D1 Series Draper Header for M Series Windrows

Published: September 2018
EC Declaration of Conformity

MacDon Industries Ltd.
660 Moray Street,
Winnipeg, Manitoba, Canada
R3J 3B3

[1] Declaration of Conformity


[3] MacDon D1 Series

Christoph Martens
Product Integrity

EN

We, [1],

Declare that the product:

MacDon Type [2]

Name & Model [3]

Serial Number [4]

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

Harmonized standards used, as referred to in Article 7 (2):

EN ISO 4234-1:2013
EN ISO 4234-2:2009
EN ISO 4234-3:2009
EN ISO 4234-4:2013
EN ISO 4234-7:2009
EN ISO 4234-9:2009
EN ISO 2036:2013
EN ISO 2036:2018
EN ISO 2036:2019
EN ISO 2036:2020
EN ISO 2036:2021

As per Shipping Document

July 11, 2018

[6]

W, [1],

verklaar, en er prophet:

Modeltype [7]

Nauwgezet model [8]

Serienummer (nummer) [4]

Ophyderen alle bestemmelser i direktiv 2006/42/EC.

Anvendt harmoniseret standard, som henvist til (paragraf 7) (2):

EN ISO 4234-1:2013
EN ISO 4234-2:2009
EN ISO 4234-3:2009
EN ISO 4234-4:2013
EN ISO 4234-7:2009
EN ISO 4234-9:2009
EN ISO 4234-9:2009
EN ISO 4234-7:2009
EN ISO 2036:2013
EN ISO 2036:2018
EN ISO 2036:2019
EN ISO 2036:2020
EN ISO 2036:2021

Verklaring door de fabrikant

Onroerend personeel van de fabrikant

Onroerend personeel van de fabrikant

Benedikt von Kiedaisch

General Manager, MacDon Europe GmbH
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benediktvonkiedaisch@macdon.com

NL

Ons, [1],

verklaren, dat dit product:

MacDon Type [2]

Name & Model [3]

Serienummer [4]

Volledig voldoet aan alle normen, behalve als aangegeven in artikel 7 (2):

EN ISO 4234-1:2013
EN ISO 4234-2:2009
EN ISO 4234-3:2009
EN ISO 4234-4:2013
EN ISO 4234-7:2009
EN ISO 4234-9:2009
EN ISO 4234-9:2009
EN ISO 4234-7:2009
EN ISO 2036:2013
EN ISO 2036:2018
EN ISO 2036:2019
EN ISO 2036:2020
EN ISO 2036:2021

Tevreden over de klacht van de klant

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DA

Vi, [1],

erklærer, at produktet:

Type [7]

Modell [8]

Serienummer (nummer) [4]

Ophyl der vejledning i direktiv 2006/42/EC.

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EN ISO 4234-7:2009
EN ISO 2036:2013
EN ISO 2036:2018
EN ISO 2036:2019
EN ISO 2036:2020
EN ISO 2036:2021

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The Harvesting Specialists

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Introduction

This instructional manual contains information on the D1 Series Draper Header for M Series Self-Propelled Windrowers. It is designed to serve a dual function in your grain, hay, and specialty crop harvesting operation. Teamed with your self-propelled windrower power unit and optional hay conditioner, D1 Series Draper Headers will cut and lay crop into uniform, fluffy windrows.

The D1 Series Draper Header is specially designed as a straight cut header and is equipped to work well in all straight cut conditions—whether cutting on or above the ground.

Carefully read all the material provided before attempting to use the machine.

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

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

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

The following conventions are used in this document:

- Right and left are determined from the operator’s position. The front of the header faces the crop; the back of the header attaches to the windrower.
- Unless otherwise noted, use the standard torque values provided in Chapter 8.2 Torque Specifications, page 270.

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.

NOTE:
Keep your MacDon publications up-to-date. The most current version can be downloaded from our Dealer-only site (https://portal.macdon.com) (login required).
Keep this manual handy for frequent reference and to pass on to new Operators or Owners. A manual storage case (A) is located inside the header left endshield.

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

This document is available in English.
# List of Revisions

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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 upper 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.

Header, Left Side Endshield

Transport/Stabilizer Option
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<td>Inside Back Cover</td>
</tr>
</tbody>
</table>
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. Two signal words, IMPORTANT and NOTE identify non-safety related information. Signal words are selected using the following guidelines:

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

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

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

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

NOTE:
Provides additional non-essential information or advice.
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 lubricant fitting) will cause drive components in other areas (belts, pulleys, and knives) to move. Stay clear of driven components at all times.
- Wear protective gear when working on 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 illegible.
- If original part on which a safety sign was installed is replaced, be sure the repair part displays the current safety sign.
- Replacement safety signs are available from your MacDon Dealer Parts Department.

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 (Optional)

Figure 1.16: Slow Speed Transport (Optional)
Figure 1.17: Slow Speed Transport Tow-Bar (Optional)

Figure 1.18: Vertical Knife (Optional)
Figure 1.19: Endsheets, Reel Arms, and Backsheet

A - MD #184422 (Four Places on DK; Two Places on SK)
B - MD #131393 (Four Places on Single Reel)
C - MD #174632 (Two Places)
D - MD #166466 (Two Places)
E - MD #131391 (Two Places)
F - MD #131392 (Two Places on Double Reel Only)
SAFETY

Figure 1.20: Backtube – 4.6 m (15 ft.) Header

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

Figure 1.21: Backtube – 6.1 m (20 ft.) Header

A - MD #184372  B - MD #166466  C - MD #131391
SAFETY

Figure 1.22: Backtube – 7.6 m (25 ft.) Header

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

A - Warning  
B - Caution  
C - Instruction
SAFETY

Figure 1.23: Backtube – 9.1–10.7 m (30–35 ft.) Header

A - MD #184372  B - MD #131391  C - MD #166466  D - MD #131392
Figure 1.24: Backtube – 12.2 m (40 ft.) Header

SAFETY

A - MD #184372
B - MD #131392
C - MD #131391
D - MD #166466
1.8 Understanding Safety Signs

MD #131391
Crushing hazard

DANGER

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

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.

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.
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.

MD #174632
Reel entanglement hazard

CAUTION

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

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

MD #184422

Chain drive hand and arm entanglement hazard

WARNING

- Do not open or remove safety shields while engine is running.
- To avoid injury, stop the engine and remove the key before opening shield.
MD #220797
Tipping hazard in transport mode

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

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.
SAFETY

MD #279085
Auger entanglement hazard

WARNING

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

Figure 1.36: MD #279085
## 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>Cab-forward</td>
<td>Windrower operation with Operator and cab facing in direction of travel</td>
</tr>
<tr>
<td>CDM</td>
<td>Cab display module on a windrower</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>D1 Series header</td>
<td>MacDon D115, D120, D125, D130, D135, and D140 rigid draper headers for M Series Windrower</td>
</tr>
<tr>
<td>DDD</td>
<td>Double-draper drive</td>
</tr>
<tr>
<td>DK</td>
<td>Double knife</td>
</tr>
<tr>
<td>DKD</td>
<td>Double-knife drive</td>
</tr>
<tr>
<td>DR</td>
<td>Double reel</td>
</tr>
<tr>
<td>DWA</td>
<td>Double Windrow Attachment</td>
</tr>
<tr>
<td>Engine-forward</td>
<td>Windrower operation with Operator and engine facing in direction of travel</td>
</tr>
<tr>
<td>Export header</td>
<td>Header configuration typical outside North America</td>
</tr>
<tr>
<td>FFFT</td>
<td>Flats from finger tight</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>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>Header</td>
<td>A machine that cuts and lays crop into a windrow and is attached to a windrower</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>HDS</td>
<td>Hydraulic deck shift</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>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Knife</td>
<td>A cutting device which uses a reciprocating cutter (also called a sickle)</td>
</tr>
<tr>
<td>M Series windrower</td>
<td>MacDon M100, M105, M150, M155, M155E4, M200, and M205 windrowers</td>
</tr>
<tr>
<td>MDS</td>
<td>Mechanical deck shift</td>
</tr>
<tr>
<td>n/a</td>
<td>Not applicable</td>
</tr>
<tr>
<td>North American header</td>
<td>Header configuration typical in North America</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>Nut</td>
<td>An internally threaded fastener that is designed to be paired with a bolt</td>
</tr>
<tr>
<td>ORB</td>
<td>O-ring boss: A style of fitting commonly used in port openings 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>rpm</td>
<td>Revolutions per minute</td>
</tr>
<tr>
<td>SAE</td>
<td>Society of Automotive Engineers</td>
</tr>
<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>SDD</td>
<td>Single-draper drive</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>SK</td>
<td>Single knife</td>
</tr>
<tr>
<td>SKD</td>
<td>Single-knife drive</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>spm</td>
<td>Strokes per minute</td>
</tr>
<tr>
<td>SR</td>
<td>Single reel</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>Timed knife drive</td>
<td>Synchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor</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>UCA</td>
<td>Upper cross auger</td>
</tr>
</tbody>
</table>
## PRODUCT OVERVIEW

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untimed knife drive</td>
<td>Unsynchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor or two hydraulic motors</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 locking mechanism</td>
</tr>
</tbody>
</table>
2.2 Specifications

The following symbol and letters are used in Table 2.1, page 24 and Table 2.2, page 27:

S: standard / OF: optional (factory installed) / OD: optional (dealer installed) / --: not available

Table 2.1 Header Specifications

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

Table 2.1 Header Specifications (continued)

<table>
<thead>
<tr>
<th>Knife</th>
<th>Single-knife drive (all sizes): One hydraulic motor with V-belt to one heavy duty MD knife drive box</th>
</tr>
</thead>
<tbody>
<tr>
<td>OF</td>
<td>Double-knife drive 4.6–10.7 m [15–35 ft.] (timed): One hydraulic motor with two V-belts to two heavy duty MD knife drive boxes</td>
</tr>
<tr>
<td>OF</td>
<td>Double-knife drive 12.2 m [40 ft.] (untimed): Two hydraulic motors with V-belts to two heavy duty MD knife drive boxes</td>
</tr>
<tr>
<td>OF</td>
<td>Knife stroke 76 mm (3 in.)</td>
</tr>
</tbody>
</table>

Table 2.1 Header Specifications (continued)

<table>
<thead>
<tr>
<th>Knife</th>
<th>Single-knife speed¹ 6.1–7.6 m (20–25 ft.) headers</th>
<th>1200–1400 (strokes/min.) S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knife</td>
<td>Single-knife speed¹ 9.1 m (30 ft.) header</td>
<td>1200–1400 (strokes/min.) S</td>
</tr>
<tr>
<td>Knife</td>
<td>Single-knife speed¹ 10.7 m (35 ft.) header</td>
<td>1150–1300 (strokes/min.) S</td>
</tr>
<tr>
<td>Knife</td>
<td>Single-knife speed¹ 12.2 m (40 ft.) header</td>
<td>1150–1220 (strokes/min.) S</td>
</tr>
<tr>
<td>Knife</td>
<td>Double-knife speed¹ 6.1–7.6 m (20–25 ft.) headers</td>
<td>1400–1700 (strokes/min.) S</td>
</tr>
<tr>
<td>Knife</td>
<td>Double-knife speed¹ 9.1 (30 ft.) header</td>
<td>1200–1500 (strokes/min.) S</td>
</tr>
<tr>
<td>Knife</td>
<td>Double-knife speed¹ 10.7 m (35 ft.) header</td>
<td>1200–1400 (strokes/min.) S</td>
</tr>
<tr>
<td>Knife</td>
<td>Double-knife speed¹ 12.2 m (40 ft.) header</td>
<td>1200–1400 (strokes/min.) S</td>
</tr>
</tbody>
</table>

Table 2.1 Header Specifications (continued)

<table>
<thead>
<tr>
<th>Knife Sections</th>
<th>Over-serrated / solid / bolted / 3.5 serrations per cm (9 serrations per inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OF</td>
<td>Over-serrated / solid / bolted / 5.6 serrations per cm (14 serrations per inch)</td>
</tr>
</tbody>
</table>

Table 2.1 Header Specifications (continued)

| Knife overlap at center (double-knife headers) | 3 mm (1/8 in.) S |

1. Under normal cutting conditions, set knife speed at the knife drive pulley between 600 and 640 rpm (1200 and 1280 spm). If set to low side of chart, you could experience knife stalling.
### Table 2.1  Header Specifications (continued)

<table>
<thead>
<tr>
<th>Guards and Hold-Downs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Guard: pointed / forged / double heat treated (DHT)</td>
<td>OF</td>
</tr>
<tr>
<td>Hold-down: Sheet metal / adjustment bolt</td>
<td></td>
</tr>
<tr>
<td>Guard: pointed / forged / case hardened (CH)</td>
<td>OF</td>
</tr>
<tr>
<td>Hold-down: Sheet metal / adjustment bolt</td>
<td></td>
</tr>
<tr>
<td>Guard: stub / forged bottom / forged top / adjustment plate</td>
<td>OF</td>
</tr>
<tr>
<td>Guard: stub / forged bottom / sheet metal top / adjustment bolt</td>
<td>OF</td>
</tr>
<tr>
<td>Guard: 4 point / no choke design (2 long points with tangs / 2 short points without tangs)</td>
<td>OF</td>
</tr>
</tbody>
</table>

### Guard Angle (Cutterbar on Ground)

<table>
<thead>
<tr>
<th>Center-link retracted</th>
<th>4.6–7.5 m (15–25 ft.) headers</th>
<th>7.5 degrees</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center-link retracted</td>
<td>9.1–12.2 m (30–40 ft.) headers</td>
<td>2.5 degrees</td>
<td>S</td>
</tr>
<tr>
<td>Center-link extended</td>
<td>4.6–7.5 m (15–25 ft.) headers</td>
<td>17 degrees</td>
<td>S</td>
</tr>
<tr>
<td>Center-link extended</td>
<td>9.1–12.2 m (30–40 ft.) headers</td>
<td>12 degrees</td>
<td>S</td>
</tr>
</tbody>
</table>

