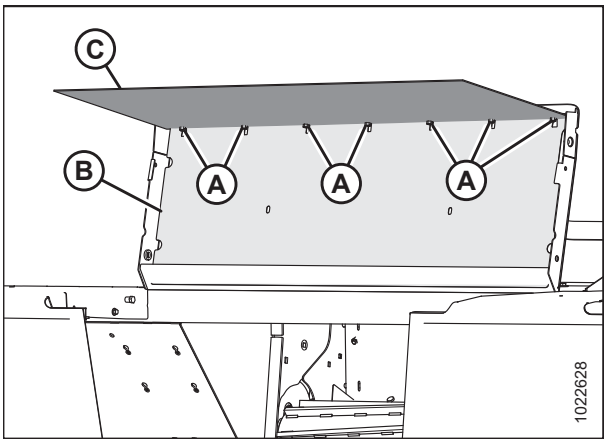


Figure 4.22: Cutterbar Door

Installing Cutterbar Door Curtains

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

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

   IMPORTANT:

   To avoid damaging bolt studs, do **NOT** overtighten the nuts.
5. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

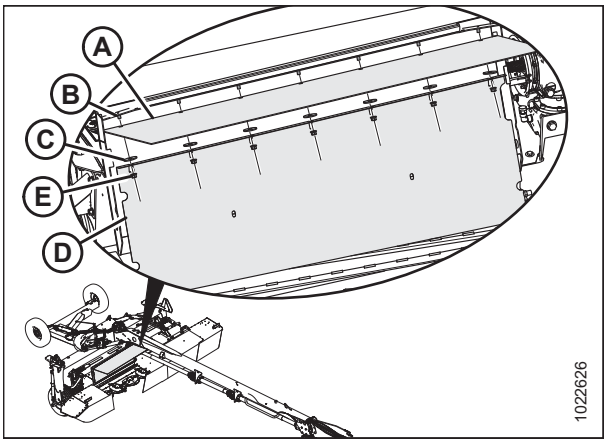


Figure 4.23: Cutterbar Curtain

Removing Cutterbar Inboard Curtain

1. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

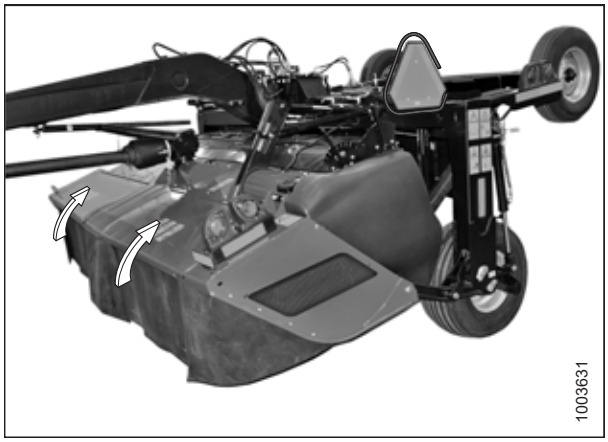


Figure 4.24: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

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

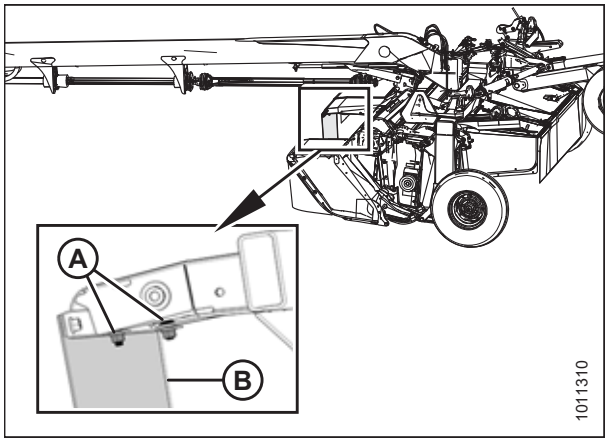


Figure 4.25: Inboard Curtain

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

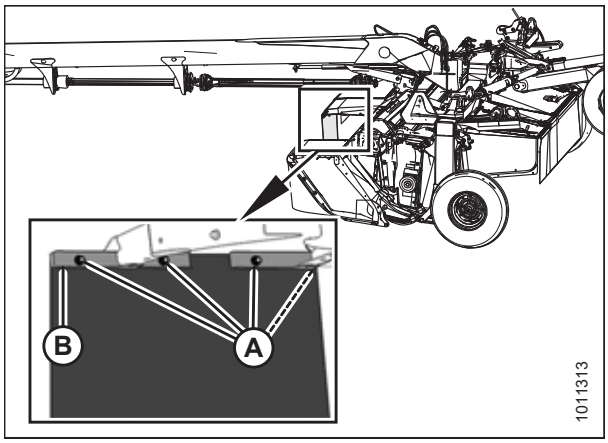


Figure 4.26: Inboard Curtain

Installing Cutterbar Inboard Curtain

1. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

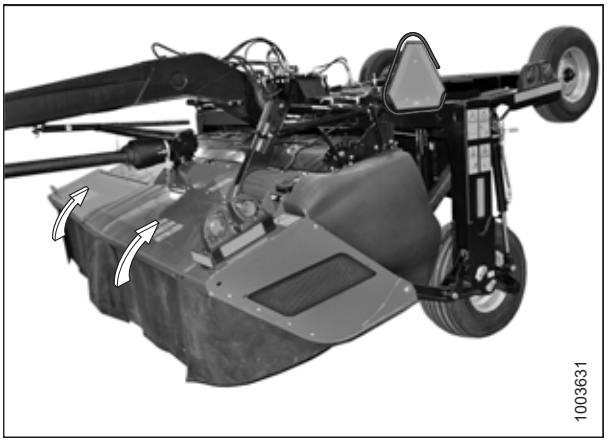


Figure 4.27: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

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

   IMPORTANT:

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

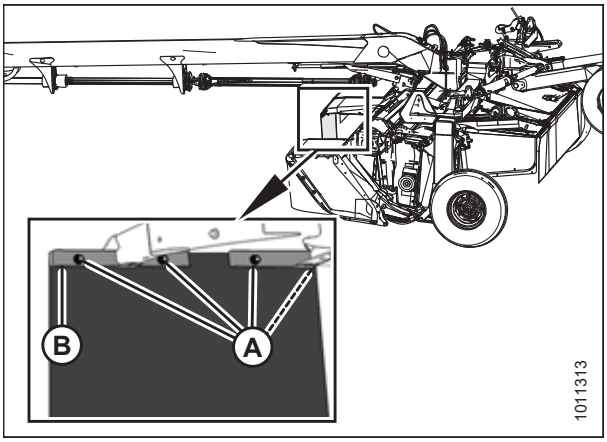


Figure 4.28: Inboard Curtain and Brackets

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

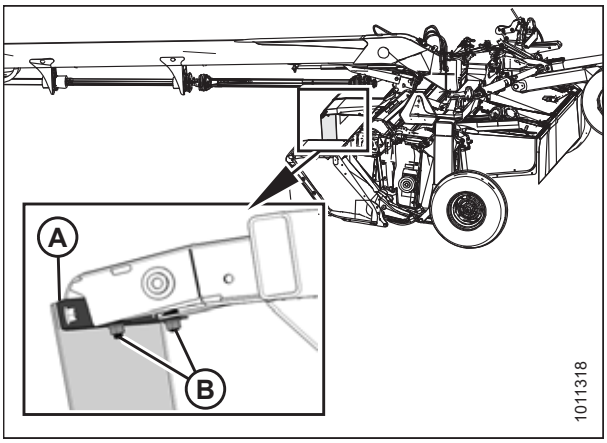


Figure 4.29: Inboard Curtain Attached to Rotary Disc Pull-Type

Removing Outboard Curtains

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

1. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

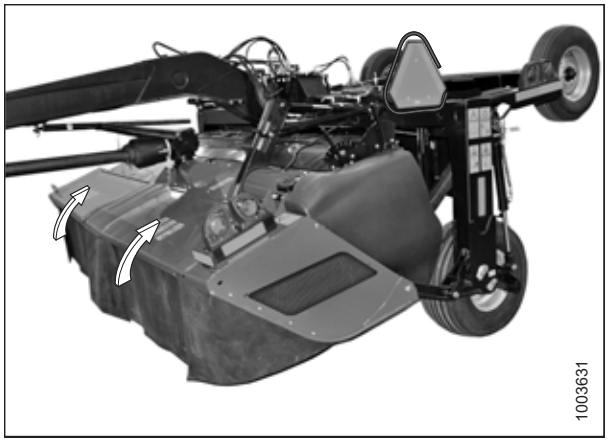


Figure 4.30: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

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

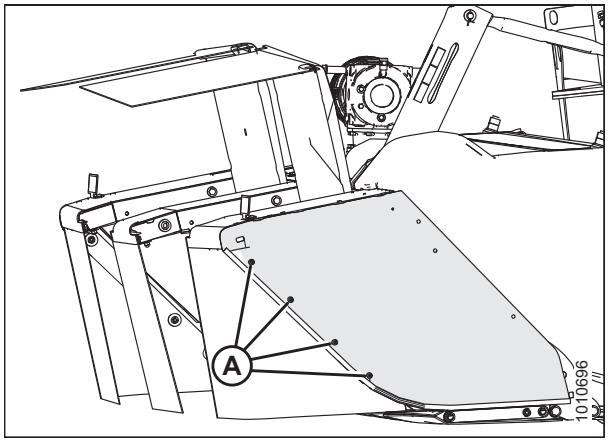


Figure 4.31: Left Endsheet

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

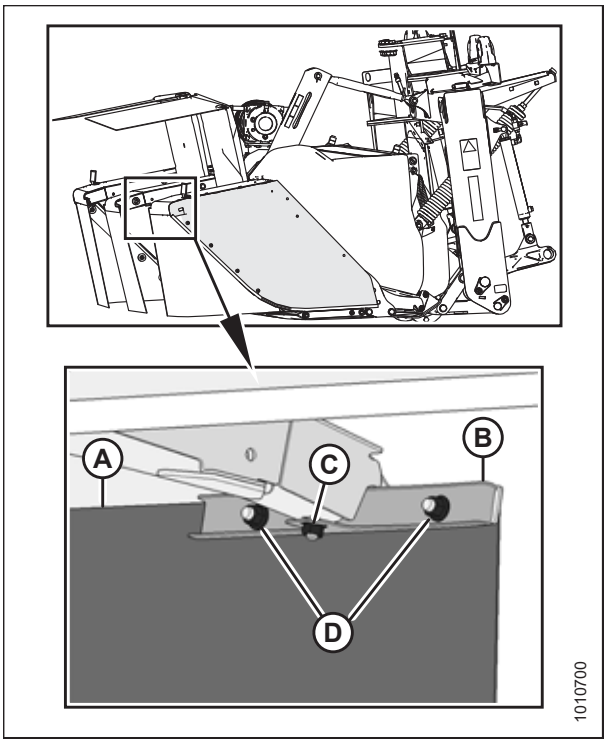


Figure 4.32: Outboard Curtain

Installing Outboard Curtains

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

1. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

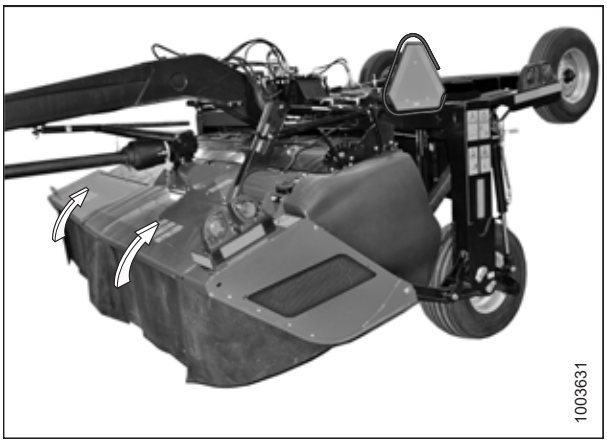


Figure 4.33: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

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

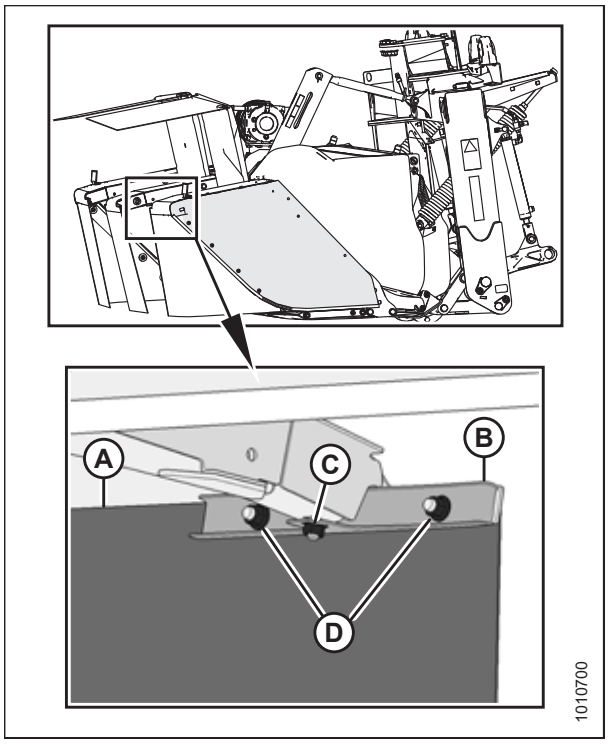


Figure 4.34: Outboard Curtain

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

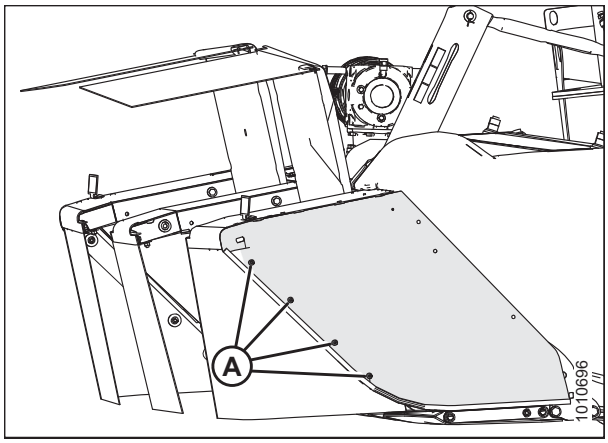


Figure 4.35: Left Endsheet

4.4.3 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 pull-type onto 25 cm (10 in.) blocks under both ends of the cutterbar.
3. Shut down the engine, and remove the key from the ignition.
4. Open the cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36* or *3.3.2 Opening Cutterbar Doors – Export Latches, page 37*.
5. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

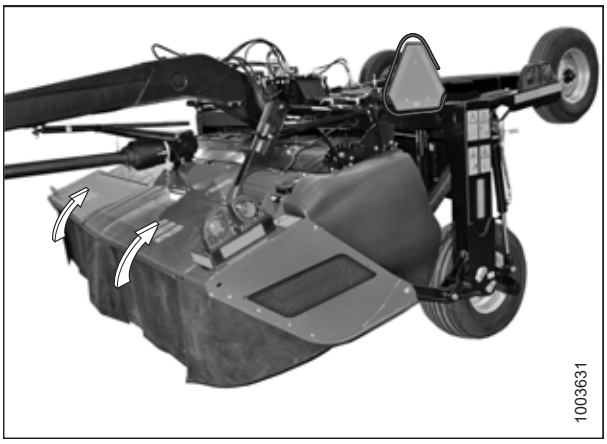


Figure 4.36: Cutterbar Doors – R1 Series Rotary Disc Pull-Type

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

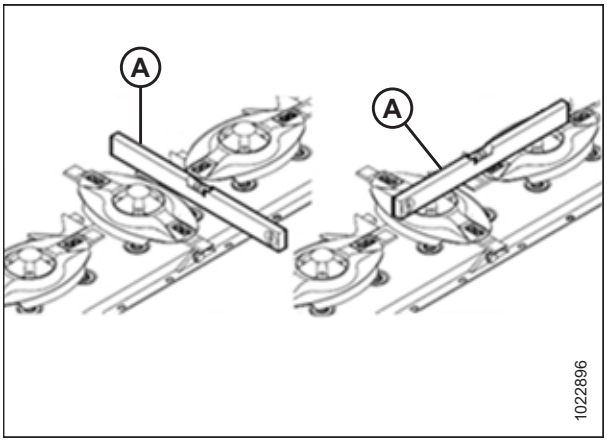


Figure 4.37: Spirit Level on Cutterbar

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 cutterbar. Oil level must be up to the inspection plug hole.

   NOTE:

   If additional lubricant is required, proceed to Step *9, page 148*. If additional lubricant is **NOT** required, proceed to Step *18, page 148*.

   IMPORTANT:

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

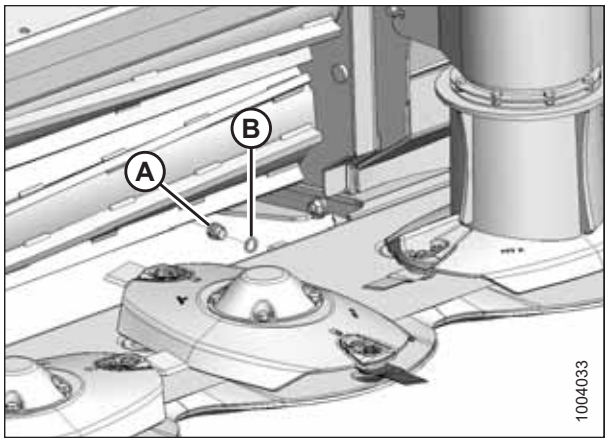


Figure 4.38: Cutterbar Oil Inspection Plug

CAUTION

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

10. Clear all bystanders from the area.
11. Start the engine, and raise the rotary disc pull-type fully.
12. Shut down the engine, and remove the key from the ignition.
13. Close the lift cylinder lock-out valves on both sides of the rotary disc pull-type. Valve handles should be in the closed position (90° angle to the hose). For instructions, refer to *3.1.1 Engaging Locks, page 31*.
14. Remove the inspection plug, and add some oil. Loosely install the inspection plug.
15. Open the lift cylinder lock-out valves on both sides of the rotary disc pull-type. Valve handles should be in the open position (parallel to the hose). For instructions, refer to *3.1.2 Disengaging Locks, page 32*.
16. Lower the rotary disc pull-type onto the blocks, then repeat Step *6, page 147*.
17. Recheck oil level.
18. Check O-ring (B) for breaks or cracks, and replace if necessary.
19. Install plug (A) and O-ring (B). Tighten securely.

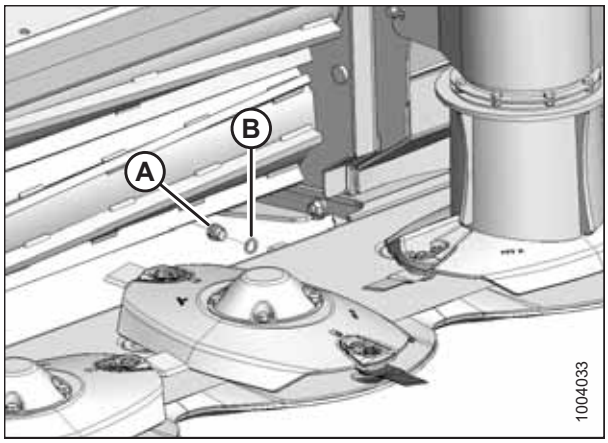


Figure 4.39: Cutterbar Oil Inspection Plug

20. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

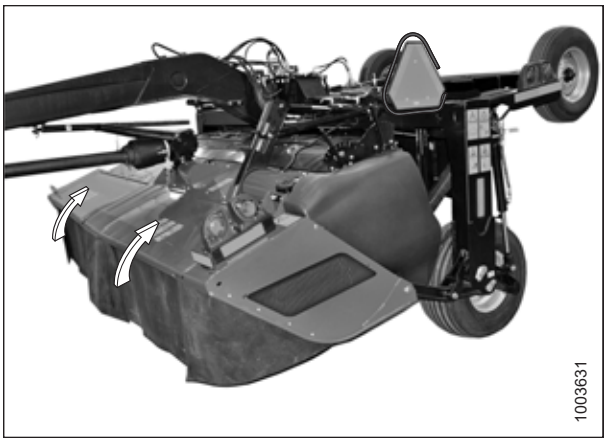


Figure 4.40: Cutterbar Doors

Draining 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. 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 184*.

   NOTE:

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

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

   IMPORTANT:

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

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

6. Place a 10 liter (10.5 US qts) capacity container under 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.

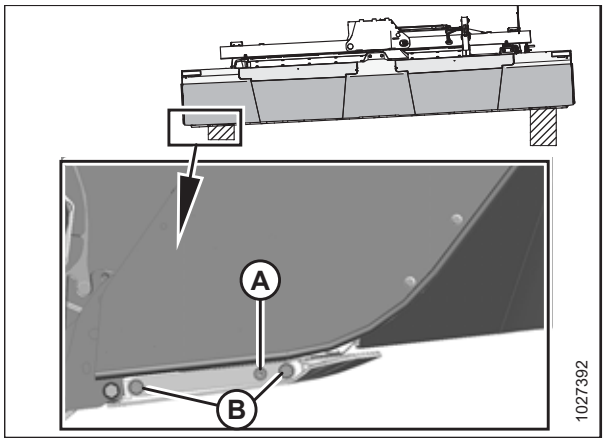


Figure 4.41: Draining Cutterbar

8. Fill the cutterbar with lubricant before operating the rotary disc pull-type. For instructions, refer to *Filling Lubricant into a Repaired Cutterbar, page 151*.

   IMPORTANT:

   Dispose of used lubricant responsibly.

9. Reinstall the right outboard rock guard. For instructions, refer to *Installing Outboard Rock Guards, page 185*.

Filling Lubricant into a Repaired Cutterbar

This procedure should be used when the cutterbar has been completely drained of oil. If you are checking oil level or topping it up, refer to *Checking and Adding Lubricant – Cutterbar, page 146*.

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 the Cutterbar, page 149*.

1. Start the engine.
2. Raise the rotary disc pull-type fully.
3. Place a block under right end of the rotary disc pull-type, so the right end is higher than the left end.
4. Lower the rotary disc pull-type onto the blocks.
5. Shut down the engine, and remove the key from the ignition.
6. Remove 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 list of recommended fluids and lubricants.

   IMPORTANT:

   Do **NOT** overfill the cutterbar. Overfilling can cause overheating, damage, or failure of cutterbar components.
7. Install access plug (A). Torque to 30 Nm (22 lbf·ft).

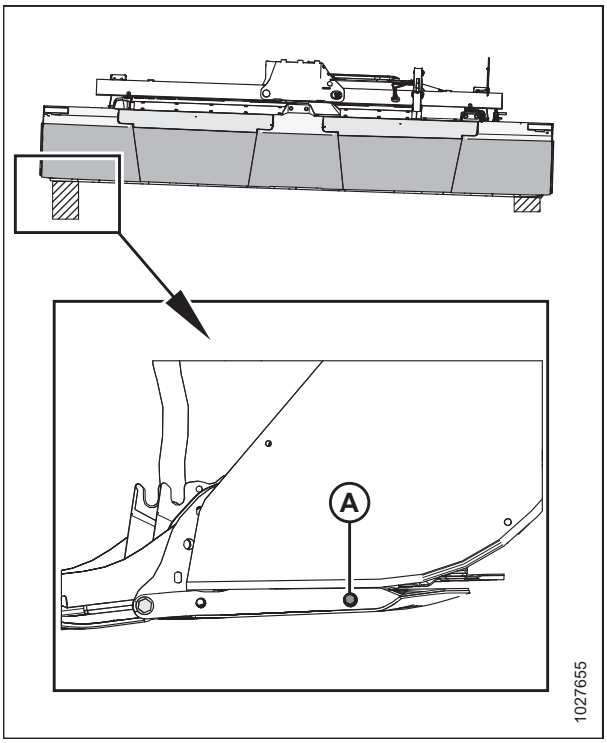


Figure 4.42: Filling Cutterbar

CAUTION

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

8. Start the engine, and raise the rotary disc pull-type fully.
9. Shut down the engine, and remove the key from the ignition. Engage the rotary disc pull-type lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
10. Remove the block from under the cutterbar.
11. Check the lubricant level. For instructions, refer to *Checking and Adding Lubricant – Cutterbar, page 146*.
12. Install the right outboard rock guard. For instructions, refer to *Installing Outboard Rock Guards, page 185*.

4.4.4 Cutterbar Discs

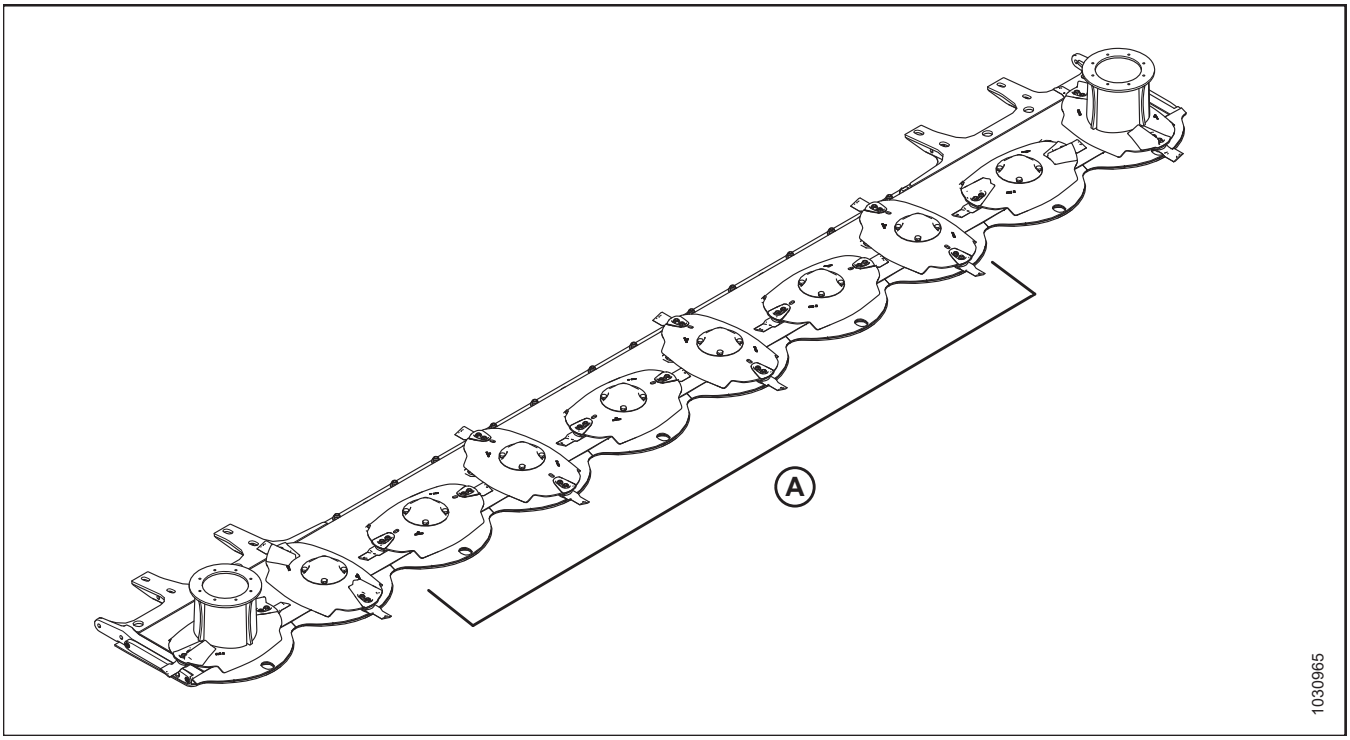


Figure 4.43: Interchangeable Cutterbar Discs

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.

CAUTION

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

1. Inspect 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 cutterbar and edge of disc as shown.

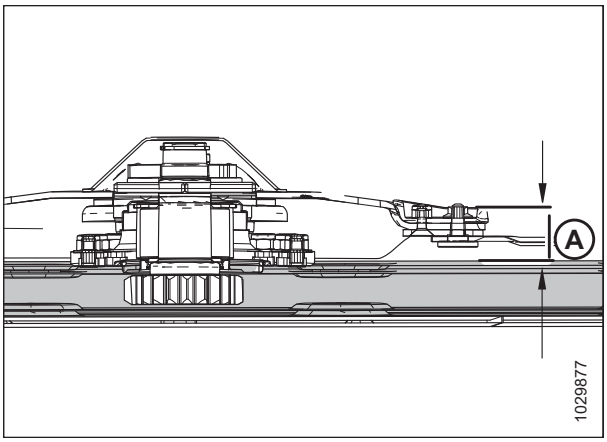


Figure 4.44: Cutterbar Disc

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

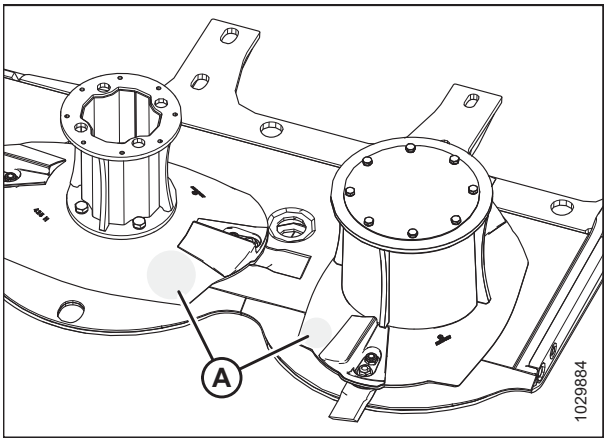


Figure 4.45: Cutterbar Disc

3. Inspect cutterbar disc surface (D) for cracks, excessive wear, and 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.

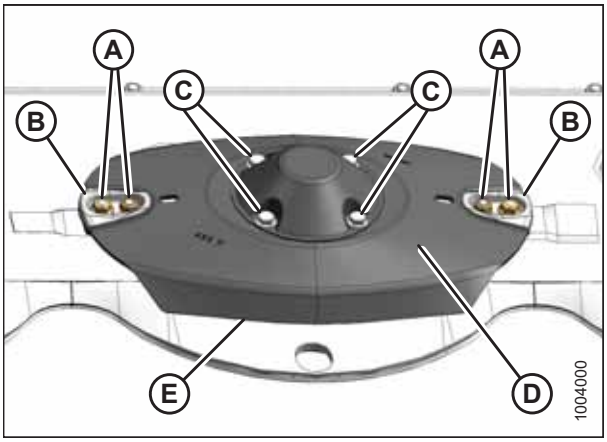


Figure 4.46: Cutterbar Disc

Removing Cutterbar Discs

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage lift cylinder lock-out valves before going under 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 rotary disc pull-type fully.
2. Shut off the engine, and remove key from the ignition.
3. Engage lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
4. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

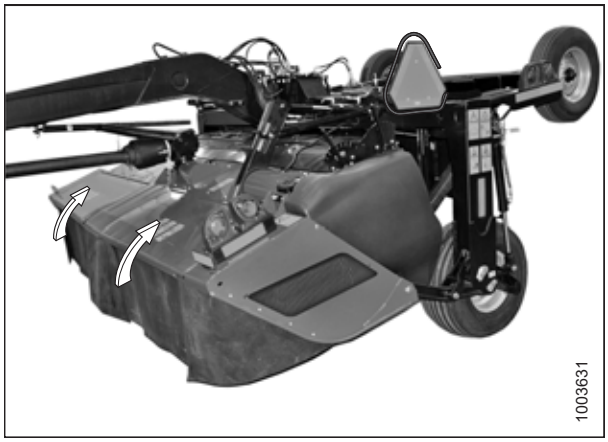


Figure 4.47: Cutterbar Doors – R1 Series Rotary Disc Pull-Type

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

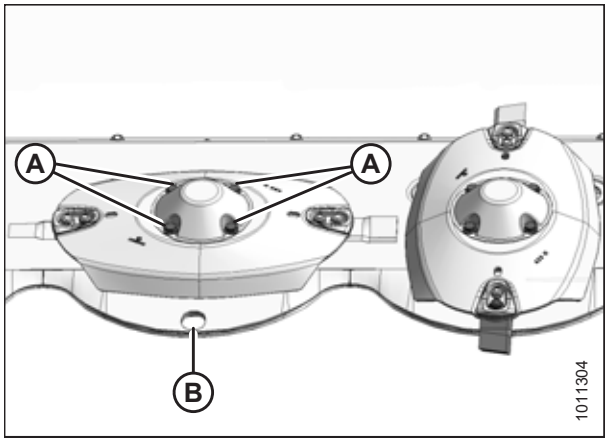


Figure 4.48: Cutterbar Disc Bolts

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

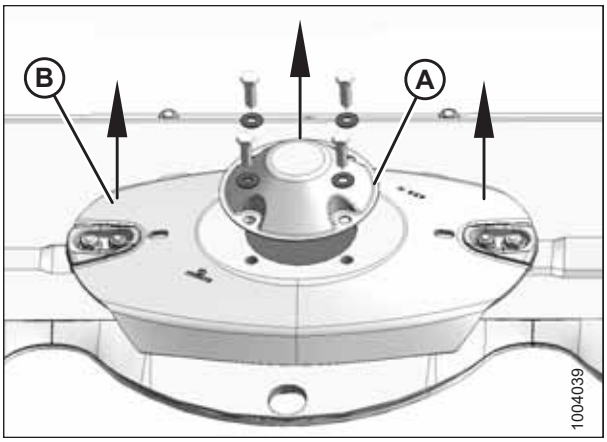


Figure 4.49: Cutterbar Disc and Cap

Installing Cutterbar Discs

DANGER

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

WARNING

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

1. Install spacer plate (A) on spindle.

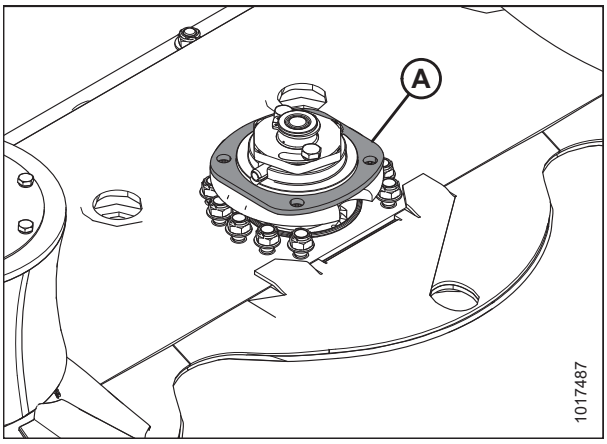


Figure 4.50: Disc Spindle

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

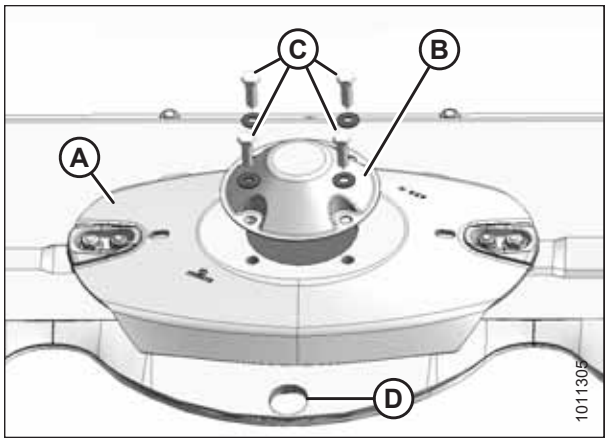


Figure 4.51: Cutterbar Disc and Cap

WARNING

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

5. Remove pin (or equivalent) from front hole of rock guard.
6. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

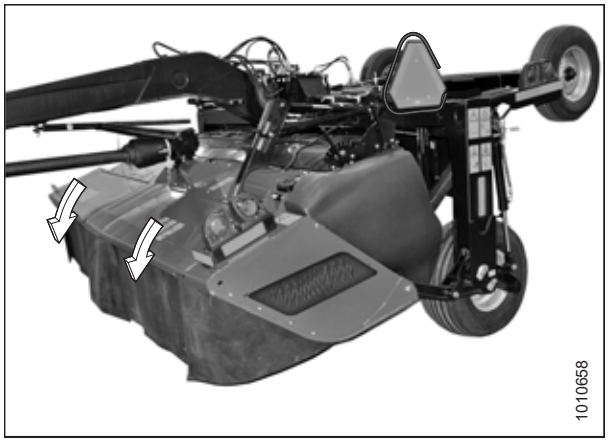


Figure 4.52: Cutterbar Doors — R1 Series Rotary Disc Pull-Type

4.4.5 Replacing Cutterbar Spindles

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

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

NOTE:

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

Refer to *4.4.13 Replacing Cutterbar Spindle Shear Pin, page 212* to replace shear pin.

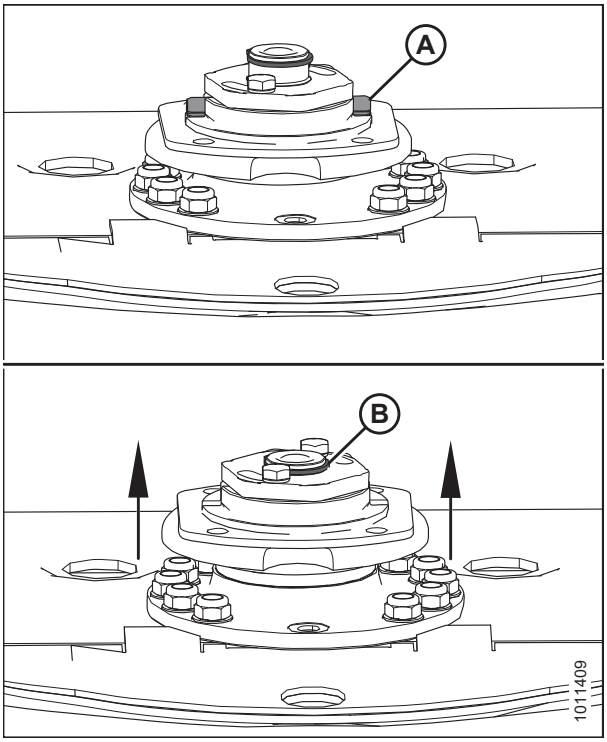


Figure 4.53: Cutterbar Spindles

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.

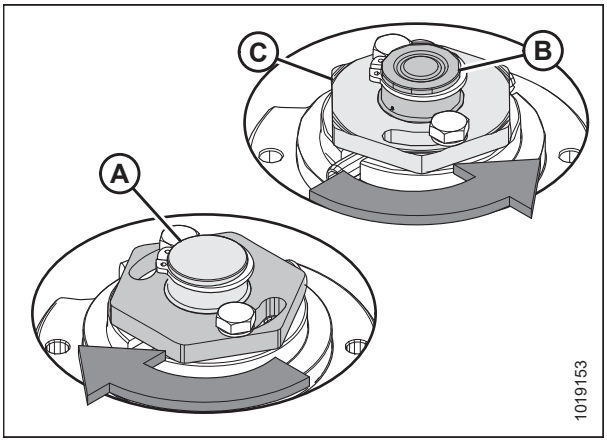


Figure 4.54: Cutterbar Spindles

Removing Cutterbar Spindles

DANGER

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

   NOTE:

   To prevent oil from spilling from the cutterbar when removing disc spindles, ensure the rotary disc pull-type is on a flat, level surface and is tilted all the way back.
3. Shut down the engine, and remove the key from the ignition.
4. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

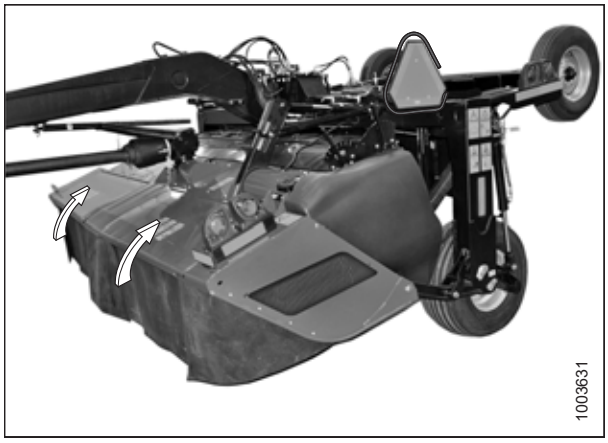


Figure 4.55: Cutterbar Doors – R1 Series Rotary Disc Pull-Type

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

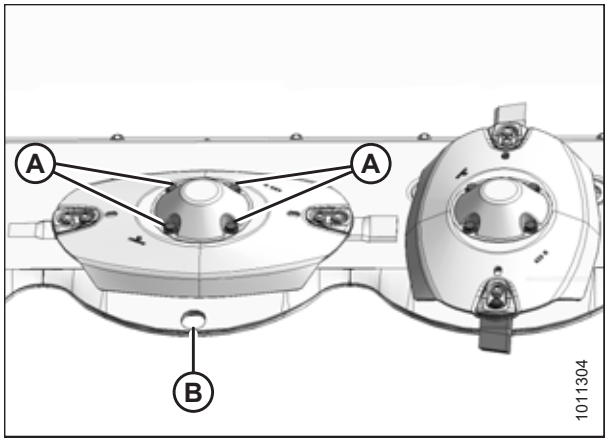


Figure 4.56: Cutterbar Disc Bolts

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

   IMPORTANT:

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

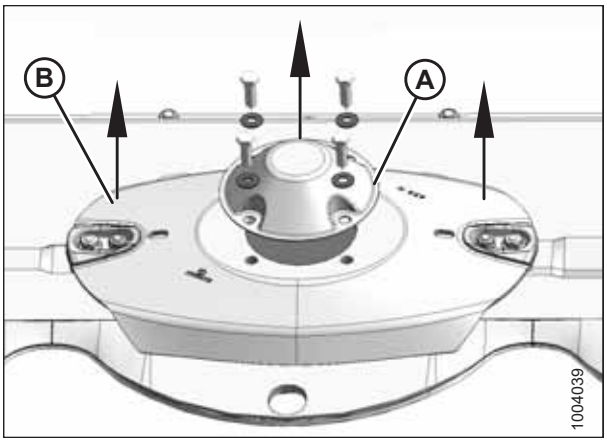


Figure 4.57: Cutterbar Disc and Cap

9. Remove spacer plate (A).

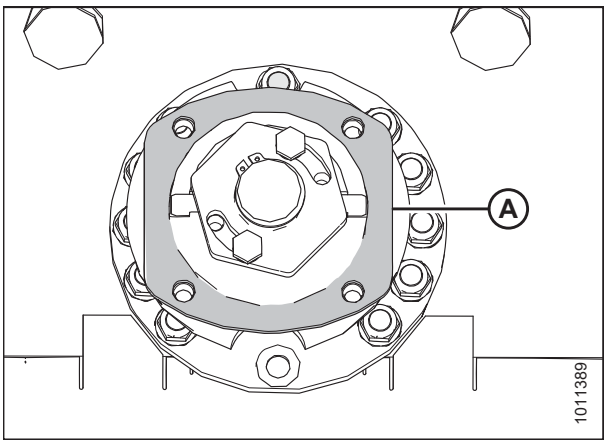


Figure 4.58: Spacer Plate

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

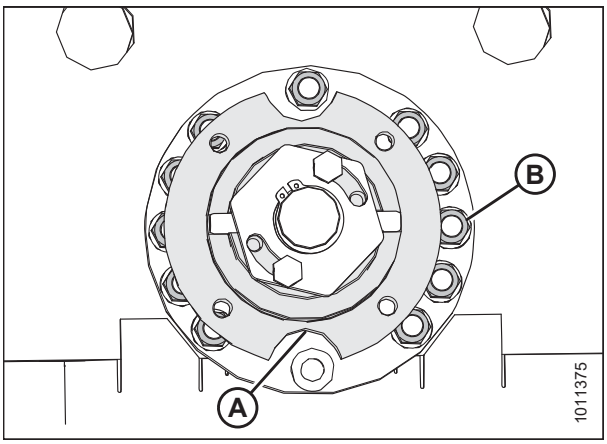


Figure 4.59: Left Spindle Hub and Hardware

11. Remove spindle (A) from cutterbar.

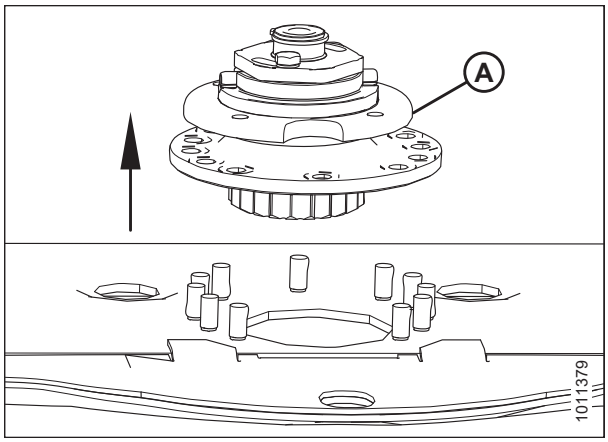


Figure 4.60: Left Spindle

Installing Cutterbar Spindles

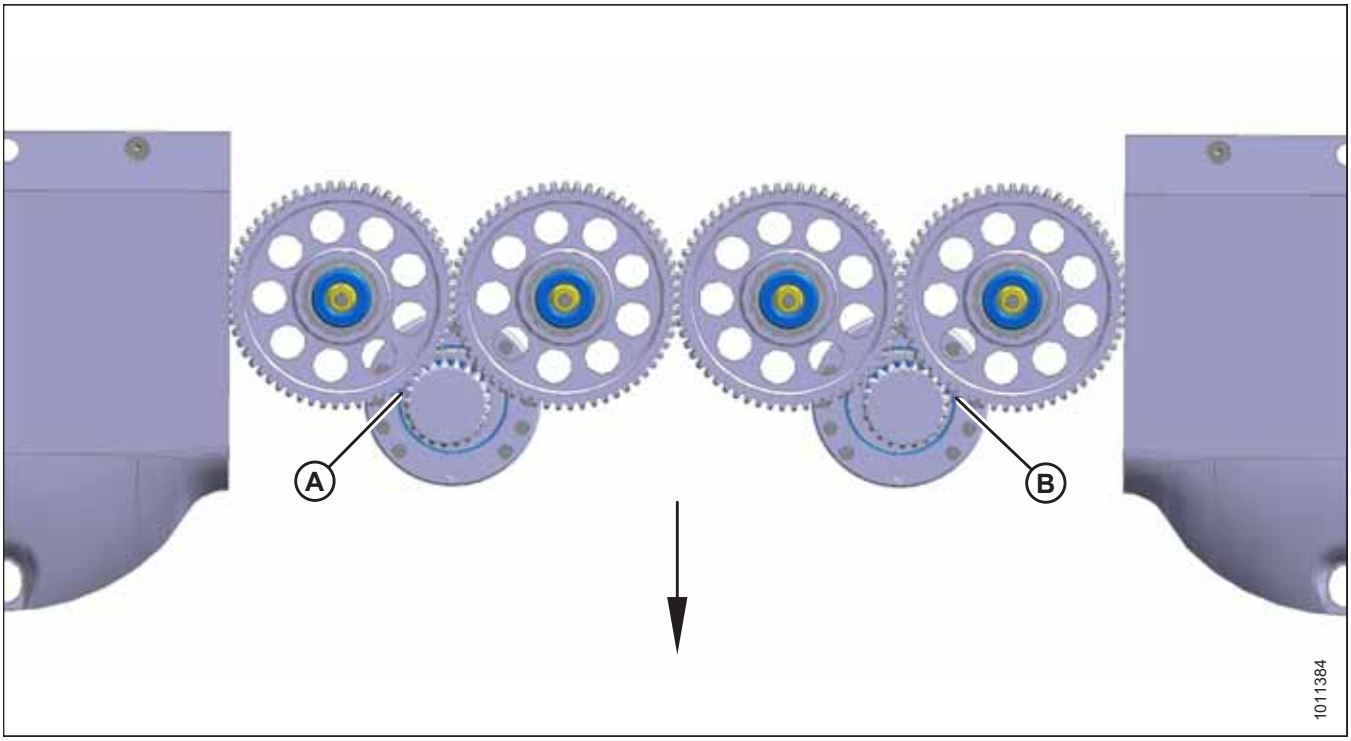


Figure 4.61: Underside of Cutterbar Spindles

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

NOTE:

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

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

DANGER

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

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 rotary disc pull-type fully.

   NOTE:

   To prevent oil from spilling from the cutterbar while installing disc spindles, ensure the rotary disc pull-type is on a flat, level surface and is tilted all the way back.
3. Shut down the engine, and remove the key from the ignition.
4. Determine suitable spindle rotation pattern for crop conditions. For instructions, refer to *4.4.5 Replacing Cutterbar Spindles, page 157*.

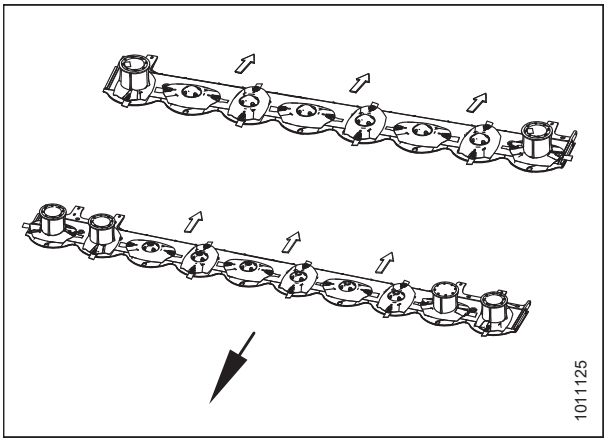


Figure 4.62: R113 and R116 PT Cutterbars

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

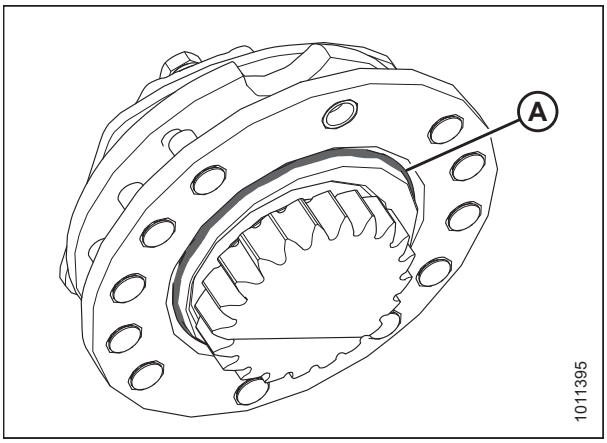


Figure 4.63: Left Spindle O-Ring

6. Insert spindle (A) into cutterbar.

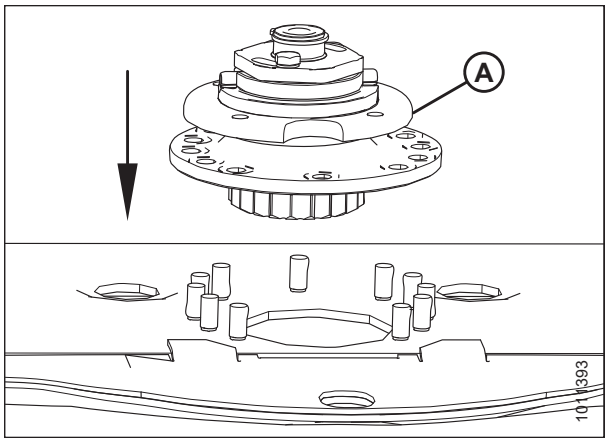


Figure 4.64: Left Spindle

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

   NOTE:

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

   IMPORTANT:

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

   IMPORTANT:

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

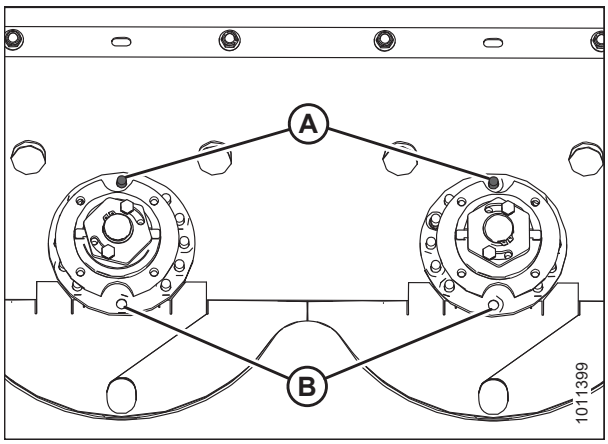


Figure 4.65: Spindle Orientation

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

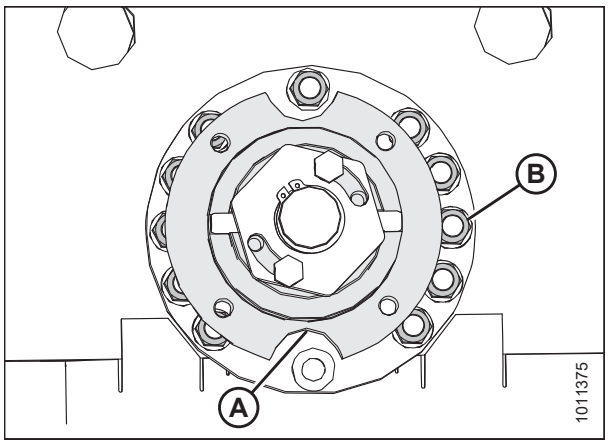


Figure 4.66: Left Spindle Hub

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

    NOTE:

    Hub removed from illustration for clarity.

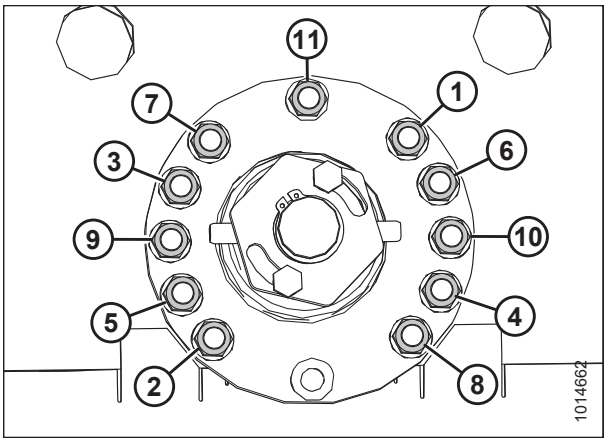


Figure 4.67: Tightening Pattern

11. Install spacer plate (A).

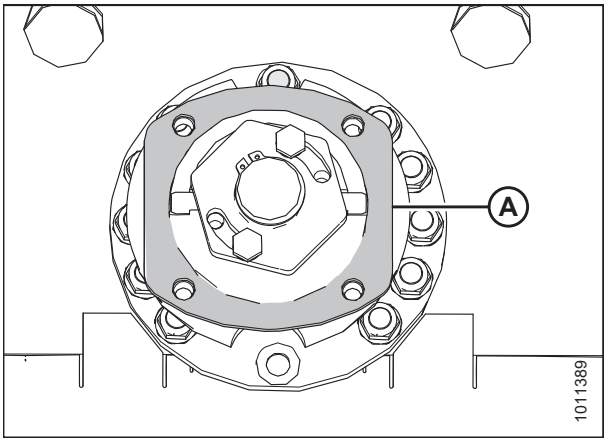


Figure 4.68: Spacer Plate

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

    IMPORTANT:

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

13. 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 disc blades do not contact each other or adjacent discs.

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

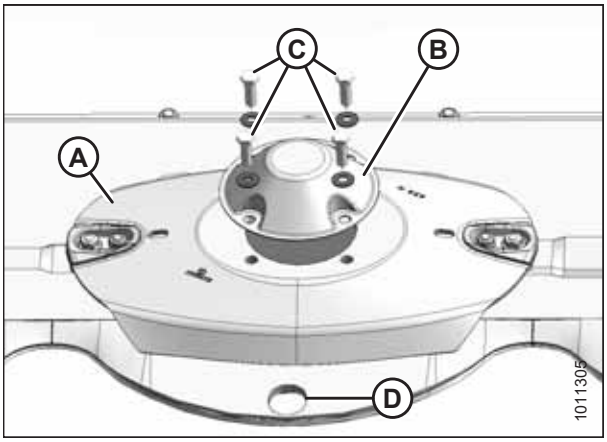


Figure 4.69: Cutterbar Disc and Cap

WARNING

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

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

16. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

Figure 4.70: R1 Series Rotary Disc Pull-Type

4.4.6 Reconfiguring Cutterbar Crop Stream

Discs are factory-installed to produce three crop streams, but 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.

