

D1 XL-Series Draper Header for Self-Propelled Windrowers

**IMPORTANT: PAGE 29 HAS
BEEN UPDATED SINCE THIS
MANUAL WAS PUBLISHED.**

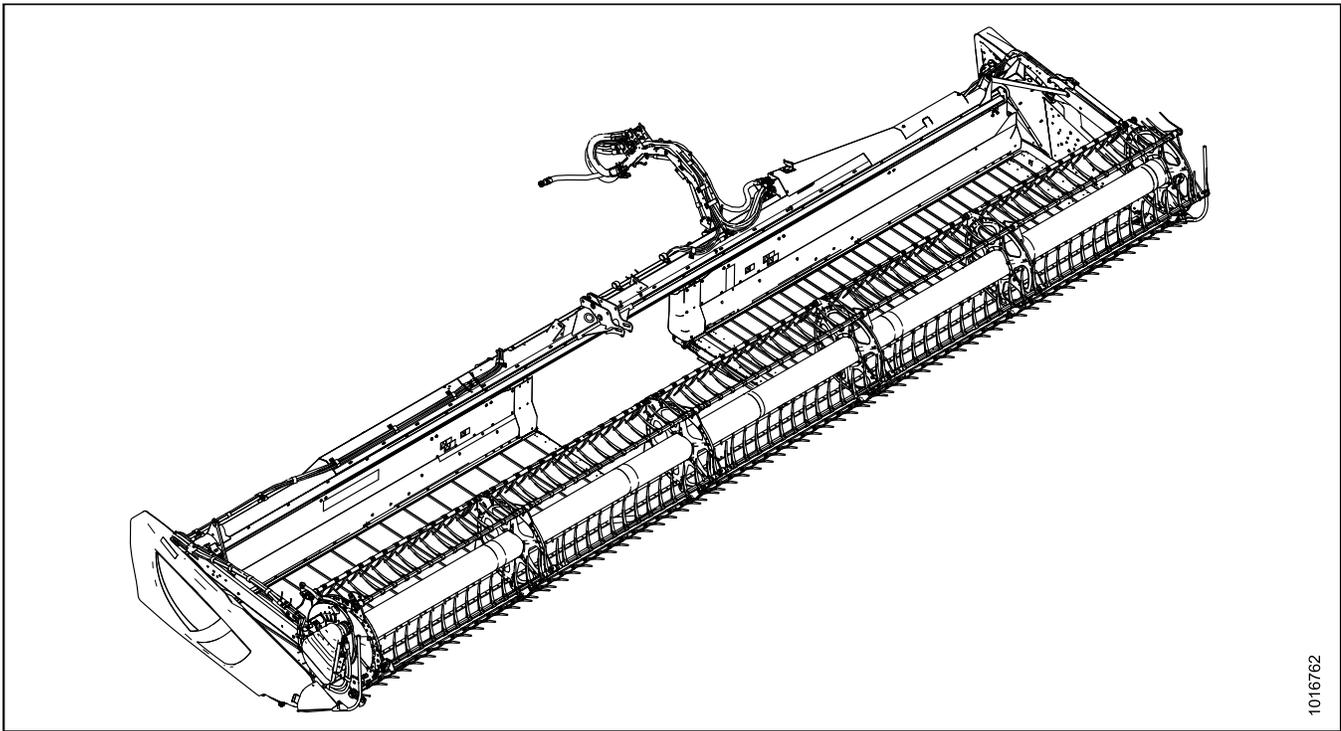
Operator's Manual

147627 Revision A

Model Year 2016

Original Instruction

D1 XL-Series Draper Header for Self-Propelled Windrowers



1016762

Published: March 2016

Introduction

This instructional manual contains information on the D1 XL-Series Draper Header. Teamed with your windrower, the D1 XL-Series Draper Header will cut and lay crop into fluffy, uniform windrows.

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

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.

Carefully read the information provided in this manual before attempting to maintain, service, or use the machine.

The Table of Contents and Index will guide you to specific areas within this manual. Examine the Table of Contents and familiarize yourself with the organization of the information.

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 endshield on the left side of the header.

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

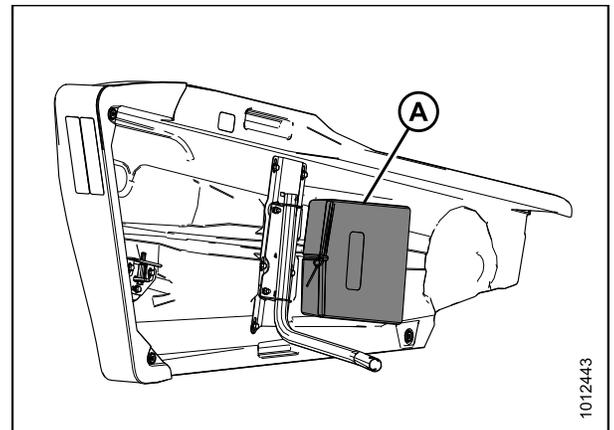


Figure 1: Left-Hand Endshield Manual Storage Location

Model and Serial Number

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

NOTE:

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

Draper Header

Header Model: _____

Serial Number: _____

Year: _____

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

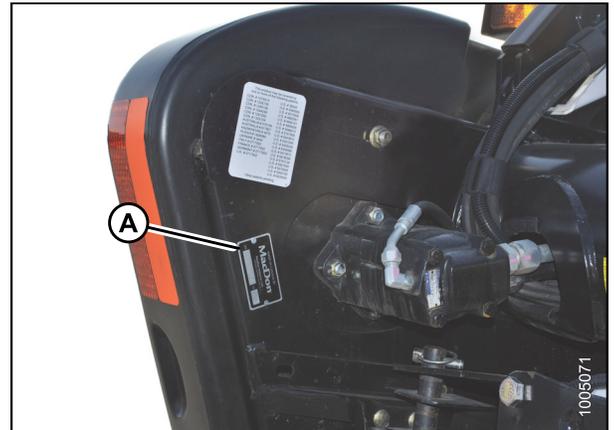


Figure 2: Header

Slow Speed Transport/Stabilizer Wheel Option

Serial Number: _____

Year: _____

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

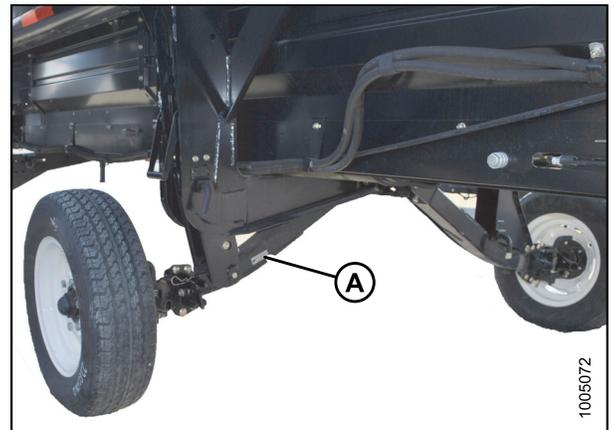


Figure 3: Transport/Stabilizer Option

TABLE OF CONTENTS

Introduction	i
Model and Serial Number	iii
1 Safety	1
1.1 Safety Alert Symbols	1
1.2 Signal Words	2
1.3 General Safety	3
1.4 Maintenance Safety	5
1.5 Hydraulic Safety	6
1.6 Battery Safety	7
1.7 Safety Signs	8
1.7.1 Installing Safety Decals	8
1.8 Safety Decal Locations	9
1.9 Understanding Safety Signs	13
2 Product Overview	19
2.1 Definitions	19
2.2 Component Identification	22
2.3 Specifications	23
3 Operation	27
3.1 Owner/Operator Responsibilities	27
3.2 Operational Safety	28
3.2.1 Header Safety Props	29
3.2.2 Reel Safety Props	29
Engaging Reel Safety Props	29
Disengaging Reel Safety Props	30
3.2.3 Endshields	31
Opening Endshields	31
Closing Endshields	32
Removing Endshields	33
Installing Endshields	33
Checking and Adjusting Endshields	34
3.2.4 Daily Start-Up Check	37
3.3 Break-in Period	38
3.4 Shutting down the Machine	39
3.5 Cab Controls	40
3.6 Header Setup	41
3.6.1 Header Attachments	41
3.6.2 Header Settings	41
3.6.3 Reel Settings	42
3.7 Header Operating Variables	45
3.7.1 Cutting Height	45
Cutting off the Ground	45
Cutting on the Ground	49
3.7.2 Header Float	50
3.7.3 Header Angle	51
Adjusting Header Angle	51
3.7.4 Reel Speed	51
Optional Reel Drive Sprockets	52
3.7.5 Ground Speed	52
3.7.6 Draper Speed	53
3.7.7 Knife Speed	54
3.7.8 Reel Height	54
3.7.9 Reel Fore-Aft Position	55
Adjusting Reel Fore-Aft Position	55

TABLE OF CONTENTS

3.7.10	Reel Tine Pitch.....	56
	Reel Cam Settings.....	56
	Adjusting Reel Cam.....	58
3.7.11	Crop Dividers.....	58
	Removing Crop Dividers with Latch Option from Header.....	58
	Removing Crop Dividers without Latch Option from Header.....	59
	Installing Crop Dividers with Latch Option onto Header.....	60
	Installing Crop Dividers without Latch Option onto Header.....	61
3.7.12	Crop Divider Rods.....	63
	Removing Crop Divider Rods.....	63
	Installing Crop Divider Rods.....	64
3.8	Delivery Opening.....	65
3.8.1	Adjusting Delivery Opening on Header.....	65
3.8.2	Adjusting Delivery Opening on Header using Hydraulic Deck Shift.....	66
3.9	Double Windrowing.....	67
3.9.1	Shifting Decks Hydraulically.....	67
3.10	Windrow Types.....	68
3.11	Haying Tips.....	70
3.11.1	Curing.....	70
3.11.2	Topsoil Moisture.....	70
3.11.3	Weather and Topography.....	70
3.11.4	Windrow Characteristics.....	70
3.11.5	Driving on Windrow.....	71
3.11.6	Raking and Tedding.....	71
3.11.7	Using Chemical Drying Agents.....	71
3.12	Levelling the Header.....	72
3.13	Unplugging the Cutterbar.....	73
3.14	Upper Cross Auger (UCA).....	74
3.14.1	Removing Beater Bars.....	74
3.14.2	Installing Beater Bars.....	74
3.15	Transporting Header.....	76
3.15.1	Transporting Header on Windrower.....	76
3.15.2	Towing.....	76
	Attaching Header to Towing Vehicle.....	77
	Towing the Header.....	77
3.15.3	Converting from Transport to Field Position.....	78
	Removing Tow-Bar.....	78
	Storing the Tow-Bar.....	79
	Moving Front (Left) Wheels into Field Position.....	81
	Moving Rear (Right) Wheels into Field Position.....	82
3.15.4	Converting from Field to Transport Position.....	85
	Moving Front (Left) Wheels into Transport Position.....	85
	Moving Rear (Right) Wheels into Transport Position.....	86
	Attaching Tow-Bar.....	89
4	Header Attachment/Detachment.....	93
4.1	Attaching Header to M1170/M1240 Self-Propelled Windrower.....	93
4.2	Detaching Header from M1170/M1240 Windrower.....	96
5	Maintenance and Servicing.....	99
5.1	Preparing Machine for Servicing.....	99
5.2	Maintenance Specifications.....	100
5.2.1	Recommended Fluids and Lubricants.....	100
5.2.2	Installing a Roller Chain.....	100
5.2.3	Installing a Sealed Bearing.....	101

