

# **D1 Series Draper Header for M Series Windrowers**

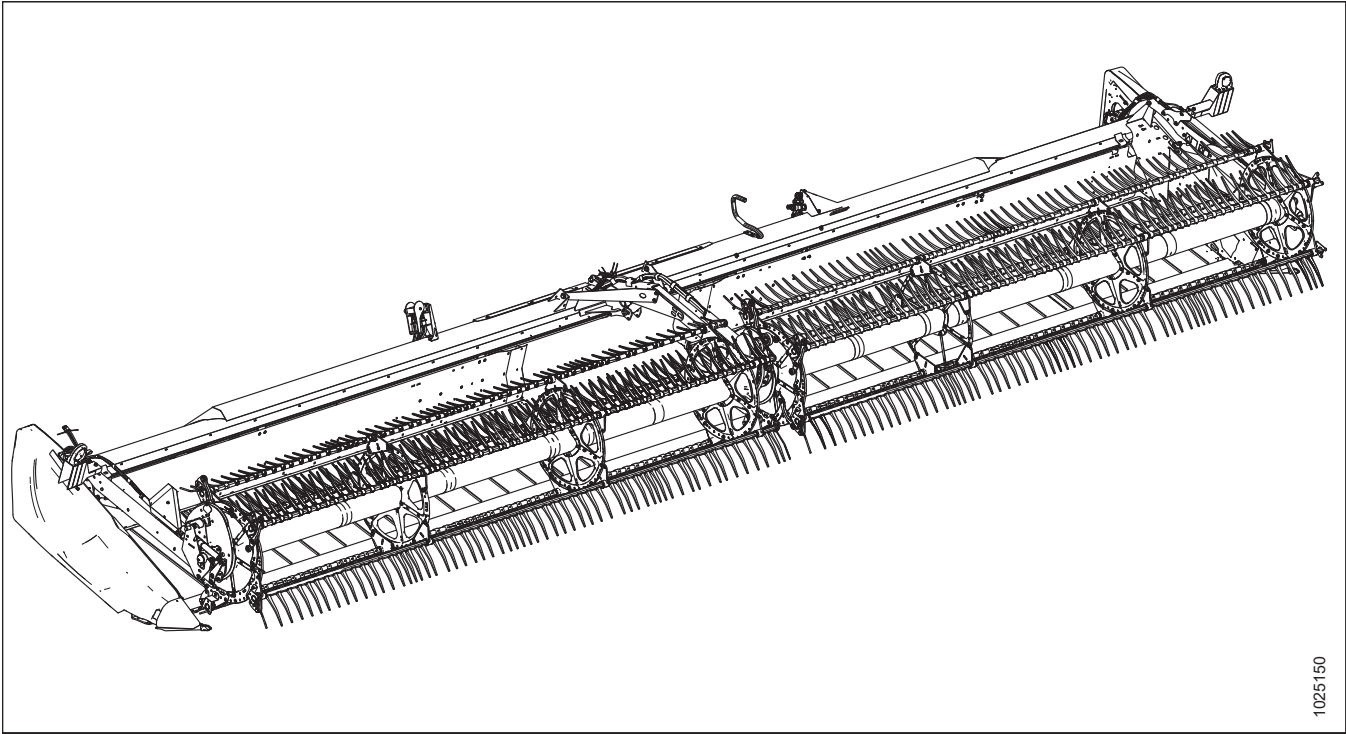
**IMPORTANT: PAGE 33 HAS BEEN  
UPDATED SINCE THIS MANUAL WAS  
PUBLISHED.**

**Operator's Manual**

215377 Revision A

Original Instruction

## D1 Series Draper Header for M Series Windrowers



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# Declaration of Conformity



## EC Declaration of Conformity



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

- [1] \_\_\_\_\_  
[2] Windrower Draper Header  
[3] MacDon D1 Series

[4] As per Shipping Document

[5] June 8, 2020

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

Christoph Martens

Product Integrity

EN	BG	CZ	DA
We, [1] Declare, that the product: Machine Type: [2] Name & Model: [3] Serial Number(s): [4] fulfils all the relevant provisions of the Directive 2006/42/EC. Harmonized standards used, as referred to in Article 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Place and date of declaration: [5] Identity and signature of the person empowered to draw up the declaration: [6] Name and address of the person authorized to compile the technical file: Benedikt von Riedesel General Manager, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Germany) bvonriedesel@macdon.com	Ние, [1] декларираме, че следният продукт: Тип машина: [2] Наименование и модел: [3] Сериен номер(а): [4] отговаря на всички приложими разпоредби на директива 2006/42/ЕО. Използвани са следните хармонизирани стандарти според чл. 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Място и дата на декларацията: [5] Име и подпис на лицето, упълномощено да изготви декларацията: [6] Име и адрес на лицето, упълномощено да състави техническия файл: Бенедикт фон Рийдесел Управител, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Германия) bvonriedesel@macdon.com	My, [1] Prohlašujeme, že produkt: Typ zařízení: [2] Název a model: [3] Sériové(á) číslo(a): [4] splňuje všechna relevantní ustanovení směrnice 2006/42/EC. Byly použity harmonizované standardy, jak je uvedeno v článku 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Místo a datum prohlášení: [5] Identita a podpis osoby oprávněné k vydání prohlášení: [6] Jméno a adresa osoby oprávněné k vyplnění technického souboru: Benedikt von Riedesel generální ředitel, MacDon Europe GmbH Hagenauer Straße 59 65203 Wiesbaden (Německo) bvonriedesel@macdon.com	Vi, [1] erklærer, at produktet: Maskintype [2] Navn og model: [3] Serienummer (-numre): [4] Opfylder alle bestemmelser i direktiv 2006/42/EF. Anvendte harmoniserede standarder, som henviser til i paragraf 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Sted og dato for erklæringen: [5] Identitet på og underskrift fra den person, som er bemyndiget til at udarbejde erklæringen: [6] Navn og adresse på den person, som er bemyndiget til at udarbejde den tekniske fil: Benedikt von Riedesel Direktør, MacDon Europe GmbH Hagenauer Straße 59 D-65203 Wiesbaden (Tyskland) bvonriedesel@macdon.com
DE	ES	ET	FR
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## Introduction

This instructional manual contains information on the D1 Series Draper Header for M Series Windrowers which is designed to serve a dual function in your grain and specialty seed crop applications, laying uniform windrows for crop curing, and pickup by a combine. It also performs well in your hay and forage applications with an optional hay conditioner.

The D1 Series Draper Header also performs as a straight cut header when mounted to a combine with MacDon's FM100 Float Module. The built in header float system works well in straight cut conditions whether harvesting above or on the ground.

**Carefully read all the material provided before attempting to 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.

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

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; the back of the header attaches to the windrower.
- Unless otherwise noted, use the standard torque values provided in Chapter [8.2 Torque Specifications, page 274](#).

The Table of Contents and Index will guide you to specific areas of this manual. Study the Table of Contents to familiarize yourself with how the information is organized.

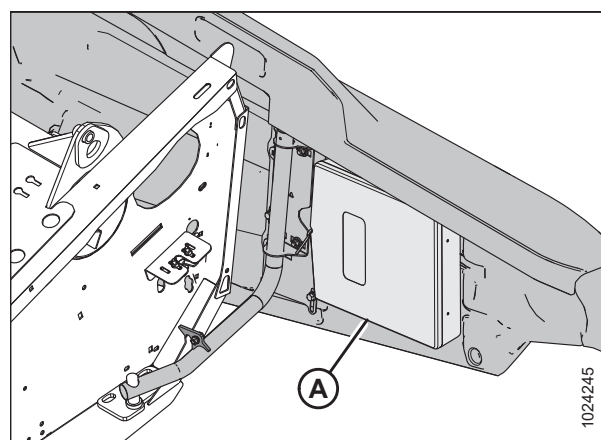
Keep this manual handy for frequent reference and to pass on to new Operators or Owners. A manual storage case (A) is located inside the header left endshield.

Call your MacDon Dealer if you need assistance, information, or additional copies of this manual.

### NOTE:

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

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



**Manual Storage Location**

## Summary of Changes

Section	Summary of Change	Internal Use Only
<i>1.9 Understanding Safety Signs, page 17</i>	Removed decal as it is superseded to MD #304865.	ECN 58722
<i>6.4.2 Draper Clips, page 253</i>	Name changed from EasyGuard	Marketing
<i>6.4.11 Upper Cross Auger (UCA) Case Drain Kit for Single Draper Drive (SDD), page 256</i>	Added kit	ECN 51932
<i>6.5 Service Kits, page 257</i>	Added topic.	ECN 59839

## Model and Serial Number

Record the model number, serial number, and model year of the header and Slow Speed Transport / Stabilizer Wheel option (if installed) on the lines below.

### D1 Series Draper Header

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

Header serial number plate (A) is located on the upper corner on the left endsheet.

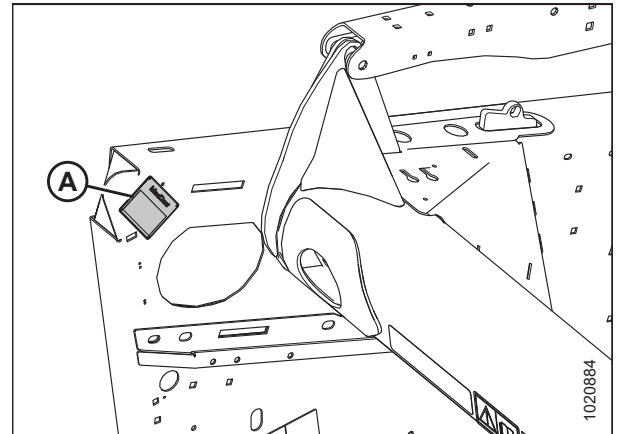


Figure 1: Header Serial Number Plate Location

### Transport / Stabilizer Wheel Option

Serial Number: \_\_\_\_\_  
Year: \_\_\_\_\_

Transport serial number plate (A) is located on the right axle assembly.



Figure 2: Transport / Stabilizer Wheel



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# Chapter 1: Safety

## 1.1 Safety Alert Symbols

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

This symbol means:

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

Carefully read and follow the safety message accompanying this symbol.

### Why is safety important to you?

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



Figure 1.1: Safety Symbol

## 1.2 Signal Words

Three signal words, **DANGER**, **WARNING**, and **CAUTION**, are used to alert you to hazardous situations. Two signal words, **IMPORTANT** and **NOTE**, identify non-safety related information. Signal words are selected using the following guidelines:



### **DANGER**

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



### **WARNING**

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



### **CAUTION**

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

#### **IMPORTANT:**

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

#### **NOTE:**

Provides additional information or advice.

## 1.3 General Safety

### CAUTION

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

Protect yourself when assembling, operating, and servicing machinery, wear all protective clothing and personal safety devices that could be necessary for the job at hand. Do **NOT** take chances. You may need the following:

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

In addition, take the following precautions:

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



Figure 1.2: Safety Equipment



Figure 1.3: Safety Equipment

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

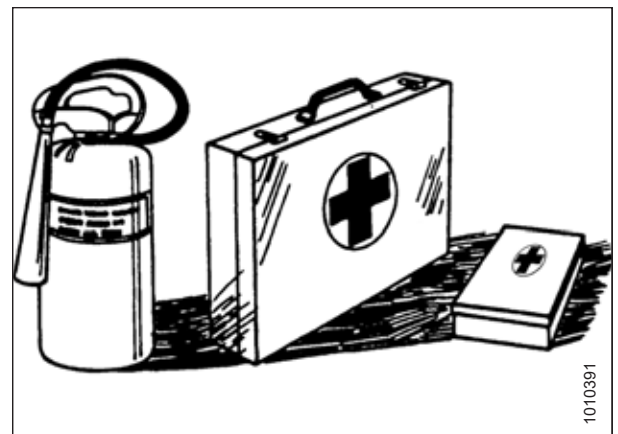


Figure 1.4: Safety Equipment

## SAFETY

- Wear close-fitting clothing and cover long hair. **NEVER** wear dangling items such as scarves or bracelets.
- Keep all shields in place. **NEVER** alter or remove safety equipment. Make sure driveline guards can rotate independently of shaft and can telescope freely.
- Use only service and repair parts made or approved by equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.



Figure 1.5: Safety around Equipment

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

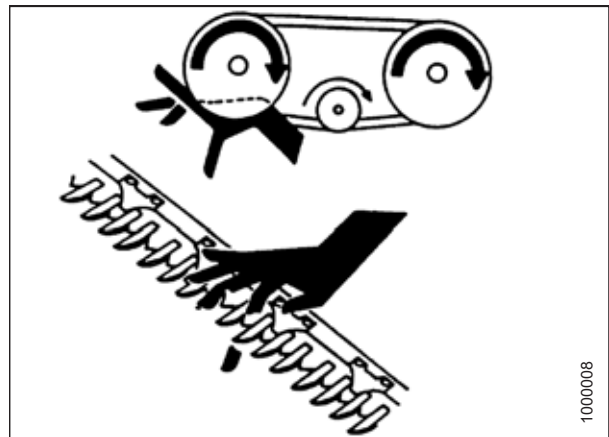


Figure 1.6: Safety around Equipment

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



Figure 1.7: Safety around Equipment



## 1.4 Maintenance Safety

To ensure your safety while maintaining machine:

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



Figure 1.8: Safety around Equipment

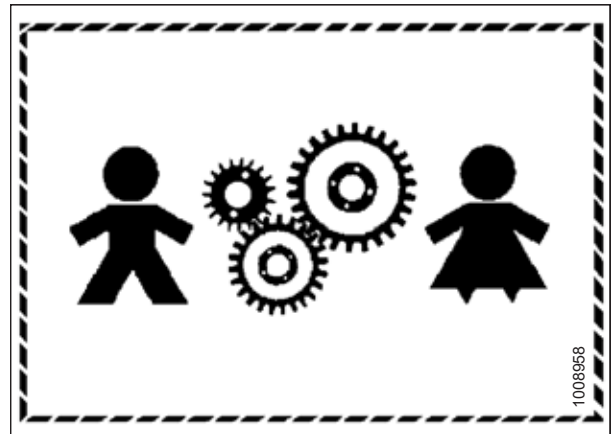


Figure 1.9: Equipment NOT Safe for Children



Figure 1.10: Safety Equipment

## 1.5 Hydraulic Safety

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

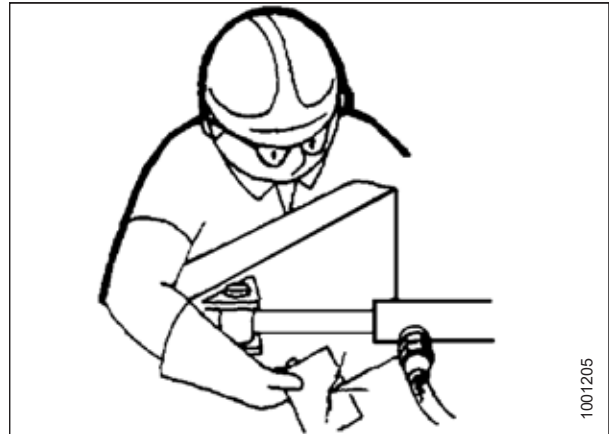


Figure 1.11: Testing for Hydraulic Leaks

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



Figure 1.12: Hydraulic Pressure Hazard

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

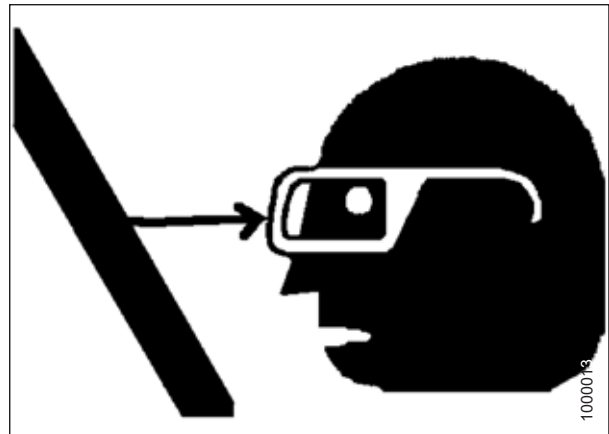


Figure 1.13: Safety around Equipment

## 1.6 Welding Precaution

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



### **WARNING**

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

If an Operator needs to do any welding on the header, it should first be disconnected and removed from the windrower.

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

## 1.7 Safety Signs

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

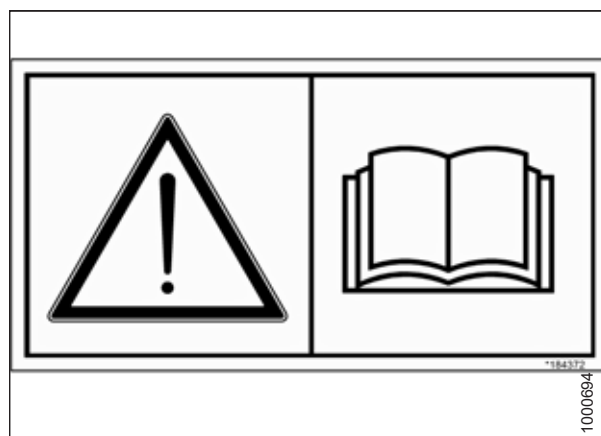


Figure 1.14: Operator's Manual Decal

### 1.7.1 Installing Safety Decals

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

1.8 Safety Decal Locations

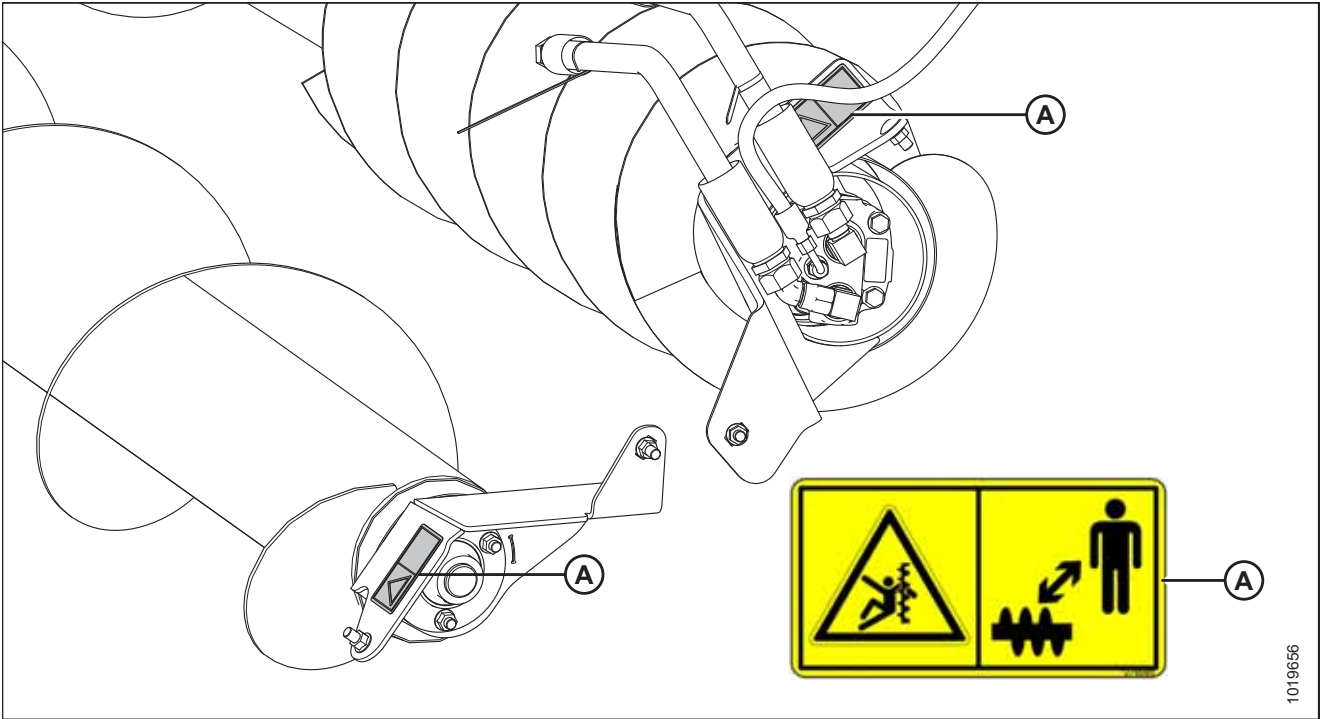


Figure 1.15: Upper Cross Auger (Optional)

A - MD #279085

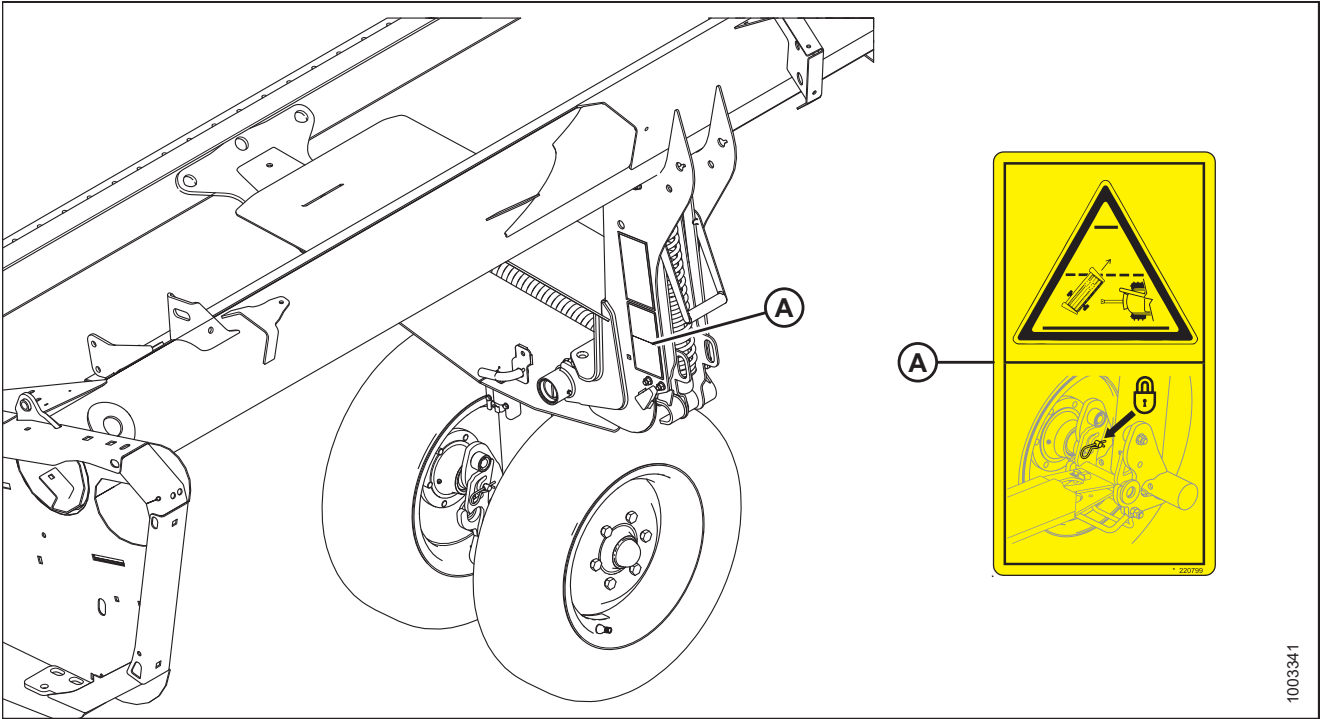


Figure 1.16: Slow Speed Transport (Optional)

A - MD #220799

SAFETY

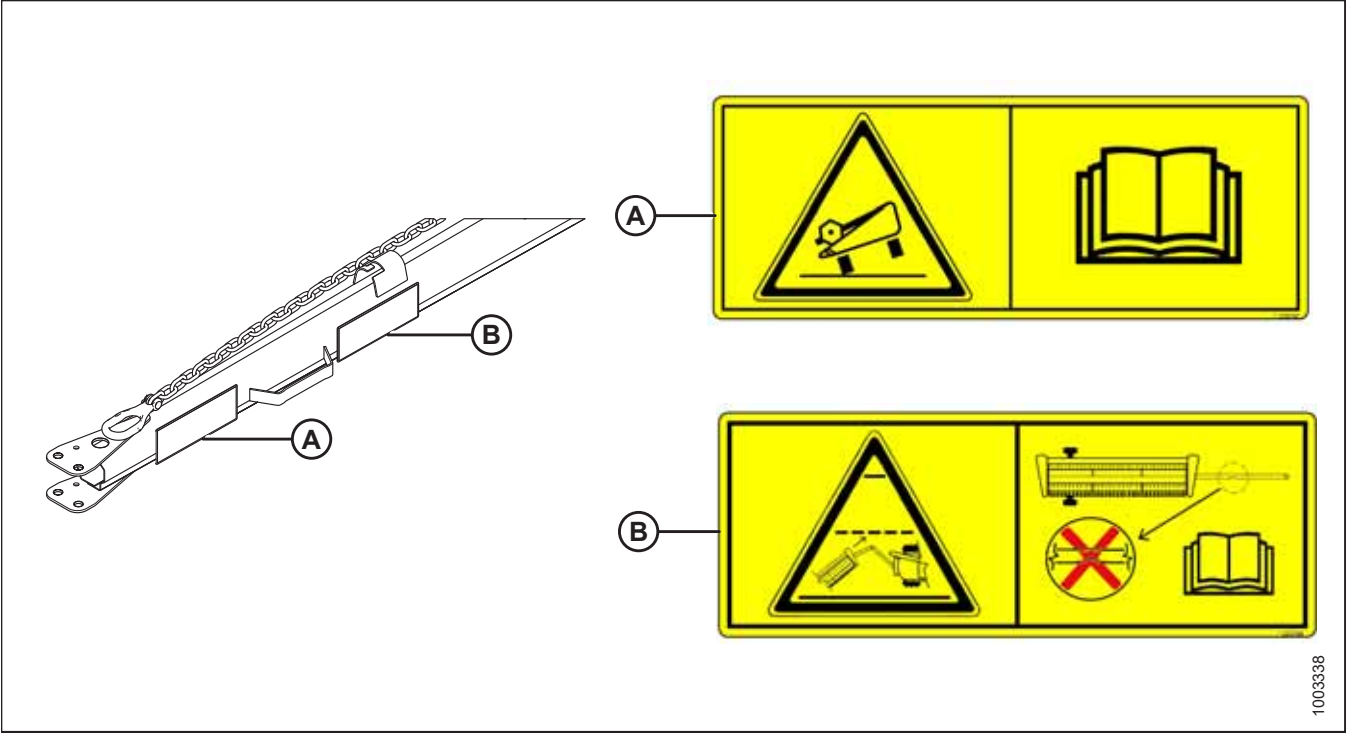


Figure 1.17: Slow Speed Transport Tow-Bar (Optional)

A - MD #220797

B - MD #220798

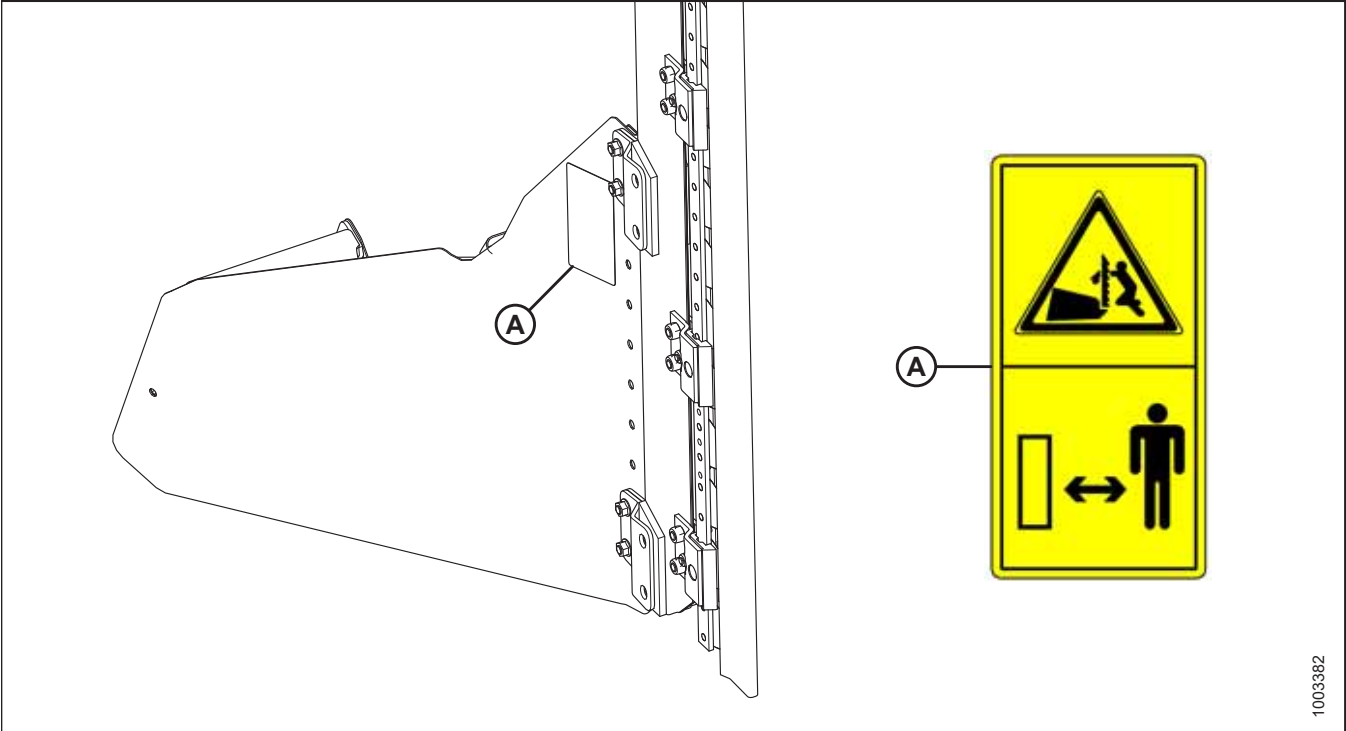
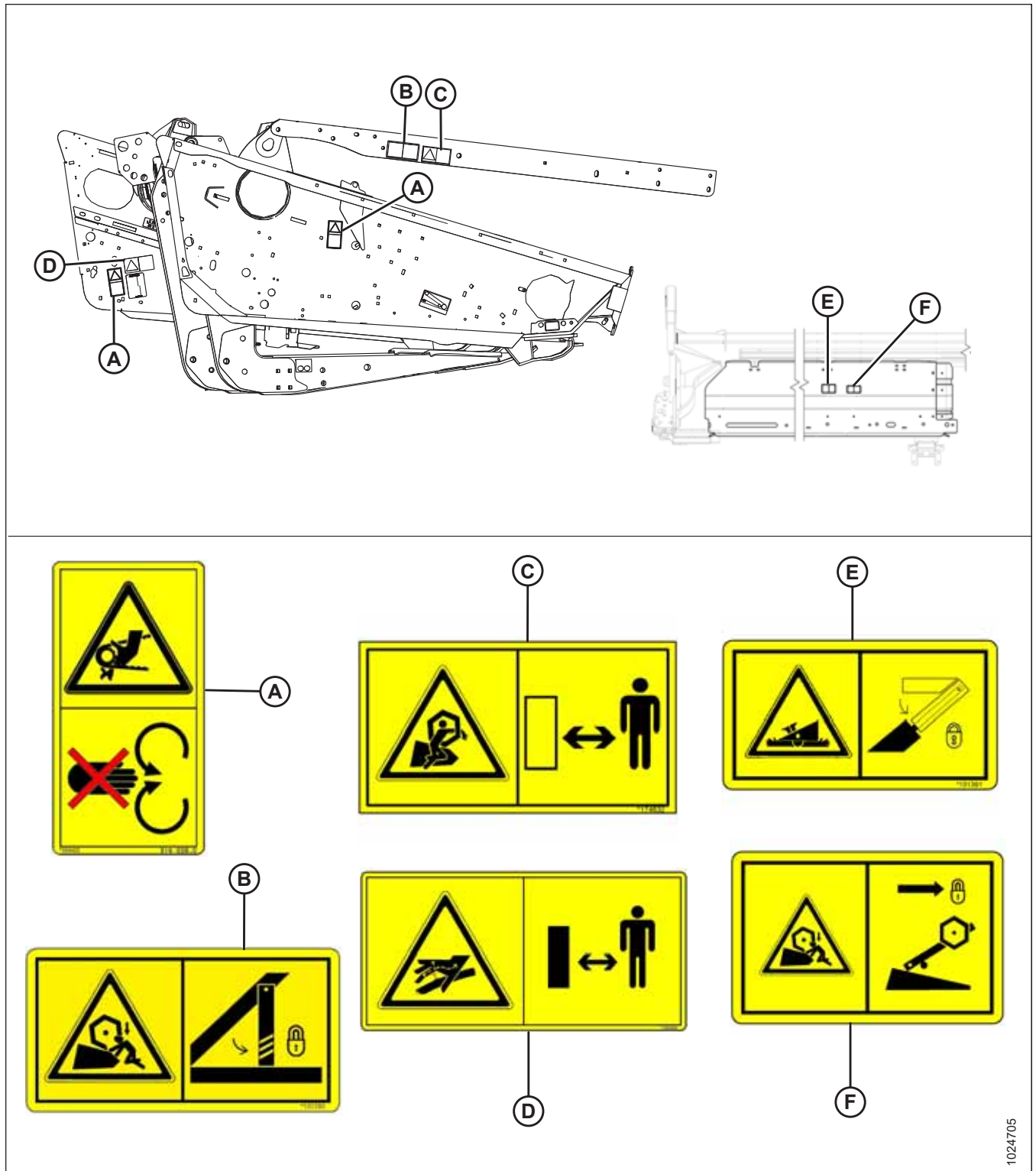


Figure 1.18: Vertical Knife (Optional)

A - MD #174684

## SAFETY



**Figure 1.19: Endsheets, Reel Arms, and Backsheet**

A - MD #184422 (Four Places on DK; Two Places on SK)  
 C - MD #174632 (Two Places)  
 E - MD #131391 (Two Places)

B - MD #131393 (Four Places on Single Reel)  
 D - MD #166466 (Two Places)  
 F - MD #131392 (Two Places on Double Reel Only)

SAFETY

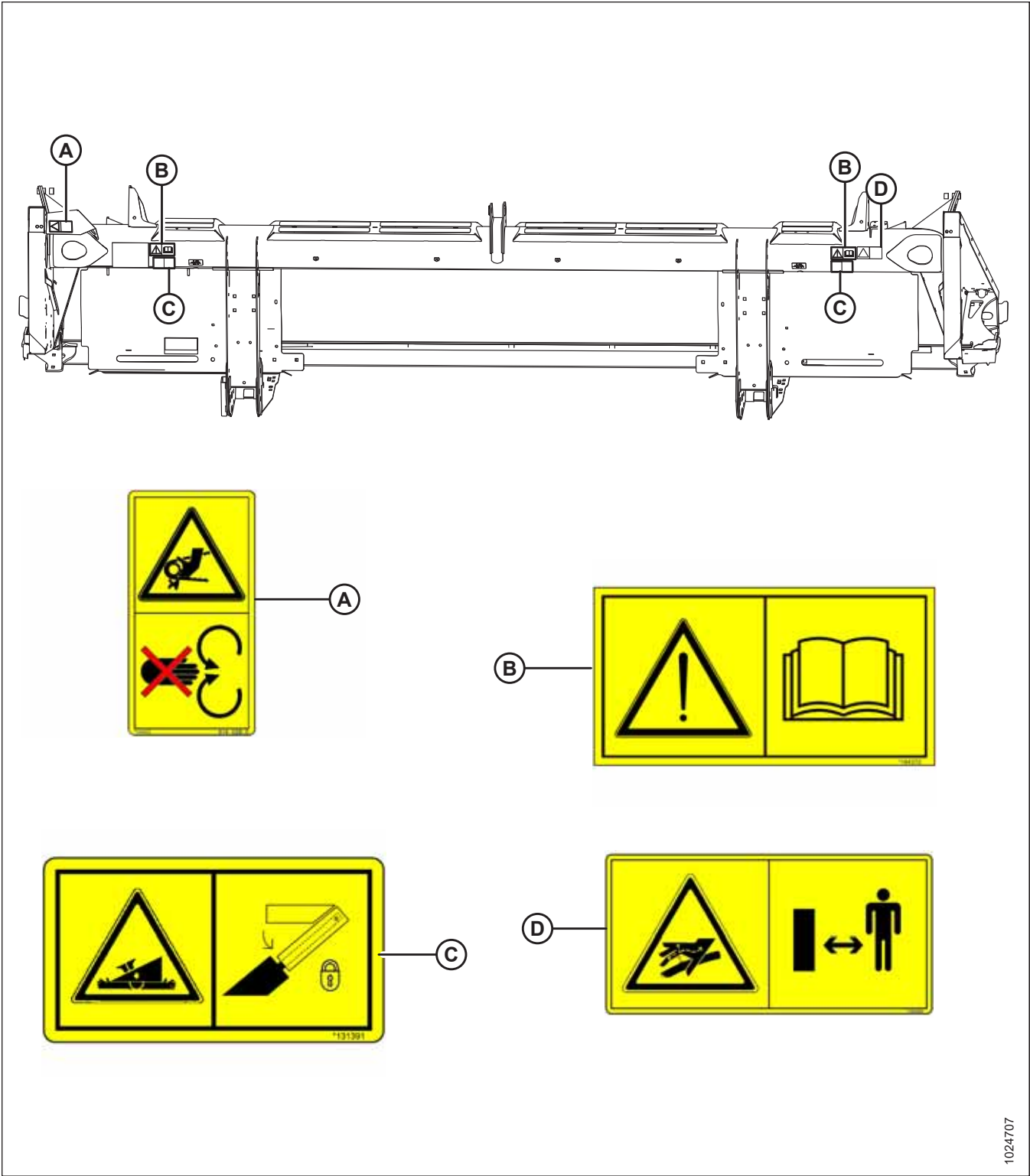


Figure 1.20: Backtube – D115 Draper Header

A - MD #184422                      B - MD #184372                      C - MD #131391                      D - MD #166466



SAFETY

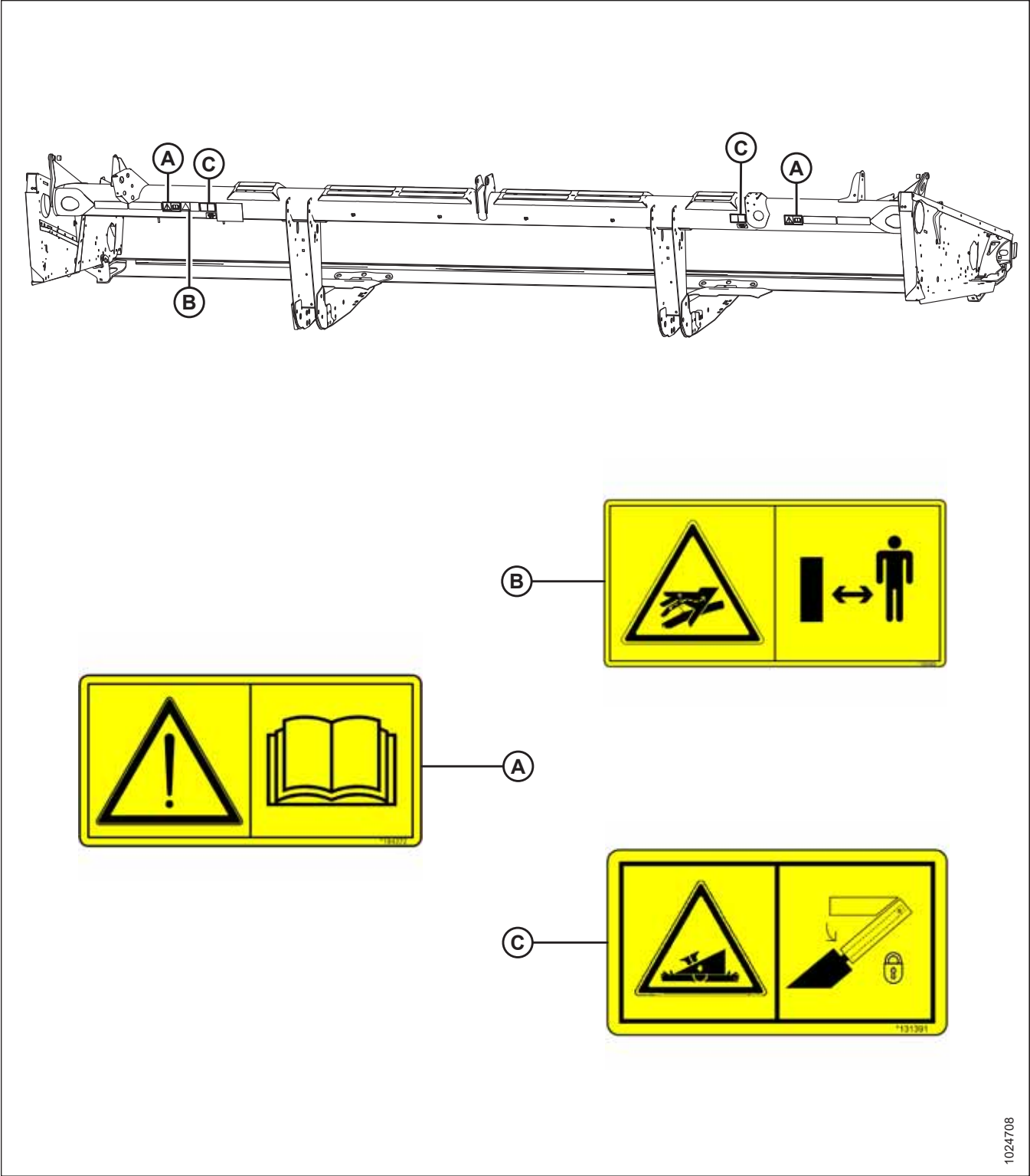


Figure 1.21: Backtube – D120 Draper Header

A - MD #184372

B - MD #166466

C - MD #131391

1024708

SAFETY

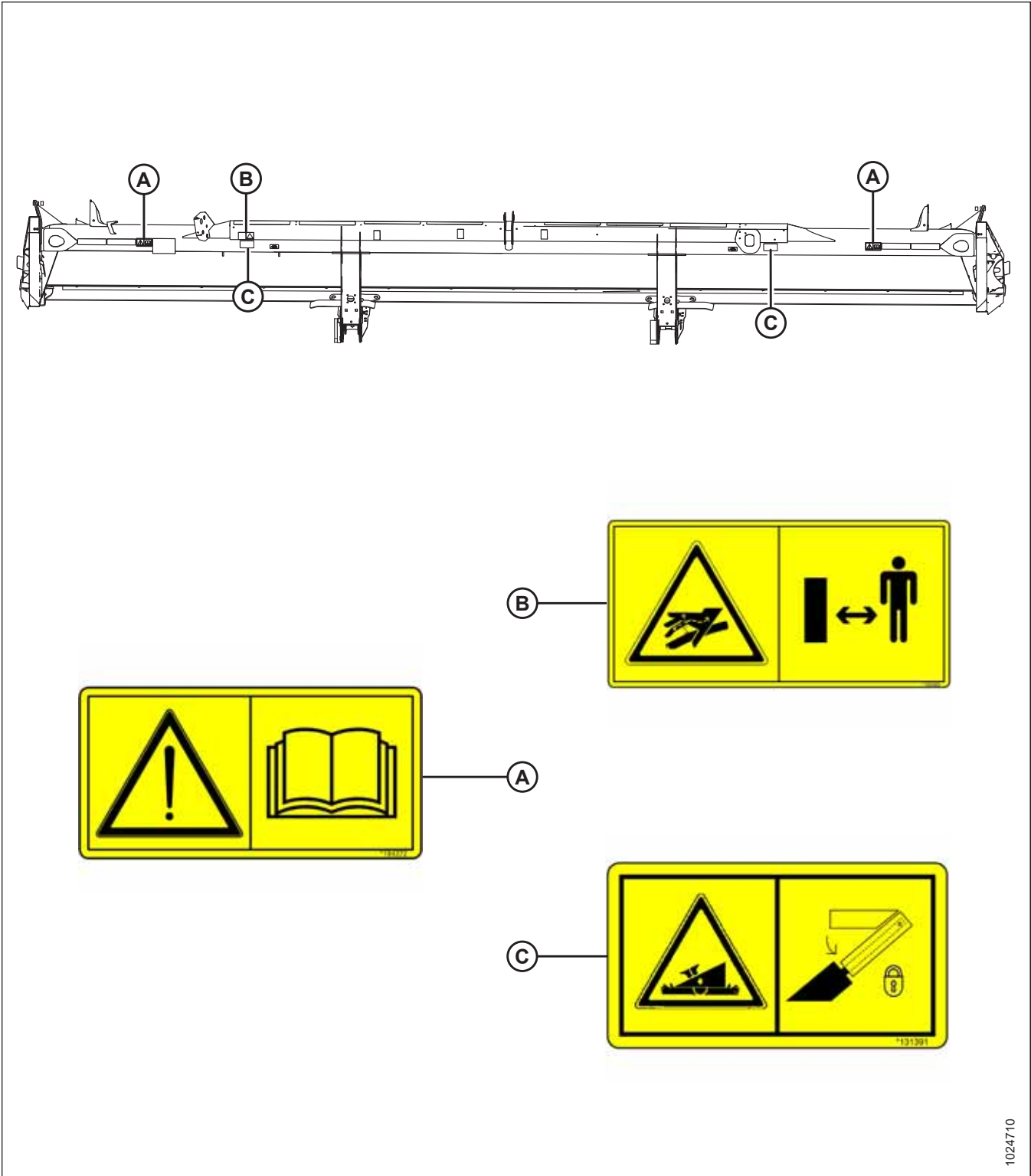


Figure 1.22: Backtube – D125 Draper Header

A - MD #184372

B - MD #166466

C - MD #131391

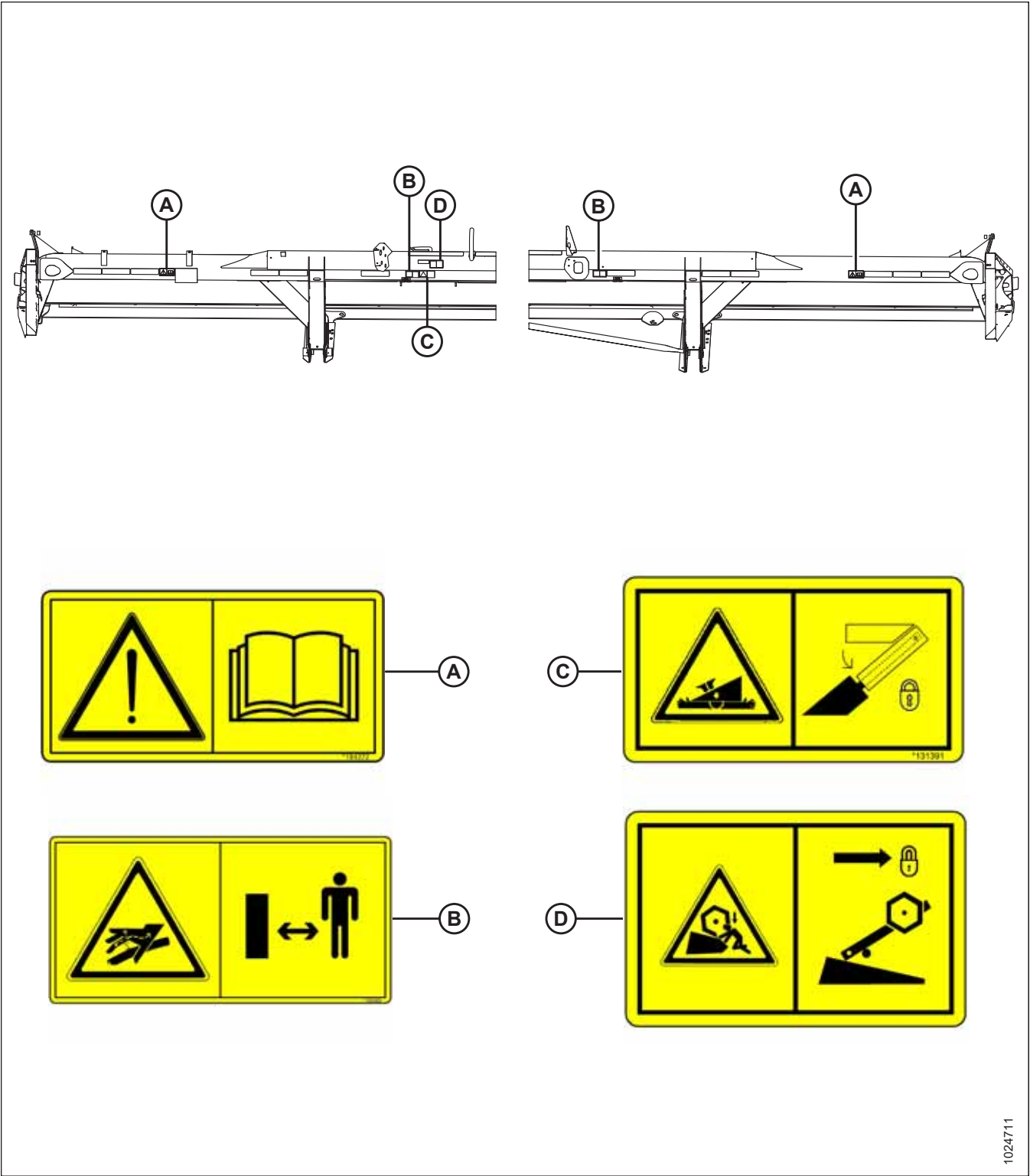


Figure 1.23: Backtube – D130 and D135 Draper Headers

A - MD #184372

B - MD #131391

C - MD #166466

D - MD #131392

SAFETY

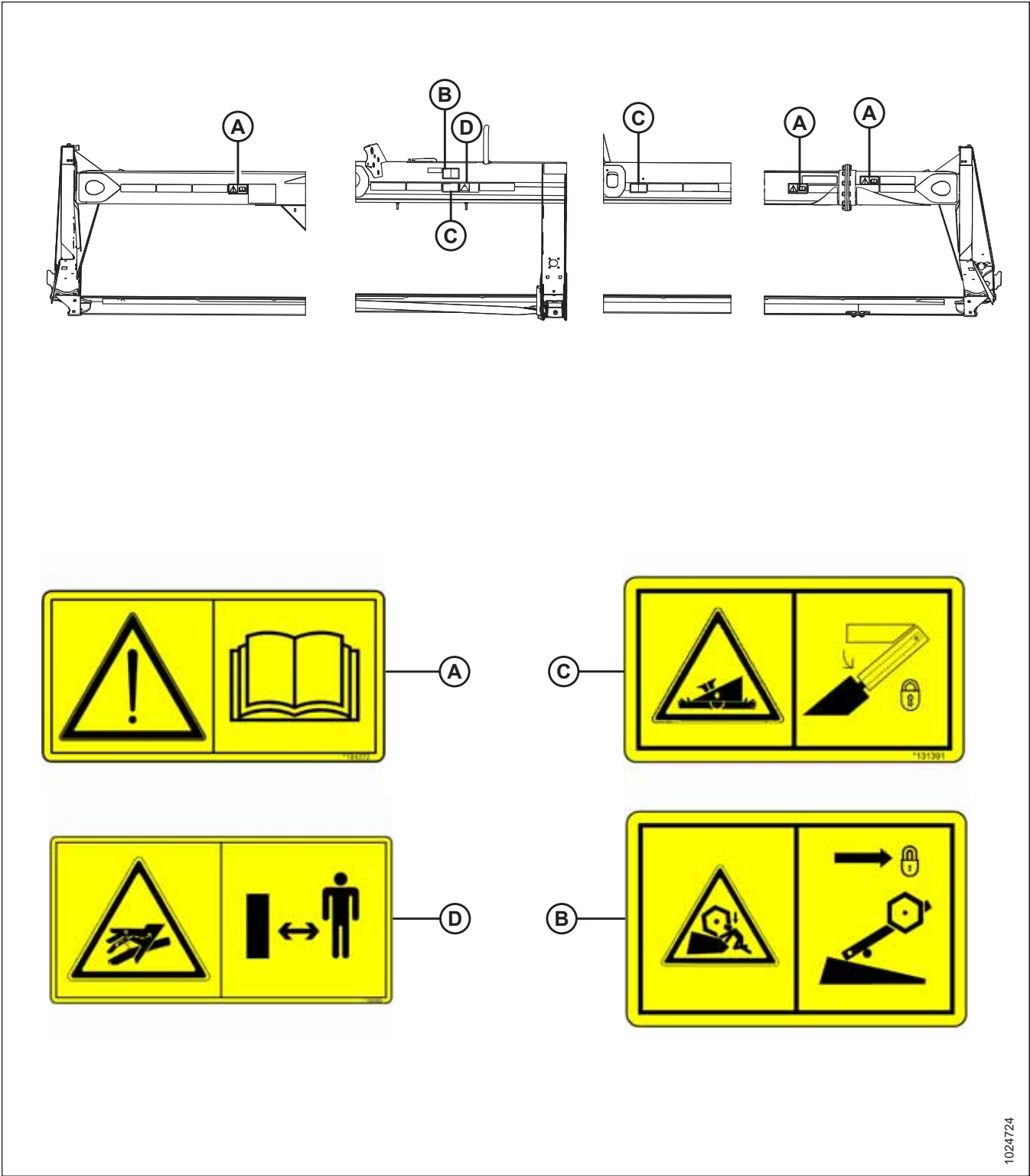


Figure 1.24: Backtube – D140 Draper Header

A - MD #184372      B - MD #131392      C - MD #131391      D - MD #166466

## 1.9 Understanding Safety Signs

### MD #113482

General hazard pertaining to machine operation and servicing

#### DANGER

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

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



Figure 1.25: MD #113482

### MD #131391

Header crushing hazard

#### DANGER

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

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



Figure 1.26: MD #131391

## SAFETY

### MD #131392

Reel crushing hazard

#### WARNING

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

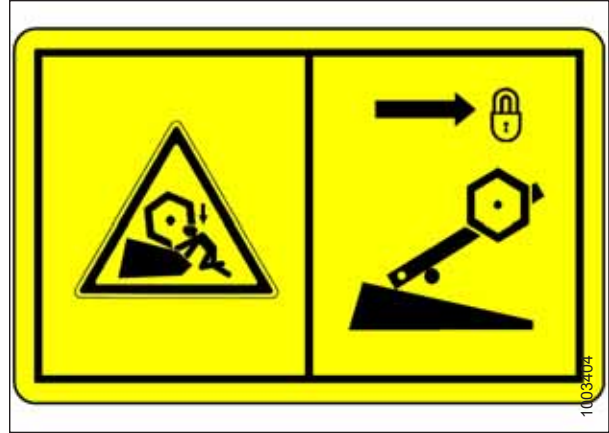


Figure 1.27: MD #131392

### MD #131393

Reel crushing hazard

#### WARNING

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



Figure 1.28: MD #131393

### MD #166466

High-pressure oil hazard

#### WARNING

To prevent serious injury, gangrene, or death:

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



Figure 1.29: MD #166466

## SAFETY

### MD #174632

Reel entanglement hazard

#### DANGER

To prevent injury from entanglement with rotating reel:

- Stand clear of header while machine is running.



Figure 1.30: MD #174632

### MD #174684

Knife cutting hazard

#### WARNING

To prevent injury from sharp cutting knife:

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



Figure 1.31: MD #174684

### MD #184372

General hazard pertaining to machine operation and servicing

#### DANGER

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

- Read the operator's manual and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
- Do **NOT** allow untrained persons to operate the machine.
- Review safety instructions with all Operators every year.
- Ensure that all safety signs are installed and legible.
- Make certain everyone is clear of machine before starting engine and during operation.
- Keep riders off the machine.
- Keep all shields in place and stay clear of moving parts.
- Disengage header drive, put transmission in Neutral, and wait for all movement to stop before leaving operator's position.

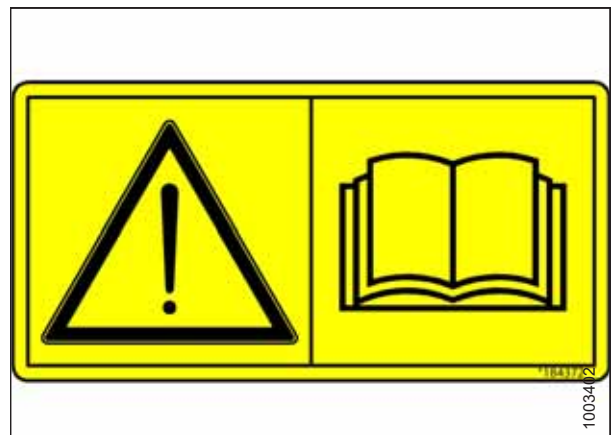


Figure 1.32: MD #184372

## SAFETY

- Stop the engine and remove the key from the ignition before servicing, adjusting, lubricating, cleaning, or unplugging machine.
- Engage safety props to prevent lowering of raised unit before servicing in the raised position.
- Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

### MD #184422

Hand and arm entanglement hazard

#### WARNING

To prevent injury:

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



Figure 1.33: MD #184422

### MD #220797

Transport tipping hazard

#### DANGER

To prevent serious injury or death from transport tipping:

- Read the operator's manual for more information on potential tipping or rollover of header while transporting.

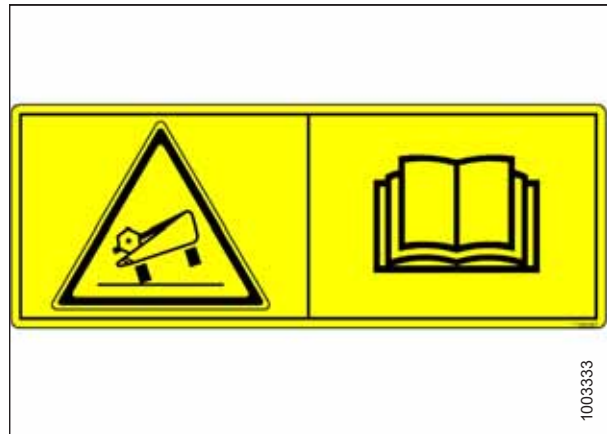


Figure 1.34: MD #220797

### MD #220798

Loss of control hazard.

#### DANGER

To prevent serious injury or death from loss of control:

- Do **NOT** tow the header with a dented or otherwise damaged tow pole.
- Consult the operator's manual for more information.



Figure 1.35: MD #220798



## SAFETY

### MD #220799

Loss of control hazard

#### WARNING

To prevent serious injury or death from loss of control:

- Ensure tow-bar lock mechanism is locked.



Figure 1.36: MD #220799

### MD #279085

Auger entanglement hazard

#### DANGER

To prevent injury from rotating auger:

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



Figure 1.37: MD #279085

### MD #304865

Header crushing hazard

#### WARNING

To prevent injury or death from fall of raised header:

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



Figure 1.38: MD #304865



## Chapter 2: Product Overview

### 2.1 Definitions

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

Term	Definition
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut
Cab-forward	Windrower operation with Operator and cab facing in direction of travel
CDM	Cab display module on an M Series Windrower
Center-link	A hydraulic cylinder link between the header and machine used to change header angle
CGVW	Combined gross vehicle weight
D1 SP Series Header	MacDon D115, D120, D125, D130, D135, and D140 rigid draper headers for windrowers
DDD	Double-draper drive
DK	Double knife
DKD	Double-knife drive
DR	Double reel
DWA	Double Windrow Attachment
Engine-forward	Windrower operation with Operator and engine facing in direction of travel
Export header	Header configuration typical outside North America
FFFT	Flats from finger tight
Finger tight	Finger tight is a reference position where sealing surfaces or components are making contact with each other, and fitting has been tightened to a point where fitting is no longer loose
GVW	Gross vehicle weight
Hard joint	A joint made with use of a fastener where joining materials are highly incompressible
Header	A machine that cuts and lays crop into a windrow and is attached to a windrower
Hex key	A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive); also known as an Allen key and various other synonyms
HDS	Hydraulic deck shift
hp	Horsepower
ISC	Intermediate Speed Control
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting

## PRODUCT OVERVIEW

Term	Definition
Knife	A cutting device which uses a reciprocating cutter (also called a sickle)
M Series windrower	MacDon M100, M105, M150, M155, M155E4, M200, and M205 windrowers
MDS	Mechanical deck shift
n/a	Not applicable
North American header	Header configuration typical in North America
NPT	National Pipe Thread: A style of fitting used for low-pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit
Nut	An internally threaded fastener that is designed to be paired with a bolt
ORB	O-ring boss: A style of fitting commonly used in port openings on manifolds, pumps, and motors
ORFS	O-ring face seal: A style of fitting commonly used for connecting hoses and tubes. This style of fitting is also commonly called ORS, which stands for O-ring seal
rpm	Revolutions per minute
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread into a mating part
SDD	Single-drawer drive
Self-Propelled (SP) Windrower	Self-propelled machine consisting of a power unit with a header
SK	Single knife
SKD	Single-knife drive
Soft joint	A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time
spm	Strokes per minute
SR	Single reel
Tension	Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)
TFFT	Turns from finger tight
Timed knife drive	Synchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor
Torque	The product of a force X lever arm length, usually measured in Newton-meters (Nm) or foot-pounds (lbf-ft)
Torque angle	A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned farther a number of degrees to achieve its final position
Torque-tension	The relationship between assembly torque applied to a piece of hardware and axial load it induces in bolt or screw
UCA	Upper cross auger
Untimed knife drive	Unsynchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor or two hydraulic motors

## PRODUCT OVERVIEW

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

## 2.2 Specifications

The following symbol and letters are used in Table 2.1, page 26 and Table 2.2, page 28:

### D1 SP Attachments

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

**Table 2.1 Header Specifications**

Cutterbar			
Effective cutting width (distance between crop divider points)			
4.6 m (15 ft.) header		4572 mm (180 in.)	S
6.1 m (20 ft.) header		6096 mm (240 in.)	S
7.6 m (25 ft.) header		7620 mm (300 in.)	S
9.1 m (30 ft.) header		9144 mm (360 in.)	S
10.7 m (35 ft.) header		10,668 mm (420 in.)	S
12.2 m (40 ft.) header		12,192 mm (480 in.)	S
Cutterbar lift range at guard tip (center-link fully retracted)		1265 mm (49.8 in.)	S
Knife			
Single-knife drive (all sizes): One hydraulic motor with V-belt to one heavy duty knife drive box			O <sub>F</sub>
Double-knife drive 4.6–10.7 m (15–35 ft.) (timed): One hydraulic motor with two V-belts to two heavy duty knife drive boxes			O <sub>F</sub>
Double-knife drive 12.2 m [40 ft.] (untimed): Two hydraulic motors with V-belts to two heavy duty knife drive boxes			O <sub>F</sub>
Knife stroke		76 mm (3 in.)	S
Single-knife speed <sup>1</sup>	6.1–7.6 m (20–25 ft.) headers	1200–1400 (strokes/min.)	S
Single-knife speed <sup>1</sup>	9.1 m (30 ft.) header	1200–1400 (strokes/min.)	S
Single-knife speed <sup>1</sup>	10.7 m (35 ft.) header	1150–1300 (strokes/min.)	S
Single-knife speed <sup>1</sup>	12.2 m (40 ft.) header	1150–1220 (strokes/min.)	S
Double-knife speed <sup>1</sup>	4.6 m (15 ft.) header	1500–1900 (strokes/min.)	S
Double-knife speed <sup>1</sup>	6.1–7.6 m (20–25 ft.) headers	1400–1700 (strokes/min.)	S
Double-knife speed <sup>1</sup>	9.1 (30 ft.) header	1200–1500 (strokes/min.)	S
Double-knife speed <sup>1</sup>	10.7 m (35 ft.) header	1200–1400 (strokes/min.)	S
Double-knife speed <sup>1</sup>	12.2 m (40 ft.) header	1200–1400 (strokes/min.)	S

- Under normal cutting conditions, set knife speed at the knife drive pulley between 600 and 640 rpm (1200 and 1280 spm). If set to low side of range, you could experience knife stalling.

## PRODUCT OVERVIEW

**Table 2.1 Header Specifications (continued)**

Knife Sections			
Over-serrated, solid, bolted, 3.5 serrations per cm (9 serrations per inch)			O <sub>F</sub>
Over-serrated, solid, bolted, 5.6 serrations per cm (14 serrations per inch)			O <sub>F</sub>
Knife overlap at center (double-knife headers)	3 mm (1/8 in.)		S
Guards and Hold-Downs			
Guard: pointed, forged, double heat treated (DHT) Hold-down: Sheet metal, adjustment bolt			O <sub>F</sub>
Guard: pointed, forged, case hardened (CH) Hold-down: Sheet metal, adjustment bolt			O <sub>F</sub>
Guard: stub, forged bottom, forged top, adjustment plate			O <sub>F</sub>
Guard: stub, forged bottom, sheet metal top, adjustment bolt			O <sub>F</sub>
Guard: 4 point, no choke design (2 long points with tangs, 2 short points without tangs)			O <sub>F</sub>
Guard Angle (Cutterbar on Ground)			
Center-link retracted	4.6–7.5 m (15–25 ft.) headers	7.5°	S
Center-link retracted	9.1–12.2 m (30–40 ft.) headers	2.5°	S
Center-link extended	4.6–7.5 m (15–25 ft.) headers	17°	S
Center-link extended	9.1–12.2 m (30–40 ft.) headers	12°	S
Draper (Conveyor) and Decks			
Draper width		1057 mm (41 19/32 in.)	S
Draper drive		Hydraulic	S
Draper speed		225 m/min. (0–742 fpm)	S
PR15 Pick-Up Reel			S
Quantity of tine tubes		5, 6, or 9	—
Center tube diameter: All reel sizes except 10.7 m (35 ft.) single reel		203 mm (8 in.)	—
Center tube diameter: 10.7 m (35 ft.) single reel		254 mm (10 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)		150 mm (6 in.)	S

## PRODUCT OVERVIEW

**Table 2.1 Header Specifications (continued)**

Reel drive	Hydraulic	S
Reel speed (adjustable from cab using ground speed index)	0–85 rpm	S

**Table 2.2 Header Attachments**

Upper Cross Auger			O <sub>D</sub>
Outside diameter		305 mm (12 in.)	
Tube diameter	All sizes except 7.6 m (25 ft.) header	152 mm (6 in.)	
Tube diameter	7.6 m (25 ft.) header	178 mm (7 in.)	
Stabilizer Wheel / Slow Speed Transport			O <sub>D</sub>
Wheels		38 cm (15 in.)	
Tires		P205/75 R-15	

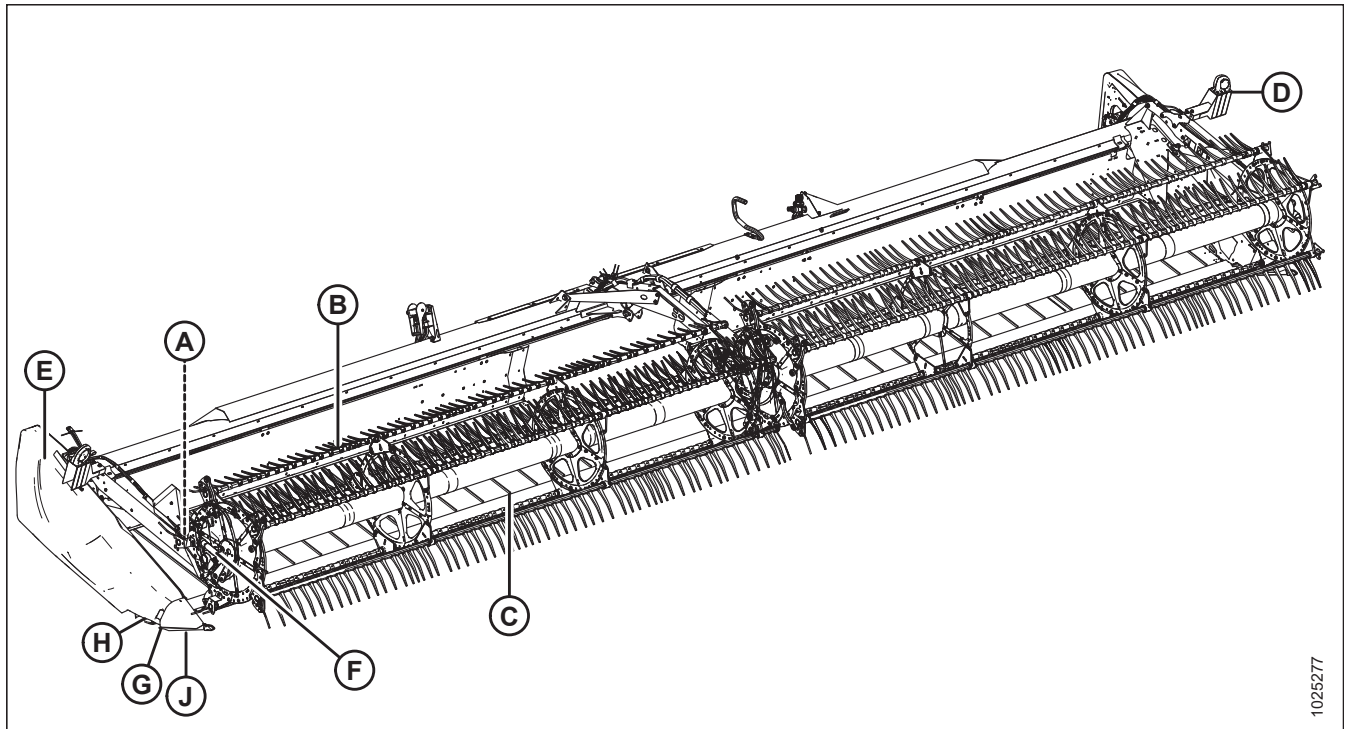
**Table 2.3 Header Weight**

Estimated weight range for base header without performance options (variances are due to different package configurations)		
4.6 m (15 ft.) header		1395–1483 kg (3075–3270 lb.)
6.1 m (20 ft.) header		1517–1624 kg (3345–3580 lb.)
7.6 m (25 ft.) header	North America frame	1696–1875 kg (3740–4130 lb.)
7.6 m (25 ft.) header	Export frame	1676 kg (3695 lb.)
9.1 m (30 ft.) header	North America frame	2003–2341 kg (4415–5160 lb.)
9.1 m (30 ft.) header	Export frame	2157 kg (4755 lb.)
10.7 m (35 ft.) header	North America frame	2209–2626 kg (4870–5790 lb.)
10.7 m (35 ft.) header	Export frame	2379 kg (5245 lb.)
12.2 m (40 ft.) header	North America frame	2540–2617 kg (5600–5770 lb.)
12.2 m (40 ft.) header	Export frame	2640 kg (5820 lb.)



## 2.3 Component Identification

Figure 2.1: D1 SP Windrower Header Components



A - Reel Cam  
D - Transport Light  
G - Knife Drive Box

B - Pick-Up Reel Tines  
E - Endshield  
H - Skid Shoe

C - Drapers  
F - Reel Fore-Aft Cylinder  
J - Crop Divider



## Chapter 3: Operation

### 3.1 Owner/Operator Responsibilities



#### CAUTION

- It is your responsibility to read and understand this manual completely before operating the header. Contact your MacDon Dealer if an instruction is not clear to you.
- Follow all safety messages in the manual and on safety decals on the machine.
- Remember that YOU are the key to safety. Good safety practices protect you and the people around you.
- Before allowing anyone 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 also 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

### 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 windrower seat.
- Check the operation of all controls in a safe, clear area before starting work.
- Do NOT allow riders on the windrower.



Figure 3.1: No Riders

### 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 transmission in gear when travelling downhill.
- Never attempt to get on or off a moving machine.
- Do NOT leave operator's station while the engine is running.
- To avoid bodily injury or death from 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 proper shutdown procedure. For instructions, refer to [3.4 Shutting down the Machine, page 41](#).
- Operate only in daylight or good artificial light.

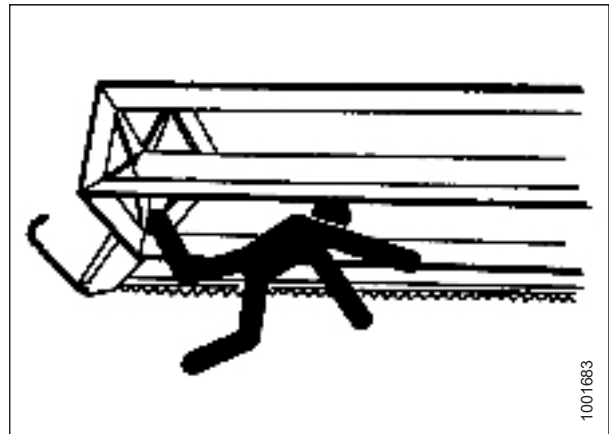


Figure 3.2: Bystander Hazard

### 3.2.1 Header Safety Props

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

### DANGER

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

### 3.2.2 Reel Safety Props

The reel safety props, located on the reel support arms, prevent the reel from unexpectedly lowering.

#### **WARNING**

To avoid bodily injury from fall of raised reel, always engage reel safety props before going under raised reel for any reason.

#### **IMPORTANT:**

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

#### *Engaging Reel Safety Props*

#### **DANGER**

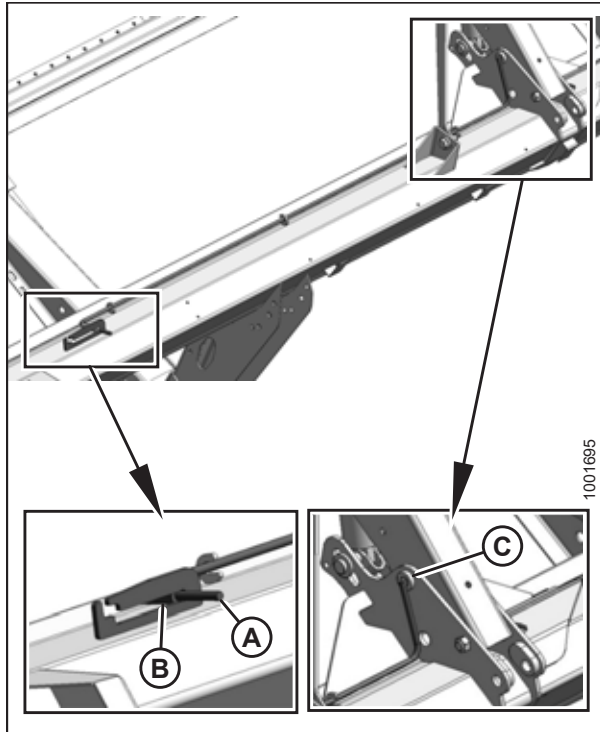
To prevent bodily injury or death from the unexpected start-up of the machine, always stop the engine and remove the key from the ignition before making adjustments to the machine.

1. Raise the reel fully.
2. Shut down the engine, and remove the key from the ignition.
3. Move reel safety props (A) to the engaged position (as shown). **The prop MUST be placed on the top surface of raised lug (B), making contact with the cylinder mount, to ensure positive engagement.**

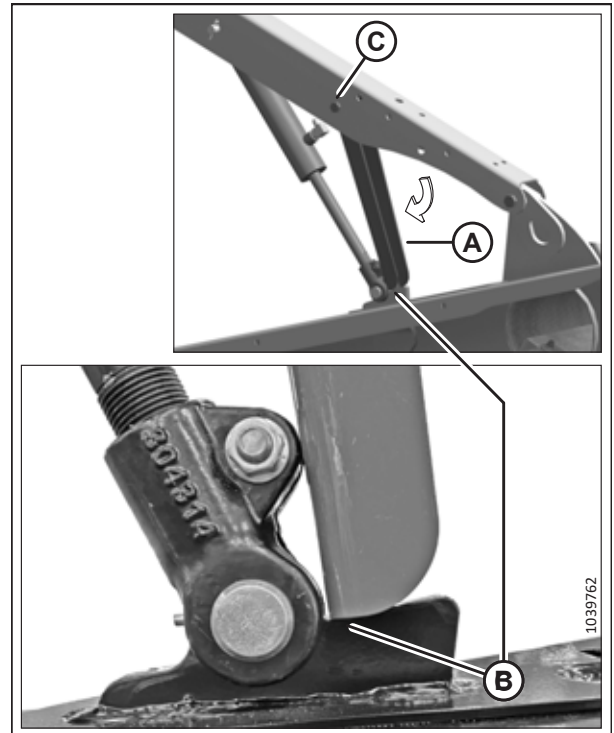
#### **NOTE:**

Keep pivot bolt (C) sufficiently tight so that the prop remains in the stored position when not in use, but can still be engaged using hand force.

4. Repeat the previous step on the opposite side of the header.



**Figure 3.4: Reel Safety Prop – Center Arm**



**Figure 3.3: Engaged Reel Safety Prop – Left Shown**

**THE CONTENT ON THIS PAGE HAS CHANGED SINCE THIS MANUAL (215377 REVISION A) WAS PUBLISHED.**

4. **Double Reel Headers Only:** Use handle (A) to move the lock rod to inboard position (B) which engages pin (C) under the prop.
5. **Double Reel Headers Only:** Lower the reel until the safety props contact the outer arm cylinder mounts and the center arm pins.

## OPERATION

### *Disengaging Reel Safety Props*

1. Raise the reel to the maximum height.
2. Move reel safety props (A) back inside the reel arms.
3. Repeat on the opposite side of the header.

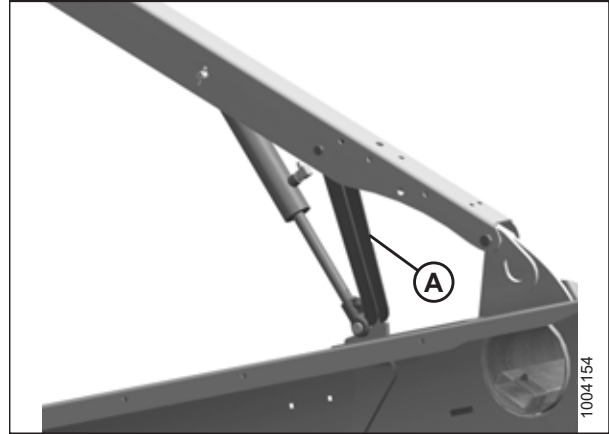


Figure 3.5: Reel Safety Prop – Left Arm Shown

4. **Double Reel Headers Only:** Use handle (B) to move lock rod (A) to the outboard position.

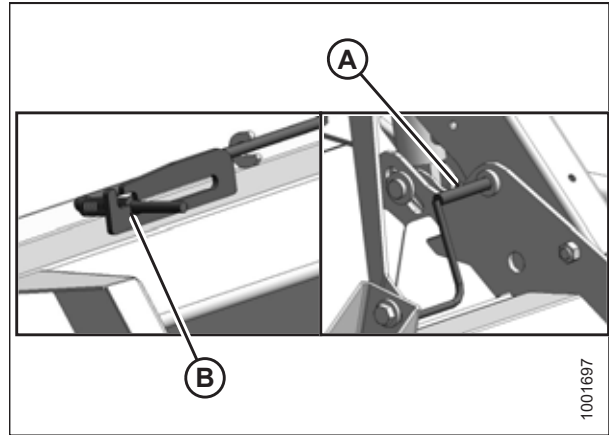


Figure 3.6: Reel Safety Prop – Center Arm

### 3.2.3 Header Endshields

A hinged, polyethylene endshield is fitted on each end of the header.

#### *Opening Endshields*

1. Push release lever (A) located on the backside of the endshield to unlock the shield.
2. Pull the endshield open using handle depression (B).

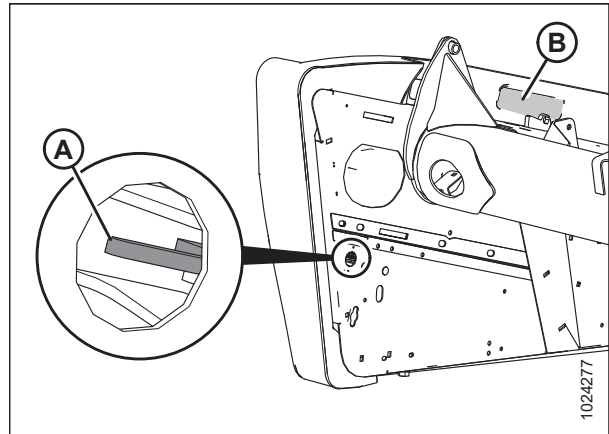


Figure 3.7: Left Endshield

## OPERATION

3. Pull the endshield at handle depression (A). The endshield is retained by hinge tab (B) and will open in direction (C).