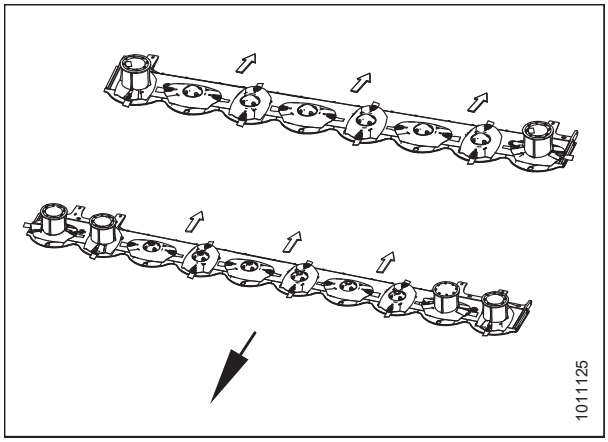


Figure 4.71: R113 and R116 PT Cutterbars

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.

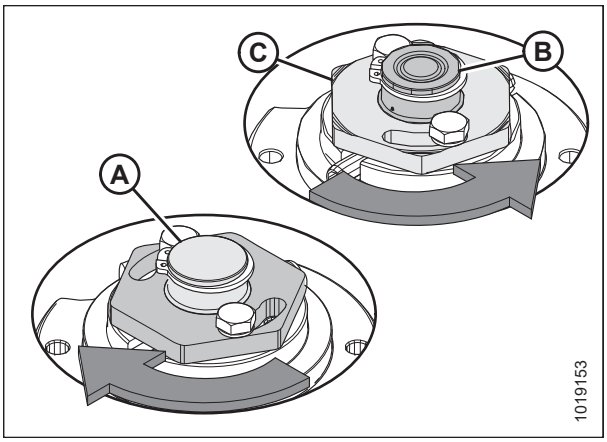
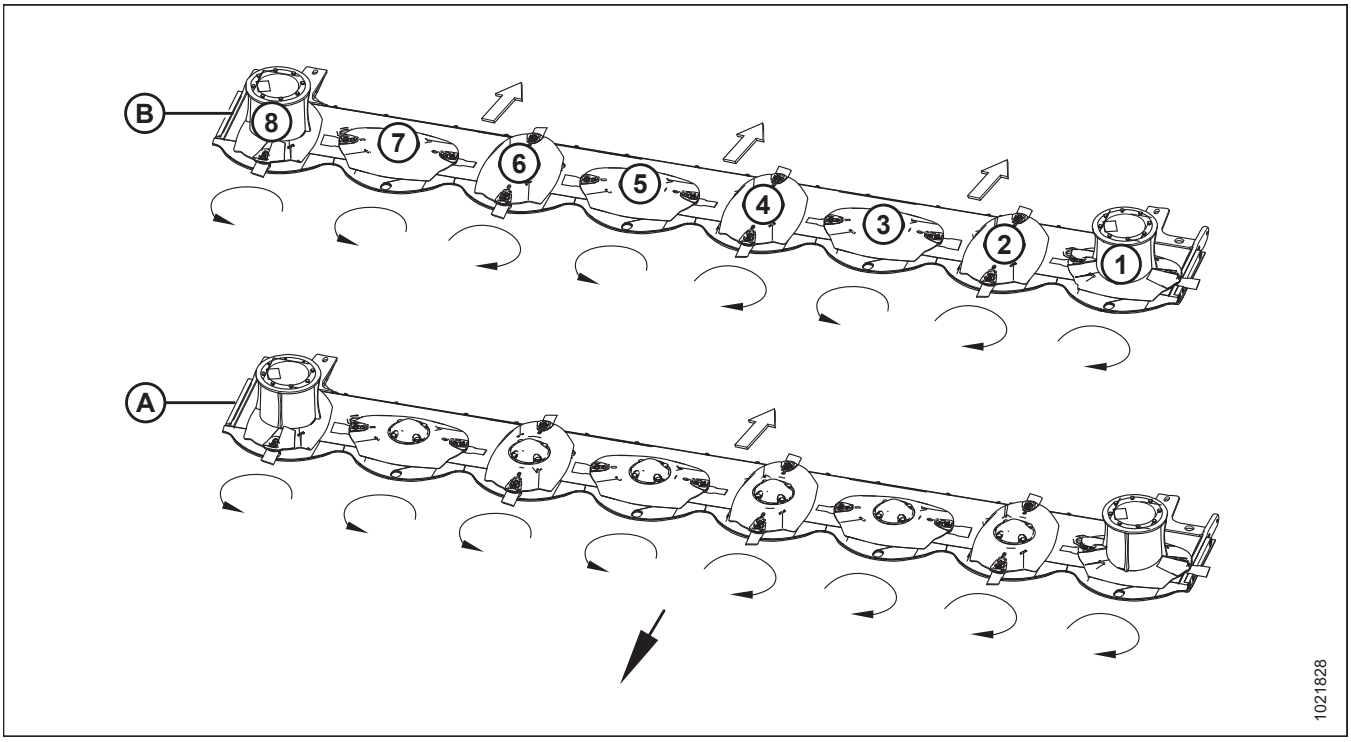


Figure 4.72: Cutterbar Spindles

Changing R113 PT Cutterbar Crop Stream Configuration

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



A - One Crop Stream

B - Three Crop Streams

NOTE:

Refer to *Removing Cutterbar Spindles, page 158* and *Installing Cutterbar Spindles, page 160*.

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

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

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

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

Changing R116 PT Cutterbar Crop Stream Configuration

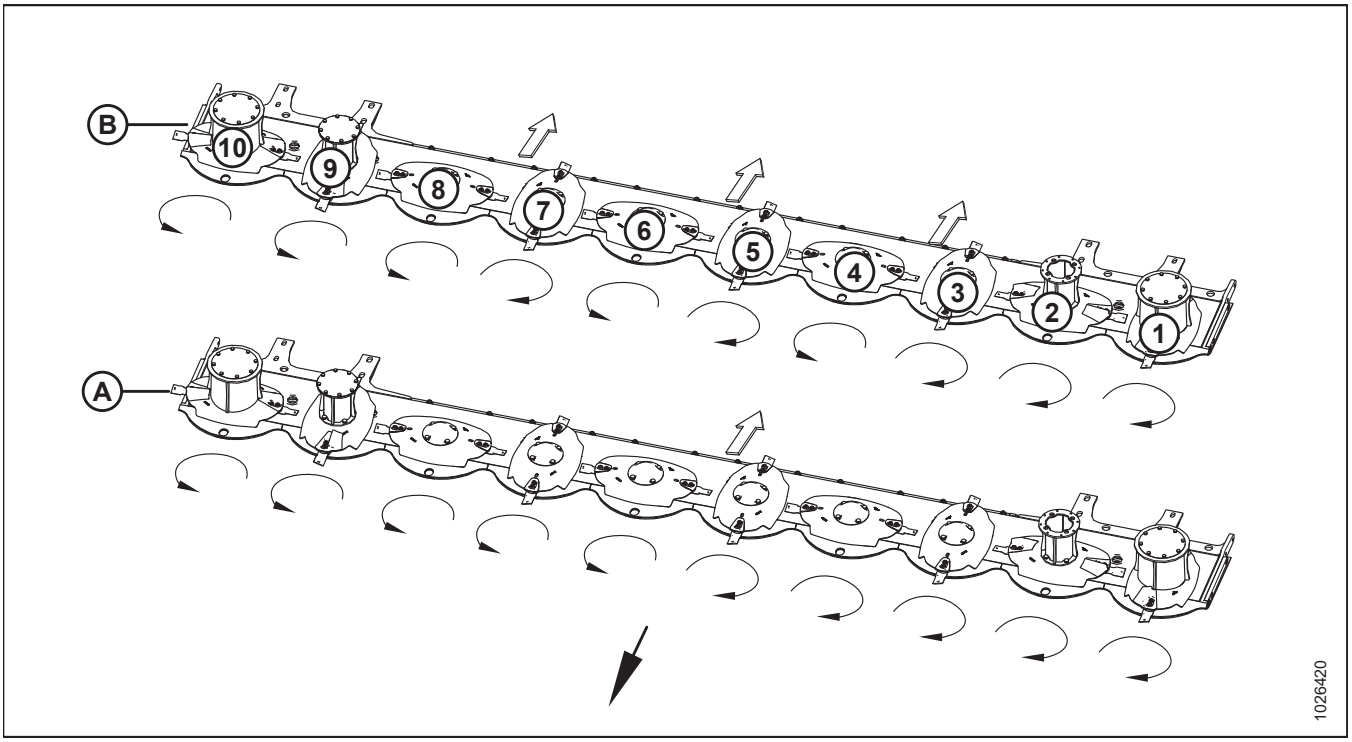


Figure 4.74: R116 PT (10 Disc) Spindle Rotation Pattern and Crop Streams

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

NOTE:

Refer to *Removing Cutterbar Spindles, page 158* and *Installing Cutterbar Spindles, page 160*.

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

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

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

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

4.4.7 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. Refer to the R1 PT Series Rotary Disc Pull-Type Parts Catalog.

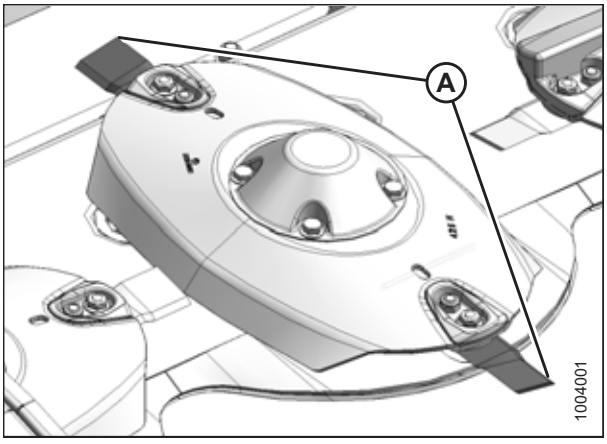


Figure 4.75: Disc blades

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.

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

   IMPORTANT:

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

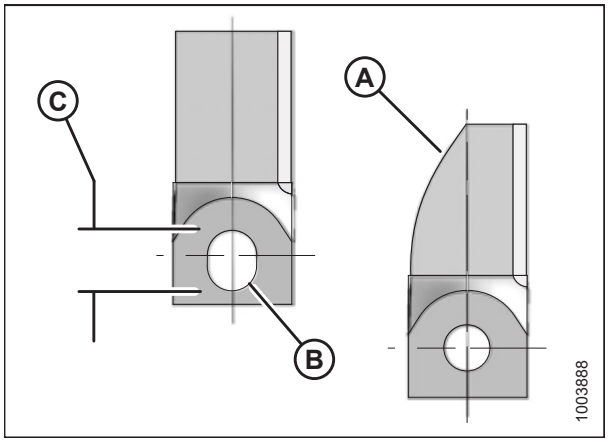


Figure 4.76: Disc Blades

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

IMPORTANT:

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

- *Changing R113 PT Cutterbar Crop Stream Configuration, page 166*
- *Changing R116 PT Cutterbar Crop Stream Configuration, page 167*

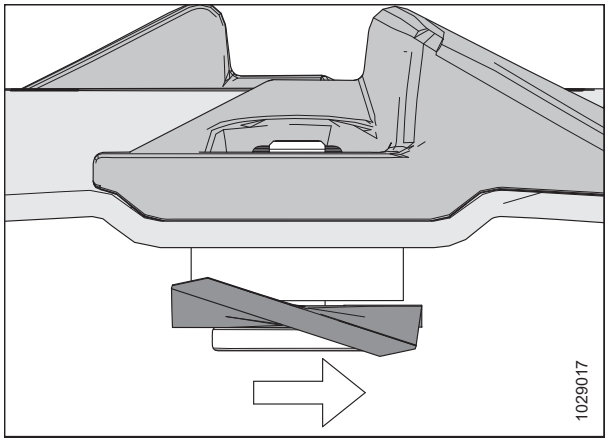


Figure 4.77: Counterclockwise Disc Rotation

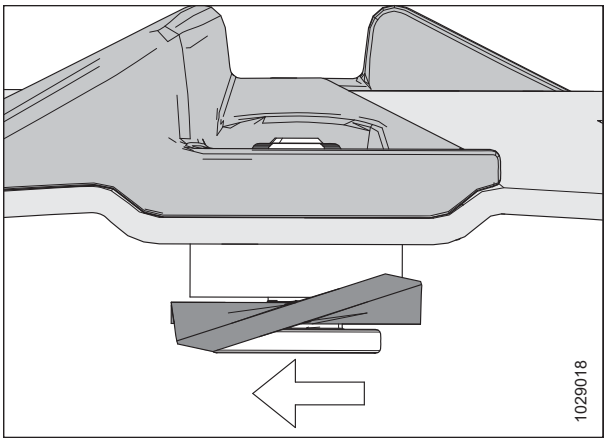


Figure 4.78: Clockwise Disc Rotation

Inspecting Disc Blade Hardware

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 171* and *Installing Disc Blades, page 172* for hardware replacement procedure.

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

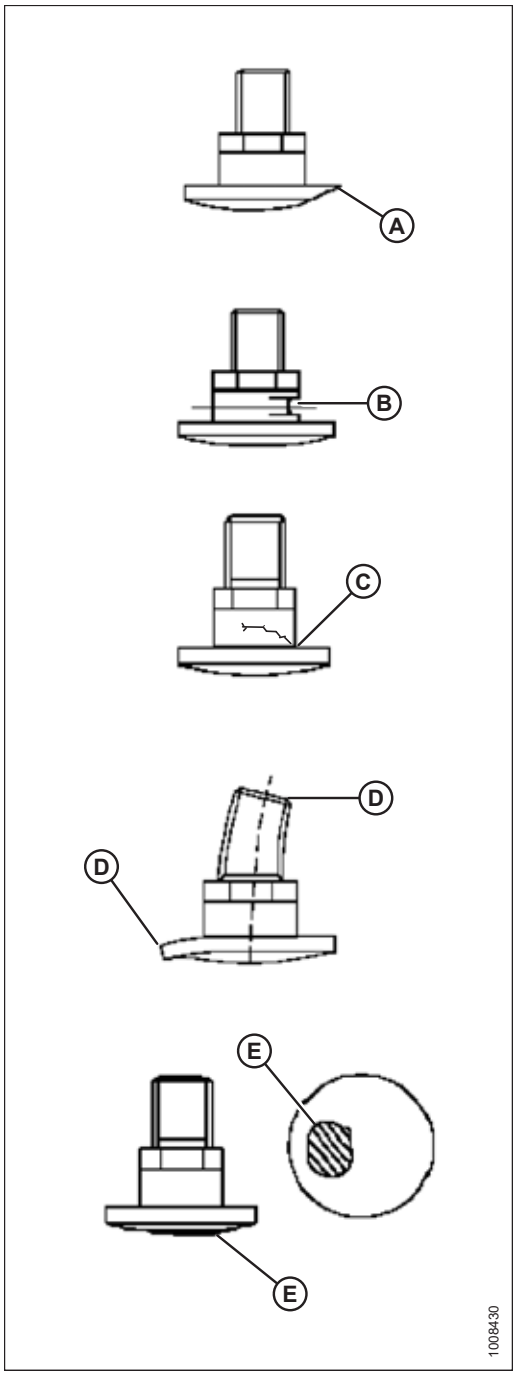


Figure 4.79: Disc Blade Bolts

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

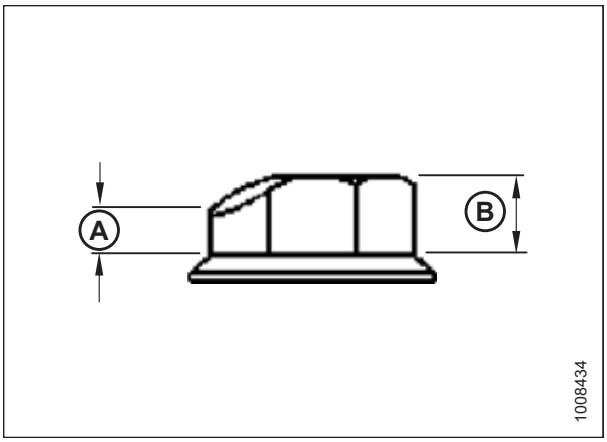


Figure 4.80: Disc Blade Nut

Removing Disc Blades

DANGER

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

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 pull-type fully, shut off engine, and remove key.
2. Engage lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
3. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

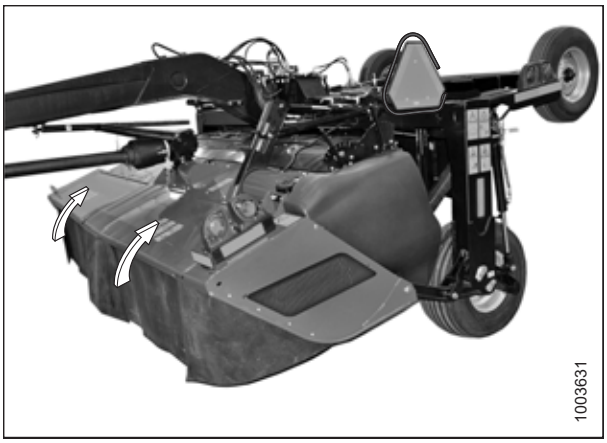


Figure 4.81: R1 Series Rotary Disc Pull-Type

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

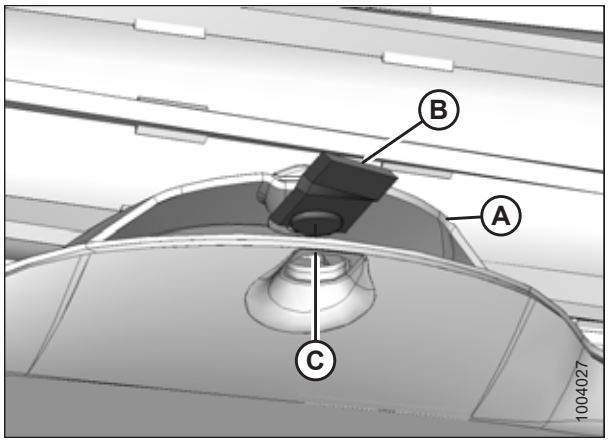


Figure 4.82: Disc Blade Aligned with Hole in Rock Guard

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

   IMPORTANT:

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

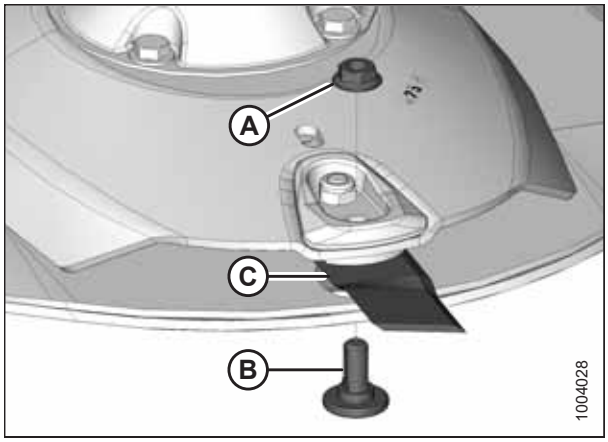


Figure 4.83: Disc Blade

Installing Disc Blades

CAUTION

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

IMPORTANT:

If you are unsure which direction the spindles rotate, refer to *4.4.6 Reconfiguring Cutterbar Crop Stream, page 164*.

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

   IMPORTANT:

   Nuts are one-time-use only. When flipping or changing a blade, replace using a **NEW** nut only.
3. Install new nut (D) and torque to 125 Nm (92 lbf·ft).

WARNING

Ensure 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.

4. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

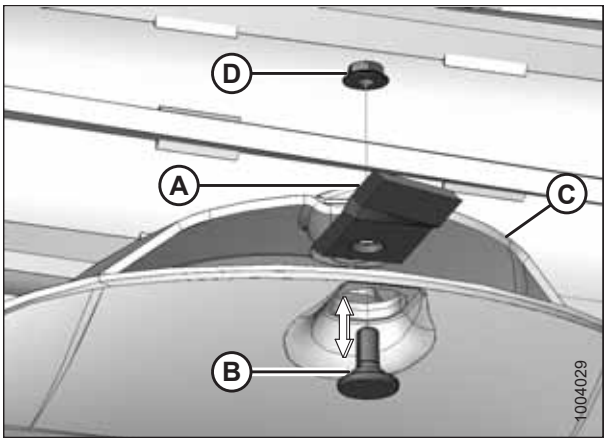


Figure 4.84: Disc Blade

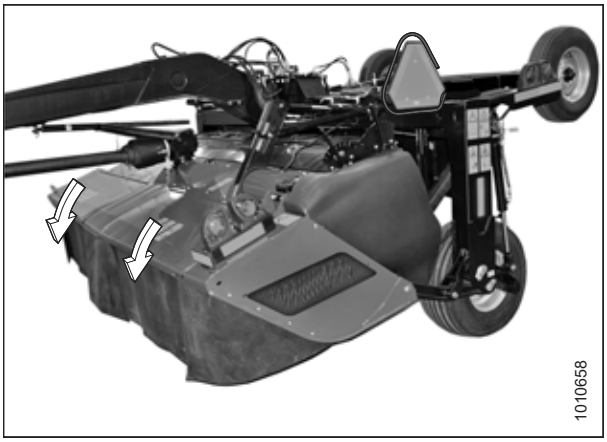


Figure 4.85: R1 Series Rotary Disc Pull-Type

4.4.8 Maintaining Quick Change Blade System

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

Inspecting Retaining Bolts

The material thickness of the retaining bolts and the quick change plate is checked using the supplied gauge.

DANGER

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

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

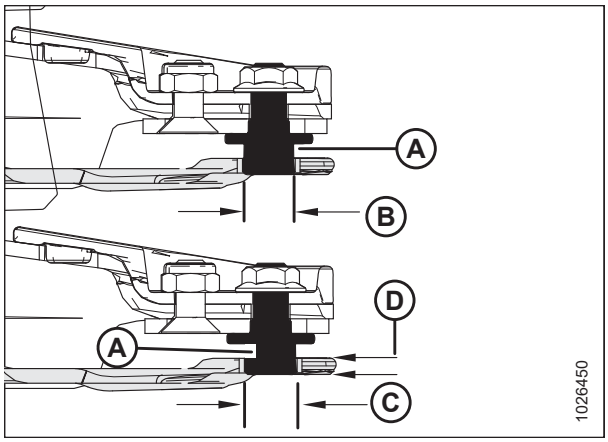


Figure 4.86: Retaining Bolt and Quick Change Plate

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

1. Gauge (A) is located on change tool (B).

   NOTE:

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

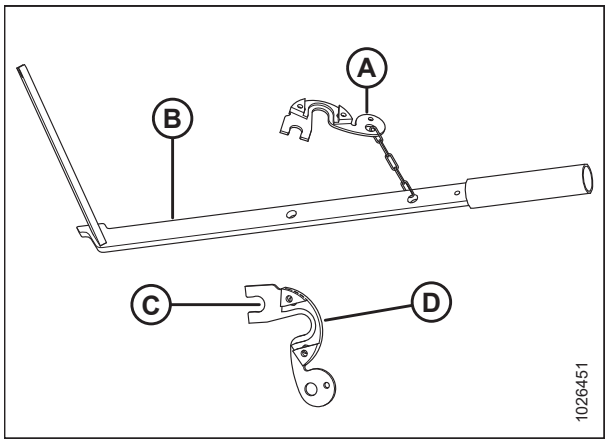


Figure 4.87: Change Tool and Gauge

2. Thoroughly clean the area around and between the retaining bolts and the quick change plate.
3. Remove blade.
4. Place gauge (A) over the retaining bolt and rotate 90°.

   NOTE:

   - If it is **NOT** possible to slide the gauge over the retaining bolt during the rotation, then the retaining bolt is still in working order.
   - If it is possible to slide the gauge over the retaining bolt during rotation, then the retaining bolt must be replaced immediately.

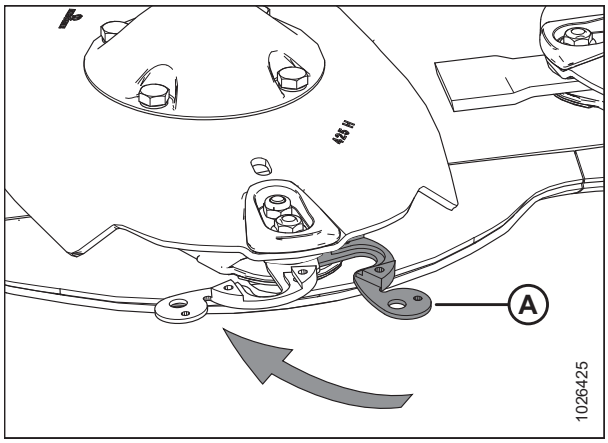


Figure 4.88: Checking Retaining Bolts

Inspecting Quick Change Plates

The material thickness of the retaining bolts and the quick change plate is checked using the supplied gauge.

DANGER

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

1. Gauge (A) is located on change tool (B).

   NOTE:

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

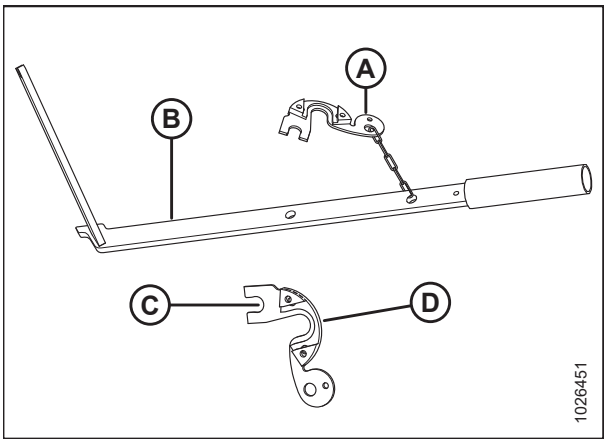


Figure 4.89: Change Tool and Gauge

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

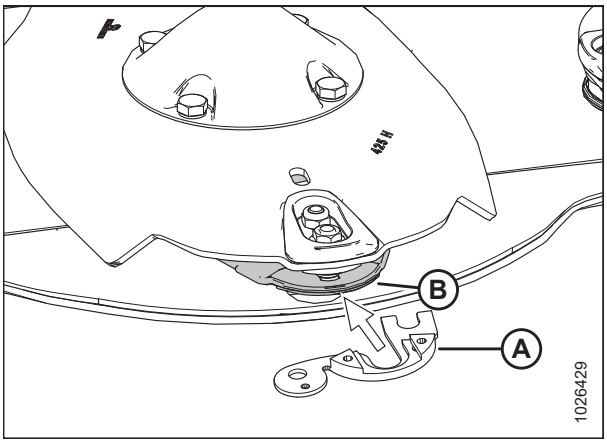


Figure 4.90: Gauge and Quick Change Plate

NOTE:

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

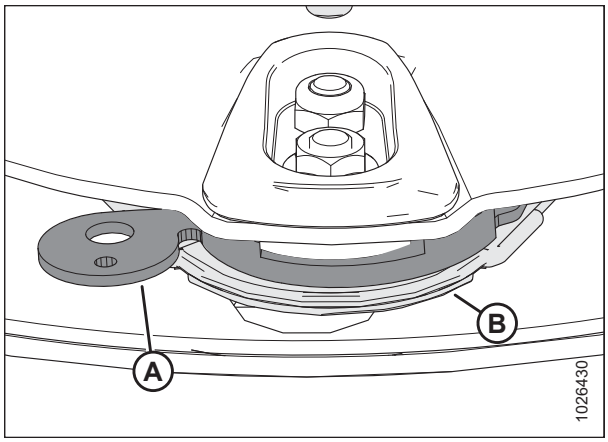


Figure 4.91: Gauge and Change Plate Aligned

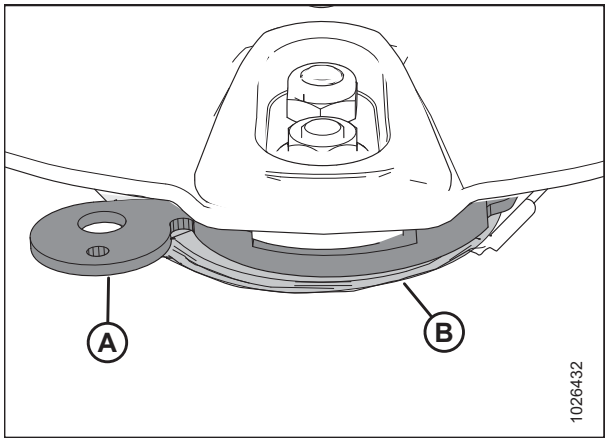


Figure 4.92: Gauge and Change Plate Unaligned

Replacing Quick Change Blades

If optional quick change blade kit is installed, replace blades as follows:

1. Remove any material that has collected between the quick change plate and the rock guard.
2. Remove change tool (A) from the storage position.
3. Place blade change tool (A) between disc (B) and quick change plate (C).

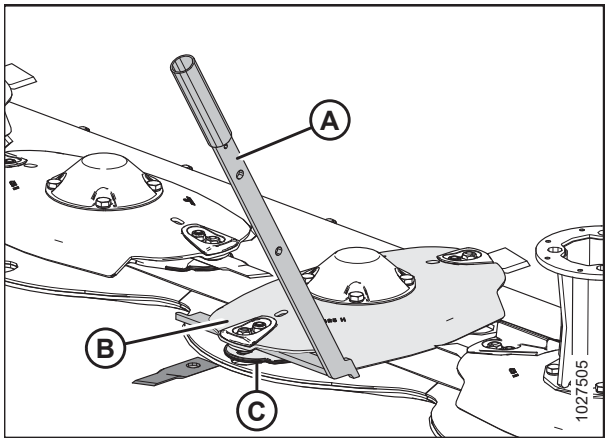


Figure 4.93: Installing Quick Change Blade

IMPORTANT:

Check that blade change tool (A) is fully engaged on both sides of disc (B).

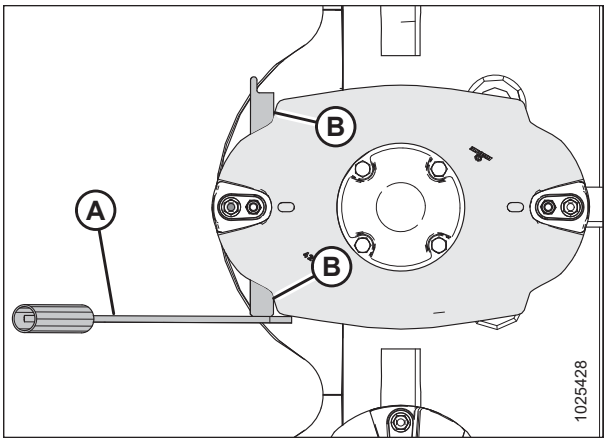


Figure 4.94: Correct Positioning of Quick Change Tool

5. Pull down on tool (A) open disc (B) and remove old blade (D) from blade bolt (E). Push tool (A) upward to return disc (B) to the closed position.
6. Pull down on tool (A) top open disc (B) and insert new blade (D) on blade bolt (E).
7. Push tool (A) upward, enclosing new blade (D) in the disc assembly.

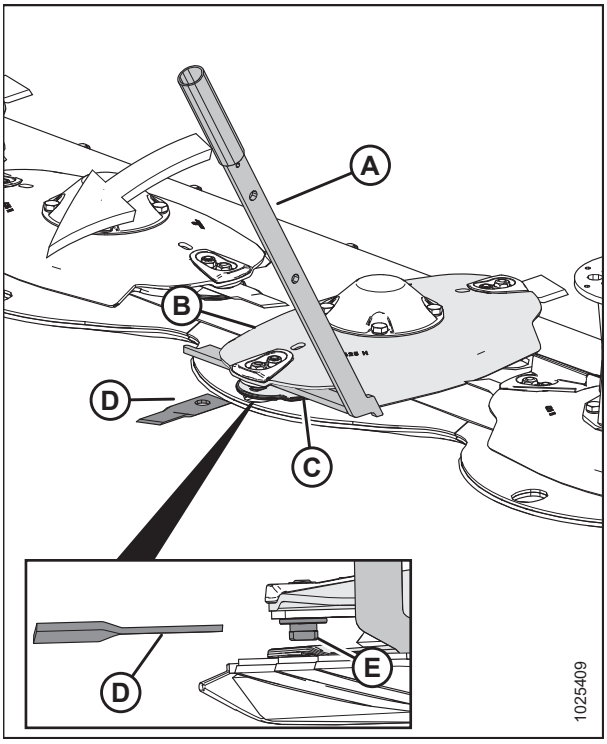


Figure 4.95: Installing Quick Change Blade

4.4.9 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.

One pair of accelerators is installed at each outboard end of an R113 PT, whereas an R116 PT has two pairs at each end.

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

IMPORTANT:

Always replace accelerators in pairs to ensure proper disc balance.

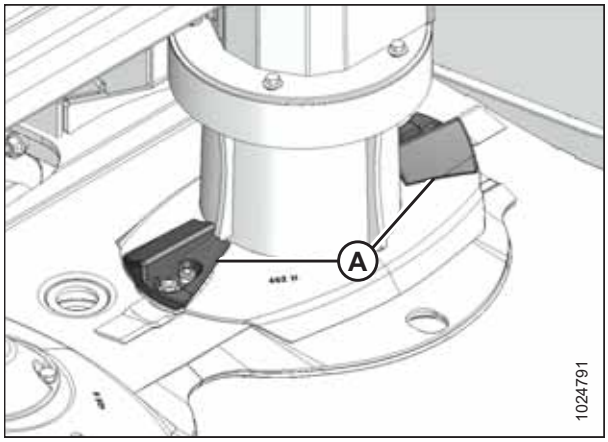


Figure 4.96: R113 PT Cutterbar Accelerators

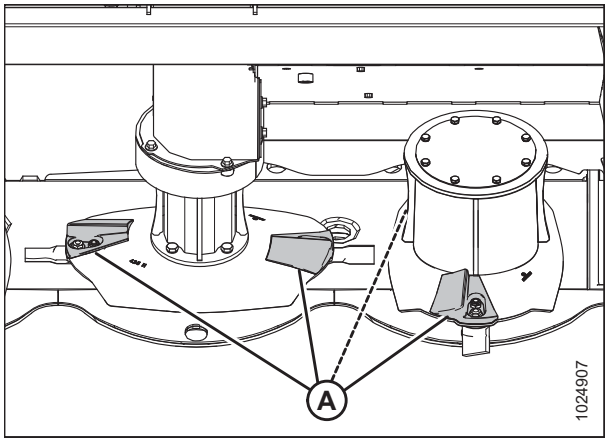


Figure 4.97: R116 PT Cutterbar Accelerators

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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
4. Open the cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

CAUTION

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

5. Inspect accelerators (A) for damage and wear, 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.

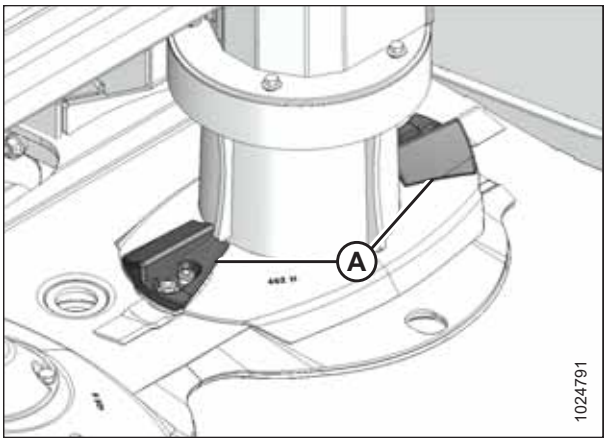


Figure 4.98: R113 PT Cutterbar Accelerators

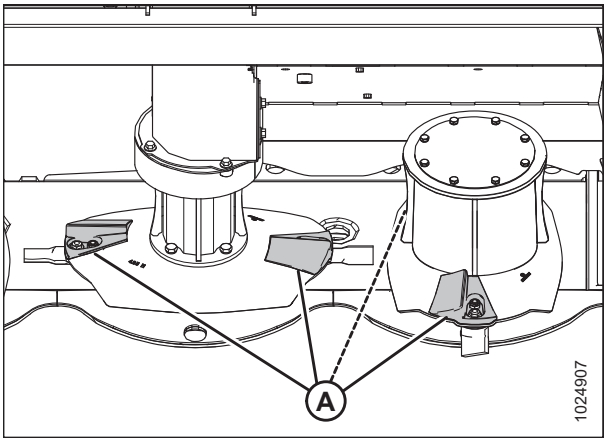


Figure 4.99: R116 PT Cutterbar Accelerators

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 header fully.
2. Shut off the engine, and remove the key from the ignition.
3. Engage lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.

4. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

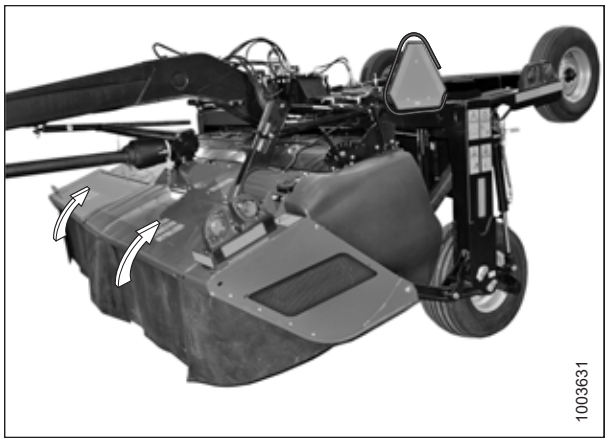


Figure 4.100: R1 Series Rotary Disc Pull-Type

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.

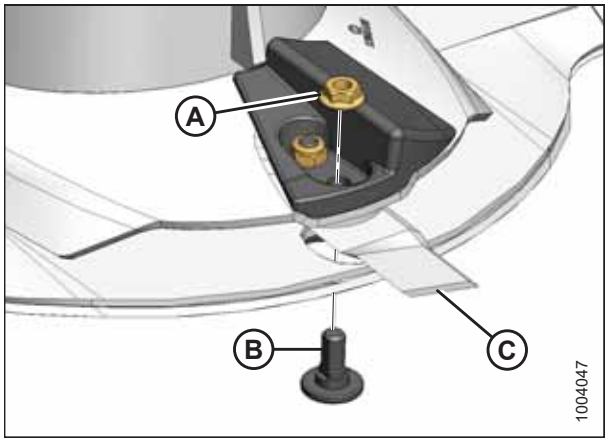


Figure 4.101: Accelerator Removal

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

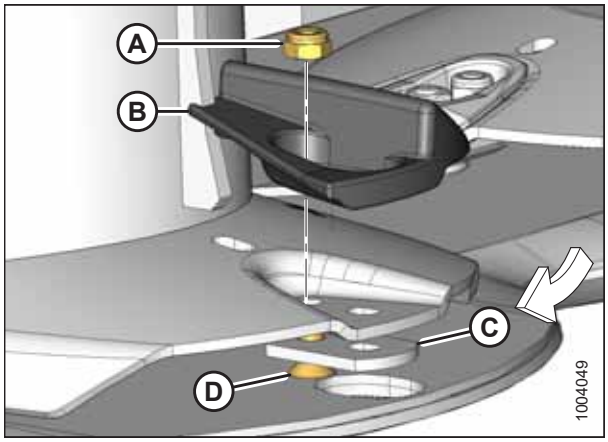


Figure 4.102: Accelerator Removal

Installing Accelerators

DANGER

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

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. If you are unsure which direction the spindle rotates, refer to *4.4.5 Replacing Cutterbar Spindles, page 157*.

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

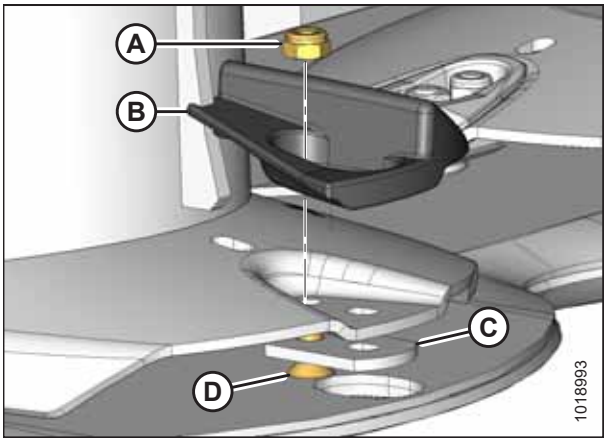


Figure 4.103: Accelerator Install

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

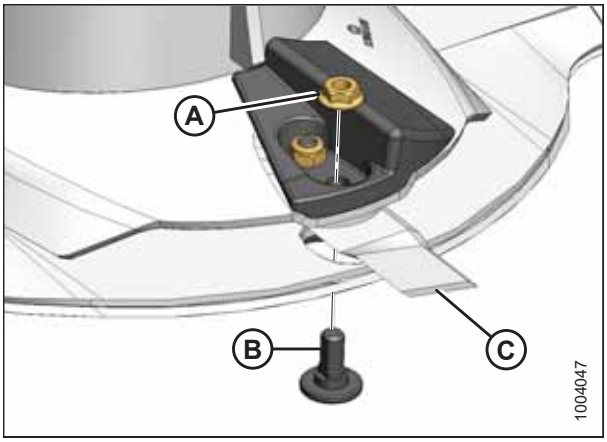


Figure 4.104: Accelerator Install

4. Torque inside nut (A) to 58 Nm (43 lbf·ft).
5. Torque outside nut (B) (closest to the blade) to 125 Nm (92 lbf·ft).
6. Repeat 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. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

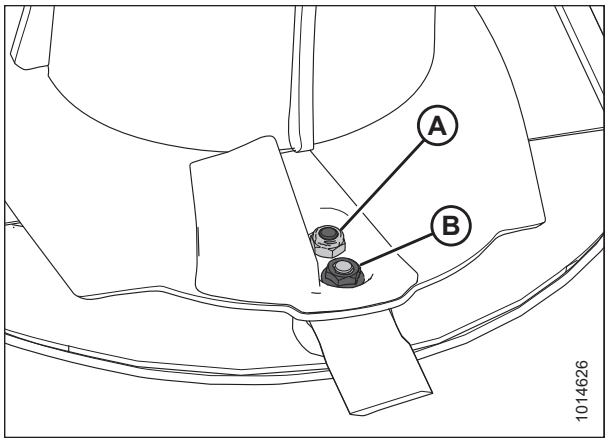


Figure 4.105: Accelerator Install

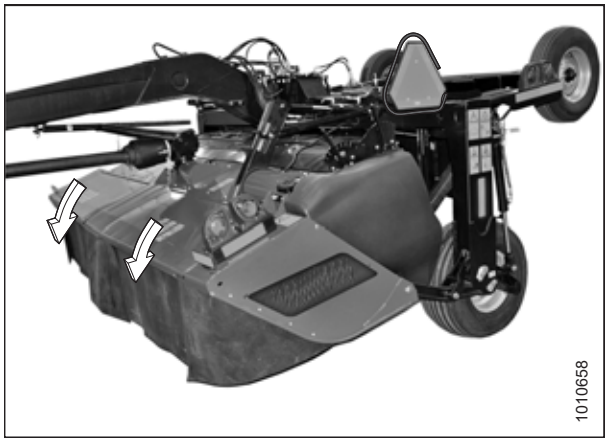


Figure 4.106: R1 Series Rotary Disc Pull-Type

4.4.10 Rock Guards

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.

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

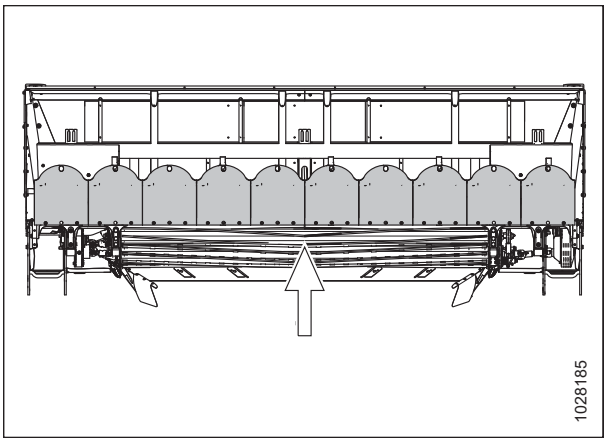


Figure 4.107: Rock Guards

Removing Inboard Rock Guards

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

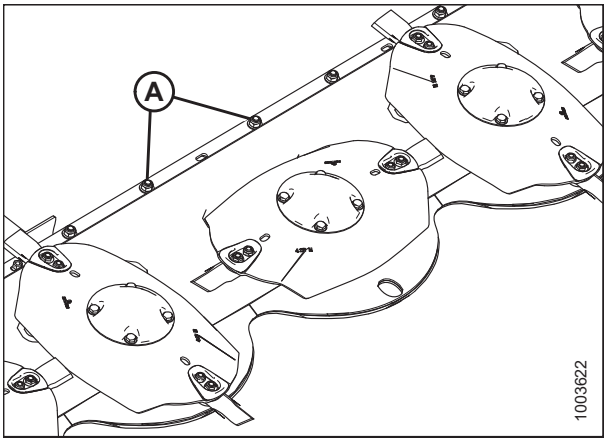


Figure 4.108: Inboard Rock Guards

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

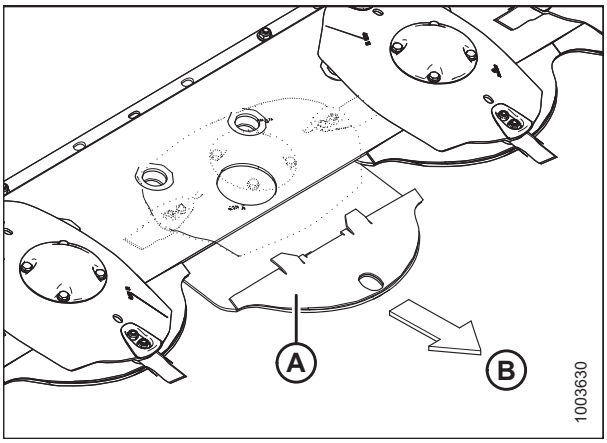


Figure 4.109: Inboard Rock Guards

Installing Inboard Rock Guards

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

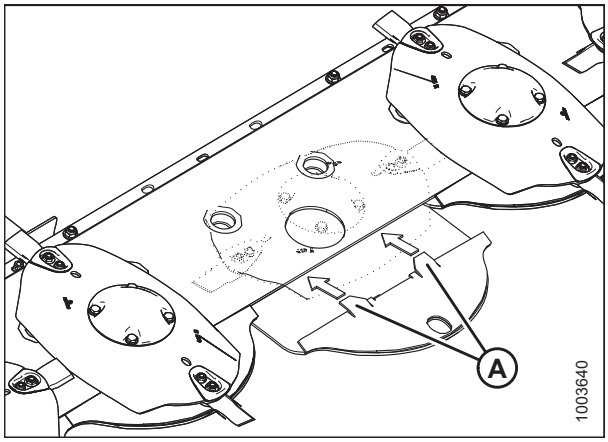


Figure 4.110: Inboard Rock Guards

2. 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.

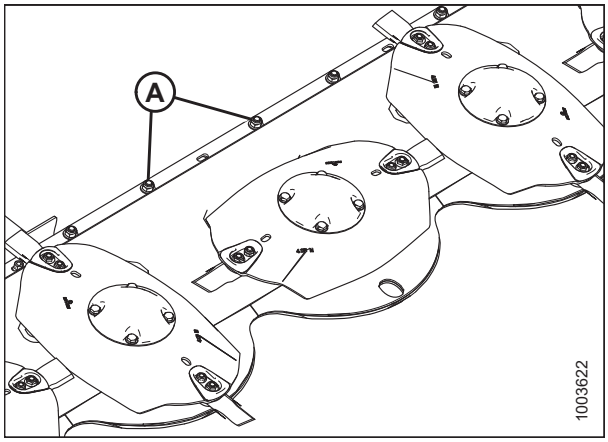


Figure 4.111: Inboard Rock Guards

Removing Outboard Rock Guards

DANGER

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

WARNING

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.

4. Locate rock guard (B) on the bottom outboard end of the cutterbar. There is one guard on each end of the cutterbar.
5. Remove the two hex head screws (A), washers, and lock nuts (C) securing rock guard (B) to the cutterbar assembly.

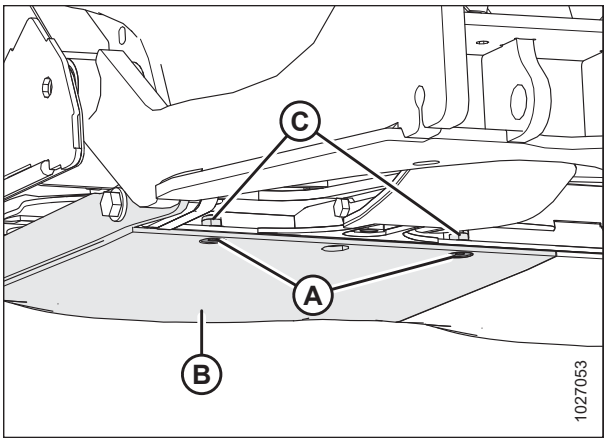


Figure 4.112: Left Outboard Rock Guard – View from Rear

6. Remove bolt and washers (A).
7. Loosen bolt (B).
8. Remove rock guard (C) by sliding it forward.
9. Repeat Steps *4, page 185* to *8, page 185* at the opposite side of the cutterbar.

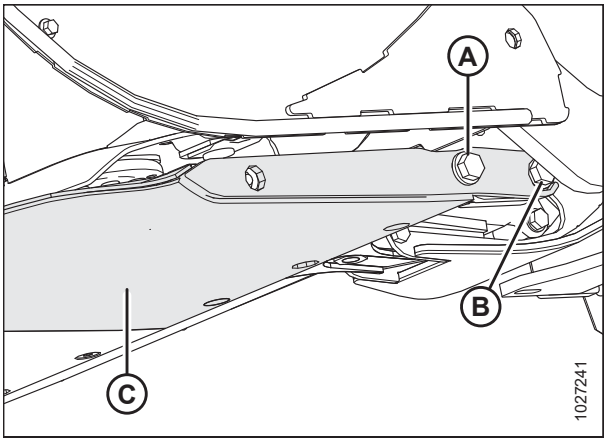


Figure 4.113: Left Outboard Rock Guard – Side View

Installing Outboard Rock Guards

DANGER

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

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 lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.

5. Apply medium-strength threadlocker (Loctite® 242 or equivalent) to bolt (B).

   NOTE:

   Some parts 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 header until the tabs on the front of the rock guard are supported by the cutterbar.

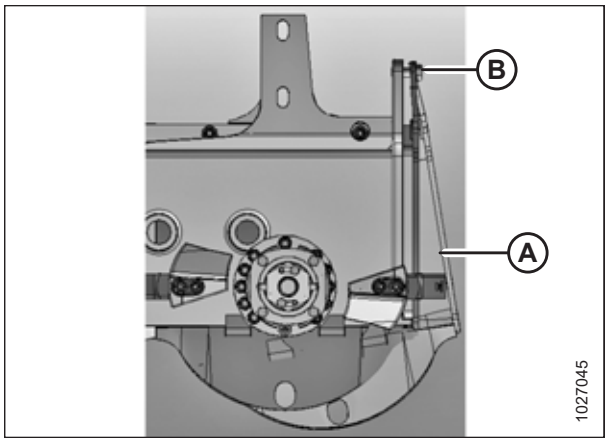


Figure 4.114: Left Outboard Rock Guard – Angled

9. Using a rubber mallet, tap rock guard (A) so it is parallel and flush against cutterbar (B).

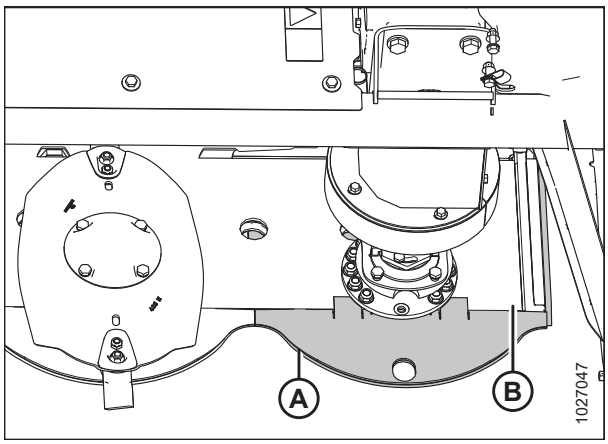


Figure 4.115: Outboard Rock Guard

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.

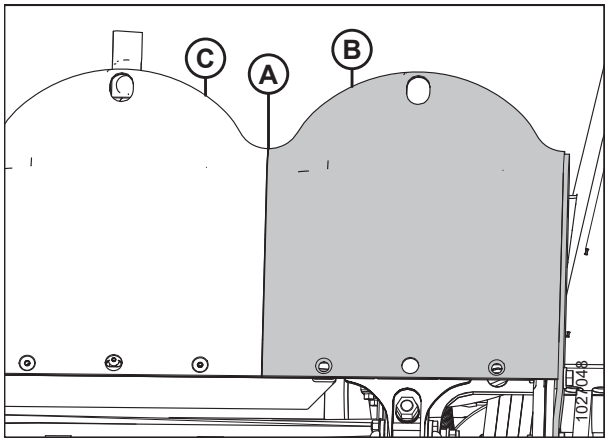


Figure 4.116: Outboard Rock Guard Installed

11. 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) (MD #136141) and one washer (B) as shown. Torque bolts (A) and (D) to 251 Nm (185 lbf·ft).
13. Torque screws (C) to 54 Nm (40 lbf·ft).
14. Repeat at the opposite side of the cutterbar.

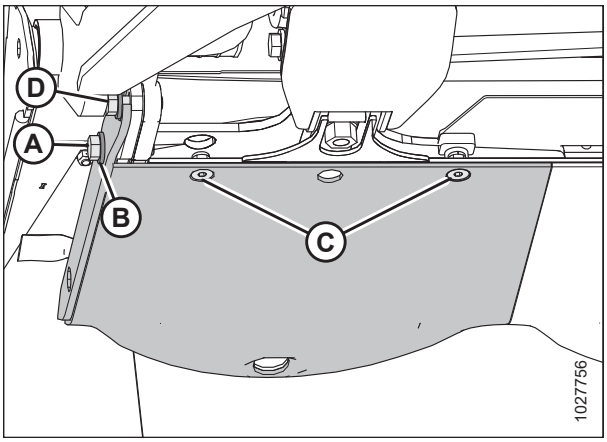


Figure 4.117: Left Outboard Rock Guard – View from Rear

4.4.11 Maintaining Small Drums – R116 PT

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

IMPORTANT:

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

IMPORTANT:

Measure drum size to determine if small or large drums are installed on your rotary disc pull-type. Large drums measure 250 mm (9 7/8 in.) across. Small drums measure 187 mm (7 3/8 in.) across. If your rotary disc pull-type has large drums, refer to *4.4.12 Maintaining Large Drums – R113 or R116 PT, page 199*.