TABLE OF CONTENTS

5.3	Maintenance Requirements.....	102
5.3.1	Maintenance Schedule/Record.....	103
5.3.2	Break-In Inspection.....	104
5.3.3	Preseason Servicing.....	104
5.3.4	End-of-Season Service.....	105
5.3.5	Checking Hydraulic Hoses and Lines.....	106
5.3.6	Lubrication and Servicing.....	106
	Greasing Procedure.....	107
	Service Intervals.....	108
5.4	Electrical System.....	114
5.4.1	Replacing Light Bulbs.....	114
5.4.2	Adjusting Reel Height Sensor.....	114
5.5	Cutterbar.....	116
5.5.1	Replacing Knife Section.....	116
5.5.2	Removing Knife.....	117
5.5.3	Removing Knifehead Bearing.....	117
5.5.4	Installing Knifehead Bearing.....	118
5.5.5	Installing Knife.....	118
5.5.6	Spare Knife.....	119
5.5.7	Knife Guards.....	119
	Adjusting Knife Guards.....	120
	Replacing Pointed Guards.....	120
	Replacing Stub Guards.....	123
	Checking Knife Hold-Downs.....	124
5.5.8	Knifehead Shield.....	126
	Installing Knifehead Shield.....	127
5.6	Knife Drive.....	128
5.6.1	Knife Drive Box.....	128
	Checking Mounting Bolts.....	129
	Removing Knife Drive Box.....	129
	Removing Knife Drive Box Pulley.....	132
	Installing Knife Drive Box Pulley.....	132
	Installing Knife Drive Box.....	132
	Changing Oil in Knife Drive Box.....	139
5.6.2	Knife Drive Belts.....	140
	Non-Timed Knife Drive Belts.....	140
	Timed Double-Knife Drive Belts.....	143
5.7	Drapers.....	155
5.7.1	Removing Header Drapers.....	155
5.7.2	Installing Drapers.....	155
5.7.3	Adjusting Draper Tension.....	157
5.7.4	Adjusting Draper Tracking.....	159
5.7.5	Adjusting Deck Height.....	160
5.7.6	Header Draper Roller Maintenance.....	163
	Inspecting Draper Roller Bearing.....	163
	Draper Deck Idler Roller.....	163
	Draper Deck Drive Roller.....	166
5.7.7	Replacing Draper Deflectors.....	170
	Removing Wide Draper Deflectors.....	170
	Installing Wide Draper Deflectors.....	171
	Removing Narrow Draper Deflectors.....	173
	Installing Narrow Draper Deflectors.....	174
5.8	Reel.....	175
5.8.1	Reel Clearance to Cutterbar.....	175

TABLE OF CONTENTS

	Measuring Reel Clearance	175
	Adjusting Reel Clearance	176
5.8.2	Reel Frown	177
	Adjusting Reel Frown	177
5.8.3	Centering the Reel	178
	Centering Double Reels	179
	Centering Single Reels	179
5.8.4	Reel Tines	179
	Removing Steel Tines	179
	Installing Steel Tines	180
	Removing Plastic Fingers	180
	Installing Plastic Fingers	181
5.8.5	Tine Tube Bushings	182
	Removing Bushings from Five-, Six-, or Nine-Bat Reels	182
	Installing Bushings on Five-, Six-, or Nine-Bat Reels	187
5.8.6	Reel Endshields	194
	Replacing Reel Endshields	194
	Replacing Reel Endshields – Right-Hand Reel on Double Reel Header	195
	Replacing Reel Endshield Supports	196
5.9	Reel Drive	198
5.9.1	Replacing Reel Drive Cover	198
	Removing Reel Drive Cover	198
	Installing Reel Drive Cover	199
5.9.2	Adjusting Reel Drive Chain Tension	200
	Loosening Reel Drive Chain	200
	Tightening Reel Drive Chain	201
5.9.3	Replacing Reel Drive Sprocket	202
	Removing Reel Drive Sprocket	202
	Installing Reel Drive Sprocket	203
5.9.4	Replacing Double-Reel U-Joint	204
	Removing Double-Reel U-Joint	204
	Installing Double-Reel U-Joint	204
5.9.5	Replacing Reel Drive Motor	206
	Removing Reel Drive Motor	206
	Installing Reel Drive Motor	206
5.9.6	Replacing Drive Chain on Double Reel	207
	Replacing Chain Using the Reel Drive Method	207
	Replacing Chain Using Breaking the Chain Method	209
5.9.7	Replacing Drive Chain on Single Reel	210
5.10	Transport System (Optional)	211
5.10.1	Checking Wheel Bolt Torque	211
5.10.2	Checking Axle Bolt Torque	212
5.10.3	Checking Tire Pressure	213
6	Options and Attachments	215
6.1	Reel	215
6.1.1	Lodged Crop Reel Finger Kit	215
6.1.2	Reel Endshield Kit	215
6.1.3	Tine Tube Reinforcing Kit	216
6.2	Cutterbar	217
6.2.1	Cutterbar Wearplate	217
6.2.2	Knifehead Shield	217
6.2.3	Stub Guard Conversion Kit	218
6.2.4	Vertical Knife Mounts	218
6.3	Header	219

TABLE OF CONTENTS

6.3.1	Divider Latch Kit.....	219
6.3.2	Stabilizer Wheels	219
6.3.3	Stabilizer/Slow Speed Transport Wheels.....	220
6.4	Crop Delivery	221
6.4.1	Double Draper Drive (DDD) Kit.....	221
6.4.2	Draper Deflector (Narrow).....	221
6.4.3	Draper Deflector (Wide).....	221
6.4.4	Draper Extension Kit.....	222
6.4.5	Swath Deflector Rods (End Delivery).....	222
6.4.6	Hydraulic Deck Shift Package	222
6.4.7	Upper Cross Auger (UCA)	223
6.4.8	Upper Cross Auger Hydraulic Kit for Double Draper Drive.....	223
6.4.9	Upper Cross Auger Case Drain Kit for Single Draper Drive	223
6.4.10	Rice Divider Rods	224
7	Unloading and Assembly	225
8	Troubleshooting	227
8.1	Crop Loss at Cutterbar.....	227
8.2	Cutting Action and Knife Components.....	229
8.3	Reel Delivery.....	232
8.4	Header and Drapers	234
8.5	Cutting Edible Beans	236
8.6	Windrow Formation.....	240
9	Reference.....	241
9.1	Torque Specifications.....	241
9.1.1	Metric Bolt Specifications.....	241
9.1.2	Metric Bolt Specifications Bolting into Cast Aluminum	244
9.1.3	Flare-Type Hydraulic Fittings.....	244
9.1.4	O-Ring Boss (ORB) Hydraulic Fittings (Adjustable).....	246
9.1.5	O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)	248
9.1.6	O-Ring Face Seal (ORFS) Hydraulic Fittings.....	249
9.2	Conversion Chart.....	251
	Index	253

1 Safety

1.1 Safety Alert Symbols

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

This symbol means:

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

Carefully read and follow the safety message accompanying this symbol.

Why is safety important to you?

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



Figure 1.1: Safety Symbol

1.2 Signal Words

Three signal words, *DANGER*, *WARNING*, and *CAUTION*, are used to alert you to hazardous situations. The appropriate signal word for each situation has been selected using the following guidelines:

DANGER

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

WARNING

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

CAUTION

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

1.3 General Safety

CAUTION

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

Protect yourself.

- When assembling, operating, and servicing machinery, wear all the protective clothing and personal safety devices that **could** be necessary for the job at hand. Don't take chances. You may need the following:
 - Hard hat
 - Protective footwear with slip resistant soles
 - Protective glasses or goggles
 - Heavy gloves
 - Wet weather gear
 - Respirator or filter mask
- Be aware that exposure to loud noises can cause hearing impairment or loss. Wear suitable hearing protection devices such as ear muffs or ear plugs to help protect against objectionable or loud noises.

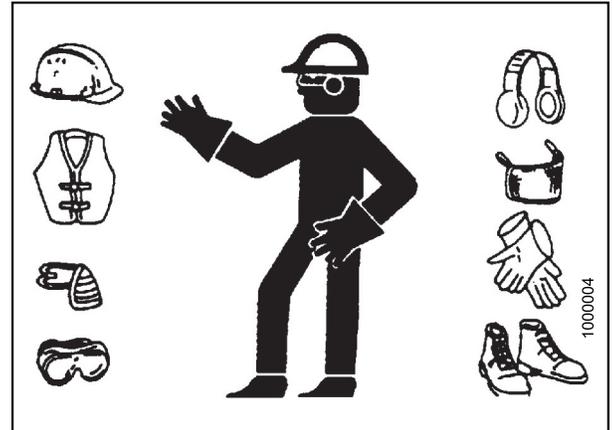


Figure 1.2: Safety Equipment



Figure 1.3: Safety Equipment

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

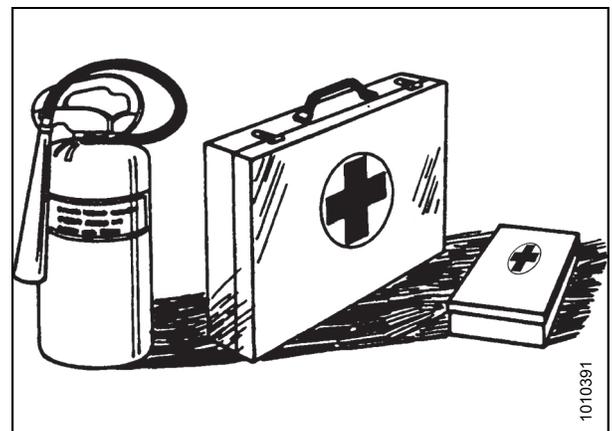


Figure 1.4: Safety Equipment

SAFETY

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



Figure 1.5: Safety around Equipment

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

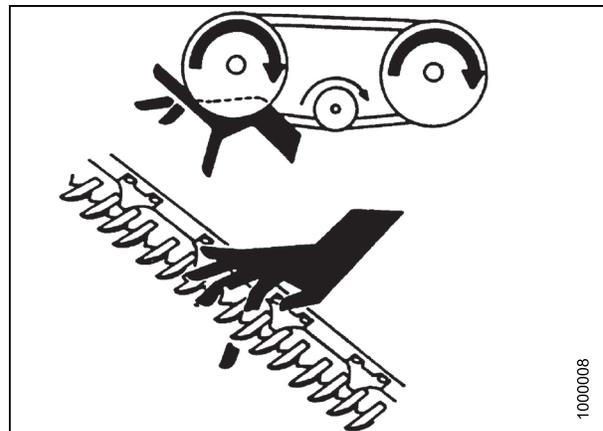


Figure 1.6: Safety around Equipment

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



Figure 1.7: Safety around Equipment

1.4 Maintenance Safety

To ensure your safety while maintaining the machine:

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



Figure 1.8: Safety around Equipment

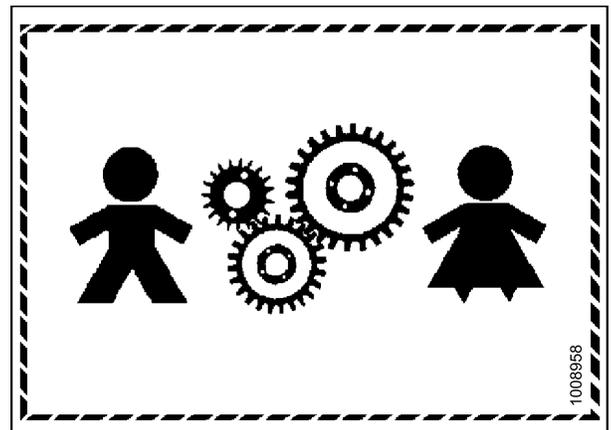


Figure 1.9: Equipment NOT Safe for Children

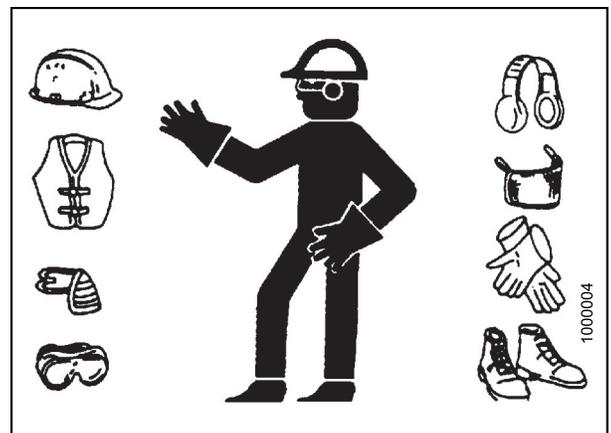


Figure 1.10: Safety Equipment

1.5 Hydraulic Safety

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

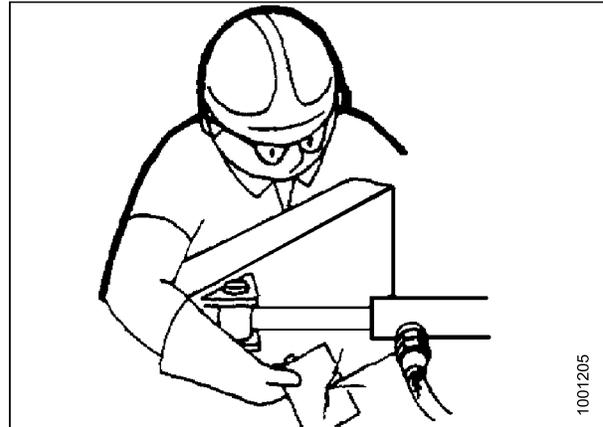


Figure 1.11: Testing for Hydraulic Leaks

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



Figure 1.12: Hydraulic Pressure Hazard

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

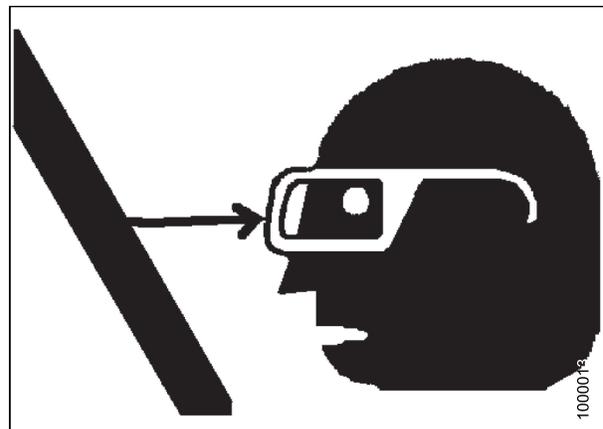


Figure 1.13: Safety around Equipment

1.6 Battery Safety

WARNING

- Keep all sparks and flames away from the batteries, as a gas given off by electrolyte is explosive.
- Ventilate when charging in enclosed space.

