

D65 Draper Header for Self-Propelled Windrowers

**IMPORTANT: PAGE 31 HAS BEEN
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PUBLISHED.**

Operator's Manual

147931 Revision B
2017 Model Year
Original Instruction

D65 Draper Header for Self-Propelled Windrowers



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Declaration of Conformity



EC Declaration of Conformity

[1] **MacDon** [4] As Per Shipping Document
MacDon Industries Ltd.
680 Moray Street,
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[2] Windrower Draper Header [5] May 16, 2016

[3] MacDon D65 Series [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: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Germany) hartmut.hartmann@prodoku.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: Хартмут Хартман Wersener Holz 2a D-49504 Lotte (Германия) hartmut.hartmann@prodoku.com	My, [1] Prohláujeme, 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: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Německo) hartmut.hartmann@prodoku.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: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Tyskland) hartmut.hartmann@prodoku.com

DE	ES	ET	FR
Wir, [1] Erklären hiermit, dass das Produkt: Maschinentyp: [2] Name & Modell: [3] Seriennummer (n): [4] alle relevanten Vorschriften der Richtlinie 2006/42/EG erfüllt. Harmonisierte Standards wurden, wie in folgenden Artikeln angegeben, verwendet: 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Ort und Datum der Erklärung: [5] Name und Unterschrift der Person, die dazu befugt ist, die Erklärung auszustellen: [6] Name und Anschrift der Person, die dazu berechtigt ist, die technischen Unterlagen zu erstellen: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Deutschland) hartmut.hartmann@prodoku.com	Nosotros [1] declaramos que el producto: Tipo de máquina: [2] Nombre y modelo: [3] Números de serie: [4] cumple con todas las disposiciones pertinentes de la directiva 2006/42/EC. Se utilizaron normas armonizadas, según lo dispuesto en el artículo 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Lugar y fecha de la declaración: [5] Identidad y firma de la persona facultada para draw redactar la declaración: [6] Nombre y dirección de la persona autorizada para elaborar el expediente técnico: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Germany) hartmut.hartmann@prodoku.com	Meie, [1] deklareerime, et toode: Seadme tüüp: [2] Nimi ja mudel: [3] Seerianumbri(d): [4] vastab kõigile direktiivi 2006/42/EÜ asjakohastele sätetele. Kasutatud on järgnevald harmoniseeritud standardeid, millele on viidatud ka punktis 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Deklaratsiooni koht ja kuupäev: [5] Deklaratsiooni koostamiseks volitatud isiku nimi ja allkiri: [6] Tehnilise dokumendi koostamiseks volitatud isiku nimi ja aadress: Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Saksamaa) hartmut.hartmann@prodoku.com	Nous soussignés, [1] Déclarons que le produit : Type de machine : [2] Nom et modèle : [3] Numéro(s) de série : [4] Est conforme à toutes les dispositions pertinentes de la directive 2006/42/EC. Utilisation des normes harmonisées, comme indiqué dans l'Article 7(2): EN ISO 4254-1:2013 EN ISO 4254-7:2009 Lieu et date de la déclaration : [5] Identité et signature de la personne ayant reçu le pouvoir de rédiger cette déclaration : [6] Nom et adresse de la personne autorisée à constituer le dossier technique : Hartmut Hartmann Wersener Holz 2a D-49504 Lotte (Allemagne) hartmut.hartmann@prodoku.com

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Introduction

This instructional manual contains information on the D65 Draper Header for Self-Propelled Windrowers. It is designed to serve a dual function in your grain, hay, and specialty crop harvesting operation. Teamed with your self-propelled windrower power unit and optional hay conditioner, D65 Draper Headers will cut and lay crop into uniform, fluffy windrows.

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. If you require more detailed service information, a technical manual is available from your MacDon Dealer.

When setting up the machine or making adjustments, review and follow the recommended machine settings in all relevant MacDon publications. Failure to do so may compromise machine function and machine life and may result in a hazardous situation.

The 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 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) or from our Dealer-only site (<https://portal.macdon.com>) (login required).

This manual is also available in the following languages:

- Russian
- Chinese

They can be ordered from MacDon, downloaded from the Dealer Portal (<https://portal.macdon.com>) or from our International website (<http://www.macdon.com/world>).

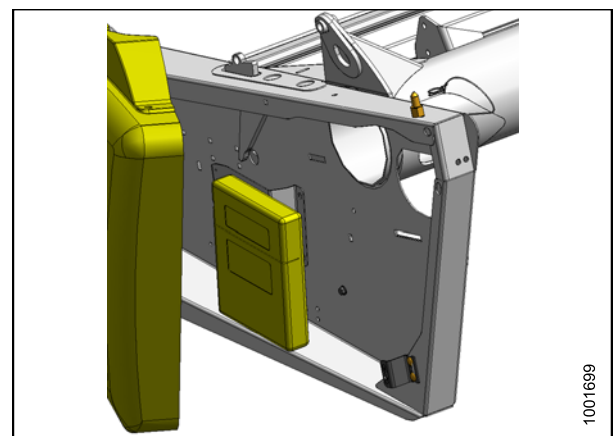


Figure 1: Manual Storage Location

List of Revisions

The following lists the changes from the previous version (147931 Revision A) of this document.

Summary of Change	Refer To
Lowered maximum speed for towing header with Slow Speed Transport.	Towing the Header, page 93

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.

NOTE:

Right-hand (RH) and left-hand (LH) designations are determined from the operator's position, facing forward.

Draper Header

Header Model: _____

Serial Number: _____

Year: _____

The serial number plate (A) is located beside the knife drive motor on the left-hand endsheet.

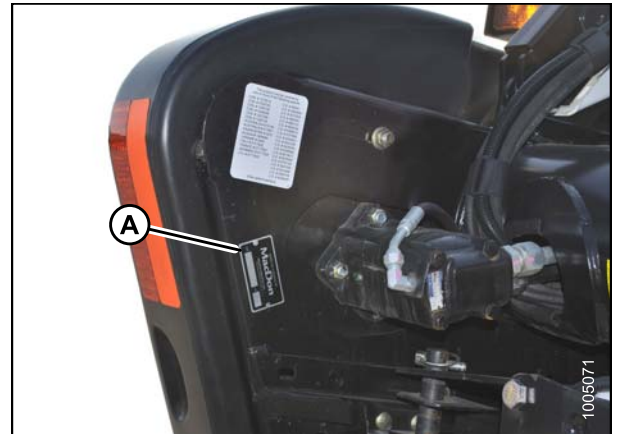


Figure 2: Header

Slow Speed Transport/Stabilizer Wheel Option

Serial Number: _____

Year: _____

The serial number plate (A) is located on the right-hand axle assembly.

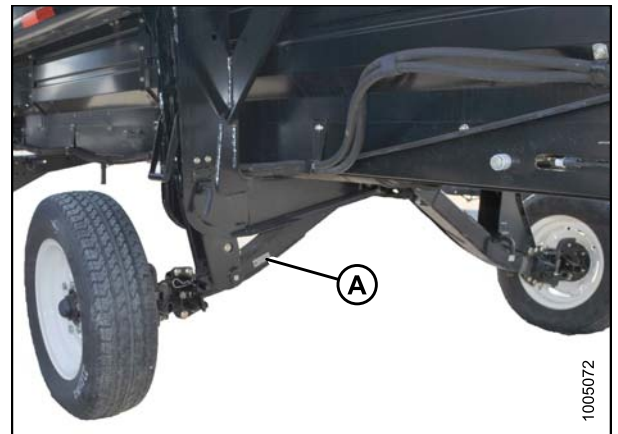


Figure 3: Transport/Stabilizer Option

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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. The appropriate signal word for each situation has been 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.

1.3 General Safety

CAUTION

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

Protect yourself.

- When assembling, operating, and servicing machinery, wear all the 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
- Be aware that exposure to loud noises can cause hearing impairment or loss. Wear suitable hearing protection devices such as ear muffs or ear plugs to help protect against objectionable or loud noises.

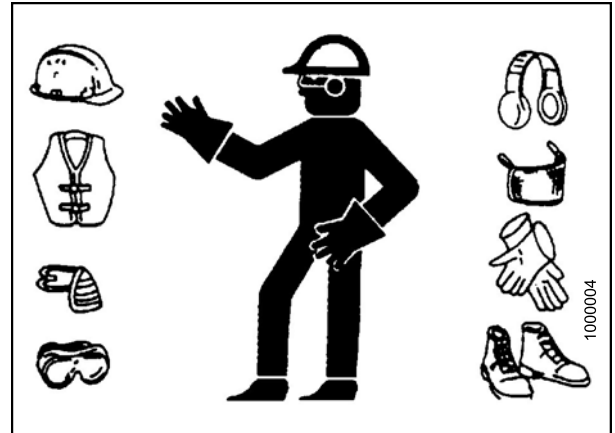


Figure 1.2: Safety Equipment



Figure 1.3: Safety Equipment

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

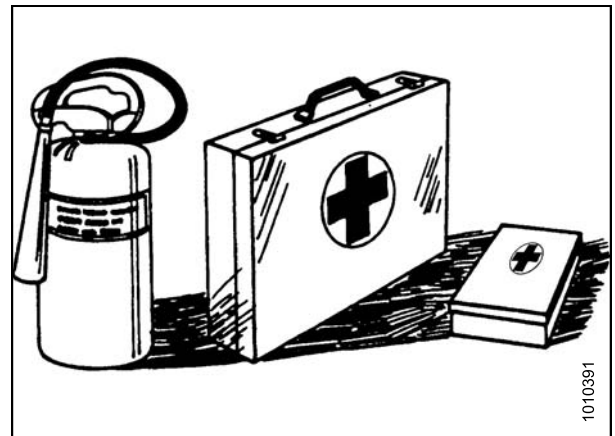


Figure 1.4: Safety Equipment

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 the shaft and can telescope freely.
- Use only service and repair parts made or approved by the 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. Non-authorized modifications may impair machine function and/or safety. It may also shorten the machine's life.
- To avoid bodily injury or death from unexpected startup of machine, **ALWAYS** stop the engine and remove the key from ignition before leaving operator's seat for any reason.

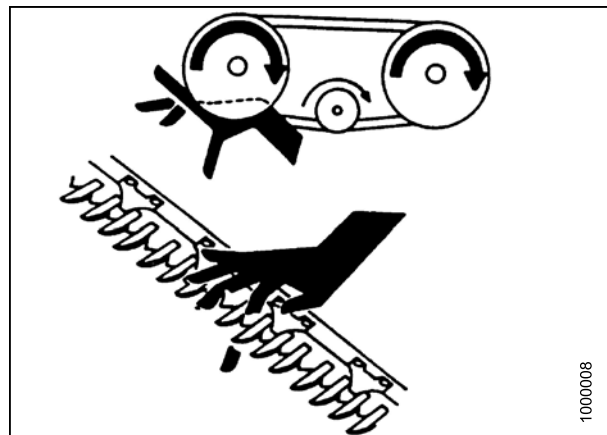


Figure 1.6: Safety around Equipment

- Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Be sure all electrical outlets and tools are properly grounded.
- Keep work area well lit.
- Keep machinery clean. Straw and chaff on a hot engine is a fire hazard. 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 the 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
 - Use adequate lighting for the job at hand
- 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 lube 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

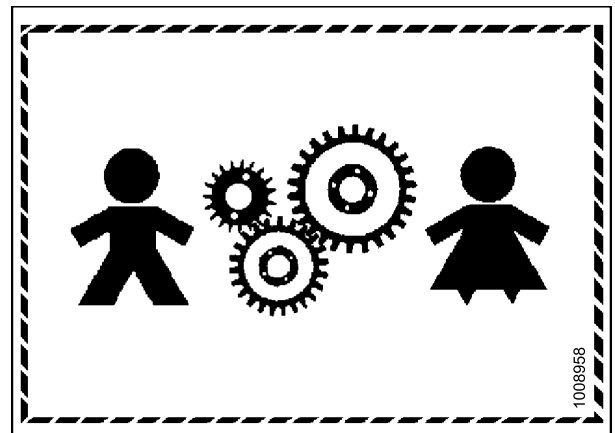


Figure 1.9: Equipment NOT Safe for Children

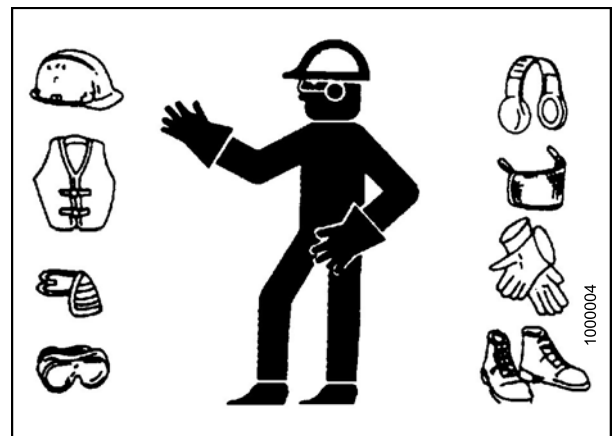


Figure 1.10: Safety Equipment

1.5 Hydraulic Safety

- Always place all hydraulic controls in Neutral before dismounting.
- 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 the 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.

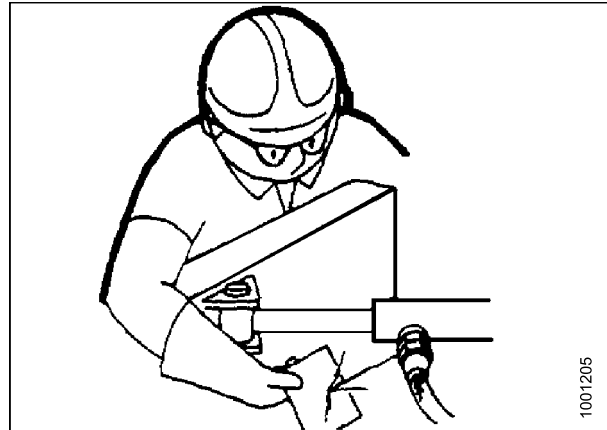


Figure 1.11: Testing for Hydraulic Leaks

- 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.

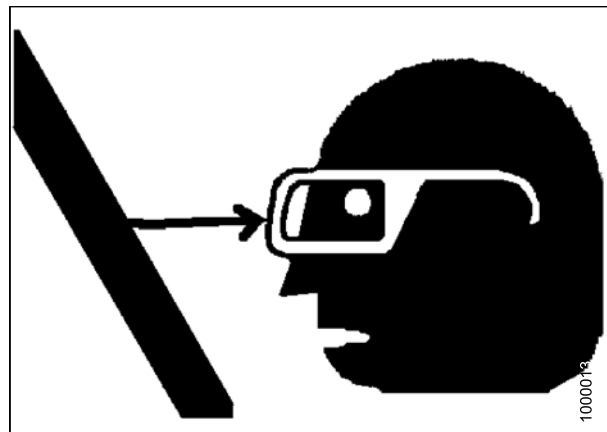


Figure 1.13: Safety around Equipment

1.6 Safety Signs

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

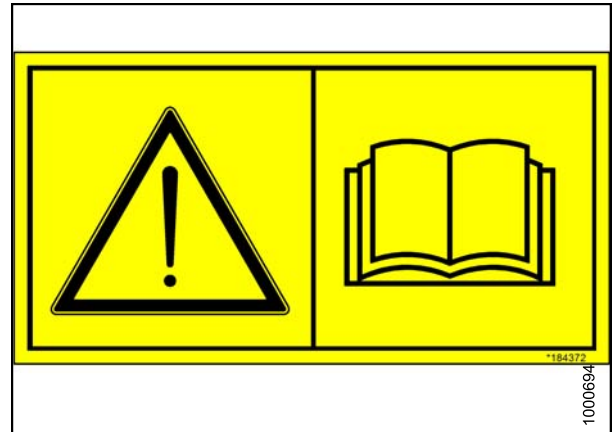
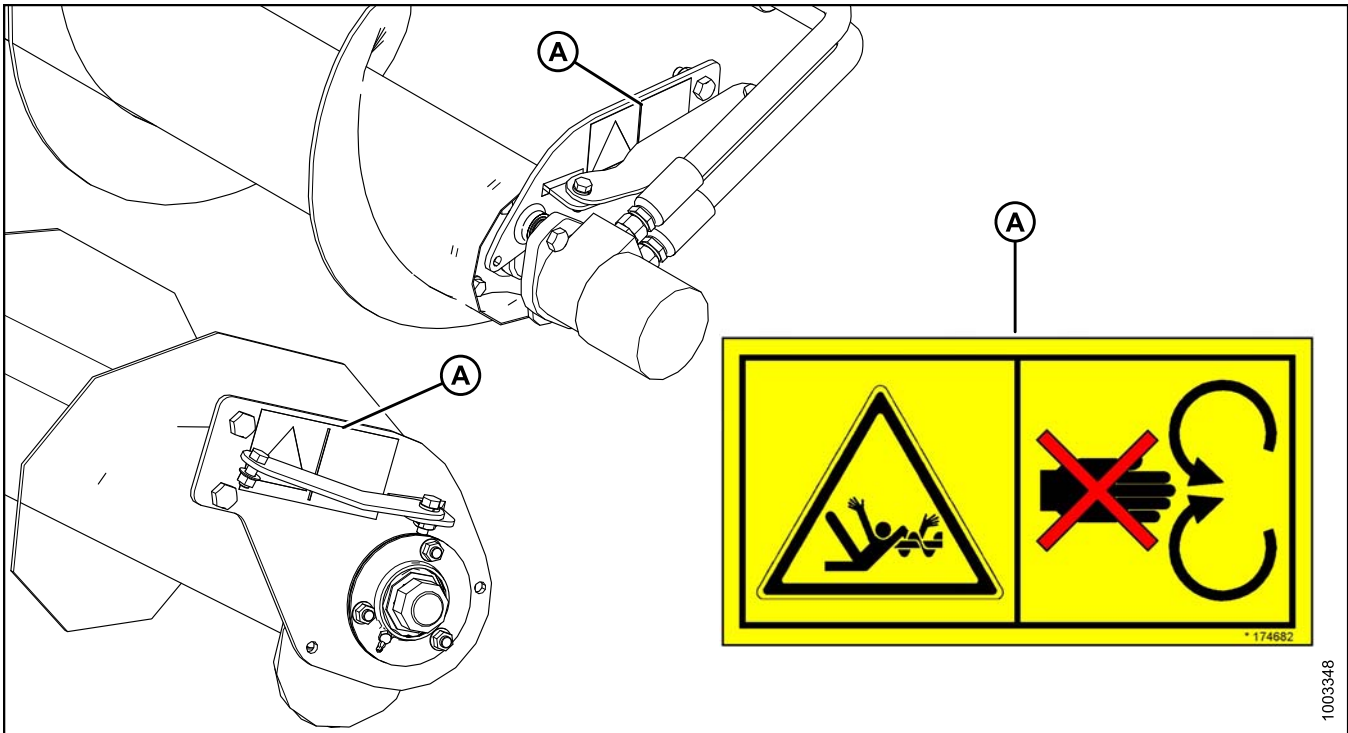


Figure 1.14: Operator's Manual Decal

1.6.1 Installing Safety Decals

1. Clean and dry installation area.
2. Decide on exact location before you remove decal backing paper.
3. Remove smaller portion of split backing paper.
4. Place sign in position and slowly peel back remaining paper, smoothing sign as it is applied.
5. Prick small air pockets with a pin and smooth out.

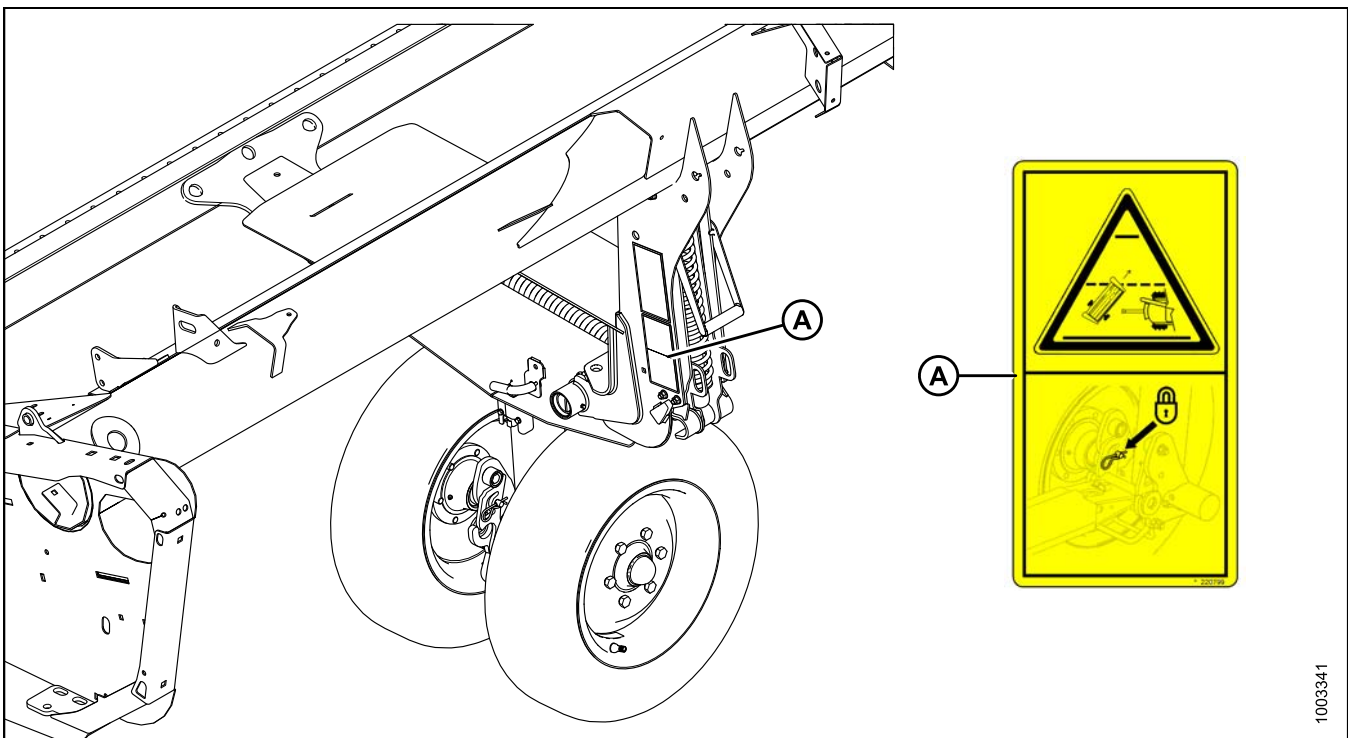
1.7 Safety Decal Locations



1003348

Figure 1.15: Upper Cross Auger

A - MD #174682

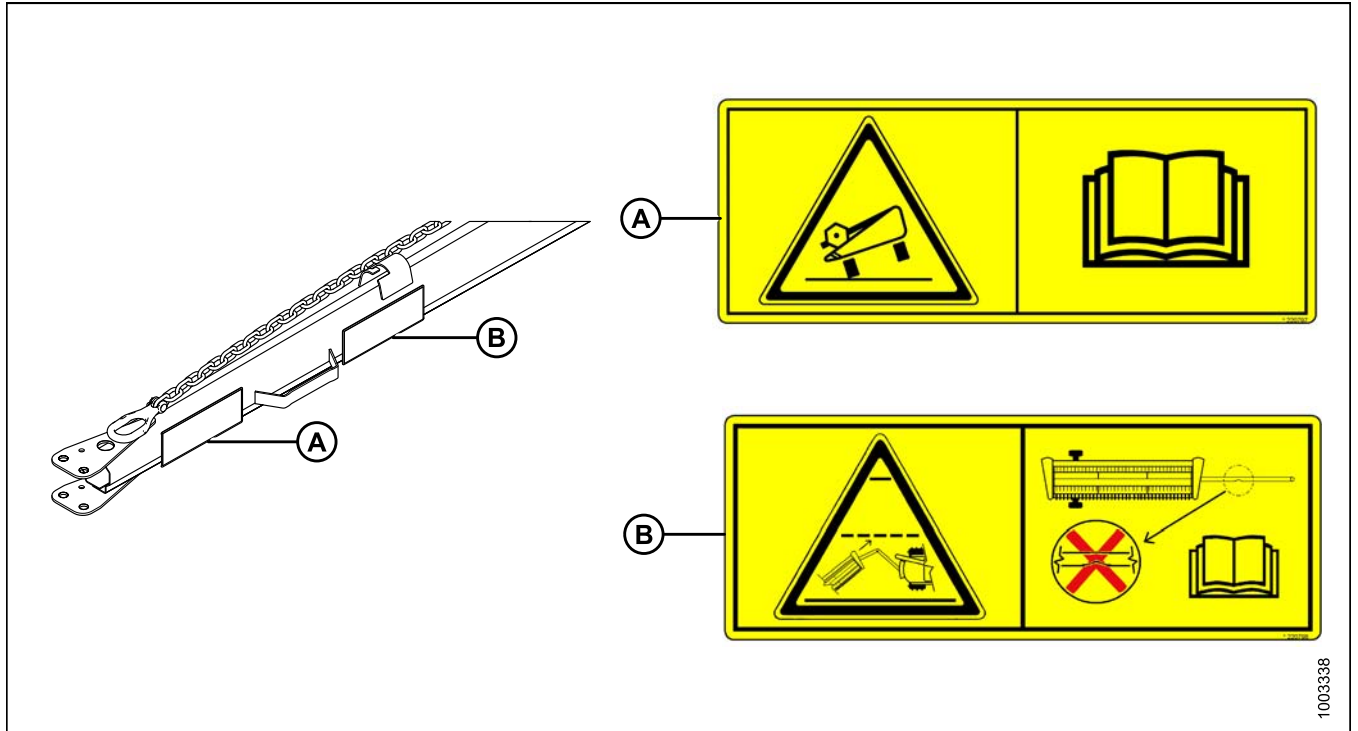


1003341

Figure 1.16: Slow Speed Transport

A - MD #220799

SAFETY

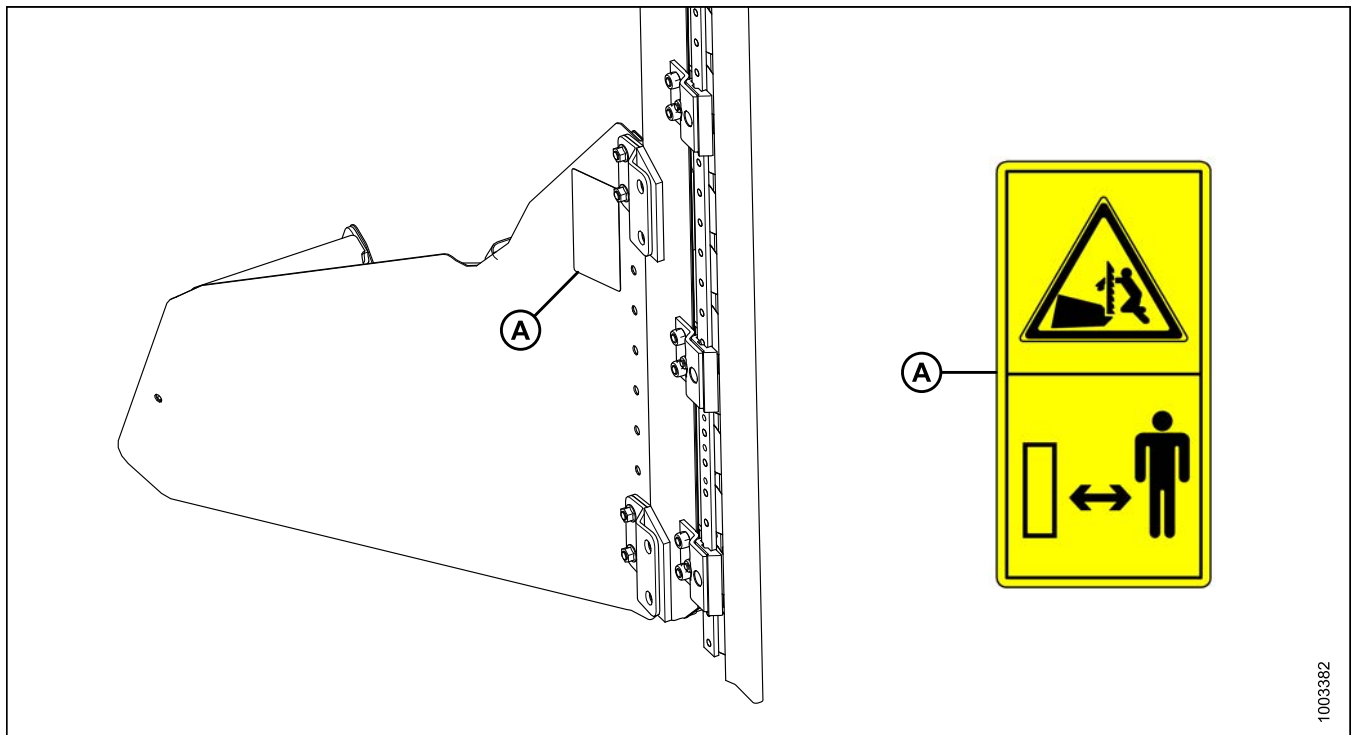


1003338

Figure 1.17: Slow Speed Transport Tow-Bar

A - MD #220797

B - MD #220798



1003382

Figure 1.18: Vertical Knife

A - MD #174684

SAFETY

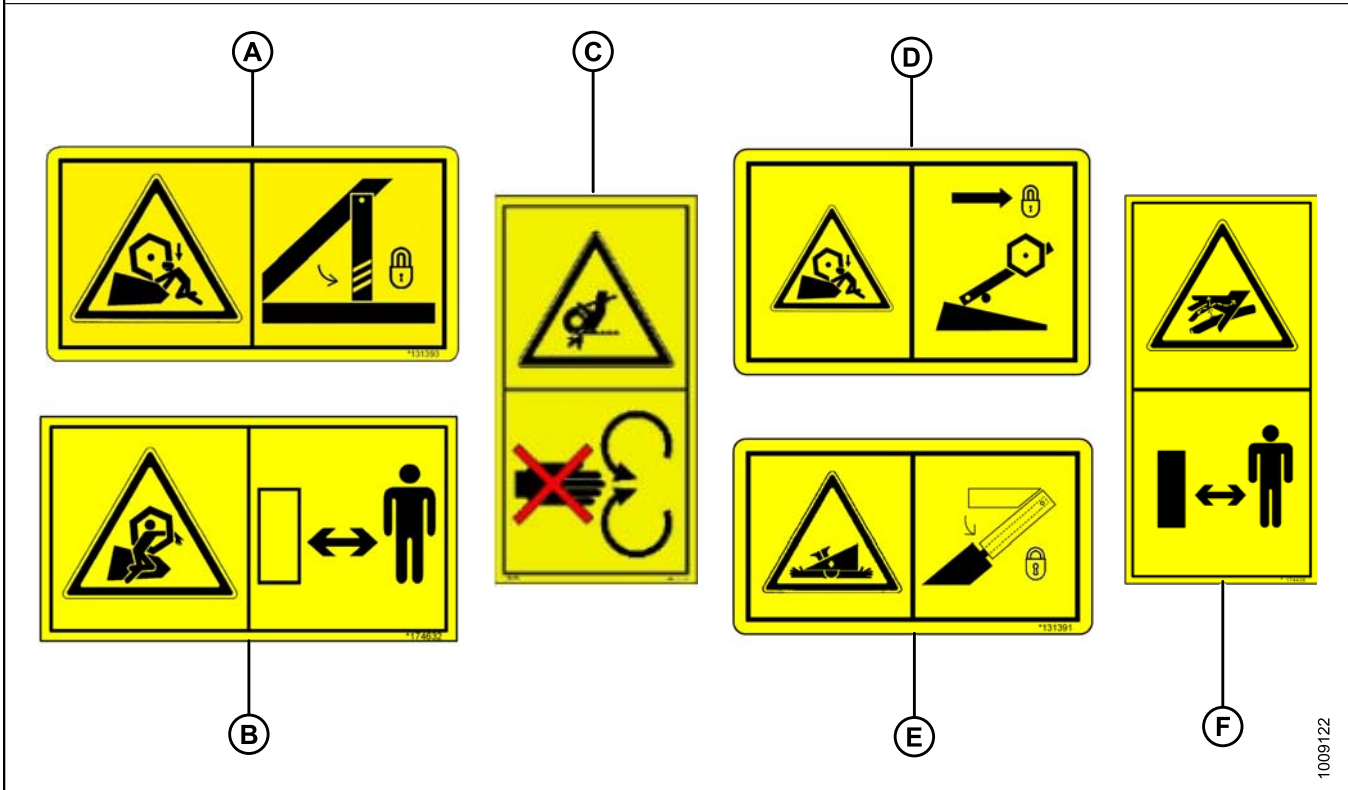
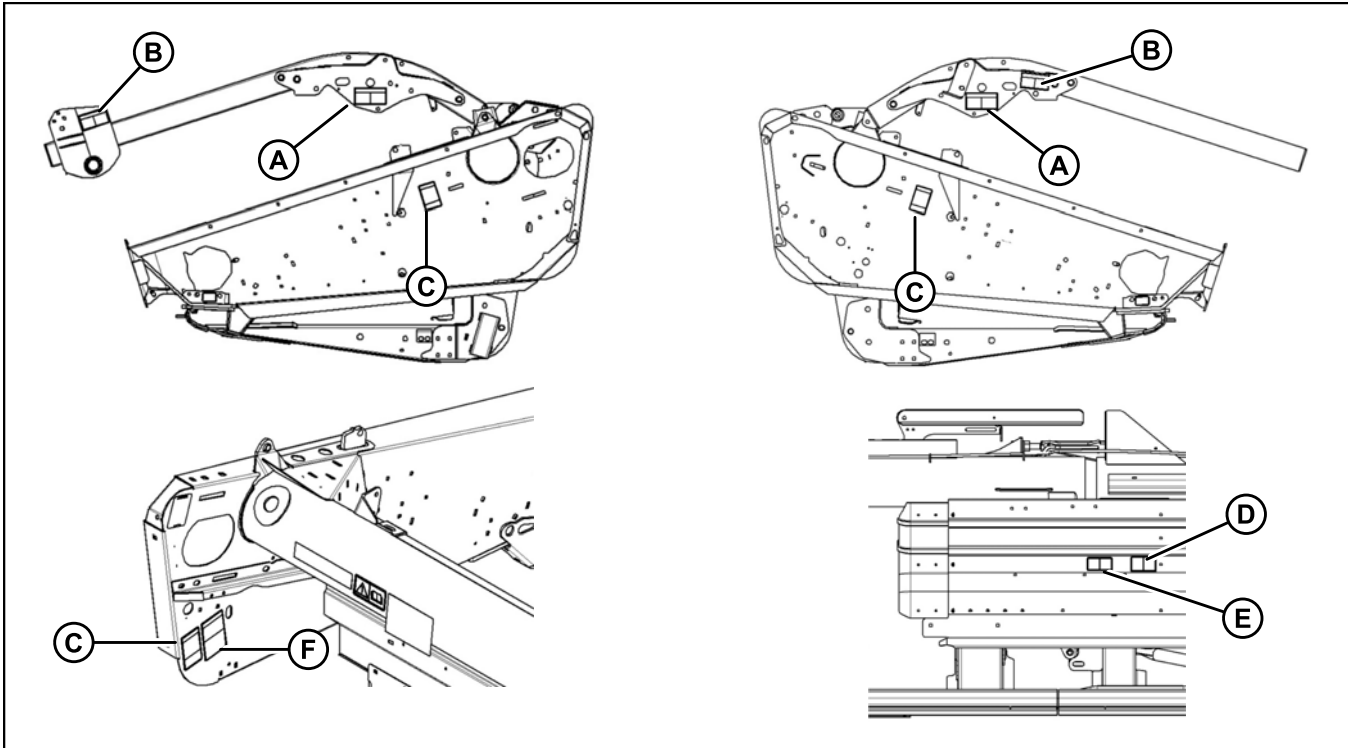


Figure 1.19: Endsheets, Reel Arms, Backsheet

A - MD #131393

B - MD #174632

C - MD #184371

D - MD #184371 (Double Knife Only)

E - MD #131392 (2 Places)

F - MD #131391 (2 Places)

G - MD #174436

H - MD #184371 (Double Knife 2 Places)

1009122

SAFETY

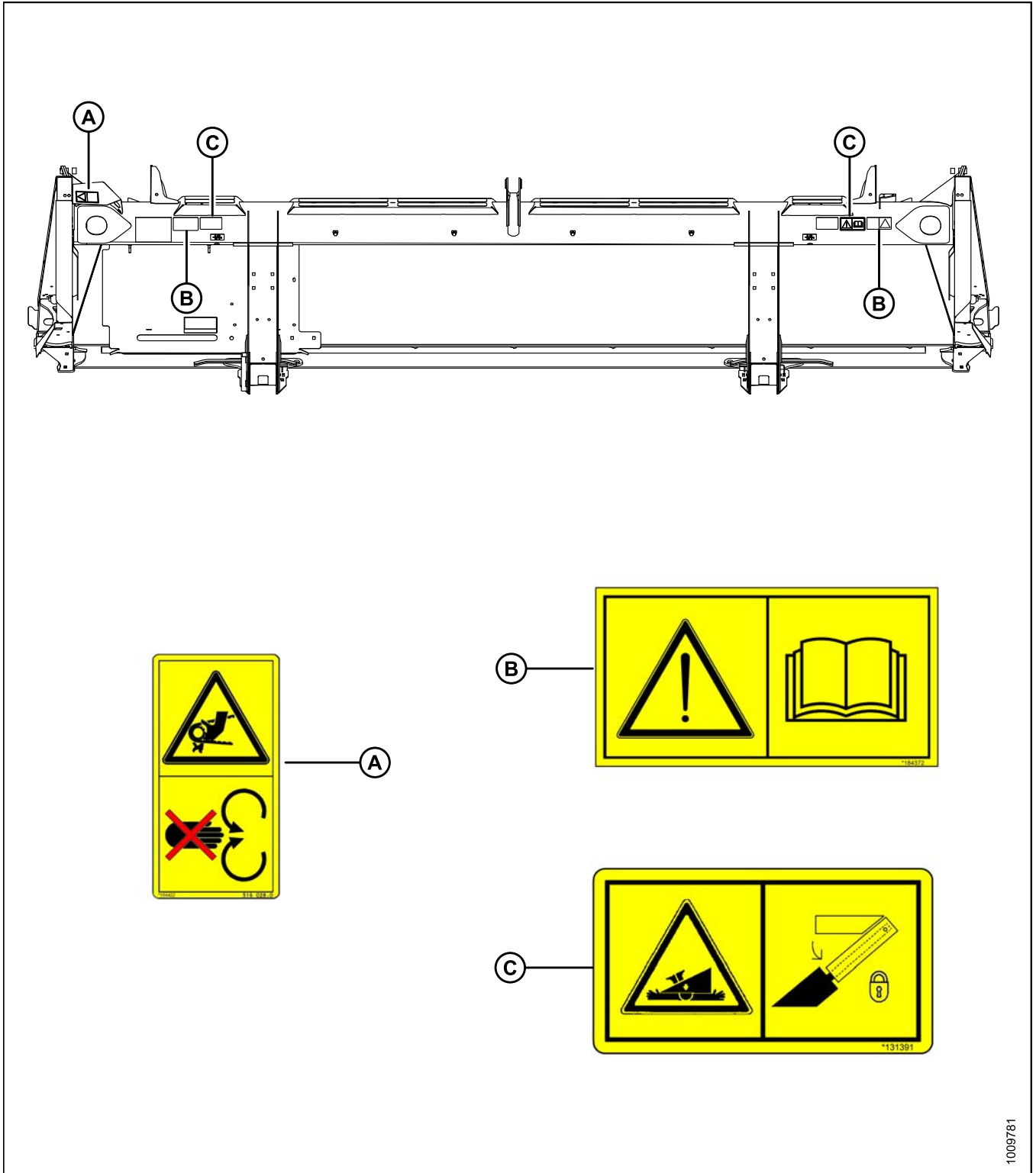


Figure 1.20: Backtube: 15-Footer Header

A - MD #184422

B - MD #184372

C - MD #131391

SAFETY

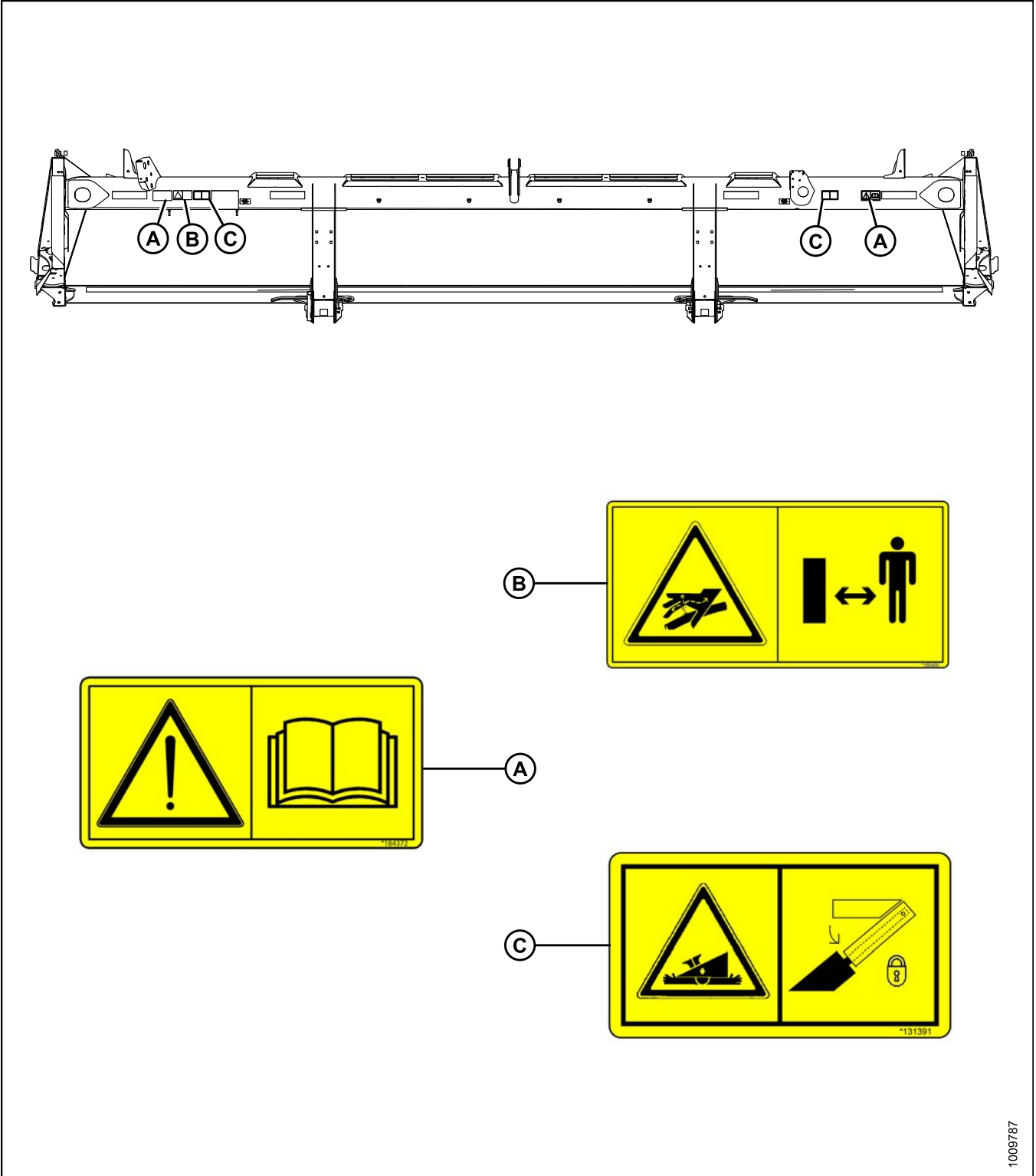


Figure 1.21: Backtube: 20-Foot Header

A - MD #184372

B - MD #166466

C - MD #131391

SAFETY

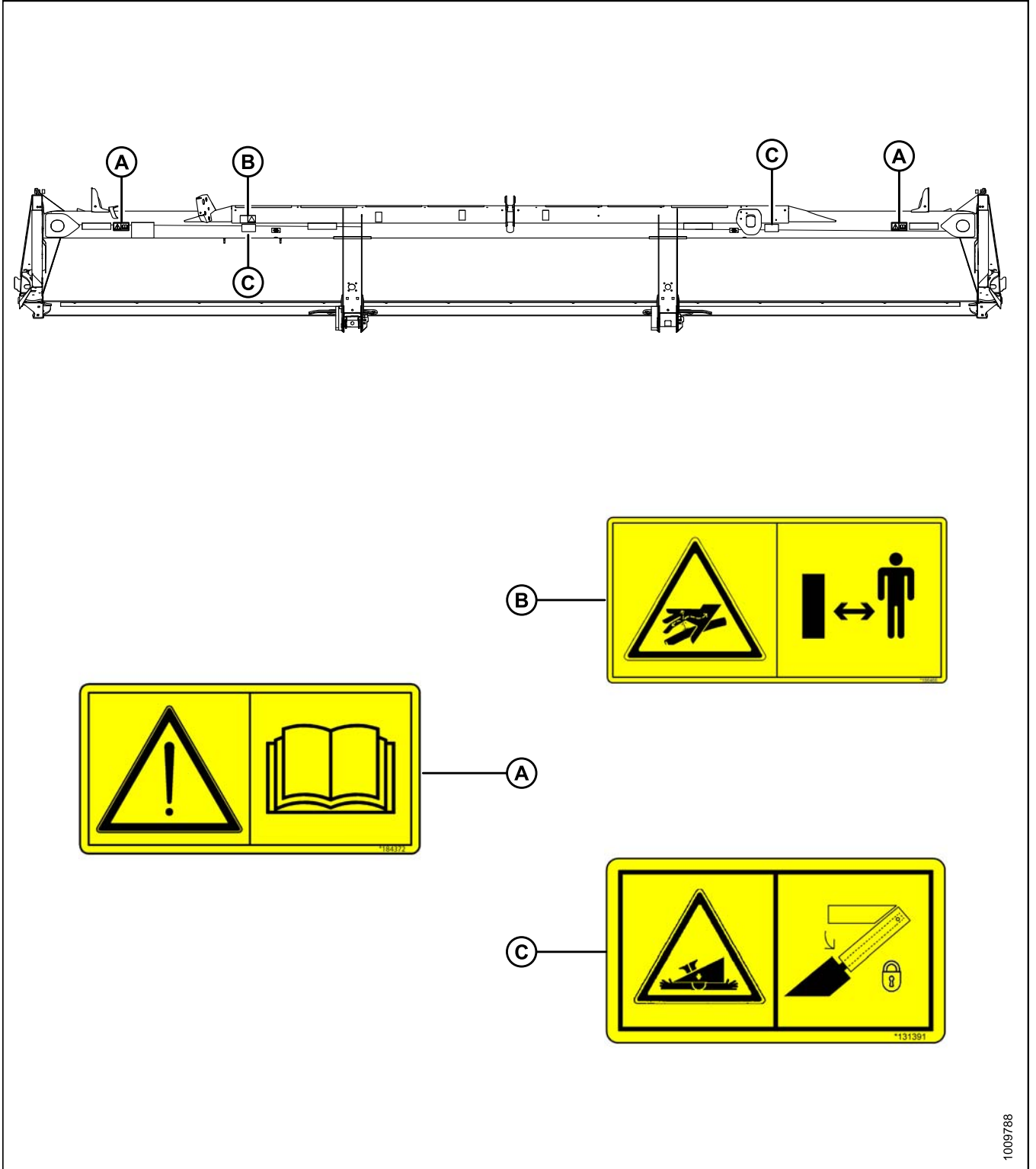


Figure 1.22: Backtube: 25-Footer Header

A - MD #184372

B - MD #166466

C - MD #131391

SAFETY

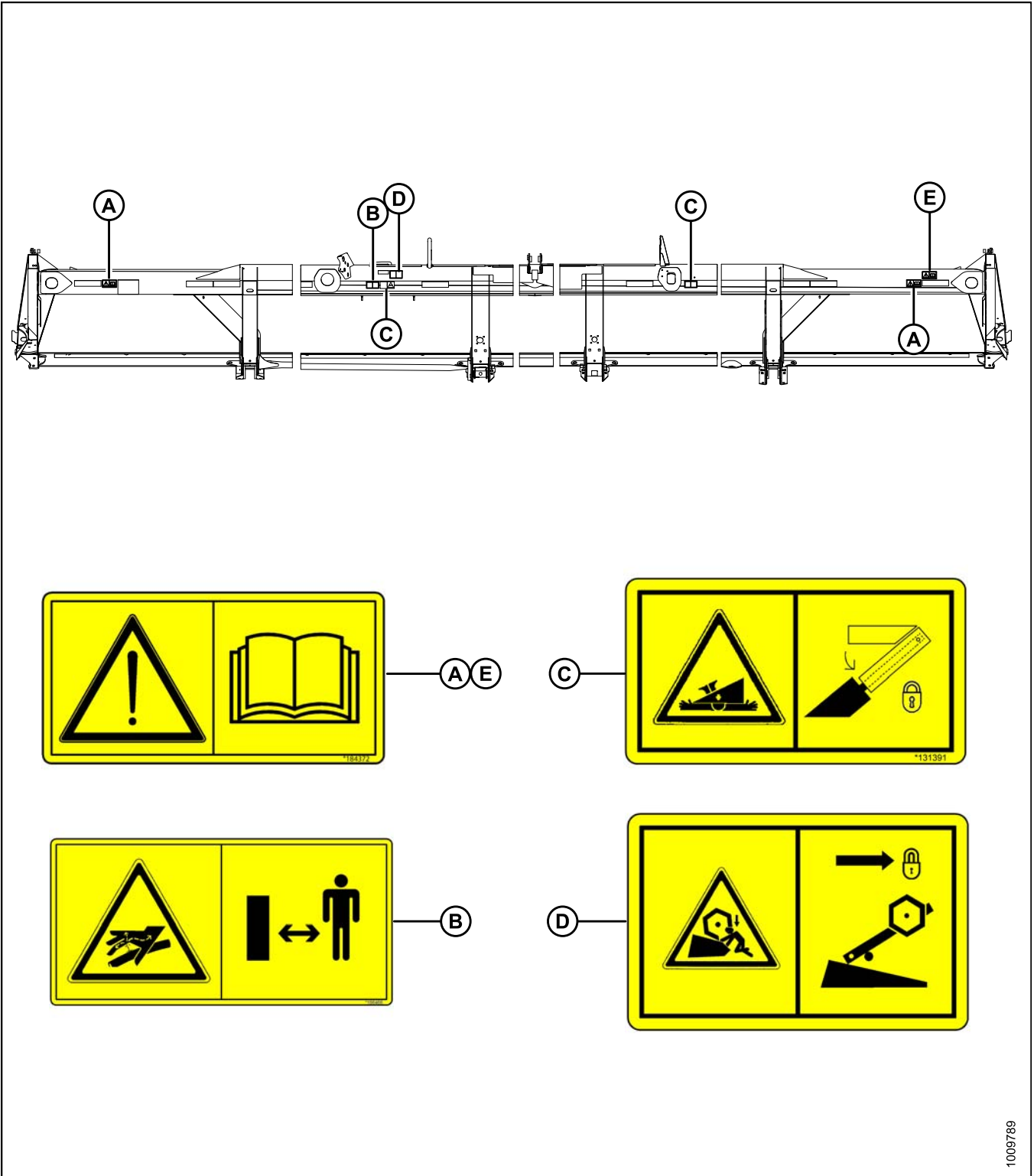


Figure 1.23: Backtube: 30-, 35-, 40-Footer Header

A - MD #184372

B - MD #166466

C - MD #131391

D - MD #131392 (30- and 35- Ft. Double Reel Only)

E - MD #184372 (Split Frame)

1009789

1.8 Understanding Safety Signs

MD #113482

General hazard pertaining to machine operation and servicing

CAUTION

To avoid 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 before servicing, adjusting, lubricating, cleaning, or unplugging machine.
- Engage safety props to prevent lowering of header or reel before servicing in the raised position (refer to the header operator's manual).
- Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

MD #131391

Crushing hazard

DANGER

- Rest header on ground or engage safety props before going under unit.

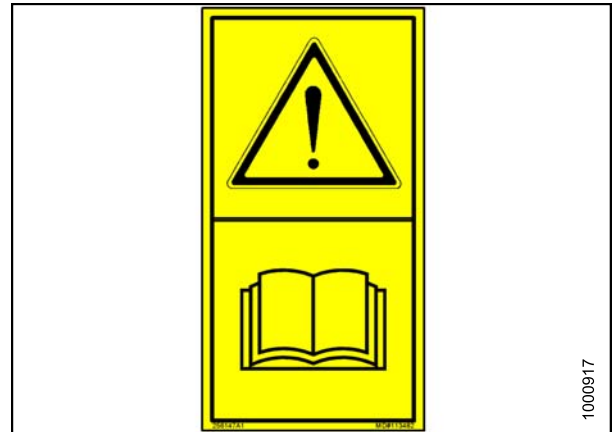


Figure 1.24: MD #113482

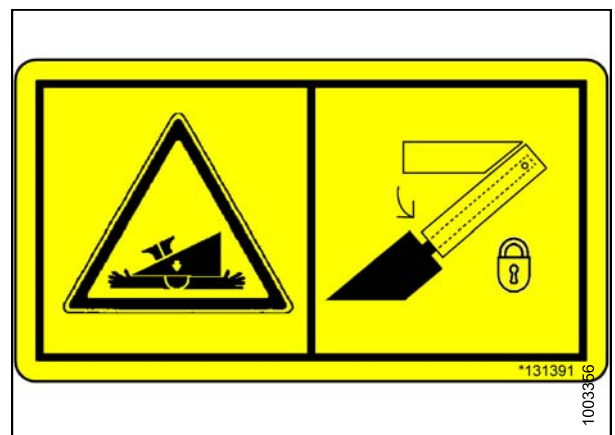


Figure 1.25: MD #131391

SAFETY

MD #131392

Crushing hazard

WARNING

- To avoid 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.

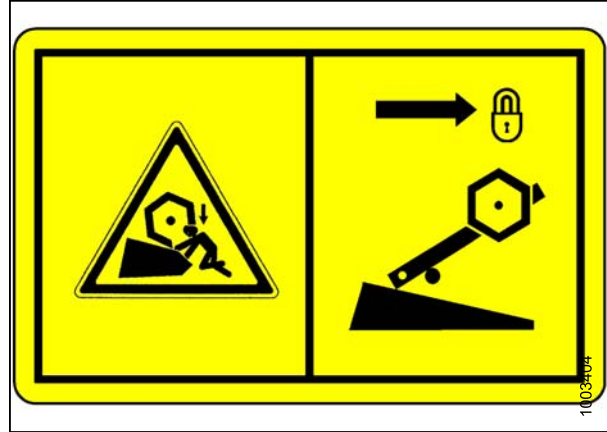


Figure 1.26: MD #131392

MD #131393

Reel hazard

WARNING

- To avoid 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 #131393

MD #166466

High pressure oil hazard

WARNING

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



Figure 1.28: MD #166466

SAFETY

MD #174436

High pressure oil hazard

WARNING

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



Figure 1.29: MD #174436

MD #174632

Reel entanglement hazard

CAUTION

- To avoid injury from entanglement with rotating reel, stand clear of header while machine is running.

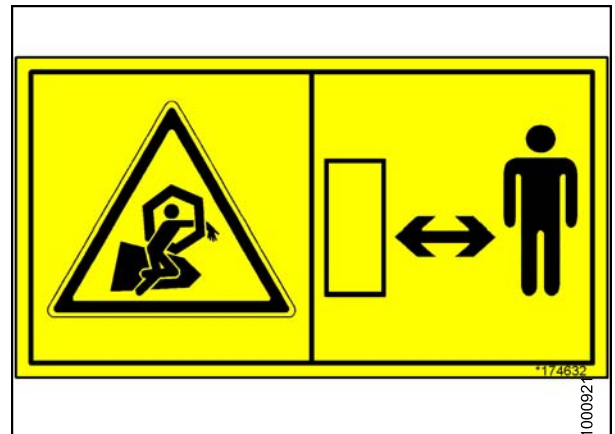


Figure 1.30: MD #174632

MD #174682

Auger entanglement hazard

CAUTION

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

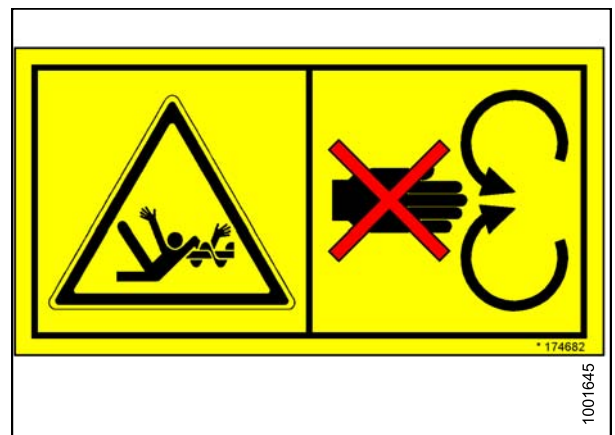


Figure 1.31: MD #174682

SAFETY

MD #174684

Sharp component hazard

CAUTION

- 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 1.32: MD #174684

MD #184372

General hazard pertaining to machine operation and servicing

CAUTION

To avoid 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 annually.
- 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 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.

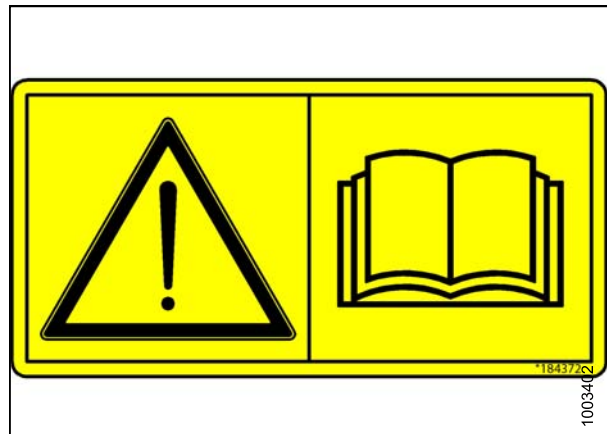


Figure 1.33: MD #184372

SAFETY

MD #184422

Keep shields in place hazard

WARNING

- Do not place hand.
- To avoid injury, stop the engine and remove the key before opening power drive system shield.
- Keep all shields in place.



Figure 1.34: MD #184422

MD #193147

Transport/roading hazard

WARNING

- Ensure tow-bar lock mechanism is locked.

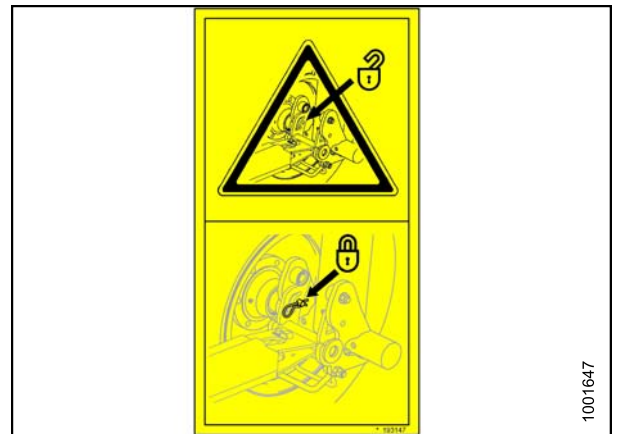


Figure 1.35: MD #193147

MD #220797

Tipping hazard in transport mode

WARNING

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

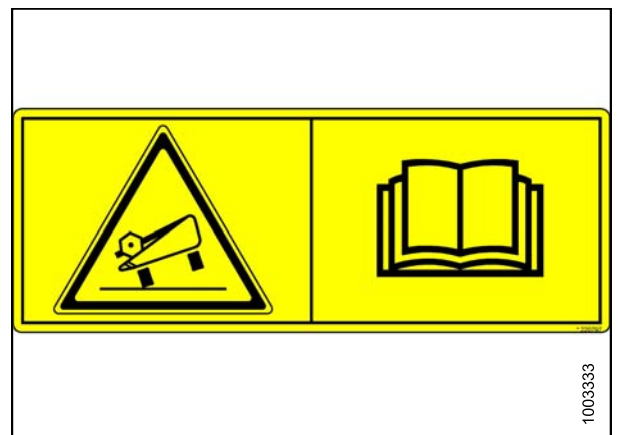


Figure 1.36: MD #220797

SAFETY

MD #220798

Loss of control hazard in transport

CAUTION

- Do not tow the header with a dented or otherwise damaged tow pole (the circle with the red X shows a dent in the pole).
- Consult the operator's manual for more information.

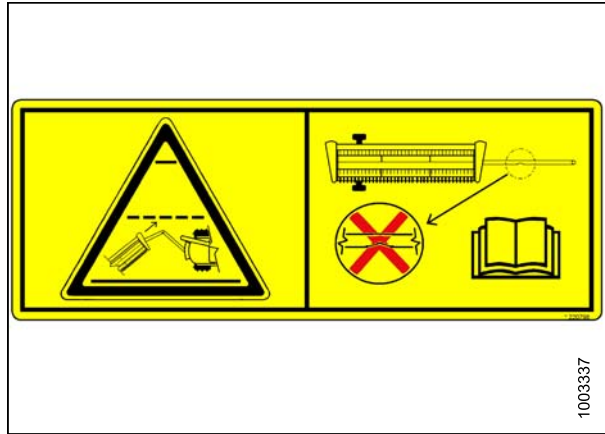


Figure 1.37: MD #220798

MD #220799

Transport/roading hazard

WARNING

- Ensure tow-bar lock mechanism is locked.

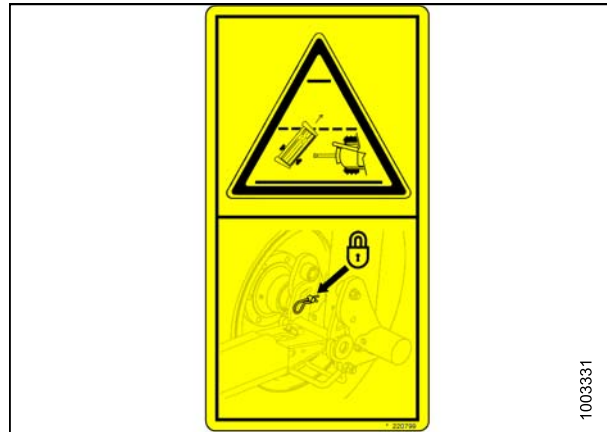


Figure 1.38: MD #220799

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
Center-link	A hydraulic cylinder link between header and machine to which it is attached: It is used to change header angle
CGVW	Combined vehicle gross weight
D-Series header	MacDon D50, D60, and D65 rigid draper headers
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
FFFT	Flats from finger tight
GSL	Ground speed lever
GVW	Gross vehicle weight
Hard joint	A joint made with the use of a fastener where joining materials are highly incompressible
Hex key	A hex key or Allen key (also known by various other synonyms) is a tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive)
hp	Horsepower
ISC	Intermediate Speed Control
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting
n/a	Not applicable
Nut	An internally threaded fastener that is designed to be paired with a bolt
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
ORB	O-ring boss: A style of fitting commonly used in port opening 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
RoHS (Reduction of Hazardous Substances)	A directive by the European Union to restrict use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc platings)
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread in one of mating parts

PRODUCT OVERVIEW

Term	Definition
Soft joint	A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time
Truck	A four-wheel highway/road vehicle weighing no less than 3400 kg (7500 lb.)
Tension	Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)
TFFT	Turns from finger tight
Torque	The product of a force X lever arm length, usually measured in Newton-meters (N·m) or foot-pounds (ft·lbf)
Torque angle	A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned further a number of degrees or a number of flats to achieve its final position
Torque-tension	The relationship between assembly torque applied to a piece of hardware and axial load it induces in bolt or screw
Washer	A thin cylinder with a hole or slot located in the center that is to be used as a spacer, load distribution element, or a locking mechanism

PRODUCT OVERVIEW

2.2 Specifications

The following symbol and letters are used in Table 2.1 *Header Specifications, page 23* and Table 2.2 *Header Attachments, page 27*:

 D65 Attachments

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

Table 2.1 Header Specifications

Cutterbar			
Effective cutting width (distance between crop divider points)			
15-foot header		4572 mm (180 in.)	S
20-foot header		6096 mm (240 in.)	S
25-foot header		7620 mm (300 in.)	S
30-foot header		9144 mm (360 in.)	S
35-foot header		10,668 mm (420 in.)	S
40-foot header		12,192 mm (480 in.)	S
Cutterbar lift range at guard tip (center-link fully retracted)		1265 mm (49.8 in.)	—
Knife			
Single-knife drive: One hydraulic motor with V-belt to one heavy duty (MD) knife drive box			O _F
Double-knife drive 15–35 foot (timed): One hydraulic motor with two cogged belts to two heavy duty MD knife drive boxes			O _F
Double-knife drive 40 foot (untimed): Two hydraulic motors with banded-belts to two heavy duty MD knife drive boxes			O _F
Knife stroke		76 mm (3 in.)	S
Single-knife speed (strokes per minute) ¹	20–25 foot	1200–1400	S
	30 foot	1200–1400	S
	35 foot	1100–1300	S
	40 foot	1050–1200	S
Double-knife speed (strokes per minute) ¹	15 foot	1500–1900	S
	20–25 foot	1400–1700	S
	30 foot	1200–1600	S
	35 foot	1200–1400	S
	40 foot	1100–1400	S

1. Under normal cutting conditions, knife speed taken at the knife drive pulley should be set between 600 and 640 rpm (1200 and 1280 spm). If set to low side of range, knife stalling could occur

PRODUCT OVERVIEW

Knife Sections			
Over-serrated / solid / bolted / 9 serrations per inch			O _F
Over-serrated / solid / bolted / 14 serrations per inch			O _F
Knife overlap at center (double-knife headers)	3 mm (0.12 in.)		S
Guards and Hold-Downs			
Guard: pointed / forged / double heat treated (DHT) Hold-down: sheet metal / adjustment bolt			O _F
Guard: pointed / forged / case hardened (CH) Hold-down: sheet metal / adjustment bolt			O _F
Guard: stub / forged bottom / forged top / adjustment plate			O _F
Guard: stub / forged bottom / sheet metal top / adjustment bolt			O _F
Guard: four point / no-choke design (two long points with tangs / two short points without tangs)			O _F
Guard Angle (Cutterbar on Ground)			
Center-link retracted	15–25 foot	7.5 Degrees	S
Center-link retracted	30–40 foot	2.5 Degrees	S
Center-link extended	15–25 foot	17.0 Degrees	S
Center-link extended	30–40 foot	12.0 Degrees	S
Conveyor (Draper) and Decks			
Draper width		1057 mm (41.6 in.)	S
Draper drive		Hydraulic	S
Draper speed		0–225 m/min. (0–742 fpm)	S
Delivery opening width (center delivery) / variable by shifting decks	15 foot	1540–1770 mm (60.6–69.7 in.)	S
	20, 25, 30, 35, 40 foot	1720–1950 mm (67.1– 76.7 in.)	S
Delivery opening height (under frame tube at 203 mm [8 in.] cutting height)	Center-link fully retracted	955 mm (37.6 in.)	S
	Center-link fully extended	1105 mm (43.5 in.)	S

PRODUCT OVERVIEW

PR15 Pick-Up Reel				
Quantity of tine tubes		5, 6, or 9		
Center tube diameter: All reel sizes except 35-foot single span		203 mm (8 in.)		
35-foot single span only		254 mm (10 in.)		
Finger tip radius	Factory-set		800 mm (31.5 in.)	
	Adjustment range		766–800 mm (30.2– 31.5 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.)		
Reel drive		Hydraulic		S
Reel speed (auto-adjust from cab using ground speed index)		0–85 rpm		S
Frame and Structure				
Header width (field mode)		Cut width + 384 mm (15.12 in.)		S
Header width (transport mode—reel fore-aft fully retracted)	Header only	(B) ^{2,3}	2636 mm (104 in.)	—
		(A) ^{2,4}	2452 mm (97 in.)	—
	With HC10 Hay Conditioner installed	(B) ^{2,3}	2834 mm (112 in.)	—
		(A) ^{2,4}	2650 mm (104 in.)	—

-
2. Refer to Figure [2.1: Header Width, page 26](#)
 3. Long dividers installed
 4. Long dividers removed

PRODUCT OVERVIEW

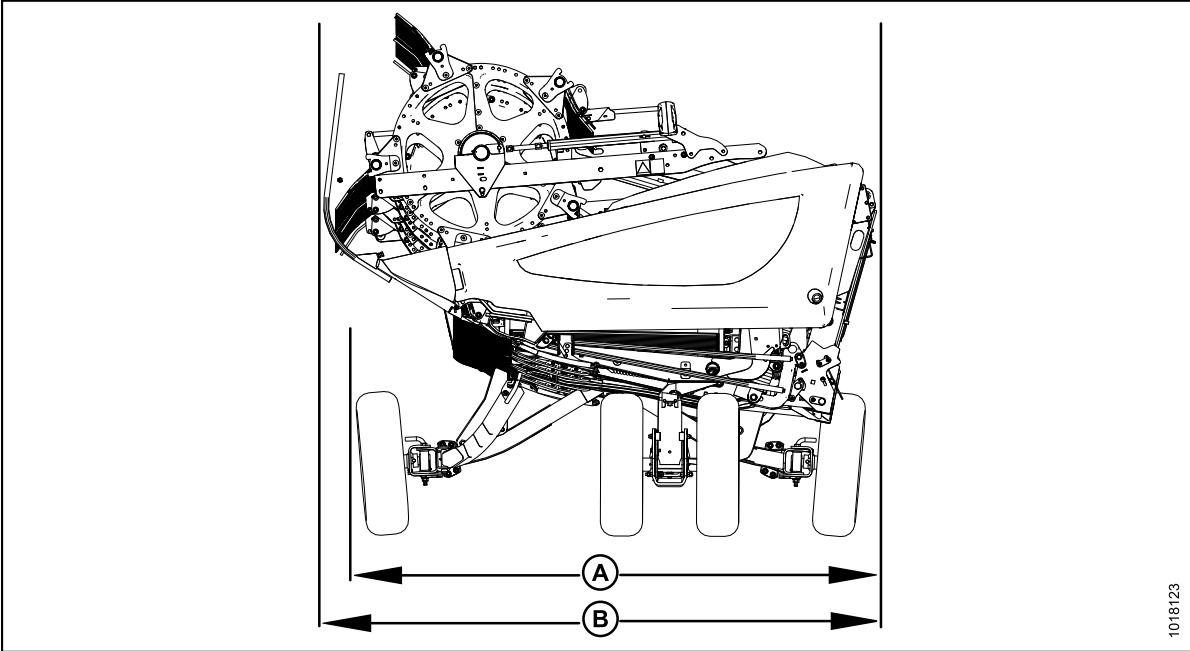


Figure 2.1: Header Width

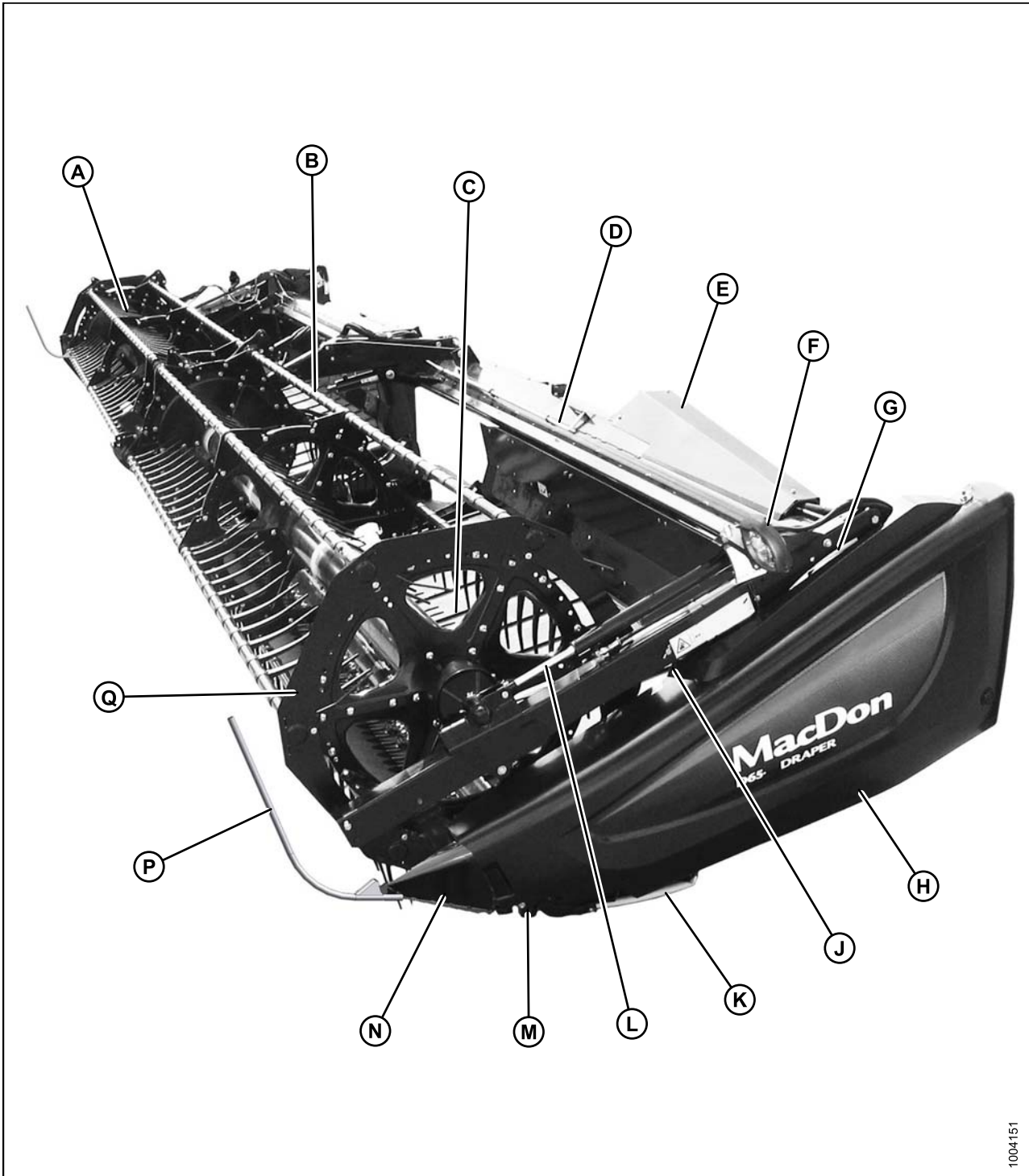
PRODUCT OVERVIEW

Table 2.2 Header Attachments

Attachments		
HC10 Hay Conditioner		O _D
Roll length		1830 mm (72 in.)
Outside diameter		232 mm (9.1 in.)
Roll tube diameter		168 mm (6.6 in.)
Roll speed		847–915 rpm
Upper Cross Auger		O _D
Flighting (Outside diameter [O.D])		305 mm (12 in.)
Tube diameter (O.D):	All sizes except 25 foot	152 mm (6 in.)
	25 foot	178 mm (7 in.)
Stabilizer Wheel / Slow Speed Transport		O _D
Wheels		381 mm (15 in.)
Tires		P205/75 R-15

Weight		
Estimated weight range with base header (variances are due to different package configurations)		
15-foot header		1329–1497 kg (2937–3302 lb.)
20-foot header		1430–1633 kg (3146–3600 lb.)
25-foot header		1605–1753 kg (3547–3872 lb.)
30-foot header		1981–2178 kg (4370–4812 lb.)
35-foot header		2181–2480 kg (4808–5337 lb.)
40-foot header	North America frame	2352–2593 kg (5197–5704 lb.)
	Export frame	2461 kg (5437 lb.)
45-foot header	North America frame	2711 kg (5990 lb.)
	Export frame	2711 kg (5990 lb.)