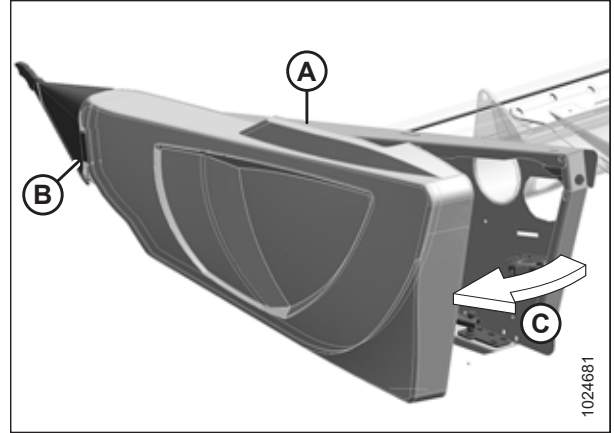


Figure 3.8: Left Endshield

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

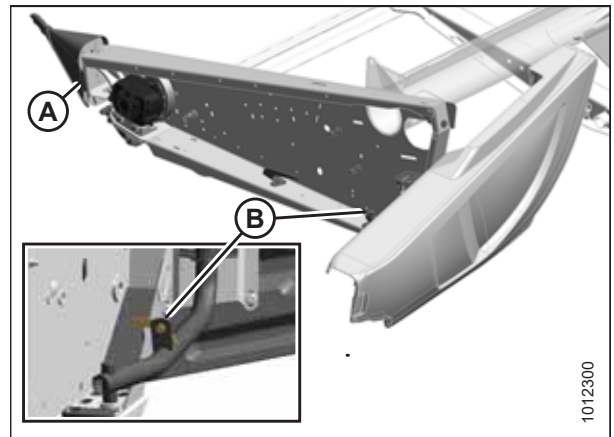


Figure 3.9: Left Endshield

### *Closing Endshields*

1. Disengage lock (B) to allow the endshield to move.
2. Insert the front of the endshield behind hinge tab (A) and into the divider cone.

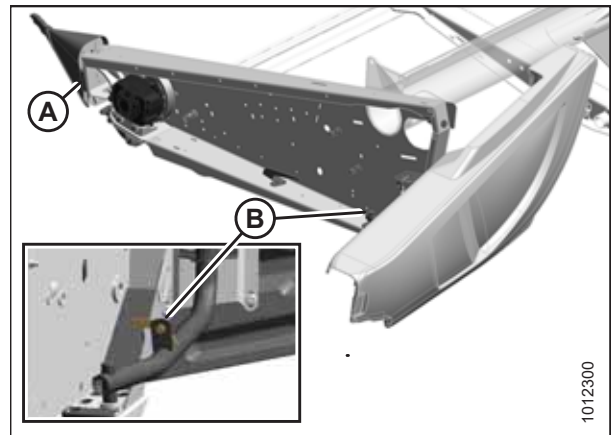


Figure 3.10: Left Endshield

## OPERATION

3. Swing the endshield in direction (A) into its closed position. Engage the lock with a firm push.
4. Check that the endshield is locked.

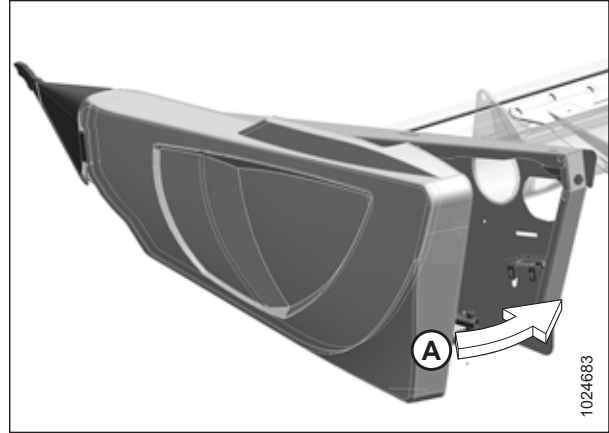


Figure 3.11: Left Endshield

### Removing Endshields

1. Fully open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
2. Engage lock (A) to prevent endshield movement.
3. Remove self-tapping screw (B).
4. Slide endshield upwards and remove from hinge arm (C).
5. Place endshield away from work area.

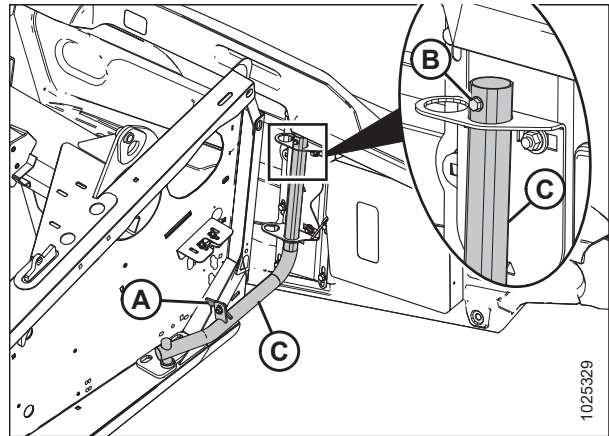


Figure 3.12: Left Endshield

### Installing Endshields

1. Guide endshield onto hinge arm (C) and slowly slide it downwards.

#### NOTE:

Ensure hinge arm (C) is installed in the outboard hole on the hinge bracket, as shown in illustration at right.

2. Install self-tapping screw (B).
3. Disengage lock (A) to allow endshield movement.
4. Close the endshield. For instructions, refer to [Closing Endshields, page 35](#).

#### NOTE:

Endshields may expand or contract when subjected to large temperature changes. The top pin and lower latch bracket positions can be adjusted to compensate for dimensional changes. For instructions, refer to [Checking and Adjusting Endshields, page 37](#).

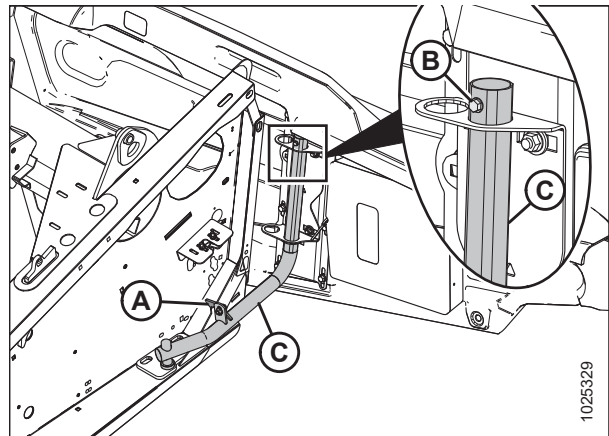


Figure 3.13: Left Endshield



## OPERATION

### Checking and Adjusting Endshields

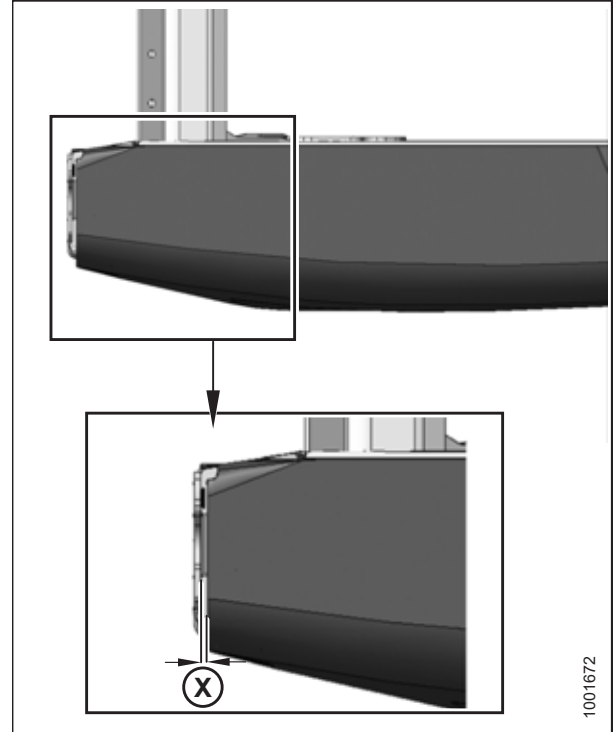
Endshields are subject to expansion or contraction caused by large temperature variations. The position of the top pin and lower latch can be adjusted to compensate for dimensional changes.

#### Checking the endshield:

1. Check gap (X) between the front end of the shields and the header frame and compare to the values in Table 3.1, page 37.

**Table 3.1 Endshield Gap at Various Temperatures**

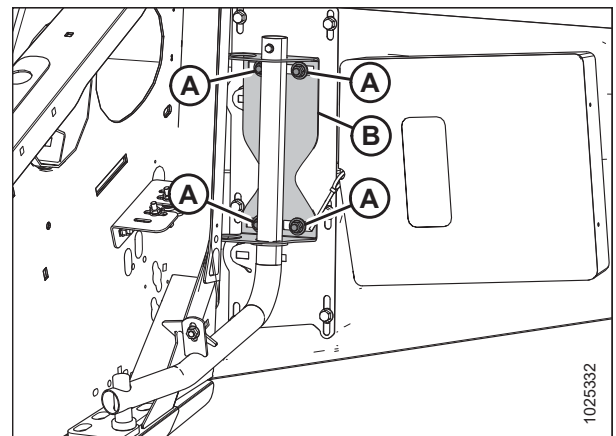
Temperature in °C (°F)	Gap (X) mm (in.)
7 (45)	13–18 (1/2–23/32)
18 (65)	10–15 (3/8–19/32)
29 (85)	7–12 (9/32–15/32)
41 (105)	4–9 (5/32–11/32)



**Figure 3.14: Gap between Endshield and Header Frame**

#### Adjusting the endshield gap:

1. Loosen four bolts (A) on support tube bracket (B).



**Figure 3.15: Left Endshield Support Tube**

## OPERATION

2. Loosen three bolts (A) on latch assembly (B).
3. Adjust latch assembly (B) to achieve the desired gap between the front end of the shield and the header frame. Refer to Table 3.1, page 37 for the recommended endshield gap at various temperatures.
4. Tighten three bolts (A) on the latch assembly to 27 Nm (20 lbf·ft).

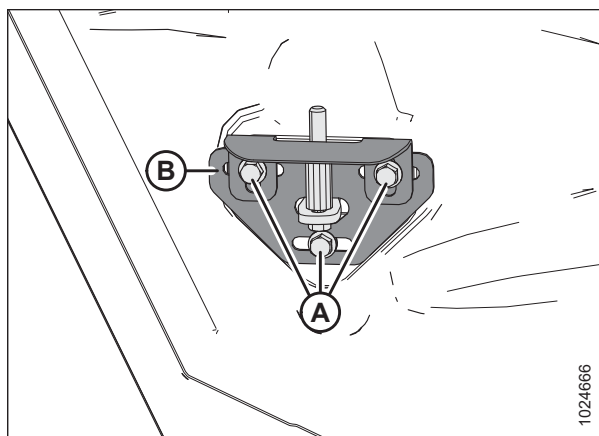


Figure 3.16: Left Endshield Latch Assembly

5. Tighten four bolts (A) on support tube bracket (B) to 31 Nm (23 lbf·ft).
6. Close the endshield. Refer to [Closing Endshields, page 35](#).

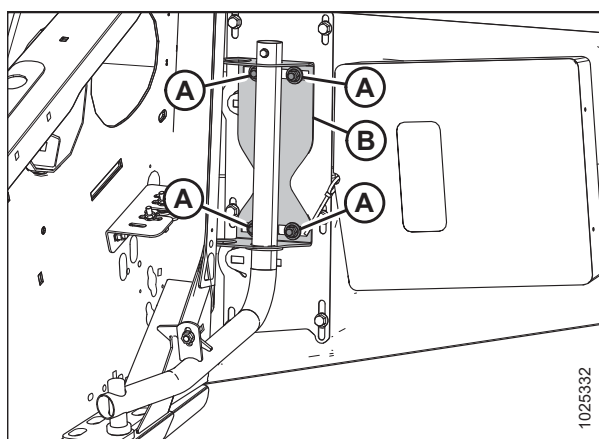


Figure 3.17: Left Endshield Support Tube

### 3.2.4 Daily Start-Up Check

#### CAUTION

- Clear the area of other persons, pets, etc. 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 with slip-resistant soles.
- Remove foreign objects from the machine and surrounding area.
- Carry with you any protective clothing and personal safety devices that could be necessary through the day. Do NOT take chances. You may need 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 protective device such as ear muffs or ear plugs to protect against objectionable or uncomfortably loud noises.



Figure 3.18: Safety Devices

Complete the following tasks each day before start-up:

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

**NOTE:**

Use proper procedure when searching for pressurized fluid leaks. For instructions, refer to [5.3.5 Checking Hydraulic Hoses and Lines, page 126](#).

2. Clean all lights and reflectors on the machine.
3. Perform all daily maintenance. For instructions, refer to [5.3.1 Maintenance Schedule/Record, page 122](#).

### 3.3 Break-In Period



#### CAUTION

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

#### NOTE:

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

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

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

#### NOTE:

Reels and side drapers will not operate until oil flow fills the lines.

2. Refer to [5.3.2 Break-In Inspection, page 124](#) and perform all the specified tasks.

## 3.4 Shutting down the Machine



### **DANGER**

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

To shut down, and before leaving the windrower seat for any reason, follow these steps:

1. Disengage the header drive.
2. Park on level ground whenever possible.
3. Lower the header fully.
4. Place all controls in NEUTRAL or PARK.
5. Lower and fully retract the reel.
6. Stop the engine and remove the key from the ignition.
7. Wait for all movement to stop before exiting the vehicle.

## 3.5 Cab Controls



### CAUTION

Be sure all bystanders are clear of machine before starting engine or engaging any header drives.

Refer to your windrower operator's manual for identification of the following in-cab controls:

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

## 3.6 Header Setup

### 3.6.1 Header Attachments

Several attachments to improve the performance of your D1 Series Draper Header are available as options from your MacDon Dealer. Refer to [6 Options and Attachments, page 243](#) for descriptions of available items.

### 3.6.2 Header Settings

The following table is a guideline for setting up the D1 Series SP Draper Header. Adjustments can be made to suit various crops and conditions not covered here.

Table 3.2 Recommended Header Settings

Crop Condition	Divider Rods	Header Angle <sup>2</sup>	Knife Speed <sup>3</sup>	Reel Time Pitch <sup>4</sup>	Reel Speed % <sup>5</sup>	Reel Fore-Aft <sup>6</sup>	Skid Shoe Position <sup>7</sup>	Stabilizer Wheels <sup>8</sup>	Upper Cross Auger	Float N (lbf) <sup>9</sup>
<b>Crop Type: Cereals</b>										
<b>Stubble Height: &lt;102 mm (&lt;4 in.)</b>										
Light	On	0–3	Medium	2	10–15	6 or 7	Up or center	Variable	Not required	311 (70)
Normal	On	0–3	High	2	10	6 or 7	Up or center	Variable	Not required	311 (70)
Heavy	On	4–7	High	2	10	6 or 7	Up or center	Variable	Not required	311 (70)
Lodged	On	4–7	High	3	5–10	4 or 5	Up or center	Variable	Not required	311 (70)
<b>Crop Type: Cereals</b>										
<b>Stubble Height: 102–203 mm (4–8 in.)</b>										
Light	On	0–3	Medium	2	10–15	6 or 7	Center or down	Variable	Not required	311 (70)
Normal	On	0–3	High	2	10	6 or 7	Center or down	Variable	Not required	311 (70)
Heavy	On	4–7	High	2	10	6 or 7	Down	Variable	Not required	311 (70)
Lodged	On	4–7	High	3	5–10	4 or 5	Down	Variable	Not required	311 (70)

2. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. For instructions, refer to [Controlling Header Angle, page 56](#).

3. Refer to .

4. Refer to [Reel Cam Settings, page 70](#).

5. Percentage above ground speed. Refer to [3.7.6 Reel Speed, page 57](#).

6. Refer to [3.7.11 Reel Fore-Aft Position, page 60](#).

7. Skid shoe position is used in combination with header angle to determine the cutting height when cutting on or very close to the ground. Refer to [3.7.1 Cutting Height, page 51](#).

8. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain, and to minimize bouncing.

9. Force required to lift header at ends. Refer to your windrower operator's manual for adjustment procedures.



Table 3.2 Recommended Header Settings (continued)

Crop Condition	Divider Rods	Header Angle <sup>10</sup>	Knife Speed <sup>11</sup>	Reel Time Pitch <sup>12</sup>	Reel Speed % <sup>13</sup>	Reel Fore-Aft <sup>14</sup>	Skid Shoe Position <sup>15</sup>	Stabilizer Wheels <sup>16</sup>	Upper Cross Auger	Float N (lbf) <sup>17</sup>
<b>Crop Type: Cereals</b>										
<b>Stubble Height: &gt;203 mm (&gt;8 in.)</b>										
Light	On	0–3	Medium	2	10–15	6 or 7	Not applicable	Storage	Not required	667 (150)
Normal	On	0–3	High	2	10	6 or 7	Not applicable	Storage	Not required	667 (150)
Heavy	On	4–7	High	2	10	6 or 7	Not applicable	Storage	Not required	667 (150)
Lodged	On	4–7	High	3	5–10	4 or 5	Not applicable	Storage	Not required	667 (150)
<b>Crop Type: Canola</b>										
<b>Stubble Height: 102–203 mm (4–8 in.)</b>										
Light	On	8–10	Low	2	5–10	6 or 7	Variable	Variable	Not required	311–445 (70–100)
Normal	On	8–10	Medium	1	10	6 or 7	Center or down	Variable	Not required	311–445 (70–100)
Heavy	On	8–10	Medium	1	10	3 or 4	Variable	Variable	Recommended	311–445 (70–100)
Lodged	On	8–10	Medium	2	5–10	3 or 4	Center or down	Variable	Recommended	311–445 (70–100)

10. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. For instructions, refer to [Controlling Header Angle, page 56](#).

11. Refer to .

12. Refer to [Reel Cam Settings, page 70](#).

13. Percentage above ground speed. Refer to [3.7.6 Reel Speed, page 57](#).

14. Refer to [3.7.11 Reel Fore-Aft Position, page 60](#).

15. Skid shoe position is used in combination with header angle to determine the cutting height when cutting on or very close to the ground. Refer to [3.7.1 Cutting Height, page 51](#).

16. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain, and to minimize bouncing.

17. Force required to lift header at ends. Refer to your windrower operator's manual for adjustment procedures.

Table 3.2 Recommended Header Settings (continued)

Crop Condition	Divider Rods	Header Angle <sup>18</sup>	Knife Speed <sup>19</sup>	Reel Time Pitch <sup>20</sup>	Reel Speed % <sup>21</sup>	Reel Fore-Aft <sup>22</sup>	Skid Shoe Position <sup>23</sup>	Stabilizer Wheels <sup>24</sup>	Upper Cross Auger	Float N (lbf) <sup>25</sup>
Crop Type: Canola										
Stubble Height: >203 mm (>8 in.)										
Light	On	8–10	Low	4	5–10	6 or 7	Not applicable	Storage	Recommended	667 (150)
Normal	On	8–10	Medium	2	10	6 or 7	Not applicable	Storage	Recommended	667 (150)
Heavy	On	8–10	Medium	3	10	3 or 4	Not applicable	Storage	Recommended	667 (150)
Lodged	On	8–10	Medium	3	5–10	3 or 4	Not applicable	Storage	Recommended	667 (150)
Crop Type: Flax										
Stubble Height: 51–153 mm (2–6 in.)										
Light	On	4–7	High	2	5–10	6 or 7	Center or down	Variable	Not required	311–445 (70–100)
Normal	On	0–3	High	2	10	6 or 7	Center or down	Variable	Not required	311–445 (70–100)
Heavy	On	4–7	High	2	10	6 or 7	Center or down	Variable	Not required	311–445 (70–100)
Lodged	On	8–10	High	2	10	6 or 7	Center or down	Variable	Not required	311–445 (70–100)

18. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. For instructions, refer to [Controlling Header Angle, page 56](#).

19. Refer to .

20. Refer to [Reel Cam Settings, page 70](#).

21. Percentage above ground speed. Refer to [3.7.6 Reel Speed, page 57](#).

22. Refer to [3.7.11 Reel Fore-Aft Position, page 60](#).

23. Skid shoe position is used in combination with header angle to determine the cutting height when cutting on or very close to the ground. Refer to [3.7.1 Cutting Height, page 51](#).

24. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain, and to minimize bouncing.

25. Force required to lift header at ends. Refer to your windrower operator's manual for adjustment procedures.

Table 3.2 Recommended Header Settings (continued)

Crop Condition	Divider Rods	Header Angle <sup>26</sup>	Knife Speed <sup>27</sup>	Reel Time Pitch <sup>28</sup>	Reel Speed % <sup>29</sup>	Reel Fore-Aft <sup>30</sup>	Skid Shoe Position <sup>31</sup>	Stabilizer Wheels <sup>32</sup>	Upper Cross Auger	Float N (lbf) <sup>33</sup>
<b>Crop Type: Edible beans</b>										
<b>Stubble Height: On ground</b>										
Light	Off	8–10	Medium	2	5–10	3 or 4	Up or center	Storage	Not required	445 (100)
Normal	Off	8–10	Medium	2	5–10	3 or 4	Up or center	Storage	Not required	445 (100)
Heavy	Off	8–10	Medium	2	5–10	3 or 4	Up or center	Storage	Not required	445 (100)
Lodged	Off	8–10	Medium	3	5–10	3 or 4	Up or center	Storage	Not required	445 (100)
<b>Crop Type: Grass</b>										
<b>Stubble Height: On ground</b>										
Light	On	Variable	High	2	10	6 or 7	Up or center	Storage	Not required	311–445 (70–100)
Normal	On	Variable	High	2	10	6 or 7	Up or center	Storage	Not required	311–445 (70–100)
Heavy	On	Variable	High	2	10	6 or 7	Up or center	Storage	Not required	311–445 (70–100)
Lodged	On	Variable	High	2	10–15	6 or 7	Up or center	Storage	Not required	311–445 (70–100)

26. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. For instructions, refer to [Controlling Header Angle, page 56](#).

27. Refer to .

28. Refer to [Reel Cam Settings, page 70](#).

29. Percentage above ground speed. Refer to [3.7.6 Reel Speed, page 57](#).

30. Refer to [3.7.11 Reel Fore-Aft Position, page 60](#).

31. Skid shoe position is used in combination with header angle to determine the cutting height when cutting on or very close to the ground. Refer to [3.7.1 Cutting Height, page 51](#).

32. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain, and to minimize bouncing.

33. Force required to lift header at ends. Refer to your windrower operator's manual for adjustment procedures.

Table 3.2 Recommended Header Settings (continued)

Crop Condition	Divider Rods	Header Angle <sup>34</sup>	Knife Speed <sup>35</sup>	Reel Time Pitch <sup>36</sup>	Reel Speed % <sup>37</sup>	Reel Fore-Aft <sup>38</sup>	Skid Shoe Position <sup>39</sup>	Stabilizer Wheels <sup>40</sup>	Upper Cross Auger	Float N (lbf) <sup>41</sup>
Crop Type: Alfalfa										
Stubble Height: On ground										
Light	On	Variable	High	3	10	6 or 7	Up or center	Storage	Not required	311–445 (70–100)
Normal	On	Variable	High	2	10	6 or 7	Up or center	Storage	Not required	311–445 (70–100)
Heavy	On	Variable	High	2	10	6 or 7	Up or center	Storage	Not required	311–445 (70–100)
Lodged	On	Variable	High	3	10–15	6 or 7	Up or center	Storage	Not required	311–445 (70–100)

34. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. For instructions, refer to [Controlling Header Angle, page 56](#).

35. Refer to .

36. Refer to [Reel Cam Settings, page 70](#).

37. Percentage above ground speed. Refer to [3.7.6 Reel Speed, page 57](#).

38. Refer to [3.7.11 Reel Fore-Aft Position, page 60](#).

39. Skid shoe position is used in combination with header angle to determine the cutting height when cutting on or very close to the ground. Refer to [3.7.1 Cutting Height, page 51](#).

40. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain, and to minimize bouncing.

41. Force required to lift header at ends. Refer to your windrower operator's manual for adjustment procedures.

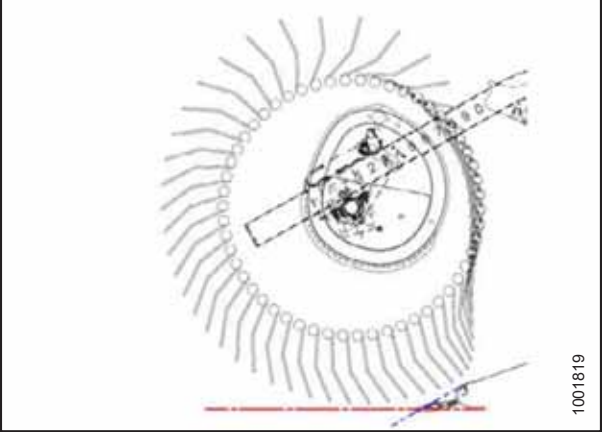
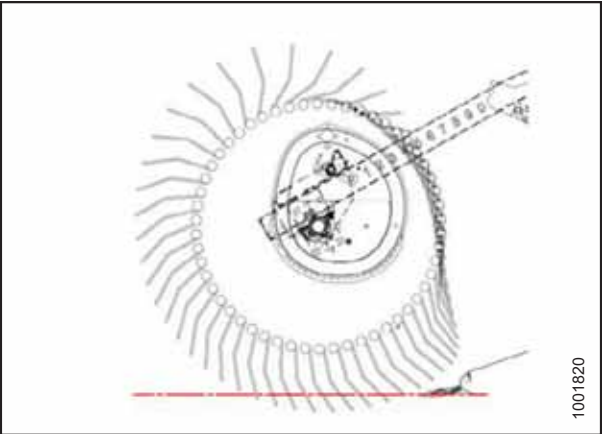
### 3.6.3 Reel Settings

The following chart illustrates the reel profile at each cam setting and the reel location relative to the ground at different positions on the reel arm. Refer to [3.6.2 Header Settings, page 43](#) for applicability of each finger pattern and reel position.

**NOTE:**

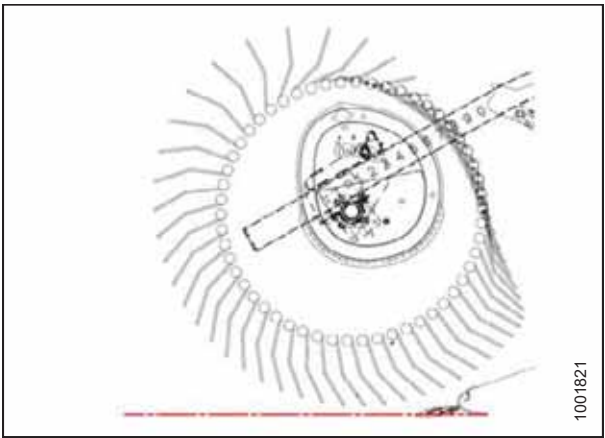
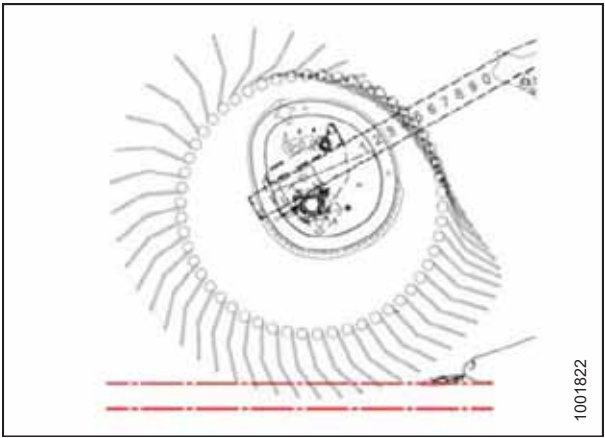
The Recommended Reel Settings chart is also applicable for steel reel tines.

**Table 3.3 Recommended Reel Settings**

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

## OPERATION

**Table 3.3 Recommended Reel Settings (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 position the fingers closer to the ground, while tilting the header back. Fingers/tines will dig into the ground at extreme reel-forward positions, so adjust skid shoes or header angle to compensate.
- Adjust the reel aft in thinner crops to prevent plugging on the cutterbar.
- Increase the header angle to position the reel closer to the ground, or decrease angle to position the reel farther from the ground.
- Raise header, increase header angle, and position reel fully forward in lodged crop for maximum stubble height.
- Minimum crop carrying capacity (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 (maximum area of exposed draper between the reel and the header backsheet) occurs with the reel in the farthest forward position.
- The finger tip speed at the cutterbar is higher than the reel speed at higher cam settings due to the nature of the cam action. For instructions, refer to Table 3.3, [page 49](#).

## 3.7 Header Operating Variables

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

Correct operation reduces crop loss and increases productivity. Proper adjustments and timely maintenance will increase the length of service you receive from your machine.

The variables listed in Table 3.4, [page 51](#) (and detailed on the following pages) will affect the header performance.

You will quickly become adept at adjusting the machine to achieve the results you desire. Most of the adjustments have been preset at the factory, but the settings can be changed to suit crop conditions.

**Table 3.4 Operating Variables**

Variable	Refer to
Cutting Height	<a href="#">3.7.1 Cutting Height, page 51</a>
Header Float	<a href="#">3.7.4 Header Float, page 56</a>
Header Angle	<a href="#">3.7.5 Header Angle, page 56</a>
Reel Speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Ground Speed	<a href="#">3.7.7 Ground Speed, page 57</a>
Reel Height	<a href="#">3.7.10 Reel Height, page 60</a>
Reel Fore-Aft Position	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
Reel Tine Pitch	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
Crop Divider Rods	<a href="#">3.7.14 Crop Divider Rods, page 77</a>

### 3.7.1 Cutting Height

The D1 Series Draper Header is capable of cutting the crop to a desired stubble height or cutting as close as possible to the ground. Cutting height will vary depending on the type of crop, crop conditions, etc.

### 3.7.2 Cutting off the Ground

The stabilizer wheel system is designed to minimize bouncing at the header ends and float the header to achieve an even cutting height when cutting above ground level in cereal crops. The system produces even stubble height and greatly reduces operator fatigue.

Cutting height is controlled using a combination of the windrower header height control and a stabilizer wheel system (or stabilizer/slow speed transport wheel system).

The stabilizer wheel system (or stabilizer/slow speed transport wheel system) is available only for 9.1–12.2 m (30–40 ft.) headers.

#### *Adjusting Stabilizer/Slow Speed Transport Wheels*

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



#### **DANGER**

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

## OPERATION

1. Raise the header so the stabilizer wheels are off the ground. Shut down engine and remove key.
2. Check that the float is working properly. Refer to your windrower operator's manual for instructions.

3. Remove hairpin (A) from the latch on the right wheel assembly.
4. Disengage latch (B), lift the wheel out of the hook, and place wheel on the ground as shown. (This reduces weight of assembly and makes adjusting the wheel position easier.)
5. Lift the left wheel slightly to support weight, and pull handle (C) upwards to release the lock.
6. Lift the left wheel to the desired height and engage the support channel in slot (D) in the upper support.
7. Push down on handle (C) to lock.
8. Lift the right wheel back into the field position and ensure latch (B) is engaged.
9. Secure the latch with hairpin (A).
10. Support the wheel weight by lifting slightly with one hand, and pull up on handle (A) to release the lock.
11. Lift the wheels to the desired height, and engage the support channel into slot (B) in the upper support.
12. Push down on handle (A) to lock.

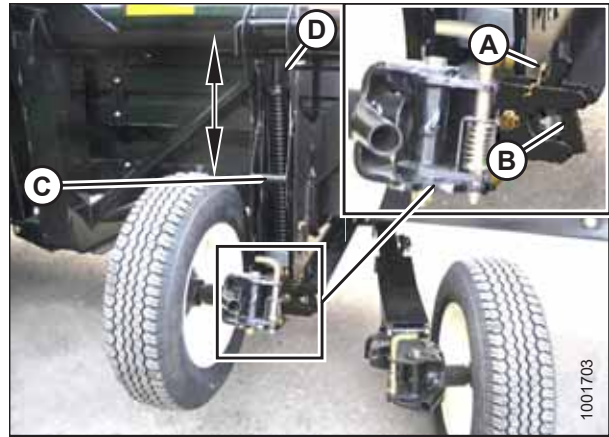


Figure 3.19: Right Wheel

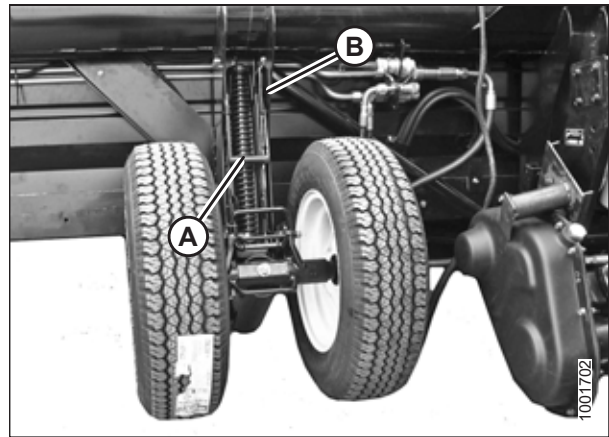


Figure 3.20: Left Wheel

13. Lower the header to the desired cutting height using the windrower controls and check load indicator (A).

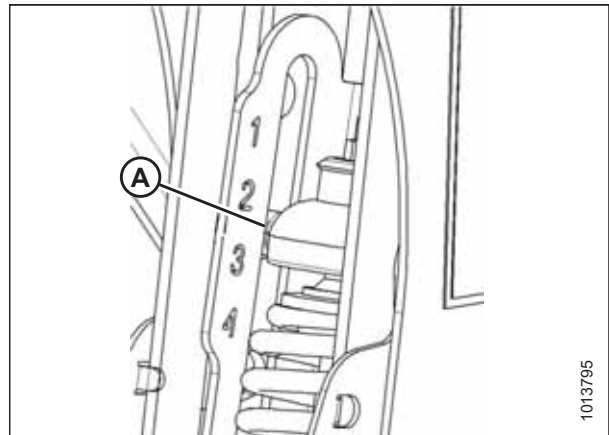


Figure 3.21: Load Indicator



## OPERATION

### IMPORTANT:

Continuous operation with excessive spring compression (that is, load indicator reading greater than 4 or a compressed length [A] less than 295 mm [11 5/8 in.]) can result in damage to the suspension system.

14. Adjust the header angle to the desired working angle with the machine's header angle controls. If header angle is not critical, set it to mid-position.
15. Use the windrower cab display module (CDM) controls to automatically maintain cutting height. Refer to your windrower operator's manual for details.

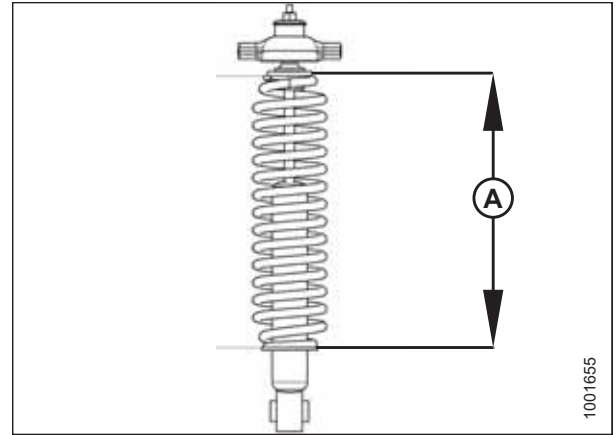


Figure 3.22: Spring Compression

### Adjusting Stabilizer Wheels

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



### DANGER

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



### CAUTION

Handle may be under tension—especially when the wheels are on the ground. Raise the header until the wheels are off the ground before making adjustments.

1. Raise the header until the stabilizer wheels are off the ground. Shut down engine and remove the key.
2. Check that the float is working properly. Refer to your windrower operator's manual for instructions.
3. Support the wheel weight by lifting slightly with one hand on handle (B), and pull up on handle (A) to release the lock.
4. Lift the wheel using handle (B), and engage the support channel into center slot (C) in the upper support.
5. Push handle (A) down to lock.

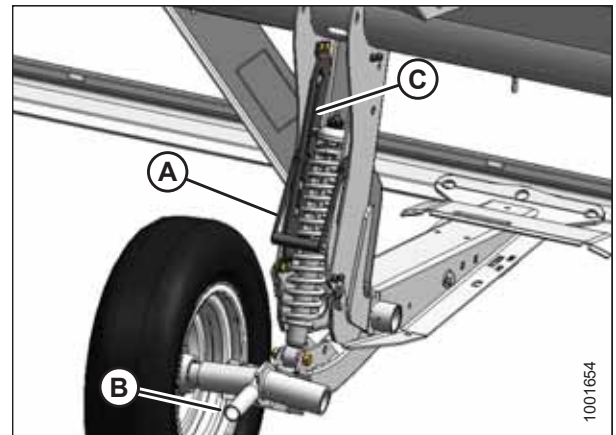


Figure 3.23: Stabilizer Wheel

## OPERATION

- Lower the header to the desired cutting height and check load indicator (A).

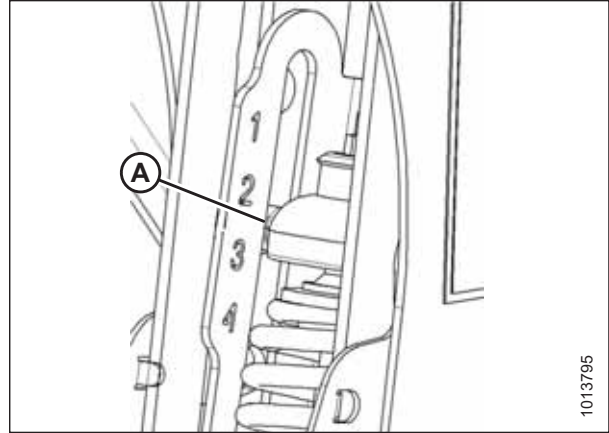


Figure 3.24: Load Indicator

### IMPORTANT:

Continuous operation with excessive spring compression (that is, load indicator reading greater than 4 or a compressed length (A) less than 295 mm [11 5/8 in.]) can result in damage to the suspension system.

- Adjust the header angle to the desired working angle with the windrower's header angle controls. If header angle is not critical, set it to mid-position.

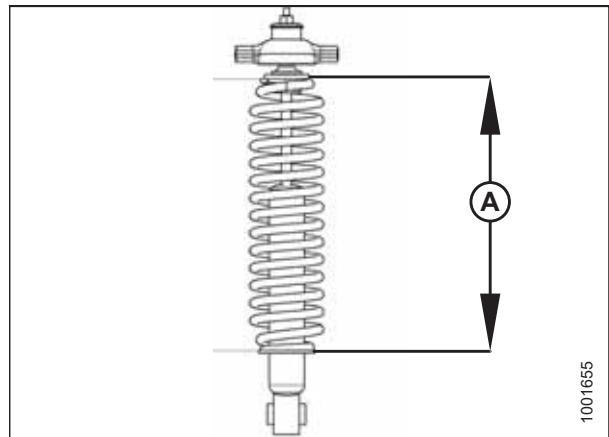


Figure 3.25: Spring Compression

### 3.7.3 Cutting on the Ground

Cutting on the ground is performed with the header fully lowered and the cutterbar on the ground. The orientation of the knife and knife guards relative to the ground (header angle) is controlled by the skid shoes and the center-link—it is **NOT** controlled by the header lift cylinders. The skid shoes and center-link allow you to adjust to field conditions and maximize the amount of material cut while reducing damage to the knife caused by stones and debris.

The header float system floats the header over the surface to compensate for ridges, trenches, and other variations in ground contour to prevent the cutterbar from pushing into the ground or leaving uncut crop.

Refer to the following for additional information:

- [Adjusting Inner Skid Shoes, page 55](#)
- [Adjusting Outer Skid Shoes, page 55](#)
- [3.7.5 Header Angle, page 56](#)
- [3.7.4 Header Float, page 56](#)

### Adjusting Inner Skid Shoes

#### **DANGER**

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props.
4. Raise the stabilizer wheels or slow speed transport wheels fully (if installed). For instructions, refer to the following:
  - [Adjusting Stabilizer Wheels, page 53](#)
  - [Adjusting Stabilizer/Slow Speed Transport Wheels, page 51](#)
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), engage in frame, and secure with lynch pin (A).
9. Check that all skid shoes are equally adjusted.
10. Adjust the header angle to the desired working position using the machine's header angle controls. If the header angle is not critical, set it to the mid-position.
11. Check the header float as described in your windrower operator's manual.

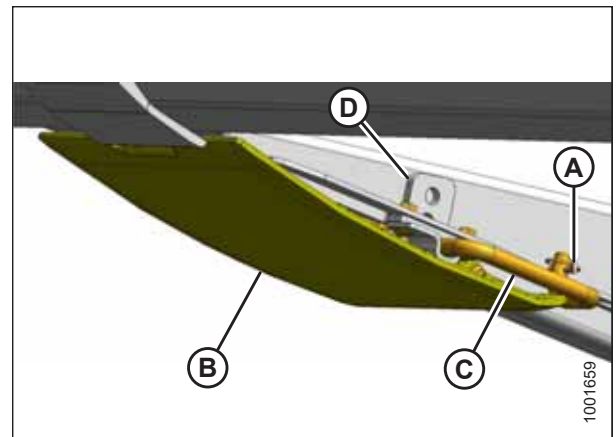


Figure 3.26: Inner Skid Shoe

### Adjusting Outer Skid Shoes

#### **DANGER**

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props.
4. Raise the stabilizer wheels or slow speed transport wheels fully (if installed). For instructions, refer to the following:
  - [Adjusting Stabilizer Wheels, page 53](#)
  - [Adjusting Stabilizer/Slow Speed Transport Wheels, page 51](#)

## OPERATION

5. Remove lynch pin (A) from each skid shoe (B).
6. Hold shoe (B) and remove adjustment 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 the support as a guide.
8. Reinstall pin (C), engage in frame, and secure with lynch pin (A).
9. Check that all skid shoes are equally adjusted.
10. Check the header float as described in your windrower operator's manual.

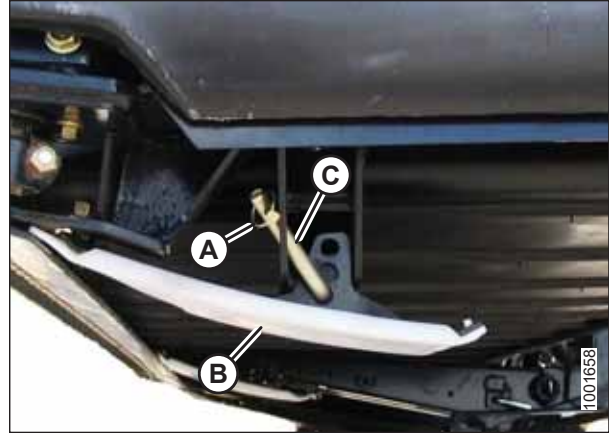


Figure 3.27: Outer Skid Shoe

### 3.7.4 Header Float

D1 Series Draper Headers are designed to ride on the skid shoes when cutting on the ground. The windrower float system reduces the ground pressure so that the header floats over obstacles and follows ground contours instead of being supported by the windrower lift cylinders. Refer to your windrower operator's manual for details about header float adjustments.

### 3.7.5 Header Angle

Header angle can be adjusted to accommodate different crop conditions and/or soil types.

Header angle (A) controls the distance (B) between the knife and the ground and is a critical component for effective cutting on the ground. Adjusting the center-link determines the position of the knife and guards and pivots the header at the point of skid shoe/ground contact (C).

Header angle (A) is equal to guard angle (D) which is the angle between the upper surface of the guards and the ground.

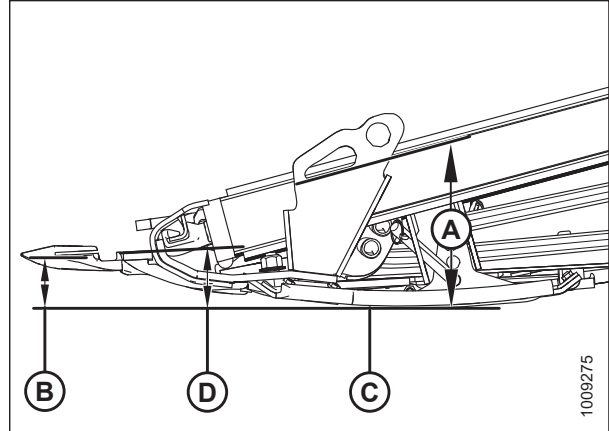


Figure 3.28: Header Angle

#### *Controlling Header Angle*

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

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

### 3.7.6 Reel Speed

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

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

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

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

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

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

**NOTE:**

Nine-bat reels are available on 4.6–7.6 m (15–25 ft.) headers from the factory. A conversion kit to change from a six-bat reel to a nine-bat reel is available for these headers.

Refer to [3.6.2 Header Settings, page 43](#) for recommended reel speeds in specific crops and crop conditions.

The reel speed is adjustable using the controls in the windrower cab. Refer to your windrower operator's manual for adjustment details.

#### *Optional Reel Drive Sprockets*

Optional reel drive sprockets for use in special crop conditions are available as an alternative to the factory-installed sprocket.

The header is factory-equipped with a 19-tooth reel drive sprocket that is suitable for most crops. Other sprockets are available that provide more torque to the reel in heavy cutting conditions, or higher reel speeds in light crops when operating at increased ground speeds.

For installation details, refer to [5.9.3 Replacing Reel Drive Sprocket, page 232](#).

### 3.7.7 Ground Speed

Operating at the proper ground speed will result in cleanly cut crops and evenly distributed material in uniform windrows.

Refer to [3.10 Windrow Types, page 87](#) for effects of ground speed on windrow formation.

Reduce ground speed in difficult cutting conditions to reduce loads on cutting components and drives.

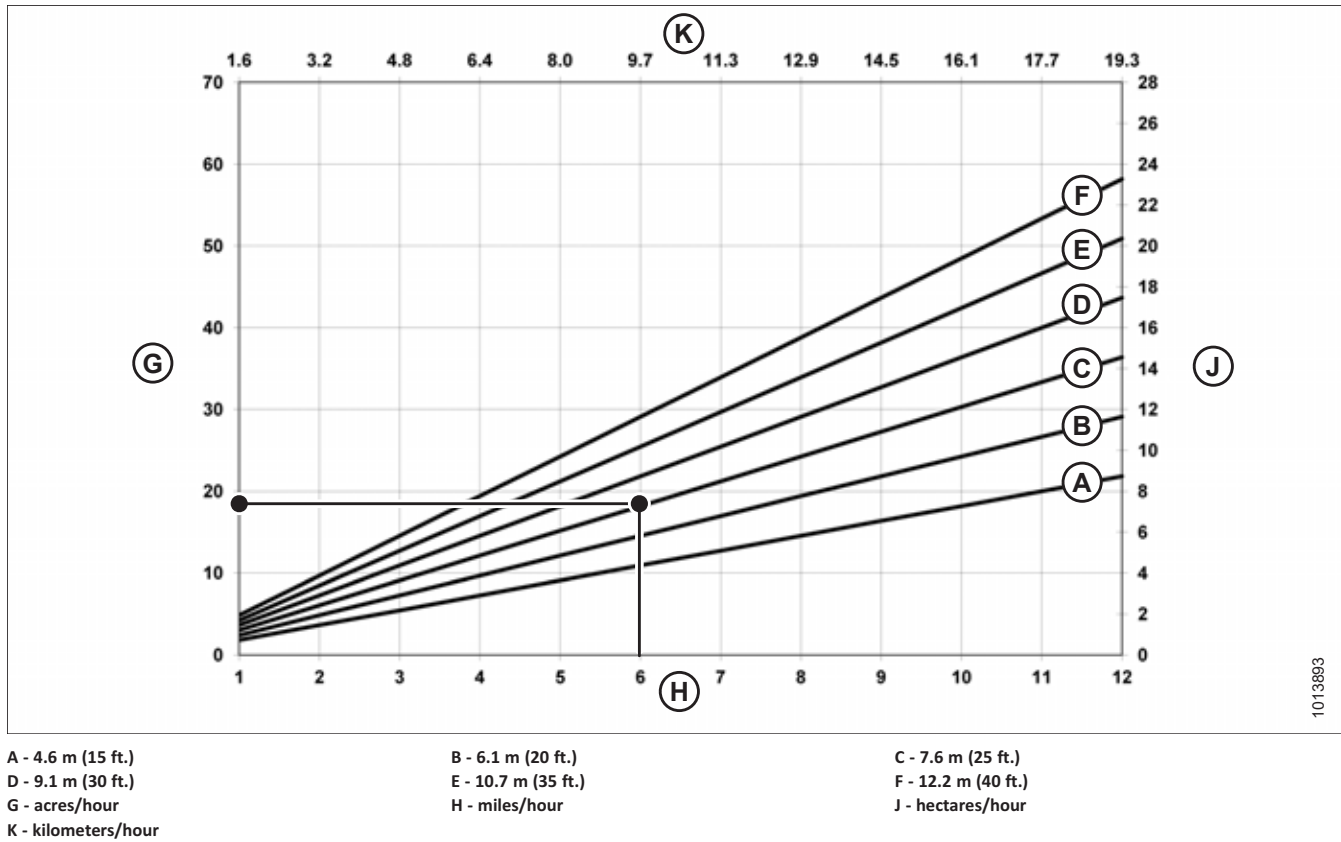
Use lower ground speeds in very light crops (e.g., short soybeans) to allow the reel to pull in short plants. Start at 4.8–5.8 km/h (3.0–3.5 mph) and adjust as required.

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

Figure [3.29, page 58](#) illustrates the relationship between ground speed and area cut for the various sized headers.

## OPERATION

Figure 3.29: Ground Speed vs Acres



**Example:** A 7.6 m (25 ft.) header operating at a ground speed of 9.7 km/h (6 mph) would produce a cut area of approximately 7.3 hectares (18 acres) in one hour.

### 3.7.8 Draper Speed

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

The draper speed is controlled with the windrower cab display module (CDM). Refer to your windrower operator's manual for instructions.

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

### 3.7.9 Knife Speed Information

The header knife drive is powered by the windrower hydraulic pump and is controlled using the windrower cab display module (CDM) (refer to your windrower operator's manual for information about using the CDM).

**Table 3.5 D1 SP Series Header Knife Speed**

Header Size	Recommended Knife Drive Speed Range (spm)	
	Single-Knife Drive	Double-Knife Drive
D115	—	1500–1900
D120	1200–1400	1400–1700
D125	1200–1400	1400–1700
D130	1200–1400	1200–1500
D135	1150–1300	1200–1400
D140	1150–1220	1200–1400

#### Checking Knife Speed



#### **DANGER**

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

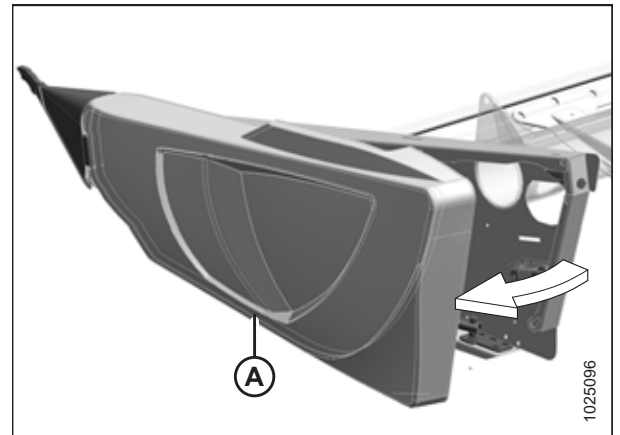
1. Stop the windrower engine and remove the key from the ignition.
2. Open left endshield (A).



#### **WARNING**

Check to be sure all bystanders have cleared the area.

3. Start the windrower engine, engage the header drive, and run the windrower at operating rpm.



**Figure 3.30: Left Endshield**

## OPERATION

4. Measure rpm of knife drive box pulley (A) with a hand-held tachometer.
5. Shut down the windrower.
6. Compare pulley rpm measurement with the rpm values in the knife speed chart. For instructions, refer to .
7. Contact your MacDon Dealer if the pulley rpm measurement exceeds the specified rpm range for your header.

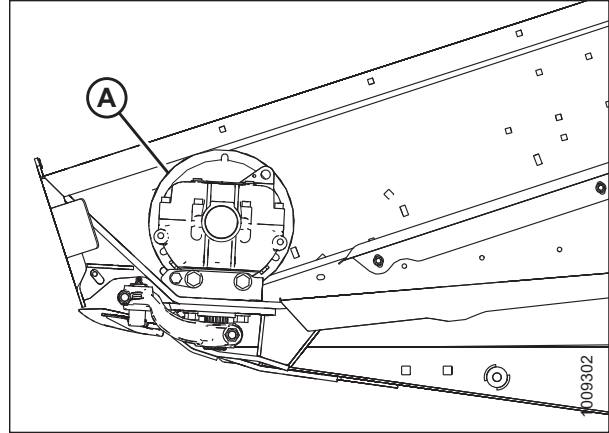


Figure 3.31: Knife Drive Pulley

### 3.7.10 Reel Height

The crop type and condition determines the operating height of the reel.

Set the reel height to carry material past the knife and onto the drapers with minimal disturbance and damage to the cut crop. For instructions, refer to [3.7.11 Reel Fore-Aft Position, page 60](#).

The reel height is controlled using switches in the windrower cab.

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

- Crop loss over the header backtube
- Crop disturbance on the drapers caused by the reel fingers
- Crop being pushed down by the tine tubes

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

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

Refer to [3.6.2 Header Settings, page 43](#) for recommended reel height in specific crops and crop conditions.

#### IMPORTANT:

Maintain reel clearance to prevent fingers contacting the knife or the ground. For instructions, refer to [5.8.1 Reel Clearance to Cutterbar, page 201](#).

### 3.7.11 Reel Fore-Aft Position

Reel fore-aft position is a critical factor for achieving the best results in adverse conditions. The reel position can be adjusted forward or backward as required using the controls inside the cab.

The reel can be moved approximately 227 mm (9 in.) farther aft by repositioning the fore-aft cylinders on the reel arms to accommodate certain crop conditions.

For double-reel header instructions, refer to [Repositioning Fore-Aft Cylinders on Double Reel, page 64](#).

For single-reel header instructions, refer to [Repositioning Fore-Aft Cylinders on Single Reel, page 62](#).



## OPERATION

Decal (A) is attached to the right reel support arm for identifying reel position. The aft edge of cam disc (B) is the reel fore-aft position marker.

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

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

### IMPORTANT:

Adjust to a steeper header angle if experiencing difficulty picking up flattened crop. Refer to [Controlling Header Angle, page 56](#) for adjustment instructions. Adjust reel position only if header angle adjustments are not satisfactory.

Refer to [3.6.2 Header Settings, page 43](#) for recommended reel positions in specific crops and crop conditions.

### NOTE:

In crops that are difficult to pick up such as rice, or severely lodged crops that require full forward positioning of the reel, set the reel tine pitch to provide proper placement of the crop onto the drapers. Refer to [3.7.12 Reel Tine Pitch, page 69](#) for adjustment details.

### Adjusting Reel Fore-Aft Position

1. Select FORE-AFT mode on the selector switch in the cab.
2. Operate the hydraulics to move the reel to the desired position while using decal (A) as a reference.
3. Check the reel clearance to cutterbar after making changes to the cam setting. Refer to the following for measurement and adjustment procedures:
  - [5.8.1 Reel Clearance to Cutterbar, page 201](#)
  - [5.8.2 Reel Frown, page 205](#)

### 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 angle as required to prevent damaging the fingers.

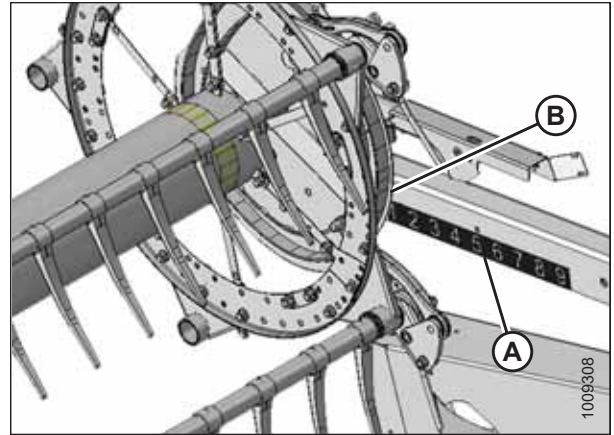


Figure 3.32: Fore-Aft Decal

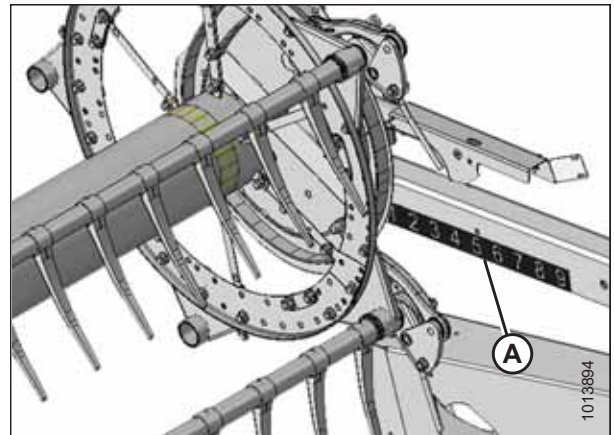


Figure 3.33: Fore-Aft Decal

### *Repositioning Fore-Aft Cylinders on Single Reel*

The reel can be moved approximately 227 mm (9 in.) farther aft by repositioning the fore-aft cylinders on the reel arms.

## **DANGER**

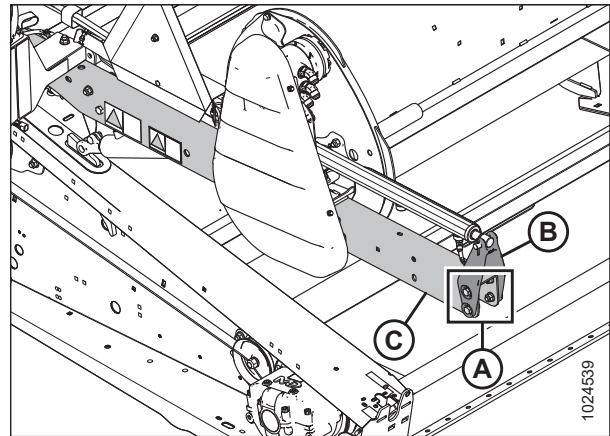
To avoid injury or death from unexpected start-up of machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

*Reposition the right reel arm cylinder as follows:*

#### **NOTE:**

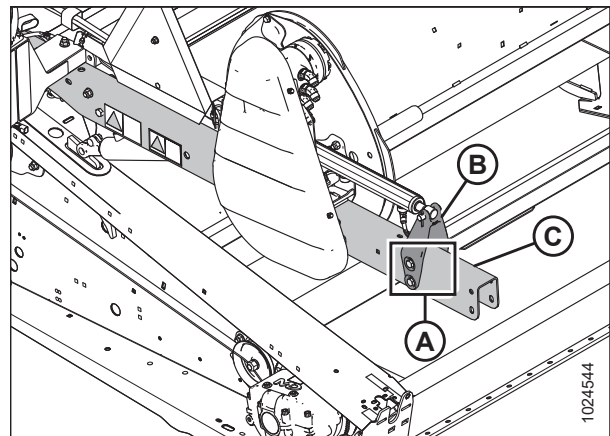
Reel components not shown in illustrations for improved clarity.

1. Position reel fully aft with support arms horizontal.
2. Stop the engine and remove the key from the ignition.
3. Remove four nuts and bolts (A) securing cylinder bracket (B) to reel arm (C). Retain hardware.



**Figure 3.34: Right Reel Arm Cylinder in Forward Position**

4. Push/pull the reel until bracket (B) lines up with the aft set of holes in the reel arm (C).
5. Reinstall the four nuts and bolts (A) and secure the cylinder bracket (B) to the reel arm at the new position.



**Figure 3.35: Right Reel Arm Cylinder in Aft Position**

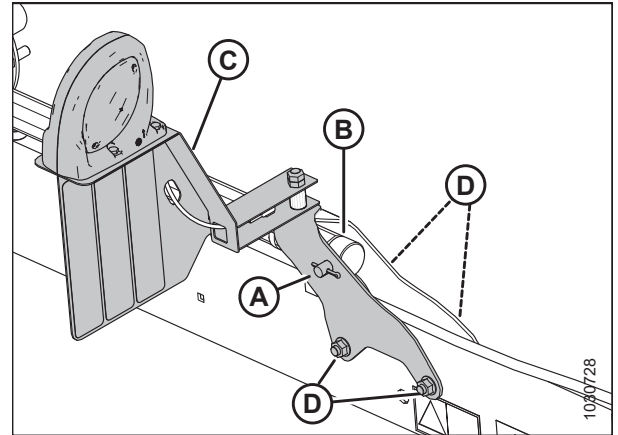
## OPERATION

### ***Reposition the left reel arm cylinder as follows:***

#### **NOTE:**

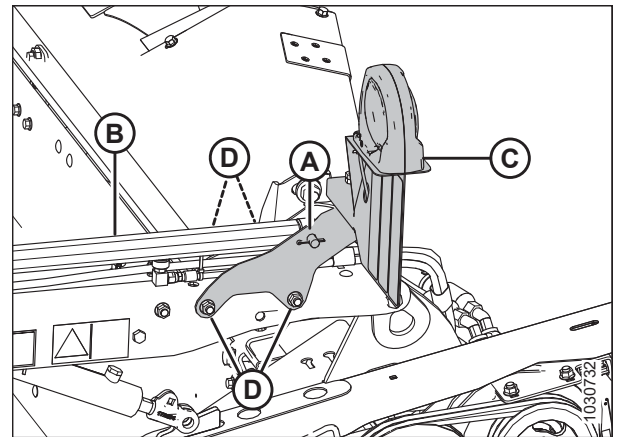
Reel components not shown in illustrations for improved clarity.

1. Remove pin (A) securing cylinder (B) to bracket/light assembly (C).
2. Remove nuts and bolts (D) securing bracket/light assembly (C) to the reel arm, and remove the bracket/light assembly.
3. If necessary, remove the cable tie securing the harness to bracket/light assembly (C) or reel arm.
4. Swivel the light to the working position as shown.



**Figure 3.36: Left Reel Arm Cylinder in Forward Position**

5. Reposition bracket/light assembly (C) on the reel arm as shown, and secure with four nuts and bolts (D). Tighten hardware.
6. Push the reel back and attach cylinder (B) to bracket/light assembly (C) with pin (A). Secure pin with cotter pin.
7. Secure the light harness to bracket/light assembly (C) using a cable tie.
8. Check the reel clearance to the backsheet, upper cross auger (if installed), and reel braces.
9. Adjust the reel tine pitch if necessary. For instructions, refer to [3.7.12 Reel Tine Pitch, page 69](#).



**Figure 3.37: Left Reel Arm Cylinder in Aft Position**

## OPERATION

### *Repositioning Fore-Aft Cylinders on Double Reel*

The reel can be moved approximately 227 mm (9 in.) farther aft by repositioning the fore-aft cylinders on the reel arms.



### **DANGER**

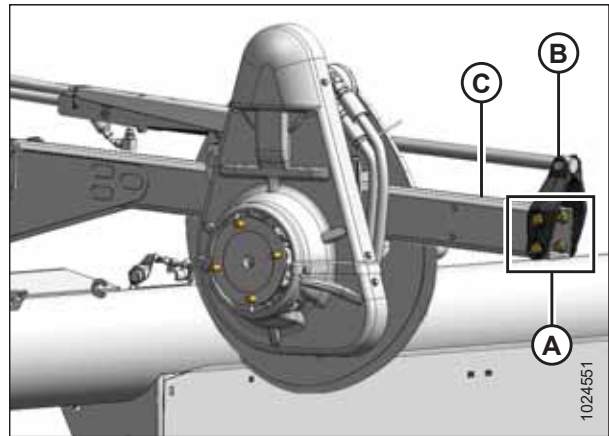
To avoid injury or death from unexpected start-up of machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

***Reposition the center reel arm cylinder as follows:***

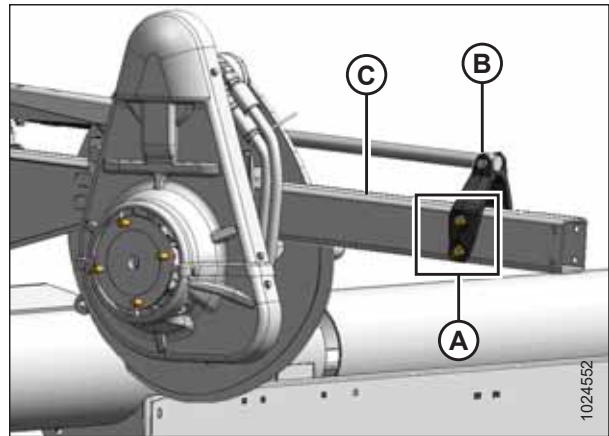
#### **NOTE:**

Some reel components are not shown in illustrations for improved clarity.

1. Position reel fully aft with support arms horizontal.
2. Shut down the engine, and remove the key from the ignition.
3. Remove four nuts and bolts (A) securing cylinder bracket (B) to reel arm (C). Retain hardware.
4. Push/pull reel until bracket (B) lines up with the aft set of holes in reel arm (C).
5. Reinstall four nuts and bolts (A) to secure bracket (B) to reel arm at new position.



**Figure 3.38: Center Arm – Forward Position**



**Figure 3.39: Center Arm – Aft Position**

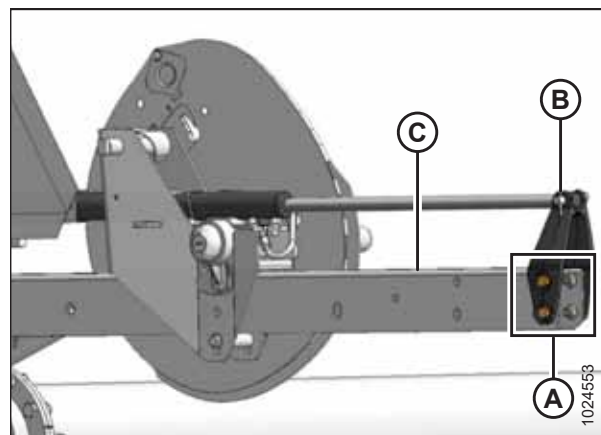
## OPERATION

***Reposition the right reel arm cylinder as follows:***

**NOTE:**

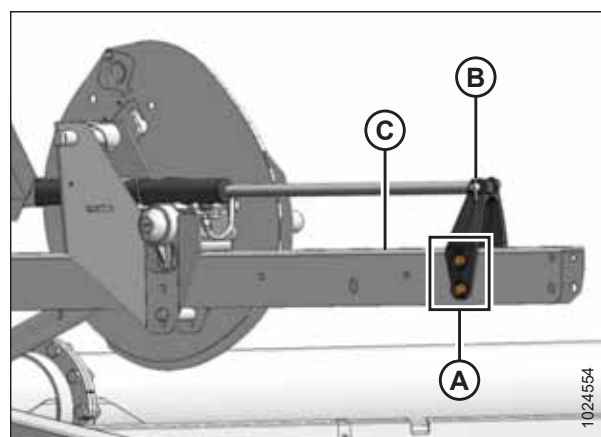
Some reel components are not shown in illustrations for improved clarity.

1. Remove four bolts (A) securing cylinder bracket (B) to reel arm (C).



**Figure 3.40: Right Reel Arm Cylinder in Forward Position**

2. Push reel back until bracket (B) lines up with the aft set of holes in reel arm (C).
3. Reinstall four bolts (A) to secure bracket to reel arm at new position.



**Figure 3.41: Right Reel Arm Cylinder in Aft Position**

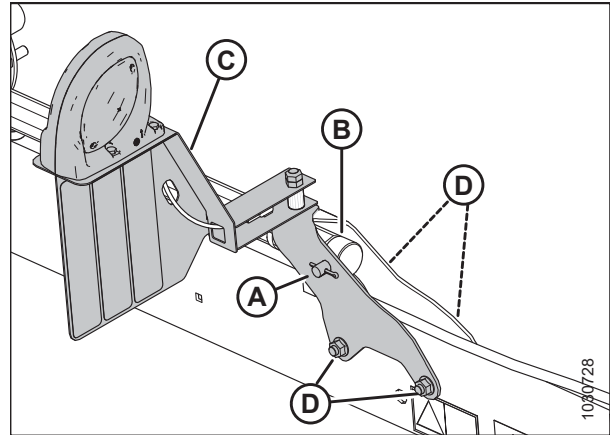
## OPERATION

### ***Reposition the left reel arm cylinder as follows:***

#### **NOTE:**

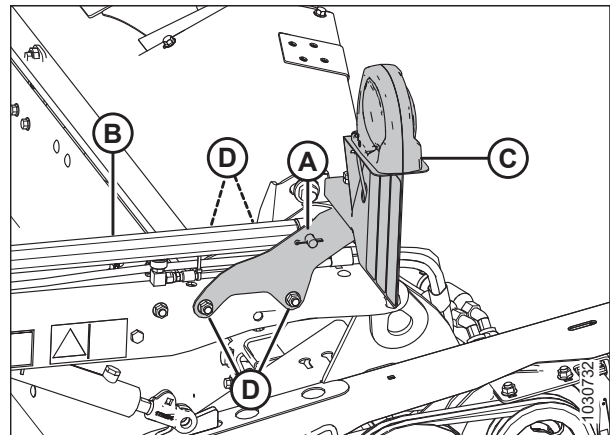
Some reel components are not shown in illustrations for improved clarity.

1. Remove pin (A) securing cylinder (B) to bracket/light assembly (C).
2. Remove four nuts and bolts (D) securing bracket/light assembly (C) to reel arm and remove bracket/light assembly. Retain hardware.
3. Remove cable tie (not shown) securing harness to bracket/light assembly (C) or to reel arm (if necessary).
4. Swivel light to working position as shown.



**Figure 3.42: Left Reel Arm Cylinder in Forward Position**

5. Reposition bracket/light assembly (C) onto reel arm as shown, and secure using four nuts and bolts (D). Tighten hardware.
6. Push reel back and reinstall cylinder (B) onto bracket/light assembly (C) using pin (A). Secure pin with cotter pin.
7. Secure light harness to bracket/light assembly (C) or to reel arm using plastic cable tie (not shown).
8. Check reel clearance to backsheet, upper cross auger (if installed), and reel braces.
9. Adjust reel tine pitch (if required). For adjustment procedures, refer to [3.7.12 Reel Tine Pitch, page 69](#).



**Figure 3.43: Left Reel Arm Cylinder in Aft Position**

## OPERATION

### *Repositioning Fore-Aft Cylinders with Multi-Crop Rapid Reel Conversion Option*

The reel can be moved approximately 227 mm (9 in.) farther aft by repositioning the fore-aft cylinders on the reel arms. The Multi-Crop Rapid Reel Conversion option is applicable to **double-reel headers only**.

#### **DANGER**

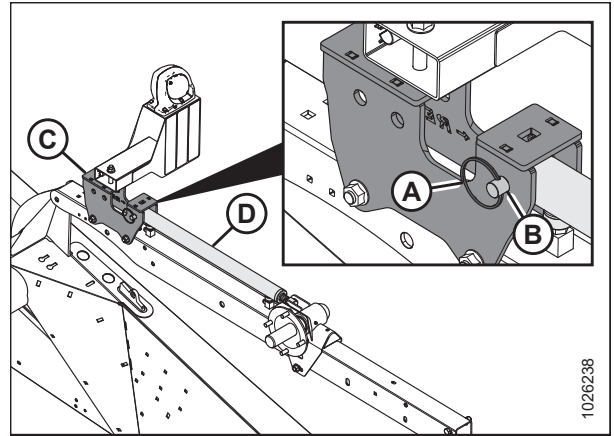
To avoid injury or death from unexpected start-up of machine, always stop the engine and remove the key from the ignition before leaving the operator's seat for any reason.

*Reposition the left reel arm cylinder as follows:*

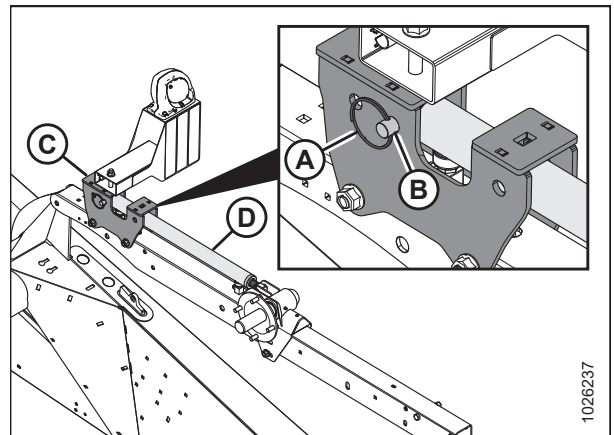
#### **NOTE:**

Some reel components not shown in illustrations for improved clarity.

1. Position reel fully aft with support arms horizontal.
2. Shut down the engine, and remove the key from the ignition.
3. Remove ring (A) and clevis pin (B) from inboard side of bracket (C). Retain ring and clevis pin.
4. Push the reel back until cylinder barrel (D) lines up with reel position 2 hole on bracket.
5. Reinstall clevis pin (B) at the new position and secure with ring (A).



**Figure 3.44: Left Reel Arm in Forward Position**



**Figure 3.45: Left Reel Arm in Aft Position**



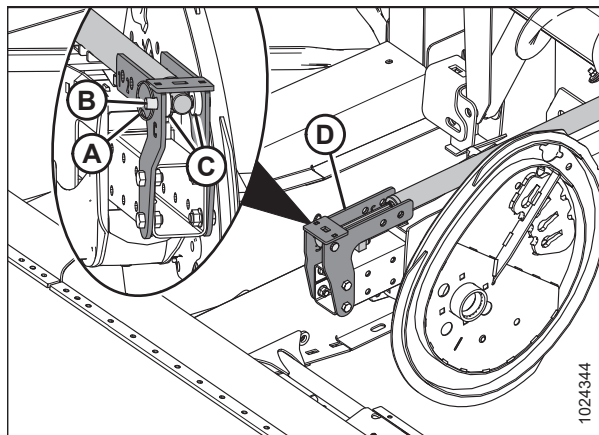
## OPERATION

### *Reposition the center reel arm cylinder as follows:*

#### **NOTE:**

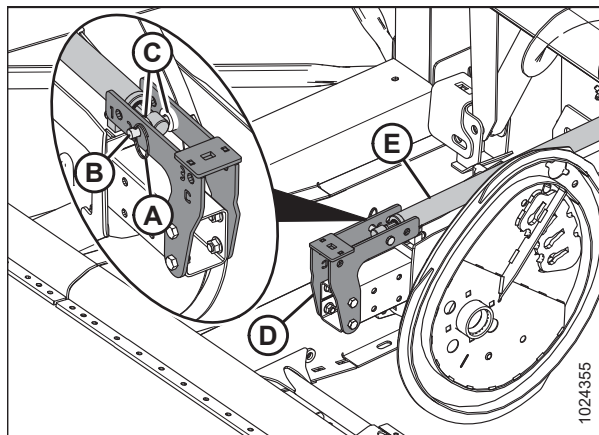
Some reel components not shown in illustrations for improved clarity.

1. Remove ring (A), clevis pin (B), and washers (C) from bracket (D). Retain ring, clevis pin, and washers.



**Figure 3.46: Center Reel Arm in Forward Position**

2. Push the reel back until the end of cylinder (E) lines up with reel position 2 hole on bracket (D). Position washers (C) on both sides of the cylinder end inside the bracket.
3. Reinstall clevis pin (B) at the new position and secure with ring (A).



**Figure 3.47: Center Reel Arm in Aft Position**



## OPERATION

### *Reposition the right reel arm cylinder as follows:*

#### **NOTE:**

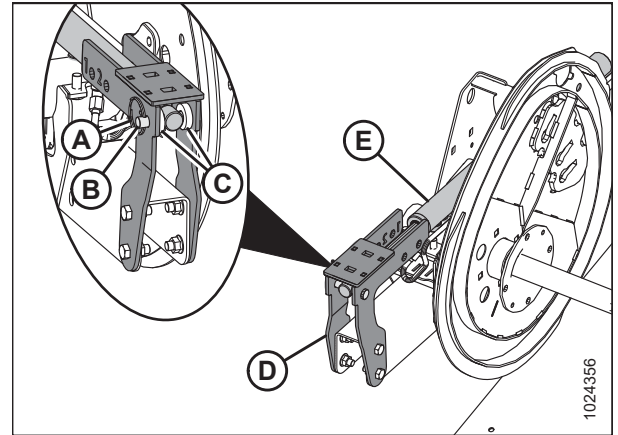
Some reel components not shown in illustrations for improved clarity.

1. Remove ring (A), clevis pin (B), and washers (C) from bracket (D). Retain ring, clevis pin, and washers.
2. Push the reel back until end of cylinder (E) lines up with reel position 2 hole on bracket (D).

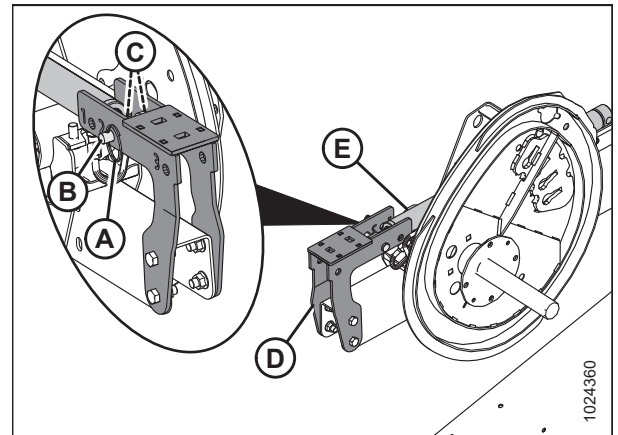
#### **NOTE:**

Washers inside center arm support bracket not shown in illustration at right.

3. Reinstall clevis pin (B) at the new position and secure with ring (A).



**Figure 3.48: Right Reel Arm in Forward Position**



**Figure 3.49: Right Reel Arm in Aft Position**

### **3.7.12 Reel Tine Pitch**

The pick-up reel is designed to pick up flattened and severely lodged crops. It is not always necessary to increase the tine pitch (select a higher cam setting) to pick up lodged crops, because the cam setting is mainly used to determine how the crop is delivered onto the drapers.

Finger positioning, relative to the ground (tine pitch), is not significantly affected by the cam setting. 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 instructions, refer to [3.6.2 Header Settings, page 43](#).

## Reel Cam Settings

The following outlines the function of each cam setting and provides set-up guidelines for various crop conditions. The setting numbers are visible above the slots on the cam disc. If adjustments are necessary, refer to [Adjusting Reel Cam, page 72](#).

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

- This setting will release crop close to the cutterbar and works best if the cutterbar is on the ground.
- Some crops will not be delivered past the cutterbar when the cutterbar is raised off the ground and the reel is pushed forward; therefore, set the initial reel speed approximately equal to the ground speed.

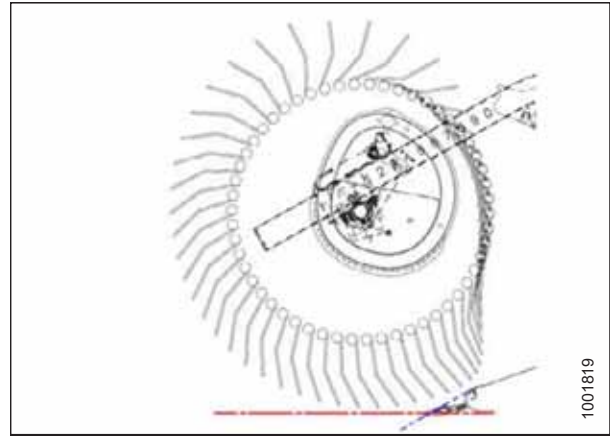


Figure 3.50: Finger Profile – Cam Position 1

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

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

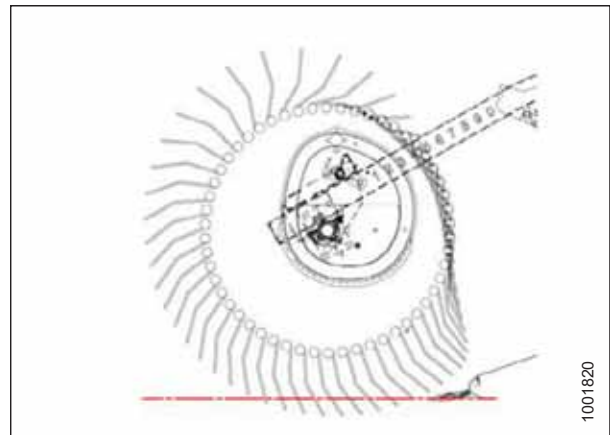


Figure 3.51: Finger Profile – Cam Position 2

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

- This position allows the reel to reach forward and lift the crop across the knife and onto the drapers.
- This setting generates a fingertip speed that is approximately 30% faster than the reel speed.

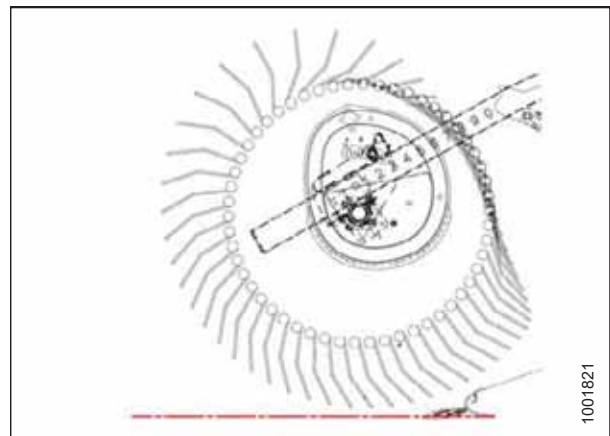


Figure 3.52: Finger Profile – Cam Position 3

## OPERATION

**Cam Position 4, Reel Position 2 or 3** is used with the reel fully forward to leave the maximum amount of stubble in lodged crops.

- This position allows the reel to reach forward and lift the crop across the knife and onto the drapers.
- This setting generates a fingertip speed that is approximately 35% faster than the reel speed.