WARNING

- Wear safety glasses when working near batteries.
- Do NOT tip batteries more than 45° to avoid electrolyte loss.
- Battery electrolyte causes severe burns. Avoid contact with skin, eyes, or clothing.
- Electrolyte splashed into the eyes is extremely dangerous. Should this occur, force the eye open, and flood with cool, clean water for five minutes. Call a doctor immediately.
- If electrolyte is spilled or splashed on clothing or the body, neutralize it immediately with a solution of baking soda and water, then rinse with clear water.

WARNING

- To avoid injury from spark or short circuit, disconnect battery ground cable before servicing and part of electrical system.
- Do NOT operate the engine with alternator or battery disconnected. With battery cables disconnected and engine running, a high voltage can be built up if terminals touch the frame. Anyone touching the frame under these conditions would be severely shocked.
- When working around storage batteries, remember that all of the exposed metal parts are live. Never lay a metal object across the terminals because a spark or short circuit will result.
- Keep batteries out of reach of children.



Figure 1.14: Safety around Batteries

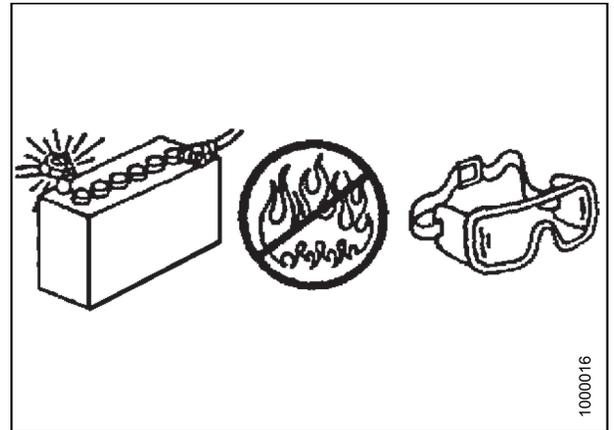


Figure 1.15: Safety around Batteries

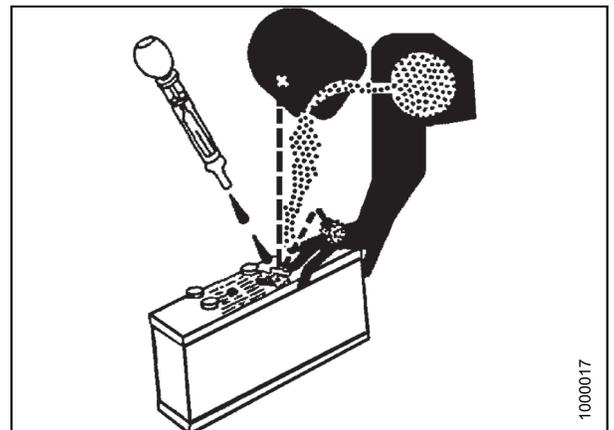


Figure 1.16: Safety around Batteries

1.7 Safety Signs

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

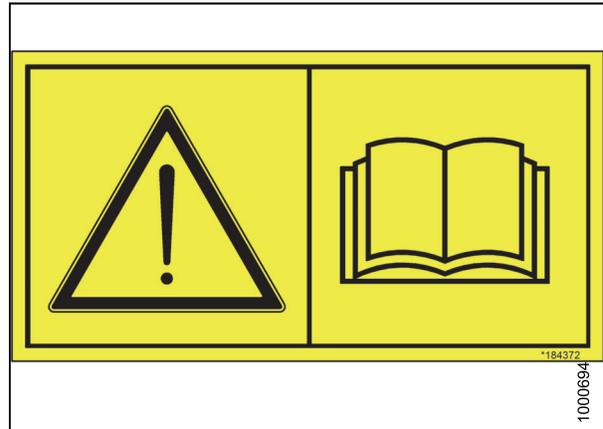


Figure 1.17: Operator's Manual Decal

1.7.1 Installing Safety Decals

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

1.8 Safety Decal Locations

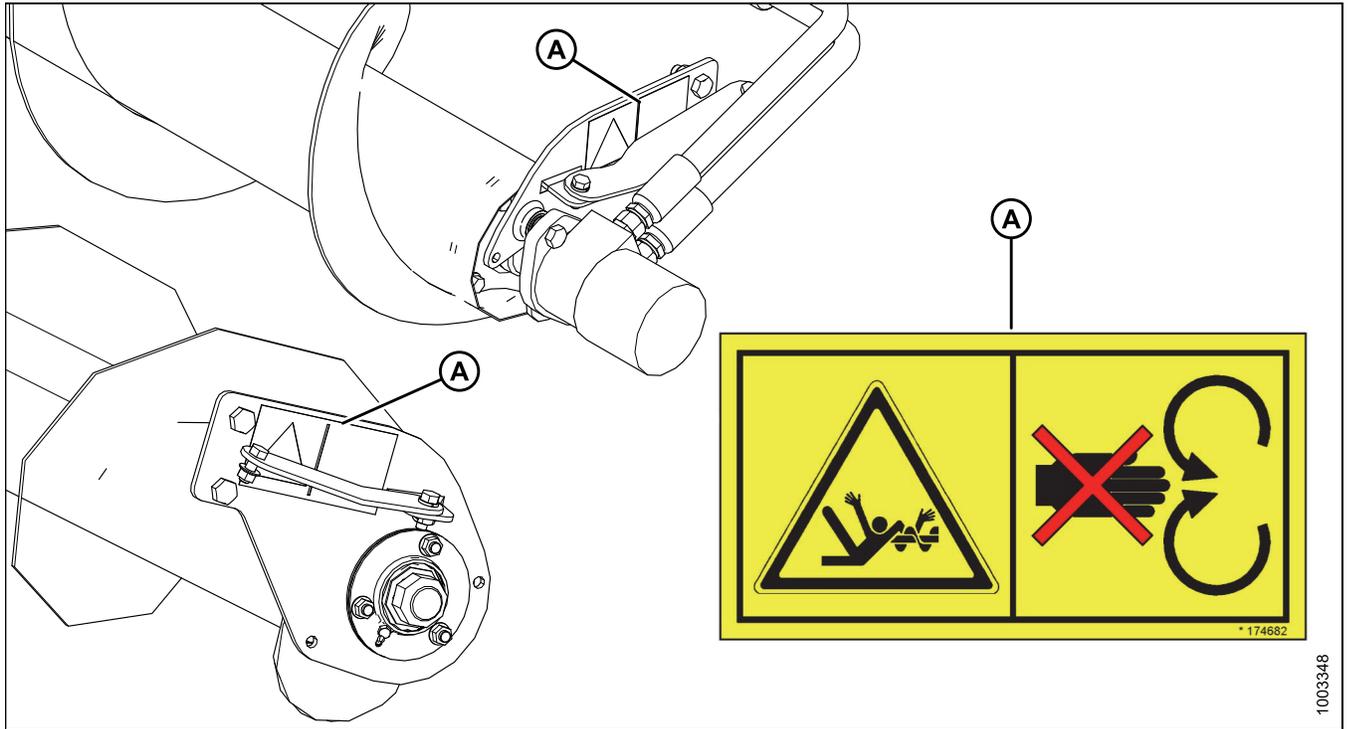


Figure 1.18: Upper Cross Auger

A - MD #174682

1003348

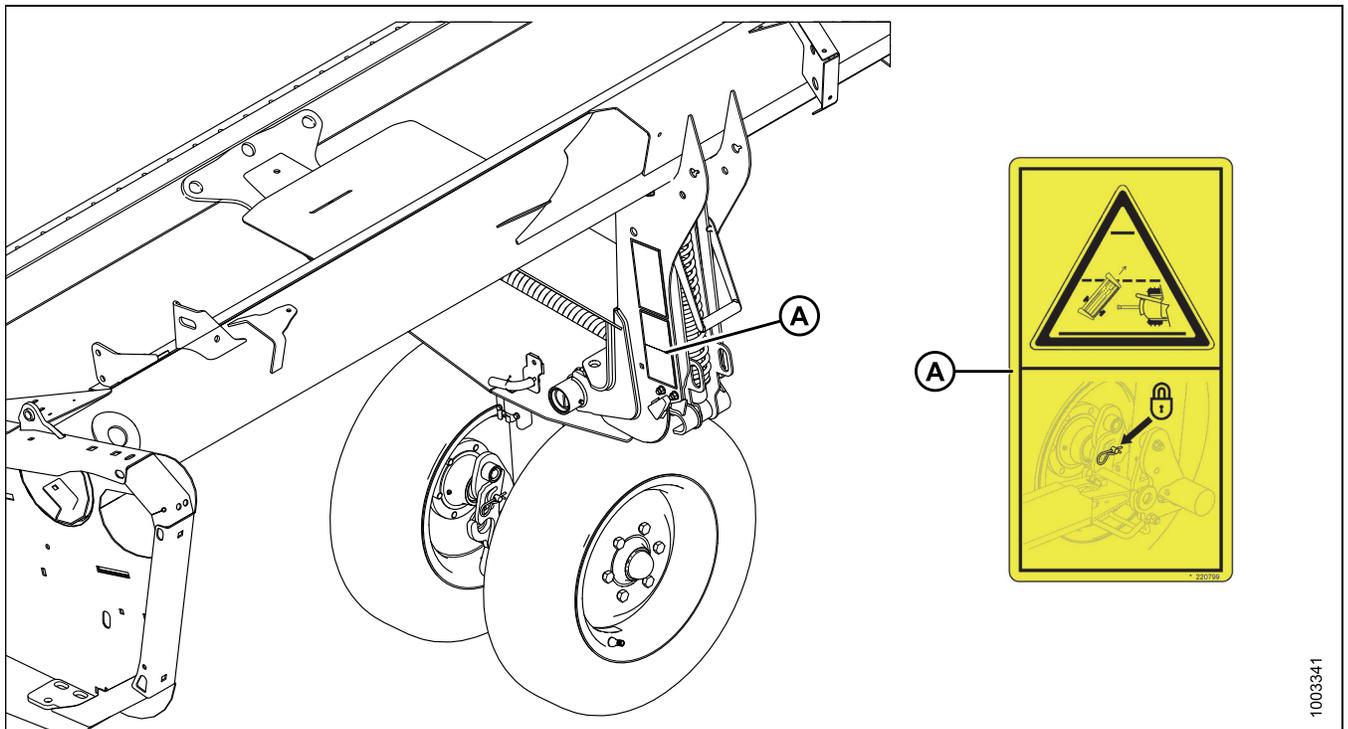
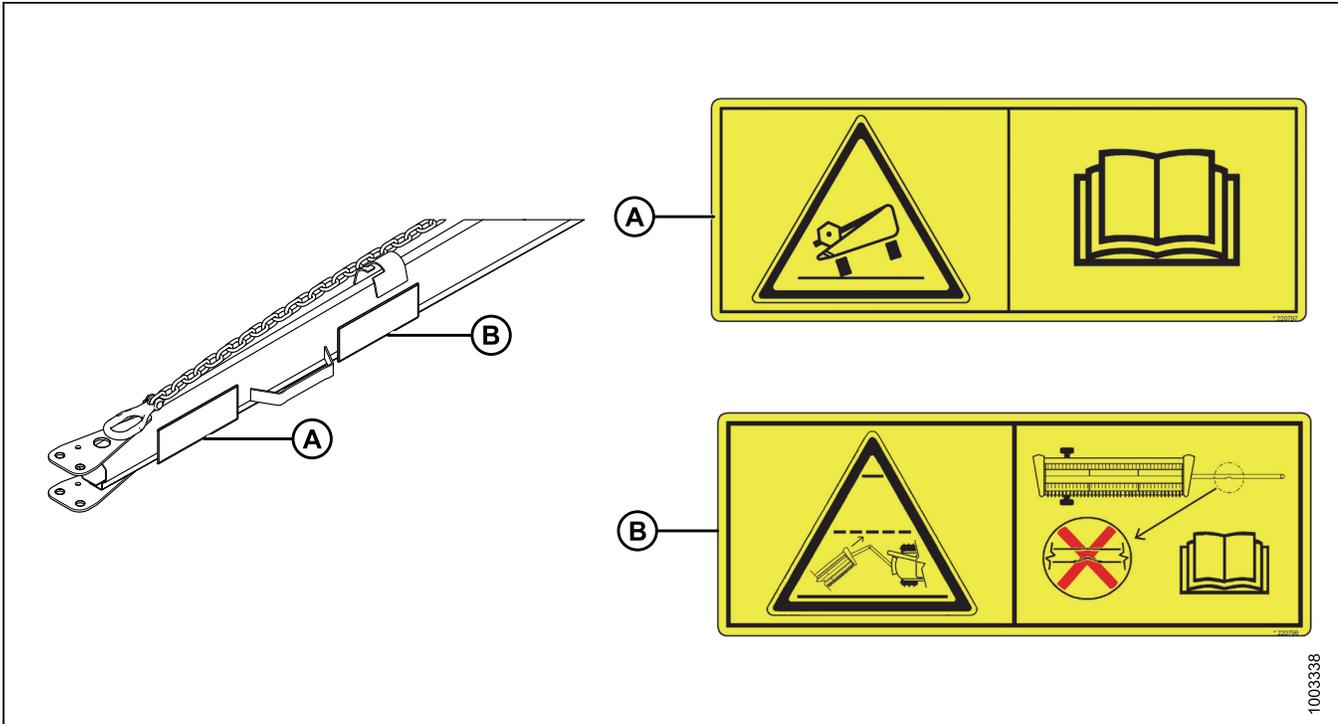


