

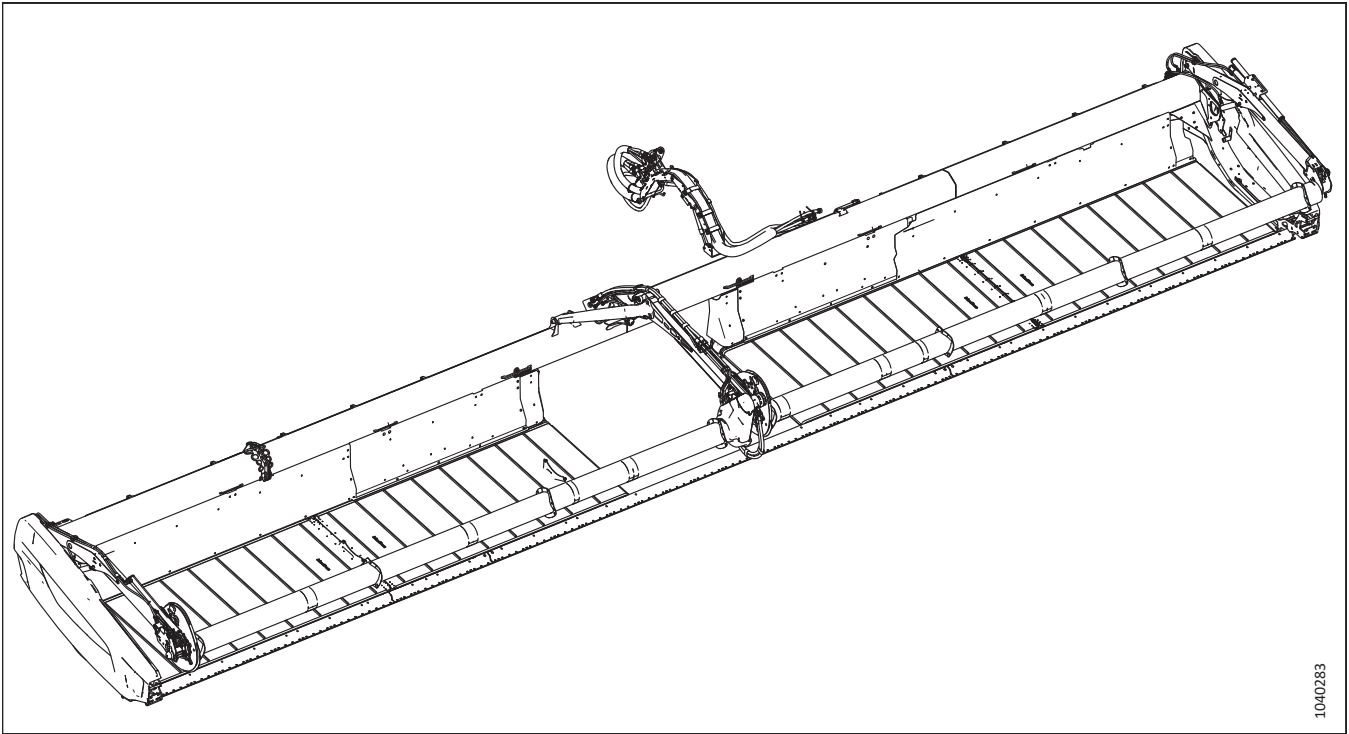
# **D2 Series Draper Header for Windrowers**

Operator's Manual

262674 Revision A

Original Instruction

## D2 Series Draper Header For Windrowers




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# Declaration of Conformity

 <h2 style="margin: 0;">EC Declaration of Conformity</h2>	
<p><b>[1] MacDon</b>                  MacDon Industries Ltd.                  680 Moray Street,                  Winnipeg, Manitoba, Canada                  R3J 3S3</p>	<p>[4] As per Shipping Document</p> <p>[5] 22-Apr-24</p>
<p>[2] Windrower Header</p>	<p>[6] _____                  Adrienne Tankeu                  Product Integrity</p>
<p>[3] MacDon D2 SP Series</p>	

EN	BG	CZ	DA
<p>We, [1]                  Declare, that the product:                  Machine Type: [2]                  Name &amp; Model: [3]                  Serial Number(s): [4]                  fulfils all the relevant provisions of the Directive 2006/42/EC.                  Harmonized standards used, as referred to in Article 7(2):                  EN ISO 4254-1:2015                  EN ISO 4254-1:2015/A1:2021                  EN ISO 4254-7:2017</p> <p>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:                  Guillaume Quenot                  General Manager, MacDon Europe GmbH                  Hagenauer Straße 59                  65203 Wiesbaden (Germany)                  gquenot@macdon.com</p>	<p>Ние, [1]                  декларираме, че следният продукт:                  Тип машина: [2]                  Наименование и модел: [3]                  Сериен номер(а) [4]                  отговаря на всички приложими разпоредби на директива 2006/42/ЕО.                  Използвани са следните хармонизирани стандарти според чл. 7(2):                  EN ISO 4254-1:2015                  EN ISO 4254-1:2015/A1:2021                  EN ISO 4254-7:2017</p> <p>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:                  Гуillaume Яуенот                  Управител, MacDon Europe GmbH                  Hagenauer Straße 59                  65203 Wiesbaden (Германия)                  gquenot@macdon.com</p>	<p>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 4254-1:2015                  EN ISO 4254-1:2015/A1:2021                  EN ISO 4254-7:2017</p> <p>Místo a datum prohlášení: [5]                  Identita a podpis osoby oprávněné k vydání prohlášení: [6]                  Jméno a adresa osoby oprávněné k vyplnění technického souboru:                  Guillaume Quenot                  generální ředitel, MacDon Europe GmbH                  Hagenauer Straße 59                  65203 Wiesbaden (Německo)                  gquenot@macdon.com</p>	<p>Vi, [1]                  erklærer, at produktet:                  Maskintype [2]                  Navn og model: [3]                  Serienummer (-numre): [4]                  Opfylder alle bestemmelser i direktiv 2006/42/EF.                  Anvendte harmoniserede standarder, som henviser til i paragraf 7(2):                  EN ISO 4254-1:2015                  EN ISO 4254-1:2015/A1:2021                  EN ISO 4254-7:2017</p> <p>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:                  Guillaume Quenot                  Direktør, MacDon Europe GmbH                  Hagenauer Straße 59                  D-65203 Wiesbaden (Tyskland)                  gquenot@macdon.com</p>

DE	ES	ET	FR
<p>Wir, [1]                  Erklären hiermit, dass das Produkt:                  Maschinentyp: [2]                  Name &amp; Modell: [3]                  Seriennummer (n): [4]                  alle relevanten Vorschriften der Richtlinie 2006/42/EG erfüllt.                  Harmonisierte Standards wurden, wie in folgenden Artikeln angegeben, verwendet 7(2):                  EN ISO 4254-1:2015                  EN ISO 4254-1:2015/A1:2021                  EN ISO 4254-7:2017</p> <p>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:                  Guillaume Quenot                  General Manager, MacDon Europe GmbH                  Hagenauer Straße 59                  65203 Wiesbaden                  gquenot@macdon.com</p>	<p>Nosotros [1]                  declaramos que el producto:                  Tipo de máquina: [2]                  Nombre y modelo: [3]                  Números de serie: [4]                  cumple con todas las disposiciones pertinentes de la directriz 2006/42/EC.                  Se utilizaron normas armonizadas, según lo dispuesto en el artículo 7(2):                  EN ISO 4254-1:2015                  EN ISO 4254-1:2015/A1:2021                  EN ISO 4254-7:2017</p> <p>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:                  Guillaume Quenot                  Gerente general - MacDon Europe GmbH                  Hagenauer Straße 59                  65203 Wiesbaden (Alemania)                  gquenot@macdon.com</p>	<p>Meie, [1]                  deklareerime, et toode                  Seadme tüüp: [2]                  Nimi ja mudel: [3]                  Seerianumbrid: [4]                  vastab kõigile direktiivi 2006/42/EÜ asjakohastele sätetele.                  Kasutatud on järgnevald harmoniseeritud standardeid, millele on viidatud ka punktis 7(2):                  EN ISO 4254-1:2015                  EN ISO 4254-1:2015/A1:2021                  EN ISO 4254-7:2017</p> <p>Deklaratsiooni koht ja kuupäev: [5]                  Deklaratsiooni koostamiseks volitatud isiku nimi ja allkiri: [6]                  Tehnilise dokumendi koostamiseks volitatud isiku nimi ja aadress:                  Guillaume Quenot                  Peadirektor, MacDon Europe GmbH                  Hagenauer Straße 59                  65203 Wiesbaden (Saksamaa)                  gquenot@macdon.com</p>	<p>Nous soussignés, [1]                  Déclarons que le produit :                  Type de machine : [2]                  Nom et modèle : [3]                  Numéro(s) de série : [4]                  Est conforme à toutes les dispositions pertinentes de la directive 2006/42/EC.                  Utilisation des normes harmonisées, comme indiqué dans l'Article 7(2):                  EN ISO 4254-1:2015                  EN ISO 4254-1:2015/A1:2021                  EN ISO 4254-7:2017</p> <p>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 :                  Guillaume Quenot                  Directeur général, MacDon Europe GmbH                  Hagenauer Straße 59                  65203 Wiesbaden (Allemagne)                  gquenot@macdon.com</p>

# EC Declaration of Conformity

<p style="text-align: center;"><b>IT</b></p> <p>Noi, [1] Dichiaro che il prodotto: Tipo di macchina: [2] Nome e modello: [3] Numero(i) di serie: [4] soddisfa tutte le disposizioni rilevanti della direttiva 2006/42/CE.  Utilizzo degli standard armonizzati, come indicato nell'Articolo 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  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: Guillaume Quenot General Manager, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Germania) gquenot@macdon.com</p>	<p style="text-align: center;"><b>HU</b></p> <p>Mi, [1] Ezennel kijelentjük, hogy a következő termék: Gép típusa: [2] Név és modell: [3] Szériaszám(ok): [4] teljesíti a következő irányelv összes vonatkozó előírásait: 2006/42/EK.  Az alábbi harmonizált szabványok kerültek alkalmazásra a 7(2) cikkely szerint: EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  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: Guillaume Quenot Vezérigazgató, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Németország) gquenot@macdon.com</p>	<p style="text-align: center;"><b>LT</b></p> <p>Mes, [1] Pareiškiami, kad šis produktas: Mašinos tipas: [2] Pavadinimas ir modelis: [3] Serijos numeris (-iai): [4] atitinka taikomus reikalavimus pagal Direktyvą 2006/42/EB.  Naudojami harmonizuoti standartai, kai nurodoma straipsnyje 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  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: Guillaume Quenot Generalinis direktorius, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Vokietija) gquenot@macdon.com</p>	<p style="text-align: center;"><b>LV</b></p> <p>Mēs, [1] Deklarējam, ka produkts: Mašīnas tips: [2] Nosaukums un modelis: [3] Sērijas numurs(-i): [4] Atbilst visām būtiskajām Direktīvas 2006/42/EK prasībām.  Piemēroti šādi saskaņotie standarti, kā minēts 7. panta 2. punktā: EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  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: Guillaume Quenot Generāldirektors, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Vācija) gquenot@macdon.com</p>
<p style="text-align: center;"><b>NL</b></p> <p>Wij, [1] Verklaren dat het product: Machinetype: [2] Naam en model: [3] Serienummer(s): [4] voldoet aan alle relevante bepalingen van de Richtlijn 2006/42/EC.  Geharmoniseerde normen toegepast, zoals vermeld in Artikel 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  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: Guillaume Quenot Algemeen directeur, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Duitsland) gquenot@macdon.com</p>	<p style="text-align: center;"><b>PO</b></p> <p>My niżej podpisani, [1] Oświadczamy, że produkt: Typ urządzenia: [2] Nazwa i model: [3] Numer serijny/numery seryjne: [4] spełnia wszystkie odpowiednie przepisy dyrektywy 2006/42/WE.  Zastosowaliśmy następujące (zharmonizowane) normy zgodnie z artykułem 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  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: Guillaume Quenot Dyrektor generalny, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Niemcy) gquenot@macdon.com</p>	<p style="text-align: center;"><b>PT</b></p> <p>Nós, [1] Declaramos, que o produto: Tipo de máquina: [2] Nome e Modelo: [3] Número(s) de Série: [4] cumpre todas as disposições relevantes da Directiva 2006/42/CE.  Normas harmonizadas aplicadas, conforme referido no Artigo 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  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: Guillaume Quenot Gerente Geral, MacDon Europa Ltda. Hagenauer Straße 59 65203 Wiesbaden (Alemanha) gquenot@macdon.com</p>	<p style="text-align: center;"><b>RO</b></p> <p>Noi, [1] Declarăm, că următorul produs: Tipul mașinii: [2] Denumirea și modelul: [3] Număr (numere) serie: [4] corespunde tuturor dispozițiilor esențiale ale directivei 2006/42/EC.  Au fost aplicate următoarele standarde armonizate conform articolului 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  Data și locul declarației: [5] Identitatea și semnătura persoanei împuternicite pentru întocmirea declarației: [6]  Numele și semnătura persoanei autorizate pentru întocmirea cărții tehnice: Guillaume Quenot Manager General, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Germania) gquenot@macdon.com</p>
<p style="text-align: center;"><b>SR</b></p> <p>Mi, [1] Izjavljujem da proizvod Tip mašine: [2] Naziv i model: [3] Serijski broj(ovi): [4] Ispunjava sve relevantne odredbe direktive 2006/42/EC.  Korišćeni su usklađeni standardi kao što je navedeno u članu 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  Datum i mesto izdavanja deklaracije: [5] Identitet i potpis lica ovlašćenog za sastavljanje deklaracije: [6]  Ime i adresa osobe ovlašćene za sastavljanje tehničke datoteke: Guillaume Quenot Generalni direktor, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Nemačka) gquenot@macdon.com</p>	<p style="text-align: center;"><b>SV</b></p> <p>Mi, [1] Intyggar att produkten: Maskintyp: [2] Namn och modell: [3] Serienummer: [4] uppfyller alla relevanta villkor i direktivet 2006/42/EG.  Harmoniserade standarder används, såsom anges i artikel 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  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: Guillaume Quenot Administrativ chef, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Tyskland) gquenot@macdon.com</p>	<p style="text-align: center;"><b>SL</b></p> <p>Mi, [1] izjavljam, 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 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  Kraj in datum izjave: [5] Istovetnost in podpis osebe, opolnomočene za pripravo izjave: [6]  Ime in naslov osebe, pooblaščenega za pripravo tehnične datoteke: Guillaume Quenot Generalni direktor, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Nemčija) gquenot@macdon.com</p>	<p style="text-align: center;"><b>SK</b></p> <p>My, [1] týmto prehlasujem, že tento výrobok: Typ zariadenia: [2] Názov a model: [3] Výrobné číslo: [4] splňa príslušné ustanovenia a základné požiadavky smernice č. 2006/42/ES.  Použitá harmonizované normy, ktoré sa uvádzajú v článku č. 7(2): EN ISO 4254-1:2015 EN ISO 4254-1:2015/A1:2021 EN ISO 4254-7:2017  Miesto a dátum prehlásenia: [5] Meno a podpis osoby oprávnenej vypracovať toto prehlásenie: [6]  Meno a adresa osoby oprávnenej zostaviť technický súbor: Guillaume Quenot Generálny riaditeľ MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Nemecko) gquenot@macdon.com</p>



## UK Declaration of Conformity

[1] **MacDon**

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

[4] As per Shipping Document

[5] 22-Apr-24

[2] Windrower Header

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

[3] MacDon D2 SP Series

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 4254-1:2015/A1:2021

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

This manual contains information on the MacDon D2 Series Draper Header for Windrowers.

### ***Your machine***

When properly configured, the D2 Series Draper Header is compatible with M Series, M1 Series, and M2 Series Windrowers as well as the TM100 Tractor Mount system.

When a D2 Series Draper Header is attached to your MacDon Windrower, it will cut and lay crop into fluffy, uniform windrows.

### ***Your manual***

**Carefully read all of 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.

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.

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 *8.1 Torque Specifications, page 389*.
- When torque values of 30 Nm or less are listed, their equivalents will be provided in both foot-pounds (lbf-ft) and inch-pounds (lbf-in).

### **NOTE:**

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

### **NOTE:**

This manual is available in the following languages:

Chinese	French
Danish	Russian
English	

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.

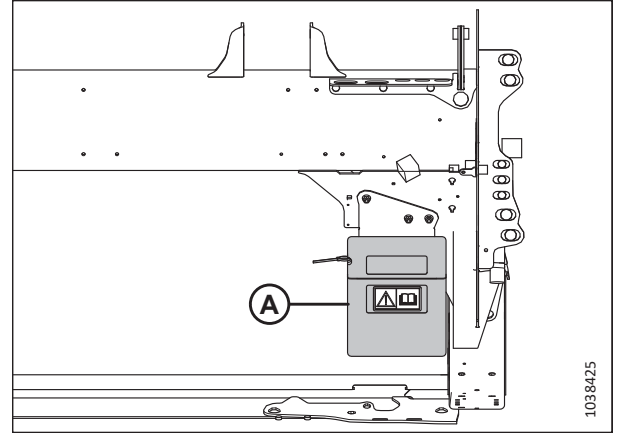


Figure 1: Manual Storage Location for D215–D225

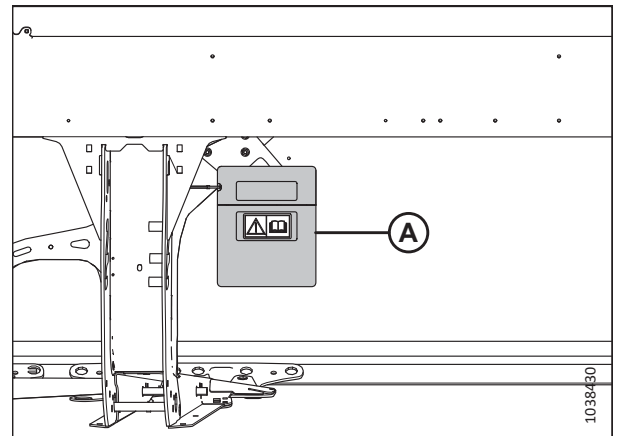


Figure 2: Manual Storage Location for D230–D241

### ***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

## Summary of Changes

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

Section	Summary of Change	Internal Use Only
<i>Declaration of Conformity, page i</i>	Updated the UK and EC Declaration of Conformity documents.	Product Integrity
<i>Introduction, page iv</i>	Added compatible products.	Product Support
<i>1.6 Tire Safety, page 8</i>	Added tire safety information.	Technical Publications
<i>1.10 Safety Decal Locations, page 13</i>	Swapped decal positions on the D225 back tube.	ECN 65853
<i>2.2 Header Specifications, page 37</i>	Updated the header weights.	ECN 65271
<i>Installing Header Endshields, page 54</i>	Added a torque value to the M6 screw in the endshield support tube.	ECN 65318
<i>3.6.3 Reel Settings, page 73</i>	Added a reference to the procedure for adjusting reel tine pitch.	Product Support
<i>3.7.8 Draper Speed, page 82</i>	Added to the information about the effect of draper speed on the formation of the windrow.	Product Support
<i>Checking and Adjusting Reel Height Sensor Orientation – M1 and M2 Series Only, page 85</i>	Updated topic to reflect new reel height sensor.	ECN 65242
<i>Repositioning Fore-Aft Cylinders, page 88</i>	Added an image and a note to show the recommended reel position when the vertical knife option is installed.	Product Support
<i>Checking and Adjusting Fore-Aft Position Sensor Voltage – M1 and M2 Series Only, page 93</i>	Updated the topic to reflect a new fore-aft sensor.	ECN 64090
<i>Adjusting Delivery Opening on Header with Hydraulic Deck Shift, page 107</i>	Updated the image of deck shift stop pins.	ECN 65312
<i>Adjusting Hydraulic Deck Shift Chain Tension, page 108</i>	Updated the topic. The difference of height at the chain midpoint from the ends of the chain was 25–50 mm and is now 10–25 mm.	ECN 65312
<i>Adjusting Size of Delivery Opening on Header with Manual Deck Shift, page 109</i>	Added a note about the wide end-deflectors options.	Product Support
<i>4.1 Attaching Draper Header Supports, page 141</i>	Added notes about the recommended installation of header support clevis pin for narrow transport configured windrowers.	ECN 65336
<i>4.4.2 Detaching Header from M2 Series Windrower, page 202</i>	Added a step to place blocks under the header support stops when setting the header on the ground.	Product Support
<i>5.2.4 Equipment Servicing – End-of-Season, page 214</i>	Removed a topic named <i>Storing the Header</i> because it shared the same information as the topic named <i>End of Season</i> .	Technical Publications
<i>Every 50 Hours, page 219</i>	Added the optional vertical knives to the 50 hour lubrication topic.	Product Support
<i>5.4.2 Adjusting Knife Speed Sensor, page 227</i>	Added a procedure for adjusting the knife speed sensor.	ECN 65317



Section	Summary of Change	Internal Use Only
<i>5.5.8 Short Knife Guards and Hold-Downs, page 264</i>	Updated the topic. Knife hold-down MD #286333 was superseded by MD #286904. Part numbers have been updated throughout the manual.	ECN 65553
<i>5.8.2 Removing Air from Reel Lift Hydraulic System, page 314</i>	Added a procedure for removing air from reel lift hydraulic system.	ECN 65213
<i>6.1.9 End Deflector Rods, page 369</i>	Added topic for end delivery deflector rods option.	Product Support
Inside back cover	Corrected an error in the conversion from liters to US quarts.	Product Support

## 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 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.

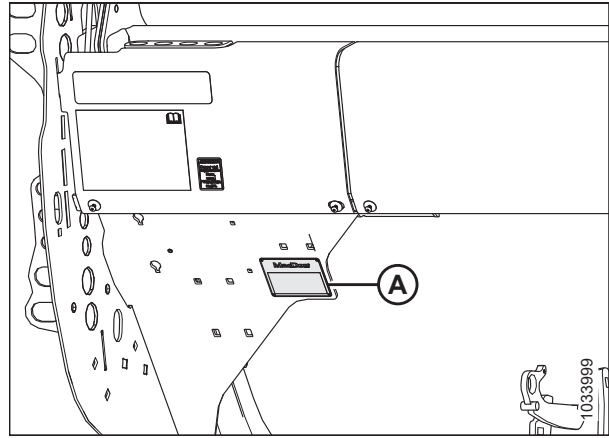


Figure 3: Header Serial Number Plate Location

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.

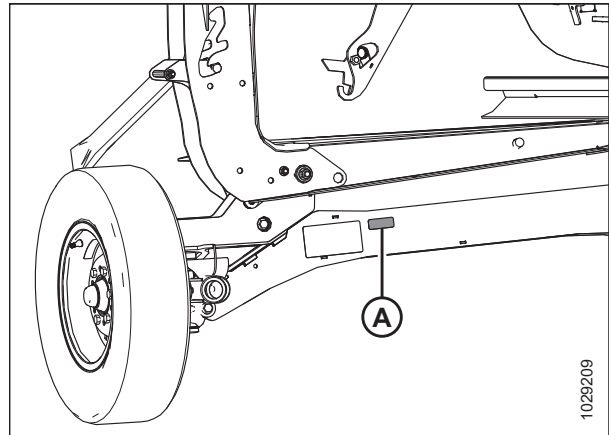


Figure 4: EasyMove™ Transport Option

A - Serial Number Plate

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# Chapter 1: Safety

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

## 1.1 Safety Alert Symbols

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

This symbol means:

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

Carefully read and follow the safety message accompanying this symbol.

### Why is safety important to you?

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



Figure 1.1: Safety Symbol

## 1.2 Signal Words

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

Signal words are selected using the following guidelines:

### **DANGER**

Indicates an imminently hazardous situation that, if 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

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 1.2: Safety Equipment



Figure 1.3: Safety Equipment

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

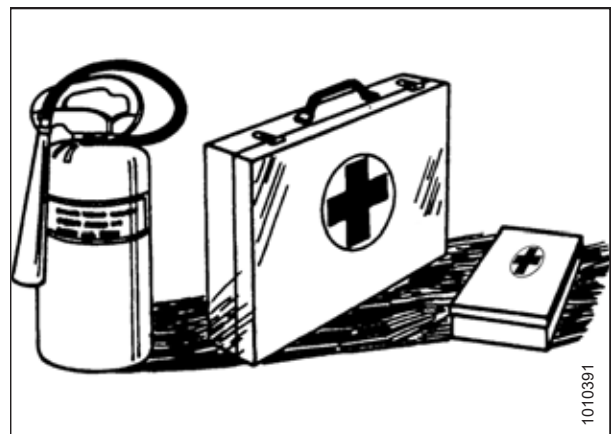


Figure 1.4: Safety Equipment

## SAFETY

- Wear close-fitting clothing and cover long hair. **NEVER** wear dangling items such as 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.

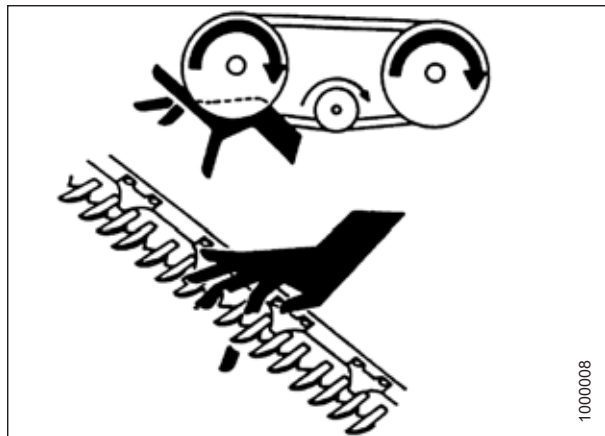


Figure 1.6: Safety around Equipment

- 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
- 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 1.8: Wet Floors Present Safety Risks

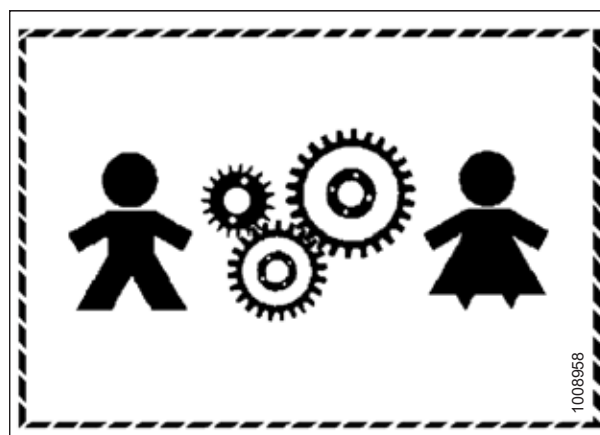


Figure 1.9: Equipment is NOT Safe for Children

## SAFETY

- 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. Follow the proper safety procedures when inspecting hydraulic fluid leaks and servicing hydraulic equipment.

- Always place all hydraulic controls in **NEUTRAL** before leaving the operator's seat.
- Ensure that all of 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 you are injured by a concentrated, high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or a toxic reaction can develop from hydraulic fluid piercing the skin.



Figure 1.12: Hydraulic Pressure Hazard

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

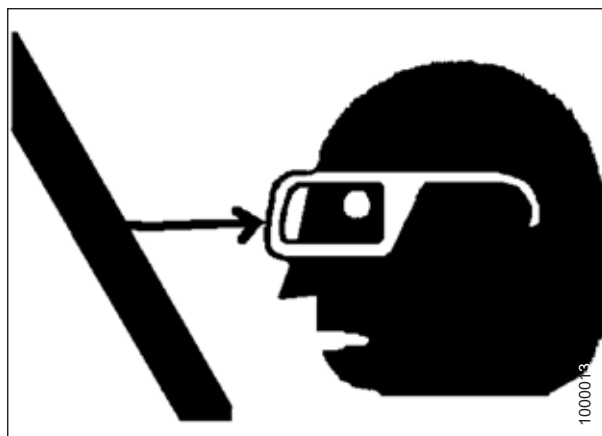


Figure 1.13: Safety around Equipment

## 1.6 Tire Safety

Inflating, installing, removing, and handling tires presents several safety risks that must be taken into account.

### WARNING

- A tire can explode during inflation, causing serious injury or death.
- Follow the proper procedures when mounting a tire. Failure to do so can produce an explosion, causing serious injury or death.



Figure 1.14: Overinflated Tire

### WARNING

- Do NOT remove, install, or repair a tire on a rim unless you have the proper equipment and experience to perform the task. Take the tire and rim to a qualified tire repair shop if necessary.
- Ensure that the tire is correctly seated on the rim before inflating it. 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.
- Do NOT stand over the tire when inflating it. Use a clip-on chuck and extension hose when inflating a tire.
- Do NOT exceed the maximum inflation pressure indicated on the tire label.
- Never use force on an inflated or partially-inflated tire.
- Ensure that all air is removed from the tire before removing the tire from the rim.
- Never weld a wheel rim.
- Replace tires that have defects. Replace wheel rims that are cracked, worn, or severely rusted.



Figure 1.15: Safely Inflating Tire

## 1.7 Welding Precautions

To prevent damage to sensitive electronics, **NEVER** attempt welding on the header while it is connected to a windrower.

### WARNING

**NEVER** attempt welding on the header while it is connected to a windrower. Severe damage to sensitive, expensive electronics can result from welding on the header while it is connected to a windrower. It can be impossible to know what effect a high current may have regarding future malfunctions or a shorter lifespan.

For further welding precautions, consult the windrower operator's manual.

If it is not practical to disconnect the header from the windrower before welding, you **MUST** disconnect the following electrical components from the header:

1. On the left side of the header, disconnect electronically timed double-knife (ETDK) control module (A) by unplugging bulkhead (B) from the module.

#### NOTE:

Parts have been removed from the illustration for clarity.

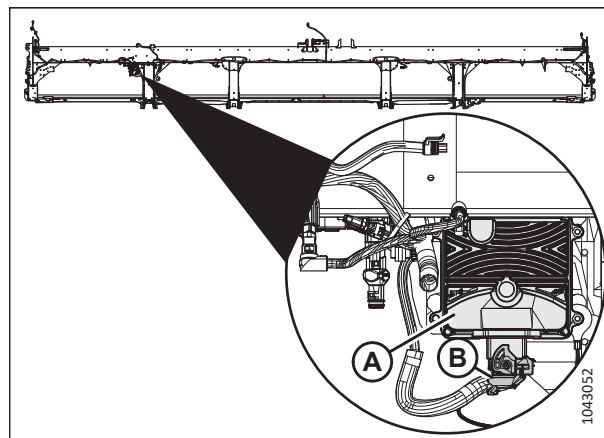


Figure 1.16: ETDK Control Module

2. To unplug the bulkhead from the module, push in tab (A) to unlatch arm (B).
3. Push arm (B) downward until it is in the position shown. Unplug the bulkhead from the module.

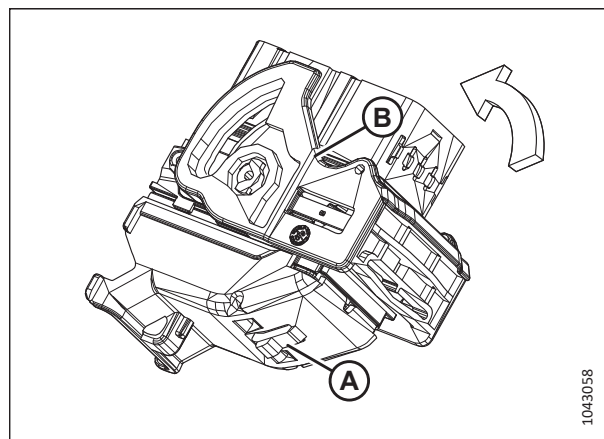


Figure 1.17: Unplugging Bulkhead from Control Module

## 1.8 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 1.18: Symbol for Do NOT Dispose with Domestic Waste

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

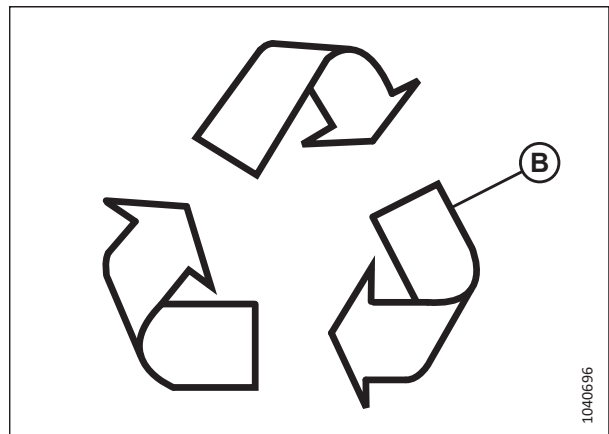


Figure 1.19: Symbol for Recycle as Labelled

## SAFETY

- 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.

## 1.9 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.

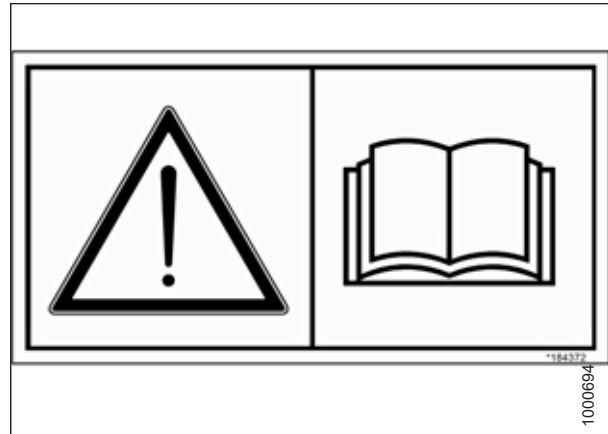


Figure 1.20: Operator's Manual Decal

### 1.9.1 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.

## 1.10 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.

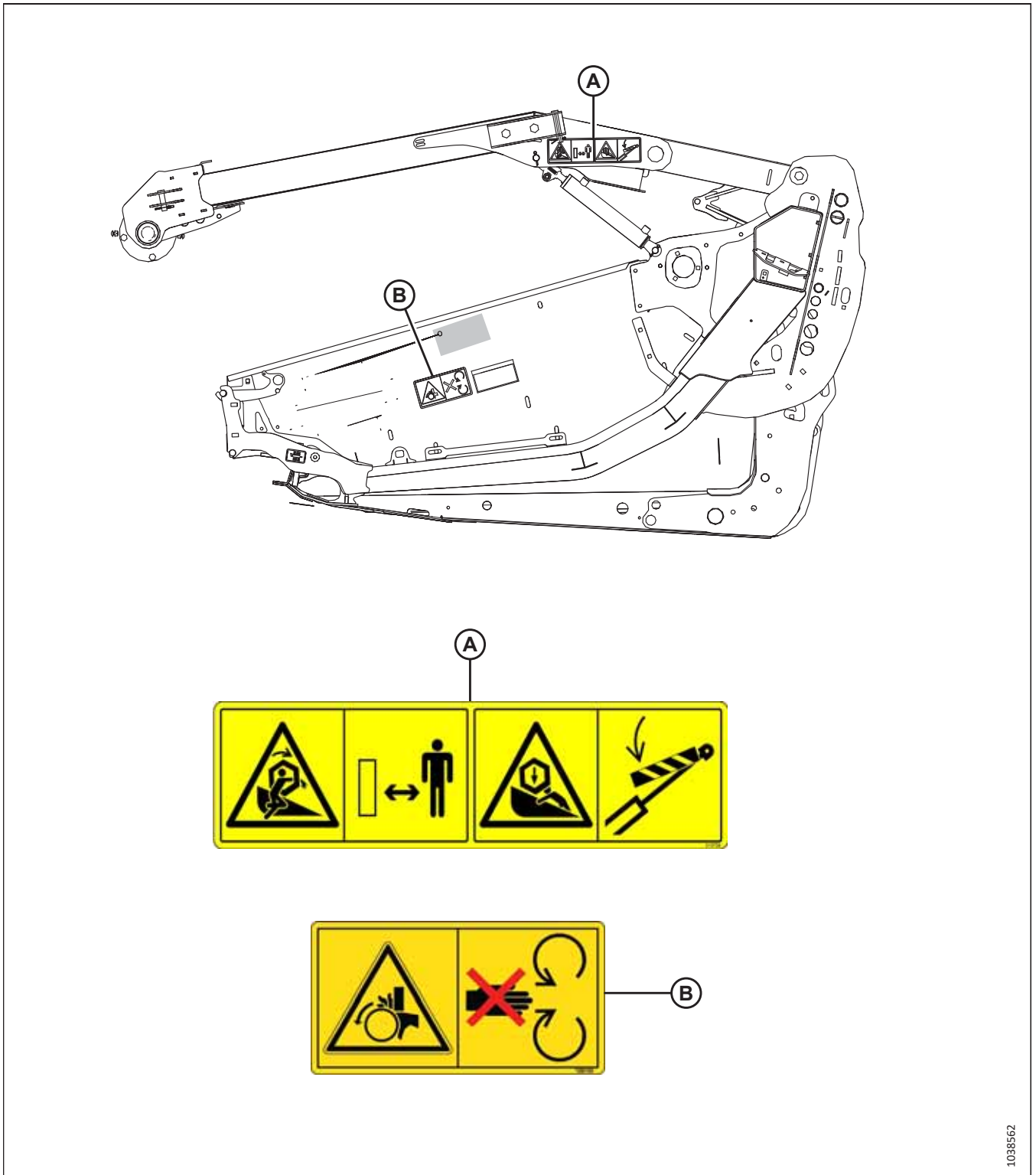


Figure 1.21: Endsheets, and Reel Arms

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

B - MD #288195 – Danger, Rotating Part

SAFETY

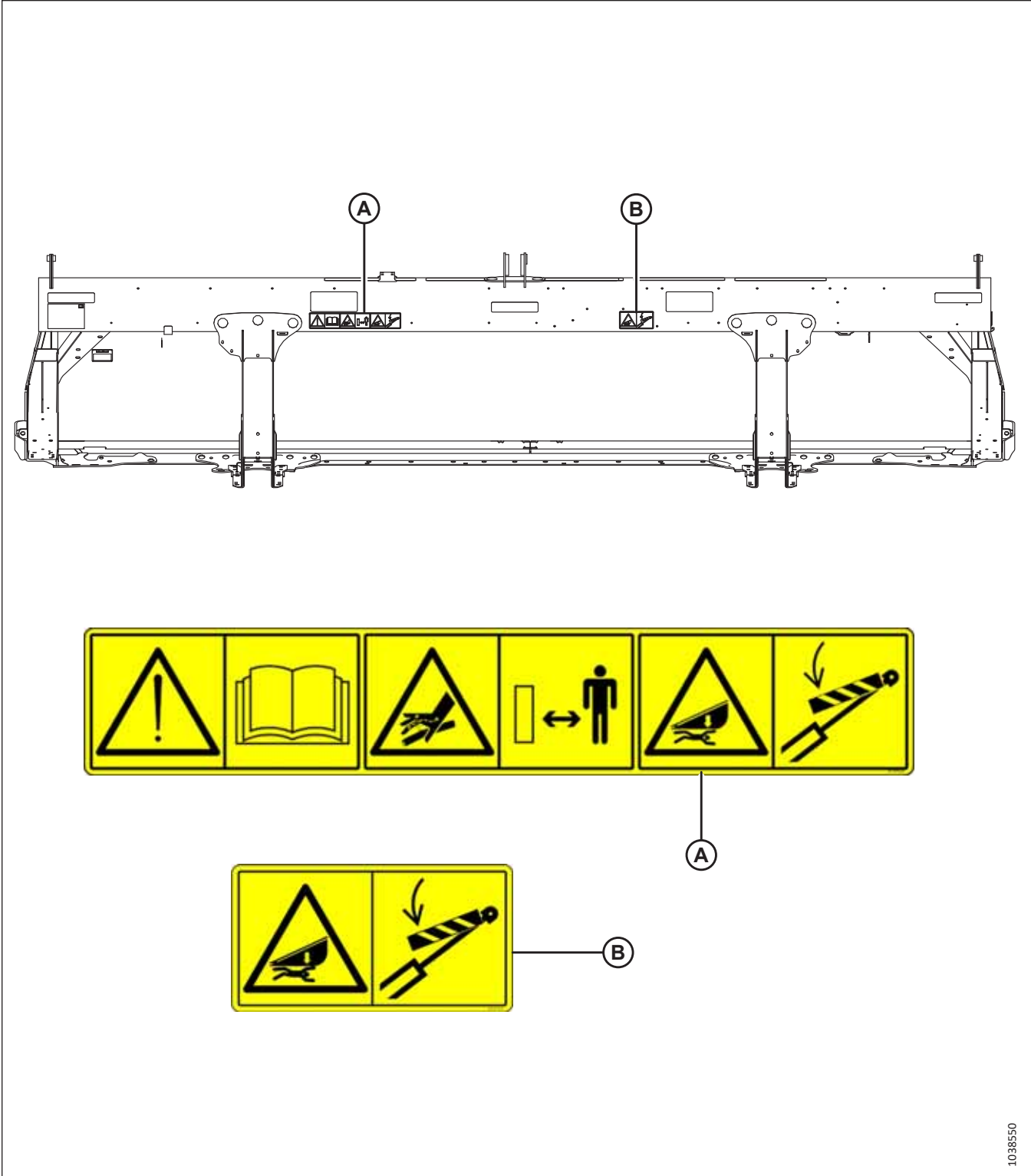


Figure 1.22: Backtube – D215 Draper Header

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

B - MD #313733 – Header Crushing Hazard



SAFETY

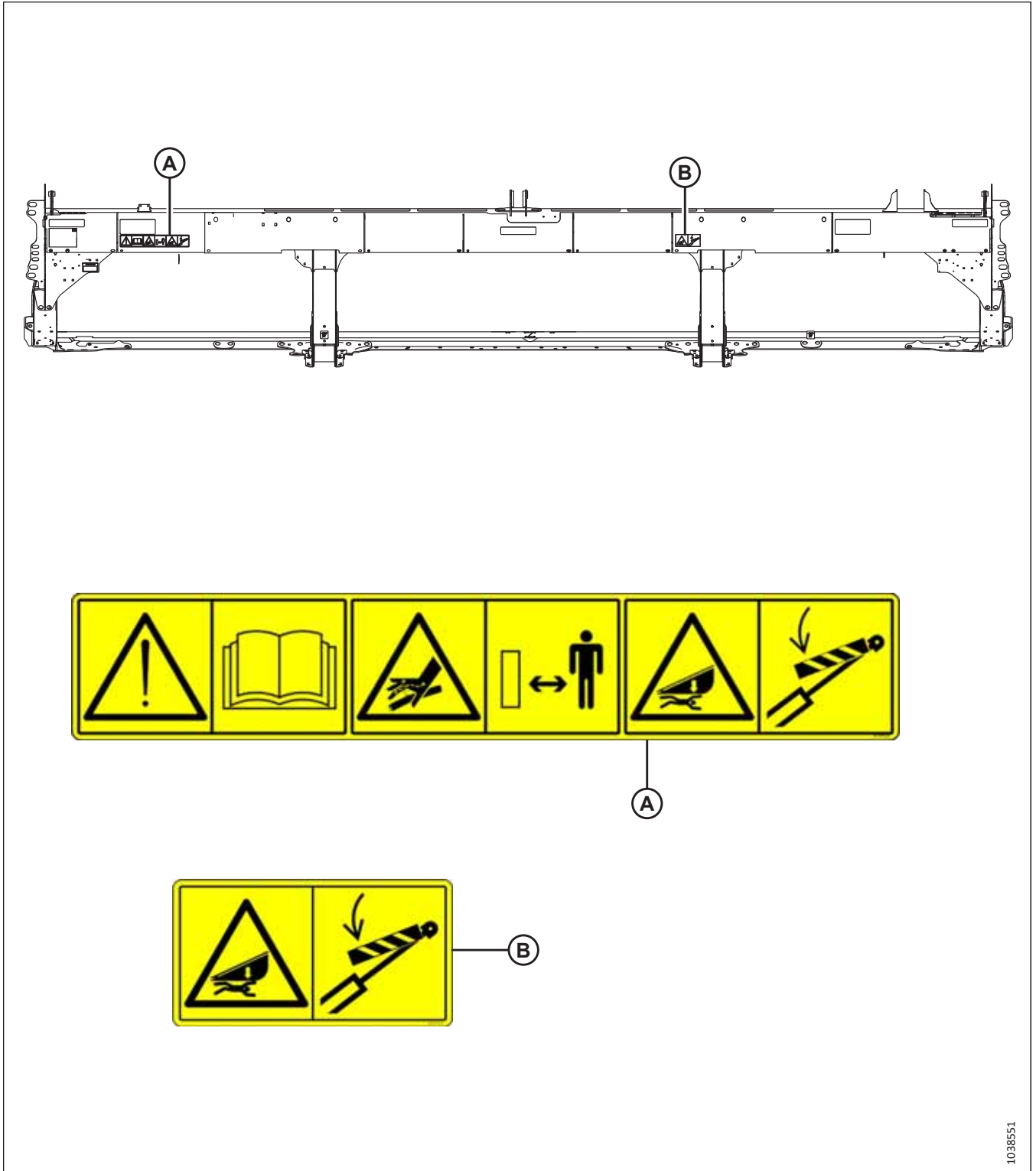


Figure 1.23: Backtube – D220 Draper Header

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

B - MD #313733 – Header Crushing Hazard

1038551

SAFETY

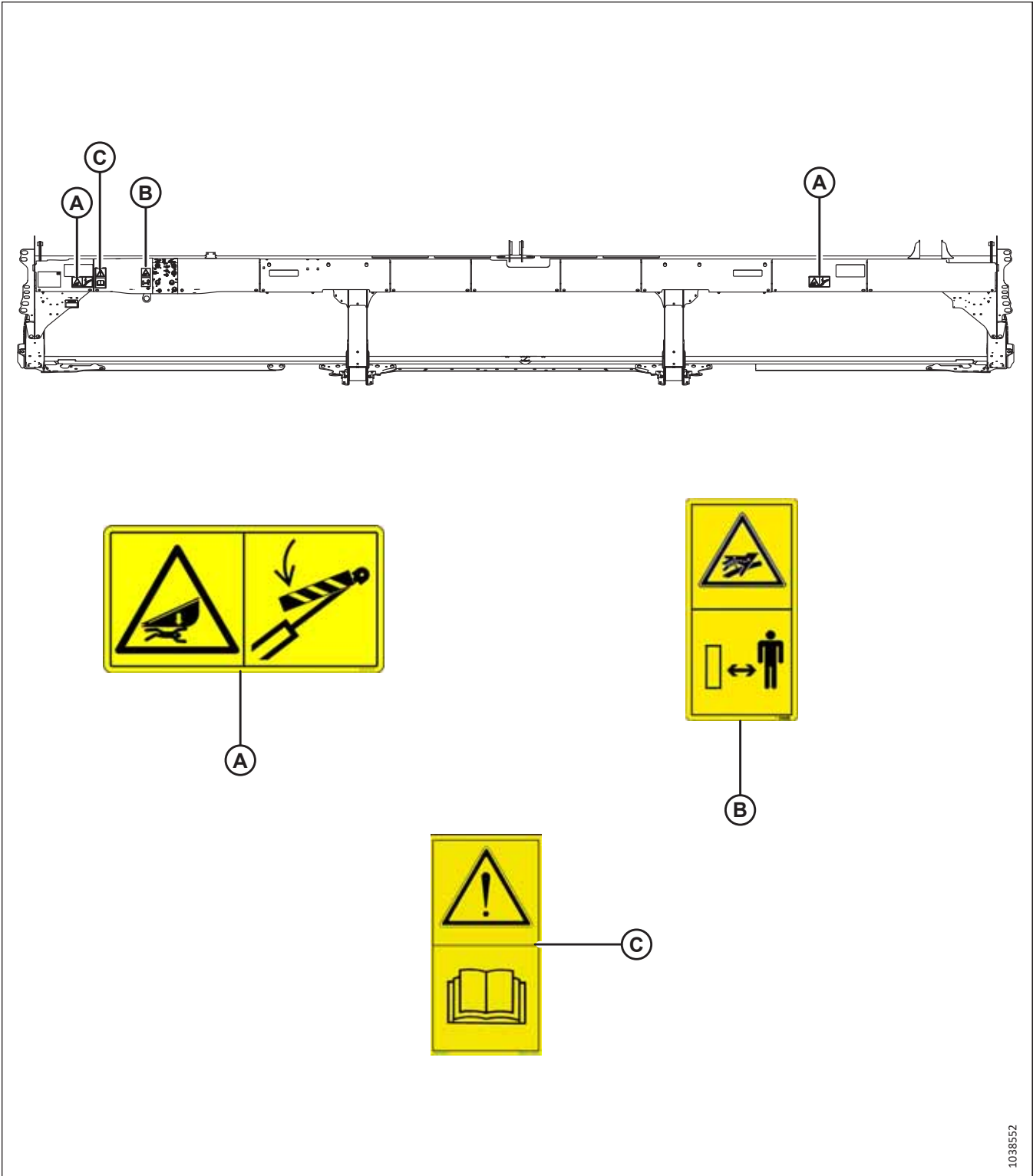


Figure 1.24: Backtube – D225 Draper Header

A - MD #313733 – Header Crushing Hazard

B - MD #174436 – High-Pressure Oil Hazard

C - MD #113482 – General Hazard Pertaining to Machine Operation and Servicing

SAFETY

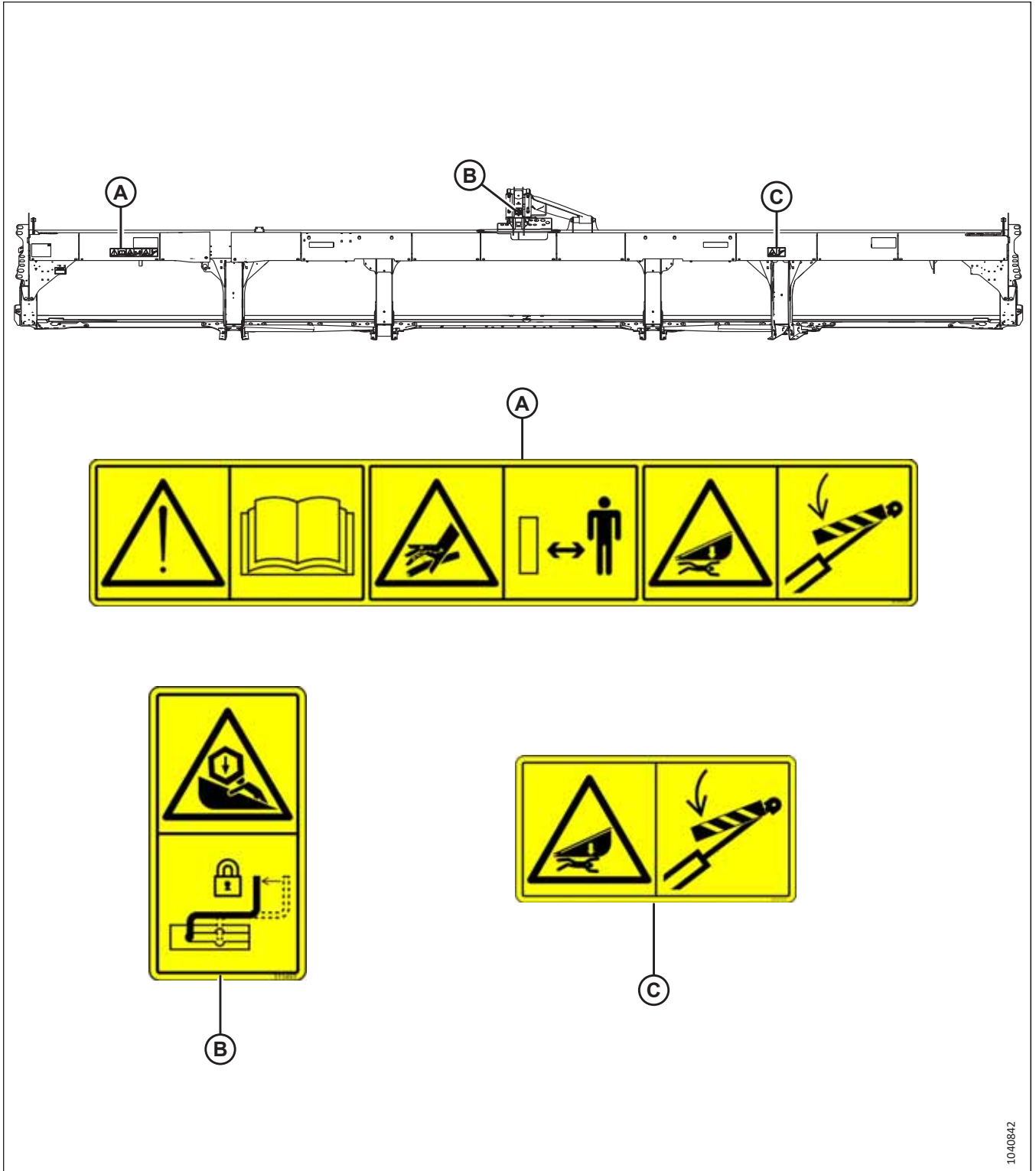


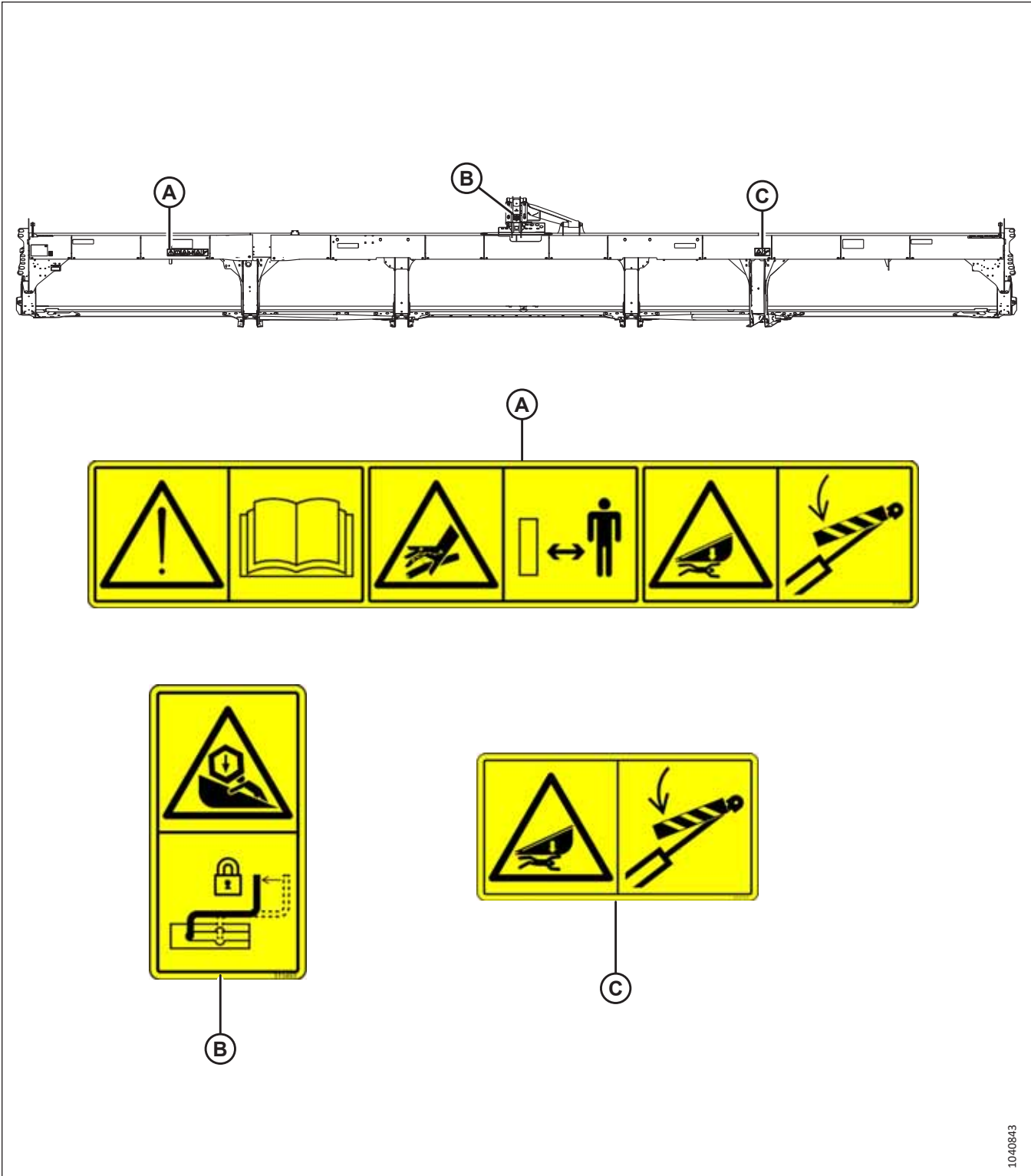
Figure 1.25: Backtube – D230 Draper Header

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

B - MD #311493 – Reel Crushing Hazard

1040842

SAFETY



1040843

Figure 1.26: Backtube – D235 Draper Header

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

B - MD #311493 – Reel Crushing Hazard

SAFETY

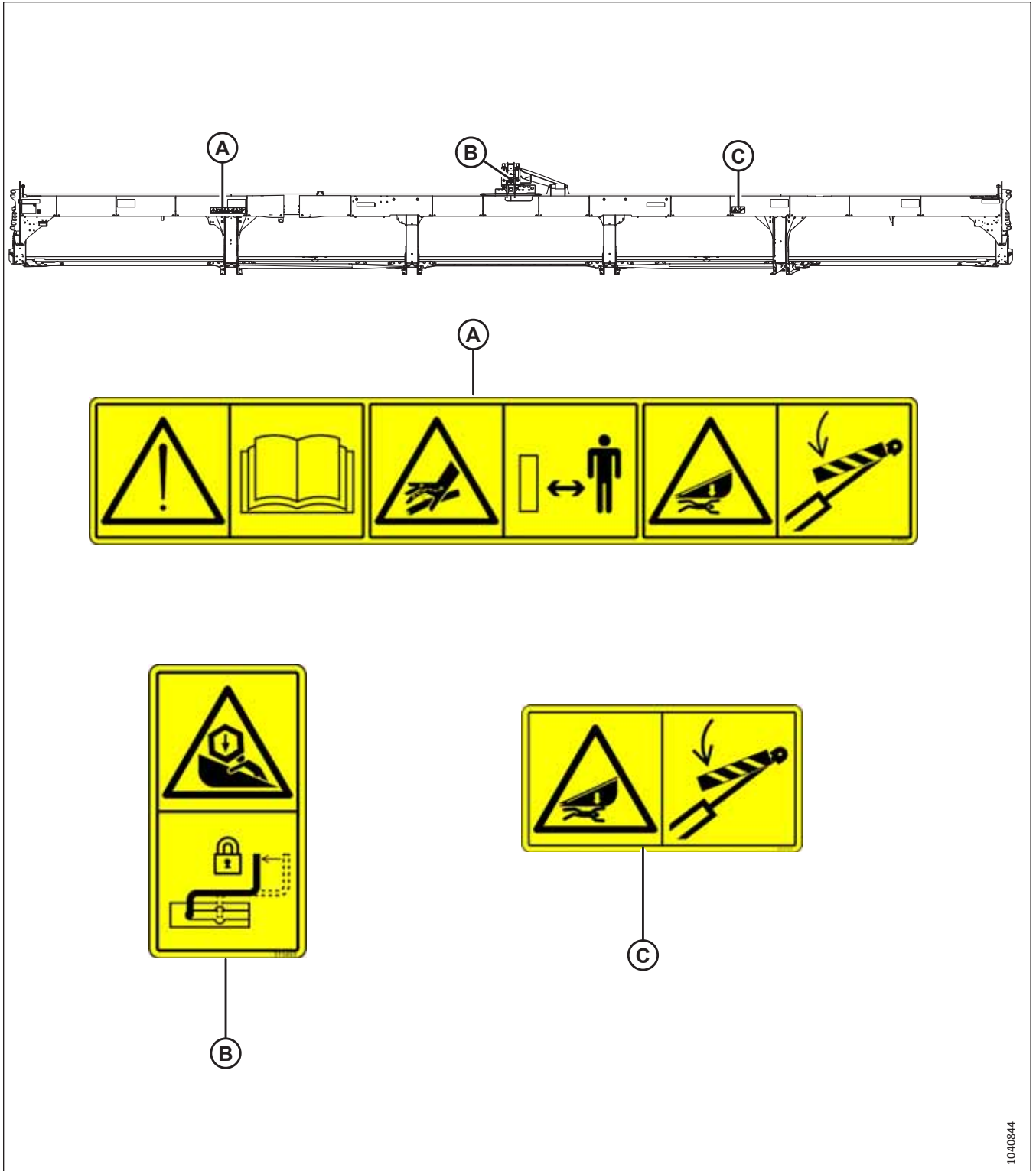


Figure 1.27: Backtube – D241 Draper Header

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

B - MD #311493 – Reel Crushing Hazard

1040844

SAFETY

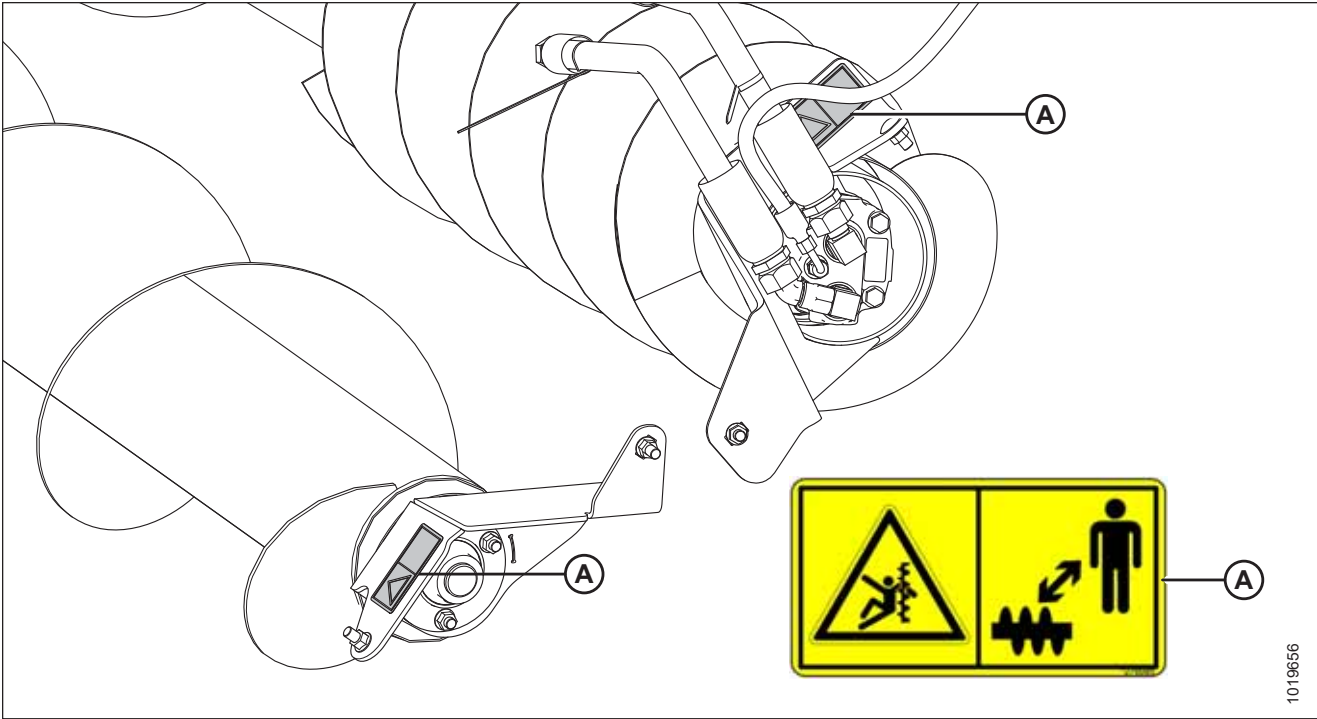


Figure 1.28: Upper Cross Auger (Optional)

A - MD #279085 – Auger Entanglement Hazard

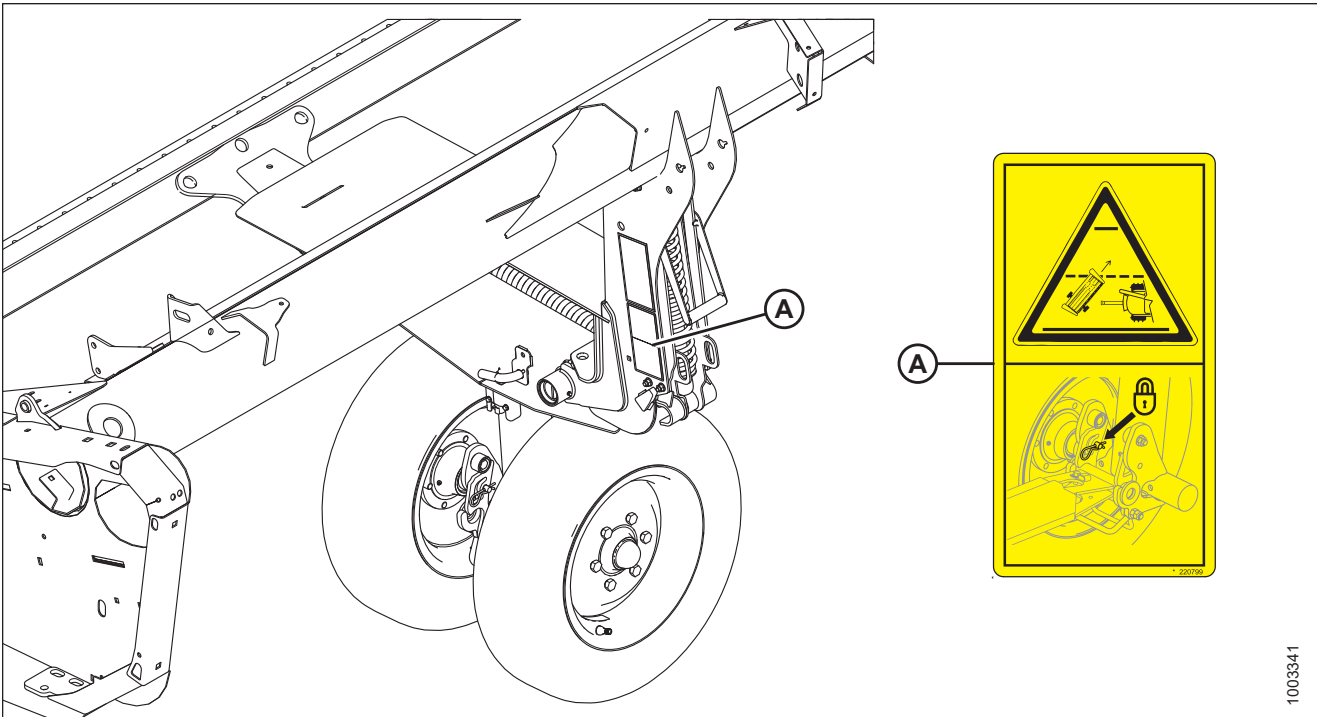
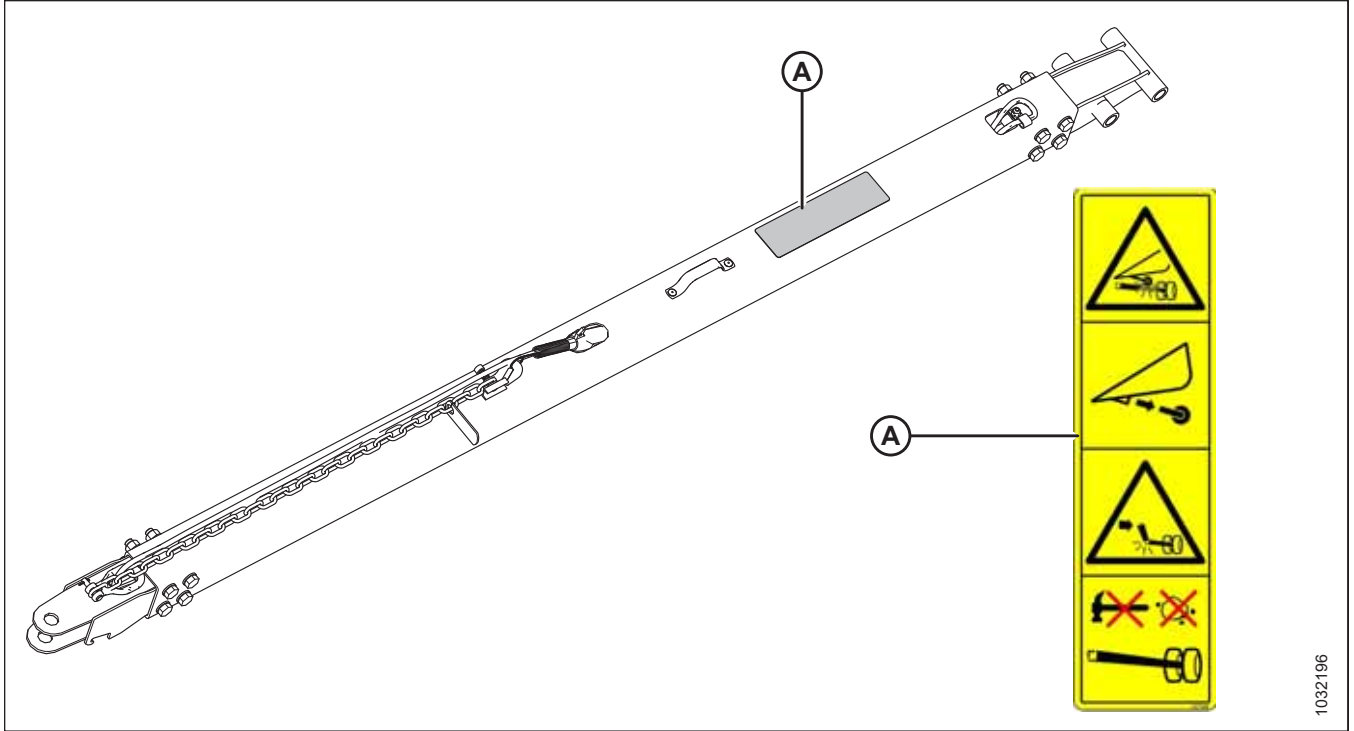


Figure 1.29: EasyMove™ Transport (Optional)

A - MD #220799 – Loss of Control Hazard

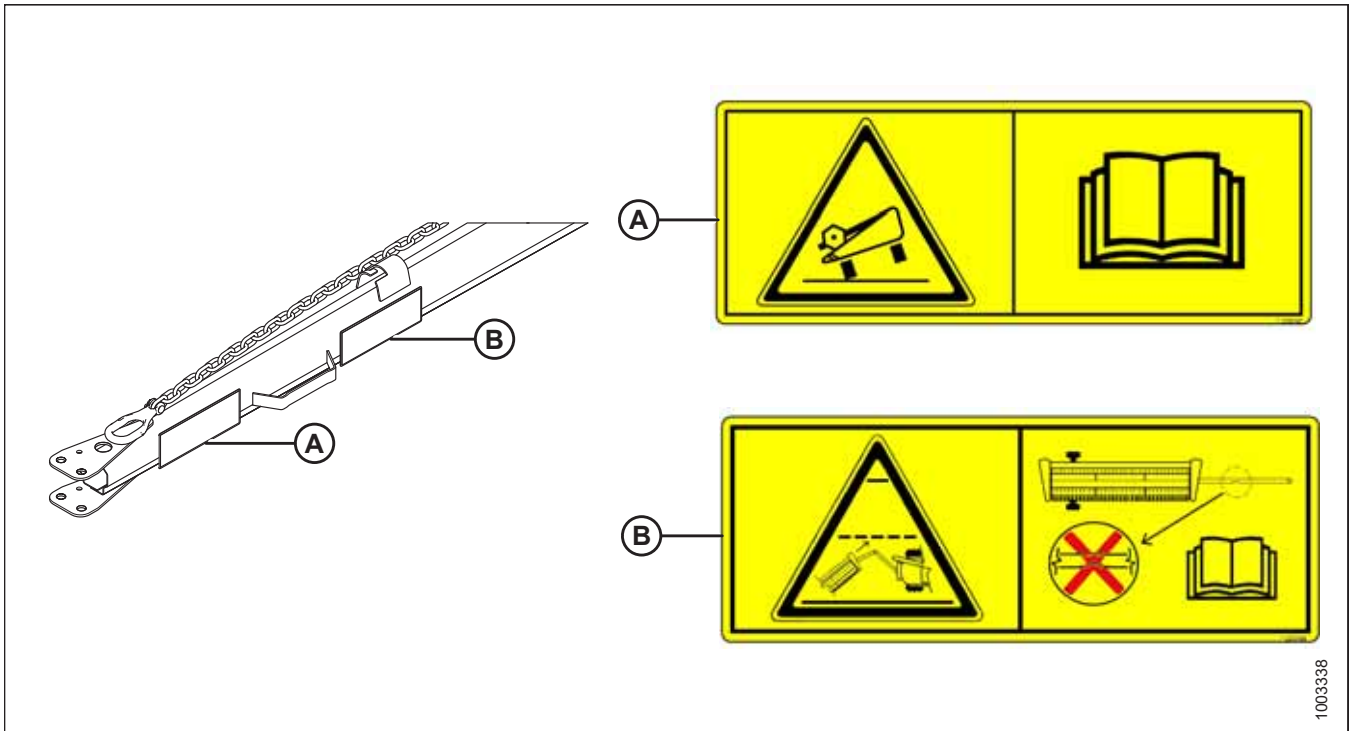
SAFETY



1032196

Figure 1.30: EasyMove™ Transport System – Tow-Bar (Short Bar Shown; Long Bar Similar) (Optional)

A - MD #327588 – Hitch Damage Hazard



1003338

Figure 1.31: EasyMove™ Transport Tow-Bar (Optional)

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

B - MD #220798 – Loss of Control Hazard

SAFETY

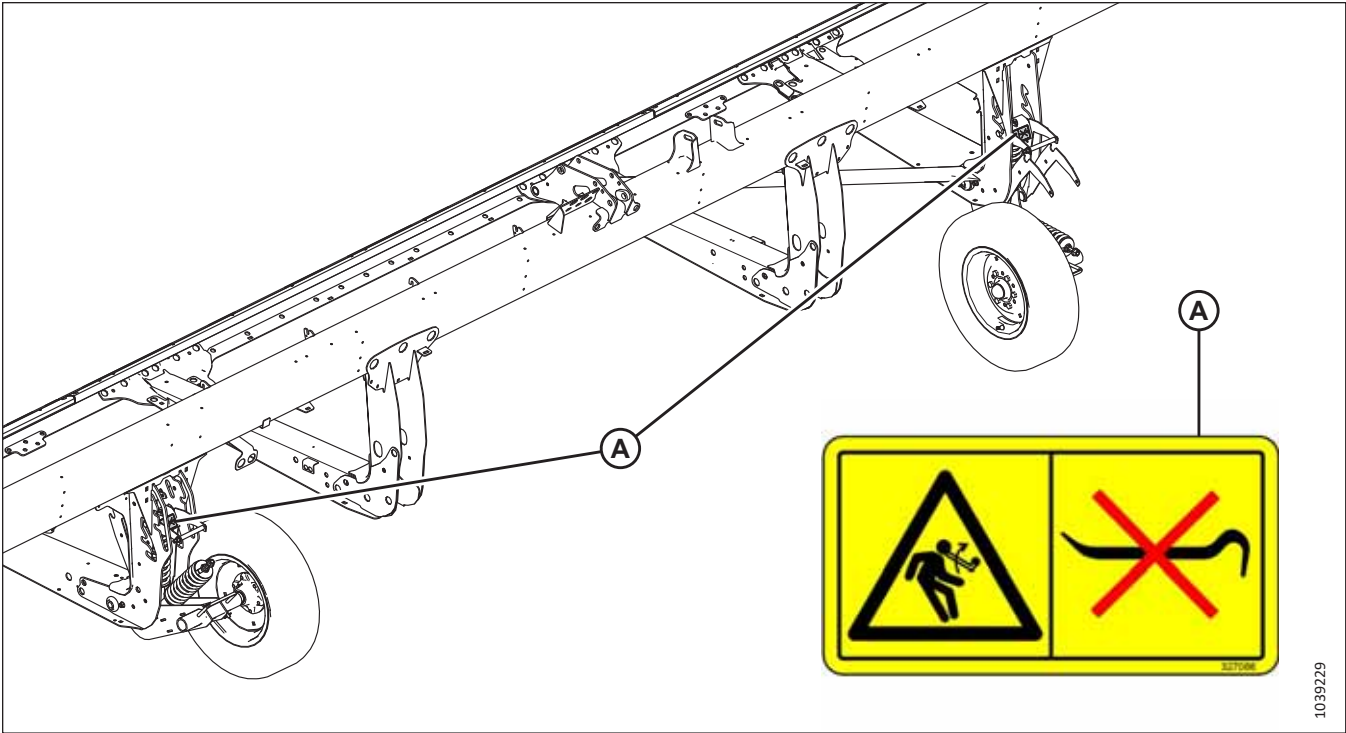


Figure 1.32: Stabilizer Wheels (Optional)

A - MD #327086 – Released Spring Energy Hazard

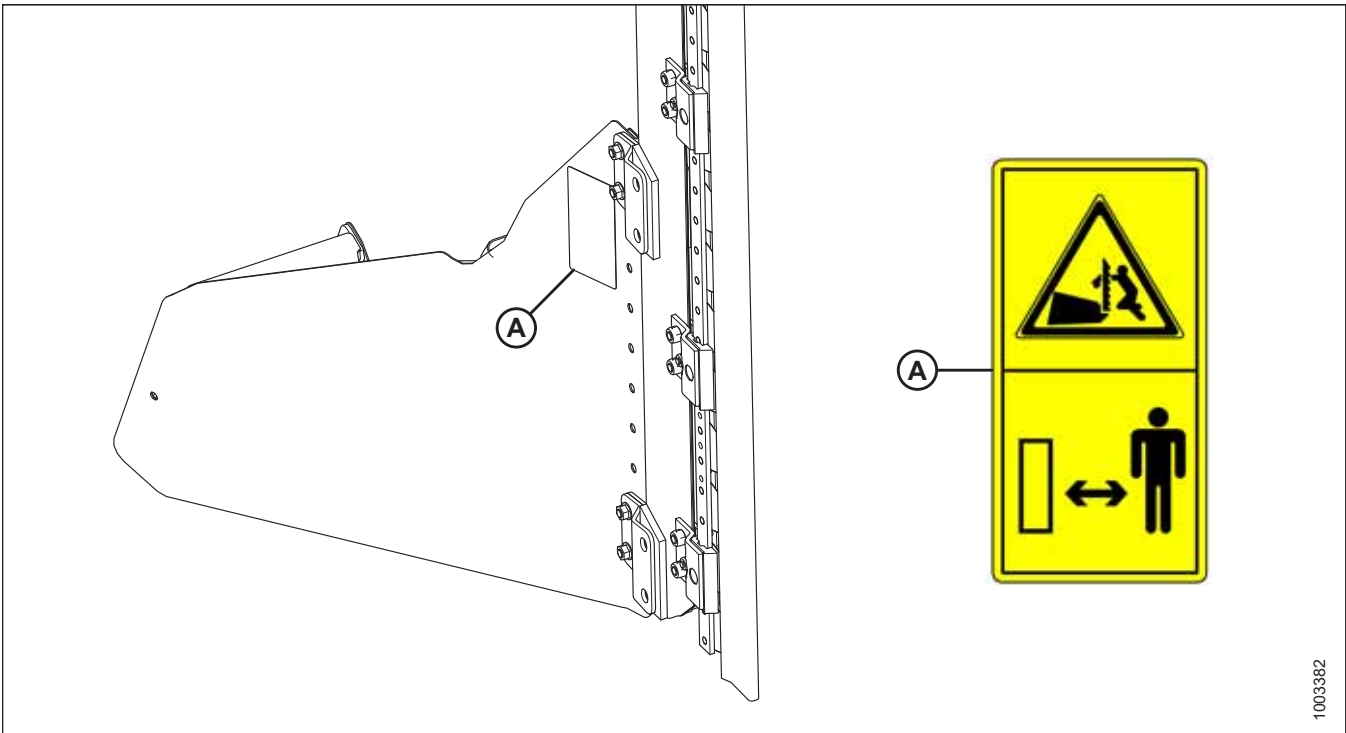


Figure 1.33: Vertical Knife (Optional)

A - MD #174684 – Knife Cutting Hazard



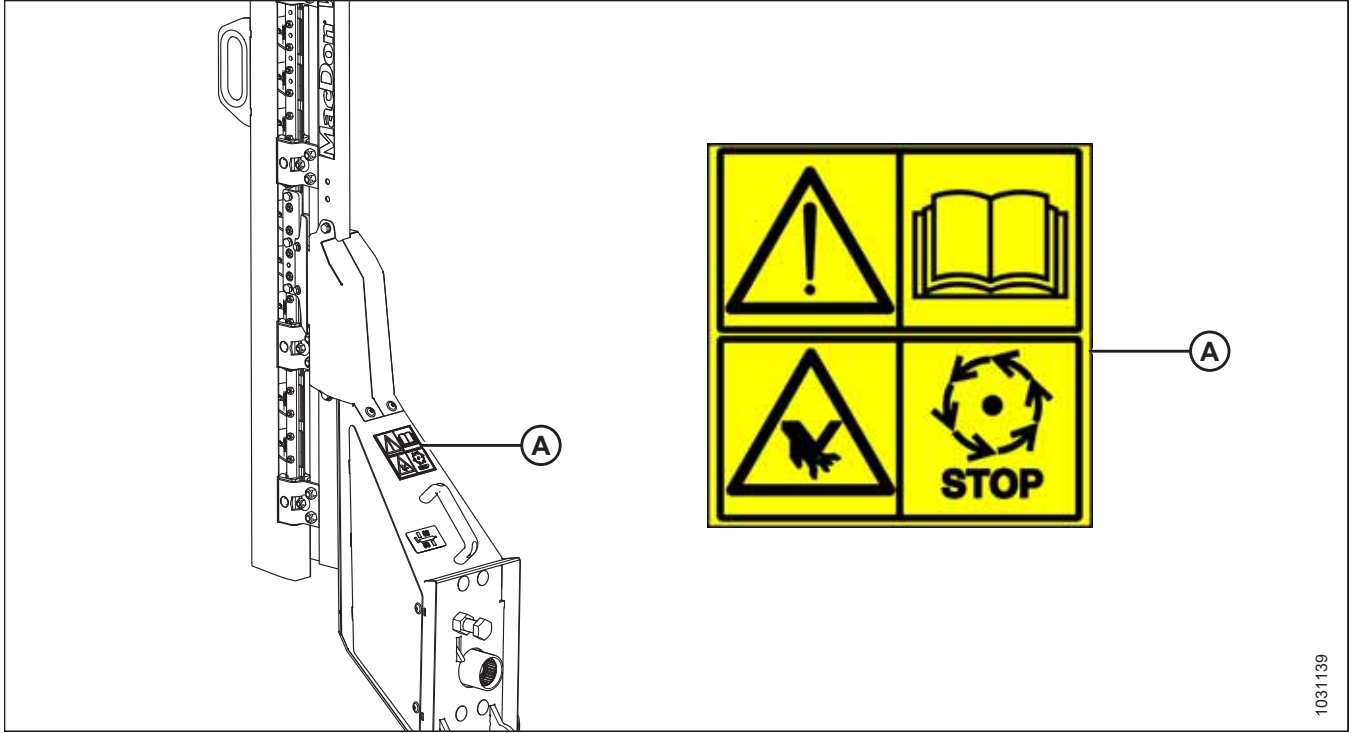


Figure 1.34: Vertical Knife (Optional)

A - MD #313881 – Knife Hazard

1031139

## 1.11 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 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 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.
- Shut down the engine and remove the key from the ignition before servicing the machine.
- To prevent a raised unit from falling, engage the safety props before servicing the unit in the raised position.
- Use the slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.



Figure 1.35: 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 your hand to check for hydraulic fluid leaks.
- Before loosening any hydraulic fittings, relieve the pressure in the hydraulic system.
- If you are injured, seek emergency medical help. **IMMEDIATE** surgery is required to remove hydraulic fluid which has penetrated the skin.



Figure 1.36: MD #174436

## SAFETY

### 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 1.37: 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.

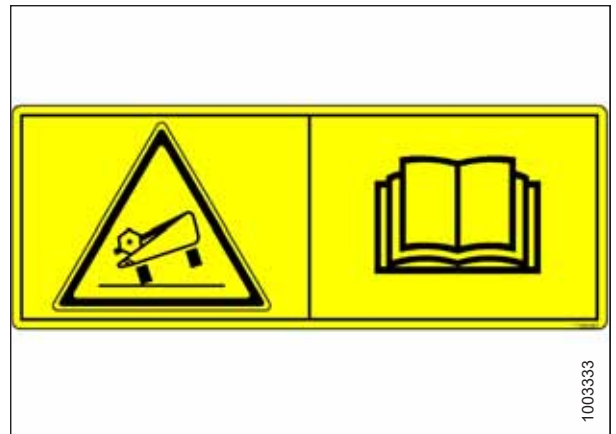


Figure 1.38: MD #220797

### 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 1.39: MD #220798

## SAFETY

### MD #220799

Loss of control hazard

#### WARNING

To prevent serious injury or death from loss of control, lock the tow-bar lock mechanism.



Figure 1.40: MD #220799

### MD #279085

Auger entanglement hazard

#### DANGER

To prevent injury from a rotating auger:

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



Figure 1.41: MD #279085

### MD #288195

Rotating object pinch hazard

#### CAUTION

To prevent injury:

- Shut down the engine and remove the key from the ignition before opening the shield.
- Do **NOT** operate the machine without shields in place.

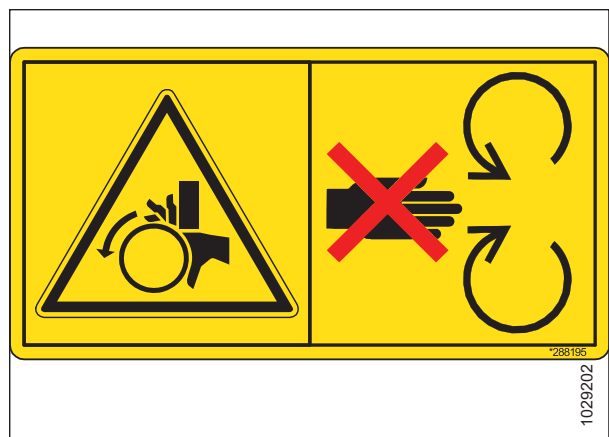


Figure 1.42: MD #288195

## SAFETY

### MD #311493

Reel crushing hazard

#### DANGER

To prevent injury from the fall of a raised reel:

- Fully raise the reel.
- Shut down the engine, remove the key from the ignition, and engage the mechanical safety lock on each reel support arm before working on or under the reel.



Figure 1.43: MD #311493

## SAFETY

### 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 Operators every year.
- Ensure that all of the safety signs are installed and legible.
- Ensure 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.
- Before leaving the operator's position, disengage the header drive, put the transmission in Neutral, and wait for all movement to stop.
- Shut down the engine and remove the key from the ignition before servicing the machine.
- Before servicing a unit in the raised position, engage the safety locks to prevent it from lowering unexpectedly.
- Use a slow moving vehicle emblem and flashing warning lights when operating on roadways (unless prohibited by law).

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

- Fully raise the header, shut down the engine, remove the key from the ignition, and engage the safety props before going under the header for any reason.
- Alternatively, fully lower the header to the ground, shut down the engine, and remove the key from the ignition before servicing the header.

#### WARNING

To prevent serious injury, gangrene, or death:

- Do **NOT** go near hydraulic leaks.
- Do **NOT** use your hand to check for leaks.
- Before loosening hydraulic fittings, relieve pressure in the hydraulic system.
- High-pressure oil can easily puncture skin, and can cause serious injury, gangrene, or death.
- If you are injured, seek emergency medical help. Immediate surgery is required to remove oil.

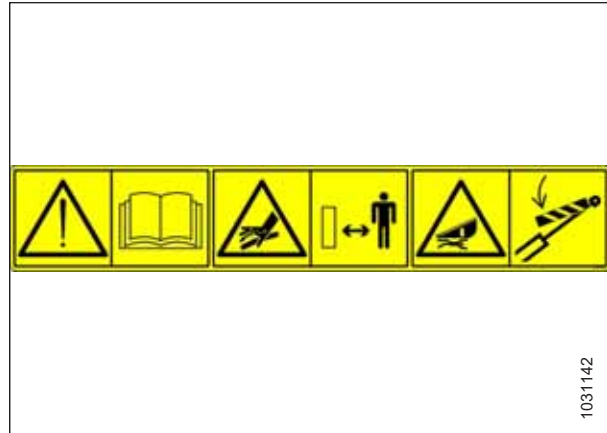


Figure 1.44: MD #313725

## SAFETY

### 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 of the safety signs are installed and legible.
- Ensure 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.
- Before leaving the Operator's position, disengage the header drive, put the transmission in Neutral, and wait for all movement to stop.
- Shut down the engine and remove the key from the ignition before servicing the machine.
- Before servicing a unit in the raised position, engage the safety locks to prevent it from lowering unexpectedly.
- 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:

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

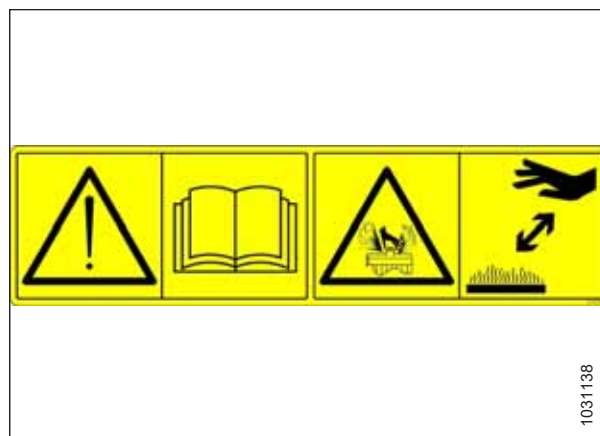


Figure 1.45: MD #3137285MC313728

## SAFETY

### MD #313733

Header crushing hazard

#### DANGER

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

- Fully raise the header, shut down the engine, remove the key from the ignition, and engage the safety props before going under the header.
- Alternatively, fully lower the header to the ground, shut down the engine, and remove the key from the ignition before servicing the machine.



Figure 1.46: MD #313733



## SAFETY

### 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 of the safety signs are installed and legible.
- Ensure that 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.
- Before leaving the operator's position, disengage the header drive, put the transmission in Neutral, and wait for all movement to stop.
- Stop the engine and remove the key from the ignition before servicing, adjusting, lubricating, cleaning, or unplugging the machine.
- Before servicing a unit in the raised position, engage the safety locks to prevent it from lowering unexpectedly.
- Use a slow moving vehicle emblem and flashing warning lights when operating on roadways (unless prohibited by law).

#### WARNING

To prevent injury from the sharp cutting knife:

- Wear suitable gloves when working with the knife.
- Ensure that no one is near the knife when removing it or rotating it.



Figure 1.47: MD #313881

## SAFETY

### MD #327086

Released spring energy hazard

#### WARNING

To prevent injury:

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



Figure 1.48: MD #327086

### MD #327588

Hitch damage hazard

#### DANGER

To prevent serious injury or death:

- If the optional contour wheel system is installed, remove the left contour wheel before transporting the header.
- Do **NOT** tow a header if the transport hitch is damaged.

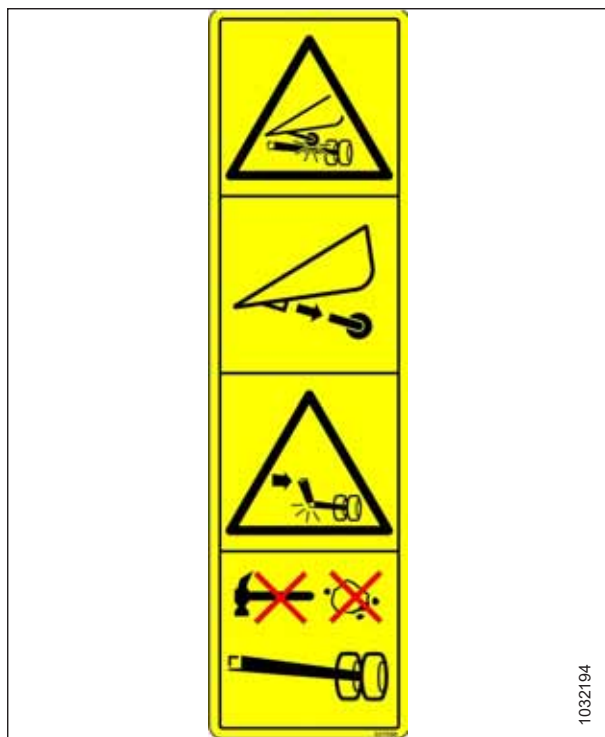


Figure 1.49: MD #327588

## SAFETY

### MD #360541

Reel entanglement / reel crushing hazard

#### DANGER

To prevent injury from entanglement with a rotating reel:

- Stand clear of the header while the machine is running.
- To prevent injury from the fall of a raised reel, fully raise the reel, shut down the engine, remove the key from the ignition, and engage the mechanical safety lock on each reel support arm before working on or under the reel.



Figure 1.50: 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
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	The cab display module in 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 Draper Header	MacDon D215, D220, D225, D230, D235, and D241 Draper Headers for M, M1, and M2 Series Windrowers, and the TM100 Tractor Mount.
Engine-forward	Windrower operation with Operator and engine facing in direction of travel
ETDK	Electronically Timed Double Knife
Export header	The header configuration typical outside North America
FFFT	Flats from finger tight
Finger tight	A reference position in which the given sealing surfaces or components are making contact with each other. The fitting has been tightened by hand to a point where the fitting is no longer loose and cannot be tightened further by hand
GSL	Ground speed lever
GVW	Gross vehicle weight
Hard joint	A joint made with use of a fastener where joining materials are highly incompressible
HarvestTouch™ Display	The touch screen display in an M2 Series Windrower
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	The Harvest Performance Tracker display in an M1 Series Windrower
M Series Windrowers	MacDon M100, M105, M150, M155, M155E4, M200, and M205 Windrowers
M1 Series Windrowers	MacDon M1170, M1170 NT, M1170 NT5, and M1240 Windrowers
M2 Series Windrowers	MacDon M2170, M2170 NT, and M2260 Windrowers
n/a	Not applicable
North American header	The header configuration typical in North America
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
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

## PRODUCT OVERVIEW

**Table 2.1 Definitions (continued)**

Term	Definition
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread when it is inserted into a mating part
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 the 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), foot-pounds (lb·ft), or inch-pounds (lb·in)
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 Header Specifications

Use the specification tables to reference information about a machine's specific configuration. The tables provide dimensions, performance ranges, and features.

The following symbols and letters are used in specification tables:

- S: standard
- O<sub>D</sub>: optional (dealer installed)
- O<sub>F</sub>: optional (factory installed)
- – : not available

**Table 2.2 Header Specifications**

<b>Cutterbar</b>			
<b>Effective cutting width (distance between crop divider points)</b>			
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
<b>Knife</b>			
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 <sub>F</sub>
Timed double-knife drive 4.6–10.7 m (15–20 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 are timed electronically using hydraulic valves and position/speed sensors			S
Timed double-knife drive 4.6–10.7 m (25–35 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 are timed electronically using hydraulic valves and position/speed sensors			O <sub>F</sub>
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			S
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
<b>Knife Sections</b>			
Over-serrated / ultra coarse / ClearCut™ / quickchange / bolted / 4 serrations per inch			O <sub>F</sub>
Over-serrated / coarse / ClearCut™ / quickchange / bolted / 9 serrations per inch			O <sub>F</sub>
Over-serrated / fine / ClearCut™ / quickchange / bolted / 14 serrations per inch			O <sub>F</sub>
<b>Guards and Hold-Downs</b>			

## PRODUCT OVERVIEW

**Table 2.2 Header Specifications (continued)**

Guard: ClearCut™ pointed - forged and double heat treated (DHT) Hold-down: forged, single bolt adjustment		O <sub>F</sub>
Guard: ClearCut™ four point - forged and double heat treated (DHT) Hold-down: forged, single bolt adjustment		O <sub>F</sub>
Guard: ClearCut™ PlugFree™ - forged and double heat treated (DHT) Hold-down: forged, dual bolt adjustment		O <sub>F</sub>
<b>Guard Angle (Cutterbar on Ground)</b>		
M Series Windrower / center-link retracted	5.2 degrees	S
M Series Windrower / center-link extended	12.3 degrees	S
M1 Series and M2 Series Windrowers / center-link retracted	5.1 degrees	S
M1 Series and M2 Series Windrowers / center-link extended	12.5 degrees	S
<b>Draper (Conveyor) and Decks</b>		
Draper width	1270 mm (50 in.)	S
Draper drive	Hydraulic	S
Draper speed (M1 Series and M2 Series Windrowers)	0–250 m/min (822 ft/min)	S
Draper speed (M Series Windrower)	0–231 m/min (760 ft/min)	S
<b>PR15 Pick-Up Reel</b>		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**

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

**Table 2.4 Header Weight**

<b>Estimated weight range for base header without performance options (variances are due to different package configurations)</b>		
4.6 m (15 ft.) header		1495–1540 kg (3294–3394 lb.)
6.1 m (20 ft.) header		1810–1877 kg (3989–4138 lb.)
7.6 m (25 ft.) header	North America frame	2163 kg (4768 lb.)



## PRODUCT OVERVIEW

**Table 2.4 Header Weight (continued)**

9.1 m (30 ft.) header	North America frame	2622 kg (5779 lb.)
10.7 m (35 ft.) header	North America frame	2843 kg (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 Dimensions

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

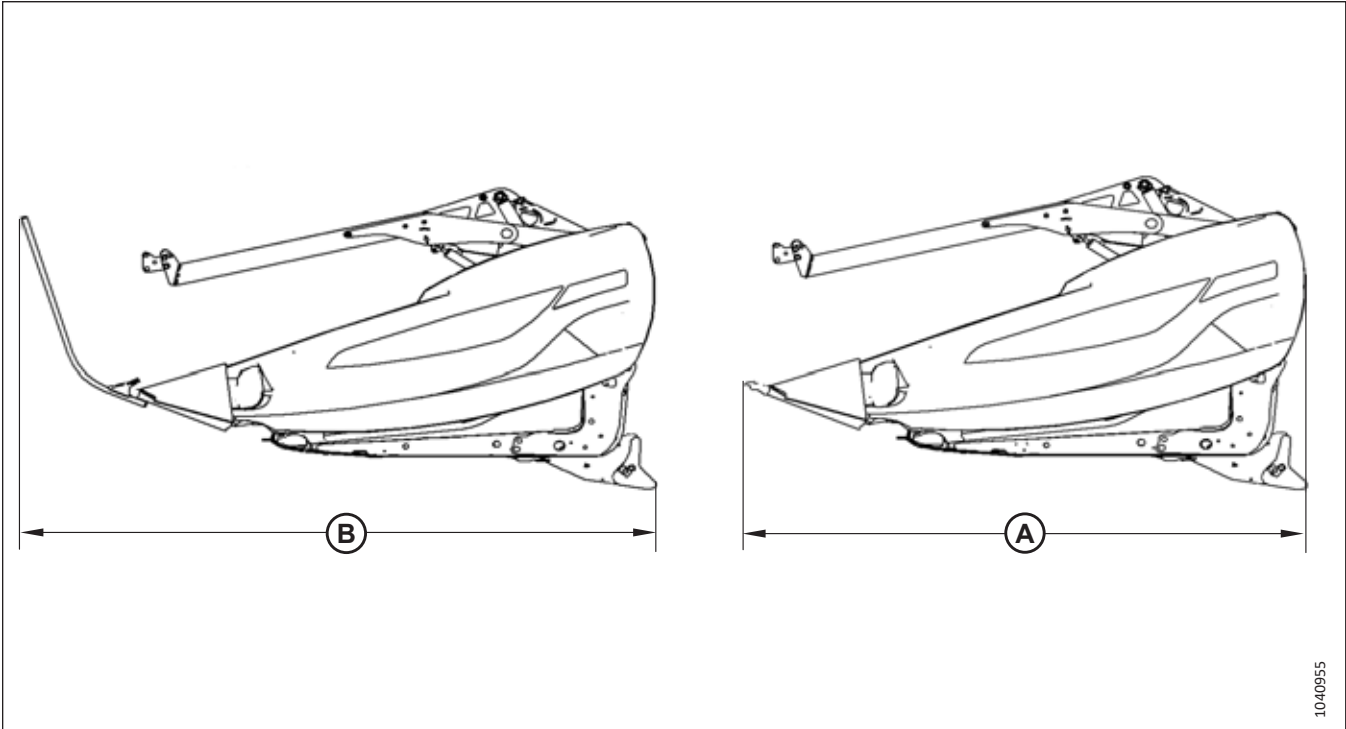


Figure 2.1: Header Width

Frame and Structure				
Header width	Field mode		Cut width + 500 mm (19.5 in.)	S
Header width	Transport mode: reel fore-aft fully retracted	Dimension (A) shows long dividers removed <sup>1</sup>	2501 mm (99 in.)	—
Header width	Transport mode: reel fore-aft fully retracted	Dimension (B) shows long dividers installed	2948 mm (116 in.)	—

1. Refer to Figure 2.1, page 40.

## 2.4 Component Identification

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

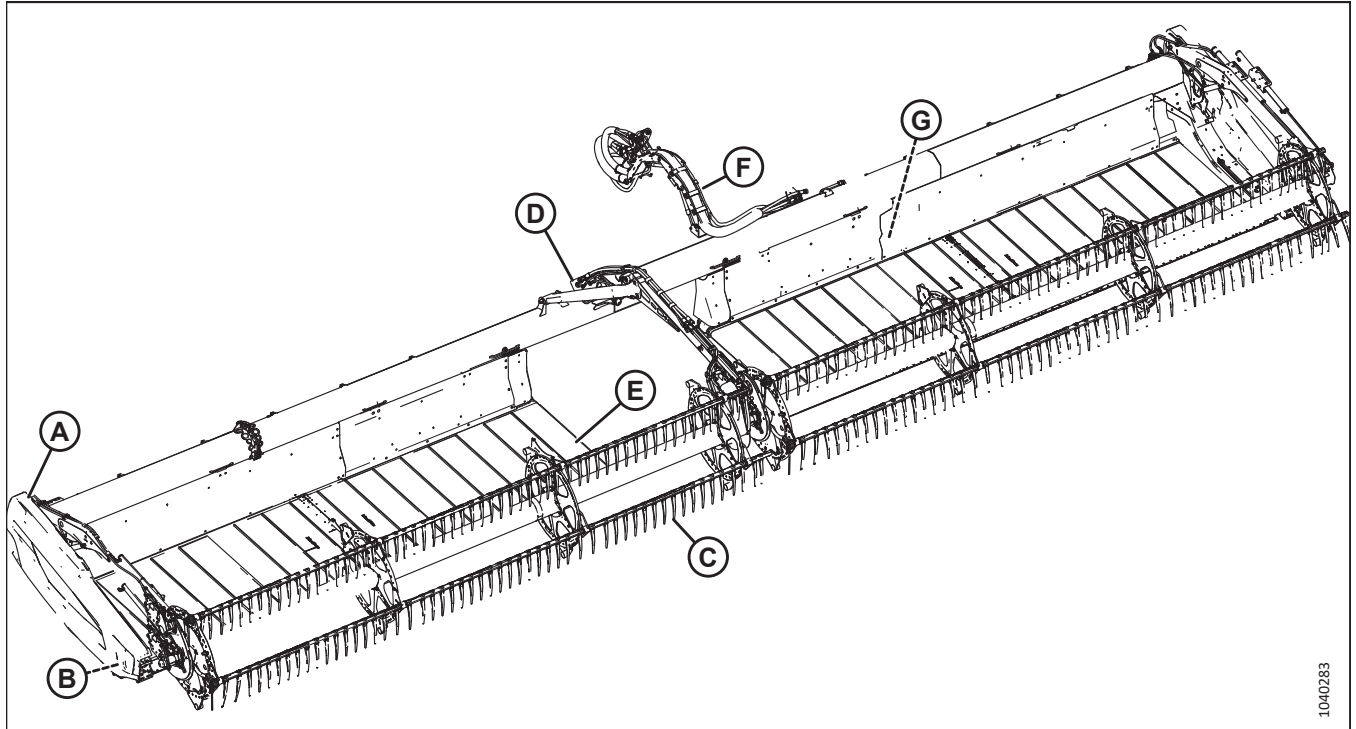


Figure 2.2: D2 Series Draper Header – Double Reel Shown

A - Endshield

B - Knife Drive Box

C - Reel Fingers

D - Center Link Mount

E - Draper

F - Hose Management Arm (M1 Series and M2 Series)

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 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.
- 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 61](#).
- Operate only in daylight or good artificial light.

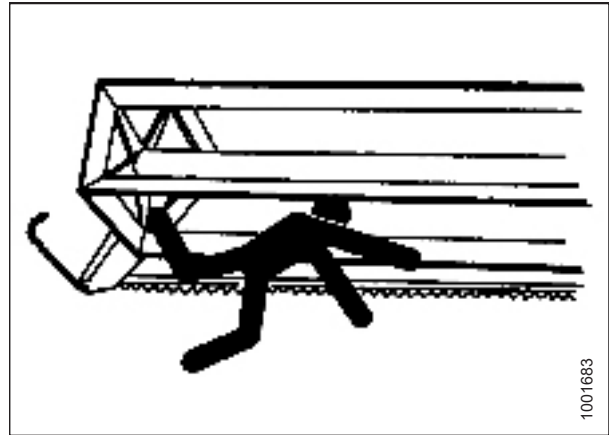


Figure 3.1: Bystander Safety

### 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 the reel safety props are engaged, they prevent the reel from unexpectedly lowering.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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.

#### Outer reel arms

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Lift up on safety prop (A) and push it forward to remove the prop from hook (B).

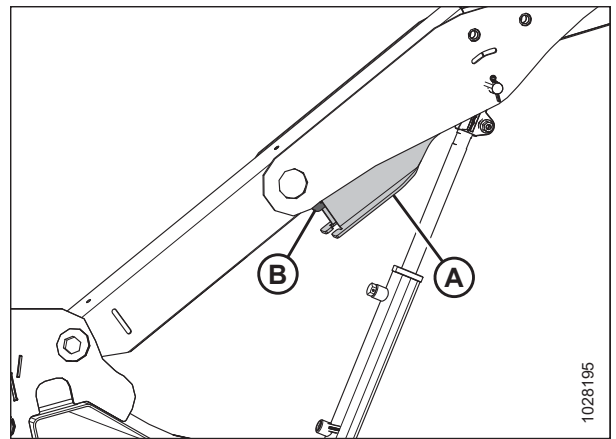


Figure 3.2: Outer Arm

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

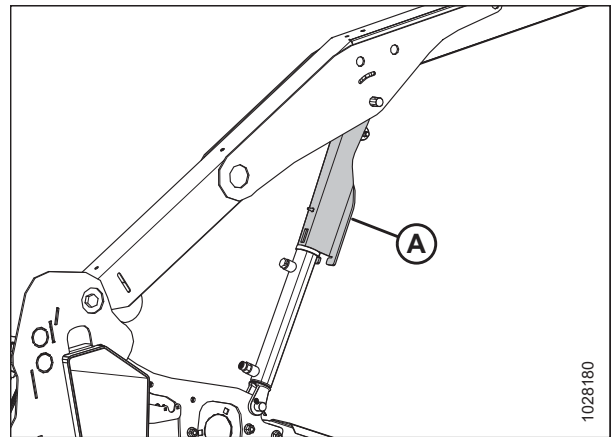


Figure 3.3: Engaged Reel Safety Prop – Outer Arm

## OPERATION

### *Center arm – double-reel headers*

5. Rotate handle (A) to release the spring tension and push the handle inboard to ensure the pin is engaged in the locked position.
6. Lower the reel until the safety props contact the outer arm cylinder mounts and the center arm pins.
7. Shut down the engine, and remove the key from the ignition.

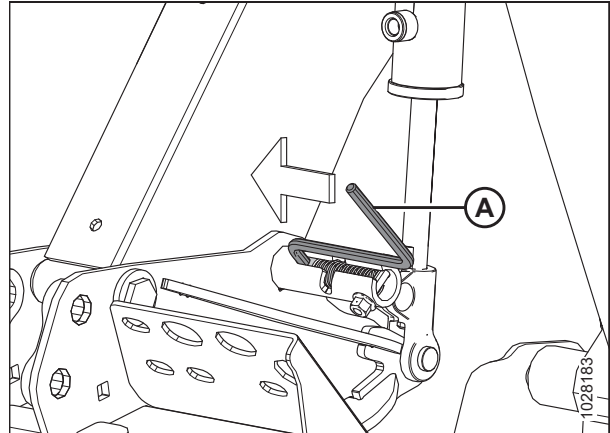


Figure 3.4: Engaged Reel Safety Prop – Center Arm

### *Disengaging Reel Safety Props*

Disengage the reel safety props once you have completed working on or around a raised reel.

#### **DANGER**

Ensure that all bystanders have cleared the area.

#### **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 reel fully.
2. Shut down the engine, and remove the key from the ignition.

### *Outer reel arms*

3. Move reel safety prop (A) up onto hook (B) under the reel arm. Repeat this step on the opposite reel arm.

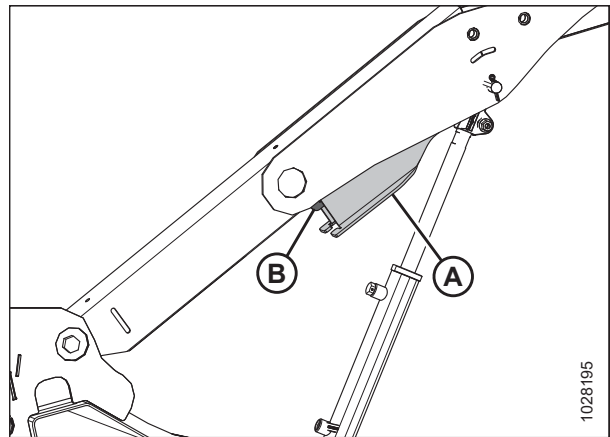


Figure 3.5: Reel Safety Prop – Right Outer Arm



## OPERATION

### *Center arm – double-reel headers*

4. Move handle (A) outboard and into slot (B) to put the pin into the unlocked position.
5. Lower the reel fully.
6. Shut down the engine, and remove the key from the ignition.

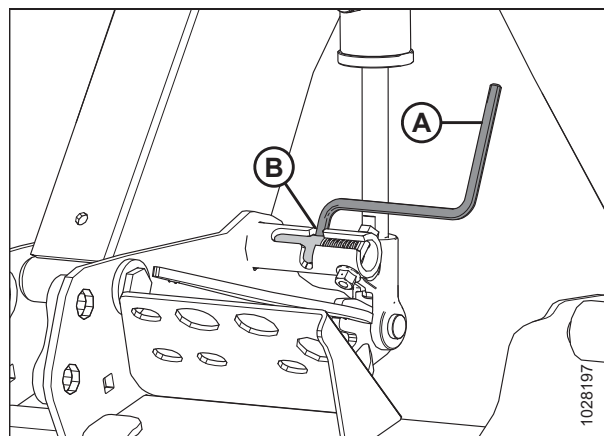


Figure 3.6: Reel Safety Prop – Center Arm

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

1. To unlock the shield, push release lever (B) using access hole (A) on the backside of the header endshield.

**NOTE:**

A tool (e.g., a screwdriver) is required to push the release lever on headers configured for Export.

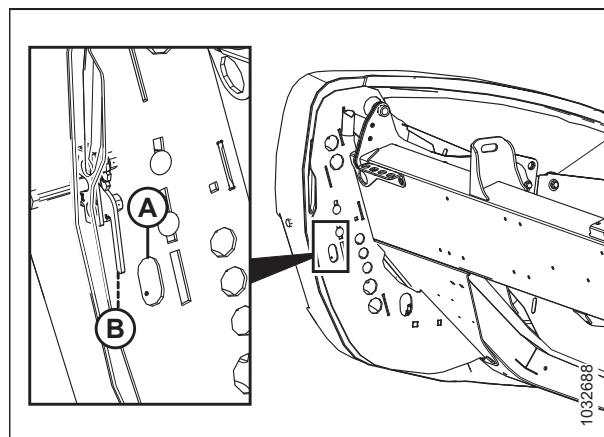


Figure 3.7: Left Header Endshield

## OPERATION

2. Pull header endshield (A) open.

### NOTE:

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

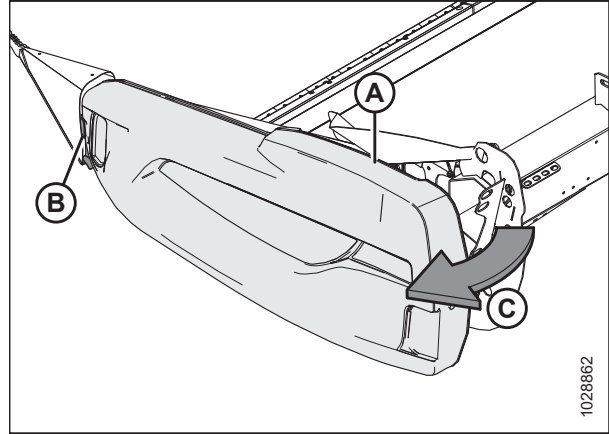


Figure 3.8: Left Header Endshield

3. If additional clearance is required, pull the header endshield free of tab (A), 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.

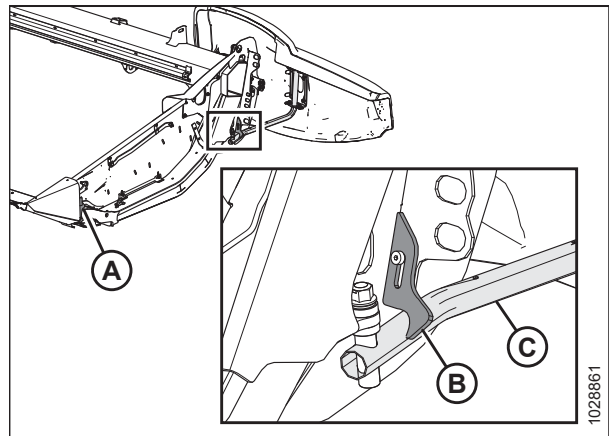


Figure 3.9: Left Header Endshield

### Closing Header Endshields

Close the header endshields to protect the drive components, the hoses, and the electrical connections from dirt and debris.

1. If the endshield is fully open 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.

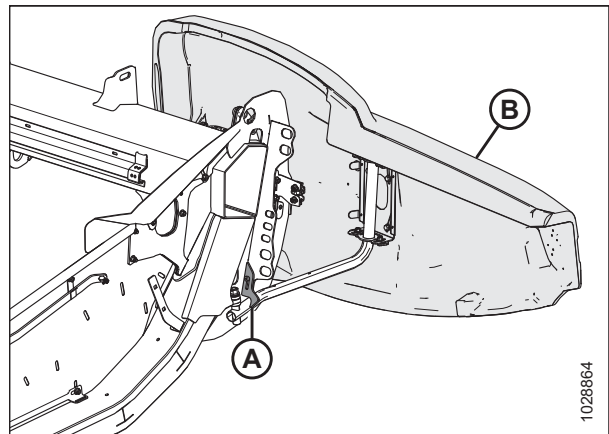


Figure 3.10: Left Header Endshield

## OPERATION

3. While closing endshield (A), ensure that it does not contact the top of endsheet (B). If adjustment is required, refer to [Checking and Adjusting Header Endshields, page 50](#).

### IMPORTANT:

Ensure that the header endshield does **NOT** rest on the aluminum endsheet.

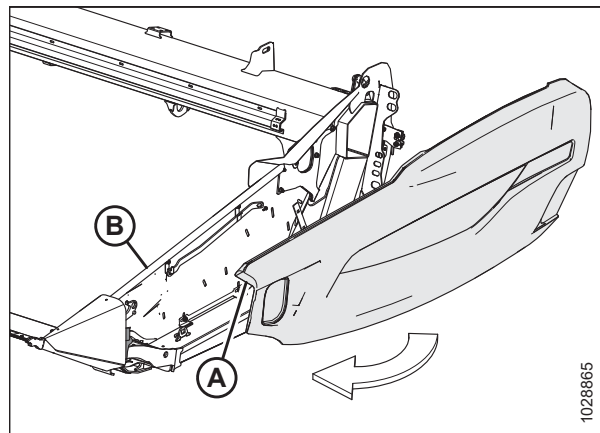


Figure 3.11: Left Header Endshield

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.

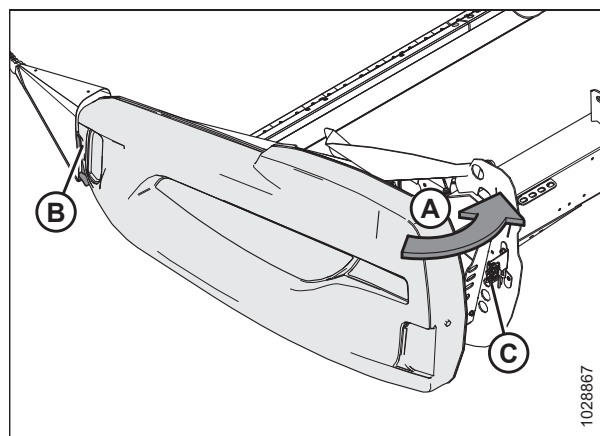


Figure 3.12: Left Header Endshield

### IMPORTANT:

To ensure that the header endshield is locked, bolt (A) must be fully engaged on two-stage latch (B) to prevent the header endshield from opening while you are operating the header. If adjustment is required, refer to [Checking and Adjusting Header Endshields, page 50](#).