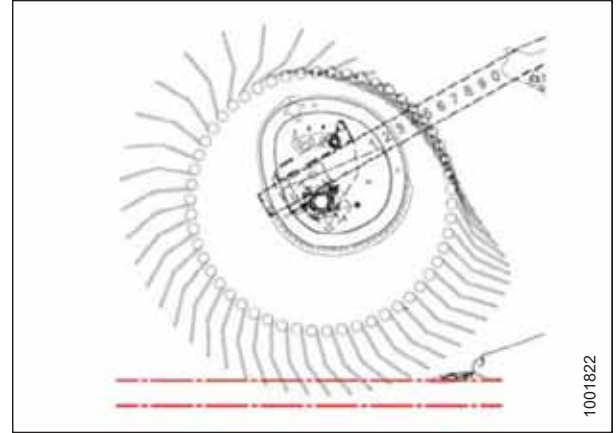


Figure 3.53: Finger Profile – Cam Position 4

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

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

### NOTE:

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

### IMPORTANT:

The reel to cutterbar clearance should always be checked following adjustments to reel tine pitch and reel fore-aft position. For instructions, refer to [5.8.1 Reel Clearance to Cutterbar, page 201](#).

Refer to [3.6.2 Header Settings, page 43](#) for recommended reel tine pitch in specific crops and crop conditions.

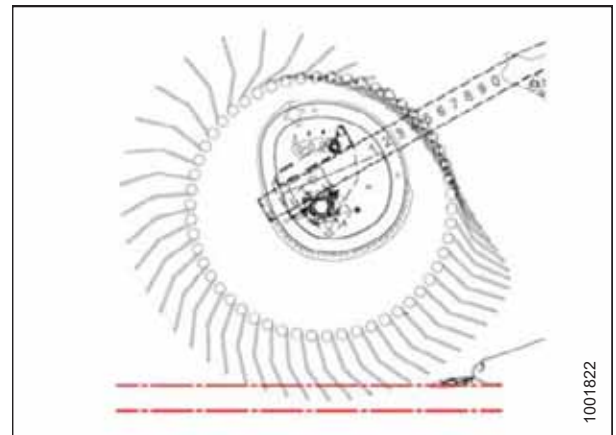


Figure 3.54: Finger Profile – Cam Position 4

### Adjusting Reel Cam

#### DANGER

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

1. Lower the reel fully.
2. Lower the header fully.
3. Shut down the engine, and remove the key from the ignition.
4. Turn latch pin (A) counterclockwise using a 3/4 in. wrench to release the cam disc.
5. Use the wrench 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 positioned through the cam disc (transparent view shown in illustration for improved clarity).

6. Turn latch pin (A) clockwise to engage and lock the cam disc.
7. Repeat Steps 4, [page 72](#) to 6, [page 72](#) for the opposite reel.

#### IMPORTANT:

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

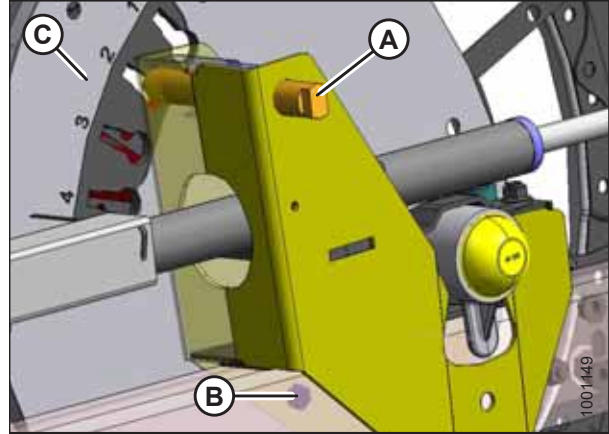


Figure 3.55: Cam Disc Positions

### 3.7.13 Crop Dividers

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

Crop dividers are bolted to the header by default, but a latch option is also available.

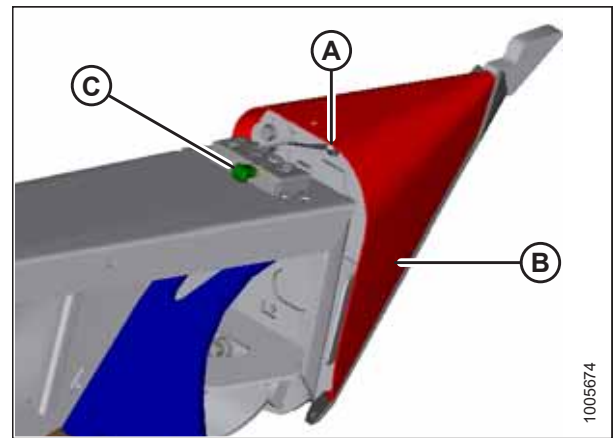
#### *Removing Crop Dividers with Latch Option from Header*



#### **DANGER**

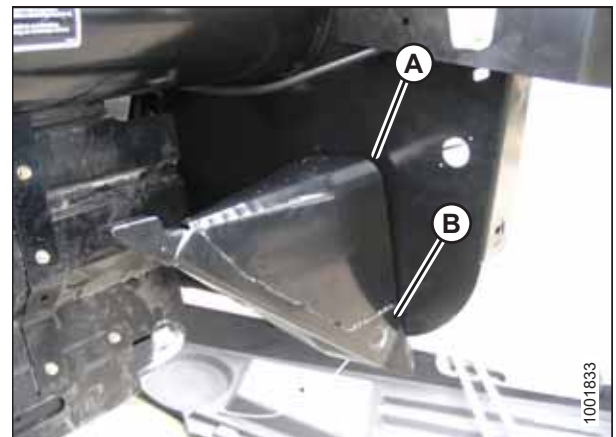
**To avoid bodily injury or death from unexpected start-up or fall of raised machine, always stop engine, remove key, and engage safety props before going under header for any reason.**

1. Lower reel, raise header, stop engine, remove key, and engage header safety props. For instructions, refer to your windrower operator's manual.
2. Open endshields. For instructions, refer to [Opening Endshields, page 34](#).
3. Lift safety lever (A).
4. Hold onto crop divider (B), push lever (C) to open latch, and lower crop divider.



**Figure 3.56: Crop Divider**

5. Lift crop divider off endsheet and store as follows:
  - a. Insert pin on crop divider into hole in endsheet at location (A) shown.
  - b. Lift crop divider and position lugs (B) on crop divider into bracket on endsheet. Ensure lugs engage bracket.
6. Close endshields. For instructions, refer to [Closing Endshields, page 35](#).



**Figure 3.57: Stored Crop Divider**

## Removing Crop Dividers without Latch Option from Header

### DANGER

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

1. Lower reel, raise header, stop engine, remove key, and engage safety props. For instructions, refer to your windrower operator's manual.
2. Open endshields. For instructions, refer to [Opening Endshields, page 34](#).
3. Remove bolt (A), lock washer, and flat washer.
4. Lower crop divider (B) and then lift to remove from endsheet.
5. Close endshields. For instructions, refer to [Closing Endshields, page 35](#).

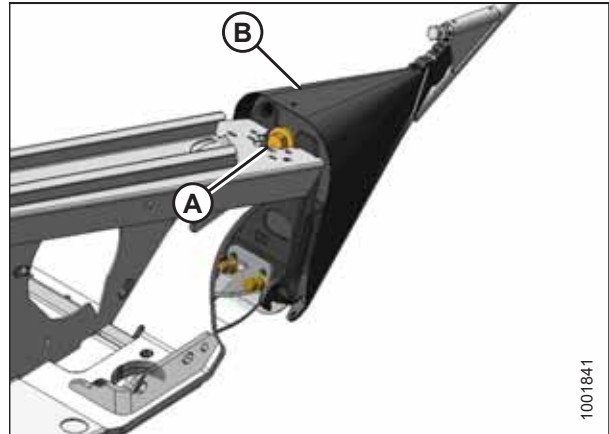


Figure 3.58: Crop Divider

## Installing Crop Dividers with Latch Option onto Header

### DANGER

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

1. Lower reel, raise header, stop engine, remove key, and engage safety props. For instructions, refer to your windrower operator's manual.
2. Open endshields. For instructions, refer to [Opening Endshields, page 34](#).
3. Remove crop divider from storage location by lifting crop divider to disengage lugs (A) at lower end and then lowering it slightly to disengage pin (B) from endsheet.

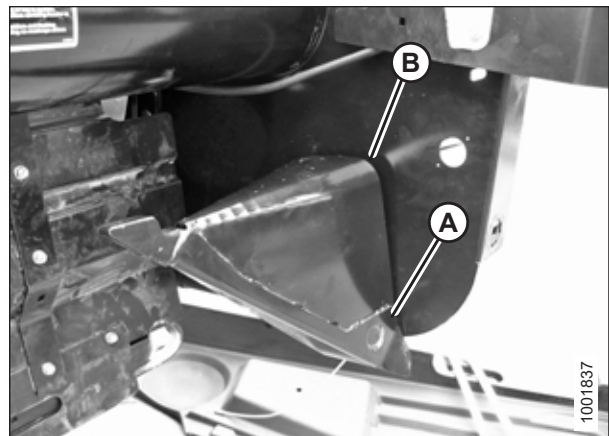


Figure 3.59: Stored Crop Divider

## OPERATION

4. Position crop divider as shown by inserting lugs (A) into holes in endsheet.
5. Lift forward end of crop divider until pin (B) at top of crop divider engages and closes latch (C).
6. Push safety lever (D) downward to lock pin into latch (C).

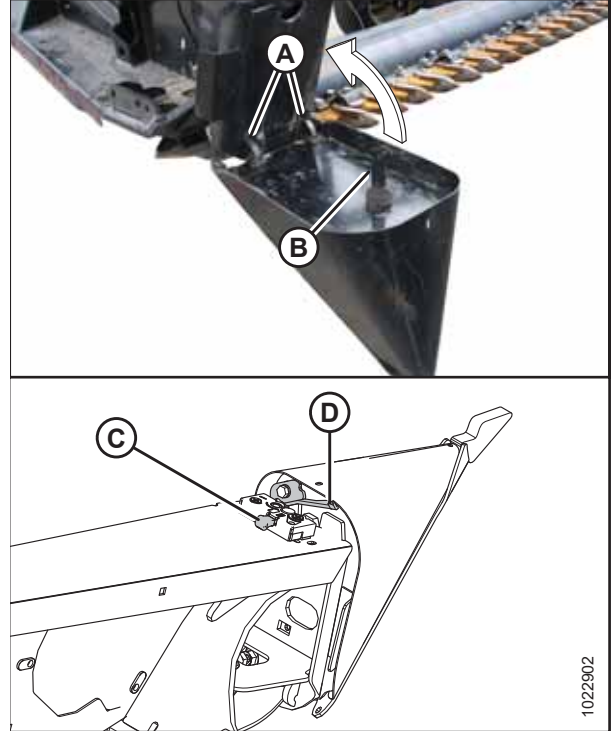


Figure 3.60: Crop Divider

7. Pull at the tip of the crop divider and ensure there is no lateral movement. If necessary, adjust bolts (A) to tighten crop divider and eliminate lateral movement.
8. Close endshields. For instructions, refer to [Closing Endshields, page 35](#).

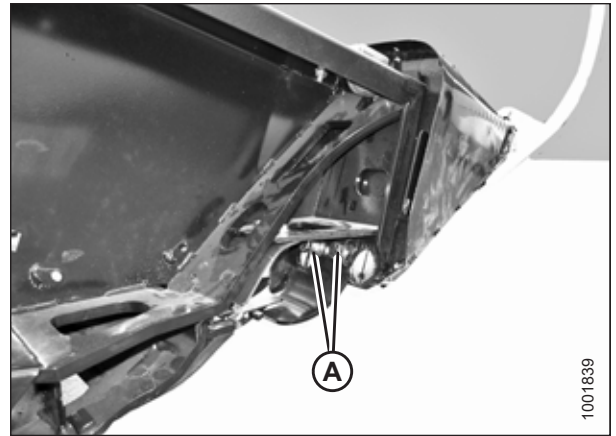


Figure 3.61: Crop Divider

### *Installing Crop Dividers without Latch Option onto Header*

#### **DANGER**

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

1. Lower reel, raise header, stop engine, remove key, and engage safety props. For instructions, refer to your windrower operator's manual.
2. Open endshields. For instructions, refer to [Opening Endshields, page 34](#).



## OPERATION

3. Remove crop divider from storage location by lifting crop divider to disengage lugs (A) at lower end and then lowering it slightly to disengage pin (B) from endsheet.

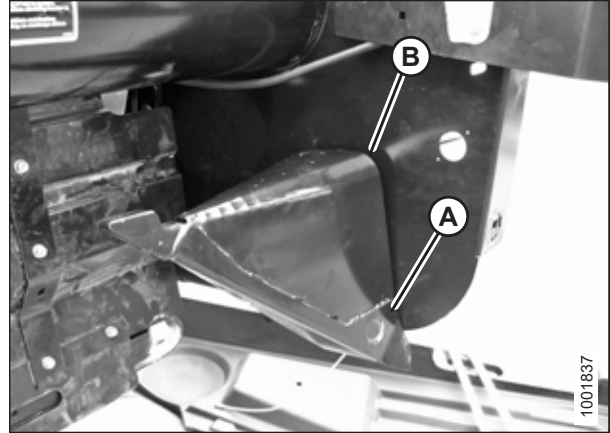


Figure 3.62: Stored Crop Divider

4. Position crop divider as shown by inserting lugs (A) into holes in endsheet.

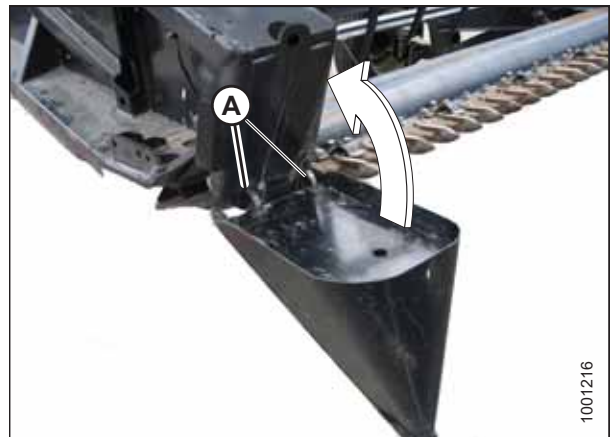


Figure 3.63: Crop Divider

5. Lift forward end of crop divider and install bolt (A) and special stepped washer (B) (step towards divider). Tighten bolt.
6. Pull at the tip of the crop divider and ensure there is no lateral movement. If necessary, adjust bolts (C) to tighten crop divider and eliminate lateral movement.
7. Close endshields. For instructions, refer to [Closing Endshields, page 35](#).

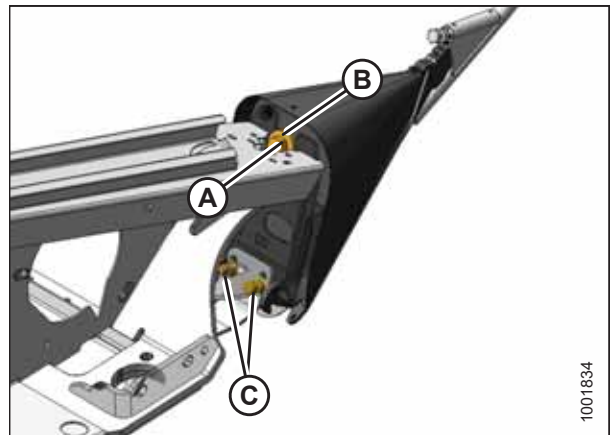


Figure 3.64: Crop Divider



### 3.7.14 Crop Divider Rods

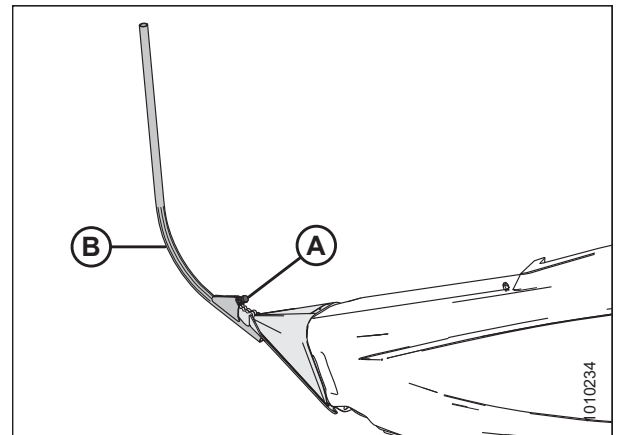
Crop divider rods can be used in conjunction with crop dividers. The removable crop divider rods are most useful when crop is down, but in standing crops using only crop dividers is recommended.

**Table 3.6 Crop Divider Rods Recommended Use**

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

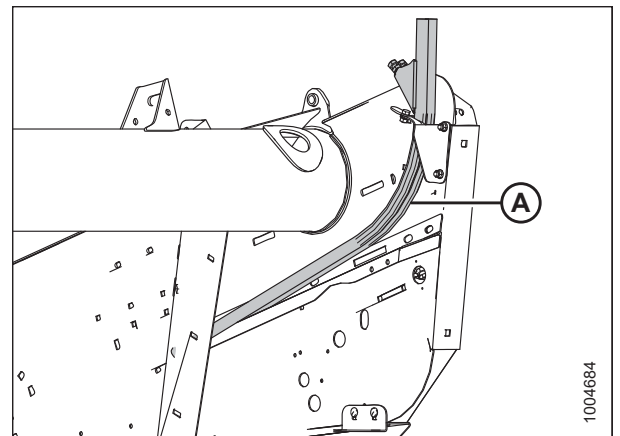
#### *Removing Crop Divider Rods*

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



**Figure 3.65: Crop Divider Rod**

2. Store both crop divider rods (A) inboard on the right endsheet.



**Figure 3.66: Right Endsheets**

## OPERATION

### *Rice Divider Rods*

Optional rice divider rods provide improved performance in tall and tangled rice crops. For instructions, refer to [6.4.4 Rice Divider Rods, page 254](#).

The installation and removal procedures are the same as for standard crop divider rods.



Figure 3.67: Divider Rod for Rice

## 3.8 Delivery Opening

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

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

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

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

Refer to [3.10 Windrow Types, page 87](#) for the strengths and weaknesses of the various windrow configurations with respect to these factors.

Also refer to [3.9 Double Windrowing, page 83](#).

### 3.8.1 Adjusting Delivery Opening on Header with Manual Deck Shift

Both decks can be positioned to vary the delivery opening as follows:

- **4.6 m (15 ft.) headers:** 154 to 177 cm (60 5/8 to 69 11/16 in.)
- **6.1–12.2 m (20–40 ft.) headers:** 172 to 195 cm (67 1/8 to 76 11/16 in.)

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

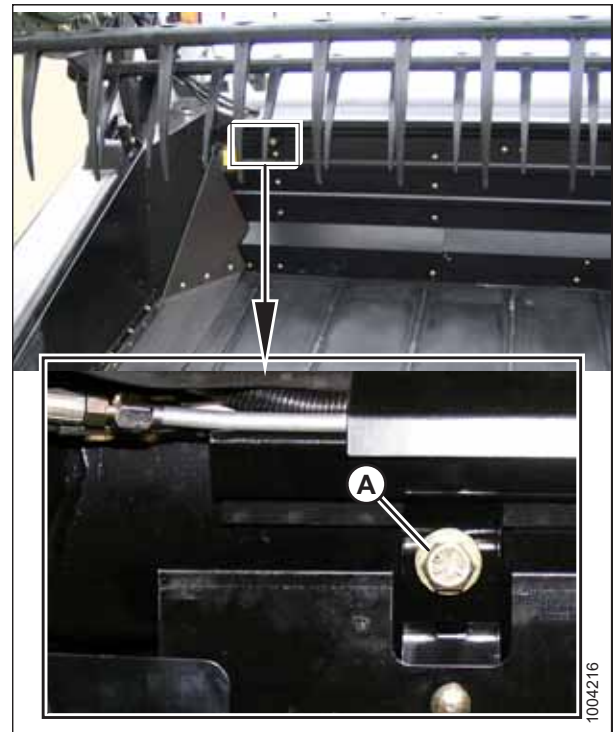


Figure 3.68: Manual Deck Shift

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

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

1. Remove bolts (A).
2. Slide stop (B) outboard to decrease the maximum opening size, or inboard to increase the maximum opening.

#### CAUTION

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

3. Reinstall bolts (A) and tighten.

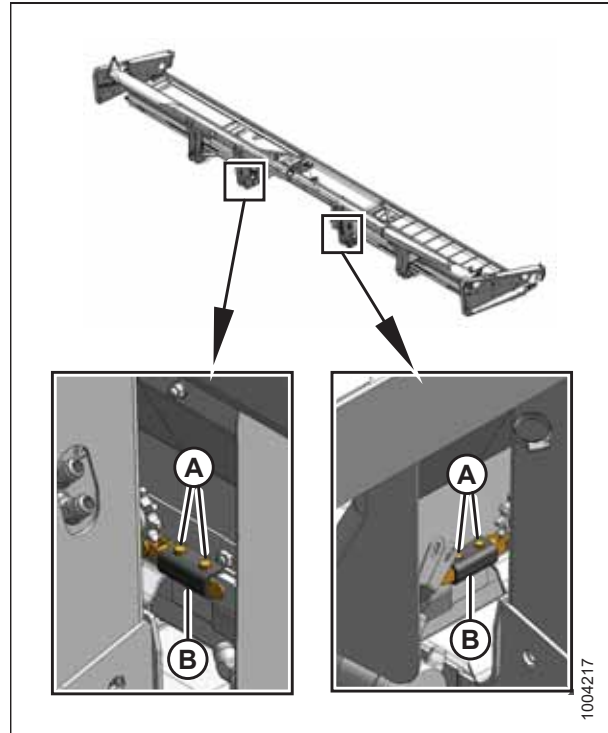


Figure 3.69: Hydraulic Deck Shift

### 3.8.3 Adjusting Hydraulic Deck Shift Chain Tension

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

1. Locate chain adjustment bolt (A).

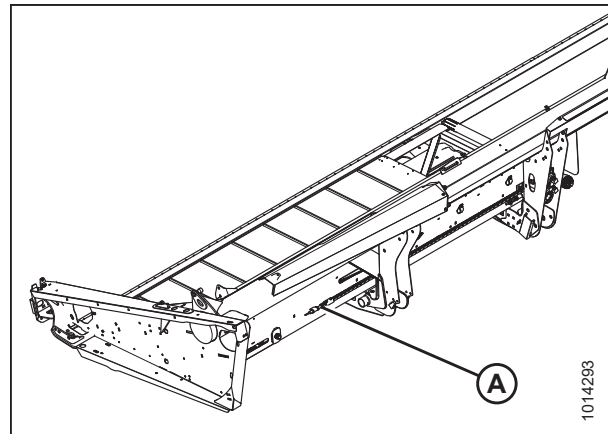


Figure 3.70: Chain Adjustment Bolt – Left Shown, Right Similar

## OPERATION

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

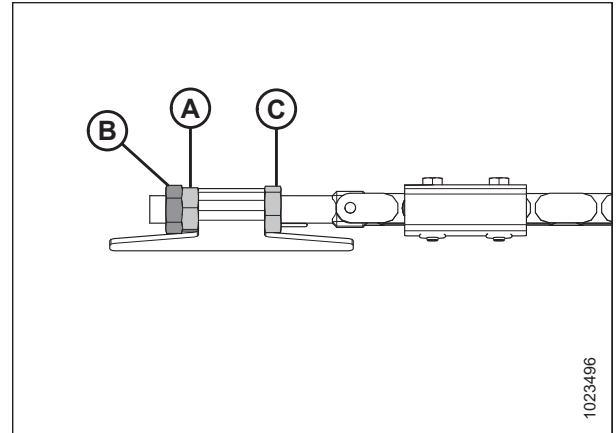
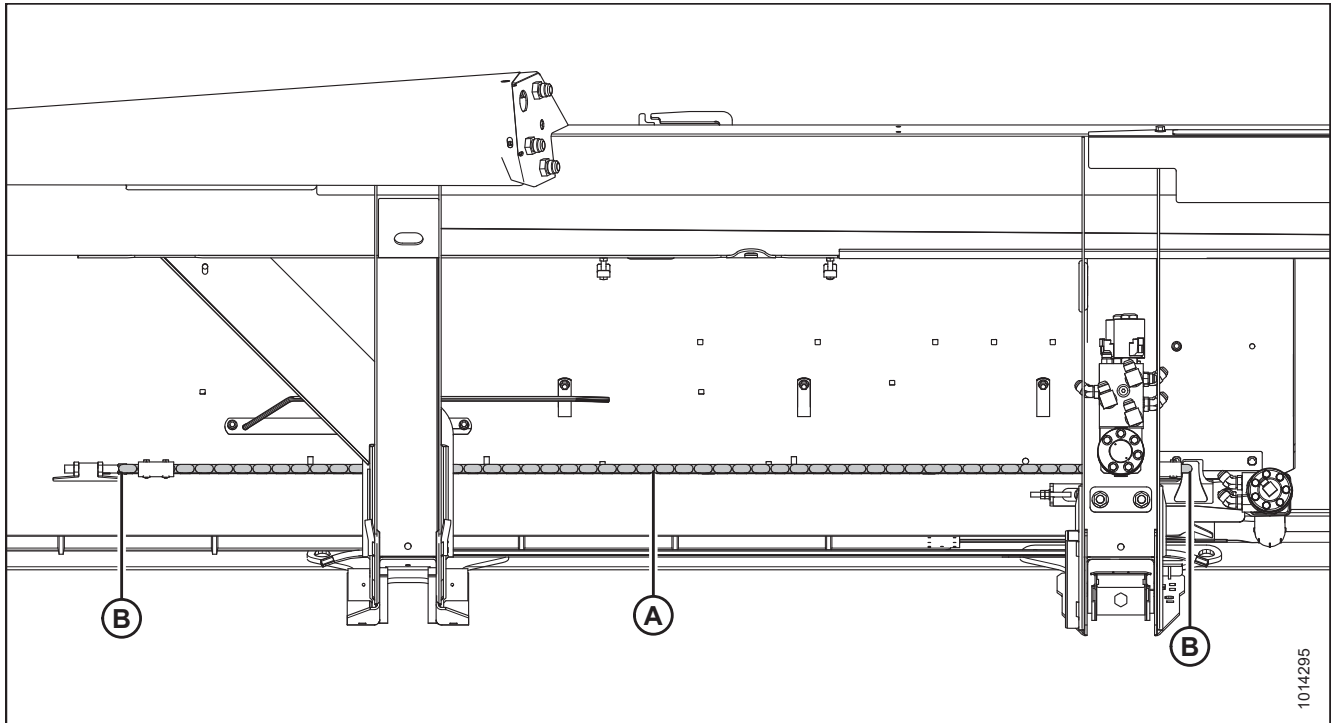


Figure 3.71: Chain Adjustment Bolt – Left Shown, Right Similar

Figure 3.72: HDS Chain – Left Shown, Right Similar



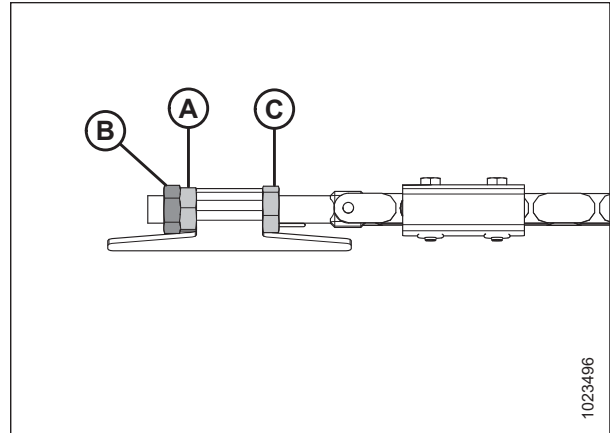
4. Measure to ensure chain midpoint (A) is 25–50 mm (1–2 in.) lower than the chain ends (B).

## OPERATION

5. Tighten jam nut (C).
6. Lock nut (B) against nut (A).

**NOTE:**

If there is less than 5 mm (3/16 in.) of thread visible beside jam nut (C), then remove nut (C).



**Figure 3.73: Chain Adjustment Bolt – Left Shown, Right Similar**

## 3.9 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 is performed with the D1 Series Draper Headers by two methods: deck shifting or using the Double Windrow Attachment (DWA).

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

- [3.9.1 Shifting Decks Hydraulically, page 83](#)
- [3.9.2 Shifting Decks Manually, page 84](#)

Forage crops such as alfalfa, hay, and some grasses are cut and then fed into the HC10 Hay Conditioner. The DWA system allows double windrowing with conditioner-equipped windrowers up to 9.1 m (30 ft.). For instructions, refer to [3.9.3 Using Double Windrow Attachment \(DWA\), page 86](#).

### 3.9.1 Shifting Decks Hydraulically

The hydraulic deck shift feature allows you to select center, left, or right delivery from the windrower cab. It is only available on 7.6–10.7 m (25–35 ft.) headers.

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

To lay a double windrow, do the following:

**NOTE:**

9.1 m (30 ft.) headers equipped with transport or stabilizer system require that the wheels be in the raised position to avoid interfering with the windrow.

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

**NOTE:**

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

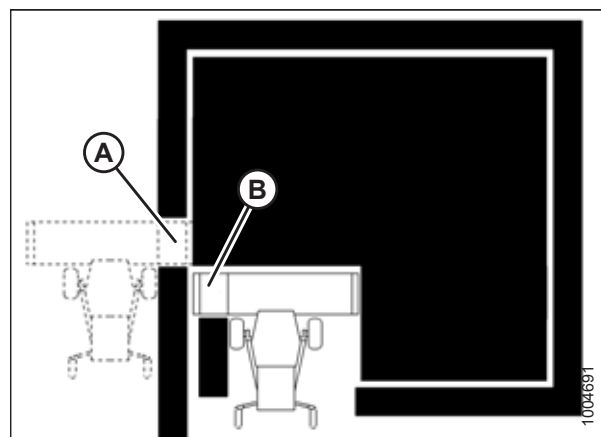


Figure 3.74: Double Windrowing

### 3.9.2 Shifting Decks Manually

Both decks can be moved manually to deliver the crop from the center or right/left end on 7.6 to 12.2 m (25 to 40 ft.) headers.

#### DANGER

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

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

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

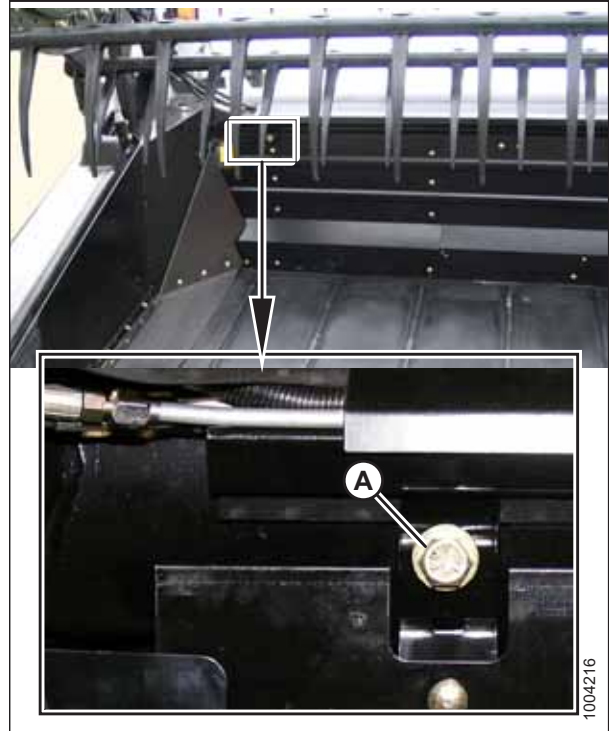


Figure 3.75: Right Deck Shown

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

**NOTE:**

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

**NOTE:**

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

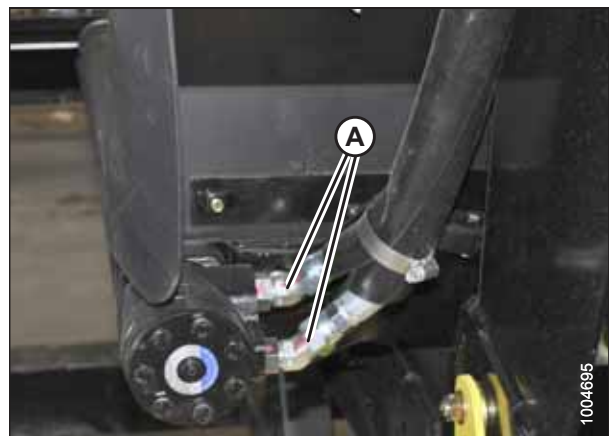


Figure 3.76: Right Deck Motor



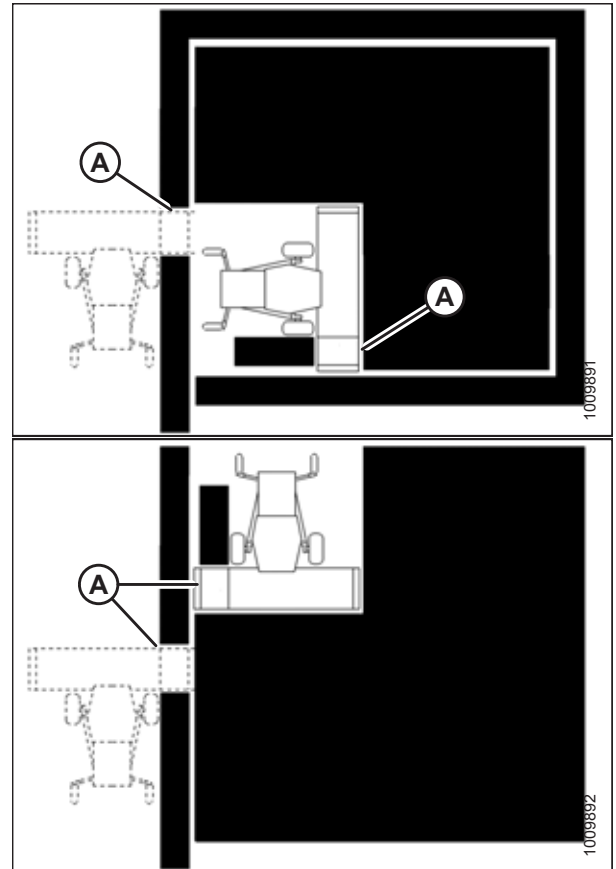
## OPERATION

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

**NOTE:**

9.1 m (30 ft.) headers equipped with transport or stabilizer system require that the wheels be in the raised position to avoid interfering with the windrow.

1. Position decks at the left end of header to deliver crop from right end (A).
2. Complete one round or one length of the field.
3. Complete the second round or length in the opposite direction to lay a double windrow.
4. Repeat above steps to lay additional double windrow.



**Figure 3.77: Double Windrowing**

### 3.9.3 Using Double Windrow Attachment (DWA)

**NOTE:**

The DWA system shuts off the draper automatically when it is raised and allows the crop to be deposited between the tractor wheels as it would be without the side delivery system.

The double windrow attachment (DWA) allows double windrowing of cut and conditioned forage type crops. The conditioned crop is deposited onto the side delivery system draper (A) and delivered to the side of the windrower when required. Draper speed and deck position are controlled with switches in the windrower cab.

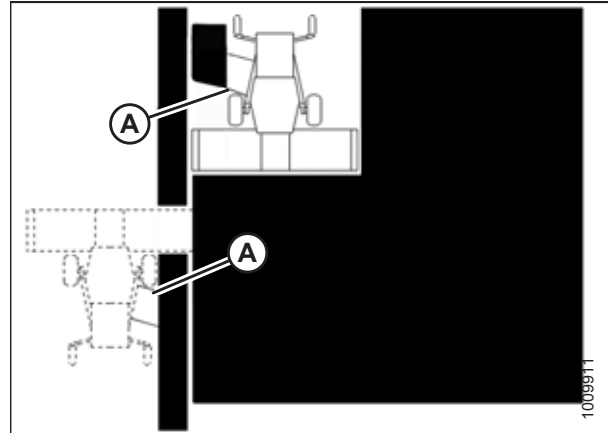


Figure 3.78: Double Windrowing

To lay a double windrow, do the following:

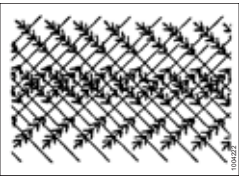
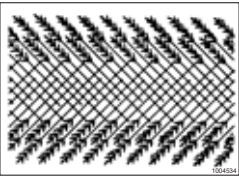
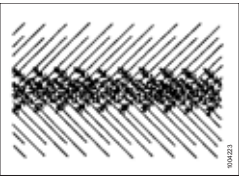
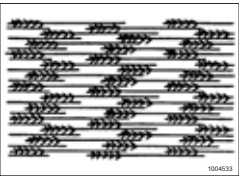
1. Complete one round or one length of the field.
2. Complete the second round or length in the opposite direction to lay a double windrow.
3. Repeat above steps to lay additional double windrow.

### 3.10 Windrow Types

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

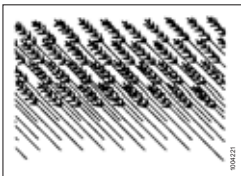
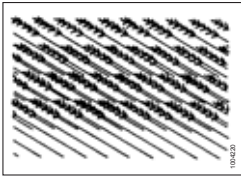
- **Weight Distribution:** Heads and stalks distributed evenly across full width of windrow
- **Good Curing:** A loose, open windrow for better drying
- **Good Weatherability:** A well-formed windrow that supports heads off the ground and holds together in extreme weather conditions

**Table 3.7 Windrow Descriptions**

Windrow Type	Description	Weight Distribution	Curing	Weatherability	Machine Setting Guidelines
<b>Herringbone</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.	Good	Good	Excellent	<ul style="list-style-type: none"> <li>• Reel and ground speed approximately equal</li> <li>• Medium draper speed</li> <li>• Center delivery</li> </ul>
<b>Fantail</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.	Fair	Fair	Fair	<ul style="list-style-type: none"> <li>• Low draper speed</li> <li>• Low header angle</li> <li>• Center delivery</li> </ul>
<b>Dovetail</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.	Poor	Fair	Poor	<ul style="list-style-type: none"> <li>• High draper speed</li> <li>• High header angle</li> <li>• Center delivery</li> </ul>
<b>Parallel</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.	Good	Good	Good	<ul style="list-style-type: none"> <li>• Medium draper speed</li> <li>• Medium header angle</li> <li>• Center or end delivery</li> </ul>

## OPERATION

**Table 3.7 Windrow Descriptions (continued)**

Windrow Type	Description	Weight Distribution	Curing	Weatherability	Machine Setting Guidelines
<b>45° Diagonal</b> 	<p>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>	Poor	Fair	Poor	<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>
<b>75° Diagonal</b> 	<p>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>	Fair	Good	Fair	<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>

## 3.11 Haying Tips

The following information may be useful when using the D1 Series Draper Header in hay crops.

### 3.11.1 Curing

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.

### 3.11.2 Topsoil Moisture

On wet soil, the general rule of wide and thin does **NOT** apply. A narrower windrow will dry faster than hay left flat on wet ground.

When the ground is wetter than the hay, moisture from the soil is absorbed by the hay above it. Determine topsoil moisture level before cutting. Use a moisture tester or estimate level using the table below.

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

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

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

### 3.11.3 Weather and Topography

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

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

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

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

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

### 3.11.4 Windrow Configuration

The following windrow characteristics are desirable:

**Table 3.8 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.
Even distribution of material across windrow	Results in even and consistent bales to minimize handling and stacking problems.
Properly conditioned	Prevents excessive leaf damage.

Refer to [3.7 Header Operating Variables, page 51](#) for instructions on adjusting the header.

### 3.11.5 Driving on Windrow

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

### 3.11.6 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%.

### 3.11.7 Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces, so that water can escape and evaporate faster. However, treated hay lying on wet ground will also absorb moisture faster. Costs and benefits relative to your area should be carefully considered before using a drying agent.

### 3.12 Leveling Header

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

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

**NOTE:**

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

### 3.13 Unplugging Cutterbar

To remove plugged material from the cutterbar, follow these steps:

1. Stop forward movement of machine and disengage header drives.
2. Raise header to prevent it from filling with dirt, and engage header drive clutch.
3. If plug does **NOT** clear, disengage header drive clutch and raise header fully.



#### CAUTION

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



#### DANGER

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

4. Shut off engine and remove key.
5. Engage header safety props.



#### CAUTION

Wear heavy gloves when working around or handling knives.

6. Clean off cutterbar by hand.

#### NOTE:

If cutterbar plugging persists, refer to [7 Troubleshooting, page 259](#).



### 3.14 Upper Cross Auger (UCA)

The UCA (A) improves delivery of very bulky crops across the header and onto the windrow.

Beater bars assist in delivering material through the header opening, but the beater bars are removable if wrapping occurs.

**IMPORTANT:**

The UCA drive motor must be equipped with a case drain kit when used on single draper drive headers. See your MacDon Dealer for details.

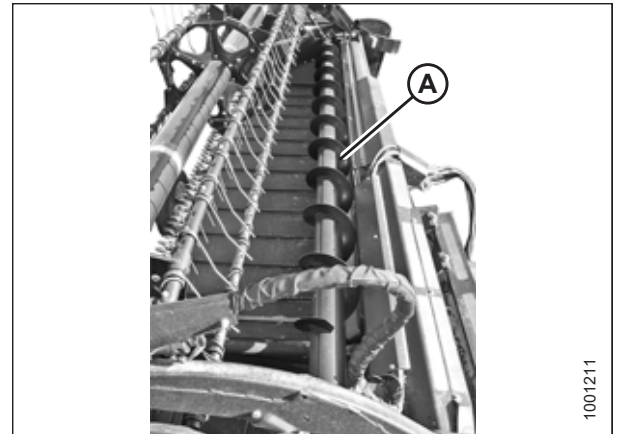


Figure 3.79: Upper Cross Auger

#### 3.14.1 Removing Beater Bars



**DANGER**

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

1. Lower the header to the ground, stop the engine, and remove the key from the ignition.
2. Remove bolts (A) securing beater bars (B) and clamps (C) to the auger tubes, and remove the beater bars and clamps.

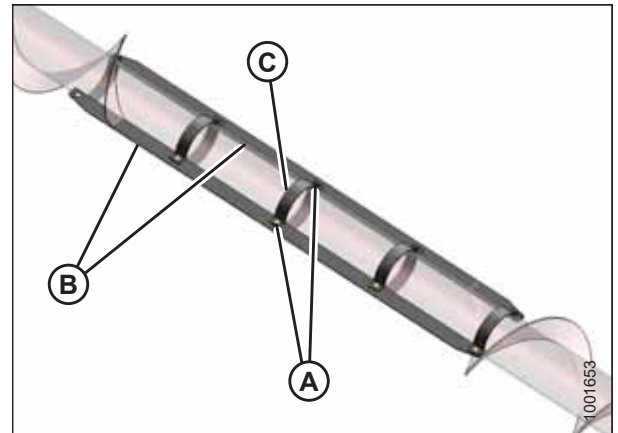


Figure 3.80: Beater Bars

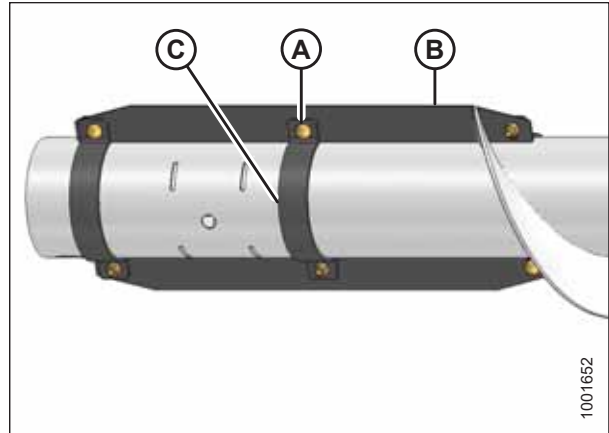


Figure 3.81: Beater Bars

### 3.14.2 Installing Beater Bars

#### WARNING

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

1. Lower the header to the ground, stop the engine, and remove the key from the ignition.
2. Position one beater bar (B) and one clamp set (C) onto the auger tube and loosely secure with carriage bolt (A) and nut. Bolt head **MUST** face the direction of auger rotation.
3. Position the remaining clamp sets (C) onto the auger tube and loosely attach to beater bar (B) with carriage bolts (A) and nuts. Bolt heads **MUST** face the direction of auger rotation.
4. Position second beater bar (B) in clamp sets (C) and secure with carriage bolts (A) and nuts.

#### NOTE:

To reduce the chance of wrapping, offset the beater bars by 90°.

5. Tighten bolts.

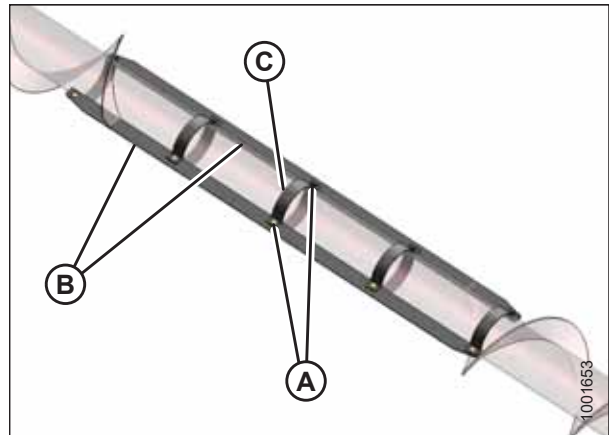


Figure 3.82: Beater Bars

## OPERATION

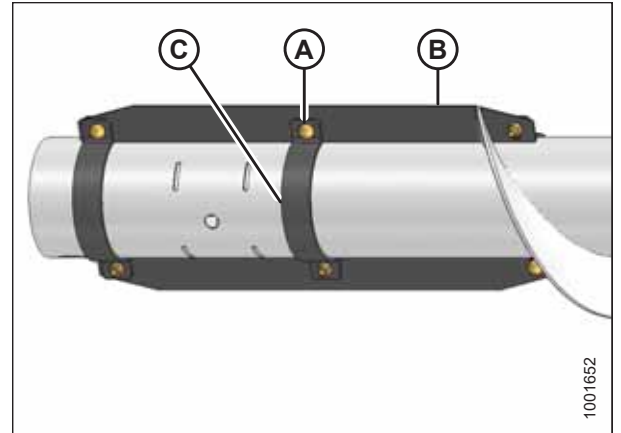


Figure 3.83: Beater Bars

## 3.15 Transporting the Header



### WARNING

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

### 3.15.1 Transporting Header on Windrower



### CAUTION

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

### 3.15.2 Towing

Headers with the Slow Speed Transport/Stabilizer Wheel option can be towed behind a properly configured MacDon windrower or an agricultural tractor. Refer to the towing vehicles operator's manual for instructions.

#### *Attaching Header to Towing Vehicle*



#### **CAUTION**

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

- Weight of towing vehicle must exceed header weight to ensure adequate control and braking performance.
- Do NOT tow with any highway-capable vehicle. Use only an agricultural tractor, agricultural combine, or a properly configured MacDon windrower.
- Ensure reel is fully lowered and back on support arms to increase header stability during transport. For headers with hydraulic reel fore-aft, never connect the fore-aft couplers to each other or the circuit will be complete and the reel could creep forward during transport.
- Check that all pins are properly secured in transport position at wheel supports, cutterbar support, and hitch.
- Check tire condition and pressure prior to transporting.
- Connect hitch to towing vehicle using a proper hitch pin with a spring locking pin or other suitable fastener.
- Attach hitch safety chain to towing vehicle. Adjust safety chain length to provide only enough slack to permit turning.
- Connect header seven-pole plug wiring harness to mating receptacle on towing vehicle. (The seven-pole receptacle is available from your MacDon Dealer Parts Department).
- Ensure lights are functioning properly and clean the slow moving vehicle sign and other reflectors. Use flashing warning lights unless prohibited by law.
- Do NOT exceed 32 km/h (20 mph) when towing a header using the Slow Speed Transport option. Reduce speed to less than 8 km/h (5 mph) for corners and slippery or rough conditions.

#### *Towing the Header*



#### **CAUTION**

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

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

### 3.15.3 Converting from Transport to Field Position

#### Removing Tow-Bar

1. Block the tires to prevent the header from rolling, and unhook the header from the towing vehicle.
2. Disconnect electrical connector (A) on the tow-bar.
3. Remove pin (B) from the tow-bar, and detach outer section (C) from inner section (D).

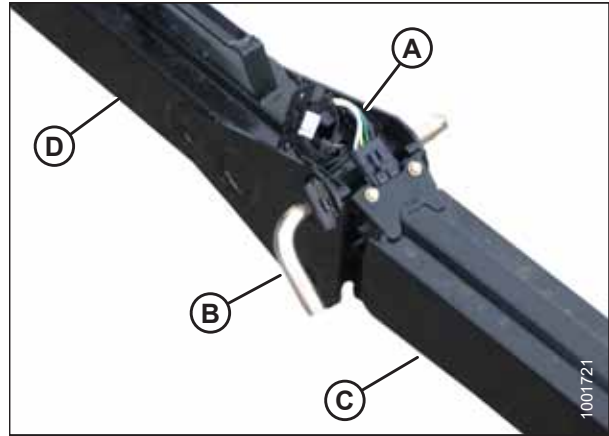


Figure 3.84: Tow-Bar Assembly

4. Disconnect electrical connector (A) at the front wheel.

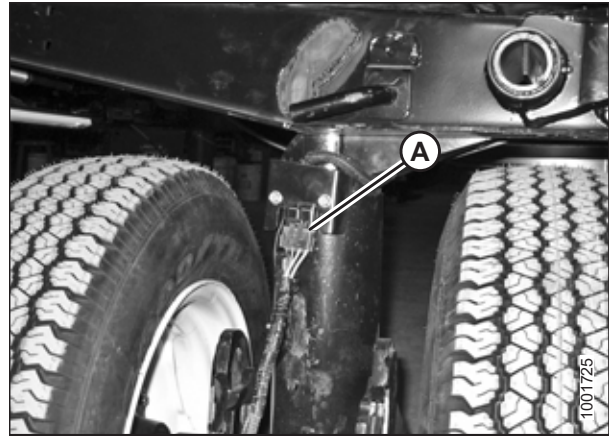


Figure 3.85: Wiring Connector

5. Remove clevis pin (A) and set aside for reinstallation.
6. Push latch (B) and lift tow-bar (C) from the hook. Release latch.
7. Install clevis pin (A).

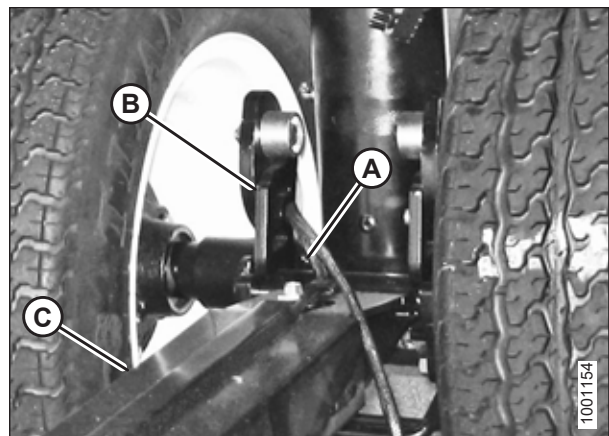
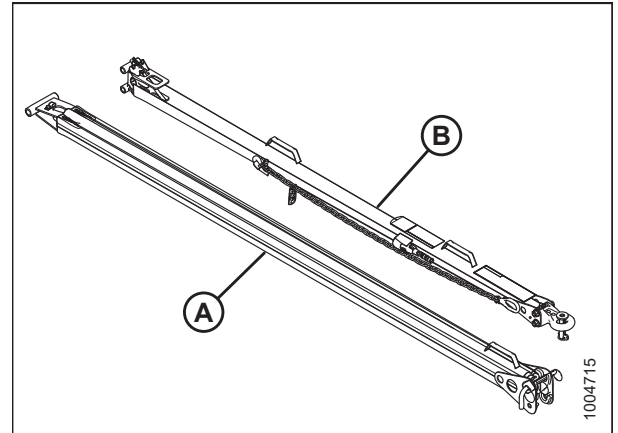


Figure 3.86: Tow-Bar Latch

## OPERATION

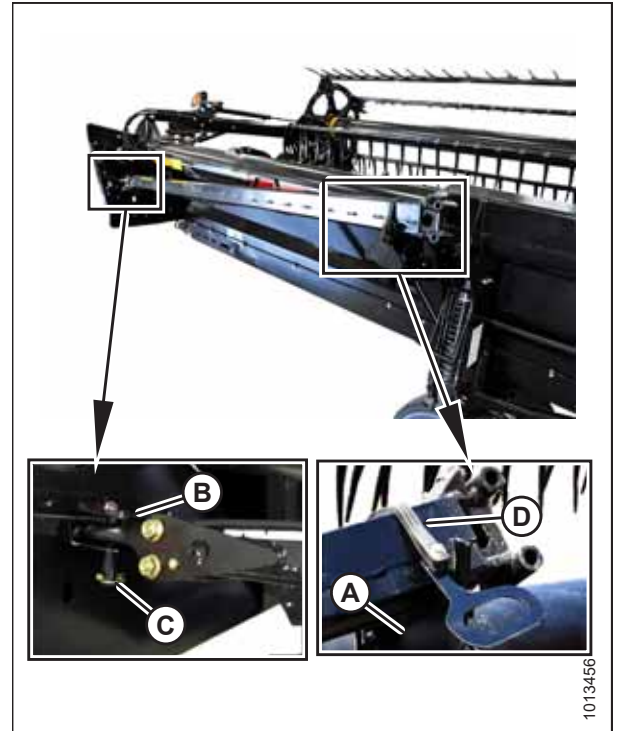
### *Storing Tow-Bar*

The tow-bar consists of two sections, an inner half (A) and an outer half (B), to make storage and handling easier.



**Figure 3.87: Tow-Bar Assembly**

1. Place the inner end of the outer half of the tow-bar into cradle (A) on the left side of the header backtube.
2. Secure clevis/pintle end of the tow-bar in support (B) on the endsheet using hitch pin (C). Secure with lynch pin.
3. Install rubber strap (D) on cradle (A).



**Figure 3.88: Tow-Bar Storage – Left Side**

## OPERATION

4. Place the inner end of the outer half of the tow-bar into cradle (A) on the right side of the header backtube.
5. Secure the tube end of the tow-bar in support (B) on the endsheet using hitch pin (C). Secure with hairpin.
6. Install rubber strap (D) on cradle (A).
7. Attach the header to the windrower. Refer to the windrower operator's manual for instructions.

### IMPORTANT:

Carrying the tow-bar on the header will affect the main header float. Refer to your windrower operator's manual for adjustment procedures.

8. Place the transport wheels into field position. For instructions, refer to the following:
  - *Moving Front Wheels (Left) into Field Position, page 101*
  - *Moving Rear (Right) Wheels into Field Position, page 102*

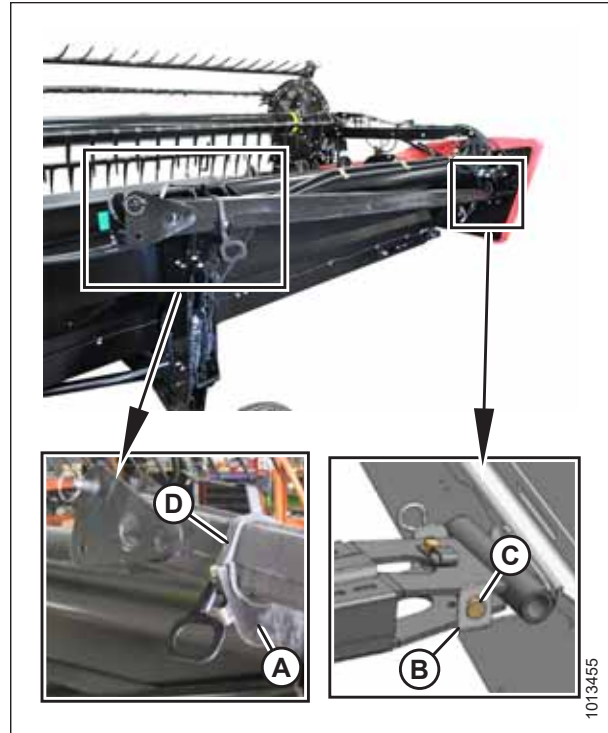


Figure 3.89: Tow-Bar Storage – Right Side



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

#### **DANGER**

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

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props.
4. Swivel front wheel assembly (A) so the wheels are aligned with the lower frame.
5. Remove pin (B) and pull the wheel assembly toward the rear of header. Store the pin in hole (C) at the top of the leg.
6. Pull handle (D) upward to release and lower the linkage into the vertical support.

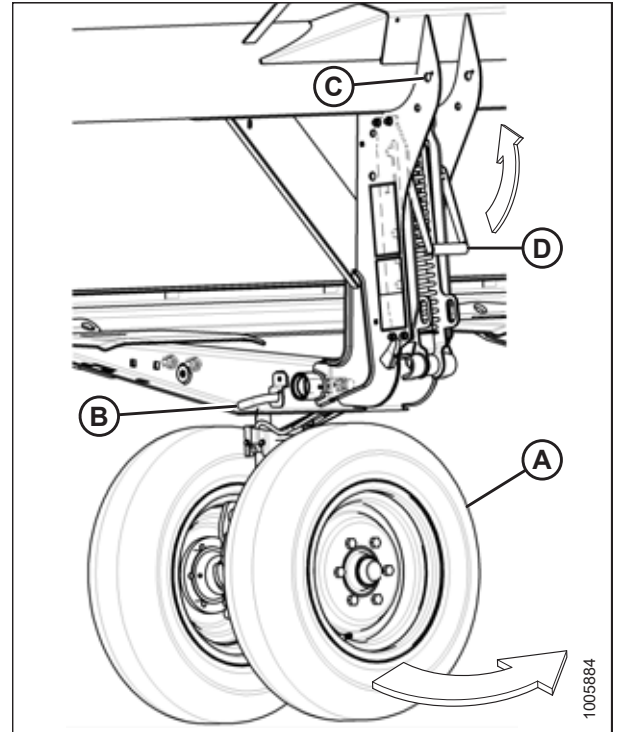


Figure 3.90: Front Wheels – Left

7. Align lift hook (A) with lug (B) and lift the wheel assembly to engage the pin in the lift hook. Ensure latch (C) is engaged.
8. Install clevis pin (D) and secure to the center of the axle with hairpin.

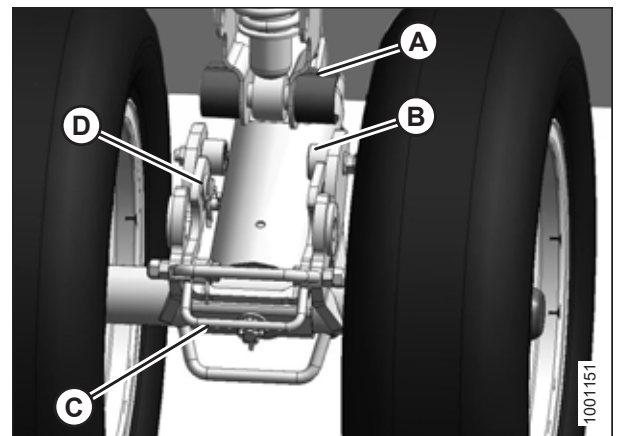


Figure 3.91: Front Wheels – Left

## OPERATION

9. Lift the wheel assembly to the desired height and slide linkage (A) into the appropriate slot in the vertical support.
10. Push handle (B) down to lock.



Figure 3.92: Front Wheels – Left

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

1. Pull pin (A) on the left rear wheel. Swivel the wheel clockwise and lock with pin.

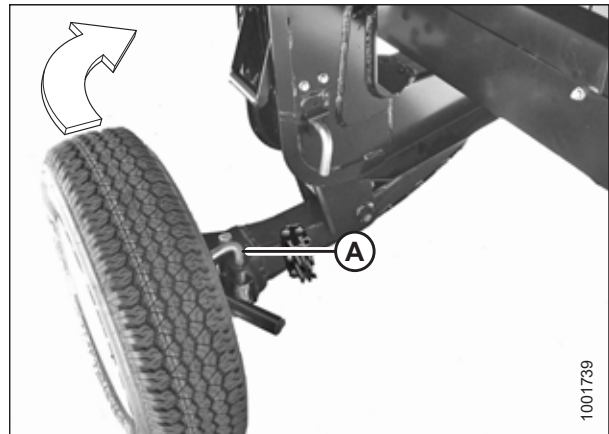


Figure 3.93: Rear Wheel – Right Side

2. Remove pin (A) and store at location (B).
3. Pull handle (C) upward to release.
4. Lift the wheel to the desired height, and engage the support channel into slot (D) in the vertical support.
5. Push handle (C) down to lock.

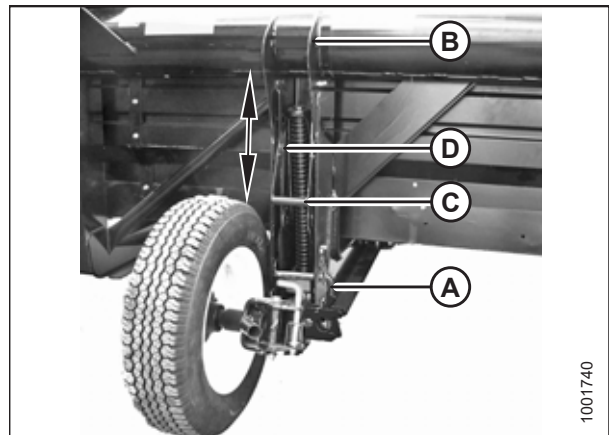


Figure 3.94: Rear Wheel – Right Side

## OPERATION

6. Pull pin (A) on brace (B) on the left wheel in front of the cutterbar. Disengage the brace from the cutterbar, and lower the brace against axle (C).
7. Remove pin (D), lower support (E) onto axle, and reinsert pin into support.
8. Swing axle (C) clockwise towards the rear of the header.

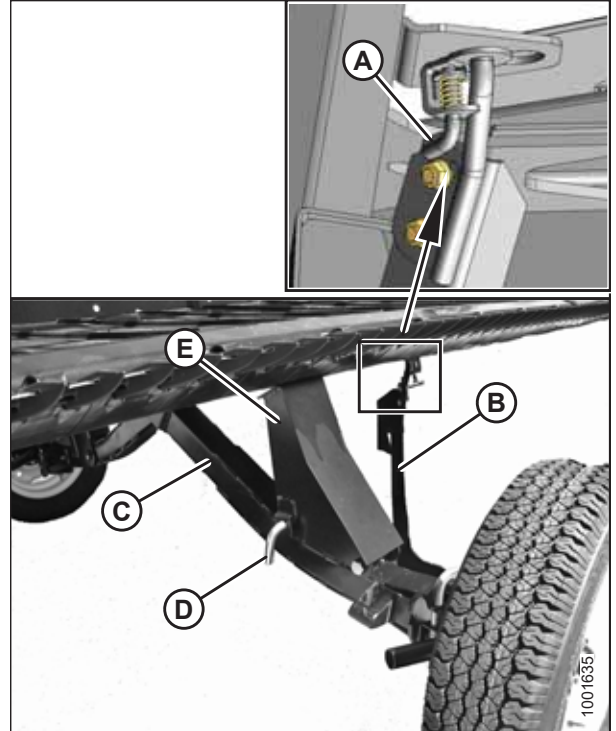


Figure 3.95: Right Rear Axle

9. Pull pin (A) on right wheel, swivel the wheel counterclockwise to position shown, and lock with pin (A).
10. Remove hairpin (B) from latch (C).
11. Lift the wheel, lift latch (C), and engage lug (D) onto the left axle. Ensure the latch closes.
12. Secure the latch with hairpin (B), ensuring the open end of the pin faces the rear of the windrower.

### NOTE:

The hairpin can become dislodged by crop if installed with the open end facing the cutterbar.

### IMPORTANT:

Check that wheels are locked and that handle is in locked position.

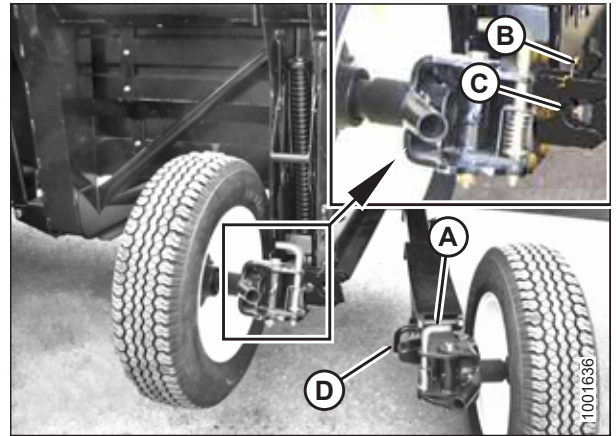


Figure 3.96: Rear Axles

## OPERATION

13. Complete the conversion by ensuring left (A) and right (B) wheels are in the position shown.

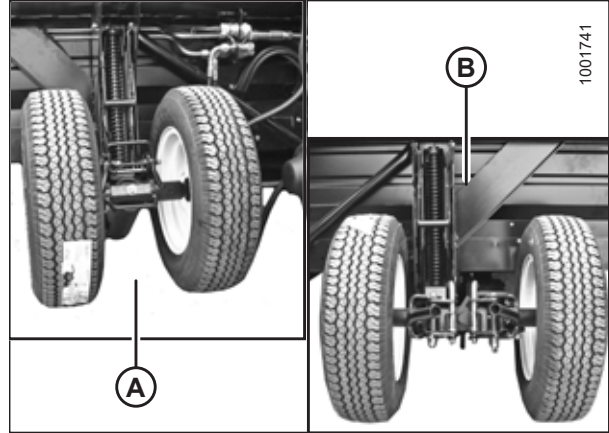


Figure 3.97: Field Position

### 3.15.4 Converting from Field to Transport Position

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



#### **DANGER**

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



#### **CAUTION**

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

1. Pull handle (B) upward to release and raise linkage (A) fully upward into the vertical support.
2. Raise the header fully, stop the engine, and remove the key from ignition. Engage the header safety props.

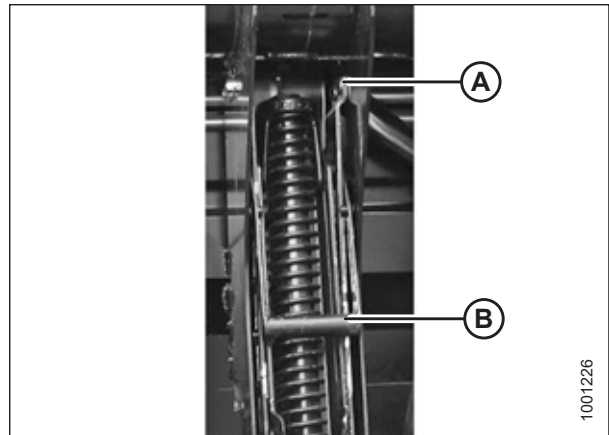


Figure 3.98: Raising Linkage

## OPERATION

3. Remove the hairpin and clevis pin (A).
4. Pull latch handle (B) to release suspension linkage (C), and pull the suspension linkage away from spindle (D).
5. Lower the wheels slowly.

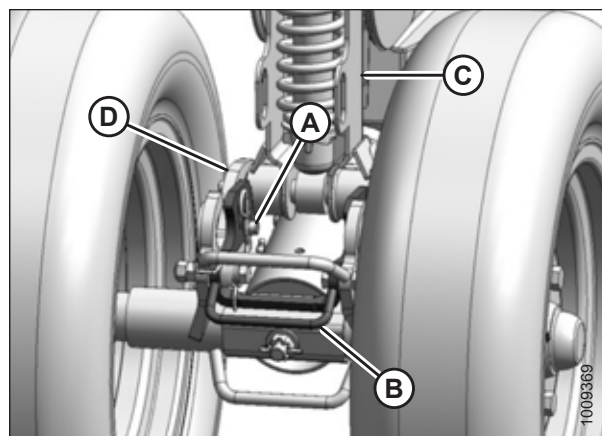


Figure 3.99: Left Front Wheels

6. Lower handle (B) to lock.

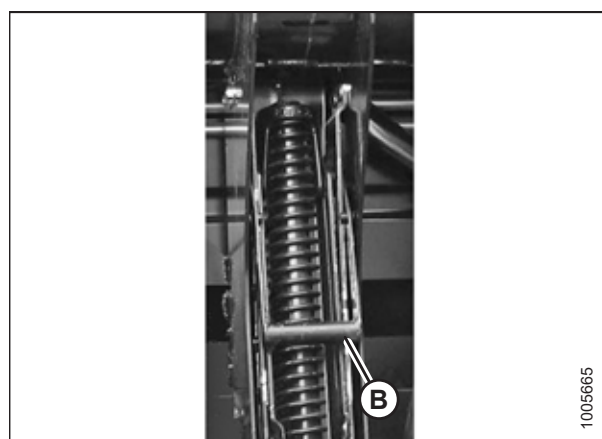


Figure 3.100: Locking Linkage

## OPERATION

7. Remove pin (A) from storage at the top of leg (B).
8. Move and swivel the wheels clockwise until connector (C) is turned towards the front end of the header.
9. Insert pin (A) and turn to lock.
10. Lower the header until the left wheels are just touching the ground.

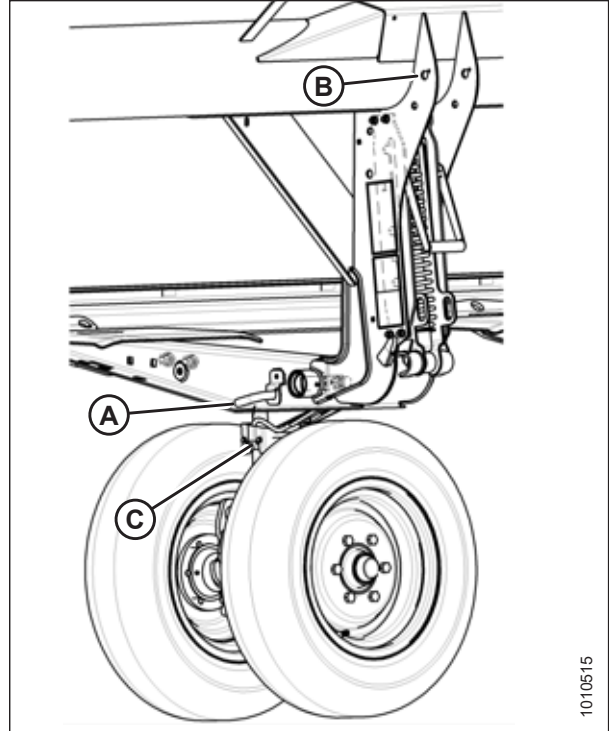


Figure 3.101: Left Front Wheels

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

1. Remove hairpin (A) from latch (B).
2. Lift latch (B), disengage right axle (C), and lower to the ground.



### CAUTION

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

3. Pull handle (D) carefully to release the spring and lower the wheel to the ground.
4. Lift the wheel and linkage with handle (E) and position the linkage in the bottom slot.
5. Lower handle (C) to lock.

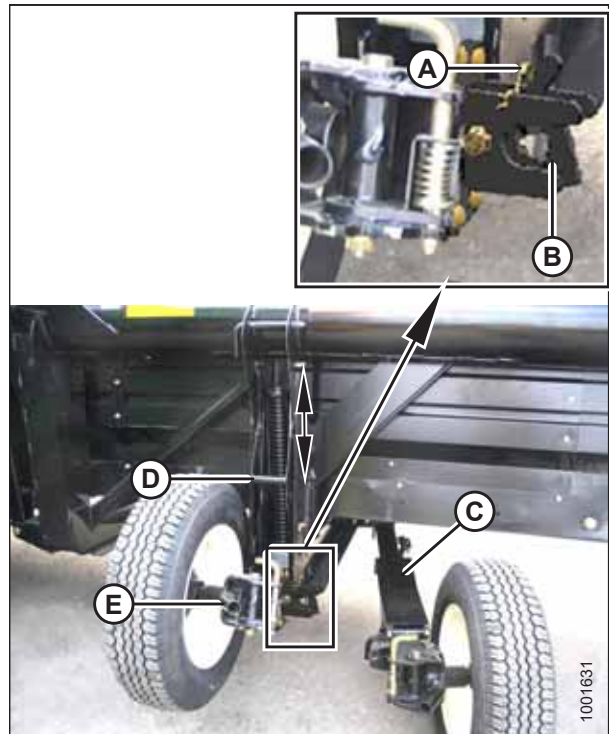


Figure 3.102: Separating Axles



## OPERATION

6. Remove pin (A) and install at location (B) to secure the linkage. Turn the pin to lock.
7. Pull pin (D), swivel wheel (C) counterclockwise 90°, and release the pin to lock.



Figure 3.103: Wheel Position

8. Ensure the left wheel is in the transport position as shown.



Figure 3.104: Left Wheel in Transport Position

9. Pull pin (A) and swivel right rear wheel (B) clockwise 90°.



Figure 3.105: Right Rear Wheel

## OPERATION

10. Lock wheel (A) with pin (B). Move right axle (C) to the front of the header.

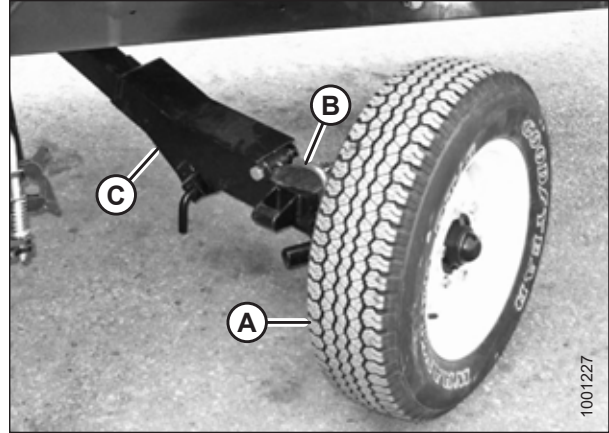


Figure 3.106: Right Rear Wheel

11. Remove pin (A), raise support (B) to the position shown, and reinsert pin.

### IMPORTANT:

Ensure pin (A) engages the tube on the axle.

12. Swing brace (C) into the position shown and insert the brace into slot (D) behind the cutterbar. Position the brace so that pin (E) engages the hole in bracket (F). The right wheel is now in transport position.
13. Disengage safety props.
14. Detach the header's hydraulic and electrical connections from the windrower. For instructions, refer to [4 Header Attachment/Detachment, page 113](#).
15. Start the windrower and lower the header to the ground.

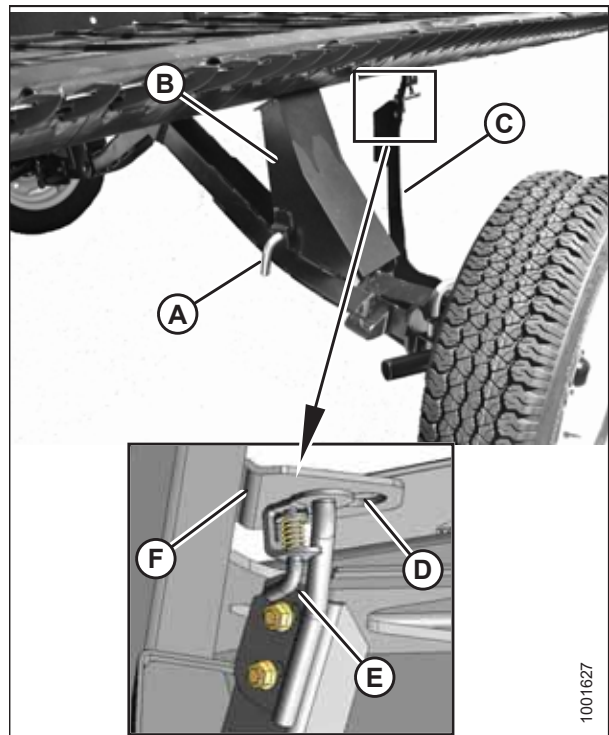


Figure 3.107: Right Rear Wheel Position



## OPERATION

### Attaching Tow-Bar

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

1. Unhook rubber strap (D) from cradle (A) on the right side of the header.
2. Remove clevis pin (C) and detach the tube end from support (B).
3. Replace clevis pin (C).
4. Lift the inner half of the tow-bar off the header and place it near the left side of the header.

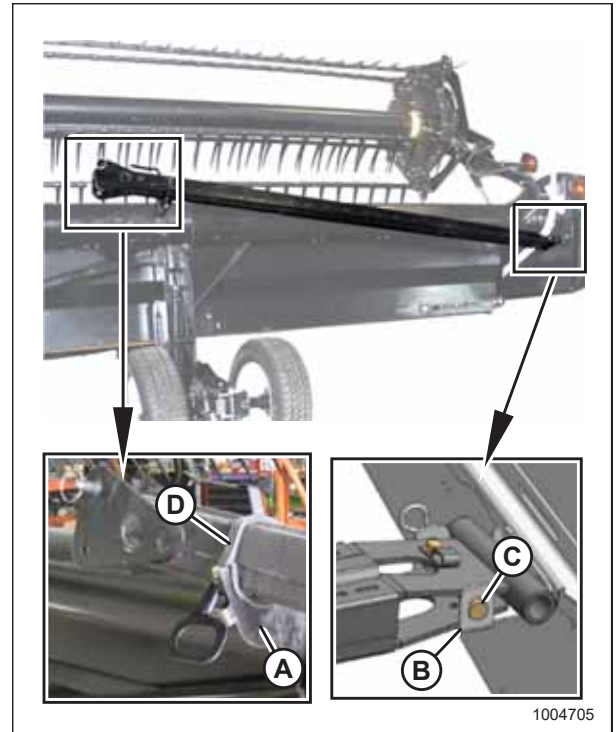


Figure 3.108: Tow-Bar Removal – Right Side

5. Unhook rubber strap (D) from cradle (A) on the left side of the header.
6. Remove hitch pin (C) from support (B), and remove the tow-bar.
7. Install rubber strap (D) on cradle (A).

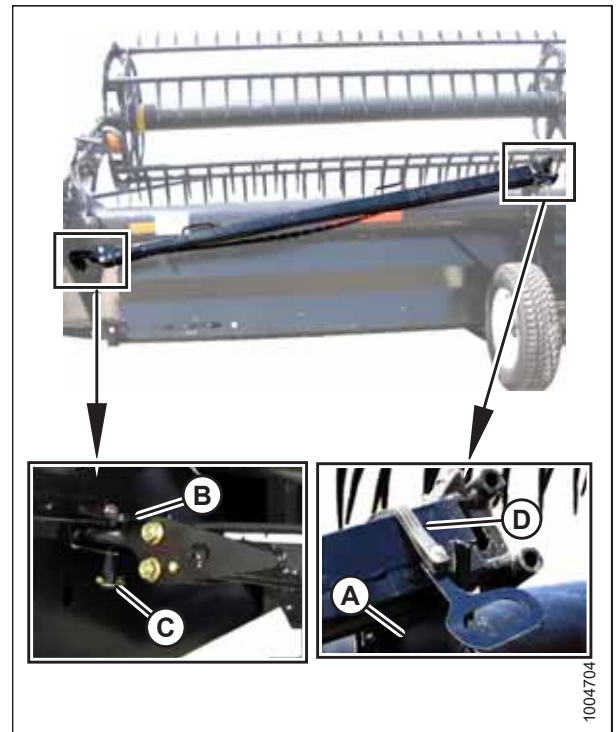


Figure 3.109: Tow-Bar Removal – Left Side

## OPERATION

8. Connect outer half (B) of the tow-bar to inner half (A).

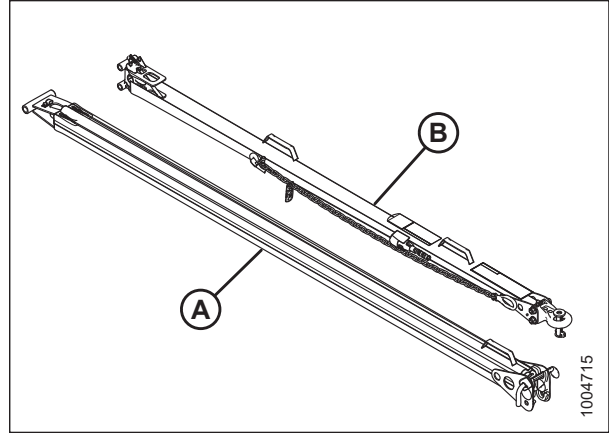


Figure 3.110: Tow-Bar Assembly

9. Lift outer half (B) and insert it into inner half (A).

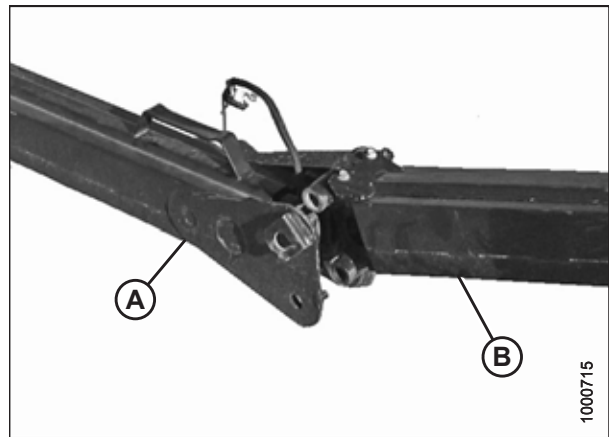


Figure 3.111: Tow-Bar Assembly

10. Secure the two halves together with L-pin (A) and then turn to lock. Secure the L-pin with ring (B).
11. Connect the electrical harness to connector (C).