Figure 1.19: Slow Speed Transport

A - MD #220799

1003341

SAFETY

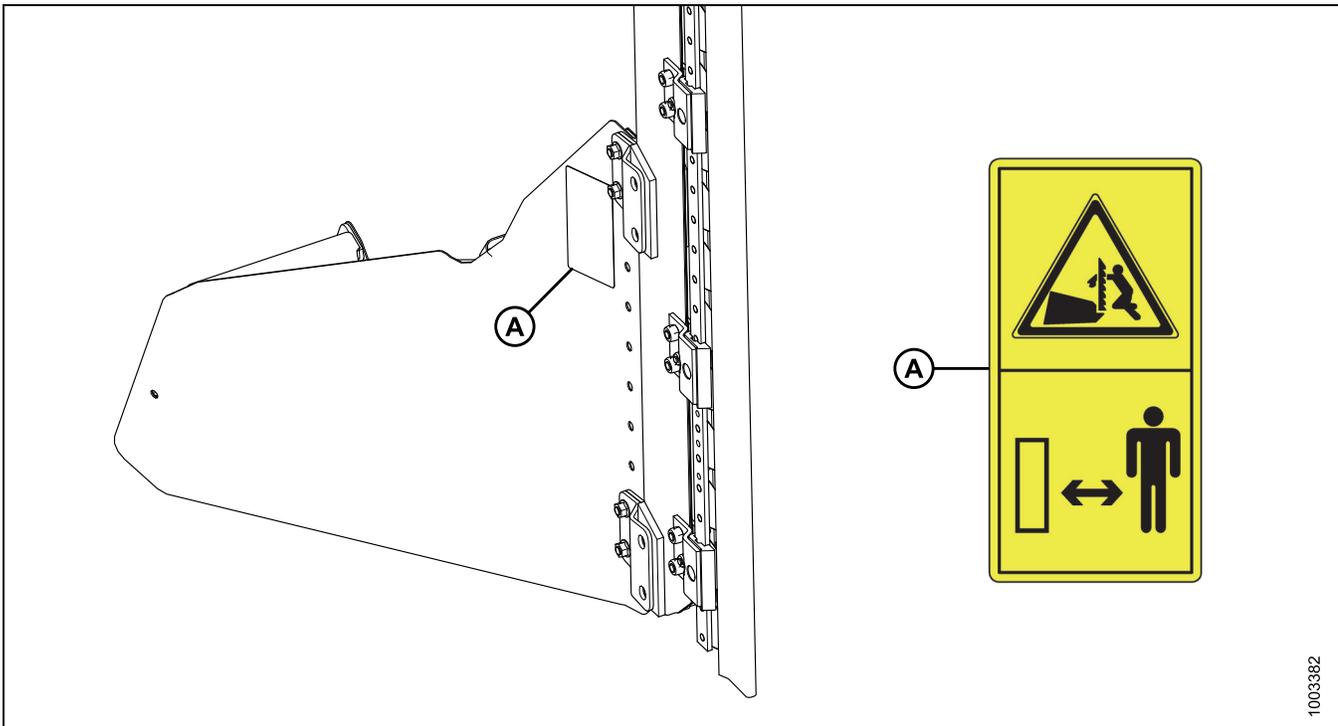


1003338

Figure 1.20: Slow Speed Transport Tow-Bar

A - MD #220797

B - MD #220798



1003382

Figure 1.21: Vertical Knife

A - MD #174684

SAFETY

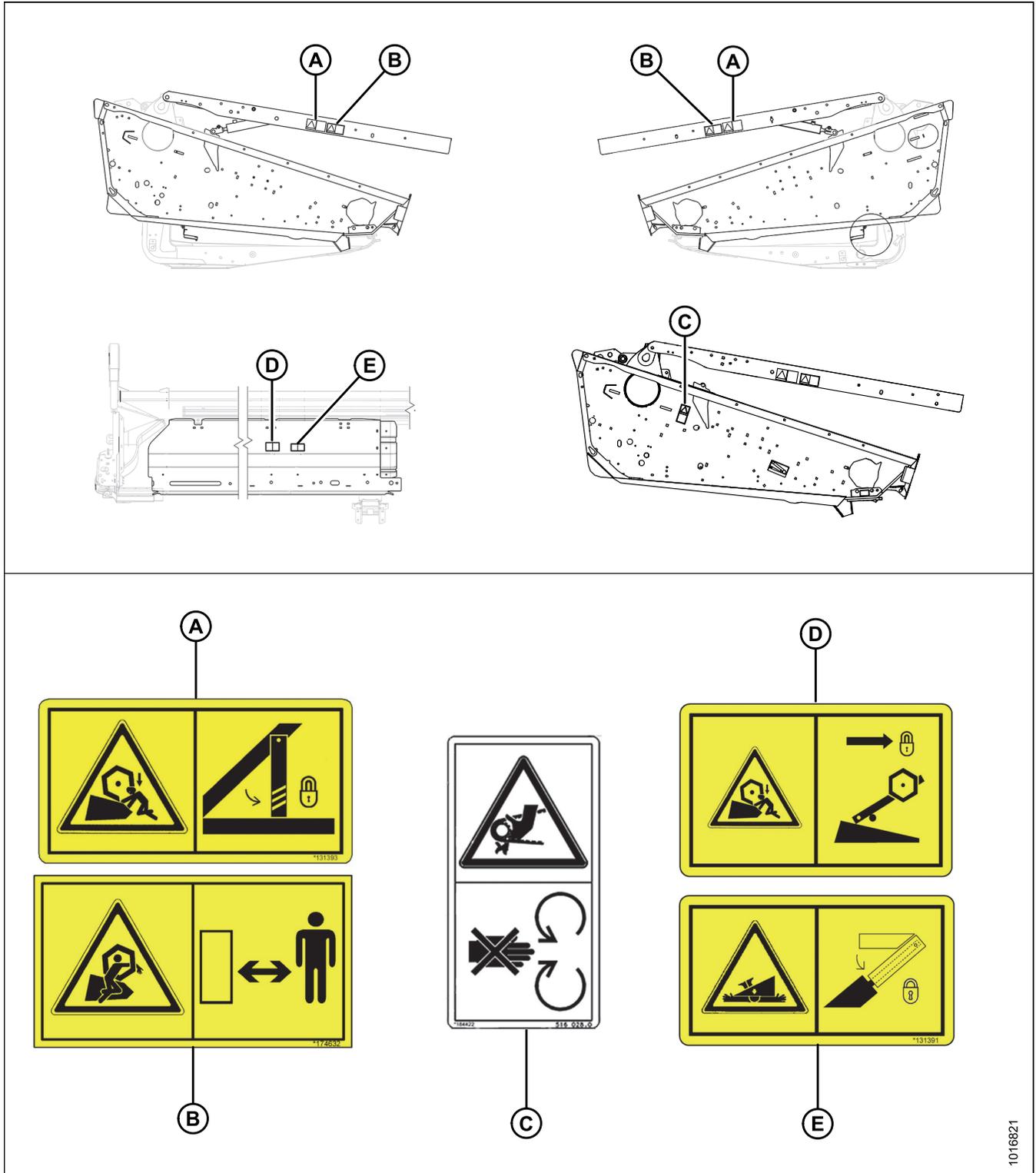


Figure 1.22: Endsheets, Reel Arms, and Backsheet

A - MD #131393

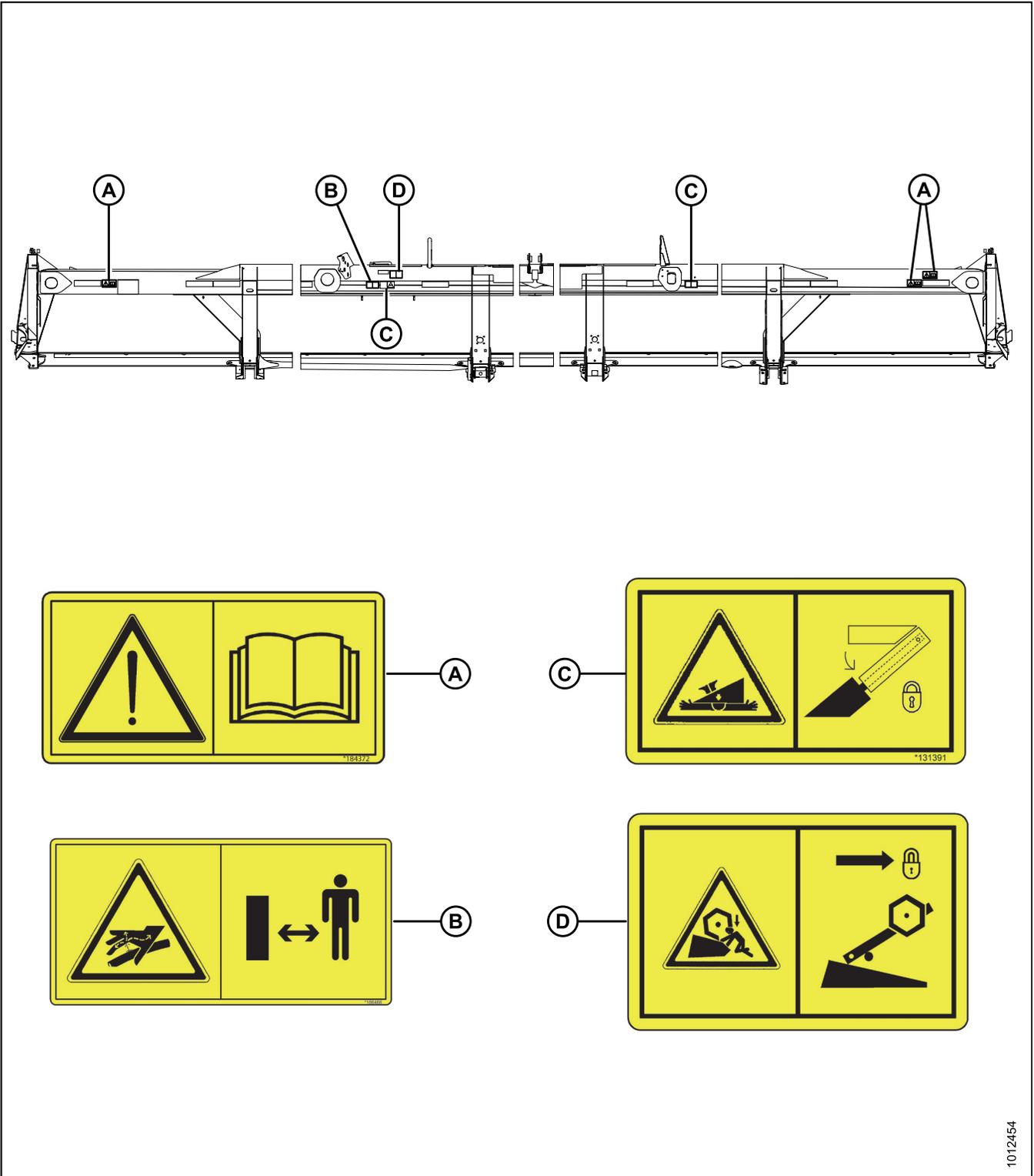
B - MD #174632

C - MD #184422 (Two Places)

