D65 Draper Header for Windrowers

Published: August 2017
Declaration of Conformity

EN
Wir, [1]

Declarant, that the product:

Machine Type: [2]

Name & Model: [3]

Serial Number(s): [4]

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

Harmonized standards used, as referred to in Article 3(2):

EN ISO 4254-1:2013
EN ISO 4254-7:2009
EN ISO 4254-8:2009
EN ISO 4254-10:2013
EN ISO 4254-7-2009

Place and date of declaration:

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

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

Benedict von Redenbach
General Manager, MacDon Europe GmbH
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65230 Wiesbaden (Hessen)
bvonder@macdon.com

BG
Име: [1]

декларирам, че следните продукти:

Тип машини: [2]

Значителни модификации: [3]

Сериин номер: [4]

отговарят на изискванията за безопасност и здраве на хората, обособени в Директива 2006/42/ЕС.

Испълнение на стандартите, споменати в стъпка 3(2):

EN ISO 4254-1:2013
EN ISO 4254-7:2009
EN ISO 4254-8:2009
EN ISO 4254-10:2013
EN ISO 4254-7-2009

Место и дата на декларацията: [5]

Име и адрес на лицето, отговорно за създаване техническата файла:

Бенедикт фон Реденбах
Управител, MacDon Европа GmbH
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bvonder@macdon.com

CZ
Me, [1]

Prohláším, že výrobek:

Typ zařízení: [2]

Název a model: [3]

Sériový číslo: [4]

odpovídá uvedeným relevantním ustanovením směrů 2006/42/ES.

Uvedené normy harmonizují standardy, jich je uvedeno v článku 3(2):

EN ISO 4254-1:2013
EN ISO 4254-7:2009
EN ISO 4254-8:2009
EN ISO 4254-10:2013
EN ISO 4254-7-2009

Místo a datum prohlášení: [5]

Identita a adresa osoby oprávněné ke vydání technického souvodu:

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Hagenauer Straße 59
65230 Wiesbaden (Hesens)
bvonder@macdon.com

DA
VI, [1]

erklærer, at produktet:

Maskintype [2]

Navn og model [3]

Serienummer (s) [4]

Udleverer alle berøringsområder i direktiv 2006/42/EC.

Anvendte harmoniserede standarder, som henvis til i 

(paragraf 7(2)):

EN ISO 4254-1:2013
EN ISO 4254-7:2009
EN ISO 4254-8:2009
EN ISO 4254-10:2013
EN ISO 4254-7-2009

Sted og dato for erklæringen: [5]

Identiteten og adresse af den person, som er 

benyttet til at udarbejde denne erklæringen: [6]

Navn og adresse på den person, som er beordret til at arbejde til denne tekstile fil:

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Direktør, MacDon Europe GmbH
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D-65230 Wiesbaden (Tyskland)
bvonder@macdon.com

DC
Wir, [3]

Erläutern, dass das Produkt:

Maschinentyp: [2]

Name & Modell: [3]

Serienummer (s): [4]-[5]

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

Harmonisierte Standards wurden, wie in folgenden 

Artikeln angegeben, verwendet: [7]

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

Ort und Datum der Erklärung: [8]

Name und Unterschrift der Person, die dies verfügt, ist die Erklärung auszuweisen: [9]

Name und Anschrift der Person, die dies beauftragt, ist die technische Unterlagen zu erstellen:

Benedikt von Redenbach
General Manager, MacDon Europe GmbH
Hagenauer Straße 59
65230 Wiesbaden
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ES
Nosotros [1]

declaramos que el producto:

Tipo de máquina: [2]

Número modelo: [3]

Números de serie: [4]

cumple con todas las disposiciones pertinentes de la directiva 2006/42/CE.

Se utilizan normas armonizadas, según lo dispuesto en el artículo 3(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 firmar la declaración: [6]

Nombre y dirección de la persona autorizada para elaborar la declaración técnica:

Benedikt von Redenbach
Gerente General, MacDon Europe GmbH
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bvonder@macdon.com

ET
Meie, [1]

deklareer, et toodet:

Tüüp maquina: [2]

Nimetus ja mudel: [3]

Seriin numbri: [4]

vastab_feedika vastab direktivi 2006/42/EÜ piiratud olemusele.

Käitletud arvuti armonisevad standardid, mida on määratud direktiivi 3(2):

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

Kohandusandmed: [5]

Käitletud arvuti koodi ja üldandme: [6]

Teade selle dokumendi koostajast: [7]

Benedikt von Redenbach
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65230 Wiesbaden (Hesens)
bvonder@macdon.com

FR
Nous, [1]

déclarons que le produit:

Type de machine: [2]

Numéro de modèle: [3]

Séries number(s): [4]

est conforme à toutes les dispositions pertinentes de la directive 2006/42/EC.

Les normes harmonisées, comme indiqué dans l’article 3(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 consigner le dossier technique:

Benedikt von Redenbach
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EC Declaration of Conformity

NIS, [1]
Definition: the product:
Type of machine [2]
Name and model [3]
Serial number [4]
Manufacturer's declaration [5]
Product to be declared:
Asbestos, containing [6]
Name and model [7]
Technical data:
Asbestos, containing [8]
Name and model [9]
Product to be declared:
NIS, [10]
Definition: the product:
Type of machine [11]
Name and model [12]
Serial number [13]
Manufacturer's declaration [14]
Product to be declared:
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Type of machine [16]
Name and model [17]
Serial number [18]
Manufacturer's declaration [19]
Product to be declared:
NIS, [20]
Definition: the product:
Type of machine [21]
Name and model [22]
Serial number [23]
Manufacturer's declaration [24]
Product to be declared:

Introduction

This manual contains information on the D65 Draper Header for Windrowers. Teamed with your windrower and optional hay conditioner, the D65 Draper Header is designed to cut your grain, hay, or specialty crop and lay it 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.

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

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

The 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](http://www.macdon.com)) or from our Dealer-only site ([https://portal.macdon.com](https://portal.macdon.com)) (login required).

This manual is also available in the following languages:

- Chinese
- Russian

Translated manuals can be ordered from MacDon or downloaded from the Dealer Portal ([https://portal.macdon.com](https://portal.macdon.com)) or our International website ([http://www.macdon.com/world](http://www.macdon.com/world)).

The following conventions are used in this document:

- Right and left are determined from the operator’s position. The front of the header is the side that faces the crop; the back of the header is the side that connects to the windrower.
• Unless otherwise noted, use the standard torque values provided in Chapter 8 Reference, page 261 of this document.
### List of Revisions

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

<table>
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<th>Summary of Change</th>
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<td>Added metric header sizes.</td>
<td>Throughout.</td>
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<tr>
<td>Added warranty information and conventions information to the Introduction page.</td>
<td><em>Introduction, page i</em></td>
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<tr>
<td>Updated the header serial number plate image.</td>
<td><em>Model and Serial Number, page v</em></td>
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<tr>
<td>Removed 13.7-meter (45-foot) header information (combine models only).</td>
<td><em>2.2 Specifications, page 23</em></td>
</tr>
<tr>
<td>Reorganize steps for clarity.</td>
<td><em>Repositioning Fore-Aft Cylinders on Double Reel, page 63</em></td>
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<tr>
<td>Add note to offset beater bars.</td>
<td><em>3.14.2 Installing Beater Bars, page 92</em></td>
</tr>
<tr>
<td>Updated illustrations and information about checking and adjusting knife.</td>
<td>- <em>Checking Knife Hold-Downs, page 145</em></td>
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<td></td>
<td>- <em>Adjusting Pointed Guard Hold-Downs, page 146</em></td>
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<tr>
<td></td>
<td>- <em>Adjusting Stub Guard Hold-Downs, page 147</em></td>
</tr>
<tr>
<td>Added illustration and step about measuring clearance at deck supports.</td>
<td><em>5.7.5 Adjusting Deck Height, page 178</em></td>
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<tr>
<td>Reorganized steps and images so that locations for taking measurements appears first in the topic.</td>
<td><em>Measuring Reel Clearance, page 192</em></td>
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<tr>
<td>Removed paragraph about checking for contact between the reel and deflector shields because it paragraph is more relevant in the deflector shields installation topic.</td>
<td><em>Adjusting Reel Clearance, page 194</em></td>
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<tr>
<td>Added cross references to the related procedures.</td>
<td><em>5.8.3 Centering Reel, page 196</em></td>
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<tr>
<td>Added illustrations to better indicate measurement location.</td>
<td>- <em>Centering Double Reel, page 196</em></td>
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<td>- <em>Centering Single Reel, page 198</em></td>
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<tr>
<td>Added bundle to Option and Attachments.</td>
<td><em>6.1.5 Short Brace Kit For Center Reel Arm, page 234</em></td>
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<tr>
<td>Updated the Unload and Assembly publication numbers for model year 2018.</td>
<td><em>8.3 Unloading and Assembly, page 273</em></td>
</tr>
<tr>
<td>Moved Recommended Fluids and Lubricants to inside back cover.</td>
<td><em>Recommended Fluids and Lubricants, page</em></td>
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</tbody>
</table>
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 and left designations are determined from the operator’s position, facing forward.

Draper Header

Header Model: ___________________________
Serial Number: _________________________
Year: _________________________________

The serial number plate (A) is located in the lower corner on the left endsheet.

Slow Speed Transport/Stabilizer Wheel Option

Serial Number: _________________________
Year: _________________________________

The serial number plate (A) is located on the right axle assembly.
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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
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 protective clothing and personal safety devices that could be necessary for 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 earmuffs or earplugs to help protect against loud noises.

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

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

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

- Keep 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.
1.4 Maintenance Safety

To ensure your safety while maintaining machine:

- Review operator’s manual and all safety items before operation and/or maintenance of machine.
- Place all controls in Neutral, stop the engine, set the park brake, remove the ignition key, and wait for all moving parts to stop before servicing, adjusting, and/or repairing.
- Follow good shop practices:
  - Keep service areas clean and dry
  - Be sure electrical outlets and tools are properly grounded
  - Keep work area well lit

- Relieve pressure from hydraulic circuits before servicing and/or disconnecting 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 area of bystanders, especially children, when carrying out any maintenance, repairs, or adjustments.
- Install transport lock or place safety stands under frame before working under machine.
- If more than one person is servicing machine at 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 machine.
- Wear heavy gloves when working on knife components.
1.5 Hydraulic Safety

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

- 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.

- Make sure all components are tight and steel lines, hoses, and couplings are in good condition before applying pressure to a hydraulic system.
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 repair part also bears current safety sign.
- Replacement safety signs are available from your Dealer Parts Department.

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 decal in position and slowly peel back remaining paper, smoothing decal as it is applied.
5. Prick small air pockets with a pin and smooth out.
1.7 Safety Decal Locations

Figure 1.15: Upper Cross Auger

Figure 1.16: Slow Speed Transport
SAFETY

Figure 1.17: Slow Speed Transport Tow-Bar

Figure 1.18: Vertical Knife

A - MD #220797
B - MD #220798
A - MD #174684
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)
Figure 1.20: Backtube: 4.5-m (15-ft.) Header

A - MD #184422
B - MD #184372
C - MD #131391
Figure 1.21: Backtube: 6.1-m (20-ft.) Header

SAFETY

A - MD #184372
B - MD #166466
C - MD #131391
Figure 1.22: Backtube: 7.6-m (25-ft.) Header
Figure 1.23: Backtube: 9.1-, 10.6-, 12.1-m (30-, 35-, 40-ft.) Header

A - MD #184372
B - MD #166466
C - MD #131391
D - MD #131392 (9.1-, 10.7-m [30- and 35-Ft.] Double Reel Only)
E - MD #184372 (Split Frame)
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.
- 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.
- 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
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
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.

MD #174632
Reel entanglement hazard

CAUTION

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

MD #174682
Auger entanglement hazard

CAUTION

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

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.
- 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.
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
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.

MD #220799
Transport/roading hazard

WARNING

• Ensure tow-bar lock mechanism is locked.
## 2 Product Overview

### 2.1 Definitions

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

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>API</td>
<td>American Petroleum Institute</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society of Testing and Materials</td>
</tr>
<tr>
<td>Bolt</td>
<td>A headed and externally threaded fastener that is designed to be paired with a nut</td>
</tr>
<tr>
<td>Center-link</td>
<td>A hydraulic cylinder link between header and machine used to change header angle</td>
</tr>
<tr>
<td>CGVW</td>
<td>Combined gross vehicle weight</td>
</tr>
<tr>
<td>D Series header</td>
<td>MacDon D50, D60, and D65 rigid draper headers</td>
</tr>
<tr>
<td>Finger tight</td>
<td>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</td>
</tr>
<tr>
<td>FFFFT</td>
<td>Flats from finger tight</td>
</tr>
<tr>
<td>GSL</td>
<td>Ground speed lever</td>
</tr>
<tr>
<td>GVW</td>
<td>Gross vehicle weight</td>
</tr>
<tr>
<td>Hard joint</td>
<td>A joint made with use of a fastener where joining materials are highly incompressible</td>
</tr>
<tr>
<td>Hex key</td>
<td>A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive); also known as an Allen key and various other synonyms</td>
</tr>
<tr>
<td>hp</td>
<td>Horsepower</td>
</tr>
<tr>
<td>ISC</td>
<td>Intermediate Speed Control</td>
</tr>
<tr>
<td>JIC</td>
<td>Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting</td>
</tr>
<tr>
<td>M Series windrower</td>
<td>MacDon M100, M105, M150, M155, M155E4, M200, and M205 windrowers</td>
</tr>
<tr>
<td>n/a</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Nut</td>
<td>An internally threaded fastener that is designed to be paired with a bolt</td>
</tr>
<tr>
<td>NPT</td>
<td>National Pipe Thread: A style of fitting used for low pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit</td>
</tr>
<tr>
<td>ORB</td>
<td>O-ring boss: A style of fitting commonly used in port opening on manifolds, pumps, and motors</td>
</tr>
<tr>
<td>ORFS</td>
<td>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</td>
</tr>
<tr>
<td>RoHS (Reduction of Hazardous Substances)</td>
<td>A directive by the European Union to restrict use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc platings)</td>
</tr>
<tr>
<td>SAE</td>
<td>Society of Automotive Engineers</td>
</tr>
</tbody>
</table>
## PRODUCT OVERVIEW

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw</td>
<td>A headed and externally threaded fastener that threads into preformed threads or forms its own thread into a mating part</td>
</tr>
<tr>
<td>Self-Propelled (SP) Windrower</td>
<td>Self-propelled machine consisting of a power unit with a header</td>
</tr>
<tr>
<td>Soft joint</td>
<td>A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time</td>
</tr>
<tr>
<td>Truck</td>
<td>A four-wheel highway/road vehicle weighing no less than 3400 kg (7500 lb.)</td>
</tr>
<tr>
<td>Tension</td>
<td>Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)</td>
</tr>
<tr>
<td>TFFT</td>
<td>Turns from finger tight</td>
</tr>
<tr>
<td>Torque</td>
<td>The product of a force X lever arm length, usually measured in Newton-meters (Nm) or foot-pounds (lbf-ft)</td>
</tr>
<tr>
<td>Torque angle</td>
<td>A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned farther a number of degrees to achieve its final position</td>
</tr>
<tr>
<td>Torque-tension</td>
<td>The relationship between assembly torque applied to a piece of hardware and axial load it induces in bolt or screw</td>
</tr>
<tr>
<td>Washer</td>
<td>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</td>
</tr>
</tbody>
</table>
2.2 Specifications

The following symbol and letters are used in Table 2.1, page 23 and Table 2.2, page 26:

<table>
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<tr>
<th>D65</th>
<th>Attachments</th>
</tr>
</thead>
<tbody>
<tr>
<td>S: standard / OF: optional (factory installed) / OD: optional (dealer installed) / —: not available</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.1 Header Specifications

<table>
<thead>
<tr>
<th>Cutterbar</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective cutting width (distance between crop divider points)</td>
<td></td>
</tr>
<tr>
<td>4.6-meter (15-foot) header</td>
<td>4572 mm (180 in.)</td>
</tr>
<tr>
<td>6.1-meter (20-foot) header</td>
<td>6096 mm (240 in.)</td>
</tr>
<tr>
<td>7.6-meter (25-foot) header</td>
<td>7620 mm (300 in.)</td>
</tr>
<tr>
<td>9.1-meter (30-foot) header</td>
<td>9144 mm (360 in.)</td>
</tr>
<tr>
<td>10.7-meter (35-foot) header</td>
<td>10,668 mm (420 in.)</td>
</tr>
<tr>
<td>12.2-meter (40-foot) header</td>
<td>12,192 mm (480 in.)</td>
</tr>
<tr>
<td>Cutterbar lift range at guard tip (center-link fully retracted)</td>
<td>1265 mm (49.8 in.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knife</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-knife drive: one hydraulic motor with V-belt to one heavy duty knife drive box</td>
<td>OF</td>
</tr>
<tr>
<td>Double-knife drive 4.6–7.6-meter (15–35-foot) (timed): one hydraulic motor with two cogged belts to two heavy duty knife drive boxes</td>
<td>OF</td>
</tr>
<tr>
<td>Double-knife drive 12.2-meter (40-foot) (non-timed): two hydraulic motors with banded-belts to two heavy duty knife drive boxes</td>
<td>OF</td>
</tr>
<tr>
<td>Knife stroke</td>
<td>76 mm (3 in.)</td>
</tr>
<tr>
<td>Single-knife speed (strokes per minute)</td>
<td></td>
</tr>
<tr>
<td>6.1–7.6 m (20–25 ft.)</td>
<td>1200–1400</td>
</tr>
<tr>
<td>9.1 m (30 ft.)</td>
<td>1200–1400</td>
</tr>
<tr>
<td>10.7 m (35 ft.)</td>
<td>1100–1300</td>
</tr>
<tr>
<td>12.2 m (40 ft.)</td>
<td>1050–1200</td>
</tr>
<tr>
<td>Double-knife speed (strokes per minute)</td>
<td></td>
</tr>
<tr>
<td>4.6 m (15 ft.)</td>
<td>1500–1900</td>
</tr>
<tr>
<td>6.1–7.6 m (20–25 ft.)</td>
<td>1400–1700</td>
</tr>
<tr>
<td>9.1 m (30 ft.)</td>
<td>1200–1600</td>
</tr>
</tbody>
</table>

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.
### Table 2.1 Header Specifications (continued)

<table>
<thead>
<tr>
<th>Knife Sections</th>
<th>Over-serrated / solid / bolted / 9 serrations per inch</th>
<th>Over-serrated / solid / bolted / 14 serrations per inch</th>
<th>Knife overlap at center (double-knife headers)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 mm (0.12 in.)</td>
<td></td>
<td>S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guards and Hold-Downs</th>
<th>Guard: pointed / forged / double heat treated (DHT) Hold-down: sheet metal / adjustment bolt</th>
<th>Guard: pointed / forged / case hardened (CH) Hold-down: sheet metal / adjustment bolt</th>
<th>Guard: stub / forged bottom / forged top / adjustment plate</th>
<th>Guard: stub / forged bottom / sheet metal top / adjustment bolt</th>
<th>Guard: four point / no-choke design (two long points with tangs / two short points without tangs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O_F</td>
<td>O_F</td>
<td>O_F</td>
<td>O_F</td>
<td>O_F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guard Angle (Cutterbar on Ground)</th>
<th>Center-link retracted</th>
<th>Center-link extended</th>
<th>Center-link fully retracted</th>
<th>Delivery opening height (under frame tube at 203 mm [8 in.] cutting height)</th>
<th>PR15 Pick-Up Reel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.6–7.6 m (15–25 ft.)</td>
<td>6.1, 7.6, 9.1, 10.7</td>
<td>955 mm (37.6 in.)</td>
<td>1105 mm (43.5 in.)</td>
<td>Delivery opening</td>
</tr>
<tr>
<td></td>
<td>9.1–12.2 m (30–40 ft.)</td>
<td>10.7, 12.2 m (20, 25, 30, 35, 40 ft.)</td>
<td>1105 mm (43.5 in.)</td>
<td>1720–1950 mm (67.1–76.7 in.)</td>
<td>Height (under frame tube at 203 mm [8 in.] cutting height)</td>
</tr>
<tr>
<td></td>
<td>7.5 Degrees</td>
<td>17.0 Degrees</td>
<td>S</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conveyor (Draper) and Decks</th>
<th>Draper width</th>
<th>Draper drive</th>
<th>Draper speed</th>
<th>Delivery opening width (center delivery) / variable by shifting decks</th>
<th>Delivery opening width (center delivery) / variable by shifting decks</th>
<th>PR15 Pick-Up Reel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1057 mm (41.6 in.)</td>
<td>Hydraulic</td>
<td>0–225 m/min. (0–742 fpm)</td>
<td>4.6 m (15 ft.)</td>
<td>1540–1770 mm (60.6–69.7 in.)</td>
<td>Delivery opening</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>Height (under frame tube at 203 mm [8 in.] cutting height)</td>
</tr>
</tbody>
</table>

|                             | Center-link fully retracted | Center-link fully extended | 955 mm (37.6 in.) | 1105 mm (43.5 in.)                                                       |                  |
|                             | S                            | S                          | S                | S                                                                        |                  |