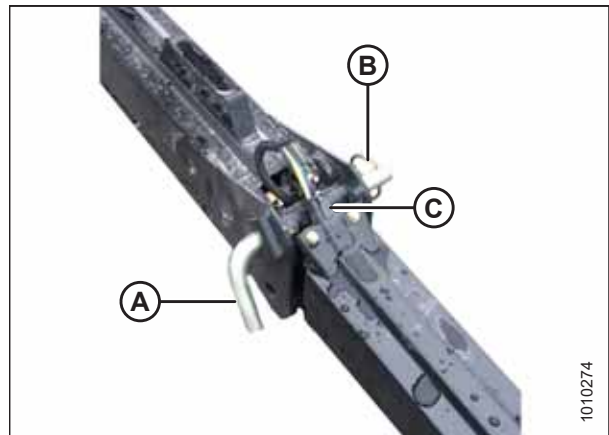


Figure 3.112: Tow-Bar Assembly

## OPERATION

12. Position tow-bar (A) onto the axle, and push against latch (B) until the tow-bar pins drop into hooks (C).
13. Check that latch (B) has engaged the tow-bar.
14. Install clevis pin (D) and secure with hairpin.

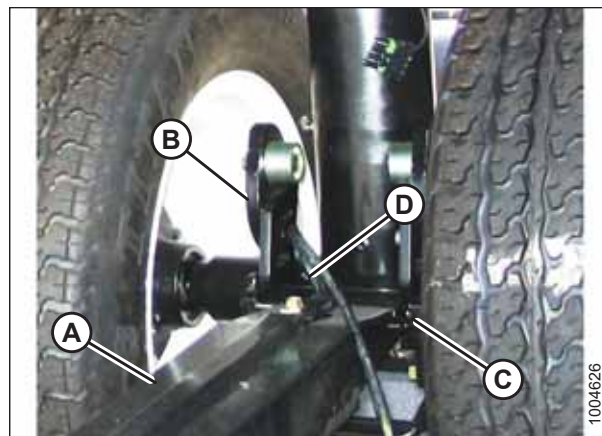


Figure 3.113: Attaching Tow-Bar

15. Connect electrical harness (A) at the front wheel.



Figure 3.114: Harness Connection

### 3.16 Storing the Header

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



#### CAUTION

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



#### CAUTION

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

- Lower the reel completely. If stored outside, tie the reel to the frame to prevent rotation caused by the wind.
- Lower the header onto blocks to keep the cutterbar off the ground.
- Clean the header thoroughly.
- Check for worn or broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at the beginning of next season.
- Loosen the drive belts.
- Lubricate the header thoroughly leaving excess grease on the fittings to keep moisture out of the bearings.
- Apply grease to exposed threads, cylinder rods, and sliding surfaces of components.
- Store the machine in a dry, protected place if possible. If storing outside, always cover with a waterproof canvas or other protective material.

#### NOTE:

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

- Replace or tighten any missing or loose hardware. For instructions, refer to [8.2 Torque Specifications, page 274](#).
- Repaint all worn or chipped painted surfaces to prevent rust.

## Chapter 4: Header Attachment/Detachment

This chapter includes instructions for setting up, attaching, and detaching the header.

### 4.1 Attaching Header to Windrower

Refer to your windrower operator's manual for instructions for mechanically attaching the header to the windrower.

Refer to the following procedures for electrical and hydraulic connections.

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

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



Figure 4.1: Header Drive Hoses

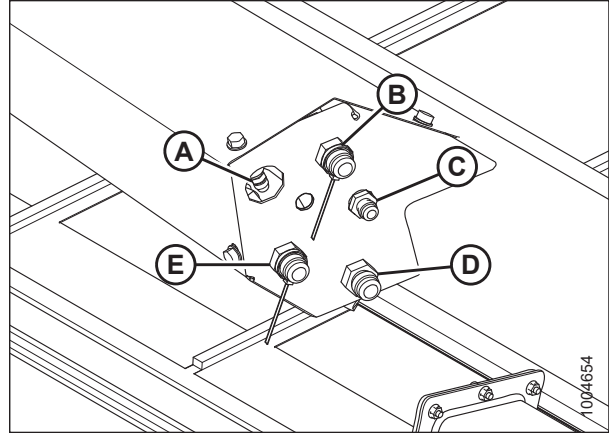
2. Disengage and rotate lever (A) counterclockwise to fully up position.
3. Remove cap (B) securing the electrical connector to the frame.
4. Move hose bundle (C) from the windrower hose support and route it along the header hose guide.



Figure 4.2: Header Drive Hoses

## HEADER ATTACHMENT/DETACHMENT

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



**Figure 4.3: Header Receptacles**

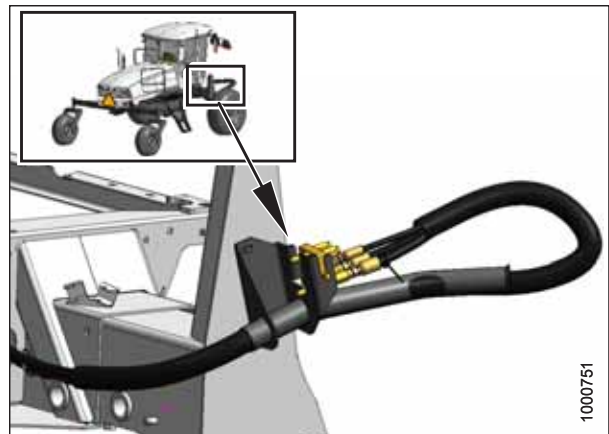
A - Electrical Connector      B - Knife Drive  
C - Case Drain (Double Knife)      D - Draper Drive  
E - Return

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



**Figure 4.4: Hose Storage**

10. Before connecting reel hydraulics, check the fittings, and clean if required.



**Figure 4.5: Reel Hose Storage**

## HEADER ATTACHMENT/DETACHMENT

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

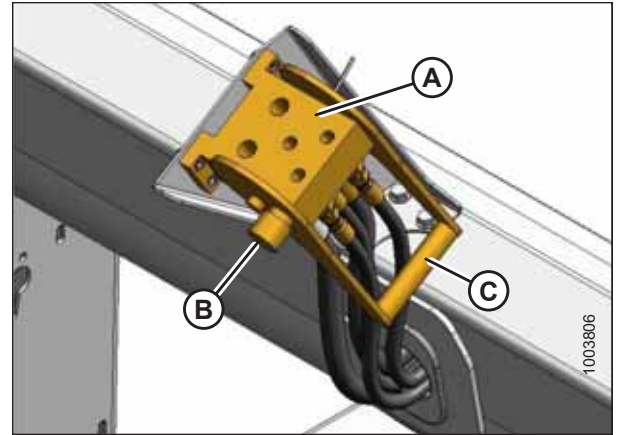


Figure 4.6: Reel Hydraulics Receptacle

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

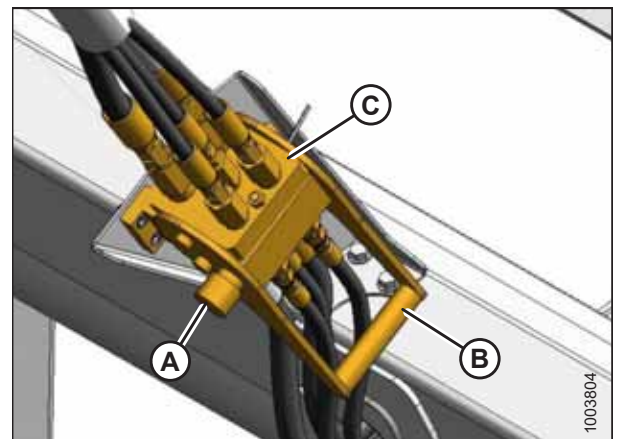


Figure 4.7: Reel Hose Connection



## 4.2 Detaching Header from Windrower

To detach the header from the windrower, follow these steps:

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

**To disconnect the reel hydraulics:**

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

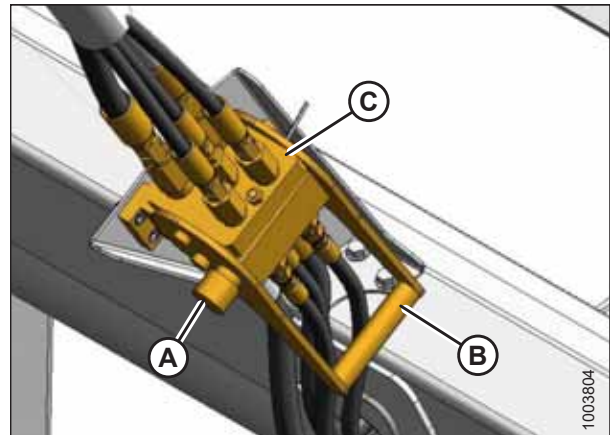


Figure 4.8: Reel Hydraulics

6. Close the cover on header receptacle (A).

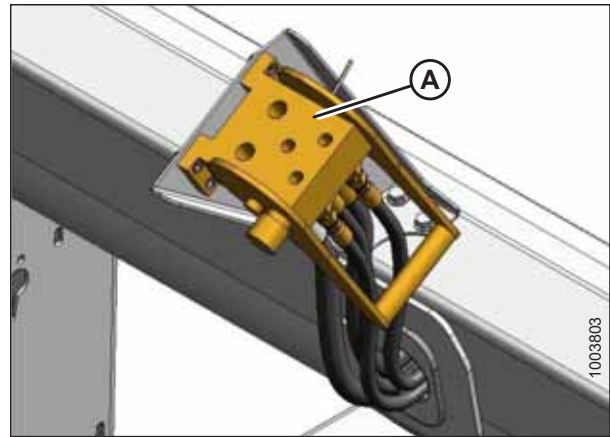


Figure 4.9: Closed Receptacle Cover



## HEADER ATTACHMENT/DETACHMENT

### *To disconnect the header drive hydraulics:*

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

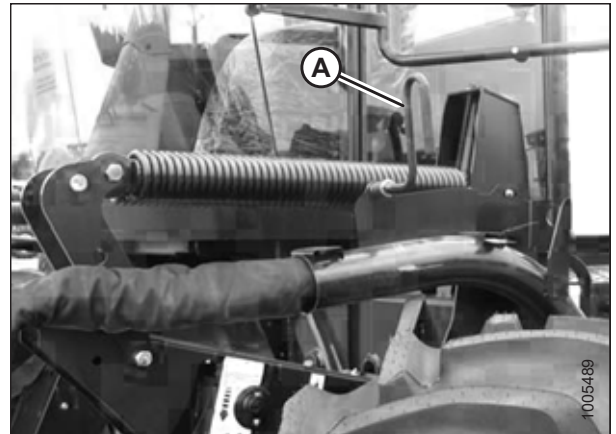


Figure 4.10: Header Drive Hydraulics

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

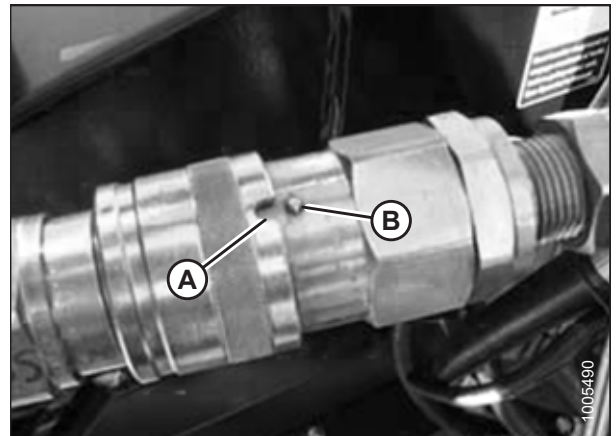


Figure 4.11: Quick Disconnect

### *To store hose bundle on windrower support:*

12. Route hose bundle (A) back onto the hose support on the windrower.
13. Rotate lever (B) and lock in the down position.
14. Install cap (C) on the electrical connector.
15. Detach the header from the windrower. For instructions, refer to the windrower operator's manual.

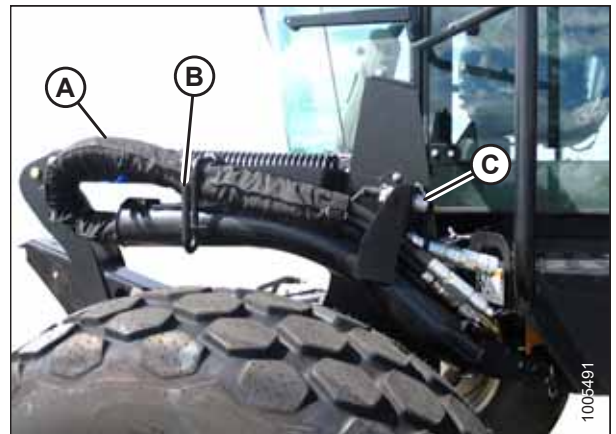


Figure 4.12: Hose Storage



## Chapter 5: Maintenance and Servicing

The following instructions provide information about routine header service. Detailed maintenance and service information is contained in the technical service manual available from your MacDon Dealer. A parts catalog is provided in the plastic manual case inside the left endshield.

Log hours of operation and use the maintenance record provided (refer to [5.3.1 Maintenance Schedule/Record, page 122](#)) to keep track of your scheduled maintenance.

### 5.1 Preparing Machine for Servicing



#### **DANGER**

**To avoid bodily injury or death from unexpected start-up or fall of a raised machine, always stop engine and remove key before leaving the operator's seat, and always engage 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.**

1. Lower the header fully. If it is necessary to service the header in the raised position, always engage the safety props.
2. Stop the engine and remove the key from the ignition.
3. Engage the park brake.
4. Wait for all moving parts to stop.

## 5.2 Maintenance Specifications

### 5.2.1 Installing a Roller Chain

To install a roller chain, follow these steps:

#### DANGER

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

1. Locate ends of chain on sprocket.
2. Install pin connector (A) into chain, preferably from the sprocket backside.
3. Install connector (B) onto pins.
4. Install spring clip (C) onto front pin (D) with closed end of clip in direction of sprocket rotation.
5. Locate one leg of clip in groove of aft pin (E).
6. Press other leg of spring clip over face of aft pin (E) until it slips into groove. Do **NOT** press clip lengthwise from closed end.
7. Ensure clip is seated in grooves of pins.

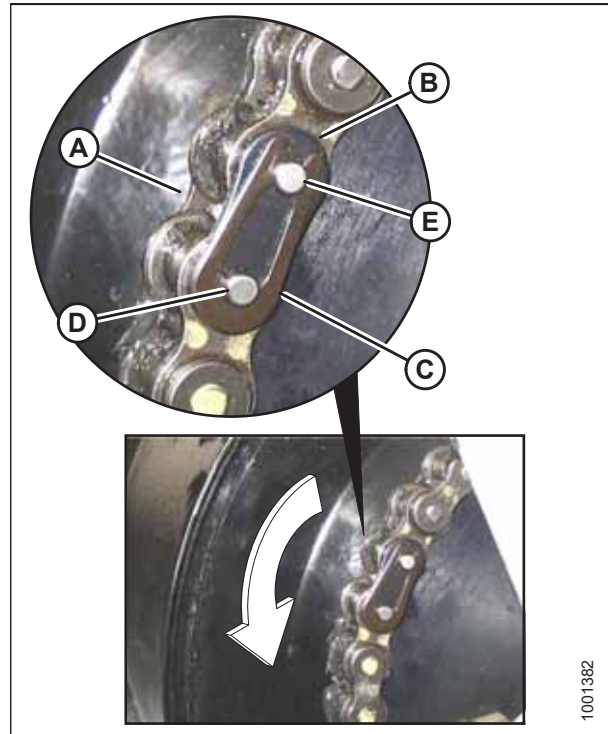


Figure 5.1: Chain Link Connector

### 5.2.2 Installing a Sealed Bearing

1. Clean the shaft and apply a rust preventive coating.
2. Install flangette (A), bearing (B), second flangette (C), and lock collar (D).

#### NOTE:

The locking cam is on only one side of the bearing.

3. Install and tighten flangette bolts (E).
4. Position the shaft correctly, and lock the lock collar with a punch. Lock the collar in the same direction the shaft rotates, and tighten the set screw in the collar.
5. Loosen the flangette bolts on the mating bearing one turn and then retighten. This will allow the bearing to properly line up.

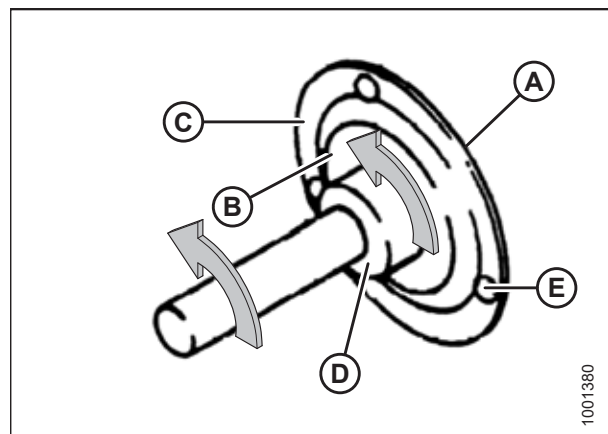


Figure 5.2: Sealed Bearing

## 5.3 Maintenance Requirements

Periodic maintenance requirements are organized according to service intervals.

Regular maintenance is the best insurance against early wear and untimely breakdowns. Following the maintenance schedule will increase your machine's life.

When servicing the machine, refer to the appropriate section in this chapter and use only the fluids and lubricants specified in Recommended Fluids and Lubricants on the inside back cover.

Log hours of operation, use the maintenance record, and keep copies of your maintenance records (refer to [5.3.1 Maintenance Schedule/Record, page 122](#)).

If a service interval specifies more than one timeframe, e.g., "100 hours or annually", service the machine at whichever interval is reached first.

### **IMPORTANT:**

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



### **CAUTION**

Carefully follow safety messages. Refer to [5.1 Preparing Machine for Servicing, page 119](#) and [1 Safety, page 1](#).

### 5.3.1 Maintenance Schedule/Record

Copy this page to continue record.

Maintenance Record	Action:	✓ - Check	🔧 - Lubricate	▲ - Change
Hour Meter Reading				
Date				
Serviced by				
First Use, refer to <a href="#">5.3.2 Break-In Inspection, page 124</a>				
End of Season, refer to <a href="#">5.3.4 End-of-Season Service, page 125</a>				
<b>10 Hours or Daily<sup>42</sup></b>				
✓ Hydraulic hoses and lines <sup>43</sup>				
✓ Knife sections, guards, and hold-downs <sup>43</sup>				
✓ Tire pressure <sup>43</sup>				
🔧 Knife (except in sandy conditions) <sup>43</sup>				
<b>25 Hours</b>				
🔧 Knifehead(s) <sup>43</sup>				
<b>50 Hours</b>				
✓ Draper roller bearings				
▲ Knife drive box oil - first 50 hours only				
<b>100 Hours or Annually<sup>42</sup></b>				
✓ Draper seal				
✓ Reel drive chain tension				
✓ Reel tine/cutterbar clearance				
✓ Knife drive belt tension				
✓ Wheel bolt torque				
✓ Knife drive box lubricant level				
✓ Knife drive box mounting bolts				
🔧 Reel drive chain				

42. Whichever occurs first.

43. A record of daily maintenance is not required, but is at the Owner's/Operator's discretion.

## MAINTENANCE AND SERVICING

[illegible]

## MAINTENANCE AND SERVICING

Maintenance Record	Action:	✓ - Check	☼ - Lubricate	▲ - Change
<b>250 Hours or Annually<sup>42</sup></b>				
✓	Draper seal			
☼	Upper cross auger center support and U-joint			
☼	Reel drive U-joint			
☼	Transport axle pivot bushings			
<b>500 Hours or Annually<sup>42</sup></b>				
✓	Draper seal			
☼	Reel shaft bearings			
☼	Stabilizer/slow speed transport wheel bearings			
<b>1000 Hours or 3 Years<sup>42</sup></b>				
▲	Knife drive box lubricant			

### 5.3.2 Break-In Inspection

Break-in inspections involve checking belts, fluids, and performing general machine inspections for loose hardware or other areas of concern. Break-in inspections ensure that all components can operate for an extended period without requiring service or replacement.

Inspection Interval	Item	Refer To
5 hours	Check for loose hardware. Tighten to required torque.	<a href="#">8.2 Torque Specifications, page 274</a>
5 hours	Check knife drive belts tension. Periodically check for first 50 hours.	<ul style="list-style-type: none"> <li>• <a href="#">Tensioning Timed Knife Drive Belts, page 171</a></li> <li>• <a href="#">Tensioning Untimed Knife Drive Belts, page 166</a></li> </ul>
10 hours	Check knife drive box mounting bolts.	<a href="#">Checking Mounting Bolts, page 156</a>
50 hours	Change knife drive box lubricant.	<a href="#">Changing Oil in Knife Drive Box, page 163</a>



### 5.3.3 Preseason/Annual Service

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



#### CAUTION

- Review this manual to refresh your memory on the safety and operating recommendations.
  - Review all the safety decals and other decals on the header and note the hazard areas.
  - Be sure all the shields and guards are properly installed and secured. Never alter or remove safety equipment.
  - Be sure you understand and have practiced safe use of all controls. Know the capacity and operating characteristics of the machine.
  - Check the first aid kit and fire extinguisher. Know where they are and how to use them.
1. Lubricate the machine completely. For instructions, refer to [Service Intervals, page 127](#).
  2. Adjust the tension on the drive belts depending on your equipment. For instructions, refer to [Tensioning Untimed Knife Drive Belts, page 166](#).
  3. Perform all the annual maintenance. For instructions, refer to [5.3.1 Maintenance Schedule/Record, page 122](#).

### 5.3.4 End-of-Season Service

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



#### CAUTION

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



#### CAUTION

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

- Lower the reel completely. If stored outside, tie the reel to the frame to prevent rotation caused by the wind.
- Lower the header onto blocks to keep the cutterbar off the ground.
- Clean the header thoroughly.
- Check for worn or broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at the beginning of next season.
- Loosen the drive belts.
- Lubricate the header thoroughly leaving excess grease on the fittings to keep moisture out of the bearings.
- Apply grease to exposed threads, cylinder rods, and sliding surfaces of components.
- Store the machine in a dry, protected place if possible. If storing outside, always cover with a waterproof canvas or other protective material.

#### NOTE:

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

- Replace or tighten any missing or loose hardware. For instructions, refer to [8.2 Torque Specifications, page 274](#).
- Repaint all worn or chipped painted surfaces to prevent rust.

### 5.3.5 Checking Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

#### WARNING

- Avoid high-pressure fluids. Escaping fluid can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure.
- If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.



Figure 5.3: Hydraulic Pressure Hazard

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

#### IMPORTANT:

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



Figure 5.4: Testing for Hydraulic Leaks

### 5.3.6 Lubrication and Servicing

#### CAUTION

To avoid personal injury, before servicing header or opening drive covers, follow procedures in [5.1 Preparing Machine for Servicing, page 119](#).

Refer to the inside back cover for recommended lubricants.

Log hours of operation and use the Maintenance Record provided to keep a record of scheduled maintenance. For instructions, refer to [5.3.1 Maintenance Schedule/Record, page 122](#).

#### *Service Intervals*

Refer to the illustrations on the following pages to identify the various locations that require lubrication and servicing. Illustrations are organized by the frequency of service.

#### **IMPORTANT:**

Unless otherwise specified, use high temperature extreme pressure (EP2) performance with 1% maximum molybdenum disulphide (NLGI grade 2) lithium base.

#### ***Knife (except in sandy conditions):***

Lubricate every 10 hours or daily.

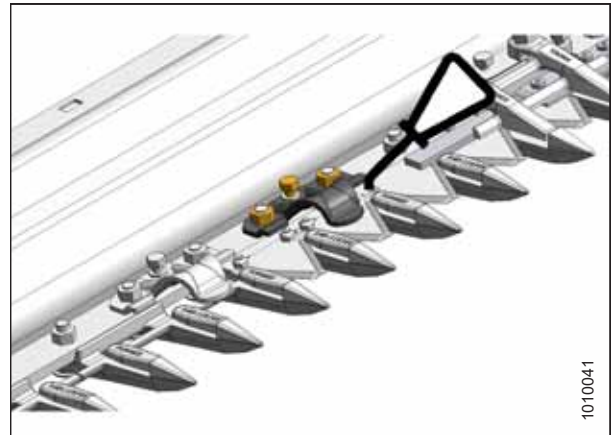


Figure 5.5: Every 10 Hours or Daily

## MAINTENANCE AND SERVICING

### **Knifehead:**

Lubricate every 25 hours.

#### **NOTE:**

To prevent binding and/or excessive wear caused by knife pressure on the guards, do **NOT** overgrease knifehead (A). Apply only one to two pumps using a mechanical grease gun (do **NOT** use an electric grease gun). If more than six to eight pumps of the grease gun are required to fill the cavity, replace the seal in the knifehead. For instructions, refer to [5.5.3 Removing Knifehead Bearing, page 141](#).

#### **NOTE:**

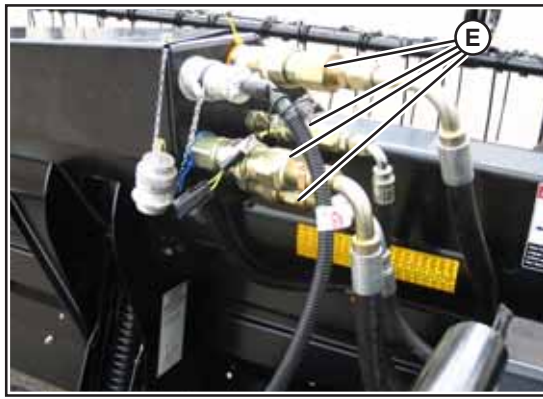
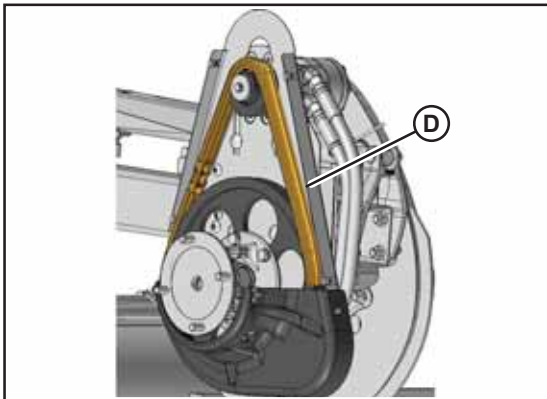
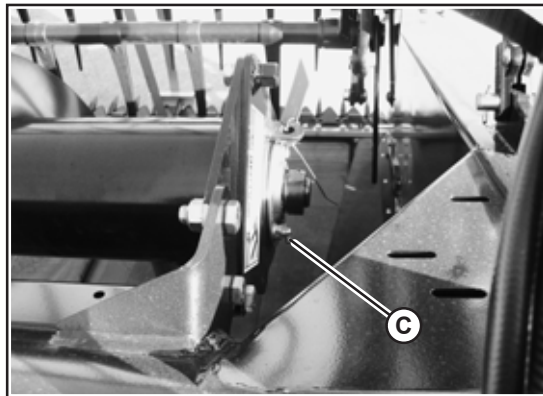
Check for signs of excessive heating on first few guards after greasing. If required, relieve pressure by pressing check-ball in grease fitting.



**Figure 5.6: Every 25 Hours**

A - Knifehead (Single Knife [1 Place]; Double Knife [2 Places])

Figure 5.7: Every 100 Hours

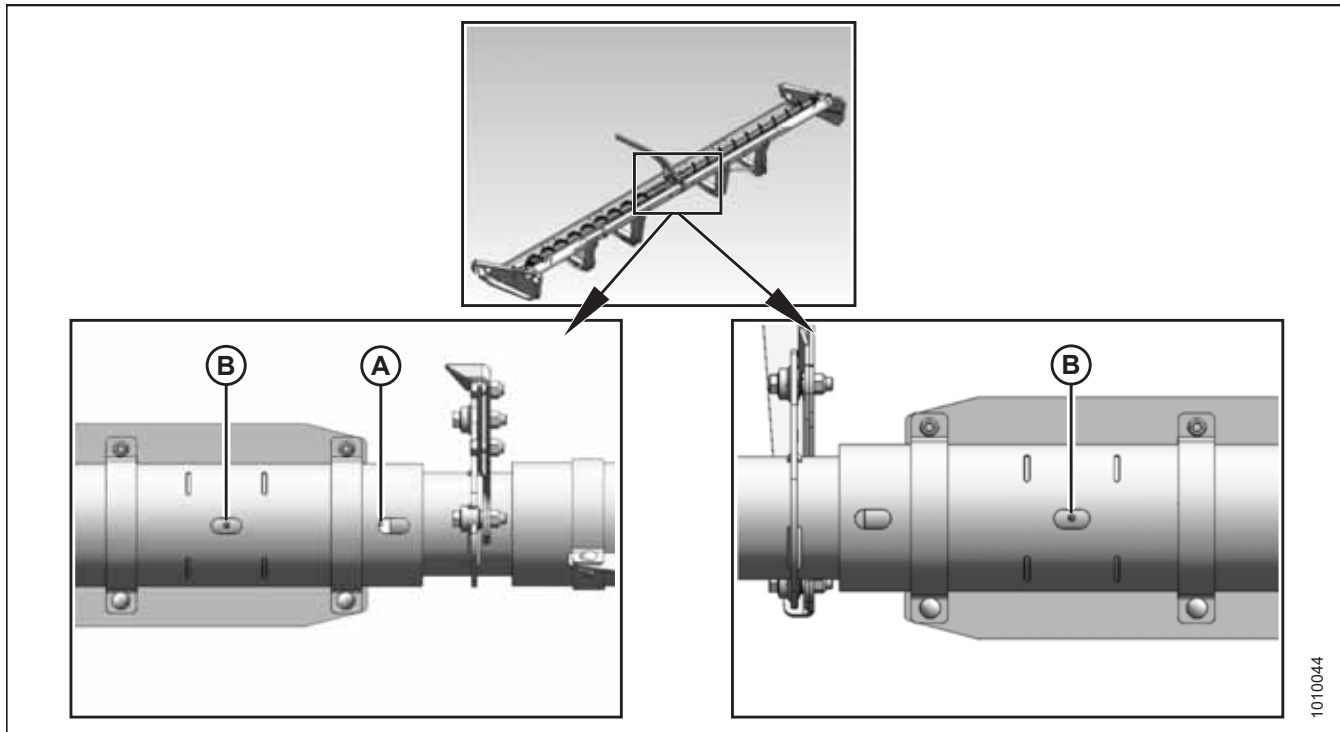


A - Knife Drive Box (Check Oil Level Between Lower Hole and End of Dipstick [B])  
 D - Reel Drive Chain (1 Place) (Double Reel Shown – Single Reel Similar)

C - Upper Cross Auger Bearing (1 Place)  
 E - Hydraulic Couplers (Use WD40® or Equivalent)

1005340

Figure 5.8: Every 250 Hours

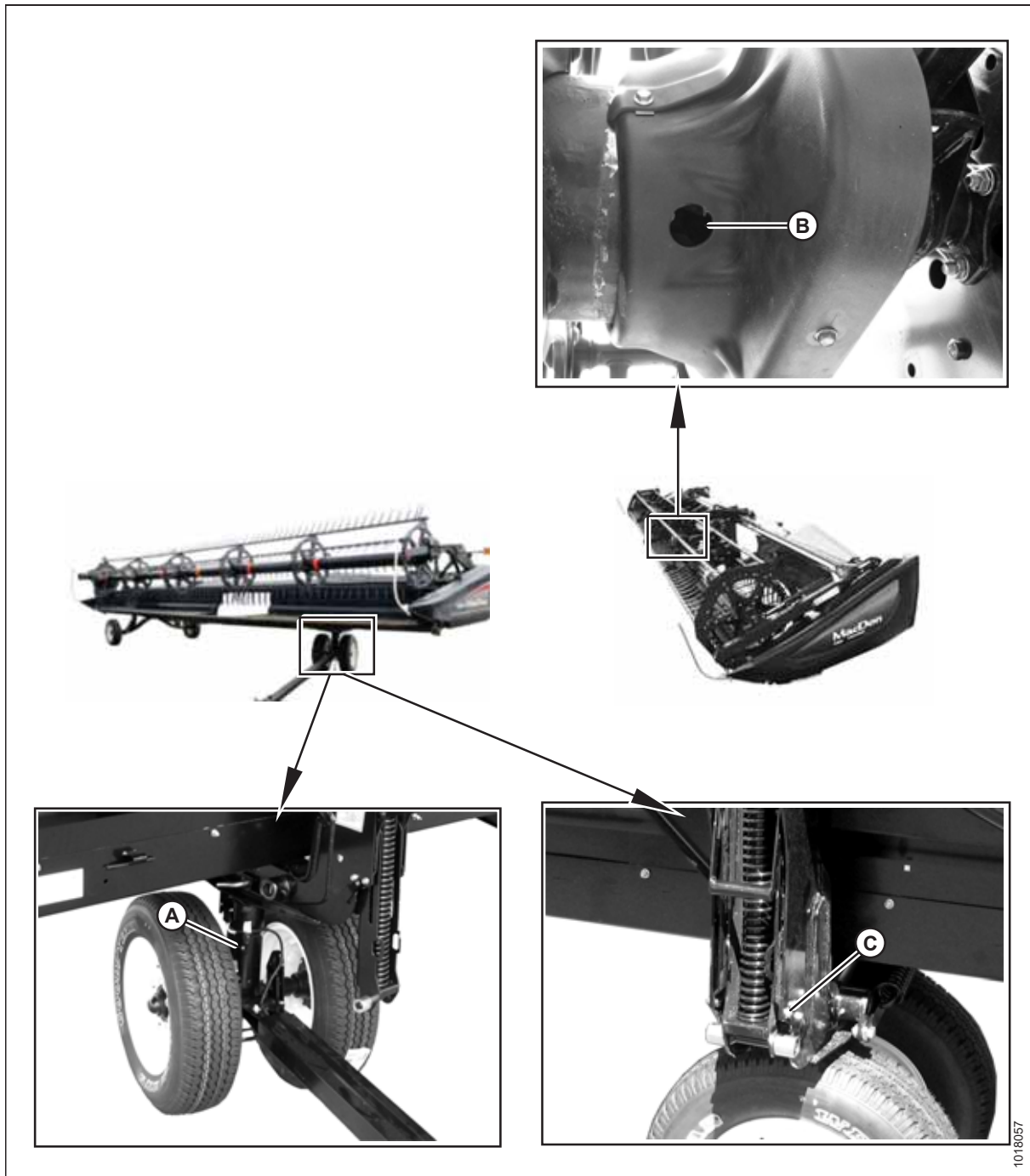


A - Upper Cross Auger U-joint<sup>44</sup>

B - Upper Cross Auger Bearing (2 Places)

44. U-joint has an extended lubrication cross and bearing kit. Stop greasing when greasing becomes difficult or if U-joint stops taking grease. Overgreasing will damage U-joint. Six to eight pumps are sufficient at first grease (factory). Decrease grease interval as U-joint wears and requires more than six pumps.

Figure 5.9: Every 250 Hours (Continued)



A - Front Wheel Pivot (1 Place)

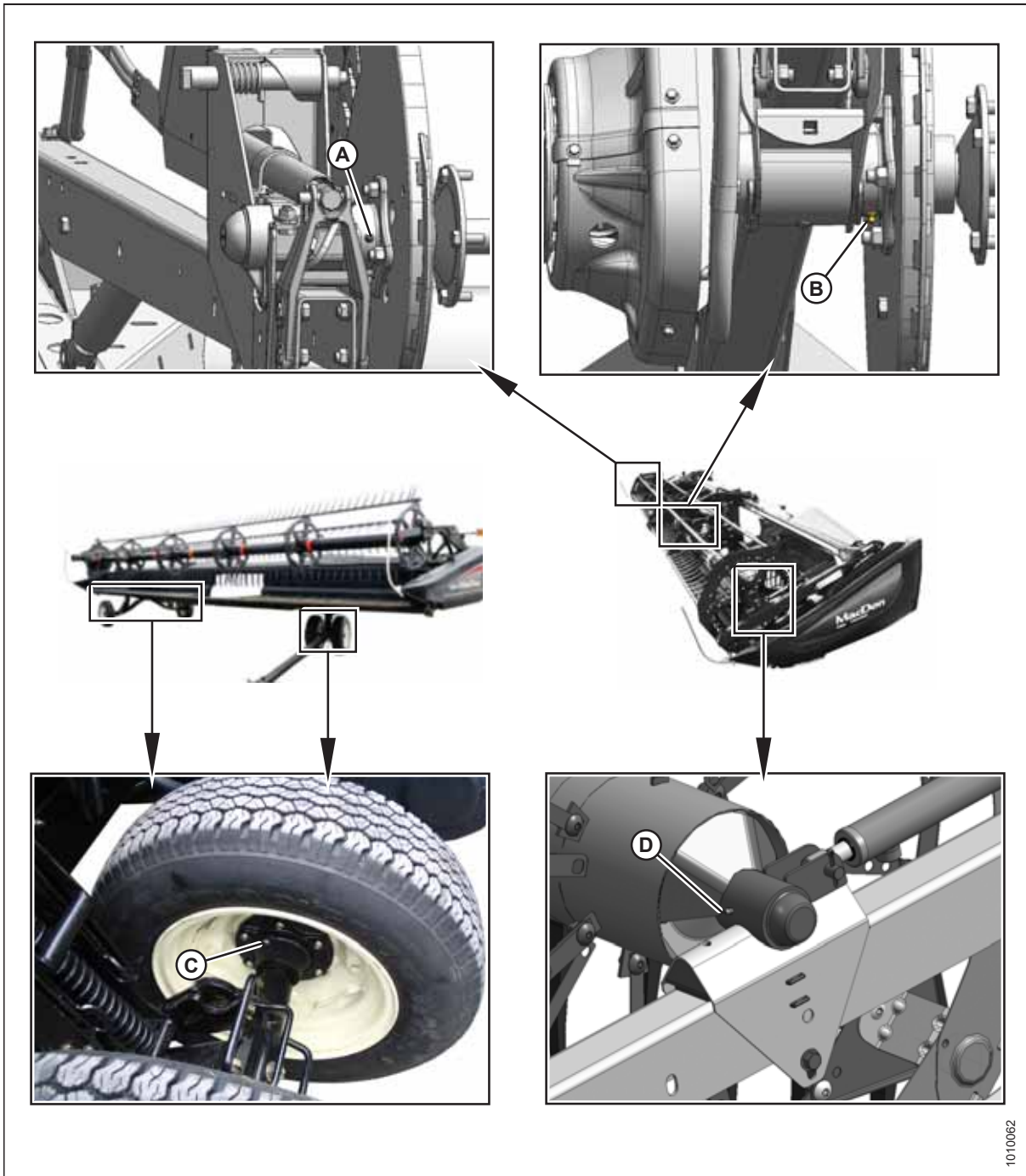
C - Frame/Wheel Pivot (1 Place) - Both Sides

B - Double Reel U-Joint (1 Place)<sup>45</sup>

45. U-joint has an extended lubrication cross and bearing kit. Stop greasing when greasing becomes difficult or if U-joint stops taking grease. Overgreasing will damage U-joint. Six to eight pumps are sufficient at first grease (factory). Decrease grease interval as U-joint wears and requires more than six pumps.



Figure 5.10: Every 500 Hours



1010062

A - Reel Right Bearing (1 Place)  
C - Wheel Bearings (4 Places)

B - Reel Center Bearing (1 Place)  
D - Reel Left Bearing (1 Place)



### Greasing Procedure

Greasing points are marked on machine by decals showing a grease gun and grease interval in hours of operation. Master grease point location decals are provided on header.

#### **DANGER**

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

Refer to the inside back cover for recommended lubricants.

Log hours of operation and use the Maintenance Record provided to keep a record of scheduled maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 122](#).

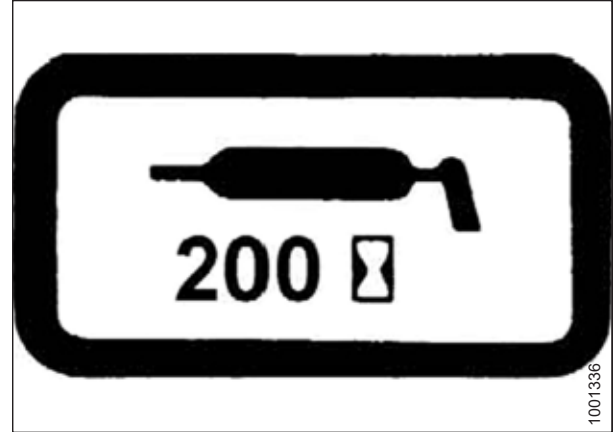


Figure 5.11: Greasing Interval Decal

1. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
2. Inject grease through fitting with grease gun until grease overflows fitting (except where noted).
3. Leave excess grease on fitting to keep out dirt.
4. Replace any loose or broken fittings immediately.
5. Remove and thoroughly clean any fitting that will not take grease. Also clean lubricant passageway. Replace fitting if necessary.
6. Use high temperature, extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2) lithium base unless otherwise specified.

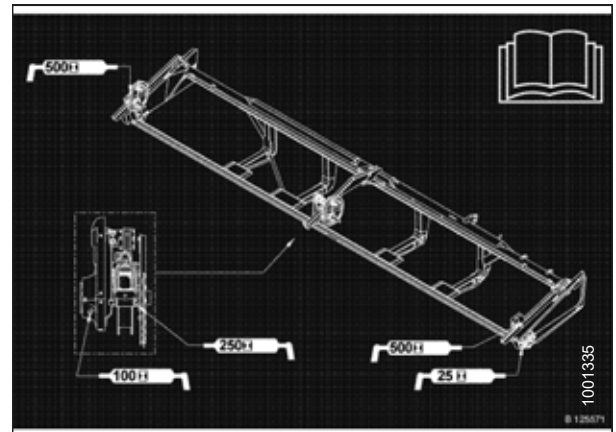


Figure 5.12: Single-Knife Header Master Grease Point Decal

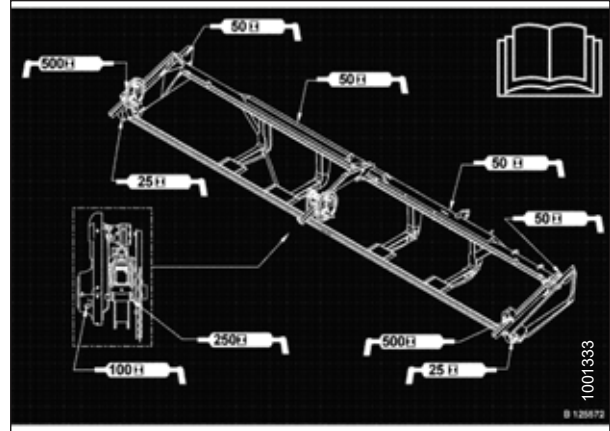


Figure 5.13: Double-Knife Header Master Grease Point Decal

### *Lubricating Reel Drive Chain – Single Reel*

#### **⚠ DANGER**

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

1. Stop the engine and remove the key from the ignition.
2. Remove four bolts (A) securing cover (B) to the reel drive.

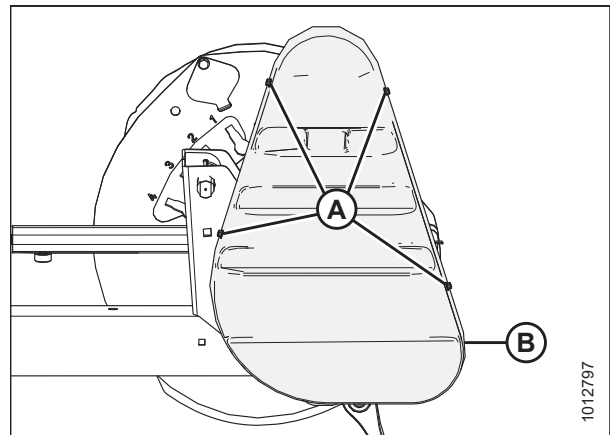


Figure 5.14: Drive Cover – Single Reel

3. Apply a liberal amount of grease to chain (A).

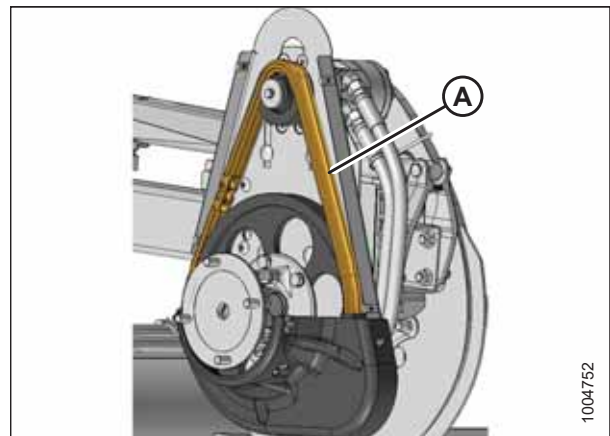


Figure 5.15: Drive Chain

## MAINTENANCE AND SERVICING

4. Position drive cover (B) onto the reel drive and secure with four bolts (A).

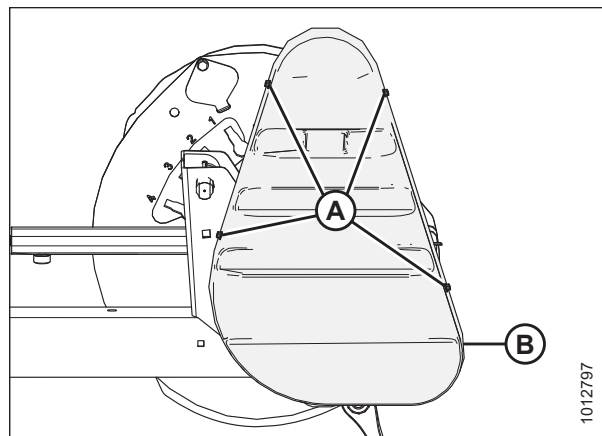


Figure 5.16: Drive Cover – Single Reel

*Lubricating Reel Drive Chain – Double Reel*

**⚠ DANGER**

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

1. Stop the engine and remove the key from the ignition.
2. Remove six bolts (A) securing upper cover (B) to the reel drive and lower cover (C).

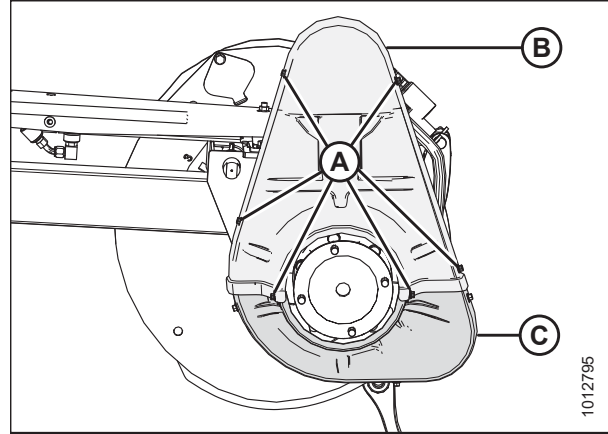


Figure 5.17: Drive Cover – Double Reel

3. Remove three bolts (A) and remove lower cover (B) if necessary.

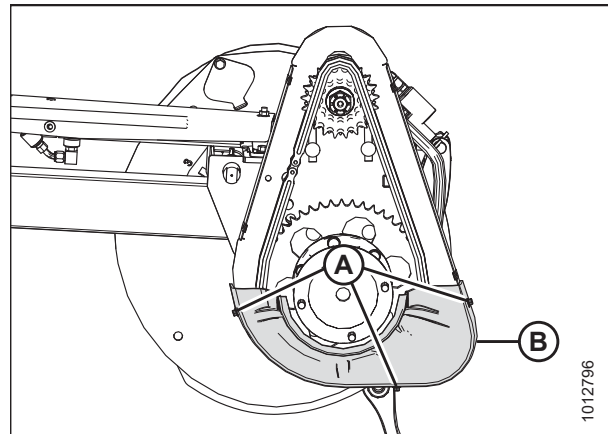


Figure 5.18: Drive Cover – Double Reel

4. Apply a liberal amount of grease to chain (A).

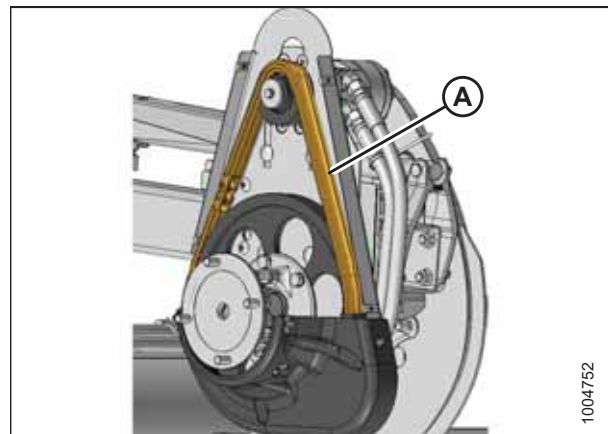


Figure 5.19: Drive Chain

## MAINTENANCE AND SERVICING

5. Position lower drive cover (B) onto the reel drive (if previously removed) and secure with three bolts (A).

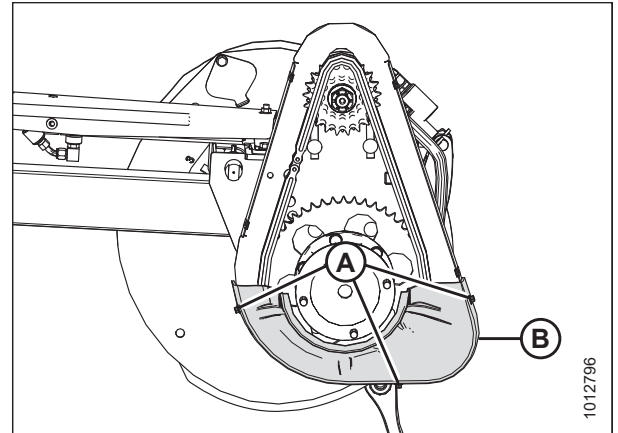


Figure 5.20: Drive Cover – Double Reel

6. Position upper drive cover (B) onto the reel drive and lower cover (C), and secure with six bolts (A).

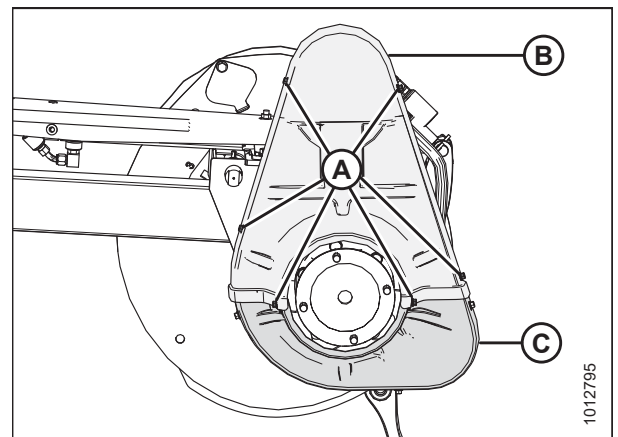


Figure 5.21: Drive Cover – Double Reel

## 5.4 Electrical System

Use electrical tape and wire clips as required to prevent wires from dragging or rubbing.

Keep lights clean and replace defective bulbs.

### 5.4.1 Replacing Light Bulbs

#### DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. Use a Phillips screwdriver to remove screws (A) from the fixture, and remove the plastic lens. Retain screws (A).
3. Replace the bulb, and reinstall the plastic lens and screws.

#### NOTE:

Use trade #1156 bulb for amber transport lights and #1157 for the red tail light (Transport option).

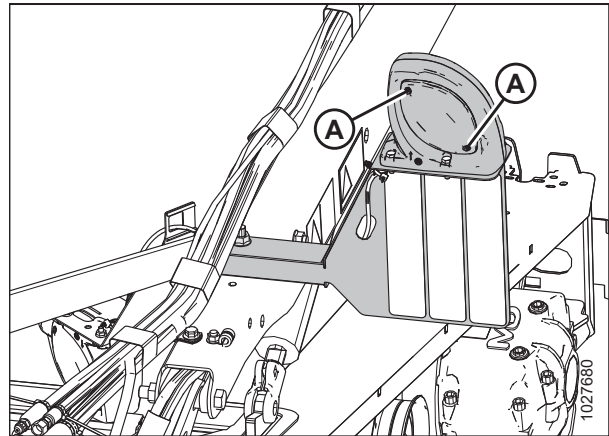


Figure 5.22: Left Transport Light

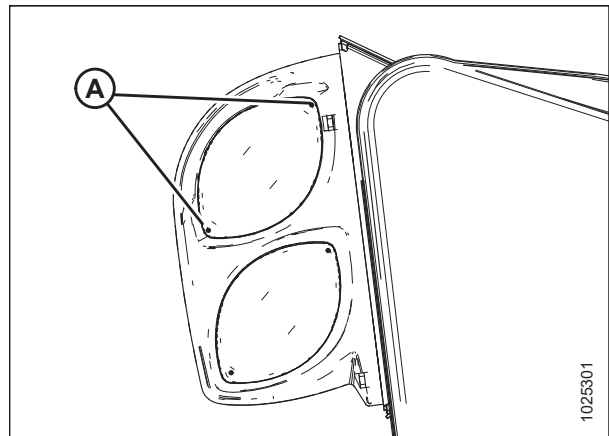


Figure 5.23: Transport Option – Red and Amber Lights

## 5.5 Knife



### WARNING

Keep hands clear of the area between guards and knife at all times.



### CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing, page 119](#).



### CAUTION

Wear heavy gloves when working around or handling knives.

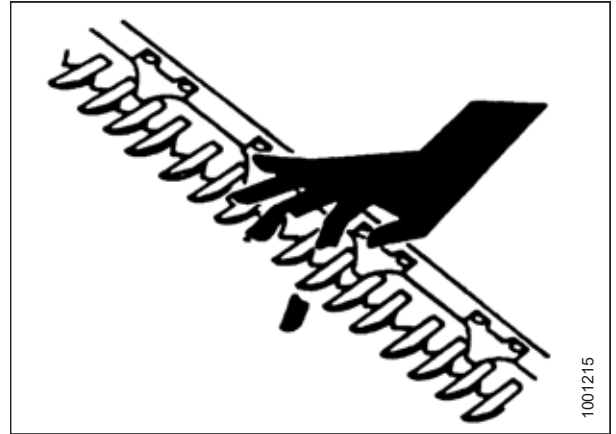


Figure 5.24: Cutterbar Hazard

### 5.5.1 Replacing Knife Section

Inspect the knife sections daily and ensure they are firmly bolted to the knife back and are not worn or damaged (worn or damaged sections leave behind uncut plants). Worn or damaged sections can be replaced without removing the knife from the cutterbar.

#### NOTE:

Coarse serrated knife sections last longer than fine serrated sections in dirty or sandy conditions. Fine serrated knife sections perform better in fine-stemmed grasses and plants that contain more fibrous stems.

1. Shut down the windrower, and remove the key from the ignition.
2. Stroke the knife as required to center knife section (A) between the guards.
3. Remove nuts (B).
4. Remove bars and lift the knife section off the knife bar.
5. Remove splice bar (C) if knife section is under the bar.
6. Clean any dirt off the knife back and position the new knife section onto the knife.

#### IMPORTANT:

Do **NOT** mix fine and coarse sections on the same knife.

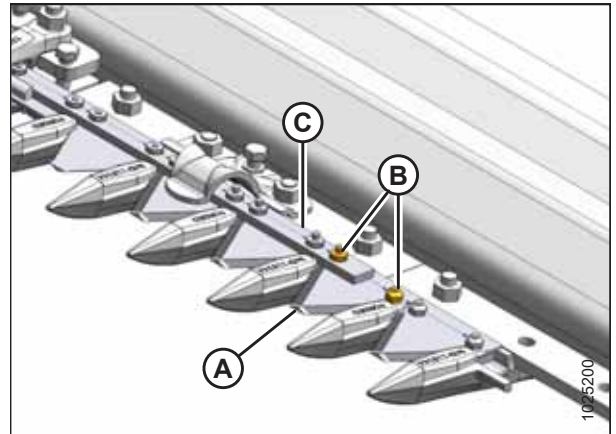


Figure 5.25: Knife Bar

7. Reposition bars (C) and/or (D) on knife (A) and install lock nuts (B).

**NOTE:**

If replacing screws, ensure they are fully inserted. Do **NOT** use nuts to draw screws into the knife bar.

8. Torque nuts to 9.5 Nm (7 lbf-ft).

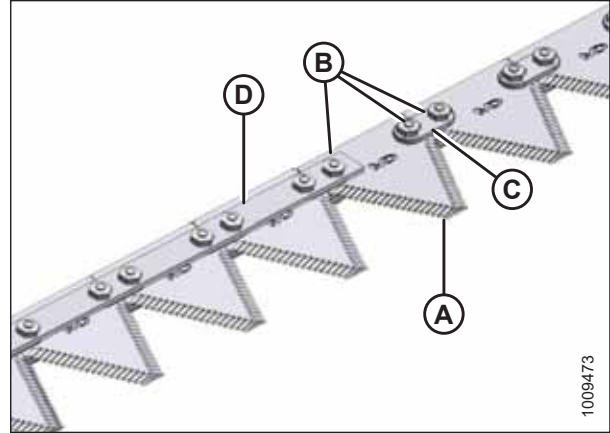


Figure 5.26: Knife Bar

## 5.5.2 Removing Knife



**DANGER**

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



**WARNING**

Stand to rear of knife during removal to reduce risk of injury from cutting edges. Wear heavy gloves when handling knife.

1. **Mower conditioner pull-type:** Raise the pull-type fully. Shut the engine off, and remove the key from the ignition. Close the lock-out valves.
2. **Auger header:** Lower the header onto blocks, or raise the header fully. Shut the engine off, and remove the key from the ignition. If raising the header, engage the safety props.
3. Stroke the knife manually to its outer limit.
4. Clean the area around the knifehead.
5. Remove bolt (A).
6. Remove grease fitting (B) from the pin.
7. Use a screwdriver or chisel in slot (C) to release the load on the knifehead pin.
8. Use a screwdriver or chisel to pry the pin upwards in the pin groove until the pin is clear of the knifehead.
9. Push the knife assembly inboard until it is clear of the output arm.
10. Seal the knifehead bearing with plastic or tape unless it is being replaced.
11. Wrap a chain around the knifehead and pull out the knife.

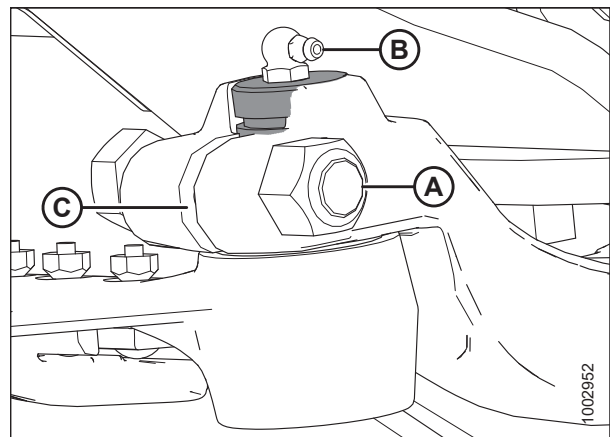


Figure 5.27: Knifehead



### 5.5.3 Removing Knifehead Bearing



#### WARNING

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



#### WARNING

Stand to rear of knife during removal to reduce risk of injury from cutting edges. Wear heavy gloves when handling knife.

#### IMPORTANT:

Repeat this procedure for each knife.

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the knife. For instructions, refer to [5.5.2 Removing Knife](#), page 140.

#### NOTE:

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

3. Use a flat-ended tool with the same approximate diameter as pin (A), and tap seal (B), bearing (C), plug (D), and O-ring (E) from the underside of the knifehead.

#### NOTE:

Seal (B) can be replaced without removing the bearing. When changing the seal, check the pin and needle bearing for wear and replace if necessary.

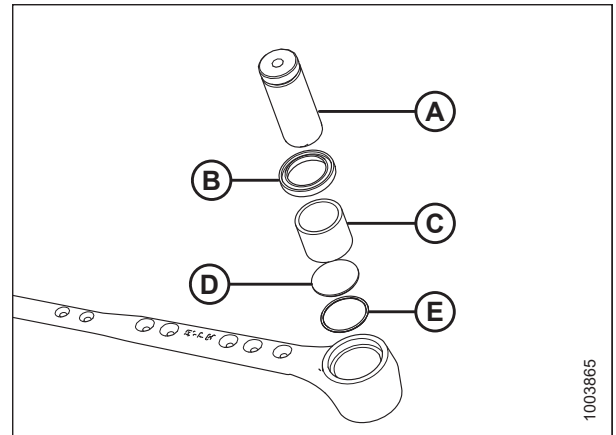


Figure 5.28: Knifehead Bearing Assembly

### 5.5.4 Installing Knifehead Bearing

1. Place O-ring (E) and plug (D) into knifehead.

#### IMPORTANT:

Install the bearing with the stamped end (the end with the identification markings) facing up.

#### NOTE:

It may be necessary to temporarily remove the grease fitting from the knifehead during installation of the knifehead pin. This will allow any trapped air to escape and knifehead pin will seat correctly.

2. Use a flat-ended tool 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.
3. Install seal (B) into knifehead with the lip facing outwards.

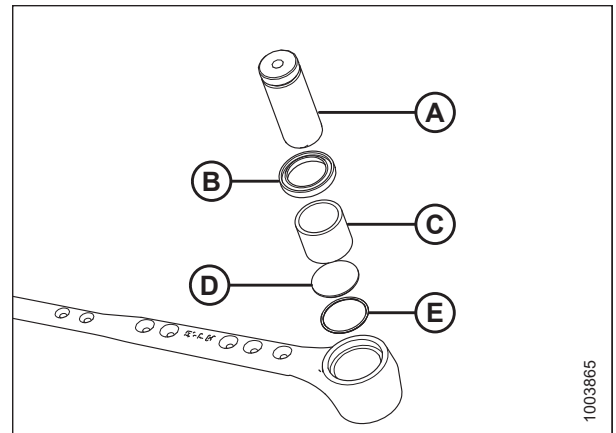


Figure 5.29: Knifehead Bearing Assembly

**IMPORTANT:**

To prevent premature knifehead or knife drive box failure, ensure there's a tight fit between knifehead pin (A) and the needle bearing, and also between the knifehead pin and the output arm.

4. Install the knife. For instructions, refer to [5.5.5 Installing Knife, page 142](#).

## 5.5.5 Installing Knife

### DANGER

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

### 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. **Mower conditioner pull-type:** Raise the pull-type fully. Shut the engine off, and remove the key from the ignition. Close the lock-out valves.
2. **Auger header:** Lower the header onto blocks, or raise the header fully. Shut the engine off, and remove the key from the ignition. If raising the header, engage the safety props.
3. Slide the knife into place and align the knifehead with the output arm.
4. For ease of removing or installing knifehead pin, remove grease fitting from pin.
5. Install knifehead pin (A) through the output arm and into the knifehead. Tap knifehead pin (A) down, and make sure the pin is seated at the bottom of the knifehead.
6. Set groove (B) in the knifehead pin 1.5 mm (1/16 in.) above output arm (C). Secure with 5/8 in. x 3 in. hex head bolt and nut (D), and torque to 217 Nm (160 lbf·ft).
7. Using a feeler gauge, check that the gap at location (E) is 0.25 mm (0.01 in.).

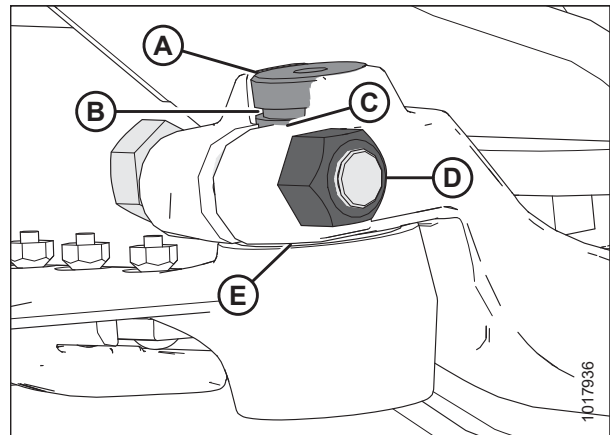


Figure 5.30: Knifehead

8. Install grease fitting (A) into the knifehead pin, and turn the grease fitting for easy access.

**IMPORTANT:**

Grease knifehead just enough to start a slight downward movement. Overgreasing will lead to knife misalignment which causes guards to overheat and drive systems to overload.

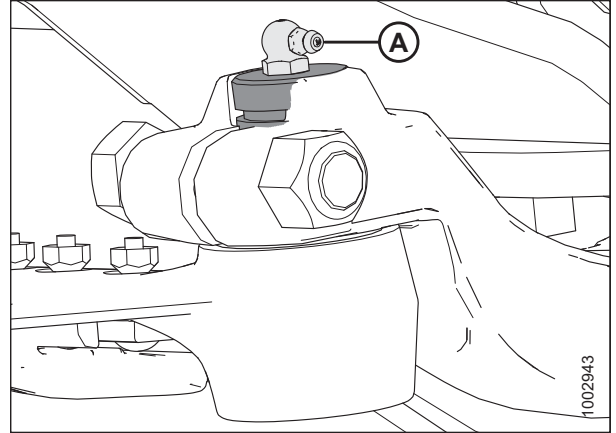


Figure 5.31: Knifehead

### 5.5.6 Spare Knife

A spare knife can be stored in header frame tube (A) at the left end of the header. Ensure the spare knife is secured in place.



Figure 5.32: Spare Knife

## 5.5.7 Knife Guards

Perform **DAILY** inspections to ensure the knife guards are aligned and the knife sections are contacting the shear surfaces of the knife guards.

### *Adjusting Knife Guards*

#### **DANGER**

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

#### **NOTE:**

Use guard straightening tool (MD #140135) available from your MacDon Dealer.

1. Stop engine, and remove the key from ignition.
2. Position the tool as shown, and pull up to adjust the guard tips upwards.



Figure 5.33: Upward Adjustment

3. Position the tool as shown, and push down to adjust the guard tips downwards.

#### **NOTE:**

If crop is difficult to cut, install stub guards with top guards and adjuster plates. A kit is available from your MacDon Dealer. For information, refer to [6.2.4 Stub Guard Conversion Kit, page 248](#).

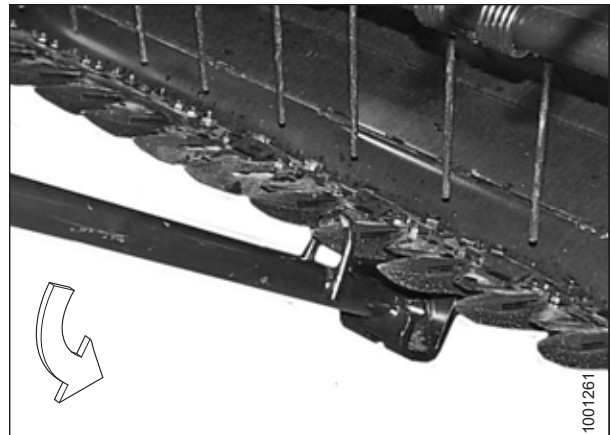


Figure 5.34: Downward Adjustment

## Replacing Pointed Guards

*Normal, drive side, and end guard replacement:*



### WARNING

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

1. Shut down the windrower, and remove the key from the ignition.
2. Stroke the knife manually until the knife sections are spaced midway between the guards.
3. Remove two nuts (B) and bolts attaching guard (A) and hold-down (C) (if applicable) to the cutterbar.
4. Remove guard (A), hold-down (C) (if applicable), and plastic wearplate (if installed).

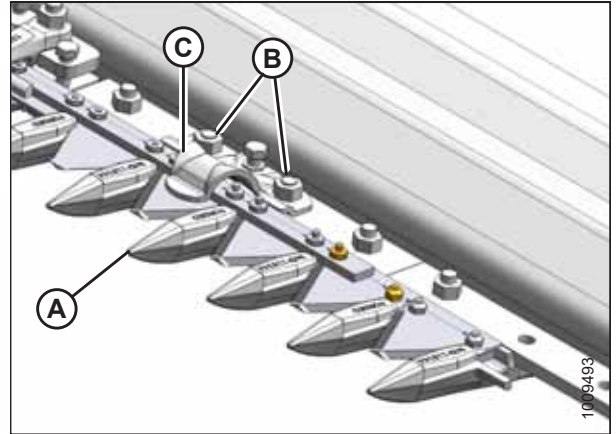


Figure 5.35: Pointed Guards

### IMPORTANT:

The first four outboard guards (B) on the drive sides of the header do **NOT** have ledger plates. Ensure proper replacement guards are installed at these locations.

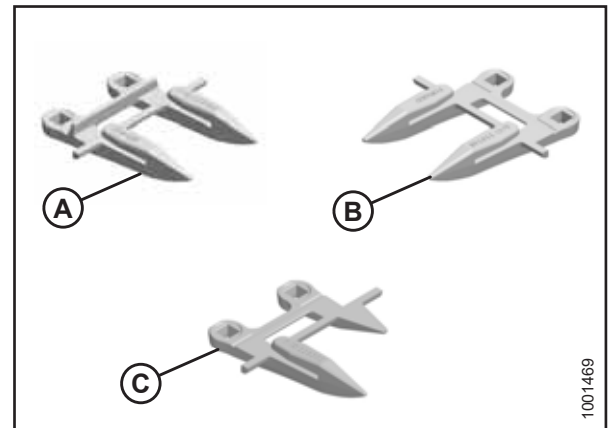


Figure 5.36: Pointed Guards

A - Normal

B - Drive Side

C - Half Guard (End)

## MAINTENANCE AND SERVICING

5. Position new guard (A), hold-down (C) (if applicable), and plastic wearplate (if applicable) onto the cutterbar. Secure with two nuts (B) and bolts, but do **NOT** tighten.
6. Check and adjust the clearance between the hold-downs and the knife. For instructions, refer to [Checking Knife Hold-Downs, page 151](#).

### NOTE:

The guard at the center of a double-knife header (where the two knives overlap) requires a different replacement procedure. For instructions, refer to Steps 7, [page 146](#) through 11, [page 147](#).

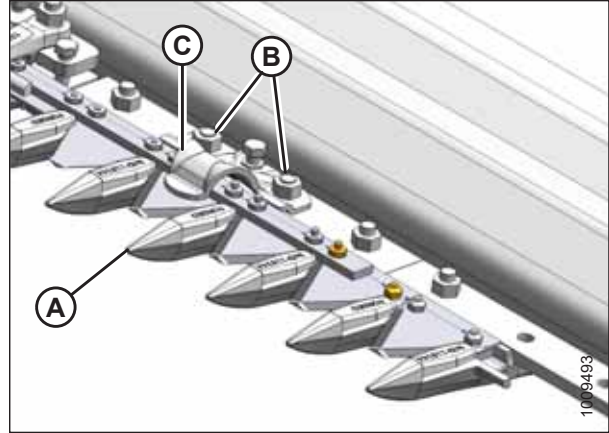


Figure 5.37: Pointed Guards

### Center guard replacement:



### WARNING

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

1. Shut down the windrower, and remove the key from the ignition.
2. Remove two nuts (B) and bolts attaching guard (A) and hold-down (C) to the cutterbar.
3. Remove guard (A), plastic wearplate (if installed), hold-down (C), and adjuster bar (D).

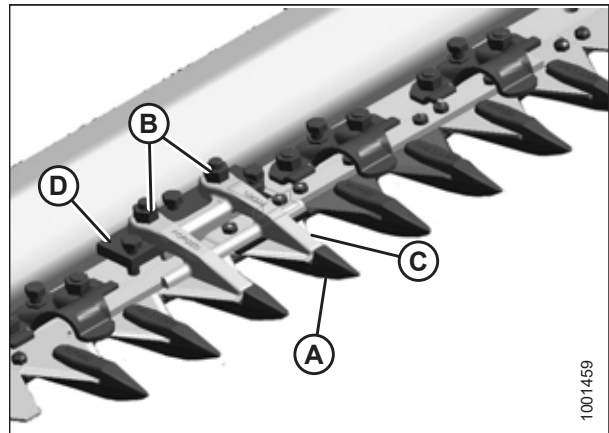


Figure 5.38: Center Guards

4. Position the plastic wearplate (if applicable), replacement center guard (A), adjuster bar, and hold-down (B) onto the cutterbar. Install bolts, but do **NOT** tighten.

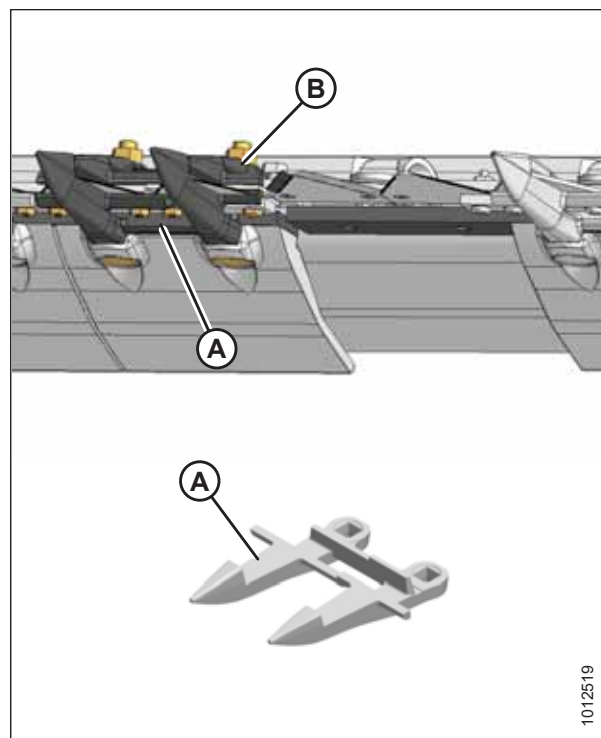
**IMPORTANT:**

Ensure center guard (A) (right of the cutterbar split) has offset cutting surfaces.

**IMPORTANT:**

Hold-down (B) must accommodate the two overlapping knives at the center guard location. Ensure the proper replacement guard is installed at this location.

5. Check and adjust the clearance between the hold-down and knife. For instructions, refer to [Checking Knife Hold-Downs](#), page 151.



**Figure 5.39: Center Guards**

## Replacing Stub Guards

Stub guards, complete with hold-downs and adjuster plates, are designed to cut tough crops. Stub guards are available for 4.6–10.7 m (15–35 ft.) headers only.

**Normal, drive side, and end guard replacement:**

### WARNING

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

1. Shut down the windrower, and remove the key from the ignition.
2. Stroke the knife manually until the knife sections are spaced midway between the guards.
3. Remove two nuts (A) and bolts attaching guard (B) and hold-down (C) to the cutterbar.
4. Remove guard (B), plastic wearplate (if installed), hold-down (C), and adjuster bar (D).

#### IMPORTANT:

Note the position of the miter on adjuster bar (D), and reinstall the adjuster bar in the same position. Mitters should **NOT** be adjacent to each other.

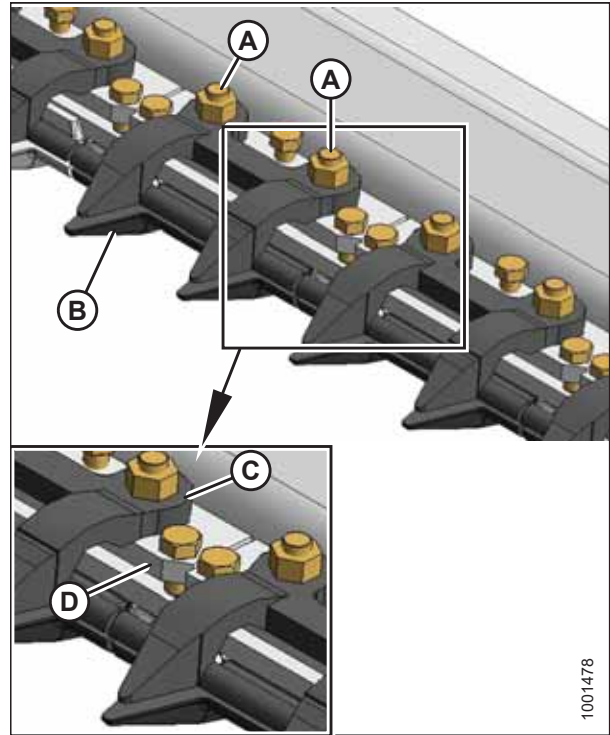


Figure 5.40: Stub Guards

#### IMPORTANT:

The first four outboard guards (B) on the drive sides of the header do **NOT** have ledger plates. Ensure the proper replacement guards are installed at these locations.

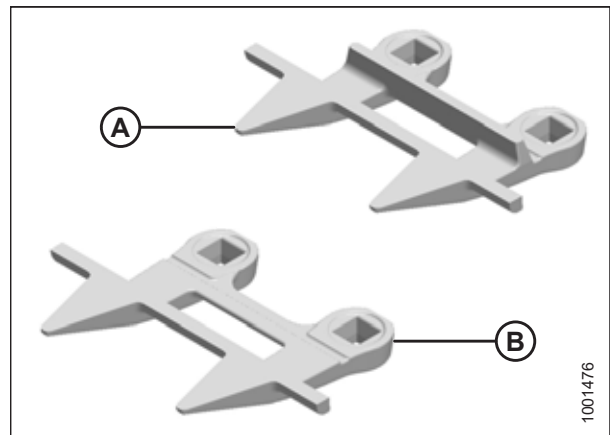


Figure 5.41: Stub Guards

A - Normal Guard

B - Drive Side Guard



## MAINTENANCE AND SERVICING

5. Position the plastic wearplate (if applicable), replacement guard (B), adjuster bar (D), hold-down (C), and install bolts and nuts (A). Do **NOT** tighten.
6. Check and adjust the clearance between the hold-downs and the knife. For instructions, refer to [Checking Knife Hold-Downs, page 151](#).

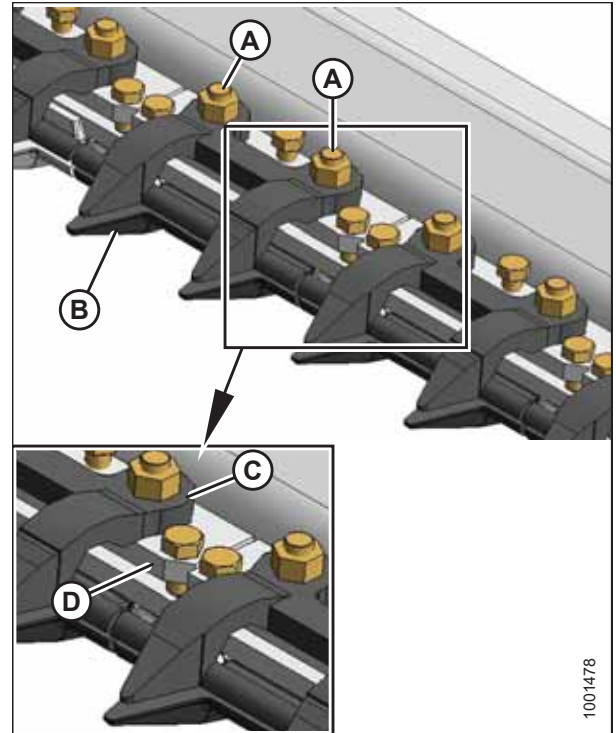


Figure 5.42: Stub Guards

**Center guard replacement:**

**NOTE:**

The guard at the center of a double-knife header (where the two knives overlap) requires a slightly different replacement procedure.



**WARNING**

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

7. Shut down the windrower, and remove the key from the ignition.
8. Remove two nuts (A) and bolts attaching guard (B), hold-down (C), and adjuster bar (D) to the cutterbar.
9. Remove guard (B), plastic wearplate (if installed), hold-down (C), and adjuster bar (D).
10. Position the plastic wearplate (if applicable), replacement guard (B), adjuster bar (D), and hold-down (C) onto the cutterbar. Install bolts, but do **NOT** tighten.

**IMPORTANT:**

Ensure center guard (B) (right of the cutterbar split) has offset cutting surfaces.

**IMPORTANT:**

Hold-down (C) must accommodate the two overlapping knives at the center guard location. Ensure the proper replacement guard is installed at this location.

11. Check and adjust the clearance between the hold-down and the knife. For instructions, refer to [Checking Knife Hold-Downs, page 151](#).