2.3 Component Identification



1004151

Figure 2.2: D65 Windrower Header Components

- | | | |
|---------------------------------|----------------------------|------------------------|
| A - Reel Cam | B - Pick-Up Reel Tines | C - Drapers |
| D - Center Reel Arm Prop Handle | E - Hydraulic Connections | F - Transport Light |
| G - Reel Safety Prop | H - Endshield | J - Reel Lift Cylinder |
| K - Skid Shoe | L - Reel Fore-Aft Cylinder | M - Knife Drive Box |
| N - Crop Divider | P - Crop Divider Rod | Q - Reel Endshield |

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.

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. Refer to [3.4 Shutting Down the Machine, page 40](#).
- Operate only in daylight or good artificial light.

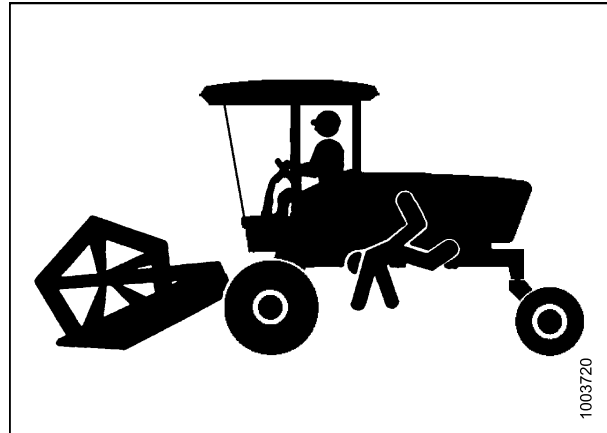


Figure 3.1: No Riders

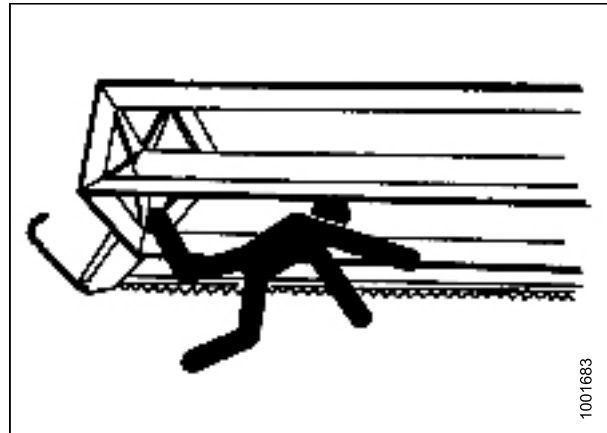


Figure 3.2: Bystander Safety

3.2.1 Header Safety Props

The header safety props, located on the header lift cylinders, prevent the lift cylinders from unexpectedly retracting and lowering the header. 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.

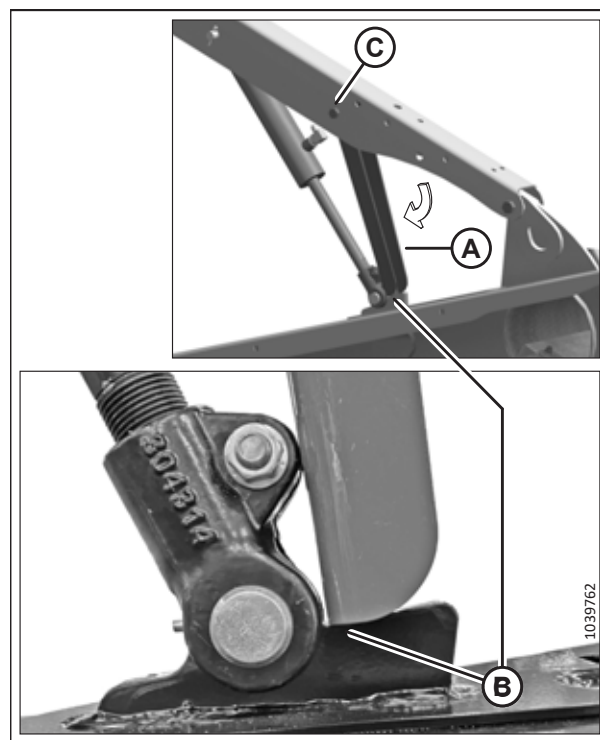


Figure 3.3: Engaged Reel Safety Prop – Left Shown

THE CONTENT ON THIS PAGE HAS CHANGED SINCE THIS MANUAL (147931 REVISION B) WAS PUBLISHED.

OPERATION

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

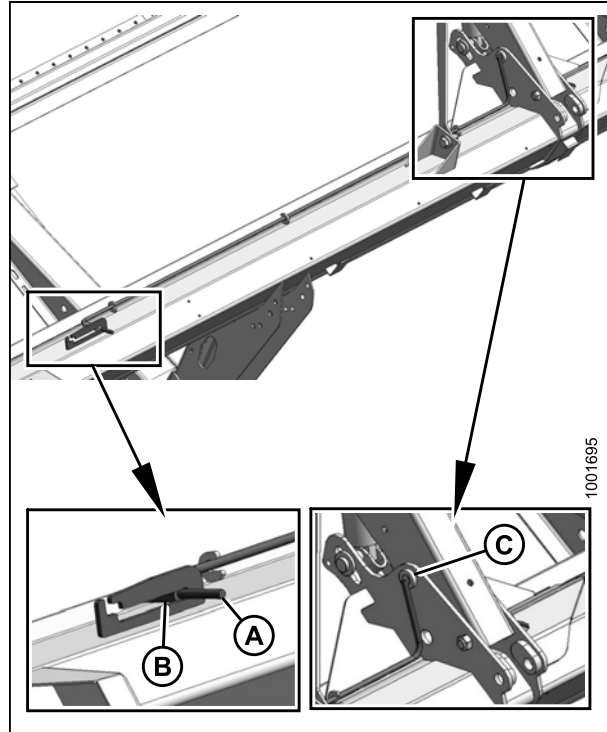


Figure 3.4: Reel Safety Prop – Center Arm

Disengaging Reel Safety Props

1. Raise the reel to maximum height.
2. Move the reel safety props (A) back inside the reel arms.

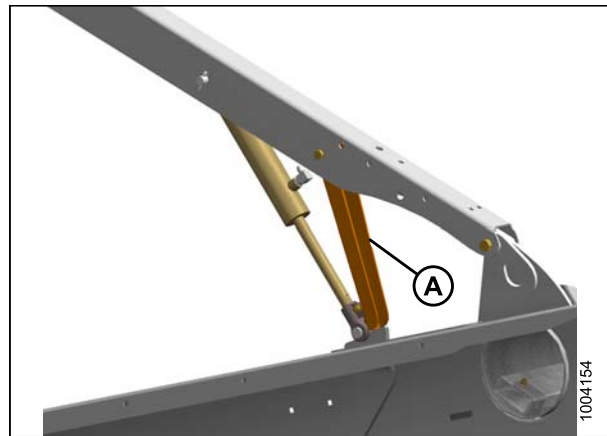


Figure 3.5: Reel Safety Prop – Left Side Outer Arm

OPERATION

3. Use the handle (B) to move the lock rod (A) to the outboard position.

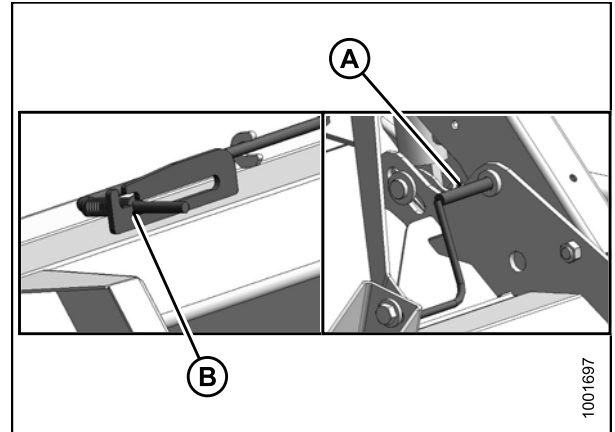


Figure 3.6: Reel Safety Prop – Center Arm

3.2.3 Endshields

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

Opening Endshield

1. Remove lynch pin (A) and tool (B) from pin (C) at top rear of endshield.

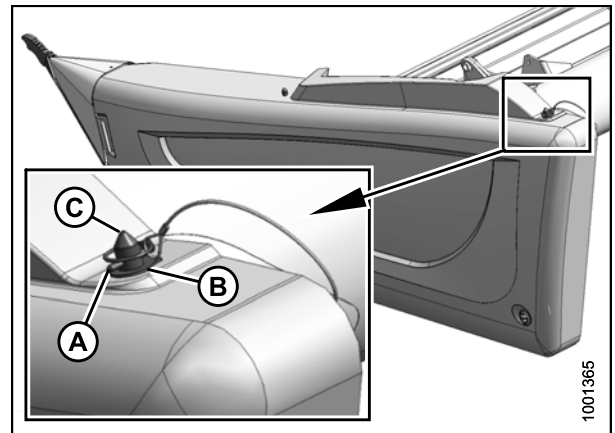


Figure 3.7: Left Endshield

2. Use tool (B) to unlock latch (A) at lower rear corner of endshield.
3. Lift endshield at aft end to clear pin at top rear of endshield.
4. Swing endshield out and away from header while maintaining forward pressure to prevent endshield from slipping out of tab (C) at front of endsheet.

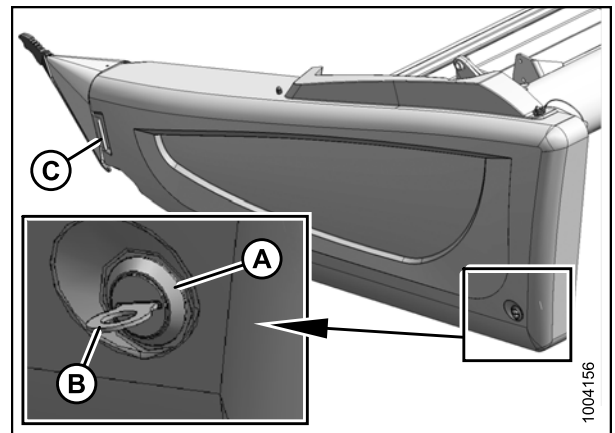


Figure 3.8: Left Endshield Open

OPERATION

IMPORTANT:

Do **NOT** force endshield once it has reached its end of travel or damage to endshield structure may result. The endshield is designed to open sufficiently to allow access to drive system and manual case.

NOTE:

If additional access is required to front of drives area, carefully disengage front of endshield from tab (C) at front of endsheet and swing front of endshield away from header.

NOTE:

If complete access to endsheet area is required, remove endshield. Refer to [Removing Endshield](#), page 35.

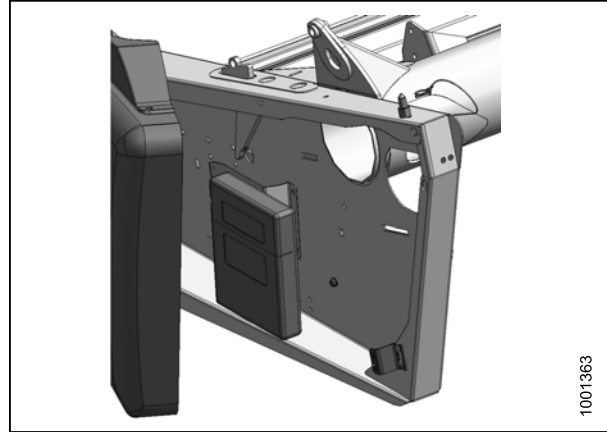


Figure 3.9: Left Endshield Open

Closing Endshield

1. Maintain forward pressure and swing the rear of the endshield towards the header.
2. Lift the endshield and engage pin (A) located on the top of the endsheet frame with the hole in endshield (B).

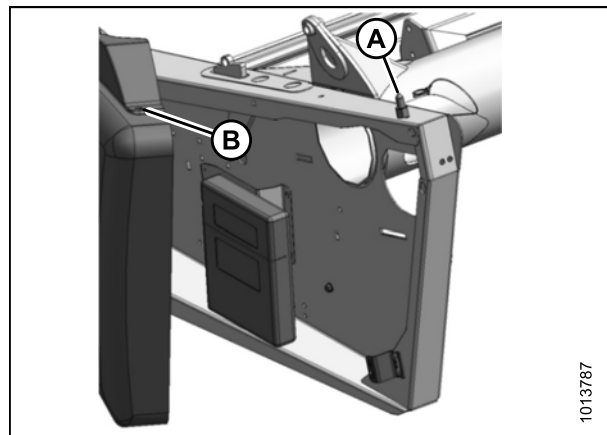


Figure 3.10: Left Endshield

3. Push in the endshield to engage lower latch (A).
4. Use tool (B) to lock lower latch (A).

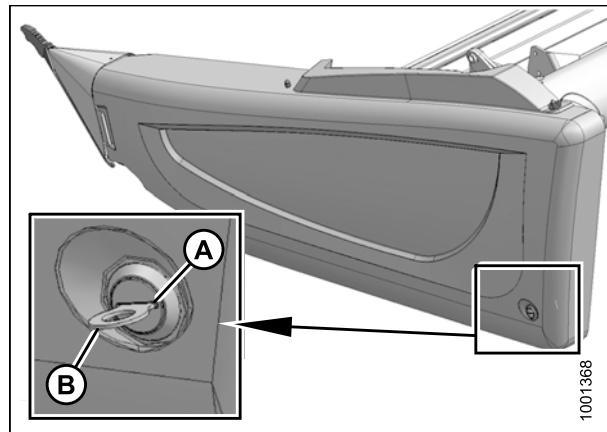


Figure 3.11: Left Endshield

OPERATION

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

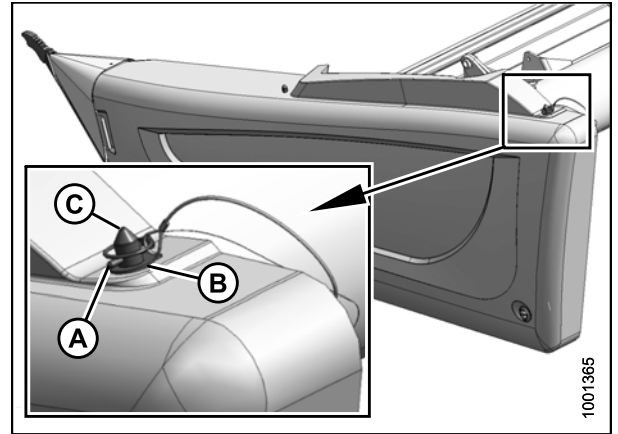


Figure 3.12: Left Endshield Pin

Removing Endshield

1. Open the endshield. Refer to [Opening Endshield, page 33](#).
2. Remove the acorn nut (A) securing the endshield to support (B).
3. Lift the endshield off support (B).

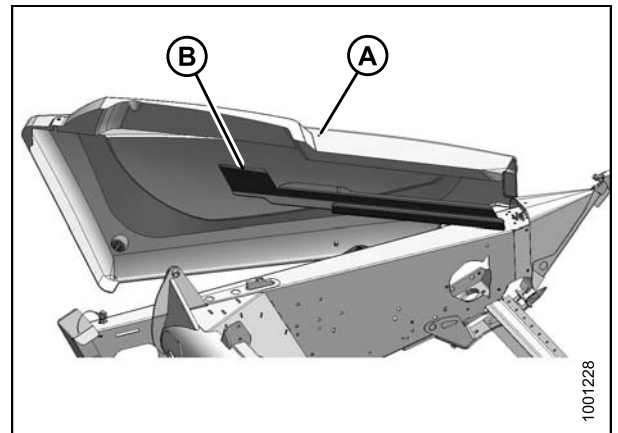


Figure 3.13: Left-Hand Endshield

OPERATION

Installing Endshield

1. Position the endshield onto support (A), and align the hole in the endshield with the stud (B) on the support.

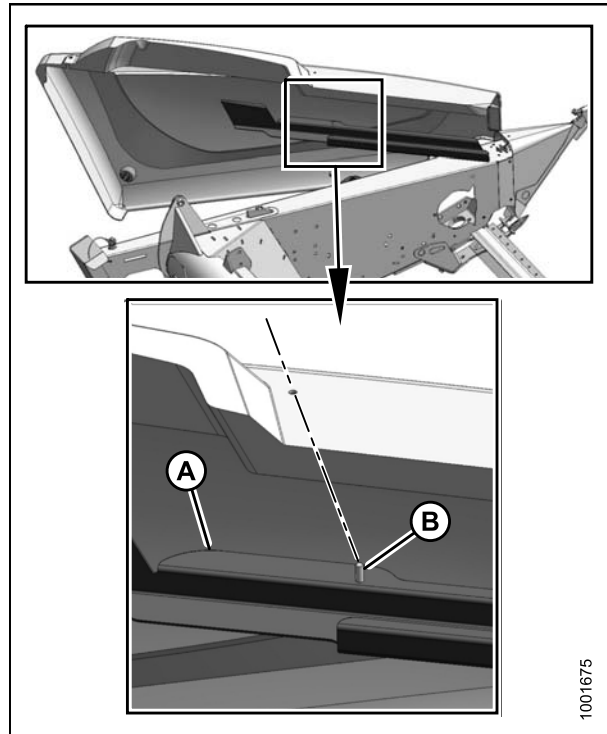


Figure 3.14: Left-Hand Endshield

2. Secure the endshield to the support with acorn nut (A).
3. Close the endshield. Refer to [Closing Endshield, page 34](#).

NOTE:

Plastic endshields may expand or contract when subjected to large temperature changes. Top pin and lower catch bracket positions can be adjusted to compensate for dimensional changes. Refer to [Adjusting Endshield, page 37](#).

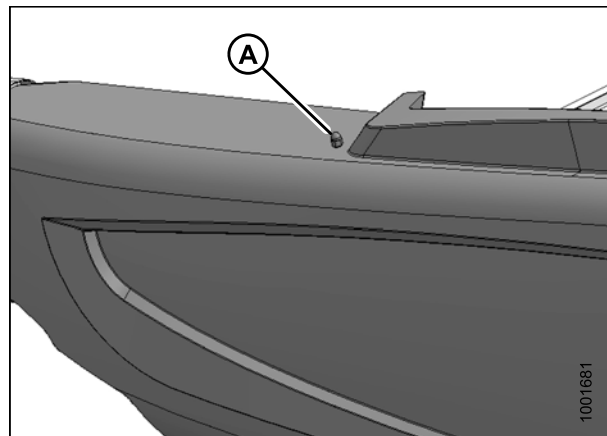


Figure 3.15: Left-Hand Endshield

OPERATION

Adjusting Endshield

Plastic endshields may expand or contract when subjected to large temperature changes. The position of the top pin and lower catch can be adjusted to compensate for dimensional changes.

1. Measure gap 'X' between the front end of the endshield and the header frame and compare the measurement to the values provided in Table 3.1 Gap "X" Chart, page 37.

Table 3.1 Gap "X" Chart

Temperature °C (°F)	Gap 'X' mm (in.)
-4 (25)	28 (1-1/8)
7 (45)	24 (1)
18(65)	20 (13/16)
29 (85)	16 (5/8)
41 (105)	12 (1/2)
52 (125)	8 (5/16)
63 (145)	4 (3/16)
89 (165)	0

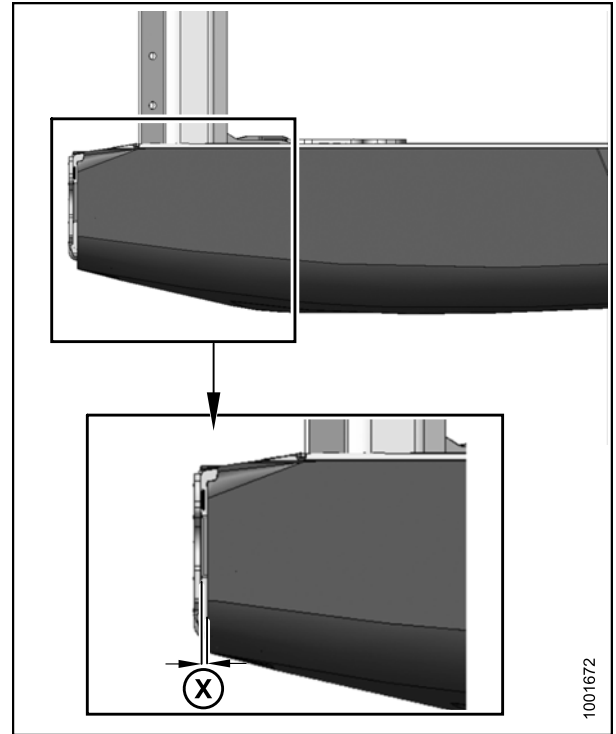


Figure 3.16: Left-Hand Endshield

If adjustments are required, proceed as follows:

2. Open the endshield. Refer to [Opening Endshield, page 33](#).
3. Loosen nut (A) on pin (B) from inside the endsheet using a .19 mm (3/4 in) socket.
4. Close the endshield and adjust its position to achieve the gap 'X' between the front end of the endshield and the header frame.
5. Open the endshield and tighten nut (A).
6. Loosen the bolts on catch (C), and adjust the catch as required to reposition the endshield. Ensure there is a snug fit between the top of the endshield and the header frame and that the endshield is fully engaged on pin (B).
7. Tighten the bolts on catch (C).
8. Close the endshield. Refer to [Adjusting Endshield, page 37](#).

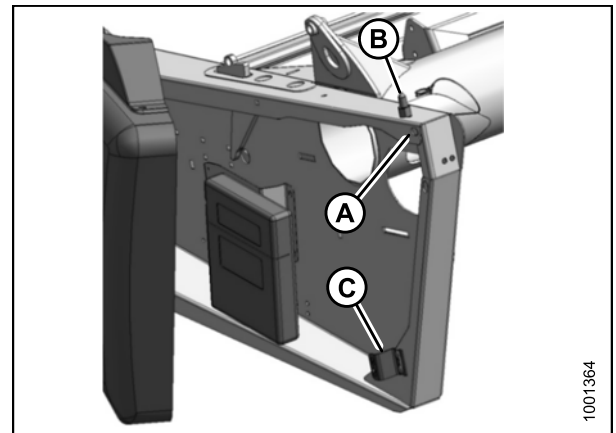


Figure 3.17: Left-Hand Endshield

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.

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. Refer to [5.3.5 Checking Hydraulic Hoses and Lines, page 122](#).

2. Clean all lights and reflective surfaces on the machine.
3. Perform all daily maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 119](#).

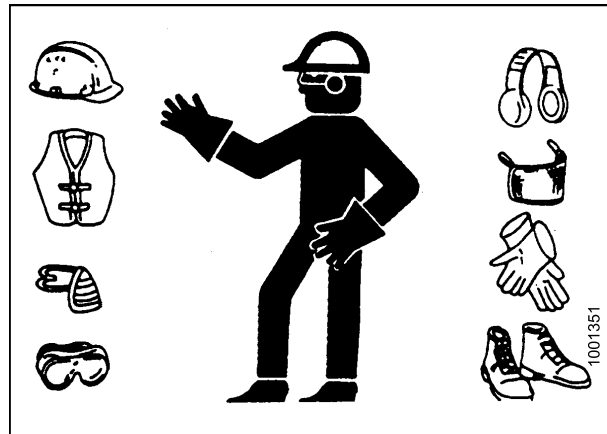


Figure 3.18: Safety Devices

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 alert and 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 120](#) 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:

- Park on level ground whenever possible.
- Lower the header fully.
- Place all controls in NEUTRAL or PARK.
- Disengage the header drive.
- Lower and fully retract the reel.
- Stop the engine and remove the key from the ignition.
- Wait for all movement to stop.

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 control
- 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 increase the performance of your D65 header are available as options that can be installed at your MacDon dealer. Refer to [6 Options and Attachments, page 229](#) for descriptions of available items.

3.6.2 Header Settings

This table is a guideline for setting up the D65 Draper Header. Settings other than those suggested can be made to suit various crops and conditions not covered here.

Table 3.2 Recommended Header Settings

Crop Type	Stubble Height mm (in.)	Crop Condition	Divider Rods	Header Angle ⁵	Knife Speed ⁶	Reel Tine Pitch ⁷	Reel Speed % ⁸	Reel Fore-Aft ⁹	Skid Shoe Position ¹⁰	Stabilizer Wheels ¹¹	Upper Cross Auger	Float N (lbf) ¹²
Cereals	<102 (<4)	Light	On	0–3	High	2	10–15	6 or 7	Up or center	Storage	Not required	311 (70)
		Normal		4–7	Medium		10					
		Heavy				3		5–10	4 or 5			
		Lodged		0–3	High		2	10–15				
	102–203 (4–8)	Light	On	0–3	High	2	10–15	6 or 7	Center or down	Variable	Not required	311 (70)
		Normal		4–7	Medium		10					
		Heavy				3		5–10	4 or 5			
		Lodged		0–3	High		2	10–15				
	>203 (>8)	Light	On	0–3	High	2	10–15	6 or 7	Not applicable	Variable	Not required	667 (150)
		Normal		4–7	Medium		10					
		Heavy				3		5–10	4 or 5			
		Lodged		0–3	High		2	10–15				

5. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. Refer to [Controlling Header Angle](#), page 53.
6. Refer to [3.7.7 Knife Speed](#), page 55.
7. Refer to [Reel Cam Settings](#), page 67.
8. Percentage above ground speed. Refer to [3.7.4 Reel Speed](#), page 54.
9. Refer to [3.7.9 Reel Fore-Aft Position](#), page 57.
10. 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 47.
11. Stabilizer wheels are used to limit the side-to-side movement when cutting off the ground in rolling terrain, and to minimize bouncing. Refer to [Adjusting Stabilizer/Slow Speed Transport Wheels](#), page 48.
12. Force required to lift header at ends. Refer to your windrower operator's manual for adjustment procedures.

OPERATION

Crop Type	Stubble Height mm (in.)	Crop Condition	Divider Rods	Header Angle ⁵	Knife Speed ⁶	Reel Time Pitch ⁷	Reel Speed % ⁸	Reel Fore-Aft ⁹	Skid Shoe Position ¹⁰	Stabilizer Wheels ¹¹	Upper Cross Auger	Float N (lbf) ¹²
Canola	102-203 (4-8)	Light	On	8-10	Medium	2	5-10	6 or 7	Variable	Variable	Not required	311-445 (70-100)
		Normal			1	10	3 or 4	Center or down	Recommended			
		Heavy			2	5-10		Variable				
		Lodged			3	5-10	Center or down					
Flax	51-153 (2-6)	Light	On	4-7	Medium	4	5-10	6 or 7	Not applicable	Variable	Not required	667 (150)
		Normal		2	10	3 or 4	Recommended					
		Heavy		3	5-10							
		Lodged		2	5-10							
Edible beans	On ground	Light	Off	0-3	High	2	5-10	6 or 7	Center or down	Variable	Not required	311-445 (70-100)
		Normal		4-7	Medium	2	10	3 or 4			Not required	
		Heavy		8-10								
		Lodged		3	5-10							
Grass	On ground	Light	On	Variable	High	2	10	6 or 7	Up or center	Storage	Not required	311-445 (70-100)
		Normal			3	10-15	Recommended					
		Heavy			2	10						
		Lodged			3	10-15						
Alfalfa	On ground	Light	On	Variable	High	2	10	6 or 7	Up or center	Storage	Not required	311-445 (70-100)
		Normal			3	10-15	Recommended					
		Heavy			2	10						
		Lodged			3	10-15						

OPERATION

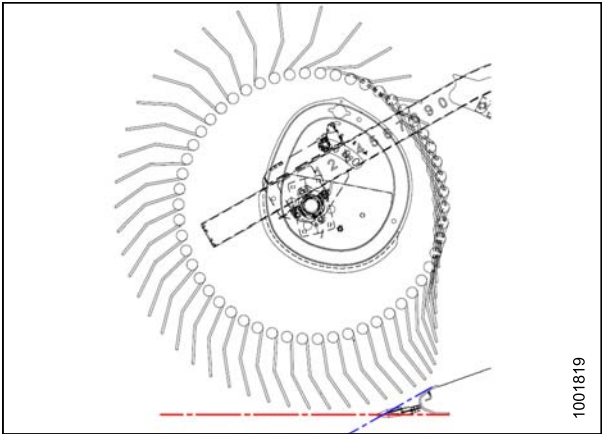
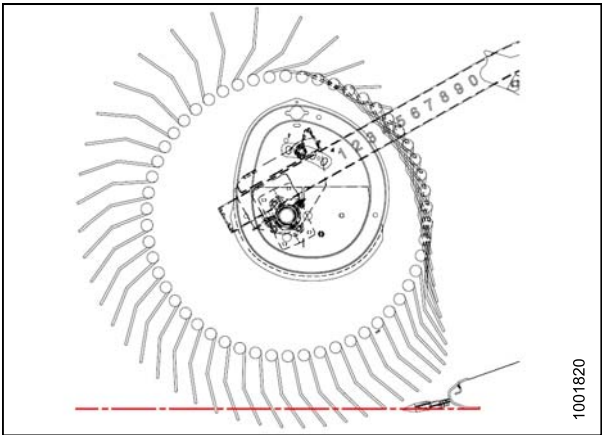
3.6.3 Reel Settings

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 42](#) for applicability of each finger pattern and reel position.

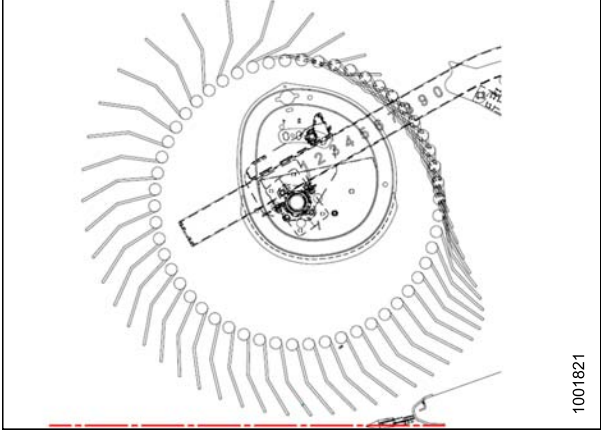
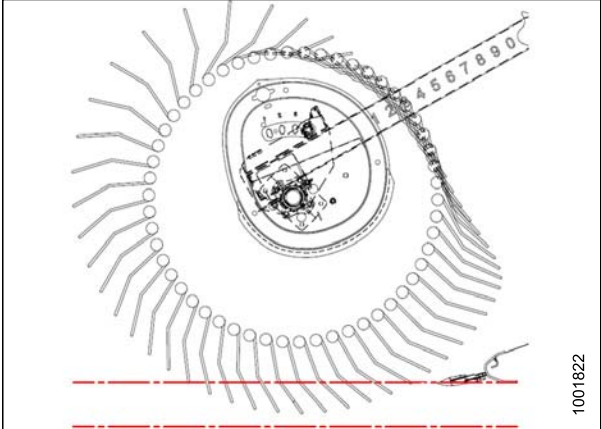
NOTE:

The reel settings chart is also applicable for reel tines.

Table 3.3 D65 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

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 further 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 furthest aft position.
- Maximum crop carrying capacity (maximum area of exposed draper between the reel and the header backsheet) occurs with the reel in the furthest 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. Refer to [Table 3.3 D65 Recommended Reel Settings, page 45](#).

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. As well, proper adjustments and timely maintenance will increase the length of service you receive from your machine.

The variables listed in Table [3.4 Operating Variables, page 47](#) and detailed on the following pages will affect the performance of the header.

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	3.7.1 Cutting Height, page 47
Header Float	3.7.2 Header Float, page 53
Header Angle	3.7.3 Header Angle, page 53
Reel Speed	3.7.4 Reel Speed, page 54
Ground Speed	3.7.5 Ground Speed, page 54
Draper Speed	3.7.6 Draper Speed, page 55
Knife Speed	3.7.7 Knife Speed, page 55
Reel Height	3.7.8 Reel Height, page 57
Reel Fore-Aft Position	3.7.9 Reel Fore-Aft Position, page 57
Reel Tine Pitch	3.7.10 Reel Tine Pitch, page 67
Crop Divider Rods	3.7.12 Crop Divider Rods, page 74

3.7.1 Cutting Height

The D65 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.

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 30-, 35-, 40-, and 45-foot headers.

OPERATION

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.

1. Raise the header so 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. Remove the hairpin (A) from the latch on the right wheel assembly.
4. Disengage the latch (B), lift the wheel out of the hook, and place 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 the weight, and the pull handle (C) upwards to release the lock.
6. Lift the left wheel to the desired height and engage the support channel into the slot (D) in the upper support.
7. Push down on the handle (C) to lock.
8. Lift the right wheel back into the field position and ensure the 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 the slot (B) in the upper support.
12. Push down on the handle (A) to lock.

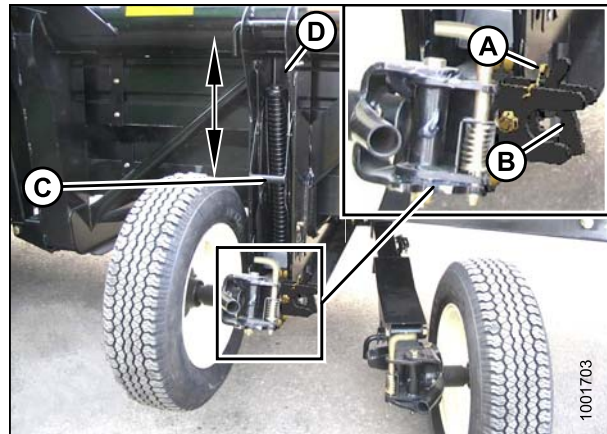


Figure 3.19: Right Wheel

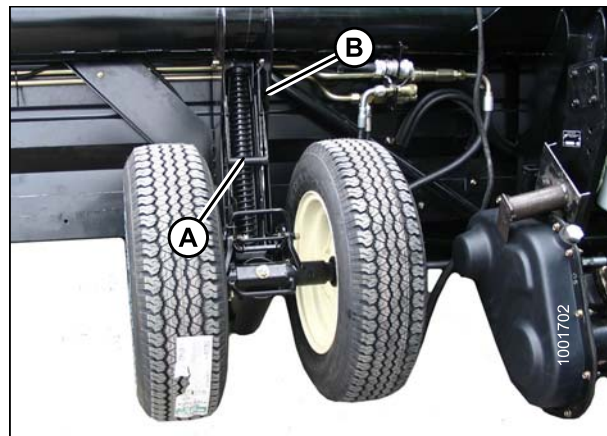


Figure 3.20: Left Wheel

OPERATION

- Lower the header to the desired cutting height using the windrower controls and check the load indicator.

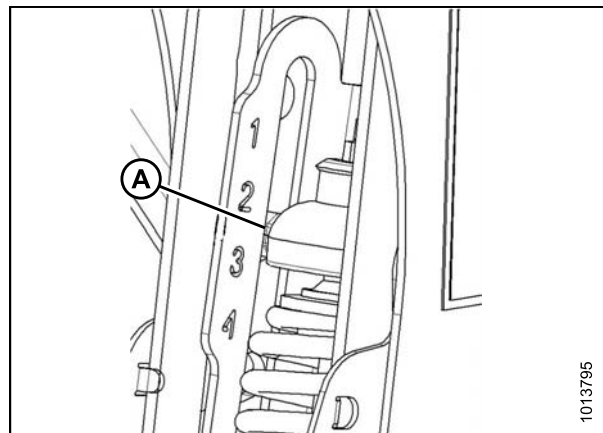


Figure 3.21: Load Indicator

IMPORTANT:

Continuous operation with excessive spring compression (i.e., 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 machine's header angle controls. If header angle is not critical, set it to mid-position.
- Use the windrower cab display module (CDM) controls to automatically maintain cutting height. Refer to your windrower operator's manual for details.

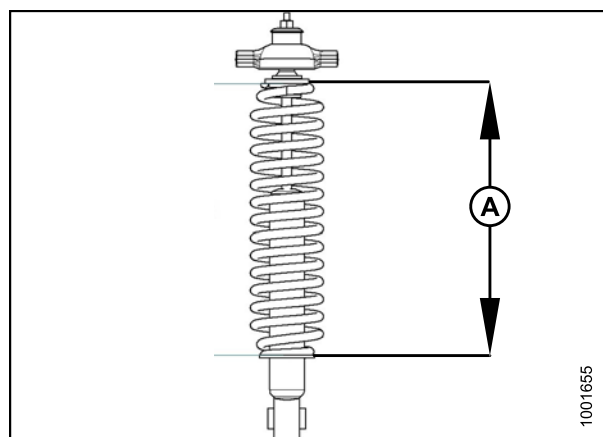


Figure 3.22: Spring Compression

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.

- Raise the header until the stabilizer wheels are off the ground. Shut down engine and remove the key.

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.

OPERATION

2. Support the wheel weight by lifting slightly with one hand on handle (B), and pull up on the handle (A) to release the lock.
3. Lift the wheel using handle (B), and engage the support channel into the center slot (C) in the upper support.
4. Push handle (A) down to lock.

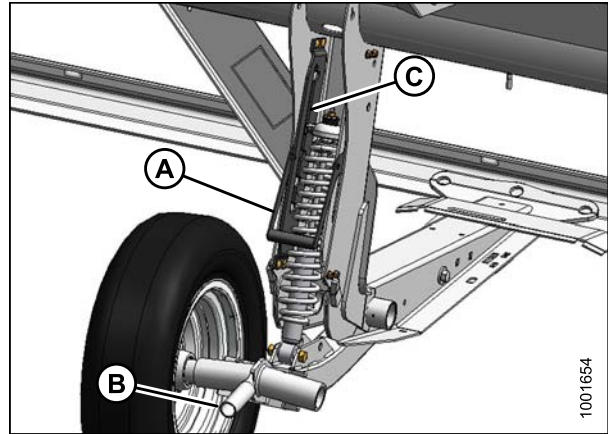


Figure 3.23: Stabilizer Wheel

5. Lower the header to the desired cutting height using the windrower controls and check the load indicator.

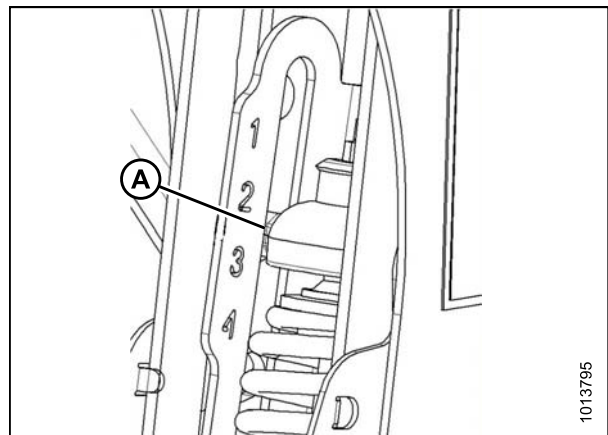


Figure 3.24: Load Indicator

IMPORTANT:

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

6. 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.

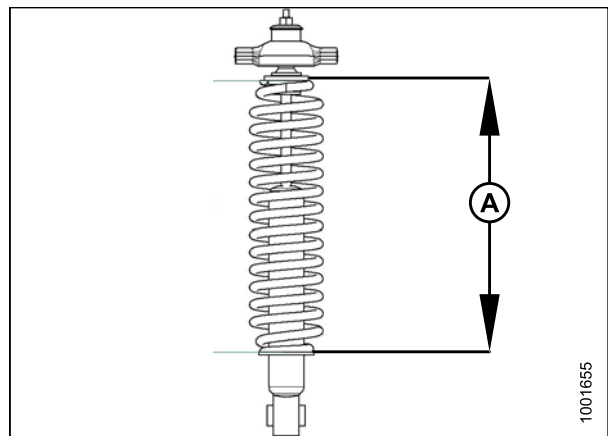


Figure 3.25: Spring Compression

OPERATION

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 the 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 52*](#)
- [*Adjusting Outer Skid Shoes, page 52*](#)
- [*3.7.3 Header Angle, page 53*](#)
- [*3.7.2 Header Float, page 53*](#)

OPERATION

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 header to full height, engage safety props, shut off engine, and remove key.
2. Raise the stabilizer wheels or slow speed transport wheels fully (if installed). Refer to the following:
 - [Adjusting Stabilizer Wheels, page 49](#)
 - [Adjusting Stabilizer/Slow Speed Transport Wheels, page 48](#)
3. Remove the lynch pin (A) from each skid shoe.
4. Hold the shoe (B) and remove the pin (C) by disengaging from the frame and pulling away from the shoe.
5. Raise or lower the skid shoe (B) to achieve the desired position using the holes in the support (D) as a guide.
6. Install the pin (C), engage in frame, and secure with lynch pin (A).
7. Check that all skid shoes are equally adjusted.
8. 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.
9. Check the header float as described in your windrower operator's manual.

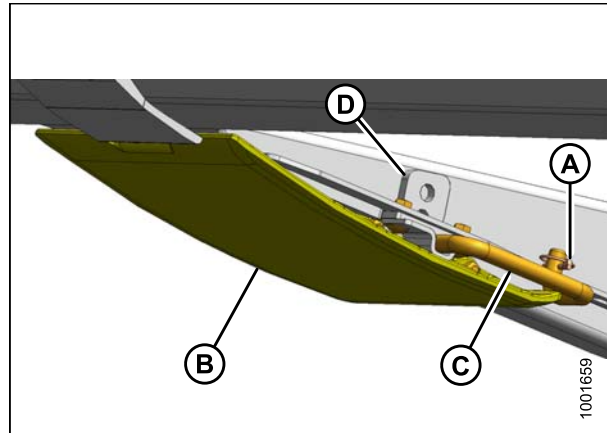


Figure 3.26: Inner Skid Shoe

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 to its full height, engage the safety props, shut off the engine, and remove the key from the ignition.
2. Raise the stabilizer wheels or slow speed transport wheels fully (if installed). Refer to the following:
 - [Adjusting Stabilizer Wheels, page 49](#)
 - [Adjusting Stabilizer/Slow Speed Transport Wheels, page 48](#)

OPERATION

3. Remove the lynch pin (A) from each skid shoe (B).
4. Hold the shoe (B) and remove the pin (C) by disengaging from the frame and pulling away from the shoe.
5. Raise or lower the skid shoe (B) to achieve the desired position using the holes in the support (D) as a guide.
6. Reinstall pin (C), engage in frame, and secure with lynch pin (A).
7. Check that all skid shoes are equally adjusted.
8. Check the header float as described in your windrower operator's manual.

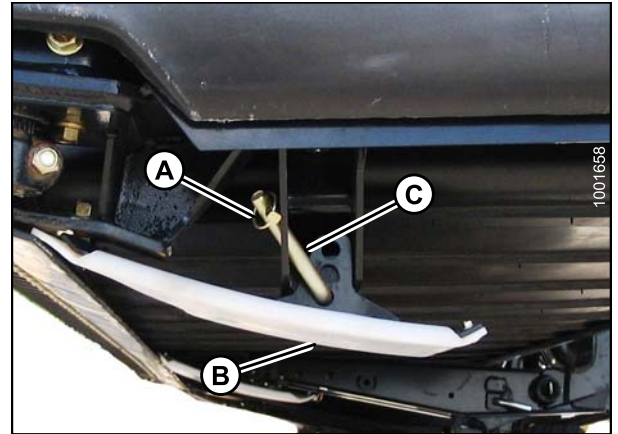


Figure 3.27: Outer Skid Shoe

3.7.2 Header Float

D65 windrower 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.

3.7.3 Header Angle

Header angle is adjustable 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 synonymous with guard angle (D) which is the angle between the upper surface of the guards and the ground.

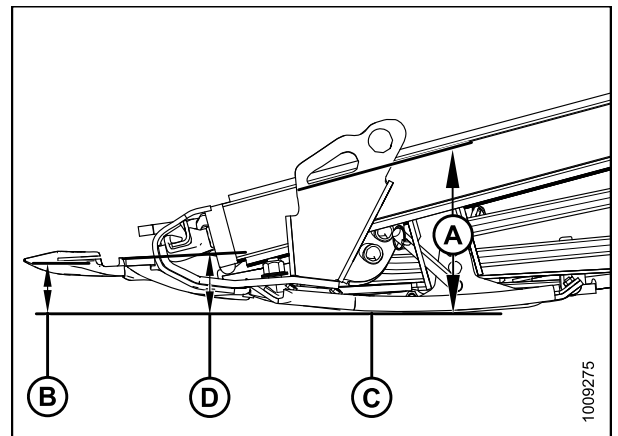


Figure 3.28: Header Angle

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.

3.7.4 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 advantageous in shatter prone crops.

NOTE:

Nine-bat reels are available on 15-, 20-, and 25-foot 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 42](#) 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 sprocket that drives the reel and it is suitable for most crops. Other sprockets are available that provide more torque to the reel in heavy cutting conditions or allow for 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 217](#).

3.7.5 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 83](#) 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 that causes uneven cutting and possible damage to the cutting components. If ground speed is increased, draper and reel speeds should generally be increased to handle the extra material.

Figure [3.29: Ground Speed vs Acres, page 55](#) illustrates the relationship between ground speed and area cut for the various sized headers.

OPERATION

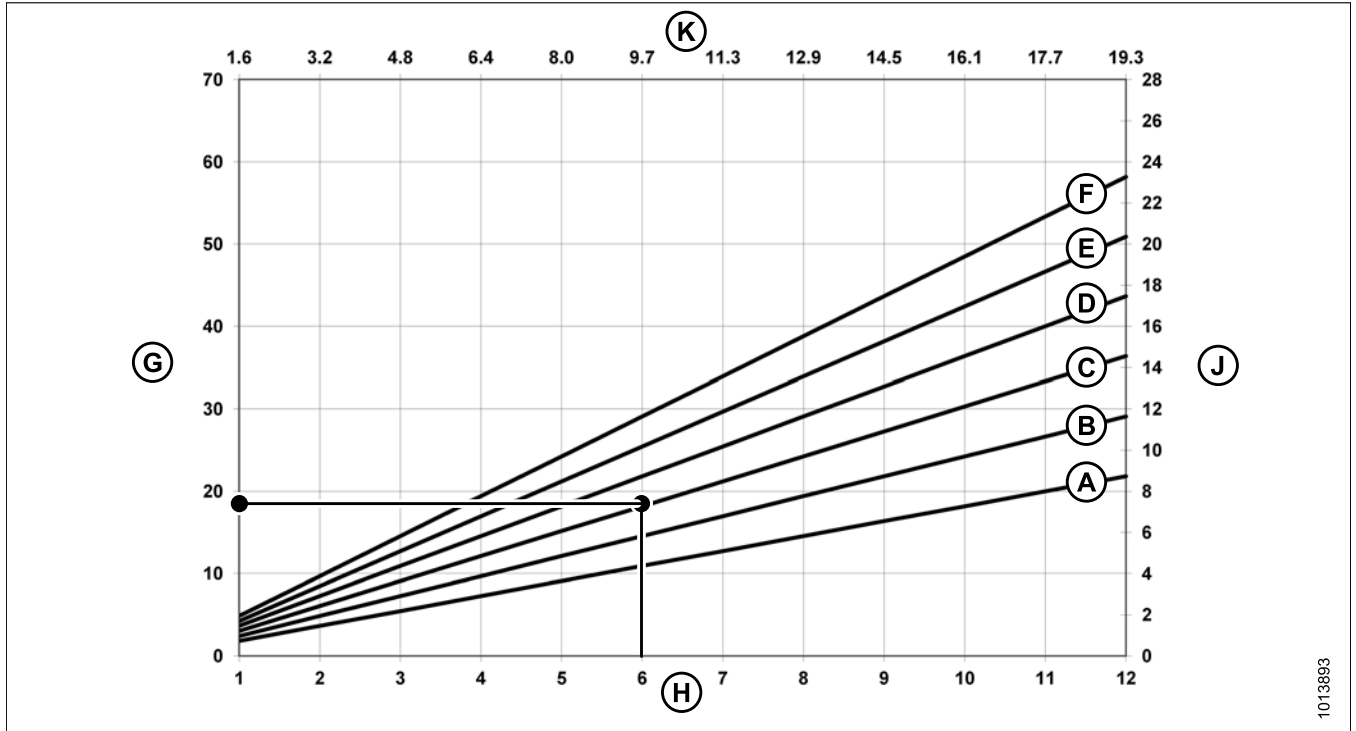


Figure 3.29: Ground Speed vs Acres

- A - 15 Foot
- B - 20 Foot
- C - 25 Foot
- D - 30 Foot
- E - 35 Foot
- F - 40 Foot
- G - acres/hour
- H - miles/hour
- J - hectares per hour
- K - kilometers/hour

Example: A 25-foot 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.

3.7.6 Draper Speed

Correct draper speed is an important factor for achieving good flow of the 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 the draper speed to achieve good feeding of crop for a good windrow. Excessive draper speed will reduce draper life.

3.7.7 Knife Speed

The header knife drive is driven by the windrower hydraulic pump and is controlled with the windrower cab display module (CDM). The default speed is 1200 strokes per minute (spm). Refer to your windrower operator's manual.

Table 3.5 Knife Speed Guidelines

Header Size (ft.)	Recommended Knife Speed Range (spm)	
	Single Knife	Double Knife
15 ft.	—	1500–1900
20, 25 ft.	1200–1400	1400–1700

OPERATION

Header Size (ft.)	Recommended Knife Speed Range (spm)	
	Single Knife	Double Knife
30 ft.	1200–1400	1200–1600
35 ft.	1100–1300	1200–1400
40 ft.	1050–1200	1100–1400

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 the left endshield (A).



Figure 3.30: Left Endshield

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.
4. Measure the rpm of the 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. Refer to [3.7.7 Knife Speed, page 55](#).
7. Contact your MacDon Dealer if the pulley rpm measurement exceeds the specified rpm range for your header.

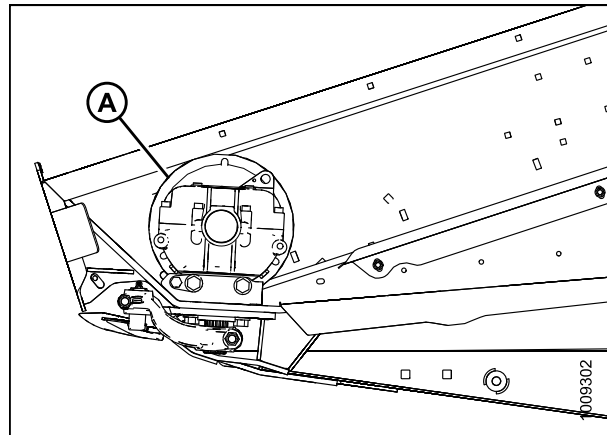


Figure 3.31: Knife Drive Pulley

3.7.8 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. Refer to [3.7.9 Reel Fore-Aft Position, page 57](#).

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 42](#) for recommended reel height in specific crops and crop conditions.

IMPORTANT:

Maintain adequate clearance to prevent fingers contacting the knife or the ground. Refer to [5.8.1 Reel Clearance to Cutterbar, page 190](#).

3.7.9 Reel Fore-Aft Position

Reel fore-aft position is a critical factor for achieving the best results in adverse conditions. The reel position is factory-set for normal conditions, but it can be adjusted forwards or backwards as required using the controls inside the cab.

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

For double-reel headers, refer to [Repositioning Fore-Aft Cylinders on Double Reel, page 62](#).

For single-reel headers, refer to [Repositioning Fore-Aft Cylinders on Single Reel, page 60](#).

OPERATION

A decal (A) is attached to the right reel support arm for identifying reel position. The aft edge of the 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 53](#) for adjustment instructions. Adjust reel position only if header angle adjustments are not satisfactory.

Refer to [3.6.2 Header Settings, page 42](#) 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 [3.7.10 Reel Tine Pitch, page 67](#) for adjustment details.

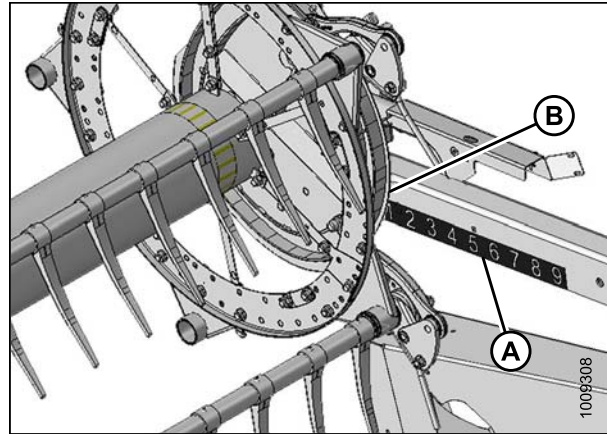


Figure 3.32: Fore-Aft Decal

OPERATION

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 the 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 190](#)
 - [5.8.2 Reel Frown, page 193](#)

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.

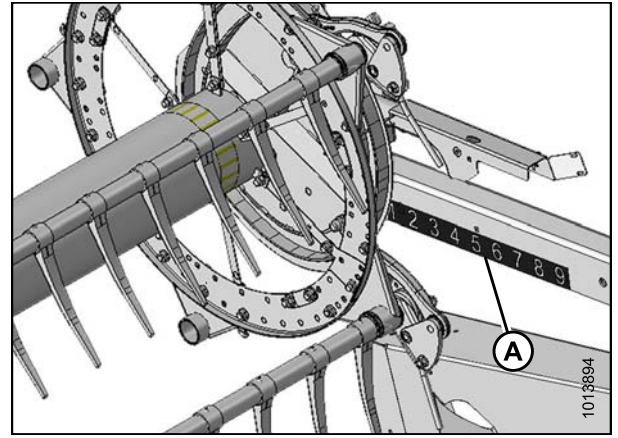


Figure 3.33: Fore-Aft Decal

OPERATION

Repositioning Fore-Aft Cylinders on Single Reel

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

⚠ 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.

Reposition the right reel arm cylinder as follows:

NOTE:

Reel components not shown in illustration 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 the four bolts (A) securing the cylinder bracket (B) to the reel arm.
4. Push/pull the reel until bracket (B) lines up with the fore/aft set of holes (C).
5. Reinstall the four bolts (A) securing the cylinder bracket (B) to the reel arm at the new position.

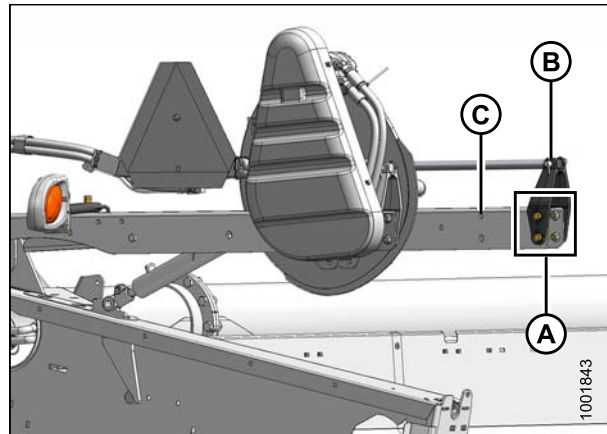


Figure 3.34: Right Arm Cylinder – Forward Position

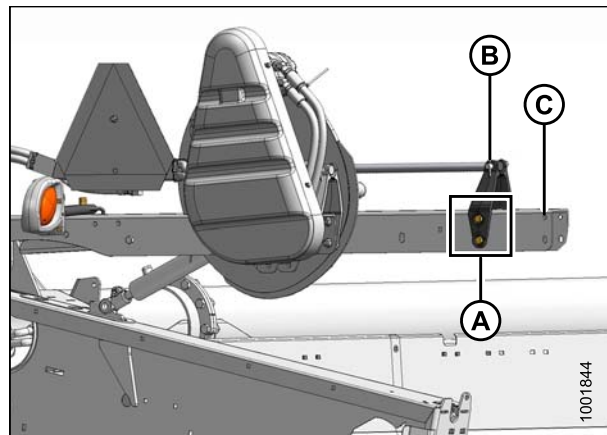


Figure 3.35: Right Arm Cylinder – Rearward Position

OPERATION

Reposition the left reel arm cylinder as follows:

NOTE:

Reel components not shown in illustration for improved clarity.

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

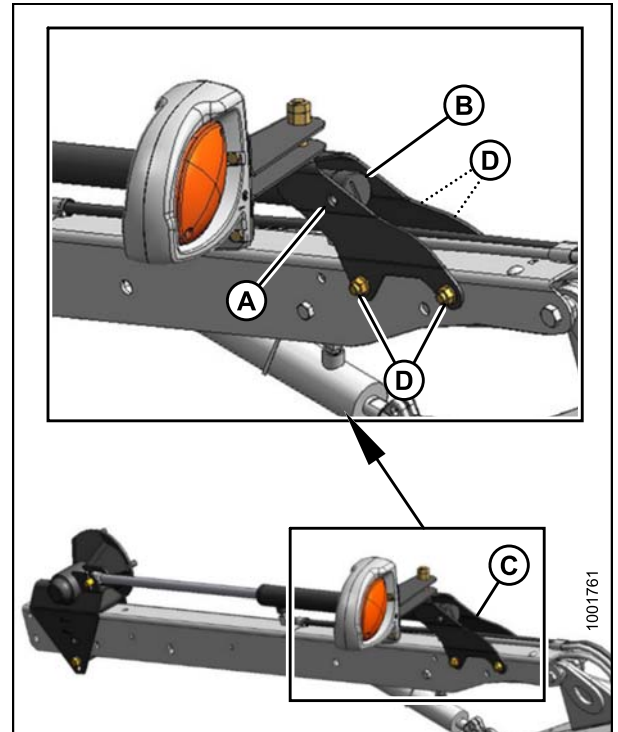


Figure 3.36: Forward Position

5. Reposition the bracket/light assembly (C) on the reel arm as shown, and secure with four bolts (D). Tighten bolts.
6. Push the reel back and attach cylinder (B) to the bracket/light assembly (C) with pin (A). Secure pin with cotter pin.
7. Secure the light harness to the 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. Refer to [3.7.10 Reel Tine Pitch, page 67](#).

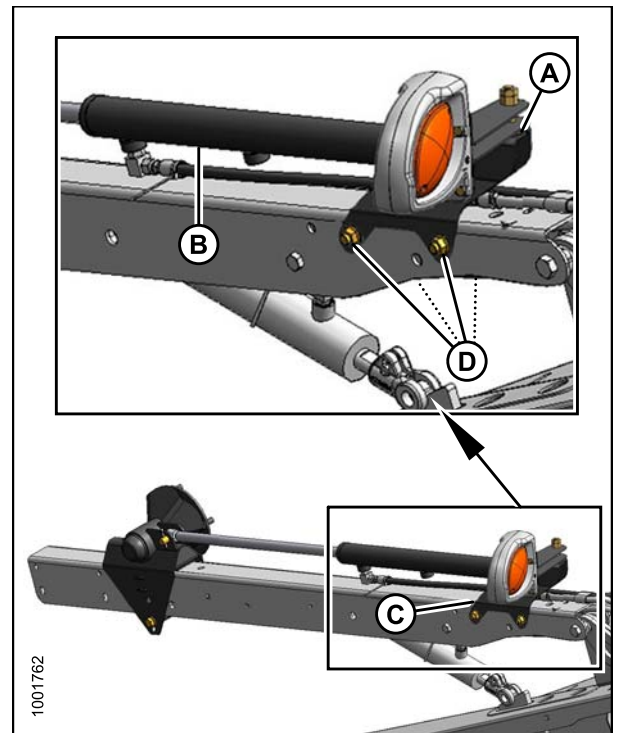


Figure 3.37: Rearward Position

OPERATION

Repositioning Fore-Aft Cylinders on Double Reel

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

⚠ 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.

Reposition the center arm cylinder as follows:

NOTE:

Reel components not shown in illustration for improved clarity.

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

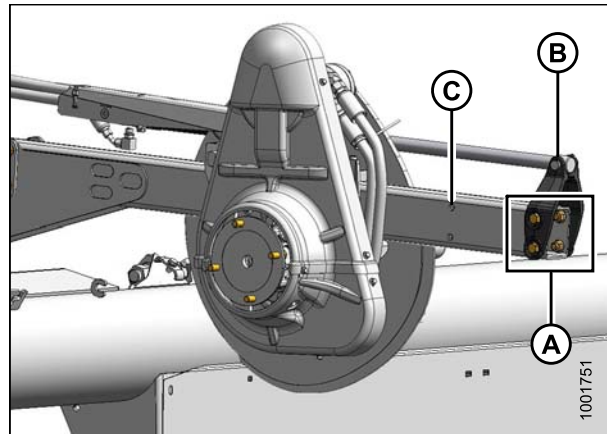


Figure 3.38: Forward Position

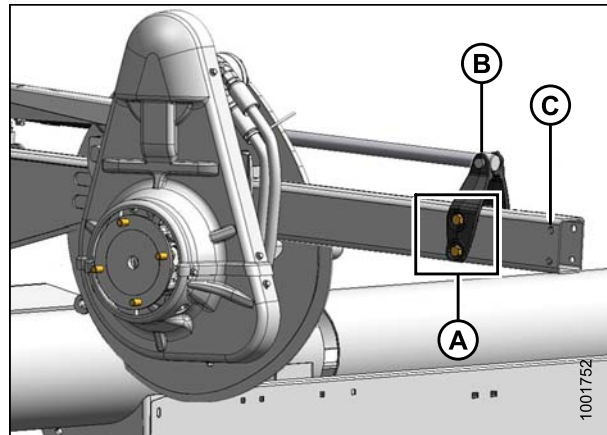


Figure 3.39: Rearward Position

OPERATION

Reposition right arm cylinder as follows:

NOTE:

Reel components not shown in illustration for improved clarity.

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

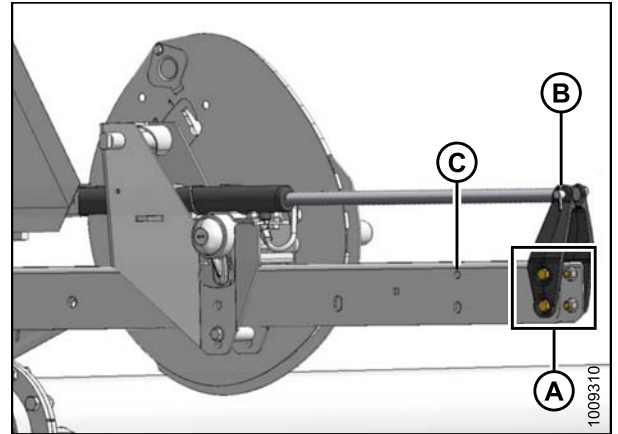


Figure 3.40: Forward Position

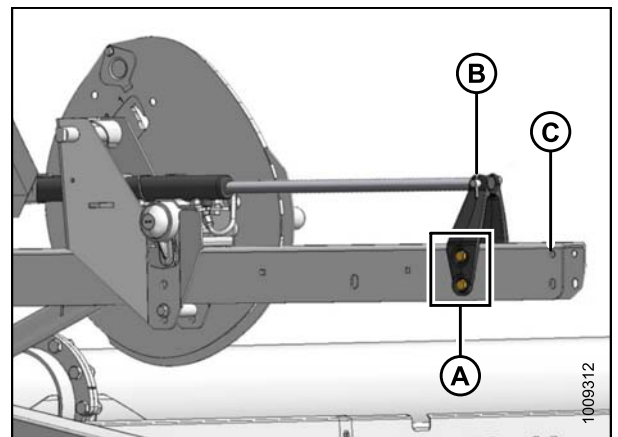


Figure 3.41: Rearward Position

OPERATION

Reposition the left reel arm cylinder as follows:

NOTE:

Reel components not shown in illustration for improved clarity.

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

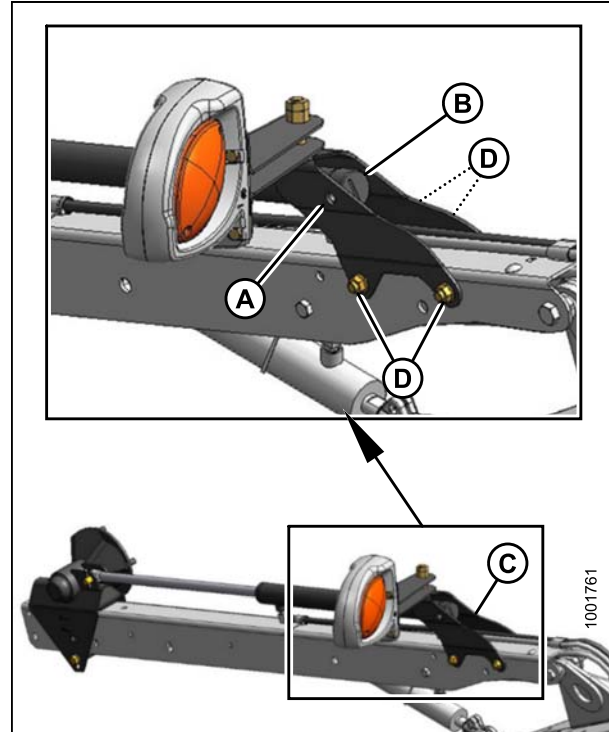


Figure 3.42: Forward Position

5. Reposition the bracket/light assembly (C) on the reel arm as shown, and secure with four bolts (D). Tighten bolts.
6. Push the reel back and attach cylinder (B) to the bracket/light assembly (C) with pin (A). Secure pin with cotter pin.
7. Secure the light harness to the 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. Refer to [3.7.10 Reel Tine Pitch, page 67](#).

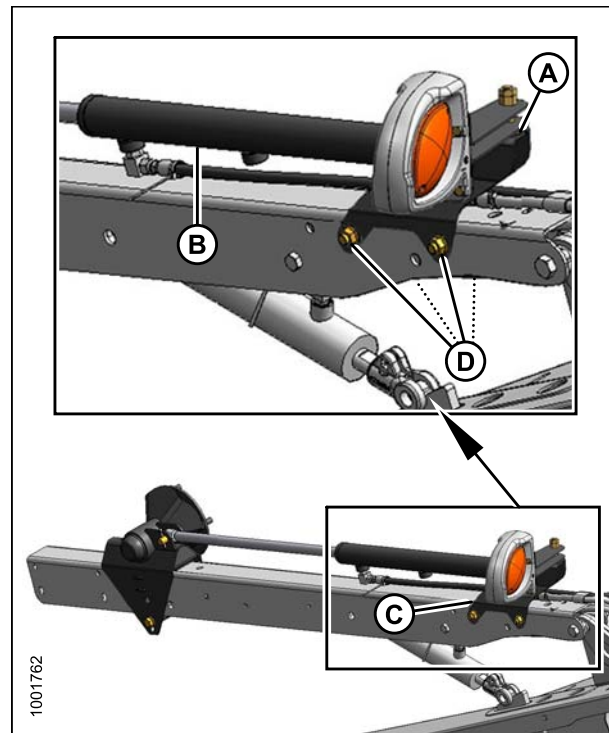


Figure 3.43: Rearward Position

OPERATION

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

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

! 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.

Reposition the left arm cylinder as follows:

NOTE:

Reel components not shown in illustration 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 cotter pin (A) and clevis pin (B).
4. Push the reel back until the cylinder barrel (C) lines up with the aft holes in bracket (D).
5. Reinstall clevis pin (B) at the new position and secure with cotter pin (A).

