MacDon

D2 Series
Draper Header for Windrowers

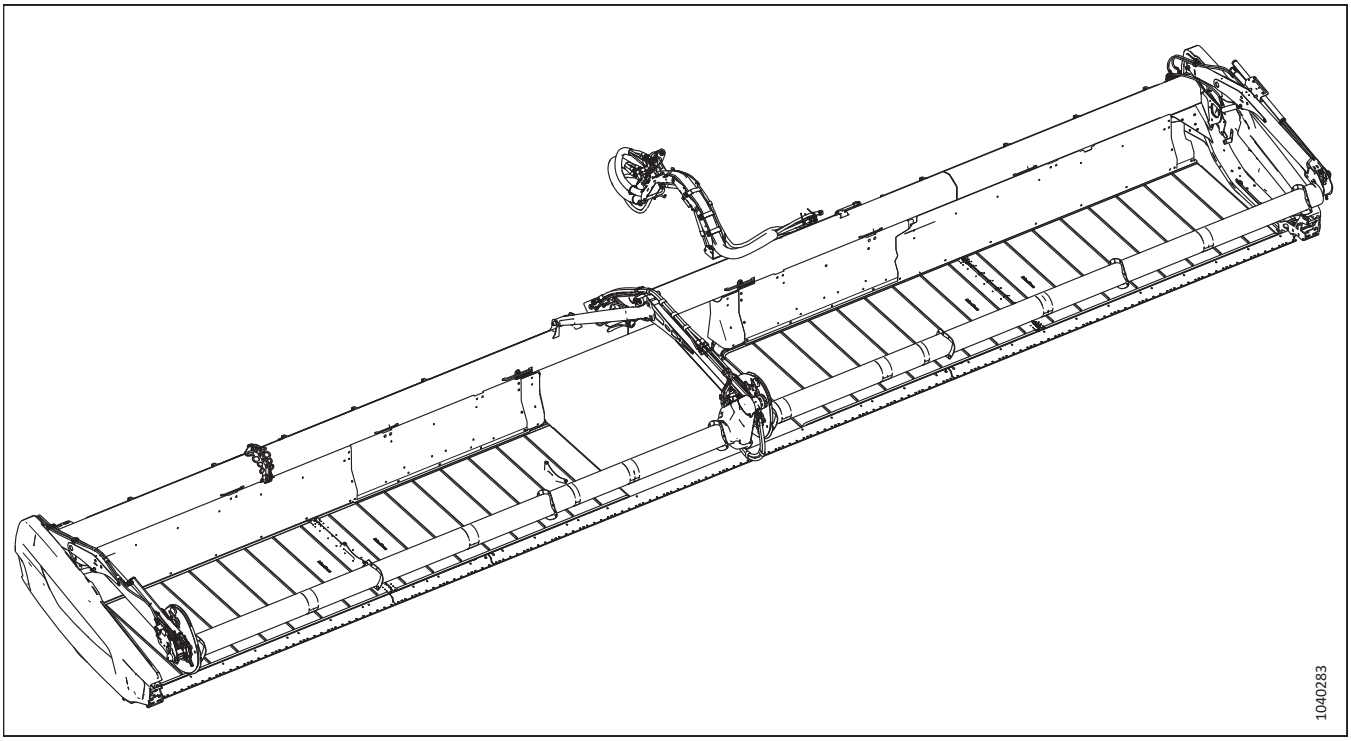
Operator's Manual

214509 Revision A

Original Instruction

The Harvesting Specialists.

D2 Series Draper Header For Windrowers



Published: April 2023

Declaration of Conformity

EC Declaration of Conformity

[1] MacDon

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

[2] Windrower Header

[3] MacDon D2 SP Series

[4] As per Shipping Document

[5] February 10, 2023

[6] _____
Adrienne Tankeu
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 tehnièke 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

UK Declaration of Conformity

[1] MacDon

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

[2] Windrower Header

[3] MacDon D2 SP Series

[4] As per Shipping Document

[5] February 10, 2023

[6] _____
Adrienne Tankeu
Product Integrity

We, [1]

Declare, that the product:

Machine Type: [2]

Name & Model: [3]

Serial Number(s): [4]

fulfills all relevant provisions of the Supply of Machinery (Safety) Regulations 2008

Designated standards used are :

EN ISO 4254-1:2015
EN ISO 4254-7:2017

Place and date of declaration: [5]

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

Introduction

Your machine

This manual contains information on the D2 Series Draper Header. Teamed with your M Series Self-Propelled Windrower or your M1 Series Windrower, the D2 Series Draper Header will cut and lay crop into fluffy, uniform windrows.

Unless otherwise noted, use the standard torque values provided in Chapter *8.1 Torque Specifications, page 343*.

Your warranty

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

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

Your manual

Carefully read all the material provided before attempting to maintain, service, or use the machine.

Use this manual as your first source of information about the machine. If you follow the instructions provided, your header will work well for many years. If you require more detailed service information, contact your MacDon Dealer.

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.

The following conventions are used in this document:

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

The Table of Contents and Index will guide you to specific areas within this manual. Examine the Table of Contents and familiarize yourself with the organization of the information.

NOTE:

This manual is available in English only.

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).

Keep this manual handy for frequent reference and to pass on to new Operators or Owners. The manual storage case (A) is located at the rear of the header, beside the right outer leg.

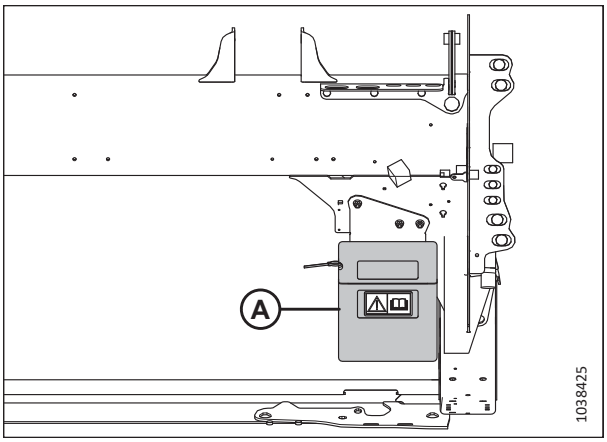


Figure 1: Manual Storage Location for D215–D225

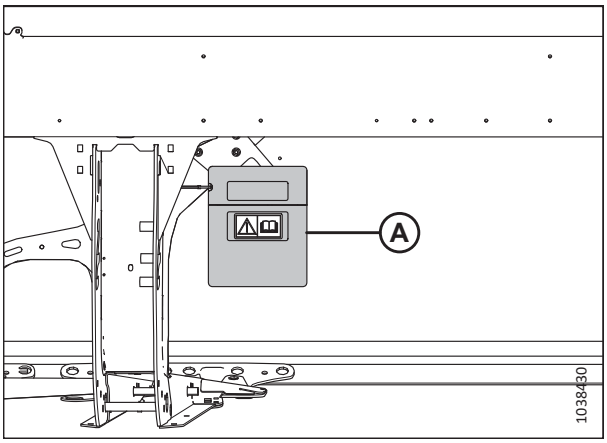


Figure 2: Manual Storage Location for D230–D241

Model and Serial Number

Record the model number, serial number, and model year of the header and transport/stabilizer wheel option (if installed) in the spaces provided.

D2 SP Series Draper Header

Header Model: _____

Serial Number: _____

Model Year: _____

The header's serial number plate (A) is located on the back of the header, beside the left endsheet.

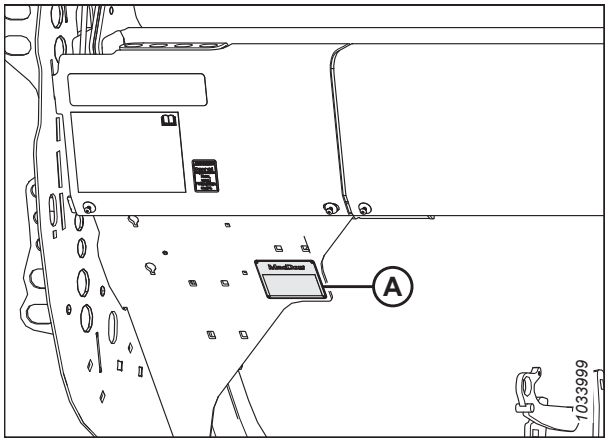


Figure 3: Header Serial Number Plate Location

A - Serial Number Plate

EasyMove™ Transport Option

Serial Number: _____

Model Year: _____

The EasyMove™ transport's serial number plate (A) is located on the right axle assembly.

NOTE:

The transport is an option and may not be installed on this header.

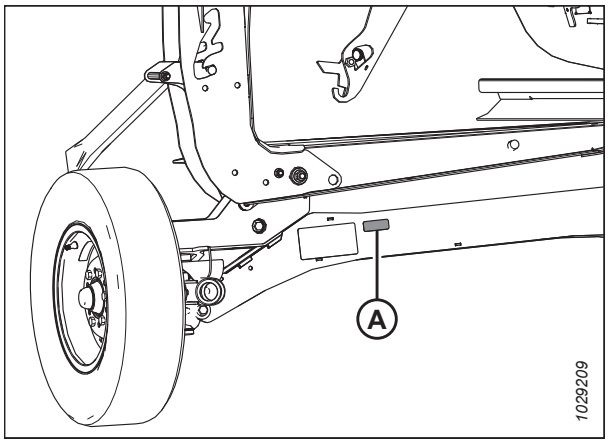


Figure 4: EasyMove™ Transport Option

A - Serial Number Plate

Chapter 1: Safety

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

1.1 Safety Alert Symbols

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

This symbol means:

- **ATTENTION!**
- **BECOME ALERT!**
- **YOUR SAFETY IS INVOLVED!**

Carefully read and follow the safety message accompanying this symbol.

Why is safety important to you?

- Accidents disable and kill
- Accidents cost
- Accidents can be avoided

Figure 1.1: Safety Symbol

1.2 Signal Words

Three signal words, **DANGER**, **WARNING**, and **CAUTION**, are used to alert you to hazardous situations. Two signal words, **IMPORTANT** and **NOTE**, identify non-safety related information.

Signal words are selected using the following guidelines:

DANGER

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

WARNING

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

CAUTION

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

IMPORTANT:

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

NOTE:

Provides additional information or advice.

1.3 General Safety

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

CAUTION

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

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

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

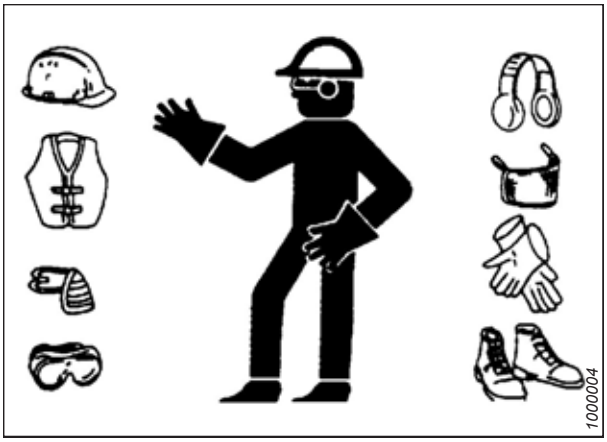


Figure 1.2: Safety Equipment

In addition, take the following precautions:

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

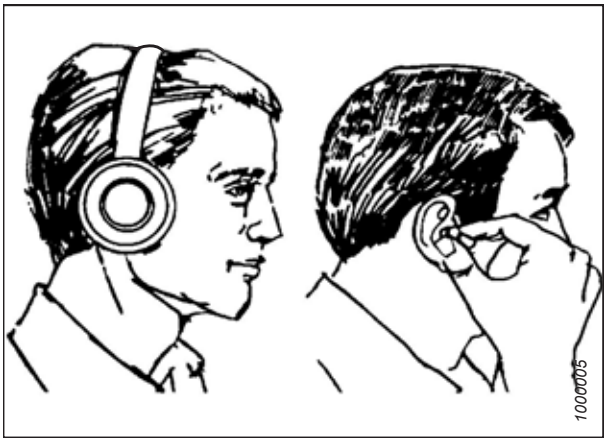


Figure 1.3: Safety Equipment

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

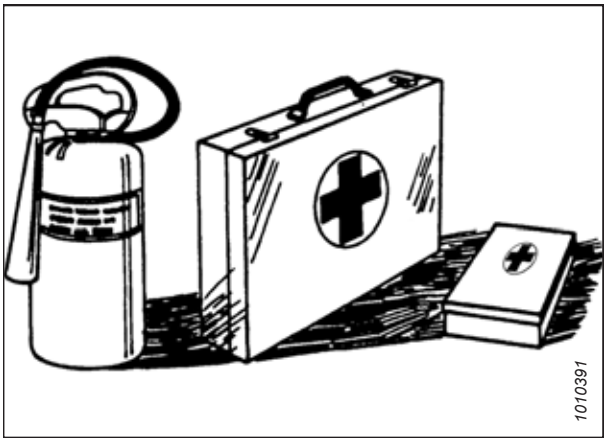


Figure 1.4: Safety Equipment

- Wear close-fitting clothing and cover long hair. **NEVER** wear dangling items such as hoodies, scarves, or bracelets.
- Keep all shields in place. **NEVER** alter or remove safety equipment. Ensure that the driveline guards can rotate independently of their shaft, and that they can telescope freely.
- Use only service and repair parts made or approved by the equipment manufacturer. Parts from other manufacturers may not meet the correct strength, design, or safety requirements.

Figure 1.5: Safety around Equipment

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

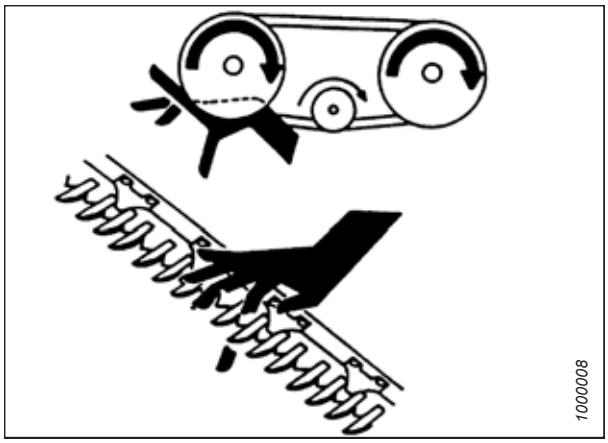


Figure 1.6: Safety around Equipment

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

Figure 1.7: Safety around Equipment

1.4 Maintenance Safety

Maintaining your equipment safely requires that you follow the relevant safety procedures and wear the appropriate personal protective equipment for the task.

To ensure your safety while maintaining the machine:

- Review the operator's manual and all safety items before operating or performing maintenance on the machine.
- Place all controls in Neutral, stop the engine, set the parking brake, remove the ignition key, and wait for all moving parts to stop before servicing, adjusting, or repairing the machine.
- Follow good shop practices:
  - Keep service areas clean and dry
  - Ensure that electrical outlets and tools are properly grounded
  - Keep the work area well lit

Figure 1.8: Wet Floors Present Safety Risks

- Relieve pressure from hydraulic circuits before servicing and/or disconnecting the machine.
- Ensure that all components are tight and that steel lines, hoses, and couplings are in good condition before applying pressure to hydraulic systems.
- Keep hands, feet, clothing, and hair away from all moving and/or rotating parts.
- Clear the area of bystanders, especially children, when carrying out any maintenance, repairs, or adjustments.
- Install the transport lock or place safety stands under the frame before working under the machine.
- If more than one person is servicing the machine at the same time, be aware that rotating a driveline or another 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.

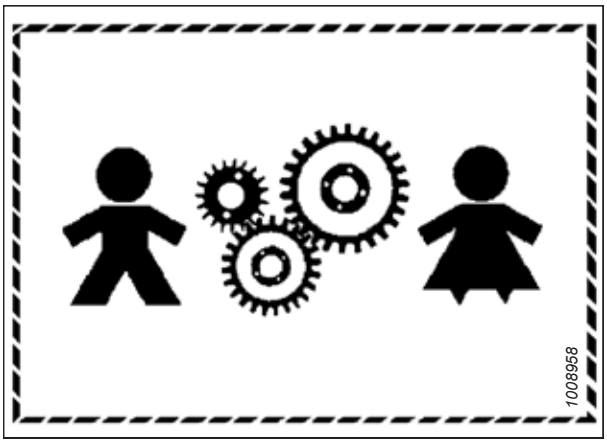


Figure 1.9: Equipment is NOT Safe for Children

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

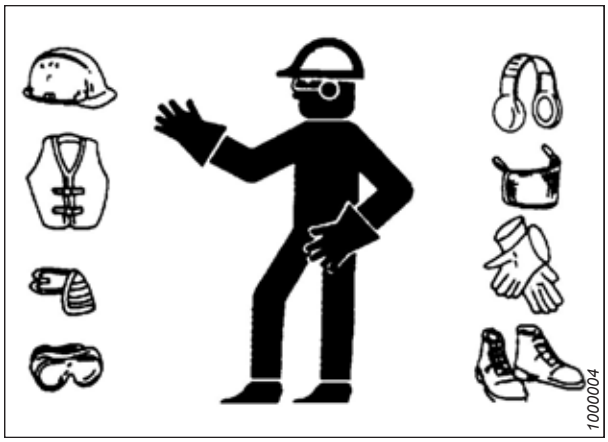


Figure 1.10: Personal Protective Equipment

1.5 Hydraulic Safety

Because hydraulic fluid is under extreme pressure, hydraulic fluid leaks can be very dangerous. The proper safety procedures must be followed when inspecting for hydraulic fluid leaks and servicing hydraulic equipment.

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

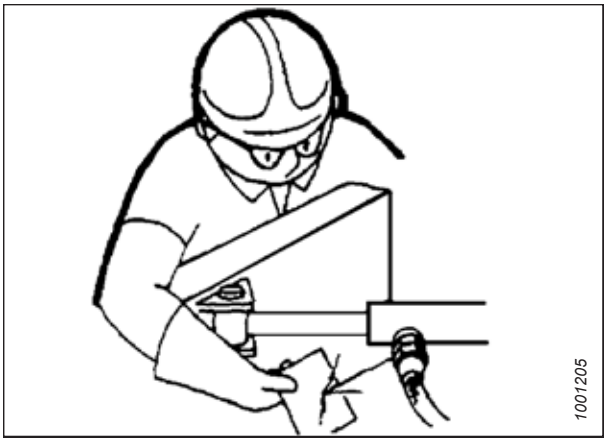


Figure 1.11: Testing for Hydraulic Leaks

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

Figure 1.12: Hydraulic Pressure Hazard

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

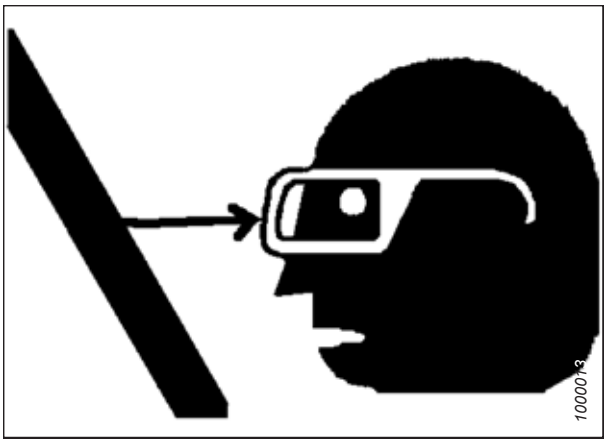


Figure 1.13: Safety around Equipment

1.6 Welding Precaution

To prevent damage to sensitive electronics, welding should never be attempted on the header while it is connected to a windrower.

WARNING

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

For further welding precautions, consult the windrower operators manual.

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

1.7 Decommissioning and Disposing of Agricultural Equipment

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

Comply with local regulations and authorities.

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

Figure 1.14: Symbol for Do NOT Dispose with Domestic Waste

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

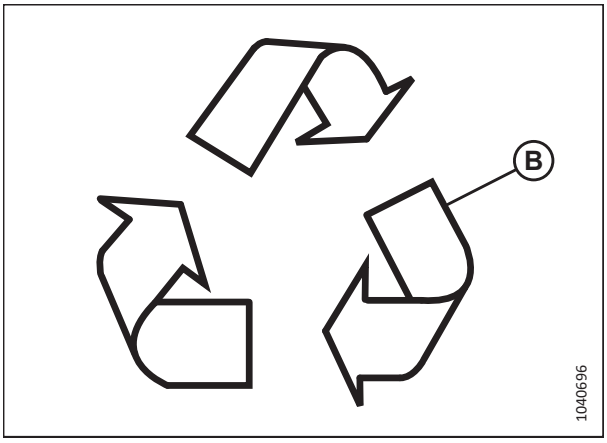


Figure 1.15: Symbol for Recycle as Labelled

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

1.8 Safety Signs

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

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

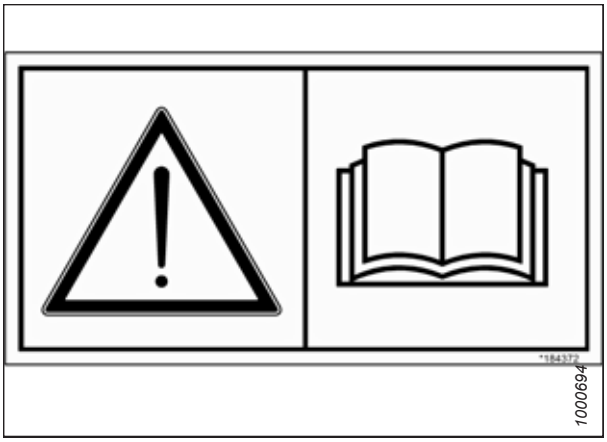


Figure 1.16: Operator's Manual Decal

1.8.1 Installing Safety Decals

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

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

1.9 Safety Decal Locations

Safety signs are usually yellow decals, and are placed on the machine where there is a risk of personal injury, or where the operator has to take extra precaution before operating controls.

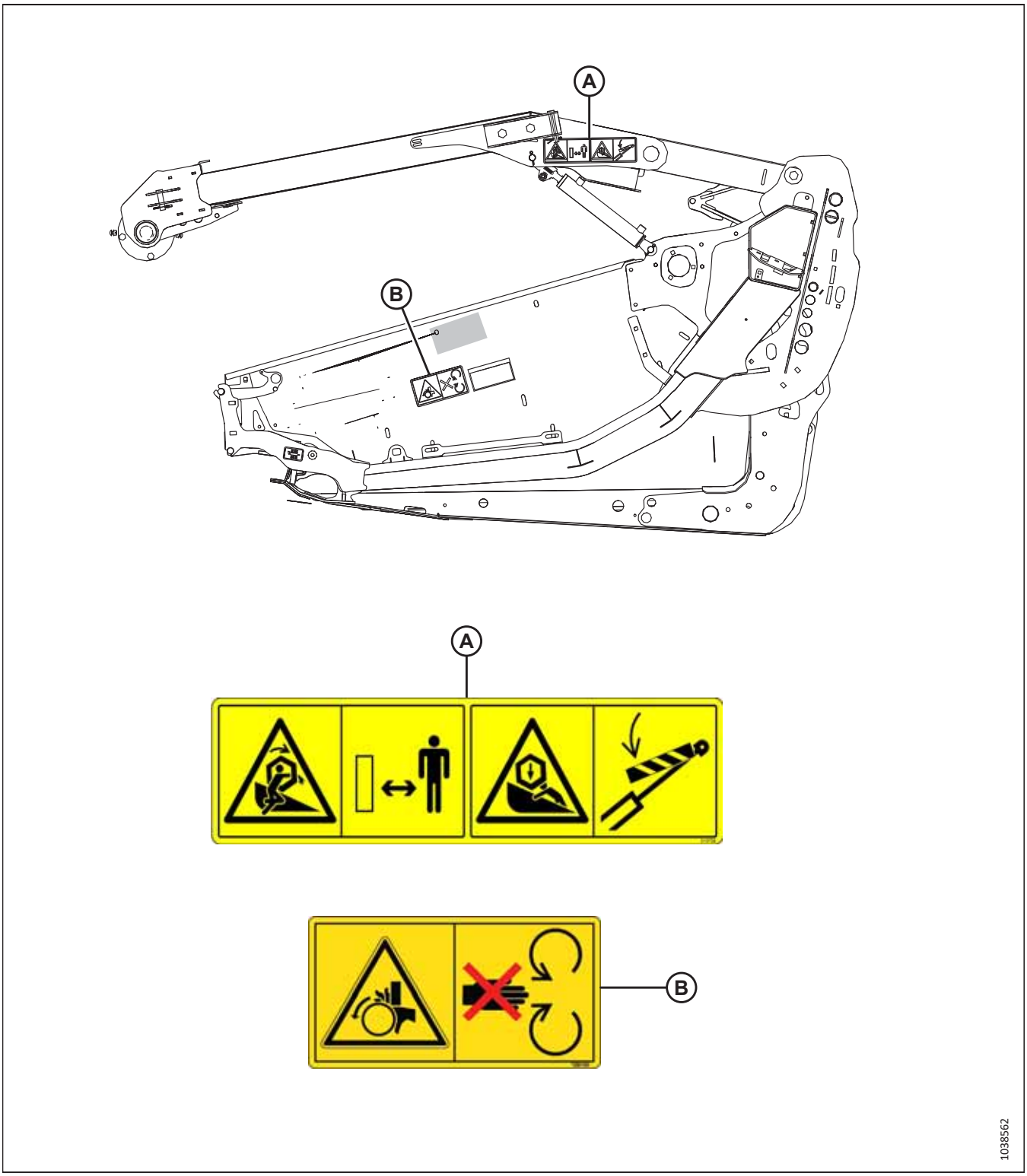


Figure 1.17: Endsheets, Reel Arms, and Backsheet

A MD #360541 – Reel Entanglement/ Hazard (Two Locations)

B - MD #288195 – Danger, Rotating Part

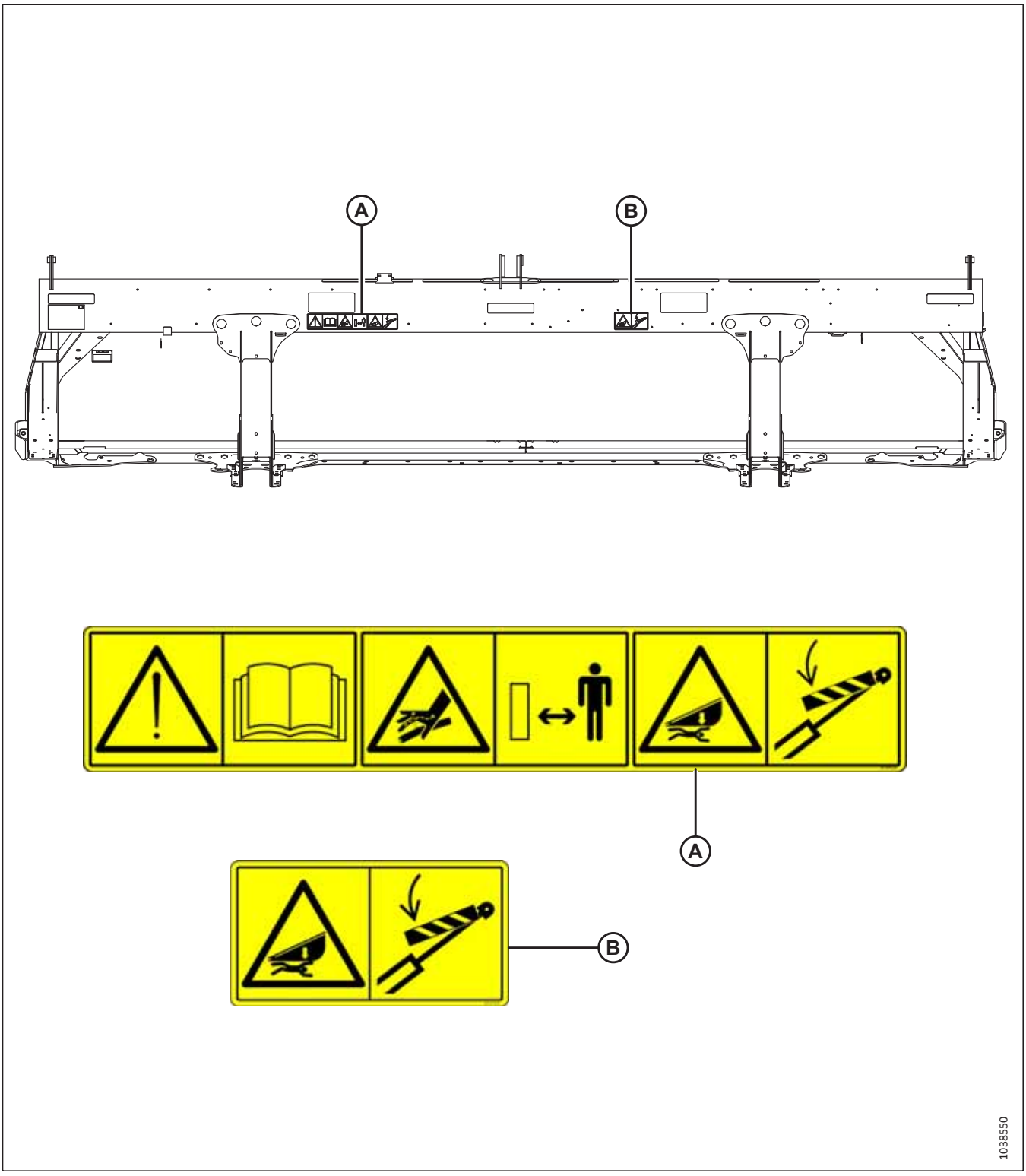


Figure 1.18: Backtube – D215 Draper Header

A - MD #313725 – Read Manual / High Pressure Fluid / Header Hazard

B - MD #313733 – Header Crushing Hazard

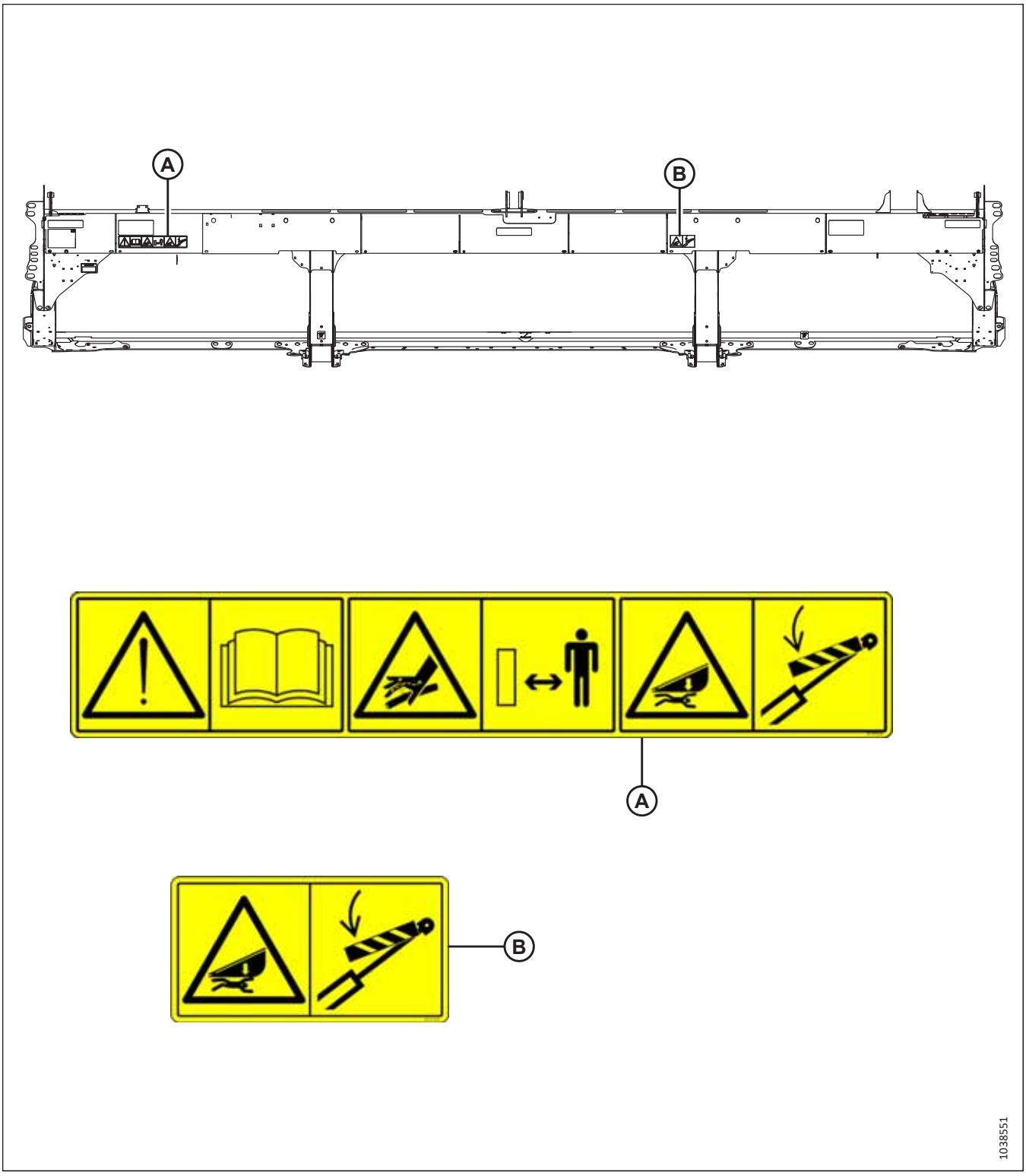


Figure 1.19: Backtube – D220 Draper Header

A - MD #313725 – Read Manual / High Pressure Fluid / Header Hazard

B - MD #313733 – Header Crushing Hazard

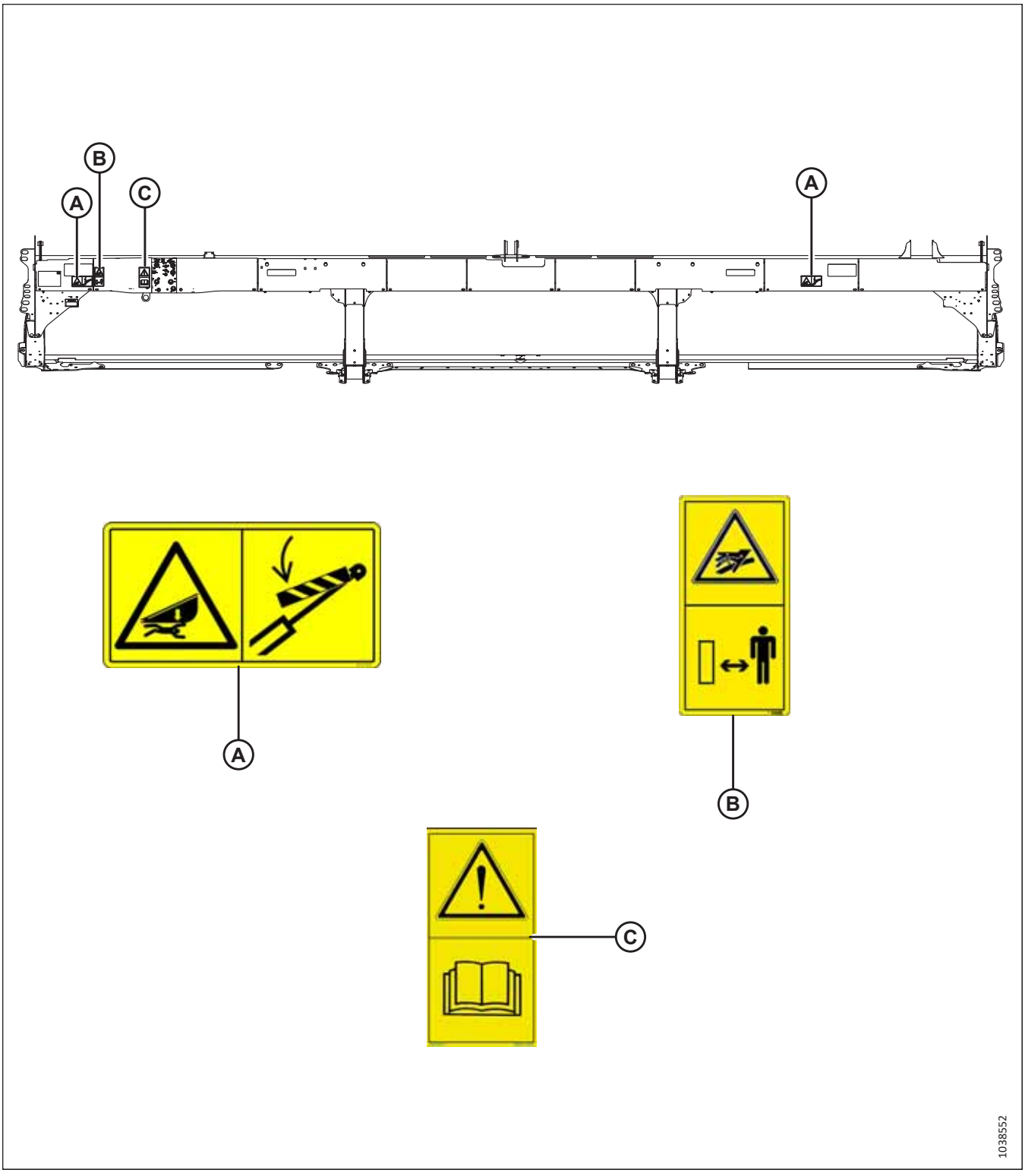


Figure 1.20: Backtube – D225 Draper Header

A - MD #313733 – Header Crushing Hazard
B - MD #174436 – High-Pressure Oil Hazard
C - MD #113482 – General Hazard Pertaining to Machine Operation and Servicing

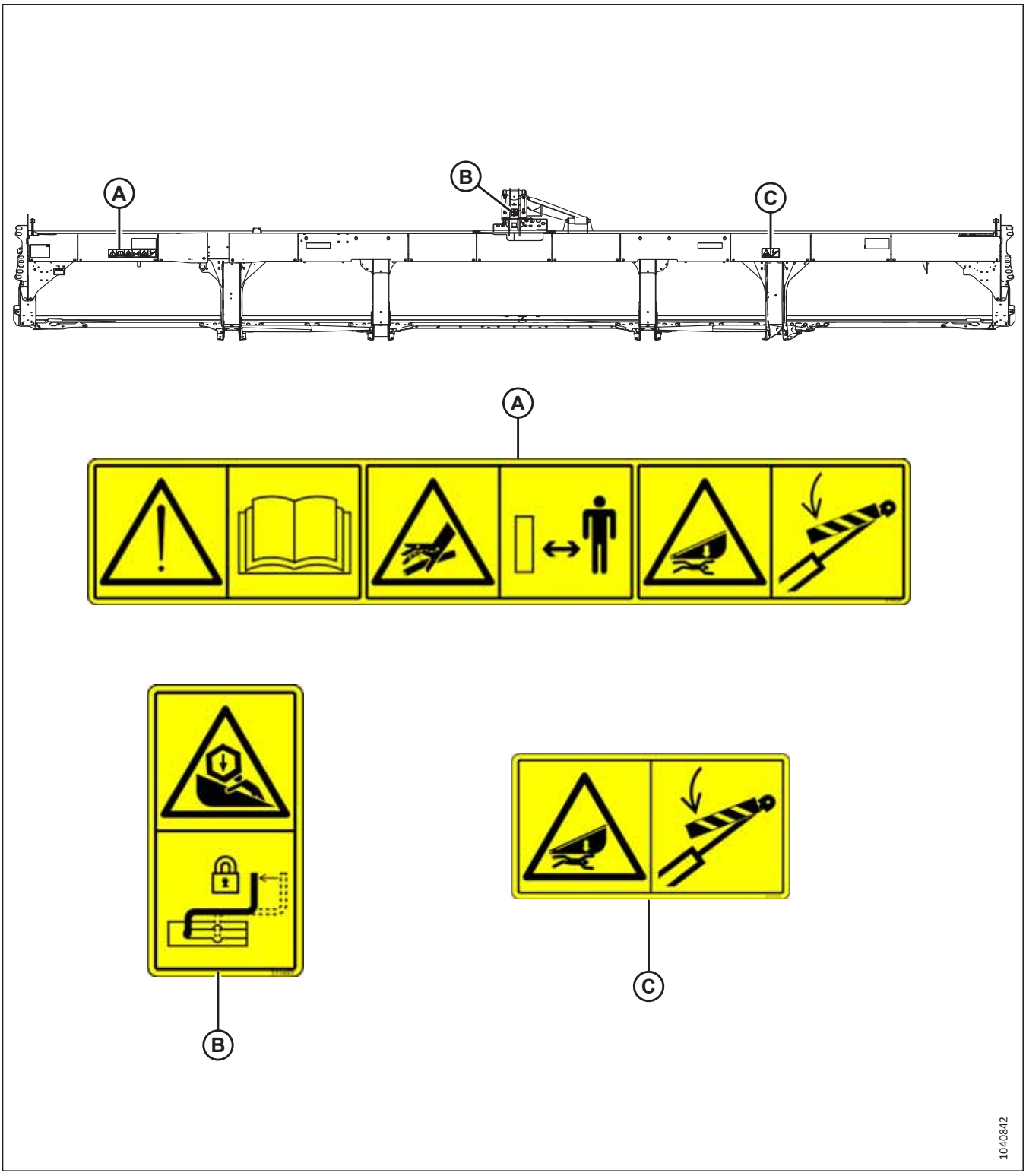


Figure 1.21: Backtube – D230 Draper Header

A - MD #313725 – Read Manual / High Pressure Fluid / Header Hazard
B - MD #311493 – Reel Crushing Hazard
C - MD #313733 – Header Crushing Hazard

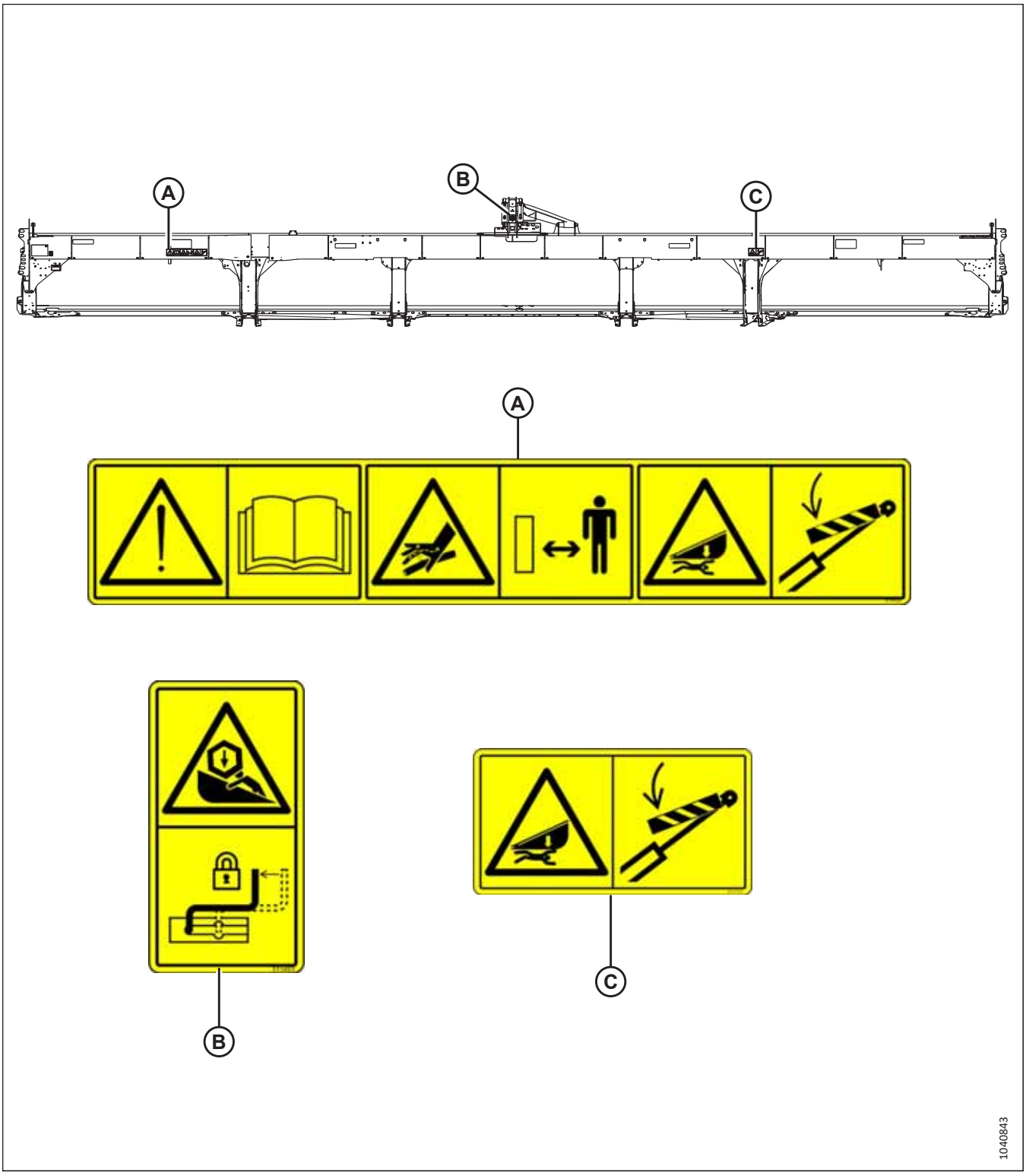


Figure 1.22: Backtube – D235 Draper Header

A - MD #313725 – Read Manual / High Pressure Fluid / Header Hazard
B - MD #311493 – Reel Crushing Hazard
C - MD #313733 – Header Crushing Hazard

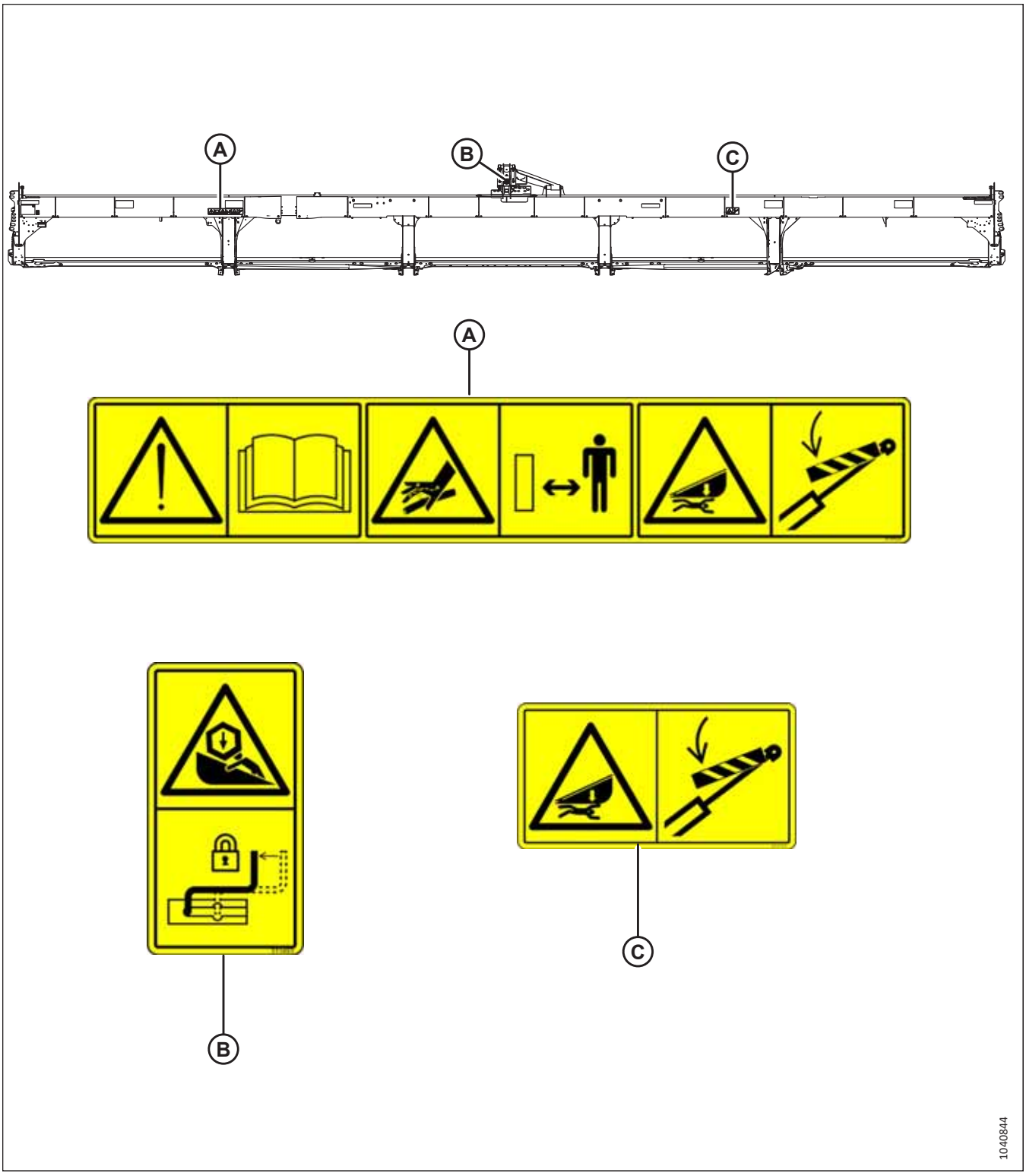


Figure 1.23: Backtube – D241 Draper Header

A - MD #313725 – Read Manual / High Pressure Fluid / Header Hazard
B - MD #311493 – Reel Crushing Hazard
C - MD #313733 – Header Crushing Hazard

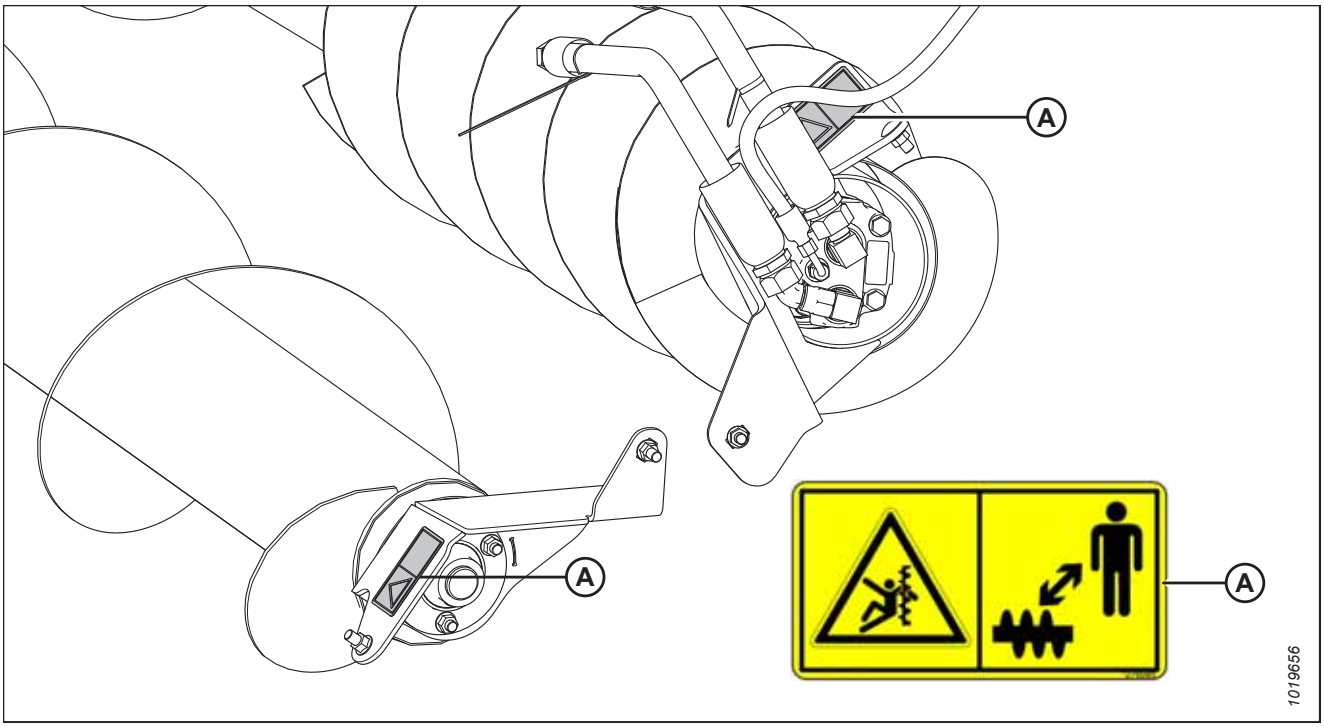


Figure 1.24: Upper Cross Auger (Optional)

A - MD #279085 – Auger Entanglement Hazard

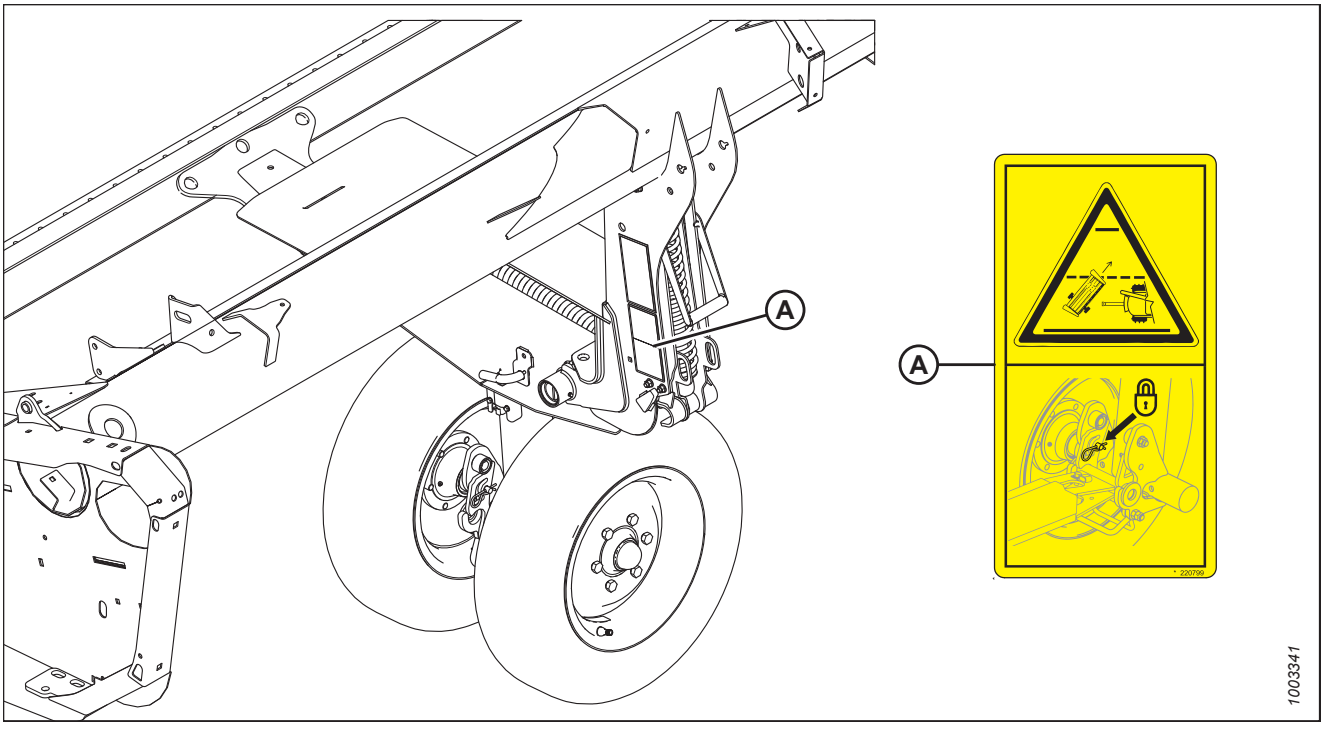


Figure 1.25: Slow Speed Transport (Optional)

A - MD #220799 – Loss of Control Hazard

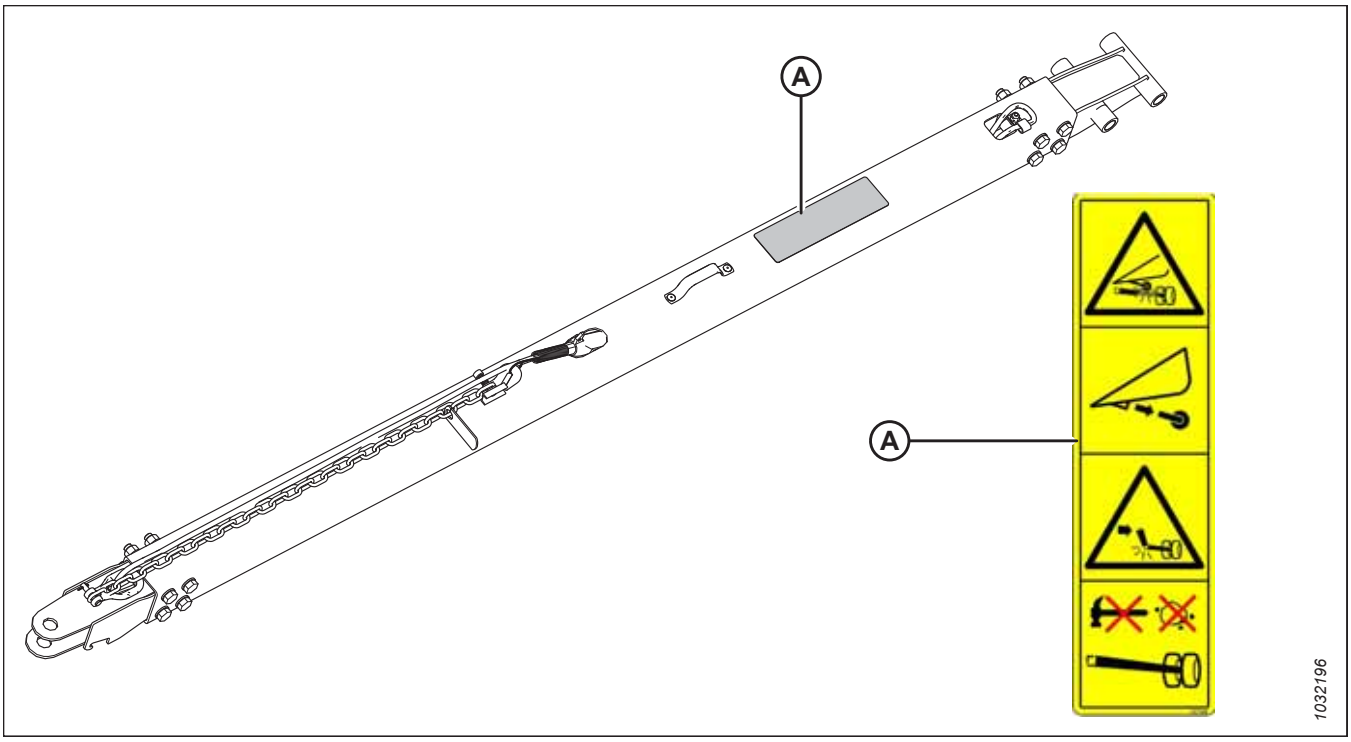


Figure 1.26: EasyMove™ Transport System – Tow-Bar (Short Bar Shown; Long Bar Similar) (Optional)

A - MD #327588 – Hitch Damage Hazard

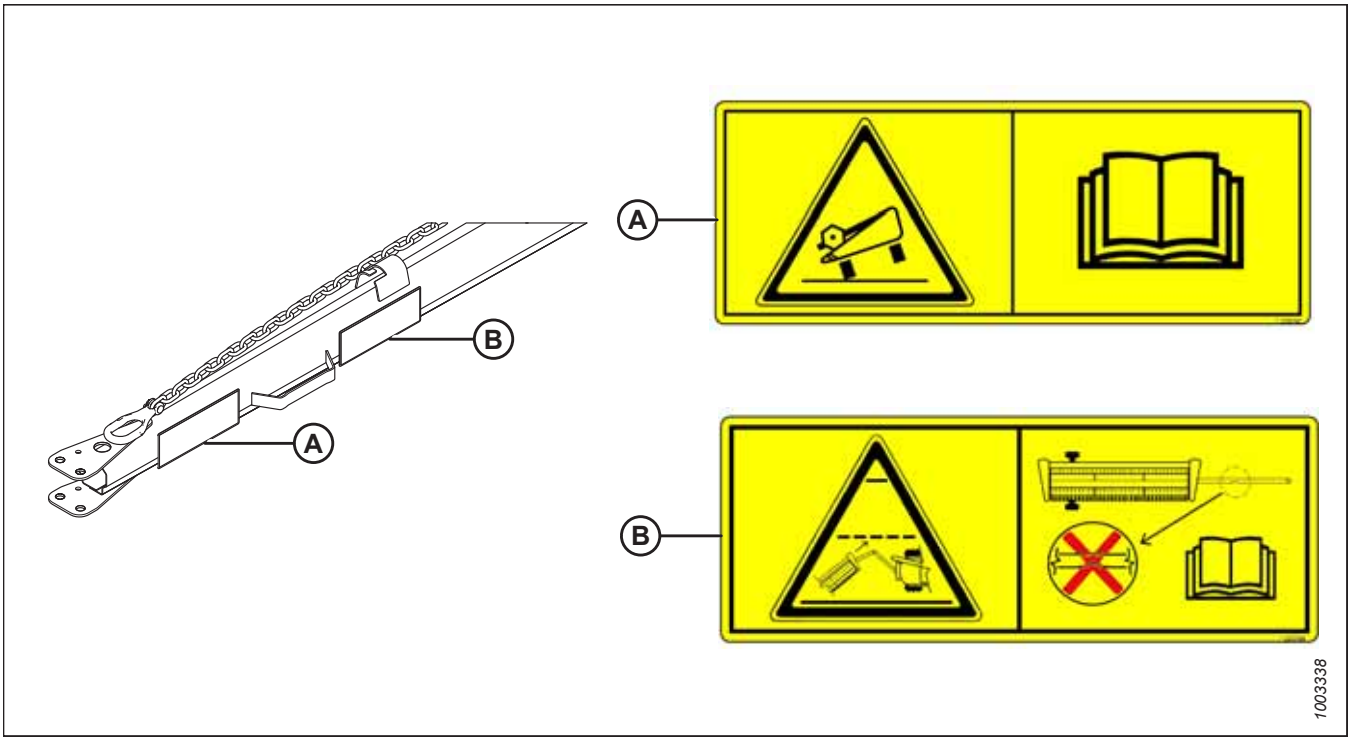


Figure 1.27: EasyMove™ Transport Tow-Bar (Optional)

A - MD #220797 – Header Tipping Hazard – Transport Mode

B - MD #220798 – Loss of Control Hazard

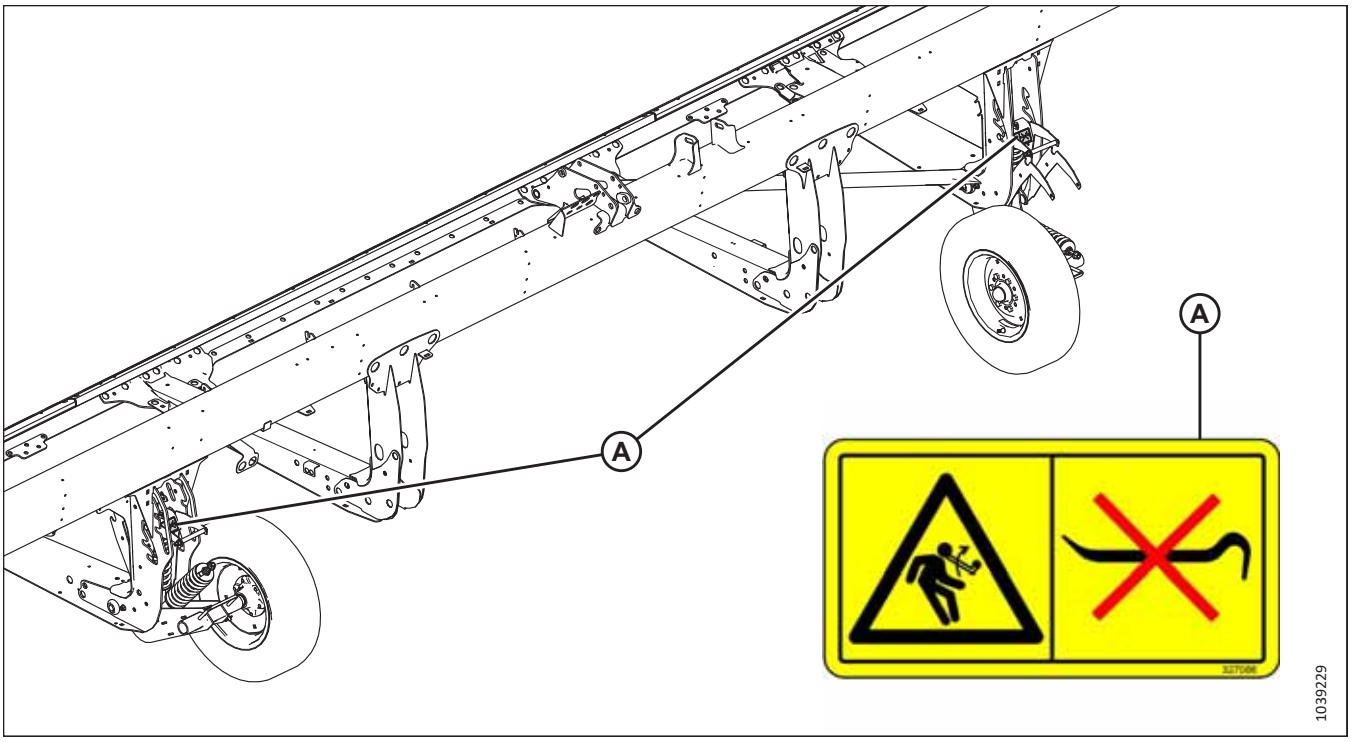


Figure 1.28: Stabilizer Wheels (Optional)

A - MD #327086 – Released Spring Energy Hazard

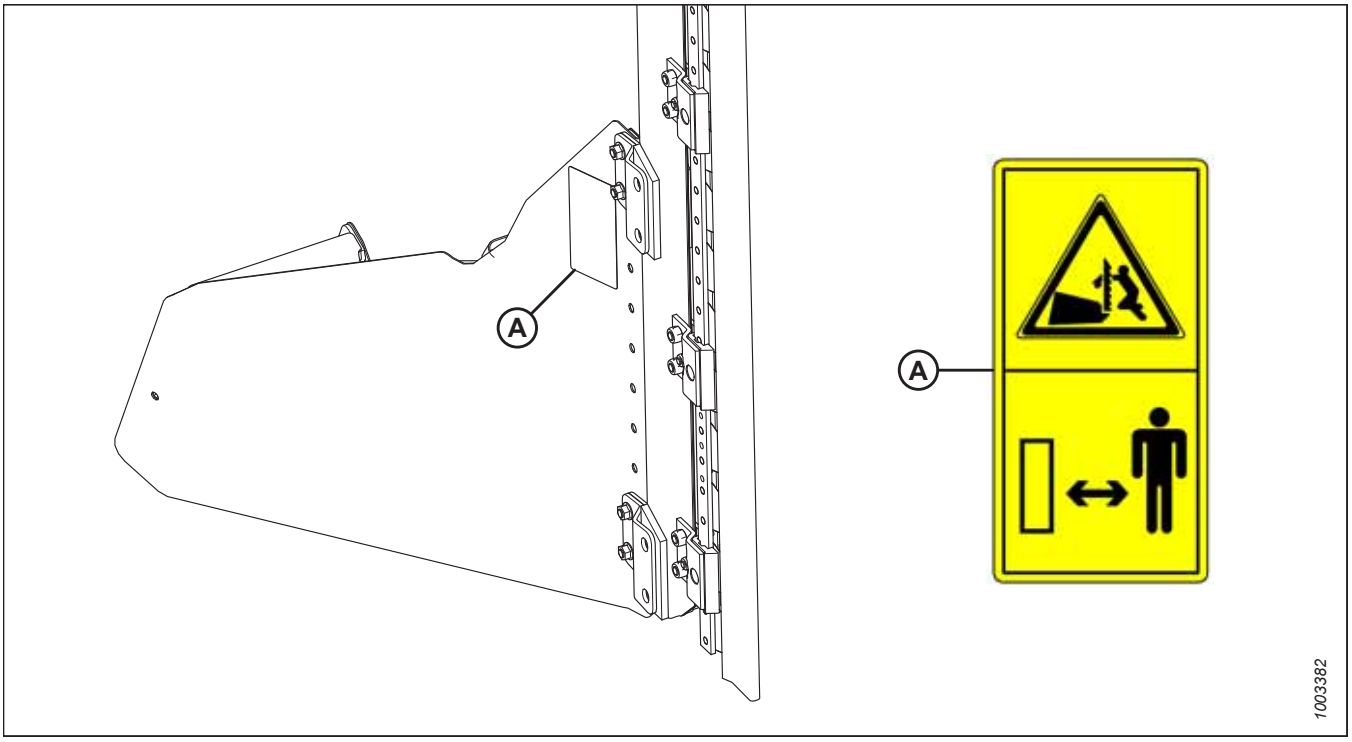


Figure 1.29: Vertical Knife (Optional)

A - MD #174684 – Knife cutting hazard

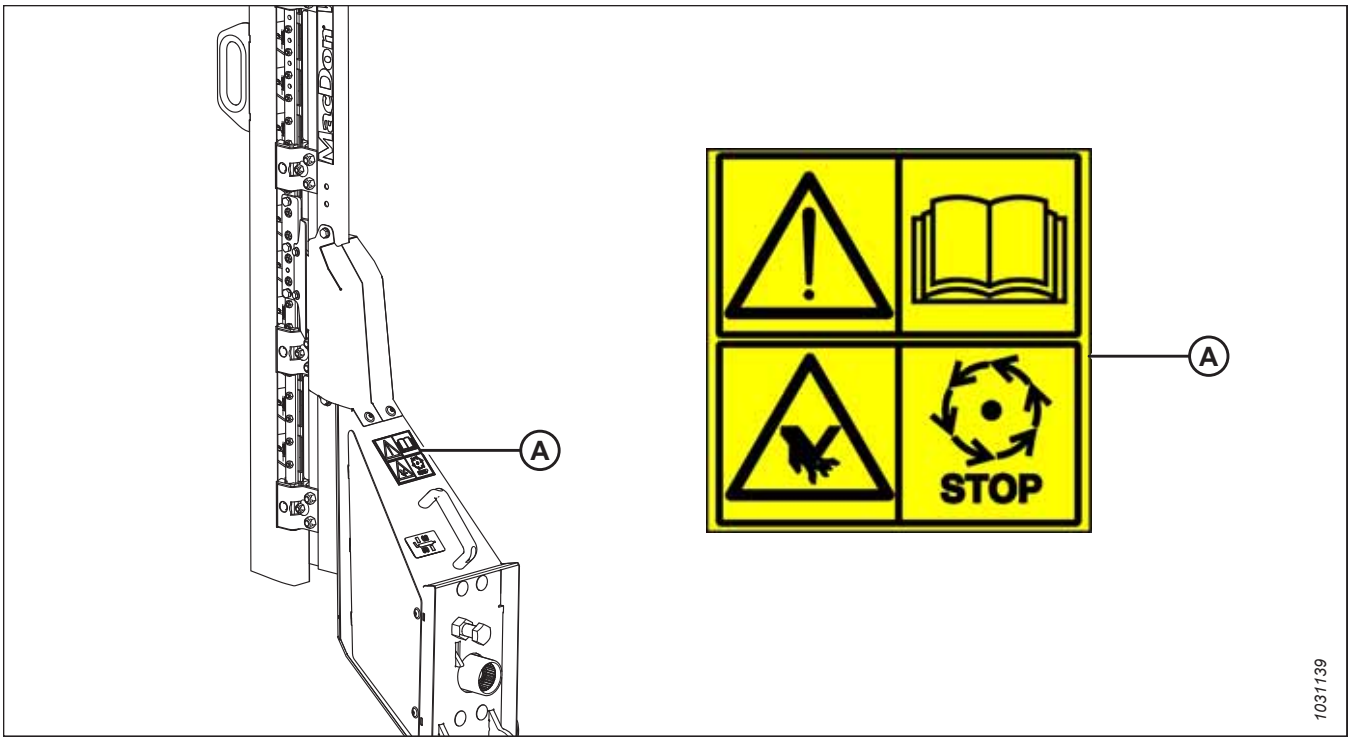


Figure 1.30: Vertical Knife (Optional)

A - MD #313881 – Knife Hazard

1.10 Understanding Safety Signs

Safety sign decals use illustrations to convey important safety or equipment maintenance information.

MD #113482

General hazard pertaining to machine operation and servicing

DANGER

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

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

Figure 1.31: MD #113482

MD #174436

High-pressure oil hazard

WARNING

High-pressure hydraulic fluid can penetrate human skin, which can cause serious injury such as gangrene, which can be fatal. To prevent this:

- Do **NOT** go near hydraulic fluid leaks.
- Do **NOT** use a finger or skin to check for hydraulic fluid leaks.
- Lower the load or relieve the pressure in the hydraulic system before loosening any hydraulic fittings.
- If you are injured, seek emergency medical help. **IMMEDIATE** surgery is required to remove hydraulic fluid which has penetrated the skin.

Figure 1.32: MD #174436

MD #174684

Knife cutting hazard

WARNING

To prevent injury from a sharp cutting knife:

- Wear heavy canvas or leather gloves when working with the knife.
- Be sure no one is near the vertical knife when removing or rotating the knife.

Figure 1.33: MD #174684

MD #220797

Header tipping hazard – transport mode

DANGER

To prevent serious injury or death from the header tipping over while in transport mode:

- Read the operator's manual for more information on potential tipping or rollover hazards that the header may be subject to while it is transport mode.

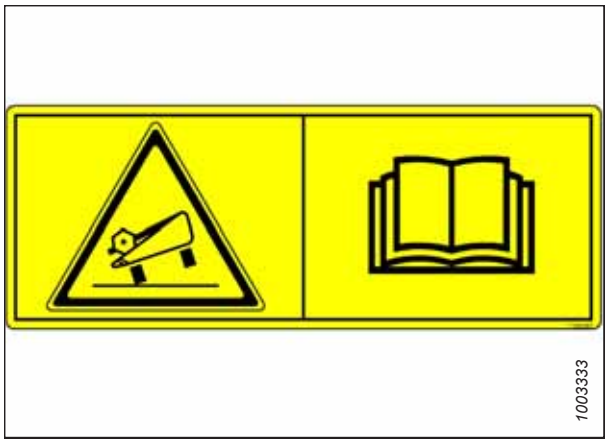


Figure 1.34: MD #220797

MD #220798

Loss of control hazard

DANGER

To prevent serious injury or death from loss of control:

- Do **NOT** tow the header with a damaged tow bar.
- Consult the operator's manual for more information.

Figure 1.35: MD #220798

MD #220799

Loss of control hazard

WARNING

To prevent serious injury or death from loss of control:

- Ensure that the tow-bar lock mechanism is locked.

Figure 1.36: MD #220799

MD #279085

Auger entanglement hazard

DANGER

To prevent injury from the rotating auger:

- Stand clear of the auger while the machine is running.
- Stop the engine and remove the key before servicing the auger.
- Do **NOT** reach into moving parts while the machine is running.

Figure 1.37: MD #279085

MD #288195

Rotating object pinch hazard

CAUTION

To prevent injury:

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

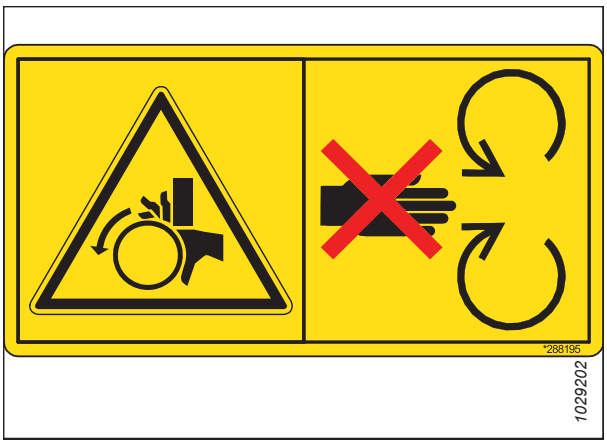


Figure 1.38: MD #288195

MD #311493

Reel crushing hazard

DANGER

- To prevent injury from the fall of a raised reel, fully raise the reel. Stop the engine and remove the key, and engage the mechanical safety lock on each reel support arm before working on or under the reel.

Figure 1.39: MD #311493

MD #313725

Read manual / high pressure fluid / header crushing hazard

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 the machine before starting the engine and during operation.
- Keep riders off of the machine.
- Keep all shields in place and stay clear of moving parts.
- Disengage the header drive, put the transmission in Neutral, and wait for all movement to stop before leaving the operator's position.
- Stop the engine and remove the key from the ignition before servicing, adjusting, lubricating, cleaning, or unplugging the machine.
- Engage the safety locks to prevent lowering of raised unit before servicing in the raised position.
- Use a slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

To prevent injury or death from fall of a raised header:

- Fully raise the header, stop the engine, remove the key, and engage the safety props before going under the header.
- Alternatively, rest the header on the ground, stop the engine, and remove the key before servicing.

WARNING

To prevent serious injury, gangrene, or death:

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

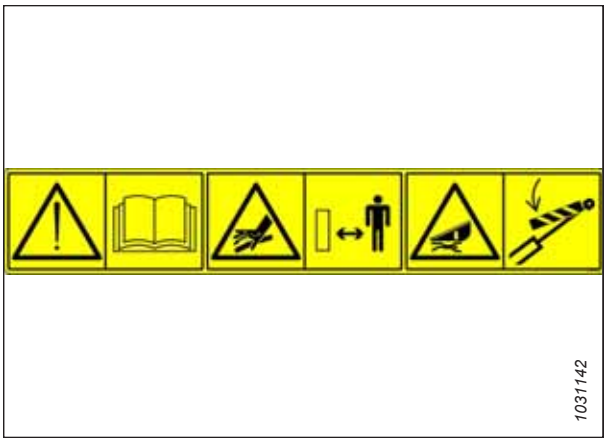


Figure 1.40: MD #313725

MD #313728

General hazard pertaining to machine operation and servicing / Hot fluid spray hazard

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 the machine before starting the engine and during operation.
- Keep riders off of the machine.
- Keep all shields in place and stay clear of moving parts.
- Disengage the header drive, put the transmission in Neutral, and wait for all movement to stop before leaving the operator's position.
- Stop the engine and remove the key from the ignition before servicing, adjusting, lubricating, cleaning, or unplugging the machine.
- Engage safety locks to prevent the lowering of a raised unit before servicing it in the raised position.
- Use a slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

CAUTION

To prevent injury from hot fluids:

- Do **NOT** remove the fluid fill cap when the machine is hot.
- Allow the machine to cool down before opening the fluid fill cap.
- Fluid is under pressure and may be hot.

Figure 1.41: MD #313728

MD #313733

Header crushing hazard

DANGER

To prevent injury or death from the fall of a raised header:

- Fully raise the header, stop the engine, remove the key, and engage the safety props before going under the header.
- Alternatively, rest the header on the ground, stop the engine, and remove the key before servicing.

Figure 1.42: MD #313733

MD #313881

General hazard pertaining to machine operation and servicing / knife hazard

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 the safety signs are installed and legible.
- Make certain everyone is clear of the machine before starting the engine and during operation.
- Keep riders off of the machine.
- Keep all shields in place and stay clear of moving parts.
- Disengage the header drive, put the transmission in Neutral, and wait for all movement to stop before leaving the operator's position.
- Stop the engine and remove the key from the ignition before servicing, adjusting, lubricating, cleaning, or unplugging the machine.
- Engage the safety locks to prevent lowering of the raised unit before servicing it in the raised position.
- Use a slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

WARNING

To prevent injury from sharp cutting knife:

- Wear heavy canvas or leather gloves when working with the knife.
- Be sure no one is near the vertical knife when removing or rotating the knife.

Figure 1.43: MD #313881

MD #327086

Released spring energy hazard

WARNING

To prevent injury:

- When servicing or replacing wheel axle components, the lift-assist spring no longer has counterweight and becomes energized.
- Do **NOT** attempt to pry adjustment handle out of a position slot before releasing tension from the assist springs.

Figure 1.44: MD #327086

MD #327588

Hitch damage hazard

DANGER

To prevent serious injury or death:

- Remove the left contour wheel before transporting the header with transport.
- Do **NOT** tow a header if the transport hitch is damaged.

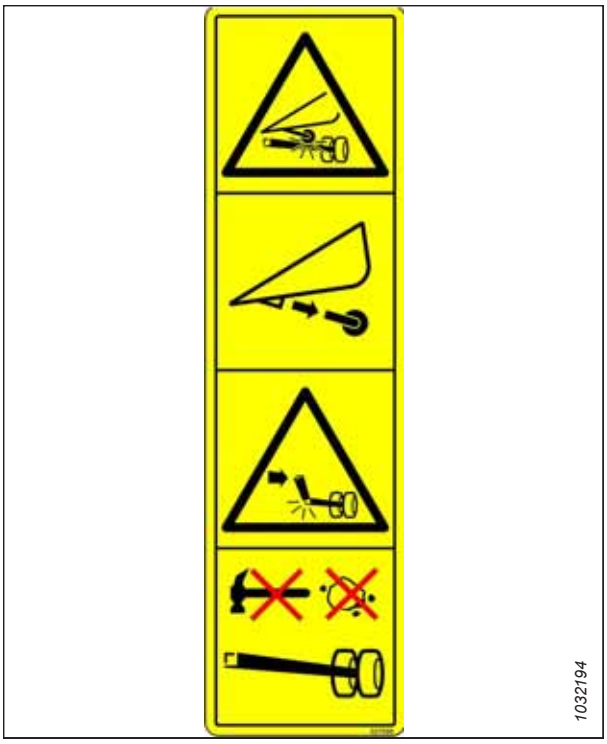


Figure 1.45: MD #327588

MD #360541

Reel entanglement / reel crushing hazard

DANGER

- To prevent injury from entanglement with the rotating reel, stand clear of the header while the machine is running.
- To prevent injury from the fall of the raised reel, fully raise the reel, stop the engine, remove the key, and engage the mechanical safety lock on each reel support arm before working on or under the reel.

Figure 1.46: MD #360541

Chapter 2: Product Overview

Refer to this section to learn the definitions of the technical terms used in this manual, the machine's specifications, and the locations of key components.

2.1 Definitions

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

Table 2.1 Definitions

Term	Definition
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener designed to be paired with a nut
Cab-forward	Windrower operation mode, in which the Operator's seat faces the header
CDM	Cab display module on an M Series Windrower
Center-link	A hydraulic cylinder or manually adjustable turnbuckle type connection between the header and the vehicle, which is used to change the angle of the header relative to the vehicle
CGVW	Combined gross vehicle weight
D2 Series Header	MacDon D215, D220, D225, D230, D235, and D241 draper headers for windrowers
DK	Double knife
DR	Double reel
Engine-forward	Windrower operation with Operator and engine facing in direction of travel
Export header	The header configuration typical outside North America
FFFT	Flats from finger tight
Finger tight	Finger tight is a reference position in which the given sealing surfaces or components are making contact with each other and the fitting has been tightened by hand to a point where the fitting is no longer loose and cannot be tightened further by hand
GVW	Gross vehicle weight
Hard joint	A joint made with use of a fastener where joining materials are highly incompressible
Header	A machine that cuts and lays crop into a windrow when attached to a windrower
Hex key	A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in the head (internal-wrenching hexagon drive); also known as an Allen key
HPT display	Harvest Performance Tracker display module on an M1 Series Windrower
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting
M Series Windrowers	MacDon M100, M105, M150, M155, M155*E4*, M200, and M205 Windrowers
M1 Series Windrowers	MacDon M1170, M1170*NT5*, and M1240 Windrowers
n/a	Not applicable
North American header	The header configuration typical in North America
NPT	National Pipe Thread: A style of fitting used for low-pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit
Nut	An internally threaded fastener 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

Table 2.1 Definitions (continued)

Term	Definition
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
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread when inserted into a mating part
SKD	Single-knife drive
Soft joint	A flexible joint made by use of a fastener in which the joining materials compress or relax over a period of time
spm	Strokes per minute
SR	Single reel
Tension	An axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.). This term can also be used to describe the force a belt exerts on a pulley or sprocket
TFFT	Turns from finger tight
Timed knife drive	Synchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor
Torque	The product of a force * the length of a lever arm, usually measured in Newton-meters (Nm) or foot-pounds (lbf·ft)
Torque angle	A tightening procedure in which a fitting is assembled to a specified tightness (usually finger tight) and then the nut is turned farther by a specified number of degrees until it achieves its final position
Torque-tension	The relationship between the assembly torque applied to a piece of hardware and the axial load it induces in a bolt or screw
UCA	Upper cross auger
Untimed knife drive	Unsynchronized motion applied at the cutterbar to two separately driven knives from a single hydraulic motor or from two hydraulic motors
Washer	A thin cylinder with a hole or a slot located in the center, used as a spacer, a load distribution element, or a locking mechanism
Windrower	The power unit for a header

2.2 D2 Series Draper Header Specifications

The following symbols and letters are used in specification tables.

S: standard / O_F: optional (factory installed) / O_D: optional (dealer installed) / –: not available

Table 2.2 Header Specifications

Cutterbar			
Effective cutting width (distance between crop divider points)			
4.6 m (15 ft.) header		4610 mm (181.5 in.)	S
6.1 m (20 ft.) header		6134 mm (241.5 in.)	S
7.6 m (25 ft.) header		7658 mm (301.5 in.)	S
9.1 m (30 ft.) header		9182 mm (361.5 in.)	S
10.7 m (35 ft.) header		10,706 mm (421.5 in.)	S
12.5 m (41 ft.) header		12,535 mm (493.5 in.)	S
Knife			
Single-knife drive 7.6–10.7 m (25–35 ft.): Hydraulic motor mounted to enclosed heavy duty MacDon knife drive box on left side of header			O_F
Timed double-knife drive 4.6–10.7 m (15–35 ft.): One hydraulic motor mounted to enclosed heavy duty MacDon knife drive box on each end of the header. Knife drives on each end of header timed electronically using hydraulic valves and position/speed sensors			O_F
Untimed double-knife drive 12.5 m (41 ft.): One hydraulic motor mounted to enclosed heavy duty MacDon knife drive box on each end of the header			O_F
Knife stroke		76 mm (3 in.)	S
Single-knife speed	7.6 m (25 ft.) header	1200–1400 (strokes/min.)	S
Single-knife speed	9.1 m (30 ft.) header	1200–1500 (strokes/min.)	S
Single-knife speed	10.7 m (35 ft.) header	1200–1400 (strokes/min.)	S
Double-knife speed	4.6 m, 6.1 m, and 7.6 m (15 ft., 20 ft., and 25 ft.) headers	1400–1800 (strokes/min.)	S
Double-knife speed	9.1 m (30 ft.) headers	1200–1800 (strokes/min.)	S
Double-knife speed	10.7 m (35 ft.) headers	1200–1700 (strokes/min.)	S
Double-knife speed	12.5 m (41 ft.) headers	1200–1600 (strokes/min.)	S
Knife Sections			
Over-serrated / ultra coarse / ClearCut™ / quickchange / bolted / 4 serrations per inch			O_F
Over-serrated / coarse / ClearCut™ / quickchange / bolted / 9 serrations per inch			O_F
Over-serrated / fine / ClearCut™ / quickchange / bolted / 14 serrations per inch			
Guards and Hold-Downs			
Guard: ClearCut™ pointed - forged and double heat treated (DHT) Hold-down: forged, single bolt adjustment			O_F
Guard: ClearCut™ four point - forged and double heat treated (DHT) Hold-down: forged, single bolt adjustment			O_F
Guard: ClearCut™ PlugFree™ - forged and double heat treated (DHT) Hold-down: forged, dual bolt adjustment			O_F

Table 2.2 Header Specifications (continued)

Guard Angle (Cutterbar on Ground)			
M Series Windrower / center-link retracted		5.2 degrees	S
M Series Windrower / center-link extended		12.3 degrees	S
M1 Series Windrower / center-link retracted		5.1 degrees	S
M1 Series Windrower / center-link extended		12.5 degrees	S
Draper (Conveyor) and Decks			
Draper width		1270 mm (50 in.)	S
Draper drive		Hydraulic	S
Draper speed (M1 Series Windrower)		0–250 m/min (822 ft/min)	S
Draper speed (M Series Windrower)		0–231 m/min (760 ft/min)	S
PR15 Pick-Up Reel			S
Quantity of tine tubes		5, 6, or 9	—
Center tube diameter		203 mm (8 in.)	—
Finger tip radius	Factory assembled	800 mm (31 1/2 in.)	—
Finger tip radius	Adjustment range	766–800 mm (30 3/16 – 31 1/2 in.)	—
Effective reel diameter (via cam profile)		1650 mm (65 in.)	—
Finger length		290 mm (11 in.)	—
Finger spacing (staggered on alternate bats)		100 mm (4 in.)	—
Reel drive		Hydraulic	S
Reel speed (auto-adjust from cab using ground speed index)		0–16.3 km/h (0 - 10.1 mph) (0-85 rpm)	S

Table 2.3 Header Attachments

Upper Cross Auger		O_D
Outside diameter	330 mm (13 in.)	
Tube diameter	152 mm (6 in.)	
Stabilizer Wheel /EasyMove™ Transport		O_D
Wheels	38 cm (15 in.)	
Tires	P225/75 R15	

Table 2.4 Header Weight

Estimated weight range for base header without performance options (variances are due to different package configurations)		
4.6 m (15 ft.) header		1617–1689 kg (3563–3723 lb.)
6.1 m (20 ft.) header		1852 kg (4081 lb.)
7.6 m (25 ft.) header	North America frame	2163 kg (4768 lb.)
9.1 m (30 ft.) header	North America frame	2622 kg (5779 lb.)
10.7 m (35 ft.) header	North America frame	2706–2843 kg (5963–6266 lb.)
12.5 m (41 ft.) header	North America frame	2946 kg (6493 lb.)
12.5 m (41 ft.) header	Export frame	3000 kg (6611 lb.)

2.3 D2 Series Draper Header Dimensions

Know the dimensions of your machinery before operating, transporting, or shipping.

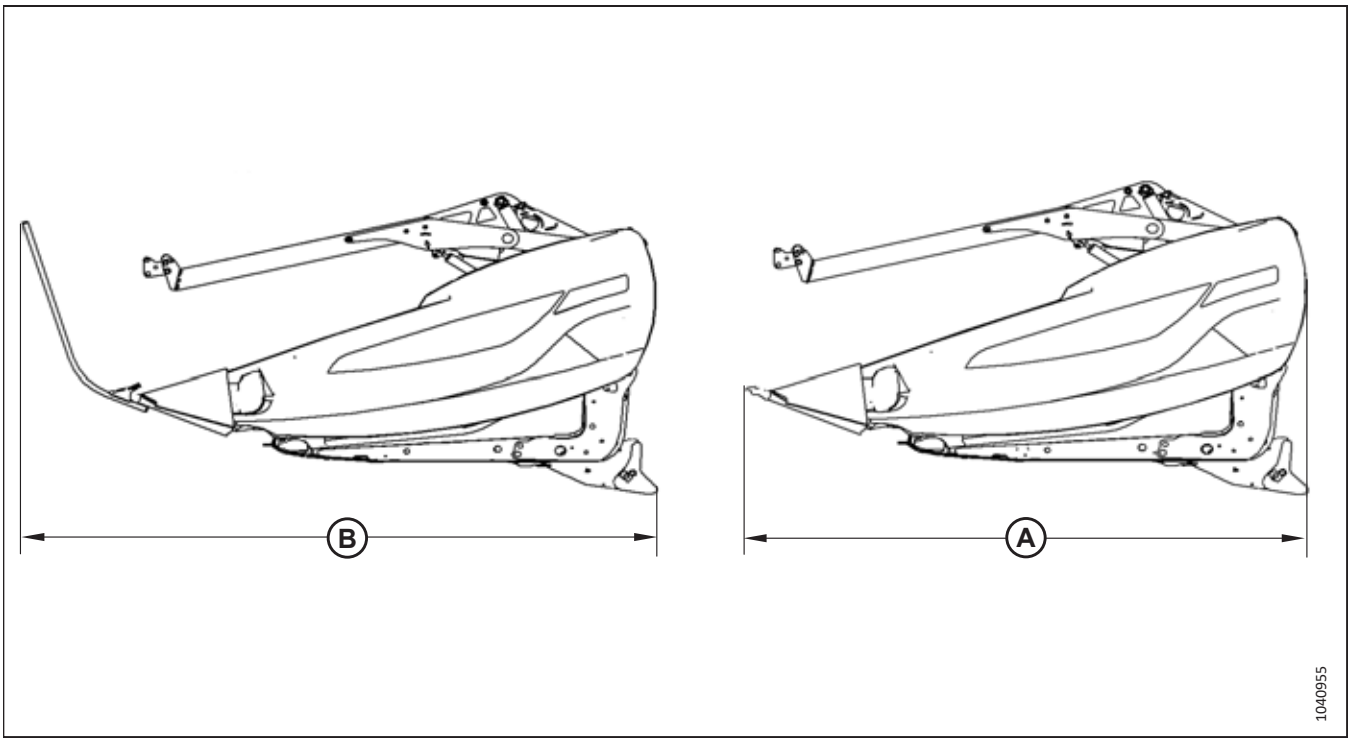


Figure 2.1: Header Width

Frame and Structure				
Header width	Field mode		Cut width + 500 mm (19.5 in.)	S
Header width	Transport mode: reel fore-aft fully retracted, shortest center-link	Dimension (A) shows long dividers removed[1]	2501 mm (99 in.)	—
Header width	Transport mode: reel fore-aft fully retracted, shortest center-link	Dimension (B) shows long dividers installed	2948 mm (116 in.)	—

1. Refer to Figure *2.1, page 37*.

2.4 D2 Series Draper Header Component Identification

Knowing the location and identity of key components is critical to properly operating and maintaining a machine.

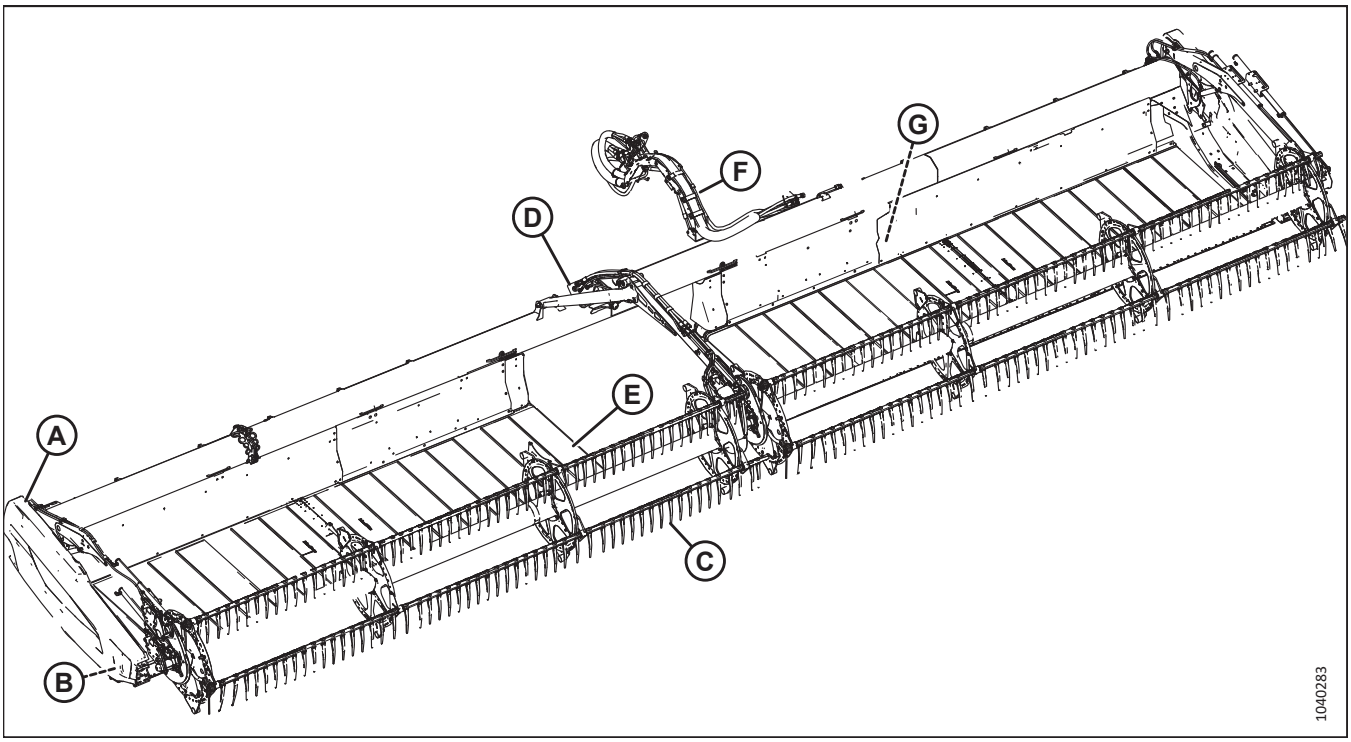


Figure 2.2: D2 Series Draper Header – Double Reel Shown

A - Endshield
B - Knife Drive Box
C - Reel Fingers
D - Center Link
E - Draper
F - Hose Management Arm (for M1 Series Only)
G - Timed Double-Knife Module

Chapter 3: Operation

Safely operating your machine requires familiarizing yourself with its capabilities.

3.1 Owner/Operator Responsibilities

Owning and operating heavy equipment comes with certain duties.

CAUTION

- **It is your responsibility to read and understand this manual completely before operating the header. 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 people to operate the header, 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. Correct these mistakes immediately, before an accident occurs.**
- **Do NOT modify the machine. Unauthorized modifications may impair the function and/or safety of the machine and may reduce the length of service you receive from your machine.**
- **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.**

3.2 Operational Safety

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

CAUTION

Adhere to the following safety precautions:

- **Follow all safety and operational instructions provided in your operator's manuals. If you do not have a windrower manual, get one from your Dealer and read it thoroughly.**
- **Never attempt to start the engine or operate the machine except from the operator's seat.**
- **Check the operation of all controls in a safe, clear area before starting work.**
- **Do NOT allow riders on the windrower.**

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.**
- **When working on inclines, travel uphill or downhill whenever possible. Be sure to keep the transmission in gear when travelling downhill.**
- **Never attempt to get on or off a moving machine.**
- **Do NOT leave the operator's station while the engine is running.**
- **To avoid bodily injury or death from the unexpected startup of a machine, always stop the engine and remove the key before adjusting or removing plugged material from the machine.**

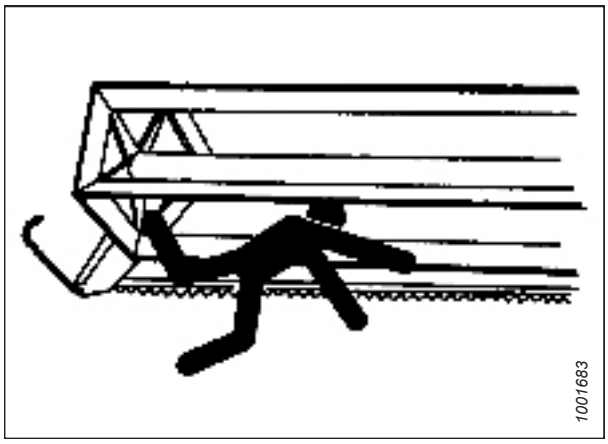


Figure 3.1: Bystander Safety

- **Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect the machine. Follow the proper shutdown procedure. For instructions, refer to *3.4 Shutting down Windrower, page 57*.**
- **Operate only in daylight or good artificial light.**

3.2.1 Header Safety Props

The header safety props located on the header lift cylinders prevent the lift cylinders from unexpectedly retracting and lowering the header. For operation instructions, refer to your windrower operator's manual.

DANGER

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

3.2.2 Reel Safety Props

The reel safety props are located on the reel arms. When engaged, the reel safety props prevent the reel from falling unexpectedly.

IMPORTANT:

To prevent damage to the reel support arms, do **NOT** transport the header with the reel safety props engaged.

Engaging Reel Safety Props

Engage the reel safety props anytime you need to work around a raised reel. When engaged, the reel safety props prevent the reel from unexpectedly lowering.

DANGER

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

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

Outer reel arms

2. Raise the reel to its maximum height.

3. Lift up on safety prop (A) and push it forward to remove the prop from hook (B).

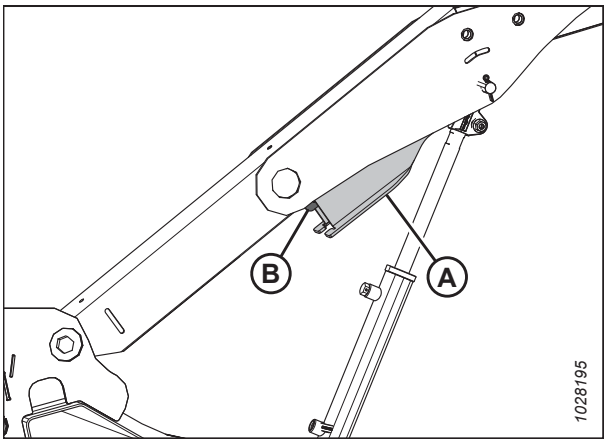


Figure 3.2: Outer Arm

4. Lower safety prop (A) and engage it on the cylinder shaft as shown. Repeat on the opposite arm.

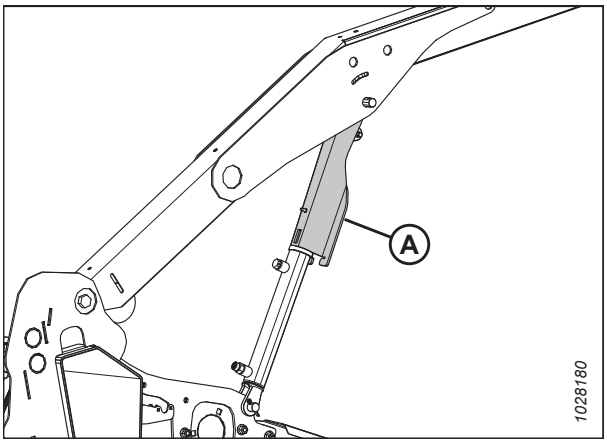


Figure 3.3: Engaged Reel Safety Prop – Outer Arm

Center reel arm – double-reel headers

5. Rotate handle (A) to release the spring tension and allow the spring to guide the pin into the locked position.
6. Lower the reel until the safety props contact the outer arm cylinder mounts and the center arm pins.

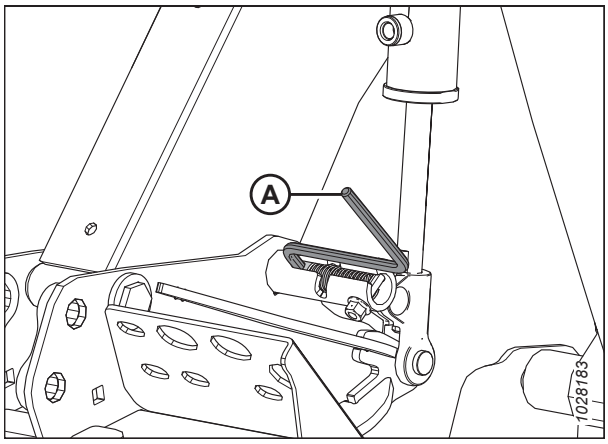


Figure 3.4: Engaged Reel Safety Prop – Center Arm

Disengaging Reel Safety Props

To ensure the proper operation of the reel and header, disengage the reel safety props once you have completed working on or around a raised reel.

DANGER

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

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

Outer reel arms

2. Raise the reel to its maximum height.
3. Move reel safety prop (A) up onto hook (B) under the reel arm. Repeat this step on the opposite reel arm.

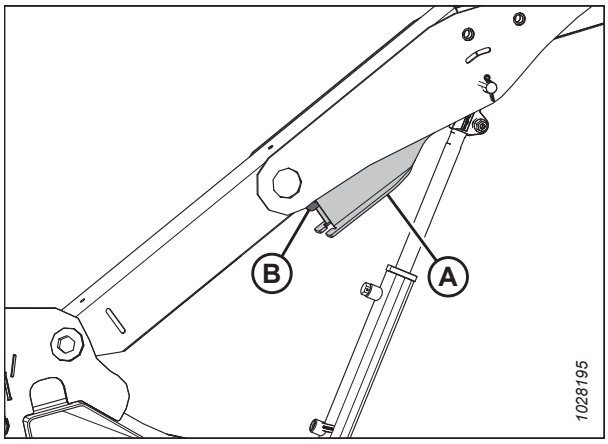


Figure 3.5: Reel Safety Prop – Right Outer Arm

Center reel arm – double-reel headers

4. Move handle (A) outboard and into slot (B) to put the pin into the unlocked position.

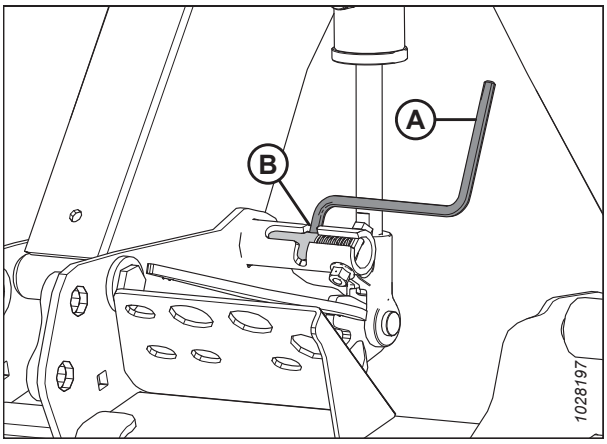


Figure 3.6: Reel Safety Prop – Center Arm

3.2.3 Header Endshields

A hinged, polyethylene endshield is fitted on each end of the header to protect critical drive components.

Opening Header Endshields

The header endshields covers knife drive components, hydraulic hoses, electrical connections, the header wrench, the spare knife, and the optional transport hitch. To access the components you will need to open the endshield.

1. Push release lever (B) using access hole (A) on the backside of the header endshield to unlock the shield.

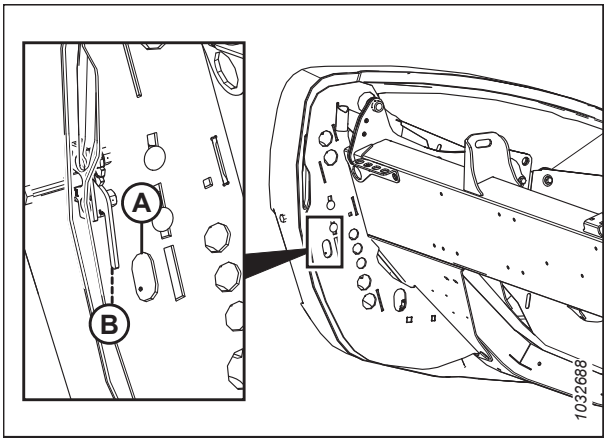


Figure 3.7: Left Header Endshield

2. Pull header endshield (A) open.

   NOTE:

   The header endshield is retained by tab (B) and will open in direction (C).

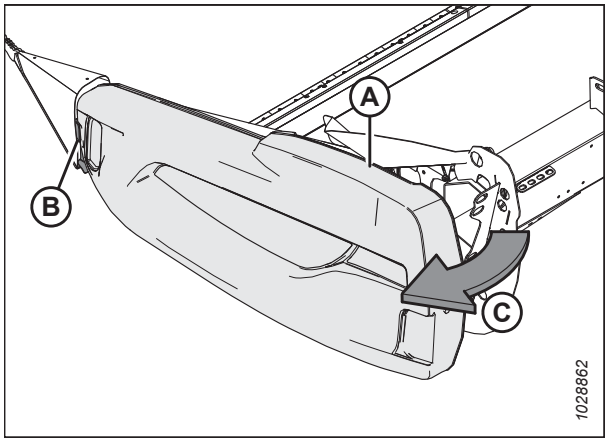


Figure 3.8: Left Header Endshield

3. If additional clearance is required, pull the header endshield free of tab (A) and then swing the shield toward the rear of the header.
4. Engage safety latch (B) on hinge arm (C) to secure the shield in the fully open position.

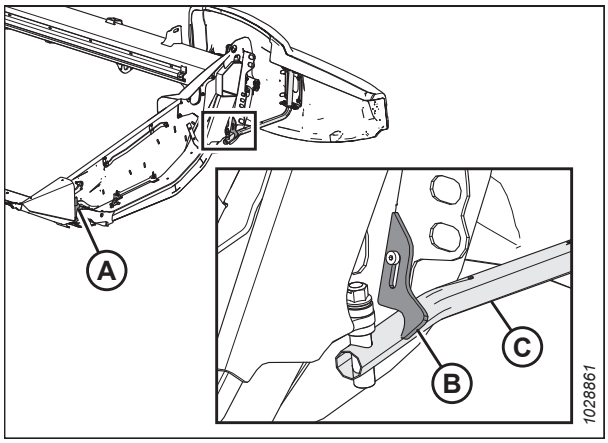


Figure 3.9: Left Header Endshield

Closing Header Endshields

The header endshields covers knife drive components, hydraulic hoses, electrical connections, the header wrench, the spare knife, and the optional transport hitch. After accessing the components you will need to close the endshield.

1. If the endshield is fully opened and secured behind the header, disengage lock (A) to allow header endshield (B) to move.
2. Rotate the header endshield toward the front of the header.

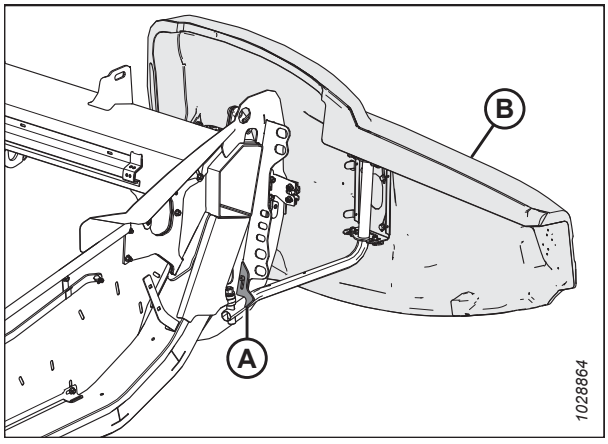


Figure 3.10: Left Header Endshield

3. While closing the endshield, ensure header endshield (A) does not contact the top of endsheet (B). If adjustment is required, refer to *Checking and Adjusting Header Endshields, page 46*.

   IMPORTANT:

   The aluminum endsheet will be damaged if the weight of the plastic endshield rests on it.

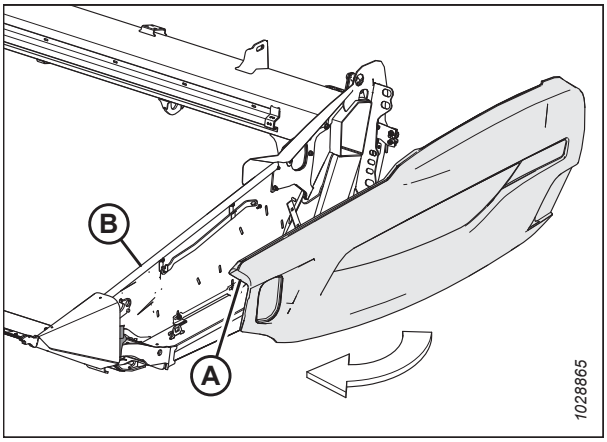


Figure 3.11: Left Header Endshield

4. Insert the front of the header endshield behind hinge tab (B) and into the divider cone.

5. Swing the header endshield in direction (A) into the closed position. Engage two-stage latch (C) with a firm push.

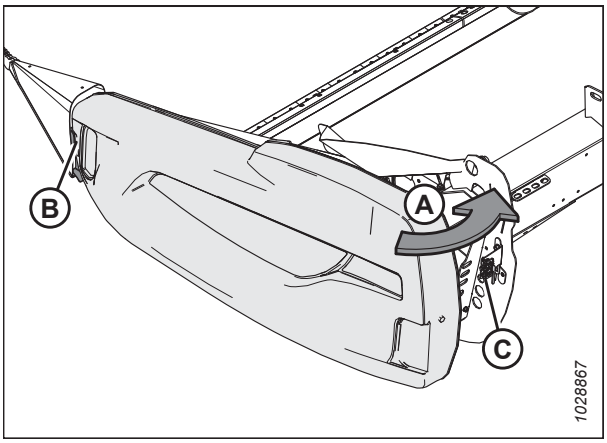


Figure 3.12: Left Header Endshield

IMPORTANT:

Check that the header endshield is locked. Ensure bolt (A) is fully engaged on two-stage latch (B) to prevent the header endshield from opening while operating the header. If adjustment is required, refer to *Checking and Adjusting Header Endshields, page 46*.

NOTE:

The header endshield is transparent in the illustration to show the latch.