**PRODUCT OVERVIEW**
### Table 2.1 Header Specifications (continued)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of tine tubes</td>
<td>5, 6, or 9</td>
</tr>
<tr>
<td>Center tube diameter: all reel sizes except 10.7-meter (35-foot) single reel</td>
<td>203 mm (8 in.)</td>
</tr>
<tr>
<td>10.7-meter (35-foot) single header reel only</td>
<td>254 mm (10 in.)</td>
</tr>
<tr>
<td>Finger tip radius Factory-set</td>
<td>800 mm (31.5 in.)</td>
</tr>
<tr>
<td>Finger tip radius Adjustment range</td>
<td>766–800 mm (30.2–31.5 in.)</td>
</tr>
<tr>
<td>Effective reel diameter (via cam profile)</td>
<td>1650 mm (65 in.)</td>
</tr>
<tr>
<td>Finger length</td>
<td>290 mm (11 in.)</td>
</tr>
<tr>
<td>Finger spacing (staggered on alternate bats)</td>
<td>150 mm (6 in.)</td>
</tr>
<tr>
<td>Reel drive Hydrostatic</td>
<td>S</td>
</tr>
<tr>
<td>Reel speed (auto-adjust from cab using ground speed index)</td>
<td>0–85 rpm S</td>
</tr>
</tbody>
</table>

#### Frame and Structure

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header width (field mode)</td>
<td>Cut width + 384 mm (15.12 in.)</td>
</tr>
<tr>
<td>Header width (transport mode —reel fore-aft fully retracted) Header only</td>
<td>(B)²,³ 2636 mm (104 in.)</td>
</tr>
<tr>
<td>Header width (transport mode —reel fore-aft fully retracted) Header only</td>
<td>(A)²,⁴ 2452 mm (97 in.)</td>
</tr>
<tr>
<td>Header width (transport mode —reel fore-aft fully retracted) With HC10 Hay</td>
<td>(B)²,³ 2834 mm (112 in.)</td>
</tr>
<tr>
<td>Conditioner installed</td>
<td></td>
</tr>
<tr>
<td>Header width (transport mode —reel fore-aft fully retracted) With HC10 Hay</td>
<td>(A)²,⁴ 2650 mm (104 in.)</td>
</tr>
<tr>
<td>Conditioner installed</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2.1: Header Width**

---

2. Refer to Figure 2.1, page 25  
3. Long dividers installed  
4. Long dividers removed
### Table 2.2 Header Attachments

<table>
<thead>
<tr>
<th>Attachments</th>
<th>O_D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HC10 Hay Conditioner</strong></td>
<td></td>
</tr>
<tr>
<td>Roll length</td>
<td>1830 mm (72 in.)</td>
</tr>
<tr>
<td>Outside diameter</td>
<td>232 mm (9.1 in.)</td>
</tr>
<tr>
<td>Roll tube diameter</td>
<td>168 mm (6.6 in.)</td>
</tr>
<tr>
<td>Roll speed</td>
<td>847–915 rpm</td>
</tr>
<tr>
<td><strong>Upper Cross Auger</strong></td>
<td></td>
</tr>
<tr>
<td>Flighting (Outside diameter [O.D])</td>
<td>305 mm (12 in.)</td>
</tr>
<tr>
<td>Tube diameter (O.D)</td>
<td></td>
</tr>
<tr>
<td>All except 7.6 m (25 ft.)</td>
<td>152 mm (6 in.)</td>
</tr>
<tr>
<td>Tube diameter (O.D)</td>
<td></td>
</tr>
<tr>
<td>7.6 m (25 ft.)</td>
<td>178 mm (7 in.)</td>
</tr>
<tr>
<td><strong>Stabilizer Wheel / Slow Speed Transport</strong></td>
<td></td>
</tr>
<tr>
<td>Wheels</td>
<td>381 mm (15 in.)</td>
</tr>
<tr>
<td>Tires</td>
<td>P205/75 R-15</td>
</tr>
</tbody>
</table>

### Weight

Estimated weight range with base header only (variances are due to different package configurations)

<table>
<thead>
<tr>
<th>Header Size</th>
<th>Weight Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6-meter (15-foot)</td>
<td>1329–1497 kg (2937–3302 lb.)</td>
</tr>
<tr>
<td>6.1-meter (20-foot)</td>
<td>1430–1633 kg (3146–3600 lb.)</td>
</tr>
<tr>
<td>7.6-meter (25-foot)</td>
<td>1605–1753 kg (3547–3872 lb.)</td>
</tr>
<tr>
<td>9.1-meter (30-foot)</td>
<td>1981–2178 kg (4370–4812 lb.)</td>
</tr>
<tr>
<td>10.7-meter (35-foot)</td>
<td>2181–2480 kg (4808–5337 lb.)</td>
</tr>
<tr>
<td>12.2-meter (40-foot)</td>
<td>2352–2593 kg (5197–5704 lb.)</td>
</tr>
<tr>
<td>12.2-meter (40-foot)</td>
<td>2461 kg (5437 lb.)</td>
</tr>
</tbody>
</table>
2.3 Component Identification

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.

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.

 важное

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

Engaging Reel Safety Props

1. Raise reel to maximum height.
2. Move reel safety props (A) to engaged position (as shown).

NOTE:

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

Figure 3.3: Reel Safety Prop – Left Side Outer Arm
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.

**Disengaging Reel Safety Props**

1. Raise the reel to maximum height.

2. Move the reel safety props (A) back inside the reel arms.
3. Use the handle (B) to move the lock rod (A) to the outboard position.

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.

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.
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:**
To access the knife drive box, carefully disengage front of endshield from tab 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*.

---

**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).

3. Push in the endshield to engage lower latch (A).

4. Use tool (B) to lock lower latch (A).
5. Replace tool (B) and lynch pin (A) on top pin (C).

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).
**Installing Endshield**

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

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*.
Adjusting Endshield

Polyethylene endshields 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, page 37.

Table 3.1 Gap (X) Chart

<table>
<thead>
<tr>
<th>Temperature °C (°F)</th>
<th>Gap (X) between Endshield and Frame mm (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4 (25)</td>
<td>28 (1-1/8)</td>
</tr>
<tr>
<td>7 (45)</td>
<td>24 (1)</td>
</tr>
<tr>
<td>18 (65)</td>
<td>20 (13/16)</td>
</tr>
<tr>
<td>29 (85)</td>
<td>16 (5/8)</td>
</tr>
<tr>
<td>41 (105)</td>
<td>12 (1/2)</td>
</tr>
<tr>
<td>52 (125)</td>
<td>8 (5/16)</td>
</tr>
<tr>
<td>63 (145)</td>
<td>4 (3/16)</td>
</tr>
<tr>
<td>89 (165)</td>
<td>0</td>
</tr>
</tbody>
</table>
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) (shown in Figure 3.16, page 37) 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 Closing Endshield, page 34.

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 123.

2. Clean all lights and reflective surfaces on the machine.

3. Perform all daily maintenance. Refer to 5.3.1 Maintenance Schedule/Record, page 120.
3.3 Break-In Period

⚠️ CAUTION

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

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

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

1. Operate the machine with the reels, drapers, and knives running slowly for five minutes. Watch and listen FROM THE OPERATOR'S SEAT for binding or interfering parts.
   
   NOTE:
   Reels and side drapers will not operate until oil flow fills the lines.

2. Refer to 5.3.2 Break-In Inspection, page 121 and perform all the specified tasks.
3.4 Shutting down the Machine

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

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

1. Park on level ground whenever possible.
2. Lower the header fully.
3. Place all controls in NEUTRAL or PARK.
4. Disengage the header drive.
5. Lower and fully retract the reel.
6. Stop the engine and remove the key from the ignition.
7. 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
- Header height
- Header angle
- Ground speed
- Knife speed
- Draper speed
- Reel speed
- Reel height
- Reel fore-aft position
3.6 Header Setup

3.6.1 Header Attachments

Several attachments to improve the performance of your D65 Draper Header are available as options that can be installed by your MacDon Dealer. Refer to *6 Options and Attachments, page 233* 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

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

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 55.
6. Refer to 3.7.9 Knife Speed, page 57.
7. Refer to Reel Cam Settings, page 68.
8. Percentage above ground speed. Refer to 3.7.6 Reel Speed, page 56.
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 50.
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 51.
12. Force required to lift header at ends. Refer to your windrower operator’s manual for adjustment procedures.
Table 3.2  Recommended Header Settings (continued)

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Stubble Height mm (in.)</th>
<th>Crop Condition</th>
<th>Divider Rods</th>
<th>Header Angle&lt;sup&gt;13&lt;/sup&gt;</th>
<th>Knife Speed&lt;sup&gt;14&lt;/sup&gt;</th>
<th>Reel Tine Pitch&lt;sup&gt;15&lt;/sup&gt;</th>
<th>Reel Speed %&lt;sup&gt;16&lt;/sup&gt;</th>
<th>Reel Fore-Aft&lt;sup&gt;17&lt;/sup&gt;</th>
<th>Skid Shoe Position&lt;sup&gt;18&lt;/sup&gt;</th>
<th>Stabilizer Wheels&lt;sup&gt;19&lt;/sup&gt;</th>
<th>Upper Cross Auger</th>
<th>Float N (lbf)&lt;sup&gt;20&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>&gt;203 (&gt;8)</td>
<td>Normal</td>
<td>On</td>
<td>0–3</td>
<td>Medium</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Not applicable</td>
<td>Variable</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Cereals</td>
<td>&gt;203 (&gt;8)</td>
<td>Heavy</td>
<td>On</td>
<td>4–7</td>
<td>Medium</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Not applicable</td>
<td>Variable</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Cereals</td>
<td>&gt;203 (&gt;8)</td>
<td>Lodged</td>
<td>On</td>
<td>4–7</td>
<td>Medium</td>
<td>3</td>
<td>5–10</td>
<td>4 or 5</td>
<td>Not applicable</td>
<td>Variable</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Canola</td>
<td>102–203 (4–8)</td>
<td>Light</td>
<td>On</td>
<td>8–10</td>
<td>Medium</td>
<td>2</td>
<td>5–10</td>
<td>6 or 7</td>
<td>Variable</td>
<td>Variable</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Canola</td>
<td>102–203 (4–8)</td>
<td>Normal</td>
<td>On</td>
<td>8–10</td>
<td>Low</td>
<td>1</td>
<td>10</td>
<td>6 or 7</td>
<td>Center or down</td>
<td>Variable</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Canola</td>
<td>102–203 (4–8)</td>
<td>Heavy</td>
<td>On</td>
<td>8–10</td>
<td>Low</td>
<td>1</td>
<td>10</td>
<td>3 or 4</td>
<td>Variable</td>
<td>Variable</td>
<td>Recommended</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Canola</td>
<td>102–203 (4–8)</td>
<td>Lodged</td>
<td>On</td>
<td>8–10</td>
<td>Low</td>
<td>2</td>
<td>5–10</td>
<td>3 or 4</td>
<td>Center or down</td>
<td>Variable</td>
<td>Recommended</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Canola</td>
<td>&gt;203 (&gt;8)</td>
<td>Light</td>
<td>On</td>
<td>8–10</td>
<td>Medium</td>
<td>4</td>
<td>5–10</td>
<td>6 or 7</td>
<td>Not applicable</td>
<td>Variable</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
</tbody>
</table>

---

13. 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 55.
14. Refer to *3.7.9 Knife Speed, page 57.*
15. Refer to *Reel Cam Settings, page 68.*
16. Percentage above ground speed. Refer to *3.7.6 Reel Speed, page 56.*
17. Refer to *3.7.11 Reel Fore-Aft Position, page 59.*
18. 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 50.*
19. 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 51.*
20. Force required to lift header at ends. Refer to your windrower operator’s manual for adjustment procedures.
### Table 3.2 Recommended Header Settings (continued)

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Stubble Height mm (in.)</th>
<th>Skid Shoe Position</th>
<th>Reel Fore-Aft Position %</th>
<th>Reel Tine Pitch</th>
<th>Reel Speed</th>
<th>Knife Speed</th>
<th>Dividend Head Angle Rods</th>
<th>Header Angle</th>
<th>Stabilizer Wheels</th>
<th>Upper Cross Auger</th>
<th>Float N (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canola</td>
<td>&gt;203 (&gt;8)</td>
<td>On</td>
<td>On</td>
<td>On 8–10</td>
<td>2</td>
<td>10</td>
<td>Low</td>
<td>5</td>
<td>3</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Canola</td>
<td>&gt;203 (&gt;8)</td>
<td>On</td>
<td>On</td>
<td>On 8–10</td>
<td>2</td>
<td>10</td>
<td>Low</td>
<td>5</td>
<td>3</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Canola</td>
<td>&gt;203 (&gt;8)</td>
<td>On</td>
<td>On</td>
<td>On 8–10</td>
<td>2</td>
<td>10</td>
<td>Low</td>
<td>5</td>
<td>3</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Flax</td>
<td>51–153 (2–6)</td>
<td>On</td>
<td>On</td>
<td>On 4–7</td>
<td>2</td>
<td>10</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Flax</td>
<td>51–153 (2–6)</td>
<td>On</td>
<td>On</td>
<td>On 4–7</td>
<td>2</td>
<td>10</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Flax</td>
<td>51–153 (2–6)</td>
<td>On</td>
<td>On</td>
<td>On 4–7</td>
<td>2</td>
<td>10</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Edible beans</td>
<td>On ground Light Off</td>
<td>Off</td>
<td>Off</td>
<td>Off 8–10</td>
<td>2</td>
<td>5–10</td>
<td>Medium</td>
<td>2</td>
<td>5–10</td>
<td>Not required</td>
<td>445 (100)</td>
</tr>
</tbody>
</table>

**OPERATION**

1. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. Refer to **Controlling Header Angle** on page 55.

2. Refer to **3.7.9 Knife Speed**, page 57.


4. Percentage above ground speed. Refer to **3.7.6 Reel Speed**, page 56.

5. 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 **3.7.7 Cutting Height**, page 50.

6. 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 51.

7. Force required to lift header at ends. Refer to your windrower operator’s manual for adjustment procedures.
### Table 3.2 Recommended Header Settings (continued)

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>CENTER LINK</th>
<th>SKID SHOES</th>
<th>HEADER ANGLE</th>
<th>HIGH</th>
<th>LIGHT</th>
<th>ON</th>
<th>VANE</th>
<th>REEL</th>
<th>REEL Fore-Aft Position</th>
<th>On</th>
<th>Stabilizer Wheels</th>
<th>Ground</th>
<th>Controlling Header</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge of Field (100)</td>
<td>Up or Center</td>
<td>Storage</td>
<td>Light</td>
<td>6 or 7</td>
<td>10</td>
<td>3</td>
<td>High</td>
<td>On</td>
<td>Light</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Grass</td>
</tr>
<tr>
<td>Edible beans On</td>
<td>Up or Center</td>
<td>Storage</td>
<td>Light</td>
<td>6 or 7</td>
<td>10</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Light</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Grass</td>
</tr>
<tr>
<td>Edible beans On</td>
<td>Up or Center</td>
<td>Storage</td>
<td>Light</td>
<td>6 or 7</td>
<td>10</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Light</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Grass</td>
</tr>
<tr>
<td>Edible beans Off</td>
<td>Up or Center</td>
<td>Storage</td>
<td>Light</td>
<td>6 or 7</td>
<td>10</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Light</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Grass</td>
</tr>
<tr>
<td>Edible beans Off</td>
<td>Up or Center</td>
<td>Storage</td>
<td>Light</td>
<td>6 or 7</td>
<td>10</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Light</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Grass</td>
</tr>
<tr>
<td>Edible beans Off</td>
<td>Up or Center</td>
<td>Storage</td>
<td>Light</td>
<td>6 or 7</td>
<td>10</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Light</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Grass</td>
</tr>
<tr>
<td>Grass Off</td>
<td>Up or Center</td>
<td>Storage</td>
<td>Light</td>
<td>6 or 7</td>
<td>10</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Light</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Grass</td>
</tr>
<tr>
<td>Grass Off</td>
<td>Up or Center</td>
<td>Storage</td>
<td>Light</td>
<td>6 or 7</td>
<td>10</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Light</td>
<td>2</td>
<td>High</td>
<td>On</td>
<td>Grass</td>
</tr>
</tbody>
</table>

30. 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 3.7.11 Reel Fore-Aft Position, page 59.
31. 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 3.7.1 Cutting Height, page 59.
32. Refer to 3.7.6 Reel Speed, page 56.
33. Refer to 3.7.9 Knife Speed, page 57.
34. Knife speed is used to limit the side-to-side movement when cutting off the ground in rolling terrain, and to minimize bouncing. Refer to Controlling Header.
35. Refer to your windrower operator’s manual for adjustment procedures.
<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Stubble Height mm (in.)</th>
<th>Crop Condition</th>
<th>Divider Rods</th>
<th>Header Angle(^\text{37})</th>
<th>Knife Speed(^\text{38})</th>
<th>Reel Tine Pitch(^\text{39})</th>
<th>Reel Speed %(^\text{40})</th>
<th>Reel Fore-Aft(^\text{41})</th>
<th>Skid Shoe Position(^\text{42})</th>
<th>Stabilizer Wheels(^\text{43})</th>
<th>Upper Cross Auger</th>
<th>Float N (lbf)(^\text{44})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>On ground</td>
<td>Normal</td>
<td>On</td>
<td>Variable</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Up or center</td>
<td>Storage</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>On ground</td>
<td>Heavy</td>
<td>On</td>
<td>Variable</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Up or center</td>
<td>Storage</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>On ground</td>
<td>Lodged</td>
<td>On</td>
<td>Variable</td>
<td>High</td>
<td>3</td>
<td>10–15</td>
<td>6 or 7</td>
<td>Up or center</td>
<td>Storage</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
</tbody>
</table>

37. 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 55.
38. Refer to *3.7.9 Knife Speed, page 57*.
39. Refer to *Reel Cam Settings, page 68*.
40. Percentage above ground speed. Refer to *3.7.6 Reel Speed, page 56*.
41. Refer to *3.7.11 Reel Fore-Aft Position, page 59*.
42. 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 50*.
43. 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 51*.
44. Force required to lift header at ends. Refer to your windrower operator’s manual for adjustment procedures.
3.6.3 Reel Settings

The following chart illustrates the reel profile at each cam setting and the reel location relative to the ground at different positions on the reel arm. Refer to 3.6.2 Header Settings, page 42 for applicability of each finger pattern and reel position.