### NOTE:

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

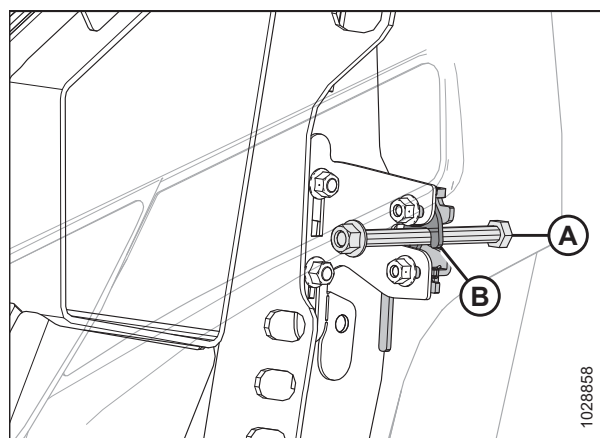


Figure 3.13: Two-Stage Latch

## OPERATION

### Checking and Adjusting Header Endshields

The header endshields can warp due to extreme changes in temperature. Adjust the position of the header endshield to compensate for dimensional changes.

#### 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.

#### IMPORTANT:

Ensure that the header endshield does **NOT** rest on the aluminum endsheet.

2. Measure clearance (A) between header endshield (B) and endsheet (C). The clearance should be 1–3 mm (1/16–1/8 in.).

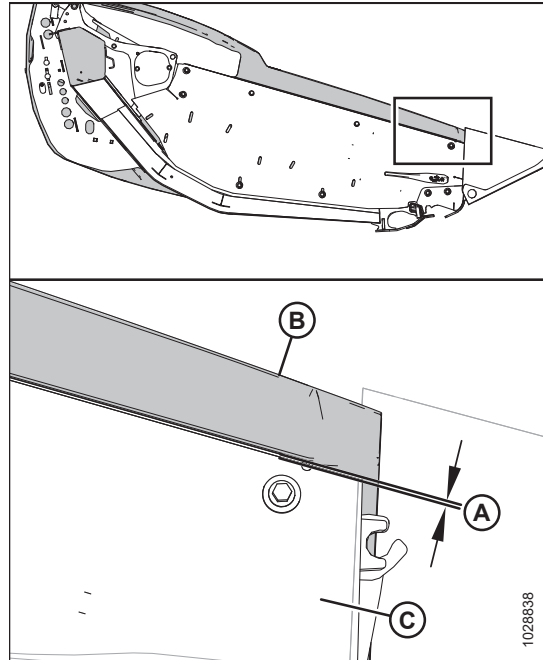


Figure 3.14: Clearance between Endshield and Endsheet

3. If the clearance between the header endshield and the endsheet 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.

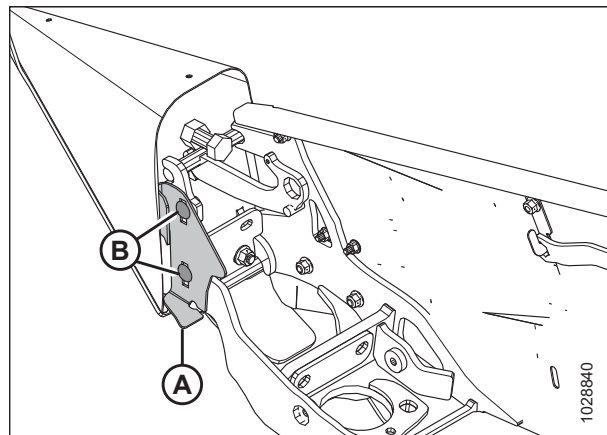
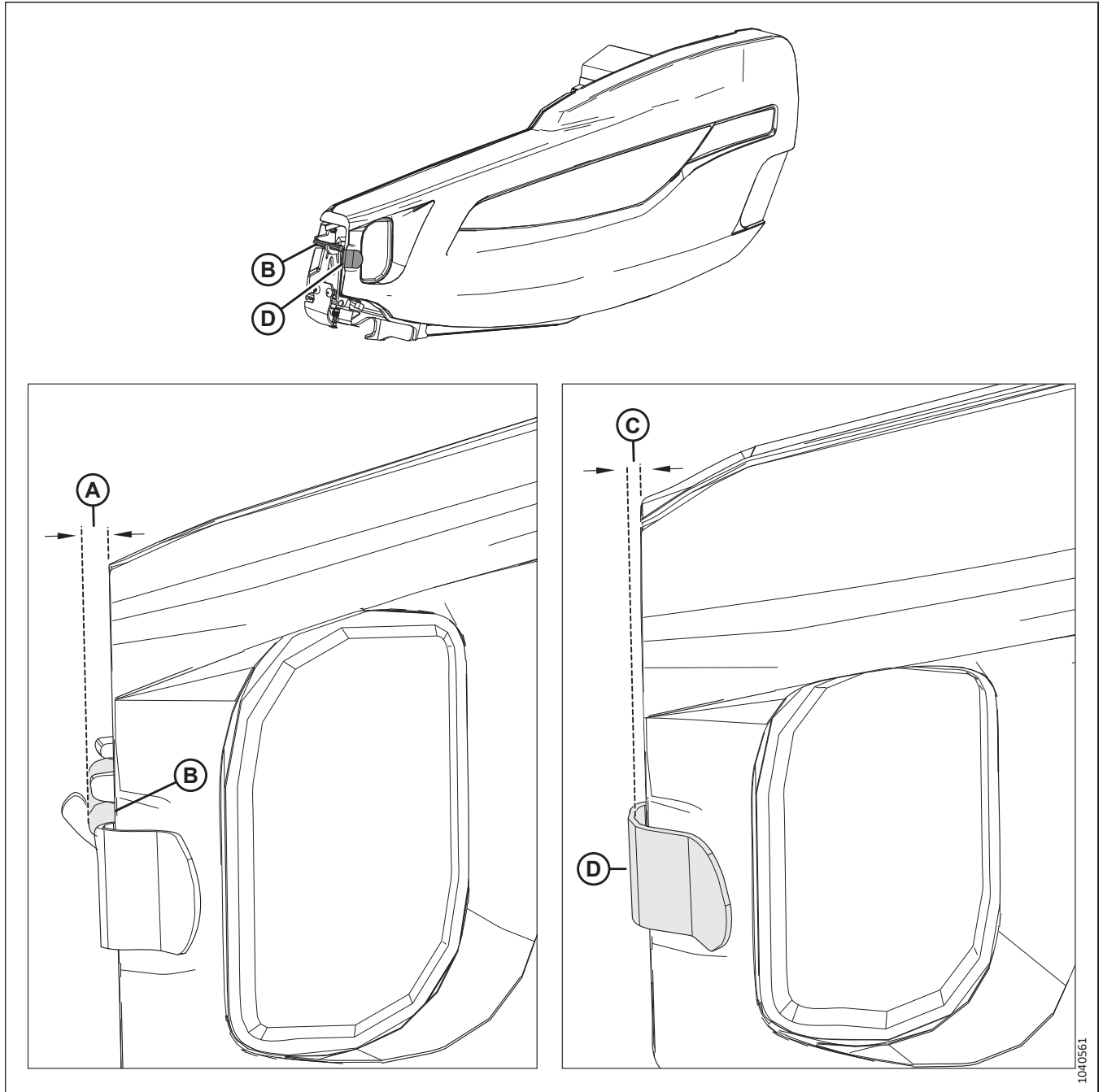


Figure 3.15: Header Endshield Support Bracket

## OPERATION



**Figure 3.16: Clearance Specifications at the Front of the Endshield**

4. Measure clearance (A) between the front of the header endshield and pin (B). The clearance should be 8–18 mm (1/32–11/16 in.)
5. Measure clearance (C) between the front of the header endshield and support bracket (D). The clearance should be 6–10 mm (1/4–3/8 in.).

## OPERATION

6. 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.

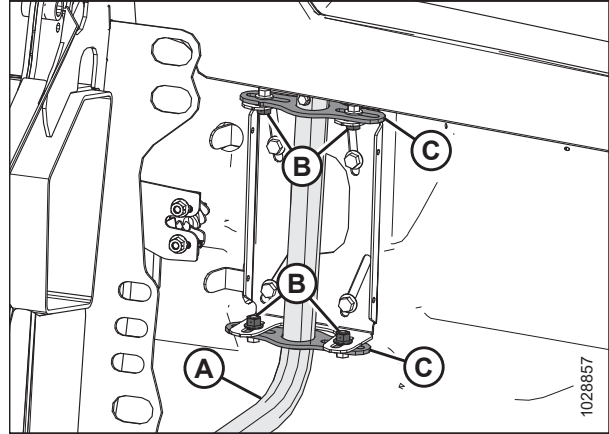


Figure 3.17: Left Header Endshield

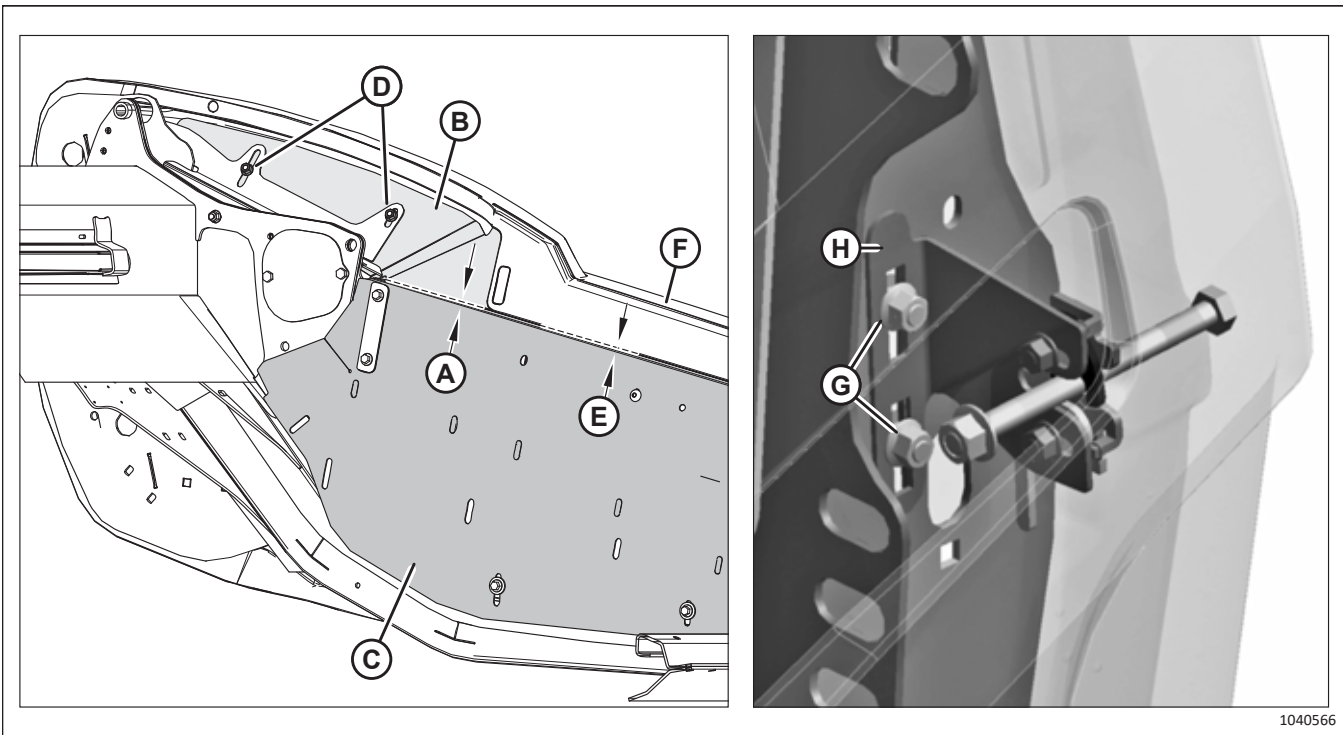


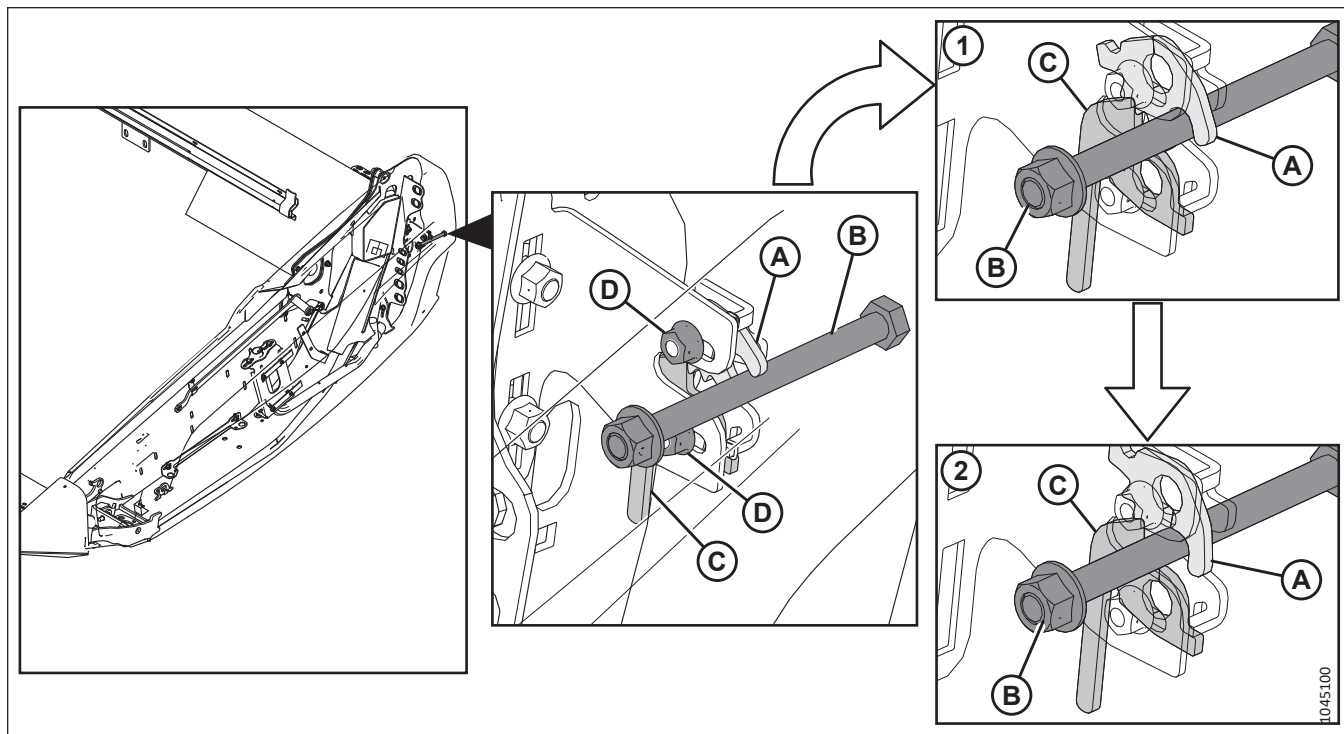
Figure 3.18: Clearance Specification between Neck Shield and End Panel

7. Measure clearance (A) between neck shield (B) and end panel (C). The clearance must be at least 3 mm (1/8 in.). To adjust the clearance, loosen two nuts (D), move neck panel (B), and tighten nuts (D).
8. Measure clearance (E) between end panel (C) and endshield (F). The clearance must be 1–3 mm (1/16–1/8 in.). To adjust the clearance, loosen two nuts (G), slide bracket (H) up or down, and tighten the nuts.

### NOTE:

Ensure that the endshield does **NOT** rest on neck panel (B).

## OPERATION



**Figure 3.19: Two-Stage Endshield Latch**

- 1 - Endshield Latch Stage One
- 2 - Endshield Latch Stage Two

When the endshield is closed, latch (A) should engage bolt (B). As the endshield is pressed fully closed, two-stage latch (A) engages lever (C) to secure endshield bolt (B). Confirm the endshield latch functions properly by following Step 9, page 53 to Step 11, page 53.

9. Close the endshield. Confirm bolt (B) engages latch (A).
10. Momentarily press the release latch.
11. Try to open the endshield.
  - If you can open the endshield partially, but **NOT** completely, then the latch is positioned properly.
  - If you can open the endshield completely, loosen nuts (D), move latch along the slotted holes, then retighten the nuts. Repeat Step 9, page 53 to Step 11, page 53.

## OPERATION

12. Check that bolt (A) is tight. If adjustment is required, tighten nut (B) until there is no gap under the nut.

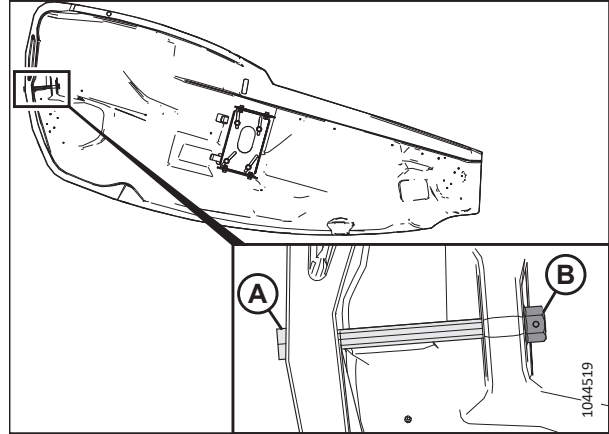


Figure 3.20: Endshield Bolt

### Removing Header Endshields

Remove the endshields to increase access to the components inside.

#### 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 47](#).
3. Engage latch (A) to prevent the endshield from moving.
4. Remove self-tapping screw (B).
5. Slide the header endshield upward and remove it from hinge arm (C).
6. Place the header endshield away from the work area.

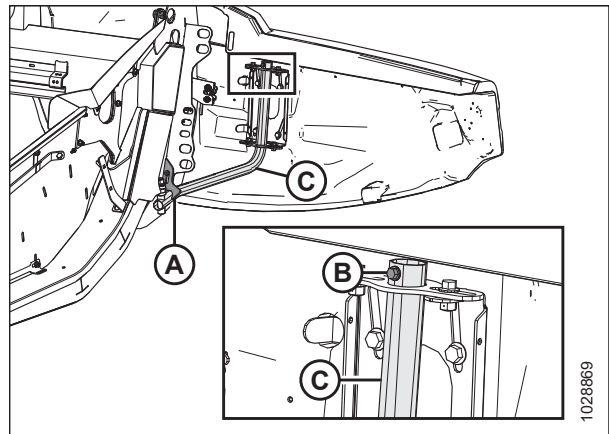


Figure 3.21: Left Header Endshield

### Installing Header Endshields

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

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



## OPERATION

2. Guide the header endshield onto hinge arm (C) and slowly slide it downwards.

### IMPORTANT:

Ensure that the header endshield does **NOT** rest on the aluminum endsheet.

3. Install self-tapping screw (B). Torque the screw to 7 Nm (5.2 lbf·ft [62 lbf·in]).
4. Disengage latch (A) to allow the header endshield to move.
5. Close the header endshield. For instructions, refer to [Closing Header Endshields, page 48](#).

### NOTE:

The header endshields can warp due to extreme changes in temperature. Adjust the position of the header endshield to compensate for these changes. For instructions, refer to [Checking and Adjusting Header Endshields, page 50](#).

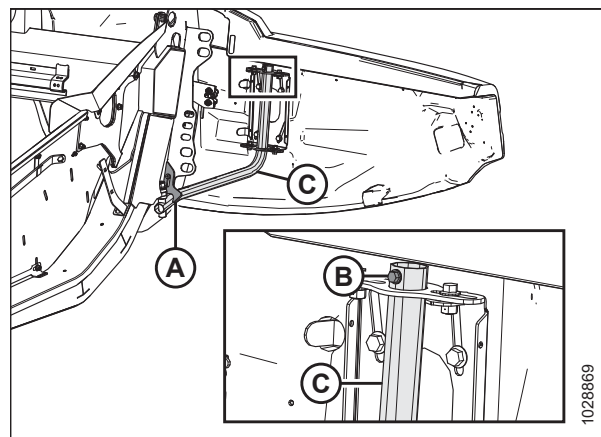


Figure 3.22: Left Header Endshield

### 3.2.4 Reel Drive Cover

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

#### *Removing Reel Drive Cover*

Remove the reel drive cover to service the reel drive components.



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

## OPERATION

### Single-reel drive

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

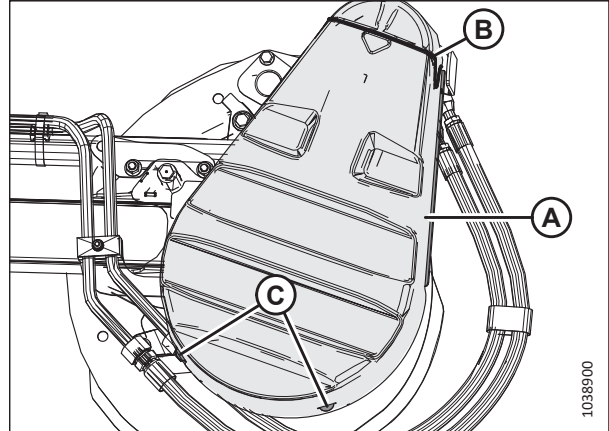


Figure 3.23: Drive Cover

### Double-reel drive

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

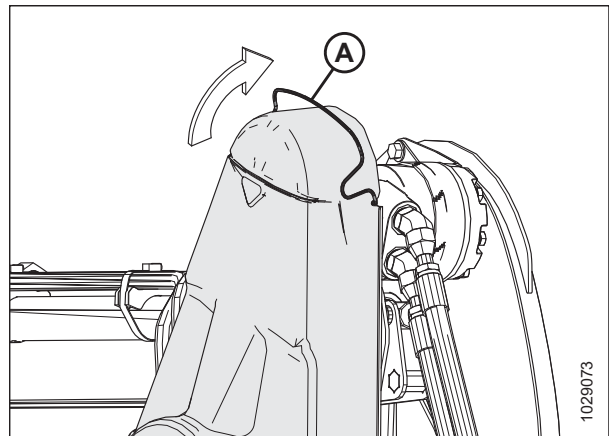


Figure 3.24: Upper Drive Cover

7. 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.

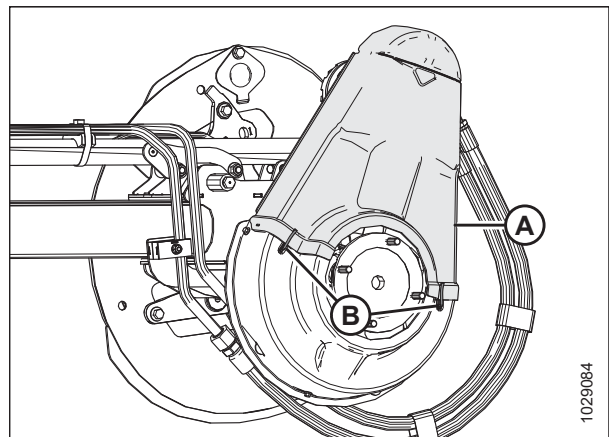


Figure 3.25: Upper Drive Cover

## OPERATION

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

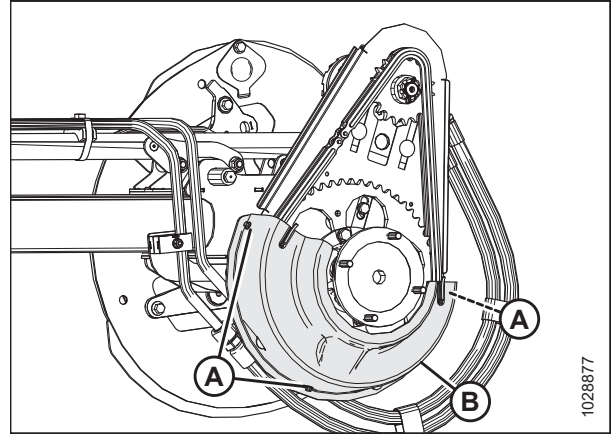


Figure 3.26: Lower Drive Cover

### *Installing Reel Drive Cover*

The reel drive cover protects the drive components from weather and debris. Do **NOT** operate the header without the reel drive 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.

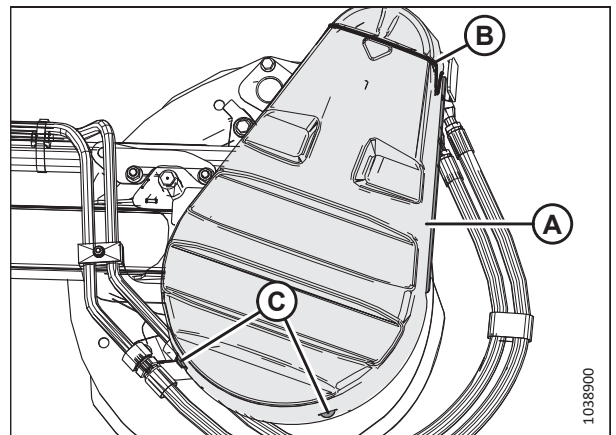


Figure 3.27: Drive Cover

## OPERATION

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

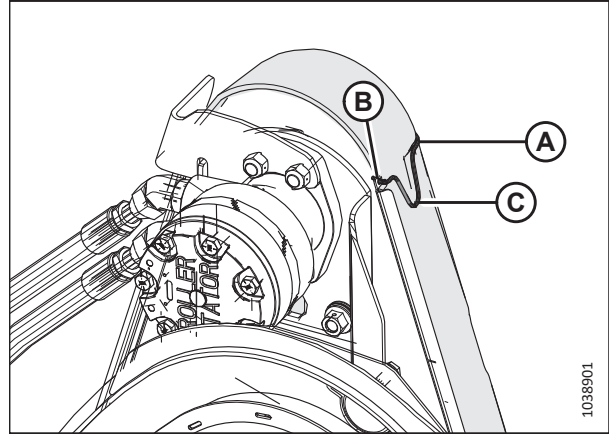


Figure 3.28: Reel Drive

### *Double-reel drive*

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

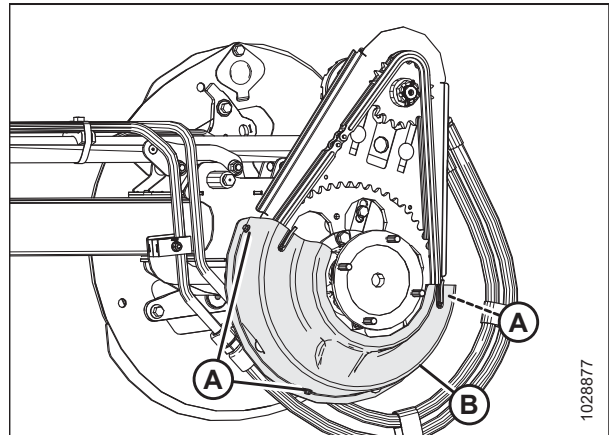


Figure 3.29: Lower Drive Cover

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

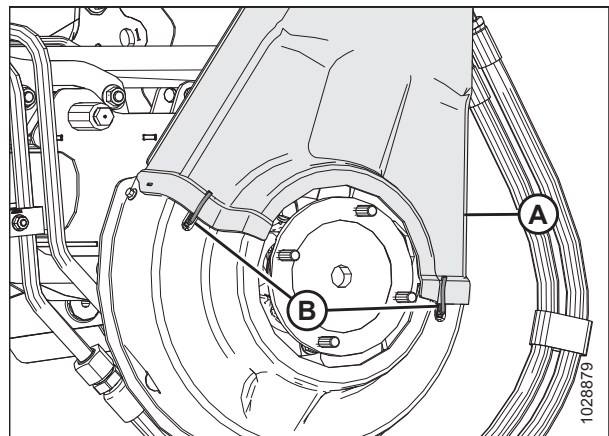


Figure 3.30: Upper Drive Cover

## OPERATION

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

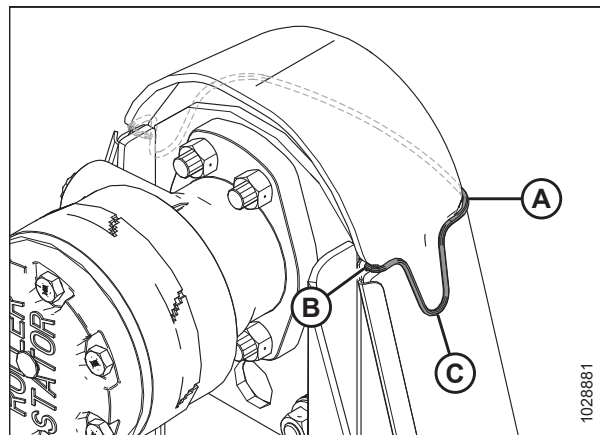


Figure 3.31: Reel Drive

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



Figure 3.32: Safety Devices

Perform the following checks before starting the machine:

- 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 215](#).

- Clean all of the lights and the reflectors on the machine.
- Perform all daily maintenance tasks. For instructions, refer to [5.2.1 Maintenance Schedule/Record, page 212](#).

### 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.

 **DANGER**

Ensure that all bystanders have cleared the area.

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

1. Slowly run the reels, the drapers, and the knives for five minutes. **FROM THE OPERATOR'S SEAT**, watch and listen for any interference.

**NOTE:**

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

2. Refer to [5.2.2 Break-in Inspection, page 213](#) 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.

### DANGER

Ensure that all bystanders have cleared the area.

To shut down the windrower, do the following:

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

## 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 to identify the following in-cab controls:

- Header engage/disengage control
- Header height
- Header angle
- Ground speed
- Reel speed
- Reel height
- Reel fore-aft position
- Knife speed
- Hydraulic deck shift



## 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 Dealer.

Refer to Chapter *6 Options and Attachments, page 365* for the 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.

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

Stabilizer Wheels <sup>2</sup>	Variable									
Float N (lbf) <sup>3</sup>	311–445 (70–100)									
Crop Condition	Divider Rods	Header Angle <sup>4</sup>	Skid Shoe Position <sup>5</sup>	Reel Cam <sup>6</sup>	Reel Speed <sup>7</sup>	Knife Speed <sup>8</sup>	Reel Position <sup>9</sup>	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 80](#).
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 78](#) and [Adjusting Outer Skid Shoes, page 79](#).
6. Refer to [Reel Cam Settings, page 94](#).
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 83](#).
9. Refer to [3.7.11 Reel Fore-Aft Position, page 87](#).

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

Stabilizer Wheels <sup>10</sup>	Variable							
Float N (lbf) <sup>11</sup>	667 (150)							
Crop Condition	Divider Rods	Header Angle <sup>12</sup>	Skid Shoe Position <sup>13</sup>	Reel Cam <sup>14</sup>	Reel Speed <sup>15</sup>	Knife Speed <sup>16</sup>	Reel Position <sup>17</sup>	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 80](#).
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 78](#) and [Adjusting Outer Skid Shoes, page 79](#).
14. Refer to [Reel Cam Settings, page 94](#).
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 83](#).
17. Refer to [3.7.11 Reel Fore-Aft Position, page 87](#).

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

Stabilizer Wheels <sup>18</sup>	Storage									
Float N (lbf) <sup>19</sup>	311 (70)									
Crop Condition	Divider Rods	Header Angle <sup>20</sup>	Skid Shoe Position <sup>21</sup>	Reel Cam <sup>22</sup>	Reel Speed <sup>23</sup>	Knife Speed <sup>24</sup>	Reel Position <sup>25</sup>	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 80](#).
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 78](#) and [Adjusting Outer Skid Shoes, page 79](#).
22. Refer to [Reel Cam Settings, page 94](#).
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 83](#).
25. Refer to [3.7.11 Reel Fore-Aft Position, page 87](#).

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

Stabilizer Wheels <sup>26</sup>	Variable										
Float N (lbf) <sup>27</sup>	311 (70)										
Crop Condition	Divider Rods	Header Angle <sup>28</sup>	Skid Shoe Position <sup>29</sup>	Reel Cam <sup>30</sup>	Reel Speed <sup>31</sup>	Knife Speed <sup>32</sup>	Reel Position <sup>33</sup>	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 80.

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 78 and Adjusting Outer Skid Shoes, page 79.

30. Refer to Reel Cam Settings, page 94.

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 83.

33. Refer to 3.7.11 Reel Fore-Aft Position, page 87.

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

Stabilizer Wheels <sup>34</sup>	Variable									
Float N (lbf) <sup>35</sup>	667 (150)									
Crop Condition	Divider Rods	Header Angle <sup>36</sup>	Skid Shoe Position <sup>37</sup>	Reel Cam <sup>38</sup>	Reel Speed <sup>39</sup>	Knife Speed <sup>40</sup>	Reel Position <sup>41</sup>	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 80](#).
- 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 78](#) and [Adjusting Outer Skid Shoes, page 79](#).
- 38. Refer to [Reel Cam Settings, page 94](#).
- 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 83](#).
- 41. Refer to [3.7.11 Reel Fore-Aft Position, page 87](#).

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

Stabilizer Wheels <sup>42</sup>	Storage									
Float N (lbf) <sup>43</sup>	445 (100)									
Crop Condition	Divider Rods	Header Angle <sup>44</sup>	Skid Shoe Position <sup>45</sup>	Reel Cam <sup>46</sup>	Reel Speed <sup>47</sup>	Knife Speed <sup>48</sup>	Reel Position <sup>49</sup>	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 80.

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 78 and *Adjusting Outer Skid Shoes*, page 79.

46. Refer to *Reel Cam Settings*, page 94.

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 83.

49. Refer to 3.7.11 *Reel Fore-Aft Position*, page 87.

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

Stabilizer Wheels <sup>50</sup>	Variable									
Float N (lbf) <sup>51</sup>	3.11–4.45 (70–100)									
Crop Condition	Divider Rods	Header Angle <sup>52</sup>	Skid Shoe Position <sup>53</sup>	Reel Cam <sup>54</sup>	Reel Speed <sup>55</sup>	Knife Speed <sup>56</sup>	Reel Position <sup>57</sup>	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 80.

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 78 and Adjusting Outer Skid Shoes, page 79.

54. Refer to Reel Cam Settings, page 94.

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 83.

57. Refer to 3.7.11 Reel Fore-Aft Position, page 87.



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

Stabilizer Wheels <sup>58</sup>	Storage							
Float N (lbf) <sup>59</sup>	311–445 (70–100)							
Crop Condition	Divider Rods	Header Angle <sup>60</sup>	Skid Shoe Position <sup>61</sup>	Reel Cam <sup>62</sup>	Reel Speed <sup>63</sup>	Knife Speed <sup>64</sup>	Reel Position <sup>65</sup>	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 80.

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 78 and *Adjusting Outer Skid Shoes*, page 79.

62. Refer to *Reel Cam Settings*, page 94.

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 83.

65. Refer to 3.7.11 *Reel Fore-Aft Position*, page 87.

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

Stabilizer Wheels <sup>66</sup>	Storage									
Float N (lbf) <sup>67</sup>	311–445 (70–100)									
Crop Condition	Divider Rods	Header Angle <sup>68</sup>	Skid Shoe Position <sup>69</sup>	Reel Cam <sup>70</sup>	Reel Speed <sup>71</sup>	Knife Speed <sup>72</sup>	Reel Position <sup>73</sup>	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 80.

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 78 and *Adjusting Outer Skid Shoes*, page 79. Refer to *Reel Cam Settings*, page 94.

70. 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.

71. Refer to 3.7.9 *Knife Speed Information*, page 83.

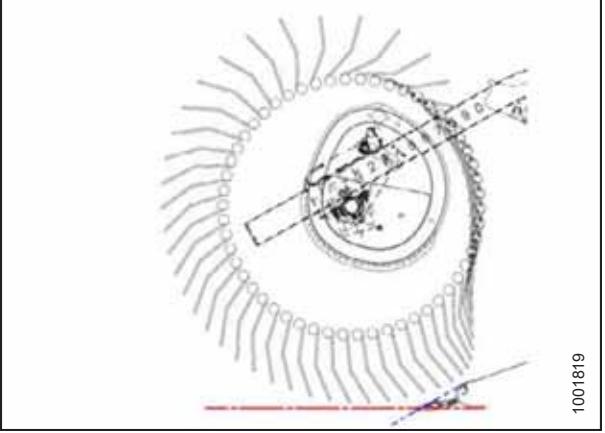
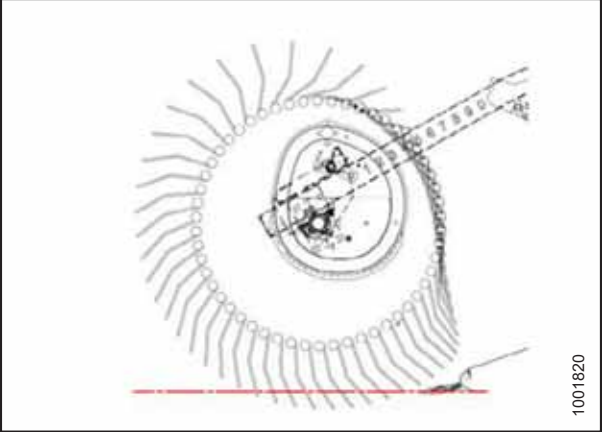
72. Refer to 3.7.11 *Reel Fore-Aft Position*, page 87.

### 3.6.3 Reel Settings

Different reel positions and cam settings affect the delivery of the crop to the drapers by rotating the finger profile.

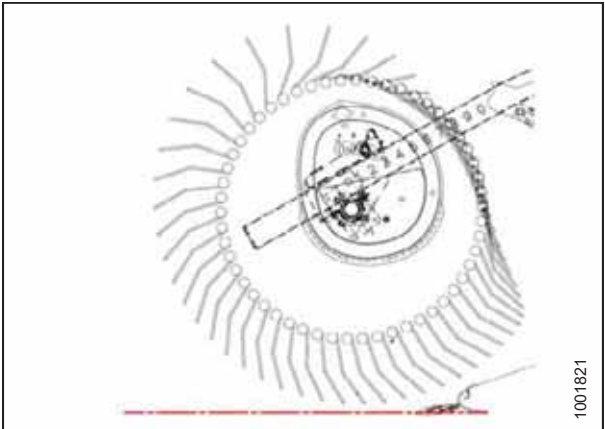
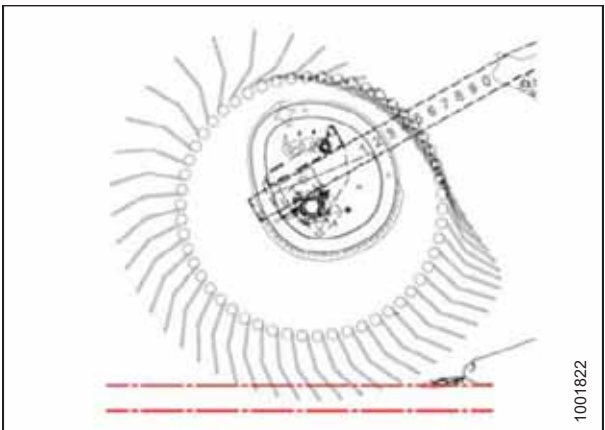
The following chart illustrates the profile of the reel at each cam or finger pitch setting as well as the reel position relative to the ground at different positions on the reel arm. Refer to *Adjusting Reel Cam, page 96* for reel cam adjusting instructions.

**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	
2 (20%)	3 or 4	

## OPERATION

**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	
4 (35%)	2 or 3	

**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.
- The 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 73.

## 3.7 Header Operating Variables

Adjusting the header correctly will reduce crop loss and speed up harvesting. Proper adjustments, along with timely maintenance, will increase the service life of the header.

Most of the settings below have been configured at the factory, but they can be changed for various crops and/or different harvesting conditions.

**Table 3.11 Operating Variables**

Variable	Refer to
Cutting height	<a href="#">3.7.2 Cutting off Ground, page 75</a>
Header float	<a href="#">3.7.4 Header Float, page 79</a>
Header angle	<a href="#">3.7.5 Header Angle, page 80</a>
Reel speed	<a href="#">3.7.6 Reel Speed, page 81</a>
Ground speed	<a href="#">3.7.7 Ground Speed, page 82</a>
Draper speed	<a href="#">3.7.8 Draper Speed, page 82</a>
Knife speed	<a href="#">3.7.9 Knife Speed Information, page 83</a>
Reel height	<a href="#">3.7.10 Reel Height, page 84</a>
Reel fore-aft position	<a href="#">3.7.11 Reel Fore-Aft Position, page 87</a>
Reel tine pitch	<a href="#">3.7.12 Reel Tine Pitch, page 94</a>
Crop divider rods	<a href="#">3.7.14 Crop Dividers, page 100</a>

### 3.7.1 Cutting Height

The header is capable of cutting the crop to a desired stubble height or cutting as close as possible to the ground. The 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.

The cutting height can be adjusted using either the Stabilizer Wheel kit or the EasyMove™ Transport option.

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 of header weight carried by the stabilizer wheels.

Refer to [3.6.2 Header Settings, page 63](#) for recommended use in specific crops and crop conditions.

#### **IMPORTANT:**

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

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

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 it more difficult to take the system 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 axle pivot handle (B), and engage the support channel into center slot (C) in the upper support.
6. Suspension handle (A) should snap into the slot. If the suspension handle does not snap in, push (for middle or lower position) or pull in (for top position) the suspension handle to ensure that it is seated in the slot.
7. Use the windrower cab controls to automatically maintain the cutting height. Refer to your windrower operator's manual for details.

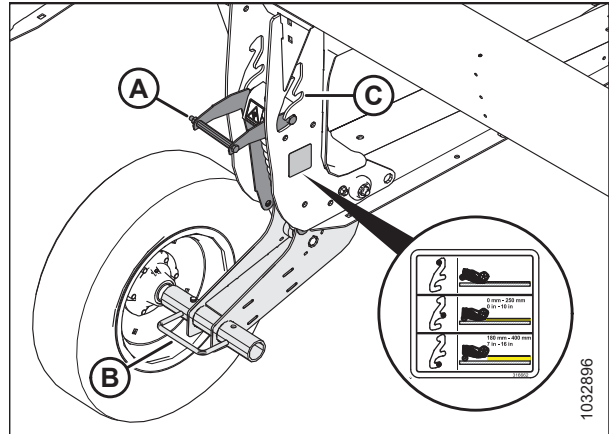


Figure 3.33: Stabilizer Wheel

*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 of header weight 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.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

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

## OPERATION

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

### NOTE:

Lifting the handle will make it more difficult to take the system 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 the suspension handle does not snap in, push (for middle position) or pull in (for top position) the suspension handle to ensure that it is seated in the slot.

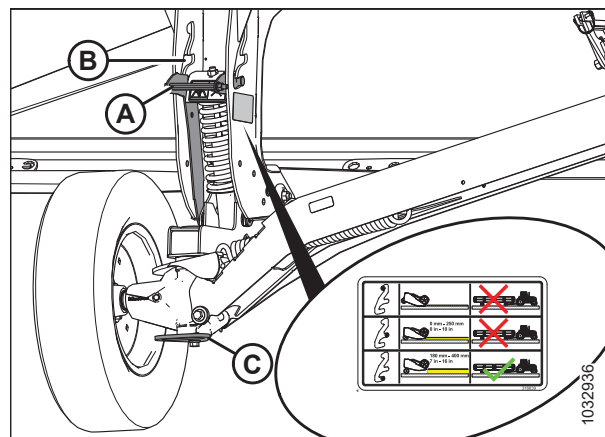


Figure 3.34: Right Wheel

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

### NOTE:

Lifting the handle will make it more difficult to take the system 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 the handle does not snap in, pull out the suspension handle to ensure that it is seated in the slot.

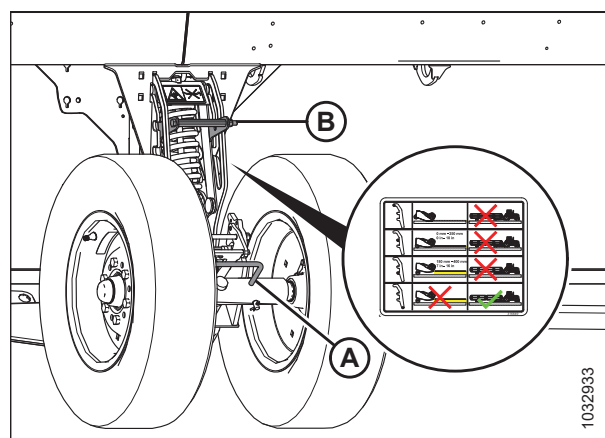


Figure 3.35: Left Wheel

12. Use the windrower cab controls to automatically maintain the 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 the knife guards relative to the ground (the 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 harvested while preventing damage to the knife caused by stones and debris.

The header float system allows the header to float above the ground, automatically moving the header to compensate for contours in the ground. This float helps 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 78](#)
- [Adjusting Outer Skid Shoes, page 79](#)
- [3.7.4 Header Float, page 79](#)
- [3.7.5 Header Angle, page 80](#)

### Adjusting Inner Skid Shoes

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

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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 the skid shoes in the down position can speed up wear on the skid shoe 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 the transport wheels fully (if installed). For instructions, refer to the following:
  - [Adjusting Stabilizer Wheels, page 75](#)
  - [Adjusting EasyMove™ Transport Wheels, page 76](#)
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. Ensure that both of the 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.

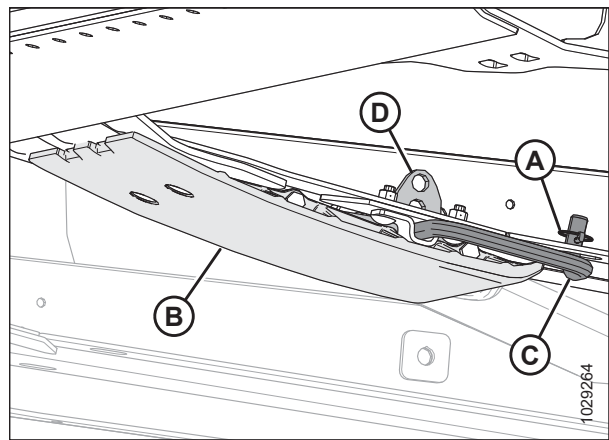


Figure 3.36: Inner Skid Shoe

**NOTE:**

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.



### Adjusting Outer Skid Shoes

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

#### 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.

#### IMPORTANT:

Running the skid shoes in the down position can speed up wear of the skid shoes.

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 the transport wheels fully (if installed). For instructions, refer to the following:
  - [Adjusting Stabilizer Wheels, page 75](#)
  - [Adjusting EasyMove™ Transport Wheels, page 76](#)
5. Remove lynch pin (A) from each skid shoe pin (C).
6. Hold skid shoe (B) and remove pin (C) by disengaging it from the bracket and pulling it 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 it with lynch pin (A).
9. Ensure that all of the skid shoes are adjusted to the same position.
10. Check the header float as described in your windrower operator's manual.

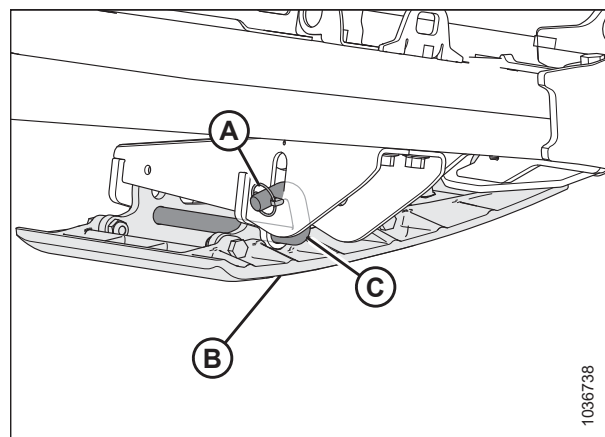


Figure 3.37: Outer Skid Shoe

### 3.7.4 Header Float

D2 Series Draper Headers are designed to ride on 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 adjusting the header float.

### 3.7.5 Header Angle

You can adjust the header angle to accommodate different crop conditions and/or soil types by 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.

When cutting the crop at ground level, the header angle controls distance (B) between the cutterbar knife and the ground.

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.

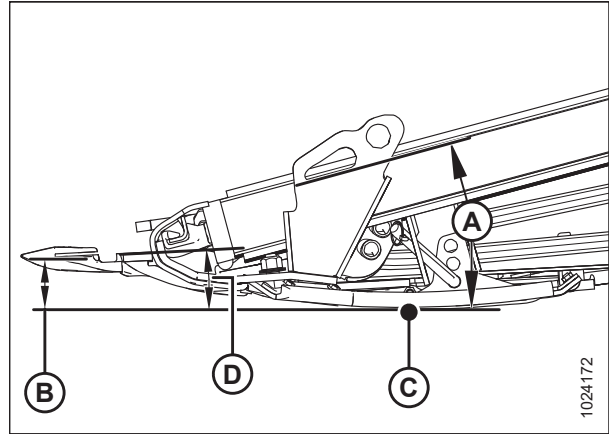


Figure 3.38: Header Angle

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.

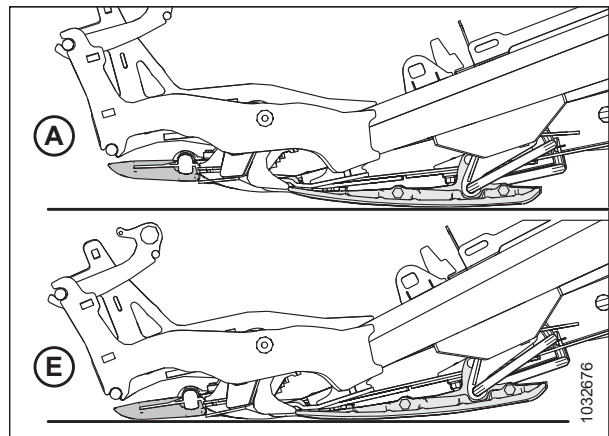


Figure 3.39: Guard Angles

Set the header angle according to the type and the condition of the crop and the soil as follows:

- Use shallower settings for normal cutting conditions and for wet soil to prevent the soil from building up at the cutterbar. A shallow header angle also minimizes knife damage in stony fields.
- Use steeper settings for lodged crops and crops that are close to the ground such as soybeans.

Choose a header angle that maximizes the header's performance for your crop and field conditions.

#### *Controlling Header Angle*

You can adjust the header angle 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 details on adjusting the header angle.

### 3.7.6 Reel Speed

The reel speed helps control how crop moves 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, the reel speed should be slightly higher than or equal to the ground speed.

In flattened crop or crop that leans away from the cutterbar, the reel speed must 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.

#### *Optional Reel Drive Sprockets*

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

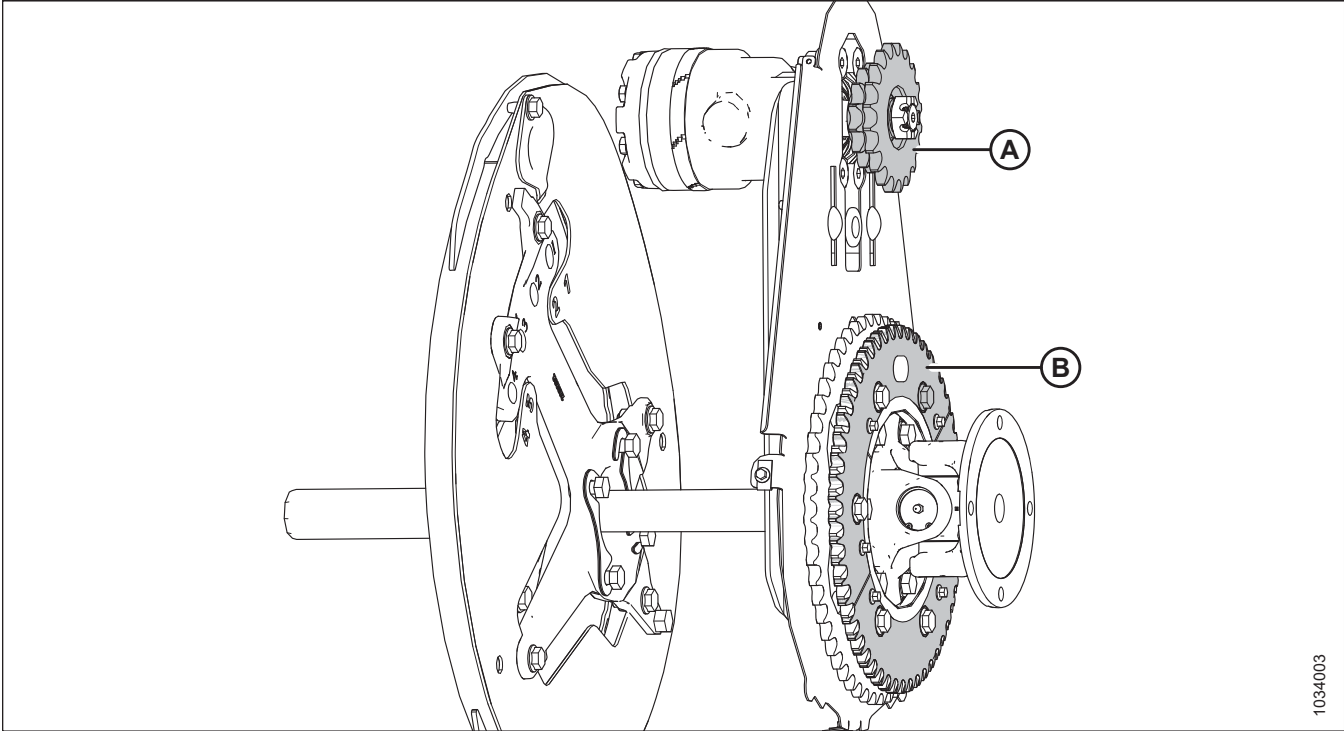
The header is factory-equipped with a 19-tooth reel drive single sprocket, which is suitable for most crops.

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. Contact your Dealer for more information.

## OPERATION



**Figure 3.40: Reel Drive with Optional Sprockets**

A - Dual Reel Drive Sprocket (MD #273451, MD #273452, or MD #273453)<sup>74</sup>

B - 52-Tooth Sprocket (MD #273689)<sup>75</sup>

### 3.7.7 Ground Speed

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

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

When harvesting very light crops, use lower ground speeds 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 the header from bouncing. If you increase the ground speed, increase the speed of the draper and the reel to handle the extra material.

### 3.7.8 Draper Speed

Draper speed is a factor in clearing crop from the cutterbar and the formation of the windrow.

Adjust draper speed to achieve a good flow of cut crop away from the cutterbar.

Adjust the draper speed to optimize crop feeding for a well formed windrow. Draper speed that is too fast may produce a windrow that is center heavy (cone shaped); whereas, a draper speed that is too slow could result in a windrow that is shallow in the center.

#### **IMPORTANT:**

Excessive draper speed will reduce the life of the drapers.

Refer to your windrower operator's manual for instructions on adjusting the draper speed

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	—	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 a windrower, the console in the windrower receives a code from the header that determines the knife speed range and the minimum speed.

The desired speed can be programmed and stored so that 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 47](#).



#### **DANGER**

**Ensure that all bystanders have cleared the area.**

- 3.
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).

## OPERATION

- 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).

- Shut down the engine, and remove the key from the ignition.
- Compare the flywheel rpm measurement with the rpm values. Refer to Table 3.12, page 83 for more information.

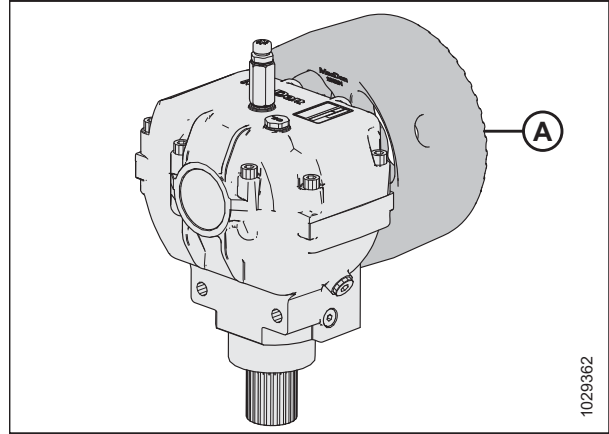


Figure 3.41: Flywheel

- Contact your MacDon Dealer if the pulley rpm measurement exceeds the specified rpm range for your header.
- If the knife speed is not within range:
  - Check that the console is displaying the correct header ID. Contact your MacDon Dealer.
  - Check that the knife speed is set. For instructions, refer to the windrower operator's manual.
  - Check that the 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 the cutting conditions.

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 more information.

You can create preset reel height positions using the One-Touch-Return feature on an M1 Series or M2 Series Windrower. To set up this feature, refer to your windrower operator's manual.

**NOTE:**

The One-Touch-Return feature for reel height is only available for D2 Series Draper Headers configured for M1 Series or M2 Series Windrowers. For more information on checking and adjusting reel height sensors, refer to [Checking and Adjusting Reel Height Sensor Orientation – M1 and M2 Series Only, page 85](#).

For more information on reel fore-aft positioning, refer to [3.7.11 Reel Fore-Aft Position, page 87](#).

The following table describes how to change the reel position for different crop conditions:

Table 3.13 Reel Position

Crop Condition	Reel Position
Lodged rice	<ul style="list-style-type: none"> <li>Lower the reel</li> <li>Change the reel speed and/or the cam setting</li> <li>Change the reel fore-aft position by extending the reel</li> </ul>
Bushy or heavy standing (all)	Raise the reel

If the reel is set too low, the following conditions may happen:

- Crop loss over the header backtube
- Crop disturbance on the drapers caused by the reel fingers

## OPERATION

- Crop pushed down by the tine tubes
- Tall crop wrapped around the reel drive and ends

If the reel is set too high, the following conditions may happen:

- Cutterbar plugging
- Crop lodging and being left uncut
- Grain stalks dropping ahead of the cutterbar

For the recommended reel heights for specific crops and crop conditions, refer to [3.6.2 Header Settings, page 63](#).

### IMPORTANT:

Maintain an adequate clearance between the reel and the cutterbar to prevent the reel fingers from contacting the cutterbar during operation. For instructions, refer to [5.8.1 Reel-to-Cutterbar Clearance, page 310](#).

### *Checking and Adjusting Reel Height Sensor Orientation – M1 and M2 Series Only*

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.



### DANGER

Ensure that all bystanders have cleared the area.



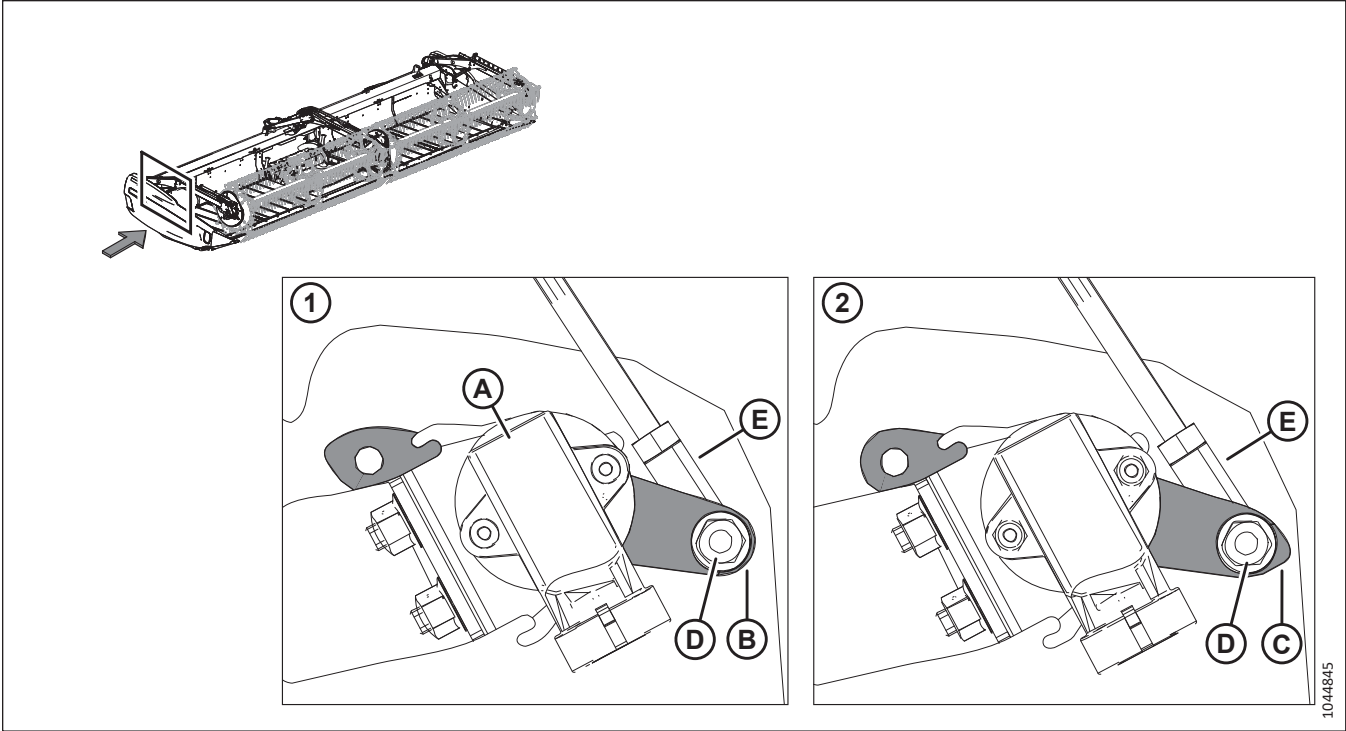
### DANGER

**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:

This procedure is not required for headers used with M Series Windrowers.

1. Park the windrower on a level surface.
2. Shut down the engine, and remove the key from the ignition.
3. Open the right endshield. For instructions, refer to [Opening Header Endshields, page 47](#).



**Figure 3.42: Reel Height Sensor Location**

4. On the right endsheet, locate reel height sensor (A). The sensor connects to the right reel arm.
5. Ensure that the sensor is configured properly for the header:
  - Configuration (1) is incorrect. Round end (B) of the sensor arm is attached to rod (E).
  - Configuration (2) is correct. Pointed end (C) of the sensor arm is attached to rod (E).
6. If the sensor arm orientation is incorrect, remove nut (D) and rod (E) and reposition the sensor to the correct orientation.
7. Torque nut (D) to 8 Nm (6 lbf·ft [71 lbf·in]).

### Replacing Reel Height Sensor

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

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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 reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the endshield. For instructions, refer to [Opening Header Endshields, page 47](#).



## OPERATION

4. Disconnect the harness from sensor (A).
5. Remove two nuts (B) securing sensor (A). Retain the hardware for reinstallation.
6. Remove sensor (A).
7. Verify the sensor arm orientation. For instructions, refer to [Checking and Adjusting Reel Height Sensor Orientation – M1 and M2 Series Only, page 85](#)

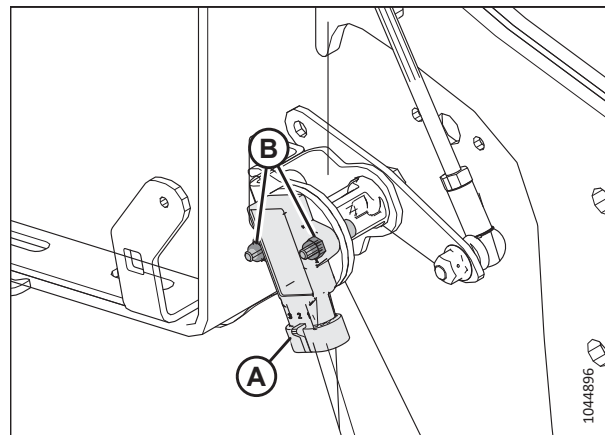


Figure 3.43: Reel Height Sensor – Right Reel Arm

8. Install new sensor (A) against washer (C).
9. Attach the sensor using retained bolts (A), washers, and nyloc nuts.
10. Tighten nuts (B) until they make contact with sensor (A), then tighten the nuts an additional quarter turn.
11. Connect the harness to sensor (A).
12. Close the endshield. For instructions, refer to [Closing Header Endshields, page 48](#).

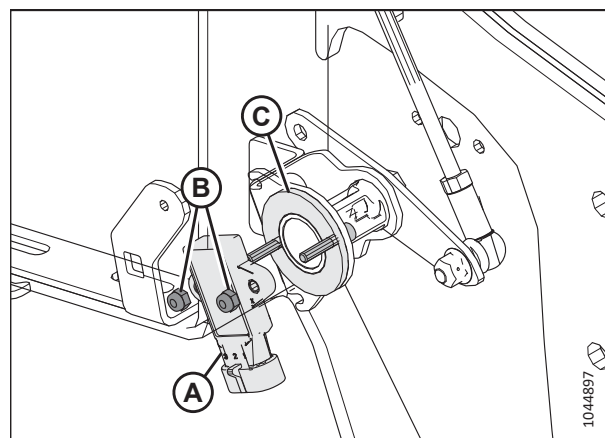


Figure 3.44: Reel Height Sensor – Right Reel Arm

### 3.7.11 Reel Fore-Aft Position

The 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 position suits normal conditions, but you can adjust the fore-aft position as required.

To improve the reel's performance in certain crop conditions, the reel can be moved approximately 155 mm (6 in.) farther aft by repositioning the fore-aft cylinders on the header's reel arms. For instructions, refer to [Repositioning Fore-Aft Cylinders, page 88](#).

You can create preset reel fore-aft positions using the One-Touch-Return feature on an M1 or M2 Series Windrower. To set up this feature, refer to your windrower operator's manual.

#### NOTE:

The One-Touch-Return feature is only available for D2 Series Draper Headers configured for M1 Series or M2 Series Windrowers.

## OPERATION

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.

### NOTE:

If you are having difficulty picking up flattened crop, adjust the header to a steeper angle. For instructions, refer to [3.7.5 Header Angle, page 80](#). Only adjust the reel position after adjusting the header angle.

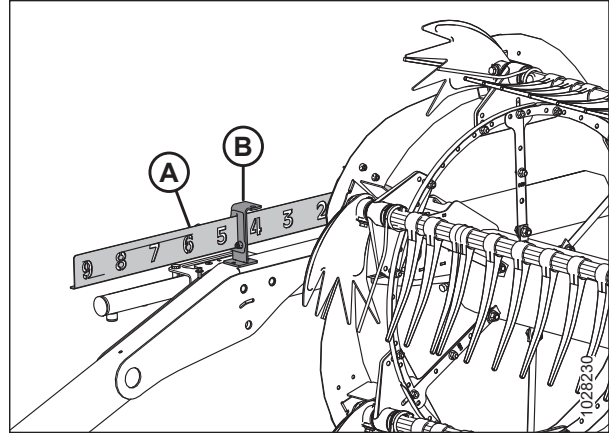


Figure 3.45: Fore-Aft Indicator

### NOTE:

In crops that are difficult to pick up such as rice, or in severely lodged crops that require full forward positioning of the reel, set the reel tine pitch to properly place the crop onto the drapers. For instructions, refer to [3.7.12 Reel Tine Pitch, page 94](#).

### Adjusting Reel Fore-Aft Position

The factory-set reel position suits normal conditions, but you can adjust the fore-aft position as required by using the controls inside of the cab.

## DANGER

Ensure that all bystanders have cleared the area.

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 to cutterbar clearance after adjusting the cam setting. For instructions, refer to [5.8.1 Reel-to-Cutterbar Clearance, page 310](#).

### 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.

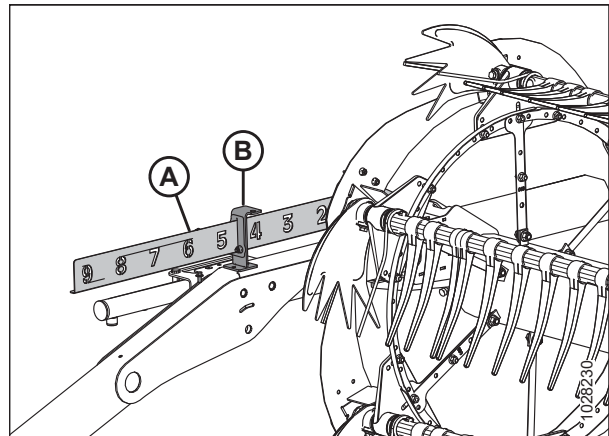


Figure 3.46: Fore-Aft Indicator

### Repositioning Fore-Aft Cylinders

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

## DANGER

Ensure that all bystanders have cleared the area.

**⚠ 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 of the fore-aft cylinders are set to the same position.

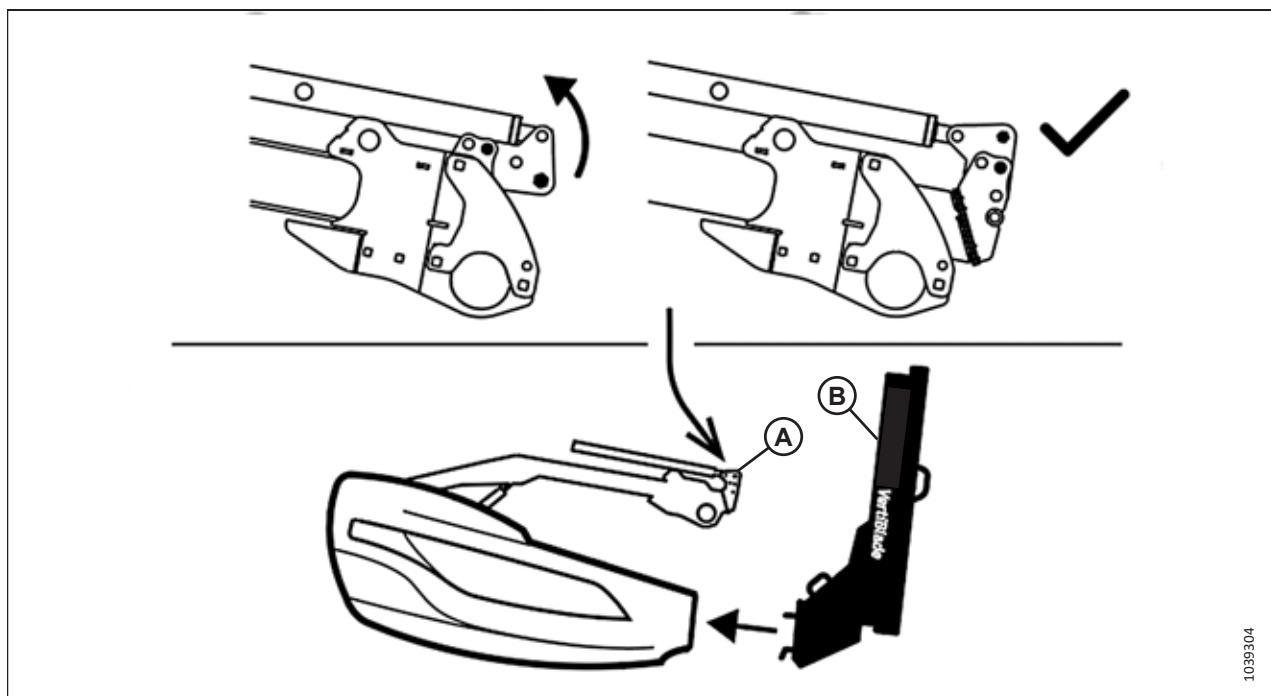


Figure 3.47: Reel Position with Vertical Knife Option Installed

**IMPORTANT:**

To prevent contact between reel arm (A) and vertical knife (B), retract the reel fore-aft cylinder position as shown in Figure 3.47, page 89 before installing the vertical knives.

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

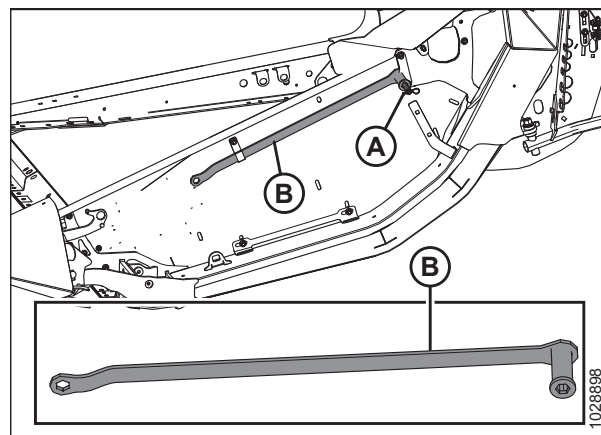


Figure 3.48: Left Endsheet

## OPERATION

5. Refer to Figure 3.49, page 90 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 6, page 91.
  - For reel arms with fore-aft cylinder adjustment [2] at the rear, refer to Step 9, page 92.

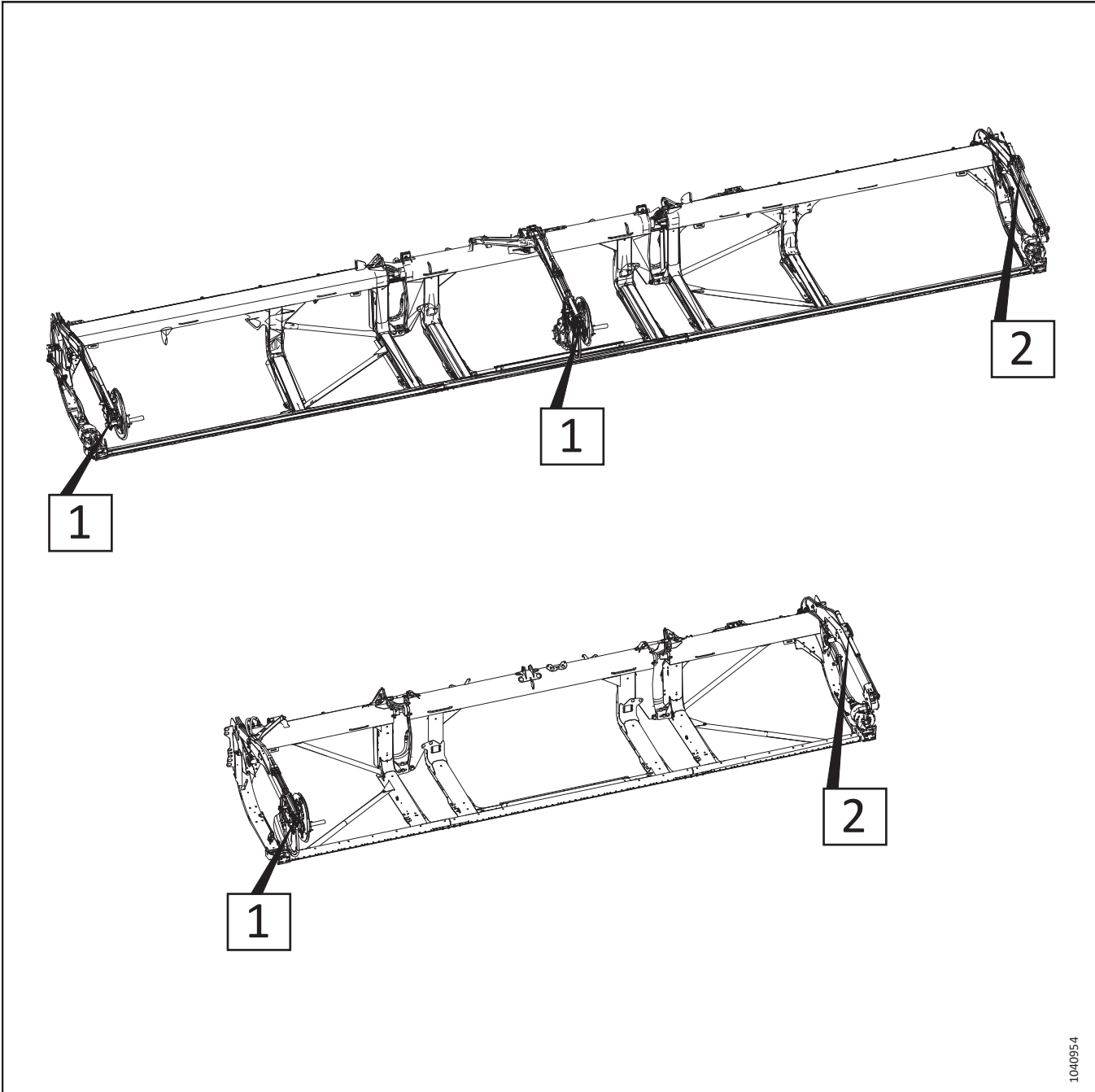


Figure 3.49: Adjustable Fore-Aft Cylinders – Procedure Reference Numbers

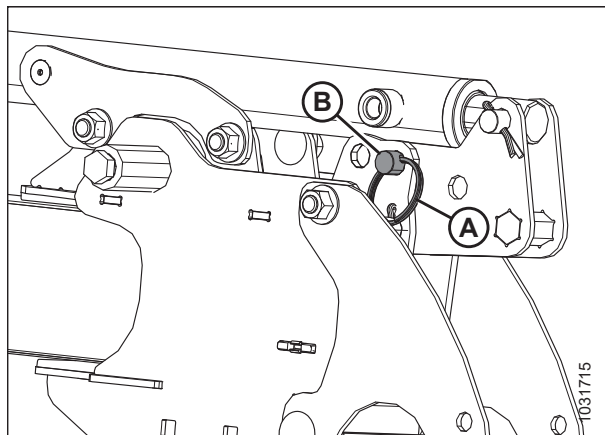
## OPERATION

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

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

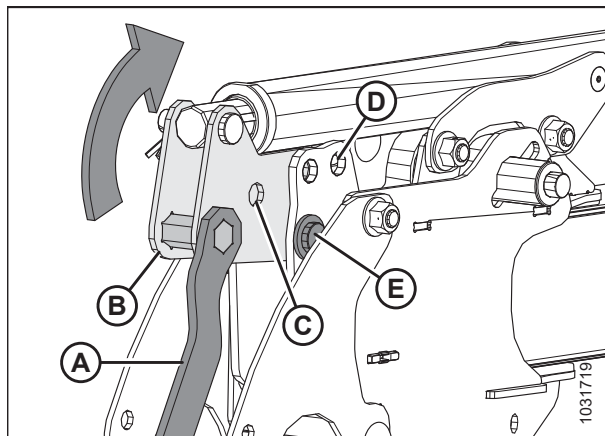
**NOTE:**

The reel drive components are not shown in the illustration.



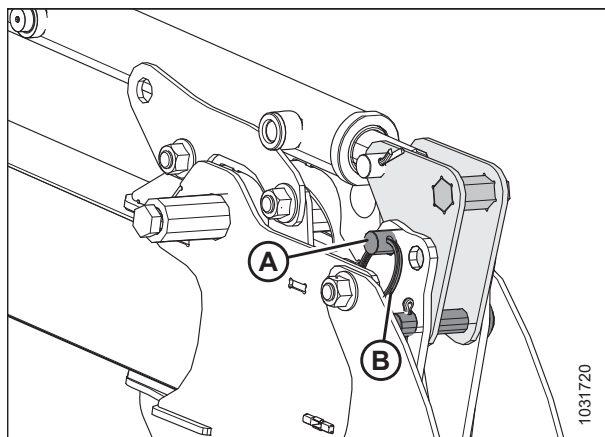
**Figure 3.50: Fore-Aft Cylinder Adjustment Type 1 – Forward Position**

7. 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 3.51: Fore-Aft Cylinder Adjustment Type 1 – Forward Position**

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



**Figure 3.52: Fore-Aft Cylinder Adjustment Type 1 – Aft Position**

## OPERATION

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

### NOTE:

The slotted cylinder bracket shown in the following illustrations is mounted on the outboard side of the reel arm.

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

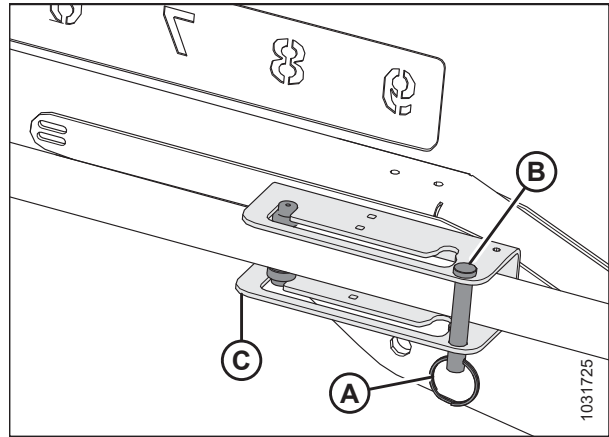


Figure 3.53: Fore-Aft Cylinder Adjustment Type 2 – Forward Position

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

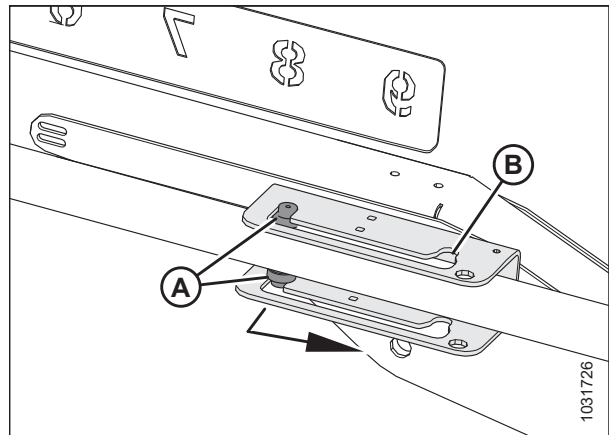


Figure 3.54: Fore-Aft Cylinder Adjustment Type 2 – Forward Position

11. Reinstall clevis pin (A) and split ring (B) to secure the cylinder in aft position (C) on the bracket.
12. Ensure that there is still an 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)
13. If necessary, adjust the reel tine pitch. For instructions, refer to [3.7.12 Reel Tine Pitch, page 94](#).

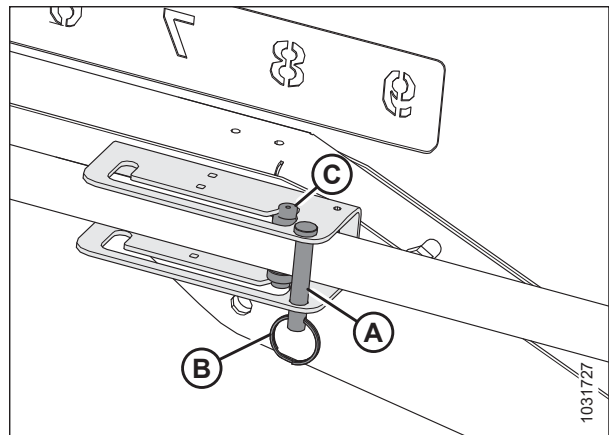


Figure 3.55: Fore-Aft Cylinder Adjustment Type 2 – Aft Position

## OPERATION

### Checking and Adjusting Fore-Aft Position Sensor Voltage – M1 and M2 Series Only

The fore-aft position sensor indicates the position of the reel in the fore-aft plane. The sensor arm's orientation needs to be set for the correct model.

#### **DANGER**

Ensure that all bystanders have cleared the area.

#### **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. Adjust the reel fully rearward.
3. Use the Harvest Performance Tracker (HPT) (M1 Series Windrowers), or the HarvestTouch™ Display (M2 Series Windrowers), or a voltmeter (if measuring the sensor manually) to measure the voltage range. If you are using a voltmeter, check sensor voltage (A) between pin 2 (ground) and pin 3 (signal). For the voltage range, refer to Table 3.14, page 93.

#### **IMPORTANT:**

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

4. Adjust the reel fully forward.
5. Check the voltage. If the sensor needs adjustment, refer to Step 6, page 94 to Step 10, page 94

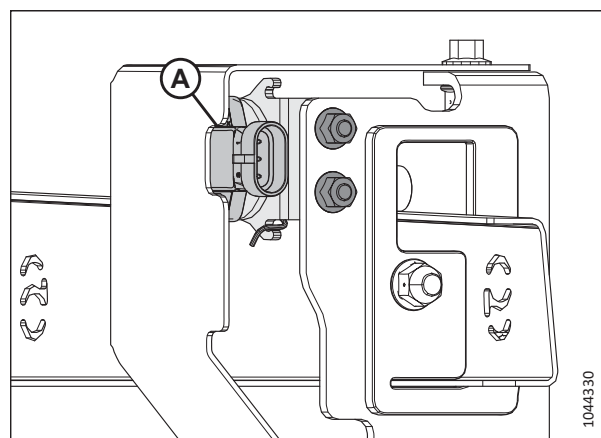


Figure 3.56: Fore-Aft Sensor

Table 3.14 Fore-Aft Sensor Voltage

Voltage (V) – Reel Fully Retracted	Voltage (V) – Reel Fully Extended	Minimum Range (V)
0.7	4.3	2.5

## OPERATION

6. Shut down the engine, and remove the key from the ignition.
7. Locate fore-aft position sensor on the left reel arm.

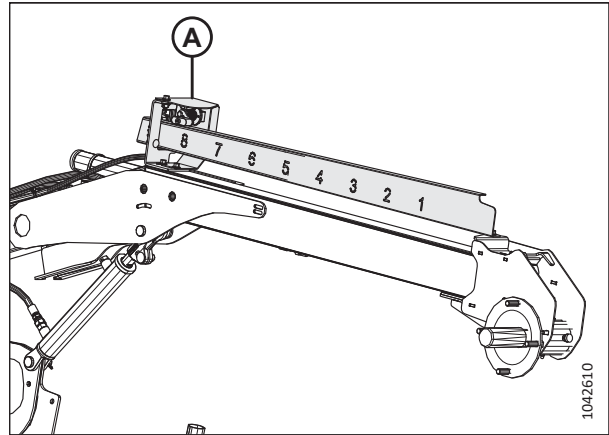


Figure 3.57: Fore-Aft Position Sensor

8. Loosen hardware (A) and move sensor support (B) until the voltage is in the correct range.
9. Once sensor adjustment is complete, torque the hardware to 8 Nm (6 lbf-ft [71 lbf-in]).
10. If required, run the windrower fore-aft sensor calibration.

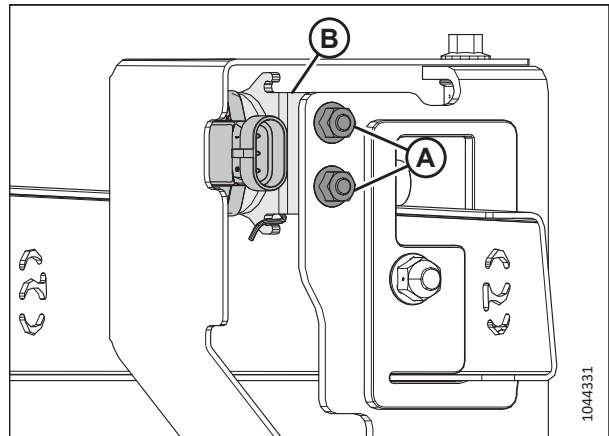


Figure 3.58: Fore-Aft Sensor

### 3.7.12 Reel Tine Pitch

Reel tine pitch describes the position of the reel fingers in relation to the cutterbar. You can change it by changing the reel fore-aft position and the reel cam setting. You may also 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. On the other hand, changing the cam setting has a smaller impact on the 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 63](#).

#### *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 96](#).



## OPERATION

**Cam Position 1, Reel Position 5 or 6** 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 is close to the ground speed.

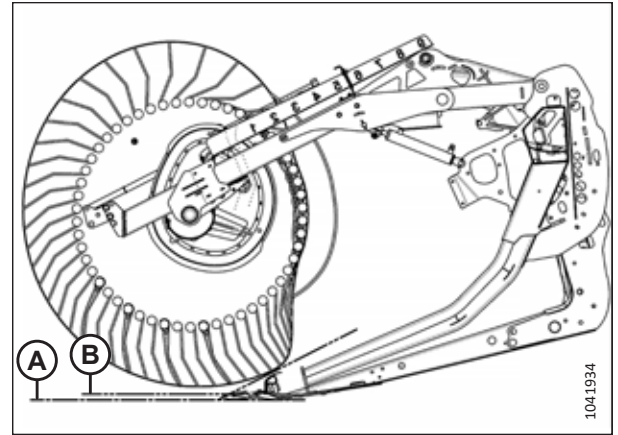


Figure 3.59: Finger Profile – Cam Position 1

**Cam Position 2, Reel Position 6 or 7** is the recommended starting position for most crops and conditions.

- Before adjusting the cam setting, adjust the reel fore or aft to try to bring the crop onto the draper.
- If the crop is still stalling on the cutterbar and the reel cannot push the crop back on the draper, increase the cam setting to push the crop past the rear edge of the cutterbar.
- If the crop is fluffing 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.

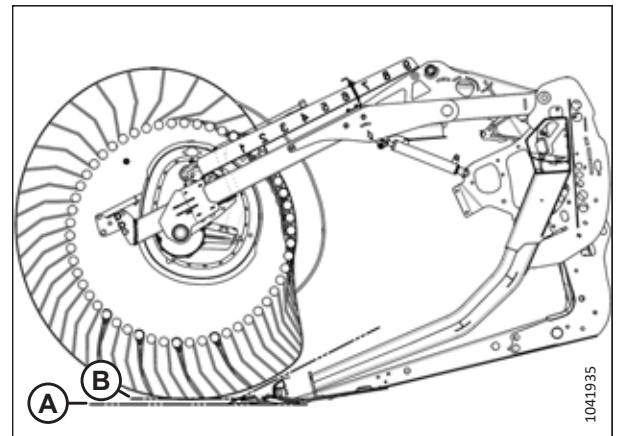


Figure 3.60: Finger Profile – Cam Position 2

**Cam Position 3, Reel Position 8** 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.

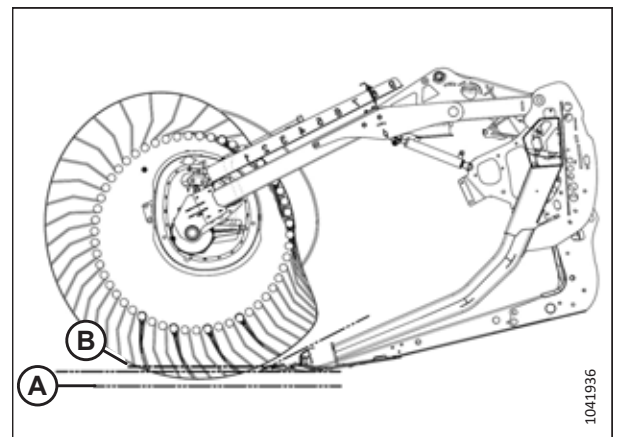


Figure 3.61: Finger Profile – Cam Position 3

## OPERATION

**Cam Position 4, Header Angle at Minimum, Reel Position 9** results in the header leaving a shorter stubble when harvesting lodged crops (in comparison to a header that is tilted fully forward). With this header angle, the reel just manages to graze the ground.

- 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.

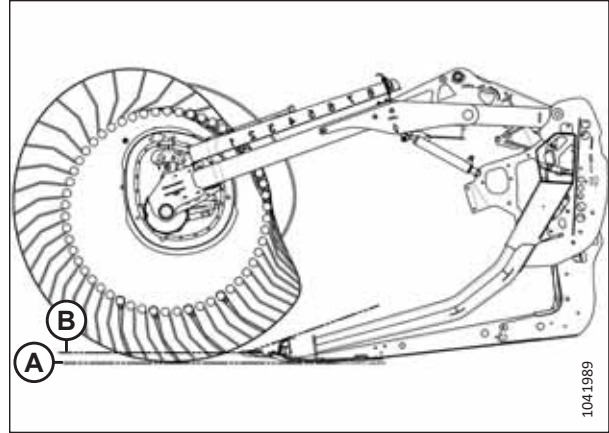


Figure 3.62: Finger Profile – Cam Position 4, Minimum Header Angle

**Cam Position 4, Header Angle at Maximum, Reel Position 9** 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 the reel fingertip speed being approximately 35% faster than the reel speed.

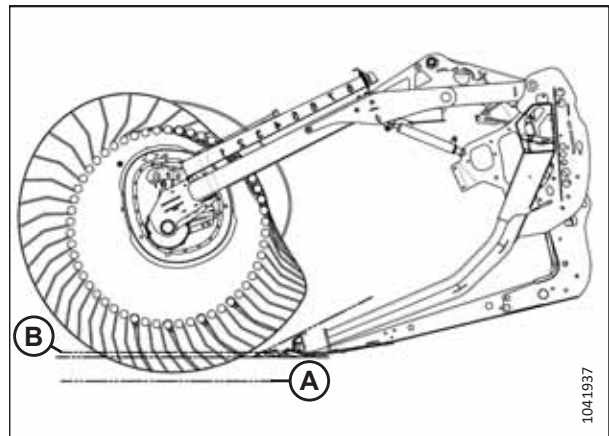


Figure 3.63: Finger Profile – Cam Position 4, Maximum Header Angle

### NOTE:

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

### Adjusting Reel Cam

Adjust the reel cam to change the reel tine pitch.

### IMPORTANT:

Always check the reel-to-cutterbar clearance after adjusting the reel tine pitch and the reel fore-aft position. For more information, refer to [5.8.1 Reel-to-Cutterbar Clearance, page 310](#) and [3.6.2 Header Settings, page 63](#).

## 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, adjust all of them.

## OPERATION

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

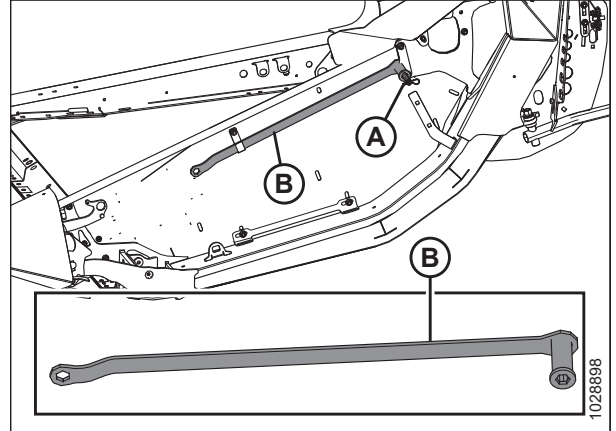


Figure 3.64: Left Endsheet

3. Using the multi-tool, turn latch pin (A) **COUNTERCLOCKWISE** 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 that the cam is secured into position before operating the machine.

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

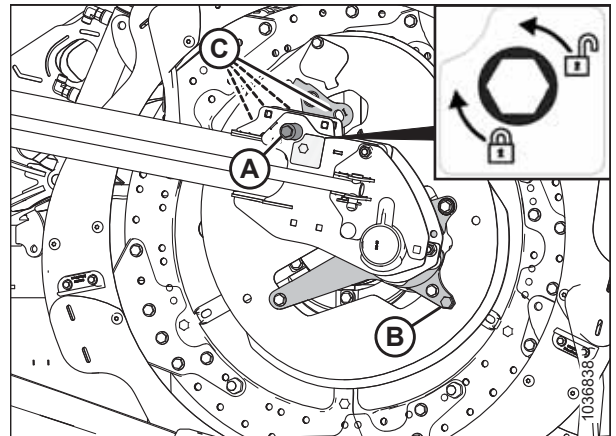


Figure 3.65: Cam Disc Positions

### 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 of forages, oats, canola, mustard, and other tall, bushy, hard-to-convey crops.

You can use shutoff valve (A) to turn off the UCA when it is not needed.

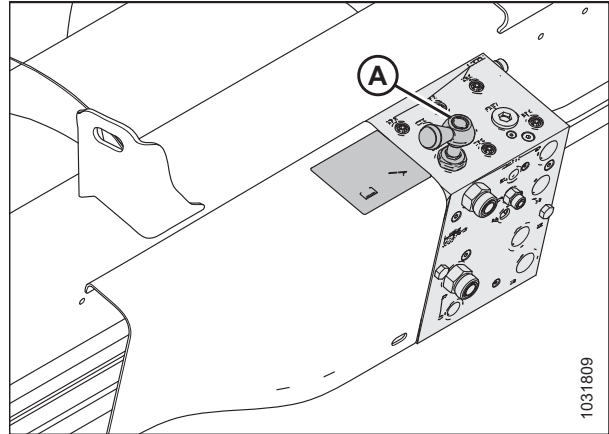


Figure 3.66: Shutoff Valve

#### *Adjusting Upper Cross Auger Position – Two-Piece Augers*

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

**NOTE:**

For more information on the positions of the primary and secondary front bolts, refer to [Figure 3.68, page 99](#).

The mount(s) are initially installed in the rear-most position, so that front bolt (A) is in the primary position. This position 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. You can adjust the position of the auger to a limited extent by changing the position of the mount with respect to rear bolt (B).

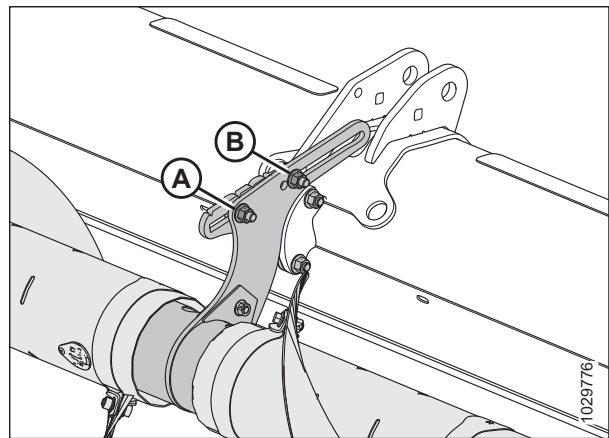


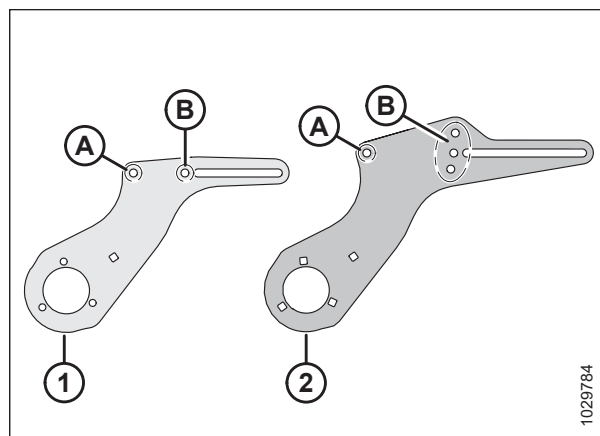
Figure 3.67: Initial Position of Adjustable Mounts – Two-Piece Auger

## OPERATION

The auger position can be adjusted to a greater extent by moving the front bolt to secondary position (B). For three-piece augers (2), 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 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 the 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 a sufficient clearance between the reel fingers and the auger.



**Figure 3.68: 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

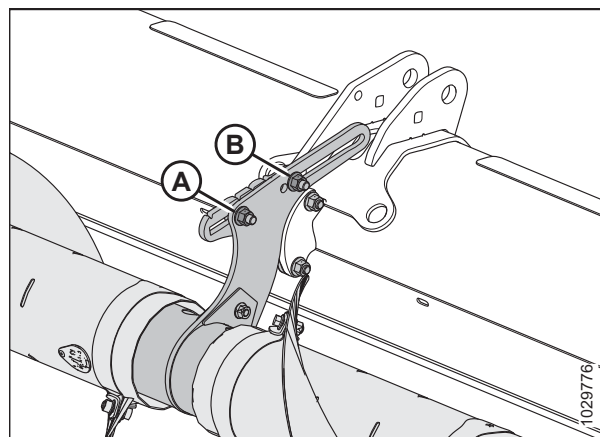
- Help convey light crops, especially on side hills
- Improve the feeding of light crops
- Reduce the reel carry over or reduce the crop flow disruption caused by the reel

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.
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.
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).



**Figure 3.69: Initial Position of Adjustable Mounts – Two-Piece Auger**

6. Check for any 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 100](#).

### 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

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.

#### DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Adjust the reel fully rearward.
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 headers: Split frame joint (E)
5. If the clearance between the UCA and the header components requires adjustment, proceed to [Adjusting Upper Cross Auger Position – Two-Piece Augers, page 98](#).

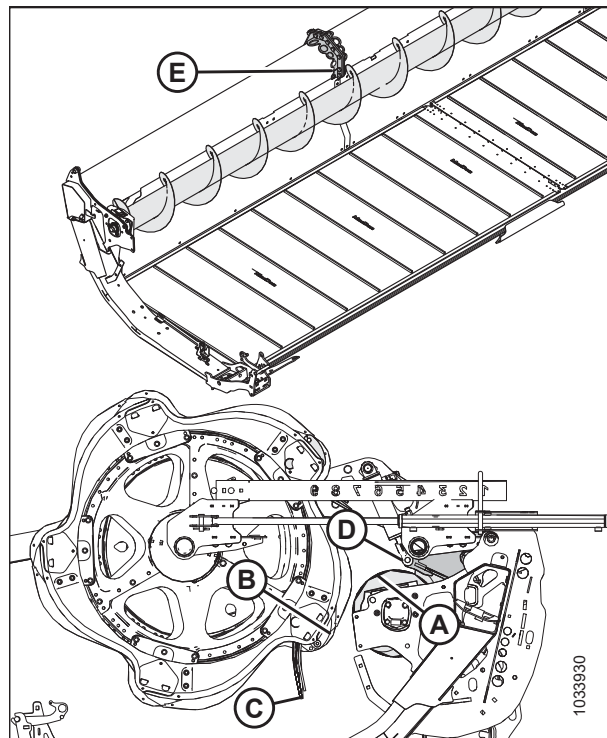


Figure 3.70: UCA Clearance Check Locations

### 3.7.14 Crop Dividers

Crop dividers separate the crop when harvesting. Remove them to install vertical knives and to decrease transport width.

Standard crop dividers are provided with all headers. You may also purchase optional floating crop dividers. Refer to [6.1.4 Floating Crop Dividers, page 366](#).

## OPERATION

### Removing Crop Dividers

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

#### DANGER

Ensure that all bystanders have cleared the area.

1. Lower the reel and raise the header. For instructions, refer to the windrower operator's manual.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the safety props. For instructions, refer to the windrower operator's manual.
4. Open the endshields. For instructions, refer to *Opening Header Endshields, page 47*.
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).

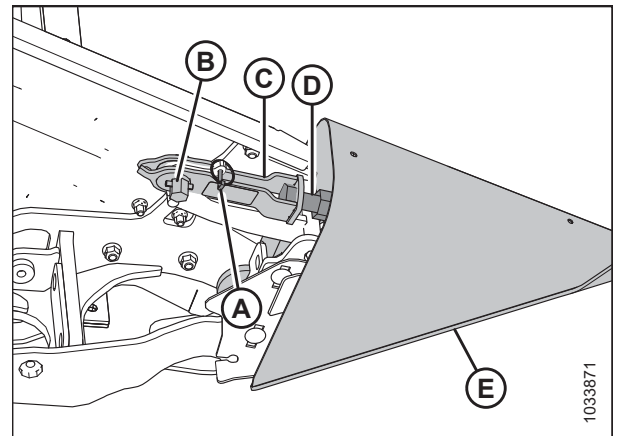


Figure 3.71: Crop Divider with Latch

8. Lower crop divider (A) and remove it from the endsheet.
9. Close the endshield. For instructions, refer to *Closing Header Endshields, page 48*.

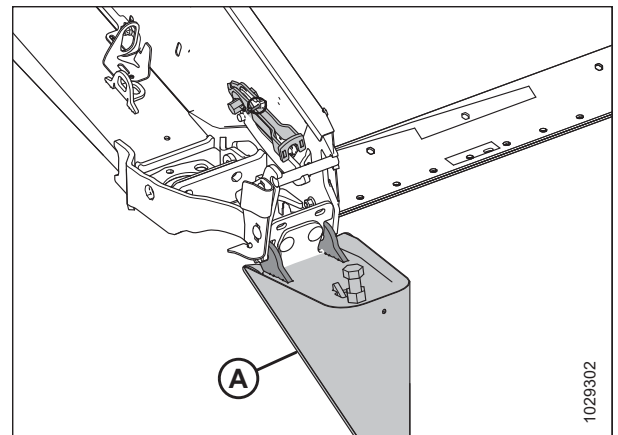


Figure 3.72: Crop Divider with Latch

## OPERATION

10. If the optional storage bracket is installed, put crop divider (A) in position on bracket (B).
11. If the optional storage bracket is not installed, store the crop dividers in a safe location.

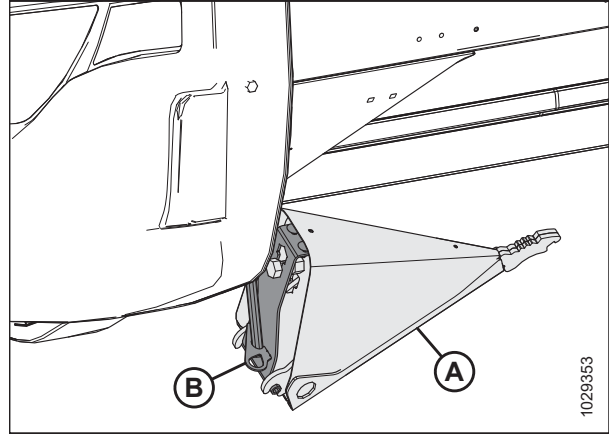


Figure 3.73: Optional Crop Divider Storage

### Installing Crop Dividers

Follow these instructions to properly install 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.

#### DANGER

Ensure that all bystanders have cleared the area.

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. For instructions, refer to the windrower operator's manual.
6. If the optional storage bracket is installed, remove crop divider (A) from its storage position by lifting the crop divider so that bolt (B) clears the slot in storage bracket (C).
7. If the optional storage bracket is **NOT** installed, retrieve the crop dividers from where they were stored.
8. Open the endshield. For instructions, refer to [Opening Header Endshields, page 47](#).

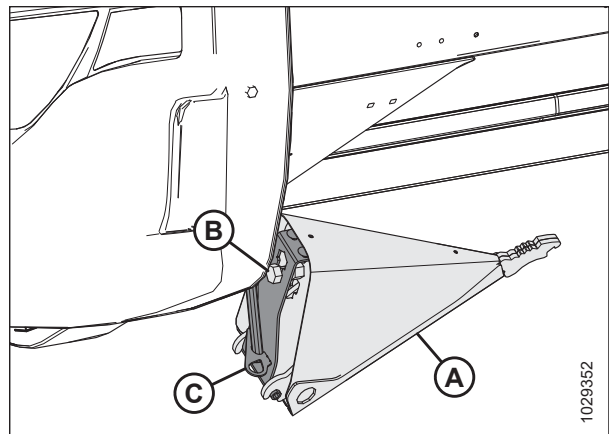


Figure 3.74: Optional Crop Divider



## OPERATION

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

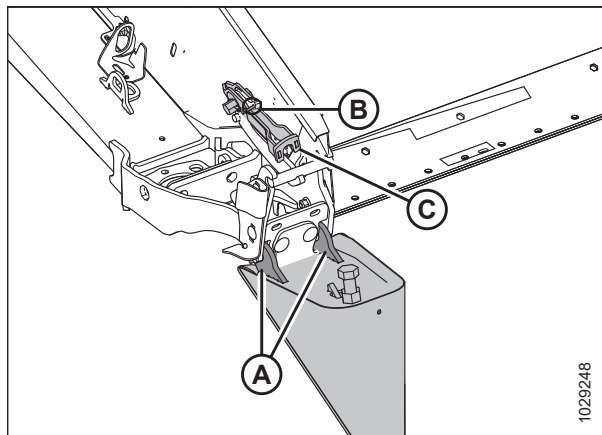


Figure 3.75: Crop Divider with Latch

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

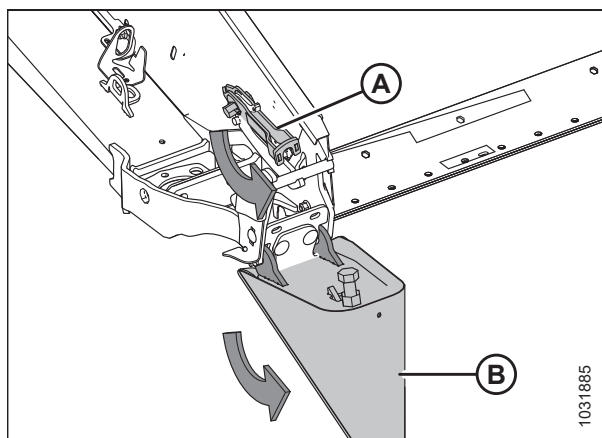


Figure 3.76: Crop Divider with Latch

12. Engage latch (A) onto crop divider bolt (B).
13. Rotate hex shaft (D) on latch (A) counterclockwise 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 the crop divider with lynch pin (C).
15. Close the endshield. For instructions, refer to [Closing Header Endshields, page 48](#).

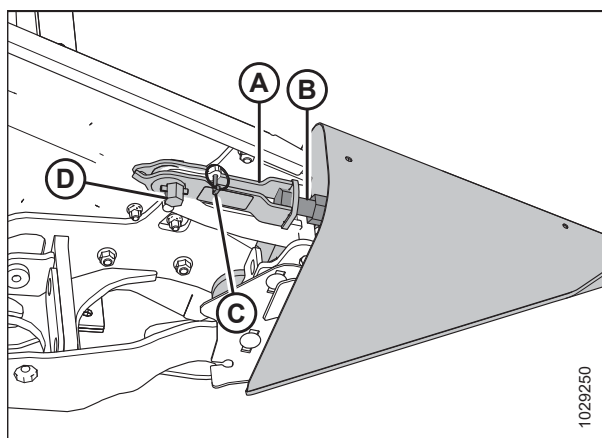


Figure 3.77: Crop Divider with Latch

## OPERATION

### 3.7.15 Crop Divider Rods

Use crop divider rods with crop dividers to help separate crop when harvesting. The crop divider rods are most useful when the crop is bushy or down. In standing crops, use only crop dividers.

The following table outlines which crops should be harvested with divider rods and which crops should be harvested without divider rods.

**Table 3.15 Recommended Use for Crop Divider Rods**

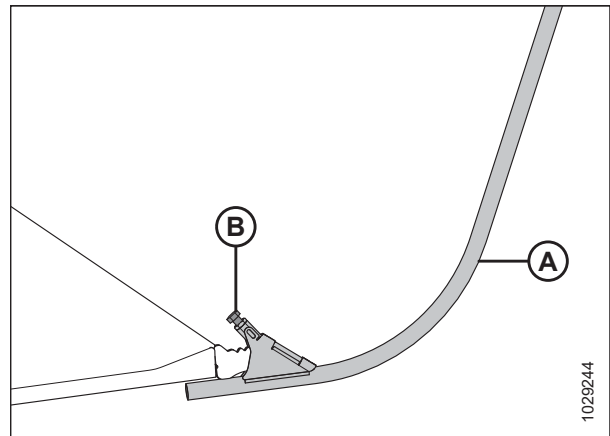
With Divider Rods		Without Divider Rods
Alfalfa	Peas	Edible beans
Canola	Rice <sup>76</sup>	Milo
Flax	Soybeans	Soybeans
Grass seed	Sudan grass	Standing cereal
Lentils	Winter forage	
Lodged cereal		

For crop delivery related options, refer to [6.1 Crop Delivery Kits, page 365](#).

#### 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 3.78: Crop Divider Rod**

76. Rice divider rods

## OPERATION

2. Store both crop divider rods (B) on the right endsheet.
3. Secure the rods with lynch pin (A).

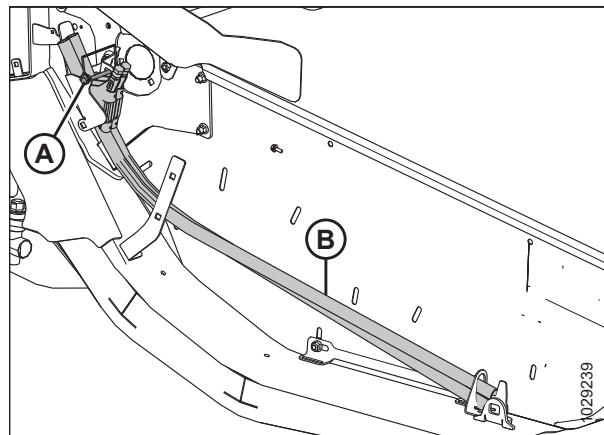


Figure 3.79: Right Endsheets

### 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 and the left endshields. For instructions, refer to [Opening Header Endshields, page 47](#).
2. Undo lynch pin (A) securing divider rods (B) to the header endsheet.
3. Remove the divider rods from their storage location.
4. Reinstall lynch pin (A).

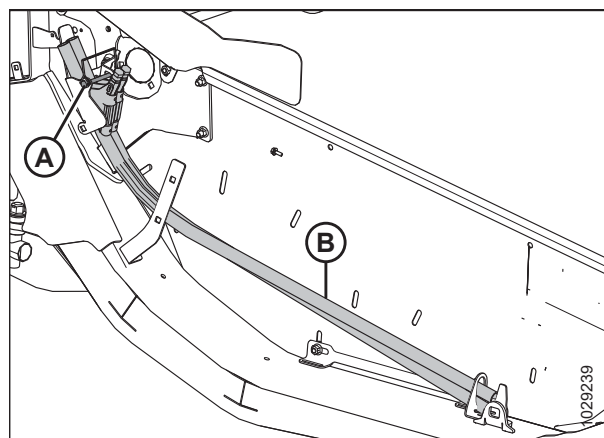


Figure 3.80: Divider Rods

5. Position crop divider rod (A) on the tip of the crop divider. Tighten bolt (B).
6. Repeat Step 2, [page 105](#) to Step 5, [page 105](#) on the opposite end of the header.
7. Close the right and left endshields. For instructions, refer to [Closing Header Endshields, page 48](#).

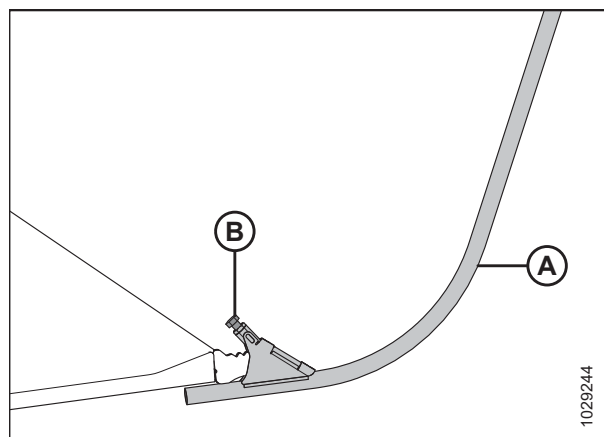


Figure 3.81: Divider Rod on Crop Divider

## OPERATION

### Optional Rice Divider Rods

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

Rice divider rods improve performance in tall and tangled rice crops. For more information, refer to [6.1.7 Rice Divider Rod Kit](#), page 368.

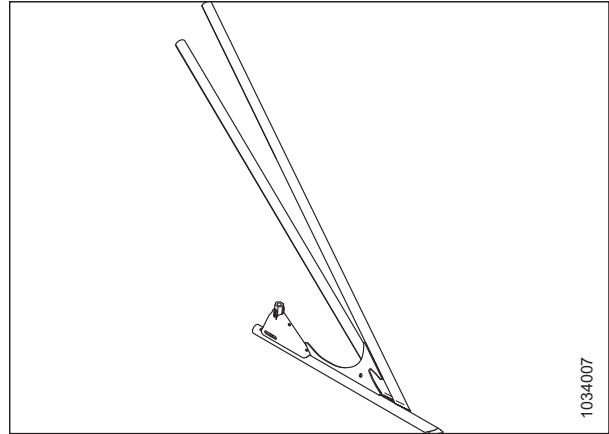


Figure 3.82: Optional Divider Rod for Rice

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 follow the same procedures as standard crop divider rods.

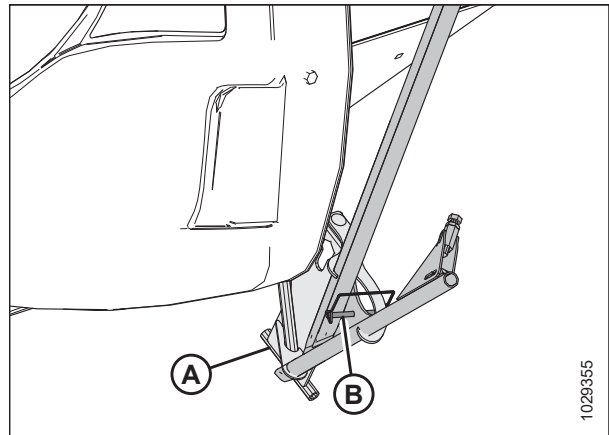


Figure 3.83: Rice Divider Rod Storage

### 3.7.16 Delivery Opening

The width and the location of the delivery opening can be changed to affect the width and the 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 113 for the strengths and weaknesses of 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.