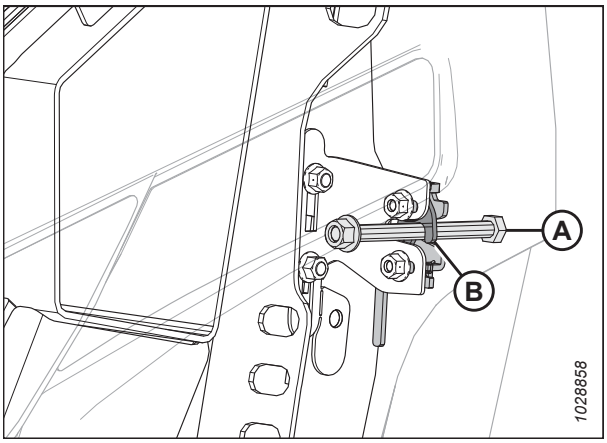


Figure 3.13: Two-Stage Latch

Checking and Adjusting Header Endshields

Header endshields are subject to expansion or contraction caused by large temperature variations. The position of the header endshield can be adjusted to compensate for dimensional changes.

IMPORTANT:

The aluminum endsheet will be damaged if the weight of the polyethylene header endshield rests on it.

1. Measure clearance (A) between header endshield (B) and endsheet (C). The clearance should be 1–3 mm (0.04–0.12 in.).

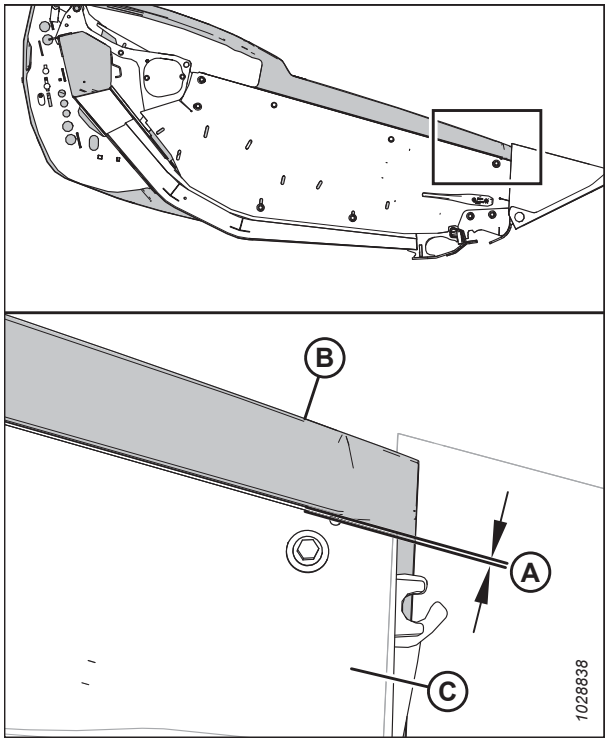


Figure 3.14: Clearance between Header Endshield and Endsheet

2. If the clearance between the header endshield and the endshield is insufficient, adjust support bracket (A) as follows:
   a. Loosen bolts (B).
   b. Move support bracket (A) up or down as needed.
   c. Retighten the hardware.

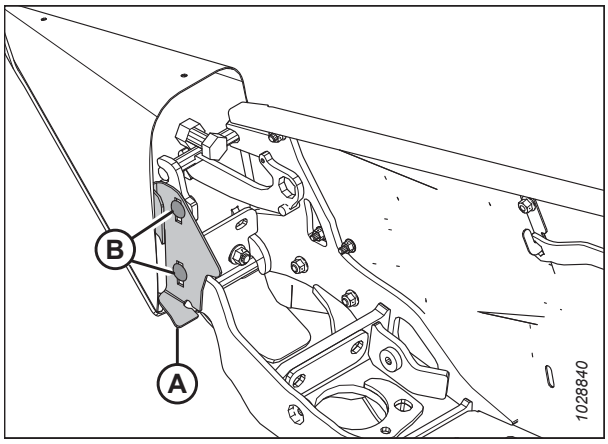


Figure 3.15: Header Endshield Support Bracket

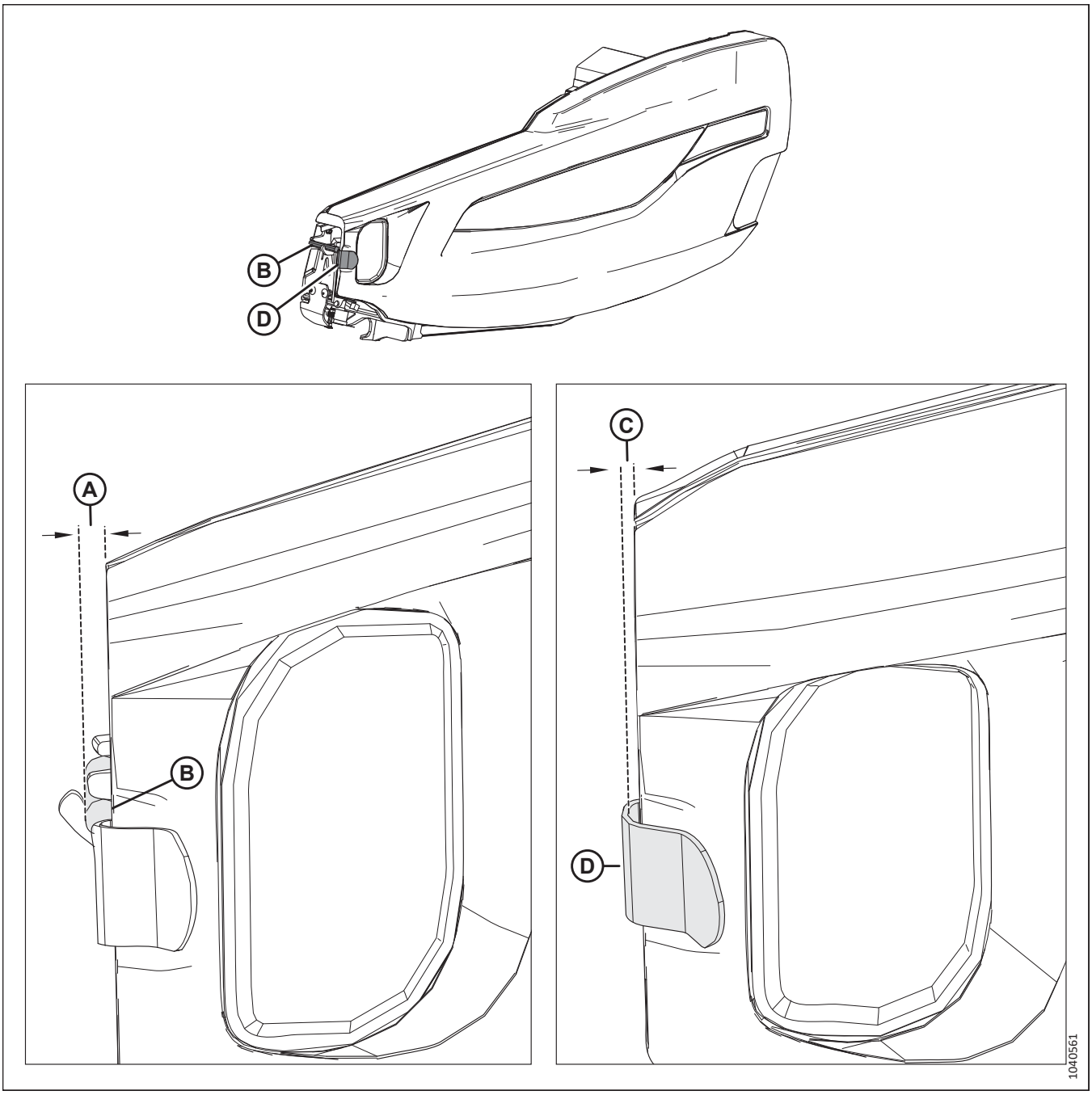


Figure 3.16: Clearance Specifications at the Front of the Endshield

3. Measure clearance (A) between the front of the header endshield and pin (B). The clearance should be 8–18 mm (0.3–0.7 in).

4. Measure clearance (C) between the front of the header endshield and support bracket (D). The clearance should be 6–10 mm (0.24–0.39 in).

5. If the clearances at the front of the endshield are insufficient, adjust the position of hinge arm (A) as follows:
   a. Loosen four nuts (B).
   b. Slide brackets (C) and hinge arm (A) fore or aft as required to achieve the correct clearance.
   c. Retighten the hardware.

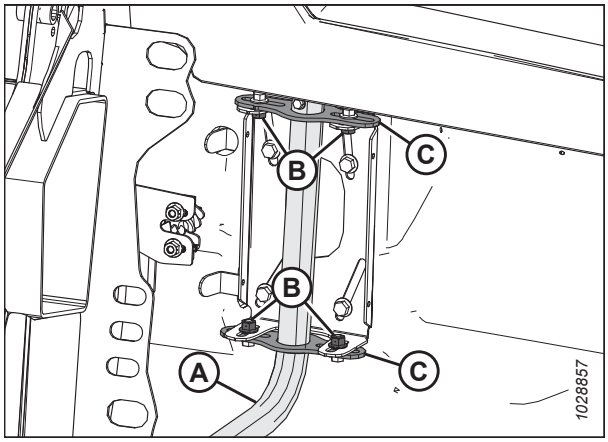


Figure 3.17: Left Header Endshield

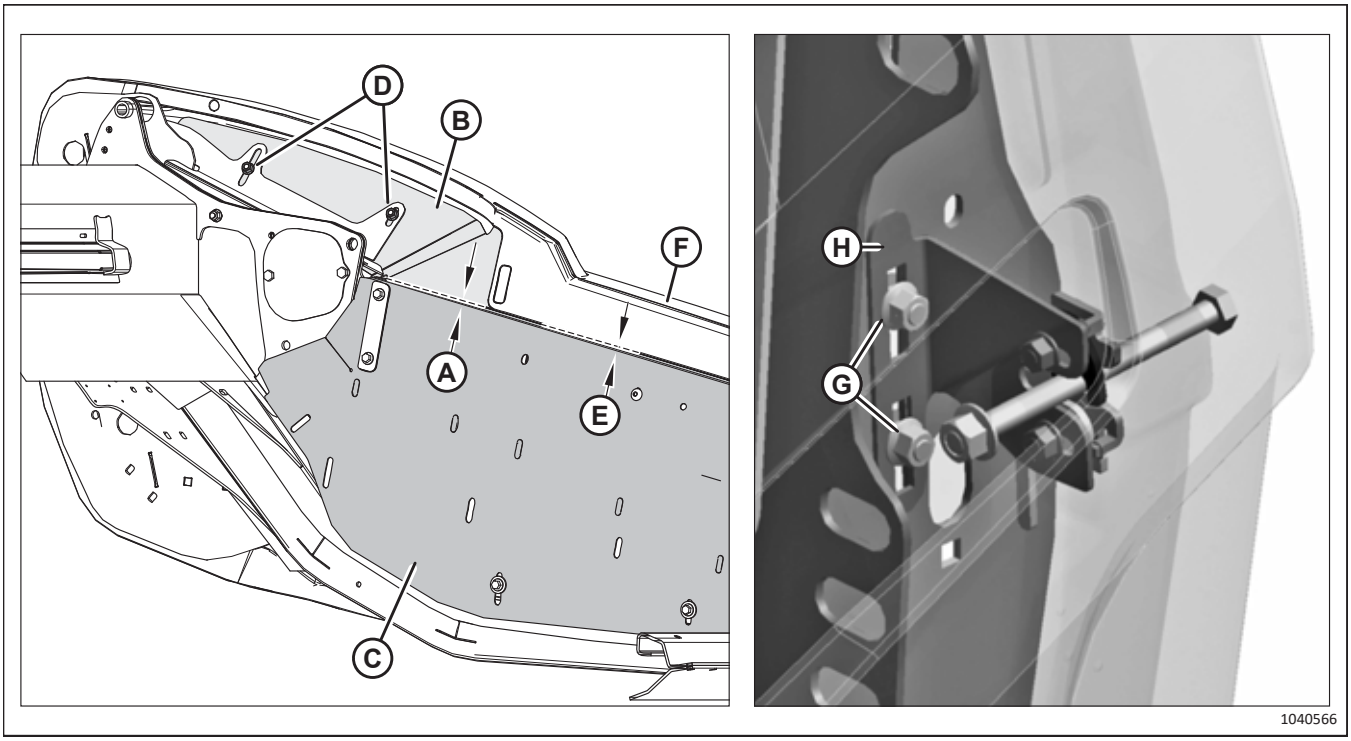


Figure 3.18: Clearance Specification between Neck Shield and Panel

6. Measure clearance (A) between neck shield (B) and panel (C). The clearance must be at least 3 mm (0.12 in.). To adjust the clearance, loosen two nuts (D), move neck panel (B), and tighten nuts (D).

7. Measure clearance (E) between panel (C) and endshield (F). The clearance must be 1–3 mm (0.04–0.12 in.). To adjust the clearance, loosen two nuts (G), slide bracket (H) up or down, and re-tighten the nuts. Make sure the endshield does **NOT** rest on neck panel (B).

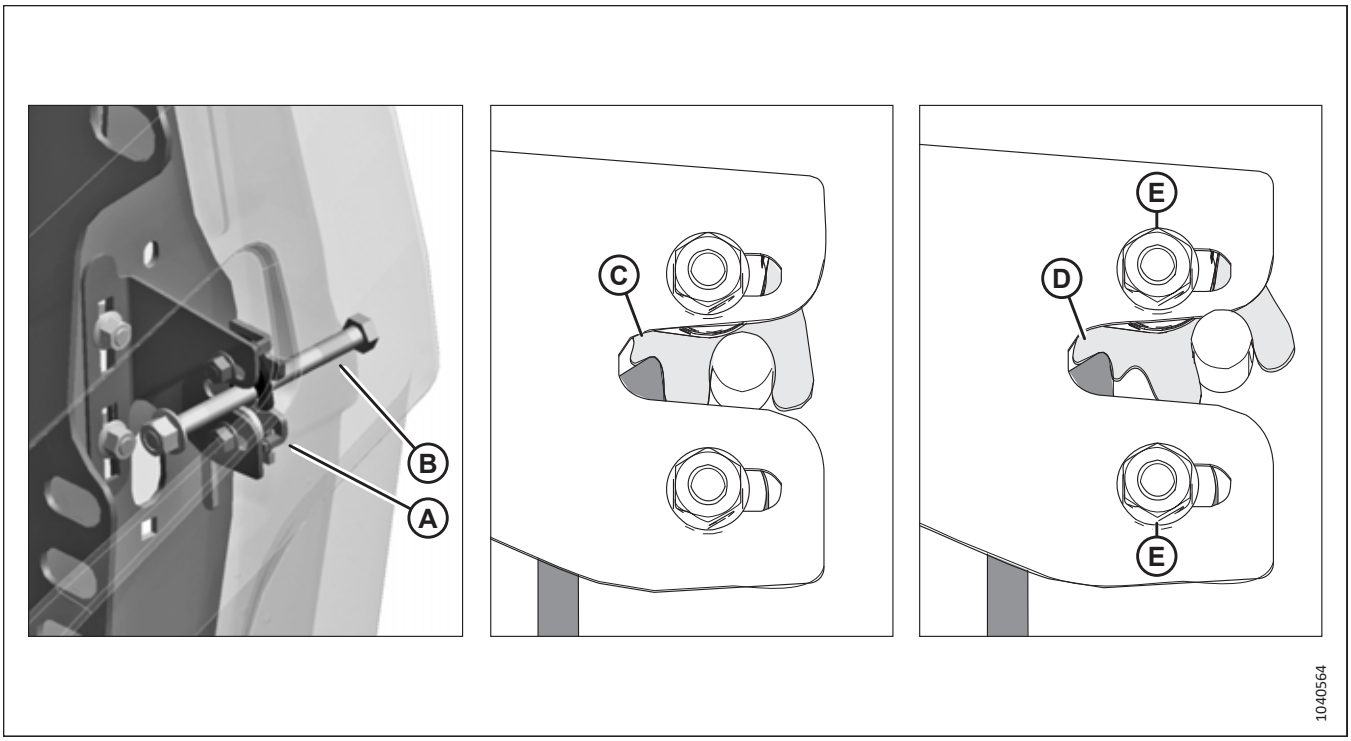


Figure 3.19: Two-Stage Latch

8. When the endshield is closed, two-stage latch (A) must engage first catch (C). This will allow second catch (D) to prevent the endshield from opening completely in case the endshield unlatches by accident. Confirm the endshield latches properly by following Step *9, page 49* to Step *11, page 49*.
9. Close the endshield. Confirm bolt (B) engages latch (A).
10. Release the latch.
11. Try to open the endshield.
    - If you can open the endshield partially, but **NOT** completely, then the latch is positioned properly. No further adjustment is necessary.
    - If you can open the endshield completely, then loosen two nuts (E), move the latch along the slotted holes, and then re-tighten the nuts. Repeat Step *9, page 49* to Step *11, page 49*.

Removing Header Endshields

Remove the endshields when servicing the end shields.

DANGER

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

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

2. Fully open the header endshield. For instructions, refer to *Opening Header Endshields, page 43*.
3. Engage latch (A) to prevent any endshield movement.
4. Remove self-tapping screw (B).
5. Slide the header endshield upwards and remove it from hinge arm (C).
6. Place the header endshield away from the work area.

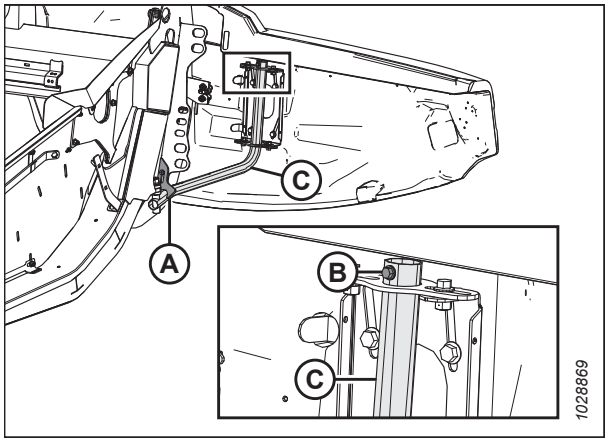


Figure 3.20: Left Header Endshield

Installing Header Endshields

To ensure the endshields are installed correctly, follow the recommended installation procedure provided here.

IMPORTANT:

Be careful not to rest the endshield on the aluminum endsheet while installing the endshield.

1. Guide the header endshield onto hinge arm (C) and slowly slide it downwards.
2. Install self-tapping screw (B).
3. Disengage latch (A) to allow the header endshield to move.
4. Close the header endshield. For instructions, refer to *Closing Header Endshields, page 44*.

   NOTE:

   Header endshields may expand or contract when subjected to large temperature changes. The header endshield position can be adjusted to compensate for dimensional changes. For instructions, refer to *Checking and Adjusting Header Endshields, page 46*.

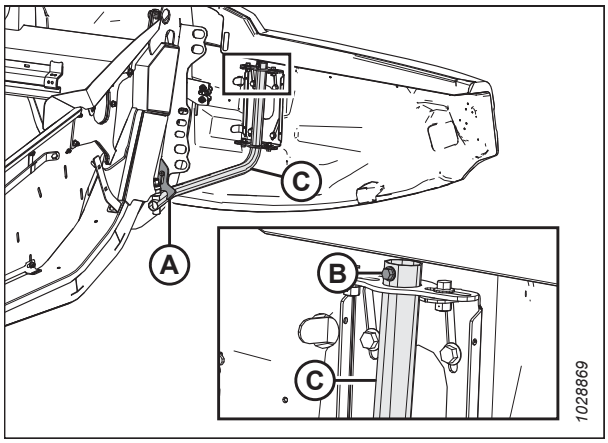


Figure 3.21: Left Header Endshield

3.2.4 Reel Drive Cover

The reel drive cover protects the reel drive components from dirt and debris.

Removing Reel Drive Cover

The reel drive cover can be removed to access the reel drive components for service.

DANGER

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

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Adjust the reel fully forward.
3. Lower the header fully.
4. Shut down the engine, and remove the key from the ignition.

Single-reel drive:

5. Support reel drive cover (A), and rotate spring latch (B) up and over the back plate.
6. Slide the reel drive cover down to unlatch it from two tabs (C). Remove reel drive cover (A).

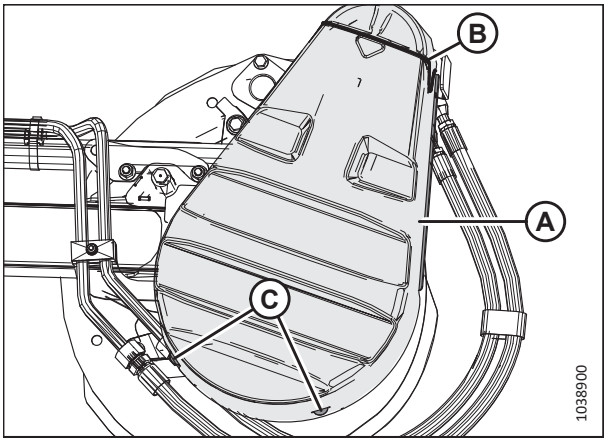


Figure 3.22: Drive Cover

Double-reel drive:

7. Rotate spring latch (A) up and over the back plate.

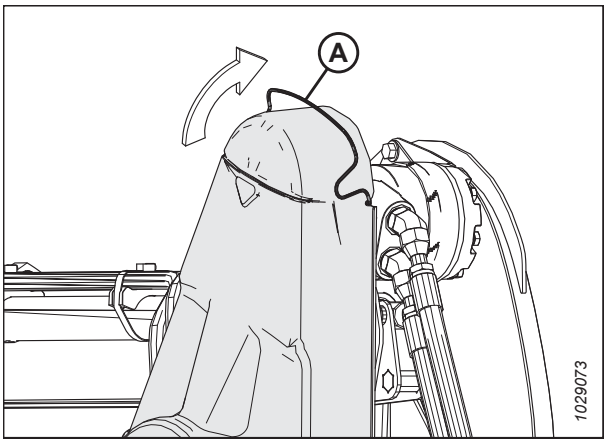


Figure 3.23: Upper Drive Cover

8. Unclip upper cover (A) from the lower cover at locations (B), and remove the upper cover. Keep the two clips engaged on the lower cover.

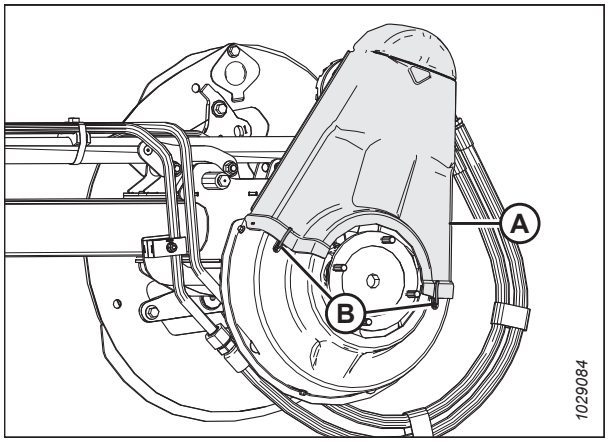


Figure 3.24: Upper Drive Cover

9. If necessary, remove lower cover (B) by removing three bolts (A).

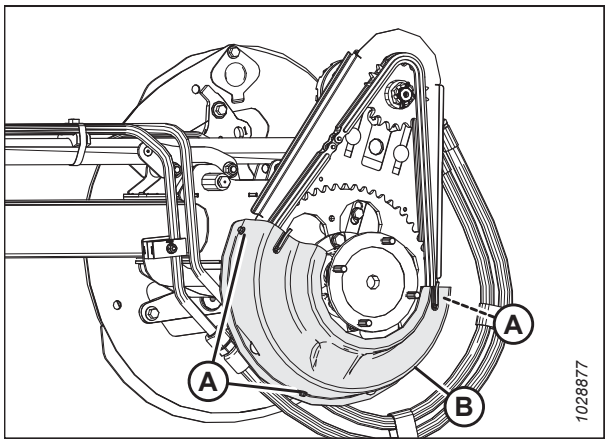


Figure 3.25: Lower Drive Cover

Installing Reel Drive Cover

The reel drive cover protects the drive components from weather and debris. The header should not be operated without the cover.

DANGER

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

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

Single-reel drive:

2. Align the slot in the bottom of reel drive cover (A) to tabs (C) on the reel drive back plate support, and slide the reel drive up.

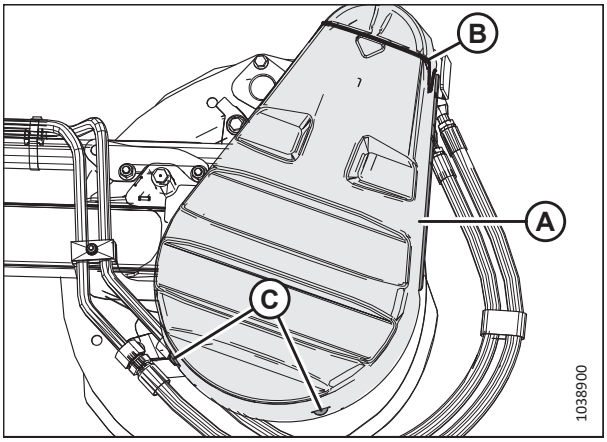


Figure 3.26: Drive Cover

3. Rotate spring latch (A) down to secure the upper cover to the reel drive. Ensure V-shaped loop (C) points down, and the spring end remains inserted into back plate hole (B) on both sides of the reel drive.

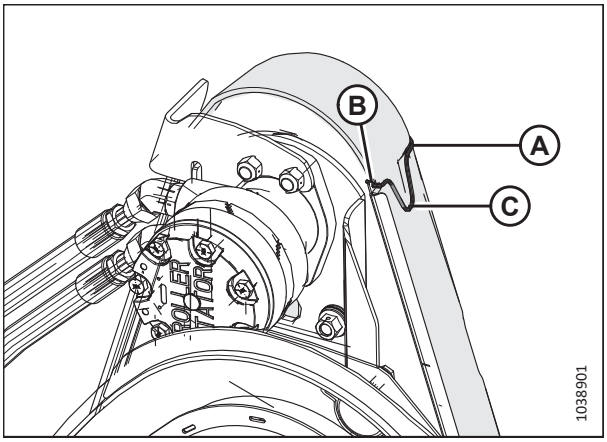


Figure 3.27: Reel Drive

Double-reel drive:

4. Position lower drive cover (B) (if previously removed) onto the reel drive. Secure the cover with three bolts (A).

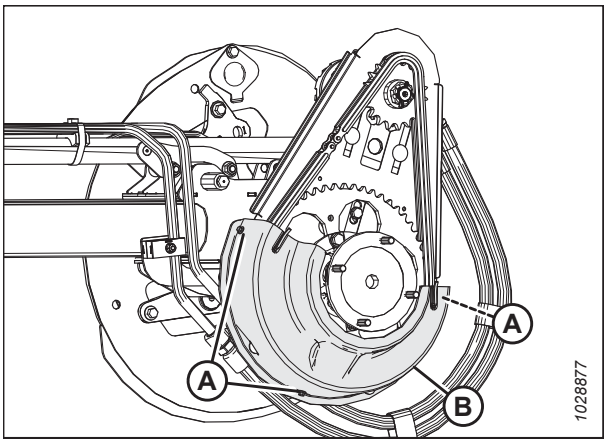


Figure 3.28: Lower Drive Cover

5. Position upper cover (A) on the reel drive. Secure the cover with two clips (B) on the lower cover.

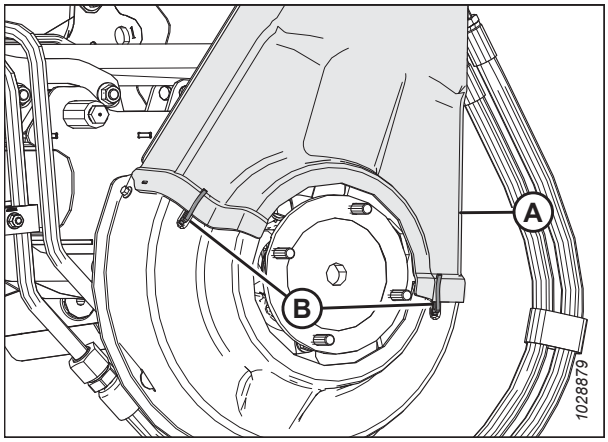


Figure 3.29: Upper Drive Cover

6. Rotate spring latch (A) down to secure the upper cover to the reel drive. Ensure V-shaped loop (C) points down, and the spring end remains inserted into back plate hole (B) on both sides of the reel drive.

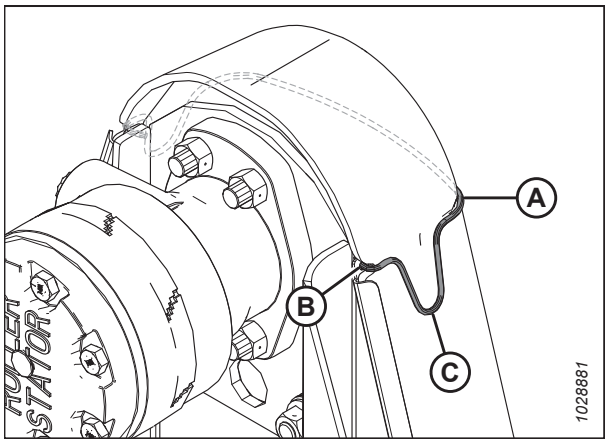


Figure 3.30: Reel Drive

3.2.5 Daily Start-Up Check

Perform these checks daily before attempting to operate the machine.

CAUTION

- **Clear the area of bystanders. Keep children away from machinery. Walk around the machine to be sure no one is under, on, or close to it.**
- **Wear close-fitting clothing and protective shoes equipped with slip-resistant soles.**
- **Remove potentially hazardous objects from the machine and from the surrounding area.**
- **Carry with you any protective clothing and personal safety devices that could be necessary through the day. Do NOT take chances. Personal safety devices that may be needed include a hard hat, protective glasses or goggles, heavy gloves, a respirator or filter mask, or wet weather gear.**

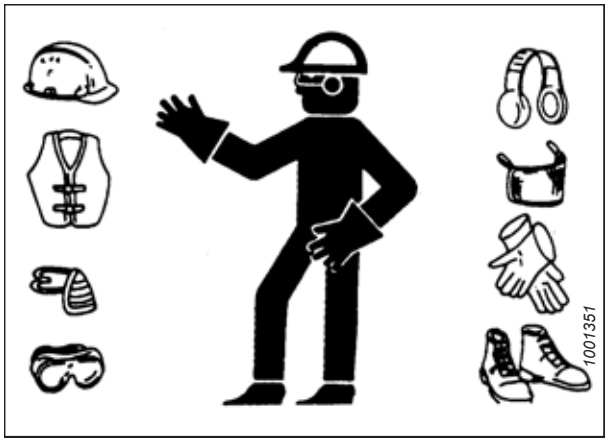


Figure 3.31: Safety Devices

- **Protect against noise. Wear a suitable hearing protection device such as ear muffs or ear plugs to protect against objectionable or uncomfortably loud noises.**

Perform the following checks before starting the machine:

1. Inspect the machine for leaks and for any parts that are missing, damaged, or nonfunctional.

   IMPORTANT:

   Use the proper procedure when searching for pressurized fluid leaks. For instructions, refer to *5.2.5 Checking Hydraulic Hoses and Lines, page 187*.

2. Clean all the lights and reflectors on the machine.

3. Perform all daily maintenance. For instructions, refer to *5.2.1 Maintenance Schedule/Record, page 184*.

3.3 Break-in Period

During the first 50 hours of operation, certain systems on the header will require extra attention. Follow this procedure to ensure the service life of the header.

NOTE:

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

DANGER

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

After attaching the header to the windrower for the first time, follow these steps:

1. Operate the machine with the reels, drapers, and knives running slowly for five minutes. Watch and listen **FROM THE OPERATOR'S SEAT** for binding or interfering parts.

   NOTE:

   The reels and side drapers will not operate until hydraulic oil fills the lines.

2. Refer to *5.2.2 Break-in Inspection, page 185* and perform all the specified tasks.

3.4 Shutting down Windrower

Before leaving the operator's seat for any reason, shut down the windrower.

DANGER

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

To shut down the windrower, do the following:

1. Park the windrower on level ground.
2. Lower the header fully.
3. Place all controls in NEUTRAL or PARK.
4. Disengage the header drive.
5. Lower and fully retract the reel.
6. Shut down the engine, and remove the key from the ignition.
7. Wait for the machine to stop moving.

3.5 Cab Controls

The header is controlled from the windrower cab.

DANGER

Ensure that all bystanders have cleared the area.

For instructions, refer to your windrower operator's manual for identification of the following in-cab controls:

- Header engage/disengage control
- Header height
- Header angle
- Ground speed
- Reel speed
- Reel height
- Reel fore-aft position

3.6 Header Setup

For optimal performance, the header must be configured specifically for various harvesting conditions and crops.

3.6.1 Header Attachments

Optional attachments can improve performance in specific conditions or add features to the header. Optional attachments can be ordered and installed by your MacDon Dealer.

Refer to *6 Options and Attachments, page 319* for descriptions of available items.

3.6.2 Header Settings

The following tables provide guidelines for setting up D2 Series Draper Headers for different crops and crop conditions; however, the suggested settings can be changed to suit crops and conditions not covered in the tables.

Refer to *3.6.3 Reel Settings, page 69*.

Table 3.1 Recommended D2 Header Settings for Canola, Stubble Height 102–203 mm (4–8 in.)

Stabilizer Wheels[2]	Variable							
Float N (lbf)[3]	311–445 (70–100)							
Crop Condition	**Divider Rods**	**Header Angle**[4]	**Skid Shoe Position**[5]	**Reel Cam**[6]	**Reel Speed**[7]	**Knife Speed**[8]	**Reel Position**[9]	**Upper Cross Auger**
Light	On	8–10	Variable	2	-1 to +1	Medium	6 or 7	Not required
Normal	On	8–10	Middle or Down	1	-0.5 to +1	Low	6 or 7	Not required
Heavy	On	8–10	Variable	1	-0.5 to +1	Low	3 or 4	Recommended
Lodged	On	8–10	Middle or Down	2	-1 to +1	Low	3 or 4	Recommended

2. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
3. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
4. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
5. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
6. Refer to *Reel Cam Settings, page 92*.
7. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
8. Refer to *3.7.9 Knife Speed Information, page 79*.
9. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

Table 3.2 Recommended D2 Header Settings for Canola, Stubble Height >203 mm (>8 in.)

Stabilizer Wheels[10]	Variable							
Float N (lbf)[11]	667 (150)							
Crop Condition	**Divider Rods**	**Header Angle**[12]	**Skid Shoe Position**[13]	**Reel Cam**[14]	**Reel Speed**[15]	**Knife Speed**[16]	**Reel Position**[17]	**Upper Cross Auger**
Light	On	8–10	Not applicable	2	-1 to +1	Medium	6 or 7	Not required
Normal	On	8–10	Not applicable	2	-0.5 to +1	Low	6 or 7	Not required
Heavy	On	8–10	Not applicable	3	-0.5 to +1	Low	3 or 4	Recommended
Lodged	On	8–10	Not applicable	3	-1 to +1	Low	3 or 4	Recommended

10. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
11. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
12. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
13. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
14. Refer to *Reel Cam Settings, page 92*.
15. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
16. Refer to *3.7.9 Knife Speed Information, page 79*.
17. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

Table 3.3 Recommended D2 Header Settings for Cereals, Stubble Height <102 mm (<4 in.)

Stabilizer Wheels[18]	Storage							
Float N (lbf)[19]	311 (70)							
Crop Condition	**Divider Rods**	**Header Angle**[20]	**Skid Shoe Position**[21]	**Reel Cam**[22]	**Reel Speed**[23]	**Knife Speed**[24]	**Reel Position**[25]	**Upper Cross Auger**
Light	On	0–3	Up or Middle	2	-0.5 to +1.5	High	6 or 7	Not required
Normal	On	0–3	Up or Middle	2	-0.5 to +1	Medium	6 or 7	Not required
Heavy	On	4–7	Up or Middle	2	-0.5 to +1	Medium	6 or 7	Not required
Lodged	On	4–7	Up or Middle	3	-1 to +1	Medium	4 or 5	Not required

18. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
19. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
20. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
21. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
22. Refer to *Reel Cam Settings, page 92*.
23. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
24. Refer to *3.7.9 Knife Speed Information, page 79*.
25. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

Table 3.4 Recommended D2 Header Settings for Cereals, Stubble Height 102–203 mm (4–8 in.)

Stabilizer Wheels[26]	Variable							
Float N (lbf)[27]	311 (70)							
Crop Condition	**Divider Rods**	**Header Angle**[28]	**Skid Shoe Position**[29]	**Reel Cam**[30]	**Reel Speed**[31]	**Knife Speed**[32]	**Reel Position**[33]	**Upper Cross Auger**
Light	On	0–3	Middle or Down	2	-0.5 to +1.5	High	6 or 7	Not required
Normal	On	0–3	Middle or Down	2	-0.5 to +1	Medium	6 or 7	Not required
Heavy	On	4–7	Middle or Down	2	-0.5 to +1	Medium	6 or 7	Not required
Lodged	On	4–7	Down	3	-1 to +1	Medium	4 or 5	Not required

26. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
27. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
28. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
29. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
30. Refer to *Reel Cam Settings, page 92*.
31. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
32. Refer to *3.7.9 Knife Speed Information, page 79*.
33. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

Table 3.5 Recommended D2 Header Settings for Cereals, Stubble Height >203 mm (>8 in.)

Stabilizer Wheels[34]	Variable							
Float N (lbf)[35]	667 (150)							
Crop Condition	**Divider Rods**	**Header Angle**[36]	**Skid Shoe Position**[37]	**Reel Cam**[38]	**Reel Speed**[39]	**Knife Speed**[40]	**Reel Position**[41]	**Upper Cross Auger**
Light	On	0–3	Not applicable	2	-0.5 to +1.5	High	6 or 7	Not required
Normal	On	0–3	Not applicable	2	-0.5 to +1	Medium	6 or 7	Not required
Heavy	On	4–7	Not applicable	2	-0.5 to +1	Medium	6 or 7	Not required
Lodged	On	4–7	Not applicable	3	-1 to +1	Medium	4 or 5	Not required

34. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
35. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
36. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
37. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
38. Refer to *Reel Cam Settings, page 92*.
39. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
40. Refer to *3.7.9 Knife Speed Information, page 79*.
41. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

Table 3.6 Recommended D2 Header Settings for Edible Beans, Ground Level Stubble Height (0 mm [0 in.])

Stabilizer Wheels[42]	Storage							
Float N (lbf)[43]	445 (100)							
Crop Condition	**Divider Rods**	**Header Angle**[44]	**Skid Shoe Position**[45]	**Reel Cam**[46]	**Reel Speed**[47]	**Knife Speed**[48]	**Reel Position**[49]	**Upper Cross Auger**
Light	Off	8–10	Up or Middle	2	-1 to +1	Medium	3 or 4	Not required
Normal	Off	8–10	Up or Middle	2	-1 to +1	Medium	3 or 4	Not required
Heavy	Off	8–10	Up or Middle	2	-1 to +1	Medium	3 or 4	Not required
Lodged	Off	8–10	Up or Middle	3	-1 to +1	Medium	3 or 4	Not required

42. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
43. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
44. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
45. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
46. Refer to *Reel Cam Settings, page 92*.
47. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
48. Refer to *3.7.9 Knife Speed Information, page 79*.
49. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

Table 3.7 Recommended D2 Header Settings for Flax, Stubble Height 51–153 mm (2–6 in.)

Stabilizer Wheels[50]	Variable							
Float N (lbf)[51]	311–445 (70–100)							
Crop Condition	**Divider Rods**	**Header Angle**[52]	**Skid Shoe Position**[53]	**Reel Cam**[54]	**Reel Speed**[55]	**Knife Speed**[56]	**Reel Position**[57]	**Upper Cross Auger**
Light	On	4–7	Middle or Down	2	-1 to +1	High	6 or 7	Not required
Normal	On	0–3	Middle or Down	2	-0.5 to +1	High	6 or 7	Not required
Heavy	On	4–7	Middle or Down	2	-0.5 to +1	High	6 or 7	Not required
Lodged	On	8–10	Middle or Down	2	-0.5 to +1	High	6 or 7	Not required

50. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
51. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
52. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
53. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
54. Refer to *Reel Cam Settings, page 92*.
55. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
56. Refer to *3.7.9 Knife Speed Information, page 79*.
57. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

Table 3.8 Recommended D2 Header Settings for Grass, Ground Level Stubble Height (0 mm [0 in.])

Stabilizer Wheels[58]	Storage							
Float N (lbf)[59]	311–445 (70–100)							
Crop Condition	**Divider Rods**	**Header Angle**[60]	**Skid Shoe Position**[61]	**Reel Cam**[62]	**Reel Speed**[63]	**Knife Speed**[64]	**Reel Position**[65]	**Upper Cross Auger**
Light	On	Variable	Up or Middle	2	-0.5 to +1	High	6 or 7	Not required
Normal	On	Variable	Up or Middle	2	-0.5 to +1	High	6 or 7	Not required
Heavy	On	Variable	Up or Middle	2	-0.5 to +1	High	6 or 7	Not required
Lodged	On	Variable	Up or Middle	2	-0.5 to +1.5	High	6 or 7	Not required

58. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
59. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
60. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
61. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
62. Refer to *Reel Cam Settings, page 92*.
63. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
64. Refer to *3.7.9 Knife Speed Information, page 79*.
65. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

Table 3.9 Recommended D2 Header Settings for Alfalfa, Ground Level Stubble Height (0 mm [0 in.])

Stabilizer Wheels[66]	Storage							
Float N (lbf)[67]	311–445 (70–100)							
Crop Condition	**Divider Rods**	**Header Angle**[68]	**Skid Shoe Position**[69]	**Reel Cam**[70]	**Reel Speed**[71]	**Knife Speed**[72]	**Reel Position**[73]	**Upper Cross Auger**
Light	On	Variable	Up or Middle	3	-0.5 to +1	High	6 or 7	Not required
Normal	On	Variable	Up or Middle	2	-0.5 to +1	High	6 or 7	Not required
Heavy	On	Variable	Up or Middle	2	-0.5 to +1	High	6 or 7	Not required
Lodged	On	Variable	Up or Middle	3	-0.5 to +1.5	High	6 or 7	Not required

66. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain and to minimize bouncing.
67. Force required to lift the header at its ends. For instructions refer to your windrower operator's manual.
68. Set the header angle as shallow as possible (setting A) with the center-link and skid shoes while maintaining cutting height. For instructions, refer to *3.7.5 Header Angle, page 75*.
69. Skid shoe position is used in combination with the header angle to determine the cutting height when cutting on, or very close to the ground. For instructions, refer to *Adjusting Inner Skid Shoes, page 74* and *Adjusting Outer Skid Shoes, page 74*.
70. Refer to *Reel Cam Settings, page 92*.
71. Speed of reel tine tubes below (- index) or above (+ index) ground speed. +0.5 index with ground speed at 5 mph, reel turns at 5.5 mph. -0.5 index with ground speed at 5 mph, reel turns at 4.5 mph. At 0 index, reel turns at 1:1 to ground speed.
72. Refer to *3.7.9 Knife Speed Information, page 79*.
73. Refer to *3.7.11 Reel Fore-Aft Position, page 85*.

3.6.3 Reel Settings

Refer to this procedure to learn how various combinations of reel position and cam setting affect the reel finger profile.

Table 3.10 Effect on Reel Finger Pattern of Cam Setting and Reel Position Number

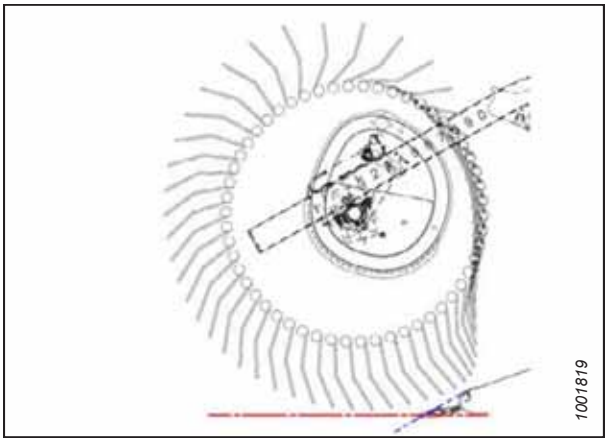
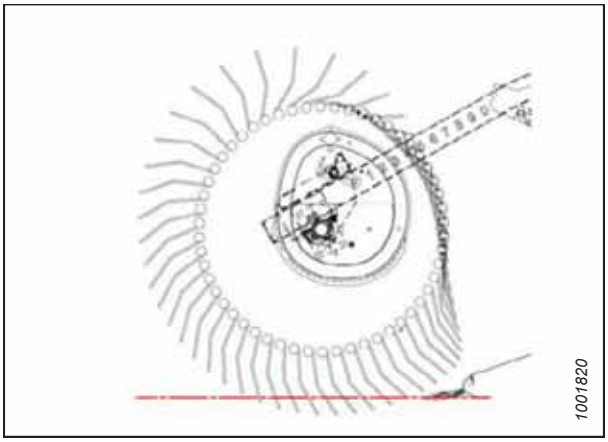
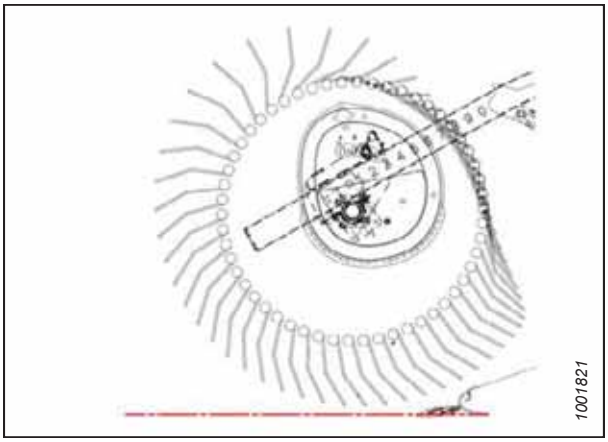
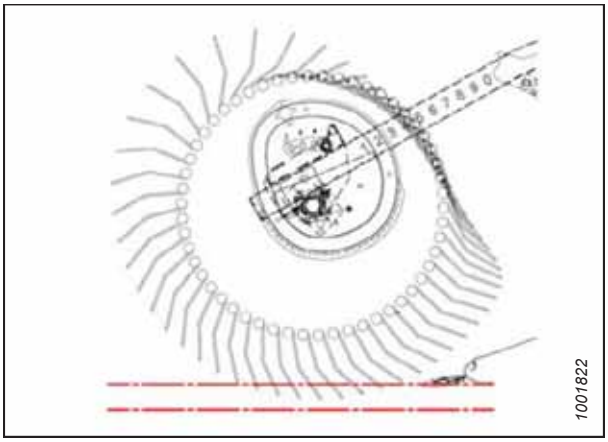
Cam Setting Number (Finger Speed Gain)	Reel Position Number	Reel Finger Pattern
1 (0%)	6 or 7	 1001819
2 (20%)	3 or 4	 1001820

Table 3.10 Effect on Reel Finger Pattern of Cam Setting and Reel Position Number (continued)

Cam Setting Number (Finger Speed Gain)	Reel Position Number	Reel Finger Pattern
3 (30%)	6 or 7	 1001821
4 (35%)	2 or 3	 1001822

NOTE:

- Adjust the reel forward to get closer to the ground while tilting the header back. Fingers/tines will dig into the ground at extreme reel-forward positions, so adjust the skid shoes or header angle to compensate. Adjust the reel rearward to position the reel farther away from the ground when tilting the header forward.
- Header tilt can be increased to position the reel closer to the ground, or decreased to position the reel farther from the ground, while keeping material flowing onto drapers.
- To leave the maximum amount of stubble in lodged crop, raise the header and increase the header tilt to keep the reel close to the ground. Position the reel fully forward.
- The reel may have to be moved back to prevent lumps or plugging on the cutterbar in thinner crops.
- Minimum crop carrying capacity (the minimum area of exposed draper between the reel and the header backsheet) occurs with the reel in the farthest aft position.
- Maximum crop carrying capacity (the maximum area of exposed draper between the reel and the header backsheet) occurs with the reel in the farthest forward position.
- Due to the nature of the cam action, the tip speed of the fingers/tines at the cutterbar becomes higher than that of the reel speed at higher cam settings. For more information, refer to Table *3.10, page 69*.

3.7 Header Operating Variables

The header will perform better if you adjust it to suit your specific crops and conditions.

Correctly adjusting the header reduces crop loss and speeds harvesting. Proper adjustments, along with timely maintenance, will also increase the service life of the header.

The variables listed in Table *3.11, page 71* and detailed on the following pages will affect the performance of your header.

You will quickly become adept at adjusting the machine to achieve the results you desire. Most of the settings below have been configured at the factory, but the settings can be changed to suit various crops and harvesting conditions.

Table 3.11 Operating Variables

Variable	Refer to
Cutting height	*3.7.2 Cutting off Ground, page 71*
Header float	*3.7.4 Header Float, page 75*
Header angle	*3.7.5 Header Angle, page 75*
Reel speed	*3.7.6 Reel Speed, page 77*
Ground speed	*3.7.7 Ground Speed, page 78*
Draper speed	*3.7.8 Draper Speed, page 78*
Knife speed	*3.7.9 Knife Speed Information, page 79*
Reel height	*3.7.10 Reel Height, page 80*
Reel fore-aft position	*3.7.11 Reel Fore-Aft Position, page 85*
Reel tine pitch	*3.7.12 Reel Tine Pitch, page 92*
Crop divider rods	*3.7.14 Crop Dividers, page 98*

3.7.1 Cutting Height

capable of cutting the crop to a desired stubble height or cutting as close as possible to the ground. Cutting height will vary depending on the type of crop, crop conditions, etc.

3.7.2 Cutting off Ground

The header's design allows you to cut crop above the ground, which results in stubble being cut to a uniform height.

When cutting above ground level:

- Use the stabilizer wheels on the header (if this optional component is installed) to set the cutting height.
- The stabilizer wheel system is designed to minimize bouncing at the header ends and may be used to float the header to achieve an even cutting height when cutting above ground level in cereal grains.

The stabilizer wheel system (or stabilizer/transport wheel system) cutting height is controlled by the windrower header height control.

The stabilizer wheel system (or stabilizer/transport speed transport wheel system) is available only for D230, D235, and D241 SP headers.

Adjusting Stabilizer Wheels

A properly adjusted header will achieve a balance between the amount of header weight carried by the float and the amount carried by the stabilizer wheels.

Refer to *3.6.2 Header Settings, page 59* for recommended use in specific crops and crop conditions.

IMPORTANT:

Set the float using the standard float adjustment procedure. For instructions, refer to your windrower operator's manual when cutting on the ground. Poor performance and potential wear will occur if using the stabilizer wheels float settings while cutting on the ground.

DANGER

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

1. Raise the header until the stabilizer wheels are off the ground.
2. Shut down the engine, and remove the key from the ignition.
3. Hold axle pivot handle (B); do **NOT** lift the handle.

   NOTE:

   Lifting the handle will make the system harder to take out of slot (C).
4. Pull suspension handle (A) rearward to remove the pin from slot (C).
5. Lift the wheel to the desired height position using support (B), and engage the support channel into center slot (C) in the upper support.
6. Suspension handle (A) should snap into the slot. If not, push in (for middle and lower position) or pull in (for top position) the suspension handle to ensure it is seated in the slot.
7. Use the windrower cab display module (CDM) controls to automatically controls to automatically maintain cutting height. Refer to your windrower operator's manual for details.

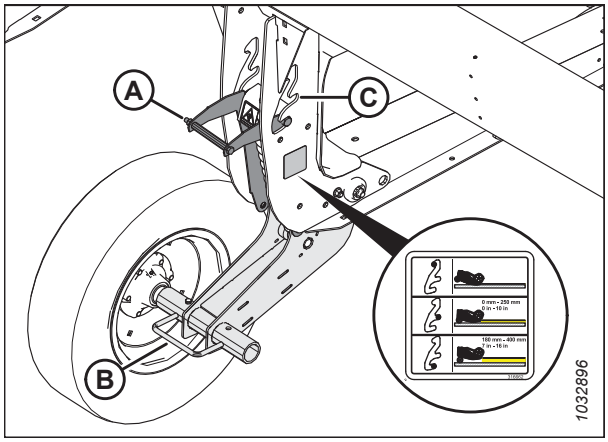


Figure 3.32: Stabilizer Wheel

Adjusting EasyMove™ Transport Wheels

A properly adjusted header will achieve a balance between the amount of header weight carried by the float and the amount carried by the transport wheels.

DANGER

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

1. Raise the header so the transport wheels are off the ground.
2. Shut down the engine, and remove the key from the ignition.
3. Check that the float is working properly.

4. Hold axle pivot handle (C); do **NOT** lift the handle.

   NOTE:

   Lifting the handle will make the system harder to take out of slot (B).

5. Pull suspension handle (A) rearward to remove the pin from slot (B).

6. Adjust the wheel to the desired slot position.

7. Suspension handle (A) should snap into the slot. If not, push in (for middle position) or pull in (for top position) the suspension handle to ensure it is seated in the slot.

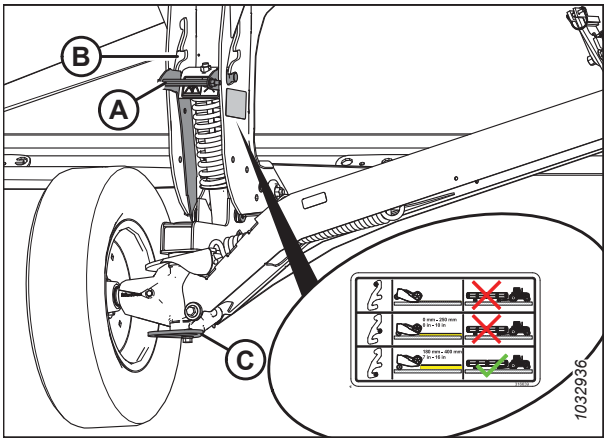


Figure 3.33: Right Wheel

8. Hold axle pivot handle (A); do **NOT** lift the handle.

   NOTE:

   Lifting the handle will make the system harder to take out of the slot.

9. Pull suspension handle (B) rearward to remove the pin from the slot.

10. Adjust the wheel to the desired slot position.

11. Suspension handle (B) should snap into the slot. If not, pull out the suspension handle to ensure it is seated in the slot.

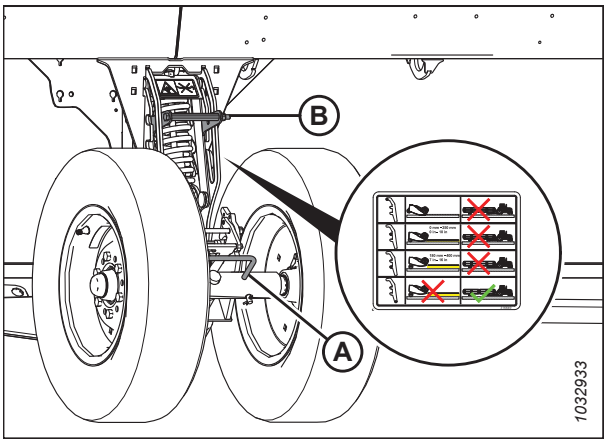


Figure 3.34: Left Wheel

12. Use the windrower cab display module (CDM) controls to automatically controls to automatically maintain cutting height. Refer to your windrower operator's manual for details.

3.7.3 Cutting on Ground

Cutting on the ground is performed with the header fully lowered and the cutterbar on the ground. The orientation of the knife and knife guards relative to the ground (header angle) is controlled by the skid shoes and the center-link, **NOT** by the header lift cylinders. Choosing the correct header angle allows the Operator to maximize the amount of material harvesting while preventing damage to the knife caused by stones and debris.

The header float system allows the header to float on the ground, automatically moving up and down to compensate for variations in ground contour. This helps to prevent the cutterbar from pushing into the ground or leaving crop uncut.

The header's cutting will vary depending on the type of crop and the harvest conditions.

Refer to the following for additional information:

- *Adjusting Inner Skid Shoes, page 74*
- *Adjusting Outer Skid Shoes, page 74*
- *3.7.4 Header Float, page 75*
- *3.7.5 Header Angle, page 75*

Adjusting Inner Skid Shoes

The skid shoes and center-link allow you to adjust to field conditions and maximize the amount of material cut while reducing damage to the knife caused by stones and debris.

DANGER

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

IMPORTANT:

Running skid shoes in the down position can result in accelerated wear of the skid shoe wear plates.

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props. For instructions, refer to the windrower operator's manual.
4. Raise the stabilizer wheels or transport wheels fully (if installed). For instructions, refer to the following:
   - *Adjusting Stabilizer Wheels, page 71*
   - *Adjusting EasyMove™ Transport Wheels, page 72*
5. Remove lynch pin (A) from each skid shoe.
6. Hold shoe (B) and remove pin (C) by disengaging from the frame and pulling away from the shoe.
7. Raise or lower skid shoe (B) to achieve the desired position using the holes in support (D) as a guide.
8. Install pin (C) in the desired position on support (D), engage in frame, and secure with lynch pin (A).
9. Check that all skid shoes are adjusted to the same position.
10. Adjust the header angle to the desired working position using the machine's header angle controls. If the header angle is not critical, set it to the mid-position.
11. Check the header float as described in your windrower operator's manual.

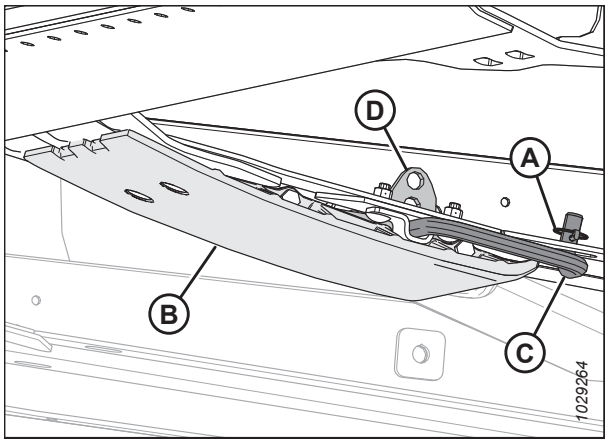


Figure 3.35: Inner Skid Shoe

Adjusting Outer Skid Shoes

The skid shoes and center-link allow you to adjust to field conditions and maximize the amount of material cut while reducing damage to the knife caused by stones and debris.

DANGER

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

IMPORTANT:

Running skid shoes in the down position can result in accelerated wear of the skid shoe wear plates.

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props. For instructions, refer to the windrower operator's manual.
4. Raise the stabilizer wheels or transport wheels fully (if installed). For instructions, refer to the following:
   - *Adjusting Stabilizer Wheels, page 71*
   - *Adjusting EasyMove™ Transport Wheels, page 72*
5. Remove lynch pin (A) from each skid shoe pin (C).
6. Hold skid shoe (B) and remove pin (C) by disengaging from the bracket and pulling away from the shoe.
7. Raise or lower skid shoe (B) to achieve the desired position using the holes in the support plate as a guide.
8. Reinstall pin (C) in the desired position on the support plate, engage the pin into the bracket, and secure with lynch pin (A).
9. Ensure all skid shoes are adjusted to the same position.
10. Check the header float as described in your windrower operator's manual.

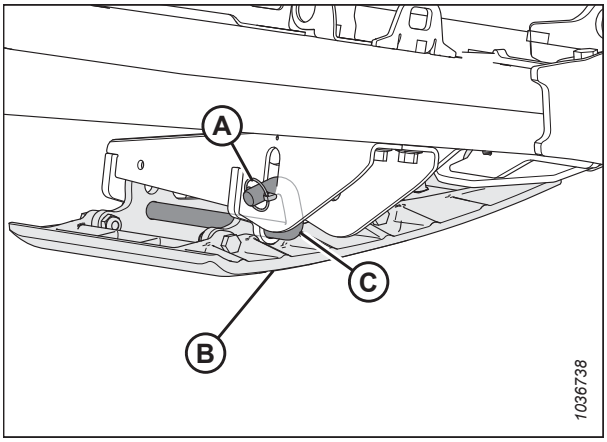


Figure 3.36: Outer Skid Shoe

3.7.4 Header Float

D2 SP Series Draper Headers are designed to ride on the skid shoes when cutting on the ground. The windrower float system reduces the ground pressure so that the header floats over obstacles and follows ground contours instead of being supported by the windrower lift cylinders.

Refer to your windrower operator's manual for details about header float adjustments.

3.7.5 Header Angle

Header angle is adjustable to accommodate different crop conditions and/or soil types and can be adjusted using the center-link between the windrower and the header.

Refer to the windrower operator's manual for in-cab adjustment details.

Header angle (A) is the angle between the header and the ground.

The header angle controls distance (B) between the cutterbar knife and the ground and is critical when cutting crop at ground level.

Adjusting the header angle pivots the header at the point of skid shoe/ground contact (C).

Guard angle (D) is the angle between the upper surface of the cutterbar guards and the ground.

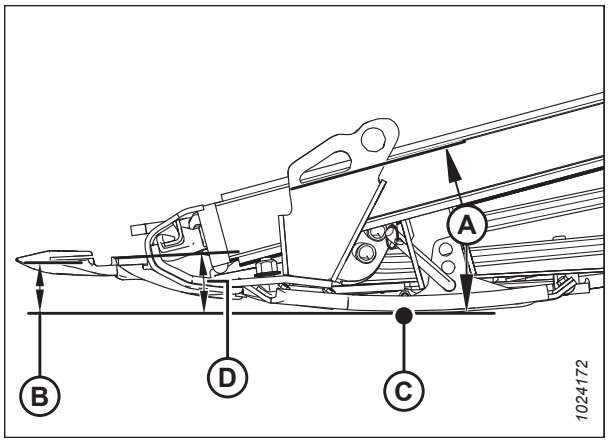


Figure 3.37: Header Angle

The header angle is set according to the type and condition of crop and soil as follows:

- Use shallower settings (A) (position **A** on the indicator) for normal cutting conditions and wet soil to reduce soil buildup at the cutterbar. Shallow angle settings also minimize damage to the knife in stony fields.
- Use steeper settings (E) (position **E** on the indicator) for lodged crops and crops that are close to the ground such as soybeans.

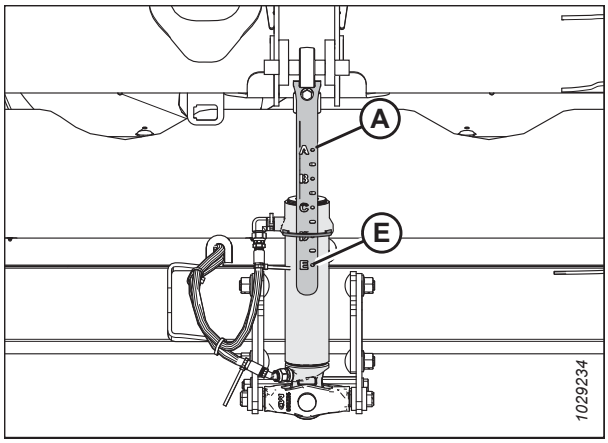


Figure 3.38: Center-Link

Shallowest angle (A) (center-link fully retracted) is at 1.7°, and produces the highest stubble when cutting on the ground.

Steepest angle (E) (center-link fully extended) is at 8.9°, and produces the lowest stubble when cutting on the ground.

Choose an angle that maximizes performance for your crop and field conditions.

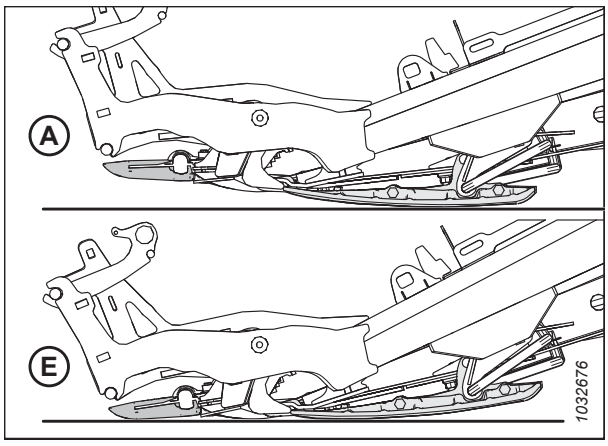


Figure 3.39: Guard Angles

Controlling Header Angle

Header angle varies by adjusting the length of the top center-link (mechanical or hydraulic) between the windrower and the header.

Refer to your windrower operator's manual for adjustment details.

3.7.6 Reel Speed

Reel speed is one of the factors that determines how crop is moved from the cutterbar onto the drapers.

The reel performs best when it appears to be driven by the ground. It should move the cut crop evenly through the cutterbar and onto the drapers without bunching and with minimal disturbance.

In standing crop, reel speed should be slightly higher than, or equal to, the ground speed.

In flattened crop or crop that is leaning away from the cutterbar, the reel speed needs to be higher than the ground speed. To achieve this, either increase the reel speed or decrease the ground speed.

Excessive shattering of grain heads or crop loss over the header backtube may indicate that the reel speed is too high. Excessive reel speed also increases reel component wear and overloads the reel drive.

NOTE:

Excessive reel speed will also cause the reel circuit to go over relief. The reel will speed up and slow down at each bat when operating in heavy, tough, and lodged crops. Reducing the reel speed, so it is closer to the ground speed, will still allow the reel to lift the crop while not trying to pull it out of the ground. This will also reduce seed loss from the reel trying to comb through the crop, instead of just lifting it.

Slower reel speeds can be used with nine-bat reels, which is advantageous in shatter-prone crops.

The reel speed is adjustable using the controls in the windrower cab. For instructions, refer to the windrower operator's manual for adjustment details.

Optional Reel Drive Sprockets

Optional sprockets for use in specific crop conditions are available as an alternative to the factory-installed single sprocket.

The header is factory-equipped with a 19-tooth reel drive single sprocket, which is suitable for most crops. Replacing the 19-tooth reel drive single sprocket with optional dual reel drive sprocket (A) will provide more torque to the reel in heavy cutting conditions. With the optional dual reel drive sprocket installed, an optional 52-tooth sprocket (B) can also be added on top of the existing 56-tooth lower sprocket that will allow for higher reel speed in light crops when operating at increased ground speed. With these two optional sprockets installed, switching from high-torque to high-speed and vice versa will be quick and easy.

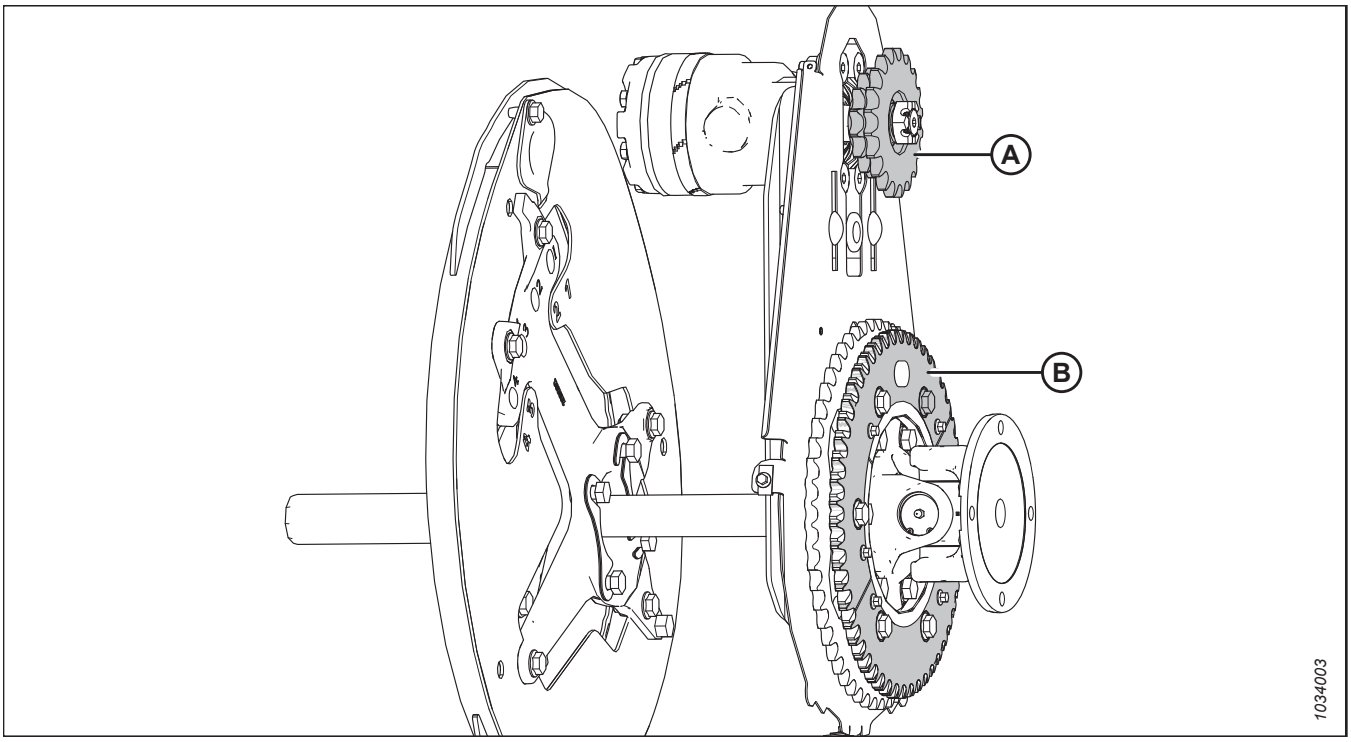


Figure 3.40: Reel Drive with Optional Sprockets

A - Dual Reel Drive Sprocket (MD #273451, MD #273452, or MD #273453)[74]
B - 52-Tooth Sprocket (MD #273689)[75]

3.7.7 Ground Speed

Operating the header at the appropriate ground speed for the conditions results in cleanly cut crop and even feeding.

Reduce the vehicle's ground speed in difficult cutting conditions to reduce equipment wear.

Use lower ground speeds when harvesting very light crops (for example, short soybeans) to allow the reel to pull in short plants. Start at 4.8–5.8 km/h (3.0–3.5 mph) and adjust the speed as needed.

Higher ground speeds may require heavier float settings to prevent excessive bouncing, which can result in uneven cutting and possible damage to the cutting components. If the ground speed is increased, the draper and reel speeds should generally be increased to handle the extra material.

3.7.8 Draper Speed

Correct draper speed is important for achieving a good flow of cut crop away from the cutterbar.

The draper speed is controlled with the windrower cab display module (CDM) in M Series windrowers, and harvest performance tracker (HPT) in M1 Series windrowers. Refer to your windrower operator's manual for instructions.

Adjust draper speed to optimize crop feeding for a well formed windrow. Excessive draper speed will reduce draper life.

74. These sprockets are sold separately (individual parts).
75. This sprocket is included in kit MD #311882.

3.7.9 Knife Speed Information

The ideal cutting speed of the knife should achieve a clean cut. Crop types and conditions influence the knife and forward speeds.

Table 3.12 Header Knife Speed

Header	Recommended Knife Drive Speed Range (rpm)	
	Single-Knife Drive	Double-Knife Drive
D215	—	700–900
D220	600–700	700–900
D225	600–700	700–900
D230	600–750	600–900
D235	600–700	600–850
D241	—	600–800

When the header is first attached to the windrower, the Harvest Performance Tracker (HPT) or cab display module (CDM) receives a code from the header that determines the knife speed range and the minimum speed.

The desired speed can be programmed and stored in the HPT so the knife will operate at the original set-point after the header is detached and reattached to the windrower.

NOTE:

The knife speed cannot be programmed outside the range specified for each header.

Checking Knife Speed

The ideal cutting speed of the knife should achieve a clean cut. Crop types and conditions influence the knife and forward speeds.

DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.

DANGER

Ensure that all bystanders have cleared the area.

3. Start the engine. For instructions, refer to the windrower operator's manual.
4. Engage the header drive and run the windrower at operating rpm.
5. Run the windrower and the header until the oil temperature is 38°C to 52°C (100°F to 125°F).

6. Measure and record the rpm of flywheel (A) with a hand-held photo tachometer.

   NOTE:

   One revolution (rpm) is equivalent to two knife strokes (spm) (1 rpm = 2 spm).

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

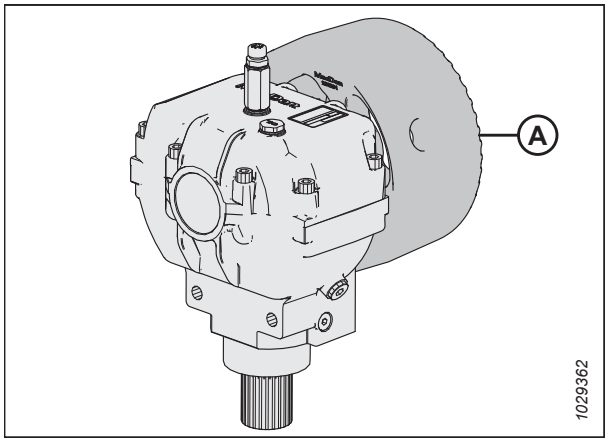


Figure 3.41: Flywheel

8. Compare the flywheel rpm measurement with the rpm values. Refer to Table *3.12, page 79* for more information.
9. Contact your MacDon Dealer if the pulley rpm measurement exceeds the specified rpm range for your header.
10. If knife speed is not within range
    - Check that the Harvest tracker pro is displaying the correct header ID. Contact a MacDon Dealer.
    - Check that knife speed is set. For instructions, refer to the windrower operator's manual.
    - Check that knife speed has been calibrated. For instructions, refer to the windrower operator's manual.

3.7.10 Reel Height

The reel operating position depends on the type of crop and cutting conditions.

You can create preset reel height positions using the Headland Management feature on an M1 Series Windrower. To set up this feature, refer to your windrower operator's manual. Set the reel height and fore-aft position to carry material past the knife and onto the drapers with minimal damage to the crop.

The reel height is controlled manually or with button presets on the ground speed lever (GSL) in the windrower cab. Refer to your windrower operator's manual for instructions on controlling reel height or setting up auto reel height presets.

NOTE:

One touch return presets for reel height and reel fore/aft are only available for D2 SP headers and M1 Series windrowers. For more information on checking and adjusting reel height sensors refer to *Checking and Adjusting Reel Height Sensor, page 81*.

For more information on fore-aft positioning, refer to *3.7.11 Reel Fore-Aft Position, page 85*.

The following conditions might result if the reel is set too low:

- Crop loss over the header backtube
- Crop disturbance on the drapers caused by the reel fingers
- Crop pushed down by the tine tubes
- Tall crop wrapped around the reel drive and ends

The following conditions might result if the reel is set too high:

- Cutterbar plugging
- Crop lodging and being left uncut

- Grain stalks dropping ahead of the cutterbar

For recommended reel heights for specific crops and crop conditions, refer to *3.6.2 Header Settings, page 59*.

IMPORTANT:

Maintain adequate clearance to prevent fingers contacting the knife or the ground. For instructions, refer to *5.9.1 Reel-to-Cutterbar Clearance, page 270*.

Checking and Adjusting Reel Height Sensor

The orientation of the reel height sensor arm must be checked manually at the sensor. The output voltage range of the sensor can be checked either manually at the sensor or from the cab. This procedure is not required for headers used with M Series Windrowers.

IMPORTANT:

Ensure that the minimum reel height is set before adjusting the reel height sensor. For instructions, refer to *5.9.1 Reel-to-Cutterbar Clearance, page 270 Measuring Reel to Cutterbar Clearance, page 270*.

NOTE:

For in-cab instructions, refer to the windrower operator's manual.

DANGER

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

DANGER

Ensure that all bystanders have cleared the area.

Checking and adjusting sensor arm orientation

1. Park the windrower on a level surface.
2. Shut down the engine, and remove the key from the ignition.
3. On the right endsheet, locate reel height sensor (A). It connects to the right reel arm.

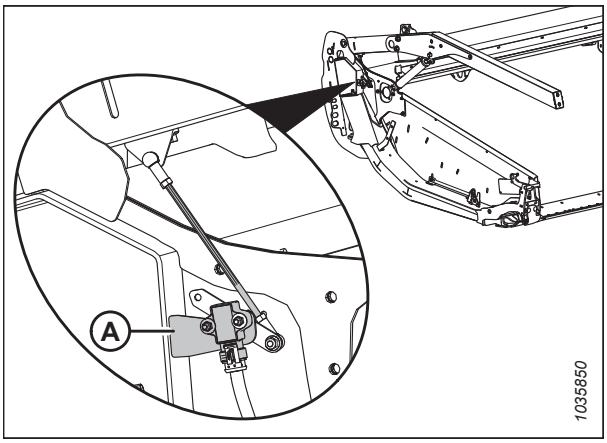


Figure 3.42: Reel Height Sensor Location

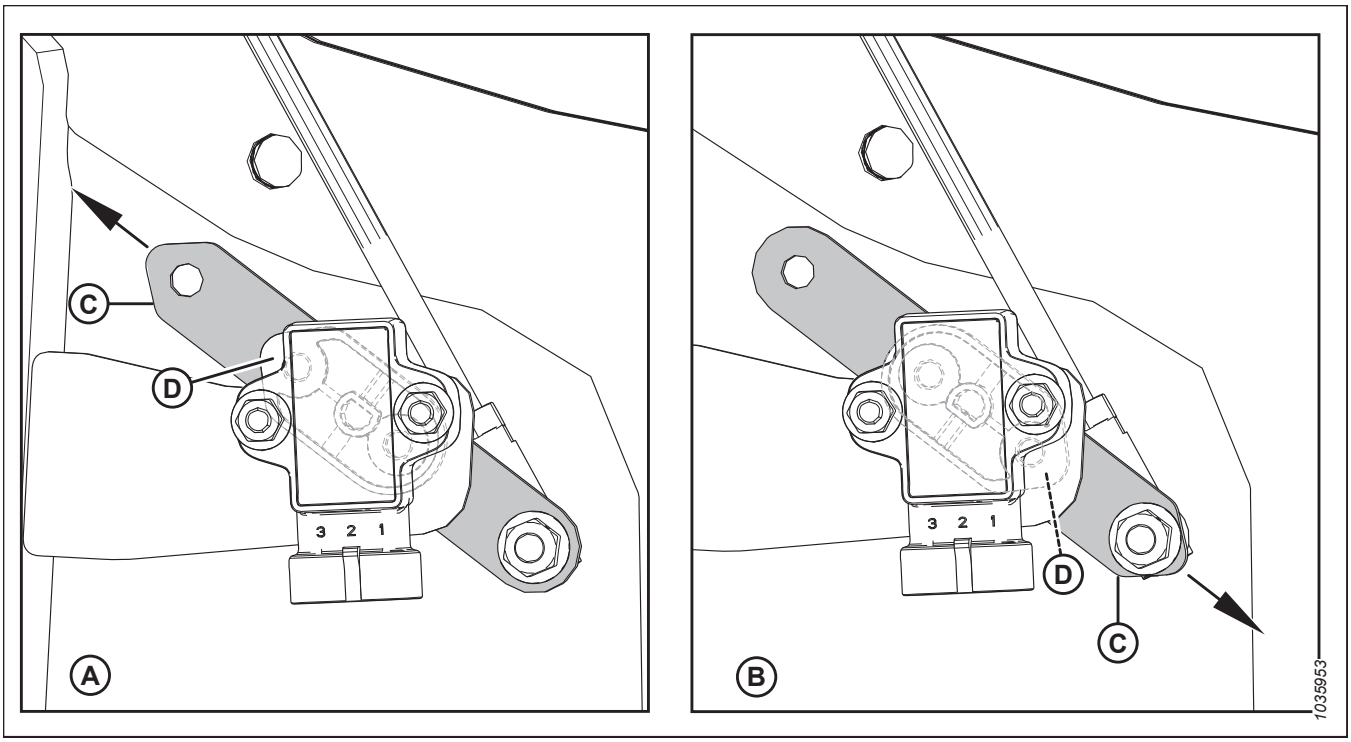


Figure 3.43: Sensor Arm/Pointer Configurations

A - Incorrect Configuration

B - Windrower Configuration

C - Sensor Arm

D - Sensor Pointer (Located Between Sensor and Sensor Arm)

4. Ensure that sensor arm (C) and pointer (D) are configured properly for the header. For instructions, refer to Figure *3.43, page 82*.

   NOTE:

   In configuration **A**, the arrow indicates that the pointed end of the sensor arm is pointed toward the back of the header.

   In configuration **B**, the arrow indicates that the pointed end of the sensor arm is pointed toward the front of the header.

5. If the sensor arm orientation is incorrect, remove sensor arm (C) and reposition it in the correct orientation. Torque the nut to 8.2 Nm (72.5 lbf·in).

Checking and adjusting sensor output voltage when reel is lowered

6. Engage the parking brake.

7. Start the engine. For instructions, refer to the windrower operator's manual.

8. Lower the reel fully.

9. Use the windrower display or a voltmeter (if measuring the sensor manually) to measure the voltage range when the reel is lowered. Refer to Table *3.13, page 83* for range requirements.

   IMPORTANT:

   To measure the output voltage of the reel height sensor, the engine needs to be running and supplying power to the sensor.

Table 3.13 Reel Height Sensor Voltage Limits

Voltage with Reel Raised	Voltage with Reel Lowered
0.7–1.1 V	3.9–4.3 V

10. Shut down the engine, and remove the key from the ignition.
11. Using a voltmeter, measure the voltage between the ground (pin 2 wire) and the signal (pin 3 wire) at reel height sensor (B).
12. Ensure that the voltage is within the recommended voltage range. If the voltage is not within the range, loosen jam nuts (D) and (E), and adjust the rod length. Hand-tighten the jam nuts. Tighten the jam nuts by another quarter-turn.

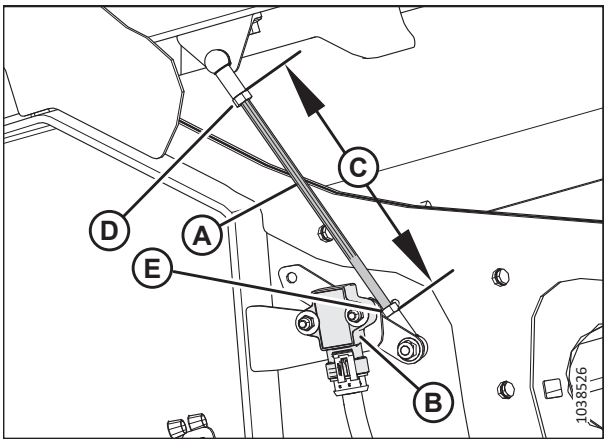


Figure 3.44: Reel Height Sensor – Right Reel Arm with Reel Down

Checking and adjusting sensor output voltage when reel is raised

13. Start the engine.
14. Fully raise the reel.
15. Use the windrower display or a voltmeter to measure the voltage range when the reel is raised. Refer to Table *3.13, page 83* for the recommended voltage ranges.
16. Shut down the engine, and remove the key from the ignition.
17. Using a voltmeter, measure the voltage between the ground (pin 2 wire) and the signal (pin 3 wire) at reel height sensor (A).
18. If the voltage is not within the recommended range, loosen two M5 hex nuts (B) and rotate sensor (A) to achieve the recommended voltage range. Tighten nuts (B) to 2.5 Nm (22 lbf·in).
19. Repeat this procedure until the voltage range is within the range specified.
20. Start the engine.
21. Lower the reel fully.
22. Recheck the voltage range. Ensure that the voltage range is still within the specified values. Repeat this procedure as needed.

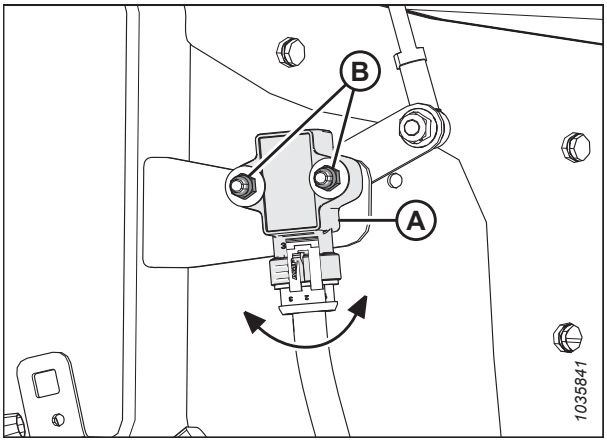


Figure 3.45: Reel Height Sensor – Right Reel Arm with Reel Up

Replacing Reel Height Sensor

The reel height sensor is used to reference where the reel is positioned above from the cutterbar.

DANGER

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

1. Start the engine.
2. Lower the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Disconnect the harness from sensor (A).
5. Remove two hex head bolts (B) from sensor arm (C). Retain the hardware for reinstallation.

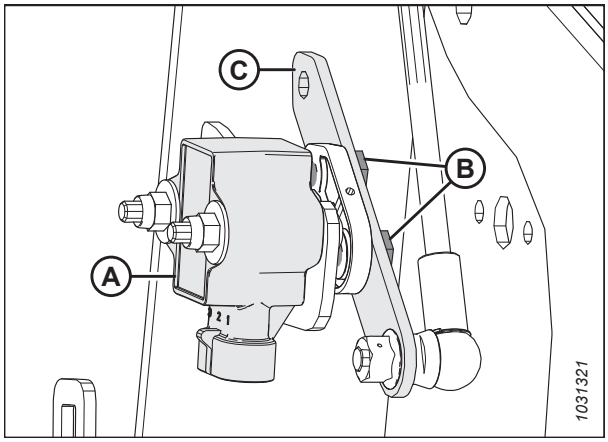


Figure 3.46: Reel Height Sensor – Right Reel Arm

6. Remove two nyloc nuts, washers, and bolts (A) securing sensor (B) to the header frame. Remove the sensor.
7. Install new sensor (B) onto bracket (C) on the header frame. Attach it using retained bolts (A), washers, and nyloc nuts. Torque bolts (A) to 2–3 Nm (17–27 lbf·in).

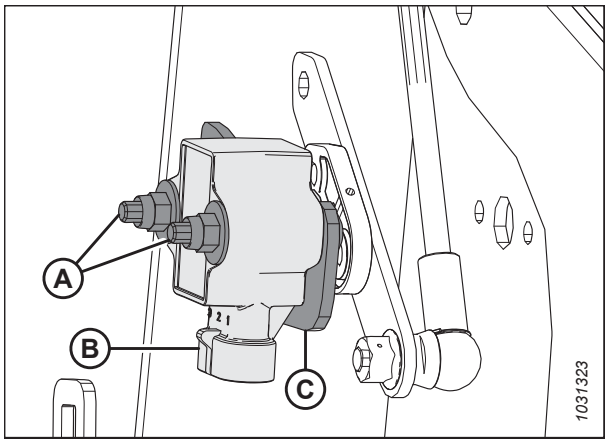


Figure 3.47: Reel Height Sensor – Right Reel Arm

8. Secure sensor arm (B) using retained hex head bolts (A). Ensure sensor pointer (C) is installed in the same direction as the pointed end of sensor arm (B).
9. Torque bolts (A) to 4 Nm (35 lbf·in).
10. Connect the harness to the sensor.
11. Check the sensor voltage range. For instructions, refer to *Checking and Adjusting Reel Height Sensor, page 81*.

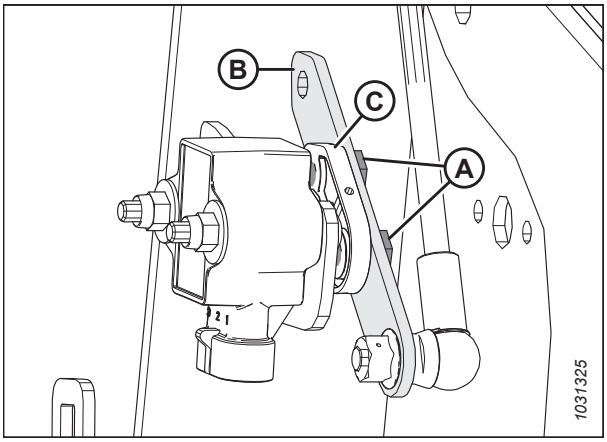


Figure 3.48: Reel Height Sensor – Right Reel Arm

3.7.11 Reel Fore-Aft Position

Reel fore-aft position is a critical factor for achieving the best results in adverse conditions. The factory-recommended reel position has the position marker centered over numbers (4–5 on the indicator). This suits normal conditions, but the fore-aft position can be adjusted as required using the controls inside the cab.

The reel can be moved approximately 155 mm (6 in) farther aft by repositioning the fore-aft cylinders on the header's reel arms to improve the reel's performance in certain crop conditions. For instructions on repositioning the reel fore-aft cylinders, refer to *Repositioning Fore-Aft Cylinders, page 86*.

The reel position indicator (A) is located at the left reel arm. Bracket (B) is the reel fore-aft position marker.

For straight standing crop, center the reel over the cutterbar (4–5 on indicator).

For crops that are down, tangled, or leaning, it may be necessary to move the reel ahead of the cutterbar (lower number on indicator).

NOTE:

If experiencing difficulty picking up flattened crop, adjust to a steeper header angle. Refer to *3.7.5 Header Angle, page 75* for adjustment instructions. Adjust reel position only if header angle adjustments are not satisfactory.

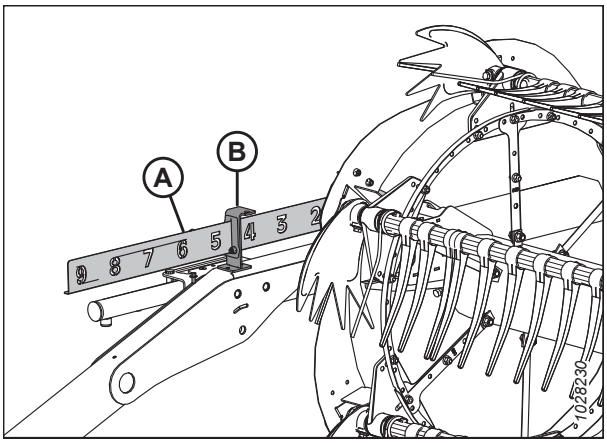


Figure 3.49: Fore-Aft Indicator

NOTE:

In crops that are difficult to pick up such as rice, or severely lodged crops that require full forward positioning of the reel, set the reel tine pitch to provide proper placement of the crop onto the drapers. Refer to *3.7.12 Reel Tine Pitch, page 92* for adjustment details.

Adjusting Reel Fore-Aft Position

The factory-set reel position suits many conditions, but the fore-aft position can be adjusted as required using the controls inside the cab.

To adjust the reel fore-aft position, follow these steps:

1. Operate the hydraulics to move the reel to the desired position while using fore-aft indicator (A) as a reference. Bracket (B) is the position marker.
2. Check the reel clearance to cutterbar after making changes to the cam setting. For instructions, refer to *5.9.1 Reel-to-Cutterbar Clearance, page 270*

   IMPORTANT:

   Operating with the reel too far forward can result in the fingers contacting the ground. When operating with the reel in this position, lower the skid shoes or adjust the header tilt as required to prevent damaging the fingers.

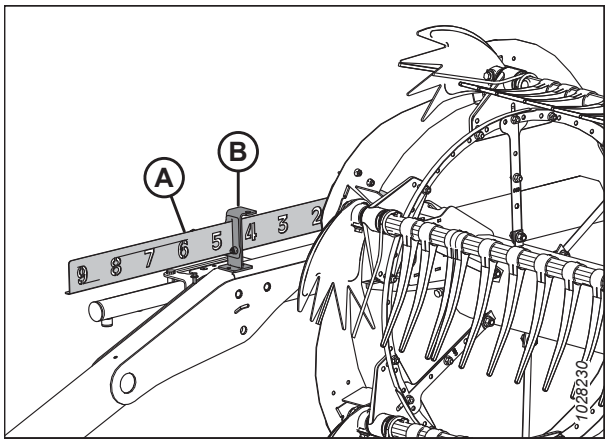


Figure 3.50: Fore-Aft Indicator

Repositioning Fore-Aft Cylinders

To accommodate certain crop conditions, the reel can be moved approximately 155 mm (6 in.) farther aft by repositioning the fore-aft cylinders on the reel arms.

DANGER

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

IMPORTANT:

Ensure that all fore-aft cylinders are set to the same position.

1. Adjust the reel height so that the reel arms are parallel with the ground.
2. Shut down the engine, and remove the key from the ignition.

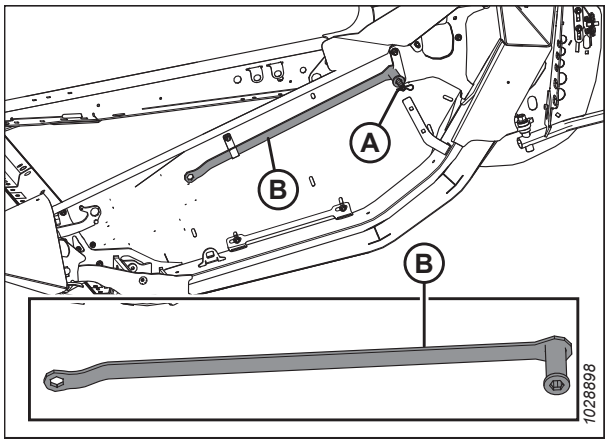


Figure 3.51: Left Endsheet

3. Remove hairpin (A) securing the multi-tool to the holder bracket on the left endsheet.
4. Remove multi-tool (B). Install the hairpin in the holder.

5. Refer to Figure *3.52, page 87* to determine the fore-aft cylinder adjustment procedures for your header type. The number on the illustration refers to one of the following procedures:

   - For reel arms with fore-aft cylinder adjustment [**1**] at the front, refer to Step *1, page 88*
   - For reel arms with fore-aft cylinder adjustment [**2**] at the rear, refer to Step *1, page 89*

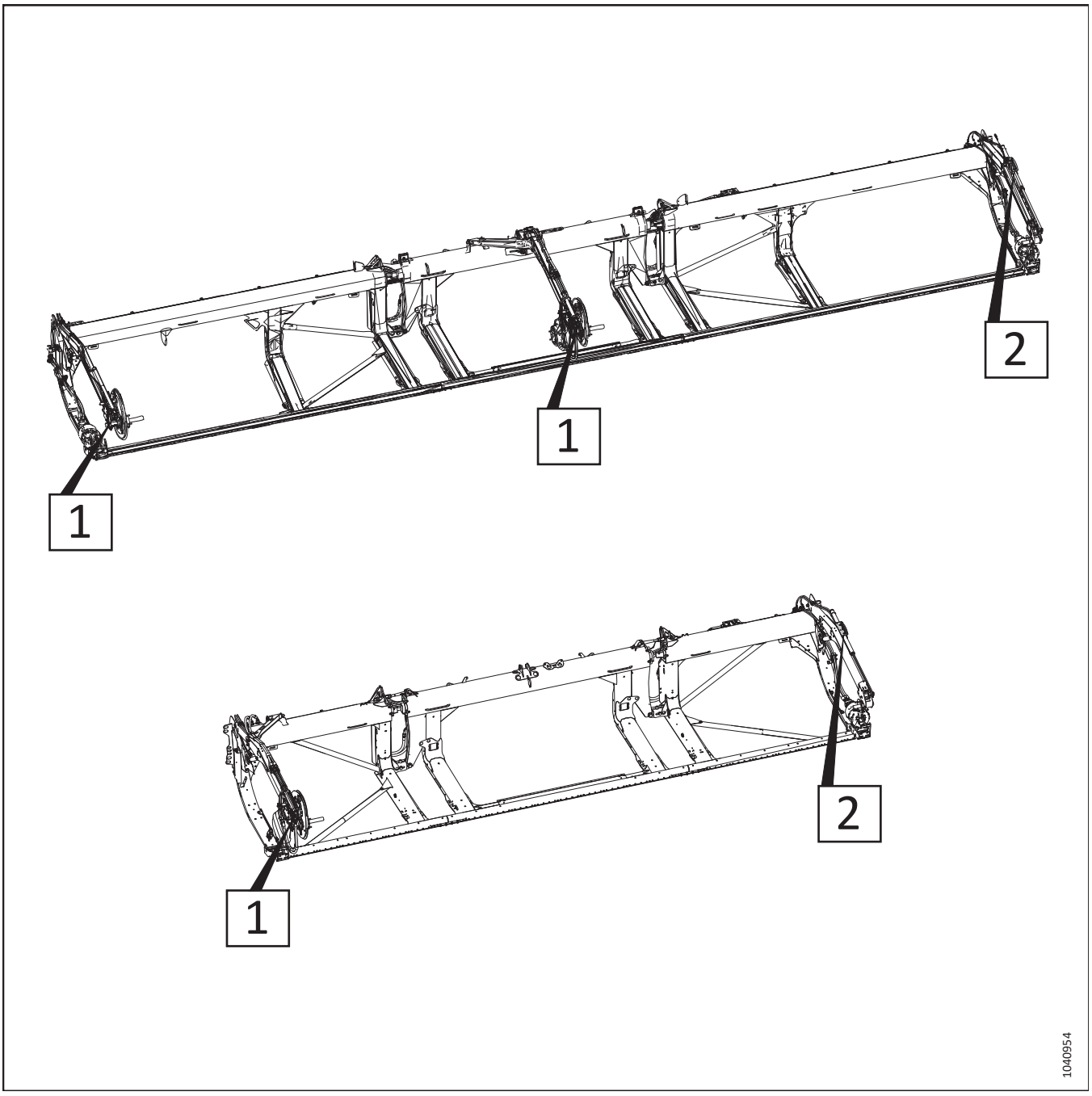


Figure 3.52: Adjustable Fore-Aft Cylinders – Procedure Reference Numbers

To change the reel position on fore-aft cylinders that adjust at the front of the reel arm, follow these steps:

1. Remove split ring (A), clevis pin (B), and flat washer (not shown) securing the adjustable fore-aft cylinder in the forward position.

   NOTE:

   The reel drive components are not shown in the illustration.

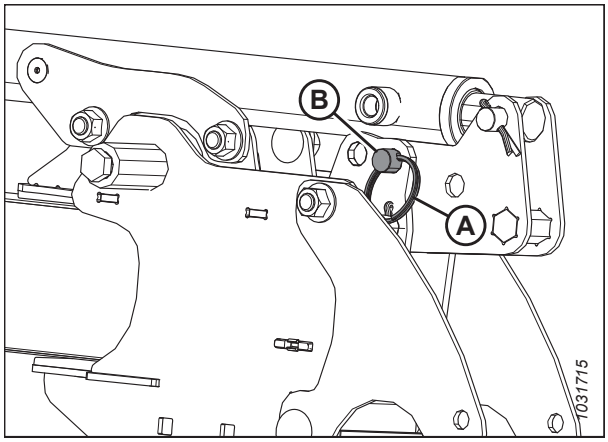


Figure 3.53: Fore-Aft Cylinder Adjustment Type 1 – Forward Position

2. Use multi-tool (A) to push bracket (B) rearward until hole (C) aligns with hole (D). The reel will move rearward as bracket (B) rotates on bottom pin (E).

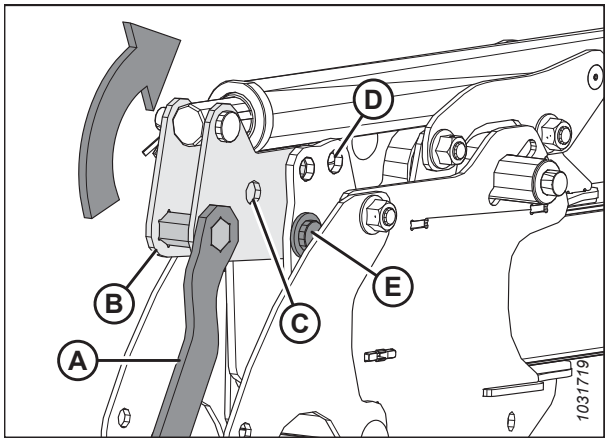


Figure 3.54: Fore-Aft Cylinder Adjustment Type 1 – Forward Position

3. Secure the cylinder in the aft position with clevis pin (A), flat washer, and split ring (B).

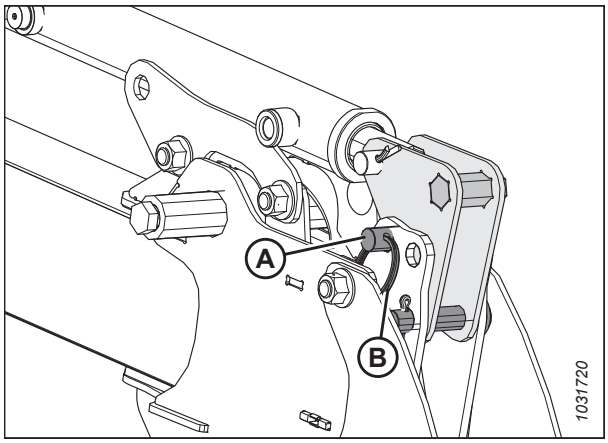


Figure 3.55: Fore-Aft Cylinder Adjustment Type 1 – Aft Position

To change the reel position on fore-aft cylinders that adjust at the back of the reel arm, follow these steps:

1. Remove split ring (A) and clevis pin (B) securing the left cylinder in the forward position on cylinder bracket (C).

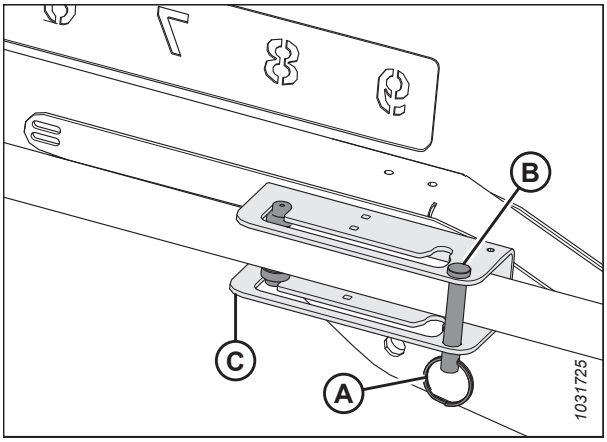


Figure 3.56: Fore-Aft Cylinder Adjustment Type 2 – Forward Position

2. Slide cylinder guides (A) along the bracket slot and into aft position (B).

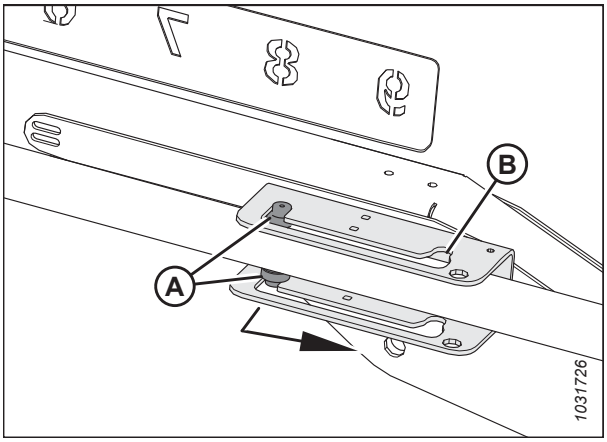


Figure 3.57: Fore-Aft Cylinder Adjustment Type 2 – Forward Position

3. Reinstall clevis pin (A) and split ring (B) to secure the cylinder in aft position (C) on the bracket.

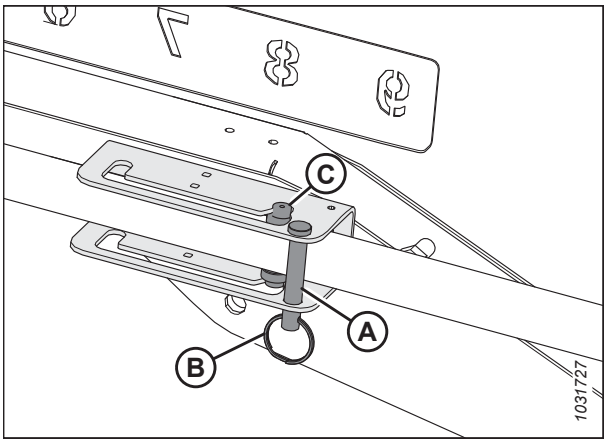


Figure 3.58: Fore-Aft Cylinder Adjustment Type 2 – Aft Position

4. Ensure that there is still adequate clearance between the reel and the following parts of the header:
   - Backsheet
   - Reel braces
   - Upper cross auger (if this is installed on the header)
5. If necessary, adjust the reel tine pitch. For instructions, refer to *3.7.12 Reel Tine Pitch, page 92*.

Checking and Adjusting Fore-Aft Position Sensor

The fore-aft position sensor indicates the position of the reel in the fore-aft plane. The sensor arm's orientation and the sensor's output voltage range must be calibrated. This procedure is not required for headers used with M Series Windrowers.

Checking and adjusting sensor arm orientation

DANGER

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

1. Park the windrower on a level surface.
2. Shut down the engine, and remove the key from the ignition.

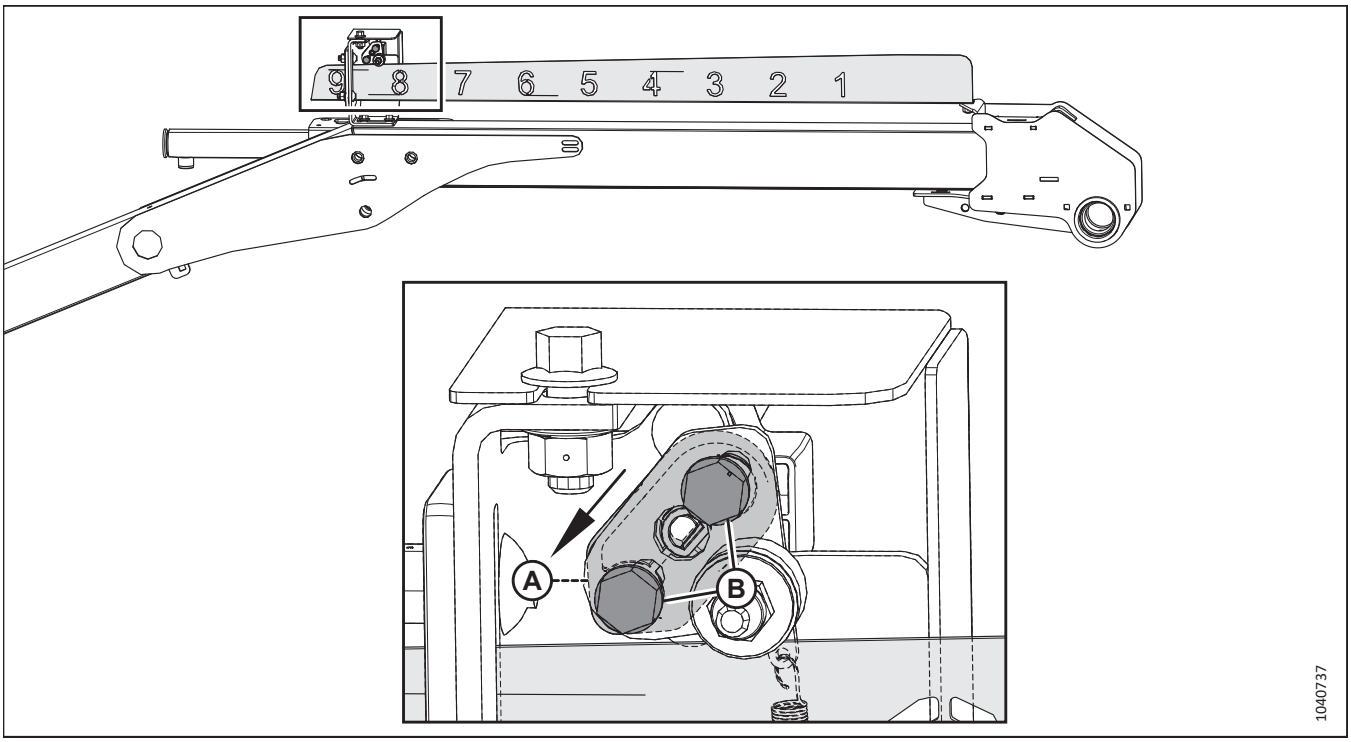


Figure 3.59: Sensor Arm Configurations

A - Sensor Arm **B - Mounting Hardware**

3. Check the orientation of sensor arm (A) and hardware (B). If sensor arm (A) is not oriented correctly, remove it and reinstall it in the correct orientation.

Checking and adjusting sensor output voltage

DANGER

Ensure that all bystanders have cleared the area.

4. Engage the parking brake.

   IMPORTANT:

   To measure the output voltage of the fore-aft sensor, the engine needs to be running and supplying power to the sensor.

5. Start the engine.

6. Adjust the reel to the fully forward position. Ensure that dimension (B) (from the sensor bracket to the end of the indicator) is 62–72 mm (2.4–2.8 in.).

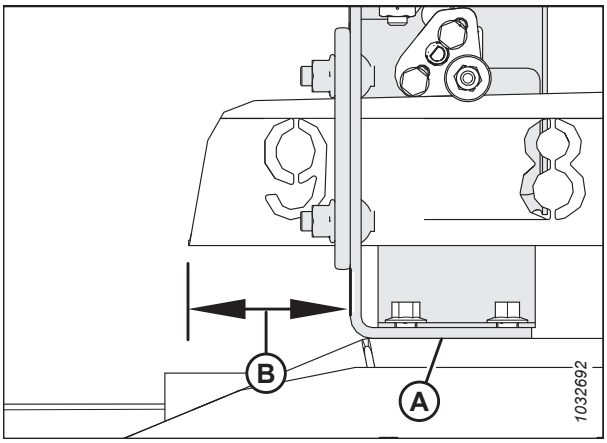


Figure 3.60: Fore-Aft Bracket

7. Use the windrower display or a voltmeter (if measuring the sensor manually) to measure the voltage range. If using a voltmeter, check sensor (A) voltage between pin 2 (ground) and pin 3 (signal). The range should be 3.9–4.3 V.

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

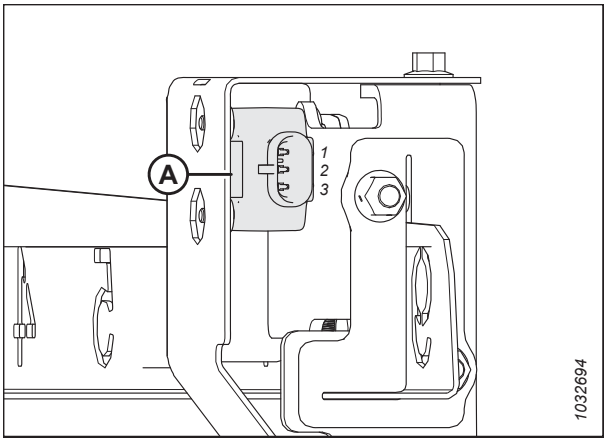


Figure 3.61: Fore-Aft Sensor

9. If adjustment is required, loosen hardware (A) and rotate sensor (B) until the voltage is in the correct range.

10. Once sensor adjustment is complete, torque the hardware to 2.1 Nm (22 lbf·in).

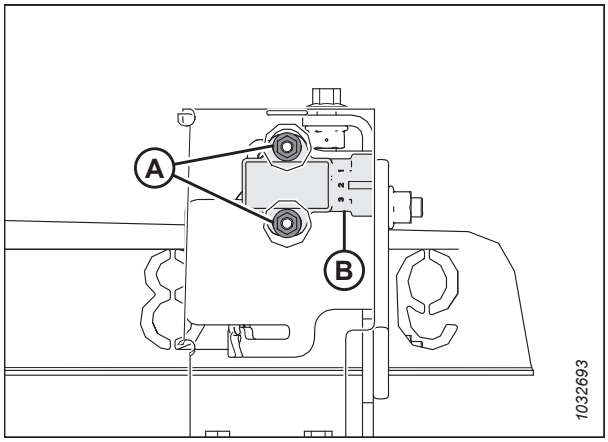


Figure 3.62: Fore-Aft Sensor

3.7.12 Reel Tine Pitch

Reel tine pitch is a term used to describe the position of the reel fingers in relation to the cutterbar. The reel tine pitch can be changed by changing the reel fore-aft position and the reel cam setting. You may wish to change the reel tine pitch to suit different harvesting conditions.

Changing the reel position has the largest impact on the reel tine pitch. Changing the cam setting, on the other hand, has a smaller impact on reel tine pitch. For example, with the cam position range at 33°, the corresponding finger pitch range is only 5° at the lowest point of the reel's rotation.

For the best results, use the minimum cam setting that delivers the crop past the rear edge of the cutterbar and onto the drapers. For more information, refer to *3.6.2 Header Settings, page 59*.

Reel Cam Settings

Changing the cam position allows you to adjust the point at which the reel fingers release gathered crop to the drapers. Recommendations are provided for reel cam settings in various harvesting conditions.

The setting numbers are visible above the slots on the cam disc. For instructions, refer to *Adjusting Reel Cam, page 94*.

Cam Position 1, Reel Position 6 or 7 delivers the most even crop flow onto the drapers without fluffing or disturbing the material.

- This setting will release crop close to the cutterbar. Use this setting when the cutterbar is on the ground while harvesting.
- Some crops will not be delivered past the cutterbar when the cutterbar is raised off the ground while the reel is far forward. Therefore, set the initial reel speed so that it close to the ground speed.