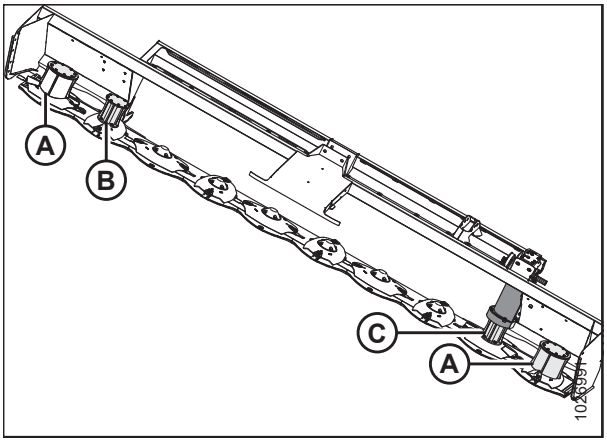


Figure 4.118: Cutterbar

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

C - Small Driven Drum

Inspecting Small Drums – R116 PT

Inspect drums daily for signs of damage or wear.

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.

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

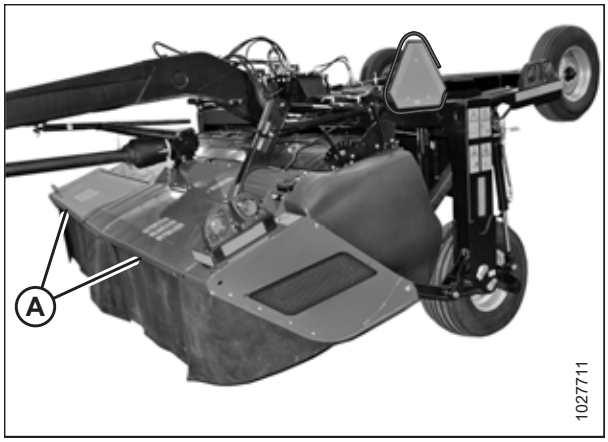


Figure 4.119: Cutterbar Doors

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

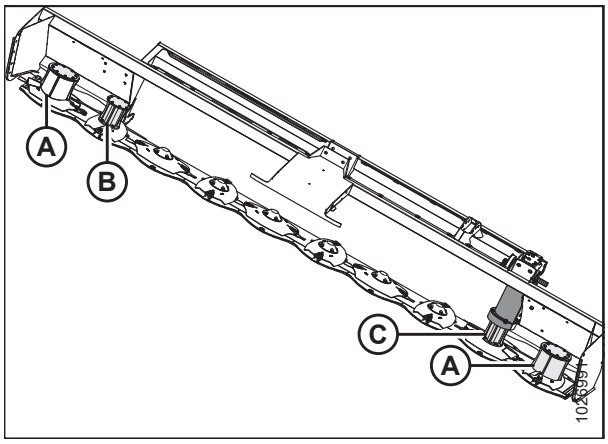


Figure 4.120: Cutterbar

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

C - Small Driven Drum

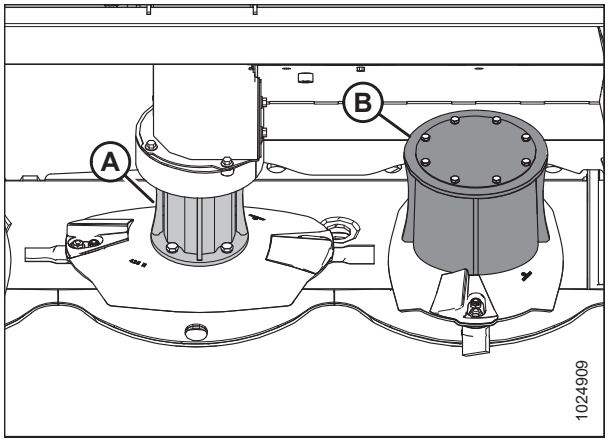


Figure 4.121: R116 PT Drums

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

7. Close cutterbar doors (A). For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

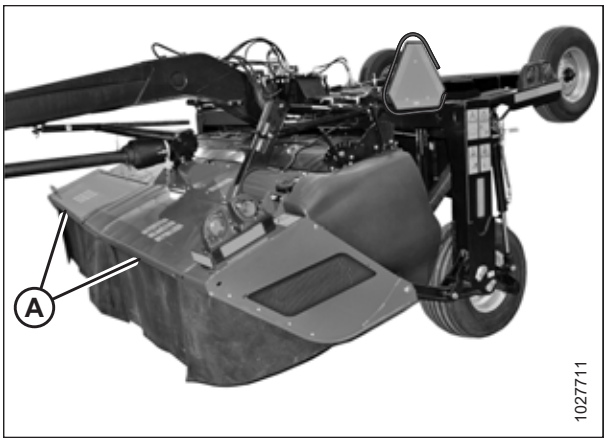


Figure 4.122: Cutterbar Doors

Removing Small Driven Drum and Driveline – R116 PT

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.

NOTE:

Illustrations show left drum and driveline.

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

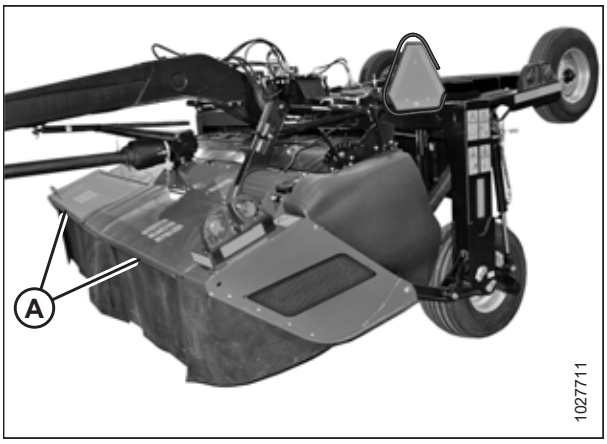


Figure 4.123: Cutterbar Doors

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

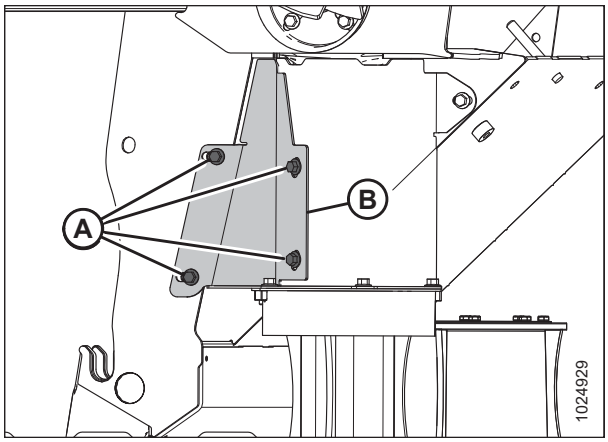


Figure 4.124: Driveline Shield

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

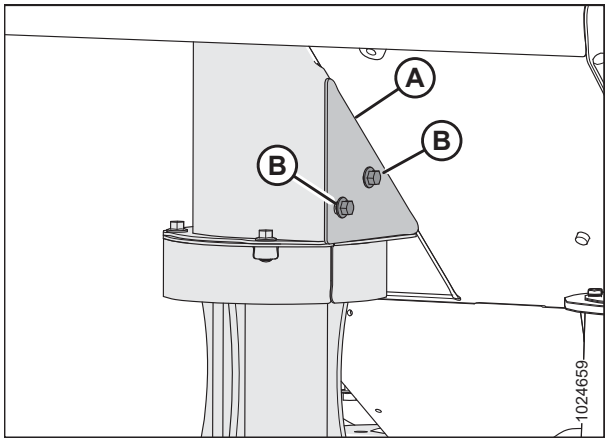


Figure 4.125: Driveline Shield

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

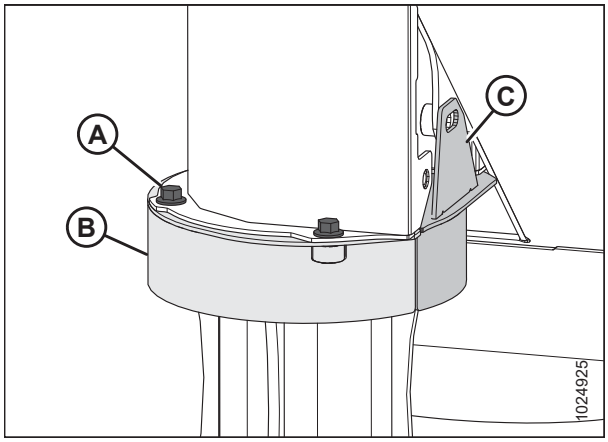


Figure 4.126: Driveline Shield

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

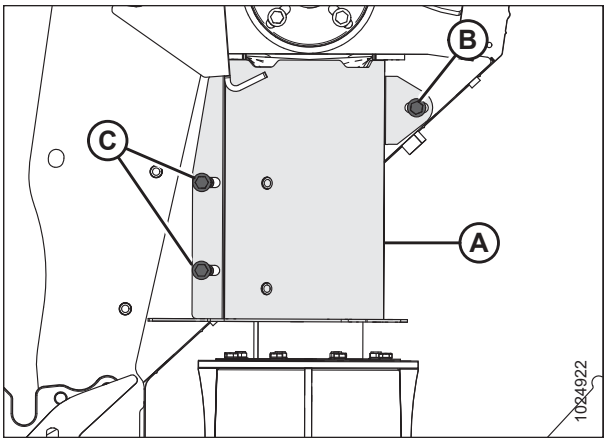


Figure 4.127: Driveline Shield

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

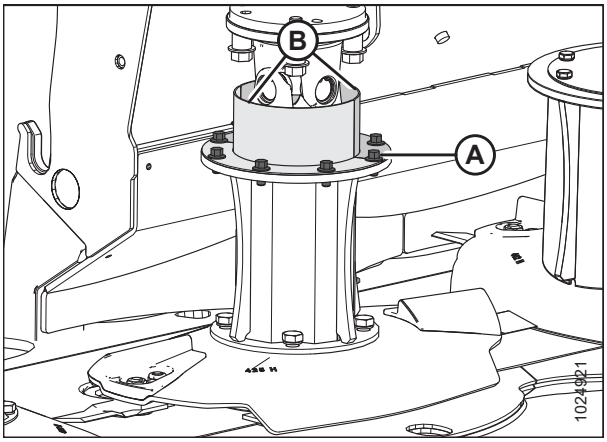


Figure 4.128: Driveline Shield

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

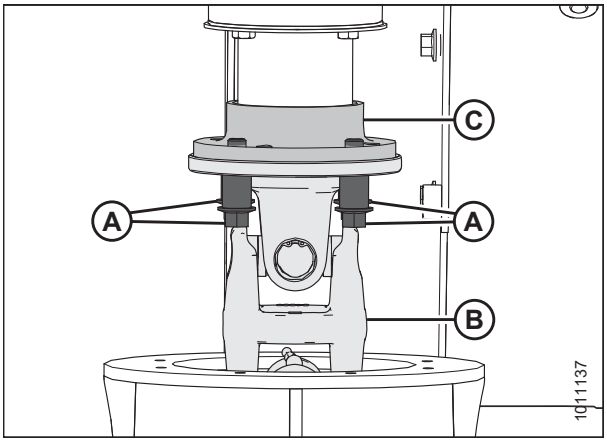


Figure 4.129: Driveline

10. 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.

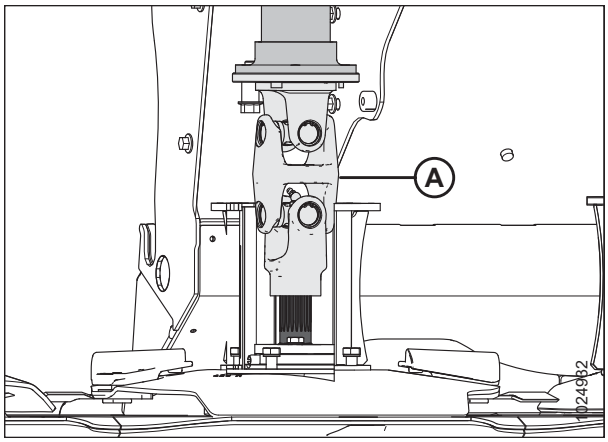


Figure 4.130: Driveline

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

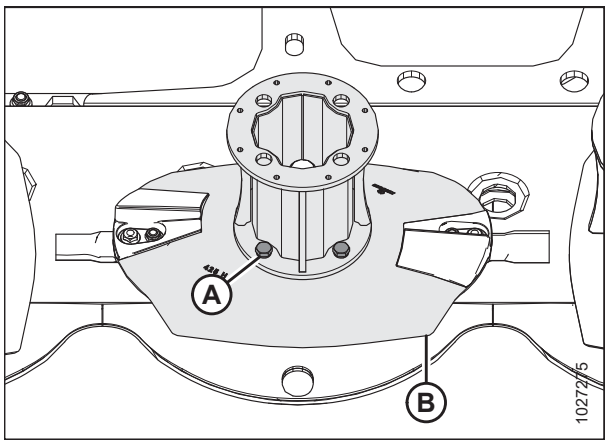


Figure 4.131: Driven Drum

Installing Small Driven Drum and Driveline – R116 PT

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.

NOTE:

Illustrations show left drum and driveline.

1. Lower the rotary disc pull-type 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).

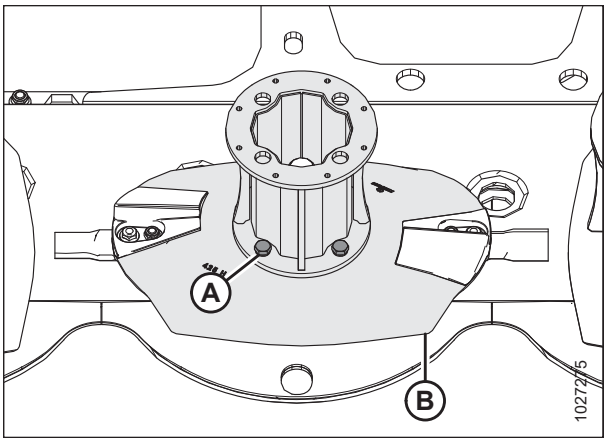


Figure 4.132: Drum Disc

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).

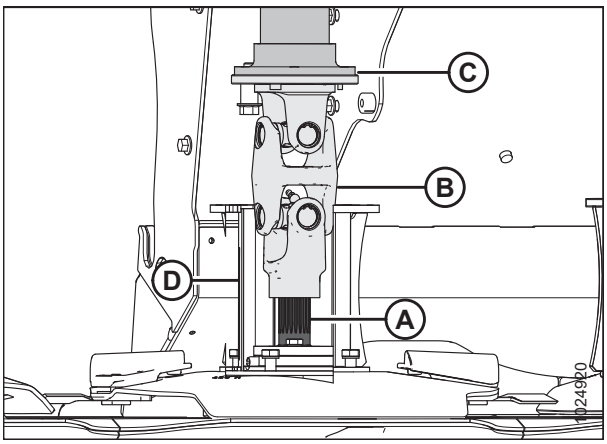


Figure 4.133: Driveline

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

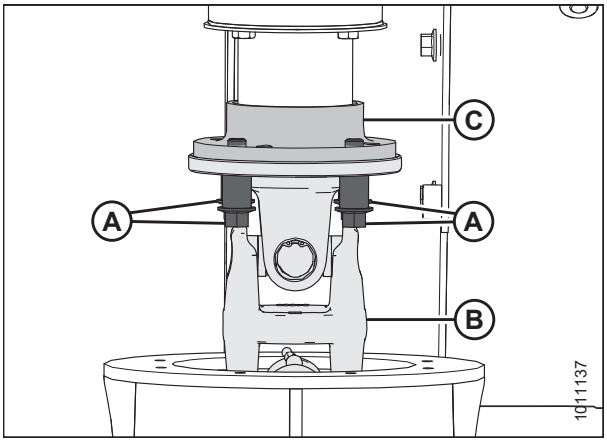


Figure 4.134: Driveline

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

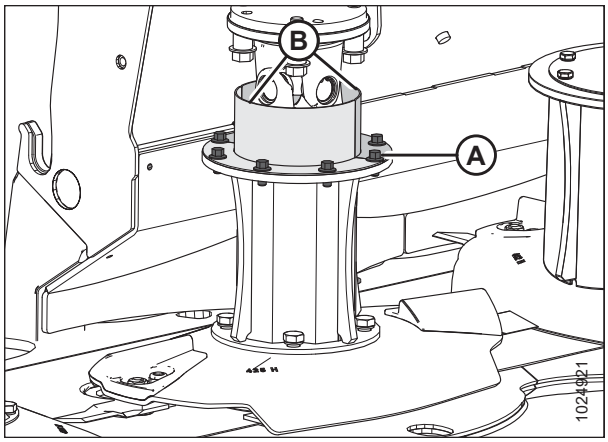


Figure 4.135: Driven Drum

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

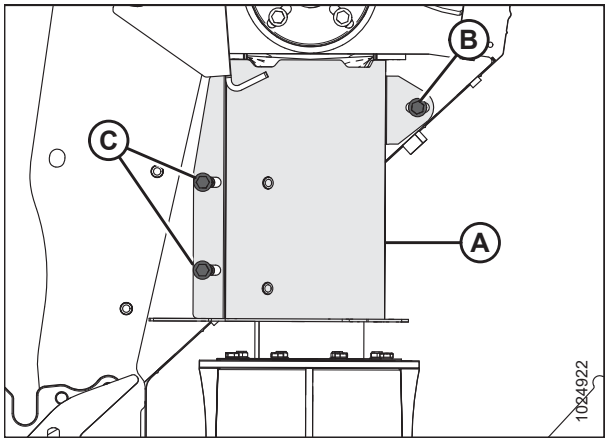


Figure 4.136: Driveline Shield

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

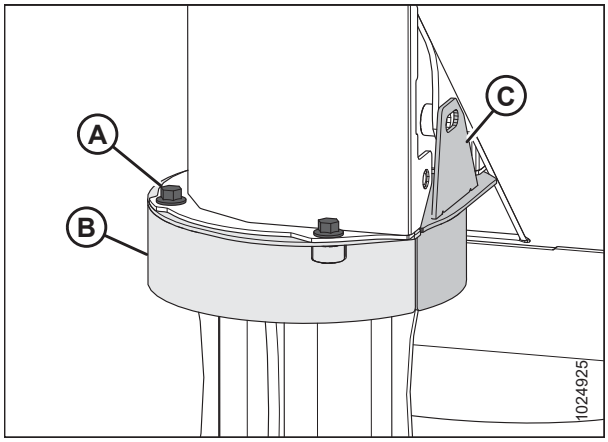


Figure 4.137: Driveline Shield

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).

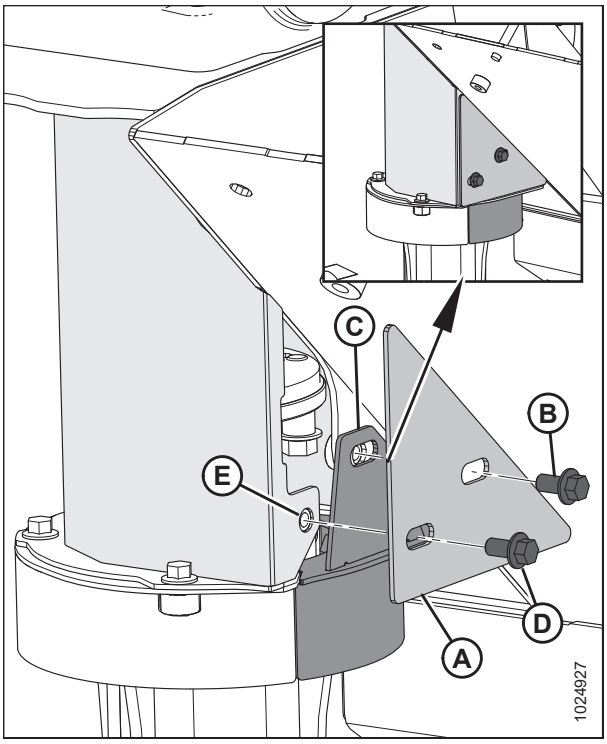


Figure 4.138: Driveline Shield

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

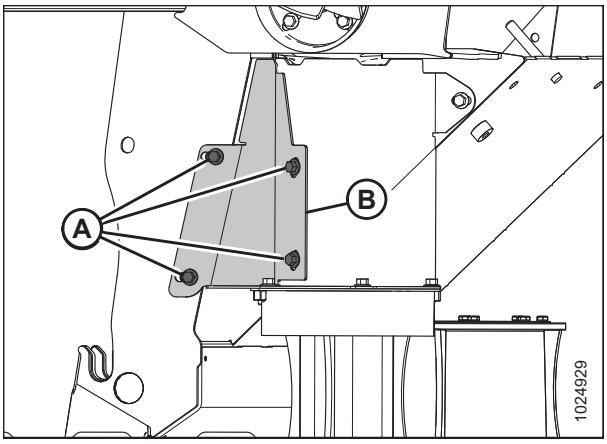


Figure 4.139: Driveline Shield

16. Close cutterbar doors (A). For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

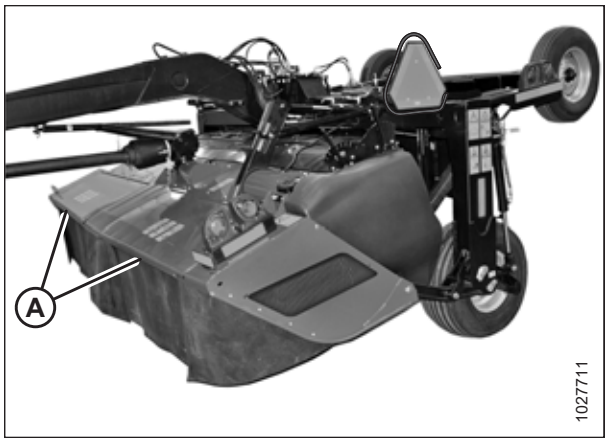


Figure 4.140: Cutterbar Doors and Curtains

Removing Small Non-Driven Drum – R116 PT

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. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open cutterbar doors (A). For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

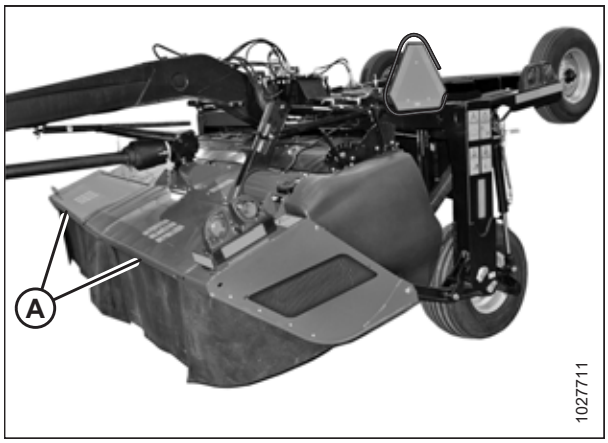


Figure 4.141: Cutterbar Doors

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

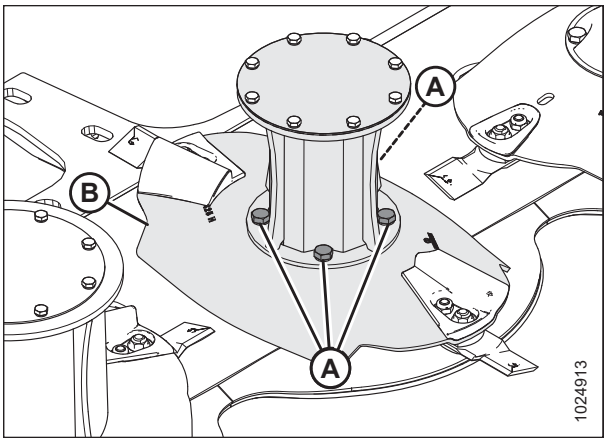


Figure 4.142: Non-Driven Drum

Installing Small Non-Driven Drum – R116 PT

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

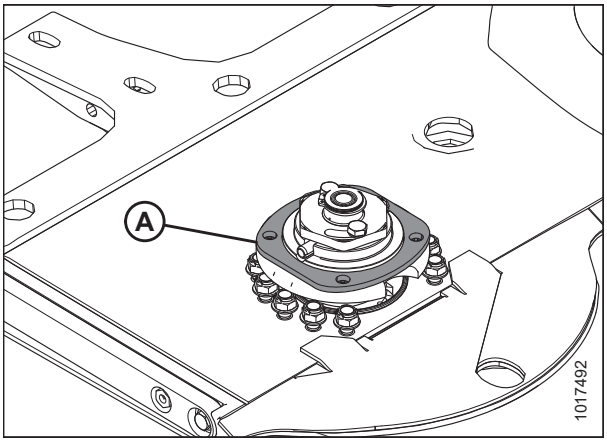


Figure 4.143: Non-Driven Spindle

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.

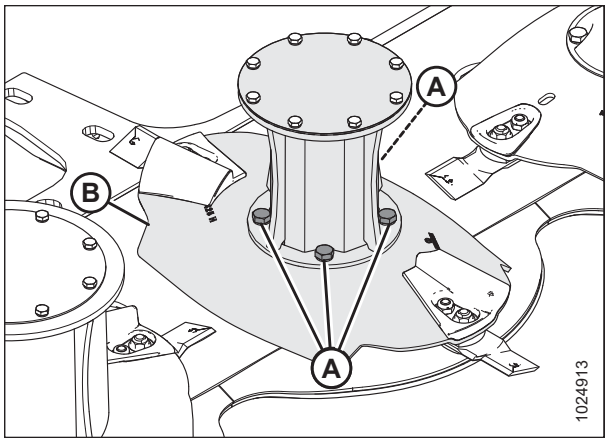


Figure 4.144: Non-Driven Drum

6. Close cutterbar doors (A). For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

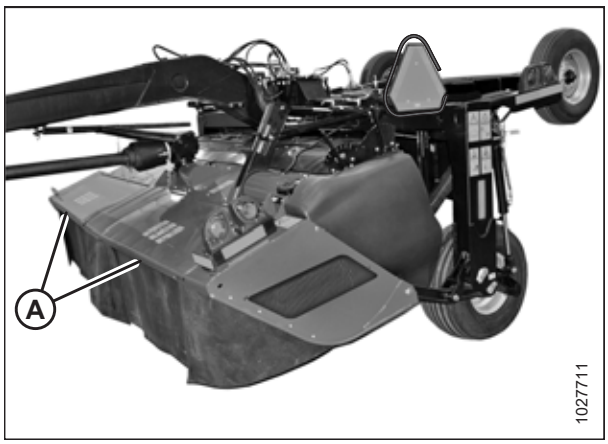


Figure 4.145: Cutterbar Doors

4.4.12 Maintaining Large Drums – R113 or R116 PT

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

IMPORTANT:

On an R116 PT, 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.

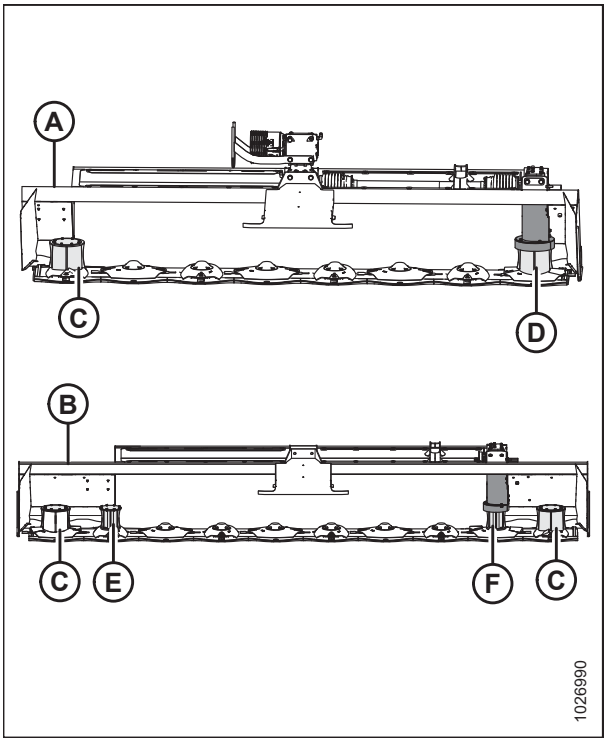


Figure 4.146: Cutterbars

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

Inspecting Large Drums – R113 or R116 PT

Inspect drums daily for signs of damage or wear.

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.

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

3. Open cutterbar doors (A). For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

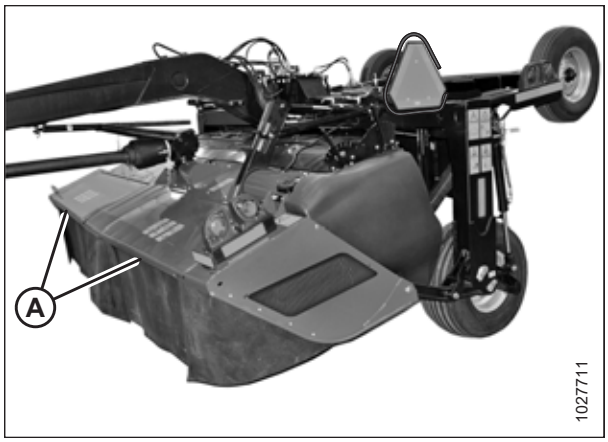


Figure 4.147: Cutterbar Doors – R113 PT Shown, R116 PT Similar

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

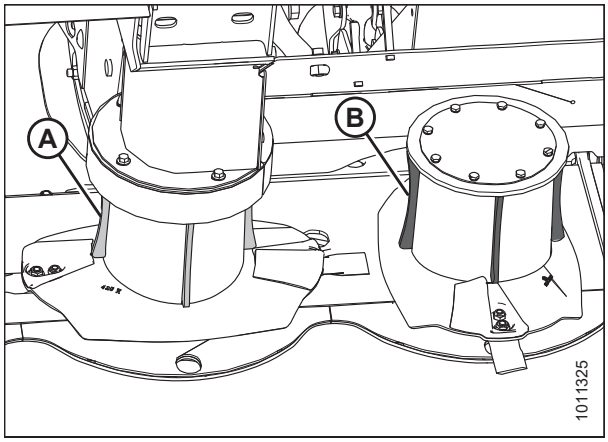


Figure 4.148: R116 PT Drums

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. Close cutterbar doors (A).

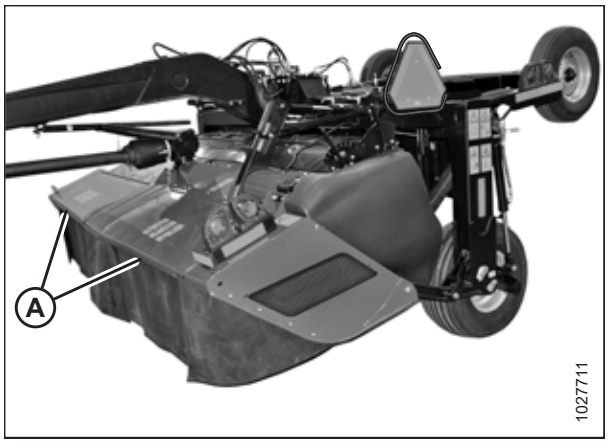


Figure 4.149: Cutterbar Doors – R113 PT Shown, R116 PT Similar

Removing Large Driven Drums and Driveline – R113 or R116 PT

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.

NOTE:

Illustrations show the left drum and driveline.

1. Shut down the engine, and remove the key from the ignition.
2. Open cutterbar doors (A). Refer to *3.3.1 Opening Cutterbar Doors – North America, page 36* for instructions.

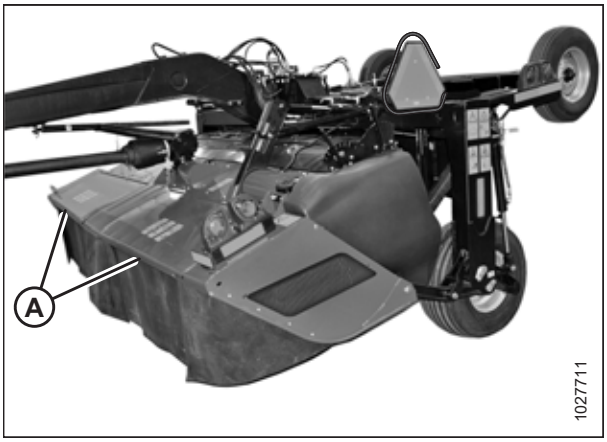


Figure 4.150: Cutterbar Doors

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

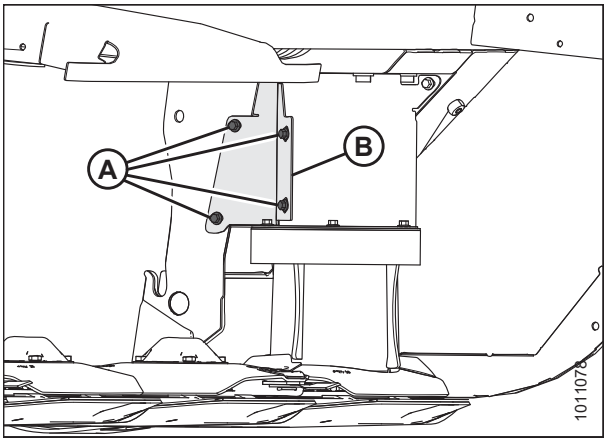


Figure 4.151: Vertical Drive Shield

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

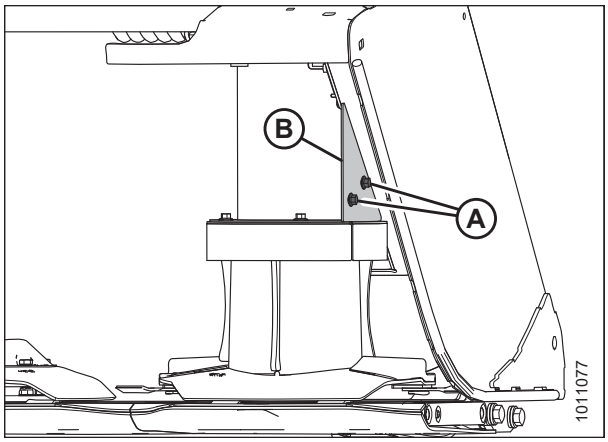


Figure 4.152: Cover Plate

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

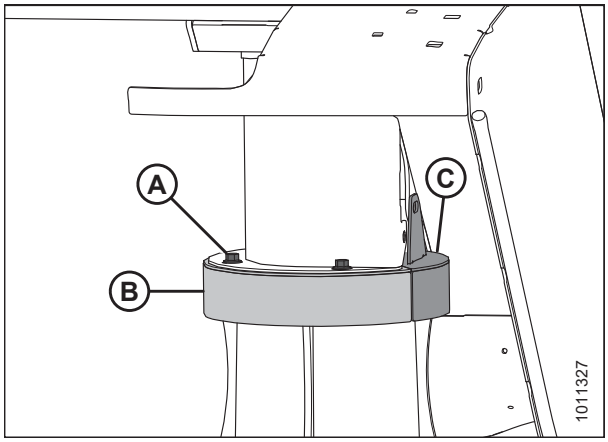


Figure 4.153: Top Plate and Drum Top

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

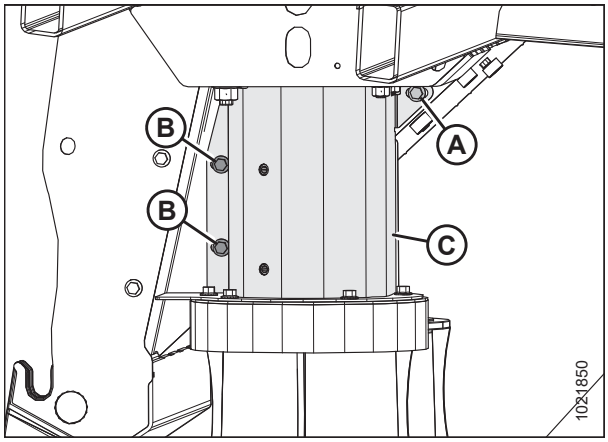


Figure 4.154: Vertical Shield

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

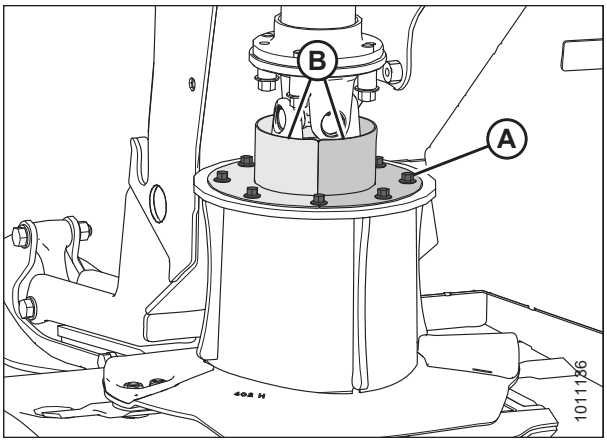


Figure 4.155: Drum Shields

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

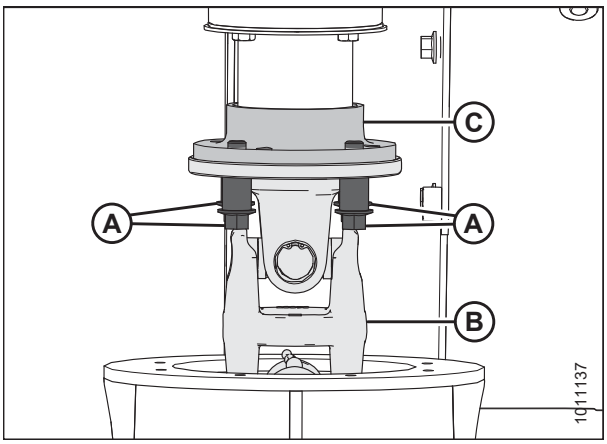


Figure 4.156: Hub Drive and Driveline Assembly

9. 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.

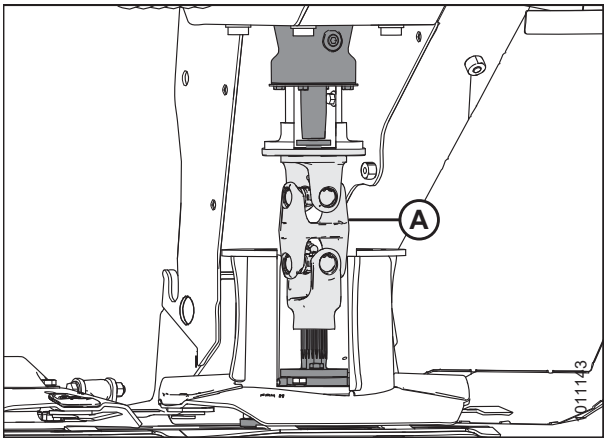


Figure 4.157: Driveline

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.

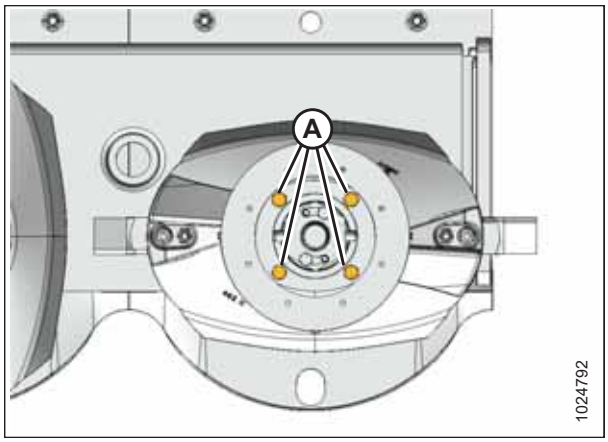


Figure 4.158: Driven Drum

Installing Large Driven Drums and Driveline – R113 or R116 PT

DANGER

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

WARNING

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

NOTE:

Illustrations show left the drum and driveline.

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

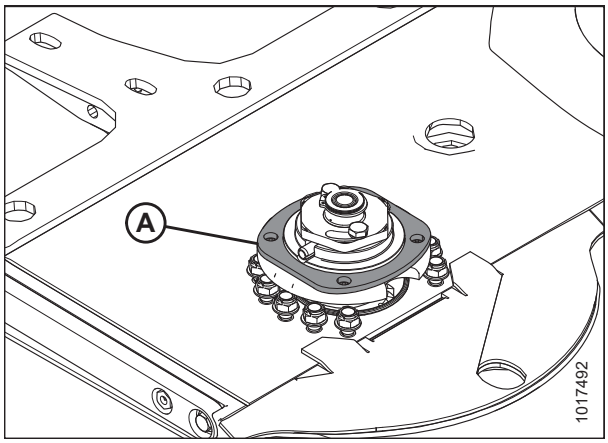


Figure 4.159: Spacer Plate

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).

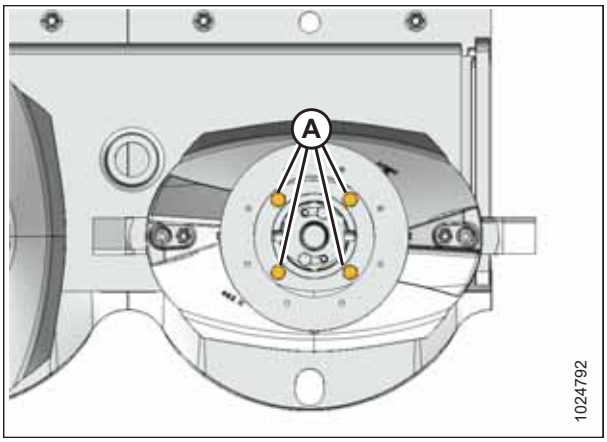


Figure 4.160: Drum Disc

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).

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

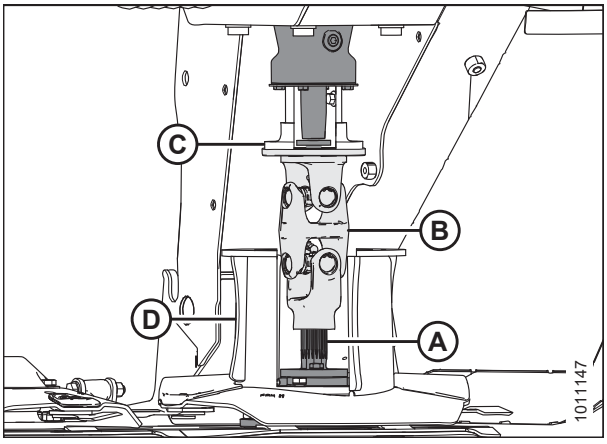


Figure 4.161: Driveline

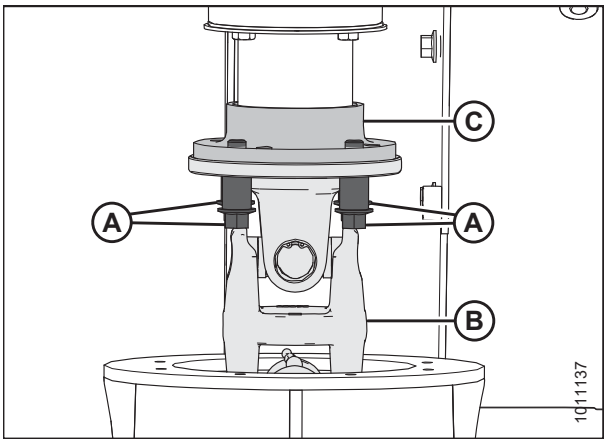


Figure 4.162: Driveline

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

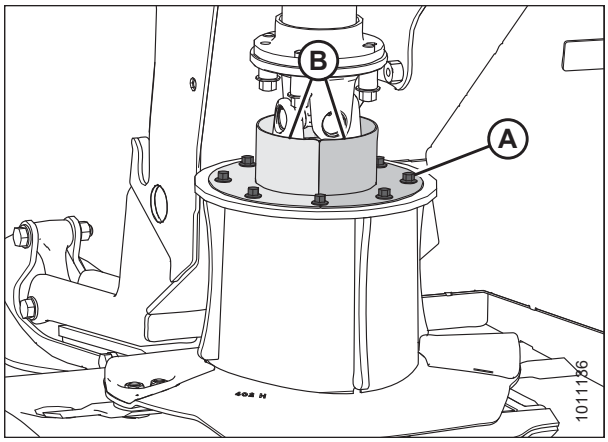


Figure 4.163: Driveline Shield

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

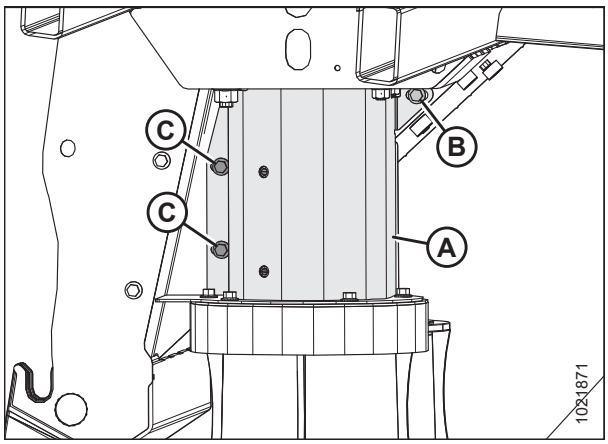


Figure 4.164: Driveline Shield

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

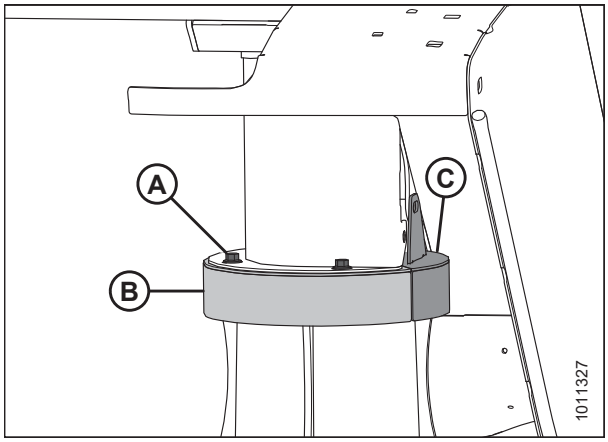


Figure 4.165: Driveline Shield

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).

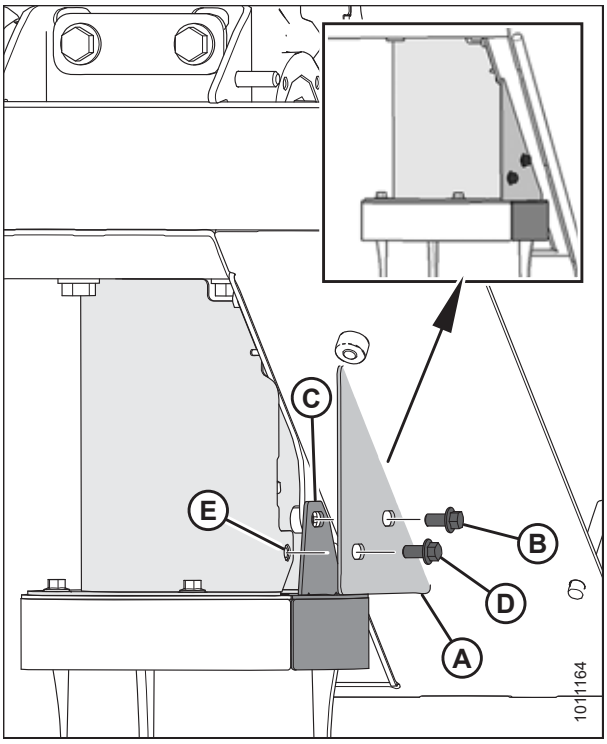


Figure 4.166: Driveline Shield

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

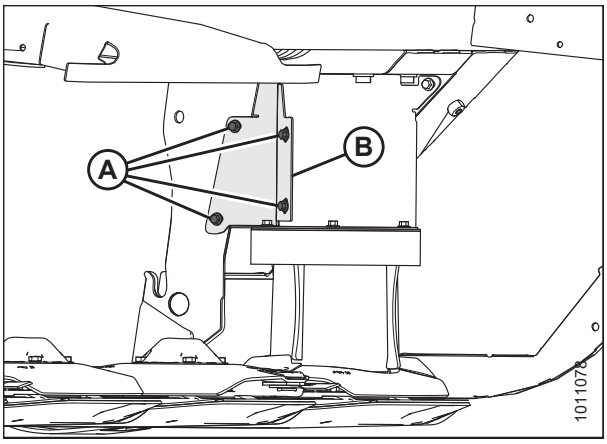


Figure 4.167: Driveline Shield

16. Close cutterbar doors (A). For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

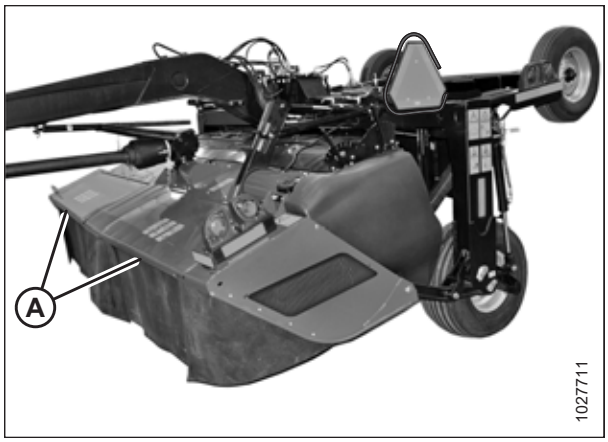


Figure 4.168: Cutterbar Doors and Curtains

Removing Large Non-Driven Drums – R113 or R116 PT

DANGER

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

WARNING

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

1. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36* or *3.3.2 Opening Cutterbar Doors – Export Latches, page 37*.

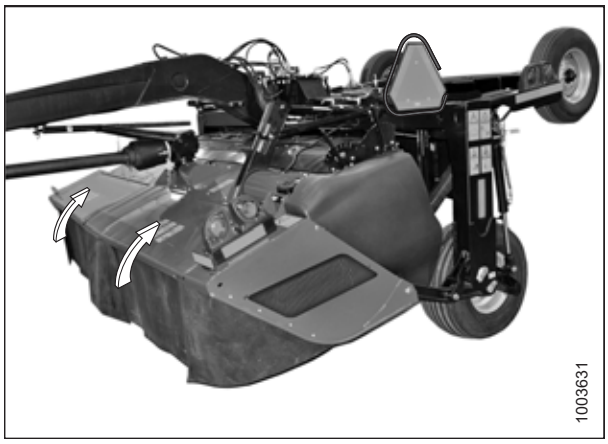


Figure 4.169: Cutterbar Doors – R1 Series Rotary Disc Pull-Type

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

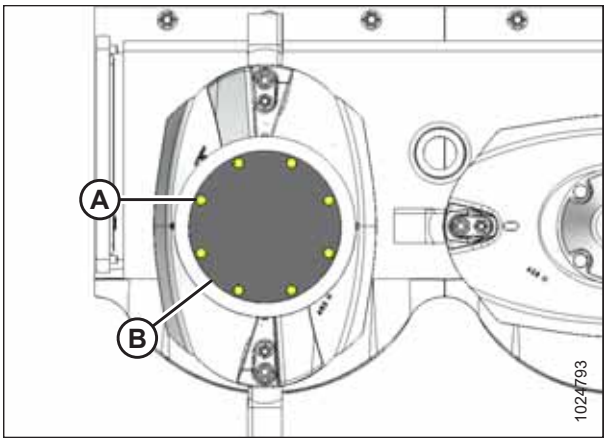


Figure 4.170: Non-Driven Drum

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

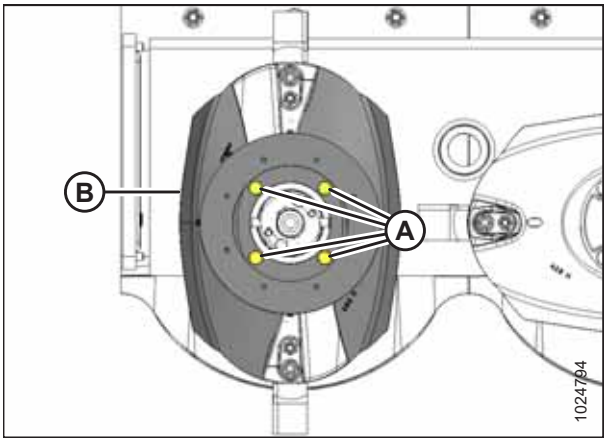


Figure 4.171: Non-Driven Drum

Installing Large Non-Driven Drums – R113 or R116 PT

DANGER

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

WARNING

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

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

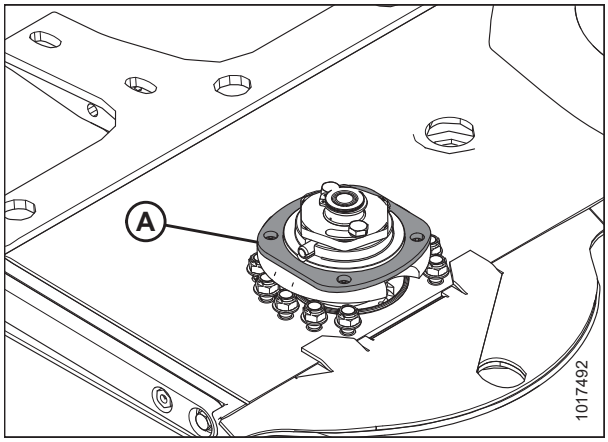


Figure 4.172: Non-Driven Spindle

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).

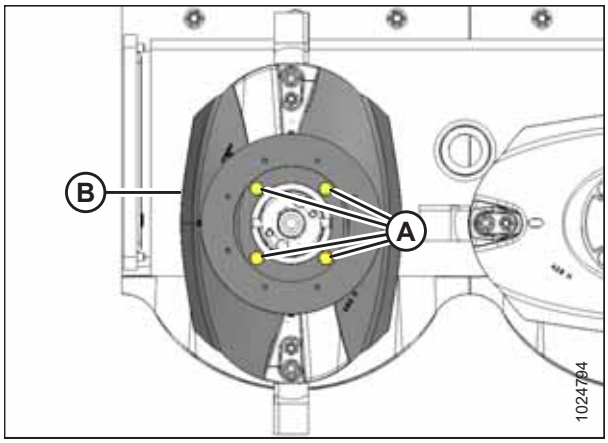


Figure 4.173: Non-Driven Drum

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.

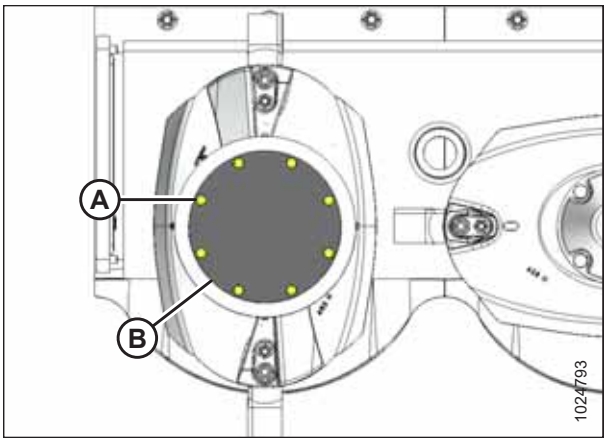


Figure 4.174: Non-Driven Drum

6. Close cutterbar doors (A). For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

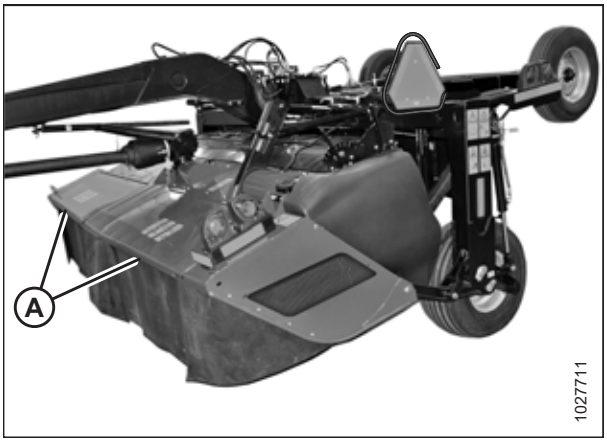


Figure 4.175: Cutterbar Doors

4.4.13 Replacing Cutterbar Spindle Shear Pin

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

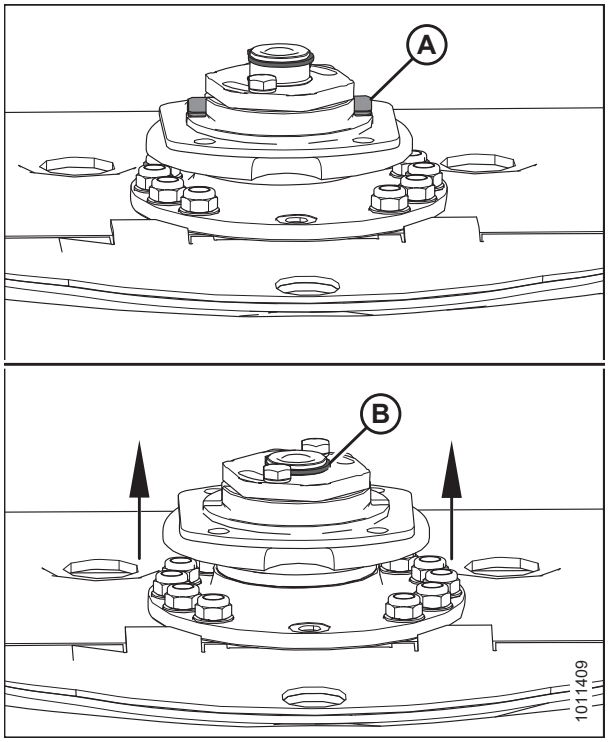


Figure 4.176: Cutterbar Spindles

Removing Cutterbar Spindle Shear Pin

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.