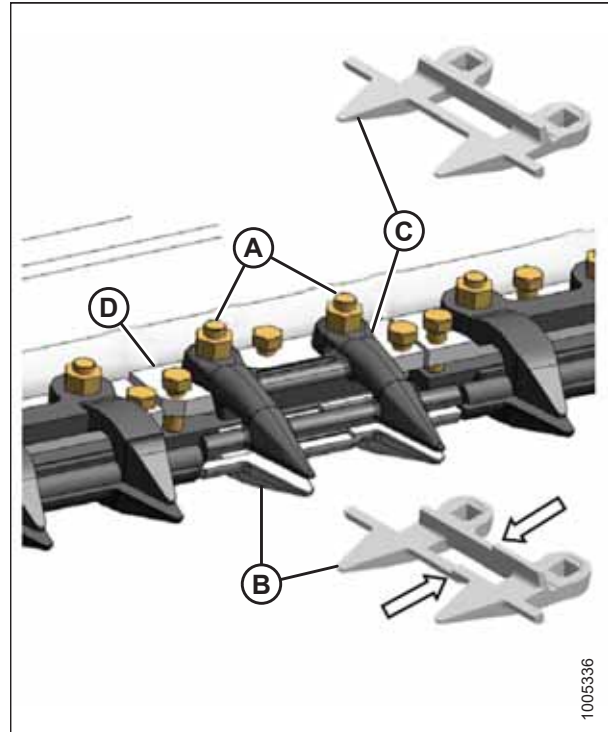


Figure 5.43: Center Guards

### Checking Knife Hold-Downs

#### **WARNING**

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

Perform daily inspections to ensure the knife hold-downs are preventing the knife sections from lifting off the guards while permitting the knife to slide without binding.

#### **NOTE:**

Align guards prior to checking and adjusting the hold-downs. For instructions, refer to [Adjusting Knife Guards, page 144](#).

Measure the clearance between the hold-downs and knife sections as follows:

#### **Normal knife guard hold-down:**

1. Shut down the windrower, and remove the key from the ignition.
2. Manually stroke knife to center the sections in guards.
3. Measure the clearance between normal guard hold-down (A) and knife section (B) with a feeler gauge. Push the section down against the bottom of the guard. The clearance should be 0.1–0.6 mm (0.004–0.024 in.).

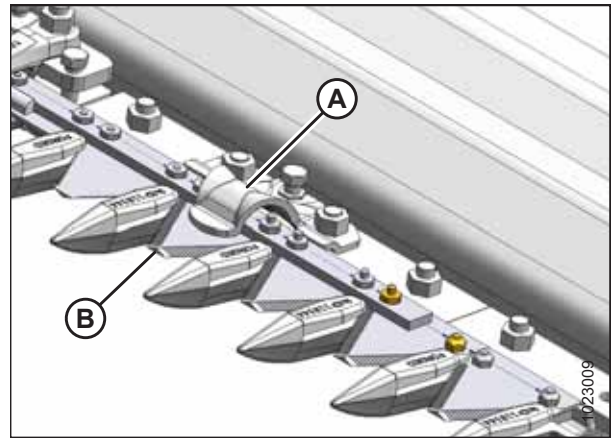


Figure 5.44: Normal Guard Hold-Down

#### **Double knife center guard hold-down:**

4. Measure the clearance between the center guard hold-down (A) and the knife section with a feeler gauge. Push the section down against the bottom of the guard. The clearances should be:
  - **At Hold-Down Tip (B):** 0.1–0.4 mm ( 0.004–0.016 in.)
  - **At Rear of Hold-Down (C):** 0.1–1.0 mm (0.004–0.040 in.)
5. If necessary, refer to the following for adjustment procedures:
  - [Adjusting Pointed Guard Hold-Downs, page 152](#)
  - [Adjusting Stub Guard Hold-Downs, page 153](#)

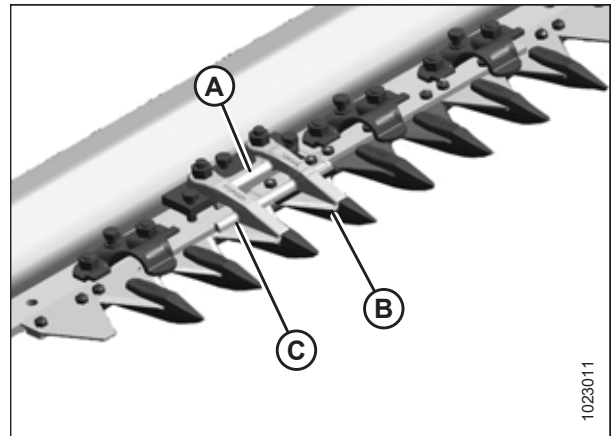


Figure 5.45: Double Knife Center Guard Hold-Down

### Adjusting Pointed Guard Hold-Downs

This procedure is applicable to formed sheet metal hold-downs. Do **NOT** use this procedure for the hold-down at center guard position where knives overlap on double-knife headers. For center guard, refer to [Adjusting Stub Guard Hold-Downs](#), [page 153](#).

#### **WARNING**

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

1. Shut down the windrower, and remove the key from the ignition.
2. Decrease clearance by turning bolt (B) clockwise to lower front of hold-down (A).
3. Increase clearance by turning bolt (B) counterclockwise to raise front of hold-down.

#### **NOTE:**

For larger adjustments, it may be necessary to loosen nuts (C), turn adjuster bolt (B), and then retighten nuts.

4. Check clearance again and adjust as required.

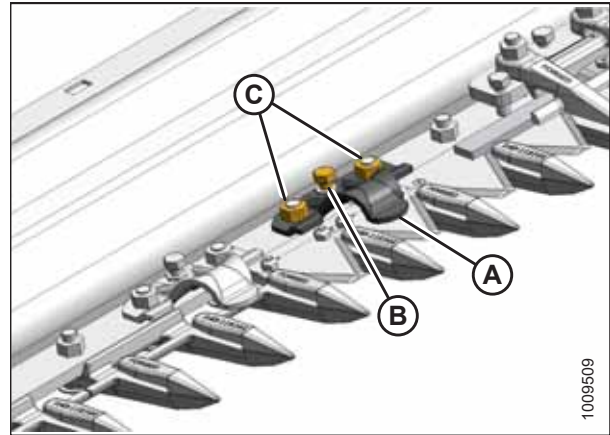


Figure 5.46: Cutterbar

#### **WARNING**

Check to be sure all bystanders have cleared the area.

5. Complete hold-down adjustments, run header at low engine speed, and listen for noise caused by insufficient clearance.

#### **NOTE:**

Insufficient hold-down clearance will result in overheating of knife and guards—adjust as necessary.

### Adjusting Stub Guard Hold-Downs

#### **WARNING**

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

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

#### **Forged hold-down:**

2. Manually stroke knife to center section(s) (A) under hold-down (B) as shown.
3. Loosen nuts (C) and back off bolts (D) clear of cutterbar.
4. Position a C-clamp or equivalent on trash bar at location (F), and lightly clamp hold-down (B) to guard (E).
5. Turn bolts (D) until they contact cutterbar, then tighten **ONE** turn.
6. Remove clamp.
7. Tighten nuts (C) and torque to 45 Nm (35 lbf-ft).
8. Check that specified clearances are achieved. For instructions, refer to [Checking Knife Hold-Downs, page 151](#).

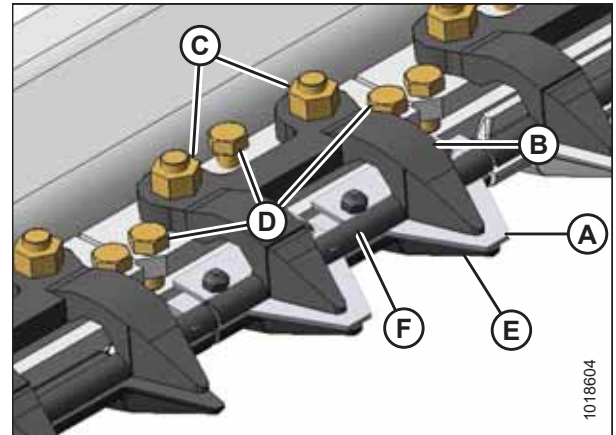


Figure 5.47: Normal Stub Guard Forged Hold-Down

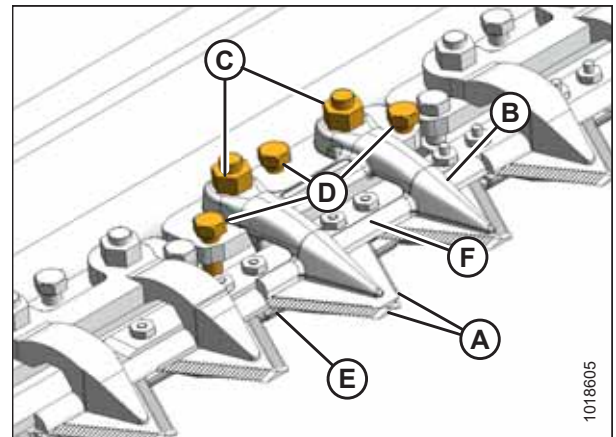


Figure 5.48: Double-Knife Center Stub Guard

**Sheet metal hold-down:**

9. Manually stroke knife to center section (A) under hold-down (B) as shown.
10. Decrease clearance by turning bolt (C) clockwise to lower front of hold-down. Clearance should be 0.1–0.6 mm (0.004–0.024 in.).
11. Increase clearance by turning bolt (C) counterclockwise to raise front of hold-down.

**NOTE:**

For larger adjustments, it may be necessary to loosen nuts (D), turn adjuster bolt (C), and then retighten nuts.

12. Torque nuts (D) to 88 Nm (65 lbf-ft) after all adjustments are complete and specified clearances are achieved. For instructions, refer to [Checking Knife Hold-Downs, page 151](#).

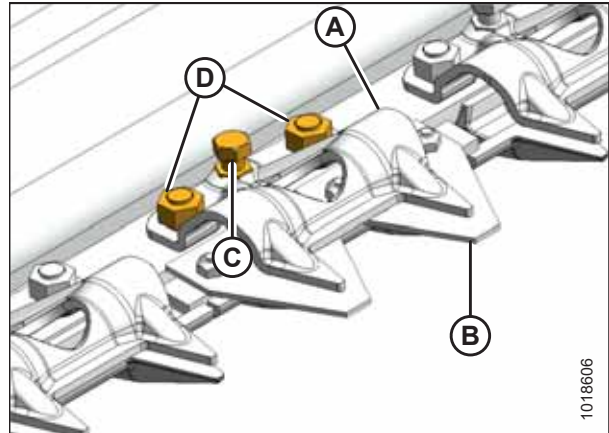


Figure 5.49: Stub Guard Sheet Metal Hold-Down

**WARNING**

Check to be sure all bystanders have cleared the area.

13. Complete hold-down adjustments, run header at low engine speed, and listen for noise caused by insufficient clearance.

**IMPORTANT:**

Insufficient hold-down clearance will result in overheating of knife and guards—readjust as necessary.

### 5.5.8 Knifehead Shield

The knifehead shield attaches to the endsheet and reduces the knifehead opening to prevent cut crop from accumulating in the knifehead cutout.

The shields and mounting hardware are available from your MacDon Dealer.

**IMPORTANT:**

Remove the shields when cutting with the cutterbar on the ground in muddy conditions. Mud may pack into the cavity behind the shield which could result in knife drive box failure.

#### Installing Knifehead Shield

The knifehead shield is supplied in flattened form, but it can be bent to suit installation on pointed or stub guard cutterbars. Knifehead shields differ slightly depending on header size and guard configuration, so ensure you are using the proper knifehead shield for your header. Refer to your parts catalog for proper replacement parts.

**DANGER**

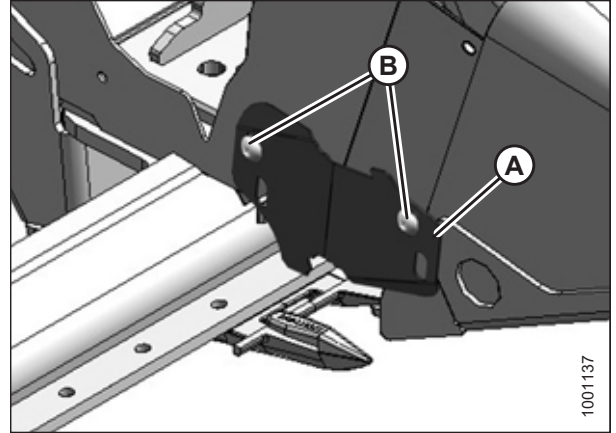
To avoid bodily injury or death from unexpected start-up or fall of raised machine, always stop engine, remove key, and engage safety props before going under header for any reason.

**CAUTION**

Wear heavy gloves when working around or handling knives.

## MAINTENANCE AND SERVICING

1. Raise the reel to its full height, lower the header to the ground, shut down the engine, and remove the key from the ignition.
2. Engage the reel safety props.
3. Place knifehead shield (A) against the endsheet as shown. Align the shield so the cutout matches the profile of the knifehead and/or hold-downs.
4. Bend knifehead shield (A) along the slit to conform to the endsheet.
5. Align the mounting holes and secure with two 3/8 in. x 1/2 in. Torx® head bolts (B).
6. Tighten bolts (B) just enough to hold knifehead shield (A) in place while allowing it to be adjusted as close to the knifehead as possible.
7. Manually rotate the knife drive box pulley to move the knife and check for areas of contact between the knifehead and knifehead shield (A). Adjust the shield to eliminate interference with the knife if necessary.
8. Tighten bolts (B).



**Figure 5.50: Knifehead Shield**

## 5.6 Knife Drive

### 5.6.1 Knife Drive Box

Knife drive boxes convert rotational motion into the reciprocating motion of the knife, and are belt driven by a hydraulic motor. There is one knife drive box on single-knife headers and two knife drive boxes on double-knife headers.

#### CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing](#), [page 119](#).

#### *Checking Mounting Bolts*

Check the torque on the four knife drive box mounting bolts after the first 10 hours of operation and every 100 hours thereafter.

#### DANGER

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

1. Torque side bolts (A) first, then torque bottom bolts (B).  
Torque all bolts to 271 Nm (200 lbf-ft).

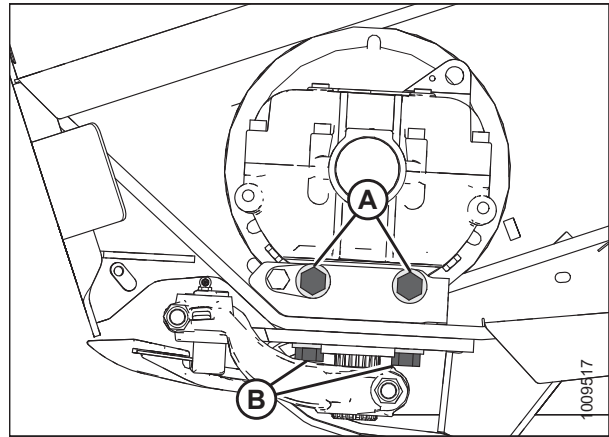


Figure 5.51: Knife Drive Box



### Removing Knife Drive Box

#### DANGER

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

#### *Timed double-knife headers:*

##### NOTE:

The procedure is the same for both ends of a timed double-knife header. Images shown are for the left end—the right end is opposite.

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
3. Loosen two nuts (A) on the belt idler bracket to relieve the belt tension.
4. Loosen nut (B) on the idler pulley and slide the idler down to loosen the belt.
5. Proceed to Step 10, [page 158](#).

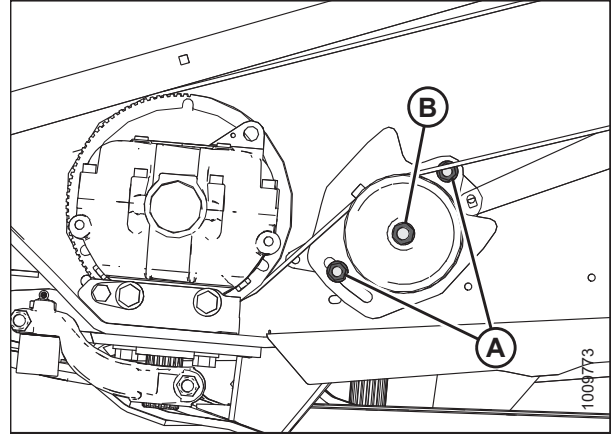


Figure 5.52: Timed Double-Knife Drive

#### *Single and untimed double-knife headers:*

6. Shut down the windrower, and remove the key from the ignition.
7. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
8. Loosen two bolts (A) securing the motor assembly to the header endsheet.
9. Loosen the belt tension by turning tensioning bolt (B) counterclockwise.

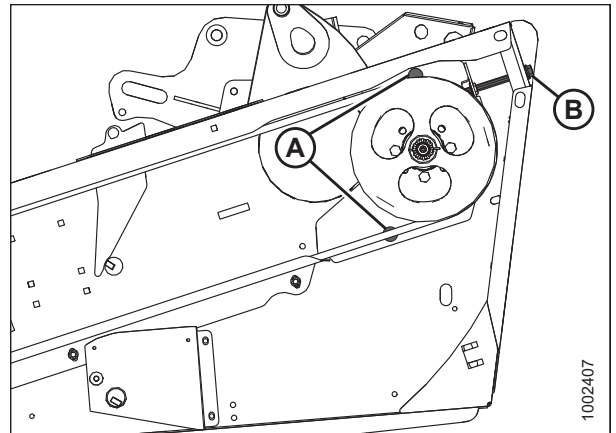


Figure 5.53: Single and Untimed Double-Knife Drive

## MAINTENANCE AND SERVICING

10. Open access cover (A) on the endsheet behind the cutterbar to provide clearance between the knife drive box pulley and the endsheet.

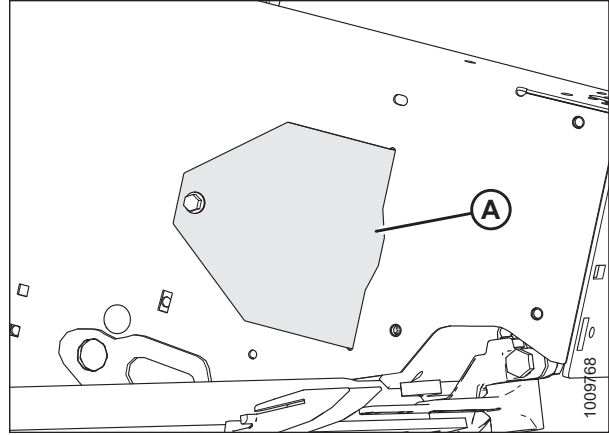


Figure 5.54: Access Cover

11. Remove belt (A) from drive pulley (B).
12. Slip belt (A) over and behind knife drive box pulley (C). Use the notch in the pulley to assist with belt removal.
13. Stroke the knife manually to its outer limit.

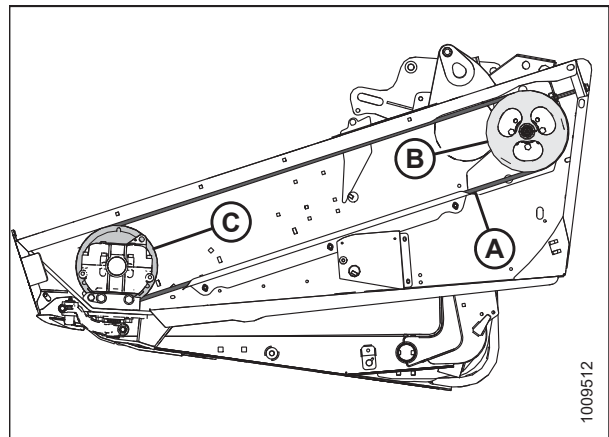


Figure 5.55: Knife Drive

14. Remove bolt (A).
15. Remove grease fitting (B) from the pin.
16. Use a screwdriver or chisel in slot (C) to release the load on the knifehead pin.
17. Use a screwdriver or chisel to pry the pin upwards in the pin groove until the pin is clear of the knifehead.
18. Push the knife assembly inboard until it is clear of the output arm.
19. Seal the knifehead bearing with plastic or tape unless it is being replaced.

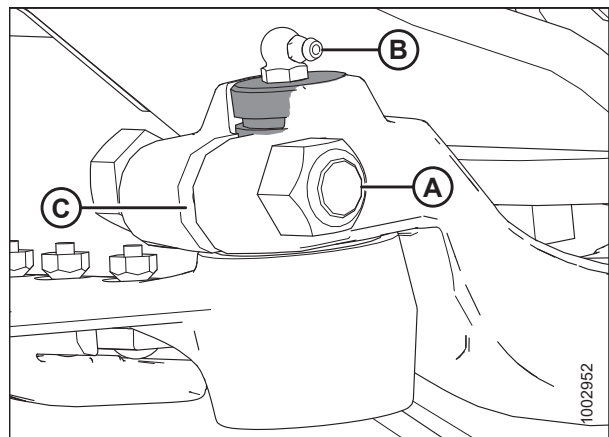


Figure 5.56: Knifehead

20. Remove bolt (A) that clamps knife drive arm (B) to the knife drive box output shaft.
21. Remove knife drive arm (B) from the knife drive box output shaft.
22. Remove four knife drive box mounting bolts (C) and (D).

**NOTE:**

Bolt (E) is factory set; do **NOT** remove. It is used to secure the knife drive box in the proper fore-aft position.



**CAUTION**

The knife drive box and pulley weigh over 35 kg (65 lb.) Use care when removing or installing. Lug (L) can be used for lifting.

23. Remove the knife drive box and place it on a bench for disassembly.
24. Repeat procedure for the opposite end of the header.

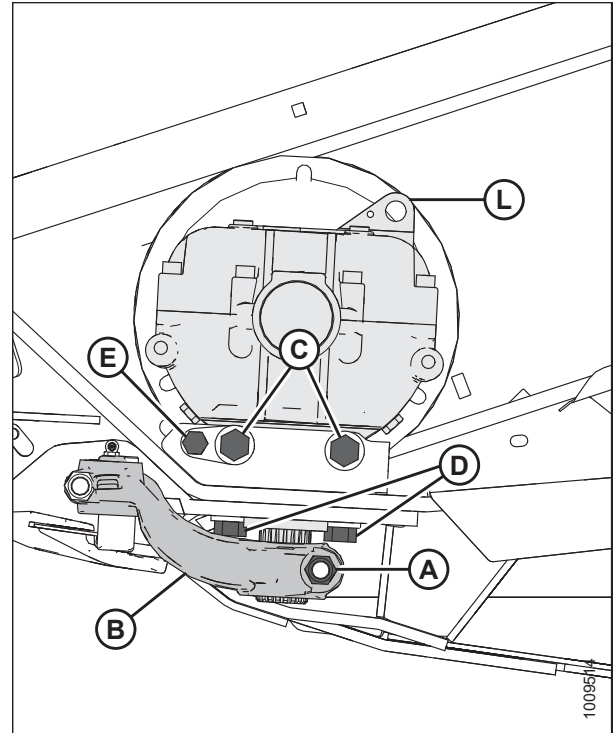


Figure 5.57: Knife Drive Box

*Removing Knife Drive Box Pulley*

1. Loosen and remove knife drive box pulley clamping bolt (A) and nut (B).
2. Remove knife drive box pulley (C) using a three-jaw puller.

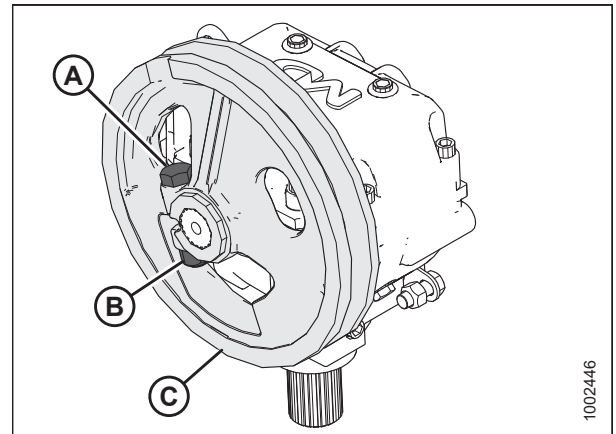


Figure 5.58: Knife Drive Box and Pulley

### Installing Knife Drive Box Pulley

1. Ensure the splines and bores in the pulley and drive arm are free of paint, oil, and solvents.
2. Apply two bands (A) of medium-strength threadlocker (Loctite® 243 or equivalent) around the shaft as shown. Apply one band at the end of the spline and the second band at the approximate midpoint location.
3. Install pulley (B) until flush with the end of the shaft.
4. Secure the pulley with 5/8 in. x 3 in. hex head bolt with distorted thread NC lock nut and torque to 217 Nm (160 lbf-ft).

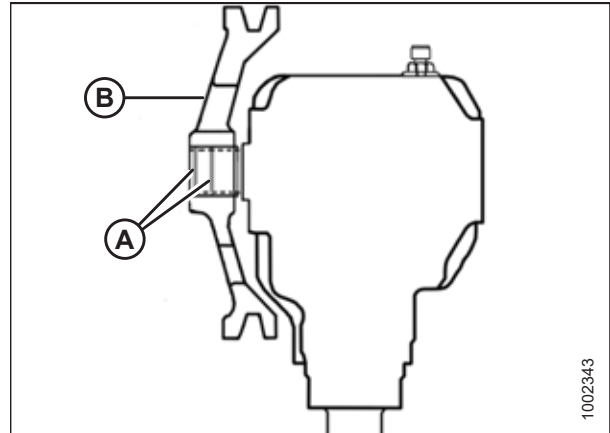


Figure 5.59: Knife Drive Box

### Installing Knife Drive Box

The procedure for installing knife drive boxes is the same for single- and double-knife headers.

#### NOTE:

If the pulley was removed from the knife drive box, refer to [Installing Knife Drive Box Pulley, page 160](#). If the pulley was not removed, proceed to Step 1, [page 160](#).

#### CAUTION

**The knife drive box and pulley weigh over 35 kg (65 lb.) Use care when removing or installing. Lug (L) can be used for lifting.**

1. Position the knife drive box onto the header mount and install the belt onto the pulley.
2. Secure the knife drive box to the frame using two 5/8 in. x 1-3/4 in. grade 8 hex head bolts (A) on the side and two 5/8 in. x 2-1/4 in. grade 8 hex head bolts (B) on the bottom.
3. Tighten knife drive box side bolts (A) slightly, then tighten bottom bolts (B) to ensure proper contact with the vertical and horizontal mounting surfaces. Do **NOT** torque the bolts at this time.

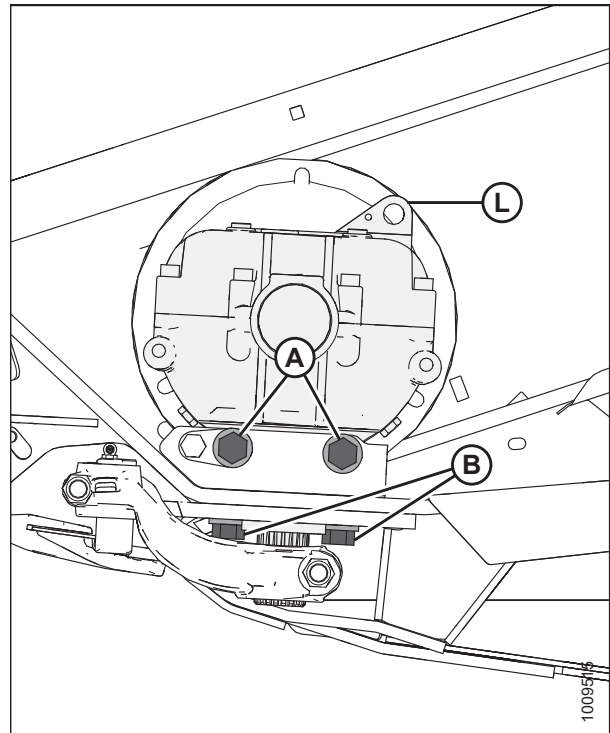


Figure 5.60: Knife Drive Box

## MAINTENANCE AND SERVICING

4. Apply two bands (A) of medium-strength threadlocker (Loctite® 243 or equivalent) to the output shaft as shown. Apply one band at the end of the output shaft and the second band at the approximate midpoint location.
5. Slide output arm (B) onto the output shaft. Rotate the pulley to ensure the splines are properly aligned and the drive arm clears the frame on the inboard stroke.

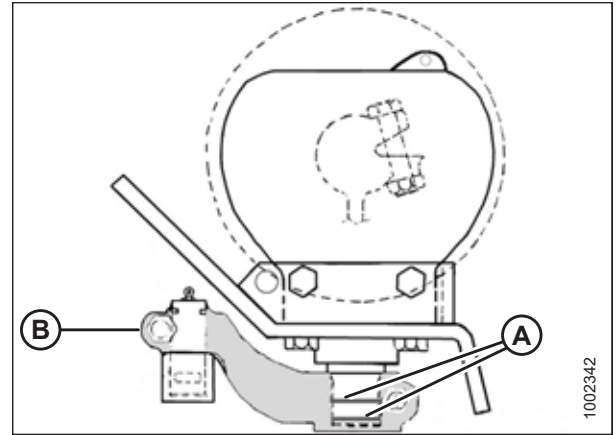


Figure 5.61: Knife Drive Box

6. Position output arm (A) to the farthest outboard position. Move output arm (A) up or down on the splined shaft until it is almost contacting knifehead (B) (exact clearance [C] is set during the knifehead pin installation).

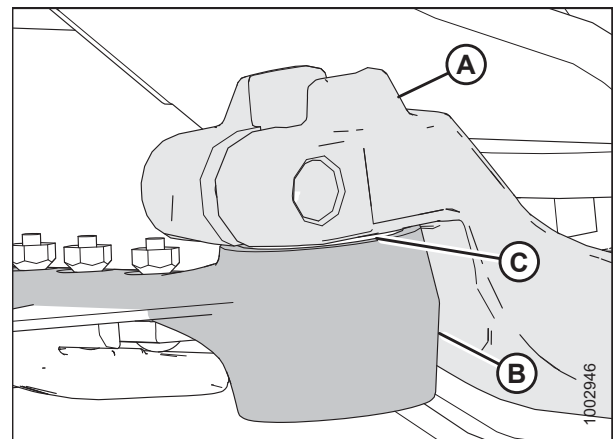


Figure 5.62: Knifehead

7. Torque output arm bolt (A) to 217 Nm (160 lbf-ft).

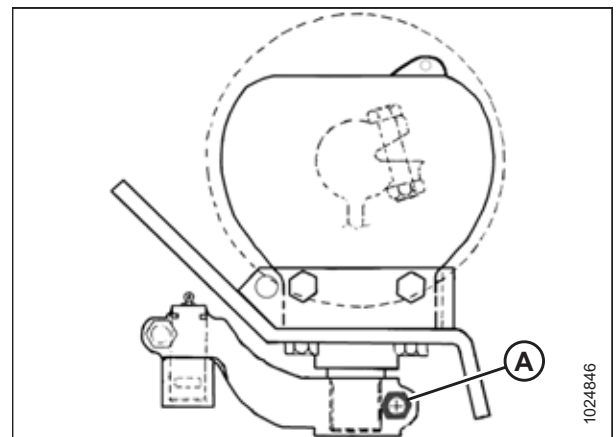


Figure 5.63: Knife Drive Box

8. Slide the knife into place and align the knifehead with the output arm.
9. For ease of removing or installing knifehead pin, remove grease fitting from pin.

## MAINTENANCE AND SERVICING

10. Install knifehead pin (A) through the output arm and into the knifehead. Tap knifehead pin (A) down, and make sure the pin is seated at the bottom of the knifehead.
11. Using a feeler gauge, check that the gap at location (E) is 0.25 mm (0.01 in.).
12. Set groove (B) in the knifehead pin 1.5 mm (1/16 in.) above output arm (C). Secure with 5/8 in. x 3 in. hex head bolt and nut (D), and torque to 217 Nm (160 lbf·ft).

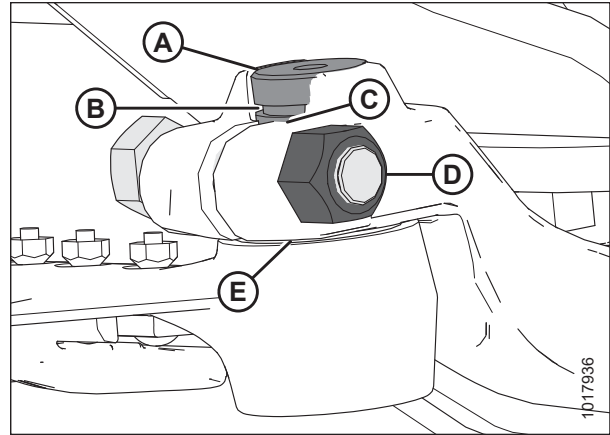


Figure 5.64: Knifehead

13. Install grease fitting (A) into the knifehead pin, and turn the grease fitting for easy access.

### IMPORTANT:

Grease knifehead just enough to start a slight downward movement. Overgreasing will lead to knife misalignment which causes guards to overheat and drive systems to overload.

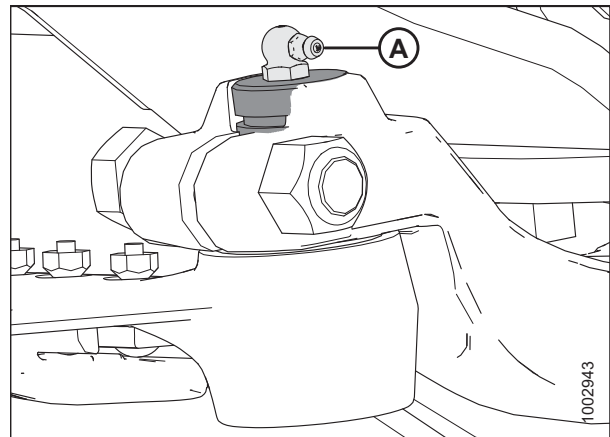


Figure 5.65: Knifehead

14. Tighten the knife drive box side bolts (A) first, then tighten bottom bolts (B). Torque to 271 Nm (200 lbf·ft).
15. Move the output arm to the midstroke position, and ensure the knife bar doesn't contact the front of the first guard. If the knife drive box requires adjustment, contact your MacDon Dealer.
16. Install and tension the knife drive belts. Refer to the following topics depending on your header:
  - For untimed belts, refer to [Tensioning Untimed Knife Drive Belts](#), page 166
  - For timed belts, refer to [Tensioning Timed Knife Drive Belts](#), page 171
  - For timed double-knife headers, also check the knife timing. For instructions, refer to [Adjusting Double-Knife Timing](#), page 173
17. Close the endshield. For instructions, refer to [Closing Endshields](#), page 35.

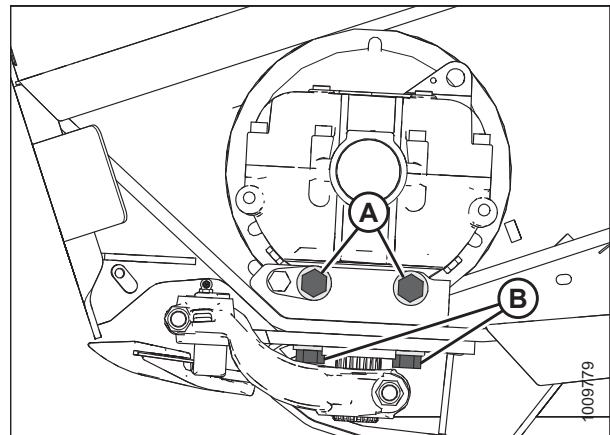


Figure 5.66: Knife Drive Box

### *Changing Oil in Knife Drive Box*

Change the knife drive box lubricant after the first 50 hours of operation and every 1000 hours (or 3 years) thereafter.

1. Shut down the windrower, and remove the key from the ignition.
2. Raise the header to allow a suitably sized container to fit under the knife box drain and collect the oil.
3. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
4. Remove breather/dipstick (A) and drain plug (B).
5. Allow the oil to drain.
6. Reinstall drain plug (B).
7. Add oil to the knife drive box. Refer to the inside back cover for specifications.
8. Reinstall breather/dipstick (A).
9. Close the endshield. For instructions, refer to [Closing Endshields, page 35](#).

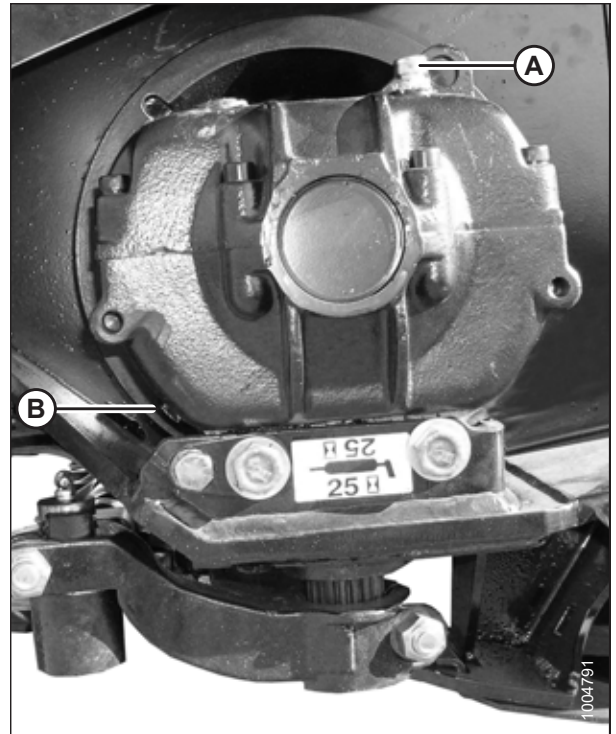


Figure 5.67: Knife Drive Box

## 5.6.2 Knife Drive Belts

### Untimed Knife Drive Belts

The knife drive box is driven by a V-belt that is powered by a hydraulic motor on the header endsheets.

#### Removing Untimed Knife Drive Belts

The untimed knife drive belt removal procedure is the same for both sides of a double-knife header.

### DANGER

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
3. Loosen two bolts (A) securing the motor assembly to the header endsheet.
4. Loosen the belt tension by turning tensioning bolt (B) counterclockwise.
5. Open access cover (A) on the endsheet behind the cutterbar to provide clearance between the knife drive box pulley and the endsheet.

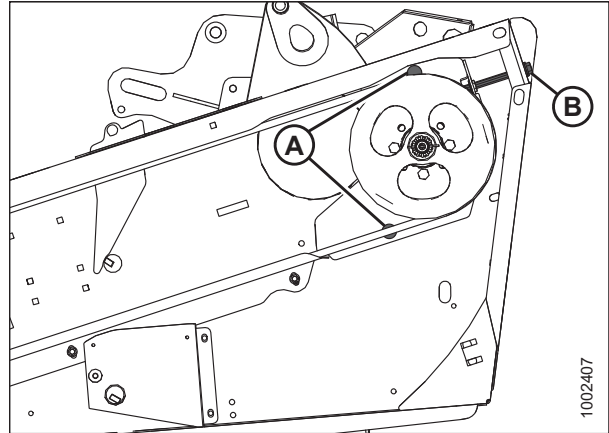


Figure 5.68: Single and Untimed Double-Knife Drive

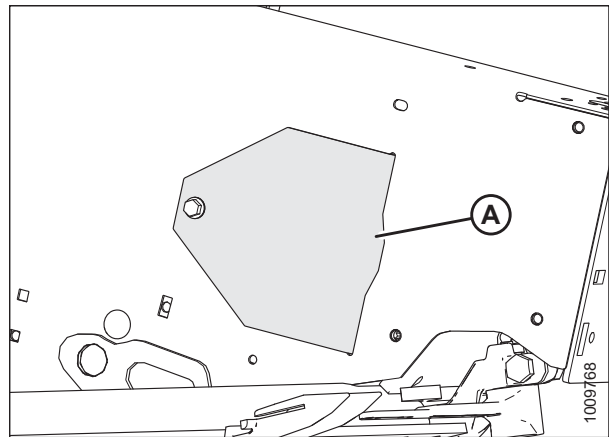


Figure 5.69: Access Cover



6. Remove belt (A) from drive pulley (B).
7. Slip belt (A) over and behind knife drive box pulley (C). Use the notch in the pulley to assist with belt removal.

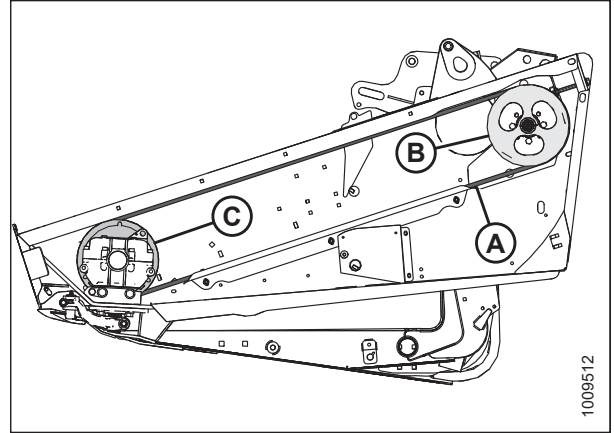


Figure 5.70: Knife Drive

### Installing Untimed Knife Drive Belts

The procedure for installing untimed knife drive belts is the same for both sides of the header.

### DANGER

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

1. Shut down the windrower, and remove the key from the ignition.
2. Route knife drive belt (A) around knife drive box pulley (C) and knife drive pulley (B). Use the notch in the pulley to assist with the belt installation.

#### NOTE:

Ensure the drive motor is fully forward, do **NOT** pry the belt over the pulley.

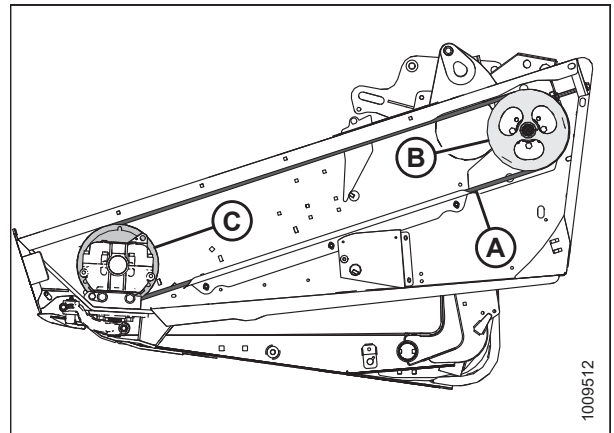


Figure 5.71: Knife Drive

3. Tension the knife drive belt. For instructions, refer to [Tensioning Untimed Knife Drive Belts, page 166](#).
4. Install access cover (A) and secure with bolt.
5. Close the endshield.

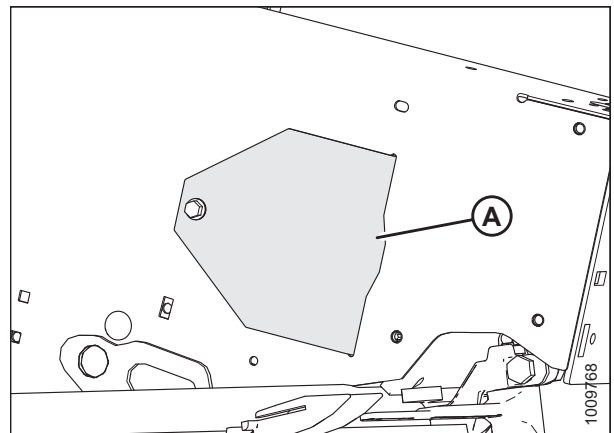


Figure 5.72: Access Cover

### Tensioning Untimed Knife Drive Belts

The procedure for tensioning untimed knife drive belts is the same for single- and double-knife headers.

#### DANGER

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

#### IMPORTANT:

To prolong belt and drive life, do **NOT** overtighten the belt.

1. Shut down machine, and remove key from the ignition.
2. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
3. Loosen two bolts (A) securing the motor assembly to the header endsheet.
4. Turn adjuster bolt (B) clockwise to move drive motor until a force of 89 N (20 lbf) deflects belt (C) 20–25 mm (3/4–1 in.) at midspan.

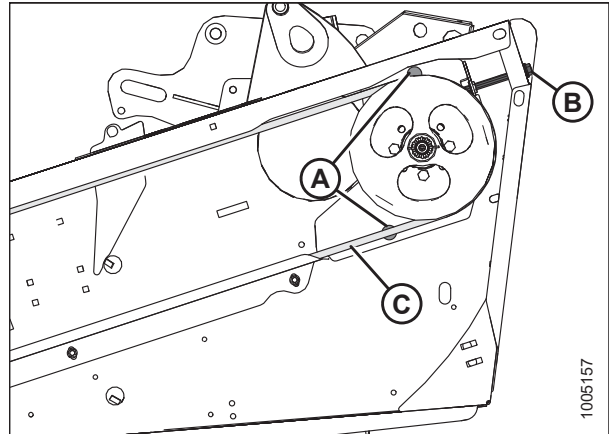


Figure 5.73: Untimed Knife Drive

5. Ensure clearance between belt (A) and belt guide (B) is 1 mm (1/32 in.).
6. Loosen three bolts (C), and adjust position of guide (B) as required.
7. Tighten three bolts (C).
8. Close endshield. For instructions, refer to [Closing Endshields, page 35](#).

#### NOTE:

Readjust tension of a new belt after a short run-in period (about five hours).

9. Repeat above steps for opposite end on double-knife headers.

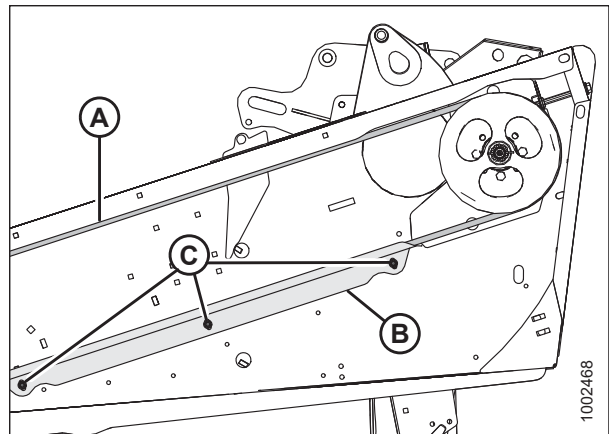


Figure 5.74: Untimed Knife Drive

## Timed Double-Knife Drive Belts

### Removing Timed Drive V-Belts



#### DANGER

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
3. Loosen two bolts (A) securing the motor assembly to the header endsheet.
4. Turn the adjuster bolt (B) counterclockwise to loosen and remove two V-belts (C).

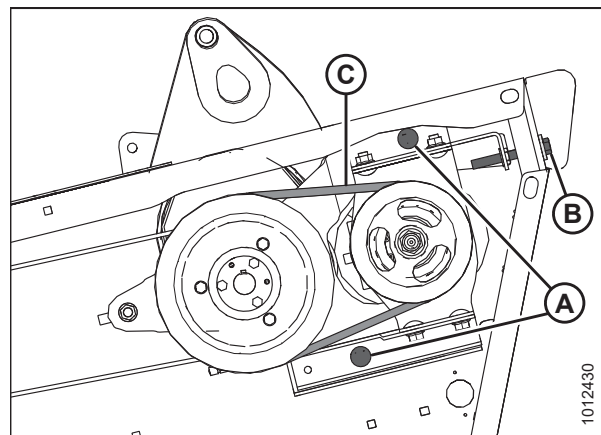


Figure 5.75: Knife Drive V-Belts

## Installing Timed Drive V-Belts

### DANGER

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

#### NOTE:

Install new V-belts in matching pairs.

1. Shut down the windrower, and remove the key from the ignition.
2. Install V-belts (C) onto the pulleys.

#### NOTE:

Ensure the drive motor is fully forward, do **NOT** pry the belts over the pulley.

3. Turn adjuster bolt (B) clockwise to tighten the V-belts. A properly tensioned V-belt should deflect 4 mm (5/32 in.) when 52–77 N (12–17 lbf) is applied at the midspan.

#### IMPORTANT:

To prolong the life of V-belts and drives, do **NOT** overtighten the V-belts.

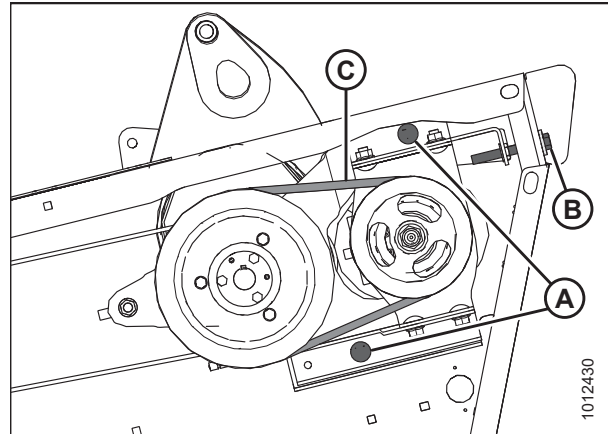


Figure 5.76: Knife Drive V-Belts

4. Tighten two bolts (A) on the endsheet.
5. Close the endshield. For instructions, refer to [Closing Endshields, page 35](#).
6. Check the tension of the new V-belts after a short run-in period (about five hours).

## Removing Timed Knife Drive Belt

The timed knife drive belt removal procedure is the same for both sides of the header.

### DANGER

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
3. Loosen two nuts (A) on the belt idler bracket to relieve the belt tension.
4. Loosen nut (B) on the idler pulley and slide the idler downwards to loosen the belt.

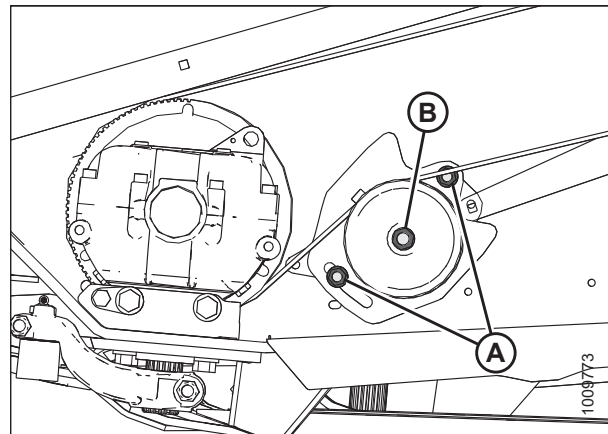


Figure 5.77: Knife Drive

**NOTE:**

The following two steps apply only to the left drive.

5. Loosen two bolts (A) on the endsheet.
6. Turn adjuster bolt (B) counterclockwise to loosen and remove two V-belts (C).

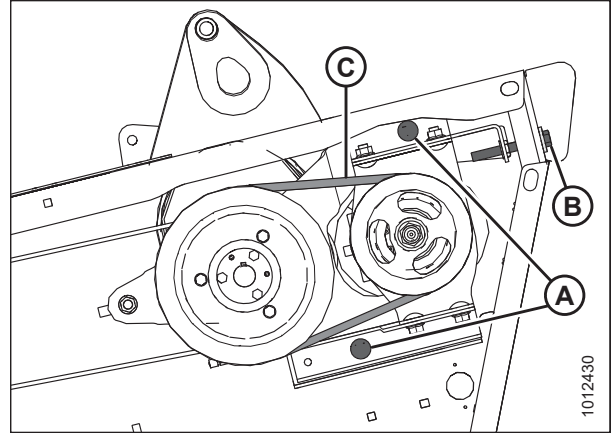


Figure 5.78: Knife Drive V-Belts

7. Open access cover (A) on the endsheet behind the cutterbar to provide clearance between the knife drive box pulley and the endsheet.
8. Remove the knife drive belt.

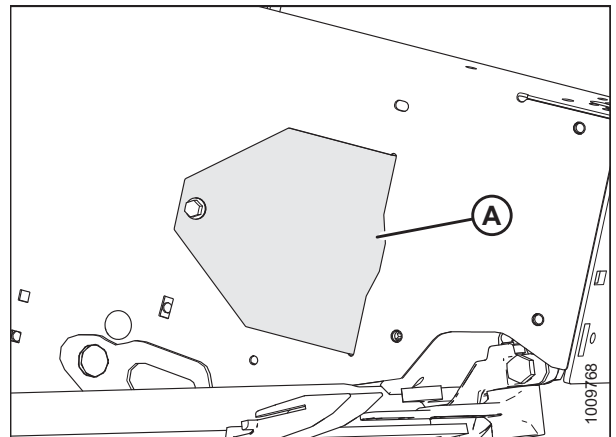


Figure 5.79: Access Cover

**Installing Timed Knife Drive Belts**

The procedure for installing timed knife drive belts is the same for both sides of the header.

**! DANGER**

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

If the belt is out of alignment, refer to [Checking Knife Drive Belt Tracking, page 176](#).

## MAINTENANCE AND SERVICING

1. Shut down the windrower, and remove the key from the ignition.
2. Route knife drive belt (A) around pulley (B) and knife drive box pulley (C).

### NOTE:

Ensure the drive motor is fully forward, do **NOT** pry the belt over the pulley.

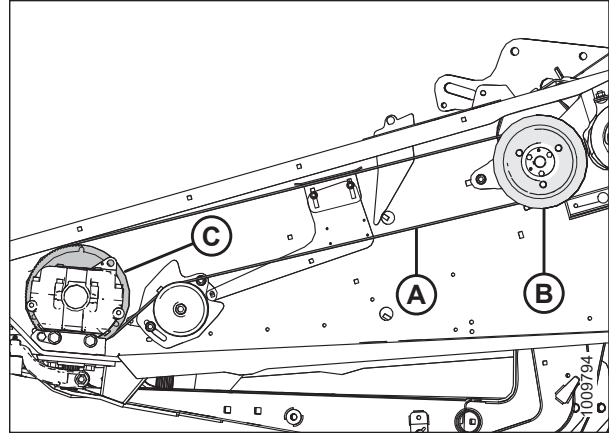


Figure 5.80: Left Side Shown – Right Side Similar

3. Install V-belt (C) onto the pulleys.
4. Turn adjuster bolt (B) clockwise to tighten the V-belts. A properly tensioned V-belt should deflect 4 mm (5/32 in.) when 52–77 N (12–17 lbf) is applied at the midspan.

### IMPORTANT:

To prolong the life of V-belts and drives, do **NOT** overtighten the V-belts.

5. Tighten two bolts (A) on the endsheet.

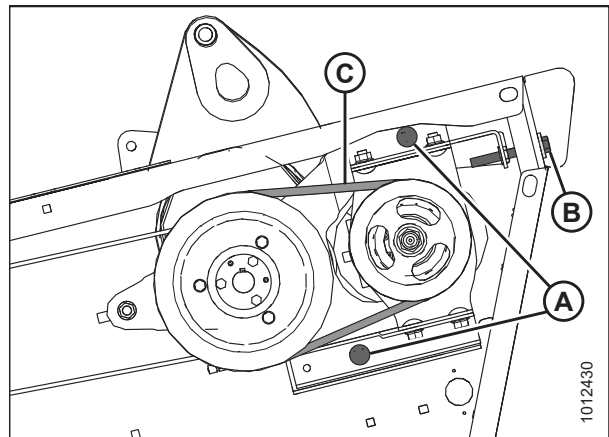


Figure 5.81: Knife Drive V-Belts

6. Ensure the knives are timed before tightening the belt. For instructions, refer to [Adjusting Double-Knife Timing, page 173](#).
7. Slide idler pulley (A) into the slot on support bracket (B) to take-up the slack in the timing belt.

### NOTE:

Ensure lower nut (C) is as high as possible in the support bracket (B) slot.

8. Tighten nut (D) to 212–234 Nm (157–173 lbf·ft).

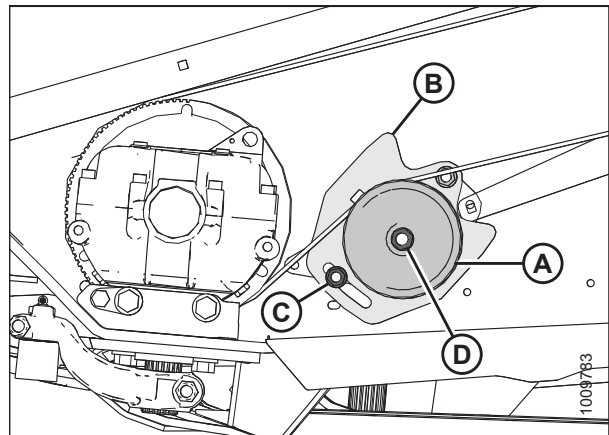


Figure 5.82: Knife Drive

9. Tension the knife drive belt. For instructions, refer to [Tensioning Timed Knife Drive Belts, page 171](#).
10. Install access cover (A) and secure with bolt.
11. Close the endshield.

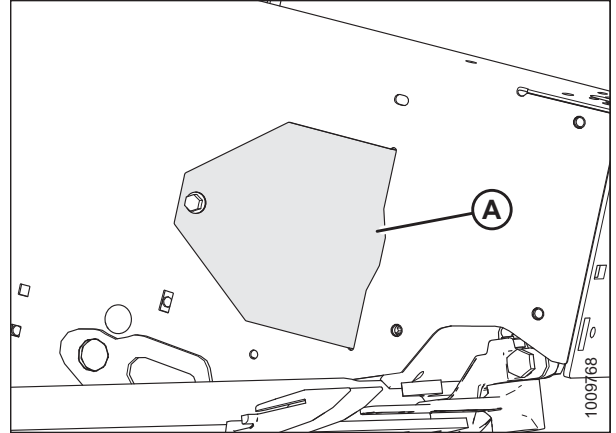


Figure 5.83: Access Cover

#### Tensioning Timed Knife Drive Belts

The procedure for tensioning timed knife drive belts is the same for both sides of the header. The illustrations shown are for the left side—the right side is opposite.



#### **DANGER**

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

#### **IMPORTANT:**

To prolong belt and drive life, do **NOT** overtighten belt.

#### **IMPORTANT:**

Do **NOT** use adjuster bolt at drive pulley to adjust timing belt tension.

1. Shut down the windrower, and remove the key from the ignition.
2. Open endshield. For instructions, refer to [Opening Endshields, page 34](#).
3. Loosen two nuts (A) on knife drive belt idler bracket.

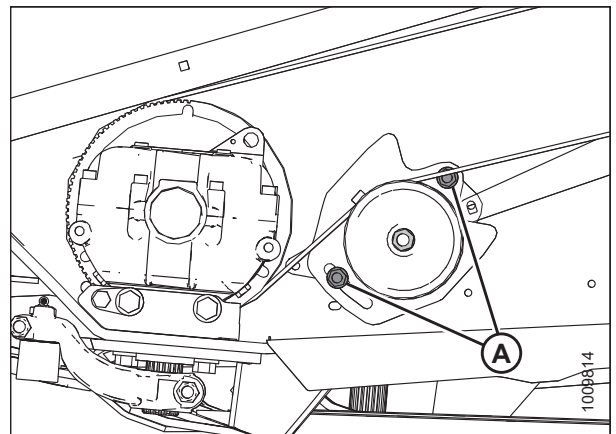


Figure 5.84: Left Knife Drive

## MAINTENANCE AND SERVICING

- Position pry bar (A) under idler bracket (C), and push bracket upwards until a force of 27 N (6 lbf) deflects belt 13 mm (1/2 in.) at midpoint of upper span.

**NOTE:**

Protect paint by placing a piece of wood (B) under pry bar (A).

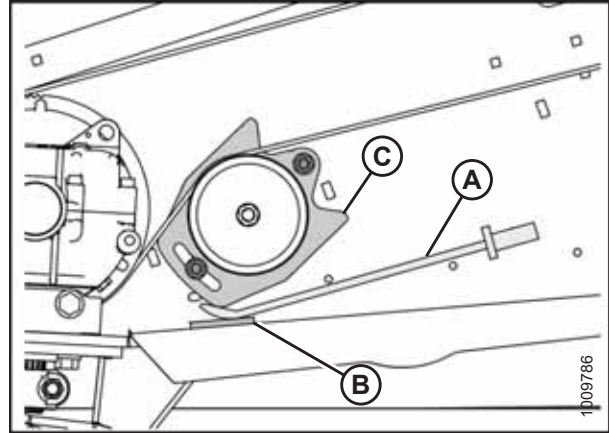


Figure 5.85: Left Knife Drive

- After achieving proper belt tension, tighten nuts (C) to 73–80 Nm (54–59 lbf-ft).
- Remove pry bar (A) and wood (B).

**NOTE:**

Readjust tension of a new belt after a short run-in period (about five hours).

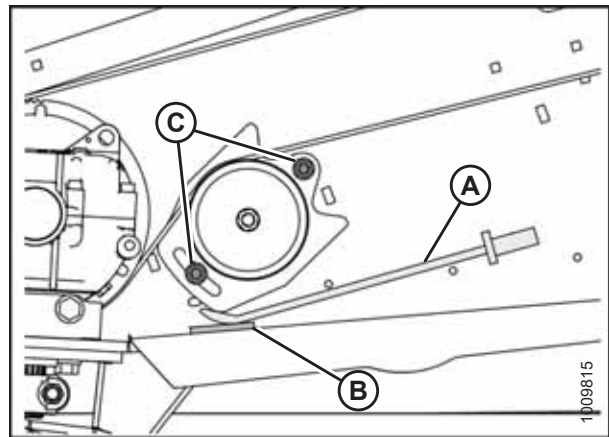


Figure 5.86: Left Knife Drive

- Ensure clearance (A) between belt (B) and guide (C) is 0.5–1.5 mm (1/32–1/16 in.).
- Loosen bolts (D) and adjust guide if necessary. Tighten bolts.
- Repeat procedure for opposite side of header.
- Close endshield. For instructions, refer to [Closing Endshields, page 35](#).

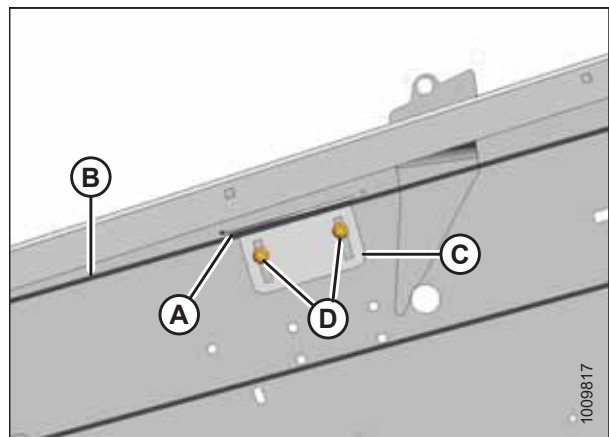


Figure 5.87: Left Belt Guide



### Adjusting Double-Knife Timing

Timed double-knife drive headers (10.7 m [35 ft.] and smaller) require the knives to be properly timed to move in opposite directions.

#### DANGER

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open both endshields. For instructions, refer to [Opening Endshields, page 34](#).
3. Remove the right knife drive belt. For instructions, refer to [Removing Timed Knife Drive Belt, page 168](#).
4. Rotate the left knife drive box driven pulley clockwise until left knife (A) is at the center of inboard stroke (B) (moving towards the center of the header).

**NOTE:**

The center stroke is when knife sections (C) are centered between the guard points.

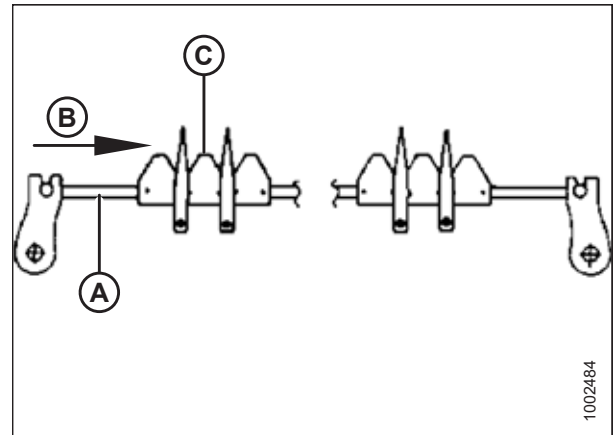


Figure 5.88: Adjusting Timing – Left Side

5. Rotate the right knife drive box pulley counterclockwise until right knife (A) is at the center of inboard stroke (B) (moving towards the center of the header).

**NOTE:**

The center stroke is when knife sections (C) are centered between the guard points.

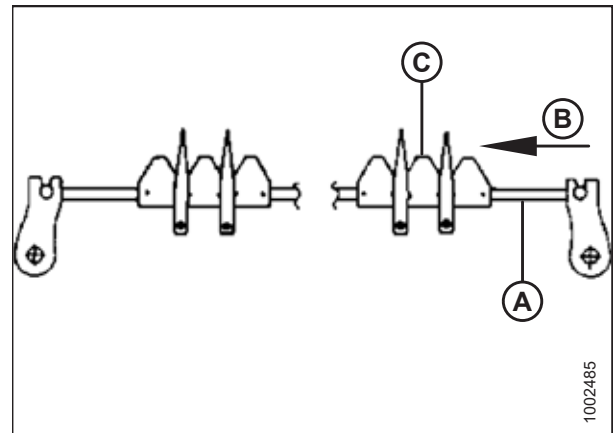


Figure 5.89: Adjusting Timing – Right Side

## MAINTENANCE AND SERVICING

6. Install right knife drive belt (A).

**NOTE:**

Ensure the knife drive box driver and driven pulleys do **NOT** rotate during belt installation.

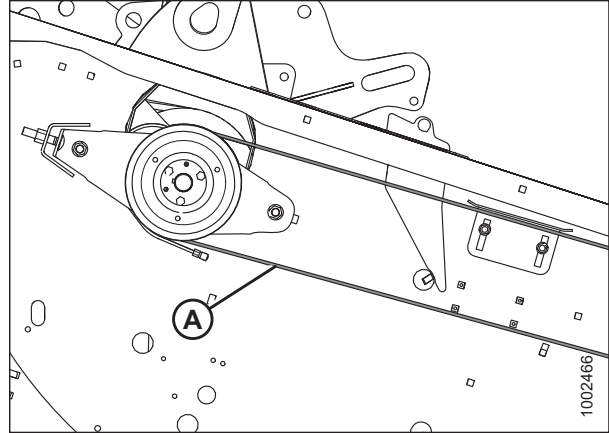


Figure 5.90: Right Knife Drive

7. Rotate idler pulley bracket (A) downward, and slide the idler pulley up by hand to remove most of the belt slack. Tighten nut (B).

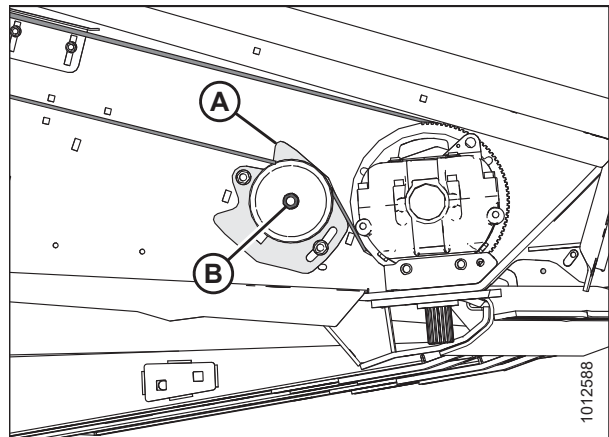


Figure 5.91: Right Knife Drive

8. Position pry bar (A) under idler bracket (C), and push the bracket upward until a force of 27 N (6 lbf) deflects the belt 13 mm (1/2 in.) at the midpoint of the upper span.

**NOTE:**

Protect the paint by placing a piece of wood (B) under pry bar (A).

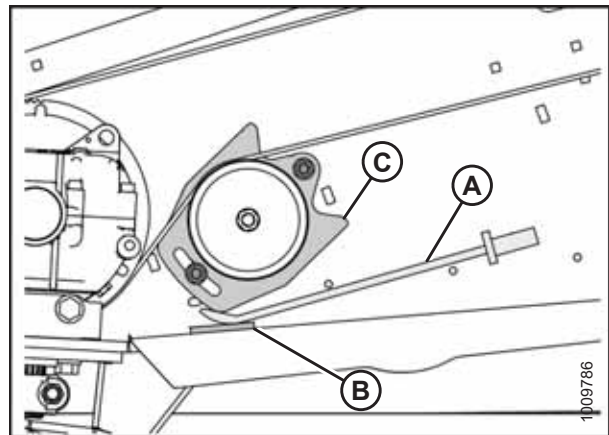


Figure 5.92: Left Shown – Right Opposite

## MAINTENANCE AND SERVICING

9. When the belt has the proper belt tension, tighten nuts (C) to 73–80 Nm (54–59 lbf-ft).
10. Ensure the timing belts are properly seated in the grooves on both driver and driven pulleys.
11. Rotate the drive slowly by hand and observe where the knives overlap at the center of the header to check for the correct knife timing.

**IMPORTANT:**

The knives must begin moving at the exact same time and must move in opposite directions.

12. Adjust the knife timing, if necessary, by loosening the right drive belt (B) just enough to reposition it to the next cog(s) and proceed as follows:
  - a. If the right knife leads the left knife, rotate the right driven pulley (A) clockwise.
  - b. If the right knife lags the left knife, rotate the right driven pulley (A) counterclockwise.

13. Ensure the drive pulleys don't rotate, and tension the right drive belts (refer to Step 7, page 174 to Step 9, page 175).

**IMPORTANT:**

Do **NOT** use the adjuster bolt at the drive pulley to adjust the timing belt tension.

14. Recheck the timing (refer to Step 11, page 175) and readjust if necessary (refer to Step 12, page 175).
15. Close both endshields. For instructions, refer to [Closing Endshields, page 35](#).

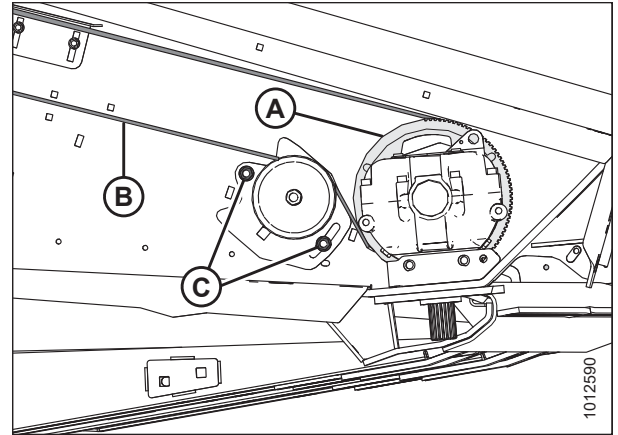


Figure 5.93: Right Knife Drive

### Checking Knife Drive Belt Tracking

The following procedure is applicable to the left knife drive and the right knife drive on timed drive headers.

#### IMPORTANT:

A belt that is not tracking properly is subject to premature failure. Ensure the pulleys are aligned and parallel. Follow the belt tensioning procedures in this manual to avoid misalignment.

The cogged timing belt should be centered on the knife drive box pulley and at least 2 mm (0.08 in.) from either edge when the header is running. The belt should avoid continual contact with the drive pulley flanges. Occasional contact is acceptable. A gap should be visible between the belt and the pulley flanges.

1. Open the endshields.

#### CAUTION

Exercise extreme care when operating the header with the endshields open.

2. Operate the header and observe how the belt is tracking on both the drive pulley and the knife drive box pulley on both sides of the header. Shut down the windrower and remove key from ignition before making any adjustments.
3. If the belt is tracking toward the inboard side of the drive pulley, the likely cause is a toe-out problem (belt tends to move toward the low tension side of the pulley [inboard]). For instructions, refer to [Adjusting Drive Belt Tracking \(Drive Pulley\)](#), page 177.
4. If the belt is tracking toward the outboard side of the drive pulley, the likely cause is a toe-in problem (belt tends to move toward the low tension side of the pulley [outboard]). For instructions, refer to [Adjusting Drive Belt Tracking \(Drive Pulley\)](#), page 177.
5. If belt (A) is tracking to one side of knife drive box pulley (B), the likely cause is an out of position idler pulley (C). For instructions, refer to [Adjusting Drive Belt Tracking \(Knife Drive Box Pulley\)](#), page 178.

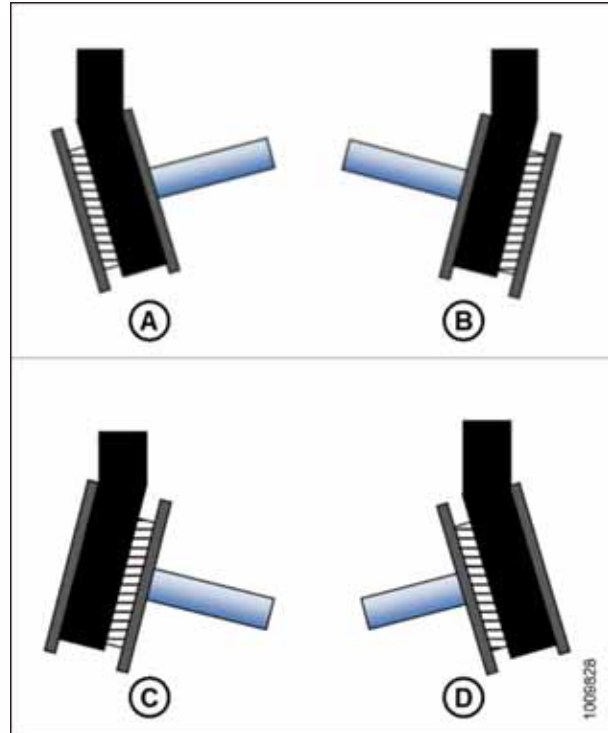


Figure 5.94: Knife Drive Pulley

A - Toe-Out: Left Side  
C - Toe-In: Left Side

B - Toe-Out: Right Side  
D - Toe-In: Right Side

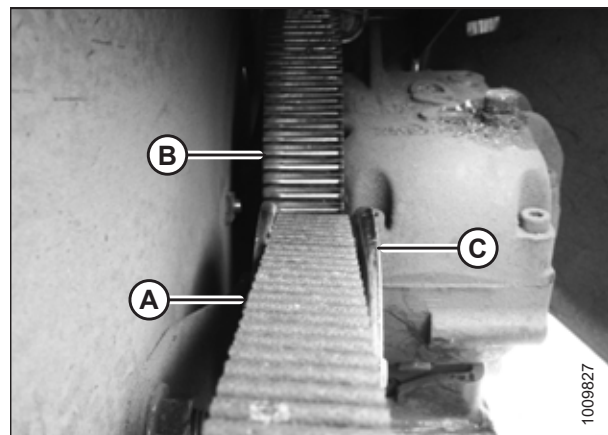


Figure 5.95: Knife Drive Belt

### Adjusting Drive Belt Tracking (Drive Pulley)

The following procedure is applicable to the left knife drive and the right knife drive on timed drive headers.

Before adjusting the drive belt tracking, verify the pulley that needs to be adjusted. For instructions, refer to [Checking Knife Drive Belt Tracking, page 176](#).

#### IMPORTANT:

A belt that is not tracking properly is subject to premature failure. Ensure the pulleys are aligned and parallel. Follow the belt tensioning procedures in this manual to avoid misalignment.

The cogged timing belt should be centered on the knife drive box pulley and at least 2 mm (0.08 in.) from either edge when the header is running. The belt should also avoid constant contact with the flanges on the drive pulley, but occasional contact is acceptable. A gap should be visible between the belt and pulley flanges.



#### CAUTION

Exercise extreme care when operating the header with the endshields open.

1. Open the endshields. For instructions, refer to [Opening Endshields, page 34](#).
2. Loosen nut (A) on support assembly (B).
3. Slide support (B) rearward in slot (C) to correct toe-out condition, or forward to correct toe-in condition.
4. Tighten nut (A).
5. Operate the header and check the tracking. For instructions, refer to [Checking Knife Drive Belt Tracking, page 176](#). Adjust the support assembly as required.
6. If the belt tracking problem continues, proceed to Step 7, [page 177](#).

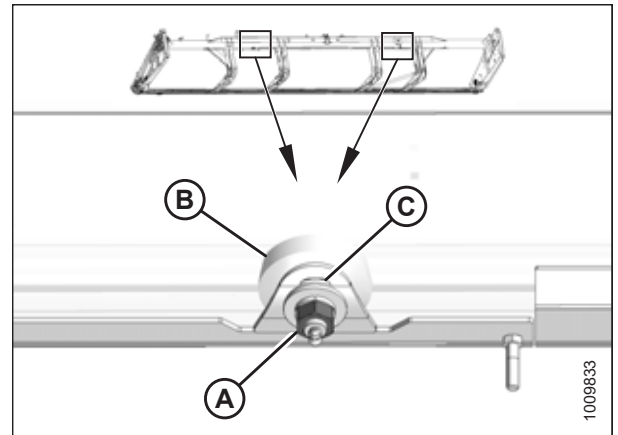


Figure 5.96: Cross-Shaft Support

7. Loosen nut (A) on idler and nuts (B) on idler bracket.
8. Loosen nuts (C) at drive pulley location.
9. To correct a toe-in problem, turn adjuster bolt (D) clockwise to allow the belt to track inboard.
10. To correct a toe-out problem, turn adjuster bolt (D) counterclockwise to allow the belt to track outboard.
11. Tighten nuts (C) at drive pulley location.
12. Tension the belt. For instructions, refer to [Tensioning Timed Knife Drive Belts, page 171](#).
13. Operate the header and check the tracking. For instructions, refer to [Checking Knife Drive Belt Tracking, page 176](#). Adjust the drive pulley if required as per the above steps.

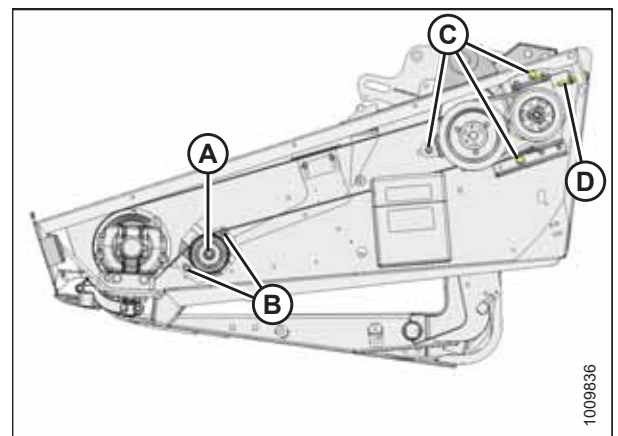


Figure 5.97: Knife Drive – Left Side

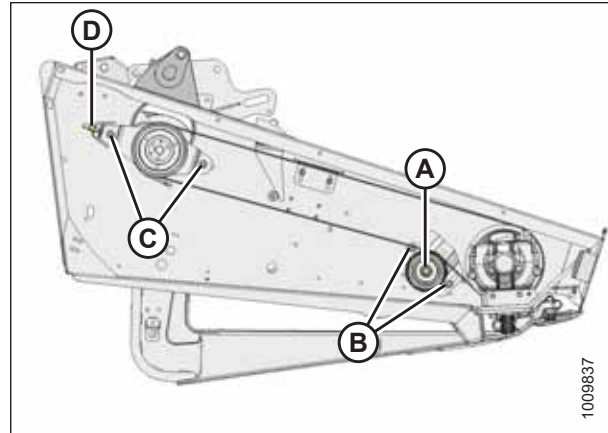


Figure 5.98: Knife Drive – Right Side

### Adjusting Drive Belt Tracking (Knife Drive Box Pulley)

The following procedure is applicable to the left knife drive and the right knife drive on timed drive headers.

The cogged timing belt should be centered on the knife drive box pulley and at least 2 mm (0.08 in.) from either edge when the header is running. The belt should also avoid constant contact with the flanges on the drive pulley but occasional contact is acceptable. A gap should be visible between the belt and the pulley flanges. Before adjusting the drive belt tracking, verify the pulley that needs to be adjusted. For instructions, refer to [Checking Knife Drive Belt Tracking, page 176](#).

#### IMPORTANT:

A belt that is not tracking properly is subject to premature failure. Ensure the pulleys are aligned and parallel. Follow the belt tensioning procedures in this manual to avoid misalignment.

1. Open the endshields. For instructions, refer to [Opening Endshields, page 34](#).



#### CAUTION

Exercise extreme care when operating the header with the endshields open.

2. Loosen nuts (A) and (B) and move bracket and idler until belt is loose.

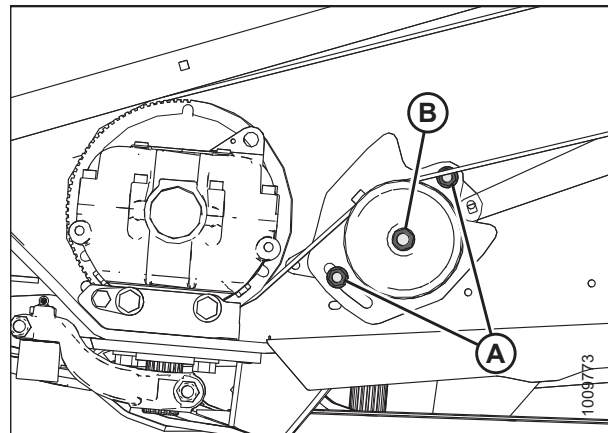


Figure 5.99: Knife Drive

## MAINTENANCE AND SERVICING

3. Remove nut (A) securing idler to bracket, and remove lock washer (D), idler pulley, and flat washer (C).
4. Install idler pulley (B), ensuring it lines up with the knife drive box pulley, using flat washer(s) (C) as required.
5. Reinstall lock washer (D) and nut (A).
6. Tension the belt. For instructions, refer to [Tensioning Timed Knife Drive Belts](#), page 171.
7. Operate the header and check the tracking. For instructions, refer to [Checking Knife Drive Belt Tracking](#), page 176.