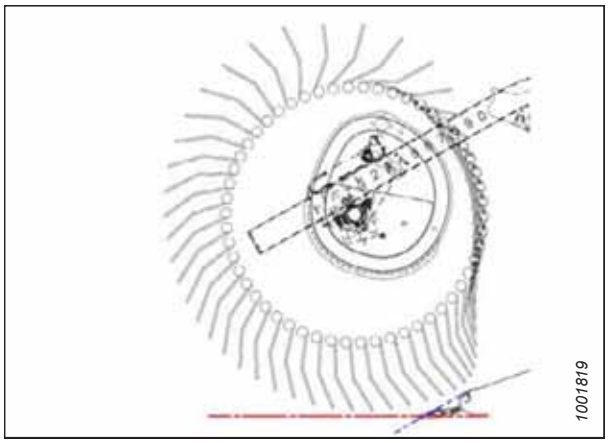


Figure 3.63: Finger Profile – Position 1

Cam Position 2, Reel Position 3 or 4 is the recommended starting position for most crops and conditions.

- If the crop is stalling on the cutterbar when the reel is in the forward position, increase the cam setting to push the crop past the rear edge of the cutterbar.
- If the crop is getting fluffed or if there is a disruption to the flow across the drapers, decrease the cam setting.
- This setting results in the reel fingertip speed being approximately 20% faster than the reel speed.

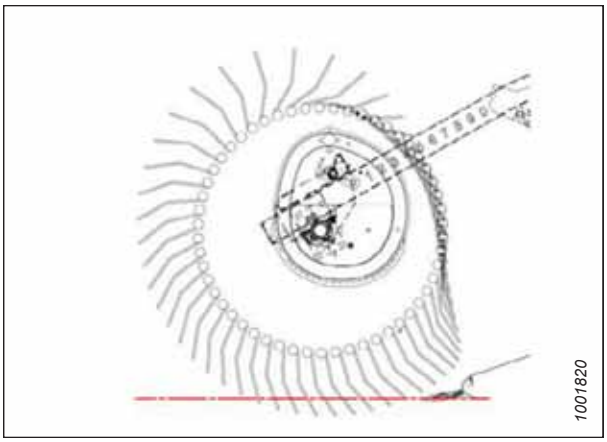


Figure 3.64: Finger Profile – Position 2

Cam Position 3, Reel Position 6 or 7 is mainly used to leave long stubble.

- This position allows the reel to reach forward and lift the crop across the knife and onto the drapers.
- This setting results in the reel fingertip speed being approximately 30% faster than the reel speed.

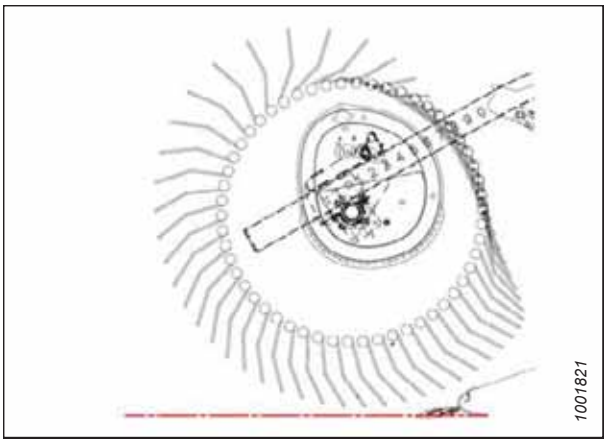


Figure 3.65: Finger Profile – Position 3

Cam Position 4, Reel Position 2 or 3 is used with the reel is fully forward. Using this setting results in the header leaving the maximum amount of stubble when harvesting in lodged crops.

- This position allows the reel to reach forward and lift the crop across the knife and onto the drapers.
- This setting results in the reel fingertip speed being approximately 35% faster than the reel speed.

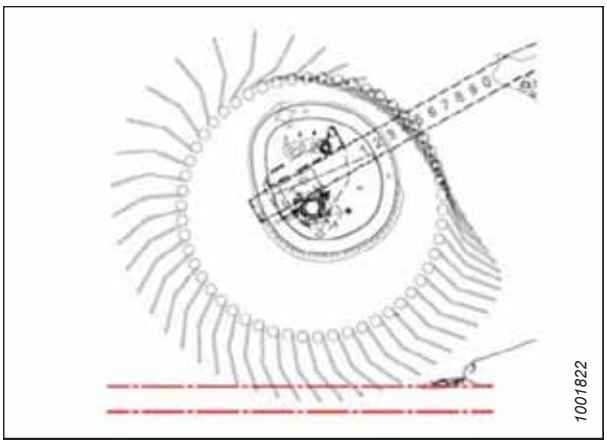


Figure 3.66: Finger Profile – Position 4

Cam Position 4, Header Angle at Maximum, and Reel Fully Forward provides the maximum amount of reel reach below the cutterbar to pick up lodged crops.

- This position leaves a significant amount of stubble when the cutting height is set to approximately 203 mm (8 in.). In damp materials such as rice, it is possible to double the windrower's ground speed because of the reduction of cut material.
- This setting results in a the reel fingertip speed being approximately 35% faster than the reel speed.

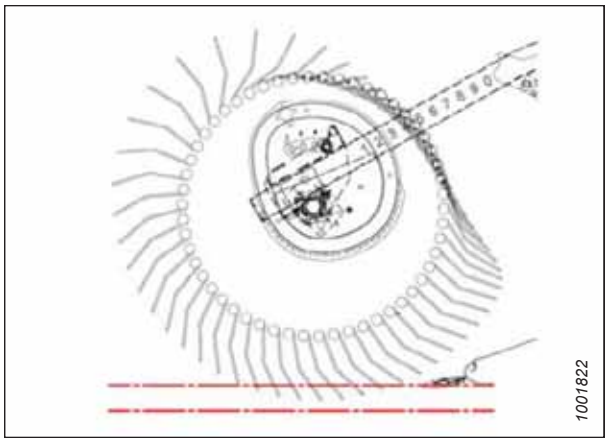


Figure 3.67: Finger Profile – Position 4

NOTE:

Higher cam settings with the reel fore-aft position set between 4–5 sharply decreases the draper capacity because the reel disrupts the crop flow across the drapers and the fingers engage the crop that is moving on the drapers. High cam settings are recommended only with the reel at, or close to, full forward settings.

Adjusting Reel Cam

The reel cam can be adjusted to change the reel tine pitch.

IMPORTANT:

Always check the reel-to-cutterbar clearance after adjusting the reel tine pitch and reel fore-aft positions. For information, refer to *5.9.1 Reel-to-Cutterbar Clearance, page 2703.6.2 Header Settings, page 59*.

DANGER

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

NOTE:

If there are multiple reel cams, the adjustments need to be made on all of the reel cams.

1. Shut down the engine, and remove the key from the ignition.
2. Remove hairpin (A) securing multi-tool (B) to bracket on the left endsheet.

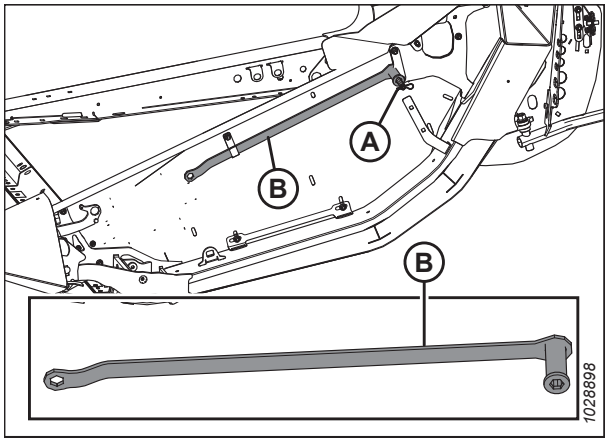


Figure 3.68: Left Endsheet

3. Turn latch pin (A) **COUNTERCLOCKWISE** using multi-tool to release the cam disc.

   IMPORTANT:

   Refer to the cam latch decal for the locking/unlocking rotation direction. Forcing the cam latch in the wrong direction can damage the roll pins.

4. Use the multi-tool on bolt (B) to rotate the cam disc and align latch pin (A) with the desired cam disc hole position (C) (1 to 4).

   NOTE:

   Bolt (B) is welded to the cam support.

5. Turn latch pin (A) **CLOCKWISE** to engage and lock the cam disc.

   IMPORTANT:

   Ensure the cam is secured into position before operating the machine.

6. For double-reel headers, repeat the above procedure for the next reel.

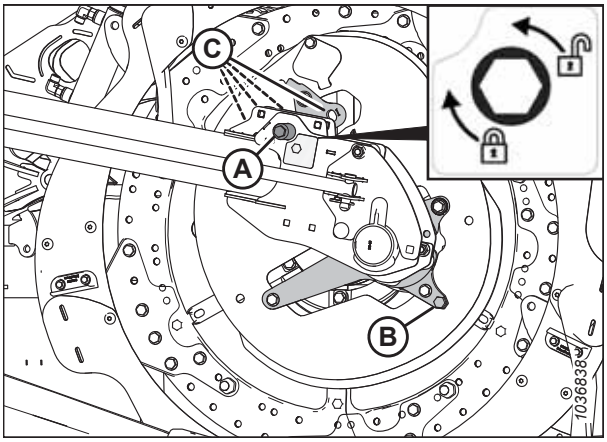


Figure 3.69: Cam Disc Positions

3.7.13 Upper Cross Auger

The Upper Cross Auger (UCA) improves crop feeding into the center of the header in heavy crop conditions. It is ideal for high-volume harvesting forages, oats, canola, mustard, and other tall, bushy, hard-to-convey crops.

The shutoff valve (A) turns off the UCA when it is not needed.

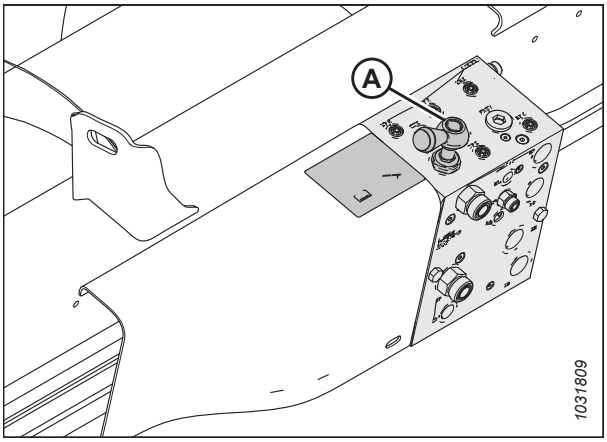


Figure 3.70: Shutoff Valve

Adjusting Upper Cross Auger Position

The upper cross auger (UCA) has an adjustable mount that allows the auger position to be adjusted for different harvesting conditions. Headers with three-piece augers have two adjustable mounts: one on each end of the center auger.

NOTE:

For information on the positions of the primary and secondary front bolts, refer to Figure *3.73, page 96*.

The mount(s) are initially installed in the rear-most position, so that front bolt (A) is in the primary position. This is the recommended configuration for most conditions.

When front bolt (A) is in the primary position, the auger and the reel are safe to operate in any position. The position of the auger can be adjusted (to a limited extent) by changing the position of the mount with respect to rear bolt (B).

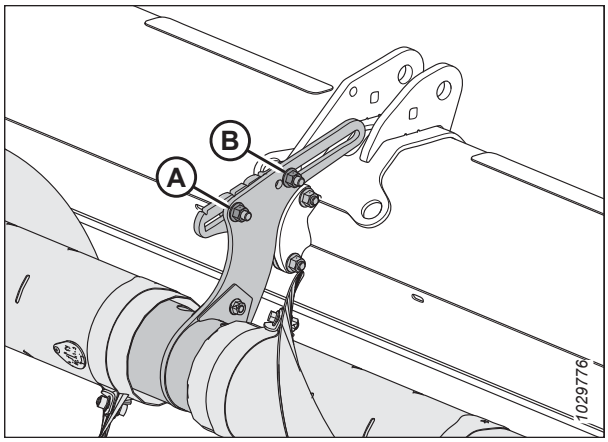


Figure 3.71: Initial Position of Adjustable Mounts – Two-Piece Auger

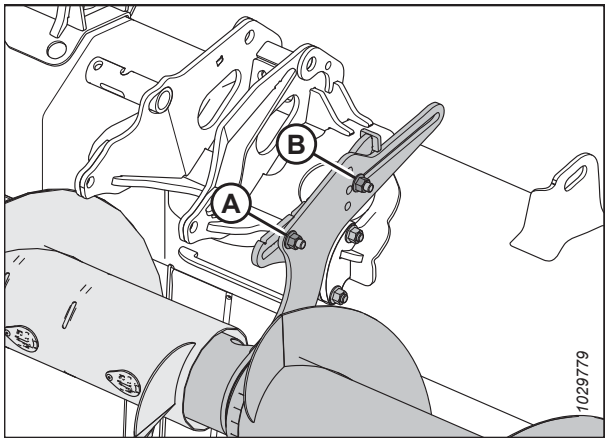


Figure 3.72: Initial Position of Adjustable Mounts – Three-Piece Auger

When the front bolt is moved to secondary position (B), the auger position can be adjusted to a greater extent. For three-piece augers, additional secondary positions (B) are available if you wish to raise or lower the auger. When the front bolt is in one of these positions, the fore-aft adjustment is limited, which prevents the UCA from interfering with the feed auger and the header frame.

IMPORTANT:

When the front bolt is in one of secondary positions (B) and the reel is in its rear-most position, the reel fingers and cam arms may contact the UCA. When the reel is moved fully back (for example, when harvesting canola), the UCA must also be moved fully back in order to allow for sufficient clearance between the reel fingers and the auger.

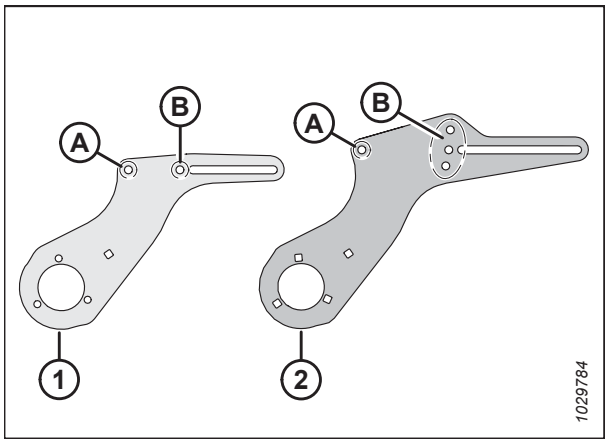


Figure 3.73: Adjustable Mount Details

1 - Two-Piece Auger Mount

2 - Three-Piece Auger Mount

A - Primary Position for Front Bolt

B - Secondary Position(s) for Front Bolt

Move the auger forward to:

- Help convey light crops, especially on side hills
- Improve the feeding of light crops
- Reduce the reel carry over or the crop flow disruption caused by the reel

Move the auger rearward to:

- Increase the available volume for conveying heavy crop
- Keep the auger close to the deflectors to prevent crop from getting behind the auger and wrapping around the auger

To adjust the auger position, do the following:

1. Locate the adjustable mount.

   NOTE:

   On two-piece augers, the adjustable mount protrudes from the center support assembly. On three-piece augers, the adjustable mount protrudes from the ends of the center auger.

   NOTE:

   The illustration shows the left adjustable mount on a three-piece auger. The adjustable mount on a two-piece auger is similar, but has only one secondary position for the front bolt instead of three. Refer to Figure *3.73, page 96* for more information.

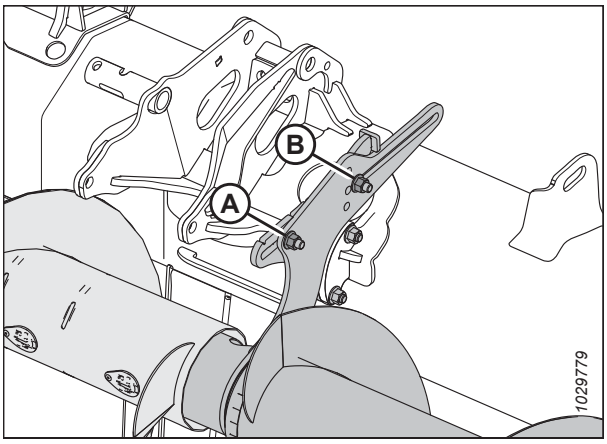


Figure 3.74: Initial Position of Adjustable Mounts – Three-Piece Auger

2. If desired, relocate front bolt and nut (A). The front bolt and nut have two possible locations on two-piece augers: the primary location and the secondary location. On three-piece augers, there are four possible locations: one primary location and three secondary locations.
3. Loosen front nut (A) and rear nut (B) just enough to allow the adjustable mount to slide.
4. Move the mount to the desired position.
5. Retighten nuts (A) and (B). Torque the nuts to 69 Nm (51 lbf·ft).
6. If a three-piece UCA is installed, repeat this procedure on the second adjustable mount.

   IMPORTANT:

   On headers with three-piece augers, ensure that both mounts are in the same position.

7. Check for interference between the reel fingers and the UCA. Check for interference between the cam arms and the UCA along the entire hydraulic fore-aft range of the reel. For instructions, refer to *Checking Upper Cross Auger for Interference, page 98*.

Checking Upper Cross Auger for Interference

If the upper cross auger (UCA) is out of adjustment, it can contact the reel or the header frame. The clearance between the UCA and certain header components will need to be inspected.

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Fully retract the reel fore/aft fully to bring the reel as close as possible to the UCA.

   NOTE:

   If the reel cam adjustment is changed, this procedure will need to be performed again.

DANGER

To prevent injury or death from the unexpected startup of the machine, stop the engine and remove the key from the ignition before you make adjustments to the machine.

3. Shut down the engine, and remove the key from the ignition.
4. Manually rotate UCA (A). Ensure that the clearance between the UCA and the header components is at least 10 mm (13/32 in.) at the following locations:
   - Reel cam arms (B)
   - Reel fingers (C)
   - Reel cylinder supports (D)
   - Split frame joint (E)
5. If the clearance between the UCA and the header components requires adjustment, proceed to *Adjusting Upper Cross Auger Position, page 95*.

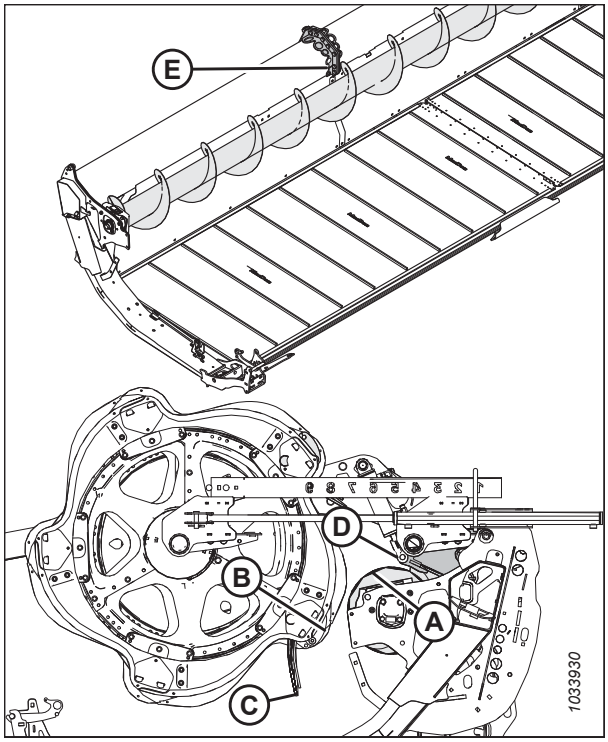


Figure 3.75: UCA Clearance Check Locations

3.7.14 Crop Dividers

Crop dividers are used to separate the crop when harvesting. They are removable to allow the installation of vertical knives, and to decrease transport width.

Standard crop dividers are provided with all headers. Optional floating crop dividers may also be purchased. Refer to *6.1.4 Floating Crop Dividers, page 320*.

Removing Crop Dividers

Crop dividers can be removed to allow installation of other options or to decrease transport width.

DANGER

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

1. Lower the reel and raise the header. For instructions, refer to your windrower operator's manual for instructions.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the safety props. For instructions, refer to your windrower operator's manual for instructions.
4. Open the endshields. For instructions, refer to *Opening Header Endshields, page 43*.
5. Remove lynch pin (A).
6. Hold onto crop divider (E).
7. Rotate hex shaft (B) on divider latch (C) forward to disengage it from bolt (D).

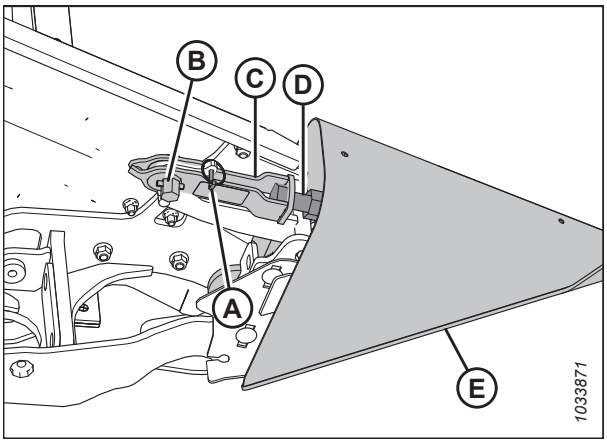


Figure 3.76: Crop Divider with Latch

8. Lower crop divider (A), and remove it from the endsheet.
9. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.

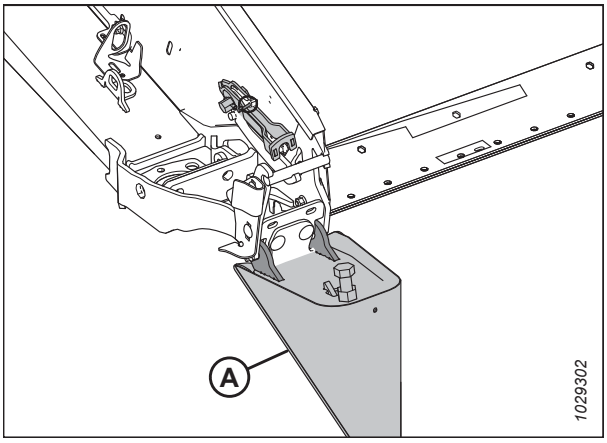


Figure 3.77: Crop Divider with Latch

10. If installed, place crop divider (A) onto optional storage position on bracket (B).
11. If not installed, place crop dividers in a safe location.

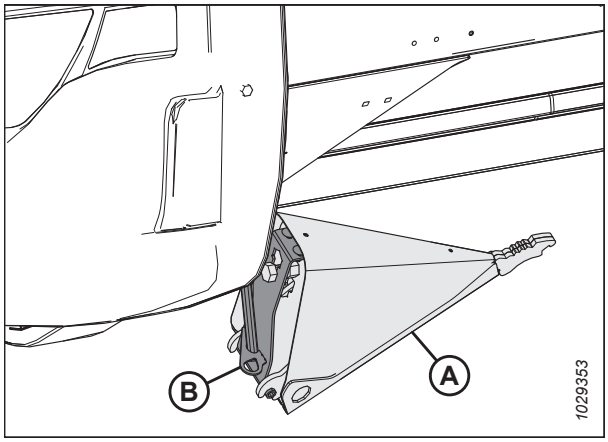


Figure 3.78: Optional Crop Divider Storage

Installing Crop Dividers

Follow these instructions to properly instal the crop dividers.

DANGER

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

1. Start the engine.
2. Lower the reel fully.
3. Raise the header fully.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the header safety props.
6. If optional storage bracket is installed. Remove crop divider (A) from storage position by lifting the crop divider so that bolt (B) clears the slot in storage bracket (C).
7. If not installed, retrieve crop dividers from where they were stored.
8. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.

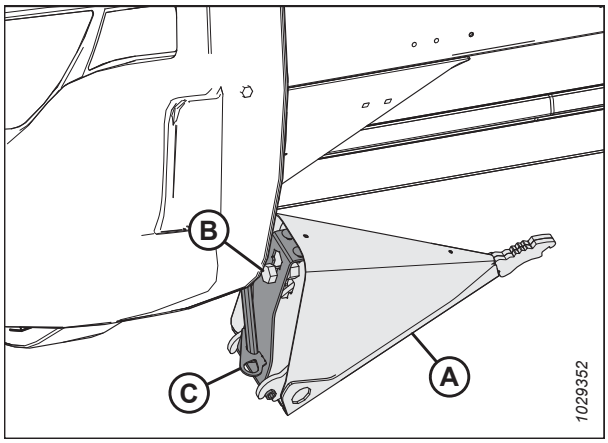


Figure 3.79: Optional Crop Divider

9. Insert crop divider lugs (A) into holes in the endsheet as shown.
10. Remove lynch pin (B) from latch (C).

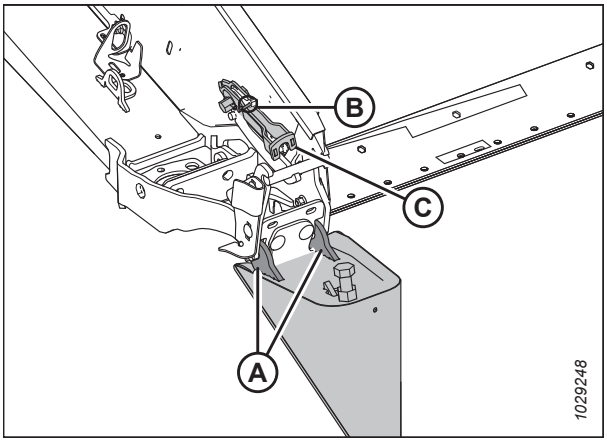


Figure 3.80: Crop Divider with Latch

11. Lift the forward end of latch (A) and crop divider (B).

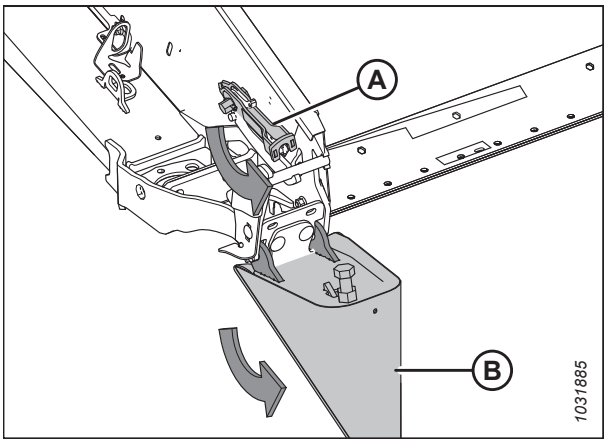


Figure 3.81: Crop Divider with Latch

12. Engage latch (A) onto crop divider bolt (B).
13. Rotate hex shaft (D) on latch (A) counter-clockwise to engage lock.

    NOTE:

    Hex shaft (D) requires a torque of 40–54 Nm (30–40 lbf·ft) to close the latch. If adjustment is required, loosen latch (A) and adjust bolt (B) to correct the amount of torque required.

14. Secure with lynch pin (C).
15. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.

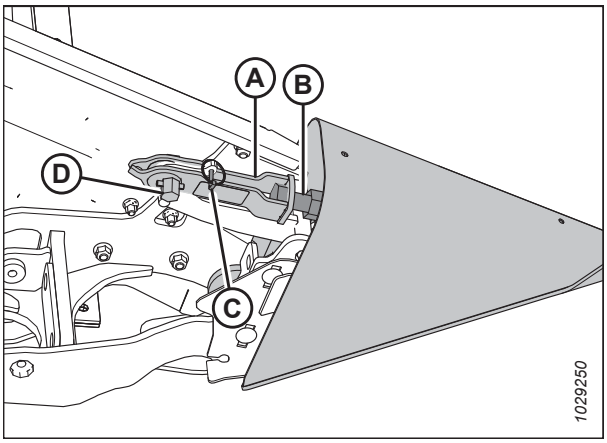


Figure 3.82: Crop Divider with Latch

3.7.15 Crop Divider Rods

Removable crop divider rods are provided with the header and to be used in conjunction with crop dividers to help separate crop when harvesting. The rods are most useful when crop is bushy or down. In standing crops, using only crop dividers is recommended.

Table 3.14 Crop Divider Rods Recommended Use

With Divider Rods		Without Divider Rods
Alfalfa	Lodged cereal	Edible beans
Canola	Peas	Milo
Flax	Soybeans	Rice
Grass seed	Sudan grass	Soybeans
Lentils	Winter forage	Standing cereal

Removing Crop Divider Rods

Crop divider rods can be removed from the ends of the crop dividers and stored on the header.

1. Loosen bolt (B) and remove crop divider rod (A) from both sides of the header.

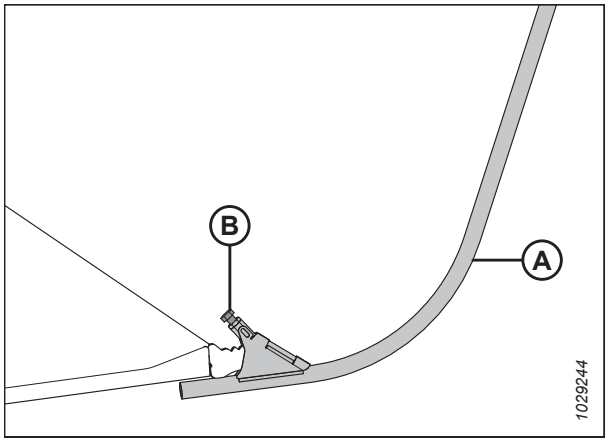


Figure 3.83: Crop Divider Rod

2. Store both crop divider rods (B) on the right endsheet, and secure with lynch pin (A).

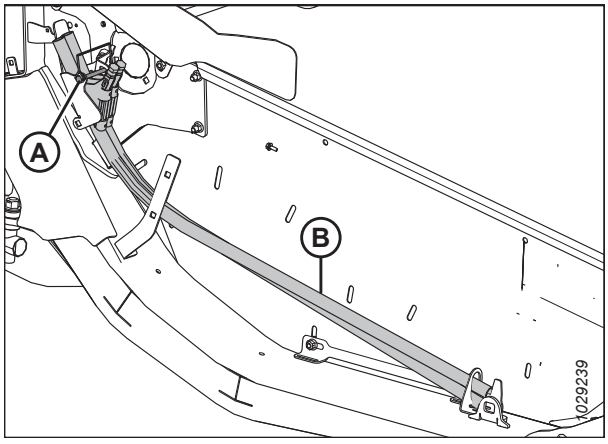


Figure 3.84: Right Endsheet

Installing Crop Divider Rods

The crop divider rods can be installed on the ends of the crop dividers to help separate bushy crop.

1. Open the right endshield. For instructions, refer to *Opening Header Endshields, page 43*.
2. Undo lynch pin (A) securing divider rods (B) to the header endsheet. Remove the divider rods from their storage location.
3. Reinstall lynch pin (A).

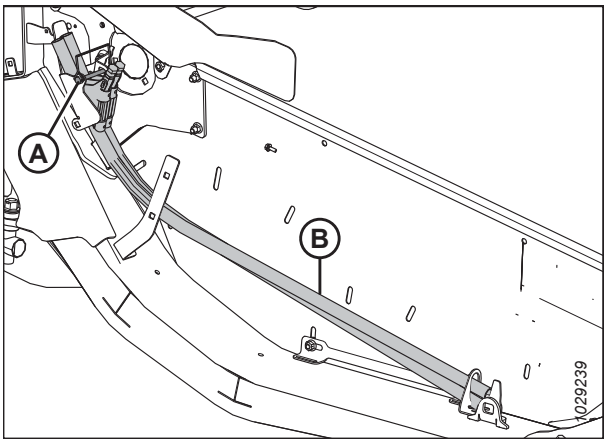


Figure 3.85: Divider Rods in Storage Location at Right Header Endsheet

4. Position crop divider rod (A) on the tip of the crop divider as shown. Tighten bolt (B).
5. Repeat this procedure to install the crop divider rod on the the opposite end of the header.
6. Close the right endshield. For instructions, refer to *Closing Header Endshields, page 44*.

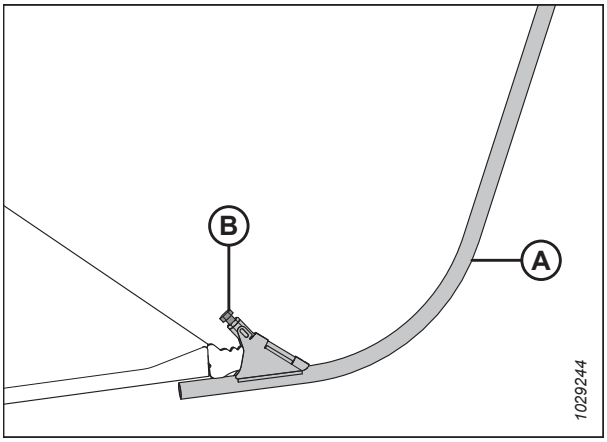


Figure 3.86: Divider Rod on Crop Divider

Optional Rice Divider Rods

The optional rice divider rods are used assist with tall and tangled rice crops. They can be installed on the ends of the crop dividers.

Rice divider rods provide improved performance in tall and tangled rice crops. For more bundle information, refer to *6.1.7 Rice Divider Rod Kit, page 322*.

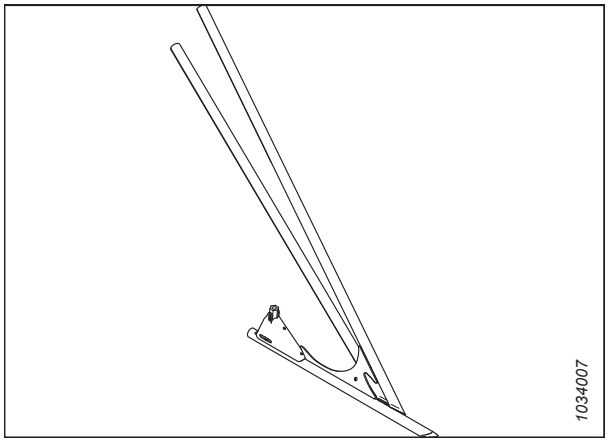


Figure 3.87: Optional Divider Rod for Rice

Rice divider rods are stored at the rear of both endsheets on storage bracket (A) and secured in place with pin (B). The installation and removal of these rods are the same as the procedures for standard crop divider rods.

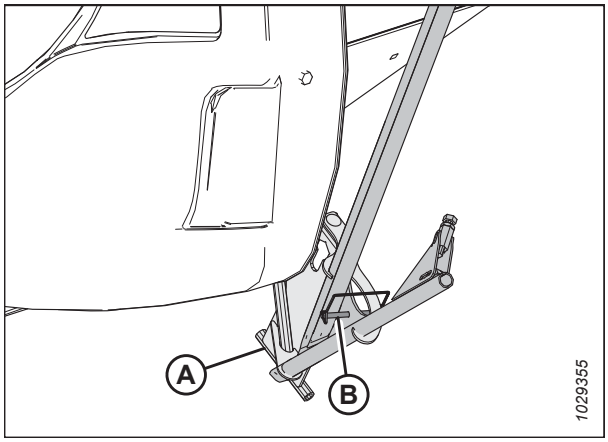


Figure 3.88: Rice Divider Rod Storage

3.7.16 Delivery Opening

The width and location of the delivery opening can be changed. This affects the width and configuration of the windrow.

The decision to widen or narrow the center delivery opening, or to double windrow, should be based on the following factors:

- Capability to pick-up a windrow
- Type and yield of crop
- Weather conditions (rain, humidity, wind)
- Drying time available

Refer to *3.7.18 Windrow Types, page 111* for the strengths and weaknesses of the various windrow configurations with respect to these factors.

The procedure for adjusting the delivery opening varies depending on whether the hydraulic deck shift has been installed.

Also refer to *3.7.17 Double Windrowing, page 108*.

Adjusting Delivery Opening on Header with Hydraulic Deck Shift

The delivery opening can be changed by moving the inboard deck shift stops.

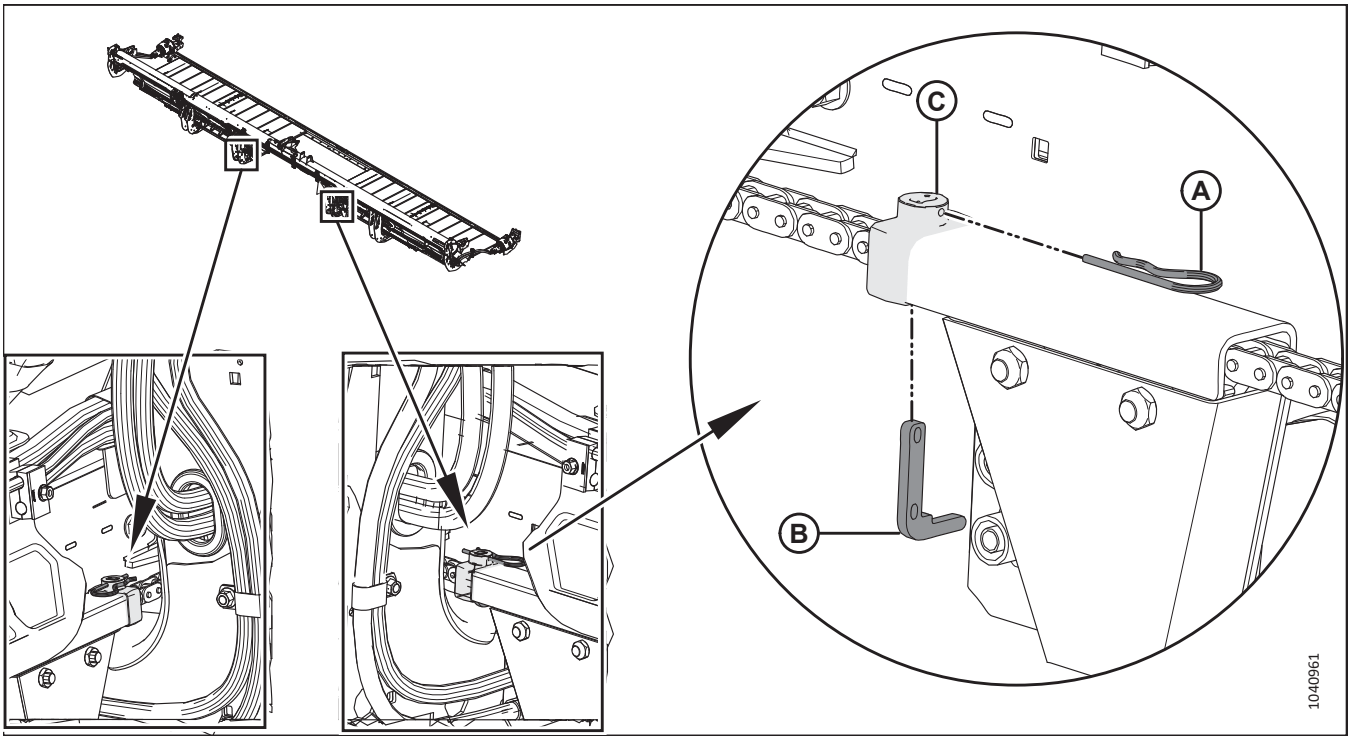


Figure 3.89: Inboard Deck Shift Stop

1. Remove hairpin (A) and hook pin (B) securing chain stop (C).
2. Slide chain stop (C) outboard to decrease the maximum opening size, or inboard to increase the maximum opening.

   NOTE:

   Each chain link is approximately 19 mm (3/4 in.) in length. Adjusting inboard deck shift stops by one chain link changes the delivery opening by 38 mm (1–1/2 in.).

CAUTION

Adjust the outboard stops to prevent the decks from contacting each other.

3. Secure chain stop (C) with hook pin (B) and hairpin (A).

   NOTE:

   Install hook from bottom of chain stop and ensure hook point towards front of header.

Adjusting Hydraulic Deck Shift Chain Tension

The hydraulic deck shift (HDS) chain's midpoint should be 25–50 mm (1–2 in.) lower than either end of the chain.

1. Locate chain adjustment bolt (A).

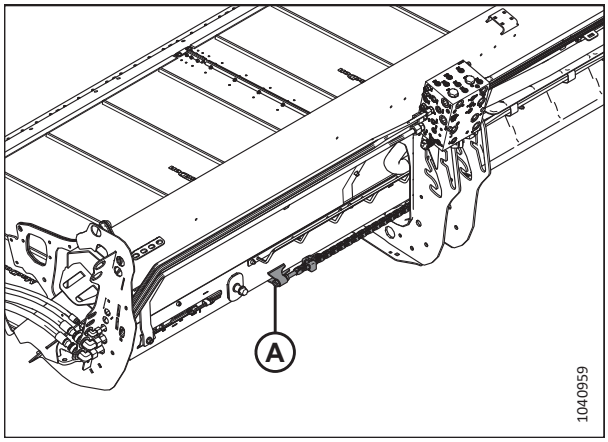


Figure 3.90: Chain Adjustment Bolt – Left Shown, Right Similar

2. Loosen jam nut (A).
3. Turn nut (B) to adjust chain tension.

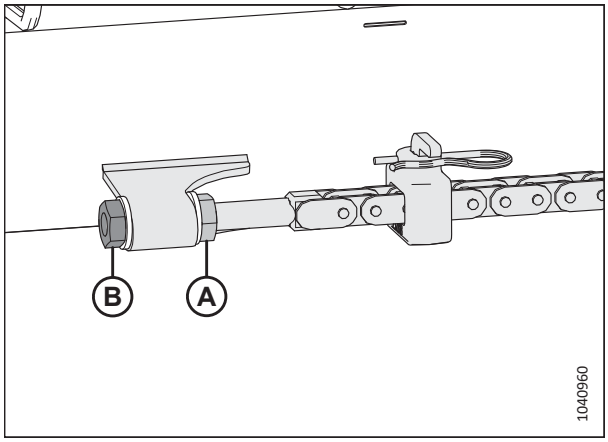


Figure 3.91: Chain Adjustment Bolt – Left Shown, Right Similar

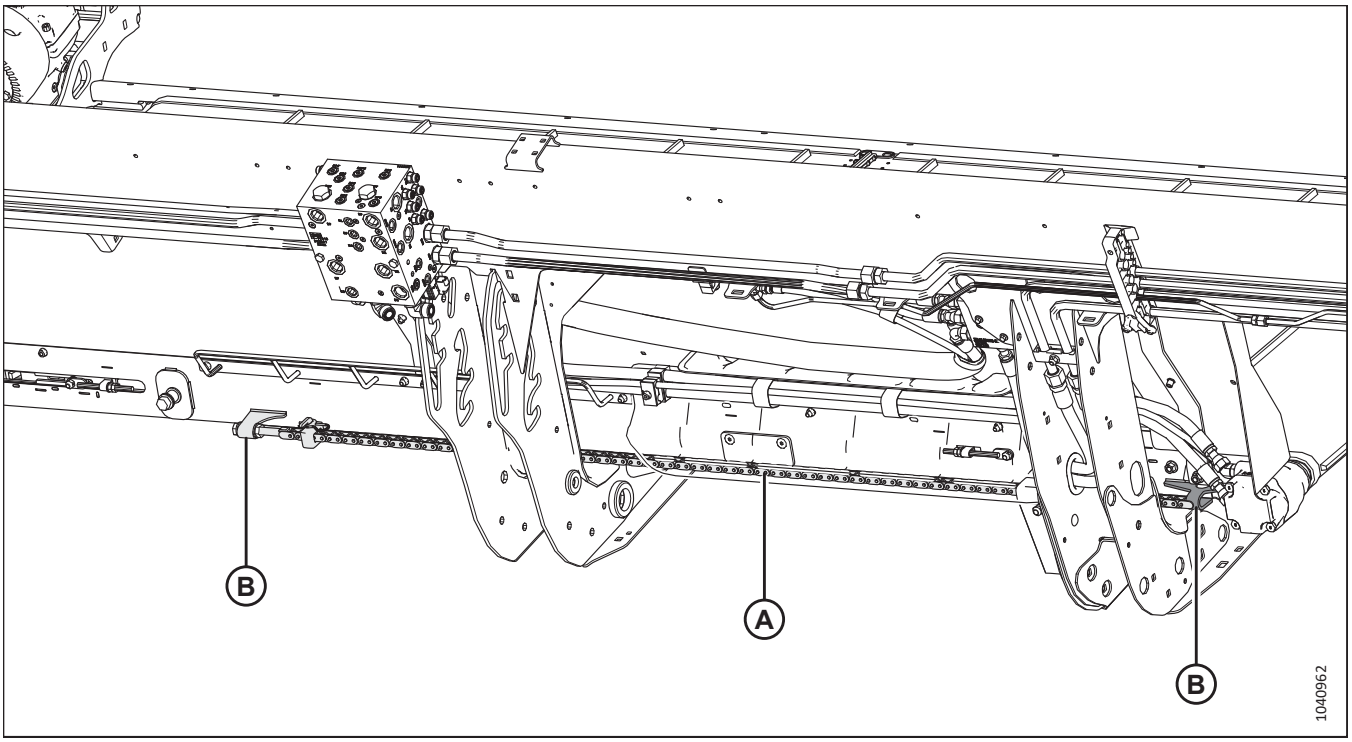


Figure 3.92: HDS Chain – Left Shown, Right Similar

4. Measure to ensure chain midpoint (A) is 25–50 mm (1–2 in.) lower than chain ends (B).

5. Tighten jam nut (A).

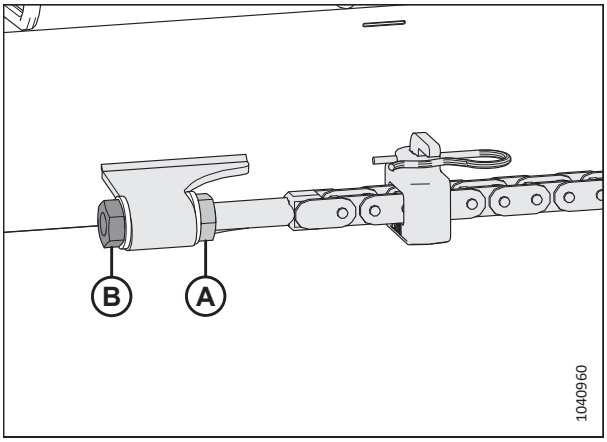


Figure 3.93: Chain Adjustment Bolt – Left Shown, Right Similar

Adjusting Size of Delivery Opening on Header with Manual Deck Shift

Both draper decks can be moved manually to adjust the delivery opening.

1. Loosen bolts (A) on both decks.
2. Slide the decks to the desired opening width. Retighten bolts (A).

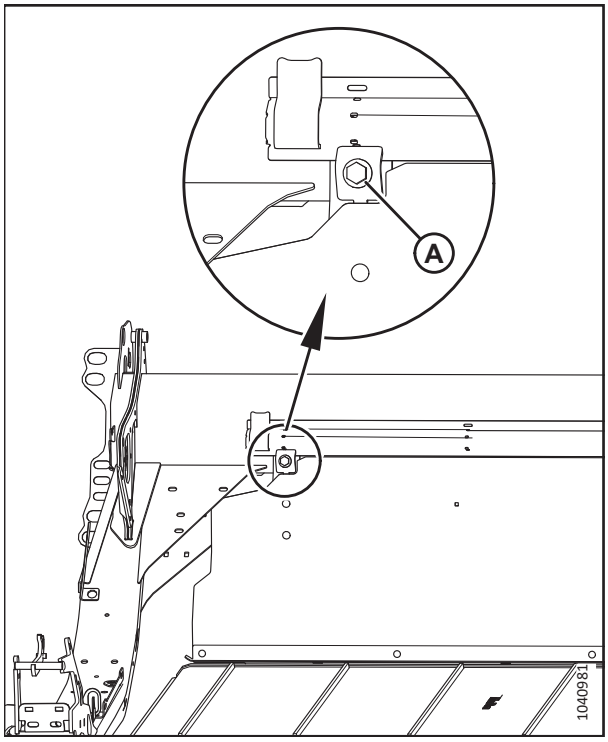


Figure 3.94: Manual Deck Shift

3.7.17 Double Windrowing

Double windrowing is laying two swaths side-by-side. Larger capacity combines or forage harvesters can then pick up twice as much material in a single pass, saving time and fuel.

Double windrowing can be performed by deck shifting.

Deck shifting is used for crops that don't require conditioning, such as grains, canola, and beans. For instructions, refer to:

- *Shifting Decks Hydraulically, page 108*
- *Shifting Decks Manually, page 109*

Shifting Decks Hydraulically

The hydraulic deck shift feature allows you to select center, left, or right delivery from the windrower cab.

Refer to your windrower operator's manual for identification and operation of the deck shift control.

To lay a double windrow, do the following:

1. Position the decks at the left end of header to deliver crop from right end (A) for the first round.
2. To deliver crop from the left end (B) of the header, use the deck shift control in the windrower to shift the decks to the right end of the header.
3. Complete the second round to lay a double windrow.
4. Repeat above steps to lay additional double windrow.

   NOTE:

   The end delivery opening is designed to give adequate clearance between the first windrow and the standing crop, and optimum space between the two windrows.

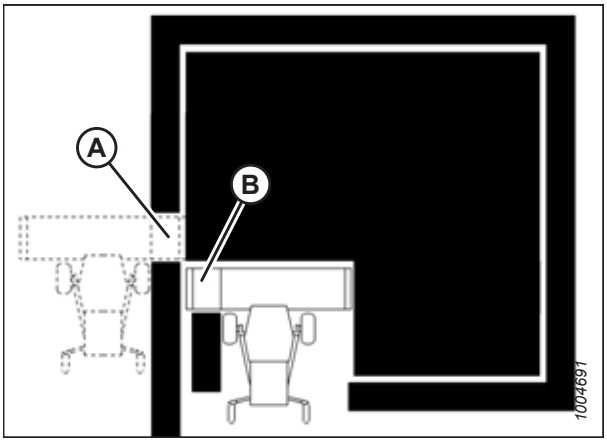


Figure 3.95: Double Windrowing

Shifting Decks Manually

On D215, D220, D225, D230, and D235 SP Draper Headers, both decks can be moved manually (if not already equipped with hydraulic deck shift) to deliver the crop from either the center or right/left end. Hydraulic hoses may need to be extended to shift the decks to the desired positions.

DANGER

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

1. **D230 and D235 SP:** Raise and lock the transport/stabilizer wheels (if installed) at the highest wheel height position to prevent the wheels from interfering with the windrow. For instructions, refer to *Moving Front (Left) Wheels into Field Position, page 125* and *Moving Front (Left) Wheels into Transport Position, page 129*.

To deliver crop from the right end, move the decks to the left end of the header as follows:

2. Loosen bolt (A) on the right deck.
3. Slide the deck to close off the center opening. Tighten bolt (A).

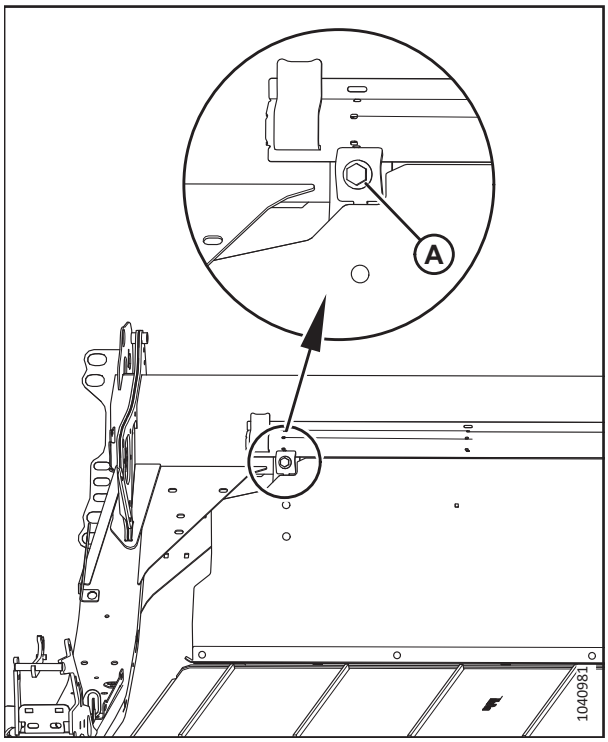


Figure 3.96: Right Deck Shown

4. Reverse draper drive motor hoses (A) on the moved deck so that the draper turns the same direction as the unmoved deck.

   NOTE:

   Loosen the clamp on the plastic sleeve at the drive motor so that hoses (A) can be reversed. Tighten the clamp.

   NOTE:

   To deliver crop from the left end, move the decks to the right end of the header following the steps above.

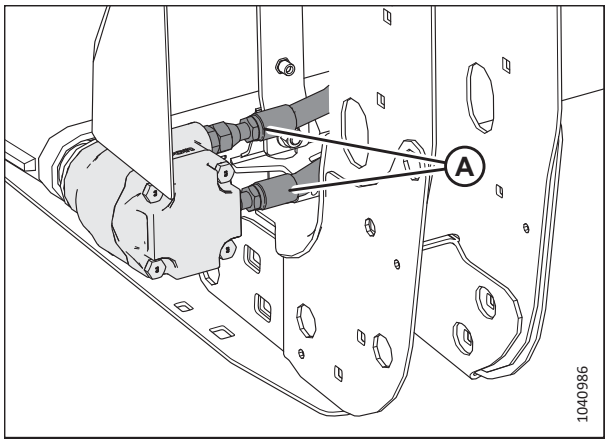


Figure 3.97: Right Deck Motor

To lay a double windrow, do the following:

5. Position decks at the left end of header to deliver crop from right end (A).
6. Complete one round or one length of the field.
7. Complete the second round or length in the opposite direction to lay a double windrow.
8. Repeat the above steps to lay additional double windrows.

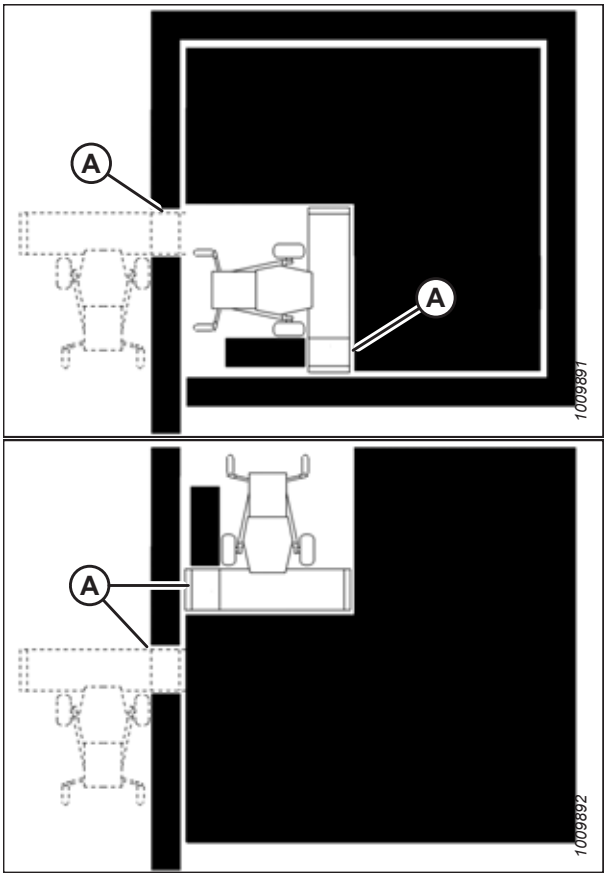


Figure 3.98: Double Windrowing

3.7.18 Windrow Types

Review the qualities that make up a good windrow to better understand how the crop delivery method affects your windrow.

There are three basic criteria by which the quality of a windrow is measured:

- **Weight Distribution:** Heads and stalks distributed evenly across full width of windrow
- **Good Curing:** A loose, open windrow for better drying
- **Good Weatherability:** A well-formed windrow that supports heads off the ground and holds together in extreme weather conditions

Table 3.15 Windrow Descriptions

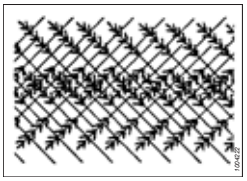
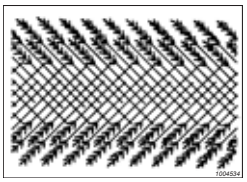
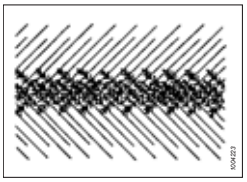
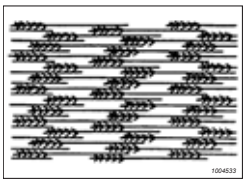
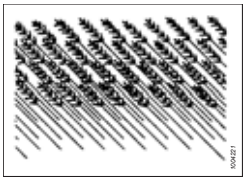
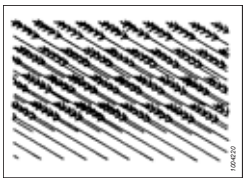
Windrow Type	Windrow Descriptions
Herringbone 	**Description:** The most desirable form of windrow, stalks are crossed and interwoven. Heads are distributed across full width of windrow. This windrow can be formed by center delivery only. **Weight Distribution:** Good **Curing:** Good **Weatherability:** Excellent **Machine Setting Guidelines:** • Reel and ground speed approximately equal • Medium draper speed • Center delivery
Fantail 	**Description:** The stalks are crossed in the center and the heads are in line along outside edges. This windrow can be formed by center delivery only. **Weight Distribution:** Fair **Curing:** Fair **Weatherability:** Fair **Machine Setting Guidelines:** • Low draper speed • Low header angle • Center delivery
Dovetail 	**Description:** The stalks are lined along outside edges of windrow and heads are crossed in center. This windrow can be formed by center delivery only. **Weight Distribution:** Poor **Curing:** Fair **Weatherability:** Poor **Machine Setting Guidelines:** • High draper speed • High header angle • Center delivery

Table 3.15 Windrow Descriptions (continued)

Windrow Type	Windrow Descriptions
Parallel 	**Description:** The stalks are parallel to windrow and heads evenly distributed across width of windrow. This windrow can be formed by center delivery or end delivery. **Weight Distribution:** Good **Curing:** Good **Weatherability:** Good **Machine Setting Guidelines:** • Medium draper speed • Medium header angle • Center or end delivery
45° Diagonal 	**Description:** The stalks are lined along one edge and heads are along opposite edge, 45° to windrow perpendicular. This windrow can be formed by end delivery or by center delivery, if the crop is leaning to one side. **Weight Distribution:** Poor **Curing:** Fair **Weatherability:** Poor **Machine Setting Guidelines:** • Low reel speed • Less aggressive tine pitch • End delivery or center delivery if crop is leaning
75° Diagonal 	**Description:** The stalks are closer to parallel than the 45° windrow. Stalk tips are lined along one edge with heads opposite, 75° to windrow perpendicular. This windrow can be formed by end delivery or by center delivery, if the crop is leaning to one side. **Weight Distribution:** Fair **Curing:** Good **Weatherability:** Fair **Machine Setting Guidelines:** • Low reel speed • Less aggressive tine pitch • End delivery or center delivery if crop is leaning

3.7.19 Haying Tips

These tips may be useful when using the header in hay crops.

Curing

Curing crops quickly helps maintain the highest quality because for each day that hay lies on the ground, 5% of the protein is lost.

A quick cure will maintain top quality because:

- 5% of the protein is lost for each day hay lies on the ground.
- The sooner the cut hay is off the ground, the earlier the start for new growth.

Leaving the windrow as wide and thin as possible makes for the quickest curing. The cured hay should be baled as soon as possible.

Topsoil Moisture

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 using the table below.

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

If the ground is wet due to irrigation, wait until soil moisture drops below 45%.

If the ground is wet due to frequent rains, cut when the weather allows and let the forage lie on the wet ground until it dries to the moisture level of the ground. The cut hay will dry no more until the ground under it dries, so consider moving the windrow to drier ground.

Weather and Topography

Cut as much hay as possible by midday, when drying conditions are best.

Fields sloping south get up to 100% more exposure to the sun's heat than the north sloping fields. If hay is baled and chopped, consider baling the south-facing fields and chopping fields facing north.

When relative humidity is high, the evaporation rate is low and hay dries slower.

If there is no wind, saturated air becomes trapped around the windrow. Raking or tedding will expose the hay to fresher, less saturated air.

Cutting hay perpendicular to the direction of the prevailing wind is also recommended.

Windrow Characteristics

Adjust speed and header variables to achieve the ideal windrow characteristics.

Table 3.16 Windrow Characteristics

Configuration	Advantage
High and fluffy	Movement of air through the windrow is more important to the curing process than is direct sunlight.
Consistent formation, not bunchy	Permits an even flow of material into the baler, chopper, etc. and allows for more even drying.

Table 3.16 Windrow Characteristics (continued)

Configuration	Advantage
Even distribution of material across windrow	Results in even and consistent bales to minimize handling and stacking problems.
Properly conditioned	Prevents excessive leaf damage.

Driving on Windrows

Driving on previously cut windrows can lengthen drying time by a full day in hay that will not be raked. If practical, set forming shields for a narrower windrow that can be straddled.

NOTE:

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

Raking and Tedding

Raking or tedding speeds up drying; however, benefits must be evaluated against additional leaf loss.

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 they reach 40–50% moisture.

To avoid excessive yield losses, hay should not be raked or tedded when moisture is less than 25%.

Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces, so that water can escape and evaporate faster.

However, treated hay lying on wet ground will also absorb moisture faster. Costs and benefits relative to your area should be carefully considered before using a drying agent.

3.8 Leveling Header

The windrower linkages are factory-set to provide the proper level for the header and should not normally require adjustment.

NOTE:

The float springs are **NOT** used to level the header.

1. If the header is not level, check the pressure of the windrower's tires to ensure they are properly inflated. For instructions, refer to the windrower operator's manual.
2. If the header is still not level, adjust the windrower linkages as required. For instructions, refer to the windrower operator's manual.

3.9 Unplugging Cutterbar

Follow this procedure if an obstruction prevents the cutterbar from working correctly.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

IMPORTANT:

Lowering a rotating reel on a plugged cutterbar will damage the reel components.

1. Reverse the windrower. If the cutterbar is still plugged, proceed to the next steps.
2. Stop the forward movement of the machine, and disengage the header drives.
3. Raise the header to prevent it from filling with dirt, and engage the header drive clutch.
4. If the plug does **NOT** clear, disengage the header drive clutch, and raise the header fully.
5. Shut down the engine, and remove the key from the ignition.
6. Engage the header safety props. For instructions, refer to the windrower operator's manual.
7. Clean the cutterbar.

3.10 Transport

There are two ways to transport the header: attached to a MacDon windrower and towed behind a properly configured MacDon windrower or an agricultural tractor.

For more information, refer to

- *3.10.1 Transporting Header on Windrower, page 118*
- *3.10.2 Towing, page 118*

3.10.1 Transporting Header on Windrower

In conditions with good visibility, you can transport the header while it is attached to a MacDon windrower.

WARNING

Do NOT drive the windrower with the header attached on a road or highway at night, or in conditions which reduce visibility, such as fog or rain. The width of the header may not be apparent under these conditions.

CAUTION

- **Check local laws for width regulations and lighting or marking requirements before transporting on roads.**
- **Follow all recommended procedures in your windrower operator's manual for transporting, towing, etc.**
- **Disengage the header drive clutch when travelling to and from the field.**
- **Before driving on a roadway, be sure flashing amber lamps, red tail lamps, and head lamps are clean and working properly. Pivot amber lamps for best visibility by approaching traffic. Always use lamps when travelling on roads to provide adequate warning to other vehicles.**
- **Do NOT use field lamps on roads—they may confuse other drivers.**
- **Before driving on a roadway, clean slow moving vehicle signs and reflectors, adjust rear view mirrors, and clean windows.**
- **Lower the reel fully and raise the header unless transporting in hills.**
- **Maintain adequate visibility and be alert for roadside obstructions, oncoming traffic, and bridges.**
- **When travelling downhill, reduce speed and keep the header at a minimum height to provide maximum stability if forward momentum is stopped for any reason. Raise the header completely at the bottom of the grade to avoid contacting the ground.**
- **Travel at safe speeds to ensure complete machine control and stability at all times.**

3.10.2 Towing

Headers with the EasyMove™ Transport option can be towed behind a properly configured MacDon windrower or an agricultural tractor at a maximum speed of 32 km/h (20 mph).

For instructions, refer to the towing vehicle's operator's manual.

Attaching Header to Towing Vehicle

The header can be towed to multiple locations using a towing vehicle. Follow the instructions below to prevent loss of control leading to bodily injury and/or machine damage.

CAUTION

Adhere to the following slow speed transport instructions to prevent loss of control leading to bodily injury and/or machine damage:

- **The weight of the towing vehicle must exceed the header weight to ensure adequate control and braking performance.**
- **Do NOT tow with any highway-capable vehicle. Use only an agricultural tractor, agricultural combine, or a properly configured MacDon windrower.**
- **Ensure the reel is fully lowered and back on support arms to increase header stability during transport. For headers with hydraulic reel fore-aft, never connect the fore-aft couplers to each other or the circuit will be complete and the reel could creep forward during transport.**
- **Ensure that all pins are properly secured in the transport position at wheel supports, cutterbar support, and hitch.**
- **Check tire condition and pressure prior to transporting.**
- **Connect the hitch to the towing vehicle using a proper hitch pin with a spring locking pin or other suitable fastener.**
- **Attach the hitch safety chain to the towing vehicle. Adjust the safety chain length to provide only enough slack to permit turning.**
- **Connect the header seven-pole plug wiring harness to the mating receptacle on towing vehicle. (The seven-pole receptacle is available from your MacDon Dealer parts department.)**
- **Ensure that lights are functioning properly and clean the slow moving vehicle sign and other reflectors. Use flashing warning lights unless prohibited by law.**

Precautions for Towing Header

Review this list of cautions before attaching and towing a header behind a properly configured MacDon windrower or an agricultural tractor.

CAUTION

Adhere to the following slow speed transport instructions to prevent loss of control leading to bodily injury and/or machine damage:

- **Do NOT exceed 32 km/h (20 mph).**
- **Reduce transport speed to less than 8 km/h (5 mph) for slippery or rough conditions.**
- **Turn corners at only very low speeds (8 km/h [5 mph] or less) as header stability is reduced while cornering. Do NOT accelerate when making or coming out of a turn.**
- **Obey all highway traffic regulations in your area when transporting on public roads. Use flashing amber lights unless prohibited by law.**

3.10.3 Converting from Transport to Field Position (Option)

The header needs to be converted back to field position if it was towed to a new location.

Removing Tow-Bar

Remove the tow bar from the transport location when converting from the transport position.

1. Block the header tires with wheel chocks (A) to prevent header from rolling.

Figure 3.99: Tire Blocking

2. Disconnect electrical connector (A) and safety chain (B) from towing vehicle and store as shown.
3. If removing a tow-bar with an extension, proceed to Step *4, page 121*. If removing a tow-bar without an extension, proceed to Step *16, page 122*.

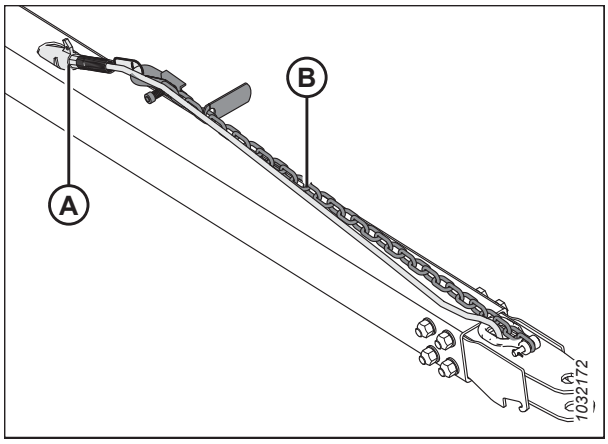


Figure 3.100: Tow-Bar Assembly

Removing tow-bar installed with an extension:

4. Disconnect tow-bar harness (A) from extension harness (B).
5. Remove lynch pin (C) from latch.

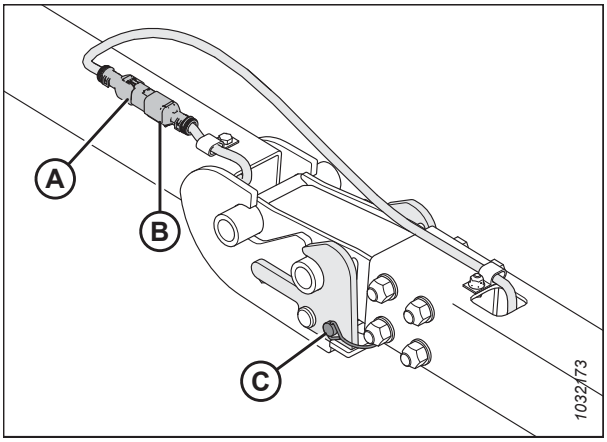


Figure 3.101: Tow-Bar / Extension Harness

6. Secure tow-bar harness (A) in storage location.
7. Lift up on hitch near latch connection to take weight off of latch. While lifting, pull up on latch handle (B) to clear tow-bar lug, and then slowly lower assembly to the ground.
8. Lift end of tow-bar (C) and pull away from extension (D).

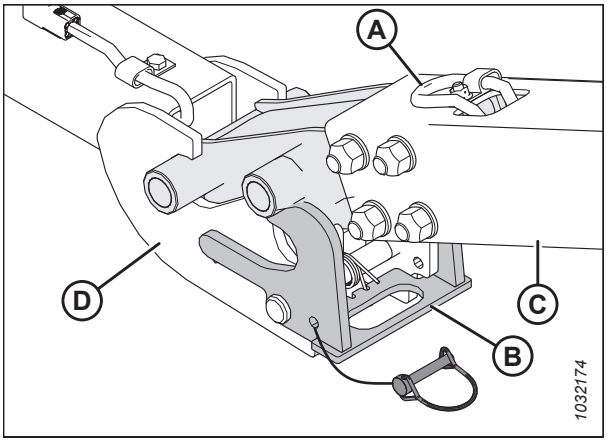


Figure 3.102: Tow-Bar / Extension Joint

9. Unplug tow-bar extension electrical harness (A) from left transport pivot harness (B).

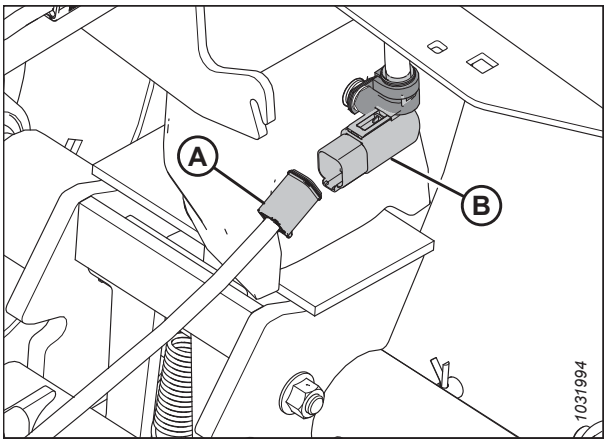


Figure 3.103: Tow-Bar Electrical Connection

10. Remove lynch pin (A) from transport pivot (B).
11. Push back on latch (C) to free extension (D).

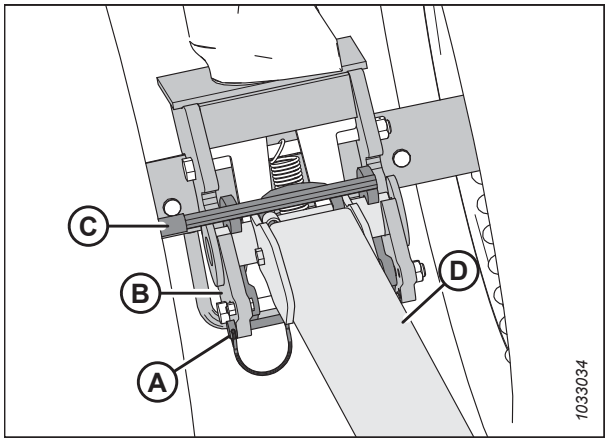


Figure 3.104: Tow-Bar Extension and Transport Pivot

12. Lift extension (A) and pull away from transport pivot (B).
13. Secure extension harness (C) inside the tow-bar extension tube (A).
14. Reinstall lynch pin in left transport pivot for safe keeping.
15. For tow-bar storage, refer to *Storing Tow-Bar, page 123*.

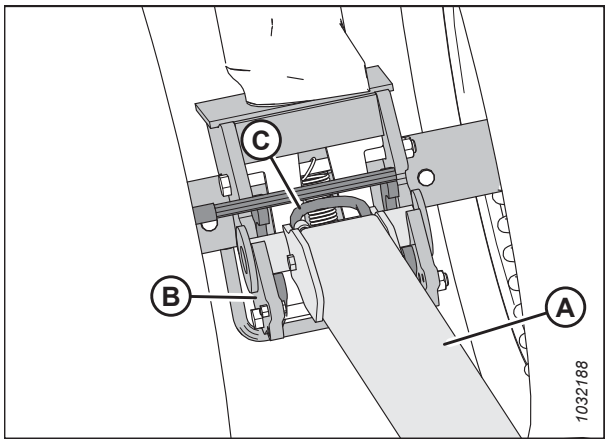


Figure 3.105: Latch Disengaged from Extension

Removing tow-bar installed without an extension:

16. Unplug tow-bar extension electrical harness (A) from left transport pivot harness (B).

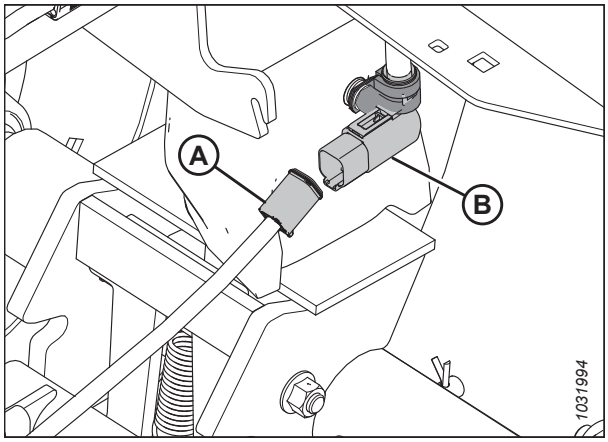


Figure 3.106: Tow-Bar Electrical Connection

17. Remove lynch pin (A), then push back on latch (B) to free the tow-bar.

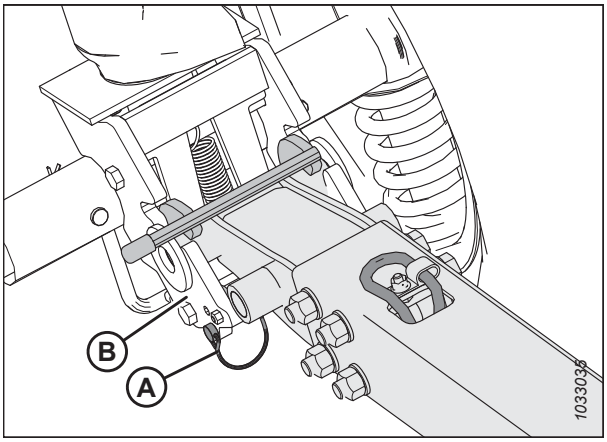


Figure 3.107: Tow-Bar and Left Transport Pivot

18. Lift tow-bar (A) and pull away from transport pivot (B).
19. Reinstall lynch pin in left transport pivot for safe keeping.
20. For tow-bar storage, refer to *Storing Tow-Bar, page 123*.

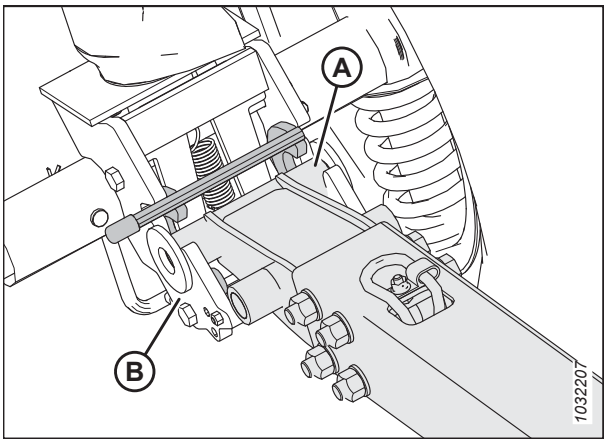


Figure 3.108: Tow-Bar and Left Transport Pivot

Storing Tow-Bar

The tow bar can be stored in the backtube when not in use.

Tow-bar Extension

1. Insert tube end (B) of tow-bar extension (A) onto pin (C).
2. Rotate tow-bar extension to cradle (D).

   NOTE:

   To prevent tow-bar extension from shaking loose, ensure extension bar engages groove in bracket (E).

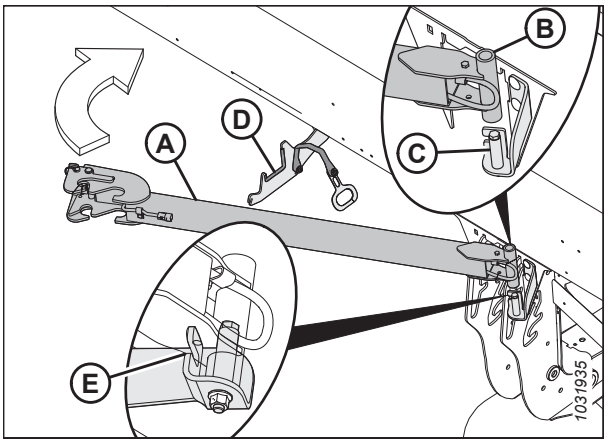


Figure 3.109: Tow-Bar Extension Storage

3. Secure tow-bar extension by hooking strap handle (A) onto notch in cradle (B).

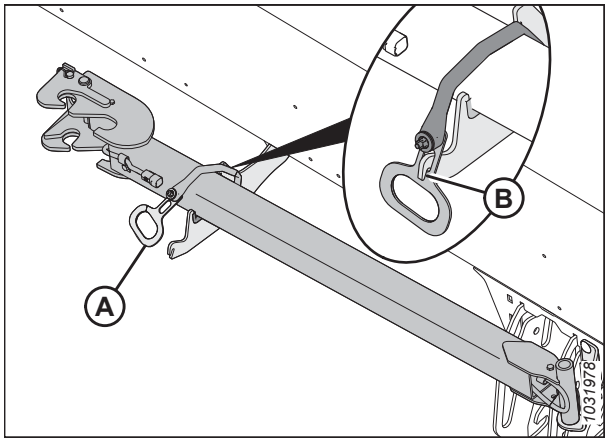


Figure 3.110: Tow-Bar Extension Storage

Tow-bar

4. Open left endshield. For instructions, refer to *Opening Header Endshields, page 43*.

5. With tow chain and harness (A) facing up, insert hitch end (B) of tow bar into left backtube.

   IMPORTANT:

   Header endshield removed from illustration for clarity.

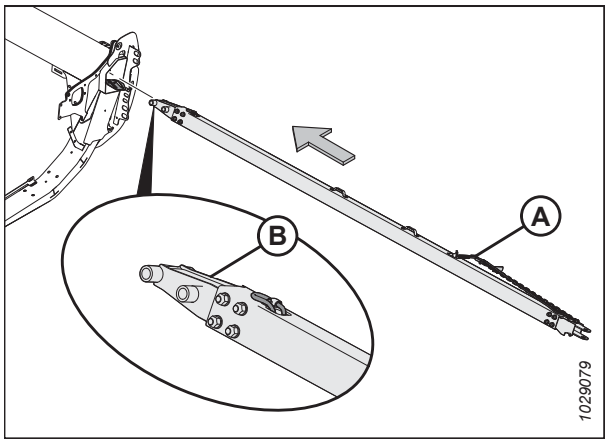


Figure 3.111: Hitch End

6. Slide tow-bar inside the backtube until hooks (A) engage the slots of support angle (B).

7. Close header endshield. For instructions, refer to *Closing Header Endshields, page 44*.

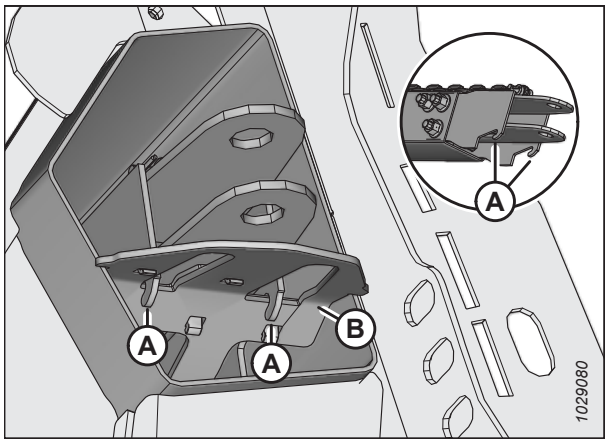


Figure 3.112: Clevis End Retainer Hooks

Moving Front (Left) Wheels into Field Position

This procedure explains how to move the wheels to the highest storage position, but you may want to use a lower position, depending on whether or not you want the wheels to support the header during field operations. This procedure assumes that the tow-bar has been removed.

DANGER

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

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Raise the header until the transport wheels are 51–102 mm (2–4 in.) off the ground.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the header safety props. For instructions, refer to the windrower operator's manual.
5. Turn left transport wheel assembly (A) 90° in the direction shown.

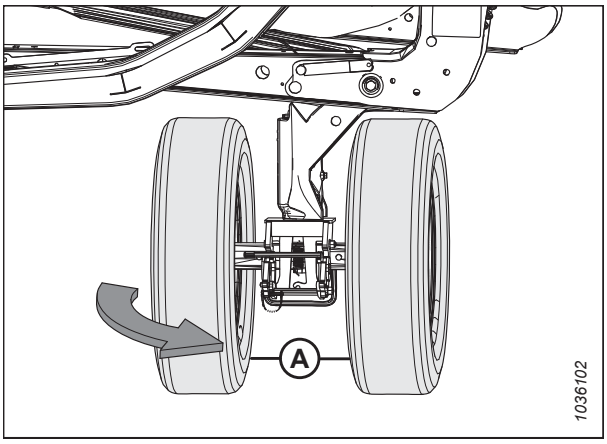


Figure 3.113: Left Transport Wheels in Transport Mode

6. Remove lynch pin (A). Pull handle (B) to engage latch (C)—this will prevent the transport wheel assembly from rotating.

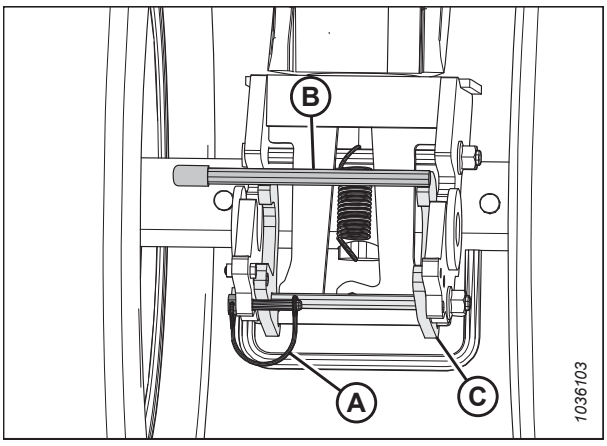


Figure 3.114: Left Transport Wheels – Rotation Lock Latch Disengaged

7. Secure latch (B) with lynch pin (A).

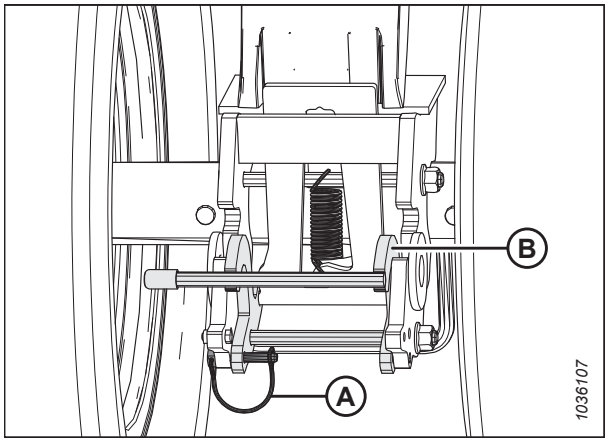


Figure 3.115: Left Transport Wheels – Rotation Lock Latch Engaged

8. To unlock the pivot, use your foot to apply pressure to bolt (B) while pushing handle (A) downward.

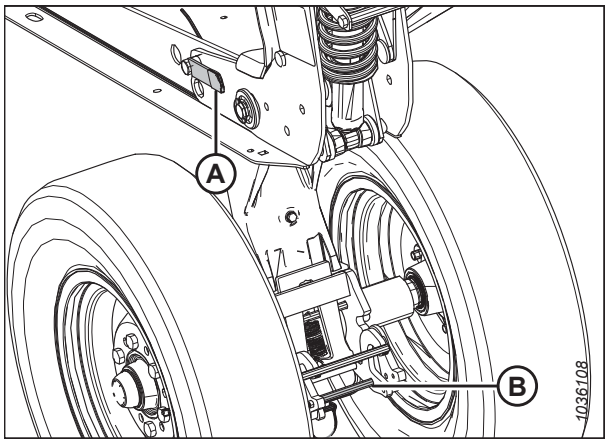


Figure 3.116: Left Transport Wheels – Pivot Released

9. Lift up on handle (A) while pulling back on handle (B) to lift the left wheel assembly into the highest storage position.

   NOTE:

   Parts have been removed from the illustration for clarity.

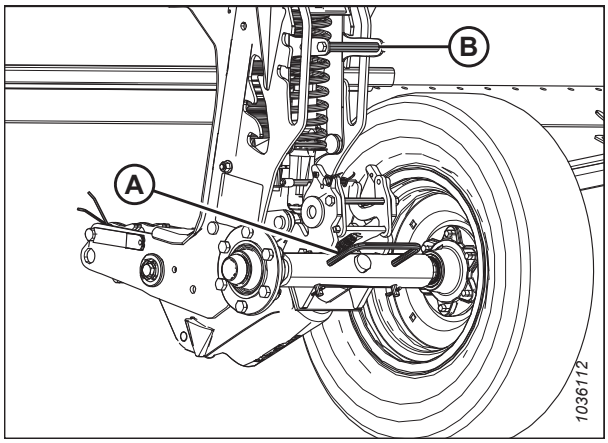


Figure 3.117: Left Transport Wheels in Highest Storage Position

10. Ensure that pin (A) is visible at the highest storage position in plate (B).

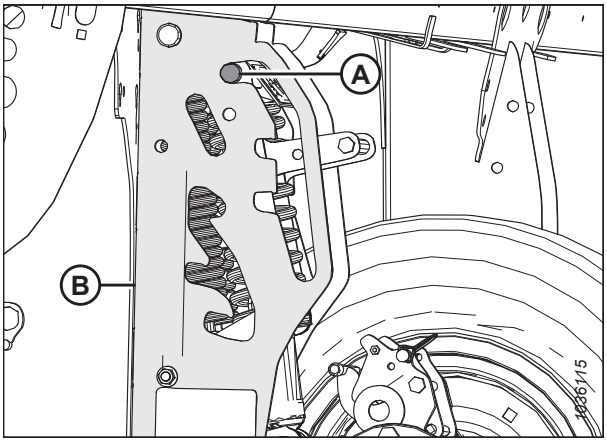


Figure 3.118: Left Transport Wheel Pivot Pin in Highest Storage Position

Moving Rear (Right) Wheels into Field Position

This procedure demonstrates how to move the wheels to the highest storage position, but you may want to use a lower position, depending on whether or not you want the wheels to support the header during field operations.

DANGER

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

1. Start the engine.
2. Raise the header until the transport wheels are 51–102 mm (2–4 in.) off the ground.

   NOTE:

   Raise the header high enough that the cylinder safety props can be engaged—you will need to work under the header to complete this procedure.

   NOTE:

   If engaging the safety props requires raising the header to a height where it is inconvenient to work on, use blocks to support the header so that the transport wheels are 51–102 mm (2–4 in.) off the ground.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the header safety props. For instructions, refer to the windrower operator's manual.

5. On the right transport axle, remove lynch pin (A) from the right transport axle latch.
6. Support the right transport axle using wheel handle (B), then push handle (C) to release the right transport axle from the header frame.
7. Lower the right transport axle to the ground using wheel handle (B).
8. Reinstall lynch pin (A) into the latch.

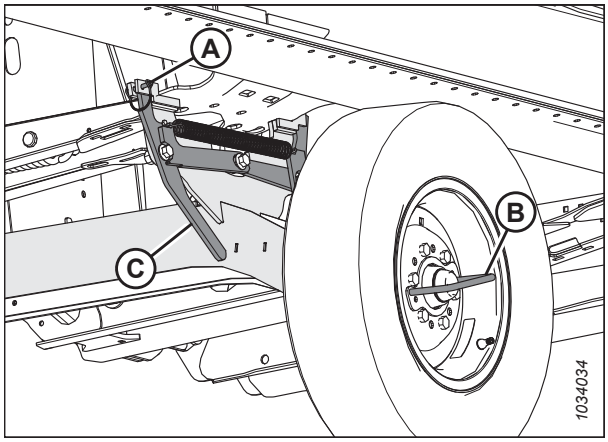


Figure 3.119: Right Transport Axle Latched in Transport Position

9. Lift and rotate right transport axle (A) in the direction shown using the wheel handle.

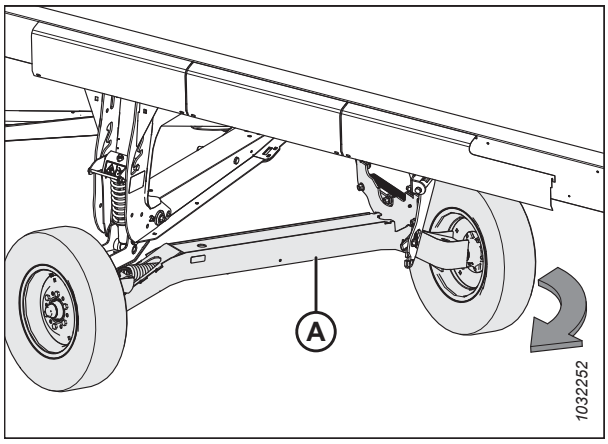


Figure 3.120: Right Transport Axle Rotation

10. Using wheel handle (A), lift and position right transport axle (B) to field support (C) to engage the latch.

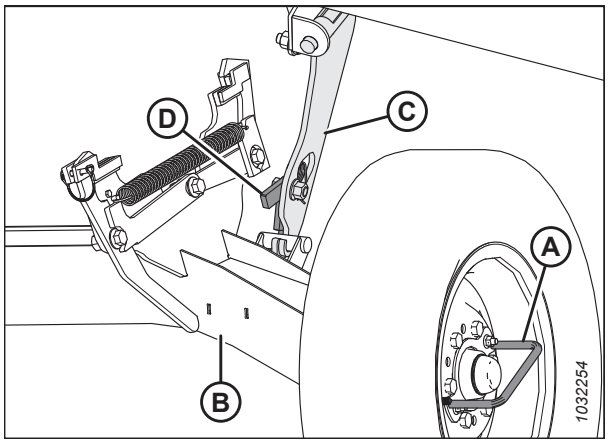


Figure 3.121: Right Transport Axle Latched in Field Position

11. Pull transport height adjustment handle (A) and lift axle pivot handle (B) to move the axle to the highest storage position. Ensure that pin (C) is visible at the highest storage position as shown.

12. Adjust the skid shoe position at the right transport leg to match the other skid shoes. For instructions, refer to *Adjusting Inner Skid Shoes, page 74*.

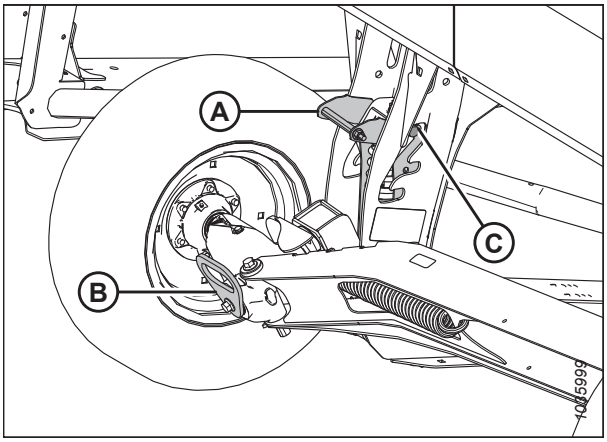


Figure 3.122: Right Transport Wheels in Highest Storage Position

3.10.4 Converting from Field to Transport Position (Option)

The header needs to be converted to the transport position when being towed to a new location.

Moving Front (Left) Wheels into Transport Position

The front (left) wheels are located closest to the towing vehicle. To prepare for transport, the wheels must be lowered to the ground and rotated to face the direction of travel.

DANGER

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

CAUTION

Stand clear of the wheels and release the linkage carefully; the wheels will drop suddenly once the mechanism is released.

1. Start the engine.
2. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the header safety props or support the header on blocks on level ground. If using blocks to support the header, ensure the header is approximately 914 mm (36 in.) off the ground.

5. Adjust gauge wheel height to transport position (lowest slot). Pull suspension handle (A) outward and push down on axle pivot handle (B) until transport position is reached.

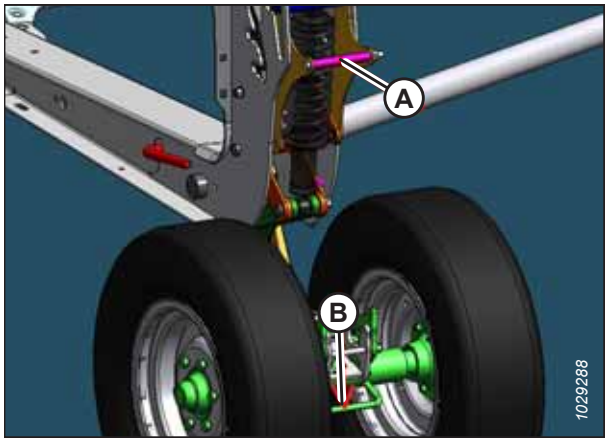


Figure 3.123: Gauge Wheel

6. Secure left transport pivot by pushing pivot handle (A) forward until latch is engaged.
7. Pull back on pivot handle to verify that latch is fully engaged.

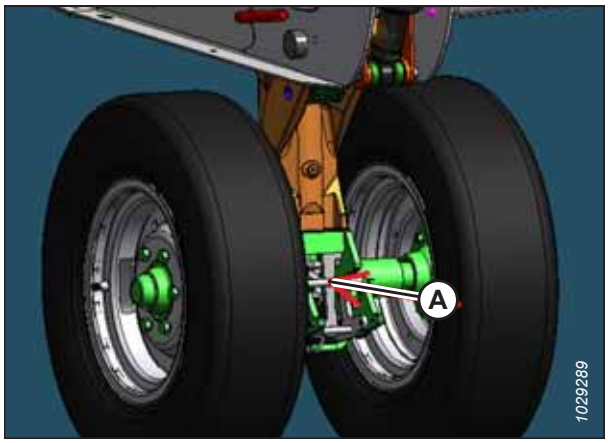


Figure 3.124: Gauge Wheel

8. Remove clevis pin (A) securing latch.
9. Push pivot handle (B) up to unlock wheel assembly.

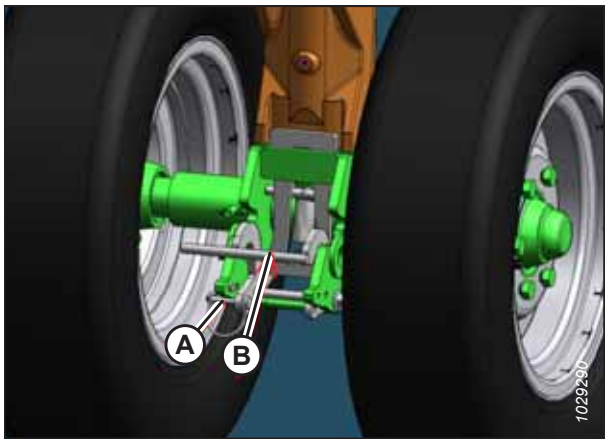


Figure 3.125: Gauge Wheel

10. Turn front wheel assembly clockwise, 90°.

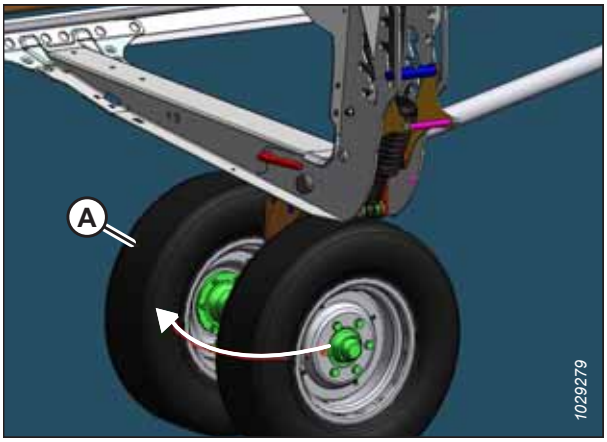


Figure 3.126: Gauge Wheel

Moving Rear (Right) Wheels into Transport Position

When towing the header it must be converted into the transport position.

DANGER

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

CAUTION

Stand clear of the wheels and release the linkage carefully; the wheels will drop suddenly once the mechanism is released.

1. Fully raise the skid shoe at the right transport axle. For instructions, refer to *Adjusting Inner Skid Shoes, page 74*.
2. Adjust gauge wheel height to transport position (lowest slot) as follows:
   - If in top slot, push on handle (A) to release.
   - If in mid slot, pull on handle (A) to release.
3. Pull suspension handle (A) outward and push down on axle pivot handle (B).

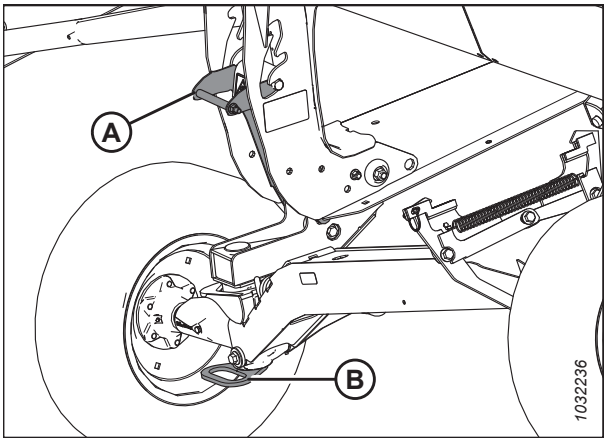


Figure 3.127: Gauge Wheels

4. Push down on latch (A) at right field support (B) to unlock.

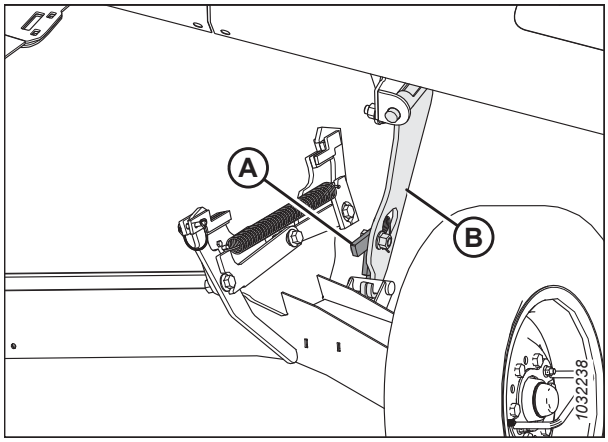


Figure 3.128: Right Field Support

5. Lift wheel handle (A) to remove right transport axle (B) from right field support (C), then lower right transport axle to the ground.

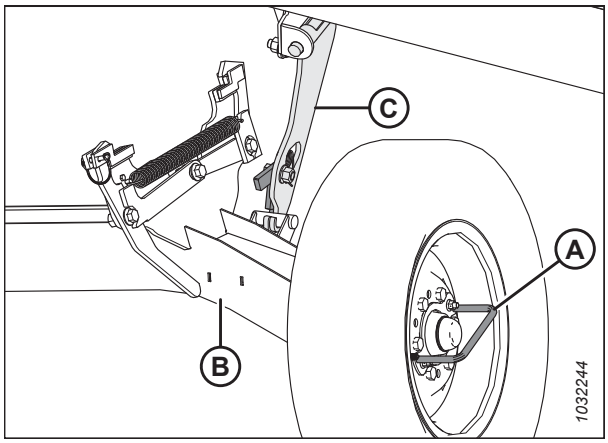


Figure 3.129: Right Field Support

6. Use wheel handle and rotate right transport axle (A) under the header frame.

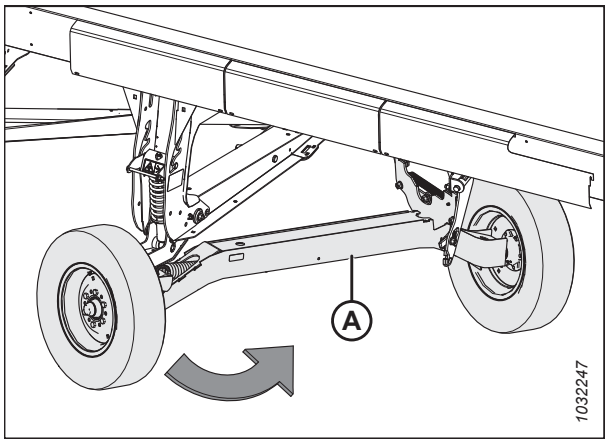


Figure 3.130: Right Transport Axle

7. Remove clevis pin (A) from right transport axle latch.
8. Lift right transport axle with wheel handle (B) until latch engages.
9. Push down on wheel handle (B) to verify latch is engaged.
10. Secure latch by reinstalling clevis pin (A).

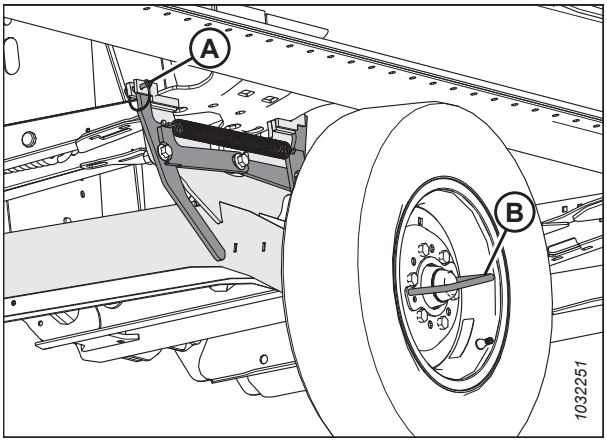


Figure 3.131: Right Transport Axle

Removing Tow-Bar from Storage

Remove the tow-bar from the backtube storage location when converting to the transport position.

Tow-Bar Extension

1. Remove strap (A) from cradle (B) to free tow-bar extension (C).
2. Rotate tow-bar extension to unlock from pin (D).
3. Lift tow-bar extension away (C) from pin (D).

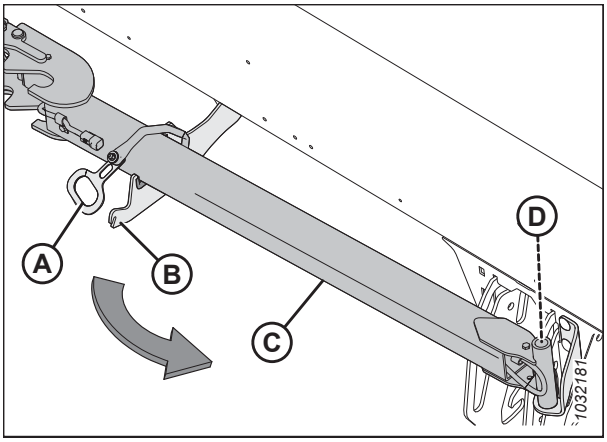


Figure 3.132: Tow-Bar Extension in Storage

Tow-Bar

4. Open the left endshield. For instructions, refer to *Opening Header Endshields, page 43*.

5. Pull tow-bar forward until it hits the stop. Lift the tow-bar to free clevis stop (C) and hook (A) from support angle (B), then pull it out of tube.

   NOTE:

   Backtube is shown transparent in illustration at right.

6. Slide tow-bar out from header backtube.

   NOTE:

   Use caution to avoid contact with any nearby hydraulic or electrical hoses and lines.

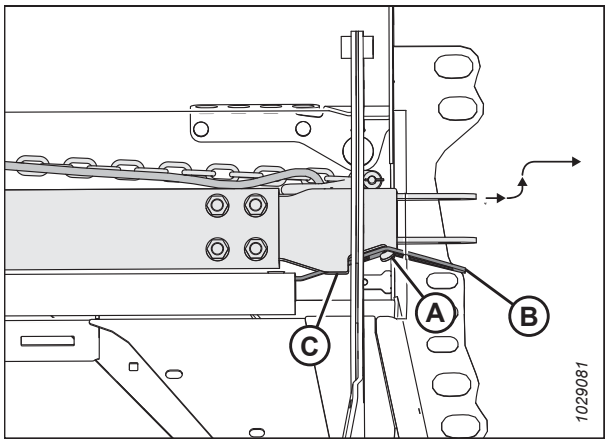


Figure 3.133: Tow-Bar in Storage

Attaching Tow-Bar

The tow-bar consists of two sections which make storage and handling easier.

1. Block the header tires with wheel chocks (A) to prevent header from rolling.

2. Remove tow-bar from storage. For instructions, refer to *Removing Tow-Bar from Storage, page 133*.

3. If installing a tow-bar and extension, proceed to Step *4, page 135*. If installing tow-bar only, proceed to Step *18, page 136*.

Figure 3.134: Tire Blocking

Installing tow-bar and extension:

4. Remove lynch pin (A) from left transport pivot (B).
5. Push extension (D) into lugs of left transport pivot until latch (C) engages.
6. Reinstall lynch pin (A) to transport pivot to secure extension.
7. Retrieve the end of extension harness (E) from inside the extension tube.

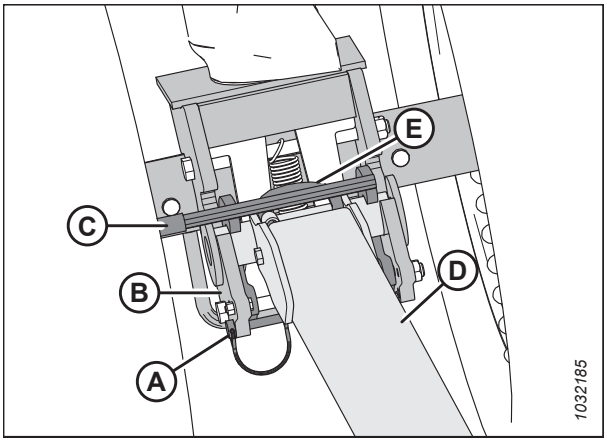


Figure 3.135: Tow-Bar Extension to Left Transport Pivot

8. Connect extension wiring harness (A) to left transport pivot harness (B).

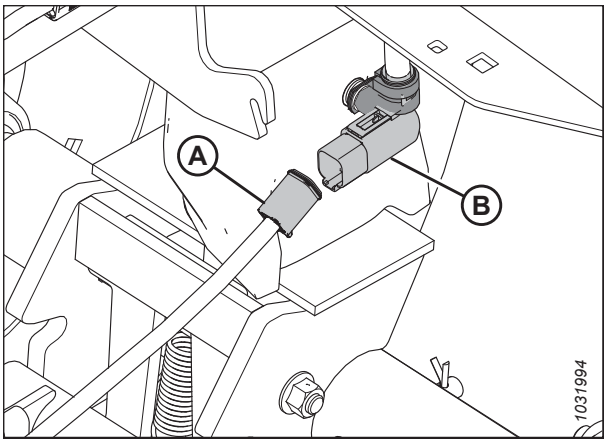


Figure 3.136: Tow-Bar Electrical Connection

9. Remove lynch pin (E) from latch (B).
10. Position end of tow-bar (C) on extension lugs then lower tow-bar to the ground.
11. Lift extension (D) for latch (B) to engage to tow-bar (C).
12. Retrieve the end of tow-bar harness (A) from storage location.

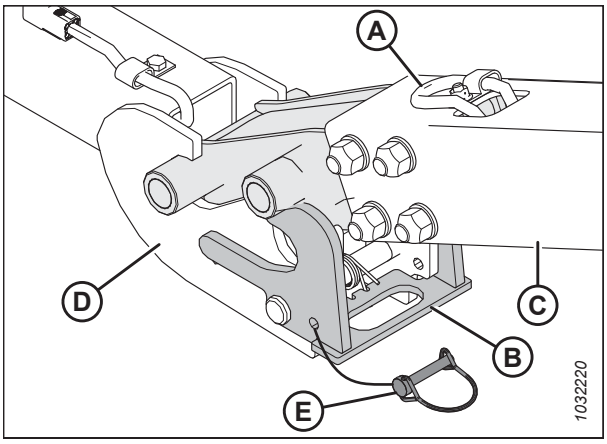


Figure 3.137: Tow-Bar to Extension

13. Connect tow-bar harness (A) to extension harness (B).
14. Reinstall lynch pin (C) to latch to secure tow-bar.

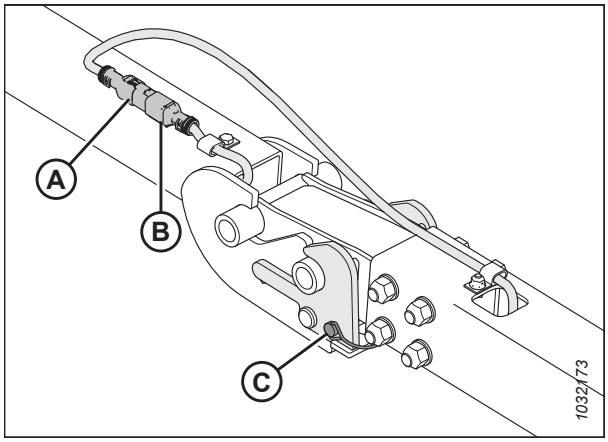


Figure 3.138: Tow-Bar / Extension Harness

15. Retrieve tow-bar wiring harness (A) and safety chain (B) from storage location.
16. Connect tow-bar wiring harness to vehicle, and secure safety chain from tow-bar to tow vehicle.
17. Turn on tow vehicle's 4-way flashers and check that all lights on header are working.

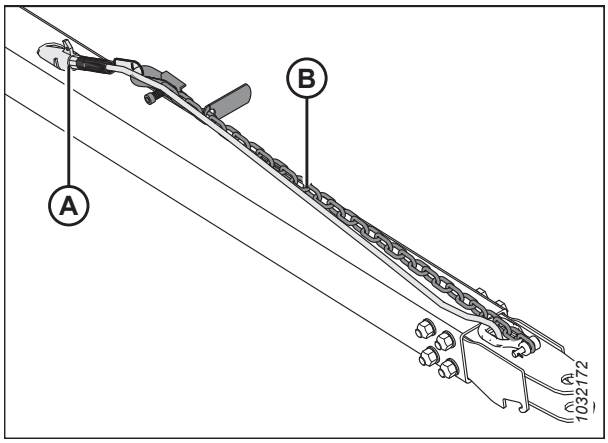


Figure 3.139: Tow-Bar Wiring Harness

Installing tow-bar only:

18. Remove lynch pin (A) from left transport pivot (B).
19. Push tow-bar (C) into lugs of left transport pivot until latch (D) engages.
20. Reinstall lynch pin (A) to transport pivot to secure tow-bar.
21. Retrieve the end of tow-bar harness (E).

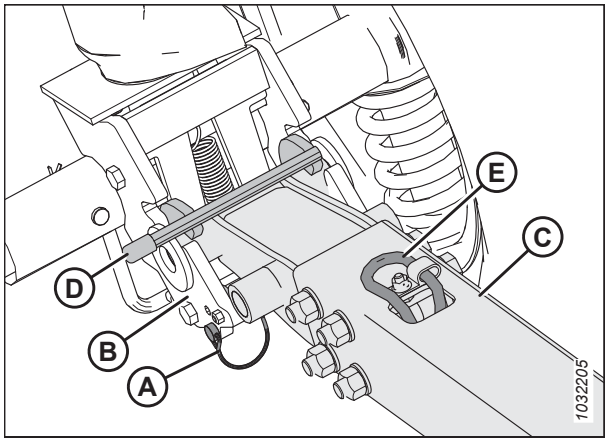


Figure 3.140: Tow-Bar and Left Transport Pivot

22. Connect extension wiring harness (A) to left transport pivot harness (B).

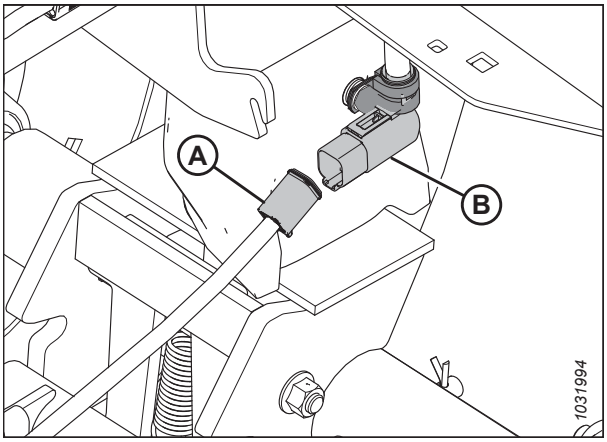


Figure 3.141: Tow-Bar Electrical Connection

23. Retrieve tow-bar wiring harness (A) and safety chain (B) from storage location.
24. Connect tow-bar wiring harness to vehicle, and secure safety chain from tow-bar to tow vehicle.
25. Turn on tow vehicle's 4-way flashers and check that all lights on header are working.