**NOTE:**
The Recommended Reel Settings chart is also applicable for reel tines.

**Table 3.3 D65 Recommended Reel Settings**

<table>
<thead>
<tr>
<th>Cam Setting Number (Finger Speed Gain)</th>
<th>Reel Position Number</th>
<th>Reel Finger Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (0)</td>
<td>6 or 7</td>
<td>![Image of reel finger pattern]</td>
</tr>
<tr>
<td>2 (20%)</td>
<td>3 or 4</td>
<td>![Image of reel finger pattern]</td>
</tr>
</tbody>
</table>
### Table 3.3  D65 Recommended Reel Settings (continued)

<table>
<thead>
<tr>
<th>Cam Setting Number (Finger Speed Gain)</th>
<th>Reel Position Number</th>
<th>Reel Finger Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 (30%)</td>
<td>6 or 7</td>
<td><img src="1001921" alt="Image" /></td>
</tr>
<tr>
<td>4 (35%)</td>
<td>2 or 3</td>
<td><img src="1001922" alt="Image" /></td>
</tr>
</tbody>
</table>

**NOTE:**
- Adjust the reel forward to position the fingers closer to the ground, while tilting the header back. Fingers/tines will dig into the ground at extreme reel-forward positions, so adjust skid shoes or header angle to compensate.
- Adjust the reel aft in thinner crops to prevent plugging on the cutterbar.
- Increase the header angle to position the reel closer to the ground, or decrease angle to position the reel farther from the ground.
- Raise header, increase header angle, and position reel fully forward in lodged crop for maximum stubble height.
- Minimum crop carrying capacity (minimum area of exposed draper between the reel and the header backsheets) occurs with the reel in the farthest aft position.
- Maximum crop carrying capacity (maximum area of exposed draper between the reel and the header backsheets) occurs with the reel in the farthest forward position.
- The finger tip speed at the cutterbar is higher than the reel speed at higher cam settings due to the nature of the cam action. Refer to Table 3.3, page 48.
3.7 Header Operating Variables

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

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

The variables listed in Table 3.4, page 50 (and detailed on the following pages) will affect the header performance.

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

**Table 3.4 Operating Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Refer to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting Height</td>
<td>3.7.1 Cutting Height, page 50</td>
</tr>
<tr>
<td>Header Float</td>
<td>3.7.4 Header Float, page 55</td>
</tr>
<tr>
<td>Header Angle</td>
<td>3.7.5 Header Angle, page 55</td>
</tr>
<tr>
<td>Reel Speed</td>
<td>3.7.6 Reel Speed, page 56</td>
</tr>
<tr>
<td>Ground Speed</td>
<td>3.7.7 Ground Speed, page 56</td>
</tr>
<tr>
<td>Draper Speed</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Knife Speed</td>
<td>3.7.9 Knife Speed, page 57</td>
</tr>
<tr>
<td>Reel Height</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>Reel Fore-Aft Position</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
</tr>
<tr>
<td>Reel Tine Pitch</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
</tr>
<tr>
<td>Crop Divider Rods</td>
<td>3.7.14 Crop Divider Rods, page 75</td>
</tr>
</tbody>
</table>

3.7.1 Cutting Height

The D65 Draper Header is capable of cutting the crop to a desired stubble height or cutting as close as possible to the ground. Cutting height will vary depending on the type of crop, crop conditions, etc.

3.7.2 Cutting off the Ground

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

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

The stabilizer wheel system (or stabilizer/slow speed transport wheel system) is available only for 9.1-, 10.7-, and 12.2-meter (30-, 35-, and 40-foot) headers.
Adjusting Stabilizer/Slow Speed Transport Wheels

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

⚠️ DANGER

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

1. Raise the header so the stabilizer wheels are off the ground. Shut down engine and remove key.

2. Check that the float is working properly. Refer to your windrower operator's manual for instructions.

3. Remove hairpin (A) from the latch on the right wheel assembly.

4. Disengage latch (B), lift the wheel out of the hook, and place wheel on the ground as shown. (This reduces weight of assembly and makes adjusting the wheel position easier.)

5. Lift the left wheel slightly to support weight, and pull handle (C) upwards to release the lock.

6. Lift the left wheel to the desired height and engage the support channel in slot (D) in the upper support.

7. Push down on handle (C) to lock.

8. Lift the right wheel back into the field position and ensure latch (B) is engaged.

9. Secure the latch with hairpin (A).

10. Support the wheel weight by lifting slightly with one hand, and pull up on handle (A) to release the lock.

11. Lift the wheels to the desired height, and engage the support channel into slot (B) in the upper support.

12. Push down on handle (A) to lock.
13. Lower the header to the desired cutting height using the windrower controls and check the load indicator (A).

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

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

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

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**Adjusting Stabilizer Wheels**

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

⚠️ **DANGER**

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

⚠️ **CAUTION**

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

1. Raise the header until the stabilizer wheels are off the ground. Shut down engine and remove the key.
2. Support the wheel weight by lifting slightly with one hand on handle (B), and pull up on handle (A) to release the lock.

3. Lift the wheel using handle (B), and engage the support channel into center slot (C) in the upper support.

4. Push handle (A) down to lock.

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

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

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

### 3.7.3 Cutting on the Ground

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

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

Refer to the following for additional information:

- Adjusting Inner Skid Shoes, page 54
- Adjusting Outer Skid Shoes, page 54
- 3.7.5 Header Angle, page 55
- 3.7.4 Header Float, page 55

**Adjusting Inner Skid Shoes**

![Figure 3.26: Inner Skid Shoe](image)

**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 52
   - Adjusting Stabilizer/Slow Speed Transport Wheels, page 51
3. Remove lynch pin (A) from each skid shoe.
4. Hold shoe (B) and remove pin (C) by disengaging from the frame and pulling away from the shoe.
5. Raise or lower skid shoe (B) to achieve the desired position using the holes in support (D) as a guide.
6. Install 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.

**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:
3. Remove lynch pin (A) from each skid shoe (B).
4. Hold shoe (B) and remove adjustment pin (C) by disengaging from the frame and pulling away from the shoe.
5. Raise or lower skid shoe (B) to achieve the desired position using the holes in the support 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.

3.7.4 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.

3.7.5 Header Angle

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

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

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

Controlling Header Angle

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

Refer to your windrower operator’s manual for adjustment details.
3.7.6 Reel Speed

Reel speed is one of the factors that determines how crop is moved from the cutterbar onto the drapers. The reel performs best when it appears to be driven by the ground. It should move the cut crop evenly through the cutterbar and onto the drapers without bunching and with minimal disturbance.

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

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

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

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

NOTE:
Nine-bat reels are available on 4.6-, 6.1-, and 7.6-meter (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 reel drive sprocket that is suitable for most crops. Other sprockets are available that provide more torque to the reel in heavy cutting conditions, or higher reel speeds in light crops when operating at increased ground speeds.

For installation details, refer to 5.9.3 Replacing Reel Drive Sprocket, page 222.

3.7.7 Ground Speed

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

Refer to 3.10 Windrow Types, page 85 for effects of ground speed on windrow formation.

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

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

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

Figure 3.29, page 57 illustrates the relationship between ground speed and area cut for the various sized headers.
Figure 3.29: Ground Speed vs Acres

Example: A 7.6-meter (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.

### 3.7.8 Draper Speed

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

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

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

### 3.7.9 Knife Speed

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

<table>
<thead>
<tr>
<th>Header Size</th>
<th>Recommended Knife Speed Range (spm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single Knife</td>
</tr>
<tr>
<td>4.6 m (15 ft.)</td>
<td>—</td>
</tr>
<tr>
<td>6.1-7.6 m (20-25 ft.)</td>
<td>1200–1400</td>
</tr>
</tbody>
</table>
Table 3.5 Knife Speed Guidelines (continued)

<table>
<thead>
<tr>
<th>Header Size</th>
<th>Recommended Knife Speed Range (spm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single Knife</td>
</tr>
<tr>
<td>9.1 m (30 ft.)</td>
<td>1200–1400</td>
</tr>
<tr>
<td>10.7 m (35 ft.)</td>
<td>1100–1300</td>
</tr>
<tr>
<td>12.2 m (40 ft.)</td>
<td>1050–1200</td>
</tr>
</tbody>
</table>

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).

**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 3.7.9 Knife Speed, page 57.
7. Contact your MacDon Dealer if the pulley rpm measurement exceeds the specified rpm range for your header.
3.7.10 Reel Height

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

Set the reel height to carry material past the knife and onto the drapers with minimal disturbance and damage to the cut crop. Refer to 3.7.11 Reel Fore-Aft Position, page 59.

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 reel clearance to prevent fingers contacting the knife or the ground. Refer to 5.8.1 Reel Clearance to Cutterbar, page 192.

3.7.11 Reel Fore-Aft Position

Reel fore-aft position is a critical factor for achieving the best results in adverse conditions. The reel position 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.) farther 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 63.

For single-reel headers, refer to Repositioning Fore-Aft Cylinders on Single Reel, page 60.

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 55 for adjustment instructions. Adjust reel position only if header angle adjustments are not satisfactory.
Adjusting Reel Fore-Aft Position

1. Select FORE-AFT mode on the selector switch in the cab.
2. Operate the hydraulics to move the reel to the desired position while using decal (A) as a reference.
3. Check the reel clearance to cutterbar after making changes to the cam setting. Refer to the following for measurement and adjustment procedures:
   - 5.8.1 Reel Clearance to Cutterbar, page 192
   - 5.8.2 Reel Frown, page 195

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.

Repositioning Fore-Aft Cylinders on Single Reel

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

⚠️ DANGER

To avoid 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.
Reposition the left reel arm cylinder as follows:

NOTE:
Reel components not shown in illustration for improved clarity.

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

10. Reposition the bracket/light assembly (C) on the reel arm as shown, and secure with four bolts (D). Tighten bolts.
11. Push the reel back and attach cylinder (B) to the bracket/light assembly (C) with pin (A). Secure pin with cotter pin.
12. Secure the light harness to the bracket/light assembly (C) using a cable tie.
13. Check the reel clearance to the backsheet, upper cross auger (if installed), and reel braces.
14. Adjust the reel tine pitch if necessary. Refer to 3.7.12 Reel Tine Pitch, page 68.

---

**Figure 3.36: Forward Position**

**Figure 3.37: Rearward Position**
Repositioning Fore-Aft Cylinders on Double Reel

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

⚠️ DANGER

To avoid 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.

NOTE:
To move a split reel into canola position, the Short Brace Kit for Center Reel Arm (B5605) is required.

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. Position reel until bracket (B) lines up with desired position holes (C):
   - Forward position, refer to Figure 3.38, page 63
   - Rearward position, refer to Figure 3.39, page 63
5. Reinstall four bolts (A) to secure bracket (B) to reel arm at new position.

![Figure 3.38: Forward Position](image)

![Figure 3.39: Rearward Position](image)
**Reposition right arm cylinder as follows:**

**NOTE:**
Reel components not shown in illustration for clarity.

1. Remove four bolts (A) securing cylinder bracket (B) to the reel arm.
2. Position reel until bracket (B) lines up with desired position holes (C):
   - Forward position, refer to Figure 3.40, page 64
   - Rearward position, refer to Figure 3.41, page 64
3. Reinstall the four bolts (A) to secure bracket to reel arm at new position.
Reposition the left reel arm cylinder as follows:

NOTE:
Reel components not shown in illustration for 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. If necessary, remove the cable tie securing the harness to the bracket/light assembly (C) or reel arm.
4. Swivel the light to the working position as shown.

5. Reposition 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 bracket/light assembly (C) with pin (A). Secure pin with cotter pin.
7. Secure the light harness to bracket/light assembly (C) using a cable tie.
8. Check the reel clearance to the backsheat, upper cross auger (if installed), and reel braces.
9. Adjust the reel tine pitch if necessary. Refer to 3.7.12 Reel Tine Pitch, page 68.
Repositioning Fore-Aft Cylinders with Multi-Crop Rapid Reel Conversion Option

The reel can be moved approximately 227 mm (9 in.) farther aft by repositioning the fore-aft cylinders on the reel arms. The Multi-Crop 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 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 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
Reposition the center arm cylinder as follows:

NOTE:
Reel components not shown in illustration for clarity.

1. Remove cotter pin (A) and clevis pin (B).
2. Push the reel back until 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).
Reposition the right arm cylinder as follows:

NOTE:
Reel components not shown in illustration for 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

3.7.12 Reel Tine Pitch

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

Finger positioning, relative to the ground (tine pitch), is not significantly affected by the cam setting. For example, with the cam position range at 33°, the corresponding finger pitch range is only 5° at the lowest point of the reel’s rotation.

For the best results, use the minimum cam setting that delivers the crop past the rear edge of the cutterbar and onto the drapers. 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 70 if adjustments are necessary.
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.

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.

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.
**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.

Figures 3.53: Finger Profile – Cam Position 4

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

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

**NOTE:**

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

**IMPORTANT:**

The reel to cutterbar clearance should always be checked following adjustments to reel tine pitch and reel fore-aft position. Refer to *5.8.1 Reel Clearance to Cutterbar, page 192*.

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.
1. Turn 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 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 latch pin (A) clockwise to engage and lock the cam disc.

4. Repeat Steps 1, page 71 to 3, page 71 for the opposite reel.

   **IMPORTANT:**
   Ensure the cam is secured into position before operating the machine.

### 3.7.13 Crop Dividers

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

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

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

**DANGER**

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

1. Lower reel, raise header, stop engine, remove key, and engage header safety props. 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.
5. Lift crop divider off endsheet and store as follows:
   a. Insert pin on crop divider into hole in endsheet at location (A) shown.
   b. Lift crop divider and position lugs (B) on crop divider into bracket on endsheet. Ensure lugs engage bracket.
6. Close or install endshields. Refer to 3.2.3 Endshields, page 33.

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.

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.

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.

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).
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.

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

5. Lift forward end of crop divider and install bolt (A) and special stepped washer (B) (step towards divider). Tighten bolt.

6. Pull at the tip of the crop divider and ensure there is no lateral movement. If necessary, adjust bolts (C) to tighten crop divider and eliminate lateral movement.

7. Close or install endshields. Refer to 3.2.3 Endshields, page 33.

3.7.14 Crop Divider Rods

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

Table 3.6 Crop Divider Rods Recommended Use

<table>
<thead>
<tr>
<th>With Divider Rods</th>
<th>Without Divider Rods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>Lodged cereal</td>
</tr>
<tr>
<td>Canola</td>
<td>Peas</td>
</tr>
<tr>
<td>Flax</td>
<td>Soybeans</td>
</tr>
<tr>
<td>Grass seed</td>
<td>Sudan grass</td>
</tr>
<tr>
<td>Lentils</td>
<td>Winter forage</td>
</tr>
<tr>
<td>Edible beans</td>
<td>Milo</td>
</tr>
<tr>
<td>Milo</td>
<td>Rice</td>
</tr>
<tr>
<td>Rice</td>
<td>Soybeans</td>
</tr>
<tr>
<td>Soybeans</td>
<td>Standing cereal</td>
</tr>
</tbody>
</table>
Removing Crop Divider Rods

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

2. Store both crop divider rods (A) inboard on the right 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 241.

The installation and removal procedures are the same as for standard crop divider rods.
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 85 for the strengths and weaknesses of the various windrow configurations with respect to these factors.

Also refer to 3.9 Double Windrowing, page 81.

3.8.1 Adjusting Delivery Opening on Header with Manual Deck Shift

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

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

1. Loosen bolts (A) on both decks.

2. Slide decks to the desired opening width. Retighten bolts (A).

Figure 3.68: Manual Deck Shift
3.8.2 Adjusting Delivery Opening on Header with Hydraulic Deck Shift

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

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

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

3. Reinstall bolts (A) and tighten.

---

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

4. Measure to ensure chain midpoint (A) is 25–50 mm (1–2 in.) lower than the chain ends (B).
5. Tighten jam nut.
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 Shown, Right Similar
3.9 Double Windrowing

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

Double windrowing is performed with the 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. Refer to

- 3.9.1 Shifting Decks Hydraulically, page 81
- 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 9.1 m (30 ft.) Refer to 3.9.3 Using Double Windrow Attachment (DWA), page 83.

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 7.6-, 9.1-, 10.7-m (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:
9.1-meter (30-foot) 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.

3.9.2 Shifting Decks Manually

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

DANGER

To avoid bodily injury or death from unexpected start-up of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
To deliver crop from the right end, move the decks to the left end of the header as follows:

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

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

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

**NOTE:**
To deliver crop from the left end, move the decks to the right end of the header following the steps above.
To lay a double-windrow, do the following:

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

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

3.9.3 Using Double Windrow Attachment (DWA)

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

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

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.

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

### Table 3.7 Windrow Descriptions

<table>
<thead>
<tr>
<th>Windrow Type</th>
<th>Description</th>
<th>Weight Distribution</th>
<th>Curing</th>
<th>Weatherability</th>
<th>Machine Setting Guidelines</th>
</tr>
</thead>
</table>
| Herringbone  | The most desirable form of windrow, stalks are crossed and interwoven. Heads are distributed across full width of windrow. This windrow can be formed by center delivery only. | Good | Good | Excellent | • Reel and ground speed approximately equal  
|              |             |                     |        |                |   • Medium draper speed  
|              |             |                     |        |                |   • Center delivery |
| Fantail      | The stalks are crossed in the center and the heads are in line along outside edges. This windrow can be formed by center delivery only. | Fair | Fair | Fair | • Low draper speed  
|              |             |                     |        |                |   • Low header angle  
|              |             |                     |        |                |   • Center delivery |
| Dovetail     | The stalks are lined along outside edges of windrow and heads are crossed in center. This windrow can be formed by center delivery only. | Poor | Fair | Poor | • High draper speed  
|              |             |                     |        |                |   • High header angle  
|              |             |                     |        |                |   • Center delivery |
| Parallel     | The stalks are parallel to windrow and heads evenly distributed across width of windrow. This windrow can be formed by center delivery or end delivery. | Good | Good | Good | • Medium draper speed  
|              |             |                     |        |                |   • Medium header angle  
|              |             |                     |        |                |   • Center or end delivery |
### Table 3.7 Windrow Descriptions (continued)

<table>
<thead>
<tr>
<th>Windrow Type</th>
<th>Description</th>
<th>Weight Distribution</th>
<th>Curing</th>
<th>Weatherability</th>
<th>Machine Setting Guidelines</th>
</tr>
</thead>
</table>
| 45° Diagonal | 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. | Poor | Fair | Poor | • Low reel speed  
• Less aggressive tine pitch  
• End delivery or center delivery if crop is leaning |
| 75° Diagonal | 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. | Fair | Good | Fair | • 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.

<table>
<thead>
<tr>
<th>Level</th>
<th>% Moisture</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet</td>
<td>Over 45%</td>
<td>Soil is muddy</td>
</tr>
<tr>
<td>Damp</td>
<td>25–45%</td>
<td>Shows footprints</td>
</tr>
<tr>
<td>Dry</td>
<td>Under 25%</td>
<td>Surface is dusty</td>
</tr>
</tbody>
</table>

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

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

3.11.3 Weather and Topography

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

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

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

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

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

3.11.4 Windrow Configuration

The following windrow characteristics are desirable:
Table 3.8 Windrow Characteristics

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High and fluffy</td>
<td>Movement of air through the windrow is more important to the curing process than is direct sunlight.</td>
</tr>
<tr>
<td>Consistent formation, not bunchy</td>
<td>Permits an even flow of material into the baler, chopper, etc. and allows for more even drying.</td>
</tr>
<tr>
<td>Even distribution of material across windrow</td>
<td>Results in even and consistent bales to minimize handling and stacking problems.</td>
</tr>
<tr>
<td>Properly conditioned</td>
<td>Prevents excessive leaf damage.</td>
</tr>
</tbody>
</table>

Refer to 3.7 Header Operating Variables, page 50 for instructions on adjusting the header.

3.11.5 Driving on Windrow

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

NOTE:

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

3.11.6 Raking and Tedding

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

There is little or no advantage to raking or tedding if the ground beneath the windrow is dry. Large windrows on damp or wet ground should be turned over when they reach 40–50% moisture.

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

3.11.7 Chemical Drying Agents

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

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

1. If header is not level, check pressure of windrower’s tires to ensure they are properly inflated (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 245.
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](image)

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.

3.14.2 Installing Beater Bars

**WARNING**

To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key before adjusting machine.
1. Lower the header to the ground, stop the engine, and remove the key from the ignition.

2. Position one beater bar (B) and one clamp set (C) onto the auger tube and loosely secure with carriage bolt (A) and nut. Bolt head **MUST** face the direction of auger rotation.

3. Position the remaining clamp sets (C) onto the auger tube and loosely attach to 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.

**NOTE:**
To reduce the chance of wrapping, offset the beater bars by 90 degrees.

5. Tighten bolts.
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 seven-pole plug wiring harness to mating receptacle on towing vehicle. (The seven-pole receptacle is available from your MacDon Dealer parts department).
- Ensure lights are functioning properly and clean the slow moving vehicle sign and other reflectors. Use flashing warning lights unless prohibited by law.