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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage lift lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
4. Open the cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36* or *3.3.2 Opening Cutterbar Doors – Export Latches, page 37*.

5. Open cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.
6. Clean any debris from the work area.

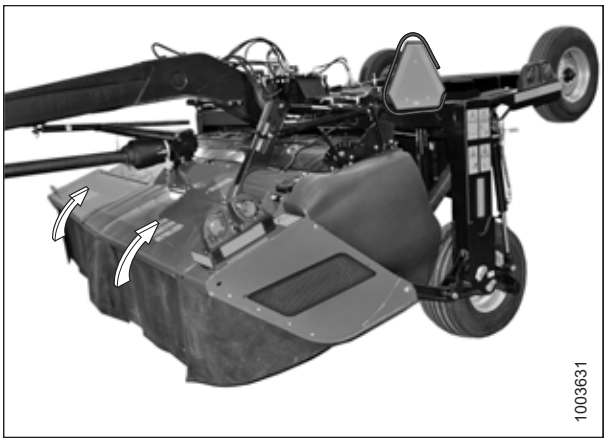


Figure 4.177: Cutterbar Doors

7. 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 153*.
   - To remove driven drum (B), refer to *Removing Large Driven Drums and Driveline – R113 or R116 PT, page 201*.
   - To remove non-driven drum (C), refer to *Removing Large Non-Driven Drums – R113 or R116 PT, page 208*.

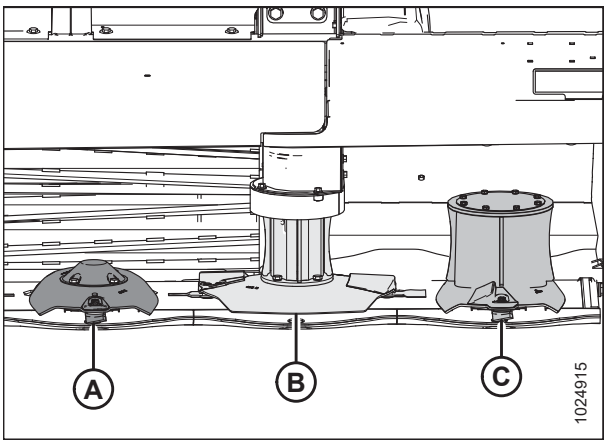


Figure 4.178: Cutterbar Disc Assemblies – R116 PT Shown, R113 PT similar

8. Remove retaining ring (A).

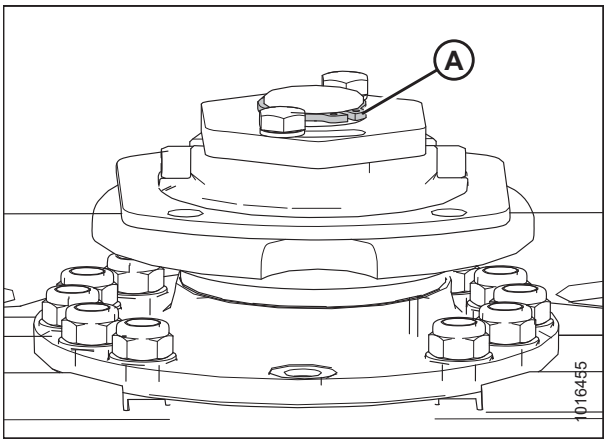


Figure 4.179: Cutterbar Spindle

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

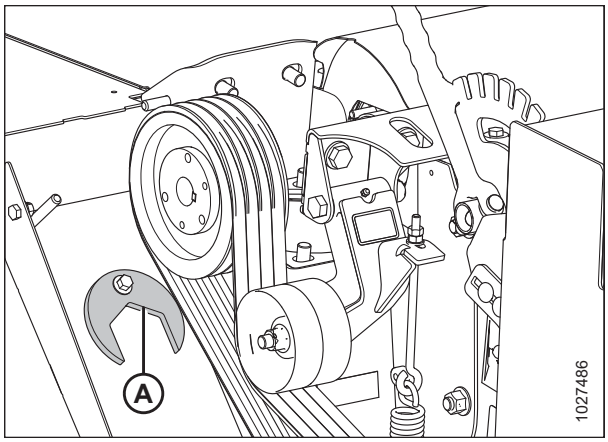


Figure 4.180: Safecut Spindle-Nut Wrench Location

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.

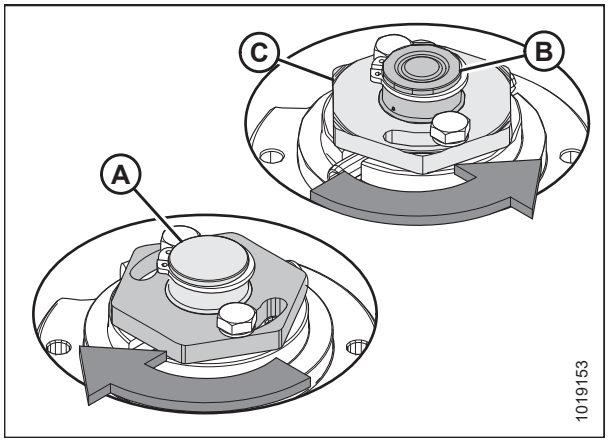


Figure 4.181: Cutterbar Spindles

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

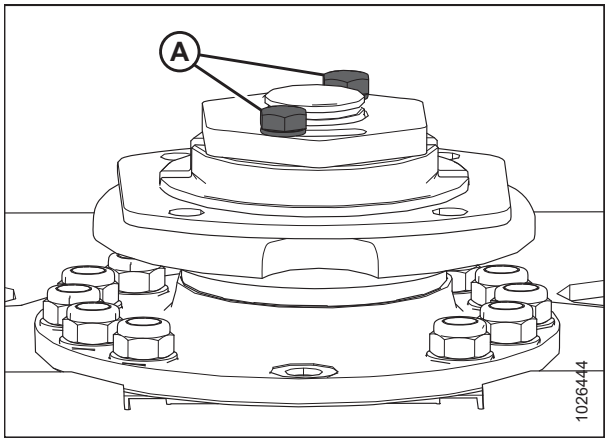


Figure 4.182: Cutterbar Spindle

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

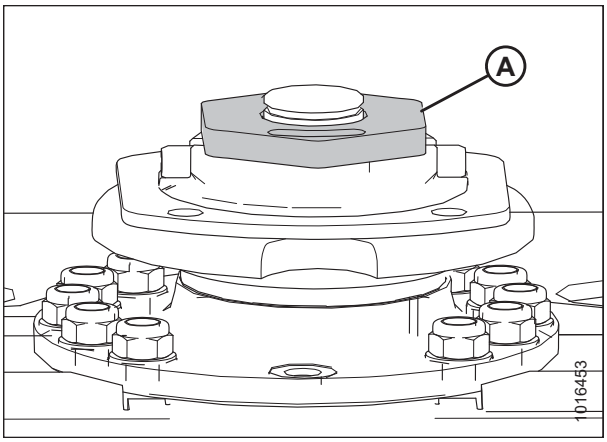


Figure 4.183: Cutterbar Spindle

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

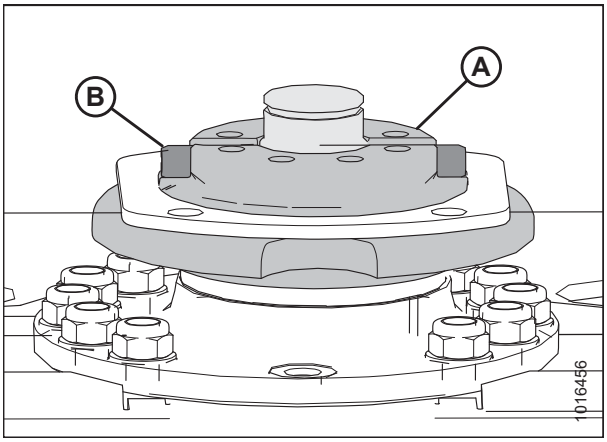


Figure 4.184: Cutterbar Spindle

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.

CAUTION

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

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

   NOTE:

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

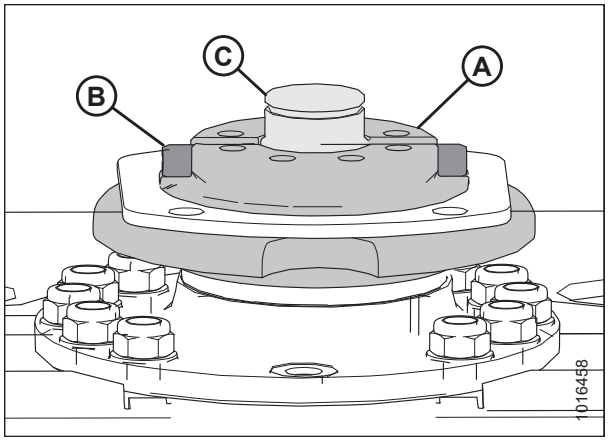


Figure 4.185: Cutterbar Spindle

4. 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.

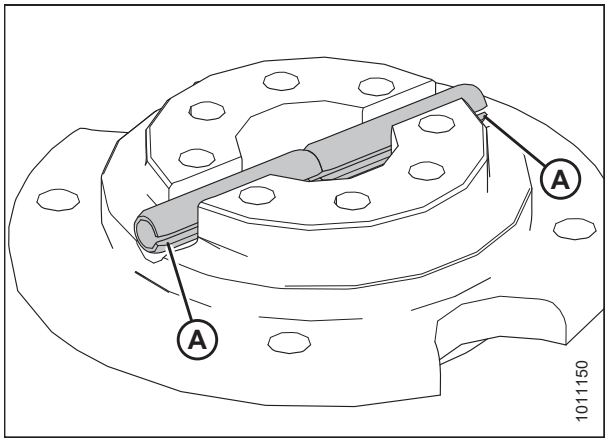


Figure 4.186: Shear Pin Orientation

5. Install nut (A).

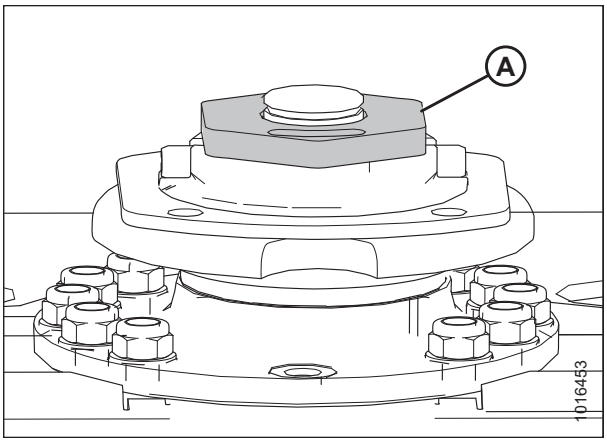


Figure 4.187: Cutterbar Spindle

6. 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.

7. Position safecut spindle-nut wrench (B) on spindle nut (C). Torque nut to 300 Nm (221 lbf·ft).

8. Return safecut spindle-nut wrench (B) to the left shield plate.

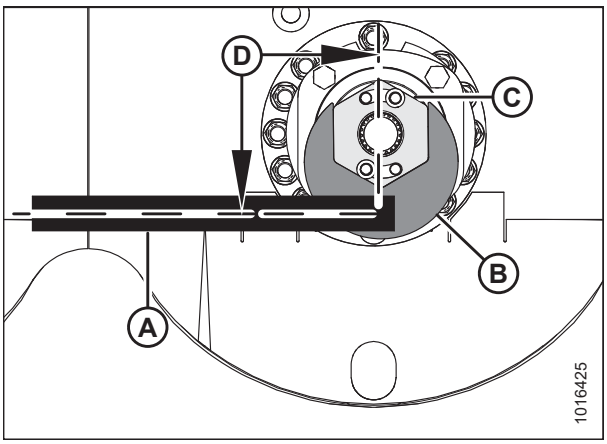


Figure 4.188: Spindle Nut

9. Inspect the threads of two M10 bolts (A) and replace if damaged.

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

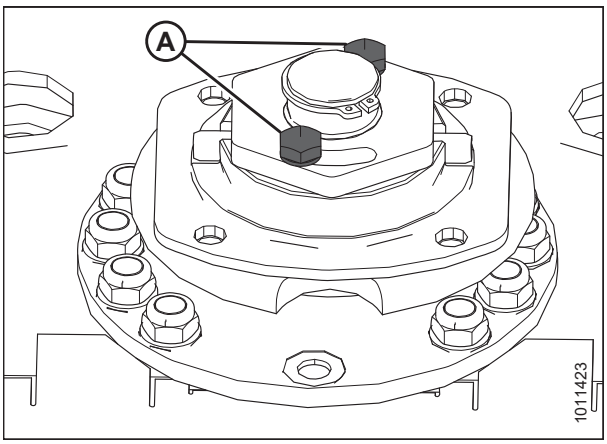


Figure 4.189: Cutterbar Spindle

11. Install retaining ring (A).

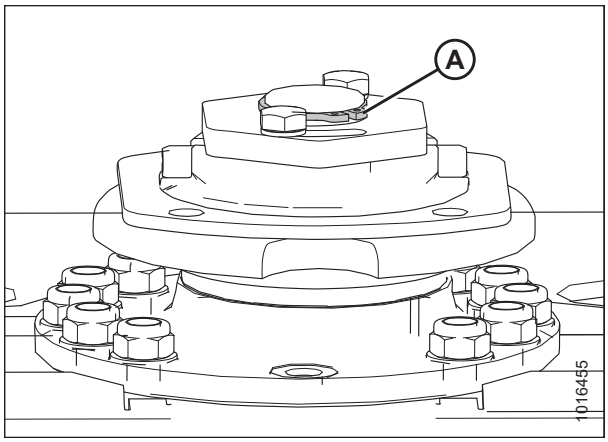


Figure 4.190: Cutterbar Spindle

12. Depending on the type of disc with the new shear pin, refer to the applicable disc installation procedure:
    - Install cutterbar disc (A). For instructions, refer to *Installing Cutterbar Discs, page 155*.
    - Install driven drum (B). For instructions, refer to *Installing Large Driven Drums and Driveline – R113 or R116 PT, page 204*.
    - Install non-driven drum (C). For instructions, refer to *Installing Large Non-Driven Drums – R113 or R116 PT, page 210*.

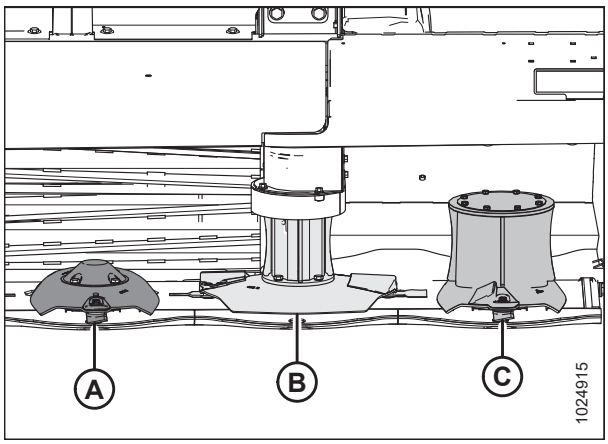


Figure 4.191: R116 PT Cutterbar

WARNING

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

13. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

Figure 4.192: R1 Series Rotary Disc Pull-Type

4.5 Drive Systems

4.5.1 Driveshields

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.

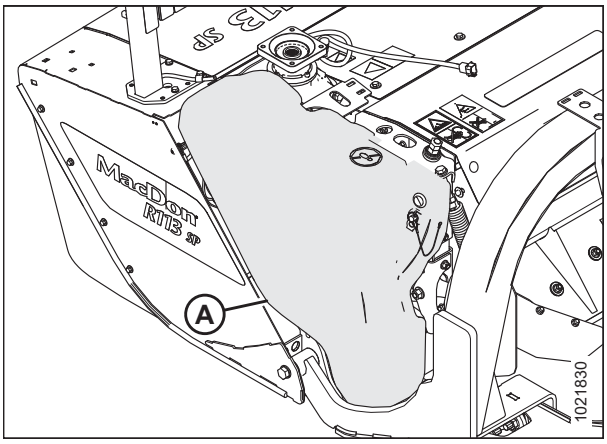


Figure 4.193: Left Driveshield

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

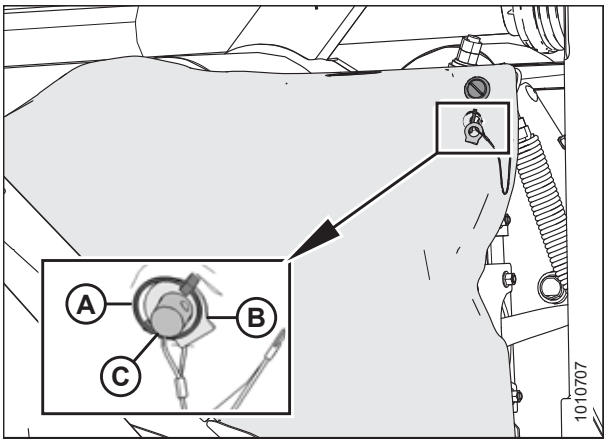


Figure 4.194: Tool to Unlock Driveshield

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

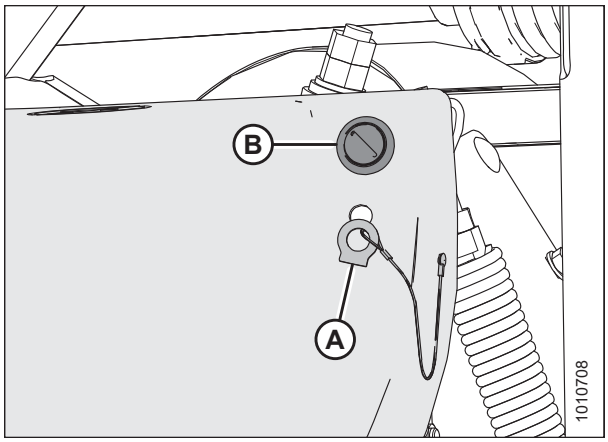


Figure 4.195: Tool to Unlock Driveshield and Latch

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

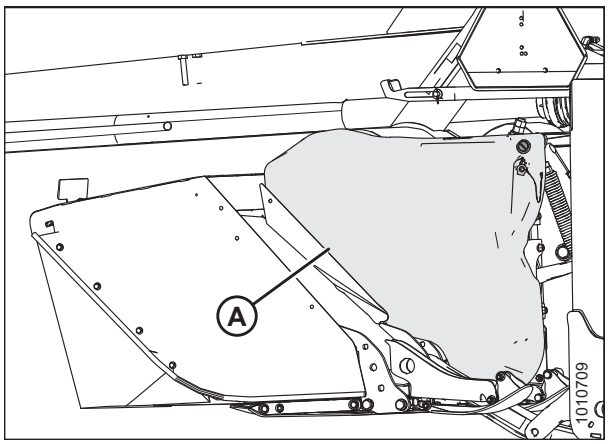


Figure 4.196: Driveshield

Installing Driveshields

CAUTION

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.

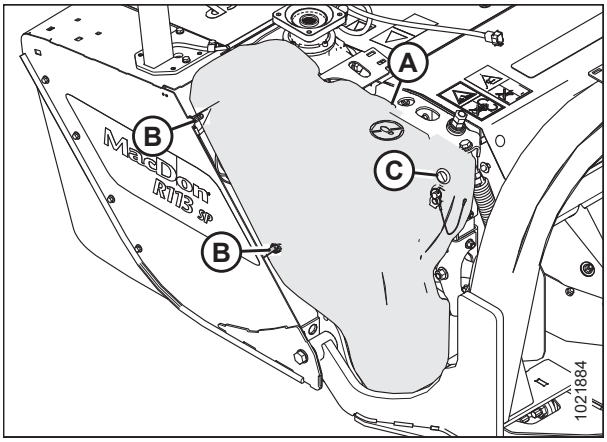


Figure 4.197: Driveshield and Latch

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

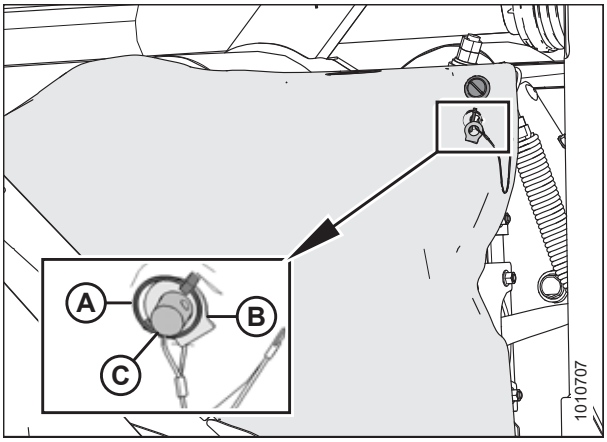


Figure 4.198: Tool to Unlock Driveshield

Replacing Driveshield Latch

CAUTION

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

NOTE:

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

1. Remove driveshield (A). For instructions, refer to *Removing Driveshields, page 219*.

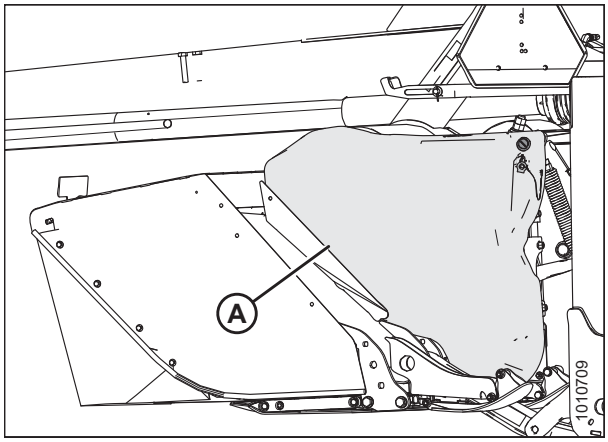


Figure 4.199: Driveshield

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.

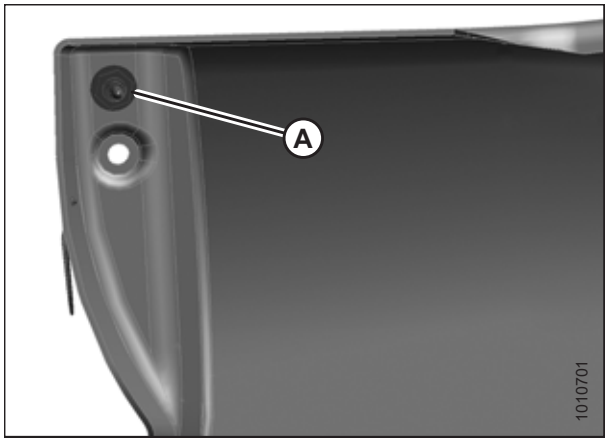


Figure 4.200: Backside of Driveshield

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 221*.

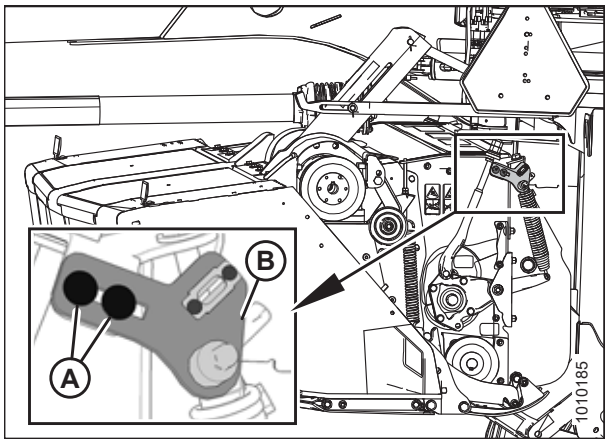


Figure 4.201: Stud and Clip Assembly

4.5.2 Driveline Shield Cone

Removing Driveline Shield Cone

WARNING

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

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

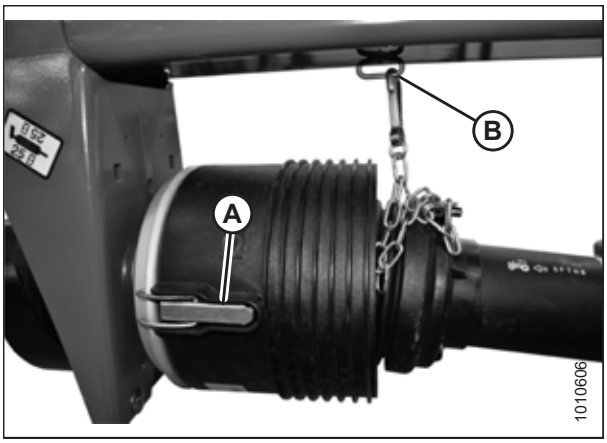


Figure 4.202: Driveline Shield Cone and Lever Clamp

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

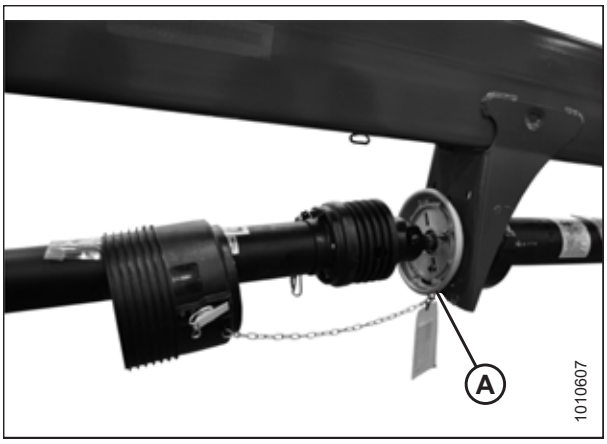


Figure 4.203: Driveline Shield Cone Removed from Metal Plate

Installing Driveline Shield Cone

WARNING

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

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

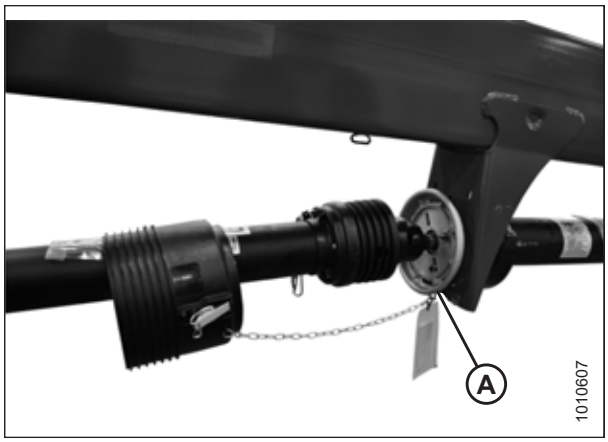


Figure 4.204: Driveline Shield Cone Removed from Metal Plate

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

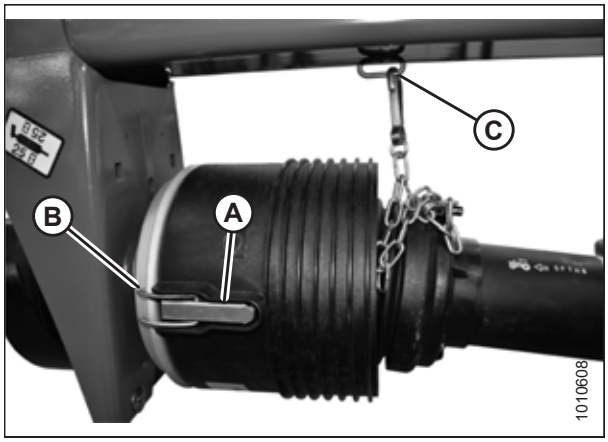


Figure 4.205: Driveline Shield Cone and Lever Clamp

4.5.3 Hitch Driveline Phasing

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

On the R113 rotary disc pull-type (refer to Figure *4.206, page 225*), the U-joint on clutch driveline (B) must be aligned 90° to the U-joint on front driveline (A).

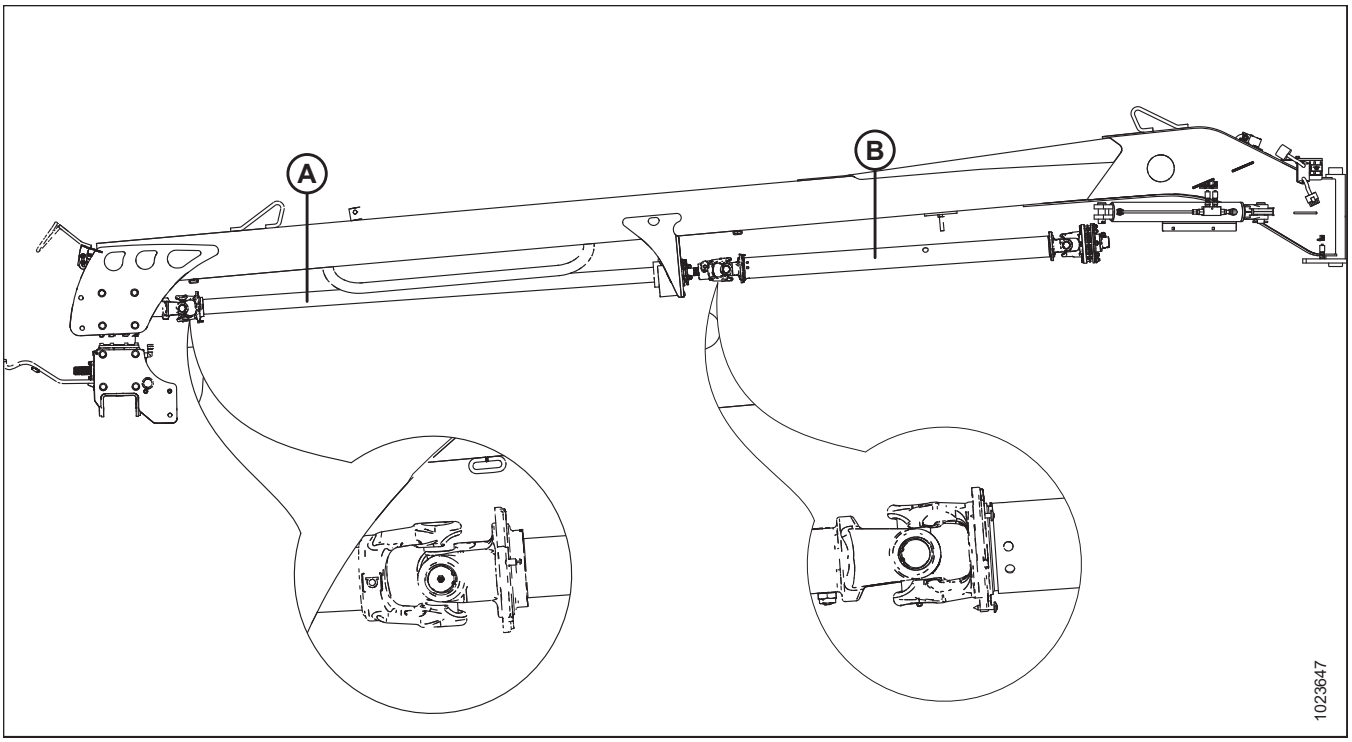


Figure 4.206: R113 Rotary Disc Pull-Type Pull-Type Driveline Phasing

A - Front Driveline (U-Joint 0°) **B - Clutch Driveline (U-Joint 90°)**

On the R116 rotary disc pull-type (refer to Figure *4.207, page 225*), the U-joint on middle driveline (B) must be aligned 90° to the U-joints on front driveline (A) and clutch driveline (C).

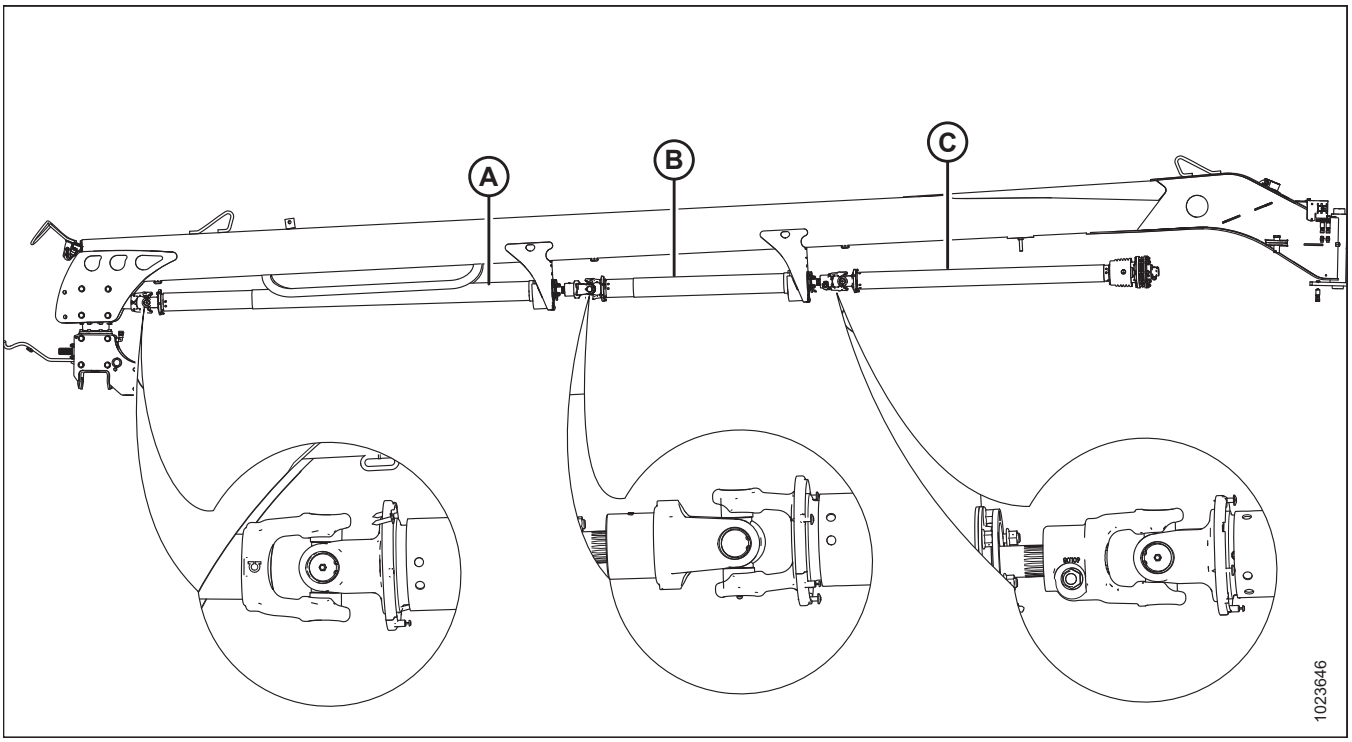


Figure 4.207: R116 Rotary Disc Pull-Type Driveline Phasing

A - Front Driveline (U-Joint 0°) **B - Middle Driveline (U-Joint 90°)** **C - Clutch Driveline (U-Joint 0°)**

4.5.4 Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the pull-type's hitch swivel gearbox. Follow regular lubrication procedures and ensure all driveline taper pins are torqued as instructed. For instructions, refer to *4.4.3 Lubricating Cutterbar, page 146*.

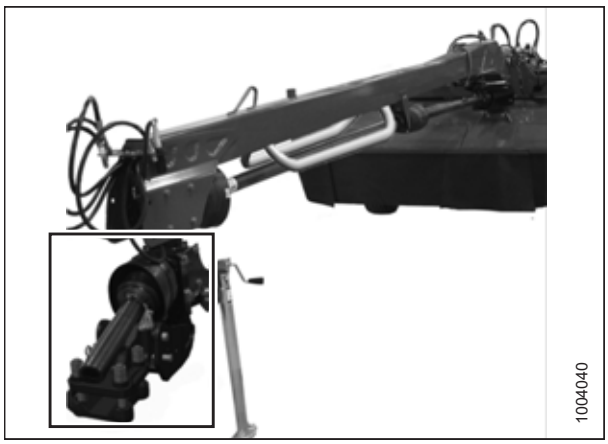


Figure 4.208: Primary Driveline

Removing Primary Driveline

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. Unhook the rotary disc pull-type from the tractor. For instructions, refer to *3.8 Detaching Rotary Disc Pull-Type from Tractor, page 52*.
3. Release two lever clamps (A) using a screwdriver or similar prying tool.

   NOTE:

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

Figure 4.209: Driveline Shield Cone and Lever Clamp

4. Slide driveline shield cone away from gearbox.
5. Loosen nut (A) so that taper pin threads are recessed inside the nut.
6. Tap nut (A) with a hammer to loosen the taper pin and release driveline yoke from the shaft.
7. Pull driveline off gearbox.
8. Remove driveline guard if necessary. For instructions, refer to *Removing Driveline Guards, page 250*.

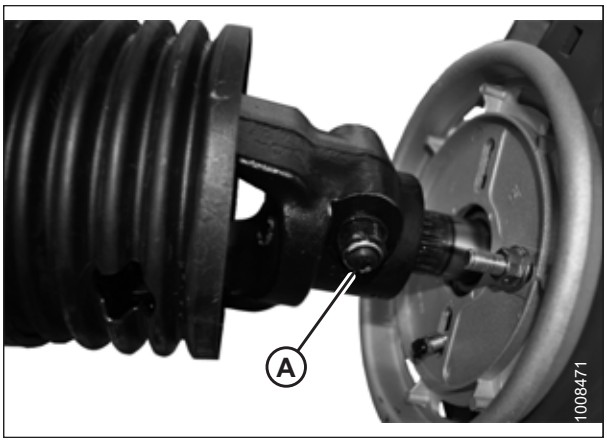


Figure 4.210: Bolt Securing Driveline to Gearbox

Installing Primary Driveline

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. Install driveline guard onto driveline (if previously removed). For instructions, refer to *Installing Driveline Guards, page 251*.

   NOTE:

   Before installing the driveline, refer to *4.5.3 Hitch Driveline Phasing, page 224* to ensure proper orientation.
3. Position U-joint (A) and grease fitting (B) as shown.

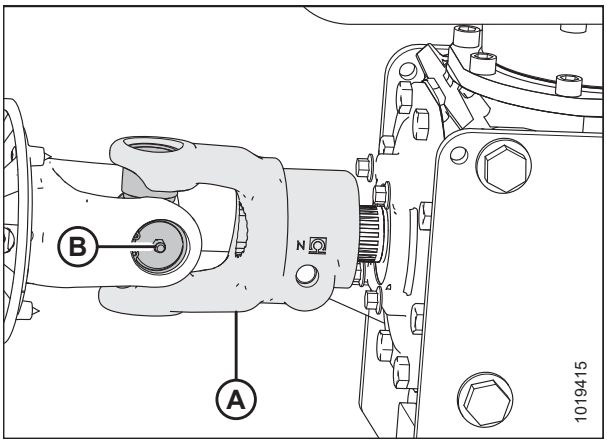


Figure 4.211: Primary Driveline

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

   IMPORTANT:

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

   IMPORTANT:

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

   NOTE:

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

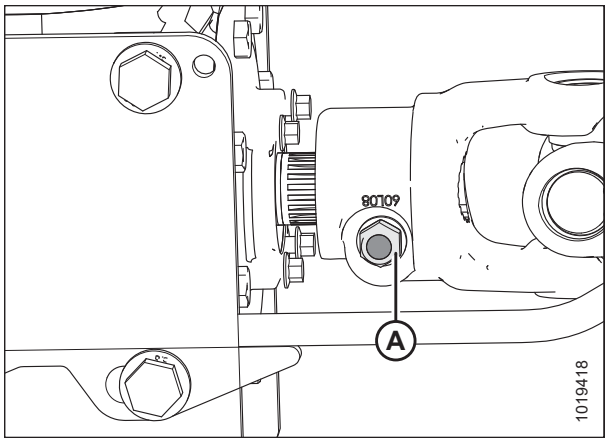


Figure 4.212: Taper Pin Installed in Yoke

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

   NOTE:

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

Figure 4.213: Shield Clipped to Driveline

8. Attach male half (A) of the driveline to the female half, and position onto storage hook (B) or connect to tractor power take-off (PTO). To attach unit to tractor, refer to *3.7 Attaching Rotary Disc Pull-Type to the Tractor, page 43*.

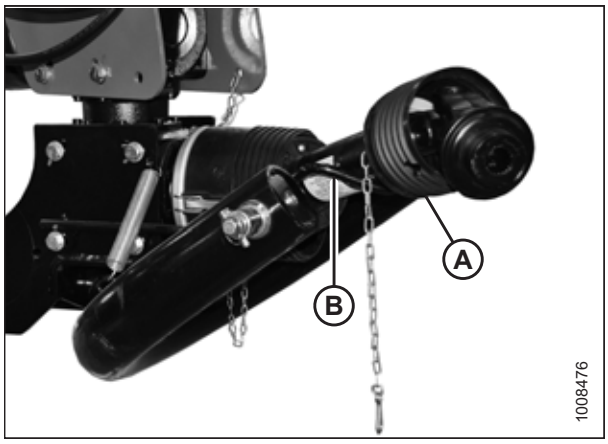


Figure 4.214: Primary Driveline

4.5.5 Hitch Driveline

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

Other than regular lubrication, no maintenance is required. For lubrication instructions, refer to *4.4.3 Lubricating Cutterbar, page 146*.

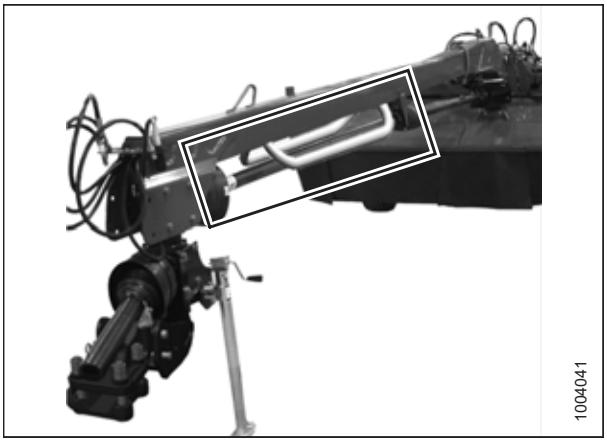


Figure 4.215: Hitch Driveline

Removing Hitch Driveline

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. Disconnect clutch driveline (A) at the center support. Do not remove entire driveline. For instructions, refer to *Removing Clutch Driveline, page 237*.

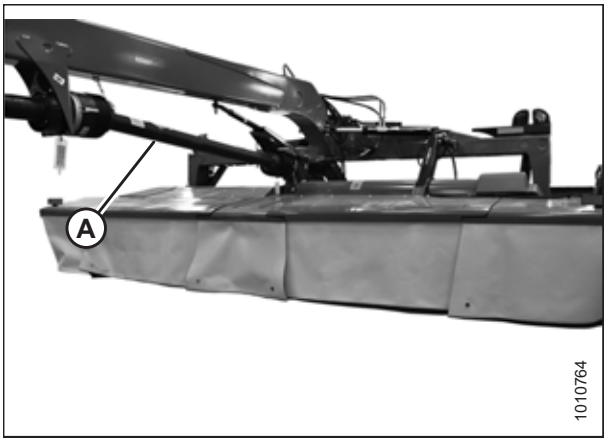


Figure 4.216: Clutch Driveline

3. Remove two bolts (A), and slide the metal shield (B) away from center support.

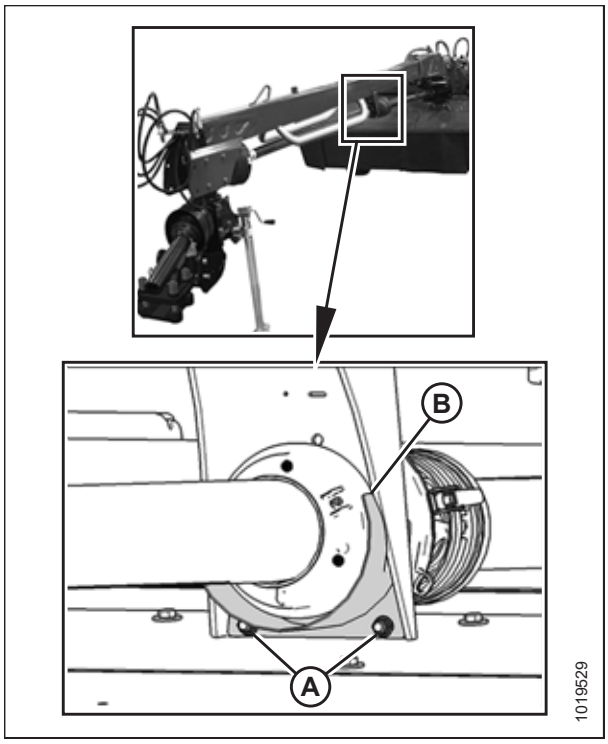


Figure 4.217: Driveline Cover and Shield Installed at Center Support

4. Remove mid-drive yoke (A) from hitch driveshaft.

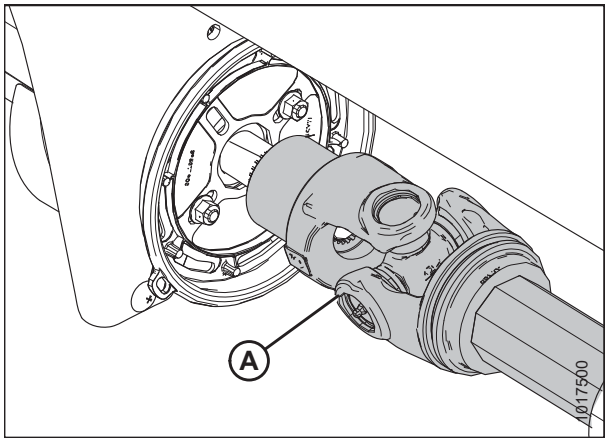


Figure 4.218: Mid-Driveshaft Yoke

5. Remove two nuts (A) that secure metal plate (B) to the center support, and then remove metal plate (B).

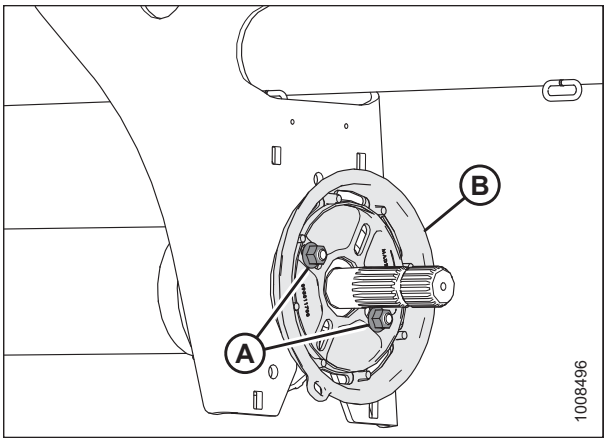


Figure 4.219: Metal Plate

6. Remove spacer (A).

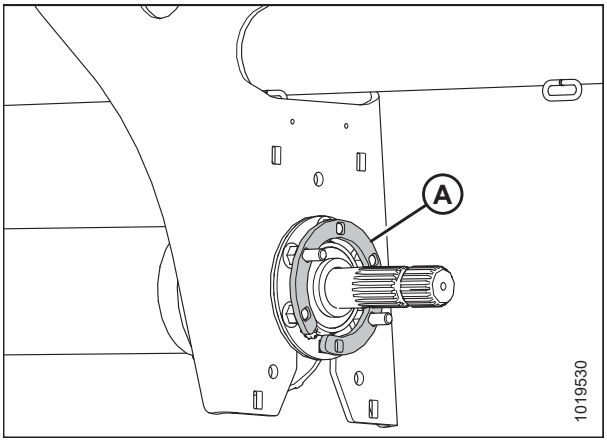


Figure 4.220: Spacer

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

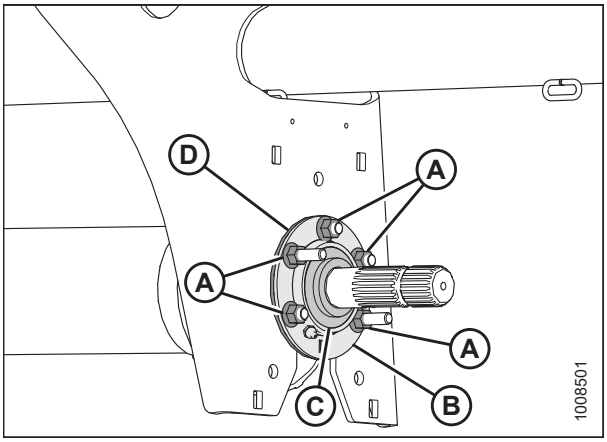


Figure 4.221: Ball Bearing and Flanges

8. Unlock bearing lock collar (A) by rotating it in the direction opposite to the rotation of the shaft.
9. Slide the bearing lock collar off the driveline shaft.
10. Lower the driveline from the center support.

    NOTE:

    If removing bolts, note position of long bolts (B) and short bolts (C).

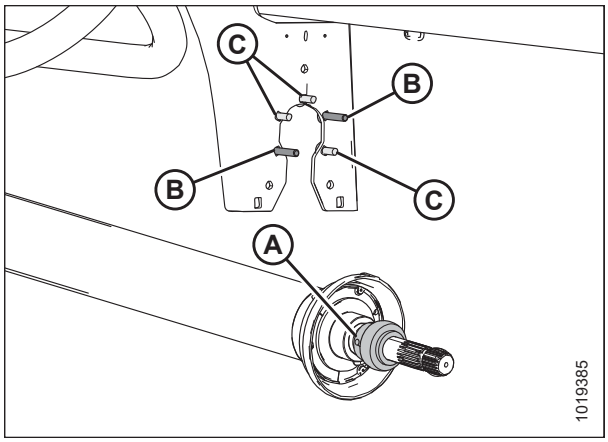


Figure 4.222: Bearing Lock Collar

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

    NOTE:

    There are three hitch drivelines installed on a R116 Rotary Disc Pull-Type.

12. Remove driveline guard if necessary. For instructions, refer to *Removing Driveline Guards, page 250*.

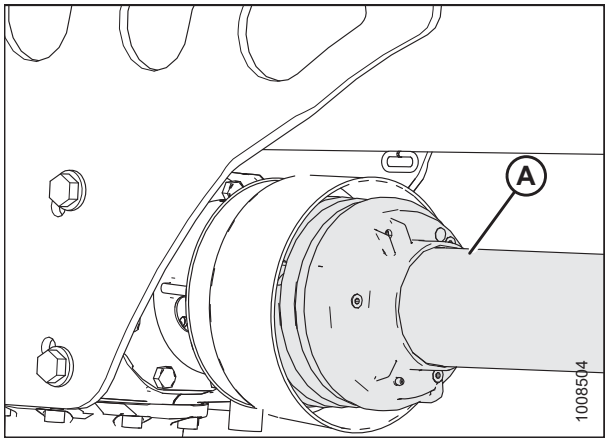


Figure 4.223: Forward End of Hitch

Installing Hitch Driveline

1. Install driveline guard onto driveline (if previously removed). For instructions, refer to *Installing Driveline Guards, page 251*.

    NOTE:

    Before installing the driveline, refer to *4.5.3 Hitch Driveline Phasing, page 224* to ensure proper orientation.

2. Orient U-joint (A) and grease fitting (B) as shown.
3. Position forward end of hitch driveline (C) onto hitch swivel gearbox shaft and push onto shaft.

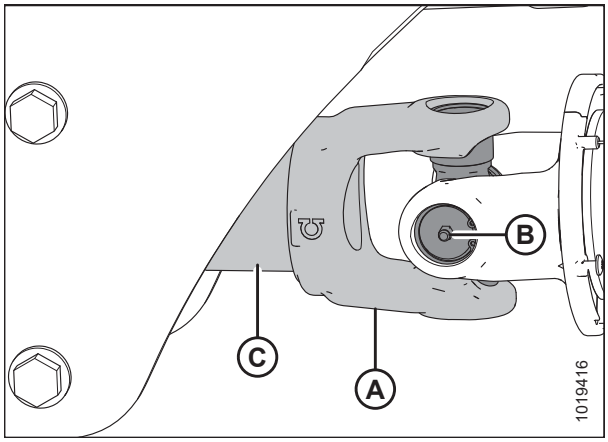


Figure 4.224: Forward End of Hitch

IMPORTANT:

If installing a replacement guard, ensure chain (A) is short enough that it does **NOT** wrap around the driveline guard.

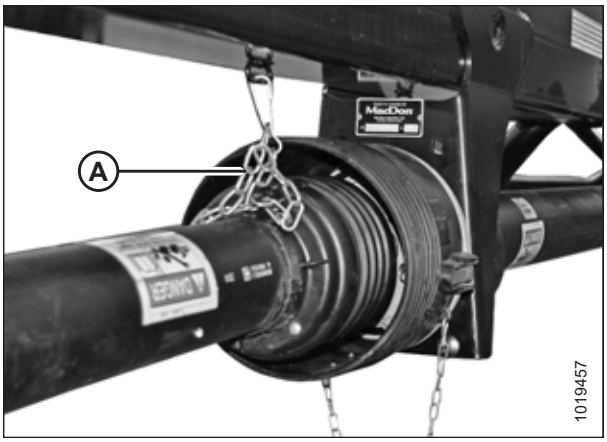


Figure 4.225: Driveline Guard

4. Slide lock collar (A) on shaft.
5. Position shaft end of the driveline onto the hitch support bracket, and support the driveline to hold it in place.

   IMPORTANT:

   Ensure locking collar (A) is on the backside of the support bracket.
6. Install two long bolts (B) and three short bolts (C) exactly as shown.

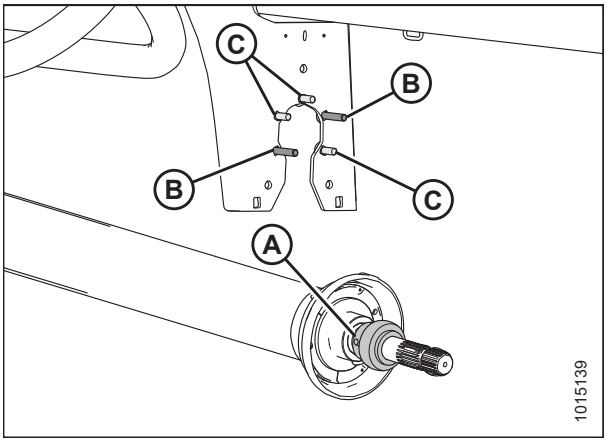


Figure 4.226: Long and Short Bolts

7. Install flange (A).
8. Ensure distance (B) between the tip of the shaft and the front face of the center support is 136 mm to 144 mm (5 3/8 in. to 5 11/16 in.).