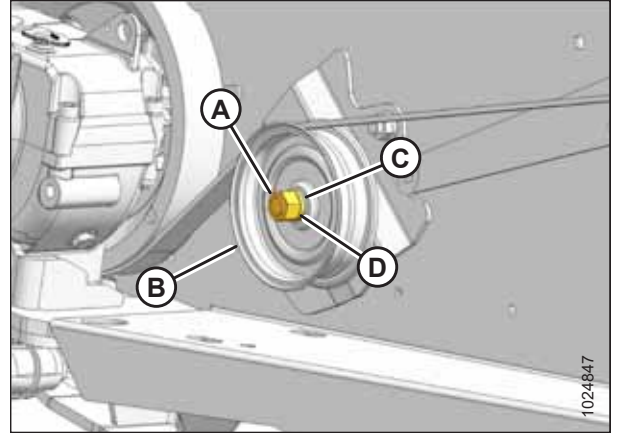


Figure 5.100: Knife Drive

## 5.7 Drapers

Two side drapers convey cut crop to center opening. Replace side drapers if torn, cracked, or missing slats.

### 5.7.1 Removing Side Drapers

#### DANGER

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

1. Raise the reel and engage the reel safety props.
2. Raise the header and engage the header safety props.
3. Move the draper until the draper joint is in the work area.

**NOTE:**

The deck can also be shifted towards the center to provide an opening at the endsheet.

4. Stop the engine and remove the key from the ignition.
5. Release the tension on the draper. For instructions, refer to [5.7.3 Adjusting Draper Tension, page 183](#).
6. Remove screws (A) and tube connectors (B) at the draper joint.
7. Pull the draper from the deck.

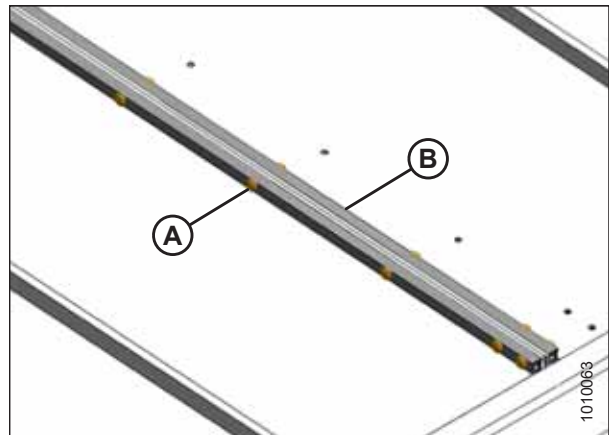


Figure 5.101: Draper Joint



## 5.7.2 Installing Side Drapers

### WARNING

To avoid bodily injury from fall of raised reel, always engage reel safety props before going under raised reel for any reason.

#### NOTE:

Check the deck height before installing the drapers. For instructions, refer to [5.7.5 Adjusting Deck Height, page 186](#).

1. Apply talc, baby powder, or talc/graphite lubricant mix to the draper surface that forms the seal with the cutterbar and to the underside of the draper guides.
2. Insert the draper into the deck at the outboard end under the rollers. Pull the draper into the deck while feeding it at the end.
3. Feed in the draper until it can be wrapped around the drive roller.
4. Insert the opposite end of the draper into the deck over the rollers. Pull the draper fully into the deck.
5. Loosen mounting bolts (B) on rear deck deflector (A) (this may help with draper installation).



Figure 5.102: Installing Draper

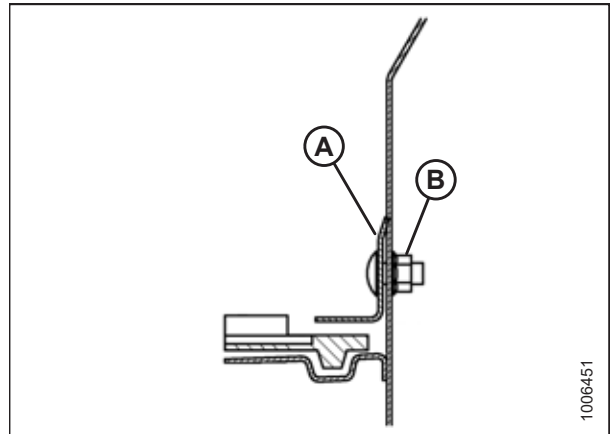


Figure 5.103: Draper Seal

## MAINTENANCE AND SERVICING

6. Attach the ends of the draper with tube connectors (B), screws (A) (with the heads facing the center opening), and nuts.
7. Adjust the draper tension. For instructions, refer to [5.7.3 Adjusting Draper Tension, page 183](#).

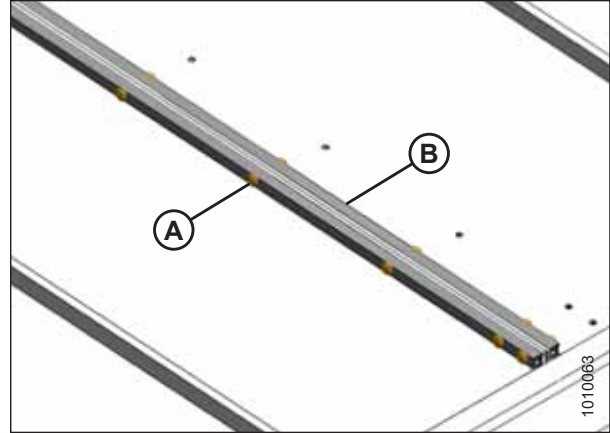


Figure 5.104: Draper Joint

8. Check the draper seal between the drapers and the cutterbar. Ensure there is a 1–2 mm (0.04–0.08 in.) gap (A) between cutterbar (C) and draper (B).
9. Refer to [5.7.5 Adjusting Deck Height, page 186](#) to achieve the proper gap.

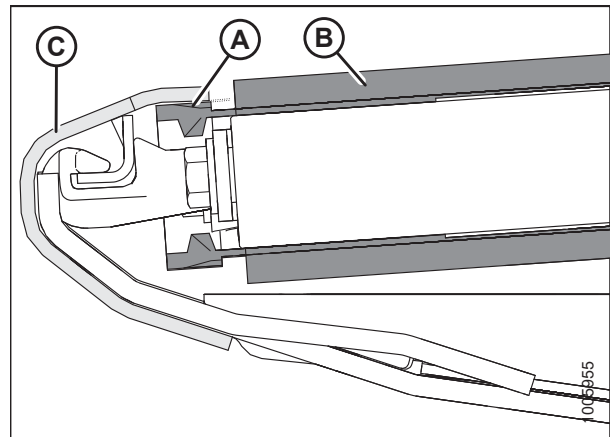


Figure 5.105: Draper Seal

10. Adjust backsheet deflector (A) (if required) by loosening nut (D) and moving the deflector until there is a 1–7 mm (3/64–9/32) gap (C) between the draper (B) and the deflector.
11. Operate the drapers with the engine at idle so the talc or talc/graphite lubricant makes contact and adheres to the draper seal surfaces.

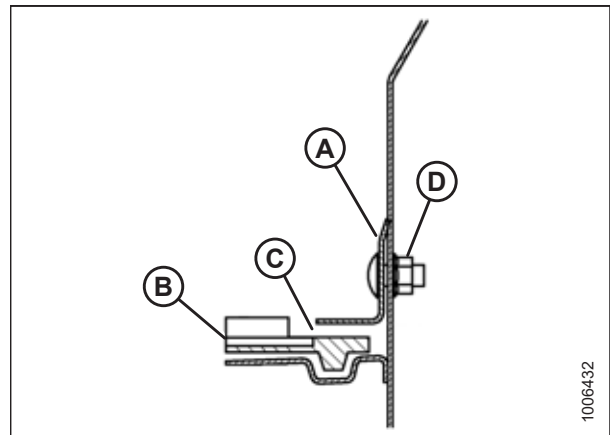


Figure 5.106: Draper Seal

### 5.7.3 Adjusting Draper Tension

#### DANGER

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

#### NOTE:

The drapers are tensioned at the factory and rarely need adjustment. If adjustment is required, tension the drapers just enough to prevent slipping and to keep the draper from sagging below the cutterbar.

1. Ensure white indicator bar (A) is at the halfway point in the window.

#### WARNING

Check to be sure all bystanders have cleared the area.

2. Start the engine and raise the header.
3. Stop the engine, remove the key from the ignition, and engage the header safety props.

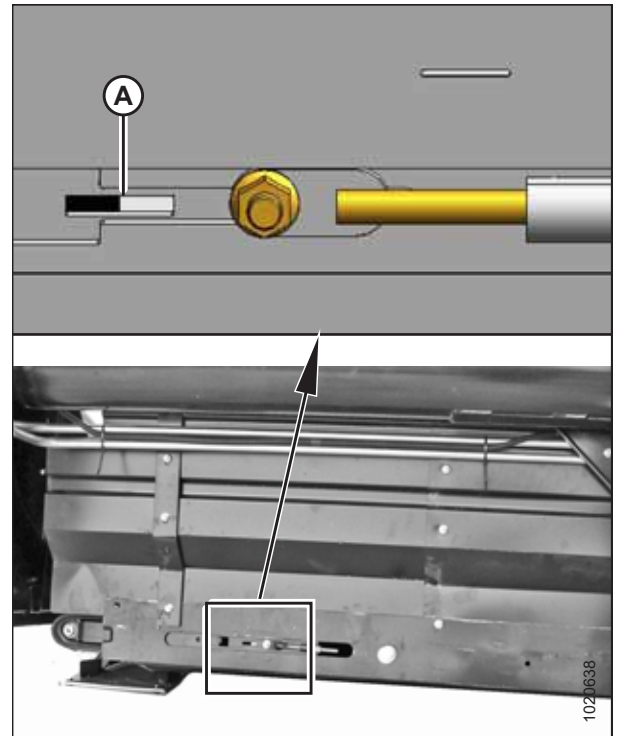


Figure 5.107: Left Adjuster Shown – Right Opposite

4. Ensure the draper guide (the rubber track on the underside of the draper) is properly engaged in groove (A) on the drive roller.

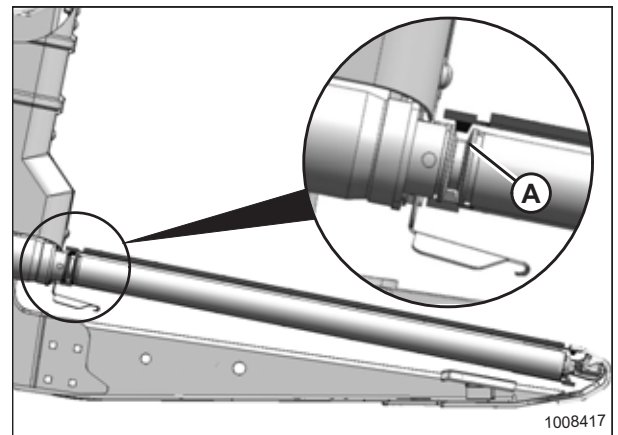


Figure 5.108: Drive Roller

5. Ensure idler roller (A) is between draper guides (B).

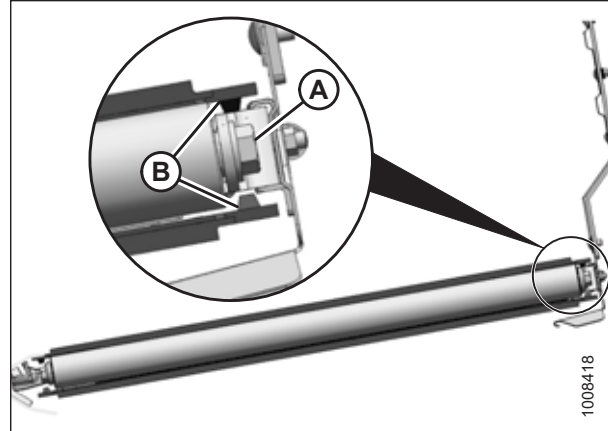


Figure 5.109: Idler Roller

**IMPORTANT:**

Do **NOT** adjust nut (C). This nut is used for draper alignment only.

6. Turn adjuster bolt (A) counterclockwise to loosen. White indicator bar (B) will move outboard in the direction of arrow (D) to indicate that the draper is loosening. Loosen until the white indicator bar is at the halfway point in the window.
7. Turn adjuster bolt (A) clockwise to tighten. White indicator bar (B) will move inboard in the direction of arrow (E) to indicate that the draper is tightening. Tighten until the white indicator bar is at the halfway point, on the right side of the window.

**IMPORTANT:**

- To avoid premature failure of the draper, draper rollers, and/or tightener components, do **NOT** operate with the tension set so the white bar is not visible.
- To prevent scooping dirt, ensure the draper is tight enough that it does not sag below the point where the cutterbar contacts the ground.

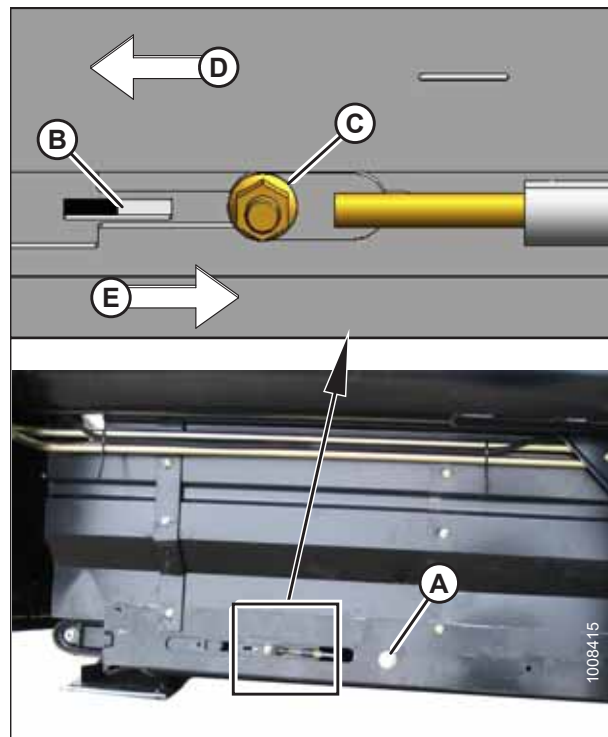


Figure 5.110: Draper Tensioner

### 5.7.4 Adjusting Side Draper Tracking

#### CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing](#), [page 119](#).

Each draper deck has a fixed drive roller (A) and a spring-loaded idler roller (B) that can be aligned using the adjuster rods so the draper tracks properly on the rollers.

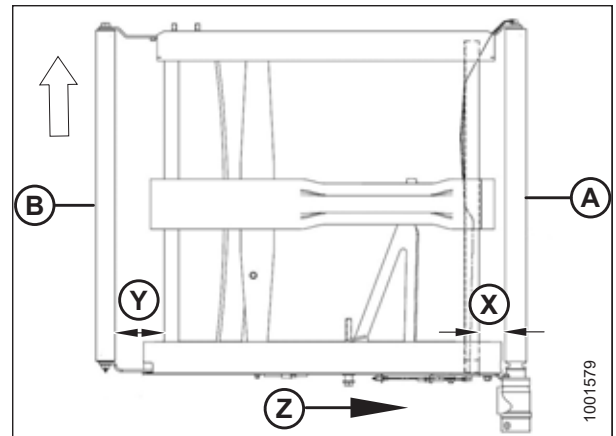
**Table 5.1 Side Draper Tracking**

Tracking	Location	Adjustment	Method
Backward	Drive roller	Increase (X)	Tighten nut
Forward	Drive roller	Decrease (X)	Loosen nut
Backward	Idler roller	Increase (Y)	Tighten nut
Forward	Idler roller	Decrease (Y)	Loosen nut

1. Refer to [Table 5.1, page 185](#) to determine which roller requires adjustment and which adjustments are necessary.

**NOTE:**

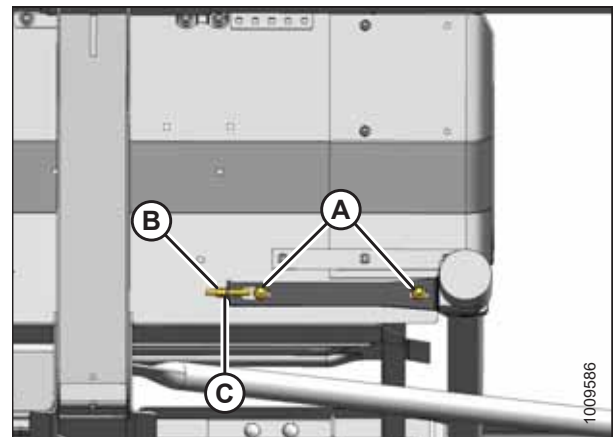
To change the distance (X), adjust the back end of the roller using the adjuster mechanism at the inboard end of the deck.



**Figure 5.111: Draper Tracking Adjustments**

A - Drive Roller  
B - Idler Roller  
X - Drive Roller Adjust  
Y - Idler Roller Adjust  
Z - Draper Rotation Direction

2. Adjust the drive roller distance (X) as follows:
  - a. Loosen nuts (A) and jam nut (B).
  - b. Turn adjuster nut (C).



**Figure 5.112: Left Drive Roller**

3. Adjust the idler roller distance (**Y**) as follows:
  - a. Loosen nut (A) and jam nut (B).
  - b. Turn adjuster nut (C).

**NOTE:**

If the draper does not track at the idler roller end after the idler roller adjustment, the drive roller is likely not square to the deck. Adjust the drive roller, and then readjust the idler roller.

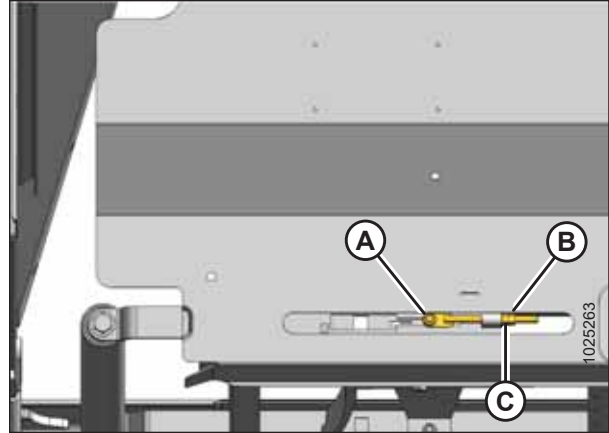


Figure 5.113: Left Idler Roller

### 5.7.5 Adjusting Deck Height

**⚠ DANGER**

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

**IMPORTANT:**

New factory-installed drapers are pressure and heat checked at the factory. The gap between draper and cutterbar is set to 1–3 mm (0.04–0.12 in.). This is to prevent material from entering into the side drapers and stalling them.

1. Shut down the engine, and remove the key from the ignition.
2. With the header in working position, check that clearance (A) between draper (B) and cutterbar (C) is 1–3 mm (0.04–0.12 in.).

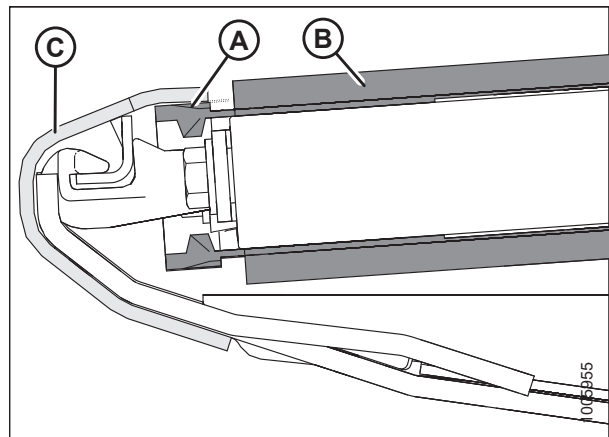


Figure 5.114: Draper Seal

3. Take measurement at deck supports (A) with the header in working position. For instructions, refer to Step 2, [page 186](#).
4. Loosen the draper tension. For instructions, refer to [5.7.3 Adjusting Draper Tension, page 183](#).

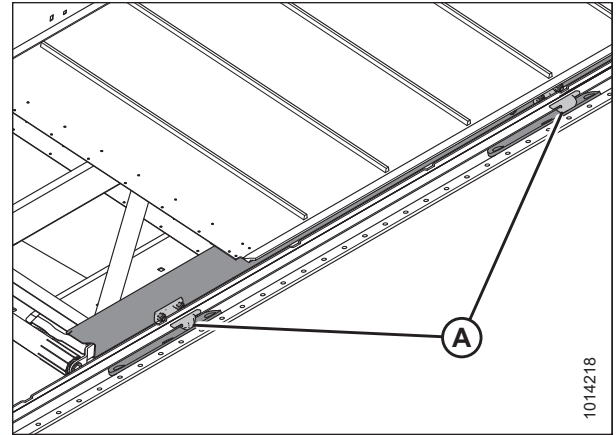


Figure 5.115: Draper Deck Supports

5. Lift front edge of draper (A) past cutterbar (B) to expose the deck support.
6. Measure and note the thickness of the draper belt.

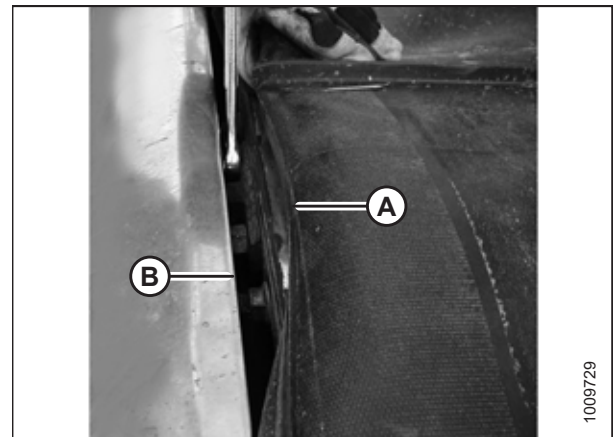


Figure 5.116: Deck Adjustment

7. Loosen two lock nuts (A) on deck support (B) one half-turn **ONLY**.

**NOTE:**

The deck is shown with the draper removed. The number of deck supports (B) is determined by the header width as follows:

- 4.6–6.1 m (15–20 ft.): Four supports
- 7.6–9.1 m (25–30 ft.): Six supports
- 10.7–12.2 m (35–40 ft.): Eight supports
- 13.7 m (45 ft.): Ten supports

8. Tap deck (C) with a hammer to lower the deck relative to the deck supports. Tap deck support (B) using a punch to raise the deck relative to the deck supports.

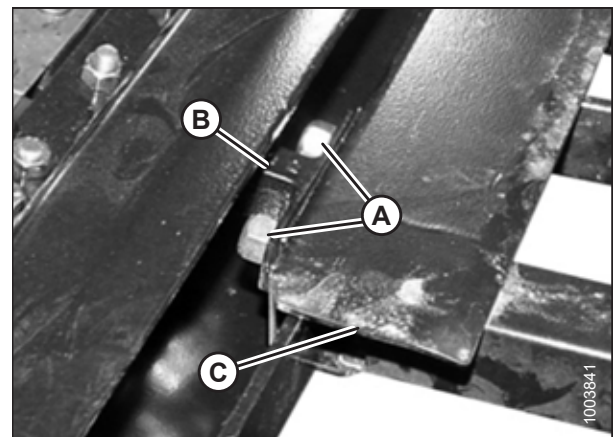


Figure 5.117: Deck Support

## MAINTENANCE AND SERVICING

9. Locate a gauge that is the same thickness as the draper belt, plus 1 mm (0.04 in.). Slide the thickness gauge along deck (A) under the cutterbar in order to properly set the gap.
10. To create a seal, adjust deck (A) so that clearance (B) between cutterbar (C) and deck is the same thickness as the draper belt plus 1 mm (0.04 in.).

**NOTE:**

When checking clearance at either roller, measure from the roller tube, **NOT** the deck.

11. Tighten deck support hardware (D).
12. Recheck gap (B) with thickness gauge. For instructions, refer to Step 9, [page 188](#).
13. Tension the draper. For instructions, refer to [5.7.3 Adjusting Draper Tension, page 183](#).
14. If required, adjust backsheet deflector (A) by loosening nut (D) and moving the deflector until there is a 1–7 mm (0.04–0.28 in.) gap (C) between draper (B) and the deflector.

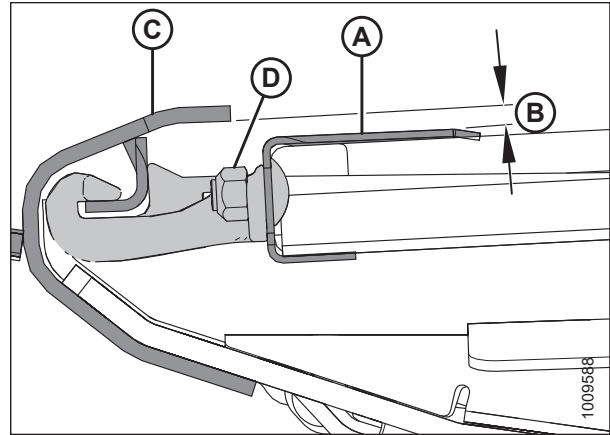


Figure 5.118: Deck Support

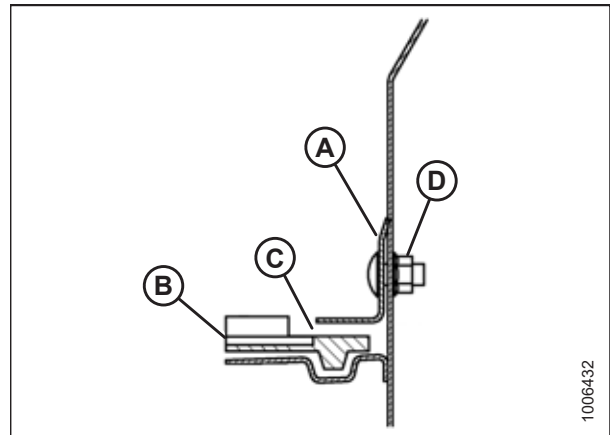


Figure 5.119: Backsheet Deflector



### 5.7.6 Side 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*

Check for bad draper roller bearings using an infrared thermometer as follows:

1. Engage the header and run the drapers for approximately 3 minutes.
2. Check the temperature of the draper roller bearings at each of roller arms (A), (B), and (C) on each deck. Ensure the temperature does **NOT** exceed 44°C (80°F) above the ambient temperature.

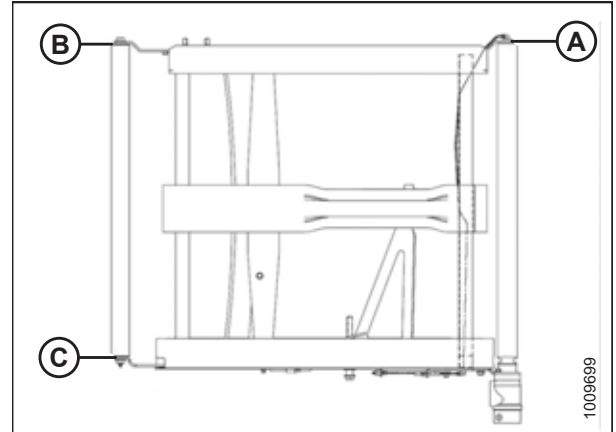


Figure 5.120: Roller Arms

#### *Removing Draper Idler Roller*



#### **DANGER**

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

#### **NOTE:**

If the draper joint is not visible, engage the header until the connector is accessible (preferably close to the outboard end of the deck).

1. Start the engine, raise the header, and raise the reel.
2. Stop the engine, and remove the key from the ignition.
3. Engage the reel safety props, and engage the header safety props.
4. Loosen the draper by turning adjuster bolt (A) counterclockwise.

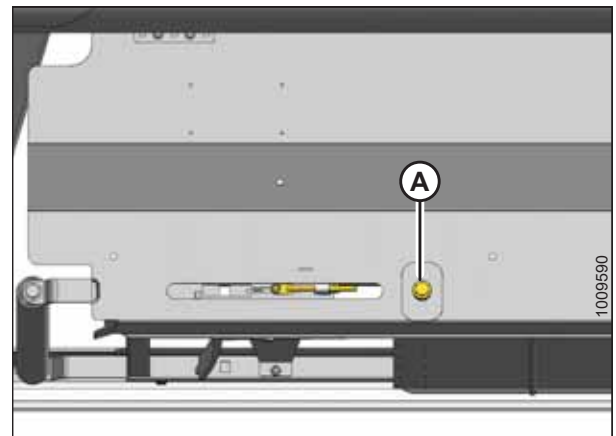


Figure 5.121: Tensioner

## MAINTENANCE AND SERVICING

5. Remove screws (A), tube connectors (B), and nuts from the draper joint to uncouple the draper.
6. Pull the draper off the idler roller.

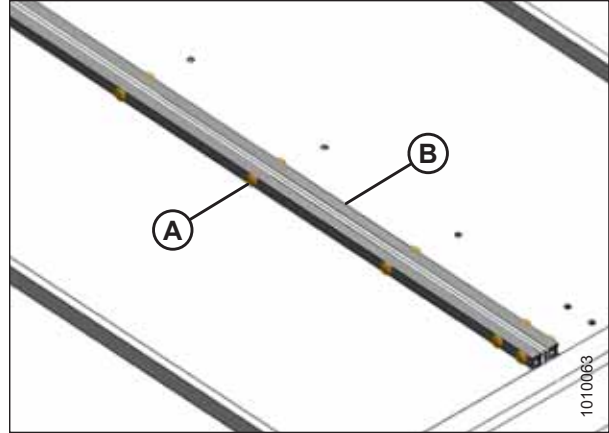


Figure 5.122: Draper Joint

7. Remove bolts (A) and washer at the ends of the idler roller.
8. Spread roller arms (B) and (C) and remove the idler roller.

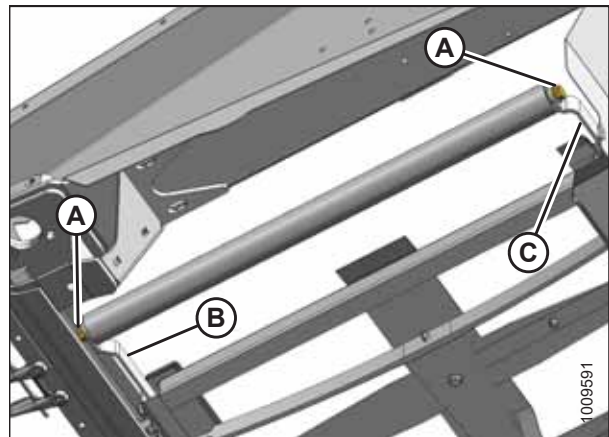


Figure 5.123: Idler Roller

### Replacing Draper Idler Roller Bearing

1. Remove the draper idler roller assembly. For instructions, refer to [Removing Draper Idler Roller, page 189](#).
2. 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).
3. Clean the inside of roller tube (C), check the tube for signs of wear or damage, and replace if necessary.

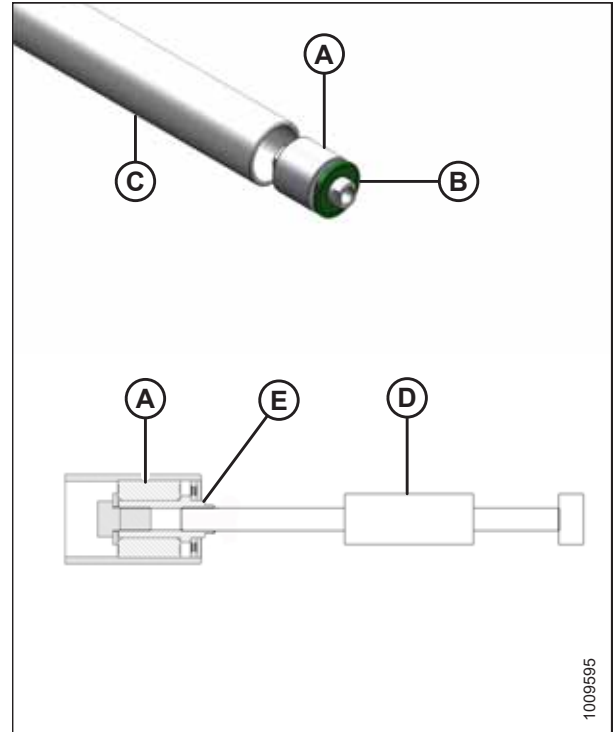


Figure 5.124: Idler Roller Bearing

4. Install new bearing assembly (A) by pressing the outer race of the bearing into the tube until it is 14–15 mm (0.55–0.2 in.) (B) from the outside edge of the tube.
5. Add approximately 8 cc or two pumps of grease in front of bearing assembly (A). Refer to the inside back cover for specifications.
6. Install new seal (C) at the roller opening.
7. Tap seal (C) into the roller opening with a suitably sized socket until the gap (D) between the seal and the outside edge of the tube is 3–4 mm (0.12–0.16 in.).

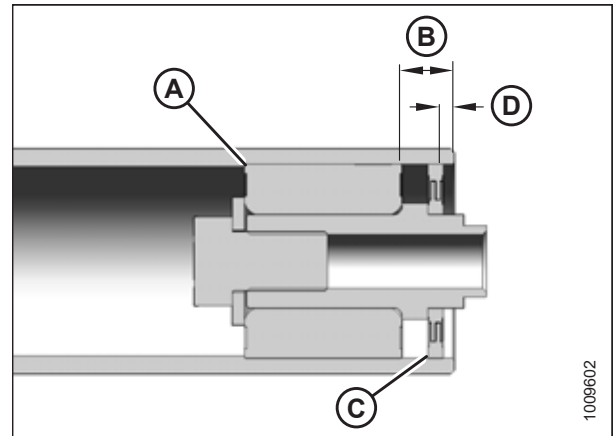


Figure 5.125: Idler Roller Bearing

### Installing Draper Idler Roller

1. Position the stub shaft into the idler roller in forward arm (B) on the deck.
2. Push on the roller to slightly deflect the forward arm so the stub shaft at the rear of the roller can be slipped into rear arm (C).
3. Install bolts (A) with washers, and torque to 93 Nm (70 lbf-ft).
4. Wrap the draper over the idler roller, close the draper, and set the tension. For instructions, refer to [5.7.2 Installing Side Drapers, page 181](#).
5. Run the machine and verify the draper tracks correctly. Adjust the draper tracking if required. For instructions, refer to [5.7.4 Adjusting Side Draper Tracking, page 185](#).

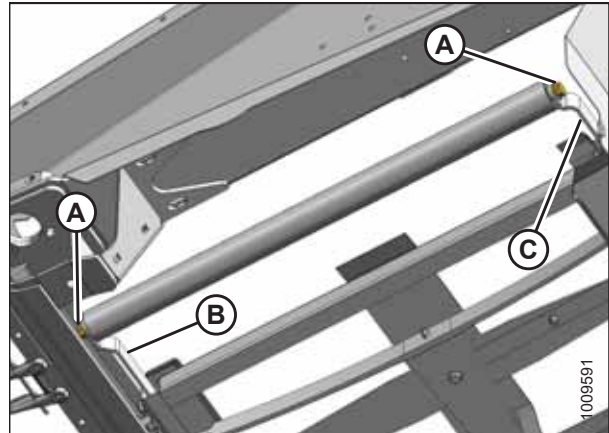


Figure 5.126: Idler Roller

### Removing Draper Deck Drive Roller



#### **DANGER**

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

#### **NOTE:**

If the draper joint is not visible, engage the header until the connector is accessible (preferably close to the outboard end of the deck).

1. Start the engine, raise the header, and raise the reel.
2. Engage the header and reel safety props.
3. Stop the engine, and remove the key from the ignition.
4. Loosen the draper by turning adjuster bolt (A) counterclockwise.

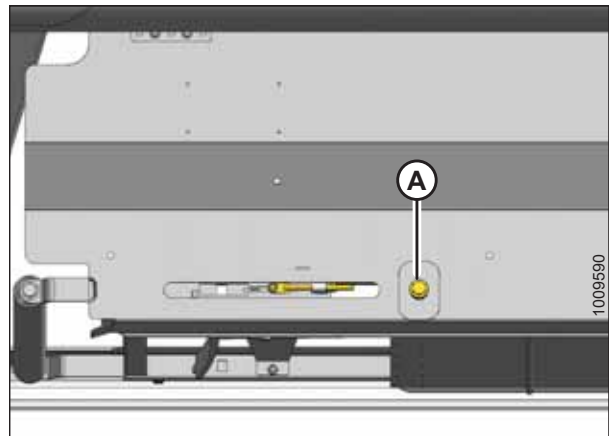


Figure 5.127: Tensioner

## MAINTENANCE AND SERVICING

5. Remove connectors (B), screws (A), and nuts from the draper joint to uncouple the draper.
6. Pull the draper off the drive roller.

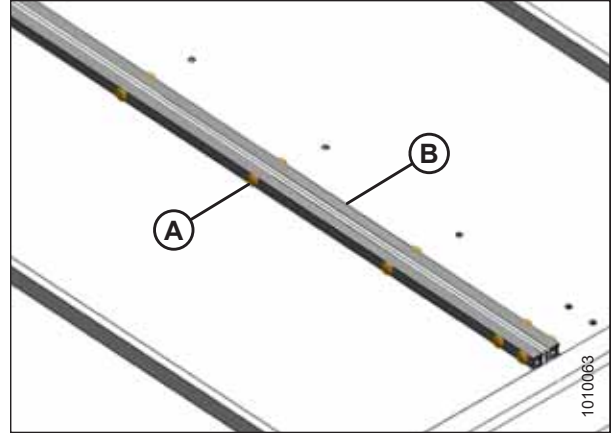


Figure 5.128: Draper Joint

7. Align the set screws with hole (A) in the guard. Remove the two set screws holding the motor onto the drive roller.

**NOTE:**

The set screws are 1/4 turn apart.

8. Remove the four 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.

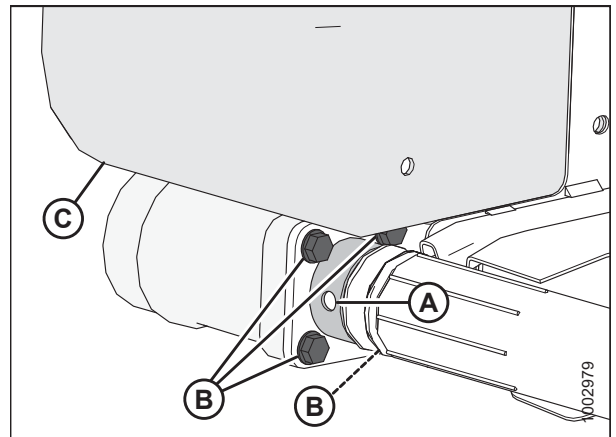


Figure 5.129: Drive Roller

9. Remove bolt (A) securing the opposite end of drive roller (B) to the support arm.
10. Remove drive roller (B).

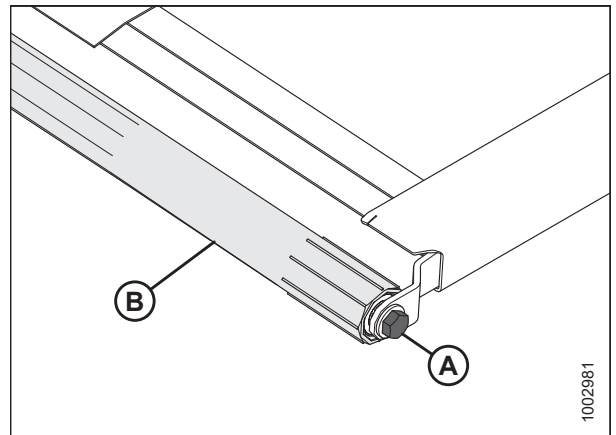


Figure 5.130: Drive Roller

### Replacing Draper Drive Roller Bearing

1. Remove the draper drive roller assembly. For instructions, refer to [Removing Draper Deck Drive Roller, page 192](#).
2. 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).
3. Clean the inside of roller tube (C), check the tube for signs of wear or damage, and replace if necessary.

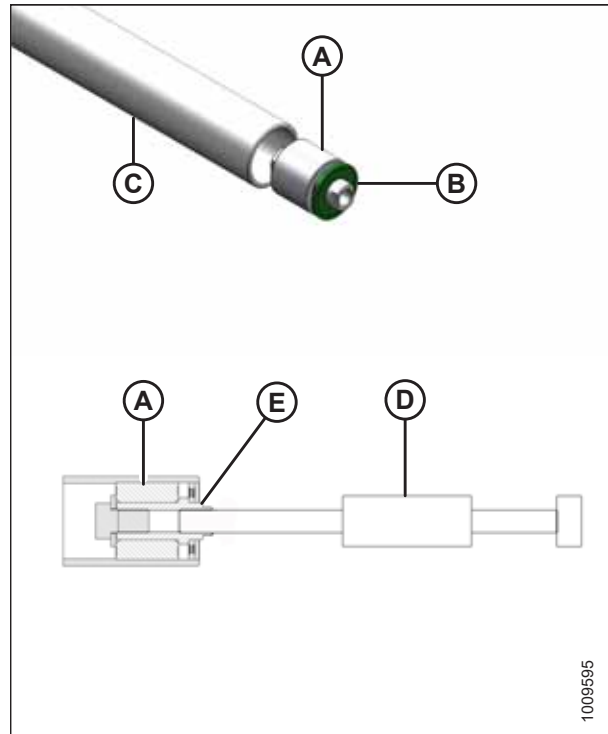


Figure 5.131: Drive Roller Bearing

4. Install new bearing assembly (A) by pressing the outer race of the bearing into the tube until it is 14–15 mm (0.55–0.2 in.) (B) from the outside edge of the tube.
5. Add approximately 8 cc or two pumps of grease in front of bearing assembly (A). Refer to the inside back cover for specifications.
6. Install new seal (C) at the roller opening.
7. Tap seal (C) into the roller opening with a suitably sized socket until gap (D) between the seal and the outside edge of the tube is 3–4 mm (0.12–0.16 in.).

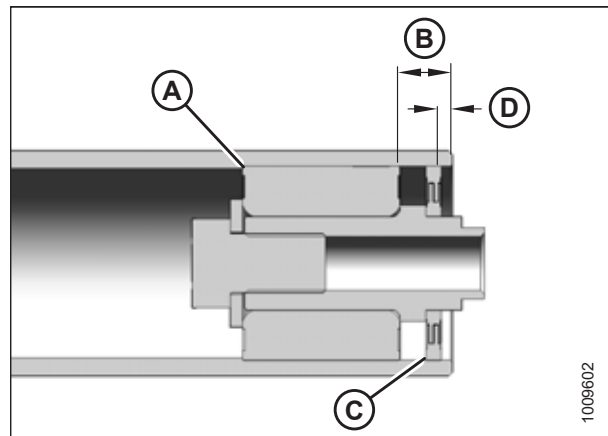


Figure 5.132: Drive Roller Bearing

### Installing Draper Deck Drive Roller

1. Position drive roller (B) between the roller support arms.
2. Attach roller (B) to arm at forward end of deck with bolt (A). Support the other end of the roller and torque bolt (A) to 95 Nm (70 lbf-ft).
3. Grease the motor shaft and insert into the end of drive roller (B).

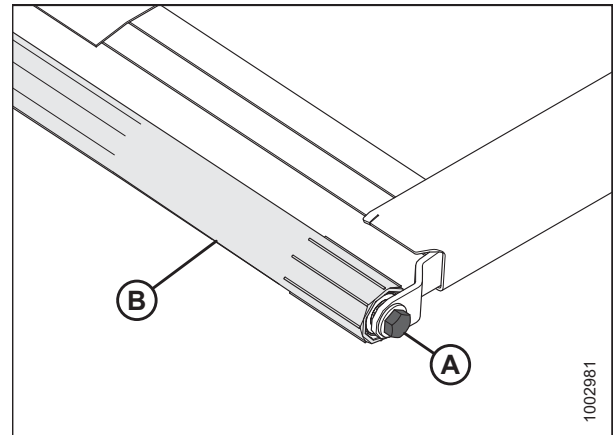


Figure 5.133: Drive Roller

4. Secure the motor to the roller support with four bolts (B). Torque to 27 Nm (20 lbf-ft).
5. Tighten any loosened bolts and reinstall plastic shield (C) if previously removed.
6. Ensure the motor is all the way into the roller, and tighten the two set screws (not shown) through access hole (A).

**NOTE:**

The set screws are 1/4 turn apart.

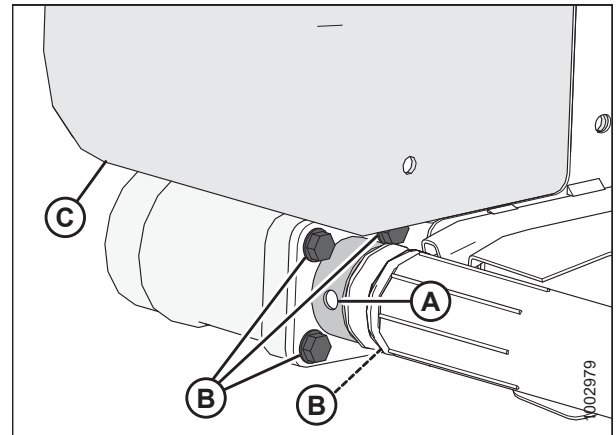


Figure 5.134: Drive Roller

7. Wrap the draper over the drive roller and attach the ends of the draper together using tube connectors (B), screws (A), and nuts.

**NOTE:**

The heads of the screws must face the center opening.

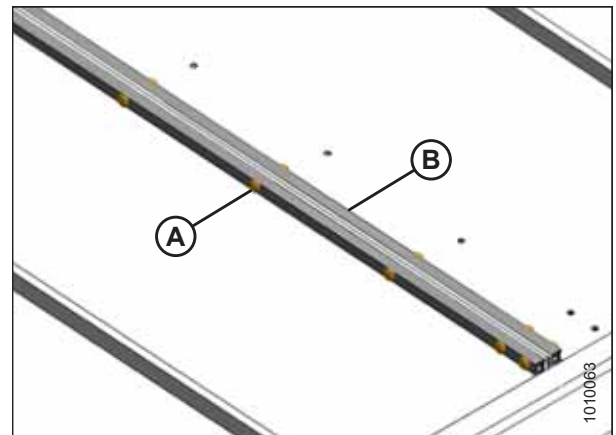


Figure 5.135: Draper Joint

8. Tension the draper. Locate adjuster bolt (A) and follow the directions on the decal for the proper draper tensioning or refer to [5.7.3 Adjusting Draper Tension, page 183](#).
9. Disengage the reel and header safety props.
10. Start the engine and lower the header and reel.
11. Run the machine to verify the draper tracks correctly. If adjustment is necessary, refer to [5.7.4 Adjusting Side Draper Tracking, page 185](#).

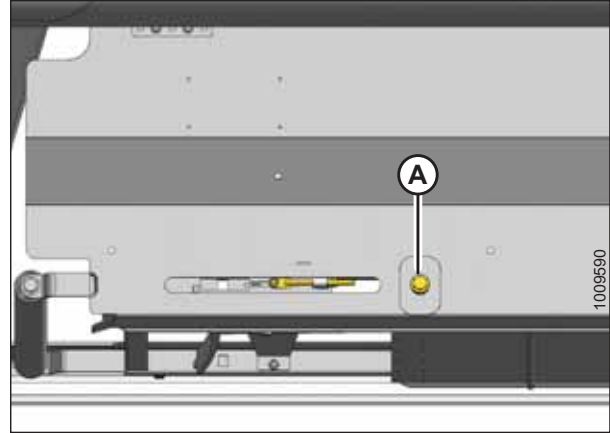


Figure 5.136: Draper Tensioner

## 5.7.7 Replacing Draper Deflectors

### Removing Wide Draper Deflectors



#### **DANGER**

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

1. Raise reel fully and lower header to ground.
2. Shift decks to create work space at one end of header if hydraulic deck shift is installed; otherwise, move decks manually after shutting down the windrower.
3. Stop engine, remove key, and engage reel safety props.
4. Open endshield. For instructions, refer to [Opening Endshields, page 34](#).
5. Loosen nuts (A) on cutterbar until retainer (B) is loose.

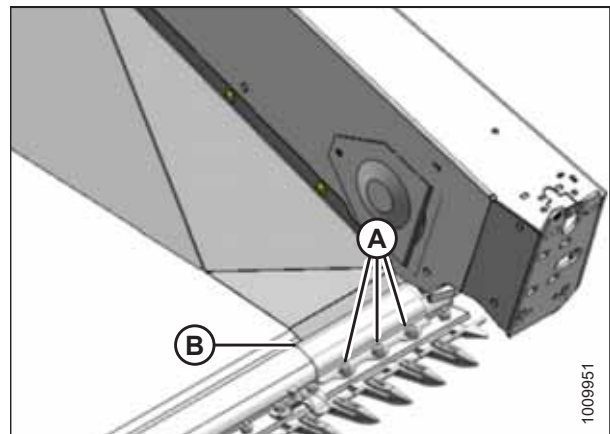


Figure 5.137: Deflector Retainer



6. Remove fasteners securing deflector to endsheet. Nuts (A) are accessible from the side of the endshield, and nuts (B) on the uppermost fasteners are accessible from behind deflector (C).
7. Remove deflector (C).

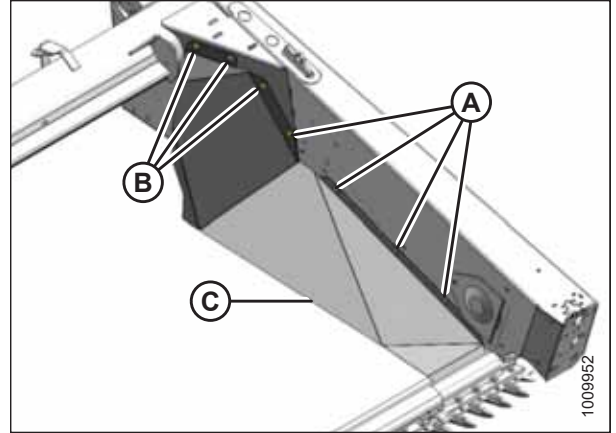


Figure 5.138: Wide Deflector

8. Remove bolts (A) and (D), and remove deflector support (B).
9. Reinstall bolt (D) (if not reinstalling support [B]) to secure belt guide (C) to opposite side of endsheet. Otherwise, position support (B) as shown, and secure with bolt (D).
10. Repeat for opposite end of header.

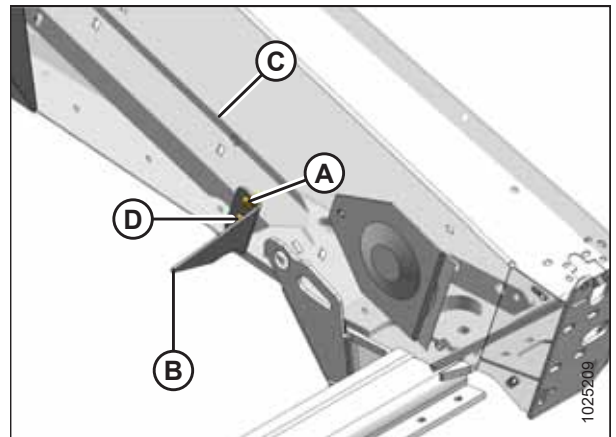


Figure 5.139: Deflector Support

### Installing Wide Draper Deflectors

1. Raise reel fully and lower header to ground.
2. Shift decks to allow work space at one end of header if hydraulic deck shift installed, otherwise move decks manually after shutting down windrower.
3. Stop engine, remove key, and engage reel safety props.
4. Open endshield. For instructions, refer to [Opening Endshields, page 34](#).
5. Loosen bolts (A) on cutterbar until retainer (B) is loose.
6. Remove existing bolt that secures belt guide (C) on opposite side of endsheet.
7. Position support (D) as shown, and reinstall bolt (E) with nut on far side.
8. Install a second 3/8 in. x 3/4 carriage bolt (F) and lock nut. Do **NOT** tighten bolts.

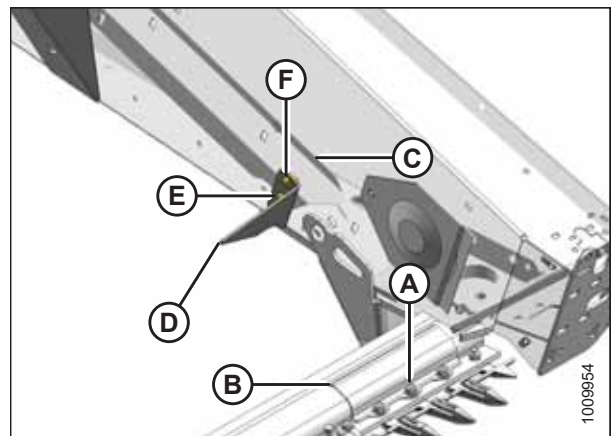


Figure 5.140: Deflector Support

## MAINTENANCE AND SERVICING

9. Position deflector (A) as shown and adjust forward edge for best fit on cutterbar. Slide deflector under retainer (B).
10. Loosely install seven 3/8 in. x 3/4 carriage bolts (C) with lock nuts to attach deflector to endsheet. Bolt heads face inboard.
11. Adjust position of deflector to obtain best fit at cutterbar and aft edge. Tighten bolts (C) as required to maintain best fit.
12. Tighten bolts (D) on retainer (B). Torque to 88 Nm (65 lbf-ft).

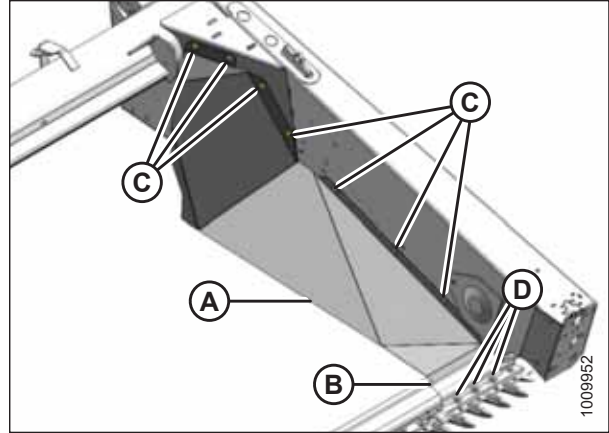


Figure 5.141: Wide Deflector

13. Adjust position of support (A) so that tip contacts deflector (B). Tighten bolts (C).
14. Repeat above steps for opposite end.
15. Close endshield. For instructions, refer to [Closing Endshields, page 35](#).
16. After setting the recommended reel clearance to cutterbar and while reel is still fully lowered, move reel back to ensure steel end fingers do **NOT** contact the deflector shields.

### NOTE:

If contact is detected, adjust reel upward until contact with deflector shields is avoided at all reel fore/aft positions. Alternatively, with the reel fully lowered, trim the steel end fingers until contact with deflector shields is avoided at all reel fore/aft positions. Periodically monitor to ensure contact is avoided and repeat adjustment procedure if necessary.

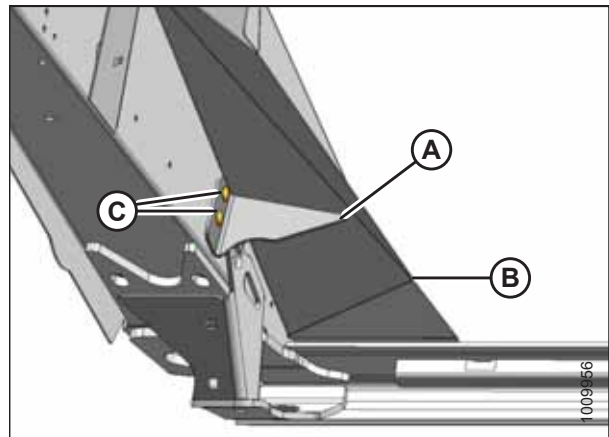


Figure 5.142: Deflector Support

### Removing Narrow Draper Deflectors



### DANGER

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

1. Raise the reel to its full height and lower the header to the ground.
2. Shift the decks to create a work space at one end of the header if hydraulic deck shift is installed; otherwise, move the decks manually after shutting down the windrower.
3. Stop the engine, remove the key, and engage the reel safety props.

## MAINTENANCE AND SERVICING

4. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
5. Remove two Torx® head screws (A) and lock nuts.
6. Remove three carriage bolts (B) and lock nuts and remove aft deflector (C).

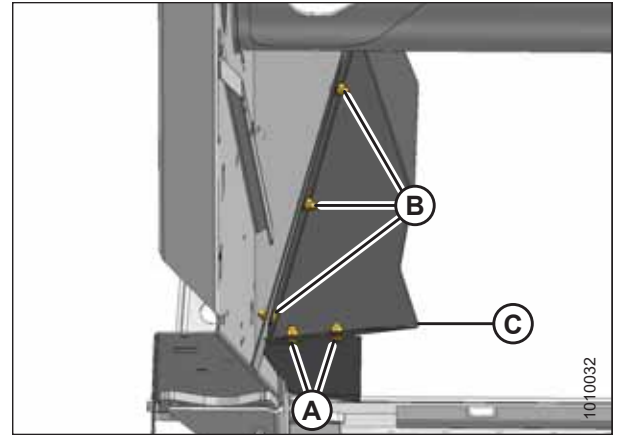


Figure 5.143: Aft Deflector

7. Remove four screws (A) and remove deflector (B).
8. Repeat for the opposite end of the header.

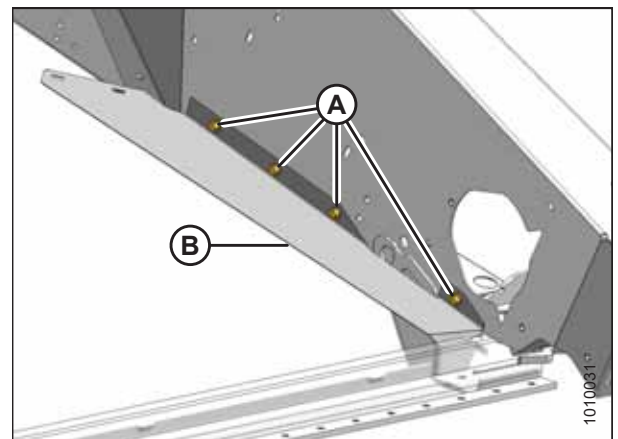


Figure 5.144: Forward Deflector

### Installing Narrow Draper Deflectors

#### DANGER

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

1. Raise the reel to its full height and lower the header to the ground.
2. Shift the decks to create a work space at one end of the header if hydraulic deck shift is installed; otherwise, move the decks manually after shutting down the windrower.
3. Stop the engine, remove the key, and engage the reel safety props.
4. Open the endshield. For instructions, refer to [Opening Endshields, page 34](#).
5. Position forward deflector (B) onto the endsheet and temporarily install forward and aft 3/8 in. x 5/8 in. self-tapping screws (A).
6. Check the fit of the forward end of deflector (B) on the cutterbar and ensure there is no gap between the deflector and cutterbar. Remove and bend the deflector as required to obtain the best fit.
7. Install two 3/8 in. x 5/8 in. self-tapping screws (C), then tighten all four screws (A) and (C).

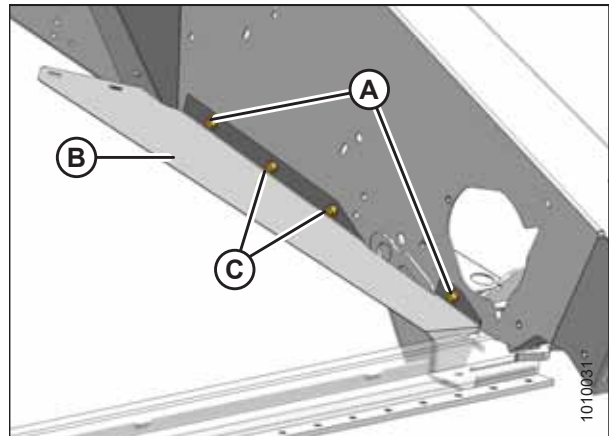


Figure 5.145: Forward Deflector

8. Position aft deflector (C) as shown and install three 3/8 in. x 3/4 in. carriage bolts (B) and lock nuts.
9. Install two Torx® head screws (A) and lock nuts with the heads facing down.
10. Tighten all fasteners.
11. Repeat for the opposite end of the header.

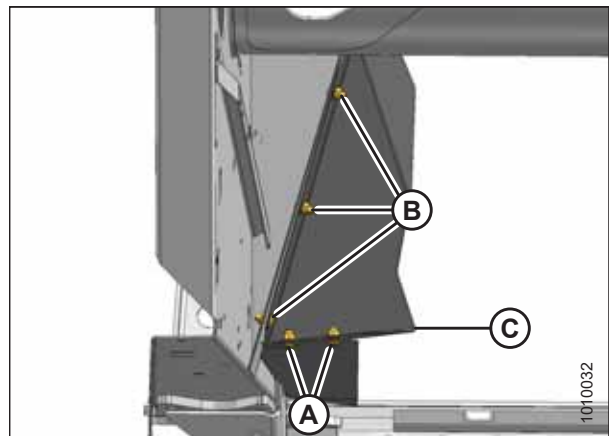


Figure 5.146: Aft Deflector

## 5.8 Reel

### CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing](#), [page 119](#).

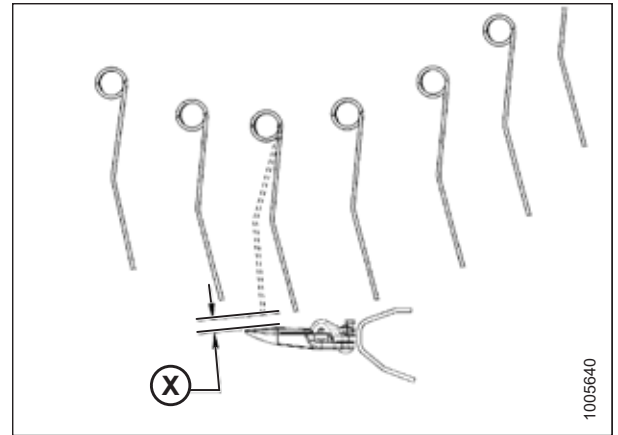
### 5.8.1 Reel Clearance to Cutterbar

The minimum clearance between reel fingers and cutterbar ensures that reel fingers do not contact cutterbar during operation. The clearance is set at the factory, but some adjustment may be necessary before operation or if there is evidence of contact during operation.

The finger to guard/cutterbar clearances with reel fully lowered are shown in [Table 5.2](#), [page 201](#).

**Table 5.2 Finger to Guard/Cutterbar Clearance**

Header Width	(X) +/- 3 mm (1/8 in.) at Reel Ends	
	Single Reel	Double Reel
4.6 m (15 ft.)	20 mm (3/4 in.)	—
6.1 m (20 ft.)	20 mm (3/4 in.)	—
7.6 m (25 ft.)	25 mm (1 in.)	—
9.1 m (30 ft.)	45 mm (1-3/4 in.)	20 mm (3/4 in.)
10.7 m (35 ft.)	60 mm (2-3/8 in.)	20 mm (3/4 in.)
12.2 m (40 ft.)	—	20 mm (3/4 in.)



**Figure 5.147: Finger Clearance**

### Measuring Reel Clearance

#### DANGER

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

1. Park machine on level ground.
2. Set fore-aft position to middle position 5 on fore-aft position indicator decal (A).
3. Lower reel fully.
4. Shut down engine and remove key from ignition.

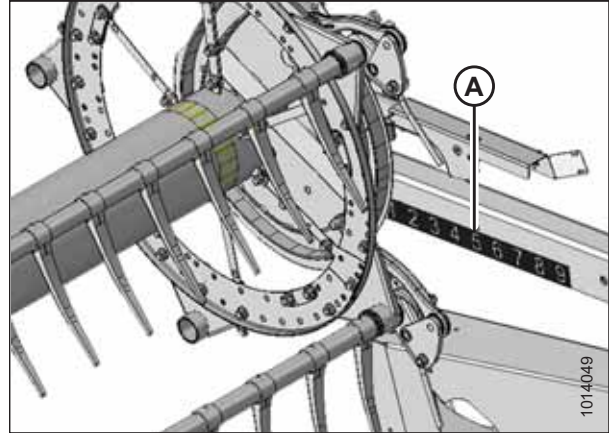


Figure 5.148: Fore-Aft Position

5. Measure clearance at ends of each reel at locations (A).

#### NOTE:

The reel is factory-set to provide more clearance at center of reel than at ends to compensate for reel flexing.

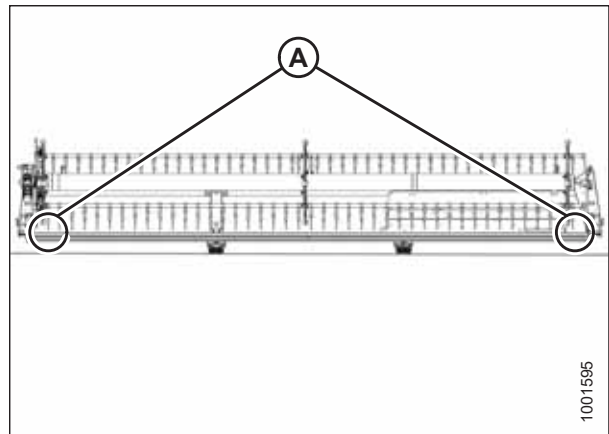


Figure 5.149: Single-Reel Header

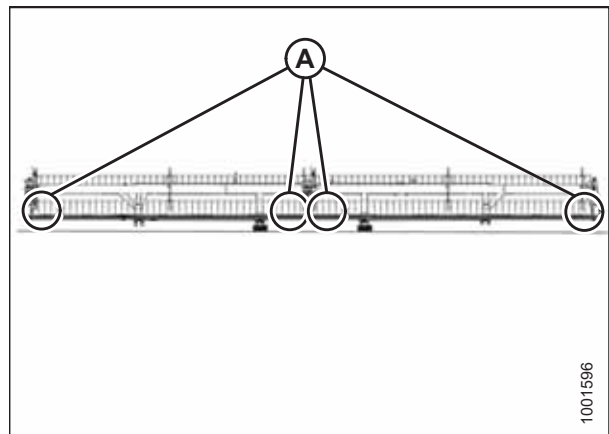


Figure 5.150: Double-Reel Header

## MAINTENANCE AND SERVICING

6. Check finger clearance (X) when positioned between locations (A) and (B). Depending on reel fore-aft position, minimum clearance can result at guard tine, hold-down, or cutterbar. For finger clearance measurements, refer to Table 5.2, page 201.
7. Adjust reel if necessary. For instructions, refer to [Adjusting Reel Clearance, page 204](#).

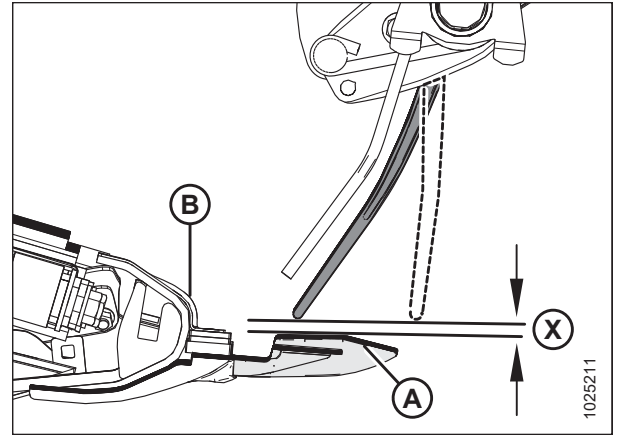


Figure 5.151: Reel Clearance

### Adjusting Reel Clearance

Perform this procedure with reel at midpoint of fore-aft range and fully lowered.

#### DANGER

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

1. Adjust outboard reel arm lift cylinders to set clearance as follows:
  - a. Loosen bolt (A).
  - b. Turn cylinder rod (B) out of clevis to raise reel and increase clearance to cutterbar, or turn cylinder rod into clevis to lower reel and decrease clearance.
  - c. Tighten bolt (A).
  - d. Repeat at opposite side.

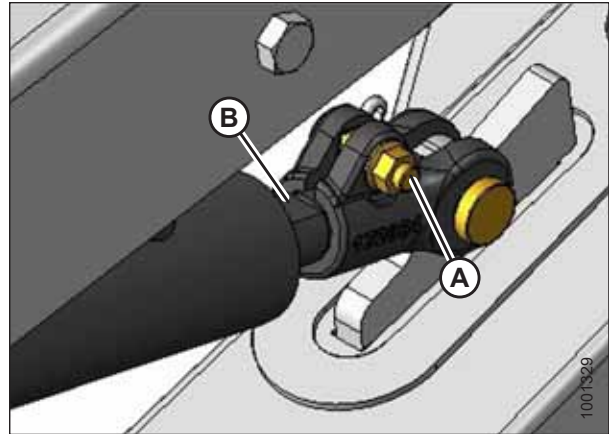


Figure 5.152: Reel Outboard Arm

2. **Double Reel:** Adjust center arm lift cylinder link (A) to set clearance at center of reel as follows:

**NOTE:**

This adjustment is most easily performed from underside of arm.

- a. Loosen nut (B).
- b. Turn nut (C) counterclockwise to raise reel and increase clearance to cutterbar, or clockwise to lower reel and decrease clearance.
- c. Tighten nut (B).

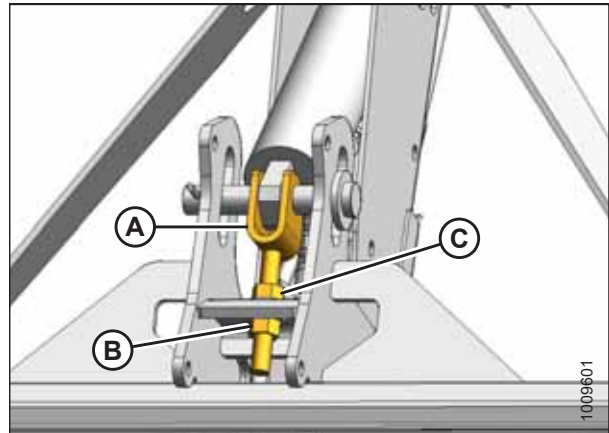


Figure 5.153: Double Reel Center Arm

3. Move reel back to ensure steel end fingers do not contact deflector shields.
4. If contact is evident, adjust reel upward to maintain clearance at all reel fore/aft positions. Alternatively, trim steel end fingers to obtain proper clearance.
5. Periodically check for evidence of contact, and adjust clearance as required.



## 5.8.2 Reel Frown

The reel is factory-set in a frown shape (more clearance at the center of the reel than at the ends) to compensate for reel flexing.

### *Adjusting Reel Frown*

Adjust the reel frown by repositioning the reel tine tubes attached to the reel discs.

**NOTE:**

Measure the frown profile before disassembling the reel for servicing so the profile can be maintained during reassembly.

1. Position the reel all the way down and over the cutterbar (between position 4 and 5 on the fore-aft decal [A]).
2. Record the measurement at each reel disc location for each reel tine tube.

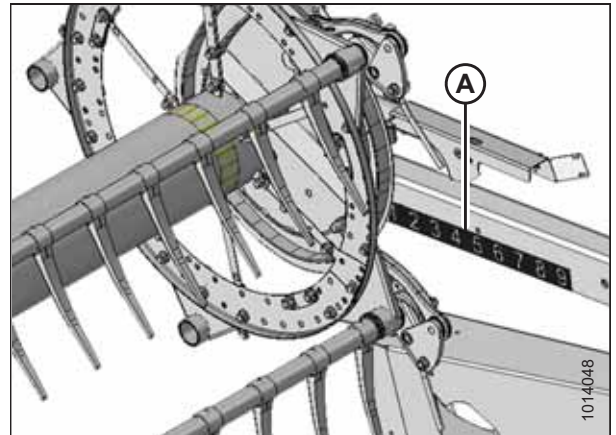


Figure 5.154: Fore-Aft Position Decal

3. Start with the reel disc closest to the center of the header and proceed outward towards the ends, adjusting the header profile as follows:
  - a. Remove bolts (A).
  - b. Loosen bolt (B) and adjust arm (C) until the desired measurement is obtained between the reel tine tube and cutterbar.

**NOTE:**

Allow the reel tine tubes to curve naturally and position the hardware accordingly.

- c. Reinstall bolts (A) in the aligned holes and tighten.

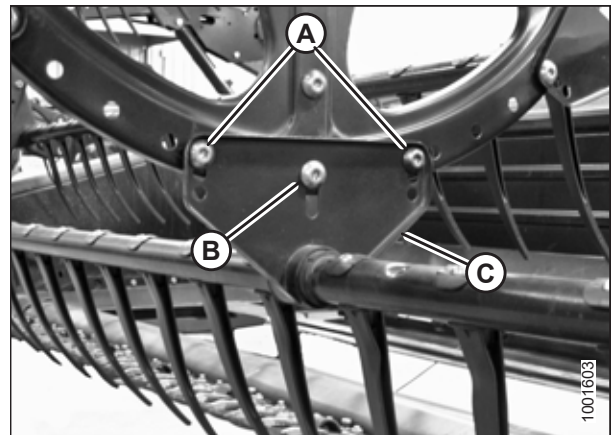


Figure 5.155: Center Reel Arm

### 5.8.3 Centering Reel

The reel should be centered between the header endsheets. To center the reel, refer to the procedure that applies to your reel type:

- [Centering Reel on Double-Reel Header, page 206](#)
- [Centering Reel on Single-Reel Header, page 207](#)

#### Centering Reel on Double-Reel Header



#### DANGER

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



#### WARNING

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

1. Start the engine.
2. Raise the header enough to put 150 mm (6 in.) blocks under the outboard skid shoes.
3. Lower the header onto the blocks, the ends of the header will be higher than the center section, causing the header to smile.
4. Shut down the engine, and remove the key from the ignition.
5. Measure clearance (A) at locations (B) between reel tine tube and endsheet at both ends of header. The clearances should be the same if reel is centered. Refer to the following steps to center reel.

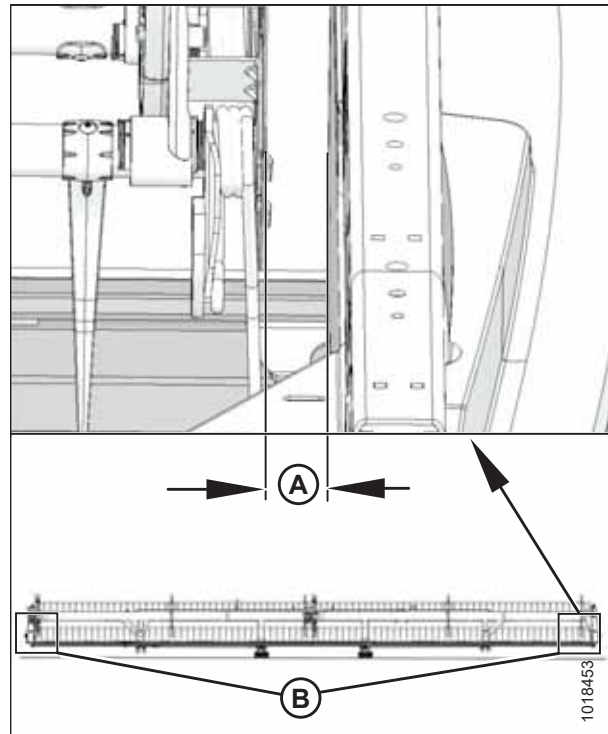


Figure 5.156: Centering Reel

6. Loosen bolt (A) on each brace (B).
7. Move the forward end of reel center support arm (C) laterally as required to center both reels.
8. Tighten bolts (A) and torque to 382 Nm (282 lbf·ft).

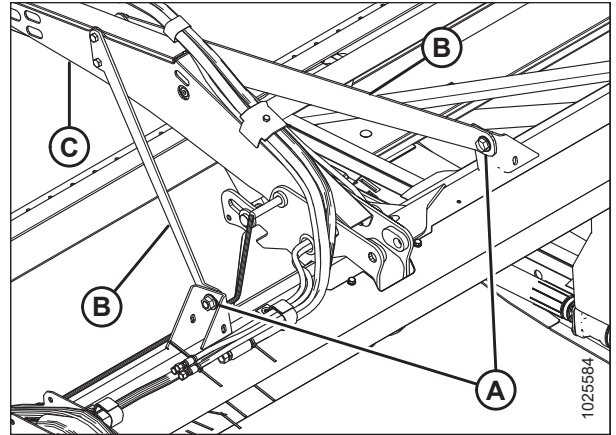


Figure 5.157: Reel Center Support Arm

9. Measure clearance at locations (A) between reel and both endsheets. The clearances should be the same if the reel is centered.

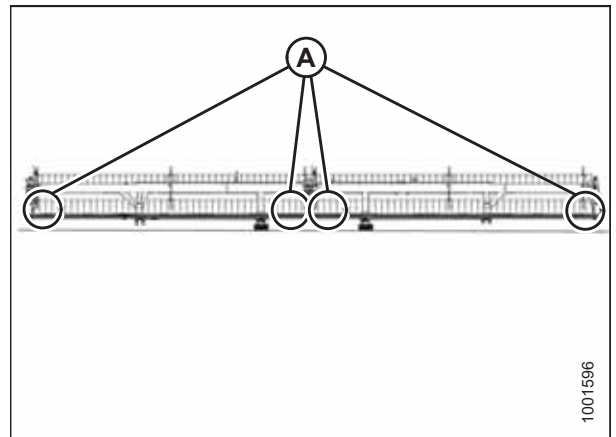


Figure 5.158: Measurement Locations

### Centering Reel on Single-Reel Header



#### **DANGER**

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

1. Shut down the engine, and remove the key from the ignition.
2. Loosen bolt (A) on brace (B) at both ends of the reel.
3. Move the forward end of reel support arm (C) laterally as required to center the reel.
4. Tighten bolt (A) and torque to 359 Nm (265 lbf·ft). Repeat at opposite side.

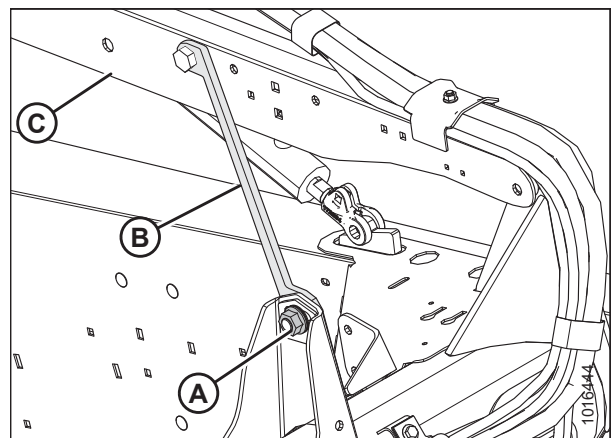


Figure 5.159: Reel Support Arm

## 5.8.4 Reel Tines

### IMPORTANT:

Keep reel tines in good condition. Straighten or replace as required.

### *Removing Steel Tines*



### DANGER

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



### WARNING

To avoid bodily injury from fall of raised reel, always engage reel safety props before going under raised reel for any reason.

### IMPORTANT:

Ensure the tine tube is supported at all times to prevent damage to the tube and other components.

1. Lower the header, raise the reel, and engage the reel safety props.
2. Shut down the engine and remove the key from the ignition.
3. Remove the tine tube bushings from the applicable tine tube at the center and left reel discs. For instructions, refer to [Removing Bushings from Five-, Six-, or Nine-Bat Reels, page 212](#).
4. Attach reel arms (B) (temporarily) to the reel disc at the original attachment locations (A).
5. Cut the damaged tine so it can be removed from the tine tube.
6. Remove bolts from the existing tines and slide the tines over to replace the tine that was cut off in [Step 5, page 208](#) (remove reel arms [B] from the tine tubes as necessary).

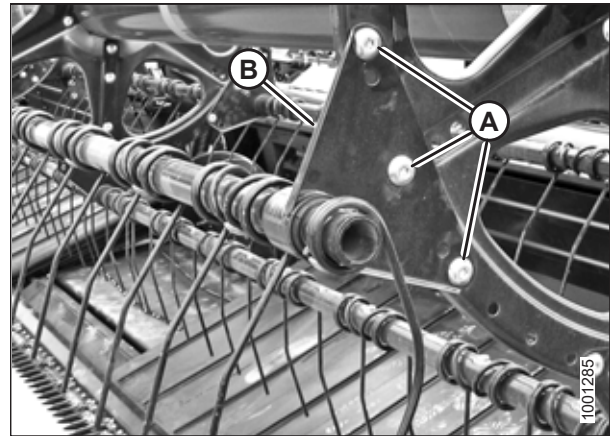


Figure 5.160: Reel Arm

### *Installing Steel Tines*

#### **DANGER**

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

#### **WARNING**

To avoid bodily injury from fall of raised reel, always engage reel safety props before going under raised reel for any reason.

#### **IMPORTANT:**

Ensure the tine tube is supported at all times to prevent damage to the tube and other components.

1. Remove the applicable tine. For instructions, refer to [Removing Steel Tines, page 208](#).
2. Slide the new tines and reel arm (A) onto the end of the tube.
3. Install the tine tube bushings. For instructions, refer to [Installing Bushings on Five-, Six-, or Nine-Bat Reels, page 217](#).
4. Attach the tines to the reel tine bar with bolts and nuts (B).

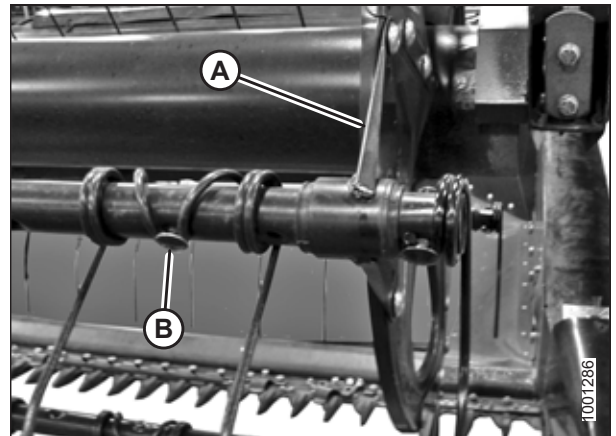


Figure 5.161: Reel Tine Tube

### *Removing Plastic Fingers*

#### **DANGER**

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

#### **WARNING**

To avoid bodily injury from fall of raised reel, always engage reel safety props before going under raised reel for any reason.