Towing the Header

⚠️ CAUTION

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

- Do NOT exceed 32 km/h (20 mph). Reduce transport speed to less than 8 km/h (5 mph) for corners and slippery or rough conditions.
- Turn corners at only very low speeds 8 km/h ([5 mph] or less). Header stability is reduced while cornering 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.
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 detach outer section (C) from inner section (D).

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

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

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).
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 98
   - Moving Rear (Right) Wheels into Field Position, page 99
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 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.

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.
7. Lift the wheel assembly to the desired height and slide linkage (A) into the appropriate slot in the vertical support.

8. Push handle (B) down to lock.

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.

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.
6. Pull pin (A) on brace (B) on the left wheel in front of the cutterbar. Disengage the brace from the cutterbar, and lower the brace against axle (C).

7. Remove pin (D), lower support (E) onto axle, and reinsert pin into support.

8. Swing the axle (C) clockwise towards the rear of the header.

9. Pull pin (A) on right wheel, swivel the wheel counterclockwise to position shown, and lock with pin (A).

10. Remove hairpin (B) from latch (C).

11. Lift the wheel, lift latch (C), and engage lug (D) onto the left axle. Ensure the latch closes.

12. Secure the latch with hairpin (B), ensuring the open end of the pin faces the rear of the windrower.

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

**IMPORTANT:**
Check that wheels are locked and that handle is in locked position.
13. Complete the conversion by ensuring the left side (A) and right side (B) wheels are in the position shown.

![Figure 3.96: Field Position](image)

### 3.15.4 Converting from Field to Transport Position

*Moving Front (Left) Wheels into Transport Position*

**DANGER**

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

**CAUTION**

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

1. Pull handle (B) upwards to release and raise 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](image)
3. Remove the hairpin and clevis pin (A).

4. Pull latch handle (B) to release suspension linkage (C), and pull the suspension linkage away from the spindle (D).

5. Lower the wheels slowly.

6. Lower handle (B) to lock.
7. Remove pin (A) from storage at the top of leg (B).

8. Move and swivel the wheels clockwise until connector (C) is turned towards the front end of the header.

9. Insert pin (A) and turn to lock.

10. Lower the header until the left wheels are just touching the ground.

---

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.
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.

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

9. Pull the pin (A) and swivel the right rear wheel (B) clockwise 90°.
10. Lock the wheel (A) with pin (B). Move the right axle (C) to the front of the header.

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 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 111.

15. Start the windrower and lower the header to the ground.
**Attaching Tow-Bar**

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

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

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

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

10. Secure the two halves together with L-pin (A) and then turn to lock. Secure the L-pin with ring (B).

11. Connect the electrical harness to connector (C).
12. Position tow-bar (A) onto the axle, and push against latch (B) until the tow-bar pins drop into hooks (C).
13. Check that latch (B) has engaged the tow-bar.
14. Install clevis pin (D) and secure with hairpin.
15. Connect electrical harness (A) at the front wheel.
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 8.2 Torque Specifications, page 262.
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 hose support and route to header.
5. Push hose connectors onto mating receptacle until collar on receptacle snaps into locked 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.

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

10. Before connecting reel hydraulics, check connectors and clean if required.
11. Open cover on header receptacle (A).
12. Push in lock button (B) and pull handle (C) to half-open position.

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

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

1. Fully lower the reel.

*To disconnect the reel hydraulics:*

2. 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.

4. Close cover on header receptacle (A).

Figure 4.8: Reel Hydraulics

Figure 4.9: Closed Receptacle Cover
To disconnect the header drive hydraulics:

5. Disengage and rotate lever (A) counterclockwise to fully up position.
6. Disconnect electrical connector from header.

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).

To store hose bundle on windrower support:

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.
5 Maintenance and Servicing

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

Log hours of operation and use the maintenance record provided (refer to 5.3.1 Maintenance Schedule/Record, page 120) to keep track of your scheduled maintenance.

5.1 Preparing Machine for Servicing

⚠️ DANGER

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

⚠️ CAUTION

To avoid personal injury, follow all the safety precautions listed before servicing header or opening drive covers.

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

5.2.1 Installing a Roller Chain

To install a roller chain, follow these steps:

⚠️ DANGER

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

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

5.2.2 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 and 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. Loosen the flangette bolts on the mating bearing one turn and then retighten. This will allow the bearing to properly line up.
5.3 Maintenance Requirements

Periodic maintenance requirements are organized according to service intervals.

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

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

Log hours of operation, use the maintenance record, and keep copies of your maintenance records (refer to 5.3.1 Maintenance Schedule/Record, page 120).

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 117 and 1 Safety, page 1.
## 5.3.1 Maintenance Schedule/Record

Copy this page to continue record.

<table>
<thead>
<tr>
<th>Maintenance Record</th>
<th>Action:</th>
<th>✓ - Check</th>
<th>✦ - Lubricate</th>
<th>▲ - Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hour Meter Reading</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serviced by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

First Use, refer to [5.3.2 Break-In Inspection, page 121](#)

End of Season, refer to [5.3.4 End-of-Season Service, page 122](#)

### 10 Hours or Daily\(^\text{45}\)

- ✓ Hydraulic hoses and lines\(^\text{46}\)
- ✓ Knife sections, guards, and hold-downs\(^\text{46}\)
- ✓ Tire pressure\(^\text{46}\)
- ✦ Knife (except in sandy conditions)\(^\text{46}\)

### 25 Hours

- ✦ Knifehead(s)\(^\text{46}\)

### 50 Hours

- ✓ Draper roller bearings

- ▲ Knife drive box oil - first 50 hours only

### 100 Hours or Annually\(^\text{45}\)

- ✓ 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 bearing

---

45. Whichever occurs first.

46. A record of daily maintenance is not required, but is at the Owner’s/Operator’s discretion.
### 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.

<table>
<thead>
<tr>
<th>Inspection Interval</th>
<th>Item</th>
<th>Refer To</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 hours</td>
<td>Check for loose hardware. Tighten to required torque.</td>
<td>8.2 Torque Specifications, page 262</td>
</tr>
<tr>
<td>5 hours</td>
<td>Check knife drive belts tension. Periodically check for first 50 hours.</td>
<td>Tensioning Timed Knife Drive Belts, page 163</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tensioning Non-Timed Knife Drive Belts, page 159</td>
</tr>
<tr>
<td>10 hours</td>
<td>Check knife drive box mounting bolts.</td>
<td>Checking Mounting Bolts, page 150</td>
</tr>
<tr>
<td>50 hours</td>
<td>Change knife drive box lubricant.</td>
<td>Changing Oil in Knife Drive Box, page 157</td>
</tr>
</tbody>
</table>
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 124.
2. Adjust the tension on the drive belts depending on your equipment. Refer to Tensioning Non-Timed Knife Drive Belts, page 159.
3. Perform all the annual maintenance. Refer to 5.3.1 Maintenance Schedule/Record, page 120.

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.
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 118.

### 5.3.5 Checking Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

> **WARNING**

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

- 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.

### 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 117.

Refer to the inside back cover for recommended lubricants.

Log hours of operation and use the Maintenance Record provided to keep a record of scheduled maintenance. Refer to 5.3.1 Maintenance Schedule/Record, page 120.
Service Intervals

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

IMPORTANT:

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

Knife (except in sandy conditions):

Lubricate every 10 hours or daily.

Knifehead:

Lubricate every 25 hours.

NOTE:

To prevent binding and/or excessive wear caused by knife pressure on the guards, do NOT overgrease 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 137.

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 5.5: Every 10 Hours or Daily

Figure 5.6: Every 25 Hours

A - Knifehead (Single Knife [1 Place]; Double Knife [2 Places])
Figure 5.7: Every 100 Hours

A - Knife Drive Box (Check Oil Level Between Lower Hole and End of Dipstick [B])
B - Upper Cross Auger Bearing (1 Place)
C - Reel Drive Chain (1 Place) (Double Reel Shown – Single Reel Similar)
D - Hydraulic Couplers (Use WD40® or Equivalent)
47. 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.
48. U-joint has an extended lubrication cross and bearing kit. Stop greasing when greasing becomes difficult or if U-joint stops taking grease. Overgreasing will damage U-joint. Six to eight pumps are sufficient at first grease (factory). Decrease grease interval as U-joint wears and requires more than six pumps.
Figure 5.10: Every 500 Hours

A - Reel Right Bearing (1 Place)
C - Wheel Bearings (4 Places)
B - Reel Center Bearing (1 Place)
D - Reel Left Bearing (1 Place)
**Greasing Procedure**

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

⚠ **DANGER**

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

Refer to the inside back cover for recommended lubricants.

Log hours of operation and use the Maintenance Record provided to keep a record of scheduled maintenance. Refer to 5.3.1 *Maintenance Schedule/Record, page 120.*

![Figure 5.11: Greasing Interval Decal](image)
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.

**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.

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

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

*Lubricating Reel Drive Chain – Double Reel*

⚠️ **DANGER**

To avoid bodily injury or death from unexpected start-up of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
1. Stop the engine and remove the key from the ignition.
2. Remove six bolts (A) securing upper cover (B) to the reel drive and lower cover (C).
3. Remove three bolts (A) and remove lower cover (B) if necessary.
4. Apply a liberal amount of grease to the chain (A).
5. Position lower drive cover (B) onto the reel drive (if previously removed) and secure with three bolts (A).

6. Position upper drive cover (B) onto the reel drive and lower cover (C), and secure with six bolts (A).
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 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 taillight (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 117.

**CAUTION**
Wear heavy gloves when working around or handling knives.

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 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.

**IMPORTANT:**
Do NOT mix fine and coarse sections on the same knife.
7. Reposition bars (C) and/or (D) on knife (A) and install lock nuts (B).

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

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

5.5.2 Removing Knife

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

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

1. Stop engine and remove the key from ignition.
2. Stroke the knife manually to its outer limit.
3. Clean the area around the knifehead.
4. Remove bolt (A).
5. Remove 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.
5.5.3 Removing Knifehead Bearing

**WARNING**

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

**WARNING**

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

**IMPORTANT:**

Repeat this procedure for each knife.

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the knife. 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 pin (A). Tap seal (B), bearing (C), plug (D), and O-ring (E) from the underside of the knifehead.

**NOTE:**

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

![Figure 5.27: Knifehead Bearing Assembly](image-url)
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 with the same approximate diameter as bearing (C), and push the bearing into the knifehead until the top of the bearing is flush with the step in the knifehead.

3. Install seal (B) into knifehead with the lip facing outwards.  
   **IMPORTANT:**  
   To prevent premature knifehead or knife drive box failure, ensure there’s a tight fit between knifehead pin (A) and the needle bearing, and also between the knifehead pin and the output arm.

4. Install the knife. Refer to 5.5.5 Installing Knife, page 138.

5.5.5 Installing Knife

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

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

1. Stop engine and remove the key from ignition.
2. Slide the knife into place and align the knifehead with the output arm.
3. For ease of removing or installing knifehead pin, remove grease zerk from pin.
4. Install knifehead pin (A) through the output arm and into the knifehead. Tap knifehead pin (A) down, make sure the pin is seated at the bottom of the knifehead.
5. Set groove (B) in the knifehead pin 1.5 mm (1/16 in.) above output arm (C). Secure with 5/8 in. x 3 in. hex head bolt and nut (D), and torque to 217 Nm (160 lbf·ft).
6. Using a feeler gauge, check that the gap at location (E) is 0.25 mm (0.01 in.).
7. Install 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. Overgreasing will lead to knife misalignment which causes guards to overheat and drive systems to overload.

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

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

*Adjusting Knife Guards*

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

**NOTE:**
Use guard straightening tool (MD #140135) available from your MacDon Dealer.
1. Stop engine and remove the key from ignition.

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

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

**NOTE:**
If crop is difficult to cut, install stub guards with top guards and adjuster plates. A kit is available from your MacDon Dealer. Refer to 6.2.3 Stub Guard Conversion Kit, page 237.

---

**Replacing Pointed Guards**

*Normal, drive side, and end guard replacement*

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

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

2. Stroke the knife manually until the knife sections are spaced midway between the guards.

3. Remove two nuts (B) and bolts attaching guard (A) and hold-down (C) (if applicable) to the cutterbar.

4. Remove guard (A), hold-down (C), and plastic wearplate (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.

6. Position the new guard (A), hold-down (C), and plastic wearplate (if applicable) onto the cutterbar. Secure with two nuts (B) and bolts, but do NOT tighten.

7. Check and adjust the clearance between the hold-downs and the knife. Refer to Checking Knife Hold-Downs, page 145.

**NOTE:**
The guard at the center of a double-knife header (where the two knives overlap) requires a different replacement procedure. Refer to Steps 1., page 142 through 5., page 142.
**Center guard replacement**

**WARNING**

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

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

**IMPORTANT:**

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

**NOTE:**

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

5. Check and adjust the clearance between the hold-down and knife. Refer to *Checking Knife Hold-Downs, page 145.*

---

**Replacing Stub Guards**

Stub guards, complete with hold-downs and adjuster plates, are designed to cut tough crops. Stub guards are available for 4.6-, 6.1-, 7.6-, 9.1-, and 10.7-meter (15-, 20-, 25-, 30-, and 35-foot) headers only.

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

**WARNING**

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

2. Stroke the knife manually until the knife sections are spaced midway between the guards.

3. Remove the two nuts (A) and bolts attaching the guard (B) and hold-down (C) to the cutterbar.

4. Remove guard (B), plastic wearplate (if installed), hold-down (C), and adjuster bar (D).

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

**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.
5. Position the plastic wearplate (if applicable), replacement guard (B), adjuster bar (D), hold-down (C), and install bolts and nuts (A). Do **NOT** tighten.

6. Check and adjust the clearance between the hold-downs and the knife. Refer to *Checking Knife Hold-Downs, page 145*.

**Center guard replacement:**

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

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

8. Remove the two nuts (A) and bolts attaching the guard (B), hold-down (C), and adjuster bar (D) to the cutterbar.

9. Remove guard (B), plastic wearplate (if installed), hold-down (C), and adjuster bar (D).

10. Position the plastic wearplate (if applicable), replacement guard (B), adjuster bar (D), and hold-down (C) onto the cutterbar. Install bolts, but do NOT tighten.

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

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

11. Check and adjust the clearance between the hold-down and the knife. Refer to *Checking Knife Hold-Downs, page 145.*

---

**Checking Knife Hold-Downs**

⚠️ **WARNING**

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

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

**NOTE:**
Align guards prior to checking and adjusting the hold-downs. Refer to *Adjusting Knife Guards, page 139.*

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

Double Knife Center Guard Hold-Down:
4. Measure the clearance between the center guard hold-down (A) (double knife) and the knife section with a feeler gauge. Push the section down against the bottom of the guard. The clearances should be:
   - At Hold-Down Tip (B):
     0.1–0.4 mm (0.004–0.016 in.)
   - At Rear of Hold-Down (C):
     0.1–1.0 mm (0.004–0.040 in.)
5. If necessary refer to the following for adjustment procedures:
   - Adjusting Pointed Guard Hold-Downs, page 146
   - Adjusting Stub Guard Hold-Downs, page 147

Adjusting Pointed Guard Hold-Downs

This procedure is applicable to formed sheet metal hold-downs. Do NOT use this procedure for hold-down at center guard position where knives overlap on double-knife headers. For center guard, refer to Checking Knife Hold-Downs, page 145.

⚠️ WARNING
To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key before adjusting machine.
1. Shut down windrower, and remove key from ignition.

2. Decrease clearance by turning bolt (B) clockwise to lower front of hold-down (A).

3. Increase clearance by turning bolt (B) counterclockwise to raise front of hold-down.

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

4. Check clearance again and adjust as required.

   ![Figure 5.45: Cutterbar](image)

   **WARNING**
   Check to be sure all bystanders have cleared the area.

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

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

### Adjusting Stub Guard Hold-Downs

   ![Figure 5.46: Normal Stub Guard Forged Hold-Down](image)

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

1. Shut down windrower, and remove key from ignition.

   **Forced hold-down:**

   2. Manually stroke knife to center section(s) (A) under hold-down (B) as shown.

   3. Loosen nuts (C) and back off bolts (D) clear of cutterbar.

   4. Lightly clamp hold-down (B) to guard (E) with a C-clamp or equivalent. Position clamp on trash-bar at (F).

   5. Turn bolts (D) until they contact cutterbar, then tighten **ONE** turn.

   6. Remove clamp.

   7. Tighten nuts (B) and torque to 45 Nm (35 lbf·ft).

   8. Check that specified clearances are achieved. Refer to **Checking Knife Hold-Downs, page 145.**
Sheet metal hold-down:

9. Manually stroke knife to center section (A) under hold-down (B) as shown.

10. Decrease clearance by turning bolt (C) clockwise to lower front of hold-down. Clearance should be 0.1–0.6 mm (0.004–0.024 in.).

11. Increase clearance by turning bolt (C) counterclockwise to raise front of hold-down.

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

12. Torque nuts (D) to 72 Nm (53 lbf-ft) after all adjustments are complete and specified clearances are achieved.

Refer to Checking Knife Hold-Downs, page 145.

WARNING

Check to be sure all bystanders have cleared the area.

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

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

5.5.8 Knifehead Shield

The knifehead shield attaches to the endsheet and reduces the knifehead opening to prevent cut crop from accumulating in the knifehead 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 knifehead shield (A) against the endsheet as shown. Align the shield so the cutout matches the profile of the knifehead and/or hold-downs.
4. Bend knifehead shield (A) along the slit to conform to the endsheet.
5. Align the mounting holes and secure with two 3/8 in. x 1/2 in. Torx® head bolts (B).
6. Tighten bolts (B) just enough to hold knifehead shield (A) in place while allowing it to be adjusted as close to the knifehead as possible.
7. Manually rotate the knife drive box pulley to move the knife and check for areas of contact between the knifehead and knifehead shield (A). Adjust the shield to eliminate interference with the knife if necessary.
8. Tighten bolts (B).
5.6 Knife Drive

5.6.1 Knife Drive Box

Knife drive boxes convert rotational motion into the reciprocating motion of the knife, and are belt driven by a hydraulic motor. There is one knife drive box on single-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 117.

Checking Mounting Bolts

Check the torque on the four knife drive box mounting bolts and 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 271 Nm (200 lbf·ft). When tightening, start with the side mounting bolts.

Removing Knife Drive Box

⚠️ DANGER

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

Timed double-knife headers:

NOTE:
The procedure is the same for both ends of a timed double-knife header. Images shown are for the left end—the right end is opposite.
1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. 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 151.

**Single and non-timed double-knife headers:**

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

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

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

13. Stroke the knife manually to its outer limit.


15. Remove 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.
20. Remove bolt (A) that clamps the knife drive arm to the knife drive box output shaft.

21. Remove knife drive arm (B) from the knife drive box output shaft.

22. Remove the four knife drive box mounting bolts (C) and (D).

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

**CAUTION**
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.

*Removing Knife Drive Box Pulley*

1. Loosen and remove the knife drive box pulley clamping bolt (A) and nut (B).

2. Remove knife drive box pulley (C) using a three-jaw puller.
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 midpoint location.

3. Install pulley (B) until flush with the end of the shaft.

4. Secure the pulley with 5/8 in. x 3 in. hex head bolt with distorted thread NC lock nut and torque to 217 Nm (160 lbf·ft).

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 154. If the pulley was not removed, proceed to Step 1, page 154.

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

5. Slide output arm (B) onto the output shaft. Rotate the pulley to ensure the splines are properly aligned and the drive arm clears the frame on the inboard stroke.

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

7. Torque output arm bolt (B) to 217 Nm (160 lbf-ft).
8. Slide the knife into place and align the knifehead with the output arm.

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

10. Install knifehead pin (A) through the output arm and into the knifehead. Tap knifehead pin (A) down, make sure the pin is seated at the bottom of the knifehead.

11. Using a feeler gauge, check that the gap at location (E) is 0.25 mm (0.01 in.).

12. Set groove (B) in the knifehead pin 1.5 mm (1/16 in.) above output arm (C). Secure with 5/8 in. x 3 in. hex head bolt and nut (D), and torque to 217 Nm (160 lbf·ft).

13. Install 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. Overgreasing will lead to knife misalignment which causes guards to overheat and drive systems to overload.