### Draper (Conveyor) and Decks

| Draper width | 1057 mm (41-19/32 in.) | S |
| Draper drive | Hydraulic | S |
| Draper speed | 225 m/min. (0–742 fpm) | S |

### PR15 Pick-Up Reel

| Quantity of tine tubes | 5, 6, or 9 | — |
| Center tube diameter: All reel sizes except 10.7 m (35 ft.) single reel | 203 mm (8 in.) | — |
| Center tube diameter: 10.7 m (35 ft.) single reel | 254 mm (10 in.) | — |
| Finger tip radius | Factory assembled | 800 mm (31-1/2 in.) | — |
| Finger tip radius | Adjustment range | 766–800 mm (30-3/16 – 31-1/2 in.) | — |
| Effective reel diameter (via cam profile) | 1650 mm (65 in.) | — |
| Finger length | 290 mm (11 in.) | — |
| Finger spacing (staggered on alternate bats) | 150 mm (6 in.) | S |
| Reel drive | Hydraulic | S |
| Reel speed (adjustable from cab using ground speed index) | 0–85 rpm | S |
## PRODUCT OVERVIEW

### Table 2.1 Header Specifications (continued)

<table>
<thead>
<tr>
<th>Frame and Structure</th>
<th>Cut width + 384 mm (15.1 in.)</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header width</td>
<td>Field mode</td>
<td></td>
</tr>
<tr>
<td>Header width</td>
<td>Transport mode: reel fore-aft fully retracted, shortest center-link</td>
<td>(A) long dividers removed^2</td>
</tr>
<tr>
<td>Header width</td>
<td>Transport mode: reel fore-aft fully retracted, shortest center-link</td>
<td>(B) long dividers installed^2</td>
</tr>
</tbody>
</table>

### Figure 2.1: Header Width

2. Refer to Figure 2.1, page 26.
### Table 2.2 Header Attachments

<table>
<thead>
<tr>
<th>Upper Cross Auger</th>
<th>( O_D )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside diameter</td>
<td>305 mm (12 in.)</td>
</tr>
<tr>
<td>Tube diameter</td>
<td>All sizes except 7.6 m (25 ft.) header 152 mm (6 in.)</td>
</tr>
<tr>
<td>Tube diameter</td>
<td>7.6 m (25 ft.) header 178 mm (7 in.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stabilizer Wheel / Slow Speed Transport</th>
<th>( O_D )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheels</td>
<td>15 in.</td>
</tr>
<tr>
<td>Tires</td>
<td>P205/75 R-15</td>
</tr>
</tbody>
</table>

### Table 2.3 Header Weight

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

Figure 2.2: D1 SP Windrower Header Components

A - Reel Cam  
B - Pick-Up Reel Tines  
C - Drapers  
D - Transport Light  
E - Endshield  
F - Reel Fore-Aft Cylinder  
G - Knife Drive Box  
H - Skid Shoe  
J - Crop Divider
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.

IMPORTANT:

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](image)
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 Endshields

1. Push release lever (A) located on the backside of the endshield to unlock the shield.
2. Pull endshield open using handle depression (B).
3. Pull endshield at handle depression (A). Endshield is retained by a hinge tab (B) and will open in direction (C).
4. If additional clearance is required, pull the endshield free of hinge tab (A) and swing shield toward the rear of the header.

5. Engage safety latch (B) on hinge arm to secure the shield in fully open position.

**Closing Endshields**

1. Disengage lock (B) to allow endshield to move.

2. Insert front of endshield behind hinge tab (A) and into divider cone.

3. Swing endshield in direction (A) into closed position. Engage lock with a firm push.

4. Check that endshield is locked.
Removing Endshields

1. Fully open the endshield. For instructions, refer to Opening Endshields, page 33.
2. Engage lock (A) to prevent endshield movement.
3. Remove self-tapping screw (B).
4. Slide endshield upwards and remove from hinge arm (C).
5. Place endshield away from work area.

Installing Endshields

1. Guide endshield onto hinge arm (C) and slowly slide it downwards.
   
   **NOTE:**
   Ensure hinge arm (C) is installed in the outboard hole on the hinge bracket, as shown in illustration at right.
2. Install self-tapping screw (B).
3. Disengage lock (A) to allow endshield movement.

   **NOTE:**
   Endshields may expand or contract when subjected to large temperature changes. Top pin and lower latch bracket positions can be adjusted to compensate for dimensional changes. Refer to Checking and Adjusting Endshields, page 36.
Checking and Adjusting Endshields

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

**Checking the endshield:**

1. Check gap (X) between front end of the shields and the header frame and compare to the values in Table 3.1, page 36.

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

Adjusting the endshield gap:

1. Loosen the four bolts (A) on support tube bracket (B).
2. Loosen the three bolts (A) on latch assembly (B).

3. Adjust latch assembly (B) to achieve the desired gap between the front end of the shield and the header frame. Refer to Table 3.1, page 36 for the recommended endshield gap at various temperatures.

4. Tighten the three bolts (A) on the latch assembly.

5. Tighten the four bolts (A) on support tube bracket (B).

6. Close endshield.
3.2.4 Daily Start-Up Check

⚠️ CAUTION

• Clear the area of other persons, pets, etc. Keep children away from machinery. Walk around the machine to be sure no one is under, on, or close to it.

• Wear close-fitting clothing and protective shoes with slip-resistant soles.

• Remove foreign objects from the machine and surrounding area.

• Carry with you any protective clothing and personal safety devices that could be necessary through the day. Do NOT take chances. You may need a hard hat, protective glasses or goggles, heavy gloves, a respirator or filter mask, or wet weather gear.

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

Complete the following tasks each day before start-up:

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

   NOTE:
   Use proper procedure when searching for pressurized fluid leaks. Refer to 5.3.5 Checking Hydraulic Hoses and Lines, page 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 D1 Series Draper Header are available as options that can be installed by your MacDon Dealer. Refer to 6 Options and Attachments, page 239 for descriptions of available items.

3.6.2 Header Settings
The following table is a guideline for setting up the D1 Series SP Draper Header. 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 Condition</th>
<th>Divider 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><strong>Crop Type: Cereals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stubble Height: &lt;102 mm (&lt;4 in.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>On</td>
<td>0–3</td>
<td>Medium</td>
<td>2</td>
<td>10–15</td>
<td>6 or 7</td>
<td>Up or center</td>
<td>Variable</td>
<td>Not required</td>
<td>311 (70)</td>
</tr>
<tr>
<td>Normal</td>
<td>On</td>
<td>0–3</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Up or center</td>
<td>Variable</td>
<td>Not required</td>
<td>311 (70)</td>
</tr>
<tr>
<td>Heavy</td>
<td>On</td>
<td>4–7</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Up or center</td>
<td>Variable</td>
<td>Not required</td>
<td>311 (70)</td>
</tr>
<tr>
<td>Lodged</td>
<td>On</td>
<td>4–7</td>
<td>High</td>
<td>3</td>
<td>5–10</td>
<td>4 or 5</td>
<td>Up or center</td>
<td>Variable</td>
<td>Not required</td>
<td>311 (70)</td>
</tr>
<tr>
<td><strong>Crop Type: Cereals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stubble Height: 102–203 mm (4–8 in.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>On</td>
<td>0–3</td>
<td>Medium</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>Normal</td>
<td>On</td>
<td>0–3</td>
<td>High</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>Heavy</td>
<td>On</td>
<td>4–7</td>
<td>High</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>Lodged</td>
<td>On</td>
<td>4–7</td>
<td>High</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>
</tbody>
</table>

3. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. Refer to *Controlling Header Angle*, page 53.

4. Refer to *3.7.9 Knife Speed*, page 58.

5. Refer to *Reel Cam Settings*, page 63.

6. Percentage above ground speed. Refer to *3.7.6 Reel Speed*, page 54.

7. Refer to *3.7.11 Reel Fore-Aft Position*, page 59.

8. 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 54.

9. 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 50.

10. 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 Condition</th>
<th>Divider 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>Crop Type: Cereals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stubble Height: &gt;203 mm (&gt;8 in.)</td>
<td></td>
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</tr>
<tr>
<td>Light</td>
<td>Off</td>
<td>0–3</td>
<td>Medium</td>
<td>2</td>
<td>10–15</td>
<td>6 or 7</td>
<td>Not applicable</td>
<td>Storage</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
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<td>0–3</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Not applicable</td>
<td>Storage</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Heavy</td>
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<td>4–7</td>
<td>High</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Not applicable</td>
<td>Storage</td>
<td>Not required</td>
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<tr>
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<td>High</td>
<td>3</td>
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<td>4 or 5</td>
<td>Not applicable</td>
<td>Storage</td>
<td>Not required</td>
<td>667 (150)</td>
</tr>
<tr>
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<tr>
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<td>8–10</td>
<td>Low</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>
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<td>8–10</td>
<td>Medium</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>Heavy</td>
<td>Off</td>
<td>8–10</td>
<td>Medium</td>
<td>1</td>
<td>10</td>
<td>3 or 4</td>
<td>Variable</td>
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<td>Recommended</td>
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<td>8–10</td>
<td>Medium</td>
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<td>3 or 4</td>
<td>Center or down</td>
<td>Variable</td>
<td>Recommended</td>
<td>311–445 (70–100)</td>
</tr>
</tbody>
</table>

11. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. Refer to Controlling Header Angle, page 53.
12. Refer to 3.7.9 Knife Speed, page 58.
13. Refer to Reel Cam Settings, page 63.
14. Percentage above ground speed. Refer to 3.7.6 Reel Speed, page 56.
15. Refer to 3.7.11 Reel Fore-Aft Position, page 58.
16. 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.
17. 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 54.
18. 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 Condition</th>
<th>Divider 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><strong>Crop Type: Canola</strong></td>
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<tr>
<td><strong>Stubble Height: &gt;203 mm (&gt;8 in.)</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>On</td>
<td>8–10</td>
<td>Low</td>
<td>4</td>
<td>5–10</td>
<td>6 or 7</td>
<td>Not applicable</td>
<td>Storage</td>
<td>Recommended</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Normal</td>
<td>On</td>
<td>8–10</td>
<td>Medium</td>
<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Not applicable</td>
<td>Storage</td>
<td>Recommended</td>
<td>667 (150)</td>
</tr>
<tr>
<td>Heavy</td>
<td>On</td>
<td>8–10</td>
<td>Medium</td>
<td>3</td>
<td>10</td>
<td>3 or 4</td>
<td>Not applicable</td>
<td>Storage</td>
<td>Recommended</td>
<td>667 (150)</td>
</tr>
<tr>
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<td>8–10</td>
<td>Medium</td>
<td>3</td>
<td>5–10</td>
<td>3 or 4</td>
<td>Not applicable</td>
<td>Storage</td>
<td>Recommended</td>
<td>667 (150)</td>
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<td></td>
</tr>
<tr>
<td>Light</td>
<td>On</td>
<td>4–7</td>
<td>High</td>
<td>2</td>
<td>5–10</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>
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<td>Normal</td>
<td>On</td>
<td>0–3</td>
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<td>2</td>
<td>10</td>
<td>6 or 7</td>
<td>Center or down</td>
<td>Variable</td>
<td>Not required</td>
<td>311–445 (70–100)</td>
</tr>
<tr>
<td>Heavy</td>
<td>On</td>
<td>4–7</td>
<td>High</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>311–445 (70–100)</td>
</tr>
<tr>
<td>Lodged</td>
<td>On</td>
<td>8–10</td>
<td>High</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>311–445 (70–100)</td>
</tr>
</tbody>
</table>

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19. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. Refer to Controlling Header Angle, page 53.
20. Refer to Knife Speed, page 58.
21. Refer to Reel Cam Settings, page 63.
22. Percentage above ground speed. Refer to Reel Speed, page 56.
24. 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 Cutting Height, page 50.
25. 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 50.
26. 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 Condition</th>
<th>Divider Rods</th>
<th>Header Angle&lt;sup&gt;27&lt;/sup&gt;</th>
<th>Knife Speed&lt;sup&gt;28&lt;/sup&gt;</th>
<th>Reel Tine Pitch&lt;sup&gt;29&lt;/sup&gt;</th>
<th>Reel Speed &lt;sup&gt;%&lt;/sup&gt;&lt;sup&gt;30&lt;/sup&gt;</th>
<th>Reel Fore-Aft&lt;sup&gt;31&lt;/sup&gt;</th>
<th>Skid Shoe Position&lt;sup&gt;32&lt;/sup&gt;</th>
<th>Stabilizer Wheels&lt;sup&gt;33&lt;/sup&gt;</th>
<th>Upper Cross Auger</th>
<th>Float N (lbf)&lt;sup&gt;34&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crop Type: Edible beans</strong></td>
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<td><strong>Stubble Height: On ground</strong></td>
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</tr>
<tr>
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<td>Off</td>
<td>8–10</td>
<td>Medium</td>
<td>2</td>
<td>5–10</td>
<td>3 or 4</td>
<td>Up or center</td>
<td>Storage</td>
<td>Not required</td>
<td>445 (100)</td>
</tr>
<tr>
<td>Normal</td>
<td>Off</td>
<td>8–10</td>
<td>Medium</td>
<td>2</td>
<td>5–10</td>
<td>3 or 4</td>
<td>Up or center</td>
<td>Storage</td>
<td>Not required</td>
<td>445 (100)</td>
</tr>
<tr>
<td>Heavy</td>
<td>Off</td>
<td>8–10</td>
<td>Medium</td>
<td>2</td>
<td>5–10</td>
<td>3 or 4</td>
<td>Up or center</td>
<td>Storage</td>
<td>Not required</td>
<td>445 (100)</td>
</tr>
<tr>
<td>Lodged</td>
<td>Off</td>
<td>8–10</td>
<td>Medium</td>
<td>3</td>
<td>5–10</td>
<td>3 or 4</td>
<td>Up or center</td>
<td>Storage</td>
<td>Not required</td>
<td>445 (100)</td>
</tr>
<tr>
<td><strong>Crop Type: Grass</strong></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stubble Height: On ground</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</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>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>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>Lodged</td>
<td>On</td>
<td>Variable</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>311–445 (70–100)</td>
</tr>
</tbody>
</table>

---

27. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. Refer to Controlling Header Angle, page 53.