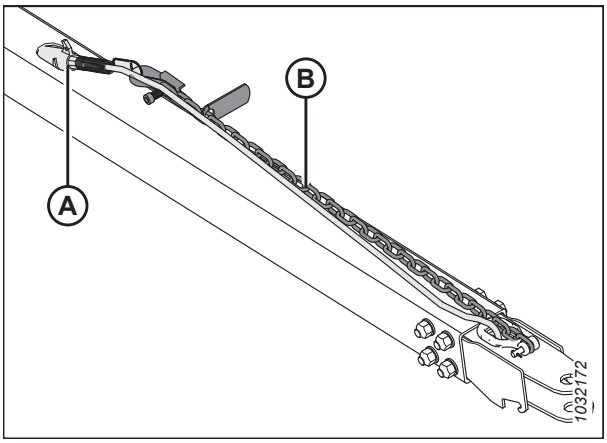


Figure 3.142: Tow-Bar Wiring Harness

3.11 Storing the Header

Storing the header properly helps to extend its service life. When putting the header into storage at the end of the season, perform this procedure.

WARNING

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

CAUTION

Cover the cutterbar and the knife guards to prevent injury from accidental contact.

1. Clean the header thoroughly.
2. Store the header in a dry, protected place if possible. If storing the header outdoors, always cover it with a waterproof canvas or other protective material.

NOTE:

If storing the header outdoors, remove the drapers and store them in a dark, dry place. If not removing the drapers, store the header with the cutterbar lowered so that water and snow will not accumulate on the drapers. The weight of water and snow accumulation puts significant stress on the drapers and the header frame.

3. Lower the header onto blocks to keep the cutterbar off of the ground.
4. Lower the reel completely. If the header will be stored outdoors, tie the reel to the frame to prevent rotation caused by the wind.
5. Repaint all worn or chipped painted surfaces to prevent rust from forming.
6. Loosen the drive belts.
7. Lubricate the header thoroughly, leaving excess grease on the fittings to keep moisture out of the bearings.
8. Apply grease to the exposed threads, cylinder rods, and sliding surfaces of components.
9. Check for worn components and repair them as necessary.
10. Check for broken components and order the replacements from your Dealer. Immediate repair of these items will save time and effort at the beginning of next season.
11. Replace or tighten any missing or loose hardware. Ensure that loose hardware is tightened to the recommended torque value. For more information, refer to *8.1 Torque Specifications, page 343*.

Chapter 4: Header Attachment/Detachment

This chapter includes instructions for attaching and detaching the header.

If attaching the header for the first time, the boots will need to be installed in the header. For instructions, refer to *4.1 Attaching Draper Header Boots, page 139*.

NOTE:

If previously attached to a combine, order draper header boot bundle (B7266).

If reattaching the header to a windrower, the header boots should already be installed on the header legs, proceed to the attachment procedure that applies to your windrower model. For instructions, refer to:

- *4.2 Attaching Header to M Series Windrower, page 141*
- *4.3 Attaching Header to M1 Series Windrower, page 168*

4.1 Attaching Draper Header Boots

The draper header boots are required to attach a D2 SP Series draper header to a windrower.

NOTE:

For headers that were previously attached to a combine, order draper header boots bundle MD #B7266.

DANGER

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

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

IMPORTANT:

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

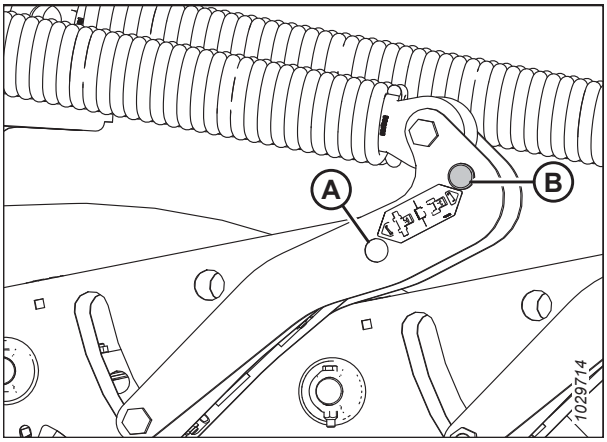


Figure 4.1: Header Float Linkage

2. Remove hairpin (A) from clevis pin (B) on draper header boot (C). Remove clevis pin (B).

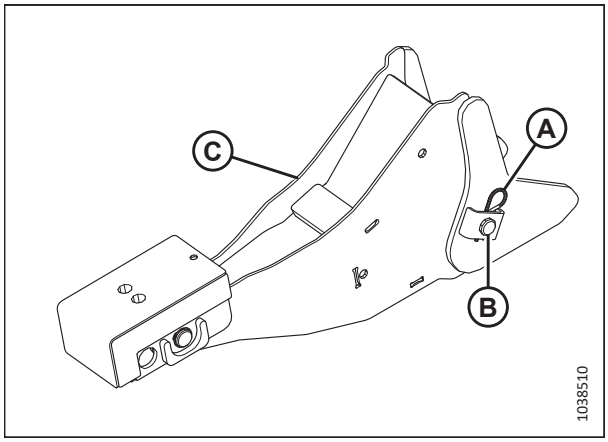


Figure 4.2: Draper Header Boot

3. Position draper header boot (B) on windrower lift linkage (A). Reinstall clevis pin (C).

   NOTE:

   To ensure that the pin doesn't snag the windrow, install the clevis pin on the outboard side of the draper header boot.

4. Secure clevis pin (C) with hairpin (D).

5. Repeat Step *2, page 140* to Step *4, page 140* to install the remaining draper header boot.

6. Proceed to the attachment procedure that applies to your windrower model:

   - *4.2 Attaching Header to M Series Windrower, page 141*
   - *4.3 Attaching Header to M1 Series Windrower, page 168*

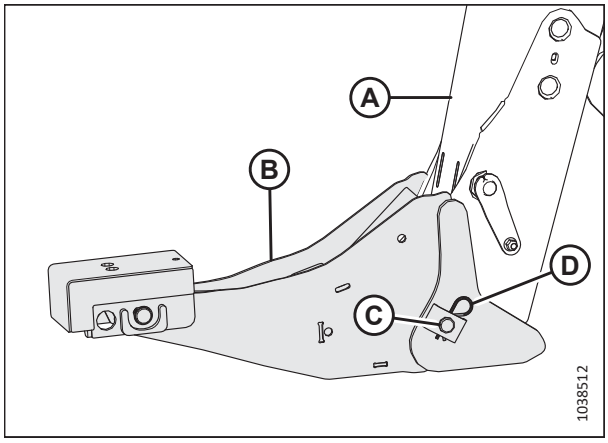


Figure 4.3: Draper Header Boot

4.2 Attaching Header to M Series Windrower

To attach a D2 Series Draper Header to an M Series Windrower, follow the procedures provided here in the order presented.

4.2.1 Attaching Header to an M Series Windrower – Hydraulic Center-Link with Self-Alignment

The header will need to be physically attached to the windrower, and the hydraulic connections completed. The windrower may be equipped with an optional self-aligning hydraulic center-link, which allows the Operator to control the vertical position of the center-link from the cab.

NOTE:

If attaching header to a windrower for the first time, the draper header boots must be installed onto the windrower lift linkage before beginning this procedure. For instructions, refer to *4.1 Attaching Draper Header Boots, page 139*.

DANGER

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

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

2. **If reattaching header to the windrower:** Remove and retain hair pin (A) and clevis pin (B) from header boot (C). Repeat at the opposite side.

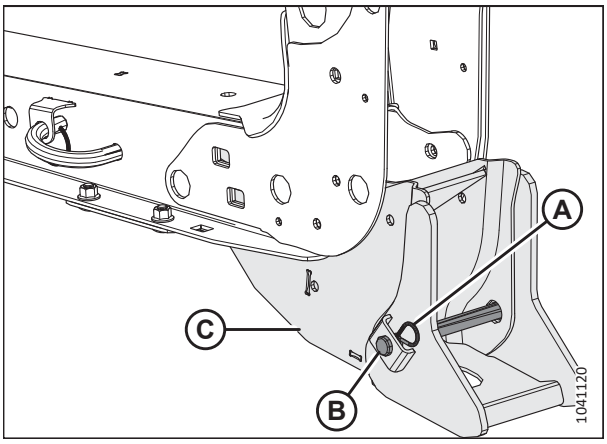


Figure 4.4: Header Boot — Left Side Shown

3. **If attaching header to the windrower for the first time:** Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat at the opposite side.

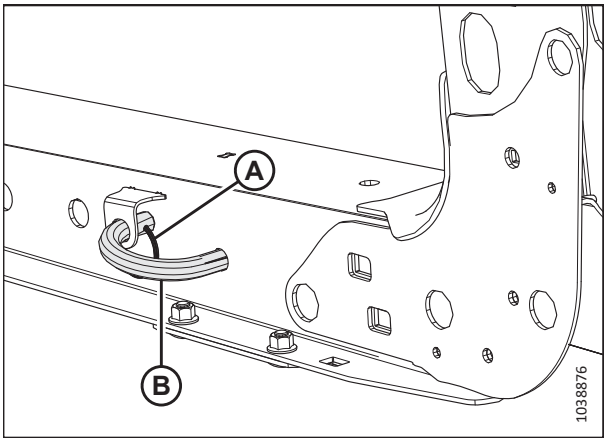


Figure 4.5: Header Leg

DANGER

Ensure that all bystanders have cleared the area.

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

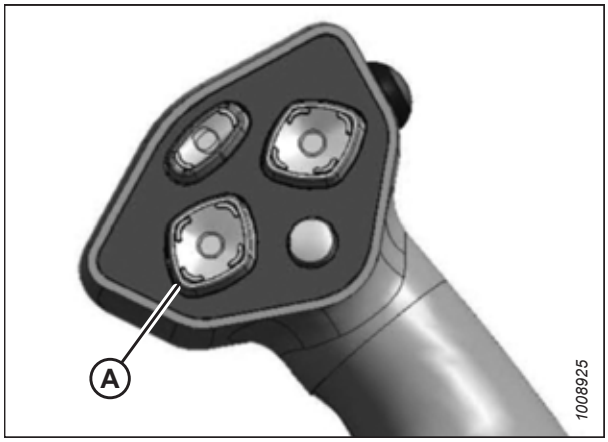


Figure 4.6: Ground Speed Lever

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

   IMPORTANT:

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

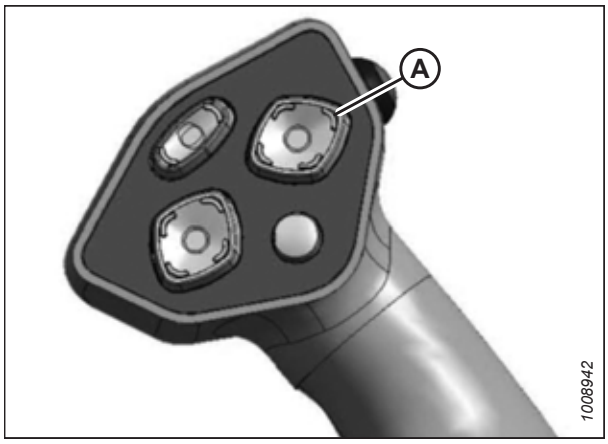


Figure 4.7: Ground Speed Lever

6. **If reattaching header to the windrower:** Drive the windrower slowly forward until windrower lift linkage (A) enter header boots (B). Continue driving slowly forward until the lift linkages contact the header boots in the header legs and the header is nudged forward.

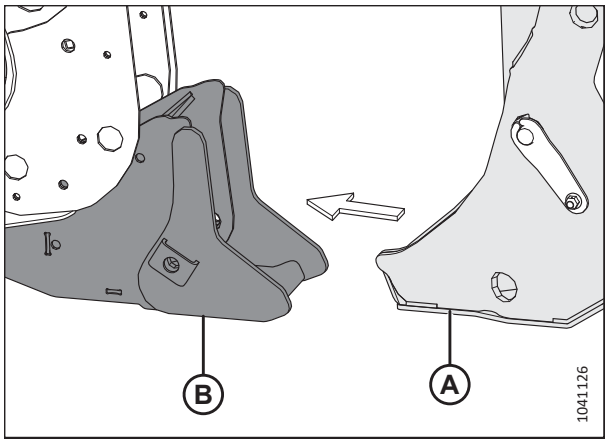


Figure 4.8: Header Leg and Boot

7. **If attaching header to the windrower for the first time:** Drive the windrower slowly forward until header boots (A) enter header legs (B). Continue driving slowly forward until the header boots contact the support plates in the header legs and the header is nudged forward.

8. Ensure that the lift linkages are properly engaged in the header boots and are contacting the support plates.

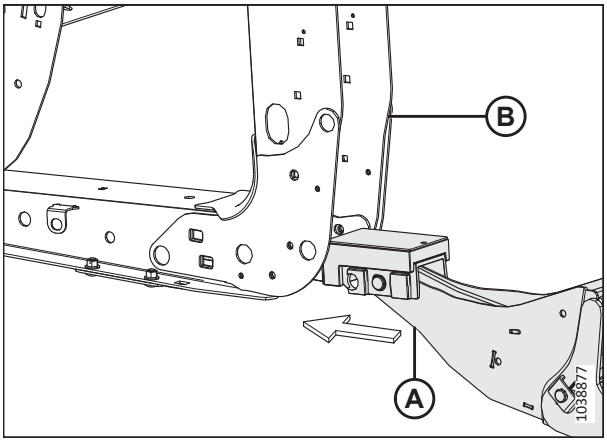


Figure 4.9: Header Leg and Boot

9. Use the following GSL functions to position the center-link hook above the header attachment pin:

   - REEL UP (A) to raise the center-link
   - REEL DOWN (B) to lower the center-link
   - HEADER TILT UP (C) to retract the center-link
   - HEADER TILT DOWN (D) to extend the center-link

   IMPORTANT:

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

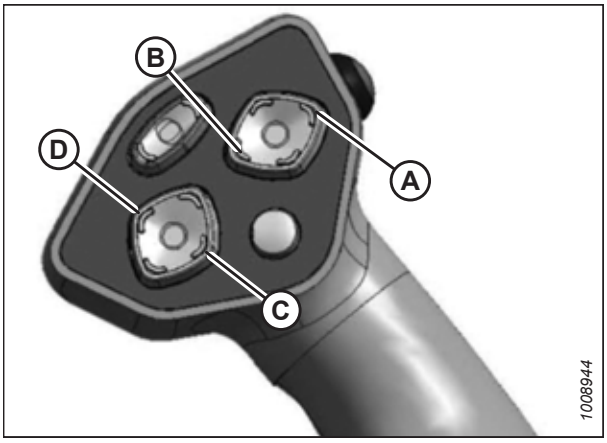


Figure 4.10: Ground Speed Lever

10. Lower center-link (A) onto the header with the REEL DOWN switch on the GSL until it locks into position (hook release [B] is down).

11. Check that center-link (A) is locked onto the header by pressing the REEL UP switch on the GSL.

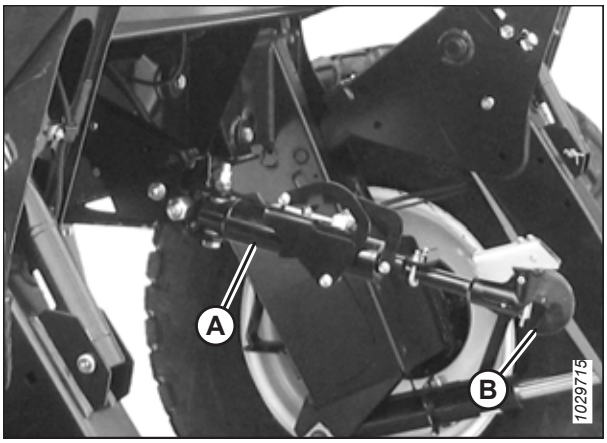


Figure 4.11: Hydraulic Center-Link

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

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

    a. Press and hold the HEADER UP switch until both cylinders stop moving.

    b. Continue to hold the switch for 3–4 seconds to fully phase the cylinders.

    NOTE:

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

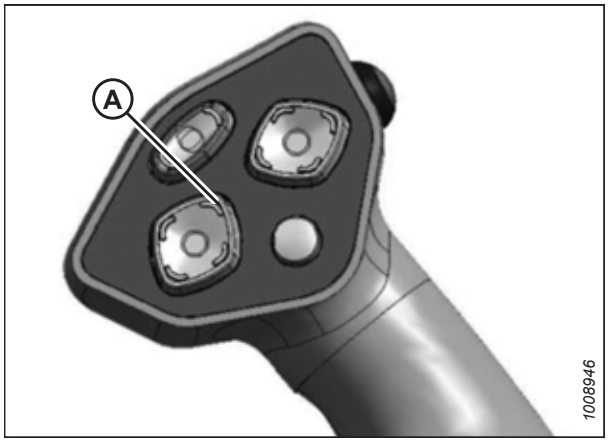


Figure 4.12: Ground Speed Lever

14. Engage the safety props on both lift cylinders:

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

    b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.

    c. Repeat the previous steps for the opposite lift cylinder.

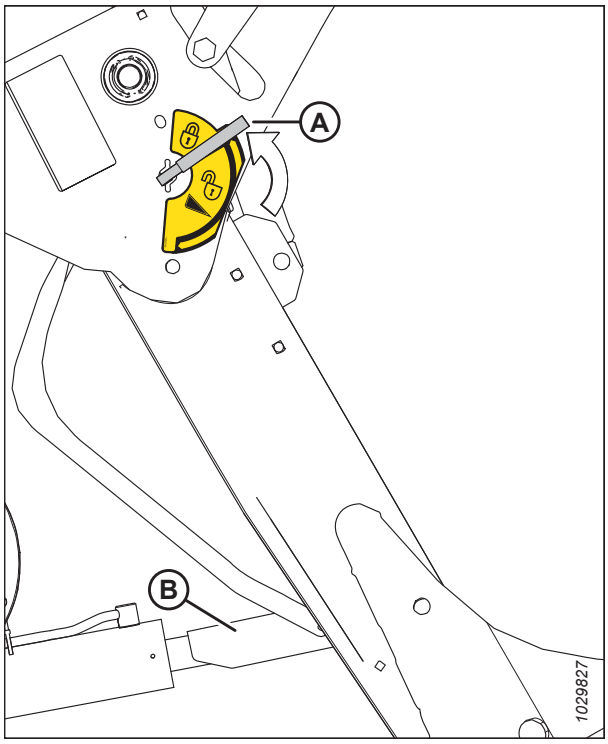


Figure 4.13: Safety Prop

15. **If reattaching header to the windrower:** Secure windrower lift linkage (A) to header boots (B) using clevis pin (C) and hair pin (D). Repeat at the opposite side.

    NOTE:

    To ensure that the pin doesn't snag the windrow, install the clevis pin on the outboard side of the draper header boot.

    NOTE:

    Some parts remove for clarity.

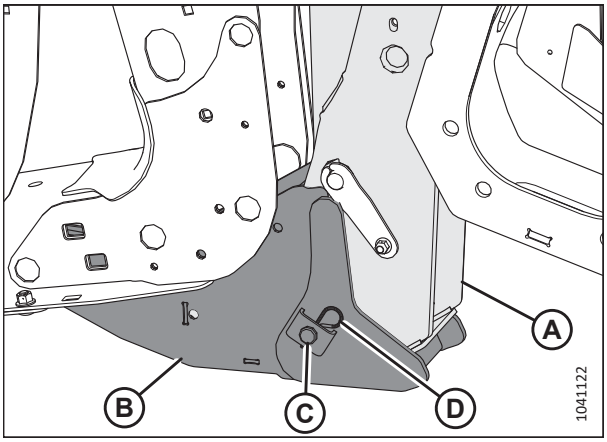


Figure 4.14: Windrower Lift Linkage and Header Leg

16. **If attaching header to the windrower for the first time:** Install pin (B) through the header leg, engaging the header support in the lift linkage. Secure the pin with ring (A). Repeat at the opposite side.

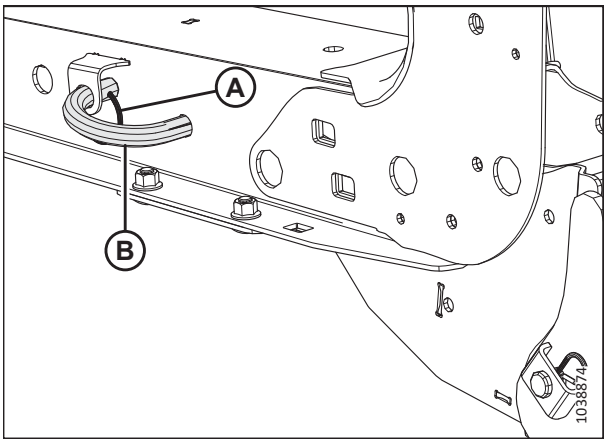


Figure 4.15: Header Leg

17. Remove the clevis pin from storage position (B) in the linkage and insert it into hole (A) to engage the float springs. Secure it with the hairpin. Repeat this step on the opposite float linkage.

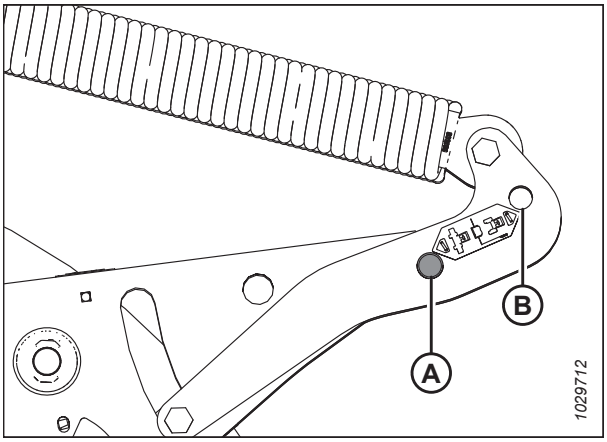


Figure 4.16: Header Float Linkage

18. Disengage the safety prop by turning lever (A) downwards until the lever locks into the vertical position.
19. Repeat the previous step to disengage the other safety prop.

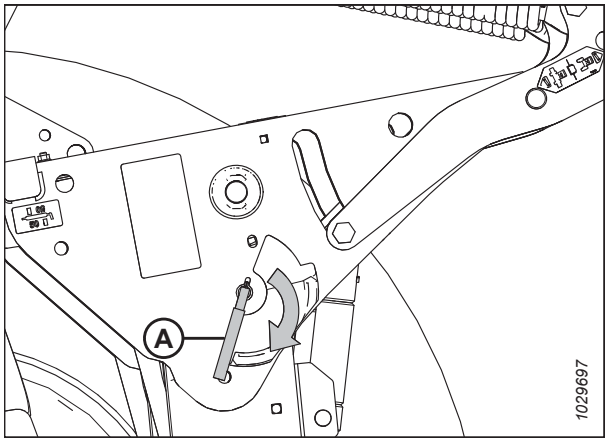


Figure 4.17: Safety Prop Lever

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

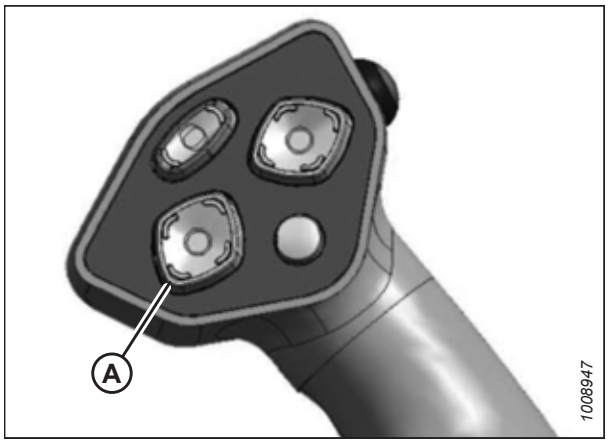


Figure 4.18: Ground Speed Lever

4.2.2 Attaching Header to an M Series Windrower – Hydraulic Center-Link without Self-Alignment

The header will need to be physically attached to the windrower, and the hydraulic connections completed. If the windrower is equipped with a hydraulic center-link that lacks the self-alignment capability, the Operator will have to manually attach the hydraulic center-link's hook to the header's center pin.

NOTE:

If attaching header to the windrower for the first time, the draper header boots must be installed onto the windrower lift linkage before beginning this procedure. For instructions, refer to *4.1 Attaching Draper Header Boots, page 139*.

DANGER

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

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

2. **If reattaching header to the windrower:** Remove and retain hair pin (A) and clevis pin (B) from header boot (C). Repeat at the opposite side.

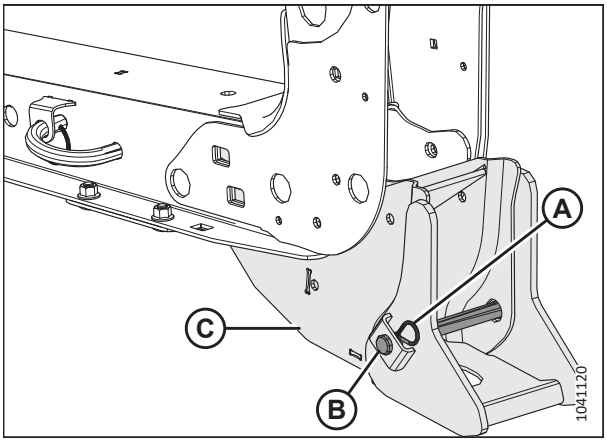


Figure 4.19: Header Boot — Left Side Shown

3. **If attaching header to the windrower for the first time:** Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat at the opposite side.

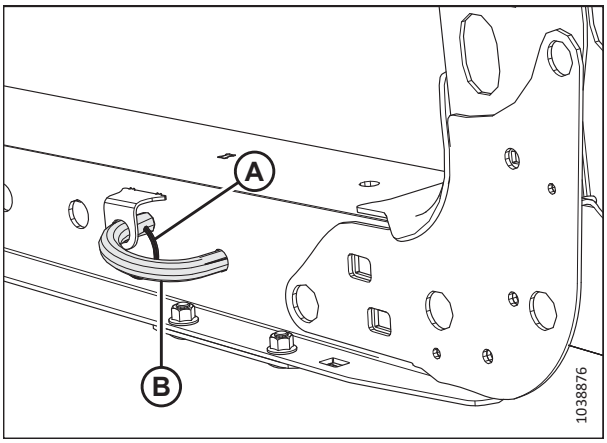


Figure 4.20: Header Leg

DANGER

Ensure that all bystanders have cleared the area.

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

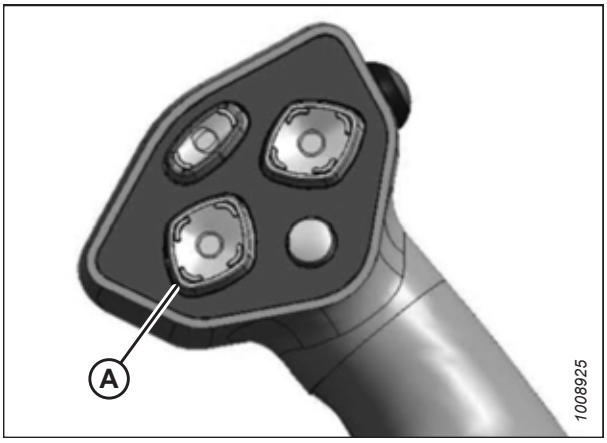


Figure 4.21: Ground Speed Lever

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

   IMPORTANT:

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

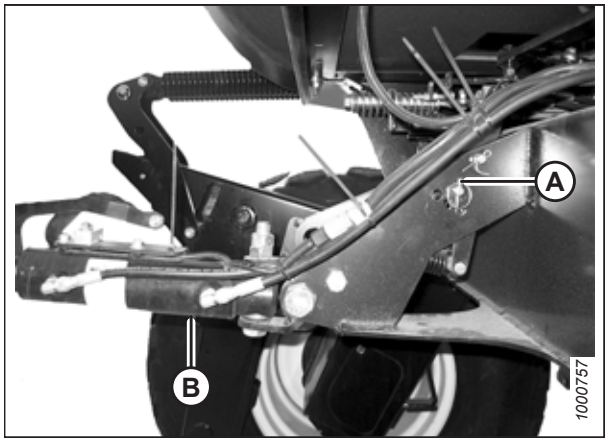


Figure 4.22: Hydraulic Center-Link without Self-Alignment Kit

6. **If reattaching header to the windrower:** Drive the windrower slowly forward until windrower lift linkage (A) enter header boots (B). Continue driving slowly forward until the lift linkages contact the header boots in the header legs and the header is nudged forward.

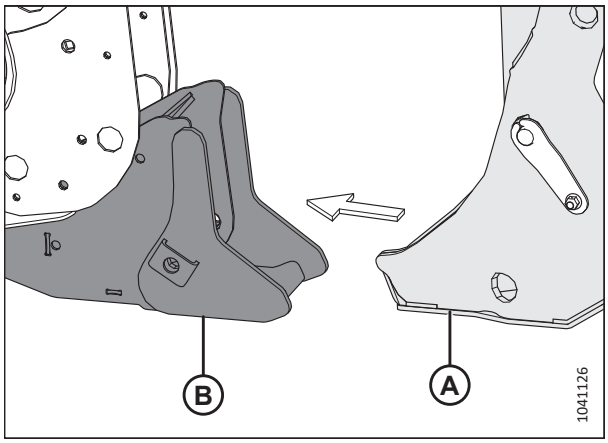


Figure 4.23: Header Leg and Boot

7. **If attaching header to the windrower for the first time:** Drive the windrower slowly forward until header boots (A) enter header legs (B). Continue driving slowly forward until the header boots contact the support plates in the header legs and the header is nudged forward.

8. Ensure that the lift linkages are properly engaged in the header boots and are contacting the support plates.

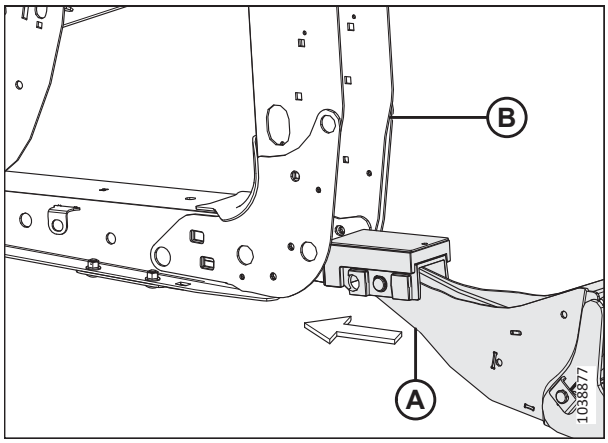


Figure 4.24: Header Leg and Boot

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

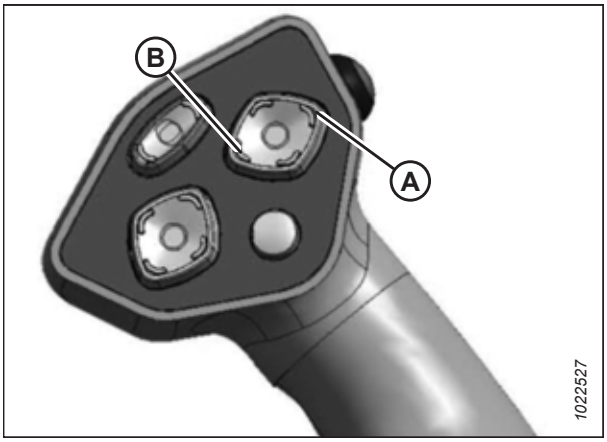


Figure 4.25: Ground Speed Lever

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

    IMPORTANT:

    The hook release must be down to enable the self-locking mechanism. If the release is open (up), manually push it down after the hook engages the header pin.
12. Check that center-link (A) is locked onto the header by pulling upward on the rod end of the cylinder.

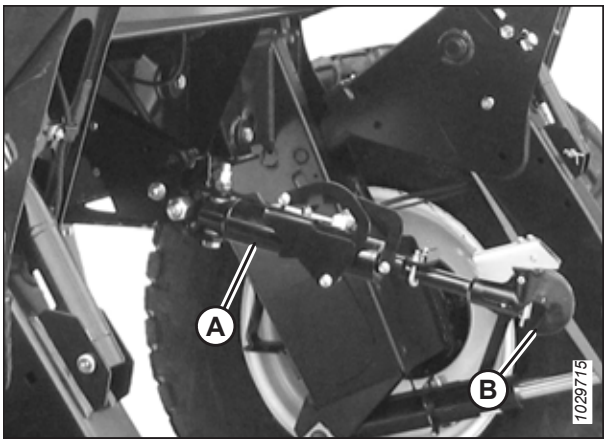


Figure 4.26: Hydraulic Center-Link

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

    NOTE:

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

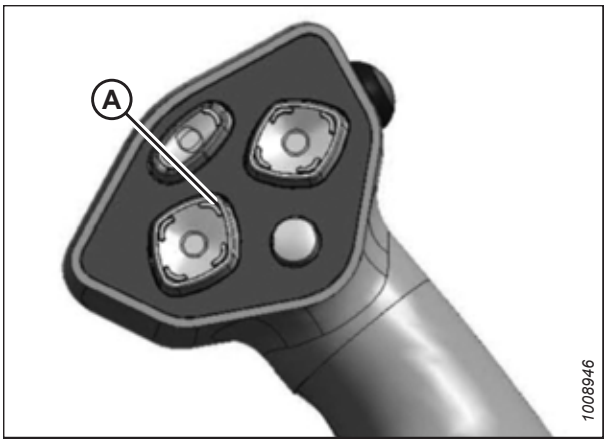


Figure 4.27: Ground Speed Lever

16. Engage the safety props on both lift cylinders:

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

    b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.

    c. Repeat the previous steps for the opposite lift cylinder.

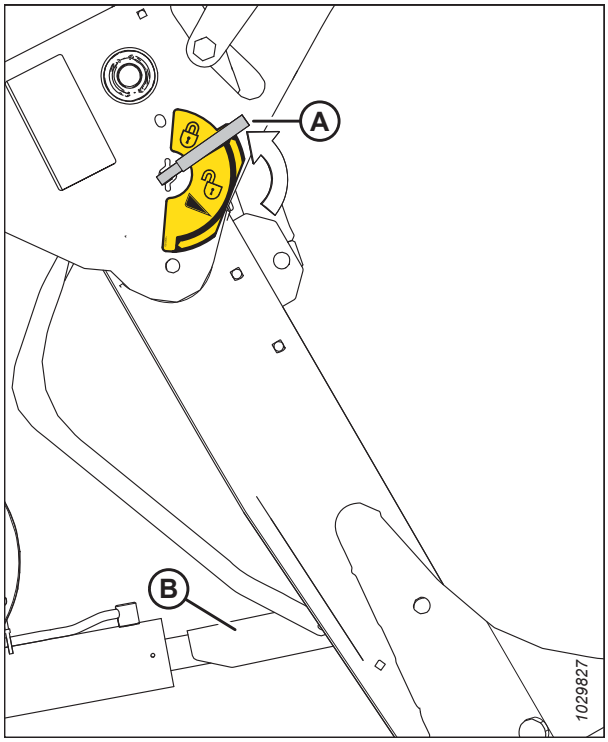


Figure 4.28: Safety Prop

17. **If reattaching header to the windrower:** Secure windrower lift linkage (A) to header boots (B) using clevis pin (C) and hair pin (D). Repeat at the opposite side.

    NOTE:

    To ensure that the pin doesn't snag the windrow, install the clevis pin on the outboard side of the draper header boot.

    NOTE:

    Some parts remove for clarity.

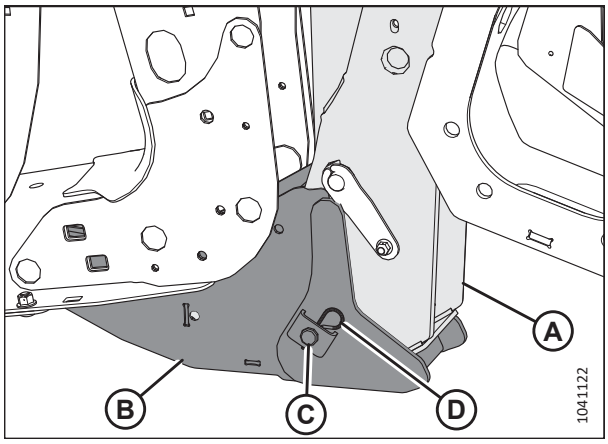


Figure 4.29: Windrower Lift Linkage and Header Leg

18. **If attaching header to the windrower for the first time:** Install pin (B) through the header leg, engaging the header support in the lift linkage. Secure the pin with ring (A). Repeat at the opposite side.

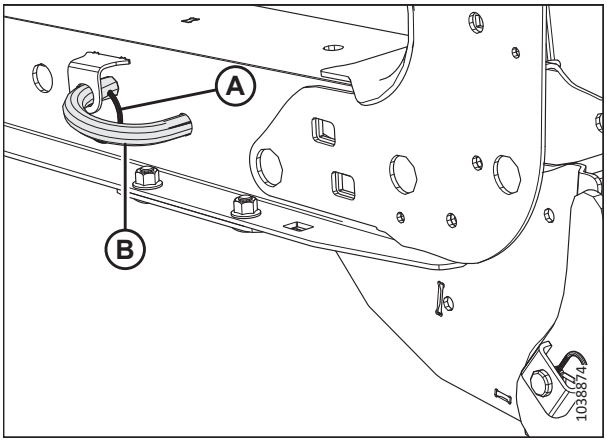


Figure 4.30: Header Leg

19. Remove the clevis pin from storage position (B) in the linkage and insert it into hole (A) to engage the float springs. Secure it with the hairpin. Repeat this step on the opposite float linkage.

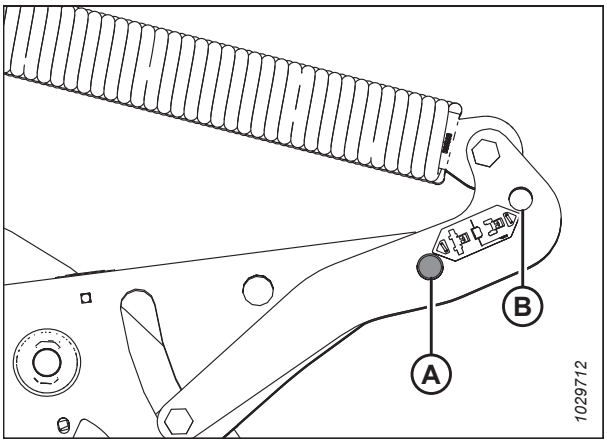


Figure 4.31: Header Float Linkage

20. Disengage the safety prop by turning lever (A) downwards until the lever locks into the vertical position.

21. Repeat the previous step to disengage the other safety prop.

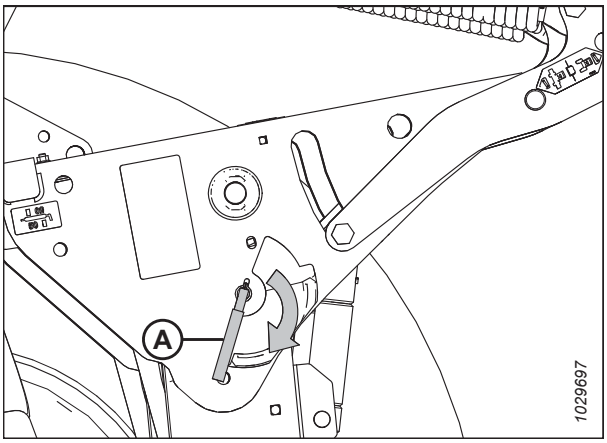


Figure 4.32: Safety Prop Lever

22. Start the engine, and press HEADER DOWN switch (A) on the GSL to fully lower the header.
23. Shut down the engine, and remove the key from the ignition.

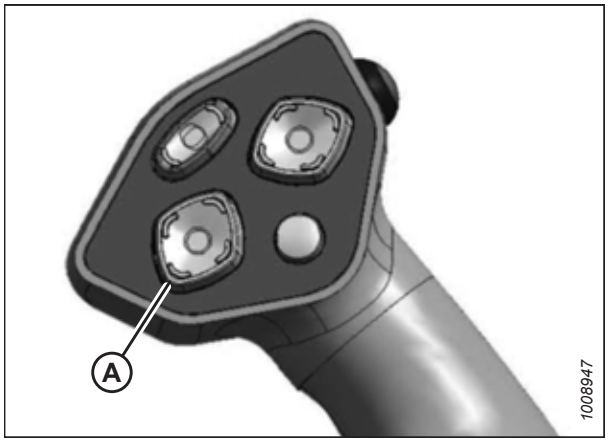


Figure 4.33: Ground Speed Lever

4.2.3 Attaching Header to an M Series Windrower – Mechanical Center-Link

To attach a D2 Series header for windrower to an M Series windrower equipped with a mechanical center-link, the center-link will need to be manually connected to the header's center pin.

NOTE:

If attaching header to the windrower for the first time, the draper header boots must be installed onto the windrower lift linkage before beginning this procedure. For instructions, refer to *4.1 Attaching Draper Header Boots, page 139*.

DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. **If reattaching header to the windrower:** Remove and retain hair pin (A) and clevis pin (B) from header boot (C). Repeat at the opposite side.

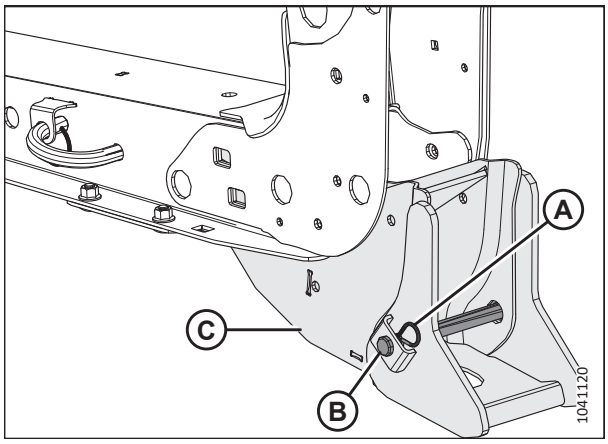


Figure 4.34: Header Boot — Left Side Shown

3. **If attaching header to the windrower for the first time:** Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat at the opposite side.

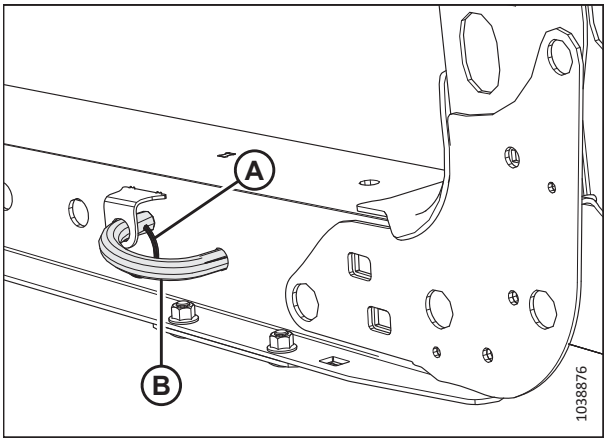


Figure 4.35: Header Leg

DANGER

Ensure that all bystanders have cleared the area.

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

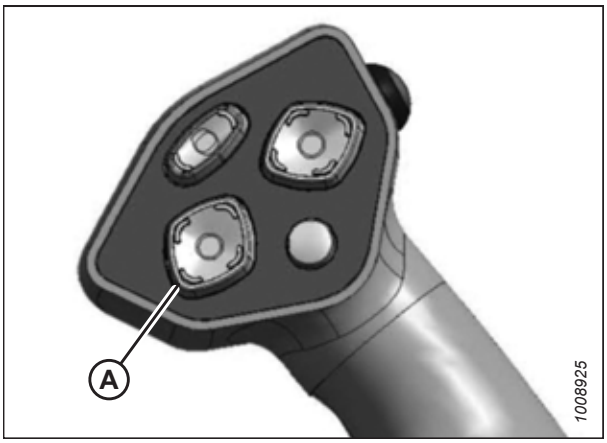


Figure 4.36: Ground Speed Lever

5. **If reattaching header to the windrower:** Drive the windrower slowly forward until windrower lift linkage (A) enter header boots (B). Continue driving slowly forward until the lift linkages contact the header boots in the header legs and the header is nudged forward.

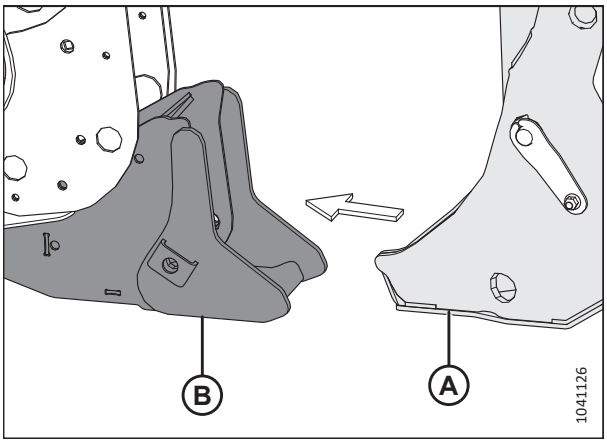


Figure 4.37: Header Leg and Boot

6. **If attaching header to the windrower for the first time:** Drive the windrower slowly forward until header boots (A) enter header legs (B). Continue driving slowly forward until the header boots contact the support plates in the header legs and the header is nudged forward.

7. Ensure that the lift linkages are properly engaged in the header boots and are contacting the support plates.

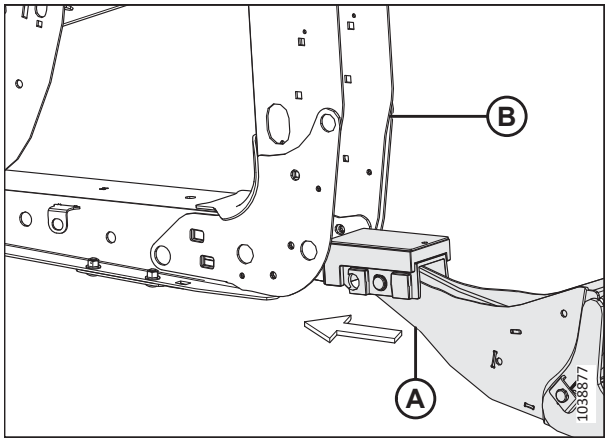


Figure 4.38: Header Leg and Boot

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

9. Loosen nut (A) and rotate barrel (B) to adjust length until the link is aligned with the header bracket.

10. Install clevis pin (C) and secure it with cotter pin (D).

11. Adjust the length of the link to achieve the proper header angle by rotating barrel (B). Tighten nut (A) against the barrel (a slight tap with a hammer is sufficient).

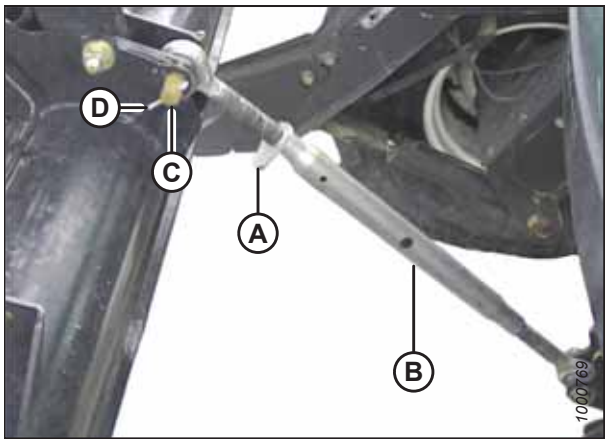


Figure 4.39: Mechanical Center-Link

DANGER

Ensure that all bystanders have cleared the area.

12. Start the engine.

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

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

    a. Press and hold the HEADER UP switch until both cylinders stop moving.

    b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.

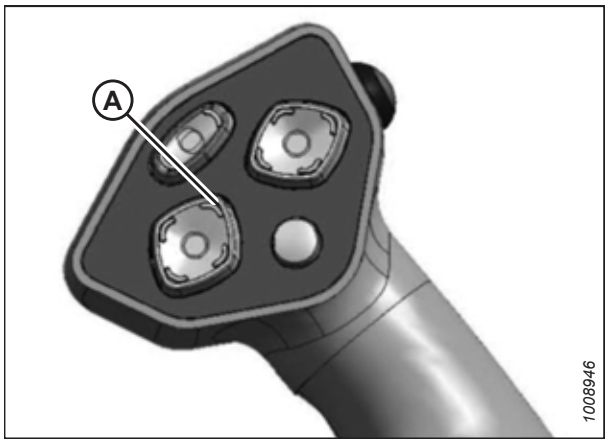


Figure 4.40: Ground Speed Lever

NOTE:

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

15. Engage the safety props on both lift cylinders:

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

    b. Pull lever (A) and rotate it towards the header to release and lower safety prop (B) onto the lift cylinder.

    c. Repeat the previous steps for the opposite lift cylinder.

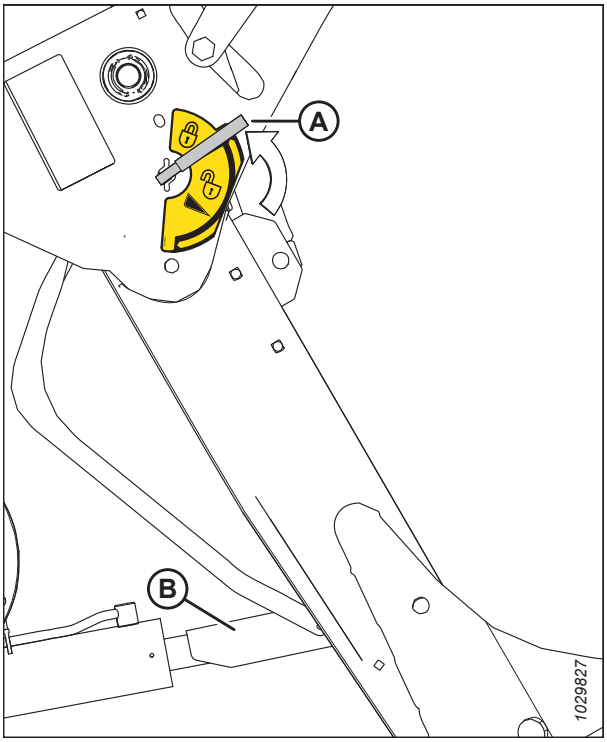


Figure 4.41: Safety Prop

16. **If reattaching header to the windrower:** Secure windrower lift linkage (A) to header boots (B) using clevis pin (C) and hair pin (D). Repeat at the opposite side.

    NOTE:

    To ensure that the pin doesn't snag the windrow, install the clevis pin on the outboard side of the draper header boot.

    NOTE:

    Some parts remove for clarity.

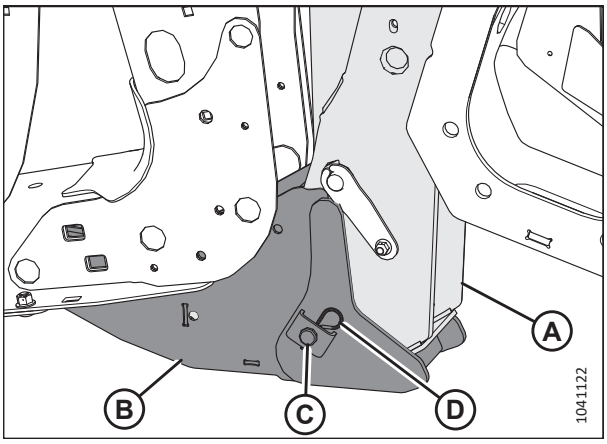


Figure 4.42: Windrower Lift Linkage and Header Leg

17. **If attaching header to the windrower for the first time:** Install pin (B) through the header leg, engaging the header support in the lift linkage. Secure the pin with ring (A). Repeat at the opposite side.

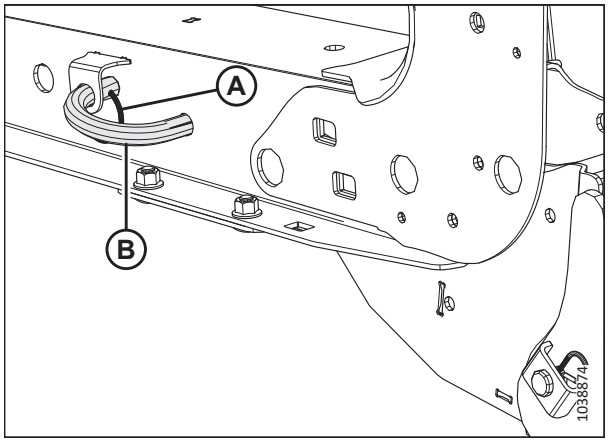


Figure 4.43: Header Leg

18. Remove the clevis pin from storage position (B) in the linkage and insert it into hole (A) to engage the float springs. Secure it with the hairpin. Repeat this step on the opposite float linkage.

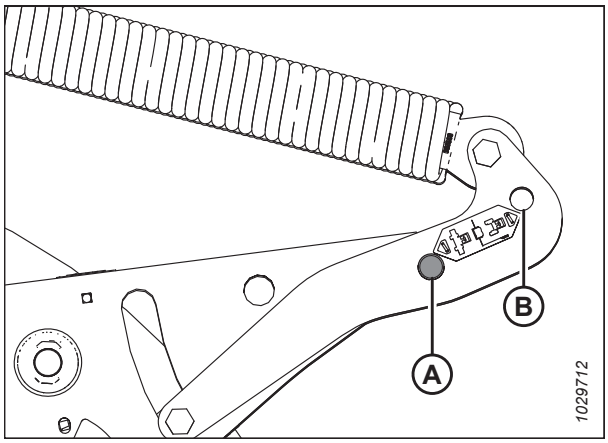


Figure 4.44: Header Float Linkage

19. Disengage the safety prop by turning lever (A) downwards until the lever locks into the vertical position.

20. Repeat the previous step to disengage the other safety prop.

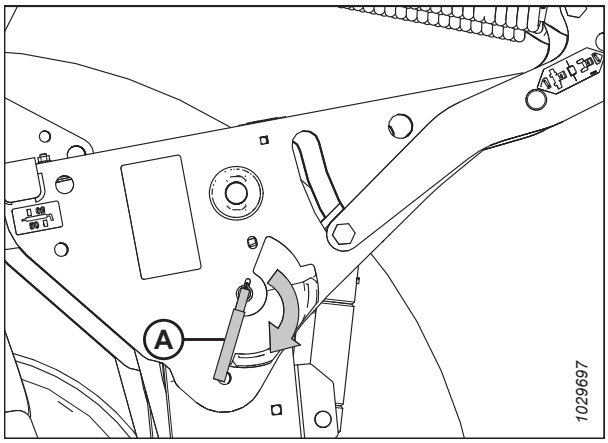


Figure 4.45: Safety Prop Lever

21. Start the engine, and press HEADER DOWN switch (A) on the GSL to fully lower the header.
22. Shut down the engine, and remove the key from the ignition.

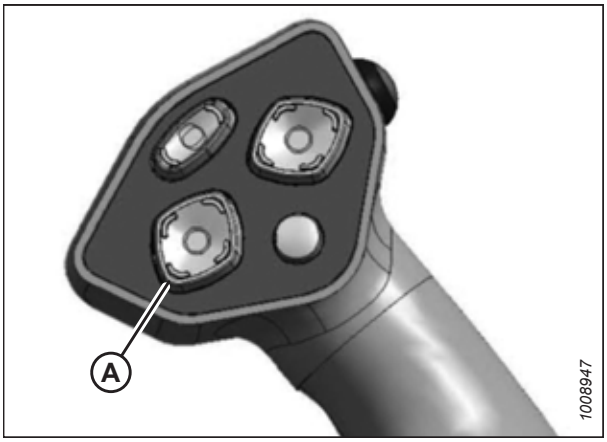


Figure 4.46: Ground Speed Lever

4.2.4 Connecting Header Hydraulic and Electrical Systems to an M Series Windrower

Header drive hydraulic hoses and electrical harness are located on the left cab-forward side of the windrower. The reel drive and control hoses are located on the right cab-forward side.

1. Before connecting header drive hydraulics (A) and electrical harness (B) to header, check fittings and connectors. Clean them if required.

Figure 4.47: Header Drive Hoses

2. Disengage and rotate lever (A) counterclockwise to fully up position.
3. Remove cap (B) securing the electrical connector to the frame.
4. Move hose bundle (C) from the windrower hose support and route it along the header hose guide.

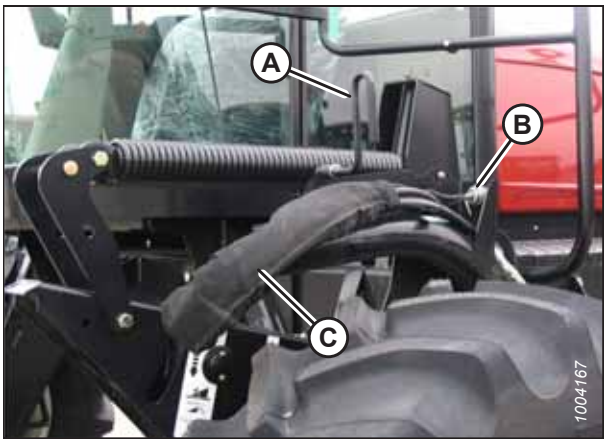


Figure 4.48: Header Drive Hoses

5. Push the hose connectors onto the mating receptacle until the collar on the receptacle snaps into locked position.
6. Remove the cover from electrical receptacle (A).
7. Push the electrical connector onto the receptacle and turn the collar on the connector to lock it in.
8. Attach the cover to the mating cover on the windrower's wiring harness.

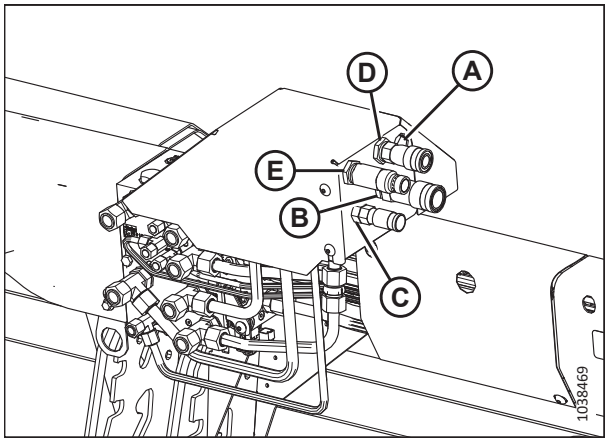


Figure 4.49: Header Receptacles

A - Electrical Receptacle
B - Knife Drive
C - Case Drain (Double Knife)
D - Draper Drive
E - Return

9. Lower lever (A) and engage it in down position.

Figure 4.50: Hose Storage

10. Before connecting the reel hydraulics, check the fittings. If the fittings are dirty, clean them.

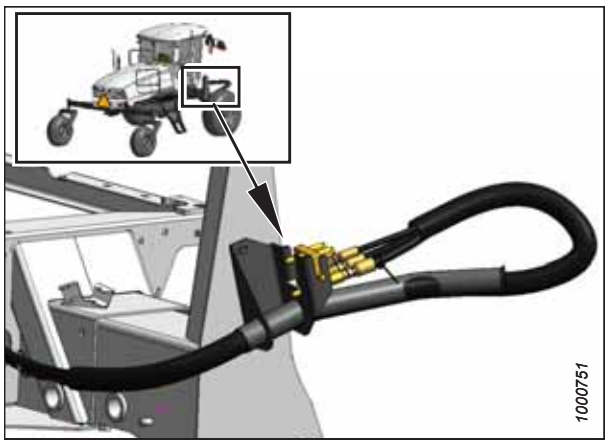


Figure 4.51: Reel Hose Storage

11. Open cover (A) on header receptacle (B).
12. Push in lock button (C) and pull handle (D) to the half-open position.

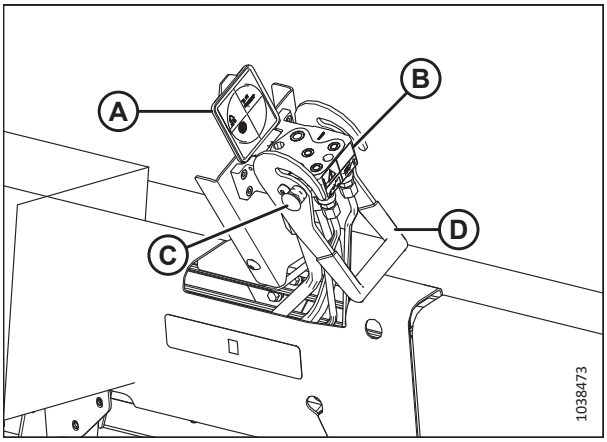


Figure 4.52: Reel Hydraulics Receptacle

13. Remove the hose bundle with multicoupler (C) from the windrower, place the multicoupler onto the header receptacle, and push handle (B) to engage the connector pins.
14. Push the handle away from the hoses until lock button (A) snaps out.
15. Raise and lower the header and the reel a few times to allow trapped air to pass back to the reservoir.

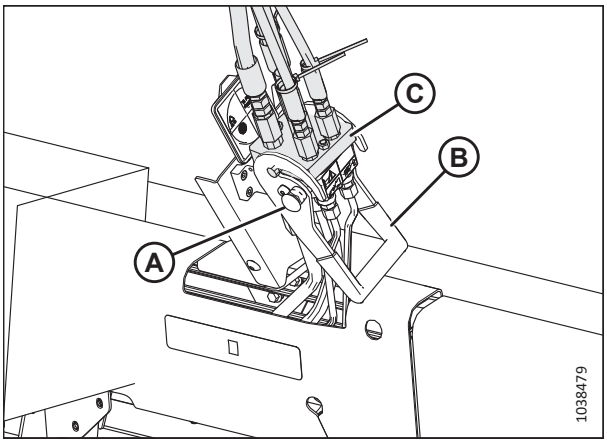


Figure 4.53: Reel Hose Connection

4.2.5 Disconnecting Header Hydraulic and Electrical Systems from an M Series Windrower

To detach the header hydraulic and electrical systems from an M Series Windrower, follow the procedure provided here.

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

Disconnecting reel hydraulics:

4. Push in lock button (A) and pull handle (B) to disengage multicoupler (C) from the header receptacle.
5. Route the hose bundle back onto the windrower and store multicoupler (C) on the hose support.

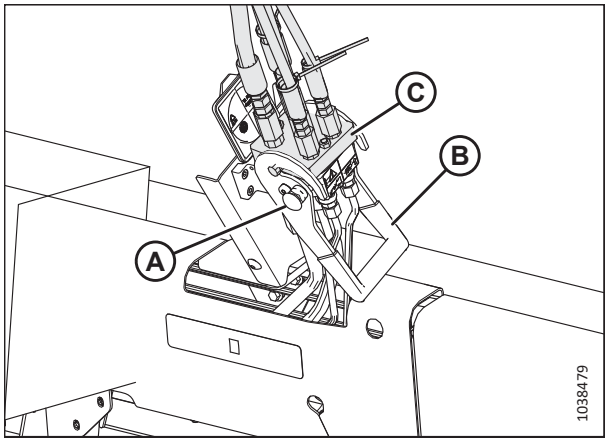


Figure 4.54: Reel Hydraulics

6. Close cover (A) on header receptacle.

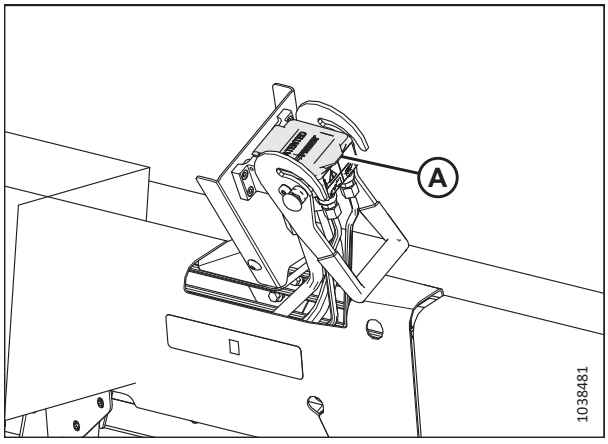


Figure 4.55: Closed Receptacle Cover

Disconnecting header drive hydraulics:

7. Disengage and rotate lever (A) counterclockwise to the fully up position.
8. Disconnect the electrical connector from the header.

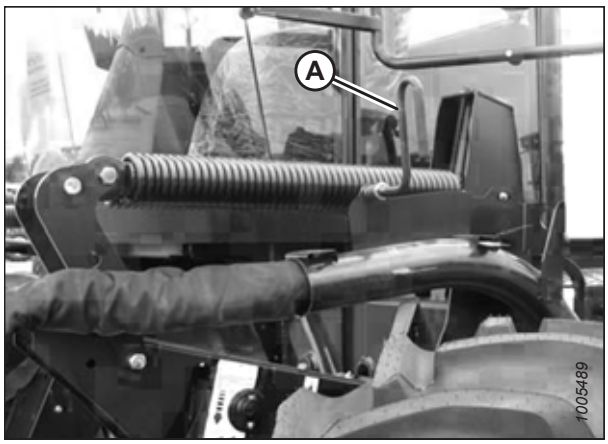


Figure 4.56: Header Drive Hydraulics

9. To disconnect the hoses from the header, line up slot (A) in collar with pin (B) on the connector.
10. Push the collar toward the pin and pull the connector to disengage.
11. Install caps on the connectors and the hose ends (if equipped).

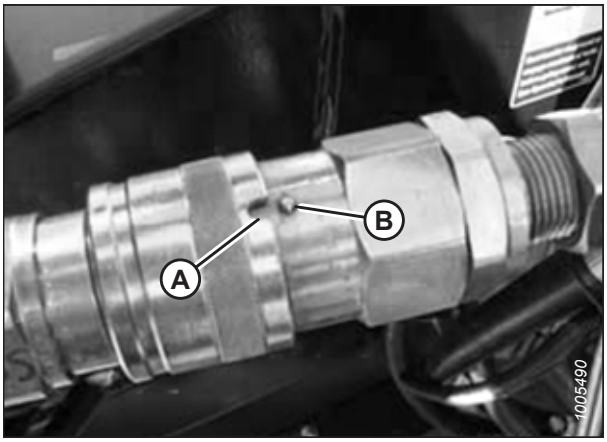


Figure 4.57: Quick Disconnect

Storing hose bundle on windrower support:

12. Route hose bundle (A) back onto the hose support on the windrower.
13. Rotate lever (B) and lock in the down position.
14. Install cap (C) on the electrical connector.

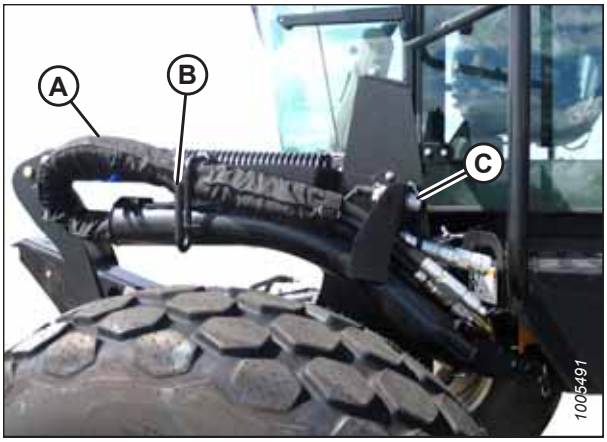


Figure 4.58: Hose Storage

4.2.6 Detaching Header from an M Series Windrower– Hydraulic Center-Link

Detaching a header from the windrower requires removing the header boot pins, disengaging the float springs, and disconnecting the electrical and hydraulic connectors.

DANGER

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

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Press HEADER UP switch (A) to raise the header to its maximum height.
3. Rephase the cylinders if one end of the header does not rise fully:
   a. Press and hold HEADER UP switch (A) until both cylinders stop moving.
   b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.
4. Shut down the engine, and remove the key from the ignition.
5. To engage the safety props on the lift cylinders:
   a. Pull lever (A) and rotate it toward the header to lower safety prop (B) onto the cylinder.
   b. Repeat the previous step for the opposite lift cylinder.

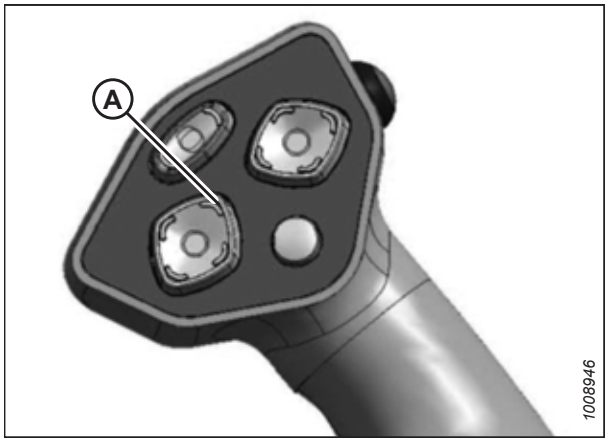


Figure 4.59: Ground Speed Lever (GSL)

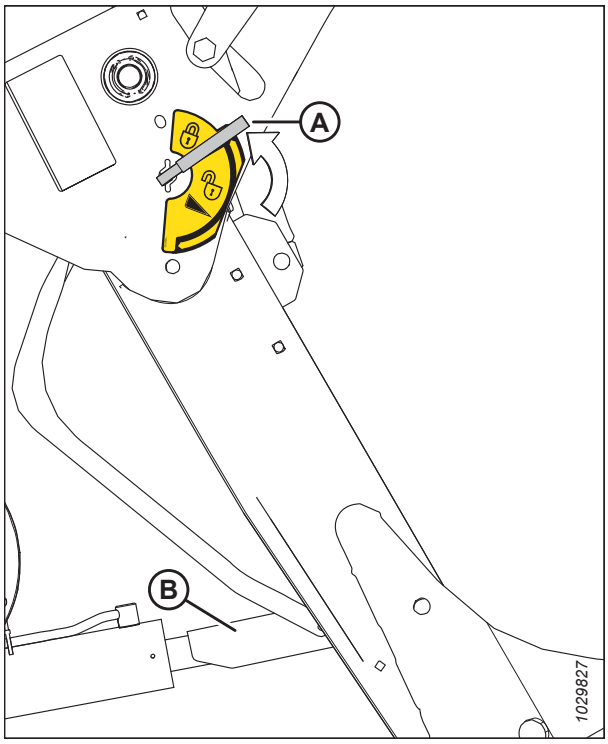


Figure 4.60: Safety Prop

6. Remove and retain hair pin (D) and clevis pin (C) from header boot (B) and windrower lift linkage (A). Repeat at the opposite side.

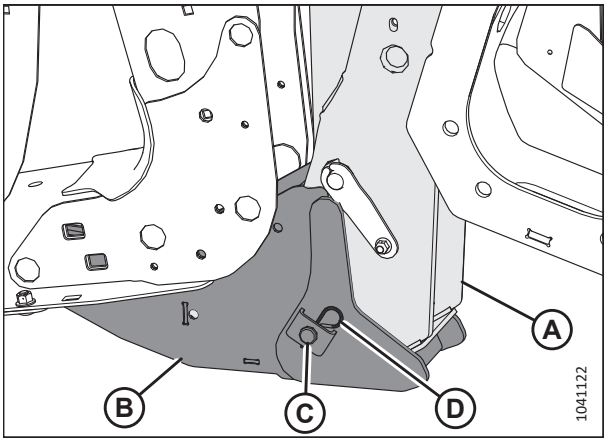


Figure 4.61: Header Leg and Windrower Lift Linkage Connected by Header Boot

7. Remove the clevis pin from location (A) to disengage the float springs. Insert the pin in storage hole (B). Secure it with the lynch pin.

   IMPORTANT:

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

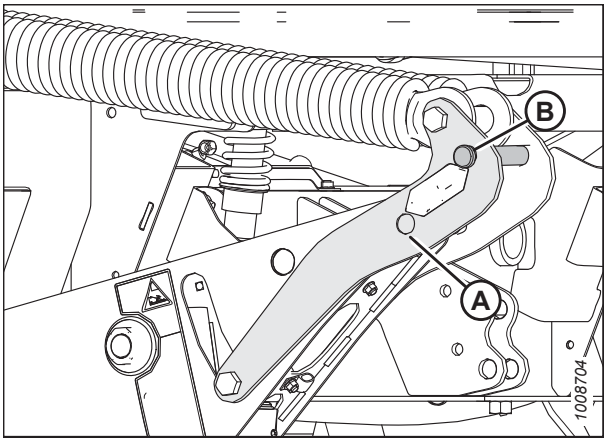


Figure 4.62: Header Float Linkage

8. To disengage the safety props on the lift cylinders:

   a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.

   b. Repeat the previous step for the opposite cylinder.

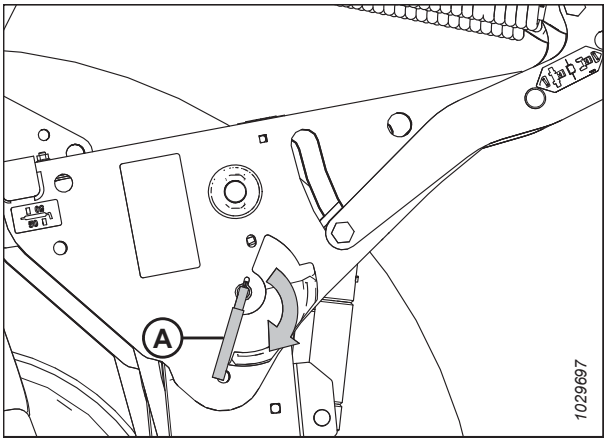


Figure 4.63: Safety Prop

9. Start the engine.

10. Activate HEADER TILT UP switch (A) or HEADER TILT DOWN switch (B) on the ground speed lever (GSL) to relieve the load on the center-link cylinder.

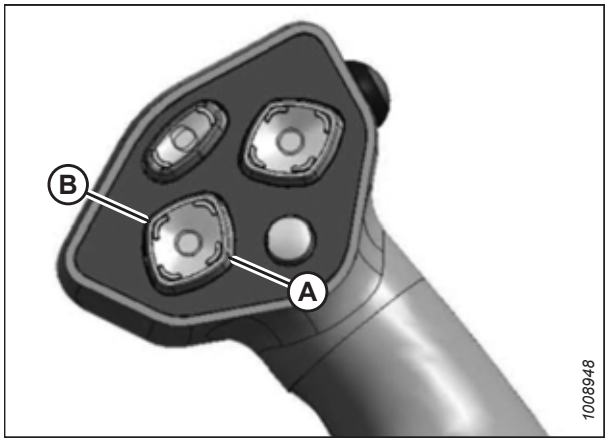


Figure 4.64: Ground Speed Lever

11. Disconnect the center-link by lifting release (B) and hook (A) off of the header.

    NOTE:

    If the optional center-link self-alignment kit is installed, lift release (B) and then operate the link lift cylinder using the REEL UP switch on the GSL to disengage the center-link from the header.

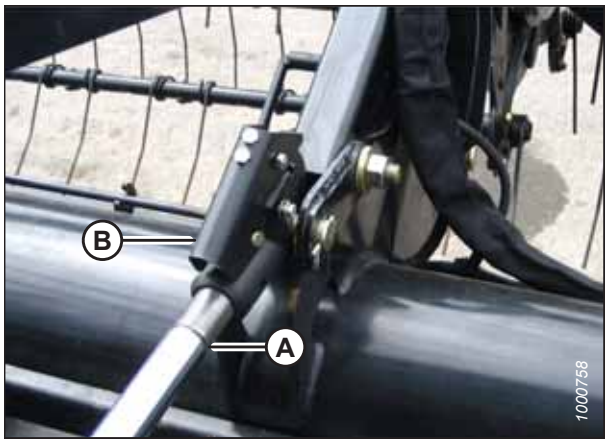


Figure 4.65: Hydraulic Center-Link

12. Back the windrower away from the header.

13. Reinstall clevis pin (B) into header boot (C) and secure it with hair pin (A). Repeat at the opposite side.

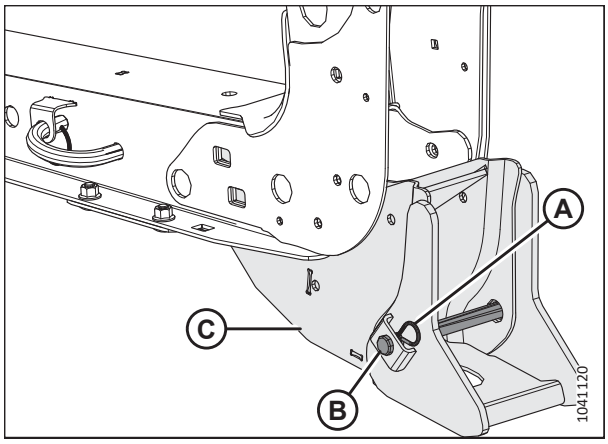


Figure 4.66: Header Leg and Boot

4.2.7 Detaching Header from an M Series Windrower – Mechanical Center-Link

Detaching a header equipped with a mechanical center-link from the windrower requires lowering the header stand, removing the leg pins, disengaging the float springs, and disconnecting the electrical and hydraulic connectors.

DANGER

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

1. Start the engine and press HEADER UP (A) switch to raise header to maximum height.
2. If one end of the header does **NOT** raise completely, rephase the cylinders as follows:
   a. Press and hold the HEADER UP (A) switch on the ground speed lever (GSL) until both cylinders stop moving.
   b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.
3. Shut down the engine, and remove the key from the ignition.

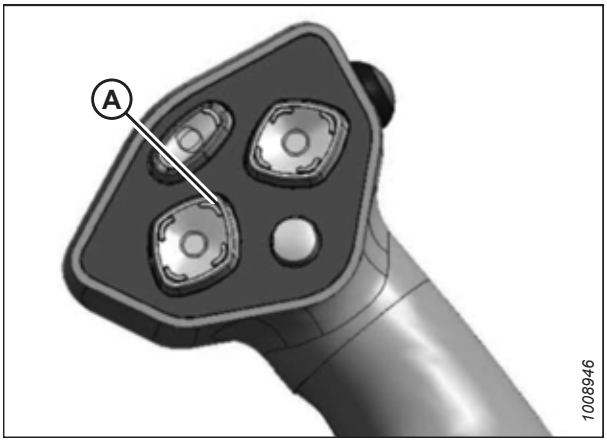


Figure 4.67: Ground Speed Lever

4. To engage the safety props on the lift cylinders:
   a. Pull lever (A) and rotate it toward the header to lower safety prop (B) onto the cylinder.
   b. Repeat the previous step for the opposite lift cylinder.

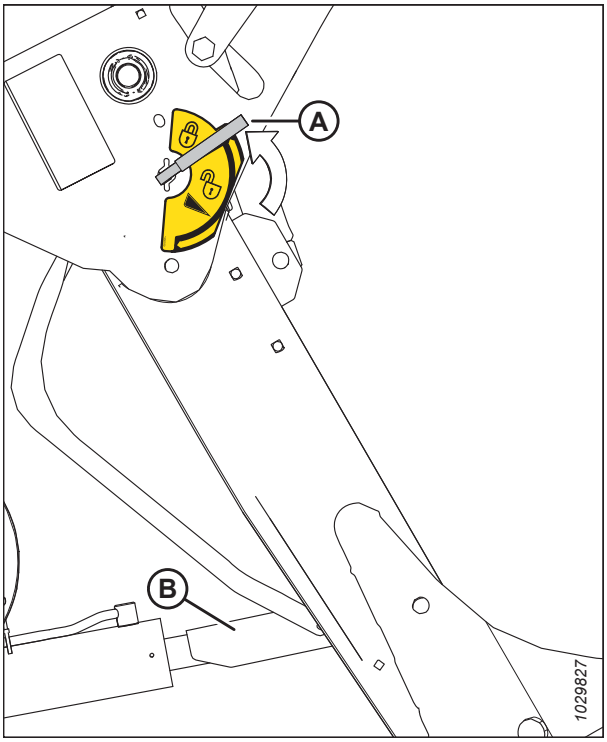


Figure 4.68: Safety Prop

5. Remove and retain hair pin (D) and clevis pin (C) from header boot (B) and windrower lift linkage (A). Repeat at the opposite side.

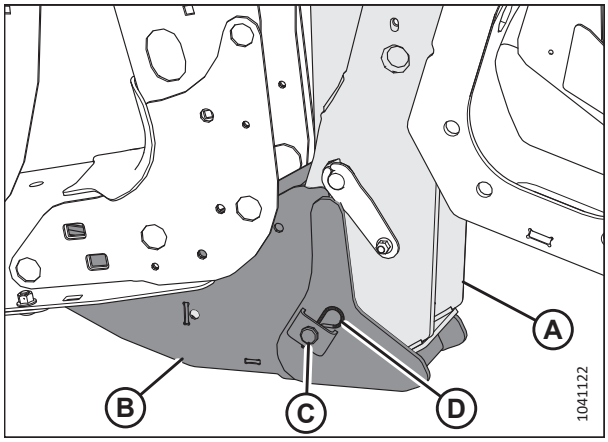


Figure 4.69: Header Leg and Windrower Lift Linkage Connected by Header Boot

6. Remove the clevis pin from location (A) to disengage the float springs, and insert the clevis pin in storage hole (B). Secure it with the lynch pin.

   IMPORTANT:

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

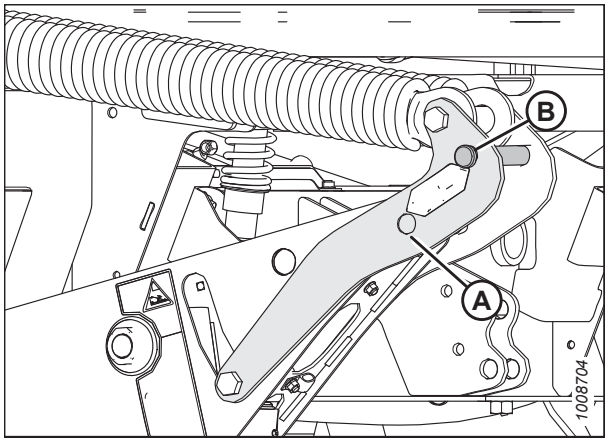


Figure 4.70: Header Float Linkage

7. To disengage the safety props on the lift cylinders:

   a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.

   b. Repeat the previous step for the opposite cylinder.

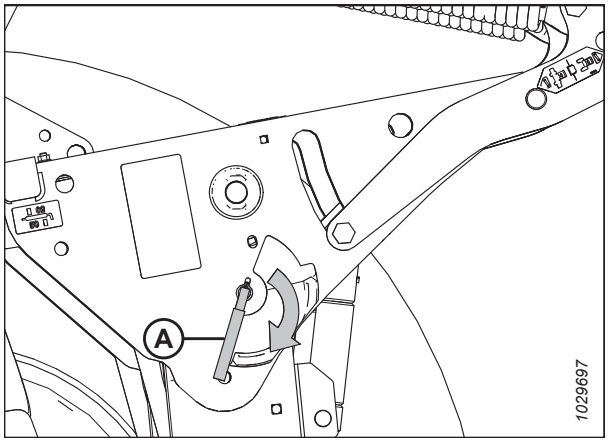


Figure 4.71: Safety Prop

8. Loosen nut (A) and rotate barrel (B) to relieve the load on the link.
9. Remove cotter pin (D) and clevis pin (C). Disconnect the mechanical center-link. Reinstall clevis pin (C) in the center-link and secure it with the cotter pin.
10. Tighten nut (A) against the barrel. A slight tap with a hammer is sufficient.

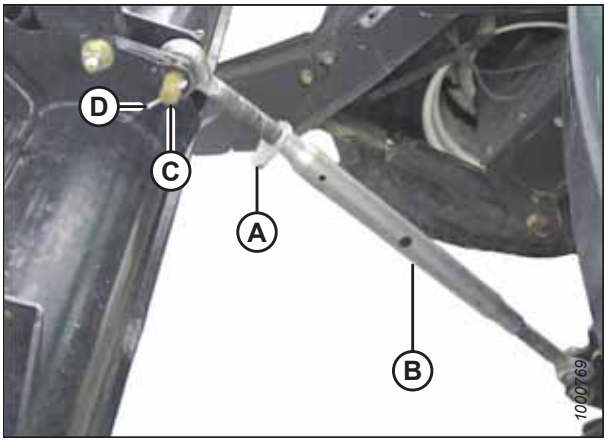


Figure 4.72: Mechanical Center-Link

11. Back the windrower away from the header.
12. Reinstall clevis pin (B) into header boot (C) and secure it with hair pin (A). Repeat at the opposite side.

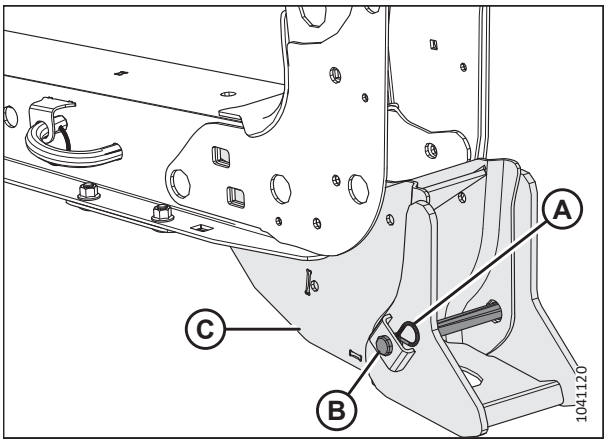


Figure 4.73: Header Leg and Boot

4.3 Attaching Header to M1 Series Windrower

To attach a D2 Series Draper Header to an M1 Series Windrower, follow the procedures provided here in the order presented.

4.3.1 Attaching Header to M1 Series Windrower

The windrower's lift linkage and center-link will need to be connected to the draper header. The windrower may be equipped with an optional self-aligning hydraulic center-link, which allows control over the vertical position of the center-link from the cab.

DANGER

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

NOTE:

If attaching header to the windrower for the first time, the draper header boots must be installed onto the windrower lift linkage before beginning this procedure. For instructions, refer to *4.1 Attaching Draper Header Boots, page 139*.

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

2. **Windrowers without the self-aligning center-link kit:** Relocate pin (A) in the frame linkage as needed to raise center-link (B) until the hook is above the attachment pin on the header.

   IMPORTANT:

   Ensure that the center-link is positioned high enough that it does not contact the header as the windrower approaches the header.

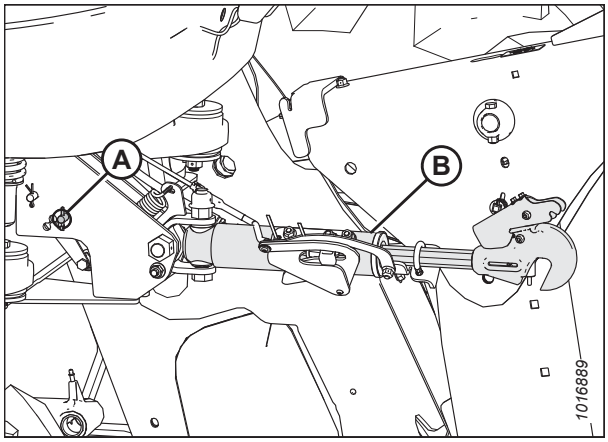


Figure 4.74: Center-Link without Self-Alignment

3. **If reattaching header to the windrower:** Remove and retain hair pin (A) and clevis pin (B) from header boot (C). Repeat at the opposite side.

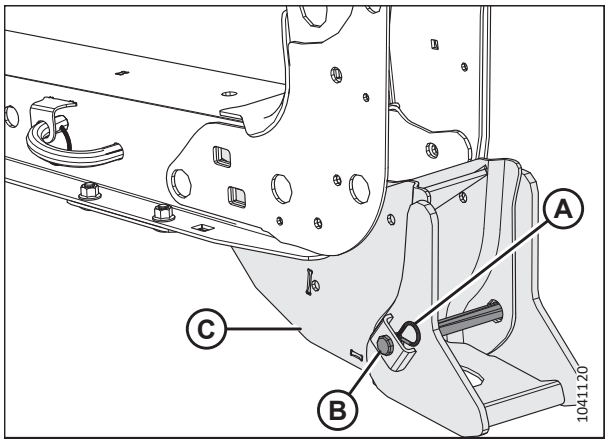


Figure 4.75: Header Boot — Left Side Shown

4. **If attaching header to the windrower for the first time:** Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat at the opposite side.

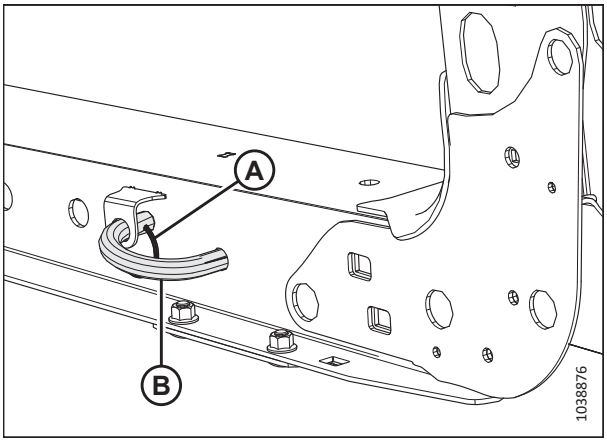


Figure 4.76: Header Leg

DANGER

Ensure that all bystanders have cleared the area.

5. Start the engine.

6. **If the header lift legs will be lowered WITH a header or weight box attached**, proceed to Step *10, page 170*.

   If the header lift legs will be lowered WITHOUT a header or weight box attached to the windrower, fully release the tension in header float springs (A):

   - If the Harvest Performance Tracker (HPT) displays a message saying that the float should be removed, then remove the float and proceed to Step *10, page 170*.
   - If the HPT does **NOT** display a message saying that the float should be removed, then proceed to Step *7, page 169* to remove the float manually.

   IMPORTANT:

   To lower the header lift legs without a header or weight box attached to the windrower, ensure that the tension on the float springs is fully released. This will prevent damage to the header lift linkages.

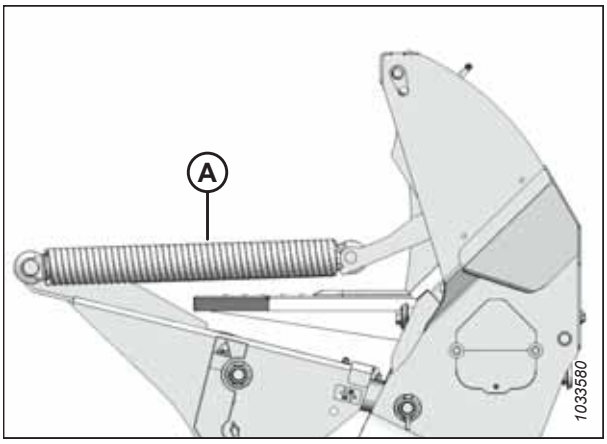


Figure 4.77: Header Float Springs

7. In the windrower cab, press scroll knob (A) on the HPT to display the QuickMenu page.

8. Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B) and press the scroll knob to select it.

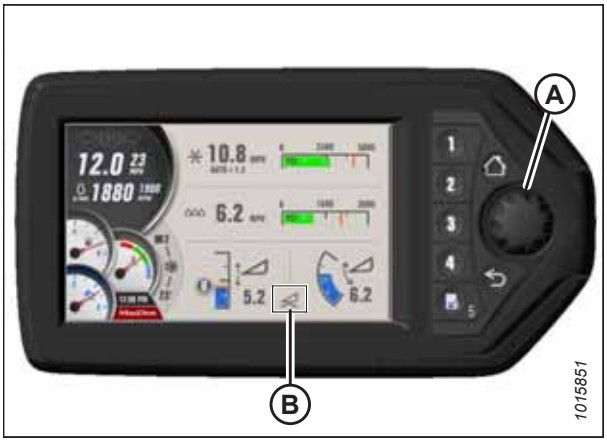


Figure 4.78: HPT Display

9. On the FLOAT ADJUST page, press soft key 3 (A) to disable the float.

Figure 4.79: HPT Display

10. **Windrowers equipped with the self-aligning center-link kit:**

    a. Press HEADER DOWN switch (E) on the ground speed lever (GSL) to fully retract the header lift cylinders.

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

    IMPORTANT:

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

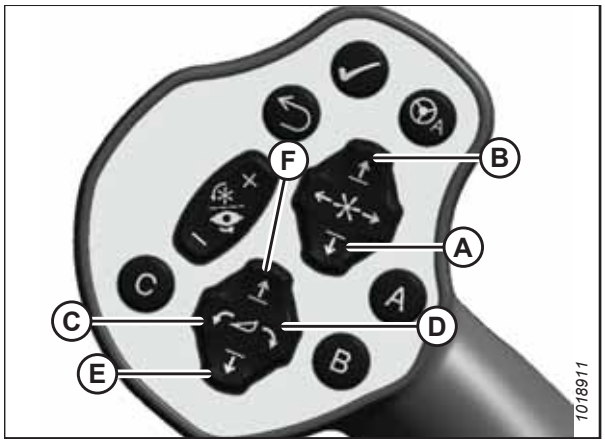


Figure 4.80: GSL Switches

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

11. Drive the windrower slowly forward until windrower lift linkage (A) enter header boots (B). Continue driving slowly forward until the lift linkages contact the header boots in the header legs and the header is nudged forward.

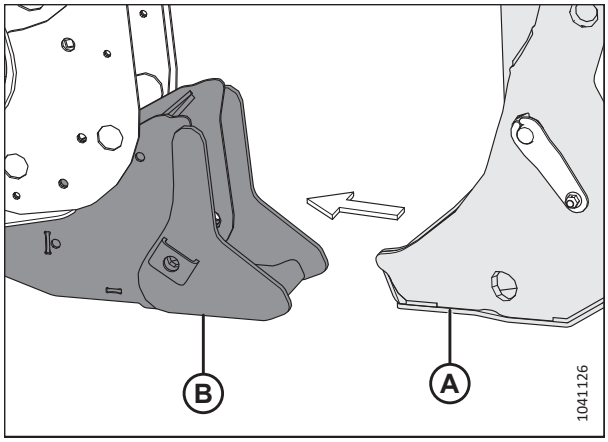


Figure 4.81: Header Leg and Boot

12. **If attaching header to the windrower for the first time:** Drive the windrower slowly forward until header boots (A) enter header legs (B). Continue driving slowly forward until the header boots contact the support plates in the header legs and the header is nudged forward.

13. Ensure that the lift linkages are properly engaged in the header legs and are in contact with the support plates.

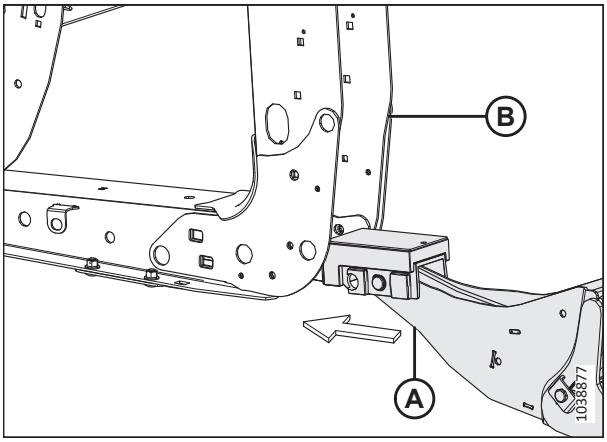


Figure 4.82: Header Leg and Boot

14. **Windrowers equipped with the self-aligning center-link kit:**

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

    IMPORTANT:

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

    b. If hook release (C) is open (in the up position), shut down the engine, and remove the key from the ignition. Manually push hook release (C) down after the hook engages the header pin.

    c. Lower center-link (A) onto the header with the REEL DOWN switch on the GSL until the center-link locks into position and hook release (C) is down.

    d. Check that the center-link is locked onto the header by pressing the REEL UP switch on the GSL.

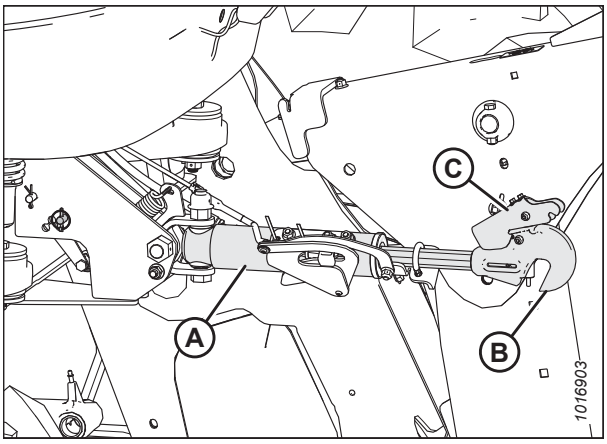


Figure 4.83: Hydraulic Center-Link

15. **Windrowers without the self-aligning center-link kit:**

    a. Press the HEADER TILT UP or HEADER TILT DOWN cylinder switches on the GSL to extend or retract the center-link cylinder until the hook is aligned with the header attachment pin.

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

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

    IMPORTANT:

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

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

    e. Start the engine.

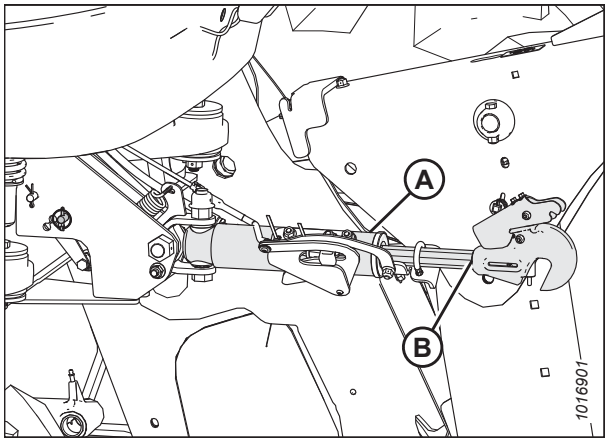


Figure 4.84: Hydraulic Center-Link

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

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

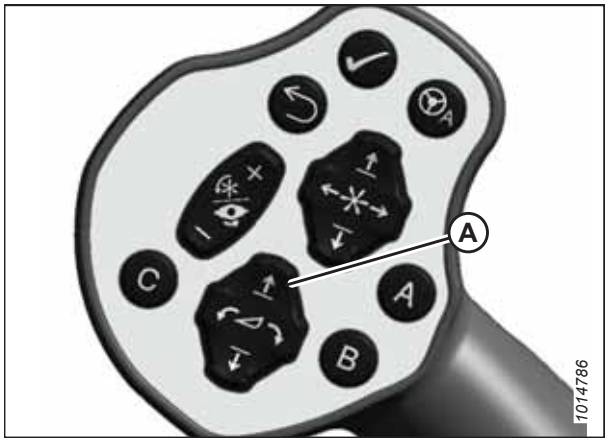


Figure 4.85: GSL

18. Engage the safety props on both lift cylinders as follows:

    a. Pull lever (A) toward you to release it, and then rotate it toward the header to lower the safety prop onto the cylinder.

    b. Repeat the previous step for the opposite lift cylinder.

    IMPORTANT:

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

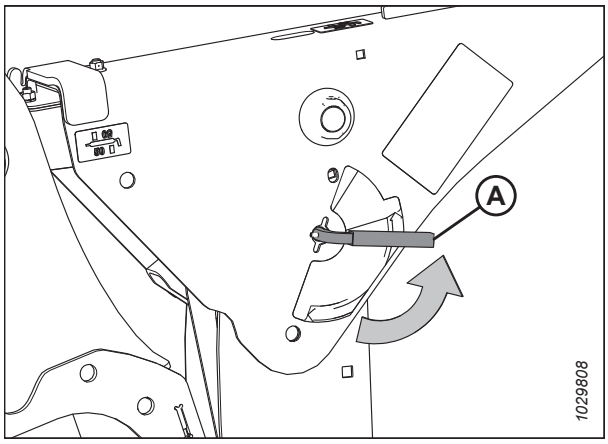


Figure 4.86: Safety Prop Lever

19. Secure windrower lift linkage (A) to header boots (B) using clevis pin (C) and hair pin (D). Repeat at the opposite side.

    NOTE:

    To ensure that the pin doesn't snag the windrow, install the clevis pin on the outboard side of the draper header boot.

    NOTE:

    Some parts remove for clarity.

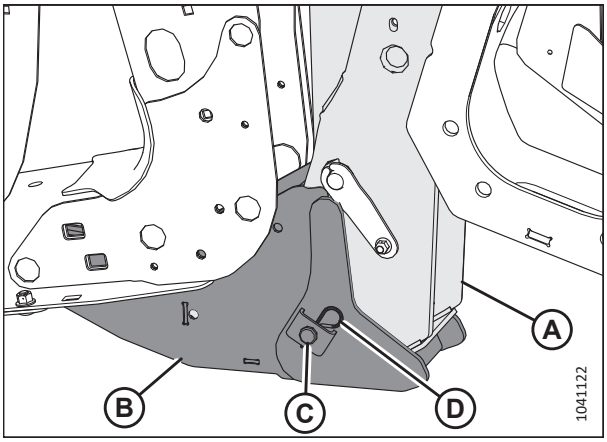


Figure 4.87: Windrower Lift Linkage and Header Leg

20. **If attaching header to the windrower for the first time:** Install pin (B) through the header leg, engaging the header support in the lift linkage. Secure the pin with ring (A). Repeat at the opposite side.

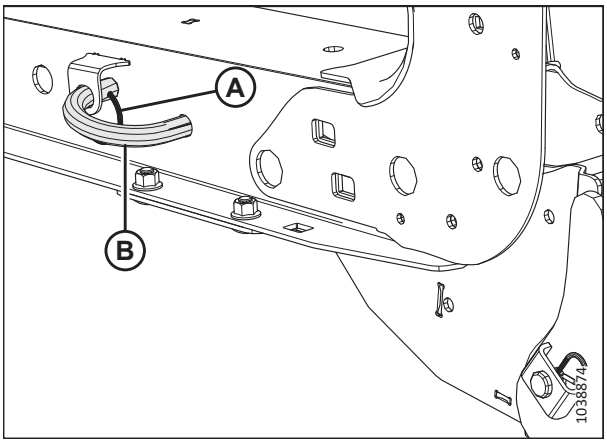


Figure 4.88: Header Leg

21. Disengage the safety props on both lift cylinders as follows:

    a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.

    b. Repeat the previous step for the opposite cylinder.

    NOTE:

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

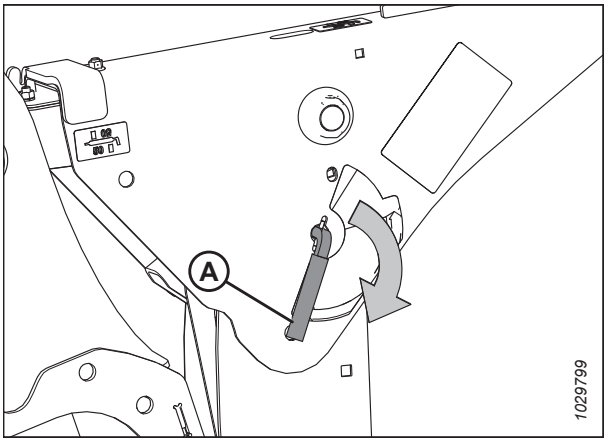


Figure 4.89: Safety Prop Lever

22. Start the engine and press HEADER DOWN switch (A) on the GSL to fully lower the header.
23. Shut down the engine, and remove the key from the ignition.

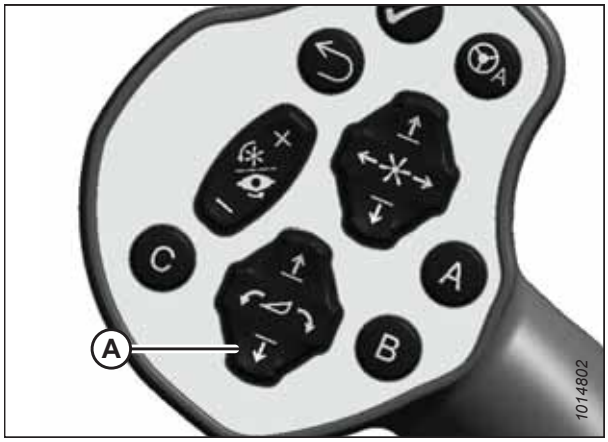


Figure 4.90: GSL

4.3.2 Connecting Header Hydraulics to M1 Series Windrower

The header's hydraulic hose multicoupler will need to be connected to the windrower.

DANGER

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

IMPORTANT:

To prevent contamination of the hydraulic system, use a clean rag to remove dirt and moisture from all hydraulic couplers.

1. Shut down the engine, and remove the key from the ignition.
2. Approach platform (A) on the left cab-forward side of the windrower. Ensure that the cab door is closed.
3. Push latch (B) and pull platform (A) toward the walking beam until it stops and the latch engages.

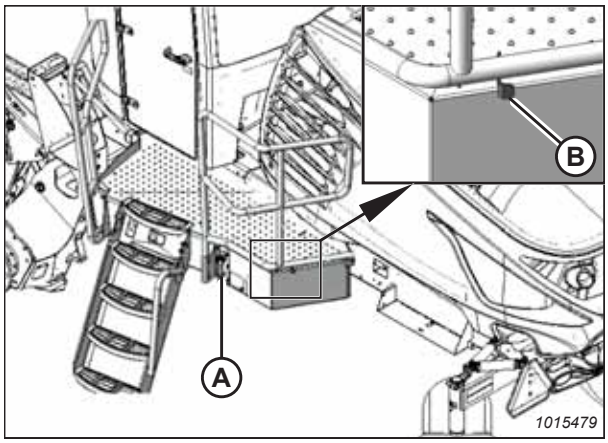


Figure 4.91: Left Cab-Forward Platform

4. **All draper headers except D215:** Push lever (A) up and pull arm (B) to get pin (C) out of latch (D).

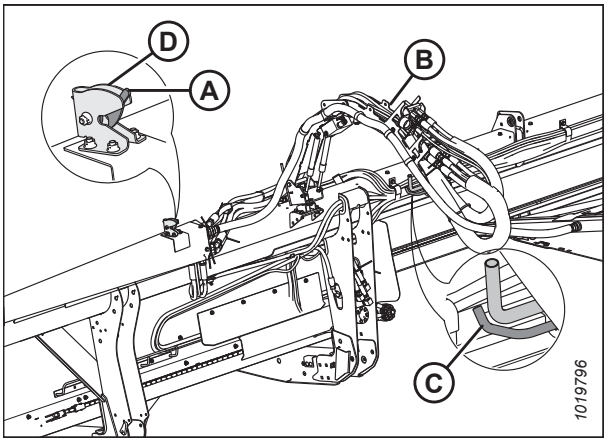


Figure 4.92: Hydraulic Hose Management System – All Headers Except D215

5. **D215 Draper Headers:** Pull hydraulic hose management system (A) towards the left outboard end of the header, disengage ball stud (B) from the cradle in support (C).

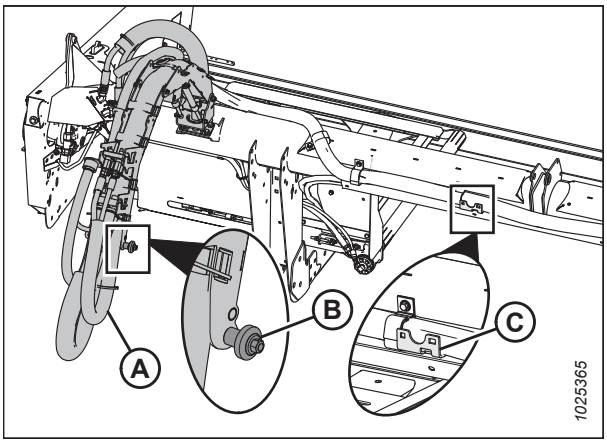


Figure 4.93: Hydraulic Hose Management System – D215

6. Push the link on latch (C) and pull handle (A) on hydraulic hose management system (B) rearward to disengage the arm from the latch.
7. Move hydraulic hose management system (B) toward the left cab-forward side of the windrower.

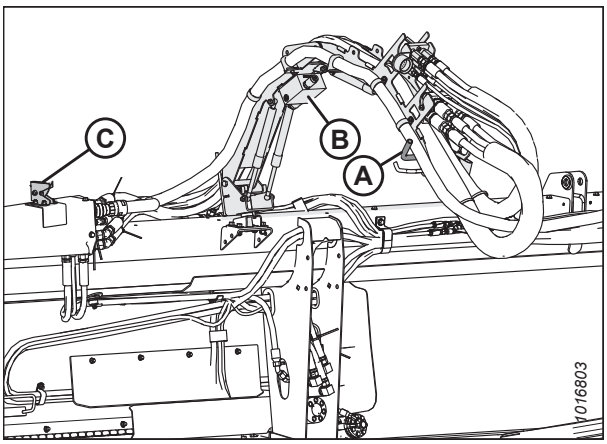


Figure 4.94: Hydraulic Hose Management System

8. Connect hydraulic hose management system (A) to the left outer leg of the windrower by pushing ball stud (B) into ball stud latch (C).

   NOTE:

   The hydraulic hoses have been removed from the illustration for clarity.

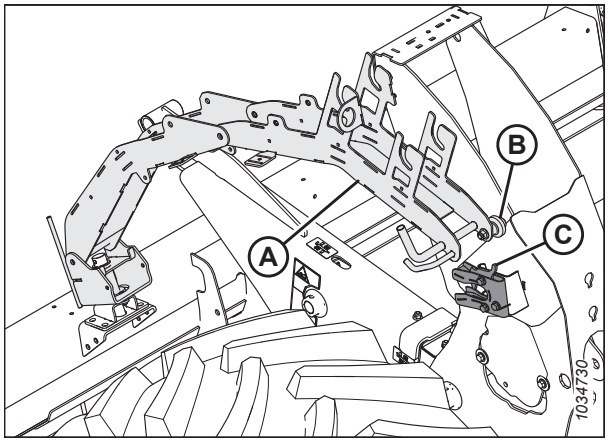


Figure 4.95: Windrower Left Outer Leg

9. Retrieve knife and reel drive multicoupler (A) from the hydraulic hose management system.
10. Push knob (B) on the hydraulic receptacle and pull handle (C) fully away from the windrower.
11. Open cover (D) and position the coupler onto the receptacle. Align the pins in the coupler with the slots in handle (C), and push the handle toward the windrower so that the coupler locks onto the receptacle and knob (B) snaps out.

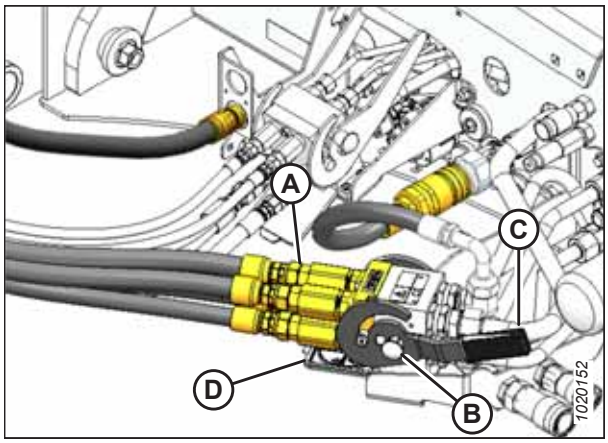


Figure 4.96: Knife/Reel Drive Multicoupler

12. Ensure that the hydraulic hose routing is as straight as possible.

    IMPORTANT:

    Straight routing will prevent abrasion damage to the hydraulic hoses.

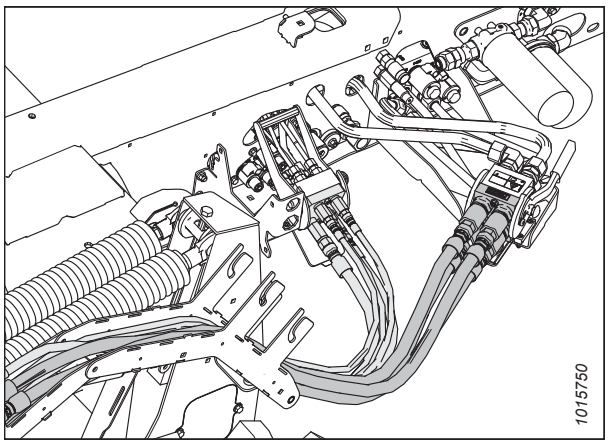


Figure 4.97: Hydraulic Multicouplers and Hose Routing

13. Push latch (A) to unlock platform (B).

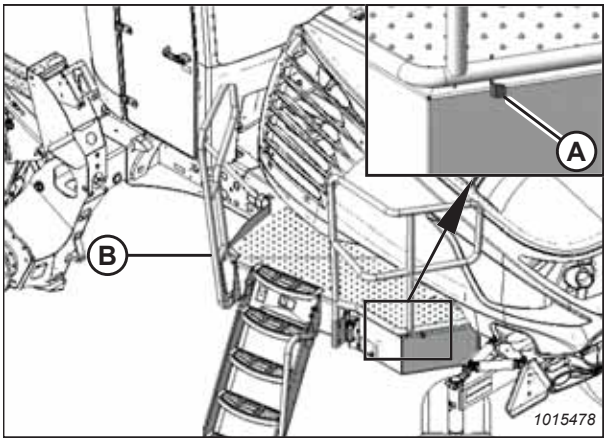


Figure 4.98: Left Cab-Forward Platform

14. Pull platform (A) toward the cab until it stops and the latch is engaged.

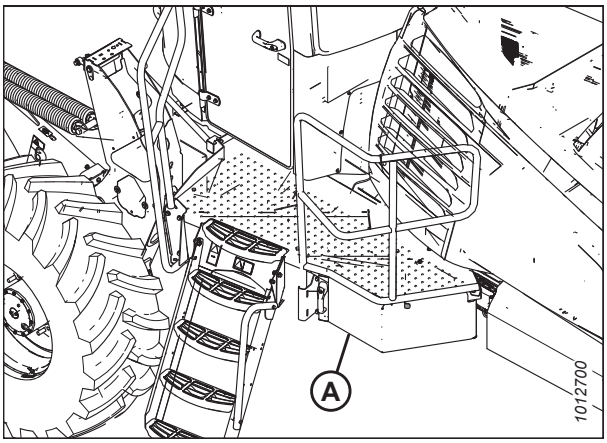


Figure 4.99: Left Cab-Forward Platform

4.3.3 Detaching Header from an M1 Series Windrower

The instructions in this section outline how to properly detach D2 SP Series Draper Headers.