14. Tighten the knife drive box side bolts (A) first, then tighten the bottom bolts (B). Torque to 271 Nm (200 lbf·ft).

15. Move the output arm to the midstroke position, and ensure the knife bar doesn’t contact the front of the first guard. If the knife drive box requires adjustment, contact your MacDon Dealer.

16. Install and tension the knife drive belts. Refer to the following topics depending on your header:
   - For non-timed belts, refer to Tensioning Non-Timed Knife Drive Belts, page 159
   - For timed belts, refer to Tensioning Timed Knife Drive Belts, page 163
   - For timed double-knife headers, also check the knife timing. Refer to Adjusting Double-Knife Timing, page 165

17. Close the endshield. Refer to Closing Endshield, page 34.
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 breather/dipstick (A) and drain plug (B).
5. Allow the oil to drain.
6. Reinstall drain plug (B).
7. Add oil to the knife drive box. Refer to the inside back cover for specifications.
8. Close the endshield. Refer to Closing Endshield, page 34.

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 Belts

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

⚠️ DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, always stop engine and remove key before leaving the operator’s seat, and always engage safety props before going under the machine for any reason.
1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield.
3. Loosen the two bolts (A) securing the motor assembly to the header endsheet.
4. Loosen the belt tension by turning tensioning bolt (B) counterclockwise.
5. Open access cover (A) on the endsheet behind the cutterbar to provide clearance between the knife drive box pulley and the endsheet.
6. Remove belt (A) from drive pulley (B).
7. Slip belt (A) over and behind knife drive box pulley (C). Use the notch in the pulley to assist with belt removal.
Installing Non-Timed Knife Drive Belts

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

⚠️ DANGER

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

1. Shut down the windrower, and remove the key from the ignition.
2. Route knife drive belt (A) around knife drive box pulley (C) and knife drive pulley (B). Use the notch in the pulley to assist with the belt installation.
   
   **NOTE:**
   Ensure the drive motor is fully forward, do **NOT** pry the belt over the pulley.

3. Tension the knife drive belt. Refer to *Tensioning Non-Timed Knife Drive Belts, page 159.*
4. Install access cover (A) and secure with bolt.
5. Close the endshield.

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Tensioning Non-Timed Knife Drive Belts

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

⚠️ DANGER

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

**IMPORTANT:**
To prolong belt and drive life, do **NOT** overtighten the belt.
1. Shut down machine, and remove key from the ignition.

2. Open the endshield.

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 midspan.

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).

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

Timed Double-Knife Drive Belts

This section applies to 10.7-meter (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).
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 midspan.

   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).

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.
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).

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.

Installing Timed Knife Drive Belts

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 167.

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.
3. Install V-belt (C) onto the pulleys.
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 midspan.

**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 165.*

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 Nm (157–173 lbf·ft).

9. Tension the knife drive belt. Refer to *Tensioning Timed Knife Drive Belts, page 163*

10. Install access cover (A) and secure with bolt.

11. Close the endshield.

**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** overtighten 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.

4. Position pry bar (A) under idler bracket (C), and push bracket upwards until a force of 27 N (6 lbf) deflects belt 13 mm (1/2 in.) at midpoint of upper span.
   **NOTE:**
   Protect paint by placing a piece of wood (B) under pry bar (A).

5. After achieving proper belt tension, tighten nuts (C) to 73–80 Nm (54–59 lbf·ft).
6. Remove pry bar (A) and wood (B).
   **NOTE:**
   Readjust tension of a new belt after a short run-in period (about five hours).
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.

Adjusting Double-Knife Timing

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

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 knife drive belt. Refer to Removing Timed Knife Drive Belt, page 161.

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.
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.

6. Install the right knife drive belt (A).

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

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).
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 midpoint of the upper span.

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

Figure 5.91: Left Shown – Right Opposite

9. After achieving the proper belt tension, tighten nuts (C) to 73–80 Nm (54–59 lbf ft).

10. Ensure the timing belts are properly seated in the grooves on both driver and driven pulleys.

11. Rotate the drive slowly by hand and observe where the knives overlap at the center of the header to check for the correct knife timing.

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

12. Adjust the knife timing, if necessary, by loosening the right 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.

13. Ensure the drive pulleys don’t rotate, and tension the right side drive belts (refer to Step 7, page 166 to Step 9, page 167).

**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 167) and readjust if necessary (refer to Step 12, page 167).

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 168.

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 168.

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 (Knife Drive Box Pulley), page 170.

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 167.
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.

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

1. Open the endshields.
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. Tighten nut (A).
5. Operate the header and check the tracking. Refer to Checking Knife Drive Belt Tracking, page 167. Adjust the support assembly as required.
6. If the belt tracking problem continues, proceed to Step 7, page 169.

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 163.
13. Operate the header and check the tracking. Refer to Checking Knife Drive Belt Tracking, page 167. Adjust the drive pulley if required as per the above steps.
Adjusting Drive Belt Tracking (Knife Drive 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 167.

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.
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 163*.

7. Operate the header and check the tracking. Refer to *Checking Knife Drive Belt Tracking, page 167*.
5.7 Drapers

Two side drapers convey cut crop to center opening. Replace side drapers if torn, cracked, or missing slats.

5.7.1 Removing Side Drapers

⚠️ DANGER

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

1. Raise the reel and engage the reel safety props.
2. Raise the header and engage the safety props.
3. Move the draper until the draper joint is in the work area.

**NOTE:**
The deck can also be shifted towards the center to provide an opening at the endsheet.

4. Stop the engine and remove the key from the ignition.
5. Release the tension on the draper. Refer to 5.7.3 Adjusting Draper Tension, page 174.
6. Remove screws (A) and tube connectors (B) at the draper joint.
7. Pull the draper from deck.

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5.7.2 Installing Side Drapers

⚠️ WARNING

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

**NOTE:**
Check the deck height before installing the drapers. Refer to 5.7.5 Adjusting Deck Height, page 178.
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1. Apply talc, baby powder, or talc/graphite lubricant mix to the draper surface that forms the seal with the cutterbar and to the underside of the draper guides.

2. Insert the draper into the deck at the outboard end under the rollers. Pull the draper into the deck while feeding it at the end.

3. Feed in the draper until it can be wrapped around the drive roller.

4. Insert the opposite end of the draper into the deck over the rollers. Pull the draper fully into the deck.

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

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 174.
8. Check the draper seal between the drapers and the cutterbar. Ensure there is a 1–2 mm (0.04–0.08 in.) gap (A) between cutterbar (C) and draper (B).

9. Refer to 5.7.5 Adjusting Deck Height, page 178 to achieve the proper gap.

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.

### 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.
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.

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

5. Ensure the idler roller (A) is between the draper guides (B).
IMPORTANT:
Do NOT adjust nut (C). This nut is used for draper alignment only.

6. 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.

7. 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.

### 5.7.4 Adjusting Side Draper Tracking

**CAUTION**

To avoid personal injury, before servicing machine or opening drive covers, refer to *5.1 Preparing Machine for Servicing, page 117*.

Each draper deck has a fixed drive roller (A) and a spring-loaded idler roller (B) that can be aligned using the adjuster rods so the draper tracks properly on the rollers.

#### Table 5.1 Side Draper Tracking

<table>
<thead>
<tr>
<th>Tracking</th>
<th>Location</th>
<th>Adjustment</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backward</td>
<td>Drive roller</td>
<td>Increase X</td>
<td>Tighten nut</td>
</tr>
<tr>
<td>Forward</td>
<td></td>
<td>Decrease X</td>
<td>Loosen nut</td>
</tr>
<tr>
<td>Backward</td>
<td>Idler roller</td>
<td>Increase Y</td>
<td>Tighten nut</td>
</tr>
<tr>
<td>Forward</td>
<td></td>
<td>Decrease Y</td>
<td>Loosen nut</td>
</tr>
</tbody>
</table>
1. Refer to Table 5.1, page 176 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.
5.7.5 Adjusting Deck Height

⚠️ DANGER

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

IMPORTANT:

New factory installed drapers are pressure and heat checked at the factory. The gap between draper (A) and cutterbar (B) is set to 0–3 mm (0–1/8 in.). This is to prevent material from entering into the side drapers and stalling them. You may need to decrease the deck clearance to 0–1 mm (1/16 in.).

1. Shut down windrower, and remove key from ignition.
2. Check that clearance (A) between draper (B) and cutterbar (C) is 0–3 mm (0–1/8 in.).
3. Take measurement at deck supports (A) with the header in working position. Refer to Step 2, page 178.
4. Loosen the draper tension. Refer to 5.7.3 Adjusting Draper Tension, page 174.
5. Lift the front edge of the draper (A) past cutterbar (B) to expose the deck support.

6. Measure and note the thickness of the draper belt.

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

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

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

9. To create a seal, adjust deck (A) so that clearance (B) between cutterbar and deck is 1 mm (1/16 in.) plus the draper thickness as measured in Step 6, page 179.

10. Tighten deck support hardware (D).

11. Recheck gap (B). Refer to Step 9, page 179.

12. Tension the draper. Refer to 5.7.3 Adjusting Draper Tension, page 174.
13. Adjust the backsheet deflector (A) (if required) by loosening nut (D) and moving the deflector until there is a 1–7 mm (1/32–5/16 in.) gap (C) between draper (B) and the deflector.

**5.7.6 Side Draper Roller Maintenance**

The draper rollers have non-greaseable bearings; however, the external seal should be checked every 200 hours (more frequently in sandy conditions) to achieve maximum bearing life.

*Inspecting Draper Roller Bearing*

Check for bad draper roller bearings using an infrared thermometer as follows:

1. Engage the header and run the drapers for approximately 3 minutes.

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

**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.

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.

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.
Replacing Draper Idler Roller Bearing

1. Remove the draper idler roller assembly. Refer to Removing Draper Idler Roller, page 180.

2. Remove bearing assembly (A) and seal (B) from the roller tube (C) as follows:
   a. Attach a slide hammer (D) to threaded shaft (E) in the bearing assembly.
   b. Tap out bearing assembly (A) and seal (B).

3. Clean the inside of roller tube (C), check the tube for signs of wear or damage, and replace if necessary.

4. Install new bearing assembly (A) by pressing the outer race of the bearing into the tube until it is 14–15 mm (0.55–0.2 in.) (B) from the outside edge of the tube.

5. Add approximately eight cc or two pumps of grease in front of bearing assembly (A). Refer to the inside back cover for specifications.

6. Install a new seal (C) at the roller opening.

7. Tap seal (C) into the roller opening with a suitably sized socket until the gap (D) between the seal and the outside edge of the tube is 3–4 mm (0.12–0.16 in.).

Figure 5.123: Idler Roller Bearing

Figure 5.124: Idler Roller Bearing
Installing Side Draper Idler Roller

1. Position the stub shaft into the idler roller in forward arm (B) on the deck.
2. Push on the roller to slightly deflect the forward arm so the stub shaft at the rear of the roller can be slipped into rear arm (C).
3. Install bolts (A) with washers, and torque to 93 Nm (70 lbf·ft).
4. Wrap the draper over the idler roller, close the draper, and set the tension. Refer to 5.7.2 Installing Side Drapers, page 172.
5. Run the machine and verify the draper tracks correctly. Adjust the draper tracking if required. Refer to 5.7.4 Adjusting Side Draper Tracking, page 176.

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. Engage the header and reel safety props.
3. Stop the engine, and remove the key from the ignition.
4. Loosen the draper by turning the adjuster bolt (A) counterclockwise.
5. Remove the connectors (B), screws (A), and nuts from the draper joint to uncouple the draper.

6. Pull the draper off the drive roller.

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

   **NOTE:**
   The setscrews are 1/4 turn apart.

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

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

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

10. Remove drive roller (B).

**Replacing Draper Drive Roller Bearing**

1. Remove the draper idler roller assembly. Refer to *Removing Draper Drive Roller, page 183.*
2. Remove bearing assembly (A) and seal (B) from the roller tube (C) as follows:
   a. Attach a slide hammer (D) to threaded shaft (E) in the bearing assembly.
   b. Tap out bearing assembly (A) and seal (B).
3. Clean the inside of roller tube (C), check the tube for signs of wear or damage, and replace if necessary.
4. Install new bearing assembly (A) by pressing the outer race of the bearing into the tube until it is 14–15 mm (0.55–0.2 in.) (B) from the outside edge of the tube.
5. Add approximately eight cc or two pumps of grease in front of bearing assembly (A). Refer to the inside back cover for specifications.
6. Install a new seal (C) at the roller opening.
7. Tap seal (C) into the roller opening with a suitably sized socket until the gap (D) between the seal and the outside edge of the tube is 3–4 mm (0.12–0.16 in.).
Installing Draper Drive Roller

1. Position drive roller (B) between the roller support arms.

2. Attach roller (B) to arm at forward end of deck with bolt (A). Support other end of roller and torque bolt to 95 Nm (70 lbf·ft).

3. Grease the motor shaft and insert into the end of drive roller (B).

4. Secure the motor to the roller support with four bolts (B). Torque to 27 Nm (20 lbf·ft).

   **NOTE:**
   Tighten any loosened bolts and reinstall plastic shield (C) if previously removed.

5. Ensure the motor is all the way into the roller, and tighten the two setscrews (not shown) through access hole (A).

6. Wrap the draper over the drive roller and attach the ends of the draper using tube connectors (B), screws (A), and nuts.

   **NOTE:**
   The heads of the screws must face the center opening.
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 174.

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. If adjustment is necessary, refer to 5.7.4 Adjusting Side Draper Tracking, page 176.

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.
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).

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.

**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 reinstall bolt (E), with nut on far side.

8. Install a second 3/8 in. x 3/4 carriage bolt (F) and lock nut. Do not tighten bolts.

9. Position deflector (A) as shown and adjust forward edge for best fit on cutterbar. Slide deflector under retainer (B).

10. Loosely install seven 3/8 in. x 3/4 carriage bolts (C) with lock nuts to attach deflector to endsheet. Bolt heads face inboard.

11. Adjust position of deflector to obtain best fit at cutterbar and aft edge. Tighten bolts (C) as required to maintain best fit.

12. Tighten bolts (D) on retainer (B). Torque to 88 Nm (65 lbf·ft).

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 and 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 with deflector shields is avoided at all reel fore/aft positions. Alternatively, with the reel fully lowered, trim the steel end fingers until contact with deflector shields is avoided at all reel fore/aft positions. Periodically monitor to ensure contact is avoided and repeat adjustment procedure if necessary.
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.
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 aft deflector (C).

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

Installing Narrow Draper Deflectors

⚠️ DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, always stop engine and remove key before leaving the operator’s seat, and always engage safety props before going under the machine for any reason.
1. Raise the reel to its full height and lower the header to the ground.

2. Shift the decks to create a work space at one end of the header if hydraulic deck shift is installed; otherwise, move the decks manually after shutting down the windrower.

3. Stop the engine, remove the key, and engage the reel safety props.

4. Open the endshield. Refer to Opening Endshield, page 33.

5. Position forward deflector (B) onto the endsheet and temporarily install forward and aft 3/8 in. x 5/8 in. self tapping screws (A).

6. Check the fit of the forward end of deflector (B) on the cutterbar and ensure there is no gap between the deflector and cutterbar. Remove and bend the deflector as required to obtain the best fit.

7. Install two 3/8 in. x 5/8 in. self-tapping screws (A) and tighten all four screws.

8. Position aft deflector (C) as shown and install three 3/8 in. x 3/4 in. carriage bolts (B) and lock nuts.

9. Install two Torx® head screws (A) and lock nuts with the heads facing down.

10. Tighten all fasteners.

11. Repeat for the opposite end of the header.

MAINTENANCE AND SERVICING
5.8 Reel

**CAUTION**

To avoid personal injury, before servicing machine or opening drive covers, refer to 5.1 Preparing Machine for Servicing, page 117.

5.8.1 Reel Clearance to Cutterbar

The minimum clearance between reel fingers and cutterbar ensures that reel fingers do not contact cutterbar during operation. The clearance is set at the factory, but some adjustment may be necessary before operation or if there is evidence of contact during operation.

The finger to guard/cutterbar clearances with reel fully lowered are shown in Table 5.2, page 192.

**Table 5.2 Finger to Guard/Cutterbar Clearance**

<table>
<thead>
<tr>
<th>Header Width</th>
<th>(X) +/- 3 mm (1/8 in.) at Reel Ends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single Reel</td>
</tr>
<tr>
<td>15 ft.</td>
<td>20 mm (3/4 in.)</td>
</tr>
<tr>
<td>20 ft.</td>
<td>20 mm (3/4 in.)</td>
</tr>
<tr>
<td>25 ft.</td>
<td>25 mm (1 in.)</td>
</tr>
<tr>
<td>30 ft.</td>
<td>45 mm (1-3/4 in.)</td>
</tr>
<tr>
<td>35 ft.</td>
<td>60 mm (2-3/8 in.)</td>
</tr>
<tr>
<td>40 ft.</td>
<td>–</td>
</tr>
</tbody>
</table>

**Measuring Reel Clearance**

**DANGER**

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

1. Park machine on level ground.
2. Set fore-aft position to middle position 5 on fore-aft position indicator decal (A).

3. Lower reel fully.

4. Shut down engine and remove key from ignition.

5. Measure clearance at ends of each reel at locations (A).

**NOTE:**
The reel is factory-set to provide more clearance at center of reel than at ends to compensate for reel flexing.
6. Check clearance (X) between (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 194.

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 5.150: Reel Clearance

Figure 5.151: Reel Outboard Arm
2. **Double Reel**: Adjust center arm lift cylinder link (A) to set clearance at center of reel as follows:

   **NOTE**:  
   This adjustment is most easily performed from underside of arm.
   
   a. Loosen nut (B).
   b. Turn nut (C) counterclockwise to raise reel and increase clearance to cutterbar, or clockwise to lower reel and decrease clearance.
   c. Tighten nut (B).

3. Move reel back to ensure steel end fingers do not contact deflector shields.

4. If contact is evident, adjust reel upward to maintain clearance at all reel fore/aft positions. Alternatively, trim steel end fingers to obtain proper clearance.

5. Periodically check for evidence of contact, and adjust clearance as required.

### 5.8.2 Reel Frown

The reel is factory-set in a frown shape (more clearance at the center of the reel than at the ends) to compensate for header flexing.

**Adjusting Reel Frown**

Adjust the reel frown by repositioning the reel tine tubes attached to the reel discs.

**NOTE**:  
Measure the frown profile before disassembling the reel for servicing so the profile can be maintained during reassembly.

1. Position the reel over the cutterbar (between position 4 and 5 on the fore-aft decal [A]).
2. Record the measurement at each reel disc location for each reel tine tube.
3. Start with the reel disc closest to the center of the header and proceed outward towards the ends adjusting the header profile as follows:
   a. Remove bolts (A).
   b. Loosen bolt (B) and adjust arm (C) until the desired measurement is obtained between the reel tine tube and cutterbar.
   
   **NOTE:**
   Allow the reel tine tubes to curve naturally and position the hardware accordingly.
   
   c. Reinstall the bolts (A) in the aligned holes and tighten.

---

**5.8.3 Centering Reel**

The reel should be centered between the header endsheets. To center the reel, refer to the procedure that applies to your reel type:

- Centering Double Reel, page 196
- Centering Single Reel, page 198

**Centering Double Reel**

⚠️ **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. 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 (A) at locations (B) between reels and endsheets at both ends of header. The clearances will be the same if reel is centered.

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 Nm (265 lbf-ft).
**Centering Single Reel**

1. Start engine and set cutterbar height at approximately 150 mm (6 in.) above the ground.
2. Lower reel and adjust fore-aft position to 5 on reel arm decal.
3. Stop engine and remove key from ignition.
4. Measure clearance (A) at locations (B) between reel and endsheet at both ends of header. The clearances should be same if reel is centered.

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

---

**5.8.4 Reel Tines**

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

**Removing Steel Tines**

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

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

**IMPORTANT:**

Ensure the tine tube is supported at all times to prevent damage to the tube and other components.

1. Lower the header, raise the reel, and engage the reel safety props.
2. Shut down the engine and remove the key from the ignition.
3. Remove the tine tube bushings from the applicable tine tube at the center and left reel discs. Refer to *Removing Bushings from Five-, Six-, or Nine-Bat Reels, page 202*.
4. Attach reel arms (B) (temporarily) to the reel disc at the original attachment locations (A).
5. Cut the damaged tine so it can be removed from the tine tube.
6. Remove bolts from the existing tines and slide the tines over to replace the tine that was cut off in Step 5, *page 199* (remove reel arms [B] from the tine tubes as necessary).