## OPERATION

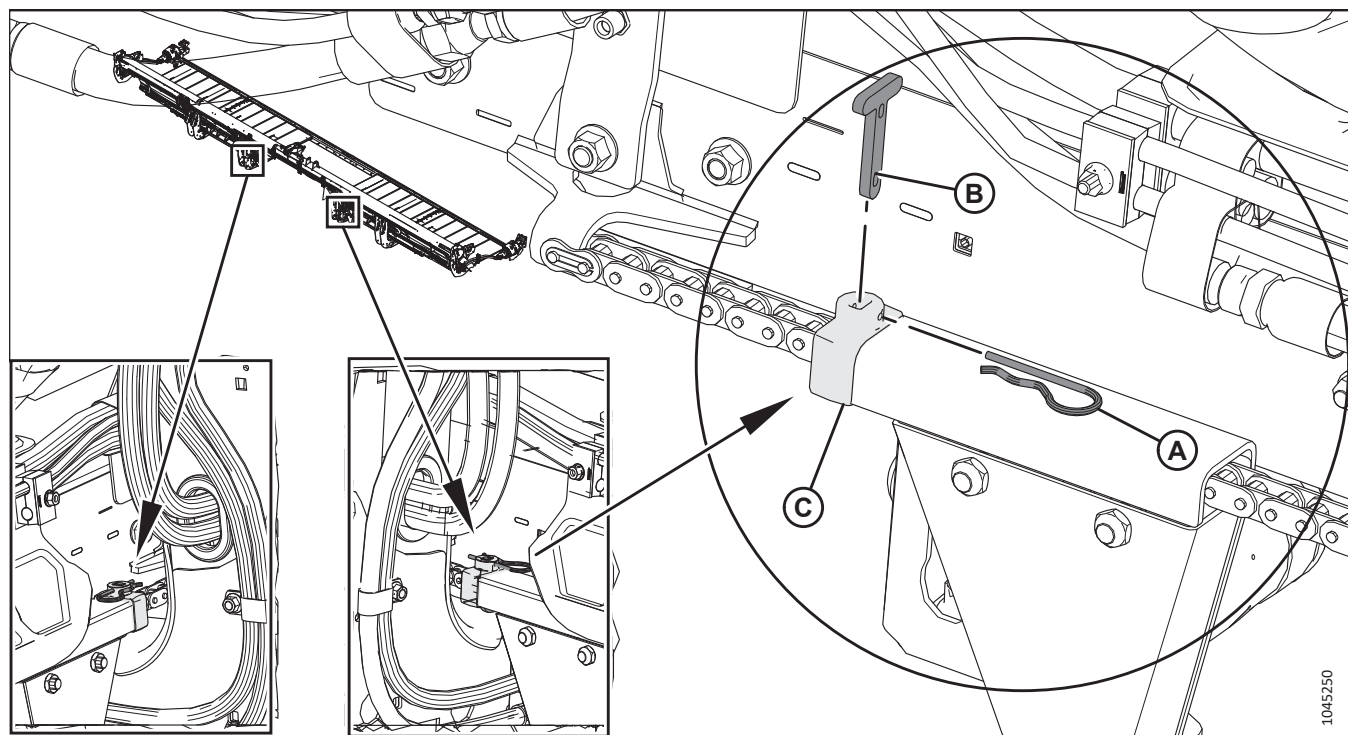
Also, refer to [3.7.17 Double Windrowing, page 110](#).

### *Adjusting Delivery Opening on Header with Hydraulic Deck Shift*

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

#### **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.



**Figure 3.84: Inboard Deck Shift Stop**

1. Shut down the engine, and remove the key from the ignition.
2. Remove hairpin (A) and hook pin (B) securing chain stop (C).
3. 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.

4. Secure chain stop (C) with hook pin (B) and hairpin (A) as shown in [Figure 3.84, page 107](#).

## OPERATION

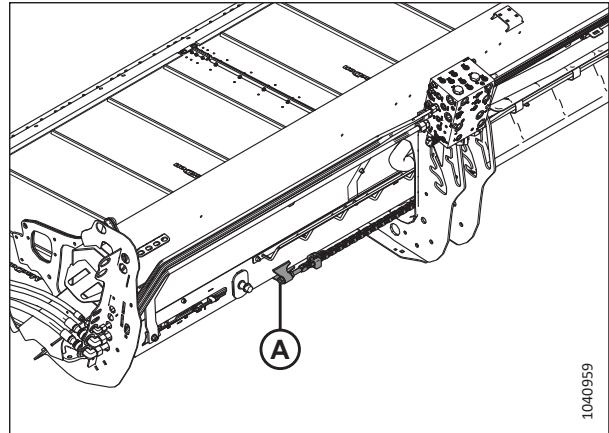
### *Adjusting Hydraulic Deck Shift Chain Tension*

The hydraulic deck shift (HDS) chain's midpoint should be 10–25 mm (3/8–1 in.) lower than either end of the chain.

#### **DANGER**

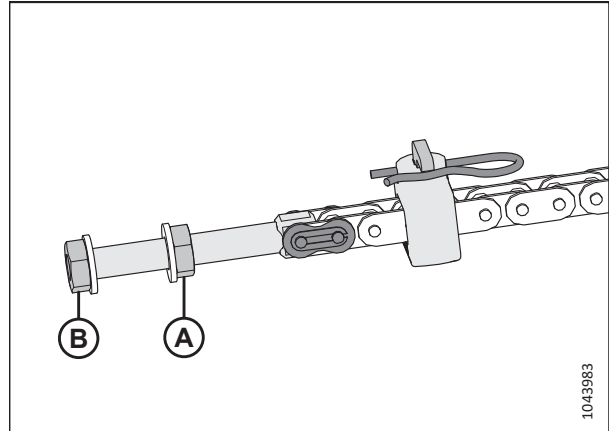
To prevent injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

1. Shut down the engine, and remove the key from the ignition.
2. Locate chain adjustment bolt (A).



**Figure 3.85: Chain Adjustment Bolt – Left Shown, Right Similar**

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



**Figure 3.86: Left Chain Adjustment Bolt – Right Side Similar**

## OPERATION

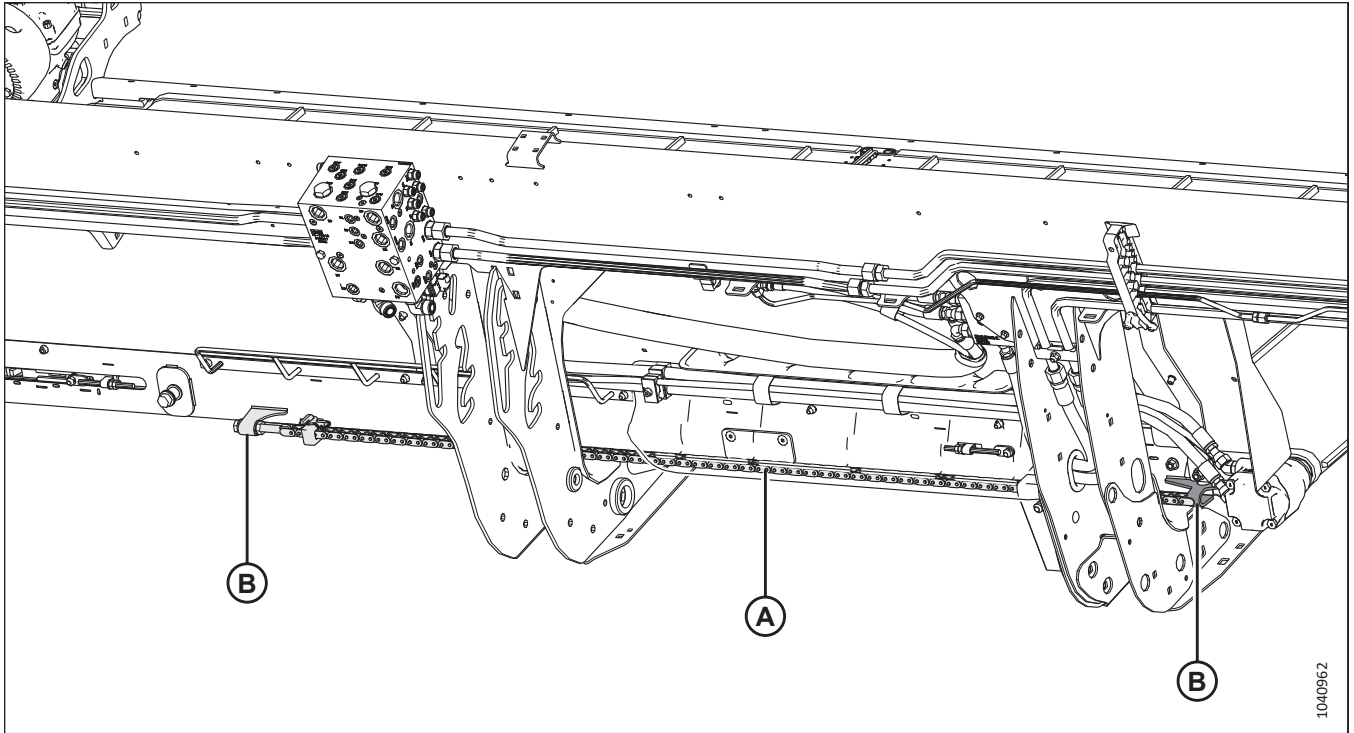


Figure 3.87: HDS Chain – Left Shown, Right Similar

5. Ensure that chain midpoint (A) is 10–25 mm (3/8–1 in.) lower than chain ends (B).
6. Tighten jam nut (A).

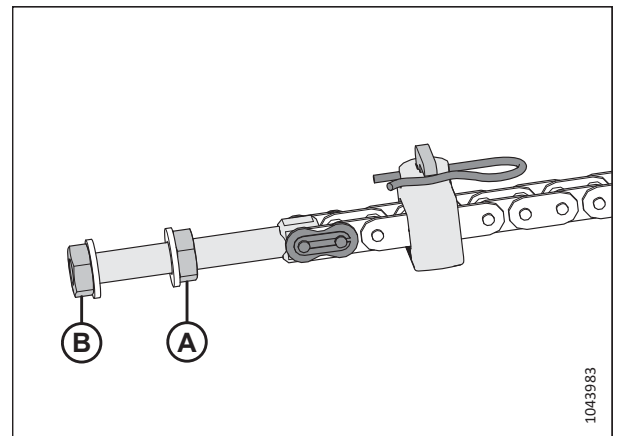


Figure 3.88: Left Chain Adjustment Bolt – Right Side Similar

### *Adjusting Size of Delivery Opening on Header with Manual Deck Shift*

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

### **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.

## OPERATION

1. Shut down the engine, and remove the key from the ignition.
2. Loosen bolts (A) on both decks.
3. Slide the decks to the desired opening width.
4. Retighten bolts (A).

**NOTE:**

Wide end-deflectors are available if it is desirable to move the decks inboard to reduce the center delivery opening. Refer to [6.1.11 Wide End Deflector Kit, page 370](#).

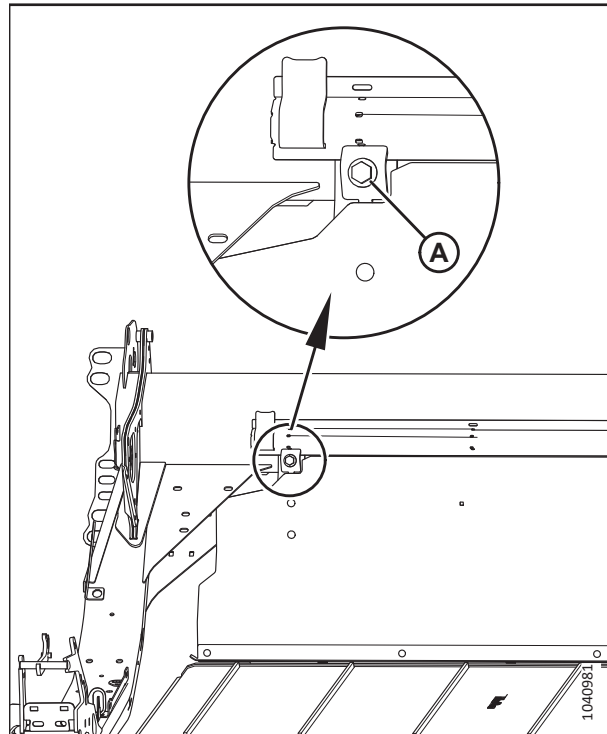


Figure 3.89: Manual Deck Shift

### 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 110](#)
- [Shifting Decks Manually, page 111](#)

#### *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.



## OPERATION

To lay a double windrow, do the following:

1. Position the decks at the left end of the header to deliver crop from right end (A) for the first round.
2. To deliver crop from 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 the above steps to lay an 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.

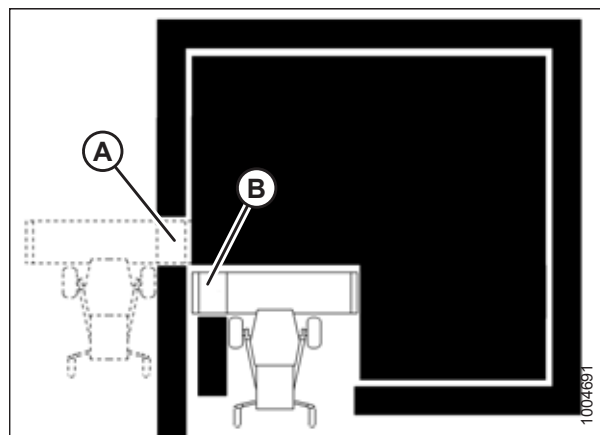


Figure 3.90: Double Windrowing

### Shifting Decks Manually

On D2 Series 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.

### IMPORTANT:

D241 draper decks cannot be shifted manually; they are mounted to fixed points on the header frame.



### DANGER

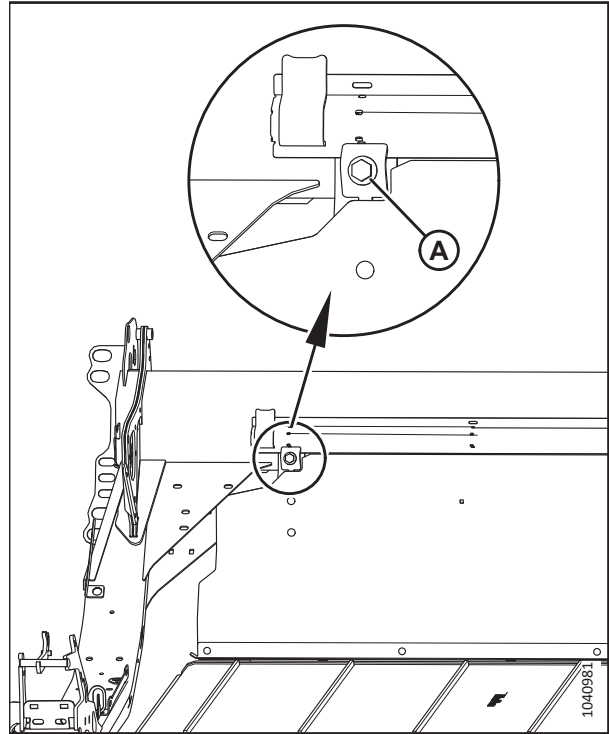
To prevent bodily injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before making adjustments to the machine.

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 127* and *Moving Front (Left) Wheels into Transport Position, page 131*.

## OPERATION

*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.
4. Retighten bolt (A).

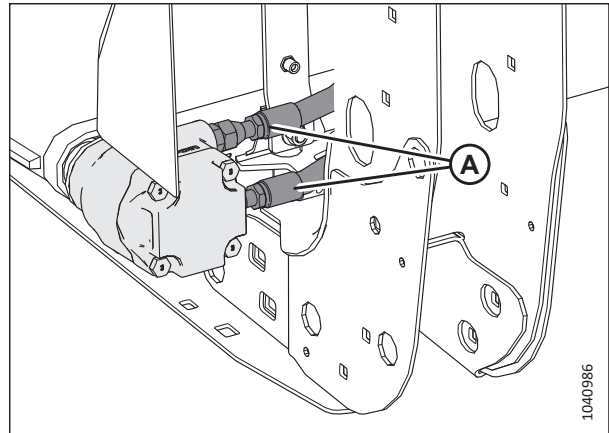


**Figure 3.91: Right Deck Shown**

5. Loosen the clamp on the plastic sleeve at the drive motor so that hoses (A) can be reversed.
6. Reverse draper drive motor hoses (A) on the right deck so that the draper turns the same direction as the left deck.
7. 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 3.92: Right Deck Motor**

## OPERATION

*To lay a double windrow, do the following:*

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

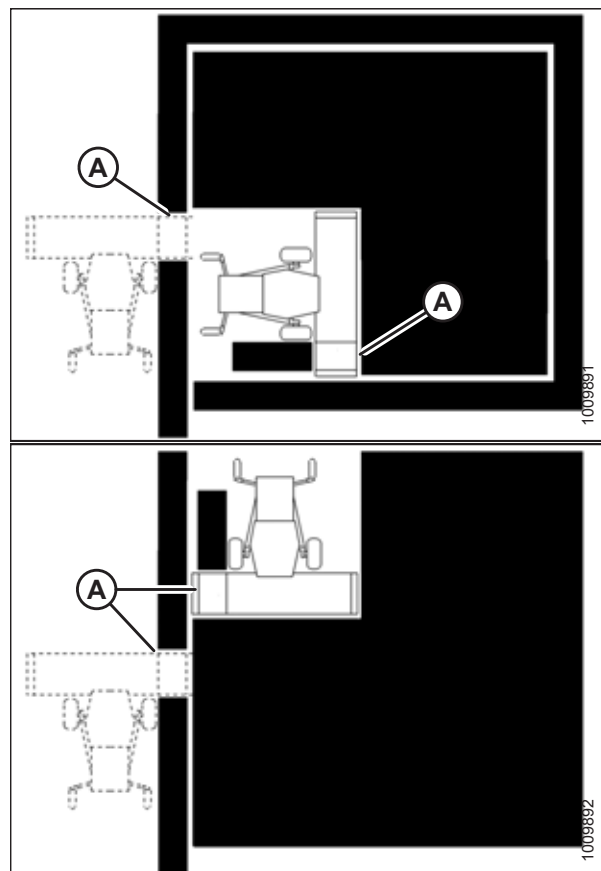


Figure 3.93: Double Windrowing

### 3.7.18 Windrow Types

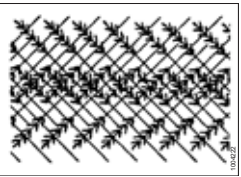
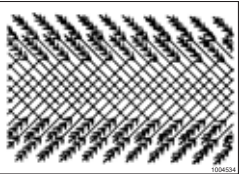
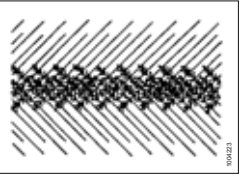
Review the qualities that make up a good windrow to better understand how the crop delivery method affects your windrow.

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

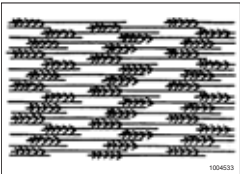
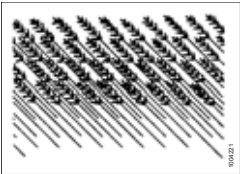
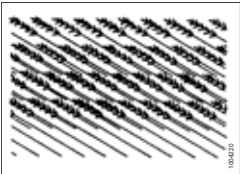
OPERATION

Table 3.16 Windrow Descriptions

Windrow Type	Windrow Descriptions
<p>Herringbone</p> 	<p><b>Description:</b> 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.</p> <p><b>Weight Distribution:</b> Good</p> <p><b>Curing:</b> Good</p> <p><b>Weatherability:</b> Excellent</p> <p><b>Machine Setting Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Reel and ground speed approximately equal</li> <li>• Medium draper speed</li> <li>• Center delivery</li> </ul>
<p>Fantail</p> 	<p><b>Description:</b> 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.</p> <p><b>Weight Distribution:</b> Fair</p> <p><b>Curing:</b> Fair</p> <p><b>Weatherability:</b> Fair</p> <p><b>Machine Setting Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Low draper speed</li> <li>• Low header angle</li> <li>• Center delivery</li> </ul>
<p>Dovetail</p> 	<p><b>Description:</b> The stalks are lined along outside edges of windrow and heads are crossed in center. This windrow can be formed by center delivery only.</p> <p><b>Weight Distribution:</b> Poor</p> <p><b>Curing:</b> Fair</p> <p><b>Weatherability:</b> Poor</p> <p><b>Machine Setting Guidelines:</b></p> <ul style="list-style-type: none"> <li>• High draper speed</li> <li>• High header angle</li> <li>• Center delivery</li> </ul>

OPERATION

Table 3.16 Windrow Descriptions (continued)

Windrow Type	Windrow Descriptions
<p>Parallel</p> 	<p><b>Description:</b> 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.</p> <p><b>Weight Distribution:</b> Good</p> <p><b>Curing:</b> Good</p> <p><b>Weatherability:</b> Good</p> <p><b>Machine Setting Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Medium draper speed</li> <li>• Medium header angle</li> <li>• Center or end delivery</li> </ul>
<p>45° Diagonal</p> 	<p><b>Description:</b> 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.</p> <p><b>Weight Distribution:</b> Poor</p> <p><b>Curing:</b> Fair</p> <p><b>Weatherability:</b> Poor</p> <p><b>Machine Setting Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Low reel speed</li> <li>• Less aggressive tine pitch</li> <li>• End delivery or center delivery if crop is leaning</li> </ul>
<p>75° Diagonal</p> 	<p><b>Description:</b> 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.</p> <p><b>Weight Distribution:</b> Fair</p> <p><b>Curing:</b> Good</p> <p><b>Weatherability:</b> Fair</p> <p><b>Machine Setting Guidelines:</b></p> <ul style="list-style-type: none"> <li>• Low reel speed</li> <li>• Less aggressive tine pitch</li> <li>• End delivery or center delivery if crop is leaning</li> </ul>

### 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 the moisture level of the topsoil before cutting the hay. Use a moisture tester or estimate the moisture 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 the soil moisture drops below 45%.

If the ground is wet due to frequent rains, cut the hay when the weather allows and let it lie on the wet ground until the hay dries to the moisture level of the ground. The cut hay will not dry 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 the hay is baled and chopped, consider baling the south-facing fields and chopping fields facing north.

When the 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 3.17 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.

## OPERATION

**Table 3.17 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. Consider the costs and benefits relative to your area 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

If the cutterbar is not working correctly, clear the cutterbar of any obstructions.

 **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.

 **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. Stop the forward movement of the machine and disengage the header drives.
2. Raise the header to prevent it from filling with dirt.
3. Reverse the header drive in the windrower. If the cutterbar is still plugged, proceed to the next step.
4. If the plug does **NOT** clear, disengage header 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: you can attach it to a MacDon windrower or tow it behind a properly configured MacDon windrower or an agricultural tractor.

For more information, refer to:

- [3.10.1 Transporting Header on Windrower, page 120](#)
- [3.10.2 Towing, page 120](#)

### 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 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 the local laws for width regulations and any lighting or marking requirements before transporting on roads.
- Follow all of the 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, ensure that the lights are clean and working properly. Pivot the amber lamps so that they can be seen by approaching traffic. Always use lamps when travelling on roads.
- Do **NOT** use field lamps on roads—they may confuse other drivers.
- Before driving on a roadway, clean vehicle signs and reflectors, adjust the rear view mirrors, and clean the windows.
- Lower the reel fully and raise the header (unless you are transporting the header across hills).
- Watch out for roadside obstructions, oncoming traffic, and bridges.
- When travelling downhill, reduce your speed and keep the header at a minimum height to provide maximum stability in case you stop for any reason. At the bottom of the hill, raise the header completely to avoid contacting the ground.

### 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.

## OPERATION

### *Attaching Header to Towing Vehicle*

The header can be towed using a properly configured windrower or an agricultural tractor.

#### **CAUTION**

Follow the instructions below to prevent loss of control leading to bodily injury and/or machine damage:

- The weight of the towing vehicle must exceed the weight of the header to ensure adequate control and braking performance.
- Only use a properly configured MacDon windrower to tow the header.
- Ensure that the reel is fully lowered and back on the support arms to stabilize the header 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 of the pins are properly secured in the transport position at the wheel supports, at the cutterbar support, and at the hitch.
- Check the condition of the tires and the tire pressure before transporting the header.
- Connect the hitch to the towing vehicle using a proper hitch pin with a spring locking pin or another 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 Dealer parts department.)
- Ensure that the lights are functioning properly and clean the slow moving vehicle sign and other reflectors. Use the flashing warning lights unless prohibited by law.

### *Precautions for Towing Header*

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

#### **CAUTION**

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

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

### 3.10.3 Converting from Transport to Field Position

Convert the header back to field position after you have towed it to a new location.

#### Removing Tow-Bar

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

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



Figure 3.94: Tire Blocking

2. Disconnect electrical connector (A) and safety chain (B) from the towing vehicle and store it as shown.
3. If removing a tow-bar with an extension, proceed to Step 4, [page 123](#). If removing a tow-bar without an extension, proceed to Step 16, [page 124](#).

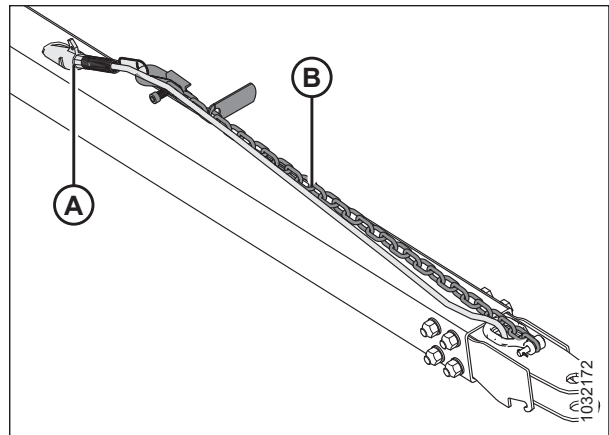
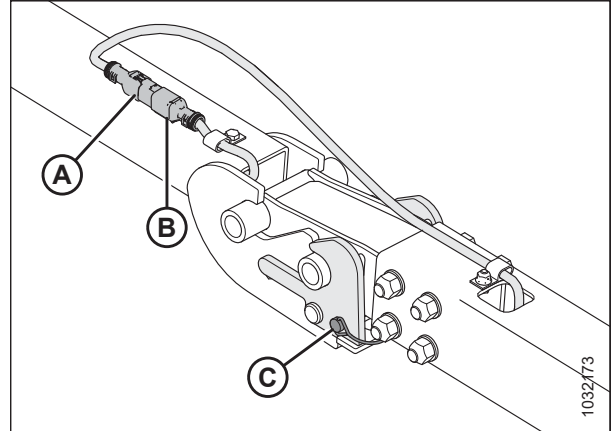


Figure 3.95: Tow-Bar Assembly

## OPERATION

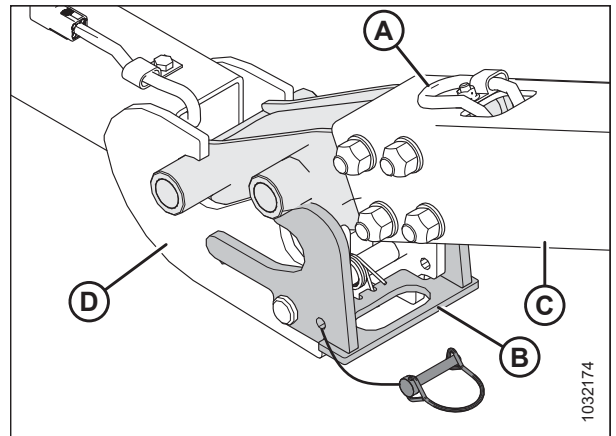
### **Removing tow-bar installed with an extension:**

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



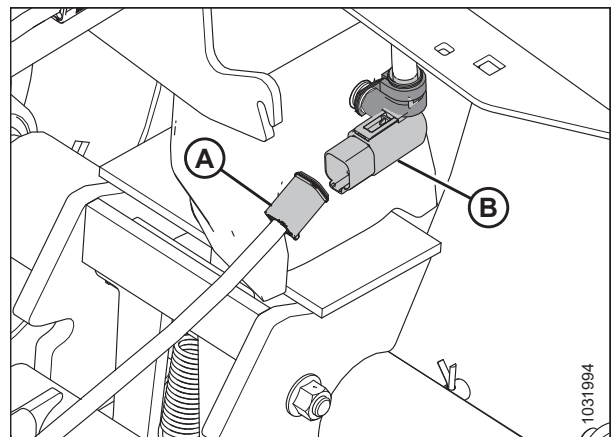
**Figure 3.96: Tow-Bar / Extension Harness**

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



**Figure 3.97: Tow-Bar / Extension Joint**

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



**Figure 3.98: Tow-Bar Electrical Connection**

## OPERATION

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

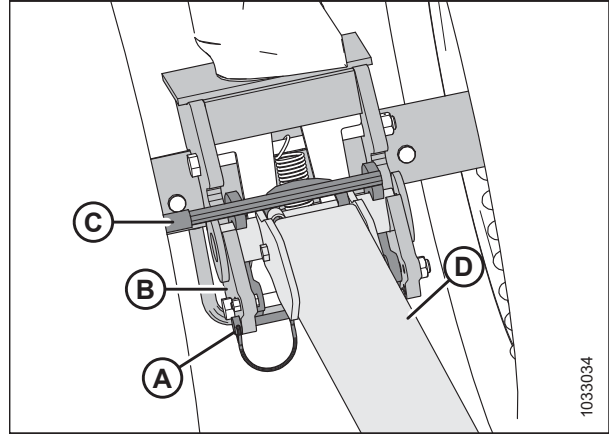


Figure 3.99: Tow-Bar Extension and Transport Pivot

12. Lift extension (A) and pull it away from transport pivot (B).
13. Secure extension harness (C) inside tow-bar extension tube (A).
14. Reinstall the lynch pin in the left transport pivot for safe keeping.
15. For tow-bar storage, refer to *Storing Tow-Bar, page 125*.

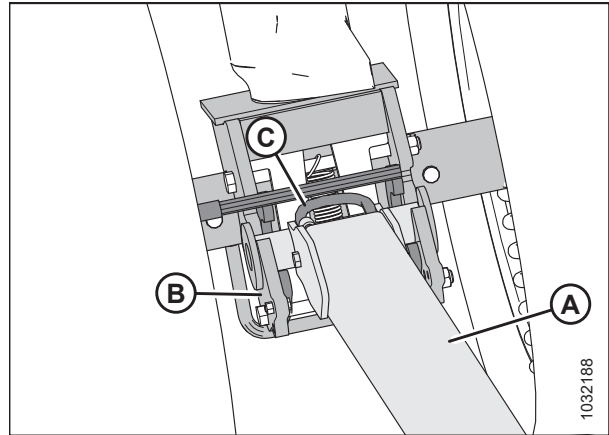


Figure 3.100: Latch Disengaged from Extension

### **Removing tow-bar installed without an extension:**

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

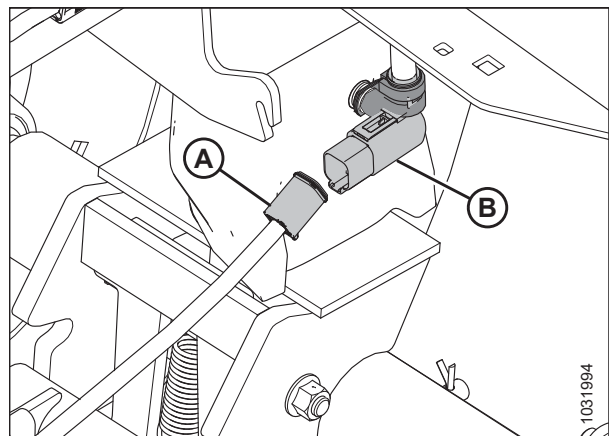


Figure 3.101: Tow-Bar Electrical Connection

## OPERATION

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

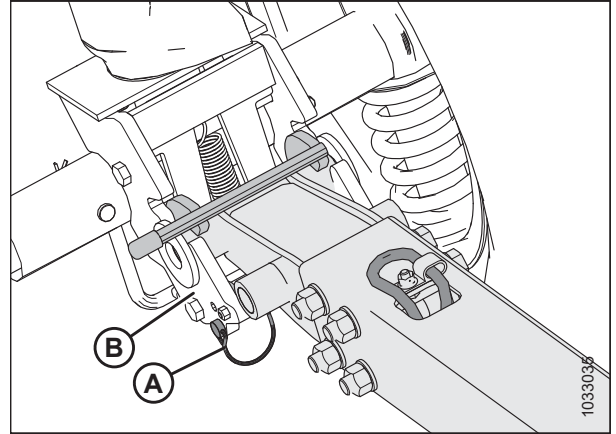


Figure 3.102: Tow-Bar and Left Transport Pivot

18. Lift tow-bar (A) and pull it away from transport pivot (B).
19. Reinstall the lynch pin in the left transport pivot for safe keeping.
20. For tow-bar storage, refer to *Storing Tow-Bar*, page 125.

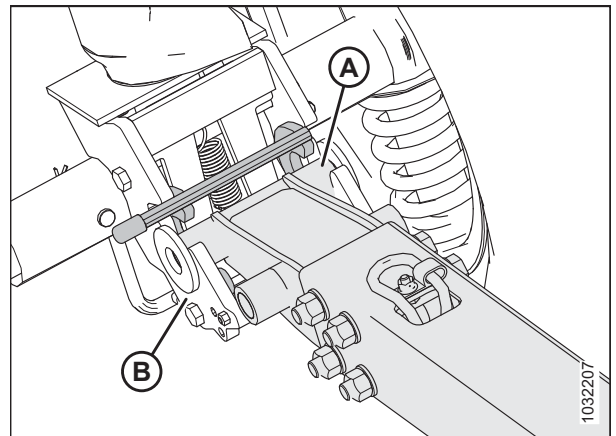


Figure 3.103: Tow-Bar and Left Transport Pivot

### *Storing Tow-Bar*

Store the tow bar in the backtube when it is not in use.

#### **Tow-bar Extension**

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

#### **NOTE:**

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

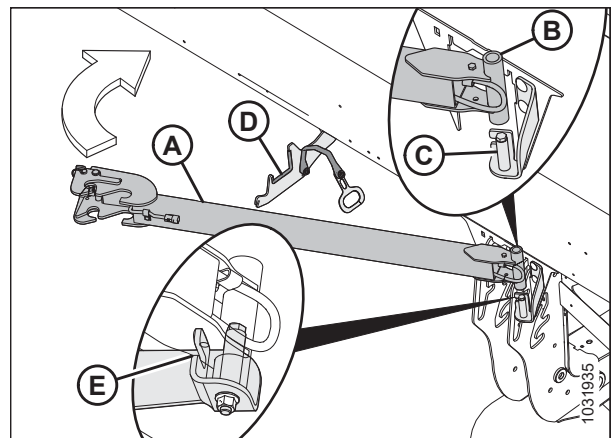


Figure 3.104: Tow-Bar Extension Storage

## OPERATION

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

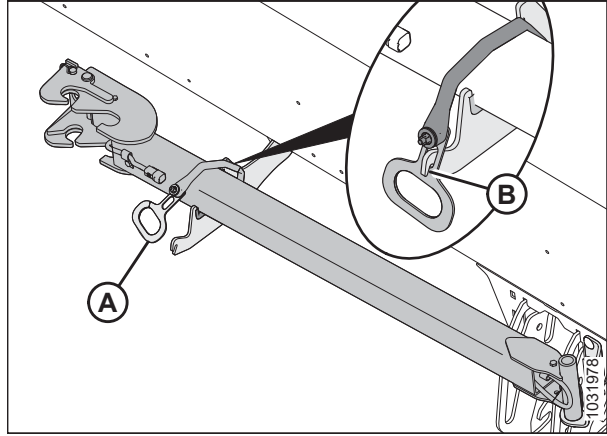


Figure 3.105: Tow-Bar Extension Storage

### Tow-bar

- Open the left endshield. For instructions, refer to [Opening Header Endshields, page 47](#).
- With the tow chain and harness (A) facing up, insert hitch end (B) of the tow-bar into the left backtube.

#### IMPORTANT:

The header endshield has been removed from the illustration for clarity.

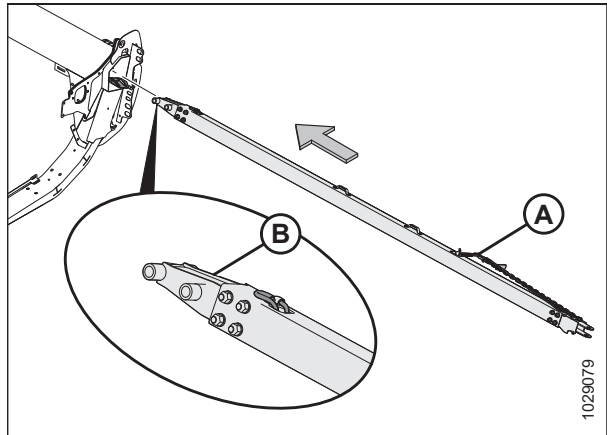


Figure 3.106: Hitch End

- Slide the tow-bar inside the backtube until hooks (A) engage the slots of support angle (B).
- Close the header endshield. For instructions, refer to [Closing Header Endshields, page 48](#).

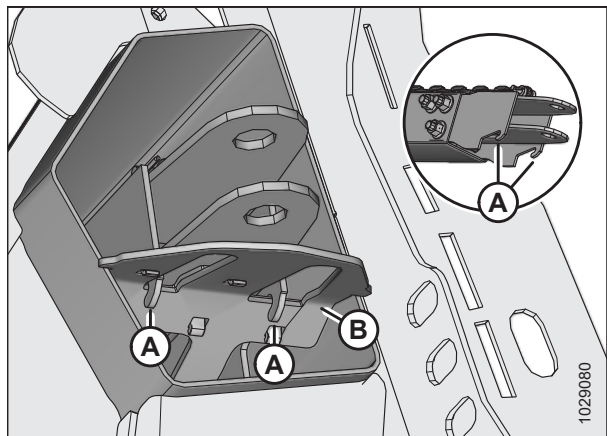


Figure 3.107: Clevis End Retainer Hooks



### 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.

**NOTE:**

This procedure assumes that the tow-bar has been removed. For instructions on removing the tow-bar, refer to [Removing Tow-Bar, page 122](#).

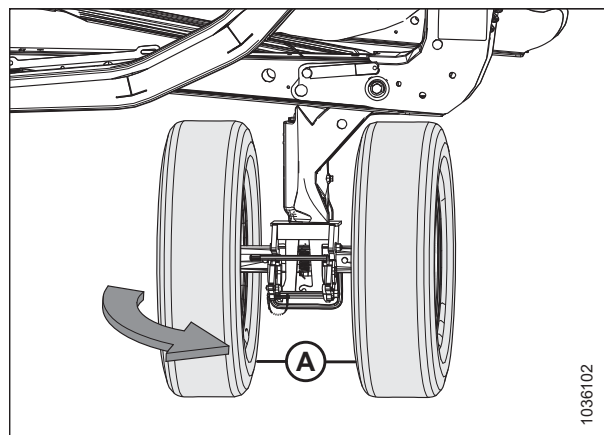
**⚠ DANGER**

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**

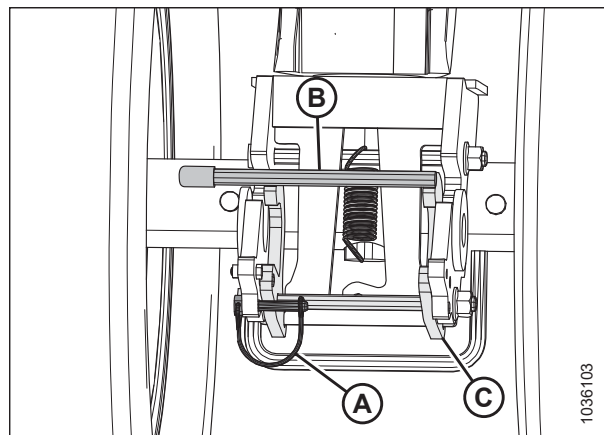
Ensure that all bystanders have cleared the area.

1. Raise the header until the transport wheels are 51–102 mm (2–4 in.) off the ground.
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. Turn left transport wheel assembly (A) 90° in the direction shown.



**Figure 3.108: Left Transport Wheels in Transport Mode**

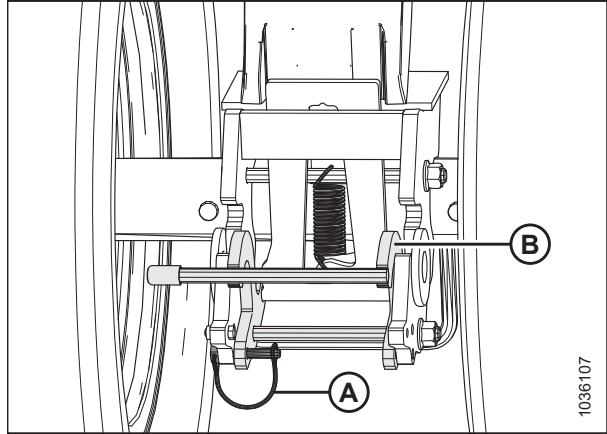
5. Remove lynch pin (A). Pull handle (B) to engage latch (C)—this will prevent the transport wheel assembly from rotating.



**Figure 3.109: Left Transport Wheels – Rotation Lock Latch Disengaged**

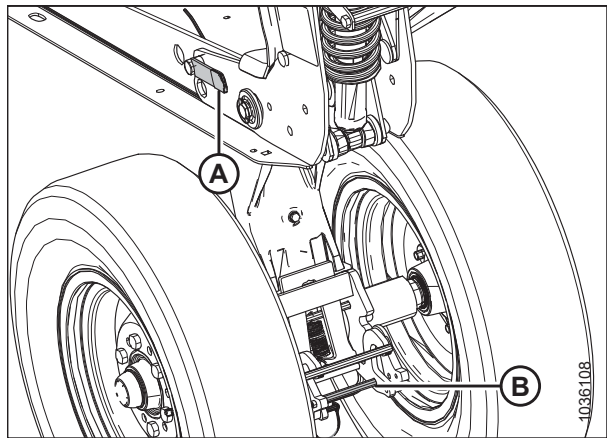
## OPERATION

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



**Figure 3.110: Left Transport Wheels – Rotation Lock Latch Engaged**

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

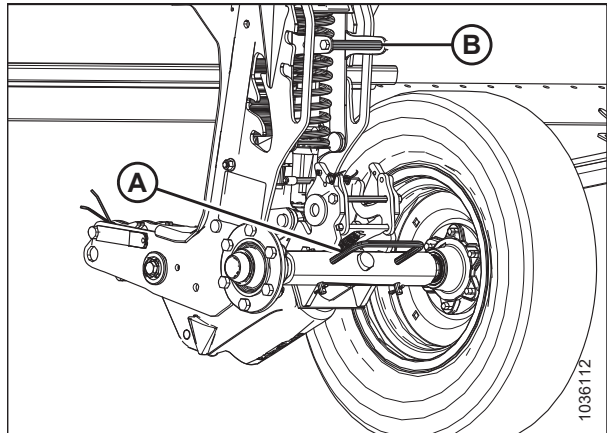


**Figure 3.111: Left Transport Wheels – Pivot Released**

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

**NOTE:**

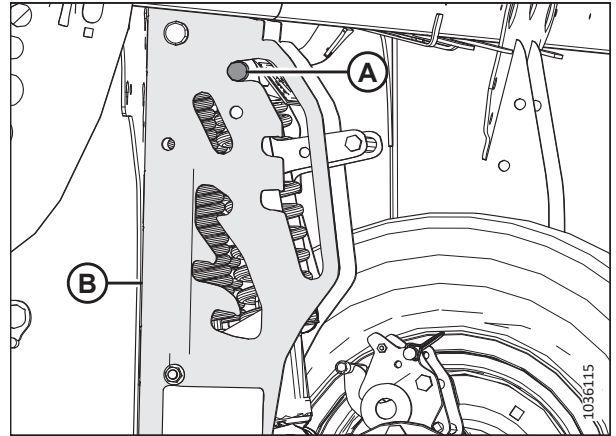
Parts have been removed from the illustration for clarity.



**Figure 3.112: Left Transport Wheels in Highest Storage Position**

## OPERATION

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



**Figure 3.113: Left Transport Wheel Pivot Pin in Highest Storage Position**

### *Moving Rear (Right) 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.

#### **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. Raise the header until the transport wheels are 51–102 mm (2–4 in.) off the ground.

##### **NOTE:**

Raise the header high enough to engage the safety props—you will need to work under the header to complete this procedure.

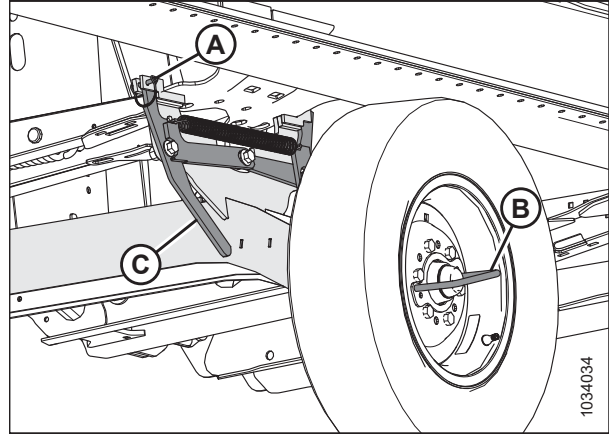
##### **NOTE:**

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.

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.

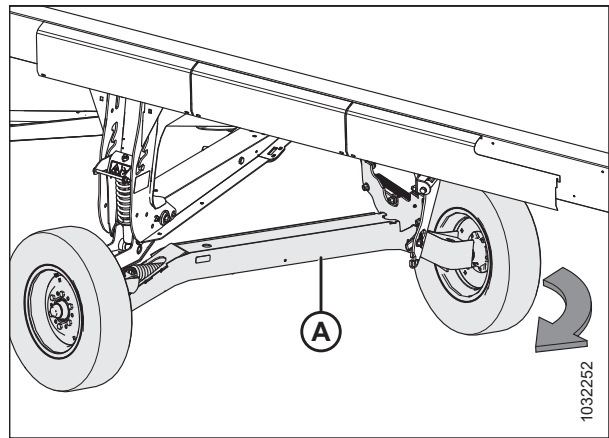
## OPERATION

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



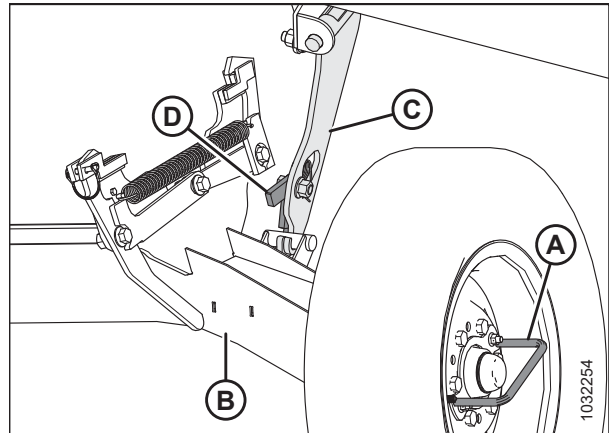
**Figure 3.114: Right Transport Axle Latched in Transport Position**

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



**Figure 3.115: Right Transport Axle Rotation**

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



**Figure 3.116: Right Transport Axle Latched in Field Position**

## OPERATION

10. 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.
11. 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 78](#).

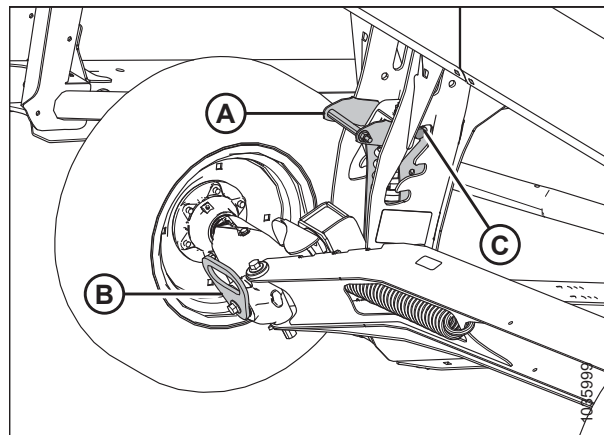


Figure 3.117: Right Transport Wheels in Highest Storage Position

### 3.10.4 Converting from Field to Transport Position

Convert the header to the transport position before towing it to a new location.

#### *Moving Front (Left) Wheels into Transport Position*

The front (left) wheels are located closest to the towing vehicle. To prepare the header for transport, lower the wheels to the ground and rotate them 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.



#### **DANGER**

Ensure that all bystanders have cleared the area.



#### **CAUTION**

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

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

## OPERATION

- Adjust the 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.

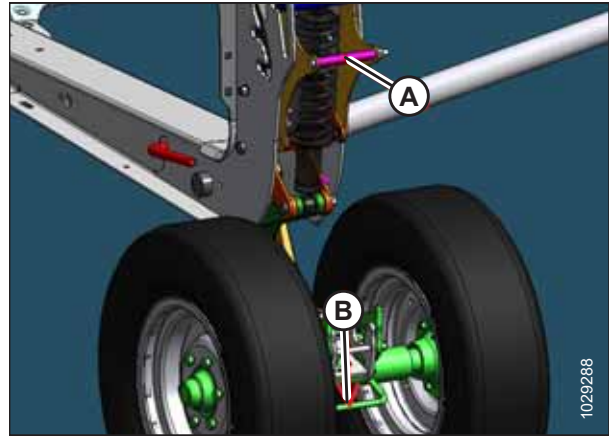


Figure 3.118: Front Transport Wheels

- Secure the left transport pivot by pushing pivot handle (A) forward until the latch is engaged.
- Pull back on the pivot handle to ensure that the latch is fully engaged.



Figure 3.119: Front Transport Wheels

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

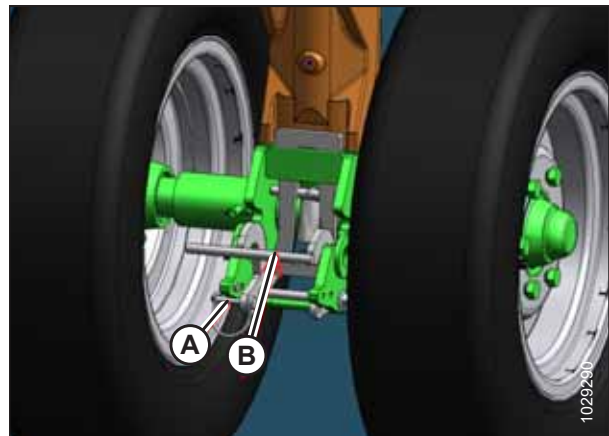


Figure 3.120: Front Transport Wheels

## OPERATION

9. Turn front wheel assembly (A) 90° clockwise.

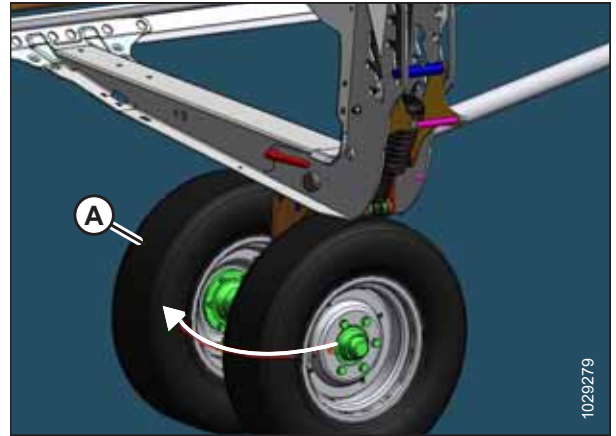


Figure 3.121: Front Transport Wheels

### *Moving Rear (Right) Wheels into Transport Position*

The header must be converted into transport position before towing the header.

#### **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 78](#).
2. Adjust the gauge wheel height to transport position (lowest slot) as follows:
  - If in the top slot, push on handle (A) to release it.
  - If in the mid slot, pull on handle (A) to release it.
3. Pull suspension handle (A) outward and push down on axle pivot handle (B).

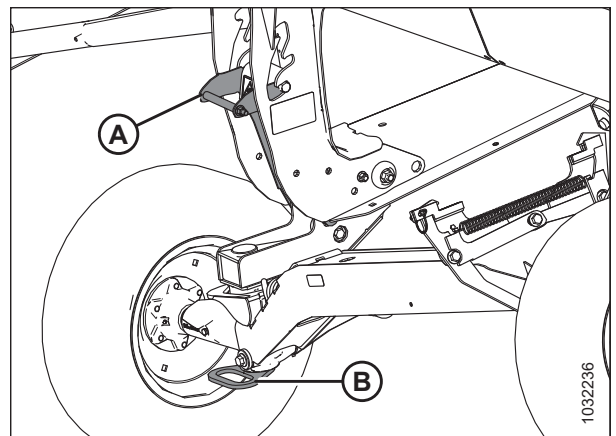


Figure 3.122: Gauge Wheels

## OPERATION

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

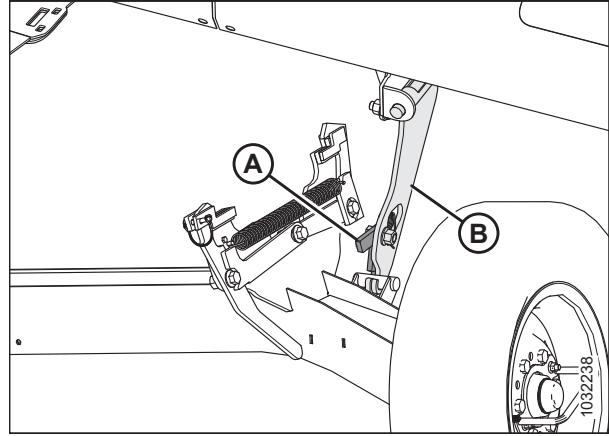


Figure 3.123: Right Field Support

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

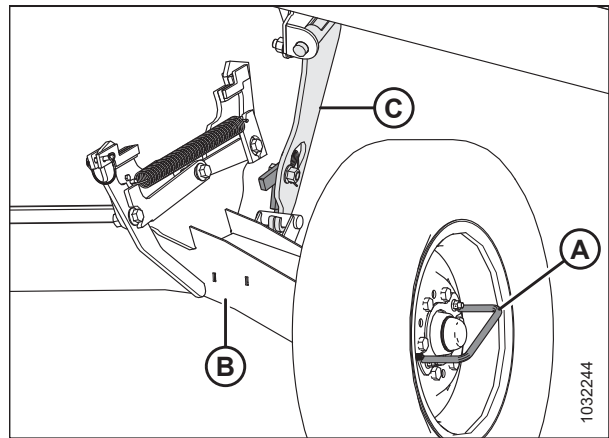


Figure 3.124: Right Field Support

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

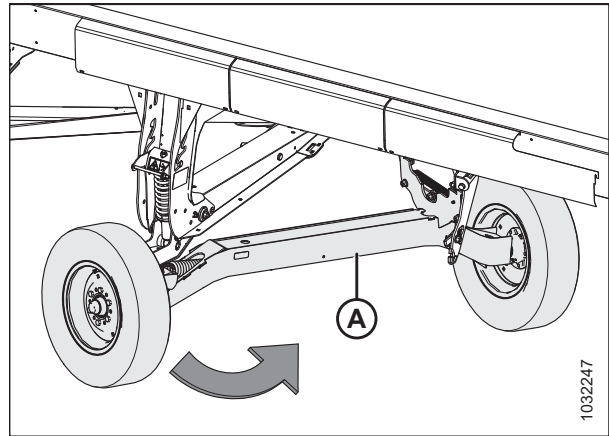


Figure 3.125: Right Transport Axle



## OPERATION

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

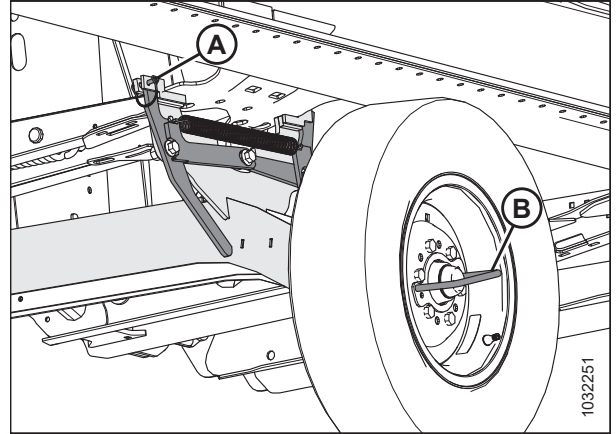


Figure 3.126: Right Transport Axle

### *Removing Tow-Bar from Storage*

When you are converting the header to the transport position, you must remove the tow-bar from its backtube storage location.

#### ***Tow-Bar Extension***

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

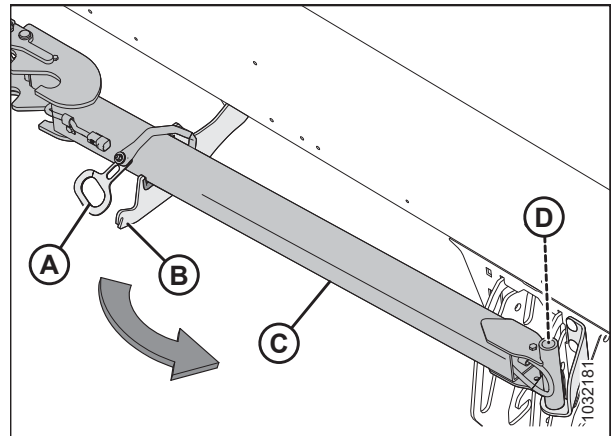


Figure 3.127: Tow-Bar Extension in Storage

## OPERATION

### Tow-Bar

4. Open the left endshield. For instructions, refer to [Opening Header Endshields, page 47](#).
5. Pull the tow-bar forward until it hits the stop. Lift the tow-bar to release clevis stop (C) and hook (A) from support angle (B), then pull it out of the tube.

**NOTE:**

The backtube is transparent in the illustration.

6. Slide the tow-bar out from the header backtube.

**IMPORTANT:**

Avoid contact with any nearby hydraulic or electrical hoses and lines.

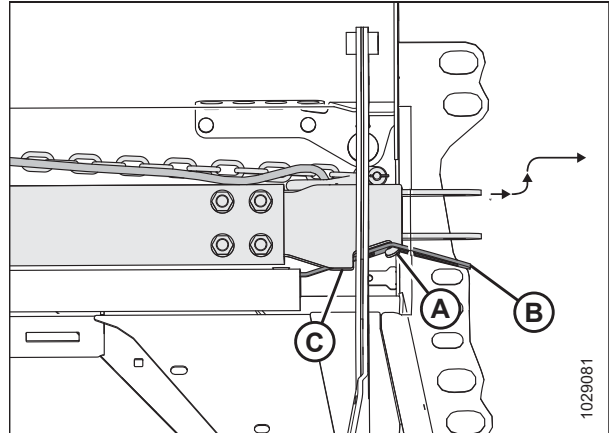


Figure 3.128: Tow-Bar in Storage

### 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 the header from rolling.
2. Remove the tow-bar from storage. For instructions, refer to [Removing Tow-Bar from Storage, page 135](#).
3. If you are installing a tow-bar and extension, proceed to Step 4, [page 137](#). If you are installing a tow-bar only, proceed to Step 18, [page 138](#).

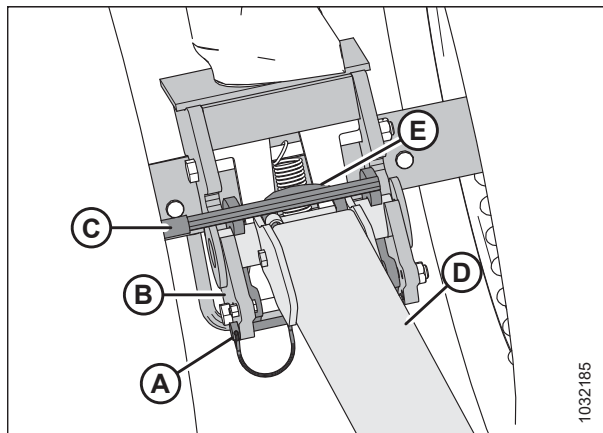


Figure 3.129: Tire Blocking

## OPERATION

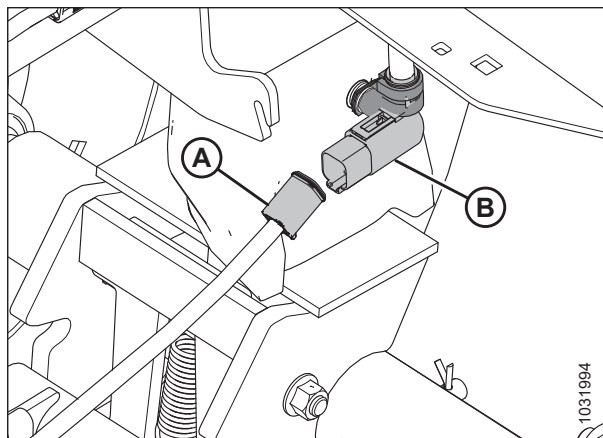
### *Installing tow-bar and extension:*

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



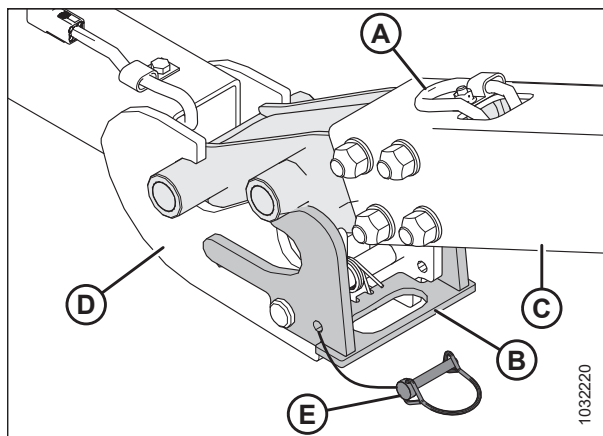
**Figure 3.130: Tow-Bar Extension to Left Transport Pivot**

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



**Figure 3.131: Tow-Bar Electrical Connection**

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



**Figure 3.132: Tow-Bar to Extension**

## OPERATION

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

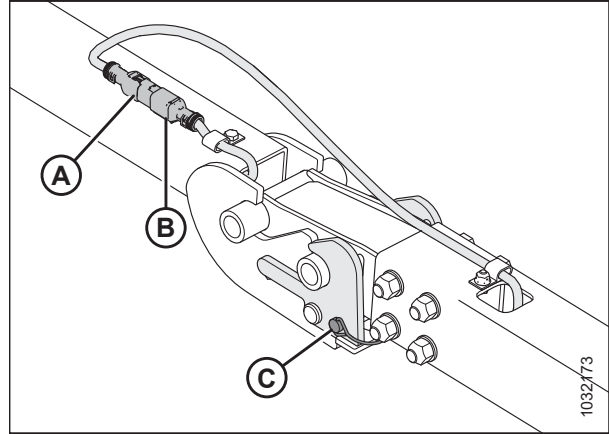


Figure 3.133: Tow-Bar / Extension Harness

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

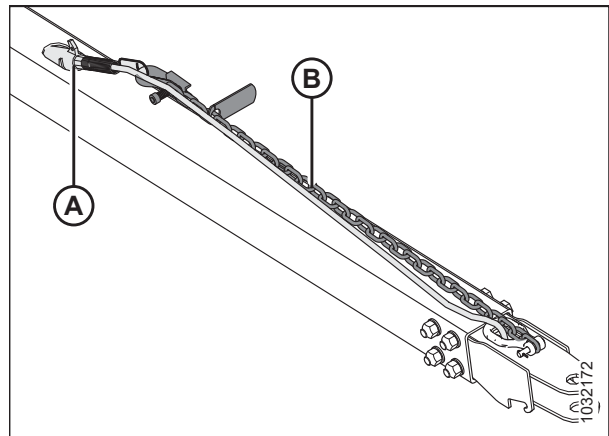


Figure 3.134: Tow-Bar Wiring Harness

### ***Installing tow-bar only:***

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

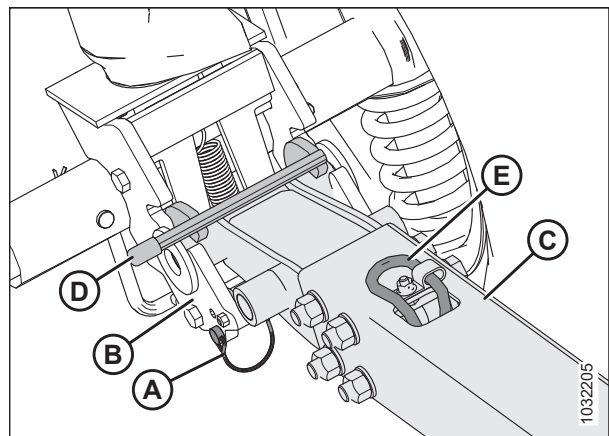


Figure 3.135: Tow-Bar and Left Transport Pivot

## OPERATION

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

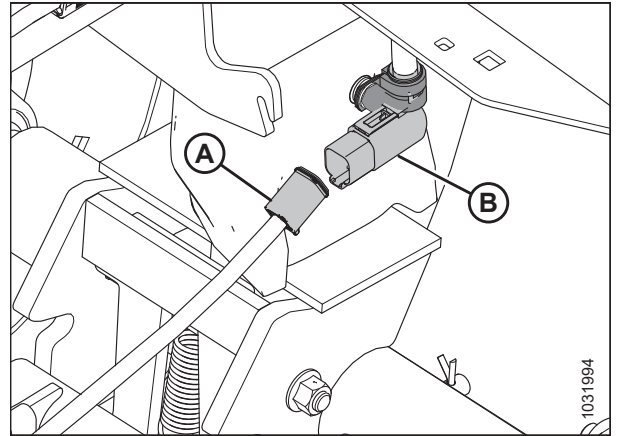


Figure 3.136: Tow-Bar Electrical Connection

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

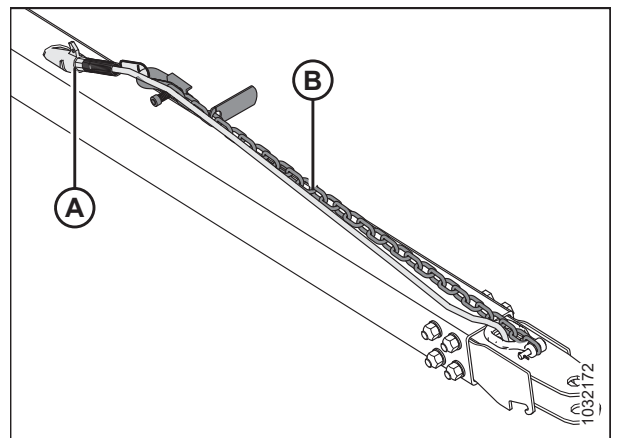


Figure 3.137: Tow-Bar Wiring Harness



# Chapter 4: Header Attachment/Detachment

This chapter includes instructions for attaching and detaching the header.

If you are attaching the header for the first time, supports will need to be installed in the header. For instructions, refer to [4.1 Attaching Draper Header Supports, page 141](#).

If you are reattaching the header to a windrower, the header supports 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 143](#)
- [4.3 Attaching Header to M1 Series Windrower, page 172](#)
- [4.4 Attaching Header to M2 Series Windrower, page 188](#)

## 4.1 Attaching Draper Header Supports

To attach draper header supports, this procedure involves removing the hairpin and clevis pin, positioning the support on the windrower lift linkage, reinstalling and securing the clevis pin with the hairpin, and repeating these steps for the remaining support. The draper header supports are required to attach a D2 Series Draper Header to a 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.

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

#### IMPORTANT:

**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).

#### NOTE:

**M1/M2 Series Windrowers:** To prevent damage to the lift system when lowering the header lift linkages without a header or weight box attached, ensure that the float is removed. For instructions, refer to the windrower operator manual.

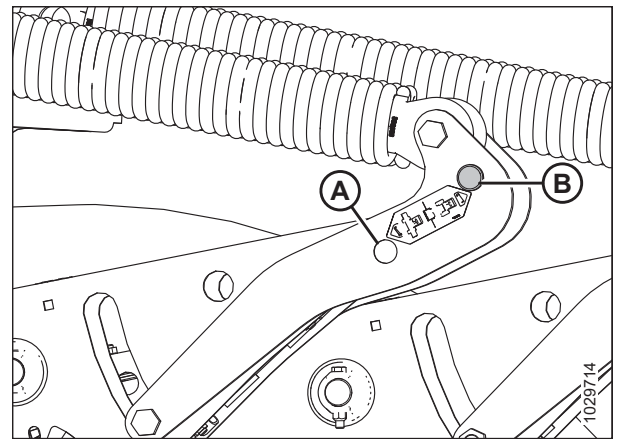


Figure 4.1: Header Float Linkage – M Series

## HEADER ATTACHMENT/DETACHMENT

- Remove hairpin (A) from clevis pin (B) on draper header support (C). Remove clevis pin (B).

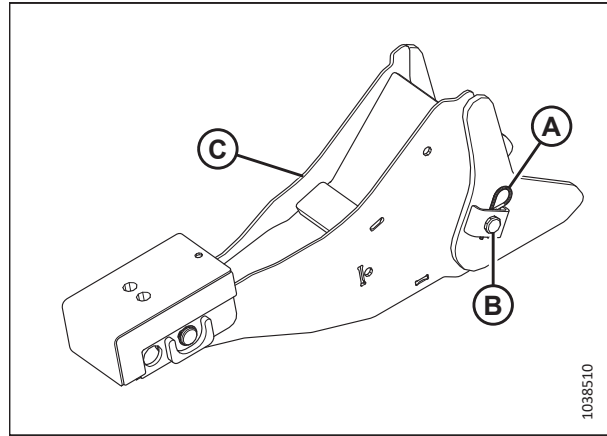


Figure 4.2: Draper Header Support

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

**NOTE:**

**All windrower models EXCEPT narrow transport (NT):** to ensure that the pin doesn't snag the windrow, install the clevis pin on the outboard side of the draper header support.

**NOTE:**

**Narrow transport (NT) configured windrowers only:** to avoid contact with the tires, install the clevis pin on the inboard side of the draper header support.

- Secure clevis pin (C) with hairpin (D).
- Repeat Step 2, page 142 to Step 4, page 142 to install the remaining draper header support.
- Proceed to the attachment procedure that applies to your windrower model:
  - 4.2 Attaching Header to M Series Windrower, page 143
  - 4.3 Attaching Header to M1 Series Windrower, page 172
  - 4.4 Attaching Header to M2 Series Windrower, page 188

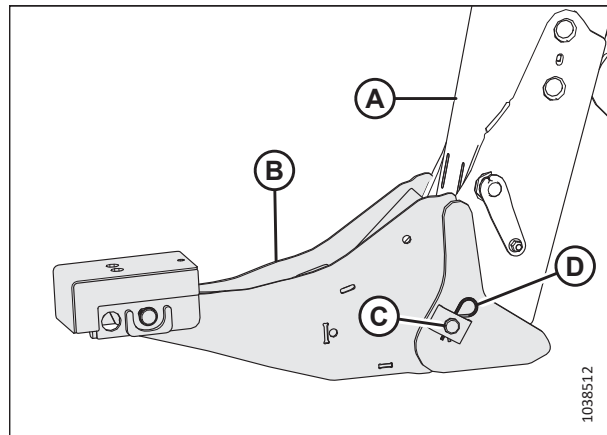


Figure 4.3: Draper Header Support



## 4.2 Attaching Header to M Series Windrower

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

Proceed to the applicable procedure:

- [4.2.1 Attaching Header to M Series Windrower – Hydraulic Center-Link with Self-Alignment, page 143](#)
- [4.2.2 Attaching Header to M Series Windrower – Hydraulic Center-Link without Self-Alignment, page 149](#)
- [4.2.3 Attaching Header to M Series Windrower – Mechanical Center-Link, page 155](#)

### 4.2.1 Attaching Header to 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. This procedure is for windrowers 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 you are attaching the header to a windrower for the first time, draper header supports must be installed onto the windrower lift linkage before beginning this procedure. For instructions, refer to [4.1 Attaching Draper Header Supports, page 141](#).

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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. Ensure that the float engagement pin is installed in storage position (B) and **NOT** in engaged position (A).

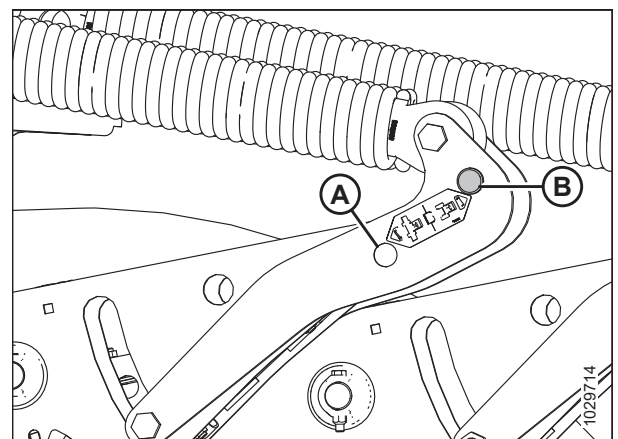


Figure 4.4: Header Float Linkage

## HEADER ATTACHMENT/DETACHMENT

3. **If reattaching the header to the windrower:** Remove and retain hairpin (A) and clevis pin (B) from header support (C). Repeat this step on the other header leg.

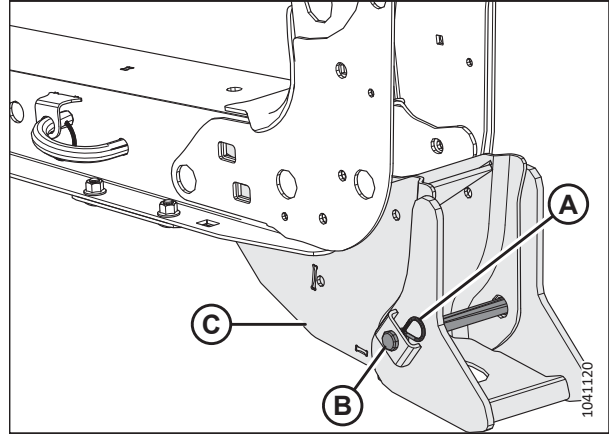


Figure 4.5: Header Support — Left Side Shown

4. **If attaching the header to the windrower for the first time:** Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat this step on the other header leg.

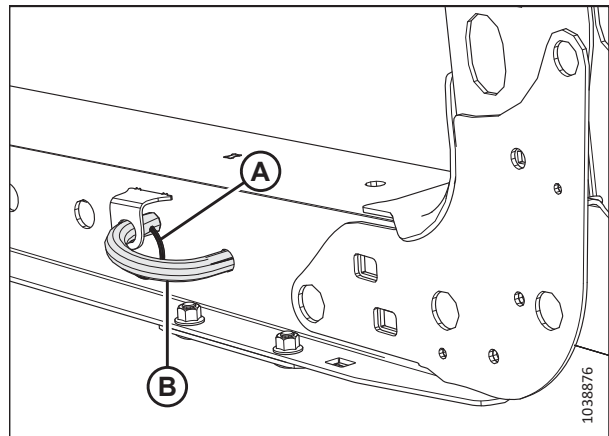


Figure 4.6: Header Leg

5. Activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.

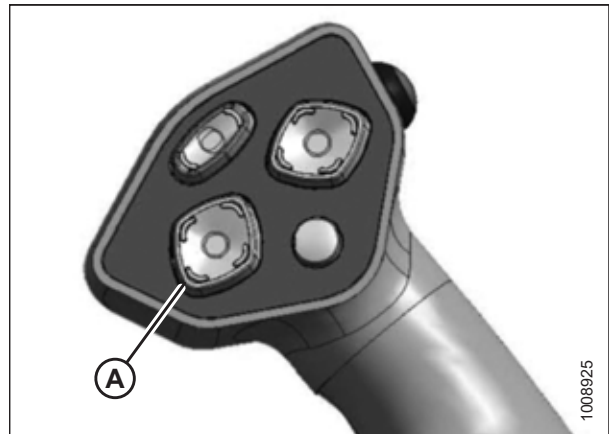


Figure 4.7: Ground Speed Lever

## HEADER ATTACHMENT/DETACHMENT

6. 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.

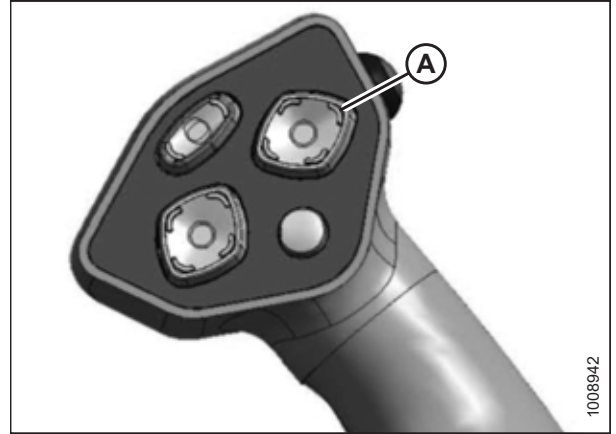


Figure 4.8: Ground Speed Lever

7. **If reattaching the header to the windrower:** Drive the windrower slowly forward until windrower lift linkages (A) enter header supports (B). Continue driving slowly forward until the lift linkages contact the header supports in the header legs and the header nudges forward.

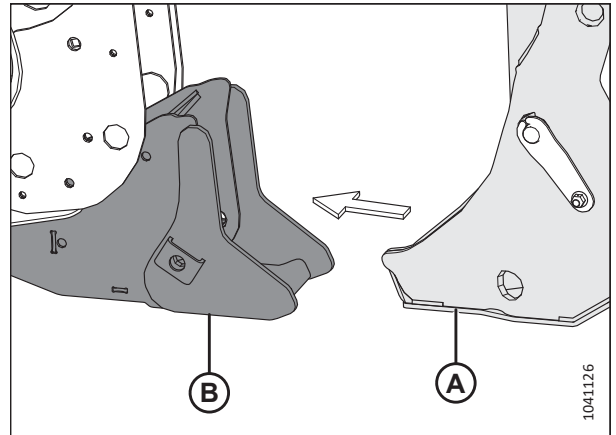


Figure 4.9: Header Leg and Support

8. **If attaching the header to the windrower for the first time:** Drive the windrower slowly forward until header supports (A) enter header legs (B). Continue driving slowly forward until the header supports contact the support plates in the header legs and the header nudges forward.
9. Ensure that the lift linkages are properly engaged in the header supports and that the linkages are contacting the support plates.

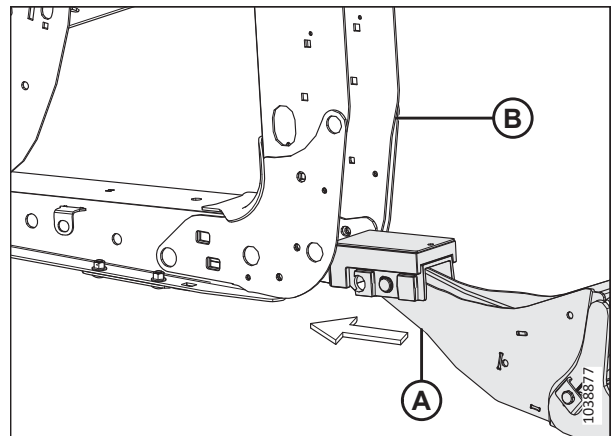


Figure 4.10: Header Leg and Support

## HEADER ATTACHMENT/DETACHMENT

10. 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.

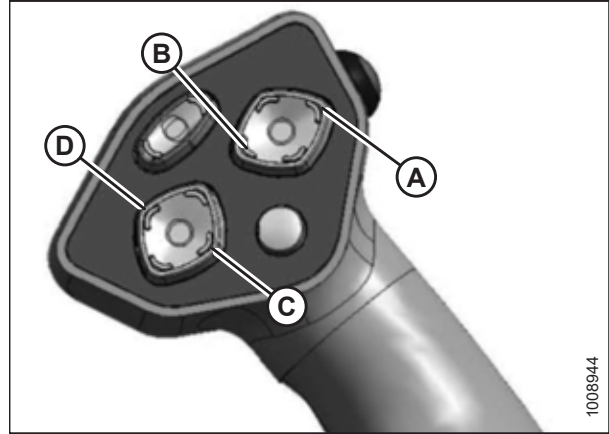


Figure 4.11: Ground Speed Lever

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

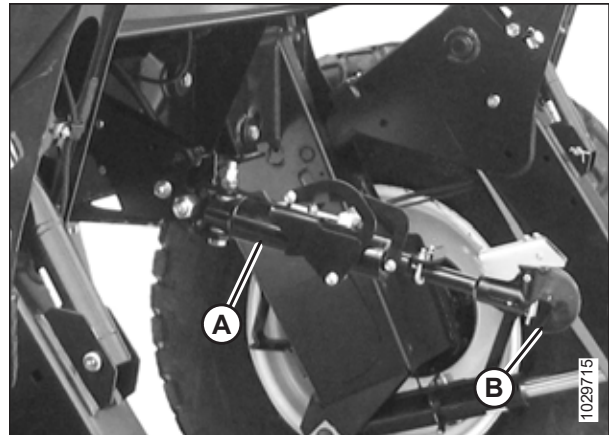


Figure 4.12: Hydraulic Center-Link

13. Press HEADER UP switch (A) to raise the header to its maximum height.
14. 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:

You may need to repeat this step if there is air in the hydraulic system.



Figure 4.13: Ground Speed Lever

## HEADER ATTACHMENT/DETACHMENT

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.

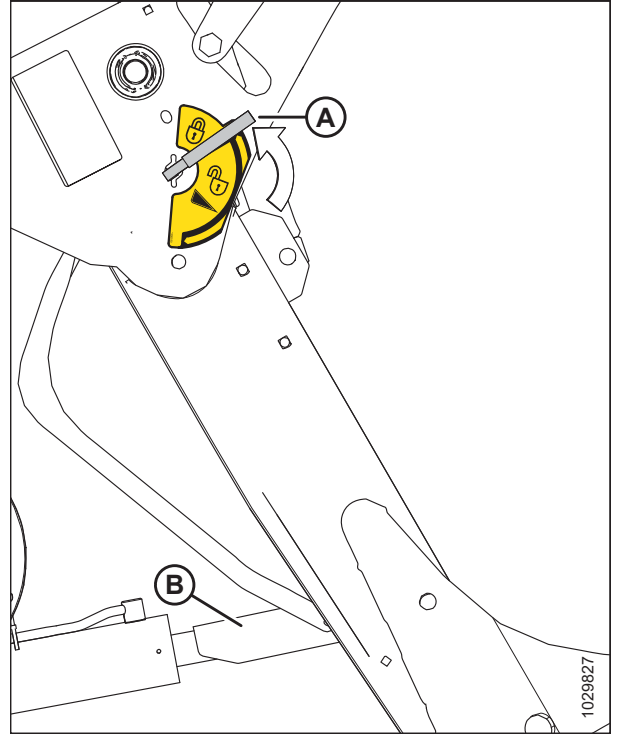


Figure 4.14: Safety Prop

16. **If reattaching the header to the windrower:** Secure windrower lift linkages (A) to header supports (B) using clevis pin (C) and hairpin (D). Repeat this step on the opposite side of the machine.

**NOTE:**

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

**NOTE:**

Some parts have been removed from the illustration for clarity.

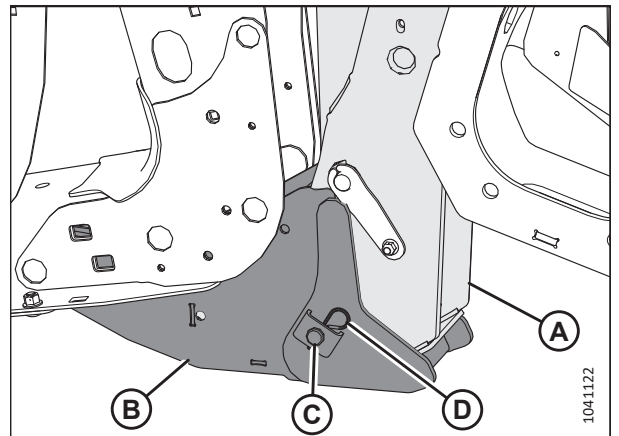


Figure 4.15: Windrower Lift Linkage and Header Leg

## HEADER ATTACHMENT/DETACHMENT

17. **If attaching the header to the windrower for the first time:** Install pin (B) through the header leg, engaging the header support in the lift linkages. Secure the pin with ring (A). Repeat this step on the other header leg.

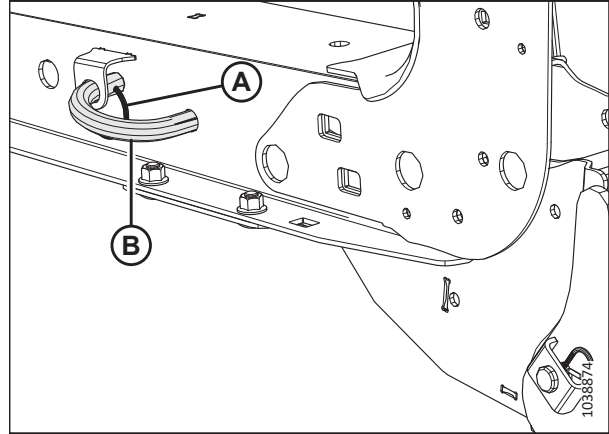


Figure 4.16: Header Leg

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

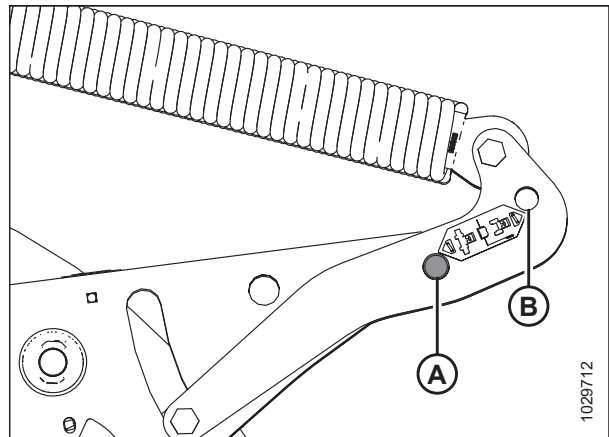


Figure 4.17: Header Float Linkage

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

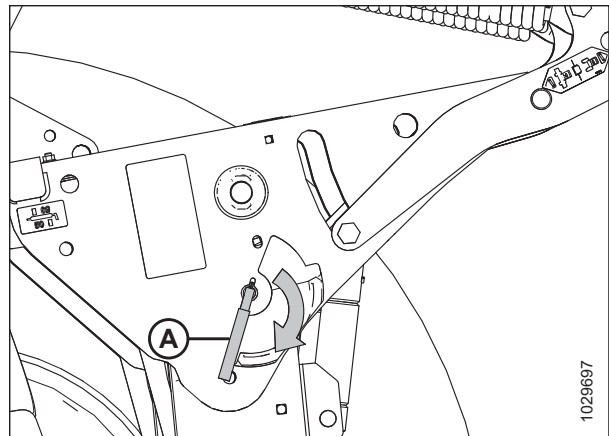


Figure 4.18: Safety Prop Lever

## HEADER ATTACHMENT/DETACHMENT

21. 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 4.19: Ground Speed Lever

### 4.2.2 Attaching Header to 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. This procedure is for windrowers without the center link self-alignment feature.

**NOTE:**

If you are attaching the header to the windrower for the first time, draper header supports must be installed onto the windrower lift linkage before beginning this procedure. For instructions, refer to [4.1 Attaching Draper Header Supports](#), page 141.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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. Ensure that the float engagement pin is installed in storage position (B) and **NOT** in engaged position (A).
2. Shut down the engine, and remove the key from the ignition.

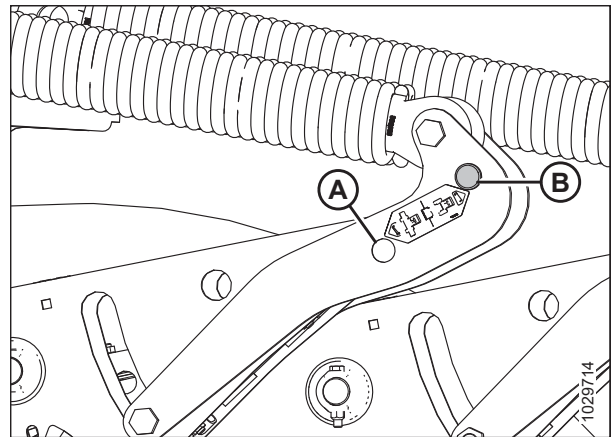


Figure 4.20: Header Float Linkage

## HEADER ATTACHMENT/DETACHMENT

3. **If reattaching the header to the windrower:** Remove and retain hairpin (A) and clevis pin (B) from header support (C). Repeat this step on the other header leg.

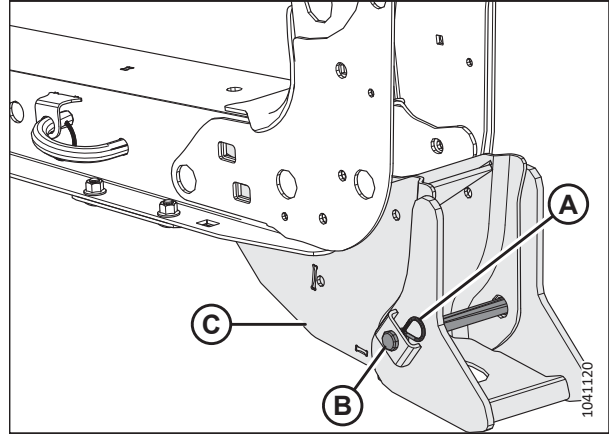


Figure 4.21: Header Support — Left Side Shown

4. **If attaching the header to the windrower for the first time:** Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat this step on the other header leg.

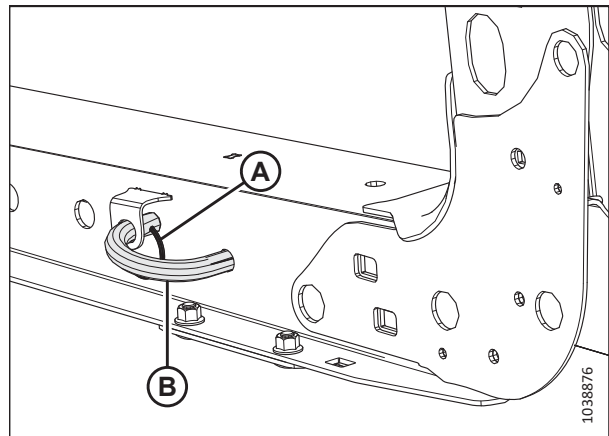


Figure 4.22: Header Leg

5. Activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.
6. Shut down the engine, and remove the key from the ignition.

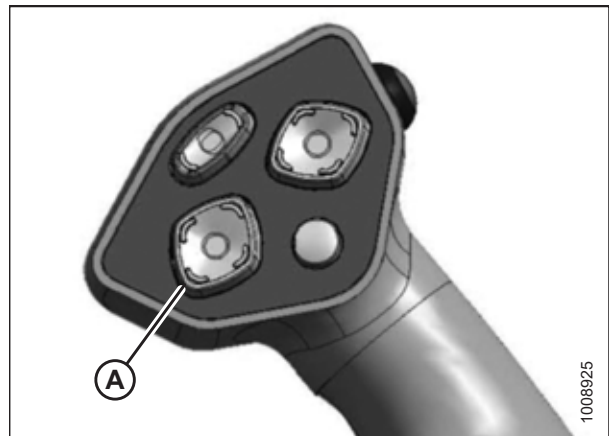


Figure 4.23: Ground Speed Lever



## HEADER ATTACHMENT/DETACHMENT

7. 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.

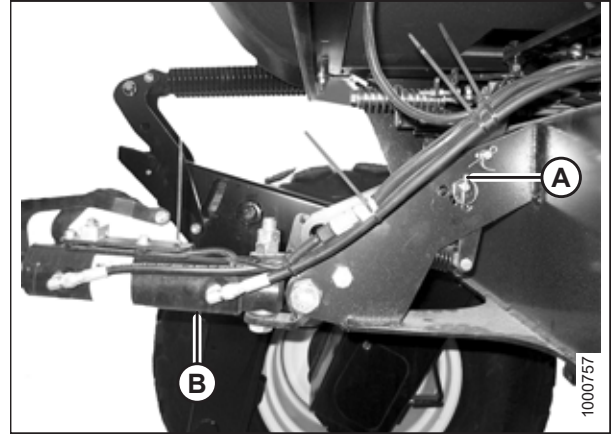


Figure 4.24: Hydraulic Center-Link without Self-Alignment Kit

8. **If reattaching the header to the windrower:** Drive the windrower slowly forward until windrower lift linkages (A) enter header supports (B). Continue driving slowly forward until the lift linkages contact the header supports in the header legs and the header nudges forward.

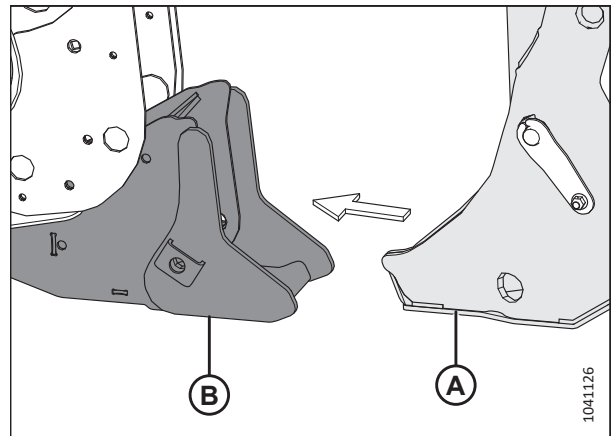


Figure 4.25: Header Leg and Support

9. **If attaching the header to the windrower for the first time:** Drive the windrower slowly forward until header supports (A) enter header legs (B). Continue driving slowly forward until the header supports contact the support plates in the header legs and the header nudges forward.
10. Ensure that the lift linkages are properly engaged in the header supports and that the linkages are contacting the support plates.

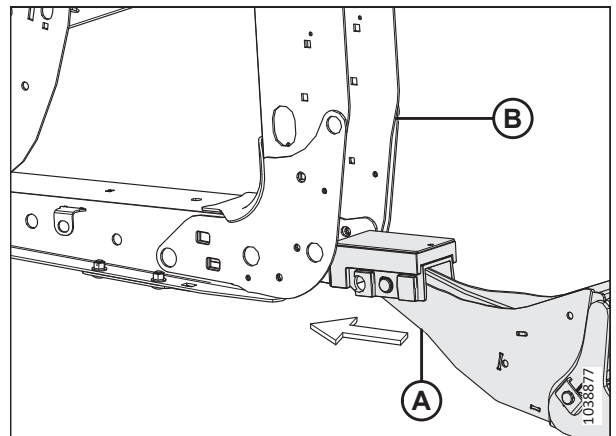


Figure 4.26: Header Leg and Support

## HEADER ATTACHMENT/DETACHMENT

11. Start the engine.
12. 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
13. Shut down the engine, and remove the key from the ignition.

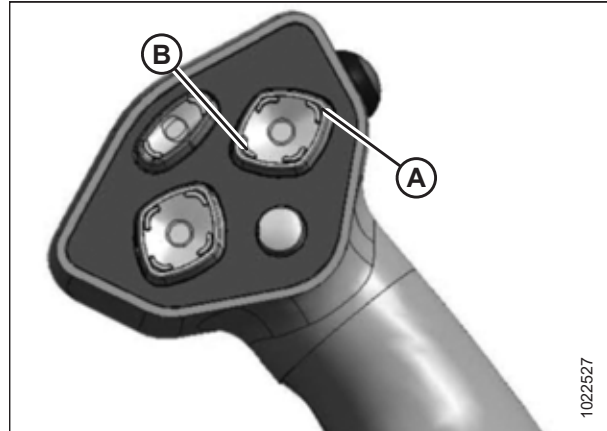


Figure 4.27: Ground Speed Lever

14. 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.

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

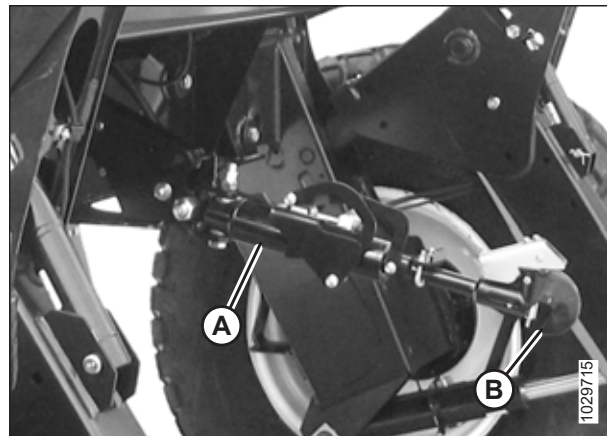


Figure 4.28: Hydraulic Center-Link

16. Start the engine.
17. Press HEADER UP switch (A) to raise the header to its maximum height.
18. 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:

You may need to repeat this step if there is air in the hydraulic system.



Figure 4.29: Ground Speed Lever

## HEADER ATTACHMENT/DETACHMENT

19. 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.

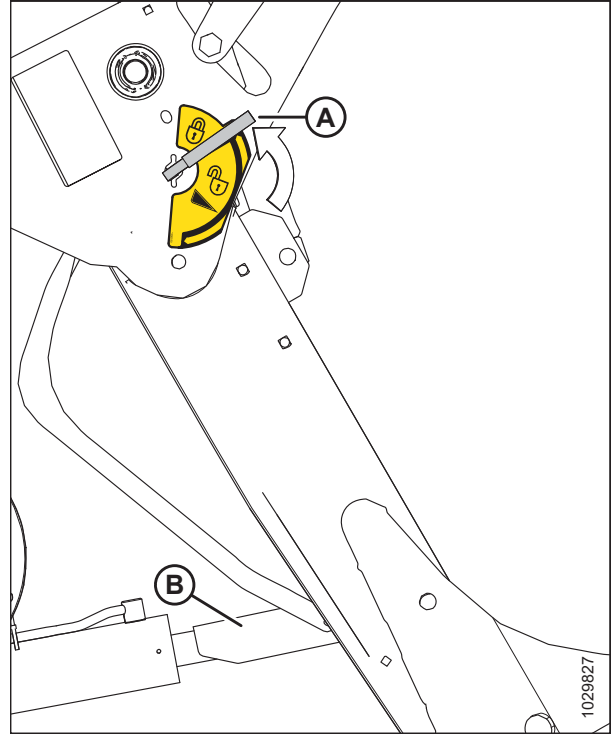


Figure 4.30: Safety Prop

20. **If reattaching the header to the windrower:** Secure windrower lift linkages (A) to header supports (B) using clevis pin (C) and hairpin (D). Repeat this step on the opposite side of the machine.

**NOTE:**

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

**NOTE:**

Some parts have been removed from the illustration for clarity.

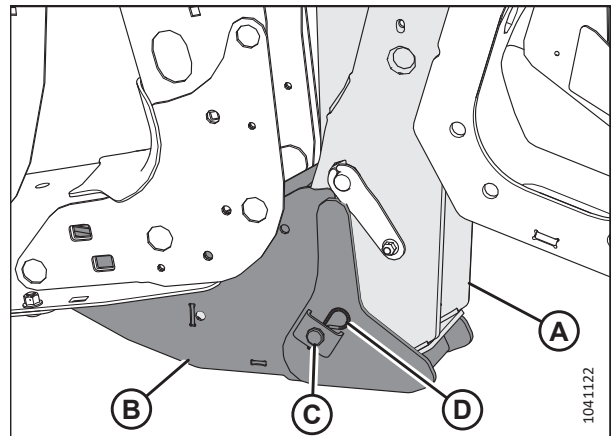


Figure 4.31: Windrower Lift Linkage and Header Leg

## HEADER ATTACHMENT/DETACHMENT

21. **If attaching the header to the windrower for the first time:** Install pin (B) through the header leg, engaging the header support in the lift linkages. Secure the pin with ring (A). Repeat this step on the other header leg.

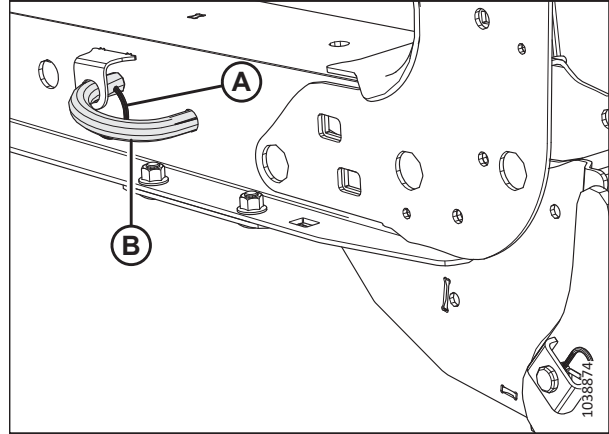


Figure 4.32: Header Leg

22. 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.

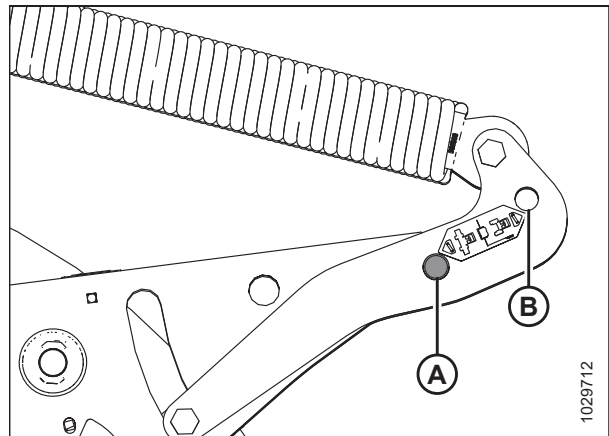


Figure 4.33: Header Float Linkage

23. Disengage the safety prop by turning lever (A) downwards until the lever locks into the vertical position.
24. Repeat the previous step to disengage the other safety prop.
25. Start the engine.

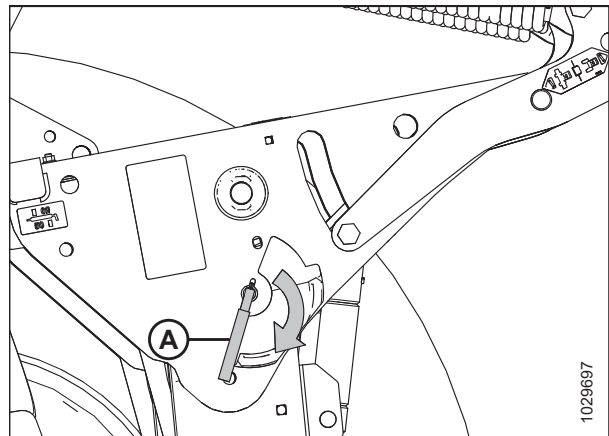


Figure 4.34: Safety Prop Lever

## HEADER ATTACHMENT/DETACHMENT

26. Press HEADER DOWN switch (A) on the GSL to fully lower the header.
27. Shut down the engine, and remove the key from the ignition.
28. Proceed to [4.2.4 Connecting Header Hydraulics and Electrical System to M Series Windrower, page 160](#).



Figure 4.35: Ground Speed Lever

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

To attach a D2 Series Draper Header 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 you are attaching the header to the windrower for the first time, draper header supports must be installed onto the windrower lift linkage before beginning this procedure. For instructions, refer to [4.1 Attaching Draper Header Supports, page 141](#).

 **DANGER**

Ensure that all bystanders have cleared the area.

 **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. Ensure that the float engagement pin is installed in storage position (B) and **NOT** in engaged position (A).

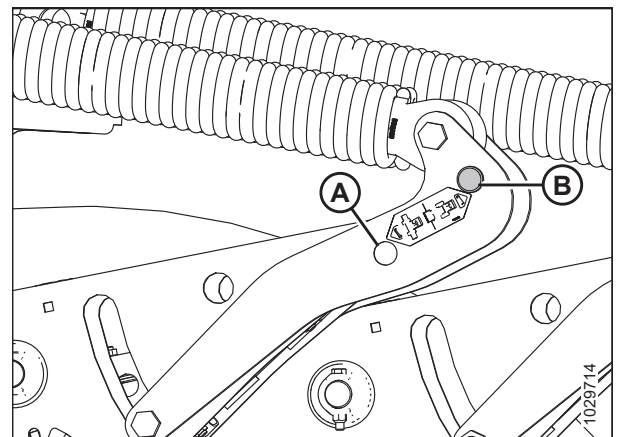


Figure 4.36: Header Float Linkage

## HEADER ATTACHMENT/DETACHMENT

3. **If reattaching the header to the windrower:** Remove and retain hairpin (A) and clevis pin (B) from header support (C). Repeat this step on the other header leg.

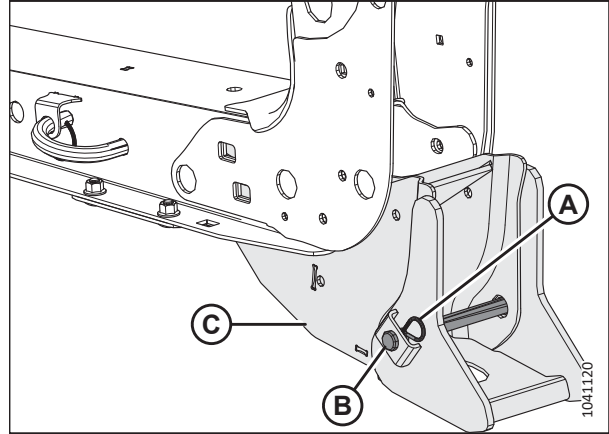


Figure 4.37: Header Support — Left Side Shown

4. **If attaching the header to the windrower for the first time:** Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat this step on the other header leg.

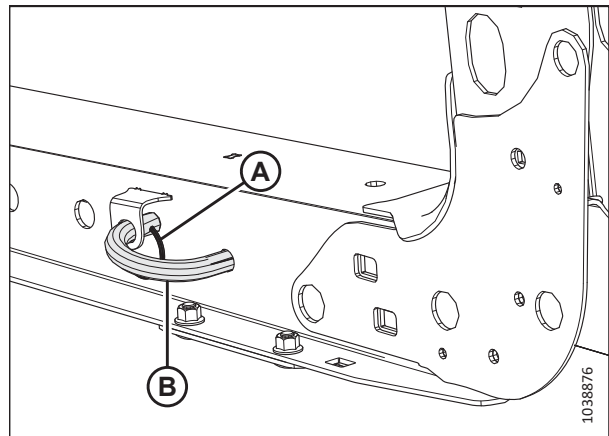


Figure 4.38: Header Leg

5. Activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.

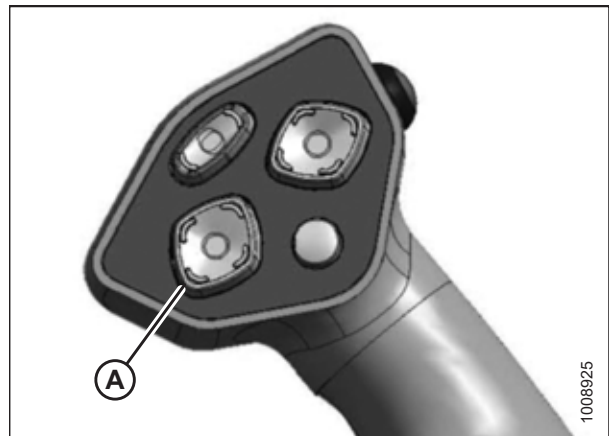


Figure 4.39: Ground Speed Lever

## HEADER ATTACHMENT/DETACHMENT

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

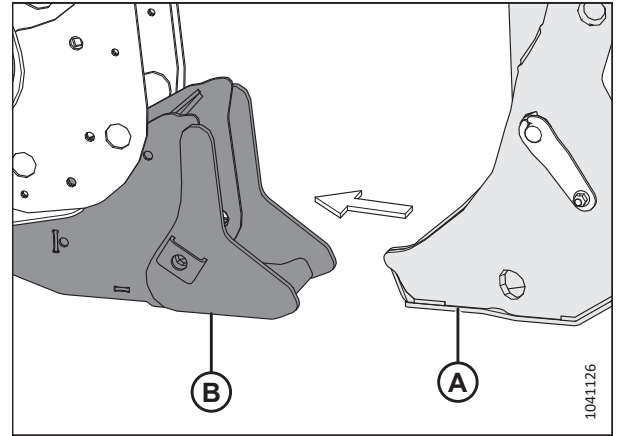


Figure 4.40: Header Leg and Support

7. **If attaching the header to the windrower for the first time:** Drive the windrower slowly forward until header supports (A) enter header legs (B). Continue driving slowly forward until the header supports contact the support plates in the header legs and the header nudges forward.
8. Ensure that the lift linkages are properly engaged in the header supports and that the linkages are contacting the support plates.

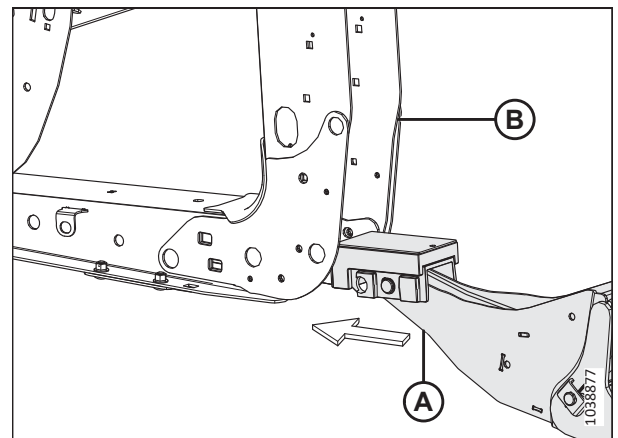


Figure 4.41: Header Leg and Support

9. Shut down the engine, and remove the key from the ignition.
10. Loosen nut (A) and rotate barrel (B) to adjust length until the link is aligned with the header bracket.
11. Install clevis pin (C) and secure it with cotter pin (D).
12. 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).

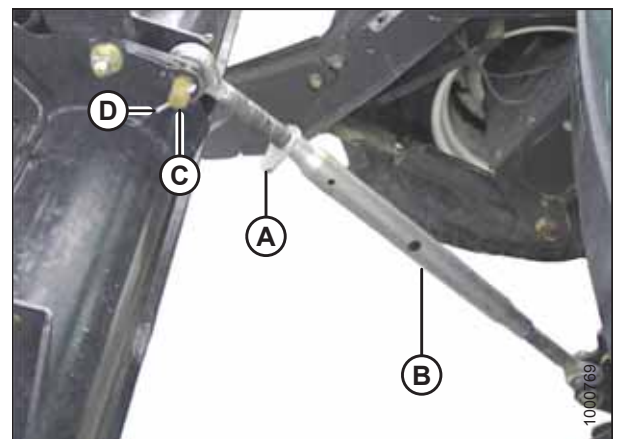


Figure 4.42: Mechanical Center-Link

## HEADER ATTACHMENT/DETACHMENT

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 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.

**NOTE:**

You may need to repeat this step if there is air in the hydraulic system.



Figure 4.43: 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.

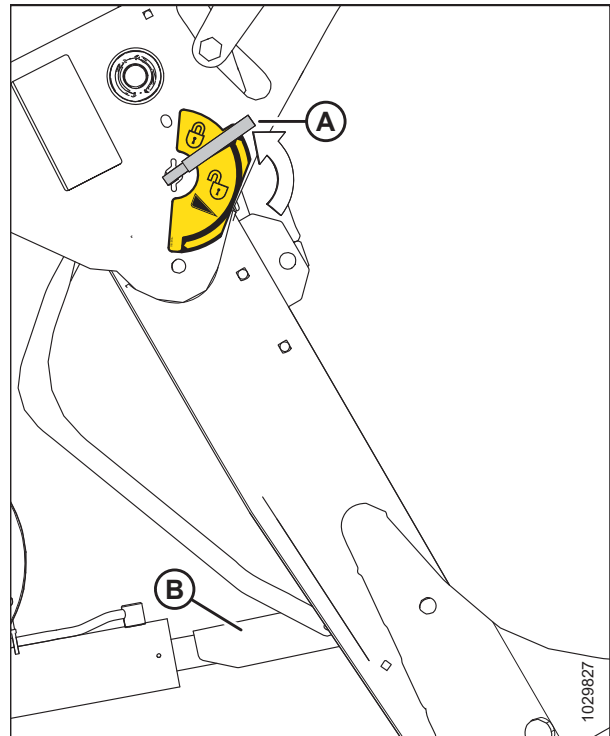


Figure 4.44: Safety Prop



## HEADER ATTACHMENT/DETACHMENT

17. **If reattaching the header to the windrower:** Secure windrower lift linkages (A) to header supports (B) using clevis pin (C) and hairpin (D). Repeat this step on the opposite side of the machine.

**NOTE:**

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

**NOTE:**

Some parts have been removed from the illustration for clarity.

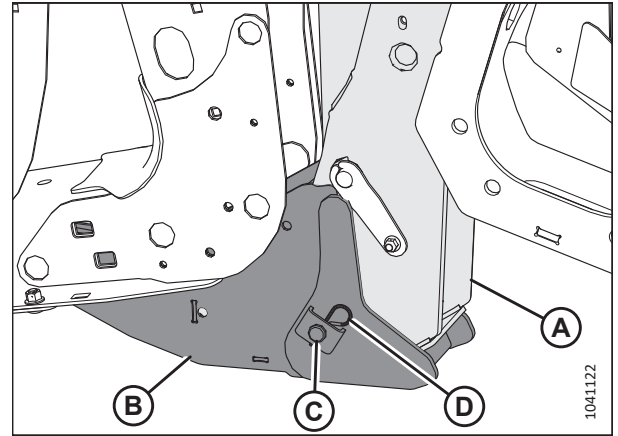


Figure 4.45: Windrower Lift Linkage and Header Leg

18. **If attaching the header to the windrower for the first time:** Install pin (B) through the header leg, engaging the header support in the lift linkages. Secure the pin with ring (A). Repeat this step on the other header leg.

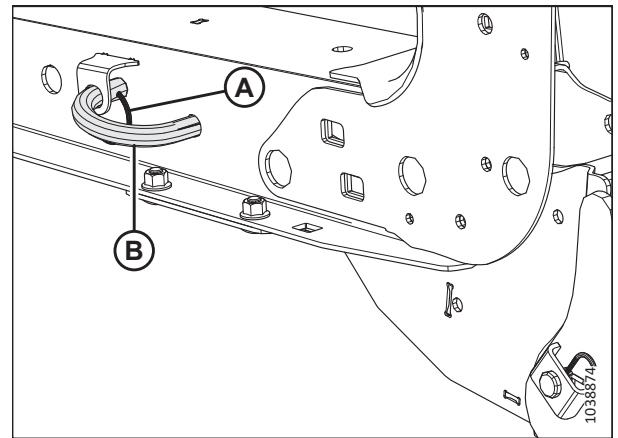


Figure 4.46: Header Leg

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.

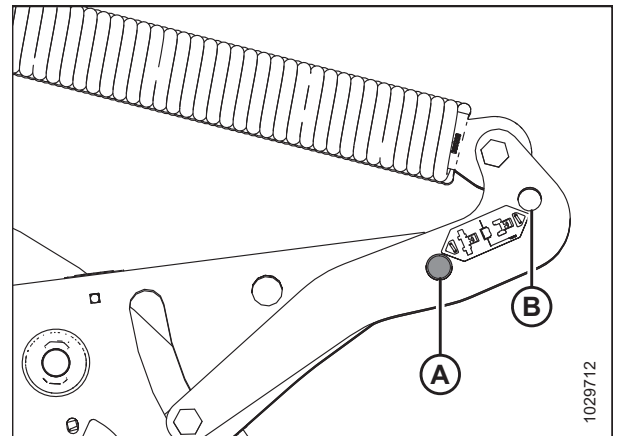


Figure 4.47: Header Float Linkage

## HEADER ATTACHMENT/DETACHMENT

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.

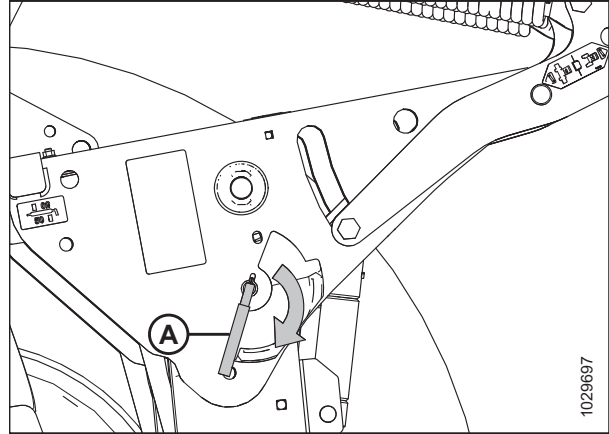


Figure 4.48: Safety Prop Lever

22. 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.
24. Proceed to [4.2.4 Connecting Header Hydraulics and Electrical System to M Series Windrower](#), page 160.

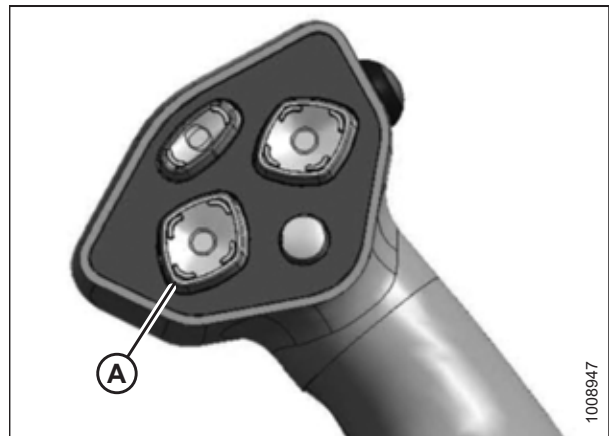


Figure 4.49: Ground Speed Lever

### 4.2.4 Connecting Header Hydraulics and Electrical System to M Series Windrower

The 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 the header, check the fittings and connectors. Clean them if required.