DANGER

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

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

3. Approach platform (A) on the left cab-forward side of the windrower. Ensure that the cab door is closed.
4. Push latch (B) and pull platform (A) toward the walking beam until it stops and the latch engages.

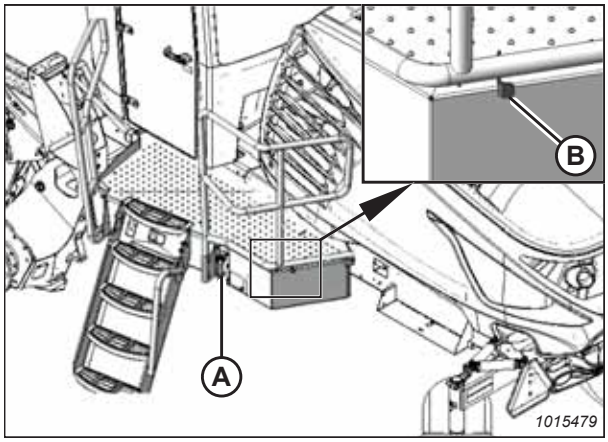


Figure 4.100: Left Cab-Forward Platform

5. Push lock button (A) and pull handle (B) to disengage multicoupler (C). Disconnect the hydraulics from the rear knife/reel drive receptacle.

   NOTE:

   Firmly hold handle (B) when disconnecting multicoupler (C). Pressure may cause the handle to kick back with force.

6. Route the knife/reel drive hose bundle back to storage position (D) on the hydraulic hose management system.
7. Remove any debris that may have accumulated on the receptacle. Close cover (E).

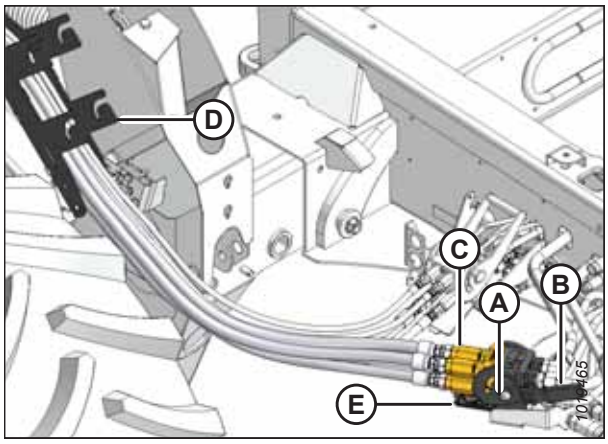


Figure 4.101: Knife/Reel Drive Multicoupler

8. Push lock button (B), and pull handle (C) to disengage multicoupler (A). Disconnect the hydraulics from the windrower draper drive/reel lift receptacle.
9. Disconnect electrical connector (E).
10. Remove any debris that may have accumulated on the windrower front receptacle, and close cover (D).

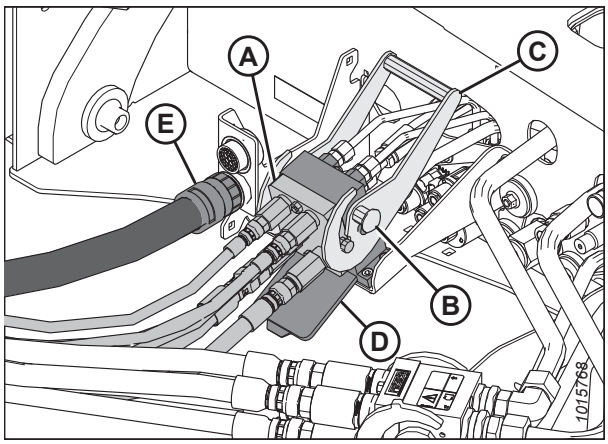


Figure 4.102: Draper/Reel Multicoupler

11. Route the draper drive/reel hose bundle back to storage position (A) on hydraulic hose management system (B).
12. Insert electrical connector into storage cup (C).

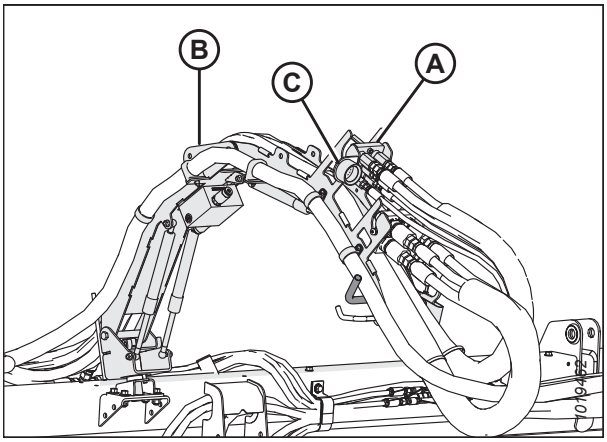


Figure 4.103: Hydraulic Hose Management System

13. Push latch (A) to unlock platform (B).

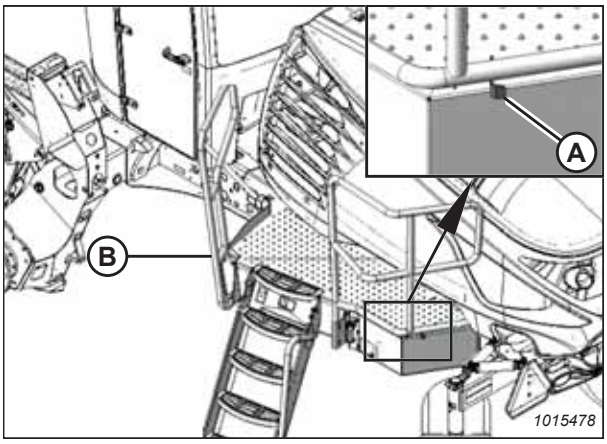


Figure 4.104: Left Cab-Forward Platform

14. Pull platform (A) toward the cab until it stops and the latch is engaged.

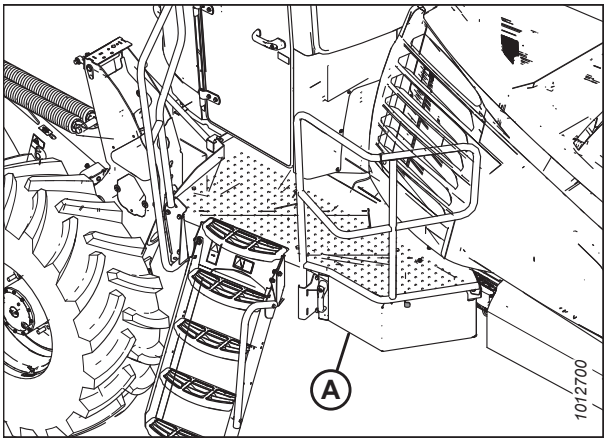


Figure 4.105: Left Cab-Forward Platform

15. Disconnect hose management system (A) from the windrower by pulling latch lever (B) to open the latch. Keep the latch open and move hose management system (A) away from the header with handle (C).

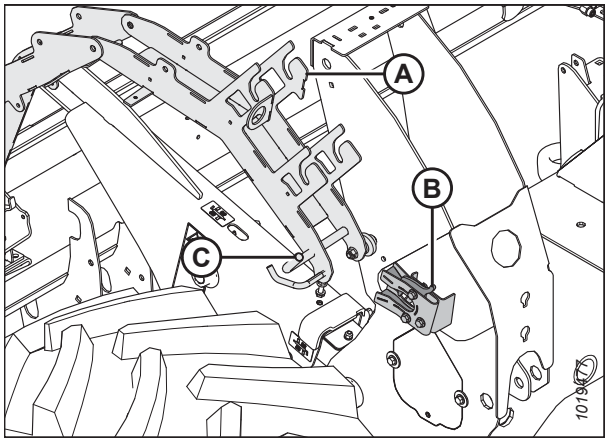


Figure 4.106: Hydraulic Hose Management System

16. Pivot hose management system (B) forward with handle (A), and engage hook (D) into latch (C) on the header.

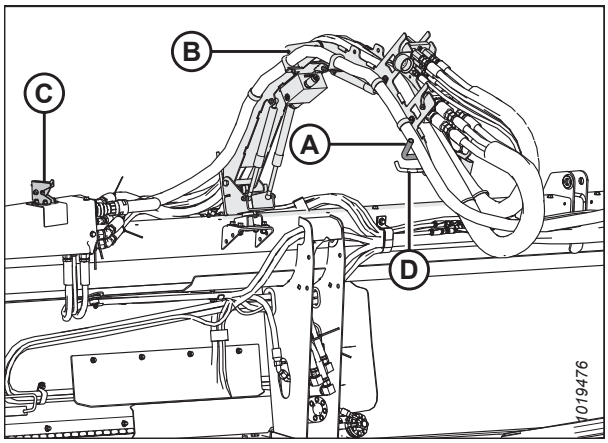


Figure 4.107: Hydraulic Hose Management System

17. Remove and retain hair pin (D) and clevis pin (C) from header boot (B) and windrower lift linkage (A). Repeat at the opposite side.

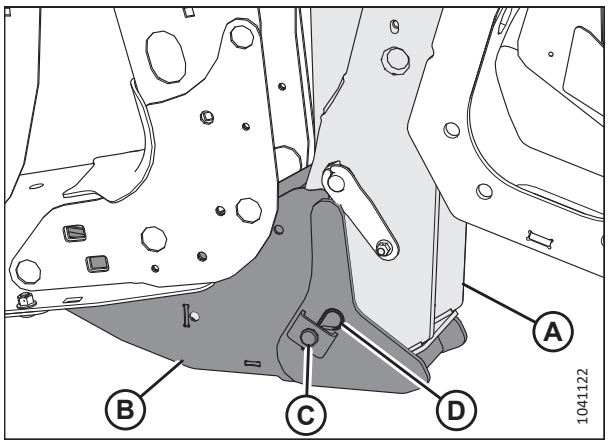


Figure 4.108: Header Leg and Windrower Lift Linkage Connected by Header Boot

18. **Windrowers with self-aligning center-link:** Release center-link latch (A) before returning to the cab.

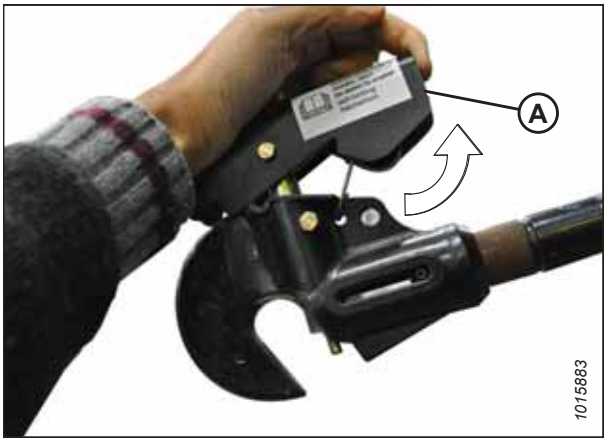


Figure 4.109: Center-Link

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

    NOTE:

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

20. Repeat the above step on the opposite side.

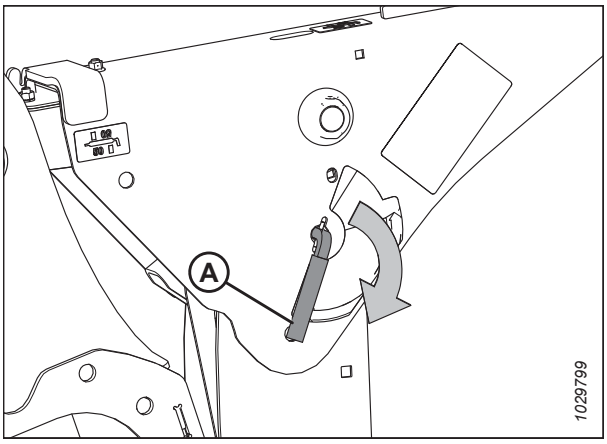


Figure 4.110: Safety Prop Lever

DANGER

Ensure that all bystanders have cleared the area.

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

    NOTE:

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

23. Lower the header to the ground with HEADER DOWN switch (A).
24. Press HEADER TILT switches (B) as needed on GSL to release the load on center-link.

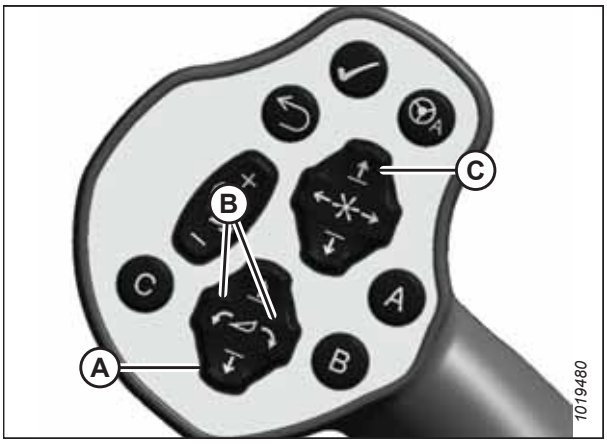


Figure 4.111: GSL

25. **Windrowers with self-aligning center-link:**

    a. Press REEL UP switch (C) to disengage the center-link from the header.

    b. Proceed to Step *28, page 182*.

26. **Windrowers without self-aligning center-link:**

    a. Shut off the engine, and remove the key from the ignition.

    b. Disconnect the center-link by lifting release (B) and lift hook (A) off the header.

    c. Start the engine.

27. Back the windrower away from the header.

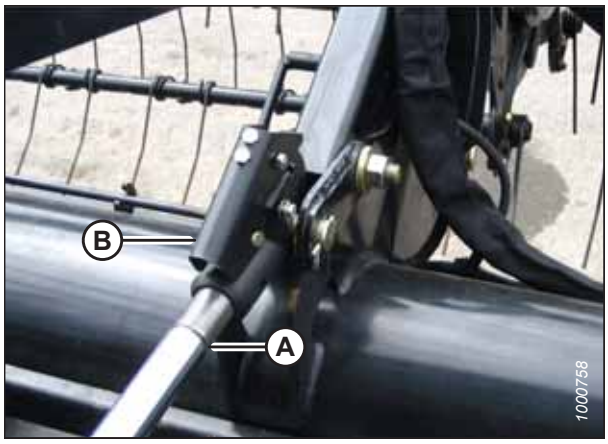


Figure 4.112: Hydraulic Center-Link

28. Reinstall clevis pin (B) into header boot (C) and secure it with hair pin (A). Repeat at the opposite side.

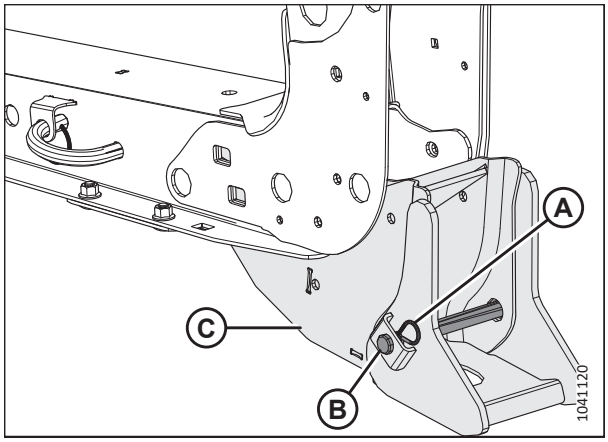


Figure 4.113: Header Stand

Chapter 5: Maintenance and Servicing

This chapter contains the information necessary to perform routine maintenance and occasional servicing tasks on your machine. The word “maintenance” refers to scheduled tasks that help your machine operate safely and effectively; “Service” refers to tasks that must be performed when a part needs to be repaired or replaced. For advanced service procedures, contact your Dealer.

A parts catalog is provided in the plastic manual case at the rear by the right header leg.

Log hours of operation and use the maintenance record provided (refer to *5.2.1 Maintenance Schedule/Record, page 184*) to keep track of your scheduled maintenance.

5.1 Preparing Machine for Servicing

Observe all safety precautions before beginning service on the machine.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator’s seat, and always engage the safety props before going under the machine for any reason.

CAUTION

To avoid personal injury, follow all the safety precautions listed before servicing header or opening drive covers.

Before servicing the machine, follow these steps:

1. Lower the header fully. If it is necessary to service the header in the raised position, always engage the safety props.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the park brake.
4. Wait for all moving parts to stop.

5.2 Maintenance Requirements

Regular maintenance is the best insurance against early wear and untimely breakdowns. Following the maintenance schedule will increase your machine's life. Log hours of operation, use the maintenance record, and keep copies of your maintenance records (refer to *5.2.1 Maintenance Schedule/Record, page 184*).

Periodic maintenance requirements are organized according to service intervals. If a service interval specifies more than one timeframe, e.g., 100 hours or annually, service the machine at whichever interval is reached first.

IMPORTANT:

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

When servicing the machine, refer to the appropriate section in this Maintenance and Servicing chapter and use only specified fluids and lubricants. Refer to the inside back cover for recommended fluids and lubricants.

CAUTION

Carefully follow safety messages. For instructions, refer to *5.1 Preparing Machine for Servicing, page 183* and *1 Safety, page 1*.

5.2.1 Maintenance Schedule/Record

Recording maintenance allows the user to keep track of when maintenance is performed.

Action:	✓ – Check	♦ – Lubricate	▲ – Change
Hour meter reading			
Service date			
Serviced by			
First Use	Refer to *5.2.2 Break-in Inspection, page 185*.		
End of Season	Refer to *5.2.4 Equipment Servicing – End-of-Season, page 186*.		
10 Hours or Daily (Whichever Occurs First)			
✓	Hydraulic hoses and lines; refer to *5.2.5 Checking Hydraulic Hoses and Lines, page 187*[76]		
✓	Knife sections, guards, and hold-downs; refer to *5.5 Knife, page 199*[76]		
✓	Tire pressure; refer to *5.11.3 Checking Tire Pressure, page 308*[76]		
✓	Axle bolt torque; refer to *5.11.2 Checking Transport Assembly Bolt Torque, page 306*		
25 Hours			
♦	Knifeheads; refer to *Every 25 Hours, page 189*[76]		
50 Hours or Annually			
♦	Upper cross auger right bearing; refer to *Every 50 Hours, page 190*		
♦	Upper cross auger sliding hubs; refer to *Every 50 Hours, page 190*		
♦	Upper cross auger center support and U-joint; refer to *Every 50 Hours, page 190*		
♦	Feed draper roller bearings, 3 locations; refer to *Every 50 Hours, page 190*		

76. MacDon recommends keeping a record of daily maintenance as evidence of a properly maintained machine.

♦	Reel drive chain (If chain is dry at next oiling interval – consider decreasing oiling interval.); refer to *Every 50 Hours, page 190*																	
▲	Knife drive box lubricant (first 50 hours only); refer to *Changing Oil in Knife Drive Box, page 237*																	
✓	Reel drive chain tension; refer to *5.10.1 Reel Drive Chain, page 300*																	
✓	Reel finger/cutterbar clearance; refer to *5.9.1 Reel-to-Cutterbar Clearance, page 270*																	
✓	Wheel bolt torque; refer to *5.11.1 Checking Wheel Bolt Torque, page 306*																	
✓	Knife drive box lubricant level; refer to *Checking Oil Level in Knife Drive Box , page 236*																	
✓	Knife drive box mounting bolts; refer to *Checking Mounting Bolts, page 237*																	
✓	Draper roller bearings; refer to *5.8.5 Draper Roller Maintenance, page 252*																	
250 Hours or Annually (Whichever Occurs First)																		
♦	Reel shaft bearings; refer to *Every 250 Hours, page 193*																	
♦	Reel drive U-joint; refer to *Every 250 Hours, page 193*																	
500 Hours or Annually (Whichever Occurs First)																		
♦	Gauge wheel / slow speed transport wheel bearings; refer to *Every 500 Hours, page 194*																	
1000 Hours or 3 Years (Whichever Occurs First)																		
▲	Knife drive box lubricant; refer to *Changing Oil in Knife Drive Box, page 237*																	

5.2.2 Break-in Inspection

Break-in inspection involves checking belts, fluids, and performing general machine inspections for loose hardware or other areas of concern. Break-in inspections ensure that all components can operate for an extended period without requiring service or replacement. The break-in period is the first 50 hours of operation after the machine's initial start up.

Inspection Interval	Item	Refer to
5 Hours	Check for loose hardware and tighten to required torque.	*8.1 Torque Specifications, page 343*
10 Hours	Check knife drive box mounting bolts.	*Checking Mounting Bolts, page 237*
10 Hours	Grease the feed draper bearings.	*Every 10 Hours, page 188*
50 Hours	Change knife drive box lubricant.	*Changing Oil in Knife Drive Box, page 237*
50 Hours	Reel drive chain.	*Every 50 Hours, page 190*

5.2.3 Equipment Servicing – Preseason

Equipment should be inspected and serviced at the beginning of each operating season.

CAUTION

- **Review this manual to refresh your memory on the safety and operating recommendations.**
- **Review all the safety decals and other decals on the header and note the hazard areas.**
- **Be sure all the shields and guards are properly installed and secured. Never alter or remove safety equipment.**
- **Be sure you understand and have practiced safe use of all controls. Know the capacity and operating characteristics of the machine.**
- **Ensure you have a first aid kit and fire extinguisher. Know where they are and how to use them.**

1. Lubricate the machine completely. For instructions, refer to *5.3 Lubrication, page 188*.
2. Perform all annual maintenance tasks. For instructions, refer to *5.2.1 Maintenance Schedule/Record, page 184*.

5.2.4 Equipment Servicing – End-of-Season

Equipment should be inspected and serviced at the end of each operating season.

WARNING

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

CAUTION

Cover the cutterbar and the knife guards to prevent injury from accidental contact.

1. Clean the header thoroughly.
2. Store the header in a dry, protected place, if possible. If storing the header outdoors, always cover the machine with a waterproof canvas or other protective material.

   NOTE:

   If storing the machine outdoors, remove the drapers and store them in a dark, dry place. If not removing the drapers, store the header with the cutterbar lowered so that water and snow will not accumulate on the drapers. The weight of water and snow accumulation puts significant stress on the drapers and header.
3. Lower the header onto blocks to keep the cutterbar off of the ground.
4. Lower the reel completely. If the header will be stored outdoors, tie the reel to the frame to prevent rotation caused by the wind.
5. Repaint all worn or chipped painted surfaces to prevent rust.
6. Loosen the drive belts.
7. Lubricate the header thoroughly, leaving excess grease on the fittings.
8. Apply grease to exposed threads, cylinder rods, and the sliding surfaces of components.
9. Lubricate the knife. Refer to the inside back cover for the recommended lubricants.
10. Check for broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at the beginning of next season.

11. Tighten any loose hardware. For torque specifications, refer to *8.1 Torque Specifications, page 343*.

5.2.5 Checking Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

DANGER

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

WARNING

- **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.**
- **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 5.1: Hydraulic Pressure Hazard

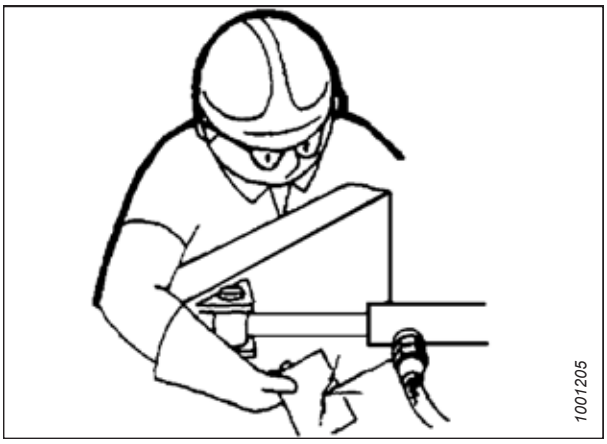


Figure 5.2: Testing for Hydraulic Leaks

1. Start the machine, and engage the header. While running, raise and lower the header and reel. Also extend and retract the reel. Run it for 10 minutes.
2. Shut down the engine, and remove the key from the ignition.
3. Once the machine has been sitting still for several hours, walk around it checking for hoses, lines, and fittings that are visibly leaking oil.

5.3 Lubrication

Grease zerk locations are marked on the machine by decals showing a grease gun and the greasing interval, which will be specified in terms of hours of header operation.

Refer to the inside back cover for information on the recommended lubricants.

Log the header's hours of operation. Use the maintenance record provided in this manual to keep track of what maintenance procedures have been performed on the header, and when. For more information, refer to *5.2.1 Maintenance Schedule/Record, page 184*.

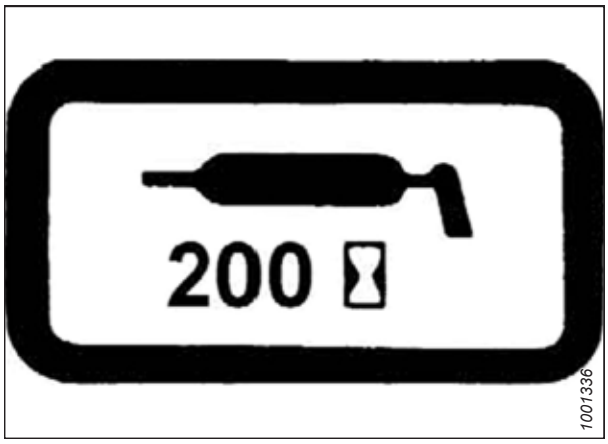


Figure 5.3: Grease Interval Decal

5.3.1 Lubrication Intervals

The lubrication intervals are specified in terms of hours of header operation. Maintaining accurate maintenance records is the best way to ensure these procedures are performed in a timely fashion.

Every 10 Hours

Daily maintenance is required to keep your machine operating at peak performance. It also allows you to do a visual inspection of the machine that may help identify issues early.

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

IMPORTANT:

When greasing, clear any debris and excess grease from around the bearing and bearing housing. Inspect the condition of the bearing and bearing housing. Grease the feed draper drive roller bearing until grease comes out of the seal. Wipe any excess grease from area after greasing.

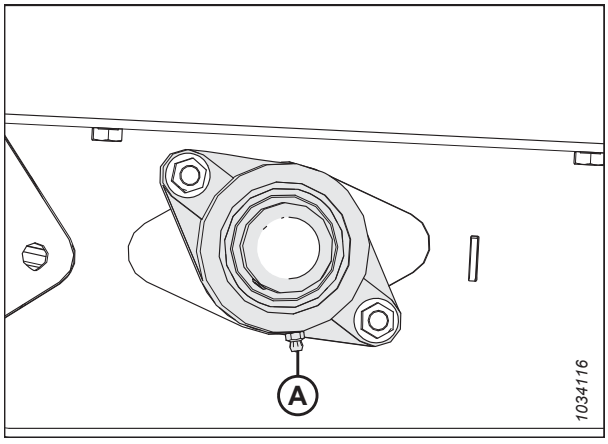


Figure 5.4: Feed Draper Drive Roller

IMPORTANT:

When greasing, clear any debris, and excess grease from around the bearing housing. Inspect the condition of the roller and bearing housing. Grease the feed draper idler roller bearing until grease comes out of the seal. Initial greasing on a new header may require additional grease (may require 5-10 pumps). Wipe any excess grease from area after greasing.

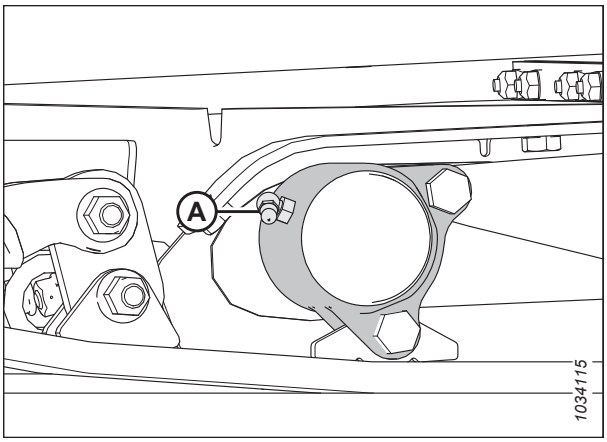


Figure 5.5: Feed Draper Idler Roller

Every 25 Hours

Regular maintenance is required to keep your machine operating at peak performance. It also allows you to do a visual inspection of the machine that may help identify issues early.

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

Lubricate knifehead (A) every 25 hours. Check for signs of excessive heating on the first few guards after greasing. If required, relieve the pressure by pressing the check-ball in the grease fitting.

IMPORTANT:

Overgreasing the knifehead puts pressure on the knife, causing it to rub against the guards, resulting in excessive wear from binding. Do **NOT** overgrease the knifehead. Apply only one to two pumps using a mechanical grease gun (do **NOT** use an electric grease gun). If more than six to eight pumps of the grease gun are required to fill the cavity, replace the seal in the knifehead. For instructions, refer to *5.5.3 Removing Knifehead Bearing, page 201*.

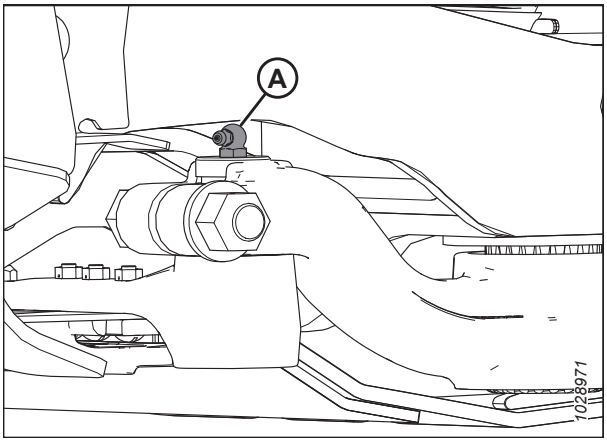


Figure 5.6: Knifehead

Every 50 Hours

Maintenance is required to keep your machine operating at peak performance. It also allows you to do a visual inspection of the machine that may help identify issues early.

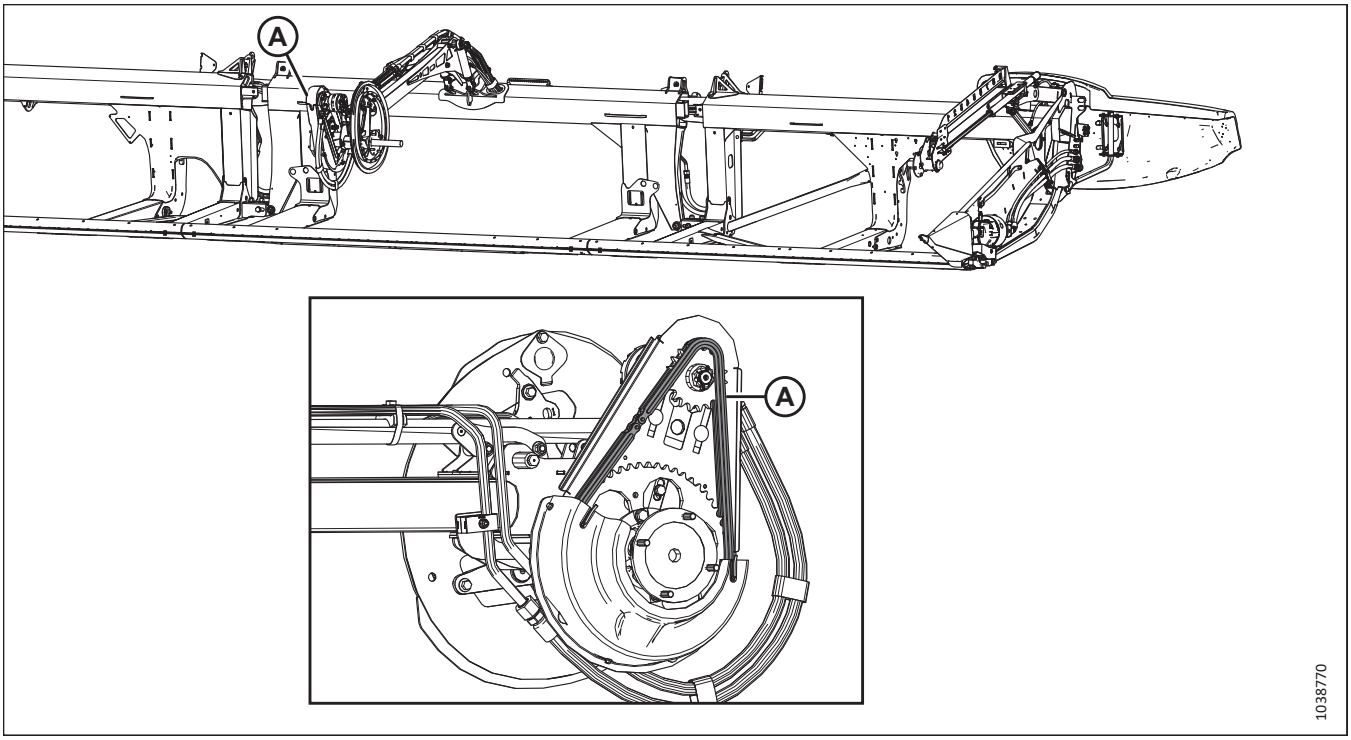


Figure 5.7: Reel

A - Reel Drive Chain. To lubricate, refer to *5.3.3 Lubricating Reel Drive Chain, page 196*.

IMPORTANT:

Use chain oil that has a viscosity of 100–150 cSt at 40°C (typically medium to heavy chain oil) or mineral oil Sae 20W50 that has no detergents or solvents.

NOTE:

If chain is dry at next oiling interval, decrease the oiling interval.

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

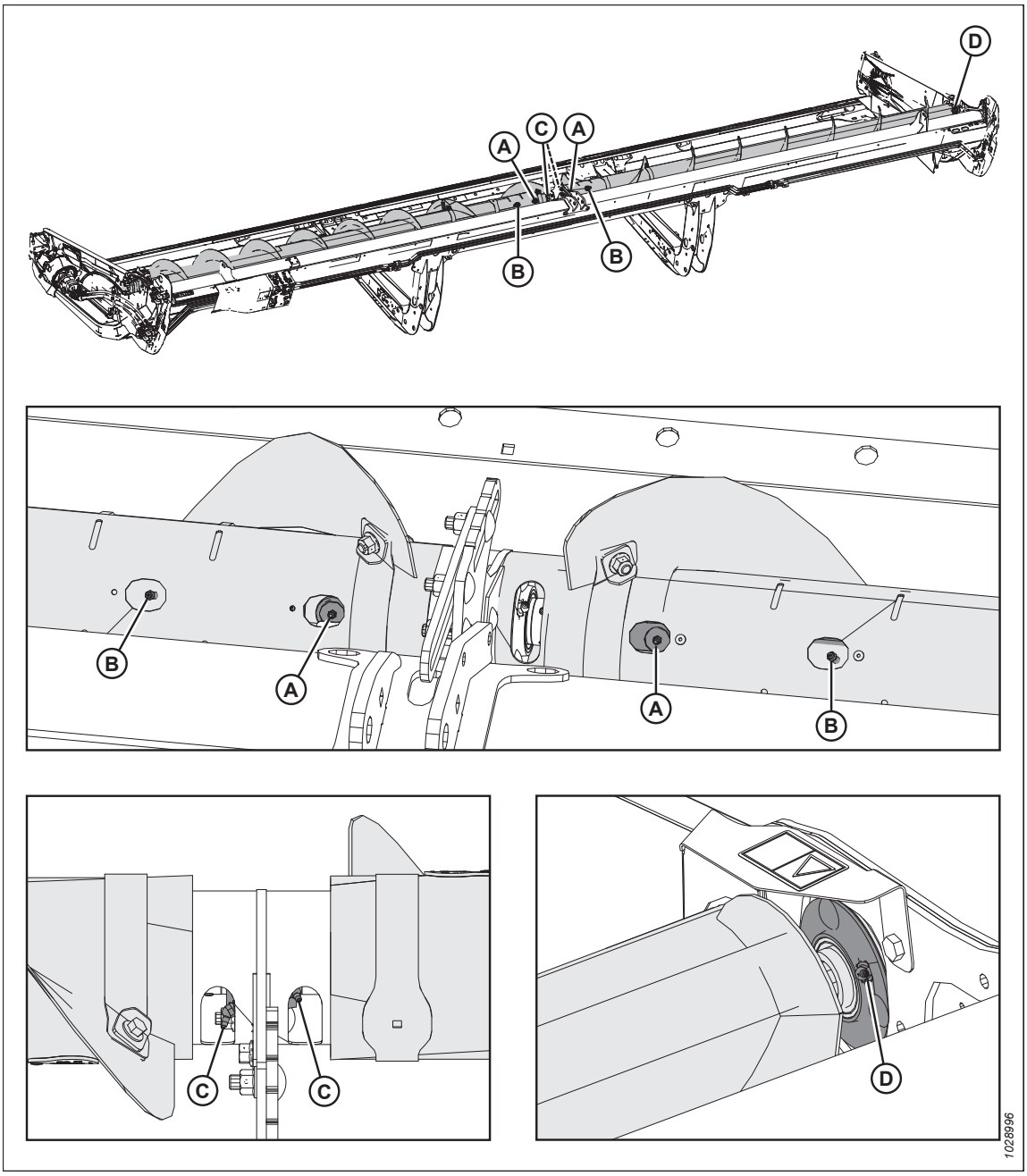


Figure 5.8: Two-Piece Upper Cross Auger

A - Upper Cross Auger U-joints (Two Places)
B - Upper Cross Auger Sliding Hubs (Two Places)
C - Upper Cross Auger Center Bearings (Two Places)
D - Right End Bearing

IMPORTANT:

The Upper Cross Auger must be greased regularly even when turned off as components of the UCA move when the header flexes, regardless of whether the auger is turning or not.

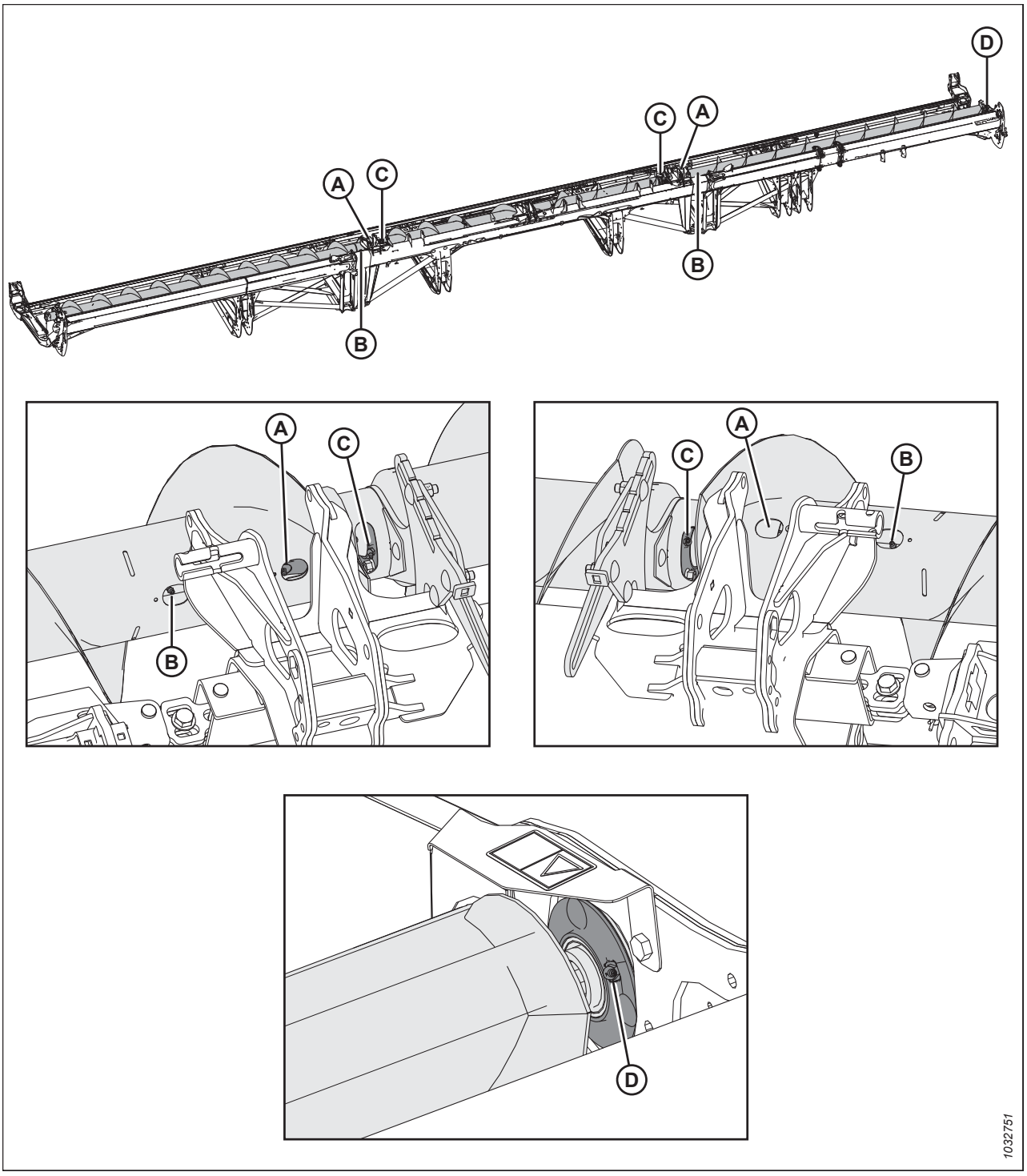


Figure 5.9: Three-Piece Upper Cross Auger

A - Upper Cross Auger U-joints (Two Places)
B - Upper Cross Auger Sliding Hubs (Two Places)
C - Upper Cross Auger Center Bearings (Two Places)
D - Right End Bearing

IMPORTANT:

The Upper Cross Auger must be greased regularly even when turned off as components of the UCA move when the header flexes, regardless of whether the auger is turning or not.

Every 100 Hours

Maintenance is required to keep your machine operating at peak performance. It also allows you to do a visual inspection of the machine that may help identify issues early.

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

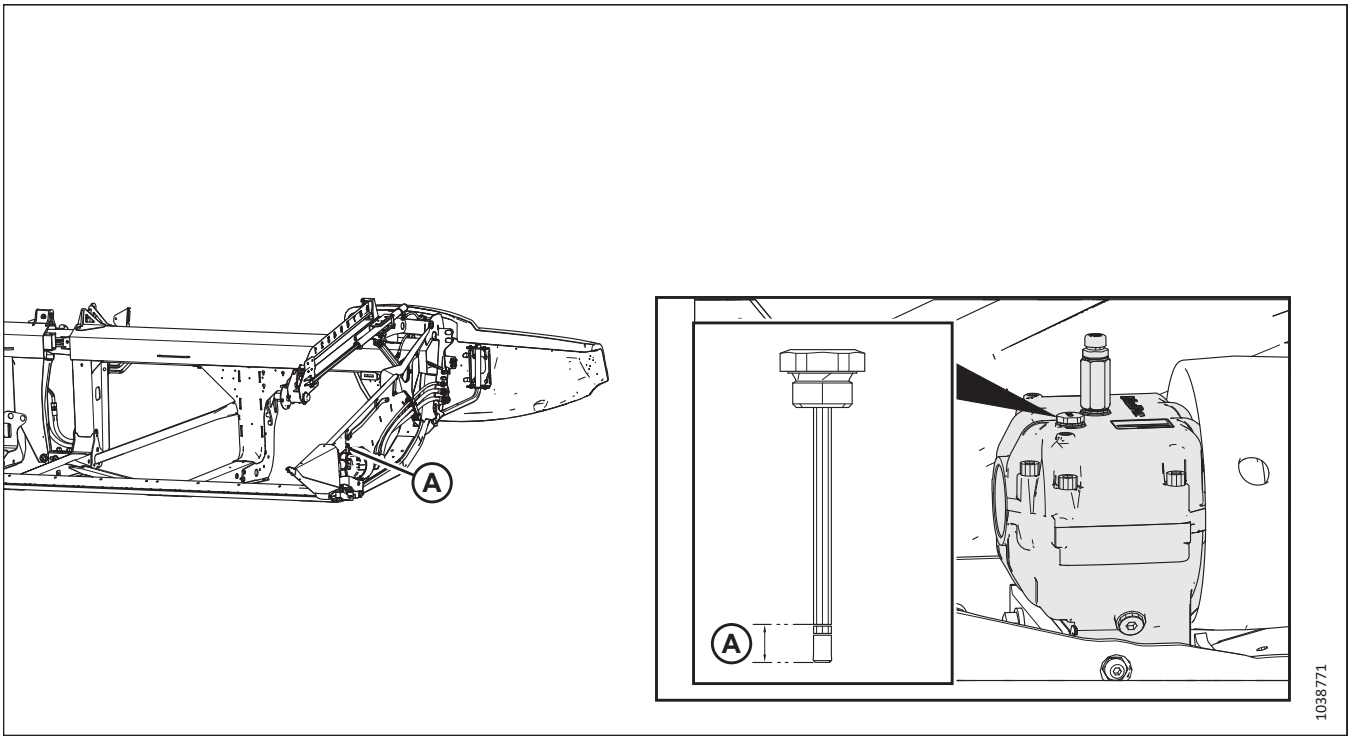


Figure 5.10: Knife Drive Box

B - Knife Drive Box Oil Level. To lubricate, refer to *Checking Oil Level in Knife Drive Box , page 236*.

Every 250 Hours

Maintenance is required to keep your machine operating at peak performance. It also allows you to do a visual inspection of the machine that may help identify issues early.

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

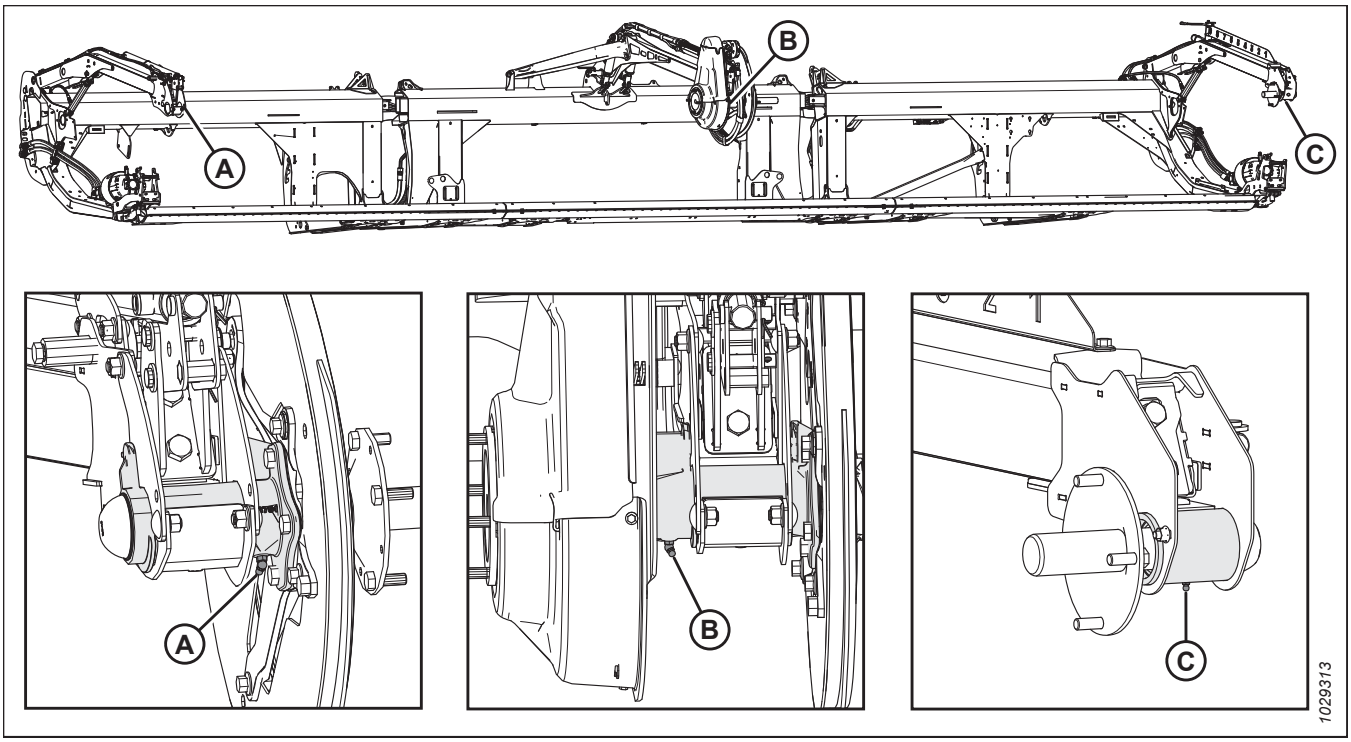


Figure 5.11: Reel

A - Reel Right Bearing (One Place) **B - Reel Center Bearing (One Place)** **C - Reel Left Bearing (One Place)**

Every 500 Hours

Maintenance is required to keep your machine operating at peak performance. It also allows you to do a visual inspection of the machine that may help identify issues early.

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

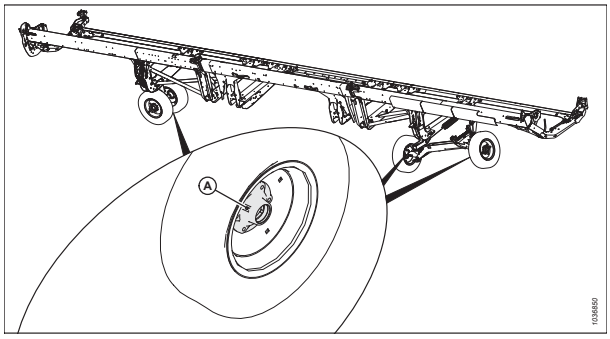


Figure 5.12: Every 500 Hours

A - Wheel Bearings (Four Places)

5.3.2 Greasing Procedure

Greasing points are identified on the machine by decals showing a grease gun and grease interval in hours of operation. Grease point layout decals are located on the header.

DANGER

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

Refer to inside back cover for recommended lubricants.

Log hours of operation and use the Maintenance Record provided to keep a record of scheduled maintenance. Refer to *5.2.1 Maintenance Schedule/Record, page 184*.

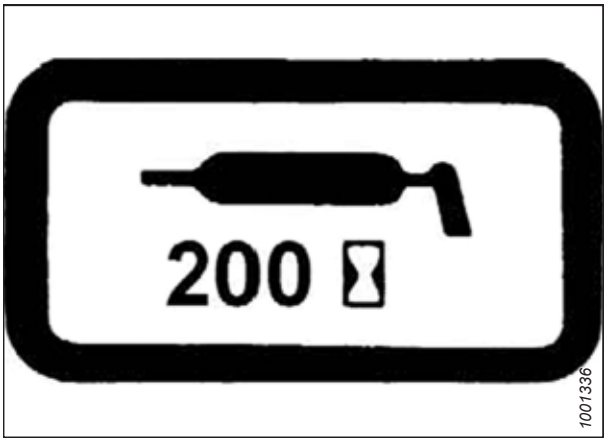


Figure 5.13: Greasing Interval Decal

1. Wipe the grease fitting with a clean cloth before greasing to avoid injecting it with dirt and grit.

   IMPORTANT:

   Use clean, high-temperature, extreme-pressure grease only.

2. Inject the grease through the fitting with a grease gun until grease overflows the fitting (except where noted).
3. Leave the excess grease on the fitting to keep the dirt out.
4. Replace any loose or broken grease fittings immediately.
5. Remove and thoroughly clean any fitting that will not take grease. Also clean the lubricant passageway. Replace the fitting if necessary.

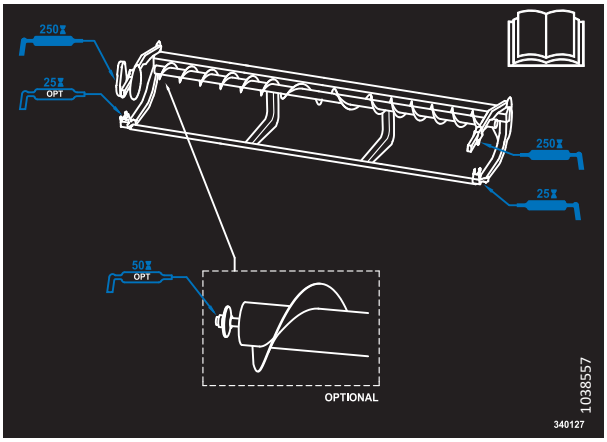


Figure 5.14: Grease Point Decal for Single-Knife Header with One-Piece Upper Cross Auger

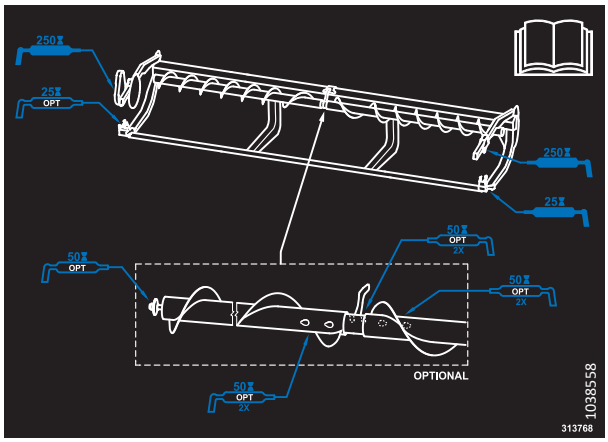


Figure 5.15: Decal for Single-Knife Header with Two-Piece Upper Cross Auger

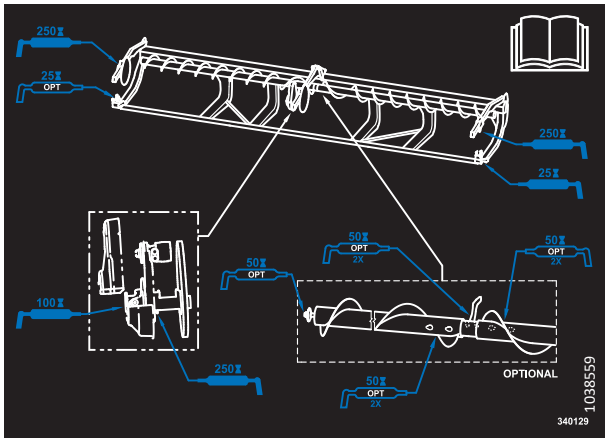


Figure 5.16: Decal for Double-Knife Header with Two-Piece Upper Cross Auger

5.3.3 Lubricating Reel Drive Chain

Lubrication protects the chain and drive sprockets against wear.

DANGER

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

WARNING

Be sure all bystanders are clear of the machine before starting the engine or engaging any header drives.

IMPORTANT:

Do **NOT** use grease or motor oils to lubricate reel drive chain.

1. Remove the reel drive cover. For instructions, refer to *Removing Reel Drive Cover, page 50*.

IMPORTANT:

Use a chain oil with a viscosity of 100–150 cSt at 40°C (104°F) (typically medium to heavy chain oil) or a mineral oil (SAE 20W50) that has no detergents or solvents.

2. Apply a liberal amount of chain oil with an oil can, brush, or aerosol to the inside of chain (A) while manually rotating reel to cover all of the chain.

3. Reinstall the reel drive cover. For instructions, refer to *Installing Reel Drive Cover, page 52*.

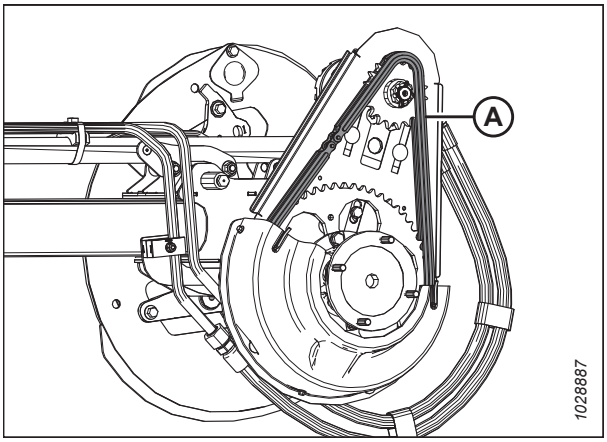


Figure 5.17: Drive Chain – Double-Reel Drive Shown

DANGER

Ensure that all bystanders have cleared the area.

4. Start the engine. For instructions, refer to the windrower operator's manual.

5. Run the header and reel for a few minutes so the oil will spread into the chain.

5.4 Electrical System

The electrical system for the header is powered by the windrower. The header has various lights and sensors that require power.

5.4.1 Replacing Light Bulbs

Lights are an important safety feature. Replace damaged or malfunctioning bulbs or lamps immediately.

DANGER

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

Use bulb trade #1156 for amber transport lights and #1157 for the red tail light (Slow Speed Transport option).

Clearance Lights (North America Only)

1. Use a Phillips screwdriver to remove the three screws (A) from the fixture, and remove the plastic lens. Retain screws (A).
2. Replace the bulb, and reinstall the plastic lens and screws.

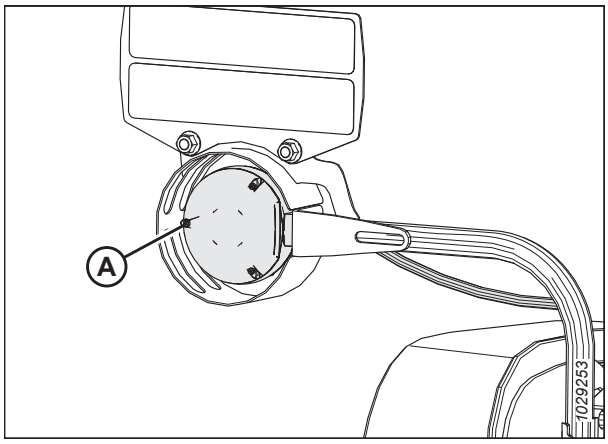


Figure 5.18: Left Clearance Light

Slow Speed Transport Lights

3. Use a Phillips screwdriver to remove screws (A) from the fixture, and remove the plastic lens. Retain screws (A).
4. Replace the bulb, and reinstall the plastic lens and screws.

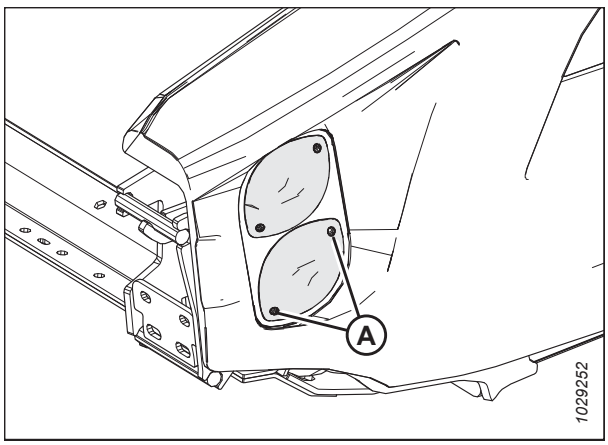


Figure 5.19: Optional Slow Speed Transport – Red and Amber Lights

5.5 Knife

The knives on the cutterbar cut the crop. The knives, guards, and knifehead will require maintenance from time to time.

WARNING

Keep hands clear of the area between guards and knife at all times.

WARNING

Wear heavy gloves when working around or handling knives.

CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to *5.1 Preparing Machine for Servicing, page 183*.

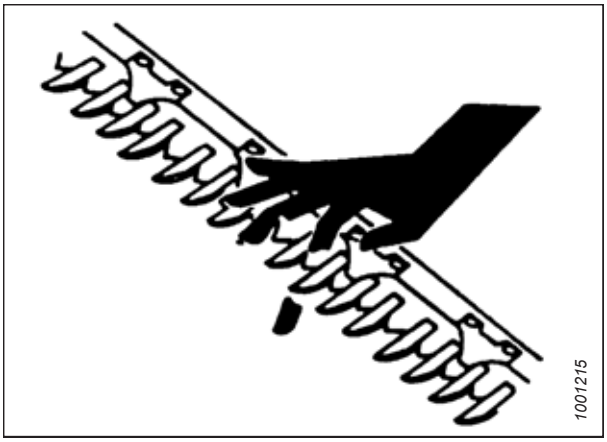


Figure 5.20: Cutterbar Hazard

5.5.1 Replacing Knife Section

Individual worn or damaged sections on a knife, can be replaced without removing the knife from the cutterbar.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
3. Shut down the engine, and remove the key from the ignition.

4. Identify the worn or broken knife section. If a hold-down is present, Loosen nuts (A) that hold hold-down (B) to access the knife section that is being replaced.

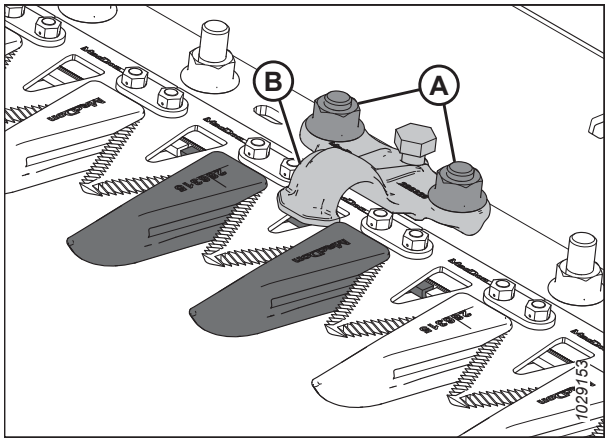


Figure 5.21: Cutterbar

5. Remove bolts and nuts (B). Retain hardware.

   NOTE:

   Stroke the knife as required to access the hardware.

6. For sections near the drive end, remove bars (C) and lift knife section (A) off the knife back bar.

7. Clean dirt off the knife back bar, and position the new knife section onto the knife back bar.

   NOTE:

   Cut quality may be affected if fine and coarsely serrated knife sections are used on the same knife.

8. For sections near the drive end, reposition bars (C).

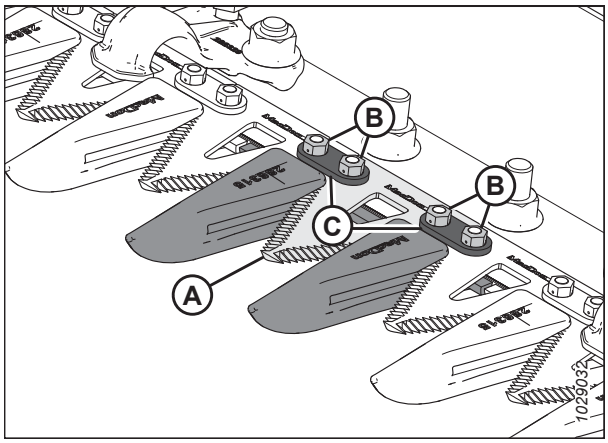


Figure 5.22: Cutterbar

9. If a hold-down was removed earlier, install it along with bolts and nuts (B).

   NOTE:

   Ensure bolt heads fully engage into oblong holes on the knife back bar.

10. Torque nuts (B) to 12 Nm (106 lbf·in).

11. To check hold-down adjustment, refer to *Checking Hold-Down – Pointed Knife Guards, page 215* or *Checking Hold-Down – Short Knife Guards, page 228*.

5.5.2 Removing Knife

If knife is damaged, it will need to be removed and replaced.

DANGER

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

WARNING

Stand to the rear of the knife during removal to reduce the risk of injury from cutting edges. Wear heavy gloves when handling the knife.

NOTE:

On single-knife headers, the knifehead is located on the left side of the knife. On double-knife headers, there are two knifeheads located on the right and left sides of the knife. Verify which knife needs to be removed before beginning.

1. Shut down the engine, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
3. Manually move the knife to the middle of its stroke range by rotating the flywheel attached to the knife drive box.
4. Clean the area around the knifehead.
5. Remove grease fitting (A) from the pin.

   NOTE:

   Removing the grease fitting will make it easier to reinstall the knifehead pin later.
6. Remove bolt and nut (B).
7. Use a screwdriver or chisel in slot (C) to release the load on the knifehead pin.
8. Use a screwdriver or chisel to pry the knifehead pin upwards in the pin groove until the knifehead pin is clear of the knifehead.

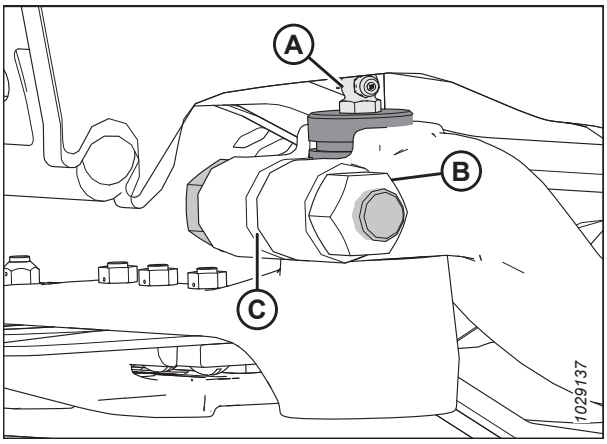


Figure 5.23: Knifehead

9. Push knife assembly (A) inboard until it is clear of drive arm (B).

   NOTE:

   Frame and endshield parts have been removed from the illustration to reveal the knifehead components.
10. Unless it is being replaced, seal knifehead bearing (C) with plastic or tape to keep out dirt and debris.
11. Pull knife drive arm (B) to the outside position to give clearance for the knife.
12. Remove knife (A).

    NOTE:

    If the knifehead, or knifehead bearing is being removed, pull the knife out far enough to access these parts.

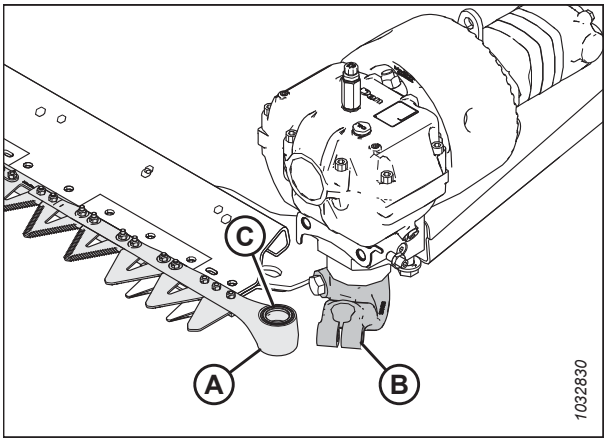


Figure 5.24: Left Knifehead

5.5.3 Removing Knifehead Bearing

The knifehead bearing allows the knifehead pin to rotate within the knifehead as the drive arm strokes the knife back and forth. If the bearing is worn or damaged, it will need to be replaced.

DANGER

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

WARNING

Stand to the rear of the knife during removal to reduce the risk of injury from cutting edges. Wear heavy gloves when handling the knife.

1. Start the engine.
2. Lower the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Remove the knife. For instructions, refer to *5.5.2 Removing Knife, page 200*.

   NOTE:

   Because the bearing is being replaced, it is not necessary to wrap the knifehead to protect the bearing.

5. Use a flat-ended tool with the same diameter as pin (A). Tap seal (B), bearing (C), plug (D), and O-ring (E) from the underside of the knifehead.

   NOTE:

   Seal (B) can be replaced without removing the bearing. When changing the seal, check the pin and needle bearing for wear, and replace if necessary.

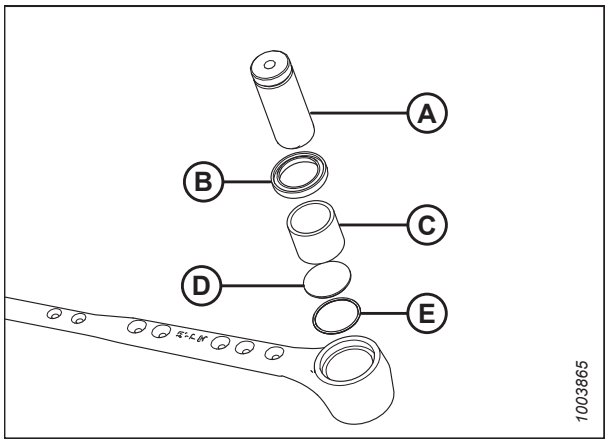


Figure 5.25: Knifehead Bearing Assembly

5.5.4 Installing Knifehead Bearing

The knifehead bearing allows the knifehead pin to rotate within the knifehead as the drive arm strokes the knife back and forth. Once the old bearing has been removed from the knifehead, a new one can be installed.

WARNING

Stand to the rear of the knife during removal to reduce the risk of injury from cutting edges. Wear heavy gloves when handling the knife.

1. Place O-ring (E) and plug (D) into the knifehead.
2. Use a flat-ended tool (A) with the same approximate diameter as bearing (C), and push the bearing into the knifehead until the top of the bearing is flush with the step in the knifehead.

   IMPORTANT:

   Install the bearing with the stamped end (the end with the identification markings) facing up.

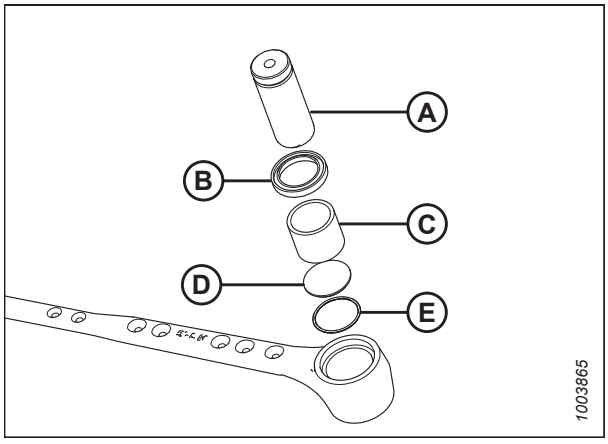


Figure 5.26: Knifehead Bearing Assembly

3. Install seal (B) into the knifehead with the lip facing outwards.

   IMPORTANT:

   To prevent premature knifehead or knife drive box failure, ensure there is a tight fit between the knifehead pin and the needle bearing and between the knifehead pin and the output arm.

5.5.5 Installing Knife

If the knife is damaged, it will need to be removed and replaced.

DANGER

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

WARNING

Stand to the rear of the knife during removal to reduce the risk of injury from cutting edges. Wear heavy gloves when handling the knife.

1. Shut down the engine, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
3. Grease the knifehead bearing.
4. Install knife assembly (A).

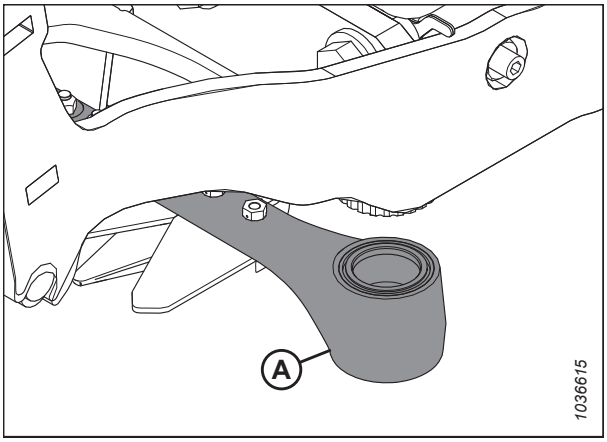


Figure 5.27: Knife Head

5. Install knifehead pin (A) through the drive arm and into the knifehead.
6. Position knifehead pin (A) so that groove (B) is 2 mm (0.08 in.) above the drive arm.

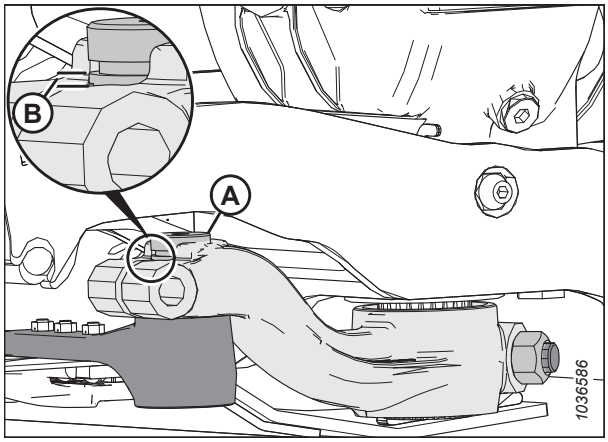


Figure 5.28: Knifehead

7. Secure the knifehead pin with M16 x 85 mm bolt (A) and nut (B). Install the bolt from the inboard side of the arm. Torque the bolt to 220 Nm (162 lbf·ft).
8. Rotate the flywheel attached to the knife drive box to manually stroke knife arm (A) to the inside limit of travel. Ensure that there is still 0.2–1.2 mm (0.02–0.05 in.) of clearance (C) between the drive arm and the knifehead.
9. If no adjustment is required, proceed to Step *10, page 204*. If the drive arm requires adjustment, contact the Dealer.

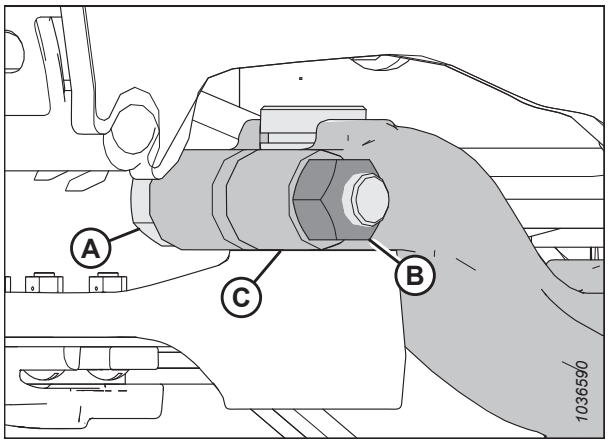


Figure 5.29: Knifehead

10. Reinstall grease fitting (A). Apply grease to the fitting until the knifehead has a slight downward movement.

    IMPORTANT:

    Do **NOT** overgrease the knifehead. Overgreasing the knifehead can result in knife misalignment, which excessive heating of the guards and strains the knife drive motor. If overgreasing occurs, remove the grease fitting to release the pressure.

    NOTE:

    If air is trapped in the bearing cavity, the knifehead will begin to move down before it has filled with grease.

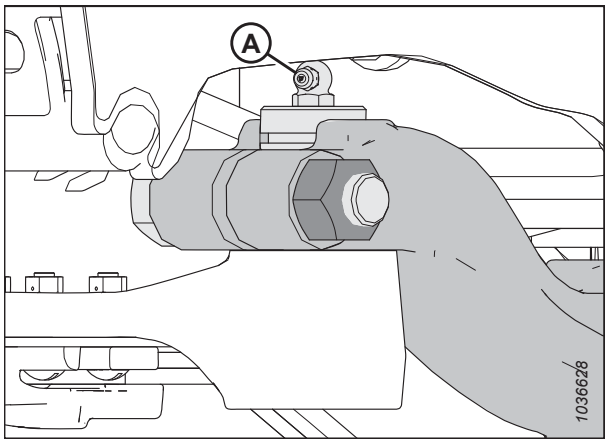


Figure 5.30: Knifehead

11. Move the knife drive arm to the mid-stroke position. Ensure that the knife's back bar doesn't contact the front of first guard (A).

12. If the knife's back bar contacts the front of the first guard, remove bolts (B), move the guard forward, and reinstall the bolts. Torque the bolts to 85 Nm (63 lbf·ft). If the necessary clearance (zero contact between the back bar and the front of the first guard) cannot be achieved, install additional shims between the knife drive box and the mounting plate. Contact the Dealer for more information.

13. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.

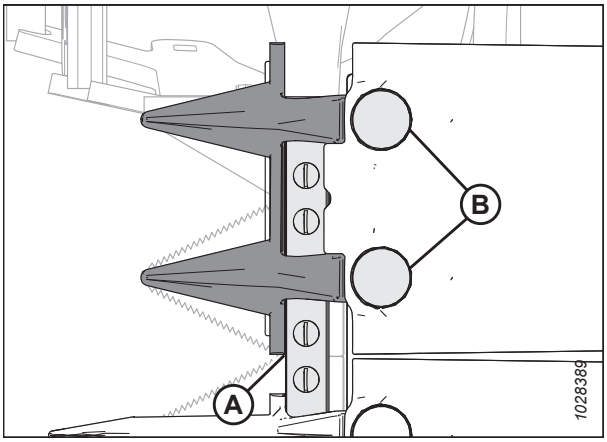


Figure 5.31: First Knife Guard – View from below Knife

5.5.6 Spare Knives

Two spare knives (A) can be stored in the header backtube at the right end. Ensure the spare knives are secured in place with latch (B) and hairpin (C).

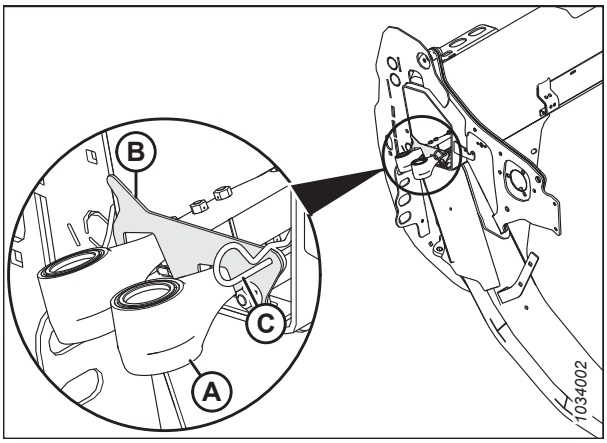


Figure 5.32: Spare Knives

5.5.7 Pointed Knife Guards and Hold-Downs

Knife guards assist with aligning the knife bar. Hold-downs hold the sections on the knife bar down against the knife guards to ensure proper cutting.

The following knife guards and hold-downs are used in pointed guard configurations:

NOTE:

Pointed knife guard configurations require two short knife guards, one at each end of the cutterbar.

NOTE:

A Four-Point Guard kit can be used to replace knife guards. Four point guards are ideal for use in rocky conditions or for harvesting shatter-prone crops such as lentils. Refer to the header parts catalog for more information.

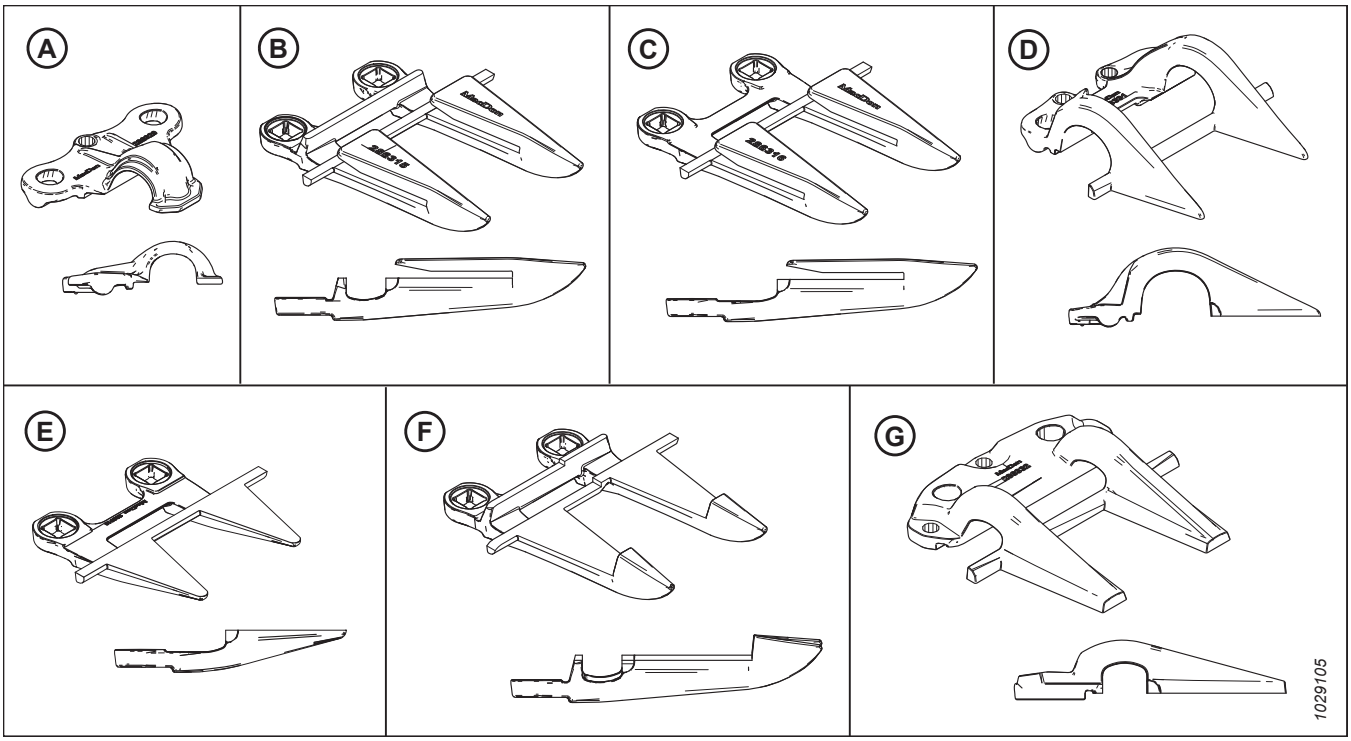


Figure 5.33: Guard and Hold-Down Types Used in Pointed Knife Guard Configurations

A - Pointed Hold-Down (MD #286329)
B - Pointed Knife Guard (MD #286315)
C - Pointed-End Knife Guard (without Wear Bar) (MD #286316)[77]
D - PlugFree™ End Hold-Down (MD #286331)
E - PlugFree™ End Knife Guard (without Wear Bar) (MD #286319)[78]
F - Pointed Center Knife Guard (MD #286317)[79]
G - Pointed Center Hold-Down (MD #286332)[79]

Guards are configured differently on different headers. When replacing pointed guards and hold-downs, ensure you use the correct replacement sequence for your header. Refer to the relevant topic:

- *Pointed Knife Guard Configuration on Single-Knife Headers, page 207*
- *Pointed Knife Guard Configuration on Double-Knife Header – D235, page 209*
- *Pointed Knife Guard Configuration on Double-Knife Header – D241, page 210*
-

77. Installed in positions 2, 3, and 4 on the drive side(s). Refer to *Replacing Pointed Knife Guards, page 213*.
78. Installed in position 1 on the drive side(s). Single-knife headers use standard guard (MD #286318) on the right end.
79. Double-knife headers only.

Pointed Knife Guard Configuration on Single-Knife Headers

Guards are configured differently on different sized headers. The illustration provided here shows pointed knife guards installed on single-knife headers

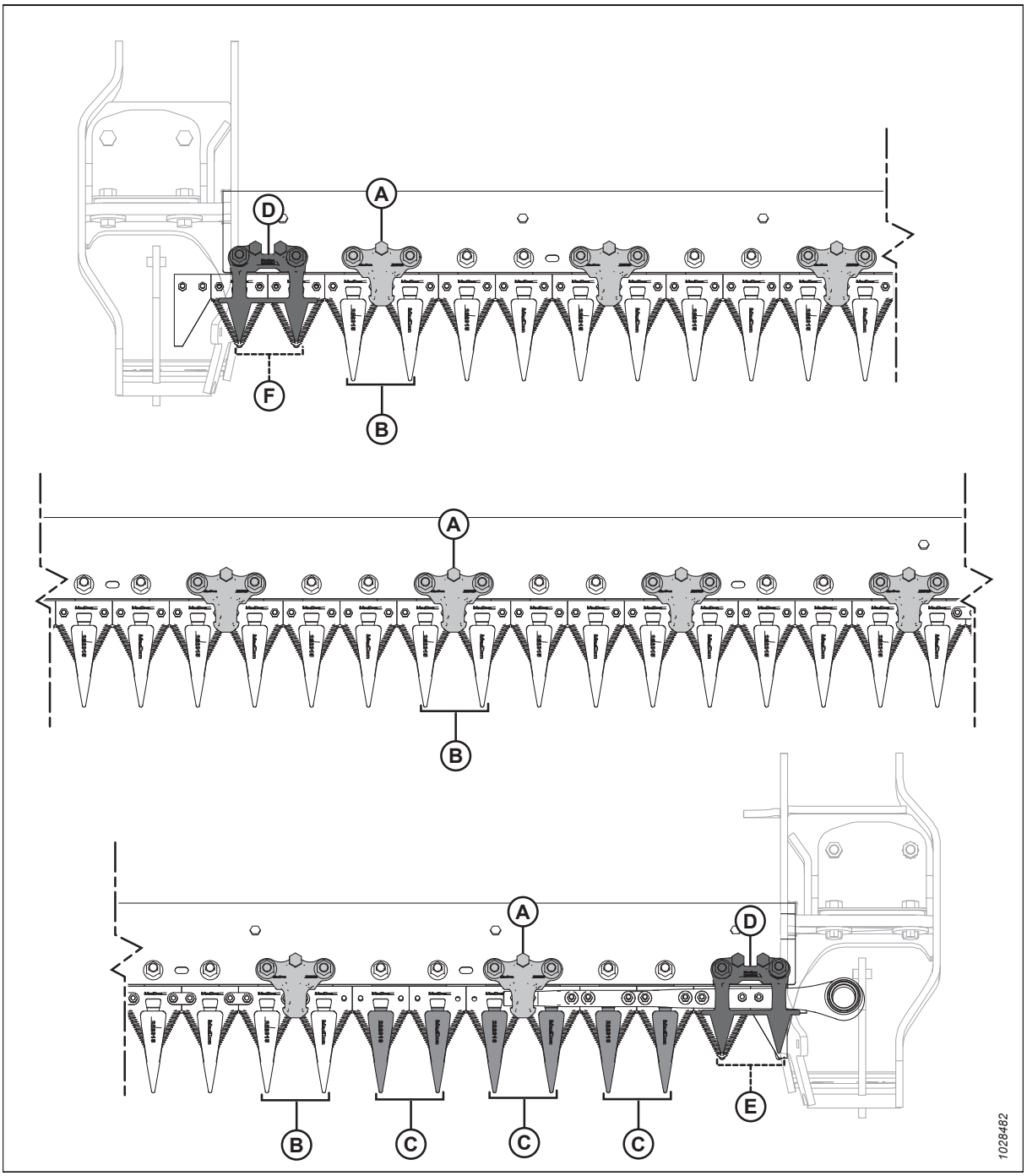


Figure 5.34: Pointed Knife Guard and Hold-Down Locations – Single-Knife Headers

A - Pointed Hold-Down (MD #286329)
B - Pointed Knife Guard (MD #286315)
C - Pointed End Knife Guard (without Wear Bar) (MD #286316)
D - PlugFree™ Hold-Down (MD #286331)
E - PlugFree™ Guard (without Wear Bar) (MD #286319)
F - Short Knife Guard (MD #286318)

Pointed Knife Guard Configuration on Double-Knife Header – D215–D235

Guards are configured differently on different headers. The illustration provided here shows pointed knife guards installed on double-knife headers.

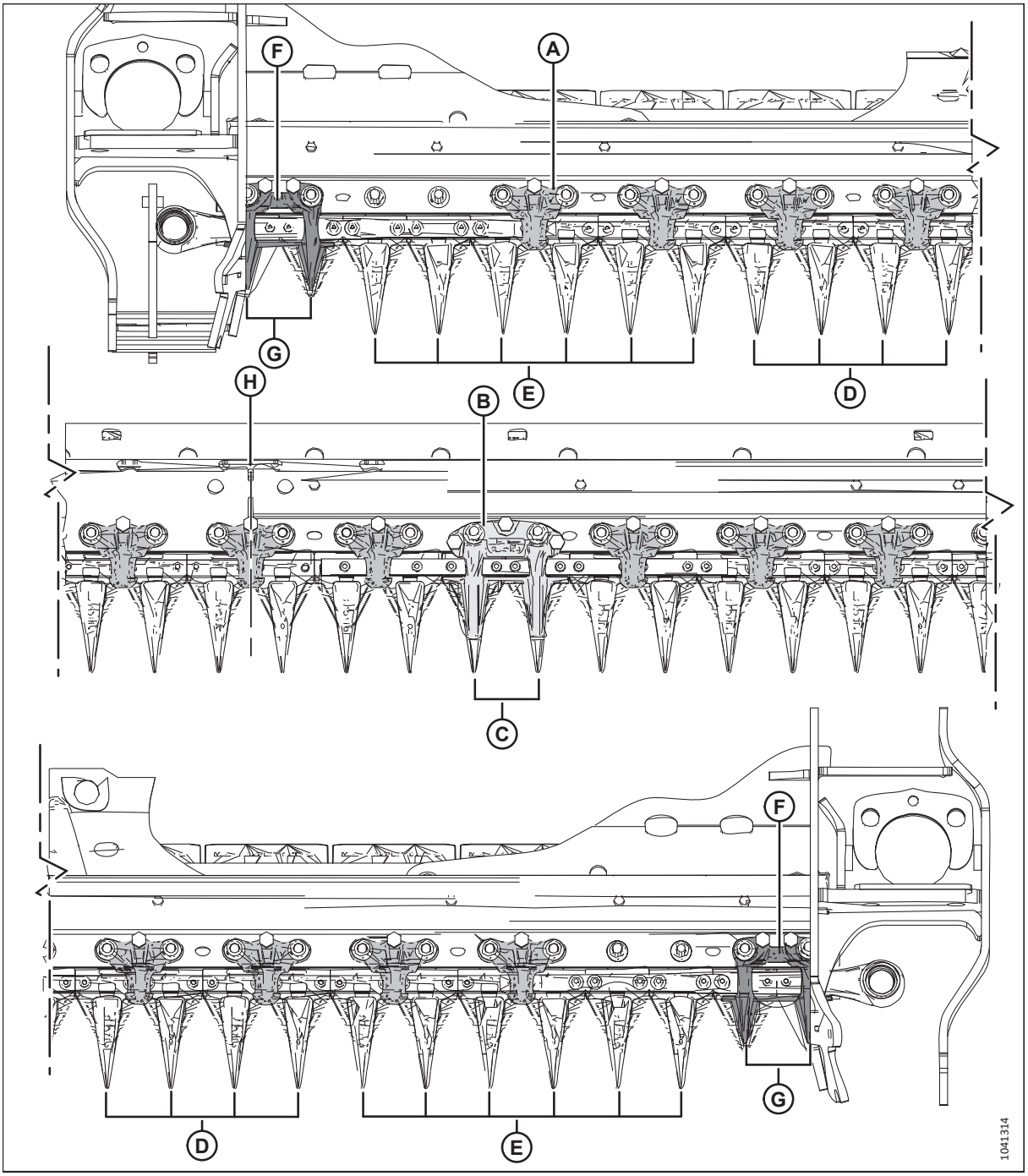


Figure 5.35: Pointed Guard and Hold-Down Locations

A - Pointed Hold-Down (MD #286329)
B - Pointed Center Hold-Down (MD #286332)
C - Pointed Center Knife Guard (MD #286317)
D - Pointed Knife Guard (MD #286315)
E - Pointed End Knife Guard (without Wear Bar) (MD #286316)
F - PlugFree™ Hold-Down (MD #286331)
G - PlugFree™ Guard (without Wear Bar) (MD #286319)
H - Center of Header

Pointed Knife Guard Configuration on Double-Knife Header – D235

Guards are configured differently on different headers. The illustration provided here shows pointed knife guards installed on double-knife headers.

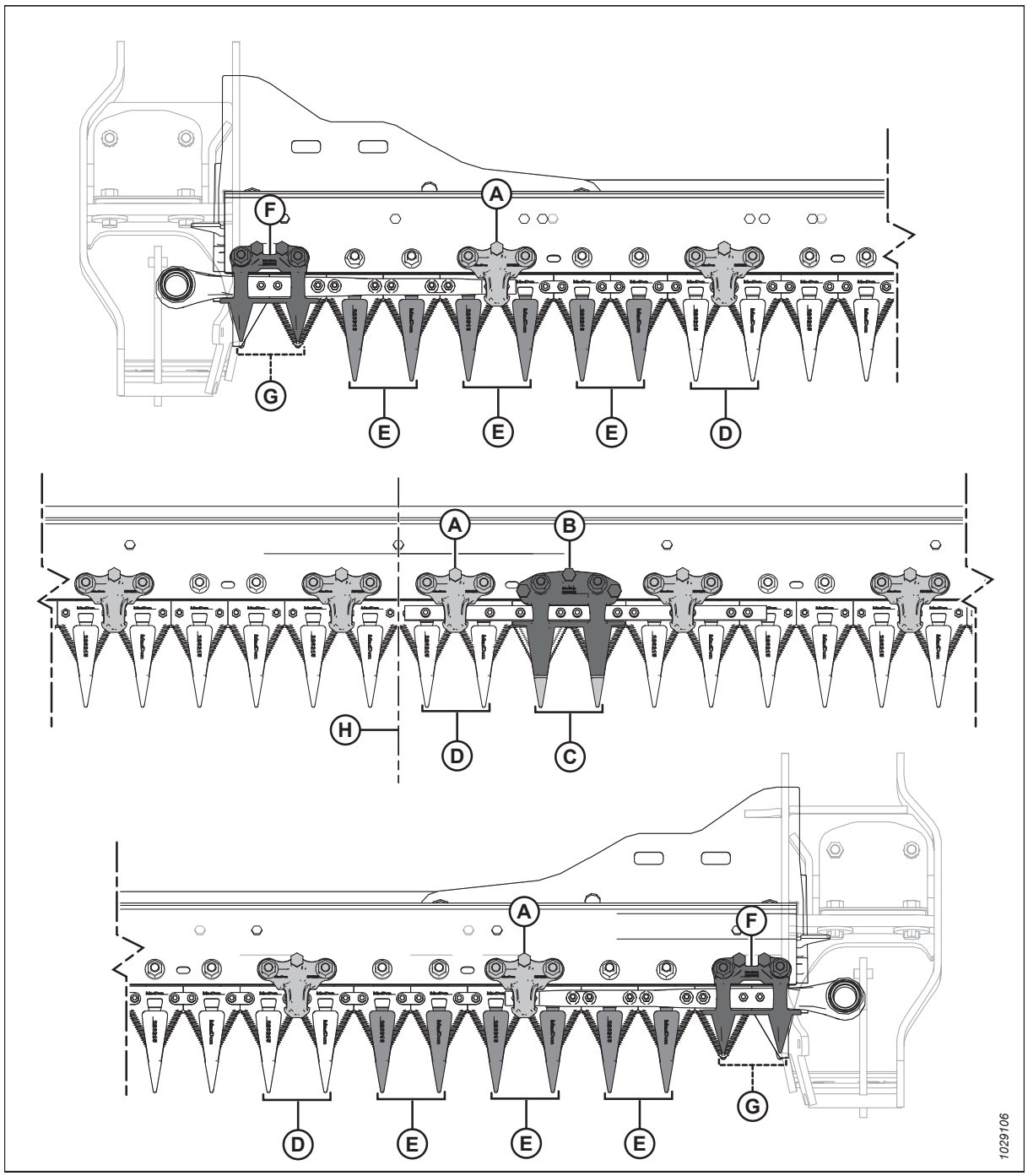


Figure 5.36: Pointed Guard and Hold-Down Locations

A - Pointed Hold-Down (MD #286329)[80]
B - Pointed Center Hold-Down (MD #286332)
C - Pointed Center Knife Guard (MD #286317)
D - Pointed Knife Guard (MD #286315)
E - Pointed End Knife Guard (without Wear Bar) (MD #286316)
F - PlugFree™ Hold-Down (MD #286331)
G - PlugFree™ Guard (without Wear Bar) (MD #286319)
H - Center of Header

80. There should always be a hold-down on the guard to the right of the center guard, regardless of the configuration.

Pointed Knife Guard Configuration on Double-Knife Header – D241

Guards are configured differently on different sized headers. The illustration provided here shows pointed knife guards installed on double-knife headers.

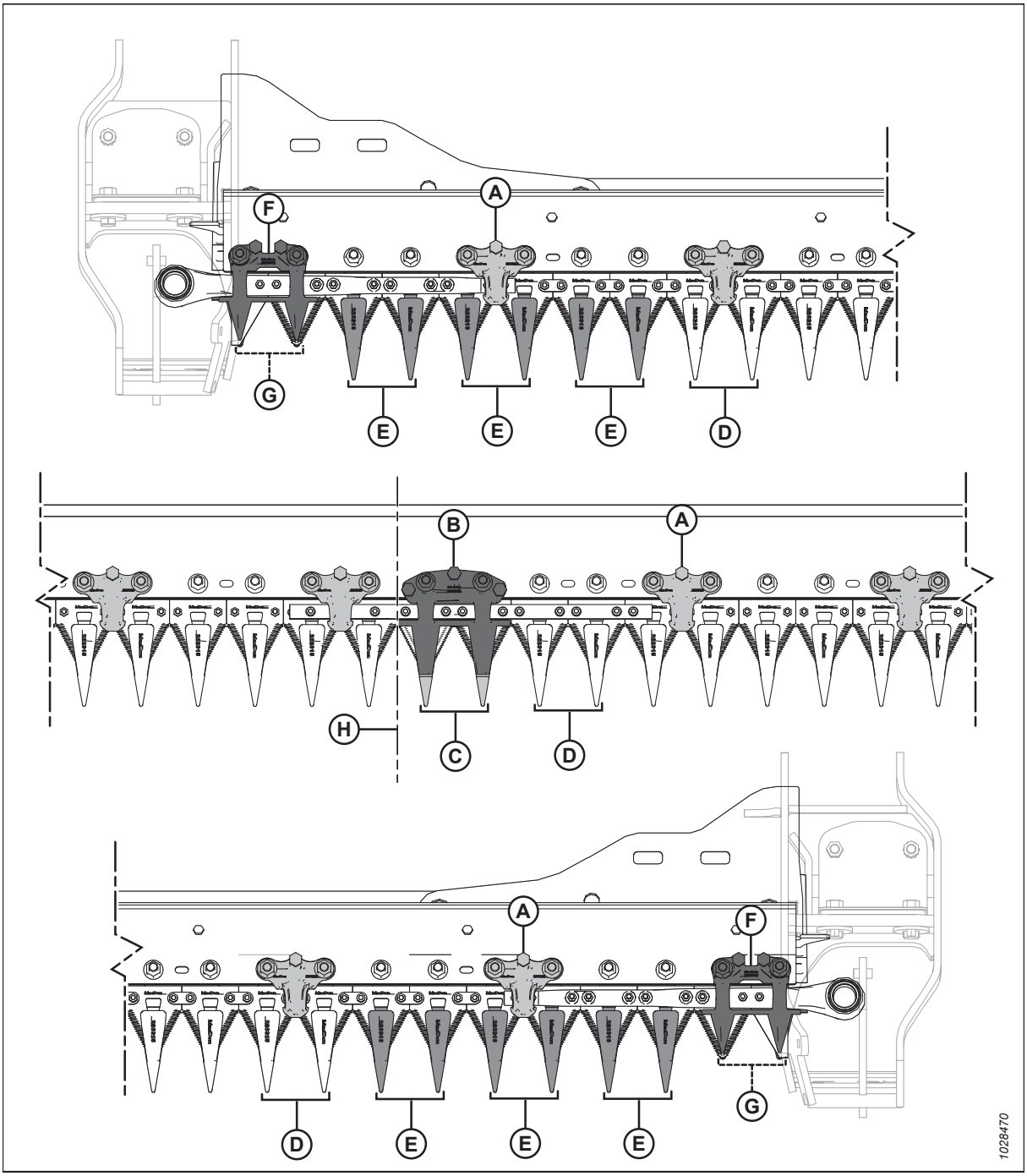


Figure 5.37: Pointed Knife Guard and Hold-Down Locations

A - Pointed Hold-Down (MD #286329)[81]
B - Pointed Center Hold-Down (MD #286332)
C - Pointed Center Knife Guard (MD #286317)
D - Pointed Knife Guard (MD #286315)
E - Pointed End Knife Guard (without Wear Bar) (MD #286316)
F - PlugFree™ Hold-Down (MD #286331)
G - PlugFree™ Guard (without Wear Bar) (MD #286319)
H - Center of Header

81. There should always be a hold-down on the guard to the right of the center guard, regardless of the configuration.

Adjusting Knife Guards and Guard Bar

If a knife guard or the guard bar is misaligned due to contact with a rock or similar obstruction, use the guard straightening tool (MD #286705) available from your MacDon Dealer to correct the issue.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. To adjust the guard tips upwards, position the tool as shown and pull up.

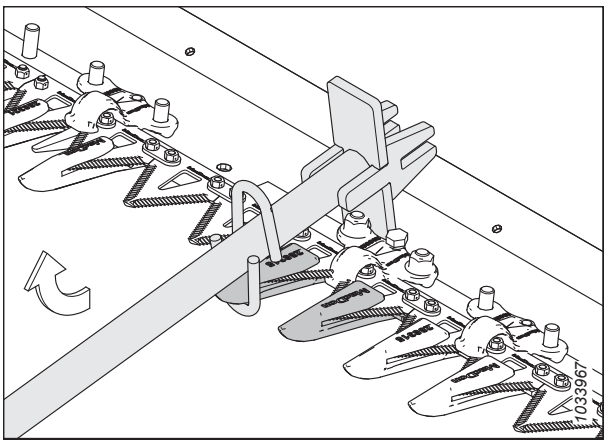


Figure 5.38: Upward Adjustment – Pointed Guard

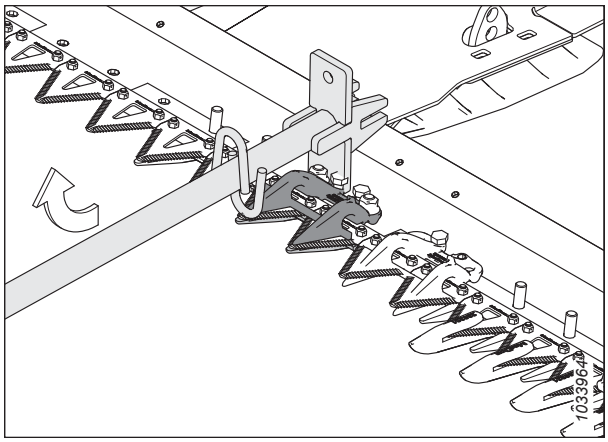


Figure 5.39: Upward Adjustment – Short Knife Guard

6. To adjust the guard tips downwards, position the tool as shown and push down.

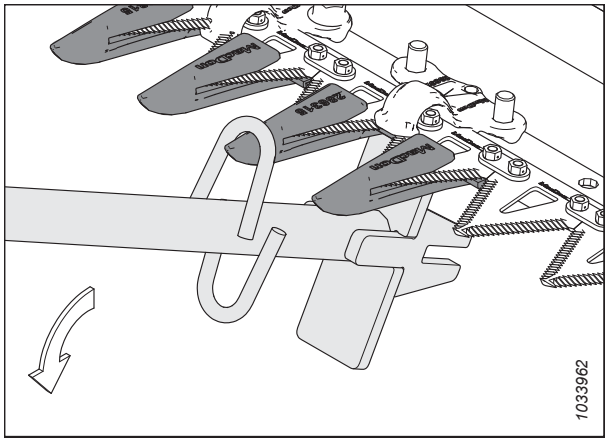


Figure 5.40: Downward Adjustment – Pointed Guard

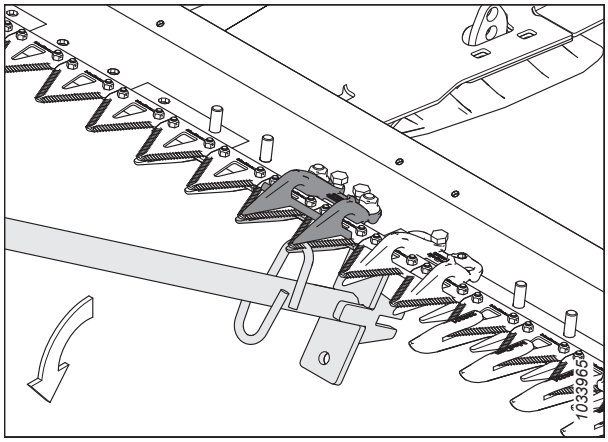


Figure 5.41: Downward Adjustment – Short Knife Guard

7. To adjust the guard bar, position the tool as shown, then push down or pull up on the tool accordingly.

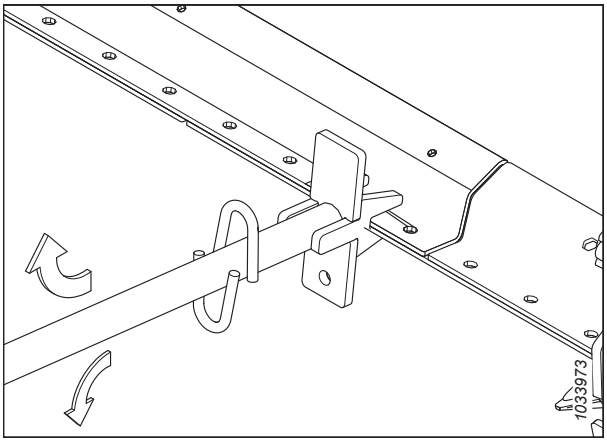


Figure 5.42: Guard Bar Adjustment – No Guards

Replacing Pointed Knife Guards

Guards become dull and need to be replaced. This procedure is for replacing standard guards and the special (drive side) guards closest to the knife drive motor.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

IMPORTANT:

When replacing pointed knife guards, ensure the hold-down sequence is correct for your header type and width. For more information, refer to *5.5.7 Pointed Knife Guards and Hold-Downs, page 205*.

NOTE:

A Four-Point Guard kit can be used to replace knife guards. The four-point guard is ideal for use in rocky conditions, or for harvesting shatter-prone crops such as lentils. Refer to the header parts catalog for more information.

IMPORTANT:

Single- and double-knife headers: On both ends of the header, position 1 (outboard guard) is a short knife guard. On the drive side(s) of the header, positions 2, 3, and 4 are pointed end knife guards (without wear bars). Starting at position 5, the remaining guards are pointed knife guards. Ensure that the proper replacement guards are installed at these locations.

IMPORTANT:

Double-knife headers: A pointed center knife guard is installed where the two knives overlap. The pointed center knife guard has a slightly different replacement procedure. For instructions, refer to *Replacing Pointed Center Knife Guard – Double Knife, page 217*.

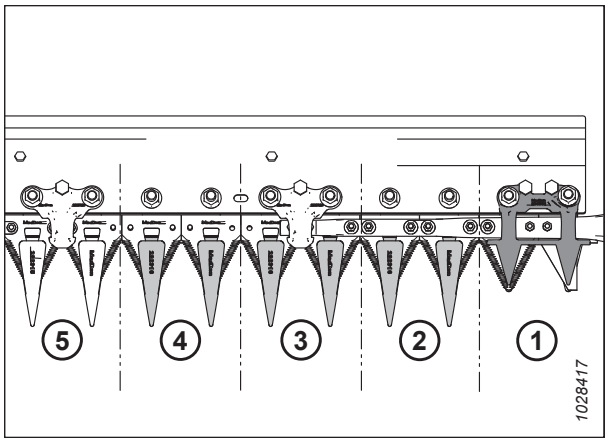


Figure 5.43: Drive Side Pointed Knife Guards

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
6. Rotate the flywheel attached to the knife drive box to manually stroke the knife until the knife sections are spaced midway between the guards.
7. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.
8. Remove two nuts and bolts (B) securing pointed knife guard (A) and hold-down (C) (if applicable) to the cutterbar.
9. Remove pointed knife guard (A), hold-down (C), and the plastic wearplate. Discard the pointed knife guard.

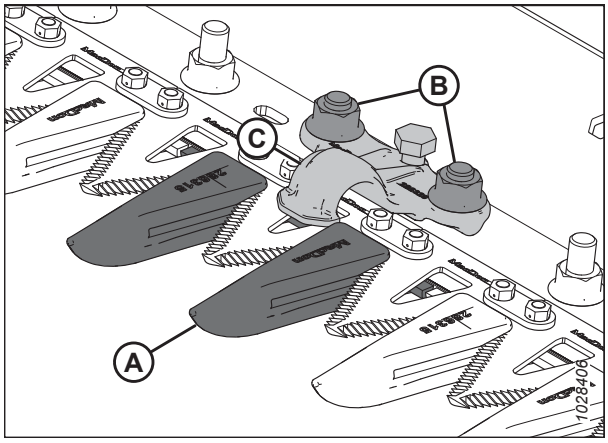


Figure 5.44: Pointed Knife Guards

10. Position plastic wearplate (A) and replacement pointed knife guard (B) under the cutterbar.

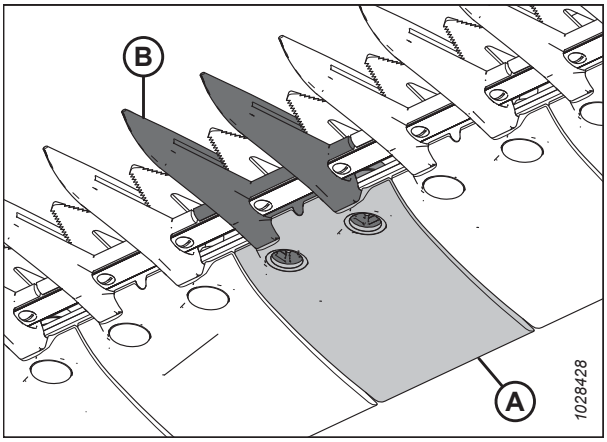


Figure 5.45: Pointed Knife Guard and Wearplate

11. Position hold-down (A) (if applicable), and loosen adjustment bolt (C) so that it is not protruding from the bottom of the hold-down.
12. Secure the pointed knife guard, wearplate, and hold-down (if applicable) with two bolts and nuts (B). Tighten the nuts to 85 Nm (63 lbf·ft).
13. If there is a hold-down at this location, proceed with adjustment. For instructions, refer to *Adjusting Hold-Down – Pointed Knife Guards, page 216*.

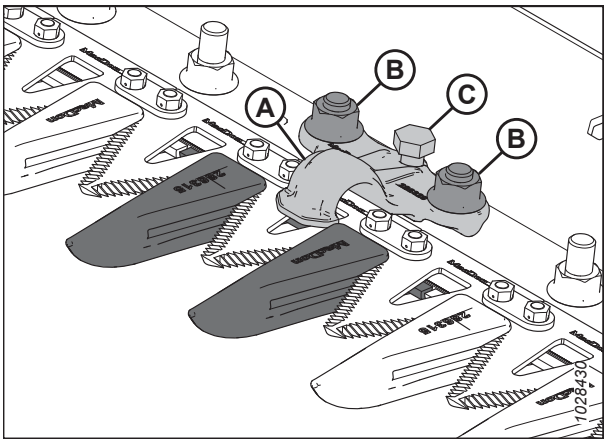


Figure 5.46: Pointed Knife Guards

Checking Hold-Down – Pointed Knife Guards

The pointed knife guard hold-downs prevent the knife sections on the cutterbar from lifting off of the guards, while still allowing the knife to slide. The hold-downs will need to be inspected to ensure that there is adequate clearance between the hold-downs and knife sections.

This procedure is for standard hold-downs. To check the center hold-down on double-knife headers, refer to *Checking Center Hold-Down – Pointed Knife Guards, page 220*.

NOTE:

Align the guards prior to adjusting the hold-down. For instructions, refer to *Adjusting Knife Guards and Guard Bar, page 211*.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
6. Rotate the flywheel attached to the knife drive box to manually stroke the knife to position knife section (A) under hold-down (B).
7. Push down on knife section (A) with approximately 44 N (10 lbf) of force, and use a feeler gauge to measure the clearance between hold-down (B) and the knife section. Ensure the clearance is 0.1–0.5 mm (0.004–0.020 in.).
8. If adjustment is required, refer to *Adjusting Hold-Down – Pointed Knife Guards, page 216*.
9. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.

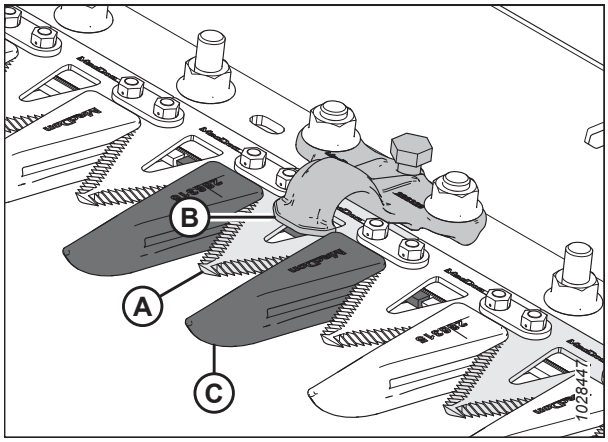


Figure 5.47: Pointed Hold-Down

Adjusting Hold-Down – Pointed Knife Guards

If a pointed or four-point knife guard hold-down is binding the knife, the hold-down will need to be adjusted.