28. Refer to 3.7.9 Knife Speed, page 58.

29. Refer to Reel Cam Settings, page 63.

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

31. Refer to 3.7.1 Reel Fore-Aft Position, page 59.

32. 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 59.

33. 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 54.

34. 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 Condition</th>
<th>Divider 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>Light</td>
<td>On</td>
<td>Variable</td>
<td>High</td>
<td>3</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>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>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>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>

**Crop Type: Alfalfa**

**Stubble Height: On ground**

35. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. Refer to [Controlling Header Angle](#) page 53.
36. Refer to [3.7.9 Knife Speed](#) page 58.
37. Refer to [Reel Cam Settings](#) page 69.
38. Percentage above ground speed. Refer to [3.7.5 Reel Speed](#) page 58.
40. 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 54.
41. 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 50.
42. 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 steel reel tines.

Table 3.3 Recommended Reel Settings

<table>
<thead>
<tr>
<th>Cam Setting Number (Finger Speed Gain)</th>
<th>Reel Position Number</th>
<th>Reel Finger Pattern</th>
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</thead>
<tbody>
<tr>
<td>1 (0)</td>
<td>6 or 7</td>
<td></td>
</tr>
<tr>
<td>2 (20%)</td>
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</table>
Table 3.3  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></td>
</tr>
<tr>
<td>4 (35%)</td>
<td>2 or 3</td>
<td></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 backsheet) occurs with the reel in the farthest aft position.
- Maximum crop carrying capacity (maximum area of exposed draper between the reel and the header backsheet) occurs with the reel in the farthest forward position.
- The finger tip speed at the cutterbar is higher than the reel speed at higher cam settings due to the nature of the cam action. 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>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 76</td>
</tr>
</tbody>
</table>

3.7.1 Cutting Height

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

3.7.2 Cutting off the Ground

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

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

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

Adjusting Stabilizer/Slow Speed Transport Wheels

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

⚠️ DANGER

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

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

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

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

1. Raise the header until the stabilizer wheels are off the ground. Shut down engine and remove the key.
2. Check that the float is working properly. Refer to your windrower operator’s manual for instructions.
3. Support the wheel weight by lifting slightly with one hand on handle (B), and pull up on handle (A) to release the lock.
4. Lift the wheel using handle (B), and engage the support channel into center slot (C) in the upper support.
5. Push handle (A) down to lock.
6. 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.

7. 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

⚠️ 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 50
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:
   • Adjusting Stabilizer Wheels, page 52
   • Adjusting Stabilizer/Slow Speed Transport Wheels, page 50
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

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

3.7.5 Header Angle

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

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

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

Controlling Header Angle

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

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

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

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

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

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

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

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

**NOTE:**

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

Refer to 3.6.2 Header Settings, page 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 228.

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

3.7.8 Draper Speed

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

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

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

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 for more information.

Table 3.5 Knife Speed Guidelines

<table>
<thead>
<tr>
<th>Header Size</th>
<th>Single Knife</th>
<th>Double Knife</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6 m (15 ft.)</td>
<td>—</td>
<td>1500–1900</td>
</tr>
<tr>
<td>6.1-7.6 m (20–25 ft.)</td>
<td>1200–1400</td>
<td>1400–1700</td>
</tr>
<tr>
<td>9.1 m (30 ft.)</td>
<td>1200–1400</td>
<td>1200–1600</td>
</tr>
<tr>
<td>10.7 m (35 ft.)</td>
<td>1150–1300</td>
<td>1200–1400</td>
</tr>
<tr>
<td>12.2 m (40 ft.)</td>
<td>1150–1220</td>
<td>1200–1400</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.

Figure 3.30: Left Endshield
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 58.

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 198.

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 61.
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.

Refer to *3.6.2 Header Settings, page 42* for recommended reel positions in specific crops and crop conditions.

**NOTE:**
In crops that are difficult to pick up such as rice, or severely lodged crops that require full forward positioning of the reel, set the reel tine pitch to provide proper placement of the crop onto the drapers. Refer to *3.7.12 Reel Tine Pitch, page 68* for adjustment details.

### Adjusting Reel Fore-Aft Position

1. Select FORE-AFT mode on the selector switch in the cab.
2. Operate the hydraulics to move the reel to the desired position while using decal (A) as a reference.
3. Check the reel clearance to cutterbar after making changes to the cam setting. Refer to the following for measurement and adjustment procedures:
   - *5.8.1 Reel Clearance to Cutterbar, page 198*
   - *5.8.2 Reel Frown, page 202*

**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 nuts and bolts (A) securing the cylinder bracket (B) to the reel arm (C). Retain hardware.

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

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

1. Remove pin (A) securing cylinder (B) to bracket/light assembly (C).
2. Remove nuts and bolts (D) securing bracket/light assembly (C) to the reel arm, and remove the bracket/light assembly.
3. If necessary, remove the cable tie securing the harness to the bracket/light assembly (C) or reel arm.
4. Swivel the light to the working position as shown.
5. Reposition the bracket/light assembly (C) on the reel arm as shown, and secure with four nuts and bolts (D). Tighten hardware.
6. Push the reel back and attach cylinder (B) to the bracket/light assembly (C) with pin (A). Secure pin with cotter pin.
7. Secure the light harness to the bracket/light assembly (C) using a cable tie.
8. Check the reel clearance to the backsheet, upper cross auger (if installed), and reel braces.
9. Adjust the reel tine pitch if necessary. Refer to 3.7.12 *Reel Tine Pitch, page 68.*
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 reel arm cylinder as follows:

NOTE:
Some reel components are not shown in illustration for improved clarity.

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

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

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

2. Push reel back until bracket (B) lines up with the aft set of holes in the reel arm (C).

3. Reinstall the four bolts (A) to secure bracket to reel arm at new position.
Reposition the left reel arm cylinder as follows:

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

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

5. Reposition bracket/light assembly (C) onto reel arm as shown, and secure using four nuts and bolts (D). Tighten hardware.
6. Push reel back and reinstall cylinder (B) onto bracket/light assembly (C) using pin (A). Secure pin with cotter pin.
7. Secure light harness to bracket/light assembly (C) or to reel arm using plastic cable tie (not shown).
8. Check reel clearance to backsheet, upper cross auger (if installed), and reel braces.
9. Adjust reel tine pitch (if required). For adjustment procedures, refer to 3.7.12 Reel Tine Pitch, page 68.

Figure 3.42: Left Reel Arm Cylinder in Forward Position

Figure 3.43: Left Reel Arm Cylinder in Aft Position
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 reel arm cylinder as follows:

**NOTE:**
Some reel components not shown in illustrations for improved clarity.

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

![Figure 3.44: Left Reel Arm in Forward Position](image1)

![Figure 3.45: Left Reel Arm in Aft Position](image2)
Reposition the center reel arm cylinder as follows:

NOTE:
Some reel components not shown in illustrations for improved clarity.

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

2. Push the reel back until the end of the cylinder (E) lines up with reel position 2 hole on bracket (D). Position washers (C) on both sides of the cylinder end inside the bracket.

3. Reinstall clevis pin (B) at the new position and secure with ring (A).
Reposition the right reel arm cylinder as follows:

NOTE:
Some reel components not shown in illustrations for improved clarity.

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

2. Push the reel back until end of cylinder (E) lines up with reel position 2 hole on bracket (D).

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

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

Figure 3.48: Right Reel Arm in Forward Position

Figure 3.49: Right Reel Arm in Aft Position

3.7.12 Reel Tine Pitch

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

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

For the best results, use the minimum cam setting that delivers the crop past the rear edge of the cutterbar and onto the drapers. 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. If adjustments are necessary, refer to *Adjusting Reel Cam, page 71*.

**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.

![Figure 3.53: Finger Profile – Cam Position 4](image)

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 198.

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.

![Figure 3.55: Cam Disc Positions](image)
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

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

1. Lower reel, raise header, stop engine, remove key, and engage header safety props. For instructions, refer to your windrower operator’s manual.
2. Open endshields. Refer to Opening 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 endshields. Refer to Closing Endshields, page 34.

Figure 3.56: Crop Divider

Figure 3.57: Stored Crop Divider
Removing Crop Dividers without Latch Option from Header

⚠️ DANGER

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

1. Lower reel, raise header, stop engine, remove key, and engage safety props. For instructions, refer to your windrower operator’s manual.
2. Open endshields. For instructions, refer to Opening Endshields, page 33.
3. Remove bolt (A), lock washer, and flat washer.
4. Lower crop divider (B) and then lift to remove from endsheet.
5. Close endshields. Refer to Closing Endshields, page 34.

![Figure 3.58: Crop Divider](image)

Installing Crop Dividers with Latch Option onto Header

⚠️ DANGER

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

1. Lower reel, raise header, stop engine, remove key, and engage safety props. For instructions, refer to your windrower operator’s manual.
2. Open endshields. For instructions, refer to Opening Endshields, page 33.
3. Remove crop divider from storage location by lifting crop divider to disengage lugs (A) at lower end and then lowering it slightly to disengage pin (B) from endsheet.

![Figure 3.59: Stored Crop Divider](image)
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 endshields. For instructions, refer to Closing Endshields, page 34.

Installing Crop Dividers without Latch Option onto Header

⚠️ DANGER

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

1. Lower reel, raise header, stop engine, remove key, and engage safety props. For instructions, refer to your windrower operator’s manual.

2. Open endshields. Refer to Opening 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 endshields. Refer to Closing Endshields, page 34.
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>
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<td>Edible beans</td>
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<td>Milo</td>
</tr>
<tr>
<td></td>
<td>Rice</td>
</tr>
<tr>
<td></td>
<td>Soybeans</td>
</tr>
<tr>
<td></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 6.4.5 Rice Divider Rods, page 251.

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

Figure 3.67: Divider Rod for Rice
3.8 Delivery Opening

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

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

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

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

Refer to 3.10 Windrow Types, page 86 for the strengths and weaknesses of the various windrow configurations with respect to these factors.

Also refer to 3.9 Double Windrowing, page 82.

3.8.1 Adjusting Delivery Opening on Header with Manual Deck Shift

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

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

1. Loosen bolts (A) on both decks.

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

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

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

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

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

3. Reinstall bolts (A) and tighten.

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 nuts (B) and (C).
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 (C).

6. Lock nut (B) against nut (A).

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

Figure 3.73: Chain Adjustment Bolt – Left Shown, Right Similar
3.9 Double Windrow

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

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

Deck shifting is used for crops that don’t require conditioning, such as grains, canola, and beans. Refer to

- 3.9.1 Shifting Decks Hydraulically, page 82
- 3.9.2 Shifting Decks Manually, page 83

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 windrowsers up to 9.1 m (30 ft.). Refer to 3.9.3 Using Double Windrow Attachment (DWA), page 85.

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 7.6–10.7 m (25–35 ft.) headers.

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

To lay a double windrow, do the following:

**NOTE:**

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

1. Position the decks at the left end of header to deliver crop from right end (A) for the first round.

2. To deliver crop from the left end (B) of the header, use the deck shift control in the windrower to shift the decks to the right end of the header.

3. Complete the second round to lay a double windrow.

4. Repeat above steps to lay additional double windrow.

**NOTE:**

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

![Figure 3.74: Double Windrowing](image)
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.

---

Figure 3.77: Double Windrowing
3.9.3 Using Double Windrow Attachment (DWA)

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

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

To lay a double windrow, do the following:

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

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

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

### Table 3.7 Windrow Descriptions

<table>
<thead>
<tr>
<th>Windrow Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Herringbone</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Fantail</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Dovetail</strong></td>
<td>The stalks are lined along outside edges of windrow and heads are crossed in center. This windrow can be formed by center delivery only.</td>
</tr>
<tr>
<td><strong>Parallel</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight Distribution</th>
<th>Curing</th>
<th>Weatherability</th>
<th>Machine Setting Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>Good</td>
<td>Excellent</td>
<td>• Reel and ground speed approximately equal</td>
</tr>
<tr>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
<td>• Medium draper speed</td>
</tr>
<tr>
<td>Poor</td>
<td>Fair</td>
<td>Poor</td>
<td>• Center delivery</td>
</tr>
<tr>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>• High draper speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• High header angle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Center delivery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Medium draper speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Medium header angle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Center or end delivery</td>
</tr>
</tbody>
</table>
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 D1 Series Draper Header in hay crops.

3.11.1 Curing

A quick cure will maintain top quality because

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

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

3.11.2 Topsoil Moisture

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

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

<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 wind 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.

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

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

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

6. Clean off cutterbar by hand.

**NOTE:**
If cutterbar plugging persists, refer to *7 Troubleshooting, page 255.*
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.