Figure 4.50: Header Drive Hoses

## HEADER ATTACHMENT/DETACHMENT

2. Disengage and rotate lever (A) counterclockwise to a fully upward 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.

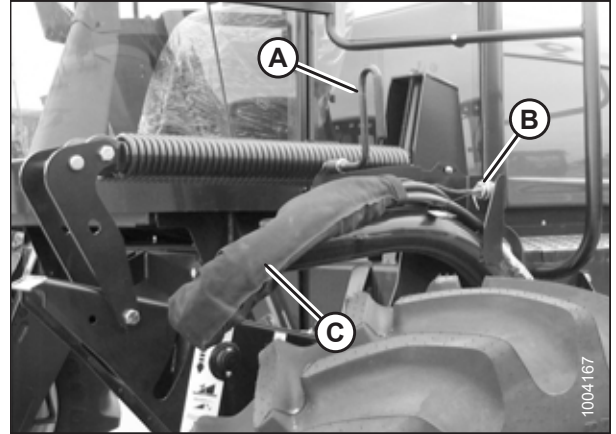


Figure 4.51: Header Drive Hoses

5. Push the hose connectors onto the mating receptacle until the collar on the receptacle snaps into place.
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.

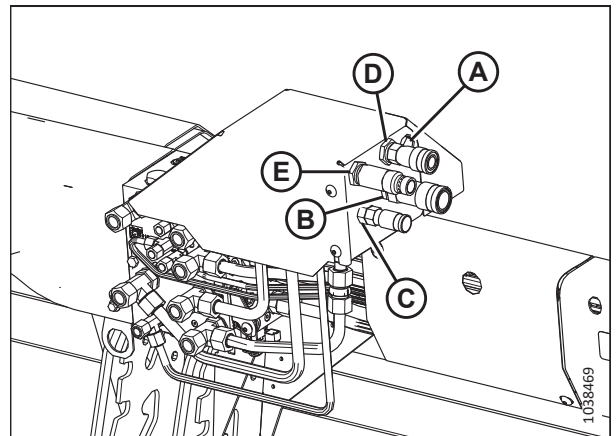


Figure 4.52: Header Receptacles

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

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

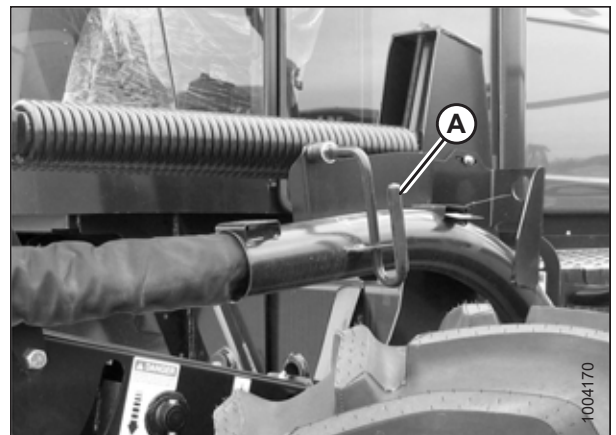


Figure 4.53: Hose Storage

## HEADER ATTACHMENT/DETACHMENT

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

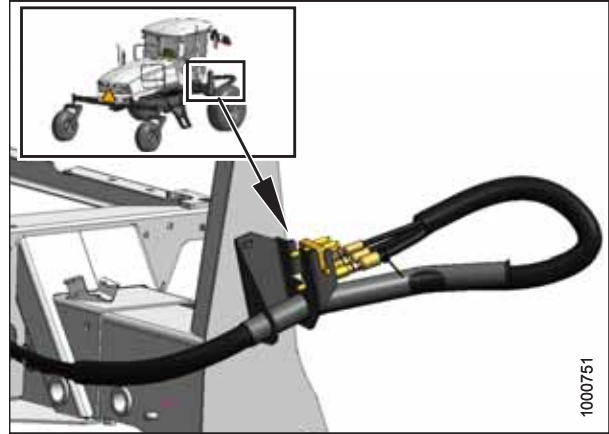


Figure 4.54: Reel Hose Storage

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

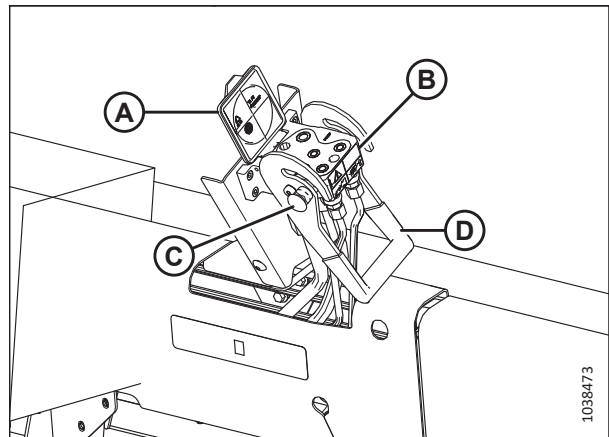


Figure 4.55: Reel Hydraulics Receptacle

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

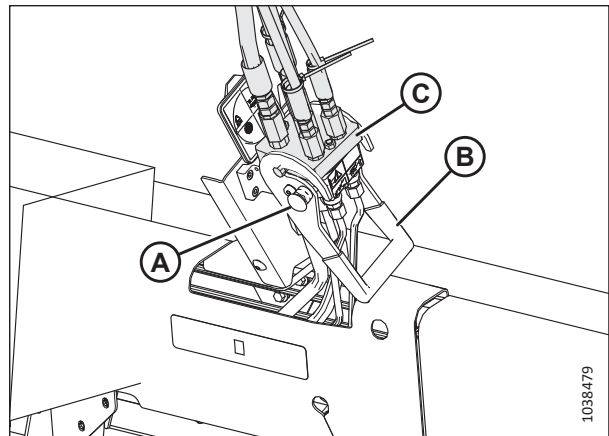


Figure 4.56: Reel Hose Connection

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

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

### **WARNING**

Ensure that all bystanders have cleared the area.

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

#### ***Disconnecting reel hydraulics:***

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

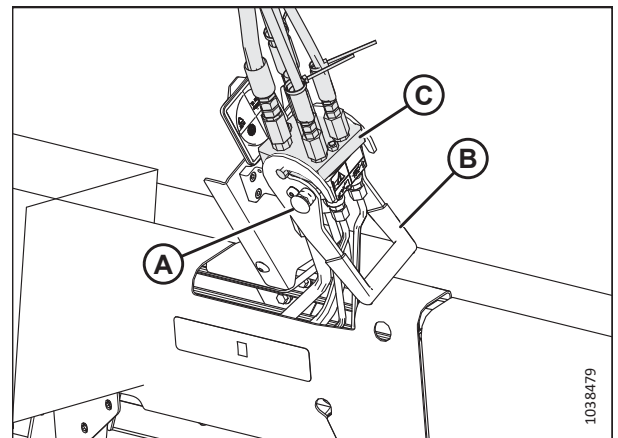


Figure 4.57: Reel Hydraulics

7. Close cover (A) on header receptacle.

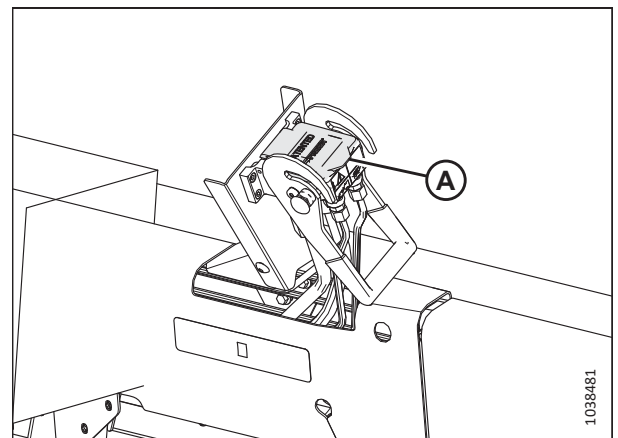


Figure 4.58: Closed Receptacle Cover

## HEADER ATTACHMENT/DETACHMENT

### *Disconnecting header drive hydraulics:*

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

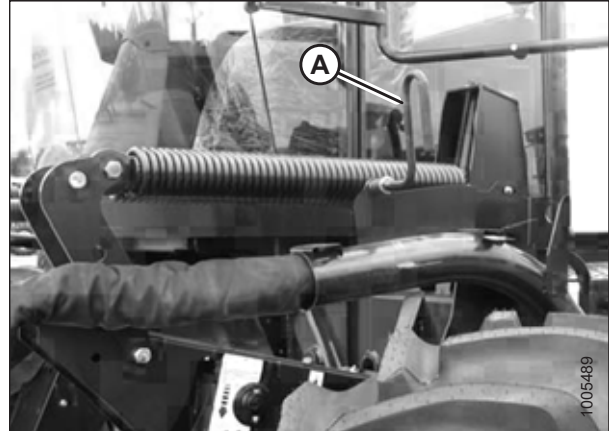


Figure 4.59: Header Drive Hydraulics

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

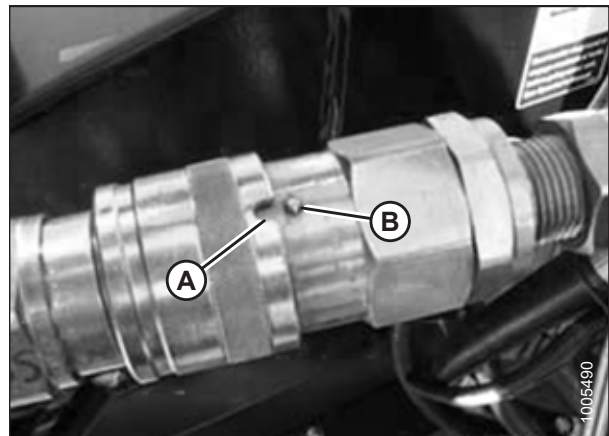


Figure 4.60: Quick Disconnect

### *Storing hose bundle on windrower support:*

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

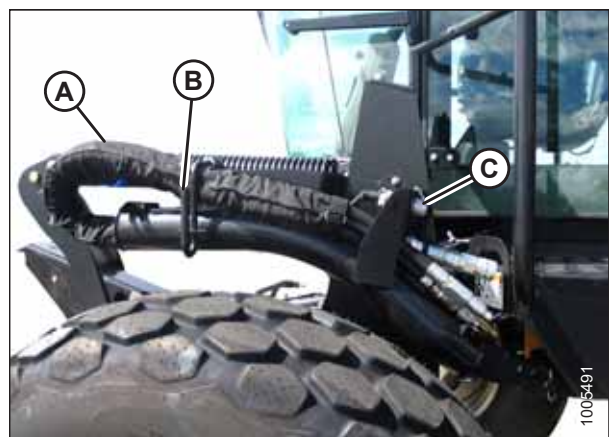


Figure 4.61: Hose Storage

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

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

**⚠ 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. 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 4.62: Ground Speed Lever (GSL)

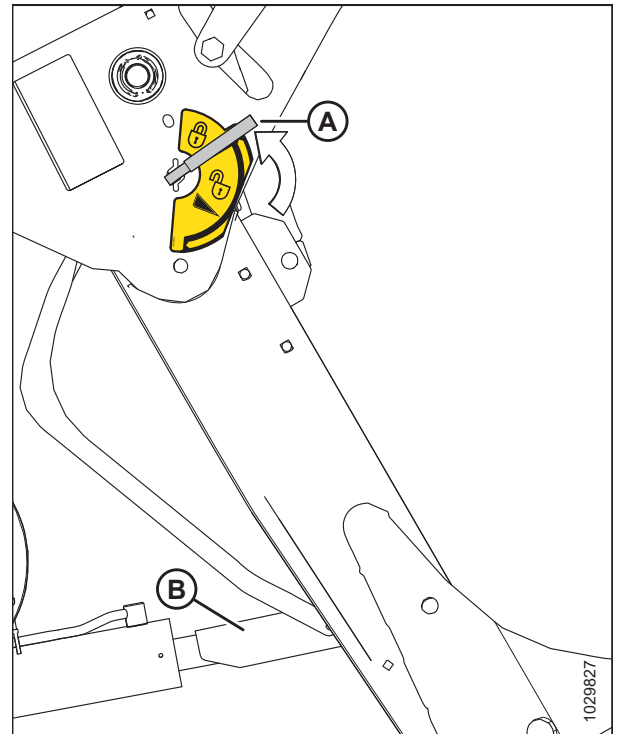


Figure 4.63: Safety Prop

## HEADER ATTACHMENT/DETACHMENT

- When the header is stored on the ground, the header supports must be raised off the ground for the windrower lift linkage to easily engage them. Position 165 mm (6 1/2 in.) blocks (A) below the header support stop plates.

**NOTE:**

If the ground is soft, place an additional 100 mm (4 in.) block (B) under the back of the header supports.

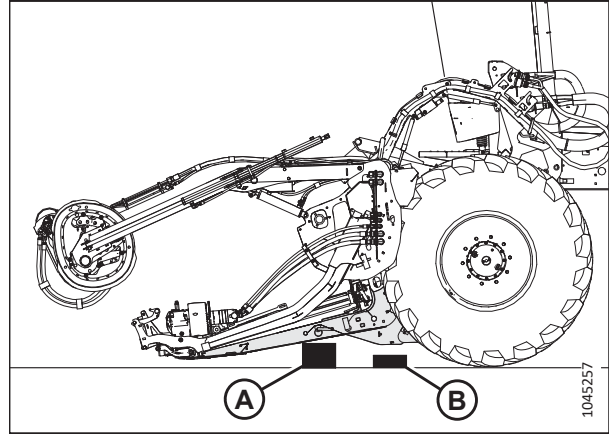


Figure 4.64: Setting Header on the Ground

- Remove and retain hairpin (D) and clevis pin (C) from header support (B) and windrower lift linkage (A). Repeat this step on the opposite side of the machine.

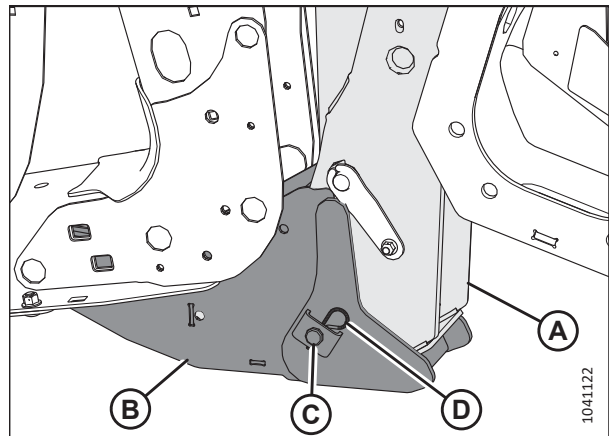


Figure 4.65: Header Leg and Windrower Lift Linkage Connected by Header Support

- Windrowers with self-aligning center-link:** Release center-link latch (A).

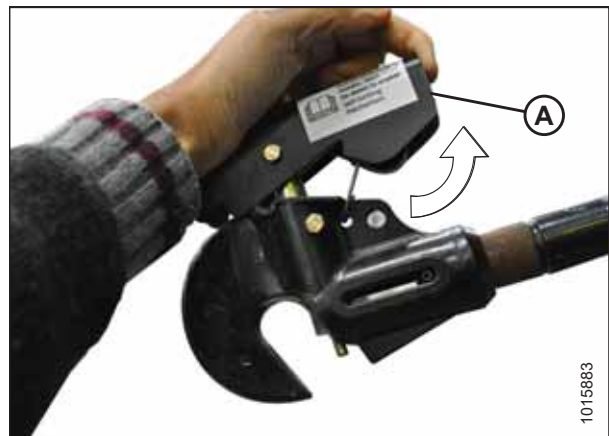


Figure 4.66: Center-Link



## HEADER ATTACHMENT/DETACHMENT

9. Remove the clevis pin from location (A) to disengage the float springs.
10. Insert the clevis pin in storage hole (B).
11. Secure the clevis with a 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).

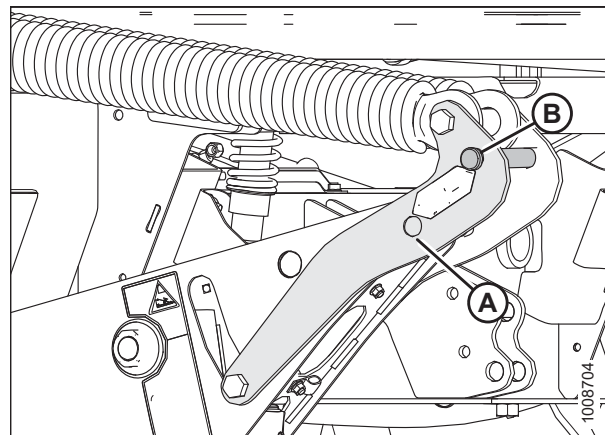


Figure 4.67: Header Float Linkage

12. 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.

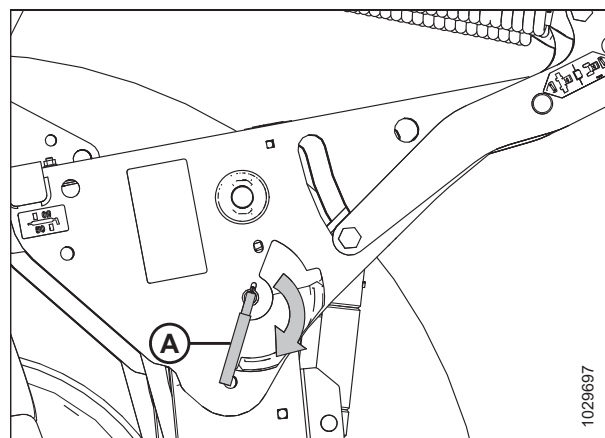


Figure 4.68: Safety Prop

13. Start the engine.
14. Lower the header fully using HEADER DOWN switch (A).
15. Activate HEADER TILT UP switch (B) or HEADER TILT DOWN switch (C) on the ground speed lever (GSL) to relieve the load on the center-link cylinder.

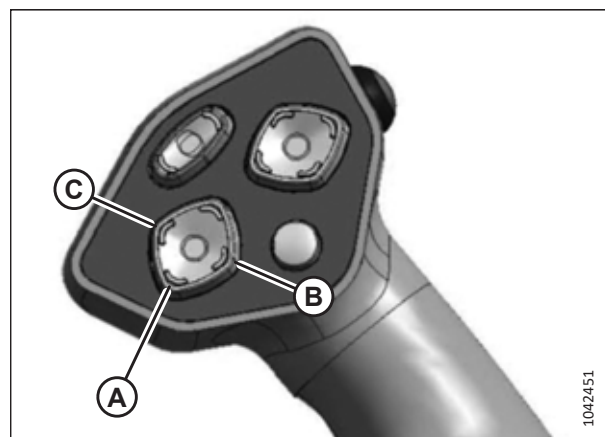


Figure 4.69: Ground Speed Lever

## HEADER ATTACHMENT/DETACHMENT

### 16. Windrowers with self-aligning center-link:

- a. Press REEL UP switch (A) to disengage the center-link from the header.
- b. Shut down the engine, and remove the key from the ignition.

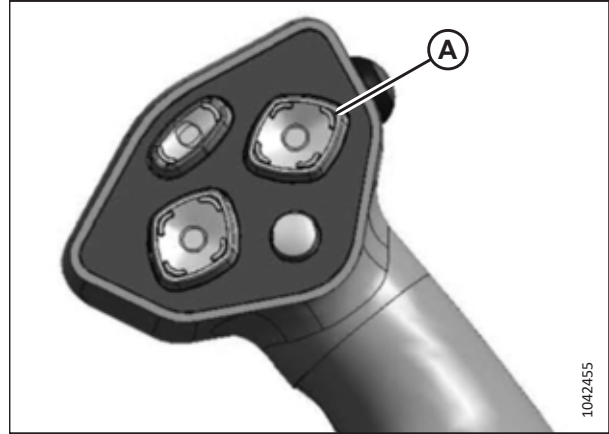


Figure 4.70: GSL

### 17. Windrowers without self-aligning center-link:

- a. Shut down 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.

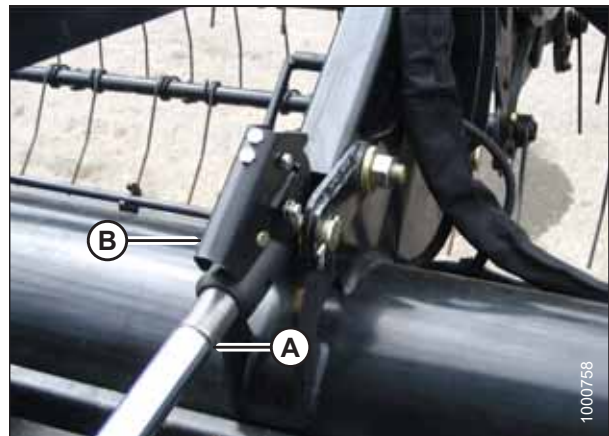


Figure 4.71: Hydraulic Center-Link

18. Reinstall clevis pin (B) into header support (C) and secure it with hairpin (A). Repeat this step on the opposite side.

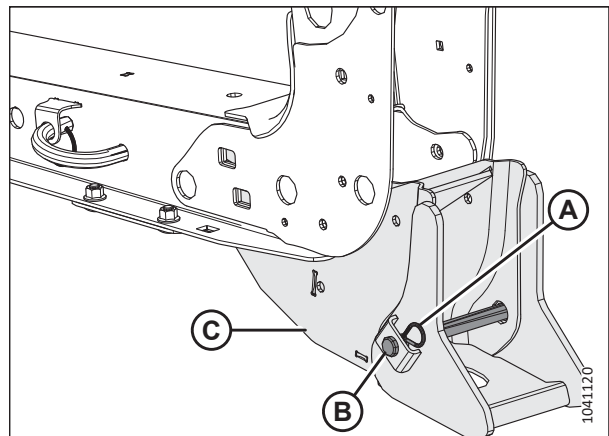


Figure 4.72: Header Leg and Support

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

Detaching a header equipped with a mechanical center-link from the windrower requires lowering the header on to blocks, 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 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. Press HEADER UP (A) switch to raise the header to its maximum height.
3. 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.
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 4.73: Ground Speed Lever

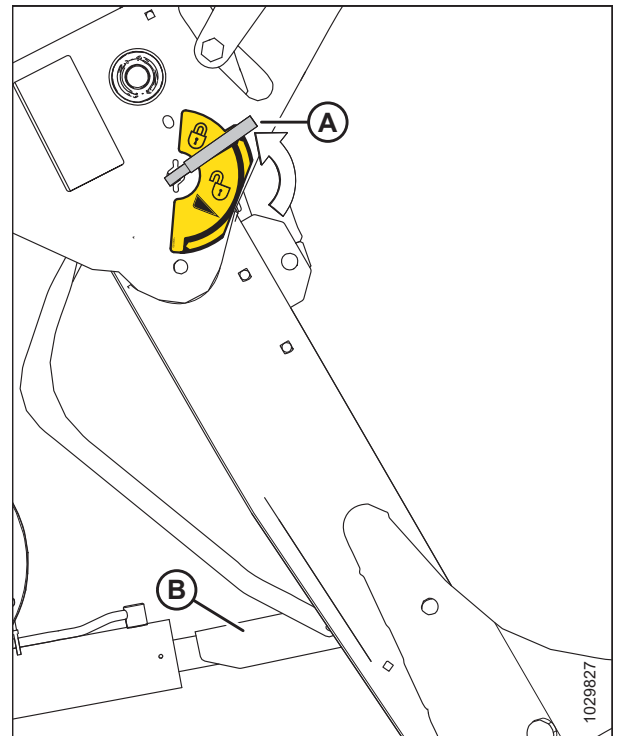


Figure 4.74: Safety Prop

## HEADER ATTACHMENT/DETACHMENT

6. Remove and retain hairpin (D) and clevis pin (C) from header support (B) and windrower lift linkage (A). Repeat this step on the opposite side of the machine.

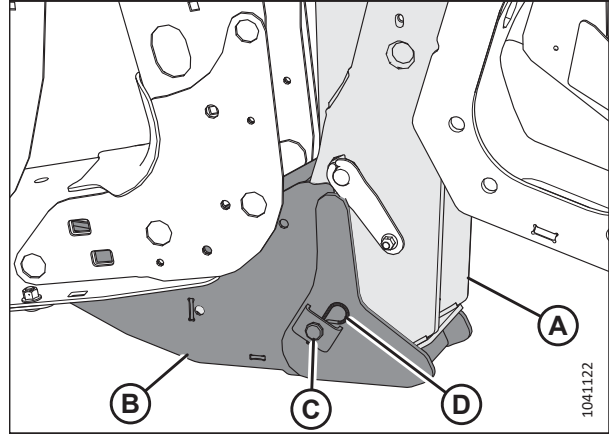


Figure 4.75: Header Leg and Windrower Lift Linkage Connected by Header Support

7. Remove the clevis pin from location (A) to disengage the float springs, and insert the clevis pin in storage hole (B). Secure the clevis pin 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 engagement position (A).

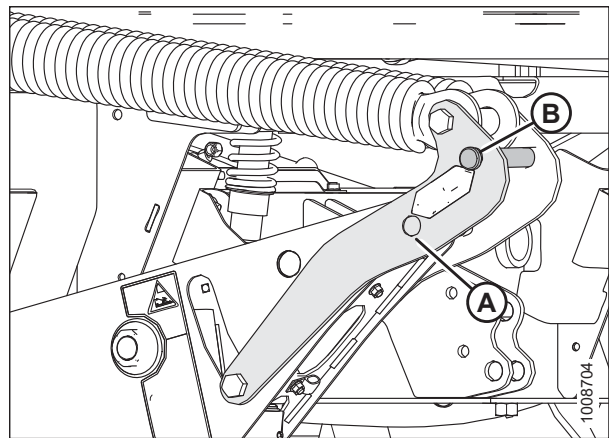


Figure 4.76: Header Float Linkage

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.

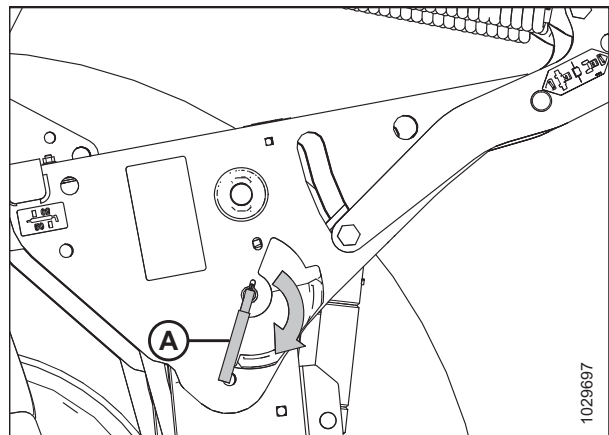


Figure 4.77: Safety Prop

## HEADER ATTACHMENT/DETACHMENT

9. Start the engine.
10. Lower the header fully using HEADER DOWN switch (A).
11. Shut down the engine, and remove the key from the ignition.

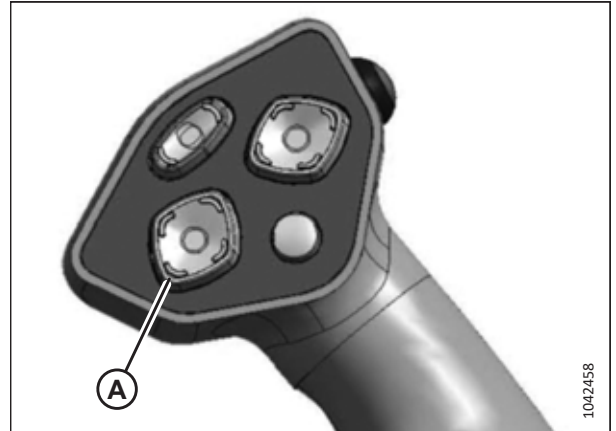


Figure 4.78: Ground Speed Lever

12. Loosen nut (A) and rotate barrel (B) to relieve the load on the link.
13. Remove cotter pin (D) and clevis pin (C).
14. Disconnect the mechanical center-link.
15. Reinstall clevis pin (C) in the center-link and secure the clevis pin with the cotter pin.
16. Tighten nut (A) against the barrel. A slight tap with a hammer should be sufficient.

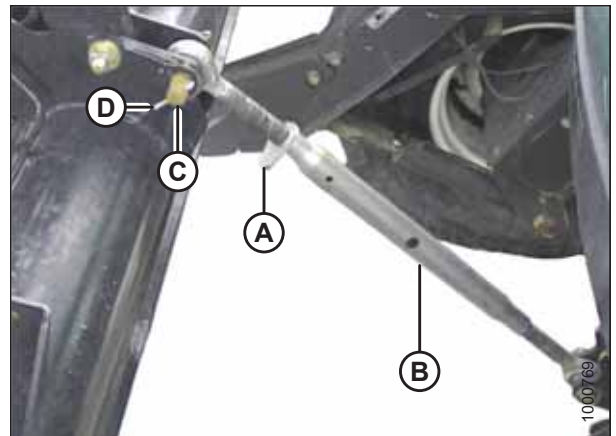


Figure 4.79: Mechanical Center-Link

17. If a hay conditioner is installed, ensure that it clears the windrower legs when the windrower is reversed.
18. Back the windrower away from the header.
19. Shut down the engine, and remove the key from the ignition.
20. Reinstall clevis pin (B) into header support (C) and secure it with hairpin (A). Repeat this step on the opposite side.

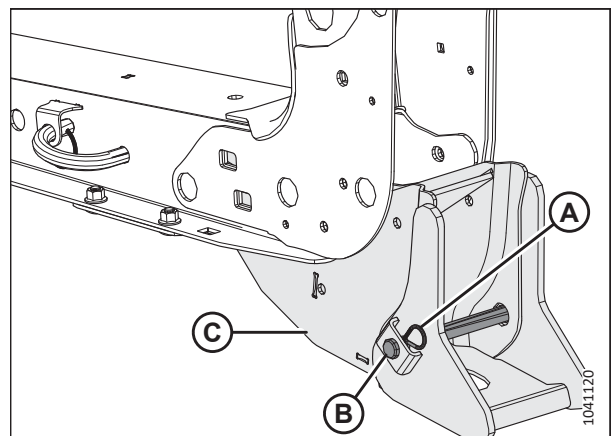


Figure 4.80: Header Leg and Support

### 4.3 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**

Ensure that all bystanders have cleared the area.

**⚠ 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 you are attaching the header to the windrower for the first time, draper header supports must be installed onto the windrower lift linkage before beginning this procedure. For instructions, refer to [4.1 Attaching Draper Header Supports](#), page 141.

1. Shut down the engine, and remove the key from the ignition.
2. **Narrow transport windrowers only:** Extend the windrower wheels from transport into field mode. For instructions, refer to the windrower operator's manual.
3. **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.

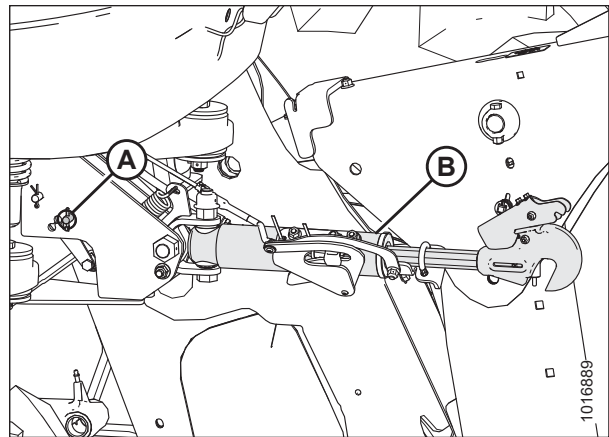


Figure 4.81: Center-Link without Self-Alignment

## HEADER ATTACHMENT/DETACHMENT

4. **Narrow transport windrowers only:** Rotate left signal light placard (A) to the up (vertical) position before connecting the windrower to the header.

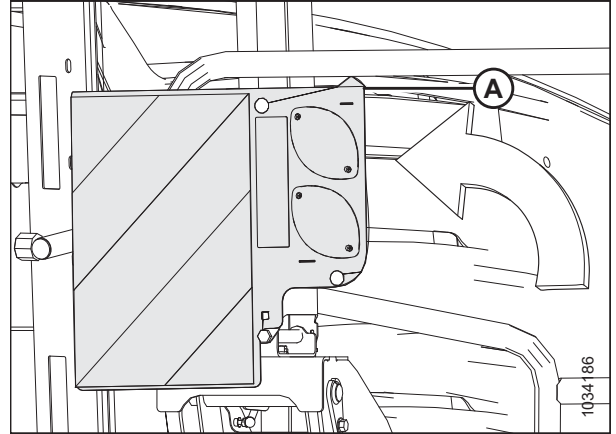


Figure 4.82: Left Signal Light Placard

5. **If reattaching the header to the windrower:** Remove and retain hairpin (A) and clevis pin (B) from header support (C). Repeat this step on the other header leg.

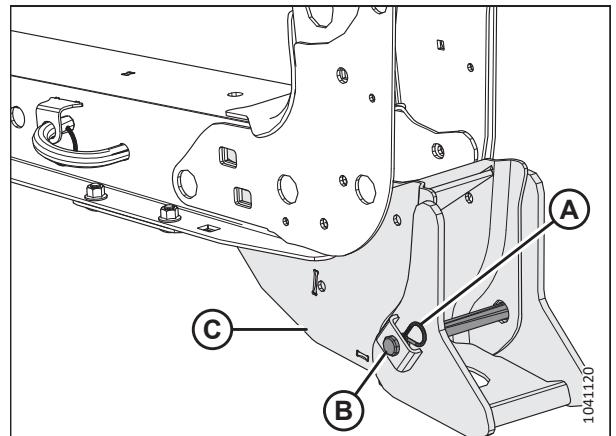


Figure 4.83: Header Support — Left Side Shown

6. **If attaching the header to the windrower for the first time:** Remove ring (A) from pin (B), and remove the pin from the header leg. Repeat this step on the other header leg.
7. Start the engine.

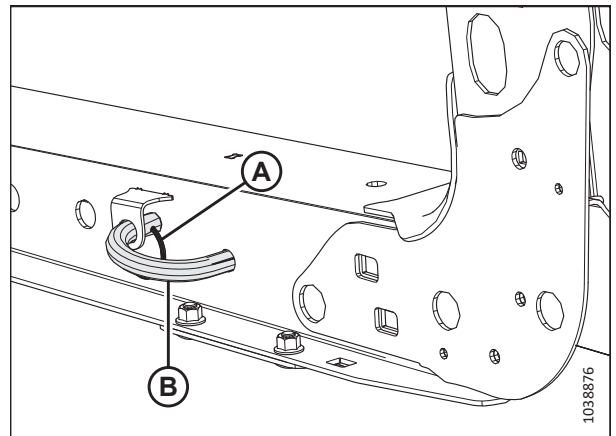


Figure 4.84: Header Leg

## HEADER ATTACHMENT/DETACHMENT

8. Release the tension in header float springs (A) by removing the header float.
  - If the Harvest Performance Tracker (HPT) displays a message saying that the float should be removed, then remove the float and proceed to Step 12, page 175.
  - If the Harvest Performance Tracker (HPT) does **NOT** display a message saying that the float should be removed, then proceed to Step 9, page 174 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.

9. In the windrower cab, press scroll knob (A) to display the QuickMenu page.
10. Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B) and press the scroll knob to select it.

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

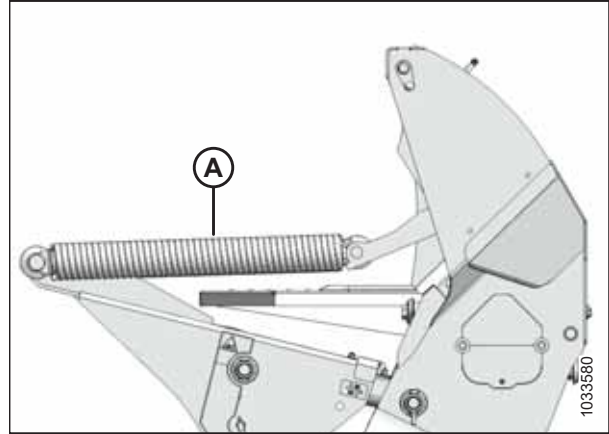


Figure 4.85: Header Float Springs



Figure 4.86: HPT Display



Figure 4.87: HPT Display



## HEADER ATTACHMENT/DETACHMENT

### 12. Windrowers equipped with the self-aligning center-link kit:

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

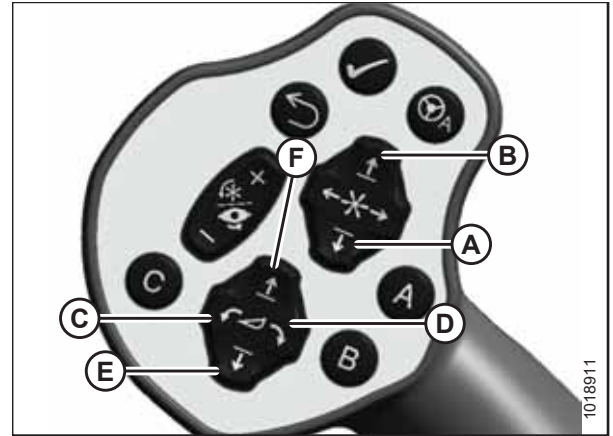


Figure 4.88: GSL Switches

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

- If reattaching the header to the windrower:** Slowly drive the windrower forward until windrower lift linkage (A) enter header supports (B). Continue driving slowly forward until the lift linkages contact the header supports in the header legs and the header nudges forward.

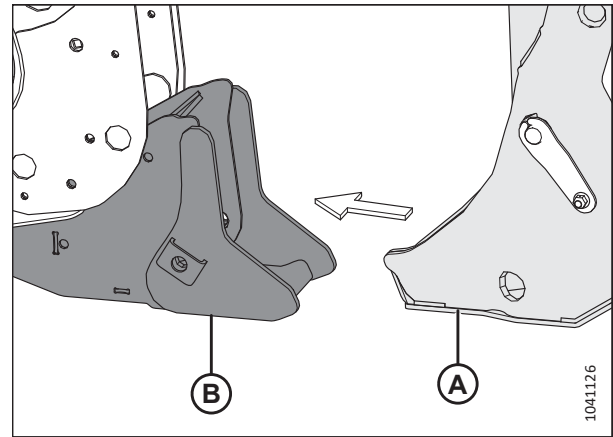


Figure 4.89: Header Leg and Support

- If attaching the header to the windrower for the first time:** Slowly drive the windrower forward until header supports (A) enter header legs (B). Continue driving slowly forward until the header supports contact the support plates in the header legs and the header nudges forward.
- Ensure that the lift linkages are properly engaged in the header legs and are in contact with the support plates.

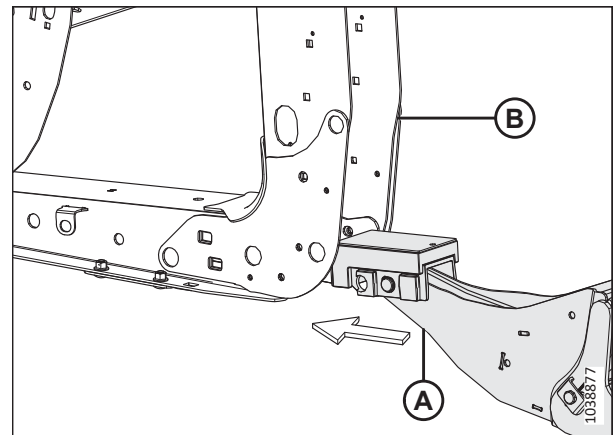


Figure 4.90: Header Leg and Support

## HEADER ATTACHMENT/DETACHMENT

### 16. 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.

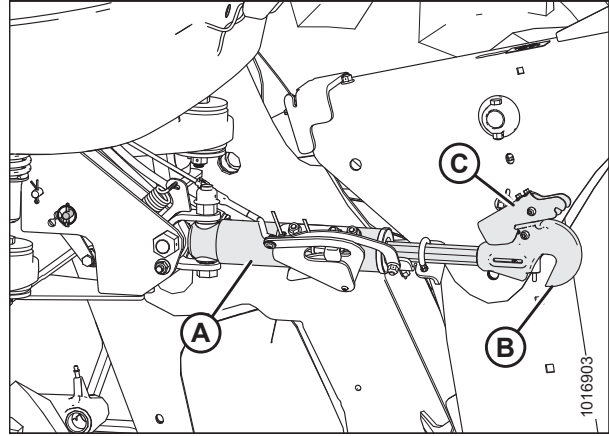


Figure 4.91: Hydraulic Center-Link

### 17. 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.

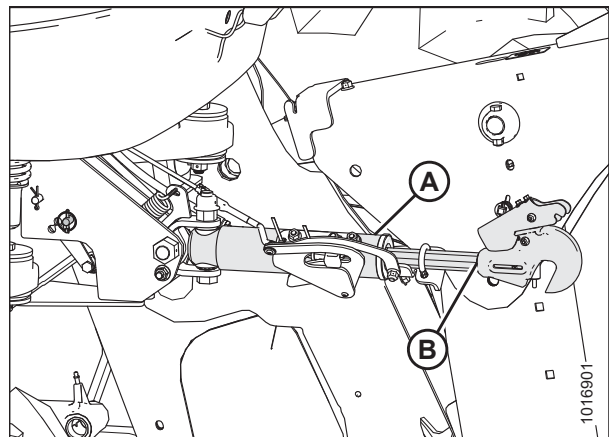


Figure 4.92: Hydraulic Center-Link

## HEADER ATTACHMENT/DETACHMENT

18. Press HEADER UP switch (A) to raise the header to its maximum height.
19. Shut down the engine, and remove the key from the ignition.

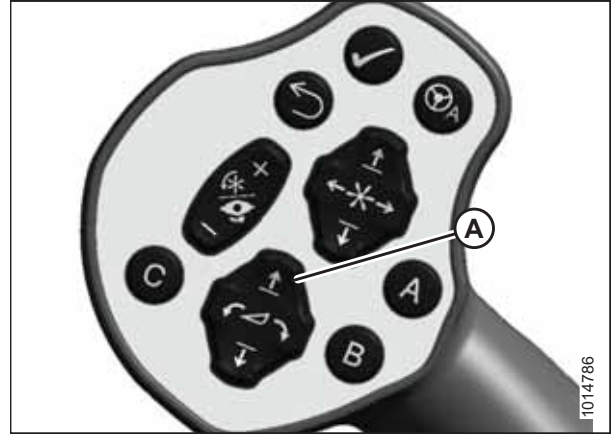


Figure 4.93: GSL

20. Engage the safety props on both lift cylinders as follows:
  - a. Pull lever (A) toward you to release it, 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.

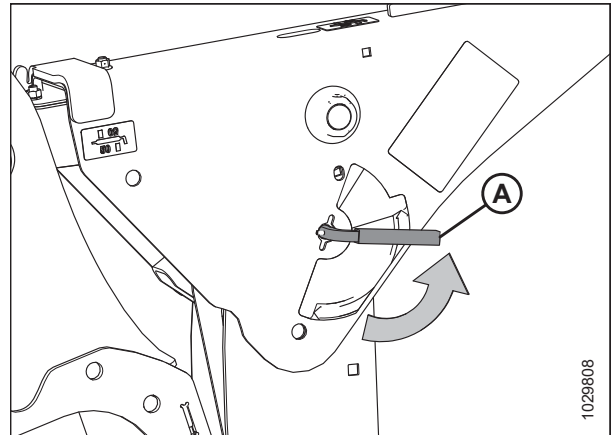


Figure 4.94: Safety Prop Lever

21. **If reattaching the header to the windrower:** Secure windrower lift linkages (A) to header supports (B) using clevis pin (C) and hairpin (D). Repeat this step on the opposite side of the machine.

**NOTE:**

**All windrower models EXCEPT narrow transport (NT):** to ensure that the pin does **NOT** snag the windrow, install the clevis pin on the outboard side of the draper header support.

**NOTE:**

**Narrow transport (NT) configured windrowers only:** to avoid contact with the tires, install the clevis pin on the inboard side of the draper header support.

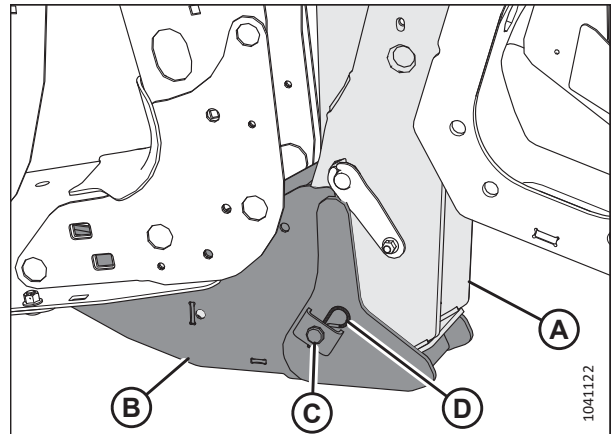


Figure 4.95: Windrower Lift Linkage and Header Leg

## HEADER ATTACHMENT/DETACHMENT

22. **If attaching the header to the windrower for the first time:** Install pin (B) through the header leg, engaging the header support in the lift linkages. Secure the pin with ring (A). Repeat this step on the other header leg.

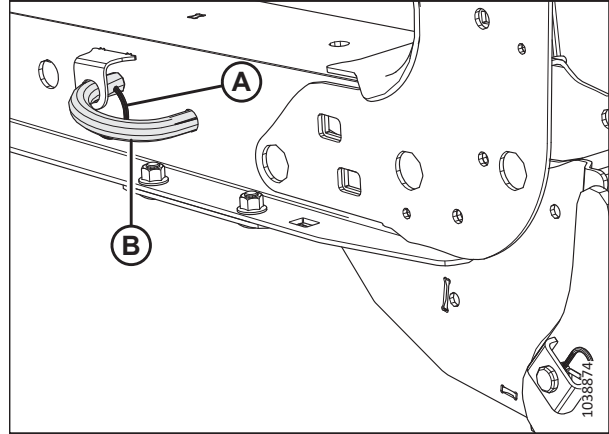


Figure 4.96: Header Leg

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

**NOTE:**

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

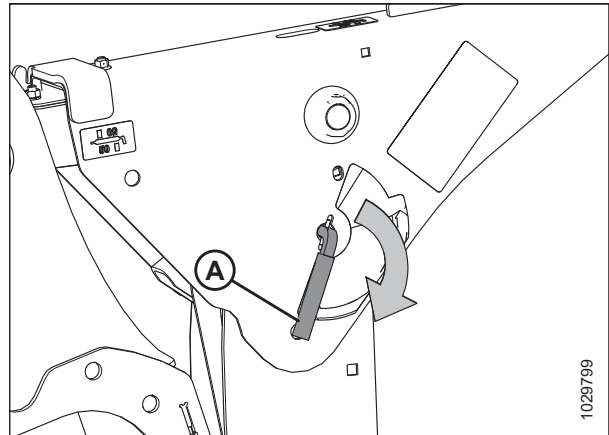


Figure 4.97: Safety Prop Lever

24. Start the engine.
25. Press HEADER DOWN switch (A) on the GSL to fully lower the header.
26. Shut down the engine, and remove the key from the ignition.

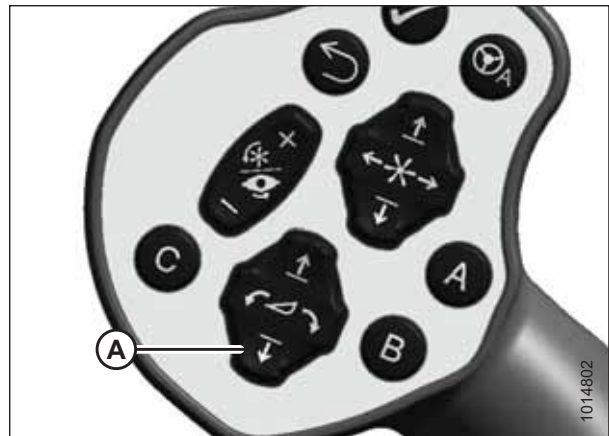


Figure 4.98: GSL

### 4.3.1 Connecting Header Hydraulics to M1 Series Windrower

To connect the header hydraulics to an M1 Series Windrower, approach from the left side, secure the platform, and manage the hydraulic hose system by disengaging and connecting various components. Ensure proper alignment and connection of hydraulic hoses and electrical connectors, and finalize the setup by adjusting the platform and ensuring all latches are engaged.

**⚠ 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 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.

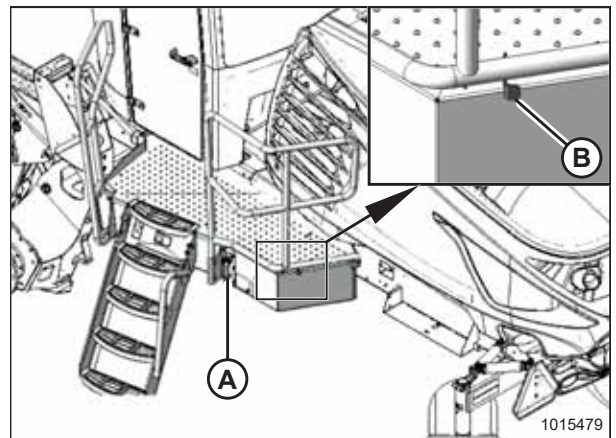


Figure 4.99: Left Platform

4. **All headers except D215:** Push lever (A) up and pull arm (B) to remove pin (C) from latch (D).

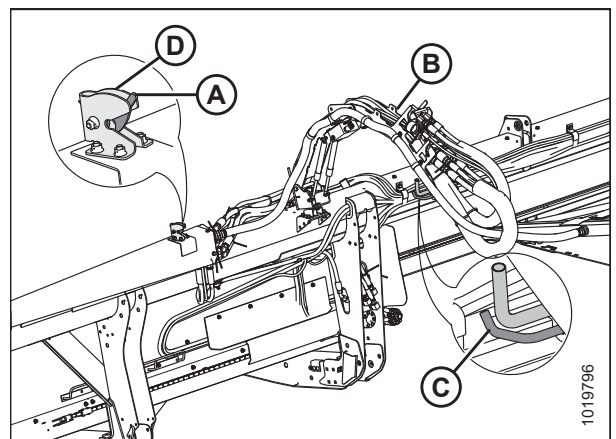


Figure 4.100: Hydraulic Hose Management System – All Headers Except D215

## HEADER ATTACHMENT/DETACHMENT

5. **D215 Draper Headers:** Pull hydraulic hose management system (A) toward the left outboard end of the header, and disengage ball stud (B) from the cradle in support (C).

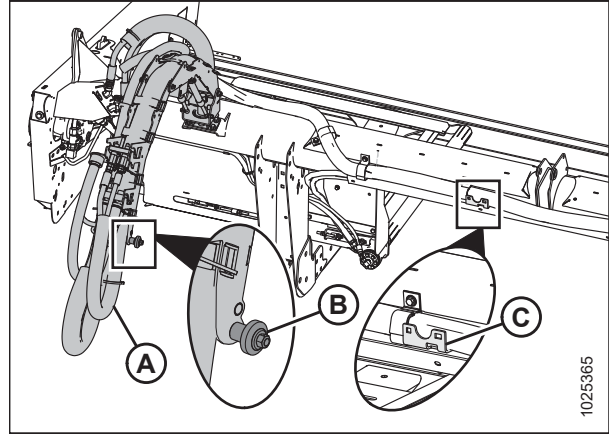


Figure 4.101: Hydraulic Hose Management System – D215

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.

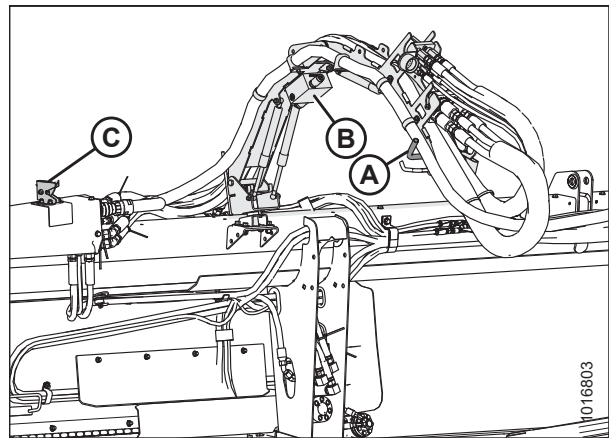


Figure 4.102: Hydraulic Hose Management System

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.

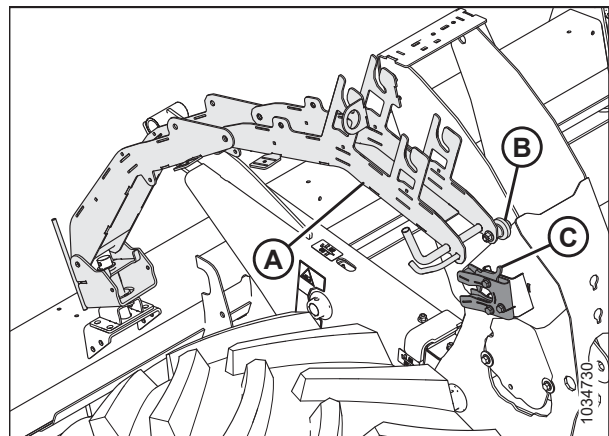


Figure 4.103: Windrower Left Outer Leg

## HEADER ATTACHMENT/DETACHMENT

9. Retrieve draper drive and reel control 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.
12. 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) pops out.
13. Remove hose quick disconnect (F) from its storage location. Connect the quick disconnect to the receptacle on the frame.
14. Remove the cover from electrical connector (E). Push the electrical connector onto the receptacle. Secure the connector by turning the collar on the electrical connector clockwise.
15. Retrieve knife and reel drive multicoupler (A) from the hydraulic hose management system.
16. Push knob (B) on the hydraulic receptacle and pull handle (C) fully away from the windrower.
17. 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) pops out.
18. Ensure that the hydraulic hose routing is as straight as possible.

### IMPORTANT:

Straight routing will prevent abrasion damage to the hydraulic hoses.

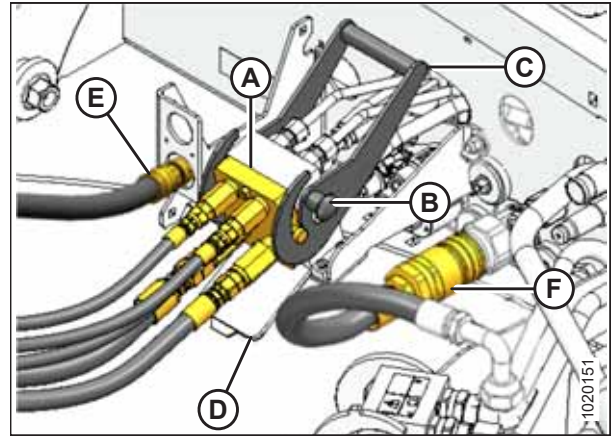


Figure 4.104: Draper/Reel Multicoupler

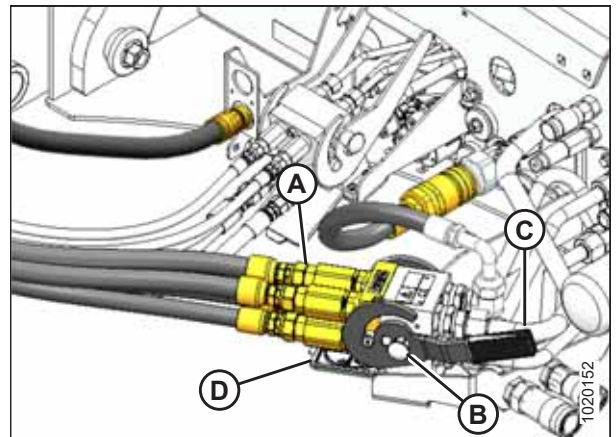


Figure 4.105: Knife/Reel Drive Multicoupler

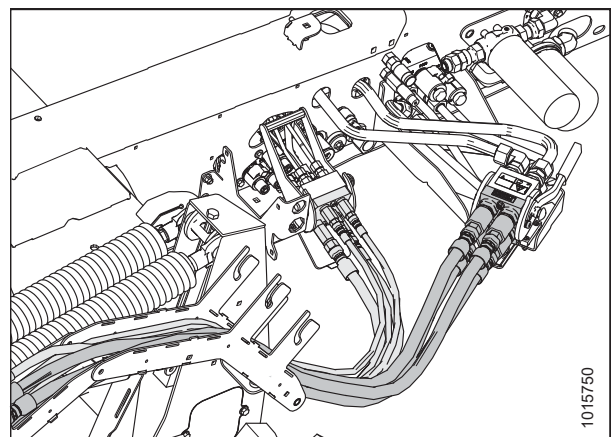


Figure 4.106: Hydraulic Multicouplers and Hose Routing

## HEADER ATTACHMENT/DETACHMENT

19. Push latch (A) to unlock platform (B).

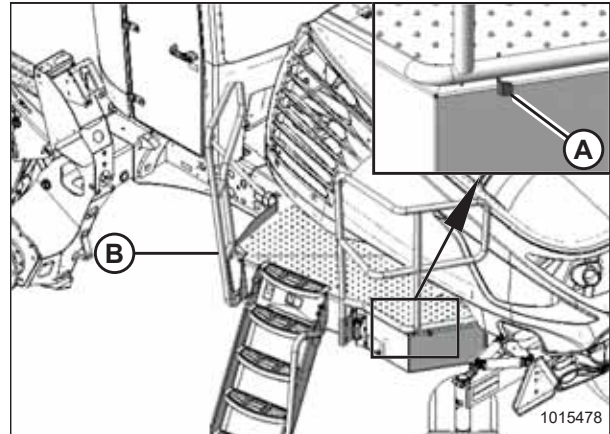


Figure 4.107: Left Platform

20. Pull platform (A) toward the cab until it stops and the latch is engaged.

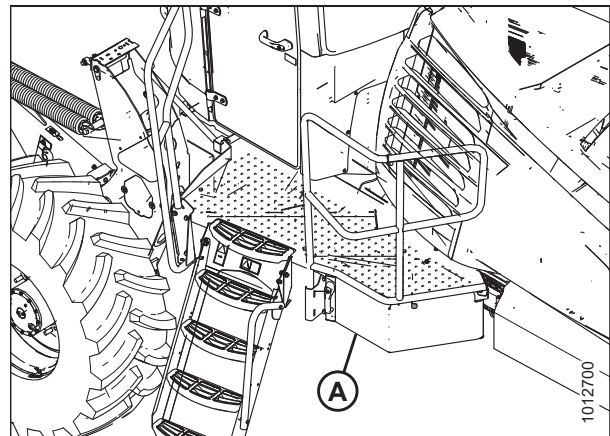


Figure 4.108: Left Platform

### 4.3.2 Detaching Header from M1 Series Windrower

The instructions in this section outline how to properly detach the header from 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.

#### WARNING

Ensure that all bystanders have cleared the area.

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



## HEADER ATTACHMENT/DETACHMENT

4. Approach platform (A) on the left side of the windrower. Ensure that the cab door is closed.
5. Push latch (B) and pull platform (A) toward the walking beam until it stops and the latch engages.

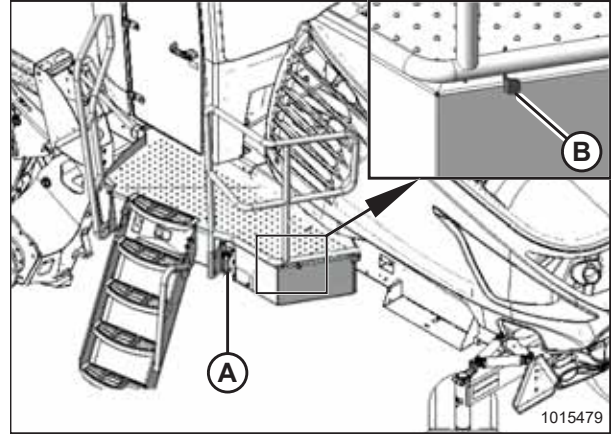


Figure 4.109: Left Platform

6. Push lock button (A) and pull handle (B) to disengage knife/reel drive 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.

7. Route the knife/reel drive hose bundle back to storage position (D) on the hydraulic hose management system.
8. Remove any debris that may have accumulated on the receptacle.
9. Close cover (E).

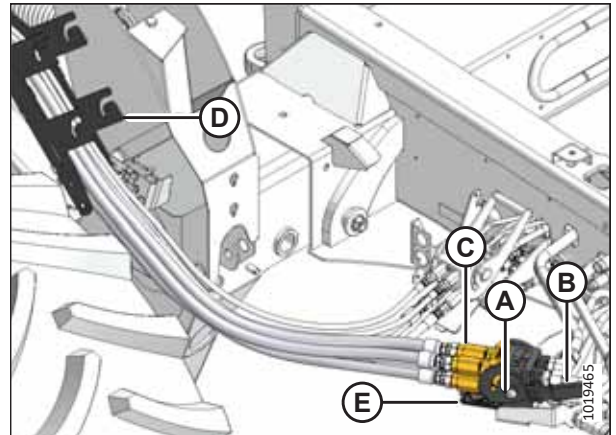


Figure 4.110: Knife/Reel Drive Multicoupler

10. Push lock button (B), and pull handle (C) to disengage draper/reel multicoupler (A). Disconnect the hydraulics from the windrower draper drive/reel lift receptacle.
11. Disconnect electrical connector (E).
12. Remove any debris that may have accumulated on the receptacle.
13. Close cover (D).

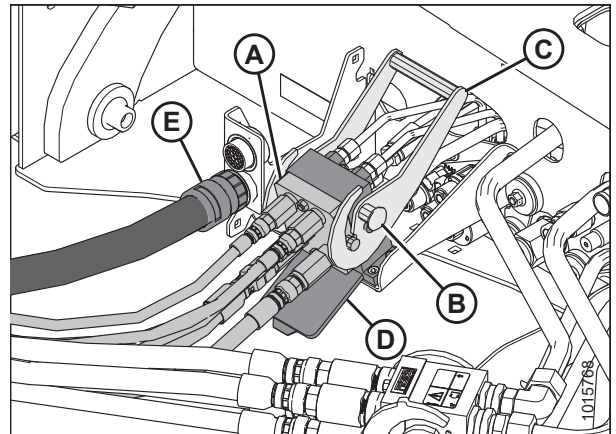


Figure 4.111: Draper/Reel Multicoupler

## HEADER ATTACHMENT/DETACHMENT

14. Route the draper drive/reel hose bundle back to storage position (A) on hydraulic hose management system (B).
15. Insert electrical connector into storage cup (C).

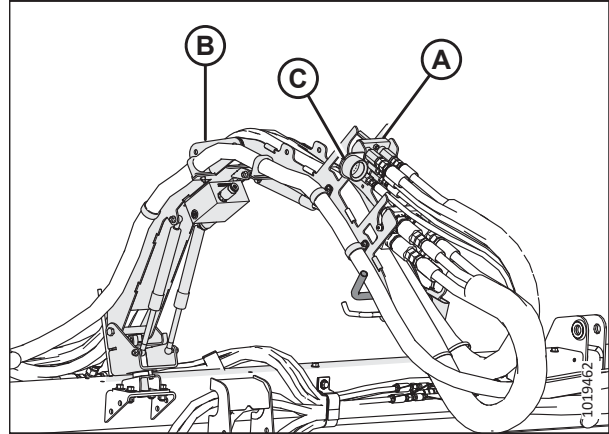


Figure 4.112: Hydraulic Hose Management System

16. Push latch (A) to unlock platform (B).

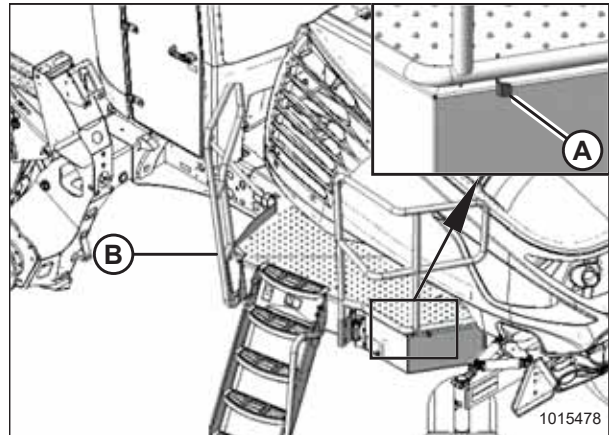


Figure 4.113: Left Platform

17. Pull platform (A) toward the cab until it stops and the latch is engaged.

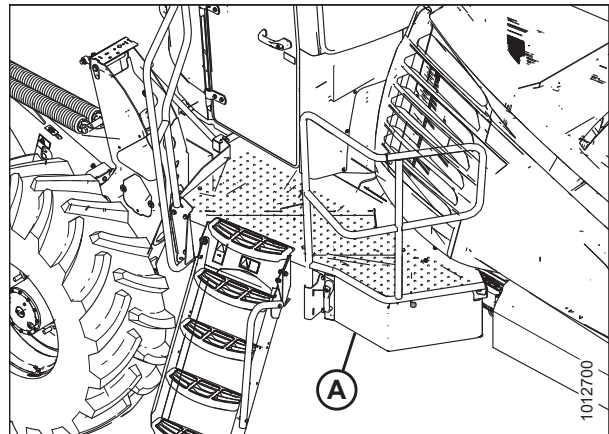


Figure 4.114: Left Platform

## HEADER ATTACHMENT/DETACHMENT

18. Disconnect hose management system (A) from the windrower by pulling latch lever (B) to open the latch.
19. Keep the latch open and move hose management system (A) away from the header with handle (C).

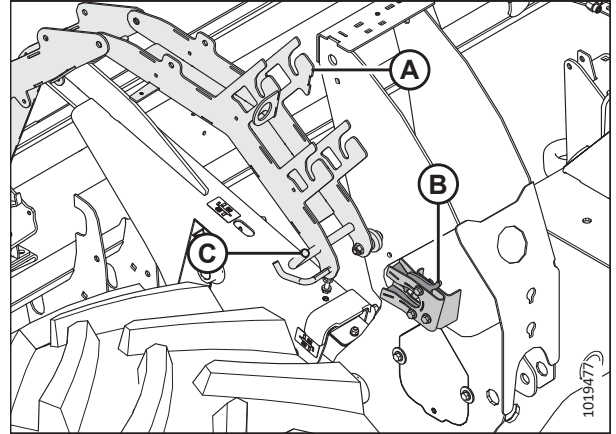


Figure 4.115: Hydraulic Hose Management System

20. Pivot hose management system (B) forward with handle (A), and engage hook (D) into latch (C) on the header.

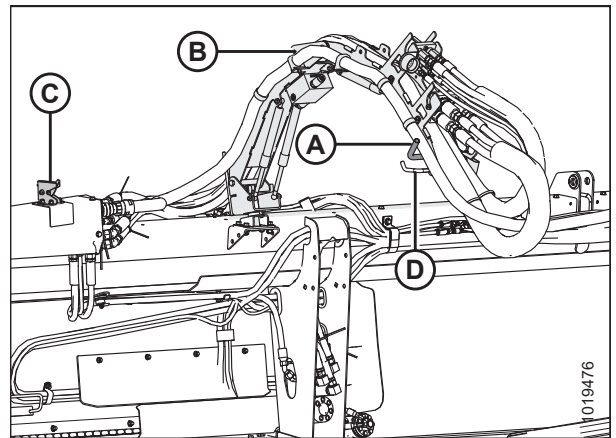


Figure 4.116: Hydraulic Hose Management System

21. When the header is stored on the ground, the header supports must be raised off the ground for the windrower lift linkage to easily engage them. Position 165 mm (6 1/2 in.) blocks (A) below the header support stop plates.

**NOTE:**

If the ground is soft, place an additional 100 mm (4 in.) block (B) under the back of the header supports.

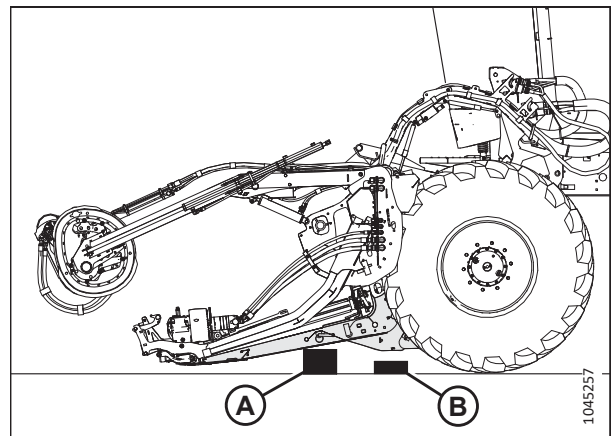


Figure 4.117: Setting Header on the Ground

## HEADER ATTACHMENT/DETACHMENT

22. Remove and retain hairpin (D) and clevis pin (C) from header support (B) and windrower lift linkage (A). Repeat this step on the opposite side of the machine.

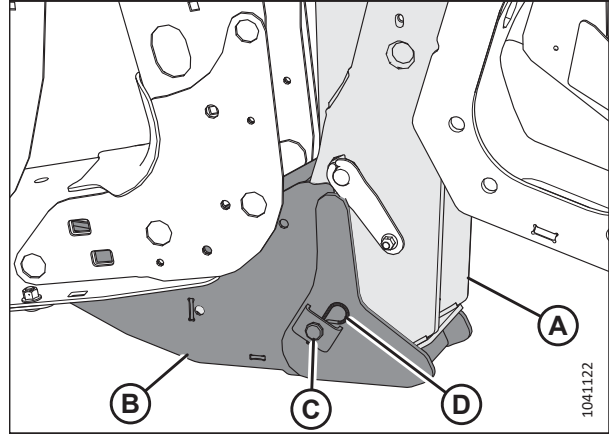


Figure 4.118: Header Leg and Windrower Lift Linkage Connected by Header Support

23. **Windrowers with self-aligning center-link:** Release center-link latch (A) before returning to the cab.

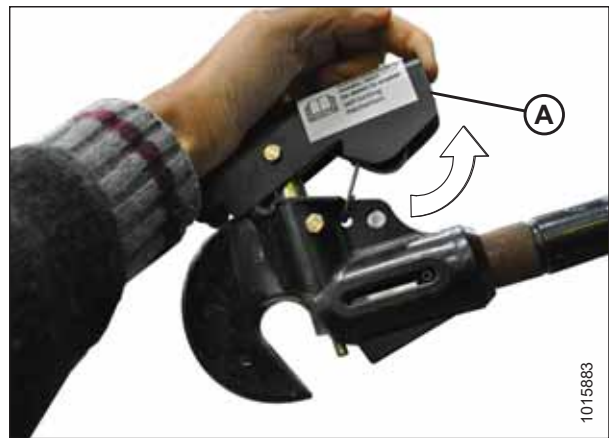


Figure 4.119: Center-Link

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

**NOTE:**

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

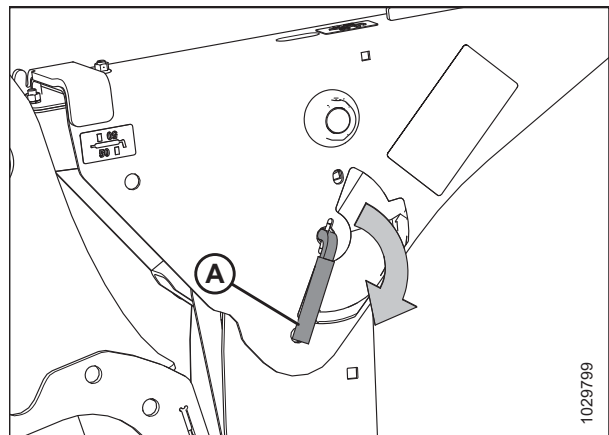


Figure 4.120: Safety Prop Lever

## HEADER ATTACHMENT/DETACHMENT

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

**NOTE:**

If you are not prompted by the Harvest Performance Tracker (HPT) to remove the float, remove it manually.

27. Lower the header to the ground with HEADER DOWN switch (A).
28. Press HEADER TILT switches (B) as needed on GSL to release the load on center-link.
29. **Windrowers with self-aligning center-link:**
  - a. Press REEL UP switch (C) to disengage the center-link from the header.
  - b. Proceed to Step 32, page 187.

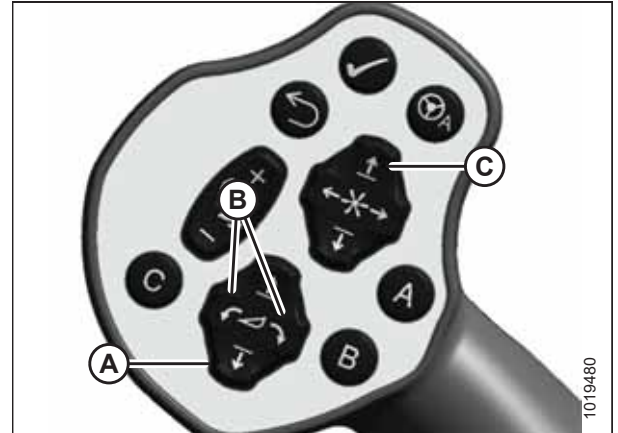


Figure 4.121: GSL

30. **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.
31. Back the windrower away from the header.

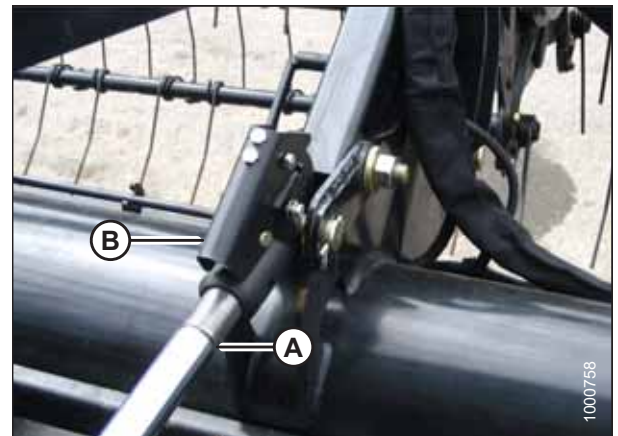


Figure 4.122: Hydraulic Center-Link

32. Reinstall clevis pin (B) into header support (C) and secure it with hairpin (A). Repeat this step on the opposite side.

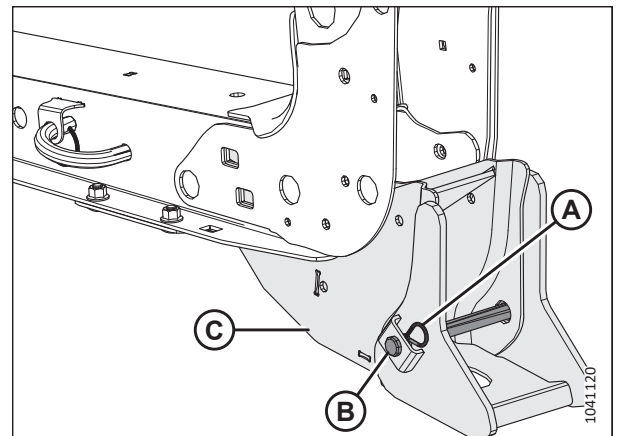


Figure 4.123: Header Support

## 4.4 Attaching Header to M2 Series Windrower

To attach the header to an M2 Series Windrower, remove any existing forming shields and ensure the draper header supports are properly installed. Prepare the header and center-link, align the lift linkages, and securely lock the center-link onto the header attachment pin. Finally, raise the header, engage the safety props, and set up the float system as needed.

### DANGER

Ensure that all bystanders have cleared the area.

### 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. Shut down the engine, and remove the key from the ignition.
2. If the windrower was previously attached to an R216 Rotary Disc Header, make sure to remove the forming shield (not shown), including forming shield support brackets (A) and hardware (B) from both legs. You can store the brackets and hardware in the windrower tool box.

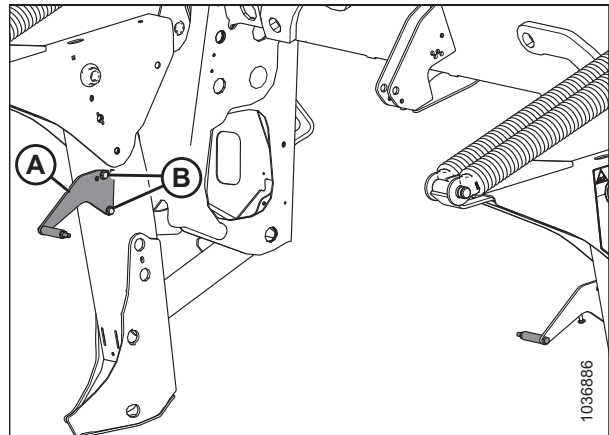


Figure 4.124: Forming Shield bracket – R2 Series

## HEADER ATTACHMENT/DETACHMENT

3. Before beginning this procedure, ensure draper header supports (A) are either:

- (B) Installed on the windrower lift linkages, or
- (C) Installed in the header legs

For instructions on installing the header supports onto the windrower, refer to [4.1 Attaching Draper Header Supports](#), [page 141](#). Header supports are typically left installed in the header legs when the header is detached from the windrower.

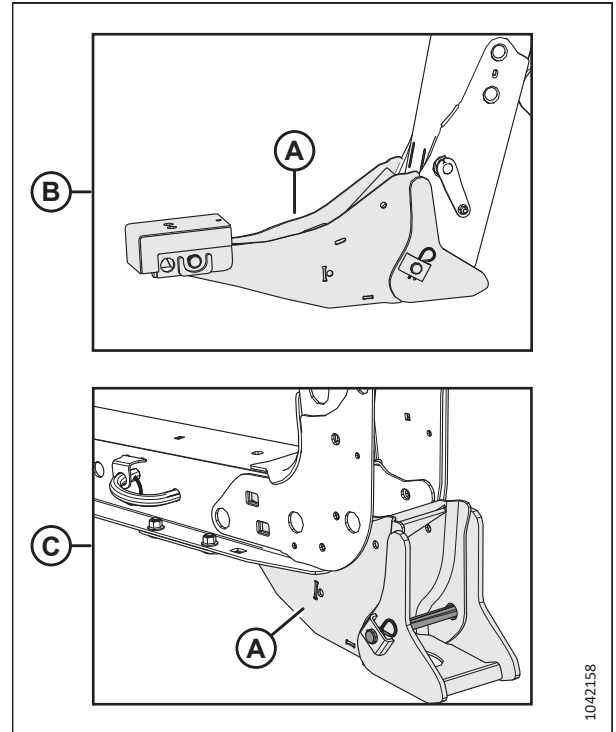


Figure 4.125: Header Supports Installed

4. **Narrow transport windrowers:** Extend the windrower wheels from narrow transport into field mode. For instructions, refer to the windrower operator's manual.
5. **Narrow transport windrowers:** Rotate left signal light placard (A) to the up (vertical) position before connecting the windrower to the header.

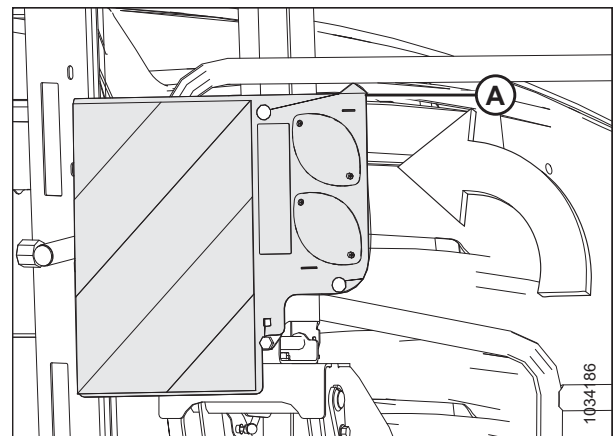


Figure 4.126: Left Signal Light Placard

## HEADER ATTACHMENT/DETACHMENT

6. Prepare the header as follows:

- **If the header supports are installed on the windrower:**  
Remove ring (A) and pin (B) from the header leg.
- **If the header supports are installed in the header:**  
Remove hairpin (C) and clevis pin (D) from the header support.

Repeat this step on the other header leg.

7. Start the engine.

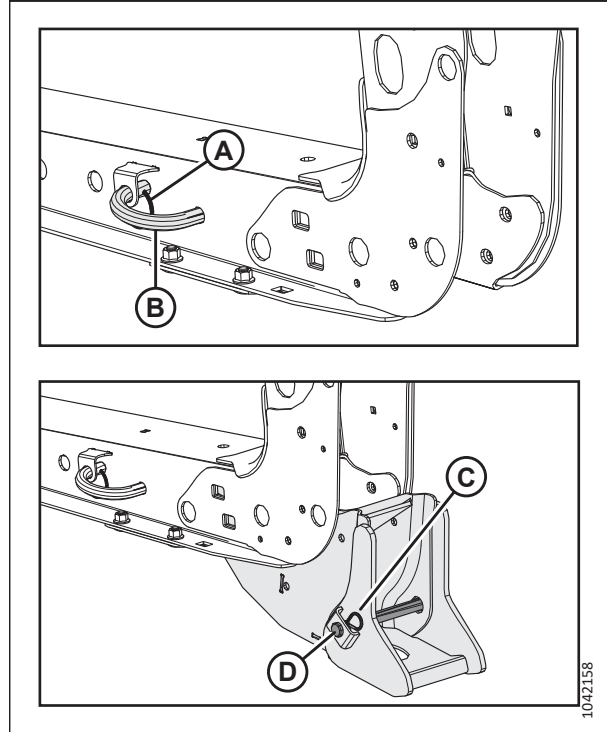
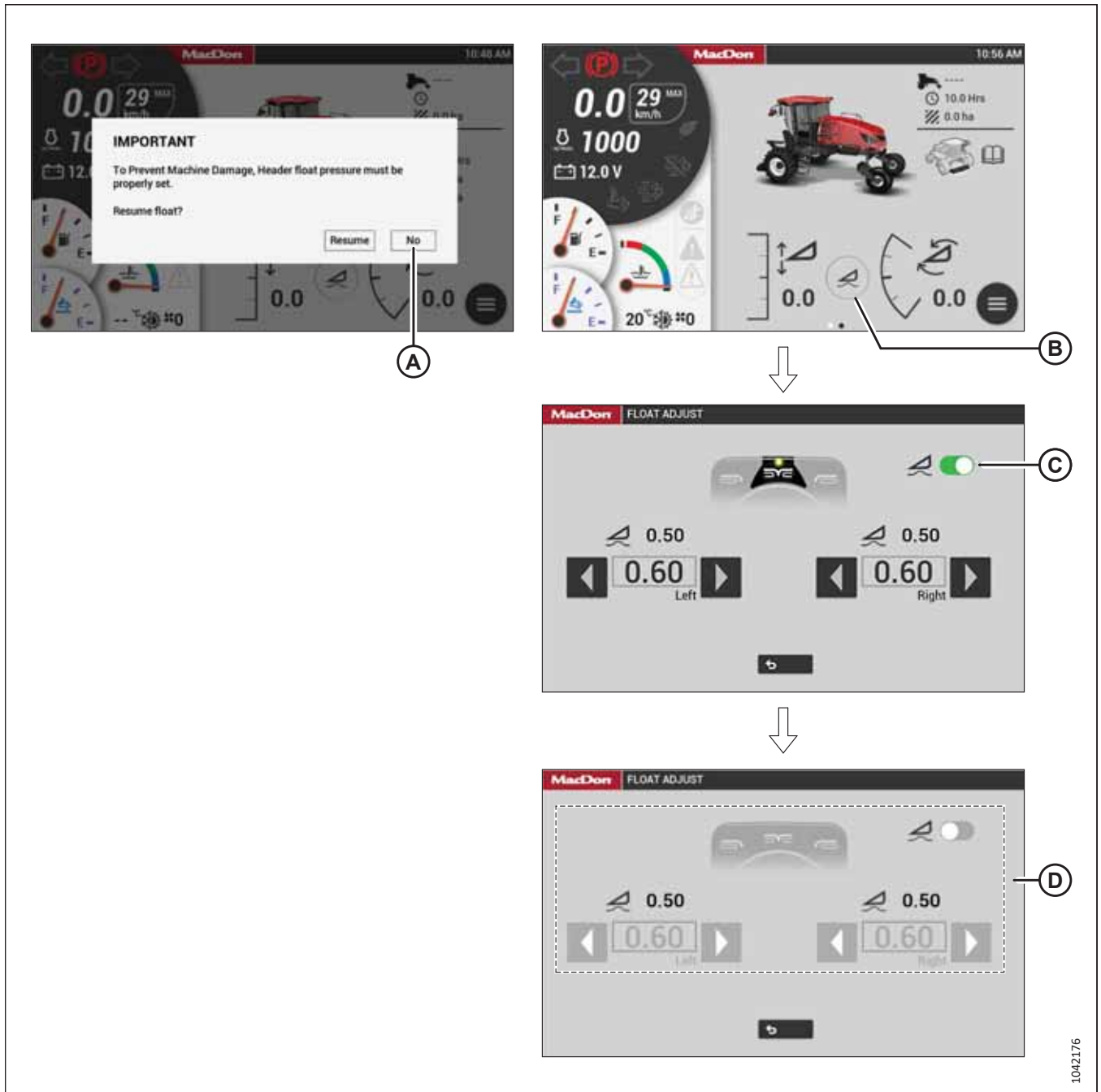


Figure 4.127: Header Leg — Left Side Shown



## HEADER ATTACHMENT/DETACHMENT



**Figure 4.128: Float Removal**

8. Remove the float as follows:

- If the HarvestTouch™ Display shows the message “Resume Float?”, then select NO (A).
- If the HarvestTouch™ Display does **NOT** show the message, then select FLOAT ADJUST (B), select switch (C), and confirm the switch and float settings (D) are grayed out.

### **IMPORTANT:**

Removing the float will release the tension in the float springs. This will prevent damage to the header lift linkages when lowering the legs without a header or weight box attached to the windrower.

## HEADER ATTACHMENT/DETACHMENT

9. Prepare the center-link as follows:

- **If not equipped with the Center-Link Alignment 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.
- **If equipped with the Center-Link Alignment kit:** Press REEL UP switch (D) on the ground speed lever (GSL) to raise the center-link 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.

10. Press HEADER DOWN switch (C) on the GSL until the windrower lift linkages are fully lowered.

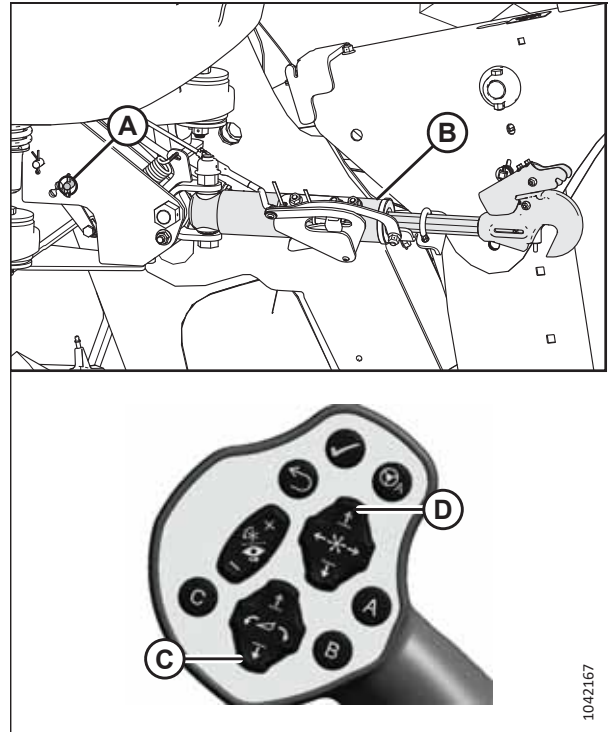


Figure 4.129: Center-Link without Self-Alignment

11. Proceed as follows:

- **If the header supports are installed on the windrower:** Drive the windrower slowly forward until header supports (A) enter header legs (B).
- **If the header supports are installed in the header:** Drive the windrower slowly forward until windrower lift linkages (C) enter header supports (D) in the header legs.

Continue driving slowly forward until the header is nudged forward.

12. Ensure that the lift linkages are properly engaged in the header legs and are in contact with the support plates.

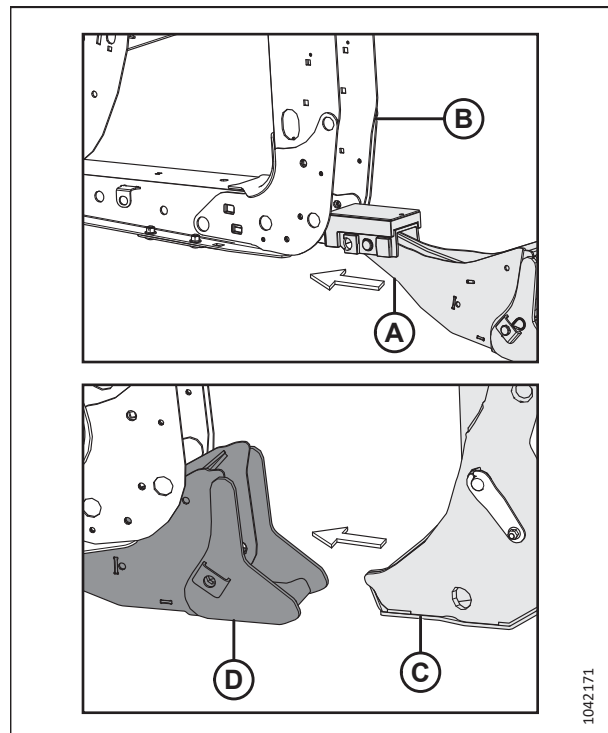


Figure 4.130: Header Leg and Support

## HEADER ATTACHMENT/DETACHMENT

### 13. Windrowers equipped with the Center-Link Alignment kit:

- Press HEADER TILT UP (A) or HEADER TILT DOWN (B) switches on the GSL to extend or retract the center-link cylinder until hook (C) is aligned with the header attachment pin.
- Lower the center-link onto the header with REEL DOWN (D) switch on the GSL until the center-link locks into position and hook release (E) is down.

#### IMPORTANT:

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

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

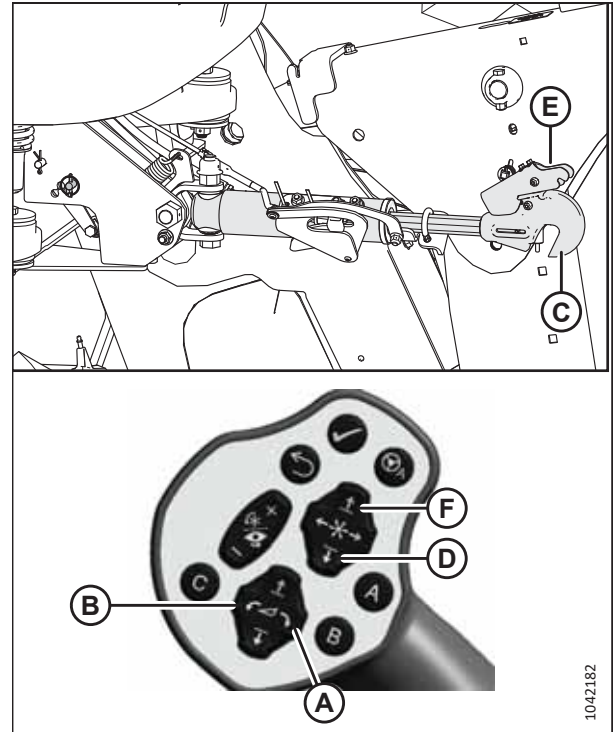


Figure 4.131: Hydraulic Center-Link

### 14. Windrowers without the Center-Link Alignment kit:

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

#### IMPORTANT:

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

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

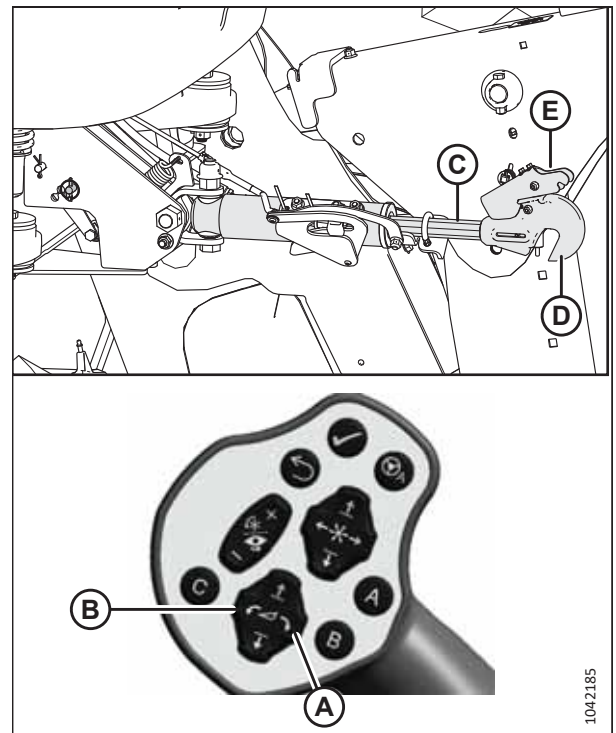


Figure 4.132: Hydraulic Center-Link

## HEADER ATTACHMENT/DETACHMENT

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

**NOTE:**

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

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

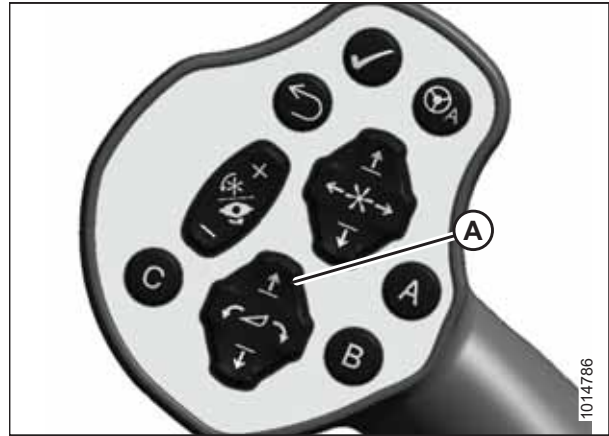


Figure 4.133: Ground Speed Lever (GSL)

17. Engage the safety props on both lift cylinders as follows:
  - a. Pull lever (A) toward you to release it, 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.

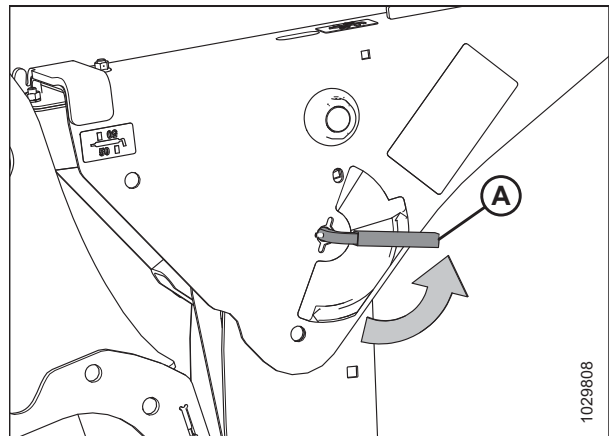


Figure 4.134: Safety Prop Lever

## HEADER ATTACHMENT/DETACHMENT

18. Proceed as follows:

- **If the header supports are installed on the windrower:**  
Install pin (B) through the header leg, engaging the header support in the lift linkage. Secure the pin with ring (A).
- **If the header supports are installed in the header:**  
Secure windrower lift linkage (C) to header supports (D) using clevis pin (E) and hairpin (F).

**NOTE:**

**All windrower models EXCEPT narrow transport (NT):** to ensure that the pin does **NOT** snag the windrow, install the clevis pin on the outboard side of the draper header support.

**NOTE:**

**Narrow transport (NT) configured windrowers only:** to avoid contact with the tires, install the clevis pin on the inboard side of the draper header support.

Repeat this step on the other header leg.

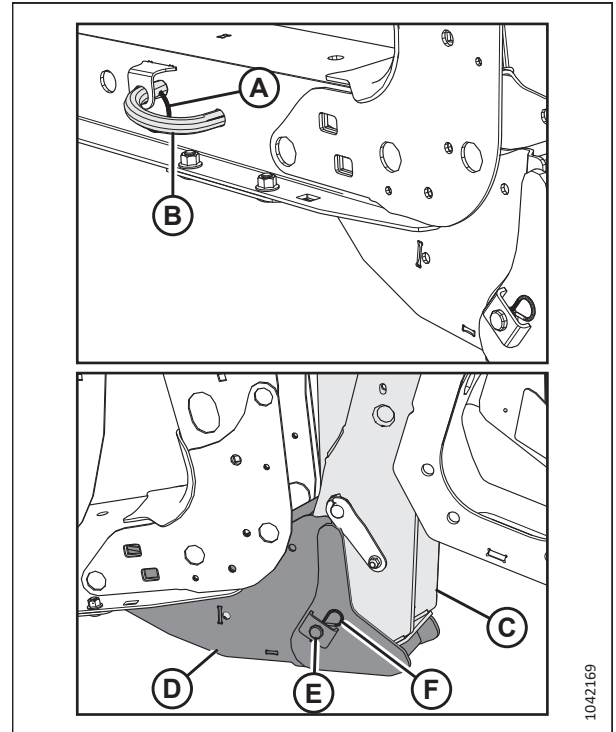


Figure 4.135: Windrower Lift Linkage and Header Leg

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.

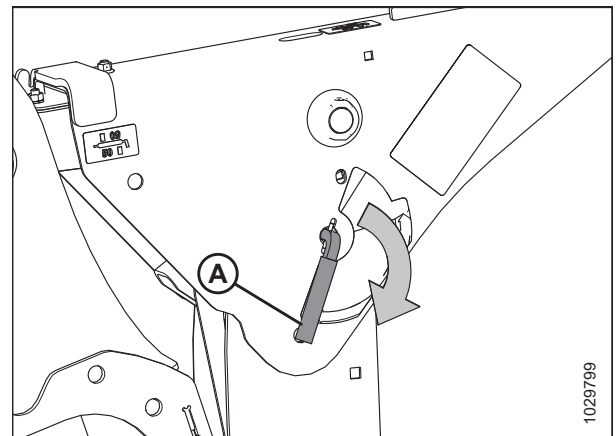


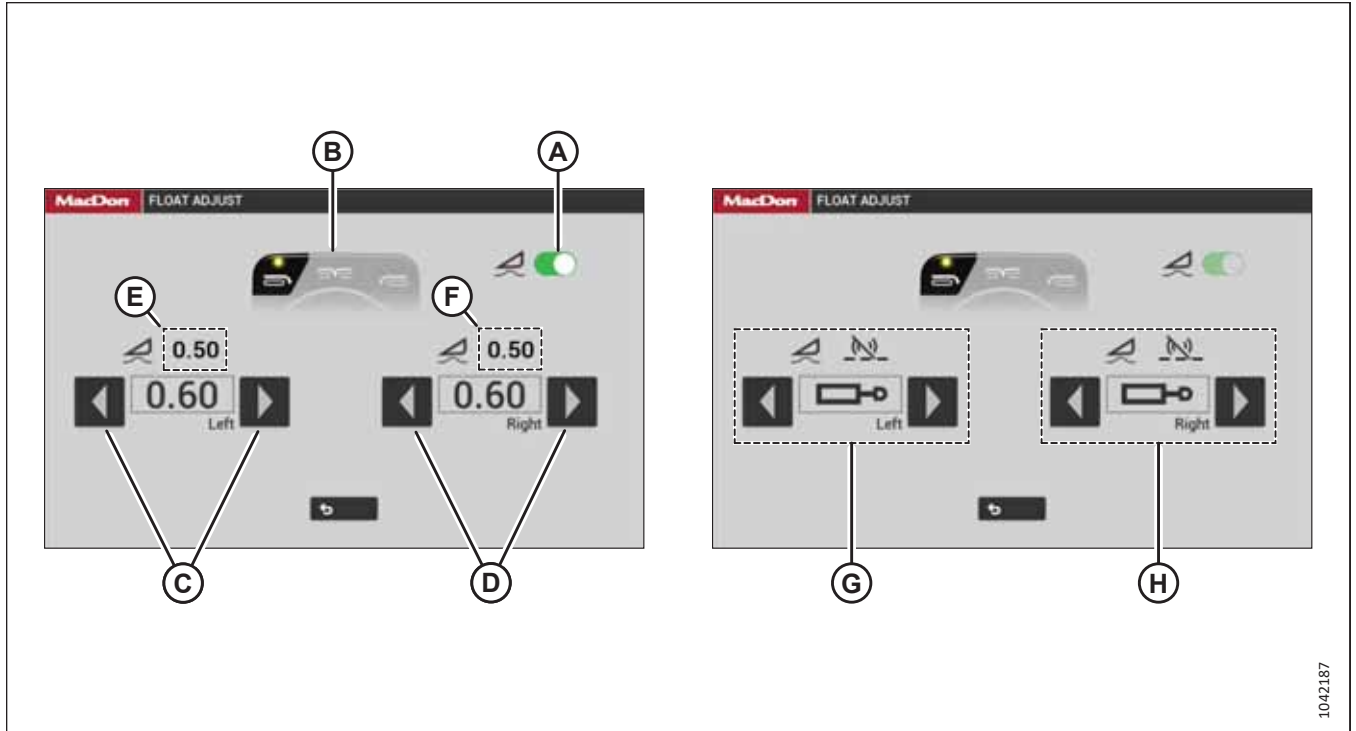
Figure 4.136: Safety Prop Lever

## HEADER ATTACHMENT/DETACHMENT

20. Start the engine.
21. Press HEADER DOWN switch (A) on the GSL to fully lower the header.



Figure 4.137: Ground Speed Lever (GSL)



**Figure 4.138: Float Adjustment**

22. Select switch (A), so that it turns green, to activate the float.

23. If the float is not already set up, set the float as follows:

- a. The float preset, which is selected using the operator's console, is displayed at location (B). Confirm if the desired preset is selected.
- b. Select arrows (C) to set the target float for the left side of the header. Value (E) is the actual amount of float (measured by the left float sensor).
- c. Select arrows (D) to set the target float for the right side of the header. Value (F) is the actual amount of float (measured by the left float sensor).

**NOTE:**

Adjusting the float by increments of 1.0 (out of 10) changes the header weight at the cutterbar by approximately 91 kg (200 lb.). Adjust the float in increments of 0.05 to fine-tune the header's performance.

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

25. Check the float as follows:

- a. Grasp one end of the draper header and lift it. The lifting force should be 335–380 N (75–85 lbf) (with stabilizer/transport wheels raised, if they are equipped).
- b. Repeat this step on the other side of the header.

26. Proceed to [4.4.1 Connecting Header Hydraulic and Electrical Systems to M2 Series Windrower, page 197](#).

### 4.4.1 Connecting Header Hydraulic and Electrical Systems to M2 Series Windrower

To connect the header hydraulics to an M2 Series Windrower, approach from the left side, secure the platform, and manage the hydraulic hose system by disengaging and connecting various components. Ensure proper alignment and

## HEADER ATTACHMENT/DETACHMENT

connection of hydraulic hoses and electrical connectors, and finalize the setup by adjusting the platform and ensuring all latches are engaged.

### 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.

### CAUTION

Do NOT stand on an unlocked platform. It is unstable and may cause you to fall.

#### IMPORTANT:

To prevent contamination of the hydraulic system, use a clean rag to remove dirt and moisture from all (fixed and movable) hydraulic couplers.

1. Shut down the engine, and remove the key from the ignition.
2. Approach platform (A) on the left 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.

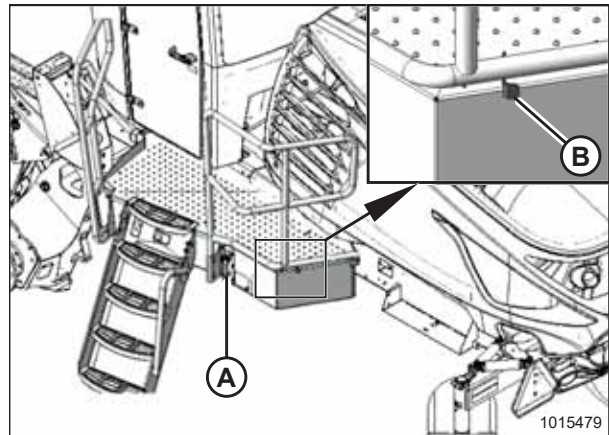


Figure 4.139: Left Platform

4. **D215 Draper Headers:** Pull hydraulic hose management system (A) toward the left outboard end of the header, disengage ball stud (B) from the cradle in support (C).

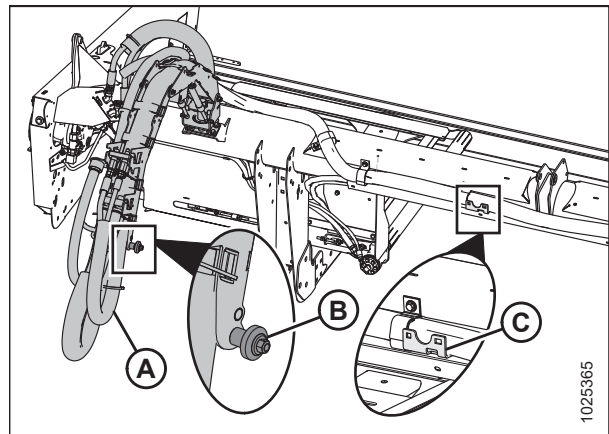


Figure 4.140: Hydraulic Hose Management System – D215 Draper Header



## HEADER ATTACHMENT/DETACHMENT

5. Push the link on latch (C) and pull handle (A) on hydraulic hose management system (B) rearward to disengage the arm from the latch.
6. Move hydraulic hose management system (B) toward the left cab-forward side of the windrower.

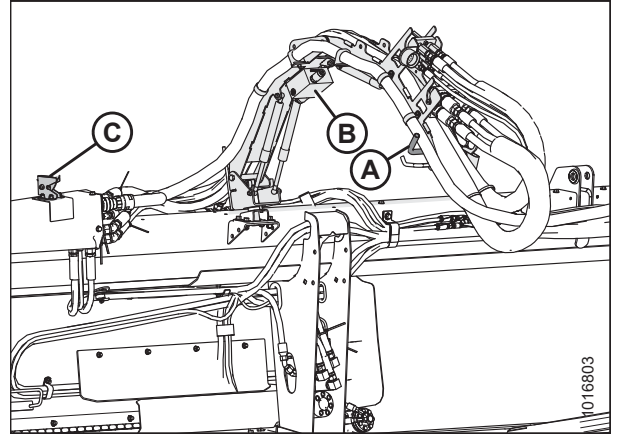


Figure 4.141: Hydraulic Hose Management System

7. 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.

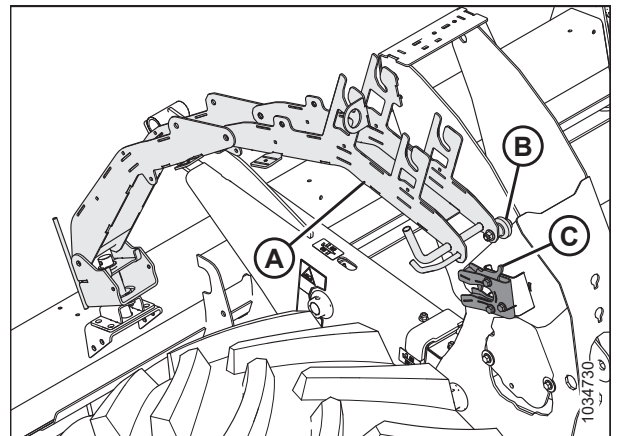


Figure 4.142: Windrower Left Outer Leg

8. **M2170 NT:** Rotate left signal light placard (A) to the up (vertical) position.

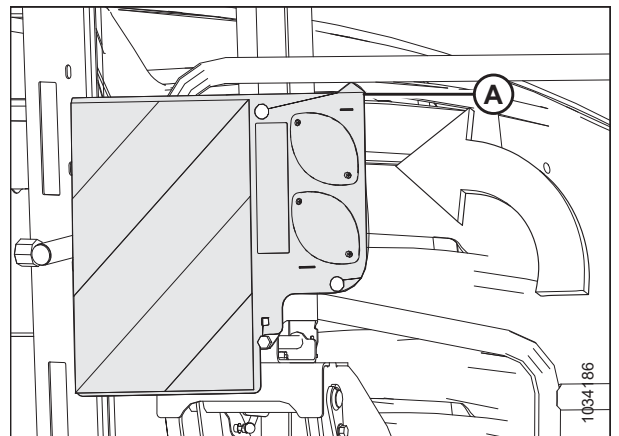


Figure 4.143: Left Signal Light Placard

## HEADER ATTACHMENT/DETACHMENT

9. Retrieve draper drive and reel control 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.
12. 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) pops out.
13. Remove the cover from electrical connector (E).
14. Push the electrical connector onto the receptacle. Secure the connector by turning the collar on the electrical connector clockwise.
15. Retrieve knife and reel drive multicoupler (A) from the hydraulic hose management system.
16. Push knob (B) on the hydraulic receptacle and pull handle (C) fully away from the windrower.
17. Open cover (D) and position the coupler onto the receptacle.
18. 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) pops out.

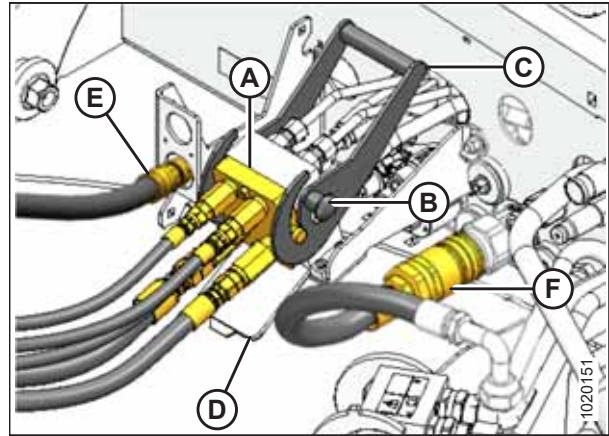


Figure 4.144: Draper/Reel Multicoupler

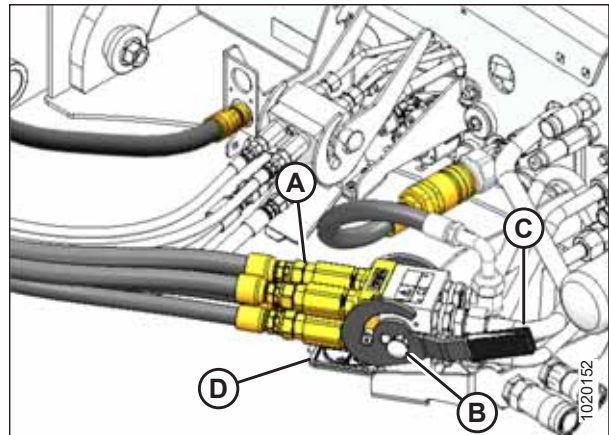


Figure 4.145: Knife/Reel Drive Multicoupler

19. Ensure that the hydraulic hose routing is as straight as possible.

### IMPORTANT:

Straight routing will prevent abrasion damage to the hydraulic hoses.

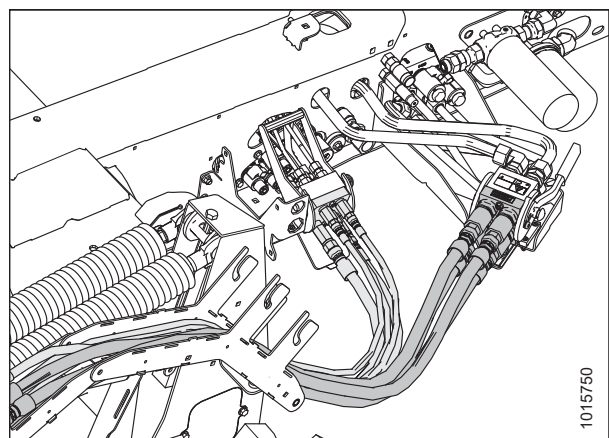


Figure 4.146: Hydraulic Multicouplers and Hose Routing

## HEADER ATTACHMENT/DETACHMENT

20. Ensure that hydraulic hoses (A) are secured tightly with straps (B).
21. Ensure that the hydraulic hoses are positioned above frame (C) of the central delivery opening.

**IMPORTANT:**

The hydraulic hoses could be damaged if they sag below frame (C).

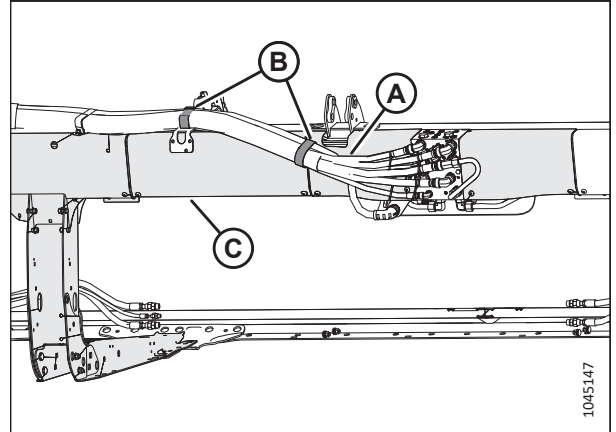


Figure 4.147: D215/D220 Draper Headers Hose Position

22. Push latch (A) to unlock platform (B).

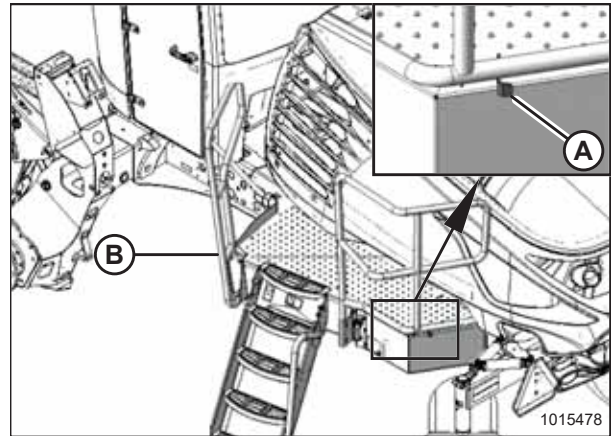


Figure 4.148: Left Platform

23. Pull platform (A) toward the cab until it stops and the latch is engaged.

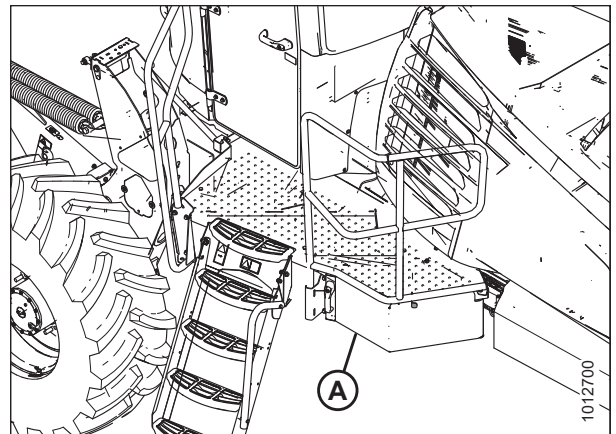


Figure 4.149: Left Platform

## 4.4.2 Detaching Header from M2 Series Windrower

The instructions in this section outline how to properly detach the header from the windrower.

### 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. Raise the reel fully.
2. Press HEADER UP button (A) on the ground speed lever (GSL) to raise the header to maximum height.
3. If one end of the header does **NOT** rise fully, rephase the cylinders as follows:
  - a. Press and hold HEADER UP (A) switch 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. Engage the safety props on both lift cylinders as follows:
  - a. Pull lever (A) toward you to release it, 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 4.150: Ground Speed Lever (GSL)

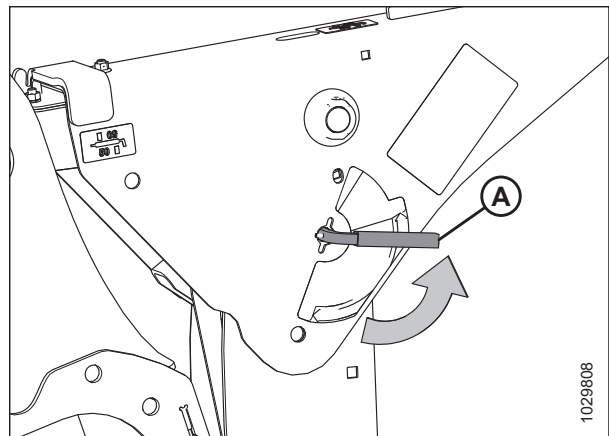


Figure 4.151: Safety Prop Lever

## HEADER ATTACHMENT/DETACHMENT

- When the header is stored on the ground, the header supports must be raised off the ground for the windrower lift linkage to easily engage them. Position 165 mm (6 1/2 in.) blocks (A) below the header support stop plates.

**NOTE:**

If the ground is soft, place an additional 100 mm (4 in.) block (B) under the back of the header supports.

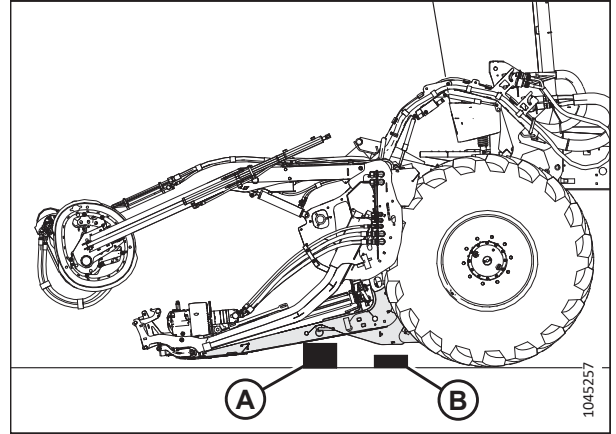


Figure 4.152: Setting Header on the Ground

- Remove and retain hairpin (D) and clevis pin (C) from header support (B) and windrower lift linkage (A). Repeat this step on the opposite side of the machine.