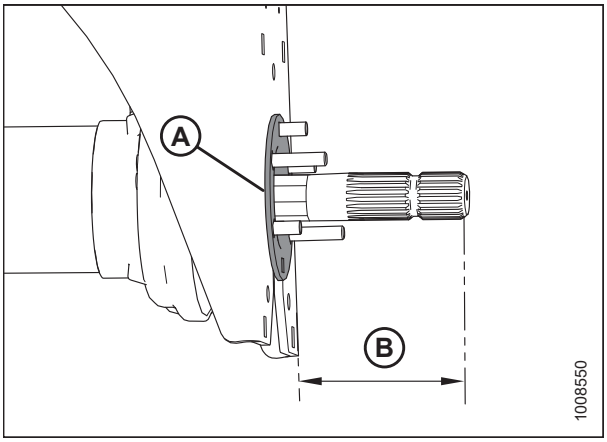


Figure 4.227: Flange Installed at Center Support

9. Install ball bearing (C).
10. Tighten the locking collar in the direction of the shaft rotation.
11. Install flange (B) with grease fitting (D), and five nuts (A).

    IMPORTANT:

    Grease fitting (D) must be positioned 90 degrees from long bolts as shown.

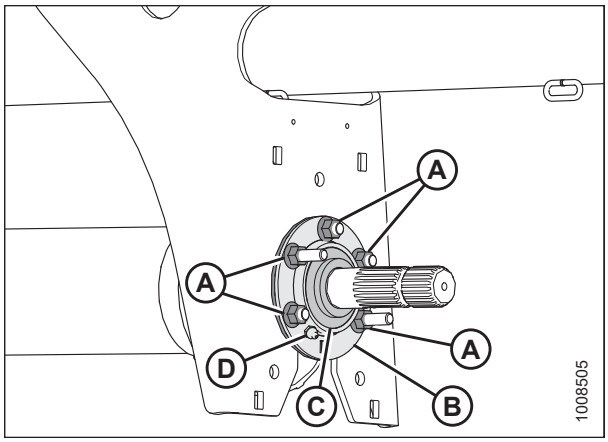


Figure 4.228: Flange, Bearing, and Grease Fitting

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

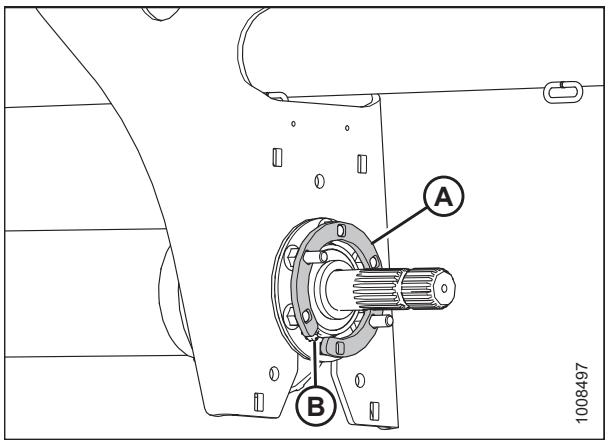


Figure 4.229: Spacer Installed at Center Support

13. Position metal plate (B) on center support.
14. Apply medium-strength threadlocker (Loctite® 243 or equivalent) to two nuts (A), and then use them to secure metal plate (B) while ensuring loop on metal plate (C) is positioned on lower side as shown.
15. Torque nuts (A) to 20 Nm (15 lbf·ft).

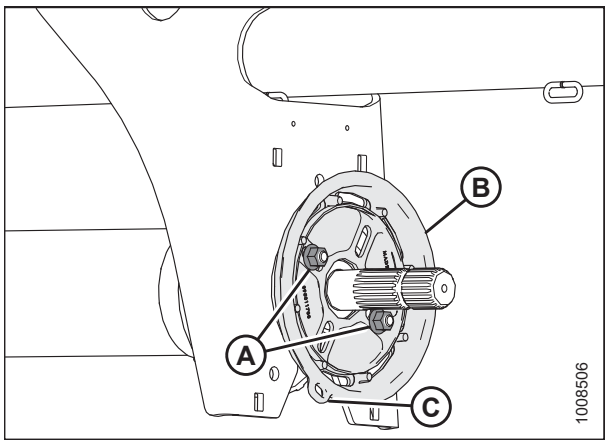


Figure 4.230: Metal Plate Attached to Center Support

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

    NOTE:

    There are three hitch drivelines for installation on the R116 rotary disc pull-type.

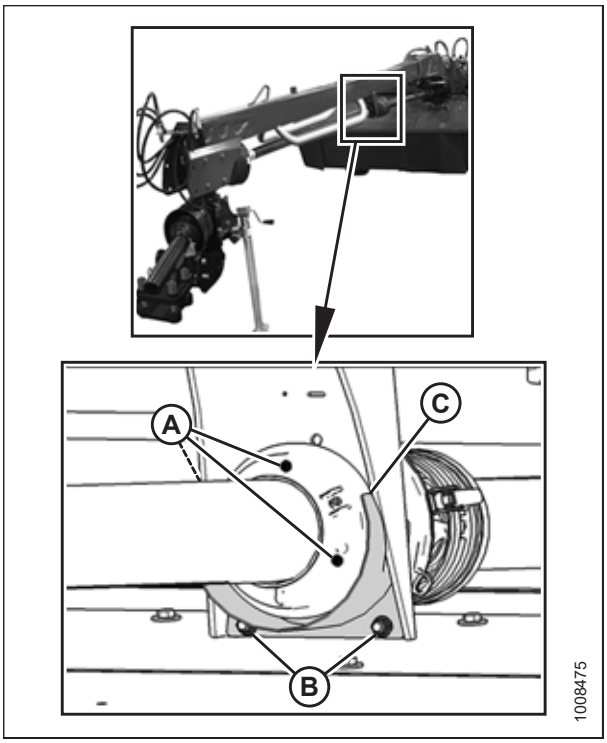


Figure 4.231: Driveline Cover and Shield Installed at Center Support

18. Install clutch driveline (A) at center support. For instructions, refer to *Installing Clutch Driveline, page 239*.

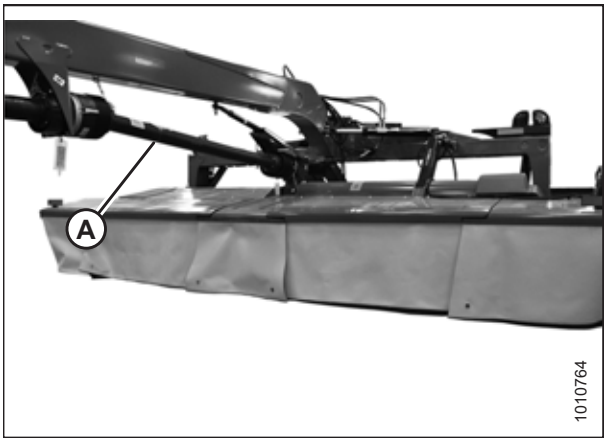


Figure 4.232: Clutch Driveline Installed at Center Support

4.5.6 Clutch Driveline

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

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

Follow regular lubrication procedures and ensure all driveline taper pins are torqued as instructed. For instructions, refer to *4.4.3 Lubricating Cutterbar, page 146* and *4.5.8 Inspecting Driveline Taper Pins, page 248*.

Perform run-in procedure as part of the rotary disc pull-type's initial break-in procedure, when clutch friction linings have been replaced, or when the unit has not been operated in 6 months. For instructions, refer to *Checking Clutch Operation, page 241*.

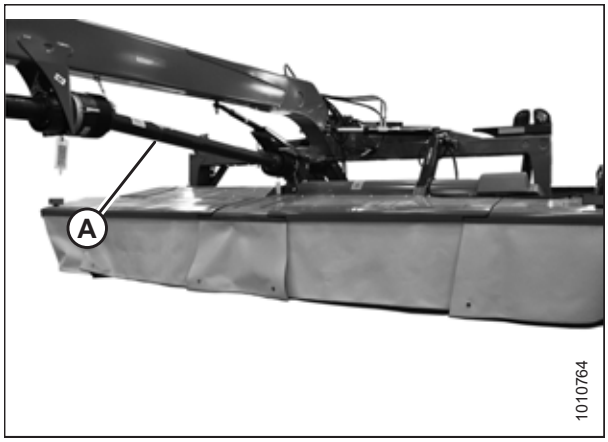


Figure 4.233: Clutch Driveline

Removing Clutch Driveline

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

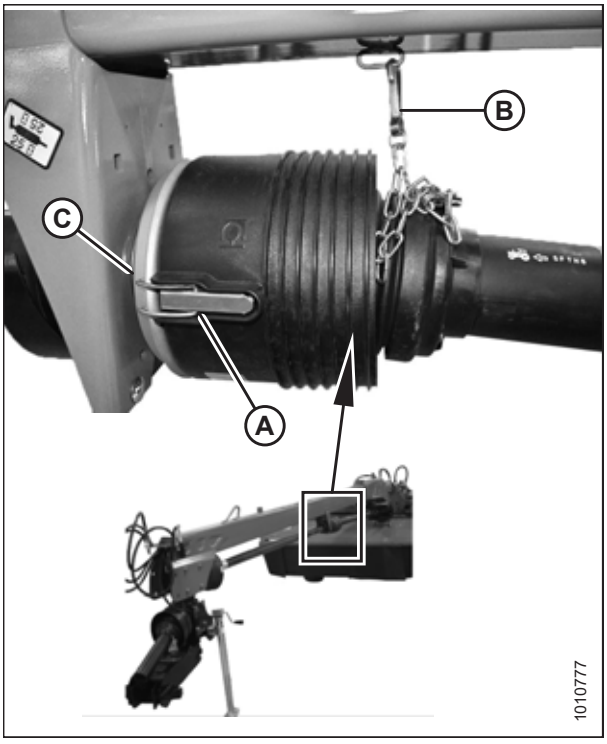


Figure 4.234: Driveline Shield Cone

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

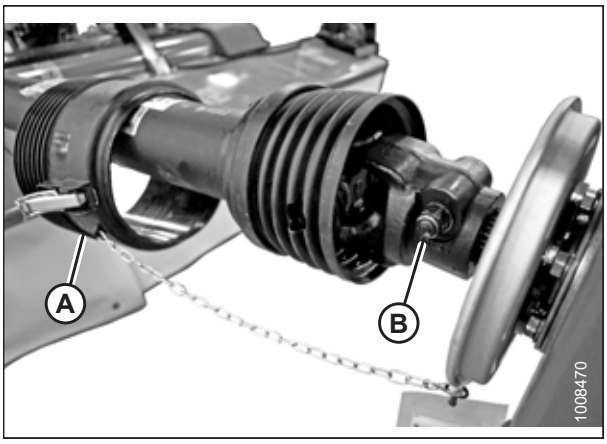


Figure 4.235: U-Joint

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

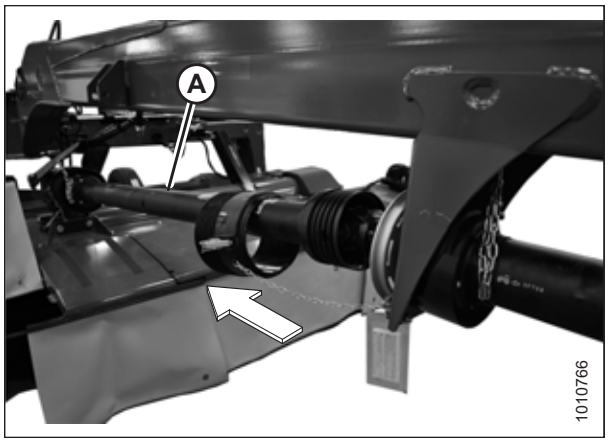


Figure 4.236: Driveline

8. Release two lever clamps (A) on the shield cone installed at the header swivel gearbox.
9. Remove driveline guard if necessary. For instructions, refer to *Removing Driveline Guards, page 250*.

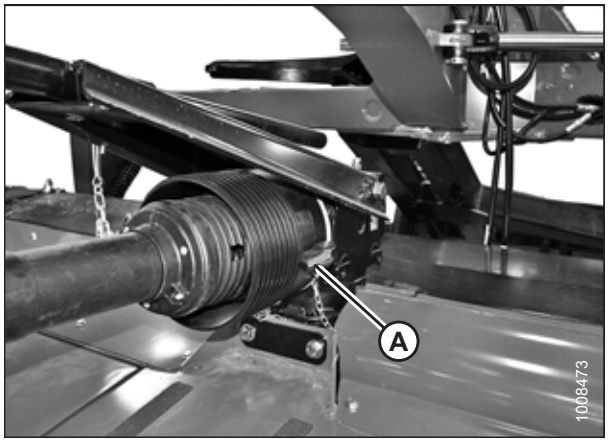


Figure 4.237: Driveline Shield Cone

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

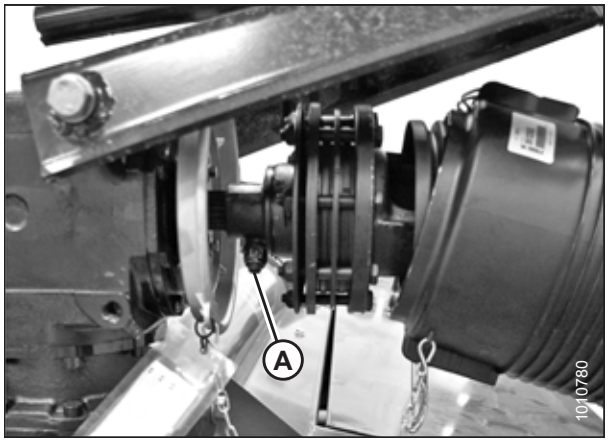


Figure 4.238: Driveline and Gearbox

Installing Clutch Driveline

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. Install driveline guard onto driveline (if previously removed). For instructions, refer to *Installing Driveline Guards, page 251*.
3. Position driveline onto the gearbox shaft as shown at right.
4. Clean the taper pin threads.
5. Install taper pin into yoke with groove on pin aligned with groove in shaft. Ensure there is no grease on threads after inserting pin through yoke.
6. Secure pin with nut (A). Torque to 150 Nm (110 lbf·ft). Pin should be flush with yoke.

   IMPORTANT:

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

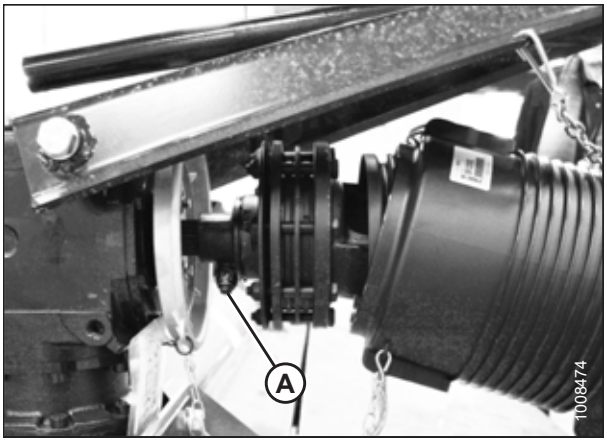


Figure 4.239: Driveline and Gearbox

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

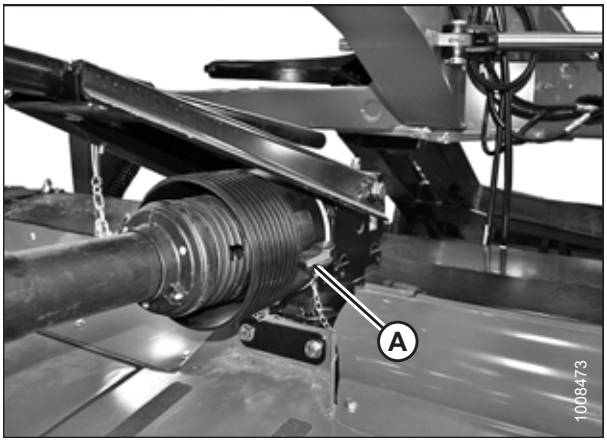


Figure 4.240: Driveline Shield Cone

8. **For R113 PT clutch driveline:**

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

   b. Position U-joint (C) as shown.

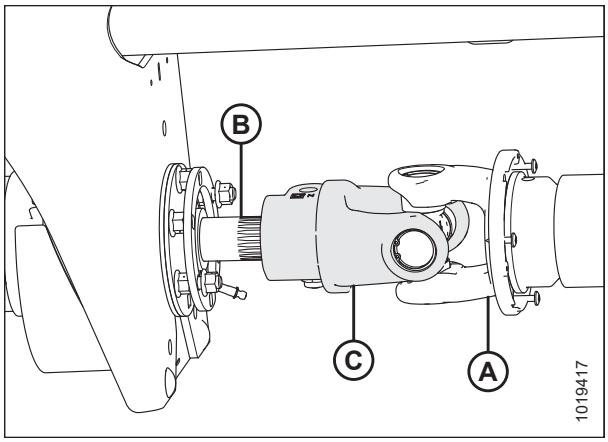


Figure 4.241: R113 PT Clutch Driveline

9. **For R116 PT clutch driveline:**

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

   b. Position the U-joint (C) and grease fitting (D) as shown.

   NOTE:

   Before installing the driveline, refer to *4.5.3 Hitch Driveline Phasing, page 224* to ensure proper orientation.

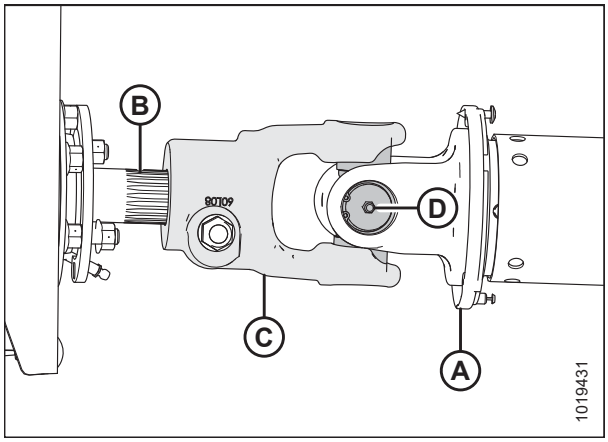


Figure 4.242: R116 PT Clutch Driveline

10. Move the shield cone to expose the U-joint.

    NOTE:

    Shield cone not shown in illustration at right.

11. Clean the taper pin threads.

12. Install taper pin so groove on pin is aligned with groove on shaft. Ensure there is no grease on taper pin threads after installing into yoke.

13. Torque taper pin nut (A) to 150 Nm (110 lbf·ft). Pin should be recessed 9–11 mm (3/8–7/16 in.) into yoke.

    IMPORTANT:

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

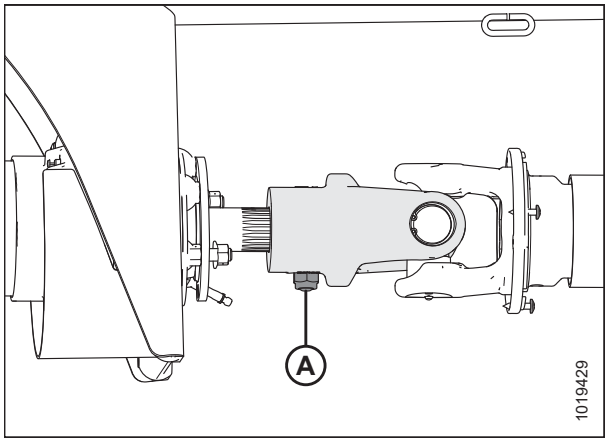


Figure 4.243: R113 PT Clutch Driveline

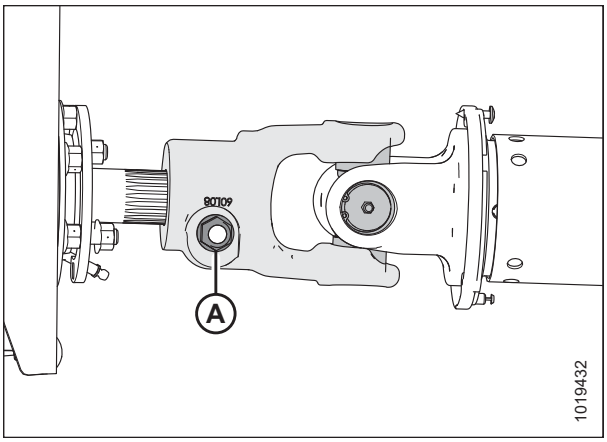


Figure 4.244: R116 PT Clutch Driveline

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

    IMPORTANT:

    If installing a replacement guard, ensure chain (B) is short enough that it does **NOT** wrap around the driveline guard.

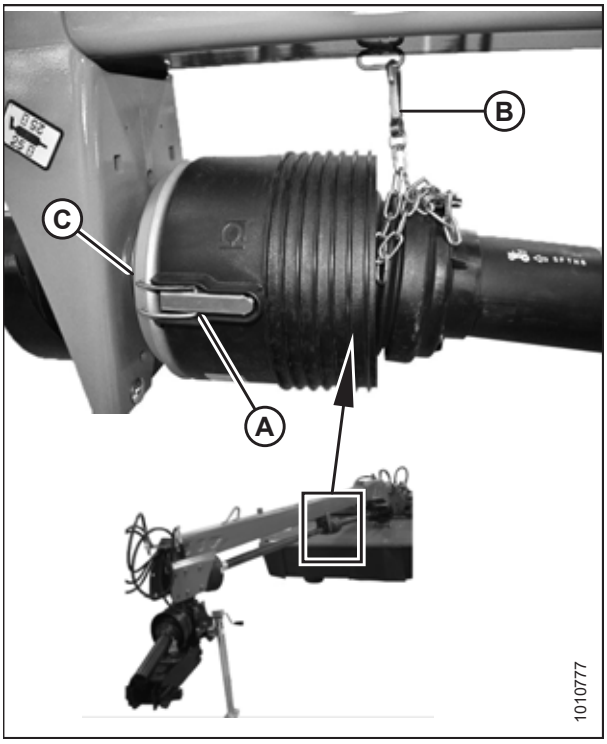


Figure 4.245: Driveline Shield Cone

Checking Clutch Operation

The driveline clutch requires an initial break-in procedure otherwise the clutch may slip prematurely. As part of the break-in procedure, the clutch spring pressure should be released and the header engaged. This intentional slippage of the clutch will wear in and seat the friction linings against the metal drive plates and remove any oxidization.

Perform the following run-in procedure during the rotary disc pull-type's initial break-in, whenever the clutch friction linings have been replaced, or when the unit has not been operated for 6 months or more.

⚠ 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. Release two lever clamps (A) on the shield cone installed at the header swivel gearbox.
2. Slide shield away from gearbox.

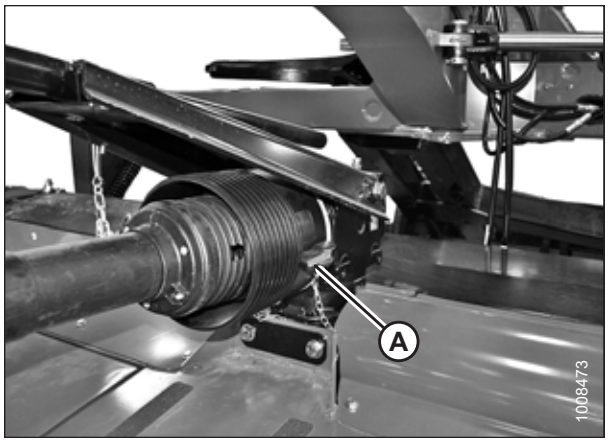


Figure 4.246: Driveline Shield Cone

3. Mark horizontal line (A) across friction discs and drive plates with a paint marker.
4. Back off all pressure plate tensioning nuts (B) one and a half revolutions.
5. Reattach the shield cone onto the header swivel gearbox.
6. Start tractor and adjust engine speed to 1000 rpm.
7. Engage the tractor's power take-off (PTO) for 3–5 seconds. Repeat three times.

   NOTE:

   The clutch will slip with a torque of 1350 Nm (995 lbf·ft) at 1000 rpm.
8. Shut down the engine, and remove the key from the ignition.
9. Inspect the clutch. Horizontal mark (A) across the friction discs should no longer line up with the metal drive plates. This indicates the clutch was slipping.

   NOTE:

   It is not necessary for the indicating mark on the friction discs to be misaligned from the metal drive plates on both sides of the disc. The friction discs are not splined to any component and will likely only slip on one surface.
10. Remove the shield cone from the header swivel gearbox.
11. If acceptable slippage is detected, retighten clutch spring adjustment nuts (B). For instructions, refer to *Adjusting Clutch, page 243*.
12. If acceptable slippage is not detected, the clutch should be removed and disassembled for inspection/repair. Contact your MacDon Dealer.

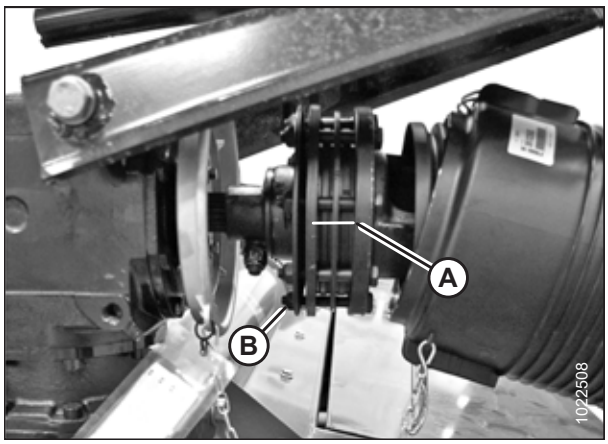


Figure 4.247: Driveline and Gearbox

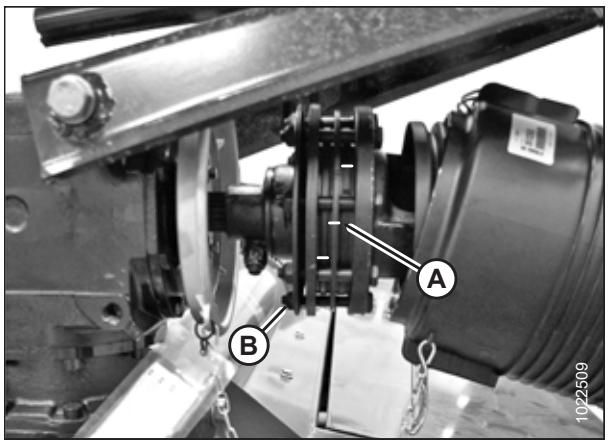


Figure 4.248: Driveline and Gearbox

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

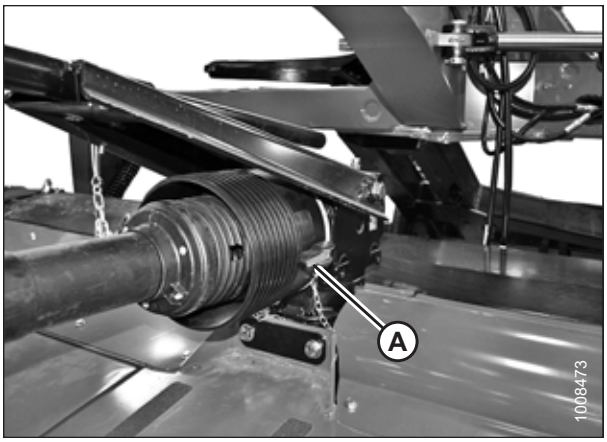


Figure 4.249: Driveline Shield Cone

Adjusting Clutch

1. Release two lever clamps (A) on the shield cone installed at the header swivel gearbox.
2. Slide shield away from gearbox.

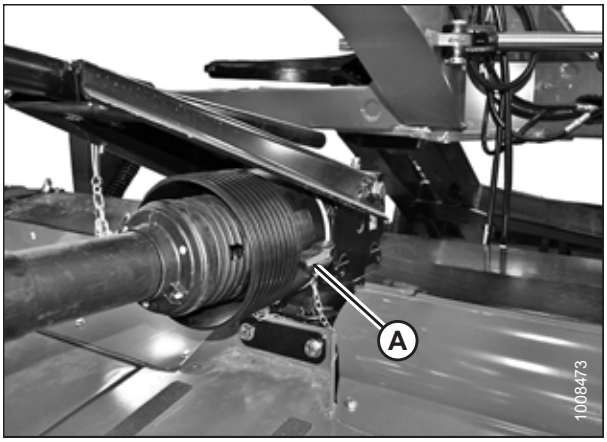


Figure 4.250: Driveline Shield Cone

3. Back off all pressure plate tensioning nuts (A) one and a half revolutions.

   NOTE:

   If this has already been done, you are not required to do it again.

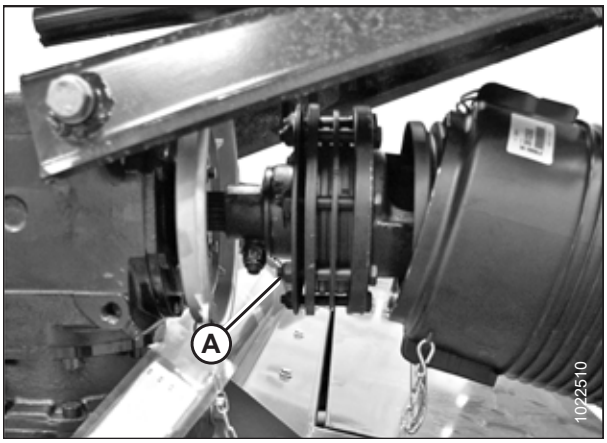


Figure 4.251: Clutch Bolts

4. Measure distance (A) between Belleville washer (B) and plate (C) using a caliper. The distance must be 17.75 mm (0.70 in.) and must be consistent all around.

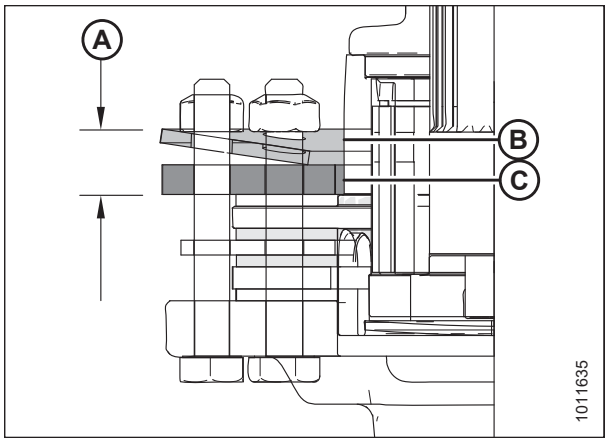


Figure 4.252: Initial Setup Measurement

5. Tighten nuts using the sequence shown at right. Once the discs are nearing the 17.75 mm (0.70 in.) dimension, check discs for looseness. Do **NOT** tighten the discs excessively. Try to achieve a balance between the clutch **slipping** during excessive loading and/or shock loading and **not slipping** during normal operation.
6. Test the clutch operation, and adjust evenly as required. For instructions, refer to *Checking Clutch Operation, page 241*.

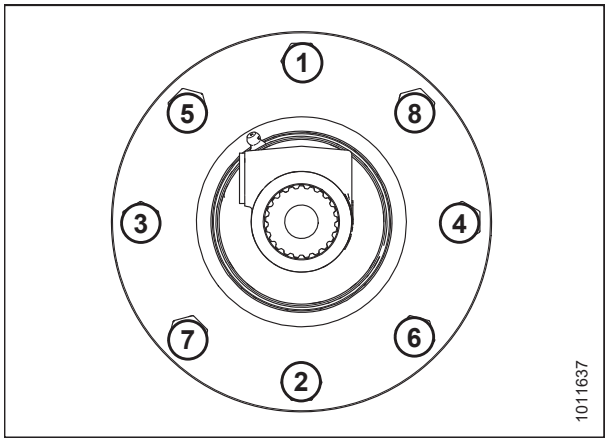


Figure 4.253: Tightening Sequence

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

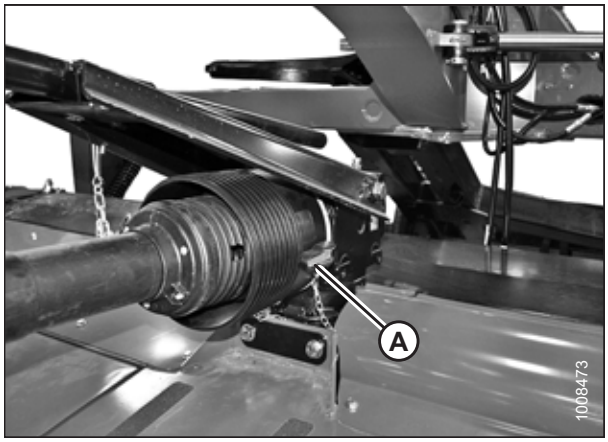


Figure 4.254: Driveline Shield Cone

4.5.7 Cross Driveline

Cross driveline (A) transfers power from the tractor's power take-off (PTO) to the cutterbar-conditioner drive gearbox (T-gearbox). Follow the regular lubrication schedule for this component. For instructions, refer to *4.3.5 Lubricating the Rotary Disc Pull-Type, page 128*.

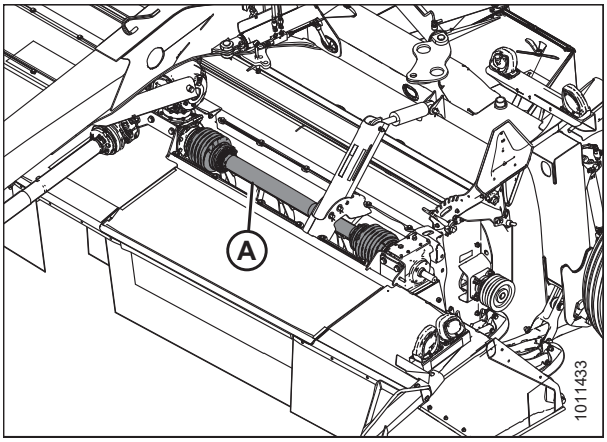


Figure 4.255: Cross Driveline

Removing Cross Driveline

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. Open the cutterbar doors to access cross driveline (A) from inside the rotary disc pull-type. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36* or *3.3.2 Opening Cutterbar Doors – Export Latches, page 37*.

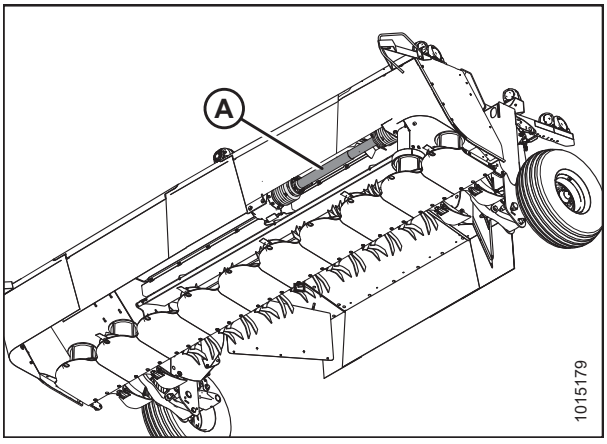


Figure 4.256: Lower Left View of Rotary Disc Pull-Type

3. Loosen clamp (A) and slide driveline shield (B) away from the yoke.
4. Repeat for the opposite end of the driveline.

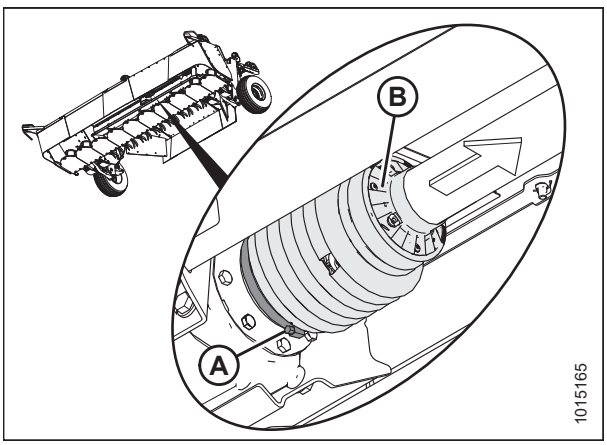


Figure 4.257: Cross Driveline Shield

5. Loosen nut (A) so that taper pin threads are recessed inside the nut.
6. Tap nut (A) with a hammer to loosen the taper pin and release driveline yoke (B) from the shaft.
7. Repeat for the opposite end of the driveline.
8. Remove the cross driveline shaft.

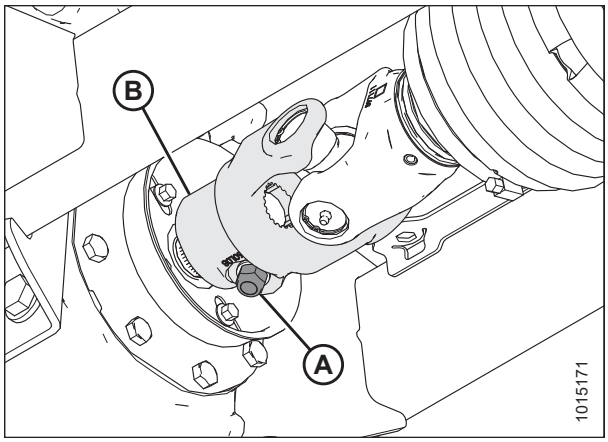


Figure 4.258: Cross Driveline

Installing Cross Driveline

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. Open the cutterbar doors to install cross driveline (A) from inside the rotary disc pull-type. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

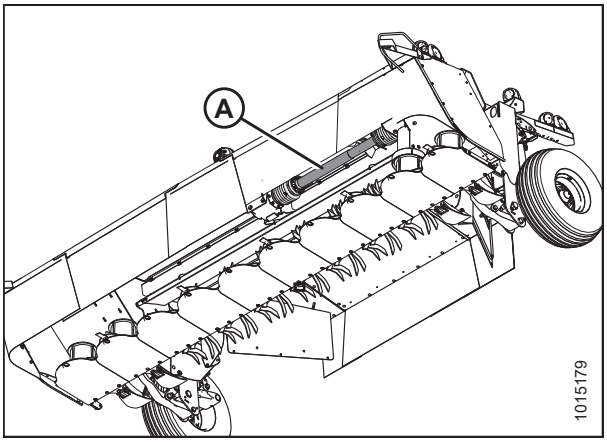


Figure 4.259: Lower Left View of Rotary Disc Pull-Type

3. Position driveline yoke (B) as shown on both ends of the cross driveline.
4. Install taper pin so groove on pin is aligned with groove on shaft.
5. Install nut (A) onto taper pin and torque to 150 Nm (110 lbf·ft). Pin must be recessed 9–11 mm (3/8–7/16 in.) inside the yoke.

   IMPORTANT:

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

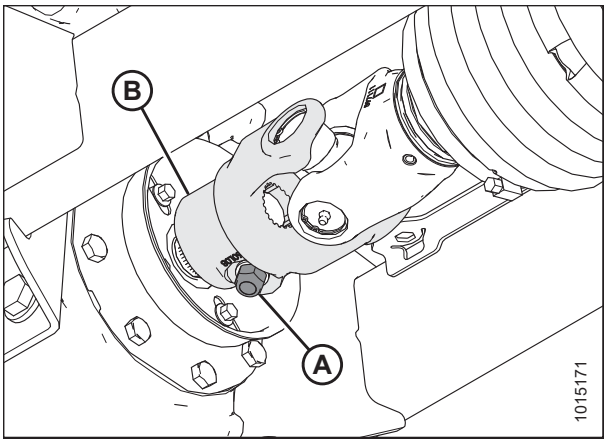


Figure 4.260: Cross Driveline Yoke

6. Slide driveline shields (B) over the yokes at both ends of the driveline, and secure them with clamps (A).
7. Close the cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

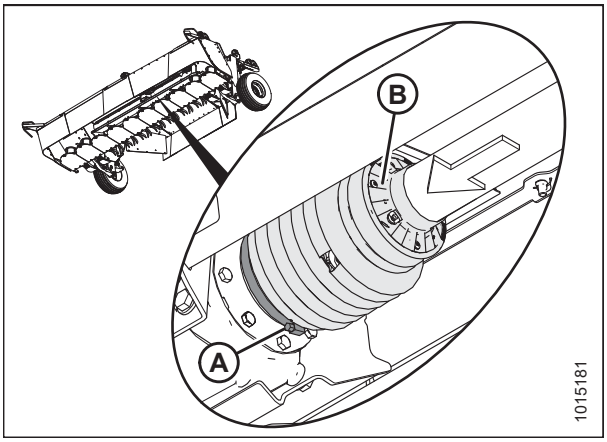


Figure 4.261: Cross Driveline Shield

4.5.8 Inspecting Driveline Taper Pins

Taper pins are located at three places (A) along the **hitch driveshaft**. Torque each pin to 150 Nm (110 lbf·ft) every 25 hours until it no longer moves, and then check at the beginning of every season.

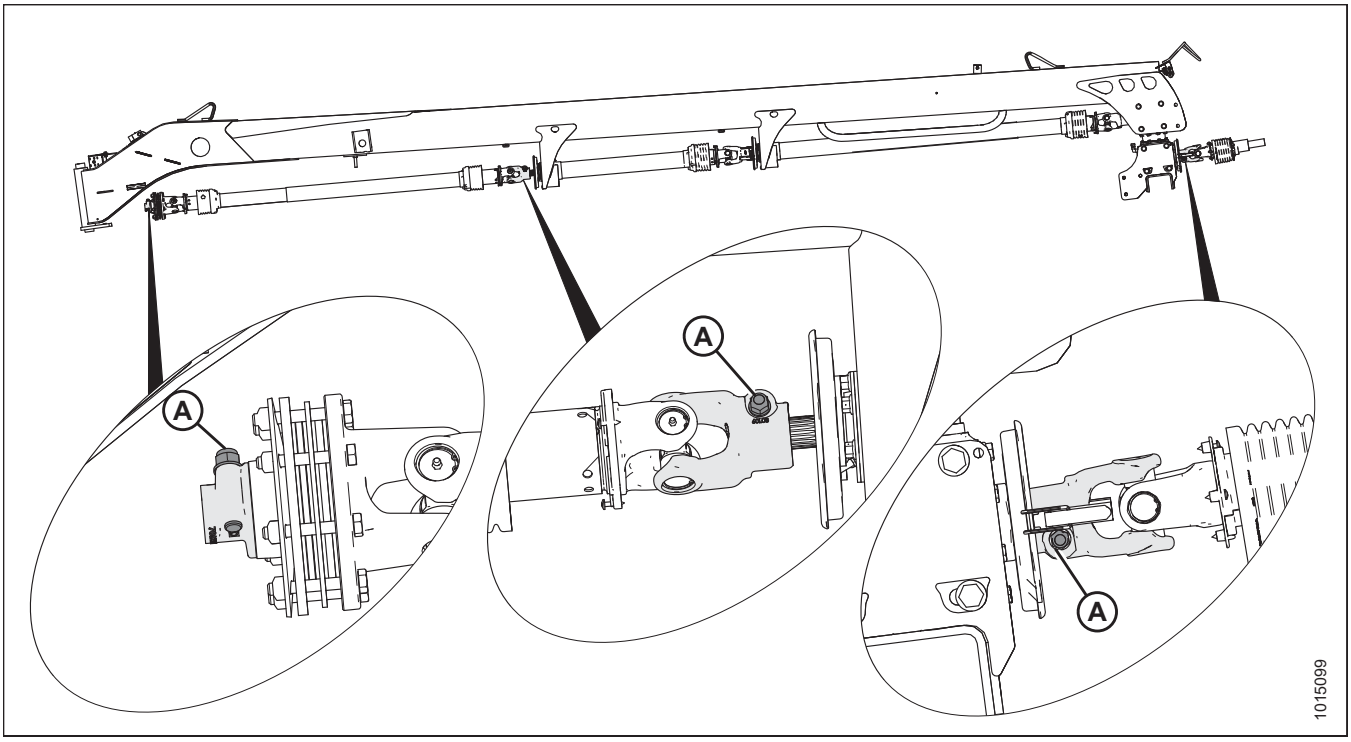


Figure 4.262: Hitch Taper Pin Locations

Taper pins are located at two places (B) on the **cross shaft driveline**. Torque each pin to 150 Nm (110 lbf·ft) every 25 hours until it no longer moves, and then check at the beginning of every season.

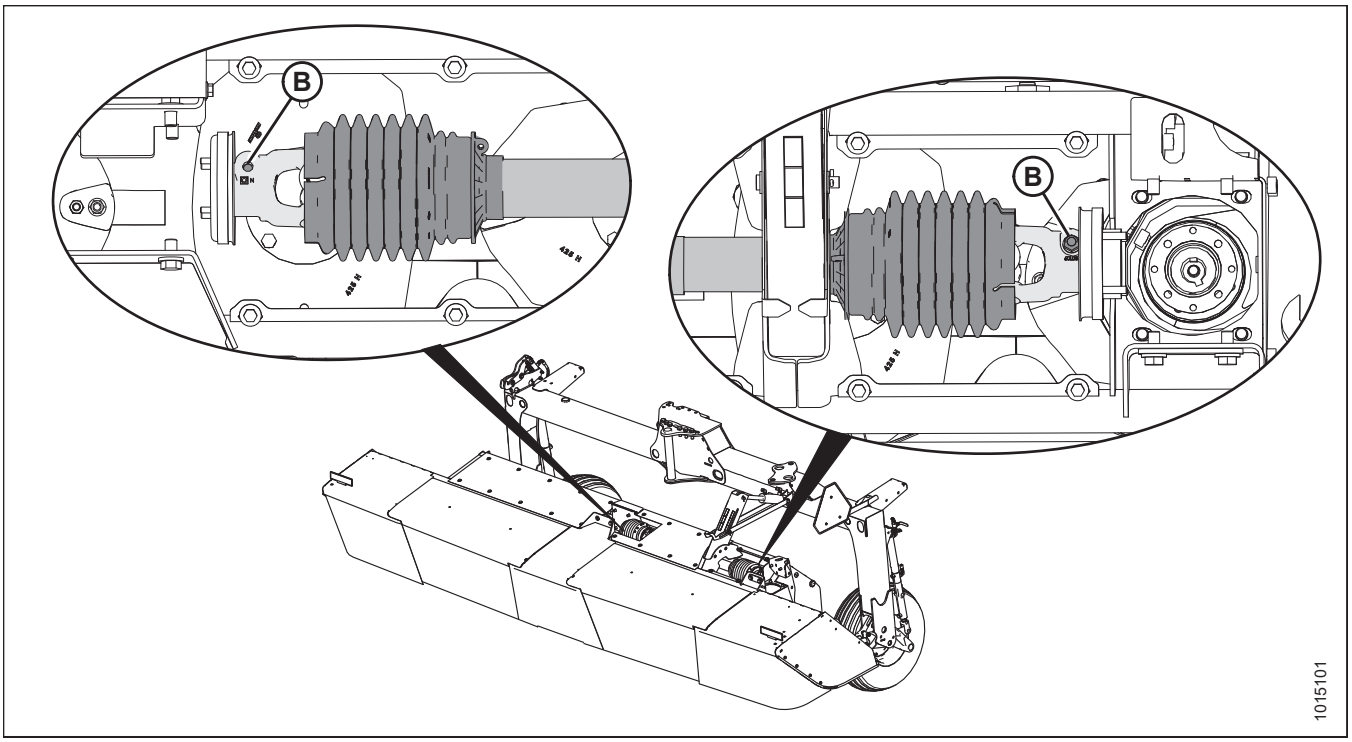


Figure 4.263: Cross Shaft Driveline Taper Pin Locations

4.5.9 Driveline Guards

Removing Driveline Guards

WARNING

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

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 driveline (A) from which the guard is going to be removed. For instructions, refer to one of the following procedures:
   - *Removing Primary Driveline, page 226*
   - *Removing Hitch Driveline, page 229*
   - *Removing Clutch Driveline, page 237*

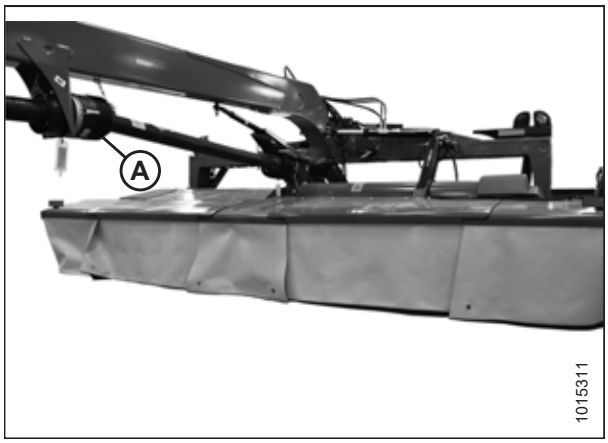


Figure 4.264: Driveline

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

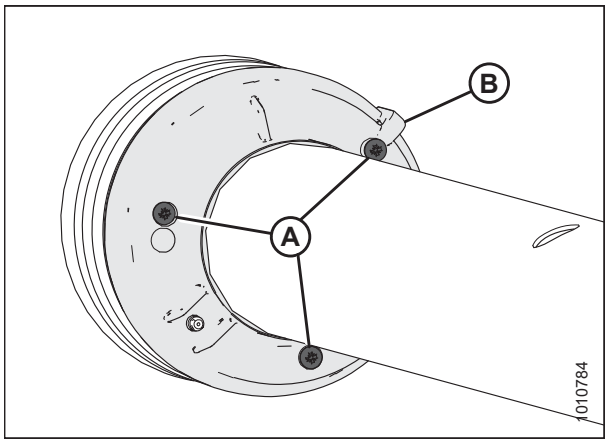


Figure 4.265: Phillips Head Screws Installed in Base Cone

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

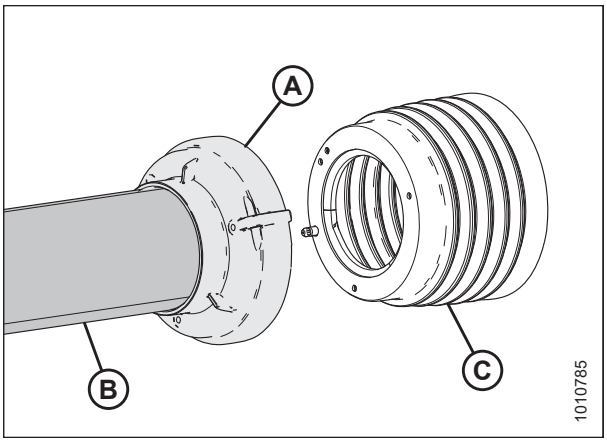


Figure 4.266: Base Cone and Shield Tube Removed from Outer Cone

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

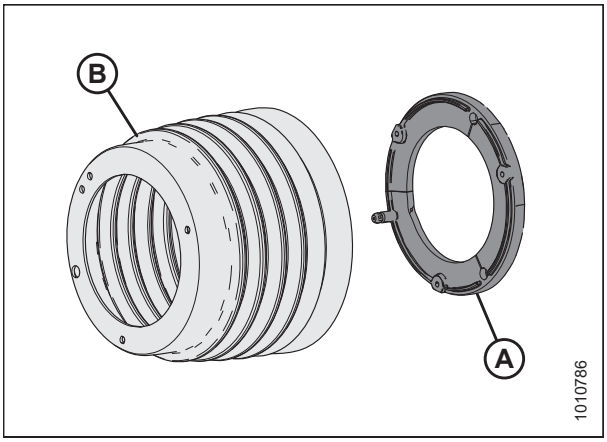


Figure 4.267: Shield Support Removed from Outer Cone

Installing Driveline Guards

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

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

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

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

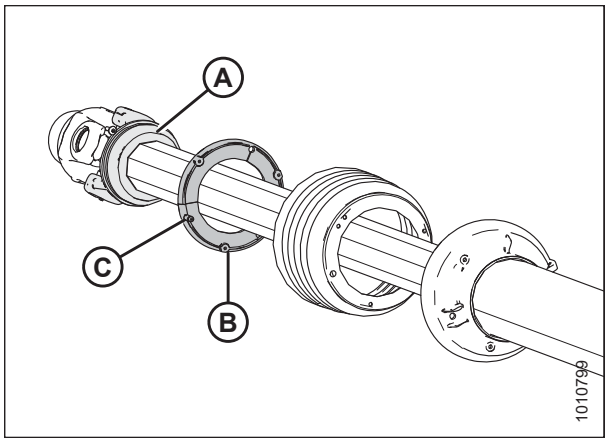


Figure 4.268: Inner Yoke and Shield Support

4. Install shield support (A) into outer cone (B), and ensure that grease fitting (C) is inserted into the proper hole.

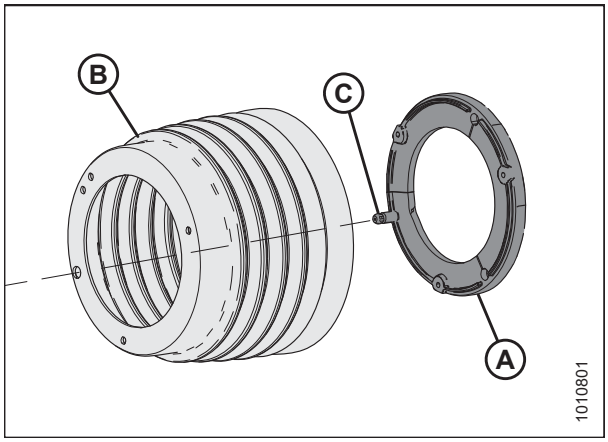


Figure 4.269: Shield Support and Outer Cone

5. Attach base cone (A) and shield tube (B) to the outer cone (C).

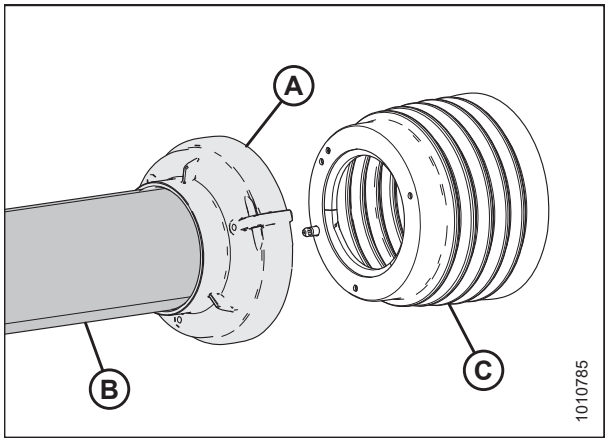


Figure 4.270: Base Cone, Shield Tube, and Outer Cone

6. Install three self-tapping Phillips head screws (A) into base cone (B).

   NOTE:

   Hand-tighten only using an appropriate screwdriver. Do **NOT** use a powered tool to tighten screws.

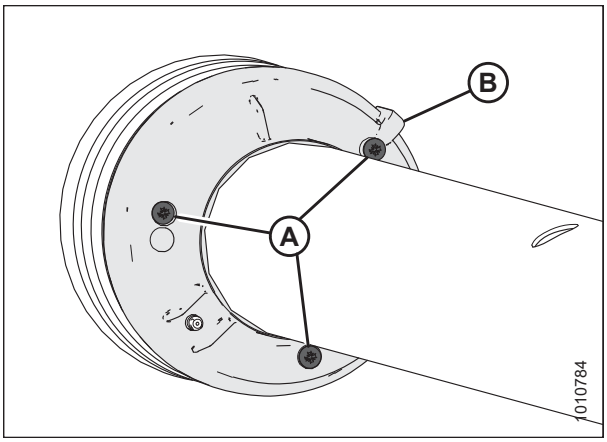


Figure 4.271: Phillips Head Screws Installed in Base Cone

IMPORTANT:

If installing a replacement guard, ensure chain (A) is short enough that it does **NOT** wrap around the driveline guard.