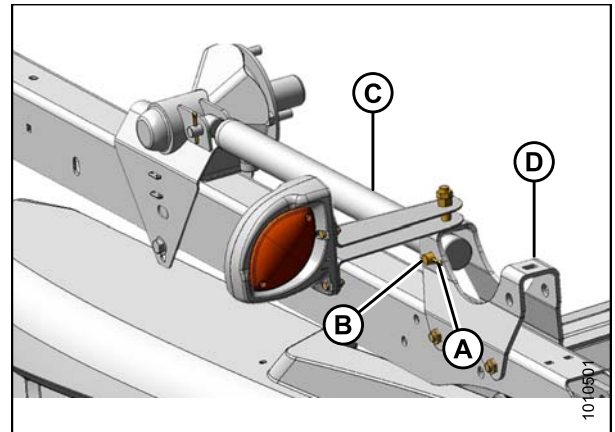


Figure 3.44: Forward Position – Left Arm

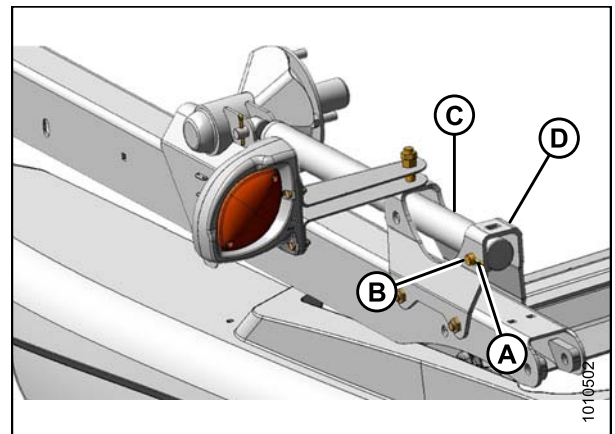


Figure 3.45: Aft Position – Left Arm

OPERATION

Reposition the center arm cylinder as follows:

NOTE:

Reel components not shown in illustration for improved clarity.

1. Remove cotter pin (A) and clevis pin (B).
2. Push the reel back until the cylinder barrel (C) lines up with the aft holes in bracket (D).
3. Reinstall clevis pin (B) at the new position and secure with cotter pin (A).

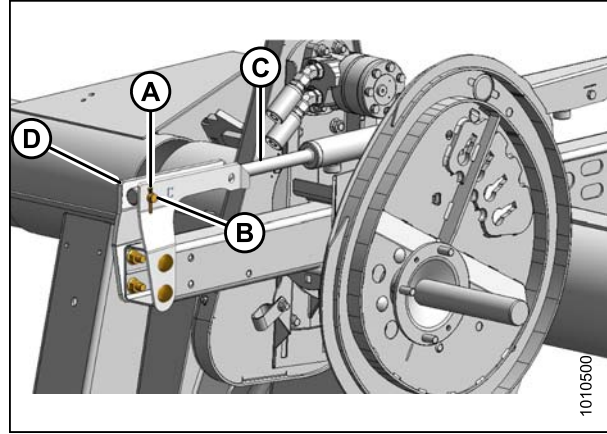


Figure 3.46: Forward Position – Center Arm

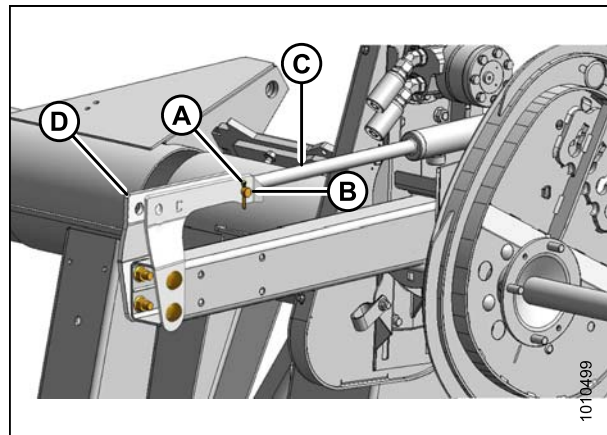


Figure 3.47: Aft Position – Center Arm

OPERATION

Reposition the right arm cylinder as follows:

NOTE:

Reel components not shown in illustration for improved clarity.

1. Remove cotter pin (A) and clevis pin (B).
2. Push the reel back until cylinder rod (C) lines up with the aft holes in bracket (D).
3. Reinstall clevis pin (B) at the new position and secure with cotter pin (A).

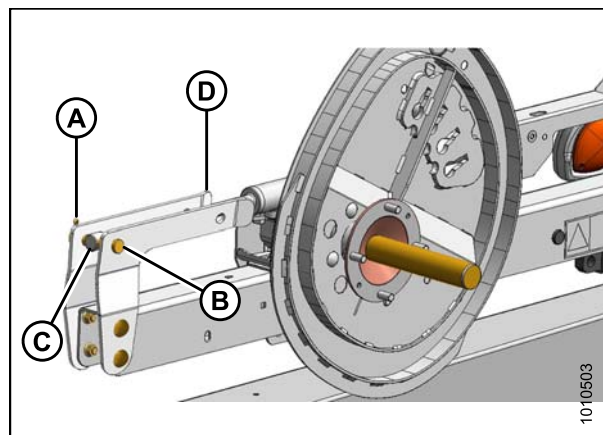


Figure 3.48: Forward Position – Right Arm

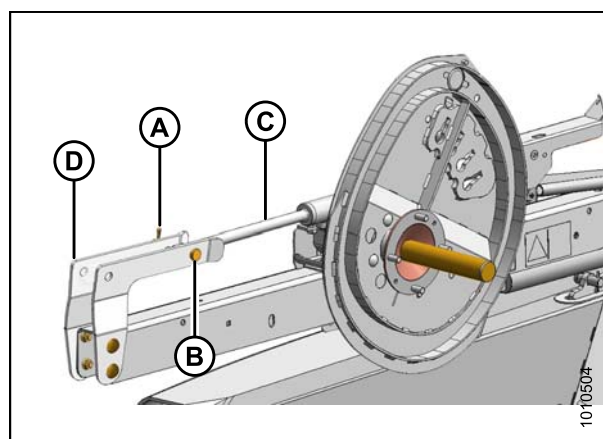


Figure 3.49: Aft Position – Right Arm

3.7.10 Reel Tine Pitch

IMPORTANT:

The following describes the conceptual and operational guidelines of the pick-up reel. Please read carefully before operating the machine.

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, however, because the cam setting is mainly used to determine how the crop gets delivered onto the drapers.

The positioning of the fingers 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. Refer to [3.6.2 Header Settings, page 42](#).

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. Refer to [Adjusting Reel Cam, page 69](#) if adjustments are necessary.

OPERATION

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.

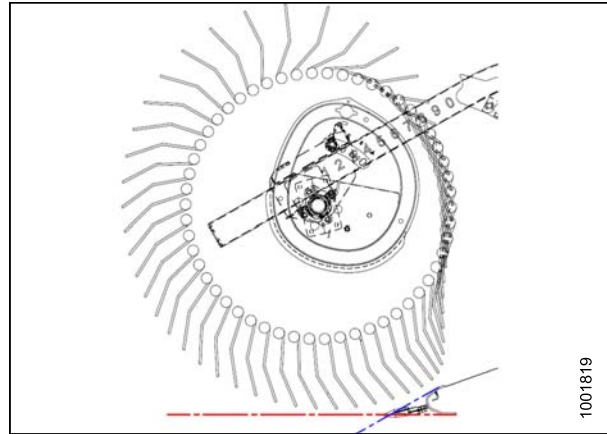


Figure 3.50: Finger Profile – Position 1

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.

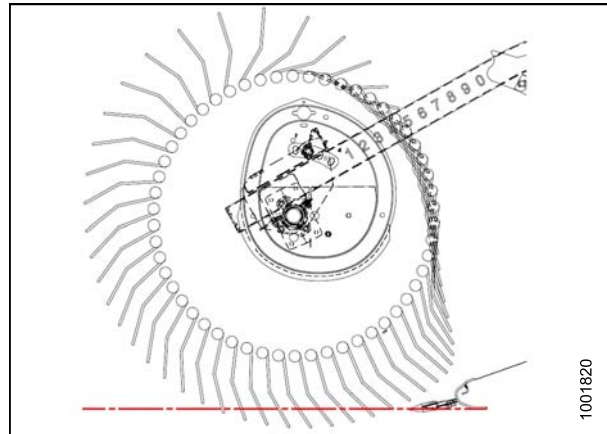


Figure 3.51: Finger Profile – Position 2

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.

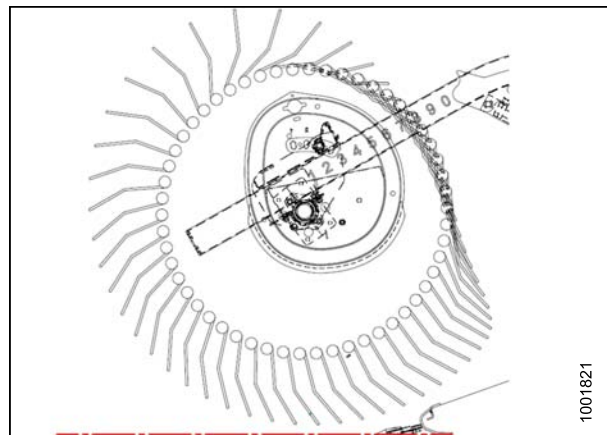


Figure 3.52: Finger Profile – Position 3

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.

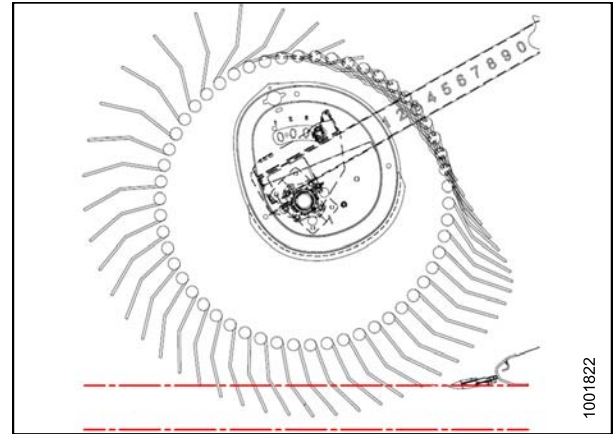


Figure 3.53: Finger Profile – Position 4

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.

- 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. Refer to [5.8.1 Reel Clearance to Cutterbar, page 190](#).

Refer to [3.6.2 Header Settings, page 42](#) for recommended reel tine pitch in specific crops and crop conditions.

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.

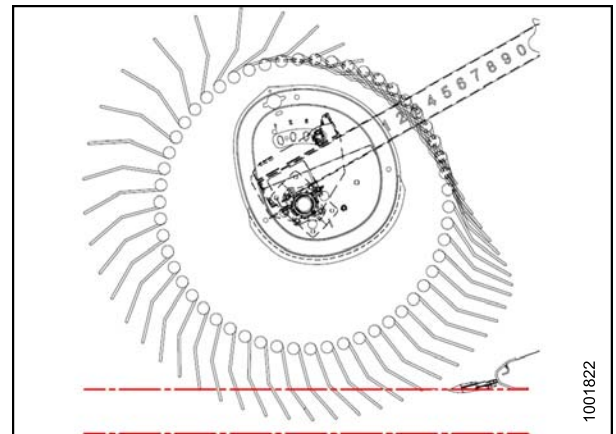


Figure 3.54: Finger Profile – Position 4

OPERATION

1. Turn the latch pin (A) counterclockwise using a 3/4 in. wrench to release the cam disc.
2. Use the wrench on bolt (B) to rotate the cam disc and align the 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).

3. Turn the latch pin (A) clockwise to engage and lock the cam disc.
4. Repeat the above procedure for the opposite reel.

IMPORTANT:

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

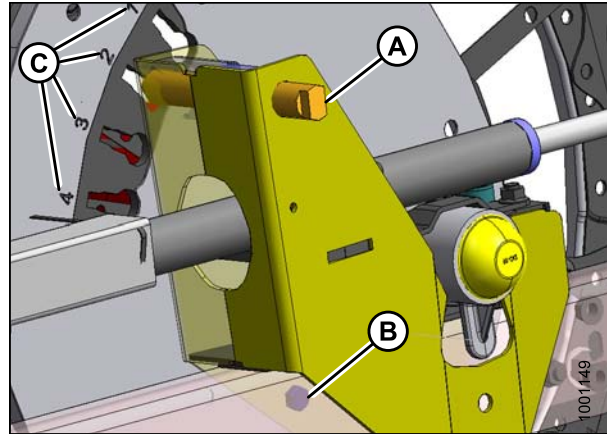


Figure 3.55: Cam Disc Positions

3.7.11 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.

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. Refer to your windrower operator's manual for instructions.
2. Open or remove endshields. Refer to [3.2.3 Endshields, page 33](#).
3. Lift safety lever (A).
4. Hold onto crop divider (B), push lever (C) to open latch, and lower crop divider.

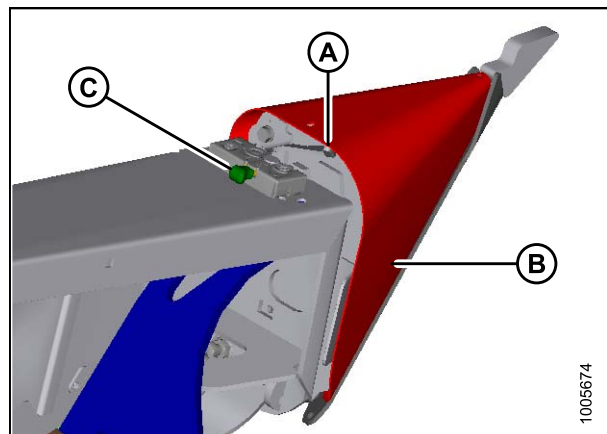


Figure 3.56: Crop Divider

OPERATION

5. Lift crop divider off endsheet and store as follows:
 - a. Insert pin (A) on crop divider into hole in endsheet at location shown.
 - b. Lift crop divider and position lugs (B) on crop divider into bracket on endsheet. Ensure lugs engage bracket.
6. Close or install endshields. Refer to [3.2.3 Endshields, page 33](#).

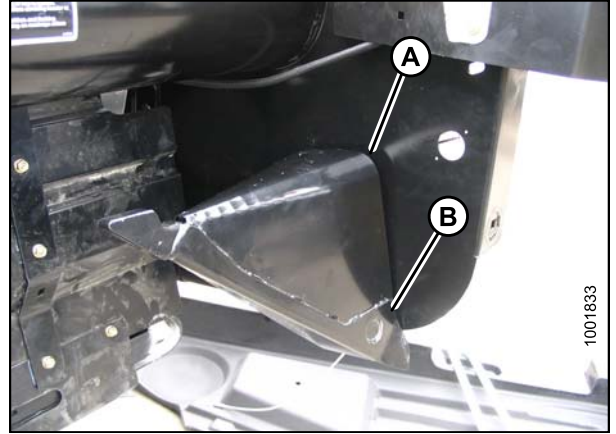


Figure 3.57: Stored Crop Divider

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. Refer to your windrower operator's manual for instructions.
2. Open or remove endshields. Refer to [3.2.3 Endshields, page 33](#).
3. Remove bolt (A), lock washer, and flat washer.
4. Lower crop divider (B) and then lift to remove from endsheet.
5. Close or install endshields. Refer to [3.2.3 Endshields, page 33](#).

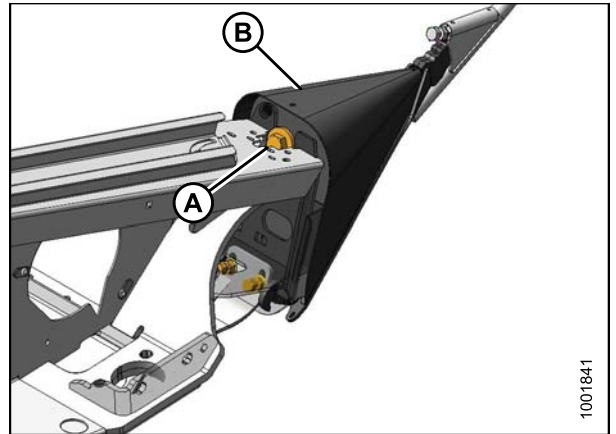


Figure 3.58: Crop Divider

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. Refer to your windrower operator's manual for instructions.
2. Open or remove endshields. Refer to [3.2.3 Endshields, page 33](#).

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.

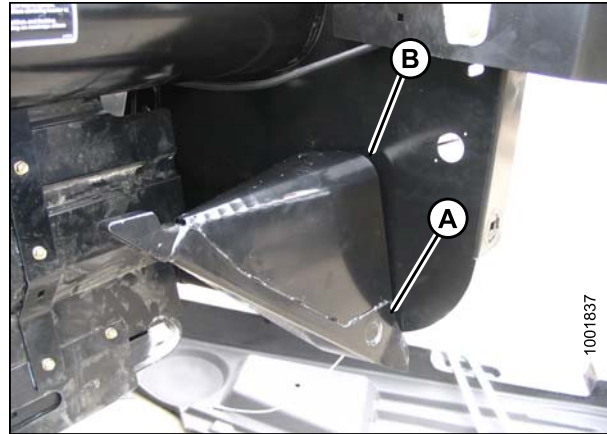


Figure 3.59: Stored Crop Divider

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) downwards to lock pin into latch (C).

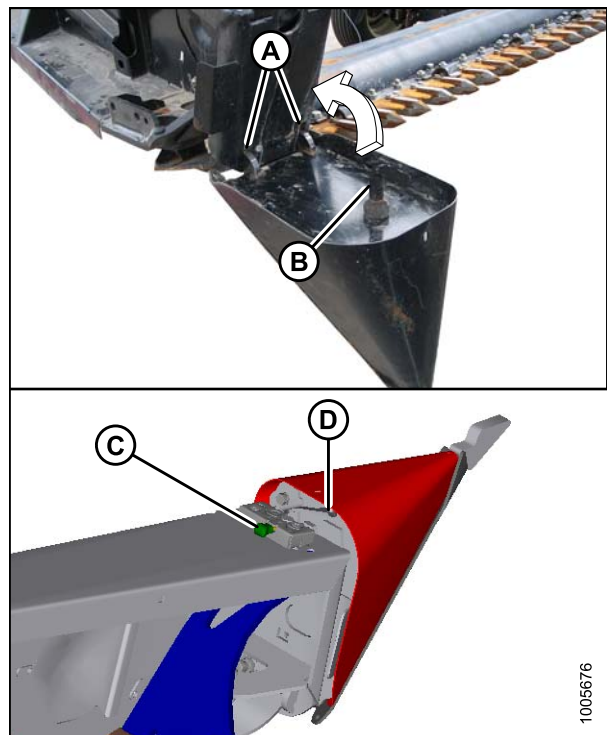


Figure 3.60: Crop Divider

OPERATION

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 or install endshields. Refer to [3.2.3 Endshields, page 33](#).



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. Refer to your windrower operator's manual for instructions.
2. Open or remove endshields. Refer to [3.2.3 Endshields, page 33](#).
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.

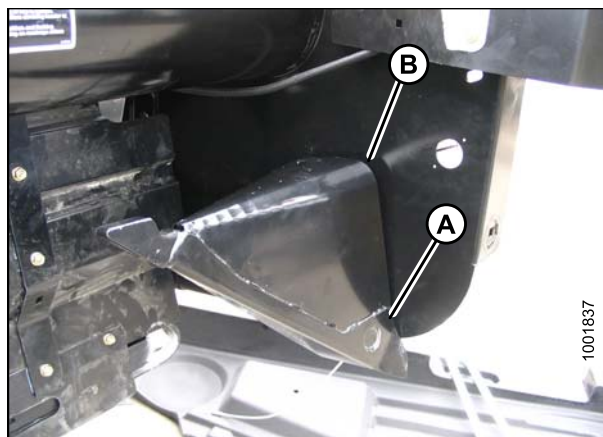


Figure 3.62: Stored Crop Divider

OPERATION

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

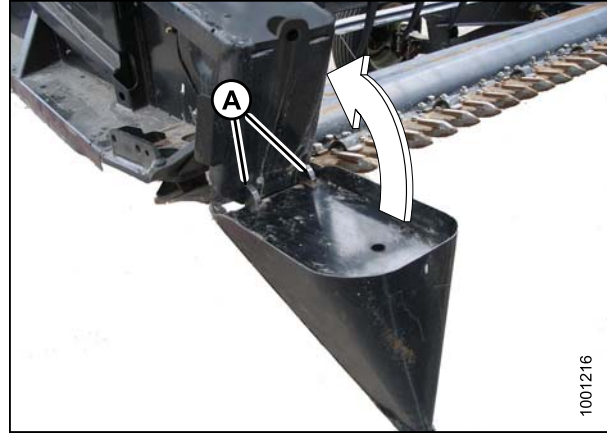


Figure 3.63: Crop Divider

- Lift forward end of crop divider and install bolt (A) and special stepped washer (B) (step towards divider). Tighten bolt.
- 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.
- Close or install endshields. Refer to [3.2.3 Endshields, page 33](#).

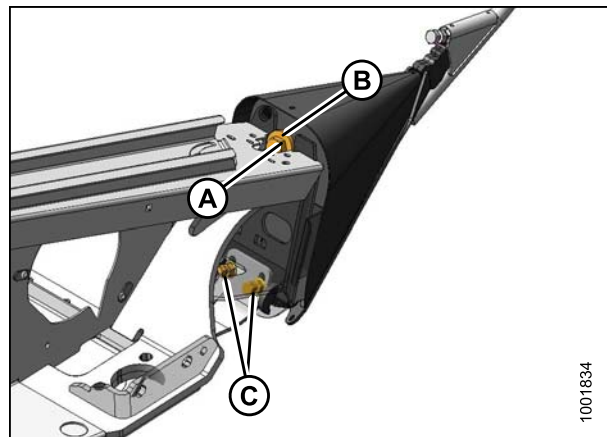


Figure 3.64: Crop Divider

3.7.12 Crop Divider Rods

Crop divider rods are 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

OPERATION

Removing Crop Divider Rods

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

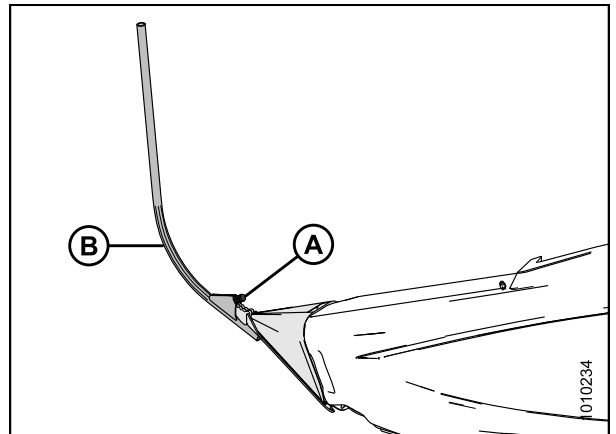


Figure 3.65: Crop Divider Rod

2. Store both crop divider rods inboard on the right side endsheet.

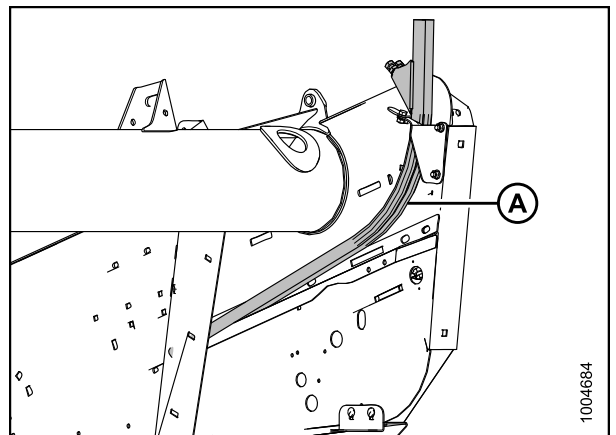


Figure 3.66: Right Side Endsheet

Rice Divider Rods

Optional rice divider rods provide improved performance in tall and tangled rice crops. Refer to [6.4.3 Rice Divider Rods, page 237](#).

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

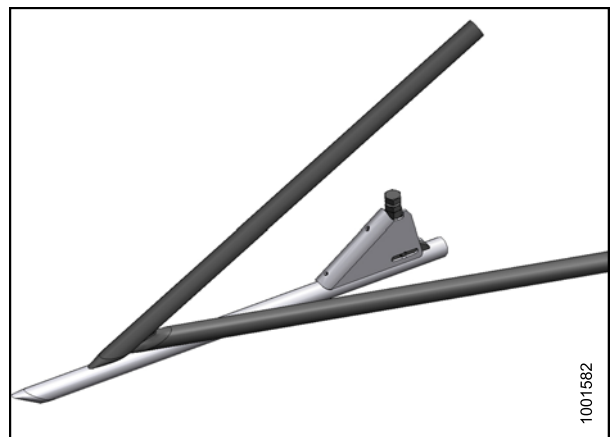


Figure 3.67: Divider Rod for Rice

3.8 Delivery Opening

The width and location of the delivery opening 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:

- Windrower pick-up capability
- Type and yield of crop
- Weather conditions (rain, humidity, wind)
- Drying time available

Refer to [3.10 Windrow Types, page 83](#) for the strengths and weaknesses of the various windrow configurations with respect to these factors.

Also refer to [3.9 Double Windrowing, page 80](#).

3.8.1 Adjusting Delivery Opening on Header with Manual Deck Shift

Both decks can be positioned to vary the delivery opening from 154–177 cm (60-5/8 to 69-11/16 in.) for the 15-ft. header and from 172–195 cm (67-1/8 to 76-11/16 in.) for 20- to 40-ft. models.

1. Loosen bolts (A) on both decks.
2. Slide decks desired amount. Retighten bolts (A).

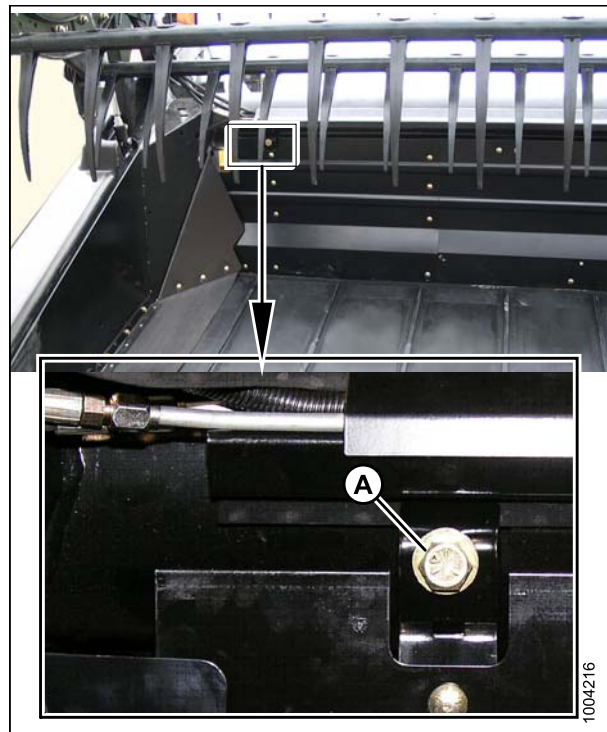


Figure 3.68: Manual Deck Shift

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.

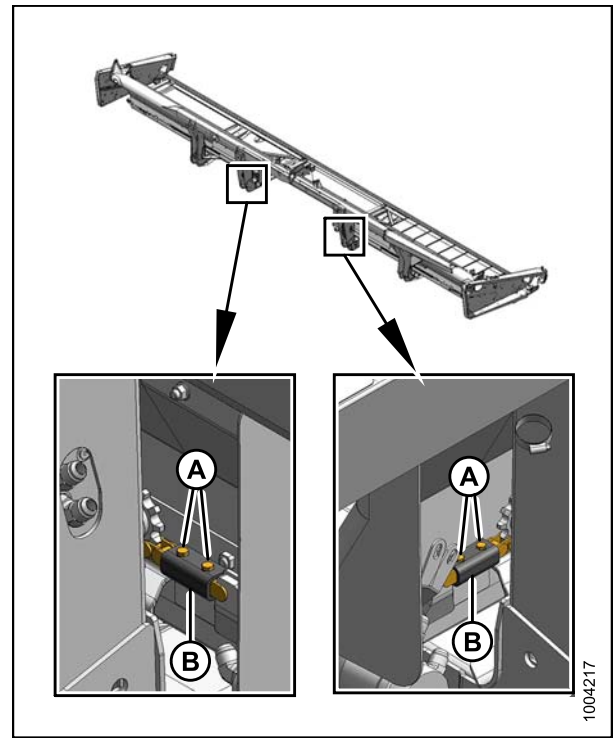


Figure 3.69: Hydraulic Deck Shift

3.8.3 Adjusting the 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).

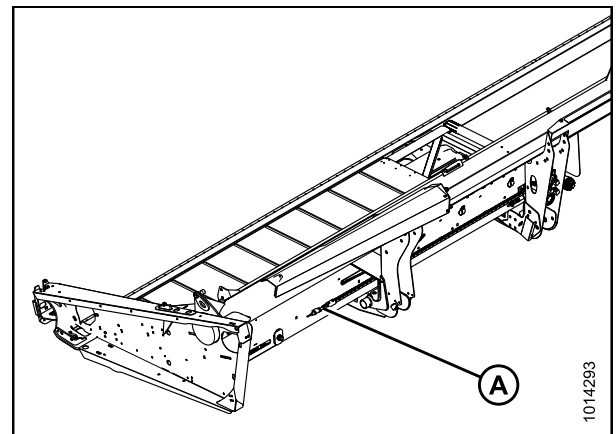


Figure 3.70: Chain Adjustment Bolt: Left Side Shown, Right Side Similar

OPERATION

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

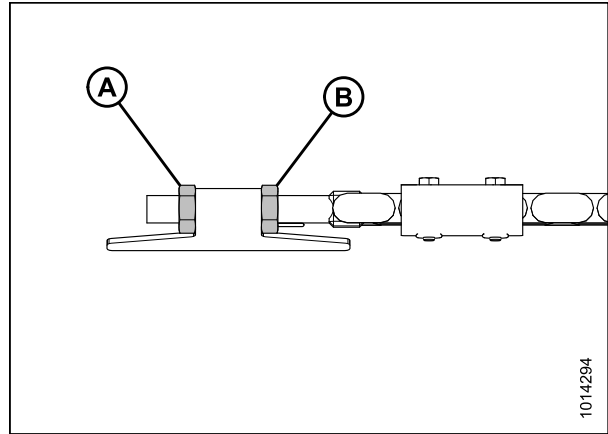


Figure 3.71: Chain Adjustment Bolt: Left Side Shown, Right Side Similar

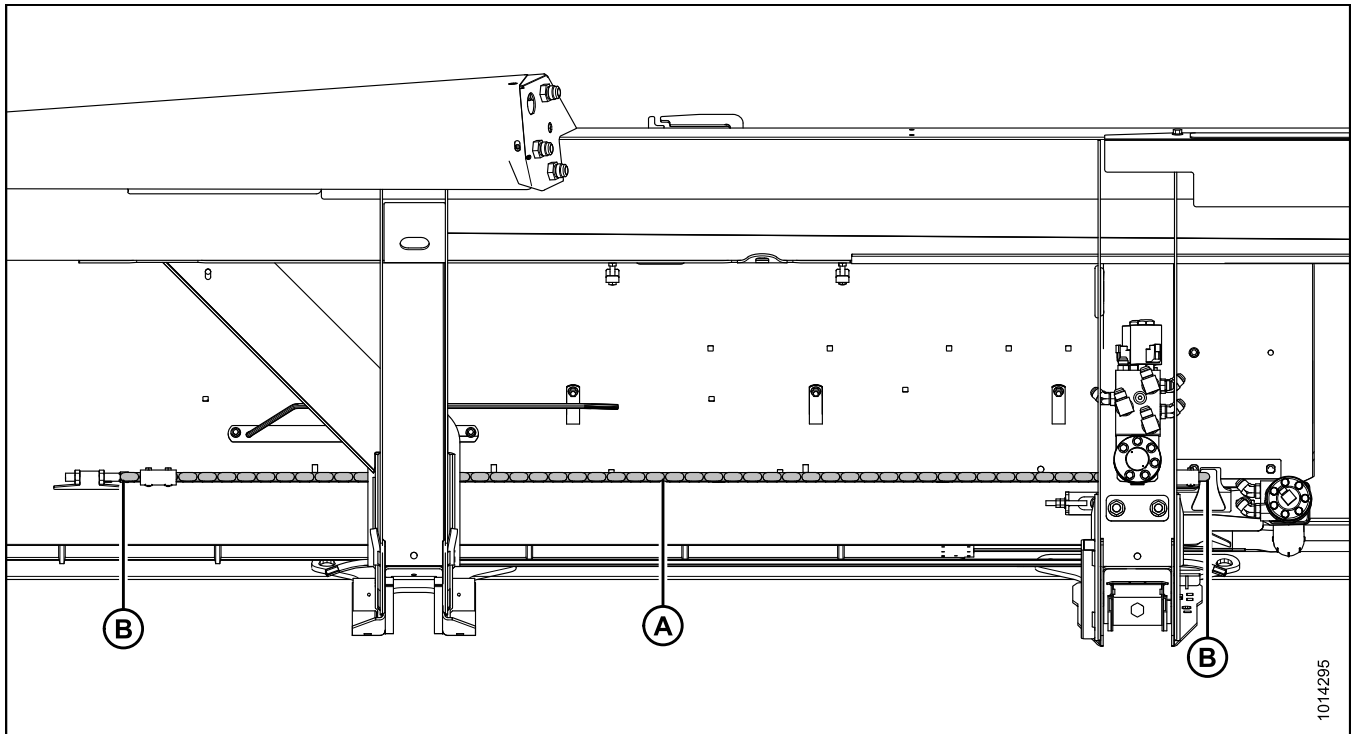


Figure 3.72: HDS Chain: Left Side Shown, Right Side Similar

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

OPERATION

NOTE:

If there is less than 5 mm (0.2 in.) of thread visible on the jam nut side (B), move nut to outside of adjustment nut (A).

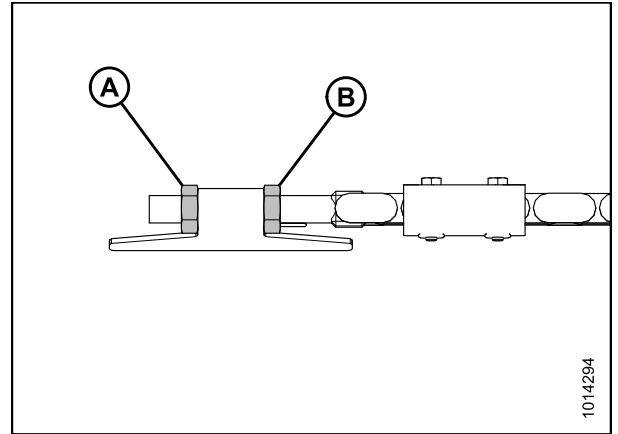


Figure 3.73: Chain Adjustment Bolt: Left Side Shown, Right Side Similar

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 D65 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 example. Refer to

- [3.9.1 Shifting Decks Hydraulically, page 80](#)
- [3.9.2 Shifting Decks Manually, page 81](#)

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 30 ft. Refer to [3.9.3 Using Double Windrow Attachment \(DWA\), page 82](#).

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 the 25-, 30-, and 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:

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.

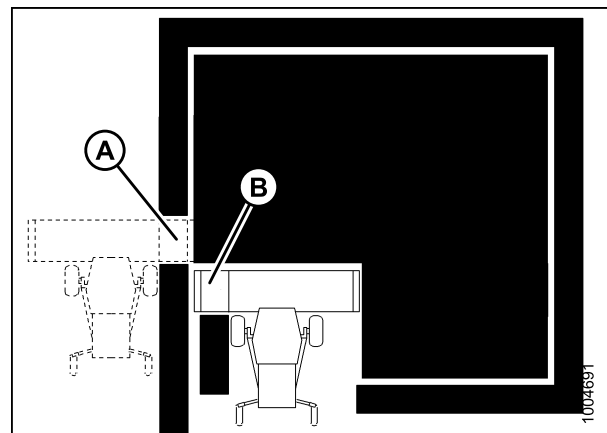


Figure 3.74: Double Windrowing

3.9.2 Shifting Decks Manually

Both decks can be moved manually to deliver the crop from the center or right/left end on 25- to 40-ft. headers.

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

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

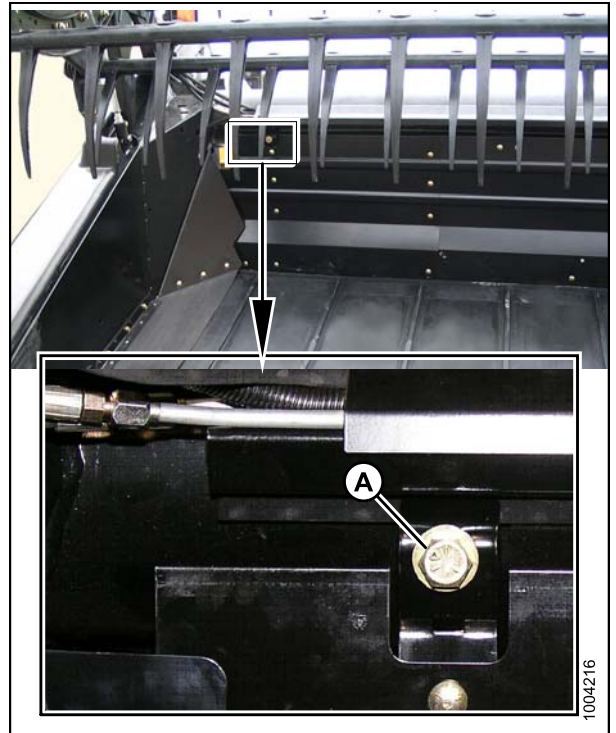


Figure 3.75: Right Deck Shown

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

NOTE:

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

NOTE:

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

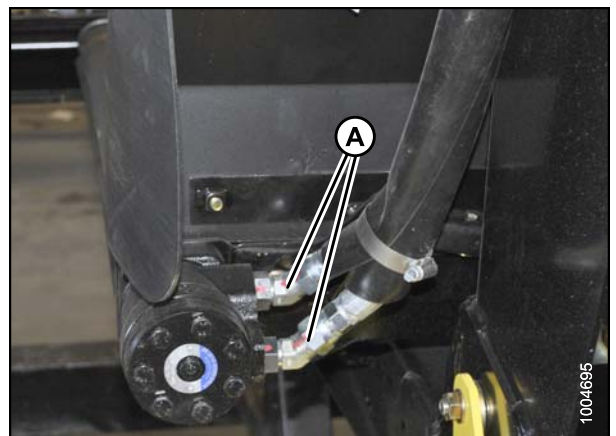


Figure 3.76: Right Deck Motor

OPERATION

To lay a double-windrow, do the following:

NOTE:

30-ft. headers equipped with transport or stabilizer system, require that the wheels be in the raised position to avoid interfering with the windrow.

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

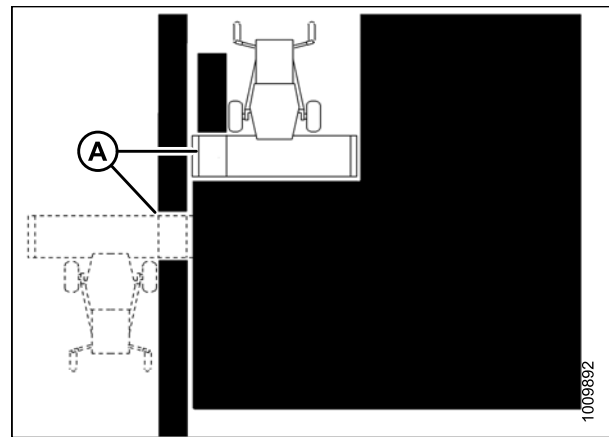
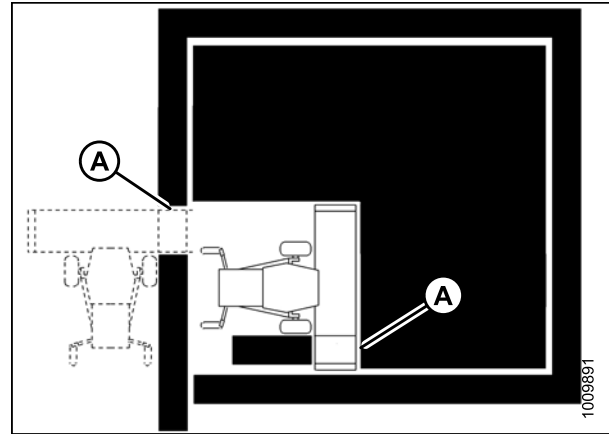


Figure 3.77: Double Windrowing

3.9.3 Using 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.

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.

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.

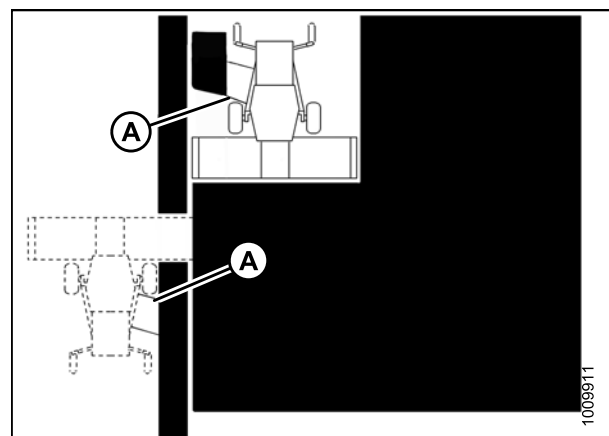
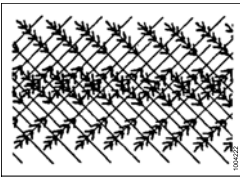
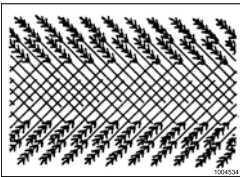
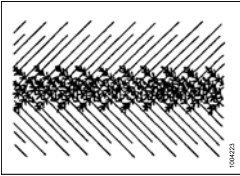
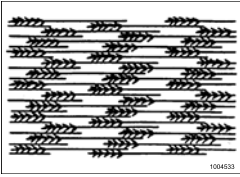


Figure 3.78: Double Windrowing

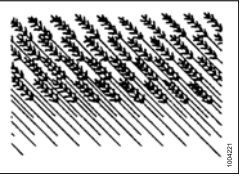
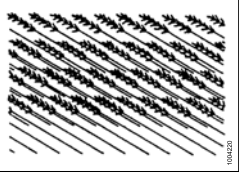
3.10 Windrow Types

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

Windrow Type	Description	Weight Distribution	Curing	Weatherability	Machine Setting Guidelines
<p>Herringbone</p> 	<p>The most desirable form of windrow, stalks are crossed and interwoven. Heads are distributed across full width of windrow. This windrow can be formed by center delivery only.</p>	Good	Good	Excellent	<ul style="list-style-type: none"> • Reel and ground speed approximately equal • Medium draper speed • Center delivery
<p>Fantail</p> 	<p>The stalks are crossed in the center and the heads are in line along outside edges. This windrow can be formed by center delivery only.</p>	Fair	Fair	Fair	<ul style="list-style-type: none"> • Low draper speed • Low header angle • Center delivery
<p>Dovetail</p> 	<p>The stalks are lined along outside edges of windrow and heads are crossed in center. This windrow can be formed by center delivery only.</p>	Poor	Fair	Poor	<ul style="list-style-type: none"> • High draper speed • High header angle • Center delivery
<p>Parallel</p> 	<p>The stalks are parallel to windrow and heads evenly distributed across width of windrow. This windrow can be formed by center delivery or end delivery.</p>	Good	Good	Good	<ul style="list-style-type: none"> • Medium draper speed • Medium header angle • Center or end delivery

OPERATION

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

3.11 Haying Tips

The following information may be useful when using the D65 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 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 mid day, 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 winds is also recommended.

3.11.4 Windrow Configuration

The following windrow characteristics are desirable:

OPERATION

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 bunched	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 47](#) 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 losses which will be the result.

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.

Hay should not be raked or tilled at less than 25% moisture, or excessive yield losses will result.

3.11.7 Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces, enabling water to escape and evaporate faster. However, treated hay lying on wet ground will also absorb ground moisture faster. Before deciding to use a drying agent, costs and benefits relative to your area should be carefully evaluated.

3.12 Levelling 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 (refer to your windrower's operator's manual).
2. If header is still not level, adjust windrower linkages as required (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.

 **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.

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 243](#).

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.

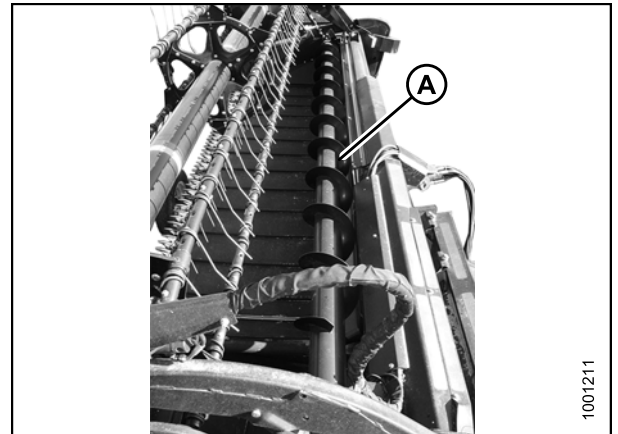


Figure 3.79: Upper Cross Auger

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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 the beater bars (B) and clamps (C) to the auger tubes, and remove the beater bars and clamps.

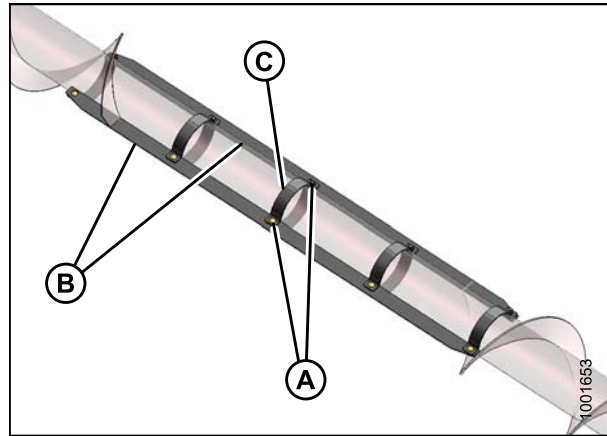


Figure 3.80: Single-Reel Headers

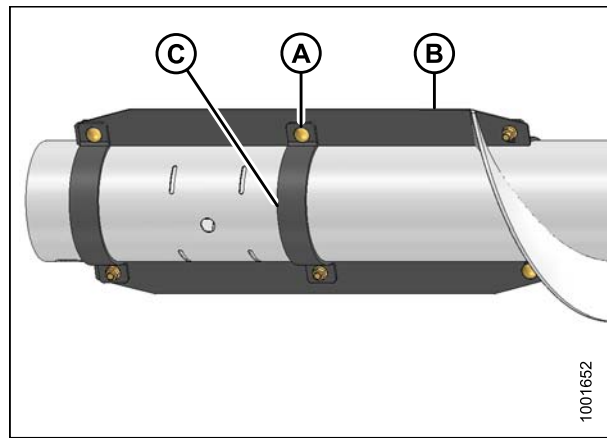


Figure 3.81: Beater Bars

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 making adjustments to 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 the beater bar (B) with carriage bolts (A) and nuts. Bolt heads **MUST** face the direction of auger rotation.
4. Position the second beater bar (B) in clamp sets (C) and secure with carriage bolts (A) and nuts.
5. Tighten bolts.

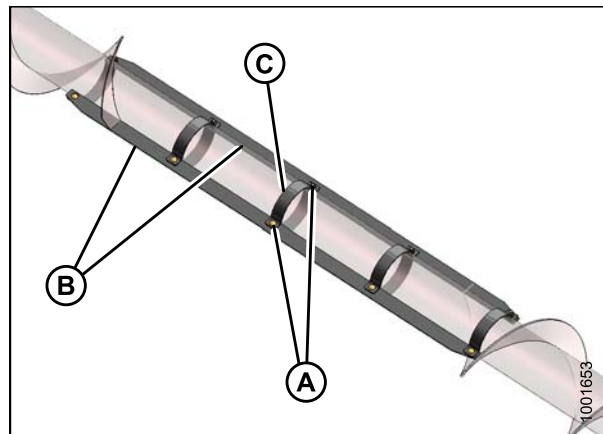


Figure 3.82: Single-Reel Headers

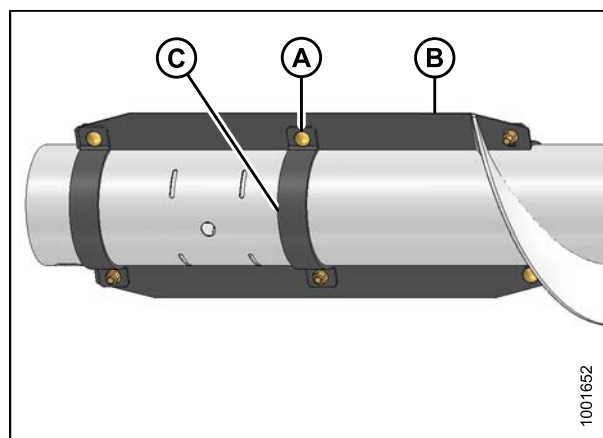


Figure 3.83: Beater Bars

3.15 Transporting Header

WARNING

Do NOT drive 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.

OPERATION

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 7-pole plug wiring harness to mating receptacle on towing vehicle. (The 7-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.

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 8km/h ([5 mph] or less). Header stability is reduced while cornering because front wheel moves to the left.
- 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.

OPERATION

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 the electrical connector (A) on the tow-bar.
3. Remove pin (B) from the tow-bar, and disassemble the outer section (C) from the inner section (D).

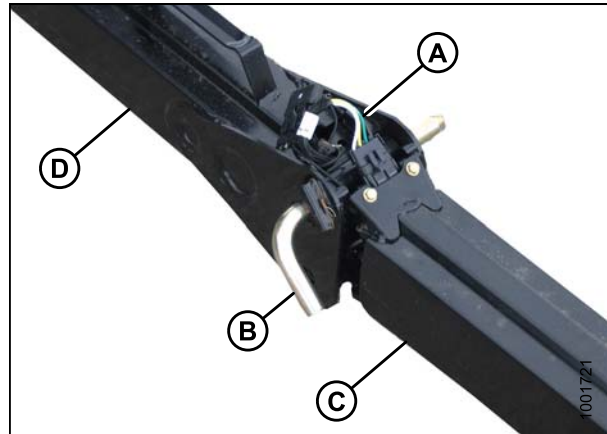


Figure 3.84: Tow-Bar Assembly

4. Disconnect the 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 the tow-bar (C) from the hook. Release latch.
7. Install clevis pin (A).

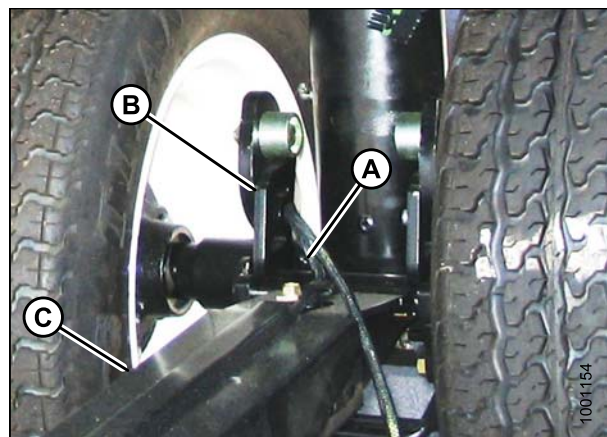


Figure 3.86: Tow-Bar Latch

OPERATION

Storing the Tow-Bar

1. Place the inner end of the outer half of the tow-bar into the 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 the rubber strap (D) on the cradle (A).

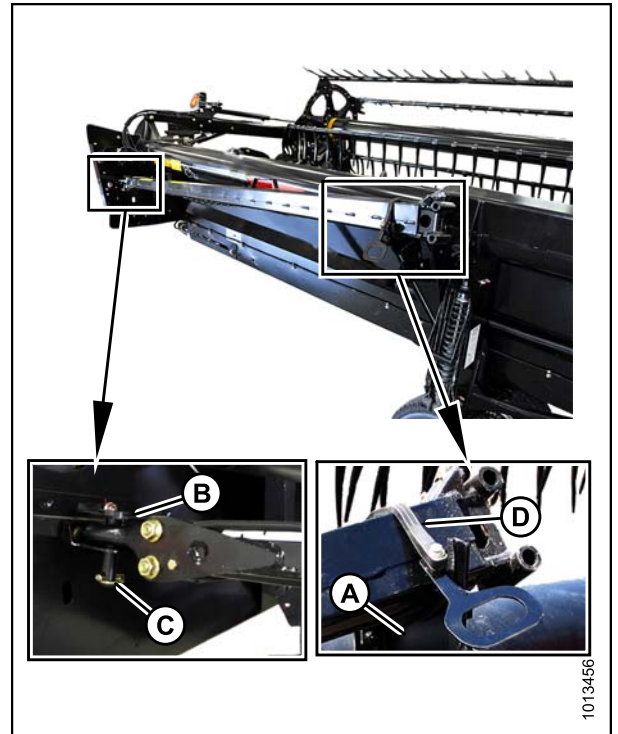


Figure 3.87: Tow-Bar Storage – Left Side

4. Place the inner end of the outer half of the tow-bar into the 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 the rubber strap (D) on the cradle (A).

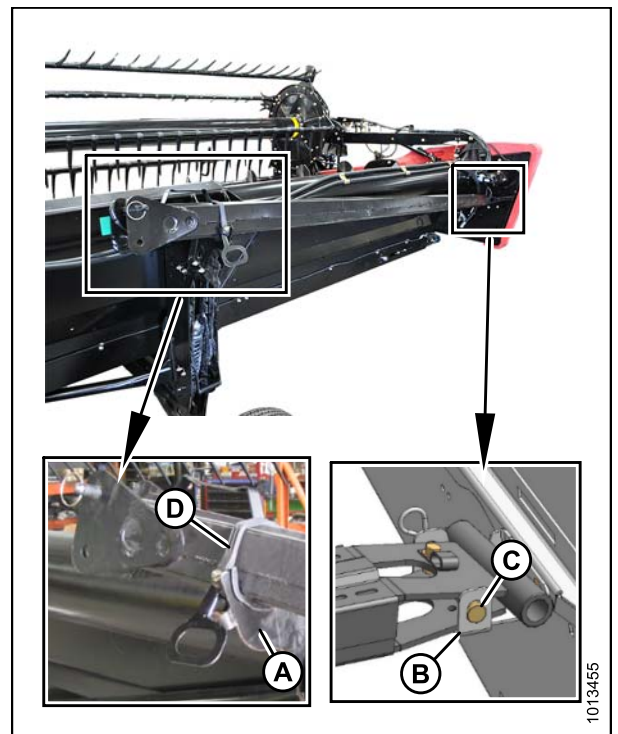


Figure 3.88: Tow-Bar Storage – Right Side

OPERATION

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. Refer to the following:
 - [Moving Front \(Left\) Wheels into Field Position, page 96](#)
 - [Moving Rear \(Right\) Wheels into Field Position, page 97](#)

Moving Front (Left) Wheels 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 and engage the header safety props.
2. Swivel the front wheel assembly (A) so the wheels are aligned with the lower frame.
3. Remove pin (B) and pull the wheel assembly towards the rear of header. Store the pin in hole (C) at the top of the leg.
4. Pull handle (D) upwards to release and lower the linkage into the vertical support.

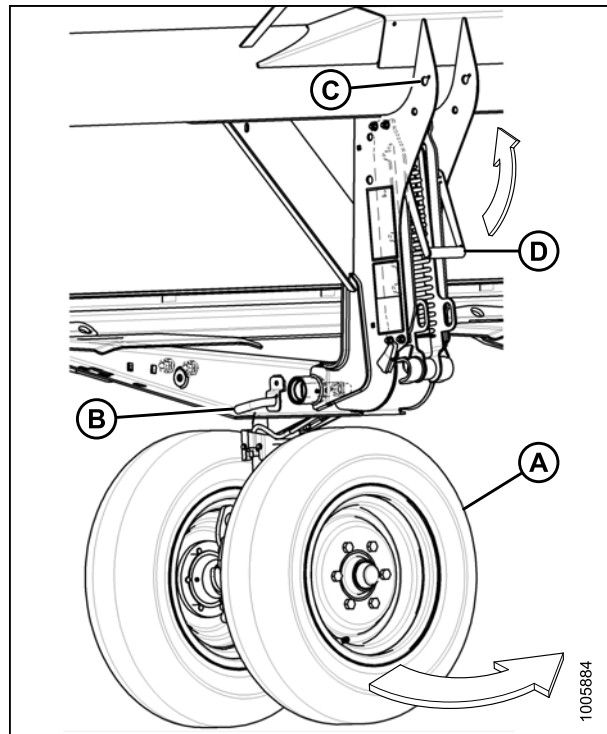


Figure 3.89: Front (Left) Wheels

OPERATION

5. 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.
6. Install clevis pin (D) and secure to the center of the axle with hairpin.

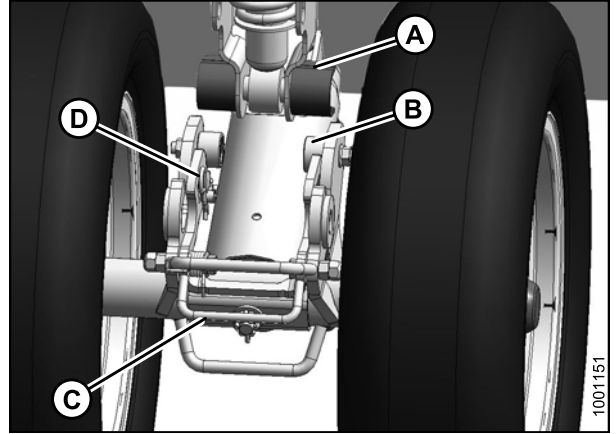


Figure 3.90: Front (Left) Wheels

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

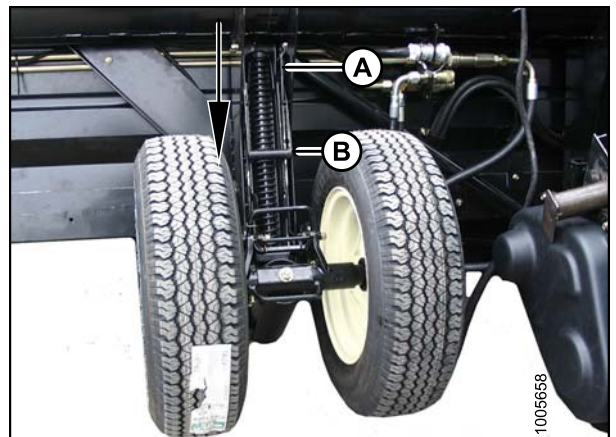


Figure 3.91: Front (Left) Wheels

Moving Rear (Right) Wheels into Field Position

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

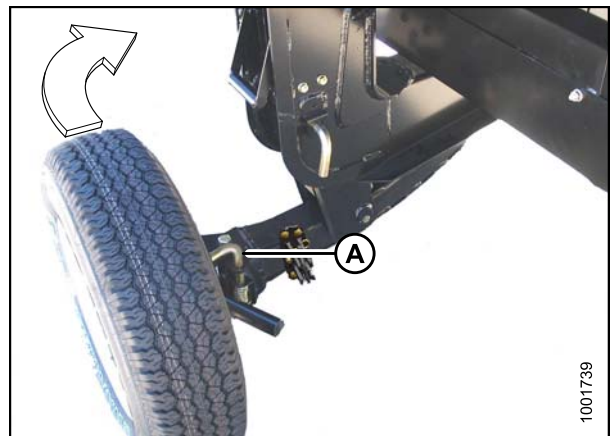


Figure 3.92: Rear Wheel – Left Side

OPERATION

2. Remove pin (A) and store at location (B).
3. Pull handle (C) upwards 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.

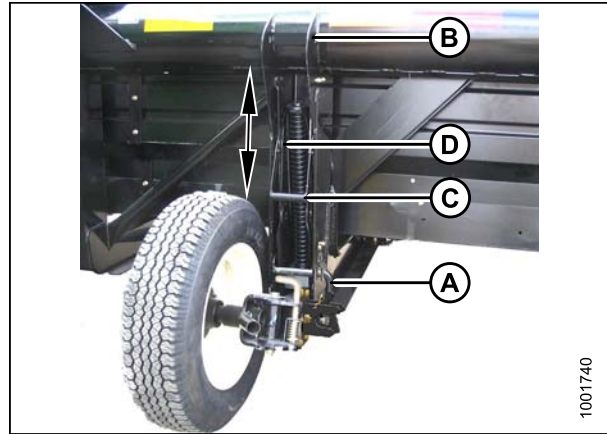


Figure 3.93: Rear Wheel – Left Side

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

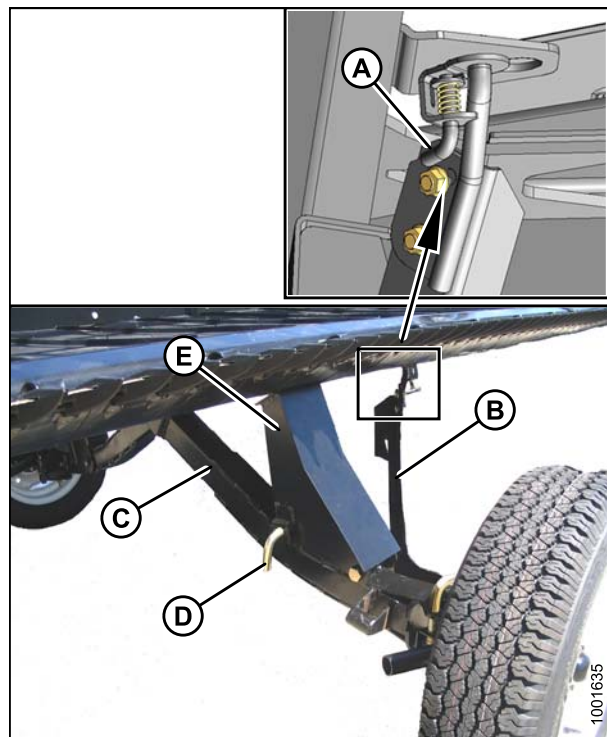


Figure 3.94: Right Rear Axle

OPERATION

9. Pull pin (A) on right-hand wheel, swivel the wheel counterclockwise to position shown, and lock with pin (A).
10. Remove the hairpin (B) from the 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.

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

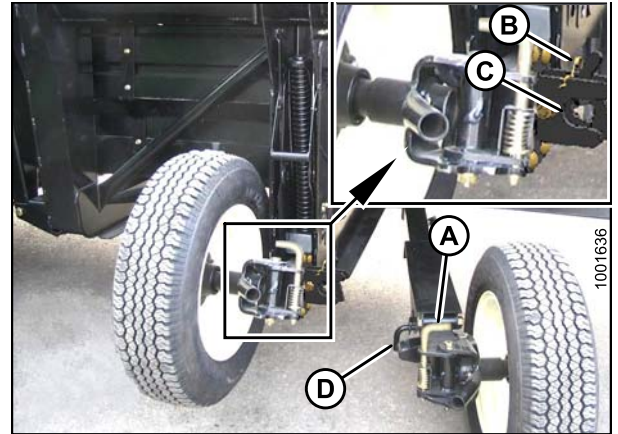


Figure 3.95: Rear Axles

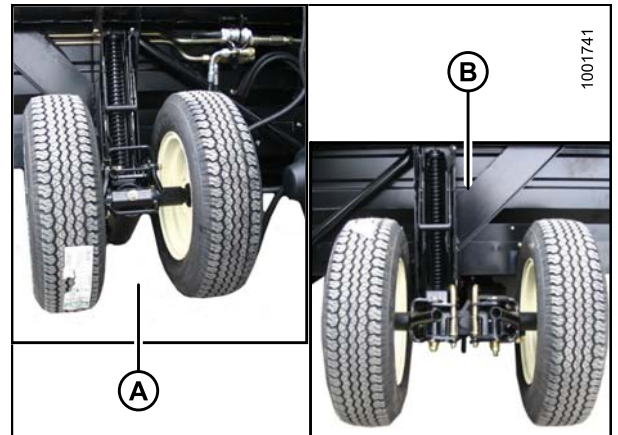


Figure 3.96: Field Position

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

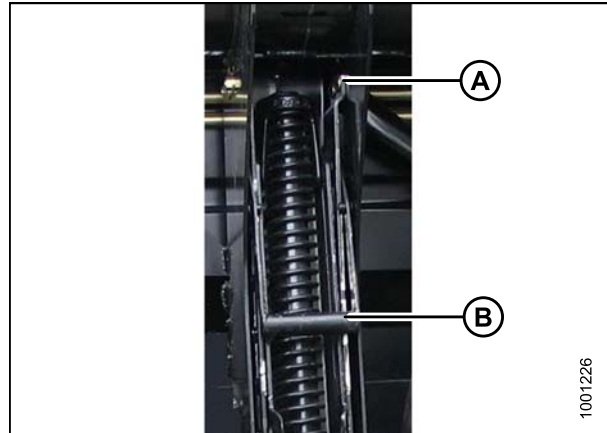


Figure 3.97: Raising Linkage

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

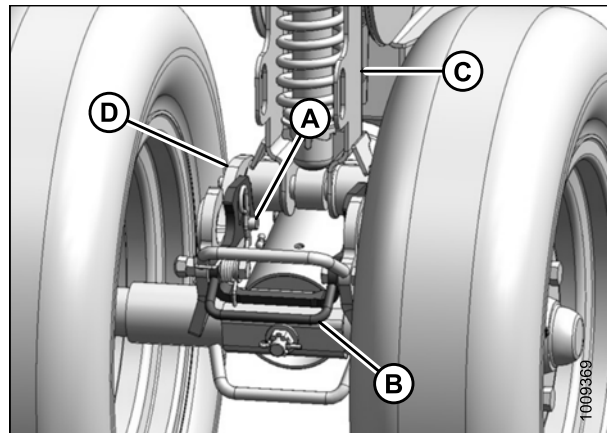


Figure 3.98: Left Front Wheels

6. Lower the handle (B) to lock.

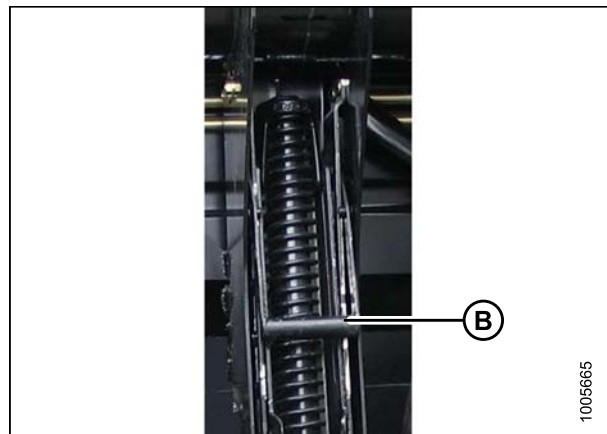


Figure 3.99: Locking Linkage

OPERATION

7. Remove the pin (A) from storage at the top of the leg (B).
8. Move and swivel the wheels clockwise until the 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.

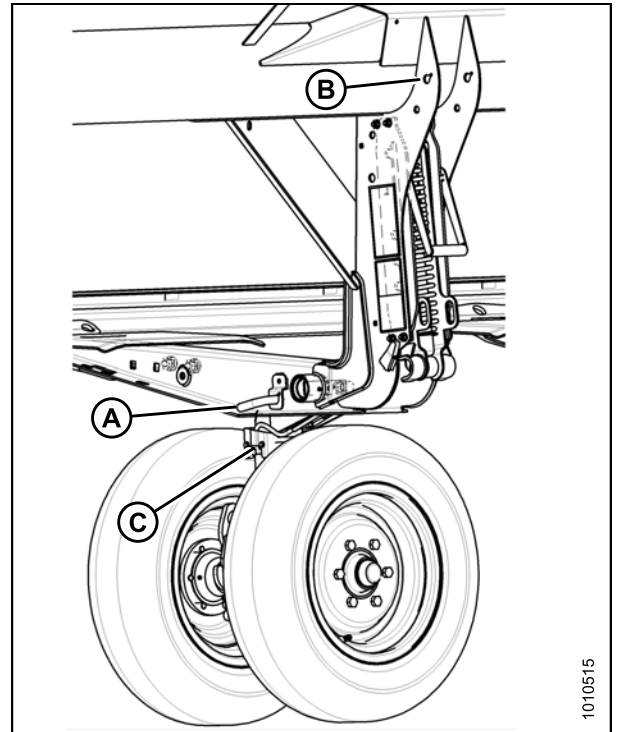


Figure 3.100: Left Front Wheels

Moving Rear (Right) Wheels into Transport Position

1. Remove the hairpin (A) from the latch (B).
2. Lift the latch (B), disengage the 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 the handle (C) to lock.

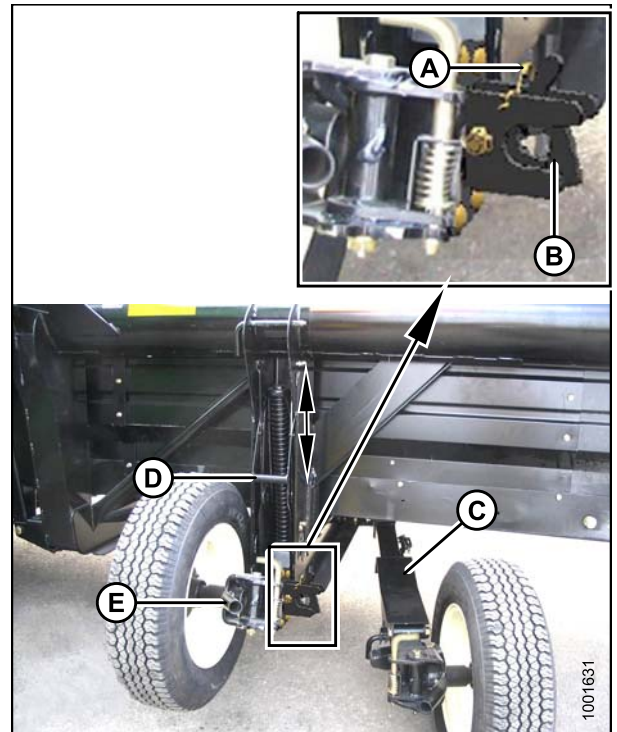


Figure 3.101: Separating Axles

OPERATION

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

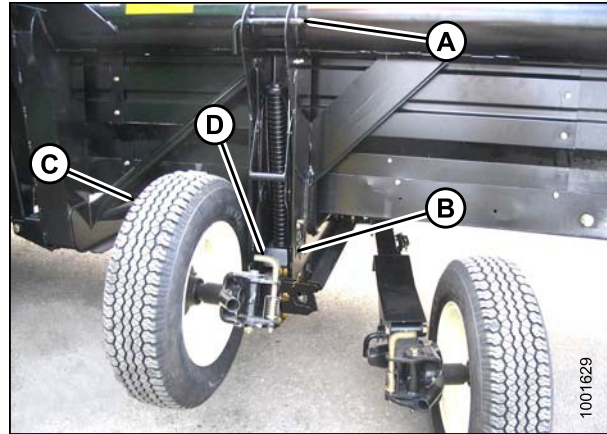


Figure 3.102: Wheel Position

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



Figure 3.103: Left Wheel in Transport Position

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

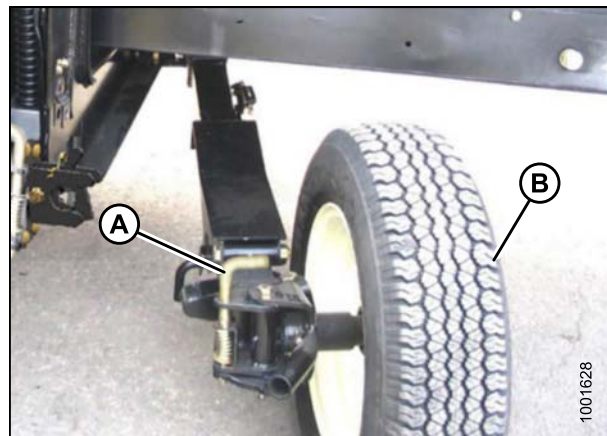


Figure 3.104: Right Rear Wheel

OPERATION

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

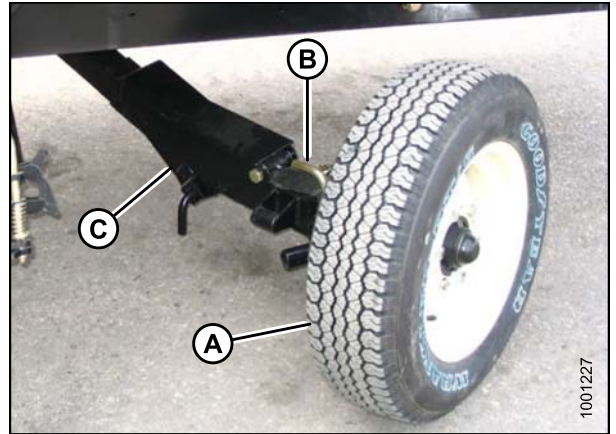


Figure 3.105: Right Rear Wheel

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

IMPORTANT:

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

12. Swing the brace (C) into the position shown and insert the brace into the slot (D) behind the cutterbar. Position the brace so that pin (E) engages the hole in the bracket (F). The right hand wheel is now in transport position.
13. Disengage the header cylinder lift stops.
14. Detach the header's hydraulic and electrical connections from the windrower. Refer to [4 Header Attachment/Detachment, page 109](#).
15. Start the windrower and lower the header to the ground.