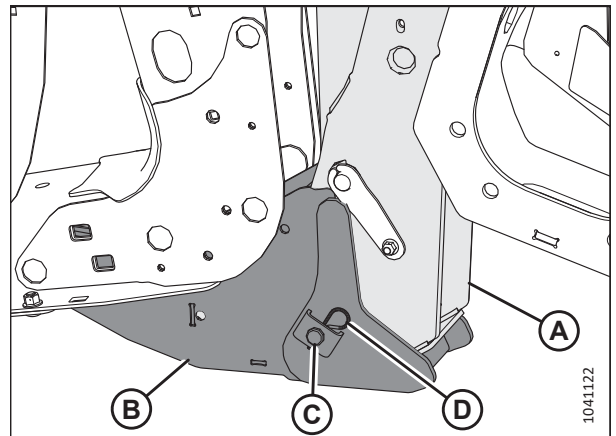


Figure 4.153: Header Leg and Windrower Lift Linkage Connected by Header Support

- Windrowers with self-aligning center-link:** Release center-link latch (A).

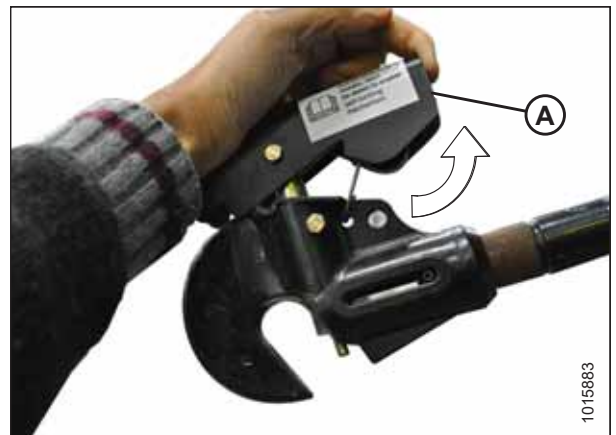


Figure 4.154: Center-Link

## HEADER ATTACHMENT/DETACHMENT

9. 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.

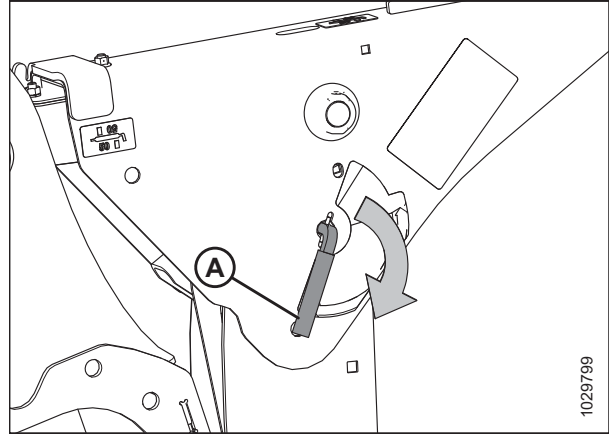
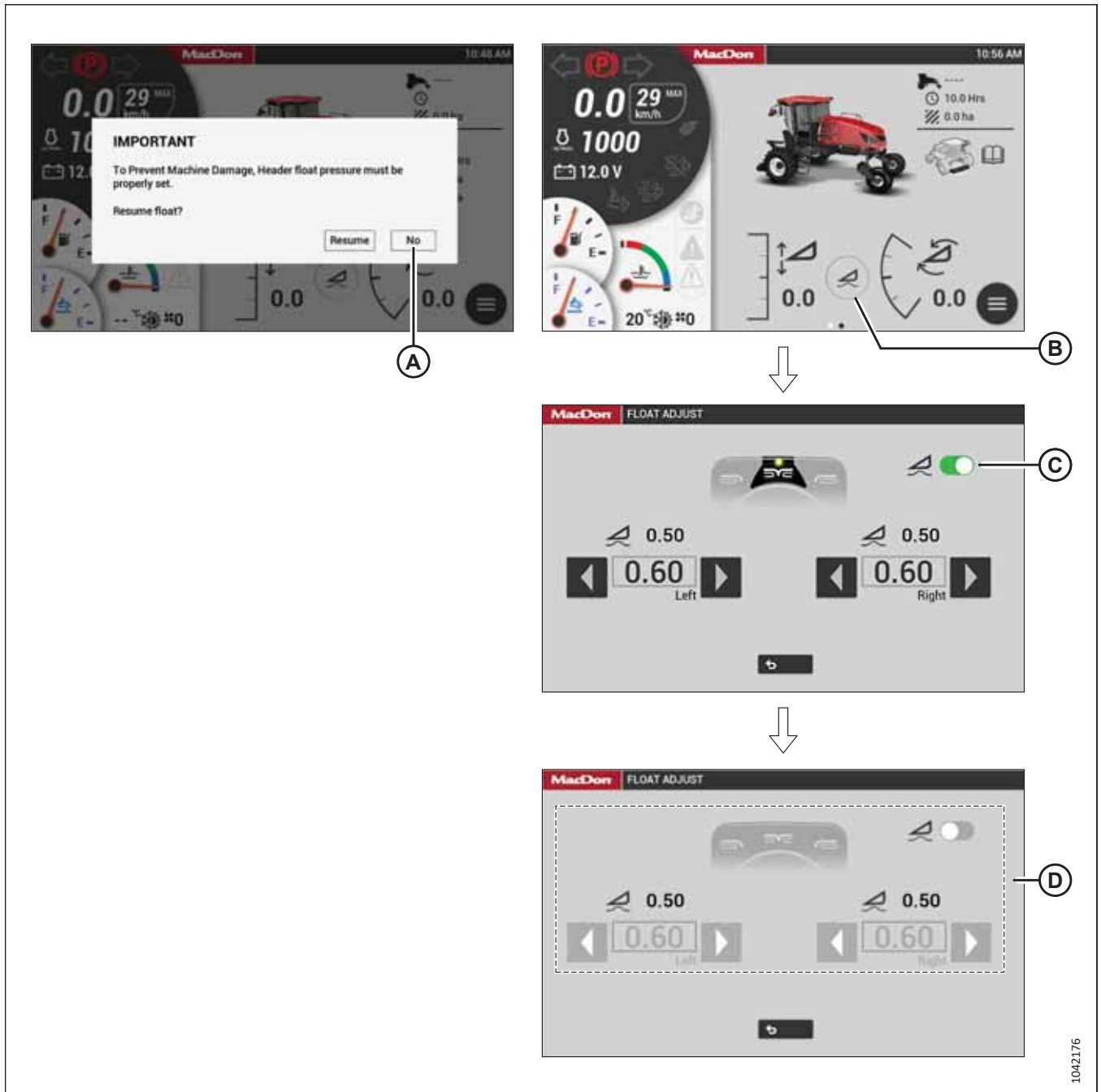


Figure 4.155: Safety Prop Lever

10. Start the engine.

## HEADER ATTACHMENT/DETACHMENT



**Figure 4.156: Float Removal**

11. Remove the float as follows:

- If the HarvestTouch™ Display shows the message “Resume Float?”, then select NO (A).
- If the HarvestTouch™ Display does **NOT** show the message, then select FLOAT ADJUST (B), select switch (C), and confirm the switch and float settings (D) are grayed out.

**IMPORTANT:**

Removing the float will release the tension in the float springs. This will prevent damage to the header lift linkages when lowering the legs without a header or weight box attached to the windrower.

## HEADER ATTACHMENT/DETACHMENT

12. Lower the header fully using HEADER DOWN switch (A).
13. Press HEADER TILT switches (B) as needed on the GSL to release the load on the center-link.

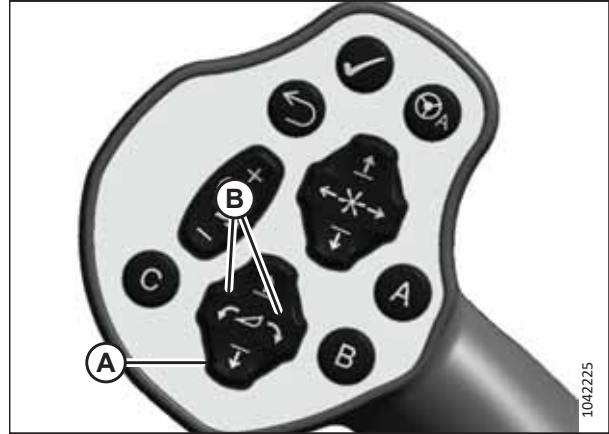


Figure 4.157: GSL

### 14. Windrowers with self-aligning center-link:

- a. Press REEL UP switch (A) to disengage the center-link from the header.
- b. Shut down the engine, and remove the key from the ignition.



Figure 4.158: GSL

### 15. Windrowers without the self-aligning center-link:

- a. Shut down the engine, and remove the key from the ignition.
- b. Disconnect the center-link by lifting release (A) and lift hook (B) off the header.

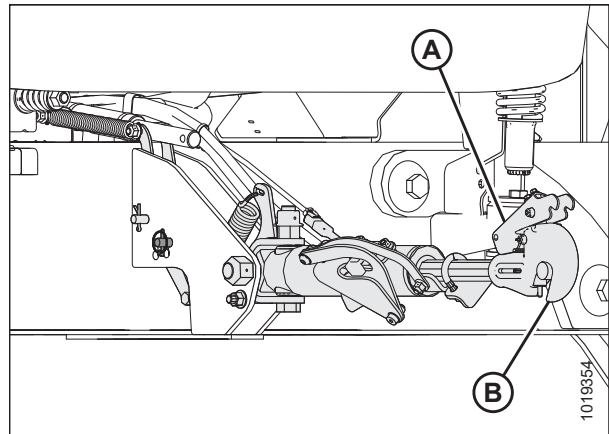


Figure 4.159: Hydraulic Center-Link



## HEADER ATTACHMENT/DETACHMENT

16. Approach platform (A) on the left side of the windrower. Ensure that the cab door is closed.
17. Push latch (B) and pull platform (A) toward the walking beam until it stops and the latch engages.

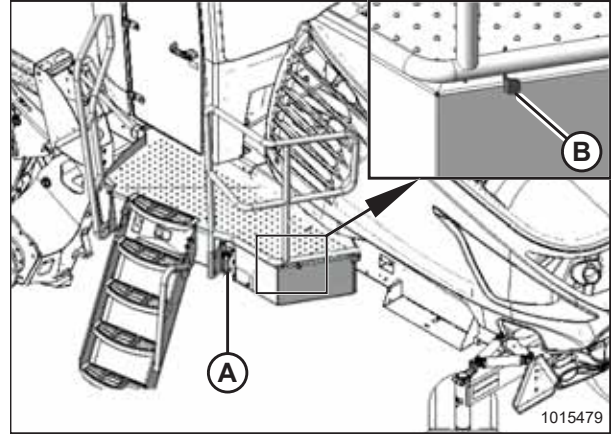


Figure 4.160: Left Platform

18. 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.

19. Route the knife/reel drive hose bundle back to storage position (D) on the hydraulic hose management system.
20. Remove any debris that may have accumulated on the receptacle.

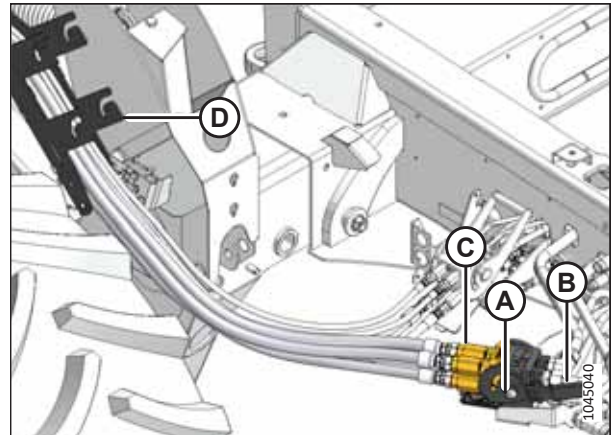


Figure 4.161: Knife/Reel Drive Multicoupler

21. Push lock button (B), and pull handle (C) to disengage multicoupler (A). Disconnect the hydraulics from the windrower draper drive/reel lift receptacle.
22. Disconnect electrical connector (D).
23. Remove any debris that may have accumulated on the receptacle.

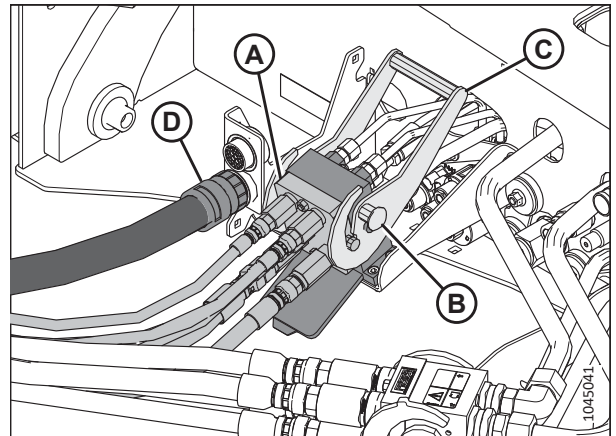


Figure 4.162: Draper/Reel Multicoupler

## HEADER ATTACHMENT/DETACHMENT

24. Route the draper drive/reel hose bundle back to storage position (A) on hydraulic hose management system (B).
25. Insert electrical connector into storage cup (C).

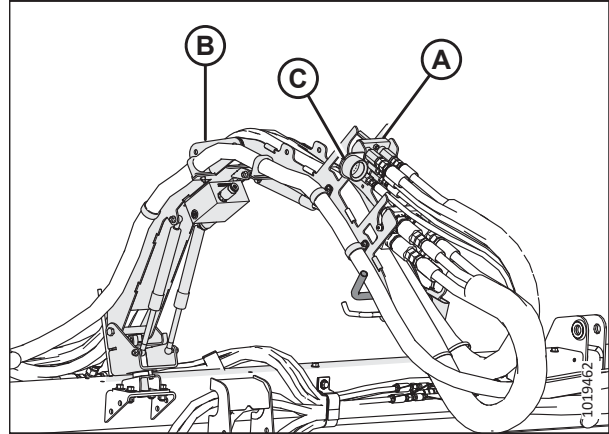


Figure 4.163: Hydraulic Hose Management System

26. Push latch (A) to unlock platform (B).

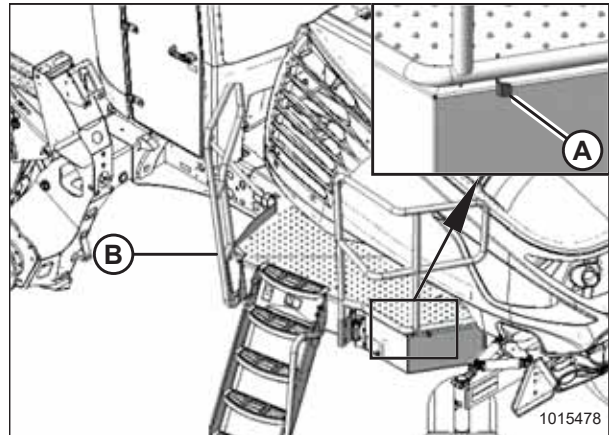


Figure 4.164: Left Platform

27. Pull platform (A) toward the cab until it stops and the latch is engaged.

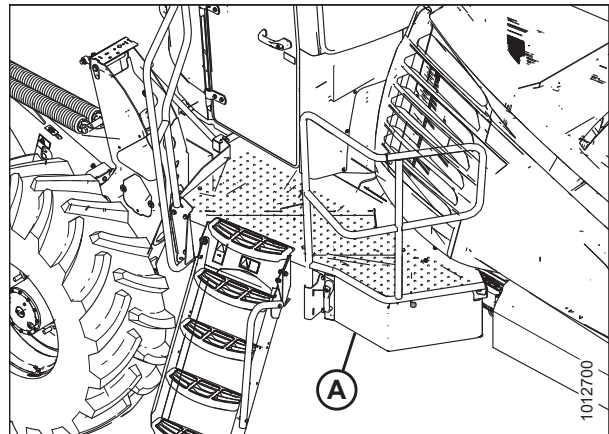


Figure 4.165: Left Platform

## HEADER ATTACHMENT/DETACHMENT

28. 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).

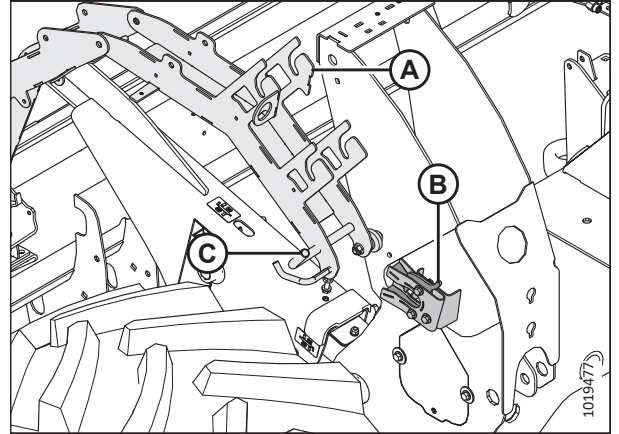


Figure 4.166: Hydraulic Hose Management System

29. Pivot hose management system (B) forward with handle (A), and engage hook (D) into latch (C) on the header.
30. Back the windrower away from the header.
31. Shut down the engine, and remove the key from the ignition.

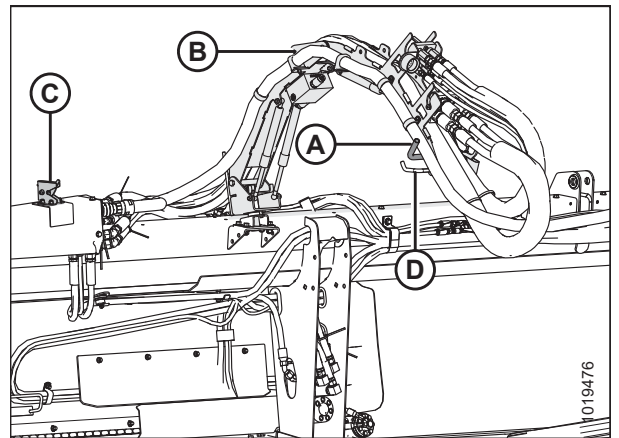


Figure 4.167: Hydraulic Hose Management System

32. Reinstall clevis pin (B) into header support (C) and secure it with hairpin (A). Repeat this step on the other header leg.

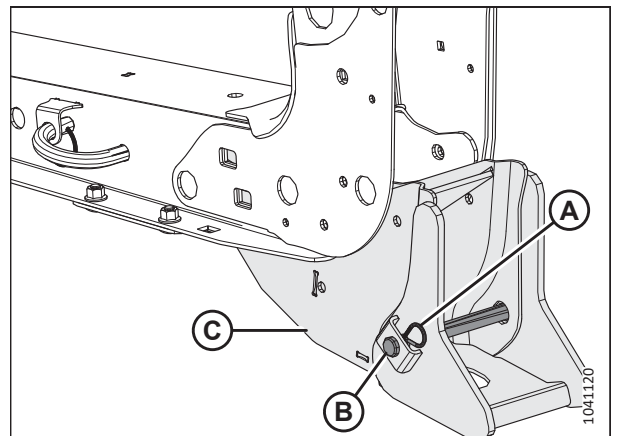


Figure 4.168: Header Stand



## 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 212](#)) 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.

#### DANGER

Ensure that all bystanders have cleared the area.

Before servicing the machine, follow these steps:

1. Lower the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the park brake.
4. Wait for all of the 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 212](#)).

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:**

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




When servicing the machine, refer to the appropriate section in this chapter and use only the specified fluids and lubricants. Refer to the inside back cover for the recommended fluids and lubricants.

 **CAUTION**

Follow all safety messages. For instructions, refer to [1 Safety, page 1](#) and [5.1 Preparing Machine for Servicing, page 211](#).

### 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												
<b>First Use</b>		Refer to <a href="#">5.2.2 Break-in Inspection, page 213</a> .											
<b>End of Season</b>		Refer to <a href="#">5.2.4 Equipment Servicing – End-of-Season, page 214</a> .											
<b>10 Hours or Daily (Whichever Occurs First)</b>													
✓	Hydraulic hoses and lines; refer to <a href="#">5.2.5 Checking Hydraulic Hoses and Lines, page 215</a> <sup>77</sup>												
✓	Knife sections, guards, and hold-downs; refer to <a href="#">5.5 Cutterbar, page 241</a> <sup>77</sup>												
✓	Tire pressure; refer to <a href="#">5.10.3 Checking Tire Pressure, page 353</a> <sup>77</sup>												
✓	Axle bolt torque; refer to <a href="#">5.10.2 Checking Transport Assembly Bolt Torque, page 351</a>												
<b>25 Hours</b>													
◆	Knifeheads; refer to <a href="#">Every 25 Hours, page 218</a> <sup>77</sup>												
<b>50 Hours or Annually</b>													
◆	Upper cross auger right bearing; refer to <a href="#">Every 50 Hours, page 219</a>												
◆	Upper cross auger sliding hubs; refer to <a href="#">Every 50 Hours, page 219</a>												
◆	Upper cross auger center support and U-joint; refer to <a href="#">Every 50 Hours, page 219</a>												
◆	Feed draper roller bearings, 3 locations; refer to <a href="#">Every 50 Hours, page 219</a>												
◆	Reel drive chain (If chain is dry at next oiling interval – consider decreasing oiling interval); refer to <a href="#">Every 50 Hours, page 219</a>												

77. MacDon recommends keeping a record of daily maintenance as evidence of a properly maintained machine.



### 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 of the safety decals and the other decals on the header. Note the hazard areas.
  - Be sure all of the shields and guards are properly installed and secured. Never alter or remove safety equipment.
  - Be sure you understand and have practiced the safe use of all controls. Know the capacity and operating characteristics of the machine.
  - Ensure that 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 217](#).
  2. Perform all annual maintenance tasks. For instructions, refer to [5.2.1 Maintenance Schedule/Record, page 212](#).

### 5.2.4 Equipment Servicing – End-of-Season

Inspect and service the necessary equipment at the end of each operating season.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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, cover the header with a waterproof canvas or another protective material.
- NOTE:**
- If you are storing the header outdoors, remove the drapers and store them in a dark, dry place. If you are **NOT** removing the drapers, lower the cutterbar so that water and snow cannot accumulate on the drapers. The weight of water and snow accumulating on the header 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 you are storing the header outdoors, tie the reel to the frame to keep wind from rotating the wheel.
  5. To prevent rust from forming on the header, repaint all worn or chipped painted surfaces.
  6. Loosen the drive belts.
  7. Lubricate the header thoroughly. Leave excess grease on the fittings to keep moisture out of the bearings.
  8. Apply grease to the 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 the header for broken components and order replacements from your Dealer. Immediately repairing these items will save time and effort at the beginning of the next season.

11. Tighten any loose hardware. For torque specifications, refer to Chapter *8.1 Torque Specifications, page 389*.

### 5.2.5 Checking Hydraulic Hoses and Lines

Check the hydraulic hoses and lines daily for signs of leaks.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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 and cause serious injury.
- Before disconnecting hydraulic lines, relieve the pressure in the hydraulic system. Before adding pressure to the hydraulic system, tighten all of the system's connections.
- Keep your body away from pin holes and nozzles which can eject fluids under high pressure.
- If any fluid is injected into the skin, it must be surgically removed within a few hours by an experienced doctor or gangrene may develop.



Figure 5.1: Hydraulic Pressure Hazard

- Use a piece of cardboard or paper to search for leaks.

#### IMPORTANT:

Keep hydraulic coupler tips and connectors clean. Allowing dust, dirt, water, or foreign material to enter the hydraulic system is the major cause of hydraulic system damage. Do **NOT** attempt to service hydraulic systems in the field. Precise fits require a perfectly clean connection during overhaul.

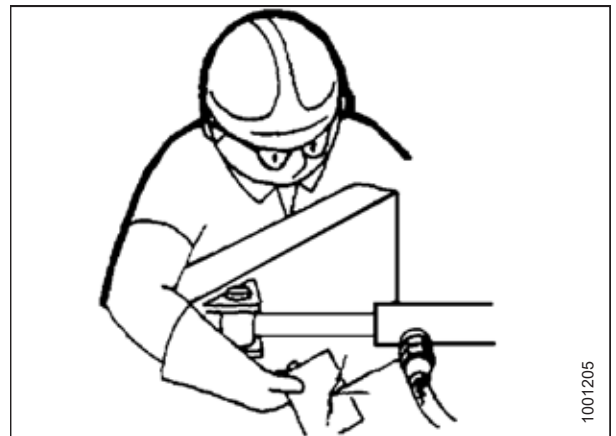


Figure 5.2: Testing for Hydraulic Leaks

1. Engage the header. While it is running, raise and lower the header and the reel. Extend and retract the reel. Run it for 10 minutes.
2. Shut down the engine, and remove the key from the ignition.

## MAINTENANCE AND SERVICING

3. Once the machine has been sitting still for several hours, walk around it and check for hoses, lines, or 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 212](#).

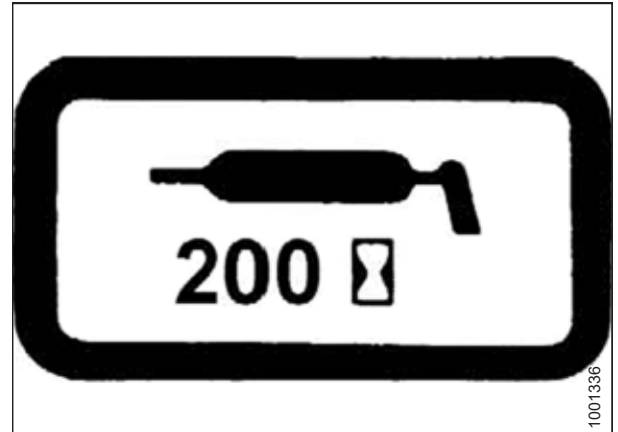


Figure 5.3: Grease Interval Decal

### 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 that these procedures are performed in a timely fashion.

#### *Every 10 Hours*

Daily maintenance is required to keep your machine operating at peak performance and to help you 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 lubricating bearing (A), clear any debris and excess lubricant from around the bearing. Inspect the condition of the bearing and the bearing housing. Lubricate the bearing until grease comes out of the seal. Wipe any excess grease from the area after greasing.

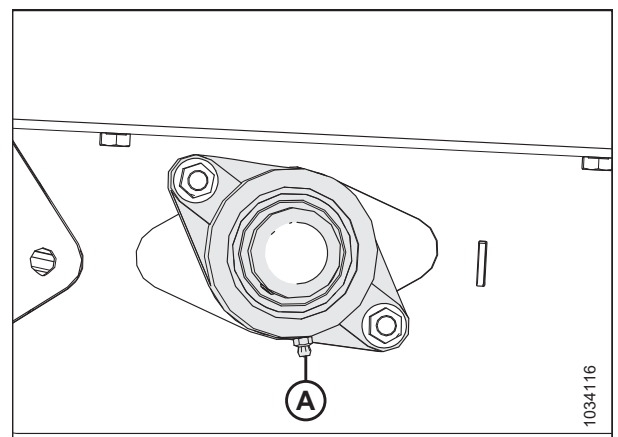


Figure 5.4: Feed Draper Drive Roller

## MAINTENANCE AND SERVICING

### IMPORTANT:

When lubricating bearing (A), clear any debris and excess grease from around the bearing housing. Inspect the condition of the roller and the bearing housing. Lubricate the bearing until grease comes out of the seal. The initial greasing on a new header may require an additional 5-10 pumps of grease. Wipe any excess grease from the area after greasing.

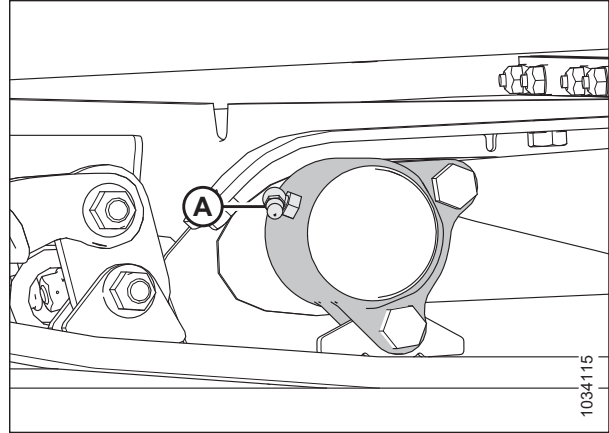


Figure 5.5: Feed Draper Idler Roller

### Every 25 Hours

Regular maintenance is required to keep your machine operating at peak performance and to help you 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. After lubricating the knifehead, check for any signs of excessive heating on the first few guards. If it is required, relieve pressure on the knifehead by pressing the check-ball in the grease fitting.

### IMPORTANT:

Do **NOT** overgrease the knifehead. Overgreasing the knifehead puts pressure on the knife, causing it to rub against the guards, resulting in excessive wear from binding. Apply only one to two pumps of grease using a mechanical grease gun (do **NOT** use an electrical grease gun). If you require more than eight pumps of grease to fill the cavity, contact your Dealer.

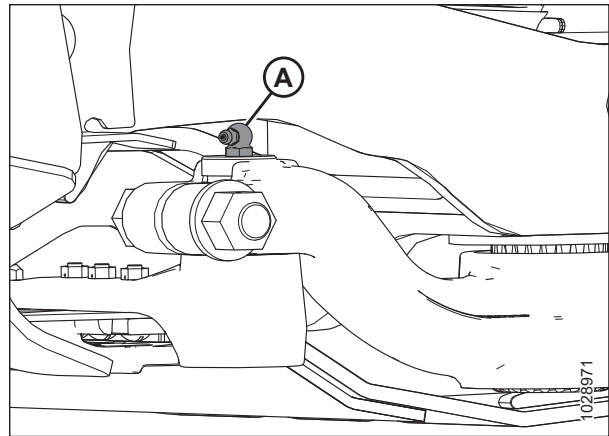
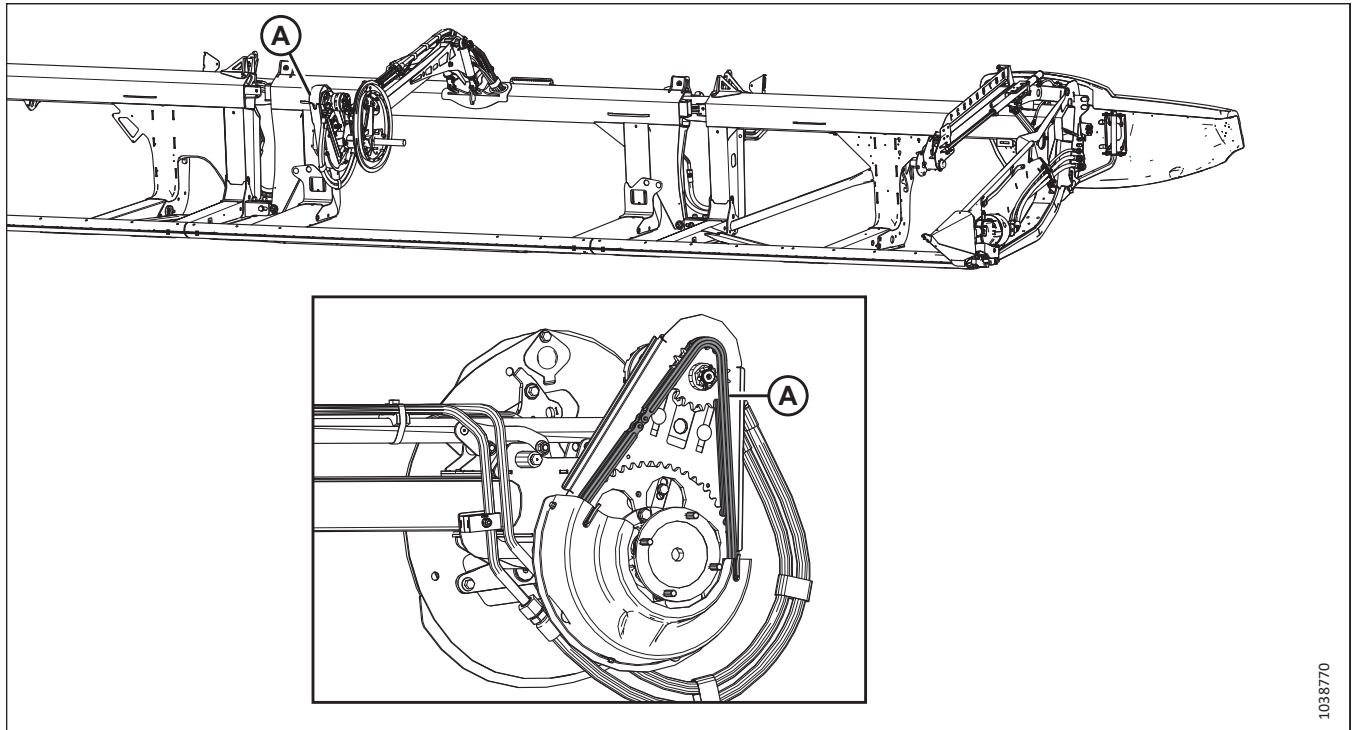


Figure 5.6: Knifehead

*Every 50 Hours*

Regular maintenance is required to keep your machine operating at peak performance and to help you identify issues early.



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**Figure 5.7: Reel**

A - Reel Drive Chain. To lubricate the chain, refer to [5.3.3 Lubricating Reel Drive Chain, page 224](#).

**IMPORTANT:**

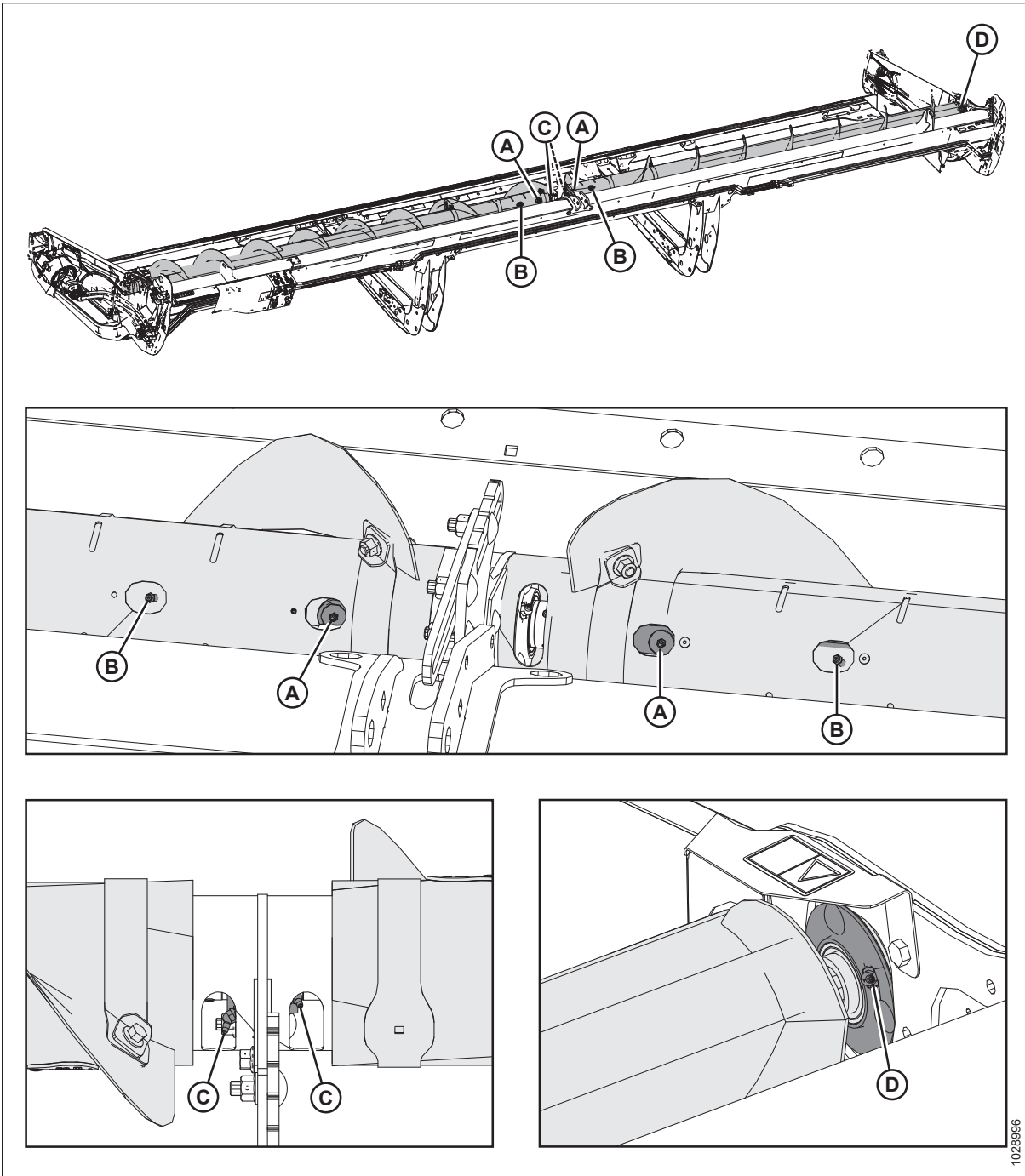
Use chain oil that has a viscosity of 100–150 cSt at 40°C (typically medium to heavy chain oil) or mineral oil Sae 20W50 that has no detergents or solvents.

**NOTE:**

If the chain is dry by the next oiling interval, lubricate it more often.

## MAINTENANCE AND SERVICING

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)

C - Upper Cross Auger Center Bearings (Two Places)

B - Upper Cross Auger Sliding Hubs (Two Places)

D - Right End Bearing

### IMPORTANT:

The upper cross auger (UCA) must be greased regularly even when it is turned off as components of the UCA move when the header flexes, regardless of whether the auger is turning or not.

## MAINTENANCE AND SERVICING

Apply grease to push rod grease zerks (A). For instructions, refer to [5.11.2 Lubricating Vertical Knife, page 362](#).

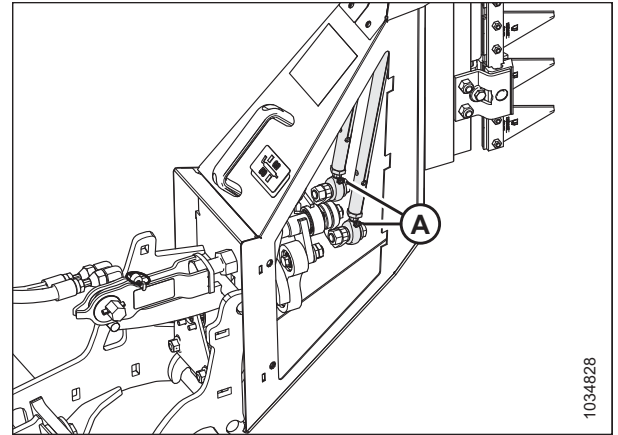


Figure 5.9: Vertical Knives – Optional

### Every 100 Hours

Maintenance is required to keep your machine operating at peak performance and to help you identify issues early.

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

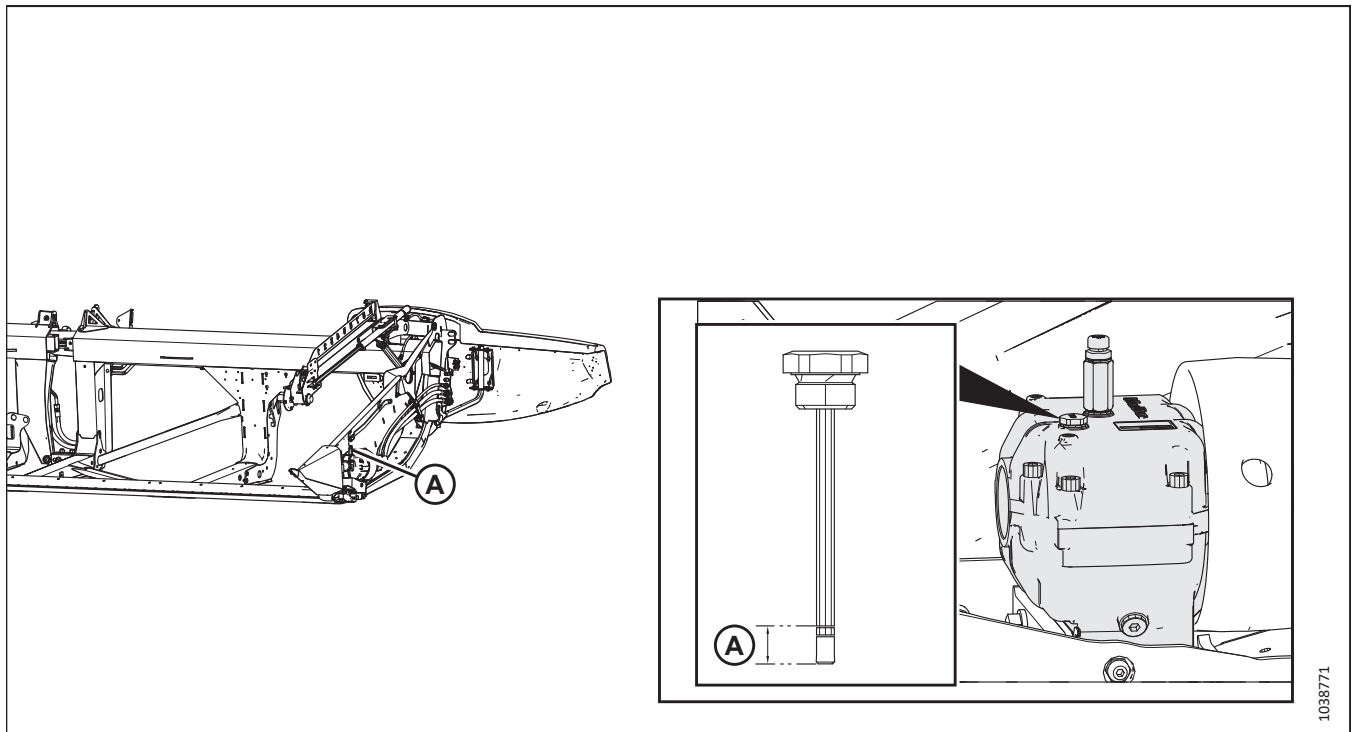


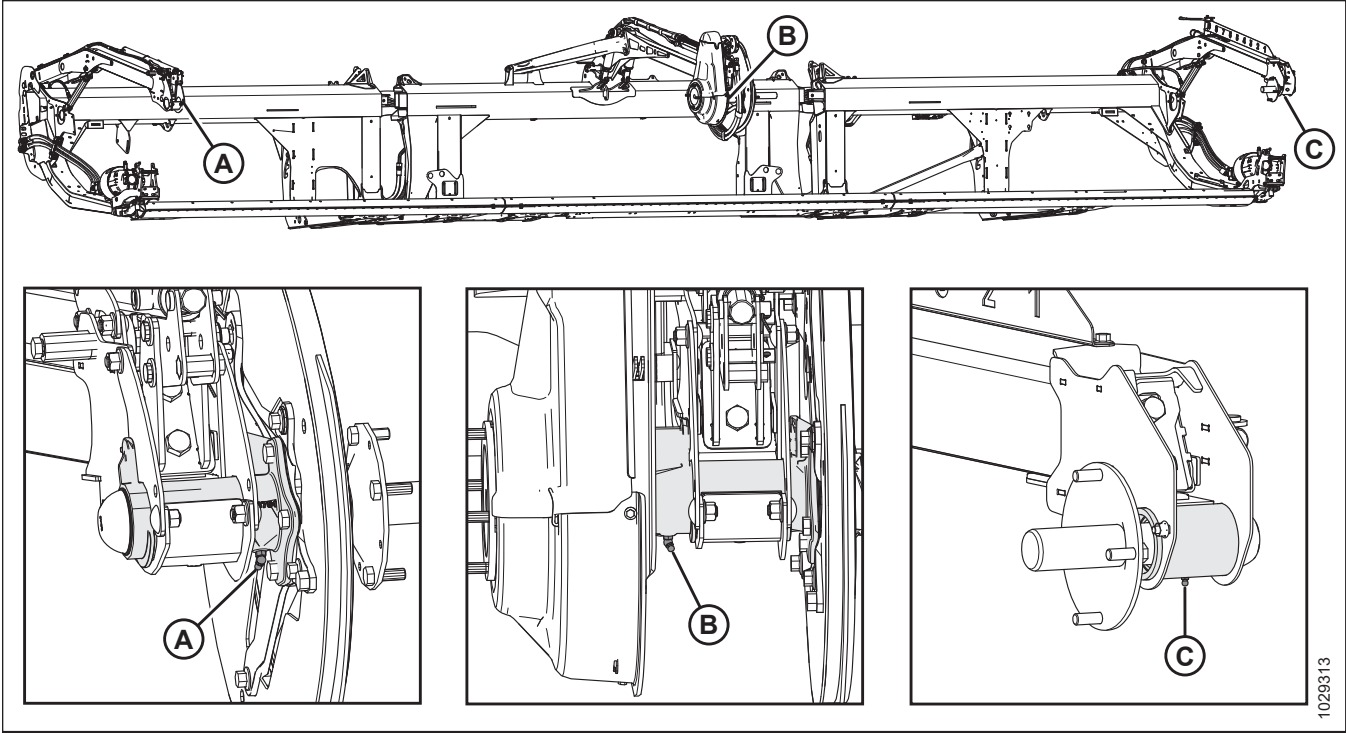
Figure 5.10: Knife Drive Box

A - Knife Drive Box Oil Level. To lubricate the knife drive box, refer to [Checking Oil Level in Knife Drive Box, page 279](#).

### Every 250 Hours

Maintenance is required to keep your machine operating at peak performance and to help you 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)

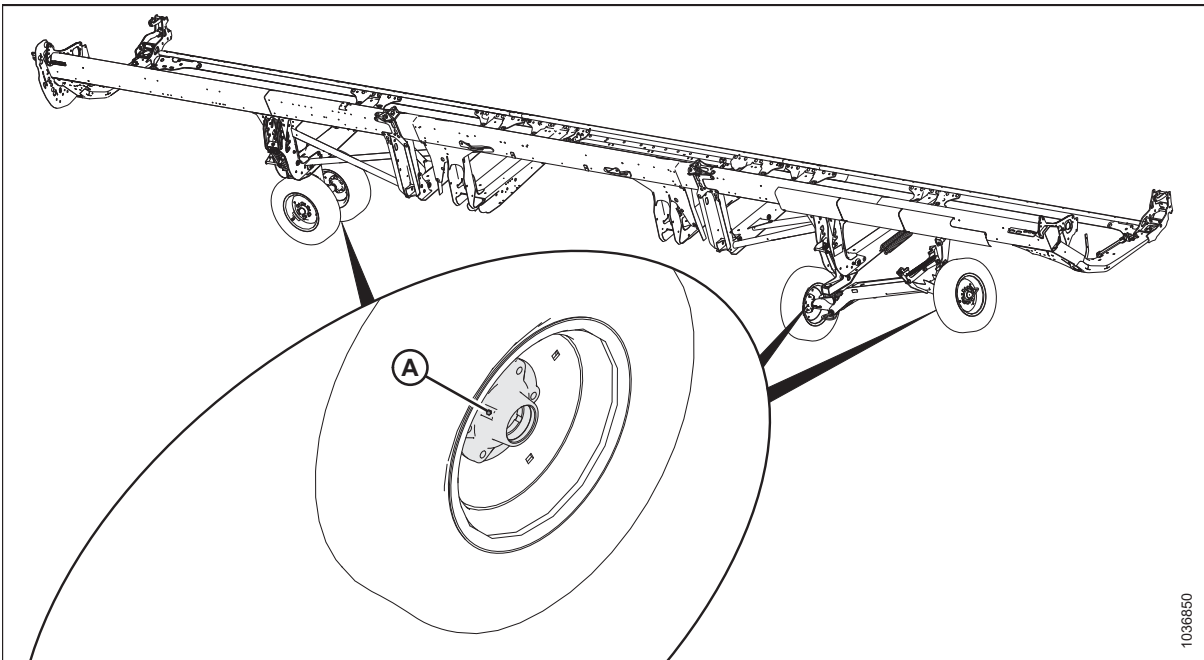
B - Reel Center Bearing (One Place)

C - Reel Left Bearing (One Place)

*Every 500 Hours*

Maintenance is required to keep your machine operating at peak performance and to help you 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: Wheel Bearings**

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 the inside back cover for the 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 212](#).

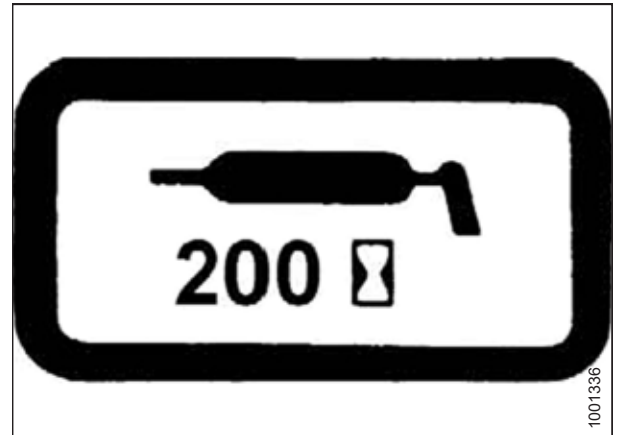


Figure 5.13: Greasing Interval Decal

1. Before lubricating a grease fitting, wipe it with a clean cloth to avoid injecting dirt and grit into the fitting.

#### IMPORTANT:

Use clean, high-temperature, extreme-pressure grease only.

2. Inject the grease through the fitting with a grease gun until the 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. Clean the lubricant passageway. Replace the fitting if necessary.

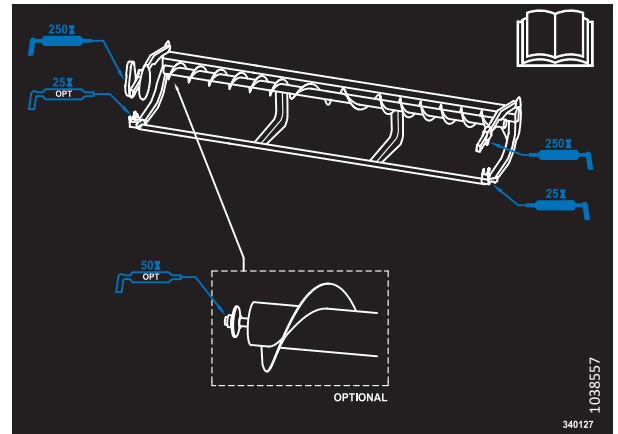


Figure 5.14: Grease Point Decal for Single-Knife Header with One-Piece Upper Cross Auger

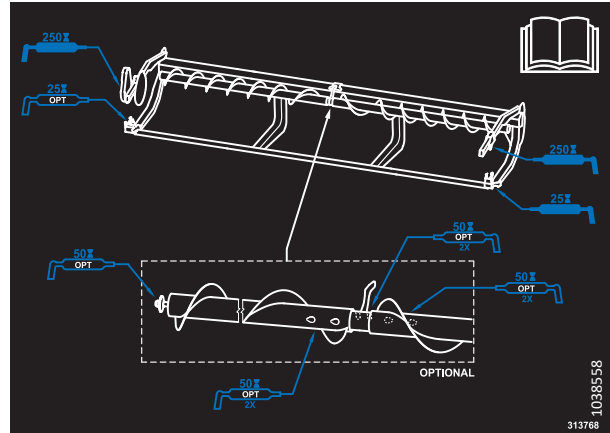


Figure 5.15: Decal for Single-Knife Header with Two-Piece Upper Cross Auger

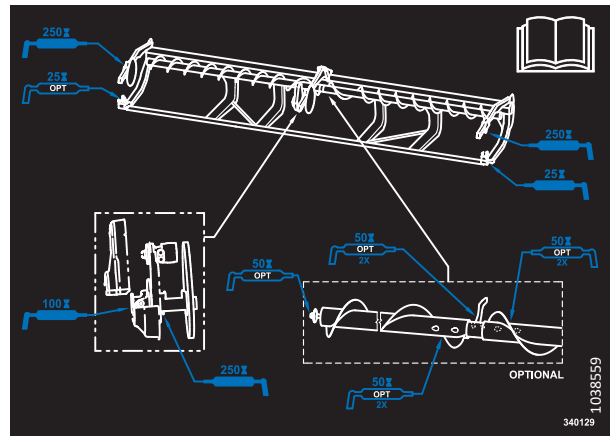


Figure 5.16: Decal for Double-Knife Header with Two-Piece Upper Cross Auger

### 5.3.3 Lubricating Reel Drive Chain

Lubrication protects the chain and the 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.

#### DANGER

Ensure that all bystanders have cleared the area.

#### IMPORTANT:

Do **NOT** use grease or motor oils to lubricate the reel drive chain.

1. Remove the reel drive cover. For instructions, refer to [Removing Reel Drive Cover, page 55](#).

#### 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.

## MAINTENANCE AND SERVICING

2. Apply a liberal amount of chain oil to inside of chain (A) with an oil can, brush, or aerosol. Manually rotate the reel to lubricate the chain.
3. Reinstall the reel drive cover. For instructions, refer to [Installing Reel Drive Cover, page 57](#).
4. Run the header and the reel for a few minutes so that the oil spreads into the chain.

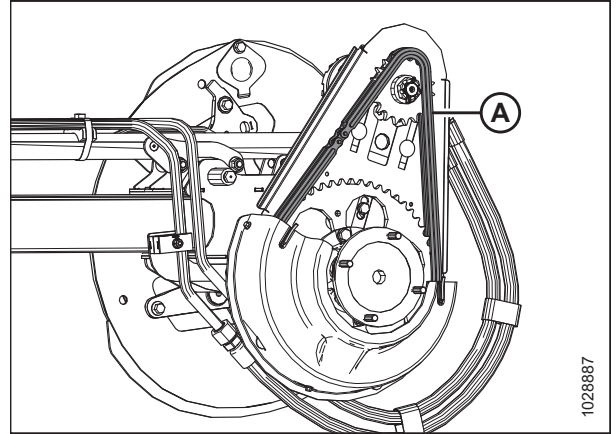


Figure 5.17: Drive Chain – Double-Reel Drive Shown

## 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 (transport option).

#### *Clearance lights (North America only)*

1. Shut down the engine, and remove the key from the ignition.
2. Use a Phillips screwdriver to remove three screws (A) from the fixture, and then remove the plastic lens. Retain the screws and lens.
3. Remove the existing bulb.
4. Install the new bulb, and then reinstall the plastic lens and screws.

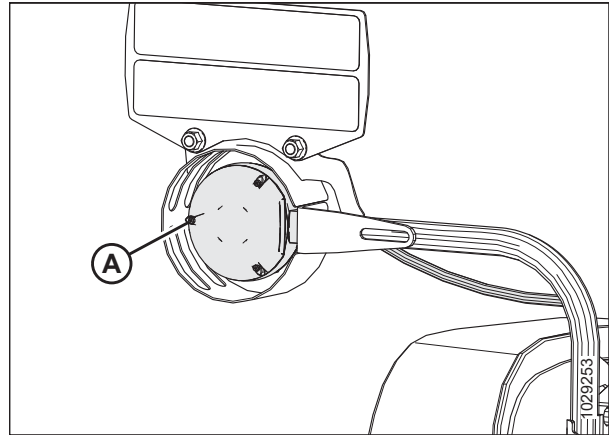


Figure 5.18: Left Clearance Light

#### *Transport lights*

5. Use a Phillips screwdriver to remove screws (A) from the fixture, and then remove the plastic lens. Retain the screws and lens.
6. Remove the existing light bulb.
7. Install the new bulb, and then reinstall the plastic lens and screws.

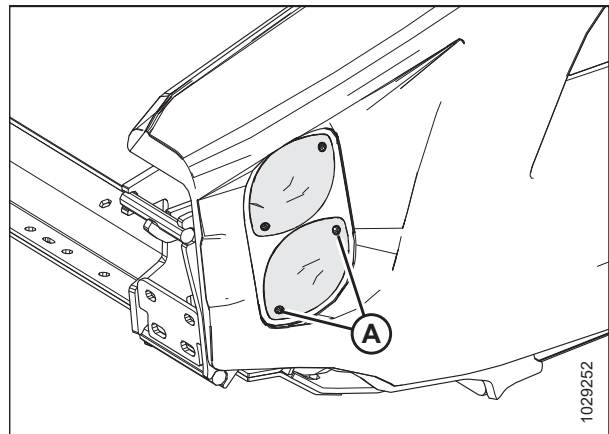


Figure 5.19: Transport Option – Red and Amber Lights

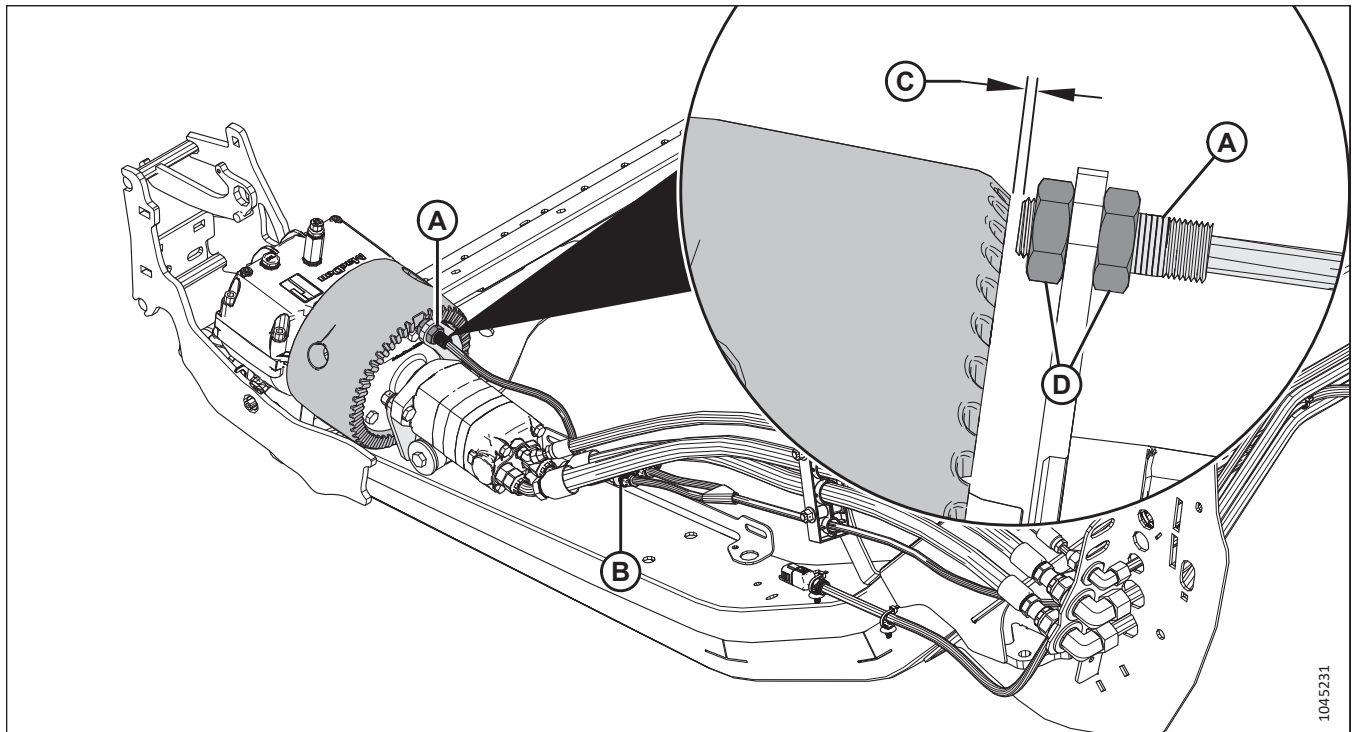
### 5.4.2 Adjusting Knife Speed Sensor

The knife system uses sensors to read knife speed information at the flywheel. Correct readings depend on proper sensor alignment.

**⚠ 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.
2. Shut down the engine, and remove the key from the ignition.
3. Open the endshield. For instructions, refer to *Opening Header Endshields*, page 47.



**Figure 5.20: Left Speed Sensor – M1/M2 Series Position**

4. Inspect the condition of sensor (A), sensor harness, and connector (B).
5. Inspect gap (C) between the sensor and the flywheel. Ensure the gap is 2–3 mm (0.08–0.12 in). Repeat inspection on the opposite side of the header.

**NOTE:**

The illustration shows the M1/M2 Series sensor position. For M Series windrowers, the sensor is secured to a lower position on the bracket.

6. If adjustment is required, loosen nuts (D) to position the sensor, and then retighten the nuts to secure the sensor.

### 5.4.3 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.

#### Troubleshooting Touch Encoder – M Series Windrowers Only

The touch encoder (TE) display and the electronic timed double-knife (ETDK) module provide operating status information for the ETDK system.

The electronic timed double knife module is constantly monitoring the system’s sensors. When the ETDK system is functioning properly, the touch encoder in the windrower cab displays operation symbol (A).



Figure 5.21: Normal Operation Symbol – TE Display

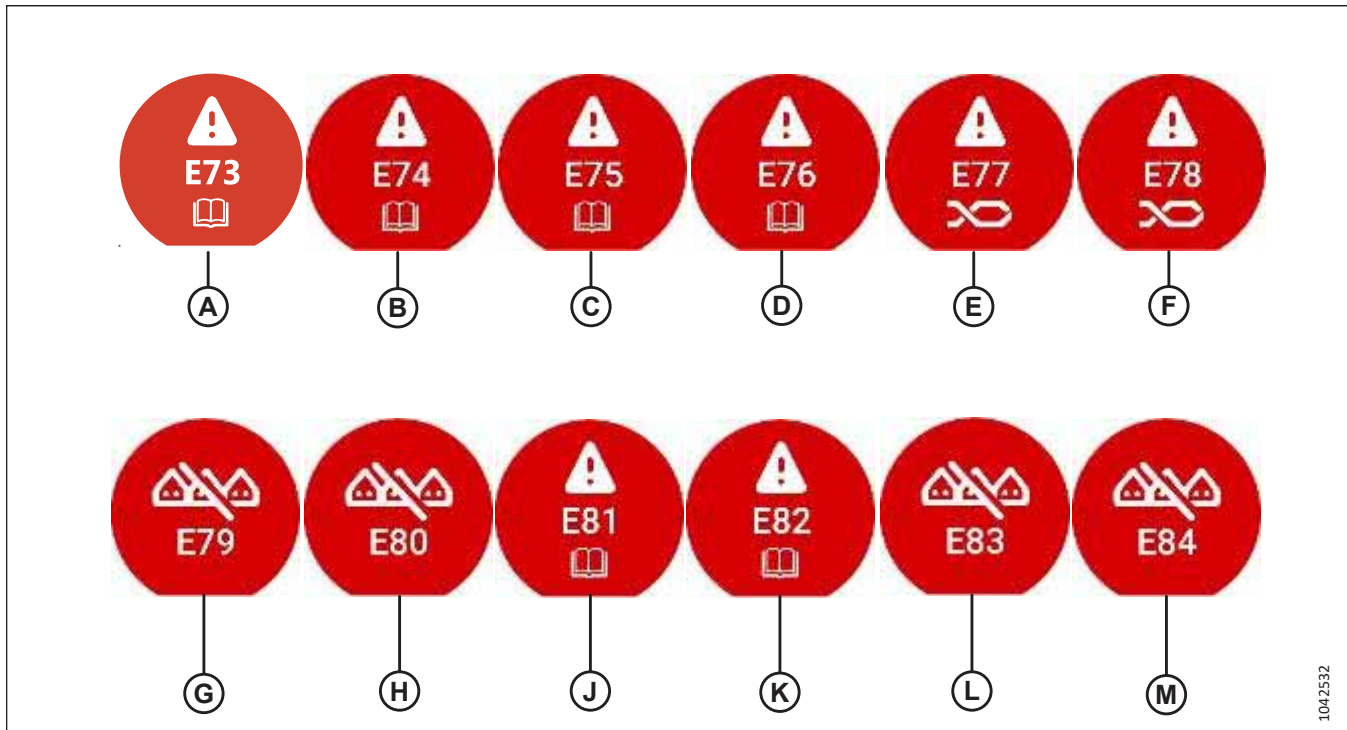
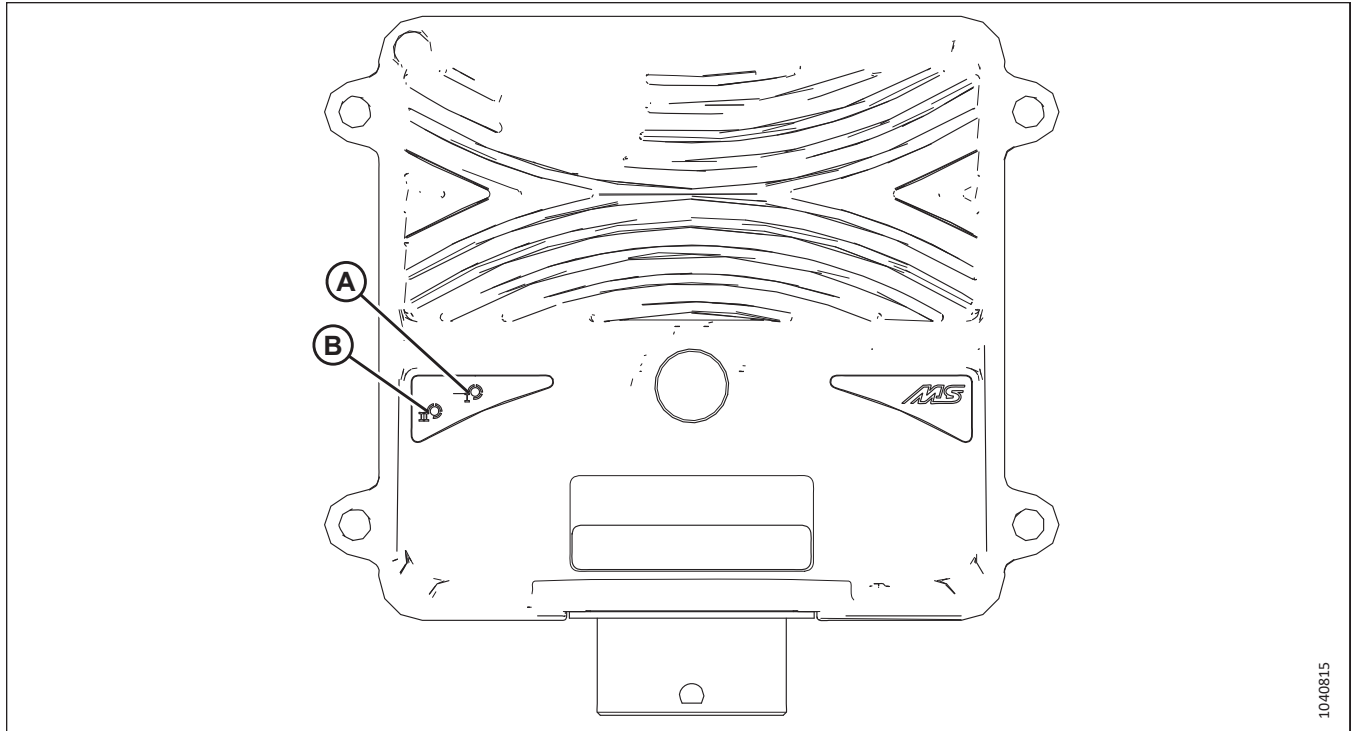


Figure 5.22: Fault Code Symbols – TE Display

When a fault occurs within the ETDK system, the touch encoder in the windrower cab displays a fault code.



**Figure 5.23: Electronically Timed Double-Knife (ETDK) Module**

A - User LED

B - Power LED

If communication between the ETDK module and the TE display is damaged, USER LED (A) can communicate error codes.

- **Example 1:** one blink (pause) then three blinks (User LED Code 1.3) indicates Error E74 – controller temperature high.

If there are multiple errors, each error code will be followed by a longer pause, then the entire sequence will repeat.

- **Example 2:** one blink (pause) then three blinks (User LED Code 1.3) (long pause) two blinks (pause) then one blink (User LED Code 2.1) indicates Error E74 – controller temperature high and E77 – CAN bus fault.

POWER LED (B) should be green when the system is active and functioning properly.

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## MAINTENANCE AND SERVICING

The Troubleshooting ETDK Module diagram can help you determine the source of a fault by referencing the TE display, the ETDK module LEDs, and the error code tables included in this section.

Callout	Description
<b>E</b>	<b>Error</b> = A fault code displays on the Touch Encoder (TE); the CAN bus communication is okay.
<b>D1</b>	<b>Decision</b> = Is the fault code described in Table 5.1, page 231 – Table 5.4, page 232? Review the fault code solution information.
<b>D2</b>	<b>Decision</b> = Is the fault code described in Table 5.5, page 233? Review the fault code solution information.
<b>C1</b>	<b>Condition</b> = Is the Power LED on the ETDK module green?
<b>F1</b>	<b>Failure</b> = Failure of the ETDK module system; contact your Dealer.
<b>C2</b>	<b>Condition</b> = Note the user LED blink code on the ETDK module and refer to the USER LED CODE column in all error tables.
<b>F2</b>	<b>Failure</b> = Failure of the CAN bus, but the ETDK module is okay; contact your Dealer.

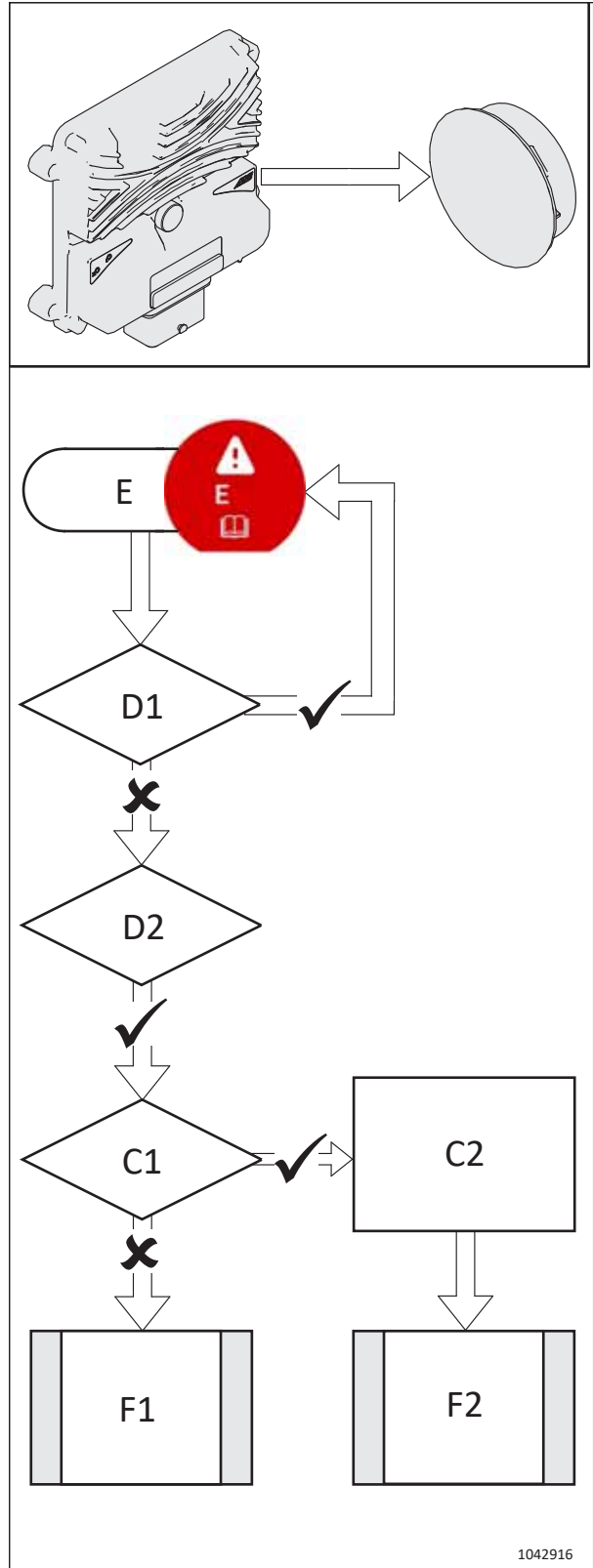


Figure 5.24: Troubleshooting ETDK Module



## MAINTENANCE AND SERVICING

**Table 5.1 Controller Error Codes**

Callout	TE Display Fault Code	User LED Code <sup>78</sup>	Description	Solution
A	E73	1.1	Battery voltage low	Check the windrower battery voltage and charge the battery if necessary. Clean and secure the battery connections.
		1.2	Battery voltage high	Check the windrower battery voltage. Check the DC voltage at the alternator output. Contact your Dealer to check the windrower charging system.
B	E74	1.3	Module temperature high	Allow the module to cool before continuing operation.
B	E74	1.4	Module CPU temperature high	Allow the module to cool before continuing operation.
B	E74	1.11	Module output voltage low	Check the wiring for damage. The knife bypass valves may be affected.
B	E74	1.12	Module output current high	Check the wiring for damage. The knife bypass valves may be affected.
B	E74	1.5	Memory failure detected	ETDK Module memory failure detected. Contact your Dealer.
B	E74	1.6	Memory corruption detected	Corrupt data detected. Contact your Dealer.
C	E75	1.7	Firmware failure detected	Turn the windrower off, wait 30 seconds, then restart the windrower. If the issue persists, contact your Dealer.
C	E75	1.8	Module timer failure detected	Turn the windrower off, wait 30 seconds, then restart the windrower. If the issue persists, contact your Dealer.
D	E76	1.9	Sensor voltage supply high	Check the wiring for damage. The knife speed sensors or the knife pressure sensor may be affected.
D	E76	1.10	Sensor voltage supply low	Check the wiring for damage. The knife speed sensors or the knife pressure sensor may be affected.

**Table 5.2 Knife Speed Error Codes**

Callout	Fault Code	User LED Code	Description	Solution
G	E79	3.1	Left knife speed low	Check the knife sensor alignment. Check the sensor wiring harness and connectors. Check the knife, hold-downs, and knife drive for any obstructions. If necessary, replace the sensor.
G	E79	3.3	Left knife speed high	Check the knife sensor alignment. Check the sensor wiring harness and the connectors. If necessary, replace the sensor.
G	E79	3.5	Left knife speed intermittent	Check the knife sensor alignment. Check the sensor wiring harness and connectors. Check the knife, hold-downs, and knife drive for any obstructions. If necessary, replace the sensor.

78. Error codes are communicated with a flashing user LED on the ETDK module.

**MAINTENANCE AND SERVICING**

**Table 5.2 Knife Speed Error Codes (continued)**

Callout	Fault Code	User LED Code	Description	Solution
H	E80	3.2	Right knife speed low	Check the knife sensor alignment. Check the sensor wiring harness and connectors. Check the knife, hold-downs, and knife drive for any obstructions. If necessary, replace the sensor.
H	E80	3.4	Right knife speed high	Check the knife sensor alignment. Check the sensor wiring harness and the connectors. If necessary, replace the sensor.
H	E80	3.6	Right knife speed intermittent	Check the knife sensor alignment. Check the sensor wiring harness and connectors. Check the knife, hold-downs, and knife drive for any obstructions. If necessary, replace the sensor.

**Table 5.3 Bypass Valve Error Codes**

Callout	Fault Code	User LED Code	Description	Solution
J	E81	4.1	Left bypass valve - persistent high output	Check the wiring harness and the connectors. If necessary, replace the valve.
J	E81	4.3	Left bypass valve - over load detected	Check the wiring harness and the connectors. If necessary, replace the valve.
J	E81	4.5	Left bypass valve - open load detected	Check the wiring harness and the connectors. If necessary, replace the valve.
J	E81	4.7	Left bypass valve - short circuit detected	Check the wiring harness and the connectors. If necessary, replace the valve.
K	E82	4.2	Right bypass valve - persistent high output	Check the wiring harness and the connectors. If necessary, replace the valve.
K	E82	4.4	Right bypass valve - over load detected	Check the wiring harness and the connectors. If necessary, replace the valve.
K	E82	4.6	Right bypass valve - open load detected	Check the wiring harness and the connectors. If necessary, replace the valve.
K	E82	4.8	Right bypass valve - short circuit detected	Check the wiring harness and the connectors. If necessary, replace the valve.

**Table 5.4 Knife Control Error Codes**

Callout	Fault Code	User LED Code	Description	Solution
L	E83	5.1	Knife phase control fault	Beware of potential header damage if the knife is run outside of the acceptable operating range for a prolonged period of time. Inspect the knife speed sensor. Contact your Dealer.
L	E83	5.3	Knife phase control failure	Beware of potential header damage if the knife is run outside of the acceptable operating range for a prolonged period of time. Inspect the knife speed sensor. Contact your Dealer.

## MAINTENANCE AND SERVICING

**Table 5.4 Knife Control Error Codes (continued)**

Callout	Fault Code	User LED Code	Description	Solution
M	E84	5.2	Knife pressure sensor - high pressure	Beware of potential header damage if the knife is run outside of the acceptable operating range for a prolonged period of time. Contact your Dealer.
M	E84	5.4	Knife pressure sensor - low voltage	Check the knife sensor alignment. Check the sensor wiring harness and the connectors. If necessary, replace the sensor.
M	E84	5.5	Knife pressure sensor - high voltage	Check the knife sensor alignment. Check the sensor wiring harness and the connectors. If necessary, replace the sensor.

**Table 5.5 CAN Communication Errors**

Callout	Fault Code	User LED Code	Description	Solution
E	E77	2.1	ETDK CAN bus fault	Check the wiring and connectors to the ETDK module. Check the red LED flash code on the ETDK module. Contact your Dealer.
E	E77	2.2	ETDK CAN bus fault	Check the wiring and connectors to the ETDK module. Check the red LED flash code on the ETDK module. Contact your Dealer.
F	E78	2.3	ETDK module communication lost	Check the wiring and connectors to the ETDK module. Check the red LED flash code on the ETDK module. Contact your Dealer.
F	E78	2.4	ETDK module communication lost	Check the wiring and connectors to the ETDK module. Check the red LED flash code on the ETDK module. Contact your Dealer.

### *Troubleshooting Fault Codes – M1 Series and M2 Series Windrowers*

The windrower display provides diagnostic information to the electronic timed double-knife (ETDK) system.

Fault codes (A) are received from the electronic timed double knife (ETDK) module. Pressing the question mark symbol on the fault code ribbon opens a detailed description of the fault.



**Figure 5.25: ETDK Knife Fault**

## MAINTENANCE AND SERVICING

The following details are displayed on the ACTIVE FAULT CODES page. For more information about investigating fault codes, refer to the windrower operator’s manual.

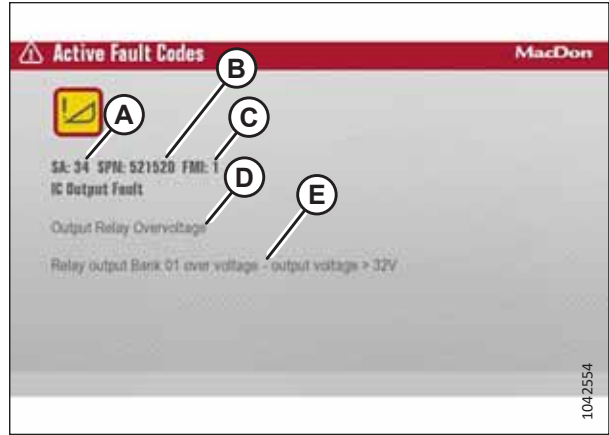
- SA: Source address number (A) is the controller that issued the fault (for example, SA: 0 = engine).

**NOTE:**

The SA number is not referenced in the tables below.

- SPN: Suspect parameter number (B) is used to report the component or condition of the fault (for example, SPN: 190 = engine speed). The SPN number is included in the troubleshooting tables.
- FMI: Failure mode indicator number (C) provides mode specific information about the type of fault reported by the controller (for example, FMI: 0 = data valid, but below/above operational range) The FMI number is included in the troubleshooting tables.
- Short description (D) provides basic information about the fault.
- Long description (E) provides a more detailed report of the fault and its location.

The INPUT/OUTPUT LIST provides additional diagnostic information. For more information about accessing the list, refer to the windrower operator’s manual.

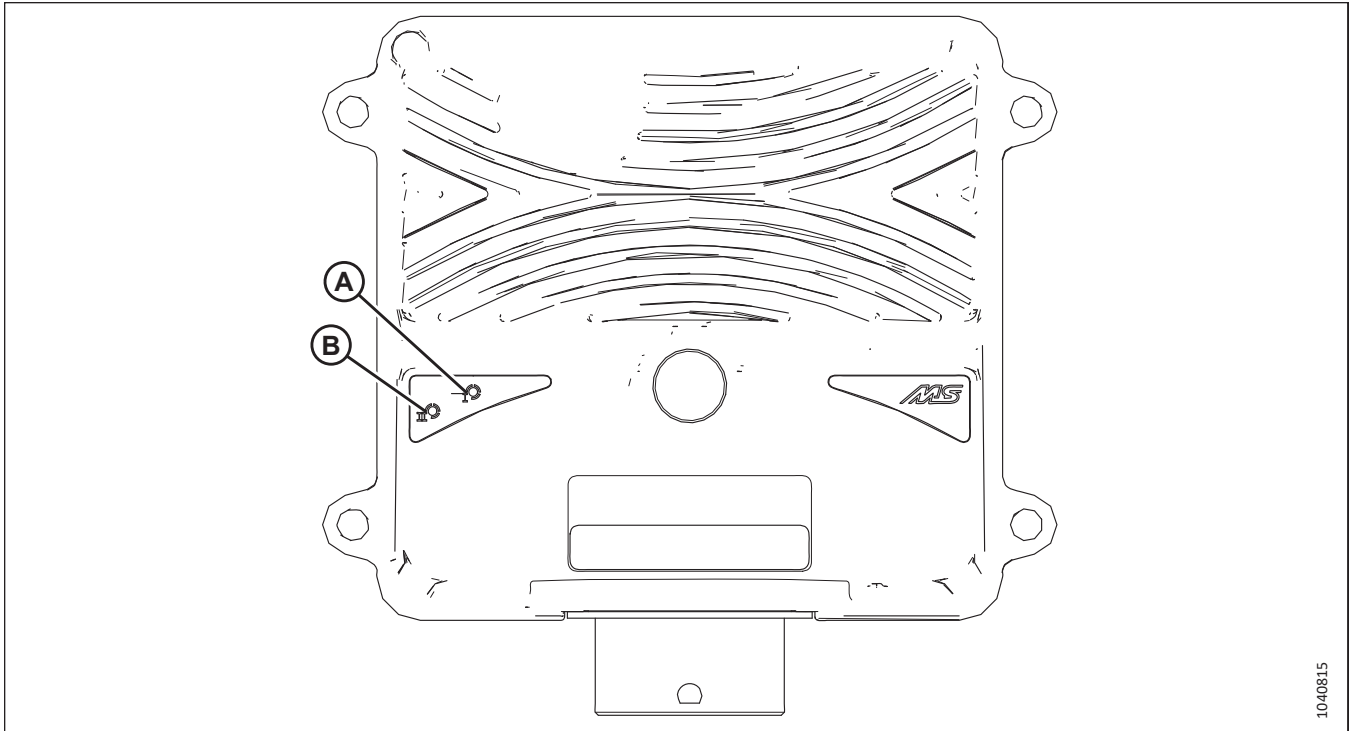


**Figure 5.26: Fault Description**

Desc	Status	Module	Type	Conn	Pos
LH Knife Speed	Error 1155 rpm	Electronic Timed Knife	F-in	P510	H4
Schematic: 11.7 Networks_CAW-Header_ETK Module_IPDNET					
RH Knife Speed	Okay 1160 rpm	Electronic Timed Knife	F-in	P510	G1
Knife Phase	Error 48.3	Electronic Timed Knife	J1939 Message	P510	B1A1
Knife Pressure - Header	Okay 1800 psi	Electronic Timed Knife	J1939 Message	P510	B1A1
Wave Command	-25.5%	Electronic Timed Knife	J1939 Message	P510	B1A1

Systems: Electronically Timed Knife

**Figure 5.27: Input/Output List**



**Figure 5.28: Electronically Timed Double-Knife (ETDK) Module**

A - User LED

B - Power LED

If communication between the ETDK module and the cab display is damaged, USER LED (A) can communicate error codes.

- **Example 1:** one blink (pause) then three blinks (Error ID 1.3) indicates – module temperature high.

**NOTE:**

Error ID 2.4 is always present on M1 Series and M2 Series Windrowers.

If there are multiple errors, each error code will be followed by a longer pause, then the entire sequence will repeat.

- **Example 2:** one blink (pause) then three blinks (Error ID 1.3) (long pause) two blinks (pause) then one blink (Error ID 2.1) indicates – module temperature high and CAN bus fault.

POWER LED (B) should be green when the system is active and functioning properly.

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## MAINTENANCE AND SERVICING

The Troubleshooting ETDK Module diagram can help you determine the source of a fault by referencing the cab display, the ETDK module LEDs, and the error code tables included in this section.

Graphic Callout	Description
E	<b>Error</b> = A fault code appears on the display; the CAN bus communication is okay.
D1	<b>Decision</b> = Is the fault code described in Table 5.6, page 237 – Table 5.9, page 239? Review the fault code solution information.
D2	<b>Decision</b> = Is the fault code described in Table 5.10, page 240? Review the fault code solution information.
C1	<b>Condition</b> = Is the Power LED on the ETDK module green?
F1	<b>Failure</b> = Failure of the ETDK module; contact your Dealer.
C2	<b>Condition</b> = Note the User LED blink code on the ETDK module and refer to the USER LED CODE column in all error tables. Review the fault code solution information.  <b>NOTE:</b> The blink code for error code 2.4 is always present. Ignore this blink code.
F2	<b>Failure</b> = Failure of the CAN bus, but the ETDK module is okay; contact your Dealer.

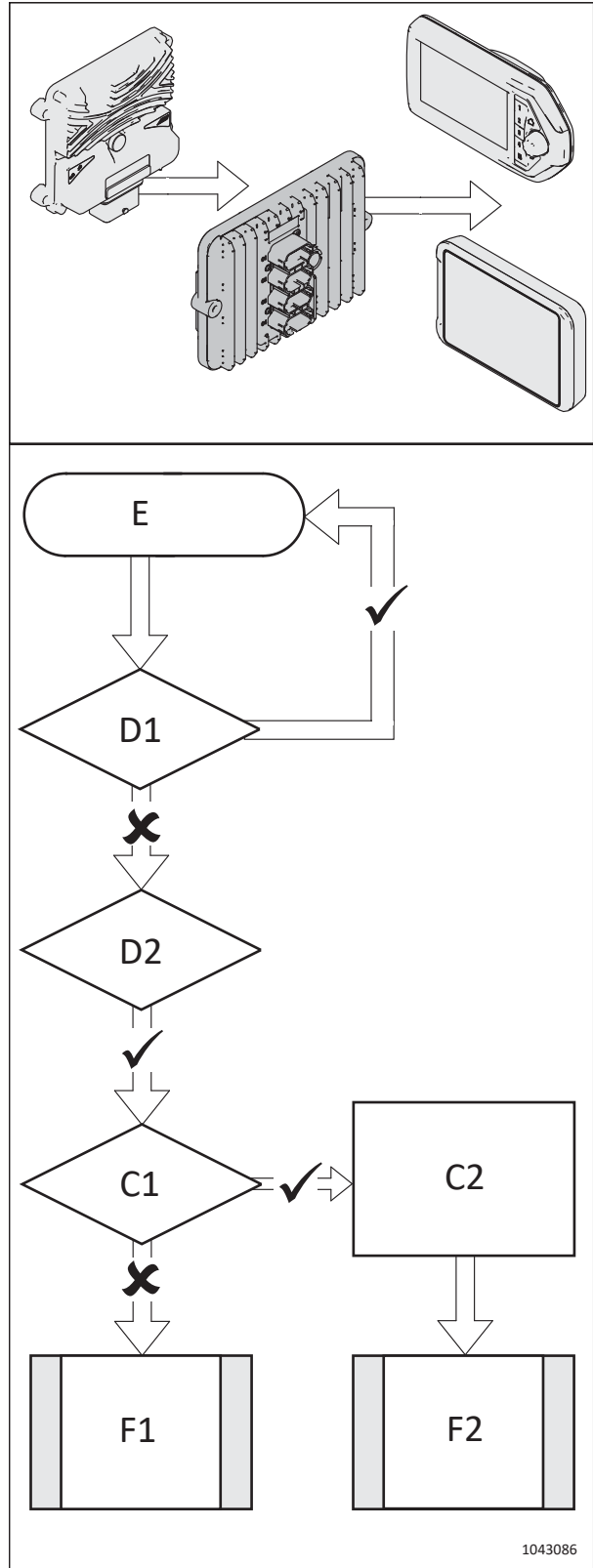


Figure 5.29: Troubleshooting ETDK Module

**MAINTENANCE AND SERVICING**

**Table 5.6 Controller Error Codes**

<b>Error ID</b>	<b>SPN</b>	<b>FMI</b>	<b>SPN Description</b>	<b>Short Fault Text</b>	<b>Solution</b>
1.1	521517	1	ETDK module	Low battery voltage	Check the windrower battery voltage and charge the battery if necessary. Clean and secure the battery connections.
1.2		2		High battery voltage	Check the windrower battery voltage. Contact your Dealer to check the windrower charging system.
1.3	521518	1	ETDK module	Temperature high	The module has exceeded the max operating temperature. Allow the module to cool before continuing operation.
1.4		2		CPU temperature high	The module has exceeded the max operating temperature. Allow the module to cool before continuing operation.
1.5		3		Memory fault	ETDK Module memory failure detected. Contact your Dealer.
1.6		4		Memory fault	Corrupt data detected. Contact your Dealer.
1.11		5		Firmware fault	Firmware failure detected. Contact your Dealer.
1.12		6		Timer fault	Turn the windrower off, wait 30 seconds, then restart the windrower. If the issue persists, contact your Dealer.
1.7	521519	1	ETDK module Vref	Low voltage	Check the wiring for damage. The knife speed sensors or the knife pressure sensor may be affected.
1.8		2		High voltage	Check the wiring for damage. The knife speed sensors or the knife pressure sensor may be affected.
1.9	521520	1	ETDK module output	Low voltage	Check the wiring for damage. The knife bypass valves may be affected.
1.10		2		Over current	Check the wiring for damage. The knife bypass valves may be affected.

**MAINTENANCE AND SERVICING**

**Table 5.7 Implement Controller Input Error Codes**

<b>Error ID</b>	<b>SPN</b>	<b>FMI</b>	<b>SPN Description</b>	<b>Short Fault Text</b>	<b>Solution</b>
3.1	521523	1	ETDK left knife speed	Low speed	The input frequency is lower than expected. Check the knife, hold-downs, and knife drive for any obstructions. Check the sensor alignment, power supply, ground, and signal path. If necessary, replace the sensor.
3.3		2		High speed	The input frequency is higher than expected. Check sensor alignment, power supply, ground, and signal path. If necessary, replace the sensor.
3.5		3		Intermittent speed	The input frequency is different than expected. Check the knife, hold-downs, and knife drive for any obstructions. Check the sensor alignment, power supply, ground, and signal path. If necessary, replace the sensor.
3.2	521525	1	ETDK right knife speed	Low speed	The input frequency is lower than expected. Check the knife, hold-downs, and knife drive for obstructions. Check the sensor alignment, power supply, ground, and signal path. If necessary, replace the sensor.
3.4		2		High speed	The input frequency is higher than expected. Check the sensor alignment, power supply, ground, and signal path. If necessary, replace the sensor.
3.6		3		Intermittent speed	The input frequency is different than expected. Check the knife, hold-downs, and knife drive for obstructions. Check the sensor alignment, power supply, ground, and signal path. If necessary, replace the sensor.



## MAINTENANCE AND SERVICING

**Table 5.8 Implement Controller Output Error Codes**

Error ID	SPN	FMI	SPN Description	Short Fault Text	Solution
4.1	521528	5	ETDK left control output	Persistent high output	The circuit current is different than expected. Check the wiring and the connector to ensure isolation of signal and ground lines. If necessary, replace the valve.
4.3		1		Over load detected	The circuit current is higher than expected. Check the wiring and the connector to ensure isolation of signal and ground lines. If necessary, replace the valve.
4.5		4		Open load detected	Check the wiring and the connector for damage or breaks. If necessary, replace the valve.
4.7		2		Short circuit detected	Check the wiring and the connector to ensure isolation of signal and ground lines. If necessary, replace the valve.
4.2	522291	5	ETDK right control output	Persistent high output	The circuit current is different than expected. Check the wiring and the connector to ensure isolation of signal and ground lines. If necessary, replace the valve.
4.4		1		Over load detected	The circuit current is higher than expected. Check the wiring and the connector to ensure isolation of signal and ground lines. If necessary, replace the valve.
4.6		4		Open load detected	Check the wiring and the connector for damage or breaks. If necessary, replace the valve.
4.8		2		Short circuit detected	Check the wiring and connector to ensure isolation of signal and ground lines. If necessary, replace the valve.

**Table 5.9 Knife Control Error Codes**

Error ID	SPN	FMI	SPN Description	Short Fault Text	Solution
5.1	522292	1	Knife phase control	Knife phase control fault	The knife phase is outside of the acceptable operating range. Beware the potential for header damage if the knife is run for a prolonged period of time. Contact your Dealer.
5.3		2		Knife phase control failure	Control system is unable to adjust knife timing. Beware the potential for header damage if the knife is run for a prolonged period of time. Knife speed output defaulted to safe speed mode. Contact your Dealer.
5.2	522293	1	Knife pressure sensor (header)	Knife pressure high (header)	Beware the potential for header damage if the knife is run for a prolonged period of time.
5.4		2	Knife pressure sensor (header)	Low voltage	Check the wiring and the connector to ensure isolation of signal and ground lines. Replace the sensor, if necessary.
5.5		3	Knife pressure sensor (header)	High voltage	Check the wiring and the connector to ensure isolation of signal and sensor power lines. Replace the sensor, if necessary.

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**Table 5.10 CAN Communication Error Codes**

<b>Error ID</b>	<b>SPN</b>	<b>FMI</b>	<b>SPN Description</b>	<b>Short Fault Text</b>	<b>Solution</b>
2.1	521521	1	ETDK module offline	ETDK CAN bus fault	The ETDK CAN bus is functional, but faults have been detected. Check the CAN bus termination and ensure no additional modules are connected to the CAN bus. Contact your Dealer.
2.2		2		ETDK CAN bus	Check the wiring and the connectors to the ETDK module. Check the red LED flash code on the ETDK module. Contact your Dealer.
2.3	521522	1	ETDK module offline	ETDK module communication lost	Check the wiring and the connectors to the ETDK module. Check the CAN bus termination. Check the red LED flash code on the ETDK module. Contact your Dealer.
2.4	—	—	—	—	Ignore this error code. This code is always present with M1/M2 Series Windrowers.

## 5.5 Cutterbar

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 the guards and the knife at all times.

### WARNING

Wear heavy gloves when working around or handling knives.

### CAUTION

Refer to [5.1 Preparing Machine for Servicing, page 211](#) before servicing the machine or opening the drive covers.

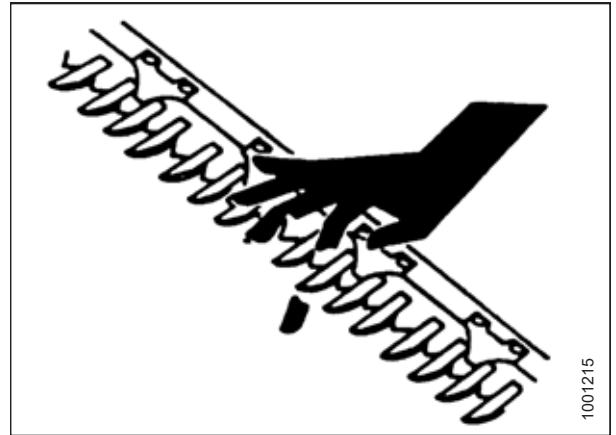


Figure 5.30: Cutterbar Hazard

### 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.

### DANGER

Ensure that all bystanders have cleared the area.

### 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 45](#).

## MAINTENANCE AND SERVICING

- Identify the damaged knife section. If there is a hold-down, loosen nuts (A) securing hold-down (B) to access the damaged knife section.

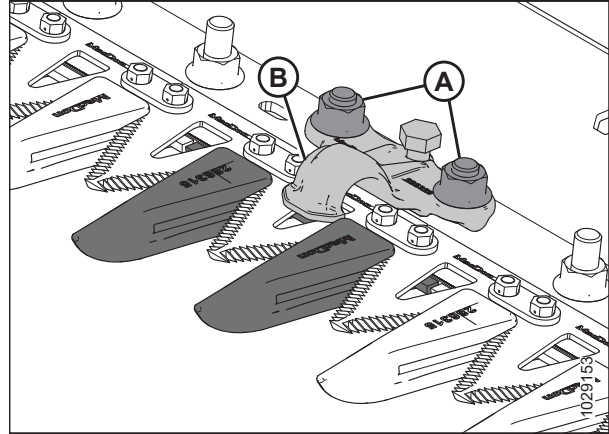


Figure 5.31: Cutterbar

- Remove bolts and nuts (B). Retain the hardware.

**NOTE:**

If the knife hardware is under a hold-down, rotate the knife flywheel to reposition the knife.

- For knife sections near the drive end, remove bars (C) and lift knife section (A) off of the knife back bar.
- Clean the knife back bar, and position the new knife section onto the back bar.

**NOTE:**

The cut quality may be affected if both fine and coarsely serrated knife sections are used on the same knife.

- For knife sections near the drive end, reposition bars (C).
- If a hold-down was removed earlier, reinstall it along with bolts and nuts (B).

**NOTE:**

Ensure that the bolt heads fully engage into the oblong holes on the knife back bar.

- Torque nuts (B) to 12 Nm (8.9 lbf-ft [106 lbf-in]).
- To check the hold-down adjustment, refer to *Checking Hold-Down – Pointed Knife Guards, page 256* or *Checking Hold-Down – Short Knife Guards, page 270*.

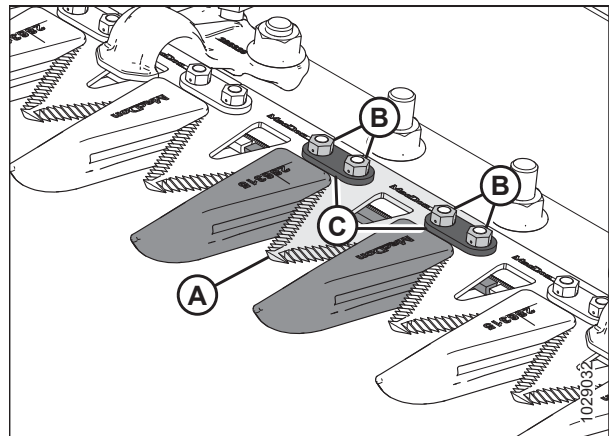


Figure 5.32: Cutterbar

### 5.5.2 Removing Knife

If the knife is damaged, it will need to 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**

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. For double-knife headers, check which knife needs to be removed before starting the procedure.

1. Shut down the engine, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to *Opening Header Endshields, page 47*.
3. Position 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 a chisel in slot (C) to release the load on the knifehead pin.
8. Use a screwdriver or a chisel to pry the knifehead pin upward in the pin groove until the pin is clear of the knifehead.
9. Push knife assembly (A) inboard until it is clear of drive arm (B).

**NOTE:**

The frame and the 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.

**NOTE:**

If the knifehead or the knifehead bearing is being removed, pull the knife out far enough to access these parts.

12. Remove knife (A).

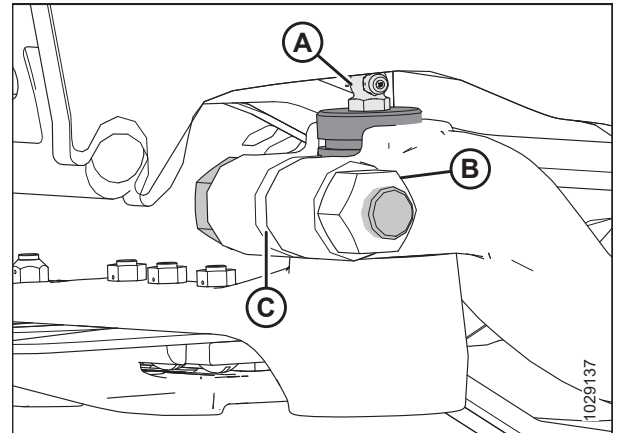


Figure 5.33: Knifehead

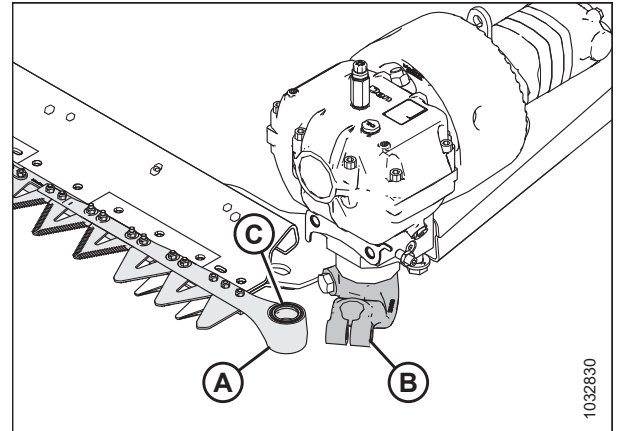


Figure 5.34: Left Knifehead

### 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.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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. Lower the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Remove the knife. For instructions, refer to [5.5.2 Removing Knife, page 242](#).

**NOTE:**

Because the bearing is being replaced, it is not necessary to wrap the knifehead to protect the bearing.

4. 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 the needle bearing for wear, and replace the seal if necessary.

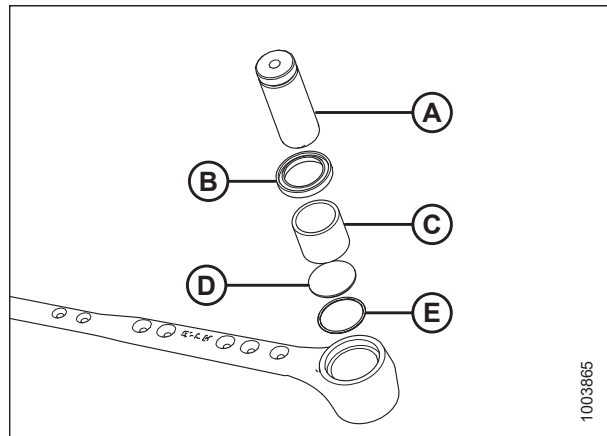


Figure 5.35: Knifehead Bearing Assembly

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

2. Place O-ring (E) and plug (D) into the knifehead.
3. 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 identification markings facing up.

4. Install seal (B) into the knifehead with the lip facing outwards.

**IMPORTANT:**

To prevent premature knifehead or knife drive box failure, ensure that there is a tight fit between the knifehead pin and the needle bearing, and a tight fit between the knifehead pin and the output arm.

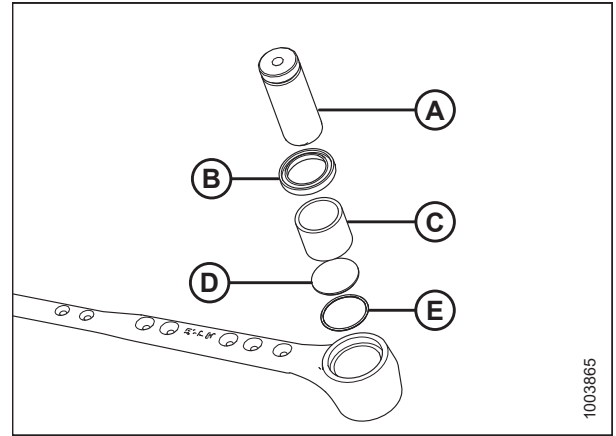


Figure 5.36: Knifehead Bearing Assembly

### 5.5.5 Installing Knife

To install the knife, open the endshield, lubricate the knifehead bearing, and install the knife assembly onto the header. Secure the knifehead pin with a bolt and nut, ensure proper clearance by rotating the flywheel, apply grease to the fitting, and then close the endshield.

**! 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 47*.

**NOTE:**

The installation illustrations show the left knife being installed. The procedure is the same for installing the right knife.

## MAINTENANCE AND SERVICING

3. Lubricate knifehead bearing (A), then install the knife assembly onto the header.

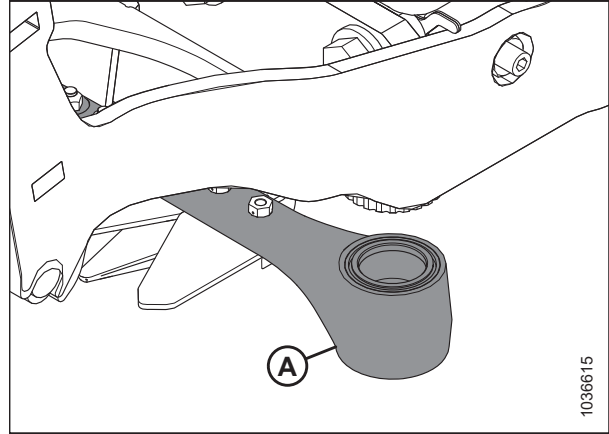


Figure 5.37: Knifehead

4. Install knifehead pin (A) through the drive arm and into the knifehead.
5. Position knifehead pin (A) so that groove (B) is 2 mm (0.08 in.) above the drive arm.

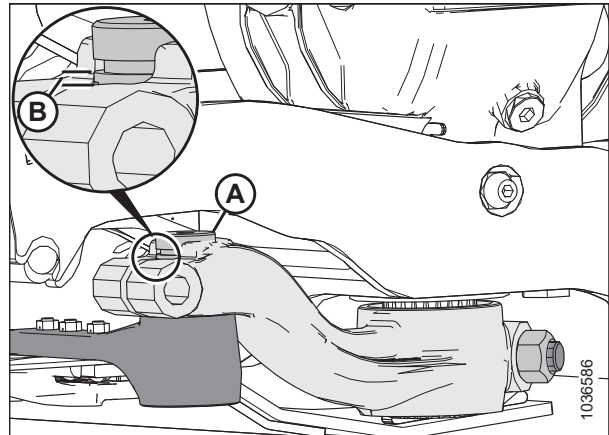


Figure 5.38: Knifehead

6. 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).
7. Rotate the flywheel attached to the knife drive box to position knife arm 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.
8. If the drive arm does not need adjustment, proceed to Step 9, page 247. If adjustment is needed, contact your Dealer.

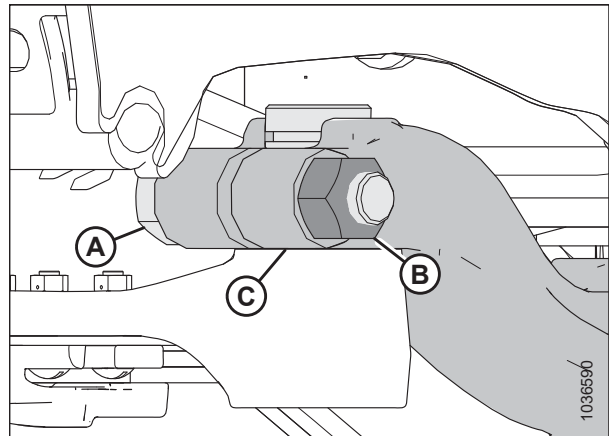


Figure 5.39: Knifehead



## MAINTENANCE AND SERVICING

- 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 misalign the knives, causing the guards to overheat and strain the knife drive motor. If you have applied too much grease to the fitting, 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.

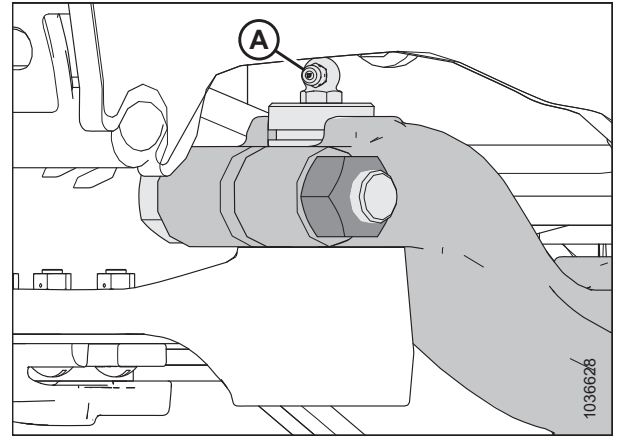


Figure 5.40: Knifehead

- Close the endshield. For instructions, refer to [Closing Header Endshields](#), page 48.

### 5.5.6 Spare Knives

Two spare knives (A) can be stored in the header backtube at the right end of the header. Ensure that the spare knives are secured in place with latch (B) and hairpin (C).

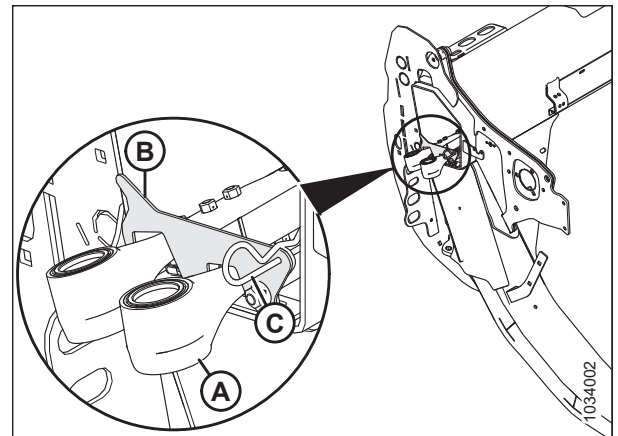


Figure 5.41: Spare Knives

### 5.5.7 Pointed Knife Guards and Hold-Downs

Knife guards help align 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:

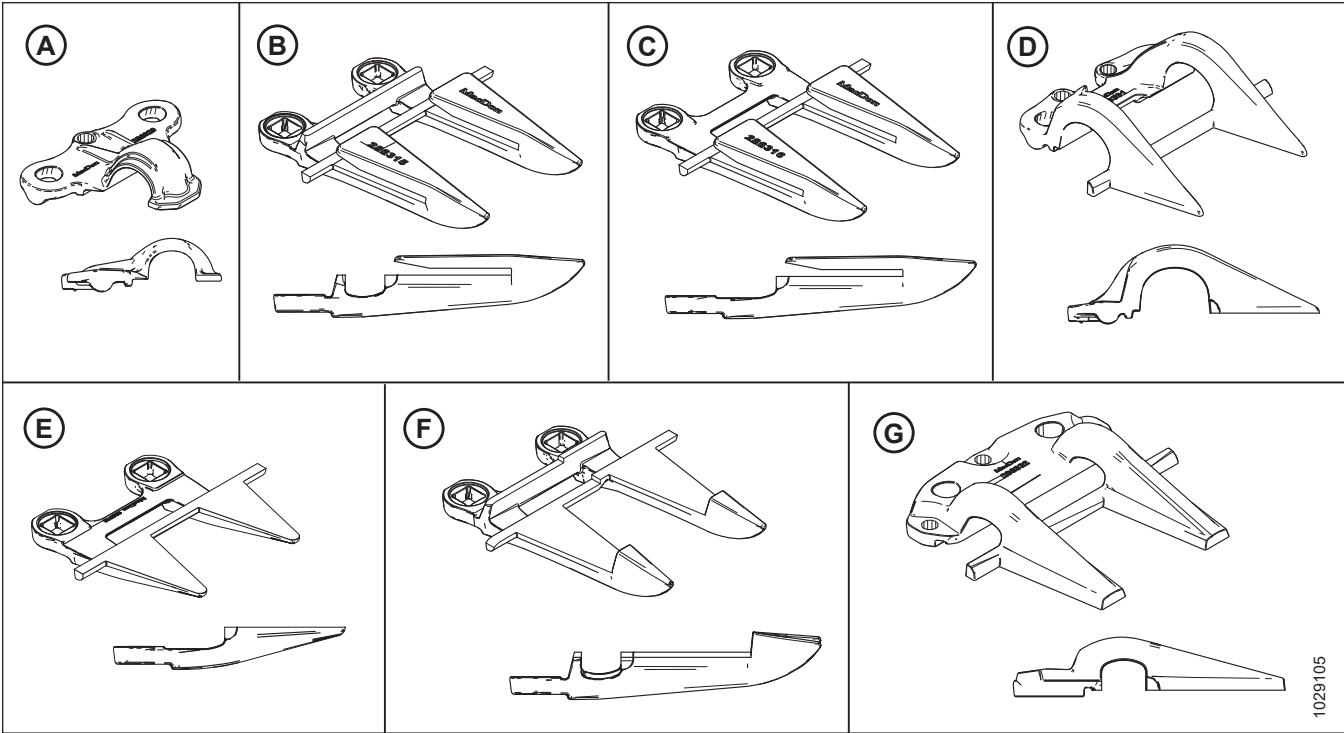
### NOTE:

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 the knife guards. Four point guards are ideal for use in rocky conditions or for harvesting shatter-prone crops such as lentils. For more information, refer to the header parts catalog.

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**Figure 5.42: 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)<sup>79</sup>

D - PlugFree™ End Hold-Down (MD #286331)

E - PlugFree™ End Knife Guard (without Wear Bar) (MD #286319)<sup>80</sup>

F - Pointed Center Knife Guard (MD #286317)<sup>81</sup>

G - Pointed Center Hold-Down (MD #286332)<sup>81</sup>

The guards are configured differently on different headers. When replacing pointed guards and hold-downs, ensure that you follow the correct replacement sequence for your header. Refer to the relevant topic:

- [Pointed Knife Guard Configuration on Single-Knife Headers, page 249](#)
- [Pointed Knife Guard Configuration on Double-Knife Header – D225–D235, page 250](#)
- [Pointed Knife Guard Configuration on Double-Knife Header – D241, page 251](#)

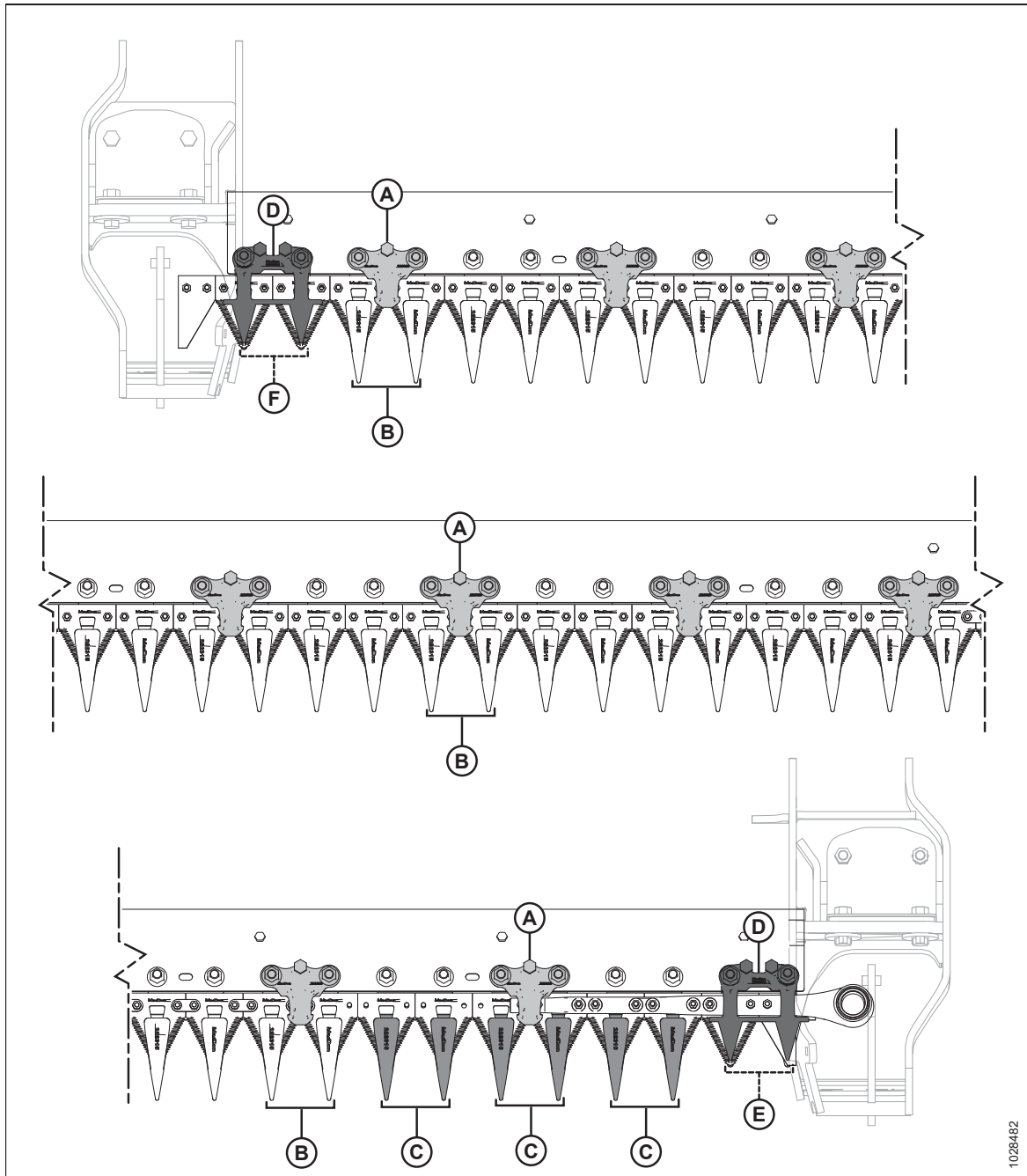
79. Installed in positions 2, 3, and 4 on the drive side(s). Refer to [Replacing Pointed Knife Guards, page 254](#).