## MAINTENANCE AND SERVICING

1. Remove screw (A) using a Torx® Plus 27 IP socket wrench.

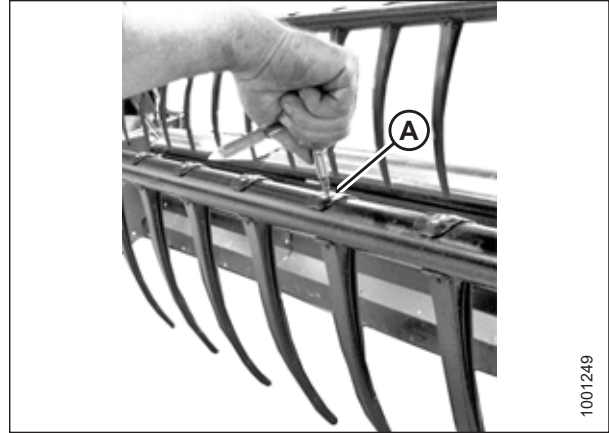


Figure 5.162: Removing Plastic Fingers

2. Push the top of finger off the reel tine tube while slightly pulling on tine under the tube. Finger can then be removed.



Figure 5.163: Removing Plastic Fingers

### Installing Plastic Fingers

#### **DANGER**

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

#### **WARNING**

To avoid bodily injury from fall of raised reel, always engage reel safety props before going under raised reel for any reason.

1. Position the finger on the rear of the finger tube and engage the lug at the bottom of the finger in the lower hole in the finger tube.
2. Lift the top flange gently and rotate the finger until the lug in the top of the finger engages the upper hole in the finger tube.



Figure 5.164: Installing Finger

#### **IMPORTANT:**

Do **NOT** apply force to the finger prior to tightening the mounting screw. Applying force without tightening the mounting screw will break the finger or shear the locating pins.

3. Install screw (A) using a Torx® Plus 27 IP socket wrench and torque to 8.5–9.0 Nm (75–80 lbf-in).

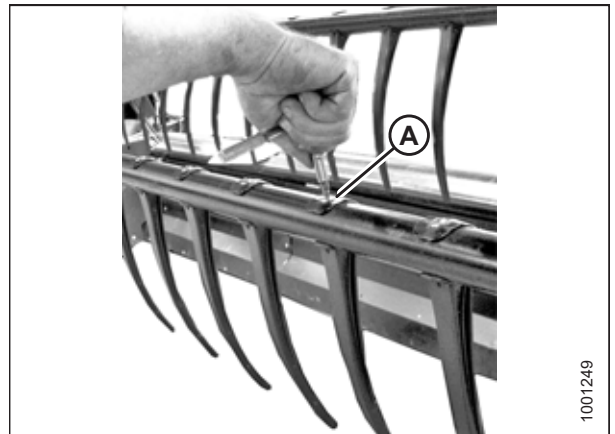


Figure 5.165: Installing Finger



## 5.8.5 Tine Tube Bushings

### *Removing Bushings from Five-, Six-, or Nine-Bat Reels*

#### **DANGER**

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

#### **WARNING**

To avoid bodily injury from fall of raised reel, always engage reel safety props before going under raised reel for any reason.

#### **IMPORTANT:**

Ensure the tine tube is supported at all times to prevent damage to the tube and other components.

1. Lower the header, raise the reel, and engage the reel safety props.
2. Shut down the engine, and remove the key from the ignition.

#### **NOTE:**

If replacing only the cam end bushing, refer to Step 8, [page 213](#).

#### **Removing center disc and tail-end bushings:**

3. 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.

4. Remove bolts (A) securing 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.

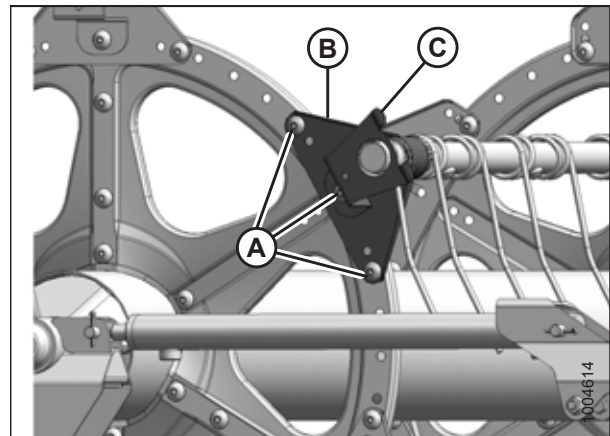


Figure 5.166: Tail End

5. Release bushing clamps (A) using a small screwdriver to separate the serrations. Pull the clamp off the tine tube.

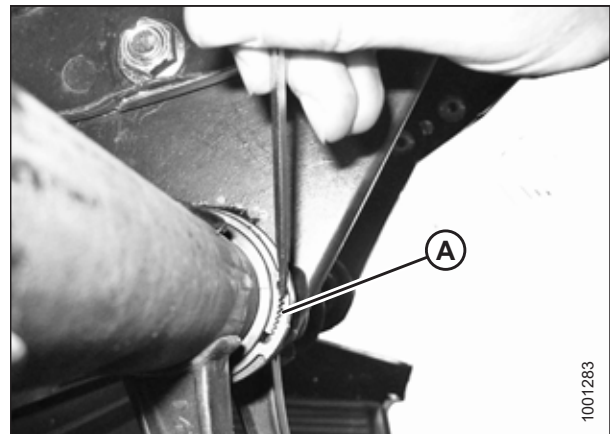


Figure 5.167: Bushing Clamp



6. Rotate arm (A) until clear of the disc and slide the arm inboard off of bushing (B).
7. Remove bushing halves (B). If required, remove the next tine or plastic finger so the arm can slide off the bushing. Refer to the following procedures as necessary:
  - [Removing Plastic Fingers, page 209](#)
  - [Removing Steel Tines, page 208](#)

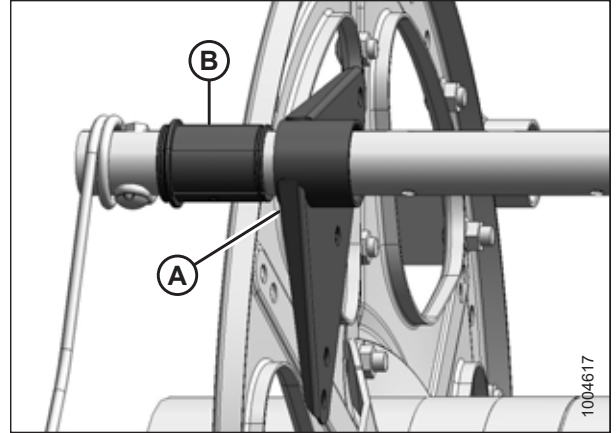


Figure 5.168: Bushing

**Removing cam end bushings:**

8. Remove the endshields and endshield support (A) at the applicable tine tube location on the cam end.

**NOTE:**

Removing cam end bushings requires the tine tube be moved through the disc arms to expose the bushing.

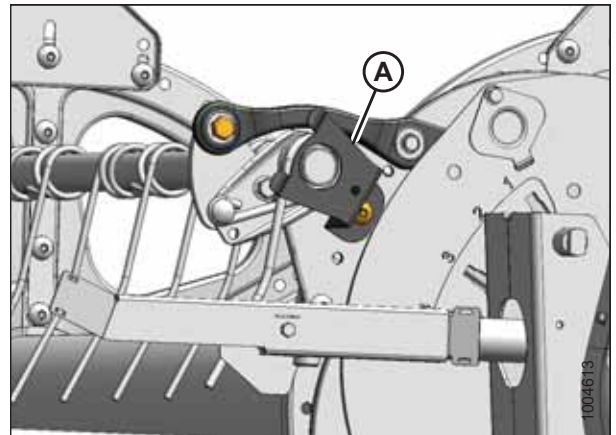


Figure 5.169: Cam End

9. Remove the reel endshields and endshield support (C) from the tail end of the reel at the applicable tine tube location.
10. Remove bolts (A) securing arms (B) to the tail and center discs.

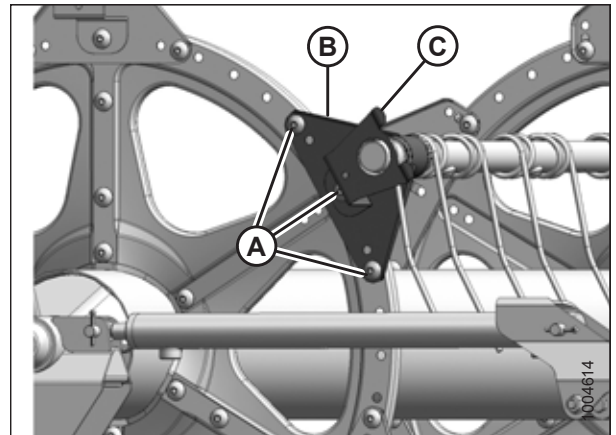


Figure 5.170: Tail End

## MAINTENANCE AND SERVICING

11. 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.

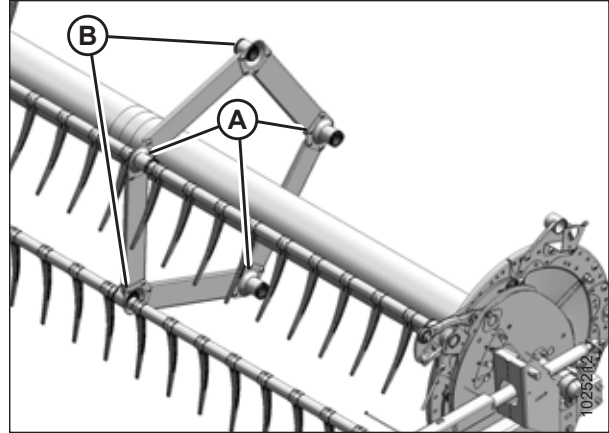


Figure 5.171: Tine Tube Supports

12. Remove bolt (A) from the cam linkage so the tine tube (B) is free to rotate.

**NOTE:**

Be sure to not lose shim, and mark shim location for reassembly.

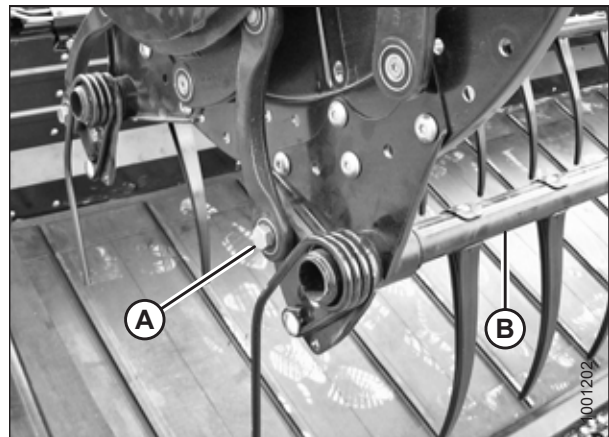


Figure 5.172: Cam End

13. Release bushing clamps (A) at the cam disc using a small screwdriver to separate the serrations. Move the clamps off the bushings.

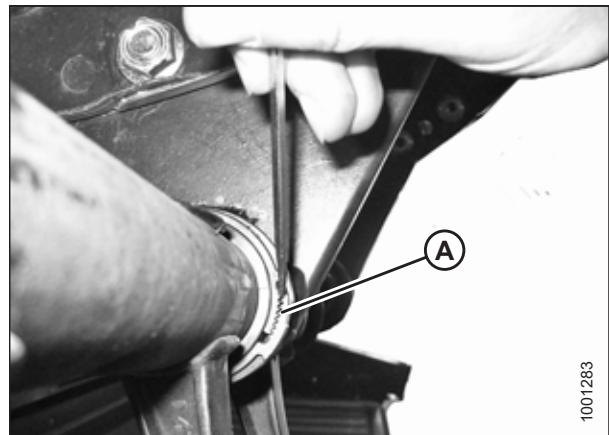


Figure 5.173: Bushing Clamp

14. Slide tine tube (A) outboard to expose bushing (B).
15. Remove bushing halves (B). If required, remove the next tine or plastic finger so the arm can slide off the bushing. Refer to the following procedures if necessary:
  - [Removing Plastic Fingers, page 209](#)
  - [Removing Steel Tines, page 208](#)

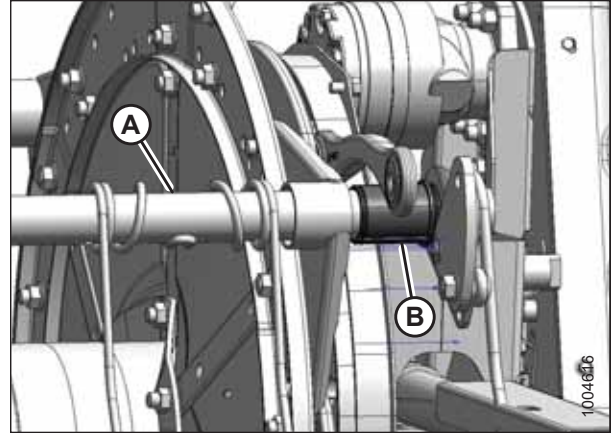


Figure 5.174: Cam End

***Removing tine tube support bushings (if installed):***

16. Locate support (A) that requires a new bushing.
17. Remove four bolts (B) securing channels (C) to support (A).
18. If finger (D) is too close to the support to allow access to the bushing, remove screw (E) and remove finger (D). For instructions, refer to [Removing Plastic Fingers, page 209](#).

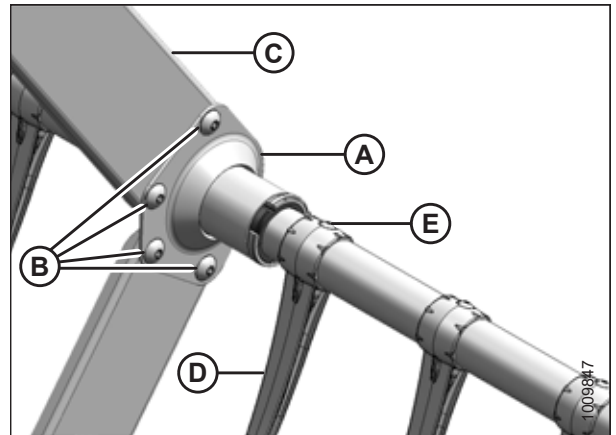


Figure 5.175: Tine Tube Support

19. Release bushing clamps (A) using a small screwdriver to separate the serrations.

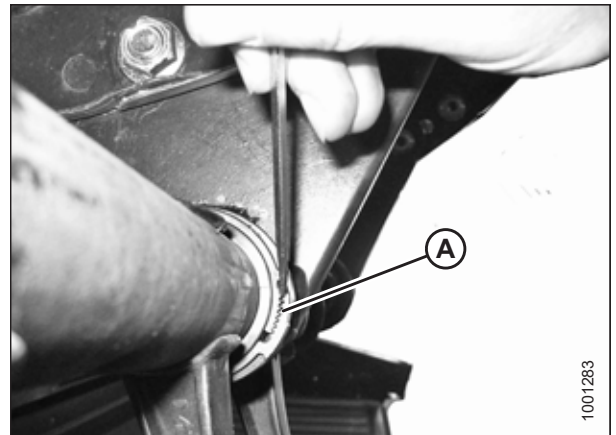


Figure 5.176: Bushing Clamp

20. Move clamps (A) off the bushings.

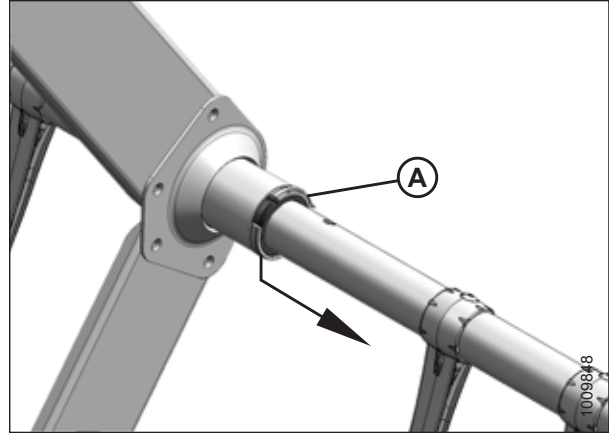


Figure 5.177: Bushing Clamp

21. Slide support (A) off bushing halves (B).

**NOTE:**

Two tine tubes have opposite-facing supports. Rotate the supports until the flanges clear the channels before moving them off bushing (B). Move the tine tube outward slightly if necessary.

22. Remove bushing halves (B).

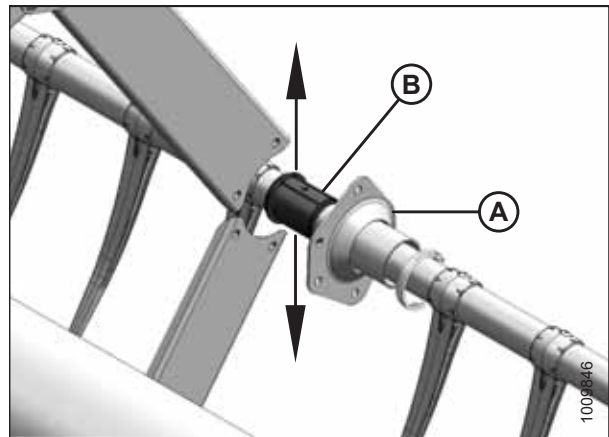


Figure 5.178: Support

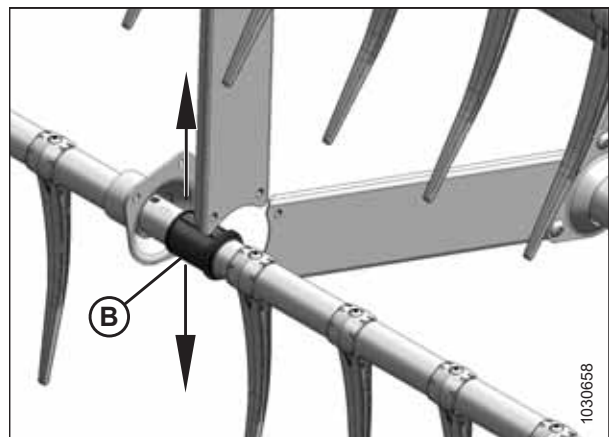


Figure 5.179: Opposite Support

*Installing Bushings on Five-, Six-, or Nine-Bat Reels*

**⚠ DANGER**

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

**⚠ WARNING**

To avoid bodily injury from fall of raised reel, always engage reel safety props before going under raised reel for any reason.

**IMPORTANT:**

Ensure tine tube is supported at all times to prevent damage to the tube or other components.

**NOTE:**

Use a pair of modified channel lock pliers (A) to install bushing clamps (C). Secure pliers in a vise and grind a notch (B) into the end of each arm to fit the clamp as shown.

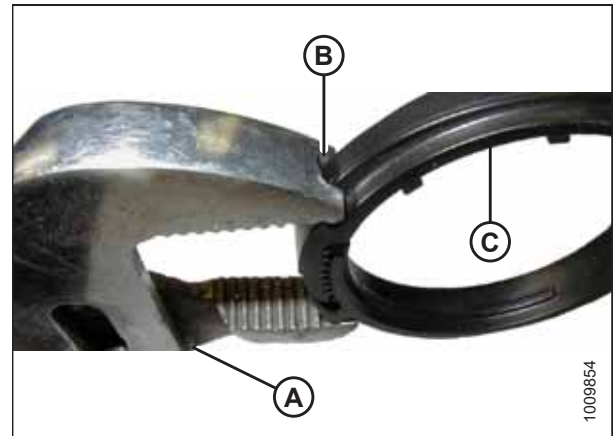


Figure 5.180: Modified Pliers

**Installing cam end bushings:**

1. Position bushing halves (B) on the tine tube with the flangeless end adjacent to the reel arm, and position the lug in each bushing half into the hole in tine tube (A).
2. Slide tine tube (A) towards the tail end of the reel to insert bushing (B) into the reel arm.

**NOTE:**

If the tine tube supports are installed, ensure the bushings at those locations slide into the support.

3. Reinstall the previously removed fingers or tines. Refer to the following procedures as necessary:
  - [Removing Plastic Fingers, page 209](#)
  - [Removing Steel Tines, page 208](#)
4. Install bushing clamp (A) onto the tine tube adjacent to the flangeless end of bushing (B).
5. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.
6. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

**IMPORTANT:**

Overtightening may break the clamp.

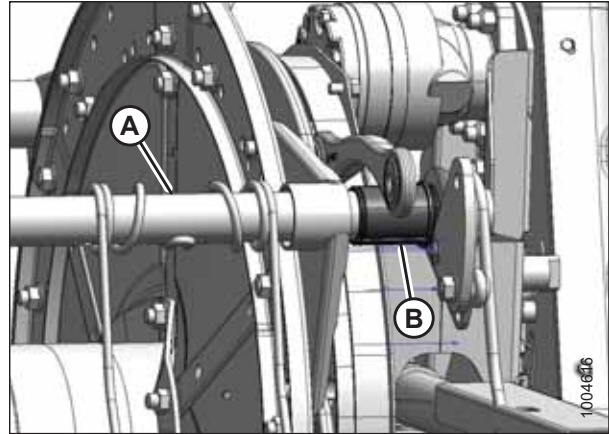


Figure 5.181: Cam End

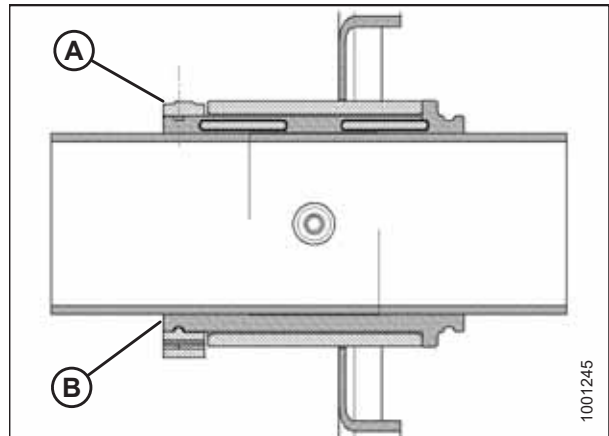


Figure 5.182: Bushing

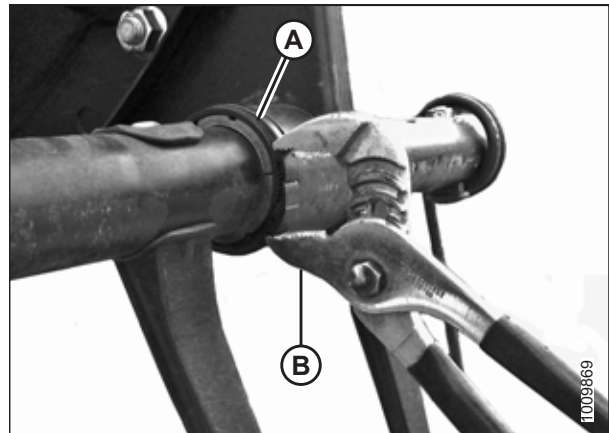


Figure 5.183: Clamp on Bushing



7. Line up tine bar (B) with the cam arm and install bolt (A). Apply medium-strength threadlocker (Loctite® 243 or equivalent) to bolt, and torque to 165 Nm (120 lbf·ft).

**NOTE:**

Make sure shim is between cam arm and reel bat.

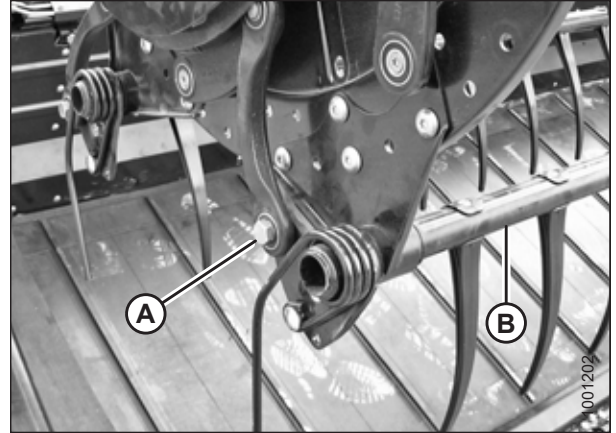


Figure 5.184: Cam End

8. Install bolts (A) securing arm (B) to the center disc.
9. Install reel arm (B) and endshield support (C) to the tail end of the reel at the applicable tine tube location and secure with bolts (A).

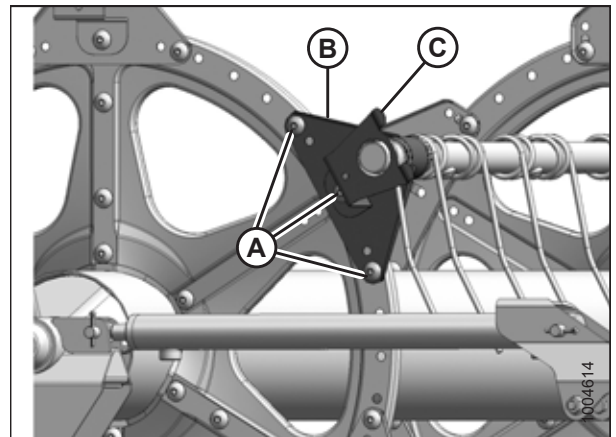


Figure 5.185: Tail End

10. Install endshield support (A) at the applicable tine tube location at the cam end.
11. Reinstall the reel endshields. For instructions, refer to [5.8.6 Reel Endshields, page 224](#).

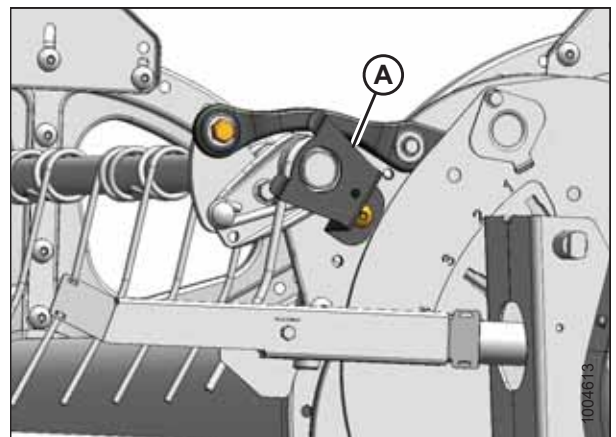


Figure 5.186: Cam End

**Installing center disc and tail-end bushings:**

12. Position bushing halves (B) on the tine tube with the flangeless end adjacent to the reel arm, and position the lug in each bushing half into the hole in tine tube (A).
13. Slide the reel arm (A) onto the bushing (B) and position against the disc at the original location.
14. Reinstall the previously removed fingers or tines. Refer to the following procedures as necessary:
  - [Removing Plastic Fingers, page 209](#)
  - [Removing Steel Tines, page 208](#)

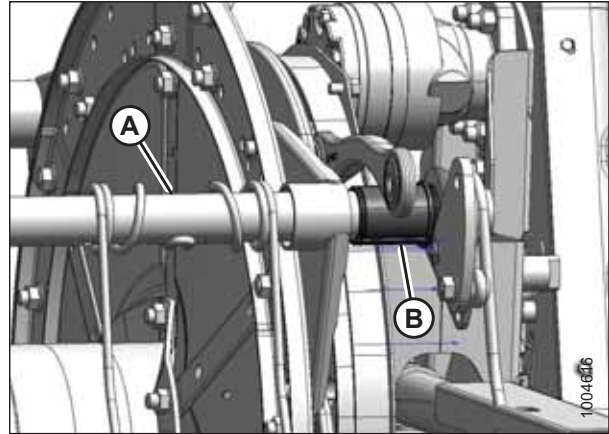


Figure 5.187: Cam End

15. Install bushing clamp (A) onto the tine tube adjacent to the flangeless end of bushing (B).
16. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

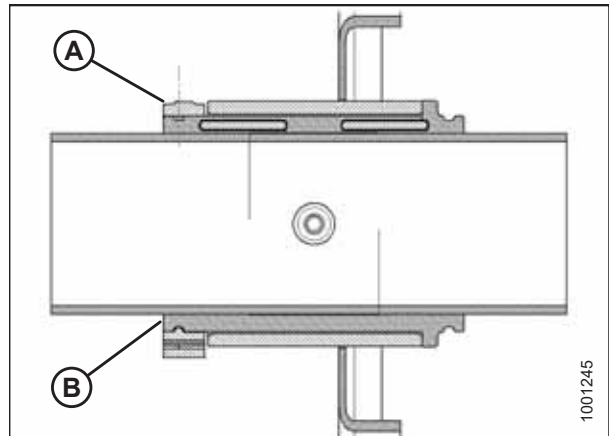


Figure 5.188: Bushing

17. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

**IMPORTANT:**

Overtightening may break the clamp.

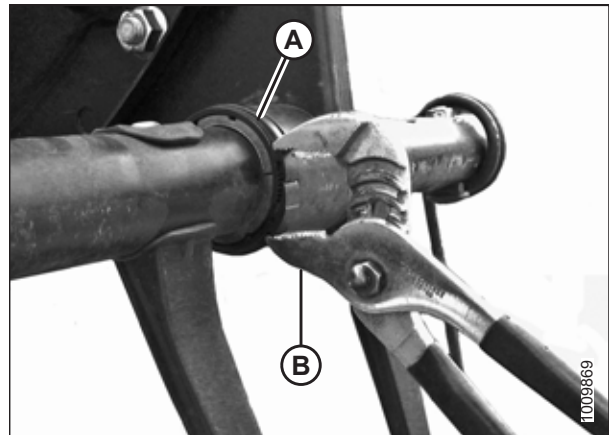


Figure 5.189: Clamp on Bushing



## MAINTENANCE AND SERVICING

18. Install bolts (A) securing arm (B) to the center disc.
19. Install reel arm (B) and endshield support (C) to the tail end of the reel at the applicable tine tube location and secure with bolts (A).

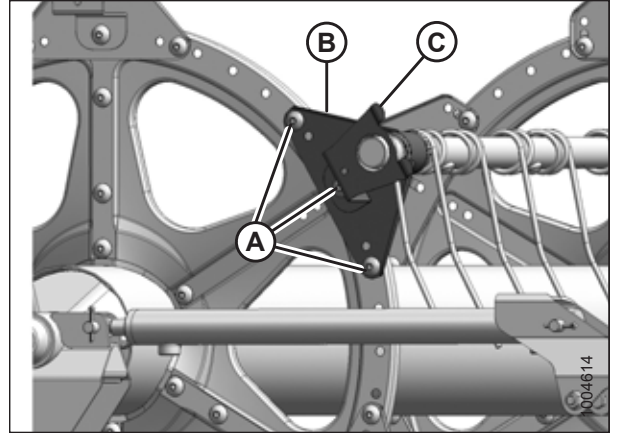


Figure 5.190: Tail End

### *Installing tine tube support (if installed) bushings:*

20. Position bushing halves (B) on the tine tube with the flangeless end adjacent to the reel arm, and position the lug in each bushing half into the hole in tine tube (A).

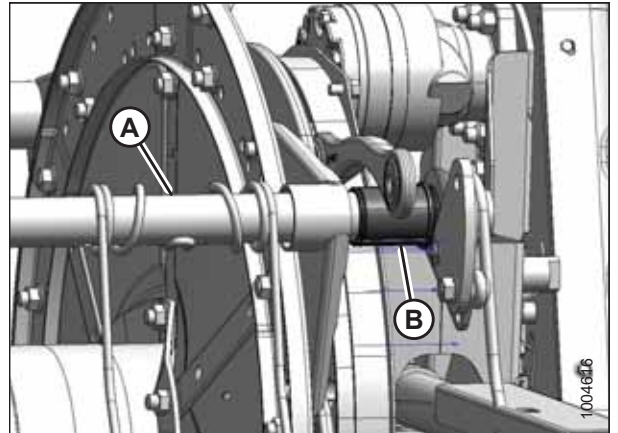


Figure 5.191: Cam End

21. Slide support (A) onto bushing (B).

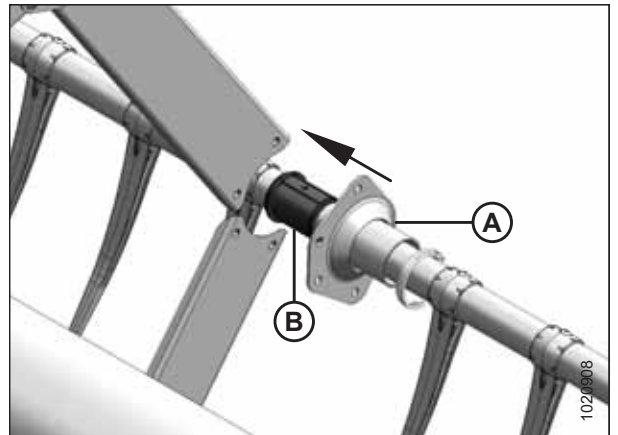


Figure 5.192: Support

## MAINTENANCE AND SERVICING

22. For the opposite tine tube, rotate support (A) or slightly move the tine tube until it clears channels (C).

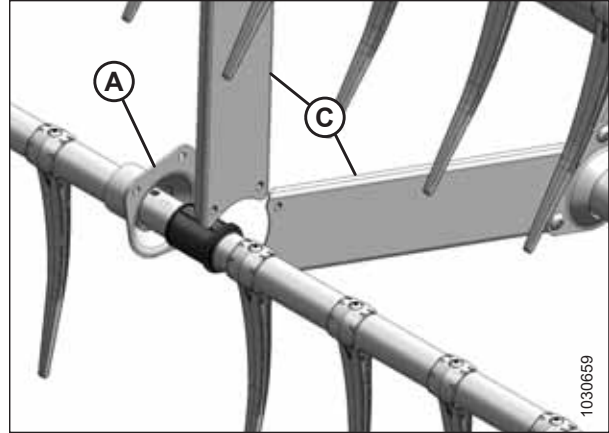


Figure 5.193: Opposite Support

23. Install bushing clamp (A) onto the tine tube adjacent to the flangeless end of bushing (B).
24. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

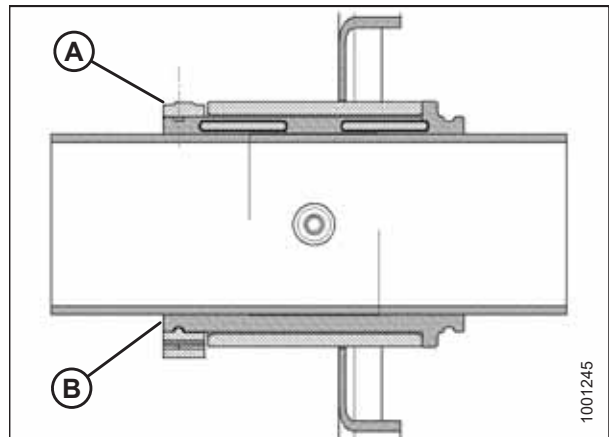


Figure 5.194: Bushing

25. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

**IMPORTANT:**

Overtightening may break the clamp.

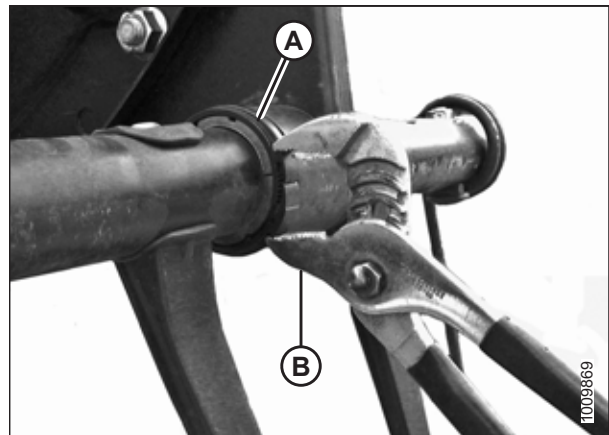


Figure 5.195: Clamp on Bushing

## MAINTENANCE AND SERVICING

26. Reattach channels (C) to support (A) with screws (B) and nuts. Torque screws to 43 Nm (32 lbf·ft).
27. Reinstall any fingers (D) that were previously removed using screws (E). For instructions, refer to [Installing Plastic Fingers, page 211](#).

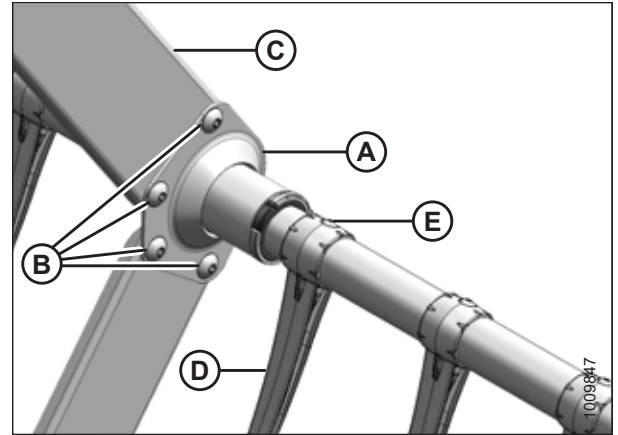


Figure 5.196: Tine Tube Support

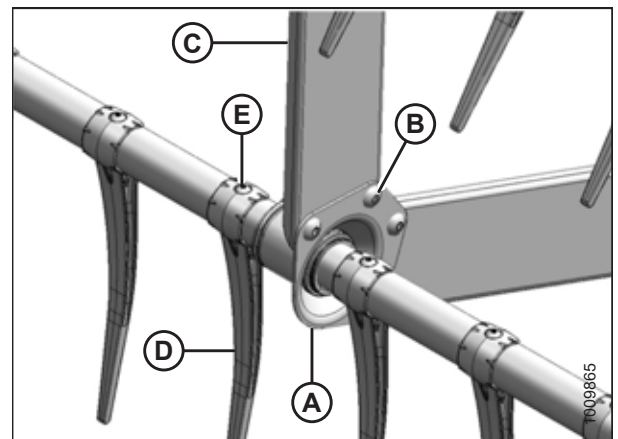


Figure 5.197: Opposite Support

## 5.8.6 Reel Endshields

Reel endshields and supports do not require regular maintenance, but they should be checked periodically for damage and loose or missing fasteners. Slightly dented or deformed endshields and supports are repairable, but severely damaged components must be replaced.

You can attach reel endshields to either end of the reel.

### *Replacing Reel Endshields*



#### **DANGER**

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

1. Lower the header and reel, shut down the engine, and remove the key from the ignition.
2. Rotate the reel manually until reel endshield support (A) requiring replacement is accessible.
3. Remove three bolts (B).

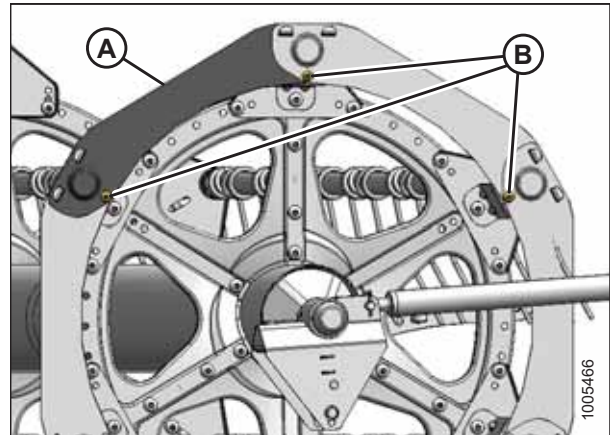


Figure 5.198: Reel Endshields

4. Lift end of reel endshield (A) off support (B).

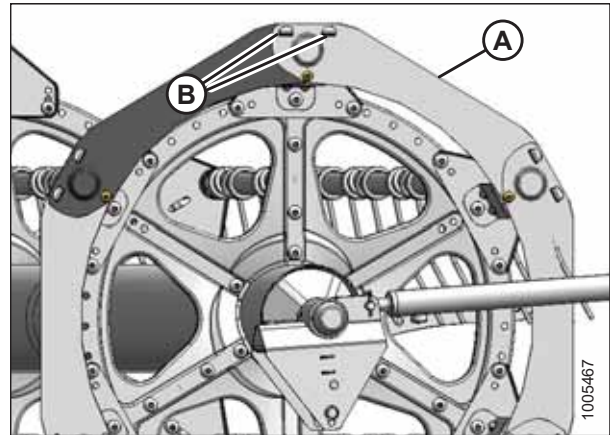


Figure 5.199: Reel Endshields

## MAINTENANCE AND SERVICING

5. Remove the reel endshield from the supports.

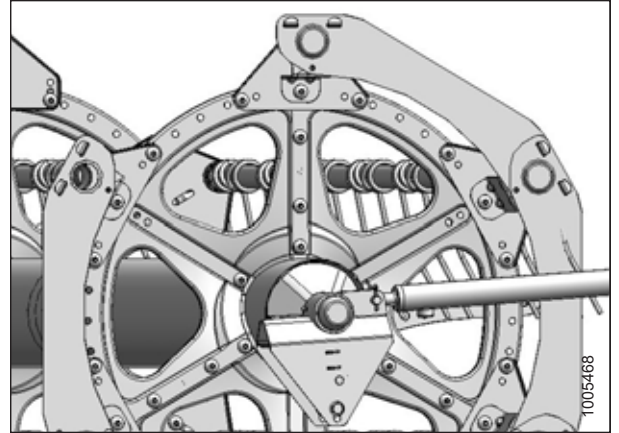


Figure 5.200: Reel Endshields

6. Remove reel endshield (A) from support (B).
7. Install new reel endshield (C) onto support (B).
8. Reattach reel endshield (A) onto support (B), ensuring it is installed on top of reel endshield (C).
9. Reinstall bolts (D).
10. Tighten all hardware.

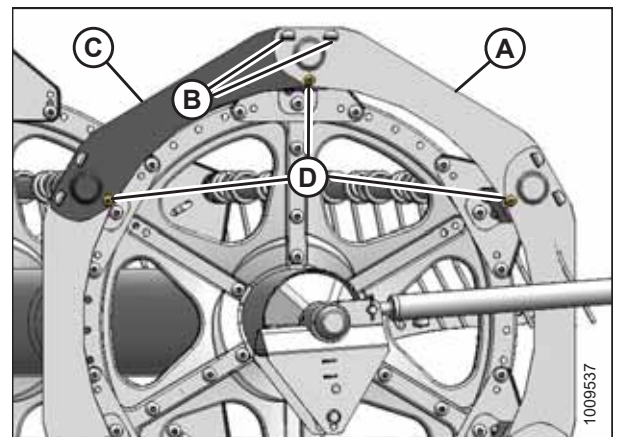


Figure 5.201: Reel Endshields

## Replacing Reel Endshield Supports

### DANGER

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

1. Lower the header and reel, shut down the engine, and remove the key from the ignition.
2. Rotate the reel manually until reel endshield (A) requiring replacement is accessible.
3. Remove bolt (B) from support (A).
4. Remove bolts (C) from support (A) and two adjacent supports.

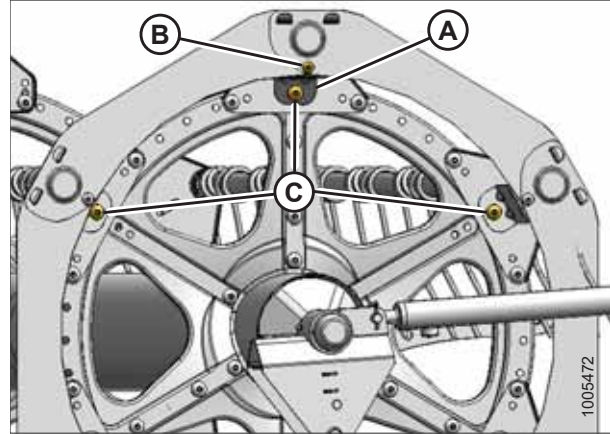


Figure 5.202: Reel Endshield Supports

5. Move reel endshields (A) away from the tine tube and rotate support (B) towards the reel to remove it.
6. Insert tabs of new support (B) into the slots in reel endshields (A). Ensure the tabs engage both reel endshields.
7. Secure support (B) to the disc with bolt (C) and nut. Do **NOT** tighten.
8. Secure reel endshields (A) to support (B) with bolt (C) and nut. Do **NOT** tighten.
9. Reattach the supports with bolts (C) and nuts.
10. Check the clearance between the tine tube and reel endshield support and adjust if necessary.
11. Torque nuts to 27 Nm (20 lbf-ft).

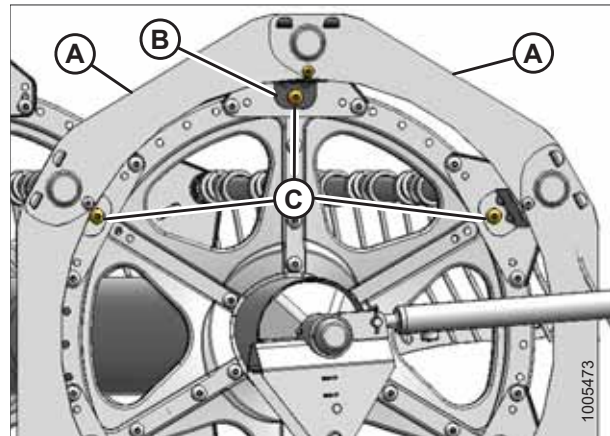


Figure 5.203: Reel Endshield Supports

## 5.9 PR15 Pick-Up Reel

All 7.6 m (25 ft.) and smaller headers have single reels, 9.1–10.7 m (30–35 ft.) headers are available in single-reel and double-reel versions. All headers larger than 10.7 m (35 ft.) are only available in double-reel configurations. Single reels are driven from the right arm and double reels are driven from the center arm.

### 5.9.1 Replacing Reel Drive Cover

#### *Removing Reel Drive Cover*



#### **DANGER**

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

#### *Single-reel drive:*

1. Stop the engine and remove the key from the ignition.
2. Remove four bolts (A) securing cover (B) to the reel drive.

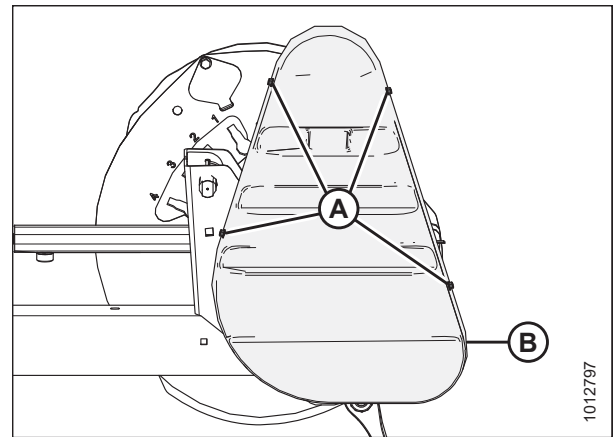


Figure 5.204: Drive Cover – Single Reel



**Double-Reel Drive:**

3. Stop the engine and remove the key from the ignition.
4. Remove six bolts (A) securing upper cover (B) to the reel drive and lower cover (C).

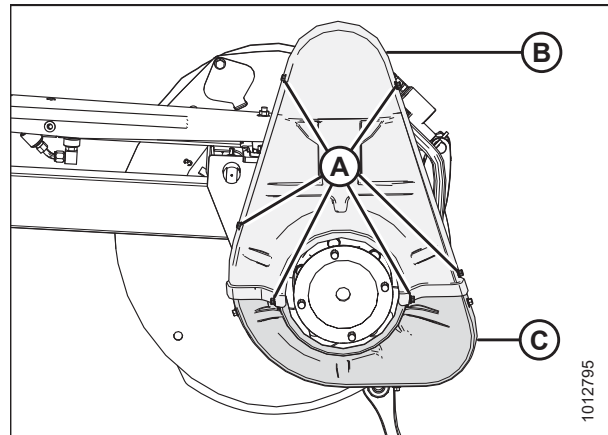


Figure 5.205: Drive Cover – Double Reel

5. Remove three bolts (A) and remove lower cover (B) if necessary.

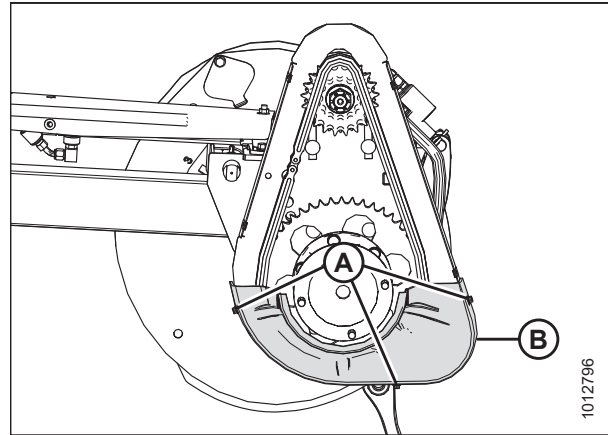


Figure 5.206: Drive Cover – Double Reel

**Installing Reel Drive Cover**

**Single-Reel Drive:**

1. Position drive cover (B) onto the reel drive and secure with four bolts (A).

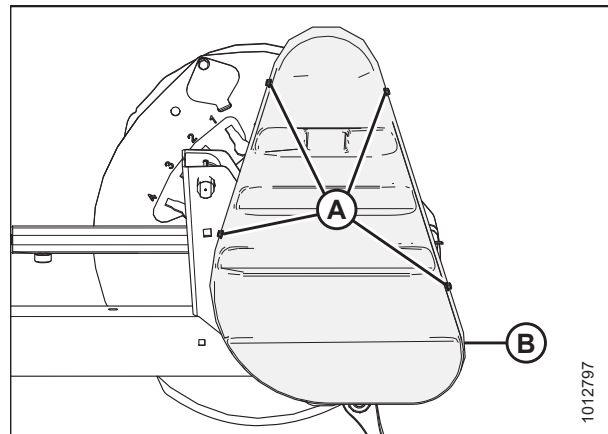


Figure 5.207: Drive Cover – Single Reel



**Double-Reel Drive:**

2. Position lower drive cover (B) onto the reel drive (if previously removed) and secure with three bolts (A).

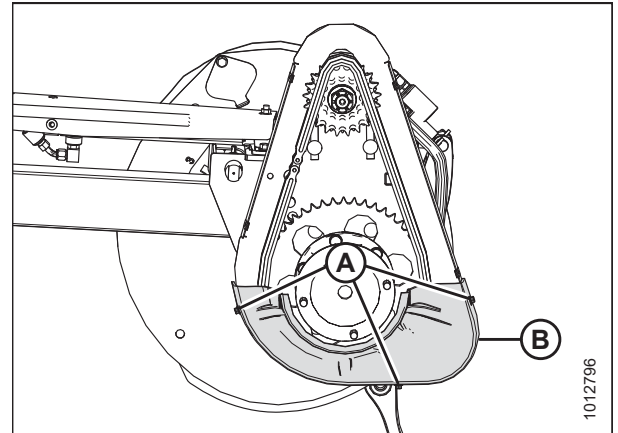


Figure 5.208: Drive Cover – Double Reel

3. Position upper drive cover (B) onto the reel drive and lower cover (C), and secure with six bolts (A).

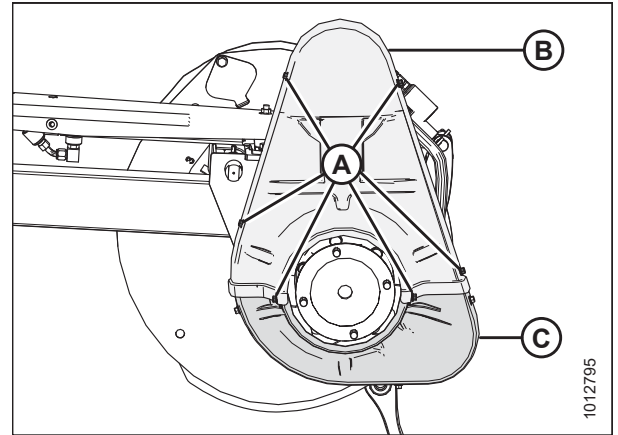


Figure 5.209: Drive Cover – Double Reel

## 5.9.2 Adjusting Reel Drive Chain Tension

### *Loosening Reel Drive Chain*



### **DANGER**

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

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the drive cover. For instructions, refer to [Removing Reel Drive Cover, page 227](#).

## MAINTENANCE AND SERVICING

3. Loosen six nuts (A). Slide motor (B) and motor mount (C) down towards the reel shaft.

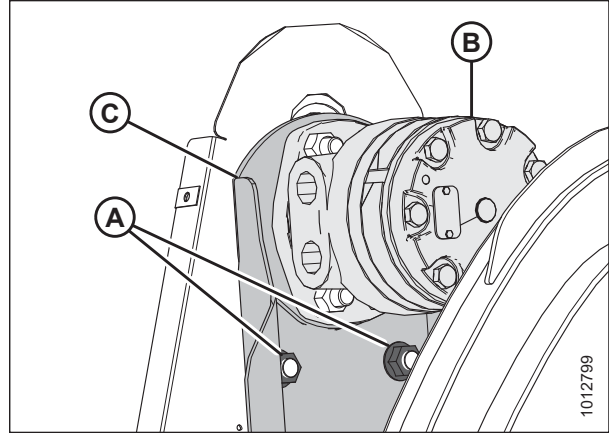


Figure 5.210: Single-Reel Drive Shown – Double-Reel Drive Similar

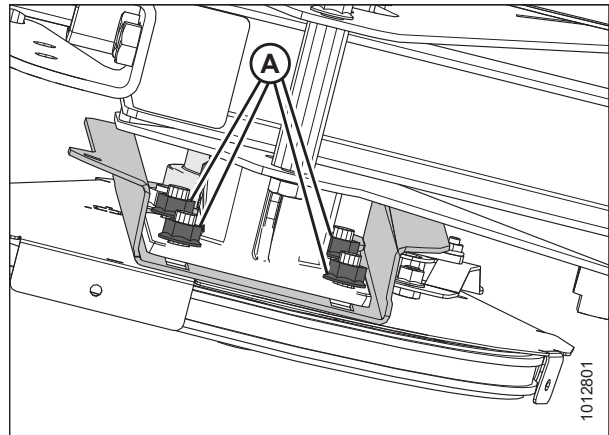


Figure 5.211: Single-Reel Drive – Viewed from Underside of Reel

### *Tightening Reel Drive Chain*

#### **DANGER**

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

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

## MAINTENANCE AND SERVICING

2. Ensure six bolts (A) securing the motor mount to the chain case are loose.

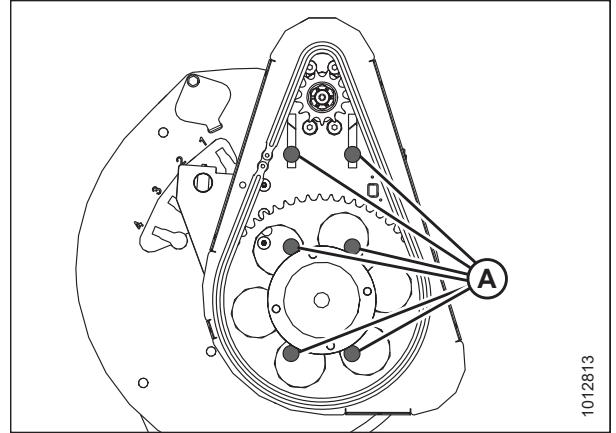


Figure 5.212: Single-Reel Drive Shown – Double Reel Similar

3. Slide motor (A) and motor mount (B) upwards until chain (C) is tight.

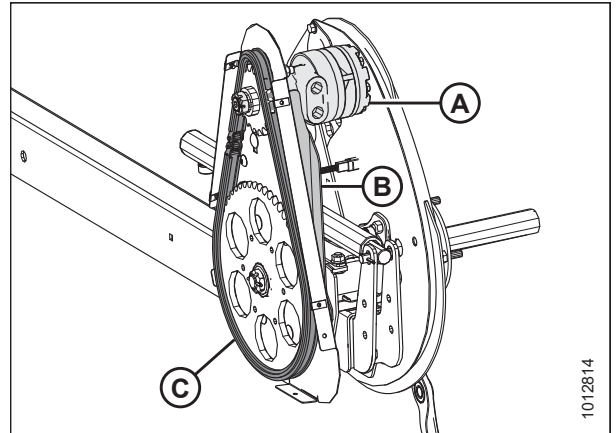


Figure 5.213: Single-Reel Drive Shown – Double Reel Similar

4. Ensure there is 3 mm (0.12 in.) of slack at the chain midspan. Adjust if necessary.
5. Torque nuts (A) to 73 Nm (54 lbf·ft).
6. Install the drive cover. For instructions, refer to [Installing Reel Drive Cover, page 228](#).

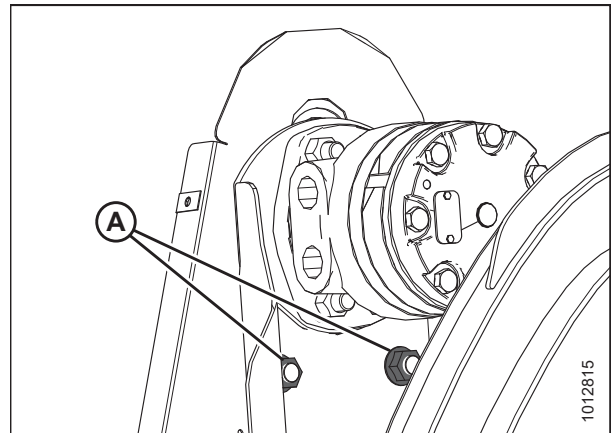


Figure 5.214: Single-Reel Drive Shown – Double Reel Similar

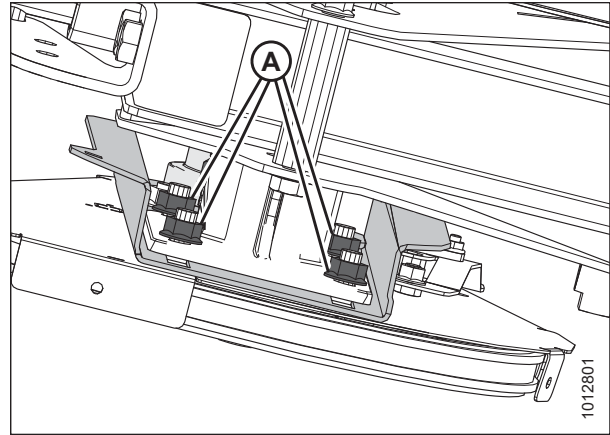


Figure 5.215: Single-Reel Drive – Viewed from Underside of Reel

### 5.9.3 Replacing Reel Drive Sprocket

#### *Removing Reel Drive Sprocket*



#### **DANGER**

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

1. Shut down the windrower, and remove the key from the ignition.
2. Loosen the drive chain. For instructions, refer to [Loosening Reel Drive Chain, page 229](#).
3. Remove drive chain (A) from drive sprocket (B).

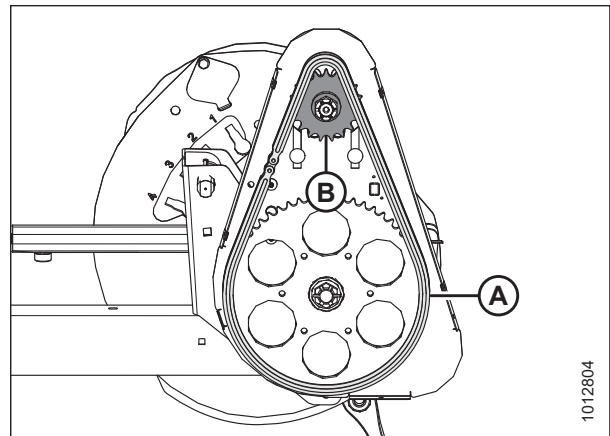


Figure 5.216: Reel Drive

4. Remove cotter pin (A), slotted nut (B), and flat washer (C) from the motor shaft.
5. Remove drive sprocket (D). Ensure the key remains in the shaft.

**IMPORTANT:**

To avoid damaging the motor, use a puller if the drive sprocket does not come off by hand. Do **NOT** use a pry bar and/or hammer to remove drive sprocket (D).

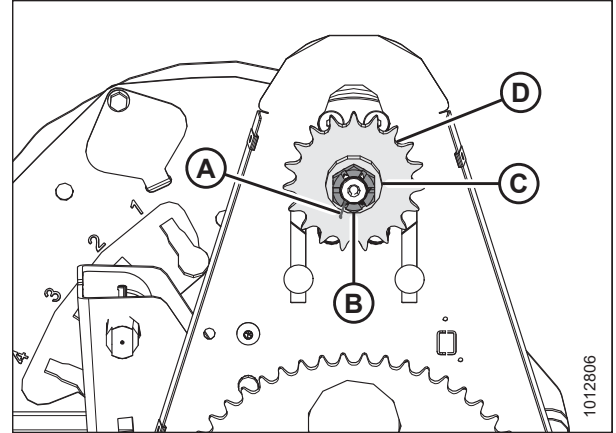


Figure 5.217: Reel Drive

*Installing Reel Drive Sprocket*

1. Align the keyway in sprocket (D) with the key on the motor shaft, and slide the sprocket onto the shaft. Secure with flat washer (C) and slotted nut (B).
2. Torque slotted nut (B) to 54 Nm (40 lbf·ft).
3. Install cotter pin (A). If necessary, tighten slotted nut (B) to the next slot to install the cotter pin.

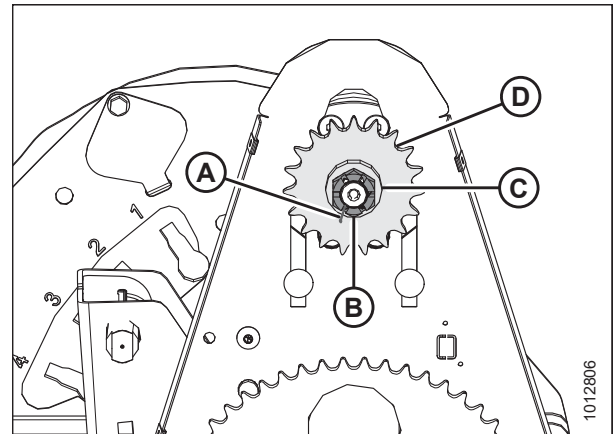


Figure 5.218: Reel Drive

4. Install drive chain (A) onto drive sprocket (B).
5. Tighten the drive chain. For instructions, refer to [Tightening Reel Drive Chain, page 230](#).

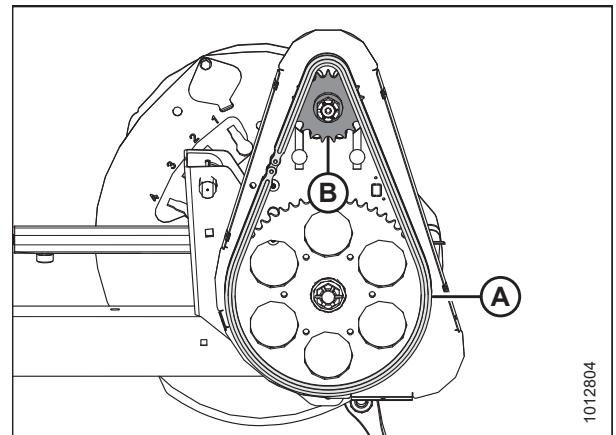


Figure 5.219: Reel Drive

## 5.9.4 Replacing Double-Reel U-Joint

The double-reel drive U-joint allows each reel to move independently from the other.

Lubricate the U-joint according to specifications. For instructions, refer to [5.3.6 Lubrication and Servicing, page 127](#).

Replace the U-joint if severely worn or damaged. For instructions, refer to [Removing Double-Reel U-Joint, page 234](#).

### Removing Double-Reel U-Joint

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the drive cover. For instructions, refer to [Removing Reel Drive Cover, page 227](#).
3. Support the inboard end of the right reel with a front end loader and nylon slings (A) (or equivalent lifting device).

**IMPORTANT:**

Avoid damaging or denting the center tube by supporting the reel as close to the cam end disc as possible.

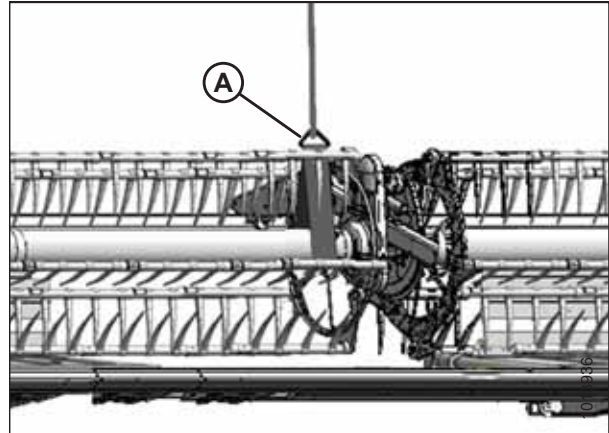


Figure 5.220: Supporting Reel

4. Remove six bolts (A) attaching U-joint flange (B) to driven sprocket (C).
5. Remove the U-joint.

**NOTE:**

It may be necessary to move the right reel sideways for the U-joint to clear the tube.

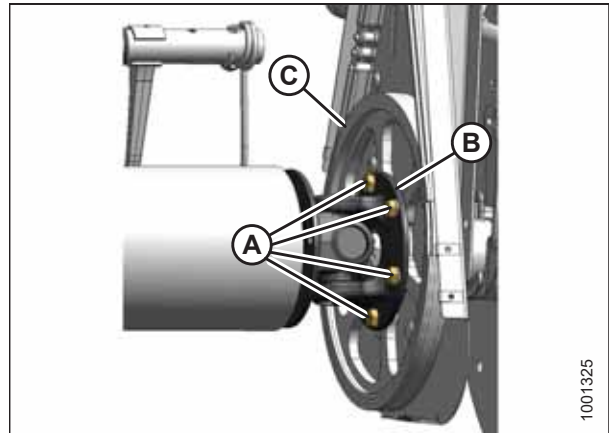


Figure 5.221: U-Joint

### Installing Double-Reel U-Joint

**NOTE:**

It may be necessary to move the right reel sideways for the U-joint to clear the reel tube.

1. Position U-joint flange (B) onto the driven sprocket (C) as shown. Install six bolts (A) and hand-tighten. Do **NOT** torque the bolts.

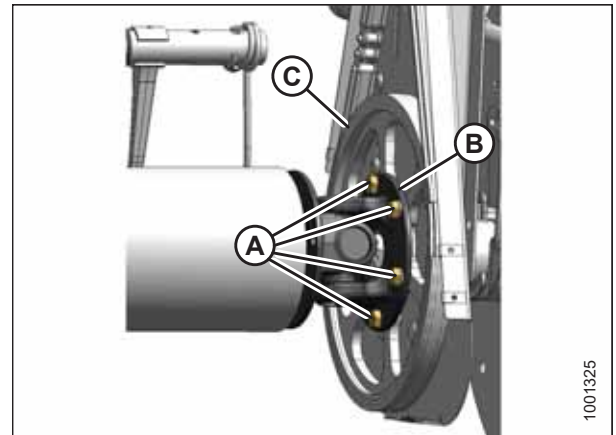


Figure 5.222: U-Joint

2. Position the right reel tube against the reel drive and engage the stub shaft into the U-joint pilot hole.
3. Rotate the reel until the holes in the end of the reel tube and U-joint flange (B) line up.
4. Apply medium-strength threadlocker (Loctite® 243 or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.
5. Torque to 102–115 Nm (75–85 lbf·ft).

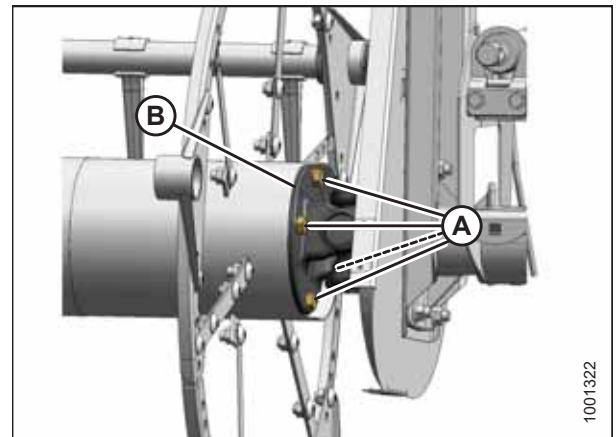


Figure 5.223: U-Joint

6. Remove temporary reel support (A).
7. Install the drive cover. For instructions, refer to [Installing Reel Drive Cover, page 228](#).

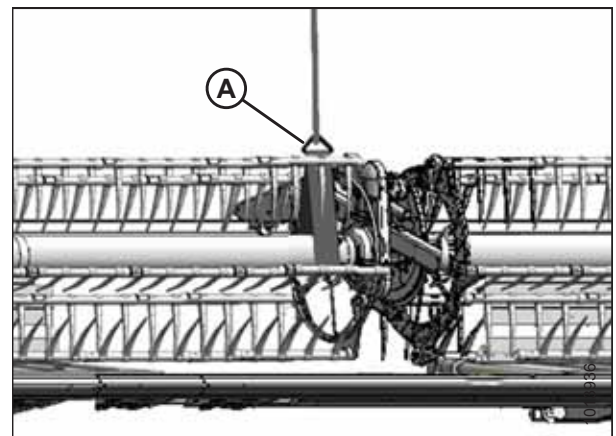


Figure 5.224: Supporting Reel

## 5.9.5 Replacing Reel Drive Motor

The reel drive motor does not require regular maintenance or servicing. If problems occur with the motor, remove it and have it serviced at your MacDon Dealer.

### *Removing Reel Drive Motor*

1. Shut down the windrower, and remove the key from the ignition.
2. Loosen the drive chain. For instructions, refer to [Loosening Reel Drive Chain, page 229](#).
3. Remove the drive sprocket. For instructions, refer to [Removing Reel Drive Sprocket, page 232](#).
4. Disconnect hydraulic lines (A) at motor (B). Cap or plug open ports and lines.

**NOTE:**

Mark hydraulic lines (A) and their locations in motor (B) to ensure correct reinstallation.

5. Remove four nuts and bolts (C) and remove motor (B). Retrieve the spacer (not shown) from between motor (B) and the motor mount (if installed).

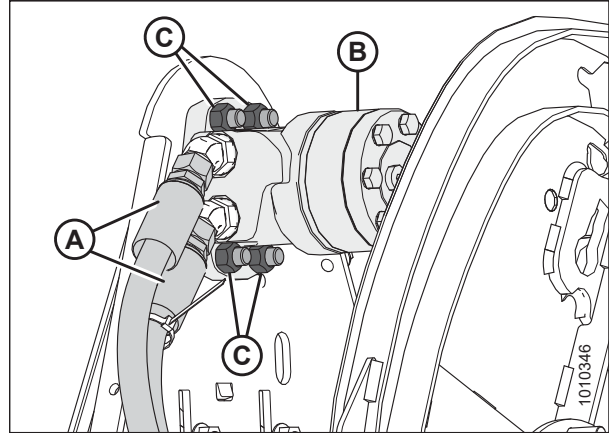


Figure 5.225: Reel Motor and Hoses

### *Installing Reel Drive Motor*

1. Slide motor mount (A) up or down so motor mounting holes (B) are accessible through the openings in the chain case.

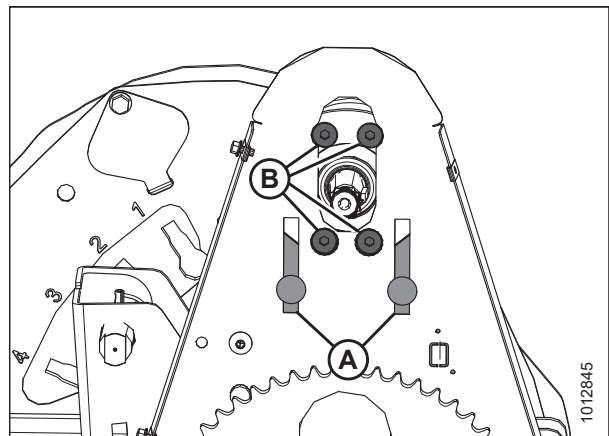


Figure 5.226: Reel Drive Motor Mounting Holes



2. Attach motor (A) (and spacer if previously removed) to motor mount (B) with four 1/2 in. x 1-3/4 in. countersunk bolts and nuts (C).
3. Torque nuts (C) to 73 Nm (54 lbf·ft).
4. If installing a new motor, install the hydraulic fittings (not shown) and torque to 110–120 Nm (81–89 lbf·ft).

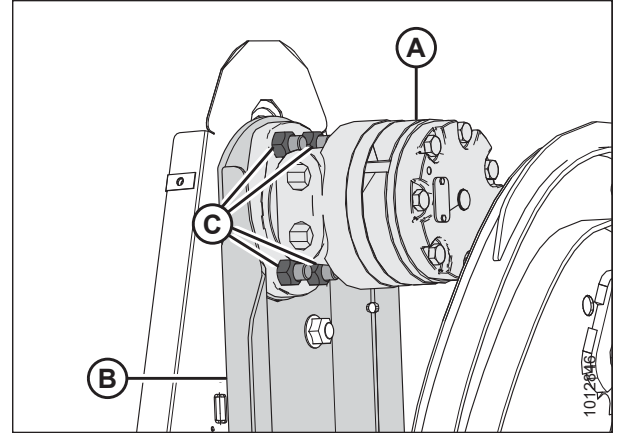


Figure 5.227: Reel Drive Motor

5. Remove the caps or plugs from the ports and lines and connect hydraulic lines (A) to hydraulic fittings (B) on motor (C).

**NOTE:**

Ensure hydraulic lines (A) are installed at their original locations.

6. Install the drive sprocket. For instructions, refer to [Installing Reel Drive Sprocket, page 233](#).
7. Tighten the drive chain. For instructions, refer to [Tightening Reel Drive Chain, page 230](#).

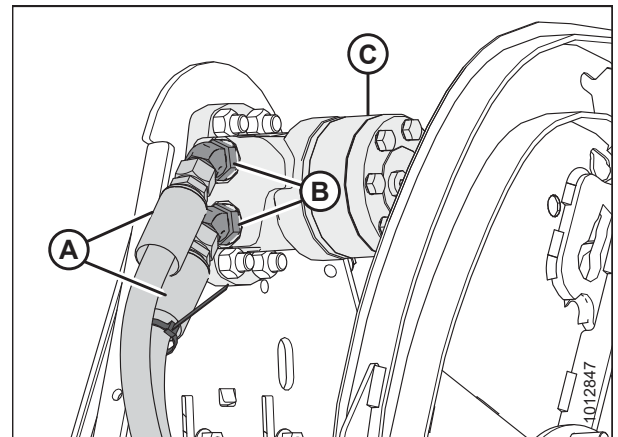


Figure 5.228: Reel Motor and Hoses

## 5.9.6 Replacing Drive Chain on Double Reel



**DANGER**

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

1. Shut down the windrower, and remove the key from the ignition.
2. Loosen the drive chain. For instructions, refer to [Loosening Reel Drive Chain, page 229](#).

## MAINTENANCE AND SERVICING

- Support the inboard end of the right reel with a front end loader and nylon slings (A) (or equivalent lifting device).

**IMPORTANT:**

Support the reel as close to the end disc as possible to avoid damaging or denting the center tube.

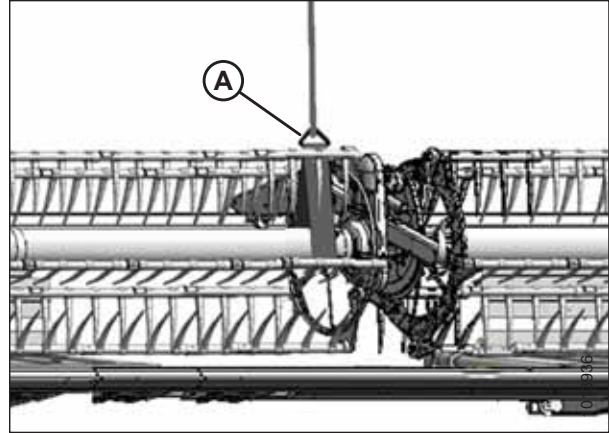


Figure 5.229: Supporting Reel

- Remove four bolts (A) securing the reel tube to U-joint flange (B).

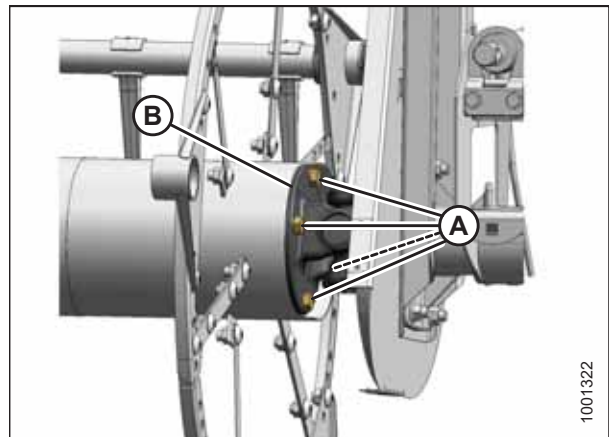


Figure 5.230: U-Joint

- Move the right reel sideways to separate reel tube (A) from U-joint (B).
- Remove drive chain (C).
- Route new chain (C) over U-joint (B) and position onto the sprockets.

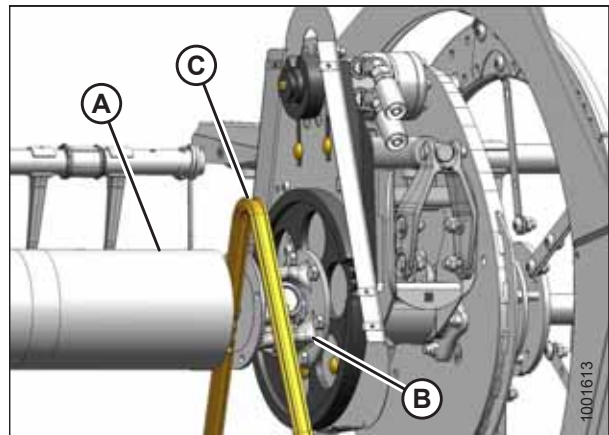


Figure 5.231: Replacing Chain

8. Position right reel tube (A) against the reel drive and engage the stub shaft into the U-joint pilot hole.
9. Rotate the reel until the holes in end of the reel tube and U-joint flange line up.
10. Apply medium-strength threadlocker (Loctite® 243 or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.
11. Torque to 102–115 Nm (75–85 lbf·ft).

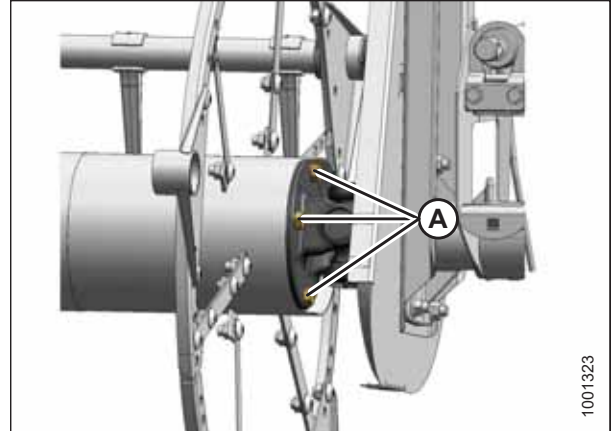


Figure 5.232: U-Joint

12. Remove temporary reel support (A).

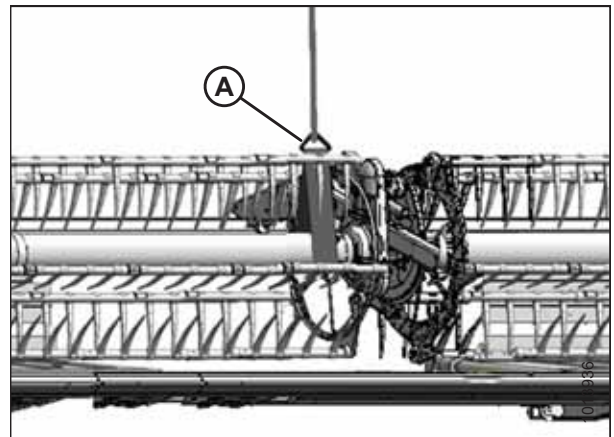


Figure 5.233: Supporting Reel

### 5.9.7 Replacing Drive Chain on Single Reel

1. Loosen the drive chain. For instructions, refer to [Loosening Reel Drive Chain, page 229](#).
2. Lift chain (A) off the drive sprocket (B).
3. Lower the chain until free of lower sprocket (C) and remove the chain from the drive.
4. Position new chain (A) around the bottom teeth on lower sprocket (C).
5. Lift the chain onto drive sprocket (B) ensuring all the links are properly engaged in the teeth.
6. Tighten the drive chain. For instructions, refer to [Tightening Reel Drive Chain, page 230](#).