This procedure applies to standard hold-downs. To adjust the center hold-down on double-knife headers, refer to *Adjusting Center Hold-Down – Pointed Knife Guards, page 221*.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Align the guards. For instructions, refer to *Adjusting Knife Guards and Guard Bar, page 211*.
2. Start the engine.
3. Raise the reel fully.
4. Shut down the engine, and remove the key from the ignition.

5. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.

6. Adjust the hold-down clearance as follows:

   a. To lower the front of hold-down (A) and decrease clearance, turn adjuster bolt (B) clockwise.

   b. To raise the front of hold-down (A) and increase clearance, turn adjuster bolt (B) counterclockwise.

   NOTE:

   For larger adjustments, it may be necessary to loosen nuts (C) before turning adjuster bolt (B). After adjustment, retighten nuts to 85 Nm (63 lbf·ft).

7. Recheck the hold-down clearance. Refer to *Checking Hold-Down – Pointed Knife Guards, page 215*. Repeat this procedure as needed.

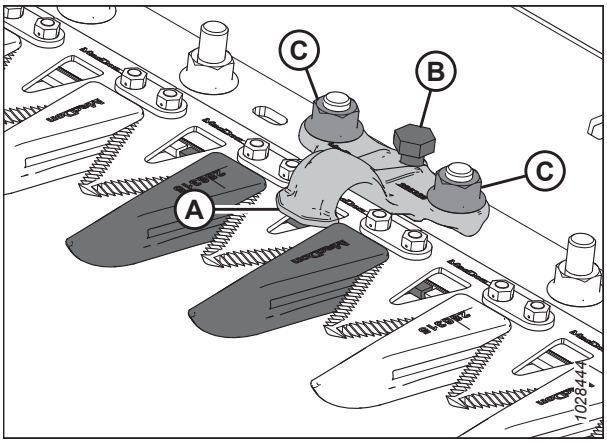


Figure 5.48: Pointed Hold-Down

8. Run the header at low engine speed, and listen for noise caused by insufficient clearance.

   IMPORTANT:

   Insufficient hold-down clearance will result in overheating of the knife and guards.

Replacing Pointed Center Knife Guard – Double Knife

The guard at the center of a double-knife header (where the two knives overlap) requires a slightly different replacement procedure than a pointed knife guard.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.

5. Remove two nuts and bolts (C) securing guard (A) and hold-down (B) to the cutterbar.

6. Remove guard (A), plastic wearplate, and hold-down (B).

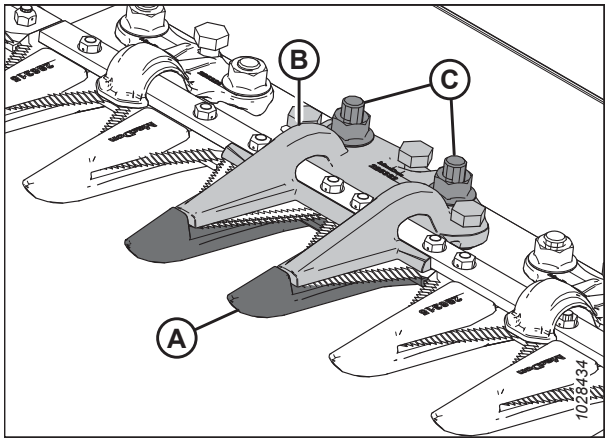


Figure 5.49: Pointed Center Knife Guard

IMPORTANT:

Ensure the replacement guard is the correct guard with offset cutting surfaces (A).

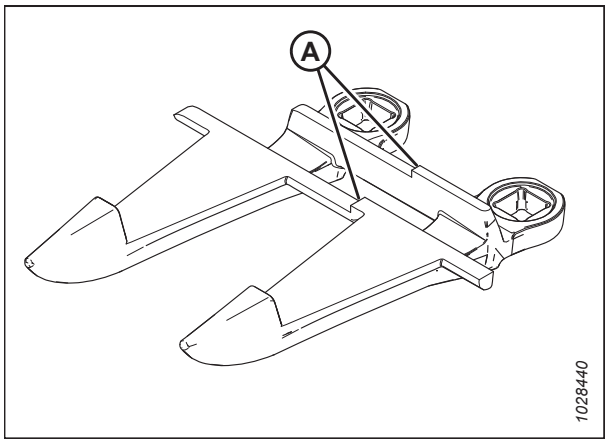


Figure 5.50: Pointed Center Knife Guard

7. Before installing the new pointed center knife guard, ensure overlap shim (A) is present under the cutterbar, and the thick end of the shim is positioned under the center guard.

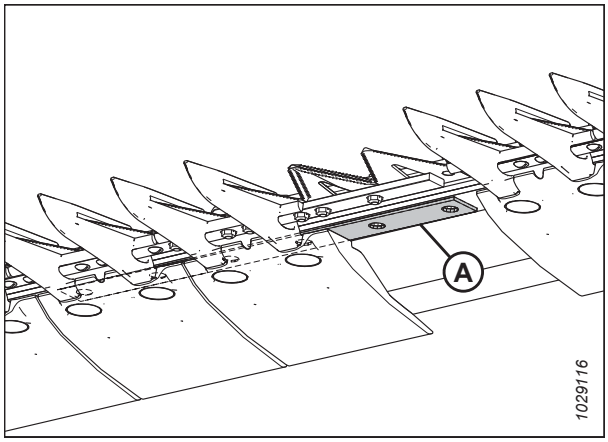


Figure 5.51: Cutterbar

8. Position plastic wearplate (A) and new guard (B) under the cutterbar.

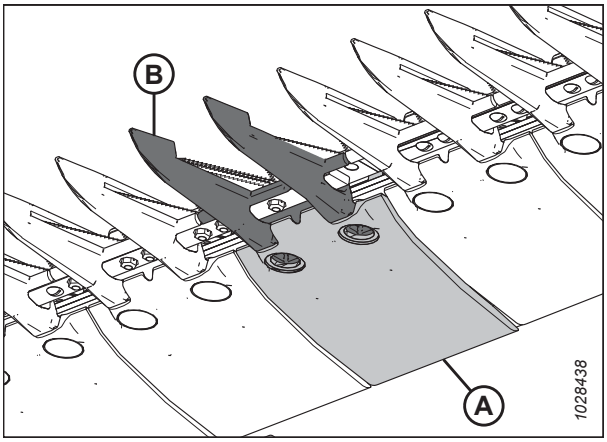


Figure 5.52: Pointed Center Knife Guard and Wearplate

9. Thread three adjustment bolts (A) so they are protruding 4 mm (5/32 in.) from the bottom of pointed center hold-down (B).
10. Position center hold-down (B) onto the cutterbar.

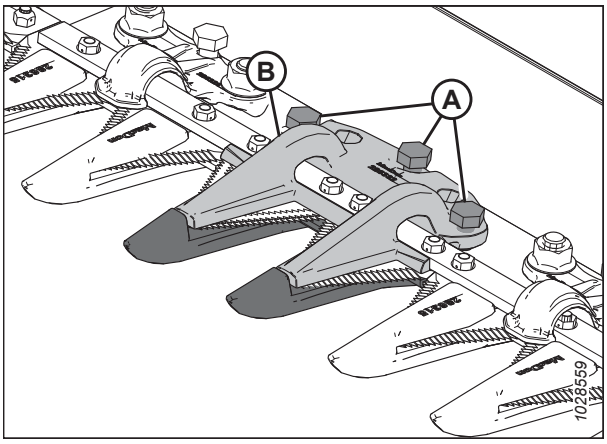


Figure 5.53: Pointed Center Knife Guard

11. Attach pointed center hold-down (A) with two bolts and nuts (B), but do **NOT** tighten at this time.

    IMPORTANT:

    Hold-down (A) must accommodate the two overlapping knives at the center guard location. Ensure the proper replacement guard is installed at this location.

12. Adjust the hold-down until the clearance is acceptable.
    - For adjustment instructions, refer to *Adjusting Center Hold-Down – Pointed Knife Guards, page 221*.
    - For clearance specifications, refer to *Checking Center Hold-Down – Pointed Knife Guards, page 220*.

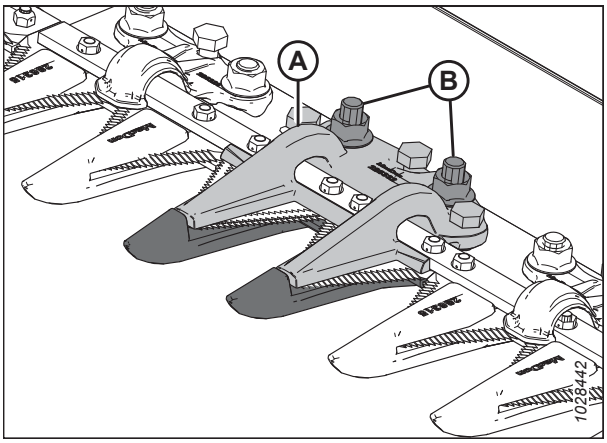


Figure 5.54: Pointed Center Knife Guard

13. Tighten nuts (B) to 85 Nm (63 lbf·ft).
14. Recheck the clearance.
    - If the clearance is acceptable, the installation of the hold-down is complete.
    - If the clearance is unacceptable, repeat Step *12, page 219* to Step *14, page 220* until the clearance is satisfactory.

Checking Center Hold-Down – Pointed Knife Guards

The pointed center knife guard hold-down prevent the center knife section on the cutterbar from lifting off of the guard, while still allowing the knife to slide. The center hold-down will need to be inspected to ensure that there is adequate clearance between the hold-down and the center knife section.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
6. Rotate the flywheel attached to the knife drive box to manually stroke the knife fully inboard until the knife sections are under hold-down (A). Repeat this step to move the other knife.
7. Push down on the knife section with approximately 44 N (10 lbf) of force, and use a feeler gauge to measure the clearance between hold-down (A) and the knife section. Ensure the clearance is as follows:
    - At tip (B) of hold-down: 0.1–0.5 mm (0.004–0.020 in.)
    - At rear (C) of hold-down: 0.1–1.0 mm (0.004–0.040 in.)
8. If adjustment is required, refer to *Adjusting Center Hold-Down – Pointed Knife Guards, page 221*.
9. If no adjustment is required, the procedure is complete.
10. Recheck clearance after tightening nuts, and adjust if necessary.

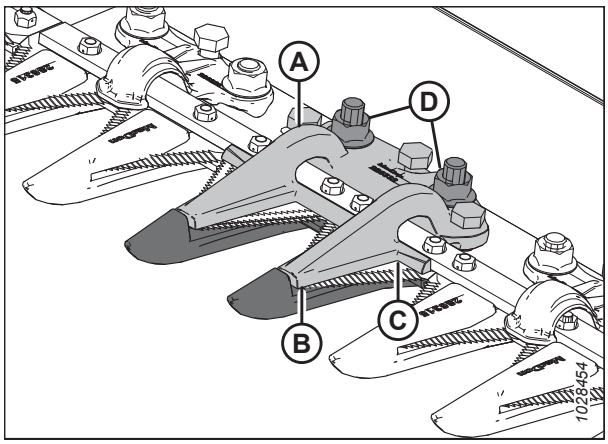


Figure 5.55: Pointed Center Hold-Down

11. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.

Adjusting Center Hold-Down – Pointed Knife Guards

If the pointed center knife guard hold-down is binding the knife, the center hold-down will need to be adjusted.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Loosen mounting hardware (B).
6. Turn adjuster bolts (A) as follows:
   - To increase the clearance, turn adjuster bolts (A) clockwise (tighten).
   - To decrease the clearance, turn adjuster bolts (A) counterclockwise (loosen).
7. To adjust clearance at tip only, adjust using only center (rear) adjustment bolt (C).
   - To increase the clearance, turn adjuster bolt (C) counterclockwise (loosen).
   - To decrease the clearance, turn adjuster bolt (C) clockwise (tighten).

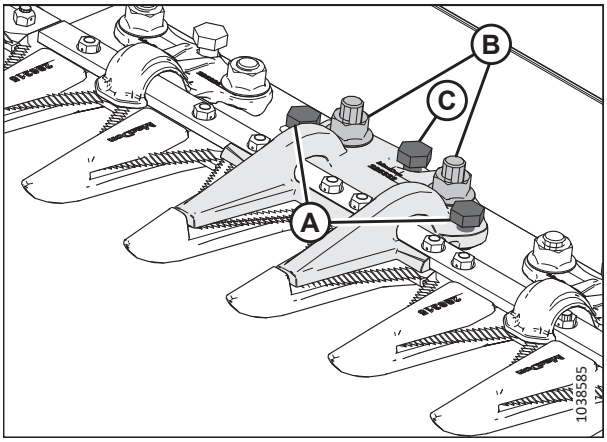


Figure 5.56: Pointed Center Hold-Down

8. Tighten nuts (B) to 85 Nm (63 lbf·ft).
9. Recheck the center guard clearance. Refer to *Checking Center Hold-Down – Pointed Knife Guards, page 220*. Repeat this procedure as needed.
10. Run the header at low engine speed, and listen for noise caused by insufficient clearance.

    IMPORTANT:

    Insufficient hold-down clearance will result in the knife and the guards overheating.

5.5.8 Short Knife Guards and Hold-Downs

Short knife guards are less likely to plug the knife in tough crops such as grasses and canola.

The following knife guards and hold-downs are used in short knife guard configurations:

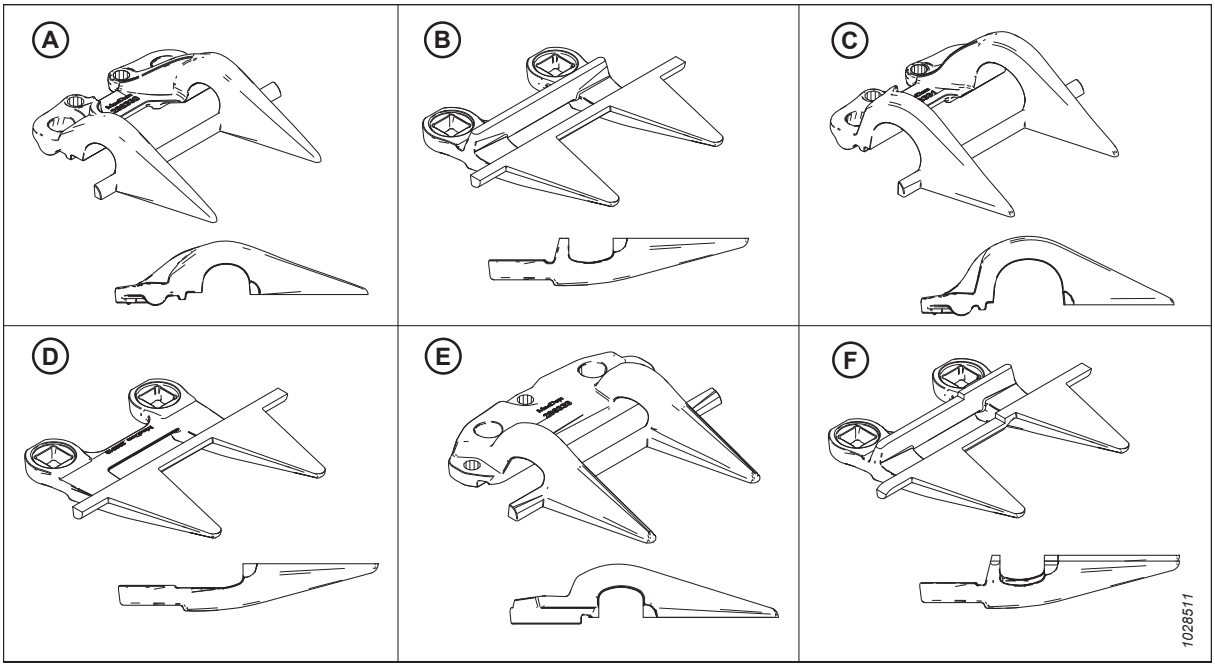


Figure 5.57: Guard and Hold-Down Types used in Short Knife Guard Configurations

A - PlugFree™ Hold-Down (MD #286330)
B - PlugFree™ Knife Guard (MD #286318)
C - PlugFree™ End Hold-Down (MD #286331)[82]
D - PlugFree™ End Knife Guard (without Wear Bar) (MD #286319)[83]
E - PlugFree™ Center Hold-Down (MD #286333)[84]
F - PlugFree™ Center Knife Guard (MD #286320)[84]

Guards are configured differently on different headers. When replacing short knife guards and hold-downs, ensure you use the correct sequence for your header. The following will guide you to the different configurations:

- *Short Knife Guard Configuration on Single-Knife Headers, page 223*
- *Short Knife Guard Configuration on Double-Knife Headers – All Sizes Except D241, page 224*

82. Installed in positions 1–3 on the drive side(s); installed in position 1 at the right end of single-knife headers.
83. Installed in positions 1–4 on the drive side(s). Single-knife headers use a standard guard (MD #286318) on the right end.
84. Double-knife headers only.

Short Knife Guard Configuration on Single-Knife Headers

Guards are configured differently on different sized headers. The illustration provided here shows short knife guards installed on single-knife headers.

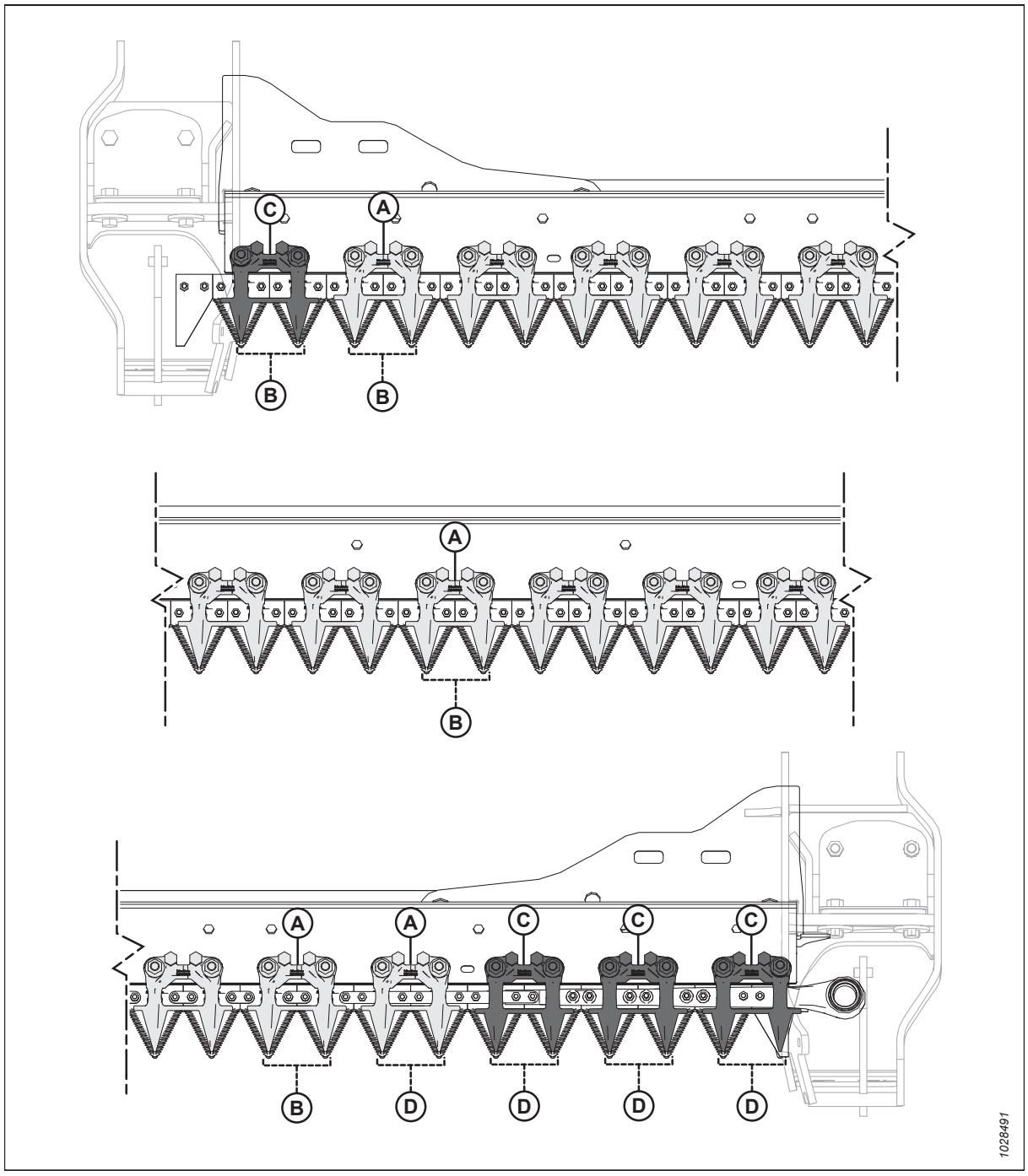


Figure 5.58: Short Knife Guard and Hold-Down Locations – Single-Knife Headers

A - PlugFree™ Hold-Down (MD #286330)
B - PlugFree™ Guard (MD #286318)
C - PlugFree™ End Hold-Down (x4) (MD #286331)
D - PlugFree™ End Knife Guard (without Wear Bar) (x5) (MD #286319)

Short Knife Guard Configuration on Double-Knife Headers – All Sizes Except D241

Guards are configured differently on different sized headers. The illustration provided here shows short knife guards installed on double-knife headers.

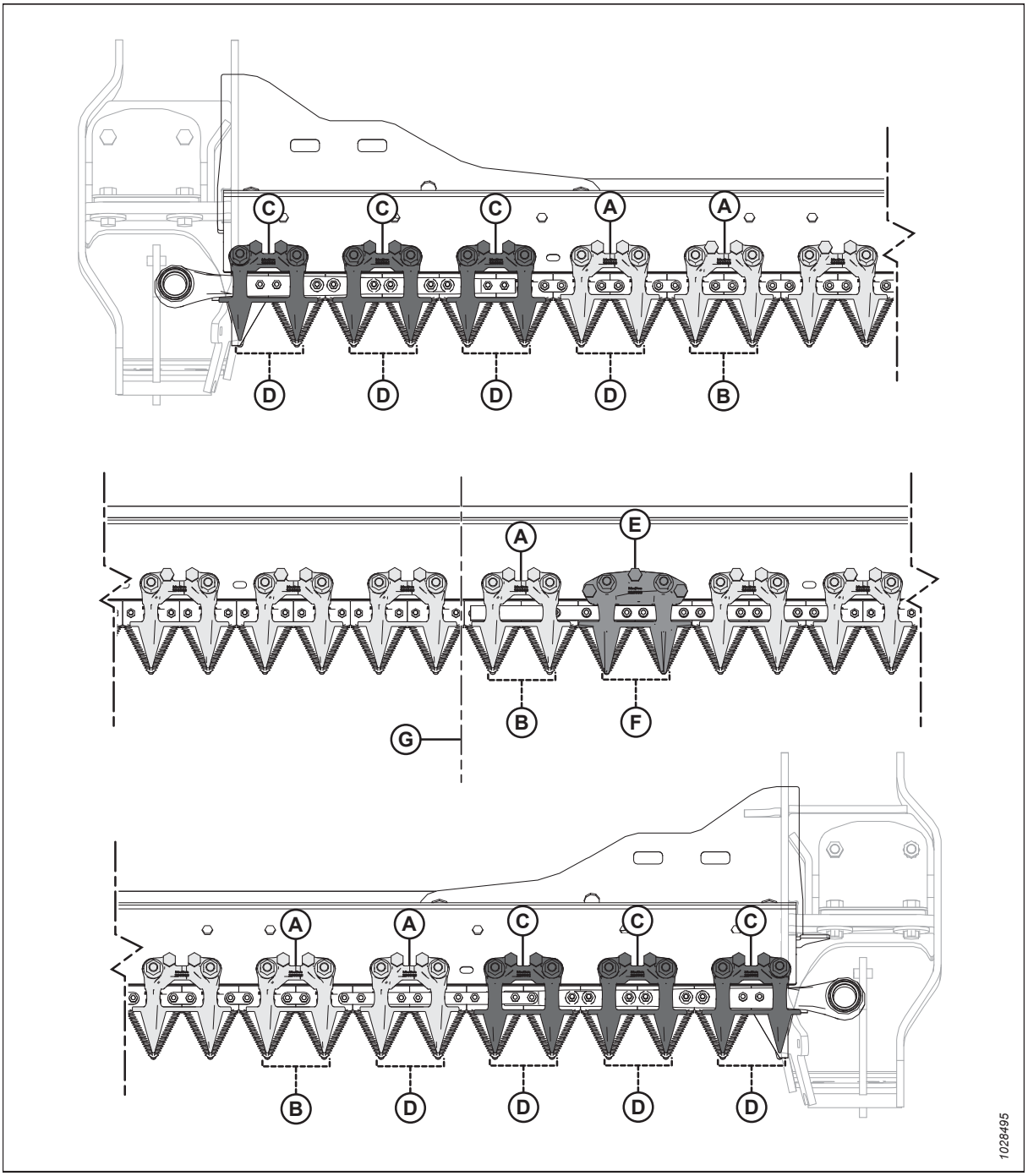


Figure 5.59: Short Knife Guard and Hold-Down Locations – Double-Knife Headers

A - PlugFree™ Hold-Down (MD #286330)
B - PlugFree™ Guard (MD #286318)
C - PlugFree™ End Hold-Down (x6) (MD #286331)
D -PlugFree™ End Knife Guard (without Wear Bar) (x8) (MD #286319)
E - PlugFree™ Center Hold-Down (MD #286333)
F - PlugFree™ Center Knife Guard (MD #286320)
G - Center of Header

Short Knife Guard configuration on Double-Knife Header – D241

Guards are configured differently on different sized headers. The illustration provided here shows short knife guards installed on double-knife headers.

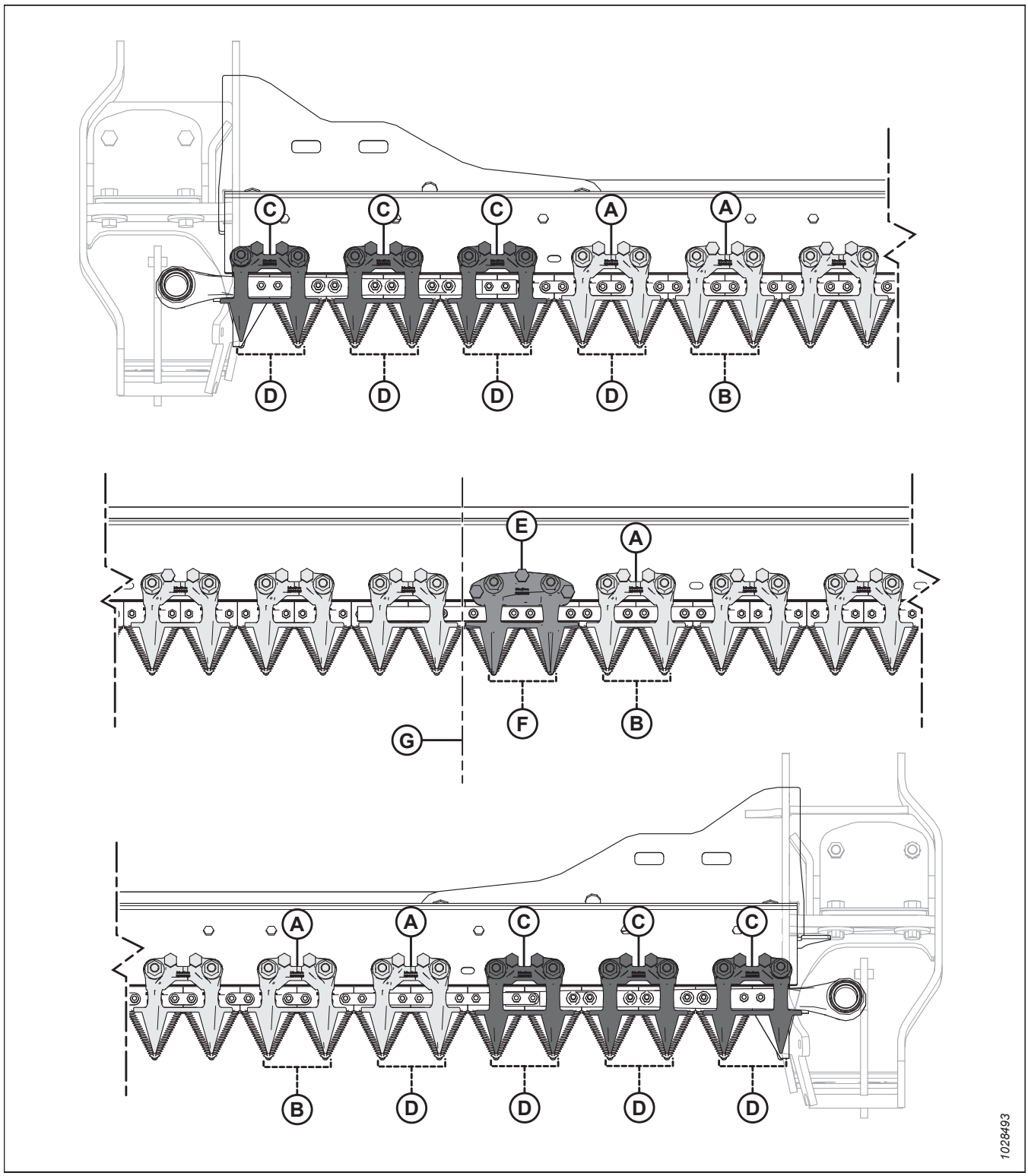


Figure 5.60: Short Knife Guard and Hold-Down Locations – D241 Double-Knife Header

A - PlugFree™ Hold-Down (MD #286330)
B - PlugFree™ Guard (MD #286318)
C - PlugFree™ End Hold-Down (x6) (MD #286331)
D - PlugFree™ End Knife Guard (without Wear Bar) (x8) (MD #286319)
E - PlugFree™ Center Hold-Down (MD #286333)
F - PlugFree™ Center Knife Guard (MD #286320)
G - Center of Header

Replacing Short Knife Guards or End Knife Guards

Short knife guards or end knife guards are less likely to plug the knife in tough crops such as grasses and canola, and are factory-installed.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

IMPORTANT:

Double-knife headers have an offset center knife guard installed where the two knives overlap. The center knife guard has a slightly different replacement procedure. For instructions, refer to *Replacing Center Knife Guard – Double Knife, page 230*.

To replace a short knife guard or end knife guard, follow these steps:

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Remove two nuts and bolts (A) securing short knife guard (B) and hold-down (C) to the cutterbar.
6. Remove short knife guard (B), hold-down (C), and the plastic wearplate.

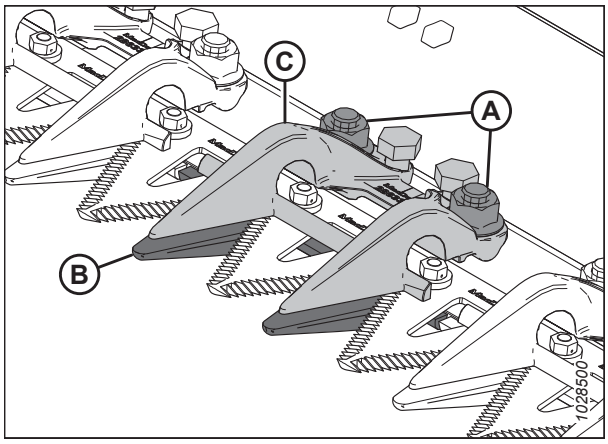


Figure 5.61: Short Knife Guards

IMPORTANT:

The first four knife guards (A) on the drive sides of the header are called end knife guards and do **NOT** have wear bars. Ensure the proper replacement knife guards are installed at these locations.

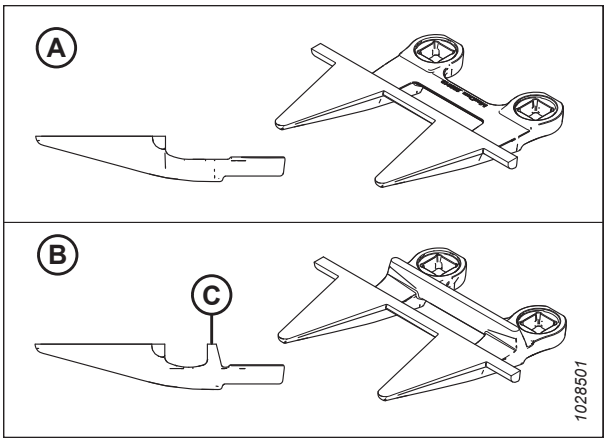


Figure 5.62: End Knife Guard and Short Knife Guards

A - Plug Free™ End Knife Guard (MD #286319)
B - Plug Free™ Guard (with Wear Bar [C]) (MD #286318)

7. Position plastic wearplate (A) and replacement short knife guard (B) under the cutterbar.

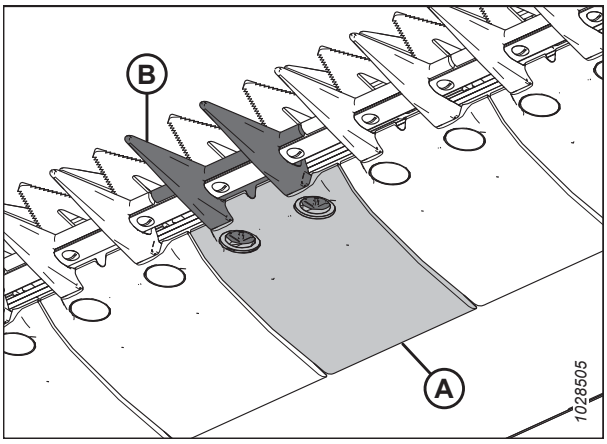


Figure 5.63: Short Knife Guard and Wearplate

8. Position hold-down (A), and loosen two adjustment bolts (B) so that they are not protruding from the bottom of the hold-down.
9. Secure the short knife guard, wearplate, and hold-down with two bolts and nuts (C). Do **NOT** tighten the nuts yet.
10. Adjust the hold-down until the clearance is acceptable.
    - For adjustment instructions, refer to *Adjusting Hold-Down – Short Knife Guards, page 229*.
    - For clearance specifications, refer to *Checking Hold-Down – Short Knife Guards, page 228*.
11. Tighten nuts (C) to 85 Nm (63 lbf·ft).

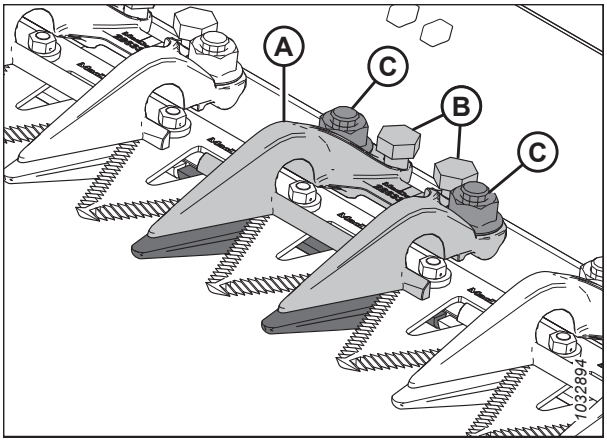


Figure 5.64: Short Knife Guard

12. Recheck the clearance.
    - If the clearance is acceptable, the installation of the hold-down is complete.
    - If the clearance is unacceptable, repeat Step *10, page 227* to Step *12, page 228* until the clearance is satisfactory.
13. Disengage the reel safety props. For instructions, refer to *Disengaging Reel Safety Props, page 42*.

Checking Hold-Down – Short Knife Guards

The short knife guard hold-downs prevent the knife sections on the cutterbar from lifting off of the guards, while still allowing the knife to slide. The hold-downs will need to be inspected to ensure that there is adequate clearance between the hold-downs and knife sections.

To check the center hold-down on double-knife headers, refer to *Checking Center Hold-Down – Short Knife Guards, page 232*.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Rotate the flywheel attached to the knife drive box to manually stroke the knife fully inboard until the knife sections are under hold-down (A). Repeat this step to move the other knife.
6. Push down on knife section with approximately 44 N (10 lbf) of force, and use a feeler gauge to measure the clearance between the tip of hold-down (B) and the knife section. Ensure the clearance is 0.1–0.5 mm (0.004–0.020 in.).
7. If adjustment is required, refer to *Adjusting Hold-Down – Short Knife Guards, page 229*.

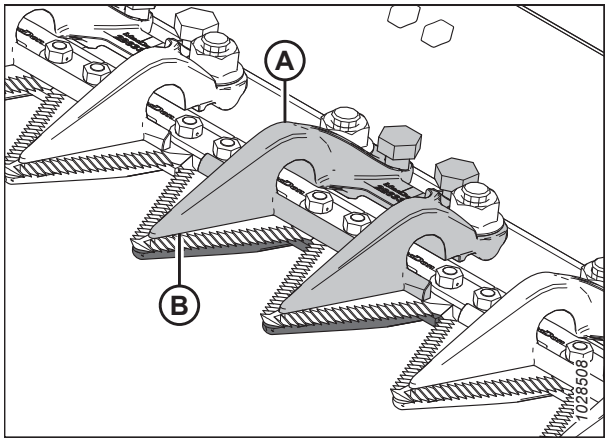


Figure 5.65: Short Knife Guards

Adjusting Hold-Down – Short Knife Guards

If a short knife guard hold-down is binding its knife, the hold-down will need to be adjusted.

To adjust the center hold-down on double-knife headers, refer to *Adjusting Center Hold-Down – Short Knife Guards, page 233*.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Adjust the hold-down clearance as follows:
   a. To decrease the clearance, turn adjuster bolts (A) clockwise.
   b. To increase the clearance, turn adjuster bolts (A) counterclockwise.

      NOTE:

      For larger adjustments, it may be necessary to loosen nuts (B) before turning adjuster bolts (A). After adjustment, retighten nuts to 85 Nm (63 lbf·ft).

   c. Recheck the hold-down clearance, and make further adjustments as necessary.

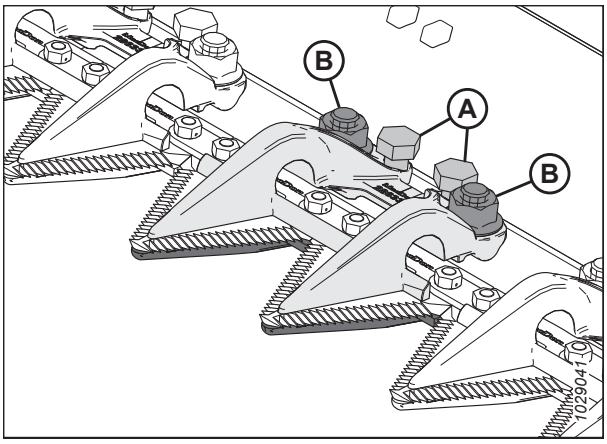


Figure 5.66: Short Knife Guard Hold-Down

6. Run the header at low engine speed, and listen for noise caused by insufficient clearance. Readjust as necessary.

   IMPORTANT:

   Insufficient hold-down clearance will result in overheating of the knife and guards.

7. Disengage the reel safety props. For instructions, refer to *Disengaging Reel Safety Props, page 42*.

Replacing Center Knife Guard – Double Knife

The offset guard at the center of a double-knife header (where the two knives overlap) requires a slightly different replacement procedure than a standard guard.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
4. Remove two nuts and bolts (C) securing center knife guard (A) and hold-down (B) to the cutterbar.
5. Remove center knife guard (A), plastic wearplate, and hold-down (B).

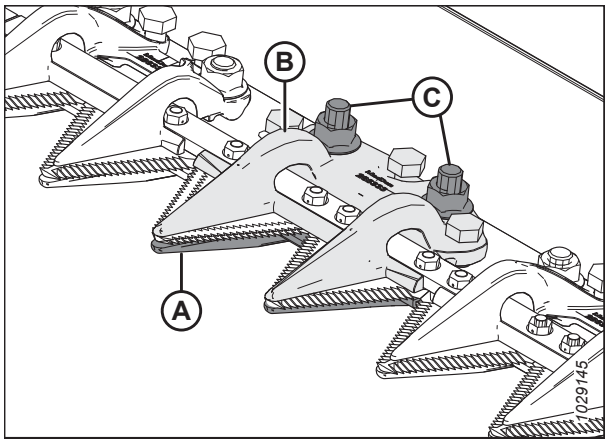


Figure 5.67: Center Knife Guard

IMPORTANT:

Ensure the replacement center knife guard is the correct guard with offset cutting surfaces (A).

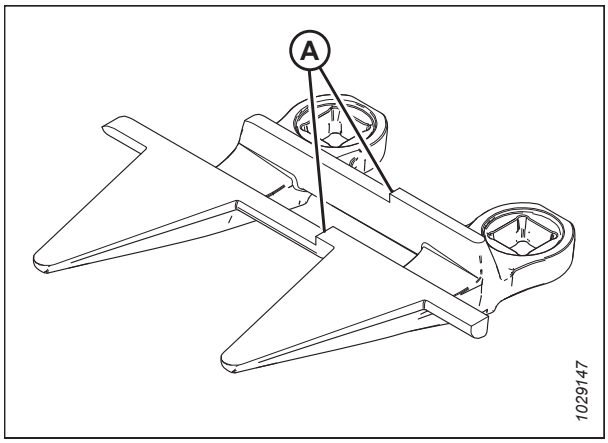


Figure 5.68: Center Knife Guard

6. Before installing the new center knife guard, ensure overlap shim (A) is present under the cutterbar, and the thick end of the shim is positioned under the center knife guard.

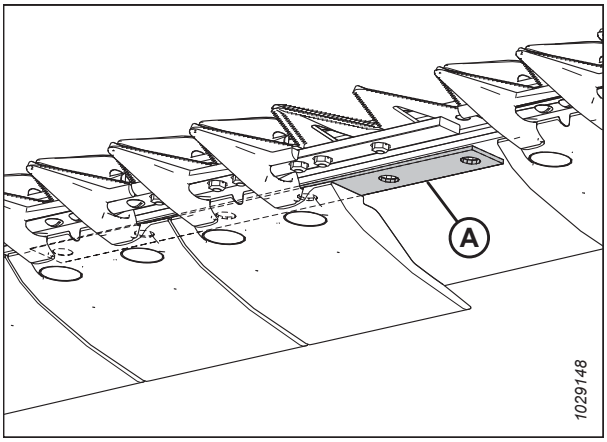


Figure 5.69: Cutterbar

7. Position plastic wearplate (A) and new center knife guard (B) under the cutterbar.

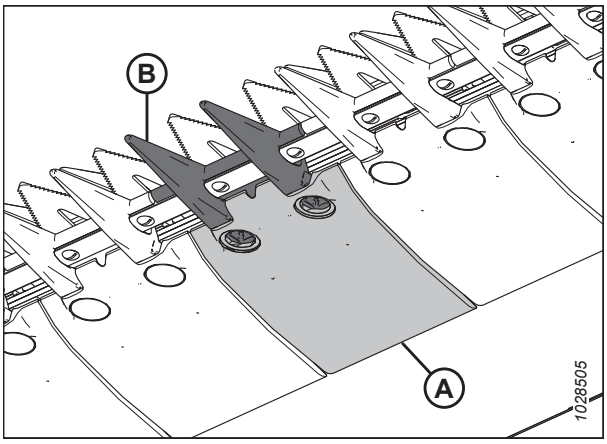


Figure 5.70: Center Knife Guard and Wearplate

8. Thread three adjustment bolts (A) so they are protruding 4 mm (5/32 in.) from the bottom of center hold-down (B).

9. Position center hold-down (B) onto the cutterbar.

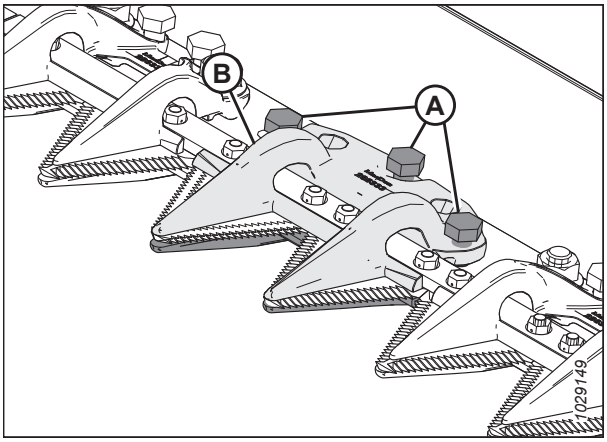


Figure 5.71: Center Knife Guard

10. Attach center hold-down (A) with two bolts and nuts (B), but do **NOT** tighten at this time.

    IMPORTANT:

    Hold-down (A) must accommodate the two overlapping knives at the center knife guard location. Ensure the proper replacement center knife guard is installed at this location.

11. Adjust the hold-down until the clearance is acceptable.

    - For adjustment instructions, refer to *Adjusting Center Hold-Down – Short Knife Guards, page 233*.
    - For clearance specifications, refer to *Checking Center Hold-Down – Short Knife Guards, page 232*.

12. Tighten nuts (B) to 85 Nm (63 lbf·ft).

13. Recheck the clearance.

    - If the clearance is acceptable, the installation of the hold-down is complete.
    - If the clearance is unacceptable, repeat Step *11, page 232* to Step *13, page 232* until the clearance is satisfactory.

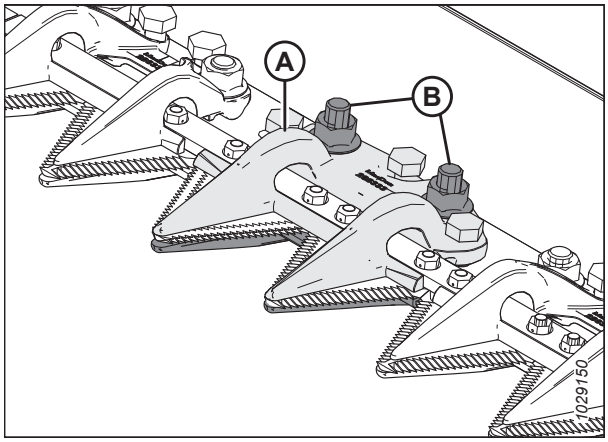


Figure 5.72: Center Knife Guard

Checking Center Hold-Down – Short Knife Guards

The short center knife guard hold-down prevent the center knife section on the cutterbar from lifting off of the guard, while still allowing the knife to slide. The center hold-down will need to be inspected to ensure that there is adequate clearance between the hold-down and the center knife section.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Start the engine.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.

6. Rotate the flywheel attached to the knife drive box to manually stroke the knife fully inboard until the knife sections are under hold-down (A). Repeat this step to move the other knife.
7. Push down on the knife section with approximately 44 N (10 lbf) of force. Use a feeler gauge to measure the clearance between hold-down (A) and the knife section. Ensure that the clearance is as follows:
   - At tip (B) of hold-down: 0.1–0.5 mm (0.004–0.020 in.)
   - At rear (C) of hold-down: 0.1–1.0 mm (0.004–0.040 in.)
8. If adjustment is required, refer to *Adjusting Center Hold-Down – Short Knife Guards, page 233*.
9. If no adjustment is required, the procedure is complete.
10. Recheck clearance after tightening nuts, and adjust if necessary.
11. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.

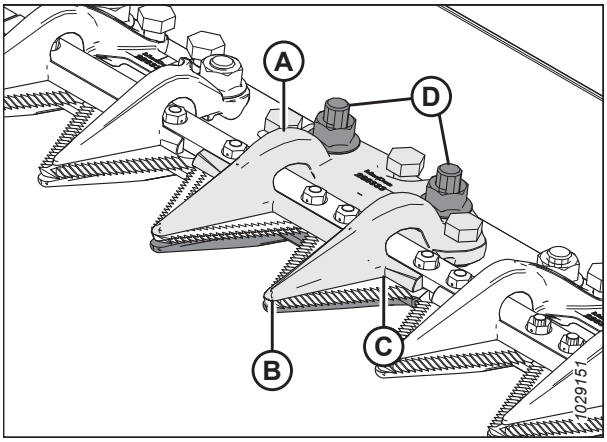


Figure 5.73: Center Knife Guard Hold-Down

Adjusting Center Hold-Down – Short Knife Guards

If a short knife guard hold-down is binding the knife, the hold-down will need to be adjusted.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.

4. Loosen mounting hardware (B).
5. Turn adjuster bolts (A) as follows:
   - To increase the clearance, turn adjuster bolts (A) clockwise (tighten).
   - To decrease the clearance, turn adjuster bolts (A) counterclockwise (loosen).
6. To adjust the clearance at the tip of the knife, turn adjustment bolt (C) as follows:
   - To increase the clearance, turn adjuster bolt (C) counterclockwise (loosen).
   - To decrease the clearance, turn adjuster bolt (C) clockwise (tighten).
7. Tighten nuts (B) to 85 Nm (63 lbf·ft).
8. Run the header at low engine speed, listening for noise caused by insufficient clearance. Readjust the knives as necessary.

   IMPORTANT:

   Insufficient hold-down clearance will result in the knife and guards overheating.

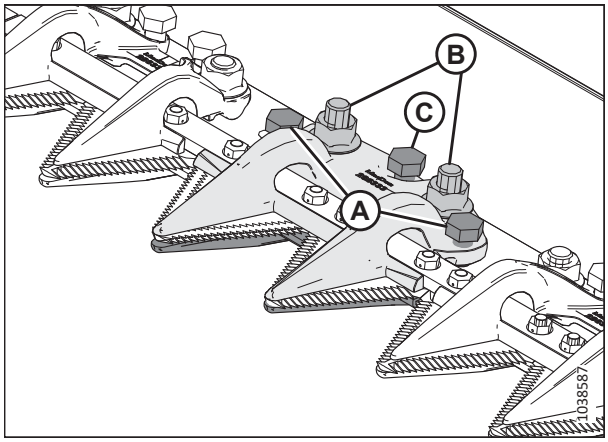


Figure 5.74: Center Hold-Down

5.5.9 Knifehead Shield

The knifehead shield attaches to the endsheet and reduces the knifehead opening to prevent cut crop from accumulating in the knifehead cutout.

IMPORTANT:

Remove the shields when using the cutterbar on the ground in muddy conditions. Mud may pack into the cavity behind the shield which could result in knife drive box failure.

Installing Knifehead Shield

The knifehead shield is primarily used in rice and fine grasses to keep crop from getting caught in the delivery opening. The knifehead shield is not recommended in all conditions.

DANGER

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

WARNING

Wear heavy gloves when working around or handling knives.

1. Raise the reel fully.
2. Lower the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Retrieve the knifehead shields from the manual storage case.

6. Place knifehead shield (A) against the endsheet as shown. Align the shield so the cutout matches the profile of the knifehead and/or hold-downs.

7. Align the mounting holes and secure with two M10 x 30 hex head bolts, washers (B), and nuts.

8. Tighten bolts (B) just enough to hold knifehead shield (A) in place while allowing it to be adjusted as close to the knifehead as possible.

9. Manually rotate the knife drive box pulley to move the knife and check for areas of contact between the knifehead and knifehead shield (A). If necessary, adjust the shield to eliminate interference with the knife.

10. Torque bolts (B) to 11 Nm (97 lbf·in).

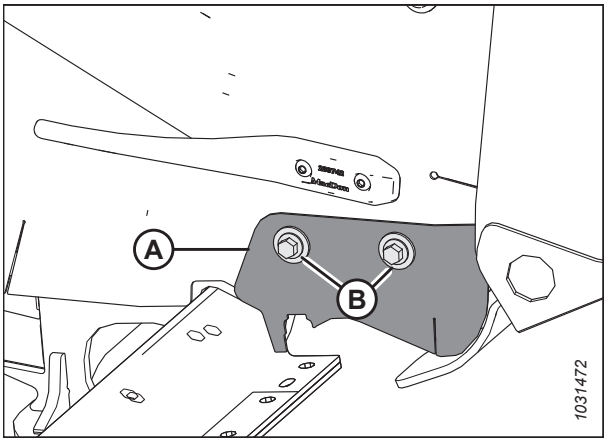


Figure 5.75: Knifehead Shield

5.6 Knife Drive System

The knife drive system transforms pumped hydraulic pressure into a mechanical motion that strokes a series of serrated knife blades at the front of the header to cut a variety of crops.

5.6.1 Knife Drive Box

The knife drive box is driven by a hydraulic motor and converts rotational motion into the reciprocating motion of the knife.

Single-knife headers have a knife drive box (A) and motor (B) on the left side of the header; double-knife headers have a knife drive box and motor at each end.

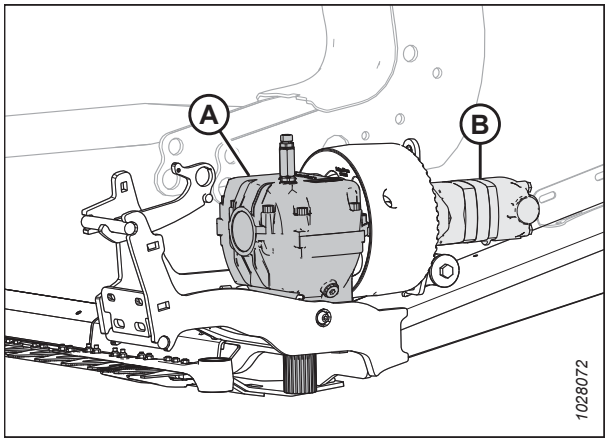


Figure 5.76: Left Knife Drive Box Shown – Right Similar

Checking Oil Level in Knife Drive Box

There must be a sufficient level of oil in each knife drive box for the knife drive to work correctly. The knife drive's oil level can be inspected using the dipstick installed in each knife drive.

DANGER

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

1. Lower the header fully.
2. Adjust the header angle so that the top of the knife drive box is level with the ground.
3. Shut down the engine, and remove the key from the ignition.
4. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
5. Ensure that the header is level.

6. Remove oil level dipstick (A). Check the oil level. The oil level must be within range (B), between the lines near the bottom of the dipstick.
7. Reinstall oil level dipstick (A). Tighten the dipstick to 23 Nm (204 lbf·in).
8. If the header has two knife drives, repeat this procedure to check the oil level on the other knife drive.

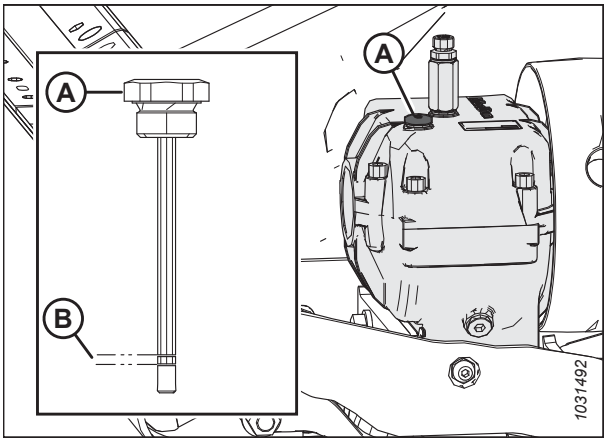


Figure 5.77: Knife Drive Box

Checking Mounting Bolts

Check the torque on the four knife drive box mounting bolts (A) and (B) after the first 10 hours of operation and every 100 hours thereafter.

1. Ensure all bolts are torqued to 343 Nm (253 lbf·ft). Torque side bolts (A) first, then torque bottom bolts (B).

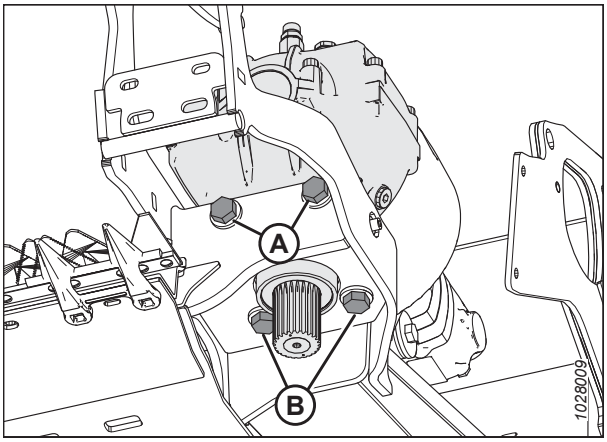


Figure 5.78: Knife Drive Box – View from Below

Changing Oil in Knife Drive Box

Change the knife drive box lubricant after the first 50 hours of operation and every 1000 hours (or 3 years) thereafter.

DANGER

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

1. Raise the header fully.
2. Shut down the windrower, and remove the key from the ignition.
3. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.

4. Place a container large enough to hold approximately 1.5 L (0.4 US gal) under the knife drive box to collect the oil.
5. Remove dipstick (A) and drain plug (C).
6. Allow the oil to drain from the knife drive box and into the container placed below it.
7. Reinstall drain plug (C).
8. Add 1.5 L (0.4 US gal) of oil to the knife drive box. Refer to the inside back cover for recommended fluids and lubricants.

   NOTE:

   Check the oil level with the top of knife drive box horizontal and with oil level dipstick (A) screwed in.
9. Check that the oil level is within range (B).
10. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.

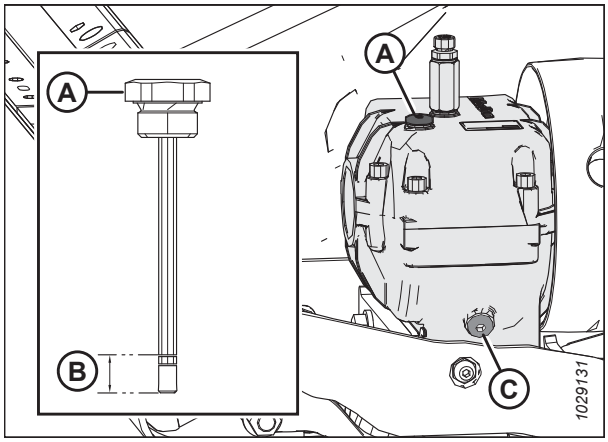


Figure 5.79: Knife Drive Box

5.7 Electronically Timed Double-Knife System

The electronically timed double-knife (ETDK) system uses sensors, an electronic controller, and bypass valves to monitor and synchronize the stroke of the double-knife system.

5.7.1 Troubleshooting Touch Encoder – M Series Windrower Only

The touch encoder display provides is the diagnostic information for the electronic timed double-knife system. It displays any error codes received from the electronic timed double-knife module. The tables below describe the error codes.

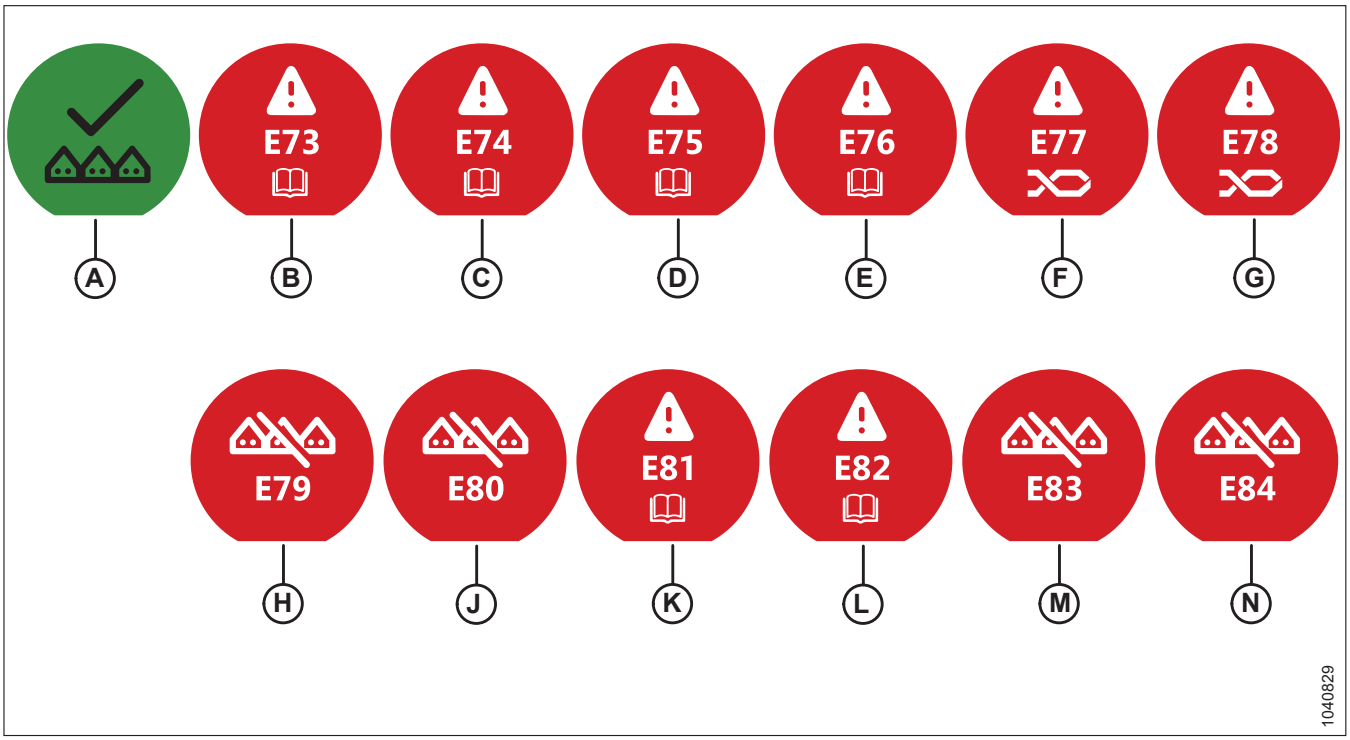


Figure 5.80: Error Codes Icons Displayed on the Touch Encoder (TE)

A - Normal Operation
B - Error E73
C - Error E74
D - Error E75
E - Error E76
F - Error E77
G - Error E78
H - Error E79
J - Error E80
K - Error E81
L - Error E82
M - Error E83
N - Error E84

Table 5.1 Controller Error Codes

Error ID	Description	Fault Code	ScreenID Signal Value
1.1	Low Battery Voltage	E73	5
1.2	High Battery Voltage	E73	5
1.3	Controller Temperature High	E74	6
1.4	Controller CPU Temperature High	E74	6
1.5	Memory Failure Detected	E74	6
1.6	Memory Corruption Detected	E74	6
1.7	Firmware Failure Detected	E75	7
1.8	Controller Timer Failure Detected	E75	7
1.9	Sensor Supply - High Voltage	E76	8
1.10	Sensor Supply - Low Voltage	E76	8

Table 5.1 Controller Error Codes (continued)

Error ID	Description	Fault Code	ScreenID Signal Value
1.11	Controller Output - Low Voltage	E74	6
1.12	Controller Output - High Current	E74	6

Table 5.2 Implement Controller Input Error Codes

Error ID	Description	Fault Code	ScreenID Signal Value
3.1	LH Knife Speed - Low	E79	11
3.2	RH Knife Speed - Low	E80	12
3.3	LH Knife Speed - High	E79	11
3.4	RH Knife Speed - High	E80	12
3.5	LH Knife Speed - Intermittent	E79	11
3.6	RH Knife Speed - Intermittent	E80	12

Table 5.3 Implement Controller Output Error Codes

Error ID	Description	Fault Code	ScreenID Signal Value
4.1	LH Bypass Valve - Persistent High Output	E81	13
4.2	RH Bypass Valve - Persistent High Output	E82	14
4.3	LH Bypass Valve - Over Load Detected	E81	13
4.4	RH Bypass Valve - Over Load Detected	E82	14
4.5	LH Bypass Valve - Open Load Detected	E81	13
4.6	RH Bypass Valve - Open Load Detected	E82	14
4.7	LH Bypass Valve - Short Circuit Detected	E81	13
4.8	RH Bypass Valve - Short Circuit Detected	E82	14

Table 5.4 Knife Control Error Codes

Error ID	Description	Fault Code	ScreenID Signal Value
5.1	Knife Phase Control Fault	E83	15
5.2	Knife Pressure Sensor - High Pressure	E84	16
5.3	Knife Phase Control Failure	E83	15
5.4	Knife Pressure Sensor - Low Voltage	E84	16
5.5	Knife Pressure Sensor - High Voltage	E84	16
5.6	Knife Pressure Sensor - Low Pressure	E84	16

Table 5.5 CAN Errors

Error ID	Description	Fault Code	ScreenID Signal Value
2.1	ETDK CAN Bus Fault	E77	15
2.2	ETDK CAN Bus Fault	E77	16
2.3	ETDK Controller Communication Lost	E78	15
2.4	ETDK Controller Communication Lost	E78	16

5.7.2 Troubleshooting Harvest Performance Tracker – M1 Series Windrower Only

The harvest performance tracker (HPT) provides is the diagnostic information for the electronic timed double-knife system. It displays any error codes received from the electronic timed double knife module. The tables below describe the error codes.

Check the Input/Output page for diagnostic information.

Table 5.6 Controller Error Codes

Error ID	SPN	FMI	SPN Description	Short Fault Text	Long Fault Text
1.1	521517	1	ETDK Controller	Low Battery Voltage	Battery voltage is low. Contact dealer to check charging system
1.2		2		High Battery Voltage	Battery voltage is high. Contact dealer
1.3	521518	1	ETDK Controller	Temperature High	Module has exceeded max operating temperature. Allow module to cool down before continuing operation.
1.4		2		CPU Temperature High	Module has exceeded max operating temperature. Allow module to cool down before continuing operation.
1.5		3		Memory Fault	Controller memory failure detected. Contact dealer
1.6		4		Memory Fault	Corrupt data detected. Contact dealer
1.11		5		Firmware Fault	Firmware failure detected. Contact dealer
1.12		6		Timer Fault	Module timer fault has been detected. Please restart module. If issue persists, please contact dealer.
1.7	521519	1	ETDK Controller Vref	Low Voltage	Reference voltage low error. Check wiring for damage. The following sensors may be affected: LH knife speed, RH knife speed, knife pressure sensor (header sensor)
1.8		2		High Voltage	Reference voltage high error. Check wiring for damage. The following sensors may be affected: LH knife speed, RH knife speed, knife pressure sensor (header sensor)
1.9	521520	1	ETDK Controller Output	Low Voltage	Low voltage on circuit. Check wiring for damage. Contact Dealer The following valves may be affected: LH knife bypass valve, RH knife bypass valve
1.10		2		Over Current	High current on circuit. Check wiring for damage. Contact dealer The following valves may be affected: LH knife bypass valve, RH knife bypass valve

Table 5.7 CAN Controller Error Codes

Error ID	SPN	FMI	SPN Description	Short Fault Text	Long Fault Text
2.1	521521	1	ETDK Controller Offline	ETDK CAN Bus Fault	ETDK CAN bus functional, but faults detected. Check CAN bus termination and ensure no additional modules are connected to the CAN bus. If ok, contact dealer.
2.2		2		ETDK CAN Bus	CAN bus down. Check wiring and connectors. If ok, contact
2.3	521522	1		ETDK Controller Communication Lost	Check wiring and connectors. If ok, contact dealer.
2.4		2		UI Communication	Check wiring and connectors. If ok, contact dealer.

Table 5.8 Implement Controller Input Error Codes

Error ID	SPN (displayed to user)	FMI	SPN Description	Short Fault Text	Long Fault Text
3.1	521523	1	ETDK LH Knife Speed	Low Speed	Input frequency lower than expected. Check sensor alignment, power supply, ground, and signal path. Replace sensor, if necessary.
3.3		2		High Speed	Input frequency higher than expected. Check sensor alignment, power supply, ground, and signal path. Replace sensor, if necessary.
3.5		3		Intermittent Speed	Input frequency different than expected. Check sensor alignment, power supply, ground, and signal path. Replace sensor, if necessary.
3.2	521525	1	ETDK RH Knife Speed	Low Speed	Input frequency lower than expected. Check sensor alignment, power supply, ground, and signal path. Replace sensor, if necessary.
3.4		2		High Speed	Input frequency higher than expected.
					Check sensor alignment, power supply, ground, and signal path. Replace sensor, if necessary.
3.6		3		Intermittent Speed	Input frequency different than expected. Check sensor alignment, power supply, ground, and signal path. Replace sensor, if necessary.

Table 5.9 Implement Controller Output Error Codes

Error ID	SPN	FMI	SPN Description	Short Fault Text	Long Fault Text
4.1	521528	5	ETDK LH Control O/P	Persistent High Output	Circuit current response different than expected. Check wiring and connector to ensure isolation of signal and ground lines. Replace the valve, if necessary.
4.3		1		Over Load Detected	Circuit current higher than expected. Check wiring and connector to ensure isolation of signal and ground lines. Replace the valve, if necessary.
4.5		4		Open Load Detected	Check wiring and connector for damage or breaks Replace the valve, if necessary.
4.7		2		Short Circuit Detected	Check wiring and connector to ensure isolation of signal and ground lines. Replace the valve if necessary.
4.2	522291	5	ETDK RH Control O/P	Persistent High Output	Circuit current response different than expected. Check wiring and connector to ensure isolation of signal and ground lines. Replace the valve, if necessary.
4.4		1		Over Load Detected	Circuit current higher than expected. Check wiring and connector to ensure isolation of signal and ground lines. Replace the valve, if necessary.
4.6		4		Open Load Detected	Check wiring and connector for damage or breaks Replace the valve, if necessary.
4.8		2		Short Circuit Detected	Check wiring and connector to ensure isolation of signal and ground lines. Replace the valve, if necessary.

Table 5.10 Knife Control Error Codes

Error ID	SPN	FMI	SPN Description	Short Fault Text	Long Fault Text
5.1	522292	1	Knife Phase Control	Knife Phase Control Fault	Knife phase is outside of acceptable operating range. Beware that there is the potential for header damage if knife is run for a prolonged period. Contact Dealer.
5.3		2		Knife Phase Control Failure	Control system is unable to adjust knife timing. Beware that there is the potential for header damage if knife is run for a prolonged period. Knife speed output defaulted to safe speed mode. Contact Dealer.
5.2	522293	1	Knife Pressure Sensor (Header)	Knife Pressure (Header) High	Knife pressure is outside of acceptable operating range (high). Beware that there is the potential for header damage if knife is run for a prolonged period.
5.4		2	Knife Pressure Sensor (Header)	Low Voltage	Signal voltage lower than expected. Check wiring and connector to ensure isolation of signal and ground lines. Replace the sensor, if necessary.
5.5		3	Knife Pressure Sensor (Header)	High Voltage	Signal voltage higher than expected. Check wiring and connector to ensure isolation of signal and sensor power lines. Replace the sensor, if necessary.
5.6		4	Knife Pressure Sensor (Header)	Knife Pressure (Header) low	Knife pressure is outside of acceptable operating range (low). Beware that there is the potential for header damage if knife is run for a prolonged period.

5.7.3 Troubleshooting Timed Double-Knife Module

The touch encoder display provides is the diagnostic information for the electronic timed double-knife system. It displays any error codes received from the electronic timed double-knife module. The tables below describes the error codes.

The power on LED shows errors that are encountered during the power on self test that the module performs.

Table 5.11 Error Codes of the Power ON LED

Power LED	Error Name	Description
Green	No error	While there is no error the LED remains green
Always Red	Flash ROM error	System supervisor encountered a flash ROM CRC error during booting up. System is halted. Please contact your Dealer.
LED is continuously fast flashing red (5 Hz)	EEPROM error	System supervisor encountered a EEPROM read error during POST or a EEPROM write error during runtime. If the error persist, please contact your Dealer.
LED flashes 3x red, then green for app. 300 ms	UE error	System encountered a low voltage power supply error during runtime. The value of UE is below the value u8_UEmin that is configured during the system supervisor initialization. This error is temporary.
LED flashes 2x red, then green for app. 500 ms	USYS error	System encountered an error on the system voltages during runtime. This error can be seen during start up until x(s)_sys_init was called by the application. The function x(s)_sys_init initializes the system voltages.
LED flashes 1x red, then green for app. 700 ms	Watchdog error	System encountered a watchdog error. The watchdog wasn't retriggered in time.

Table 5.12 LED Assignment of Flash loader

LED Name	Color	Blink Code	Description
Power on LED	Red Green	LED flashes 2x red, then green for approximately 500 ms	USYS error blink code. This error will be active until the system is initialized. When the Flashloader mode is active, the Power ON LED indicates an USYS error, because during Flashloader mode the system voltages are not initialized yet.

Table 5.13 Error Codes of the User LED

User LED	Flash Loader Status	Description
Red	Wait for Request / Application CRC error	At power-up, the device checks the active communication interfaces for a short time if there is any request, e.g. from the openSYDE PC tool. • If no request is received within that time, the Flashloader tries to start the user application. Therefore, on a power-up with a valid application, there is only a short red flash of the User LED. • If no valid application is available, the Flashloader stays in Flashloader mode and waits for a request from the openSYDE PC tool.
Red	Flashloader CRC error	The Flashloader detected a signature error in its own memory area. To avoid undefined behavior, the Flashloader is not executed and will not respond to the openSYDE PC tool. This state can only be reached due to a severe internal error. Verify the communication settings to make sure that the red LED indicates a Flashloader CRC error and not an application CRC error. If the ECU still does not respond, contact your Dealer.
Green	Sleep	When Flashloader mode is requested with the openSYDE PC tool, the ECU will restart, but will not jump to a valid application. This state is also entered if the flash request flag has been set by the application.
Green	Active	A connection has been established with the openSYDE PC tool, the Flashloader is ready for flash programming, or flash programming is in progress.
Off	Reset / Application start	The User LED will be switched off before a user application is started.

5.8 Header Side Drapers

There are two side drapers, one on each side of the header. Replace the drapers if they are torn, cracked, or missing slats.

5.8.1 Removing Side Drapers

Replace the drapers if they are torn, cracked, or missing slats.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

WARNING

Ensure that all bystanders have cleared the area.

1. Start the engine. For instructions, refer to the windrower operator's manual.
2. Raise the reel fully.
3. Raise the header fully.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the header safety props.
6. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
7. Move the draper until the draper joint is in the work area.
8. Release the tension on the draper. For instructions, refer to *5.8.3 Adjusting Draper Tension, page 248*.

9. Remove nuts and screws (A), and tube connectors (B) from the draper joint.
10. Remove screws (C), bridge connector (D), and nuts from the front end of the draper joint.
11. Pull the draper from the deck.

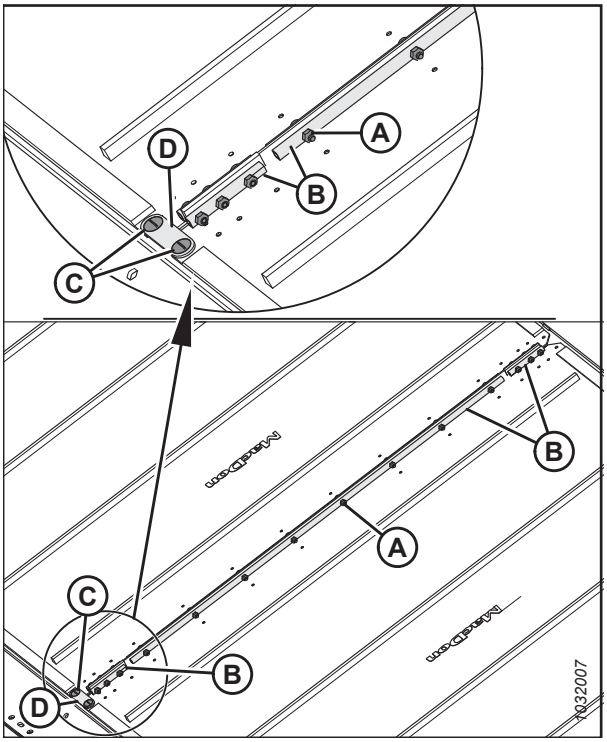


Figure 5.81: Draper Connectors

5.8.2 Installing Drapers

Side drapers are used to bring cut crop to the center of the header. To ensure they are installed correctly, follow the recommended installation procedure provided here.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

1. Start the engine. For instructions, refer to the windrower operator's manual.
2. Raise the reel fully.
3. Raise the header fully.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the header safety props.
6. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
7. Apply talc, baby powder, or talc/graphite lubricant mix to the underside of the draper guides and to the draper surface that forms the seal with the cutterbar.
8. Insert the draper into the deck at the inboard end at the drive roller. Pull the draper into the deck while feeding it at the end.
9. Feed in the draper until it can be wrapped around the drive roller.

10. Insert the opposite end of the draper into the deck over the rollers. Pull the draper fully into the deck.

11. Attach the ends of the draper with tube connectors (B), screws (A) (with the heads facing the center opening), and nuts.

    NOTE:

    The two short tube connectors are attached at the front and rear of the draper.

12. Install bridge connector (D) using screws (C) and the nuts at the front end of the draper joint.

    NOTE:

    Hold screws (C) at a 90° angle to bridge connector (D) while tightening the nuts. Allowing the screws to rotate while tightening will cause the bridge connector to bow up.

13. Torque the nuts to 9.5 Nm (84 lbf·in).

14. Adjust the draper tension. For instructions, refer to *5.8.3 Adjusting Draper Tension, page 248*.

15. Operate the drapers with the engine at idle so the talc or talc/graphite lubricant makes contact and adheres to the draper seal surfaces.

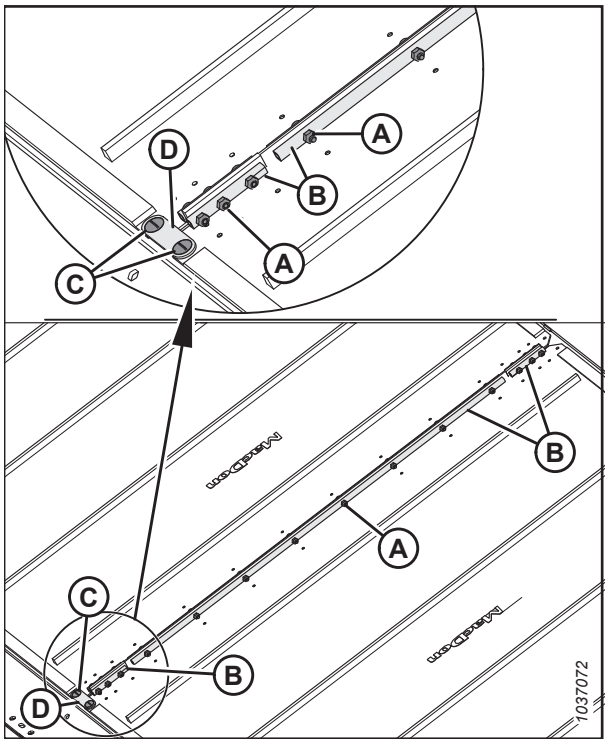


Figure 5.82: Draper Connectors

5.8.3 Adjusting Draper Tension

The tension on the drapers can be adjusted using the draper tension adjusters on the end of each draper.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine, remove the key, and engage the vehicle's safety props before going under the machine for any reason.

IMPORTANT:

The draper tension is set at the factory, and should not require adjustment. If adjustment is necessary, ensure that the tension is set so that the draper does not slip or sag below the cutterbar. Excessive tension on the draper can damage the draper drive and rollers.

1. Ensure that tension indicator (A) covers the inboard half of the window.

DANGER

Ensure that all bystanders have cleared the area.

2. Start the engine.
3. Raise the header fully.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the header safety props. For instructions, refer to the windrower operator's manual.

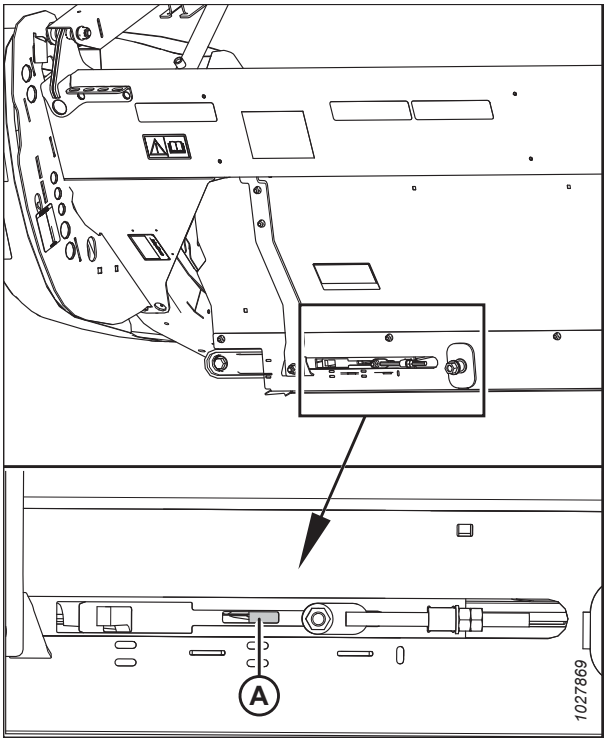


Figure 5.83: Checking Left Tension Adjuster

6. Ensure that the draper guide (the rubber track on the underside of the draper) is properly engaged in groove (A) of the drive roller.

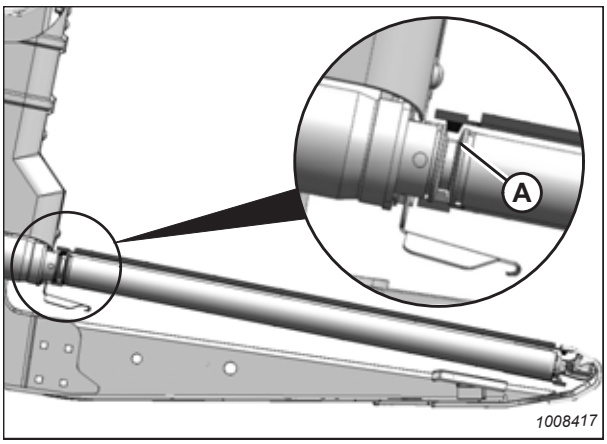


Figure 5.84: Drive Roller

7. Ensure that idler roller (A) is between guides (B).

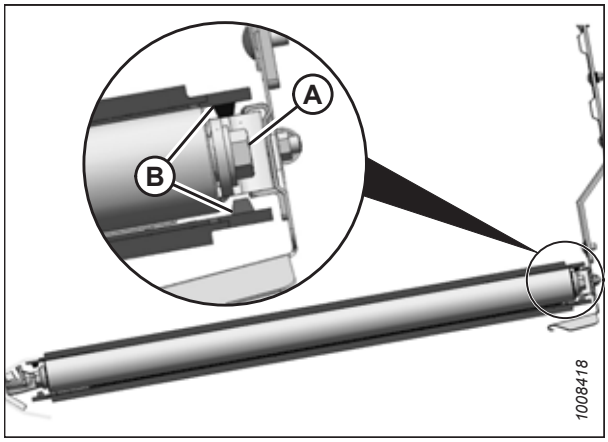


Figure 5.85: Idler Roller

IMPORTANT:

Do **NOT** adjust nut (C). This nut is used for draper alignment only.

8. Turn adjuster bolt (A) clockwise to increase the tension on the draper; turn bolt (A) counterclockwise to decrease the tension on the draper. Tensioner indicator (B) will move inboard to show that the draper is tightening. Tighten the adjuster bolt until the tensioner indicator covers the inboard half of the window.

IMPORTANT:

To avoid premature failure of the draper, draper rollers, and/or tightener components, do **NOT** operate the header when the tension indicator is not visible.

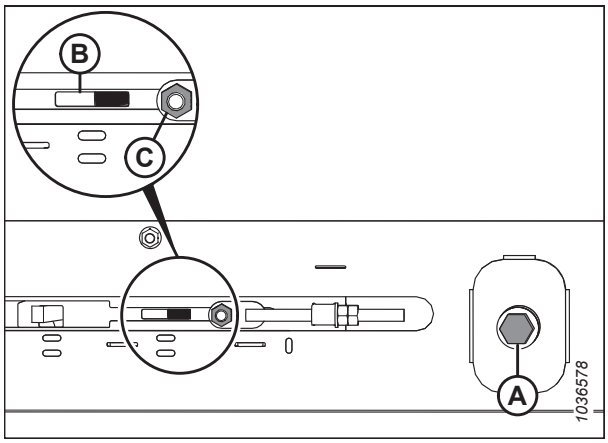


Figure 5.86: Adjusting Left Tensioner

5.8.4 Adjusting Draper Tracking

To ensure that the side drapers rotate smoothly without rubbing the side of the header frame, the side draper tracking may need to be adjusted.

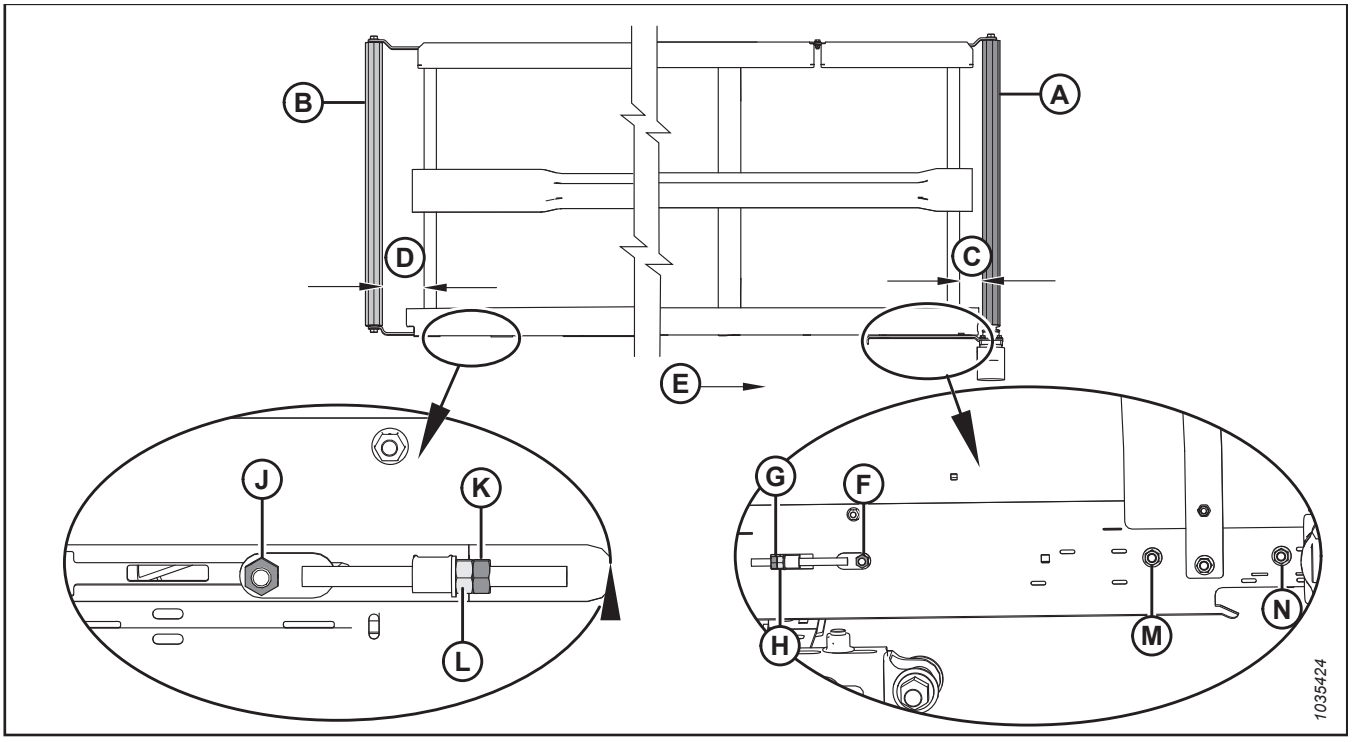


Figure 5.87: Draper Tracking Adjustments – Left Draper

A - Drive Roller
B - Idler Roller
C - Drive Roller Adjust
D - Idler Roller Adjust
E - Draper Direction
F - Nut on Drive Roller Side
G - Jam Nut for Drive Roller
H - Adjuster Nut for Drive Roller
J - Nut on Idler Roller Side
K - Jam Nut for Idler Roller
L - Adjuster Nut for Idler Roller
M - Nut on Drive Roller Side
N - Nut on Drive Roller Side

1. To determine which roller requires adjustment and which adjustments are necessary, refer to the following table:

Table 5.14 Draper Tracking

Tracking Tendency	Location	Adjustment	Method
Toward backsheet	Drive roller	Increase **C**	Tighten adjuster nut (H)
Toward cutterbar	Drive roller	Decrease **C**	Loosen adjuster nut (H)
Toward backsheet	Idler roller	Increase **D**	Tighten adjuster nut (L)
Toward cutterbar	Idler roller	Decrease **D**	Loosen adjuster nut (L)

2. Adjust drive roller (A) to change **C** (refer to Table *5.14, page 251* and Figure *5.87, page 251*) as follows:
   a. Loosen nuts (F), (M), and (N), and jam nut (G).
   b. Turn adjuster nut (H).
   c. Tighten nuts (F), (M), and (N), and jam nut (G).
3. Adjust idler roller (B) to change **D** (refer to Table *5.14, page 251* and Figure *5.87, page 251*) as follows:
   a. Loosen nut (J) and jam nut (K).
   b. Turn adjuster nut (L).

   NOTE:
   If the draper does not track at the idler roller end after the idler roller has been adjusted, the drive roller is likely not in line with the deck. Adjust the drive roller, and then readjust the idler roller.
   c. Tighten nut (J) and jam nut (K).

5.8.5 Draper Roller Maintenance

The draper rollers have non-greaseable bearings; however, the external seal should be checked every 200 hours (more frequently in sandy conditions) to achieve maximum bearing life.

Inspecting Draper Roller Bearing

The draper rollers have non-greaseable bearings; however, the external seal should be checked every 200 hours (more frequently in sandy conditions) to achieve maximum bearing life.

Using an infrared thermometer, check for faulty draper roller bearings as follows:

1. Engage the header and run the drapers for approximately 3 minutes.
2. Check the temperature of the draper roller bearings at each of roller arms (A), (B), and (C) on each deck. Ensure the temperature does not exceed 44°C (80°F) above the ambient temperature.

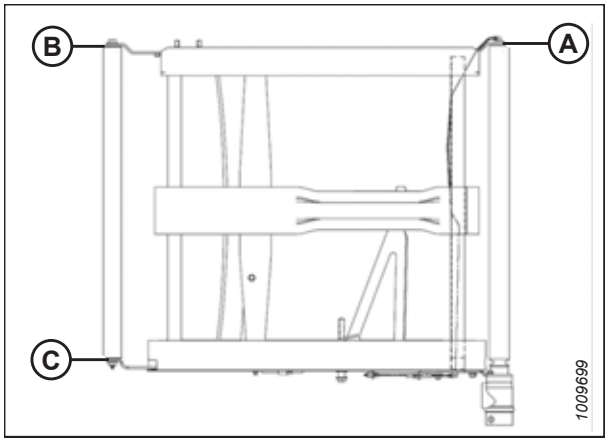


Figure 5.88: Roller Arms

Removing Draper Idler Roller

The side draper deck has a roller on either end of the deck. One is the idler roller and one is the drive roller.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine and engage the header until the side draper connector is accessible (preferably close to the outboard end of the deck).
2. Raise the header fully.
3. Raise the reel fully.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the header safety props.
6. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
7. Loosen the draper by turning adjuster bolt (A) counterclockwise until the adjuster bolt runs out of adjustment and hits a hard stop.

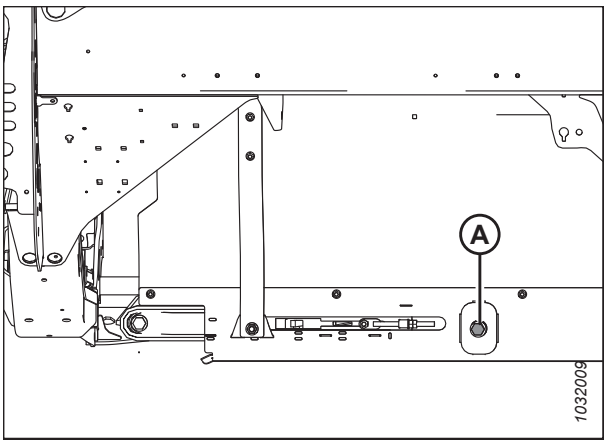


Figure 5.89: Tensioner – Left Side Shown

8. Remove screws (C), bridge connector (D), and nuts from the front end of the draper joint.
9. Remove nuts and screws (A) and tube connectors (B) from the draper joint.
10. Pull the draper off the idler roller.

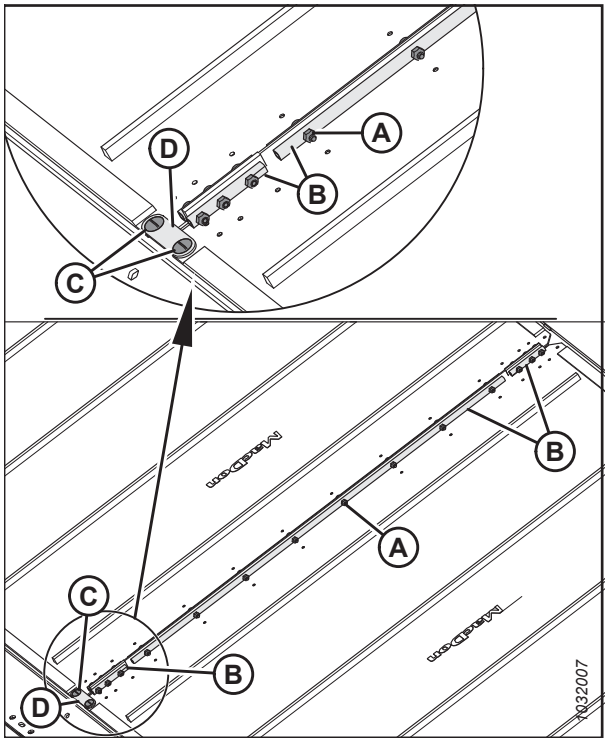


Figure 5.90: Draper Connectors

11. Remove bolt (A) and washer from the idler roller at the back of the header deck.
12. Remove bolt (B) and washer from the idler roller at the front of the header deck.
13. Spread roller arms (C) and (D), and remove the idler roller.

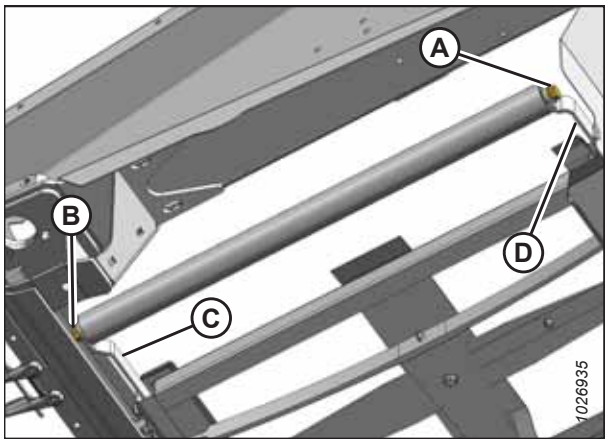


Figure 5.91: Idler Roller

Replacing Draper Idler Roller Bearing

The side draper deck idlers rollers have bearings installed to allow the roller to turn.

1. Remove draper deck idler roller. For instructions, refer to *Removing Draper Idler Roller, page 252*.

2. Clamp idler roller tube (C) in a vise with cloth wrapped around the roller to prevent damage to the roller.
3. Remove bearing assembly (A) and seal (B) from roller tube (C) as follows:
   a. Attach slide hammer (D) to threaded shaft (E) in the bearing assembly.
   b. Tap out bearing assembly (A) and seal (B).
4. Clean the inside of roller tube (C), check the tube for signs of wear or damage, and replace if necessary.

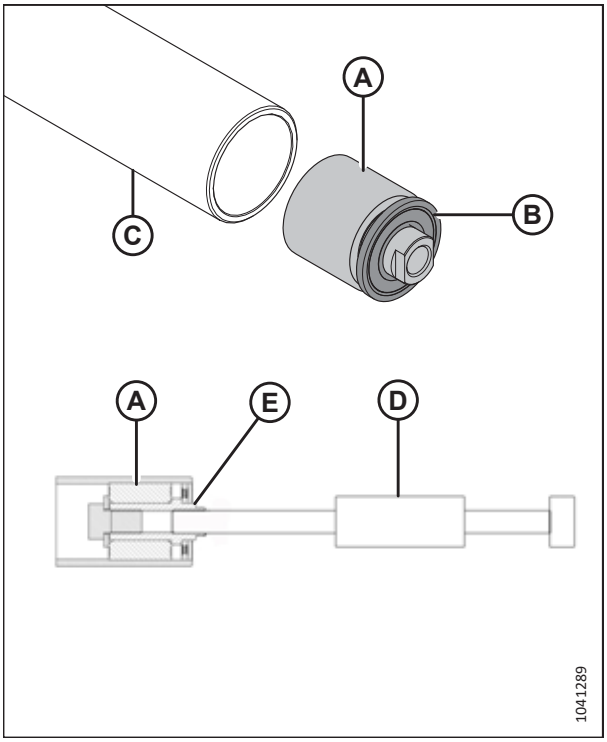


Figure 5.92: Idler Roller Bearing and Seal

IMPORTANT:

When installing the new bearing, do **NOT** place the end of the roller directly onto the ground. Bearing assembly (A) protrudes past roller tube (B), and placing the end on the ground will push the bearing farther into the tube.

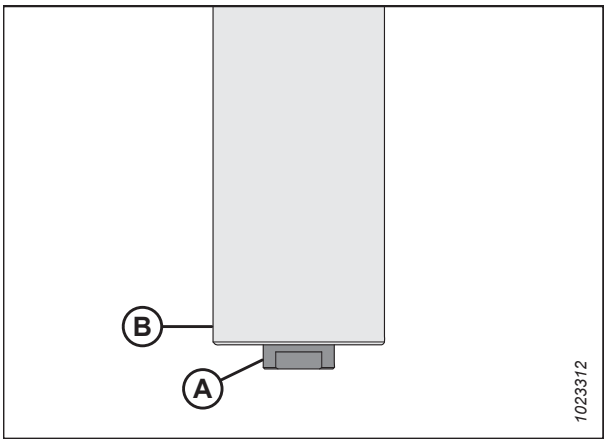


Figure 5.93: Idler Roller

5. Cut a relief (A) into a block of wood.
6. Place the end of idler roller (B) onto the block, with the protruding bearing assembly inside relief (A).

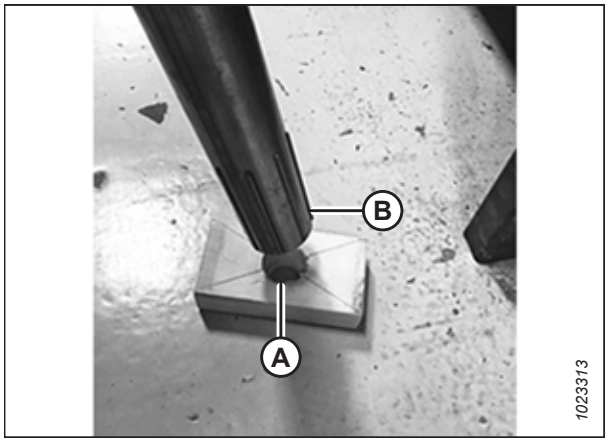


Figure 5.94: Idler Roller

7. Install new bearing assembly (C) by pressing the outer race of the bearing into the tube until it is 14–15 mm (9/16–19/32 in.) (B) from the outside edge of the tube.

   NOTE:

   Before installing new seal, fill area (A) with approximately 8 pumps of grease.

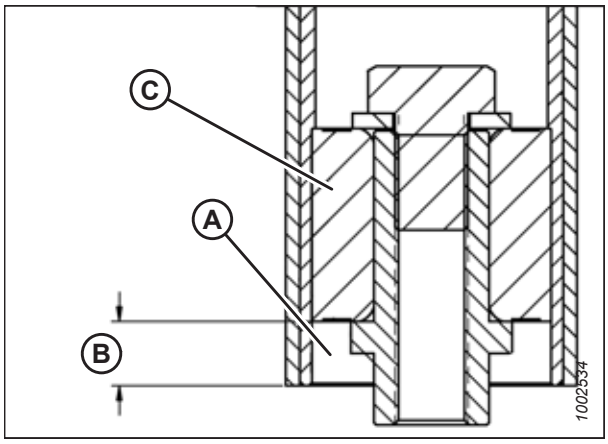


Figure 5.95: Idler Roller Bearing

8. Install new seal (A) by pressing on the inner and outer race of the seal until it is 3–4 mm (1/8–3/16 in.) (B) from the outside edge of the tube.

   NOTE:

   The seal can be oriented in either direction.

9. Reinstall the idler roller. For instructions, refer to *Installing Draper Idler Roller, page 257*.

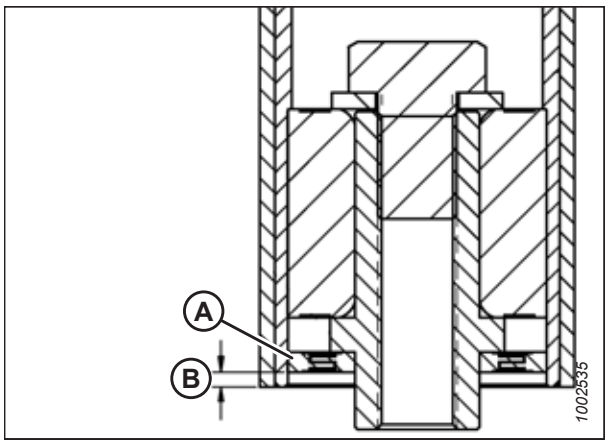


Figure 5.96: Idler Roller Bearing

Installing Draper Idler Roller

The side draper deck has a roller on each end of the deck. One is the idler roller and one is the drive roller. If the idler roller is worn or damaged, it will need to be replaced.

1. Install idler roller (A) between idler arms (B).
2. Secure the roller with two bolts and washers (C). Tighten the bolts to 95 Nm (70 lbf·ft).

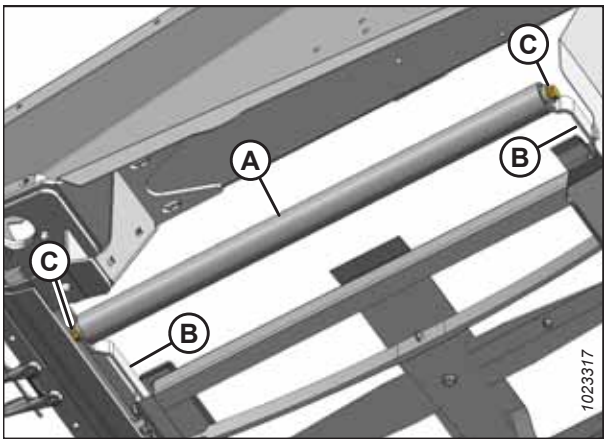


Figure 5.97: Idler Roller

3. Secure the ends of the draper with tube connectors (B) and screws and nuts (A).

   IMPORTANT:

   Install the screws so that the heads face inboard.

   NOTE:

   The two short tube connectors are attached at the front and rear of the draper.

4. Install bridge connector (D) using screws (C) and the nuts at the front end of the draper joint.

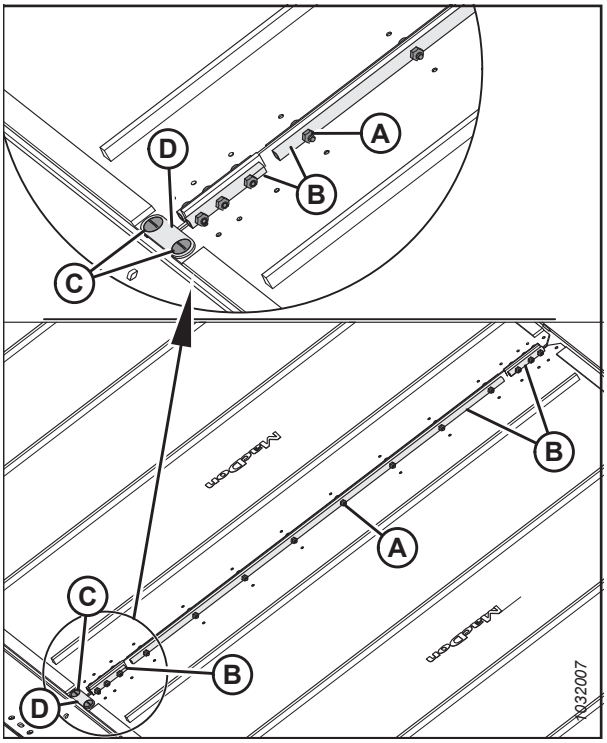


Figure 5.98: Draper Connector

5. Tighten the draper by turning adjuster bolt (A) clockwise. For instructions, refer to *5.8.3 Adjusting Draper Tension, page 248*.
6. Disengage the reel and header safety props.

DANGER

Ensure that all bystanders have cleared the area.

7. Start the engine.
8. Fully lower the header and the reel.
9. Engage the header. Ensure that the side drapers track correctly. For instructions on adjusting the drapers, refer to *5.8.3 Adjusting Draper Tension, page 248*.

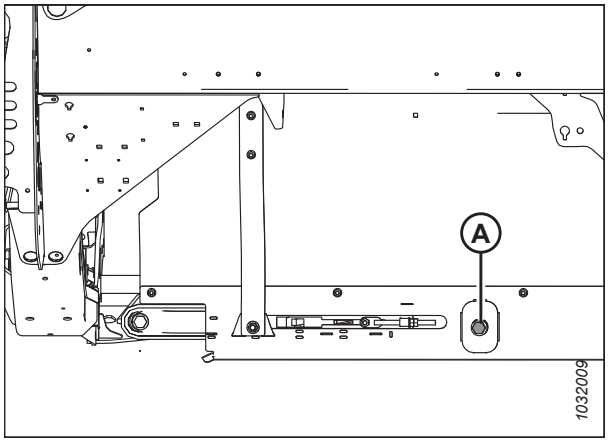


Figure 5.99: Draper Tensioner

Removing Side Draper Drive Roller

The side draper deck has a roller on either end of the deck. One is the idler roller and one is the drive roller.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Raise the header fully.
3. Raise the reel fully.
4. If the draper connector is not visible, engage the header until the connector is accessible at the outboard end of the deck.
5. Shut down the engine, and remove the key from the ignition.
6. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
7. Engage the header safety props.

8. Loosen the draper by turning adjuster bolt (A) counterclockwise until the adjuster bolt runs out of adjustment and hits a hard stop.

   IMPORTANT:

   Do **NOT** adjust nut (B). This nut is used for draper alignment only.

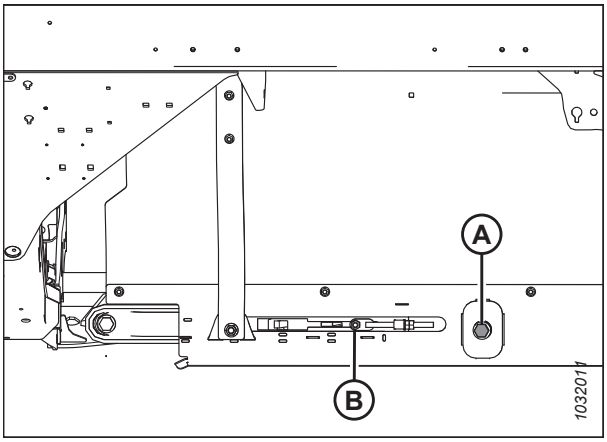


Figure 5.100: Draper Tensioner

9. Remove nuts and screws (A), and tube connectors (B) from the draper joint.
10. Remove screws (C), bridge connector (D), and the nuts from the front end of the draper joint.
11. Pull the draper off the drive roller.

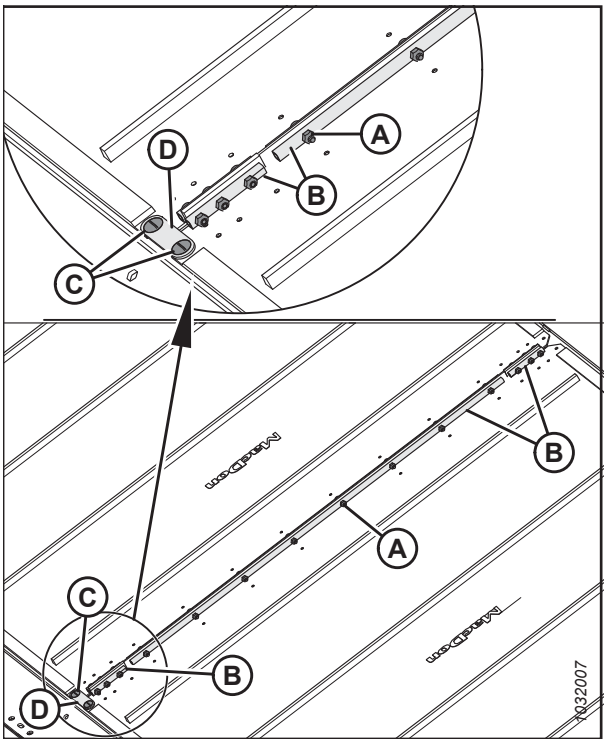


Figure 5.101: Draper Connectors

12. Align the set screws with guard hole (A). Remove the two set screws securing the motor to the drive roller.

    NOTE:

    The set screws are 1/4 turn apart.

13. Loosen two bolts (B) securing the motor to the drive roller arm.

    NOTE:

    It may be necessary to remove plastic shield (C) to gain access to the top bolt.

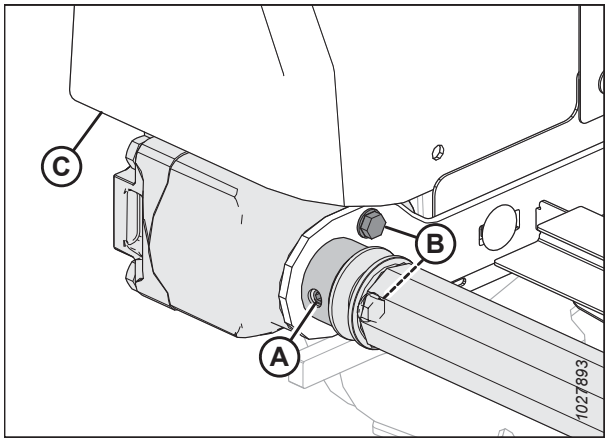


Figure 5.102: Drive Roller

NOTE:

It may be necessary to pry between the roller and bracket (A) to remove the roller from shaft. Take care not to lose the straight key

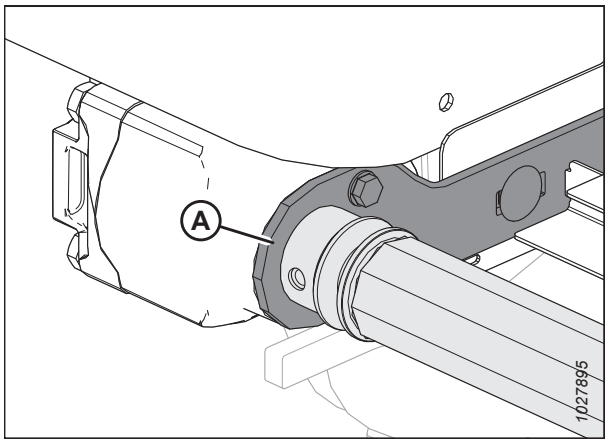


Figure 5.103: Drive Roller

14. Loosen two bolts (A) securing support arm (B).

15. Remove bolt (C) and the washer securing the opposite end of the drive roller to support arm (B).

16. Remove drive roller (D).

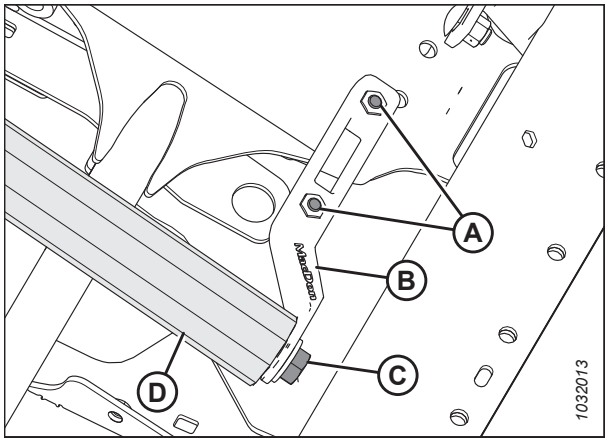


Figure 5.104: Drive Roller

Replacing Draper Drive Roller Bearing

You will need a slide hammer to remove and replace the bearing on a drive roller.

1. Remove the draper idler roller assembly. For instructions, refer to *Removing Side Draper Drive Roller, page 258*.
2. Clamp drive roller in a vise with cloth wrapped around the roller to prevent damage to the roller.
3. Remove bearing assembly (A) and seal (B) from roller tube (C) as follows:
   a. Attach slide hammer (D) to threaded shaft (E) in the bearing assembly.
   b. Tap out bearing assembly (A) and seal (B).
4. Clean the inside of roller tube (C), check the tube for signs of wear or damage, and replace it if necessary.