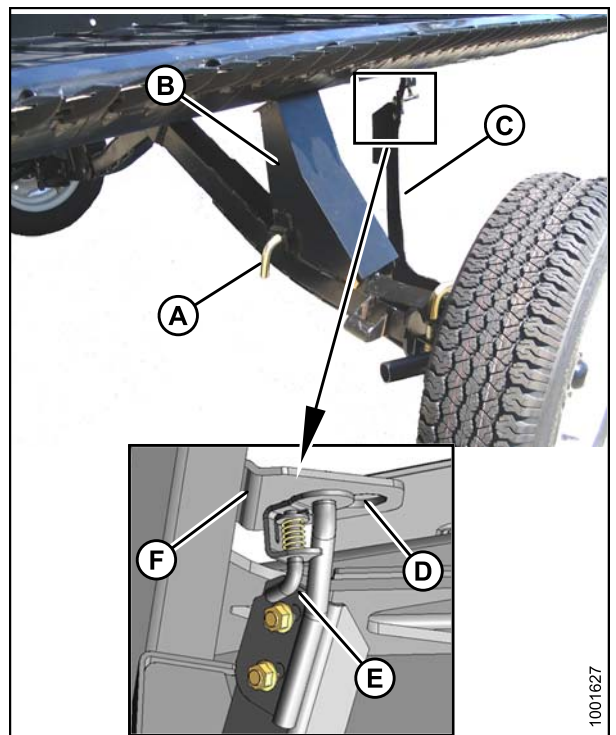


Figure 3.106: Right Rear Wheel Position

OPERATION

Attaching Tow-Bar

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

1. Unhook the rubber strap (D) from the cradle (A) on the right side of the header.
2. Remove the clevis pin (C) and detach the tube end from the support (B).
3. Replace the 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.

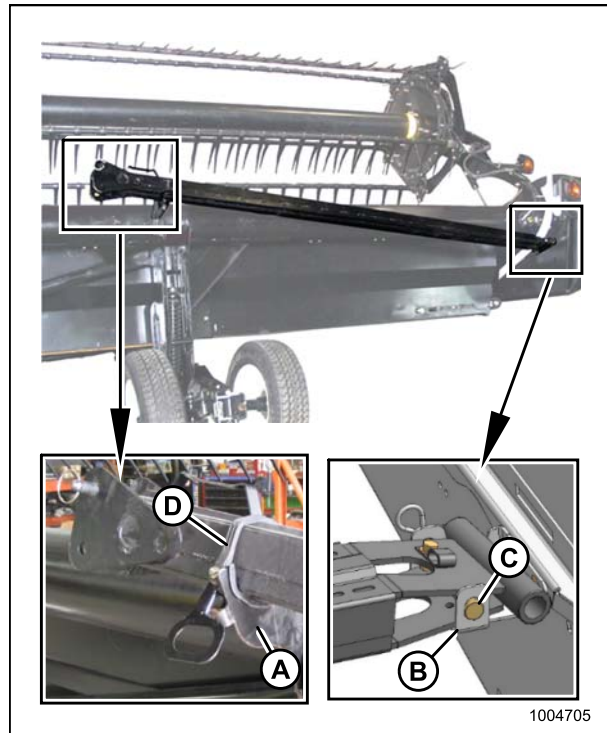


Figure 3.107: Tow-Bar Removal – Right Side

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

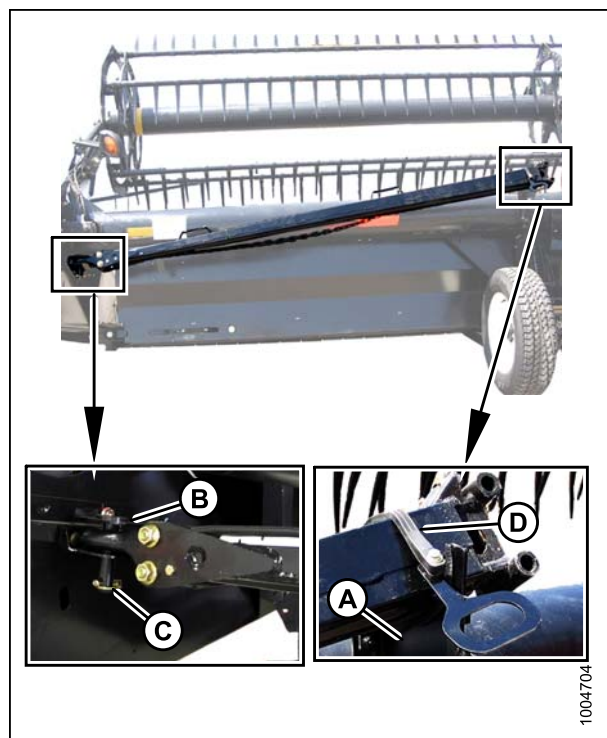


Figure 3.108: Tow-Bar Removal – Left Side

OPERATION

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

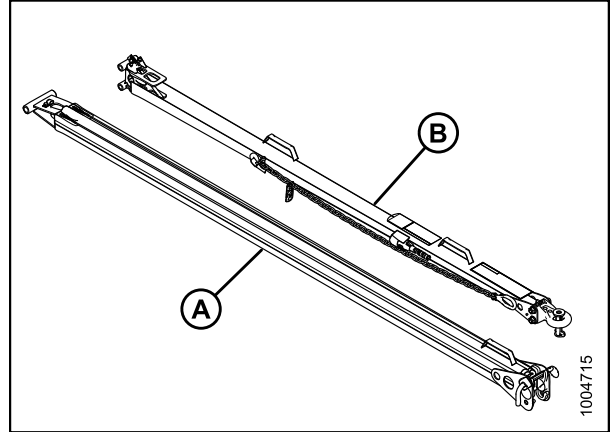


Figure 3.109: Tow-Bar Assembly

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

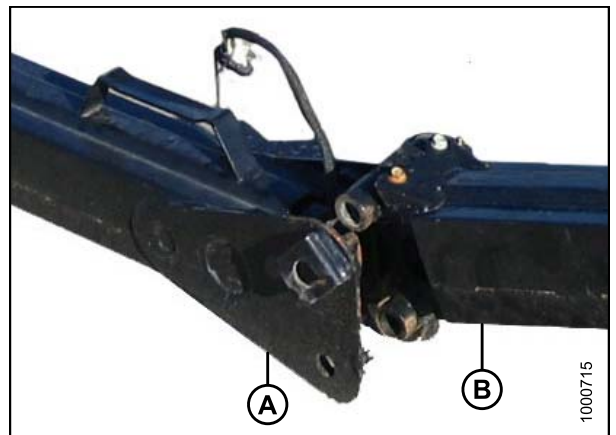


Figure 3.110: Tow-Bar Assembly

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

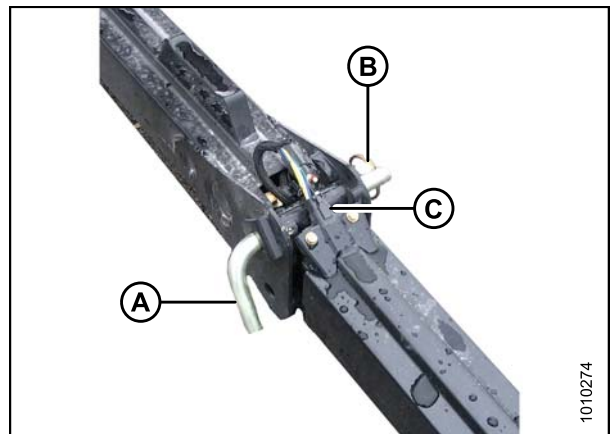


Figure 3.111: Tow-Bar Assembly

OPERATION

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

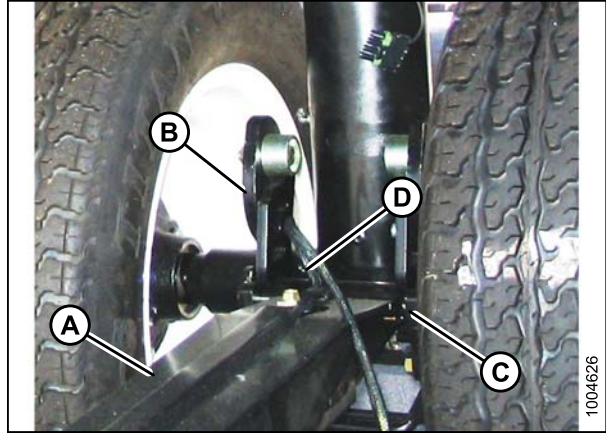


Figure 3.112: Attaching Tow-Bar

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

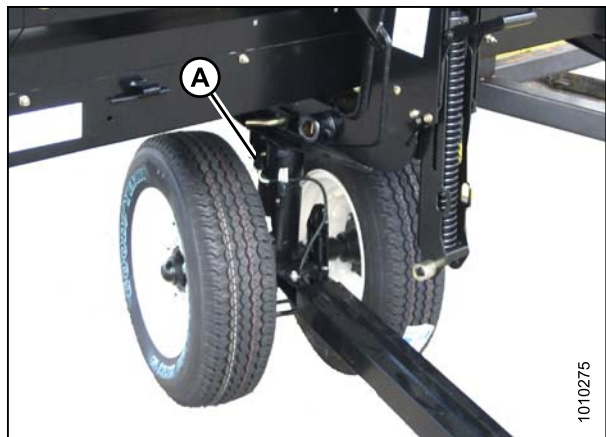


Figure 3.113: Harness Connection

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.

1. Clean the header thoroughly.
2. 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.

3. Lower the header onto blocks to keep the cutterbar off the ground.
4. Lower the reel completely. If stored outside, tie the reel to the frame to prevent rotation caused by the wind.
5. Repaint all worn or chipped painted surfaces to prevent rust.
6. Loosen the drive belts.
7. Lubricate the header thoroughly leaving excess grease on the fittings to keep moisture out of the bearings.
8. Apply grease to exposed threads, cylinder rods, and sliding surfaces of components.
9. Check for worn components and repair as necessary.
10. Check for broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at the beginning of next season.
11. Replace or tighten any missing or loose hardware. Refer to .

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 self-propelled 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.

To attach the header to a windrower, follow these steps:

1. Before connecting header drive hydraulics (A) and electrical harness (B) to header, check connectors and clean if required.
2. Disengage and rotate lever (A) counterclockwise to fully up position.
3. Remove cap (B) securing electrical connector to frame.
4. Move hose bundle (C) from windrower around hose support on header.

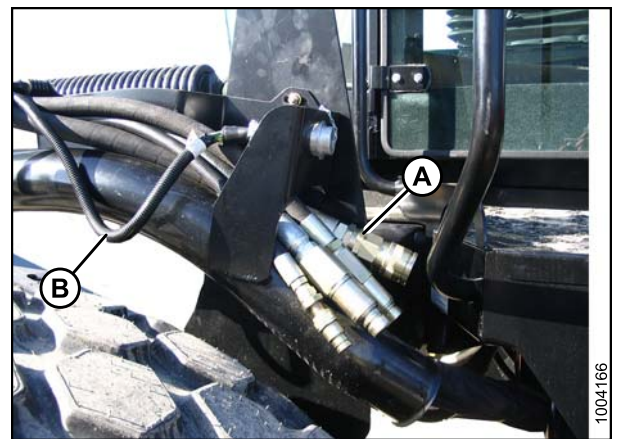


Figure 4.1: Header Drive Hoses

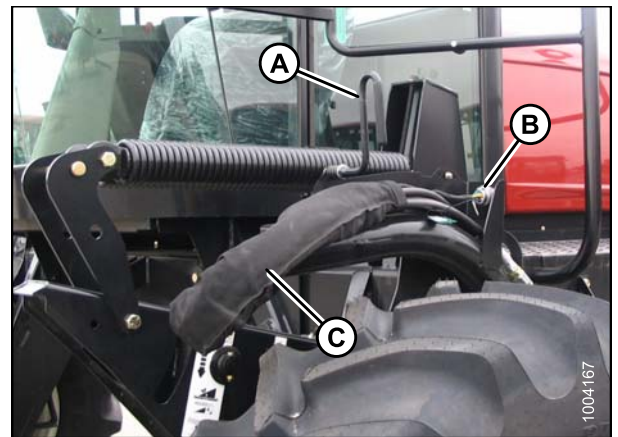


Figure 4.2: Header Drive Hoses

HEADER ATTACHMENT/DETACHMENT

5. Push hose connectors onto mating receptacle until collar on receptacle snaps into lock position.
6. Remove cover on electrical receptacle (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.

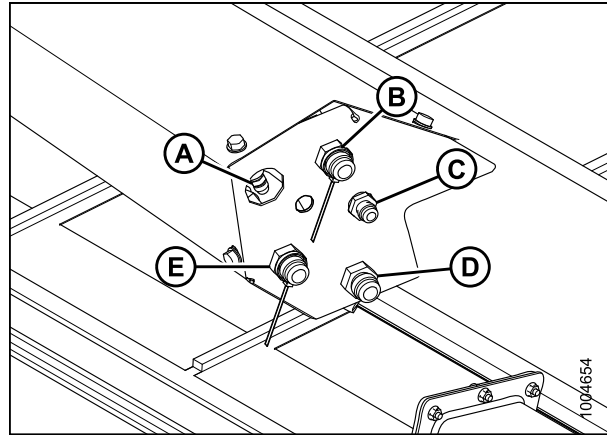


Figure 4.3: Header Receptacles

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 connectors and clean if required.

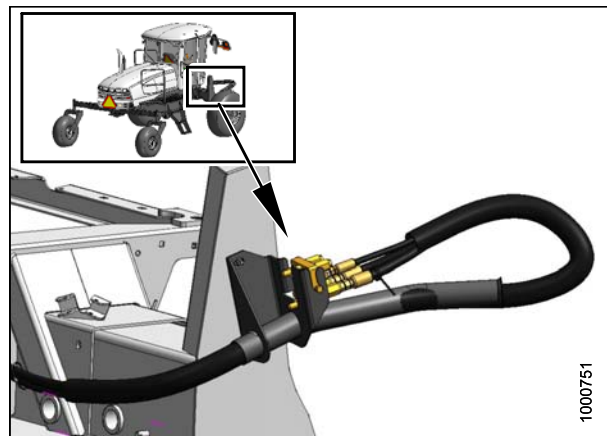


Figure 4.5: Reel Hose Storage

HEADER ATTACHMENT/DETACHMENT

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

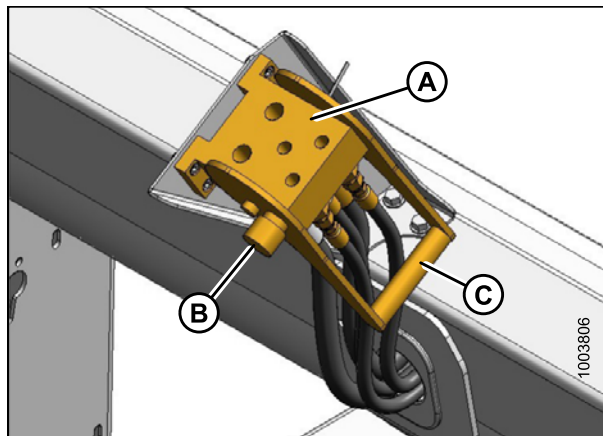


Figure 4.6: Reel Hydraulics Receptacle

13. Remove hose bundle with multicoupler (C) from windrower, locate onto header receptacle and push handle (B) to engage pins on connector.
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.

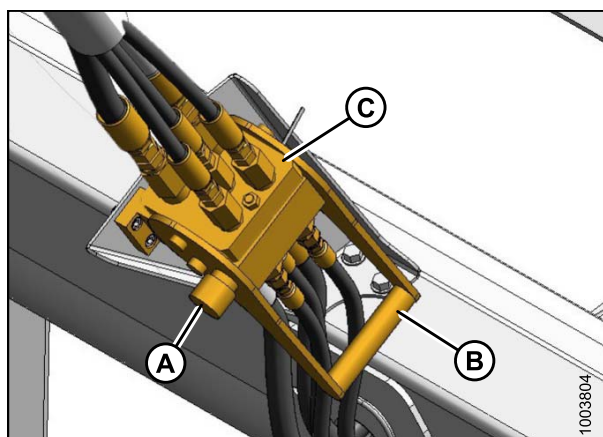


Figure 4.7: Reel Hose Connection

4.2 Detaching Header from Windrower

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

1. Fully lower the reel.
2. To disconnect the reel hydraulics, push in lock button (A) and pull handle (B) to disengage multicoupler (C) from header receptacle.
3. Route hose bundle back onto windrower and store multicoupler (C) on hose support.

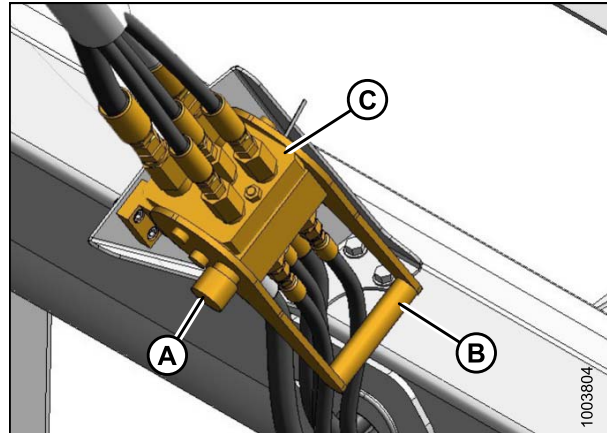


Figure 4.8: Reel Hydraulics

4. Close cover on header receptacle (A).

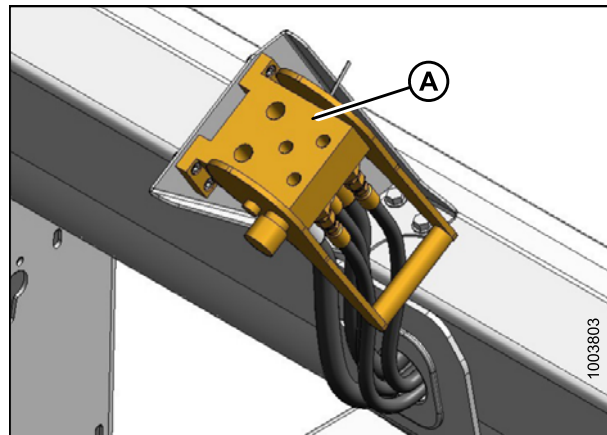


Figure 4.9: Close Cover

5. To disconnect header drive hydraulics, disengage and rotate lever (A) counterclockwise to fully up position.
6. Disconnect electrical connector from header.

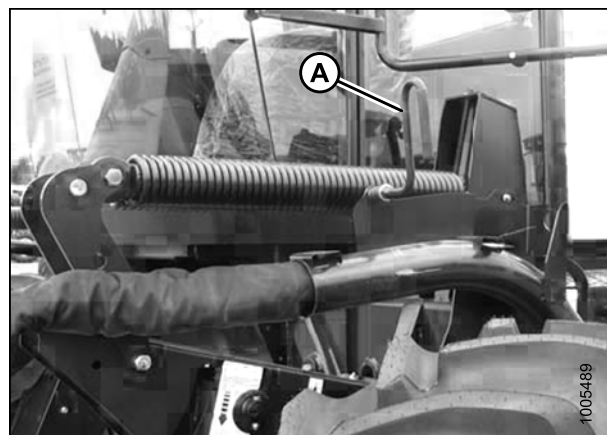


Figure 4.10: Header Drive Hydraulics

HEADER ATTACHMENT/DETACHMENT

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

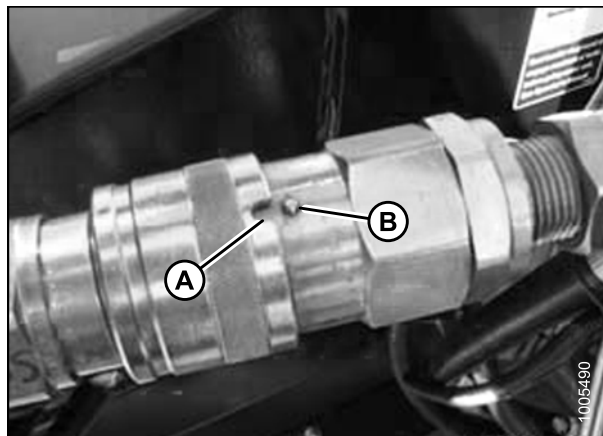


Figure 4.11: Quick Disconnect

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

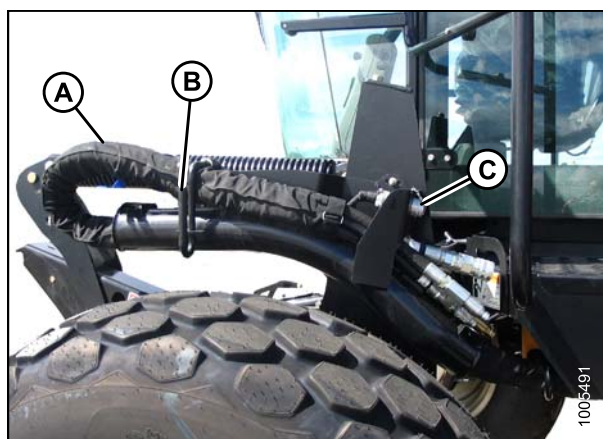


Figure 4.12: Hose Storage

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 that is available from your Dealer. A parts catalog is provided in the plastic manuals case inside the left endshield.

Log hours of operation and use the maintenance record provided (refer to [5.3.1 Maintenance Schedule/Record, page 119](#)) 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 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)
			Main drive gearbox	2.5 liters (2.6 quarts)

5.2.2 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.

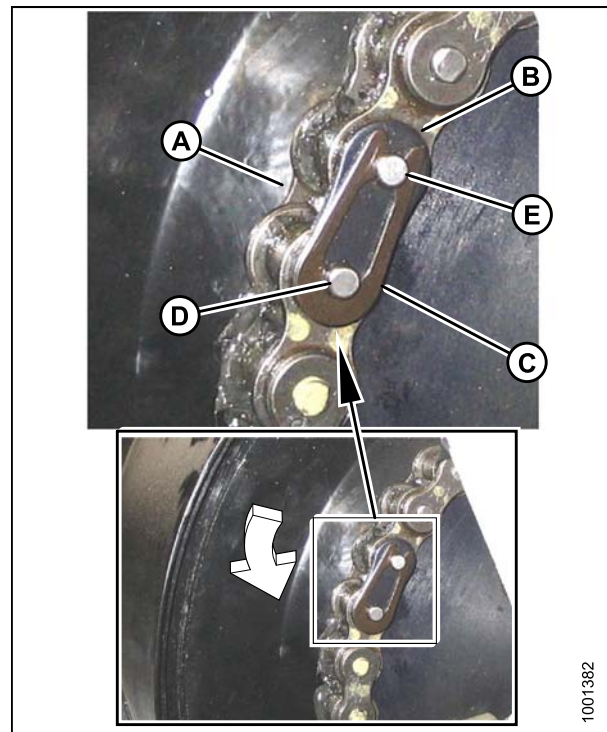


Figure 5.1: Arrow Shows Direction of Rotation

5.2.3 Installing a Sealed Bearing

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

NOTE:

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

3. Install, but do not tighten, the 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 setscrew in the collar.
5. Tighten the flangette bolts (E).
6. Loosen the flangette bolts on the mating bearing one turn and then retighten. This will enable the bearing to properly line up.

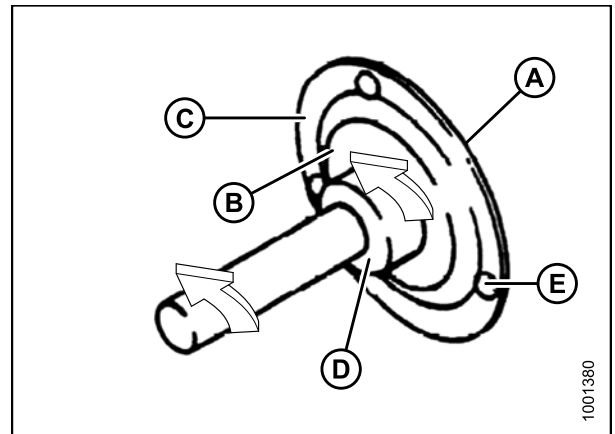


Figure 5.2: Sealed Bearing

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 "Maintenance and Servicing" chapter and use only fluids and lubricants specified in [5.2.1 Recommended Fluids and Lubricants, page 116](#).

Log hours of operation, use the maintenance record, and keep copies of your maintenance records (refer to [5.3.1 Maintenance Schedule/Record, page 119](#)).

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 115](#) and [1 Safety, page 1](#).

MAINTENANCE AND SERVICING

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 5.3.2 Break-In Inspection, page 120																			
End of Season, Refer to 5.3.4 End-of-Season Service, page 121																			
10 Hours or Daily¹³																			
✓	Hydraulic hoses and lines ¹⁴																		
✓	Knife sections, guards, and hold-downs ¹⁴																		
✓	Tire pressure ¹⁴																		
◆	Knife (except in sandy conditions) ¹⁴																		
25 Hours																			
◆	Knifehead(s) ¹⁴																		
50 Hours																			
✱	Draper roller bearings																		
▲	Knife drive box oil - first 50 hours only																		
100 Hours or Annually¹³																			
✓	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																		
◆	Upper cross auger right-hand bearing																		

13. Whichever occurs first.

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

MAINTENANCE AND SERVICING

Maintenance Record	Action:	✓ - Check	⬇ - Lubricate	▲ - Change
250 Hours or Annually¹³				
✓ Draper seal				
⬇ Upper cross auger center support and U-joint				
⬇ Reel drive U-joint				
⬇ Transport axle pivot bushings				
500 Hours or Annually¹³				
✓ Draper seal				
⬇ Reel shaft bearings				
⬇ Stabilizer/slow speed transport wheel bearings				
1000 Hours or 3 Years¹³				
▲ 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.

Timing	Item	Refer To
At 5 hours	Check for loose hardware. Tighten to required torque.	
	Check knife drive belts tension. Periodically check for first 50 hours.	Tensioning Timed Knife Drive Belts, page 162 Tensioning Non-Timed Knife Drive Belts, page 157
At 10 hours	Check knife drive box mounting bolts.	Checking Mounting Bolts, page 148
At 50 hours	Change knife drive box lubricant.	Changing Oil in Knife Drive Box, page 155

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. Refer to [Service Intervals, page 123](#).
 2. Adjust the tension on the drive belts. Depending on your equipment. Refer to [Tensioning Non-Timed Knife Drive Belts, page 157](#).
 3. Perform all the annual maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 119](#).

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.

1. Clean the header thoroughly.
2. 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.

3. Lower the header onto blocks to keep the cutterbar off the ground.
4. Lower the reel completely. If stored outside, tie the reel to the frame to prevent rotation caused by the wind.
5. Repaint all worn or chipped painted surfaces to prevent rust.
6. Loosen the drive belts.
7. Lubricate the header thoroughly leaving excess grease on the fittings to keep moisture out of the bearings.
8. Apply grease to exposed threads, cylinder rods, and sliding surfaces of components.
9. Check for worn components and repair as necessary.

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10. Check for broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at the beginning of next season.
11. Replace or tighten any missing or loose hardware. Refer to [5.2 Maintenance Specifications, page 116](#).

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 pin holes and nozzles which eject fluids under high pressure.
- **If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.**
- **Use a piece of cardboard or paper to search for leaks.**

IMPORTANT:

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



Figure 5.3: Hydraulic Pressure Hazard

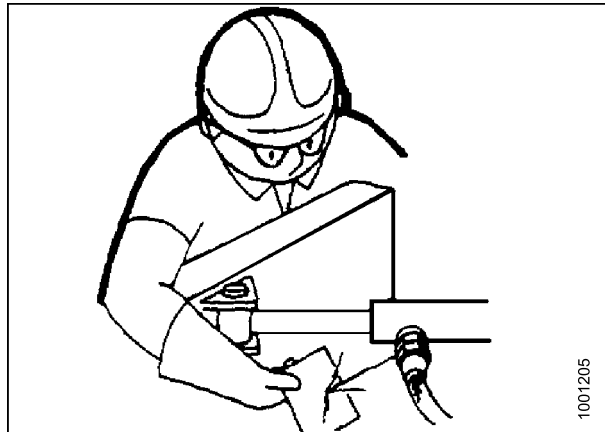


Figure 5.4: Testing for Hydraulic Leaks

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 115](#).

Refer to [5.2.1 Recommended Fluids and Lubricants, page 116](#) 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 119](#).

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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 that is required.

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.

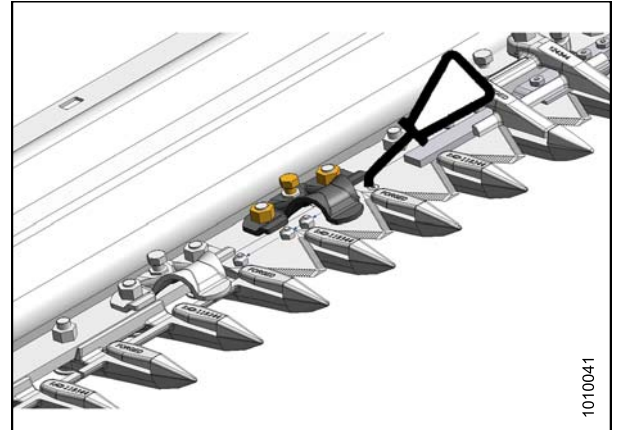


Figure 5.5: Every 10 Hours or Daily

Knifehead:

NOTE:

To prevent binding and/or excessive wear caused by knife pressure on the guards, do **NOT** over grease the 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. Refer to [5.5.3 Removing Knifehead Bearing](#), page 136.

NOTE:

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

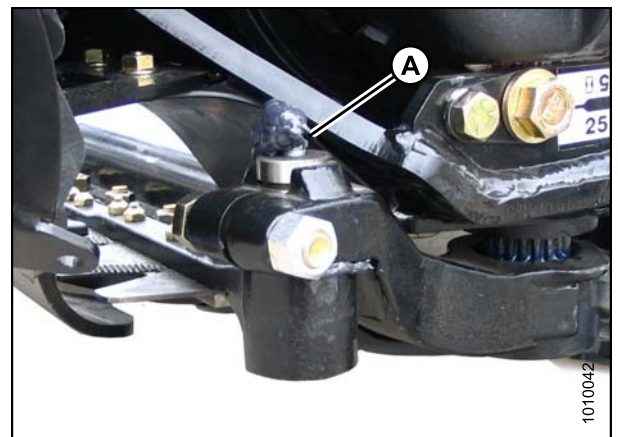
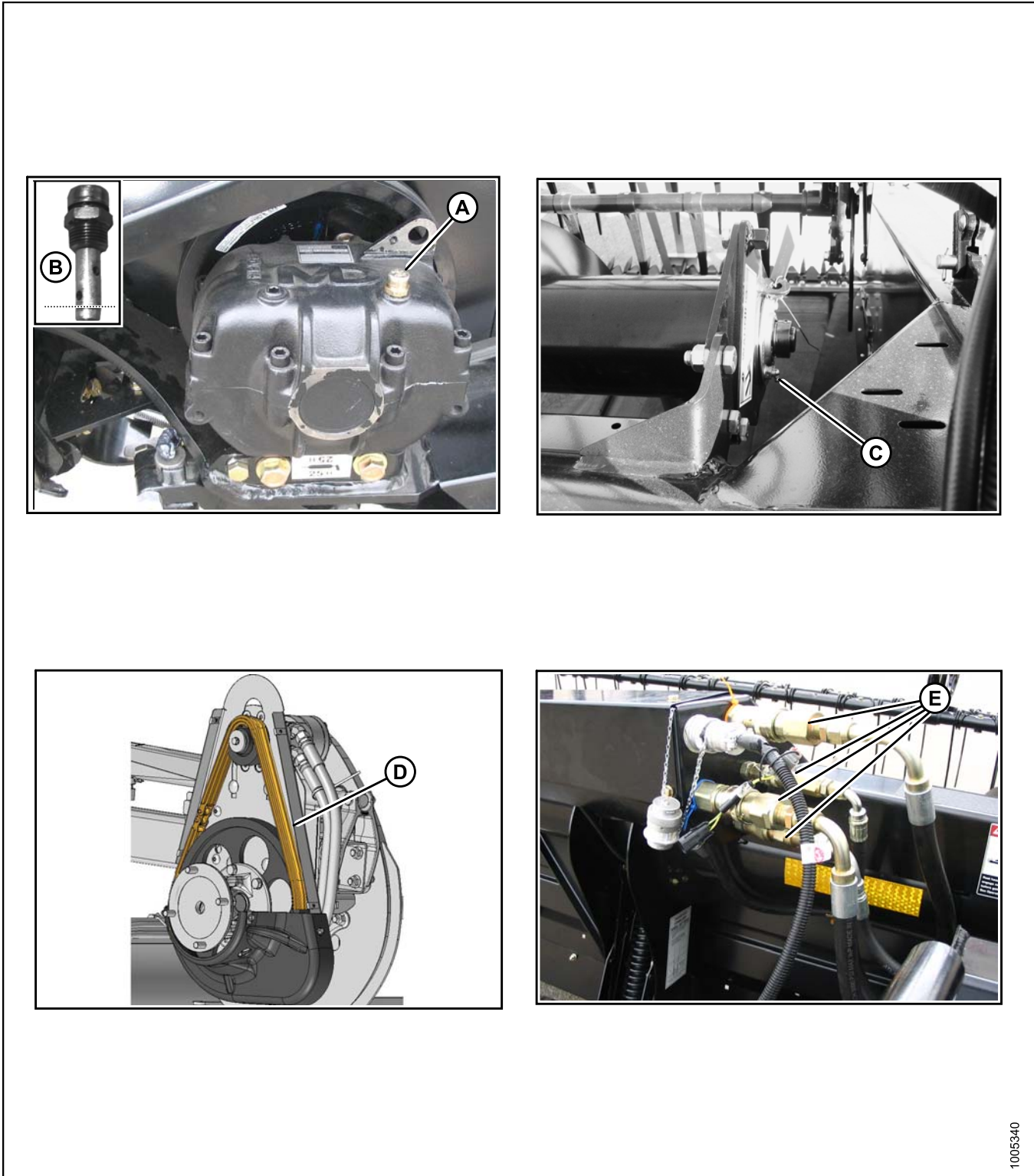


Figure 5.6: Every 25 Hours

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

MAINTENANCE AND SERVICING



1005340

Figure 5.7: Every 100 Hours

A - Knife Drive Box (Check Oil Level Between Lower Hole and End of Dipstick [B])

C - Upper Cross Auger Bearing (1 Place)

D - Reel Drive Chain (1 Place) (Double Reel Shown – Single Reel Similar)

E - Hydraulic Couplers (Use WD40® or Equivalent)

MAINTENANCE AND SERVICING

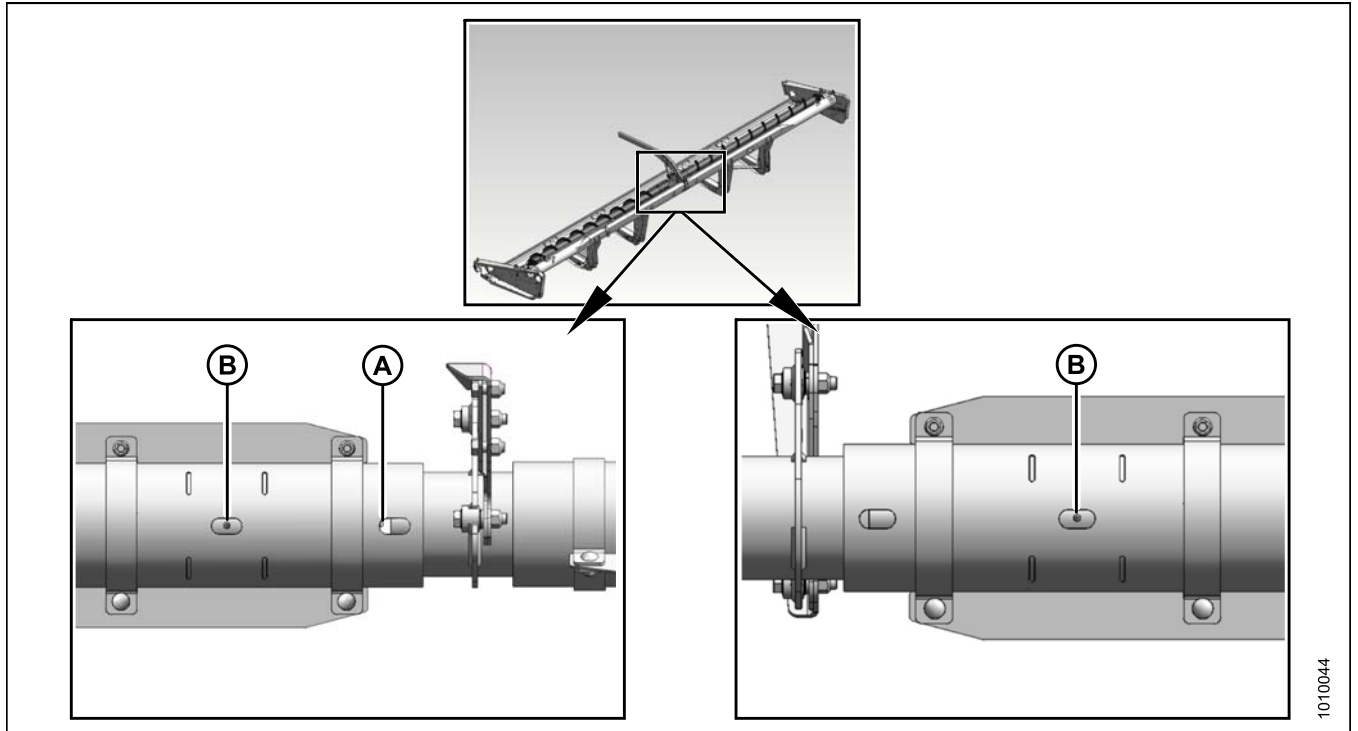


Figure 5.8: Every 250 Hours

A - Upper Cross Auger U-joint¹⁵

B - Upper Cross Auger Bearing (2 Places)

15. 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.

MAINTENANCE AND SERVICING

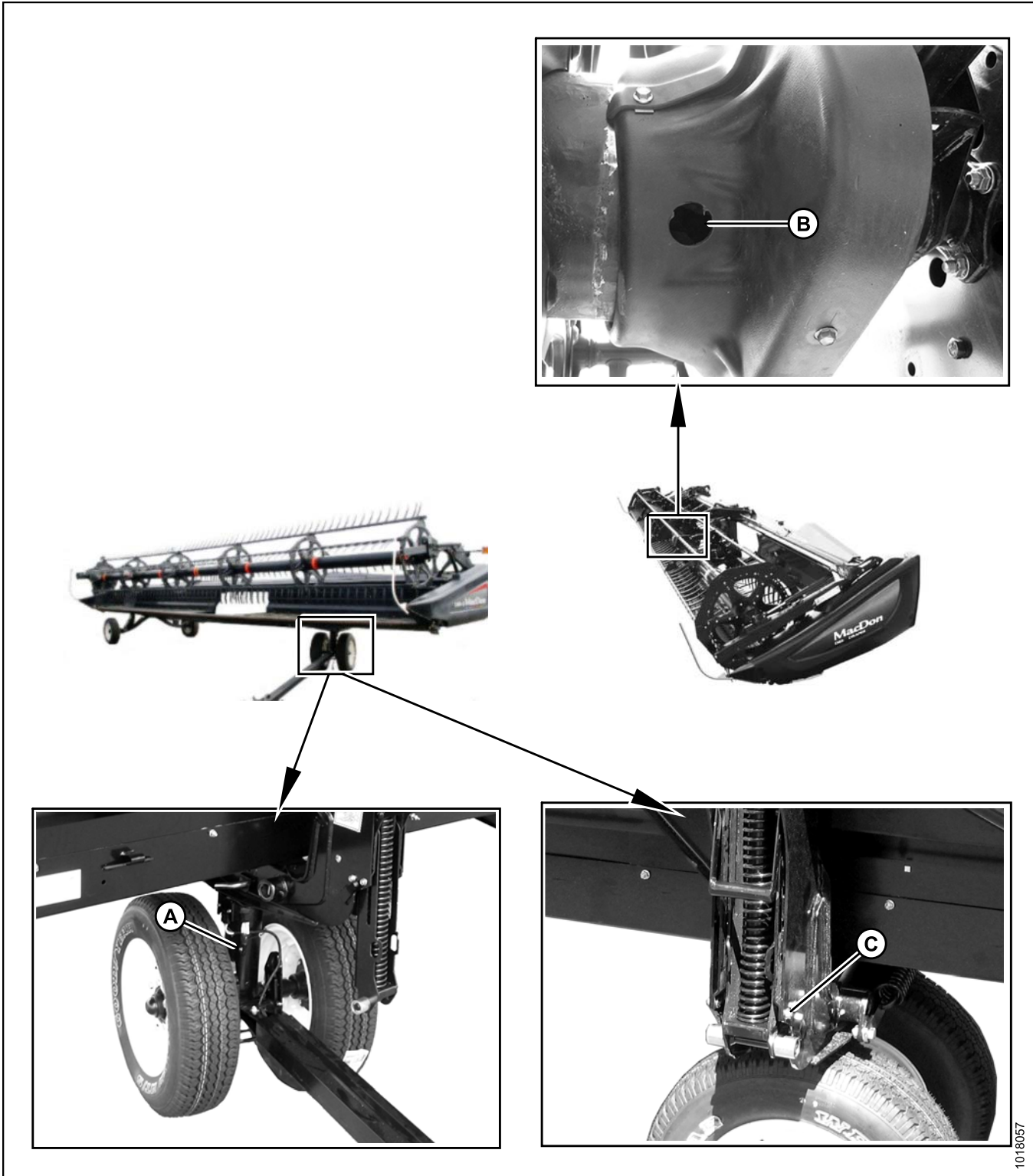


Figure 5.9: Every 250 Hours (Continued)

A - Front Wheel Pivot (1 Place)

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

B - Double Reel U-Joint (1 Place)¹⁶

16. 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.

MAINTENANCE AND SERVICING

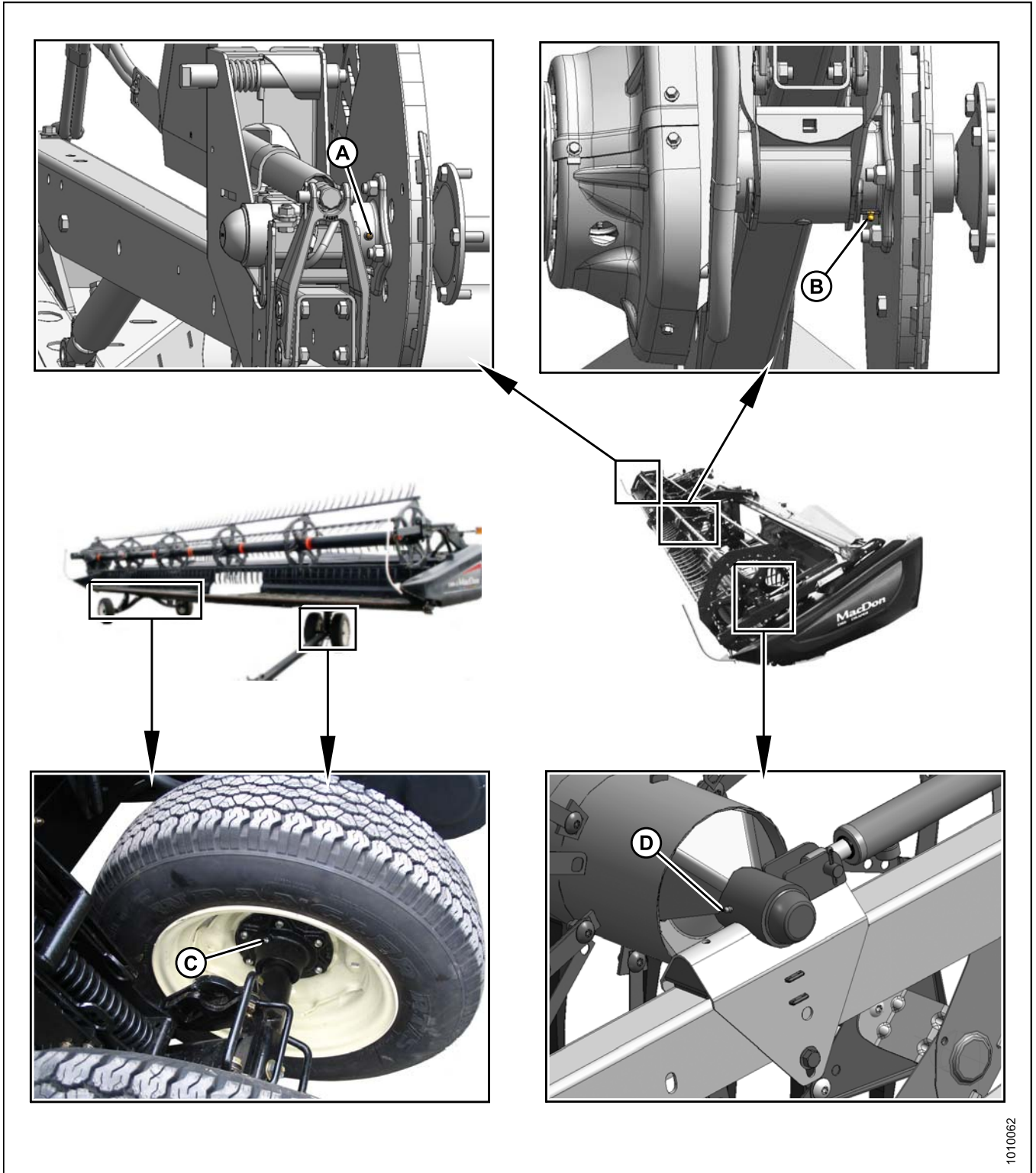


Figure 5.10: Every 500 Hours

A - Reel Right Bearing (1 Place)

B - Reel Center Bearing (1 Place)

C - Wheel Bearings (4 Places)

D - Reel Left Bearing (1 Place)

MAINTENANCE AND SERVICING

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 [5.2.1 Recommended Fluids and Lubricants, page 116](#) 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 119](#).

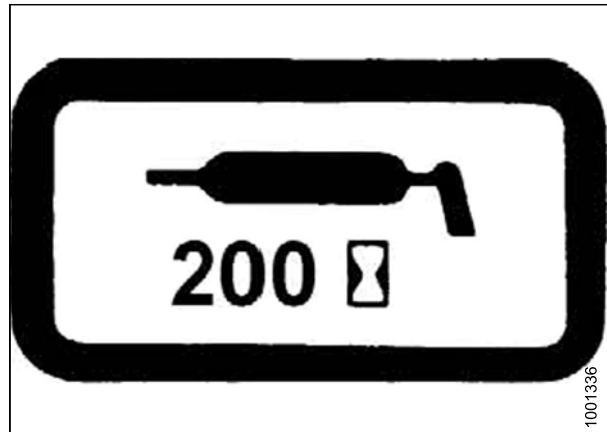


Figure 5.11: Greasing Interval Decal

MAINTENANCE AND SERVICING

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.

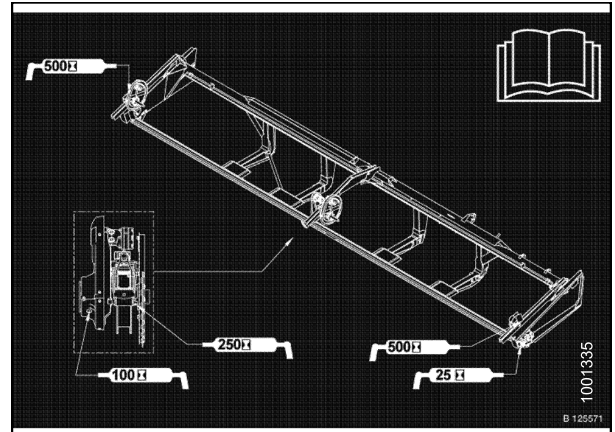


Figure 5.12: Single-Knife Header Master Grease Point Decal

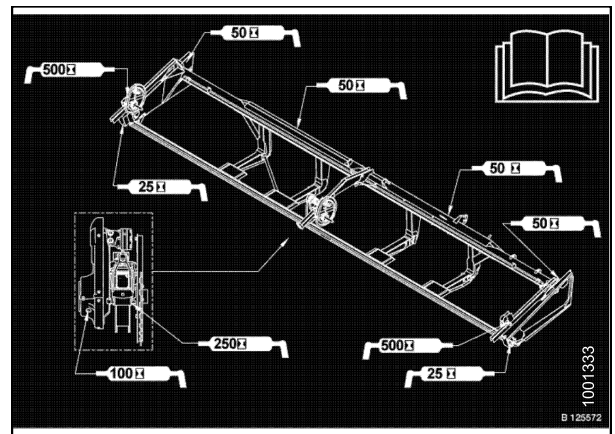


Figure 5.13: Double-Knife Header Master Grease Point Decal

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 the cover (B) to the reel drive.

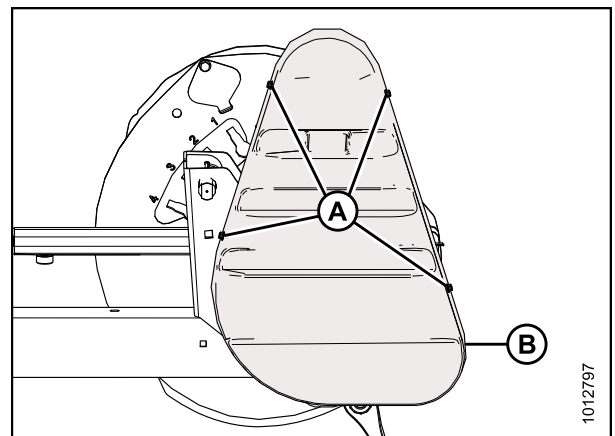


Figure 5.14: Drive Cover – Single Reel

MAINTENANCE AND SERVICING

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

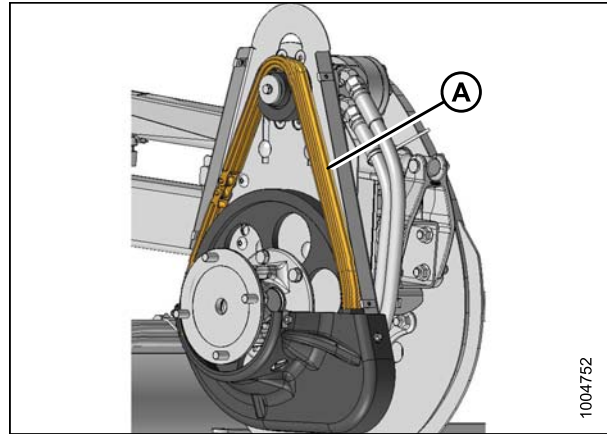


Figure 5.15: Drive Chain

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

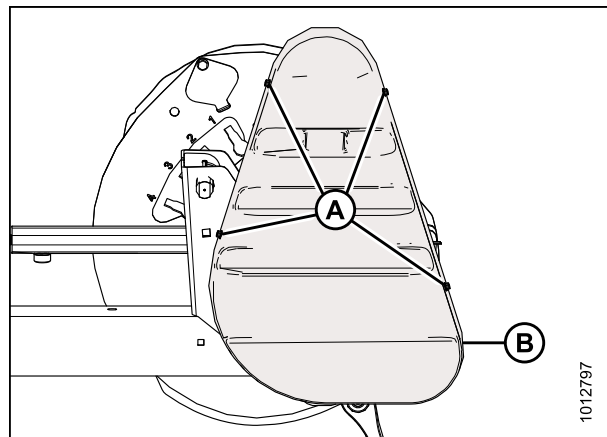


Figure 5.16: Drive Cover – Single Reel

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 the upper cover (B) to the reel drive and lower cover (C).

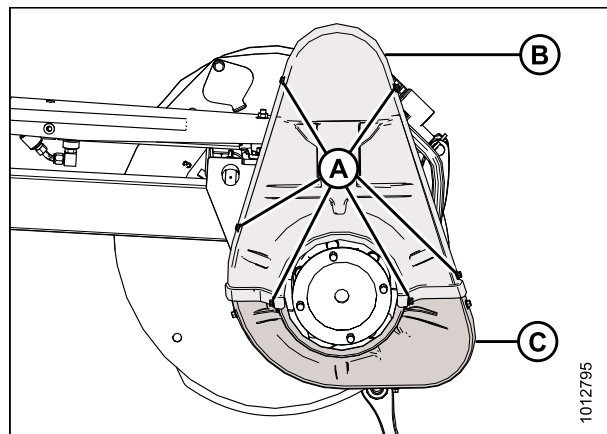


Figure 5.17: Drive Cover – Double Reel

MAINTENANCE AND SERVICING

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

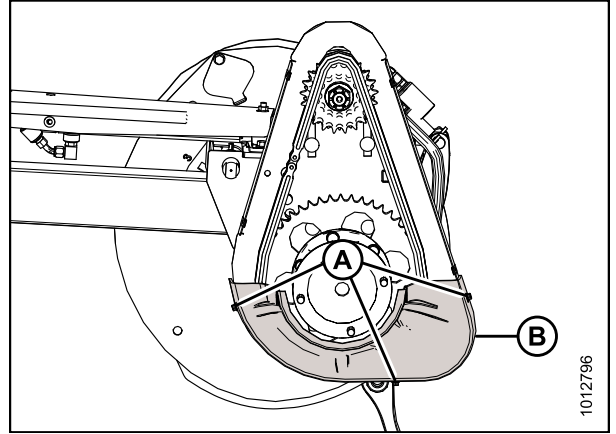


Figure 5.18: Drive Cover – Double Reel

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

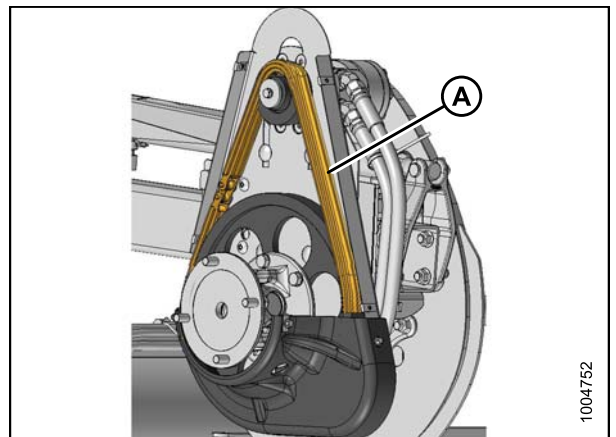


Figure 5.19: Drive Chain

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

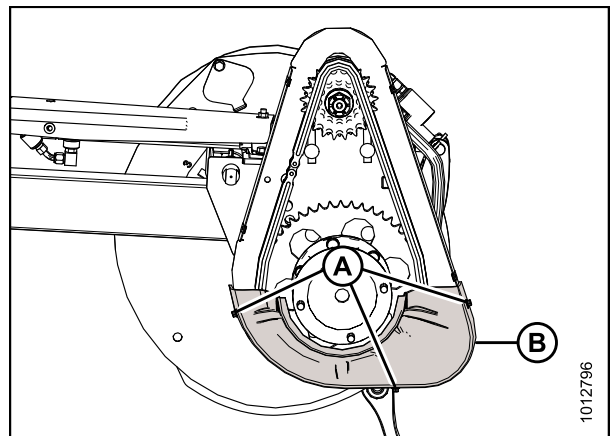


Figure 5.20: Drive Cover – Double Reel

MAINTENANCE AND SERVICING

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

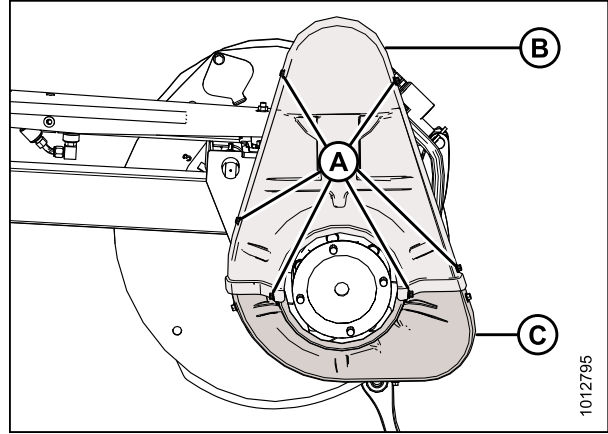


Figure 5.21: Drive Cover – Double Reel

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

1. Use a Phillips screwdriver to remove the screws (A) from the fixture and remove the plastic lens.
2. Replace the bulb and reinstall the plastic lens and screws.

NOTE:

Use bulb trade #1156 for amber clearance lights and #1157 for red tail light (Slow Speed Transport option).

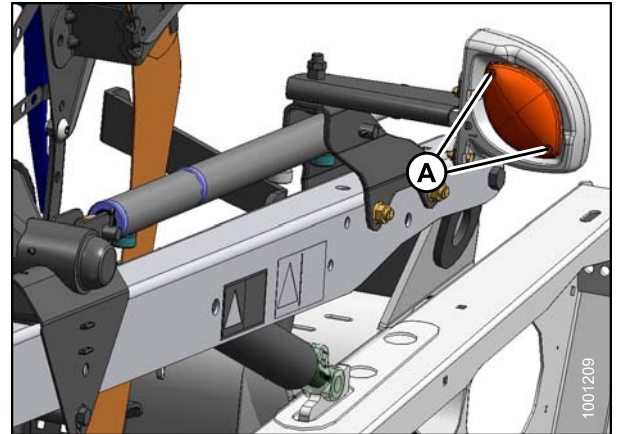


Figure 5.22: Clearance Light

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 115](#).

CAUTION

Wear heavy gloves when working around or handling knives.

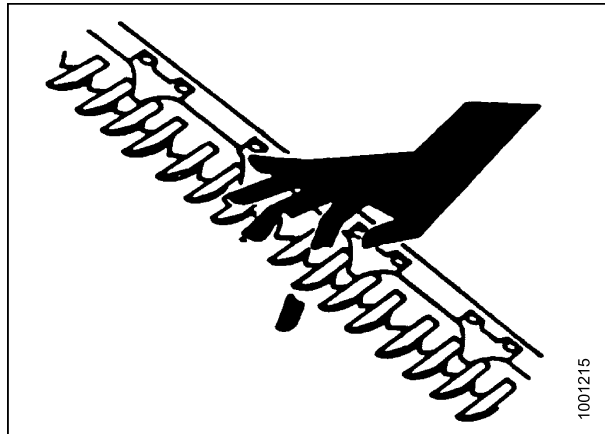


Figure 5.23: Cutterbar Hazard

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 sections last longer than fine serrated sections in dirty or sandy conditions. Fine serrated 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 the knife section (A) between the guards.
3. Remove nuts (B).
4. Remove bars (C) and lift the knife section off the knife bar.
5. Remove the splice bar (D) if knife section is under the bar.
6. Clean any dirt off the knife back and position the new knife section onto the knife.

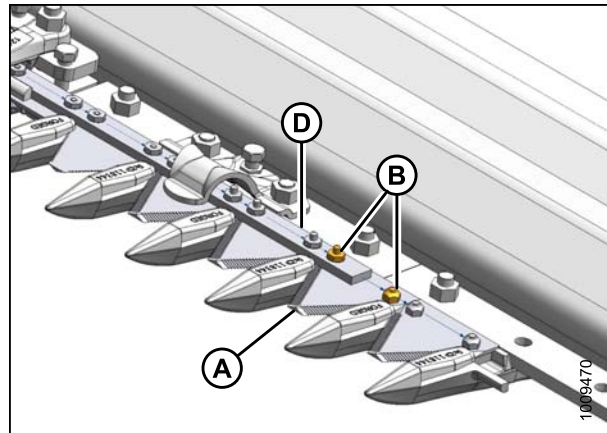


Figure 5.24: Knife Bar

IMPORTANT:

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

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

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 N·m (7 ft·lbf).

MAINTENANCE AND SERVICING

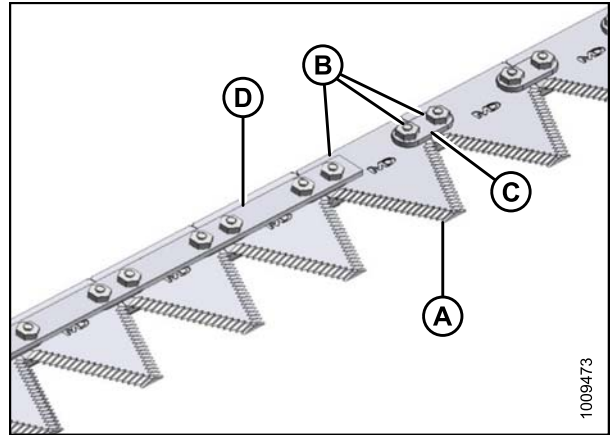


Figure 5.25: Knife Bar

1009473

5.5.2 Removing Knife

WARNING

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

1. Shut down the windrower, and remove the key from the ignition.
2. Stroke the knife manually to its outer limit.
3. Clean the area around the knifehead.
4. Remove bolt (A).
5. Remove the grease zerk (B) from the pin.
6. Use a screwdriver or chisel in slot (C) to release the load on the knifehead pin.
7. Use a screwdriver or chisel to pry the pin upwards in the pin groove until the pin is clear of the knifehead.
8. Push the knife assembly inboard until it is clear of the output arm.
9. Seal the knifehead bearing with plastic or tape unless it is being replaced.
10. Wrap a chain around the knifehead and pull out the knife.

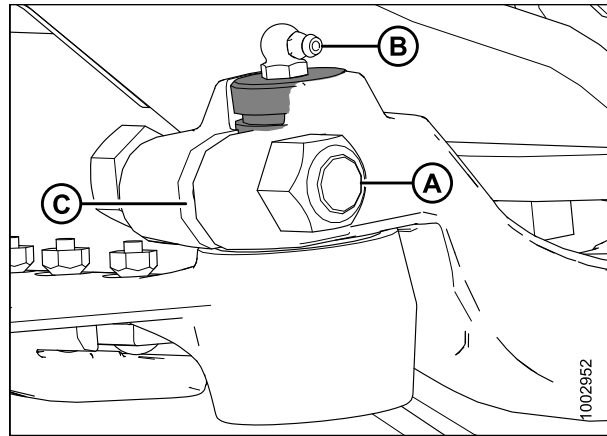


Figure 5.26: Knifehead

5.5.3 Removing Knifehead Bearing

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.

MAINTENANCE AND SERVICING

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the knife. Refer to [5.5.2 Removing Knife, page 136](#).

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 the pin (A). Tap the 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.

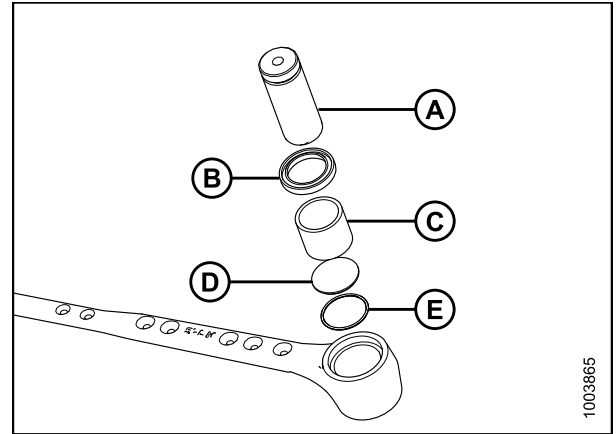


Figure 5.27: Knifehead Bearing Assembly

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.

2. Use a flat-ended tool (A) with the same approximate diameter as the 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.

IMPORTANT:

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

4. Install the knife. Refer to [5.5.5 Installing Knife, page 137](#).

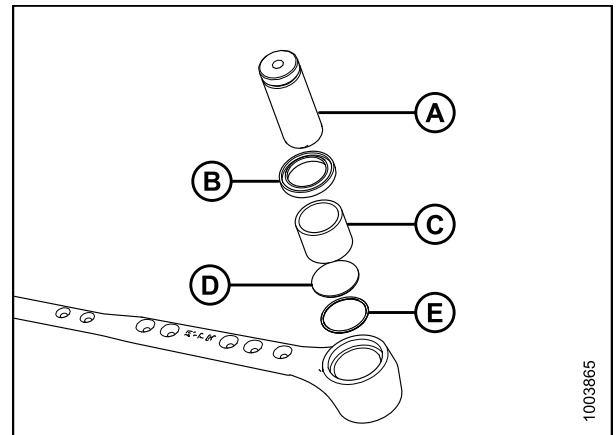


Figure 5.28: Knifehead Bearing Assembly

5.5.5 Installing Knife

⚠ WARNING

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

MAINTENANCE AND SERVICING

1. Slide the knife into place and align the knifehead with the output arm.

NOTE:

For ease of removing or installing knifehead pin, remove grease zerk from pin.

2. Install knifehead pin (A) through the output arm and into the knifehead. Tap the knifehead pin (A) down, make sure the pin is seated at the bottom of the knifehead.
3. Set the groove (B) in the knifehead pin 1.5 mm (1/16 in.) above the output arm (C). Secure with 5/8 in. x 3 in. hex head bolt and nut (D), and torque to 217 N·m (160 ft-lbf).
4. Using a feeler gauge, check that the gap at (E) is 0.25 mm (0.01 in).
5. Install the grease zerk (A) into the knifehead pin, and turn the grease zerk for easy access.

IMPORTANT:

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

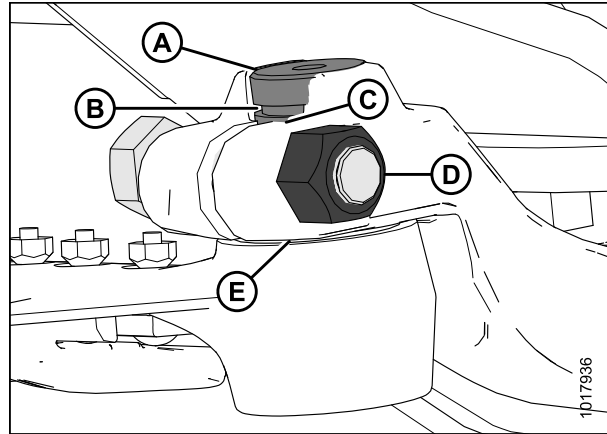


Figure 5.29: Knifehead

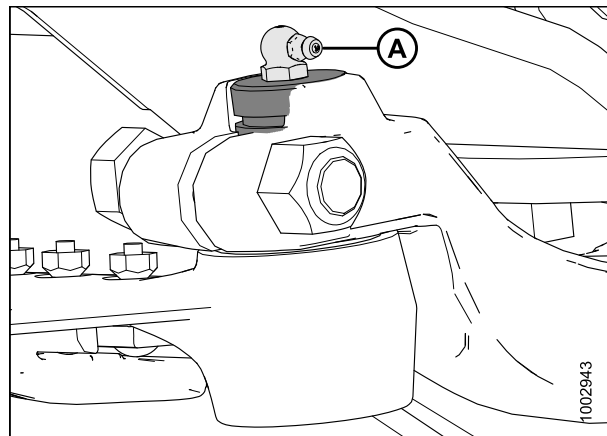


Figure 5.30: Knifehead

5.5.6 Spare Knife

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

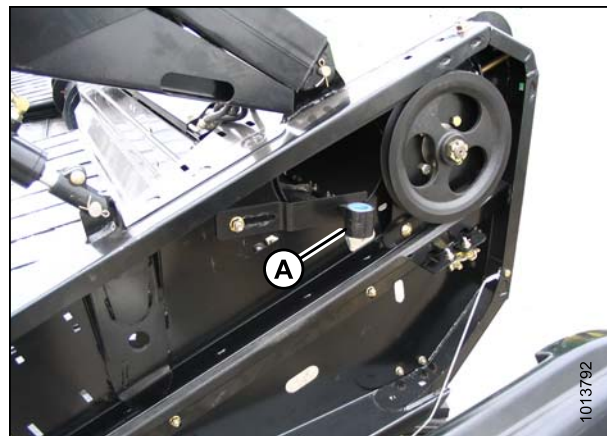


Figure 5.31: Spare Knife

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. Position the tool as shown, and pull up to adjust the guard tips upwards.



Figure 5.32: Upward Adjustment

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

TIP:

If material is tough to cut, install stub guards with top guard and adjuster plate. A kit is available from your MacDon Dealer. Refer to [6.2.3 Stub Guard Conversion Kit, page 233](#).



Figure 5.33: Downward Adjustment

Replacing Pointed Guards

Normal, Drive Side, and End Guard Replacement

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 the guard (A) and hold-down (C) (if applicable) to the cutterbar.
4. Remove the guard (A), hold-down (C), and plastic wear plate (if installed).

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.

5. Position the new guard (A), hold-down (C), and plastic wear plate (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. Refer to [Checking Knife Hold-Downs, page 144](#).