*Installing Steel Tines*

**DANGER**

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

**WARNING**

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

**IMPORTANT:**

Ensure the tine tube is supported at all times to prevent damage to the tube and other components.
1. Remove the applicable tine. Refer to *Removing Steel Tines, page 198.*

2. Slide the new tines and reel arm (A) onto the end of the tube.

3. Install the tine tube bushings. Refer to *5.8.5 Tine Tube Bushings, page 202.*

4. Attach the tines to the reel tine bar with bolts and nuts (B).

![Figure 5.160: Reel Tine Tube](image1)

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**Removing Plastic Fingers**

![Figure 5.161: Plastic Fingers](image2)

**DANGER**

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

**WARNING**

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

1. Remove screw (A) using a Torx® Plus 27 IP socket wrench.
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 5.162: Plastic Fingers](image)

**Installing Plastic Fingers**

⚠️ **DANGER**

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

⚠️ **WARNING**

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

1. Position the finger on the rear of the finger tube and engage the lug at the bottom of the finger in the lower hole in the finger tube.

2. Lift the top flange gently and rotate the finger until the lug in the top of the finger engages the upper hole in the finger tube.

![Figure 5.163: Installing Finger](image)
**IMPORTANT:**
Do **NOT** apply force to the finger prior to tightening the mounting screw. Applying force without tightening the mounting screw will break the finger or shear the locating pins.

3. Install screw (A) using a Torx® Plus 27 IP socket wrench and torque to 8.5–9.0 Nm (75–80 lbf-in).

---

### 5.8.5 Tine Tube Bushings

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

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

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

**IMPORTANT:**
Ensure the tine tube is supported at all times to prevent damage to the tube and other components.

1. Lower the header, raise the reel, and engage the reel safety props.
2. Shut down the engine, and remove the key from the ignition.

**NOTE:**
If replacing only the cam end bushing, refer to Step 8, page 204.
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 bushing clamps (A) using a small screwdriver to separate the serrations. Pull the clamp off the tine tube.

6. Rotate arm (A) until clear of the disc and slide the arm inboard off of bushing (B).

7. Remove bushing halves (B). If required, remove the next tine or plastic finger so the arm can slide off the bushing. Refer to the following procedures as necessary:
   - Removing Plastic Fingers, page 200
   - Removing Steel Tines, page 198
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.

9. Remove the reel endshields and endshield support (C) from the tail end of the reel at the applicable tine tube location.

10. Remove bolts (A) securing arms (B) to the tail and center discs.

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

**NOTE:**
Be sure to not lose shim, and mark shim location for reassembly.

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

14. Slide tine tube (A) outboard to expose the bushing (B).

15. Remove bushing halves (B). If required, remove the next tine or plastic finger so the arm can slide off the bushing. Refer to the following procedures if necessary:
   - *Removing Plastic Fingers, page 200*
   - *Removing Steel Tines, page 198*
Removing tine tube support bushings (if installed):

16. Locate support (A) that requires a new bushing.
17. Remove the four bolts (B) securing channels (C) to support (A).
18. If finger (D) is too close to the support to allow access to the bushing, remove screw (E) and remove finger (D). Refer to Removing Plastic Fingers, page 200.

19. Release bushing clamps (A) using a small screwdriver to separate the serrations. Move the clamps off the bushings.
20. Slide support (A) off bushing halves (B).

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

21. Remove bushing halves (B).

---

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

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

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

**IMPORTANT:**
Ensure tine tube is supported at all times to prevent damage to the tube or other components.
NOTE:
Use a pair of modified channel lock pliers (A) to install bushing clamps (C). Secure pliers in a vice and grind a notch (B) into the end of each arm to fit the clamp as shown.

![Figure 5.179: Modified Pliers](image)

**Installing cam end bushings:**

1. Position bushing halves (B) on the tine tube with the flangeless end adjacent to the reel arm, and position the lug in each bushing half into the hole in the tine tube (A).

2. Slide tine tube (A) towards the tail end of the reel to insert bushing (B) into the reel arm.

   **NOTE:**
   If the tine tube supports are installed, ensure the bushings at those locations slide into the support.

3. Reinstall the previously removed fingers or tines. Refer to the following procedures as necessary:
   - Removing Plastic Fingers, page 200
   - Removing Steel Tines, page 198

4. Install bushing clamp (A) onto the tine tube adjacent to the flangeless end of bushing (B).

5. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

![Figure 5.180: Cam End](image)

![Figure 5.181: Bushing](image)
6. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

**IMPORTANT:**
Overtightening clamp may result in breakage.

7. Line up tine bar (B) with the cam arm and install bolt (A). Apply Loctite® to bolt, and torque to 165 Nm (120 lbf ft).

**NOTE:**
Make sure shim is between cam arm and reel bat.

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

9. Install reel arm (B) and endshield support (C) to the tail end of the reel at the applicable tine tube location and secure with bolts (A).
10. Install 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 213.

**Installing center disc and tail end bushings:**

12. Position bushing halves (B) on the tine tube with the flangeless end adjacent to the reel arm, and position the lug in each bushing half into the hole in the tine tube (A).

13. Slide the reel arm (A) onto the bushing (B) and position against the disc at the original location.

14. Reinstall the previously removed fingers or tines. Refer to the following procedures as necessary:
   - Removing Plastic Fingers, page 200
   - Removing Steel Tines, page 198

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

16. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.
17. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

**IMPORTANT:**
Overtightening clamp may result in breakage.

18. Install bolts (A) securing arm (B) to the center disc.
19. Install reel arm (B) and endshield support (C) to the tail end of the reel at the applicable tine tube location and secure with bolts (A).

*Installing tine tube support (if installed) bushings:*
20. Position bushing halves (B) on the tine tube with the flangeless end adjacent to the reel arm, and position the lug in each bushing half into the hole in the tine tube (A).
21. Slide support (A) onto bushing (B). For the opposite tine tube, rotate support (A) or slightly move the tine tube until it clears channels (C).

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

23. Position clamp (A) on bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.
24. Tighten clamp (A) using modified channel lock pliers (B) until finger pressure will **NOT** move the clamp.

**IMPORTANT:**
Overtightening clamp may result in breakage.

25. Reattach channels (C) to support (A) with screws (B) and nuts. Torque screws to 43 Nm (32 lbf-ft).

26. Reinstall any fingers (D) that were previously removed using screws (E). Refer to *Installing Plastic Fingers, page 201*.

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

4. Lift end of reel endshield (A) off support (B).
5. Remove the reel endshield from the supports.

6. Remove reel endshield (A) from support (B).
7. Install new reel endshield (C) onto support (B).
8. Reattach reel endshield (A) onto support (B) ensuring it is installed on top of the reel endshield (C).
9. Reinstall bolts (D).
10. Tighten all hardware.

Replacing Reel Endshield Supports

⚠️ DANGER

To avoid bodily injury or death from unexpected start-up of machine, always stop engine and remove key from ignition before leaving operator’s seat for any reason.
1. Lower the header and reel, shut down the engine, and remove the key from the ignition.

2. Rotate the reel manually until reel endshield (A) requiring replacement is accessible.

3. Remove bolt (B) from support (A).

4. Remove bolts (C) from support (A) and two adjacent supports.

5. Move reel endshields (A) away from the tine tube and rotate support (B) towards the reel to remove it.

6. Insert tabs of new support (B) into the slots in reel endshields (A). Ensure the tabs engage both reel endshields.

7. Secure support (B) to the disc with bolt (C) and nut. Do not tighten.

8. Secure reel endshields (A) to support (B) with bolt (C) and nut. Do not tighten.

9. Reattach the supports with bolts (C) and nuts.

10. Check the clearance between the tine tube and reel endshield support and adjust if necessary.

11. Torque nuts to 27 Nm (20 lbf-ft).
5.9 PR15 Pick-Up Reel

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.

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

![Figure 5.203: Drive Cover – Single Reel](image)

![Figure 5.204: Drive Cover – Double Reel](image)
MAINTENANCE AND SERVICING

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

Installing Reel Drive Cover

Single-reel drive:

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

Double-reel drive:

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

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

5.9.2 Adjusting Reel Drive Chain Tension

Loosening Reel Drive Chain

⚠️ DANGER

To avoid bodily injury or death from unexpected start-up or fall of raised machine, always stop engine, remove key, and engage safety props before going under header for any reason.
1. Shut down the windrower, and remove the key from the ignition.
2. Remove the drive cover. Refer to Removing Reel Drive Cover, page 217.
3. Loosen six nuts (A). Slide motor (B) and motor mount (C) down towards the reel shaft.

**Tightening Reel Drive Chain**

⚠️ **DANGER**

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

2. Ensure the six bolts (A) securing the motor mount to the chain case are loose.

3. Slide motor (A) and motor mount (B) upwards until chain (C) is tight.
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 Nm (54 lbf-ft).

7. Install the drive cover. Refer to *Installing Reel Drive Cover, page 218.*

5.9.3 Replacing Reel Drive Sprocket

*Removing Reel Drive Sprocket*

⚠️ **DANGER**

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

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

2. Loosen the drive chain. Refer to *Loosening Reel Drive Chain, page 219.*
3. Remove drive chain (A) from drive sprocket (B).

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

5. Remove drive sprocket (D). Ensure the key remains in the shaft.

**IMPORTANT:**
To avoid damaging the motor, use a puller if the drive sprocket does not come off by hand. Do **NOT** use a pry bar and/or hammer to remove drive sprocket (D).

---

**Installing Reel Drive Sprocket**

1. Align the keyway in sprocket (D) with the key on the motor shaft, and slide the sprocket onto the shaft. Secure with flat washer (C) and slotted nut (B).

2. Torque slotted nut (B) to 54 Nm (40 lbf·ft).

3. Install cotter pin (A). If necessary, tighten slotted nut (B) to the next slot to install the cotter pin.
4. Install drive chain (A) onto drive sprocket (B).

5. Tighten the drive chain. Refer to *Tightening Reel Drive Chain, page 220.*

5.9.4 Replacing Double-Reel U-Joint

The double-reel drive U-joint allows each reel to move independently from the other.

Lubricate the U-joint according to specifications. Refer to *5.3.6 Lubrication and Servicing, page 123.*

Replace the U-joint if severely worn or damaged. Refer to *Removing Double-Reel U-Joint, page 224.*

*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 217.*

3. Support the inboard end of the right reel with a front end loader and nylon slings (A) (or equivalent lifting device).

   **IMPORTANT:**
   Avoid damaging or denting the center tube by supporting the reel as close to the cam end disc as possible.

---

*Figure 5.218: Reel Drive*

*Figure 5.219: Supporting Reel*
4. Remove the six bolts (A) attaching U-joint flange (B) to driven sprocket (C).

5. Remove the U-joint.

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

---

**Installing Double-Reel U-Joint**

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

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

2. Position the right reel tube against the reel drive and engage the stub shaft into the U-joint pilot hole.

3. Rotate the reel until the holes in the end of the reel tube and U-joint flange (B) line up.

4. Apply Loctite® #243 (or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.

5. Torque to 102–115 Nm (75–85 lbf-ft).
6. Remove temporary reel support (A).

7. Install the drive cover. Refer to *Installing Reel Drive Cover, page 218.*

---

### 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 219.*

3. Remove the drive sprocket. Refer to *Removing Reel Drive Sprocket, page 222.*

4. Disconnect hydraulic lines (A) at motor (B). Cap or plug open ports and lines.

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

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

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

2. Attach motor (A) (and spacer if previously removed) to motor mount (B) with four 1/2 in. x 1-3/4 in. countersunk bolts and nuts (C).

3. Torque nuts (C) to 73 Nm (54 lbf-ft).

4. If installing a new motor, install the hydraulic fittings (not shown) and torque to 110–120 Nm (81–89 lbf-ft).

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

**NOTE:**
Ensure hydraulic lines (A) are installed at their original locations.

6. Install the drive sprocket. Refer to *Installing Reel Drive Sprocket, page 223.*

7. Tighten the drive chain. Refer to *Tightening Reel Drive Chain, page 220.*
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 219*.

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.

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

5. Move the right reel sideways to separate reel tube (A) from U-joint (B).

6. Remove drive chain (C).

7. Route new chain (C) over U-joint (B) and position onto the sprockets.
8. Position right reel tube (A) against the reel drive and engage the stub shaft into the U-joint pilot hole.

9. Rotate the reel until the holes in end of the reel tube and U-joint flange line up.

10. Apply Loctite® #243 (or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.

11. Torque to 102–115 Nm (75–85 lbf-ft).

12. Remove temporary reel support (A).

5.9.7 Replacing Drive Chain on Single Reel

1. Loosen the drive chain. Refer to Loosening Reel Drive Chain, page 219.

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.

6. Tighten the drive chain. Refer to Tightening Reel Drive Chain, page 220.
5.10 Transport System (Optional)

Refer to 6.3.3 Stabilizer/Slow Speed Transport Wheels, page 239 for more information.

5.10.1 Checking Wheel Bolt Torque

If a transport system is installed, follow these steps to torque the wheel bolts:

1. Torque wheel bolts to 120 Nm (90 lbf-ft) using sequence shown.

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

![Figure 5.234: Bolt Tightening Sequence](image)

5.10.2 Checking Axle Bolt Torque

If a transport system is installed, torque axle bolts as follows:

![Figure 5.235: Axle Bolts](image)
1. Check and tighten axle bolts **DAILY** until torque is maintained as follows:
   - (A): 244 Nm (180 lbf·ft)
   - (B): 203 Nm (150 lbf·ft)
   - (C): 244 Nm (180 lbf·ft)

### 5.10.3 Checking Tire Pressure

Check the tire inflation pressure and inflate according to the information provided in Table 5.3, page 231.

#### Table 5.3 Tire Pressure

<table>
<thead>
<tr>
<th>Size</th>
<th>Load Range</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST205/75 R15</td>
<td>D</td>
<td>448 kPa (65 psi)</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>552 kPa (80 psi)</td>
</tr>
</tbody>
</table>

⚠️ **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.
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 an aft location that minimizes crop disturbance. The kit also enables the reel fore-aft cylinders to be quickly relocated to the normal operating location.

Installation instructions are included in the kit.

MD #B5943

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

6.1.3 PR15 Tine Tube Reel Conversion Kit

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

Installation instructions are included in the kit.

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

- 4.6 meter (15 foot) – Steel Fingers MD #B5654
6.1 meter (20 foot) – Steel Fingers MD #B5655
7.6 meter (25 foot) – Plastic Fingers MD #B5277
9.1 meter (30 foot) – Plastic Fingers MD #B5278 49
9.1 meter (30 foot) – Steel Fingers MD #B5657 49
10.7 meter (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.

6.1.5 Short Brace Kit For Center Reel Arm

The Short Brace kit for Center Reel Arm consists of a set of shorter braces and necessary hardware for the center reel support arm. This kit allows you to move the reel farther back for applications such as straight cutting canola and cutting shatter prone crops.

Installation and adjustment instructions are included.

MD #B5605

49. Double-reel units only
6.1.6 Tine Tube Reinforcing Kit

Tine tube reinforcing kits are available for five- and six-bat reels. They are designed to support high reel loads when cutting extremely heavy crops.

Installation instructions are included in the kit.

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

Figure 6.5: Five-Bat Reinforcing Kit Shown – Six-Bat Reinforcing Kit Similar
6.2 Cutterbar

6.2.1 Cutterbar Wearplate

Cutterbar wearplates are recommended for cutting on the ground when the soil is adhering to the steel.

Installation instructions are included in the kit.

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

- 4.6 meter (15 foot) – MD #B4864
- 6.1 meter (20 foot) – MD #B4865
- 7.6 meter (25 foot) – MD #B4838
- 9.1 meter (30 foot) – MD #B4839
- 10.7 meter (35 foot) – MD #B4840
- 12.2 meter (40 foot) – MD #B4841

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.

Installation instructions are included in the kit.

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

Regular Guards
- 9.1 meter (30 foot) and larger – MD #220101

Stub Guards
- 9.1 meter (30 foot) and larger – MD #220103
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:

- 4.6 meter (15 foot) – MD #B5009
- 6.1 meter (20 foot) – MD #B5010
- 7.6 meter (25 foot) – MD #B5011
- 9.1 meter (30 foot) – MD #B5012
- 10.7 meter (35 foot) – MD #B5013

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:
The Left Vertical Knife Mount kit can only be installed if installing both sides.

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

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 9.1-, 10.7- and 12.2-meter (30-, 35-, and 40-foot) headers.

MD #C1986

Second Stabilizer Wheel kit:

The Second Stabilizer Wheel kit is available to upgrade the header to two stabilizer wheels. Each kit consists of one wheel assembly; two kits are required to upgrade both sides of the header.

Installation instructions are included with the kit.

MD #B6179
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 238.

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 9.1-, 10.7, and 12.2-meter (30-, 35-, and 40-foot) headers.

MD #C1997
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 6.13: Draper Deflector (Narrow)](image)

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 6.14: Draper Deflector (Wide)](image)
6.4.3 Rice Divider Rods
Rice divider rods attach to the left and right crop dividers and divide tall and tangled rice crops in a similar manner to standard crop divider rods performing in standing crops. Installation instructions are included in the kit.

MD #B5609

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 9.1- to 12.2-meter (30- to 40-foot) headers.

MD #B5653

6.4.5 Double Windrow Attachment (DWA)
The DWA51 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 Conditioner52.

MD #C1987

50. MD #B5606 is required to operate both upper cross auger and double draper drive on an SP Windrower.
51. This option is not compatible with the M105 SP Windrower.
52. 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 #B540753

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

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

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53. 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.

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 7.6-, 9.1-, 10.7-, and 12.2-m (25-, 30-, 35-, and 40-ft.) headers.

MD #B5664
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.

Installation instructions are included with the kit.

Order from the following bundles according to your header size:

- 4.6 meter (15 foot) – MD #B4844
- 7.6 meter (25 foot) – MD #B4846
- 9.1 meter (30 foot) – MD #B4847
- 10.7 meter (35 foot) – MD #B4848
- 12.2 meter (40 foot) – MD #B4849

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 Windrows.

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 windrows, except the M205.