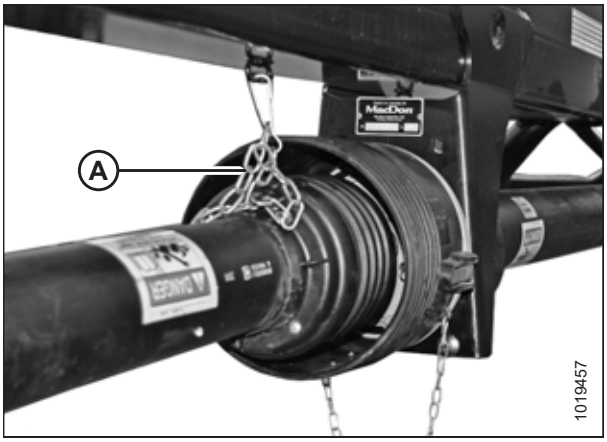


Figure 4.272: Driveline Guard

7. Install driveline (A). For instructions, refer to one of the following:

   - *Installing Clutch Driveline, page 239*
   - *Installing Hitch Driveline, page 232*
   - *Installing Primary Driveline, page 227*

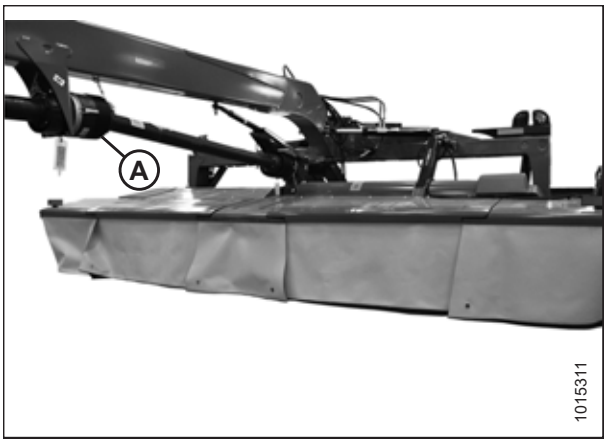


Figure 4.273: Driveline

4.5.10 Conditioner Drive Belt

The conditioner drive belt is located inside the left driveshield and is tensioned with a spring tensioner. The tension is factory-set and should not require adjustment.

Inspecting Conditioner Drive Belt

Check the belt tension and inspect for damage or wear 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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open left driveshield (A). For instructions, refer to *3.2.1 Opening Driveshields, page 33*.

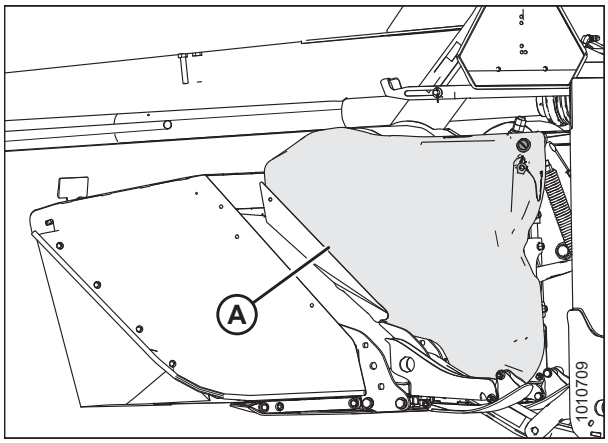


Figure 4.274: Left Driveshield

4. Inspect drive belt (A) and replace if damaged or cracked.
5. Check that jam nut (B) and adjuster nut (C) are tight.

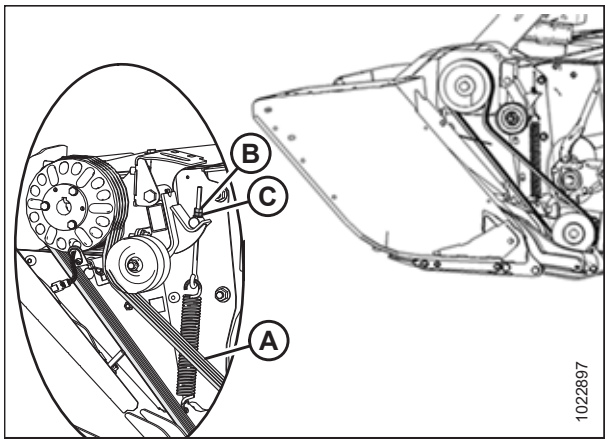


Figure 4.275: Conditioner Drive

6. Measure the length of tensioner spring (A), and ensure spring length is 366 mm (14 3/8 in.) in accordance with spring tension decal (B). If spring length requires adjustment, refer to *Installing Conditioner Drive Belt, page 257*.

7. Close the driveshield. For instructions, refer to *3.2.2 Closing Driveshields, page 35*.

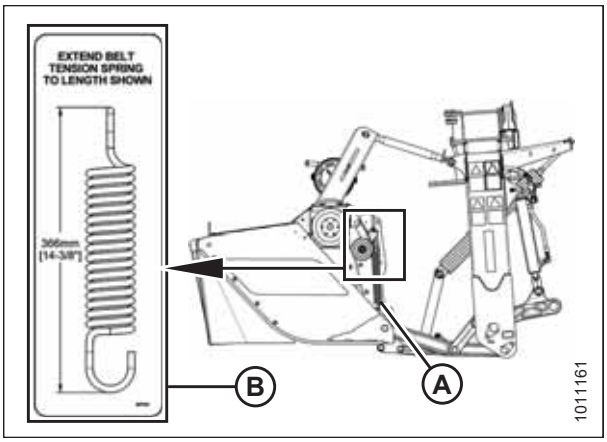


Figure 4.276: Spring Tension Decal

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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove left driveshield (A). For instructions, refer to *Removing Driveshields, page 219*.

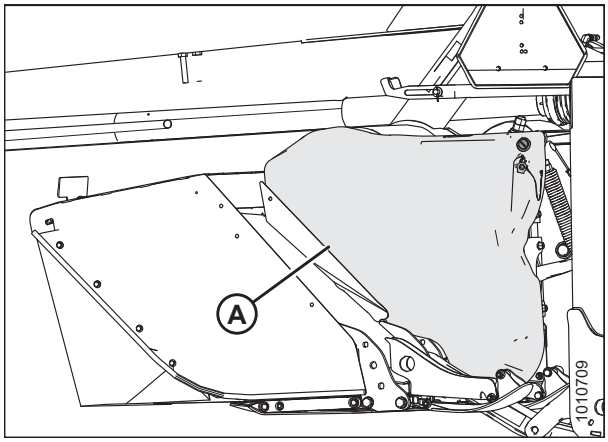


Figure 4.277: Left Driveshield

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

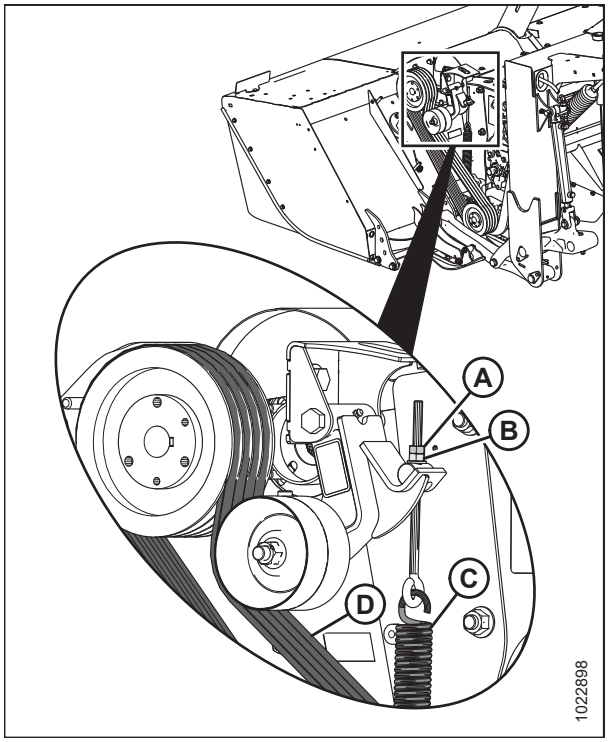


Figure 4.278: Conditioner Drive

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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Install drive belt (A) onto driven pulley (C), and then onto drive pulley (B). Ensure the belt is in the pulley grooves.

   NOTE:

   If necessary, loosen jam nut and adjuster nut (D) to relieve spring tension.

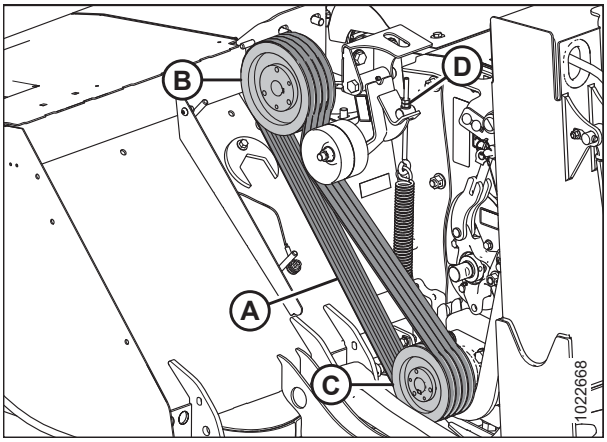


Figure 4.279: Conditioner Drive

4. Measure the length of tensioner spring (A), and adjust spring length to 366 mm (14 3/8 in.) to match spring tension decal (B).

   NOTE:

   Tensioner springs hook into different locations on different types of conditioners.

5. Increase spring length (tension) by turning adjuster nut (D) clockwise.
6. Once correct spring measurement has been achieved, hold adjuster nut (D) and tighten jam nut (C) against it.

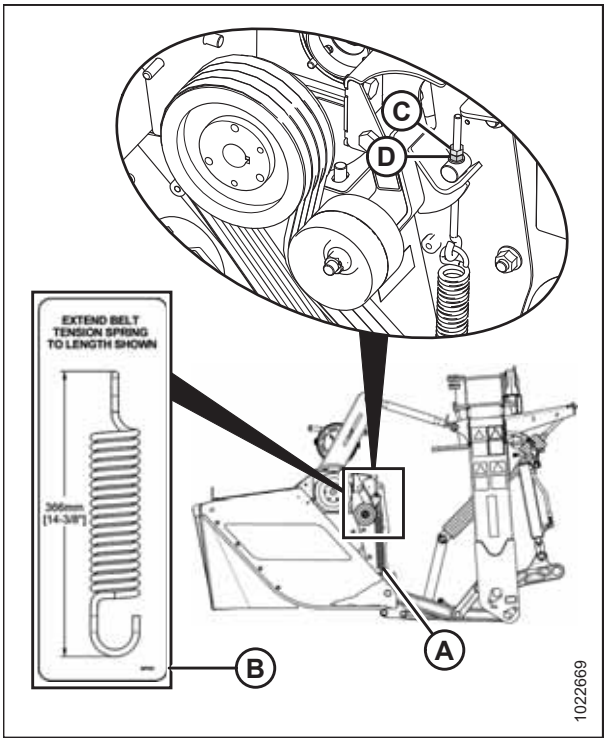


Figure 4.280: Spring Tension Decal

7. Install left driveshield (A). For instructions, refer to *Installing Driveshields, page 221*.

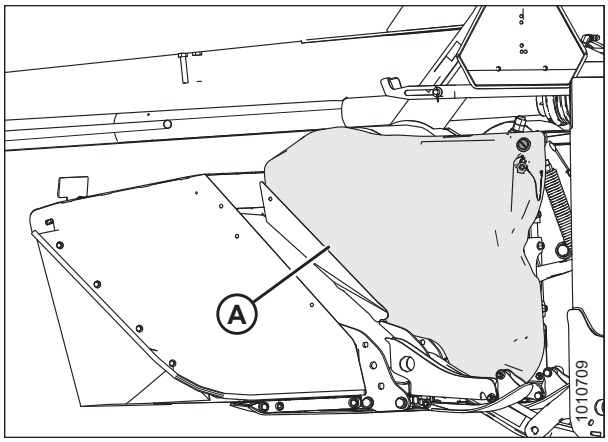


Figure 4.281: Left Driveshield

4.5.11 Conditioner Roll Timing Gearbox

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

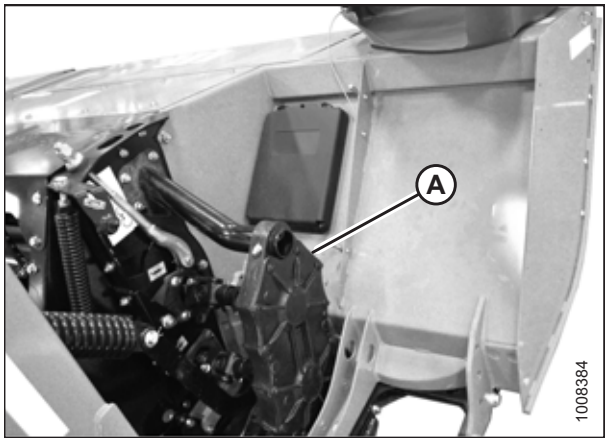


Figure 4.282: Conditioner Roll Timing Gearbox

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. Open right driveshield (A). For instructions, refer to *3.2.1 Opening Driveshields, page 33*.

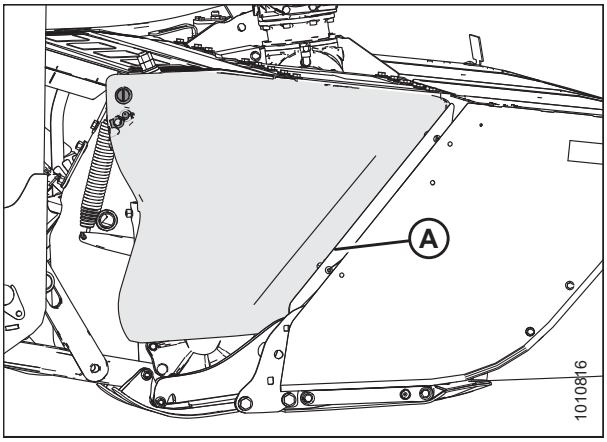


Figure 4.283: Right Driveshield

Checking conditioner roll timing gearbox oil level:

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

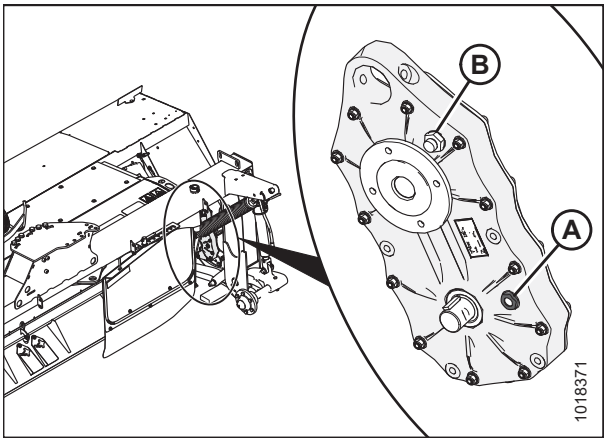


Figure 4.284: Roll Timing Gearbox

Changing conditioner roll timing gearbox oil:

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.

5. Raise the rotary disc pull-type to provide sufficient access to oil drain plug (A).
6. Shut down the engine, and remove the key from the ignition.
7. Close the cylinder lock-out valve on each lift cylinder by turning the handle to the closed position (90° angle to the hose). For instructions, refer to *3.11.1 Lift Cylinders, page 60*.
8. 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.
9. Place a 1 liter (1.05 qts [US]) container underneath the conditioner gearbox.
10. Remove oil drain plug (A) using a hex key.
11. Allow sufficient time for the oil to drain, replace oil drain plug (A), and tighten.
12. 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).
13. Properly dispose of oil.

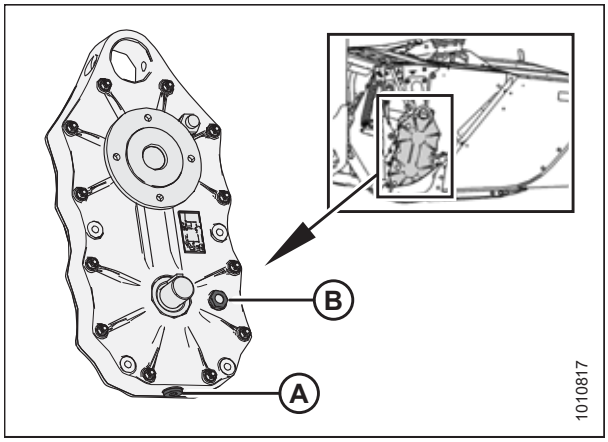


Figure 4.285: Roll Timing Gearbox

4.5.12 Pull-Type Drive Gearbox (T-Gearbox)

The cutterbar-conditioner drive gearbox (T-gearbox) (A), located inside the drive compartment at the left of the rotary disc pull-type, transfers power from the header swivel gearbox to the conditioner and cutterbar.

NOTE:

If the gearbox requires repair, contact your MacDon dealer.

For service intervals, refer to *4.3.1 Maintenance Schedule/ Record, page 123*.

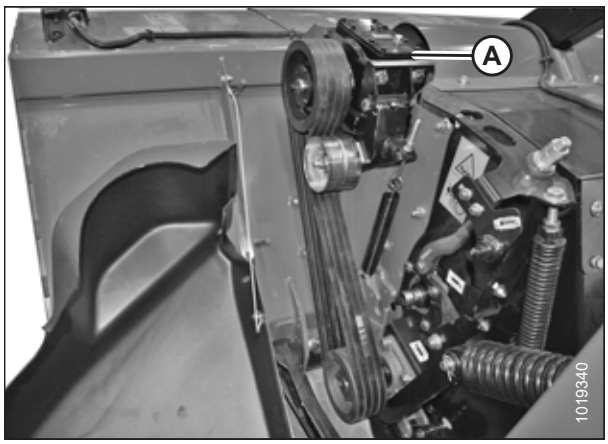


Figure 4.286: Left of Rotary Disc Pull-Type

Checking and Adding Lubricant – Cutterbar-Conditioner Drive Gearbox (T-Gearbox)

The cutterbar-conditioner drive gearbox is located inside the drive compartment at the left side of the rotary disc pull-type.

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. Retract the center-link completely.
2. Lower the rotary disc pull-type until it is level with the ground.

   NOTE:

   To help ensure an accurate oil level reading for the cutterbar-conditioner drive gearbox, set the rotary disc pull-type's skid shoes in the fully raised position. For instructions, refer to *Adjusting Cutting Height, page 88*.
3. Shut down the engine, and remove the key from the ignition.
4. Detach the tractor from the hitch. For instructions, refer to *3.8 Detaching Rotary Disc Pull-Type from Tractor, page 52*.
5. Open the left driveshield. For instructions, refer to *3.2.1 Opening Driveshields, page 33*.
6. **If equipped with a drawbar hitch:** Install jack (A) and secure with pin (B). Adjust hitch jack (A) until the drive gearbox is parallel to the ground.

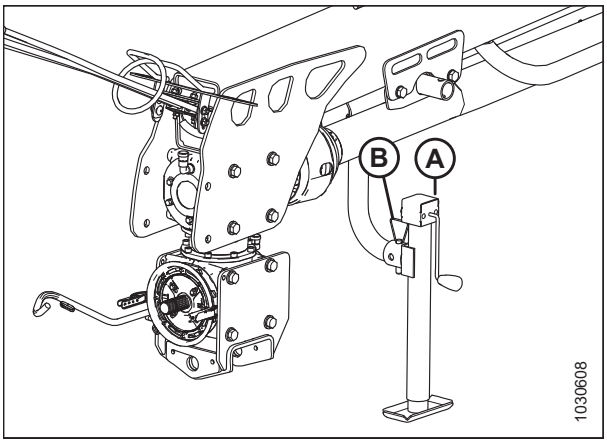


Figure 4.287: Drawbar Hitch Jack

7. **If equipped with a two-point hitch:** Install jack (A). Make sure the drive gearbox is parallel to the ground. Secure jack with pin (B).

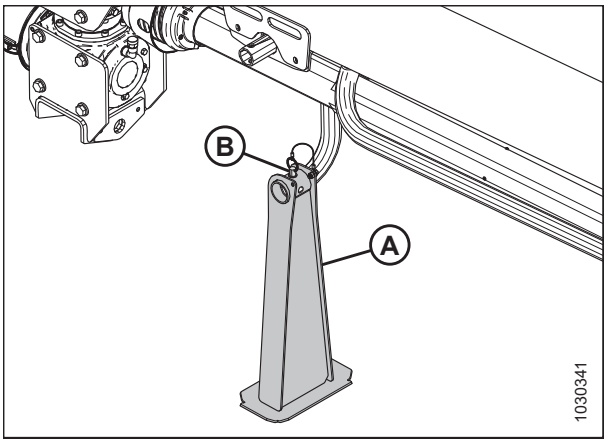


Figure 4.288: Two-Point Hitch Jack

8. Clean area around dipstick (A).
9. Remove dipstick (A) using a 22 mm socket.
10. Ensure lubricant level is to the line on dipstick.
11. If necessary, add gear lubricant to gearbox through dipstick hole (A). Refer to the manual's inside back cover for lubricant information.
12. Reinstall dipstick and tighten.
13. Close left driveshield. For instructions, refer to *3.2.2 Closing Driveshields, page 35*.

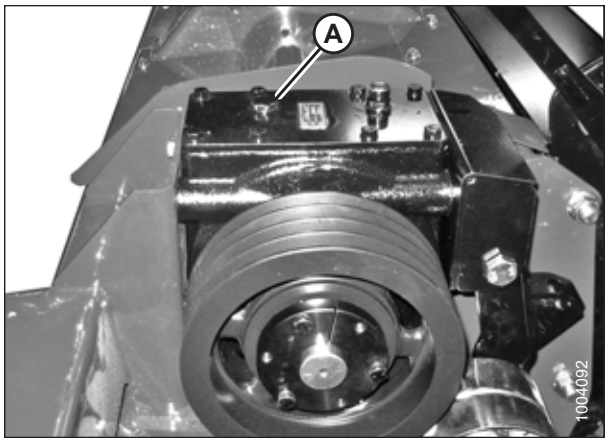


Figure 4.289: Left Side of Rotary Disc Pull-Type

Draining Rotary Disc Pull-Type Gearbox (T-Gearbox) Lubricant

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:

Drain the gearbox lubricant when the lubricant is warm. If the lubricant is cold, idle the machine for approximately 10 minutes prior to draining.

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open left cutterbar door. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

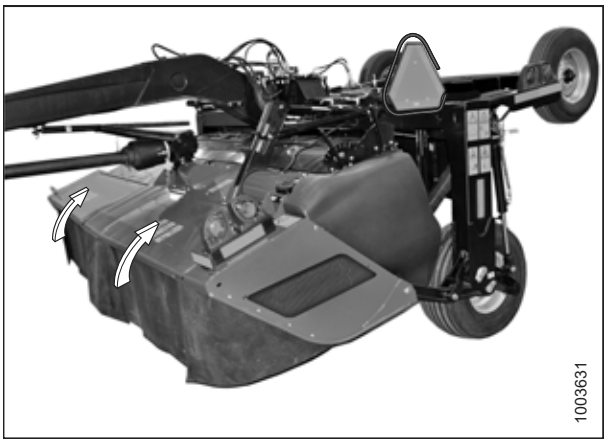


Figure 4.290: Cutterbar Doors

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

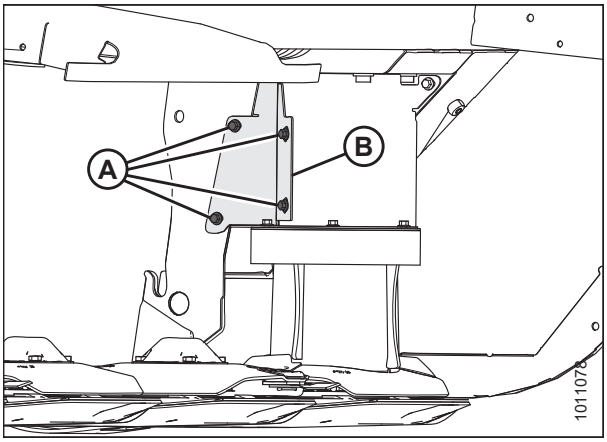


Figure 4.291: Vertical Driveshield

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

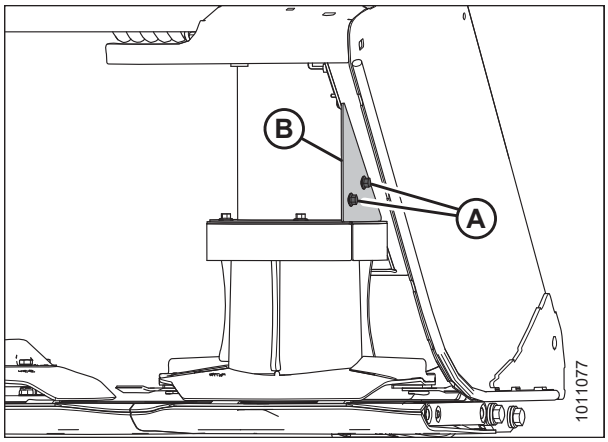


Figure 4.292: Cover Plate

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

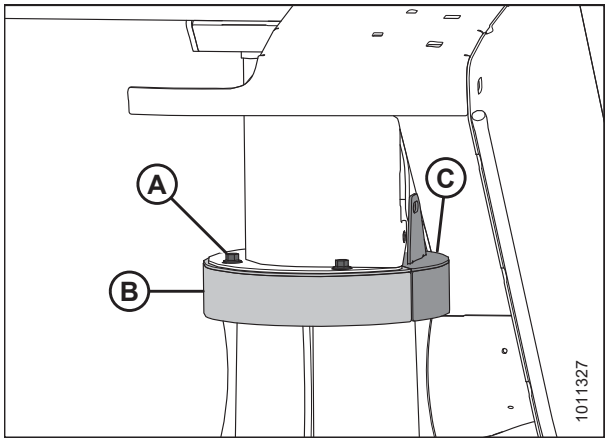


Figure 4.293: Top Plate and Drum Top

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

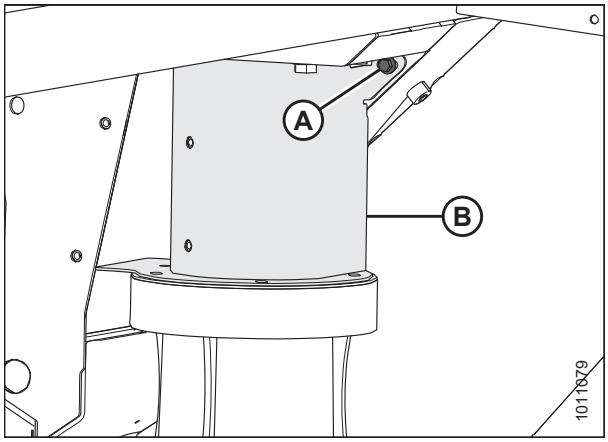


Figure 4.294: Vertical Shield

8. Place a 2 liter (2.11 qts [US]) capacity container under drain plug (A), and remove plug using a 17 mm socket.
9. Allow sufficient time for lubricant to drain, replace drain plug (A), and tighten.
10. Properly dispose of used oil.

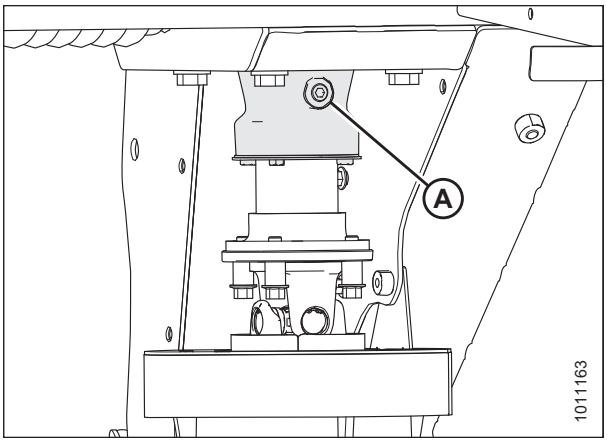


Figure 4.295: Cutterbar-Conditioner Drive Gearbox (T-Gearbox) Drain Plug

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

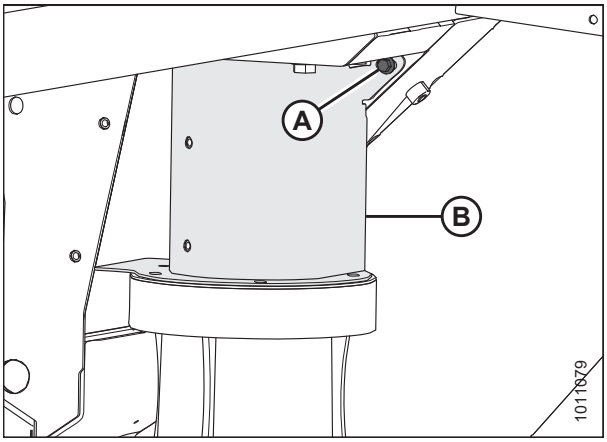


Figure 4.296: Vertical Shield

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

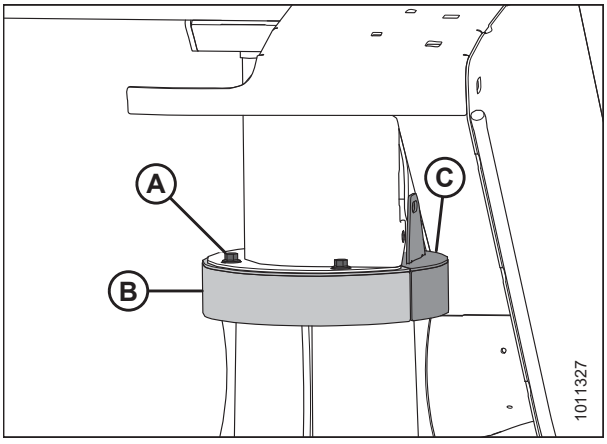


Figure 4.297: Top Plate and Drum Top

13. Install top M10 hex flange head bolt (B) through cover plate (A) and top plate (C).
14. Install lower M10 hex flange head bolt (D) through cover plate (A) and vertical shield (E).
15. Tighten bolts (B) and (D).

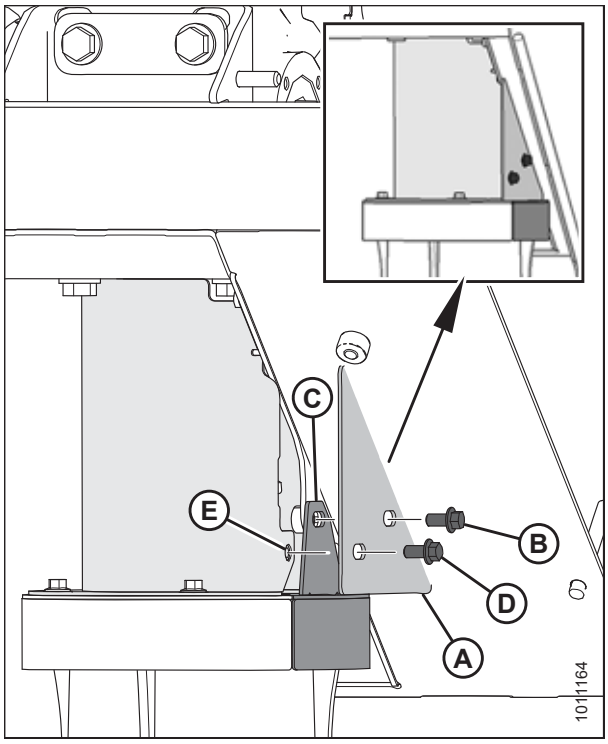


Figure 4.298: Cover Plate

16. Install vertical driveshield (B) using four M10 hex flange head bolts (A).

WARNING

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

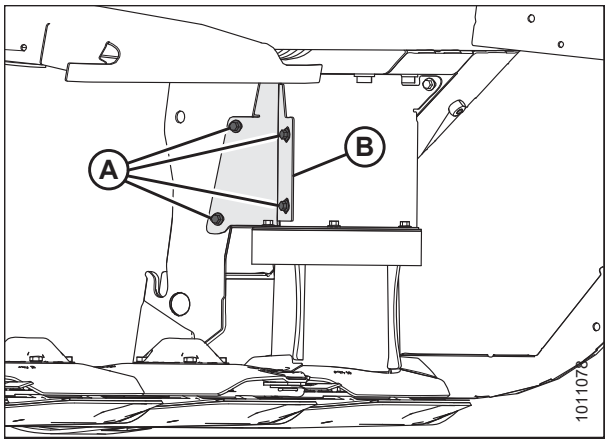


Figure 4.299: Vertical Driveshield

17. Close cutterbar doors. For instructions, refer to *3.3.3 Closing Cutterbar Doors, page 38*.

Figure 4.300: Cutterbar Doors in Closed Position

4.5.13 Header Swivel Gearbox and Hitch Swivel Gearbox

There are two gearboxes located on the rotary disc pull-type: the header swivel gearbox that transfers power to the rotary disc pull-type cutterbar and conditioner roll timing gearbox, and the hitch swivel gearbox that transfers power from the tractor to the header swivel gearbox. Both gearboxes consist of upper and lower gearboxes.

If either of the gearboxes requires repair, remove it and have it serviced at your MacDon Dealer.

IMPORTANT:

The header and hitch swivel gearboxes appear similar but they are **NOT** the same and they are **NOT** interchangeable.

For service intervals, refer to *4.3.1 Maintenance Schedule/Record, page 123*.

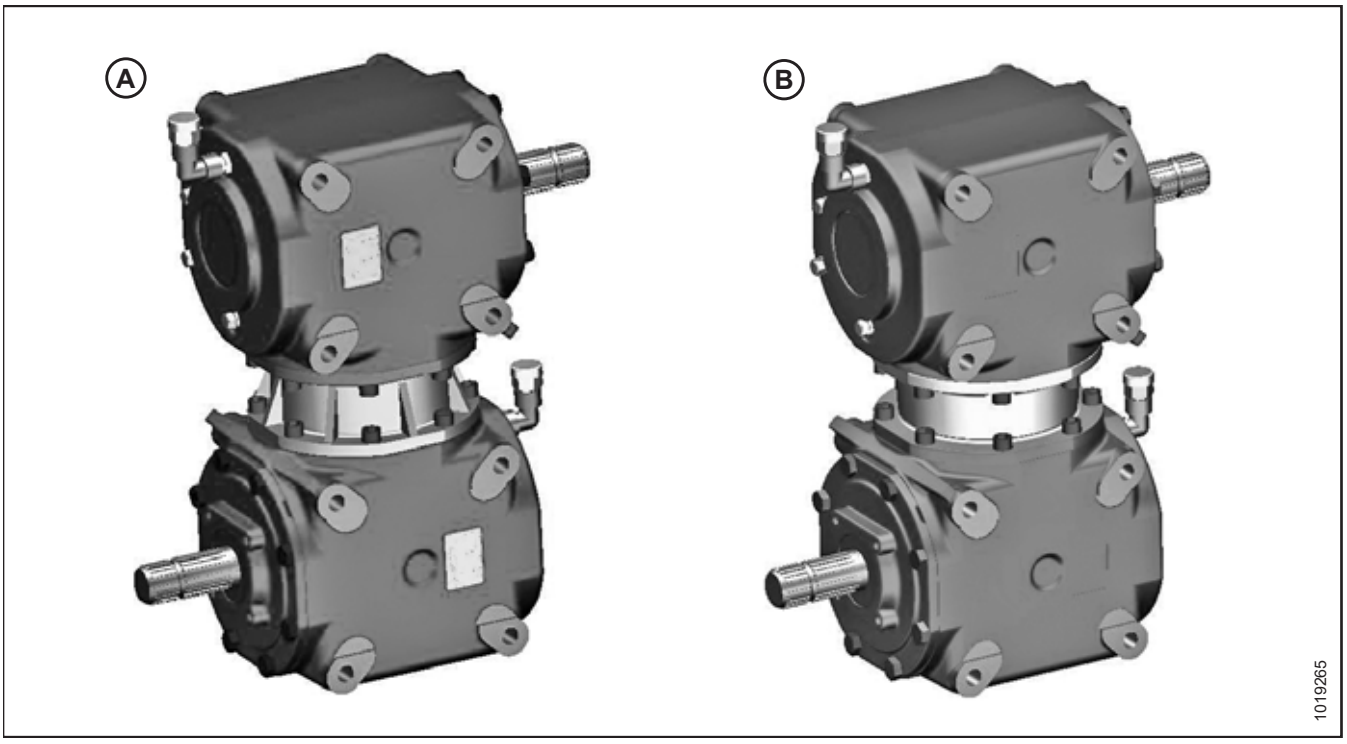


Figure 4.301: Header Swivel and Hitch Swivel Gearboxes

A - Header Swivel Gearbox

B - Hitch Swivel Gearbox

Checking Lubricant Levels in the Header Swivel Gearbox and Hitch Swivel Gearbox

Check plugs are located at the same position on each gearbox and need to be removed in order to check the lubricant level. Check lubricant level while lubricant is warm. The lubricant should be visible or slightly draining from the port if filled to the correct level. Refer to *4.3.1 Maintenance Schedule/Record, page 123* for required service intervals.

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.

NOTE:

This procedure is the same for both header swivel and hitch swivel gearboxes and), and must be done on both upper and lower gearboxes.

1. Lower rotary disc pull-type fully.

   NOTE:

   Hitch swivel and header swivel gearbox orientations are not affected by positioning of skid shoes on the rotary disc pull-type, but ideally the pull-type should be level with the ground prior to checking gearbox oil levels.

2. Shut down the engine, and remove the key from the ignition.
3. Clean area around check plug (A).
4. Remove plug using a 15 mm socket. Check lubricant level and ensure lubricant is visible or slightly draining from the port.
5. If lubricant is low, you will need to add some. For instructions, refer to *Adding Lubricant to the Header Swivel Gearbox and Hitch Swivel Gearbox , page 270*.
6. Reinstall check plug (A) and tighten.

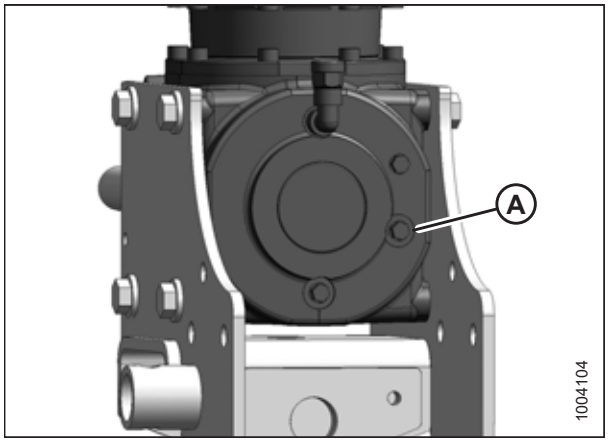


Figure 4.302: Header Swivel or Hitch Swivel Gearbox Check Plug

Draining Lubricant from the Header Swivel Gearbox and Hitch Swivel Gearbox

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:

This procedure is the same for both header swivel and hitch swivel gearboxes, and must be done on both upper and lower gearboxes.

1. Shut down the engine, and remove the key from the ignition.
2. Place a 2 liter (2.11 qts [US]) capacity container under drain plug (A), and remove plug using a 17 mm socket.

   NOTE:

   For faster draining, remove check plug (B).
3. Allow sufficient time for lubricant to drain. Replace drain plug (A) and check plug (B) (if removed), and tighten plugs.
4. Properly dispose of used lubricant and clean up any spills.

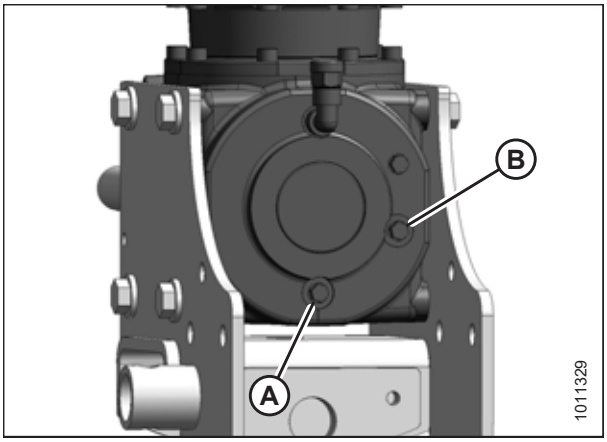


Figure 4.303: Gearbox Drain Plug

Adding Lubricant to the Header Swivel Gearbox and Hitch Swivel Gearbox

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:

This procedure is the same for both header swivel and hitch swivel gearboxes and , and must be done on both upper and lower gearboxes.

1. Shut down the engine, and remove the key from the ignition.
2. Clean the area around check plug (A) and breather/filler plug (B).
3. Remove check plug (A) and breather/filler plug (B).
4. Ensure the lubricant level is visible or begins to drain through check port (A), and add gear lubricant to gearbox through port (B) as required. Refer to this manual's inside back cover for a list of recommended fluids, lubricants, and capacities.
5. Reinstall check plug (A) and breather/filler plug (B), and tighten.

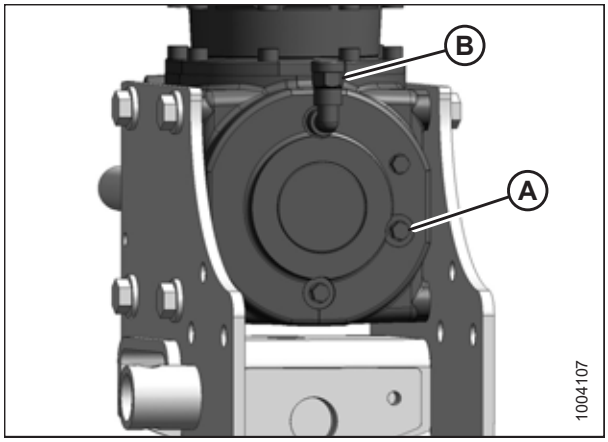


Figure 4.304: Swivel Gearbox

4.5.14 Wheels and Tires

Checking Wheel Bolts

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:

Check and tighten field wheel bolts and transport system wheel bolts (if installed) after the first hour of operation and every 100 hours thereafter.

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

Torque wheel bolts to 160 Nm (120 lbf·ft) using the tightening sequence shown at right.

IMPORTANT:

Whenever a wheel is installed, check torque after 1 hour of operation.

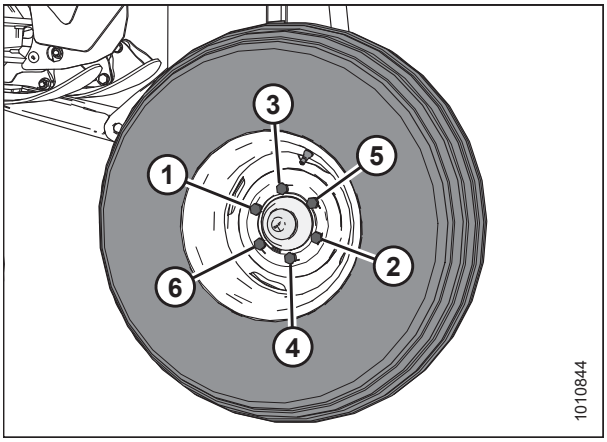


Figure 4.305: Tightening Sequence

Removing Wheels

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. Place blocks (A) under opposite wheel to prevent machine from moving if rotary disc pull-type is not attached to towing vehicle.
3. Position jack under frame leg (B).
4. Loosen wheel bolts slightly.
5. Operate jack to raise wheel off ground.
6. Place blocks or a stand under frame leg.
7. Remove wheel bolts and remove wheel.

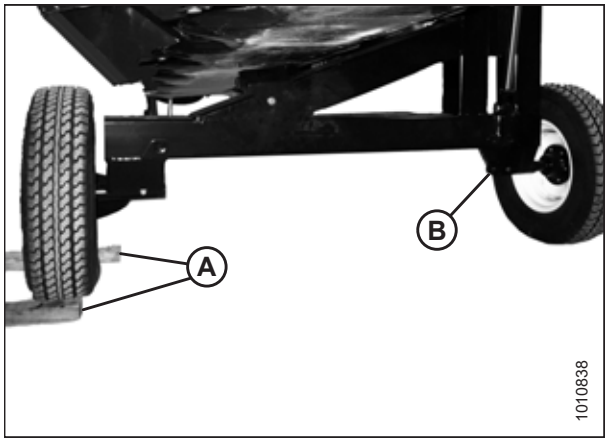


Figure 4.306: Transport Wheel

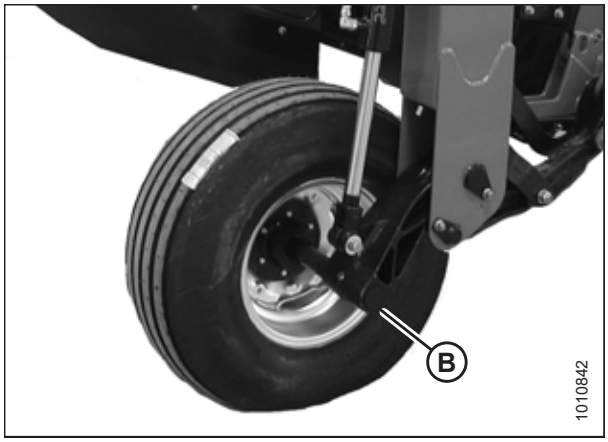


Figure 4.307: Field Wheel

Installing Field Wheels

1. Position wheel (A) on the spindle, install bolts (B), and partially tighten.

   IMPORTANT:

   Be sure valve stem (C) points away from the wheel support.

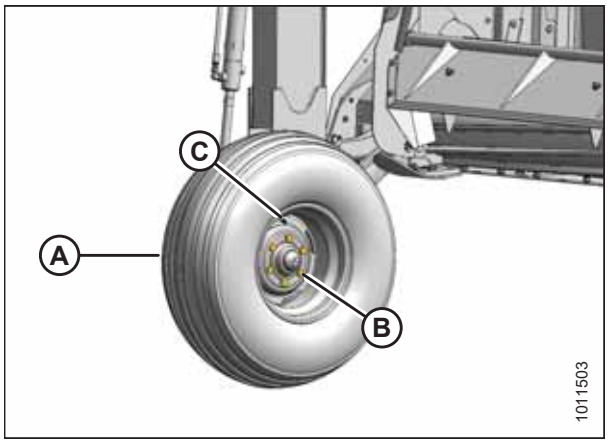


Figure 4.308: Installing Wheel Bolts

2. Lower wheels to the ground and torque wheel bolts to 160 Nm (120 lbf·ft) using the tightening sequence shown at right.

   IMPORTANT:

   Whenever a wheel is installed, check torque after 1 hour of operation.

3. Check tire pressure and adjust as required. For instructions, refer to *Inflating Tires, page 273*.

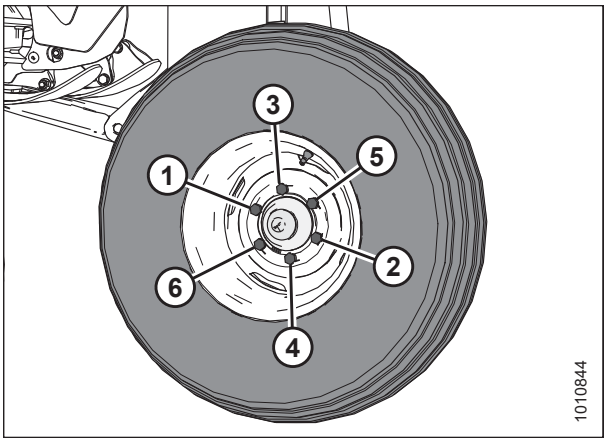


Figure 4.309: Tightening Sequence

Inflating Tires

WARNING

- **Service tires safely.**
- **A tire can explode during inflation which could cause serious injury or death.**

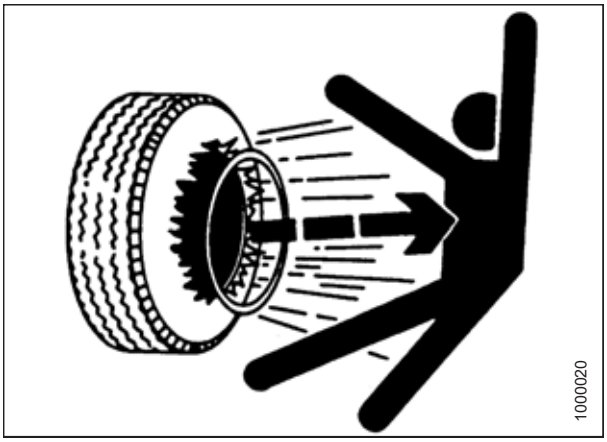


Figure 4.310: Overinflated Tire

Check tire pressure daily:

- Maximum pressure is 310 kPa (45 psi) for field wheels (A).
- Maximum pressure is 552 kPa (80 psi) for optional transport wheels (B).

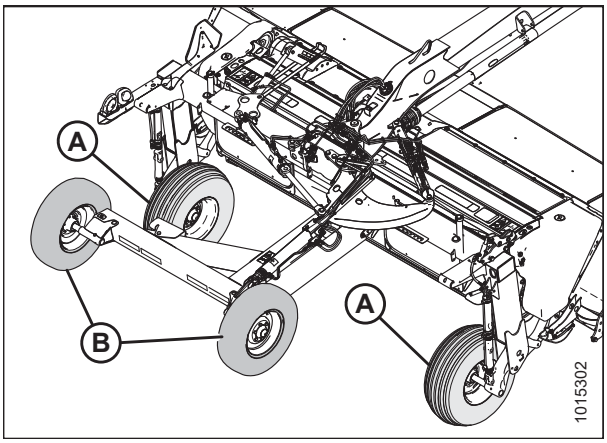


Figure 4.311: Field and Transport Wheels

4.6 Hydraulics

4.6.1 Checking Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

WARNING

- **Avoid high-pressure fluids. Escaping fluid can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes and nozzles which eject fluids under high pressure.**
- **If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.**

Figure 4.312: 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.

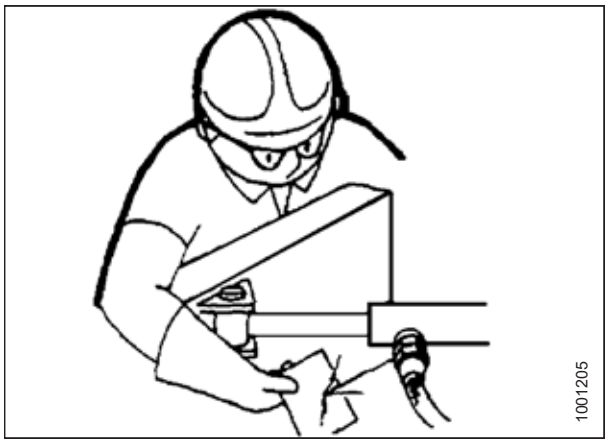


Figure 4.313: Testing for Hydraulic Leaks

4.6.2 Hydraulic Cylinders

The hydraulic cylinders do not require routine maintenance or service. Occasionally visually inspect cylinders for signs of leaks or damage. If repairs are required, remove them and have them serviced by your MacDon Dealer.

4.7 Electrical System

4.7.1 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.

4.7.2 Servicing Amber Hazard/Signal Lights

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 rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove two Phillips screws (A) from the fixture, and remove the plastic lens.
4. Replace the bulb (trade #1157), and reinstall the plastic lens and screws.

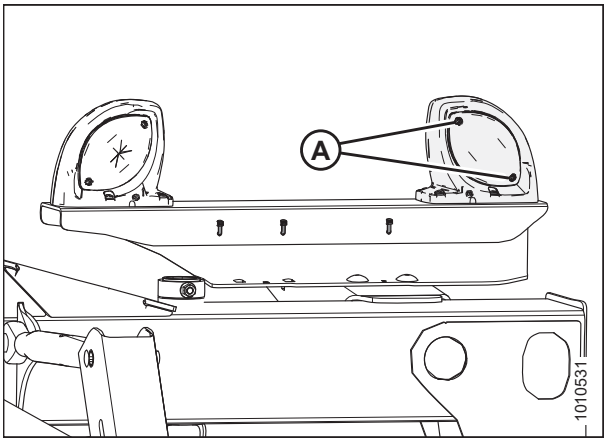


Figure 4.314: Plastic Lens and Screws

Replacing Amber Hazard/Signal Light Fixture

1. Cut cable ties (A) securing harness covering to light.
2. Retrieve connections from inside harness covering (approximately 150 mm [6 in.] from light) and disconnect wires (not shown). If necessary, remove tape.
3. Remove four nuts (B) (only 3 shown) securing light to bracket, and remove light. Pull wires through hole in bracket.
4. Feed connectors of new light (not shown) through hole in bracket, and position light onto bracket.
5. Install four nuts (B) and tighten.
6. Connect wires to connectors in harness, and secure harness covering with tape and cable ties (A) as required.

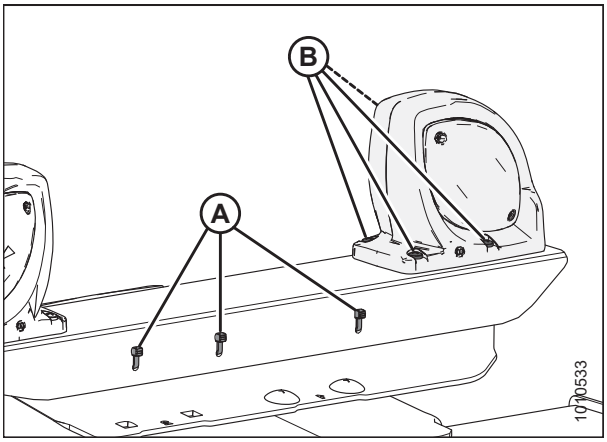


Figure 4.315: Amber Hazard Light and Mounting Bracket

4.7.3 Servicing Red Brake/Tail Lights

Replacing Red Brake/Tail Light Bulb

1. Remove two Phillips screws (A) from fixture, and remove the plastic lens.
2. Replace bulb, and reinstall plastic lens and screws.

   NOTE:

   Bulb—Trade #1157.

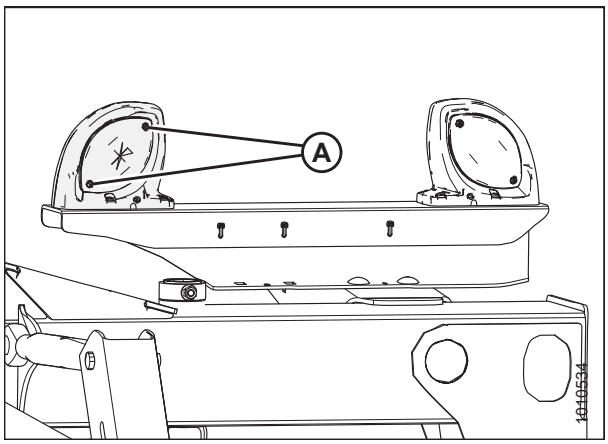


Figure 4.316: Plastic Lens and Screws

Replacing Red Brake/Tail Light Fixture

1. Cut cable ties (A) securing harness covering to light.
2. Retrieve connections from inside harness covering (approximately 150 mm [6 in.] from light) and disconnect wires (not shown). If necessary, remove tape.
3. Remove four nuts (B) securing light to bracket, and remove light. Pull wires through hole in bracket.
4. Feed connectors of new light (not shown) through hole in bracket, and position light onto bracket.
5. Install four nuts (B) and tighten.
6. Connect wires to connectors in harness, and secure harness covering with tape and cable ties (A) as required.

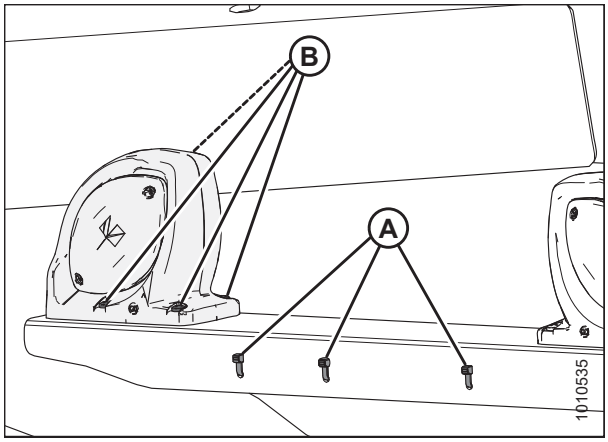


Figure 4.317: Red Hazard Light and Mounting Bracket

4.8 Conditioner System

4.8.1 Roll Conditioner

Rolls condition the crop by crimping and crushing the stem in several places, allowing the release of moisture resulting in faster drying times. Both steel and polyurethane conditioner rolls are available. Refer to Chapter *5 Options and Attachments, page 299* for ordering information.