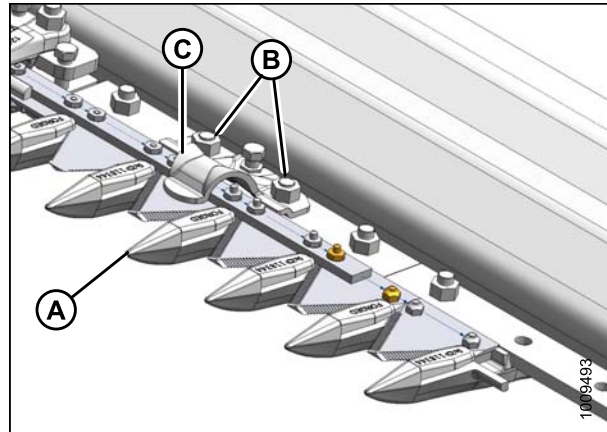


Figure 5.34: Pointed Guards

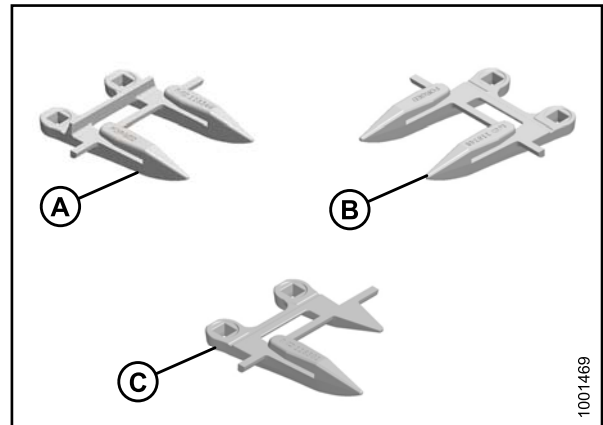


Figure 5.35: Pointed Guards

A - Normal

B - Drive Side

C - Half Guard (End)

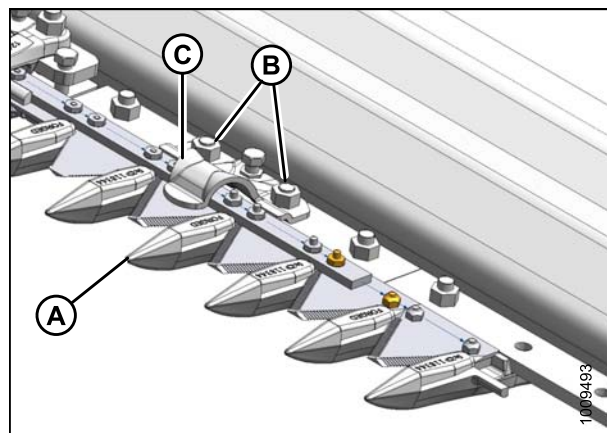


Figure 5.36: Pointed Guards

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.

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the two nuts (B) and bolts attaching the guard (A) and top guide (C) to the cutterbar.
3. Remove the guard (A), plastic wear plate (if installed), top guide (C), and adjuster bar (D).
4. Position the plastic wear plate (if applicable), replacement center guard (A), adjuster bar, and top guide (B) onto the cutterbar. Install bolts, but do **NOT** tighten.

IMPORTANT:

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

NOTE:

The top guide (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. Refer to [Checking Knife Hold-Downs, page 144](#).

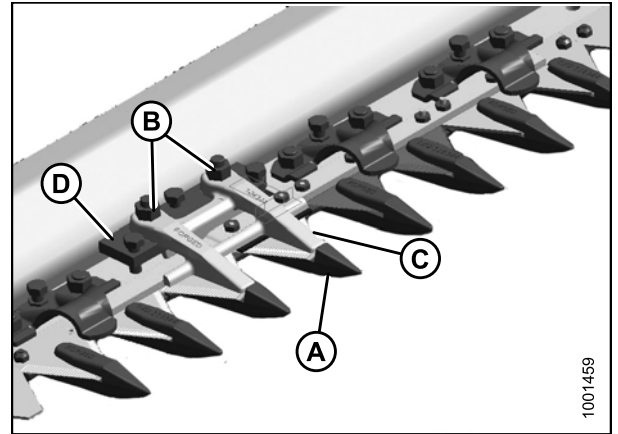


Figure 5.37: Center Guards

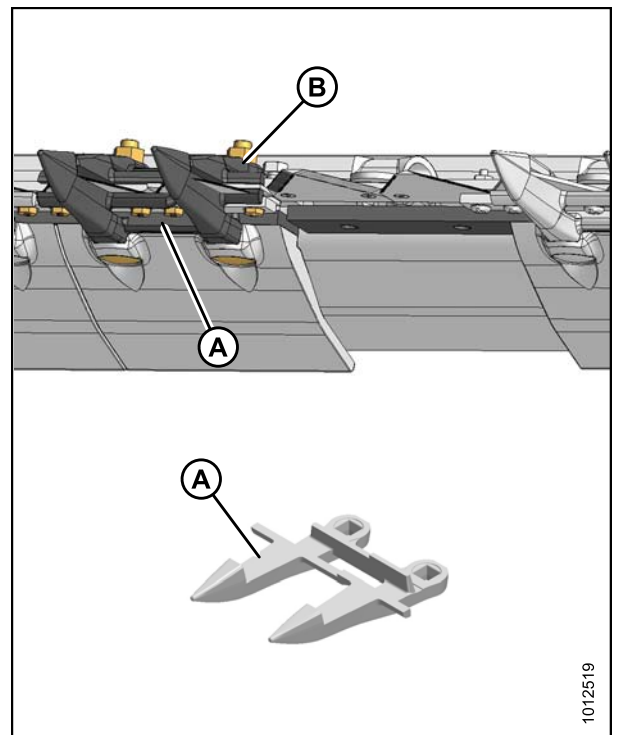


Figure 5.38: Center Guards

Replacing Stub Guards

Stub guards, complete with top guides and adjuster plates, are designed to cut tough crops. Stub guards are available for 15-, 20-, 25-, 30-, and 35-foot headers only.

Normal, Drive Side, and End Guard Replacement

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 the two nuts (A) and bolts attaching the guard (B) and top guide (C) to the cutterbar.
4. Remove the guard (B), plastic wear plate (if installed), top guide (C), and adjuster bar (D).

IMPORTANT:

Note the position of the mitre on the adjuster bar (D), and reinstall the adjuster bar in the same position. Mitres should not be adjacent to each other.

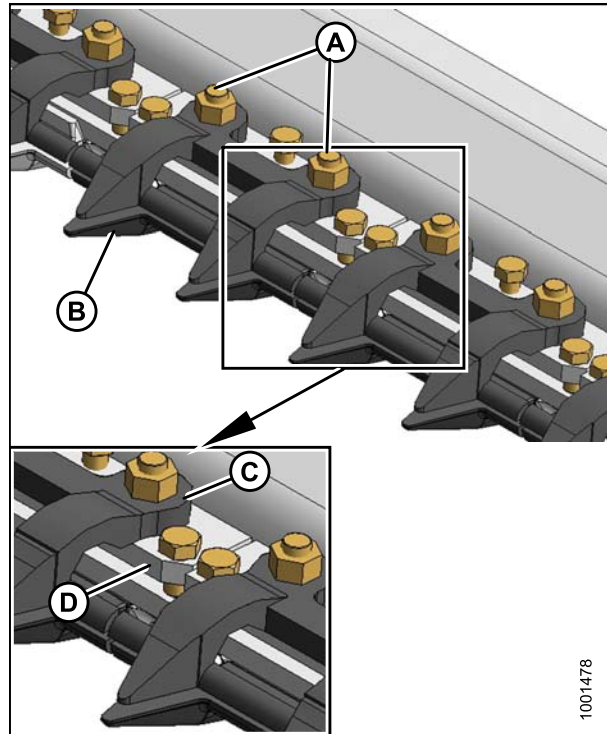


Figure 5.39: Stub Guards

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.

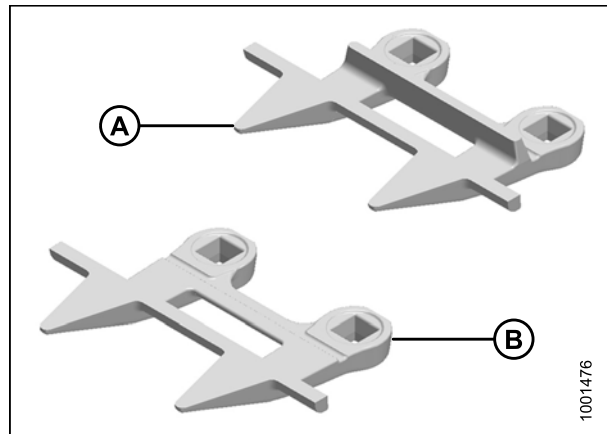


Figure 5.40: Stub Guards

A - Normal Guard

B - Drive Side Guard

MAINTENANCE AND SERVICING

5. Position the plastic wear plate (if applicable), replacement guard (B), adjuster bar (D), top guide (C), and install bolts and nuts (A). Do **NOT** tighten.
6. Check and adjust the clearance between the hold-downs and the knife. Refer to [Checking Knife Hold-Downs, page 144](#).

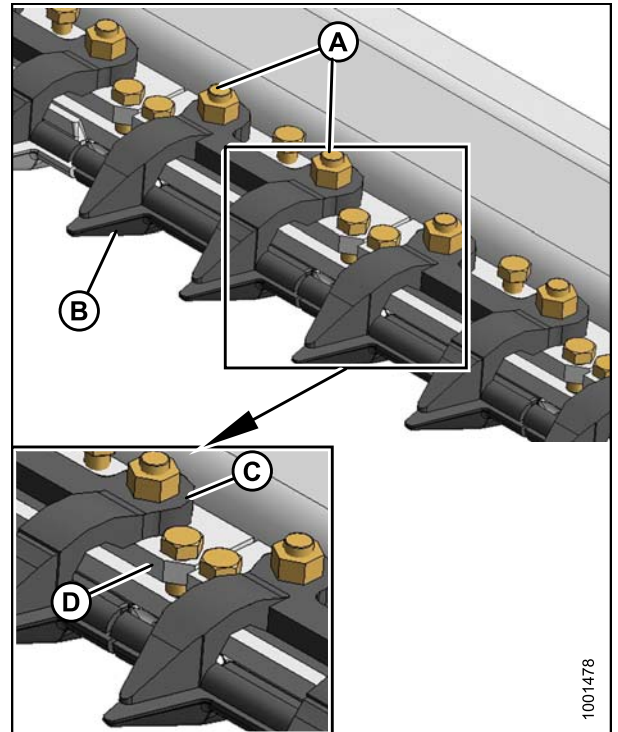


Figure 5.41: Stub Guards

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.

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the two nuts (A) and bolts attaching the guard (B), top guide (C), and adjuster bar (D) to the cutterbar.
3. Remove the guard (B), plastic wear plate (if installed), top guide (C), and adjuster bar (D).
4. Position the plastic wear plate (if applicable), replacement guard (B), adjuster bar (D), and top guide (C) onto the cutterbar. Install bolts, but do **NOT** tighten.

IMPORTANT:

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

NOTE:

The top guide (C) 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 the knife. Refer to [Checking Knife Hold-Downs, page 144](#).

Checking Knife Hold-Downs

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. Use a feeler gauge to measure the clearance between the hold-downs and knife sections and refer to the following for adjustment procedures:

- [Adjusting Hold-Downs with Pointed Guards, page 144](#)
- [Adjusting Hold-Downs with Stub Guards, page 146](#)

NOTE:

Align guards prior to adjusting the hold-downs. Refer to [Adjusting Knife Guards, page 139](#).

Adjusting Hold-Downs with Pointed Guards

⚠ WARNING

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

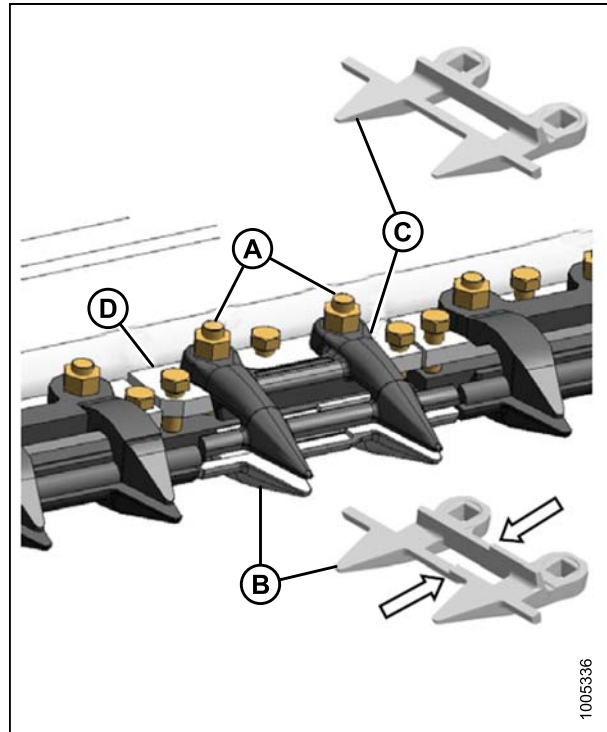


Figure 5.42: Center Guards

MAINTENANCE AND SERVICING

1. Shut down the windrower, and remove the key from the ignition.
2. Use a feeler gauge to measure the clearance between the normal guard hold-down (A) and the knife section. Ensure the clearance is between 0.1–0.6 mm (0.004–0.024 in.).
3. Adjust by turning bolt (B) clockwise to lower the front of the hold-down and decrease clearance, or counterclockwise to raise the front of the hold-down and increase clearance.

NOTE:

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

4. Use a feeler gauge to measure the clearance between the center guard hold-down (A) and the knife section. Ensure the clearance is between the following measurements:
 - **At Guide Tip (B):** 0.1–0.4 mm (0.004–0.016 in.)
 - **At Rear of Guide (C):** 0.1–1.0 mm (0.004–0.040 in.)
5. Adjust the clearance as follows:
 - a. Tighten nuts (D) until they are finger tight.
 - b. Turn the three adjuster bolts (E) clockwise to raise the front of the hold-down and increase clearance, or counterclockwise to lower the front of the hold-down and decrease clearance.
 - c. Torque the nuts (D) to 72 N·m (53 ft·lbf) after all the adjustments are complete and the specified clearances are achieved.

WARNING

Check to be sure all bystanders have cleared the area.

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

NOTE:

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

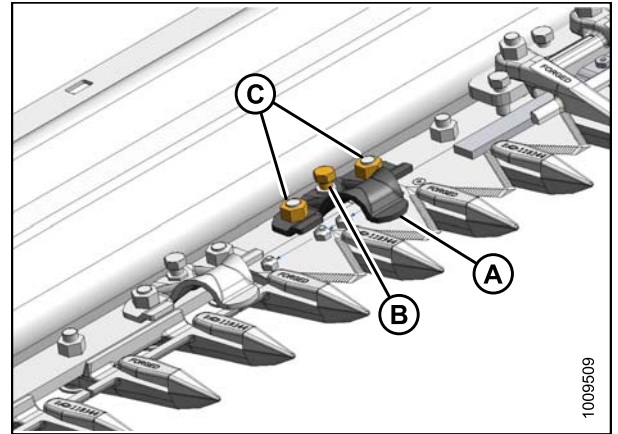


Figure 5.43: Normal Guard Hold-Down

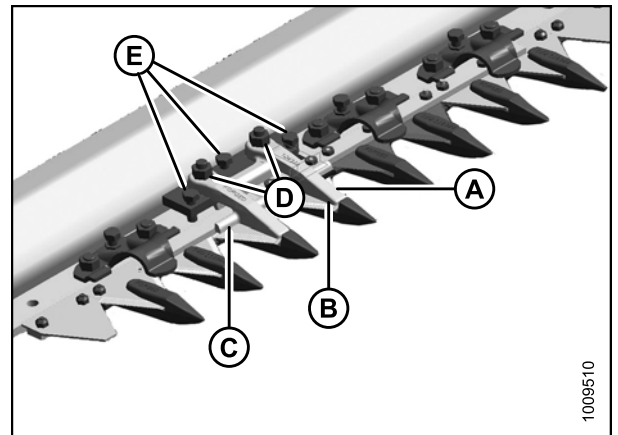


Figure 5.44: Center Guard Hold-Down

Adjusting Hold-Downs with Stub Guards

WARNING

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

1. Shut down the windrower, and remove the key from the ignition.
2. Use a feeler gauge to measure the clearance between the center guard hold-down (A) and the knife section. Ensure the clearance is between the following measurements:
 - **At Guide Tip (B):** 0.1–0.4 mm (0.004–0.016 in.)
 - **At Rear of Guide (C):** 0.1–1.0 mm (0.004–0.040 in.)
3. Adjust the clearance as follows:
 - a. Tighten nuts (D) until they are finger tight.
 - b. Turn the three adjuster bolts (E) clockwise to lower the front of the hold-down and decrease clearance, or counterclockwise to raise the front of the hold-down and increase clearance
 - c. Torque the nuts (D) to 72 N·m (53 ft·lbf) after all the adjustments are complete and the specified clearances are achieved.

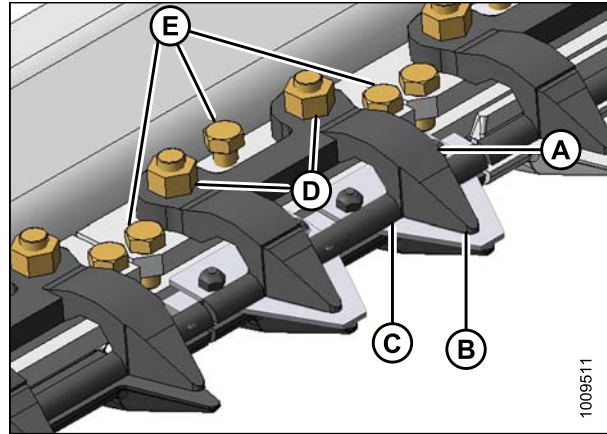


Figure 5.45: Stub Guards

WARNING

Check to be sure all bystanders have cleared the area.

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

NOTE:

Insufficient hold-down clearance will result in overheating of the 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 cut-out.

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.

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 arm locks.
3. Place the 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 the 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 the bolts (B) just enough to hold the knifehead shield (A) in place while allowing it to be adjusted as close to the knifehead as possible.
7. Rotate the knife drive box pulley manually 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 the bolts (B).

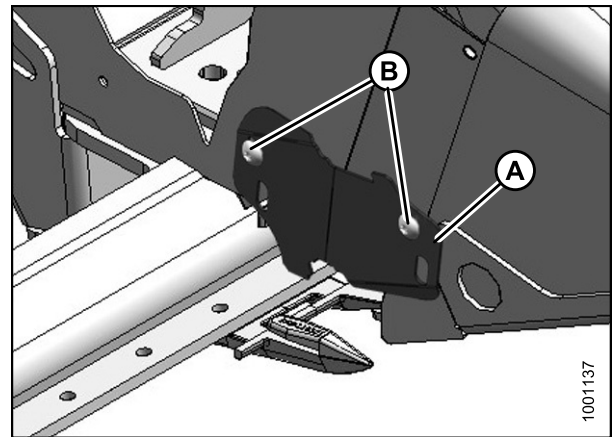


Figure 5.46: Knifehead Shield

5.6 Knife Drive

5.6.1 Knife Drive Box

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

CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing, page 115](#).

Checking Mounting Bolts

Check the torque on the four knife drive box mounting bolts (A) and (B) after the first 10 hours 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 the side bolts (A) first, then torque the bottom bolts (B). Torque all bolts to 200 ft-lbf (271 N m). When tightening, start with the side mounting bolts.

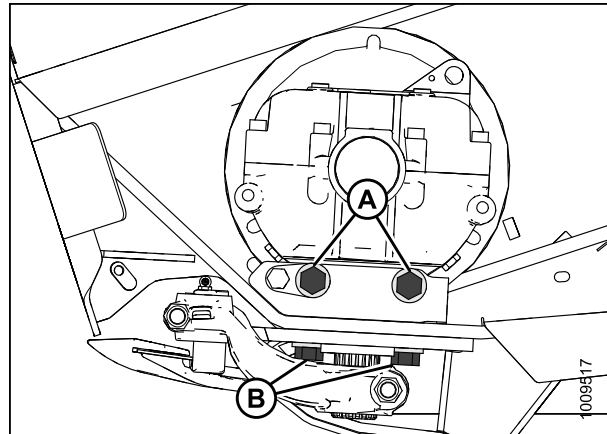


Figure 5.47: Knife Drive Box

Removing Knife Drive Box

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. Refer to [Opening Endshield, page 33](#).
3. Loosen the two nuts (A) on the belt idler bracket to relieve the belt tension.
4. Loosen the nut (B) on the idler pulley and slide the idler down to loosen the belt.
5. Proceed to Step [10., page 149](#).

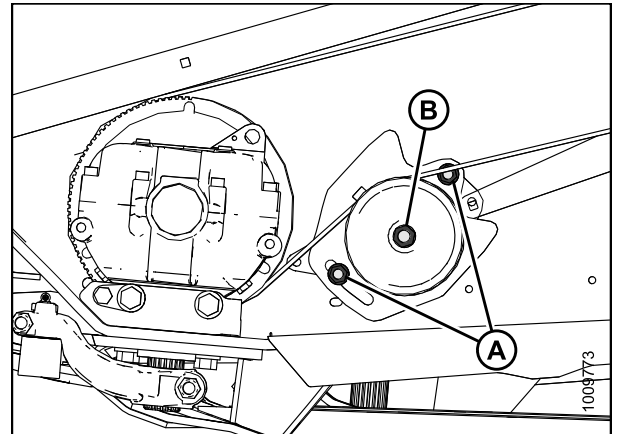


Figure 5.48: Timed Double-Knife Drive

Single and Untimed Double-Knife Headers:

6. Shut down the windrower, and remove the key from the ignition.
7. Open the endshield. Refer to [Opening Endshield, page 33](#).
8. Loosen the two bolts (A) securing the motor assembly to the header endsheet.
9. Loosen the belt tension by turning the tensioning bolt (B) counterclockwise.

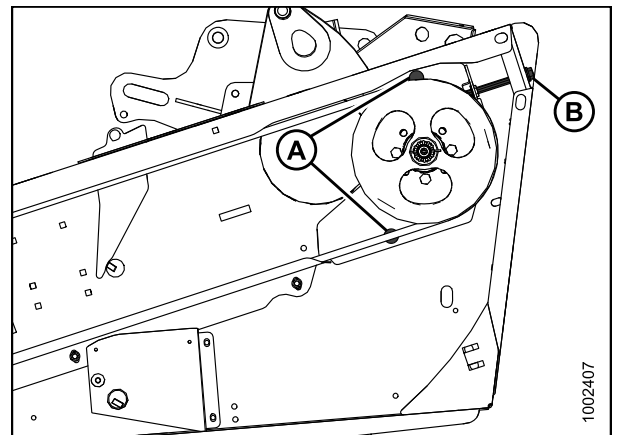


Figure 5.49: Single and Untimed Double-Knife Drive

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

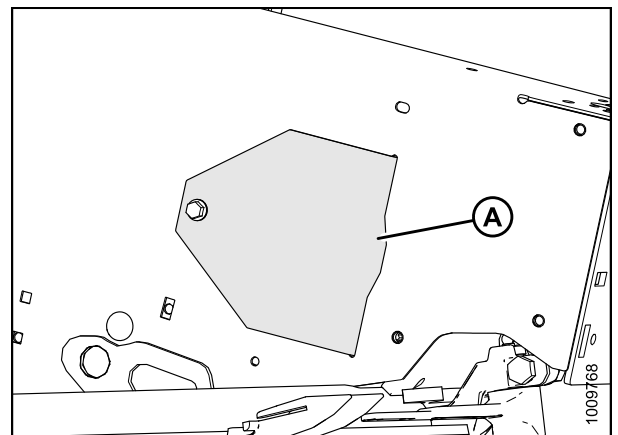


Figure 5.50: Access Cover

MAINTENANCE AND SERVICING

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

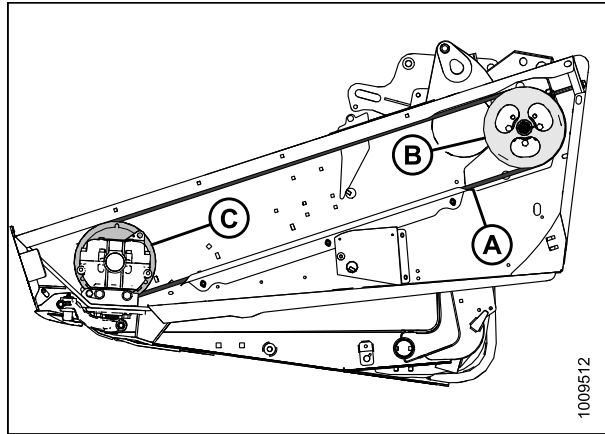


Figure 5.51: Knife Drive

13. Stroke the knife manually to its outer limit.
14. Remove bolt (A).
15. Remove the grease zerk (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.

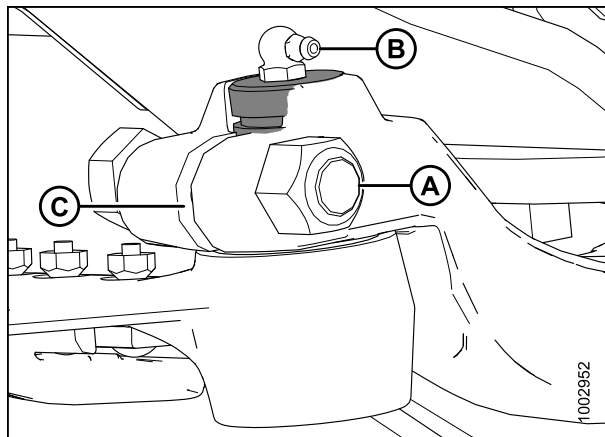


Figure 5.52: Knifehead

MAINTENANCE AND SERVICING

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

NOTE:

Do **NOT** remove bolt (E); it is factory-set to properly position the knife drive box in the correct fore-aft position.

CAUTION

Extension may shift when supports are removed. Use care when removing fasteners and supports.

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

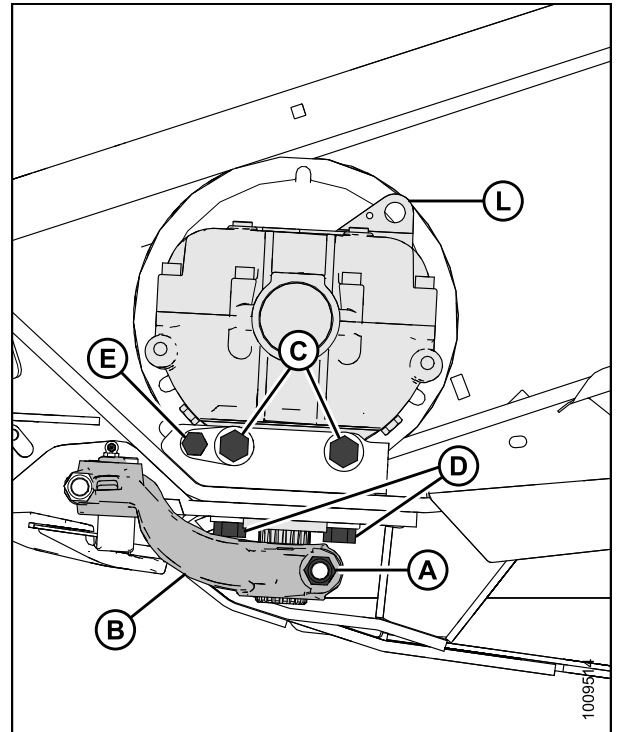


Figure 5.53: Knife Drive Box

Removing Knife Drive Box Pulley

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

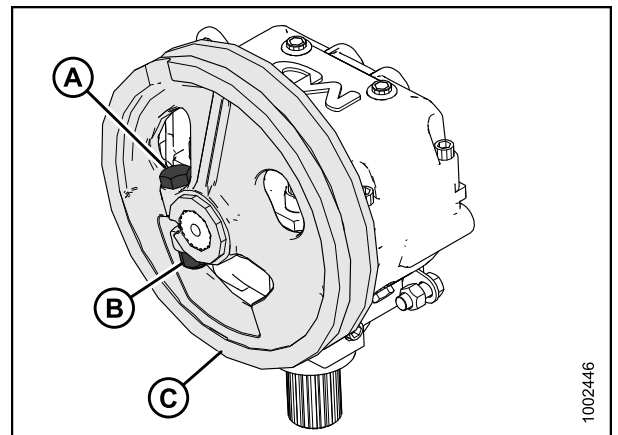


Figure 5.54: Knife Drive Box and Pulley

MAINTENANCE AND SERVICING

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 Loctite® #243 adhesive (or equivalent) around the shaft as shown. Apply one band at the end of the spline and the second band at the approximate mid-point location.
3. Install the 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 N·m (160 ft·lbf).

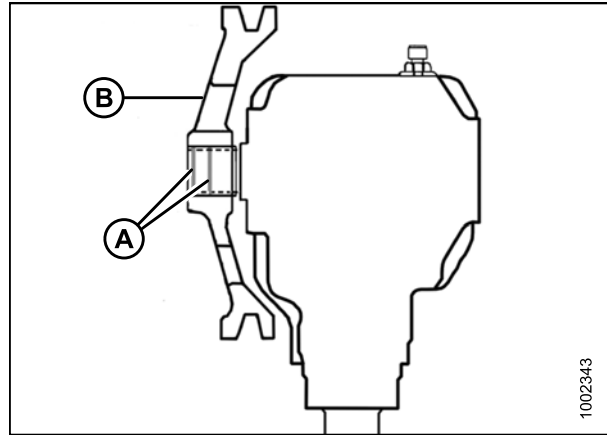


Figure 5.55: Knife Drive Box

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 152](#). If the pulley was not removed, proceed to Step 1., [page 152](#).

CAUTION

Extension may shift when supports are removed. Use care when removing fasteners and supports.

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 the knife drive box side bolts (A) slightly, then tighten the bottom bolts (B) to ensure proper contact with the vertical and horizontal mounting surfaces. Do **NOT** torque the bolts at this time.

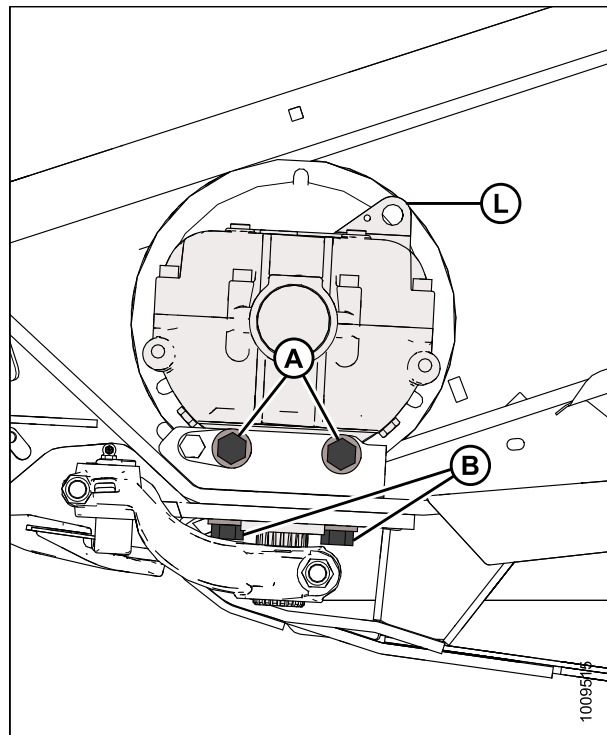


Figure 5.56: Knife Drive Box

MAINTENANCE AND SERVICING

4. Apply two bands (A) of 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 mid-point location.
5. Slide the 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.

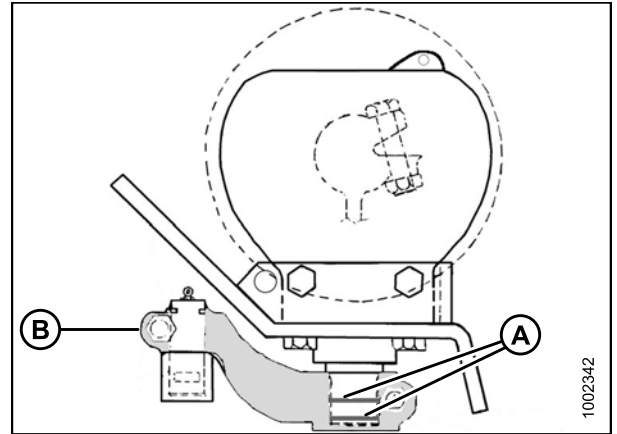


Figure 5.57: Knife Drive Box

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

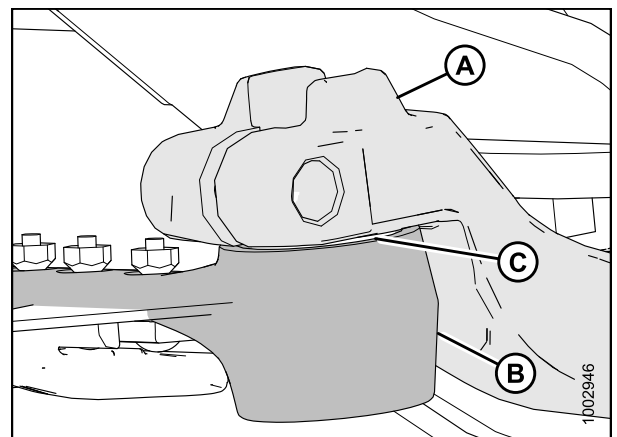


Figure 5.58: Knifehead

7. Torque the output arm bolt (B) to 217 N·m (160 ft·lbf).

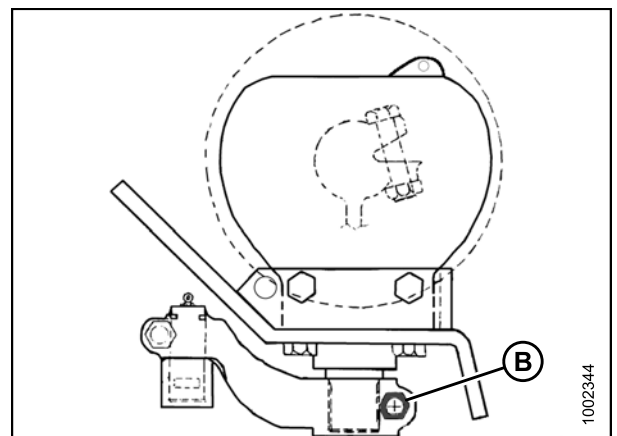


Figure 5.59: Knife Drive Box

MAINTENANCE AND SERVICING

- Slide the knife into place and align the knifehead with the output arm.

NOTE:

For ease of removing or installing knifehead pin, remove grease zerk from pin.

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

IMPORTANT:

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

- Tighten the knife drive box side bolts (A) first, then tighten the bottom bolts (B). Torque to 200 ft-lbf (271 N·m).
- Move the output arm to the mid-stroke 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.
- Install and tension the knife drive belts. For untimed belts refer to [Tensioning Non-Timed Knife Drive Belts, page 157](#), for timed belts refer to [Tensioning Timed Knife Drive Belts, page 162](#). For timed double-knife headers, also check the knife timing, refer to [Adjusting Double-Knife Timing, page 163](#).
- Close the endshield. Refer to [Closing Endshield, page 34](#).

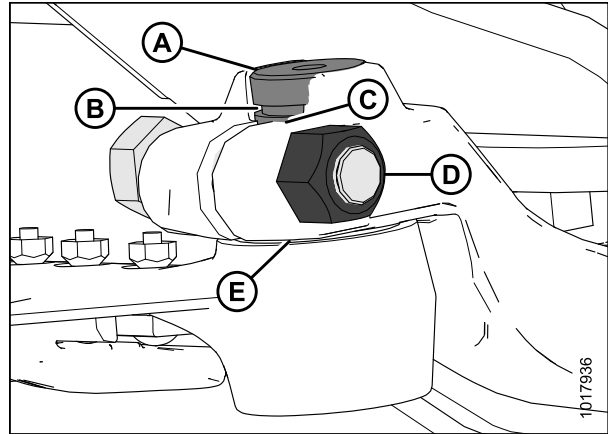


Figure 5.60: Knifehead

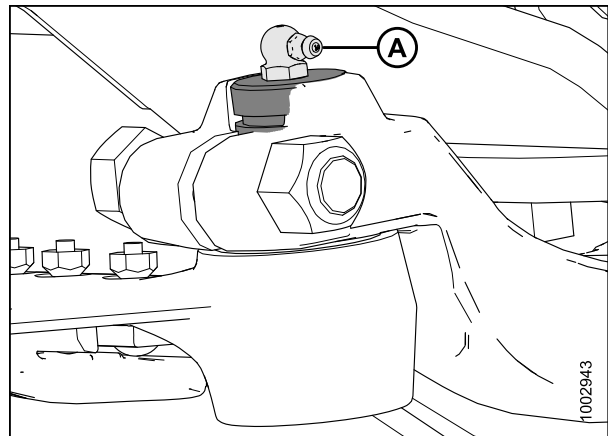


Figure 5.61: Knifehead

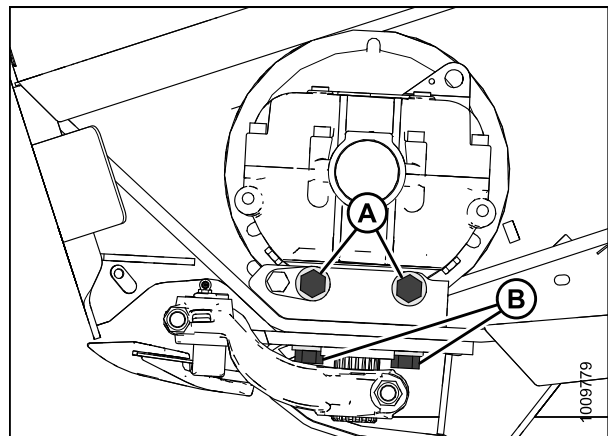


Figure 5.62: Knife Drive Box

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. Refer to [Opening Endshield, page 33](#).
4. Remove the breather/dipstick (A) and the drain plug (B).
5. Allow the oil to drain.
6. Reinstall the drain plug (B).
7. Add oil to the knife drive box. Refer to [5.2.1 Recommended Fluids and Lubricants, page 116](#).
8. Close the endshield. Refer to [Closing Endshield, page 34](#).

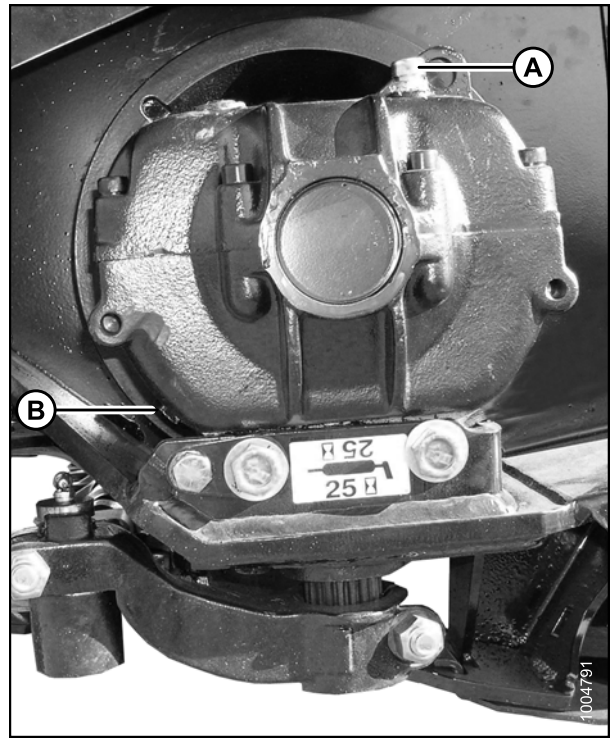


Figure 5.63: Knife Drive Box

5.6.2 Knife Drive Belts

Non-Timed 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 Non-Timed Knife Drive Belt

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

MAINTENANCE AND SERVICING

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to [Opening Endshield, page 33](#).
3. Loosen the two bolts (A) securing the motor assembly to the header endsheet.
4. Loosen the belt tension by turning the tensioning bolt (B) counterclockwise.

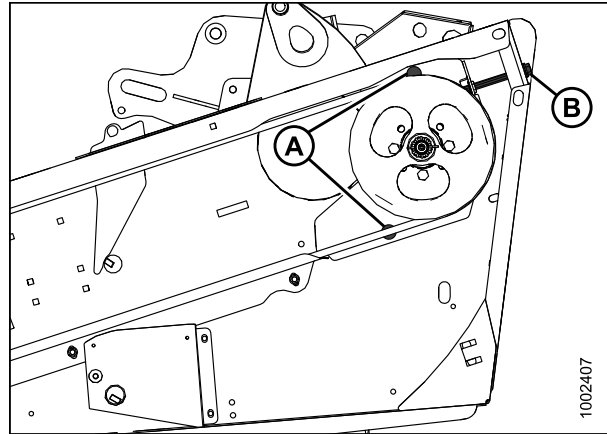


Figure 5.64: Single and Untimed Double-Knife Drive

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

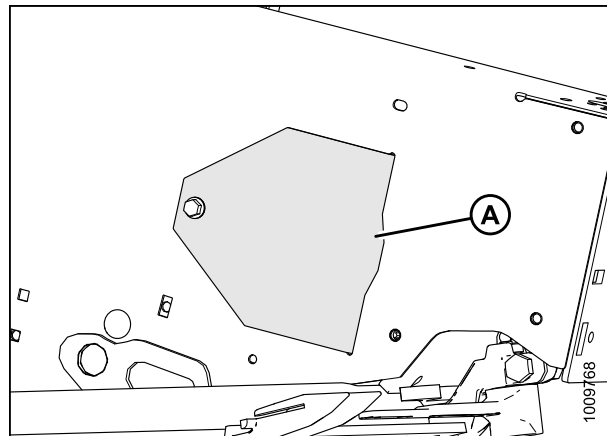


Figure 5.65: Access Cover

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

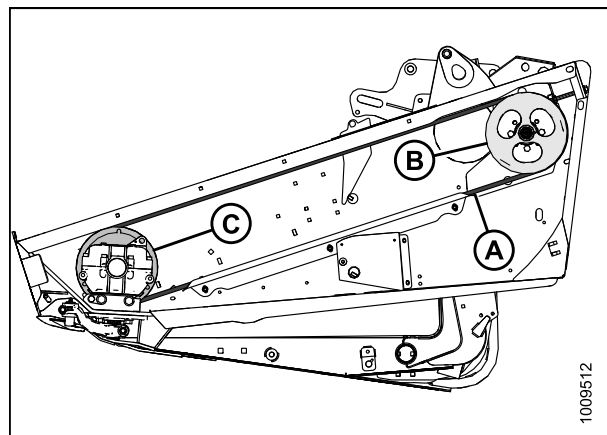


Figure 5.66: Knife Drive

MAINTENANCE AND SERVICING

Installing Non-Timed Knife Drive Belts

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

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

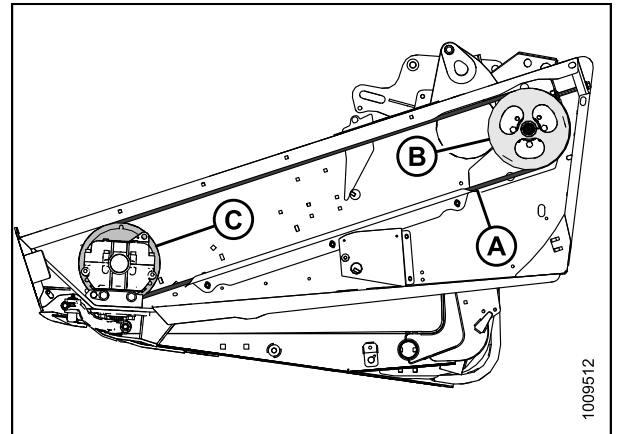


Figure 5.67: Knife Drive

3. Tension the knife drive belt. Refer to [Tensioning Non-Timed Knife Drive Belts, page 157](#).
4. Install the access cover (A) and secure with bolt.
5. Close the endshield. Refer to [Closing Endshield, page 34](#).

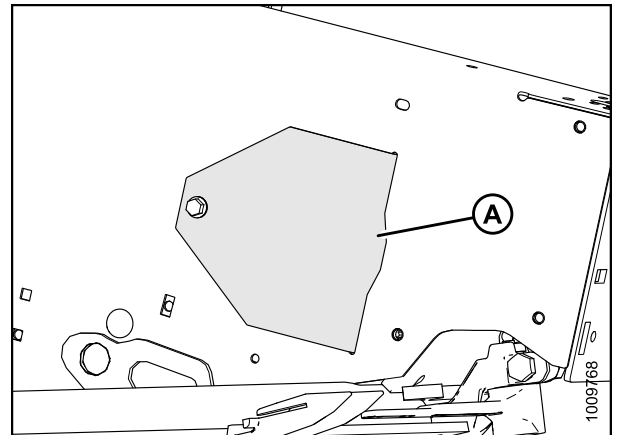


Figure 5.68: Access Cover

Tensioning Non-Timed Knife Drive Belts

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

IMPORTANT:

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

MAINTENANCE AND SERVICING

1. Shut down machine, and remove key from the ignition.
2. Open the endshield. Refer to [Opening Endshield, page 33](#).
3. Loosen the 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 mid-span.

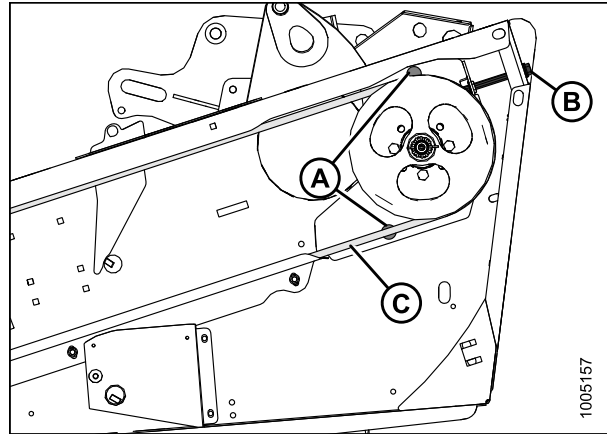


Figure 5.69: Left Shown – Right Opposite for Double-Knife Headers

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. Refer to [Closing Endshield, page 34](#).

NOTE:

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

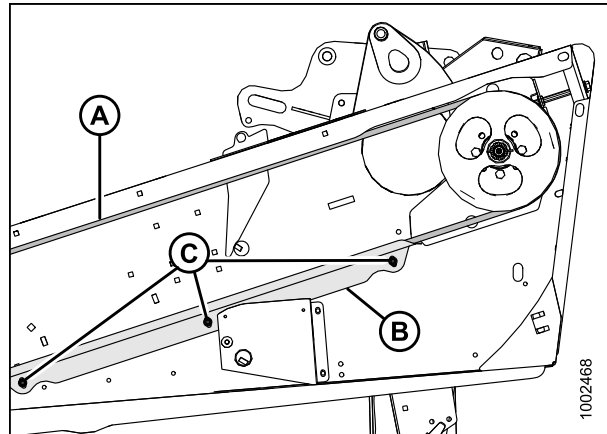


Figure 5.70: Knife Drive

Timed Double-Knife Drive Belts

This section applies to 35-foot and smaller double-knife model D65 Draper Headers with timed drives.

Removing Timed Drive V-Belts

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to [Opening Endshield, page 33](#).
3. Loosen the two bolts (A) securing the motor assembly to the header endsheet.
4. Turn the adjuster bolt (B) counterclockwise to loosen and remove the two V-belts (C).

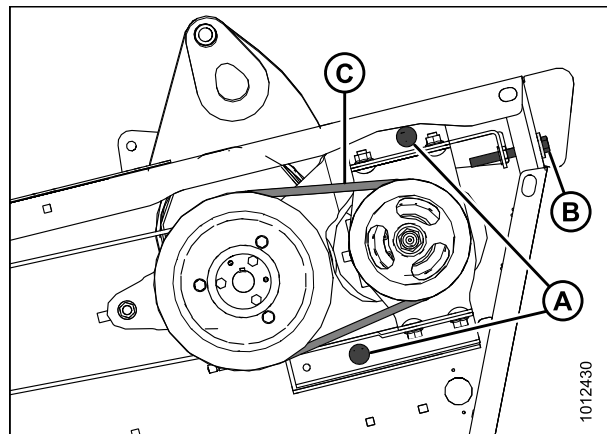


Figure 5.71: Knife Drive V-Belts

Installing Timed Drive V-Belts

NOTE:

Install new V-belts in matching pairs.

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

NOTE:

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

3. Turn the 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 mid-span.

IMPORTANT:

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

4. Tighten the two bolts (A) on the endsheet.
5. Close the endshield. Refer to [Closing Endshield, page 34](#).
6. Check the tension of the new V-belts after a short run-in period (about five hours).

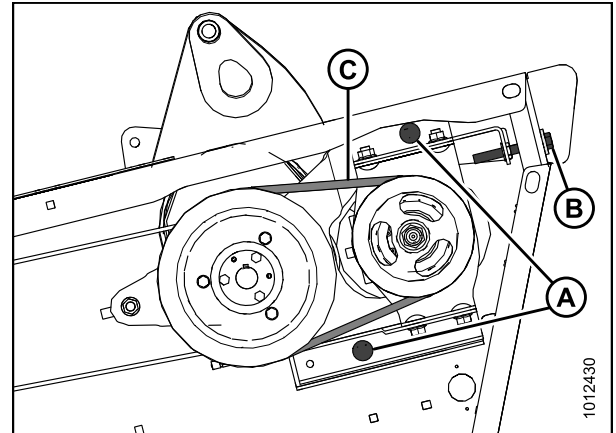


Figure 5.72: Knife Drive V-Belts

Removing Timed Knife Drive Belt

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to [Opening Endshield, page 33](#).
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.

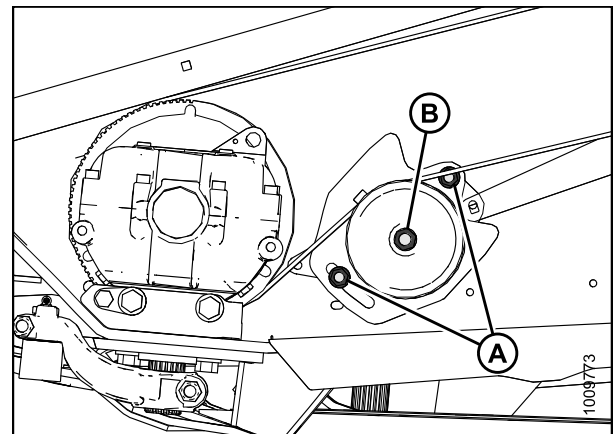


Figure 5.73: Knife Drive

MAINTENANCE AND SERVICING

NOTE:

The following two steps apply only to the left side drive.

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

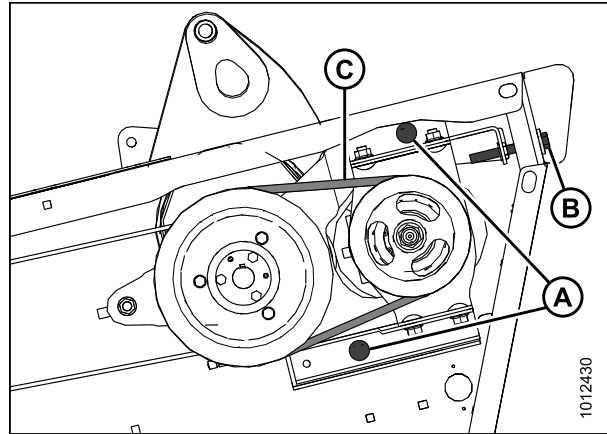


Figure 5.74: Knife Drive V-Belts

7. Open the 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.

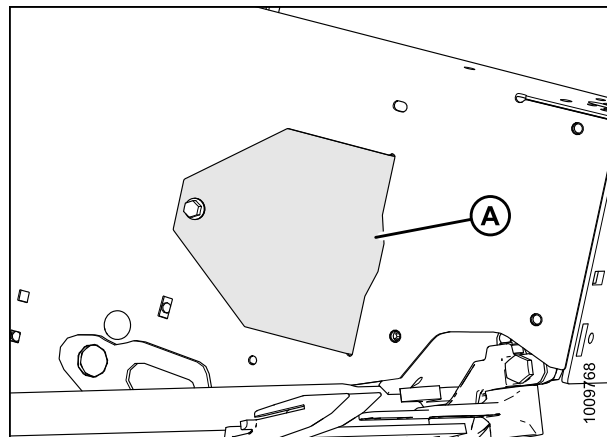


Figure 5.75: Access Cover

Installing Timed Knife Drive Belt

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

If the belt is out of alignment, refer to [Checking Knife Drive Belt Tracking, page 166](#).

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

NOTE:

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

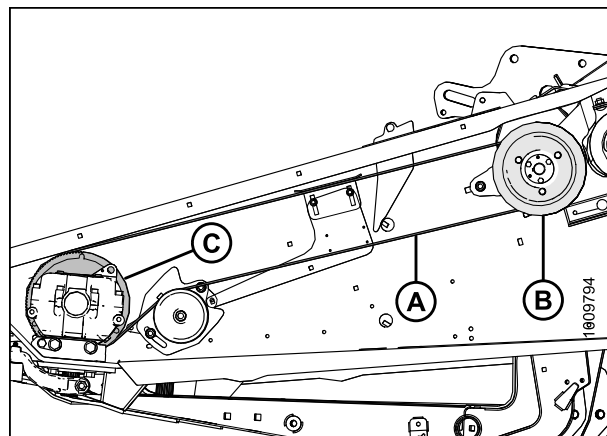


Figure 5.76: Left Side Shown – Right Side Similar

MAINTENANCE AND SERVICING

NOTE:

The following two steps apply only to the left side drive.

3. Install the V-belts (C) onto the pulleys.

NOTE:

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

4. Turn the 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 mid-span.

IMPORTANT:

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

5. Tighten the two bolts (A) on the endsheet.
6. Ensure the knives are timed before tightening the belt. Refer to [Adjusting Double-Knife Timing, page 163](#).
7. Slide the idler pulley (A) into the slot on the support bracket (B) to take-up the slack in the timing belt.

NOTE:

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

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

9. Tension the knife drive belt. Refer to [Tensioning Timed Knife Drive Belts, page 162](#)
10. Install the access cover (A) and secure with bolt.
11. Close the endshield. Refer to [Closing Endshield, page 34](#).

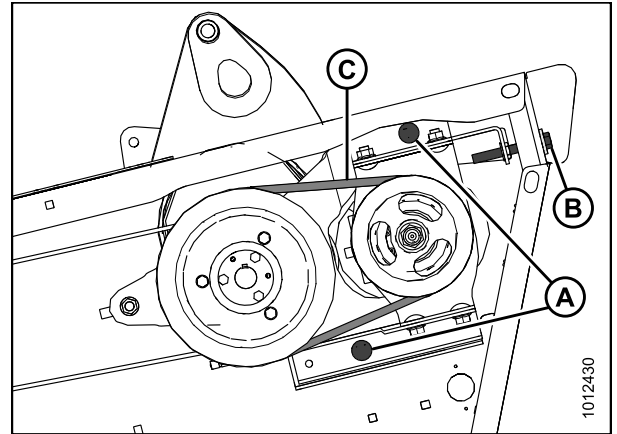


Figure 5.77: Knife Drive V-Belts

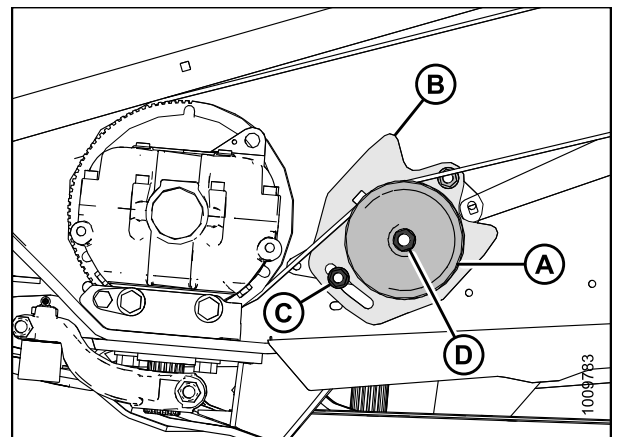


Figure 5.78: Knife Drive

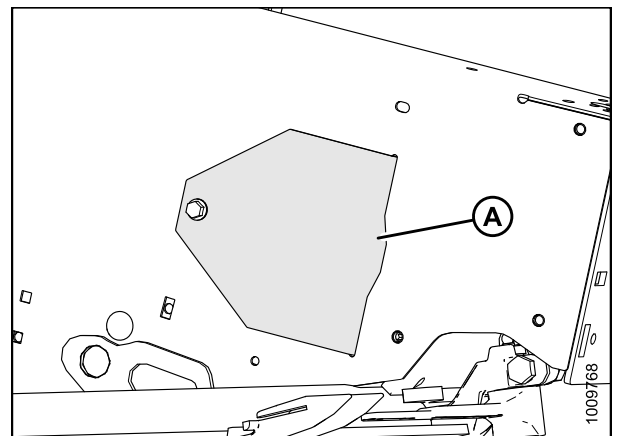


Figure 5.79: Access Cover

MAINTENANCE AND SERVICING

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.

IMPORTANT:

To prolong belt and drive life, do **NOT** over-tighten belt.

IMPORTANT:

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

1. Shut down windrower, and remove key from the ignition.
2. Open endshield. Refer to [Opening Endshield, page 33](#).
3. Loosen two nuts (A) on knife drive belt idler bracket.

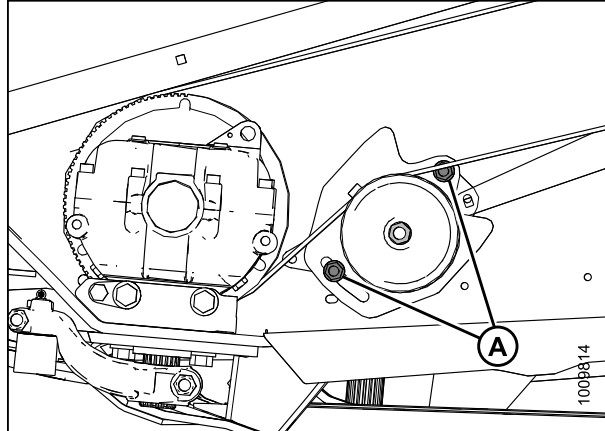


Figure 5.80: Left Side Knife Drive

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

NOTE:

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

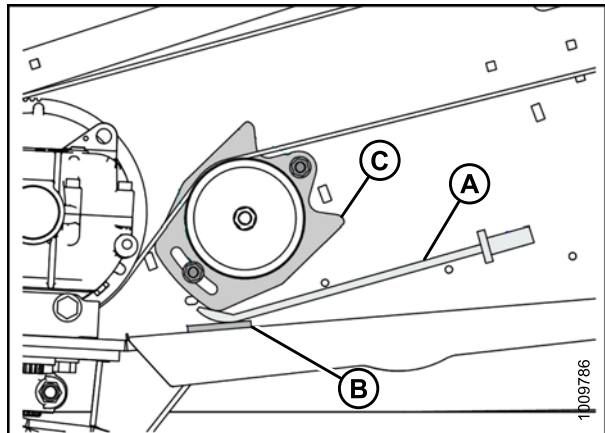


Figure 5.81: Left Side Knife Drive

MAINTENANCE AND SERVICING

5. Tighten nuts (C) to 73–80 N·m (54–59 ft·lbf) after achieving proper belt tension.
6. Remove pry bar (A) and wood (B).

NOTE:

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

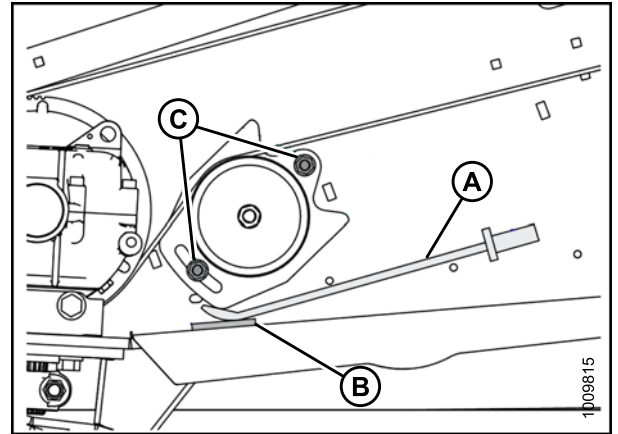


Figure 5.82: Left Side Knife Drive

7. Ensure clearance (A) between belt (B) and guide (C) is 0.5–1.5 mm (1/32–1/16 in.).
8. Loosen bolts (D) and adjust guide if necessary. Tighten bolts.
9. Repeat procedure for opposite side of header.
10. Close endshield. Refer to [Closing Endshield, page 34](#).

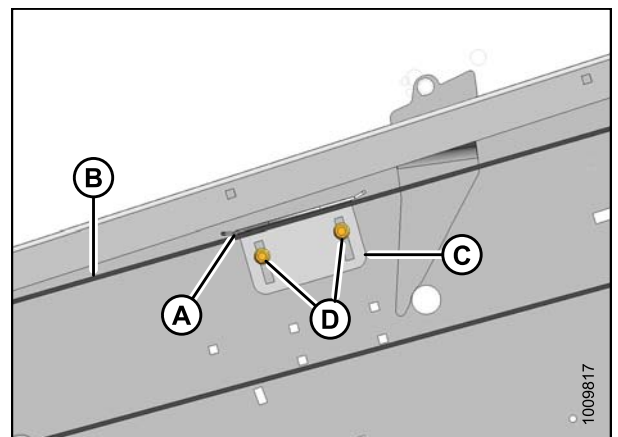


Figure 5.83: Left Side Belt Guide

Adjusting Double-Knife Timing

Timed double-knife drive headers (35-foot and smaller) require the knives to be properly timed to move in opposite directions.

1. Shut down the windrower, and remove the key from the ignition.
2. Open both endshields. Refer to [Opening Endshield, page 33](#).
3. Remove the right-hand belt. Refer to [Removing Timed Knife Drive Belt, page 159](#).

MAINTENANCE AND SERVICING

4. Rotate the left knife drive box driven pulley clockwise until the left knife (A) is at the center of the inboard stroke (B) (moving towards the center of the header).

NOTE:

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

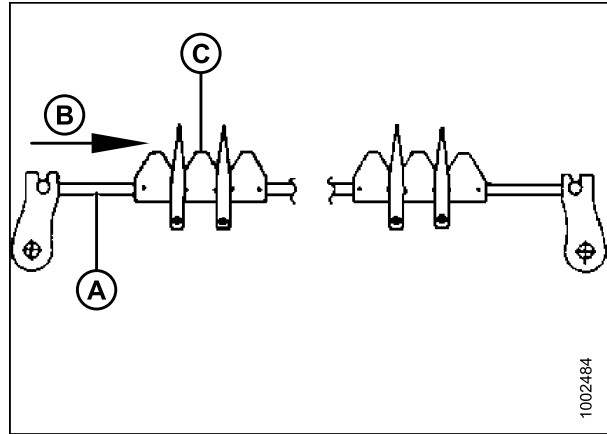


Figure 5.84: Adjusting Timing – Left Side

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

NOTE:

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

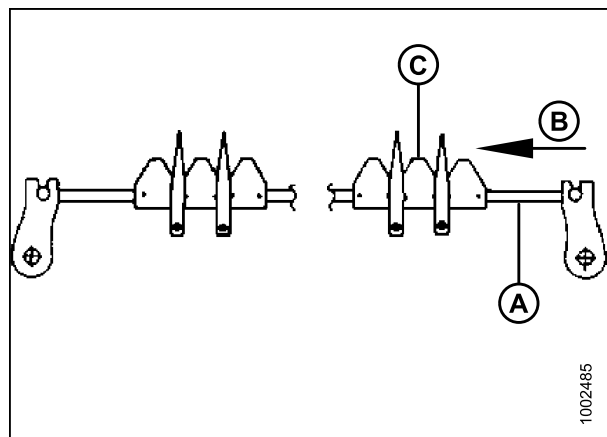


Figure 5.85: Adjusting Timing – Right Side

6. Install the right-hand belt (A).

NOTE:

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

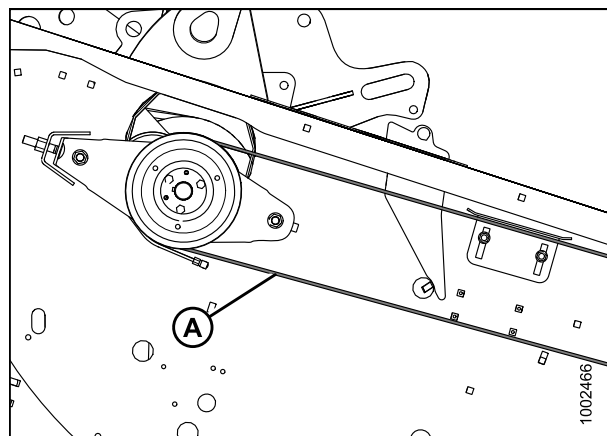


Figure 5.86: Right Side Knife Drive

MAINTENANCE AND SERVICING

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

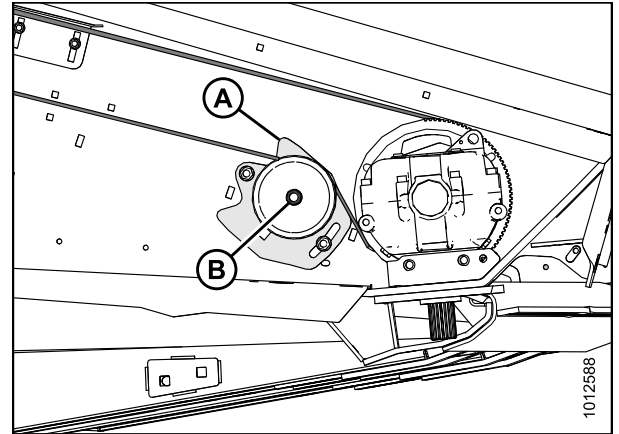


Figure 5.87: Right Side Knife Drive

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

NOTE:

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

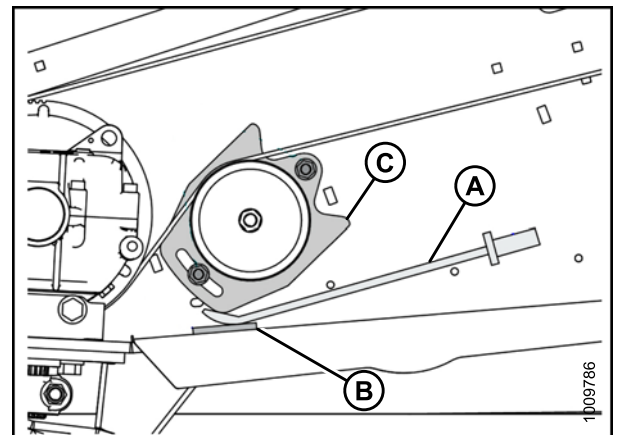


Figure 5.88: Left Side Shown – Right Side Opposite

9. Tighten the nuts (C) to 73–80 N·m (54–59 ft·lbf) after achieving the proper belt tension.
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 side 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 side driven pulley (A) clockwise.
 - b. If the right knife lags the left knife, rotate the right side driven pulley (A) counterclockwise.

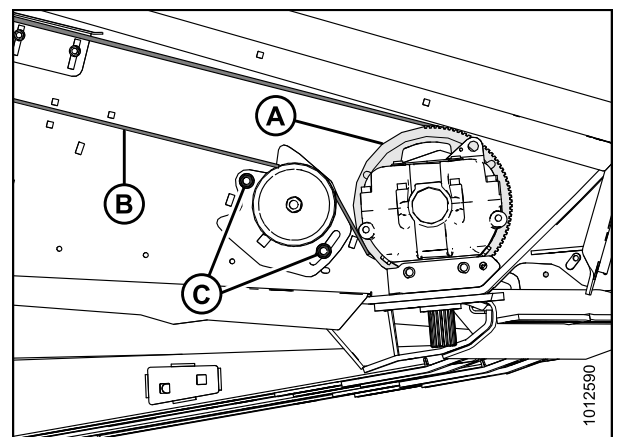


Figure 5.89: Right Side Knife Drive

MAINTENANCE AND SERVICING

13. Ensure the drive pulleys don't rotate, and tension the right side drive belts (refer to Step 7., page 165 to Step 9., page 165).

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 165) and readjust if necessary (refer to Step 12., page 165).
15. Close both endshields. Refer to *Closing Endshield*, page 34.

Checking Knife Drive Belt Tracking

The following procedure is applicable to the left side knife drive and the right side 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 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.

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]). Refer to *Adjusting Drive Belt Tracking (Drive Pulley)*, page 167.
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]). Refer to *Adjusting Drive Belt Tracking (Drive Pulley)*, page 167.

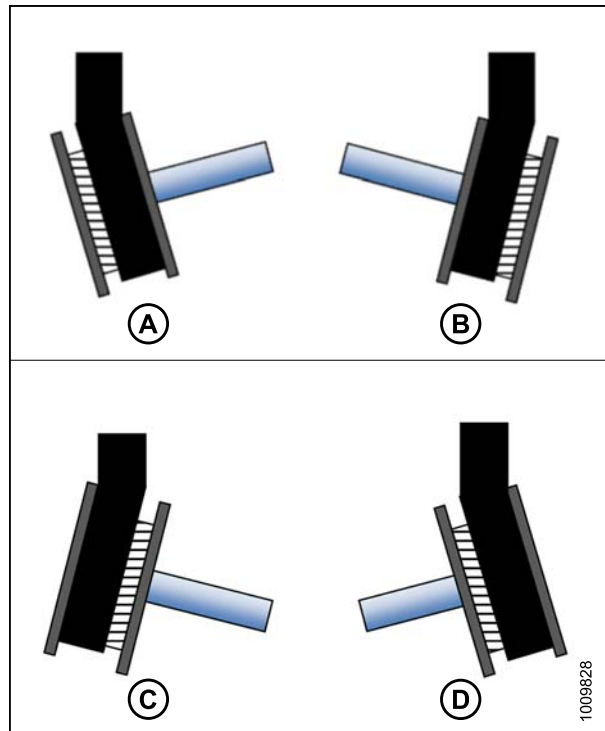


Figure 5.90: Knife Drive Pulley

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

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

MAINTENANCE AND SERVICING

5. If the belt (A) is tracking to one side of the knife drive box pulley (B), the likely cause is an out of position idler pulley (C). Refer to [Adjusting Drive Belt Tracking \(Wobble Box Pulley\)](#), page 168.

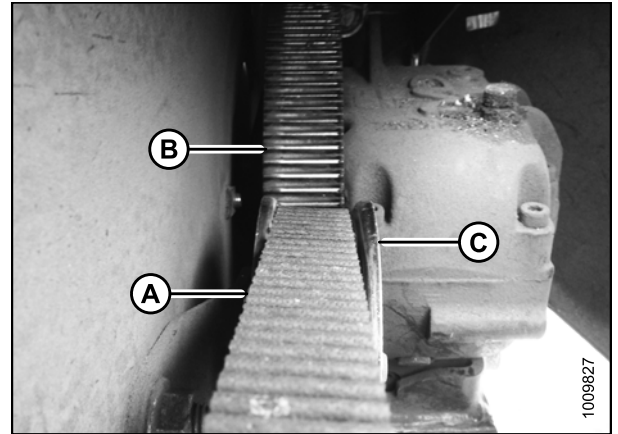


Figure 5.91: Knife Drive Belt

Adjusting Drive Belt Tracking (Drive Pulley)

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

Before adjusting the drive belt tracking, verify the pulley that needs to be adjusted. Refer to [Checking Knife Drive Belt Tracking](#), page 166.

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 the pulley flanges.

1. Open the endshields.

CAUTION

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

2. Loosen nut (A) on support assembly (B).
3. Slide the support (B) rearward in slot (C) to correct toe-out condition, or forward to correct toe-in condition.
4. Retighten nut (A).
5. Operate the header and check the tracking. Refer to [Checking Knife Drive Belt Tracking](#), page 166. Adjust the support assembly as required.
6. If the belt tracking problem continues, proceed to Step 7., page 168.

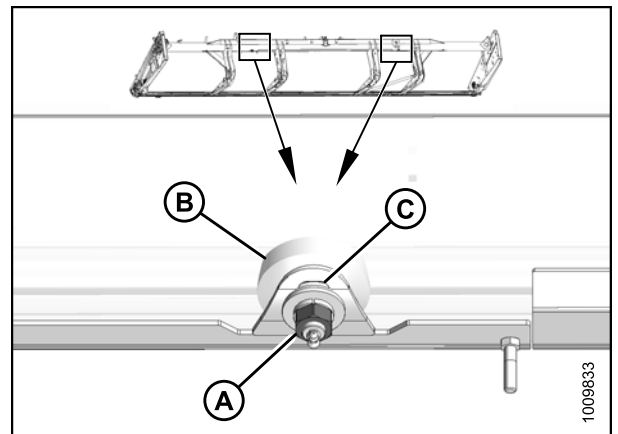


Figure 5.92: Cross-Shaft Support

MAINTENANCE AND SERVICING

7. Loosen nut (A) on idler and nuts (B) on idler bracket.
8. Loosen nuts (C) at drive pulley location.
9. Turn adjuster bolt (D) clockwise to correct a toe-in problem, which will allow the belt to track inboard.
10. Turn adjuster bolt (D) counterclockwise to correct a toe-out problem, which will allow the belt to track outboard.
11. Tighten nuts (C) at drive pulley location.
12. Tension the belt. Refer to [Tensioning Timed Knife Drive Belts, page 162](#).
13. Operate the header and check the tracking. Refer to [Checking Knife Drive Belt Tracking, page 166](#). Adjust the drive pulley if required as per the above steps.