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.
Figure 3.83: Beater Bar
3.15 Transporting the Header

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

3.15.1 Transporting Header on Windrower

**CAUTION**

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

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

Attaching Header to Towing Vehicle

**CAUTION**

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

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

Towing the Header

**CAUTION**

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

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

Removing Tow-Bar

1. Block the tires to prevent the header from rolling, and unhook the header from the towing vehicle.
2. Disconnect 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 99*
   - *Moving Rear (Right) Wheels into Field Position, page 100*
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.

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.
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.
**OPERATION**

**Attaching Tow-Bar**

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

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

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 270*.
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).
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 MacDon Dealer. A parts catalog is provided in the plastic manual case inside the left endshield.

Log hours of operation and use the maintenance record provided (refer to 5.3.1 Maintenance Schedule/Record, page 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 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.
### Maintenance Schedule/Record

Copy this page to continue record.

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

- ✓ Hydraulic hoses and lines
- ✓ Knife sections, guards, and hold-downs
- ✓ Tire pressure
- ✶ Knife (except in sandy conditions)

#### 25 Hours

- ✶ Knifehead(s)

#### 50 Hours

- ✓ Draper roller bearings
- ✶ Knife drive box oil - first 50 hours only

#### 100 Hours or Annually

- ✓ 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

43. Whichever occurs first.

44. A record of daily maintenance is not required, but is at the Owner’s/Operator’s discretion.
Maintenance and Servicing

<table>
<thead>
<tr>
<th>Maintenance Record</th>
<th>Action:</th>
<th>✓ - Check</th>
<th>♦ - Lubricate</th>
<th>▲ - Change</th>
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</thead>
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<tr>
<td></td>
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<td>Reel drive U-joint</td>
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<tr>
<td>1000 Hours or 3 Years&lt;sup&gt;43&lt;/sup&gt;</td>
<td>▲ Knife drive box lubricant</td>
<td>▲</td>
<td>▲</td>
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</tr>
</tbody>
</table>

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 270</td>
</tr>
</tbody>
</table>
| 5 hours             | Check knife drive belts tension. Periodically check for first 50 hours. | • Tensioning Timed Knife Drive Belts, page 168  
 • Tensioning Untimed Knife Drive Belts, page 163 |
| 10 hours            | Check knife drive box mounting bolts. | Checking Mounting Bolts, page 153 |
| 50 hours            | Change knife drive box lubricant. | Changing Oil in Knife Drive Box, page 160 |
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 Untimed Knife Drive Belts, page 163.
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.

Figure 5.5: 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 138](#).

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

Figure 5.6: Every 25 Hours
A - Knifehead (Single Knife [1 Place]; Double Knife [2 Places])
Figure 5.7: Every 100 Hours

A - Knife Drive Box (Check Oil Level Between Lower Hole and End of Dipstick [B])
B - Upper Cross Auger Bearing (1 Place)
D - Reel Drive Chain (1 Place) (Double Reel Shown – Single Reel Similar)
E - Hydraulic Couplers (Use WD40® or Equivalent)
Figure 5.8: Every 250 Hours

45. U-joint has an extended lubrication cross and bearing kit. Stop greasing when greasing becomes difficult or if U-joint stops taking grease. Overgreasing will damage U-joint. Six to eight pumps are sufficient at first grease (factory). Decrease grease interval as U-joint wears and requires more than six pumps.
46. 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)
B - Reel Center Bearing (1 Place)
C - Wheel Bearings (4 Places)
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.

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 cover (B) to the reel drive.
3. Apply a liberal amount of grease to the chain (A).

4. Position 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

WARNING

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

1. Use a Phillips screwdriver to remove the screws (A) from the fixture, and remove the plastic lens. Retain screws (A).

2. Replace the bulb, and reinstall the plastic lens and screws.

NOTE:

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

Figure 5.22: Left Transport Light

Figure 5.23: Optional Slow Speed Transport (Red and Amber Lights)
5.5 Knife

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

⚠️ CAUTION
To avoid personal injury, before servicing machine or opening drive covers, refer to 5.1 Preparing Machine for Servicing, page 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 knife sections last longer than fine serrated sections in dirty or sandy conditions. Fine serrated knife sections perform better in fine-stemmed grasses and plants that contain more fibrous stems.

1. Shut down the windrower, and remove the key from the ignition.
2. Stroke the knife as required to center 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 (C) if knife section is under the bar.
6. Clean any dirt off the knife back and position the new knife section onto the knife.

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

Figure 5.24: Cutterbar Hazard

Figure 5.25: Knife Bar
7. Reposition bars (C) and/or (D) on knife (A) and install lock nuts (B).

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

8. Torque nuts to 9.5 Nm (7 lbf·ft).

### 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 fitting (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 137.

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

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

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

Figure 5.28: Knifehead Bearing Assembly
5.5.4 Installing Knifehead Bearing

1. Place O-ring (E) and plug (D) into knifehead.
   **IMPORTANT:**
   Install the bearing with the stamped end (the end with the identification markings) facing up.

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 139.

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

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

### 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 6.2.4 Stub Guard Conversion Kit, page 243.
Replacing Pointed Guards

Normal, drive side, and end guard replacement:

⚠️ WARNING

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

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

**IMPORTANT:**

The first four outboard guards (B) on the drive sides of the header do not have ledger plates. Ensure proper replacement guards are installed at these locations.
5. Position the new guard (A), hold-down (C) (if applicable), and plastic wearplate (if applicable) onto the cutterbar. Secure with two nuts (B) and bolts, but do NOT tighten.

6. Check and adjust the clearance between the hold-downs and the knife. Refer to Checking Knife Hold-Downs, page 148.

NOTE:
The guard at the center of a double-knife header (where the two knives overlap) requires a different replacement procedure. Refer to Steps 7, page 143 through 11, page 144.

**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 148.*
Replacing Stub Guards

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

Normal, drive side, and end guard replacement:

**WARNING**

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

1. Shut down the windrower, and remove the key from the ignition.
2. Stroke the knife manually until the knife sections are spaced midway between the guards.
3. Remove 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 miter on the adjuster bar (D), and reinstall the adjuster bar in the same position. Miters 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 148.*

**Figure 5.42: Stub Guards**
Center guard replacement:

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

⚠️ WARNING

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

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

8. Remove 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 148.
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 141.

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

**Normal knife guard hold-down:**

1. Shut down the windrower, and remove the key from the ignition.
2. Manually stroke knife to center the sections in guards.
3. Measure the clearance between 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) 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 149
   - Adjusting Stub Guard Hold-Downs, page 150
Adjusting Pointed Guard Hold-Downs

This procedure is applicable to formed sheet metal hold-downs. Do **NOT** use this procedure for the hold-down at center guard position where knives overlap on double-knife headers. For center guard, refer to Adjusting Stub Guard Hold-Downs, page 150.

**WARNING**

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

1. Shut down the windrower, and remove the key from the ignition.
2. Decrease clearance by turning bolt (B) clockwise to lower front of hold-down (A).
3. Increase clearance by turning bolt (B) counterclockwise to raise front of hold-down.
   **NOTE:**
   For larger adjustments, it may be necessary to loosen nuts (C), turn adjuster bolt (B), and then retighten nuts.
4. Check clearance again and adjust as required.

**WARNING**

Check to be sure all bystanders have cleared the area.

5. Complete hold-down adjustments, run header at low engine speed, and listen for noise caused by insufficient clearance.
   **NOTE:**
   Insufficient hold-down clearance will result in overheating of knife and guards—adjust as necessary.
**Adjusting Stub Guard Hold-Downs**

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

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

**Forged hold-down:**

2. Manually stroke knife to center section(s) (A) under hold-down (B) as shown.
3. Loosen nuts (C) and back off bolts (D) clear of cutterbar.
4. Position a C-clamp or equivalent on trash bar at location (F), and lightly clamp hold-down (B) to guard (E).
5. Turn bolts (D) until they contact cutterbar, then tighten ONE turn.
6. Remove clamp.
7. Tighten nuts (C) and torque to 45 Nm (35 lbf·ft).
8. Check that specified clearances are achieved. Refer to *Checking Knife Hold-Downs, page 148.*

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**Figure 5.47: Normal Stub Guard Forged Hold-Down**

**Figure 5.48: Double-Knife Center Stub Guard**

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MAINTENANCE AND SERVICING
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 148.*

**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 after the first 10 hours of operation and every 100 hours thereafter.

⚠️ DANGER

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

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

Figure 5.51: Knife Drive Box
Removing Knife Drive Box

⚠️ DANGER

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

Timed double-knife headers:

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to Opening Endshields, 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 155.

Single and untimed 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 fitting (B) from the pin.

16. Use a screwdriver or chisel in slot (C) to release the load on the knifehead pin.

17. Use a screwdriver or chisel to pry the pin upwards in the pin groove until the pin is clear of the knifehead.

18. Push the knife assembly inboard until it is clear of the output arm.

19. Seal the knifehead bearing with plastic or tape unless it is being replaced.
20. Remove bolt (A) that clamps the knife drive arm (B) to the knife drive box output shaft.

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

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

23. Remove the knife drive box and place it on a bench for disassembly.

24. Repeat procedure for the opposite end of the header.

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 medium-strength threadlocker (Loctite® 243 or equivalent) around the shaft as shown. Apply one band at the end of the spline and the second band at the approximate midpoint location.

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

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

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 157. If the pulley was not removed, proceed to Step 1, page 157.

⚠️ CAUTION

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

1. Position the knife drive box onto the header mount and install the belt onto the pulley.

2. Secure the knife drive box to the frame using two 5/8 in. x 1-3/4 in. grade 8 hex head bolts (A) on the side and two 5/8 in. x 2-1/4 in. grade 8 hex head bolts (B) on the bottom.

3. Tighten knife drive box side bolts (A) slightly, then tighten bottom bolts (B) to ensure proper contact with the vertical and horizontal mounting surfaces. Do NOT torque the bolts at this time.
4. Apply two bands (A) of medium-strength threadlocker (Loctite® 243 or equivalent) to the output shaft as shown. Apply one band at the end of the output shaft and the second band at the approximate midpoint location.

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

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

7. Torque output arm bolt (A) 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 fitting 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 fitting (A) into the knifehead pin, and turn the grease fitting for easy access.

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

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

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

16. Install and tension the knife drive belts. Refer to the following topics depending on your header:
   - For untimed belts, refer to *Tensioning Untimed Knife Drive Belts, page 163*
   - For timed belts, refer to *Tensioning Timed Knife Drive Belts, page 168*
   - For timed double-knife headers, also check the knife timing. Refer to *Adjusting Double-Knife Timing, page 170*

17. Close the endshield. Refer to *Closing Endshields, 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 Endshields, 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 Endshields, page 34.

Figure 5.67: Knife Drive Box
5.6.2 Knife Drive Belts

Untimed Knife Drive Belts

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

Removing Untimed Knife Drive Belts

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

⚠️ DANGER

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield.
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 Untimed Knife Drive Belts

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

⚠️ DANGER

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

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

   NOTE:
   Ensure the drive motor is fully forward, do NOT pry the belt over the pulley.
3. Tension the knife drive belt. Refer to *Tensioning Untimed Knife Drive Belts, page 163.*

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

5. Close the endshield.

**Tensioning Untimed Knife Drive Belts**

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

**DANGER**

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

**IMPORTANT:**

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

1. Shut down machine, and remove key from the ignition.
2. Open the endshield.
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.

**MAINTENANCE AND SERVICING**
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 Endshields, 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 m (35 ft.) and smaller double-knife model D1 Series Draper Headers with timed drives.

Removing Timed Drive V-Belts

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

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

2. Open the endshield. Refer to Opening Endshields, 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

⚠️ DANGER

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

NOTE:
Install new V-belts in matching pairs.

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

2. Install 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 Endshields, 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.

⚠️ 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. Refer to *Opening Endshields, 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.

⚠️ DANGER

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

If the belt is out of alignment, refer to Checking Knife Drive Belt Tracking, page 173.

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 170.*

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 168.*

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

11. Close the endshield.

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**Tensioning Timed Knife Drive Belts**

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

⚠️ **DANGER**

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

**IMPORTANT:**

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

**IMPORTANT:**

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

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

2. Open endshield. Refer to *Opening Endshields, 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 Endshields, 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.

⚠️ DANGER

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open both endshields. Refer to Opening Endshields, page 33.
3. Remove the right knife drive belt. Refer to Removing Timed Knife Drive Belt, page 165.
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 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).

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

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

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

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

12. Adjust the knife timing, if necessary, by loosening the right 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 171 to Step 9, page 172).

**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 172) and readjust if necessary (refer to Step 12, page 172).

15. Close both endshields. Refer to **Closing Endshields, 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 avoid continual contact with the drive pulley flanges. Occasional contact is acceptable. A gap should be visible between the belt and the pulley flanges.

1. Open the endshields.

**CAUTION**

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

2. Operate the header and observe how the belt is tracking on both the drive pulley and the knife drive box pulley on both sides of the header. Shut down the windrower and remove key from ignition before making any adjustments.

3. If the belt is tracking toward the inboard side of the drive pulley, the likely cause is a toe-out problem (belt tends to move toward the low tension side of the pulley [inboard]). Refer to Adjusting Drive Belt Tracking (Drive Pulley), page 174.

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 174.

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 175.
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 173.

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

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

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

1. Open the endshields.
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 173. Adjust the support assembly as required.
6. If the belt tracking problem continues, proceed to Step 7, page 174.

7. Loosen nut (A) on idler and nuts (B) on idler bracket.
8. Loosen nuts (C) at drive pulley location.
9. To correct a toe-in problem, turn adjuster bolt (D) clockwise to allow the belt to track inboard.
10. To correct a toe-out problem, turn adjuster bolt (D) counterclockwise to allow the belt to track outboard.
11. Tighten nuts (C) at drive pulley location.
12. Tension the belt. Refer to Tensioning Timed Knife Drive Belts, page 168.
13. Operate the header and check the tracking. Refer to Checking Knife Drive Belt Tracking, page 173. 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.