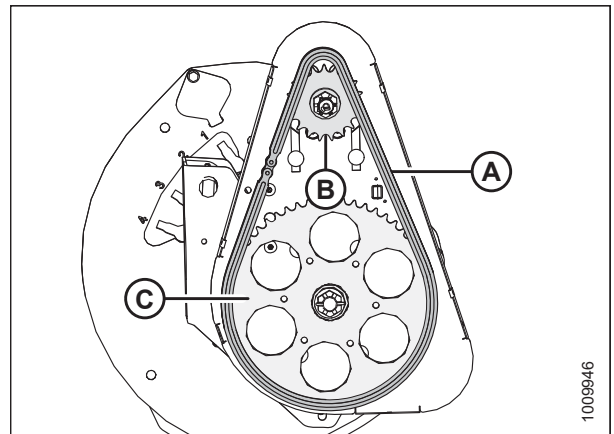


Figure 5.234: Reel Drive

## 5.10 Transport System (Optional)

Refer to [6.3.4 Stabilizer Wheels and Transport Package, page 251](#) for more information.

### 5.10.1 Checking Wheel Bolt Torque

If a transport system is installed, follow these steps to torque the wheel bolts:

1. Torque wheel bolts to 120 Nm (90 lbf-ft) using sequence shown at right.

**IMPORTANT:**

Whenever a wheel is removed and reinstalled, check the wheel bolt torque after one hour of operation and every 100 hours thereafter.

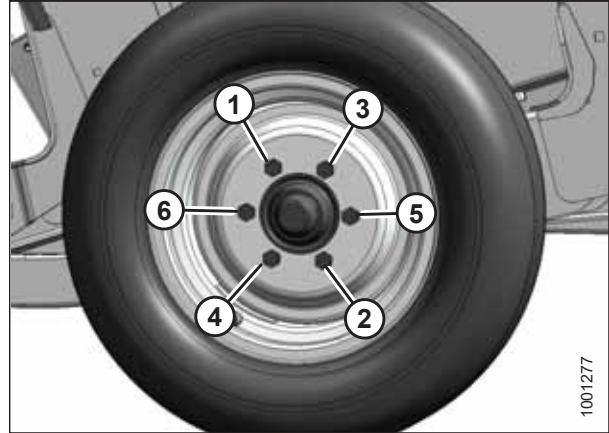
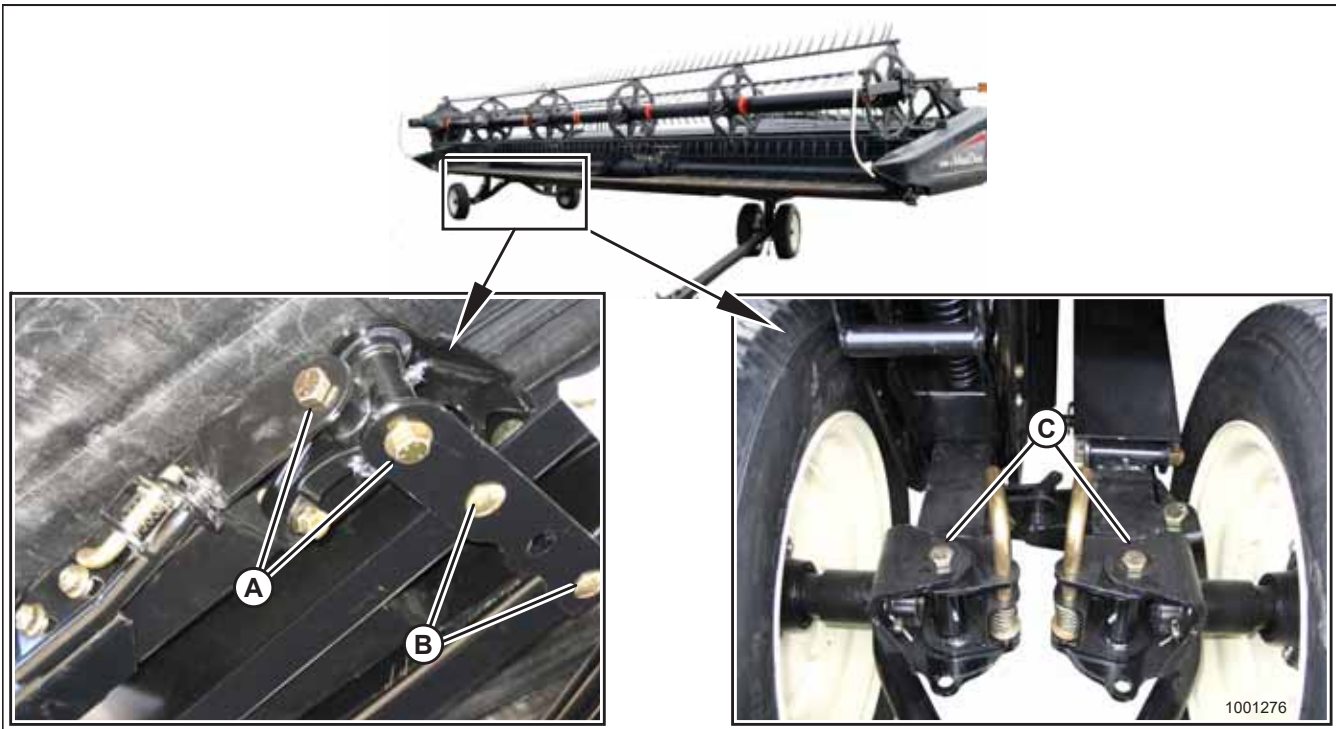


Figure 5.235: Bolt Tightening Sequence

### 5.10.2 Checking Axle Bolt Torque

If a transport system is installed, torque axle bolts as follows:

Figure 5.236: Axle Bolts



1. Check and tighten axle bolts **DAILY** until torque is maintained as follows:

- (A): 244 Nm (180 lbf-ft)
- (B): 203 Nm (150 lbf-ft)
- (C): 244 Nm (180 lbf-ft)

### 5.10.3 Checking Tire Pressure

Check the tire inflation pressure and inflate according to the information provided in Table 5.3, page 241.

Table 5.3 Tire Pressure for ST205/75 R15

Load Range	Pressure
D	448 kPa (65 psi)
E	552 kPa (80 psi)



#### WARNING

- Service tires safely.
- A tire can explode during inflation which could cause serious injury or death.
- Do NOT stand over tire. Use a clip-on chuck and extension hose.
- Do NOT exceed maximum inflation pressure indicated on tire label or sidewall.
- Replace tires that have defects.
- Replace wheel rims that are cracked, worn, or severely rusted.
- Never weld a wheel rim.
- Never use force on an inflated or partially inflated tire.
- Make sure the tire is correctly seated before inflating to operating pressure.
- If the tire is not correctly positioned on the rim or is overinflated, the tire bead can loosen on one side causing air to escape at high speed and with great force. An air leak of this nature can thrust the tire in any direction, endangering anyone in the area.
- Make sure all the air is removed from the tire before removing the tire from the rim.
- Do NOT remove, install, or repair a tire on a rim unless you have the proper equipment and experience to perform the job.
- Take the tire and rim to a qualified tire repair shop.

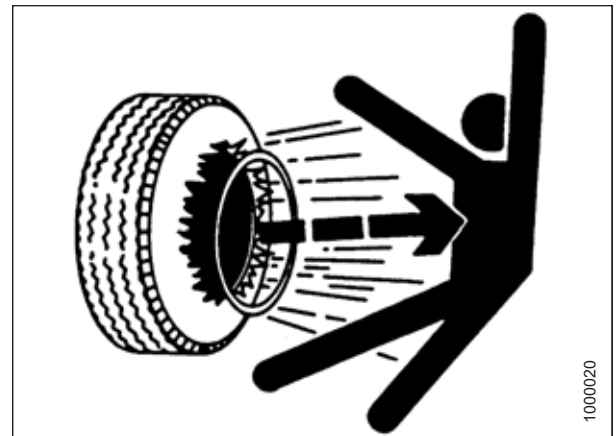


Figure 5.237: Inflation Warning



## Chapter 6: Options and Attachments

The following options and attachments are available for use with your header. See your MacDon Dealer for availability and ordering information.

### 6.1 Reel

#### 6.1.1 Multi-Crop Rapid Reel Conversion Kit

For use on double-reel headers only, the Multi-Crop Rapid Reel Conversion kit decreases the time required to change the fore-aft cylinder position on the reel support arm from the normal operating location to a farther aft location that minimizes crop disturbance. The kit also allows the reel fore-aft cylinders to be quickly moved to the normal operating location.

MD #B6590

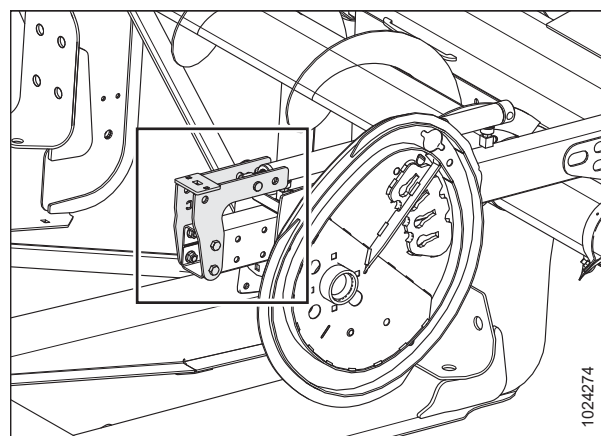


Figure 6.1: Center Arm – Left and Right Similar

#### 6.1.2 Reel Arm Extension Kit – North American-Configured Headers Only

This kit provides extensions for the outer reel support arms on a North American-configured D1 Series header. These extensions provide the additional reel arm length required to properly install a Vertical Knife Mount kit (MD #B6608, MD #B6609) onto the header. The Reel Arm Extension kit also includes reel fore-aft brackets allowing quick reel repositioning from the reel's most forward position to its most rearward position.

**NOTE:**

Parts removed from illustration for clarity.

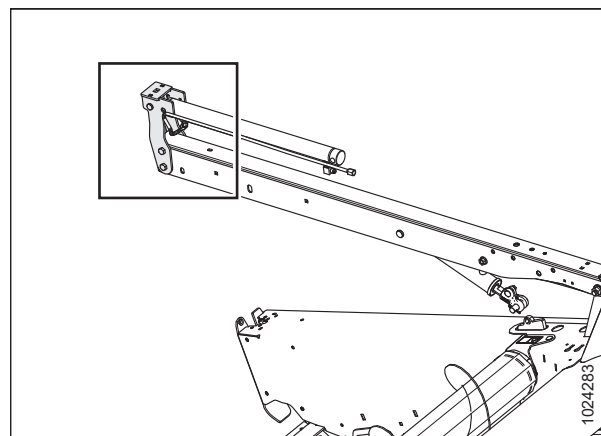


Figure 6.2: Right Arm – Center and Left Arms Similar



### 6.1.3 Lodged Crop Reel Finger Kit

Steel fingers (A) provided in the Lodged Crop Reel Finger kit attach to the ends of every other tine bar and help to clear material in heavy, hard-to-cut crops such as lodged rice.

Each kit contains three fingers for the cam end of the reel and three fingers for the tail end. Hardware and installation instructions are included in the kit.

MD #B4831

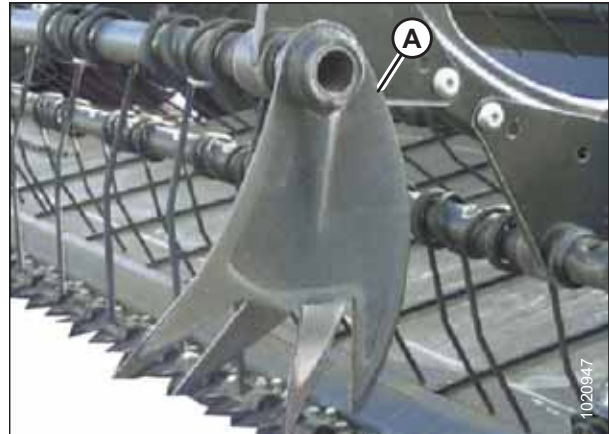


Figure 6.3: Lodged Crop Fingers



### 6.1.4 PR15 Tine Tube Reel Conversion Kit

These kits allow conversion from a six-bat reel to a nine-bat reel.

#### *Steel and Plastic Fingers*

- D115 – Steel Fingers – MD #B6514
- D115 – Plastic Fingers – MD #B6516
- D120 – Steel Fingers – MD #B6515
- D120 – Plastic Fingers – MD #B6517
- D125 – Steel Fingers – MD #B5656
- D125 – Plastic Fingers – MD #B5937
- D130 – Steel Fingers – MD #B5657
- D130 – Plastic Fingers – MD #B6029

#### **NOTE:**

You must also order additional reel endshields when converting the reel.

### 6.1.5 Reel Endshield Kit

The steel shields provided in the reel endshield kit attach to the ends of the reels and help to clear material in heavy, hard-to-cut crops. They are standard equipment on all headers (except those with nine-bat reels). Hardware and installation instructions are included in the kit.

See your MacDon Dealer for more information.

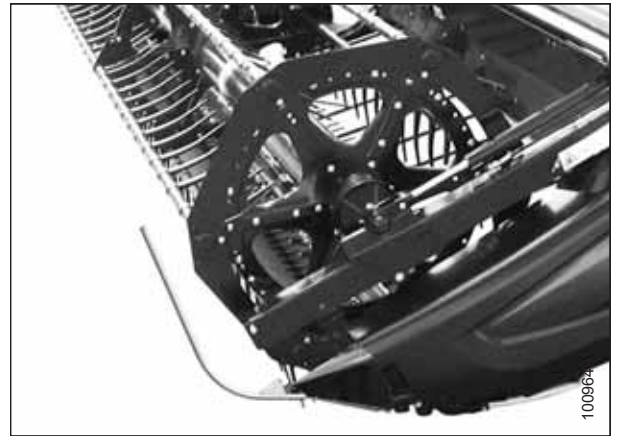


Figure 6.4: Reel Endshields

### 6.1.6 Tine Tube Reinforcing Kit

Tine tube reinforcing kits are available for five- and six-bat reels. They are designed to support high reel loads when cutting extremely heavy crops. Installation instructions are provided in the kit.

- Five-Bat Reels – MD #B5825
- Six-Bat Reels – MD #B5826



Figure 6.5: Five-Bat Reinforcing Kit Shown – Six-Bat Reinforcing Kit Similar

## 6.2 Cutterbar

### 6.2.1 Cutterbar Wearplate

Cutterbar wearplates are recommended for cutting on the ground when the soil is adhering to the steel.

Order one of the following bundles based on header size:

- D115 – MD #B4864
- D120 – MD #B4865
- D125 – MD #B4838
- D130 – MD #B4839
- D135 – MD #B4840
- D140 – MD #B4841
- D145 – MD #B5114



Figure 6.6: Cutterbar Wearplates

### 6.2.2 Knife Cutout Cover

Knife cutout covers attach to the endsheets and prevent cut crop, particularly severely lodged crop, from passing through the knifehead opening and accumulating in the knife drive box and endsheet.

Order the following kits according to your header size:

- D120–D125 – MD #220102 (stub guards)
- D130–D140 – MD #220103 (stub guards)

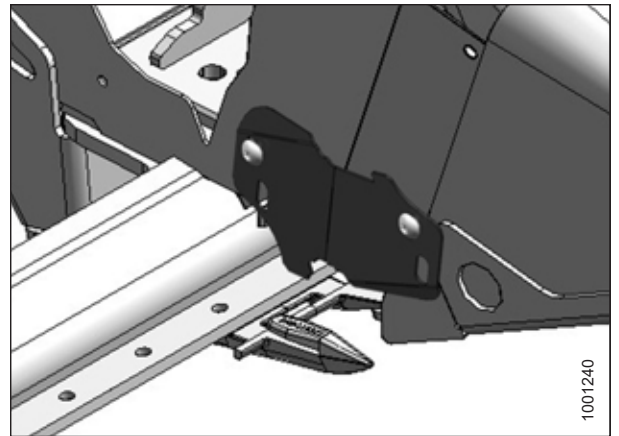


Figure 6.7: Knife Cutout Cover

### 6.2.3 Rock Retarder

Rock retarder (A) consists of a steel angle that is bolted to the cutterbar immediately aft of the knife, and helps prevent rocks and large debris from being swept onto the drapers with the crop. Installation instructions are included with the kit.

Order bundles by header size:

- D125, D130, and D135 – MD #B5084
- D140 and D145 – MD #B5085

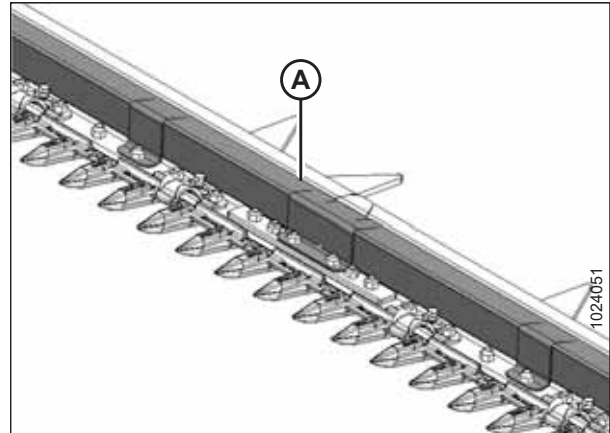


Figure 6.8: Rock Retarder

### 6.2.4 Stub Guard Conversion Kit

Stub guards, complete with top guides and adjuster shoes, are designed to cut tough crops.

Installation and adjustment instructions are included in the kits.

Order one of the following bundles according to your header size:

- 4.6 m (15 ft.) – MD #B5009
- 6.1 m (20 ft.) – MD #B5010
- 7.6 m (25 ft.) – MD #B5011
- 9.1 m (30 ft.) – MD #B5012
- 10.7 m (35 ft.) – MD #B5013

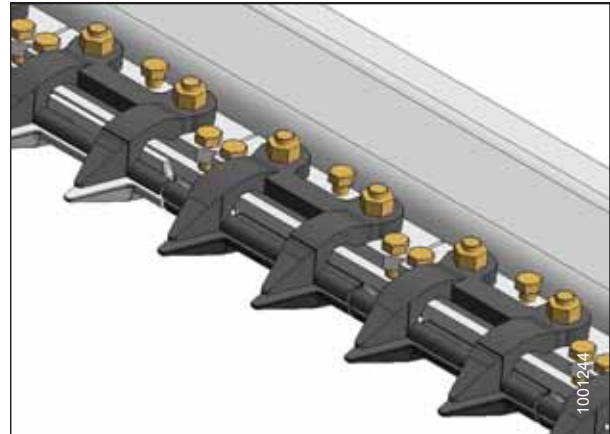


Figure 6.9: Stub Guards

### 6.2.5 Vertical Knife Mounts

The vertical knife mounts allow the installation of vertically oriented knives onto both ends of the header.

The vertical knives themselves are not sold by MacDon and must be purchased from a separate supplier.

Installation and adjustment instructions are included in the kits.

Order mount kits based on whether they will be installed on the left or right side of the header:

**NOTE:**

While the Right Vertical Knife Mount kit can be installed independently of the Left Vertical Knife Mount kit, the Left Vertical Knife Mount kit **must** be installed with the Right Vertical Knife Mount kit.

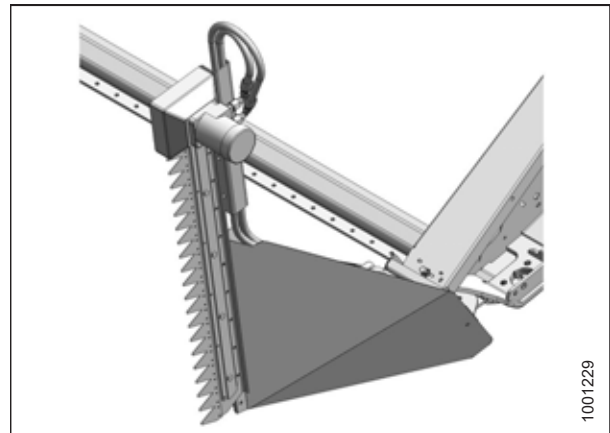


Figure 6.10: Vertical Knife Mount

## OPTIONS AND ATTACHMENTS

- Left – MD #B6608 (includes hardware and some plumbing. This mount requires installation of MD #B6609)
- Right – MD #B6609 (includes flow control, template, hardware, and some plumbing. This mount can be installed individually or with MD #B6608)

### 6.2.6 Vertical Knife Plumbing Kits

Order one of the following bundles according to your header type:

- D115 – MD #B6263
- D120 – MD #B6264
- D125 – MD #B6265
- D130 single reel – MD #B6266
- D130 double reel – MD #B6255
- D135 single reel – MD #B6267
- D135 double reel – MD #B6256
- D140 – MD #B6257

## 6.3 Header

### 6.3.1 Divider Quick Latch Kit

Divider Quick Latch kits attach to the endsheets. They allow for quick removal and storage of endsheet divider cones and, if required, reduce the transport width of the header. Installation instructions are included in the kit.

MD #B6158

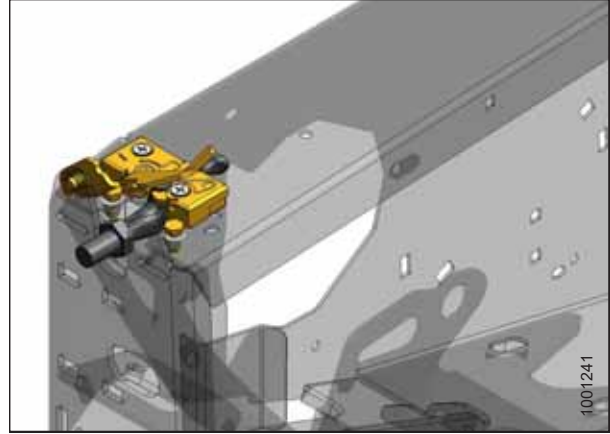


Figure 6.11: Divider Latch

### 6.3.2 Stabilizer Wheels

Stabilizer wheels help stabilize the header in field conditions that would otherwise cause the header to bounce, resulting in uneven cutting heights. Installation and adjustment instructions are included in the kit.

Available as an attachment for use with 9.1–12.2 m (30–40 ft.) headers.

MD #C1986

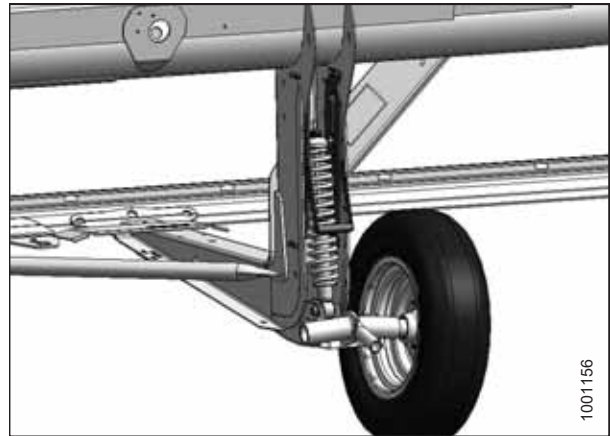


Figure 6.12: Stabilizer Wheel

### 6.3.3 Secondary Stabilizer Wheel

The secondary stabilizer wheel is added to existing stabilizer wheels to help stabilize the header in field conditions that would otherwise cause the header to bounce and result in uneven cutting height. Installation and adjustment instructions are included with the kit.

Available as an attachment for use with 9.1 m–12.2 m (30–40 ft.) headers.

MD #B6179<sup>46</sup>

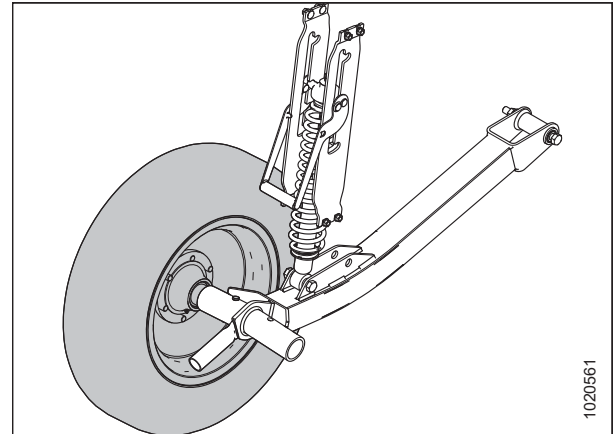


Figure 6.13: Secondary Stabilizer Wheel

### 6.3.4 Stabilizer Wheels and Transport Package

The Stabilizer Wheels and Transport Package help to stabilize the header in field conditions that would otherwise cause the header to bounce, resulting in uneven cutting heights. This system is similar to the Stabilizer Wheel (MD #C1986) option. For instructions, refer to [6.3.2 Stabilizer Wheels, page 250](#).

The Stabilizer Wheels and Transport Package are also used to convert the header into transport mode for slow-speed towing behind a properly-configured windrower (or agricultural tractor). A tow pole and installation instructions are included in the kit.

This option is available for use with 9.1–12.2 m (30–40 ft.) headers.

MD #C2007

MD #C2008



Figure 6.14: Stabilizer Wheels and Transport

46. Kit consists of one wheel assembly; two kits are required to upgrade both sides of the header.

### 6.3.5 Skid Shoe Kits

Skid Shoe kits provide improved performance when cutting low to the ground.

Installation instructions are included in the kits.

- MD #B5615 – Inboard Skid Shoes
- MD #B4963 – Outboard Skid Shoes

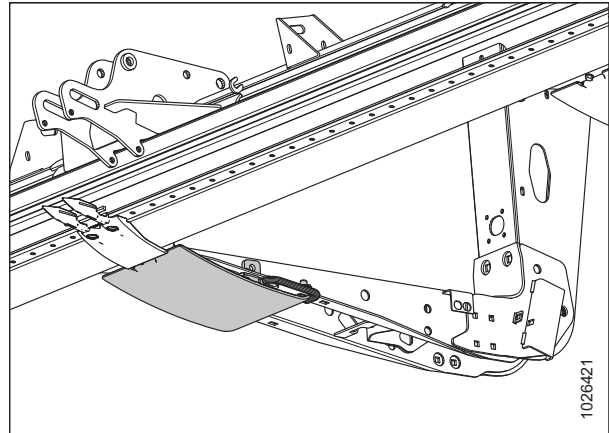


Figure 6.15: Center Skid Shoe – Inboard Shown, Outboard Similar

### 6.3.6 Steel Skid Shoes

**IMPORTANT:**

Not recommended for wet mud or conditions prone to sparking.

Steel skid shoes offer extra abrasion resistance.

Installation instructions are included with kit.

MD #B6583

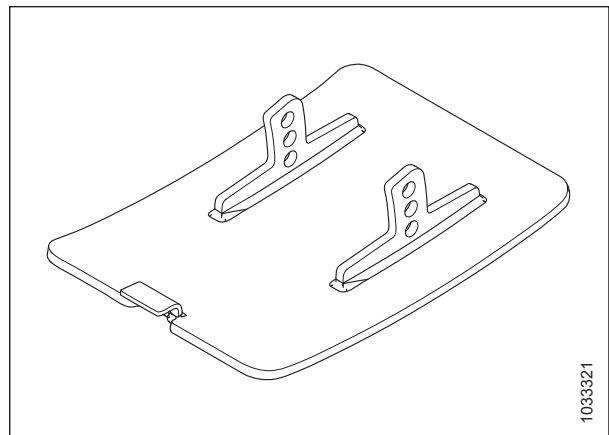


Figure 6.16: Steel Skid Shoe



## 6.4 Crop Delivery

### 6.4.1 Wide Draper Deflector

Wide metal draper deflectors attach to the inboard side of the endsheets to prevent material from falling through the gap between the endsheet and the draper.

Installation instructions are included with the kit.

**IMPORTANT:**

The wide draper deflector is **NOT** compatible with the Lodged Crop Reel Finger (MD #B4831) option.

MD #B6551

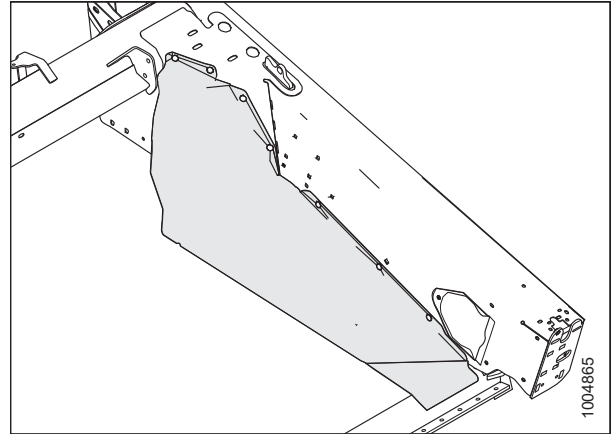


Figure 6.17: Wide Draper Deflector

### 6.4.2 Draper Clips

Draper clips offer additional wear protection for the draper cleats. They may prove useful in situations where conditions are dry or consistently hot.

Installation instructions are included with the kit.

- MD #294859 for square cleats (for drapers MD #172195, MD #172196, MD #172197, MD #172198)
- MD #294858 for tapered cleats (for drapers MD #220635, MD #220636, MD #220637, MD #220638, MD #220639, MD #220640)

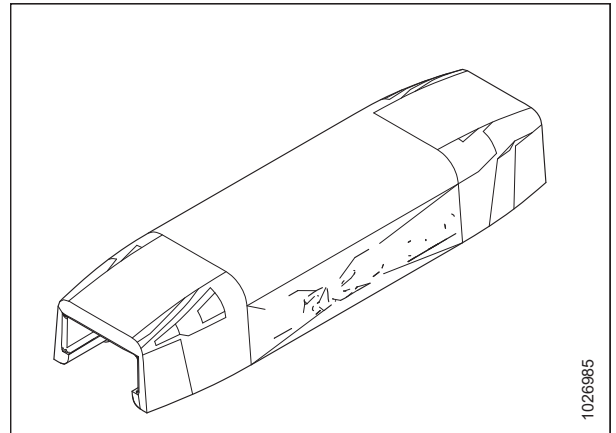


Figure 6.18: Draper Clip

### 6.4.3 Upper Cross Auger

Upper Cross Auger (A) attaches in front of the backtube and 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-feed crops.

Order from the following list of kits according to your header model:

- D115 – MD #B6280
- D120 – MD #B6281
- D125 – MD #B6461
- D130 – MD #B6462
- D135 – MD #B6463
- D140 – MD #B6464

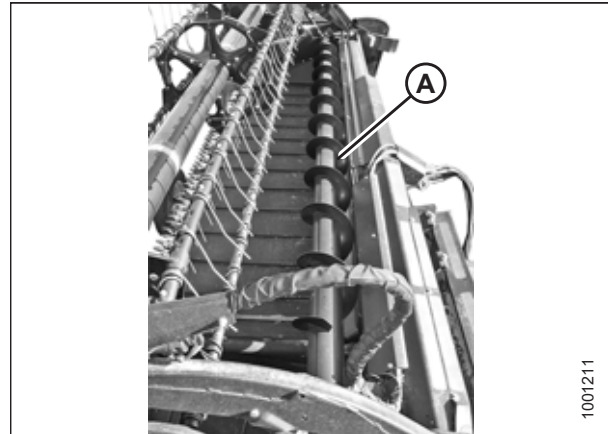


Figure 6.19: Upper Cross Auger

### 6.4.4 Rice Divider Rods

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.

Installation instructions are included in the kit.

MD #B5609



Figure 6.20: Rice Divider Rod

### 6.4.5 Double Draper Drive Kit

The Double Draper Drive (DDD) kit provides power to four draper rollers instead of the usual two in order to minimize draper slipping when using the side delivery feature in heavy forage crops.

Installation instructions are included in the kit.

**NOTE:**

The draper slip sensor is disabled with the installation of this kit.

Available for 10.7–12.2 m (30–40 ft.) headers.

MD #B6154

### 6.4.6 Double Windrow Attachment (DWA)

The DWA lays up to 14.6 m (48 ft.) of crop in a single windrow which is ideal for large forage harvesters. It is designed to mount only on SP windrowers equipped with an HC10 Conditioner.

MD #C1987



Figure 6.21: Double Windrow Attachment

### 6.4.7 Draper Extension Kit

The draper extension kit increases the inboard length of each deck up to 500 mm (20 in.) which narrows the header opening and decreases windrow width when cutting light/thin crops.

The kit includes roller support extensions, a draper repair kit, all necessary hardware, and installation instructions.

MD #B5407

### 6.4.8 Swath Forming Rods (Center Delivery)

Swath forming rods form windrows so the heads are in the center and protected from shatter. Swath forming rods are mainly used for grass seed cutting applications.

Installation and adjustment instructions are included with the kit.

MD #B4803



Figure 6.22: Swath Forming Rods

### 6.4.9 HC10 Hay Conditioner

The HC10 Hay Conditioner lays uniform, fluffy windrows. Conditioning or crimping the cut hay allows the release of moisture, resulting in faster drying times and earlier processing.

A parts list and installation and operating instructions are included with the kit.

MD #C1982

**NOTE:**

Not for use on M205 Windrower.

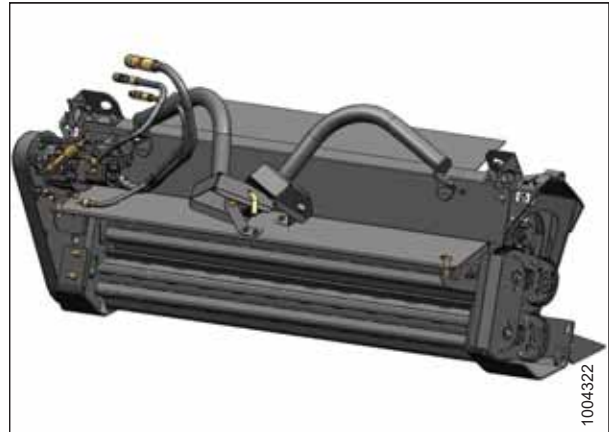


Figure 6.23: Hay Conditioner

### 6.4.10 Hydraulic Deck Shift Package

This system allows Operators to shift the decks using the in-cab console when double-swathing.

Installation and adjustment instructions are included with the kit.

Available on 7.6–12.2 m (25–40 ft.) headers.

MD #B6474

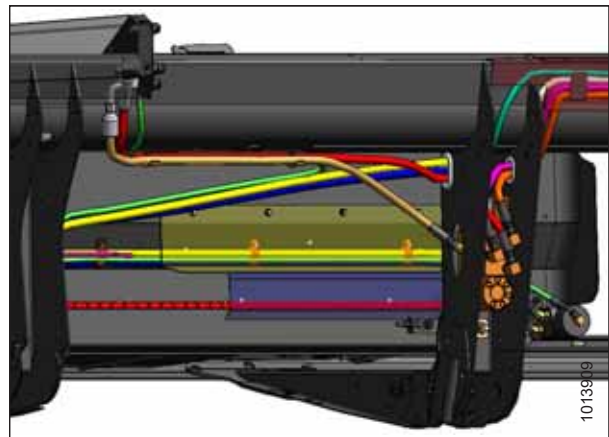


Figure 6.24: Hydraulic Deck Shift

### 6.4.11 Upper Cross Auger (UCA) Case Drain Kit for Single Draper Drive (SDD)

This kit is intended for SDD headers equipped with an UCA and is applicable to all M Series windrowers, except the M205.

MD #B5842

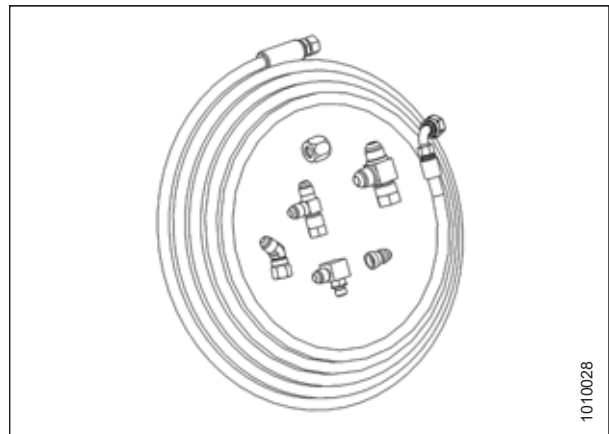


Figure 6.25: Case Drain

## 6.5 Service Kits

Service kits are now available for draper headers. They contain parts that should get you through the first season assuming normal wear and minor issues.

Service Kit – D1 for Windrowers (Fine Sections) – B5953

- Includes various service items for all configurations with fine sections, pointed guards, heavy duty plastic fingers.

Service Kit – D1 for Windrowers (Coarse Sections) – B5954

- Includes various service items for all configurations with coarse sections, pointed guards, heavy duty plastic fingers.



## Chapter 7: Troubleshooting

### 7.1 Crop Loss at Cutterbar

Problem	Solution	Refer to
<b>Symptom: Does Not Pick Up Down Crop</b>		
Cutterbar too high	Lower cutterbar	<a href="#">3.7.1 Cutting Height, page 51</a>
Header angle too low	Increase header angle	<a href="#">Controlling Header Angle, page 56</a>
Reel too high	Lower reel	<a href="#">3.7.10 Reel Height, page 60</a>
Reel too far back	Move reel forward	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
Ground speed too fast for reel speed	Reduce ground speed or increase reel speed	<ul style="list-style-type: none"> <li><a href="#">3.7.6 Reel Speed, page 57</a></li> <li><a href="#">3.7.7 Ground Speed, page 57</a></li> </ul>
Reel fingers not lifting crop sufficiently	Increase finger pitch aggressiveness	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
Reel fingers not lifting crop sufficiently	Install lifter guards	See your MacDon Dealer
<b>Symptom: Heads Shattering or Breaking Off</b>		
Reel speed too fast	Reduce reel speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Reel too low	Raise reel	<a href="#">3.7.10 Reel Height, page 60</a>
Ground speed too fast	Reduce ground speed	<a href="#">3.7.7 Ground Speed, page 57</a>
Crop too ripe	Operate at night when humidity is higher	—
<b>Symptom: Cut Grain Falling Ahead of Cutterbar</b>		
Ground speed too slow	Increase ground speed	<a href="#">3.7.7 Ground Speed, page 57</a>
Reel speed too slow	Increase reel speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Reel too high	Lower reel	<a href="#">3.7.10 Reel Height, page 60</a>
Cutterbar too high	Lower cutterbar	<a href="#">3.7.1 Cutting Height, page 51</a>
Reel too far forward	Move reel back on arms	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
Cutting at speeds over 10 km/h (6 mph) with high torque (10-tooth) reel drive sprocket	Replace with standard torque (19-tooth) reel drive sprocket	<ul style="list-style-type: none"> <li><a href="#">5.9.3 Replacing Reel Drive Sprocket, page 232</a></li> <li>See your MacDon Dealer</li> </ul>
Worn or broken knife components	Replace components	<a href="#">5.5 Knife, page 139</a>

## TROUBLESHOOTING

Problem	Solution	Refer to
<b>Symptom: Strips of Uncut Material</b>		
Crowding uncut crop	Allow enough room for crop to be fed to cutterbar	—
Broken knife sections	Replace broken sections	<a href="#">5.5.1 Replacing Knife Section, page 139</a>
<b>Symptom: Excessive Bouncing at Normal Field Speed</b>		
Float set too light	Adjust header float	<a href="#">3.7.4 Header Float, page 56</a>
<b>Symptom: Divider Rod Running Down Standing Crop</b>		
Divider rods too long	Remove divider rod	<a href="#">3.7.14 Crop Divider Rods, page 77</a>
<b>Symptom: Bushy or Tangled Crop Flows over Divider Rod, Builds Up on Endsheets</b>		
Divider rods providing insufficient separation	Install long divider rods	<a href="#">3.7.14 Crop Divider Rods, page 77</a>
<b>Symptom: Crop Not Being Cut at Ends</b>		
Reel not frowning or not centered in header	Adjust reel frown or reel horizontal position	<ul style="list-style-type: none"> <li><a href="#">3.7.11 Reel Fore-Aft Position, page 60</a></li> <li><a href="#">5.8.2 Reel Frown, page 205</a></li> </ul>
Knife hold-downs not adjusted properly	Adjust hold-downs so knife works freely, but still keep sections from lifting off guards	<ul style="list-style-type: none"> <li><a href="#">Adjusting Pointed Guard Hold-Downs, page 152</a></li> <li><a href="#">Adjusting Stub Guard Hold-Downs, page 153</a></li> </ul>
Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	<a href="#">5.5 Knife, page 139</a>
Header is not level	Level header	<a href="#">3.12 Leveling Header, page 91</a>
Reel fingers not lifting crop properly ahead of knife	Adjust reel position / finger pitch	<ul style="list-style-type: none"> <li><a href="#">3.7.11 Reel Fore-Aft Position, page 60</a></li> <li><a href="#">3.7.12 Reel Tine Pitch, page 69</a></li> </ul>
Divider runs down thick crop at ends, preventing proper feeding due to material bridging the cutter guards	Replace three or four end guards with stub guards	<ul style="list-style-type: none"> <li><a href="#">5.5.7 Knife Guards, page 144</a></li> <li><a href="#">6.2.4 Stub Guard Conversion Kit, page 248</a></li> <li>See your MacDon Dealer</li> </ul>
<b>Symptom: Material Accumulating in Gap between Cutout in Endsheets and Knifehead</b>		
Crop heads leaning away from knifehead hole in endsheet	Add knifehead shield(s), except in damp/sticky soils	<a href="#">5.5.8 Knifehead Shield, page 154</a>



## 7.2 Cutting Action and Knife Components

Problem	Solution	Refer to
<b>Symptom: Ragged or Uneven Cutting of Crop</b>		
Knife hold-downs not adjusted properly	Adjust hold-downs	<i>Checking Knife Hold-Downs, page 151</i>
Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	<i>5.5 Knife, page 139</i>
Knife is not operating at recommended speed	Check engine speed of windrower	Refer to your windrower operator's manual
Ground speed too fast for reel speed	Reduce ground speed or increase reel speed	<ul style="list-style-type: none"> <li>• <i>3.7.7 Ground Speed, page 57</i></li> <li>• <i>3.7.6 Reel Speed, page 57</i></li> </ul>
Reel fingers not lifting crop properly ahead of knife	Adjust reel position / finger pitch	<ul style="list-style-type: none"> <li>• <i>3.7.11 Reel Fore-Aft Position, page 60</i></li> <li>• <i>3.7.12 Reel Tine Pitch, page 69</i></li> </ul>
Cutterbar too high	Lower cutting height	<i>3.7.1 Cutting Height, page 51</i>
Header angle too flat	Steepen header angle	<i>Controlling Header Angle, page 56</i>
Bent knife, causing binding of cutting parts	Straighten a bent knife. Align guards	<i>5.5.7 Knife Guards, page 144</i>
Cutting edge of guards not close enough, or parallel to knife sections	Align guards	<i>5.5.7 Knife Guards, page 144</i>
Tangled / tough to cut crop	Install stub guards	<ul style="list-style-type: none"> <li>• <i>5.5.7 Knife Guards, page 144</i></li> <li>• <i>6.2.4 Stub Guard Conversion Kit, page 248</i></li> <li>• See your MacDon Dealer</li> </ul>
Reel too far back	Move reel forward	<i>3.7.11 Reel Fore-Aft Position, page 60</i>
Loose knife drive belt	Adjust drive belt tension	<ul style="list-style-type: none"> <li>• <i>Tensioning Untimed Knife Drive Belts, page 166</i></li> <li>• <i>Tensioning Timed Knife Drive Belts, page 171</i></li> </ul>

## TROUBLESHOOTING

Problem	Solution	Refer to
<b>Symptom: Knife Plugging</b>		
Reel too high or too far forward	Lower reel or move reel rearward	<ul style="list-style-type: none"> <li>3.7.10 Reel Height, page 60</li> <li>3.7.11 Reel Fore-Aft Position, page 60</li> </ul>
Ground speed too slow	Increase ground speed	3.7.6 Reel Speed, page 57
Loose knife drive belt	Adjust drive belt tension	<ul style="list-style-type: none"> <li>Tensioning Untimed Knife Drive Belts, page 166</li> <li>Tensioning Timed Knife Drive Belts, page 171</li> </ul>
Improper knife hold-down adjustment	Adjust hold-down	Checking Knife Hold-Downs, page 151
Dull or broken knife sections	Replace knife section	5.5.1 Replacing Knife Section, page 139
Bent or broken guards	Align or replace guards	5.5.7 Knife Guards, page 144
Reel fingers not lifting crop properly ahead of knife	Adjust reel position / finger pitch	<ul style="list-style-type: none"> <li>3.7.11 Reel Fore-Aft Position, page 60</li> <li>3.7.12 Reel Tine Pitch, page 69</li> </ul>
Steel pick-up fingers contacting knife	Increase reel clearance to cutterbar, or adjust frown	<ul style="list-style-type: none"> <li>5.8.1 Reel Clearance to Cutterbar, page 201</li> <li>5.8.2 Reel Frown, page 205</li> </ul>
Float too heavy	Adjust springs for lighter float	3.7.4 Header Float, page 56
Mud or dirt build up on cutterbar	Raise cutterbar by lowering skid shoes	3.7.3 Cutting on the Ground, page 54
Mud or dirt build up on cutterbar	Install cut-out sections	See your MacDon Dealer
Mud or dirt build up on cutterbar	Flatten header angle	Controlling Header Angle, page 56
Knife is not operating at recommended speed	Check engine speed of windrower	Refer to your windrower's operator's manual

## TROUBLESHOOTING

Problem	Solution	Refer to
<b>Symptom: Excessive Header Vibration</b>		
Knife hold-downs not adjusted properly	Adjust hold-downs	<a href="#">Checking Knife Hold-Downs, page 151</a>
Knives on double-knife drive not timed	Adjust knife timing	<a href="#">Adjusting Double-Knife Timing, page 173</a>
Knife not operating at recommended speed	Check engine speed of windrower	Refer to your windrower's operator's manual
Excessive knife wear	Replace knife	<ul style="list-style-type: none"> <li>• <a href="#">5.5.2 Removing Knife, page 140</a></li> <li>• <a href="#">5.5.5 Installing Knife, page 142</a></li> </ul>
Loose or worn knifehead pin or drive arm	Tighten or replace parts	<ul style="list-style-type: none"> <li>• <a href="#">5.5.3 Removing Knifehead Bearing, page 141</a></li> <li>• <a href="#">5.6.1 Knife Drive Box, page 156</a></li> </ul>
Bent cutterbar	Straighten cutterbar	See your MacDon Dealer
<b>Symptom: Knife Back Breakage</b>		
Bent or broken guard	Straighten or replace guard	<a href="#">5.5.7 Knife Guards, page 144</a>
Worn knifehead pin	Replace knifehead pin	<a href="#">5.5.3 Removing Knifehead Bearing, page 141</a>
Dull knife	Replace knife	<ul style="list-style-type: none"> <li>• <a href="#">5.5.2 Removing Knife, page 140</a></li> <li>• <a href="#">5.5.5 Installing Knife, page 142</a></li> </ul>
<b>Symptom: Excessive Breakage of Knife Sections or Guards</b>		
Knife hold-downs not adjusted properly	Adjust hold-downs	<a href="#">Checking Knife Hold-Downs, page 151</a>
Cutterbar operating too low in stony conditions	Raise cutterbar, using skid shoes	<a href="#">3.7.3 Cutting on the Ground, page 54</a>
Float is set too heavy	Adjust for lighter float	<a href="#">3.7.4 Header Float, page 56</a>
Bent or broken guard	Straighten or replace	<a href="#">5.5.7 Knife Guards, page 144</a>
Header angle too steep	Flatten header angle	<a href="#">Controlling Header Angle, page 56</a>

## 7.3 Reel Delivery

Problem	Solution	Refer to
<b>Symptom: Reel Not Releasing Material in Normal Standing Crop</b>		
Reel speed too fast	Reduce reel speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Reel too low	Raise reel	<a href="#">3.7.10 Reel Height, page 60</a>
Reel tines too aggressive	Reduce cam setting	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
Reel too far back	Move reel forward	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
<b>Symptom: Reel Not Releasing Material in Lodged and Standing Crop (Reel Fully Lowered)</b>		
Reel tines too aggressive for standing crop	Reduce cam setting (1 or 2)	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
<b>Symptom: Wrapping on Reel End</b>		
Reel tines too aggressive	Reduce cam setting	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
Reel too low	Raise reel	<a href="#">3.7.10 Reel Height, page 60</a>
Reel speed too fast	Reduce reel speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Crop conditions	Install optional endshields	See your MacDon Dealer
Reel not centered in header	Center reel in header	<a href="#">5.8.3 Centering Reel, page 206</a>
<b>Symptom: Reel Releases Crop too Quickly</b>		
Reel tines not aggressive enough	Increase cam setting	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
Reel too far forward	Move reel back	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
<b>Symptom: Reel Will Not Lift</b>		
Reel lift couplers are incompatible or defective	Change quick coupler	—
<b>Symptom: Reel Will Not Turn</b>		
Control set at 0	Activate reel speed control	<a href="#">3.7.6 Reel Speed, page 57</a>
Quick couplers not properly connected	Connect couplers	<a href="#">4.1 Attaching Header to Windrower, page 113</a>
Reel drive chain disconnected	Connect chain	<a href="#">5.9.7 Replacing Drive Chain on Single Reel, page 239</a>
<b>Symptom: Reel Motion Uneven under no Load</b>		
Excessive slack in reel drive chain	Tighten chain	<a href="#">5.9.2 Adjusting Reel Drive Chain Tension, page 229</a>

## TROUBLESHOOTING

Problem	Solution	Refer to
<b>Symptom: Reel Motion is Uneven or Stalls in Heavy Crops</b>		
Reel speed too fast	Reduce reel speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Reel fingers not aggressive enough	Move to a more aggressive finger pitch notch	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
Reel too low	Raise reel	<a href="#">3.7.10 Reel Height, page 60</a>
Relief valve on windrower has low relief pressure setting	Increase relief pressure to manufacturer's recommendations	Refer to the windrower operator's manual
Low oil reservoir level on windrower (sometimes more than one reservoir)	Fill to proper level	Refer to the windrower operator's manual
Relief valve malfunction	Replace relief valve	Refer to the windrower operator's manual
Cutting tough crops with standard torque (19-tooth) reel drive sprocket	Replace with high torque (10-tooth) or 14-tooth reel drive sprocket	<a href="#">Optional Reel Drive Sprockets, page 57</a>
<b>Symptom: Plastic Fingers Cut at Tip</b>		
Insufficient reel to cutterbar clearance	Increase clearance	<a href="#">5.8.1 Reel Clearance to Cutterbar, page 201</a>
<b>Symptom: Plastic Fingers Bent Rearward at Tip</b>		
Reel digging into ground with reel speed slower than ground speed	Raise header	<a href="#">3.7.1 Cutting Height, page 51</a>
Reel digging into ground with reel speed slower than ground speed	Decrease header tilt	<a href="#">Controlling Header Angle, page 56</a>
Reel digging into ground with reel speed slower than ground speed	Move reel aft	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
<b>Symptom: Plastic Fingers Bent Forward at Tip (Opposite of Above)</b>		
Reel digging into ground with reel speed faster than ground speed	Raise header	<a href="#">3.7.1 Cutting Height, page 51</a>
Reel digging into ground with reel speed faster than ground speed	Decrease header tilt	<a href="#">Controlling Header Angle, page 56</a>
Reel digging into ground with reel speed faster than ground speed	Move reel aft	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</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 plugging/cutting issues	<a href="#">3.13 Unplugging Cutterbar, page 92</a>
Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation	Stop reel before plugging becomes excessive	—

## 7.4 Header and Drapers

Problem	Solution	Refer to
<b>Symptom: Insufficient Header Lift</b>		
Low relief pressure	Increase relief pressure	See your MacDon Dealer
<b>Symptom: Insufficient Draper Speed</b>		
Speed control set too low	Increase control setting	<a href="#">3.7.8 Draper Speed, page 58</a>
Relief pressure too low	Increase relief pressure to recommended setting	See your MacDon Dealer
Windrower header drive too slow	Adjust to correct speed for windrower model	Refer to windrower operator's manual
Worn out gear pump	Replace pump	See your MacDon Dealer
Pressure compensator (V7) set too low	Adjust to increase setting	Refer to windrower operator's manual
<b>Symptom: Draper Will Not Move</b>		
Drapers are loose	Tighten drapers	<a href="#">5.7.3 Adjusting Draper Tension, page 183</a>
Drive or idler roller wrapped with material	Loosen draper and clean rollers	<a href="#">5.7.3 Adjusting Draper Tension, page 183</a>
Slat or connector bar jammed by frame or material	Loosen draper and clear obstruction	<a href="#">5.7.3 Adjusting Draper Tension, page 183</a>
Roller bearing seized	Replace bearing	<a href="#">5.7.6 Side Draper Roller Maintenance, page 189</a>
Low hydraulic oil	Fill windrower reservoir to full level	See your MacDon Dealer
Incorrect relief setting at flow control valve	Adjust relief setting	See your MacDon Dealer
<b>Symptom: Draper Stalling</b>		
Material not feeding evenly off knife	Lower reel	<a href="#">3.7.10 Reel Height, page 60</a>
Material not feeding evenly off knife	Install stub guards	<ul style="list-style-type: none"> <li>• <a href="#">6.2.4 Stub Guard Conversion Kit, page 248</a></li> <li>• <a href="#">5.5.7 Knife Guards, page 144</a></li> <li>• See your MacDon Dealer</li> </ul>
<b>Symptom: Hesitation in Flow of Bulky Crop</b>		
Header angle too low	Increase header angle	<a href="#">Controlling Header Angle, page 56</a>
Material overload on drapers	Increase side draper speed	<a href="#">3.7.8 Draper Speed, page 58</a>
Material overload on drapers	Install upper cross auger	<a href="#">6.4.3 Upper Cross Auger, page 254</a>
Material overload on drapers	Add flighting extensions	See your MacDon Dealer
<b>Symptom: Drapers Back Feed</b>		
Drapers running too slow in heavy crop	Increase draper speed	<a href="#">3.7.8 Draper Speed, page 58</a>

## TROUBLESHOOTING

Problem	Solution	Refer to
<b>Symptom: Crop is Thrown Across Opening and under Opposite Side Draper</b>		
Drapers running too fast in light crop	Reduce draper speed	<a href="#">3.7.8 Draper Speed, page 58</a>
<b>Symptom: Material Accumulates inside or under Front Edge of Draper</b>		
Deck height improperly adjusted	Adjust deck height	<a href="#">5.7.5 Adjusting Deck Height, page 186</a>
<b>Symptom: Material Wrapping at Upper Cross Auger Beater Bars</b>		
Crop conditions do not require beater bars	Remove beater bars	<a href="#">3.14.1 Removing Beater Bars, page 93</a>
<b>Symptom: Material Accumulating on End Deflectors and Releasing in Bunches</b>		
End deflectors too wide	For headers with manual deck shift only, trim deflector or replace with narrow deflector (MD #172381)	<a href="#">3.13 Unplugging Cutterbar, page 92</a>

## 7.5 Cutting Edible Beans

Problem	Solution	Refer to
<b>Symptom: Plants Being Stripped and Complete or Partial Plants Left Behind</b>		
Header off ground	Lower header to ground and run on skid shoes and/or cutterbar	<a href="#">3.7.3 Cutting on the Ground, page 54</a>
Float set too light—rides on high spots and does not lower soon enough	Set float as follows: <ul style="list-style-type: none"> <li>• Dry ground: 445-667 N (100–150 lbf)</li> <li>• Wet ground: 222–445 N (50–100 lbf)</li> </ul>	<a href="#">3.7.4 Header Float, page 56</a>
Reel too high	Fully retract reel cylinders	<a href="#">3.7.10 Reel Height, page 60</a>
Reel too high with cylinders fully retracted	Adjust reel height	<a href="#">3.7.10 Reel Height, page 60</a>
Finger pitch not aggressive enough	Adjust finger pitch	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
Reel too far aft	Move reel forward until the fingertips skim the soil surface with header on the ground and the center-link properly adjusted	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
Header angle too shallow	Lengthen center-link	<a href="#">Controlling Header Angle, page 56</a>
Header angle too shallow	If cutting on ground, header angle can be increased by fully retracting lift cylinders	<a href="#">Controlling Header Angle, page 56</a>
Reel too slow	Adjust reel speed to be marginally faster than ground speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Ground speed too fast	Lower ground speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Skid shoes too low	Raise skid shoes to highest setting	<a href="#">3.7.3 Cutting on the Ground, page 54</a>
Dirt packs on bottom of cutterbar and raises cutterbar off the ground	Install plastic wear strips on bottom of cutterbar and skid shoes	See your MacDon Dealer
Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar and raises cutterbar off the ground	Ground too wet. Allow soil to dry	—
Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar and raises cutterbar off the ground	Manually clean the bottom of cutterbar when accumulation gets unacceptable	—
Plastic wear strip for cutterbar has been installed over top of steel wearplates	Remove steel cutterbar wearplates when installing the plastic wear strips for cutterbar	—
Header not level	Level header	<a href="#">3.12 Leveling Header, page 91</a>
Worn/damaged knife sections	Replace sections or complete knife	<a href="#">5.5 Knife, page 139</a>



## TROUBLESHOOTING

Problem	Solution	Refer to
Parts of vines get caught in pointed guard tip. (Occurs more in row-cropped beans that are hilled from cultivating)	Install stub guard kit	<a href="#">6.2.4 Stub Guard Conversion Kit, page 248</a>
<b>Symptom: Excessive Losses at Dividers</b>		
Divider rod running down crop and shattering pods	Remove divider rod	<a href="#">3.7.14 Crop Divider Rods, page 77</a>
Vines and plants build up on endsheet	Install divider rod	<a href="#">3.7.14 Crop Divider Rods, page 77</a>
<b>Plant Vines Pinched between Top of Draper and Cutterbar</b>		
Cutterbar has filled up with trash with draper to cutterbar gap properly adjusted	Raise header fully at each end of field, or as required and shift decks back and forth to help clean out cutterbar	—
Shifting of decks with header raised does not clean out cutterbar debris	Manually remove debris from cutterbar cavity to prevent damage to drapers	—
<b>Symptom: Crop Accumulating at Guards and Not Moving Rearward onto Drapers</b>		
Reel finger pitch not aggressive enough	Increase finger aggressiveness (cam position)	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
Reel too high	Lower reel	<a href="#">3.7.10 Reel Height, page 60</a>
Minimum reel clearance to cutterbar setting too high	Readjust reel minimum height with cylinders fully retracted	<a href="#">Adjusting Reel Clearance, page 204</a>
Reel too far forward	Reposition reel	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
<b>Symptom: Reel Shattering Pods</b>		
Reel too far forward	Reposition reel	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
Reel speed too high	Reduce reel speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Bean pods are too dry	Cut at night with heavy dew once pods have softened	—
Reel finger pitch too retarded	Increase finger aggressiveness (cam position)	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
<b>Symptom: Cutterbar Guards Breaking</b>		
Float insufficient	Increase float	<a href="#">3.7.4 Header Float, page 56</a>
Excessive number of rocks in field	Consider installing optional stub guards <b>Note:</b> Experiment with a few guards on a section of cutterbar to compare the performance of the two different styles of guards	<ul style="list-style-type: none"> <li>• <a href="#">5.5.7 Knife Guards, page 144</a></li> <li>• <a href="#">6.2.4 Stub Guard Conversion Kit, page 248</a></li> </ul>
<b>Symptom: Cutterbar Pushing Too Much Trash and Dirt</b>		
Header too heavy	Readjust float to make header lighter	<a href="#">3.7.4 Header Float, page 56</a>
Header angle too steep	Decrease header angle with lift cylinders	<a href="#">3.7.5 Header Angle, page 56</a>

## TROUBLESHOOTING

Problem	Solution	Refer to
Header angle too steep	Shorten the center-link	<a href="#">3.7.5 Header Angle, page 56</a>
Regular guards push dirt and plug up with trash or plug up with trash and then push dirt	Install stub guard kit	<a href="#">6.2.4 Stub Guard Conversion Kit, page 248</a>
Insufficient support for header	Install center skid shoes on header	<a href="#">3.7.3 Cutting on the Ground, page 54</a>
<b>Symptom: Cutterbar Fills Up with Dirt</b>		
Excessive gap between top of front of draper and cutterbar	Adjust front deck supports to obtain proper clearance between cutterbar and draper	<a href="#">5.7.5 Adjusting Deck Height, page 186</a>
Excessive gap between top of front of draper and cutterbar	Raise header fully at each end of field or as required and shift decks back and forth to help clean out cutterbar	—
<b>Symptom: Reel Carries Over Odd Plants in Same Location</b>		
Reel steel fingers bent and hook plants from crop flow on drapers	Straighten steel fingers	—
Dirt accumulation on end of fingers prevent plants dropping off fingers onto drapers	Raise reel	<a href="#">3.7.10 Reel Height, page 60</a>
Dirt accumulation on end of fingers prevent plants dropping off fingers onto drapers	Adjust reel fore and aft location to move fingers out of the ground	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
Dirt accumulation on end of fingers prevent plants dropping off fingers onto drapers	Adjust reel fore and aft location to move fingers out of the ground	<a href="#">3.7.11 Reel Fore-Aft Position, page 60</a>
<b>Symptom: Cutterbar Pushing Too Much Dirt in Certain Locations for Length of Field</b>		
Tire tracks or row crop ridges	Cut at angle to ridges or crop rows to allow knife and guards to clean out better	—
Rolling land along length of field	Cut at 90° angle to undulations, provided knife floats across without digging in	—

## TROUBLESHOOTING

Problem	Solution	Refer to
<b>Symptom: Reel Carries Over Excessive Amounts of Plants or Wads</b>		
Excessive accumulation of crop on drapers (up to height of reel center tube)	Increase draper speed	<a href="#">3.7.8 Draper Speed, page 58</a>
Finger pitch too retarded	Increase finger aggressiveness (cam position)	<a href="#">3.7.12 Reel Tine Pitch, page 69</a>
<b>Symptom: Reel Wraps Up with Crop</b>		
Reel too low	Raise reel	<a href="#">3.7.10 Reel Height, page 60</a>
<b>Symptom: Reel Ends Wrap Up with Crop</b>		
Uncut crop interfering on reel ends	Add reel endshields	Refer to the header parts catalog

## 7.6 Windrow Formation

Problem	Solution	Refer to
<b>Symptom: Heads on Ground and Scattered</b>		
Draper speed too slow	Increase draper speed	<a href="#">3.7.8 Draper Speed, page 58</a>
Draper angle too flat	Increase header angle	<a href="#">Controlling Header Angle, page 56</a>
Ground speed too slow	Increase ground speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Crop too ripe	Cut material before too mature	—
<b>Symptom: Hollow in Center</b>		
Draper speed too slow	Increase draper speed	<a href="#">3.7.8 Draper Speed, page 58</a>
Delivery opening too wide	Decrease delivery opening width	<a href="#">3.8 Delivery Opening, page 79</a>
<b>Symptom: All Heads in Center</b>		
Draper speed too fast or header angle too steep	Reduce draper speed and/or decrease header angle	<ul style="list-style-type: none"> <li>• <a href="#">3.7.8 Draper Speed, page 58</a></li> <li>• <a href="#">3.7.5 Header Angle, page 56</a></li> </ul>
Ground speed too fast	Reduce ground speed	<a href="#">3.7.6 Reel Speed, page 57</a>
Crop too green	Allow to mature	—
<b>Symptom: All Heads To One Side</b>		
Crop leaning to one side and reel too slow	Increase reel speed to orient crop parallel to draper slats and/or increase finger pitch aggressiveness	<ul style="list-style-type: none"> <li>• <a href="#">3.7.6 Reel Speed, page 57</a></li> <li>• <a href="#">3.7.12 Reel Tine Pitch, page 69</a></li> </ul>
<b>Symptom: Uneven Windrow (Any Crop Condition)</b>		
Reel too low	Raise reel	<a href="#">3.7.10 Reel Height, page 60</a>
Ground speed too fast for drapers, causing heads to fan out and crop to leave drapers unevenly	Reduce ground speed or increase draper speed	<ul style="list-style-type: none"> <li>• <a href="#">3.7.6 Reel Speed, page 57</a></li> <li>• <a href="#">3.7.8 Draper Speed, page 58</a></li> </ul>
Reel speed too fast	Reduce reel speed	<a href="#">3.7.6 Reel Speed, page 57</a>

## Chapter 8: Reference

### 8.1 Conversion Chart

Table 8.1 Conversion Chart

Quantity	SI Units (Metric)		Factor	US Customary Units (Standard)	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectare	ha	$\times 2.4710 =$	acre	acres
Flow	liters per minute	L/min	$\times 0.2642 =$	US gallons per minute	gpm
Force	Newton	N	$\times 0.2248 =$	pound force	lbf
Length	millimeter	mm	$\times 0.0394 =$	inch	in.
Length	meter	m	$\times 3.2808 =$	foot	ft.
Power	kilowatt	kW	$\times 1.341 =$	horsepower	hp
Pressure	kilopascal	kPa	$\times 0.145 =$	pounds per square inch	psi
Pressure	megapascal	MPa	$\times 145.038 =$	pounds per square inch	psi
Pressure	bar (Non-SI)	bar	$\times 14.5038 =$	pounds per square inch	psi
Torque	Newton meter	Nm	$\times 0.7376 =$	pound feet or foot pounds	lbf-ft
Torque	Newton meter	Nm	$\times 8.8507 =$	pound inches or inch pounds	lbf-in
Temperature	degrees Celsius	°C	$(^{\circ}\text{C} \times 1.8) + 32 =$	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	$\times 3.2808 =$	feet per minute	ft/min
Velocity	meters per second	m/s	$\times 3.2808 =$	feet per second	ft/s
Velocity	kilometers per hour	km/h	$\times 0.6214 =$	miles per hour	mph
Volume	liter	L	$\times 0.2642 =$	US gallon	US gal
Volume	milliliter	mL	$\times 0.0338 =$	ounce	oz.
Volume	cubic centimeter	cm <sup>3</sup> or cc	$\times 0.061 =$	cubic inch	in. <sup>3</sup>
Weight	kilogram	kg	$\times 2.2046 =$	pound	lb.

## 8.2 Torque Specifications

The following tables provide correct torque values for various bolts, cap screws, and hydraulic fittings.

- Tighten all bolts to torque values specified in charts (unless otherwise noted throughout this manual).
- Replace hardware with same strength and grade of bolt.
- Use torque value tables as a guide and periodically check tightness of bolts.
- Understand torque categories for bolts and cap screws by using their identifying head markings.

### *Jam nuts*

When applying torque to finished jam nuts, multiply the torque applied to regular nuts by  $f=0.65$ .

### *Self-tapping screws*

Standard torque is to be used (**NOT** to be used on critical or structurally important joints).

### 8.2.1 Metric Bolt Specifications

Table 8.2 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

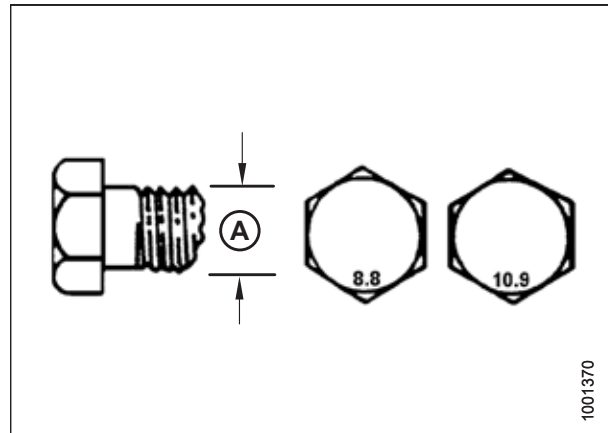
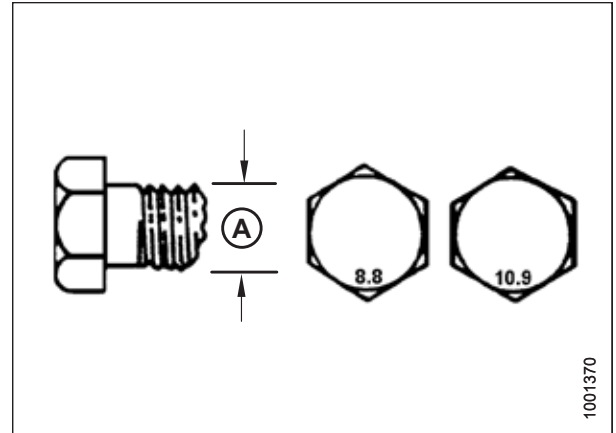


Figure 8.1: Bolt Grades

## REFERENCE

**Table 8.3 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut**

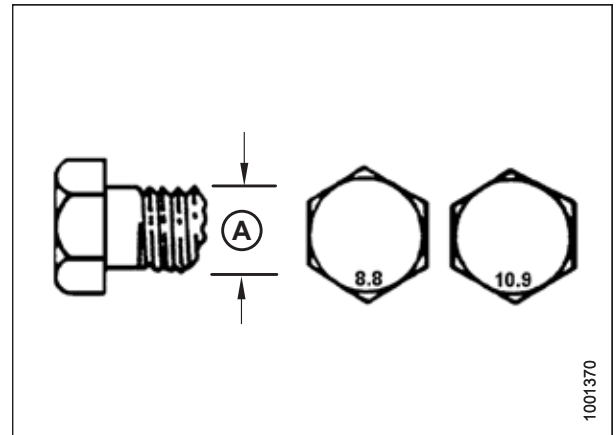
Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1	1.1	*9	*10
3.5-0.6	1.5	1.7	*14	*15
4-0.7	2.3	2.5	*20	*22
5-0.8	4.5	5	*40	*45
6-1.0	7.7	8.6	*69	*76
8-1.25	18.8	20.8	*167	*185
10-1.5	37	41	28	30
12-1.75	65	72	48	53
14-2.0	104	115	77	85
16-2.0	161	178	119	132
20-2.5	314	347	233	257
24-3.0	543	600	402	444



**Figure 8.2: Bolt Grades**

**Table 8.4 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

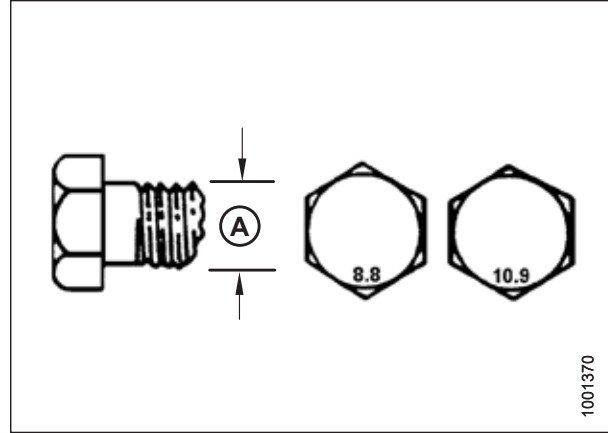


**Figure 8.3: Bolt Grades**

## REFERENCE

**Table 8.5 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut**

Nominal Size (A)	Torque (Nm)		Torque (lbf·ft) (*lbf·in)	
	Min.	Max.	Min.	Max.
3-0.5	1.3	1.5	*12	*13
3.5-0.6	2.1	2.3	*19	*21
4-0.7	3.1	3.4	*28	*31
5-0.8	6.3	7	*56	*62
6-1.0	10.7	11.8	*95	*105
8-1.25	26	29	19	21
10-1.5	51	57	38	42
12-1.75	90	99	66	73
14-2.0	143	158	106	117
16-2.0	222	246	165	182
20-2.5	434	480	322	356
24-3.0	750	829	556	614

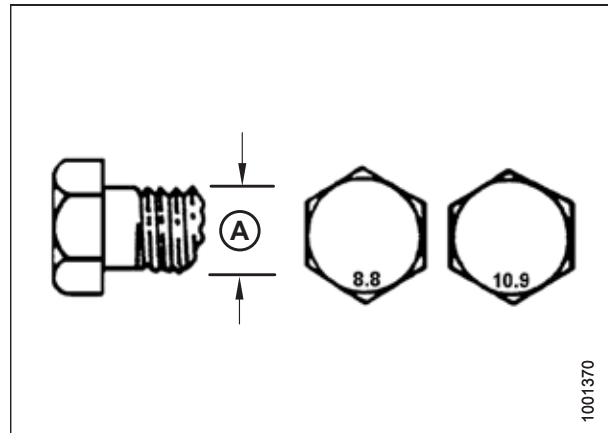


**Figure 8.4: Bolt Grades**

## 8.2.2 Metric Bolt Specifications Bolting into Cast Aluminum

**Table 8.6 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**



### 8.2.3 O-Ring Boss Hydraulic Fittings – Adjustable

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Back off lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward lock nut (C) as far as possible.
3. Check that O-ring (A) is **NOT** on threads and adjust if necessary.
4. Apply hydraulic system oil to O-ring (A).

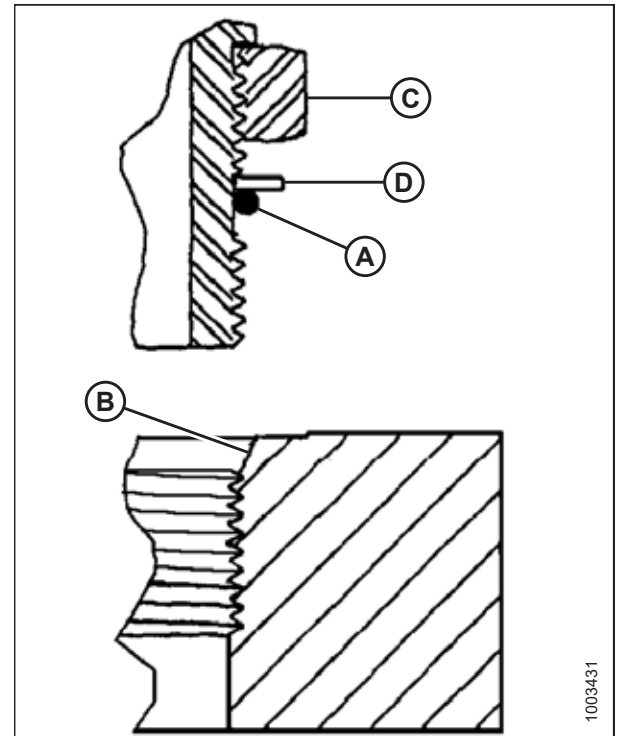


Figure 8.6: Hydraulic Fitting

5. Install fitting (B) into port until backup washer (D) and O-ring (A) contact part face (E).
6. Position angle fittings by unscrewing no more than one turn.
7. Turn lock nut (C) down to washer (D) and tighten to torque shown. Use two wrenches, one on fitting (B) and other on lock nut (C).
8. Check final condition of fitting.

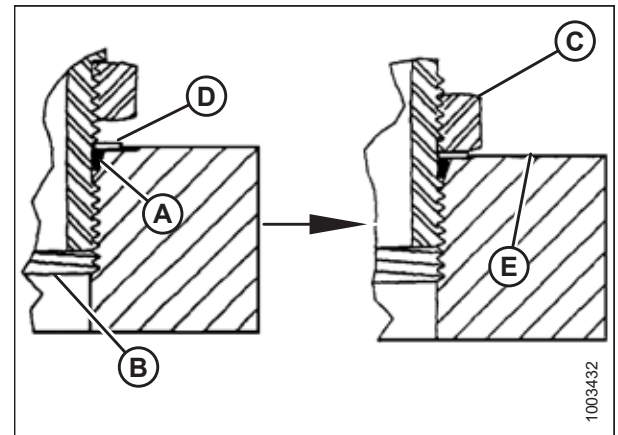


Figure 8.7: Hydraulic Fitting

# REFERENCE

**Table 8.7 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable**

SAE Dash Size	Thread Size (in.)	Torque Value <sup>47</sup>	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1 1/16–12	120–132	88–97
-14	1 3/8–12	153–168	113–124
-16	1 5/16–12	176–193	130–142
-20	1 5/8–12	221–243	163–179
-24	1 7/8–12	270–298	199–220
-32	2 1/2–12	332–365	245–269

47. Torque values shown are based on lubricated connections as in reassembly.

## 8.2.4 O-Ring Boss Hydraulic Fittings – Non-Adjustable

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on threads and adjust if necessary.
3. Apply hydraulic system oil to O-ring.
4. Install fitting (C) into port until fitting is hand-tight.
5. Torque fitting (C) according to values in Table 8.8, page 279.
6. Check final condition of fitting.

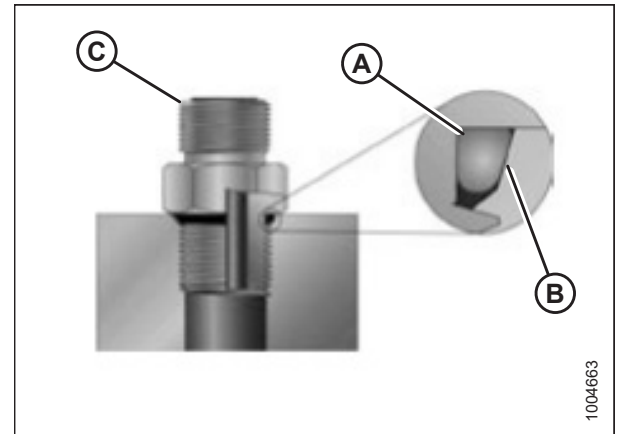


Figure 8.8: Hydraulic Fitting

Table 8.8 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value <sup>48</sup>	
		Nm	lbf·ft (*lbf·in)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1 1/16–12	120–132	88–97
-14	1 3/8–12	153–168	113–124
-16	1 5/16–12	176–193	130–142
-20	1 5/8–12	221–243	163–179
-24	1 7/8–12	270–298	199–220
-32	2 1/2–12	332–365	245–269

48. Torque values shown are based on lubricated connections as in reassembly.

### 8.2.5 O-Ring Face Seal Hydraulic Fittings

1. Check components to ensure that sealing surfaces and fitting threads are free of burrs, nicks, scratches, or any foreign material.



Figure 8.9: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to values in Table 8.9, page 280.

**NOTE:**

If applicable, hold hex on fitting body (E) to prevent rotation of fitting body and hose when tightening fitting nut (D).

6. Use three wrenches when assembling unions or joining two hoses together.
7. Check final condition of fitting.

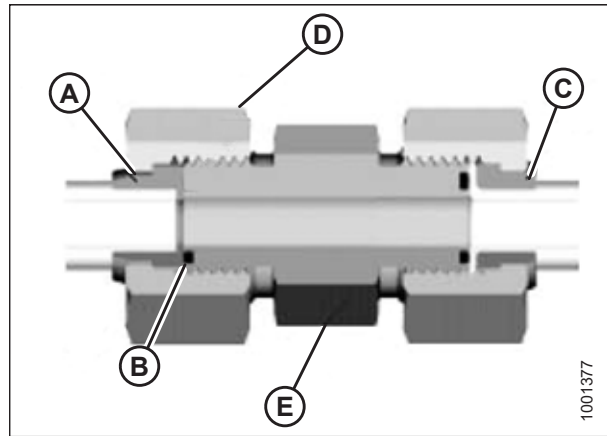


Figure 8.10: Hydraulic Fitting

Table 8.9 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>49</sup>	
			Nm	lbf-ft
-3	Note <sup>50</sup>	3/16	—	—
-4	9/16	1/4	25–28	18–21
-5	Note <sup>50</sup>	5/16	—	—
-6	11/16	3/8	40–44	29–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1 3/16	3/4	115–127	85–94

49. Torque values and angles shown are based on lubricated connection as in reassembly.

50. O-ring face seal type end not defined for this tube size.

## REFERENCE

**Table 8.9 O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)**

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>51</sup>	
			Nm	lbf·ft
-14	Note <sup>50</sup>	7/8	–	–
-16	1 7/16	1	150–165	111–122
-20	1 11/16	1 1/4	205–226	151–167
-24	1–2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

### 8.2.6 Tapered Pipe Thread Fittings

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks, scratches, or any form of contamination.
2. Apply pipe thread sealant (paste type) to external pipe threads.
3. Thread fitting into port until hand-tight.
4. Torque connector to appropriate torque angle. The turns from finger tight (TFFT) and flats from finger tight (FFFT) values are shown in Table 8.10, page 281. Make sure that tube end of a shaped connector (typically 45° or 90°) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

**NOTE:**

Overtorque failure of fittings may not be evident until fittings are disassembled.

**Table 8.10 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

51. Torque values and angles shown are based on lubricated connection as in reassembly.

## REFERENCE

**Table 8.10 Hydraulic Fitting Pipe Thread (continued)**

<b>Tapered Pipe Thread Size</b>	<b>Recommended TFFT</b>	<b>Recommended FFFT</b>
1 1/2–11 1/2	1.5–2.5	9–15
2–11 1/2	1.5–2.5	9–15

## 8.3 Unloading and Assembly

Refer to the instructions for your specific header for unloading, assembly, and setup procedures that are included with your shipment. The instruction part numbers are shown in the following table:

Shipping Destination	Header Description	MacDon Instruction Part Number
North America	D1 Series Draper Header for M Series Windrowers	MD #215020
Export (anywhere other than North America)	D1 Series Draper Header for M Series Windrowers	MD #215021





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## Recommended Fluids and Lubricants

Ensure your machine operates at top efficiency by using clean fluids and lubricants only.

- Use clean containers to handle all fluids and lubricants.
- Store fluids and lubricants in an area protected from dust, moisture, and other contaminants.

Lubricant	Specification	Description	Use	Capacities
Grease	SAE multi-purpose	High temperature extreme pressure (EP2) performance with 1% max. Molybdenum disulphide (NLGI grade 2) Lithium base	As required unless otherwise specified	—
Gear lubricant	SAE 85W-140	API service class GL-5	Knife drive box	2.2 liters (2.3 quarts)

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