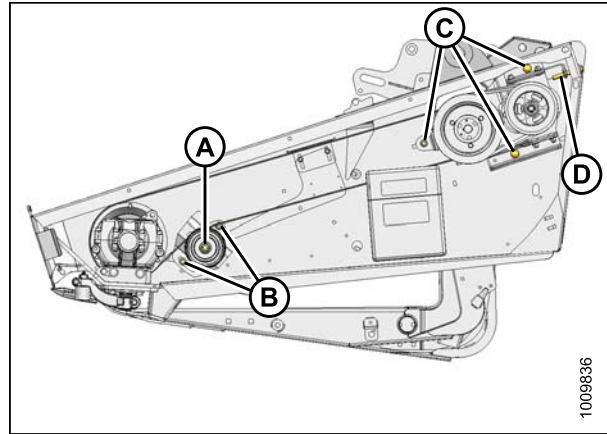


Figure 5.93: Knife Drive: Left Side

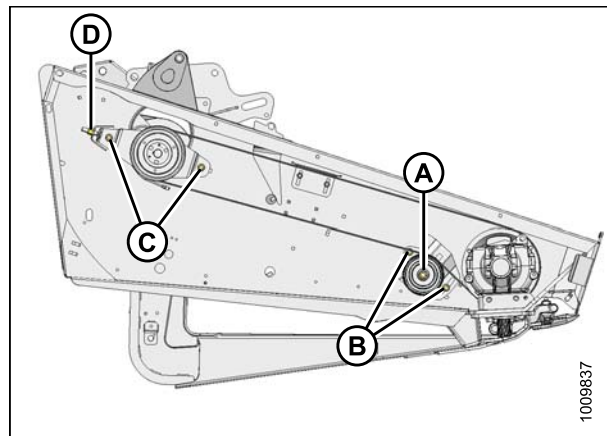


Figure 5.94: Knife Drive: Right Side

Adjusting Drive Belt Tracking (Wobble Box Pulley)

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

Before adjusting the drive belt tracking, verify the pulley that needs to be adjusted. Refer to [Checking Knife Drive Belt Tracking, page 166](#).

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 the pulley flanges.

1. Open the endshields.

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.

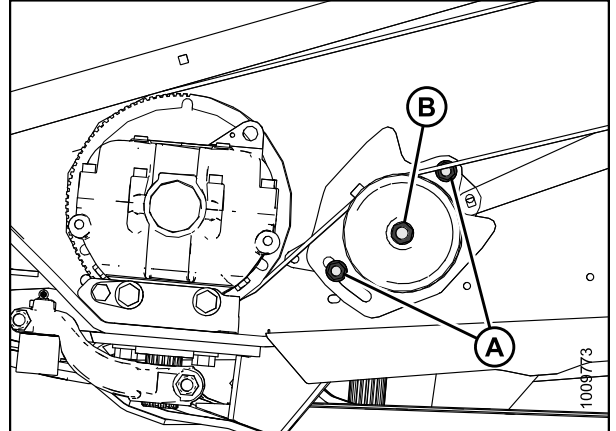


Figure 5.95: Knife Drive

3. Remove nut (B) securing idler to bracket, and remove lock washer, idler pulley, and flat washer.
4. Install the idler pulley (C), ensuring it lines up with the knife drive box pulley, using flat washer(s) (D) as required.
5. Reinstall lock washer (E) and nut (B).
6. Tension the belt. Refer to [Tensioning Timed Knife Drive Belts, page 162](#).
7. Operate the header and check the tracking. Refer to [Checking Knife Drive Belt Tracking, page 166](#).

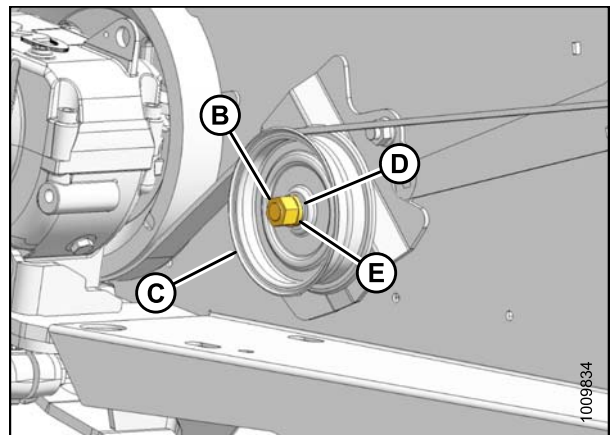


Figure 5.96: Knife Drive

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 Header 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 safety props.
3. Move the draper until the draper joint is in the work area.

NOTE:

The deck also can 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. Refer to [5.7.3 Adjusting Draper Tension, page 172](#).
6. Remove the screws (A) and tube connectors (B) at the draper joint.
7. Pull the draper from deck.

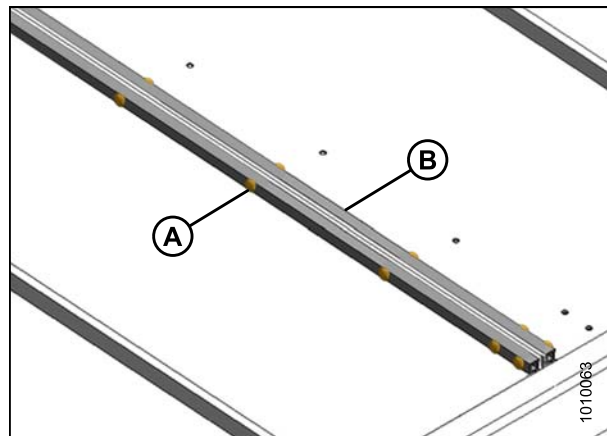


Figure 5.97: Draper Connector

5.7.2 Installing Header 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. Refer to [5.7.5 Adjusting Deck Height, page 176](#).

MAINTENANCE AND SERVICING

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.



Figure 5.98: Installing Draper

5. Loosen the mounting bolts (B) on the rear deck deflector (A) (this may help with draper installation).

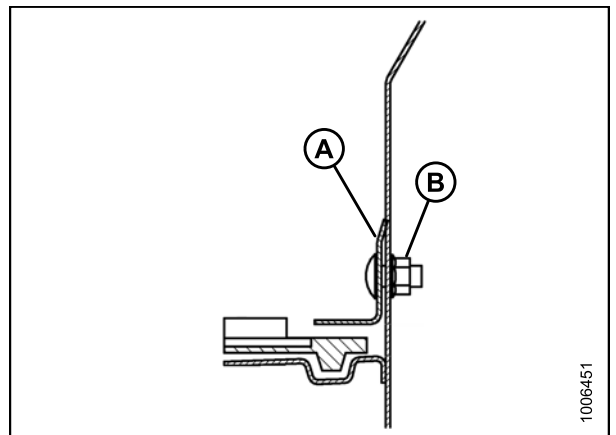


Figure 5.99: Draper Seal

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. Refer to [5.7.3 Adjusting Draper Tension, page 172](#).

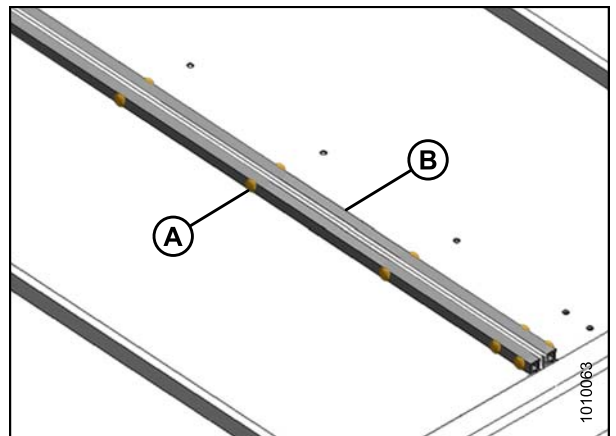


Figure 5.100: Draper Connector

MAINTENANCE AND SERVICING

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 the cutterbar (C) and the draper (B).
9. Refer to [5.7.5 Adjusting Deck Height, page 176](#) to achieve the proper gap.

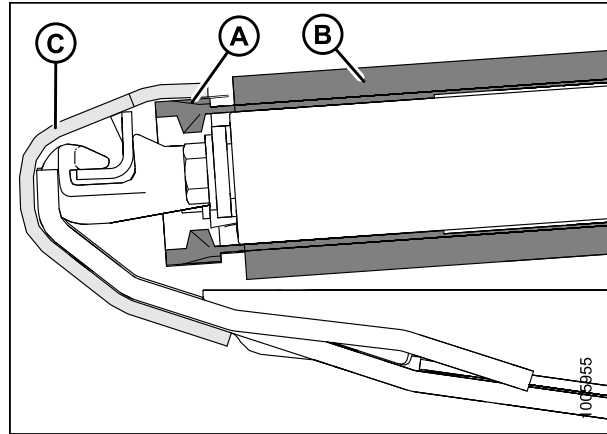


Figure 5.101: Draper Seal

10. Adjust the 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.

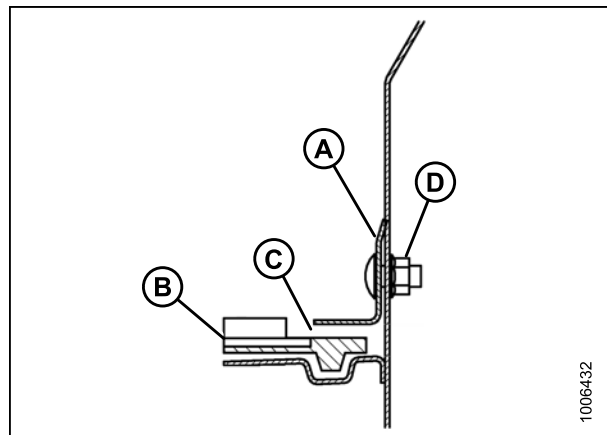


Figure 5.102: Draper Seal

5.7.3 Adjusting Draper Tension

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.

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.

MAINTENANCE AND SERVICING

1. Ensure the 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.

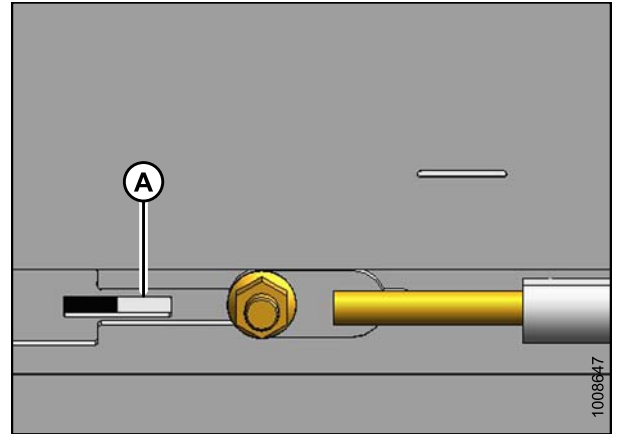


Figure 5.103: Left Adjuster Shown – Right Opposite

4. Ensure the draper guide (the rubber track on the underside of the draper) is properly engaged in the groove on the drive roller.

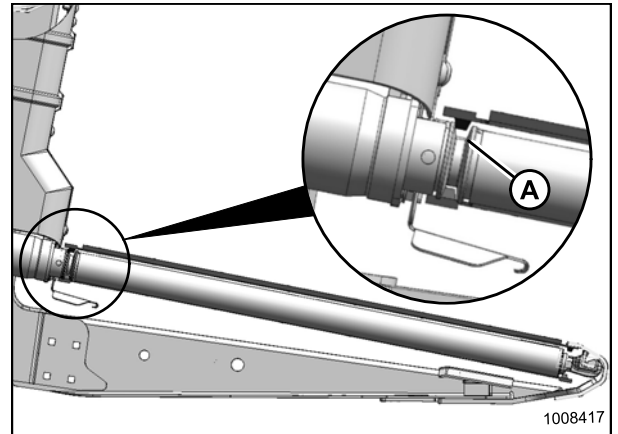


Figure 5.104: Drive Roller

5. Ensure the idler roller is between the draper guides.

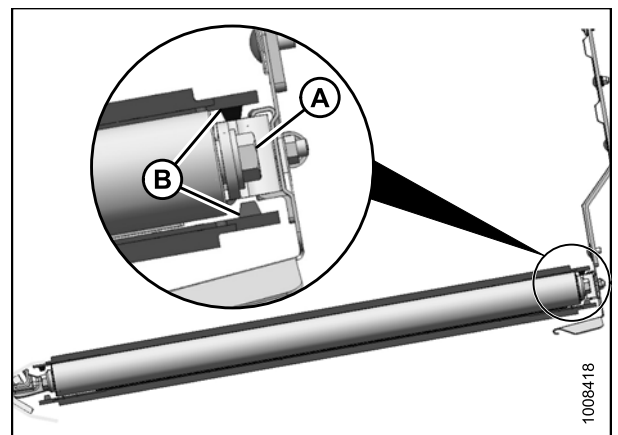


Figure 5.105: Idler Roller

MAINTENANCE AND SERVICING

IMPORTANT:

Do **NOT** adjust nut (C). This nut is used for draper alignment only.

- Turn the adjuster bolt (A) counterclockwise to loosen. The 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.
- Turn the adjuster bolt (A) clockwise to tighten. The 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 in 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.

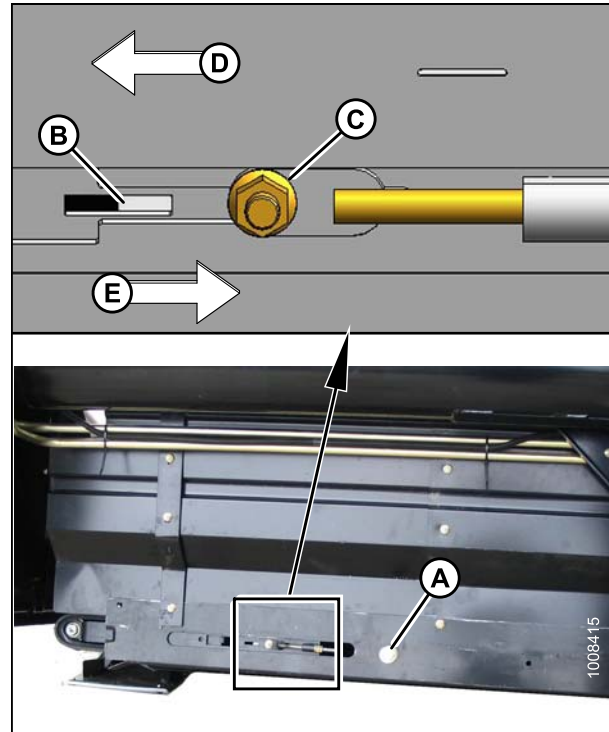


Figure 5.106: Left Adjuster Shown – Right Opposite

5.7.4 Adjusting Header Draper Tracking

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.

CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing, page 115](#).

MAINTENANCE AND SERVICING

Table 5.1 Header Draper Tracking

Tracking	At Location	Adjustment	Method
Backward	Drive Roller	Increase X	Tighten nut (C)
Forward		Decrease X	Loosen nut (C)
Backward	Idler Roller	Increase Y	Tighten nut (C)
Forward		Decrease Y	Loosen nut (C)

1. Refer to Table 5.1 Header Draper Tracking, page 175 to determine which roller requires adjustment and which adjustments are necessary.

NOTE:

To change **X**, adjust the back end of the roller using the adjuster mechanism at the inboard end of the deck.

2. Adjust the **DRIVE** roller at **X** as follows:
 - a. Loosen nuts (A) and jam nut (B).
 - b. Turn the adjuster nut (C).

3. Adjust the **IDLER** roller **Y** as follows:
 - a. Loosen nut (F) and jam nut (G).
 - b. Turn the adjuster nut (H).

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.

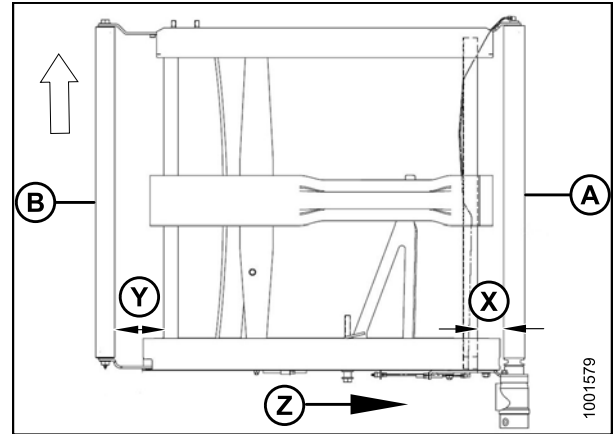


Figure 5.107: Draper Tracking Adjustments

A - Drive Roller B - Idler Roller C - Draper Direction
X - Drive Roller Adjust Y - Idler Roller Adjust

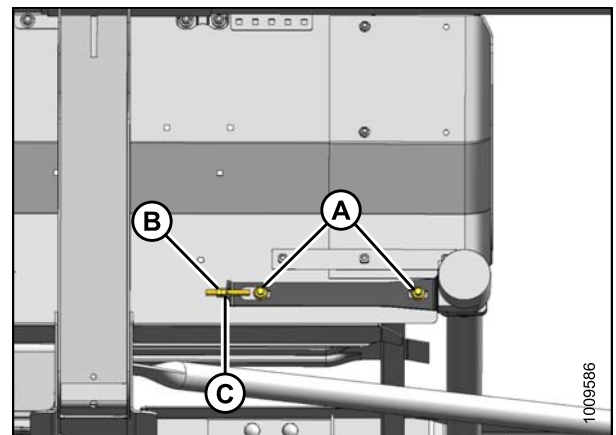


Figure 5.108: Left Side Drive Roller

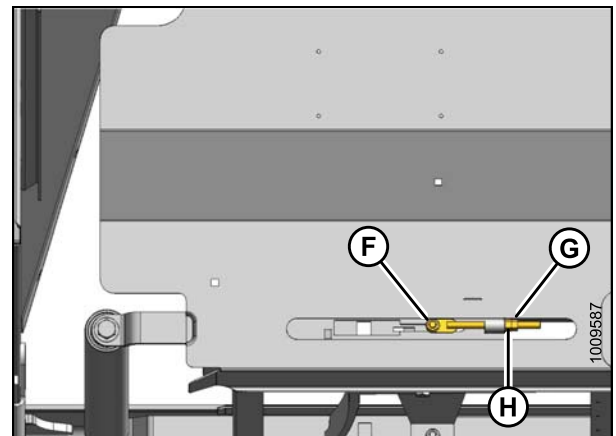


Figure 5.109: Left Side Idler Roller

5.7.5 Adjusting Deck Height

Maintain the deck height so that the draper runs just below the cutterbar. With a new header or newly installed draper, set the initial gap to 3 mm (0.12). To prevent material from entering the drapers and cutterbar, you may need to decrease the deck clearance to 0–1 mm (0–0.04 in.) after the initial break-in period of approximately 50 hours.

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. Check the deck height and ensure the draper (B) runs just below the cutterbar (C) with a gap (A) of 3 mm (0.12 in.) between the top of the draper and the cutterbar. If the draper is used, the gap (A) should be 1–2 mm (0.04–0.07 in.)

NOTE:

Measurement is at the supports with the header in working position and the decks fully forward.

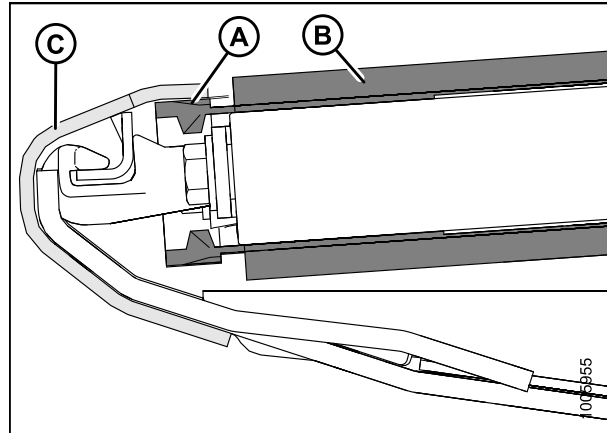


Figure 5.110: Draper Seal

3. Loosen the draper tension. Refer to [5.7.3 Adjusting Draper Tension, page 172](#).
4. Lift the front edge of the draper (A) past the cutterbar (B) to expose the deck support.

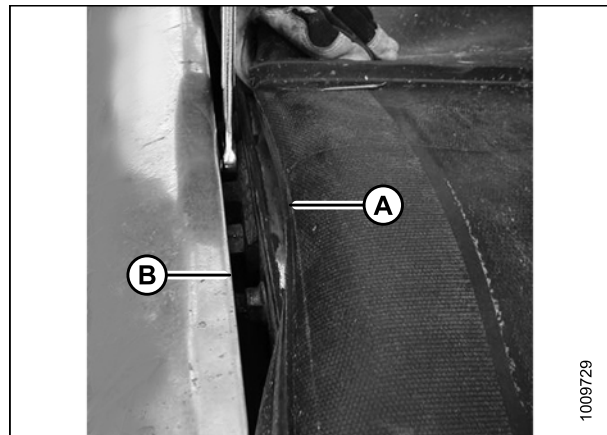


Figure 5.111: Draper Adjustment

MAINTENANCE AND SERVICING

- Loosen the two lock nuts (A) on the deck support (B) **one-half turn only**.

NOTE:

The number of deck supports (B) is determined by the header size: four on single reels, and eight on double reels.

- Tap the deck (C) to lower the deck relative to the deck supports. Tap the deck support (B) using a punch to raise the deck relative to the deck supports.

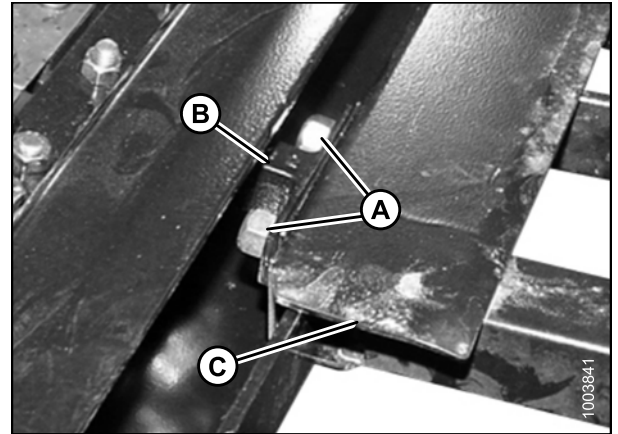


Figure 5.112: Deck Support

- On the draper, measure the draper thickness at the sealing location. Add 1–2 mm (0.04–0.07 in.) for used drapers, to the measurement of draper sealing location. Set deck (A), so that gap (B) is equal to the draper sealing location thickness, plus 1–2 mm (0.04–0.07 in.) below the top of the cutterbar (C).
- Tighten the deck support hardware (D).
- Recheck gap (B) to ensure it is equal to the draper sealing location thickness plus 1–2 mm (0.04–0.07 in.).
- Tension the draper. Refer to [5.7.3 Adjusting Draper Tension, page 172](#).

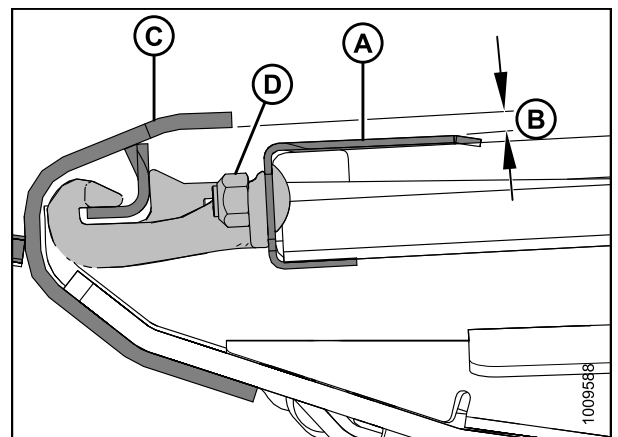


Figure 5.113: Deck Support

- Adjust the backsheet deflector (A) (if required) by loosening nut (D) and moving the deflector until there is a 1–7 mm (0.04–0.28 in.) gap (C) between the draper (B) and the deflector.

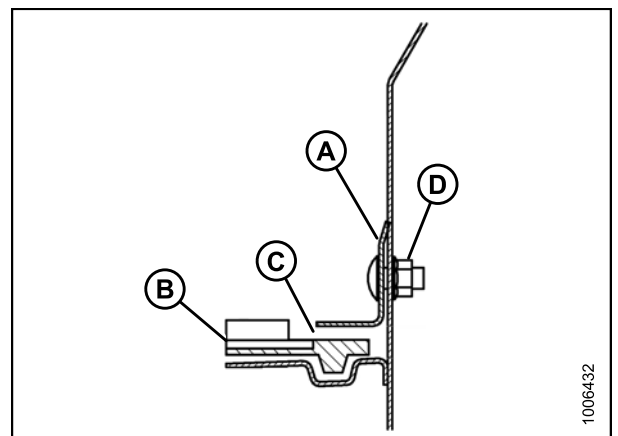


Figure 5.114: Backsheet Deflector

5.7.6 Header 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 three minutes.
2. Check the temperature of the draper roller bearings at each of the roller arms (A), (B), and (C) on each deck. Ensure the temperature does not exceed 80°F (44°C) above the ambient temperature.

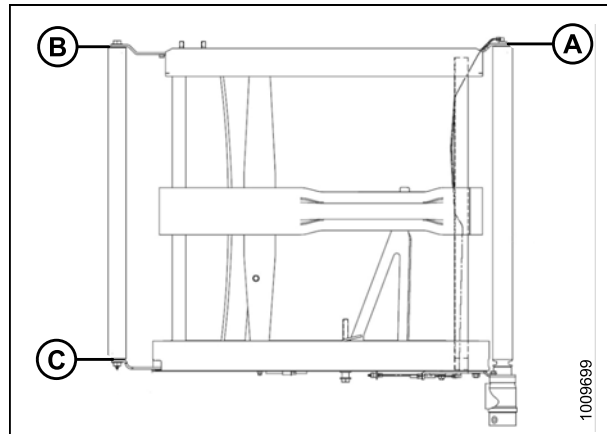


Figure 5.115: Roller Arms

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 connector 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.

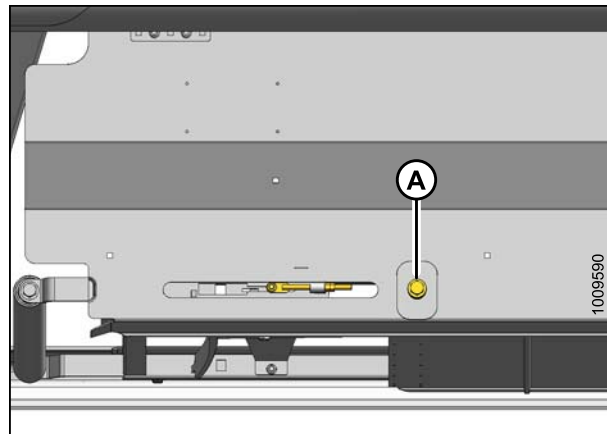


Figure 5.116: Tensioner

MAINTENANCE AND SERVICING

5. Remove the screws (A), tube connectors (B), and nuts from the draper joint to uncouple the draper.
6. Pull the draper off the idler roller.

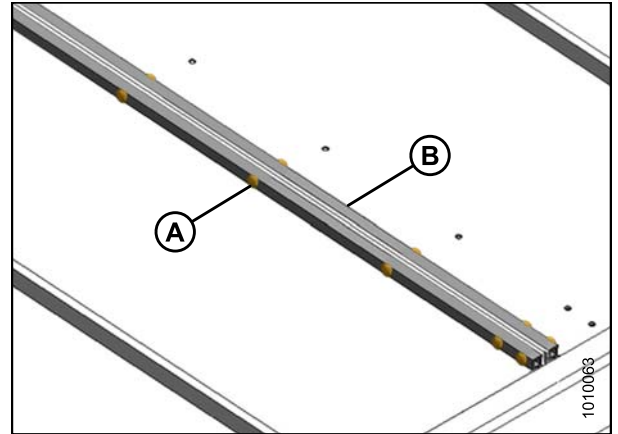


Figure 5.117: Draper Connector

7. Remove the bolts (A) and washer at the ends of the idler roller.
8. Spread the roller arms (B) and (C) and remove the idler roller.

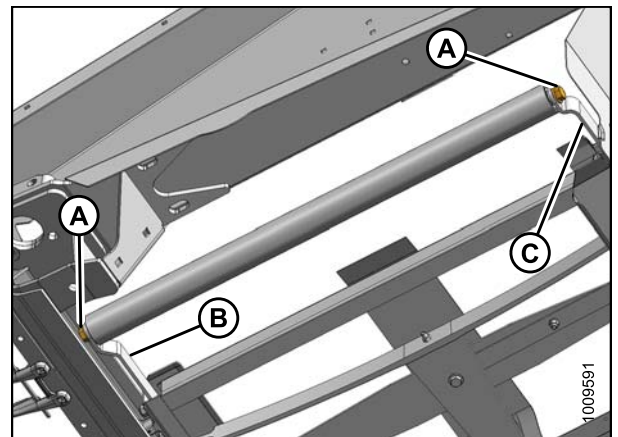


Figure 5.118: Idler Roller

Replacing Draper Idler Roller Bearing

1. Remove the draper idler roller assembly. Refer to [Removing Draper Idler Roller, page 178](#).

MAINTENANCE AND SERVICING

2. Remove the bearing assembly (A) and seal (B) from the roller tube (C) as follows:
 - a. Attach a slide hammer (D) to the threaded shaft (E) in the bearing assembly.
 - b. Tap out the bearing assembly (A) and seal (B).
3. Clean the inside of the roller tube (C), check the tube for signs of wear or damage, and replace if necessary.

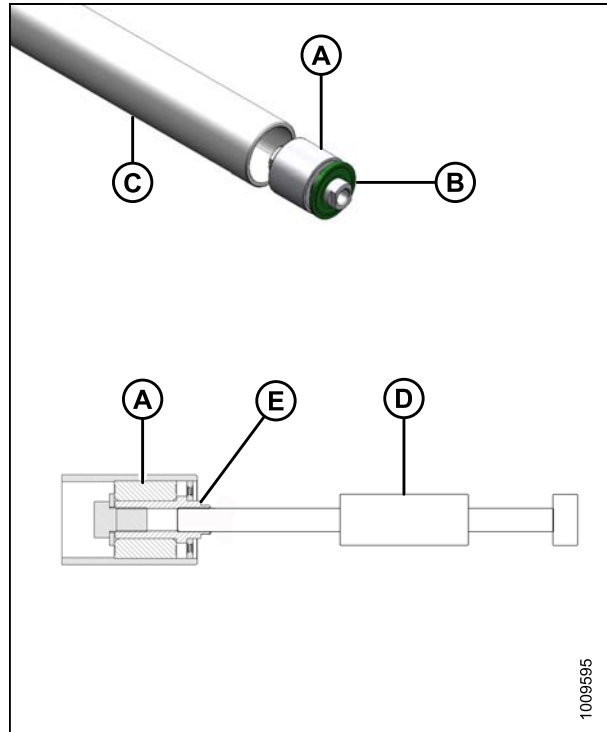


Figure 5.119: Idler Roller Bearing

4. Install the 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 eight cc or eight pumps of grease in front of the bearing assembly (A). Refer to [5.2.1 Recommended Fluids and Lubricants](#), page 116.
6. Install a new seal (C) at the roller opening.
7. Tap the seal (C) into the roller opening with a suitably sized socket. Tap it until the seal is 3–4 mm (0.12–0.16 in.) (D) from the outside edge of the tube.

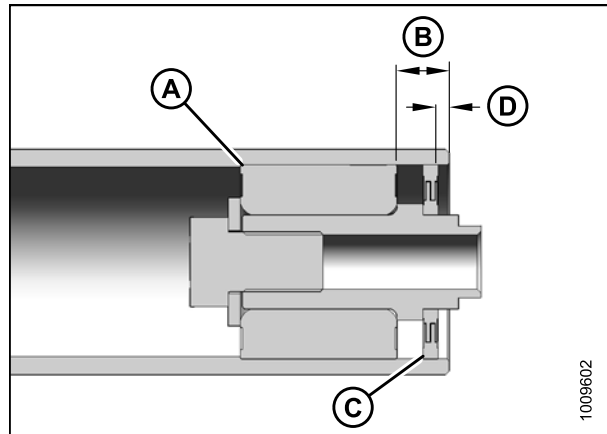


Figure 5.120: Idler Roller Bearing

Installing Draper Idler Roller

1. Position the stub shaft into the idler roller in the 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 the rear arm (C).
3. Install bolts (A) with washers, and torque to 93 N·m (70 ft lbf).
4. Wrap the draper over the idler roller, close the draper, and set the tension. Refer to [5.7.2 Installing Header Drapers, page 170](#).
5. Run the machine and verify the draper tracks correctly. Adjust the draper tracking if required. Refer to [5.7.4 Adjusting Header Draper Tracking, page 174](#).

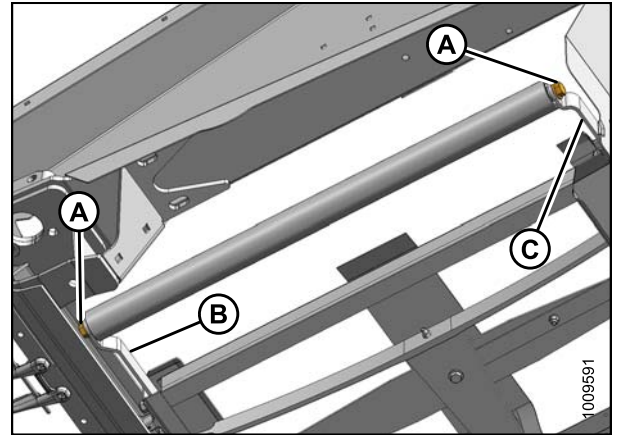


Figure 5.121: Idler Roller

Removing Draper 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 connector 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. Loosen the draper by turning the adjuster bolt (A) counterclockwise.

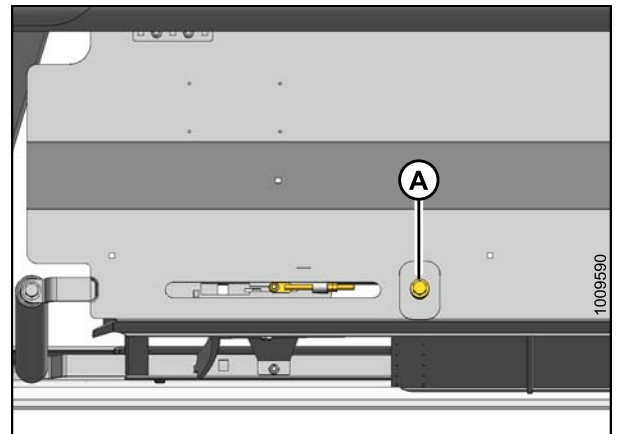


Figure 5.122: Tensioner

MAINTENANCE AND SERVICING

4. Remove the tube connectors (B), screws (A), and nuts from the draper joint to uncouple the draper.
5. Pull the draper off the drive roller.

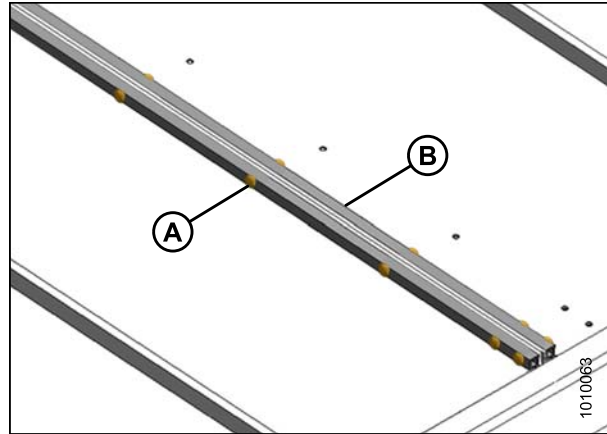


Figure 5.123: Draper Connector

6. Align the setscrews with the hole (A) in the guard. Remove the two setscrews holding the motor onto the drive roller.

NOTE:

The setscrews are 1/4 turn apart.

7. Remove the four bolts (B) securing the motor to the drive roller arm.

NOTE:

It may be necessary to remove the plastic shield (C) to gain access to the top bolt.

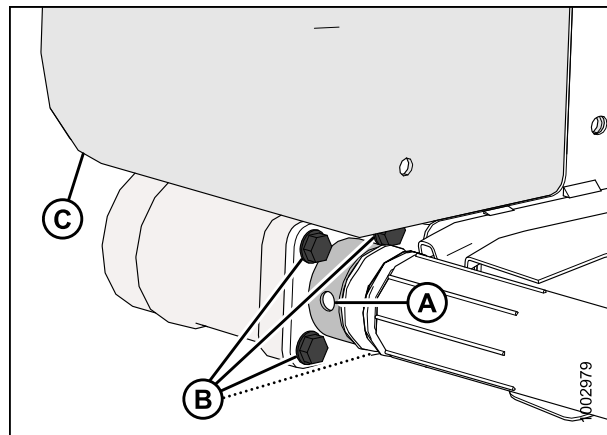


Figure 5.124: Drive Roller

8. Remove the bolt (A) securing the opposite end of the drive roller (B) to the support arm.
9. Remove the drive roller (B).

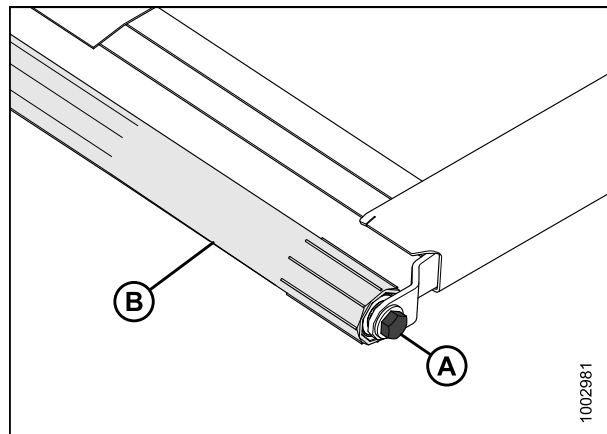


Figure 5.125: Drive Roller

Replacing Draper Drive Roller Bearing

1. Remove the draper idler roller assembly. Refer to [Removing Draper Drive Roller, page 181](#).

MAINTENANCE AND SERVICING

2. Remove the bearing assembly (A) and seal (B) from the roller tube (C) as follows:
 - a. Attach a slide hammer (D) to the threaded shaft (E) in the bearing assembly.
 - b. Tap out the bearing assembly (A) and seal (B).
3. Clean the inside of the roller tube (C), check the tube for signs of wear or damage, and replace if necessary.

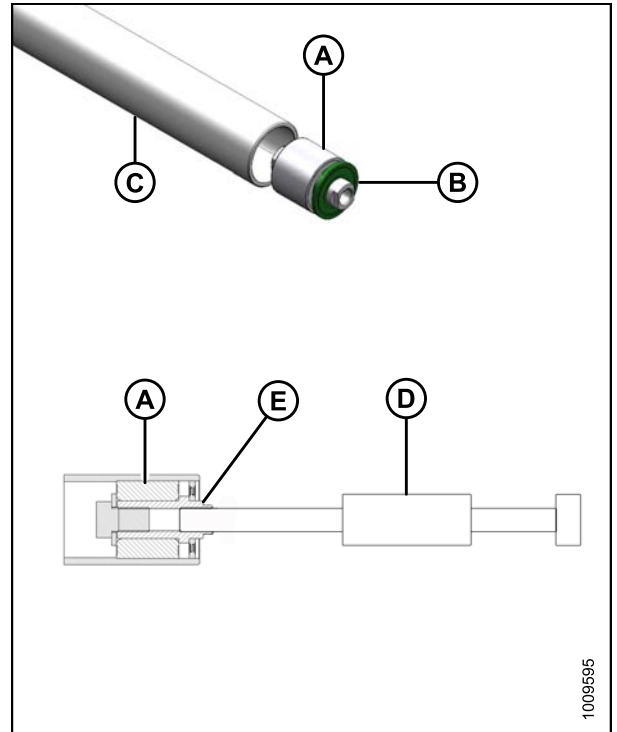


Figure 5.126: Idler Roller Bearing

4. Install the 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 eight cc or eight pumps of grease in front of the bearing assembly (A). Refer to [5.2.1 Recommended Fluids and Lubricants](#), page 116.
6. Install a new seal (C) at the roller opening.
7. Tap the seal (C) into the roller opening with a suitably sized socket. Tap it until the seal is 3–4 mm (0.12–0.16 in.) (D) from the outside edge of the tube.

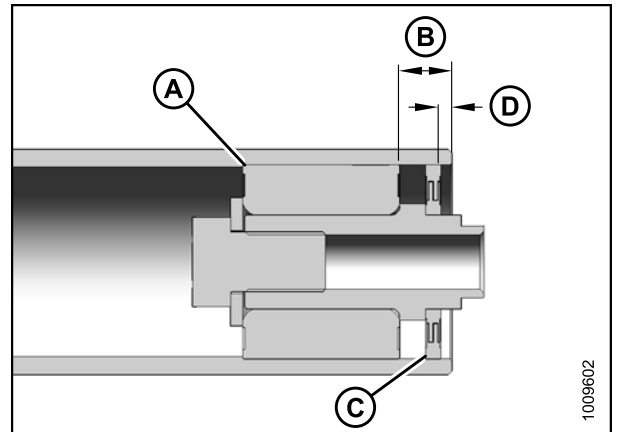


Figure 5.127: Idler Roller Bearing

MAINTENANCE AND SERVICING

7. 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 172](#).
8. Disengage the reel and header safety props.
9. Start the engine and lower the header and reel.
10. Run the machine to verify the draper tracks correctly. Refer to [5.7.4 Adjusting Header Draper Tracking, page 174](#) if further adjustment is necessary.

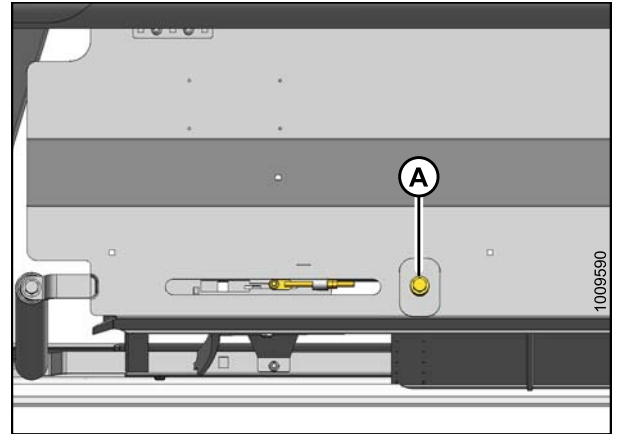


Figure 5.131: Draper Tensioner

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 windrower.
3. Stop engine, remove key, and engage reel safety props.
4. Open endshield. Refer to [Opening Endshield, page 33](#).
5. Loosen nuts (A) on cutterbar until retainer (B) is loose.

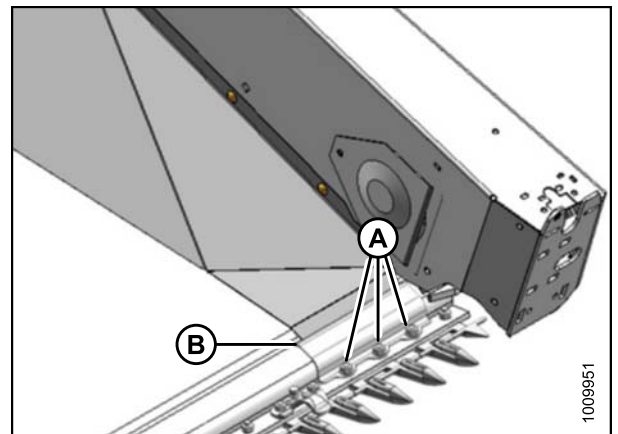


Figure 5.132: Deflector Retainer

MAINTENANCE AND SERVICING

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).

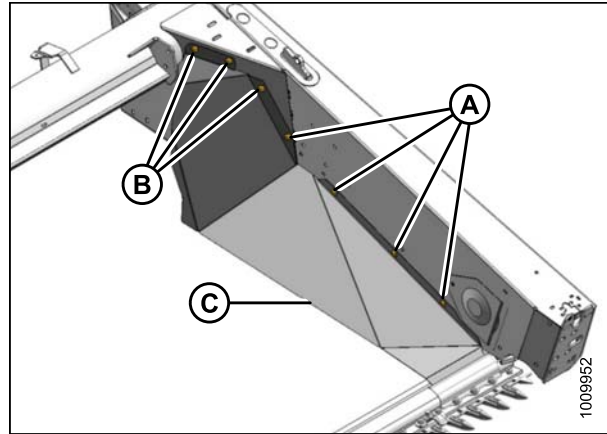


Figure 5.133: Wide Deflector

8. Remove bolts (A) and remove deflector support (B).
9. Replace lower bolt (A) (if not reinstalling support [B]) to secure belt guide (C) to opposite side of endsheet.
10. Repeat for opposite end of header.

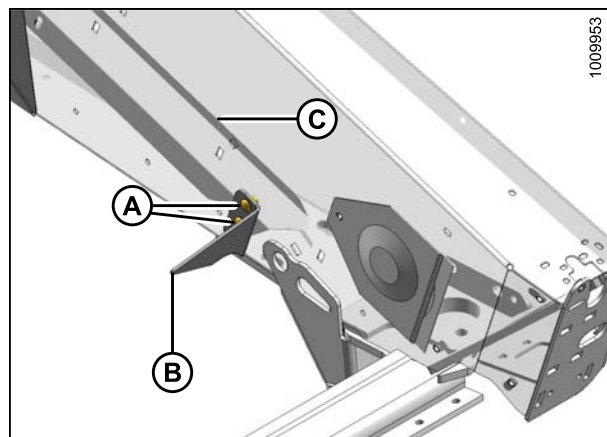


Figure 5.134: Deflector Support

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. Refer to [Opening Endshield, page 33](#).
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. Locate support (D) as shown and re-install 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.

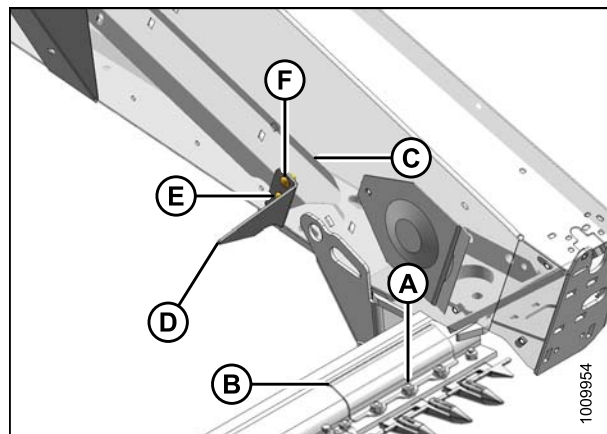


Figure 5.135: Deflector Support

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 N·m (65 lbf ft).

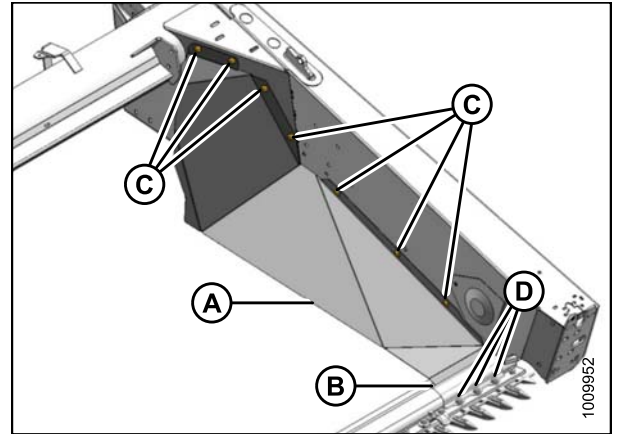


Figure 5.136: Wide Deflector

13. Adjust position of support (A) so that tip contacts the deflector (B). Tighten bolts (C).
14. Repeat above steps for opposite end.
15. Close endshield. Refer to [Closing Endshield, page 34](#).

After setting the recommended reel clearance to cutterbar, while reel is still fully lowered, move reel back to ensure steel end fingers do not contact the deflector shields. If contact is detected, adjust reel upward until contact to deflector shields is avoided at all reel fore/aft positions. Alternatively, with the reel fully lowered, trim the steel end fingers until contact to deflector shields is avoided at all reel fore/aft positions. Periodically monitor to ensure contact is avoided and repeat procedure if necessary.

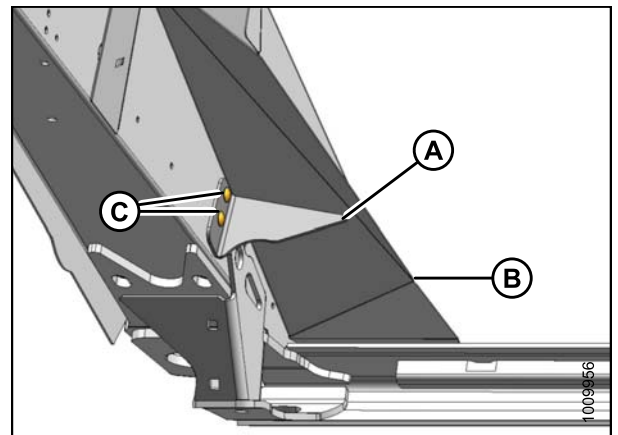


Figure 5.137: Deflector Support

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. Refer to [Opening Endshield, page 33](#).
5. Remove two Torx® head screws (A) and lock nuts.
6. Remove three carriage bolts (B) and lock nuts and remove the aft deflector (C).

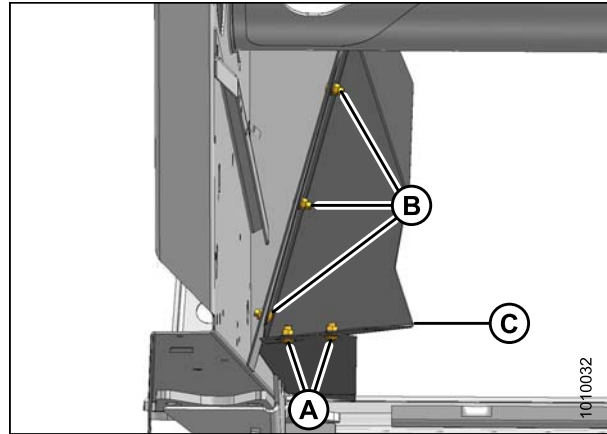


Figure 5.138: Aft Deflector

7. Remove four screws (A) and remove the deflector (B).
8. Repeat for the opposite end of the header.

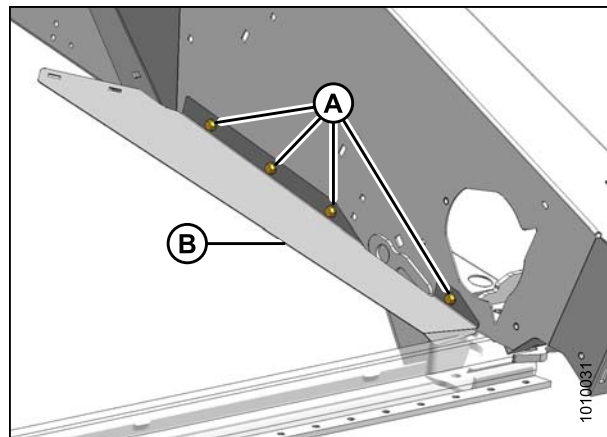


Figure 5.139: Forward Deflector

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.

MAINTENANCE AND SERVICING

4. Open the endshield. Refer to [Opening Endshield, page 33](#).
5. Position the 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 the 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 (A) and tighten all four screws.
8. Position the 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.

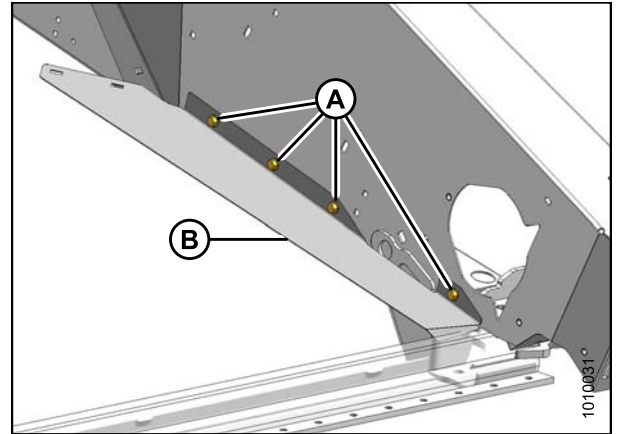


Figure 5.140: Forward Deflector

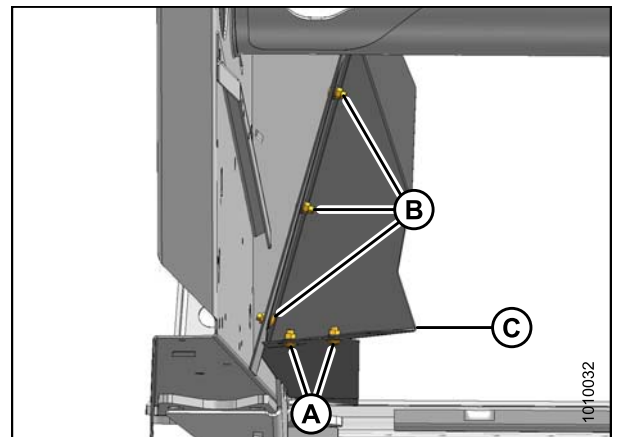


Figure 5.141: Aft Deflector

5.8 Reel

CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing, page 115](#).

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 adjusted 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 the reel fully lowered are shown in [Table 5.2 Finger to Guard/Cutterbar Clearance, page 190](#).

Table 5.2 Finger to Guard/Cutterbar Clearance

Header Width	(X) +/- 3 mm (1/8 in.) at Reel Ends	
	Single Reel	Double Reel
15 ft.	20 mm (3/4 in.)	—
20 ft.		
25 ft.	25 mm (1 in.)	20 mm (3/4 in.)
30 ft.	45 mm (1-3/4 in.)	
35 ft.	60 mm (2-3/8 in.)	
40 ft.	—	

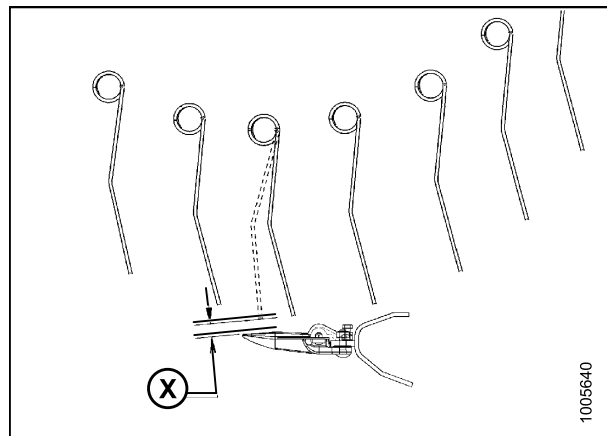


Figure 5.142: Finger Clearance

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 header on level ground.

MAINTENANCE AND SERVICING

2. Set fore-aft position to middle position (5) on fore-aft position decal (A).
3. Lower reel fully.
4. Shut down engine and remove key from the ignition.

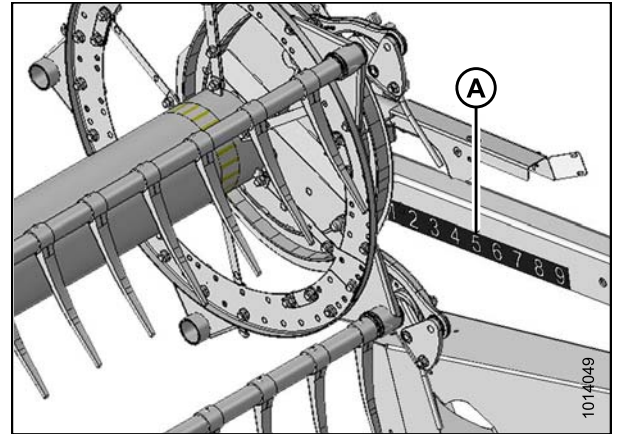


Figure 5.143: Fore-Aft Position

5. Measure clearance (X) between points (B) and (C) at ends of each reel (A).

NOTE:

The reel is factory-set to provide more clearance at center of reel than at ends (frown) to compensate for reel flexing.

6. Check all possible points of contact between points (B) and (C). Depending on reel fore-aft position, minimum clearance can result at guard tine, hold-down, or cutterbar.
7. Adjust reel if necessary. Refer to [Adjusting Reel Clearance, page 192](#).

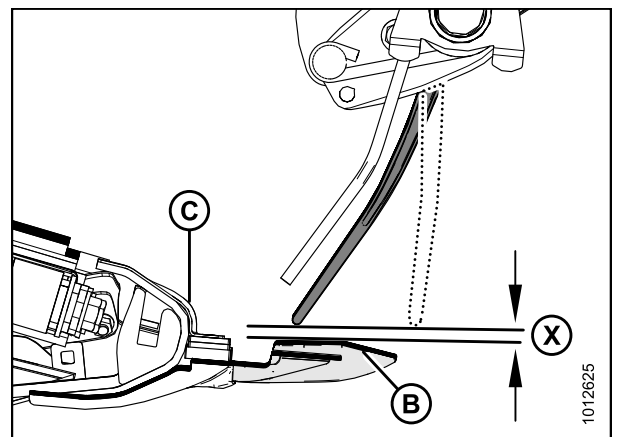


Figure 5.144: Reel Clearance

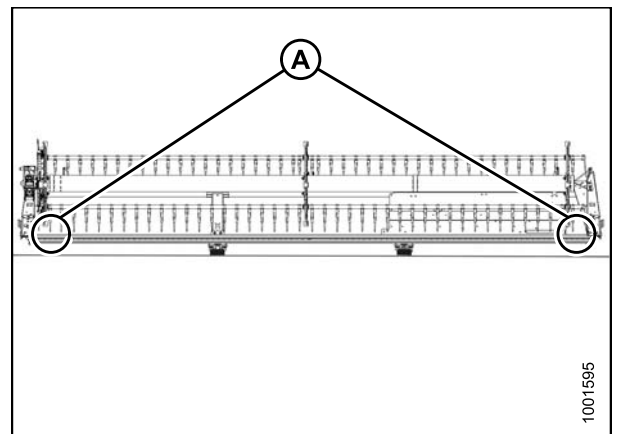


Figure 5.145: Single-Reel Measurement Locations (Two Places)

A - Clearance Points

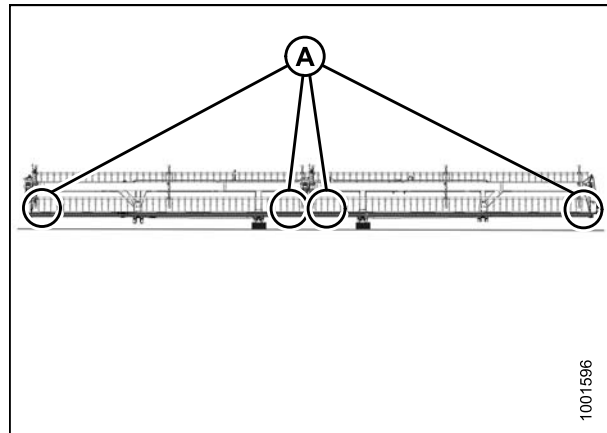


Figure 5.146: Double-Reel Measurement Locations (Four Places)

A - Clearance Points

Adjusting Reel Clearance

Perform this procedure with reel at mid-point 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.

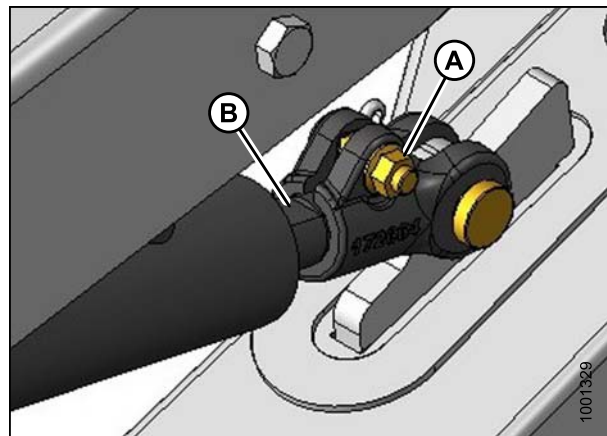


Figure 5.147: Outboard Reel Arm

MAINTENANCE AND SERVICING

2. **For Double Reel Only:** 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).
3. Move reel back to ensure steel end fingers don't 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.

After setting the recommended reel clearance to cutterbar, while reel is still fully lowered, move reel back to ensure steel end fingers do not contact the deflector shields. If contact is detected, adjust reel upward until contact to deflector shields is avoided at all reel fore/aft positions. Alternatively, with the reel fully lowered, trim the steel end fingers until contact to deflector shields is avoided at all reel fore/aft positions. Periodically monitor to ensure contact is avoided and repeat procedure if necessary.

5.8.2 Reel Frown

The reel is factory-set to provide more clearance at the center of the reel than at the ends ('frown') 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.

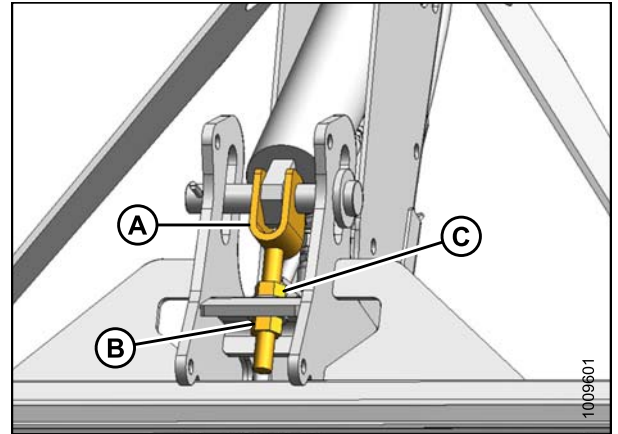


Figure 5.148: Looking Up at Arm Underside-Double Reel Only

MAINTENANCE AND SERVICING

1. Position the reel over the cutterbar (between '4' and '5' on the fore-aft position decal) (A).
2. Record the measurement at each reel disc location for each reel tine tube.

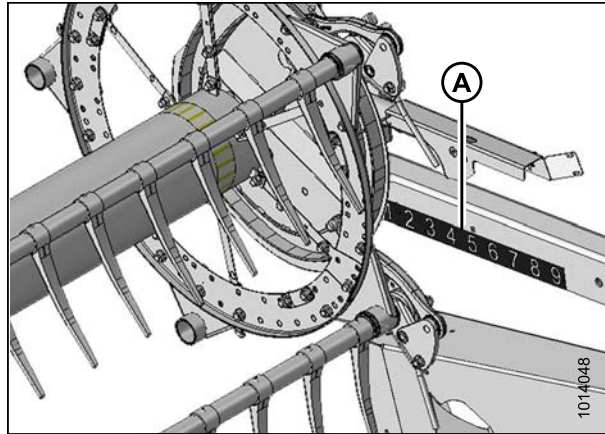


Figure 5.149: Fore-Aft Position Decal

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 the 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 locate the hardware accordingly.

- c. Reinstall the bolts (A) in the aligned holes and tighten.

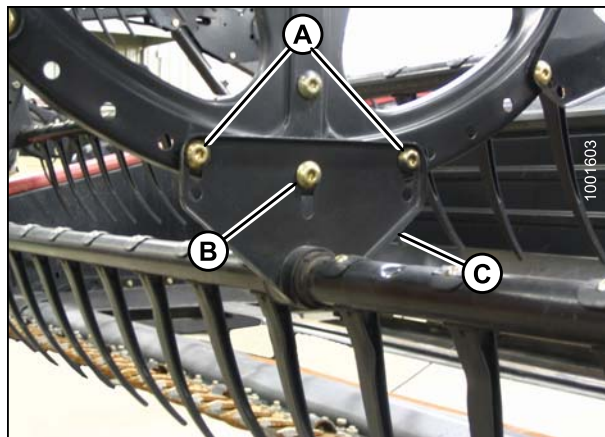


Figure 5.150: Reel Arm

5.8.3 Centering Reel

Center reel between endsheets.

Centering Double Reel

1. Start engine and set cutterbar height at approximately 150 mm (6 in) above the ground.
2. Stop engine and remove key from ignition.
3. Measure clearances at locations (A) between reels and endsheets at both ends of header. The clearances should be same if reel is centered.

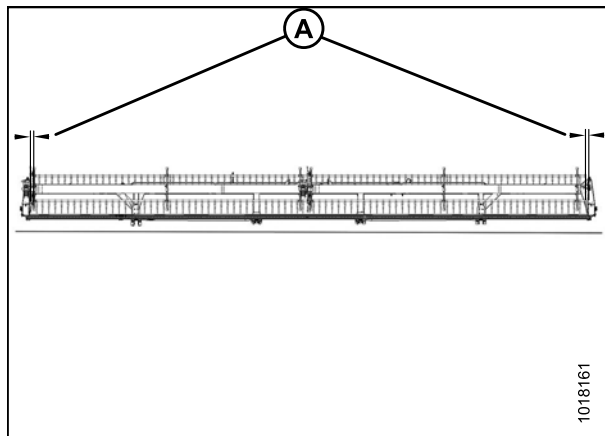


Figure 5.151: Double-Reel Measurement Locations

MAINTENANCE AND SERVICING

If adjustment is required:

4. Loosen bolt (A) on each brace (B).
5. Move forward end of reel center support arm (C) laterally as required to center both reels.
6. Tighten bolts (A) and torque to 359 N·m (265 ft·lbf).

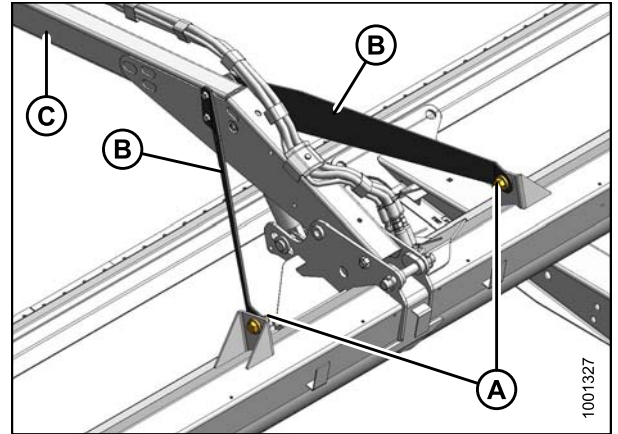


Figure 5.152: Reel Center Support Arm

Centering Single Reel

1. Start engine and set cutterbar height at approximately 150 mm (6 in) above the ground.
2. Stop engine and remove key from ignition.
3. Measure clearances at locations (A) between reels and endsheets at both ends of header. The clearances should be same if reel is centered.

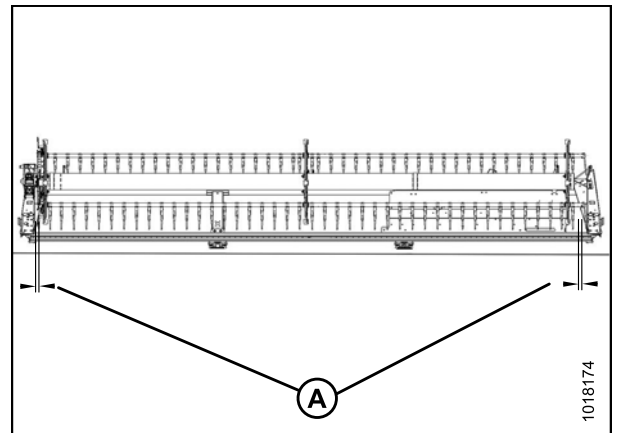


Figure 5.153: Header on Blocks

4. Loosen bolt (A) on brace (B) at both ends of the reel.
5. Move forward end of reel support arm (C) laterally as required to center reel.
6. Tighten bolts (A) and torque to 359 N·m (265 ft·lbf).

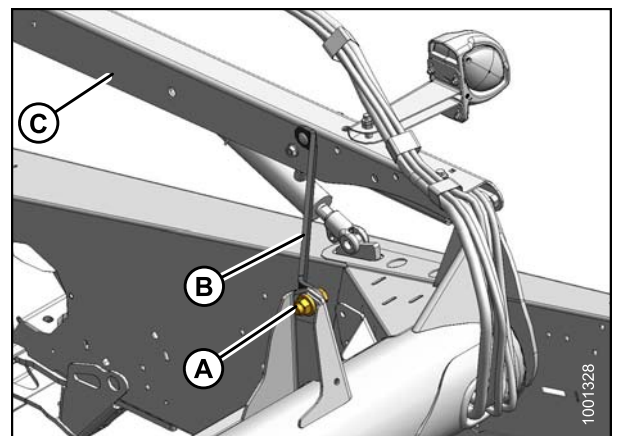


Figure 5.154: Reel Support Arm

5.8.4 Reel Tines

IMPORTANT:

Keep reel tines in good condition. Straighten or replace as required.

Removing Steel Tines

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. Refer to [Removing Bushings from Five-, Six-, or Nine-Bat Reels, page 198](#).
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 4., [page 196](#) (remove the reel arms [B] from the tine tubes as necessary).

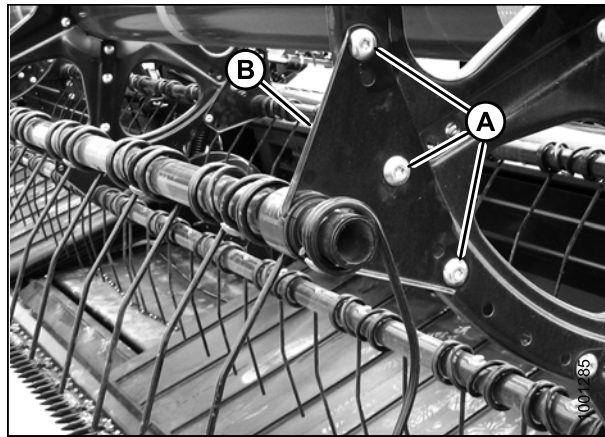


Figure 5.155: Reel Arm

Installing Steel Tines

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.

MAINTENANCE AND SERVICING

1. Remove the applicable tine. Refer to [Removing Steel Tines, page 196](#).
2. Slide the new tines and reel arm (A) onto the end of the tube.
3. Install the tine tube bushings. Refer to .
4. Attach the tines to the reel tine bar with bolts and nuts (B).