80. Installed in position 1 on the drive side(s). Single-knife headers use a standard guard on the right end.

81. 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.



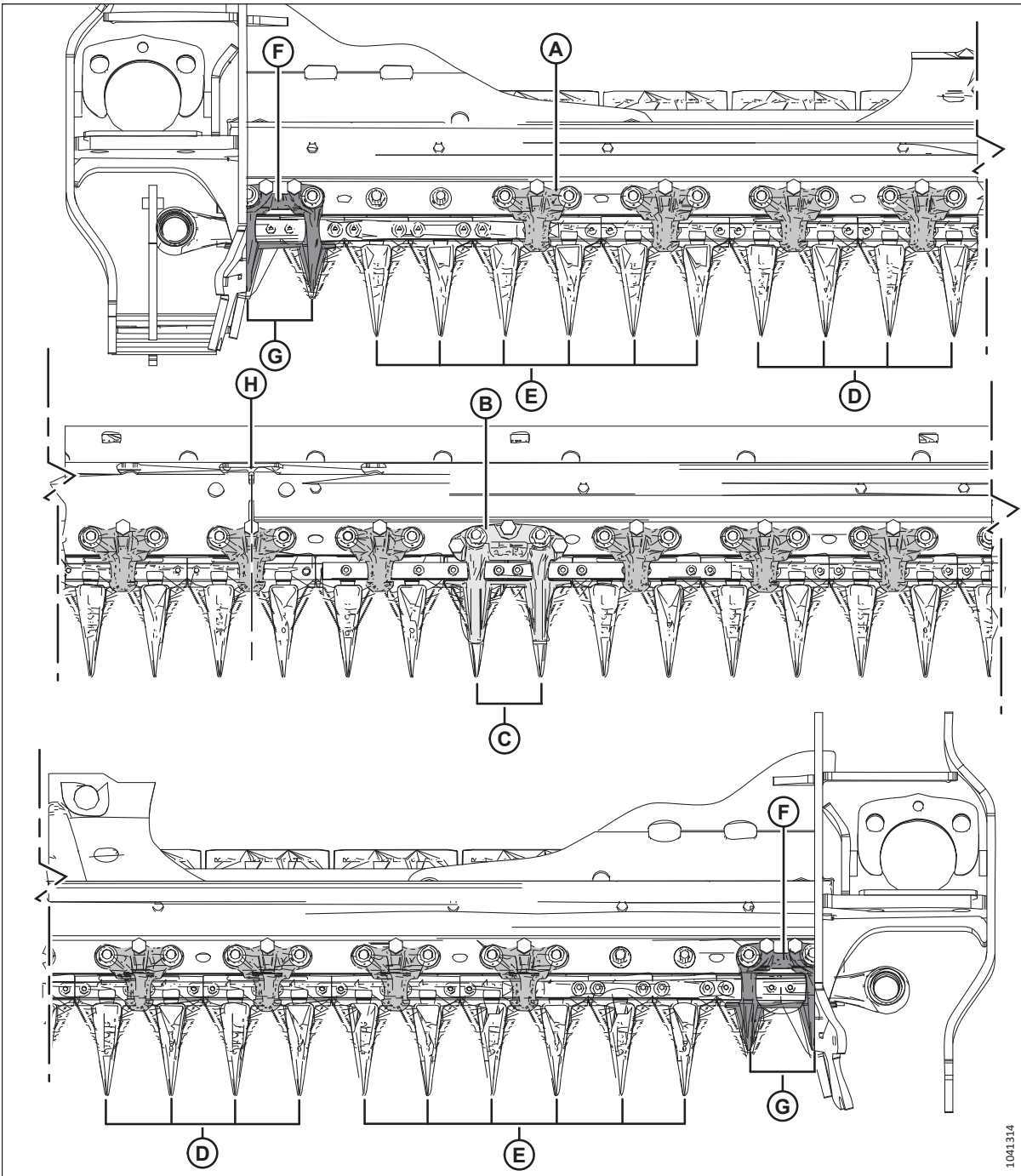
**Figure 5.43: Pointed Knife Guard and Hold-Down Locations – Single-Knife Headers**

- |   |                                      |
|---|--------------------------------------|
| 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)   |

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### *Pointed Knife Guard Configuration on Double-Knife Header – D225–D235*

Guards are configured differently on different headers. The illustration provided here shows pointed knife guards installed on double-knife headers.



**Figure 5.44: Pointed Guard and Hold-Down Locations**

A - Pointed Hold-Down (MD #286329)

C - Pointed Center Knife Guard (MD #286317)

E - Pointed End Knife Guard (without Wear Bar) (MD #286316)

G - PlugFree™ Guard (without Wear Bar) (MD #286319)

B - Pointed Center Hold-Down (MD #286332)

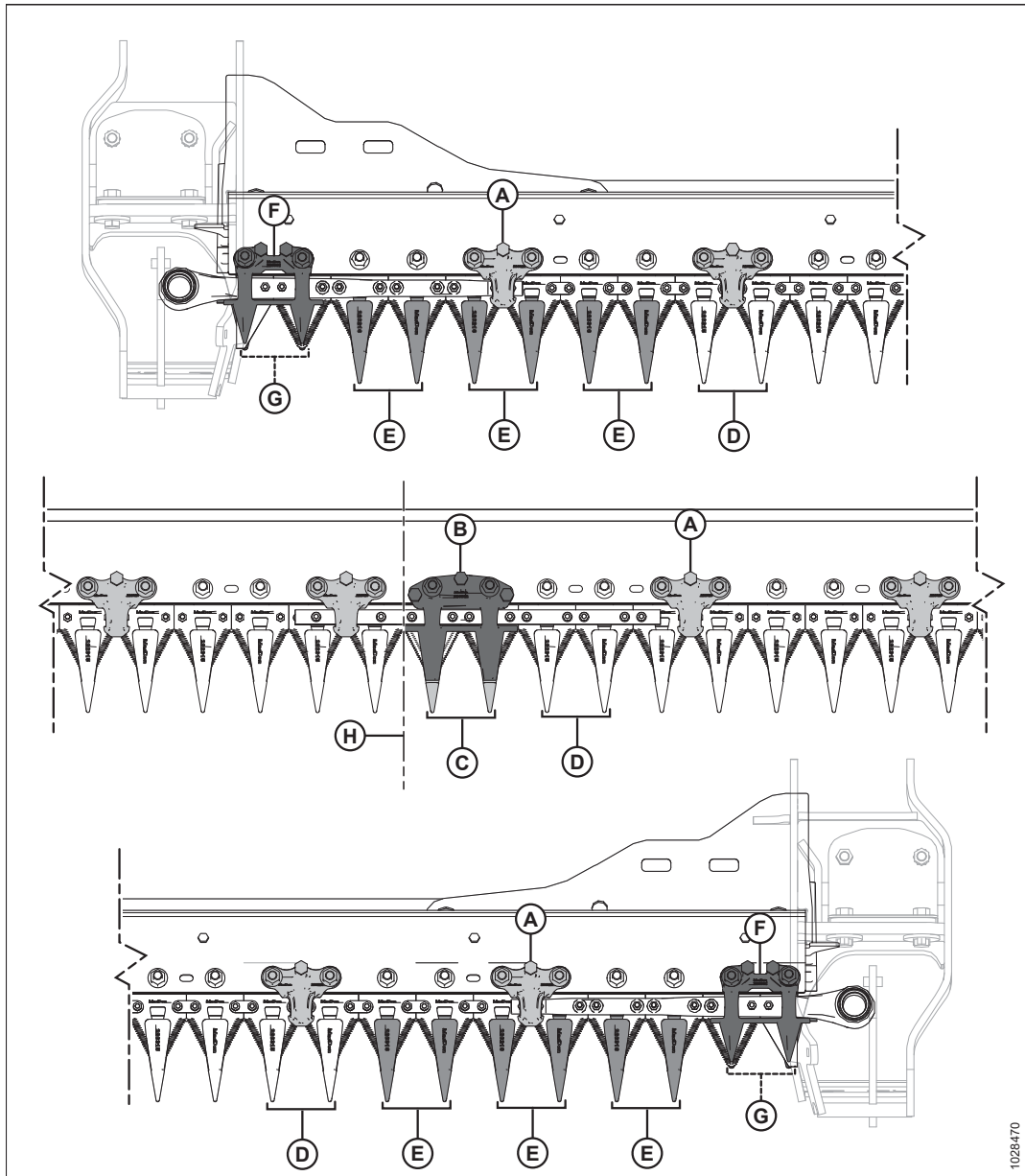
D - Pointed Knife Guard (MD #286315)

F - PlugFree™ Hold-Down (MD #286331)

H - Center of Header

*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 D241 double-knife headers.



**Figure 5.45: Pointed Knife Guard and Hold-Down Locations**

- |   |   |
|---|---|
| A - Pointed Hold-Down (MD #286329) <sup>82</sup>            | 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                      |

82. 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 obstruction, use the guard straightening tool to correct the alignment.

 **DANGER**

Ensure that all bystanders have cleared the area.

 **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 45](#).

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4. To adjust the guard tips upward, position the guard straightening tool as shown and pull the tool up.

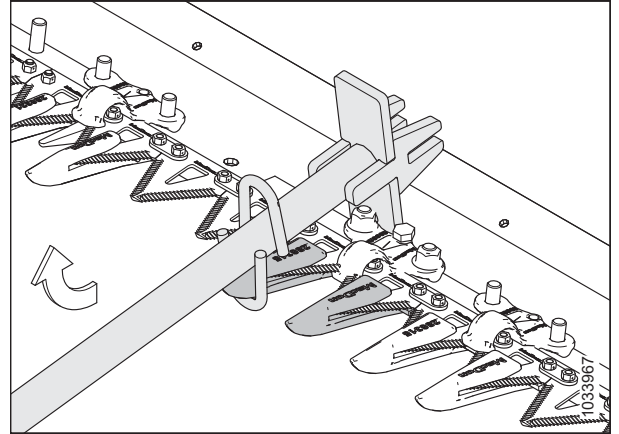


Figure 5.46: Upward Adjustment – Pointed Guard

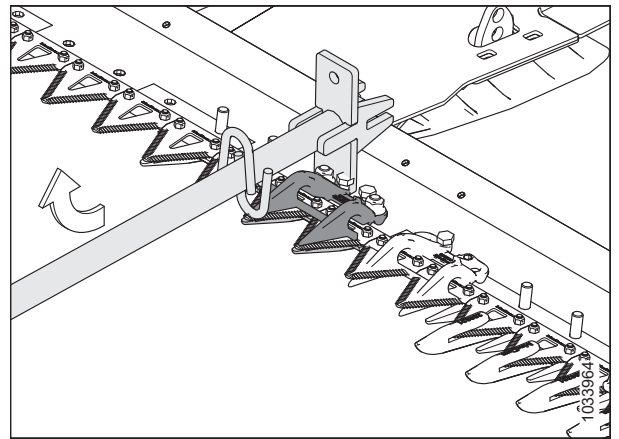


Figure 5.47: Upward Adjustment – Short Knife Guard

5. To adjust the guard tips downward, position the guard straightening tool as shown and push the tool down.

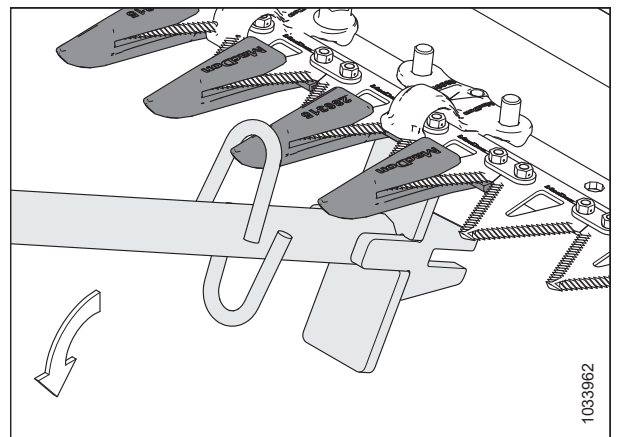


Figure 5.48: Downward Adjustment – Pointed Guard

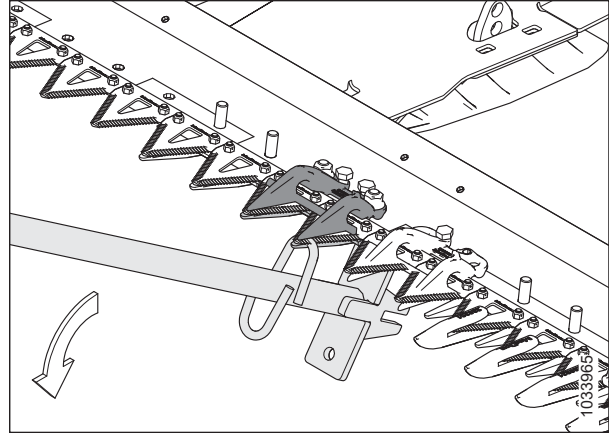


Figure 5.49: Downward Adjustment – Short Knife Guard

6. To adjust the guard bar, position the guard straightening tool as shown, then push down or pull up on the tool accordingly.

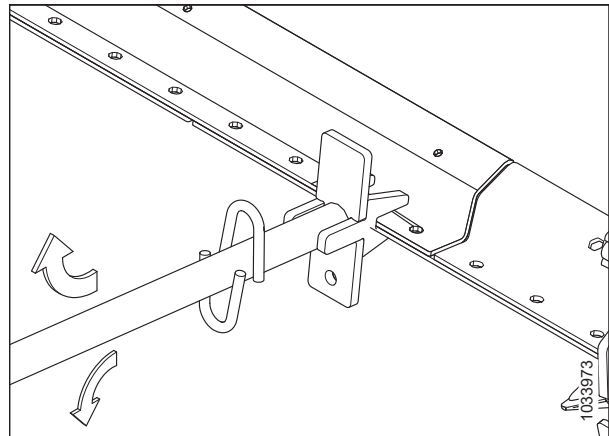


Figure 5.50: Guard Bar Adjustment – No Guards

### *Replacing Pointed Knife Guards*

The guards eventually 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.

#### **DANGER**

Ensure that all bystanders have cleared the area.

#### **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 the pointed knife guards, ensure that 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 247.

**NOTE:**

A Four-Point Guard kit can be used to replace the knife guards. The four-point guard is ideal for use in rocky conditions, or for harvesting shatter-prone crops such as lentils. For more information, refer to the header parts catalog.

**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 Header](#), page 259.

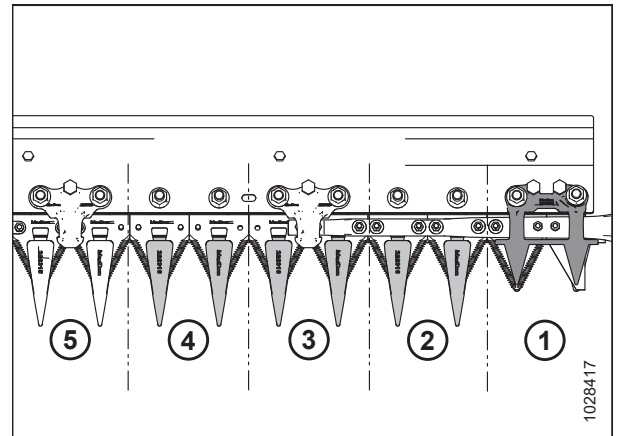


Figure 5.51: Drive Side Pointed Knife Guards

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 45.
4. Open the endshield. For instructions, refer to [Opening Header Endshields](#), page 47.
5. Rotate the flywheel attached to the knife drive box to adjust the knife position until the knife sections are spaced midway between the guards.
6. Close the endshield. For instructions, refer to [Closing Header Endshields](#), page 48.
7. Remove two nuts and bolts (B) securing pointed knife guard (A) and hold-down (C) (if applicable) to the cutterbar.
8. Remove pointed knife guard (A), hold-down (C), and the plastic wearplate. Discard the pointed knife guard.

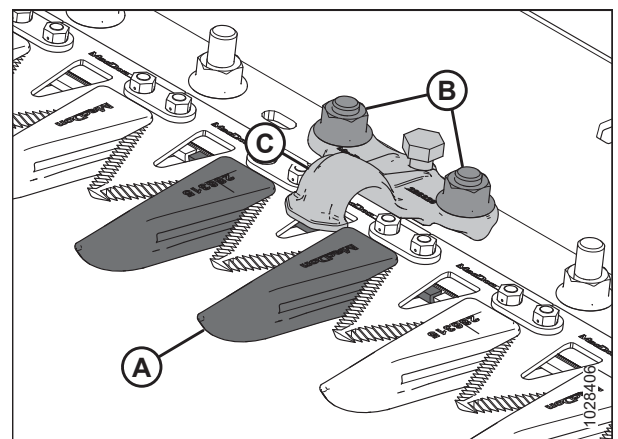


Figure 5.52: Pointed Knife Guards

9. Position plastic wearplate (A) and replacement pointed knife guard (B) under the cutterbar.

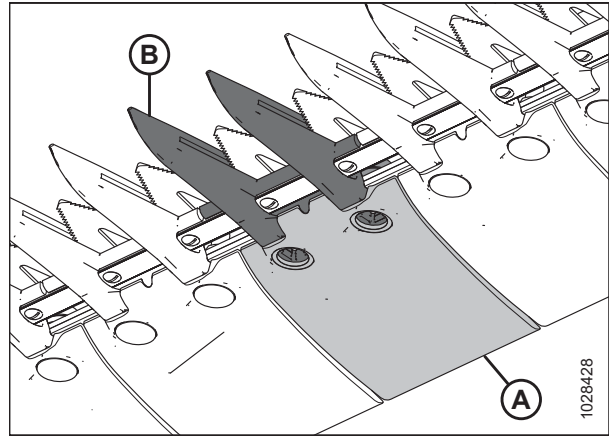


Figure 5.53: Pointed Knife Guard and Wearplate

10. Position hold-down (A) (if applicable), then loosen adjustment bolt (C) so that it does not protrude from the bottom of the hold-down.
11. Secure the pointed knife guard, the wearplate, and the hold-down (if applicable) with two bolts and nuts (B). Torque the nuts to 85 Nm (63 lbf-ft).
12. If there is a hold-down at this location, refer to [Adjusting Hold-Down – Pointed Knife Guards, page 258](#).

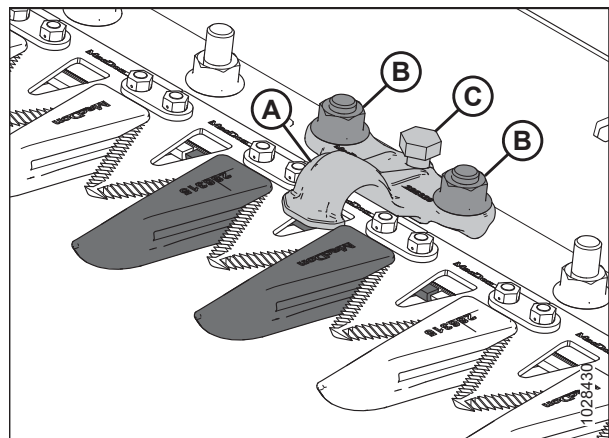


Figure 5.54: Pointed Knife Guards

### 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. Inspect the hold-downs to ensure that there is an 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 on Double-Knife Header – Pointed Knife Guards, page 261](#).

**NOTE:**

Align the guards before adjusting the hold-down. For instructions, refer to [Adjusting Knife Guards and Guard Bar, page 252](#).

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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 45*.
4. Open the endshield. For instructions, refer to *Opening Header Endshields, page 47*.
5. Rotate the flywheel attached to the knife drive box to position knife section (A) under hold-down (B), and between guard (C).
6. 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.).
7. If adjustment is necessary, refer to *Adjusting Hold-Down – Pointed Knife Guards, page 258*.
8. Close the endshield. For instructions, refer to *Closing Header Endshields, page 48*.

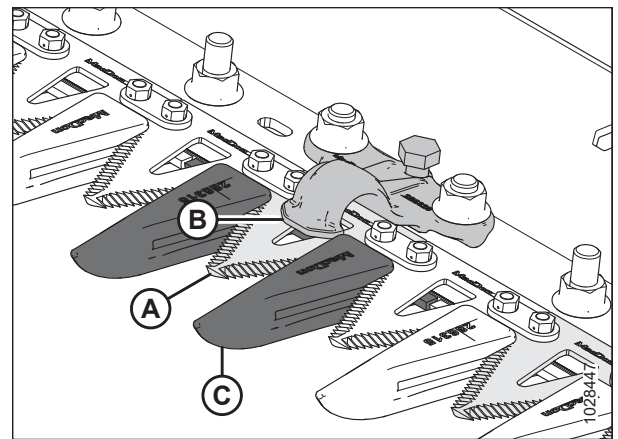


Figure 5.55: Pointed Guard Hold-Down

### Adjusting Hold-Down – Pointed Knife Guards

Following the checking procedure, if a pointed or four-point knife guard hold-down is binding the knife, adjust the hold-down.

This procedure applies to standard hold-downs. To adjust the center hold-down on double-knife headers, refer to [Adjusting Center Hold-Down on Double-Knife Header – Pointed Knife Guards, page 263](#).

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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 252](#).
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 45](#).
5. Adjust the hold-down clearance as follows:
  - To lower the front of hold-down (A) and decrease the clearance, rotate adjuster bolt (B) clockwise.
  - To raise the front of hold-down (A) and increase the clearance, rotate adjuster bolt (B) counterclockwise.

**NOTE:**

For larger adjustments, it may be necessary to loosen nuts (C) before rotating adjuster bolt (B). After adjustment, retighten the nuts to 85 Nm (63 lbf-ft).

6. Check the hold-down clearance. For instructions, refer to [Checking Hold-Down – Pointed Knife Guards, page 256](#).

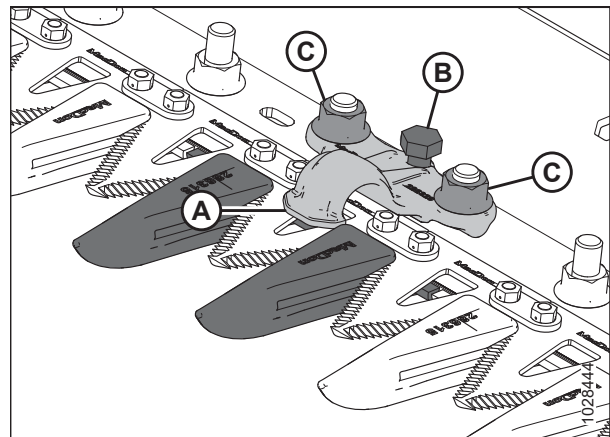


Figure 5.56: Pointed Hold-Down

7. Run the engine at a low idle and listen for noise caused by insufficient clearance. Repeat Step 5, [page 258](#) to Step 6, [page 258](#) if necessary.

**IMPORTANT:**

An insufficient hold-down clearance will cause the knife and the guards to overheat.

### Replacing Pointed Center Knife Guard – Double-Knife Header

The guard at the center of a double-knife header (where the two knives overlap) requires a 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.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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 45](#).
4. Remove two nuts and bolts (C) securing guard (A) and hold-down (B) to the cutterbar.
5. Remove guard (A), plastic wearplate, and hold-down (B).

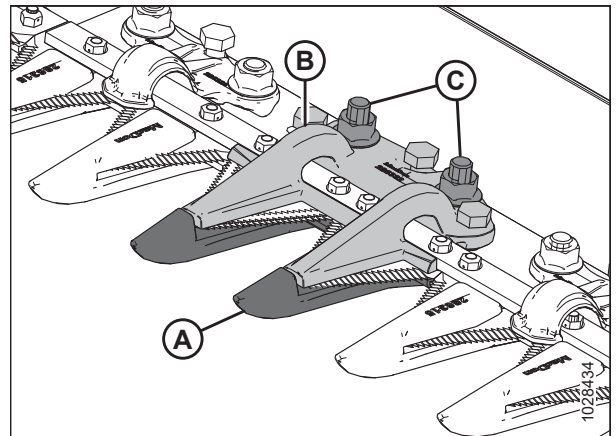


Figure 5.57: Pointed Center Knife Guard

## MAINTENANCE AND SERVICING

### IMPORTANT:

Ensure that the replacement guard is the correct guard with offset cutting surfaces (A).

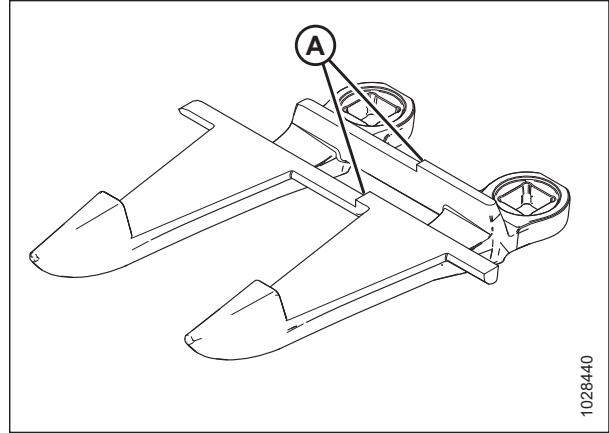


Figure 5.58: Pointed Center Knife Guard

6. Before installing the new pointed center knife guard, ensure that overlap shim (A) is present under the cutterbar, and that the thick end of the shim is positioned under the center guard.

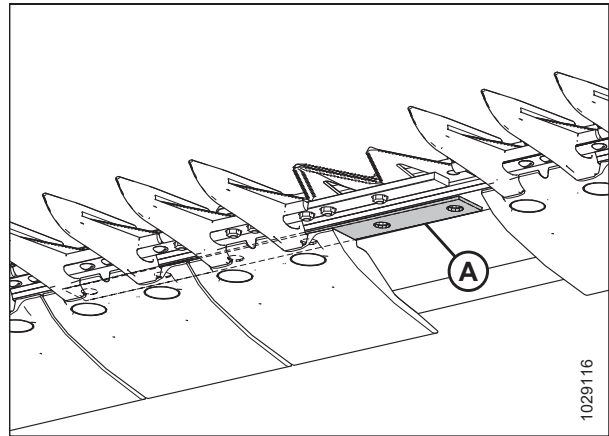


Figure 5.59: Cutterbar

7. Position plastic wearplate (A) and new guard (B) under the cutterbar.

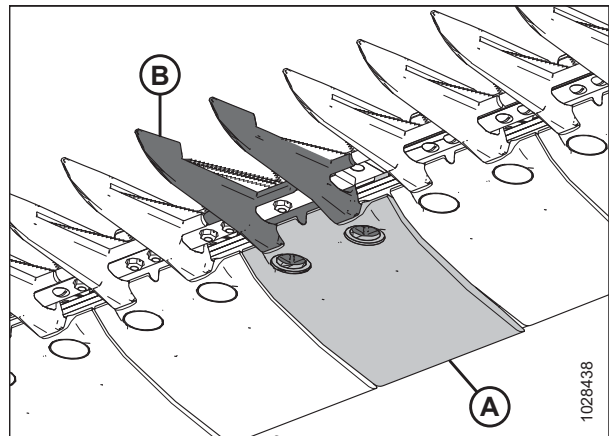


Figure 5.60: Pointed Center Knife Guard and Wearplate

## MAINTENANCE AND SERVICING

- Install three adjustment bolts (A) so that they are protruding 4 mm (5/32 in.) from the bottom of pointed center hold-down (B).
- Position center hold-down (B) onto the cutterbar.

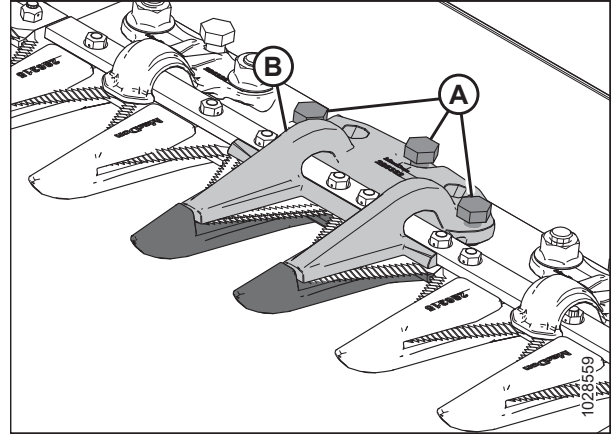


Figure 5.61: Pointed Center Knife Guard

- Secure pointed center hold-down (A) with two bolts and nuts (B), but do **NOT** tighten the hardware at this time.

### IMPORTANT:

Hold-down (A) must accommodate two overlapping knives at the center guard location. Ensure that the proper replacement guard is installed at this location.

- Adjust the hold-down until the clearance is acceptable.
  - For adjustment instructions, refer to [Adjusting Center Hold-Down on Double-Knife Header – Pointed Knife Guards](#), page 263.
  - For clearance specifications, refer to [Checking Center Hold-Down on Double-Knife Header – Pointed Knife Guards](#), page 261.

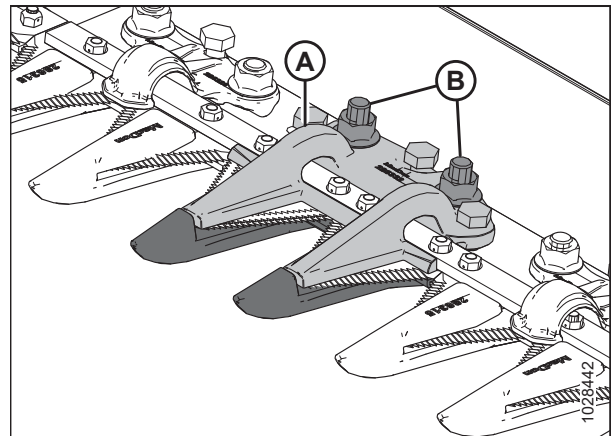


Figure 5.62: Pointed Center Knife Guard

- Torque nuts (B) to 85 Nm (63 lbf-ft).

### Checking Center Hold-Down on Double-Knife Header – Pointed Knife Guards

The pointed center knife guard hold-down prevents the center knife section on the cutterbar from lifting off of the guard while still allowing the knives to slide. Inspect the center hold-down to ensure that there is adequate clearance between the hold-down and the center knife section.

### DANGER

Ensure that all bystanders have cleared the area.

### 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 45*.
4. Open the endshield. For instructions, refer to *Opening Header Endshields, page 47*.
5. Rotate the flywheel attached to the knife drive box to position 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 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 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.)
7. If adjustment is required, refer to *Adjusting Center Hold-Down on Double-Knife Header – Pointed Knife Guards, page 263*.
8. After tightening nuts (D), recheck the clearance and adjust if necessary.
9. Close the endshield. For instructions, refer to *Closing Header Endshields, page 48*.

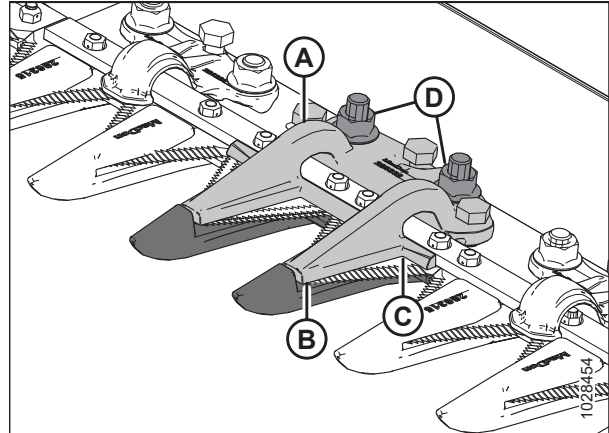


Figure 5.63: Pointed Center Hold-Down



*Adjusting Center Hold-Down on Double-Knife Header – Pointed Knife Guards*

Following the checking procedure, if the pointed center knife guard hold-down is binding the knife, adjust it.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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.

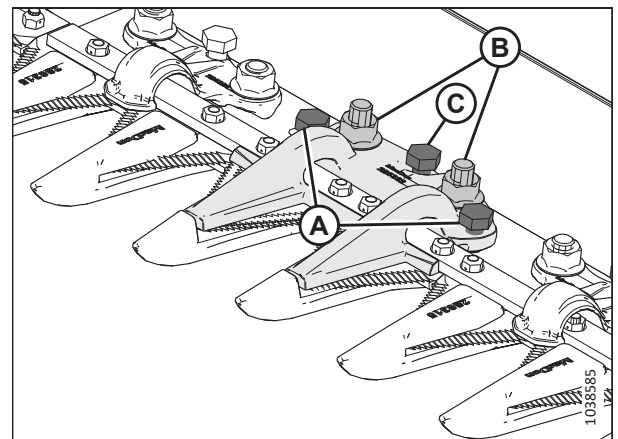
**⚠ WARNING**

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 45*.
4. Loosen mounting hardware (B).
5. Adjust the hold-down clearance as follows:
  - To increase the clearance, rotate adjuster bolts (A) clockwise (tighten the bolts).
  - To decrease the clearance, rotate adjuster bolts (A) counterclockwise (loosen the bolts).
6. To adjust the clearance at the hold-down tip only, use adjustment bolt (C) as follows:
  - To increase the clearance, rotate adjuster bolt (C) counterclockwise (loosen the bolts).
  - To decrease the clearance, rotate adjuster bolt (C) clockwise (tighten the bolts).
7. Tighten nuts (B) to 85 Nm (63 lbf-ft).
8. Run the engine at a low idle, and listen for noise caused by insufficient clearance.



**Figure 5.64: Pointed Center Hold-Down**

**IMPORTANT:**

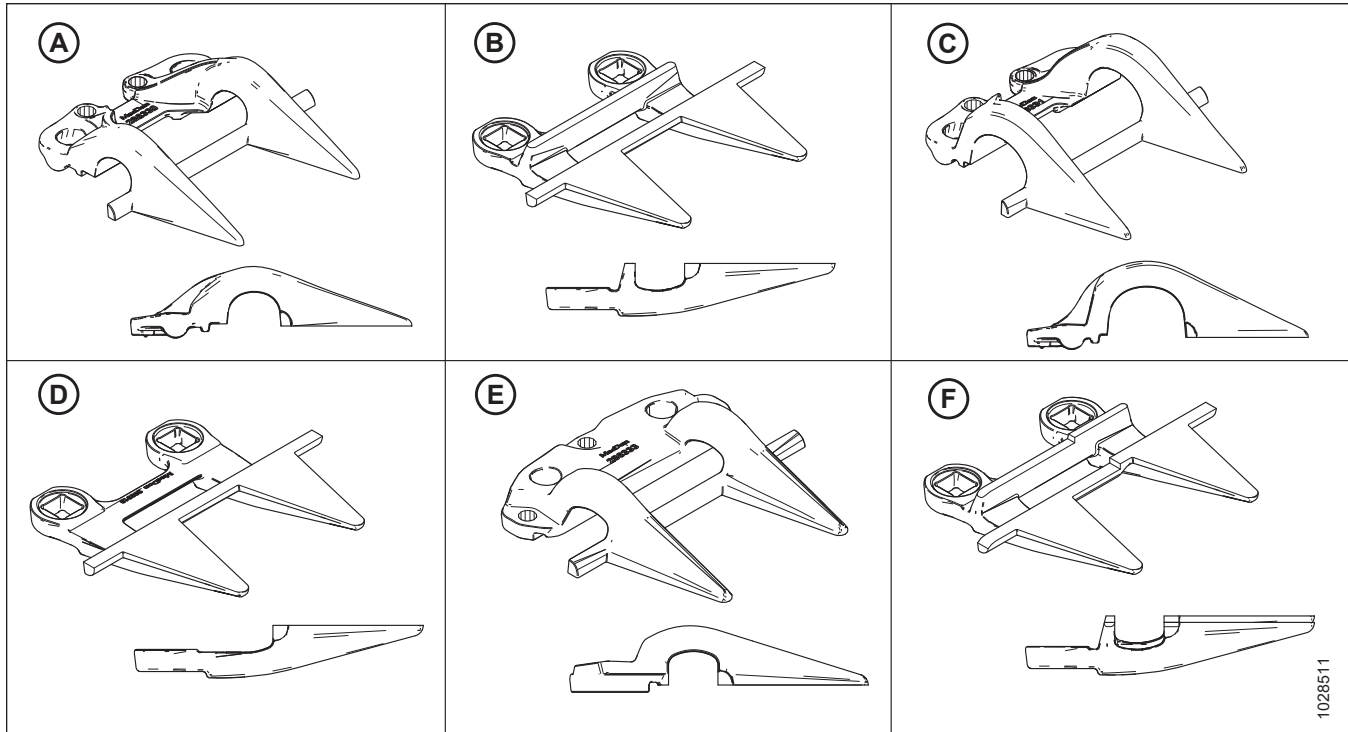
An insufficient hold-down clearance will cause the knife and the guards to overheat.

9. Check the center guard clearance. For more information, refer to *Checking Center Hold-Down on Double-Knife Header – Pointed Knife Guards, page 261*.

### 5.5.8 Short Knife Guards and Hold-Downs

Short knife guards make the knife less likely to plug in wet or muddy conditions and in tough crops such as grasses and canola.

The following knife guards and hold-downs are used in short knife guard configurations:



**Figure 5.65: Guard and Hold-Down Types used in Short Knife Guard Configurations**

A - PlugFree™ Hold-Down (MD #286330)

C - PlugFree™ End Hold-Down (MD #286331)<sup>83</sup>

E - PlugFree™ Center Hold-Down (MD #286904)<sup>85</sup>

B - PlugFree™ Knife Guard (MD #286318)

D - PlugFree™ End Knife Guard (without Wear Bar) (MD #286319)<sup>84</sup>

F - PlugFree™ Center Knife Guard (MD #286320)<sup>85</sup>

The guards are configured differently on different headers. When replacing the short knife guards and the hold-downs, ensure that you use the correct sequence for your header. The following list will guide you to the different guard configurations:

- *Short Knife Guard Configuration on Single-Knife Headers, page 265*
- *Short Knife Guard Configuration on Double-Knife Headers – All Sizes Except D241, page 266*
- *Short Knife Guard Configuration on Double-Knife Headers – D241, page 267*

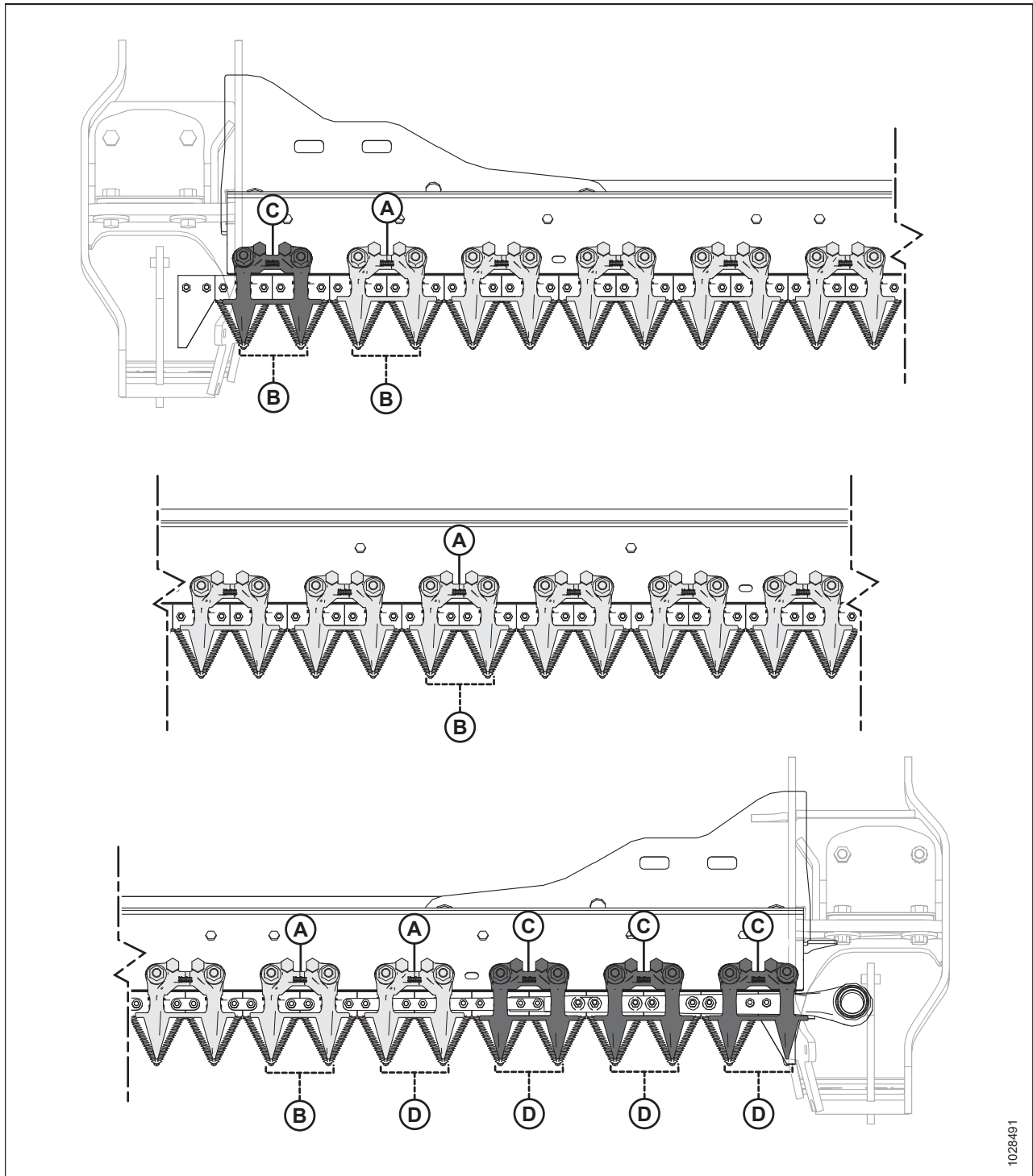
83. Installed in positions 1–3 on the drive side(s); installed in position 1 at the right end of single-knife headers.

84. Installed in positions 1–4 on the drive side(s). Single-knife headers use a standard guard on the right end of the header.

85. Double-knife headers only.

*Short Knife Guard Configuration on Single-Knife Headers*

The guards are configured differently on different sized headers. The illustration provided here shows short knife guards installed on single-knife headers.



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**Figure 5.66: Short Knife Guard and Hold-Down Locations – Single-Knife Headers**

A - PlugFree™ Hold-Down (MD #286330)

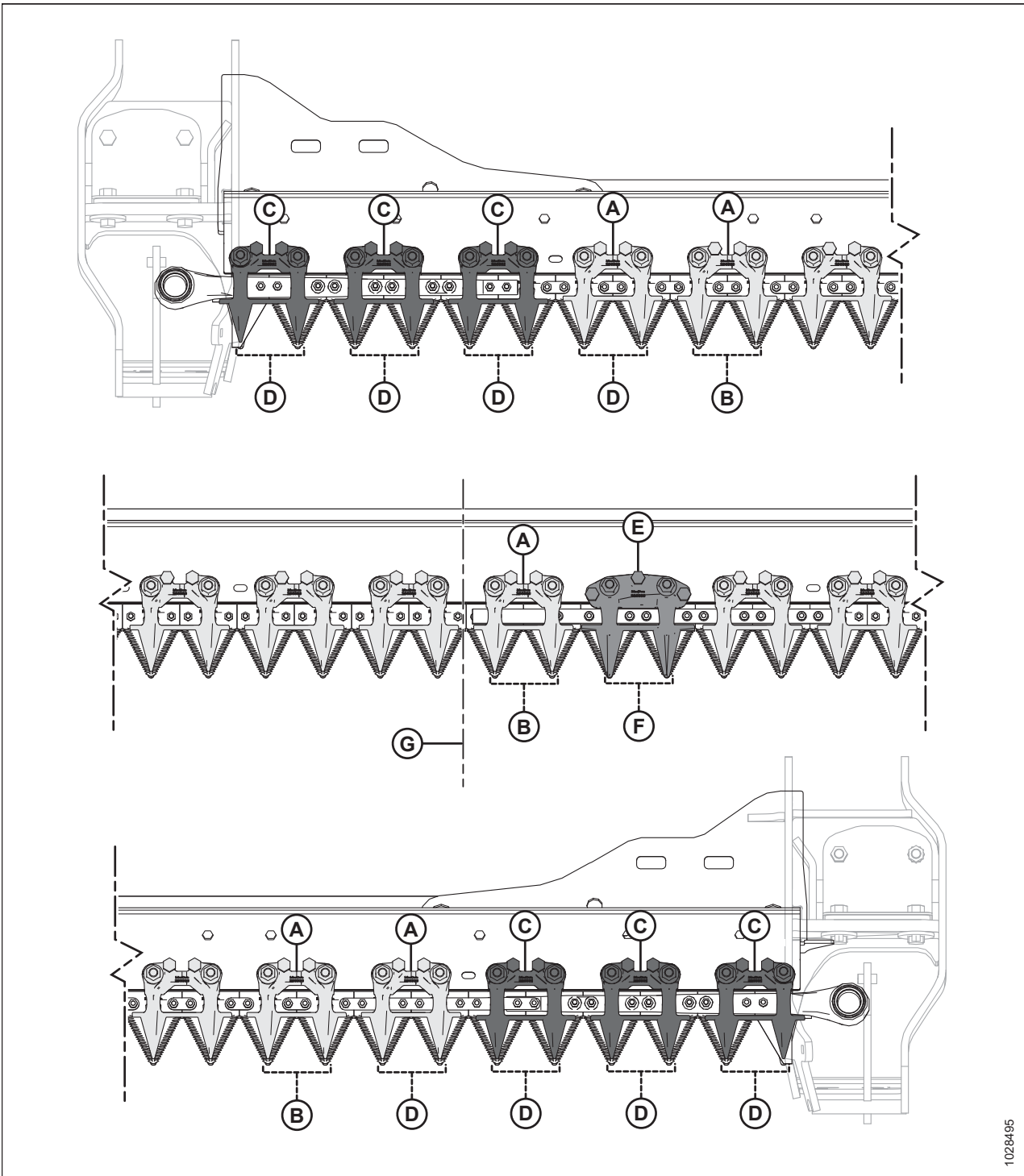
B - PlugFree™ Guard (MD #286318)

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*

The guards are configured differently on different sized headers. The illustration provided here shows short knife guards installed on double-knife headers.

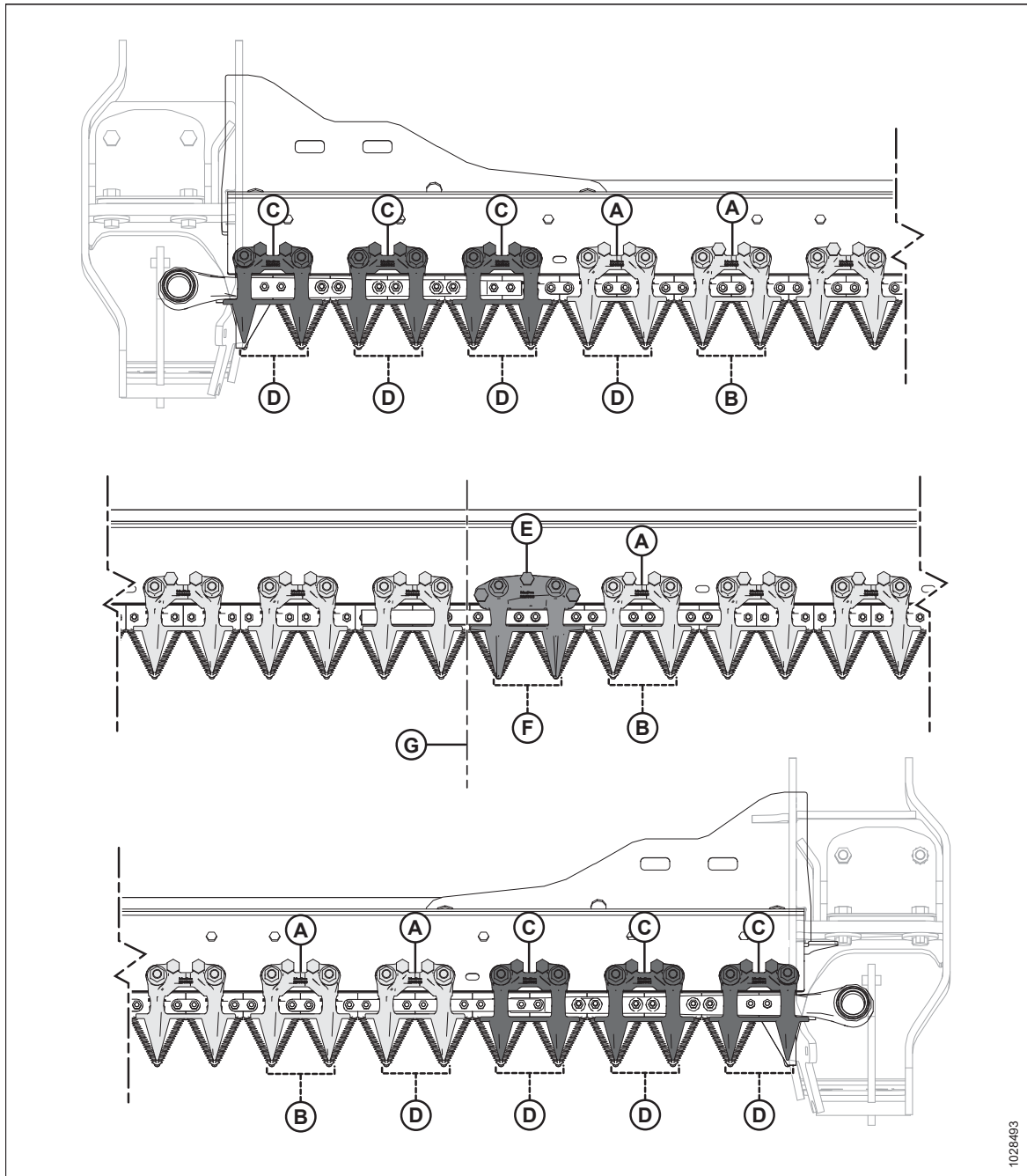


**Figure 5.67: Short Knife Guard and Hold-Down Locations – Double-Knife Headers**

- |   |  |
|---|--|
| 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 #286904)   | F - PlugFree™ Center Knife Guard (MD #286320)                      |
| G - Center of Header                          |  |

*Short Knife Guard Configuration on Double-Knife Headers – D241*

The guards are configured differently on different sized headers. The illustration provided here shows short knife guards installed on D241 double-knife headers.



**Figure 5.68: Short Knife Guard and Hold-Down Locations**

- A - PlugFree™ Hold-Down (MD #286330)
- C - PlugFree™ End Hold-Down (x6) (MD #286331)
- E - PlugFree™ Center Hold-Down (MD #286904)
- G - Center of Header

- B - PlugFree™ Guard (MD #286318)
- D - PlugFree™ End Knife Guard (without Wear Bar) (x8) (MD #286319)
- F - PlugFree™ Center Knife Guard (MD #286320)

### Replacing Short Knife Guards or End Knife Guards

Short knife guards or end knife guards are installed at the factory and make the knife less likely to plug in wet or muddy conditions or in tough crops such as grasses and canola.

#### 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.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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:

The center knife guard for a double-knife header has a slightly different replacement procedure. For instructions, refer to [Replacing Center Knife Guard – Double-Knife Headers, page 272](#).

To replace a short knife guard or an end knife guard, follow these steps:

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 45](#).
4. Remove nuts and bolts (A) securing short knife guard (B) and hold-down (C) to the cutterbar.
5. Remove short knife guard (B), hold-down (C), and the plastic wearplate.

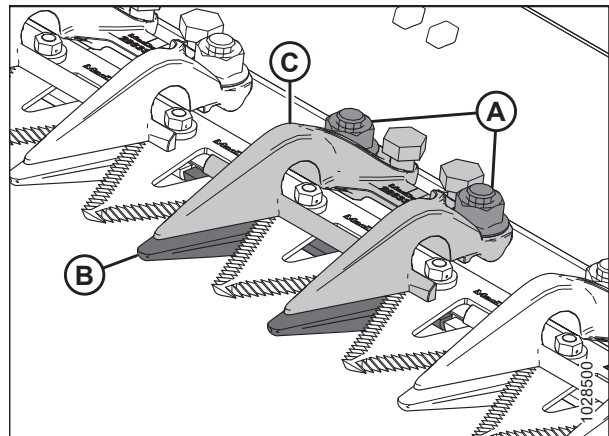
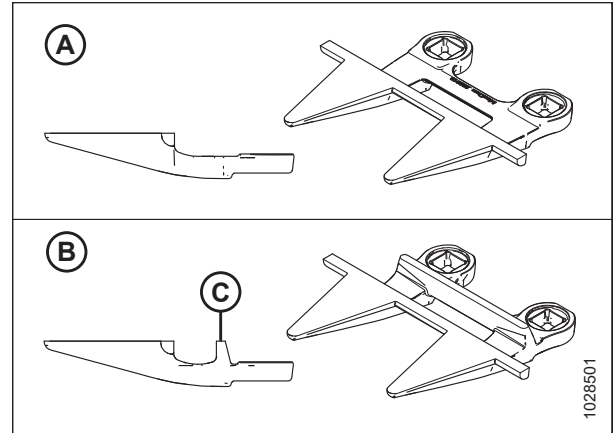


Figure 5.69: Short Knife Guards

**IMPORTANT:**

The end knife guards are the first four knife guards (A) on the drive sides of the header and they do **NOT** have wear bars. Install the proper replacement knife guards at these locations.

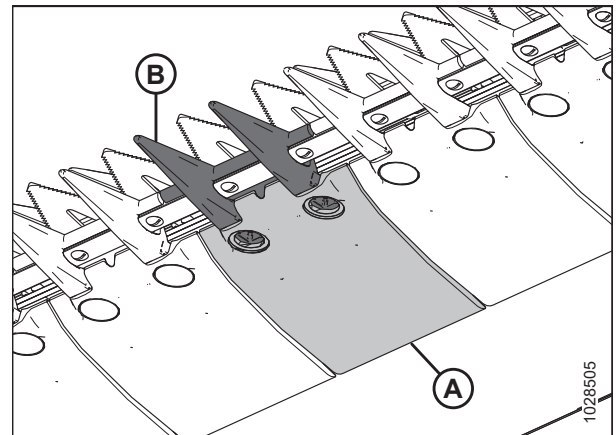


**Figure 5.70: End Knife Guard and Short Knife Guards**

A - PlugFree™ End Knife Guard (MD #286319)

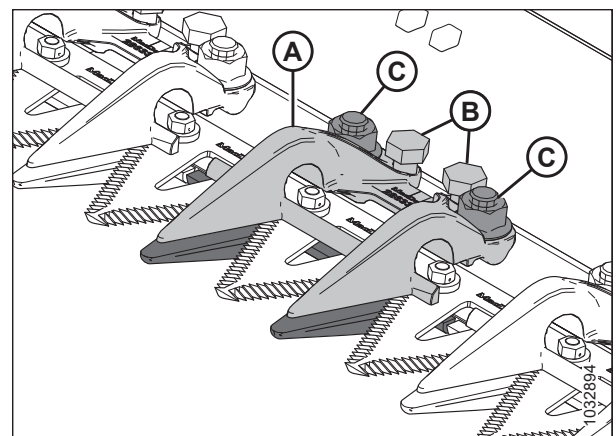
B - PlugFree™ Guard (with Wear Bar [C]) (MD #286318)

6. Position plastic wearplate (A) and replacement short knife guard (B) under the cutterbar.



**Figure 5.71: Short Knife Guard and Wearplate**

7. Position hold-down (A) and loosen adjustment bolts (B) so that they do not protrude below the hold-down.
8. Secure the short knife guard, the wearplate, and the hold-down with bolts and nuts (C). Do **NOT** tighten the nuts.
9. Adjust the hold-down until the clearance is acceptable.
  - For adjustment instructions, refer to [Adjusting Hold-Down – Short Knife Guards, page 271](#).
  - For clearance specifications, refer to [Checking Hold-Down – Short Knife Guards, page 270](#).
10. Tighten nuts (C) to 85 Nm (63 lbf-ft).



**Figure 5.72: Short Knife Guard**

## MAINTENANCE AND SERVICING

11. Check the clearance.
  - If the clearance is acceptable, the installation of the hold-down is complete.
  - If the clearance is unacceptable, repeat Step 9, page 269 to Step 11, page 270.
12. Disengage the reel safety props. For instructions, refer to *Disengaging Reel Safety Props, page 46*.

### Checking Hold-Down – Short Knife Guards

The short guard hold-downs prevent the knife sections on the cutterbar from lifting off of the guards while still allowing the knife to slide. Inspect the hold-downs 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 on Double-Knife Headers – Short Knife Guards, page 274*.

### DANGER

Ensure that all bystanders have cleared the area.

### 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 45*.
4. Rotate the flywheel attached to the knife drive box to position the knife inboard until the knife sections are under hold-down (A).
5. Push down on the 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 that the clearance is 0.1–0.5 mm (0.004–0.020 in.).
6. If adjustment is required, refer to *Adjusting Hold-Down – Short Knife Guards, page 271*.

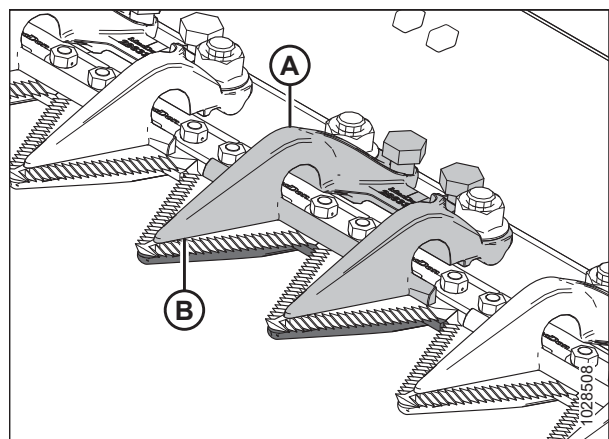


Figure 5.73: Short Knife Guards



### Adjusting Hold-Down – Short Knife Guards

Following the checking procedure, if a short guard hold-down is binding its knife, adjust the hold-down.

To adjust the center hold-down on double-knife headers, refer to [Adjusting Center Hold-Down on Double-Knife Headers – Short Knife Guards, page 276](#).

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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 45](#).
4. Adjust the hold-down clearance as follows:
  - To decrease the clearance, rotate adjuster bolts (A) clockwise.
  - To increase the clearance, rotate adjuster bolts (A) counterclockwise.

#### NOTE:

For larger adjustments, loosen nuts (B) before rotating adjuster bolts (A). After adjustment, retighten the nuts to 85 Nm (63 lbf-ft).

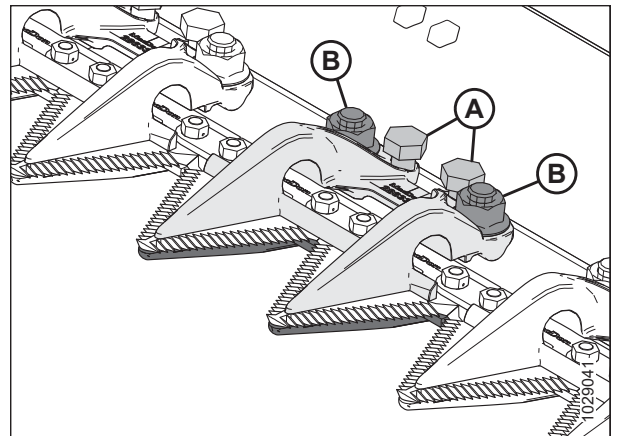


Figure 5.74: Short Knife Guard Hold-Down

5. Run the header at a low idle, and listen for noise caused by insufficient clearance. Adjust the header as necessary.

#### IMPORTANT:

An insufficient hold-down clearance will cause the knife and the guards to overheat.

6. Disengage the reel safety props. For instructions, refer to [Disengaging Reel Safety Props, page 46](#).

### Replacing Center Knife Guard – Double-Knife Headers

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.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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 45](#).
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).

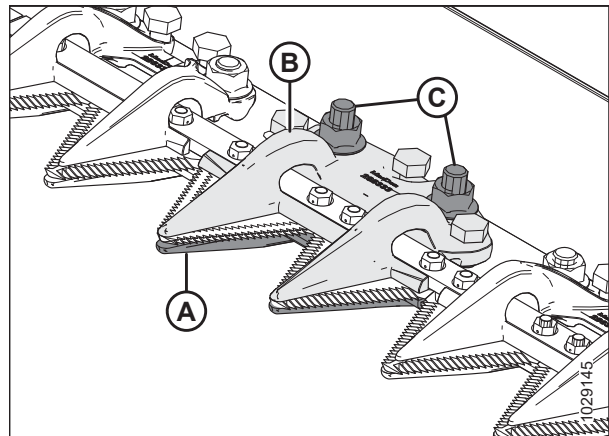


Figure 5.75: Center Knife Guard

## MAINTENANCE AND SERVICING

### IMPORTANT:

Ensure that the replacement center knife guard is the correct guard with offset cutting surfaces (A).

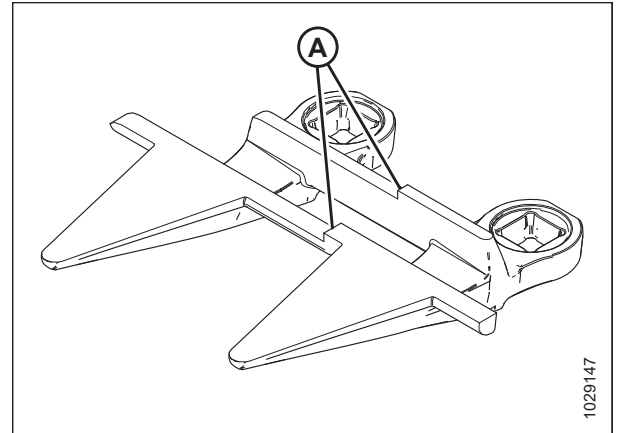


Figure 5.76: Center Knife Guard

6. Before installing the new center knife guard, ensure that overlap shim (A) is under the cutterbar, and that the thick end of the shim is positioned under the center knife guard.

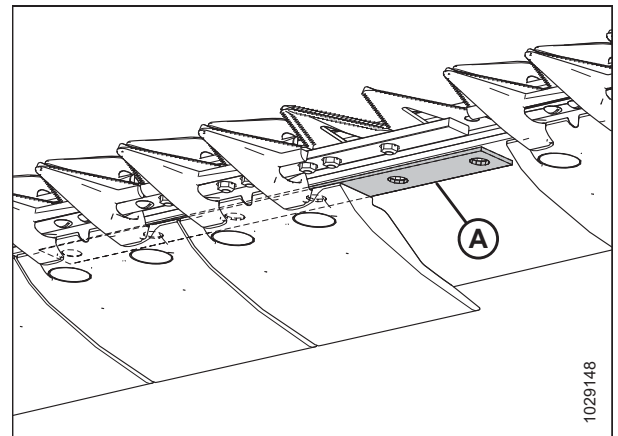


Figure 5.77: Cutterbar

7. Position plastic wearplate (A) and new center knife guard (B) under the cutterbar.

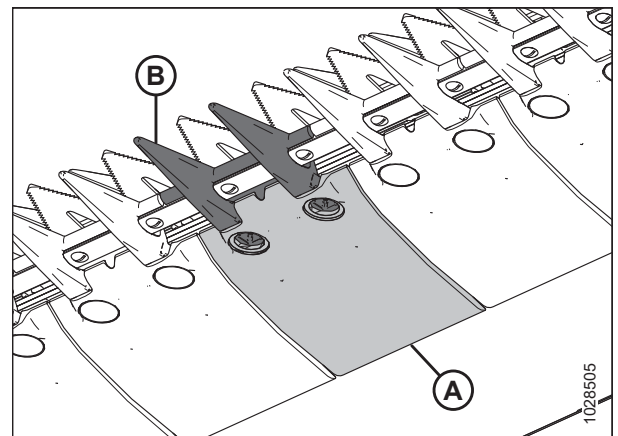


Figure 5.78: Center Knife Guard and Wearplate

## MAINTENANCE AND SERVICING

- Thread three adjustment bolts (A) so that they protrude 4 mm (5/32 in.) from the bottom of center hold-down (B).
- Position center hold-down (B) onto the cutterbar.

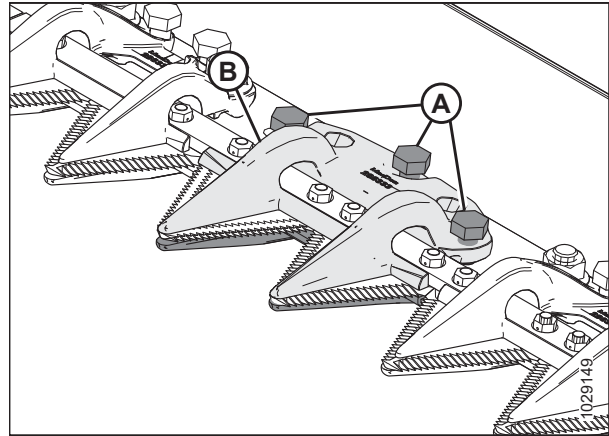


Figure 5.79: Center Knife Guard

- Secure center hold-down (A) with two bolts and nuts (B), but do **NOT** tighten the nuts at this time.

### IMPORTANT:

Hold-down (A) must accommodate two overlapping knives at the center knife guard location. Install the proper replacement center knife guard at this location.

- Adjust the hold-down until the clearance is acceptable.
  - For adjustment instructions, refer to [Adjusting Center Hold-Down on Double-Knife Headers – Short Knife Guards](#), page 276.
  - For clearance specifications, refer to [Checking Center Hold-Down on Double-Knife Headers – Short Knife Guards](#), page 274.

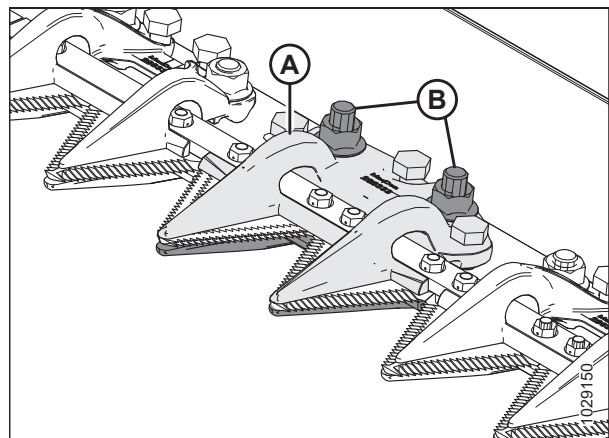


Figure 5.80: Center Knife Guard

- Tighten nuts (B) to 85 Nm (63 lbf-ft).

### Checking Center Hold-Down on Double-Knife Headers – Short Knife Guards

The short center knife guard hold-down prevents the center knife sections on the cutterbar from lifting off of the guard while still allowing the knife to slide. Inspect the center hold-down to ensure that there is adequate clearance between the hold-down and the center knife sections.

### DANGER

Ensure that all bystanders have cleared the area.

### 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 45*.
4. Open the endshield. For instructions, refer to *Opening Header Endshields, page 47*.
5. Rotate the flywheel attached to the knife drive box to position the knife inboard until the knife section is under hold-down (A). Repeat this step to move the other knife.
6. 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.)
7. If adjustment is required, refer to *Adjusting Center Hold-Down on Double-Knife Headers – Short Knife Guards, page 276*.
8. Tighten nuts (D), recheck the clearance, and adjust if necessary.
9. Close the endshield. For instructions, refer to *Closing Header Endshields, page 48*.

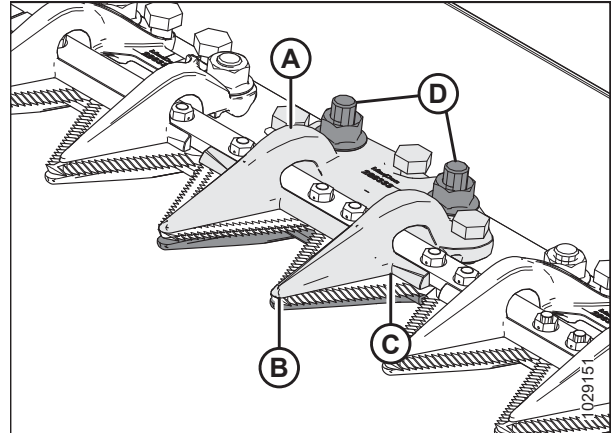


Figure 5.81: Center Knife Guard Hold-Down

*Adjusting Center Hold-Down on Double-Knife Headers – Short Knife Guards*

Following the checking procedure, if a short knife guard hold-down is binding the knife, adjust the hold-down.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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 45*.
4. Loosen mounting hardware (B).
5. Adjust the hold-down clearance as follows:
  - To increase the clearance, rotate adjuster bolts (A) clockwise (tighten the bolts).
  - To decrease the clearance, rotate adjuster bolts (A) counterclockwise (loosen the bolts).
6. To adjust the clearance at the tip of the hold-down, turn adjustment bolt (C) as follows:
  - To increase the clearance, turn adjuster bolt (C) counterclockwise (loosen the bolts).
  - To decrease the clearance, turn adjuster bolt (C) clockwise (tighten the bolts).
7. Torque nuts (B) to 85 Nm (63 lbf·ft).
8. If further adjustment is needed, repeat Step 4, *page 276* to Step 7, *page 276*.
9. Run the engine at a low idle while listening for noise caused by insufficient clearance. Adjust the knives as necessary.

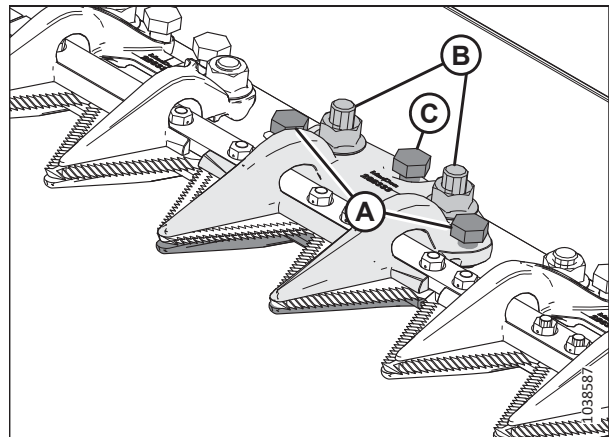


Figure 5.82: Center Hold-Down

**IMPORTANT:**

An insufficient hold-down clearance will cause the knife and the guards to overheat.

### 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. The mud may pack into the cavity behind the shield, resulting in knife drive box failure.

#### *Installing Knifehead Shield*

The knifehead shield is primarily used in rice and fine grasses to keep the 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**

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.

 **DANGER**

Ensure that all bystanders have cleared the area.

 **WARNING**

Wear heavy gloves when working around or handling knives.

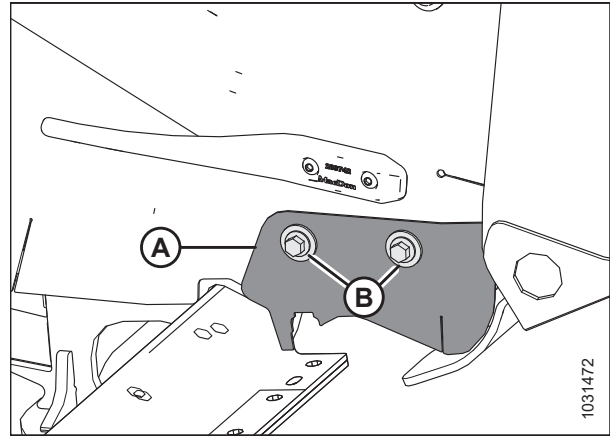
**IMPORTANT:**

If the shields are required in muddy conditions, check the cavity behind the shield frequently and remove any mud that packs behind the shield.

1. Raise the reel fully.
2. Lower the header.
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 45*.
5. Retrieve the knifehead shields from the manual storage case.

## MAINTENANCE AND SERVICING

6. Place knifehead shield (A) against the endsheet as shown. Align the shield so that the cutout matches the profile of the knifehead and/or the hold-downs.
7. Align the mounting holes and secure the shield 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 the shield to be as close to the knifehead as possible.
9. Manually rotate the knife drive box pulley to move the knife and check for interference between the knifehead and knifehead shield (A). Adjust the knifehead shield to eliminate any interference with the knife.
10. Torque bolts (B) to 11 Nm (8.11 lbf·ft [97 lbf·in]).



**Figure 5.83: 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 of the header.

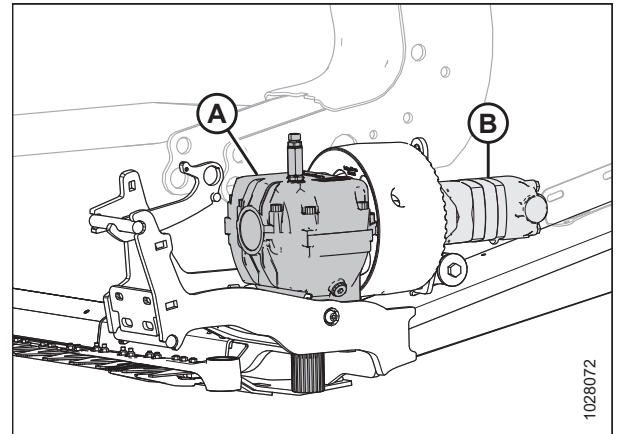


Figure 5.84: Left Knife Drive Box Shown – Right Similar

#### *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. You can inspect the oil level using the dipstick installed in each knife drive.

#### **DANGER**

Ensure that all bystanders have cleared the area.

#### **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. Ensure that the header is level.
2. Lower the header.
3. Adjust the header angle so that the top of the knife drive box is level with the ground.
4. Shut down the engine, and remove the key from the ignition.
5. Open the endshield. For instructions, refer to [Opening Header Endshields, page 47](#).

## MAINTENANCE AND SERVICING

6. Remove oil level dipstick (A), wipe it, and then reinstall it. Tighten it until it is finger-tight.
7. Remove the dipstick again to check the oil level. The oil level must be within range (B), between the lines near the bottom of the dipstick.
8. Reinstall dipstick (A). Tighten the dipstick to 23 Nm (17 lbf-ft [204 lbf-in]).
9. Repeat Step 5, page 279 to Step 8, page 280 to check the oil level for the other knife drive.

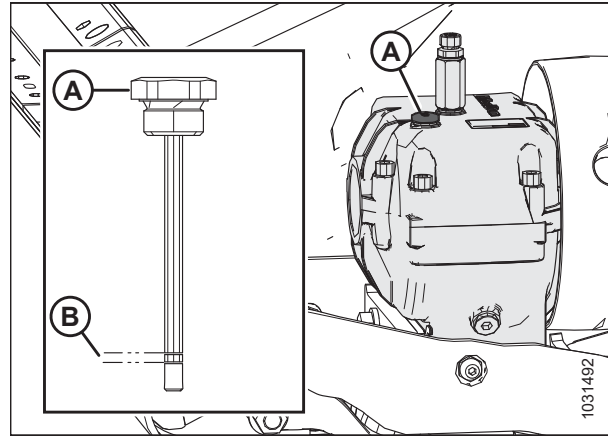


Figure 5.85: Knife Drive Box

### Checking Mounting Bolts

After the first 10 hours of operation, check the torque on the four knife drive box mounting bolts (A) and (B) and every 100 hours thereafter.

1. Ensure that all bolts are torqued to 343 Nm (253 lbf-ft). Torque side bolts (A) first, then bottom bolts (B).

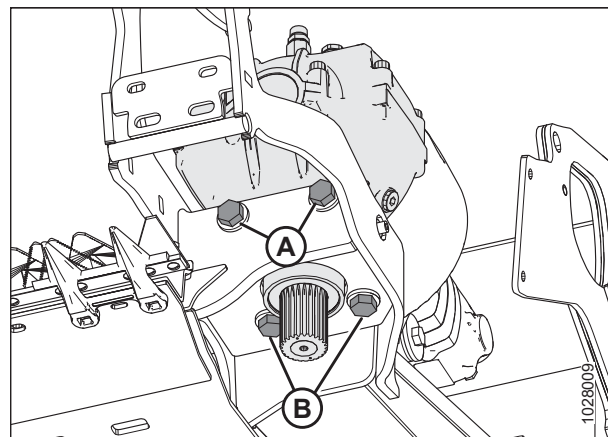


Figure 5.86: Knife Drive Box – View from Below

### Changing Oil in Knife Drive Box

After the first 50 hours of operation, change the knife drive box lubricant 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.

#### DANGER

Ensure that all bystanders have cleared the area.

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Open the endshield. For instructions, refer to *Opening Header Endshields*, page 47.

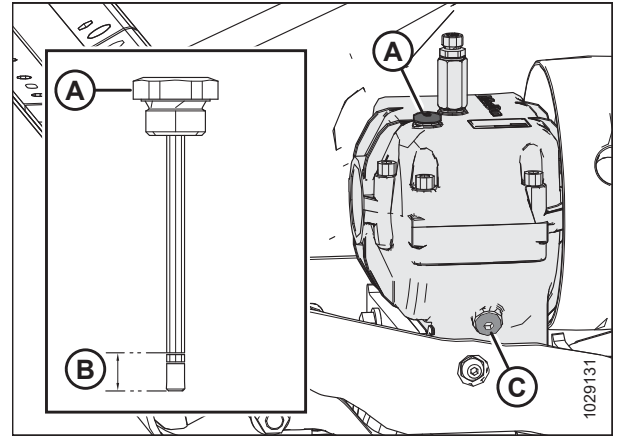
## MAINTENANCE AND SERVICING

4. Under the knife drive box, place a container large enough to hold approximately 1.5 L (0.4 US gal) of oil.
5. Remove dipstick (A) and drain plug (C).
6. Allow the oil to drain from the knife drive box and into the container 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 the 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 48](#).



**Figure 5.87: Knife Drive Box**

## 5.7 Drapers

There are two drapers, one on each side of the header. Replace the drapers if they are torn, cracked, or missing slats.

### 5.7.1 Removing 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.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the header safety props. For instructions, refer to the windrower operator's manual.
5. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 45*.
6. Rotate the draper until the draper connector (A) is on top of the side draper deck.

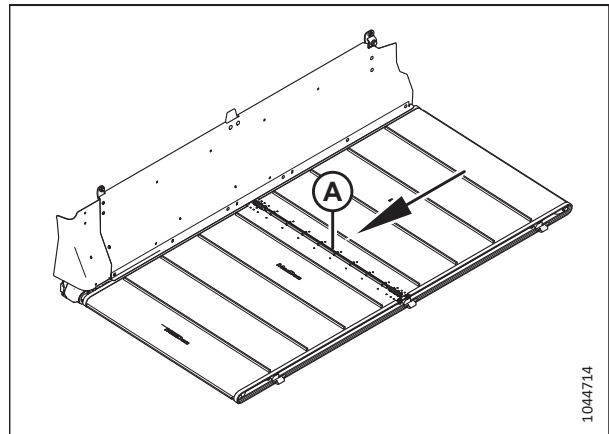


Figure 5.88: Draper Connector

## MAINTENANCE AND SERVICING

7. Locate draper tension adjuster (A).
8. Turn bolt (B) counterclockwise to decrease the tension on the draper. Tension indicator (C) will move outboard to show that the draper is loosening.

**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.

**IMPORTANT:**

Do **NOT** adjust nut (D). This nut is used for draper alignment only.

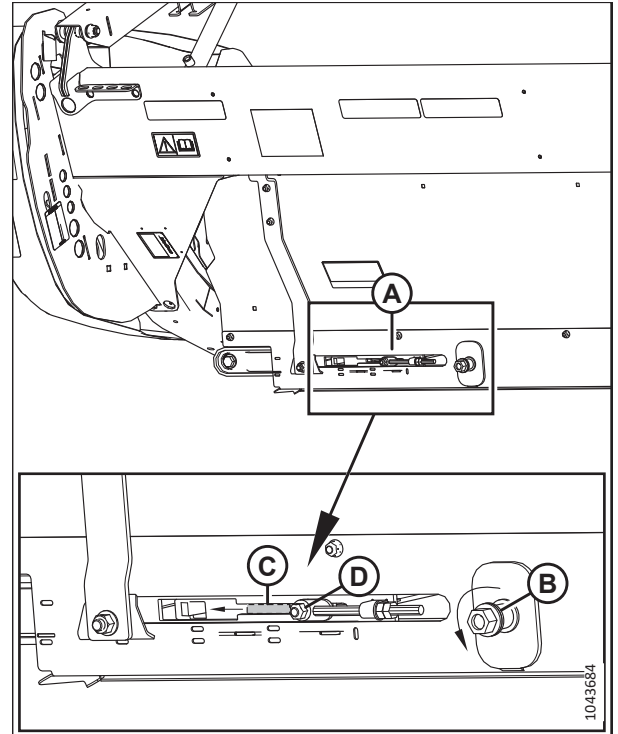


Figure 5.89: Adjusting Left Tensioner

9. Remove cutterbar seals (A).

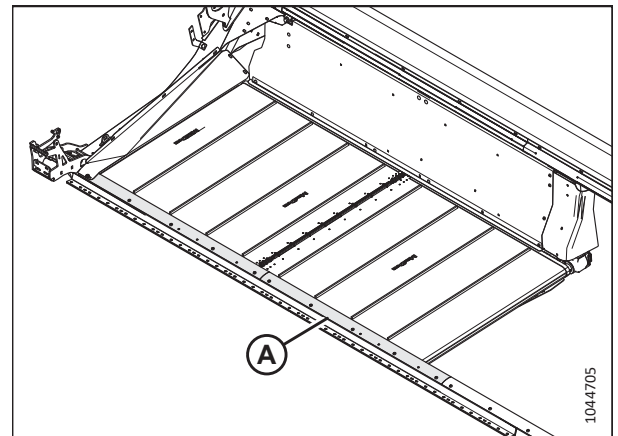


Figure 5.90: Cutterbar Seals

## MAINTENANCE AND SERVICING

10. Remove nuts and screws (A), and tube connectors (B) from the draper joint.
11. Remove screws (C), bridge connector (D), and nuts from the front end of the draper joint.
12. Remove the side draper from the deck.

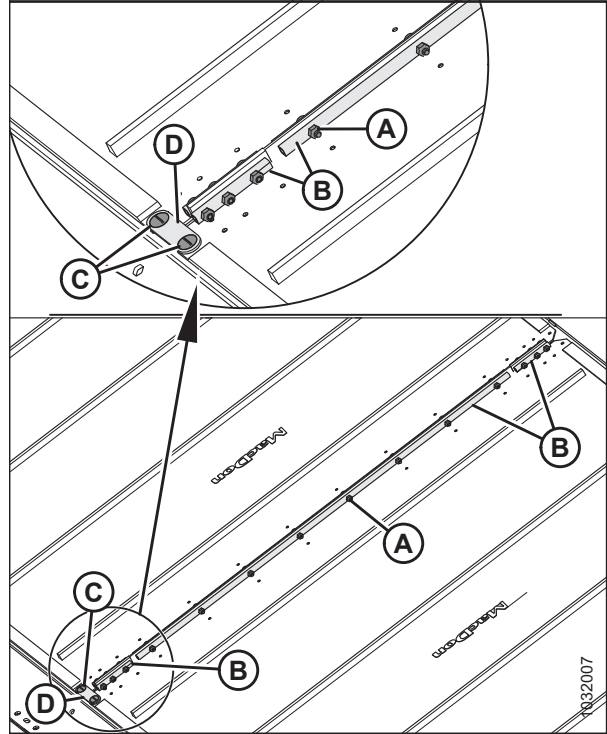


Figure 5.91: Draper Connectors

### 5.7.2 Installing Drapers

The drapers bring cut crop to the center of the header.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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

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. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the header safety props. For instructions, refer to the windrower operator's manual.
5. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props*, page 45.

## MAINTENANCE AND SERVICING

- Place draper on feed draper deck.
- Insert the end of draper (A) into the inboard end of side draper deck (B) under drive roller (C).

**NOTE:**

The slats on the draper should be facing down.

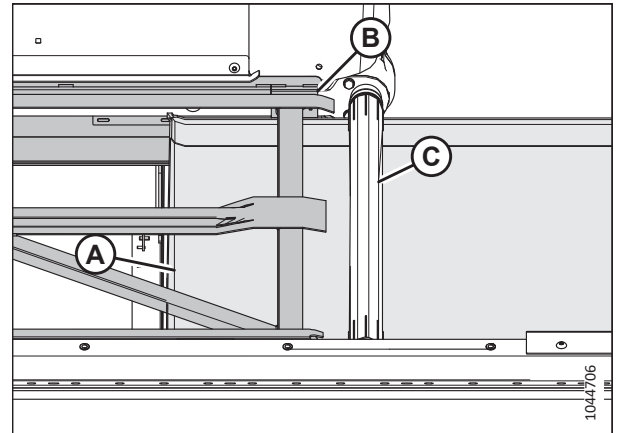


Figure 5.92: Draper

- Continue pulling side draper (A) into the deck until it can be wrapped around the idler and drive rollers meeting on top of the side draper deck in the middle.

**NOTE:**

Draper (A) should be installed under deflector (B).

**NOTE:**

If you are performing this job alone, it will be easier to install the side draper into the draper deck if you lower the front of the feed deck to increase the vertical gap between the side deck and the feed deck.

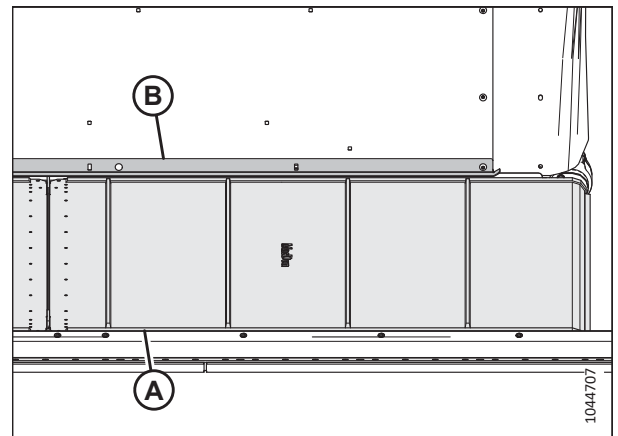


Figure 5.93: Draper

9. 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 the rear of the draper.

10. Install bridge connector (D) using screws (C) and the nuts at the cutterbar end of the draper connection.

**IMPORTANT:**

The bridge connector is installed on the cutterbar end of the draper connection only.

**NOTE:**

Hold screws (C) at a 90° angle to bridge connector (D) while tightening the nuts. Holding the screws will prevent the bridge connector from bowing up.

11. Torque the nuts to 9.5 Nm (7 lbf-ft [84 lbf-in]).
12. Adjust the draper tension. For instructions, refer to [5.7.3 Adjusting Draper Tension](#), page 286.

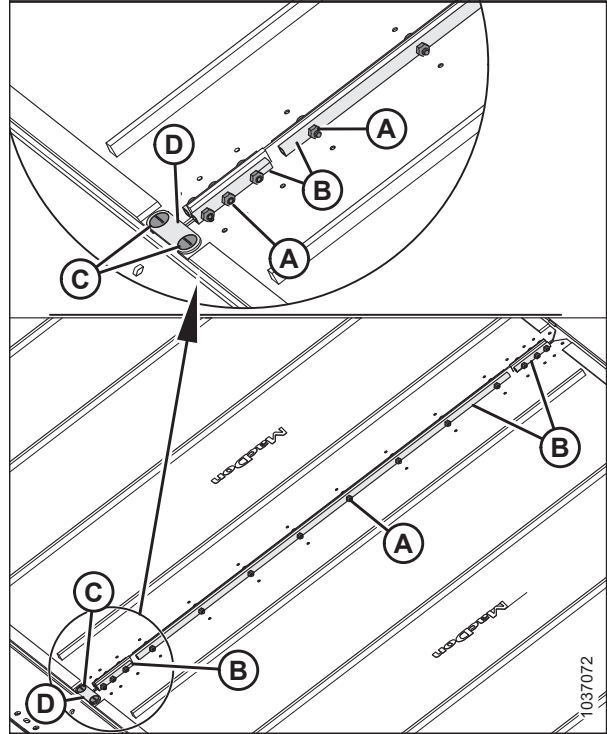


Figure 5.94: Draper Connectors

13. Install cutterbar seals (A).

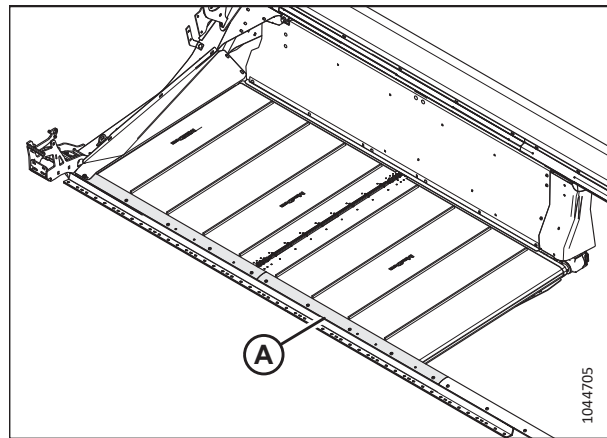


Figure 5.95: Cutterbar Seals

### 5.7.3 Adjusting Draper Tension

To check and adjust the draper tension, ensure that the tension indicator is correctly positioned, raise the header, engage safety props, and verify the draper guide and idler roller alignment. Adjust until the tension indicator shows proper tension. After installing the draper extensions, the draper tension must be reset using the tension adjusters on the end of each draper. The tension on the drapers can be adjusted from the end of each draper.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.



**⚠ 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.
2. Raise the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Engage the header safety props. For instructions, refer to the windrower operator's manual.

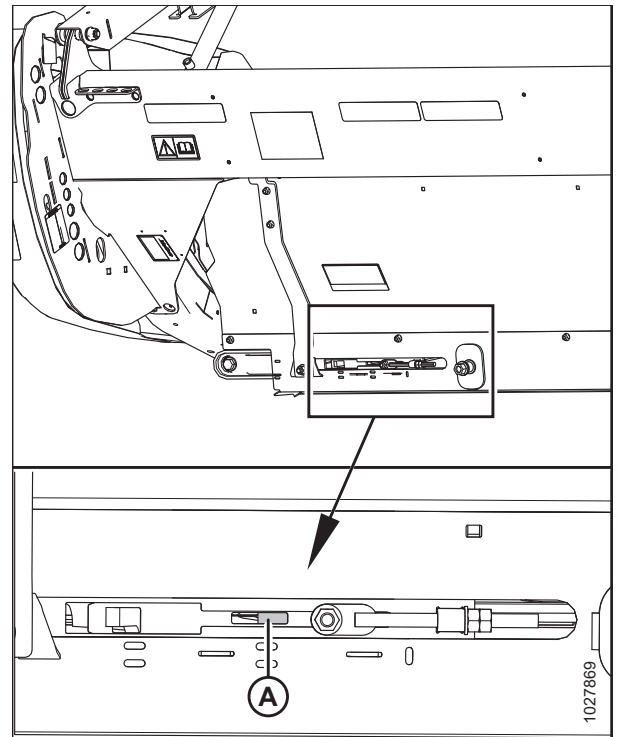


Figure 5.96: Checking Left Tension Adjuster

5. Ensure that the draper guide (the rubber track on the underside of the draper) is engaged in groove (A) of the drive roller.

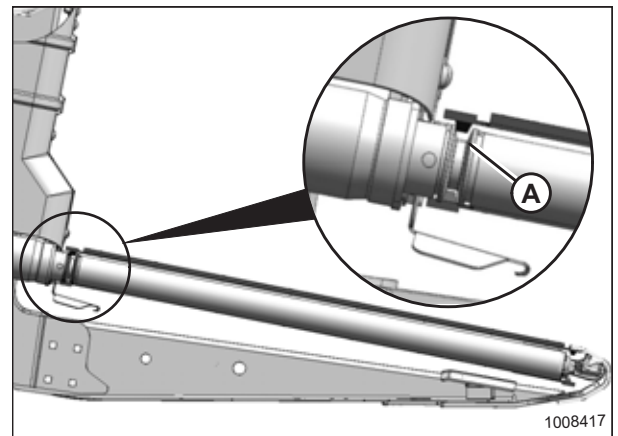


Figure 5.97: Drive Roller

## MAINTENANCE AND SERVICING

6. Ensure that idler roller (A) is between guides (B).

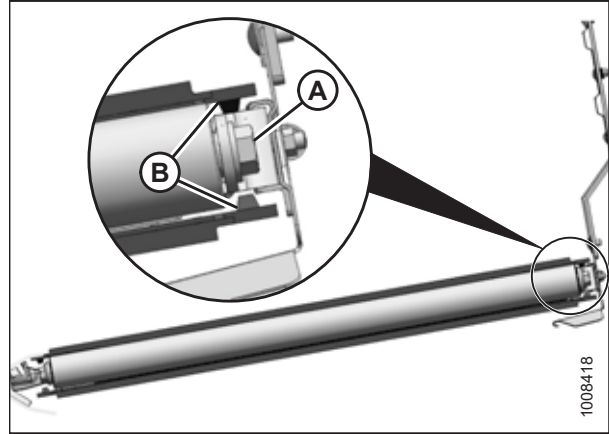


Figure 5.98: Idler Roller

7. Tighten adjuster bolt (A) until the tensioner indicator covers the inboard half of the window. Tensioner indicator (B) will move inboard to show that the draper is tightening.

**IMPORTANT:**

To avoid premature failure of the draper, draper rollers, and/or the tightener components, do **NOT** operate the header when the tension indicator is not visible.

**IMPORTANT:**

Do **NOT** adjust nut (C). This nut is used for draper alignment only.

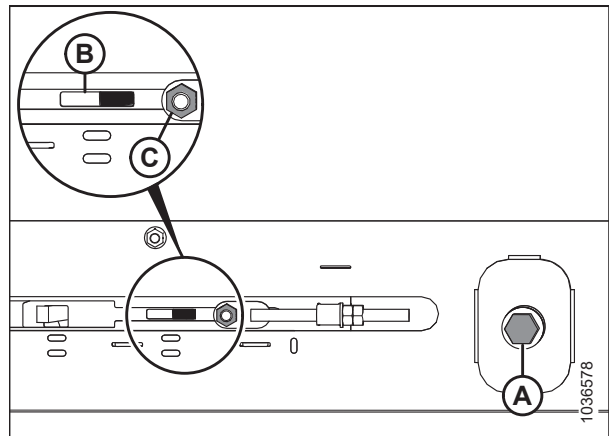


Figure 5.99: Adjusting Left Tensioner

### 5.7.4 Adjusting Draper Tracking

If the drapers rub the header frame during operation, the draper tracking may need to be adjusted.

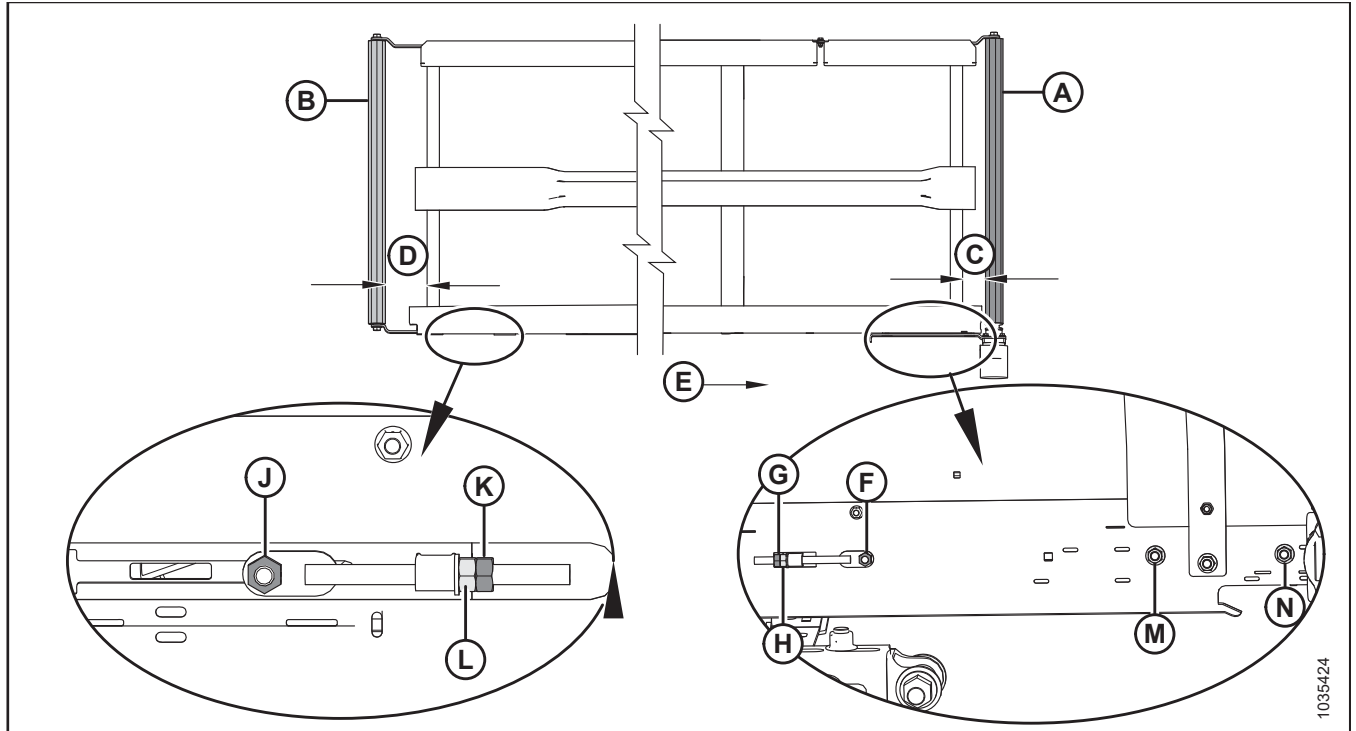


Figure 5.100: Draper Tracking Adjustments – Left Draper

- 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 5.11 Draper Tracking

If tracking towards	Location	Adjustment	Method
Backsheet	Drive roller	Increase C	Tighten adjuster nut (H)
Cutterbar	Drive roller	Decrease C	Loosen adjuster nut (H)
Backsheet	Idler roller	Increase D	Tighten adjuster nut (L)
Cutterbar	Idler roller	Decrease D	Loosen adjuster nut (L)

## MAINTENANCE AND SERVICING

2. Adjust drive roller (A) to change **C** (refer to Table 5.11, page 289 and Figure 5.100, page 289) 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 5.11, page 289 and Figure 5.100, page 289) 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).

## 5.7.5 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 that the temperature does not exceed 44°C (80°F) above the ambient temperature.

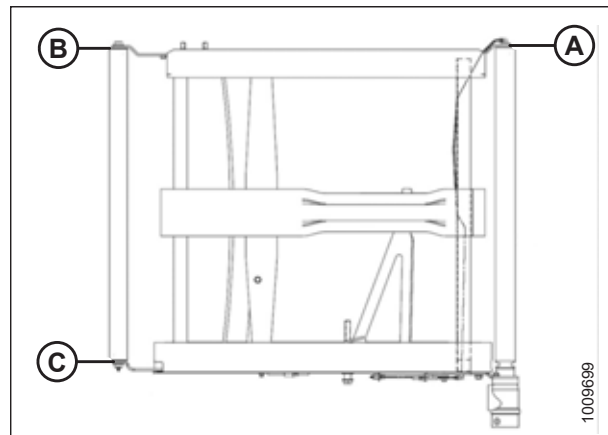


Figure 5.101: Roller Arms

### *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

Ensure that all bystanders have cleared the area.

**⚠ 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**

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. Engage the header until you can access the side draper connector from 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. For instructions, refer to the windrower operator's manual.
6. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 45*.
7. Loosen the draper by turning adjuster bolt (A) counterclockwise until the adjuster bolt hits a hard stop.

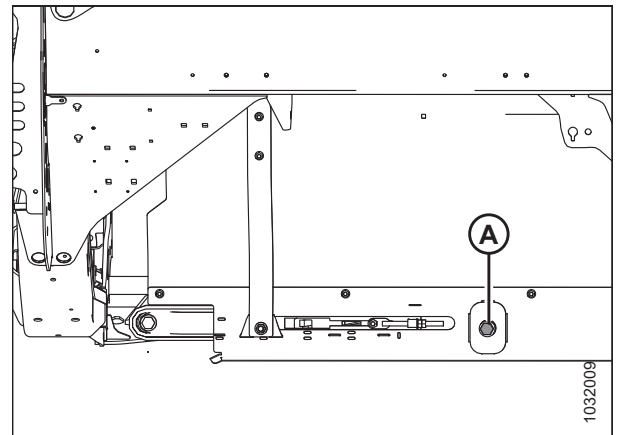


Figure 5.102: Tensioner – Left Side Shown

## MAINTENANCE AND SERVICING

8. Remove screws (C), bridge connector (D), and the 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.

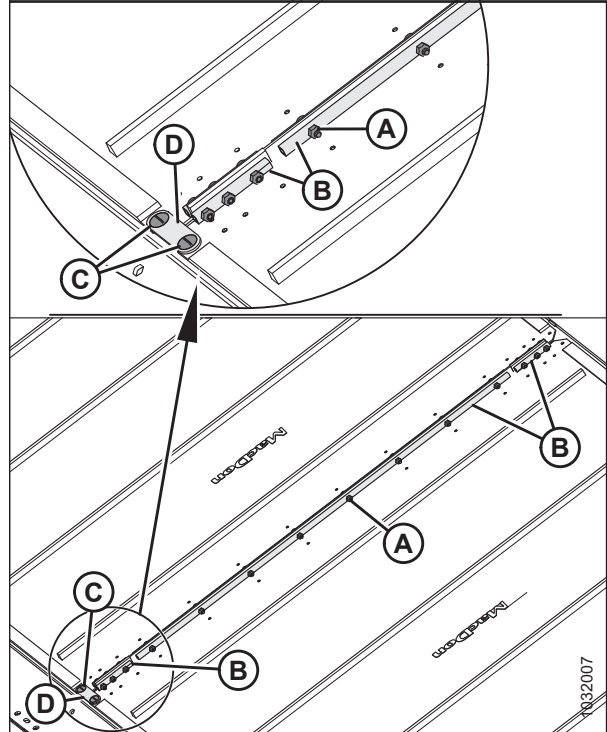


Figure 5.103: Draper Connectors

11. Remove bolt and washer (A) from the idler roller at the back of the header deck.
12. Remove bolt and washer (B) from the idler roller at the front of the header deck.
13. Spread roller arms (C) and (D), and remove the idler roller.

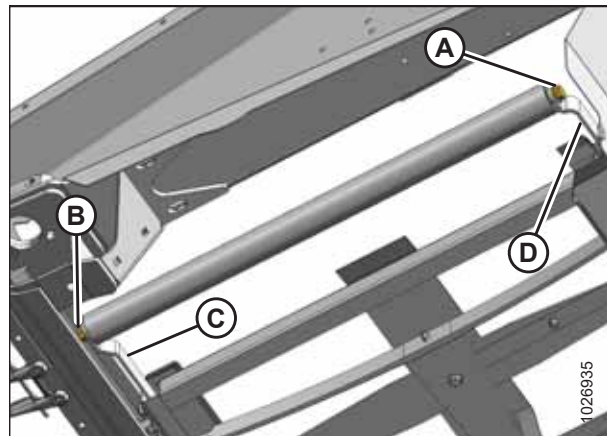


Figure 5.104: Idler Roller

### *Replacing Side Draper Deck Idler Roller Bearing*

The side draper deck idler rollers have bearings installed to allow the roller to turn.

1. Remove the draper deck idler roller. For instructions, refer to [Removing Draper Idler Roller, page 290](#).

## MAINTENANCE AND SERVICING

2. Clamp idler roller tube (C) in a vise with a 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) and check the tube for signs of wear or damage. Replace the tube if necessary.

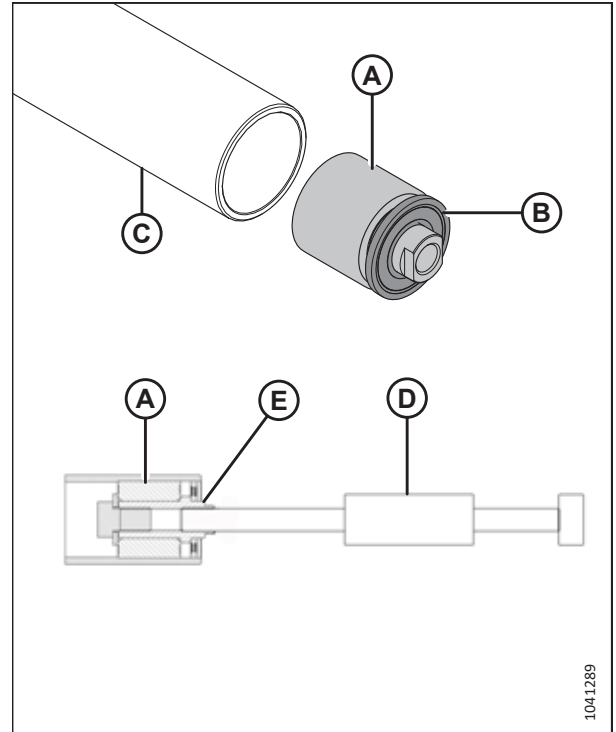


Figure 5.105: Idler Roller Bearing and Seal

### 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 of the roller on the ground will push the bearing farther into the tube.

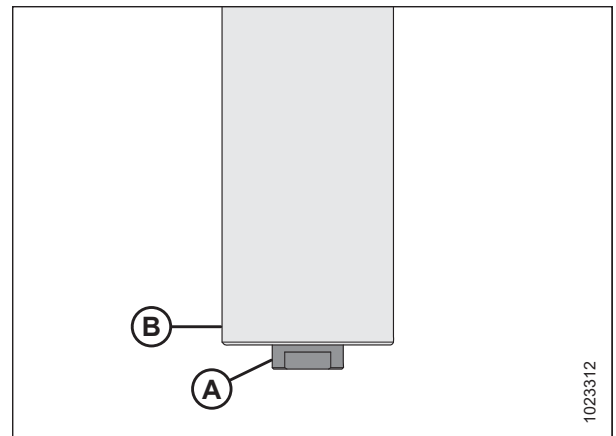


Figure 5.106: Idler Roller

## MAINTENANCE AND SERVICING

5. Cut relief (A) into a block of wood.
6. Place the end of idler roller (B) onto the block of wood, with the protruding bearing assembly inside of relief (A).

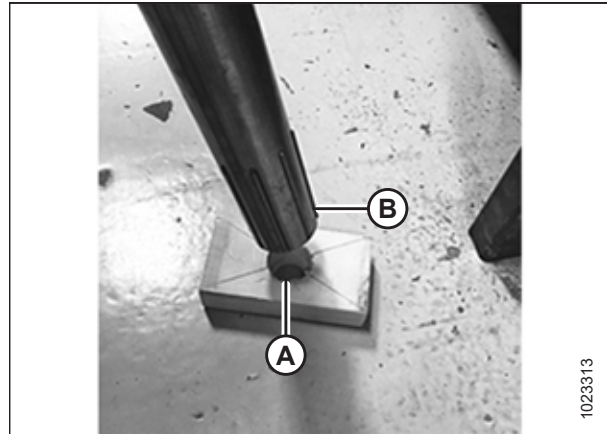


Figure 5.107: Idler Roller

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 a new seal, fill area (A) with approximately 8 pumps of grease.

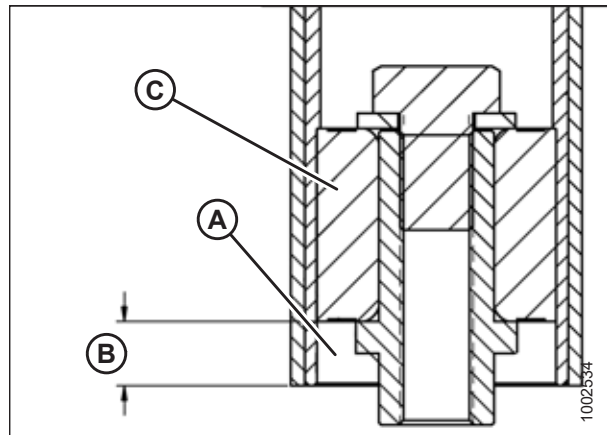


Figure 5.108: Idler Roller Bearing

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 295*.

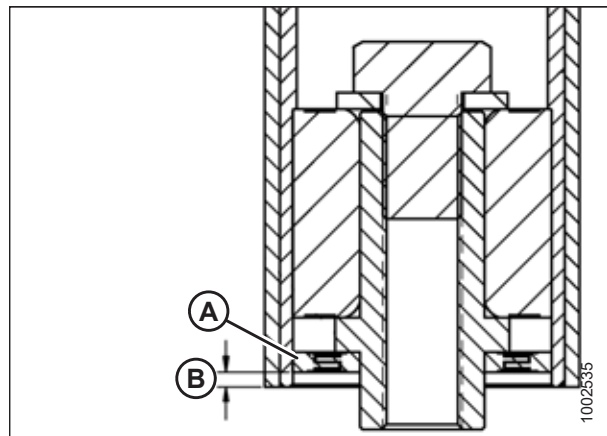


Figure 5.109: Idler Roller Bearing



### *Installing Draper Idler Roller*

The side draper deck has a roller on each end of the deck. One roller is the idler roller and one roller is the drive roller. If the idler roller is worn or damaged, it will need to be replaced.

 **DANGER**

Ensure that all bystanders have cleared the area.

 **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**

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 header fully.
2. Raise the reel fully.
3. Engage the reel safety props. For instructions, refer to the header operator's manual.
4. Engage the header safety props. For instructions, refer to the windrower operator's manual.
5. Shut down the engine, and remove the key from the ignition.
6. Install idler roller (A) between idler arms (B).
7. Secure the idler roller with two bolts and washers (C). Tighten the bolts to 95 Nm (70 lbf·ft).

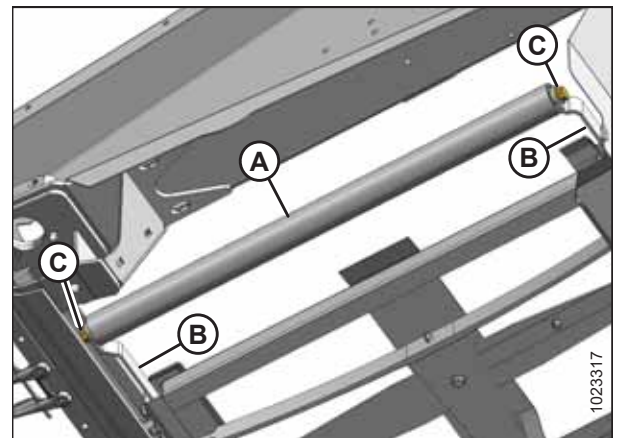


Figure 5.110: Idler Roller

## MAINTENANCE AND SERVICING

- 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.

- Install bridge connector (D) using screws (C) and the nuts at the front end of the draper joint.

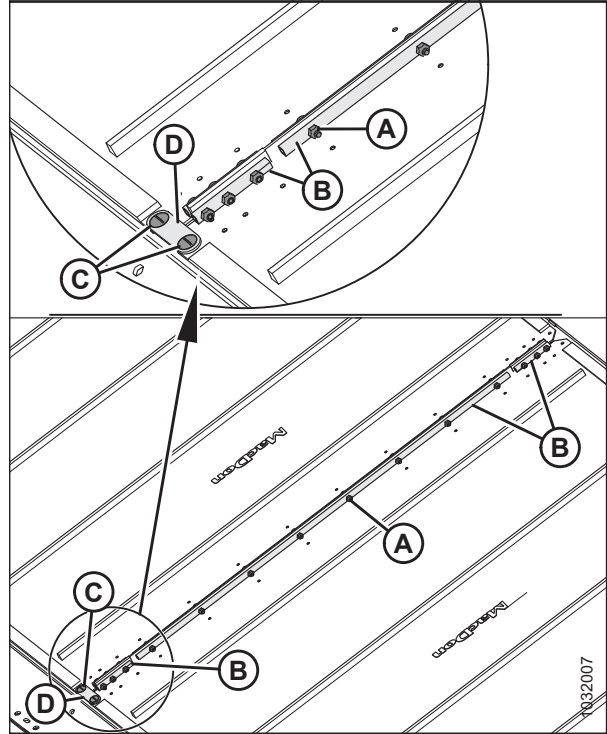


Figure 5.111: Draper Connector

- Tighten the draper by turning adjuster bolt (A) clockwise. For instructions, refer to [5.7.3 Adjusting Draper Tension, page 286](#).
- Disengage the reel safety props. For instructions, refer to the header operator's manual.
- Disengage the header safety props.
- Lower the reel fully.
- Lower the header.

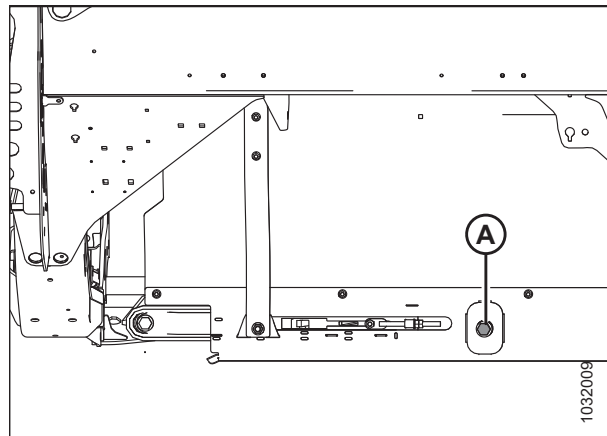


Figure 5.112: Draper Tensioner

- Engage the header. Ensure that the side drapers track correctly. For instructions, refer to [5.7.3 Adjusting Draper Tension, page 286](#).
- Shut down the engine, and remove the key from the ignition.

### Removing Side Draper Drive Roller

The side draper deck has a roller on both ends of the deck. One roller is the idler roller and the other roller 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.

#### 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 header fully.
2. Raise the reel fully.
3. If the draper connector is not visible, engage the header until you can access the connector from the outboard end of the deck.
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 45*.
6. Engage the header safety props. For instructions, refer to the windrower operator's manual.
7. Loosen the draper by turning adjuster bolt (A) counterclockwise until the adjuster bolt hits a hard stop.

#### IMPORTANT:

Do **NOT** adjust nut (B). This nut is used for draper alignment only.

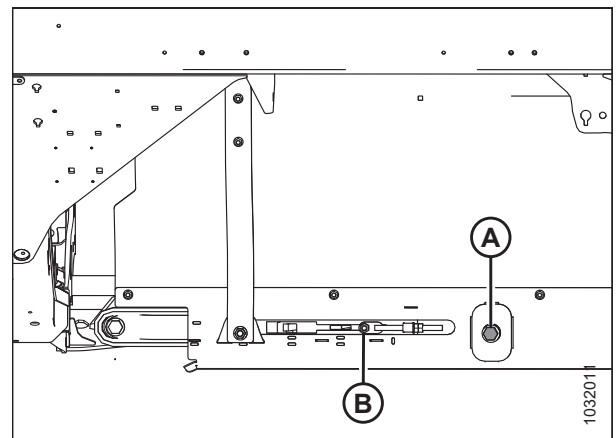


Figure 5.113: Draper Tensioner

## MAINTENANCE AND SERVICING

8. Remove nuts and screws (A), and tube connectors (B) from the draper joint.
9. Remove screws (C), bridge connector (D), and the nuts from the front end of the draper joint.
10. Pull the draper off the drive roller.

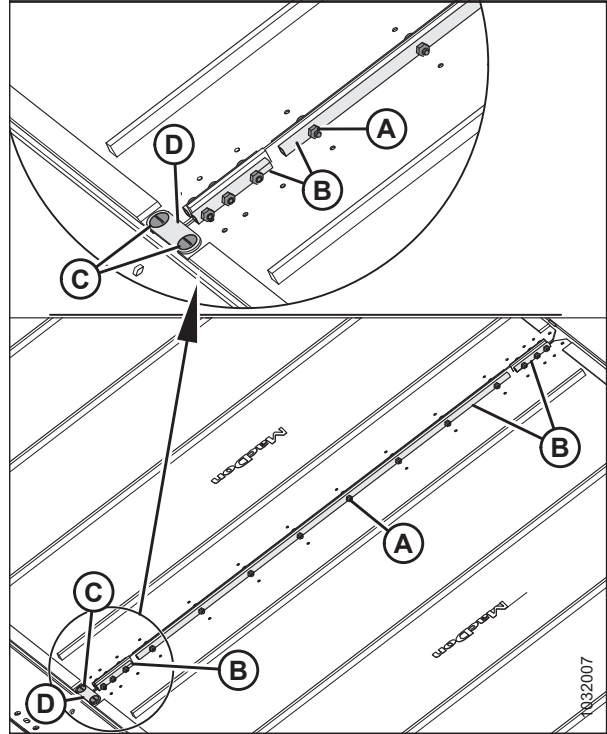


Figure 5.114: Draper Connectors

11. 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 a 1/4 turn apart.

12. 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.