The cogged timing belt should be centered on the knife drive box pulley and at least 2 mm (0.08 in.) from either edge when the header is running. The belt should also avoid constant contact with the flanges on the drive pulley but occasional contact is acceptable. A gap should be visible between the belt and the pulley flanges. Before adjusting the drive belt tracking, verify the pulley that needs to be adjusted. Refer to Checking Knife Drive Belt Tracking, page 173.

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

1. Open the endshields.

**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 (A) securing idler to bracket, and remove lock washer (D), idler pulley, and flat washer (C).

4. Install the idler pulley (B), ensuring it lines up with the knife drive box pulley, using flat washer(s) (C) as required.

5. Reinstall lock washer (D) and nut (A).

6. Tension the belt. Refer to *Tensioning Timed Knife Drive Belts, page 168.*

7. Operate the header and check the tracking. Refer to *Checking Knife Drive Belt Tracking, page 173.*

Figure 5.100: Knife Drive
5.7 Drapers

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

5.7.1 Removing Side Drapers

⚠️ DANGER

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

1. Raise the reel and engage the reel safety props.
2. Raise the header and engage the 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 180.
6. Remove screws (A) and tube connectors (B) at the draper joint.
7. Pull the draper from the deck.

Figure 5.101: Draper Joint
5.7.2 Installing Side Drapers

**WARNING**

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

**NOTE:**
Check the deck height before installing the drapers. Refer to 5.7.5 Adjusting Deck Height, page 183.

1. Apply talc, baby powder, or talc/graphite lubricant mix to the draper surface that forms the seal with the cutterbar and to the underside of the draper guides.

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

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

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

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

![Figure 5.102: Installing Draper](image1)

![Figure 5.103: Draper Seal](image2)
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 180.

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 183 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

⚠️ DANGER

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

**NOTE:**

The drapers are tensioned at the factory and rarely need adjustment. If adjustment is required, tension the drapers just enough to prevent slipping and to keep the draper from sagging below the cutterbar.

1. Ensure 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 groove (A) on the drive roller.

![Figure 5.107: Left Adjuster Shown – Right Opposite](image_url)

![Figure 5.108: Drive Roller](image_url)
5. Ensure 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 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, on the right side of the window.

**IMPORTANT:**
- To avoid premature failure of the draper, draper rollers, and/or tightener components, do **NOT** operate with the tension set so the white bar is not visible.
- To prevent scooping dirt, ensure the draper is tight enough that it does not sag below the point where the cutterbar contacts the ground.
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>Drive roller</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>Idler roller</td>
<td>Decrease (Y)</td>
<td>Loosen nut</td>
</tr>
</tbody>
</table>

1. Refer to Table 5.1, page 182 to determine which roller requires adjustment and which adjustments are necessary.

NOTE:

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

2. Adjust the drive roller distance (X) as follows:
   a. Loosen nuts (A) and jam nut (B).
   b. Turn adjuster nut (C).
3. Adjust the idler roller distance (Y) as follows:
   a. Loosen nut (A) and jam nut (B).
   b. Turn adjuster nut (C).

**NOTE:**
If the draper does not track at the idler roller end after the idler roller adjustment, the drive roller is likely not square to the deck. Adjust the drive roller, and then readjust the idler roller.

---

### 5.7.5 Adjusting Deck Height

**DANGER**

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

**IMPORTANT:**

New factory-installed drapers are pressure and heat checked at the factory. The gap between draper and cutterbar is set to 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 1 mm (1/16 in.).

1. Shut down the 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.).

---

**Figure 5.113: Left Side Idler Roller**

**Figure 5.114: Draper Seal**
3. Take measurement at deck supports (A) with the header in working position. Refer to Step 2, page 183.

4. Loosen the draper tension. Refer to 5.7.3 Adjusting Draper Tension, page 180.

5. Lift the front edge of 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 reels: four on single-reel headers, and eight on double-reel headers.

8. Tap deck (C) with a hammer to lower the deck relative to the deck supports. Tap deck support (B) using a punch to raise the deck relative to the deck supports.
9. To create a seal, adjust deck (A) so that clearance (B) between cutterbar (C) and deck is 1 mm (1/16 in.) plus the draper thickness as measured in Step 6, page 184.

10. Tighten deck support hardware (D).

11. Recheck gap (B). Refer to Step 9, page 185.

12. Tension the draper. Refer to 5.7.3 Adjusting Draper Tension, page 180.

13. If required, adjust the backsheet deflector (A) 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 joint is not visible, engage the header until the connector is accessible (preferably close to the outboard end of the deck).

1. Start the engine, raise the header, and raise the reel.
2. Stop the engine, and remove the key from the ignition.
3. Engage the reel safety props, and engage the header safety props.
4. Loosen the draper by turning adjuster bolt (A) counterclockwise.

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 186.

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 8 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 5.124: Idler Roller Bearing

Figure 5.125: Idler Roller Bearing
Installing Draper Idler Roller

1. Position the stub shaft into the idler roller in forward arm (B) on the deck.
2. Push on the roller to slightly deflect the forward arm so the stub shaft at the rear of the roller can be slipped into rear arm (C).
3. Install bolts (A) with washers, and torque to 93 Nm (70 lbf·ft).
4. Wrap the draper over the idler roller, close the draper, and set the tension. Refer to 5.7.2 Installing Side Drapers, page 178.
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 182.

Removing Draper Deck Drive Roller

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

NOTE:
If the draper joint is not visible, engage the header until the connector is accessible (preferably close to the outboard end of the deck).

1. Start the engine, raise the header, and raise the reel.
2. Engage the header and reel safety props.
3. Stop the engine, and remove the key from the ignition.
4. Loosen the draper by turning adjuster bolt (A) counterclockwise.
5. Remove 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 Deck Drive Roller, page 189.

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 8 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 Deck Drive Roller

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

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

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

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

5. Tighten any loosened bolts and reinstall plastic shield (C) if previously removed.

6. Ensure the motor is all the way into the roller, and tighten the two setscrews (not shown) through access hole (A).
   
   **NOTE:**
   The setscrews are 1/4 turn apart.

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

   **NOTE:**
   The heads of the screws must face the center opening.
8. Tension the draper. Locate adjuster bolt (A) and follow the directions on the decal for the proper draper tensioning or refer to **5.7.3 Adjusting Draper Tension, page 180**.

9. Disengage the reel and header safety props.

10. Start the engine and lower the header and reel.

11. Run the machine to verify the draper tracks correctly. If adjustment is necessary, refer to **5.7.4 Adjusting Side Draper Tracking, page 182**.

### 5.7.7 Replacing Draper Deflectors

*Removing Wide Draper Deflectors*

⚠️ **DANGER**

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

1. Raise reel fully and lower header to ground.

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

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

4. Open endshield. Refer to **Opening Endshields, page 33**.

5. Loosen nuts (A) on cutterbar until retainer (B) is loose.

---

Figure 5.136: Draper Tensioner

Figure 5.137: Deflector Retainer
6. Remove fasteners securing deflector to endsheet. Nuts (A) are accessible from the side of the endshield, and nuts (B) on the uppermost fasteners are accessible from behind deflector (C).

7. Remove deflector (C).

8. Remove bolts (A) and (D), and remove deflector support (B).

9. Reinstall bolt (D) (if not reinstalling support [B]) to secure belt guide (C) to opposite side of endsheet. Otherwise, position support (B) as shown, and secure with bolt (D).

10. Repeat for opposite end of header.

---

**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 Endshields, 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. Position support (D) as shown, and reinstall bolt (E) with nut on far side.

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

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 Endshields, page 34*.

16. After setting the recommended reel clearance to cutterbar and while reel is still fully lowered, move reel back to ensure steel end fingers do not contact the deflector shields.

**NOTE:**
If contact is detected, adjust reel upward until contact with deflector shields is avoided at all reel fore/aft positions. Alternatively, with the reel fully lowered, trim the steel end fingers until contact with deflector shields is avoided at all reel fore/aft positions. Periodically monitor to ensure contact is avoided and repeat adjustment procedure if necessary.
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 Endshields, 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 Endshields, 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 (C), then tighten all four screws (A) and (C).

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.
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 198.

Table 5.2 Finger to Guard/Cutterbar Clearance

<table>
<thead>
<tr>
<th>Header Width</th>
<th>Single Reel</th>
<th>Double Reel</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6 m (15 ft.)</td>
<td>20 mm (3/4 in.)</td>
<td>–</td>
</tr>
<tr>
<td>6.1 m (20 ft.)</td>
<td>20 mm (3/4 in.)</td>
<td>–</td>
</tr>
<tr>
<td>7.6 m (25 ft.)</td>
<td>25 mm (1 in.)</td>
<td>–</td>
</tr>
<tr>
<td>9.1 m (30 ft.)</td>
<td>45 mm (1-3/4 in.)</td>
<td>20 mm (3/4 in.)</td>
</tr>
<tr>
<td>10.7 m (35 ft.)</td>
<td>60 mm (2-3/8 in.)</td>
<td>20 mm (3/4 in.)</td>
</tr>
<tr>
<td>12.2 m (40 ft.)</td>
<td>–</td>
<td>20 mm (3/4 in.)</td>
</tr>
</tbody>
</table>

Figure 5.147: Finger Clearance
Measuring Reel Clearance

**DANGER**

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

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

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 finger clearance (X) when positioned between locations (A) and (B). Depending on reel fore-aft position, minimum clearance can result at guard tine, hold-down, or cutterbar. For finger clearance measurements, refer to Table 5.2, page 198.

7. Adjust reel if necessary. Refer to Adjusting Reel Clearance, page 201.
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.

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 203
- Centering Single Reel, page 204

**WARNING**

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

To center the reel, follow these steps:

1. Raise the header enough to put 150 mm (6 in.) blocks under the outboard skid shoes. Lower the header slowly to force it into a full smile.

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

3. Loosen bolt (A) on each brace (B).

4. Move forward end of reel center support arm (C) laterally as required, to center both reels.

5. Tighten bolts (A) and torque to 382 Nm (282 lbf-ft).

*Figure 5.156: Reel Center Support Arm*
Centering Single Reel

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

1. Loosen bolt (A) on the brace (B) at both ends of the reel.
2. Move the forward end of the reel support arm (C) laterally as required, to center the reel.
3. Tighten bolt (A) and torque to 359 Nm (265 lbf-ft). Repeat at opposite side.

![Figure 5.157: Reel Support Arm](image)

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.
MAINTENANCE AND SERVICING

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 208.
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 205 (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 204.
2. Slide the new tines and reel arm (A) onto the end of the tube.
3. Install the tine tube bushings. Refer to Installing Bushings on Five-, Six-, or Nine-Bat Reels, page 213.
4. Attach the tines to the reel tine bar with bolts and nuts (B).
Removing Plastic Fingers

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

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

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.
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.

**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 209.

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.

Figure 5.164: Tail End
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 206
   - Removing Steel Tines, page 204

**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 (A) require channel disconnection and two tine tubes (B) 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 206
   - Removing Steel Tines, page 204

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 206.
19. Release bushing clamps (A) using a small screwdriver to separate the serrations.

![Figure 5.174: Bushing Clamp](image)

20. Move the clamps (A) off the bushings.

![Figure 5.175: Bushing Clamp](image)

21. Slide support (A) off bushing halves (B).

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

22. Remove bushing halves (B).

![Figure 5.176: Support](image)
Installing Bushings on Five-, Six-, or Nine-Bat Reels

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

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

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

NOTE:
Use a pair of modified channel lock pliers (A) to install bushing clamps (C). Secure pliers in a vise and grind a notch (B) into the end of each arm to fit the clamp as shown.
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 206
   - Removing Steel Tines, page 204

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

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

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

   **IMPORTANT:**
   Overtightening may break the clamp.
7. Line up tine bar (B) with the cam arm and install bolt (A). Apply medium-strength threadlocker (Loctite® 243 or equivalent) to bolt, and torque to 165 Nm (120 lbf·ft).

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

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 220.**
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 206
   - Removing Steel Tines, page 204

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 may break the clamp.
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).
22. For the opposite tine tube, rotate support (A) or slightly move the tine tube until it clears channels (C).

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

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

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

**IMPORTANT:**
Overtightening may break the clamp.
26. Reattach channels (C) to support (A) with screws (B) and nuts. Torque screws to 43 Nm (32 lbf·ft).

27. Reinstall any fingers (D) that were previously removed using screws (E). Refer to *Installing Plastic Fingers*, page 207.
5.8.6 Reel Endshields

Reel endshields and supports do not require regular maintenance, but they should be checked periodically for damage and loose or missing fasteners. Slightly dented or deformed endshields and supports are repairable, but severely damaged components must be replaced.

You can attach reel endshields to either end of the reel.

Replacing Reel Endshields

⚠️ DANGER

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

1. Lower the header and reel, shut down the engine, and remove the key from the ignition.
2. Rotate the reel manually until reel endshield support (A) requiring replacement is accessible.
3. Remove three bolts (B).
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

All 7.6 m (25 ft.) and smaller headers have single reels, 9.1–10.7 m (30–35 ft.) headers are available in single-reel and double-reel versions. All headers larger than 10.7 m (35 ft.) are only available in double-reel configurations. Single reels are driven from the right arm and double reels are driven from the center arm.