Inspecting Roll Conditioner

DANGER

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

WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
4. Remove left and right driveshields (A). For instructions, refer to *Removing Driveshields, page 219*.

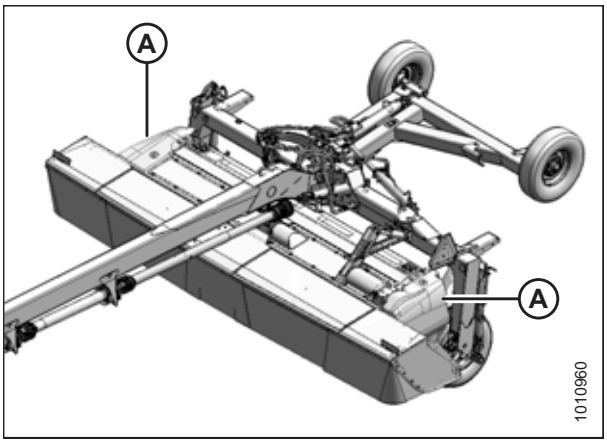


Figure 4.318: Driveshields

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

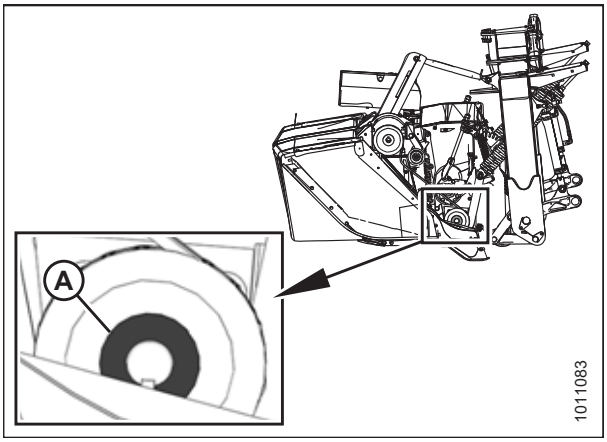


Figure 4.319: Conditioner Roll Left Bearing

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

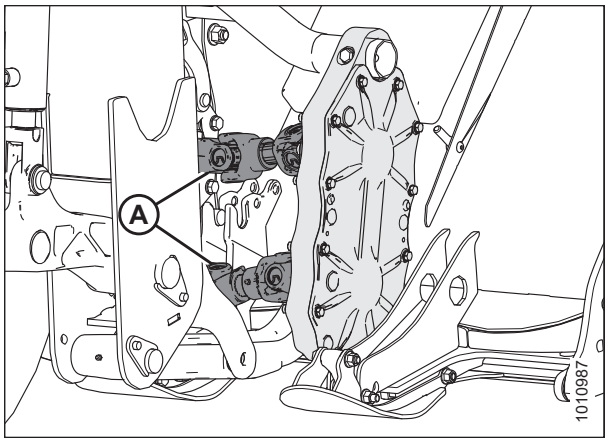


Figure 4.320: Conditioner Drive U-Joints

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

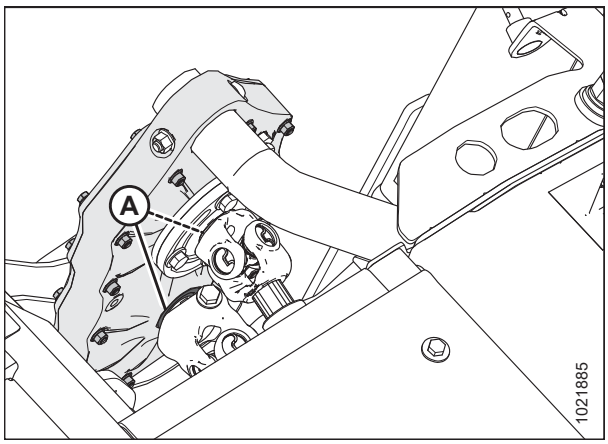


Figure 4.321: Roll Timing Gearbox Bearings

4.8.2 Finger Conditioner

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

The degree to which the crop is conditioned as it passes through the conditioner is controlled by the clearance between the fingers and the internal intensity baffle and by the rotational speed of the fingers. To make adjustments, refer to *Adjusting Internal Intensity Baffle Clearance, page 107* and, or, *Changing Finger Rotor Speed, page 108*.

Inspecting Finger Conditioner

DANGER

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

WARNING

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

1. Lower the rotary disc pull-type fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the lift cylinder lock-out valves. For instructions, refer to *3.1.1 Engaging Locks, page 31*.
4. Remove left and right driveshields (A). For instructions, refer to *Removing Driveshields, page 219*.

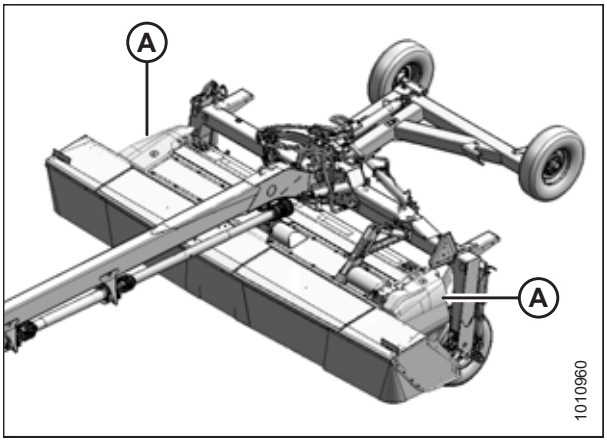


Figure 4.322: Driveshields

5. Open the cutterbar doors. For instructions, refer to *3.3.1 Opening Cutterbar Doors – North America, page 36*.

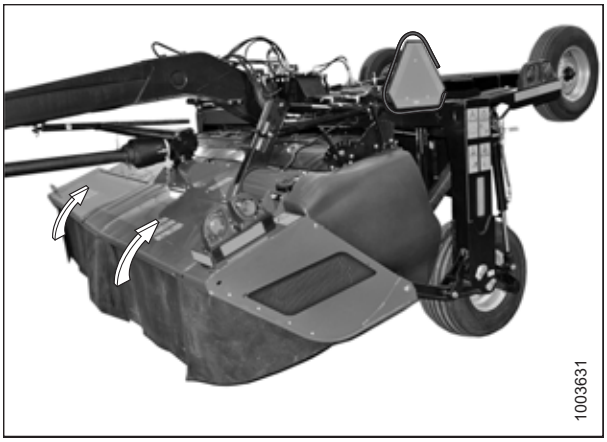


Figure 4.323: Cutterbar Doors

6. Check rotor fingers (A) for damage and replace any bent fingers to prevent rotor imbalance.

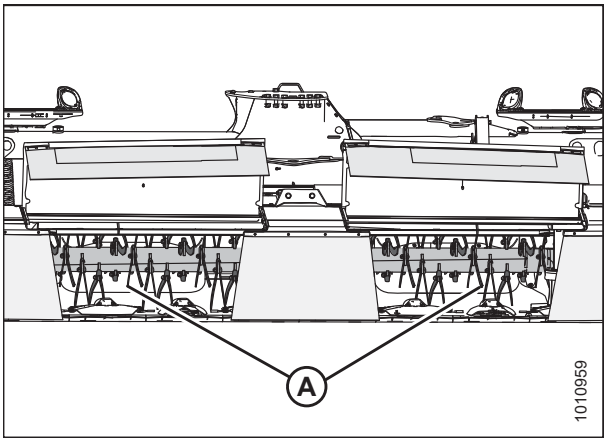


Figure 4.324: Rotor Fingers

7. Remove the left driveshield. For instructions, refer to *Removing Driveshields, page 219*.

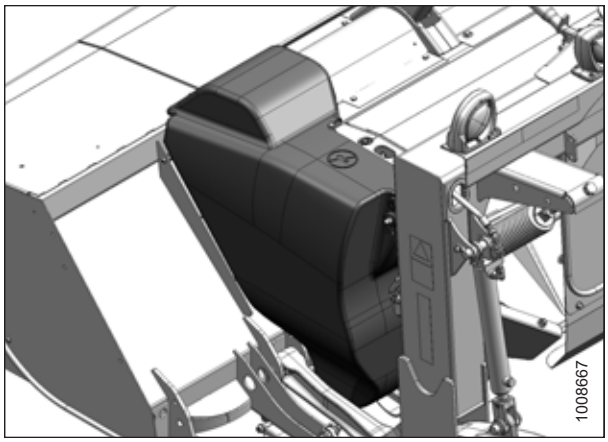


Figure 4.325: Driveshield – Left Side

8. Inspect left rotor bearing (A) for signs of wear or damage. Contact your MacDon dealer if bearing needs to be replaced.

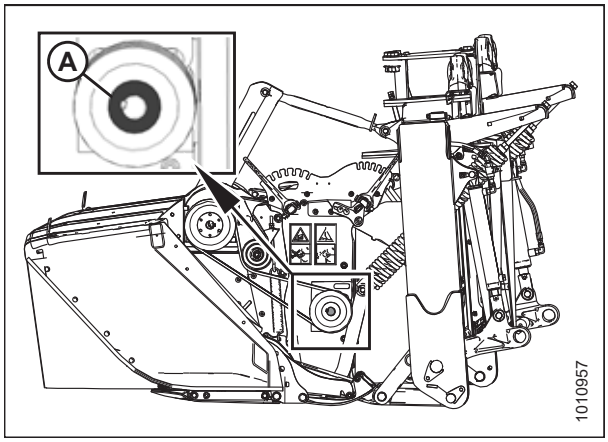


Figure 4.326: Left Side Rotor Bearing

9. Remove the right driveshield. For instructions, refer to *Removing Driveshields, page 219*.
10. Inspect right rotor bearing (A) for signs of wear or damage. Contact your MacDon dealer if bearing needs to be replaced.

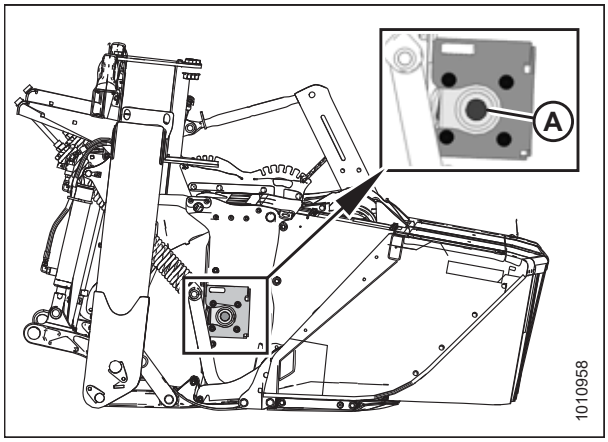


Figure 4.327: Right Side Rotor Bearing

4.8.3 Changing the Conditioner

R1 Rotary Disc Pull-Types can be equipped with either a finger conditioner, a polyurethane roll conditioner, a steel roll conditioner, or no conditioner at all. Follow these instructions to change conditioners.

NOTE:

These instructions apply to all conditioners. Exceptions are identified where applicable.

Separating Header from Carrier

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.

The rotary disc pull-type includes a header and conditioner attached to a carrier frame. Before removing or installing the conditioner, the header and carrier must be separated.

1. Connect the rotary disc pull-type to the tractor. For instructions, refer to *3.7 Attaching Rotary Disc Pull-Type to the Tractor, page 43*.
2. Start the tractor and center the rotary disc pull-type behind tractor.
3. Raise the rotary disc pull-type fully, set center-link to mid-position, and shut off the engine. Remove key from ignition.

   NOTE:

   The float adjuster bolt is easier to turn when the rotary disc pull-type is in the raised position.

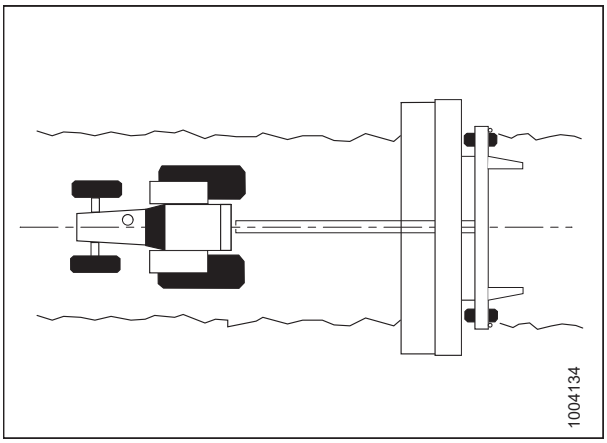


Figure 4.328: Rotary Disc Pull-Type Centered behind Tractor

4. Close the lift cylinder lock-out valves (A). Repeat on opposite side.
5. Loosen retaining bolt (B) and rotate cover plate (C) away from float spring bolt (D). Repeat on opposite side.

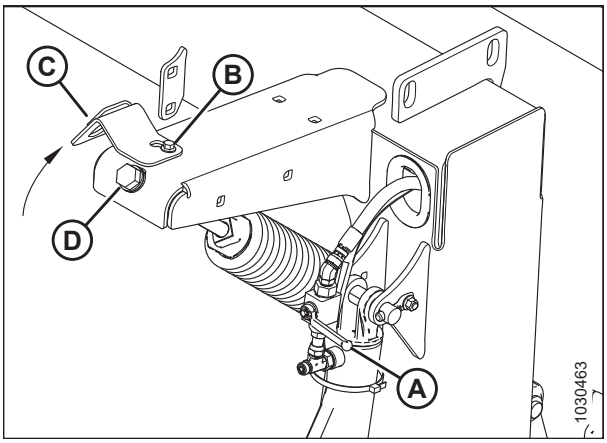


Figure 4.329: Right Float Adjuster

6. Turn out adjuster bolt (A) on each float spring until 400 mm (17 3/4 in.) of thread (B) is exposed. Repeat on opposite side.

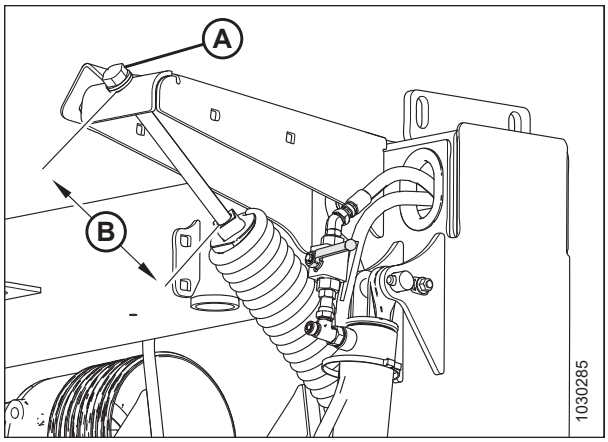


Figure 4.330: Adjuster Bolt

7. Open lift cylinder lock-out valves (A) (so the handle is in line with the hose). Repeat on opposite side.
8. Start the engine.
9. Lower the rotary disc pull-type fully.
10. Shut down the engine, and remove the key from the ignition.
11. Check that float adjuster bolts (B) are loose. Back off adjuster bolts as required. Repeat on the opposite side.
12. On the **LEFT** of the rotary disc pull-type, remove float adjuster bolt (B) from spring. Do **NOT** allow spring to drop when bolt is removed.

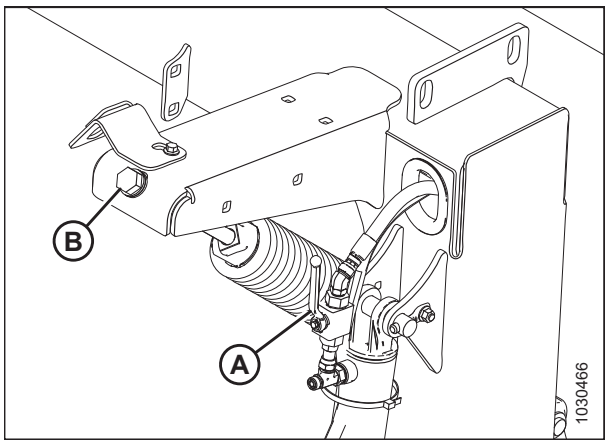


Figure 4.331: Right Float Adjuster

13. Open left and right driveshields (A). For instructions, refer to *3.2.1 Opening Driveshields, page 33*.

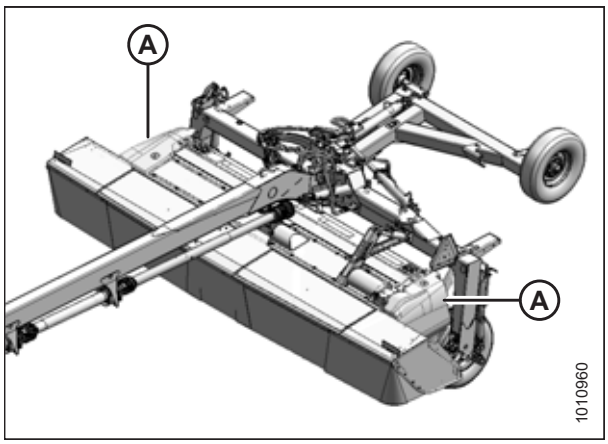


Figure 4.332: Driveshields

14. On the right of the rotary disc pull-type, remove M20 nut (A), washers, and hex head bolt (B) securing carrier leg (C) and float spring arm (D) to the header.
15. Move float spring arm (D) clear of conditioner.

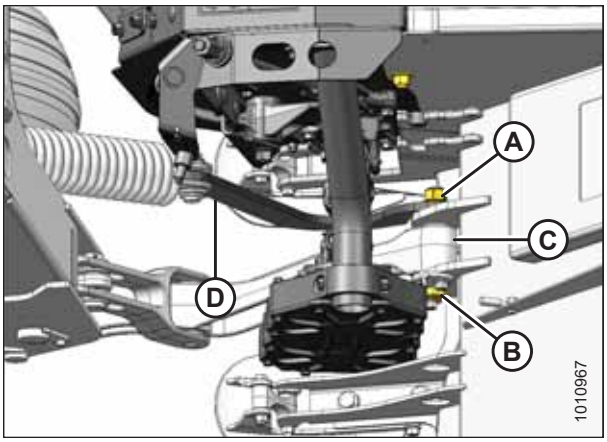


Figure 4.333: Right of Carrier – Top View

16. Remove M20 nut (A), washers, and hex head bolt (B) securing carrier leg (C) to the left end of the header.

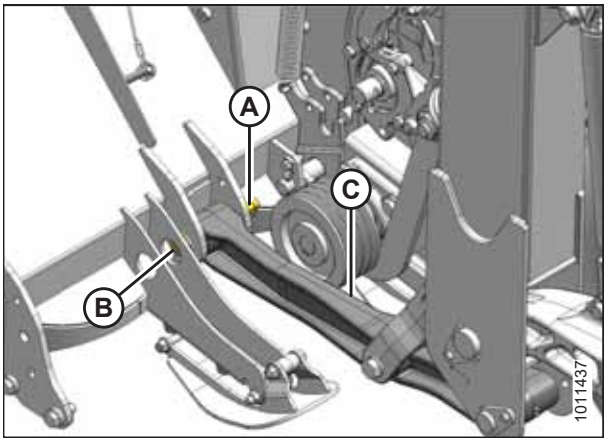


Figure 4.334: Left of Conditioner

17. **If equipped with mechanical center-link:** Remove clevis pin (A) connecting center-link (B) to anchor (C), and separate the center-link from the anchor. Reinstall the pin in the anchor to store.
18. **If equipped with mechanical center-link:** Secure center-link (B) to the carrier frame with a strap or wire to prevent them from contacting the rotary disc pull-type during separation.

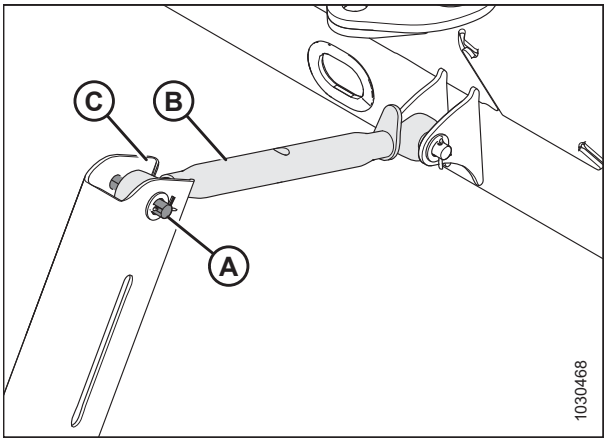


Figure 4.335: Mechanical Center-Link

19. **If equipped with hydraulic center-link:** Remove clevis pin (A) connecting center-link (B) to anchor (C), and separate the center-link from the anchor. Reinstall the pin in the anchor to store.
20. **If equipped with hydraulic center-link:** Secure center-link (B) and indicator (D) to carrier the frame with a strap or wire to prevent them from contacting the rotary disc pull-type during separation.

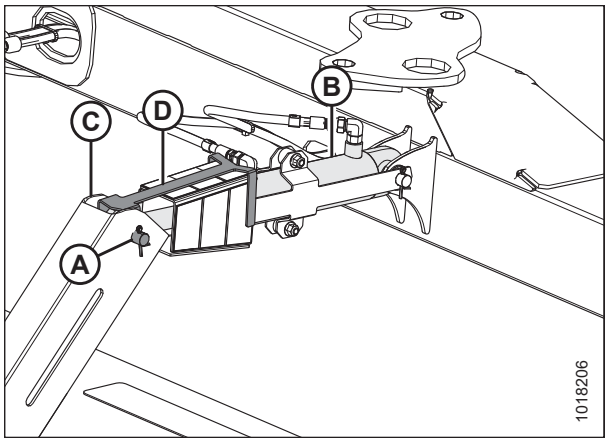


Figure 4.336: Hydraulic Center-Link and Indicator

21. Remove two hex head bolts (A) and spacers (B) securing steering arm (C) to the gearbox.
22. Lift steering arm (C) off the gearbox and secure the arm to hitch (D) with a strap or wire.
23. Reinstall hex head bolts (A) and spacers (B) into the gearbox.
24. Disconnect aft driveline (E) from the header swivel gearbox. For instructions, refer to *Removing Clutch Driveline, page 237*.
25. Secure driveline (E) to hitch (D) with a strap or wire.

    NOTE:

    Ensure that the driveline is secured in such a way that when backing the carrier away from the header, the driveline clears the gearbox and its steering linkage.
26. If the transport system is installed, disconnect wiring harness (A) at light assembly (B).
27. Remove cable ties (E), clamp (D), and clips (C). Retain them for reinstallation.
28. Temporarily attach the harness to the carrier.

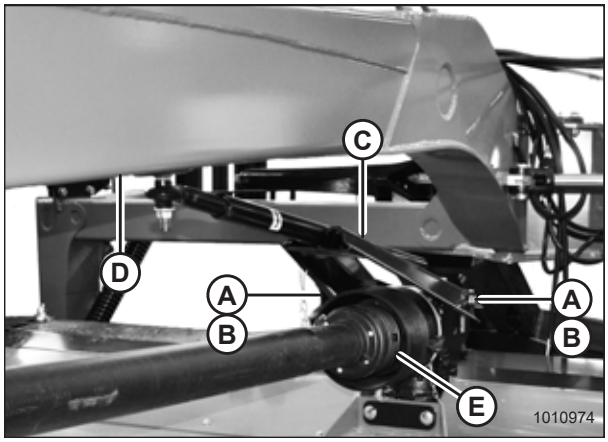


Figure 4.337: Aft Driveline and Hitch

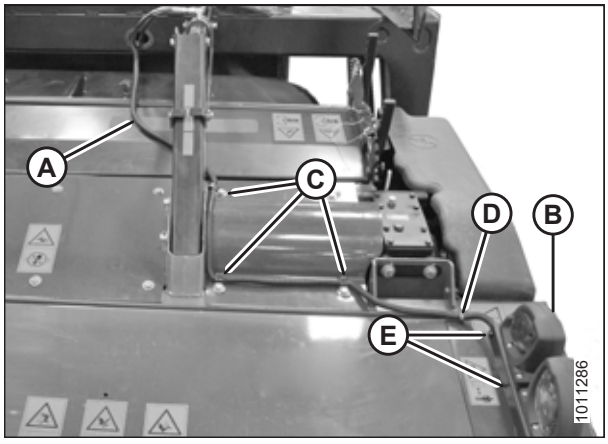


Figure 4.338: Electrical Harness

29. Start the tractor, and slowly maneuver carrier (A), away from header (B).

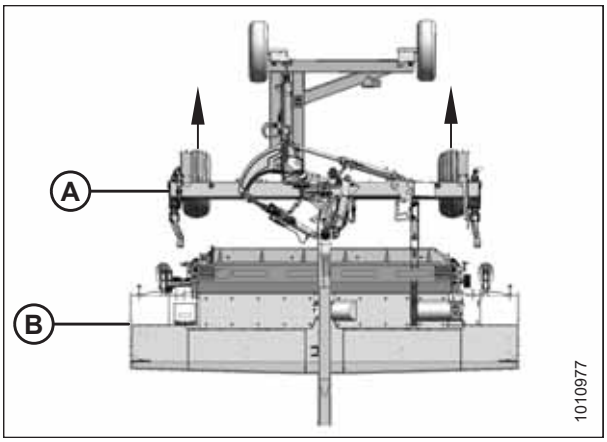


Figure 4.339: Carrier Removed from Header

Removing the Conditioner

CAUTION

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast while detaching the conditioner from the rotary disc pull-type.

1. Attach spreader bar (A) to a forklift or equivalent lifting device, and attach chains to lugs (B) on the conditioner. Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).

DANGER

To prevent the conditioner from falling backward, ensure lifting chains are secure and tight. Failure to do so may result in death or serious injury.

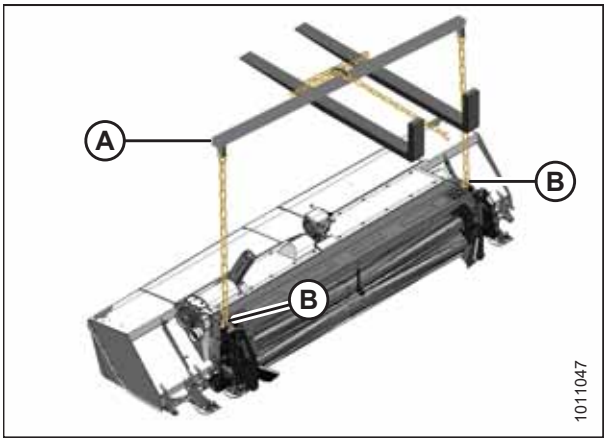


Figure 4.340: Spreader Bar

2. On the left side of the rotary disc pull-type, remove the conditioner drive belt as follows:
   a. Back off the jam nut and tensioner nut (B) on the belt idler until belts (A) are loose and can be removed.
   b. Remove the four belts.

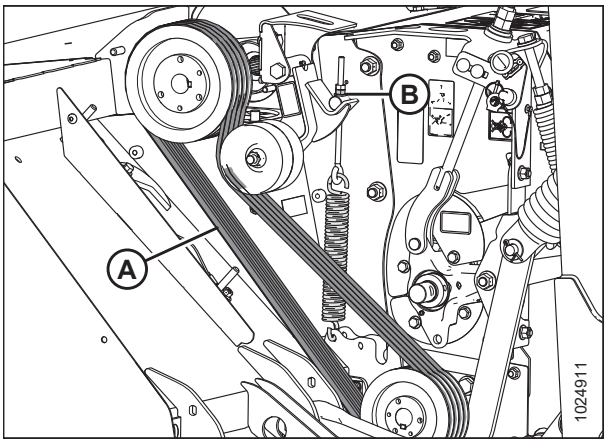


Figure 4.341: Conditioner Drive

3. **For finger conditioner:** Move forward baffle adjustment handle (A) to the fully lowered position, as shown.
4. **For finger conditioner:** Move rear baffle adjustment handle (B) to the fully raised position as shown.

   NOTE:

   Access to upper bolts (C) is easiest from the rear of the conditioner.

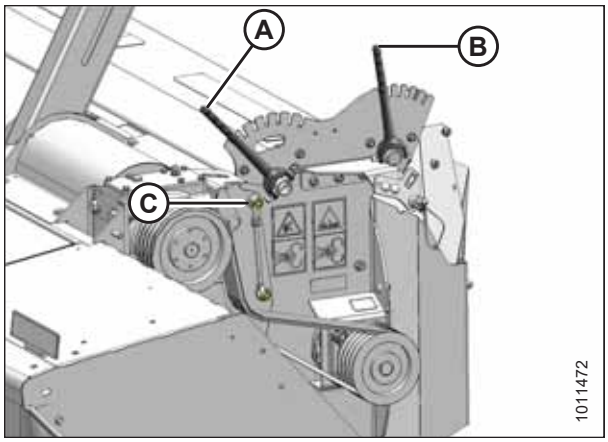


Figure 4.342: Left of Finger Conditioner

5. **For roll conditioners:** Move baffle adjustment handle (A) to the fully raised position as shown.

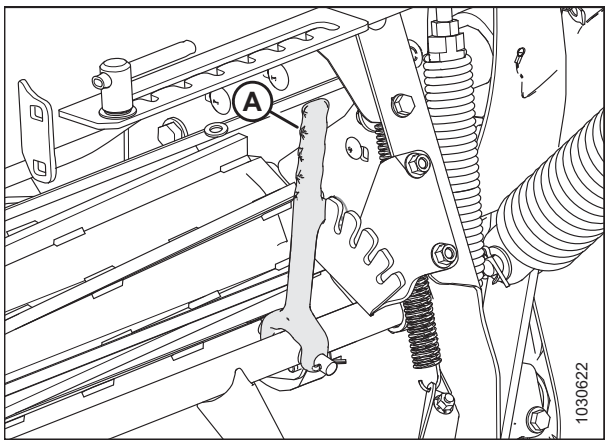


Figure 4.343: Roll Conditioner – Inboard Right Side

6. Lift conditioner slightly forward to take load off bolts (A) and to hold the conditioner after the bolts are removed. Retain hardware for reinstallation.

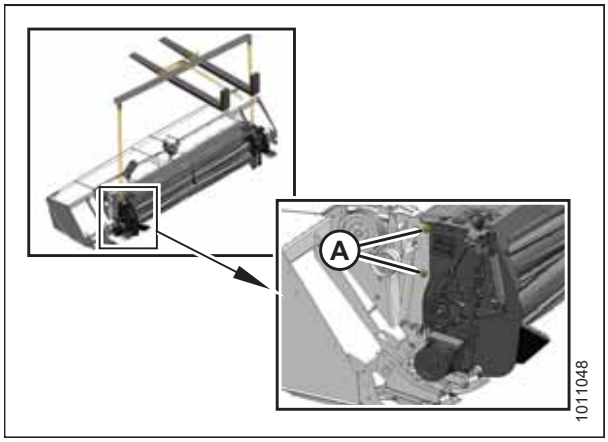


Figure 4.344: Left Side of Conditioner – Right Side is Similar

CAUTION

Stand clear when detaching the conditioner.

7. Remove two M16 hex head bolts (A) from each side of the conditioner.

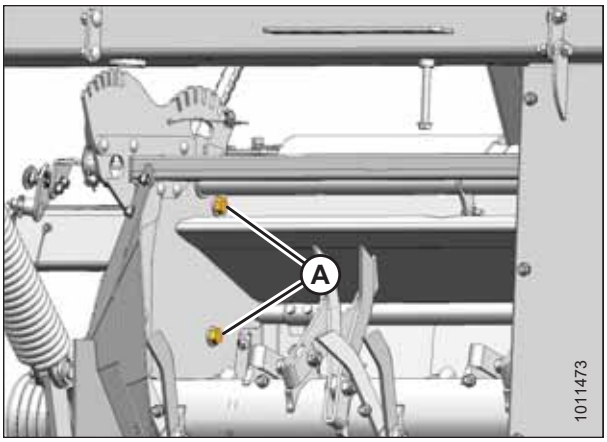


Figure 4.345: Left Side of Finger Conditioner – Right Side is Similar

CAUTION

Stand clear when detaching the conditioner.

8. Lift conditioner (A) off rotary disc pull-type header (B), and move the conditioner away from the work area.

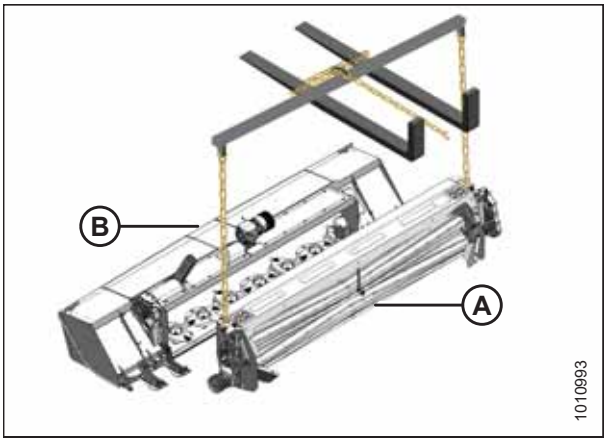


Figure 4.346: Conditioner Lift

NOTE:

If installing a finger conditioner or if deflector plates (A) need to be replaced, remove deflector plates (A). For instructions, refer to *Removing Cutterbar Deflectors, page 93*.

NOTE:

If you are replacing a roll conditioner, deflector plates (A) need to remain installed on the header. For instructions, proceed to *Installing the Conditioner, page 288*.

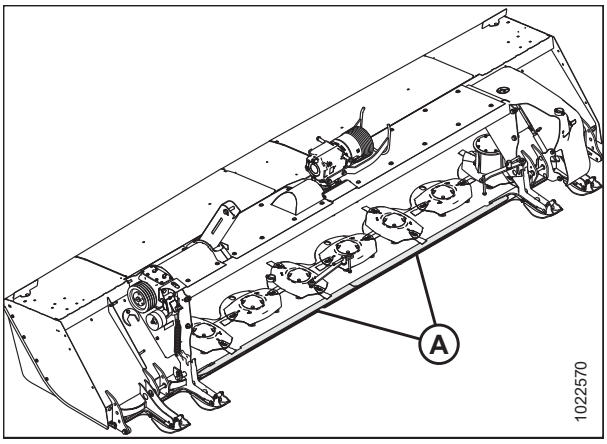


Figure 4.347: Deflector Location

Installing the Conditioner

CAUTION

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast while attaching the conditioner to the rotary disc pull-type.

Refer to the following notes before beginning the procedure:

NOTE:

If installing a finger conditioner, deflector plates (A) must be removed. For instructions, refer to *Removing Cutterbar Deflectors, page 93*.

NOTE:

Install deflector plates (A) when installing a roll conditioner and when replacing faulty or damaged deflector plates. For instructions, refer to *Installing Cutterbar Deflectors, page 94*.

NOTE:

If you are replacing a roll conditioner and deflector plates (A) are already installed on the machine, proceed to Step *1, page 288*.

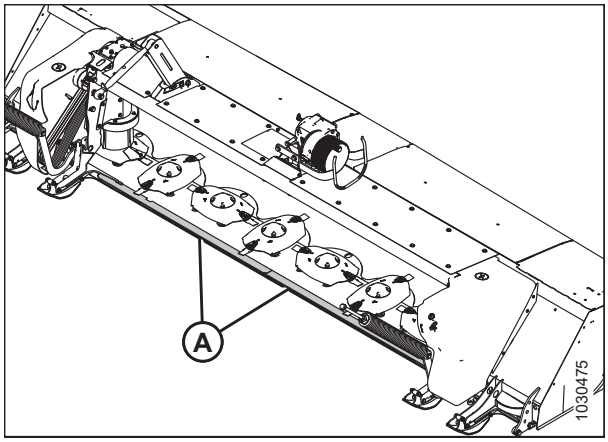


Figure 4.348: Deflector Plates

1. Attach spreader bar (A) to a forklift or equivalent lifting device and attach the chains to lugs (B) on the conditioner. Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).
2. Lift the conditioner and position it into the opening on the rotary disc pull-type.

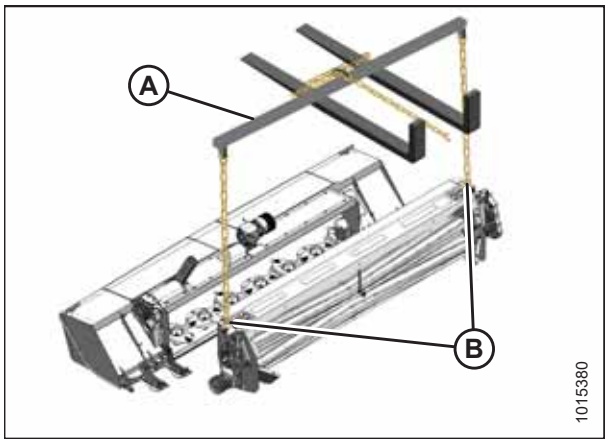


Figure 4.349: Conditioner Lift

3. Carefully align pin (A) at each end of the conditioner with lug (B) on the rotary disc pull-type, and lower the conditioner so that pins (A) engage lugs (B) on both ends of the rotary disc pull-type.

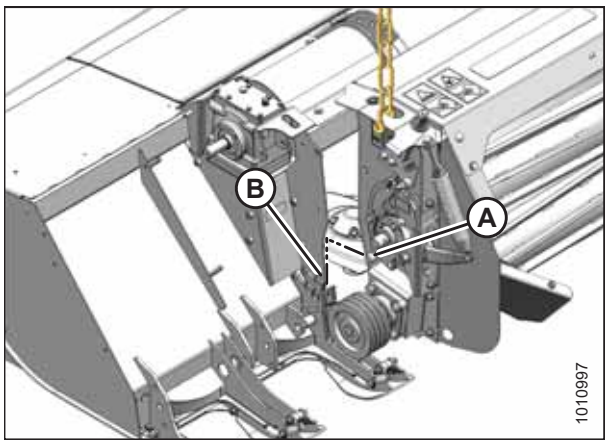


Figure 4.350: Conditioner Pins

4. Align the mounting holes and install four M16 x 40 hex head bolts (A) with the heads facing inboard (two per side). Secure with M16 center lock flanged nuts and torque to 170 Nm (126 lbf·ft).
5. Remove the lifting chains from the conditioner and move the lifting device clear of the work area.
6. If necessary, install the conditioner drive components. For instructions, refer to *Installing Conditioner Drive, page 289*.

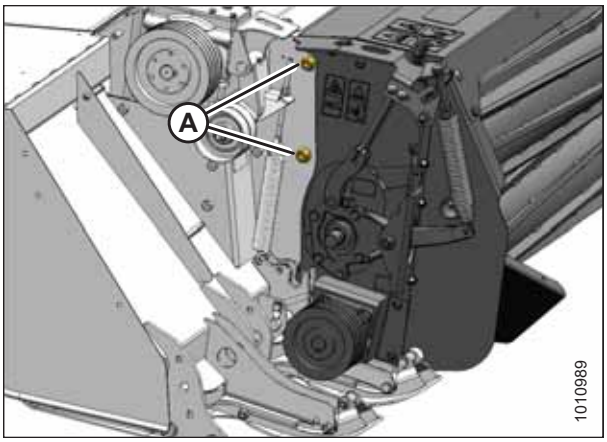


Figure 4.351: Left Side of Conditioner – Right Side Similar

Installing Conditioner Drive

This procedure describes the installation of conditioner drive components.

If installing a conditioner on the R1 Series Rotary Disc Pull-Type, refer to *Installing the Conditioner, page 288*.

1. Remove two screws (A) from cover (B), and remove the cover from the gearbox shaft. Retain parts for future use.

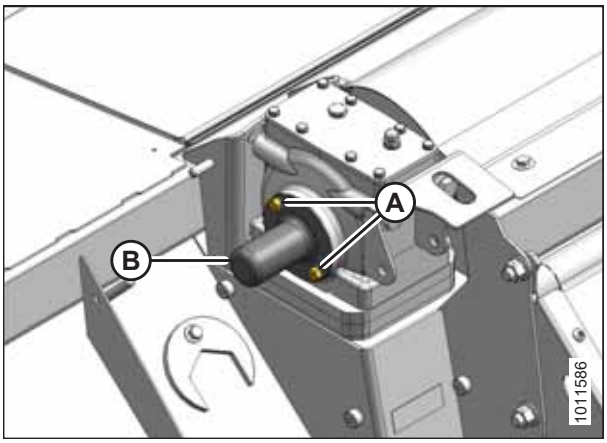


Figure 4.352: Shaft Cover

2. Assemble pulley (A) and bushing (B) onto the gearbox shaft with key (C).
3. Install three M10 hex head bolts (D) through bushing (B) into pulley (A).

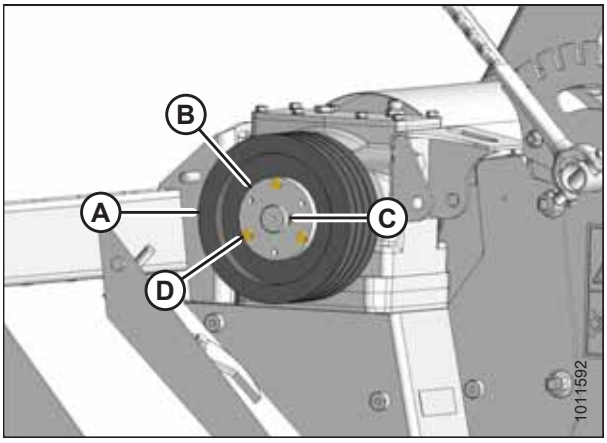


Figure 4.353: Drive Pulley

4. Tighten the three M10 bolts while maintaining 11 mm (7/16 in.) dimension (B) between pulley (A) and gearbox (C). Torque the bolts to 39 Nm (29 lbf·ft).

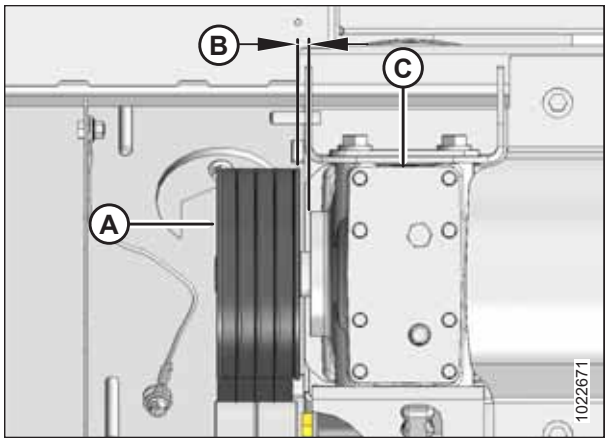


Figure 4.354: Drive Pulley

5. Position tensioner assembly (A) as shown, and secure with M16 x 120 bolt (B) and nut (C). Torque nut (C) to 51 Nm (38 lbf·ft).

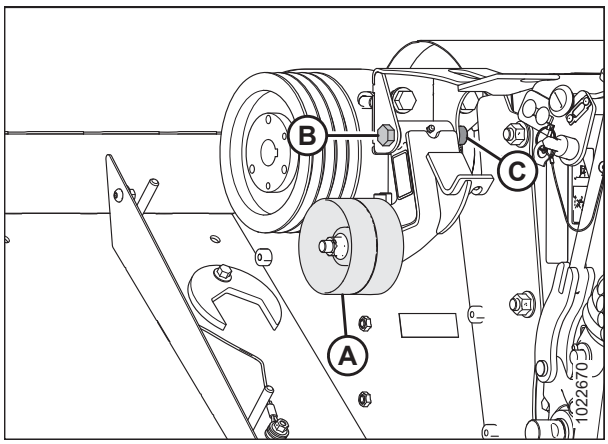


Figure 4.355: Tensioner

6. Install spring (A) into rear hole (B) for a finger conditioner, or forward hole (C) for a roll conditioner.
7. Install eyebolt (D) onto tensioner (E) and spring (A). Secure the eyebolt with hardened washer (F) and two M10 nuts (G).

   NOTE:

   Install the conditioner drive belt after reattaching the header to the carrier.

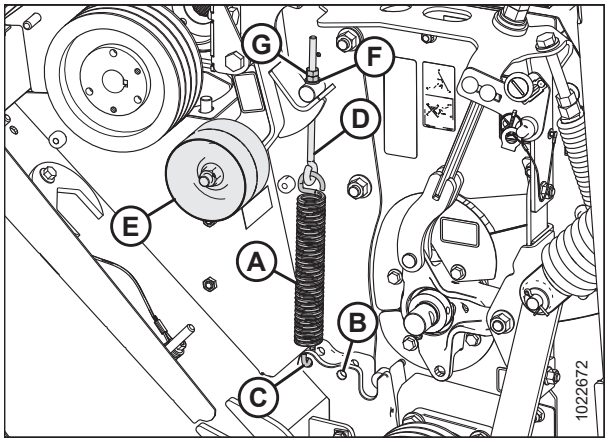


Figure 4.356: Tensioner

Assembling Header and Carrier

The carrier must be attached to a tractor for the header and carrier to be assembled.

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. Start the tractor and maneuver carrier (A) directly behind header (B) so the carrier legs line up with the header attachment points.
2. Drive slowly forward to engage carrier legs (C) into the header attachment brackets.

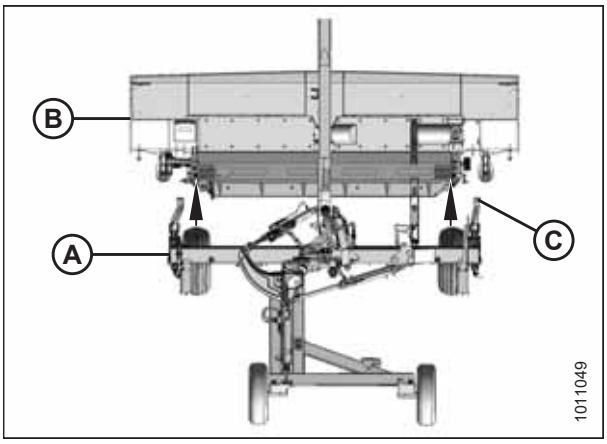


Figure 4.357: Carrier Aligned with Header

3. Inspect left carrier leg (A) for excessive gap between the inner steel sleeve of the bushing and the header brackets. If there is a gap, install washer (1.2 mm [0.047 in.] thick) on both sides of the carrier leg to minimize the gap.
4. Align left carrier leg (A) with header brackets, and install M20 x 40 bolt (B) with hardened washer (C).
5. Install three hardened washers (D) and flanged lock nut (E) on bolt (B).
6. Torque bolt (B) to 339 Nm (250 lbf·ft).

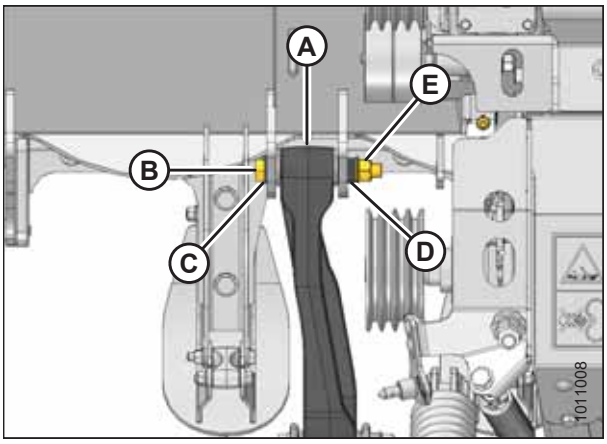


Figure 4.358: Left Leg

7. Inspect carrier leg (A) for excess gap between the inner steel sleeve of the bushing and the header brackets. If there is a gap, install a washer (1.2 mm [0.047 in.] thick) to both sides of the carrier leg to minimize the gap.
8. Align right carrier leg (A) with the header brackets, and install M20 x 40 bolt (B) with hardened washer (C).
9. Install hardened washer (D), spacer (E), float tension arm (F), and flanged lock nut (G) on bolt (B).
10. Torque bolt (B) to 339 Nm (250 lbf·ft).

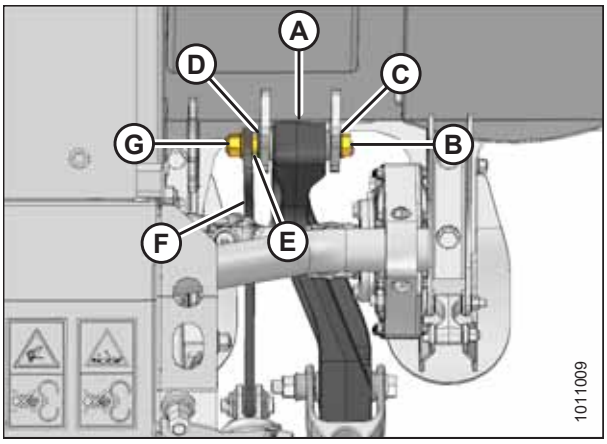


Figure 4.359: Right Leg

11. Undo strapping or wire supporting driveline to hitch (D), and connect driveline (E) to the header swivel gearbox. For instructions, refer to *Installing Clutch Driveline, page 239*.
12. Remove hex head bolts (A) and spacers (B) from the gearbox.
13. Undo strapping or wire supporting the steering arm to the hitch, and position steering arm (C) on the gearbox.
14. Secure the steering arm to the gearbox with spacers (B) and hex head bolts (A). Apply high-strength threadlocker (Loctite® 262 or equivalent) to the front holes and torque bolts to 203 Nm (150 lbf·ft).

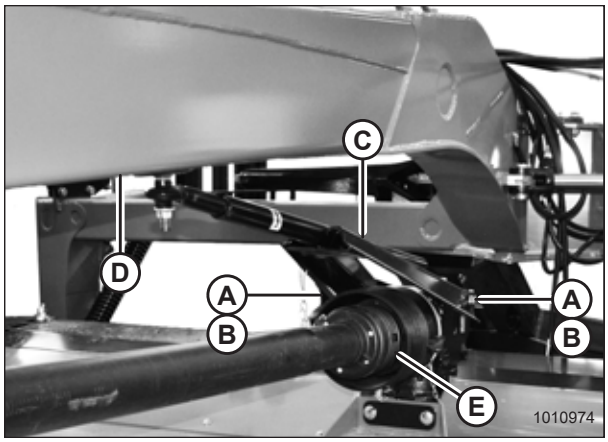


Figure 4.360: Aft Driveline and Steering Arm

15. **If equipped with mechanical center-link:** Undo the strapping or wire securing center-link (B) to the carrier frame.
16. **If equipped with mechanical center-link:** Remove the pins and hardware from anchor (C).
17. **If equipped with mechanical center-link:** Attach center-link (B) to anchor (C) with clevis pin (A) and secure with a cotter pin.

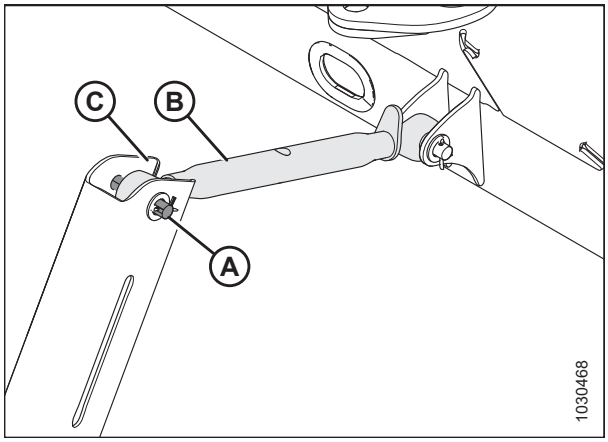


Figure 4.361: Mechanical Center-Link

18. **If equipped with hydraulic center-link:** Undo the strapping or wire securing center-link (B) and indicator (D) to the carrier frame.
19. **If equipped with hydraulic center-link:** Remove the pins and hardware from anchor (C).
20. **If equipped with hydraulic center-link:** Attach center-link (B) and indicator (D) to anchor (C) with clevis pin (A) and secure with a cotter pin.

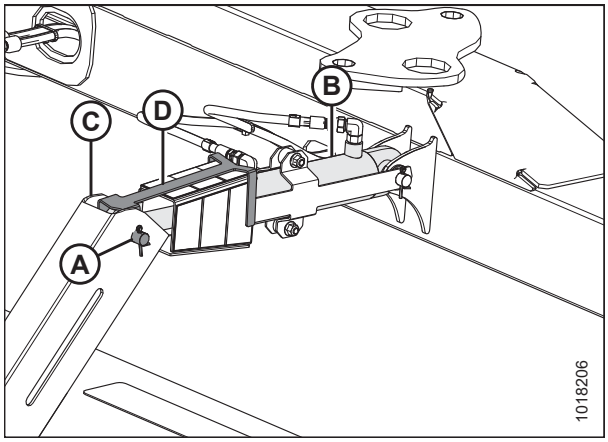


Figure 4.362: Hydraulic Center-Link and Indicator Links

NOTE:

Ensure proper pulley configuration installation—the large pulley is installed onto the gearbox for both roll and finger conditioners.

21. Install conditioner drive belts (A) onto the pulleys.
22. Check that the tensioner spring is installed at the correct location:
    - Hole (D) for a roll conditioner
    - Hole (E) for a finger conditioner
23. Tighten idler tensioner nut (C) until spring length (B) measures 366 mm (14 3/8 in.).
24. Tighten the jam nut.
25. Replace the driveshields. For instructions, refer to *Installing Driveshields, page 221*.
26. If a transport system is installed, reconnect electrical harness (A) to lights (B), and secure the harness to the shielding using existing clamps (C) and (D).

    NOTE:

    R113 PT: Harness for rotary disc pull-type is secured with one plastic clamp (D).

    NOTE:

    R116 PT: Harness for rotary disc pull-type is secured with two plastic clamps.
27. Secure the harness to the light bracket with cable ties (E).
28. Tighten four M10 hex head bolts (A) and flat washers. Torque to 29 Nm (21 lbf·ft).
29. Check the float settings. Refer to *Adjusting Float, page 84* for float adjustment instructions.

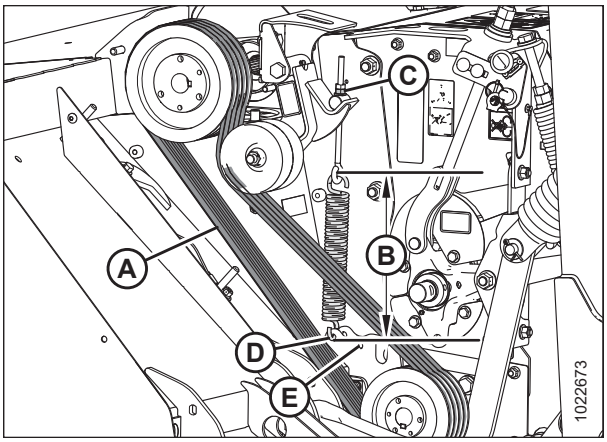


Figure 4.363: Conditioner Drive

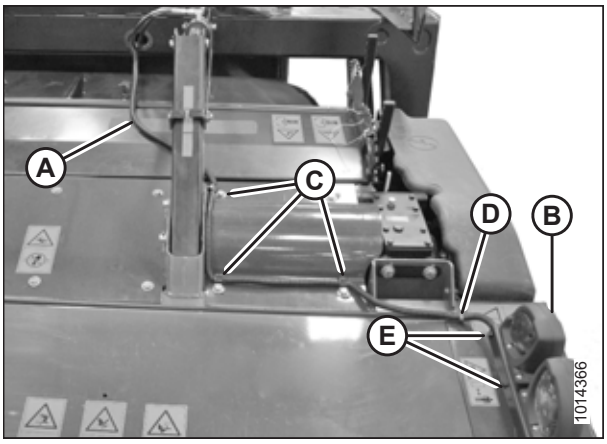


Figure 4.364: Electrical Harness

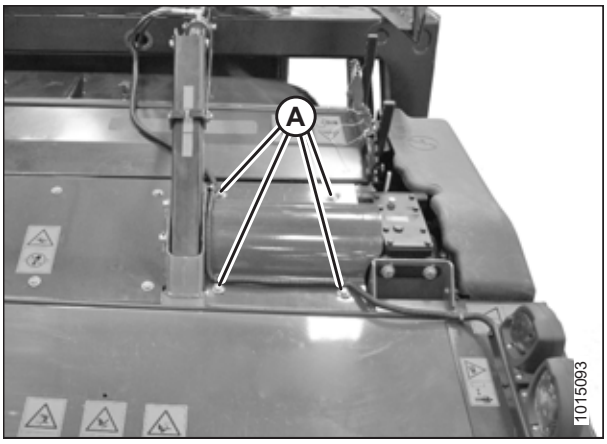


Figure 4.365: Electrical Harness

4.9 Replacing Shield – No Conditioner

4.9.1 Removing Discharge Shield – No Conditioner

Follow these steps to remove the shielding installed on a rotary disc pull-type configured without a conditioner:

1. Raise the rotary disc pull-type fully and extend the center-link to maximize the space between shield (A) and carrier frame (B).