D - MD #131392 DR – MD #131393 SR (Two Places)

E - MD #131391 (Two Places)

SAFETY



1012454

Figure 1.23: Backtube

A - MD #184372
C - MD #131391

B - MD #166466
D - MD #131392

1.9 Understanding Safety Signs

MD #113482

General hazard pertaining to machine operation and servicing

CAUTION

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

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

MD #131391

Crushing hazard

DANGER

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

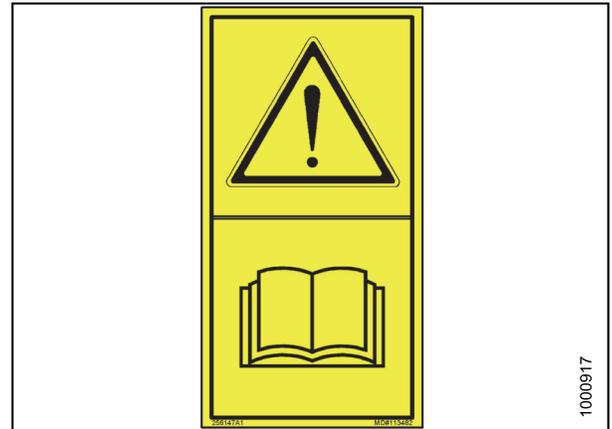


Figure 1.24: MD #113482



Figure 1.25: MD #131391

SAFETY

MD #131392

Crushing hazard

WARNING

- To avoid injury from fall of raised reel; fully raise reel, stop the engine, remove the key, and engage safety prop on each reel support arm before working on or under reel.
- Refer to header operator's manual.

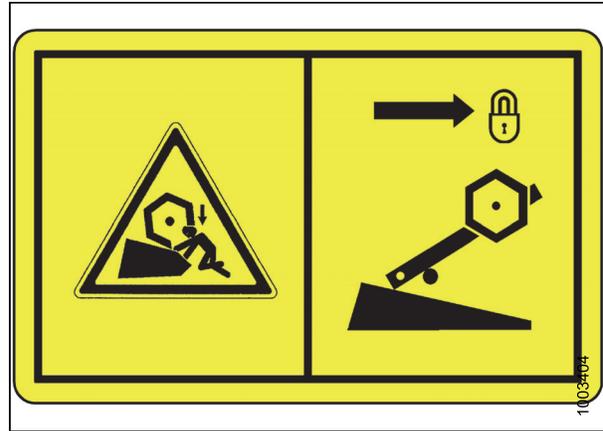


Figure 1.26: MD #131392

MD #131393

Reel hazard

WARNING

- To avoid injury from fall of raised reel; fully raise reel, stop the engine, remove the key, and engage safety prop on each reel support arm before working on or under reel.
- Refer to header operator's manual.



Figure 1.27: MD #131393

MD #166466

High pressure oil hazard

WARNING

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



Figure 1.28: MD #166466

SAFETY

MD #174436

High pressure oil hazard

WARNING

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



Figure 1.29: MD #174436

MD #174632

Reel entanglement hazard

CAUTION

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

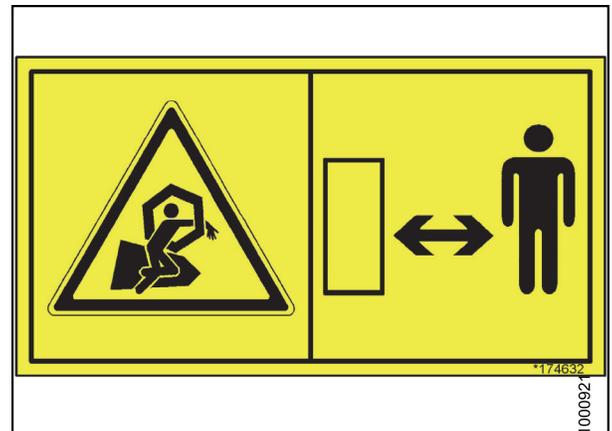


Figure 1.30: MD #174632

MD #174682

Auger entanglement hazard

CAUTION

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



Figure 1.31: MD #174682

SAFETY

MD #174684

Sharp component hazard

CAUTION

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



Figure 1.32: MD #174684

MD #184372

General hazard pertaining to machine operation and servicing

CAUTION

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

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

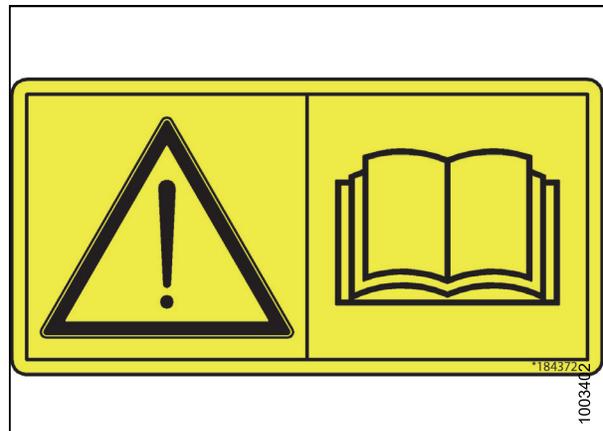


Figure 1.33: MD #184372

SAFETY

MD #184422

Keep shields in place hazard

WARNING

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



Figure 1.34: MD #184422

MD #193147

Transport/roading hazard

WARNING

- Ensure tow-bar lock mechanism is locked.

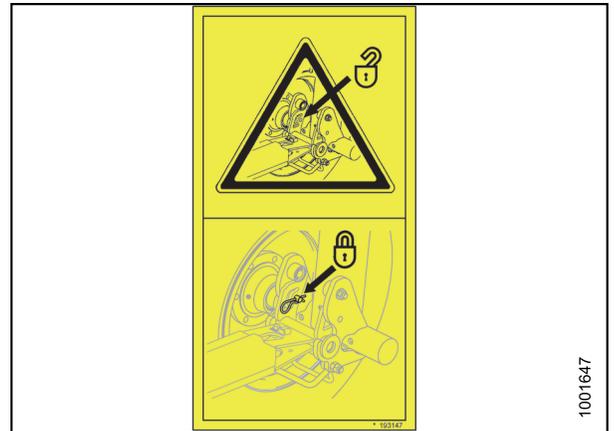


Figure 1.35: MD #193147

MD #220797

Tipping hazard in transport mode

WARNING

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

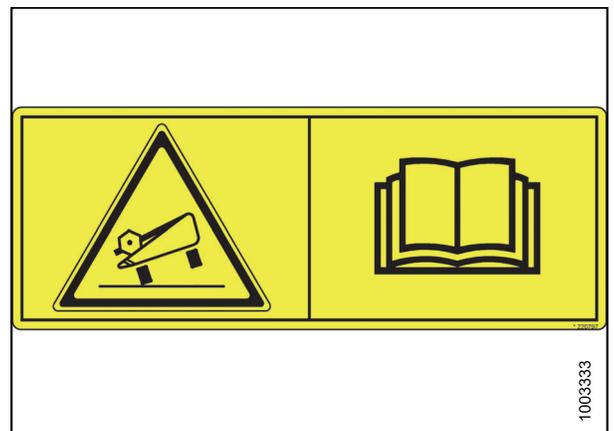


Figure 1.36: MD #220797

SAFETY

MD #220798

Loss of control hazard in transport

CAUTION

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

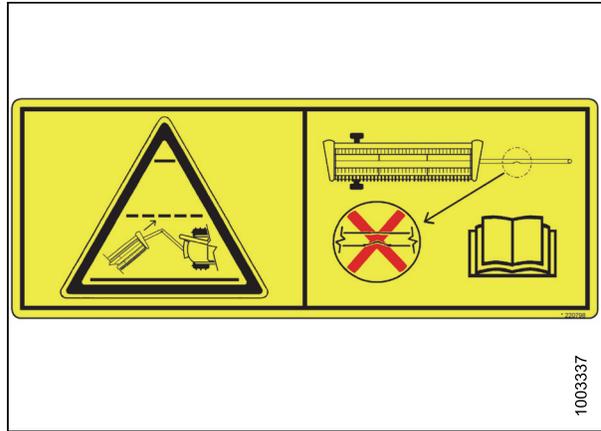


Figure 1.37: MD #220798

MD #220799

Transport/roading hazard

WARNING

- Ensure tow-bar lock mechanism is locked.

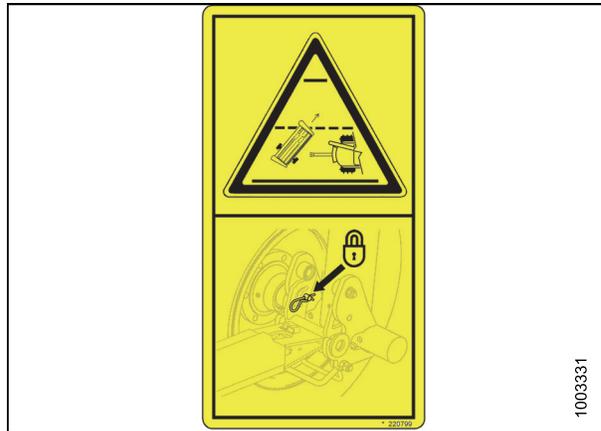


Figure 1.38: MD #220799

2 Product Overview

2.1 Definitions

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

Term	Definition
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut
Cab-forward	Windrower operation with the Operator and cab facing in the direction of travel
Center-link	A hydraulic cylinder link between the header and the machine to which it is attached: It is used to change header angle
CGVW	Combined vehicle gross weight
D1 XL-Series header	MacDon D130 XL, D135 XL, D140 XL, and D145 XL rigid draper headers for windrowers from the D1 XL model number series
DK	Double knife
DKD	Double-knife drive
DDD	Double-draper drive
DR	Double reel
ECU	Electronic control unit
Engine-forward	Windrower operation with the Operator and engine facing in the direction of travel
Export header	Header configuration typical outside North America
Finger tight	Finger tight is a reference position where sealing surfaces or components are making contact with each other and the fitting has been tightened to a point where the fitting is no longer loose
FFFT	Flats from finger tight
GSL	Ground speed lever
GVW	Gross vehicle weight
Hard joint	A joint made with the use of a fastener where the joining materials are highly incompressible
HPT display	Harvest Performance Tracker display module on a self-propelled windrower.
Header	A machine that cuts and lays crop into a windrow and is attached to a self-propelled windrower
Hex key	A hex key or Allen key (also known by various other synonyms) is a tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in the head (internal-wrenching hexagon drive)
HDS	Hydraulic deck shift
hp	Horsepower
JIC	Joint Industrial Council: A standards body that developed the standard sizing and shape for original 37° flared fitting