MD #5842

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

### 7.1 Crop Loss at Cutterbar

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| Cut grain falling ahead of cutterbar | Cutting at speeds over 10 km/h (6 mph) with high torque (10-tooth) reel drive sprocket | Replace with standard torque (19-tooth) reel drive sprocket               | • 5.9.3 Replacing Reel Drive Sprocket, page 222  
• See your MacDon Dealer |
| Cut grain falling ahead of cutterbar | Worn or broken knife components                                         | Replace components                                                        | 5.5 Knife, page 135                        |
| Strips of uncut material         | Crowding uncut crop                                                     | Allow enough room for crop to be fed to cutterbar                          |                                            |
| Strips of uncut material         | Broken knife sections                                                   | Replace broken sections                                                   | 5.5.1 Replacing Knife Section, page 135     |
| Excessive bouncing at normal field speed | Float set too light                                                   | Adjust header float                                                        | 3.7.4 Header Float, page 55                |
| Divider rod running down standing crop | Divider rods too long                                                   | Remove divider rod                                                         | 3.7.14 Crop Divider Rods, page 75          |
| Bushy or tangled crop flows over divider rod, builds up on endsheets | Divider rods providing insufficient separation                          | Install long divider rods                                                 | 3.7.14 Crop Divider Rods, page 75          |
| Crop not being cut at ends       | Reel not frowning or not centered in header                             | Adjust reel frown or reel horizontal position                             | • 3.7.11 Reel Fore-Aft Position, page 59    
• 5.8.2 Reel Frown, page 195    |
| Crop not being cut at ends       | 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 145         |
| Crop not being cut at ends       | Knife sections or guards are worn or broken                             | Replace all worn and broken cutting parts                                 | 5.5 Knife, page 135                        |
| Crop not being cut at ends       | Header is not level                                                     | Level header                                                               | 3.12 Leveling Header, page 89              |
| Crop not being cut at ends       | Reel fingers not lifting crop properly ahead of knife                    | Adjust reel position/finger pitch                                          | • 3.7.11 Reel Fore-Aft Position, page 59    
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# 7.3 Reel Delivery

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<td>Fill to proper level</td>
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<td>Optional Reel Drive Sprockets, page 56</td>
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<tr>
<td>Plastic fingers cut at tip</td>
<td>Insufficient reel to cutterbar clearance</td>
<td>Increase clearance</td>
<td>5.8.1 Reel Clearance to Cutterbar, page 192</td>
</tr>
<tr>
<td>Plastic fingers bent rearward at tip</td>
<td>Reel digging into ground with reel speed slower than ground speed</td>
<td>Raise header</td>
<td>3.7.1 Cutting Height, page 50</td>
</tr>
<tr>
<td>Plastic fingers bent rearward at tip</td>
<td>Reel digging into ground with reel speed slower than ground speed</td>
<td>Decrease header tilt</td>
<td>Controlling Header Angle, page 55</td>
</tr>
<tr>
<td>Plastic fingers bent rearward at tip</td>
<td>Reel digging into ground with reel speed slower than ground speed</td>
<td>Move reel aft</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
</tr>
<tr>
<td>Plastic fingers bent forward at tip (opposite of above)</td>
<td>Reel digging into ground with reel speed faster than ground speed</td>
<td>Raise header</td>
<td>3.7.1 Cutting Height, page 50</td>
</tr>
<tr>
<td>Plastic fingers bent forward at tip (opposite of above)</td>
<td>Reel digging into ground with reel speed faster than ground speed</td>
<td>Decrease header tilt</td>
<td>Controlling Header Angle, page 55</td>
</tr>
<tr>
<td>Plastic fingers bent forward at tip (opposite of above)</td>
<td>Reel digging into ground with reel speed faster than ground speed</td>
<td>Move reel aft</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
</tr>
</tbody>
</table>
## TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Symptom</th>
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<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic fingers bent close to tine tube</td>
<td>Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation</td>
<td>Correct plugging/cutting issues</td>
<td>3.13 Unplugging Cutterbar, page 90</td>
</tr>
<tr>
<td>Plastic fingers bent close to tine tube</td>
<td>Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation</td>
<td>Stop reel before plugging becomes excessive</td>
<td>—</td>
</tr>
</tbody>
</table>
## 7.4 Header and Drapers

<table>
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<tr>
<th>Symptom</th>
<th>Problem</th>
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<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header lift insufficient</td>
<td>Low relief pressure</td>
<td>Increase relief pressure</td>
<td>See your MacDon Dealer</td>
</tr>
<tr>
<td>Insufficient draper speed</td>
<td>Speed control set too low</td>
<td>Increase control setting</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Insufficient draper speed</td>
<td>Relief pressure too low</td>
<td>Increase relief pressure to recommended setting</td>
<td>See your MacDon Dealer</td>
</tr>
<tr>
<td>Insufficient draper speed</td>
<td>Windrower header drive too slow</td>
<td>Adjust to correct speed for windrower model</td>
<td>Refer to windrower operator’s manual</td>
</tr>
<tr>
<td>Insufficient draper speed</td>
<td>Worn out gear pump</td>
<td>Replace pump</td>
<td>See your MacDon Dealer</td>
</tr>
<tr>
<td>Insufficient draper speed</td>
<td>Pressure compensator (V7) set too low</td>
<td>Adjust to increase setting</td>
<td>Refer to windrower operator’s manual</td>
</tr>
<tr>
<td>Draper will not move</td>
<td>Drapers are loose</td>
<td>Tighten drapers</td>
<td>5.7.3 Adjusting Draper Tension, page 174</td>
</tr>
<tr>
<td>Draper will not move</td>
<td>Drive or idler roller wrapped with material</td>
<td>Loosen draper and clean rollers</td>
<td>5.7.3 Adjusting Draper Tension, page 174</td>
</tr>
<tr>
<td>Draper will not move</td>
<td>Slat or connector bar jammed by frame or material</td>
<td>Loosen draper and clear obstruction</td>
<td>5.7.3 Adjusting Draper Tension, page 174</td>
</tr>
<tr>
<td>Draper will not move</td>
<td>Roller bearing seized</td>
<td>Replace</td>
<td>5.7.6 Side Draper Roller Maintenance, page 180</td>
</tr>
<tr>
<td>Draper will not move</td>
<td>Low hydraulic oil</td>
<td>Fill windrower reservoir to full level</td>
<td>See your MacDon Dealer</td>
</tr>
<tr>
<td>Draper will not move</td>
<td>Incorrect relief setting at flow control valve</td>
<td>Adjust relief setting</td>
<td>See your MacDon Dealer</td>
</tr>
<tr>
<td>Draper stalling</td>
<td>Material not feeding evenly off knife</td>
<td>Lower reel</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>Draper stalling</td>
<td>Material not feeding evenly off knife</td>
<td>Install stub guards</td>
<td>• 6.2.3 Stub Guard Conversion Kit, page 237</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 5.5.7 Knife Guards, page 139</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• See your MacDon Dealer</td>
</tr>
<tr>
<td>Hesitation in flow of bulky crop</td>
<td>Header angle too low</td>
<td>Increase header angle</td>
<td>Controlling Header Angle, page 55</td>
</tr>
<tr>
<td>Hesitation in flow of bulky crop</td>
<td>Material overload on drapers</td>
<td>Increase side draper speed</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Hesitation in flow of bulky crop</td>
<td>Material overload on drapers</td>
<td>Install upper cross auger</td>
<td>6.4.11 Upper Cross Auger (UCA), page 244</td>
</tr>
<tr>
<td>Hesitation in flow of bulky crop</td>
<td>Material overload on drapers</td>
<td>Add flighting extensions</td>
<td>See your MacDon Dealer</td>
</tr>
</tbody>
</table>
### TROUBLESHOOTING

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<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drapers back-feed</td>
<td>Drapers running too slow in heavy crop</td>
<td>Increase draper speed</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Crop is thrown across opening and under opposite side draper</td>
<td>Drapers running too fast in light crop</td>
<td>Reduce draper speed</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Material accumulates inside or under front edge of draper</td>
<td>Deck height improperly adjusted</td>
<td>Adjust deck height</td>
<td>5.7.5 Adjusting Deck Height, page 178</td>
</tr>
<tr>
<td>Material wrapping at upper cross auger beater bars</td>
<td>Crop conditions do not require beater bars</td>
<td>Remove beater bars</td>
<td>3.14.1 Removing Beater Bars, page 91</td>
</tr>
<tr>
<td>Material accumulating on end deflectors and releasing in bunches</td>
<td>End deflectors too wide</td>
<td>For headers with manual deck shift only, trim deflector or replace with narrow deflector (MD #172381)</td>
<td>3.13 Unplugging Cutterbar, page 90</td>
</tr>
</tbody>
</table>
## 7.5 Cutting Edible Beans

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants being stripped and complete or partial plants left behind</td>
<td>Header off ground</td>
<td>Lower header to ground and run on skid shoes and/or cutterbar</td>
<td>3.7.3 Cutting on the Ground, page 53</td>
</tr>
</tbody>
</table>
| Plants being stripped and complete or partial plants left behind       | Float set too light—rides on high spots and does not lower soon enough  | Set float as follows:  
  - Dry ground: 445-667 N (100–150 lbf)  
  - Wet ground: 222–445 N (50–100 lbf)                                           | 3.7.4 Header Float, page 55                                                      |
<p>| Plants being stripped and complete or partial plants left behind       | Reel too high                                                           | Fully retract reel cylinders                                                                                                           | 3.7.10 Reel Height, page 59                  |
| Plants being stripped and complete or partial plants left behind       | Reel too high with cylinders fully retracted                           | Adjust reel height                                                                                                                    | 3.7.10 Reel Height, page 59                  |
| Plants being stripped and complete or partial plants left behind       | Finger pitch not aggressive enough                                      | Adjust finger pitch                                                                                                                   | 3.7.12 Reel Tine Pitch, page 68              |
| Plants being stripped and complete or partial plants left behind       | 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            | 3.7.11 Reel Fore-Aft Position, page 59       |
| Plants being stripped and complete or partial plants left behind       | Header angle too shallow                                               | Lengthen center-link                                                                                                                  | Controlling Header Angle, page 55           |
| Plants being stripped and complete or partial plants left behind       | Header angle too shallow                                               | If cutting on ground, header angle can be increased by fully retracting lift cylinders                                                | Controlling Header Angle, page 55           |
| Plants being stripped and complete or partial plants left behind       | Reel too slow                                                           | Adjust reel speed to be marginally faster than ground speed                                                                          | 3.7.6 Reel Speed, page 56                   |
| Plants being stripped and complete or partial plants left behind       | Ground speed too fast                                                  | Lower ground speed                                                                                                                   | 3.7.6 Reel Speed, page 56                   |
| Plants being stripped and complete or partial plants left behind       | Skid shoes too low                                                     | Raise skid shoes to highest setting                                                                                                  | 3.7.3 Cutting on the Ground, page 53        |
| Plants being stripped and complete or partial plants left behind       | 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                     |</p>
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants being stripped and</td>
<td>Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar</td>
<td>Ground too wet. Allow soil to dry</td>
<td></td>
</tr>
<tr>
<td>complete or partial plants</td>
<td>and raises cutterbar off the ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>left behind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants being stripped and</td>
<td>Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar</td>
<td>Manually clean the bottom of cutterbar when accumulation gets unacceptable</td>
<td></td>
</tr>
<tr>
<td>complete or partial plants</td>
<td>and raises cutterbar off the ground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>left behind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants being stripped and</td>
<td>Plastic wear strip for cutterbar has been installed over top of steel</td>
<td>Remove steel cutterbar wearplates when installing the plastic wear strips</td>
<td></td>
</tr>
<tr>
<td>complete or partial plants</td>
<td>steel wearplates</td>
<td>for cutterbar</td>
<td></td>
</tr>
<tr>
<td>left behind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants being stripped and</td>
<td>Header not level</td>
<td>Level header</td>
<td>3.12 Leveling Header, page 89</td>
</tr>
<tr>
<td>complete or partial plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>left behind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants being stripped and</td>
<td>Worn/damaged knife sections</td>
<td>Replace sections or complete knife</td>
<td>5.5 Knife, page 135</td>
</tr>
<tr>
<td>complete or partial plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>left behind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants being stripped and</td>
<td>Parts of vines get caught in pointed guard tip. (Occurs more in row-</td>
<td>Install stub guard kit</td>
<td>6.2.3 Stub Guard Conversion Kit, page 237</td>
</tr>
<tr>
<td>complete or partial plants</td>
<td>cropped beans that are hilled from cultivating)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>left behind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive losses at dividers</td>
<td>Divider rod running down crop and shattering pods</td>
<td>Remove divider rod</td>
<td>3.7.14 Crop Divider Rods, page 75</td>
</tr>
<tr>
<td>Excessive losses at dividers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vines and plants build up on</td>
<td>Install divider rod</td>
<td></td>
<td>3.7.14 Crop Divider Rods, page 75</td>
</tr>
<tr>
<td>endsheet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant vines pinched between top</td>
<td>Cutterbar has filled up with trash with draper to cutterbar gap</td>
<td>Raise header fully at each end of field, or as required and shift decks</td>
<td></td>
</tr>
<tr>
<td>of draper and cutterbar</td>
<td>properly adjusted</td>
<td>back and forth to help clean out cutterbar</td>
<td></td>
</tr>
<tr>
<td>Plant vines pinched between top</td>
<td>Shifting of decks with header raised does not clean out cutterbar</td>
<td>Manually remove debris from cutterbar cavity to prevent damage to</td>
<td></td>
</tr>
<tr>
<td>of draper and cutterbar</td>
<td></td>
<td>drapers</td>
<td></td>
</tr>
<tr>
<td>Crop accumulating at guards and</td>
<td>Reel finger pitch not aggressive enough</td>
<td>Increase finger aggressiveness (cam position)</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
</tr>
<tr>
<td>not moving rearward onto</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>drapers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop accumulating at guards and</td>
<td>Reel too high</td>
<td>Lower reel</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>not moving rearward onto</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>drapers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TROUBLESHOOTING

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<thead>
<tr>
<th>Symptom</th>
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<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop accumulating at guards and not moving rearward onto drapers</td>
<td>Minimum reel clearance to cutterbar setting too high</td>
<td>Readjust reel minimum height with cylinders fully retracted</td>
<td>Adjusting Reel Clearance, page 194</td>
</tr>
<tr>
<td>Crop accumulating at guards and not moving rearward onto drapers</td>
<td>Reel too far forward</td>
<td>Reposition reel</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
</tr>
<tr>
<td>Reel shattering pods</td>
<td>Reel too far forward</td>
<td>Reposition reel</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
</tr>
<tr>
<td>Reel shattering pods</td>
<td>Reel speed too high</td>
<td>Reduce reel speed</td>
<td>3.7.6 Reel Speed, page 56</td>
</tr>
<tr>
<td>Reel shattering pods</td>
<td>Bean pods are too dry</td>
<td>Cut at night with heavy dew once pods have softened</td>
<td>—</td>
</tr>
<tr>
<td>Reel shattering pods</td>
<td>Reel finger pitch too retarded</td>
<td>Increase finger aggressiveness (cam position)</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
</tr>
<tr>
<td>Cutterbar guards breaking</td>
<td>Float insufficient</td>
<td>Increase float</td>
<td>3.7.4 Header Float, page 55</td>
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</tbody>
</table>
| Cutterbar guards breaking | Excessive number of rocks in field | Consider installing optional stub guards | • 5.5.7 Knife Guards, page 139  
• 6.2.3 Stub Guard Conversion Kit, page 237 |
| Cutterbar guards breaking | Excessive number of rocks in field | Tip: Experiment with a few guards on a section of cutterbar to compare the performance of the two different styles of guards | • 5.5.7 Knife Guards, page 139  
• 6.2.3 Stub Guard Conversion Kit, page 237 |
<p>| Cutterbar pushing too much trash and dirt | Header too heavy | Readjust float to make header lighter | 3.7.4 Header Float, page 55 |
| Cutterbar pushing too much trash and dirt | Header angle too steep | Decrease header angle with lift cylinders | 3.7.5 Header Angle, page 55 |
| Cutterbar pushing too much trash and dirt | Header angle too steep | Shorten the center-link | 3.7.5 Header Angle, page 55 |
| Cutterbar pushing too much trash and dirt | 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 237 |
| Cutterbar pushing too much trash and dirt | Insufficient support for header | Install center skid shoes on header | 3.7.3 Cutting on the Ground, page 53 |
| 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 178 |</p>
<table>
<thead>
<tr>
<th>Symptom</th>
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<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutterbar fills up with dirt</td>
<td>Excessive gap between top of front of draper and cutterbar</td>
<td>Raise header fully at each end of field or as required and shift decks back and forth to help clean out cutterbar</td>
<td>—</td>
</tr>
<tr>
<td>Reel carries over odd plants in same location</td>
<td>Reel fingers (steel) bent and hook plants from crop flow on drapers</td>
<td>Straighten fingers (steel)</td>
<td>—</td>
</tr>
<tr>
<td>Reel carries over odd plants in same location</td>
<td>Dirt accumulation on end of fingers prevent plants dropping off fingers onto drapers</td>
<td>Raise reel</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>Reel carries over odd plants in same location</td>
<td>Dirt accumulation on end of fingers prevent plants dropping off fingers onto drapers</td>
<td>Adjust reel fore and aft location to move fingers out of the ground</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
</tr>
<tr>
<td>Reel carries over odd plants in same location</td>
<td>Dirt accumulation on end of fingers prevent plants dropping off fingers onto drapers</td>
<td>Adjust reel fore and aft location to move fingers out of the ground</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
</tr>
<tr>
<td>Cutterbar pushing too much dirt in certain locations for length of field</td>
<td>Tire tracks or row crop ridges</td>
<td>Cut at angle to ridges or crop rows to allow knife and guards to clean out better</td>
<td>—</td>
</tr>
<tr>
<td>Cutterbar pushing too much dirt in certain locations for length of field</td>
<td>Rolling land along length of field</td>
<td>Cut at 90° to undulations, provided knife floats across without digging in</td>
<td>—</td>
</tr>
<tr>
<td>Reel carries over excessive amounts of plants or wads</td>
<td>Excessive accumulation of crop on drapers (up to height of reel center tube)</td>
<td>Increase draper speed</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Reel carries over excessive amounts of plants or wads</td>
<td>Finger pitch too retarded</td>
<td>Increase finger pitch</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
</tr>
<tr>
<td>Reel wraps up with crop</td>
<td>Reel too low</td>
<td>Raise reel</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>Reel ends wrap up with crop</td>
<td>Uncut crop interfering on reel ends</td>
<td>Add reel endshields</td>
<td>Refer to the header parts catalog</td>
</tr>
</tbody>
</table>

**TROUBLESHOOTING**
## 7.6 Windrow Formation

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<tr>
<th>Symptom</th>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads on ground and scattered</td>
<td>Draper speed too slow</td>
<td>Increase draper speed</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Heads on ground and scattered</td>
<td>Draper angle too flat</td>
<td>Increase header angle</td>
<td>Controlling Header Angle, page 55</td>
</tr>
<tr>
<td>Heads on ground and scattered</td>
<td>Ground speed too slow</td>
<td>Increase ground speed</td>
<td>3.7.6 Reel Speed, page 56</td>
</tr>
<tr>
<td>Heads on ground and scattered</td>
<td>Crop too ripe</td>
<td>Cut material before too mature</td>
<td>—</td>
</tr>
<tr>
<td>Hollow in center</td>
<td>Draper speed too slow</td>
<td>Increase draper speed</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Hollow in center</td>
<td>Delivery opening too wide</td>
<td>Decrease delivery opening width</td>
<td>3.8 Delivery Opening, page 77</td>
</tr>
<tr>
<td>All heads in center</td>
<td>Draper speed too fast or header angle too steep</td>
<td>Reduce draper speed and/or decrease header angle</td>
<td>3.7.8 Draper Speed, page 57, 3.7.5 Header Angle, page 55</td>
</tr>
<tr>
<td>All heads in center</td>
<td>Ground speed too fast</td>
<td>Reduce ground speed</td>
<td>3.7.6 Reel Speed, page 56</td>
</tr>
<tr>
<td>All heads in center</td>
<td>Crop too green</td>
<td>Allow to mature</td>
<td>—</td>
</tr>
<tr>
<td>All heads to one side</td>
<td>Crop leaning to one side and reel too slow</td>
<td>Increase reel speed to orient crop parallel to draper slats and/or increase finger pitch aggressiveness</td>
<td>3.7.6 Reel Speed, page 56, 3.7.12 Reel Tine Pitch, page 68</td>
</tr>
<tr>
<td>Uneven windrow (any crop condition)</td>
<td>Reel too low</td>
<td>Raise reel</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>Uneven windrow (any crop condition)</td>
<td>Ground speed too fast for drapers, causing heads to fan out and crop to leave drapers unevenly</td>
<td>Reduce ground speed or increase draper speed</td>
<td>3.7.6 Reel Speed, page 56, 3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td>Uneven windrow (any crop condition)</td>
<td>Reel speed too fast</td>
<td>Reduce reel</td>
<td>3.7.6 Reel Speed, page 56</td>
</tr>
</tbody>
</table>
# 8 Reference

## 8.1 Conversion Chart

### Table 8.1 Conversion Chart

<table>
<thead>
<tr>
<th>Quantity</th>
<th>SI Units (Metric)</th>
<th>Factor</th>
<th>Inch-Pound Units (Imperial)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit Name</td>
<td>Abbreviation</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>hectares</td>
<td>ha</td>
<td>x 2.4710 =</td>
</tr>
<tr>
<td>Flow</td>
<td>liters per minute</td>
<td>L/min</td>
<td>x 0.2642 =</td>
</tr>
<tr>
<td>Force</td>
<td>Newtons</td>
<td>N</td>
<td>x 0.2248 =</td>
</tr>
<tr>
<td>Length</td>
<td>millimeters</td>
<td>mm</td>
<td>x 0.0394 =</td>
</tr>
<tr>
<td>Length</td>
<td>meters</td>
<td>m</td>
<td>x 3.2808 =</td>
</tr>
<tr>
<td>Power</td>
<td>kilowatts</td>
<td>kW</td>
<td>x 1.341 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>kilopascals</td>
<td>kPa</td>
<td>x 0.145 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>megapascals</td>
<td>MPa</td>
<td>x 145.038 =</td>
</tr>
<tr>
<td>Pressure</td>
<td>bar (Non-SI)</td>
<td>bar</td>
<td>x 14.5038 =</td>
</tr>
<tr>
<td>Torque</td>
<td>Newton meters</td>
<td>Nm</td>
<td>x 0.7376 =</td>
</tr>
<tr>
<td>Torque</td>
<td>Newton meters</td>
<td>Nm</td>
<td>x 8.8507 =</td>
</tr>
<tr>
<td>Temperature</td>
<td>degrees Celsius</td>
<td>°C</td>
<td>(°C x 1.8) + 32 =</td>
</tr>
<tr>
<td>Velocity</td>
<td>meters per minute</td>
<td>m/min</td>
<td>x 3.2808 =</td>
</tr>
<tr>
<td>Velocity</td>
<td>meters per second</td>
<td>m/s</td>
<td>x 3.2808 =</td>
</tr>
<tr>
<td>Velocity</td>
<td>kilometers per hour</td>
<td>km/h</td>
<td>x 0.6214 =</td>
</tr>
<tr>
<td>Volume</td>
<td>liters</td>
<td>L</td>
<td>x 0.2642 =</td>
</tr>
<tr>
<td>Volume</td>
<td>milliliters</td>
<td>ml</td>
<td>x 0.0338 =</td>
</tr>
<tr>
<td>Volume</td>
<td>cubic centimeters</td>
<td>cm³ or cc</td>
<td>x 0.061 =</td>
</tr>
<tr>
<td>Weight</td>
<td>kilograms</td>
<td>kg</td>
<td>x 2.2046 =</td>
</tr>
</tbody>
</table>
8.2 Torque Specifications

The following tables provide correct torque values for various bolts, cap screws, and hydraulic fittings.