5.9.1 Replacing Reel Drive Cover

Removing Reel Drive Cover

⚠️ DANGER

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

Single-reel drive:

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

Figure 5.202: Drive Cover – Single Reel
**Double-Reel Drive:**

3. Stop the engine and remove the key from the ignition.

4. Remove six bolts (A) securing upper cover (B) to the reel drive and lower cover (C).

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

**Installing Reel Drive Cover**

**Single-Reel Drive:**

1. Position 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).

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**

⚠️ **DANGEROUS**

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 223.*
3. Loosen six nuts (A). Slide motor (B) and motor mount (C) down towards the reel shaft.

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

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

**Tightening Reel Drive Chain**

⚠️ **DANGER**

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

1. Shut down the windrower, and remove the key from the ignition.
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. Torque nuts (A) to 73 Nm (54 lbf-ft).

6. Install the drive cover. Refer to *Installing Reel Drive Cover, page 224.*
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 225.
3. Remove drive chain (A) from drive sprocket (B).

Figure 5.213: Single-Reel Drive – Viewed from Underside of Reel

Figure 5.214: Reel Drive
MAINTENANCE AND SERVICING

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 226.*
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 124.

Replace the U-joint if severely worn or damaged. Refer to Removing Double-Reel U-Joint, page 230.

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 223.
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.

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 medium-strength threadlocker (Loctite® 243 or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.

5. Torque to 102–115 Nm (75–85 lbf·ft).

6. Remove temporary reel support (A).

7. Install the drive cover. Refer to *Installing Reel Drive Cover, page 224.*
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 225.
3. Remove the drive sprocket. Refer to Removing Reel Drive Sprocket, page 228.
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 (B). 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 229*.

7. Tighten the drive chain. Refer to *Tightening Reel Drive Chain, page 226*.

### 5.9.6 Replacing Drive Chain on Double Reel

**DANGER**

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

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

2. Loosen the drive chain. Refer to *Loosening Reel Drive Chain, page 225*. 
3. Support the inboard end of the right reel with a front end loader and nylon slings (A) (or equivalent lifting device).

**IMPORTANT:**
Support the reel as close to the end disc as possible to avoid damaging or denting the center tube.

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 medium-strength threadlocker (Loctite® 243 or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.

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

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 225.

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 226.
5.10 Transport System (Optional)

Refer to 6.3.4 Stabilizer Wheels and Slow Speed Transport Package, page 246 for more information.

5.10.1 Checking Wheel Bolt Torque

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

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

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

Figure 5.233: Bolt Tightening Sequence

5.10.2 Checking Axle Bolt Torque

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

Figure 5.234: Axle Bolts
1. Check and tighten axle bolts **DAILY** until torque is maintained as follows:
   - (A): 244 Nm (180 lbf-ft)
   - (B): 203 Nm (150 lbf-ft)
   - (C): 244 Nm (180 lbf-ft)

### 5.10.3 Checking Tire Pressure

Check the tire inflation pressure and inflate according to the information provided in Table 5.3, page 237.

**Table 5.3 Tire Pressure for ST205/75 R15**

<table>
<thead>
<tr>
<th>Load Range</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>448 kPa (65 psi)</td>
</tr>
<tr>
<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 a farther aft location that minimizes crop disturbance. The kit also allows the reel fore-aft cylinders to be quickly moved to the normal operating location.

MD #B6590

6.1.2 Lodged Crop Reel Finger Kit

The steel fingers (A) provided in the Lodged Crop Reel Finger kit attach to the ends of every other tine bar and help to clear material in heavy, hard-to-cut crops such as lodged rice.

Each kit contains three fingers for the cam end of the reel and three fingers for the tail end. Hardware and installation instructions are included in the kit.

MD #B4831
6.1.3 PR15 Tine Tube Reel Conversion Kit

These kits allow conversion from a six-bat reel to a nine-bat reel.

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

- D115 – Steel Fingers – MD #B6514
- D115 – Plastic Fingers – MD #B6516
- D120 – Steel Fingers – MD #B6515
- D120 – Plastic Fingers – MD #B6517
- D125 – Steel Fingers – MD #B5656
- D125 – Plastic Fingers – MD #B5937
- D130 – Steel Fingers – MD #B5657
- D130 – Plastic Fingers – MD #B6029

**NOTE:**
You must also order additional 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 those with nine-bat reels). Hardware and installation instructions are included in the kit.

See your MacDon Dealer for more information.
6.1.5  Tine Tube Reinforcing Kit

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

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

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

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

Order one of the following bundles based on header size:

- 4.6 m (15 ft.) – MD #B4864
- 6.1 m (20 ft.) – MD #B4865
- 7.6 m (25 ft.) – MD #B4838
- 9.1 m (30 ft.) – MD #B4839
- 10.7 m (35 ft.) – MD #B4840
- 12.2 m (40 ft.) – 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.

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

- Regular guards 9.1 m (30 ft.) and larger – MD #220101
- Stub guards 9.1 m (30 ft.) and larger – MD #220103
6.2.3 Rock Retarder

The rock retarder (A) consists of a steel angle that is bolted to the cutterbar immediately aft of the knife, and helps prevent rocks and large debris from being swept onto the drapers with the crop. Installation instructions are included with the kit.

Order bundles by header size:

- 9.1–10.7 m (30–35 ft.) – MD #B5084
- 12.2 m (40 ft.) – MD #B5085

6.2.4 Stub Guard Conversion Kit

Stub guards, complete with top guides and adjuster shoes, are designed to cut tough crops.

Installation and adjustment instructions are included in the kits.

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

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

6.2.5 Vertical Knife Mounts

The vertical knife mounts allow the installation of vertically oriented knives onto both ends of the header.

The vertical knives themselves are not sold by MacDon and must be purchased from a separate supplier.

Installation and adjustment instructions are included in the kits.

Order mount kits based on whether they will be installed on the left or right side of the header:

NOTE:

While the Right Vertical Knife Mount kit can be installed independently of the Left Vertical Knife Mount kit, the Left Vertical Knife Mount kit must be installed with the Right Vertical Knife Mount kit.
OPTIONS AND ATTACHMENTS

- Left – MD #B6608 (includes hardware and some plumbing. This mount requires installation of MD #B6609)
- Right – MD #B6609 (includes flow control, template, hardware, and some plumbing. This mount can be installed individually or with MD #B6608)

Order mounts based on the left or right side of the header:

### 6.2.6 Vertical Knife Plumbing Kits

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

- D115 – MD #B6263
- D120 – MD #B6264
- D125 – MD #B6265
- D130 single reel – MD #B6266
- D130 double reel – MD #B6255
- D135 single reel – MD #B6267
- D135 double reel – MD #B6256
- D140 – MD #B6257
6.3 Header

6.3.1 Divider 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 #B6158

![Figure 6.10: Divider Latch](image)

6.3.2 Stabilizer Wheels

Stabilizer wheels help stabilize the header in field conditions that would otherwise cause the header to bounce, resulting in uneven cutting heights. Installation and adjustment instructions are included in the kit.

Available as an attachment for use with 9.1–12.2 m (30–40 ft.) headers.

MD #C1986

![Figure 6.11: Stabilizer Wheel](image)
6.3.3 Secondary Stabilizer Wheel

The secondary stabilizer wheel is added to existing stabilizer wheels to help stabilize the header in field conditions that would otherwise cause the header to bounce and result in uneven cutting height. Installation and adjustment instructions are included with the kit.

Available as an attachment for use with 9.1 m–12.2 m (30–40 ft.) headers.

MD #B6179

Figure 6.12: Secondary Stabilizer Wheel

6.3.4 Stabilizer Wheels and Slow Speed Transport Package

The Stabilizer Wheels and Slow Speed Transport Package help to stabilize the header in field conditions that would otherwise cause the header to bounce, resulting in uneven cutting heights. This system is similar to the Stabilizer Wheel (MD #C1986) option. Refer to 6.3.2 Stabilizer Wheels, page 245.

The Stabilizer Wheels and Slow Speed Transport Package 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 9.1–12.2 m (30–40 ft.) headers.

MD #C2007

Figure 6.13: Stabilizer Wheels Slow Speed Transport

47. Kit consists of one wheel assembly; two kits are required to upgrade both sides of the header.
6.3.5 Backsheet Extension Kit

The Backsheet Extension kit (A) helps retain small seeds in shatter prone crops such as canola. They are usually used with headers equipped with upper cross augers (UCA).

Order the following bundles according to your D1 Series Header size:

- D130 – MD #B6359
- D135 – MD #C2042
- D140 – MD #C2043

Figure 6.14: D1 Series Backsheet Extensions

6.3.6 Center Skid Shoes Kit

The Center Skid Shoes kit provides improved performance when cutting low to the ground.

Installation instructions are included in the kit.

MD #B5615

Figure 6.15: Center Skid Shoe
6.3.7 Steel Skid Shoes

Steel skid shoes offer extra abrasion resistance.
Installation instructions are included with the kit.
MD #B6583

Figure 6.16: Steel Skid Shoe
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.

Refer to the header parts catalog for the necessary parts.

Figure 6.17: Draper Deflector (Narrow)

6.4.2 Draper Deflector (Wide)

Wide metal draper deflectors attach to the inboard side of the endsheets to prevent material from falling through the gap between the endsheet and the draper.

MD #B6551 - for D1X (includes extra parts for various cutterbar layouts).

IMPORTANT:
The wide draper deflector is **NOT** compatible with the Upper Cross Auger option.

Figure 6.18: Draper Deflector (Wide)
6.4.3 Cleat Saver Kit

The cleat saver kit offers additional wear protection for the draper. They may prove useful in situations where conditions are dry or consistently hot.

Installation instruction are included with the kit.

MD #294859 (LEGG Header)
MD #294858 (WCCO Header)

6.4.4 Upper Cross Auger (UCA)

The upper cross auger (A) attaches in front of the backtube and improves crop feeding into the center of the header in heavy crop conditions. It is ideal for high-volume harvesting of forages, oats, canola, mustard, and other tall, bushy, hard-to-feed crops.

Order from the following list of kits according to your header size:

- 4.6 m (15 ft.) – MD #B6280
- 6.1 m (20 ft.) – MD #B6281
- 7.6 m (25 ft.) – MD #B6461
- 9.1 m (30 ft.) – MD #B6462
- 10.7 m (35 ft.) – MD #B6463
- 12.2 m (40 ft.) – MD #B6464
6.4.5 Rice Divider Rods

Rice divider rods attach to the left and right crop dividers and divide tall and tangled rice crops in a similar manner to standard crop divider rods performing in standing crops. Installation instructions are included in the kit.

MD #B5609

Figure 6.21: Rice Divider Rod

6.4.6 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 in the kit.

NOTE:
The draper slip sensor is disabled with the installation of this kit.

Available for 10.7–12.2 m (30–40 ft.) headers.

MD #B5653
6.4.7 Double Windrow Attachment (DWA)

The DWA lays up to 14.6 m (48 ft.) of crop in a single windrow which is ideal for large forage harvesters. It is designed to mount only on SP windrowers equipped with an HC10 Conditioner.

MD #C1987

6.4.8 Draper Extension Kit

The draper extension kit increases the inboard length of each deck up to 500 mm (20 in.) which narrows the header opening and decreases windrow width when cutting light/thin crops.

The kit includes roller support extensions, a draper repair kit, all necessary hardware, and installation instructions.

MD #B5407

6.4.9 Swath Forming Rods (Center Delivery)

Swath forming rods form windrows so the heads are in the center and protected from shatter. Swath forming rods are mainly used for grass seed cutting applications.

Installation and adjustment instructions are included with the kit.

MD #B4803
6.4.10 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

6.4.11 Hydraulic Deck Shift Package

This system allows Operators to shift the decks using the in-cab console when double-swathing.

Installation and adjustment instructions are included with the kit.

Available on 7.6–13.7 m (25–40 ft.) headers.