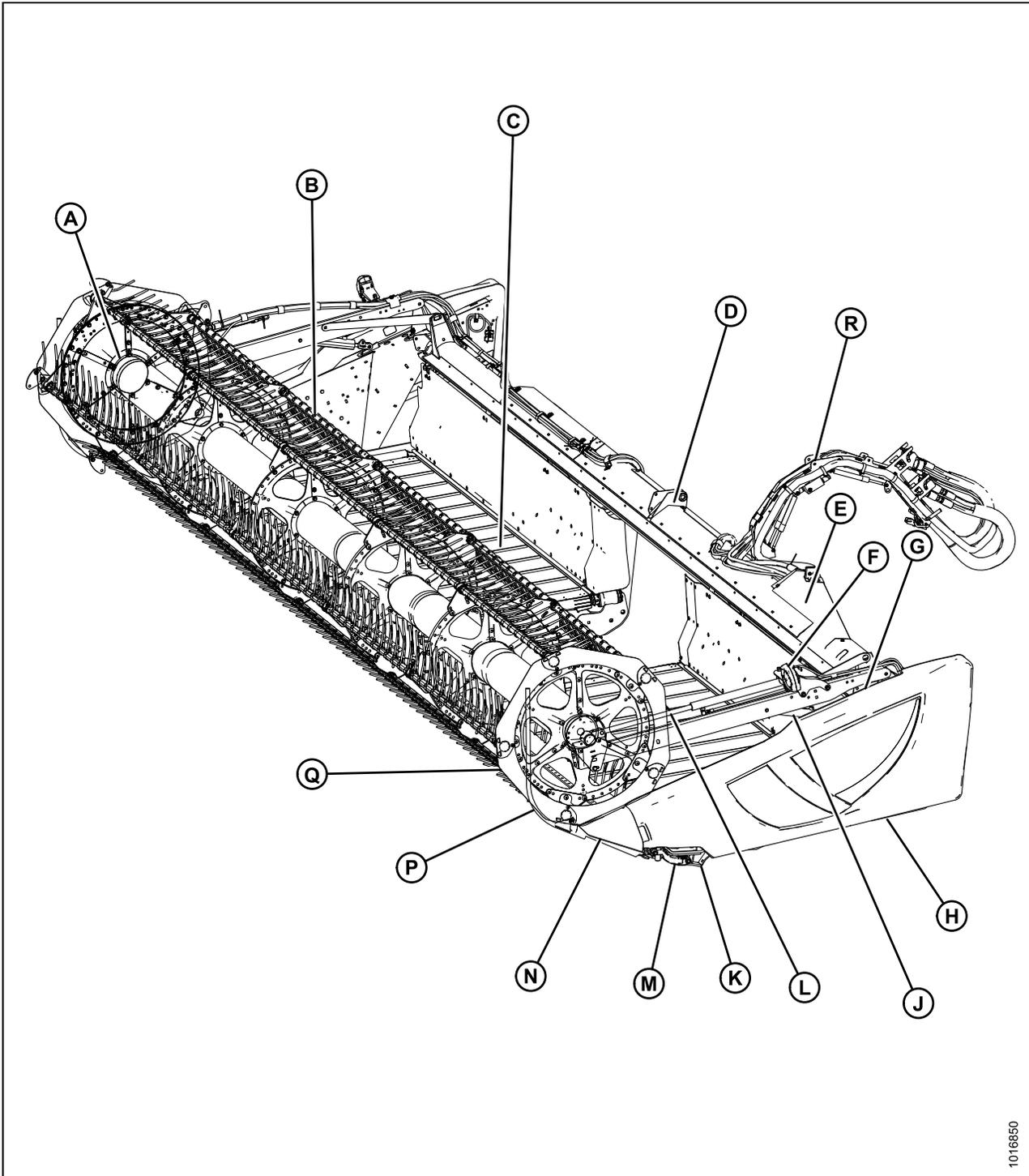
PRODUCT OVERVIEW

Term	Definition
Knife	A cutting device which uses a reciprocating cutter (also called a sickle)
n/a	Not applicable
Nut	An internally threaded fastener that is designed to be paired with a bolt
N-DETENT	The slot opposite the NEUTRAL position on operator's console
North American header	Header configuration typical in North America
NPT	National Pipe Thread: A style of fitting used for low pressure port openings Threads on NPT fittings are uniquely tapered for an interference fit
ORB	O-ring boss: A style of fitting commonly used in port opening on manifolds, pumps, and motors
ORFS	O-ring face seal: A style of fitting commonly used for connecting hoses and tubes This style of fitting is also commonly called ORS, which stands for O-ring seal
rpm	Revolutions per minute
RoHS (Reduction of Hazardous Substances)	A directive by the European Union to restrict the use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc platings)
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread in one of the mating parts
SDD	Single-drapeer drive
Self-Propelled (SP) Windrower	Self-propelled machine consisting of a power unit with a header
SK	Single knife
SKD	Single-knife drive
Soft joint	A joint made with the use of a fastener where the joining materials are compressible or experience relaxation over a period of time
spm	Strokes per minute
SR	Single reel
Truck	A four-wheel highway/road vehicle weighing no less than 7500 lb. (3400 kg)
Timed knife drive	Synchronized motion applied at the cutterbar to two separately driven knives from a single hydraulic motor
Tension	Axial load placed on a bolt or screw, usually measured in pounds (lb.) or Newtons (N)
TFFT	Turns from finger tight
Torque	The product of a force X lever arm length, usually measured in foot-pounds (ft-lbf) or Newton-meters (N·m)
Torque angle	A tightening procedure where the fitting is assembled to a precondition (finger tight) and then the nut is turned further a number of degrees or a number of flats to achieve its final position
Torque-tension	The relationship between the assembly torque applied to a piece of hardware and the axial load it induces in the bolt or screw
ULSD	Ultra low sulphur diesel

PRODUCT OVERVIEW

Term	Definition
UCA	Upper cross auger
Untimed knife drive	Unsynchronized motion applied at the cutterbar to two separately driven knives from a single hydraulic motor or two hydraulic motors
Washer	A thin cylinder with a hole or slot located in the center that is to be used as a spacer, load distribution element, or a locking mechanism
Windrower	Power unit of a self-propelled header
WCM	Windrower control module

2.2 Component Identification



1016850

Figure 2.1: D1 XL-Series Windrower Header Components

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

PRODUCT OVERVIEW

2.3 Specifications

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

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

Table 2.1 Header Specifications

Cutterbar			
Effective cutting width (distance between crop divider points)			
30-ft. header		30 ft. (360 in. [9144 mm])	S
35-ft. header		35 ft. (420 in. [10,668 mm])	S
40-ft. header		40 ft. (480 in. [12192 mm])	S
45-ft. header		45 ft (540 in. [13716 mm])	S
Cutterbar lift range at guard tip (center-link fully retracted)		49-13/16 in. (1265 mm)	—
Knife			
Single-knife drive: One hydraulic motor with V-belt to one heavy duty (MD) knife drive box			O _F
Double-knife drive 15–35 ft. (timed): One hydraulic motor with two cogged belts to two heavy duty MD knife drive boxes			O _F
Double-knife drive 40 ft. (untimed): Two hydraulic motors with banded-belts to two heavy duty MD knife drive boxes			O _F
Knife stroke		3 in. (76 mm)	S
Single-knife speed (strokes per minute) ¹	30 ft.	1200–1400	S
	35 ft.	1100–1300	S
	40 ft.	1050–1200	S
	45 ft.		
Double-knife speed (strokes per minute) ¹	30 ft.	1200–1600	S
	35 ft.	1200–1400	S
	40 ft.	1100–1400	S
	45 ft.	1100–1400	S

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

PRODUCT OVERVIEW

Knife Sections			
Over-serrated / solid / bolted / 9 serrations per inch			O _F
Over-serrated / solid / bolted / 14 serrations per inch			O _F
Knife overlap at center (double-knife headers)	1/8 in. (3 mm)		S
Guards and Hold-Downs			
Guard: pointed / forged / double heat treated (DHT) Hold-down: sheet metal / adjustment bolt			O _F
Guard: pointed / forged / case hardened (CH) Hold-down: sheet metal / adjustment bolt			O _F
Guard: stub / forged bottom / forged top / adjustment plate			O _F
Guard: stub / forged bottom / sheet metal top / adjustment bolt			O _F
Guard: four point / no-choke design (two long points with tangs / two short points without tangs)			O _F
Guard Angle (Cutterbar on Ground)			
Center-link retracted	30–40 ft.	2.5 Degrees	S
Center-link extended	30–40 ft.	12.0 Degrees	S
Conveyor (Draper) and Decks			
Draper width		41-5/8 in. (1057 mm)	S
Draper drive		Hydraulic	S
Draper speed		0–742 fpm (225 m/min.)	S
Delivery opening width (center delivery) / variable by shifting decks	30, 35, 40 ft.	67-1/8 – 76-11/16 in. (1720–1950 mm)	S
Delivery opening height (under frame tube at 8 in. cutting height)	Center-link fully retracted	37-5/8 in. (955 mm)	S
	Center-link fully extended	43-1/2 in. (1105 mm)	S
PR15 Pick-Up Reel			
Quantity of tine tubes		5, 6, or 9	
Center tube diameter	35 ft.	10 in. (254 mm)	
Finger tip radius	Factory-set	31-1/2 in. (800 mm)	
	Adjustment range	30-3/16 – 31-1/2 in. (766–800 mm)	
Effective reel diameter (via cam profile)		65 in. (1650 mm)	
Finger length		11 in. (290 mm)	
Finger spacing (staggered on alternate bats)		6 in. (150 mm)	
Reel drive		Hydraulic	S
Reel speed (auto-adjust from cab using ground speed index)		0–85 rpm	S

PRODUCT OVERVIEW

Frame and Structure				
Header width (field mode)			Cut width + 15-1/8 in. (384 mm)	S
Header width (transport mode—reel fore-aft fully retracted)	Header only	(B) ² (long dividers installed)	104 in. (2636 mm)	—
		(A) ² (long dividers removed)	97 in. (2452 mm)	—

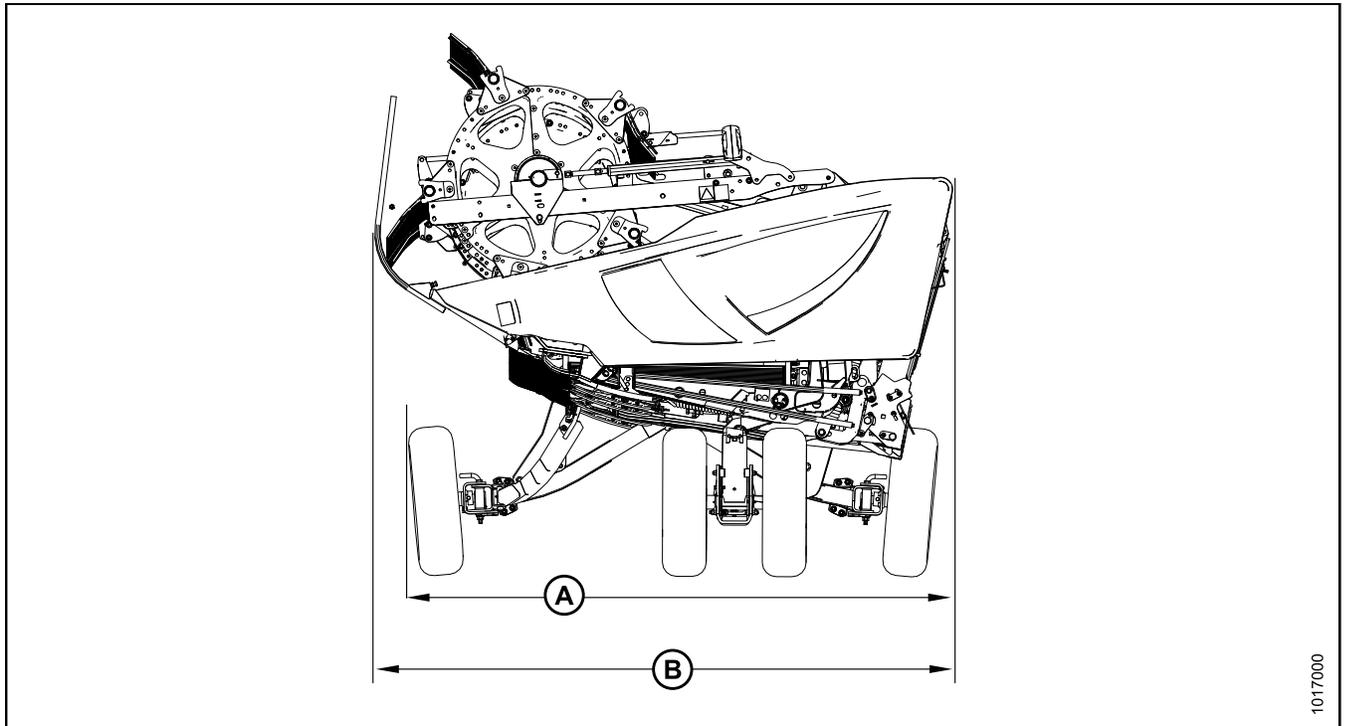


Figure 2.2: Header Width

1017000

2. Refer to Figure 2.2: *Header Width*, page 25.

PRODUCT OVERVIEW

Table 2.2 Header Attachments

Attachments			
Upper Cross Auger			O _D
Outside diameter		12 in. (305 mm)	
Tube diameter	All sizes	6 in. (152 mm)	
Stabilizer Wheel / Slow Speed Transport			O _D
Wheels		15 in.	
Tires		P205/75 R-15	

Weight			
Estimated weight range with base header (variances are due to different package configurations)			
30-ft. header		4370–4812 lb. (1981–2178 kg)	
35-ft. header		4808–5337 lb. (2181–2480 kg)	
40-ft. header		North America frame	5197–5704 lb. (235 –2593 kg)

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 39](#).
- Operate only in daylight or good artificial light.