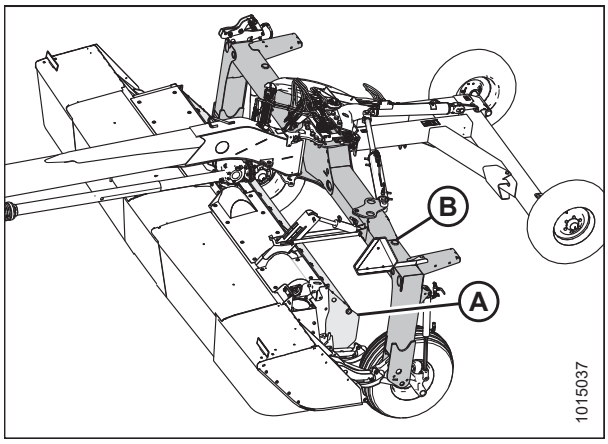


Figure 4.366: Rotary Disc Pull-Type with Transport

2. Close lift cylinder lock-out valves (A) on both sides of the rotary disc pull-type. Valve handles should be in the closed position (90° angle to the hose).

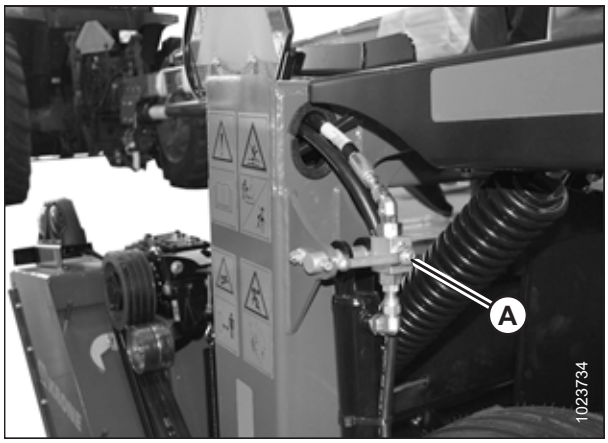


Figure 4.367: Lift Cylinder Lock-Out Valves

3. Remove four M16 hex head bolts (A), nuts, and flat washers securing shield (B) to panel (C) on the rotary disc pull-type.

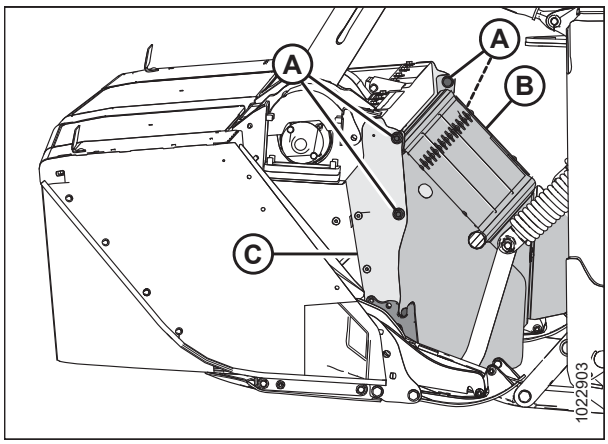


Figure 4.368: Header – View from Left

4. Lift shield (A) until pins (B) (one on each side) disengage from the slots in support (C) and from the shield on panel (D).

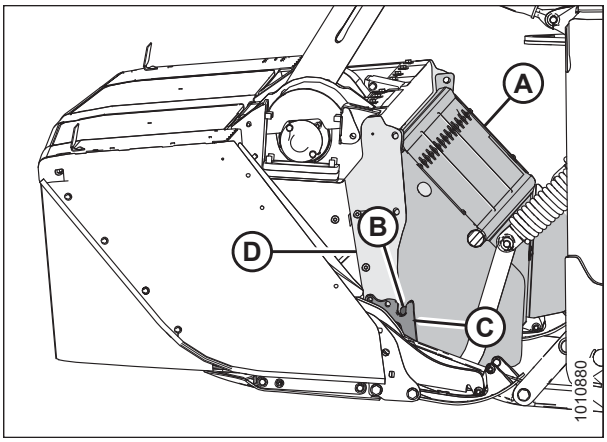


Figure 4.369: Header – View from Left

5. Rotate shield (A) 90° and move it away from the carrier frame.

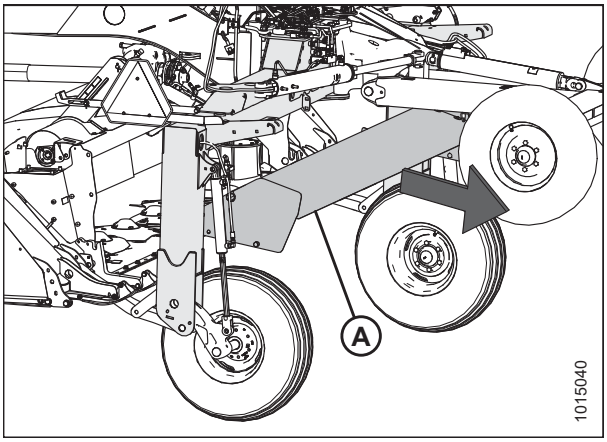


Figure 4.370: Shield Rotated

4.9.2 Installing Discharge Shield – No Conditioner

Follow these steps to install the shielding on a rotary disc pull-type configured without a conditioner:

1. Raise the rotary disc pull-type fully and extend the center-link to maximize the space between field wheels (A) and carrier frame (B).

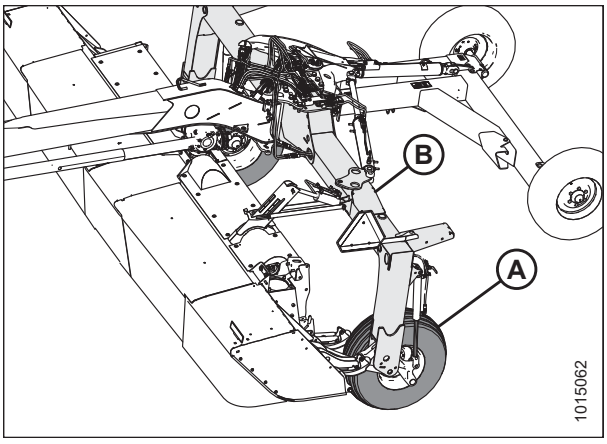


Figure 4.371: Rotary Disc Pull-Type with Transport

2. Close lift cylinder lock-out valves (A) on both sides of the rotary disc pull-type. Valve handles should be in the closed position (90° angle to the hose).

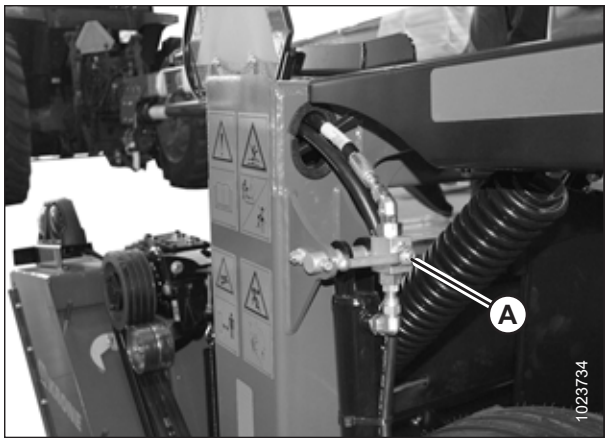


Figure 4.372: Lift Cylinder Lock-Out Valves – Closed Position

3. Rotate shield (A) and pass it between the field wheels and the carrier frame toward the rotary disc pull-type.

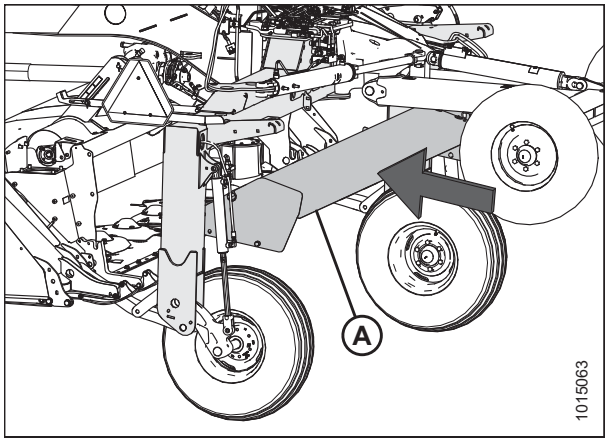


Figure 4.373: Shield Rotated

4. Position shield (A) so that pins (B) (one on each side) engage the slots in cutterbar support (C) and the bolt holes align with panel (D).

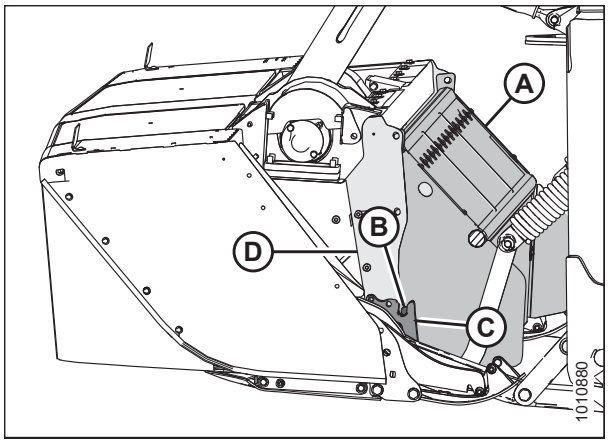


Figure 4.374: Left Side of Header – Right Opposite

5. Install four M16 hex head bolts (A), nuts, and flat washers to secure shield (B) to panel (C). Ensure the bolt heads face inboard.

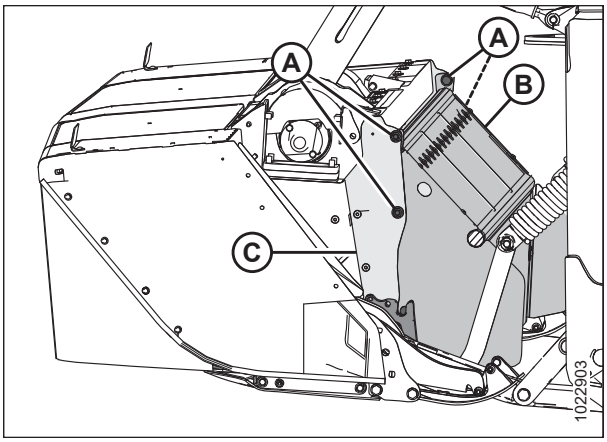


Figure 4.375: Left Side of Header – Right Opposite

6. Open lift cylinder lock-out valves (A) on both sides of the rotary disc pull-type. Valve handles should be in the open position (in line with the hose).

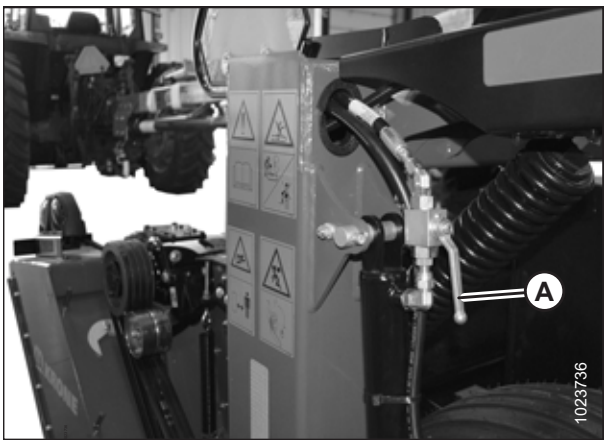


Figure 4.376: Lift Cylinder Lock-Out Valves – Open Position

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 pull-type for clean crop dividing and cutterbar entry in tall crops. The kit includes left and right dividers and attachment hardware.

MD #B5800

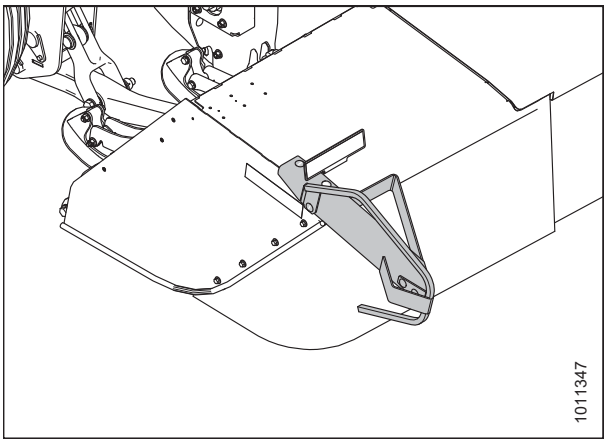


Figure 5.1: Tall Crop Divider — Right Shown, Left Opposite

5.1.2 Hydraulic Center-Link Kit

The Hydraulic Center-Link kit replaces the standard mechanical link and uses a hydraulic cylinder and separate tractor hydraulic circuit to adjust the rotary disc pull-type angle. The kit includes installation instructions.

MD #B5810

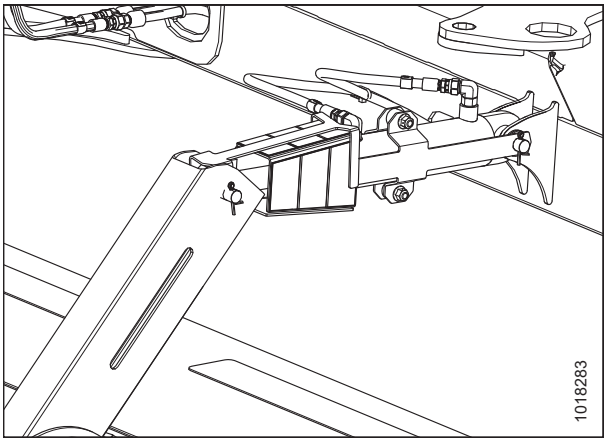


Figure 5.2: Hydraulic Center-Link

5.1.3 Driveline Extension Kit

Some tractor models using a two-point hitch may require a longer primary driveline than the factory-installed driveline on R1 Series Rotary Disc Pull-Types. The Driveline Extension kit can be used to extend the primary driveline length by an additional 152 mm (6 in.).

- B6555 – Full shaft for 1 3/8 in. tractor 1000 RPM PTO Extended Length
- B6556 – Full shaft for 1 3/4 in. tractor 1000 RPM PTO Extended Length

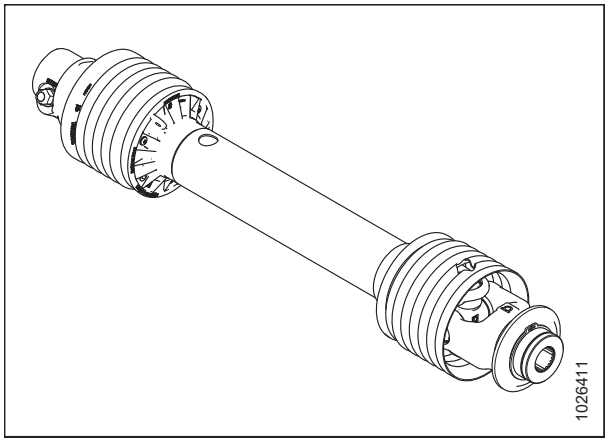


Figure 5.3: Driveline (B6555 Shown, B6556 Similar)

5.1.4 Tractor Utility Hitch Adapter

The Tractor Utility Hitch Adapter allows the rotary disc pull-type to connect to a tractor drawbar regardless of installed hitch option (Tractor Two-Point Hitch Adapter or Tractor Drawbar Hitch Adapter). The kit includes the transport hitch, attachment hardware, and safety chain.

MD #B5802

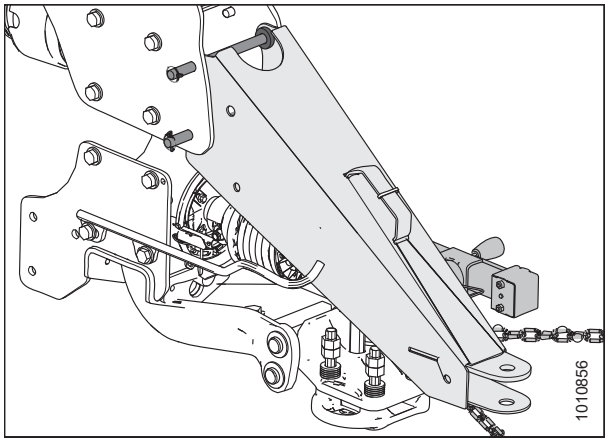


Figure 5.4: Tractor Utility Hitch Adapter

5.1.5 Transport System

The transport system allows the rotary disc pull-type to be towed on roadways while remaining within the legal width restrictions on most roads and highways.

The kit is available as a Dealer-installed option and includes all hardware and installation instructions.

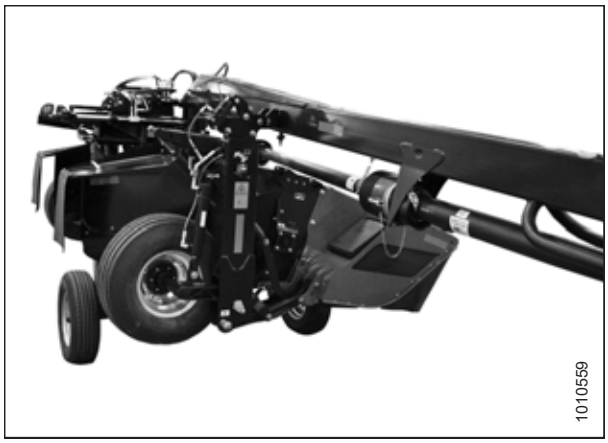


Figure 5.5: Transport System

5.1.6 Quick Change Blade Kit

The Quick Change Blade kit allows you to change blades quickly using a blade change tool that separates the disc assembly.

Kits include all hardware and installation instructions. Available for factory-configured R1 PT Series machines with quick-change-ready discs.

- 10 Disc Kit – MD #257135
- 8 Disc Kit – MD #257136

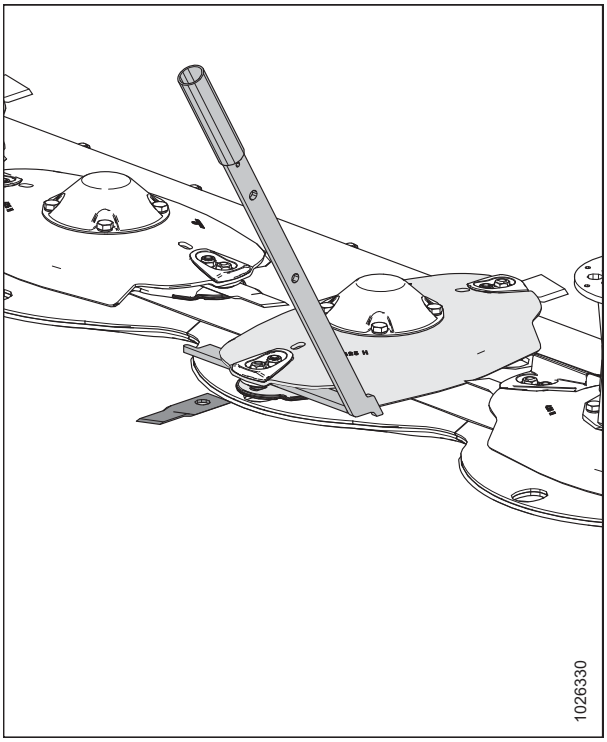


Figure 5.6: Quick Change Blade Kit

5.2 Replacement Conditioners

The following kits are available through your MacDon Dealer. The Dealer will require the bundle number for pricing and availability.

5.2.1 Polyurethane Intermeshing Roller

Polyurethane rolls are better suited for crushing stems while providing reduced crimping and are recommended for alfalfa, clover, legumes, and similar crops. A replacement polyurethane intermeshing roller conditioner can be ordered for the R1 Series Rotary Disc Pull-Type.

MD #B5754

5.2.2 Steel Intermeshing Roller

Steel conditioner rolls are suited to a wide range of crops (including alfalfa and thicker-stemmed cane-type crops). A replacement steel intermeshing roller conditioner can be ordered for the R1 Series Rotary Disc Pull-Type.

MD #B5755

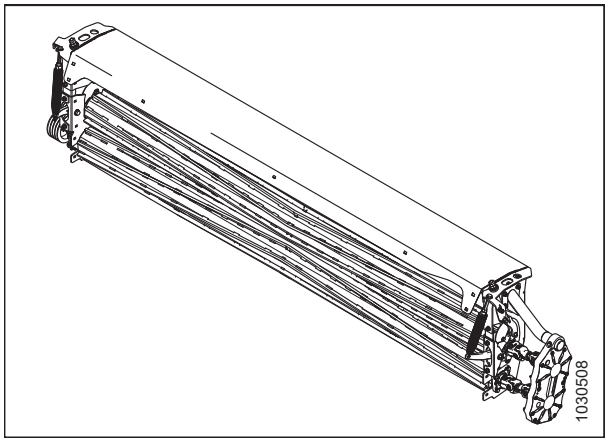


Figure 5.7: Steel Intermeshing Roller

5.2.3 Finger Conditioner

Finger conditioners use rotating fingers to carry crop over the drum and rub against an adjustable conditioning hood. The rubbing action removes the plant's waxy layer and promotes moisture evaporation. Finger conditioners work well in legumes and most all-grass crops, especially alfalfa. Finger conditioners are not recommended for thick-stemmed or cane crops such as Sudan or Sudex, or for crops taller than 1.5 m (5 ft.).

A replacement finger conditioner can be ordered for the R1 Series Rotary Disc Pull-Type.

MD #B5753

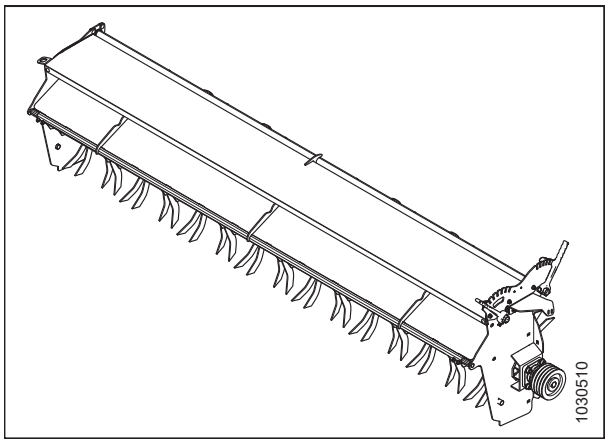


Figure 5.8: Finger Conditioner

Chapter 6: Troubleshooting

6.1 Troubleshooting Rotary Disc Pull-Type Performance

Problem	Solution	Refer to
Symptom: Cutterbar plugging		
Dull, bent, or badly worn blades	Replace blades.	*4.4.7 Maintaining Disc blades, page 167*
Build-up of dirt between rock guards	Decrease rotary disc pull-type angle and increase flotation. In some conditions, it may be necessary to carry rotary disc pull-type slightly with lower skid shoes.	*3.15.2 Cutting Height, page 87*
Conditioner drive belt slipping	Adjust conditioner drive belt tension.	*4.5.10 Conditioner Drive Belt, page 254*
Symptom: Ragged or uneven cutting of crop		
Float too light, causing bouncing	Adjust to heavier float setting.	*3.15.1 Float, page 84*
Ground speed too slow	Increase ground speed.	*3.15.4 Ground Speed, page 91*
Downed crop	Adjust rotary disc pull-type angle or install blade-lowering kit on rotary disc pull-type to cut closer to ground.	*3.15.3 Adjusting Cutterbar Angle, page 90*
Symptom: Strips of uncut crop left on field		
Bent or dull disc blades	Replace blades.	*4.4.7 Maintaining Disc blades, page 167*
Build-up of dirt between rock guards	Decrease rotary disc pull-type angle and increase flotation.	*3.15.3 Adjusting Cutterbar Angle, page 90*
Build-up of dirt between rock guards	Decrease rotary disc pull-type angle and increase flotation.	*3.15.1 Float, page 84*
Ground speed too slow	Increase ground speed.	*3.15.4 Ground Speed, page 91*
Foreign object on cutterbar	Disengage rotary disc pull-type and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*
Symptom: Conditioner rolls plugging		
Ground speed too fast	Reduce ground speed.	*3.15.4 Ground Speed, page 91*
Roll gap too large for proper feeding	Decrease roll gap.	*3.16.1 Roll Gap, page 97*
Roll gap too small in thick-stemmed cane-type crops	Increase roll gap.	*3.16.1 Roll Gap, page 97*
Baffle set too low	Raise baffle.	*3.17.1 Internal Intensity Baffle, page 107*

Problem	Solution	Refer to
Foreign object between rolls	Disengage rotary disc pull-type and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*
Cutting height too low	Decrease rotary disc pull-type angle to raise cutting height.	*3.15.3 Adjusting Cutterbar Angle, page 90*
Backing into windrow	Raise rotary disc pull-type before backing up.	*3.11 Raising and Lowering the Rotary Disc Pull-Type, page 60*
Rolls improperly timed	Adjust roll timing.	*3.16.3 Roll Timing, page 101*
Symptom: Uneven formation and bunching of windrow		
Rear deflector bypassing or dragging crop	Adjust rear deflector for proper crop control. Raise baffle 1 notch.	*3.15.5 Cutterbar Deflectors, page 93*
Forming shields improperly adjusted	Adjust forming shields.	• *3.16.4 Adjusting Forming Shields – Roll Conditioner, page 104* • *3.17.3 Forming Shields – Finger Conditioner, page 111*
Roll gap too large	Adjust roll gap.	*3.16.1 Roll Gap, page 97*
Symptom: Cutting height varies from one side to the other		
Float not properly balanced	Adjust rotary disc pull-type float.	*3.15.1 Float, page 84*
Symptom: Not cutting short enough in down crop		
Broken, bent, or dull blades	Replace blades, or turn blades over.	*4.4.7 Maintaining Disc blades, page 167*
Ground speed too fast	Reduce ground speed.	*3.15.4 Ground Speed, page 91*
Cutting height too high	Adjust to steeper rotary disc pull-type angle in order to lower cutting height if field conditions allow.	*3.15.3 Adjusting Cutterbar Angle, page 90*
Symptom: Material being pulled out by roots when cutting, tall crop leaning into machine		
Crop in conditioner rolls before crop is cut	Increase roll gap.	*3.16.1 Roll Gap, page 97*
Symptom: Damaged leaves and broken stems		
Insufficient roll gap	Adjust roll spacing.	*3.16.1 Roll Gap, page 97*
Roll timing off	Check roll timing and adjust if necessary.	*3.16.3 Roll Timing, page 101*
Symptom: Slow crop drying		
Rolls not crimping crop sufficiently	Decrease roll gap.	*3.16.1 Roll Gap, page 97*
Crop is bunched in windrow	Adjust forming shields/baffle.	• *3.16.4 Adjusting Forming Shields – Roll Conditioner, page 104* • *3.17.3 Forming Shields – Finger Conditioner, page 111* • *3.17.1 Internal Intensity Baffle, page 107*

Problem	Solution	Refer to
Symptom: Excessive drying or bleaching of crop		
Excessive crimping	Increase roll gap.	*3.16.1 Roll Gap, page 97*
Crop is spread too wide in windrow	Adjust forming shields.	• *3.16.4 Adjusting Forming Shields – Roll Conditioner, page 104* • *3.17.3 Forming Shields – Finger Conditioner, page 111*
Symptom: Plugging behind end drums		
Ground speed too slow	Increase ground speed.	*3.15.4 Ground Speed, page 91*
Symptom: Bunching or poorly formed windrows		
Forming shields not properly adjusted	Adjust forming shields.	• *3.16.4 Adjusting Forming Shields – Roll Conditioner, page 104* • *3.17.3 Forming Shields – Finger Conditioner, page 111*
Symptom: Windrow too wide (finger conditioner)		
Crop not throwing far enough	Adjust internal intensity baffle, or adjust finger rotor speed.	• *3.17.1 Internal Intensity Baffle, page 107* • *3.17.2 Finger Rotor Speed, page 108*

6.2 Troubleshooting Mechanical Issues

Problem	Solution	Refer to
Symptom: Excessive noise		
Bent disc blade	Replace blade.	*4.4.7 Maintaining Disc blades, page 167*
Conditioner roll timing off	Check roll timing, and adjust if necessary.	*3.16.3 Roll Timing, page 101*
Conditioner roll gap too small	Check roll gap, and adjust if necessary.	*3.16.1 Roll Gap, page 97*
Symptom: Excessive vibration or noise in rotary disc pull-type		
Mud deposits on conditioner rolls	Clean rolls.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*
Conditioner rolls contacting each other	Increase roll gap.	*3.16.1 Roll Gap, page 97*
Conditioner rolls contacting each other	Check roll timing.	*3.16.3 Roll Timing, page 101*
Symptom: Excessive heat in cutterbar		
Too much oil in cutterbar	Drain oil, and refill with specified amount.	*4.4.3 Lubricating Cutterbar, page 146*
Symptom: Frequent blade damage		
Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*
Material wrapped around spindle	Remove disc and remove material.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*
Cutting too low in rocky field conditions	Decrease rotary disc pull-type angle.	*3.15.3 Adjusting Cutterbar Angle, page 90*
Cutting too low in rocky field conditions	Increase flotation.	*3.15.1 Float, page 84*
Float set too heavy	Increase flotation.	*3.15.1 Float, page 84*
Ground speed too high in rocky field conditions. At high ground speed, rotary disc pull-type tends to dig rocks from ground instead of floating over them.	Reduce ground speed.	*3.15.4 Ground Speed, page 91*
Blade incorrectly mounted	Check all blade mounting hardware, and ensure blades move freely.	*4.4.7 Maintaining Disc blades, page 167*
Symptom: Excessive wear of cutting components		
Angle too steep	Reduce rotary disc pull-type angle.	*3.15.3 Adjusting Cutterbar Angle, page 90*
Crop residue and dirt deposits on cutterbar	Clean cutterbar.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*
Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*

Problem	Solution	Refer to
Symptom: Breakage of conditioner drive belt		
Improper belt tension	Adjust conditioner drive belt tension.	*4.5.10 Conditioner Drive Belt, page 254*
Belt not in proper groove in pulley	Move belt to proper groove.	*4.5.10 Conditioner Drive Belt, page 254*
Foreign object between rolls	Disengage rotary disc pull-type and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*
Belt pulleys and idlers misaligned	Align pulleys and idler.	*4.5.10 Conditioner Drive Belt, page 254*
Symptom: Machine pulling to one side		
Rotary disc pull-type dragging on one end and pulling to that side	Adjust rotary disc pull-type flotation on both ends.	*3.15.1 Float, page 84*
Low tire pressure on one side	Check and correct tire pressure (207 kPa [30 psi]).	*4.5.14 Wheels and Tires, page 270*
Symptom: Disc does not start when engaging power take-off (PTO)		
Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	*3.20 Unplugging the Rotary Disc Pull-Type, page 116*
Primary driveline not connected	Connect driveline.	*4.5.4 Primary Driveline, page 226*
Symptom: Transport control box is not working and transport function will not activate		
Control box's 10 amp fuse has failed	Ensure all electrical connections in the control box are secure. If necessary, replace the fuse in the control box.	Contact your Dealer

Chapter 7: Reference

7.1 Torque Specifications

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

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

Jam nuts

When applying torque to finished jam nuts, multiply the torque applied to regular nuts by f=0.65.

Self-tapping screws

Standard torque is to be used (**NOT** to be used on critical or structurally important joints).

7.1.1 SAE Bolt Torque Specifications

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

Table 7.1 SAE Grade 5 Bolt and Grade 5 Free Spinning Nut

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

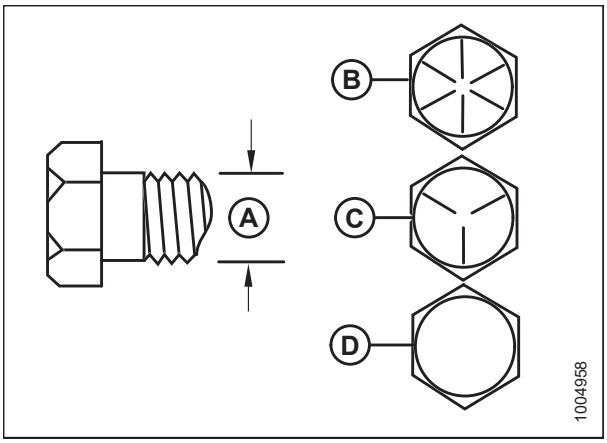


Figure 7.1: Bolt Grades

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

Table 7.2 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

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

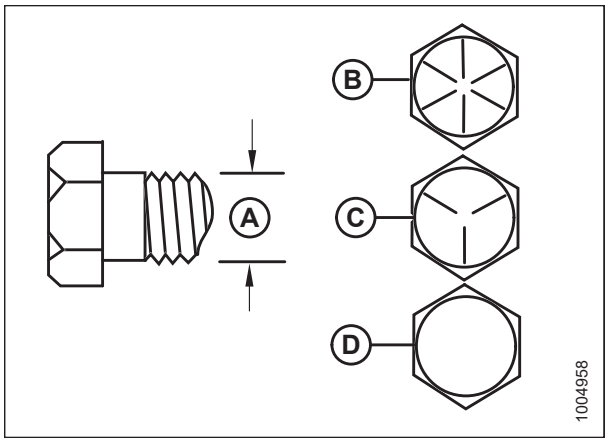


Figure 7.2: Bolt Grades

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

Table 7.3 SAE Grade 8 Bolt and Grade G Distorted Thread Nut

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

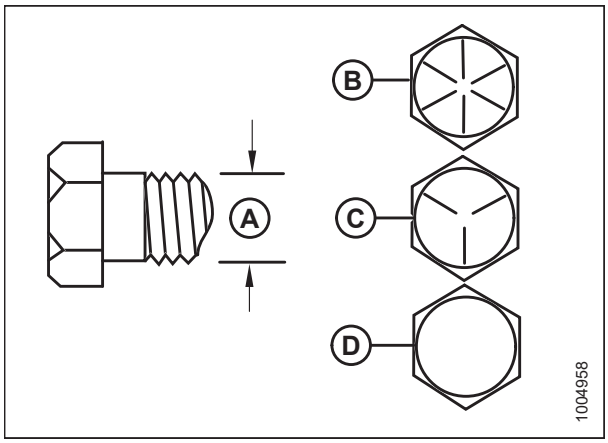


Figure 7.3: Bolt Grades

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

Table 7.4 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

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

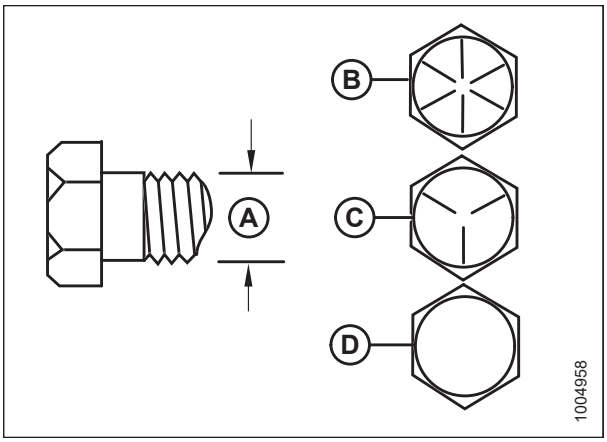


Figure 7.4: Bolt Grades

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

7.1.2 Metric Bolt Specifications

Table 7.5 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

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

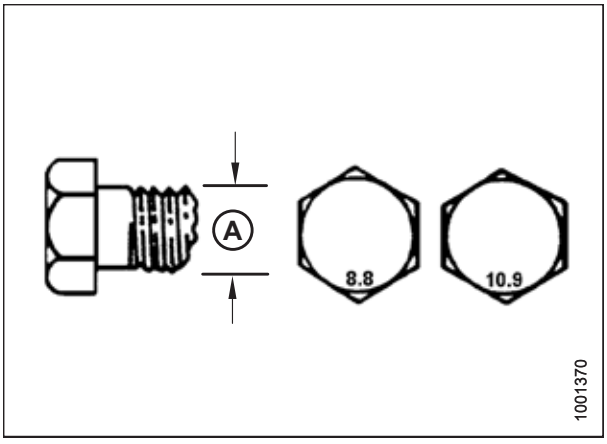


Figure 7.5: Bolt Grades

Table 7.6 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

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

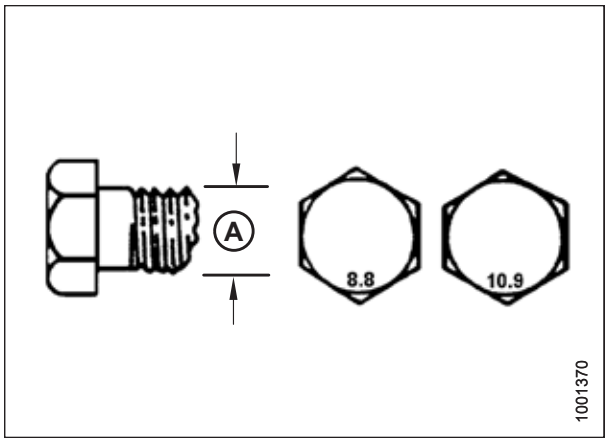


Figure 7.6: Bolt Grades

Table 7.7 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

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

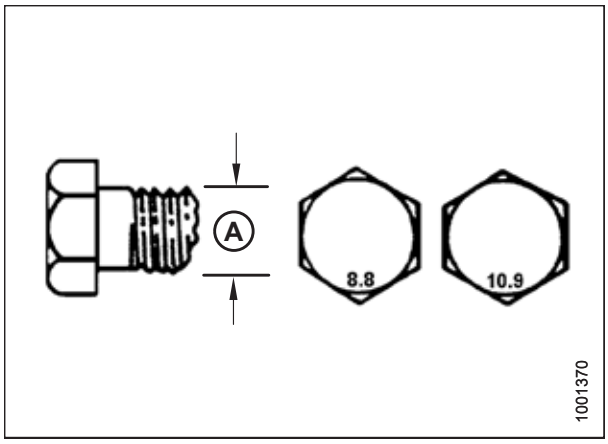


Figure 7.7: Bolt Grades

Table 7.8 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

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

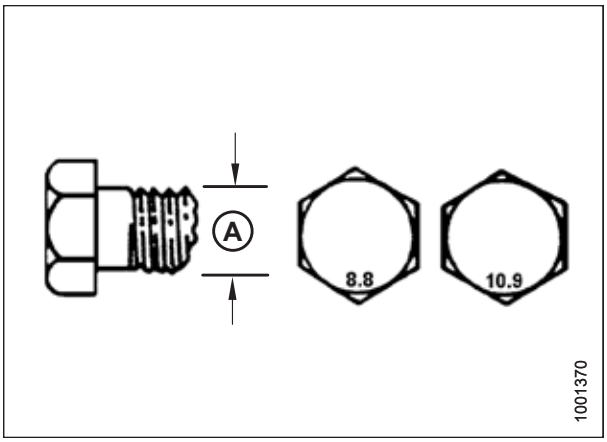


Figure 7.8: Bolt Grades

7.1.3 Metric Bolt Specifications Bolting into Cast Aluminum

Table 7.9 Metric Bolt Bolting into Cast Aluminum

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

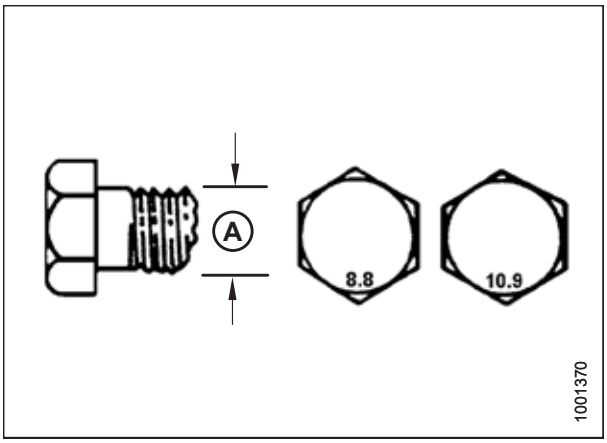


Figure 7.9: Bolt Grades

7.1.4 Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between flared surfaces.
3. Torque fitting nut (E) to specified number of flats from finger tight (FFFT) or to a given torque value in Table *7.10, page 314*.
4. Use two wrenches to prevent fitting (D) from rotating. Place one wrench on fitting body (D), and tighten nut (E) with other wrench to torque shown.
5. Assess final condition of connection.

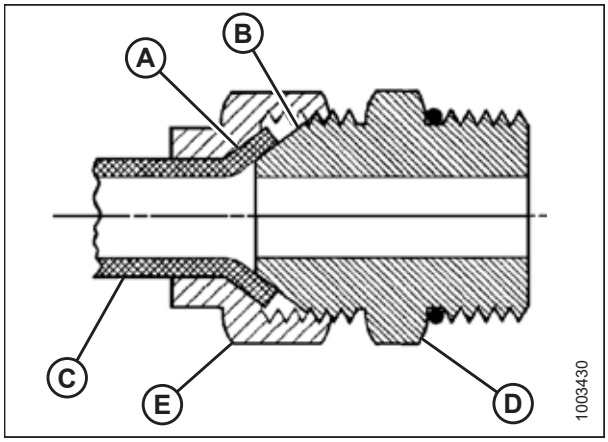


Figure 7.10: Hydraulic Fitting

Table 7.10 Flare-Type Hydraulic Tube Fittings

SAE Dash Size	Thread Size (in.)	Torque Value[14]		Flats from Finger Tight (FFFT)	
		Nm	lbf·ft	Tube	Swivel Nut or Hose
-2	5/16–24	4–5	3–4	—	—
-3	3/8–24	7–8	5–6	—	—
-4	7/16–20	18–19	13–14	2 1/2	2
-5	1/2–20	19–21	14–15	2	2
-6	9/16–18	30–33	22–24	2	1 1/2
-8	3/4–16	57–63	42–46	2	1 1/2
-10	7/8–14	81–89	60–66	1 1/2	1 1/2
-12	1 1/16–12	113–124	83–91	1 1/2	1 1/4
-14	1 3/16–12	136–149	100–110	1 1/2	1 1/4
-16	1 5/16–12	160–176	118–130	1 1/2	1
-20	1 5/8–12	228–250	168–184	1	1
-24	1 7/8–12	264–291	195–215	1	1
-32	2 1/2–12	359–395	265–291	1	1
-40	3–12	—	—	1	1

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

7.1.5 O-Ring Boss Hydraulic Fittings – Adjustable

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

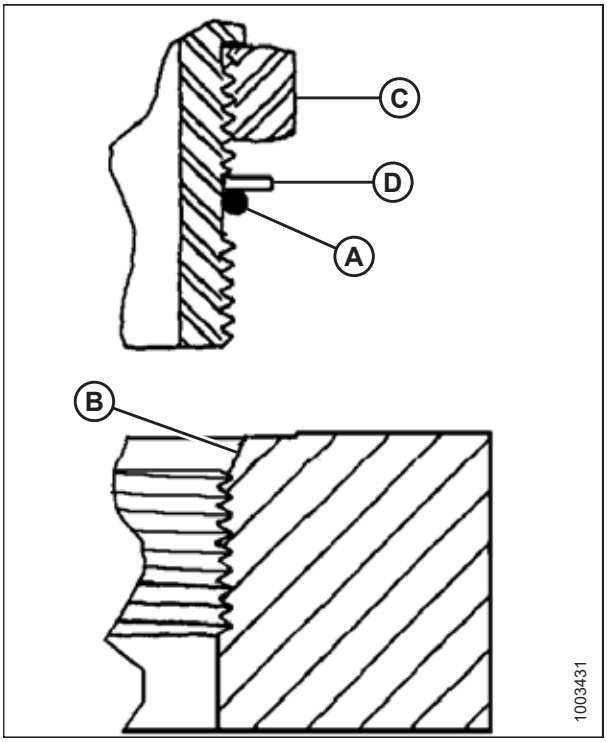


Figure 7.11: Hydraulic Fitting

5. Install fitting (B) into port until 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.

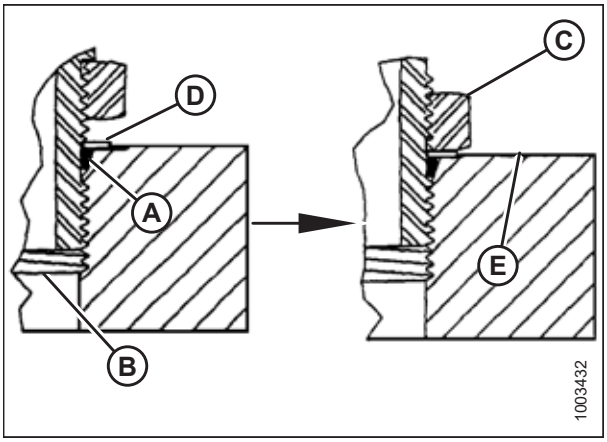


Figure 7.12: Hydraulic Fitting

Table 7.11 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value[15]	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1 1/16–12	120–132	88–97
-14	1 3/8–12	153–168	113–124
-16	1 5/16–12	176–193	130–142
-20	1 5/8–12	221–243	163–179
-24	1 7/8–12	270–298	199–220
-32	2 1/2–12	332–365	245–269

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

7.1.6 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 *7.12, page 317*.
6. Check final condition of fitting.

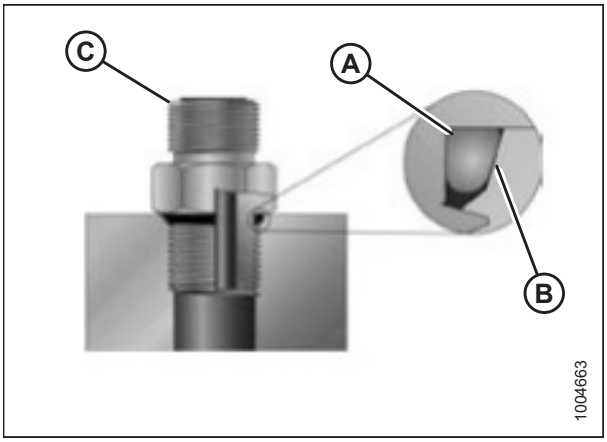


Figure 7.13: Hydraulic Fitting

Table 7.12 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value[16]	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1 1/16–12	120–132	88–97
-14	1 3/8–12	153–168	113–124
-16	1 5/16–12	176–193	130–142
-20	1 5/8–12	221–243	163–179
-24	1 7/8–12	270–298	199–220
-32	2 1/2–12	332–365	245–269

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

7.1.7 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 7.14: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to values in Table *7.13, page 318*.

   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.

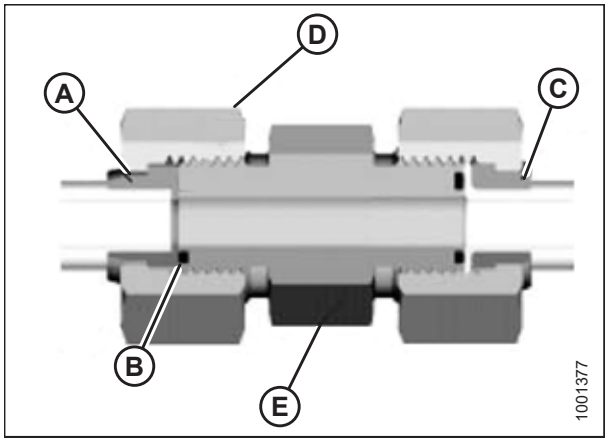


Figure 7.15: Hydraulic Fitting

Table 7.13 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value[17]	
			Nm	lbf·ft
-3	Note[18]	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note[18]	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[18]	7/8	–	–

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

Table 7.13 O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value[19]	
			Nm	lbf·ft
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167
-24	1–2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

7.1.8 Tapered Pipe Thread Fittings

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 *7.14, page 319*. Make sure that tube end of a shaped connector (typically 45° or 90°) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

   NOTE:

   Overtorque failure of fittings may not be evident until fittings are disassembled.

Table 7.14 Hydraulic Fitting Pipe Thread

Tapered Pipe Thread Size	Recommended 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

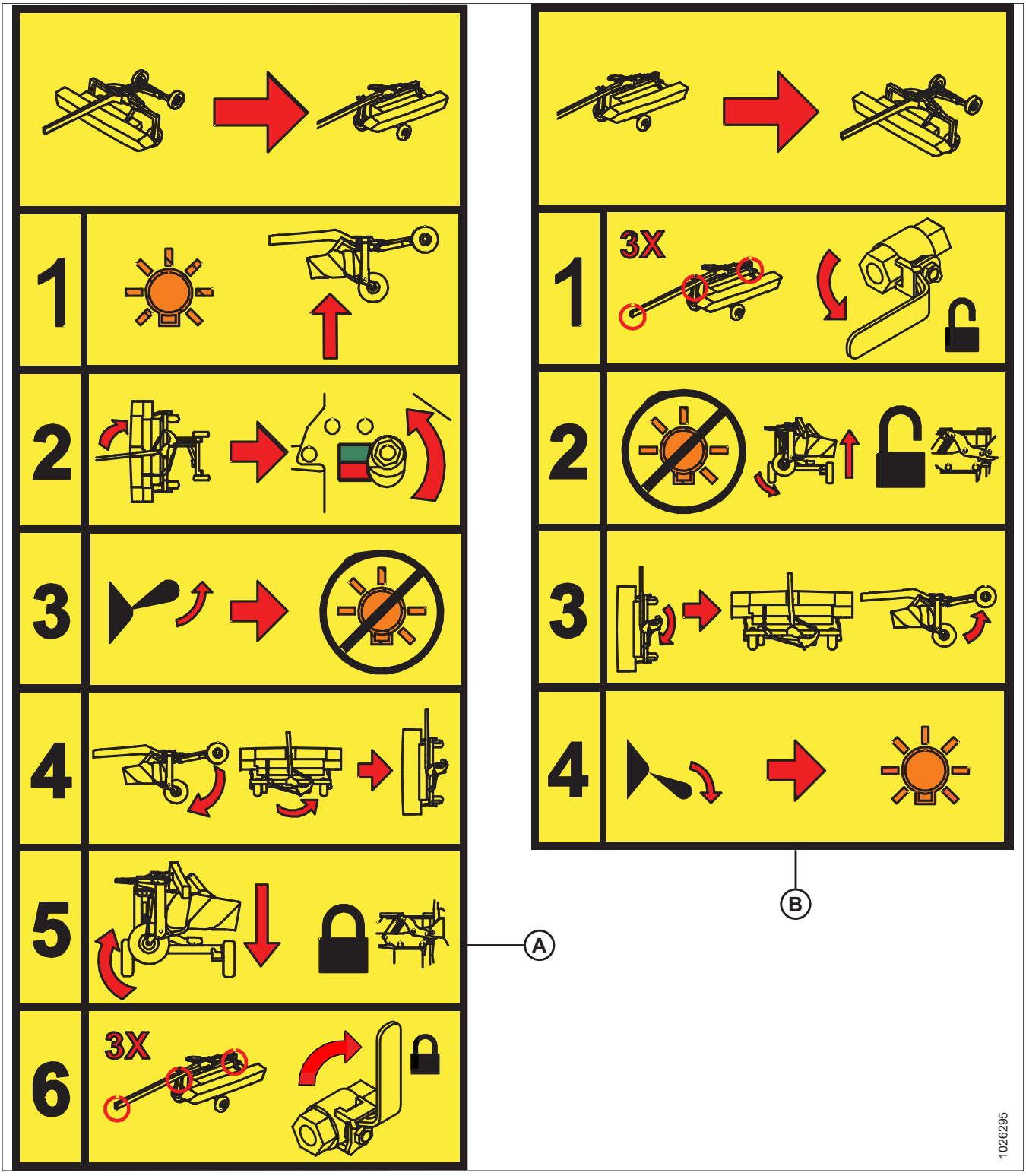
19. Torque values and angles shown are based on lubricated connection as in reassembly.

7.2 Conversion Chart

Table 7.15 Conversion Chart

Quantity	SI Units (Metric)		Factor	US Customary Units (Standard)	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectare	ha	x 2.4710 =	acre	acres
Flow	liters per minute	L/min	x 0.2642 =	US gallons per minute	gpm
Force	Newton	N	x 0.2248 =	pound force	lbf
Length	millimeter	mm	x 0.0394 =	inch	in.
Length	meter	m	x 3.2808 =	foot	ft.
Power	kilowatt	kW	x 1.341 =	horsepower	hp
Pressure	kilopascal	kPa	x 0.145 =	pounds per square inch	psi
Pressure	megapascal	MPa	x 145.038 =	pounds per square inch	psi
Pressure	bar (Non-SI)	bar	x 14.5038 =	pounds per square inch	psi
Torque	Newton meter	Nm	x 0.7376 =	pound feet or foot pounds	lbf·ft
Torque	Newton meter	Nm	x 8.8507 =	pound inches or inch pounds	lbf·in
Temperature	degrees Celsius	°C	(°C x 1.8) + 32 =	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	x 3.2808 =	feet per minute	ft/min
Velocity	meters per second	m/s	x 3.2808 =	feet per second	ft/s
Velocity	kilometers per hour	km/h	x 0.6214 =	miles per hour	mph
Volume	liter	L	x 0.2642 =	US gallon	US gal
Volume	milliliter	mL	x 0.0338 =	ounce	oz.
Volume	cubic centimeter	cm^3 or cc	x 0.061 =	cubic inch	$in.^3$
Weight	kilogram	kg	x 2.2046 =	pound	lb.

7.3 Converting Transport Decal



A - Converting From Field to Transport

B - Converting From Transport to Field

Index

D

E

F

G

H

I

L

M

N

O

P

R

S

T

U

W

Recommended Lubricants

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

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

IMPORTANT:

Do **NOT** overfill the cutterbar when adding lubricant. Overfilling could result in overheating and failure of cutterbar components.

Table .16 Recommended Lubricants

Specification	Description	Use	Capacities
Lubricant: Grease			
SAE Multipurpose	High temperature, extreme pressure (EP) performance with 1% max. molybdenum disulphide (NLGI Grade 2) lithium base	As required unless otherwise specified	—
SAE Multipurpose	High temperature, extreme pressure (EP) performance with 10% max. molybdenum disulphide (NLGI Grade 2) lithium base	Driveline slip-joints	—
Lubricant: Gear Lubricant			
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R113 Cutterbar	8 L(8.5 qts [US])
SAE 80W-90	High thermal and oxidation stability API service class GL-5	R116 Cutterbar	10 L(10.5 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Conditioner roll timing gearbox	0.7 L (0.75 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Pull-type roll timing gearbox	1.8 L (1.9 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Hitch (front) swivel gearbox	Upper: 1.2 L (1.3 qts [US])Lower: 1.7 L (1.8 qts [US])
SAE 85W-140	Gear lubricant API service class GL-5	Header (rear) swivel gearbox	Upper: 1.2 liters (1.3 qts [US])Lower: 1.7 L (1.8 qts [US])

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