MD #B6474
# Troubleshooting

## 7.1 Crop Loss at Cutterbar

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<tr>
<td>Reel fingers not lifting crop sufficiently</td>
<td>Install lifter guards</td>
<td>See your MacDon Dealer</td>
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### Symptom: Heads Shattering or Breaking Off

| Reel speed too fast                  | Reduce reel speed                 | 3.7.6 Reel Speed, page 56       |
| Reel too low                         | Raise reel                        | 3.7.10 Reel Height, page 59     |
| Ground speed too fast                | Reduce ground speed               | 3.7.7 Ground Speed, page 56     |
| Crop too ripe                        | Operate at night when humidity is higher |                                  |

### Symptom: Cut Grain Falling Ahead of Cutterbar

| Ground speed too slow                | Increase ground speed             | 3.7.7 Ground Speed, page 56     |
| Reel speed too slow                  | Increase reel speed               | 3.7.6 Reel Speed, page 56       |
| Reel too high                        | Lower reel                        | 3.7.10 Reel Height, page 59     |
| Cutterbar too high                   | Lower cutterbar                   | 3.7.1 Cutting Height, page 50    |
| Reel too far forward                 | Move reel back on arms            | 3.7.11 Reel Fore-Aft Position, page 59 |
| 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 228 |
| Worn or broken knife components      | Replace components                | 5.5 Knife, page 136             |
### TROUBLESHOOTING

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<td>Knife hold-downs not adjusted properly</td>
<td>Adjust hold-downs so knife works freely, but still keep sections from lifting off guards</td>
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<td>Knife sections or guards are worn or broken</td>
<td>Replace all worn and broken cutting parts</td>
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<td>Adjust reel position / finger pitch</td>
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<td>Divider runs down thick crop at ends, preventing proper feeding due to material bridging the cutter guards</td>
<td>Replace three or four end guards with stub guards</td>
<td>5.5.7 Knife Guards, page 141, 6.2.4 Stub Guard Conversion Kit, page 243</td>
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<td><strong>Symptom: Material Accumulating in Gap between Cutout in Endsheets and Knifehead</strong></td>
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<td>Crop heads leaning away from knifehead hole in endsheet</td>
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## TROUBLESHOOTING

### 7.2 Cutting Action and Knife Components

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<td>Knife is not operating at recommended speed</td>
<td>Check engine speed of windrower</td>
<td>Refer to your windrower’s operator’s manual</td>
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### Problem: Excessive Header Vibration

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<td>Check engine speed of windrower</td>
<td>Refer to your windrower’s operator’s manual</td>
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- 5.5.5 Installing Knife, page 139 |
| Loose or worn knifehead pin or drive arm | Tighten or replace parts | - 5.5.3 Removing Knifehead Bearing, page 138  
- 5.6.1 Knife Drive Box, page 153 |
| Bent cutterbar | Straighten cutterbar | See your MacDon Dealer |

### Symptom: Knife Back Breakage

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| Dull knife | Replace knife | - 5.5.2 Removing Knife, page 137  
- 5.5.5 Installing Knife, page 139 |

### Symptom: Excessive Breakage of Knife Sections or Guards

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<tr>
<th>Symptom</th>
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<tbody>
<tr>
<td>Knife hold-downs not adjusted properly</td>
<td>Adjust hold-downs</td>
<td>Checking Knife Hold-Downs, page 148</td>
</tr>
<tr>
<td>Cutterbar operating too low in stony conditions</td>
<td>Raise cutterbar, using skid shoes</td>
<td>3.7.3 Cutting on the Ground, page 53</td>
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<tr>
<td>Float is set too heavy</td>
<td>Adjust for lighter float</td>
<td>3.7.4 Header Float, page 55</td>
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<tr>
<td>Bent or broken guard</td>
<td>Straighten or replace</td>
<td>5.5.7 Knife Guards, page 141</td>
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<tr>
<td>Header angle too steep</td>
<td>Flatten header angle</td>
<td>Controlling Header Angle, page 55</td>
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### 7.3 Reel Delivery

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<tbody>
<tr>
<td>Symptom: Reel Not Releasing Material in Normal Standing Crop</td>
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<tr>
<td>Reel speed too fast</td>
<td>Reduce reel speed</td>
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<tr>
<td>Reel too low</td>
<td>Raise reel</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>Reel lines too aggressive</td>
<td>Reduce cam setting</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
</tr>
<tr>
<td>Reel too far back</td>
<td>Move reel forward</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
</tr>
<tr>
<td>Symptom: Reel Not Releasing Material in Lodged and Standing Crop (Reel Fully Lowered)</td>
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<tr>
<td>Reel lines too aggressive for standing crop</td>
<td>Reduce cam setting (1 or 2)</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
</tr>
<tr>
<td>Symptom: Wrapping on Reel End</td>
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<tr>
<td>Reel lines too aggressive</td>
<td>Reduce cam setting</td>
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<tr>
<td>Reel too low</td>
<td>Raise reel</td>
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<tr>
<td>Reel speed too fast</td>
<td>Reduce reel speed</td>
<td>3.7.6 Reel Speed, page 56</td>
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<tr>
<td>Crop conditions</td>
<td>Install optional endshields</td>
<td>See your MacDon Dealer</td>
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<tr>
<td>Reel not centered in header</td>
<td>Center reel in header</td>
<td>5.8.3 Centering Reel, page 203</td>
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<tr>
<td>Symptom: Reel Releases Crop too Quickly</td>
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<tr>
<td>Reel lines not aggressive enough</td>
<td>Increase cam setting</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
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<tr>
<td>Reel too far forward</td>
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<tr>
<td>Symptom: Reel Will Not Lift</td>
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<tr>
<td>Reel lift couplers are incompatible or defective</td>
<td>Change quick coupler</td>
<td></td>
</tr>
<tr>
<td>Symptom: Reel Will Not Turn</td>
<td></td>
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<tr>
<td>Control set at 0</td>
<td>Activate reel speed control</td>
<td>3.7.6 Reel Speed, page 56</td>
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<tr>
<td>Quick couplers not properly connected</td>
<td>Connect couplers</td>
<td>4.1 Attaching Header to Windrower, page 111</td>
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<tr>
<td>Reel drive chain disconnected</td>
<td>Connect chain</td>
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<tr>
<td>Symptom: Reel Motion Uneven under no Load</td>
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<tr>
<td>Excessive slack in reel drive chain</td>
<td>Tighten chain</td>
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<td>Problem</td>
<td>Solution</td>
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<td><strong>Symptom: Reel Motion is Uneven or Stalls in Heavy Crops</strong></td>
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<td></td>
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<tr>
<td>Reel speed too fast</td>
<td>Reduce reel speed</td>
<td>3.7.6 Reel Speed, page 56</td>
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<tr>
<td>Reel fingers not aggressive enough</td>
<td>Move to a more aggressive finger pitch notch</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
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<tr>
<td>Reel too low</td>
<td>Raise reel</td>
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</tr>
<tr>
<td>Relief valve on windrower has low relief pressure setting</td>
<td>Increase relief pressure to manufacturer’s recommendations</td>
<td>Refer to the windrower operator’s manual</td>
</tr>
<tr>
<td>Low oil reservoir level on windrower (sometimes more than one reservoir)</td>
<td>Fill to proper level</td>
<td>Refer to the windrower operator’s manual</td>
</tr>
<tr>
<td>Relief valve malfunction</td>
<td>Replace relief valve</td>
<td>Refer to the windrower operator’s manual</td>
</tr>
<tr>
<td>Cutting tough crops with standard torque (19-tooth) reel drive sprocket</td>
<td>Replace with high torque (10-tooth) or 14-tooth reel drive sprocket</td>
<td>Optional Reel Drive Sprockets, page 56</td>
</tr>
<tr>
<td><strong>Symptom: Plastic Fingers Cut at Tip</strong></td>
<td></td>
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<tr>
<td>Insufficient reel to cutterbar clearance</td>
<td>Increase clearance</td>
<td>5.8.1 Reel Clearance to Cutterbar, page 198</td>
</tr>
<tr>
<td><strong>Symptom: Plastic Fingers Bent Rearward at Tip</strong></td>
<td></td>
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</tr>
<tr>
<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>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>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><strong>Symptom: Plastic Fingers Bent Forward at Tip (Opposite of Above)</strong></td>
<td></td>
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</tr>
<tr>
<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>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>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>
<tr>
<td><strong>Symptom: Plastic Fingers Bent Close to Tine Tube</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<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 91</td>
</tr>
<tr>
<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>
## TROUBLESHOOTING

### 7.4 Header and Drapers

<table>
<thead>
<tr>
<th>Problem</th>
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<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptom: Insufficient Header Lift</strong></td>
<td>Low relief pressure</td>
<td>Increase relief pressure</td>
</tr>
<tr>
<td><strong>Symptom: Insufficient Draper Speed</strong></td>
<td>Speed control set too low</td>
<td>Increase control setting</td>
</tr>
<tr>
<td></td>
<td>Relief pressure too low</td>
<td>Increase relief pressure to recommended setting</td>
</tr>
<tr>
<td></td>
<td>Windrower header drive too slow</td>
<td>Adjust to correct speed for windrower model</td>
</tr>
<tr>
<td></td>
<td>Worn out gear pump</td>
<td>Replace pump</td>
</tr>
<tr>
<td></td>
<td>Pressure compensator (V7) set too low</td>
<td>Adjust to increase setting</td>
</tr>
</tbody>
</table>

### Symptom: Draper Will Not Move

| Drapers are loose | Tighten drapers | 5.7.3 Adjusting Draper Tension, page 180 |
| Drive or idler roller wrapped with material | Loosen draper and clean rollers | 5.7.3 Adjusting Draper Tension, page 180 |
| Slat or connector bar jammed by frame or material | Loosen draper and clear obstruction | 5.7.3 Adjusting Draper Tension, page 180 |
| Roller bearing seized | Replace bearing | 5.7.6 Side Draper Roller Maintenance, page 186 |
| Low hydraulic oil | Fill windrower reservoir to full level | See your MacDon Dealer |
| Incorrect relief setting at flow control valve | Adjust relief setting | See your MacDon Dealer |

### Symptom: Draper Stalling

| Material not feeding evenly off knife | Lower reel | 3.7.10 Reel Height, page 59 |
| Material not feeding evenly off knife | Install stub guards | 6.2.4 Stub Guard Conversion Kit, page 243; 5.5.7 Knife Guards, page 141; See your MacDon Dealer |

### Symptom: Hesitation in Flow of Bulky Crop

<p>| Header angle too low | Increase header angle | Controlling Header Angle, page 55 |
| Material overload on drapers | Increase side draper speed | 3.7.8 Draper Speed, page 57 |
| Material overload on drapers | Install upper cross auger | 6.4.4 Upper Cross Auger (UCA), page 250 |
| Material overload on drapers | Add flighting extensions | See your MacDon Dealer |</p>
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<tr>
<th>Problem</th>
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</thead>
<tbody>
<tr>
<td><strong>Symptom: Drapers Back Feed</strong></td>
<td>Drapers running too slow in heavy crop</td>
<td>Increase draper speed</td>
</tr>
<tr>
<td></td>
<td>Increase draper speed</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td><strong>Symptom: Crop is Thrown Across Opening and under Opposite Side Draper</strong></td>
<td>Drapers running too fast in light crop</td>
<td>Reduce draper speed</td>
</tr>
<tr>
<td></td>
<td>Drapers running too fast in light crop</td>
<td>3.7.8 Draper Speed, page 57</td>
</tr>
<tr>
<td><strong>Symptom: Material Accumulates inside or under Front Edge of Draper</strong></td>
<td>Deck height improperly adjusted</td>
<td>Adjust deck height</td>
</tr>
<tr>
<td></td>
<td>Deck height improperly adjusted</td>
<td>5.7.5 Adjusting Deck Height, page 183</td>
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<tr>
<td><strong>Symptom: Material Wrapping at Upper Cross Auger Beater Bars</strong></td>
<td>Crop conditions do not require beater bars</td>
<td>Remove beater bars</td>
</tr>
<tr>
<td></td>
<td>Crop conditions do not require beater bars</td>
<td>3.14.1 Removing Beater Bars, page 92</td>
</tr>
<tr>
<td><strong>Symptom: Material Accumulating on End Deflectors and Releasing in Bunches</strong></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>
</tr>
<tr>
<td></td>
<td>End deflectors too wide</td>
<td>3.13 Unplugging Cutterbar, page 91</td>
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## TROUBLESHOOTING