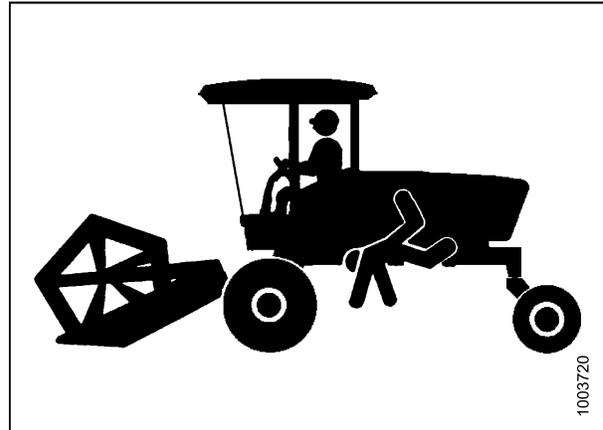


Figure 3.1: No Riders

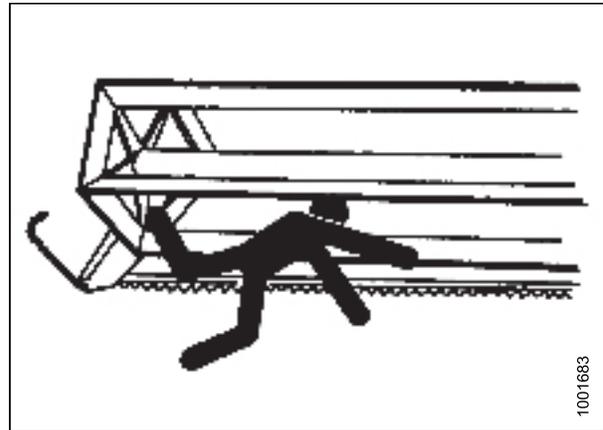


Figure 3.2: Bystander Safety

3.2.1 Header Safety Props

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

DANGER

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

3.2.2 Reel Safety Props

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

WARNING

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

IMPORTANT:

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

Engaging Reel Safety Props

DANGER

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

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

NOTE:

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

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

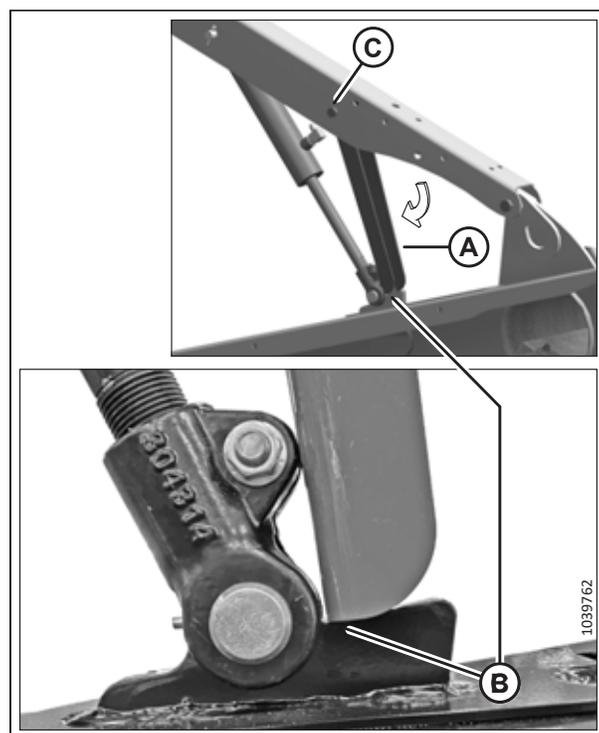


Figure 3.3: Engaged Reel Safety Prop – Left Shown

THE CONTENT ON THIS PAGE HAS CHANGED SINCE THIS MANUAL (147627 REVISION A) WAS PUBLISHED.

OPERATION

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

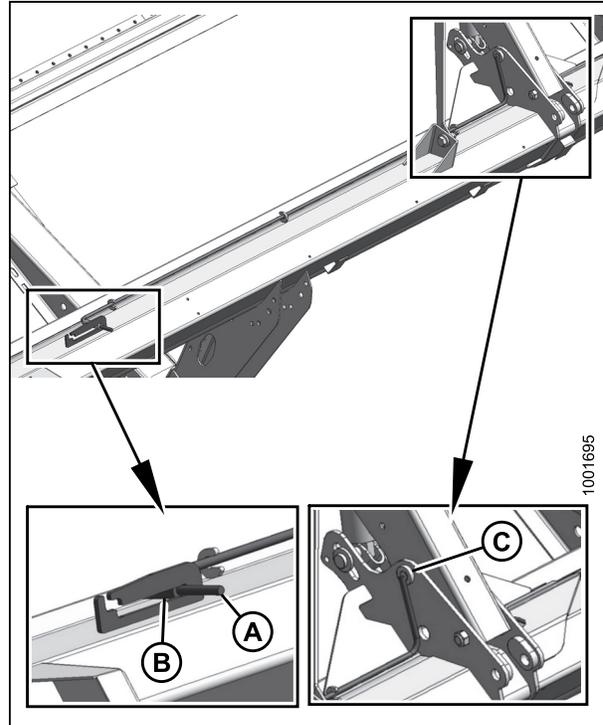


Figure 3.4: Reel Safety Prop – Center Arm

Disengaging Reel Safety Props

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

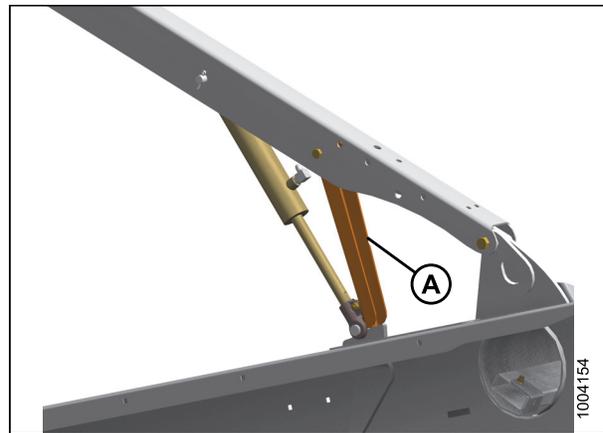


Figure 3.5: Reel Safety Prop – Left Side Outer Arm

OPERATION

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

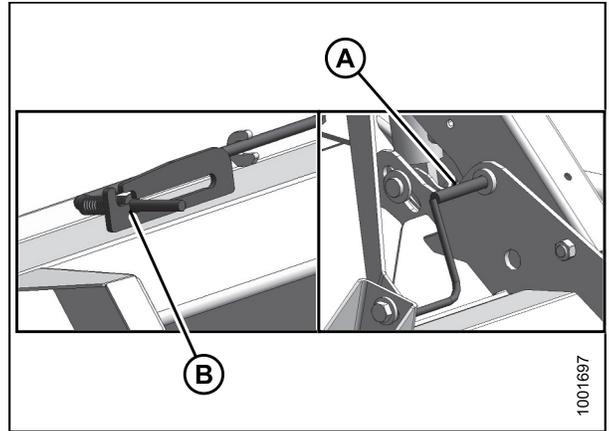


Figure 3.6: Reel Safety Prop – Center Arm

3.2.3 Endshields

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

Opening 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).

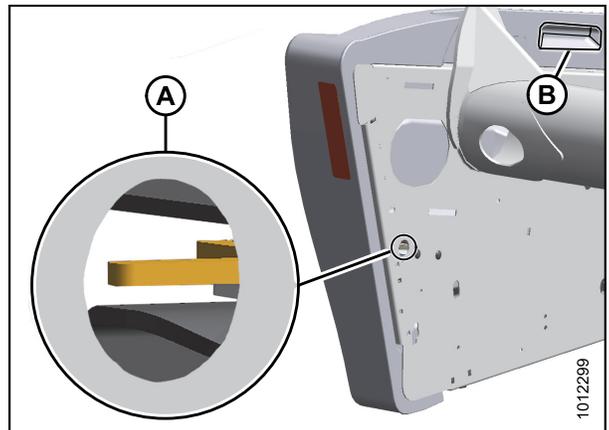


Figure 3.7: Left Endshield

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

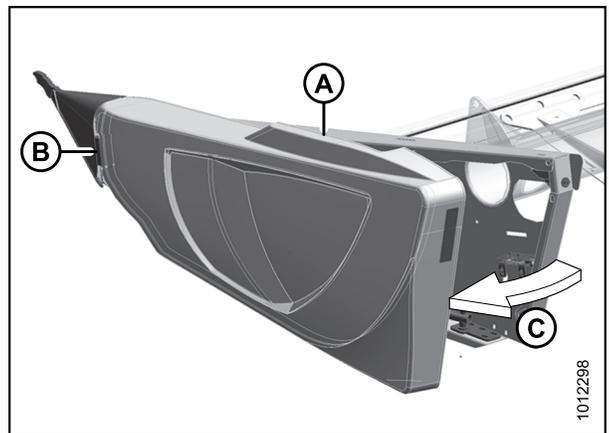


Figure 3.8: Left Endshield

OPERATION

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

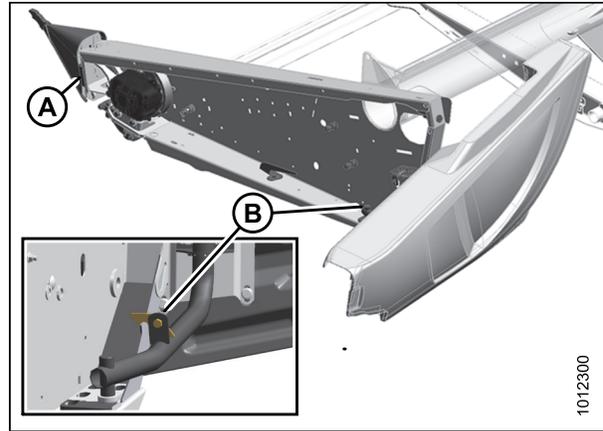


Figure 3.9: Left Endshield

Closing Endshields

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

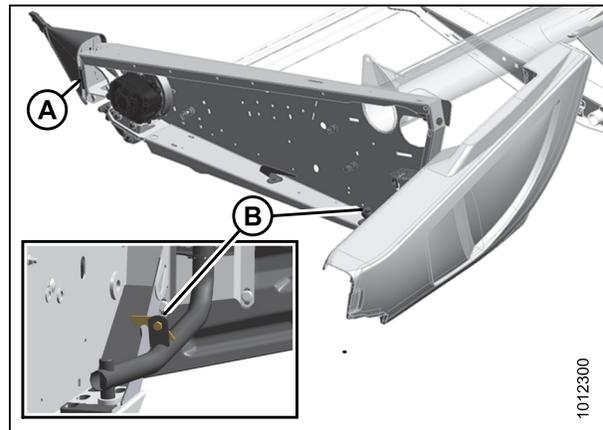


Figure 3.10: Left Endshield

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

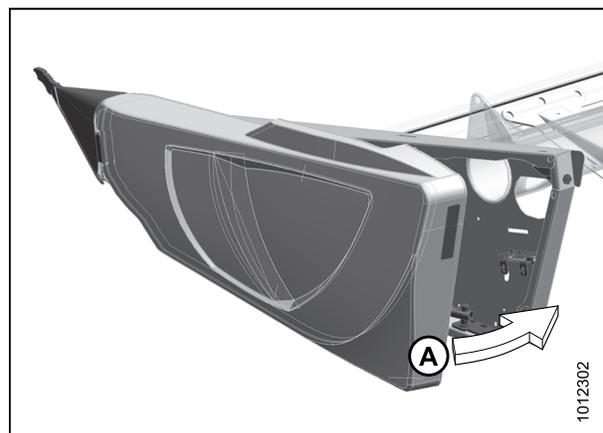


Figure 3.11: Left Endshield

OPERATION

Removing Endshields

1. Fully open endshield. Refer to [Opening Endshields, page 31](#).
2. Engage lock (A) to prevent endshield movement.
3. Remove self-tapping screw (B).
4. Slide endshield upwards and remove from hinge arm.
5. Place endshield away from work area.