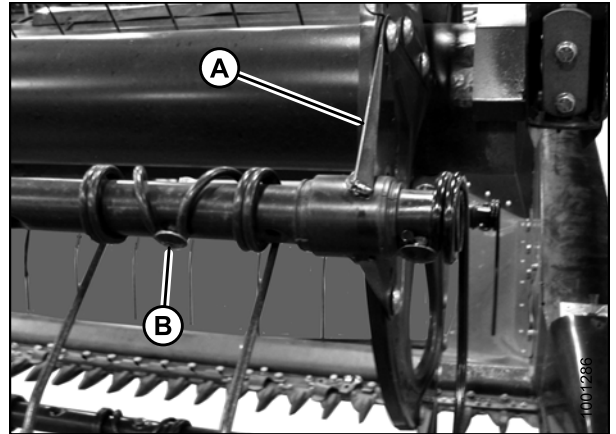


Figure 5.156: Reel Tine Tube

Removing Plastic Fingers

WARNING

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

1. Remove screw (A) using a Torx® Plus 27 IP socket wrench.

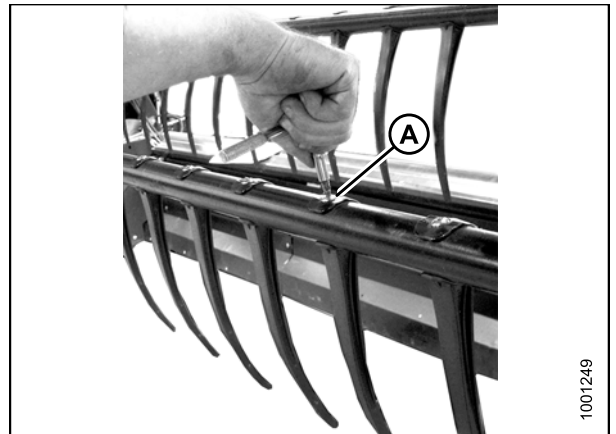


Figure 5.157: Removing Plastic Finger

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 5.158: Removing Plastic Finger

Installing Plastic Fingers

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 5.159: 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 the screw (A) using a Torx® Plus 27 IP socket wrench and torque to 8.5–9.0 N·m (75–80 in·lbf).

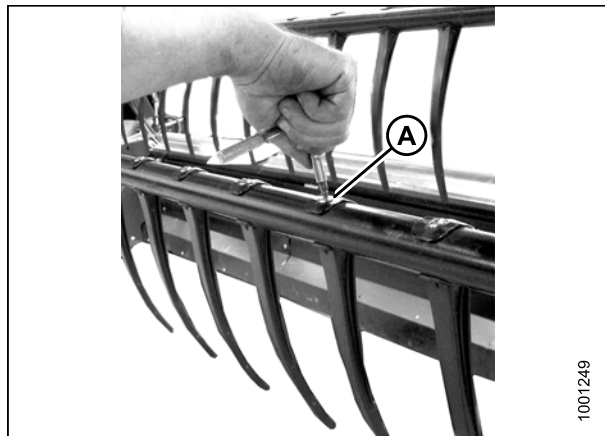


Figure 5.160: Installing Finger

5.8.5 Tine Tube Bushings

Removing Bushings from Five-, Six-, or Nine-Bat Reels

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 200.

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 the bolts (A) are reinstalled at the original locations.

5. Release the bushing clamps (A) using a small screwdriver to separate the serrations. Pull the clamp off the tine tube.

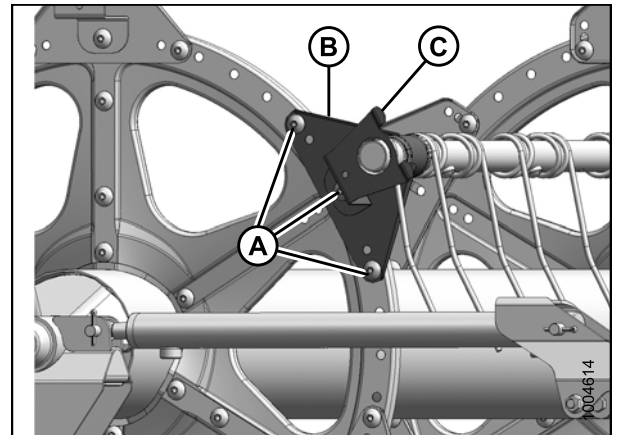


Figure 5.161: Tail End

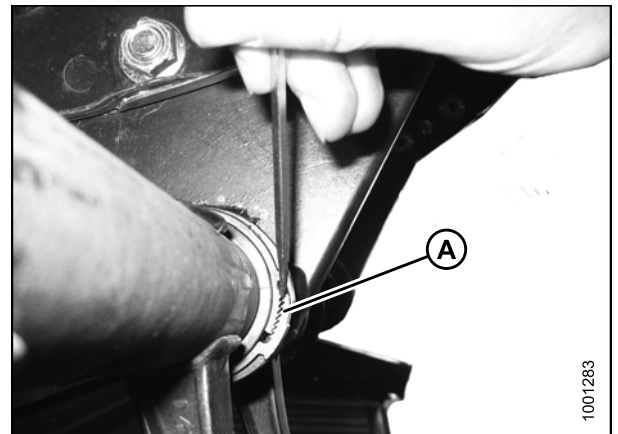


Figure 5.162: Bushing Clamp

6. Rotate the arm (A) until clear of the disc and slide the arm inboard off of bushing (B).
7. Remove the 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 197](#)
- [Removing Steel Tines, page 196](#)

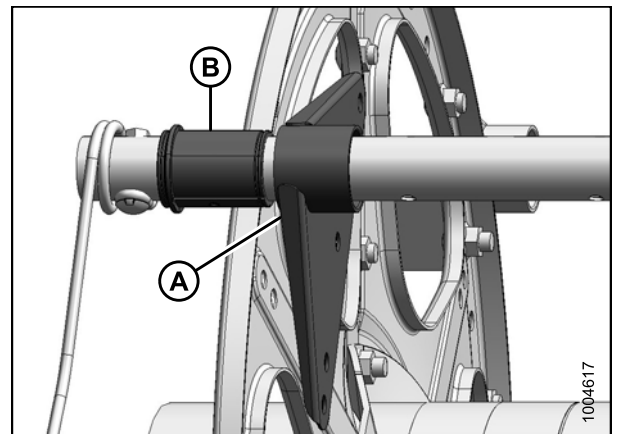


Figure 5.163: Bushing

MAINTENANCE AND SERVICING

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.

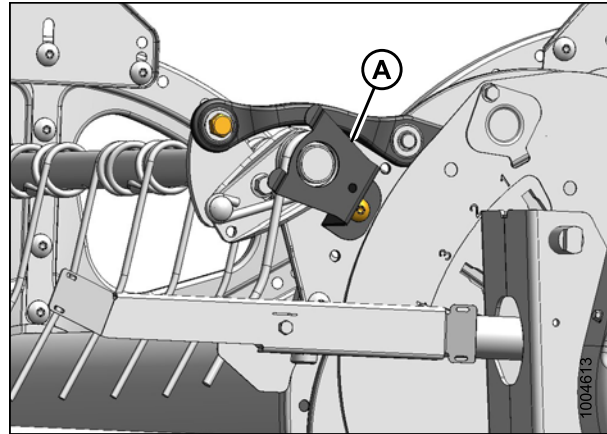


Figure 5.164: Cam End

9. Remove the reel endshields and endshield support (C) from the tail end of the reel at the applicable tine tube location.
10. Remove the bolts (A) securing the arms (B) to the tail and center discs.

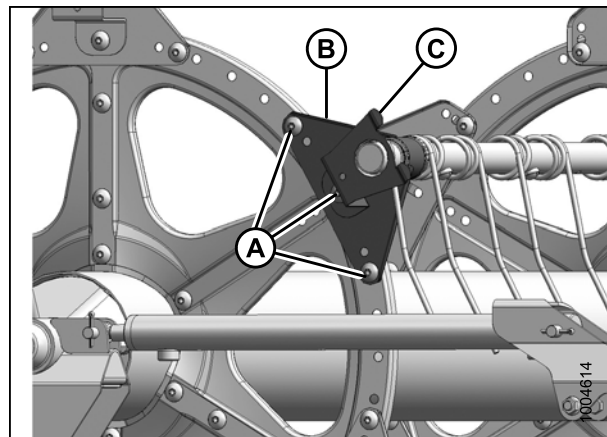


Figure 5.165: Tail End

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 (B) require channel disconnection and two tine tubes (C) require only bushing clamp removal.

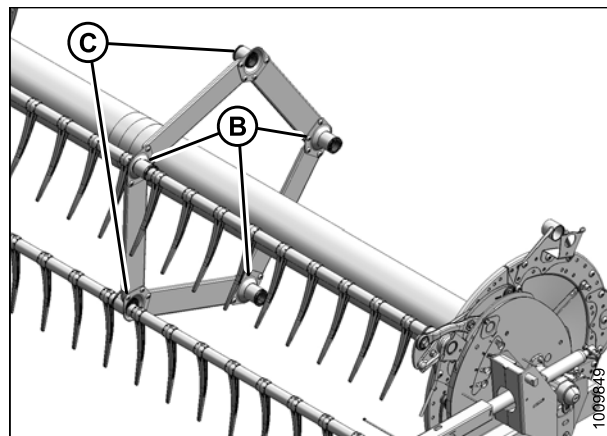


Figure 5.166: Tine Tube Supports

MAINTENANCE AND SERVICING

- Remove bolt (A) from the cam linkage so the tine tube (B) is free to rotate.

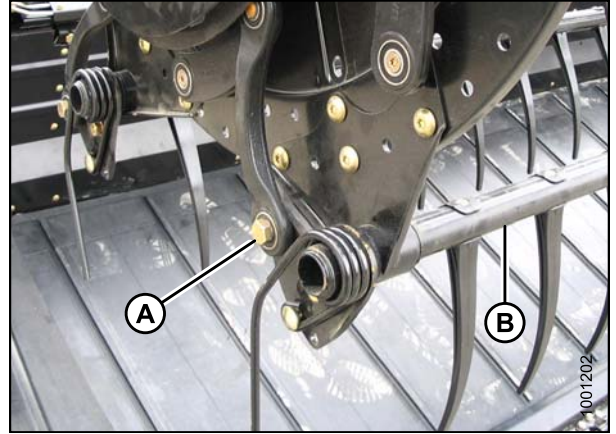


Figure 5.167: Cam End

- Release the bushing clamps (A) at the cam disc using a small screwdriver to separate the serrations. Move the clamps off the bushings.

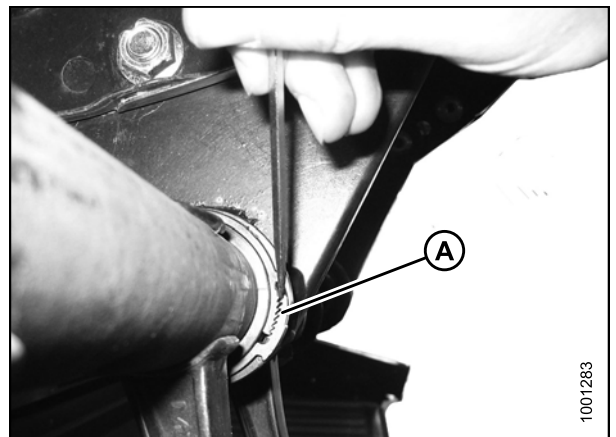


Figure 5.168: Bushing Clamp

- Slide the tine tube (A) outboard to expose the bushing (B).
- Remove the 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 197](#)
 - [Removing Steel Tines, page 196](#)

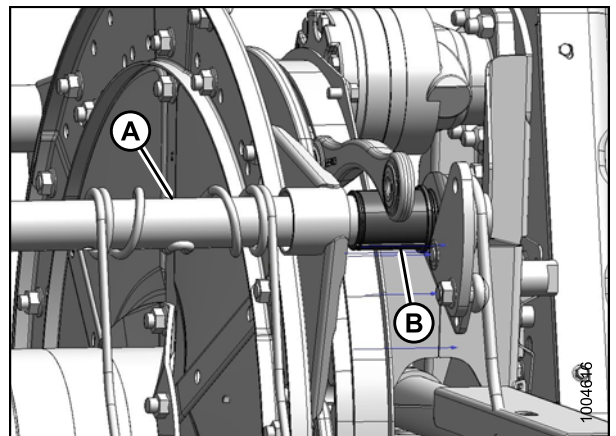


Figure 5.169: Cam End

MAINTENANCE AND SERVICING

Removing Tine Tube Support Bushings (If Installed)

16. Locate the support (A) that requires a new bushing.
17. Remove the four bolts (B) securing channels (C) to the support (A).
18. Remove screw (E) and remove the finger (D) if it is too close to the support to allow access to the bushing. Refer to [Removing Plastic Fingers, page 197](#).

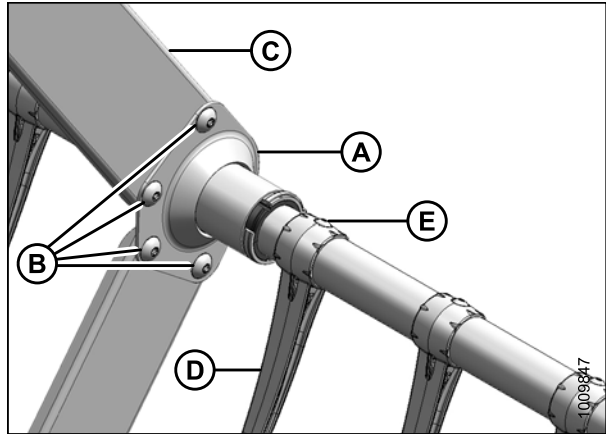


Figure 5.170: Tine Tube Support

19. Release the bushing clamps (A) using a small screwdriver to separate the serrations. Move the clamps off the bushings.

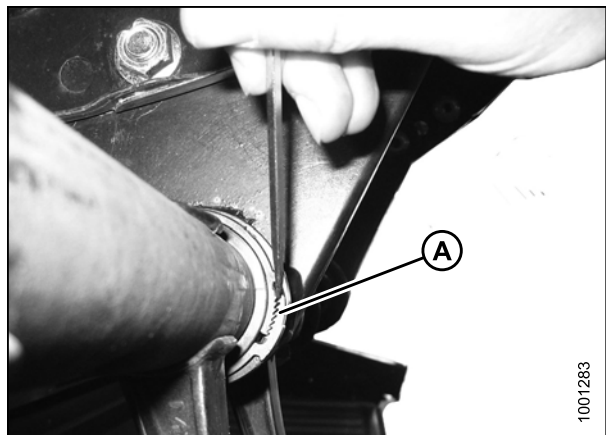


Figure 5.171: Bushing Clamp

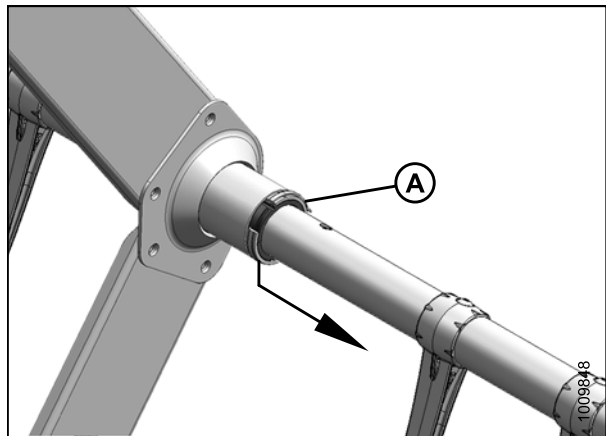


Figure 5.172: Bushing Clamp

MAINTENANCE AND SERVICING

20. Slide the support (A) off the bushing halves (B).

NOTE:

Two tine tubes have opposite supports (C).
Rotate the supports until the flanges clear the channels before moving them off the bushing (B).
Move the tine tube outwards slightly if necessary.

21. Remove the bushing halves (B).

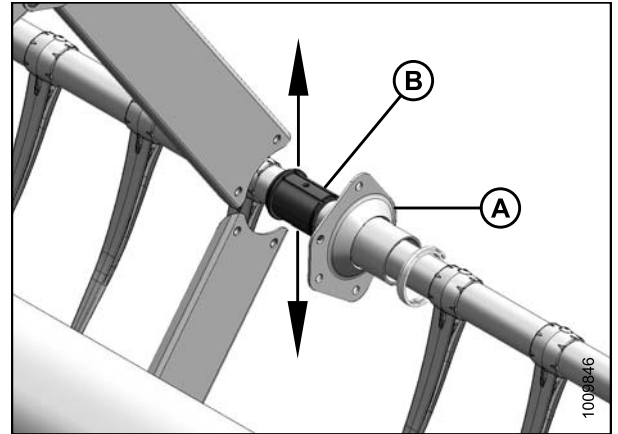


Figure 5.173: Support

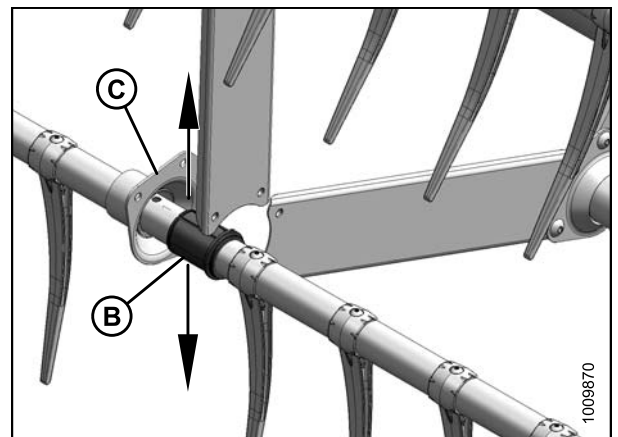


Figure 5.174: Opposite Support

Installing Bushings on Five-, Six-, or Nine-Bat Reels

⚠ 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.

MAINTENANCE AND SERVICING

NOTE:

Use a pair of modified channel lock pliers (A) to install bushing clamps (C). Secure pliers in a vice and grind a notch (B) into the end of each arm to fit the clamp as shown.

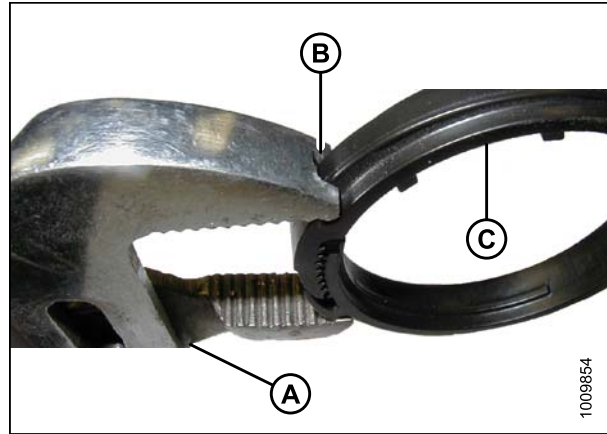


Figure 5.175: Modified Pliers

Installing Cam End Bushings

1. Position the 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 the tine tube.
2. Slide the tine tube (A) towards the tail end of the reel to insert the bushing (B) into the reel arm. 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 197](#)
 - [Removing Steel Tines, page 196](#)
4. Install the bushing clamp (A) onto the tine tube adjacent to the flangeless end of the bushing (B).
5. Position the clamp (A) on the 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.

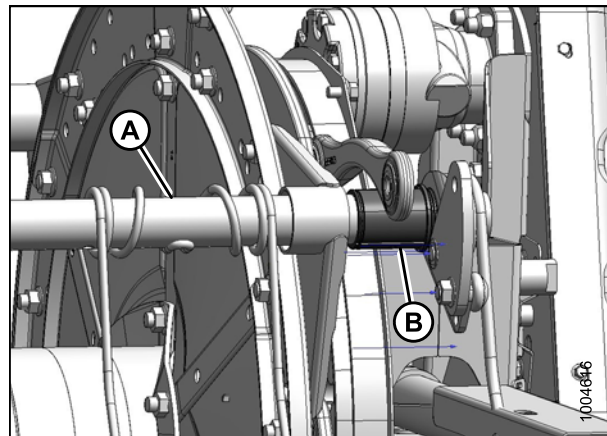


Figure 5.176: Cam End

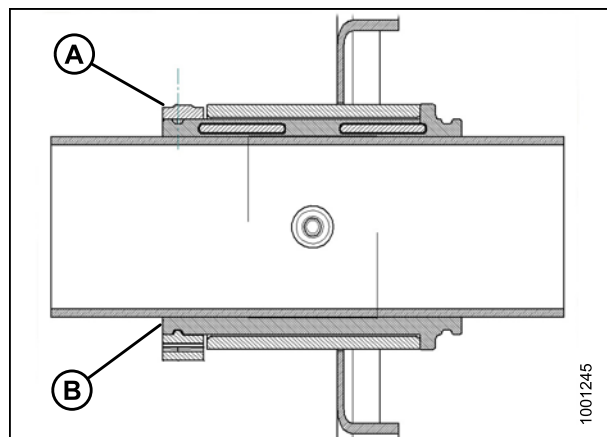


Figure 5.177: Bushing

MAINTENANCE AND SERVICING

6. Tighten the clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

IMPORTANT:

Over-tightening clamp may result in breakage.

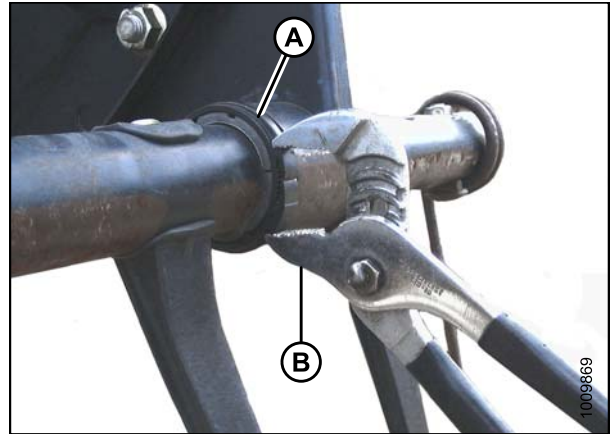


Figure 5.178: Installing Clamp

7. Line up the tine bar (B) with the cam arm and install bolt (A). Torque bolt to 120 ft·lbf (165 N·m).

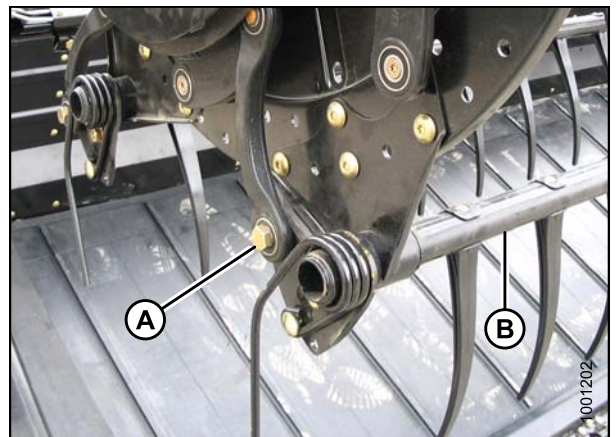


Figure 5.179: Cam End

8. Install the bolts (A) securing the arm (B) to the center disc.
9. Install the 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).

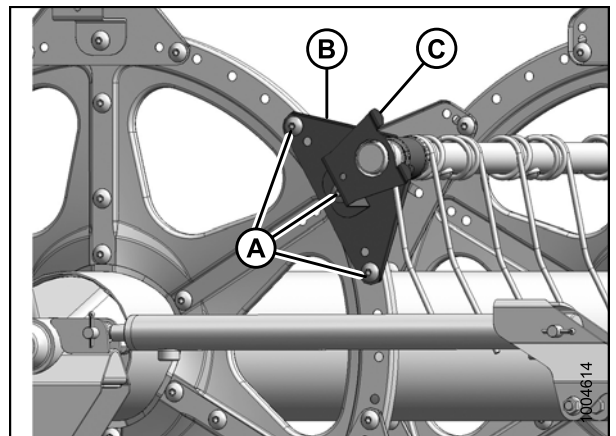


Figure 5.180: Tail End

MAINTENANCE AND SERVICING

10. Install the endshield support (A) at the applicable tine tube location at the cam end.
11. Reinstall the reel endshields. Refer to [5.8.6 Reel Endshields, page 210](#).

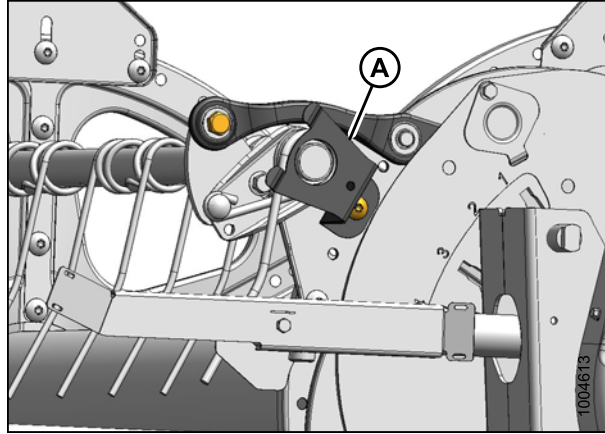


Figure 5.181: Cam End

Installing Center Disc and Tail End Bushings

12. Position the 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 the tine tube.
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 197](#)
 - [Removing Steel Tines, page 196](#)

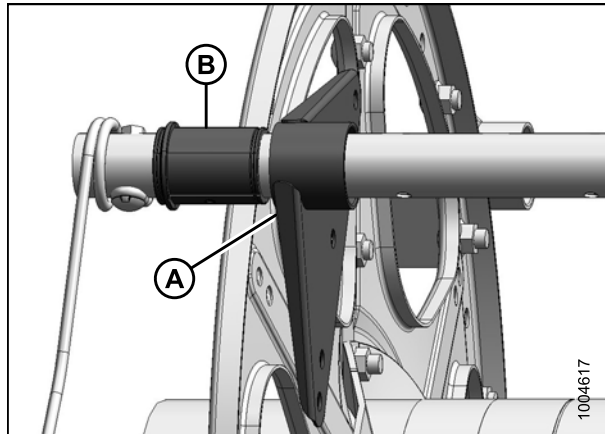


Figure 5.182: Tail End

15. Install the bushing clamp (A) onto the tine tube adjacent to the flangeless end of the bushing (B).
16. Position the clamp (A) on the 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.

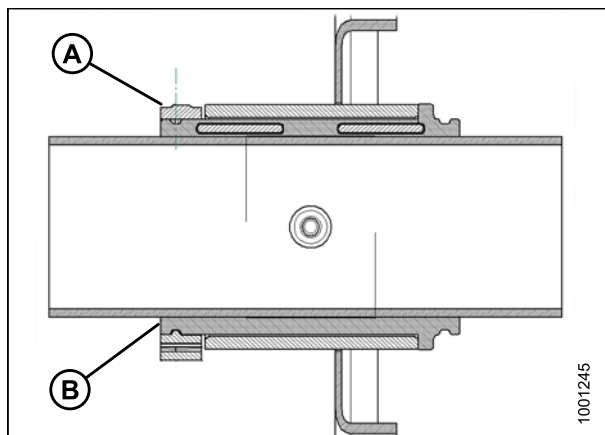


Figure 5.183: Bushing

MAINTENANCE AND SERVICING

17. Tighten the clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

IMPORTANT:

Over-tightening clamp may result in breakage.

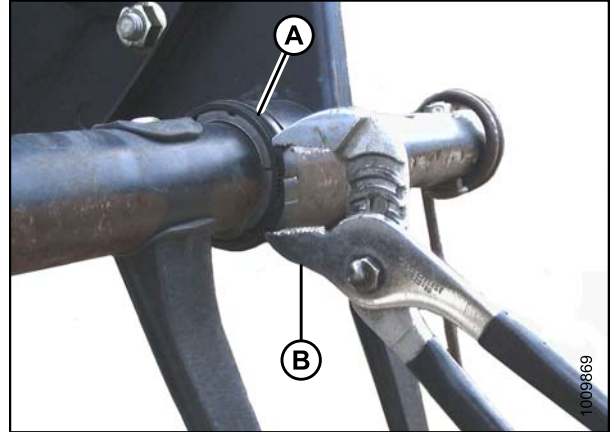


Figure 5.184: Installing Clamp

18. Install the bolts (A) securing the arm (B) to the center disc.
19. Install the 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).

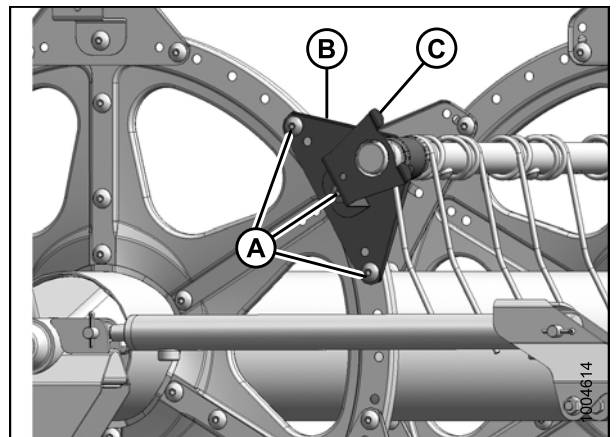


Figure 5.185: Tail End

MAINTENANCE AND SERVICING

Installing Tine Tube Support (If installed) Bushings

20. Position the 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 the tine tube.
21. Slide the support (C) onto the bushing (B). For the opposite tine tube, rotate the support (C) or slightly move the tine tube until it clears the channels (D).

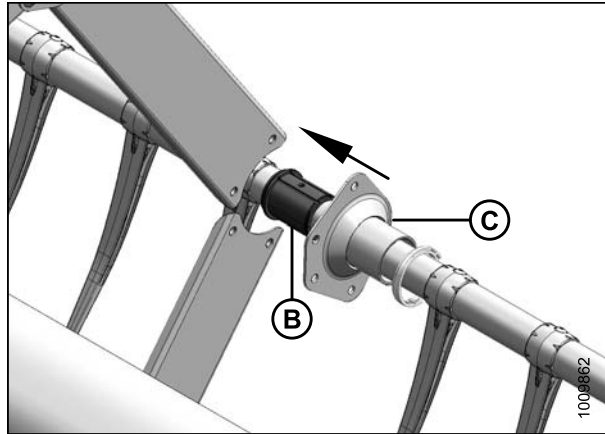


Figure 5.186: Tine Tube Support

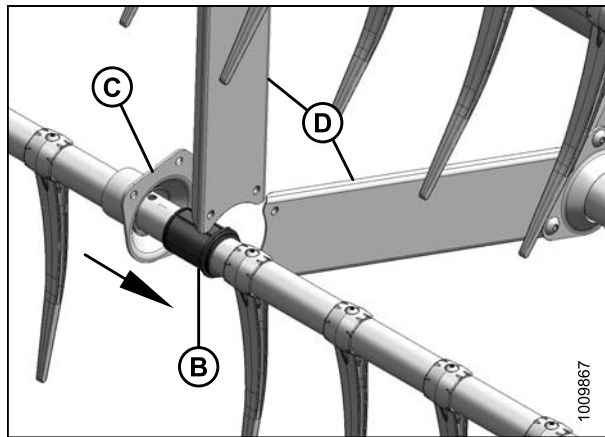


Figure 5.187: Opposite Support

22. Install the bushing clamp (A) onto the tine tube adjacent to the flangeless end of the bushing (B).
23. Position the clamp (A) on the 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.

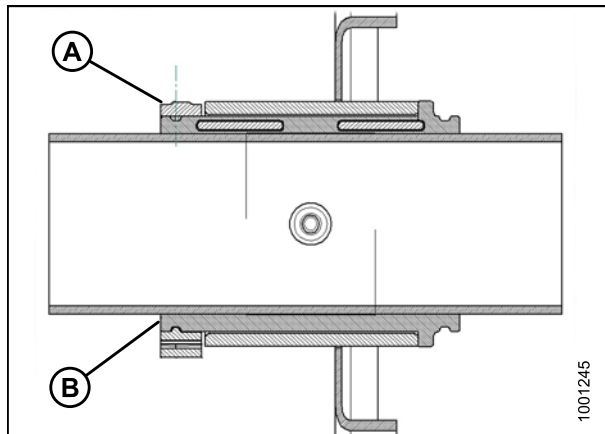


Figure 5.188: Bushing Clamp

MAINTENANCE AND SERVICING

24. Tighten the clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

IMPORTANT:

Over-tightening clamp may result in breakage.

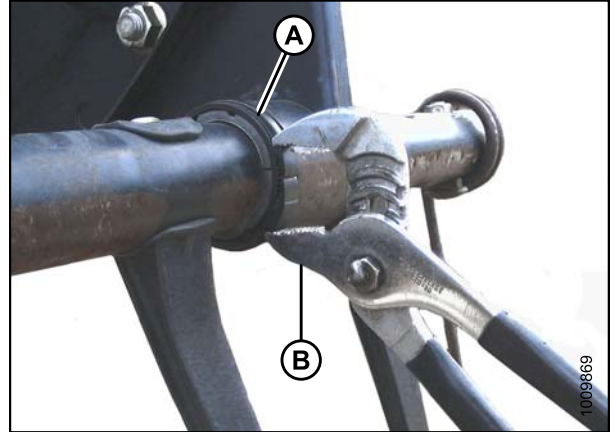


Figure 5.189: Installing Clamp

25. Reattach the channels (C) to the support (A) with screws (B) and nuts. Torque screws to 32 ft·lbf (43 N·m).
26. Reinstall any fingers (D) that were previously removed using screws (E). Refer to [Installing Plastic Fingers](#), page 198.

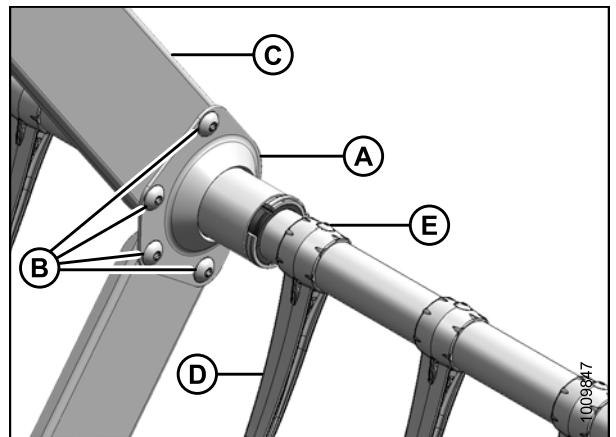


Figure 5.190: Tine Tube Support

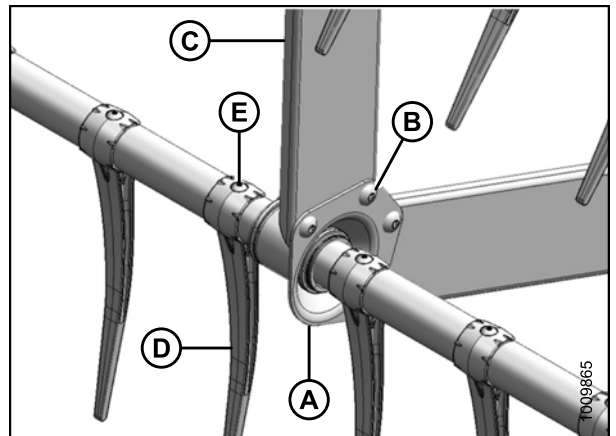


Figure 5.191: Opposite Support

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 it's necessary to replace severely damaged components.

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 the reel endshield (A) requiring replacement is accessible.
3. Remove three bolts (B).

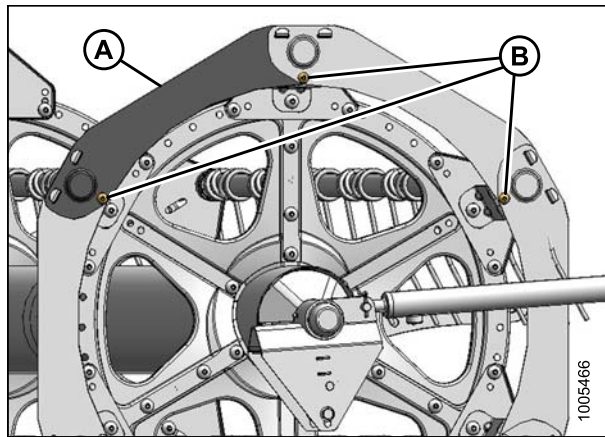


Figure 5.192: Reel Endshields

4. Lift end of reel endshield (A) off support (B).

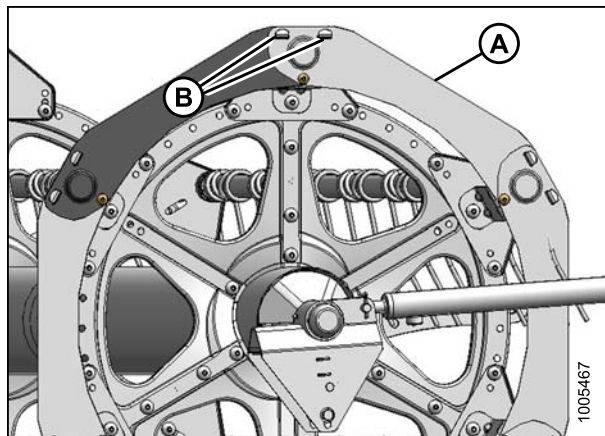


Figure 5.193: Reel Endshields

MAINTENANCE AND SERVICING

5. Remove the reel endshield from the supports.

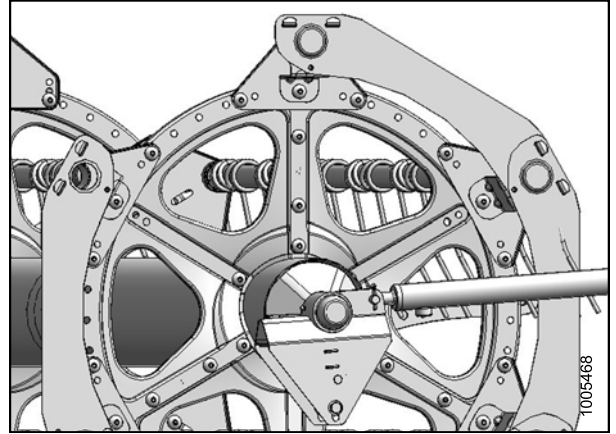


Figure 5.194: Reel Endshields

6. Remove the 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 the reel endshield (C).
9. Reinstall bolts (D).
10. Tighten all hardware.

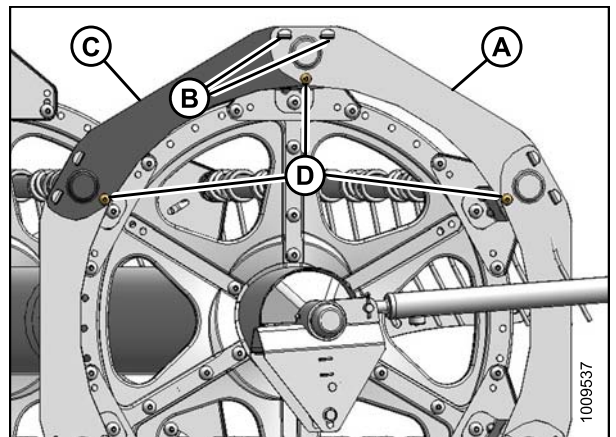


Figure 5.195: Reel Endshields

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 the 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.

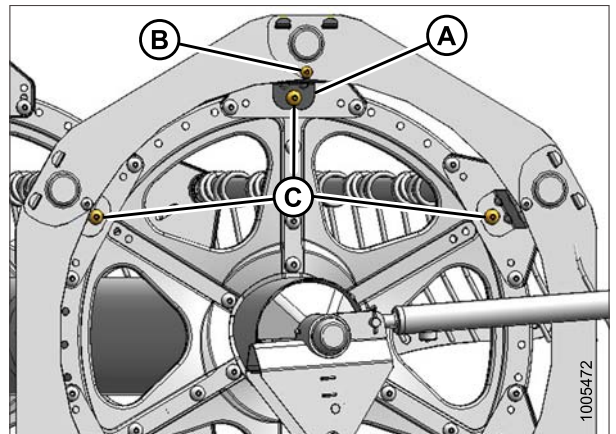


Figure 5.196: Reel Endshield Supports

MAINTENANCE AND SERVICING

5. Move the reel endshields (A) away from the tine tube and rotate the support (B) towards the reel to remove it.
6. Insert tabs of new support (B) into the slots in the 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 the 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 20 ft·lbf (27 N·m).

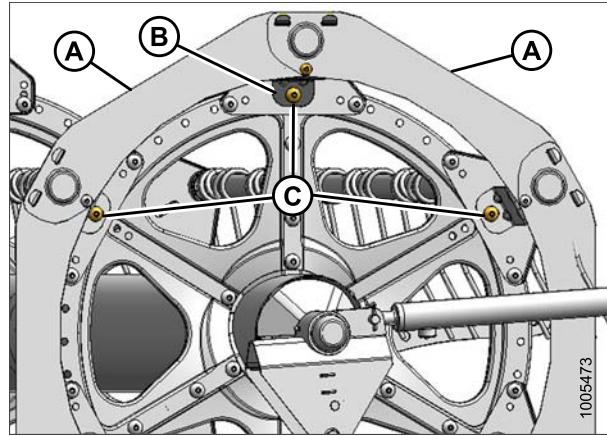


Figure 5.197: Reel Endshield Supports

5.9 Reel Drive

The reel is hydraulically driven through a chain case that is attached to the right end of the reel on a single-reel header, and between the reels on a double-reel header.

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 the cover (B) to the reel drive.

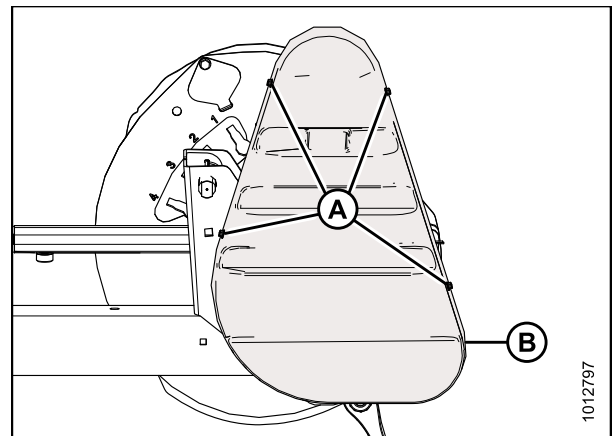


Figure 5.198: Drive Cover – Single Reel

Double Reel Drive:

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

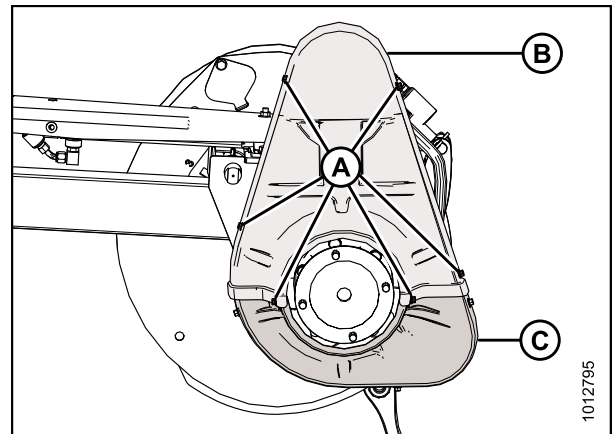


Figure 5.199: Drive Cover – Double Reel

MAINTENANCE AND SERVICING

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

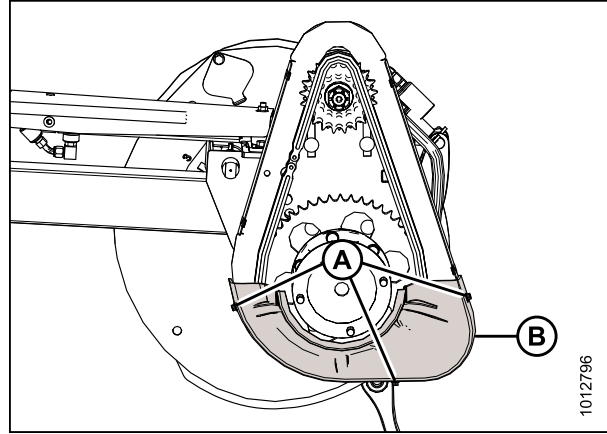


Figure 5.200: Drive Cover – Double Reel

Installing Reel Drive Cover

Single Reel Drive:

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

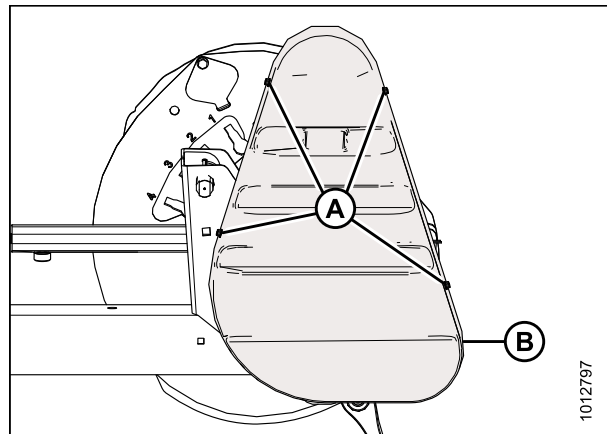


Figure 5.201: Drive Cover – Single Reel

Double Reel Drive:

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

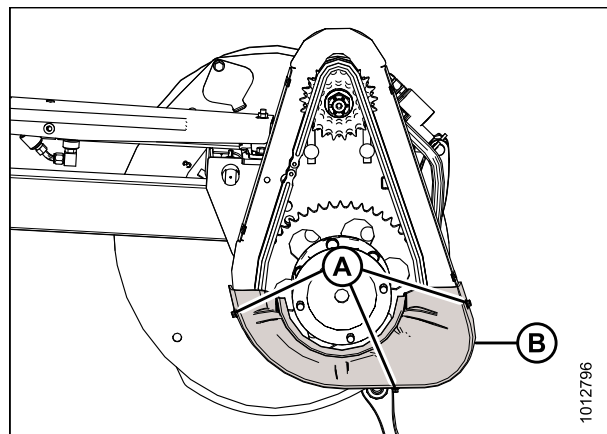


Figure 5.202: Drive Cover – Double Reel

MAINTENANCE AND SERVICING

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

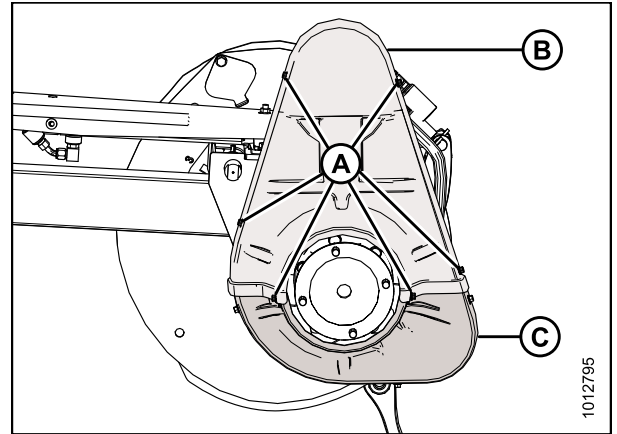


Figure 5.203: Drive Cover – Double Reel

5.9.2 Adjusting Reel Drive Chain Tension

Loosening Reel Drive Chain

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the drive cover. Refer to [Removing Reel Drive Cover, page 213](#).
3. Loosen six nuts (A). Slide the motor (B) and motor mount (C) down towards the reel shaft.

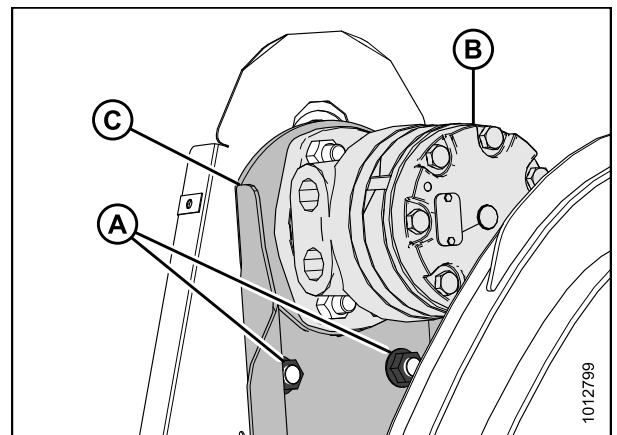


Figure 5.204: Single-Reel Drive Shown – Double-Reel Drive Similar

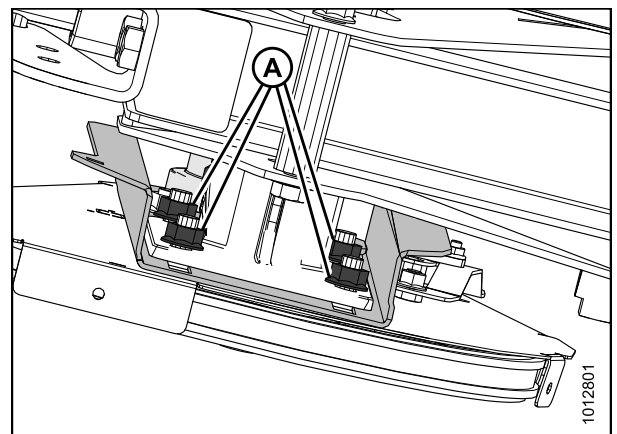


Figure 5.205: Single-Reel Drive – Viewed from Underside of Reel

MAINTENANCE AND SERVICING

Tightening Reel Drive Chain

1. Shut down the windrower, and remove the key from the ignition.
2. Ensure the six bolts (A) securing the motor mount to the chain case are loose.

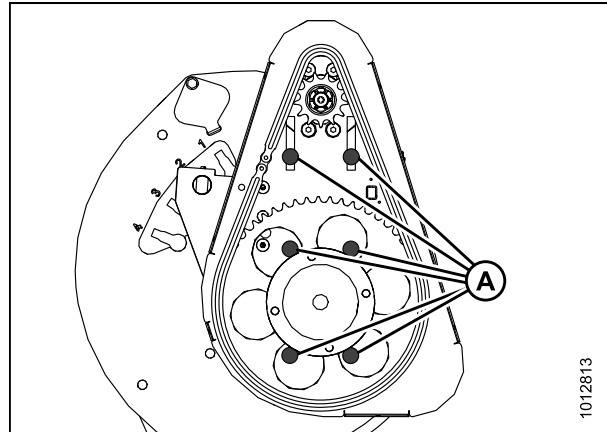


Figure 5.206: Single-Reel Drive Shown – Double Reel Similar

3. Slide the motor (A) and motor mount (B) upwards until the chain (C) is tight.

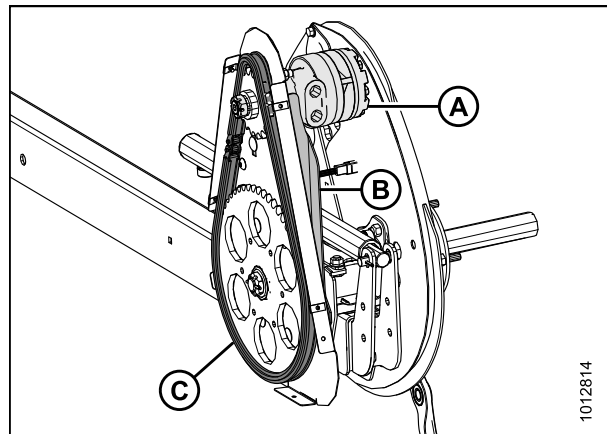


Figure 5.207: Single-Reel Drive Shown – Double Reel Similar

MAINTENANCE AND SERVICING

4. Ensure there is 3 mm (0.12 in.) of slack at the chain midspan. Adjust if necessary.
5. Tighten six nuts (A).
6. Torque nuts (A) to 73 N·m (54 ft·lbf).
7. Install the drive cover. Refer to [Installing Reel Drive Cover, page 214](#).

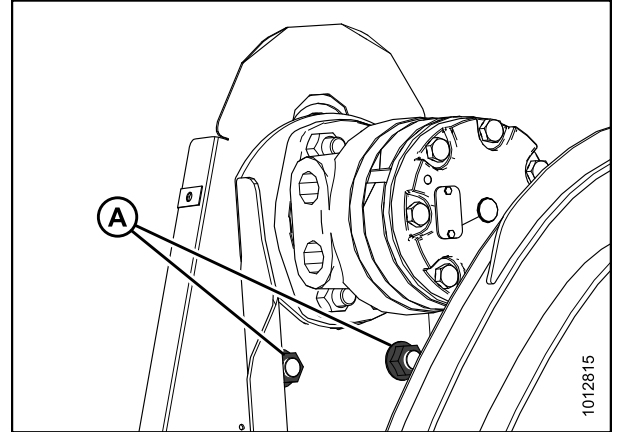


Figure 5.208: Single-Reel Drive Shown – Double Reel Similar

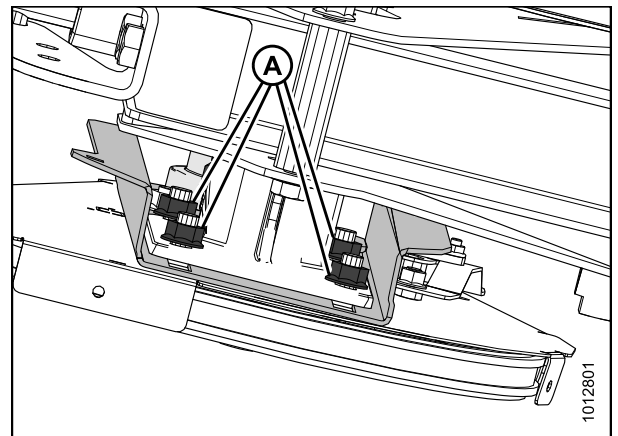


Figure 5.209: Single-Reel Drive – Viewed from Underside of Reel

5.9.3 Replacing Reel Drive Sprocket

Removing Reel Drive Sprocket

1. Shut down the windrower, and remove the key from the ignition.
2. Loosen the drive chain. Refer to [Loosening Reel Drive Chain, page 215](#).

MAINTENANCE AND SERVICING

3. Remove the drive chain (A) from the drive sprocket (B).

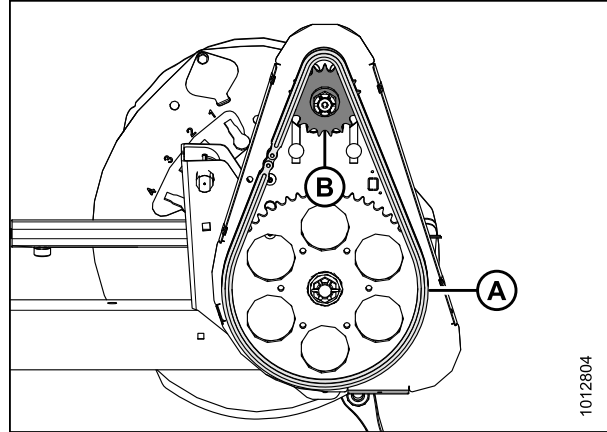


Figure 5.210: Reel Drive

4. Remove the cotter pin (A), slotted nut (B), and flat washer (C) from the motor shaft.
5. Remove the 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 the drive sprocket (D).

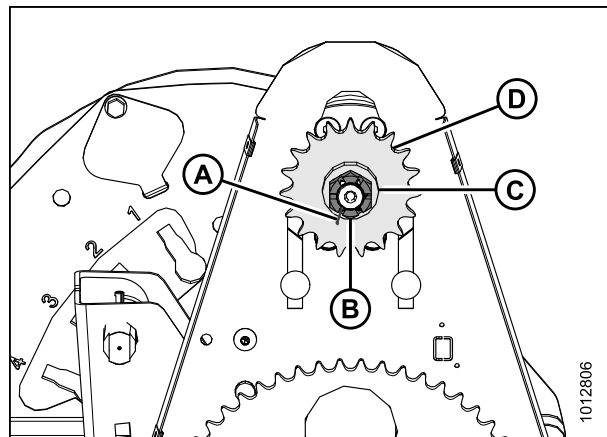


Figure 5.211: Reel Drive

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 40 ft-lbf (54 N-m).
3. Install cotter pin (A). If necessary, tighten the slotted nut (B) to the next slot to install the cotter pin.

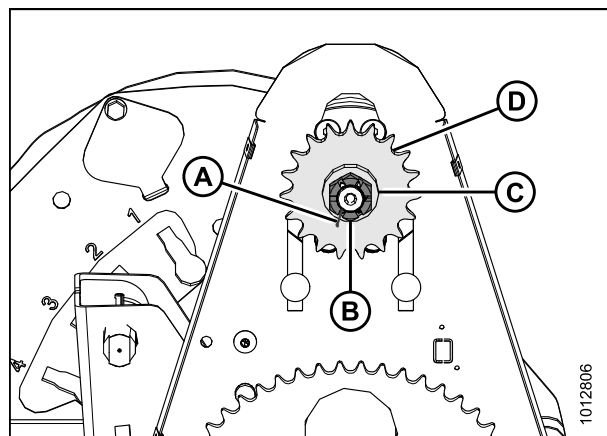


Figure 5.212: Reel Drive

MAINTENANCE AND SERVICING

4. Install the drive chain (A) onto the drive sprocket (B).

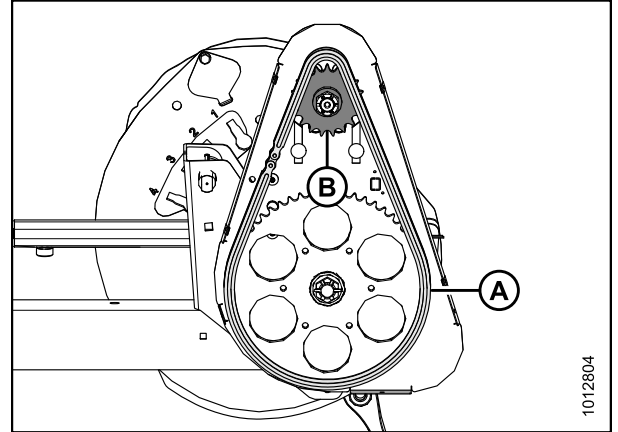


Figure 5.213: Reel Drive

5. Tighten the drive chain. Refer to [Tightening Reel Drive Chain, page 216](#).

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 the specifications. Refer to [5.3.6 Lubrication and Servicing, page 122](#).

Replace the U-joint if severely worn or damaged. Refer to [Removing Double-Reel U-Joint, page 219](#).

Removing Double-Reel U-Joint

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the drive cover. Refer to [Removing Reel Drive Cover, page 213](#).
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 end disc as possible.

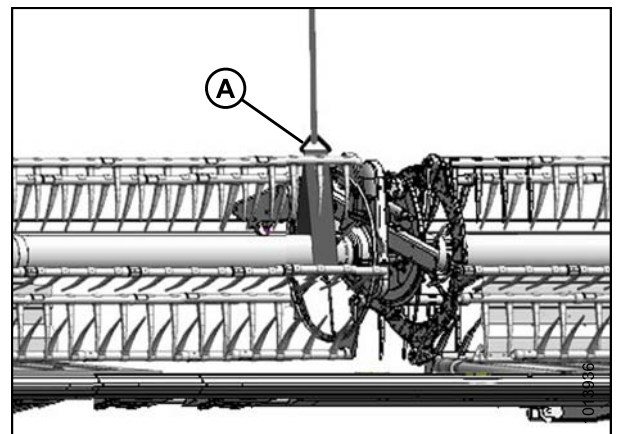


Figure 5.214: Supporting Reel

MAINTENANCE AND SERVICING

4. Remove the six bolts (A) attaching the U-joint flange (B) to the driven sprocket (C).
5. Remove the U-joint.

NOTE:

It may be necessary to move the right-hand reel sideways for the U-joint to clear the tube.

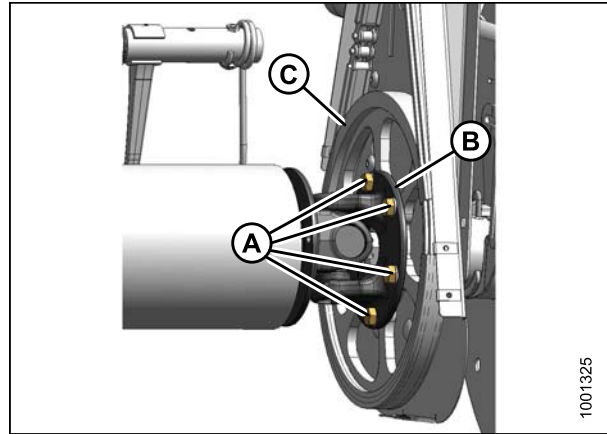


Figure 5.215: U-Joint

Installing Double-Reel U-Joint

NOTE:

It may be necessary to move the right-hand reel sideways for the U-joint to clear the reel tube.

1. Position the U-joint flange (B) onto the driven sprocket (C) as shown. Install six bolts (A) and hand-tighten. Do **NOT** torque the bolts.

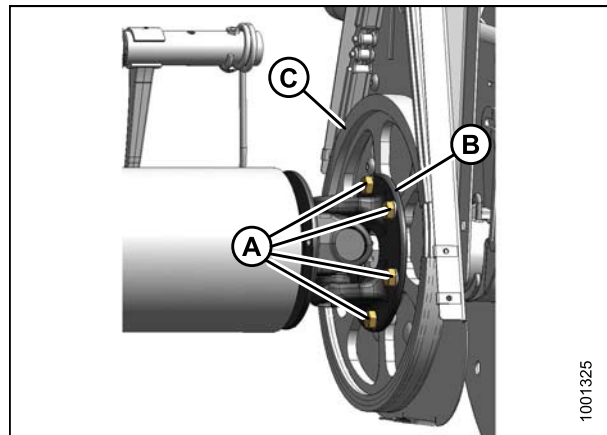


Figure 5.216: U-Joint

2. Position the right-hand 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 Loctite® #243 (or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.
5. Torque to 102–115 N·m (75–85 ft·lbf).

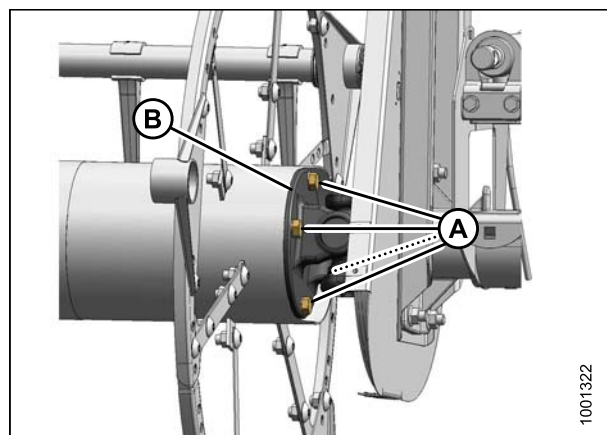


Figure 5.217: U-Joint

6. Remove the temporary reel support (A).

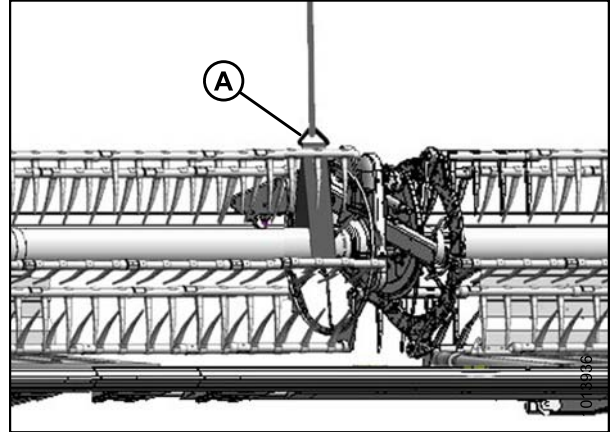


Figure 5.218: Supporting Reel

7. Install the drive cover. Refer to [Installing Reel Drive Cover, page 214](#).

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. Refer to [Loosening Reel Drive Chain, page 215](#).
3. Remove the drive sprocket. Refer to [Removing Reel Drive Sprocket, page 217](#).
4. Disconnect the hydraulic lines (A) at the motor (B). Cap or plug open ports and lines.

NOTE:

Mark the hydraulic lines (A) and their locations in the motor (B) to ensure correct reinstallation.

5. Remove four nuts and bolts (C) and remove the motor (A). Retrieve the spacer (not shown) from between the motor (B) and the motor mount (if installed).

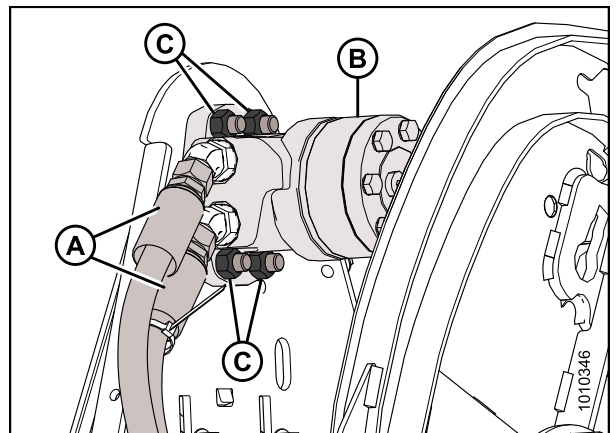


Figure 5.219: Reel Motor and Hoses

Installing Reel Drive Motor

1. Slide the motor mount (A) up or down so the motor mounting holes (B) are accessible through the openings in the chain case.

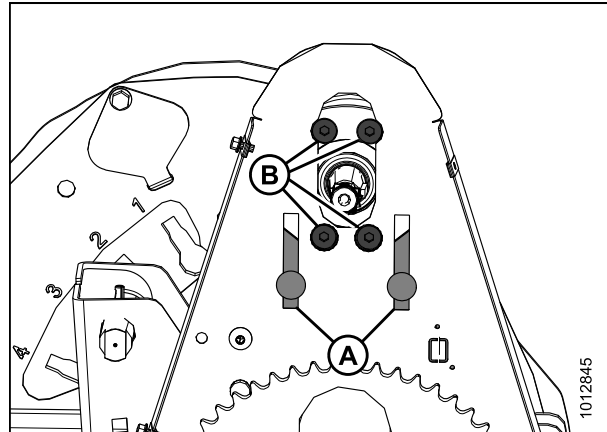


Figure 5.220: Reel Drive Motor Mounting Holes

2. Attach the motor (A) (and spacer if previously removed) to the motor mount (B) with four 1/2 in. x 1-3/4 in. countersunk bolts and nuts (C).
3. Torque nuts (C) to 73 N·m (54 ft-lbf).
4. If installing a new motor, install the hydraulic fittings (not shown) and torque to 110–120 N·m (81–89 ft-lbf).

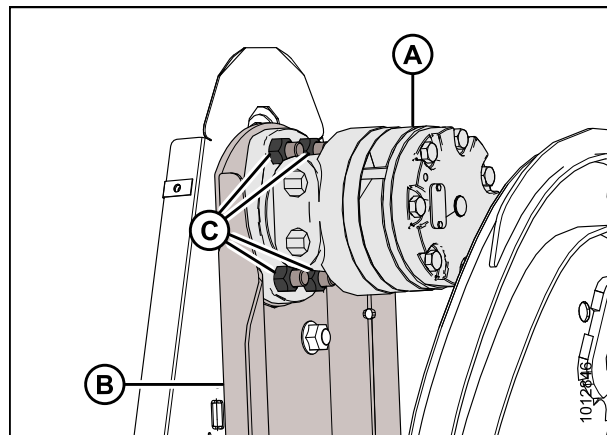


Figure 5.221: Reel Drive Motor

5. Remove the caps or plugs from the ports and lines and connect the hydraulic lines (A) to the hydraulic fittings (B) on the motor (C).

NOTE:

Ensure the hydraulic lines (A) are installed at their original locations.

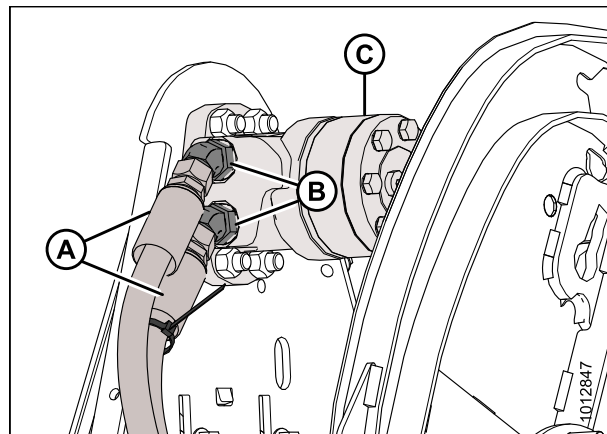


Figure 5.222: Reel Motor and Hoses

6. Install the drive sprocket. Refer to [Installing Reel Drive Sprocket, page 218](#).
7. Tighten the drive chain. Refer to [Tightening Reel Drive Chain, page 216](#).

5.9.6 Replacing Drive Chain on Double Reel

1. Shut down the windrower, and remove the key from the ignition.
2. Loosen the drive chain. Refer to [Loosening Reel Drive Chain, page 215](#).
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 end disc as possible.

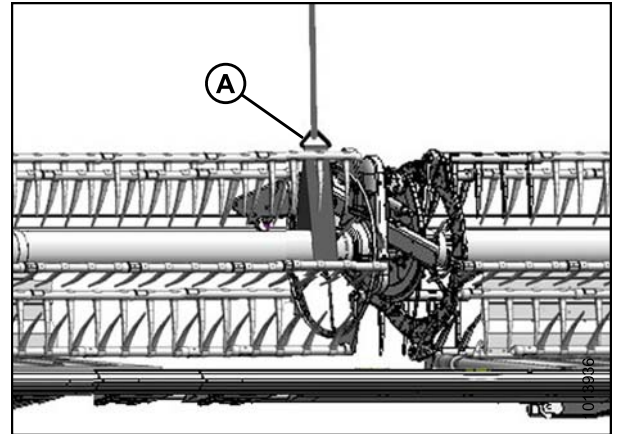


Figure 5.223: Supporting Reel

4. Remove the four bolts (A) securing the reel tube to the U-joint flange (B).

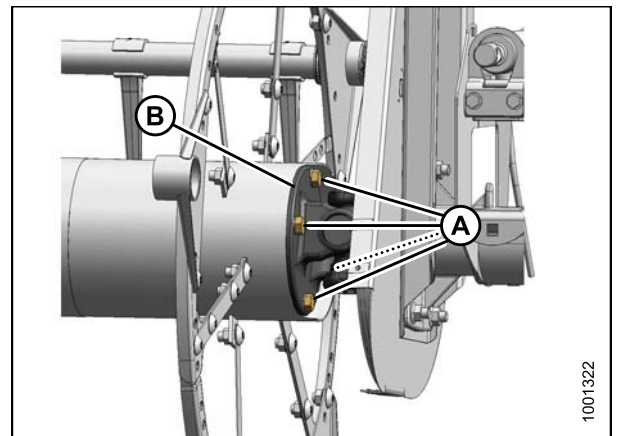


Figure 5.224: U-Joint

5. Move the right-hand reel sideways to separate the reel tube (A) from the U-joint (B).
6. Remove the drive chain (C).
7. Route the new chain (C) over the U-joint (B) and position onto the sprockets.

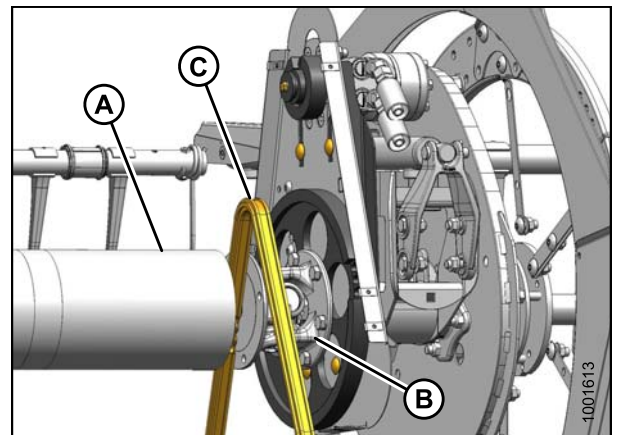


Figure 5.225: Replacing Chain

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8. Position the right-hand 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 (B) line up.
10. Apply Loctite® #243 (or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.
11. Torque to 102–115 N·m (75–85 ft·lbf).