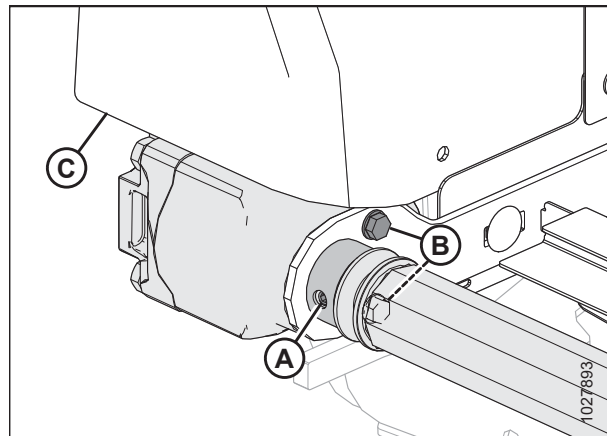


Figure 5.115: Drive Roller

## MAINTENANCE AND SERVICING

### NOTE:

It may be necessary to pry between the roller and bracket (A) to remove the roller from the shaft. Retain the key.

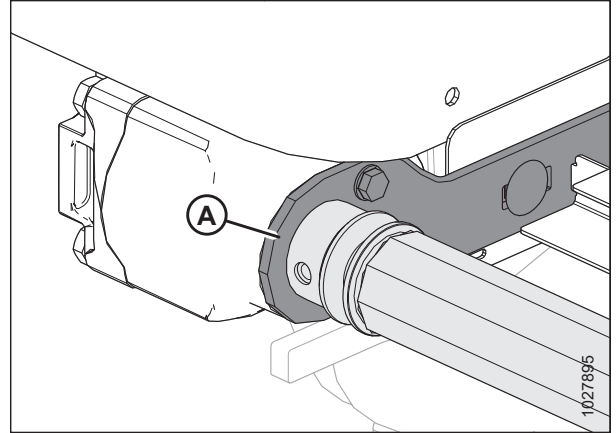


Figure 5.116: Drive Roller

13. Loosen two bolts (A) securing support arm (B).
14. Remove bolt (C) and the washer securing the opposite end of the drive roller to support arm (B).
15. Remove drive roller (D).

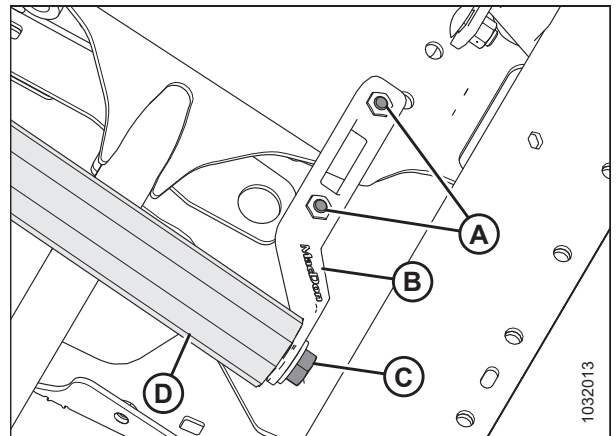


Figure 5.117: Drive Roller

### *Replacing Draper Drive Roller Bearing*

You will need a slide hammer to replace the bearing on a drive roller.

1. Remove the draper idler roller assembly. For instructions, refer to [Removing Side Draper Drive Roller, page 297](#).
2. Clamp the drive roller in a vise with a cloth wrapped around the roller to prevent damage to the roller.

## MAINTENANCE AND SERVICING

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.

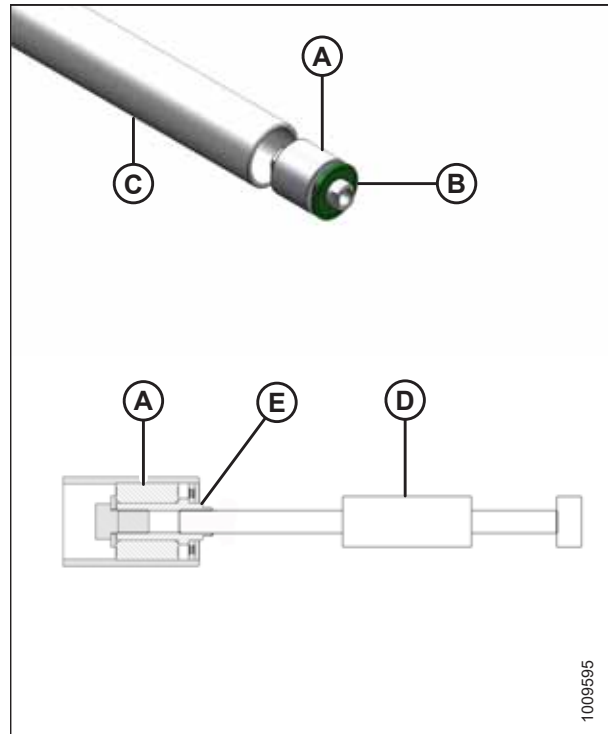


Figure 5.118: Roller Bearing

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.

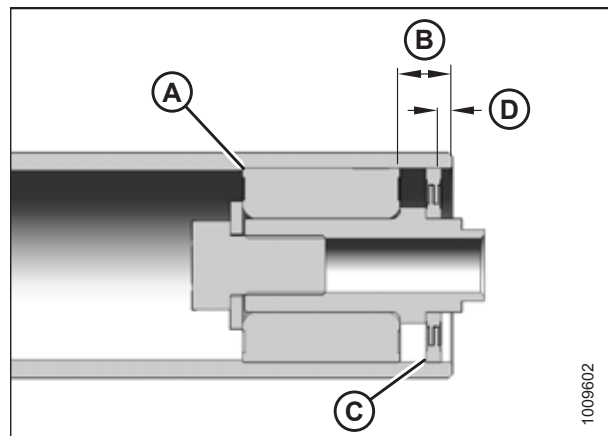


Figure 5.119: Roller Bearing

### Installing Side Draper Drive Roller

The side draper deck has a roller on either end of the deck. One roller is the idler roller and one roller is the drive roller.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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**

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 header fully.
2. Raise the reel fully.
3. Engage the reel safety props. For instructions, refer to *Engaging Reel Safety Props, page 45*.
4. Engage the header safety props. For instructions, refer to the windrower operator's manual.
5. Shut down the engine, and remove the key from the ignition.
6. Position drive roller (A) between the roller support arms.
7. Secure the drive roller with washer and bolt (B).
8. Tighten bolts (C) on the support arm.
9. Torque bolt (B) to 95 Nm (70 lbf·ft).
10. Lubricate the motor shaft and insert it into the end of drive roller (A).

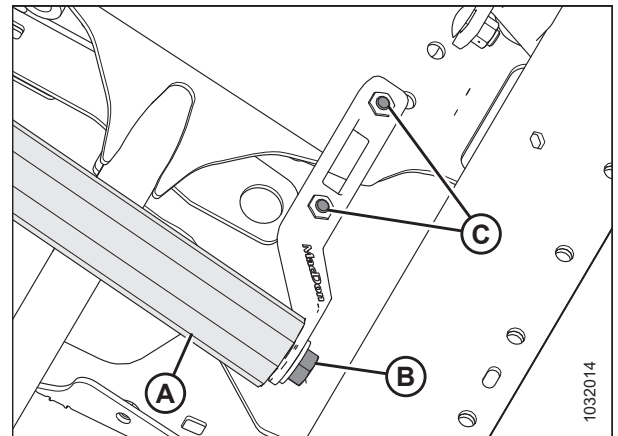


Figure 5.120: Drive Roller

11. Secure the motor to the roller support with two bolts (B). Torque the bolts to 27 Nm (19.9 lbf·ft [239 lbf·in]).
12. Ensure that the straight key is in place on the motor shaft, then insert the motor shaft all the way into the roller.
13. Using a hex key, tighten the two set screws (not shown) through access hole (A).

**NOTE:**

Tighten any loosened bolts and reinstall plastic shield (C), if it was previously removed.

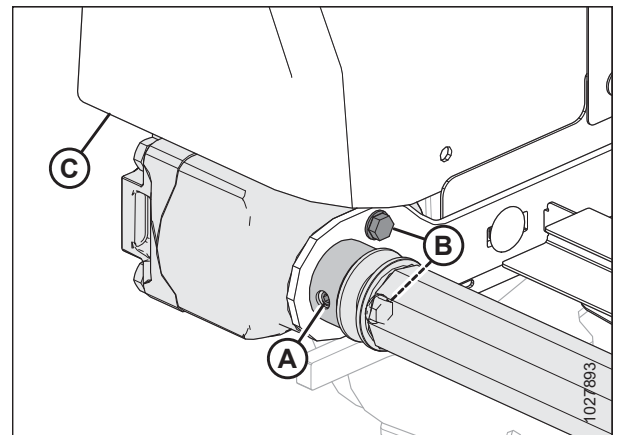


Figure 5.121: Drive Roller

## MAINTENANCE AND SERVICING

14. Wrap the draper over the drive roller and 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 the rear of the draper.

15. Install bridge connector (D) using screws (C) and the nuts at the front end of the draper joint.

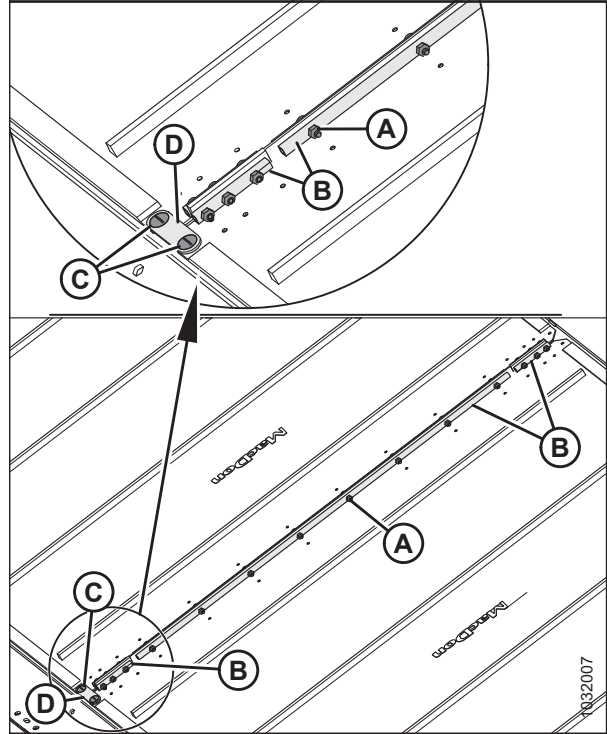


Figure 5.122: Draper Connector

16. Tighten the draper by turning adjuster bolt (A) clockwise. For instructions, refer to [5.7.3 Adjusting Draper Tension](#), page 286.

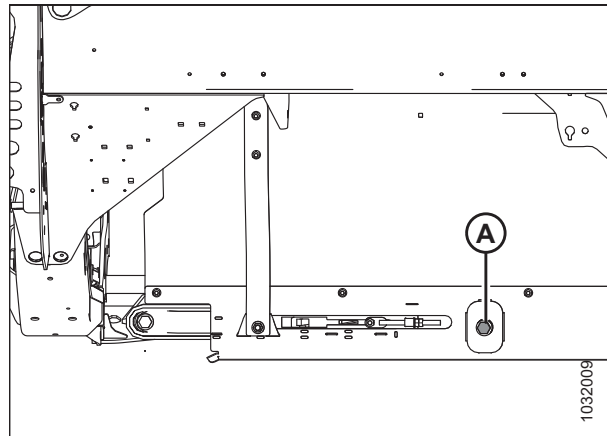


Figure 5.123: Draper Tensioner – Left Side Shown

17. Disengage the header safety props. For instructions, refer to the windrower operator's manual.
18. Disengage the reel safety props. For instructions, refer to the header operator's manual.
19. Start the engine.
20. Lower the reel fully.
21. Lower the header.
22. Engage the header.
23. Ensure that the draper tracks on the deck correctly. If adjustment is required, refer to [5.7.4 Adjusting Draper Tracking](#), page 289.



## 5.7.6 Draper Deflectors

Draper deflectors attach to the inboard sides of the endsheets to prevent material from getting in the gap between the endsheet and the draper. When the drapers are shifted inboard to narrow the delivery opening, optional wide draper deflectors can be installed to seal the larger gap between the endsheet and the draper. For double windrowing, wide deflectors can be installed to prevent the end-delivered swath from interfering with uncut crop.

### 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.

#### WARNING

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Raise the reel fully.
3. Lower the header.
4. Shift the decks to create work space at one end of the header. For instructions, refer to [Adjusting Delivery Opening on Header with Hydraulic Deck Shift, page 107](#).
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 45](#).
7. Open the endshield. For instructions, refer to [Opening Header Endshields, page 47](#).
8. Remove two M8 screws and washers (A) securing wide front left deflector (B) to C-bar seal end plate (C).
9. Remove seven M10 screws and nuts (D) securing wide front left deflector to end panel (E) and wide rear left deflector (F).
10. Remove wide front left deflector (B).

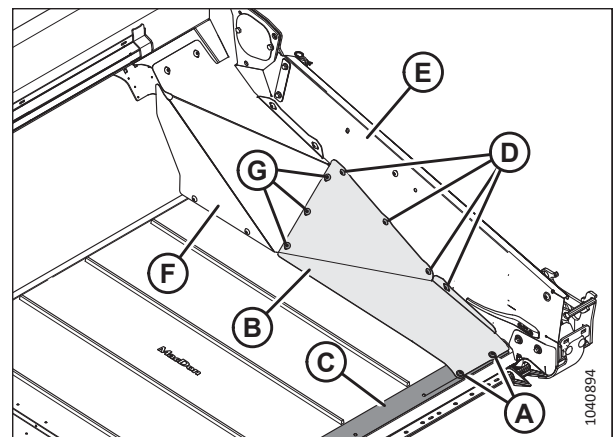


Figure 5.124: Wide Deflectors – Left Side Shown

## MAINTENANCE AND SERVICING

11. 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).
12. Remove wide rear left deflector (B).

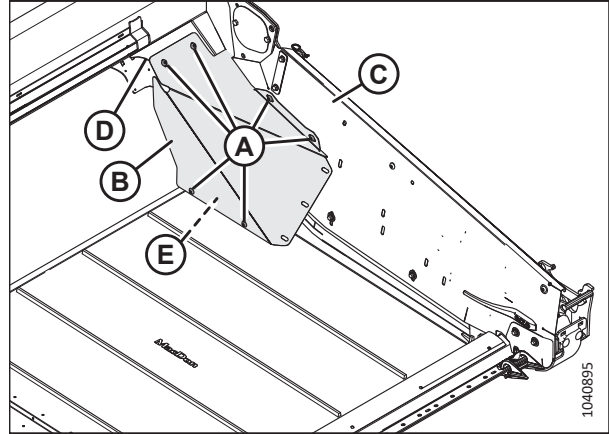


Figure 5.125: Rear Wide Deflector – Left Side Shown

13. Remove hex screw (B) securing wide left deflector plate (A).
14. Remove gusset (A).
15. Repeat this procedure at the opposite end of the header.
16. Install the narrow draper deflectors. For instructions, refer to [Installing Narrow Draper Deflectors, page 307](#).

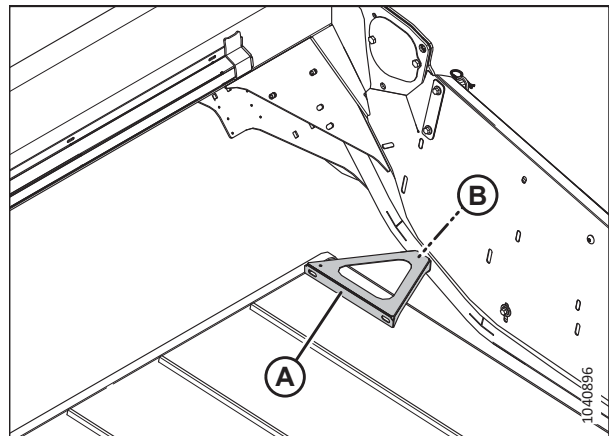


Figure 5.126: Gusset – Left Side Shown

### *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.

#### **⚠ WARNING**

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Raise the reel fully.
3. Lower the header.

## MAINTENANCE AND SERVICING

- Shift the decks to create work space at one end of the header. For instructions, refer to [Adjusting Delivery Opening on Header with Hydraulic Deck Shift, page 107](#).
- Shut down the engine, and remove the key from the ignition.
- Engage the reel safety props. For instructions, refer to [Engaging Reel Safety Props, page 45](#).
- Open the endshield. For instructions, refer to [Opening Header Endshields, page 47](#).
- Remove narrow draper deflectors. For instructions, refer to [Removing Narrow Draper Deflectors, page 306](#).
- Position gusset (A) against the end panel as shown, and secure the gusset with hex screw (B).

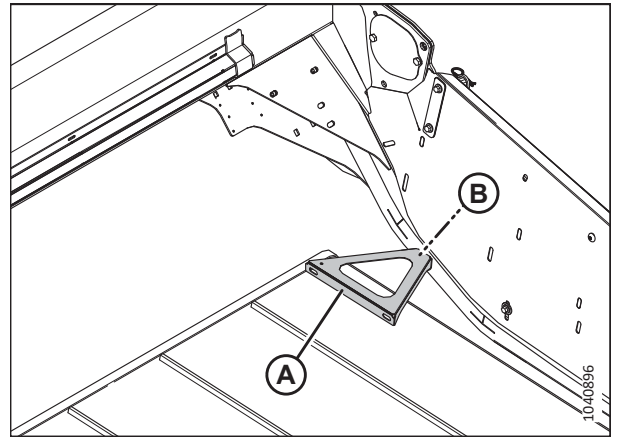


Figure 5.127: Gusset – Left Side Shown

- Position wide rear left deflector (B) as shown.
- Secure wide rear left deflector (B) to end panel (C), back plate (D), and gusset (E) with six M10 screws and nuts (A).

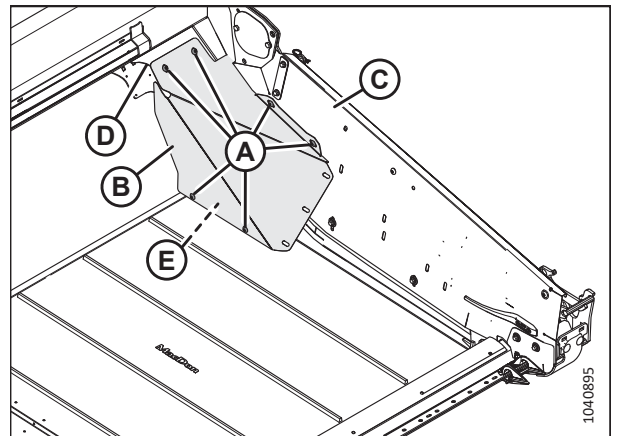


Figure 5.128: Rear Wide Deflector – Left Side Shown

## MAINTENANCE AND SERVICING

12. Position wide front left deflector (B) on top of cutterbar seal plate (C), wide rear left deflector (F), and end panel (E).
13. Loosely secure wide front left deflector (B) to cutterbar seal plate (C) using two M8 screws and washers (A).
14. Loosely secure wide front left deflector to end panel (E) using four M10 screws and nuts (D).
15. Secure wide front left deflector to wide rear left deflector (F) using three M10 screws and nuts (G).

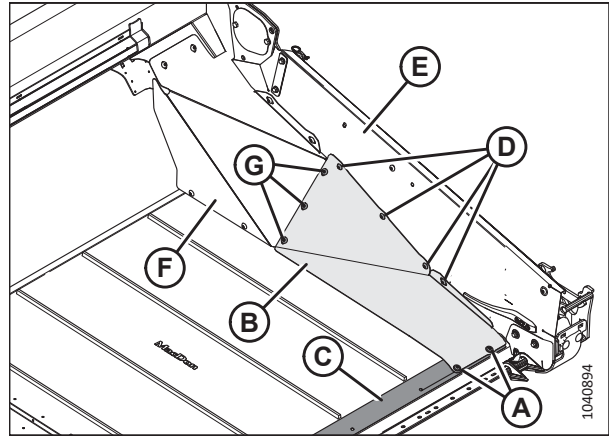


Figure 5.129: Wide Deflectors – Left Side Shown

16. Set a clearance of 25 mm (1 in.) (A) between rubber slat (B) and wide rear deflector (C). Tighten six bolts (D).
17. Set a clearance of 15 mm (9/16 in.) (E) between rubber slat (B) and wide front deflector (F). Tighten six bolts (G).
18. Repeat the above steps on the opposite end of the header.
19. Close the endshield. For instructions, refer to [Closing Header Endshields, page 48](#).

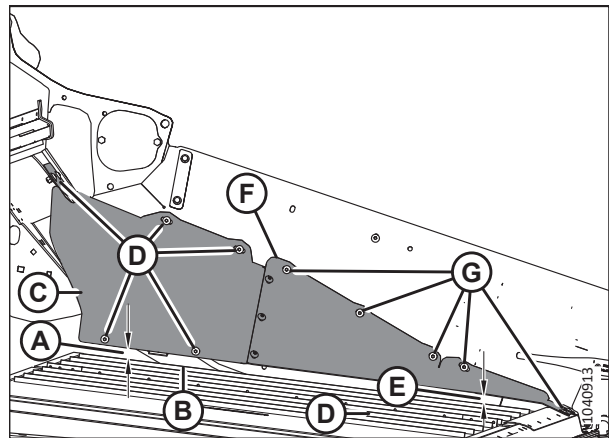


Figure 5.130: Deflectors – Left Side Shown

20. Move the reel back to ensure that the steel end fingers do **NOT** contact the deflector shields.

### NOTE:

If the fingers contact the deflector shields, adjust the reel upward until the fingers do not contact the deflector shields at all reel fore/aft positions. Alternatively, with the reel fully lowered, trim the steel end fingers until the fingers do not contact the deflector shields at all reel fore/aft positions. Periodically monitor the fingers to ensure they do not contact the deflector shields and repeat the adjustment procedure if necessary.

### 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.

#### WARNING

Ensure that all bystanders have cleared the area.

## MAINTENANCE AND SERVICING

1. Start the engine.
2. Raise the reel fully.
3. Lower the header.
4. Shift the decks to create work space at one end of the header.
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 45*.
7. Open the endshield. For instructions, refer to *Opening Header Endshields, page 47*.
8. Remove two Torx® head screws (A) and lock nuts.
9. Remove three carriage bolts (B) and lock nuts, and remove aft deflector (C).

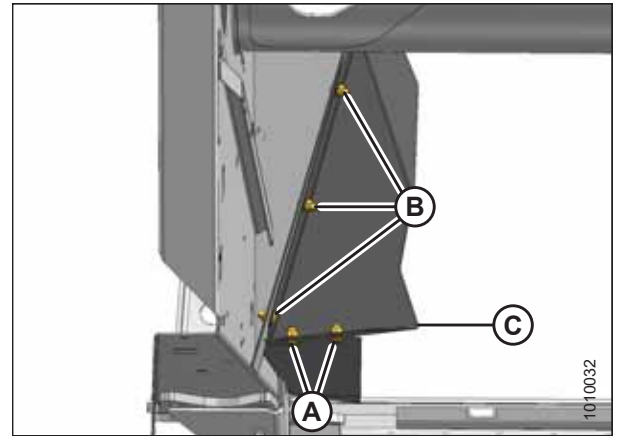


Figure 5.131: Aft Deflector

10. Remove four screws (A) and remove deflector (B).
11. Repeat this procedure for the opposite end of the header.

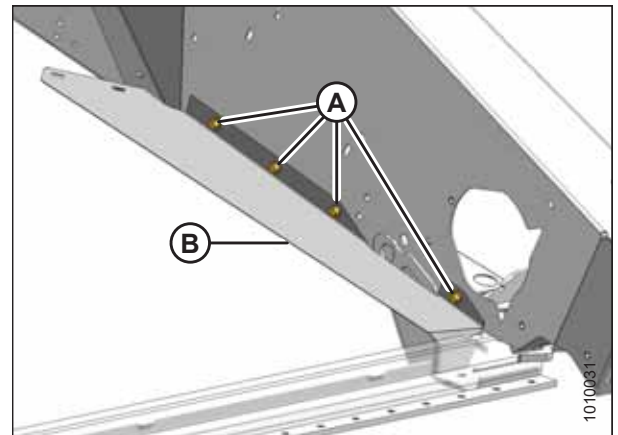


Figure 5.132: Forward Deflector

### *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.

**WARNING**

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Raise the reel fully.
3. Lower the header.
4. Shift the decks to create work space at one end of the header. For instructions, refer to *Adjusting Delivery Opening on Header with Hydraulic Deck Shift, page 107*.
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 45*.
7. Open the endshield. For instructions, refer to *Opening Header Endshields, page 47*.
8. Position forward deflector (B) onto the endsheet and temporarily install forward and aft 3/8 in. x 5/8 in. self-tapping screws (A).
9. Check the fit of the forward end of deflector (B) on the cutterbar and ensure that there is no gap between the deflector and cutterbar. Remove and bend the deflector as required to obtain the best fit.
10. Install two 3/8 in. x 5/8 in. self-tapping screws (C), then tighten all four screws (A) and (C).

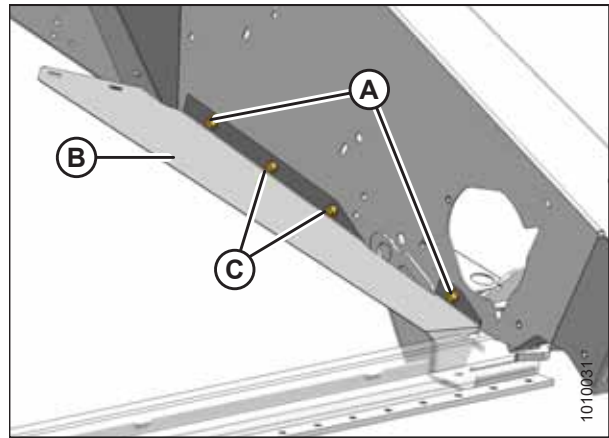


Figure 5.133: Forward Deflector

11. Position aft deflector (C) as shown and install three 3/8 in. x 3/4 in. carriage bolts (B) and lock nuts.
12. Install two Torx® head screws (A) and lock nuts with the heads facing down.
13. Tighten all of the fasteners.
14. Repeat this procedure on the opposite end of the header.

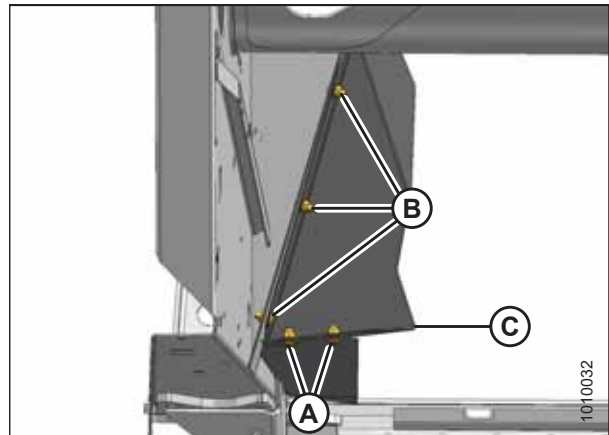


Figure 5.134: Aft Deflector

## 5.8 Reel

The procedures and information in this section describe the adjustments and service necessary to optimize the performance of the reel.



### CAUTION

To avoid personal injury, before servicing the machine or opening the drive covers, refer to [5.1 Preparing Machine for Servicing, page 211](#).

### 5.8.1 Reel-to-Cutterbar Clearance

There must be a 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 may be necessary before operating the header.

#### *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**

Ensure that all bystanders have cleared the area.

**⚠ 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. Adjust the reel fore-aft position until the 7 on fore-aft indicator (A) is hidden by sensor support (B).
3. Shut down the engine, and remove the key from the ignition.

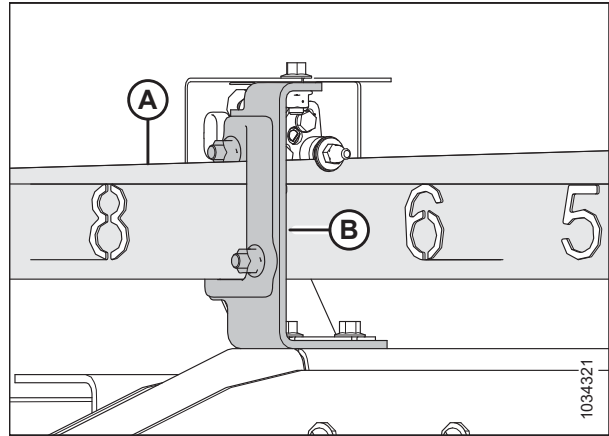


Figure 5.135: Fore-Aft Position



## MAINTENANCE AND SERVICING

4. Rotate the reel by hand until a tine tube is directly above the cutterbar.
5. 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 Tables 5.12, page 312 and 5.13, page 312.

For measurement locations, refer to:

- Figure 5.137, page 311 – single-reel headers
- Figure 5.138, page 312 – double-reel headers

6. If required, adjust the reel clearance. For instructions, refer to *Adjusting Reel-to-Cutterbar Clearance*, page 312.

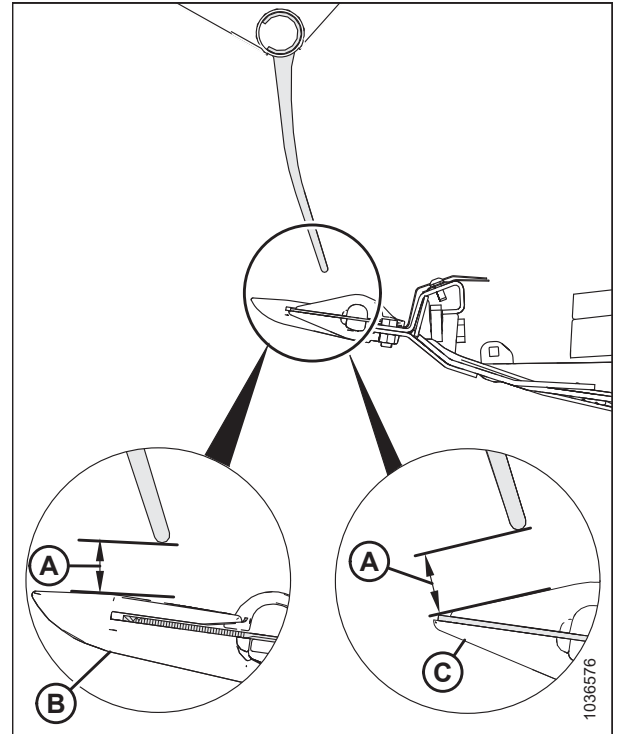


Figure 5.136: Measurement from Finger Tip to Guard

**Single-reel header measurement locations (A):** Outer ends of the reel (two places).

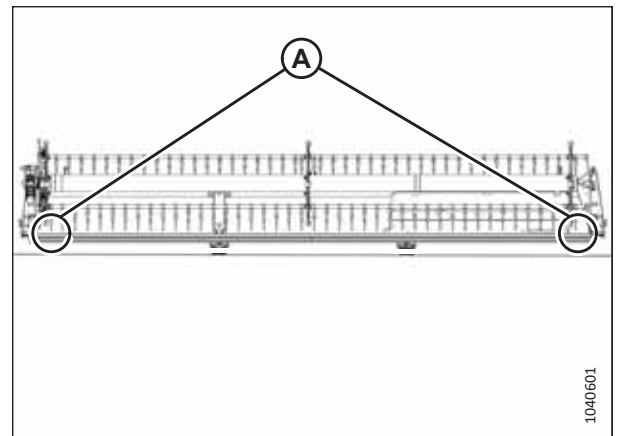
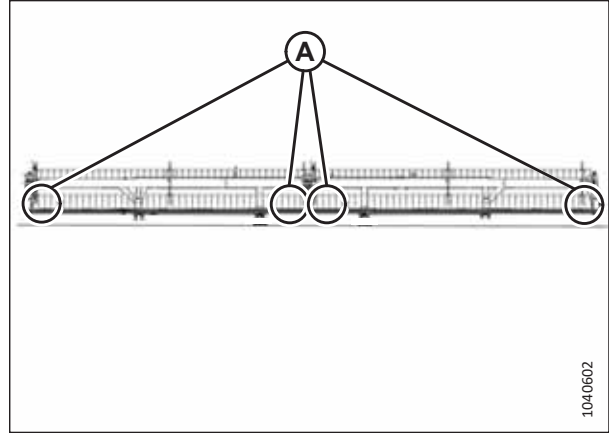


Figure 5.137: Single-Reel Header Measurement Locations

## MAINTENANCE AND SERVICING

**Double-reel header measurement locations (A):** Both ends of both reels (four places).



**Figure 5.138: Double-Reel Header Measurement Locations**

- Compare your measurements with the specifications in the table below.

**Table 5.12 Finger to Guard/Cutterbar Clearance – Single Reel**

Header	Reel Ends
D215	20 mm (3/4 in.)
D220	20 mm (3/4 in.)
D225	25 mm (1 in.)

**Table 5.13 Finger to Guard/Cutterbar Clearance – Double Reel**

Header	Reel Ends	Beside Center Arm
D230, D235, D241	20 mm (3/4 in.)	20 mm (3/4 in.)

- Adjust the reel clearance, if required. For instructions, refer to [Adjusting Reel-to-Cutterbar Clearance, page 312](#).

### *Adjusting Reel-to-Cutterbar Clearance*

If the clearance between the reel fingers and the cutterbar is insufficient, it will need to be adjusted to prevent the equipment from being damaged.

**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 the same position for the duration of the procedure.

** DANGER**

Ensure that all bystanders have cleared the area.

** 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.

- Prior to making adjustments, make sure that the reel-to-cutterbar clearance has been measured and recorded. For instructions, refer to [Measuring Reel-to-Cutterbar Clearance, page 310](#).

## MAINTENANCE AND SERVICING

2. 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).
3. Repeat Step 2, [page 313](#) on the opposite side of the header.
4. Loosen bolts (A) on both center arm cylinders.
5. 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.
6. Ensure that measurement (B) is identical on both cylinders.

**NOTE:**

Measurement (B) runs from the center of mounting pins (C) to the tops of the notches in cylinder rods (D).

7. Ensure that both mounting pins (C) **CANNOT** be rotated by hand. If one of the mounting pins 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.
8. Tighten bolts (A).
9. Raise the reel fully.
10. Lower the reel fully and continue holding the control button down to phase the cylinders.

**NOTE:**

If after phasing the cylinders, the reel lift cylinders will not raise/lower equally, purge air from the reel lift hydraulic system. For instructions, refer to [5.8.2 Removing Air from Reel Lift Hydraulic System, page 314](#).

11. Shut down the engine, and remove the key from the ignition.
12. Check the reel-to-cutterbar clearance measurements again. If necessary, repeat the adjustment procedures.

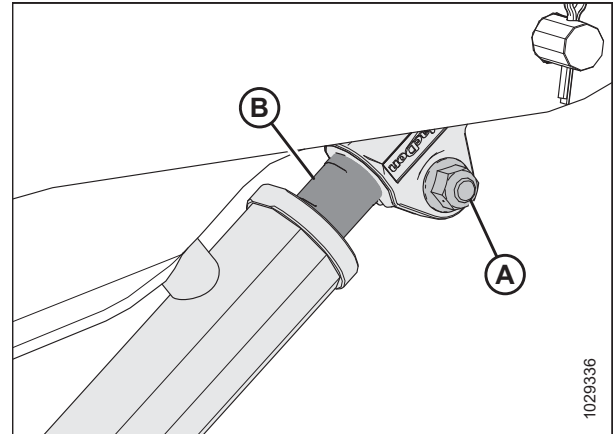


Figure 5.139: Outside Arm Cylinder

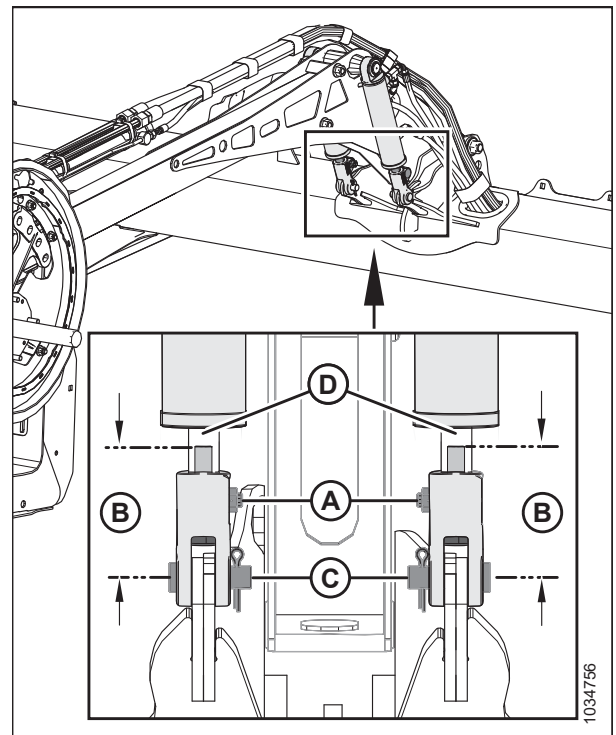


Figure 5.140: Center Arm Cylinders

## MAINTENANCE AND SERVICING

13. Move the reel back to ensure that the reel fingers do not contact the deflector shields.
14. 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 fingers as needed.
15. Periodically check for evidence of contact during operation. Adjust the reel-to-cutterbar clearance as needed.

### 5.8.2 Removing Air from Reel Lift Hydraulic System

Purge air from the hydraulic reel lift system after replacing a component.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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:

Single-reel headers have an air release coupler located on the right reel lift cylinder. Double-reel headers have air release couplers the left and the right reel lift cylinders.

1. Install a hose onto air release coupler (A) on the right lift cylinder. Place the opposite end of the hose in a clean pail.

#### NOTE:

If air release parts are required, source coupler Parker PD242 and hose MD #16984.

2. Press and hold the reel raise button until the oil flows with no foam or bubbles.
3. Shut down the engine, and remove the key from the ignition.

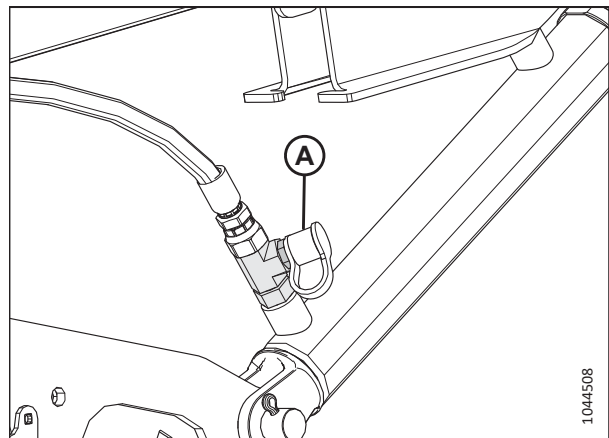


Figure 5.141: Reel Lift Air Release Coupler

4. Remove the hose from the lift cylinder air release coupler.
5. Verify that the reel lift cylinders raise and lower at the same time.
6. Shut down the engine, and remove the key from the ignition.
7. Check the reel-to-cutterbar clearance. For instructions, refer to [Measuring Reel-to-Cutterbar Clearance, page 310](#).

### 5.8.3 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.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

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

**Single-reel headers**

4. At each location (B), measure clearance (A) between the reel tine tube and the endsheet. Clearance (A) must be 20 mm (25/32 in.). If clearance (A) is insufficient, refer to the following steps to center the reel.

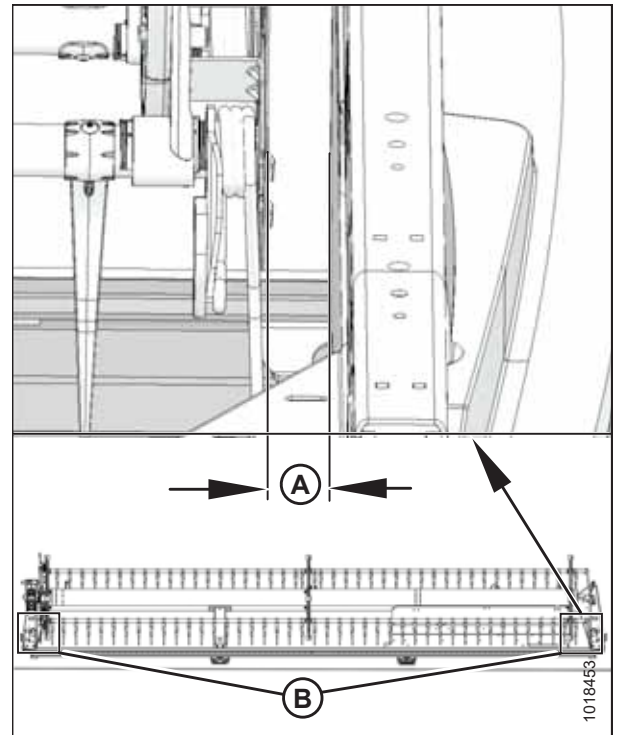


Figure 5.142: Clearance between Reel and Endsheet

5. Loosen bolt (A) on brace (B) at both ends of the reel.
6. Move the end of reel support arm (C) laterally, as needed, to center the reel.
7. Tighten bolt and nut (A). Torque the nut to 457 Nm (337 lbf-ft).

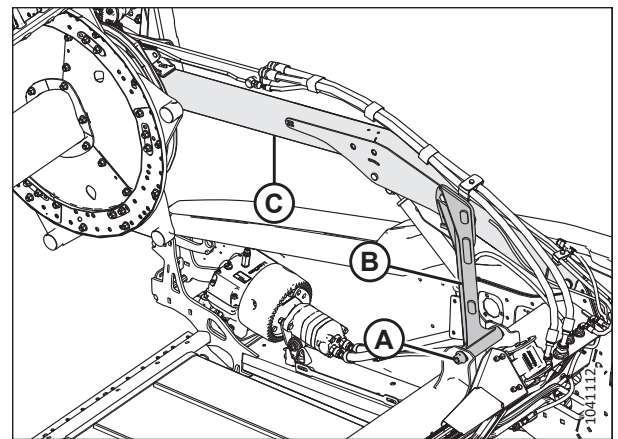


Figure 5.143: Single Reel Support Arm

**Double-reel headers**

8. 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.

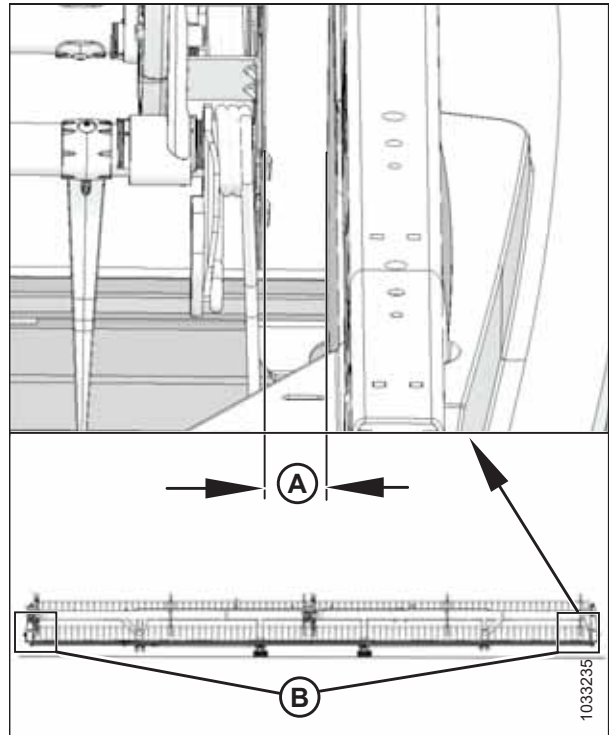


Figure 5.144: Clearance between Reel and Endsheet

9. Loosen bolt (A) on brace (B) on the center support arm.
10. Move the forward end of reel support arm (C) laterally as needed to center the reel.
11. Torque bolt (A) to 457 Nm (337 lbf-ft).

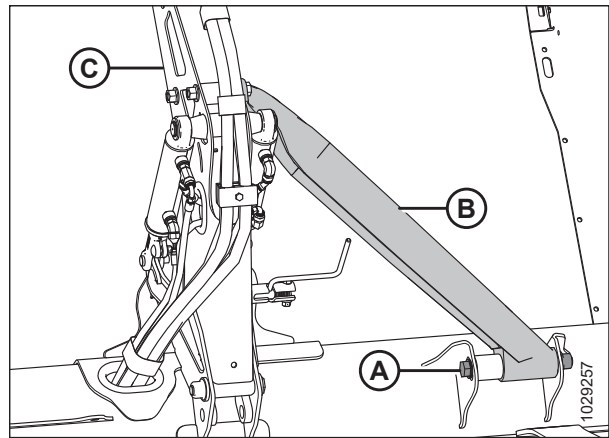


Figure 5.145: Double-Reel Center Support Arm

**5.8.4 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 Reel 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.

#### DANGER

Ensure that all bystanders have cleared the area.

#### 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:

Support the tine tube at all times to avoid damaging it and other components.

1. Lower the header.
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 45*.
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 320*.
6. Attach tine tube arms (B) to the reel disc at original attachment locations (A).
7. Cut the damaged finger to remove it from the tine tube.
8. Remove the bolts from the fingers that were beside the original finger and slide the fingers over to replace the finger that was cut off. Remove tine tube arms [B] from the tine tubes as necessary.

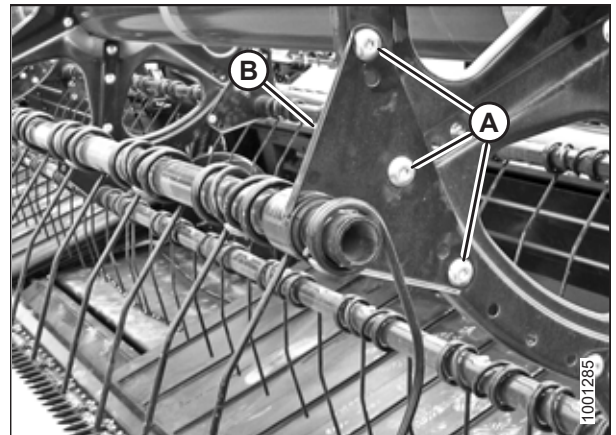


Figure 5.146: Tine Tube Arm

### Installing Steel Reel Fingers

Once the old steel finger has been removed, a new finger can be pushed onto the tine tube.

#### NOTE:

This procedure assumes a finger has been removed from the machine. For instructions about removing fingers, refer to *Removing Steel Reel Fingers, page 317*.

**⚠ 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:**

Support the tine tube at all times to prevent damage to the tube and other components.

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 326](#).
3. Attach the fingers to the tine tube with bolts and nuts (B).

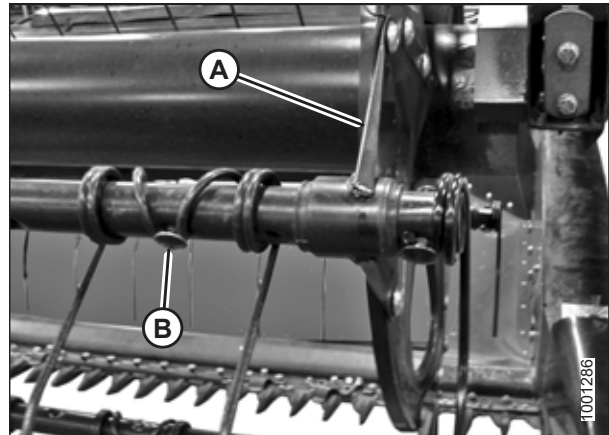


Figure 5.147: Tine Tube

*Removing Plastic Reel 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.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ 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.
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 45](#).



## MAINTENANCE AND SERVICING

5. Remove screw (A) using a Torx Plus® 27 IP socket wrench.

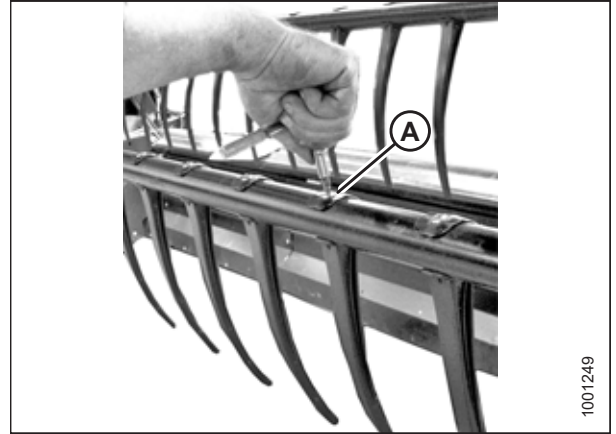


Figure 5.148: Removing Plastic Finger

6. Push the clip at the top of the finger back toward the reel tube as shown and remove the finger from the tube.



Figure 5.149: Removing Plastic Finger

### *Installing Plastic Reel 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 Reel Fingers, page 318](#).

## MAINTENANCE AND SERVICING

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 5.150: Installing Plastic Finger

3. Install screw (A) using a Torx Plus® 27 IP socket wrench and torque it to 8.5–9.0 Nm (6.3–6.6 lbf·ft [75–80 lbf·in]).

### IMPORTANT:

Do **NOT** apply force to the finger before tightening the mounting screw. Applying force without tightening the mounting screw will break the finger or shear the locating pins.

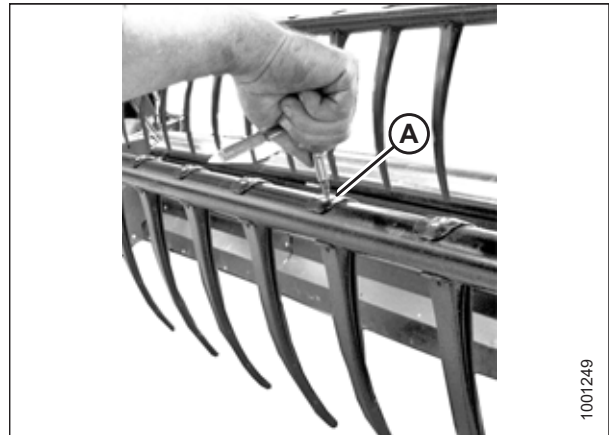


Figure 5.151: Installing Plastic Finger

### 5.8.5 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.

### DANGER

Ensure that all bystanders have cleared the area.

### 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:**

Support the tine tube at all times to prevent damage to the tube and other components.

1. Lower the header.
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 45*.

**NOTE:**

If you are only replacing the cam end bushing, proceed to Step 10, page 322.

**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.

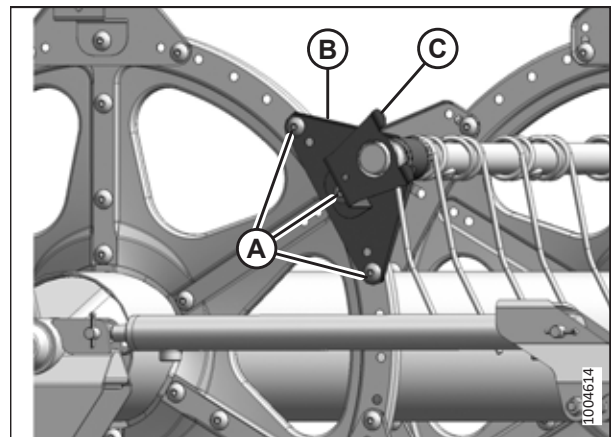


Figure 5.152: Tail End

7. Release bushing clamps (A) using a small screwdriver to separate the serrations. Pull the clamp off the tine tube.

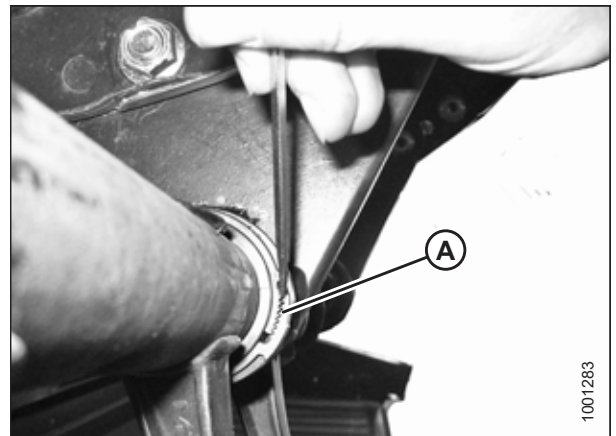


Figure 5.153: Bushing Clamp

## MAINTENANCE AND SERVICING

8. Rotate tine tube arm (A) until it is clear of the disc, and then 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 Reel Fingers, page 318*
  - *Removing Steel Reel Fingers, page 317*

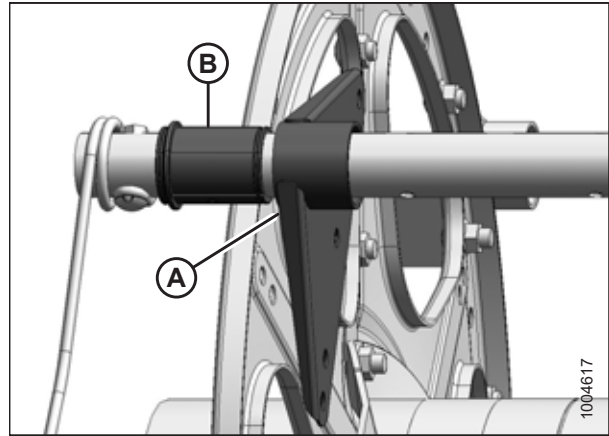


Figure 5.154: Bushing

### Cam end bushings

10. Remove the endshields and endshield support (A) from the applicable tine tube location on the cam end.

**NOTE:**

Removing the cam end bushings requires moving the tine tube through the disc arms to expose the bushing.

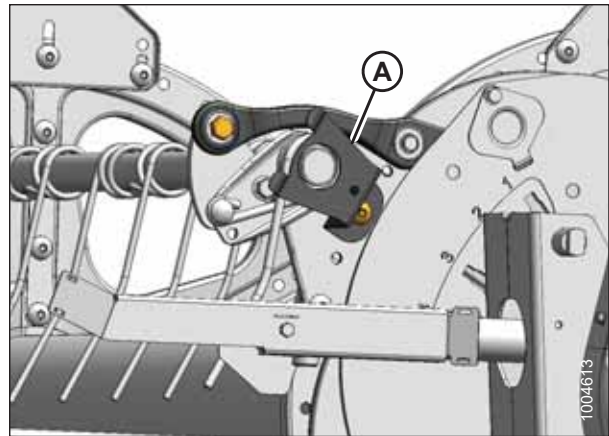


Figure 5.155: Cam End

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 the center discs.

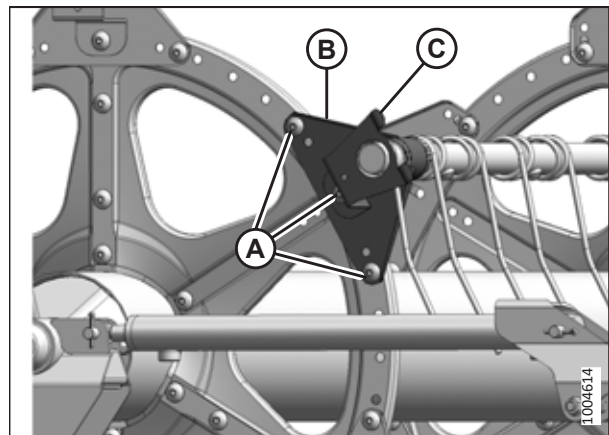


Figure 5.156: Tail End

*Tine tube reinforcing kit*

13. Release the bushing clamps or disconnect the support channels from the tine tube support (if installed) depending on which tine tube is being moved. Three tine tubes (A) require channel disconnection and two tine tubes (B) require only bushing clamp removal.

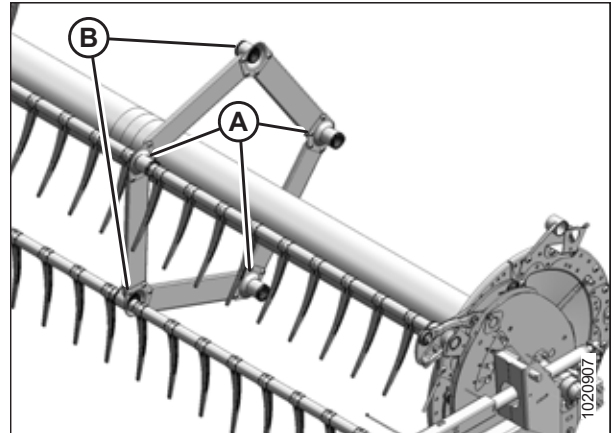


Figure 5.157: Tine Tube Supports

14. Remove bolt (A) from the cam linkage so tine tube (B) is free to rotate.

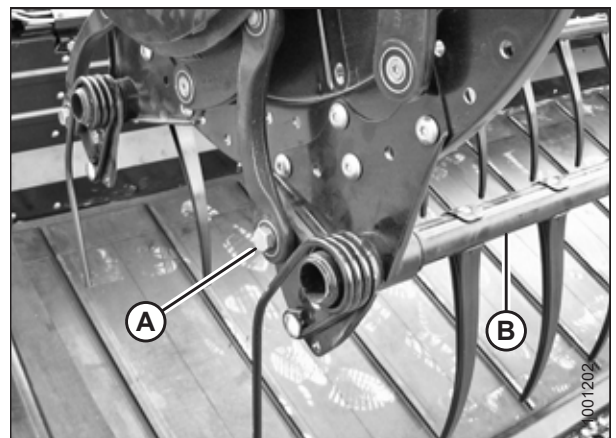


Figure 5.158: Cam End

15. Release bushing clamps (A) at the cam disc using a small screwdriver to separate the serrations. Move the clamps off the bushings.

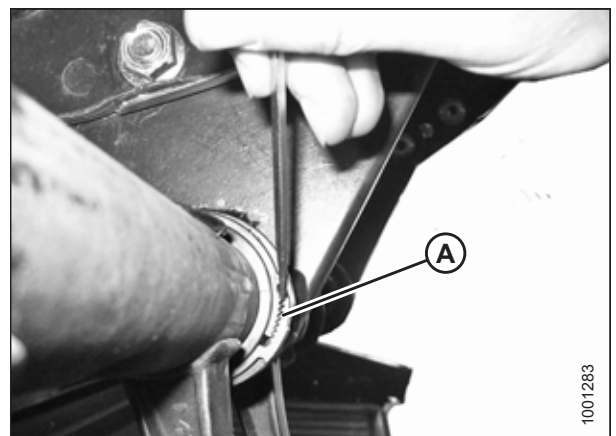


Figure 5.159: Bushing Clamp

## MAINTENANCE AND SERVICING

16. Slide tine tube (A) outboard to expose bushing (B).
17. Remove bushing halves (B). If required, remove the next steel or plastic finger so the arm can slide off the bushing. Refer to the following procedures if necessary:
  - [Removing Plastic Reel Fingers, page 318](#)
  - [Removing Steel Reel Fingers, page 317](#)

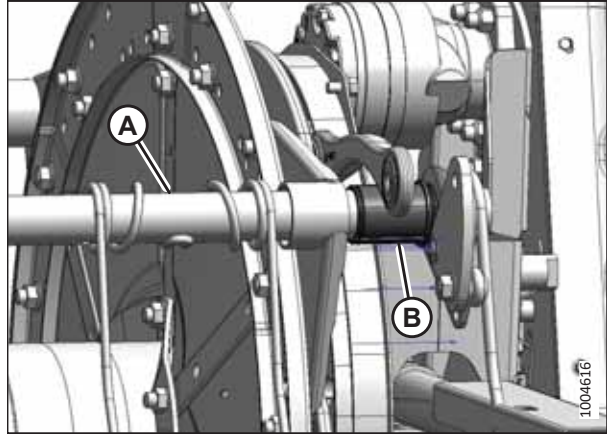


Figure 5.160: Cam End

### ***Tine tube reinforcing kit bushings***

18. Locate support (A) that requires a new bushing.
19. Remove four bolts (B) securing channel (C) to support (A).
20. Remove screw (E) and remove finger (D) if it is too close to the support to allow access to the bushing. For instructions, refer to [Removing Plastic Reel Fingers, page 318](#) or [Removing Steel Reel Fingers, page 317](#).

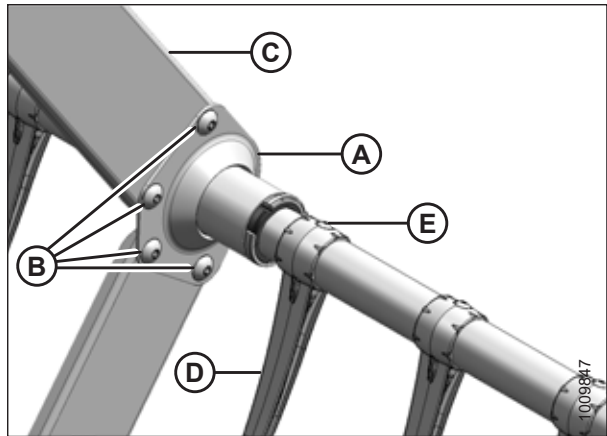


Figure 5.161: Tine Tube Support

21. Release bushing clamps (A) using a small screwdriver to separate the serrations.

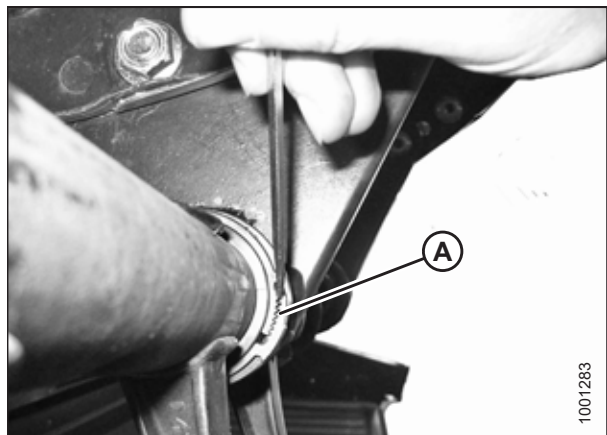


Figure 5.162: Bushing Clamp

22. Move clamps (A) off the bushings.

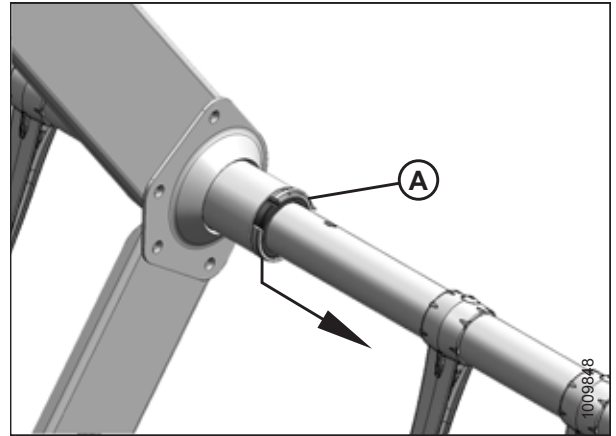


Figure 5.163: Tine Tube Reinforcing Kit Bushing Clamp

23. On each reel, there are three right-facing supports (A). Slide the support off bushing halves (B).

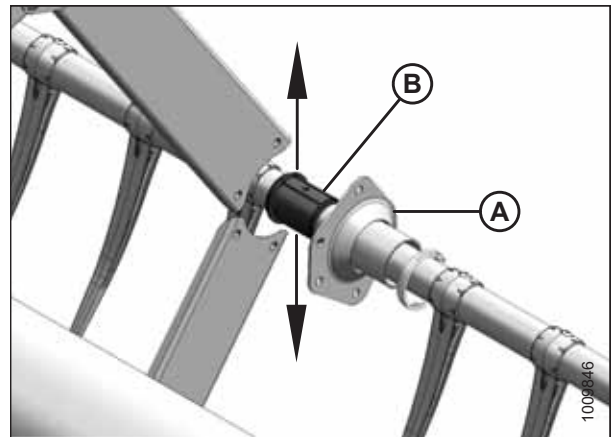


Figure 5.164: Tine Tube Reinforcing Kit Support

24. On each reel, there are two left-facing supports (A). Rotate the supports until the flanges clear the channels before moving them off bushing (B). Move the tube slightly away from the reel if necessary.

25. Remove bushing halves (B) from the tine tubes.

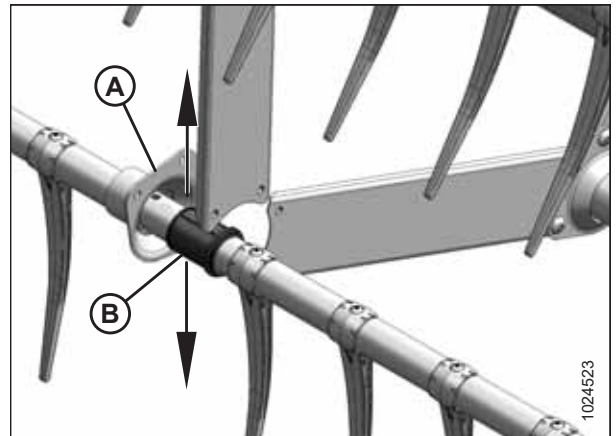


Figure 5.165: Tine Tube Reinforcing Kit Opposite Support

### *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 320* 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:**

Support the tine tube 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 the pliers in a vise and grind notch (B) into the end of each arm to fit the clamp as shown.

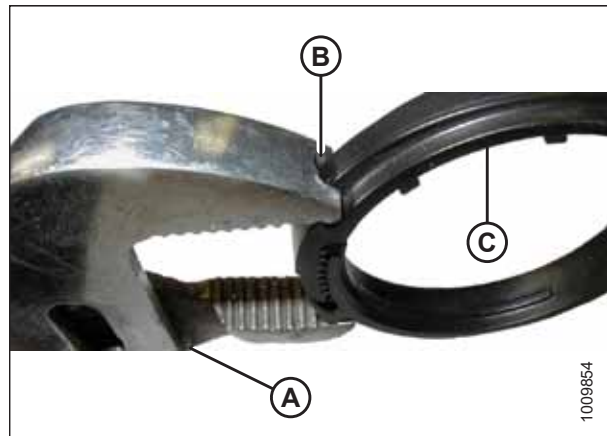


Figure 5.166: Modified Channel Lock Pliers

### *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) toward 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:
  - *Installing Plastic Reel Fingers, page 319*
  - *Installing Steel Reel Fingers, page 317*

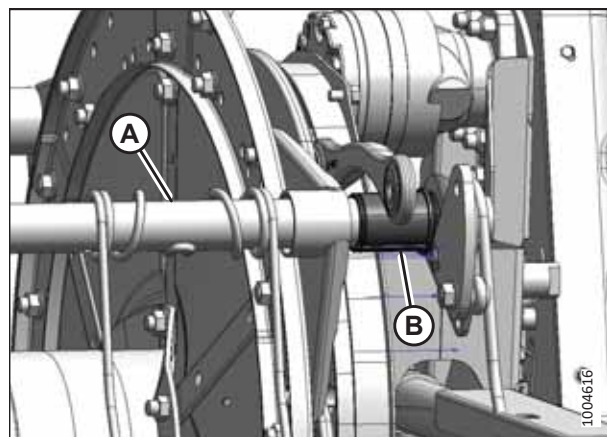


Figure 5.167: Cam End



## MAINTENANCE AND SERVICING

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 that the edges of the clamp and the bushing are flush when the clamp fits into the groove on the bushing and when the lock tabs are engaged.

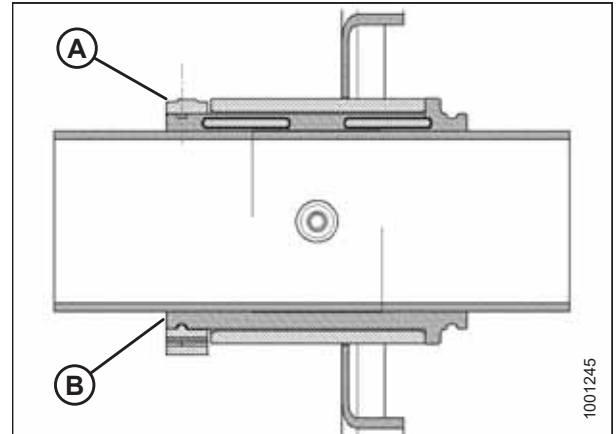


Figure 5.168: Bushing

7. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure **CANNOT** move the clamp.

**IMPORTANT:**

Overtightening the clamp may result in breakage.

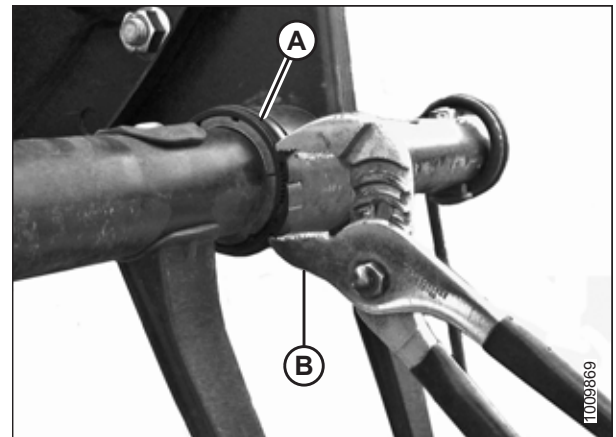


Figure 5.169: Installing Clamp

8. Line up tine tube (B) with the cam arm and install bolt (A). Torque the bolt to 165 Nm (120 lbf-ft).

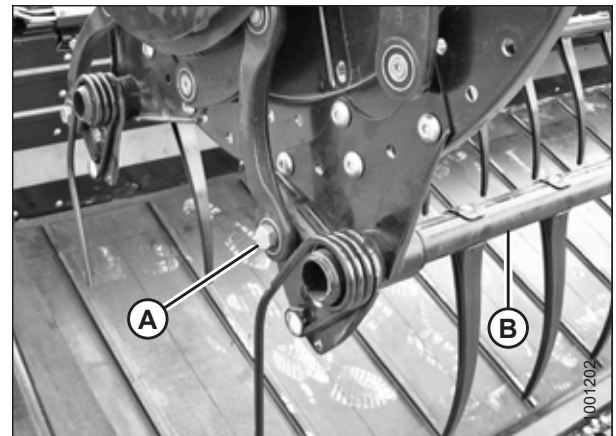


Figure 5.170: Cam End

## MAINTENANCE AND SERVICING

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.

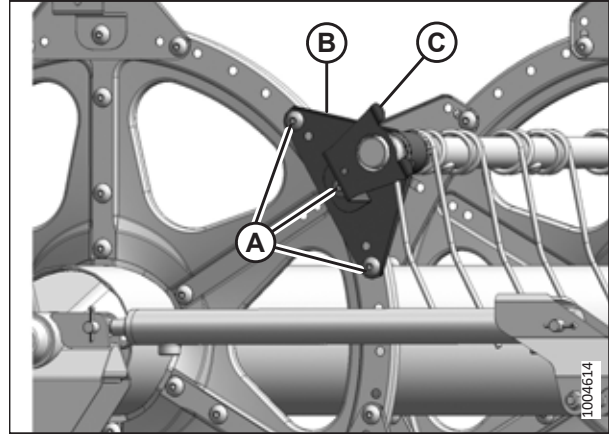


Figure 5.171: Tail End

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 [5.8.6 Reel Endshields, page 332](#).

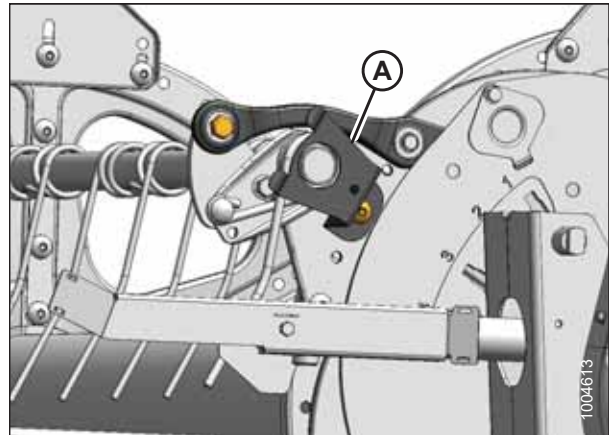


Figure 5.172: Cam End

### **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:
  - [Installing Plastic Reel Fingers, page 319](#)
  - [Installing Steel Reel Fingers, page 317](#)

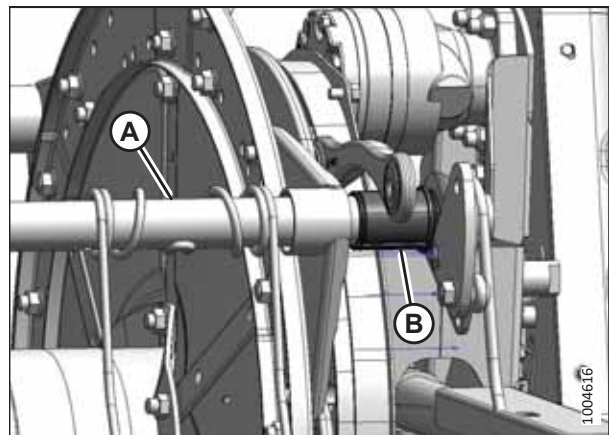


Figure 5.173: Cam End

## MAINTENANCE AND SERVICING

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 that the edges of the clamp and the bushing are flush when the clamp fits into the groove on the bushing and when the lock tabs are engaged.

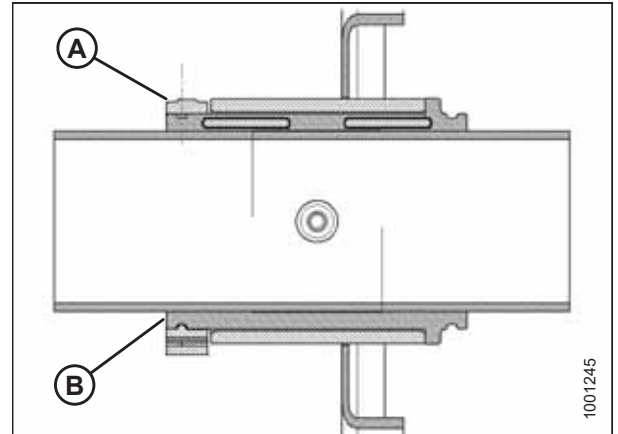


Figure 5.174: Bushing

18. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure **CANNOT** move the clamp.

**IMPORTANT:**

Overtightening the clamp may result in breakage.

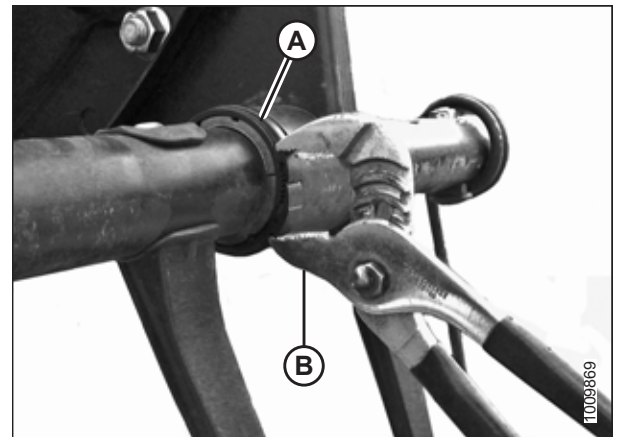


Figure 5.175: Installing Clamp

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.

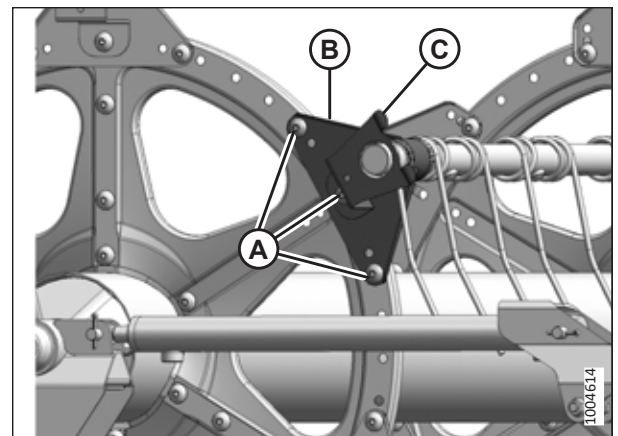


Figure 5.176: Tail End

*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.

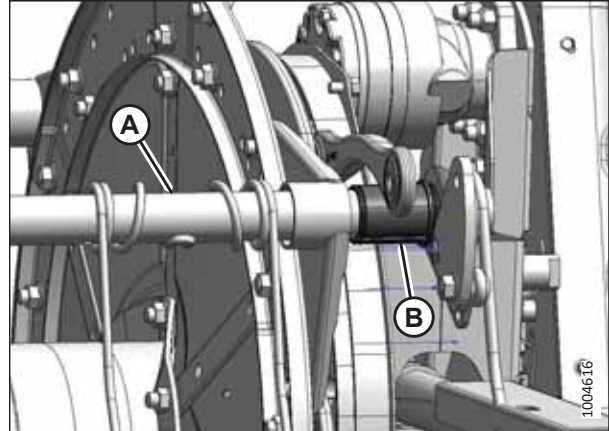


Figure 5.177: Cam End

22. On each reel, there are three right-facing supports (A). Slide the support onto bushing (B).

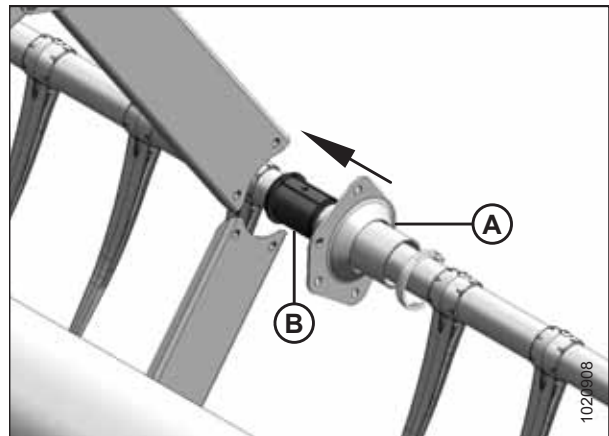


Figure 5.178: Tine Tube Reinforcing Kit Support – Option

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 give the support flange enough room to clear the channel.

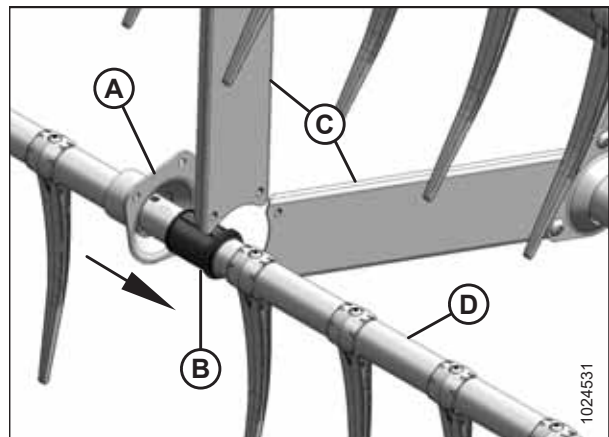


Figure 5.179: Tine Tube Reinforcing Kit Opposite Support – Option

## MAINTENANCE AND SERVICING

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 that the edges of the clamp and the bushing are flush when the clamp fits into the groove on the bushing and when the lock tabs are engaged.

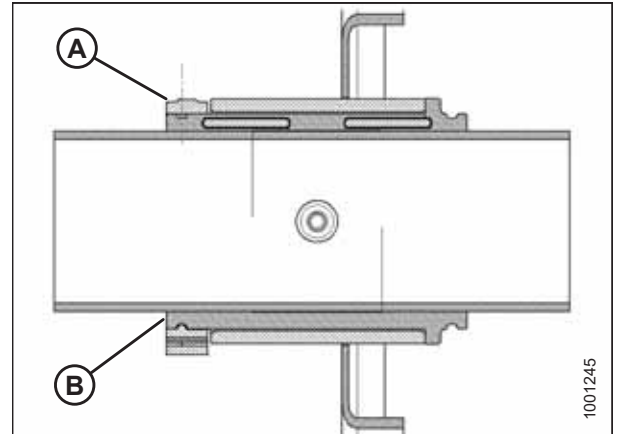


Figure 5.180: Bushing

26. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure **CANNOT** move the clamp.

**IMPORTANT:**

Overtightening the clamp may result in breakage.

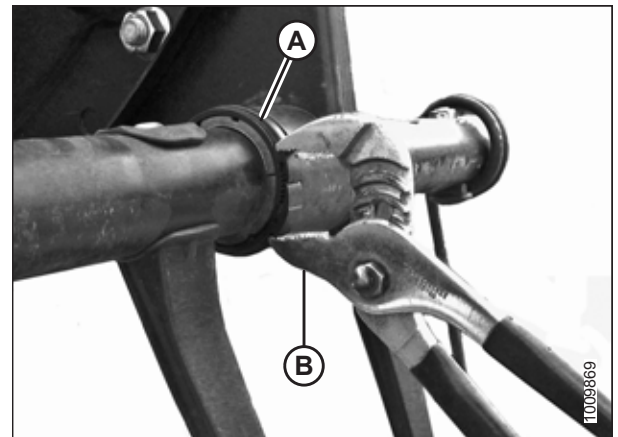


Figure 5.181: Installing Clamp

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 Reel Fingers, page 319](#)
  - [Installing Steel Reel Fingers, page 317](#)

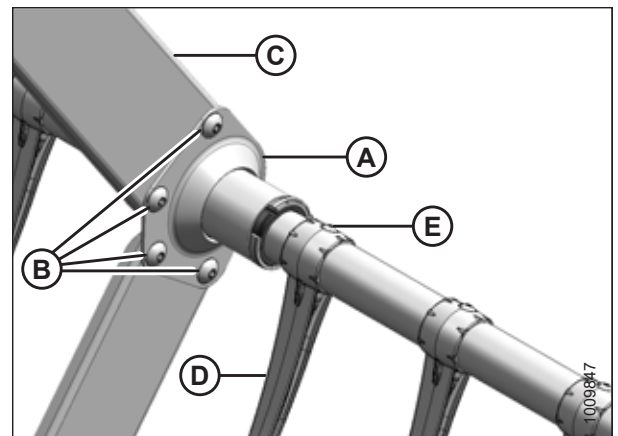


Figure 5.182: Tine Tube Reinforcing Kit Support – Option

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 Reel Fingers, page 319](#)
  - [Installing Steel Reel Fingers, page 317](#)

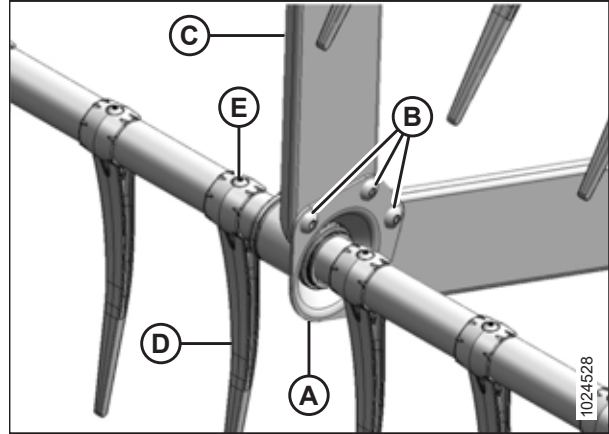


Figure 5.183: Tine Tube Reinforcing Kit Opposite Support – Option

### 5.8.6 Reel Endshields

The reel endshields and the 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 is necessary to replace severely damaged components.

There are four kinds of reel endshields. Ensure that you are installing the correct reel endshield to the proper location as shown in Figure 5.184 *Reel Endshields, page 332*.

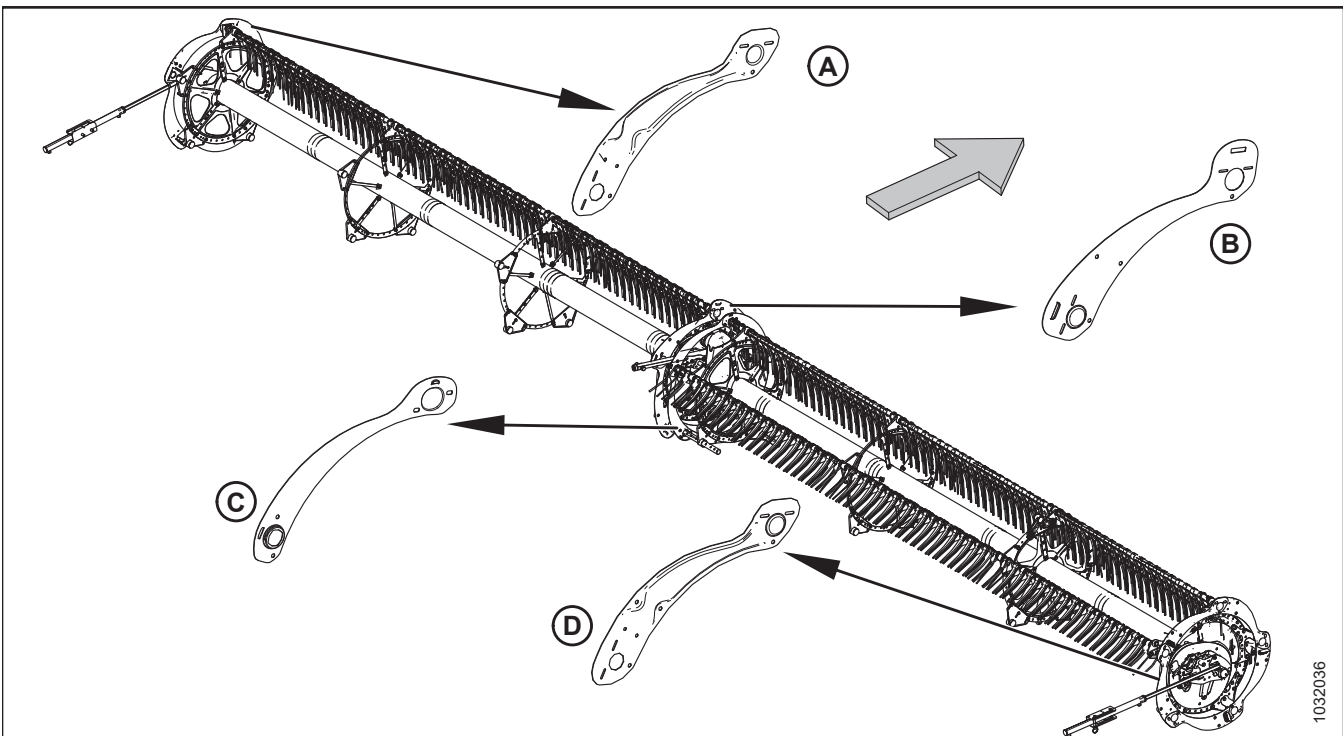


Figure 5.184: Reel Endshields

A - Tail End, Outboard (MD #311695)  
 C - Tail End, Inboard (MD #311795)

B - Cam End, Inboard (MD #273823)  
 D - Cam End, Outboard (MD #311694)

**NOTE:**

The arrow in the illustration points to the front of the machine.

*Replacing Reel Endshields at Outboard Cam End*

The procedure for replacing reel endshields is applicable to the 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.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**NOTE:**

The arrows in the illustrations in this procedure indicate the front of the header.

**NOTE:**

Retain all of the 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).

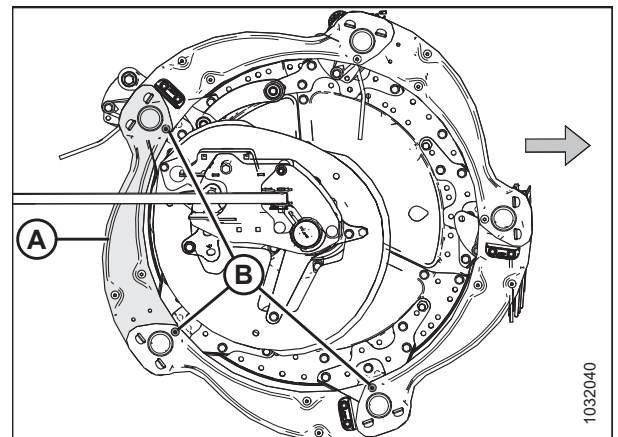


Figure 5.185: Reel Endshields – Outboard Cam End

5. Remove two screws and nuts (A). Remove the outboard cam deflector.
6. Lift the end of reel endshield (B) off of support (C).

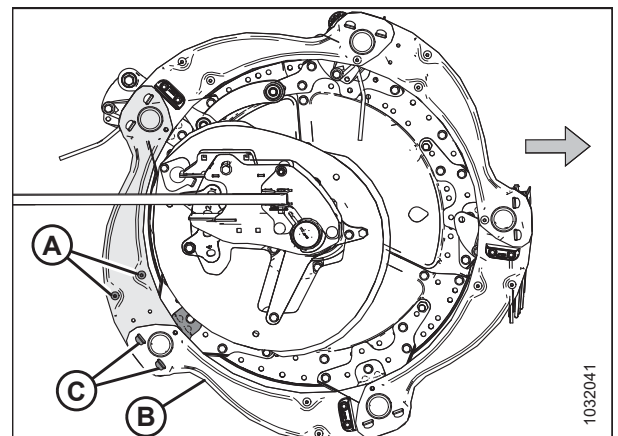


Figure 5.186: Reel Endshields – Outboard Cam End

- Remove the reel endshield from supports (A).

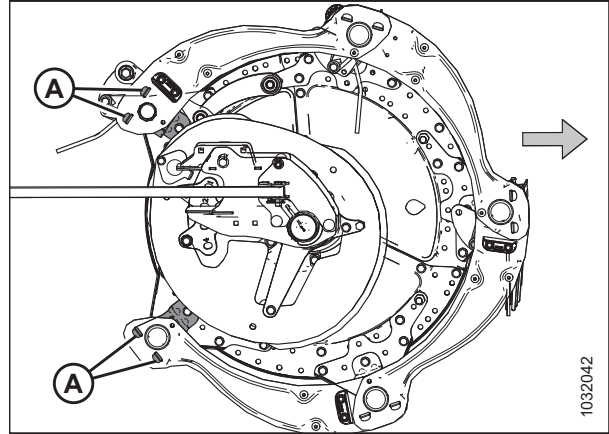


Figure 5.187: Reel Endshield Removed – Outboard Cam End

- Slightly lift the end of old reel endshield (A) off of support (B).
- Position new reel endshield (C) onto support (B) under old reel endshield (A).
- Position the other end of new reel endshield (C) onto other support (D) over old reel endshield (E).
- Reinstall three bolts (F).
- Reinstall two screws (G), the outboard cam deflector, and the nuts (removed in Step 5, [page 333](#)) on the new reel endshield.
- Tighten all of the installed hardware.

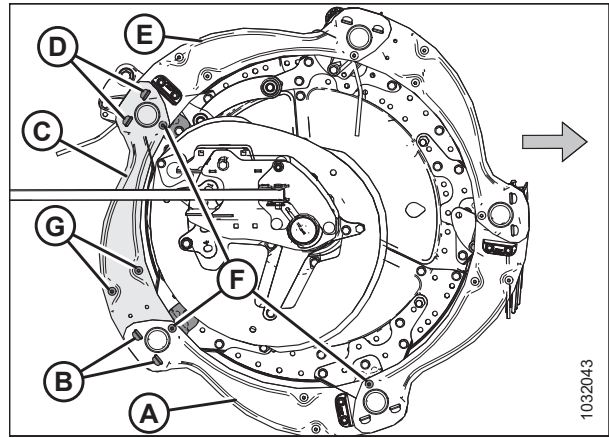


Figure 5.188: Reel Endshields – Outboard Cam End

### Replacing Reel Endshields at Inboard Cam End

The procedure for replacing reel endshields is applicable to the inboard 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.

#### DANGER

Ensure that all bystanders have cleared the area.

The endshields are different for the inboard and outboard cam ends. For reference, refer to [Figure 5.184, page 332](#).

#### NOTE:

The arrows in the following illustrations point to the front of the machine.

- Lower the reel fully.
- Lower the header.
- Shut down the engine, and remove the key from the ignition.



## MAINTENANCE AND SERVICING

4. Rotate the reel manually until reel endshield requiring replacement (A) is accessible.
5. Remove three bolts (B).

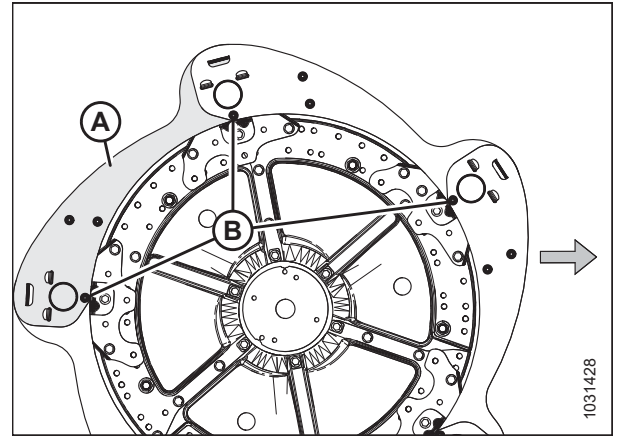


Figure 5.189: Reel Endshields – Inboard Cam End

6. Remove and retain two screws (A), the cam deflector, and the nuts from the reel endshield.
7. Lift the end of reel endshield (B) off support (C).

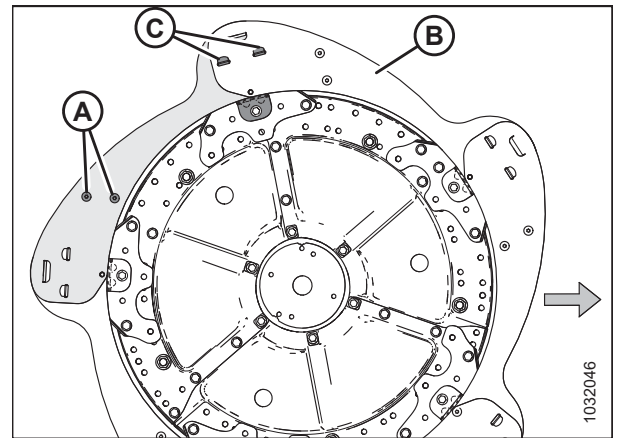


Figure 5.190: Reel Endshields – Inboard Cam End

8. Remove the reel endshield from supports (A).

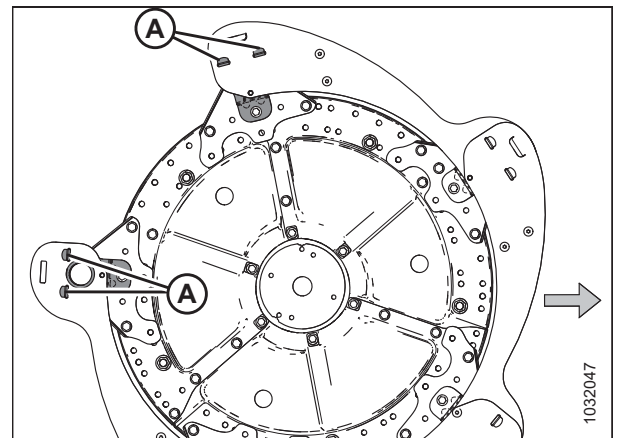


Figure 5.191: Reel Endshield Removed – Inboard Cam End

## MAINTENANCE AND SERVICING

9. Slightly lift the end of old reel endshield (A) off of support (B).
10. Position new reel endshield (C) onto support (B) under old reel endshield (A).
11. Position the other end of new reel endshield (C) onto other support (D) over old reel endshield (E).
12. Reinstall three bolts (F).
13. Reinstall two screws (G), the cam deflector, and the nuts (removed in Step 6, [page 335](#)) on the new reel endshield.
14. Tighten all of the installed hardware.

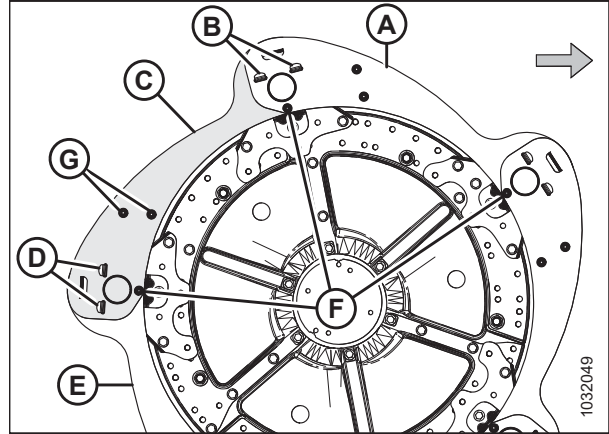


Figure 5.192: Reel Endshields – Inboard Cam End

### *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.

#### **⚠ DANGER**

Ensure that all bystanders have cleared the area.

1. Lower the reel fully.
2. Lower the header.
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).

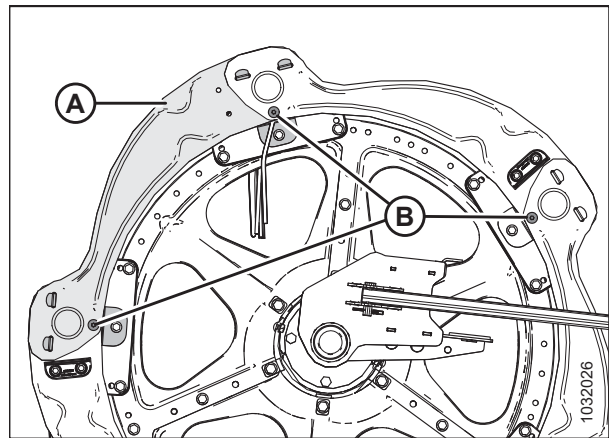


Figure 5.193: Reel Endshields – Outboard Tail End

## MAINTENANCE AND SERVICING

- Lift the end of reel endshield (A) off support (B).

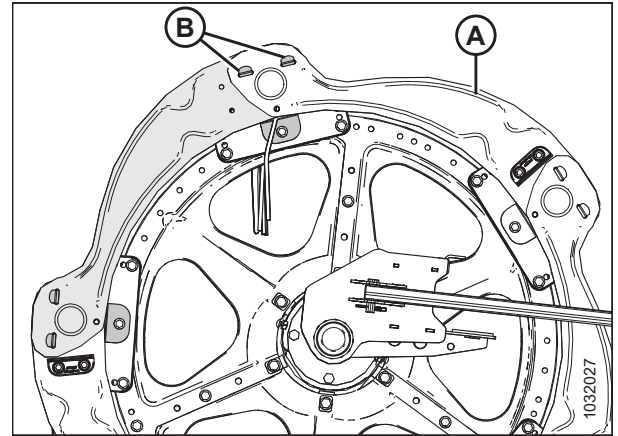


Figure 5.194: Reel Endshields – Outboard Tail End

- Remove the reel endshield from supports (A).
- Remove the reel paddle, if it is installed on the reel endshield.

**NOTE:**

Reel end paddles (B) are installed alternately on the reel endshields.

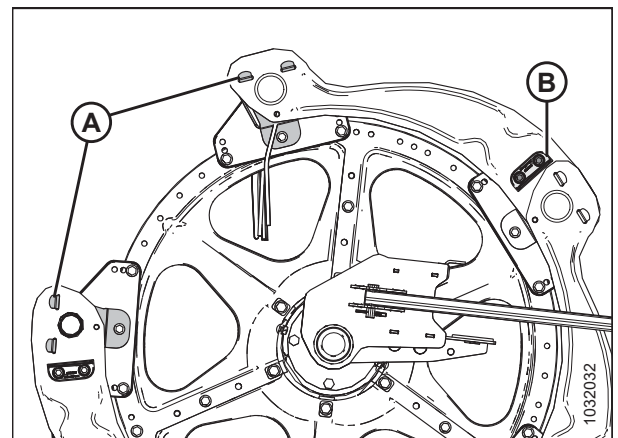


Figure 5.195: Reel Endshield Removed – Outboard Tail End

- Slightly lift the end of reel endshield (A) off of support (B).
- Position new reel endshield (C) onto support (B) under old reel endshield (A).
- Position the other end of new reel endshield (C) on other support (E) over the old reel endshield.
- Reinstall three bolts (D).
- Reinstall the paddle (removed in Step 8, [page 337](#)) onto the new reel endshield, if it was previously installed.
- Tighten all of the installed hardware.

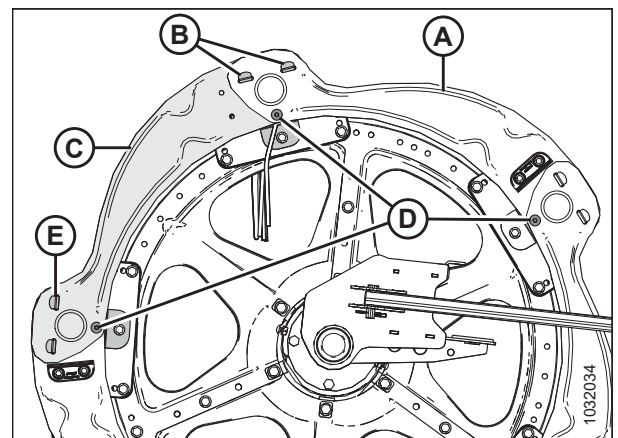


Figure 5.196: Reel Endshields – Outboard Tail End

*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.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**NOTE:**

Retain all removed parts, unless directed to do otherwise.

1. Lower the reel fully.
2. Lower the header.
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).

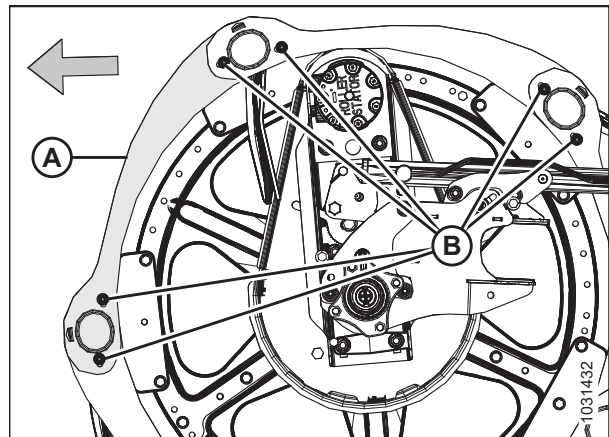


Figure 5.197: Reel Endshields – Inboard Tail End

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.

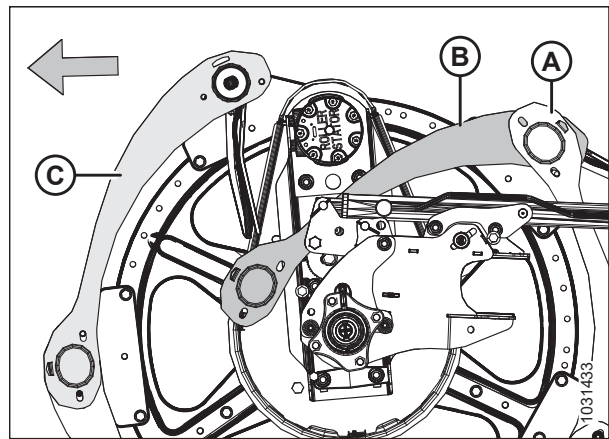


Figure 5.198: Reel Endshields – Inboard Tail End

## MAINTENANCE AND SERVICING

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).

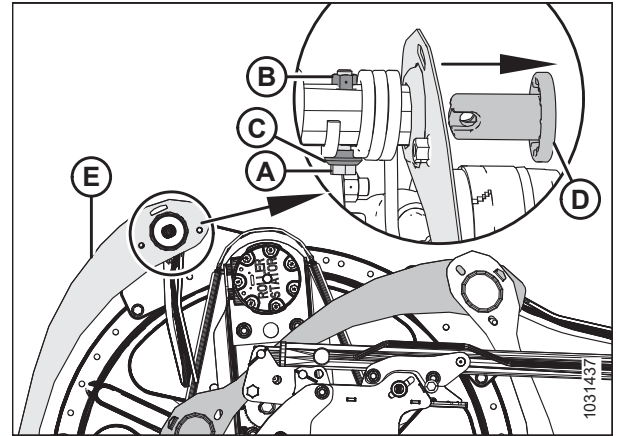


Figure 5.199: Reel Endshields – Inboard Tail End

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).

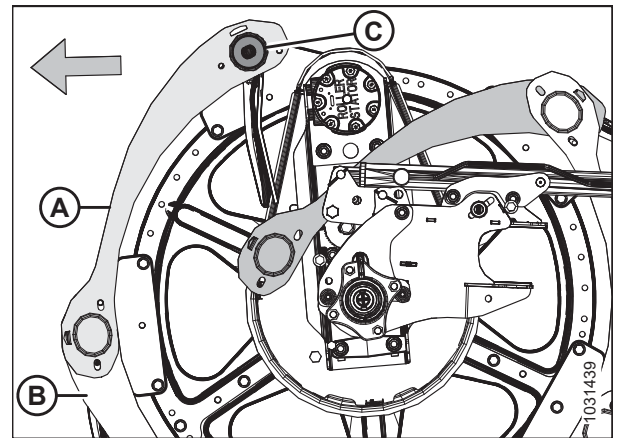


Figure 5.200: Reel Endshields – Inboard Tail End

13. Position tail end finger (A) as shown.
14. Secure tail end finger (A) and the bushing (installed in Step 12, page 339) with M10 bolt (B), end finger retainer (C), and nut (D).

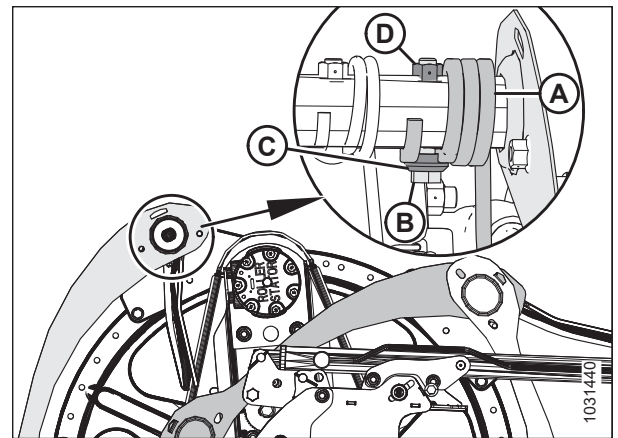


Figure 5.201: Reel Endshields – Inboard Tail End

## MAINTENANCE AND SERVICING

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.

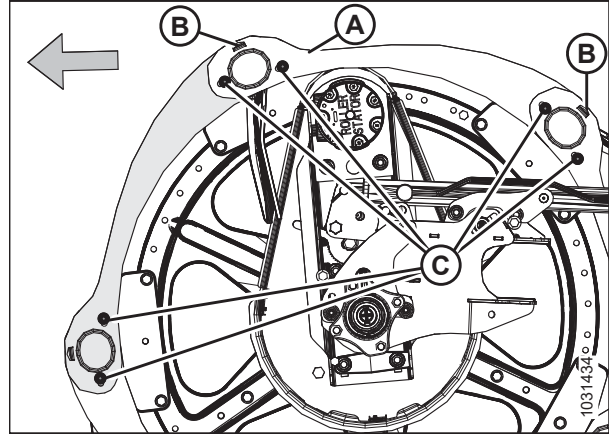


Figure 5.202: Reel Endshields – Inboard Tail End

### 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.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**NOTE:**

All of the illustrations shown show the outboard cam end.

1. Lower the reel fully.
2. Lower the header.
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.

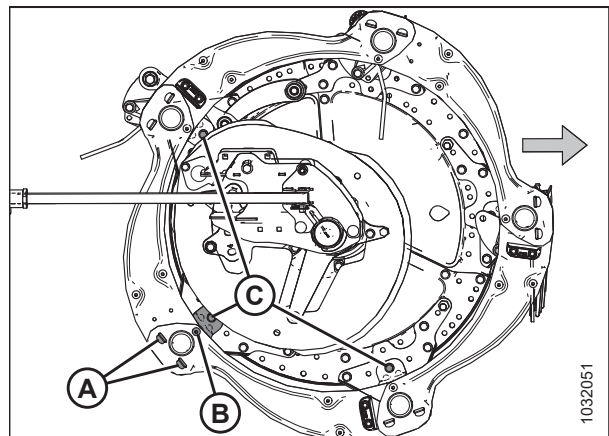


Figure 5.203: Reel Endshield Supports

## MAINTENANCE AND SERVICING

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.

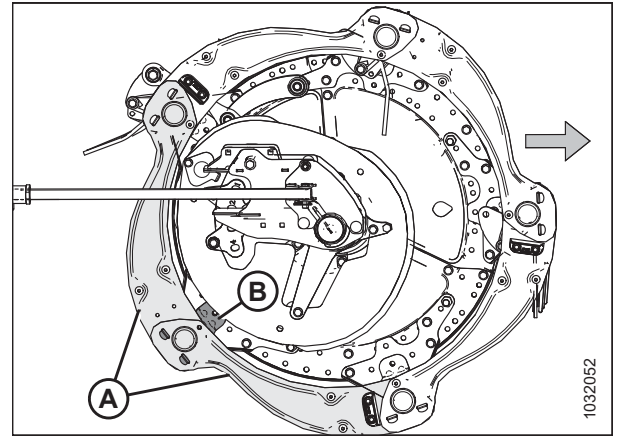


Figure 5.204: Reel Endshield Supports

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 (20 lbf-ft [239 lbf-in]).

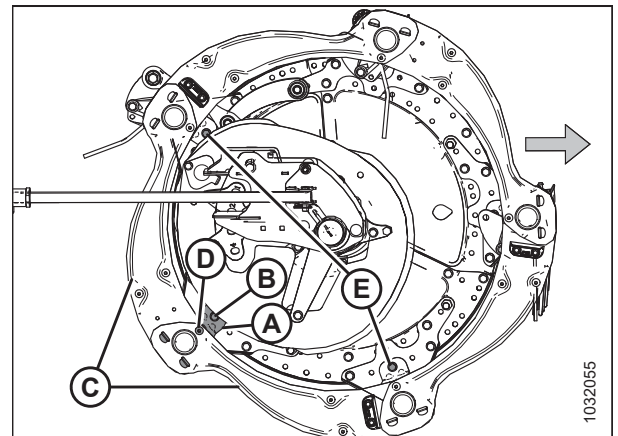


Figure 5.205: Reel Endshield Supports

## 5.9 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, and to the right end of the reel on a single-reel header.

### 5.9.1 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.

#### DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header.
2. Adjust the reel fully forward.
3. Shut down the engine, and remove the key from the ignition.
4. Remove the reel drive cover. For instructions, refer to *Removing Reel Drive Cover, page 55*.
5. Open the endshield. For instructions, refer to *Opening Header Endshields, page 47*.
6. Remove hairpin (A) securing multi-tool (B) to the bracket on the left endsheet.
7. Remove multi-tool (B), and reinstall the hairpin on the bracket.

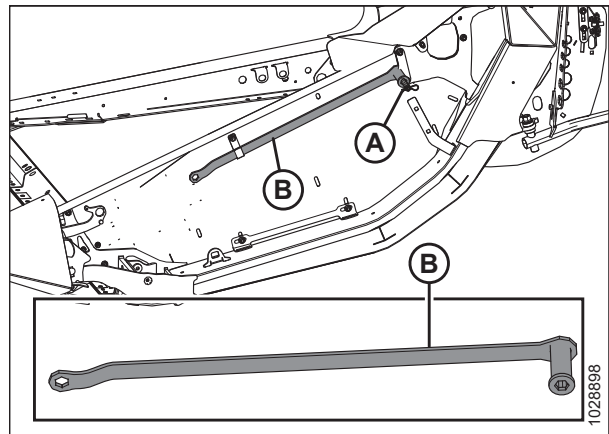


Figure 5.206: Multi-Tool Storage Location



**IMPORTANT:**

Do **NOT** loosen the motor mount, as it is factory-adjusted and secured with Belleville washers. Adjust the chain tension without loosening the drive mounting bolts.

8. Push tension retainer (A) clockwise with your thumb, and hold it in the unlocked position.
9. Place multi-tool (B) onto chain tensioner (C), and rotate the multi-tool upwards to loosen the chain tension.
10. Return the multi-tool to the storage position.

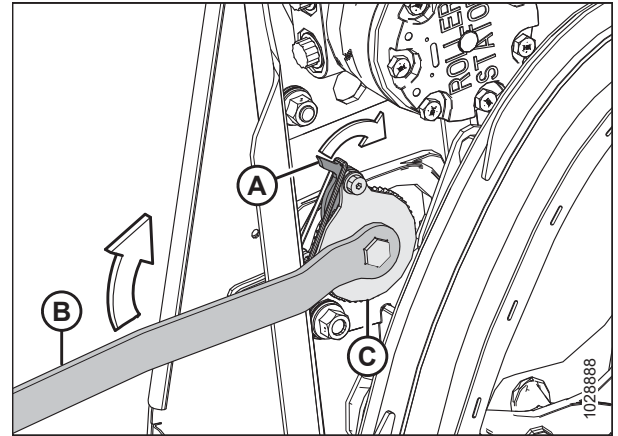


Figure 5.207: Reel Drive

*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 47](#).
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.

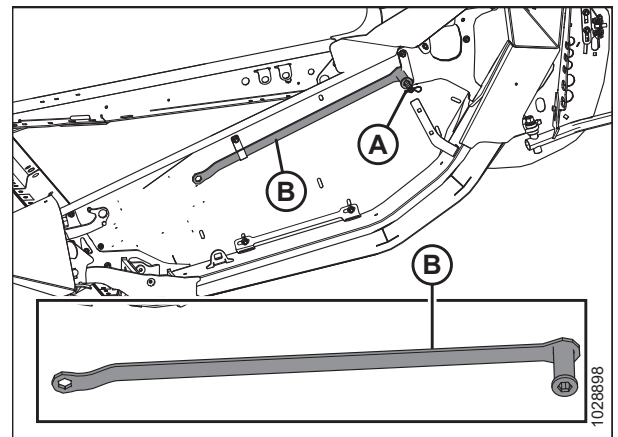


Figure 5.208: Multi-Tool Storage Location – Left Side

## MAINTENANCE AND SERVICING

- Place multi-tool (A) onto chain tensioner (B).

### IMPORTANT:

Do **NOT** loosen the motor mount, as it is factory-adjusted and secured with Belleville washers. Adjust the chain tension without loosening the drive mounting bolts.

- Rotate multi-tool (A) downward until the chain is tight.

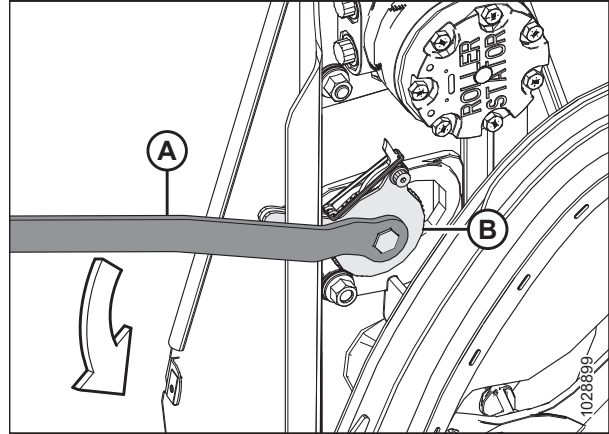


Figure 5.209: Reel Drive

- 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 the chain is too tight, it can put an excessive load 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.

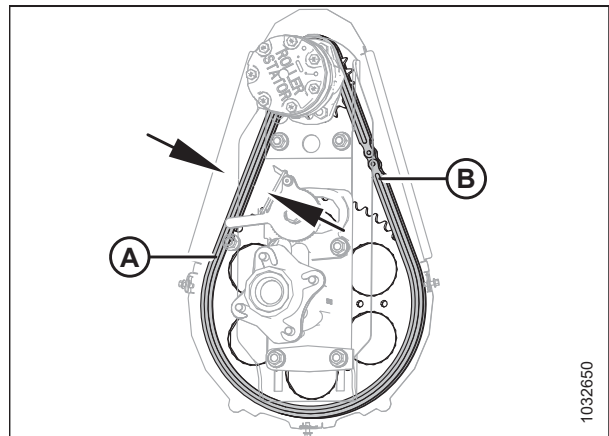


Figure 5.210: Reel Drive

- Rotate the reel by hand to ensure that the chain properly engages all teeth on lower sprocket (A). To prevent damage, ensure that the chain does not become too tight as the reel rotates.
- Return the multi-tool to the storage position.
- Close the endshield. For instructions, refer to [Closing Header Endshields, page 48](#).

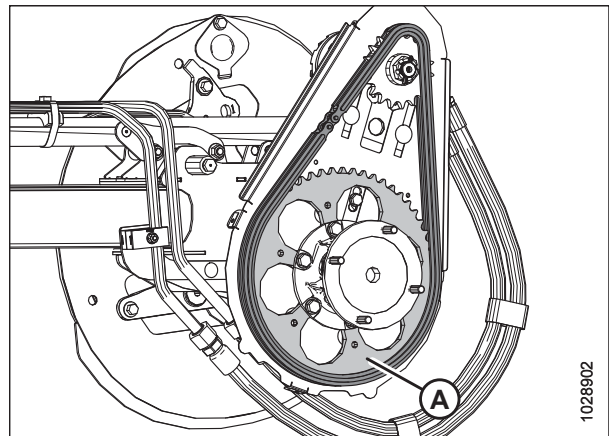


Figure 5.211: Reel Drive

## 5.9.2 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 55](#).
3. Loosen reel drive chain (A). For instructions, refer to [Loosening Reel Drive Chain, page 342](#).
4. Remove reel drive chain (A) from reel drive sprocket (B).