- Tighten all bolts to torque values specified in charts (unless otherwise noted throughout this manual).
- Replace hardware with same strength and grade of bolt.
- Use torque value tables as a guide and periodically check tightness of bolts.
- Understand torque categories for bolts and cap screws by using their identifying head markings.

**Jam nuts**

When applying torque to finished jam nuts, multiply the torque applied to regular nuts by $f=0.65$.

**Self-tapping screws**

Standard torque is to be used (not to be used on critical or structurally important joints).

8.2.1 SAE Bolt Torque Specifications

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

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf·in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>1/4-20</td>
<td>11.9</td>
<td>13.2</td>
</tr>
<tr>
<td>5/16-18</td>
<td>24.6</td>
<td>27.1</td>
</tr>
<tr>
<td>3/8-16</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>7/16-14</td>
<td>70</td>
<td>77</td>
</tr>
<tr>
<td>1/2-13</td>
<td>106</td>
<td>118</td>
</tr>
<tr>
<td>9/16-12</td>
<td>153</td>
<td>170</td>
</tr>
<tr>
<td>5/8-11</td>
<td>212</td>
<td>234</td>
</tr>
<tr>
<td>3/4-10</td>
<td>380</td>
<td>420</td>
</tr>
<tr>
<td>7/8-9</td>
<td>606</td>
<td>669</td>
</tr>
<tr>
<td>1-8</td>
<td>825</td>
<td>912</td>
</tr>
</tbody>
</table>

**Figure 8.1: Bolt Grades**

A - Nominal Size  
B - SAE-8  
C - SAE-5  
D - SAE-2
### Table 8.3 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>1/4-20</td>
<td>8.1</td>
<td>9</td>
</tr>
<tr>
<td>5/16-18</td>
<td>16.7</td>
<td>18.5</td>
</tr>
<tr>
<td>3/8-16</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>7/16-14</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td>1/2-13</td>
<td>73</td>
<td>80</td>
</tr>
<tr>
<td>9/16-12</td>
<td>105</td>
<td>116</td>
</tr>
<tr>
<td>5/8-11</td>
<td>144</td>
<td>160</td>
</tr>
<tr>
<td>3/4-10</td>
<td>259</td>
<td>286</td>
</tr>
<tr>
<td>7/8-9</td>
<td>413</td>
<td>456</td>
</tr>
<tr>
<td>1-8</td>
<td>619</td>
<td>684</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>1/4-20</td>
<td>16.8</td>
<td>18.6</td>
</tr>
<tr>
<td>5/16-18</td>
<td>24</td>
<td>26</td>
</tr>
<tr>
<td>3/8-16</td>
<td>42</td>
<td>46</td>
</tr>
<tr>
<td>7/16-14</td>
<td>67</td>
<td>74</td>
</tr>
<tr>
<td>1/2-13</td>
<td>102</td>
<td>113</td>
</tr>
<tr>
<td>9/16-12</td>
<td>148</td>
<td>163</td>
</tr>
<tr>
<td>5/8-11</td>
<td>204</td>
<td>225</td>
</tr>
<tr>
<td>3/4-10</td>
<td>362</td>
<td>400</td>
</tr>
<tr>
<td>7/8-9</td>
<td>583</td>
<td>644</td>
</tr>
<tr>
<td>1-8</td>
<td>874</td>
<td>966</td>
</tr>
</tbody>
</table>

**Figure 8.2: Bolt Grades**

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

**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

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>1/4-20</td>
<td>16.8</td>
<td>18.6</td>
</tr>
<tr>
<td>5/16-18</td>
<td>35</td>
<td>38</td>
</tr>
<tr>
<td>3/8-16</td>
<td>61</td>
<td>68</td>
</tr>
<tr>
<td>7/16-14</td>
<td>98</td>
<td>109</td>
</tr>
<tr>
<td>1/2-13</td>
<td>150</td>
<td>166</td>
</tr>
<tr>
<td>9/16-12</td>
<td>217</td>
<td>239</td>
</tr>
<tr>
<td>5/8-11</td>
<td>299</td>
<td>330</td>
</tr>
<tr>
<td>3/4-10</td>
<td>531</td>
<td>587</td>
</tr>
<tr>
<td>7/8-9</td>
<td>855</td>
<td>945</td>
</tr>
<tr>
<td>1-8</td>
<td>1165</td>
<td>1288</td>
</tr>
</tbody>
</table>

8.2.2 Metric Bolt Specifications

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

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1.4</td>
<td>1.6</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>2.2</td>
<td>2.5</td>
</tr>
<tr>
<td>4-0.7</td>
<td>3.3</td>
<td>3.7</td>
</tr>
<tr>
<td>5-0.8</td>
<td>6.7</td>
<td>7.4</td>
</tr>
<tr>
<td>6-1.0</td>
<td>11.4</td>
<td>12.6</td>
</tr>
<tr>
<td>8-1.25</td>
<td>28</td>
<td>30</td>
</tr>
<tr>
<td>10-1.5</td>
<td>55</td>
<td>60</td>
</tr>
<tr>
<td>12-1.75</td>
<td>95</td>
<td>105</td>
</tr>
<tr>
<td>14-2.0</td>
<td>152</td>
<td>168</td>
</tr>
<tr>
<td>16-2.0</td>
<td>236</td>
<td>261</td>
</tr>
<tr>
<td>20-2.5</td>
<td>460</td>
<td>509</td>
</tr>
<tr>
<td>24-3.0</td>
<td>796</td>
<td>879</td>
</tr>
</tbody>
</table>
Table 8.7 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>4-0.7</td>
<td>2.3</td>
<td>2.5</td>
</tr>
<tr>
<td>5-0.8</td>
<td>4.5</td>
<td>5</td>
</tr>
<tr>
<td>6-1.0</td>
<td>7.7</td>
<td>8.6</td>
</tr>
<tr>
<td>8-1.25</td>
<td>18.8</td>
<td>20.8</td>
</tr>
<tr>
<td>10-1.5</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>12-1.75</td>
<td>65</td>
<td>72</td>
</tr>
<tr>
<td>14-2.0</td>
<td>104</td>
<td>115</td>
</tr>
<tr>
<td>16-2.0</td>
<td>161</td>
<td>178</td>
</tr>
<tr>
<td>20-2.5</td>
<td>314</td>
<td>347</td>
</tr>
<tr>
<td>24-3.0</td>
<td>543</td>
<td>600</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1.8</td>
<td>2</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>2.8</td>
<td>3.1</td>
</tr>
<tr>
<td>4-0.7</td>
<td>4.2</td>
<td>4.6</td>
</tr>
<tr>
<td>5-0.8</td>
<td>8.4</td>
<td>9.3</td>
</tr>
<tr>
<td>6-1.0</td>
<td>14.3</td>
<td>15.8</td>
</tr>
<tr>
<td>8-1.25</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>10-1.5</td>
<td>75</td>
<td>83</td>
</tr>
<tr>
<td>12-1.75</td>
<td>132</td>
<td>145</td>
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<tr>
<td>14-2.0</td>
<td>210</td>
<td>232</td>
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<tr>
<td>16-2.0</td>
<td>326</td>
<td>360</td>
</tr>
<tr>
<td>20-2.5</td>
<td>637</td>
<td>704</td>
</tr>
<tr>
<td>24-3.0</td>
<td>1101</td>
<td>1217</td>
</tr>
</tbody>
</table>
Table 8.9 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Torque (Nm)</th>
<th>Torque (lbf-ft) (*lbf-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>3-0.5</td>
<td>1.3</td>
<td>1.5</td>
</tr>
<tr>
<td>3.5-0.6</td>
<td>2.1</td>
<td>2.3</td>
</tr>
<tr>
<td>4-0.7</td>
<td>3.1</td>
<td>3.4</td>
</tr>
<tr>
<td>5-0.8</td>
<td>6.3</td>
<td>7</td>
</tr>
<tr>
<td>6-1.0</td>
<td>10.7</td>
<td>11.8</td>
</tr>
<tr>
<td>8-1.25</td>
<td>26</td>
<td>29</td>
</tr>
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<td>10-1.5</td>
<td>51</td>
<td>57</td>
</tr>
<tr>
<td>12-1.75</td>
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<tr>
<td>16-2.0</td>
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<td>20-2.5</td>
<td>434</td>
<td>480</td>
</tr>
<tr>
<td>24-3.0</td>
<td>750</td>
<td>829</td>
</tr>
</tbody>
</table>

8.2.3 Metric Bolt Specifications Bolting into Cast Aluminum

Table 8.10 Metric Bolt Bolting into Cast Aluminum

<table>
<thead>
<tr>
<th>Nominal Size (A)</th>
<th>Bolt Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.8 (Cast Aluminum)</td>
</tr>
<tr>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>M3</td>
<td>–</td>
</tr>
<tr>
<td>M4</td>
<td>–</td>
</tr>
<tr>
<td>M5</td>
<td>–</td>
</tr>
<tr>
<td>M6</td>
<td>9</td>
</tr>
<tr>
<td>M8</td>
<td>20</td>
</tr>
<tr>
<td>M10</td>
<td>40</td>
</tr>
<tr>
<td>M12</td>
<td>70</td>
</tr>
<tr>
<td>M14</td>
<td>–</td>
</tr>
<tr>
<td>M16</td>
<td>–</td>
</tr>
</tbody>
</table>
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, page 267.

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.

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value(^{55})</th>
<th>Flats from Finger Tight (FFFT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nm</td>
<td>lbf-ft</td>
</tr>
<tr>
<td>-2</td>
<td>5/16–24</td>
<td>4–5</td>
<td>3–4</td>
</tr>
<tr>
<td>-3</td>
<td>3/8–24</td>
<td>7–8</td>
<td>5–6</td>
</tr>
<tr>
<td>-4</td>
<td>7/16–20</td>
<td>18–19</td>
<td>13–14</td>
</tr>
<tr>
<td>-5</td>
<td>1/2–20</td>
<td>19–21</td>
<td>14–15</td>
</tr>
<tr>
<td>-6</td>
<td>9/16–18</td>
<td>30–33</td>
<td>22–24</td>
</tr>
<tr>
<td>-8</td>
<td>3/4–16</td>
<td>57–63</td>
<td>42–46</td>
</tr>
<tr>
<td>-10</td>
<td>7/8–14</td>
<td>81–89</td>
<td>60–66</td>
</tr>
<tr>
<td>-12</td>
<td>1-1/16–12</td>
<td>113–124</td>
<td>83–91</td>
</tr>
<tr>
<td>-14</td>
<td>1-3/16–12</td>
<td>136–149</td>
<td>100–110</td>
</tr>
<tr>
<td>-16</td>
<td>1-5/16–12</td>
<td>160–176</td>
<td>118–130</td>
</tr>
<tr>
<td>-20</td>
<td>1-5/8–12</td>
<td>228–250</td>
<td>168–184</td>
</tr>
<tr>
<td>-24</td>
<td>1-7/8–12</td>
<td>264–291</td>
<td>195–215</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2–12</td>
<td>359–395</td>
<td>265–291</td>
</tr>
<tr>
<td>-40</td>
<td>3–12</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

\(^{55}\) Torque values shown are based on lubricated connections as in reassembly.
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).

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

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value$^{56}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td>5/16–24</td>
<td>6–7</td>
</tr>
<tr>
<td>-3</td>
<td>3/8–24</td>
<td>12–13</td>
</tr>
<tr>
<td>-4</td>
<td>7/16–20</td>
<td>19–21</td>
</tr>
<tr>
<td>-5</td>
<td>1/2–20</td>
<td>21–33</td>
</tr>
<tr>
<td>-6</td>
<td>9/16–18</td>
<td>26–29</td>
</tr>
<tr>
<td>-8</td>
<td>3/4–16</td>
<td>46–50</td>
</tr>
<tr>
<td>-10</td>
<td>7/8–14</td>
<td>75–82</td>
</tr>
<tr>
<td>-12</td>
<td>1-1/16–12</td>
<td>120–132</td>
</tr>
<tr>
<td>-14</td>
<td>1-3/8–12</td>
<td>153–168</td>
</tr>
<tr>
<td>-16</td>
<td>1-5/16–12</td>
<td>176–193</td>
</tr>
<tr>
<td>-20</td>
<td>1-5/8–12</td>
<td>221–243</td>
</tr>
<tr>
<td>-24</td>
<td>1-7/8–12</td>
<td>270–298</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2–12</td>
<td>332–365</td>
</tr>
</tbody>
</table>

56. Torque values shown are based on lubricated connections as in reassembly.
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, page 270.
6. Check final condition of fitting.

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

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value(^{57})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>-2</td>
<td>5/16–24</td>
<td>6–7</td>
</tr>
<tr>
<td>-3</td>
<td>3/8–24</td>
<td>12–13</td>
</tr>
<tr>
<td>-4</td>
<td>7/16–20</td>
<td>19–21</td>
</tr>
<tr>
<td>-5</td>
<td>1/2–20</td>
<td>21–33</td>
</tr>
<tr>
<td>-6</td>
<td>9/16–18</td>
<td>26–29</td>
</tr>
<tr>
<td>-8</td>
<td>3/4–16</td>
<td>46–50</td>
</tr>
<tr>
<td>-10</td>
<td>7/8–14</td>
<td>75–82</td>
</tr>
<tr>
<td>-12</td>
<td>1-1/16–12</td>
<td>120–132</td>
</tr>
<tr>
<td>-14</td>
<td>1-3/8–12</td>
<td>153–168</td>
</tr>
<tr>
<td>-16</td>
<td>1-5/16–12</td>
<td>176–193</td>
</tr>
<tr>
<td>-20</td>
<td>1-5/8–12</td>
<td>221–243</td>
</tr>
<tr>
<td>-24</td>
<td>1-7/8–12</td>
<td>270–298</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2–12</td>
<td>332–365</td>
</tr>
</tbody>
</table>

---

\(^{57}\) 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.

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, page 271.

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

6. Use three wrenches when assembling unions or joining two hoses together.

7. Check final condition of fitting.

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

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Tube O.D. (in.)</th>
<th>Torque Value&lt;sup&gt;58&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>Note&lt;sup&gt;59&lt;/sup&gt;</td>
<td>3/16</td>
<td>Nm</td>
</tr>
<tr>
<td>-4</td>
<td>9/16</td>
<td>1/4</td>
<td>25–28</td>
</tr>
<tr>
<td>-5</td>
<td>Note&lt;sup&gt;59&lt;/sup&gt;</td>
<td>5/16</td>
<td>–</td>
</tr>
<tr>
<td>-6</td>
<td>11/16</td>
<td>3/8</td>
<td>40–44</td>
</tr>
<tr>
<td>-8</td>
<td>13/16</td>
<td>1/2</td>
<td>55–61</td>
</tr>
<tr>
<td>-10</td>
<td>1</td>
<td>5/8</td>
<td>80–88</td>
</tr>
<tr>
<td>-12</td>
<td>1-3/16</td>
<td>3/4</td>
<td>115–127</td>
</tr>
</tbody>
</table>

---

<sup>58</sup> Torque values and angles shown are based on lubricated connection as in reassembly.
<sup>59</sup> O-ring face seal type end not defined for this tube size.
Table 8.14 O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Tube O.D. (in.)</th>
<th>Torque Value(^{60})</th>
</tr>
</thead>
<tbody>
<tr>
<td>-14</td>
<td>Note(^{59})</td>
<td>7/8</td>
<td>–</td>
</tr>
<tr>
<td>-16</td>
<td>1-7/16</td>
<td>1</td>
<td>150–165</td>
</tr>
<tr>
<td>-20</td>
<td>1-11/16</td>
<td>1-1/4</td>
<td>205–226</td>
</tr>
<tr>
<td>-24</td>
<td>1–2</td>
<td>1-1/2</td>
<td>315–347</td>
</tr>
<tr>
<td>-32</td>
<td>2-1/2</td>
<td>2</td>
<td>510–561</td>
</tr>
</tbody>
</table>

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 (T.F.F.T.) values are shown in Table 8.15, page 272. Make sure that tube end of a shaped connector (typically 45º or 90º) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

**NOTE:**
Overtorque failure of fittings may not be evident until fittings are disassembled.

Table 8.15 Hydraulic Fitting Pipe Thread

<table>
<thead>
<tr>
<th>Tapered Pipe Thread Size</th>
<th>Recommended T.F.F.T.</th>
<th>Recommended F.F.F.T.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8–27</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>1/4–18</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>3/8–18</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>1/2–14</td>
<td>2–3</td>
<td>12–18</td>
</tr>
<tr>
<td>3/4–14</td>
<td>1.5–2.5</td>
<td>12–18</td>
</tr>
<tr>
<td>1–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>1 1/4–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>1 1/2–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
<tr>
<td>2–11 1/2</td>
<td>1.5–2.5</td>
<td>9–15</td>
</tr>
</tbody>
</table>

\(^{60}\) Torque values and angles shown are based on lubricated connection as in reassembly.
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:

<table>
<thead>
<tr>
<th>Shipping Destination</th>
<th>Header Description</th>
<th>MacDon Instruction Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>D65 Draper Header for Self-Propelled Windrowers</td>
<td>MD #214328</td>
</tr>
<tr>
<td>Export (anywhere other than North America)</td>
<td>D65 Draper Header for Self-Propelled Windrowers</td>
<td>MD #214329</td>
</tr>
</tbody>
</table>
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Recommended Fluids and Lubricants

Ensure your machine operates at top efficiency by using clean fluids and lubricants only.

- Use clean containers to handle all fluids and lubricants.
- Store fluids and lubricants in an area protected from dust, moisture, and other contaminants.

<table>
<thead>
<tr>
<th>Lubricant</th>
<th>Specification</th>
<th>Description</th>
<th>Use</th>
<th>Capacities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease</td>
<td>SAE multipurpose</td>
<td>High temperature extreme pressure (EP2) performance with 1% max. Molybdenum disulphide (NLGI grade 2)</td>
<td>As required unless otherwise specified</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Lithium base</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gear lubricant</td>
<td>SAE 85W-140</td>
<td>API service class GL-5</td>
<td>Knife drive box</td>
<td>2.2 liters (2.3 quarts)</td>
</tr>
<tr>
<td>Gear lubricant</td>
<td>SAE 85W-140</td>
<td>API service class GL-5</td>
<td>Main drive gearbox</td>
<td>2.5 liters (2.6 quarts)</td>
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</tbody>
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