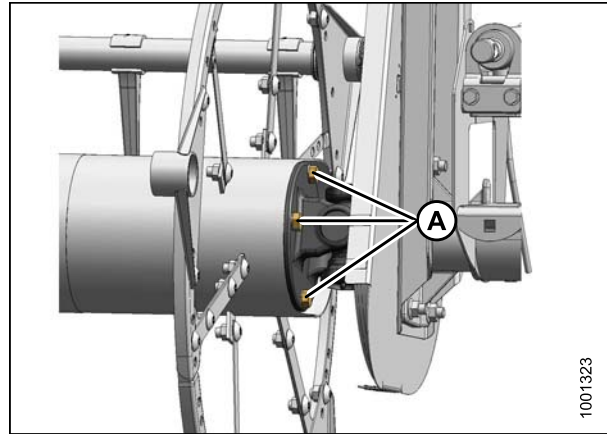


Figure 5.226: U-Joint

12. Remove the temporary reel support (A).

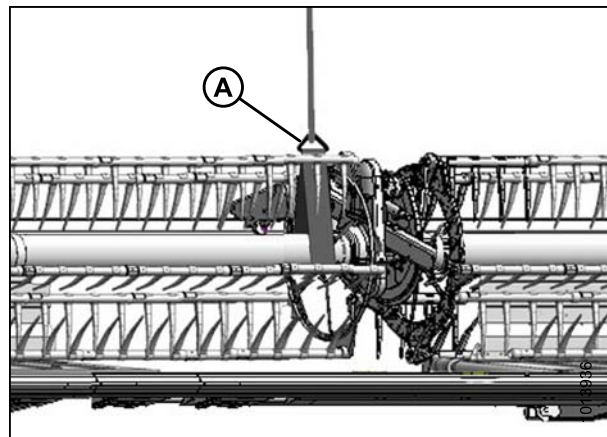


Figure 5.227: Supporting Reel

5.9.7 Replacing Drive Chain on Single Reel

1. Loosen the drive chain. Refer to [Loosening Reel Drive Chain, page 215](#).
2. Lift the chain (A) off the drive sprocket (B).
3. Lower the chain until free of the lower sprocket (C) and remove the chain from the drive.
4. Position the new chain (A) around the bottom teeth on the lower sprocket (C).
5. Lift the chain onto the drive sprocket (B) ensuring all the links are properly engaged in the teeth.

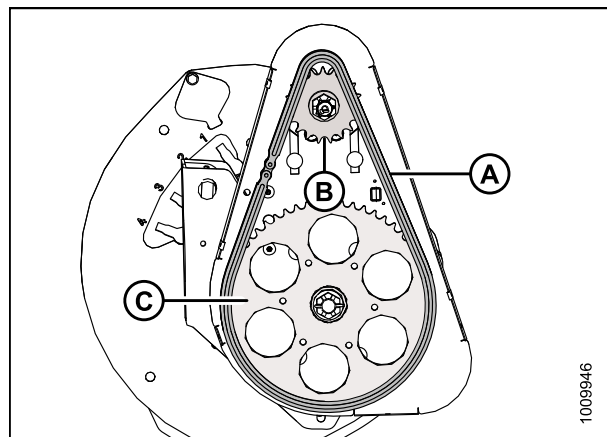


Figure 5.228: Reel Drive

6. Tighten the drive chain. Refer to [Tightening Reel Drive Chain, page 216](#).

5.10 Transport System (Optional)

Refer to [6.3.3 Stabilizer/Slow Speed Transport Wheels, page 235](#) for more information.

5.10.1 Checking Wheel Bolt Torque

If a transport system is installed, adhere to the following procedure for torquing the wheel bolts:

1. Follow the bolt tightening sequence shown, and torque the wheel bolts to 110–120 N·m (80–90 ft·lbf).

IMPORTANT:

Whenever a wheel is removed and reinstalled, check the wheel bolt torque after one hour of operation and every 100 hours thereafter.

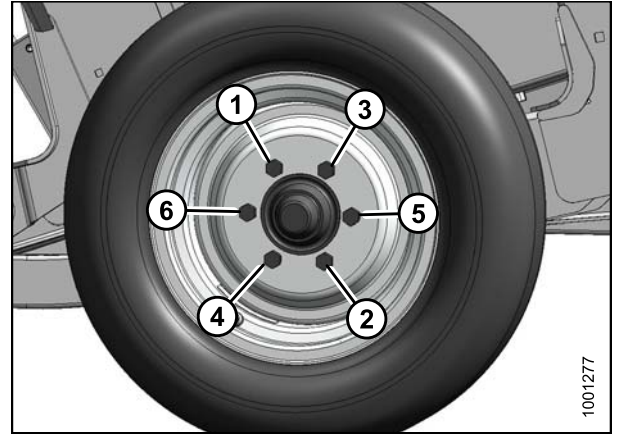


Figure 5.229: Bolt Tightening Sequence

5.10.2 Checking Axle Bolt Torque

If a transport system is installed, adhere to the following procedure for torquing the axle bolts:

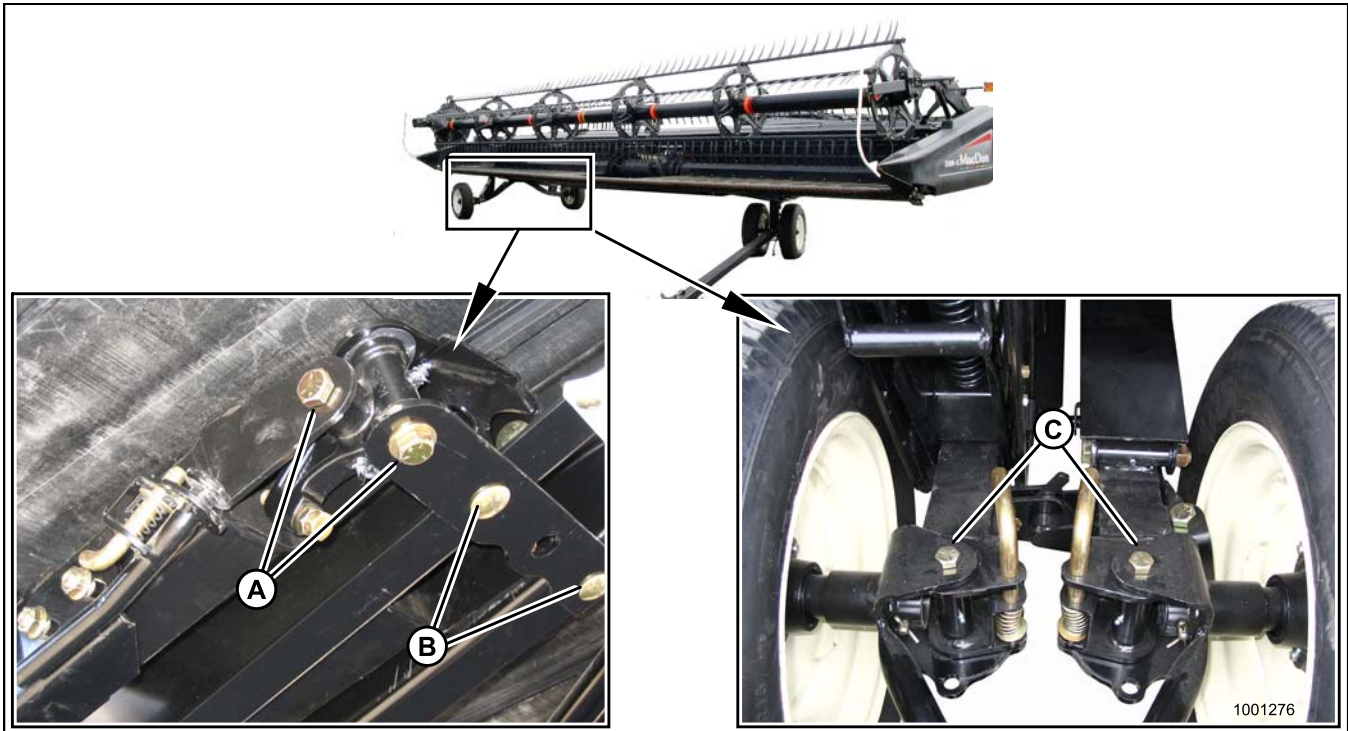


Figure 5.230: Axle Bolts

1. Check and tighten axle bolts **DAILY** until torque is maintained as follows:
 - (A): 244 N·m (180 ft·lbf)
 - (B): 203 N·m (150 ft·lbf)
 - (C): 244 N·m (180 ft·lbf)

5.10.3 Checking Tire Pressure

Check the tire inflation pressure and inflate according to the information provided in Table 5.3 *Tire Pressure*, page 227.

Table 5.3 Tire Pressure

Size	Load Range	Pressure
ST205/75 R15	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.

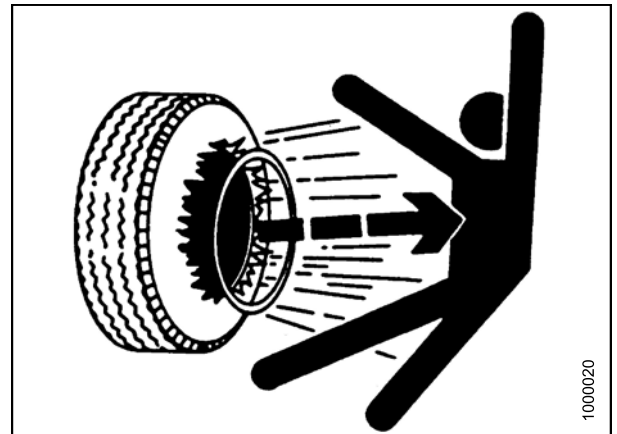


Figure 5.231: Inflation Warning

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 enables the reel fore-aft cylinders to also be quickly relocated to the normal operating location.

MD #B5943

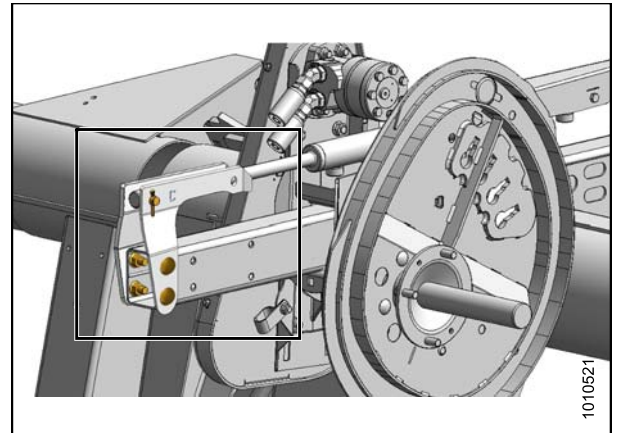


Figure 6.1: Center Arm – Left and Right Similar

6.1.2 Lodged Crop Reel Finger Kit

The steel fingers 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 6.2: Lodged Crop Finger

6.1.3 PR15 Tine Tube Reel Conversion Kit

This kit allows conversion from a six-bat reel to a nine-bat reel.

Order the following bundles according to your header size and type:

- 15 foot – Steel Fingers MD #B5654
- 20 foot – Steel Fingers MD #B5655
- 25 foot – Plastic Fingers MD #B5277
- 30 foot – Plastic Fingers MD #B5278¹⁷
- 30 foot – Steel Fingers MD #B5657
- 35 foot – Plastic Fingers MD #B5674

NOTE:

You must also order additional endshields when converting the reel.

6.1.4 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 nine-bat reels). Hardware and installation instructions are included in the kit.

See your MacDon Dealer for more information.

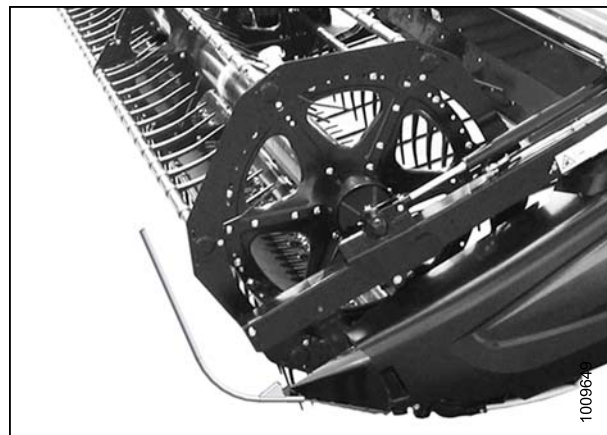


Figure 6.3: Reel Endshields

17. Double-reel units only

6.1.5 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.

- Five-Bat Reels – MD #B5825
- Six-Bat Reels – MD #B5826

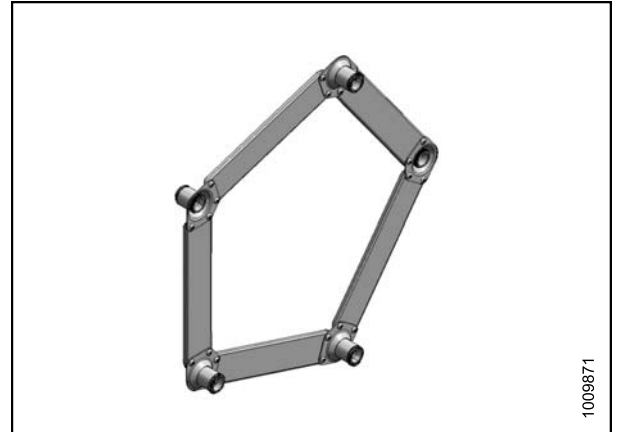


Figure 6.4: Five-Bat Reinforcing Kit Shown – Six-Bat Reinforcing Kit Similar

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 according to your header size:

- 15 foot – MD #B4864
- 20 foot – MD #B4865
- 25 foot – MD #B4838
- 30 foot – MD #B4839
- 35 foot – MD #B4840
- 40 foot – MD #B4841



Figure 6.5: Cutterbar Wearplates

6.2.2 Knifehead Shield

Knifehead shields attach to the endsheets and reduce the knifehead opening to prevent cut crop, particularly severely lodged crop, from accumulating over the knifehead and damaging the knife drive box and endsheet.

Order the following bundles according to your header size and guard type:

Regular Guards

- 30 foot and larger – MD #220101

Stub Guards

- 30 foot and larger – MD #220103

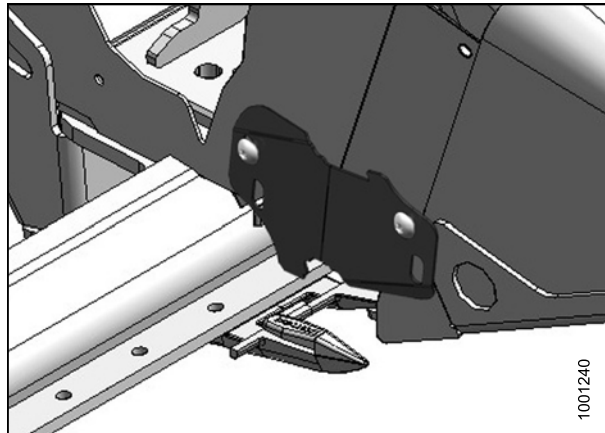


Figure 6.6: Knifehead Shield

6.2.3 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 kit.

Order one of the following bundles according to your header size:

- 15 foot – MD #B5009
- 20 foot – MD #B5010
- 25 foot – MD #B5011
- 30 foot – MD #B5012
- 35 foot – MD #B5013

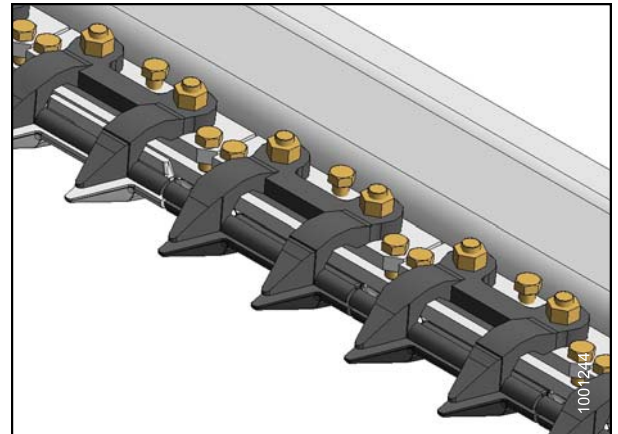


Figure 6.7: Stub Guards

6.2.4 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 bundle.

Order the following bundles according to left or right side:

- Left Side – MD #B5757
- Right Side – MD #B5758

NOTE:

If mounting onto multiple headers, you will also require the auxiliary vertical knife plumbing kit MD #B5406.

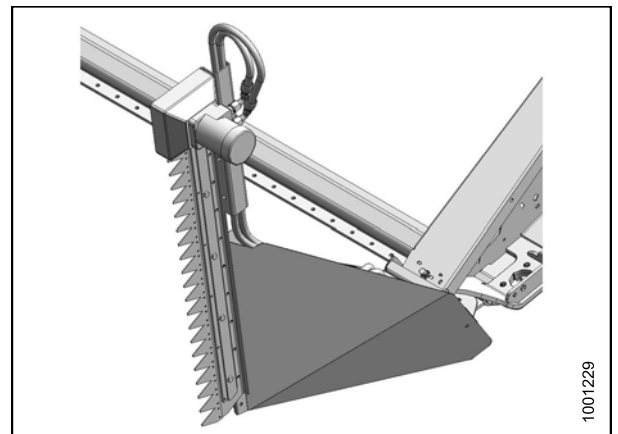


Figure 6.8: Vertical Knife Mount

6.3 Header

6.3.1 Divider Latch Kit

Divider 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 #B5607

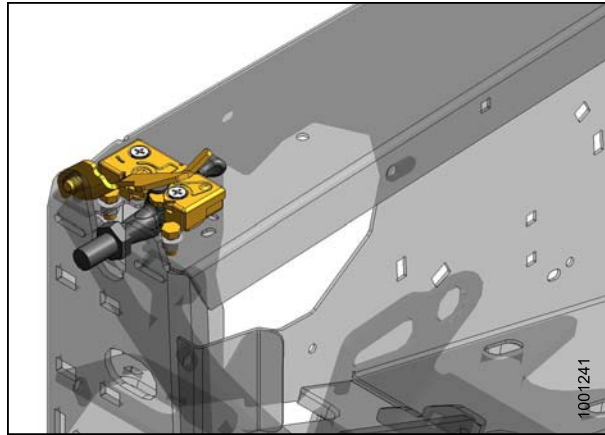


Figure 6.9: Divider Latch

6.3.2 Stabilizer Wheels

Stabilizer wheels help to 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.

This kit is available as an attachment for use with 30-, 35-, and 40-foot headers.

MD #C1986

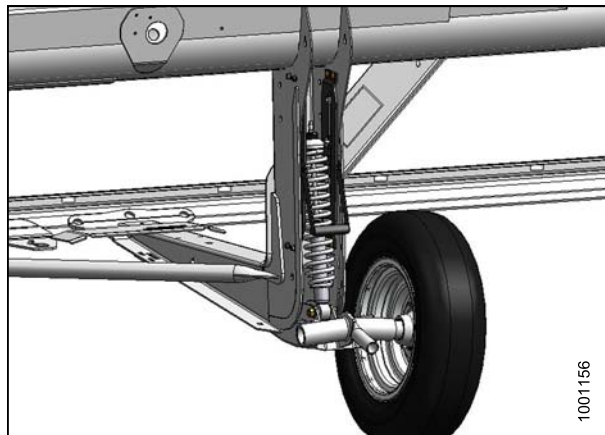


Figure 6.10: Stabilizer Wheel

6.3.3 Stabilizer/Slow Speed Transport Wheels

Stabilizer/slow speed transport wheels 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 option. Refer to [6.3.2 Stabilizer Wheels, page 234](#).

Stabilizer/slow speed transport wheels are 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 30-, 35-, and 40-foot headers.

MD #C1997



Figure 6.11: Stabilizer/Transport Wheels

6.4 Crop Delivery

6.4.1 Draper Deflector (Narrow)

Narrow 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 while minimizing reel carryover in bushy crops.

NOTE:

Narrow draper deflectors are not recommended for double windrowing – wide draper deflectors are available for this purpose.

Refer to your parts catalog for the necessary parts.

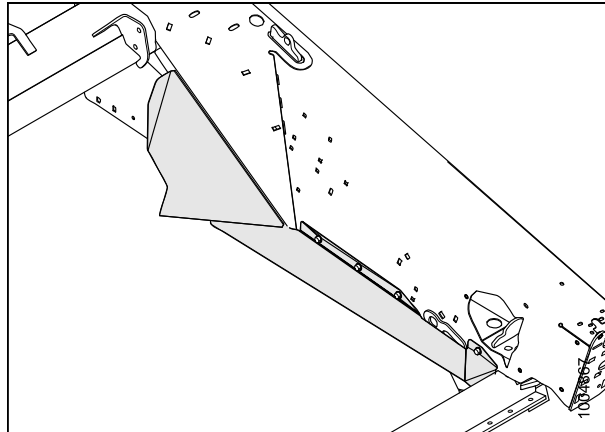


Figure 6.12: Draper Deflector (Narrow)

6.4.2 Draper Deflector (Wide)

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.

NOTE:

Required for double swathing only (leaves a gap between the standing crop and the swath for the divider to run through).

Refer to your parts catalog for the necessary parts.

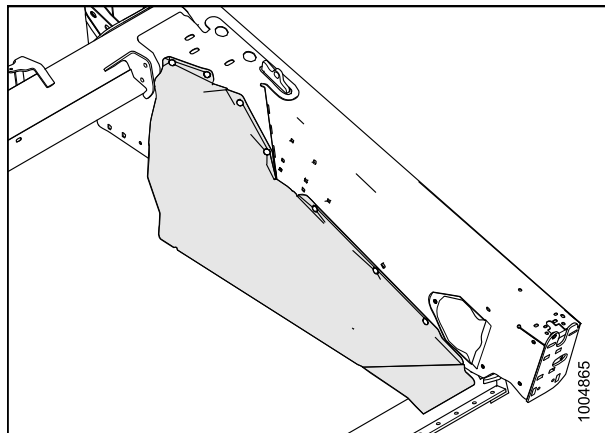


Figure 6.13: Draper Deflector (Wide)

6.4.3 Rice Divider Rods

Rice divider rods attach to the left- and right-hand 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 6.14: Rice Divider Rod

6.4.4 Double Draper Drive (DDD) Kit

The 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 with the kit.

Available for 30- to 40-foot headers.

MD #B¹⁸

6.4.5 Double Windrow Attachment (DWA)

The DWA¹⁹ lays up to 18.3 m. (60 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 Conditioner²⁰.

MD #C1987

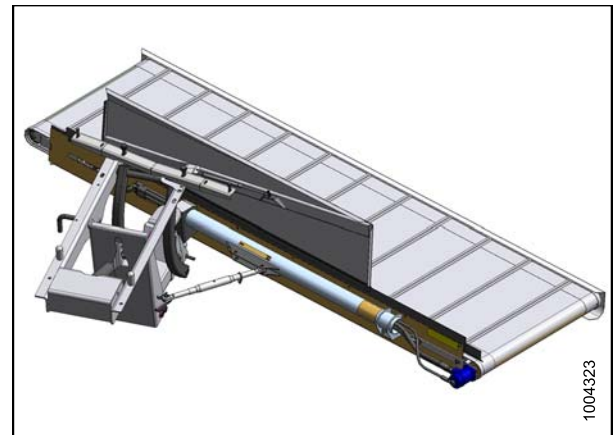


Figure 6.15: Double Windrow Attachment

18. MD #B5606 is required to operate both upper cross auger and double draper drive on an SP Windrower.

19. This option is not compatible with the M105 SP Windrower.

20. This option is not for use with the M205 or M105 SP Windrower.

6.4.6 Draper Extension Kit

The draper extension kit increases the inboard length of each deck up to 250 mm (10 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 #B5407²¹

6.4.7 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 #4803

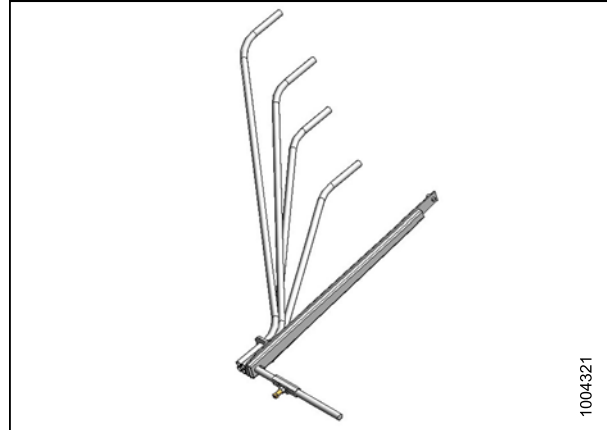


Figure 6.16: Swath Forming Rods

6.4.8 Swath Deflector Rods (End Delivery)

End delivery deflector rods are used for double swathing with end delivery only, but can be left in place for center delivery.

The deflector rods help prevent delivered crop at the opening from interfering with the standing crop.

Installation and adjustment instructions are included with the bundle.

Order bundles according to left or right side:

- **Left Side:** MD #B5088
- **Right Side:** MD #B5089

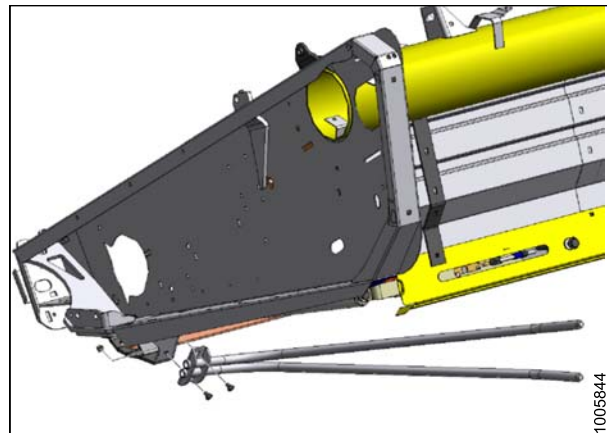


Figure 6.17: Swath Deflector

21. Not for use with Double Draper Drive (DDD).

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.

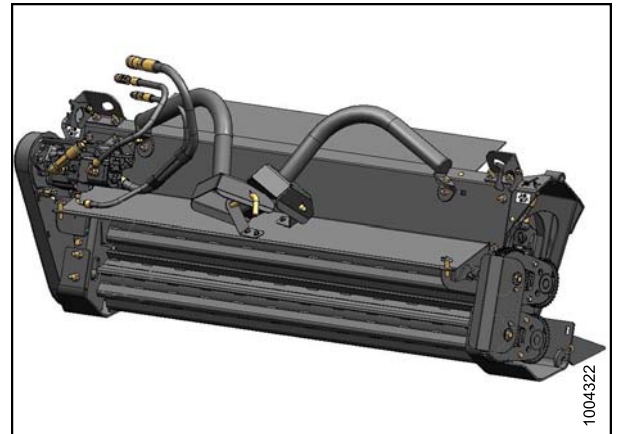


Figure 6.18: Hay Conditioner

6.4.10 Hydraulic Deck Shift Package

This system allows shifting of the decks from the operator's console when double-swathing.

Installation and adjustment instructions are included with the kit.

Available on 25-, 30-, 35-, and 40-ft. headers.

MD #B5664

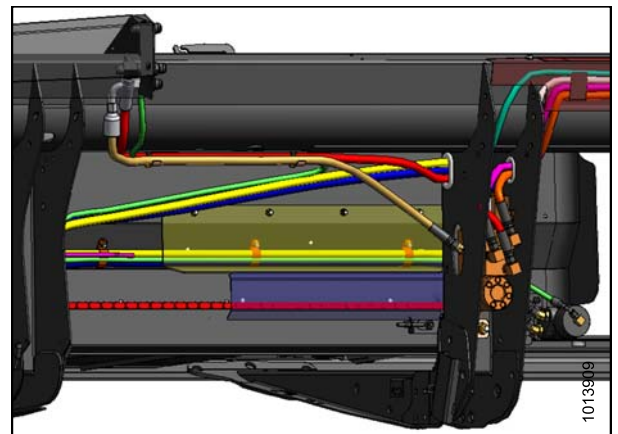


Figure 6.19: Hydraulic Deck Shift

6.4.11 Upper Cross Auger (UCA)

The upper cross auger 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 bundles²² according to your header size:

- 15 foot – MD #B4844
- 25 foot – MD #B4846
- 30 foot – MD #B4847
- 35 foot – MD #B4848
- 40 foot – MD #B4849

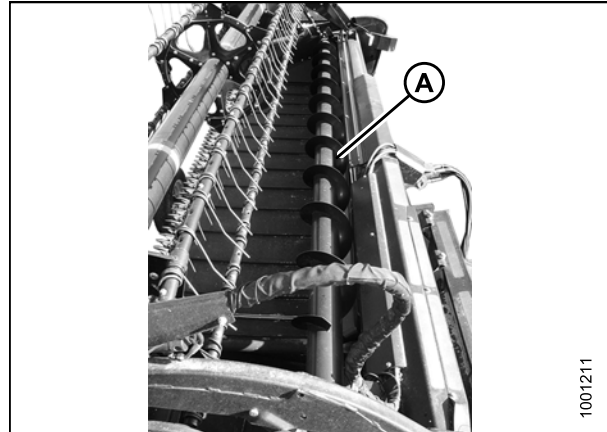


Figure 6.20: Upper Cross Auger

6.4.12 Upper Cross Auger (UCA) Hydraulic Kit for Double Draper Drive (DDD)

This kit is required to provide hydraulic power to the UCA on headers with both UCA and DDD kits installed. Operating both options without this kit can result in damage to the UCA motor and inadequate power to the draper drive system. This kit is not applicable to M100 and M105 Windrowers.

MD #B5606

6.4.13 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 #5842

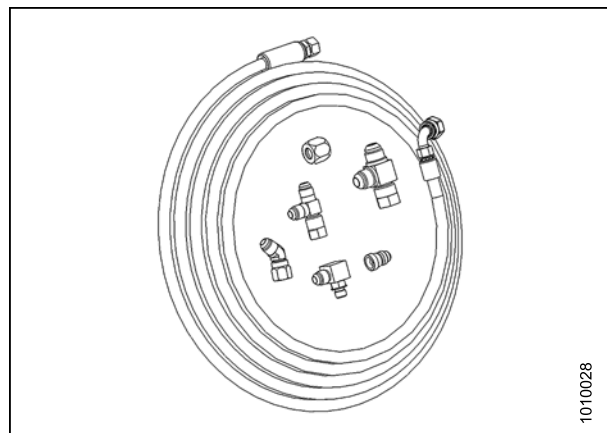


Figure 6.21: Case Drain

22. MD #B5606 is required to operate both upper cross auger and double draper drive on an SP Windrower.

6.4.14 Rice Divider Rods

Rice divider rods attach to the left- and right-hand 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 6.22: Rice Divider Rod

7 Troubleshooting

7.1 Crop Loss at Cutterbar

Symptom	Problem	Solution	Refer to
Does not pick up down crop	Cutterbar too high	Lower cutterbar	3.7.1 Cutting Height, page 47
	Header angle too low	Increase header angle	Controlling Header Angle, page 53
	Reel too high	Lower reel	3.7.8 Reel Height, page 57
	Reel too far back	Move reel forward	3.7.9 Reel Fore-Aft Position, page 57
	Ground speed too fast for reel speed	Reduce ground speed or increase reel speed	<ul style="list-style-type: none"> 3.7.4 Reel Speed, page 54 3.7.5 Ground Speed, page 54
	Reel fingers not lifting crop sufficiently	Increase finger pitch aggressiveness	3.7.10 Reel Tine Pitch, page 67
Install lifter guards		See your MacDon Dealer	
Heads shattering or breaking off	Reel speed too fast	Reduce reel speed	3.7.4 Reel Speed, page 54
	Reel too low	Raise reel	3.7.8 Reel Height, page 57
	Ground speed too fast	Reduce ground speed	3.7.5 Ground Speed, page 54
	Crop too ripe	Operate at night when humidity is higher	—
Cut grain falling ahead of cutterbar	Ground speed too slow	Increase ground speed	3.7.5 Ground Speed, page 54
	Reel speed too slow	Increase reel speed	3.7.4 Reel Speed, page 54
	Reel too high	Lower reel	3.7.8 Reel Height, page 57
	Cutterbar too high	Lower cutterbar	3.7.1 Cutting Height, page 47
	Reel too far forward	Move reel back on arms	3.7.9 Reel Fore-Aft Position, page 57
	Cutting at speeds over 6 mph (10 km/h) with high torque (10-tooth) reel drive sprocket	Replace with standard torque (19-tooth) reel drive sprocket	<ul style="list-style-type: none"> 5.9.3 Replacing Reel Drive Sprocket, page 217 See your MacDon Dealer
	Worn or broken knife components	Replace components	5.5 Knife, page 134

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Strips of uncut material	Crowding uncut crop	Allow enough room for crop to be fed to cutterbar	—
	Broken knife sections	Replace broken sections	5.5.1 Replacing Knife Section, page 134
Excessive bouncing at normal field speed	Float set too light	Adjust header float	3.7.2 Header Float, page 53
Divider rod running down standing crop	Divider rods too long	Remove divider rod	3.7.12 Crop Divider Rods, page 74
Bushy or tangled crop flows over divider rod, builds up on endsheets	Divider rods providing insufficient separation	Install long divider rods	3.7.12 Crop Divider Rods, page 74
Crop not being cut at ends	Reel not frowning or not centered in header	Adjust reel frown or reel horizontal position	<ul style="list-style-type: none"> • 3.7.9 Reel Fore-Aft Position, page 57 • 5.8.2 Reel Frown, page 193
	Knife hold-downs not adjusted properly	Adjust hold-downs so knife works freely, but still keep sections from lifting off guards	Checking Knife Hold-Downs, page 144
	Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	5.5 Knife, page 134
	Header is not level	Level header	3.12 Levelling Header, page 87
	Reel fingers not lifting crop properly ahead of knife	Adjust reel position/ finger pitch	<ul style="list-style-type: none"> • 3.7.9 Reel Fore-Aft Position, page 57 • 3.7.10 Reel Tine Pitch, page 67
	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"> • 5.5.7 Knife Guards, page 139 • 6.2.3 Stub Guard Conversion Kit, page 233 • See your MacDon Dealer
Material accumulating in gap between cut-out in endsheet and knifehead	Crop heads leaning away from knifehead hole in endsheet	Add knifehead shield(s), except in damp/sticky soils	5.5.8 Knifehead Shield, page 146

TROUBLESHOOTING

7.2 Cutting Action and Knife Components

Symptom	Problem	Solution	Section
Ragged or uneven cutting of crop	Knife hold-downs not adjusted properly	Adjust hold-downs	Checking Knife Hold-Downs, page 144
	Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	5.5 Knife, page 134
	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"> • 3.7.5 Ground Speed, page 54 • 3.7.4 Reel Speed, page 54
	Reel fingers not lifting crop properly ahead of knife	Adjust reel position / finger pitch	<ul style="list-style-type: none"> • 3.7.9 Reel Fore-Aft Position, page 57 • 3.7.10 Reel Tine Pitch, page 67
	Cutterbar too high	Lower cutting height	3.7.1 Cutting Height, page 47
	Header angle too flat	Steepen header angle	Controlling Header Angle, page 53
	Bent knife, causing binding of cutting parts	Straighten a bent knife. Align guards	5.5.7 Knife Guards, page 139
	Cutting edge of guards not close enough, or parallel to knife sections	Align guards	
	Tangled / tough to cut crop	Install stub guards	<ul style="list-style-type: none"> • 5.5.7 Knife Guards, page 139 • 6.2.3 Stub Guard Conversion Kit, page 233 • See your MacDon Dealer
	Reel too far back	Move reel forward	3.7.9 Reel Fore-Aft Position, page 57
	Loose knife drive belt	Adjust drive belt tension	<ul style="list-style-type: none"> • Tensioning Non-Timed Knife Drive Belts, page 157 • Tensioning Timed Knife Drive Belts, page 162

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Knife plugging	Reel too high or too far forward	Lower reel or move reel rearward	<ul style="list-style-type: none"> • 3.7.8 Reel Height, page 57 • 3.7.9 Reel Fore-Aft Position, page 57
	Ground speed too slow	Increase ground speed	3.7.4 Reel Speed, page 54
	Loose knife drive belt	Adjust drive belt tension	<ul style="list-style-type: none"> • Tensioning Non-Timed Knife Drive Belts, page 157 • Tensioning Timed Knife Drive Belts, page 162
	Improper knife hold-down adjustment	Adjust hold-down	Checking Knife Hold-Downs, page 144
	Dull or broken knife sections	Replace knife section	5.5.1 Replacing Knife Section, page 134
	Bent or broken guards	Align or replace guards	5.5.7 Knife Guards, page 139
	Reel fingers not lifting crop properly ahead of knife	Adjust reel position / finger pitch	<ul style="list-style-type: none"> • 3.7.9 Reel Fore-Aft Position, page 57 • 3.7.10 Reel Tine Pitch, page 67
	Steel pick-up fingers contacting knife	Increase reel clearance to cutterbar, or adjust frown	<ul style="list-style-type: none"> • 5.8.1 Reel Clearance to Cutterbar, page 190 • 5.8.2 Reel Frown, page 193
	Float too heavy	Adjust springs for lighter float	3.7.2 Header Float, page 53
	Mud or dirt build-up on cutterbar	Raise cutterbar by lowering skid shoes	Cutting on the Ground, page 51
		Install cut-out sections	See your MacDon Dealer
		Flatten header angle	Controlling Header Angle, page 53
Knife is not operating at recommended speed	Check engine speed of windrower	Refer to your windrower's operator's manual	

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Excessive header vibration	Knife hold-downs not adjusted properly	Adjust hold-downs	Checking Knife Hold-Downs, page 144
	Knives on double-knife drive not timed	Adjust knife timing	Adjusting Double-Knife Timing, page 163
	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"> • 5.5.2 Removing Knife, page 136 • 5.5.5 Installing Knife, page 137
	Loose or worn knifehead pin or drive arm	Tighten or replace parts	<ul style="list-style-type: none"> • 5.5.3 Removing Knifehead Bearing, page 136 • 5.6.1 Knife Drive Box, page 148
	Bent cutterbar	Straighten cutterbar	See your MacDon Dealer
Knife back breakage	Bent or broken guard	Straighten or replace	5.5.7 Knife Guards, page 139
	Worn knifehead pin	Replace	5.5.3 Removing Knifehead Bearing, page 136
	Dull knife	Replace	<ul style="list-style-type: none"> • 5.5.2 Removing Knife, page 136 • 5.5.5 Installing Knife, page 137
Excessive breakage of knife sections or guards.	Knife hold-downs not adjusted properly	Adjust hold-downs	Checking Knife Hold-Downs, page 144
	Cutterbar operating too low in stony conditions	Raise cutterbar, using skid shoes	Cutting on the Ground, page 51
	Float is set too heavy	Adjust for lighter float	3.7.2 Header Float, page 53
	Bent or broken guard	Straighten or replace	5.5.7 Knife Guards, page 139
	Header angle too steep	Flatten header angle	Controlling Header Angle, page 53

TROUBLESHOOTING

7.3 Reel Delivery

Symptom	Problem	Solution	Section
Reel not releasing material in normal standing crop	Reel speed too fast	Reduce reel speed	3.7.4 Reel Speed, page 54
	Reel too low	Raise reel	3.7.8 Reel Height, page 57
	Reel tines too aggressive	Reduce cam setting	3.7.10 Reel Tine Pitch, page 67
	Reel too far back	Move reel forward	3.7.9 Reel Fore-Aft Position, page 57
Reel not releasing material in lodged and standing crop (reel fully lowered)	Reel tines too aggressive for standing crop	Reduce cam setting (1 or 2)	3.7.10 Reel Tine Pitch, page 67 Reel Tine Pitch
Wrapping on reel end	Reel tines too aggressive	Reduce cam setting	3.7.10 Reel Tine Pitch, page 67
	Reel too low	Raise reel	3.7.8 Reel Height, page 57
	Reel speed too fast	Reduce reel speed	3.7.4 Reel Speed, page 54
	Crop conditions	Install optional endshields	See your MacDon Dealer
	Reel not centered in header	Center reel in header	5.8.3 Centering Reel, page 194
Reel releases crop too quickly	Reel tines not aggressive enough	Increase cam setting	3.7.10 Reel Tine Pitch, page 67
	Reel too far forward	Move reel back	3.7.9 Reel Fore-Aft Position, page 57
Reel will not lift	Reel lift couplers are incompatible or defective	Change quick coupler	—
Reel will not turn	Control set at 0	Activate reel speed control	3.7.4 Reel Speed, page 54
	Quick couplers not properly connected	Connect couplers	4.1 Attaching Header to Windrower, page 109
	Reel drive chain disconnected	Connect chain	5.9.7 Replacing Drive Chain on Single Reel, page 224
Reel motion uneven under no load	Excessive slack in reel drive chain	Tighten chain	5.9.2 Adjusting Reel Drive Chain Tension, page 215

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Reel motion is uneven or stalls in heavy crops	Reel speed too fast	Reduce reel speed	3.7.4 Reel Speed, page 54
	Reel fingers not aggressive enough	Move to a more aggressive finger pitch notch	3.7.10 Reel Tine Pitch, page 67
	Reel too low	Raise reel	3.7.8 Reel Height, page 57
	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	
	Relief valve malfunction	Replace relief valve	
	Cutting tough crops with standard torque (19-tooth) reel drive sprocket	Replace with high torque (10-tooth) or 14-tooth reel drive sprocket	Optional Reel Drive Sprockets, page 54
Plastic fingers cut at tip	Insufficient reel to cutterbar clearance	Increase clearance	5.8.1 Reel Clearance to Cutterbar, page 190
Plastic fingers bent rearward at tip	Reel digging into ground with reel speed slower than ground speed	Raise header	3.7.1 Cutting Height, page 47
		Decrease header tilt	Controlling Header Angle, page 53
		Move reel aft	3.7.9 Reel Fore-Aft Position, page 57
Plastic fingers bent forward at tip (opposite of above)	Reel digging into ground with reel speed faster than ground speed	Raise header	3.7.1 Cutting Height, page 47
		Decrease header tilt	Controlling Header Angle, page 53
		Move reel aft	3.7.9 Reel Fore-Aft Position, page 57
Plastic fingers bent close to tine tube.	Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation	Correct plugging/cutting issues	3.13 Unplugging Cutterbar, page 88
		Stop reel before plugging becomes excessive	—

TROUBLESHOOTING

7.4 Header and Drapers

Symptom	Problem	Solution	Section
Header lift insufficient	Low relief pressure	Increase relief pressure	See your MacDon Dealer
Insufficient draper speed	Speed control set too low	Increase control setting	3.7.6 Draper Speed, page 55
	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 the 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 your windrower operator's manual
Draper will not move	Drapers are loose	Tighten drapers	5.7.3 Adjusting Draper Tension, page 172
	Drive or idler roller wrapped with material	Loosen draper and clean rollers	
	Slat or connector bar jammed by frame or material	Loosen draper and clear obstruction	
	Roller bearing seized	Replace	5.7.6 Header Draper Roller Maintenance, page 178
	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
Draper stalling	Material not feeding evenly off knife	Lower reel	3.7.8 Reel Height, page 57
		Install stub guards	<ul style="list-style-type: none"> • 6.2.3 Stub Guard Conversion Kit, page 233 • 5.5.7 Knife Guards, page 139 • See your MacDon Dealer
Hesitation in flow of bulky crop	Header angle too low	Increase header angle	Controlling Header Angle, page 53
	Material overload on drapers	Increase side draper speed	3.7.6 Draper Speed, page 55
		Install upper cross auger	6.4.11 Upper Cross Auger (UCA), page 240
		Add flighting extensions	See your MacDon Dealer

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Drapers back-feed	Drapers running too slow in heavy crop	Increase draper speed	3.7.6 Draper Speed, page 55
Crop is thrown across opening and under opposite side draper	Drapers running too fast in light crop	Reduce draper speed	
Material accumulates inside or under front edge of draper	Deck height improperly adjusted	Adjust deck height	5.7.5 Adjusting Deck Height, page 176
Material wrapping at upper cross auger beater bars	Crop conditions do not require beater bars	Remove beater bars	3.14.1 Removing Beater Bars, page 90
Material accumulating on end deflectors and releasing in bunches	End deflectors too wide	For headers with manual deck shift only, trim deflector or replace with narrow deflector (MD #172381)	3.13 Unplugging Cutterbar, page 88

TROUBLESHOOTING

7.5 Cutting Edible Beans

Symptom	Problem	Solution	Section	
Plants being stripped and complete or partial plants left behind	Header off ground	Lower header to ground and run on skid shoes and/or cutterbar	Cutting on the Ground, page 51	
	Float set too light—rides on high spots and does not lower soon enough	Set float for: - Dry ground: 445-667 (100–150 lbf) - Wet ground: 222–445(50–100 lbf)	3.7.2 Header Float, page 53	
	Reel too high	Fully retract reel cylinders	3.7.8 Reel Height, page 57	
	Reel too high with cylinders fully retracted	Adjust reel height	3.7.8 Reel Height, page 57	
	Finger pitch not aggressive enough	Adjust finger pitch	3.7.10 Reel Tine Pitch, page 67	
	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	3.7.9 Reel Fore-Aft Position, page 57	
	Header angle too shallow	Lengthen center-link	If cutting on ground, header angle can be increased by fully retracting lift cylinders	Controlling Header Angle, page 53
	Reel too slow	Adjust reel speed to be marginally faster than ground speed	3.7.4 Reel Speed, page 54	
	Ground speed too fast	Lower ground speed	3.7.4 Reel Speed, page 54	
	Skid shoes too low	Raise skid shoes to highest setting	Cutting on the Ground, page 51	
	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	Manually clean the bottom of cutterbar when accumulation gets unacceptable	—

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Plants being stripped and complete or partial plants left behind (cont'd)	Plastic wear strip for cutterbar has been installed over top of steel wear plates	Remove steel cutterbar wear plates when installing the plastic wear strips for cutterbar	—
	Header not level	Level header	3.12 Levelling Header, page 87
	Worn/damaged knife sections	Replace sections or complete knife	5.5 Knife, page 134
	Parts of vines get caught in pointed guard tip. (Occurs more in row-cropped beans that are hilled from cultivating)	Install stub guard kit	6.2.3 Stub Guard Conversion Kit, page 233
Excessive losses at dividers	Divider rod running down crop and shattering pods	Remove divider rod	3.7.12 Crop Divider Rods, page 74
	Vines and plants build up on endsheet	Install divider rod	
Plant vines pinched between top of draper and cutterbar	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	
Crop accumulating at guards and not moving rearward onto drapers	Reel finger pitch not aggressive enough	Increase finger aggressiveness (cam position)	3.7.10 Reel Tine Pitch, page 67
	Reel too high	Lower reel	3.7.8 Reel Height, page 57
	Minimum reel clearance to cutterbar setting too high	Readjust reel minimum height with cylinders fully retracted	Adjusting Reel Clearance, page 192
	Reel too far forward	Reposition reel	3.7.9 Reel Fore-Aft Position, page 57
Reel too far forward			
Reel shattering pods	Reel speed too high	Reduce reel speed	3.7.4 Reel Speed, page 54
	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)	3.7.10 Reel Tine Pitch, page 67

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Cutterbar guards breaking	Float insufficient	Increase float	3.7.2 Header Float, page 53
	Excessive number of rocks in field	Consider installing optional stub guards	<ul style="list-style-type: none"> • 5.5.7 Knife Guards, page 139 • 6.2.3 Stub Guard Conversion Kit, page 233
Tip: Experiment with a few guards on a section of cutterbar to compare the performance of the two different styles of guards			
Cutterbar pushing too much trash and dirt	Header too heavy	Readjust float to make header lighter	3.7.2 Header Float, page 53
	Header angle too steep	Decrease header angle with lift cylinders	3.7.3 Header Angle, page 53
		Shorten the center-link	
	Regular guards push dirt and plug up with trash or plug up with trash and then push dirt	Install stub guard kit	6.2.3 Stub Guard Conversion Kit, page 233
Insufficient support for header	Install center skid shoes on header	Cutting on the Ground, page 51	
Cutterbar fills up with dirt	Excessive gap between top of front of draper and cutterbar	Adjust front deck supports to obtain proper clearance between cutterbar and draper	5.7.5 Adjusting Deck Height, page 176
		Raise header fully at each end of field or as required and shift decks back and forth to help clean out cutterbar	—
Reel carries over odd plants in same location	Reel fingers (steel) bent and hook plants from crop flow on drapers	Straighten fingers (steel)	
	Dirt accumulation on end of fingers prevent plants dropping off fingers onto drapers	Raise reel	3.7.8 Reel Height, page 57
		Adjust reel fore and aft location to move fingers out of the ground	3.7.9 Reel Fore-Aft Position, page 57
Cutterbar pushing too much dirt in certain locations for length of field	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° to undulations, provided knife floats across without digging in	

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Reel carries over excessive amounts of plants or wads	Excessive accumulation of crop on drapers (up to height of reel center tube)	Increase draper speed	3.7.6 Draper Speed, page 55
	Finger pitch too retarded	Increase finger pitch	3.7.10 Reel Tine Pitch, page 67
Reel wraps up with crop	Reel too low	Raise reel	3.7.8 Reel Height, page 57
Reel ends wrap up with crop	Uncut crop interfering on reel ends	Add reel endshields	Refer to the header parts catalog

TROUBLESHOOTING

7.6 Windrow Formation

Symptom	Problem	Solution	Section
Heads on ground and scattered	Draper speed too slow	Increase draper speed	3.7.6 Draper Speed, page 55
	Draper angle too flat	Increase header angle	Controlling Header Angle, page 53
	Ground speed too slow	Increase ground speed	3.7.4 Reel Speed, page 54
	Crop too ripe	Cut material before too mature	—
Hollow in center	Draper speed too slow	Increase draper speed	3.7.6 Draper Speed, page 55
	Delivery opening too wide	Decrease delivery opening width	3.8 Delivery Opening, page 76
All heads in center	Draper speed too fast or header angle too steep	Reduce draper speed and/or decrease header angle	3.7.6 Draper Speed, page 55 3.7.3 Header Angle, page 53
	Ground speed too fast	Reduce ground speed	3.7.4 Reel Speed, page 54
	Crop too green	Allow to mature	—
All heads to one side	Crop leaning to one side and reel too slow	Increase reel speed to re-orient crop parallel to draper slats and/or increase finger pitch aggressiveness	<ul style="list-style-type: none"> • 3.7.4 Reel Speed, page 54 • 3.7.10 Reel Tine Pitch, page 67
Uneven windrow (any crop condition)	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"> • 3.7.4 Reel Speed, page 54 • 3.7.6 Draper Speed, page 55
	Reel too low	Raise reel	3.7.8 Reel Height, page 57
	Reel speed too fast	Reduce reel speed	3.7.4 Reel Speed, page 54

8 Reference

8.1 Conversion Chart

Table 8.1 Conversion Chart

Quantity	SI Units (Metric)		Factor	Inch-Pound Units	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectares	ha	$\times 0.4047 =$	acres	acres
Flow	liters per minute	L/min	$\times 3.7854 =$	US gallons per minute	gpm
Force	Newtons	N	$\times 4.4482 =$	pounds force	lbf
Length	millimeters	mm	$\times 25.4 =$	inch	in.
	meters	m	$\times 0.305 =$	foot	ft.
Power	kilowatts	kW	$\times 0.7457 =$	horsepower	hp
Pressure	kilopascals	kPa	$\times 6.8948 =$	pounds per square inch	psi
	megapascals	MPa	$\times .00689 =$		
	bar (Non-SI)	bar	$\div 14.5038 =$		
Torque	Newton meters	N-m	$\times 1.3558 =$	pound feet or foot pounds	ft-lbf
	Newton meters	N-m	$\times 0.1129 =$	pound inches or inch pounds	in-lbf
Temperature	Celsius	$^{\circ}\text{C}$	$(^{\circ}\text{F}-32) \times 0.56 =$	degrees Fahrenheit	$^{\circ}\text{F}$
Velocity	meters per minute	m/min	$\times 0.3048 =$	feet per minute	ft/min
	meters per second	m/s	$\times 0.3048 =$	feet per second	ft/s
	kilometers per hour	km/h	$\times 1.6063 =$	miles per hour	mph
Volume	liters	L	$\times 3.7854 =$	US gallons	US gal
	milliliters	ml	$\times 29.5735 =$	ounces	oz.
	cubic centimeters	cm ³ or cc	$\times 16.3871 =$	cubic inches	in. ³
Weight	kilograms	kg	$\times 0.4536 =$	pounds	lb.

8.2 Torque Specifications

The following tables provide the 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.

8.2.1 SAE Bolt Torque Specifications

Torque values shown in the following tables are valid for non-greased, or non-oiled threads and heads; therefore, do **NOT** grease or oil bolts or cap screws unless otherwise specified in this manual.

Table 8.2 SAE Grade 5 Bolt and Grade 5 Free Spinning Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
1/4-20	11.9	13.2	*106	*117
5/16-18	24.6	27.1	*218	*241
3/8-16	44	48	32	36
7/16-14	70	77	52	57
1/2-13	106	118	79	87
9/16-12	153	170	114	126
5/8-11	212	234	157	173
3/4-10	380	420	281	311
7/8-9	606	669	449	496
1-8	825	912	611	676

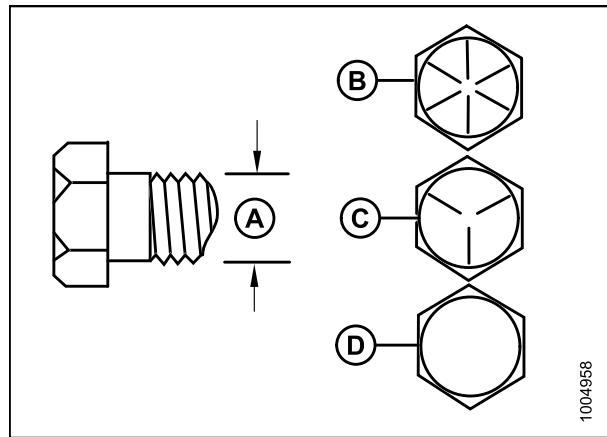


Figure 8.1: Bolt Grades

A - Nominal Size
C - SAE-5

B - SAE-8
D - SAE-2

REFERENCE

Table 8.3 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
1/4-20	8.1	9	*72	*80
5/16-18	16.7	18.5	*149	*164
3/8-16	30	33	22	24
7/16-14	48	53	35	39
1/2-13	73	80	54	59
9/16-12	105	116	77	86
5/8-11	144	160	107	118
3/4-10	259	286	192	212
7/8-9	413	456	306	338
1-8	619	684	459	507

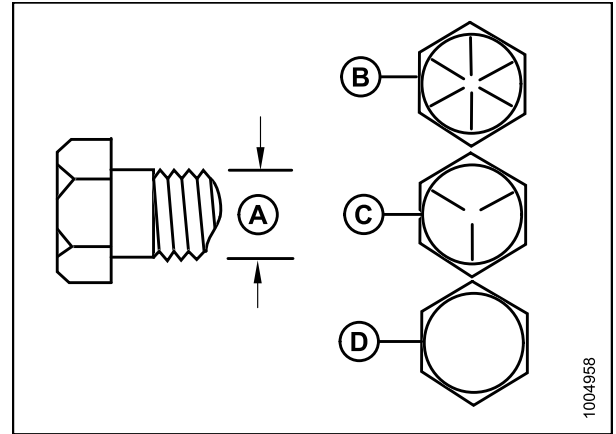


Figure 8.2: Bolt Grades

A - Nominal Size
 B - SAE-8
 C - SAE-5
 D - SAE-2

Table 8.4 SAE Grade 8 Bolt and Grade G Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
1/4-20	16.8	18.6	*150	*165
5/16-18	24	26	18	19
3/8-16	42	46	31	34
7/16-14	67	74	50	55
1/2-13	102	113	76	84
9/16-12	148	163	109	121
5/8-11	204	225	151	167
3/4-10	362	400	268	296
7/8-9	583	644	432	477
1-8	874	966	647	716

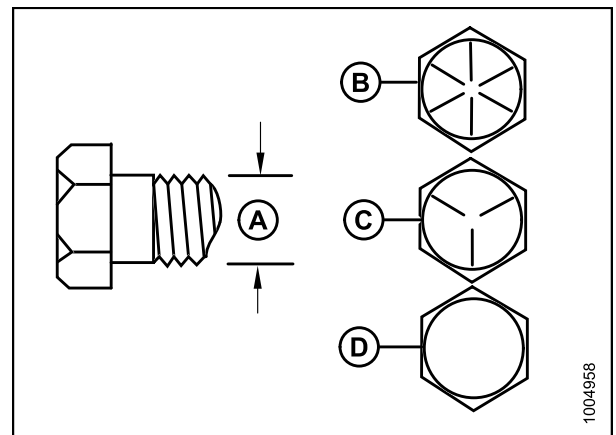


Figure 8.3: Bolt Grades

A - Nominal Size
 B - SAE-8
 C - SAE-5
 D - SAE-2

REFERENCE

Table 8.5 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
1/4-20	16.8	18.6	*150	*165
5/16-18	35	38	26	28
3/8-16	61	68	46	50
7/16-14	98	109	73	81
1/2-13	150	166	111	123
9/16-12	217	239	160	177
5/8-11	299	330	221	345
3/4-10	531	587	393	435
7/8-9	855	945	633	700
1-8	1165	1288	863	954

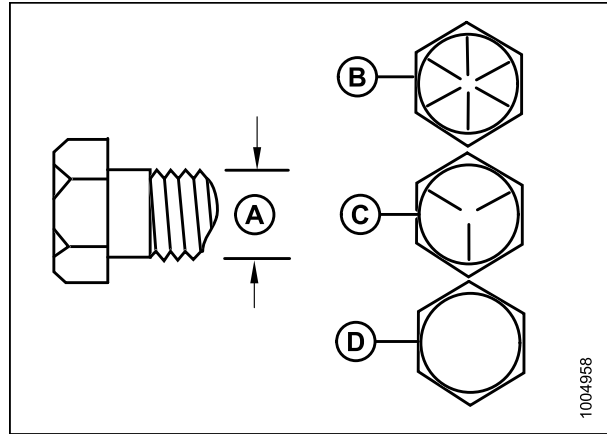


Figure 8.4: Bolt Grades

A - Nominal Size
C - SAE-5

B - SAE-8
D - SAE-2

8.2.2 Metric Bolt Specifications

Table 8.6 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	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

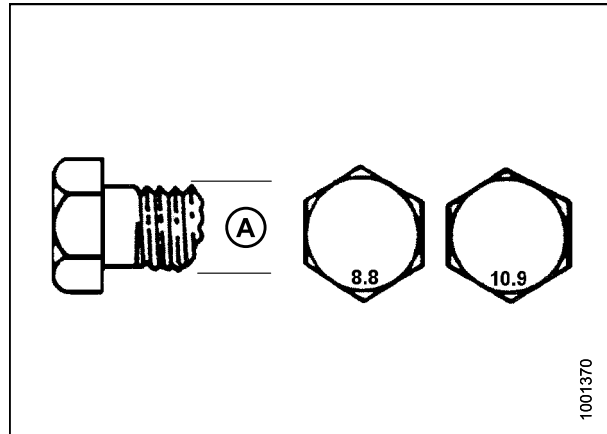


Figure 8.5: Bolt Grades

REFERENCE

Table 8.7 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	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

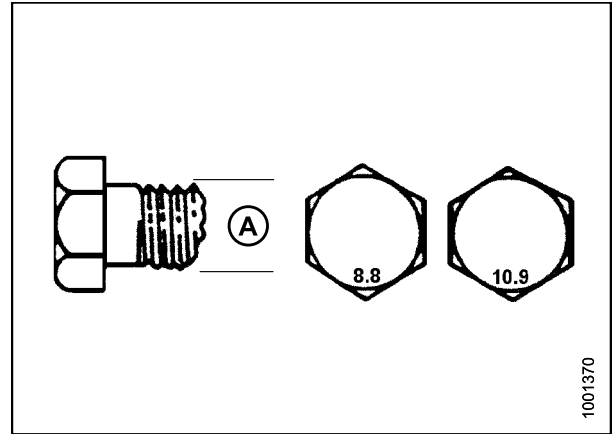


Figure 8.6: Bolt Grades

Table 8.8 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	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

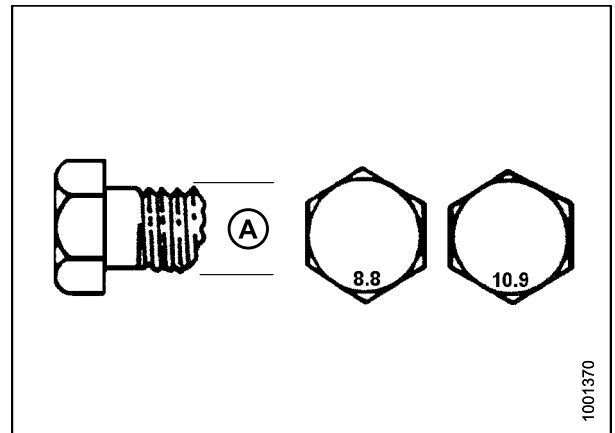


Figure 8.7: Bolt Grades

REFERENCE

Table 8.9 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	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

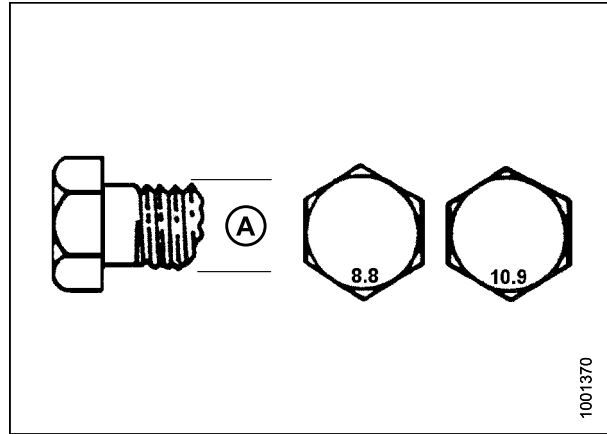


Figure 8.8: Bolt Grades

8.2.3 Metric Bolt Specifications Bolting into Cast Aluminum

Table 8.10 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	N·m	ft·lbf	N·m	ft·lbf
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	–	–	–	–

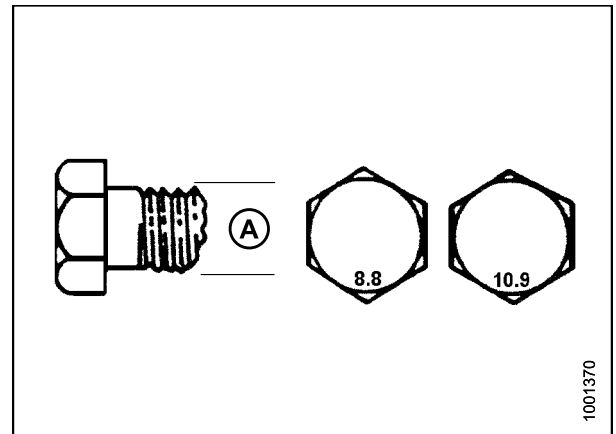


Figure 8.9: Bolt Grades

8.2.4 Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between flared surfaces.
3. Torque fitting nut (E) to specified number of flats from finger tight (FFFT) or to a given torque value in [Table 8.11 Flare-Type Hydraulic Tube Fittings, page 264](#).
4. Use two wrenches to prevent fitting (D) from rotating. Place one wrench on fitting body (D), and tighten nut (E) with other wrench to torque shown.
5. Assess final condition of connection.

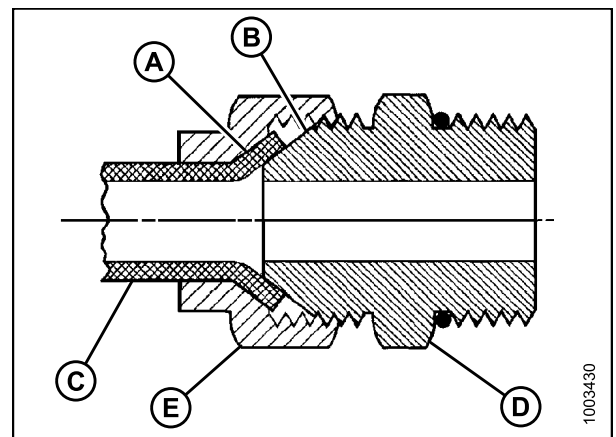


Figure 8.10: Hydraulic Fitting

REFERENCE

Table 8.11 Flare-Type Hydraulic Tube Fittings

SAE Dash Size	Thread Size (in.)	Torque Value ²³		Flats from Finger Tight (FFFT)	
		N-m	ft-lbf	Tube	Swivel Nut or Hose
-2	5/16-24	4-5	3-4	—	—
-3	3/8-24	7-8	5-6	—	—
-4	7/16-20	18-19	13-14	2-1/2	2
-5	1/2-20	19-21	14-15	2	2
-6	9/16-18	30-33	22-24	2	1-1/2
-8	3/4-16	57-63	42-46	2	1-1/2
-10	7/8-14	81-89	60-66	1-1/2	1-1/2
-12	1-1/16-12	113-124	83-91	1-1/2	1-1/4
-14	1-3/16-12	136-149	100-110	1-1/2	1-1/4
-16	1-5/16-12	160-176	118-130	1-1/2	1
-20	1-5/8-12	228-250	168-184	1	1
-24	1-7/8-12	264-291	195-215	1	1
-32	2-1/2-12	359-395	265-291	1	1
-40	3-12	—	—	1	1

23. Torque values shown are based on lubricated connections as in reassembly.

REFERENCE

8.2.5 O-Ring Boss (ORB) 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).

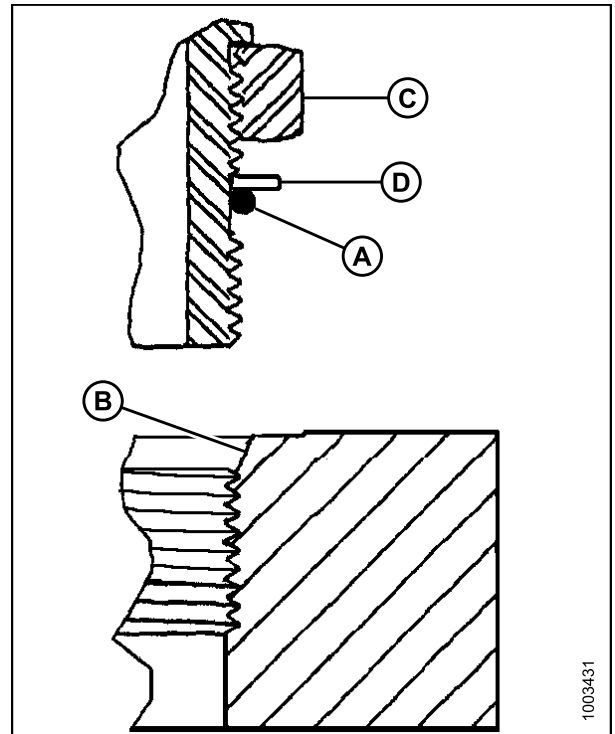


Figure 8.11: Hydraulic Fitting

5. Install fitting (B) into port until back up 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.

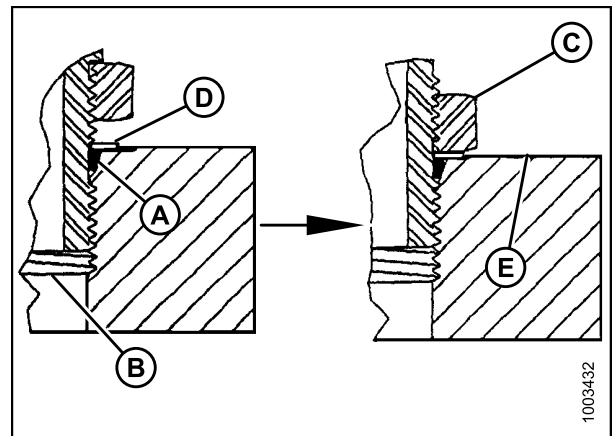


Figure 8.12: Hydraulic Fitting

REFERENCE

Table 8.12 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value ²⁴	
		N-m	ft·lbf (*in·lbf)
-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

24. Torque values shown are based on lubricated connections as in reassembly.

REFERENCE

8.2.6 O-Ring Boss (ORB) 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 8.13 *O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)*, page 267.
6. Check final condition of fitting.

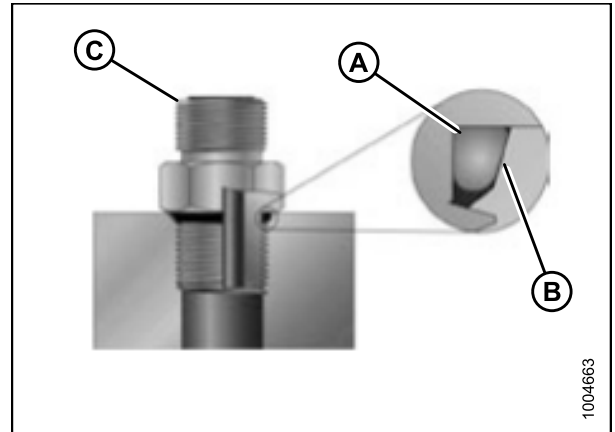


Figure 8.13: Hydraulic Fitting

Table 8.13 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value ²⁵	
		N·m	ft·lbf (*in·lbf)
-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

25. Torque values shown are based on lubricated connections as in reassembly.

8.2.7 O-Ring Face Seal (ORFS) Hydraulic Fittings

1. Check components to ensure that sealing surfaces and fitting threads are free of burrs, nicks, scratches, or any foreign material.



Figure 8.14: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to values in Table [8.14 O-Ring Face Seal \(ORFS\) Hydraulic Fittings, page 269](#).

NOTE:

If applicable, hold hex on fitting body (E) to prevent rotation of fitting body and hose when tightening fitting nut (D).

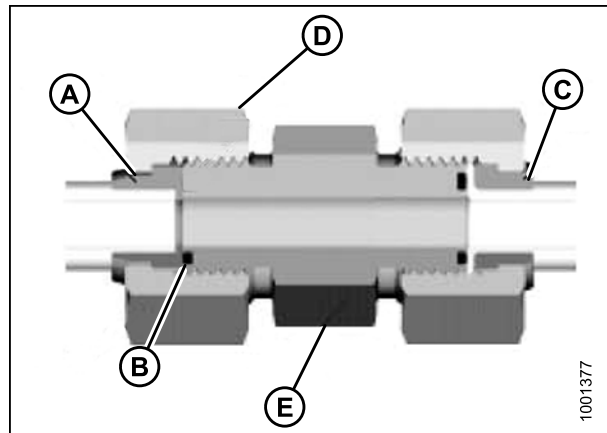


Figure 8.15: Hydraulic Fitting

6. Use three wrenches when assembling unions or joining two hoses together.
7. Check final condition of fitting.

REFERENCE

Table 8.14 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value ²⁶	
			N·m	ft·lbf
-3	Note ²⁷	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note ²⁷	5/16	–	–
-6	11/16	3/8	40–44	29–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1-3/16	3/4	115–127	85–94
-14	Note ²⁷	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

26. Torque values and angles shown are based on lubricated connection as in reassembly.

27. O-ring face seal type end not defined for this tube size.

8.2.8 Tapered Pipe Thread Fittings

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks and 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) values are shown in Table [8.15 Hydraulic Fitting Pipe Thread, page 270](#). 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:

*Over-torque failure of fittings may not be evident until fittings are disassembled.

Table 8.15 Hydraulic Fitting Pipe Thread

Tapered Pipe Thread Size	Recommended T.F.F.T	Recommended F.F.F.T
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
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REFERENCE

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	D65 Draper Header for Self-Propelled Windrowers	MD #147932
Export (anywhere other than North America)	D65 Draper Header for Self-Propelled Windrowers	MD #147933

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