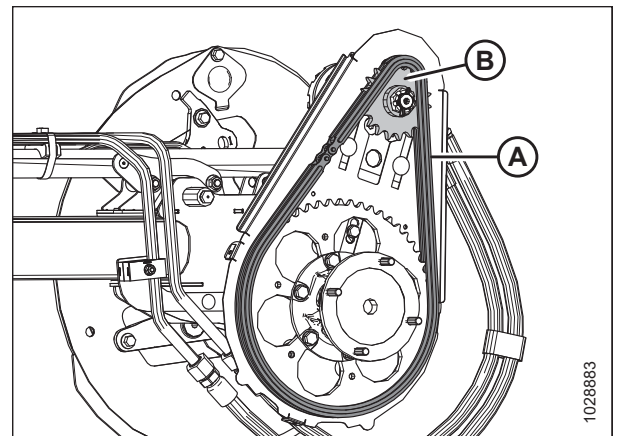


Figure 5.212: Single Sprocket

5. Remove the cotter pin and slotted nut (A) from the motor shaft.
6. Remove reel drive sprocket (B). Ensure that 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.

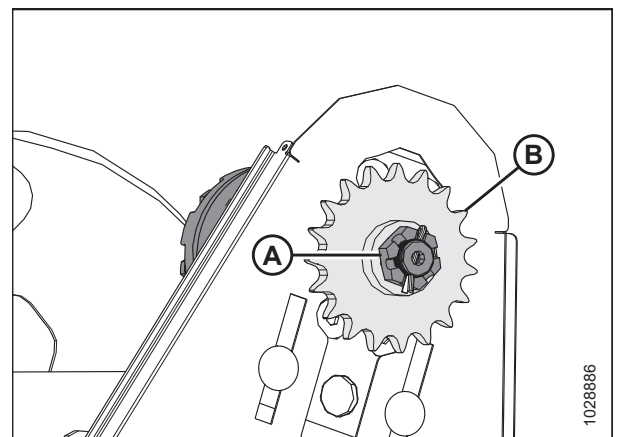


Figure 5.213: Single Sprocket

### 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, then slide sprocket (B) onto the shaft. Secure it with slotted nut (A).
2. Torque slotted nut (A) to 12 Nm (8.85 lbf·ft [106 lbf·in]).
3. If necessary, tighten slotted nut (A) to the next slot to install cotter pin (C). Bend the longer leg of the cotter pin over the end of the motor shaft.

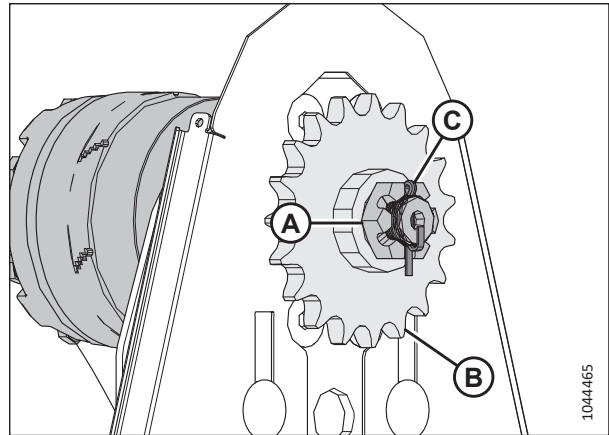


Figure 5.214: Single Sprocket

4. Install drive chain (A) onto drive sprocket (B).
5. Tighten the drive chain. For instructions, refer to [Tightening Reel Drive Chain, page 343](#).
6. Reinstall the reel drive cover. For instructions, refer to [Installing Reel Drive Cover, page 57](#).

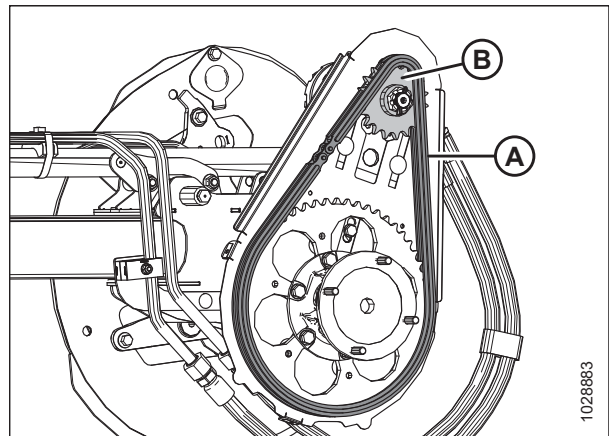
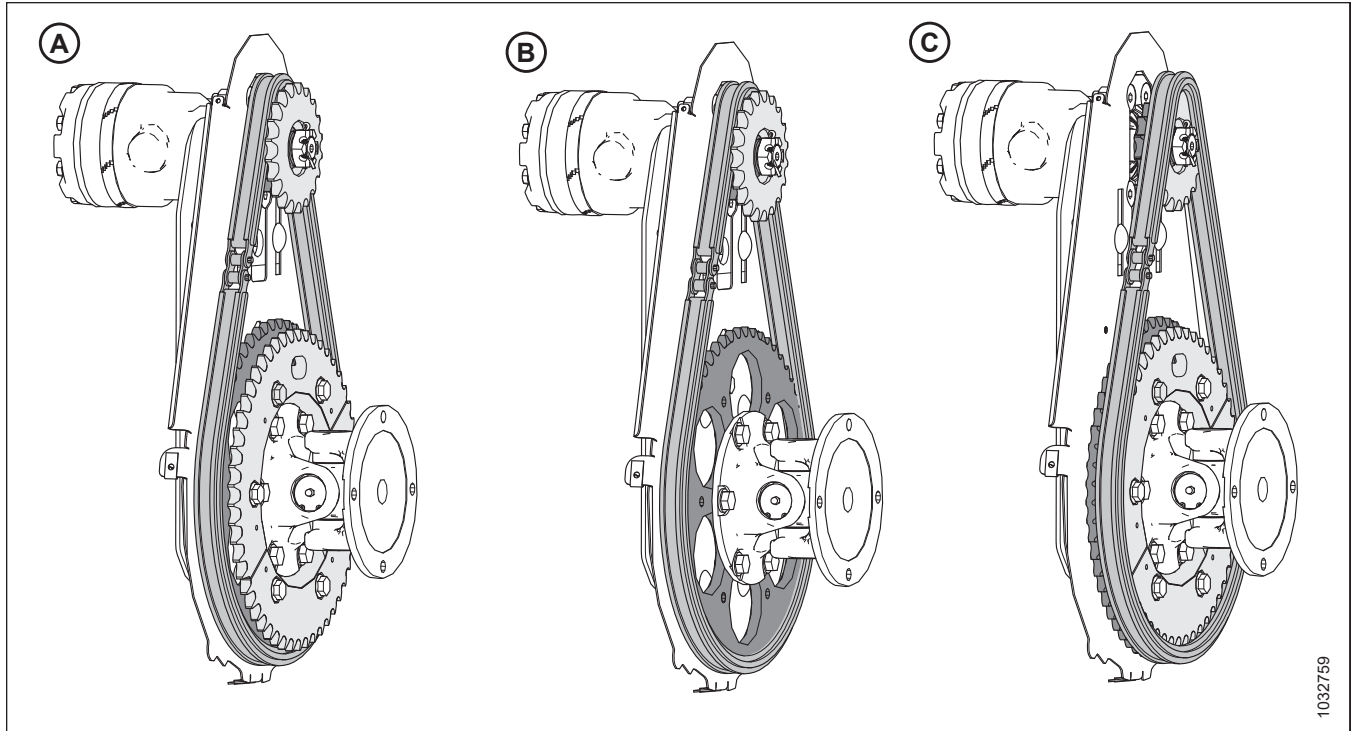


Figure 5.215: Single Sprocket

### Removing Reel Drive Optional Dual Sprocket

Follow this procedure to remove the reel drive optional dual sprocket.

This procedure is applicable to all configurations shown in [Figure 5.216, page 347](#).



**Figure 5.216: Reel Drive Configurations—Optional Dual Sprockets**

A - Dual Sprocket in High-Torque Configuration WITH the Optional 52-Tooth Sprocket Installed but NOT Required

B - Dual Sprocket in High-Torque Configuration WITHOUT the Optional 52-Tooth Sprocket

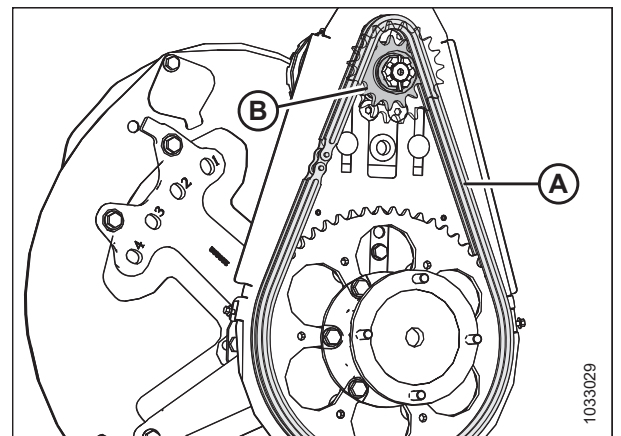
C - Dual Sprocket in High-Speed Configuration WITH the Optional 52-Tooth Sprocket Installed and Required

**! 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 remove the optional dual sprocket, do the following:

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 55*.
3. Loosen reel drive chain (A). For instructions, refer to *Loosening Reel Drive Chain, page 342*.
4. Remove reel drive chain (A) from reel drive dual sprocket (B).



**Figure 5.217: Dual Sprocket in High-Torque Configuration**

## MAINTENANCE AND SERVICING

5. Remove the cotter pin and slotted nut (A) from motor shaft (B).
6. Remove reel drive dual sprocket (C). Ensure that 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.

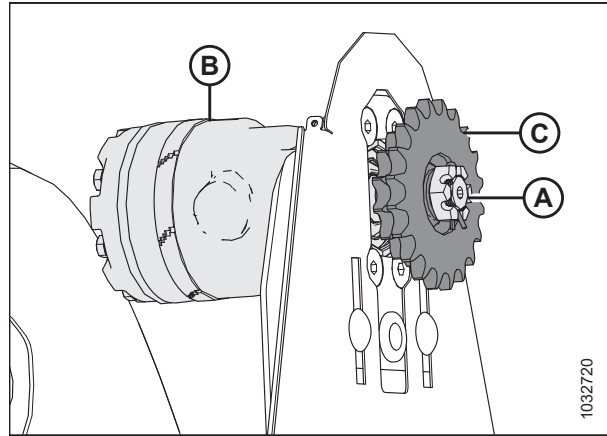


Figure 5.218: Dual Sprocket

### Installing Reel Drive Optional Dual Sprocket

Follow the procedure to install the reel drive optional dual sprocket.

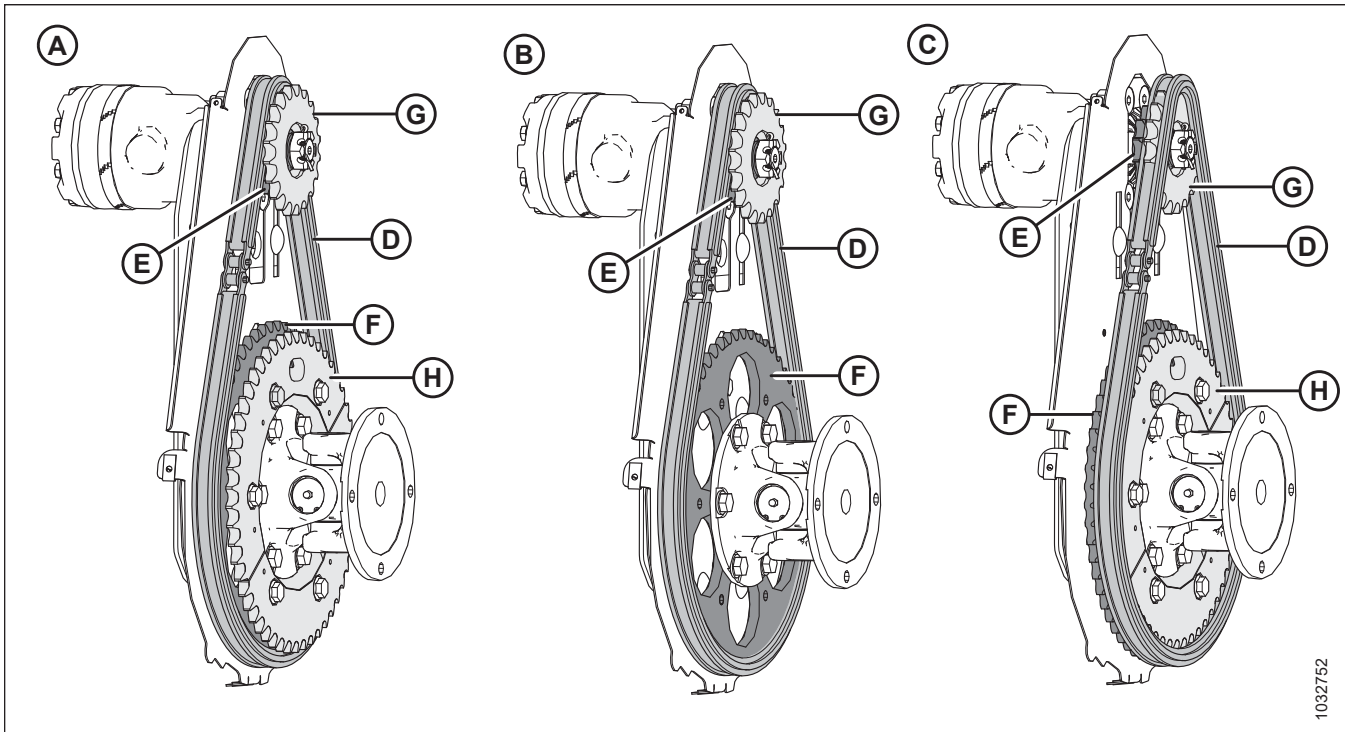


Figure 5.219: Reel Drive Configurations—Optional Dual Sprockets

A - Dual Sprocket in High-Torque Configuration WITH the Optional 52-Tooth Sprocket Installed but NOT Required

B - Dual Sprocket in High-Torque Configuration WITHOUT the Optional 52-Tooth Sprocket

C - Dual Sprocket in High-Speed Configuration WITH the Optional 52-Tooth Sprocket Installed and Required

The optional dual sprocket, when paired with the factory-installed 56-tooth sprocket, will provide more torque to the reel in heavy cutting conditions, and when paired with the optional 52-tooth sprocket will provide higher reel speed in light crops when operating at increased ground speed.

In high-torque configuration (A) or (B), drive chain (D) is on inboard sprocket (E) and on factory-installed 56-tooth sprocket (F), whereas in high-speed configuration (C), drive chain (D) is on outboard sprocket (G) and on optional 52-tooth sprocket (H).

**NOTE:**

The optional 52-tooth sprocket (H) is **NOT** required for high-torque configuration.

**⚠ 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 install the dual sprocket, do the following:

1. Position the dual sprocket so that smaller sprocket (A) is closer to reel motor (B).
2. Align the keyway in the sprocket with the key on the motor shaft, and slide the sprocket onto the shaft. Secure the sprocket with slotted nut (C).
3. Torque slotted nut (C) to 12 Nm (8.9 lbf·ft [106 lbf·in]).
4. If necessary, tighten slotted nut (C) to the next slot to install cotter pin (D). Bend the longer leg of the cotter pin over the end of the motor shaft.

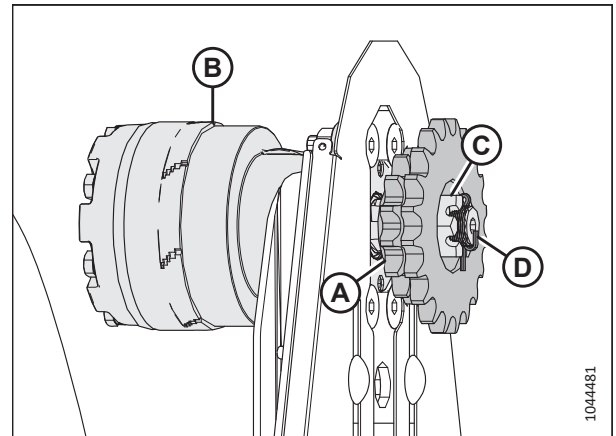


Figure 5.220: Dual Sprocket

5. For the high-torque configuration, install drive chain (A) onto inboard sprocket (B) and on factory-installed 56-tooth sprocket (C).

**NOTE:**

Outboard sprocket (D) is illustrated as though it were transparent so that the inboard sprocket is visible.

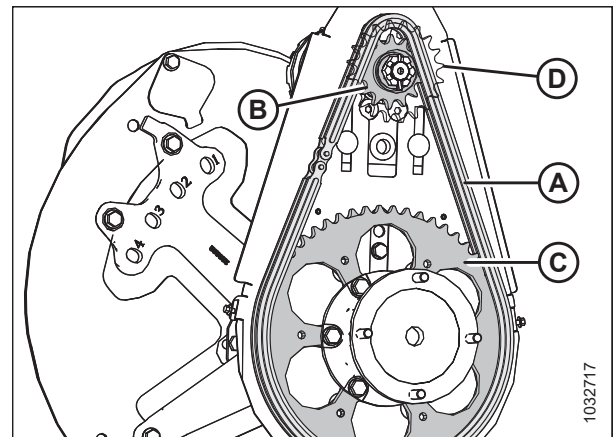


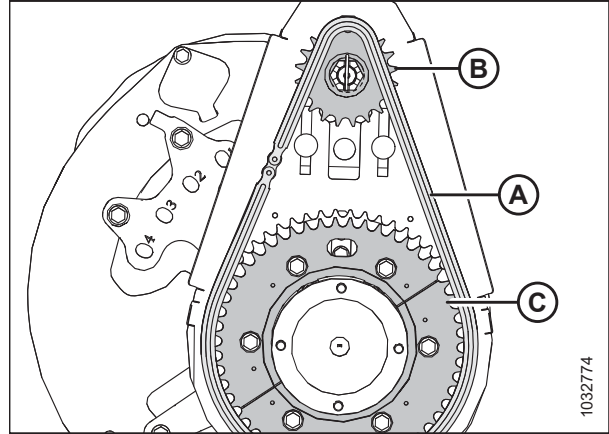
Figure 5.221: Dual Sprocket – High Torque Configuration

## MAINTENANCE AND SERVICING

### NOTE:

The optional 52-tooth sprocket is required for high-speed configuration.

6. For the high-speed configuration, position drive chain (A) onto outboard sprocket (B) and on optional 52-tooth sprocket (C).
7. Tighten the drive chain. For instructions, refer to [Tightening Reel Drive Chain, page 343](#).
8. Reinstall the reel drive cover. For instructions, refer to [Installing Reel Drive Cover, page 57](#).



**Figure 5.222: Dual Sprocket – High Speed Configuration**



## 5.10 Transport System – Option

The header can be equipped with a set of transport wheels, so that the header can be towed by a windrower or tractor.

Refer to *Adjusting EasyMove™ Transport Wheels*, page 76 for more information.

### 5.10.1 Checking Wheel Bolt Torque

Check the transport wheel bolt torque 1 operating hour after installing 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. In the order shown, tighten the bolts to 115 Nm (85 lbf-ft).

#### IMPORTANT:

After reinstalling a wheel, check the bolt torque after 1 hour of operation and every 100 hours thereafter.

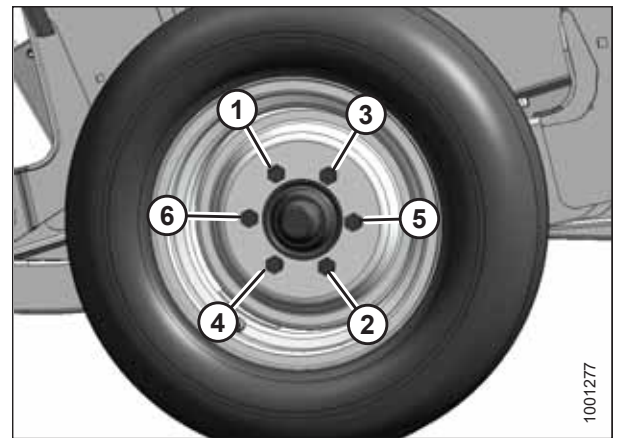


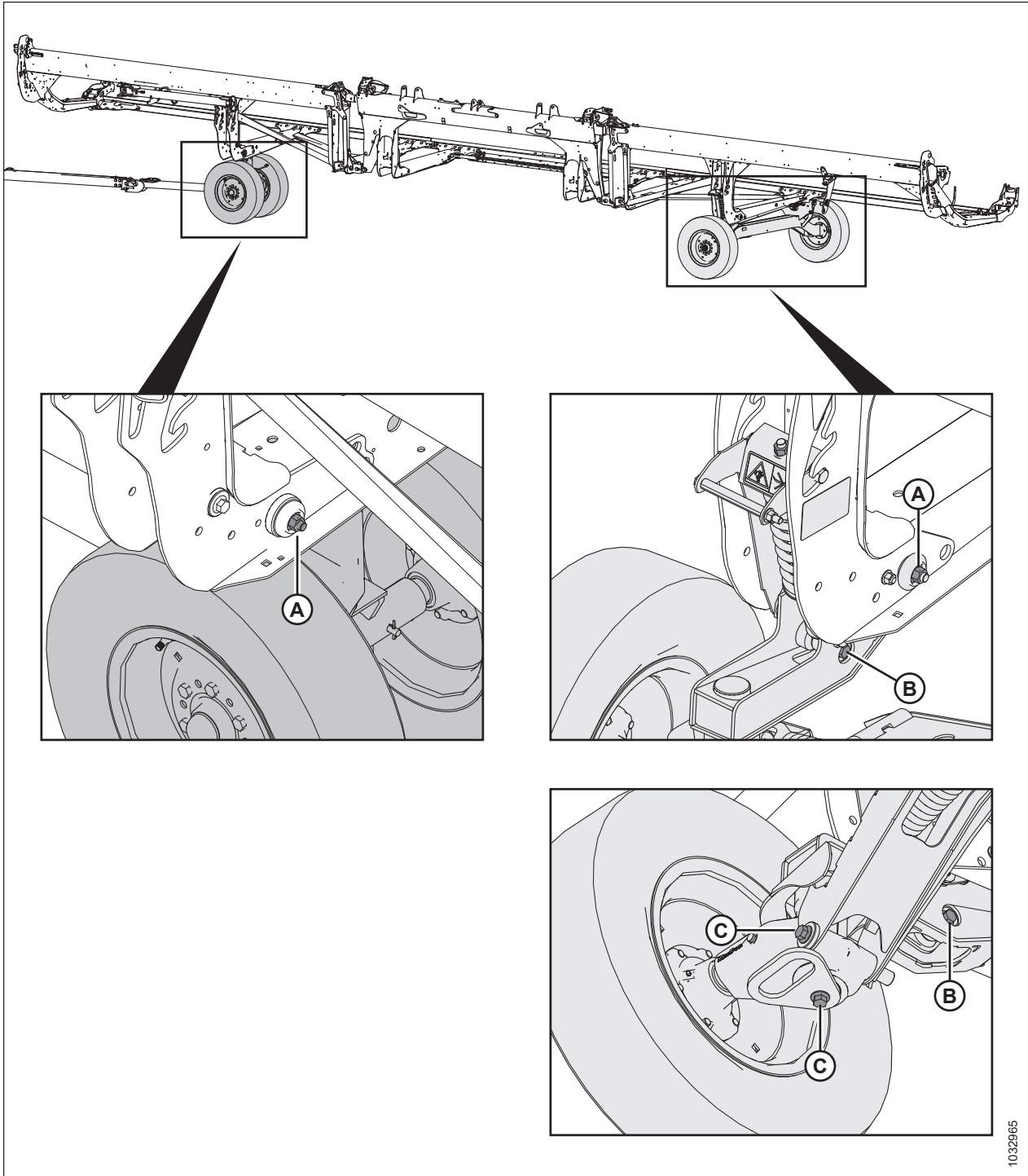
Figure 5.223: Bolt Tightening Sequence

### 5.10.2 Checking Transport Assembly Bolt Torque

To ensure safe operation, check the hardware that secures the optional transport system components to the header daily.

#### 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 5.224: Transport System Assembly Bolts**

1. Check the following bolts **DAILY** to ensure that the 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)

### 5.10.3 Checking Tire Pressure

Proper tire pressure ensures the tires perform properly and wear evenly.

**⚠ WARNING**

- During inflation, a tire can explode and cause serious injury or death.
- Do NOT stand over the tire. Use a clip-on chuck and an extension hose.
- Do NOT exceed the maximum inflation pressure indicated on the tire label.
- Replace defective tires.
- Replace wheel rims that are cracked, worn, or severely rusted.
- Never weld a wheel rim.
- Never use force on an inflated or a partially inflated tire.
- Ensure that the tire is correctly seated before inflating it to operating pressure.
- If the tire is not correctly positioned on the rim or if it 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.
- Remove all the air from a tire before removing it 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.

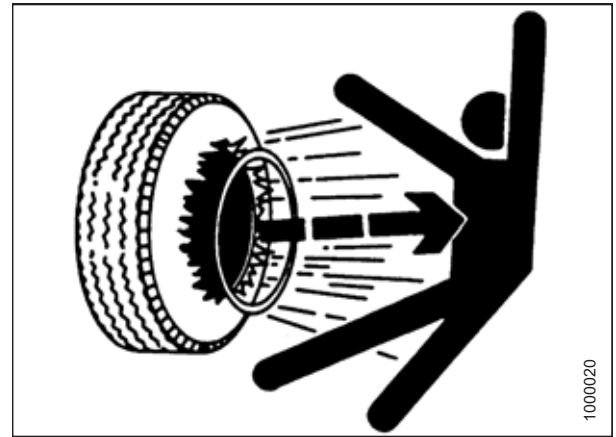


Figure 5.225: Inflation Warning

1. Check the tire pressure. For pressure specifications, refer to Table 5.14, page 353.
2. Make sure the tire is correctly seated on the rim before inflating it. 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 the maximum inflation pressure indicated on the tire label.

Table 5.14 Tire Inflation Pressure

Size	Load Range	Pressure
225/75 R15	F	655 kPa (95 psi)

### 5.10.4 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.

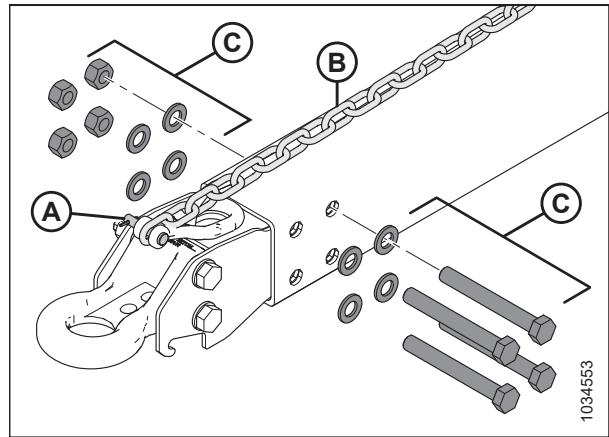


Figure 5.226: Removing Pintle Towing Adapter

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.

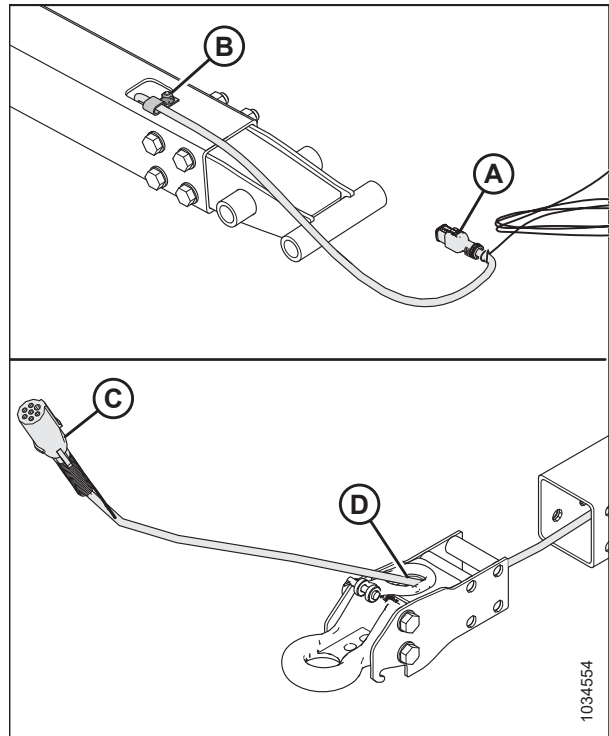


Figure 5.227: Removing Pintle Towing Adapter

## MAINTENANCE AND SERVICING

6. Retrieve the clevis adapter.
7. Insert transport connector (A) of the electrical harness through opening (B) in the ring on the clevis adapter.
8. Secure pull-line (C) to the harness. Using the pull-line, gently pull the harness through the tow-bar.
9. Ensure that transport end (A) of the harness extends 480 mm (18 7/8 in.) past P-clip (D).
10. Secure the harness in the P-clip with the bolt from Step 6, [page 355](#).

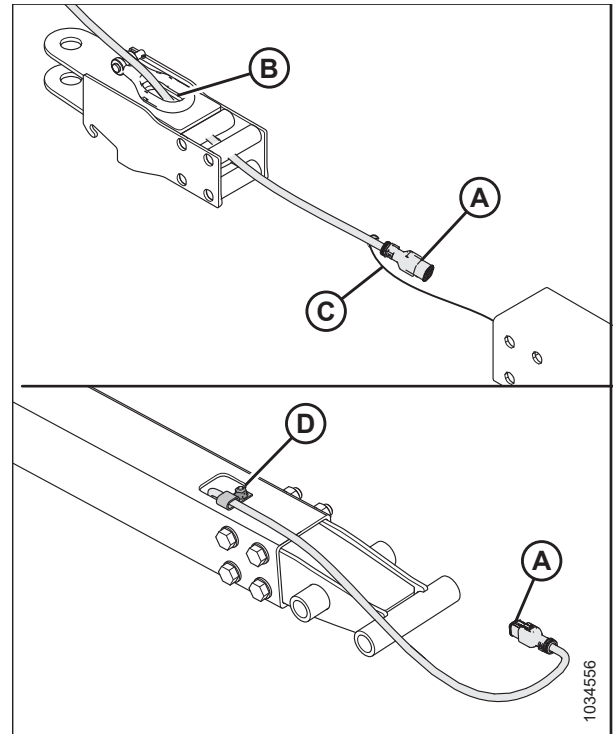


Figure 5.228: Installing Clevis Ring Adapter

11. 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.

12. Reconnect the chain with clevis pin (B) and secure it with the cotter pin.

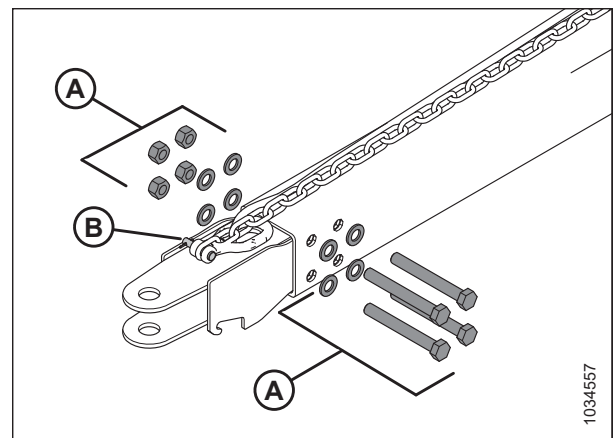


Figure 5.229: Installing Clevis Ring Adapter

## MAINTENANCE AND SERVICING

13. Tighten nuts (A) in the cross pattern shown. Recheck each nut in sequence until they are torqued to 310 Nm (229 lbf-ft).
14. Insert the hitch pin into the clevis adapter. Secure the pin with the lynch pin.

**NOTE:**

The pins are not shown in the illustration.

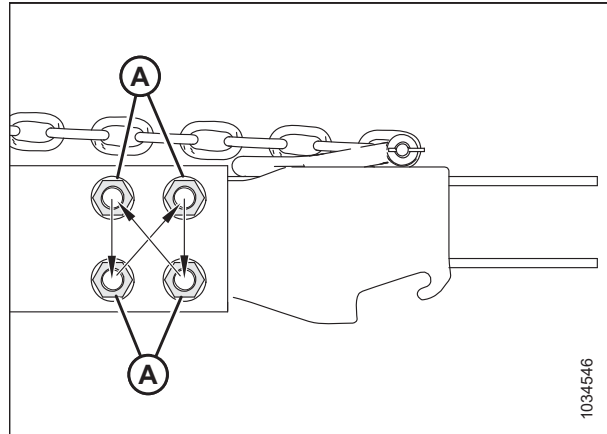


Figure 5.230: Torque Sequence

### 5.10.5 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.

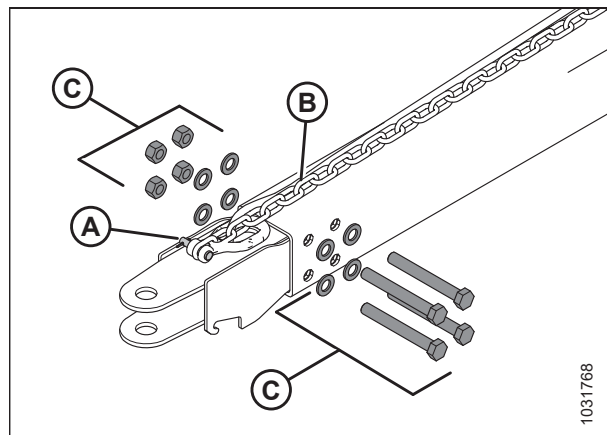


Figure 5.231: Removing Clevis Adapter

## MAINTENANCE AND SERVICING

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.

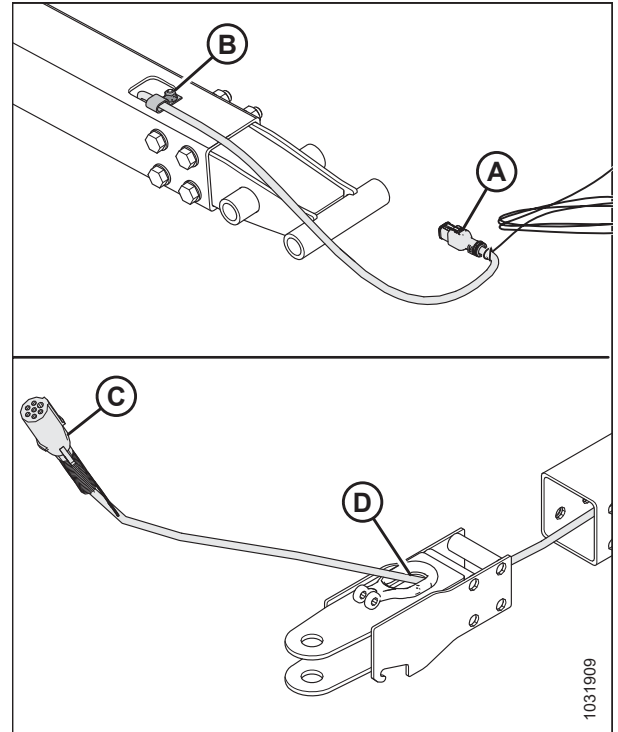


Figure 5.232: Removing Clevis Towing Adapter

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 480 mm (18 7/8 in.) past P-clip (D).
9. Secure the harness in the P-clip with the bolt removed in Step 4, [page 357](#).

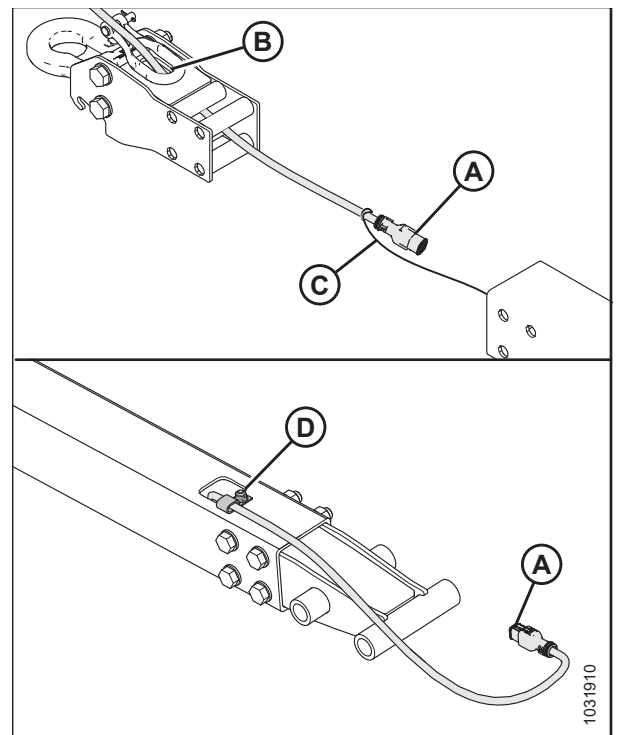


Figure 5.233: Installing Pintle Ring Adapter

## MAINTENANCE AND SERVICING

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.

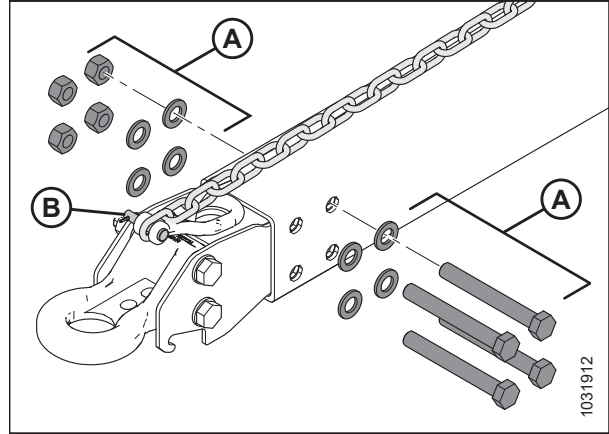


Figure 5.234: Installing Pintle Ring Adapter

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.

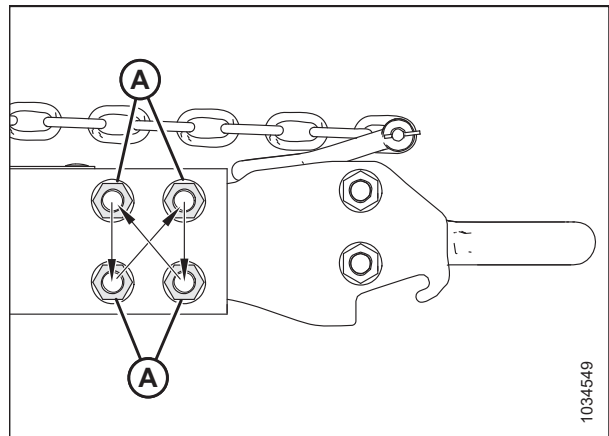


Figure 5.235: Torque Sequence



## 5.11 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.

### 5.11.1 Replacing Vertical Knife Sections

The VertiBlade™ Vertical Knife kit (sold separately) 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.

#### DANGER

Ensure that all bystanders have cleared the area.

#### WARNING

Install vertical knife guards before attaching or removing vertical knives. Wear heavy gloves when working around or handling knives.

#### NOTE:

The replacement vertical knife parts in this topic are sold separately with Vertical Knives kit (B7466).

1. Position the header so that the cutterbar is 254–356 mm (10–14 in.) off the ground.
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. Open the endshield. For instructions, refer to *Opening Header Endshields, page 47*.
5. Remove lynch pin (B), then detach vertical knife shield (A).

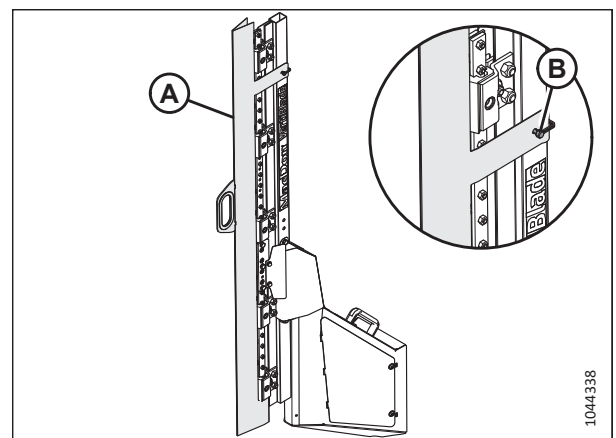


Figure 5.236: Vertical Knife

## MAINTENANCE AND SERVICING

6. Remove three bolts (A) securing milling bar (B) to the blade bracket and knife section assembly (C).
7. Tilt milling bar (B) upward.
8. Slide assembly (C) out.

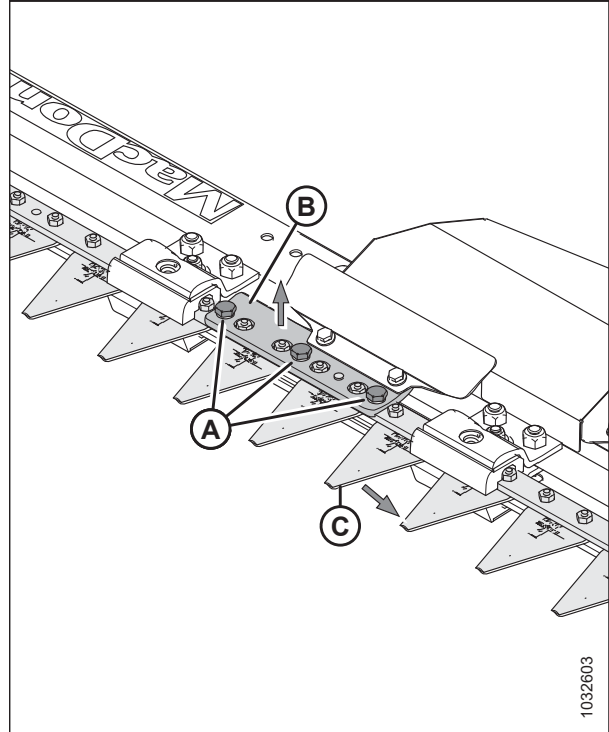


Figure 5.237: Vertical Knife – Guard Removed

### NOTE:

If you cannot tilt milling bar (A) upward enough to slide knife section assembly (B) out, remove bolts (C) securing hood (D) to the vertical knife assembly. Loosen nuts (E) securing slide rail (F). The milling bar should now be loose enough to tilt it upward.

### IMPORTANT:

If you need to loosen knife guide clamp hardware (G) and knife guide clamp (H) to slide the knife section assembly out, follow Step 13, page 361 to properly tighten the hardware when the knife is installed.

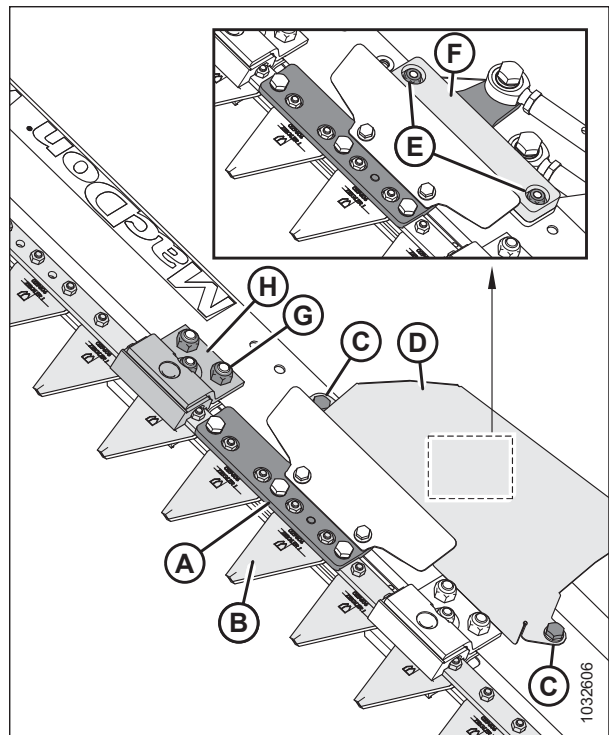


Figure 5.238: Vertical Knife – Guard Removed

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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 (5.2 lbf·ft [62 lbf·in]).

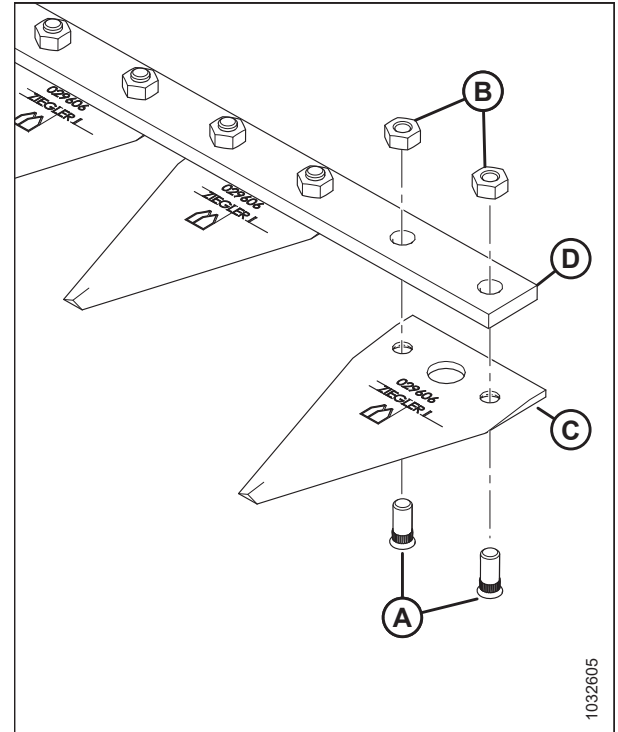


Figure 5.239: Knife Section Assembly

13. If you loosened knife guide clamp hardware (A), and (B) to slide the knife section assembly out, tighten the hardware as follows:
  - a. Tighten nuts (A). Torque the nuts to 54 Nm (40 lbf·ft).
  - b. Tighten nut (B) until gap (E) is set to 0.4 mm (0.02 in) between knife sections (D) and guide (C). Knife sections (D) must move freely, if the gap is too tight it will cause guides (C) to overheat.
14. Reinstall the remaining components and the knife guard. Installation is the reverse of removal.

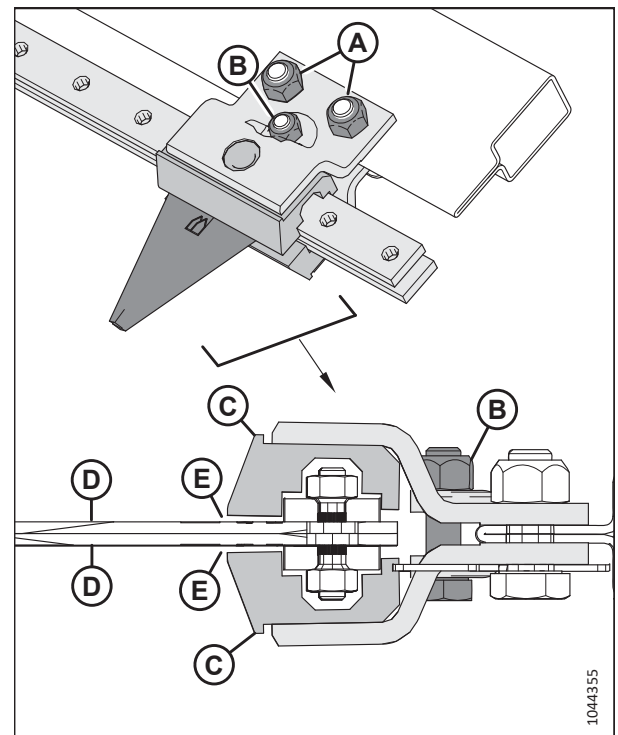


Figure 5.240: Vertical Knife (Top View)

### 5.11.2 Lubricating Vertical Knife

Each vertical knife has two lubrication points, which you can access by removing the knife's service panel.

**⚠ 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.

Lubricate vertical knife push rods (A) after they are first installed and every 50 operating hours thereafter.

**NOTE:**

Use high-temperature extreme-pressure (EP2) performance lubricant with 1% max. molybdenum disulphide (NLGI Grade 2) lithium base to lubricate the vertical knives.

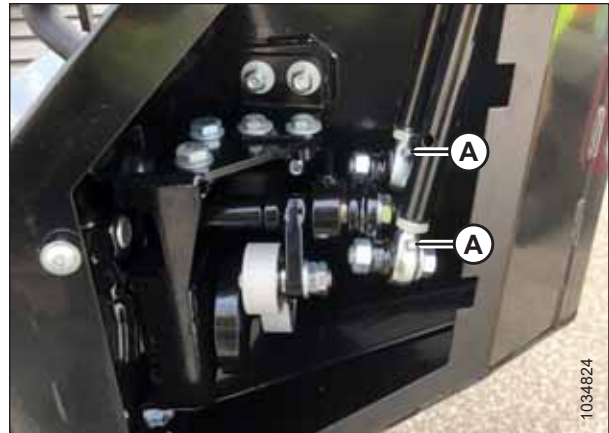


Figure 5.241: Grease Zerks on Vertical Knife Push Rods

To lubricate the vertical knife push rods, follow the steps below:

**NOTE:**

Some parts have been removed from the illustrations for clarity.

1. Lower the header to the ground.
2. Shut down the engine, and remove the key from the ignition.
3. Remove screws (A) and access cover (B).

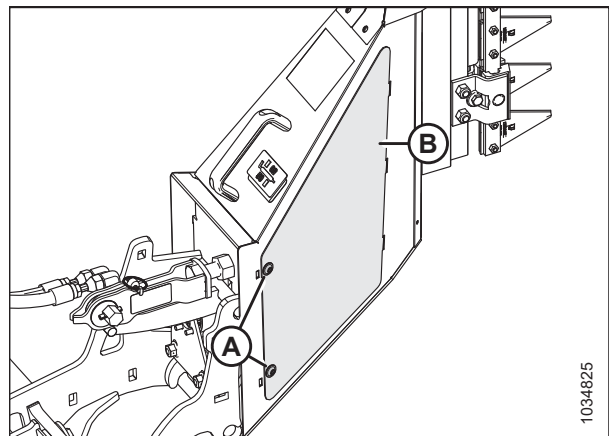
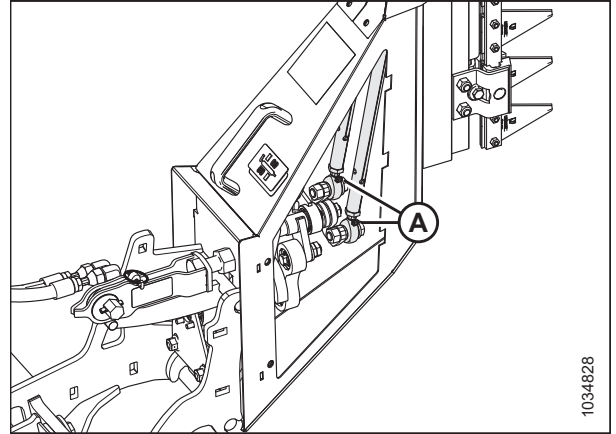


Figure 5.242: Vertical Knife Access Cover

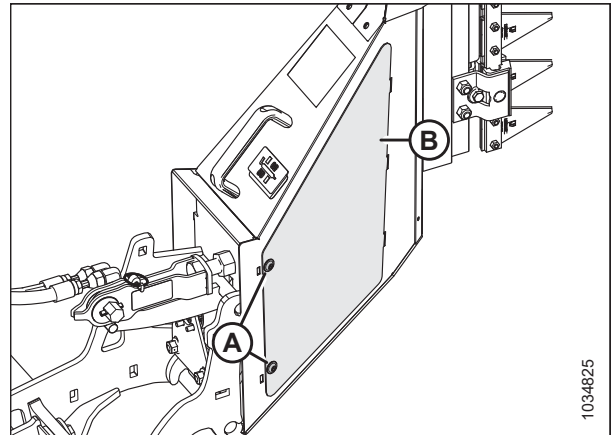
## MAINTENANCE AND SERVICING

4. Apply grease to push rod grease zerks (A).



**Figure 5.243: Grease Zerks on Vertical Knife Push Rods**

5. Reinstall access cover (B).
6. Secure the access cover with screws (A).
7. Repeat Step 3, page 362 to Step 6, page 363 to lubricate the other vertical knife.



**Figure 5.244: Vertical Knife Access Cover**



## Chapter 6: Options and Attachments

The following options and attachments are available for use with your header. See your 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 the maximum possible stubble height (for example, when harvesting severely lodged cereal crops).

Installation instructions are included in the kit.

Each kit (B7022) contains 10 lifters. Order the following number of kits depending on your header's size:

- D215 – 2 kits
- D220 – 2 kits
- D225 – 3 kits
- D230 – 3 kits
- D235 – 4 kits
- D241 – 4 kits

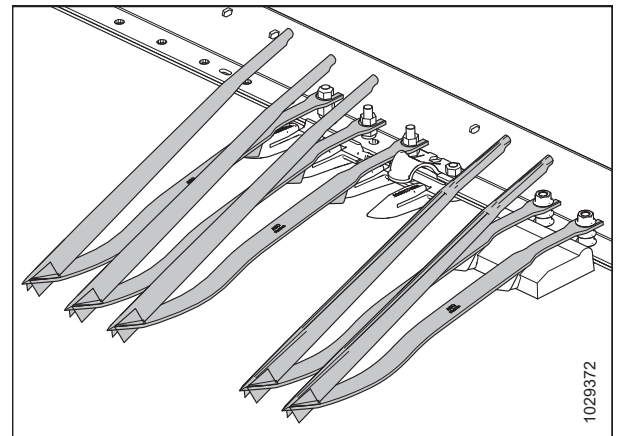


Figure 6.1: Grain Crop Lifter Kit

#### 6.1.2 Crop Lifter Storage Rack Kit

Crop lifter racks store crop lifters at the rear of the header.

Installation instructions are included in the kit.

B7023

**NOTE:**

This kit is for one side only. Order two kits for both sides of the header.

**NOTE:**

This kit is not compatible with D215 and D220 headers.

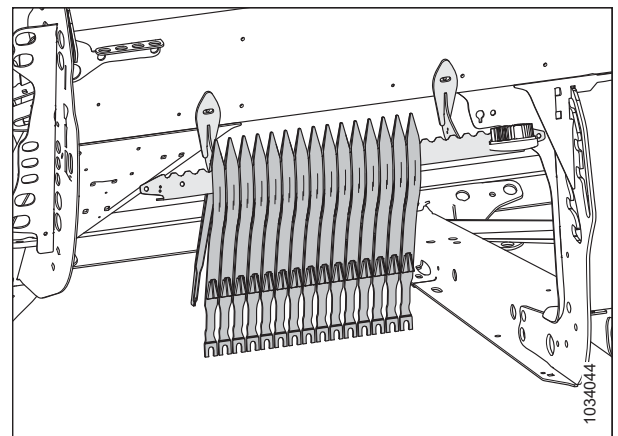


Figure 6.2: Crop Lifter Rack Kit – Left Side

### 6.1.3 Crop Divider Storage Bracket Kit

The crop divider storage bracket kit can store standard, rice, or floating crop dividers on the header.

Installation instructions are included in the kit.

B7030

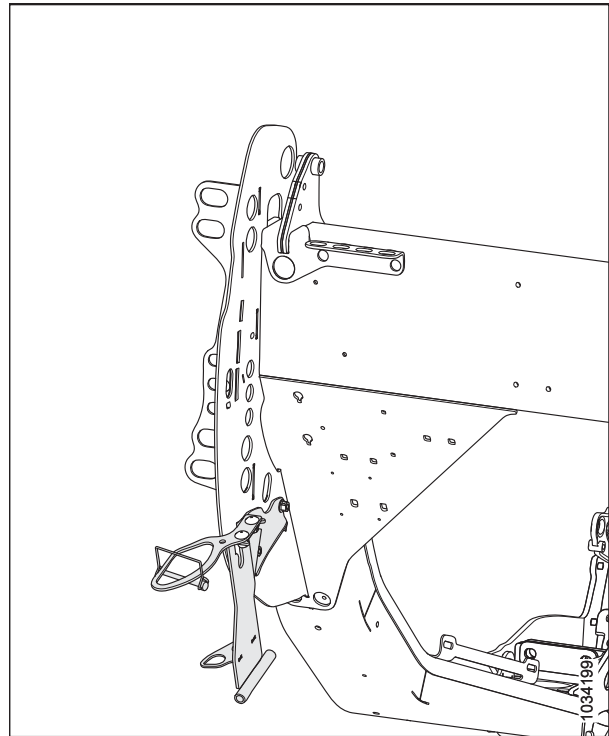


Figure 6.3: Divider Storage Bracket Kit

### 6.1.4 Floating Crop Dividers

Floating crop dividers help the header follow contours in the ground, improve crop dividing, and reduce trampling.

Installation instructions are included in the kit.

B7346

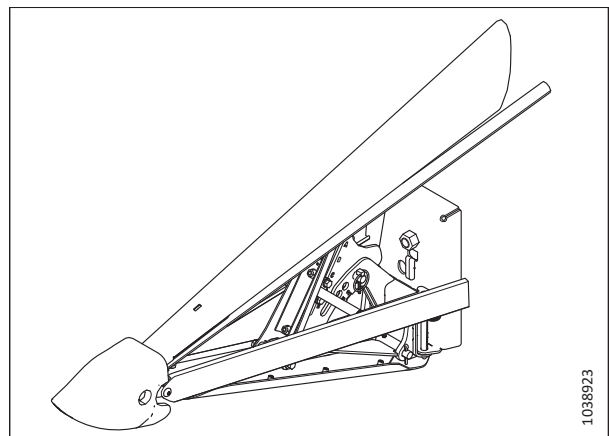


Figure 6.4: Floating Crop Divider



### 6.1.5 Full Length Upper Cross Auger

The upper cross auger (UCA) attaches to the header in front of the backtube and improves crop feeding to the center of the header in heavy crop conditions.

The upper cross auger (A) is ideal for the high-volume harvesting of forages, oats, canola, mustard, and other tall, bushy, hard-to-feed crops.

Order the following bundles:

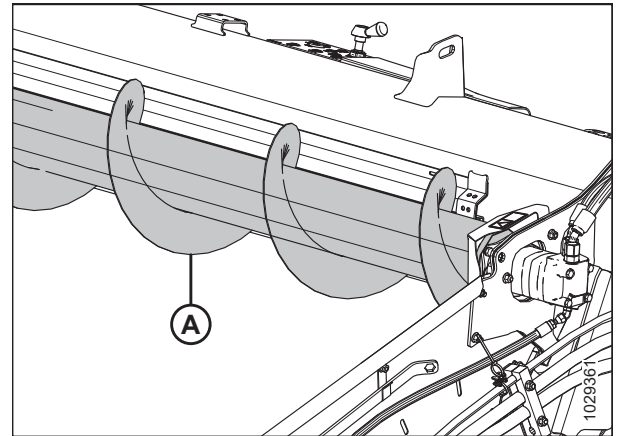


Figure 6.5: Upper Cross Auger

#### ***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:

- D215 – B7290 (one piece)
- D220 – B7291 (one piece)
- D225 – B6413 (two piece)
- D230 – B6414 (two piece)
- D235 – B6415 (two piece)
- D241 – B6416 (two piece)

#### ***Hydraulic plumbing package***

This package is only required for headers without factory-installed UCA hydraulics.

Order from the following list of kits according to your header size:

- D215 – B7270 (one piece)
- D220 – B7271 (one piece)
- D225 – B7338 (two piece)
- D230 – B7117 (two piece)
- D235 – B7118 (two piece)
- D241 – 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.

B7238

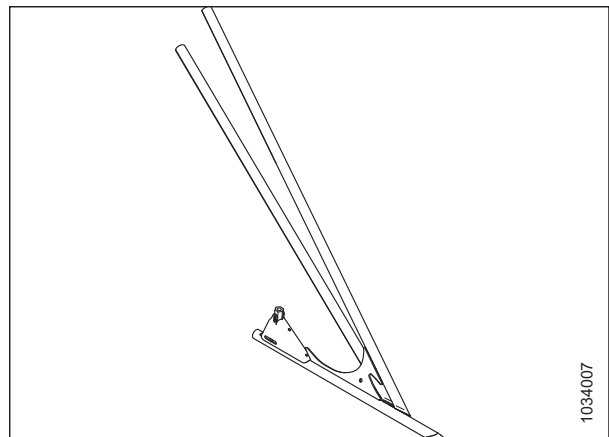


Figure 6.7: Left Rice Divider Rod Kit

### 6.1.8 Swath Forming Rods – Center Delivery

Swath forming rods help form windrows to protect crop from shattering. 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 End Deflector Rods

Deflector rods help prevent delivered crop at the opening from interfering with standing crop.

**NOTE:**

End deflector rods are used for double-swathing with end delivery only.

There is a kit for the left side of the header (B6447) and a kit for the right side of the header (B6448).

Installation and adjustment instructions are included with each kit.

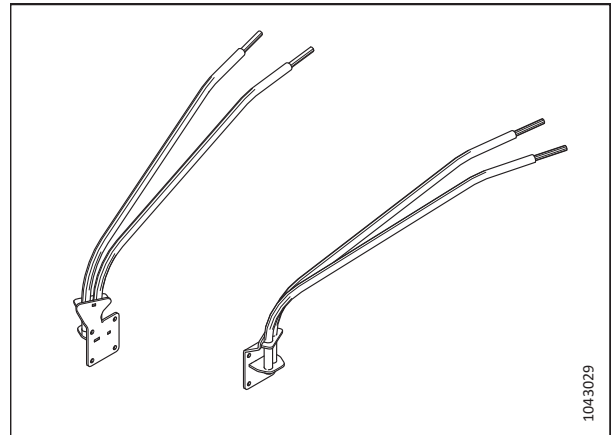


Figure 6.9: End Deflector Rods

### 6.1.10 VertiBlade™ Vertical Knife Kit

The VertiBlade™ Vertical Knife is a vertical crop cutter that is mounted to each end of the header. It is used to cut through lodged or tangled crops.

Order the following bundles:

**Base VertiBlade™ kit**

Includes the knives, mounts, drive, and hydraulic completion plumbing to complete installation on a power-divider ready header.

B7029

**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:

- D215 – B7274
- D220 – B7275
- D225 – B7339
- D235 – B7128
- D241 – B7130

Installation instructions are included in the kits.

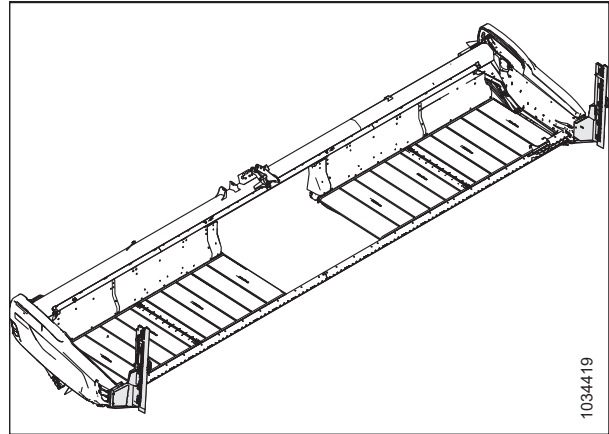


Figure 6.10: VertiBlade™ Vertical Knife Kit

### 6.1.11 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 kit is **NOT** compatible with the Lodged Crop Reel Finger kit (B7230).

MD #340274

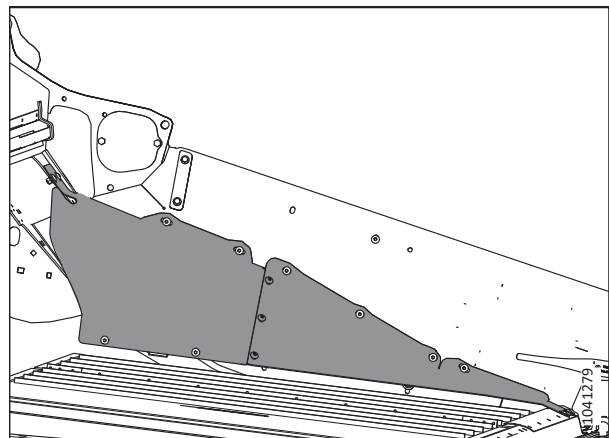


Figure 6.11: Wide End Deflector Kit

## 6.2 Cutterbar Kits

The cutterbar is located on the front of the header. It supports the knife and the 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 from rolling onto the draper decks.

Order bundles by header size:

D225, D230, D235, and D241 – B7122

Installation instructions are included in the kits.

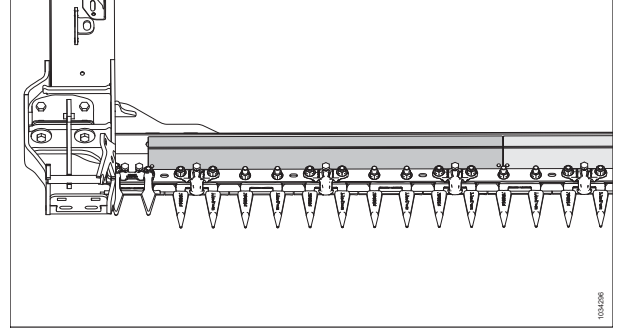


Figure 6.12: Rock Retarder Kit

### 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 D2 Series Draper Headers. Refer to the header parts catalog or contact your Dealer for part numbers.

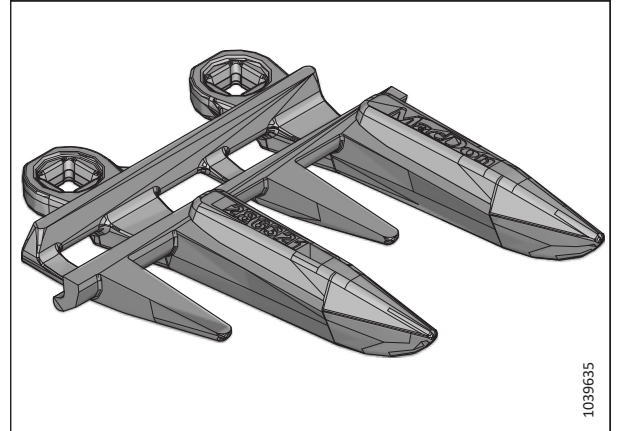


Figure 6.13: Four-Point Knife Guard

## 6.3 Header Kits

Header kits add features or enhancements to the header.

### 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.

To install this kit, order one of the following according to the header model:

- D230 – C2173
- D235 – C2260
- D241 – C2173

C2173 consists of

- Stabilizer Wheels / EasyMove™ Transport Base Kit – B6288
- Wheels and Tires – B7398
- Long Tow Pole – B7392

**NOTE:**

The EasyMove™ Transport System is **NOT** compatible with D215, D220, or D225 headers.

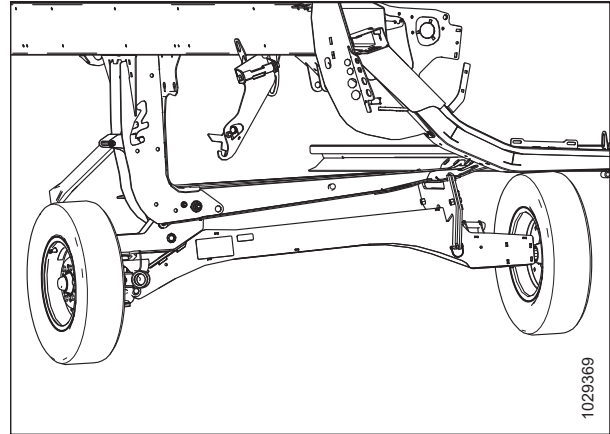


Figure 6.14: EasyMove™ Transport System

### 6.3.2 HC20 Hay Conditioner

The HC20 Hay Conditioner conditions crop and lays it into uniform, fluffy windrows.

Installation instructions are included in the kit.

C2251

C2251 consists of:

- Base Conditioner – B7477
- Feed Deck and Pan – B7478
- Forming Shields – B7479
- Information Package – B7519

**NOTE:**

The HC20 is **ONLY** compatible with D215, D220, D225, and D230 headers equipped with a timed double-knife. To ensure the best performance, do **NOT** attach the HC20 Hay Conditioner to single-knife headers.



Figure 6.15: HC20 Hay Conditioner

### 6.3.3 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

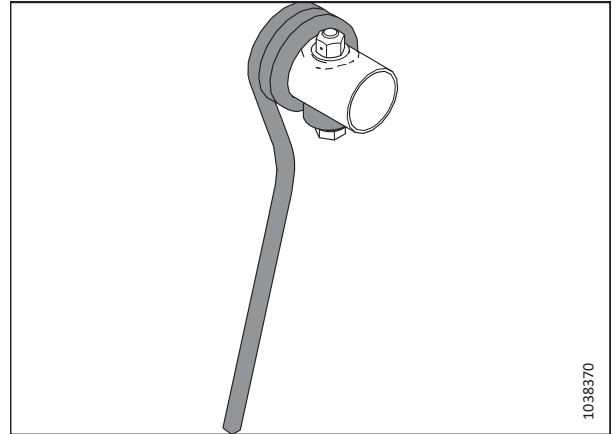


Figure 6.16: Inboard Steel End Finger

### 6.3.4 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

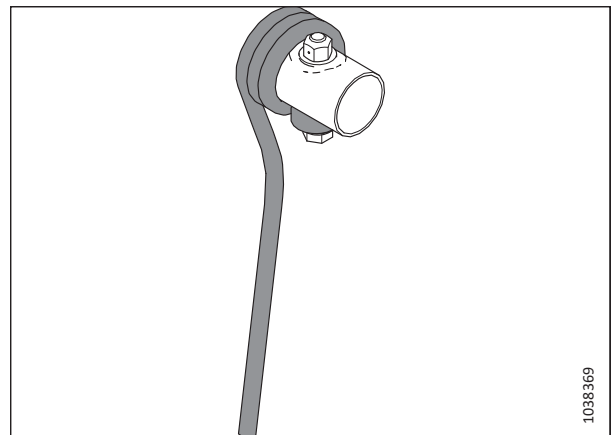


Figure 6.17: Outboard Steel End Finger

### 6.3.5 Plastic Reel Finger Kit

Order one of the following based on your header size:

- D220, Single Reel, 6 bat to 9 bat – B7360
- D225, Single Reel, 6 bat to 9 bat – B7361
- D230, Double Reel, 6 bat to 9 bat – B7362
- D235, Double Reel, 5 bat to 6 bat – B7358
- D241, Double Reel, 5 bat to 6 bat – B7359

For installation instructions, refer to *Installing Plastic Reel Fingers*, page 319.

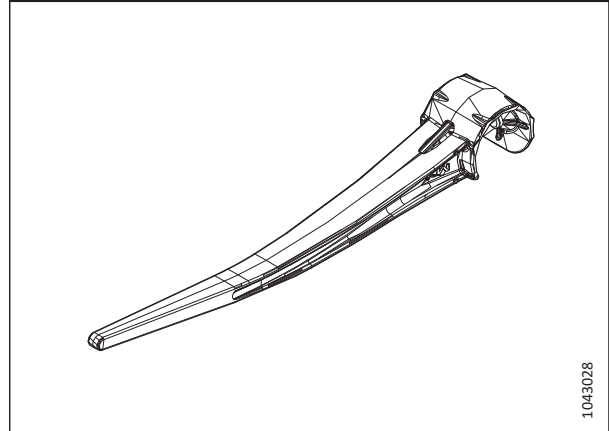


Figure 6.18: Plastic Reel Finger

### 6.3.6 Steel Reel Finger Kit

Optional fingers to be used in difficult crops, lodged canola, and/or forage.

Order one of the following based on your header model:

- D215, single Reel, 6 bat – MD #360676
- D215, single Reel, 9 bat – MD #360677
- D220, single Reel, 6 bat – MD #360678
- D220, single Reel, 9 bat – MD #360685
- D225, single Reel, 6 bat – MD #360679
- D225, single Reel, 9 bat – MD #360680
- D230, double Reel, 5 bat – MD #311054
- D230, double Reel, 6 bat – MD #311055
- D235, double Reel, 5 bat – 311068
- D235, double Reel, 6 bat – MD #311069

Installation instructions are included in the kit.

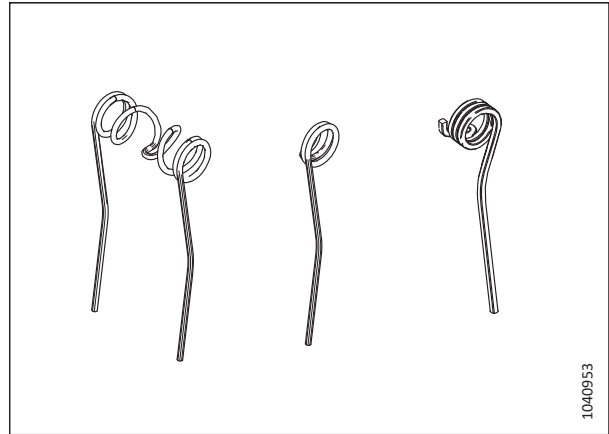


Figure 6.19: Steel Reel Finger



### 6.3.7 Stabilizer Wheel Kit

Stabilizer wheels stabilize the header's lateral movement when cutting at heights higher than possible with the standard skid shoes.

The kit contains two wheel assemblies.

The kit is compatible with D230, D235, and D241 only.

Installation and adjustment instructions are included in the kit.

C2171

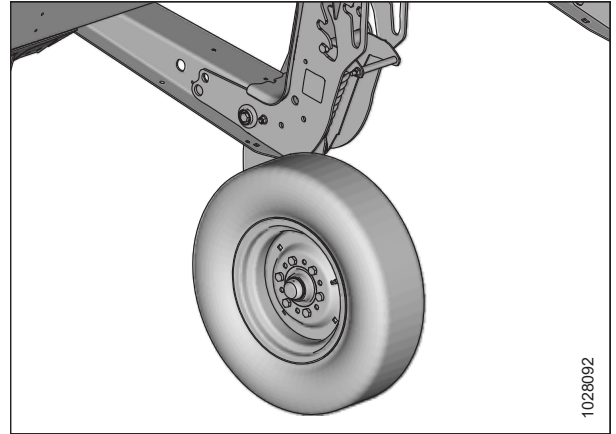


Figure 6.20: Stabilizer Wheel Kit

### 6.3.8 Steel Skid Shoes Kit

This kit provides extended-wear skid shoes for use in rocky, abrasive conditions.

**IMPORTANT:**

This kit is not recommended for use in wet mud or conditions that are prone to sparking.

B6801

Installation instructions are included in the kit.

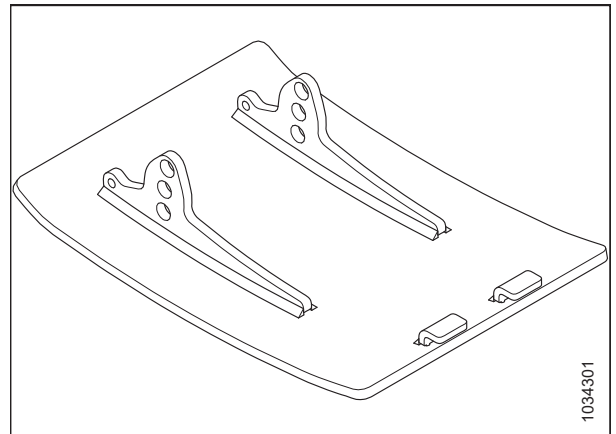
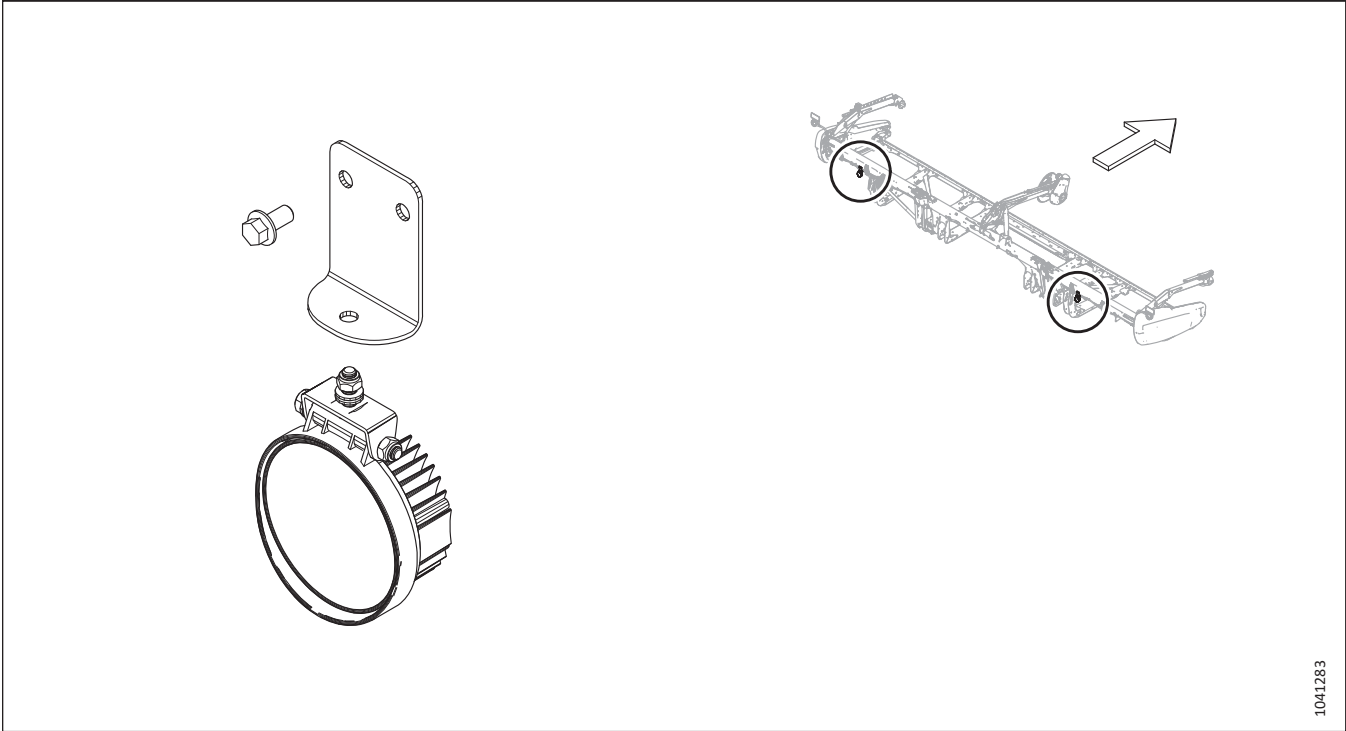


Figure 6.21: Steel Skid Shoes Kit

### 6.3.9 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 D225, D230, D235, and D241 windrower headers. This kit is currently compatible with M1 Series and M2 Series Windrowers only.



1041283

**Figure 6.22: Stubble Light Kit**

Installation instructions are included with the kit.

B7575

## Chapter 7: Troubleshooting

Troubleshooting tables are provided to help you diagnose and solve any problems you may have with the header.

### 7.1 Troubleshooting 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
<b>Symptom: The header is not picking up downed crop</b>		
Cutterbar too high	Lower the cutterbar	<ul style="list-style-type: none"> <li>3.7.2 Cutting off Ground, page 75</li> <li>3.7.3 Cutting on Ground, page 77</li> </ul>
Header angle too low	Increase the header angle	3.7.5 Header Angle, page 80
Reel too high	Lower the reel	3.7.10 Reel Height, page 84
Reel too far back	Move the reel forward	3.7.11 Reel Fore-Aft Position, page 87
Ground speed too fast for reel speed	Increase the reel speed or reduce the ground speed	<ul style="list-style-type: none"> <li>3.7.6 Reel Speed, page 81</li> <li>3.7.7 Ground Speed, page 82</li> </ul>
Reel fingers not lifting crop sufficiently	Increase the finger pitch aggressiveness	3.7.12 Reel Tine Pitch, page 94
Reel fingers not lifting crop sufficiently	Install crop lifters	Dealer
<b>Symptom: Heads are shattering or breaking off</b>		
Reel speed too fast	Reduce the reel speed	3.7.6 Reel Speed, page 81
Reel too low	Raise the reel	3.7.10 Reel Height, page 84
Ground speed too fast	Reduce the ground speed	3.7.7 Ground Speed, page 82
Crop too ripe	Work at night when the humidity is higher	—
<b>Symptom: Material accumulating between the endsheet and the knifehead</b>		
Crop heads leaning away from knifehead hole in endsheet	Add knifehead shields (except in damp or sticky soils)	5.5.9 Knifehead Shield, page 277
<b>Symptom: Material is not being cut</b>		
Guards plugged with debris	Install short knife guards	5.5.8 Short Knife Guards and Hold-Downs, page 264
Broken knife sections	Replace the broken sections	5.5.1 Replacing Knife Section, page 241
<b>Symptom: Excessive bouncing at normal field speed</b>		
Float set too light	Adjust the header float	3.7.4 Header Float, page 79
<b>Symptom: Divider rod running down standing crop</b>		
Divider rods too long	Remove divider rods	3.7.14 Crop Dividers, page 100
<b>Symptom: Crop is not being cut at ends</b>		
Reel not frowning or not centered in header	Adjust the reel horizontal position or the reel frown	3.7.11 Reel Fore-Aft Position, page 87

## TROUBLESHOOTING

**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	<ul style="list-style-type: none"> <li>• <i>Adjusting Hold-Down – Pointed Knife Guards, page 258</i></li> <li>• <i>Adjusting Hold-Down – Short Knife Guards, page 271</i></li> </ul>
Knife sections or guards are worn or broken	Replace all of the worn and broken cutting parts	<i>5.5 Cutterbar, page 241</i>
Header is not level	Level the header	<i>3.8 Leveling Header, page 118</i>
Reel fingers not lifting crop properly ahead of knife	Adjust the reel position and/or the finger pitch	<ul style="list-style-type: none"> <li>• <i>3.7.11 Reel Fore-Aft Position, page 87</i></li> <li>• <i>3.7.12 Reel Tine Pitch, page 94</i></li> </ul>
Divider runs down thick crop at the ends, preventing proper feeding due to the material bridging the guards	Replace 3–4 end guards with short knife guard	<ul style="list-style-type: none"> <li>• <i>5.5.8 Short Knife Guards and Hold-Downs, page 264</i></li> <li>• Dealer</li> </ul>
<b>Symptom: Crop flows over divider rods and builds up on the endsheets</b>		
Divider rods providing insufficient separation	Install long divider rods	<i>3.7.14 Crop Dividers, page 100</i>
<b>Symptom: Cut grain falls ahead of the cutterbar</b>		
Ground speed too slow	Increase the ground speed	<i>3.7.7 Ground Speed, page 82</i>
Reel speed too slow	Increase the reel speed	<i>3.7.6 Reel Speed, page 81</i>
Reel too high	Lower the reel	<i>3.7.10 Reel Height, page 84</i>
Cutterbar too high	Lower the cutterbar	<ul style="list-style-type: none"> <li>• <i>3.7.2 Cutting off Ground, page 75</i></li> <li>• <i>3.7.3 Cutting on Ground, page 77</i></li> </ul>
Reel too far forward	Move the reel back on the arms	<i>3.7.11 Reel Fore-Aft Position, page 87</i>
Cutting at speeds over 10 km/h (6 mph) with 10-tooth reel drive sprocket	Replace the reel drive sprocket with a 19-tooth reel drive sprocket	<ul style="list-style-type: none"> <li>• <i>Removing Reel Drive Single Sprocket, page 345</i></li> <li>• <i>Removing Reel Drive Optional Dual Sprocket, page 346</i></li> <li>• <i>5.9.2 Reel Drive Sprocket, page 345</i></li> </ul>
Worn or broken knife components	Replace the components	<i>5.5 Cutterbar, page 241</i>

## 7.2 Troubleshooting Cutting Action and Knife Components

Use the following table 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
<b>Symptom: Ragged or uneven cutting of crop</b>		
Knife hold-down not adjusted properly	Adjust the hold-down	<ul style="list-style-type: none"> <li>• <i>Adjusting Hold-Down – Pointed Knife Guards, page 258</i></li> <li>• <i>Adjusting Hold-Down – Short Knife Guards, page 271</i></li> </ul>
Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	<ul style="list-style-type: none"> <li>• <i>Replacing Pointed Knife Guards, page 254</i></li> <li>• <i>Replacing Pointed Center Knife Guard – Double-Knife Header, page 259</i></li> <li>• <i>Replacing Short Knife Guards or End Knife Guards, page 268</i></li> <li>• <i>Replacing Center Knife Guard – Double-Knife Headers, page 272</i></li> <li>• <i>5.5.1 Replacing Knife Section, page 241</i></li> </ul>
Ground speed too fast for reel speed	Reduce the ground speed or increase the reel speed	<ul style="list-style-type: none"> <li>• <i>3.7.6 Reel Speed, page 81</i></li> <li>• <i>3.7.7 Ground Speed, page 82</i></li> </ul>
Reel fingers not lifting crop properly ahead of knife	Adjust the reel position/ finger pitch	<ul style="list-style-type: none"> <li>• <i>3.7.11 Reel Fore-Aft Position, page 87</i></li> <li>• <i>3.7.12 Reel Tine Pitch, page 94</i></li> </ul>
Cutterbar too high	Lower the cutting height	<i>3.7.2 Cutting off Ground, page 75</i>
Header angle too flat	Steepen the header angle	<i>3.7.5 Header Angle, page 80</i>
Cutting edge of guards not close enough or parallel to knife sections	Align the guards	<i>Adjusting Knife Guards and Guard Bar, page 252</i>
Tangled/tough-to-cut crop	Install short knife guards	Dealer <ul style="list-style-type: none"> <li>• <i>Adjusting Hold-Down – Pointed Knife Guards, page 258</i></li> <li>• <i>Adjusting Hold-Down – Short Knife Guards, page 271</i></li> </ul>
Reel too far back	Move the reel forward	<i>3.7.11 Reel Fore-Aft Position, page 87</i>
<b>Symptom: Knife plugging</b>		
Reel too high or too far forward	Lower the reel or move the reel rearward	<ul style="list-style-type: none"> <li>• <i>3.7.10 Reel Height, page 84</i></li> <li>• <i>3.7.11 Reel Fore-Aft Position, page 87</i></li> </ul>
Ground speed too high	Decrease the ground speed	<i>3.7.7 Ground Speed, page 82</i>

## TROUBLESHOOTING

**Table 7.2 Troubleshooting – Cutting Action and Knife Components (continued)**

Problem	Solution	Refer to
Improper knife hold-down adjustment	Adjust the hold-down	<ul style="list-style-type: none"> <li>• <i>Adjusting Hold-Down – Pointed Knife Guards, page 258</i></li> <li>• <i>Adjusting Hold-Down – Short Knife Guards, page 271</i></li> </ul>
Dull or broken knife section	Replace the corresponding knife section	<i>5.5.1 Replacing Knife Section, page 241</i>
Bent or broken guards	Align or replace the guards	<i>Adjusting Knife Guards and Guard Bar, page 252</i>
Reel fingers not lifting crop properly ahead of knife	Adjust the reel position/ finger pitch	<ul style="list-style-type: none"> <li>• <i>3.7.11 Reel Fore-Aft Position, page 87</i></li> <li>• <i>3.7.12 Reel Tine Pitch, page 94</i></li> </ul>
Steel pick-up fingers contacting knife	Increase the reel clearance from the cutterbar / adjust the frown	<i>5.8.1 Reel-to-Cutterbar Clearance, page 310</i>
Mud or dirt build-up on cutterbar	Raise the cutterbar by lowering skid shoes	<i>3.7.3 Cutting on Ground, page 77</i>
Mud or dirt build-up on cutterbar	Flatten the header angle	<i>3.7.5 Header Angle, page 80</i>
Knife is not operating at recommended speed	Check the header knife speed	<i>Checking Knife Speed, page 83</i>
<b>Symptom: Excessive header vibration</b>		
Excessive knife wear	Replace the knife	<ul style="list-style-type: none"> <li>• <i>5.5.2 Removing Knife, page 242</i></li> <li>• <i>5.5.5 Installing Knife, page 245</i></li> </ul>
Knife hold-down not adjusted properly	Adjust the hold-down	<ul style="list-style-type: none"> <li>• <i>Adjusting Hold-Down – Pointed Knife Guards, page 258</i></li> <li>• <i>Adjusting Center Hold-Down on Double-Knife Header – Pointed Knife Guards, page 263</i></li> <li>• <i>Adjusting Hold-Down – Short Knife Guards, page 271</i></li> <li>• <i>Adjusting Center Hold-Down on Double-Knife Headers – Short Knife Guards, page 276</i></li> </ul>
Loose or worn knifehead pin or drive arm	Tighten or replace the parts	<ul style="list-style-type: none"> <li>• <i>5.5.2 Removing Knife, page 242</i></li> <li>• <i>5.5.5 Installing Knife, page 245</i></li> </ul>
<b>Symptom: Excessive vibration of float module and header</b>		
Incorrect knife speed	Adjust the knife speed	Dealer
Bent cutterbar	Straighten the cutterbar	Dealer
<b>Symptom: Excessive breakage of knife sections or guards</b>		

## TROUBLESHOOTING

**Table 7.2 Troubleshooting – Cutting Action and Knife Components (continued)**

Problem	Solution	Refer to
Knife hold-down not adjusted properly	Adjust the hold-down	<ul style="list-style-type: none"> <li>• <i>Adjusting Hold-Down – Pointed Knife Guards, page 258</i></li> <li>• <i>Adjusting Hold-Down – Short Knife Guards, page 271</i></li> </ul>
Cutterbar operating too low in stony conditions	Raise the cutterbar with skid shoes	<i>3.7.3 Cutting on Ground, page 77</i>
Float is set too heavy	Adjust the float springs for a lighter float	Windrower operator's manual
Bent or broken guard	Straighten or replace the guard	<ul style="list-style-type: none"> <li>• <i>5.5.7 Pointed Knife Guards and Hold-Downs, page 247</i></li> <li>• <i>5.5.8 Short Knife Guards and Hold-Downs, page 264</i></li> </ul>
Header angle too steep	Flatten the header angle	<i>3.7.5 Header Angle, page 80</i>
<b>Symptom: Knife back breakage</b>		
Bent or broken guard	Straighten or replace the guard	<ul style="list-style-type: none"> <li>• <i>5.5.7 Pointed Knife Guards and Hold-Downs, page 247</i></li> <li>• <i>5.5.8 Short Knife Guards and Hold-Downs, page 264</i></li> </ul>
Worn knifehead pin	Replace the knifehead pin	Dealer
Dull knife	Replace the knife	<ul style="list-style-type: none"> <li>• <i>5.5.2 Removing Knife, page 242</i></li> <li>• <i>5.5.5 Installing Knife, page 245</i></li> </ul>

## 7.3 Troubleshooting 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
<b>Symptom: Reel not releasing material in normal standing crop</b>		
Reel speed too fast	Reduce the reel speed	<a href="#">3.7.6 Reel Speed, page 81</a>
Reel too low	Raise the reel	<a href="#">3.7.10 Reel Height, page 84</a>
Reel tines too aggressive	Reduce the cam setting	<a href="#">3.7.12 Reel Tine Pitch, page 94</a>
Reel too far back	Move the reel forward	<a href="#">3.7.11 Reel Fore-Aft Position, page 87</a>
<b>Symptom: Reel not releasing material in lodged and standing crop (reel fully lowered)</b>		
Reel tines too aggressive for standing crop	Reduce the cam setting by one or two or move reel forward	<a href="#">3.7.12 Reel Tine Pitch, page 94</a>
<b>Symptom: Wrapping on the end of the reel</b>		
Reel tines too aggressive	Reduce the cam setting	<a href="#">3.7.12 Reel Tine Pitch, page 94</a>
Reel too low	Raise the reel	<a href="#">3.7.10 Reel Height, page 84</a>
Reel speed too fast	Reduce the reel speed	<a href="#">3.7.6 Reel Speed, page 81</a>
Reel not centered in header	Center the reel in the header	<a href="#">5.8.3 Centering Reel, page 314</a>
<b>Symptom: Reel releases crop too quickly</b>		
Reel tines not aggressive enough	Increase the cam setting to match reel delivery to the reel fore-aft position	<a href="#">3.7.12 Reel Tine Pitch, page 94</a>
Reel too far forward	Move the reel back to match the reel cam setting	<a href="#">3.7.11 Reel Fore-Aft Position, page 87</a>
<b>Symptom – Reel will not lift</b>		
Reel lift couplers are incompatible or defective	Change the quick coupler	Dealer
<b>Symptom – Reel will not turn</b>		
Quick couplers not properly connected	Connect the couplers	<a href="#">4 Header Attachment/Detachment, page 141</a>
Reel drive chain disconnected or broken	Connect/replace the chain	Dealer
<b>Symptom: Reel motion uneven under no load</b>		
Excessive slack in reel drive chain	Tighten the chain	<a href="#">Tightening Reel Drive Chain, page 343</a>
<b>Symptom: Reel motion is uneven or stalls in heavy crops</b>		
Reel speed too fast	Reduce the reel speed	<a href="#">3.7.6 Reel Speed, page 81</a>
Reel fingers not aggressive enough	Move the reel finger or the cam setting to a more aggressive finger pitch notch	<a href="#">3.7.12 Reel Tine Pitch, page 94</a>
Reel too low	Raise the reel	<a href="#">3.7.10 Reel Height, page 84</a>
Cutting tough crops with standard torque (19-tooth) reel drive sprocket	Replace with high-torque 10-tooth or 14-tooth reel drive sprocket	<ul style="list-style-type: none"> <li>• <a href="#">5.9.2 Reel Drive Sprocket, page 345</a></li> <li>• Install Two Speed Kit (MD #311882)</li> </ul>
<b>Symptom: Plastic fingers cut at tip</b>		
Insufficient reel to cutterbar clearance	Increase the clearance	<a href="#">5.8.1 Reel-to-Cutterbar Clearance, page 310</a>



## TROUBLESHOOTING

**Table 7.3 Troubleshooting – Reel Delivery (continued)**

Problem	Solution	Refer to
<b>Symptom: Plastic fingers bent rearward at tip</b>		
Reel digging into ground with reel speed slower than ground speed	Raise the header	<ul style="list-style-type: none"> <li>• <a href="#">3.7.2 Cutting off Ground, page 75</a></li> </ul>
Reel digging into ground with reel speed slower than ground speed	Decrease the header tilt	<a href="#">3.7.5 Header Angle, page 80</a>
Reel digging into ground with reel speed slower than ground speed	Move the reel aft	<a href="#">3.7.11 Reel Fore-Aft Position, page 87</a>
<b>Symptom: Plastic fingers bent forward at tip</b>		
Reel digging into the ground with reel speed faster than ground speed	Raise the header	<ul style="list-style-type: none"> <li>• <a href="#">3.7.2 Cutting off Ground, page 75</a></li> <li>• <a href="#">3.7.3 Cutting on Ground, page 77</a></li> </ul>
Reel digging into the ground with reel speed faster than ground speed	Decrease the header tilt	<a href="#">3.7.5 Header Angle, page 80</a>
Reel digging into ground with reel speed faster than ground speed	Move the reel aft	<a href="#">3.7.11 Reel Fore-Aft Position, page 87</a>
<b>Symptom: Plastic fingers bent close to tine tube</b>		
Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation	Correct the plugging/cutting issues	<a href="#">3.9 Unplugging Cutterbar, page 119</a>
Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation	Stop the reel before plugging becomes excessive	<a href="#">3.9 Unplugging Cutterbar, page 119</a>

## 7.4 Troubleshooting Header and Drapers

Use the following table to determine the header and draper problems and the recommended repair procedure.

**Table 7.4 Troubleshooting – Header and Drapers**

Problem	Solution	Refer to
<b>Symptom: Insufficient side draper speed</b>		
Speed control is set too low	Increase the speed control setting	<i>3.7.8 Draper Speed, page 82</i>
<b>Symptom: Insufficient feed draper speed</b>		
Relief pressure is too low	Test the feed draper hydraulic system	Dealer
<b>Symptom: Side draper is stalling</b>		
Material not feeding evenly off knife	Lower the reel	<i>3.7.10 Reel Height, page 84</i>
Material not feeding evenly off knife	Install short knife guards	<i>5.5.8 Short Knife Guards and Hold-Downs, page 264</i>
<b>Symptom: Bulky crop does not flow evenly</b>		
Header angle is too low	Increase the header angle	<i>3.7.5 Header Angle, page 80</i>
Material overload on drapers	Increase the side draper speed	<i>3.7.8 Draper Speed, page 82</i>
Material overload on drapers	Install an upper cross auger	<i>6.1.5 Full Length Upper Cross Auger, page 367</i>
Material overload on drapers	Add flighting extensions	Dealer
<b>Symptom: Drapers back-feed</b>		
Drapers running too slow in heavy crop	Increase the draper speed	<i>3.7.8 Draper Speed, page 82</i>
<b>Symptom: Crop is thrown across the opening and under the opposite side draper</b>		
Drapers running too fast in light crop	Reduce the draper speed	<i>3.7.8 Draper Speed, page 82</i>
<b>Symptom: Material accumulates on the end deflectors and releases in bunches</b>		
End deflectors are too wide	For headers with manual deck shift, trim the deflector or replace with a narrow deflector (MD #172381)	<i>3.9 Unplugging Cutterbar, page 119</i>

## 7.5 Troubleshooting 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
<b>Symptom: Plants are being stripped and left complete or partial plants are being left behind</b>		
Header off the ground	Lower the header to the ground and run the header on skid shoes and/or the cutterbar	<a href="#">3.7.3 Cutting on Ground, page 77</a>
Reel too high with cylinders fully retracted	Adjust the reel height	<a href="#">3.7.10 Reel Height, page 84</a>
Finger pitch not aggressive enough	Adjust the finger pitch	<a href="#">3.7.12 Reel Tine Pitch, page 94</a>
Reel too far aft	With the header on the ground and the header angle properly adjusted, move the reel forward until the fingertips skim the soil surface	<a href="#">3.7.11 Reel Fore-Aft Position, page 87</a>
Header angle too shallow	Adjust the header angle	<a href="#">3.7.5 Header Angle, page 80</a>
Header angle too shallow	Increase the header angle by fully retracting the lift cylinders (if cutting on ground)	<a href="#">3.7.5 Header Angle, page 80</a>
Reel too slow	Adjust the reel speed to be slightly faster than ground speed	<a href="#">3.7.6 Reel Speed, page 81</a>
Ground speed too fast	Lower the ground speed	<a href="#">3.7.7 Ground Speed, page 82</a>
Skid shoes too low	Raise the skid shoes to the highest setting	<a href="#">3.7.3 Cutting on Ground, page 77</a>
Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar; raises the cutterbar off the ground	<ul style="list-style-type: none"> <li>• Increase the float</li> <li>• The ground is too wet – allow the soil to dry</li> <li>• Manually clean the bottom of the cutterbar when excessive accumulation occurs</li> </ul>	<a href="#">3.7.4 Header Float, page 79</a>
Header not level	Level the header	<a href="#">3.8 Leveling Header, page 118</a>
Worn or damaged knife sections	Replace the sections or replace the knife	<a href="#">5.5 Cutterbar, page 241</a>
Parts of vines get caught in pointed guard tips <b>NOTE:</b> This problem occurs more in row-cropped beans that are hilled from cultivating.	Install the short knife guard conversion kit	<a href="#">5.5.8 Short Knife Guards and Hold-Downs, page 264</a>
Pushing of crop debris on the ground	Install short knife guards	<a href="#">5.5.8 Short Knife Guards and Hold-Downs, page 264</a>
Knife speed too low	Increase the feeder house speed or ensure that the knife speed is set within the recommended range	<ul style="list-style-type: none"> <li>• <a href="#">3.7.9 Knife Speed Information, page 83</a></li> <li>• <a href="#">Checking Knife Speed, page 83</a></li> </ul>

## TROUBLESHOOTING

**Table 7.5 Troubleshooting – Cutting Edible Beans (continued)**

Problem	Solution	Refer to
<b>Symptom: Excessive losses at dividers</b>		
Divider rod running down crop and shattering the pods	Remove the divider rod	<i>3.7.14 Crop Dividers, page 100</i>
Vines and plants build up on the endsheet	Install divider rods	<i>3.7.14 Crop Dividers, page 100</i>
<b>Symptom: Plant vines pinch between the top of the draper and the cutterbar</b>		
Cutterbar fills with debris when the draper to cutterbar clearance is properly adjusted	Raise the header as required and shift the 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	—
<b>Symptom: Crop accumulates at the guards and does not move rearward onto the drapers</b>		
Reel finger pitch not aggressive enough	Increase the finger aggressiveness (cam position)	<i>3.7.12 Reel Tine Pitch, page 94</i>
Reel too high	Lower the reel	<i>3.7.10 Reel Height, page 84</i>
Minimum reel to cutterbar clearance setting too high	Adjust the minimum reel height with the cylinders fully retracted	<i>5.8.1 Reel-to-Cutterbar Clearance, page 310</i>
Reel too far forward	Reposition the reel	<i>3.7.11 Reel Fore-Aft Position, page 87</i>
<b>Symptom: Crop is wrapping around the reel</b>		
Reel too low	Raise the reel	<i>3.7.10 Reel Height, page 84</i>
<b>Symptom: The reel is shattering pods</b>		
Reel too far forward	Reposition the reel	<i>3.7.11 Reel Fore-Aft Position, page 87</i>
Reel speed too high	Reduce the reel speed	<i>3.7.6 Reel Speed, page 81</i>
Bean pods too dry	Cut the crop at night when dew is present and the pods have softened	—
Reel finger pitch not aggressive enough	Increase the finger aggressiveness (cam position)	<i>3.7.12 Reel Tine Pitch, page 94</i>
<b>Symptom: The cutterbar guards are breaking</b>		
Excessive number of rocks in field	Consider installing optional short knife guards  <b>NOTE:</b> With the installation of short knife guards, you are trading guard damage for knife section damage (although changing sections with short knife guards is easier).	<i>5.5.8 Short Knife Guards and Hold-Downs, page 264</i>
<b>Symptom: The cutterbar is pushing too much debris and dirt</b>		
Header too heavy	Make the header lighter	<i>3.7.4 Header Float, page 79</i>
Header angle too steep	Decrease the header angle	<i>3.7.5 Header Angle, page 80</i>
Guards plug with debris and/or soil	Install short knife guards	<i>5.5.8 Short Knife Guards and Hold-Downs, page 264</i>

## TROUBLESHOOTING

**Table 7.5 Troubleshooting – Cutting Edible Beans (continued)**

Problem	Solution	Refer to
Insufficient support for the header	Install center skid shoes	<a href="#">3.7.3 Cutting on Ground, page 77</a>
<b>Symptom: Crop is wrapping around the reel ends</b>		
Uncut crop interfering on reel ends	Add reel endshields	Header parts catalog
<b>Symptom: The cutterbar is filling up with dirt</b>		
Excessive gap between the draper and the cutterbar	Raise the header as required and shift the decks back and forth to help clean out the cutterbar	—
<b>Symptom: The reel occasionally carries over plants in the same location</b>		
Steel fingers bent and hooking plants from drapers	Straighten the fingers	—
Dirt accumulation on end of fingers preventing plants from falling off fingers onto drapers	Raise the reel	<a href="#">3.7.10 Reel Height, page 84</a>
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	<a href="#">3.7.11 Reel Fore-Aft Position, page 87</a>
<b>Symptom: The cutterbar is pushing soil</b>		
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)	—
<b>Symptom: The reel is carrying over an excessive amount of plants or wads</b>		
Excessive accumulation of crop on drapers (up to reel center tube)	Increase the draper speed	<a href="#">3.7.8 Draper Speed, page 82</a>
Finger pitch too slow	Increase the finger pitch	<a href="#">3.7.12 Reel Tine Pitch, page 94</a>

## 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
<b>Symptom: Heads on Ground and Scattered</b>		
Draper speed too slow	Increase the draper speed	<i>3.7.8 Draper Speed, page 82</i>
Draper angle too flat	Increase the header angle	<i>Controlling Header Angle, page 80</i>
Ground speed too slow	Increase the ground speed	<i>3.7.7 Ground Speed, page 82</i>
Crop too ripe	Cut the crop before it matures	—
<b>Symptom: Hollow in Center</b>		
Draper speed too slow	Increase the draper speed	<i>3.7.8 Draper Speed, page 82</i>
Delivery opening too wide	Decrease the delivery opening width	<i>3.7.16 Delivery Opening, page 106</i>
<b>Symptom: All Heads in Center</b>		
Draper speed too fast or header angle too steep	Reduce the draper speed and/or decrease the header angle	<ul style="list-style-type: none"> <li>• <i>3.7.8 Draper Speed, page 82</i></li> <li>• <i>3.7.5 Header Angle, page 80</i></li> </ul>
Ground speed too fast	Reduce the ground speed	<i>3.7.7 Ground Speed, page 82</i>
Crop too green	Let the crop mature	—
<b>Symptom: All Heads To One Side</b>		
Crop leaning to one side and reel too slow	Increase the reel speed and orient the crop parallel to the draper slats and/or increase the finger pitch aggressiveness	<ul style="list-style-type: none"> <li>• <i>3.7.12 Reel Tine Pitch, page 94</i></li> <li>• <i>3.7.6 Reel Speed, page 81</i></li> </ul>
<b>Symptom: Uneven Windrow (Any Crop Condition)</b>		
Reel too low	Raise the reel	<i>3.7.10 Reel Height, page 84</i>
Ground speed too fast for drapers, causing heads to fan out and crop to leave drapers unevenly	Reduce the ground speed or increase the draper speed	<ul style="list-style-type: none"> <li>• <i>3.7.7 Ground Speed, page 82</i></li> <li>• <i>3.7.8 Draper Speed, page 82</i></li> </ul>
Reel speed too fast	Reduce the reel speed	<i>3.7.6 Reel Speed, page 81</i>

# Chapter 8: Reference

Refer to the procedures and information in this chapter 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

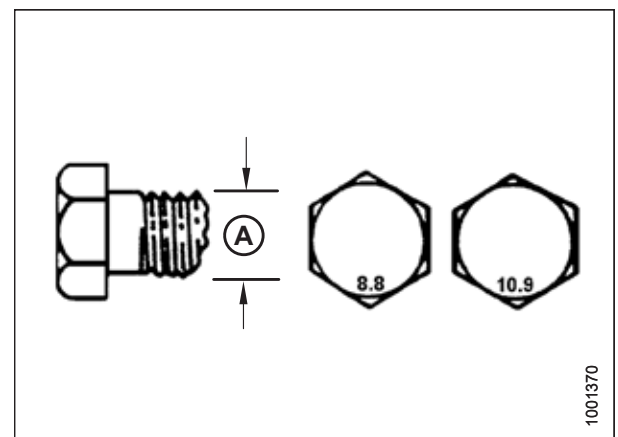
Specifications are provided for the appropriate final torque values to secure various sizes of metric bolts.

#### 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**

REFERENCE

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

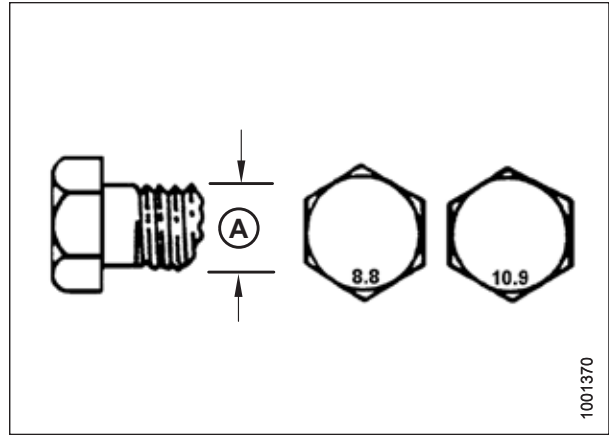


Figure 8.2: Bolt Grades

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

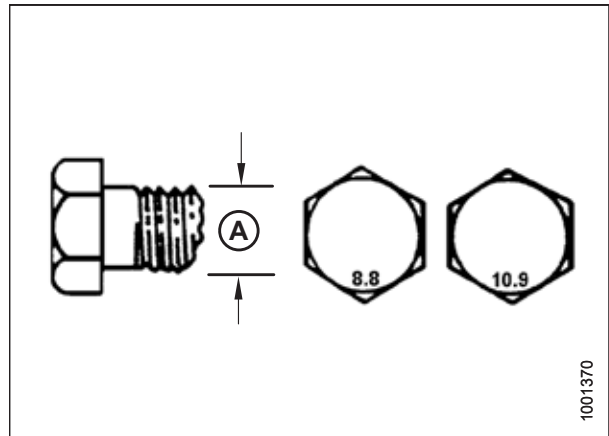


Figure 8.3: Bolt Grades

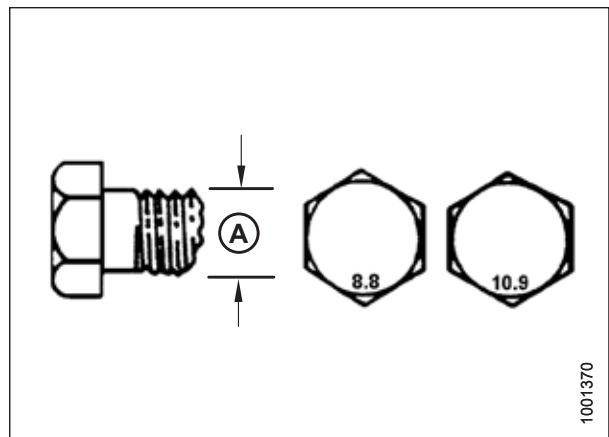


Figure 8.4: Bolt Grades



REFERENCE

**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

### 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	–	–	–	–

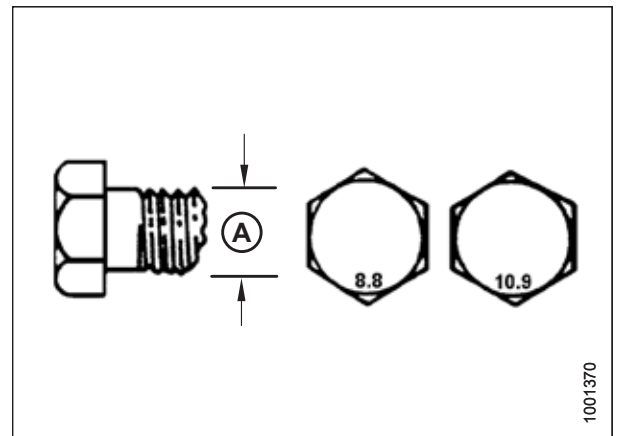


Figure 8.5: Bolt Grades

### 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 that it 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).

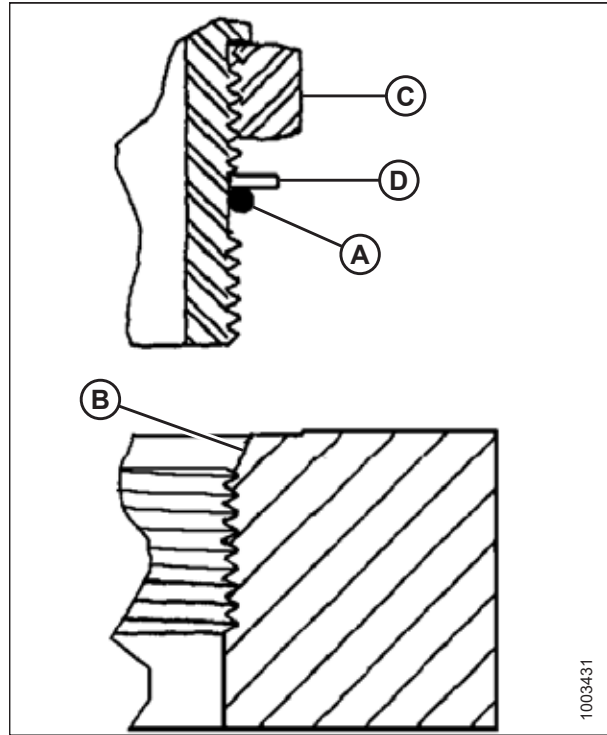


Figure 8.6: Hydraulic Fitting

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.

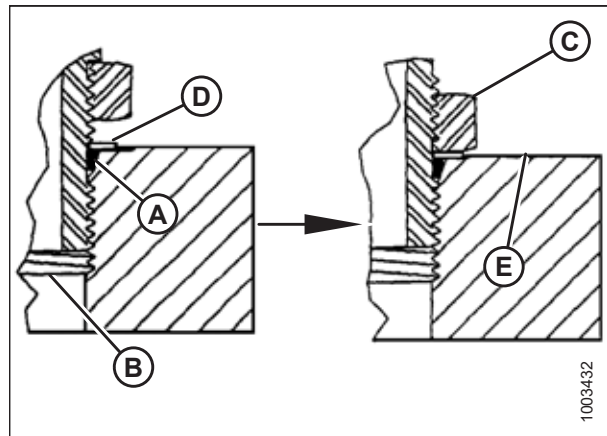


Figure 8.7: Hydraulic Fitting

REFERENCE

Table 8.6 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable and Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value <sup>86</sup>	
		Nm	lbf-ft (*lbf-in)
-2	5/16-24	10-11	*89-97
-3	3/8-24	18-20	*159-177
-4	7/16-20	29-32	21-24
-5	1/2-20	32-35	24-26
-6	9/16-18	40-44	30-32
-8	3/4-16	70-77	52-57
-10	7/8-14	115-127	85-94
-12	1 1/16-12	183-201	135-148
-14	1 3/16-12	237-261	175-193
-16	1 5/16-12	271-298	200-220
-20	1 5/8-12	339-373	250-275
-24	1 7/8-12	414-455	305-336
-32	2 1/2-12	509-560	375-413

### 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 393.
6. Verify the final condition of the fitting.

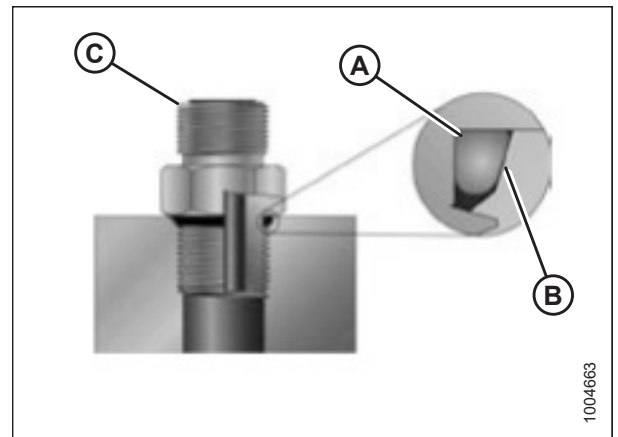


Figure 8.8: Hydraulic Fitting

Table 8.7 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable and Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value <sup>86</sup>	
		Nm	lbf-ft (*lbf-in)
-2	5/16-24	10-11	*89-97
-3	3/8-24	18-20	*159-177
-4	7/16-20	29-32	21-24
-5	1/2-20	32-35	24-26

86. Torque values shown are based on lubricated connections as in reassembly.

REFERENCE

Table 8.7 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable and Non-Adjustable (continued)

SAE Dash Size	Thread Size (in.)	Torque Value <sup>87</sup>	
		Nm	lbf-ft (*lbf-in)
-6	9/16-18	40-44	30-32
-8	3/4-16	70-77	52-57
-10	7/8-14	115-127	85-94
-12	1 1/16-12	183-201	135-148
-14	1 3/16-12	237-261	175-193
-16	1 5/16-12	271-298	200-220
-20	1 5/8-12	339-373	250-275
-24	1 7/8-12	414-455	305-336
-32	2 1/2-12	509-560	375-413

### 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 395.

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

87. Torque values shown are based on lubricated connections as in reassembly.

## REFERENCE

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 395.

**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).

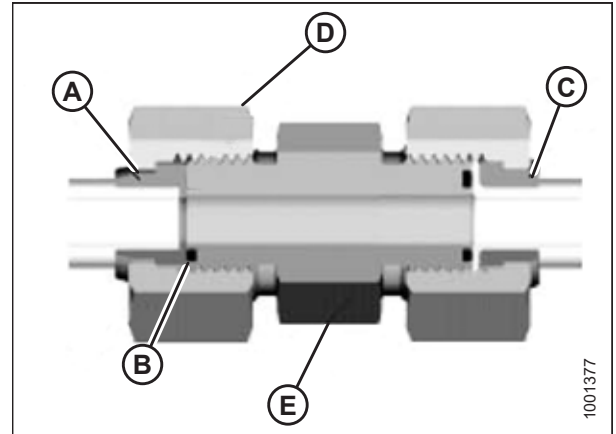


Figure 8.10: Hydraulic Fitting

6. Use three wrenches when assembling unions or joining two hoses together.
7. Verify the final condition of the fitting.

Table 8.8 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>88</sup>	
			Nm	lbf-ft
-3	Note <sup>89</sup>	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note <sup>89</sup>	5/16	–	–
-6	11/16	3/8	40–44	30–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1 3/16	3/4	115–127	85–94
-14	Note <sup>89</sup>	7/8	–	–
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167
-24	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.

88. Torque values and angles shown are based on lubricated connection as in reassembly.

89. O-ring face seal type end not defined for this tube size.

## REFERENCE

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 396. 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

This manual uses both SI units (including metric) and US customary units (sometimes referred to as standard units) of measurement. 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 <sup>3</sup> or cc	x 0.061 =	cubic inch	in. <sup>3</sup>
Weight	kilogram	kg	x 2.2046 =	pound	lb.





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## Recommended Fluids and Lubricants

Ensure that 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.

Lubricant	Specification	Description	Use	Capacities
<b>Grease</b>	SAE multi-purpose	High-temperature extreme-pressure (EP) performance with 1% max. molybdenum disulphide (NLGI Grade 2) lithium base	As required unless otherwise specified	—
<b>Gear lubricant</b>	SAE 85W-140	API service class GL-5	Knife drive box	1.5 liters (1.6 quarts)
<b>Chain oil</b>	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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