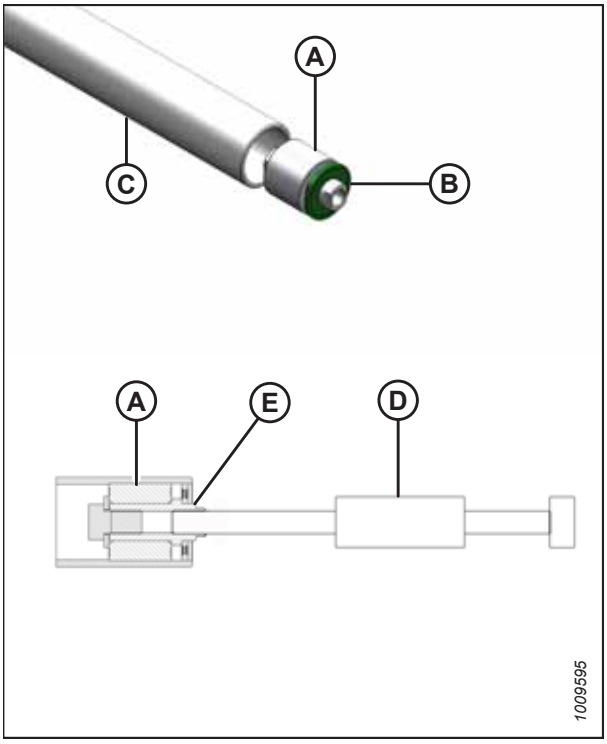


Figure 5.105: Roller Bearing

5. Install new bearing assembly (A) by pressing the outer race of the bearing into the tube until it is 14–15 mm (9/16–19/32 in.) (B) from the outside edge of the tube.
6. Apply grease in front of bearing assembly (A). Refer to the inside back cover of this manual for grease specifications.
7. Install new seal (C) at the roller opening, and install a flat washer (1.0 in. I.D. x 2.0 in. O.D.) on the seal.
8. Tap seal (C) into the roller opening with a suitably sized socket. Tap the washer and bearing assembly (A) until the seal is 3–4 mm (1/8–3/16 in.) (D) from the outside edge of the tube.

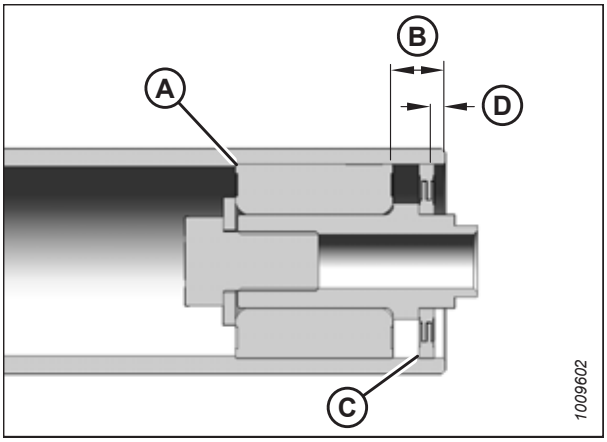


Figure 5.106: Roller Bearing

Installing Side Draper Drive Roller

The side draper deck has a roller on either end of the deck. One is the idler roller and one is the drive roller.

1. Position drive roller (A) between the roller support arms.
2. Secure the drive roller with washer and bolt (B).
3. Tighten bolts (C) on the support arm.
4. Torque bolt (B) to 95 Nm (70 lbf·ft).
5. Grease the motor shaft and insert it into the end of drive roller (A).

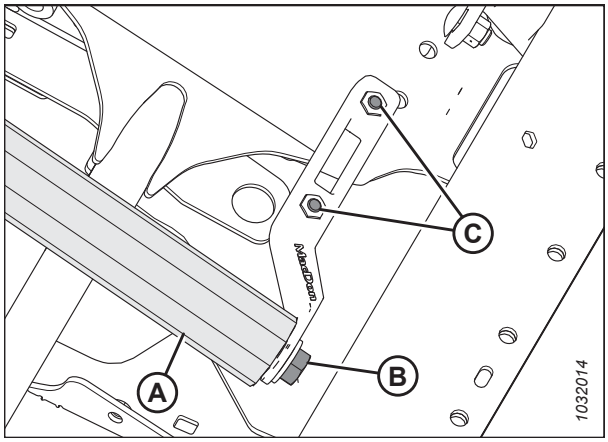


Figure 5.107: Drive Roller

6. Secure the motor to the roller support with two bolts (B). Torque the bolts to 27 Nm (239 lbf·in).
7. Ensure the straight key is in place on the motor shaft, and then insert the motor shaft all the way into the roller.
8. Tighten the two set screws (not shown) through access hole (A).

   NOTE:

   Tighten any loosened bolts and reinstall plastic shield (C), if previously removed.

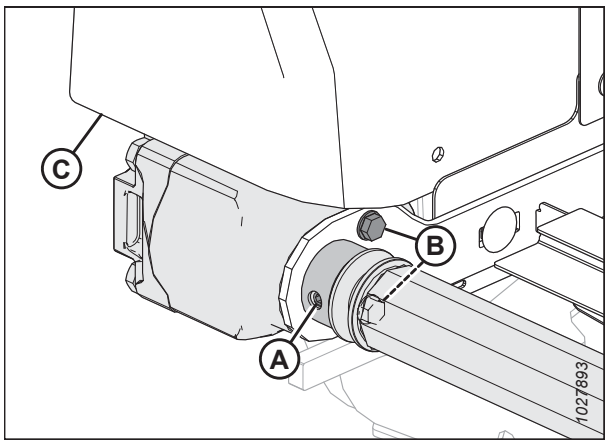


Figure 5.108: Drive Roller

9. Wrap the draper over the drive roller, and attach the ends of draper with tube connectors (B), screws (A) (with the heads facing the center opening), and nuts.

   NOTE:

   The two short tube connectors are attached at the front and rear of the draper.

10. Install bridge connector (D) using screws (C) and nuts at the front end of the draper joint.

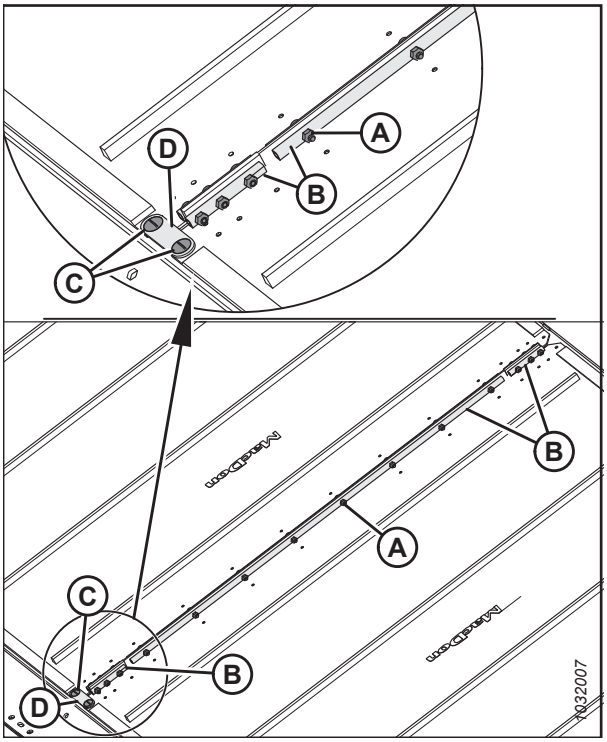


Figure 5.109: Draper Connector

11. Tighten the draper by turning adjuster bolt (A) clockwise. For instructions, refer to *5.8.3 Adjusting Draper Tension, page 248*.

12. Disengage the reel and header safety props. For instructions, refer to *Disengaging Reel Safety Props, page 42*.

DANGER

Ensure that all bystanders have cleared the area.

13. Start the engine, and lower the header and reel.

14. Run the machine to verify the draper tracks correctly. If additional adjustment is necessary, refer to *5.8.4 Adjusting Draper Tracking, page 251*.

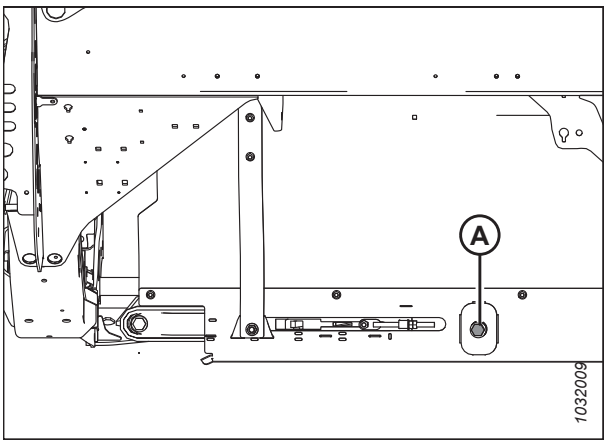


Figure 5.110: Draper Tensioner – Left Side Shown

5.8.6 Draper Deflectors

Removing Wide Draper Deflectors

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

1. Raise the reel fully.
2. Lower the header fully.
3. Shift the decks to create work space at one end of the header.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
6. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
7. Remove two M8 screws and washers (A) securing wide front left deflector (B) to C-bar seal end plate (C).
8. Remove seven M10 screws and nuts (D) securing wide front left deflector to end panel (E) and wide rear left deflector (F).
9. Remove wide front left deflector (B).

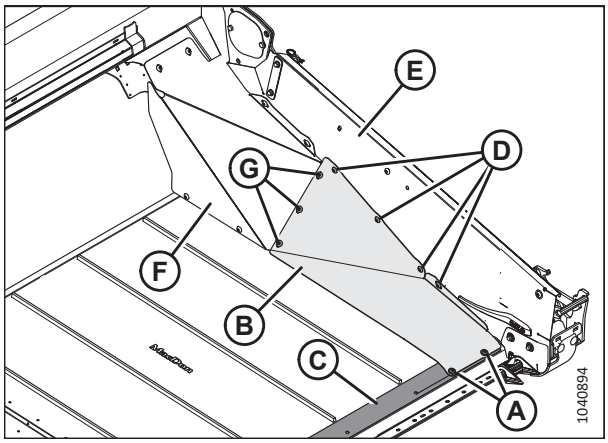


Figure 5.111: Wide Deflectors – Left Side Shown

10. Remove six M10 screws and nuts (A) securing wide rear left deflector (B) to end panel (C), back plate (D), and wide left deflector plate (E).
11. Remove wide rear left deflector (B).

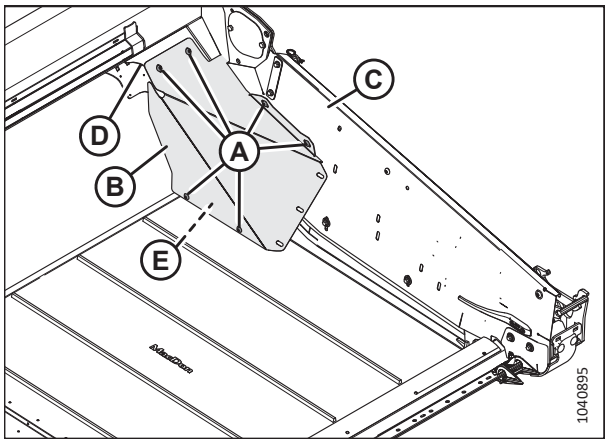


Figure 5.112: Rear Wide Deflector – Left Side Shown

12. Remove hex screw (B) securing wide left deflector plate (A).
13. Remove wide left deflector plate (A).
14. Repeat this procedure at the opposite end of the header.
15. Install the narrow draper deflectors. For instructions, refer to *Installing Narrow Draper Deflectors, page 268*.

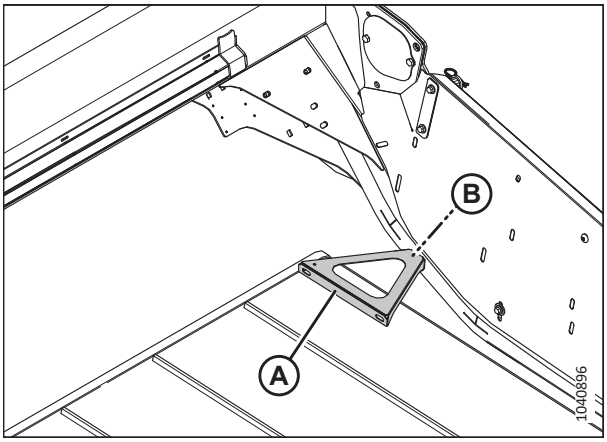


Figure 5.113: Wide Deflector Plate – Left Side Shown

Installing Wide Draper Deflectors

Wide draper deflectors provide better end delivery performance.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

1. Raise the reel fully.
2. Lower the header fully.
3. Shift the decks to create work space at one end of the header.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
6. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
7. Remove narrow draper deflectors. For instructions, refer to *Removing Narrow Draper Deflectors, page 267*.

8. Position wide left deflector plate (A) against the end panel as shown, and secure with hex screw (B).

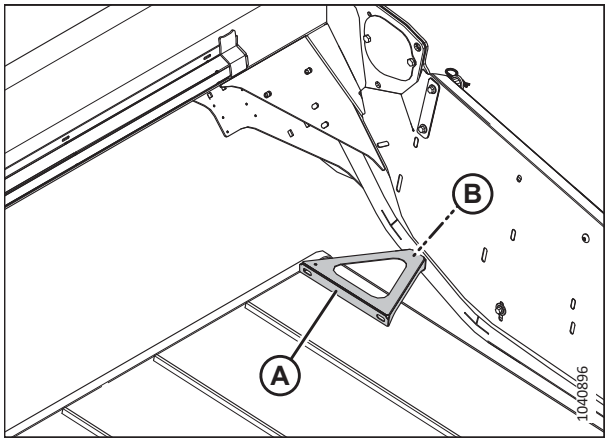


Figure 5.114: Wide Deflector Plate – Left Side Shown

9. Position wide rear left deflector (B) as shown.
10. Secure wide rear left deflector (B) to end panel (C), back plate (D), and wide left deflector plate (E) with six M10 screws and nuts (A).

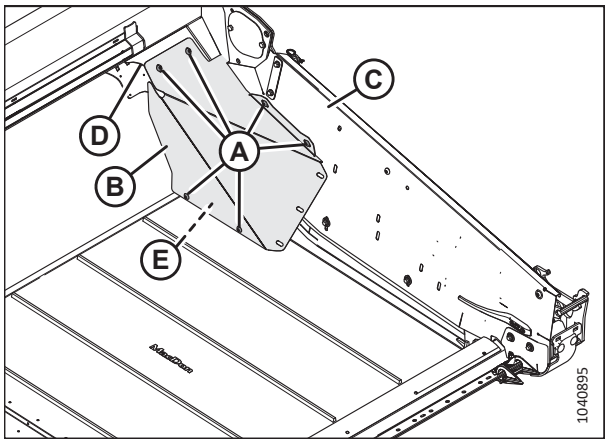


Figure 5.115: Rear Wide Deflector – Left Side Shown

11. Position wide front left deflector (B) on top of the C-bar seal end plate (C), wide rear left deflector (F), and end panel (E).
12. Loosely secure wide front left deflector (B) to C-bar seal end plate (C) using two M8 screws and washers (A).
13. Loosely secure wide front left deflector to end panel (E) using seven M10 screws and nuts (D).
14. Secure wide front left deflector to wide rear left deflector (F) using seven M10 screws and nuts (G).

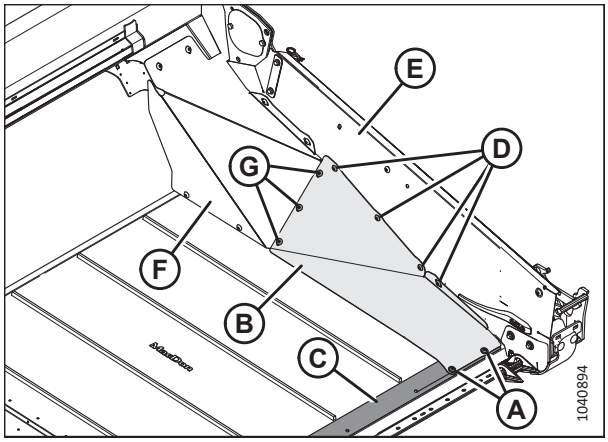


Figure 5.116: Wide Deflectors – Left Side Shown

15. Set a clearance of 25 mm (A) between rubber slat (B) and wide rear deflector (C). Tighten six bolts (D).
16. Set a clearance of 15 mm (E) between rubber slat (B) and wide front deflector (F). Tighten six bolts (G).
17. Repeat the above steps at the opposite end.
18. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.
19. After setting the recommended reel clearance to the cutterbar and while the reel is still fully lowered, move the reel back to ensure the steel end fingers do **NOT** contact the deflector shields.

    NOTE:

    If contact is detected, adjust the reel upward until contact with the deflector shields is avoided at all reel fore/aft positions. Alternatively, with the reel fully lowered, trim the steel end fingers until contact with the deflector shields is avoided at all reel fore/aft positions. Periodically monitor them to ensure contact is avoided and repeat the adjustment procedure if necessary.

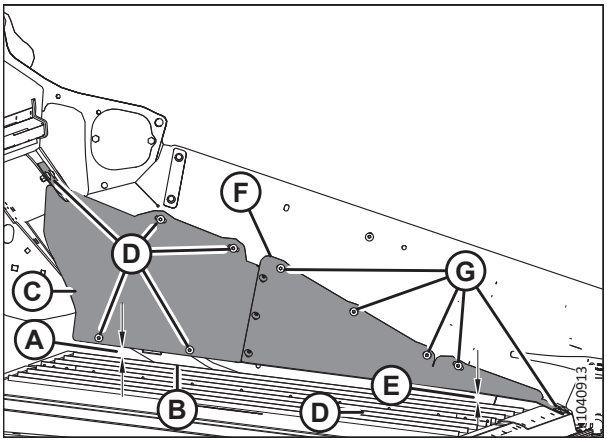


Figure 5.117: Deflectors – Left Side Shown

Removing Narrow Draper Deflectors

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

1. Raise the reel fully.
2. Lower the header fully.
3. Shift the decks to create work space at one end of the header.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.

6. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
7. Remove two Torx® head screws (A) and lock nuts.
8. Remove three carriage bolts (B) and lock nuts, and remove aft deflector (C).

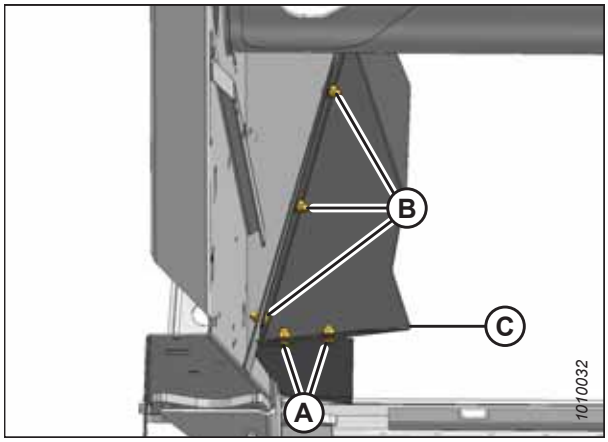


Figure 5.118: Aft Deflector

9. Remove four screws (A) and remove deflector (B).
10. Repeat this procedure for the opposite end of the header.

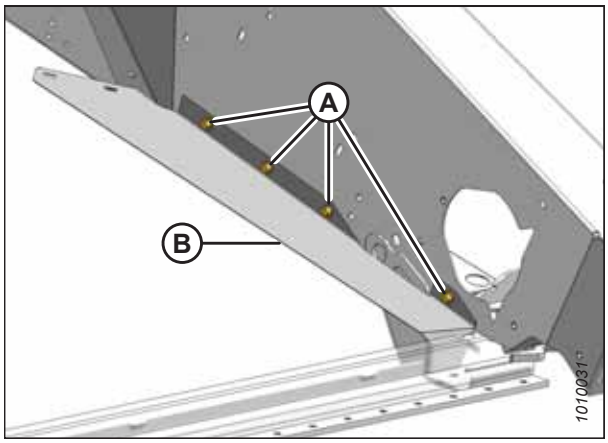


Figure 5.119: Forward Deflector

Installing Narrow Draper Deflectors

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

1. Raise the reel fully.
2. Lower the header fully.
3. Shift the decks to create work space at one end of the header.
4. Shut down the engine, and remove the key from the ignition.
5. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
6. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.

7. Position forward deflector (B) onto the endsheet and temporarily install forward and aft 3/8 in. x 5/8 in. self-tapping screws (A).
8. Check the fit of the forward end of deflector (B) on the cutterbar and ensure there is no gap between the deflector and cutterbar. Remove and bend the deflector as required to obtain the best fit.
9. Install two 3/8 in. x 5/8 in. self-tapping screws (C), then tighten all four screws (A) and (C).

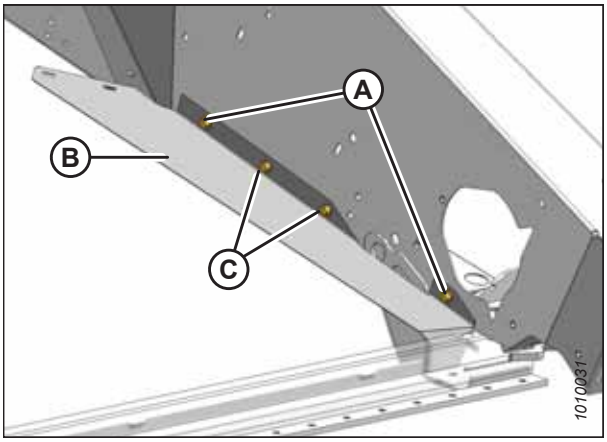


Figure 5.120: Forward Deflector

10. Position aft deflector (C) as shown and install three 3/8 in. x 3/4 in. carriage bolts (B) and lock nuts.
11. Install two Torx® head screws (A) and lock nuts with the heads facing down.
12. Tighten all fasteners.
13. Repeat this procedure for the opposite end of the header.

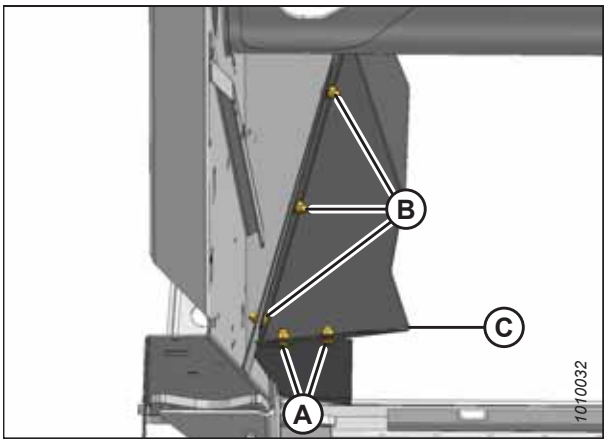


Figure 5.121: Aft Deflector

5.9 Reel

The reel features a uniquely shaped cam, which allows the fingers to get underneath lodged crop and pick it up before it is cut.

CAUTION

To avoid personal injury, before servicing the machine or opening the drive covers, refer to *5.1 Preparing Machine for Servicing, page 183*.

5.9.1 Reel-to-Cutterbar Clearance

There must be sufficient clearance between the reel fingers and the cutterbar to ensure that the reel fingers do not contact the cutterbar during operation. The clearance is set at the factory, but some adjustment.

Measure clearance (A) between the tip of the reel finger and the guard: guard (B) or short guard (C), depending on the configuration of the header. Compare the measurement to the specifications listed in the table below:

Table 5.15 Finger to Guard/Cutterbar Clearance – Single Reel

Header	End Panels
D215	20 mm (0.80 in.)
D220	20 mm (0.80 in.)
D225	25 mm (1 in.)

Table 5.16 Finger to Guard/Cutterbar Clearance – Double Reel

Header	End Panels	Beside Center Arm
D230 D235 D241	20 mm (0.80 in.)	20 mm (0.80 in.)

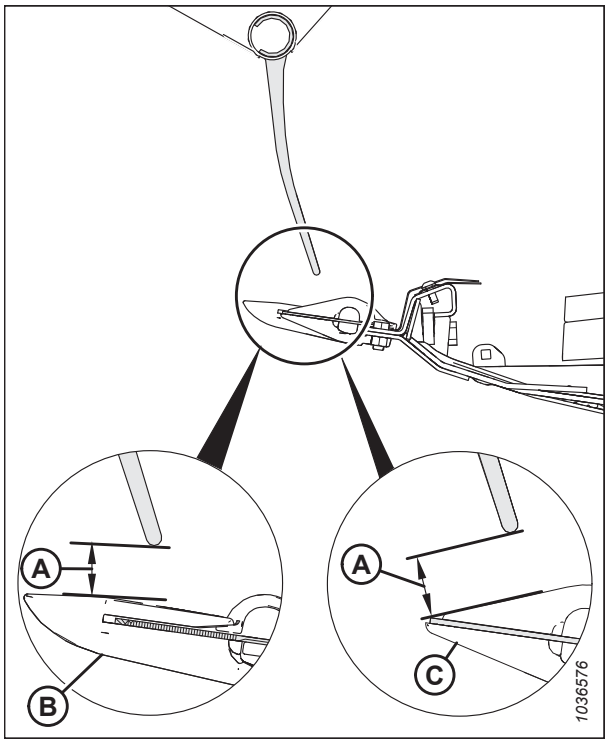


Figure 5.122: Finger Clearance

Measuring Reel to Cutterbar Clearance

Make sure there is sufficient clearance between the reel and the cutterbar to prevent the knife from cutting reel finger tips off during operation.

DANGER

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

DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine. For instructions, refer to the windrower operator's manual.
2. Park the windrower on a level surface.
3. Position the header so that the cutterbar is 254–356 mm (10–14 in.) off the ground.
4. Adjust the reel fore-aft position until sensor support (B) hides the number seven on fore-aft indicator (A).
5. Shut down the engine, and remove the key from the ignition.

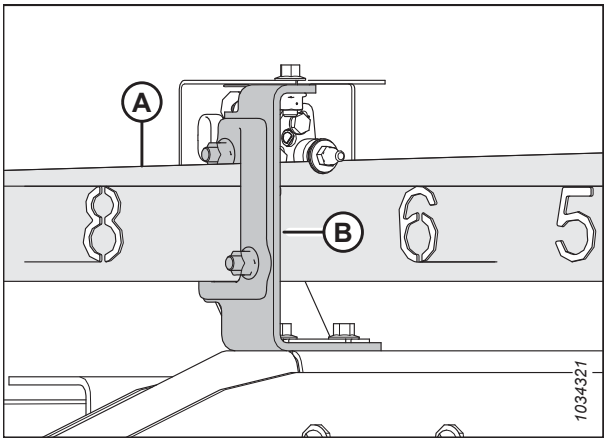


Figure 5.123: Fore-Aft Position

6. Rotate the reel by hand until a tine tube is directly above the cutterbar.
7. Measure and record clearance (A) from the finger tip to the top of pointed guard (B), or short guard (C). For clearance specifications, refer to *5.9.1 Reel-to-Cutterbar Clearance, page 270*.

   For measurement locations, refer to:

   - Figure *5.125, page 272* – single reel
   - Figure *5.126, page 272* – double reel
8. Adjust the reel clearance, if required. For instructions, refer to *Adjusting Reel-to-Cutterbar Clearance, page 272*.

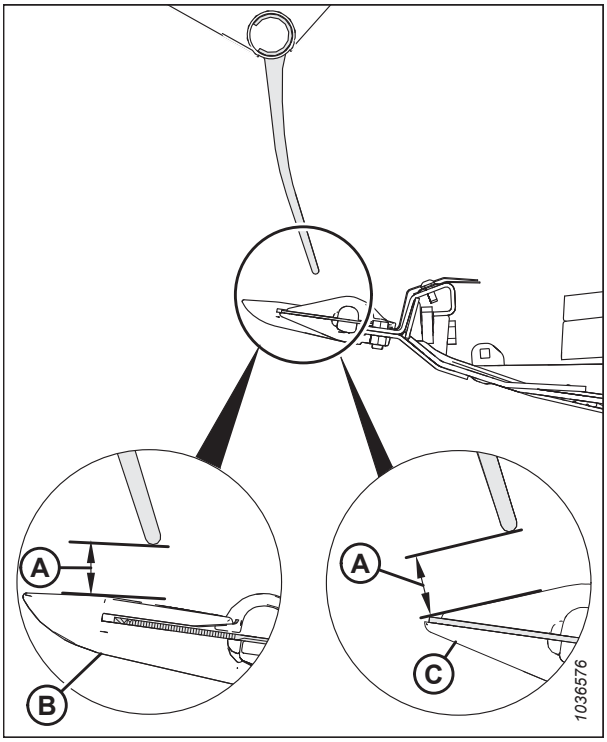


Figure 5.124: Measurement from Finger Tip to Guard

Single-reel measurement locations (A): Outer ends of the reel (two places).

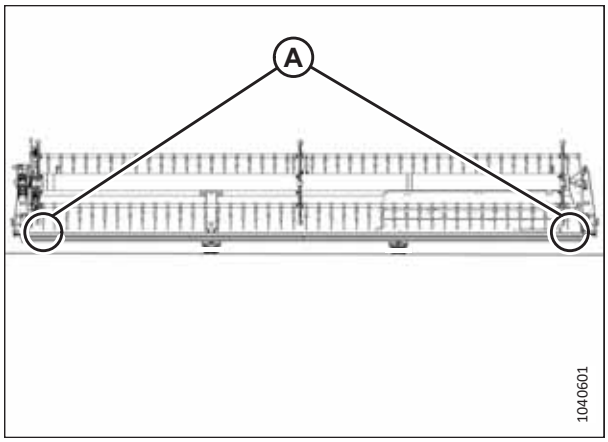


Figure 5.125: Single-Reel Measurement Locations

Double-reel measurement location (A): Both ends of both reels (four places).

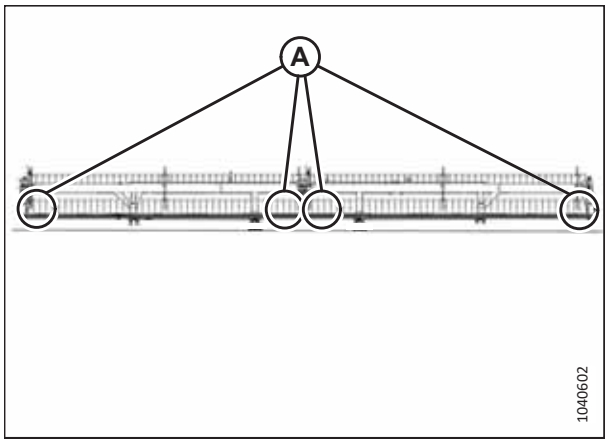


Figure 5.126: Double-Reel Measurement Locations

Adjusting Reel-to-Cutterbar Clearance

If the clearance between the reel fingers and the cutterbar is insufficient, it will need to be adjusted so that damage to the equipment does not occur.

NOTE:

This procedure can be performed with the reel fore-aft cylinders in either the standard position or the canola-harvesting position, as long as the fore-aft cylinders remain in that position for the duration of the procedure.

DANGER

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

WARNING

Ensure that all bystanders have cleared the area.

1. Measure the reel-to-cutterbar clearance. For instructions, refer to *Measuring Reel to Cutterbar Clearance, page 270*.
2. Start the engine.

3. Adjust the reel fore-aft position until the **7** on fore-aft indicator (A) is hidden by sensor support (B).

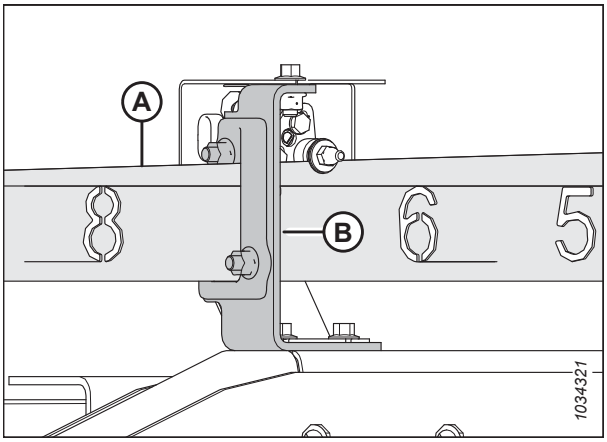


Figure 5.127: Fore-Aft Position

4. Position the header so that the cutterbar is 254–356 mm (10–14 in.) off the ground.
5. Lower the reel fully, and continue holding the control button down to phase the cylinders.
6. Shut down the engine, and remove the key from the ignition.
7. Adjust the clearance at the outboard ends of the reel as follows:
   a. Loosen bolt (A) on the outer arm cylinder.
   b. Adjust cylinder rod (B) as needed:
      - To increase the clearance between the reel fingers and the cutterbar, turn cylinder rod (B) out of the clevis.
      - To decrease the clearance between the reel fingers and the cutterbar, turn cylinder rod (B) into the clevis.
   c. Tighten bolt (A).
8. Repeat Step *7, page 273* on the opposite side of the header.

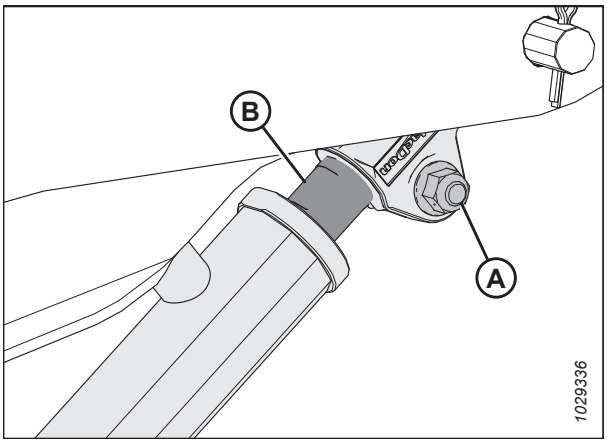


Figure 5.128: Outside Arm Cylinder

9. Loosen bolts (A) on both center arm cylinders.
10. Adjust the clearance as follows:

    IMPORTANT:

    Adjust both cylinder rods equally.

    - To increase the clearance between the reel fingers and the cutterbar, turn cylinder rods (D) out of the clevis.
    - To decrease the clearance between the reel fingers and the cutterbar, turn cylinder rods (D) into the clevis.
11. Ensure that distance measurement (B) is identical on both cylinders.

    NOTE:

    Distance measurement (B) runs from the center of mounting pins (C) to the tops of the notches in cylinder rods (D).
12. Ensure that both mounting pins (C) are **NOT** able to be rotated by hand. If one of the mounting pins is can be rotated, adjust cylinder rods (D) as needed:

    - Turn the cylinder rod out of the clevis to increase the load on the cylinder rod.
    - Turn the cylinder rod into the clevis to decrease the load on the cylinder rod.
13. Tighten bolts (A).

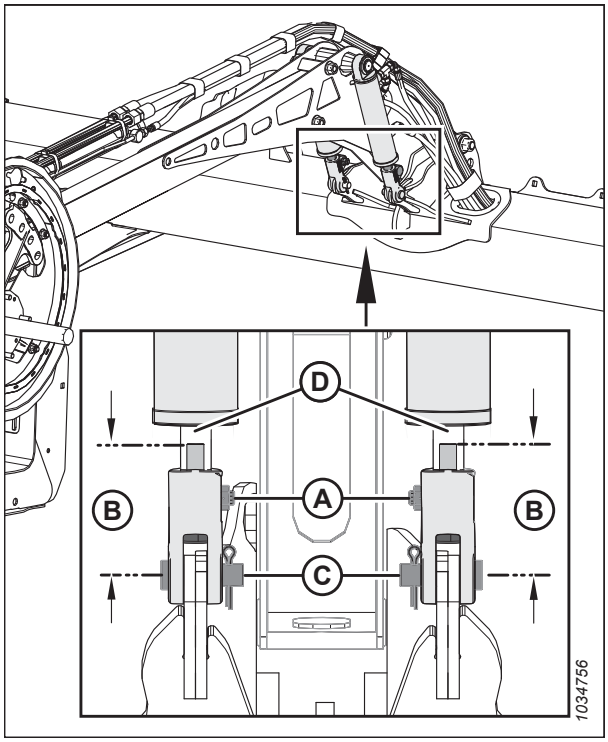


Figure 5.129: Center Arm Cylinders

DANGER

Ensure that all bystanders have cleared the area.

14. Start the engine.
15. Raise the reel fully.
16. Lower the reel fully, and continue holding the control button down to phase the cylinders.
17. Shut down the engine, and remove the key from the ignition.
18. Check the reel-to-cutterbar clearance measurements again. If necessary, repeat the adjustment procedures.
19. Move the reel back to ensure that the steel end fingers do not contact the deflector shields.
20. If the reel fingers contact the deflector shields, adjust the reel upward to maintain the clearance at all reel fore-aft positions. If contact still occurs after the reel is adjusted, trim the steel end fingers as needed.
21. Periodically check for evidence of contact during operation. Adjust the reel-to-cutterbar clearance as needed.

5.9.2 Centering Reel

The reel needs to be centered on the header to avoid any contact with the end panels.

DANGER

To prevent bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key before adjusting the machine.

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

Single-reel headers

5. At each location (B), measure the clearance (indicated by [A]) between the reel tine tube and the endsheet. The clearances must be within 20 mm (25/32 in.) of each other. if not, refer to the following steps to center the reel.

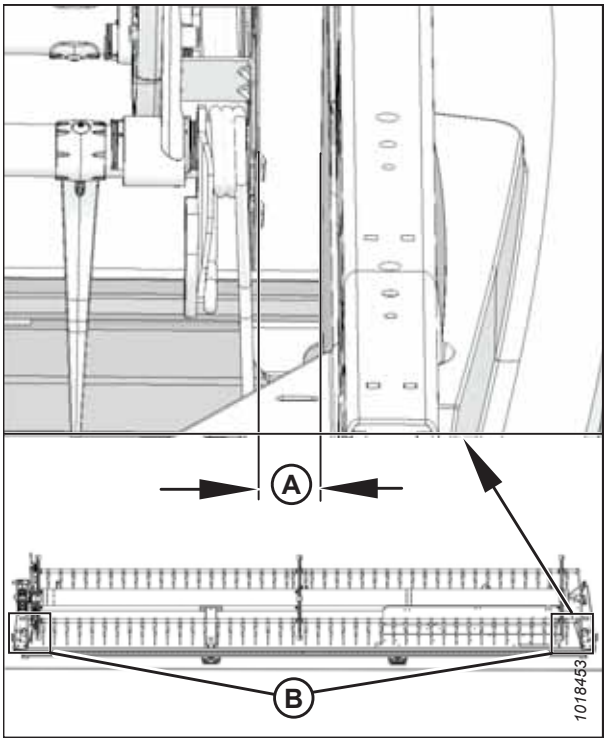


Figure 5.130: Clearance between Reel and Endsheet

6. Loosen bolt (A) on brace (B) at both ends of the reel.
7. Move the end of reel support arm (C) laterally, as needed, to center reel.
8. Tighten bolt and nut (A). Torque the nut to 457 Nm (337 lbf·ft).

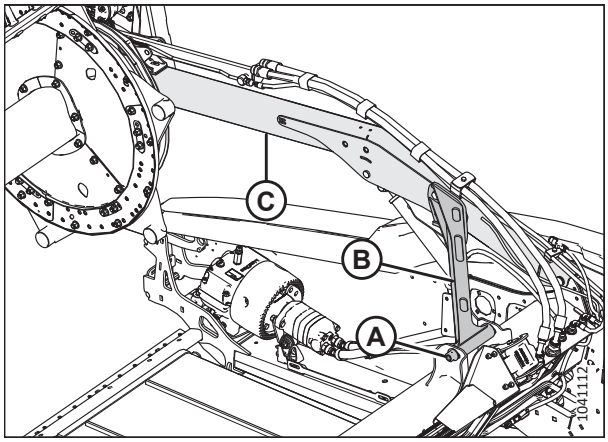


Figure 5.131: Single Reel Support Arm

Double-reel headers

9. Measure clearance (A) at locations (B) between the reel tine tube and the endsheet at both ends of the header. The clearances should be the same if the reel is centered.

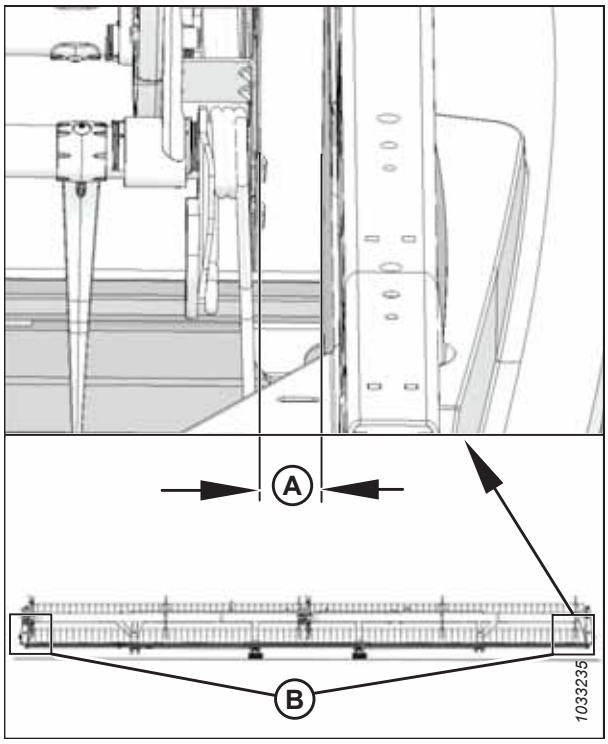


Figure 5.132: Clearance between Reel and Endsheet

10. Loosen bolt (A) on brace (B) at the center support arm.
11. Move the forward end of reel support arm (C) laterally as needed to center the reel.
12. Tighten bolt (A). Torque the bolt to 457 Nm (337 lbf·ft).

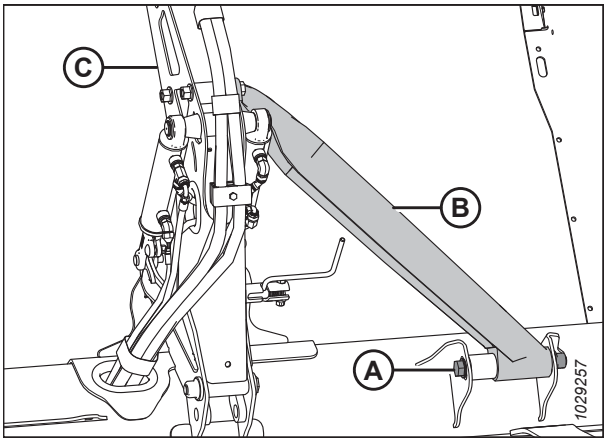


Figure 5.133: Double-Reel Center Support Arm

5.9.3 Reel Fingers

If a reel finger is damaged or worn, it will need to be removed so it can be replaced. Reel fingers are either steel or plastic.

IMPORTANT:

Keep the reel fingers in good condition and straighten or replace them as necessary.

Removing Steel Fingers

Damaged steel fingers will need to be cut off of the reel tine tube.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

IMPORTANT:

Ensure the tine tube is supported at all times to avoid damaging it and other components.

1. Lower the header fully.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Remove the tine tube bushings from the applicable tine tube at the center and left reel discs. For instructions, refer to *Removing Bushings from Reels, page 281*.

6. Attach tine tube arms (B) to the reel disc at original attachment locations (A).
7. Cut the damaged finger so it can be removed from the tine tube.
8. Remove bolts from the existing fingers and slide the fingers over to replace the finger that was cut off in Step *7, page 278* (remove tine tube arms [B] from the tine tubes as necessary).

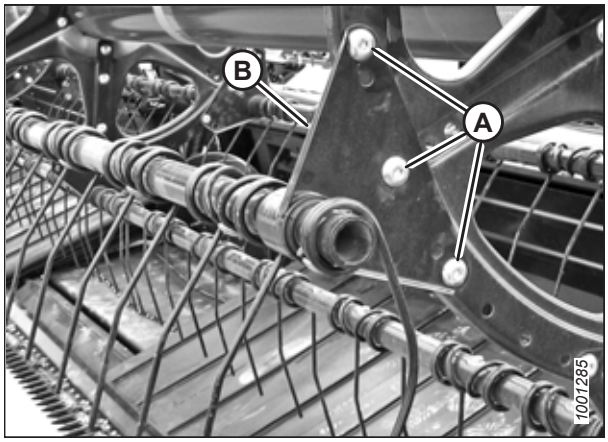


Figure 5.134: Tine Tube Arm

Installing Steel Fingers

Once the old steel finger has been removed, a new finger can be pushed onto the tine tube.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

IMPORTANT:

Ensure the tine tube is supported at all times to prevent damage to the tube and other components.

NOTE:

This procedure assumes a finger has been removed from the machine. For instructions about removing fingers, refer to *Removing Steel Fingers, page 277*.

1. Slide the new finger and tine tube arm (A) onto the end of the tube.
2. Install the tine tube bushings. For instructions, refer to *Installing Bushings onto Reels, page 283*.
3. Attach the fingers to the tine tube with bolts and nuts (B).

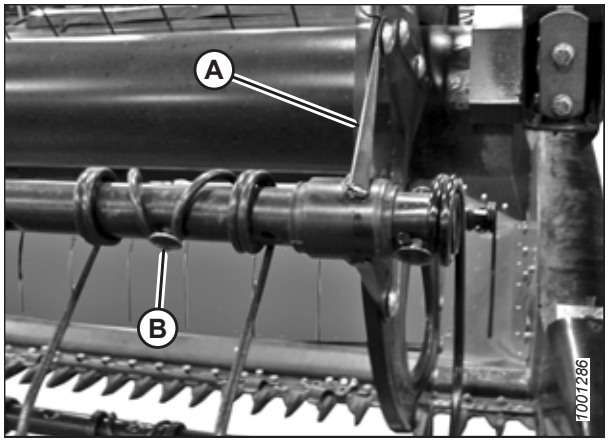


Figure 5.135: Tine Tube

Removing Plastic Fingers

Plastic reel fingers are secured to the tine tube with a single Torx® screw.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

1. Lower the header fully.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.
5. Remove screw (A) using a Torx® Plus 27 IP socket wrench.

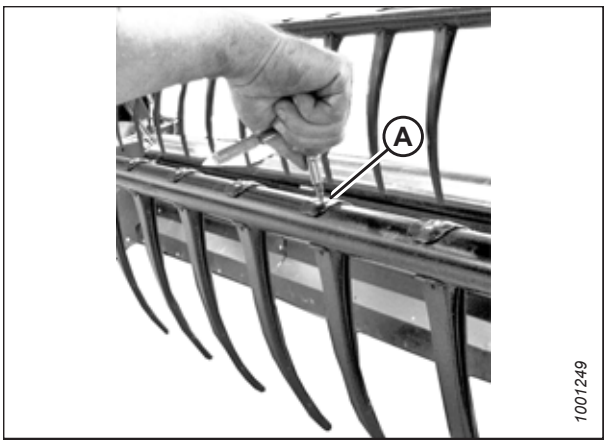


Figure 5.136: Removing Plastic Finger

6. Push the clip at the top of the finger back towards the reel tube as shown and remove the finger from the tube.

Figure 5.137: Removing Plastic Finger

Installing Plastic Fingers

Once the old plastic reel finger has been removed, the new one can be installed.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

NOTE:

This procedure assumes a finger has been removed from the machine. For information about removing fingers, refer to *Removing Plastic Fingers, page 279*.

1. Position the new finger on the rear of the tine tube. Engage the lug at the bottom of the finger in the lower hole in the tine tube.
2. Lift the top flange and rotate the finger as shown until the lug in the top of the finger engages the upper hole in the tine tube.

Figure 5.138: Installing Plastic Finger

3. Install screw (A) using a Torx® Plus 27 IP socket wrench and torque it to 8.5–9.0 Nm (75–80 lbf·in).

   IMPORTANT:

   Do **NOT** apply force to the finger prior to tightening the mounting screw. Applying force without tightening the mounting screw will break the finger or shear the locating pins.

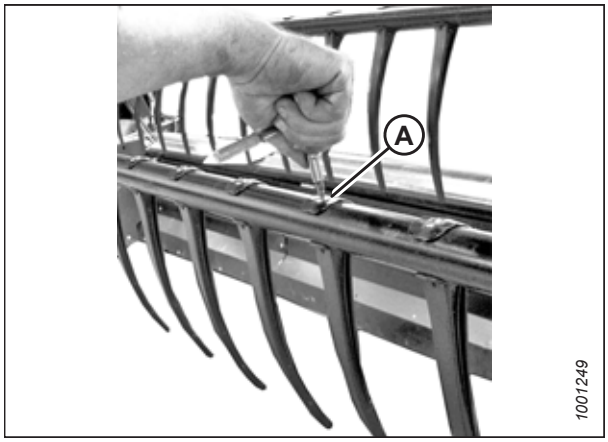


Figure 5.139: Installing Plastic Finger

5.9.4 Tine Tube Bushings

The reel tine tube rests in a tine tube bushing, which is secured to the reel disc. If a tine tube bushing is damaged or worn, it will need to be replaced.

Removing Bushings from Reels

The bushing clamps securing the tine tube to the bushing will need to be released so that the bushing halves can be removed.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

IMPORTANT:

Ensure the tine tube is supported at all times to prevent damage to the tube and other components.

1. Lower the header fully.
2. Raise the reel fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 41*.

   NOTE:

   If replacing only the cam end bushing, proceed to Step *10, page 282*.

Center disc and tail end bushings

5. Remove the reel endshields and endshield support (C) from the tail end of the reel at the applicable tine tube location.

   NOTE:

   There are no endshields on the center disc.

6. Remove bolts (A) securing tine tube arm (B) to the disc.

   IMPORTANT:

   Note the hole locations in the arm and disc and ensure bolts (A) are reinstalled at the original locations.

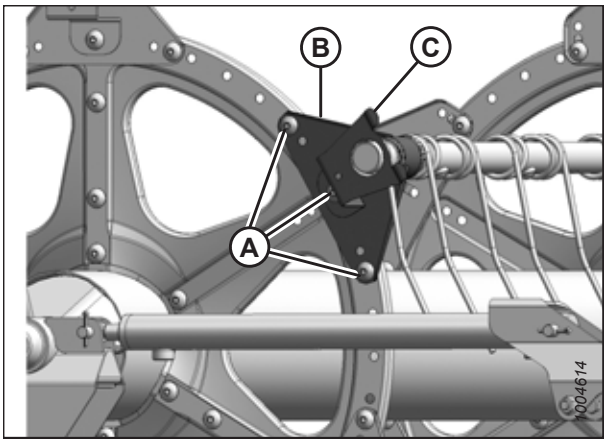


Figure 5.140: Tail End

7. Release bushing clamps (A) using a small screwdriver to separate the serrations. Pull the clamp off the tine tube.

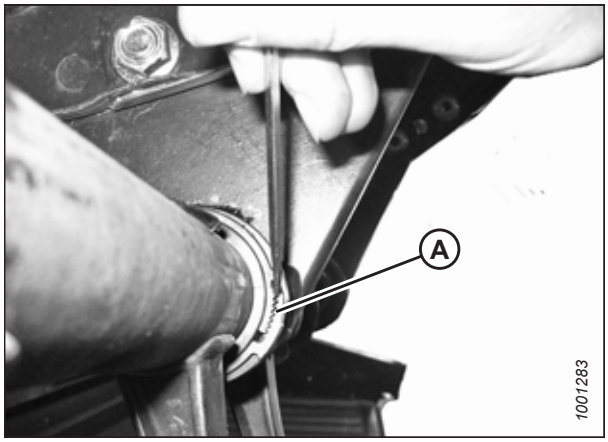


Figure 5.141: Bushing Clamp

8. Rotate tine tube arm (A) until clear of the disc and slide the arm inboard off of bushing (B).
9. Remove bushing halves (B). If necessary, remove the next finger, so that the arm can slide off of the bushing. Refer to the following procedures as needed:
   - *Removing Plastic Fingers, page 279*
   - *Removing Steel Fingers, page 277*

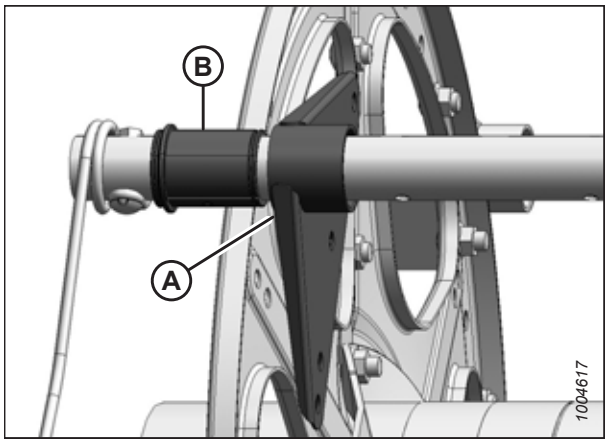


Figure 5.142: Bushing

Cam end bushings

10. Remove the endshields and endshield support (A) from the applicable tine tube location on the cam end.

    NOTE:

    Removing cam end bushings requires the tine tube to be moved through the disc arms to expose the bushing.

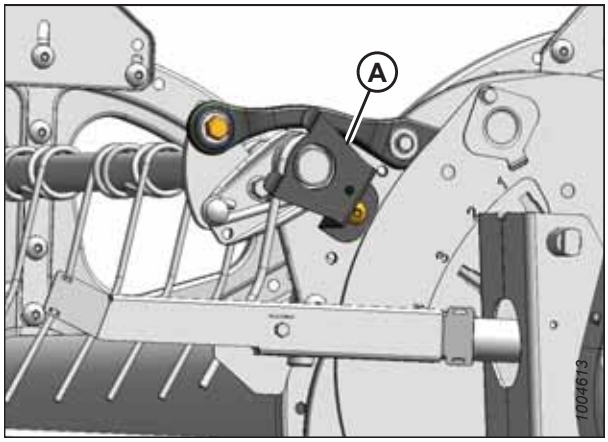


Figure 5.143: Cam End

11. Remove the reel endshields and endshield support (C) from the tail end of the reel at the applicable tine tube location.

    NOTE:

    There are no endshields on the center disc.

12. Remove bolts (A) securing tine tube arms (B) to the tail and center discs.

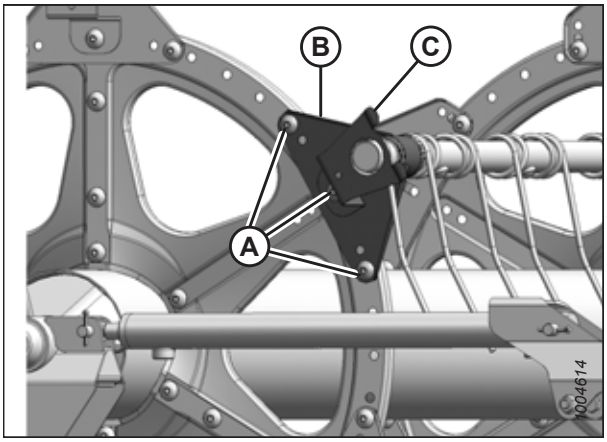


Figure 5.144: Tail End

Installing Bushings onto Reels

Once the old tine tube bushing halves have been removed, the new ones can be installed.

NOTE:

This procedure assumes the steps for *Removing Bushings from Reels, page 281* have been completed.

DANGER

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

WARNING

To prevent bodily injury from the fall of a raised reel, always engage the reel safety props before going under the raised reel for any reason.

IMPORTANT:

Ensure the tine tube is supported at all times to prevent damage to the tube or other components.

1. Use a pair of modified channel lock pliers (A) to install bushing clamps (C). Secure pliers in a vise and grind a notch (B) into the end of each arm to fit the clamp as shown.

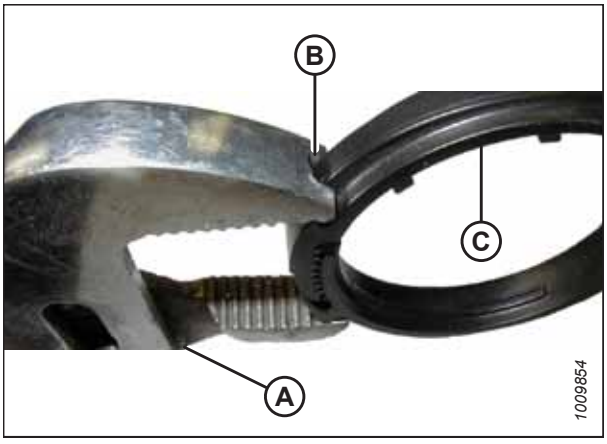


Figure 5.145: Modified Channel Lock Pliers

Cam end bushings

2. Position bushing halves (B) on tine tube (A) with the flangeless end adjacent to the tine tube arm, and position the lug in each bushing half into the hole in the tine tube.

3. Slide tine tube (A) towards the tail end of the reel to insert bushing (B) into the tine tube arm. If the tine tube supports are installed, ensure that the bushings at those locations slide into the support.

4. Reinstall the previously removed fingers. Refer to the following procedures as needed:

   - *Removing Plastic Fingers, page 279*
   - *Removing Steel Fingers, page 277*

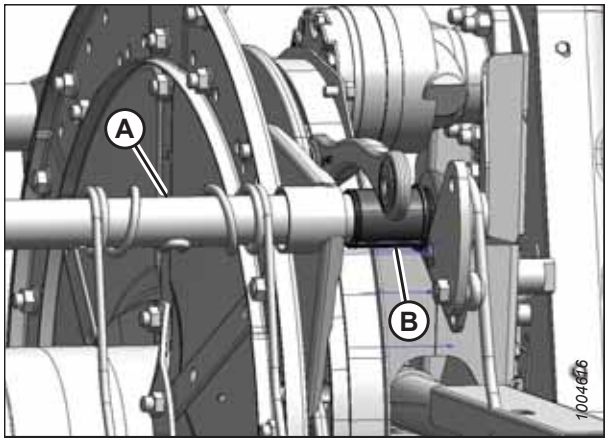


Figure 5.146: Cam End

5. Install bushing clamp (A) onto the tine tube adjacent to the flangeless end of bushing (B).

6. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

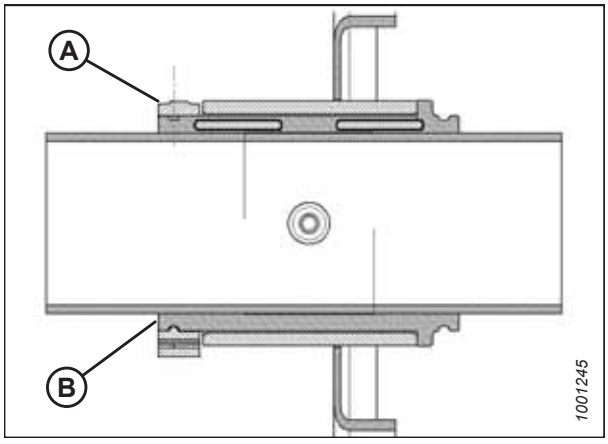


Figure 5.147: Bushing

7. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

   IMPORTANT:

   Overtightening the clamp may result in breakage.

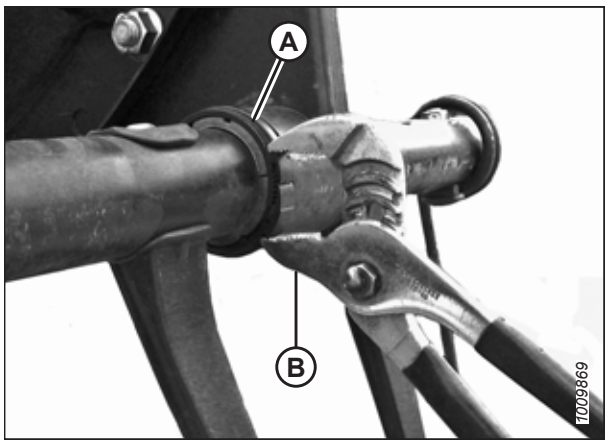


Figure 5.148: Installing Clamp

8. Line up tine tube (B) with the cam arm and install bolt (A). Torque the bolt to 165 Nm (120 lbf·ft).

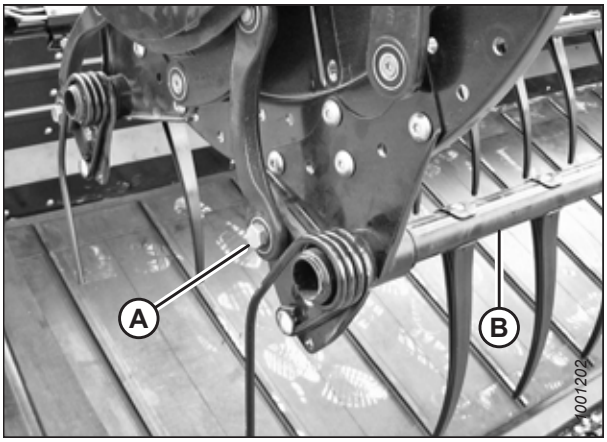


Figure 5.149: Cam End

9. Install bolts (A) securing tine tube arm (B) to the center disc.
10. Install tine tube arm (B) and endshield support (C) onto the tail end of the reel at the applicable tine tube location. Secure the support with bolts (A).

    NOTE:

    There are no endshields on the center discs.

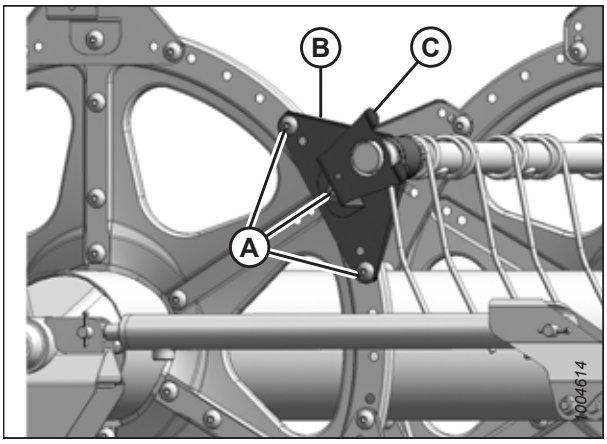


Figure 5.150: Tail End

11. Install endshield support (A) at the applicable tine tube location at the cam end of the reel.
12. Reinstall the reel endshields. For instructions, refer to *5.9.5 Reel Endshields, page 289*.

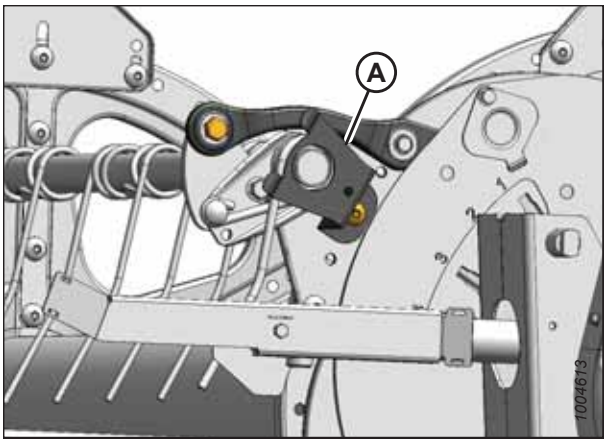


Figure 5.151: Cam End

Center disc and tail end bushings

13. Position bushing halves (B) on tine tube (A) with the flangeless end adjacent to the tine tube arm, and position the lug in each bushing half into the hole in the tine tube.

14. Slide tine tube (A) onto bushing (B). Position the tine tube against the disc at its original location.

15. Reinstall the previously removed fingers. For instructions, refer to:

    - *Removing Plastic Fingers, page 279*
    - *Removing Steel Fingers, page 277*

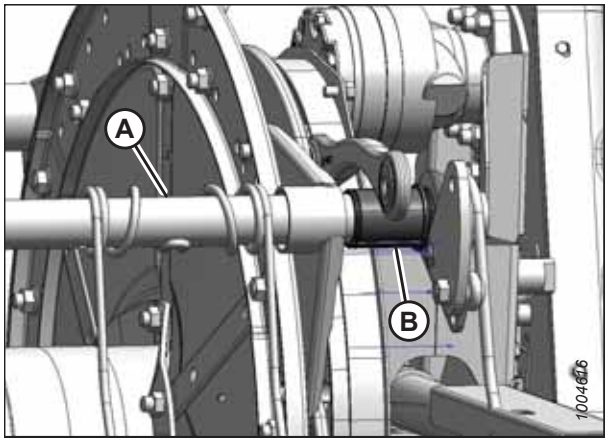


Figure 5.152: Cam End

16. Install bushing clamp (A) onto the tine tube adjacent to the flangeless end of bushing (B).

17. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

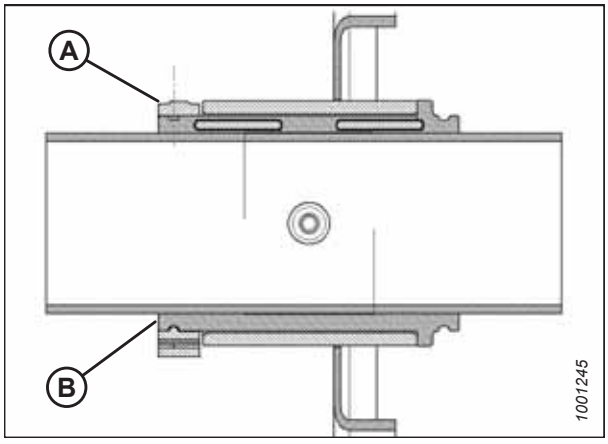


Figure 5.153: Bushing

18. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

    IMPORTANT:

    Overtightening the clamp may result in breakage.

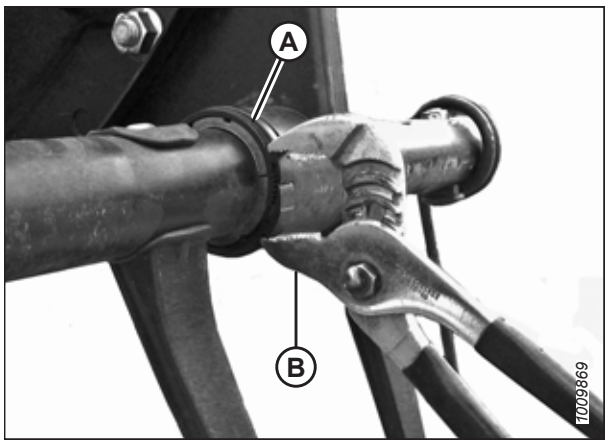


Figure 5.154: Installing Clamp

19. Install bolts (A) securing tine tube arm (B) to the center disc.

20. Install tine tube arm (B) and endshield support (C) onto the tail end of the reel at the applicable tine tube location. Secure the support with bolts (A).

    NOTE:

    There are no endshields on the center discs.

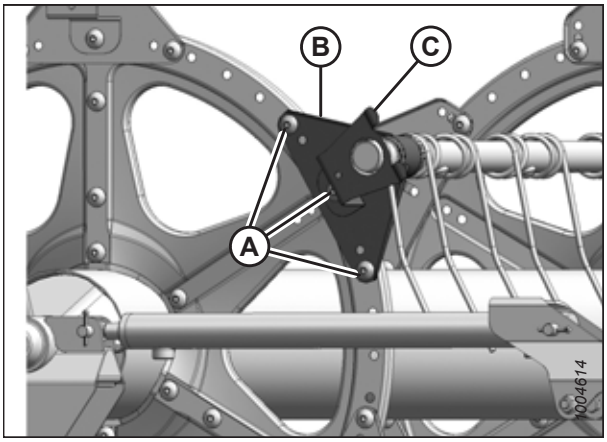


Figure 5.155: Tail End

Tine tube reinforcing kit – option

21. Position bushing halves (B) on tine tube (A) with the flangeless end adjacent to the tine tube arm, and position the lug in each bushing half into the hole in the tine tube.

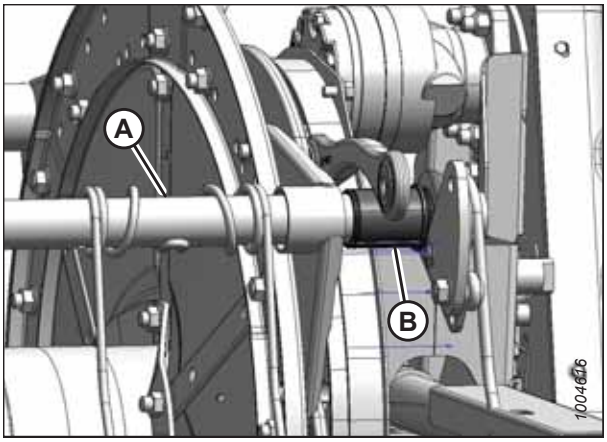


Figure 5.156: Cam End

22. On each reel, there are three right-facing supports (A). Slide the support onto bushing (B).

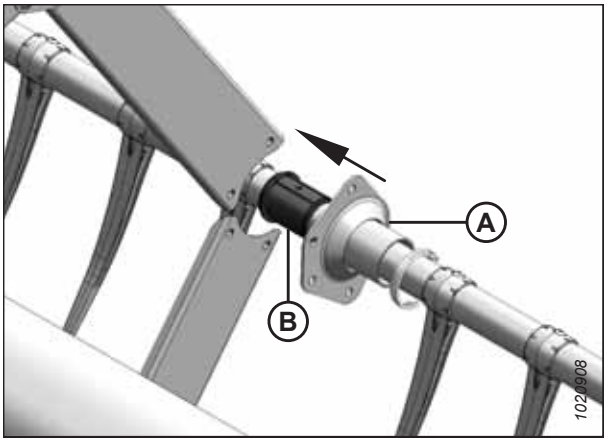


Figure 5.157: Tine Tube Reinforcing Kit Support – Option

23. On each reel, there are two left-facing supports (A). Rotate support (A) until its flanges clear channels (C) before moving the support onto bushing (B).

    NOTE:

    If necessary, move tine tube (D) slightly away from the reel to allow the support flange enough room to clear the channel.

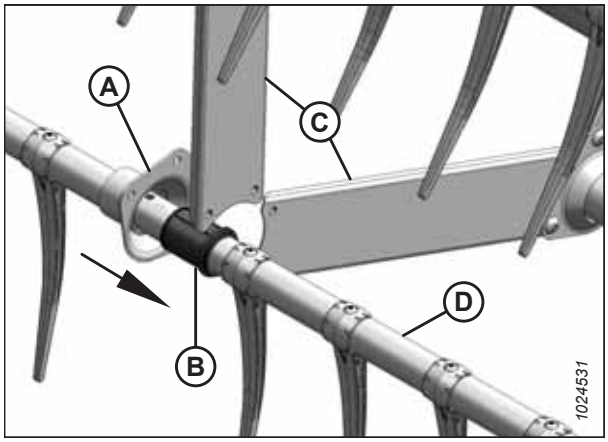


Figure 5.158: Tine Tube Reinforcing Kit Opposite Support – Option

24. Install bushing clamp (A) onto the tine tube adjacent to the flangeless end of bushing (B).

25. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

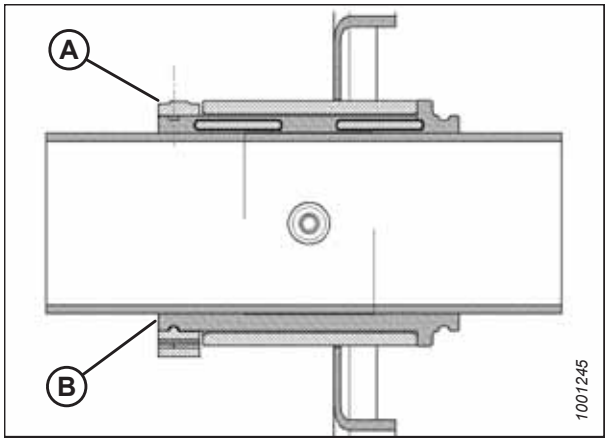


Figure 5.159: Bushing

26. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

    IMPORTANT:

    Overtightening the clamp may result in breakage.

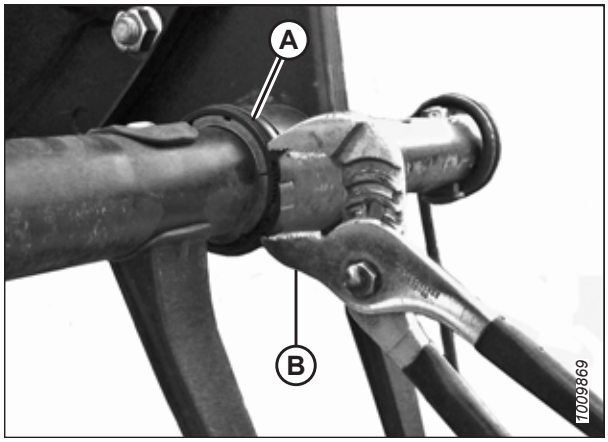


Figure 5.160: Installing Clamp

27. Reattach channels (C) to three right-facing supports (A) on each reel with screws (B) and nuts. Torque the screws to 43 Nm (32 lbf·ft).

28. Using screws (E), reinstall any fingers (D) that were previously removed. For instructions, refer to:

    - *Installing Plastic Fingers, page 280*
    - *Installing Steel Fingers, page 278*

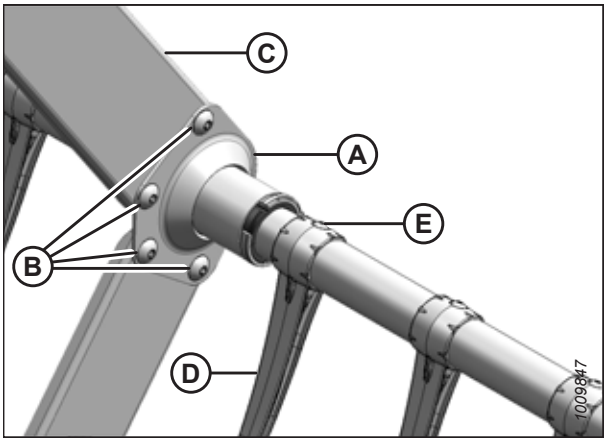


Figure 5.161: Tine Tube Reinforcing Kit Support – Option

29. Reattach channels (C) to two left-facing supports (A) on each reel with screws (B) and nuts. Torque the screws to 43 Nm (32 lbf·ft).

30. Using screws (E), reinstall any fingers (D) that were previously removed. For instructions, refer to:

    - *Installing Plastic Fingers, page 280*
    - *Installing Steel Fingers, page 278*

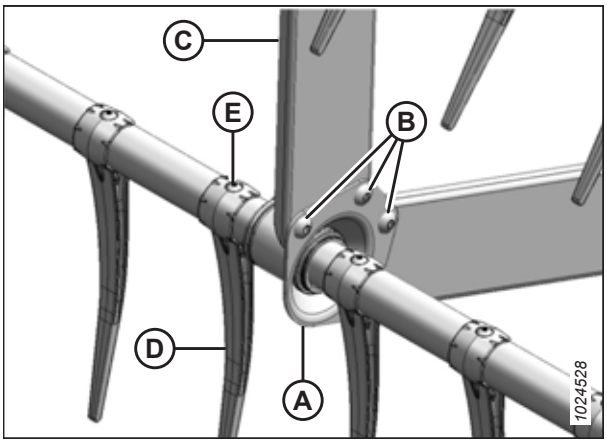


Figure 5.162: Tine Tube Reinforcing Kit Opposite Support – Option

5.9.5 Reel Endshields

Reel endshields and supports do not require regular maintenance, but they should be checked periodically for damage and loose or missing fasteners. Slightly dented or deformed endshields and supports are repairable, but it's necessary to replace severely damaged components.

There are four kinds of reel endshields. Ensure you are installing the correct reel endshield to the proper location as shown in Figure *5.163 Reel Endshields, page 290*.

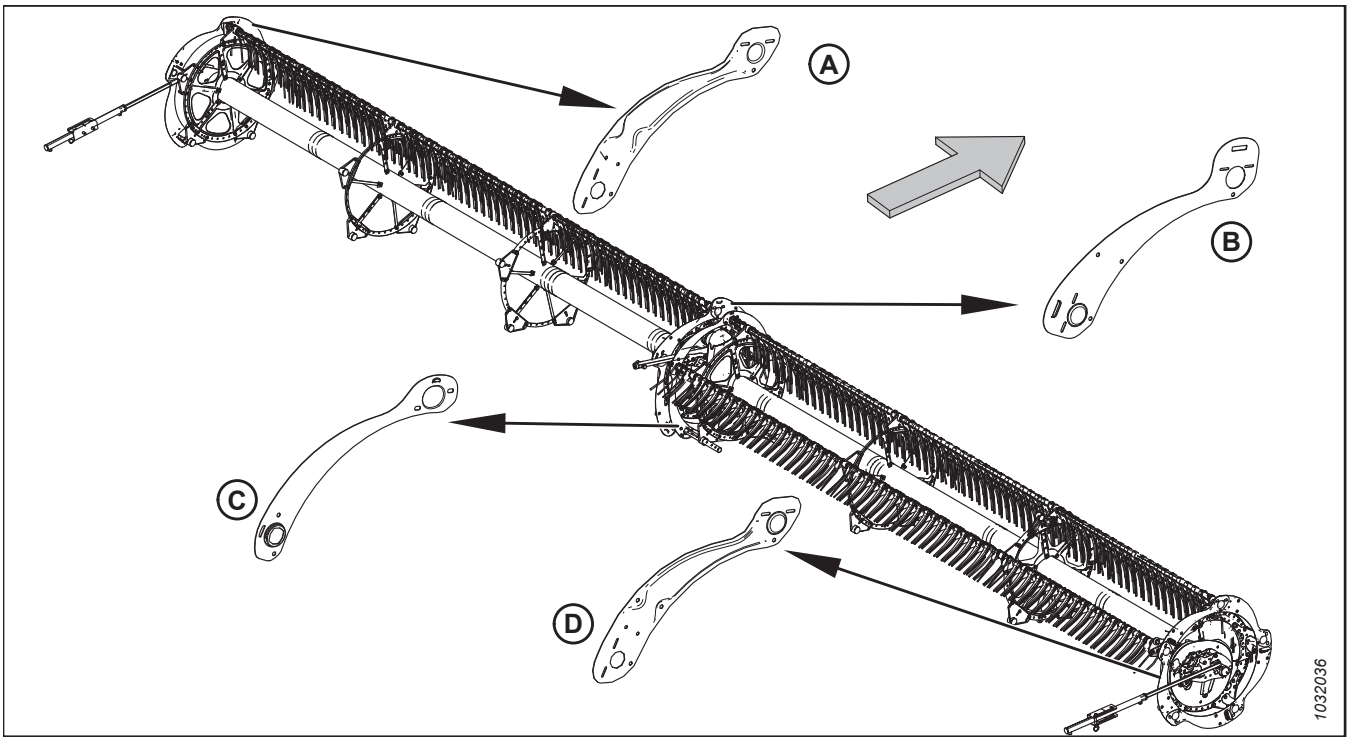


Figure 5.163: Reel Endshields

A - Tail End, Outboard (MD #311695)
B - Cam End, Inboard (MD #273823)
C - Tail End, Inboard (MD #311795)
D - Cam End, Outboard (MD #311694)

NOTE:

Arrow points to the front of the machine.

Replacing Reel Endshields at Outboard Cam End

The procedure for replacing reel endshields is applicable to the inboard and outboard cam end, except where noted.

DANGER

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

NOTE:

The arrows in the illustrations in this procedure indicate the front of the header.

NOTE:

Retain all removed parts unless directed to do otherwise.

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

3. Rotate the reel manually until reel endshield requiring replacement (A) is accessible.
4. Remove three bolts (B).

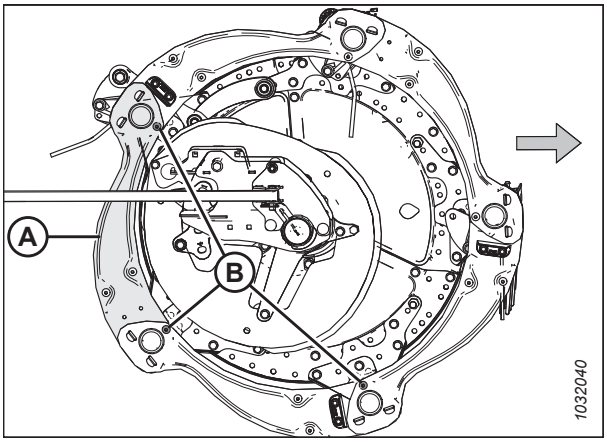


Figure 5.164: Reel Endshields – Outboard Cam End

5. Remove two screws and nuts (A). Remove the outboard cam deflector.
6. Lift the end of reel endshield (B) off of support (C).

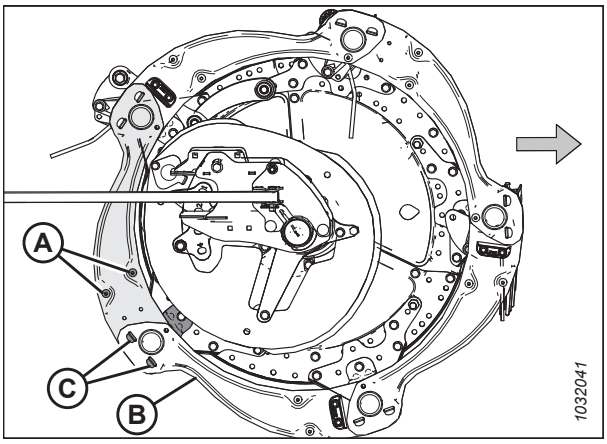


Figure 5.165: Reel Endshields – Outboard Cam End

7. Remove the reel endshield from supports (A).

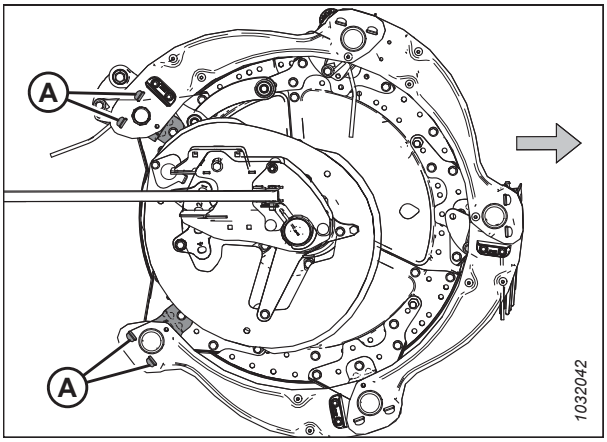


Figure 5.166: Reel Endshield Removed – Outboard Cam End

8. Slightly lift the end of existing reel endshield (A) off of support (B).
9. Position new reel endshield (C) onto support (B) under existing reel endshield (A).
10. Position the other end of new reel endshield (C) onto other support (D) over existing reel endshield (E).
11. Reinstall three bolts (F).
12. Reinstall two screws (G), the outboard cam deflector, and the nuts (removed in Step *5, page 291*) on the new reel endshield.
13. Tighten all of the installed hardware.

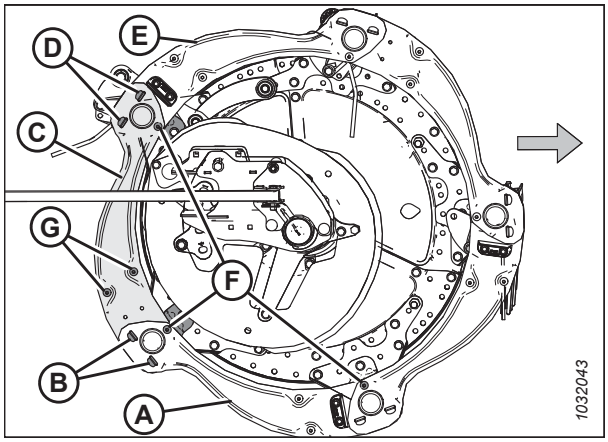


Figure 5.167: Reel Endshields – Outboard Cam End

Replacing Reel Endshields at Inboard Cam End

The procedure for replacing reel endshields is applicable to the inboard and outboard cam end.

DANGER

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

Endshields are different for inboard and outboard cam end. Fore reference, refer to Figure *5.163, page 290*.

NOTE:

Arrows in the following illustrations point to the front of machine.

1. Lower the reel fully.
2. Lower the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Rotate the reel manually until reel endshield (A) requiring replacement is accessible.
5. Remove three bolts (B).

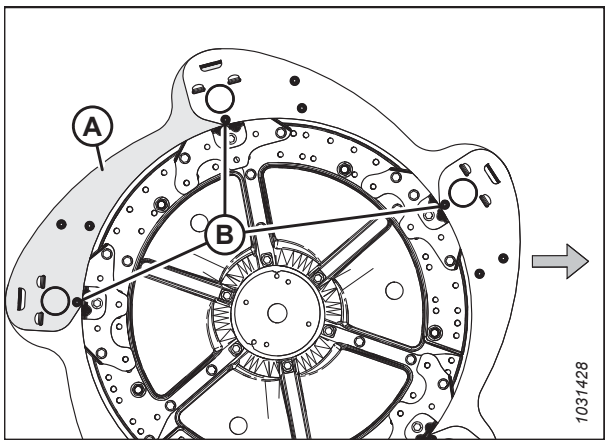


Figure 5.168: Reel Endshields – Inboard Cam End

6. Remove and retain two screws (A), cam deflector, and nuts from the reel endshield.
7. Lift the end of reel endshield (B) off support (C).

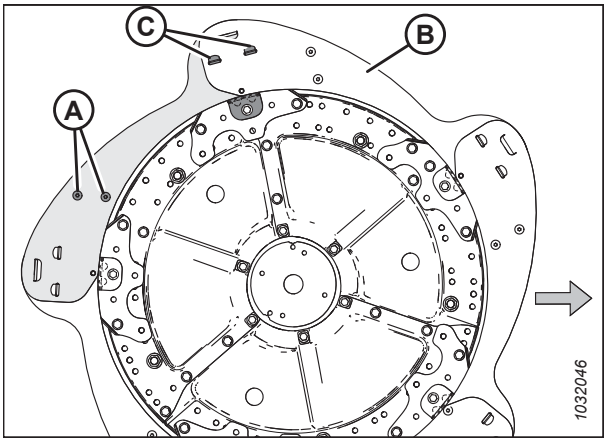


Figure 5.169: Reel Endshields – Inboard Cam End

8. Remove the reel endshield from supports (A).

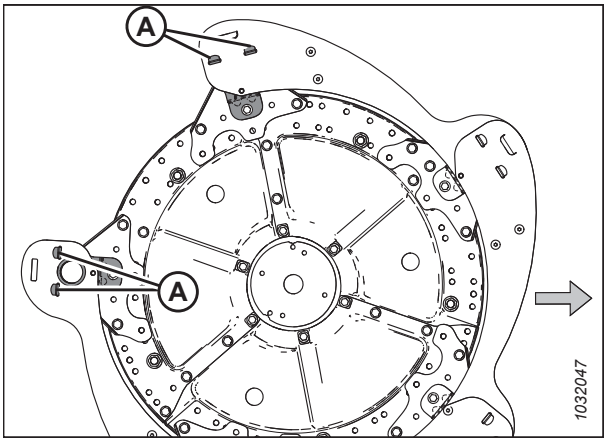


Figure 5.170: Reel Endshield Removed – Inboard Cam End

9. Slightly lift the end of existing reel endshield (A) off of support (B).
10. Position new reel endshield (C) onto support (B) under existing reel endshield (A).
11. Position the other end of new reel endshield (C) onto other support (D) over existing reel endshield (E).
12. Reinstall three bolts (F).
13. Reinstall two screws (G), cam deflector, and nuts (removed in Step *6, page 293*) on the new reel endshield.
14. Tighten all hardware.

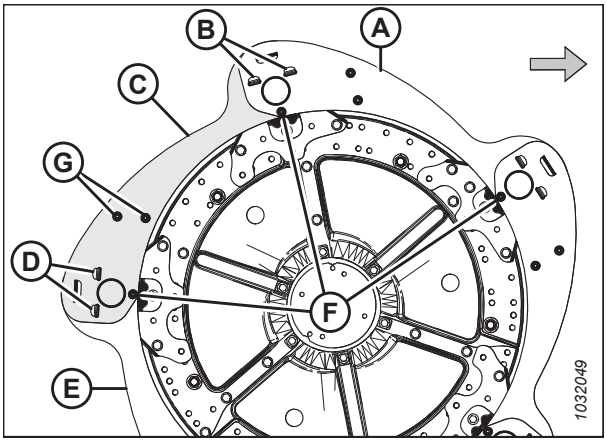


Figure 5.171: Reel Endshields – Inboard Cam End

Replacing Reel Endshields at Outboard Tail End

If the reel endshield is damaged, it will need to be replaced.

DANGER

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

1. Lower the reel fully.
2. Lower the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Rotate the reel manually until reel endshield requiring replacement (A) is accessible.
5. Remove three bolts (B).

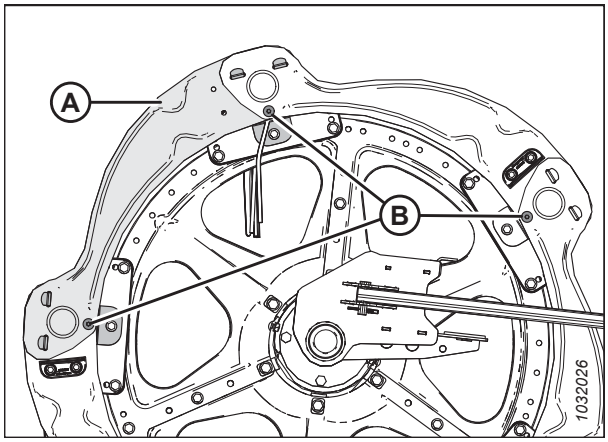


Figure 5.172: Reel Endshields – Outboard Tail End

6. Lift the end of reel endshield (A) off support (B).

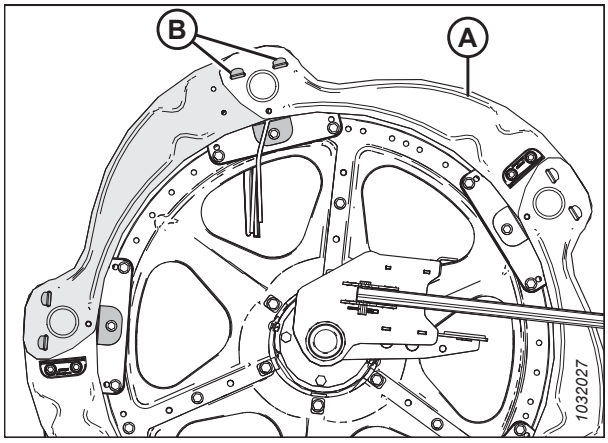


Figure 5.173: Reel Endshields – Outboard Tail End

7. Remove the reel endshield from supports (A).
8. Remove the reel paddle, if it is installed on the reel endshield.

   NOTE:

   Reel end paddles (B) are installed alternately on the reel endshields.

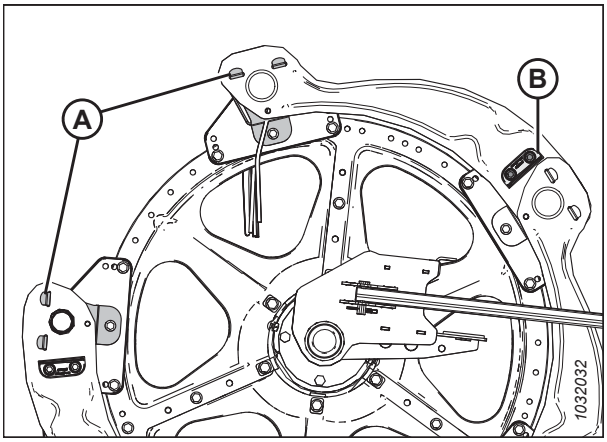


Figure 5.174: Reel Endshield Removed – Outboard Tail End

9. Slightly lift the end of reel endshield (A) off of support (B).
10. Position new reel endshield (C) onto support (B) under existing reel endshield (A).
11. Position the other end of new reel endshield (C) on other support (E) over the existing reel endshield.
12. Reinstall three bolts (D).
13. Reinstall the paddle (removed in Step *8, page 295*) onto the new reel endshield, if previously installed.
14. Tighten all of the installed hardware.

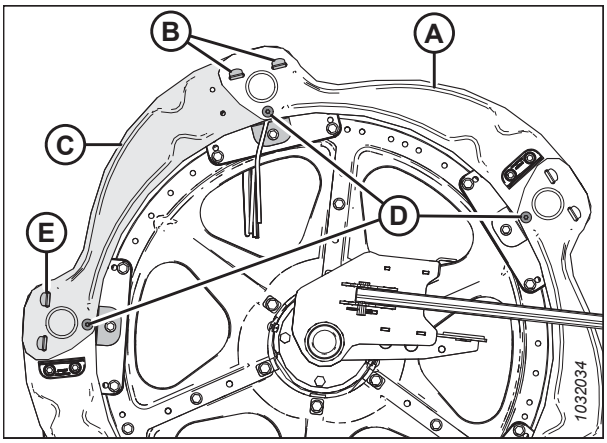


Figure 5.175: Reel Endshields – Outboard Tail End

Replacing Reel Endshields at Inboard Tail End

The reel endshields need to be replaced if they are damaged.

DANGER

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

NOTE:

Retain all removed parts, unless directed to do otherwise.

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

4. Rotate the reel manually until reel endshield requiring replacement (A) is accessible.
5. Remove six M10 screws and nuts (B).

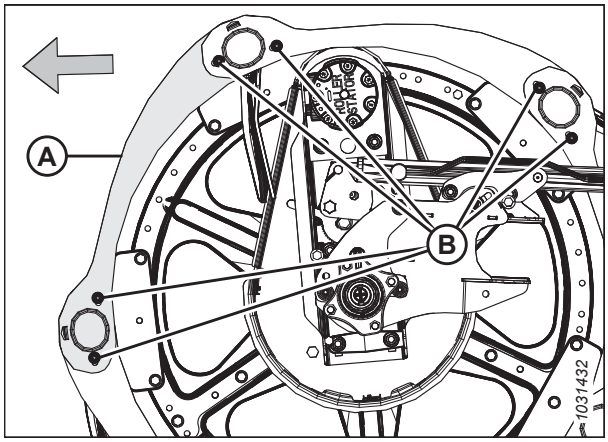


Figure 5.176: Reel Endshields – Inboard Tail End

6. Lift other endshield (A) to disengage the tab from endshield (B).
7. Lift the end of reel endshield (B) off endshield (C), and rotate endshield (B) downward.

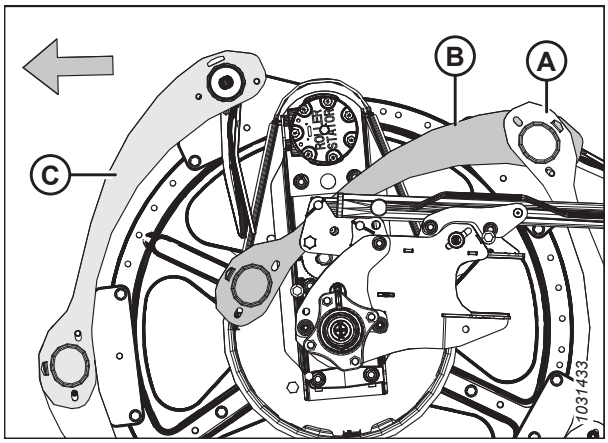


Figure 5.177: Reel Endshields – Inboard Tail End

8. Remove M10 bolt (A), nut (B), and end finger retainer (C) from the tine tube securing the bushing and tail end finger.
9. Remove endshield bushing (D).
10. Remove and discard damaged reel endshield (E).

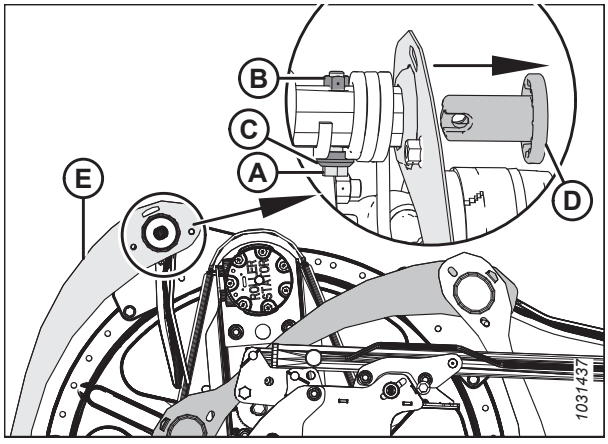


Figure 5.178: Reel Endshields – Inboard Tail End

11. Position new reel endshield (A) as shown. Insert the endshield tab into neighboring endshield (B).

12. Position the other end of new endshield (A) on the tine tube. Secure the endshield with bushing (C).

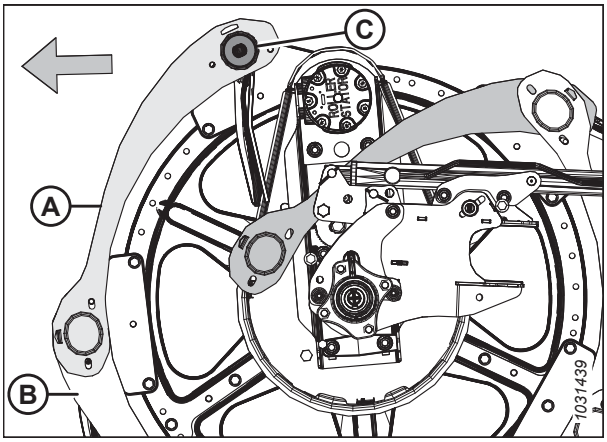


Figure 5.179: Reel Endshields – Inboard Tail End

13. Position tail end finger (A) as shown.

14. Secure tail end finger (A) and the bushing (installed in Step *12, page 297*) with M10 bolt (B), end finger retainer (C), and nut (D).

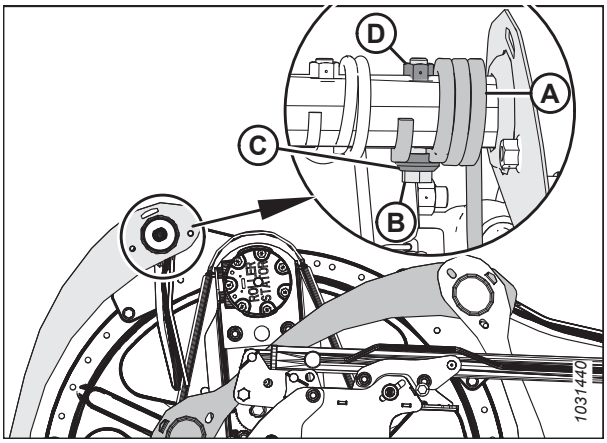


Figure 5.180: Reel Endshields – Inboard Tail End

15. Rotate reel endshield (A) upward. Engage tabs (B) on both ends.

16. Secure the reel endshields using six M10 screws and nuts (C).

17. Torque nuts (C) to 35 Nm (26 lbf·ft).

    IMPORTANT:

    Do **NOT** overtighten the nuts.

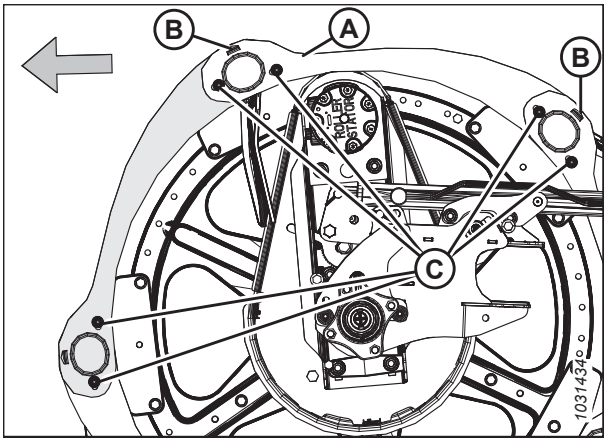


Figure 5.181: Reel Endshields – Inboard Tail End

Replacing Reel Endshield Supports

The reel endshield supports need to be replaced if they are damaged.

DANGER

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

NOTE:

All illustrations shown are from the outboard cam end.

1. Lower the reel fully.
2. Lower the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Rotate the reel manually until the reel endshield support requiring replacement is accessible.
5. Remove bolt (B) securing the reel endshields to support (A).
6. Remove bolts (C) from support (A) and from the two adjacent supports.

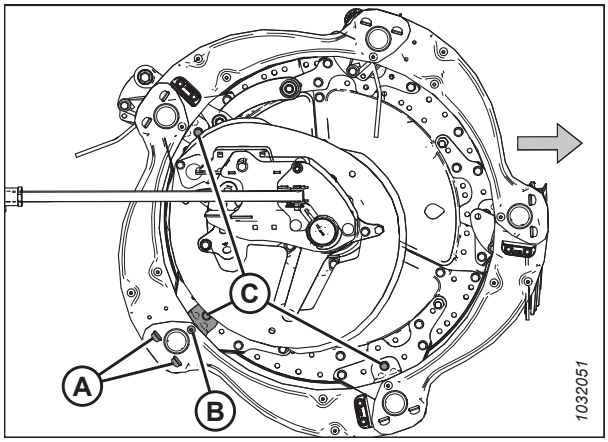


Figure 5.182: Reel Endshield Supports

7. Move reel endshields (A) and support (B) away from the tine tube. Remove the support from the endshields.
8. Insert the tabs of new support (B) into the slots in reel endshields (A). Ensure that the tabs engage both reel endshields.

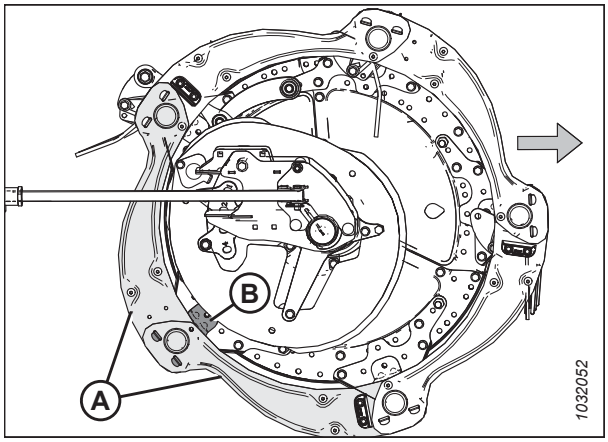


Figure 5.183: Reel Endshield Supports

9. Secure support (A) to the disc sector with bolt and nut (B). Do **NOT** tighten the hardware yet.
10. Secure reel endshields (C) to support (A) with bolt and nut (D). Do **NOT** tighten the hardware yet.
11. Reattach the other supports with bolts and nuts (E).
12. Ensure that there is adequate clearance between the tine tube and the reel endshield support.
13. Torque the nuts to 27 Nm (239 lbf·in).

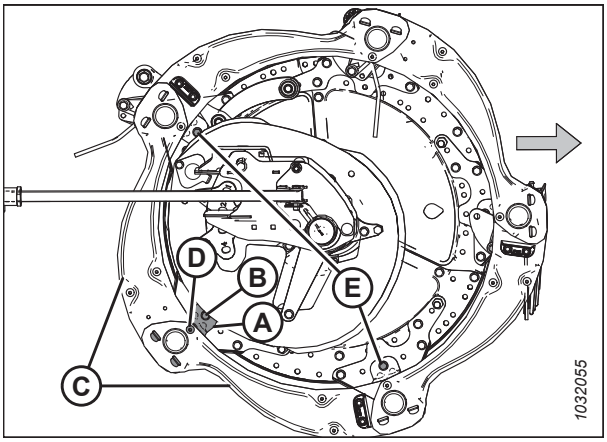


Figure 5.184: Reel Endshield Supports

5.10 Reel Drive

The hydraulically driven reel motor drives a chain that is attached to the center arm between the reels on a double-reel header.

5.10.1 Reel Drive Chain

The reel drive chain transfers power from the hydraulically driven reel motor to the sprockets that rotate the reels.

Loosening Reel Drive Chain

The tension on the reel drive chain can be loosened to allow access to drive components.

DANGER

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

1. Start the engine.
2. Lower the header fully.
3. Adjust the reel fully forward.
4. Shut down the engine, and remove the key from the ignition.
5. Remove the reel drive cover. For instructions, refer to *Removing Reel Drive Cover, page 50*.
6. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
7. Remove hairpin (A) securing multi-tool (B) to the bracket on the left endsheet.
8. Remove multi-tool (B), and reinstall the hairpin on the bracket.

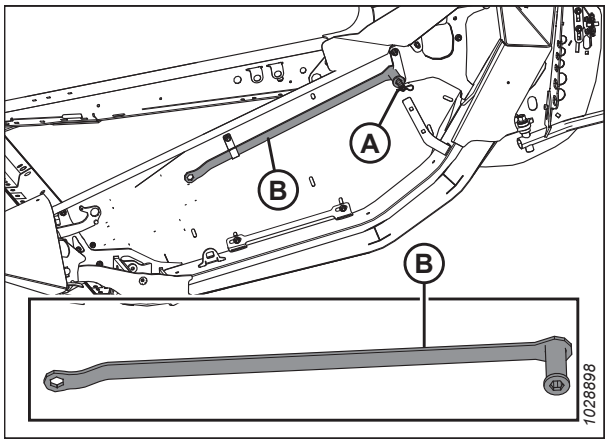


Figure 5.185: Multi-Tool Storage Location

IMPORTANT:

Do **NOT** loosen the motor mount, it is factory-adjusted and secured with Belleville washers. Chain tension is adjusted without loosening the drive mounting bolts.

9. Push tension retainer (A) clockwise with your thumb, and hold it in the unlocked position.
10. Place multi-tool (B) onto chain tensioner (C), and rotate the multi-tool upwards to loosen the chain tension.
11. Return the multi-tool to the storage position.

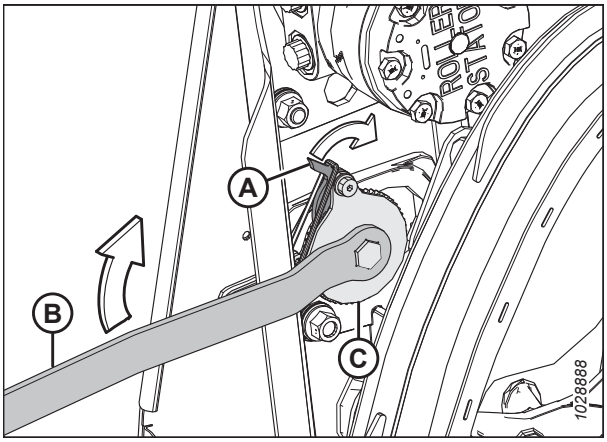


Figure 5.186: Reel Drive

Tightening Reel Drive Chain

A correctly tensioned drive chain ensures optimum power transfer while minimizing component wear.

DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.
3. Remove hairpin (A) securing multi-tool (B) to the bracket on the left endsheet.
4. Remove multi-tool (B), and reinstall the hairpin on the bracket.

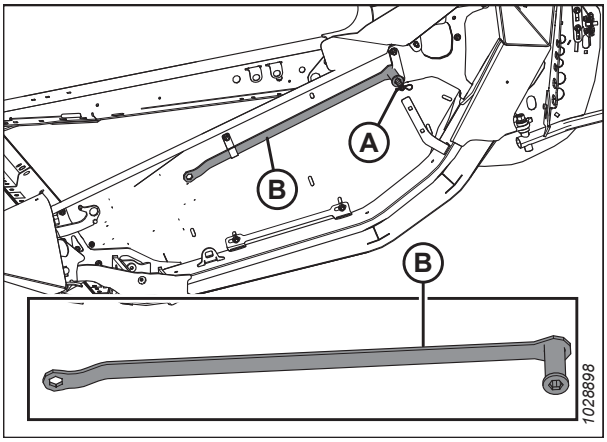


Figure 5.187: Multi-Tool Storage Location – Left Side

5. Place multi-tool (A) onto chain tensioner (B).

   IMPORTANT:

   Do **NOT** loosen the motor mount, it is factory-adjusted and secured together with Belleville washers. Chain tension is adjusted without loosening the drive mounting bolts.

6. Rotate multi-tool (A) downward until the chain is tight.

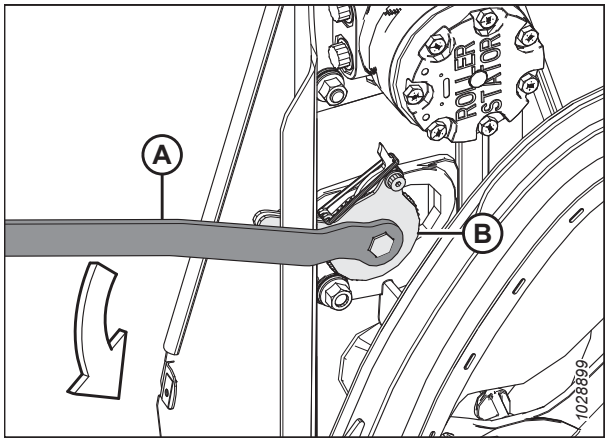


Figure 5.188: Reel Drive

7. Once the chain is tight, rotate the multi-tool upward to properly engage the teeth from the lock/latch into the tightener teeth. If the tightener will not skip a tooth before tightening, do **NOT** force the tightener to the next notch.

   IMPORTANT:

   Do **NOT** overtighten the chain. If overtightened, the chain will put excessive loads on the sprockets, causing the motor bearings and/or other components to fail prematurely.

   IMPORTANT:

   There should be approximately 38 mm (1 1/2 in.) of play on one side (A) of the chain, while it is tight on the other side (B). This level of tension and play in the chain is required to skip one notch on the chain tightener.

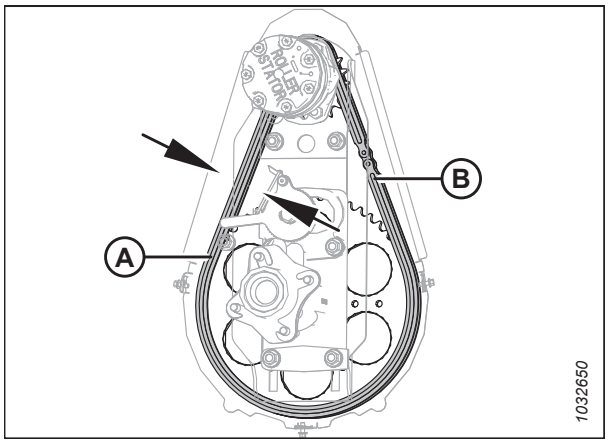


Figure 5.189: Reel Drive

8. Rotate the reel by hand to verify that the chain is still engaged properly on all teeth on lower sprocket (A). To prevent damaging components, ensure the chain does not get too tight as the reel is rotated.
9. Return the multi-tool to the storage position.
10. Close the endshield. For instructions, refer to *Closing Header Endshields, page 44*.

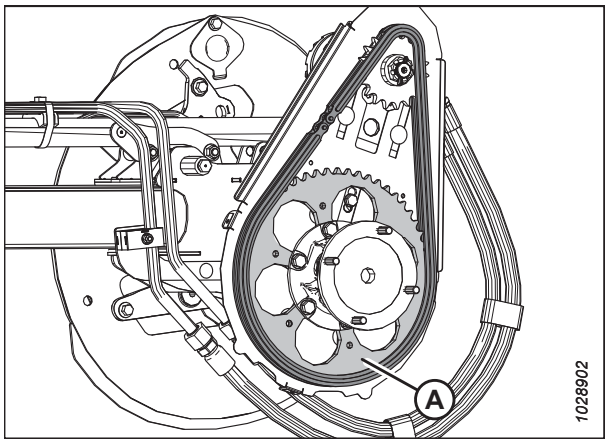


Figure 5.190: Reel Drive

5.10.2 Reel Drive Sprocket

The reel drive sprocket is attached to the reel drive motor.

Removing Reel Drive Single Sprocket

The reel drive sprocket is attached to the reel drive motor. The speed and torque of the reel can be changed by changing the drive and driven sprockets.

DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. Remove the reel drive cover. For instructions, refer to *Removing Reel Drive Cover, page 50*.
3. Loosen reel drive chain (A). For instructions, refer to *Loosening Reel Drive Chain, page 300*.
4. Remove reel drive chain (A) from reel drive sprocket (B).

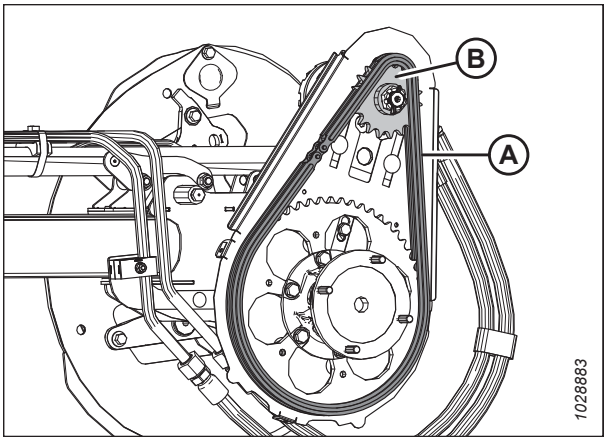


Figure 5.191: Single Sprocket

5. Remove the cotter pin and slotted nut (A) from the motor shaft.
6. Remove reel drive sprocket (B). Ensure the key remains in the shaft.

   IMPORTANT:

   To avoid damaging the motor, use a puller if drive sprocket (B) does not come off by hand. Do **NOT** use a pry bar and/or hammer to remove the drive sprocket.