### 7.5 Cutting Edible Beans

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<tr>
<td><strong>Symptom: Plants Being Stripped and Complete or Partial Plants Left Behind</strong></td>
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<tr>
<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>
<tr>
<td>Float set too light—rides on high spots and does not lower soon enough</td>
<td>Set float as follows:</td>
<td>3.7.4 Header Float, page 55</td>
</tr>
<tr>
<td></td>
<td>• Dry ground: 445–667 N (100–150 lbf)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wet ground: 222–445 N (50–100 lbf)</td>
<td></td>
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<tr>
<td>Reel too high</td>
<td>Fully retract reel cylinders</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>Reel too high with cylinders fully retracted</td>
<td>Adjust reel height</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<td>Finger pitch not aggressive enough</td>
<td>Adjust finger pitch</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
</tr>
<tr>
<td>Reel too far aft</td>
<td>Move reel forward until the fingertips skim the soil surface with header on the ground and the center-link properly adjusted</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
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<tr>
<td>Header angle too shallow</td>
<td>Lengthen center-link</td>
<td>Controlling Header Angle, page 55</td>
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<tr>
<td></td>
<td>If cutting on ground, header angle can be increased by fully retracting lift cylinders</td>
<td>Controlling Header Angle, page 55</td>
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<tr>
<td>Reel too slow</td>
<td>Adjust reel speed to be marginally faster than ground speed</td>
<td>3.7.6 Reel Speed, page 56</td>
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<tr>
<td>Ground speed too fast</td>
<td>Lower ground speed</td>
<td>3.7.6 Reel Speed, page 56</td>
</tr>
<tr>
<td>Skid shoes too low</td>
<td>Raise skid shoes to highest setting</td>
<td>3.7.3 Cutting on the Ground, page 53</td>
</tr>
<tr>
<td>Dirt packs on bottom of cutterbar and raises cutterbar off the ground</td>
<td>Install plastic wear strips on bottom of cutterbar and skid shoes</td>
<td>See your MacDon Dealer</td>
</tr>
<tr>
<td>Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar and raises cutterbar off the ground</td>
<td>Ground too wet. Allow soil to dry</td>
<td>—</td>
</tr>
<tr>
<td>Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar and raises cutterbar off the ground</td>
<td>Manually clean the bottom of cutterbar when accumulation gets unacceptable</td>
<td>—</td>
</tr>
<tr>
<td>Plastic wear strip for cutterbar has been installed over top of steel wearplates</td>
<td>Remove steel cutterbar wearplates when installing the plastic wear strips for cutterbar</td>
<td>—</td>
</tr>
<tr>
<td>Header not level</td>
<td>Level header</td>
<td>3.12 Leveling Header, page 90</td>
</tr>
<tr>
<td>Worn/damaged knife sections</td>
<td>Replace sections or complete knife</td>
<td>5.5 Knife, page 136</td>
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<tr>
<td>Problem</td>
<td>Solution</td>
<td>Section</td>
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<tr>
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</tr>
<tr>
<td>Parts of vines get caught in pointed guard tip. (Occurs more in row-cropped beans that are hilled from cultivating)</td>
<td>Install stub guard kit</td>
<td>6.2.4 Stub Guard Conversion Kit, page 243</td>
</tr>
<tr>
<td><strong>Symptom: Excessive Losses at Dividers</strong></td>
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<tr>
<td>Divider rod running down crop and shattering pods</td>
<td>Remove divider rod</td>
<td>3.7.14 Crop Divider Rods, page 76</td>
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<tr>
<td>Vines and plants build up on endsheet</td>
<td>Install divider rod</td>
<td>3.7.14 Crop Divider Rods, page 76</td>
</tr>
<tr>
<td><strong>Plant Vines Pinched between Top of Draper and Cutterbar</strong></td>
<td></td>
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<tr>
<td>Cutterbar has filled up with trash with draper to cutterbar gap properly adjusted</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>Shifting of decks with header raised does not clean out cutterbar debris</td>
<td>Manually remove debris from cutterbar cavity to prevent damage to drapers</td>
<td>—</td>
</tr>
<tr>
<td><strong>Symptom: Crop Accumulating at Guards and Not Moving Rearward onto Drapers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<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>Reel too high</td>
<td>Lower reel</td>
<td>3.7.10 Reel Height, page 59</td>
</tr>
<tr>
<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 201</td>
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<tr>
<td>Reel too far forward</td>
<td>Reposition reel</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
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<tr>
<td><strong>Symptom: Reel Shattering Pods</strong></td>
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<tr>
<td>Reel too far forward</td>
<td>Reposition reel</td>
<td>3.7.11 Reel Fore-Aft Position, page 59</td>
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<tr>
<td>Reel speed too high</td>
<td>Reduce reel speed</td>
<td>3.7.6 Reel Speed, page 56</td>
</tr>
<tr>
<td>Bean pods are too dry</td>
<td>Cut at night with heavy dew once pods have softened</td>
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<tr>
<td>Reel finger pitch too retarded</td>
<td>Increase finger aggressiveness (cam position)</td>
<td>3.7.12 Reel Tine Pitch, page 68</td>
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<tr>
<td><strong>Symptom: Cutterbar Guards Breaking</strong></td>
<td></td>
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</tr>
<tr>
<td>Float insufficient</td>
<td>Increase float</td>
<td>3.7.4 Header Float, page 55</td>
</tr>
<tr>
<td>Excessive number of rocks in field</td>
<td>Consider installing optional stub guards</td>
<td></td>
</tr>
<tr>
<td><strong>Tip:</strong> Experiment with a few guards on a section of cutterbar to compare the performance of the two different styles of guards</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>5.5.7 Knife Guards, page 141</td>
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<td>6.2.4 Stub Guard Conversion Kit, page 243</td>
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<tr>
<td>Problem</td>
<td>Solution</td>
<td>Section</td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td><strong>Symptom: Cutterbar Pushing Too Much Trash and Dirt</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Header too heavy</td>
<td>Readjust float to make header lighter</td>
<td>3.7.4 Header Float, page 55</td>
</tr>
<tr>
<td>Header angle too steep</td>
<td>Decrease header angle with lift cylinders</td>
<td>3.7.5 Header Angle, page 55</td>
</tr>
<tr>
<td>Header angle too steep</td>
<td>Shorten the center-link</td>
<td>3.7.5 Header Angle, page 55</td>
</tr>
<tr>
<td>Regular guards push dirt and plug up with trash or plug up with trash and then push dirt</td>
<td>Install stub guard kit</td>
<td>6.2.4 Stub Guard Conversion Kit, page 243</td>
</tr>
<tr>
<td>Insufficient support for header</td>
<td>Install center skid shoes on header</td>
<td>3.7.3 Cutting on the Ground, page 53</td>
</tr>
<tr>
<td><strong>Symptom: Cutterbar Fills Up with Dirt</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive gap between top of front of draper and cutterbar</td>
<td>Adjust front deck supports to obtain proper clearance between cutterbar and draper</td>
<td>5.7.5 Adjusting Deck Height, page 183</td>
</tr>
<tr>
<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><strong>Symptom: Reel Carries Over Odd Plants in Same Location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reel steel fingers bent and hook plants from crop flow on drapers</td>
<td>Straighten steel fingers</td>
<td>—</td>
</tr>
<tr>
<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>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>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><strong>Symptom: Cutterbar Pushing Too Much Dirt in Certain Locations for Length of Field</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<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>Rolling land along length of field</td>
<td>Cut at 90 degree angle to undulations, provided knife floats across without digging in</td>
<td>—</td>
</tr>
</tbody>
</table>
# TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptom: Reel Carries Over Excessive Amounts of Plants or Wads</strong></td>
<td>Excessive accumulation of crop on drapers (up to height of reel center tube)</td>
<td>Increase draper speed</td>
</tr>
<tr>
<td></td>
<td>Finger pitch too retarded</td>
<td>Increase finger pitch</td>
</tr>
<tr>
<td><strong>Symptom: Reel Wraps Up with Crop</strong></td>
<td>Reel too low</td>
<td>Raise reel</td>
</tr>
<tr>
<td><strong>Symptom: Reel Ends Wrap Up with Crop</strong></td>
<td>Uncut crop interfering on reel ends</td>
<td>Add reel endshields</td>
</tr>
</tbody>
</table>
# 7.6 Windrow Formation

<table>
<thead>
<tr>
<th>Symptom: Heads on Ground and Scattered</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Draper speed too slow</td>
<td>Increase draper speed</td>
</tr>
<tr>
<td>Draper angle too flat</td>
<td>Increase header angle</td>
</tr>
<tr>
<td>Ground speed too slow</td>
<td>Increase ground speed</td>
</tr>
<tr>
<td>Crop too ripe</td>
<td>Cut material before too mature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom: Hollow in Center</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Draper speed too slow</td>
<td>Increase draper speed</td>
</tr>
<tr>
<td>Delivery opening too wide</td>
<td>Decrease delivery opening width</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom: All Heads in Center</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Draper speed too fast or header angle too steep</td>
<td>Reduce draper speed and/or decrease header angle</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground speed too fast</td>
<td>Reduce ground speed</td>
</tr>
<tr>
<td>Crop too green</td>
<td>Allow to mature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom: All Heads To One Side</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<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>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom: Uneven Windrow (Any Crop Condition)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reel too low</td>
<td>Raise reel</td>
</tr>
<tr>
<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>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Reel speed too fast</td>
<td>Reduce reel speed</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>US Customary Units (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit Name</td>
<td>Abbreviation</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>hectare</td>
<td>ha</td>
<td>x 2.4710 = acre</td>
</tr>
<tr>
<td>Flow</td>
<td>liters per minute</td>
<td>L/min</td>
<td>x 0.2642 = US gallons per minute</td>
</tr>
<tr>
<td>Force</td>
<td>Newton</td>
<td>N</td>
<td>x 0.2248 = pound force</td>
</tr>
<tr>
<td>Length</td>
<td>millimeter</td>
<td>mm</td>
<td>x 0.0394 = inch</td>
</tr>
<tr>
<td>Length</td>
<td>meter</td>
<td>m</td>
<td>x 3.2808 = foot</td>
</tr>
<tr>
<td>Power</td>
<td>kilowatt</td>
<td>kW</td>
<td>x 1.341 = horsepower</td>
</tr>
<tr>
<td>Pressure</td>
<td>kilopascal</td>
<td>kPa</td>
<td>x 0.145 = pounds per square inch</td>
</tr>
<tr>
<td>Pressure</td>
<td>megapascal</td>
<td>MPa</td>
<td>x 145.038 = pounds per square inch</td>
</tr>
<tr>
<td>Pressure</td>
<td>bar (Non-SI)</td>
<td>bar</td>
<td>x 14.5038 = pounds per square inch</td>
</tr>
<tr>
<td>Torque</td>
<td>Newton meter</td>
<td>Nm</td>
<td>x 0.7376 = pound feet or foot pounds</td>
</tr>
<tr>
<td>Torque</td>
<td>Newton meter</td>
<td>Nm</td>
<td>x 8.8507 = pound inches or inch pounds</td>
</tr>
<tr>
<td>Temperature</td>
<td>degrees Celsius</td>
<td>°C</td>
<td>(°C x 1.8) + 32 = degrees Fahrenheit</td>
</tr>
<tr>
<td>Velocity</td>
<td>meters per minute</td>
<td>m/min</td>
<td>x 3.2808 = feet per minute</td>
</tr>
<tr>
<td>Velocity</td>
<td>meters per second</td>
<td>m/s</td>
<td>x 3.2808 = feet per second</td>
</tr>
<tr>
<td>Velocity</td>
<td>kilometers per hour</td>
<td>km/h</td>
<td>x 0.6214 = miles per hour</td>
</tr>
<tr>
<td>Volume</td>
<td>liter</td>
<td>L</td>
<td>x 0.2642 = US gallon</td>
</tr>
<tr>
<td>Volume</td>
<td>milliliter</td>
<td>ml</td>
<td>x 0.0338 = ounce</td>
</tr>
<tr>
<td>Volume</td>
<td>cubic centimeter</td>
<td>cm³ or cc</td>
<td>x 0.061 = cubic inch</td>
</tr>
<tr>
<td>Weight</td>
<td>kilogram</td>
<td>kg</td>
<td>x 2.2046 = pound</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 Metric Bolt Specifications

**Table 8.2 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>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>

*Figure 8.1: Bolt Grades*
### Table 8.3 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 8.4 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>
</tr>
<tr>
<td>14-2.0</td>
<td>210</td>
<td>232</td>
</tr>
<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 8.5 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>7.0</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>
<tr>
<td>10-1.5</td>
<td>51</td>
<td>57</td>
</tr>
<tr>
<td>12-1.75</td>
<td>90</td>
<td>99</td>
</tr>
<tr>
<td>14-2.0</td>
<td>143</td>
<td>158</td>
</tr>
<tr>
<td>16-2.0</td>
<td>222</td>
<td>246</td>
</tr>
<tr>
<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>

8.2.2 Metric Bolt Specifications Bolting into Cast Aluminum

Table 8.6 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>
8.2.3 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 backup washer (D) and O-ring (A) contact part face (E).

6. Position angle fittings by unscrewing no more than one turn.

7. Turn lock nut (C) down to washer (D) and tighten to torque shown. Use two wrenches, one on fitting (B) and other on lock nut (C).

8. Check final condition of fitting.
REFERENCE

Table 8.7 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value[^1]</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>

[^1]: Torque values shown are based on lubricated connections as in reassembly.
8.2.4 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 8.8, page 275.
6. Check final condition of fitting.

Table 8.8 O-Ring Boss (ORB) Hydraulic Fittings – Non-Adjustable

<table>
<thead>
<tr>
<th>SAE Dash Size</th>
<th>Thread Size (in.)</th>
<th>Torque Value(^{49})</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>5/16–24</td>
<td>6–7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</td>
</tr>
<tr>
<td>-3</td>
<td>3/8–24</td>
<td>12–13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</td>
</tr>
<tr>
<td>-4</td>
<td>7/16–20</td>
<td>19–21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</td>
</tr>
<tr>
<td>-5</td>
<td>1/2–20</td>
<td>21–33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</td>
</tr>
<tr>
<td>-6</td>
<td>9/16–18</td>
<td>26–29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</td>
</tr>
<tr>
<td>-8</td>
<td>3/4–16</td>
<td>46–50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</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></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</td>
</tr>
<tr>
<td>-14</td>
<td>1-3/8–12</td>
<td>153–168</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</td>
</tr>
<tr>
<td>-16</td>
<td>1-5/16–12</td>
<td>176–193</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(\text{Nm} \times \text{lbf}-\text{ft} \times \text{lbf}-\text{in})</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>

\(^{49}\) Torque values shown are based on lubricated connections as in reassembly.
8.2.5 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 8.9, page 276.

   **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 8.9 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(^{50})</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>Note(^{51})</td>
<td>3/16</td>
<td>–</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(^{51})</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>

---

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

51. O-ring face seal type end not defined for this tube size.
Table 8.9 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(^{52})</th>
</tr>
</thead>
<tbody>
<tr>
<td>-14</td>
<td>Note(^{51})</td>
<td>7/8</td>
<td>Nm</td>
</tr>
<tr>
<td>-16</td>
<td>1-7/16</td>
<td>1</td>
<td>150–165</td>
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<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>
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</table>

8.2.6 Tapered Pipe Thread Fittings

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks and scratches, or any form of contamination.
2. Apply pipe thread sealant (paste type) to external pipe threads.
3. Thread fitting into port until hand-tight.
4. Torque connector to appropriate torque angle. The turns from finger tight (TFFT) and flats from finger tight (FFFT) values are shown in Table 8.10, page 277. Make sure that tube end of a shaped connector (typically 45 degree or 90 degree) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

NOTE:
Overtorque failure of fittings may not be evident until fittings are disassembled.

Table 8.10 Hydraulic Fitting Pipe Thread

<table>
<thead>
<tr>
<th>Tapered Pipe Thread Size</th>
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<th>Recommended FFFT</th>
</tr>
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</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>

\(^{52}\) 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:

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<th>Shipping Destination</th>
<th>Header Description</th>
<th>MacDon Instruction Part Number</th>
</tr>
</thead>
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<tr>
<td>North America</td>
<td>D1 Series Draper Header for M Series Windrowsers</td>
<td>MD #214769</td>
</tr>
<tr>
<td>Export (anywhere other than North America)</td>
<td>D1 Series Draper Header for M Series Windrowsers</td>
<td>MD #214770</td>
</tr>
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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 multi-purpose</td>
<td>High temperature extreme pressure (EP2) performance with 1% max. Molybdenum disulphide (NLGI grade 2) Lithium base</td>
<td>As required unless otherwise specified</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>
</tr>
</tbody>
</table>