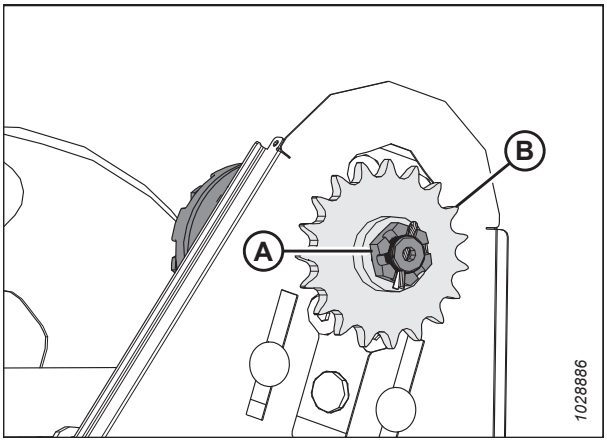


Figure 5.192: Single Sprocket

Installing Reel Drive Single Sprocket

The reel drive sprocket is attached to the reel drive motor. The speed and torque of the reel can be changed by changing the drive and driven sprockets.

DANGER

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

1. Align the keyway in sprocket (B) with the key on the motor shaft, and slide the sprocket onto the shaft. Secure it with slotted nut (A).
2. Torque slotted nut (A) to 12 Nm (106 lbf·in).
3. Install the cotter pin. If necessary, tighten slotted nut (A) to the next slot to install the cotter pin.

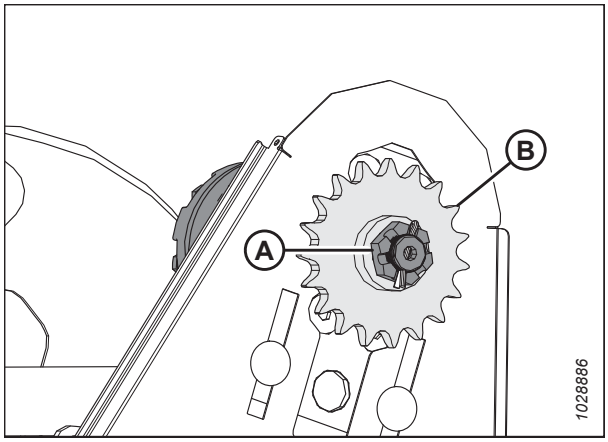


Figure 5.193: Single Sprocket

4. Install drive chain (A) onto drive sprocket (B).
5. Tighten the drive chain. For instructions, refer to *Tightening Reel Drive Chain, page 301*.
6. Reinstall the reel drive cover. For instructions, refer to *Installing Reel Drive Cover, page 52*.

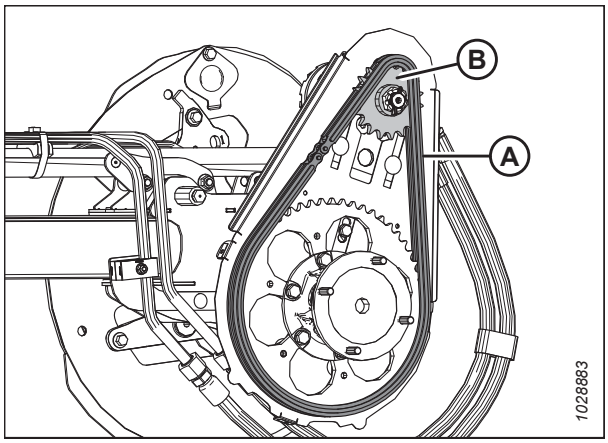


Figure 5.194: Single Sprocket

5.10.3 Changing Reel Speed Chain Position with Two Speed Kit Installed

The reel drive sprocket is attached to the reel drive motor. The speed and torque of the reel can be changed by changing the drive and driven sprockets.

DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to *Opening Header Endshields, page 43*.

3. Loosen the reel drive chain. For instructions, refer to *Loosening Reel Drive Chain, page 300*.

4. Move chain (A) from the current set of sprockets to other set (B).

   NOTE:

   The inner set of sprockets are for high torque applications, and the outer set of sprockets are for high speed applications.

   NOTE:

   - If converting from the high speed setting to the high torque setting, move the chain on the top driver sprocket first. This will allow for more chain slack to make the change on the bottom driven sprocket
   - If converting from the high torque setting to the high speed setting, move the chain on the bottom driven sprocket first. This will allow for more slack to make the change on the top driver sprocket.

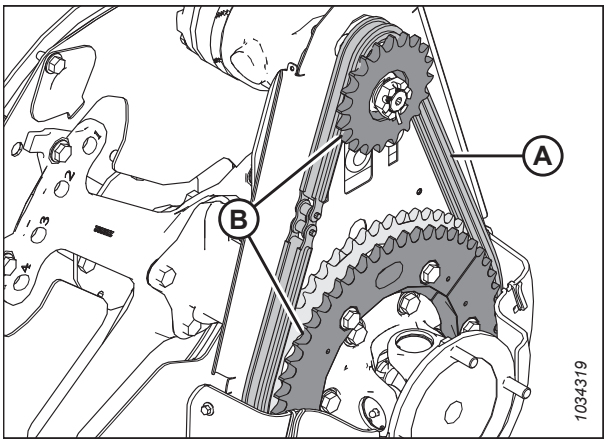


Figure 5.195: Reel Drive Sprocket

5. Tighten the reel drive chain. For instructions, refer to *Tightening Reel Drive Chain, page 301*.

5.11 Transport System – Option

The header can be equipped with a set of transport wheels, so that the header can be towed by a combine or tractor.

Refer to *Adjusting EasyMove™ Transport Wheels, page 72* for more information.

5.11.1 Checking Wheel Bolt Torque

The transport wheel bolt torque should be checked after one operating hour following the installation of the wheels, and every 100 operating hours thereafter.

DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. Follow the bolt tightening sequence shown, and torque the wheel bolts to 115 Nm (85 lbf·ft).

   IMPORTANT:

   Whenever a wheel is removed and reinstalled, check the wheel bolt torque after 1 hour of operation and every 100 hours thereafter.

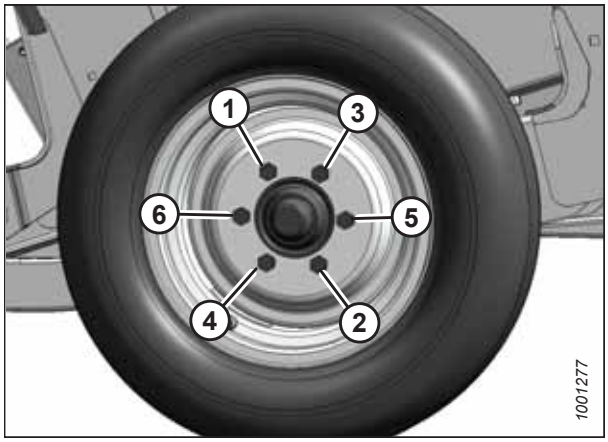


Figure 5.196: Bolt Tightening Sequence

5.11.2 Checking Transport Assembly Bolt Torque

The hardware that secures the optional transport system components to the header must be checked daily to ensure safe operation.

DANGER

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

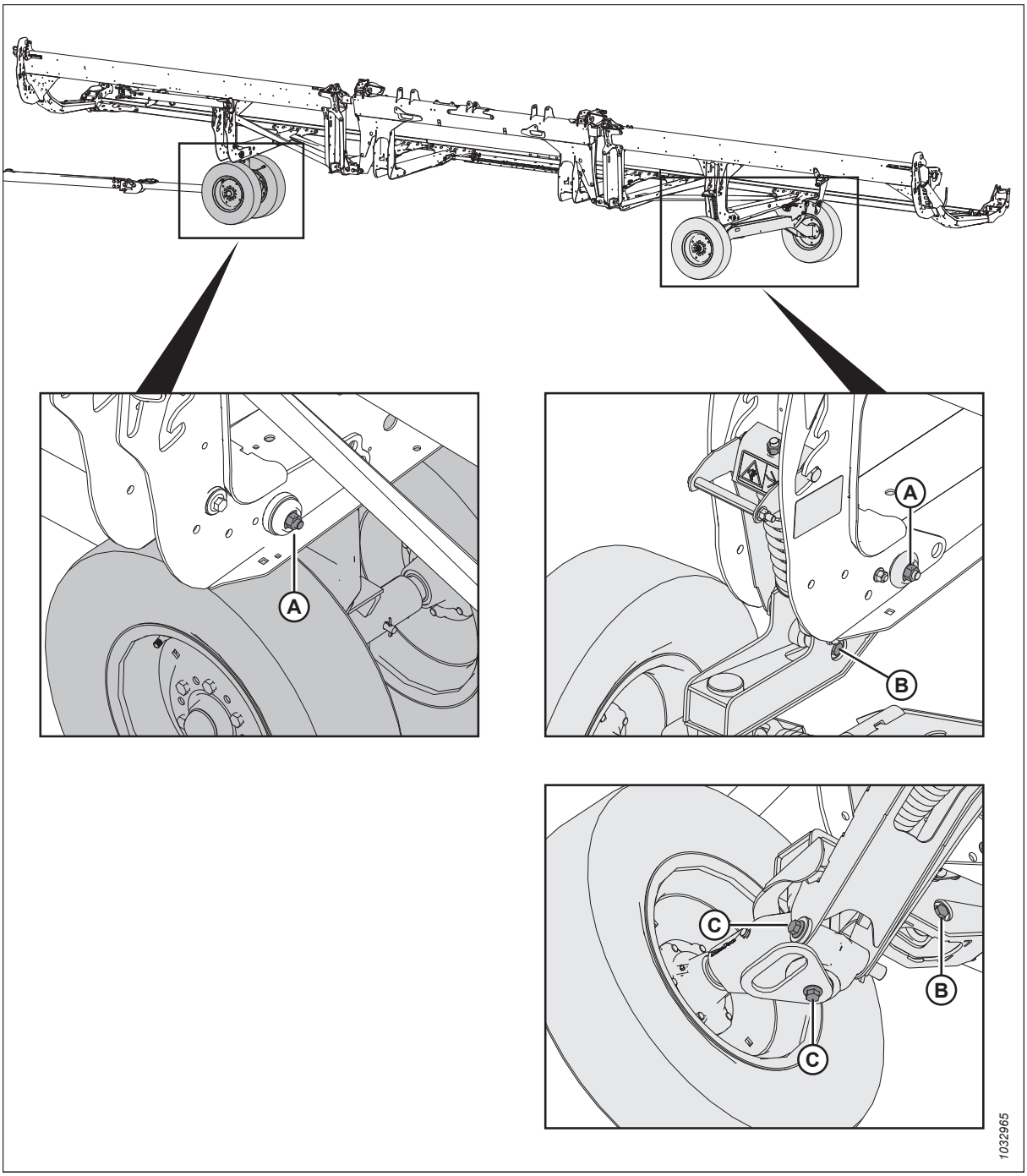


Figure 5.197: Transport Assembly Bolts

1. Check the following bolts **DAILY** to ensure bolts are torqued to the specified values:
    - Bolts (A) to 234 Nm (173 lbf·ft)
    - Bolts (B) to 343 Nm (253 lbf·ft)
    - Bolts (C) to 343 Nm (253 lbf·ft)

5.11.3 Checking Tire Pressure

Proper tire pressure ensures tires perform properly and wear evenly.

WARNING

- **A tire can explode during inflation, which could cause serious injury or death.**
- **Do NOT stand over tire. Use a clip-on chuck and extension hose.**
- **Do NOT exceed maximum inflation pressure indicated on tire label or sidewall.**
- **Replace tires that have defects.**
- **Replace wheel rims that are cracked, worn, or severely rusted.**
- **Never weld a wheel rim.**

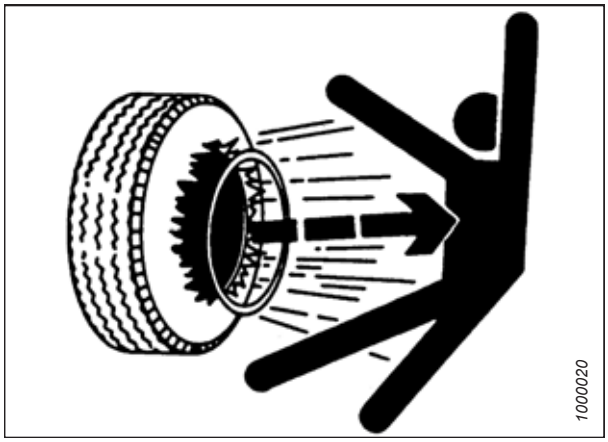


Figure 5.198: Inflation Warning

- **Never use force on an inflated or partially inflated tire.**
- **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 the area.**
- **Make sure all the air is removed from the tire before removing the tire from the rim.**
- **Do NOT remove, install, or repair a tire on a rim unless you have the proper equipment and experience to perform the job.**
- **Take the tire and rim to a qualified tire repair shop.**

1. Check the tire pressure. For pressure specifications, refer to Table *5.17, page 308*.
2. Make sure the tire is correctly seated on the rim before inflating.
   a. If the tire is not correctly positioned on the rim, take the tire to a qualified tire repair shop.
3. If inflation is required, use a clip-on chuck and an extension hose to inflate the tire to the desired pressure.

   IMPORTANT:

   Do **NOT** exceed maximum inflation pressure indicated on tire label or sidewall.

Table 5.17 Tire Inflation Pressure

Size	Load Range	Pressure
225/75 R15	E	552 kPa (80 psi)

5.11.4 Changing Tow-Bar Hitch Connection from Pintle to Clevis

The transport tow-bar includes clevis and pintle ring towing mounts.

1. Remove the hairpin from clevis pin (A) and disconnect chain (B). Store clevis pin (A) with the pintle hitch adapter.
2. Remove four nuts, four bolts, and eight flat washers (C) from the end of the tow-bar. Retain the hardware for reinstallation.

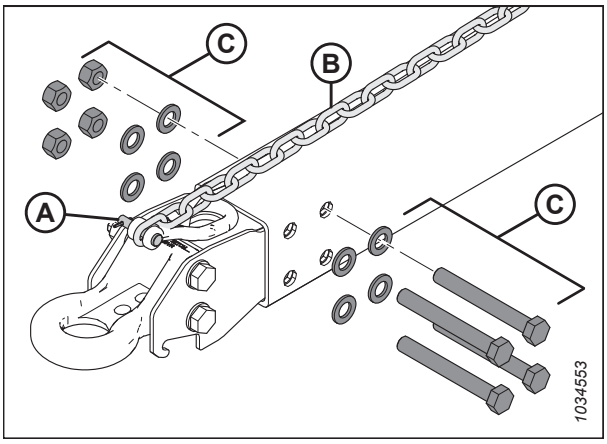


Figure 5.199: Removing Pintle Towing Adapter

3. Tape or tie 6 m (20 ft.) of pull-line to harness transport end (A).
4. Remove bolt (B) securing the harness in the P-clip. Retain the bolt.
5. From hitch end (C), gently pull the harness out through the opening in pintle (D) until you can see the pull-line, then disconnect the pull-line and set the pintle aside. Leave the pull-line inside the tow-bar.

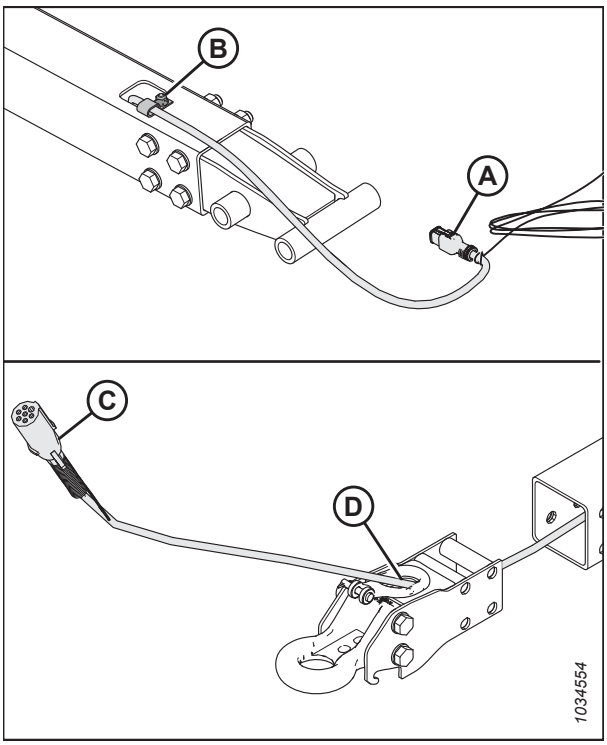


Figure 5.200: Removing Pintle Towing Adapter

6. Retrieve the clevis adapter. Insert transport connector (A) of the electrical harness through opening (B) in the ring on the clevis adapter.
7. Tie or tape pull-line (C) to the harness. Using the pull-line at the transport end, gently pull the harness through the tow-bar.
8. Ensure that transport end (A) of the harness extends 48 cm (18 7/8 in.) past P-clip (D).
9. Secure the harness in the P-clip with the bolt removed in Step *6, page 310*.

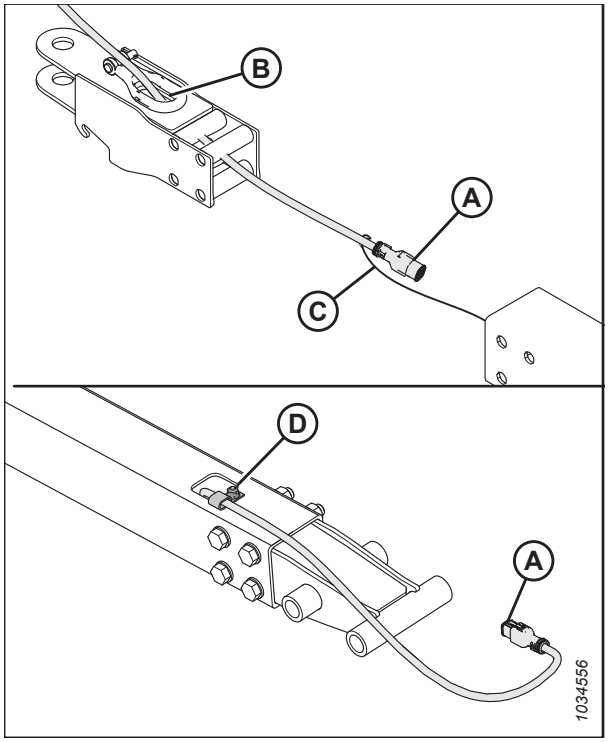


Figure 5.201: Installing Clevis Ring Adapter

10. Install four nuts, four bolts, and eight flat washers (A) to secure the clevis adapter to the tow-bar.

    NOTE:

    Ensure that hardware (A) is reinstalled in the same orientation it was in before it was removed.
11. Reconnect the chain with clevis pin (B) and secure it with the cotter pin.

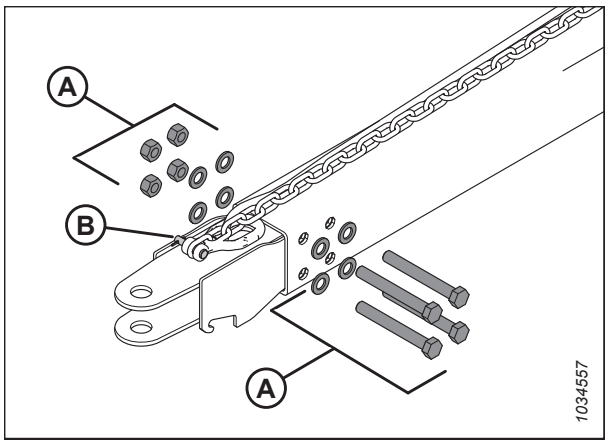


Figure 5.202: Installing Clevis Ring Adapter

12. Tighten nuts (A) in the cross pattern shown. Recheck each nut in sequence until they are torqued to 310 Nm (229 lbf·ft).

13. Insert the hitch pin into the clevis adapter. Secure the pin with the lynch pin.

    NOTE:

    The pins are not shown in the illustration.

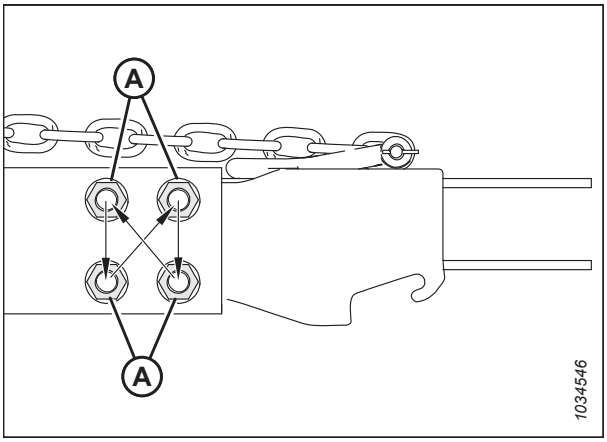


Figure 5.203: Torque Sequence

5.11.5 Changing Tow-Bar Hitch Connection from Clevis to Pintle

The transport tow-bar includes clevis and pintle ring towing mounts.

1. Remove the hairpin from clevis pin (A) and disconnect chain (B). Store clevis pin (A) with the clevis adapter.

2. Remove four nuts, four bolts, and eight flat washers (C) from the end of the tow-bar. Retain the hardware for reinstallation.

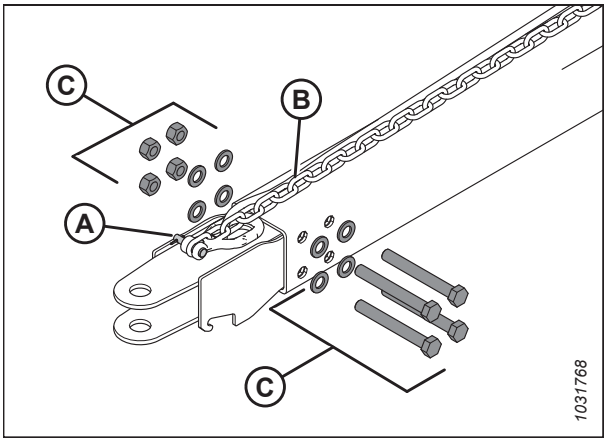


Figure 5.204: Removing Clevis Adapter

3. Tape or tie 6 m (20 ft.) of pull-line to harness transport end (A).
4. Remove bolt (B) securing the harness in the P-clip. Retain the bolt for reinstallation.
5. From hitch end (C), gently pull the harness out through the opening in clevis (D) until you can see the pull-line, then disconnect the pull-line and set the clevis adapter aside. Leave the pull-line inside the tow-bar.

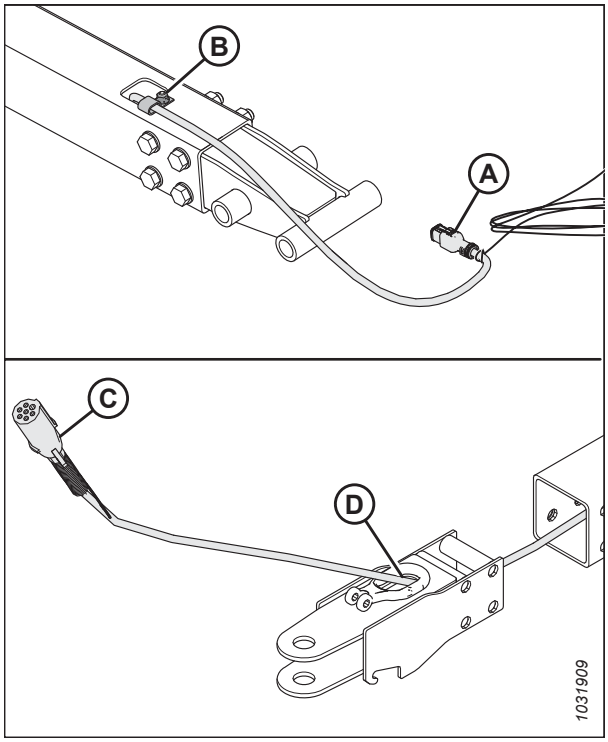


Figure 5.205: Removing Clevis Towing Adapter

6. Insert transport connector (A) of the electrical harness through opening (B) in the pintle ring adapter.
7. Tie or tape pull-line (C) to the harness. Gently pull the harness through the tow-bar with the pull line at the transport end.
8. Ensure that transport end (A) of the harness extends 48 cm (18 7/8 in.) past P-clip (D).
9. Secure the harness in the P-clip with the bolt removed in Step *4, page 312*.

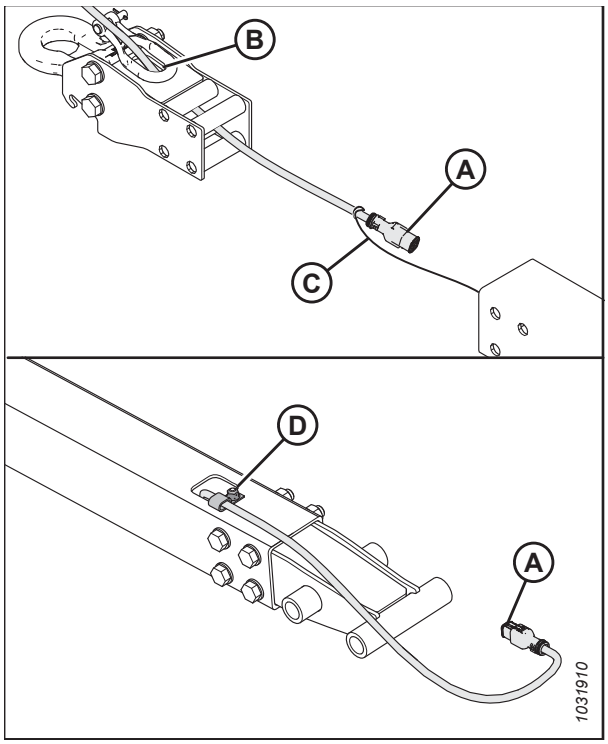


Figure 5.206: Installing Pintle Ring Adapter

10. Reinstall four nuts, four bolts, and eight flat washers (A) to secure the pintle ring adapter to the tow-bar.

    NOTE:

    Ensure that hardware (A) is reinstalled with the four bolt heads on the same side.

11. Reconnect the chain with clevis pin (B) and secure it with the cotter pin.

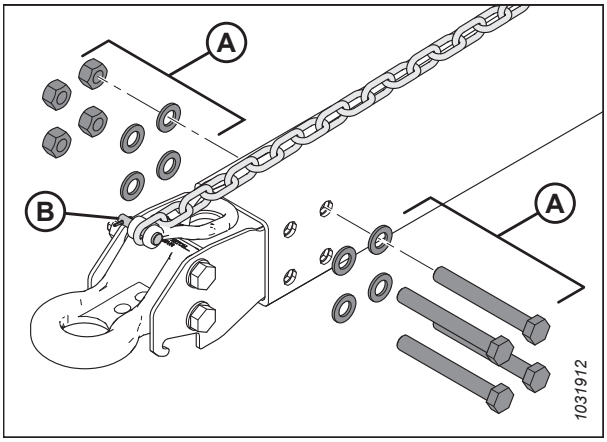


Figure 5.207: Installing Pintle Ring Adapter

12. Tighten nuts (A) in the cross pattern shown. Recheck each nut in sequence until they are torqued to 310 Nm (229 lbf·ft).

13. Insert the hitch pin into the pintle ring adapter. Secure the pin with the lynch pin.

    NOTE:

    The pins are not shown in the illustration.

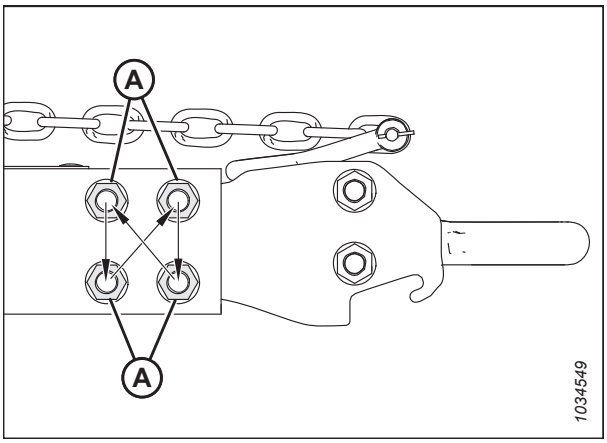


Figure 5.208: Torque Sequence

5.12 VertiBlade™ Vertical Knife – Option

The optional vertical knife kit is a vertical crop cutter that is mounted to each end of the header. The vertical knife slices through tangled, shatter-prone crops such as canola to reduce seed loss.

5.12.1 Replacing Vertical Knife Sections

The VertiBlade™ Vertical Knife kit includes a service kit that supplies four replacement knife sections. Follow these instructions to replace a damaged knife section.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

CAUTION

Install vertical knife guards before attaching or removing vertical knives. Wear heavy gloves when working around or handling knives.

1. Raise the header 153–254 mm (6–10 in.) off of the ground.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props.
4. Open the header endshields.
5. Detach the vertical knife from the header. Set the vertical knife aside.
6. Remove retaining pin (A) from the knife guard.
7. Remove the knife guard using handle (B).

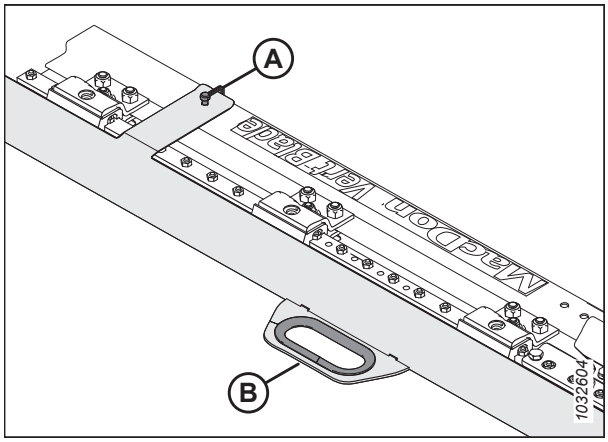


Figure 5.209: Vertical Knife Guard

8. Remove three bolts (A) securing milling bar (B) to the blade bracket and knife section assembly (C). Tilt milling bar (B) upward. Slide assembly (C) out.

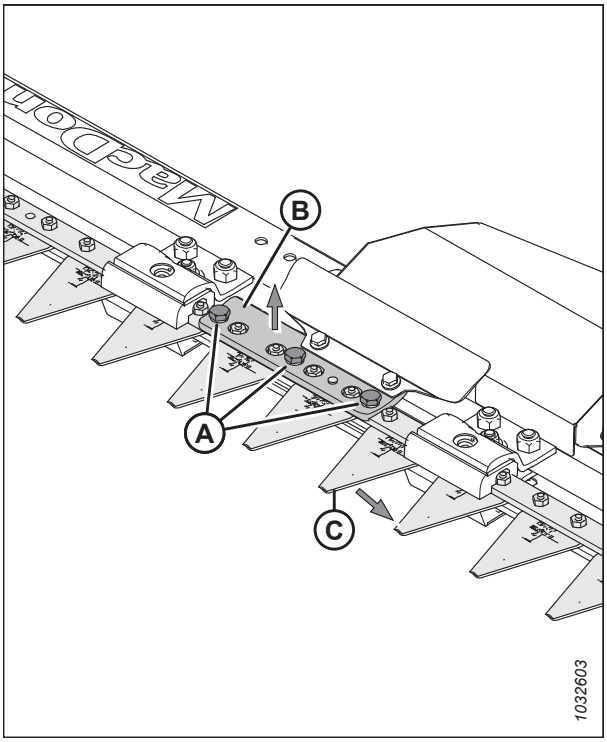


Figure 5.210: Vertical Knife – Guard Removed

NOTE:

If you cannot tilt milling bar (A) upwards enough to slide knife section assembly (B) out, remove two bolts (C) securing hood (D) to the vertical knife assembly. Loosen two nuts (E) to loosen slide rail (F). Milling bar (A) should now be loose enough to tilt upward.

IMPORTANT:

You should not need to loosen clip hardware (G) and clips (H) to slide the knife section assembly out. If you need to loosen this hardware, follow Step *13, page 316* to properly tighten the hardware when it is reinstalled. Overtightening this hardware can cause the motor to overheat, melt plastic components, or burn out. Undertightening the hardware can cause debris to plug the knives.

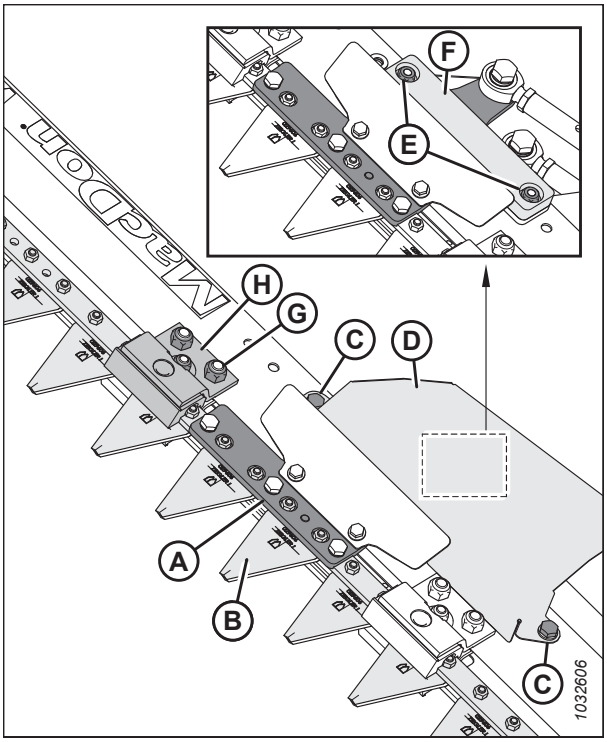


Figure 5.211: Vertical Knife – Guard Removed

9. Remove two screws (A) and nuts (B) securing knife section (C) to bracket (D).
10. Apply medium-strength threadlocker (Loctite® 243 or an equivalent) to two new screws (A) (MD #313790).
11. Secure new knife section (C) (MD #313788) to bracket (D) using two screws (A) and nuts (B) (MD #313789).
12. Tighten nuts (B) to 7 Nm (62 lbf·in).

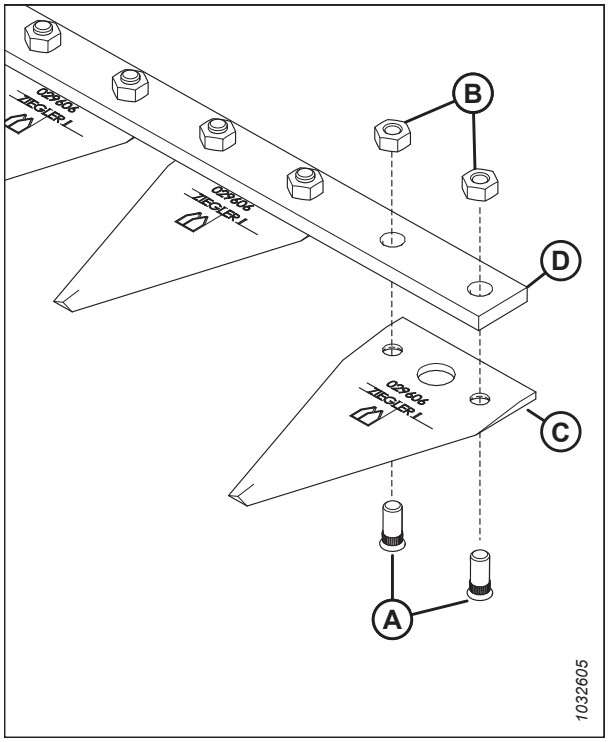


Figure 5.212: Knife Section Assembly

13. If you loosened clip hardware (A), (B), and clips (C), tighten the hardware as follows:
    a. Tighten M8 nut (A) so that gap (D) at the tip of knife sections (E) does **NOT** exceed 3 mm (1/8 in.).
    b. Ensure that clips (C) do **NOT** clamp the knife too tightly.

       NOTE:

       Excessively tight clips restrict the movement of the knife.

    c. Tighten two M10 nuts (B) to 50 Nm (37 lbf·ft).
14. Reinstall the remaining components and the knife guard. Installation is the reverse of removal.

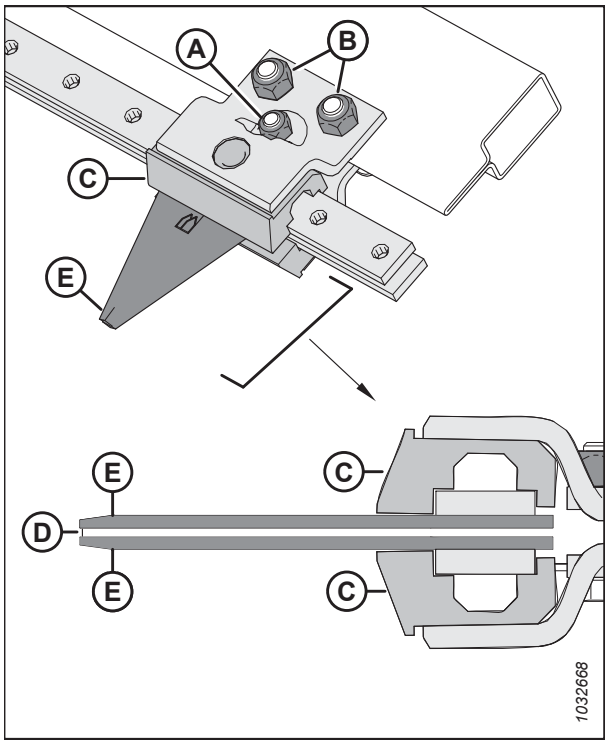


Figure 5.213: Gap Between Clip and Knife Section

5.12.2 Lubricating Vertical Knife

Each vertical knife has two lubrication points, which can be accessed by removing the knife's service panel.

Use high temperature extreme pressure (EP2) performance lubricant with 1% max molybdenum disulphide (NLGI Grade 2) lithium base to lubricate the vertical knives.

Lubricate vertical knife push rods (A) after they are first installed and every 50 operating hours thereafter.

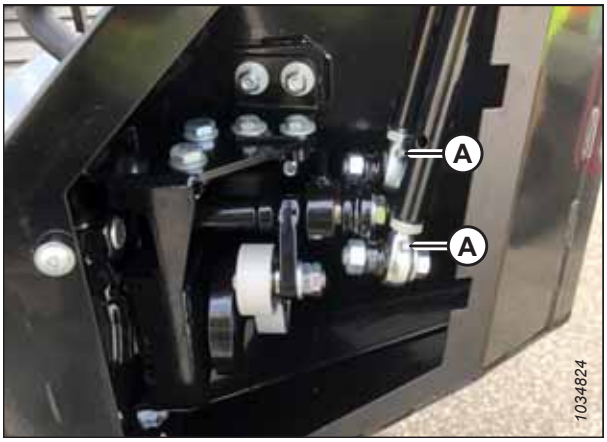


Figure 5.214: Grease Zerks on Vertical Knife Push Rods

To lubricate the vertical knife push rods, follow these steps:

NOTE:

Some parts have been removed from the illustrations for clarity.

DANGER

To prevent bodily injury or death from the unexpected start-up or fall of a raised machine, always stop the engine and remove the key before leaving the operator's seat, and always engage the safety props before going under the machine for any reason.

1. Lower the header to the ground.
2. Shut down the engine, and remove the key from the ignition.
3. Remove screws (A). Remove access cover (B).

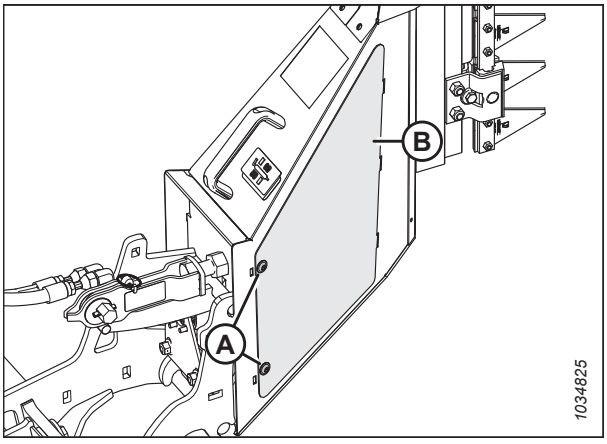


Figure 5.215: Vertical Knife Access Cover

4. Apply grease to two push rod grease zerks (A).

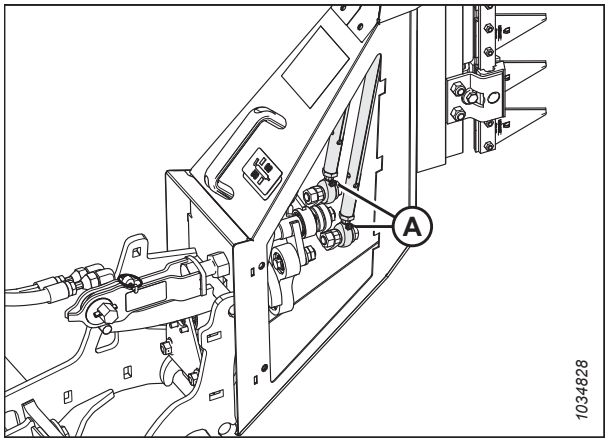


Figure 5.216: Grease Zerks on Vertical Knife Push Rods

5. Reinstall access cover (B). Secure the cover with screws (A).
6. Repeat this procedure to lubricate the other vertical knife.

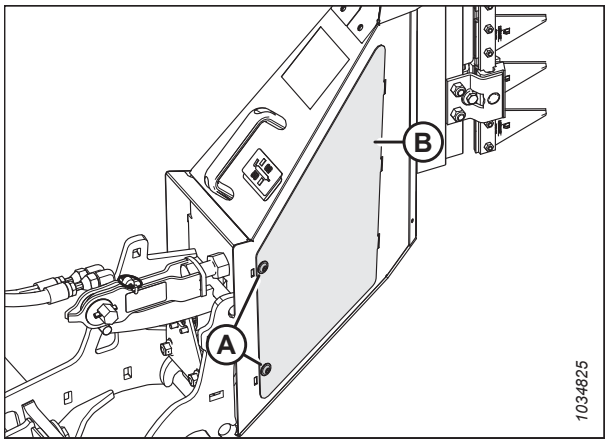


Figure 5.217: Vertical Knife Access Cover

Chapter 6: Options and Attachments

The following options and attachments are available for use with your header. See your MacDon Dealer for availability and ordering information.

6.1 Crop Delivery Kits

Crop delivery is the process in which crop gets from the cutterbar to the crimper or opening at the back of the header. Optional crop delivery kits can optimize header performance for specific crops or conditions.

6.1.1 Crop Lifter Kit

Crop lifters are recommended for severely lodged cereal crops where the operator wants maximum possible stubble height.

Installation instructions are included in the kit.

Each kit (MD #B7022) contains 10 lifters. Order the following number of kits depending on header size:

- 4.6 m (15 ft.) – 2 kits
- 6.1 m (20 ft.) – 2 kits
- 7.6 m (25 ft.) – 3 kits
- 9.1 m (30 ft.) – 3 kits
- 10.6 m (35 ft.) – 4 kits
- 12.5 m (41 ft.) –4 kits

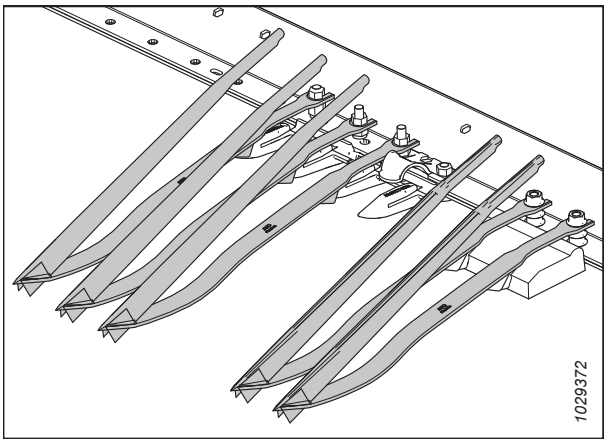


Figure 6.1: Grain Crop Lifter Kit

6.1.2 Crop Lifter Storage Rack Kit

Crop lifter racks are used to store crop lifters at the rear of the header.

Installation instructions are included in the kit.

MD #B7023

NOTE:

Not compatible with 4.6 m (15 ft.) and 6.1 m (20 ft.) headers.

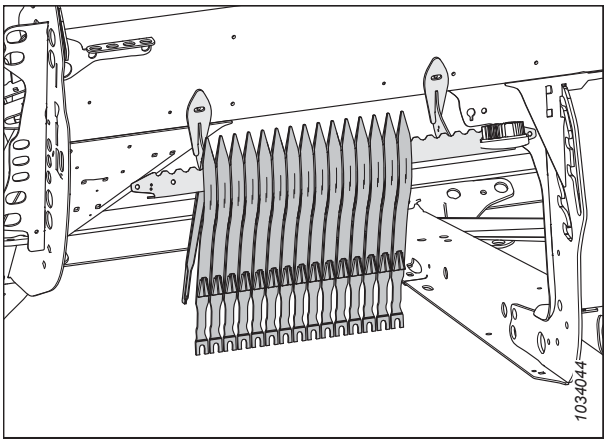


Figure 6.2: Crop Lifter Rack Kit – Left Side

6.1.3 Crop Divider Storage Bracket Kit

The divider storage bracket kit is used to store the standard divider cones on the header.

Installation instructions are included in the kit.

B7030

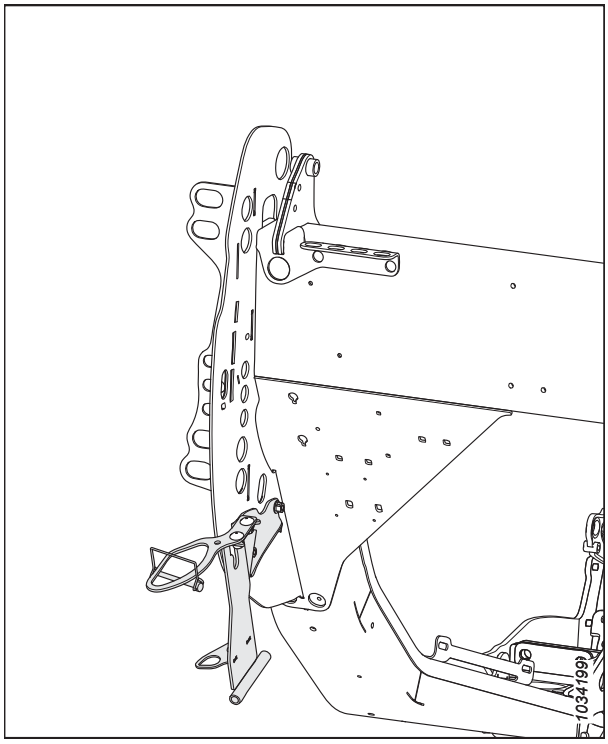


Figure 6.3: Divider Storage Bracket Kit – B7030

6.1.4 Floating Crop Dividers

Floating dividers follow the ground contour and allow for improved dividing in both lodged and standing crops and reduce trampling.

Installation instructions are included in the kit.

B7346

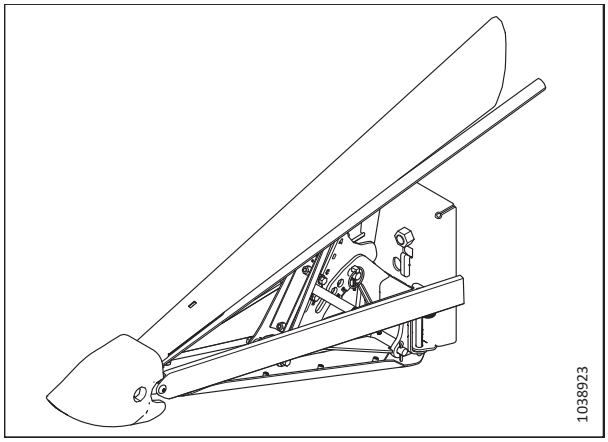


Figure 6.4: Floating Crop Divider

6.1.5 Full Length Upper Cross Auger

The upper cross auger attaches to the header in front of the backtube, and improves crop feeding into the center of the header in heavy crop conditions.

The upper cross auger (UCA) (A) is ideal for high-volume harvesting of forages, oats, canola, mustard, and other tall, bushy, hard-to-feed crops. Order the following bundles:

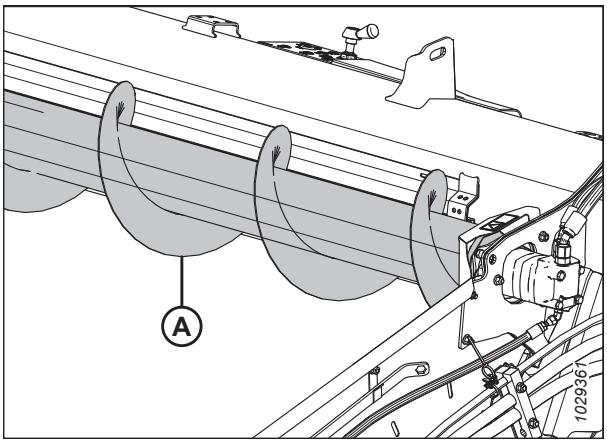


Figure 6.5: Upper Cross Auger

Base auger package

Includes the auger, mounts, drive, and hydraulic completion plumbing for headers that are upper cross auger ready.

Order from the following list of kits according to your header size:

- 4.6 m (15 ft.) – B7290 (one piece)
- 6.1 m (20 ft.) – B7291 (one piece)
- 7.6 m (25 ft.) – B6413 (two piece)
- 9.1 m (30 ft.) – B6414 (two piece)
- 10.6 m (35 ft.) – B6415 (two piece)
- 12.5 m (41 ft.) – B6416 (two piece)

Hydraulic Plumbing Package

Required only for headers without factory installed UCA hydraulics. Includes hydraulic lines to make header UCA ready, if not factory configured.

Order from the following list of kits according to your header size:

- 4.6 m (15 ft.) – B7270 (one piece)
- 6.1 m (20 ft.) – B7271 (one piece)
- 7.6 m (25 ft.) – B7272 (two piece)
- 9.1 m (30 ft.) – B7117 (two piece)
- 10.6 m (35 ft.) – B7118 (two piece)
- 12.5 m (41 ft.) – B7120 (two piece)

6.1.6 Lodged Crop Reel Finger Kit

The steel fingers attach to the ends of every other tine bar and help clear material in heavy, hard-to-cut crops such as lodged rice.

NOTE:

The Lodged Crop Reel Finger kit is not compatible with wide draper deflectors.

Each kit contains three fingers for the cam end and three fingers for the tail end of the reel. Hardware and installation and adjustment instructions are included with the kit.

B7230

Figure 6.6: Lodged Crop Finger

6.1.7 Rice Divider Rod Kit

Rice divider rods attach to the left and right crop dividers and divide tall and tangled rice crops in a similar manner to standard crop divider rods performing in standing crops.

The kit includes both left and right rods, and storage brackets.

Installation instructions are included in the kit.

B7238

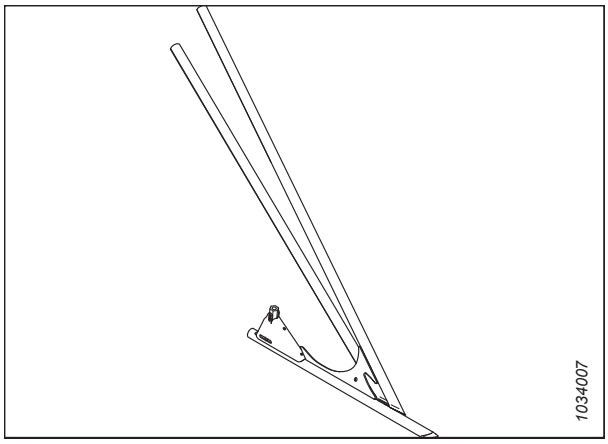


Figure 6.7: Left Rice Divider Rod Kit

6.1.8 Swath Forming Rods – Center Delivery

Swath forming rods form windrows so the heads are in the center and protected from shatter. Swath forming rods are mainly used for grass seed cutting applications.

Installation and adjustment instructions are included with the kit.

B7383

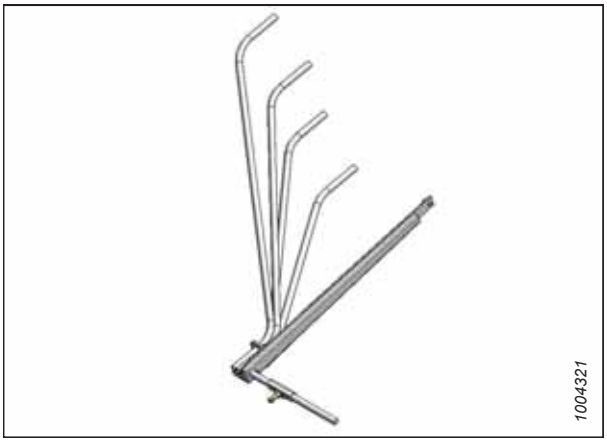


Figure 6.8: Swath Forming Rods

6.1.9 VertiBlade™ Vertical Knife Kit

The VertiBlade™ is a vertical crop cutter that is mounted to each end of the header. It is used to cut though lodged or tangled crops.

Order the following bundles:

Base VertiBlade™

Includes the knives, mounts, drive, and hydraulic completion plumbing to complete installation on a power-divider ready header.

B7029

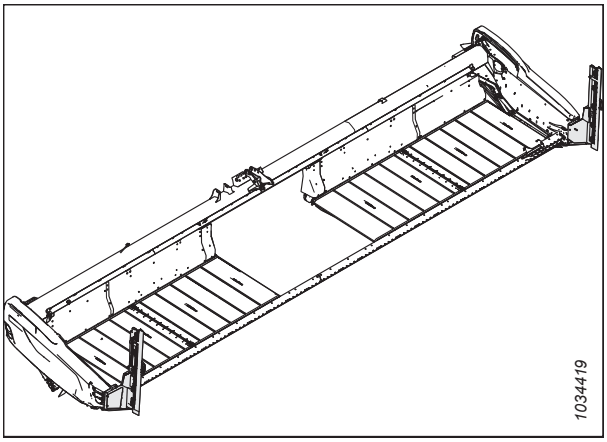


Figure 6.9: VertiBlade™ Vertical Knife Kit

Hydraulic Plumbing Package

The hydraulic plumbing packages are required only for headers without factory-installed power divider hydraulics. The package includes the hydraulic lines to make a header power-divider (VertiBlade™) ready.

Order one of the following kits based on your header size:

- 4.6 m (15 ft.) – B7274
- 6.1 m (20 ft.) – B7275
- 7.6 m (25 ft.) – B7276
- 9.1 m (30 ft.) – B7127
- 10.6 m (35 ft.) – B7128
- 12.5 m (41 ft.) – B7130

Installation instructions are included in the kits.

6.1.10 Wide End Deflector Kit

The wide end deflector kit is recommended for swath end delivery operation in heavy crop to keep swath away from uncut crop.

Installation instructions are included in the kit.

IMPORTANT:

The wide end deflector is **NOT** compatible with the Lodged Crop Reel Finger (B7230) option.

MD #340274

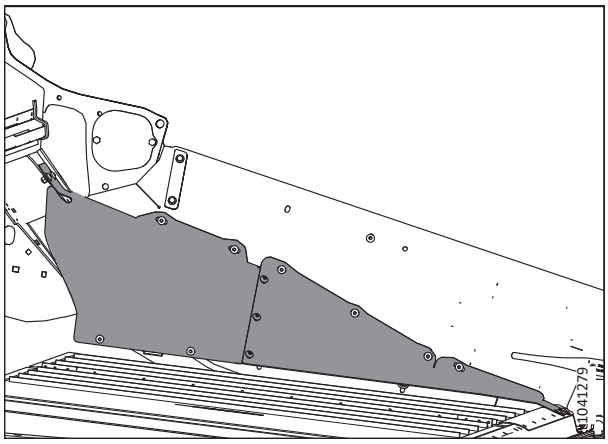


Figure 6.10: Wide End Deflector Kit

6.2 Cutterbar Kits

The cutterbar is located on the front of the header. It supports the knife and guards which together are used to cut the crop.

6.2.1 Rock Retarder Kit

A rock retarder extends the height of the cutterbar lip to help prevent rocks rolling onto the draper decks.

Order bundles by header size:

- 7.6–12.5 m (25–41 ft.) — B7122

NOTE:

Installation instructions are included in the kits.

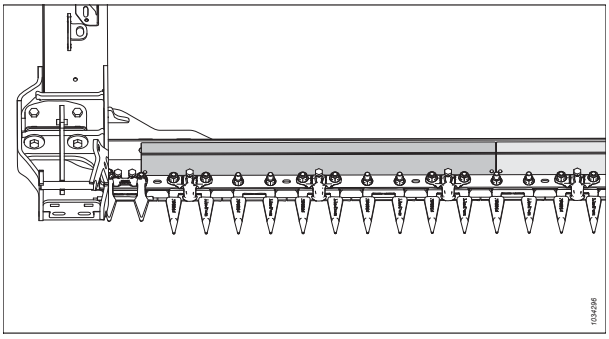


Figure 6.11: Rock Retarder Kit

6.2.2 Four-Point Knife Guard

Four-point guards provide increased knife protection in very rocky conditions, and can improve header performance with shatter-prone crops by reducing side-to-side crop motion.

Four-point knife guard kits are available for all 2 Series header sizes. Refer to the Parts Catalog or contact your Dealer for part numbers.

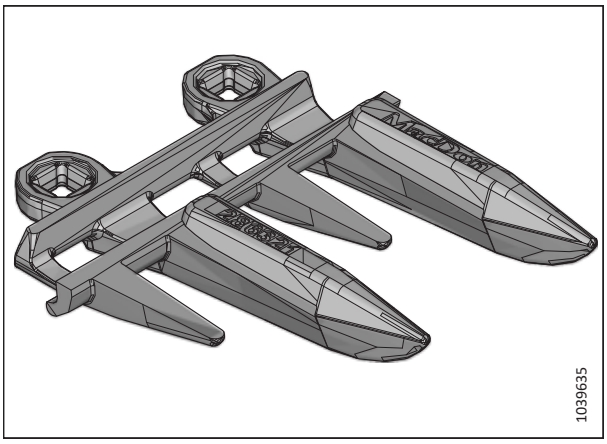


Figure 6.12: Four-Point Knife Guard

6.3 Header Kits

Header options add features or enhancements to the header frame rather than a specific system or function.

6.3.1 EasyMove™ Transport System

The EasyMove™ Transport System makes it faster than ever to move your header from field to field. When operating in the field, the wheels can also be used as stabilizer wheels.

Installation instructions are included in the kit.

In order to complete the installation of this kit, order one of the following according to header size:

- 9.1 m (30 ft.) – C2050
- 10.6 m (35 ft.) – C2050
- 12.5 m (41 ft.) – C2050

C2050 consists of

- Stabilizer Wheels / Slow Speed Transport Base Kit – B6288
- Wheels and Tires – B6275
- Long Tow Pole – B7392

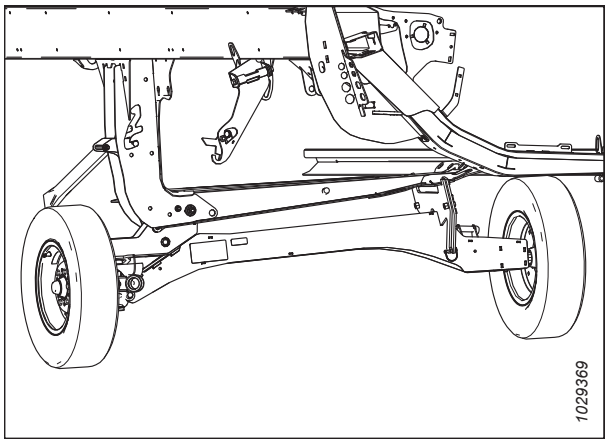


Figure 6.13: EasyMove™ Transport System

6.3.2 Inboard Steel End Finger Kit

Optional fingers to be used in difficult crops, lodged canola, and forage, where the angled plastic finger yields and distorts from heavy crop loads.

Installation instructions are included in the kit.

MD #311972

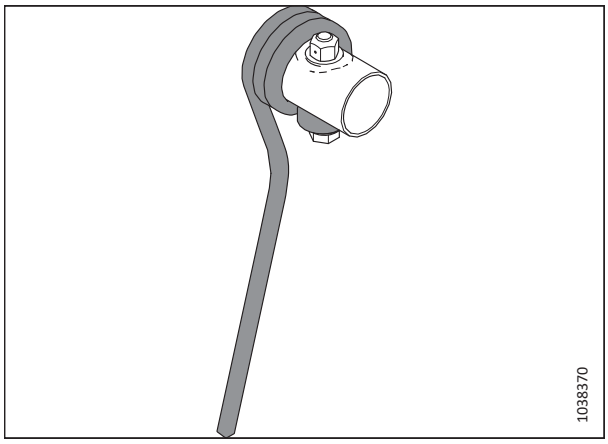


Figure 6.14: Inboard Steel End Finger

6.3.3 Outboard Steel End Finger Kit

Optional fingers to be used in difficult crops such as lodged canola, and forage, where the angled plastic finger yields and distorts from heavy crop loads.

Installation instructions are included in the kit.

MD #311959

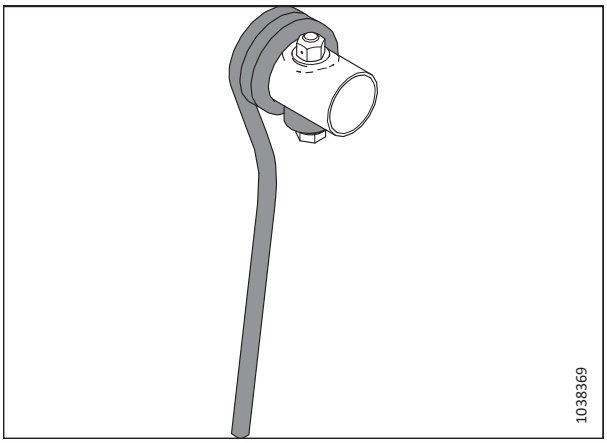


Figure 6.15: Outboard Steel End Finger

6.3.4 Steel Reel Finger Kit

Optional fingers to be used in difficult crops, lodged canola, and forage, where the angled plastic finger yields and distorts from heavy crop loads.

Order one of the following based on your header size:

- 4.6 m (15 ft.), Single Reel, 6 bat – MD #360676
- 4.6 m (15 ft.), Single Reel, 9 bat – MD #360677
- 6.1 m (20 ft.), Single Reel, 6 bat – MD #360678
- 6.1 m (20 ft.), Single Reel, 9 bat – MD #360685
- 7.6 m (25 ft.), Single Reel, 6 bat – MD #360679
- 7.6 m (25 ft.), Single Reel, 9 bat – MD #360680
- 9.1 m (30 ft.), Double Reel, 5 bat – MD #311054
- 9.1 m (30 ft.), Double Reel, 6 bat – MD #311055
- 10.6 m (35 ft.), Double Reel, 5 bat – MD #311068
- 10.6 m (35 ft.), Double Reel, 6 bat – MD #311069

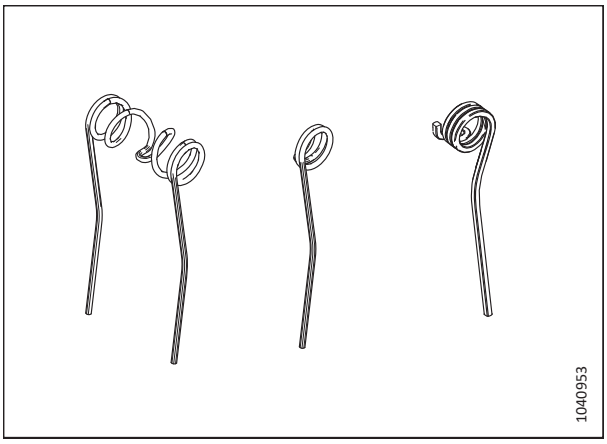


Figure 6.16: Steel Reel Finger

Installation instructions are included in the kit.

6.3.5 Stabilizer Wheel Kit

The stabilizer wheel kit stabilizes the headers lateral movement when cutting at heights higher than possible with the standard skid shoes.

Installation and adjustment instructions are included in the kit.

C2051

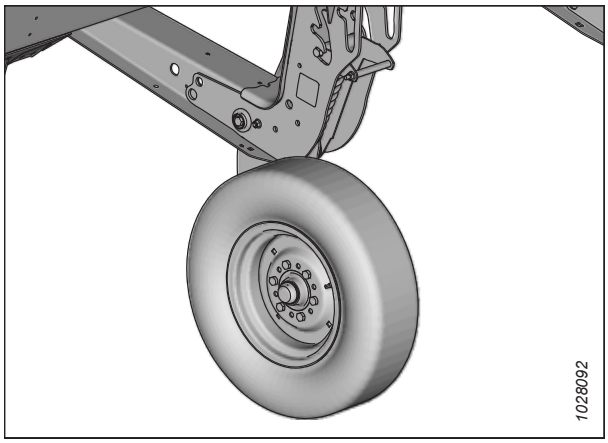


Figure 6.17: Stabilizer Wheel Kit

6.3.6 Steel Skid Shoes Kit

The steel skid shoes kit provides extended-wear skid shoes for use in rocky, abrasive conditions.

IMPORTANT:

Not recommended for use in wet mud or conditions that are prone to sparking.

B6801

NOTE:

Installation instructions are included in the kit.

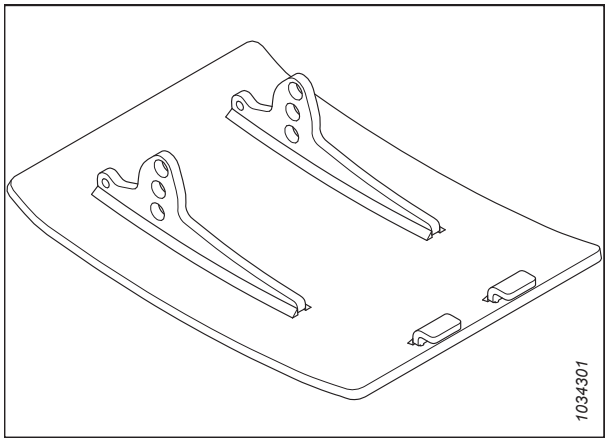


Figure 6.18: Steel Skid Shoes Kit

6.3.7 Stubble Light Kit

Stubble lights are used in low light conditions and allow you to see the stubble cut behind the header. The Stubble Light kit is available for MacDon D225, D230, D235, and D241 headers. This kit is currently compatible with M1 Series Windrowers only.

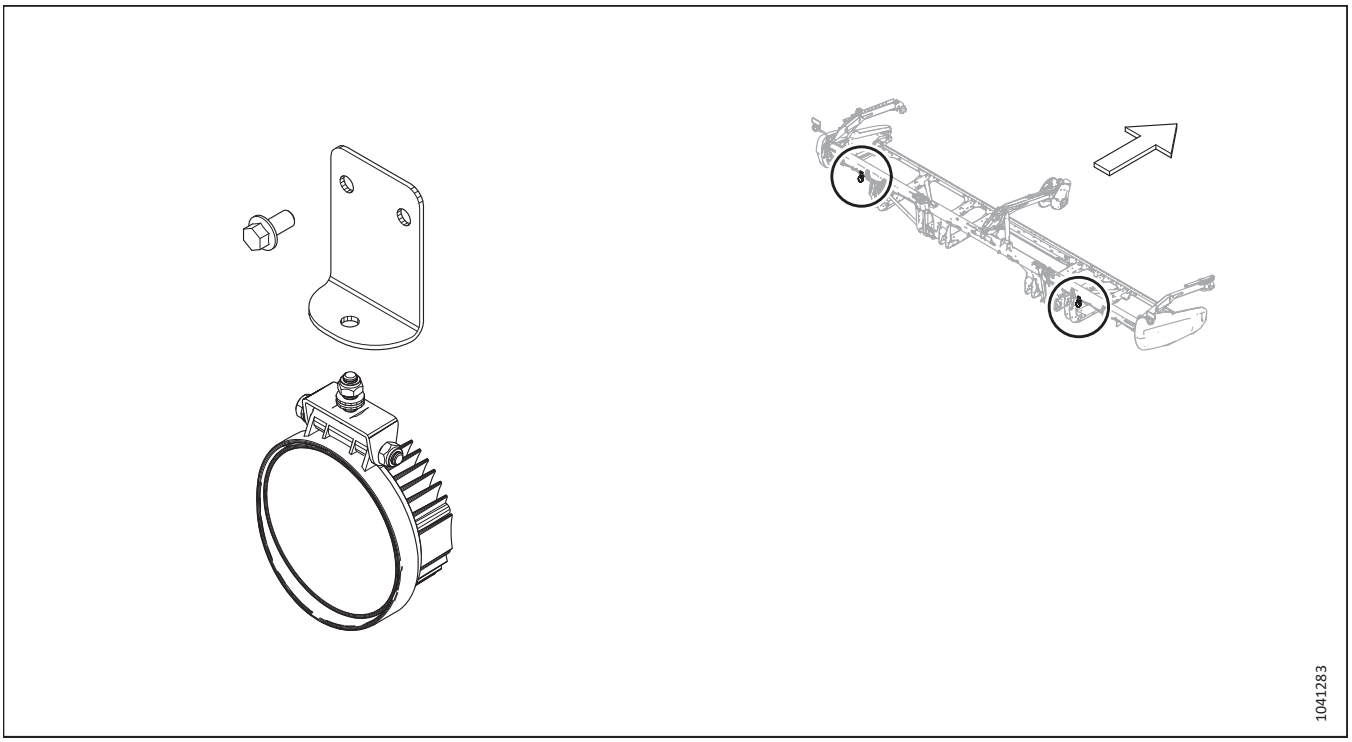


Figure 6.19: Stubble Light Kit

Installation instructions are included with the kit.

MD #B7027

Chapter 7: Troubleshooting

Troubleshooting tables are provided to help you diagnose and solve any problems you may have with the header.

7.1 Crop Loss at Cutterbar

Use the following tables to determine the cause of crop loss at the cutterbar and the recommended solution.

Table 7.1 Troubleshooting – Crop Loss at Cutterbar

Problem	Solution	Refer to
Symptom: Does not pick up downed crop		
Cutterbar too high	Lower cutterbar	• *3.7.2 Cutting off Ground, page 71*
Header angle too low	Increase header angle	*3.7.5 Header Angle, page 75*
Reel too high	Lower reel	*3.7.10 Reel Height, page 80*
Reel too far back	Move reel forward	*3.7.11 Reel Fore-Aft Position, page 85*
Ground speed too fast for reel speed	Increase reel speed or reduce ground speed	• *3.7.6 Reel Speed, page 77* • *3.7.7 Ground Speed, page 78*
Reel fingers not lifting crop sufficiently	Increase finger pitch aggressiveness	*3.7.12 Reel Tine Pitch, page 92*
Reel fingers not lifting crop sufficiently	Install crop lifters	MacDon Dealer
Symptom: Heads shattering or breaking off		
Reel speed too fast	Reduce reel speed	*3.7.6 Reel Speed, page 77*
Reel too low	Raise reel	*3.7.10 Reel Height, page 80*
Ground speed too fast	Reduce ground speed	*3.7.7 Ground Speed, page 78*
Crop too ripe	Operate at night when humidity is higher	—
Symptom: Material accumulating in the gap between the cut-out in endsheet and the knifehead		
Crop heads leaning away from knifehead hole in endsheet	Add knifehead shields (except in damp or sticky soils)	*5.5.9 Knifehead Shield, page 234*
Symptom: Strips of uncut material		
Guards plugged with debris	Install short knife guards	*5.5.8 Short Knife Guards and Hold-Downs, page 222*
Broken knife sections	Replace broken sections	*5.5.1 Replacing Knife Section, page 199*
Symptom: Excessive bouncing at normal field speed		
Float set too light	Adjust header float	*3.7.4 Header Float, page 75*
Symptom: Divider rod running down standing crop		
Divider rods too long	Remove divider rod	*3.7.14 Crop Dividers, page 98*
Symptom: Crop not being cut at ends		
Reel not frowning or not centered in header	Adjust reel horizontal position or reel frown	*3.7.11 Reel Fore-Aft Position, page 85*

Table 7.1 Troubleshooting – Crop Loss at Cutterbar (continued)

Problem	Solution	Refer to
Knife hold-down not adjusted properly	Adjust the hold-down so that the knife works freely but still keeps sections from lifting off of the guards	• *Adjusting Hold-Down – Pointed Knife Guards, page 216* or • *Adjusting Hold-Down – Short Knife Guards, page 229*
Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	*5.5 Knife, page 199*
Header is not level	Level the header	
Reel fingers not lifting crop properly ahead of knife	Adjust reel position and/or finger pitch	• *3.7.11 Reel Fore-Aft Position, page 85* • *3.7.12 Reel Tine Pitch, page 92*
Divider runs down thick crop at ends preventing proper feeding due to material bridging the guards	Replace 3–4 end guards with short knife guard	• *5.5.8 Short Knife Guards and Hold-Downs, page 222* • MacDon Dealer
Symptom: Bushy or tangled crop flows over the divider rod, and builds up on the endsheets		
Divider rods providing insufficient separation	Install long divider rods	*3.7.14 Crop Dividers, page 98*
Symptom: Cut grain falling ahead of the cutterbar		
Ground speed too slow	Increase ground speed	*3.7.7 Ground Speed, page 78*
Reel speed too slow	Increase reel speed	*3.7.6 Reel Speed, page 77*
Reel too high	Lower reel	*3.7.10 Reel Height, page 80*
Cutterbar too high	Lower cutterbar	• *3.7.2 Cutting off Ground, page 71* • *3.7.3 Cutting on Ground, page 73*
Reel too far forward	Move reel back on arms	*3.7.11 Reel Fore-Aft Position, page 85*
Cutting at speeds over 10 km/h (6 mph) with 10-tooth reel drive sprocket	Replace with 19-tooth reel drive sprocket	*Removing Reel Drive Single Sprocket, page 3035.10.2 Reel Drive Sprocket, page 303*
Worn or broken knife components	Replace components	*5.5 Knife, page 199*

7.2 Cutting Action and Knife Components

Use the following tables to determine the cause of the cutting action and knife component problems and the recommended repair procedure.

Table 7.2 Troubleshooting – Cutting Action and Knife Components

Problem	Solution	Refer to
Symptom: Ragged or uneven cutting of crop		
Knife hold-down not adjusted properly	Adjust the hold-down	• *Adjusting Hold-Down – Pointed Knife Guards, page 216* • *Adjusting Hold-Down – Short Knife Guards, page 229*
Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	• *Replacing Pointed Center Knife Guard – Double Knife, page 217* • *Replacing Pointed Knife Guards, page 213* • *Replacing Center Knife Guard – Double Knife, page 230* • *Replacing Short Knife Guards or End Knife Guards, page 226* • *5.5.1 Replacing Knife Section, page 199*
Ground speed too fast for reel speed	Reduce ground speed or increase reel speed	• *3.7.6 Reel Speed, page 77* • *3.7.7 Ground Speed, page 78*
Reel fingers not lifting crop properly ahead of knife	Adjust reel position/finger pitch	• *3.7.11 Reel Fore-Aft Position, page 85* • *3.7.12 Reel Tine Pitch, page 92*
Cutterbar too high	Lower cutting height	*3.7.2 Cutting off Ground, page 71* or
Header angle too flat	Steepen header angle	*3.7.5 Header Angle, page 75*
Cutting edge of guards not close enough or parallel to knife sections	Align guards	*Adjusting Knife Guards and Guard Bar, page 211*
Tangled/tough-to-cut crop	Install short knife guards	MacDon Dealer
Reel too far back	Move the reel forward	*3.7.11 Reel Fore-Aft Position, page 85*
Symptom: Knife plugging		
Reel too high or too far forward	Lower the reel or move reel rearward	• *3.7.10 Reel Height, page 80* • *3.7.11 Reel Fore-Aft Position, page 85*
Ground speed too high	Decrease the ground speed	*3.7.7 Ground Speed, page 78*
Improper knife hold-down adjustment	Adjust the hold-down	*Adjusting Hold-Down – Pointed Knife Guards, page 216* or *Adjusting Hold-Down – Short Knife Guards, page 229*
Dull or broken knife section	Replace knife section	*5.5.1 Replacing Knife Section, page 199*

Table 7.2 Troubleshooting – Cutting Action and Knife Components (continued)

Problem	Solution	Refer to
Bent or broken guards	Align or replace the guards	*Adjusting Knife Guards and Guard Bar, page 211*
Reel fingers not lifting crop properly ahead of knife	Adjust the reel position/finger pitch	• *3.7.11 Reel Fore-Aft Position, page 85* • *3.7.12 Reel Tine Pitch, page 92*
Steel pick-up fingers contacting knife	Increase the reel clearance to cutterbar or adjust "frown"	• *5.9.1 Reel-to-Cutterbar Clearance, page 270*
Mud or dirt build-up on cutterbar	Raise the cutterbar by lowering skid shoes	*3.7.3 Cutting on Ground, page 73*
Mud or dirt build-up on cutterbar	Flatten the header angle	*3.7.5 Header Angle, page 75*
Knife is not operating at recommended speed	Check the header knife speed	*Checking Knife Speed, page 79*
Symptom: Excessive header vibration		
Knife hold-down not adjusted properly	Adjust hold-down	• *Adjusting Hold-Down – Pointed Knife Guards, page 216* or *Adjusting Hold-Down – Short Knife Guards, page 229*
Excessive knife wear	Replace knife	• *5.5.2 Removing Knife, page 200* • *5.5.5 Installing Knife, page 203*
Knife hold-down not adjusted properly	Adjust hold-down	• *Adjusting Hold-Down – Pointed Knife Guards, page 216* • *Adjusting Center Hold-Down – Pointed Knife Guards, page 221* • *Adjusting Hold-Down – Short Knife Guards, page 229* • *Adjusting Center Hold-Down – Short Knife Guards, page 233*
Excessive knife wear	Replace knife	• *5.5.2 Removing Knife, page 200* • *5.5.5 Installing Knife, page 203*
Loose or worn knifehead pin or drive arm	Tighten or replace parts	*5.5.1 Replacing Knife Section, page 199*
Symptom: Excessive vibration of float module and header		
Incorrect knife speed	Adjust knife speed	*Checking Knife Speed, page 79*
Bent cutterbar	Straighten the cutterbar	MacDon DealerMacDon Product Support
Symptom: Excessive breakage of knife sections or guards		
Knife hold-down not adjusted properly	Adjust the hold-down	• *Adjusting Hold-Down – Pointed Knife Guards, page 216* or • *Adjusting Hold-Down – Short Knife Guards, page 229*

Table 7.2 Troubleshooting – Cutting Action and Knife Components (continued)

Problem	Solution	Refer to
Cutterbar operating too low in stony conditions	Raise cutterbar using skid shoes	*3.7.3 Cutting on Ground, page 73*
Float is set too heavy	Adjust float springs for lighter float	Windrower operator's manual
Bent or broken guard	Straighten or replace the guard	• *5.5.7 Pointed Knife Guards and Hold-Downs, page 205* or • *5.5.8 Short Knife Guards and Hold-Downs, page 222*
Header angle too steep	Flatten the header angle	*3.7.5 Header Angle, page 75*
Symptom: Knife back breakage		
Bent or broken guard	Straighten or replace the guard	• *5.5.7 Pointed Knife Guards and Hold-Downs, page 205* or • *5.5.8 Short Knife Guards and Hold-Downs, page 222*
Worn knifehead pin	Replace the knifehead pin	• *5.5.3 Removing Knifehead Bearing, page 201* and • *5.5.4 Installing Knifehead Bearing, page 202*
Dull knife	Replace the knife	• *5.5.2 Removing Knife, page 200* and • *5.5.5 Installing Knife, page 203*

7.3 Reel Delivery

Use the following tables to determine the cause of reel delivery problems and the recommended repair procedure.

Table 7.3 Troubleshooting – Reel Delivery

Problem	Solution	Refer to
Symptom – Reel not releasing material in normal standing crop		
Reel speed too fast	Reduce the reel speed	*3.7.6 Reel Speed, page 77*
Reel too low	Raise the reel	*3.7.10 Reel Height, page 80*
Reel tines too aggressive	Reduce the cam setting	*3.7.12 Reel Tine Pitch, page 92*
Reel too far back	Move the reel forward	*3.7.11 Reel Fore-Aft Position, page 85*
Symptom – Reel not releasing material in lodged and standing crop (reel fully lowered)		
Reel tines too aggressive for standing crop	Reduce the cam setting (one or two) or move reel forward	*3.7.12 Reel Tine Pitch, page 92*
Symptom – Wrapping on reel end		
Reel tines too aggressive	Reduce the cam setting	*3.7.12 Reel Tine Pitch, page 92*
Reel too low	Raise the reel	*3.7.10 Reel Height, page 80*
Reel speed too fast	Reduce the reel speed	*3.7.6 Reel Speed, page 77*
Reel not centered in header	Center the reel in the header	*5.9.2 Centering Reel, page 275*
Symptom – Reel releases crop too quickly		
Reel tines not aggressive enough	Increase the cam setting to match reel delivery to the reel fore-aft position	*3.7.12 Reel Tine Pitch, page 92*
Reel too far forward	Move the reel back to match the reel cam setting	*3.7.11 Reel Fore-Aft Position, page 85*
Symptom – Reel will not lift		
Reel lift couplers are incompatible or defective	Change the quick coupler	MacDon Dealer
Symptom – Reel will not turn		
Quick couplers not properly connected	Connect the couplers	*4 Header Attachment/Detachment, page 139*
Reel drive chain disconnected or broken	Connect/replace the chain	Contact your Dealer
Symptom – Reel motion uneven under no load		
Excessive slack in reel drive chain	Tighten the chain	*Tightening Reel Drive Chain, page 301*
Symptom – Reel motion is uneven or stalls in heavy crops		
Reel speed too fast	Reduce the reel speed	*3.7.6 Reel Speed, page 77*
Reel fingers not aggressive enough	Move to a more aggressive finger pitch notch	*3.7.12 Reel Tine Pitch, page 92*
Reel too low	Raise the reel	*3.7.10 Reel Height, page 80*
Cutting tough crops with standard torque (19-tooth) reel drive sprocket	Replace with high-torque 10-tooth or 14-tooth reel drive sprocket	• *5.10.2 Reel Drive Sprocket, page 303* • Install Two Speed Kit (MD #311882)
Symptom – Plastic fingers cut at tip		
Insufficient reel to cutterbar clearance	Increase the clearance	*5.9.1 Reel-to-Cutterbar Clearance, page 270*

Table 7.3 Troubleshooting – Reel Delivery (continued)

Problem	Solution	Refer to
Symptom – Plastic fingers bent rearward at tip		
Reel digging into ground with reel speed slower than ground speed	Raise the header	*3.7.3 Cutting on Ground, page 73*
Reel digging into ground with reel speed slower than ground speed	Decrease the header tilt	*3.7.5 Header Angle, page 75*
Reel digging into ground with reel speed slower than ground speed	Move the reel aft	*3.7.11 Reel Fore-Aft Position, page 85*
Symptom – Plastic fingers bent forward at tip		
Reel digging into ground with reel speed faster than ground speed	Raise the header	*3.7.3 Cutting on Ground, page 73*
Reel digging into ground with reel speed faster than ground speed	Decrease the header tilt	*3.7.5 Header Angle, page 75*
Reel digging into ground with reel speed faster than ground speed	Move the reel aft	*3.7.11 Reel Fore-Aft Position, page 85*
Symptom – Plastic fingers bent close to tine tube		
Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation	Correct the plugging/cutting issues	*3.9 Unplugging Cutterbar, page 117*
Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation	Stop the reel before plugging becomes excessive	*3.9 Unplugging Cutterbar, page 117*

7.4 Troubleshooting Header and Drapers

Use the following tables to determine the header and draper problems and the recommended repair procedure.

Table 7.4 Troubleshooting – Header and Drapers

Problem	Solution	Refer to
Symptom: Insufficient side draper speed		
Speed control set too low	Increase the speed control setting	*3.7.8 Draper Speed, page 78*
Symptom: Insufficient feed draper speed		
Relief pressure too low	Test the feed draper hydraulic system	See your MacDon Dealer
Symptom: Side Draper stalling		
Material not feeding evenly off knife	Lower the reel	*3.7.10 Reel Height, page 80*
Material not feeding evenly off knife	Install short knife guards	*5.5.8 Short Knife Guards and Hold-Downs, page 222*
Symptom: Hesitation in the flow of bulky crop		
Header angle too low	Increase the header angle	*3.7.5 Header Angle, page 75*
Material overload on drapers	Increase the side draper speed	*3.7.8 Draper Speed, page 78*
Material overload on drapers	Install an upper cross auger	*6.1.5 Full Length Upper Cross Auger, page 321*
Material overload on drapers	Add flighting extensions	MacDon Dealer
Symptom: Drapers back-feed		
Drapers running too slow in heavy crop	Increase the draper speed	*3.7.8 Draper Speed, page 78*
Symptom: Crop is thrown across the opening and under opposite side draper		
Drapers running too fast in light crop	Reduce the draper speed	*3.7.8 Draper Speed, page 78*
Symptom: Material accumulating on the end deflectors and releasing in bunches		
End deflectors too wide	For headers with manual deck shift only, trim the deflector or replace with a narrow deflector (MD #172381)	*3.9 Unplugging Cutterbar, page 117*

7.5 Cutting Edible Beans

Use the following tables to determine the cause of any cutting edible bean problems and the recommended solutions.

Table 7.5 Troubleshooting – Cutting Edible Beans

Problem	Solution	Refer to
Symptom: Plants being stripped and complete or partial plants left behind		
Header off ground	Lower the header to ground and run it on the skid shoes and/or the cutterbar	*3.7.3 Cutting on Ground, page 73*
Reel too high with cylinders fully retracted	Adjust the reel height	*3.7.10 Reel Height, page 80*
Finger pitch not aggressive enough	Adjust the finger pitch	*3.7.12 Reel Tine Pitch, page 92*
Reel too far aft	Move the reel forward until the fingertips skim the soil surface with the header on the ground and the header angle properly adjusted	*3.7.11 Reel Fore-Aft Position, page 85*
Header angle too shallow	Adjust the header angle	*3.7.5 Header Angle, page 75*
Header angle too shallow	Increase the header angle by fully retracting lift cylinders (if cutting on ground)	*3.7.5 Header Angle, page 75*
Reel too slow	Adjust the reel speed to be marginally faster than ground speed	*3.7.6 Reel Speed, page 77*
Ground speed too fast	Lower the ground speed	*3.7.7 Ground Speed, page 78*
Skid shoes too low	Raise the skid shoes to the highest setting	*3.7.3 Cutting on Ground, page 73*
Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar; raises the cutterbar off the ground	Ground too wet – allow soil to dry	—
Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar; raises the cutterbar off the ground	Float too heavy	*3.7.4 Header Float, page 75*
Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar; raises the cutterbar off the ground	Manually clean the bottom of the cutterbar when excessive accumulation occurs	—
Header not level	Level the header	*3.8 Leveling Header, page 116*
Worn or damaged knife sections	Replace the sections or replace the knife	*5.5 Knife, page 199*
Parts of vines get caught in pointed guard tip. (Occurs more in row-cropped beans that are hilled from cultivating.)	Install the short knife guard conversion kit	*5.5.8 Short Knife Guards and Hold-Downs, page 222*
Pushing of crop debris on the ground	Install the short knife guards	*5.5.8 Short Knife Guards and Hold-Downs, page 222*
Knife speed too low	Increase the feeder house speed or check that the knife speed is set within the recommended range	*3.7.9 Knife Speed Information, page 79* or *Checking Knife Speed, page 79*
Symptom: Excessive losses at dividers		
Divider rod running down crop and shattering the pods	Remove the divider rod	*3.7.14 Crop Dividers, page 98*

Table 7.5 Troubleshooting – Cutting Edible Beans (continued)

Problem	Solution	Refer to
Vines and plants build up on the endsheet	Install the divider rod	*3.7.14 Crop Dividers, page 98*
Symptom: Plant vines pinched between top of draper and cutterbar		
Cutterbar fills with debris when draper to cutterbar gap is properly adjusted	Raise the header fully at each end of the field (or as required) and shift decks back and forth to help clean out the cutterbar	—
Shifting the decks with the header raised does not clean out the cutterbar debris.	Manually remove the debris from the cutterbar cavity to prevent damaging the drapers	—
Symptom: Crop accumulating at guards and not moving rearward onto the drapers		
Reel finger pitch not aggressive enough	Increase the finger aggressiveness (cam position)	*3.7.12 Reel Tine Pitch, page 92*
Reel too high	Lower the reel	*3.7.10 Reel Height, page 80*
Minimum reel clearance to cutterbar setting too high	Adjust the minimum reel height with cylinders fully retracted	*5.9.1 Reel-to-Cutterbar Clearance, page 270*
Reel too far forward	Reposition the reel	*3.7.11 Reel Fore-Aft Position, page 85*
Symptom: Crop wrapping around reel		
Reel too low	Raise the reel	*3.7.10 Reel Height, page 80*
Symptom: Reel shattering pods		
Reel too far forward	Reposition the reel	*3.7.11 Reel Fore-Aft Position, page 85*
Reel speed too high	Reduce the reel speed	*3.7.6 Reel Speed, page 77*
Bean pods too dry	Cut at night when heavy dew is present and pods have softened	—
Reel finger pitch not aggressive enough	Increase the finger aggressiveness (cam position)	*3.7.12 Reel Tine Pitch, page 92*
Symptom: Cutterbar guards breaking		
Excessive number of rocks in field	Consider installing optional short knife guards **Note:** With the installation of short knife guards, you are trading guard damage for section damage (although changing sections with short knife guards is easier)	*5.5.8 Short Knife Guards and Hold-Downs, page 222*
Symptom: Cutterbar pushing too much debris and dirt		
Header too heavy	Readjust the float to make the header lighter	*3.7.4 Header Float, page 75*
Header angle too steep	Decrease the header angle	*3.7.5 Header Angle, page 75*
Guards plug with debris or and soil	Install the short knife guard	*5.5.8 Short Knife Guards and Hold-Downs, page 222*
Insufficient support for the header	Install the center skid shoes	*3.7.3 Cutting on Ground, page 73*
Symptom: Crop wrapping around reel ends		
Uncut crop interfering on reel ends	Add reel endshields	Header parts catalog
Symptom: Cutterbar fills up with dirt		

Table 7.5 Troubleshooting – Cutting Edible Beans (continued)

Problem	Solution	Refer to
Excessive gap between the draper and the cutterbar	Raise the header fully at each end of field (or as required) and shift the decks back and forth to help clean out the cutterbar	—
Symptom: Reel occasionally carries over plants in the same location		
Steel fingers bent and hooking plants from drapers	Straighten the fingers (steel)	—
Dirt accumulation on end of fingers preventing plants from falling off fingers onto drapers	Raise the reel	*3.7.10 Reel Height, page 80*
Dirt accumulation on end of fingers preventing plants from falling off fingers onto drapers	Adjust the reel fore-aft position to move the fingers out of the ground	*3.7.11 Reel Fore-Aft Position, page 85*
Symptom: Cutterbar pushing soil		
Tire tracks or row crop ridges	Cut at an angle to crop rows or ridges	—
Rolling terrain along length of field	Cut at 90° to the rolling terrain (provided knife floats across without digging in)	—
Symptom: Reel carries over an excessive amount of plants or wads		
Excessive accumulation of crop on drapers (up to reel center tube)	Increase the draper speed	*3.7.8 Draper Speed, page 78*
Finger pitch too slow	Increase the finger pitch	*3.7.12 Reel Tine Pitch, page 92*

7.6 Troubleshooting Windrow Formation

Use the following tables to determine the cause of any windrow formation problems and the recommended solutions.

Table 7.6 Troubleshooting – Windrow Formation

Problem	Solution	Refer to
Symptom: Heads on Ground and Scattered		
Draper speed too slow	Increase draper speed	*3.7.8 Draper Speed, page 78*
Draper angle too flat	Increase header angle	*Controlling Header Angle, page 76*
Ground speed too slow	Increase ground speed	*3.7.7 Ground Speed, page 78*
Crop too ripe	Cut material before too mature	—
Symptom: Hollow in Center		
Draper speed too slow	Increase draper speed	*3.7.8 Draper Speed, page 78*
Delivery opening too wide	Decrease delivery opening width	*3.7.16 Delivery Opening, page 104*
Symptom: All Heads in Center		
Draper speed too fast or header angle too steep	Reduce draper speed and/or decrease header angle	• *3.7.8 Draper Speed, page 78* • *3.7.5 Header Angle, page 75*
Ground speed too fast	Reduce ground speed	*3.7.7 Ground Speed, page 78*
Crop too green	Allow time to mature	—
Symptom: All Heads To One Side		
Crop leaning to one side and reel too slow	Increase reel speed to orient crop parallel to draper slats and/or increase finger pitch aggressiveness	• *3.7.12 Reel Tine Pitch, page 92* • *3.7.6 Reel Speed, page 77*
Symptom: Uneven Windrow (Any Crop Condition)		
Reel too low	Raise reel	*3.7.10 Reel Height, page 80*
Ground speed too fast for drapers, causing heads to fan out and crop to leave drapers unevenly	Reduce ground speed or increase draper speed	• *3.7.7 Ground Speed, page 78* • *3.7.8 Draper Speed, page 78*
Reel speed too fast	Reduce reel speed	*3.7.6 Reel Speed, page 77*

Chapter 8: Reference

The procedures and information in this chapter can be referred to as needed.

8.1 Torque Specifications

The following tables provide torque values for various bolts, cap screws, and hydraulic fittings. Refer to these values only when no other torque value has been specified in a given procedure.

- Tighten all bolts to the torque values specified in the charts below, unless you are directed otherwise in this manual.
- Replace removed hardware with hardware of the same strength and grade.
- Refer to the torque value tables as a guide when periodically checking the tightness of bolts.
- Understand the torque categories for bolts and cap screws by reading the markings on their heads.

Jam nuts

Jam nuts require less torque than nuts used for other purposes. When applying torque to finished jam nuts, multiply the torque applied to regular nuts by 0.65 to obtain the modified torque value.

Self-tapping screws

Refer to the standard torque values when installing the self-tapping screws. Do **NOT** install the self-tapping screws on structural or otherwise critical joints.

8.1.1 Metric Bolt Specifications

Specifications are provided for the appropriate final torque values to secure various sizes of metric bolts.

NOTE:

The torque values provided in the following metric bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** add grease, oil, or threadlocker to bolts or cap screws unless you are directed to do so in this manual.

Table 8.1 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1.4	1.6	*13	*14
3.5-0.6	2.2	2.5	*20	*22
4-0.7	3.3	3.7	*29	*32
5-0.8	6.7	7.4	*59	*66
6-1.0	11.4	12.6	*101	*112
8-1.25	28	30	20	23
10-1.5	55	60	40	45
12-1.75	95	105	70	78
14-2.0	152	168	113	124
16-2.0	236	261	175	193
20-2.5	460	509	341	377
24-3.0	796	879	589	651

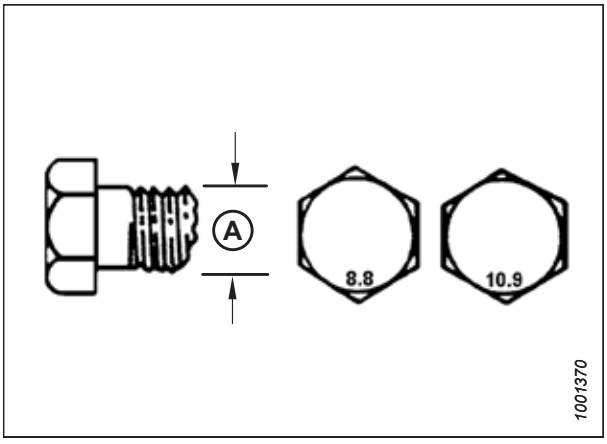


Figure 8.1: Bolt Grades

Table 8.2 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1	1.1	*9	*10
3.5-0.6	1.5	1.7	*14	*15
4-0.7	2.3	2.5	*20	*22
5-0.8	4.5	5	*40	*45
6-1.0	7.7	8.6	*69	*76
8-1.25	18.8	20.8	*167	*185
10-1.5	37	41	28	30
12-1.75	65	72	48	53
14-2.0	104	115	77	85
16-2.0	161	178	119	132
20-2.5	314	347	233	257
24-3.0	543	600	402	444

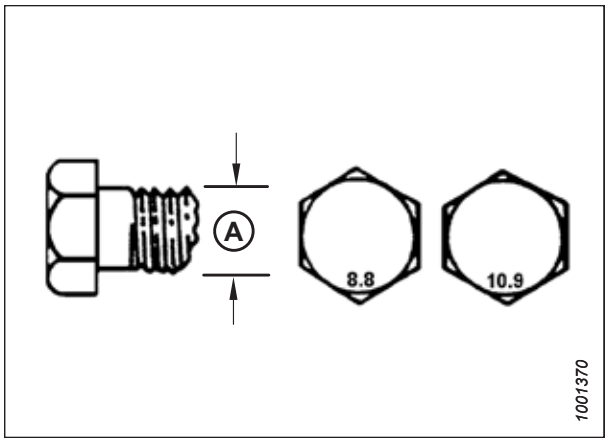


Figure 8.2: Bolt Grades

Table 8.3 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1.8	2	*18	*19
3.5-0.6	2.8	3.1	*27	*30
4-0.7	4.2	4.6	*41	*45
5-0.8	8.4	9.3	*82	*91
6-1.0	14.3	15.8	*140	*154
8-1.25	38	42	28	31
10-1.5	75	83	56	62
12-1.75	132	145	97	108
14-2.0	210	232	156	172
16-2.0	326	360	242	267
20-2.5	637	704	472	521
24-3.0	1101	1217	815	901

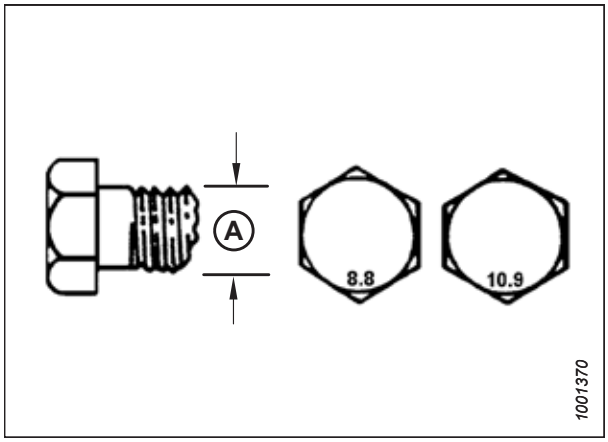


Figure 8.3: Bolt Grades

Table 8.4 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1.3	1.5	*12	*13
3.5-0.6	2.1	2.3	*19	*21
4-0.7	3.1	3.4	*28	*31
5-0.8	6.3	7	*56	*62
6-1.0	10.7	11.8	*95	*105
8-1.25	26	29	19	21
10-1.5	51	57	38	42
12-1.75	90	99	66	73
14-2.0	143	158	106	117
16-2.0	222	246	165	182
20-2.5	434	480	322	356
24-3.0	750	829	556	614

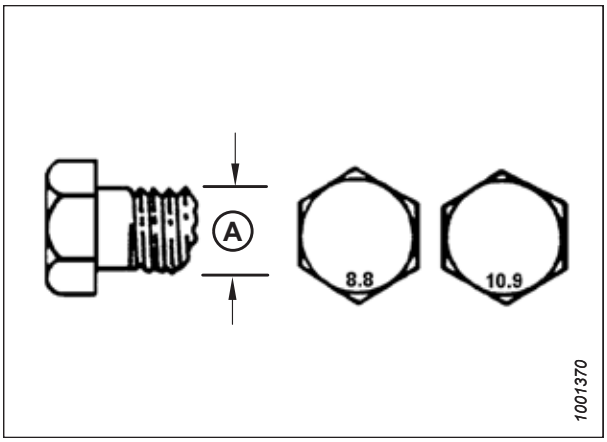


Figure 8.4: Bolt Grades

8.1.2 Metric Bolt Specifications – Cast Aluminum

Specifications are provided for the appropriate final torque values for various sizes of metric bolts in cast aluminum.

NOTE:

The torque values provided in the following metric bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** add grease, oil, or threadlocker to bolts or cap screws unless you are directed to do so in this manual.

Table 8.5 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	Nm	lbf·ft	Nm	lbf·ft
M3	–	–	–	1
M4	–	–	4	2.6
M5	–	–	8	5.5
M6	9	6	12	9
M8	20	14	28	20
M10	40	28	55	40
M12	70	52	100	73
M14	–	–	–	–
M16	–	–	–	–

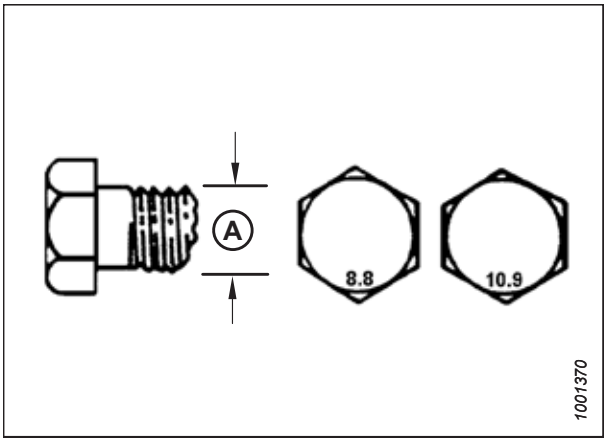


Figure 8.5: Bolt Grades

8.1.3 O-Ring Boss Hydraulic Fittings – Adjustable

The standard torque values are provided for adjustable hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

1. Inspect O-ring (A) and seat (B) for dirt or defects.
2. Back off lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward lock nut (C) as far as possible.
3. Ensure that O-ring (A) is **NOT** on the threads. Adjust O-ring (A) if necessary.
4. Apply hydraulic system oil to O-ring (A).

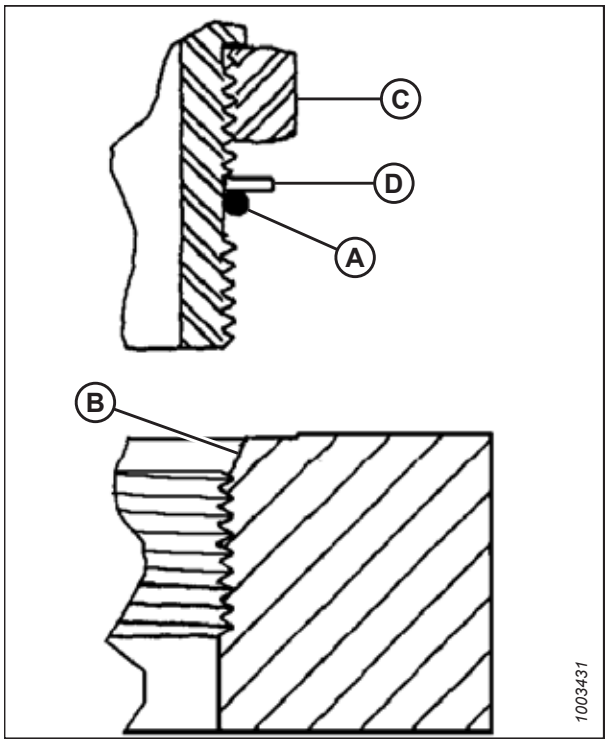


Figure 8.6: Hydraulic Fitting

5. Install fitting (B) into the port until backup washer (D) and O-ring (A) contact part face (E).
6. Position the angle fittings by unscrewing no more than one turn.
7. Turn lock nut (C) down to washer (D) and tighten it to the torque value indicated in the table. Use two wrenches, one on fitting (B) and the other on lock nut (C).
8. Verify the final condition of the fitting.

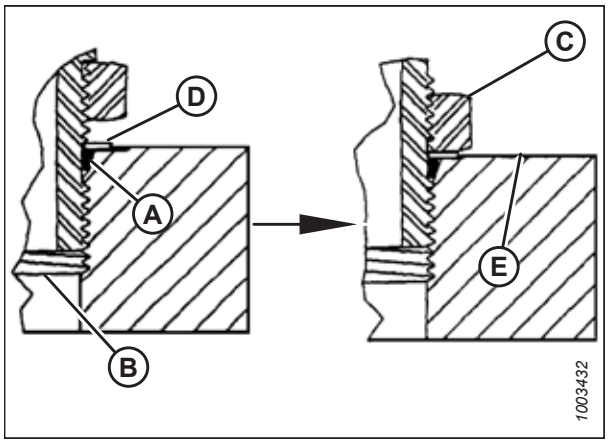


Figure 8.7: Hydraulic Fitting

Table 8.6 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value[85]	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1 1/16–12	120–132	88–97
-14	1 3/8–12	153–168	113–124
-16	1 5/16–12	176–193	130–142
-20	1 5/8–12	221–243	163–179
-24	1 7/8–12	270–298	199–220
-32	2 1/2–12	332–365	245–269

8.1.4 O-Ring Boss Hydraulic Fittings – Non-Adjustable

The standard torque values for non-adjustable hydraulic fittings are provided. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, use the value specified in the procedure instead.

1. Inspect O-ring (A) and seat (B) for dirt or defects.
2. Ensure that O-ring (A) is **NOT** on the threads. Adjust O-ring (A) if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into the port until the fitting is hand-tight.
5. Torque fitting (C) according to values in Table *8.7, page 347*.
6. Verify the final condition of the fitting.

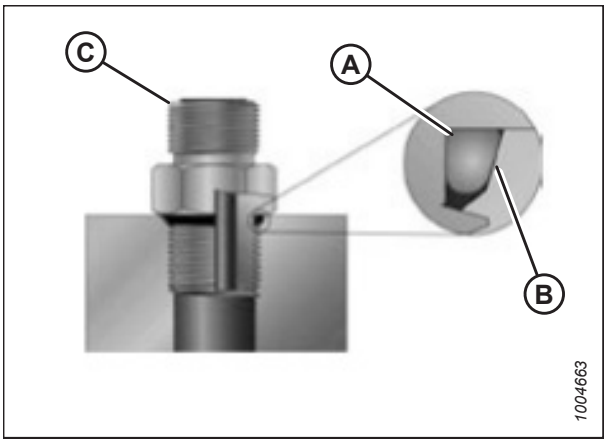


Figure 8.8: Hydraulic Fitting

Table 8.7 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value[85]	
		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

85. Torque values shown are based on lubricated connections as in reassembly.

Table 8.7 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable (continued)

SAE Dash Size	Thread Size (in.)	Torque Value[86]	
		Nm	lbf·ft (*lbf·in)
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1 1/16–12	120–132	88–97
-14	1 3/8–12	153–168	113–124
-16	1 5/16–12	176–193	130–142
-20	1 5/8–12	221–243	163–179
-24	1 7/8–12	270–298	199–220
-32	2 1/2–12	332–365	245–269

8.1.5 O-Ring Face Seal Hydraulic Fittings

The standard torque values are provided for O-ring face seal hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

Torque values are shown in the Table *8.8, page 349*.

1. Ensure that the sealing surfaces and the fitting threads are free of burrs, nicks, scratches, and any foreign material.

Figure 8.9: Hydraulic Fitting

86. Torque values shown are based on lubricated connections as in reassembly.

2. Apply hydraulic system oil to O-ring (B).
3. Align the tube or hose assembly so that the flat face of sleeve (A) or (C) comes into full contact with O-ring (B).
4. Thread tube or hose nut (D) until it is hand-tight. The nut should turn freely until it bottoms out.
5. Torque the fittings according to values in Table *8.8, page 349*.

   NOTE:

   If applicable, hold the hex flange on fitting body (E) to prevent the rotation of the fitting body and the hose when tightening fitting nut (D).
6. Use three wrenches when assembling unions or joining two hoses together.
7. Verify the final condition of the fitting.

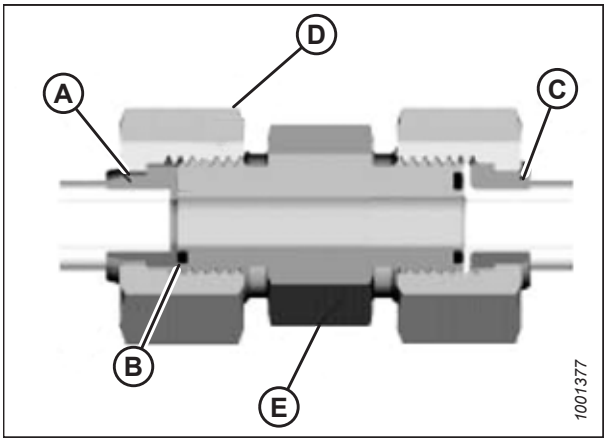


Figure 8.10: Hydraulic Fitting

Table 8.8 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value[87]	
			Nm	lbf·ft
-3	Note[88]	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note[88]	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[88]	7/8	–	–
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167
-24	1–2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

8.1.6 Tapered Pipe Thread Fittings

The standard torque values are provided for tapered pipe thread fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

Assemble pipe fittings as follows:

1. Ensure that the fitting and the port threads are free of burrs, nicks, scratches, and any other form of contamination.
2. Apply paste-type pipe thread sealant to the external pipe threads.
3. Thread the fitting into the port until it is hand-tight.

87. Torque values and angles shown are based on lubricated connection as in reassembly.
88. O-ring face seal type end not defined for this tube size.

4. Torque the connector to the appropriate torque angle. The turns from finger tight (TFFT) and flats from finger tight (FFFT) values are shown in Table *8.9, page 350*. Ensure that the tube end of a shaped connector (typically a 45° or 90° elbow) is aligned to receive the incoming tube or hose assembly. Always finish the alignment of the fitting in the direction of tightening. Never loosen the threaded connectors to achieve alignment.

5. Clean all residue and any excess thread conditioner with an appropriate cleaner.

6. Inspect the final condition of the fitting. Pay special attention to the possibility of cracks in the port opening.

7. Mark the final position of the fitting. If a fitting leaks, disassemble the fitting and check it for damage.

   NOTE:

   The failure of fittings due to over-torquing may not be evident until the fittings are disassembled and inspected.

Table 8.9 Hydraulic Fitting Pipe Thread

Tapered Pipe Thread Size	Recommended TFFT	Recommended FFFT
1/8–27	2–3	12–18
1/4–18	2–3	12–18
3/8–18	2–3	12–18
1/2–14	2–3	12–18
3/4–14	1.5–2.5	12–18
1–11 1/2	1.5–2.5	9–15
1 1/4–11 1/2	1.5–2.5	9–15
1 1/2–11 1/2	1.5–2.5	9–15
2–11 1/2	1.5–2.5	9–15

8.2 Conversion Chart

Both SI units (including metric) and US customary units (sometimes referred to as standard units) of measurement are used in this manual. A list of those units along with their abbreviations and conversion factors is provided here for your reference.

Table 8.10 Conversion Chart

Quantity	SI Units (Metric)		Factor	US Customary Units (Standard)	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectare	ha	x 2.4710 =	acre	acres
Flow	liters per minute	L/min	x 0.2642 =	US gallons per minute	gpm
Force	Newton	N	x 0.2248 =	pound force	lbf
Length	millimeter	mm	x 0.0394 =	inch	in.
Length	meter	m	x 3.2808 =	foot	ft.
Power	kilowatt	kW	x 1.341 =	horsepower	hp
Pressure	kilopascal	kPa	x 0.145 =	pounds per square inch	psi
Pressure	megapascal	MPa	x 145.038 =	pounds per square inch	psi
Pressure	bar (Non-SI)	bar	x 14.5038 =	pounds per square inch	psi
Torque	Newton meter	Nm	x 0.7376 =	pound feet or foot pounds	lbf·ft
Torque	Newton meter	Nm	x 8.8507 =	pound inches or inch pounds	lbf·in
Temperature	degrees Celsius	°C	(°C x 1.8) + 32 =	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	x 3.2808 =	feet per minute	ft/min
Velocity	meters per second	m/s	x 3.2808 =	feet per second	ft/s
Velocity	kilometers per hour	km/h	x 0.6214 =	miles per hour	mph
Volume	liter	L	x 0.2642 =	US gallon	US gal
Volume	milliliter	mL	x 0.0338 =	ounce	oz.
Volume	cubic centimeter	cm^3 or cc	x 0.061 =	cubic inch	$in.^3$
Weight	kilogram	kg	x 2.2046 =	pound	lb.

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Recommended Fluids and Lubricants

Ensure your machine operates at top efficiency by using clean fluids and lubricants only.

- Use clean containers to handle all fluids and lubricants.
- Store fluids and lubricants in an area protected from dust, moisture, and other contaminants.

Table: Recommended Fluids and Lubricants

Lubricant	Specification	Description	Use	Capacities
Grease	SAE multi-purpose	High temperature extreme pressure (EP) performance with 1% max. molybdenum disulphide (NLGI Grade 2) lithium base	As required unless otherwise specified	—
Gear lubricant	SAE 85W-140	API service class GL-5	Knife drive box	1.5 liters (1.3 quarts)
Chain oil	Chain oil with a viscosity of 100–150 sCt at 40°C (104°F) or mineral oil SAE 20W-50 that has no detergents or solvents	Chain oil is formulated to provide good wear protection and resistance to foaming. It protects the chain and drive sprockets against wear.	Reel drive chain	—

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