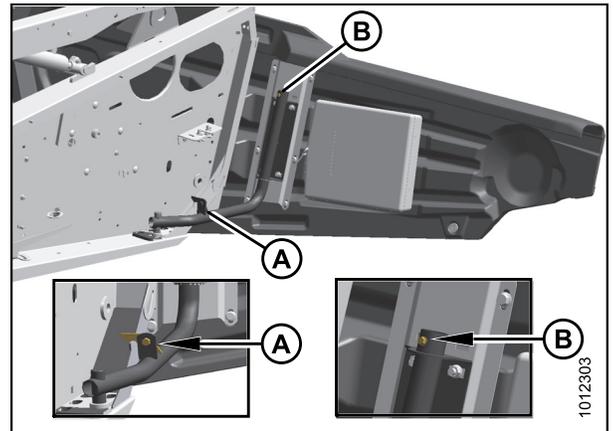


Figure 3.12: Left Endshield

Installing Endshields

1. Guide endshield onto hinge arm and slowly slide it downwards.
2. Install self-tapping screw (B).
3. Disengage lock (A) to allow endshield movement.
4. Close endshield. Refer to [Closing Endshields, page 32](#).

NOTE:

Plastic 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 34](#).

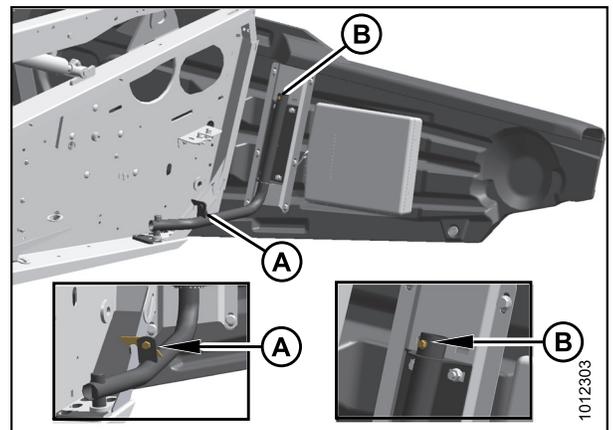


Figure 3.13: Left Endshield

OPERATION

Checking and Adjusting Endshields

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

1. Check gap (X) between front end of shields and header frame and compare to the values in Table 3.1 *Endshield Gap at Various Temperatures*, page 34.

Table 3.1 Endshield Gap at Various Temperatures

Temperature in Degrees F (C)	Gap (X) in Inches (mm)
25 (-4)	1-1/10 (28)
45 (7)	1 (24)
65 (18)	13/16 (20)
85 (29)	5/8 (16)
105 (41)	1/2 (12)
125 (52)	5/16 (8)
145 (63)	3/16 (4)
165 (89)	0

NOTE:

If the endshield gap is correct, skip to the next procedure.
If adjustment is required, follow these steps:

Opening the endshield:

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

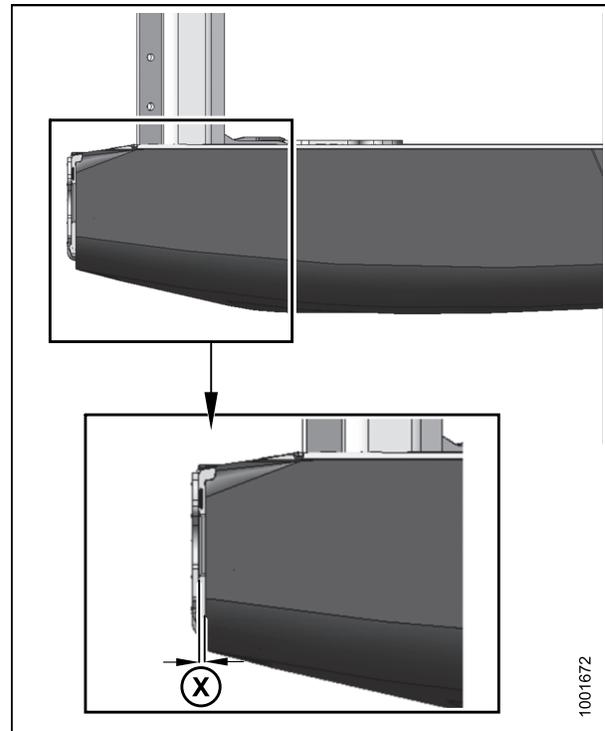


Figure 3.14: Gap between Endshield and Header Frame

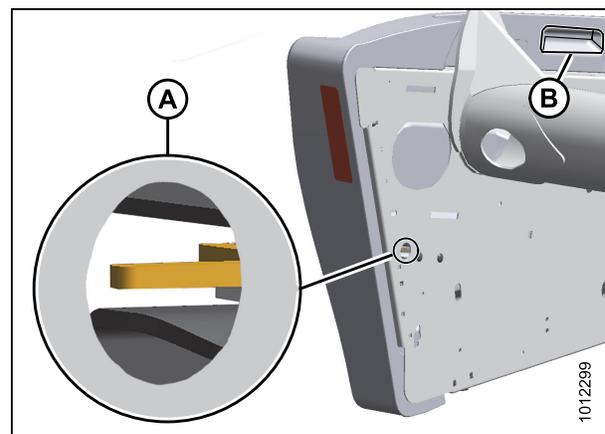


Figure 3.15: Left Endshield

OPERATION

4. Pull endshield at handle depression (A). Endshield is retained by a hinge tab (B) and will open in direction (C).

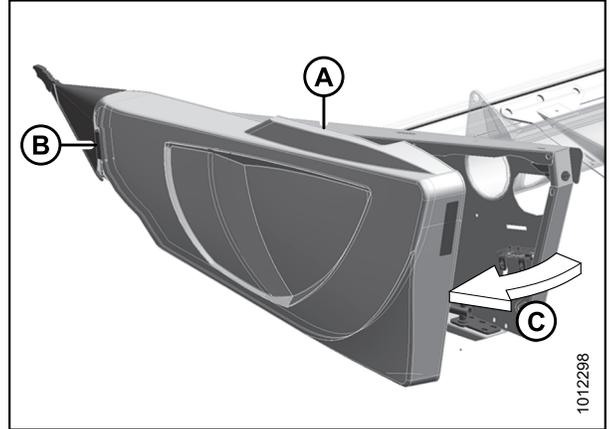


Figure 3.16: Left Endshield

5. Pull the endshield free of hinge tab (A) if additional clearance is required, and swing shield towards the rear of the header.
6. Engage safety catch (B) on hinge arm to secure the shield in fully open position.

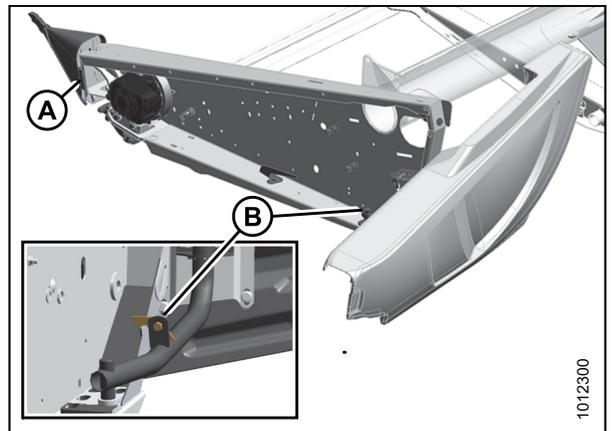


Figure 3.17: Left Endshield

Adjusting the endshield gap:

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

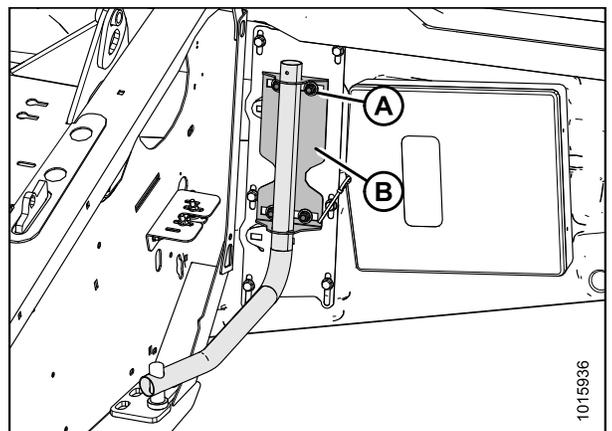


Figure 3.18: LH Endshield Support Tube

OPERATION

8. Loosen the three bolts (A) on latch assembly (B).
9. Adjust latch assembly to achieve the desired gap between the front end of shield and header frame in accordance with Table 3.1 *Endshield Gap at Various Temperatures, page 34*.
10. Tighten the three bolts (A) on latch assembly.
11. Tighten the four bolts on the support tube bracket.
12. Close endshield.

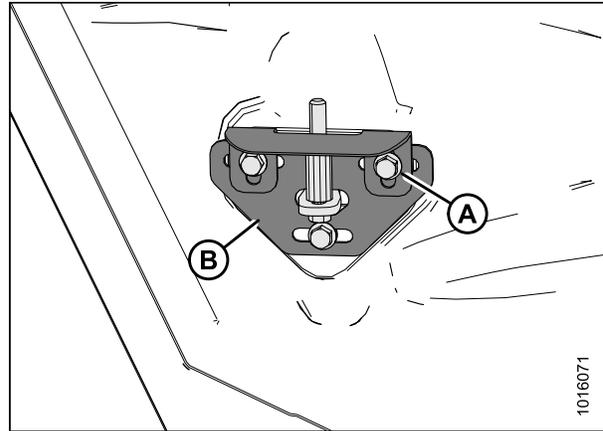


Figure 3.19: LH Endshield Latch Assembly

Closing the endshield:

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

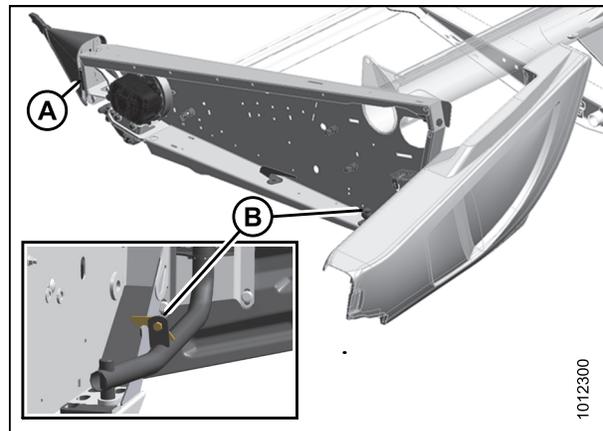


Figure 3.20: Left Endshield

15. Swing endshield in direction (A) into closed position. Engage lock with a firm push.
16. Verify that endshield is locked.

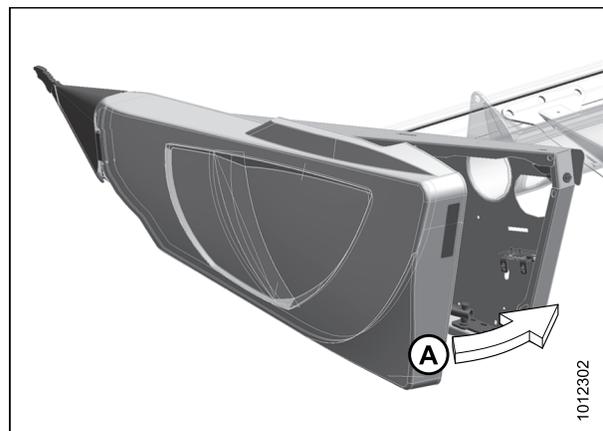


Figure 3.21: Left Endshield

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 106](#).

2. Clean all lights and reflective surfaces on the machine.
3. Perform all daily maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 103](#).

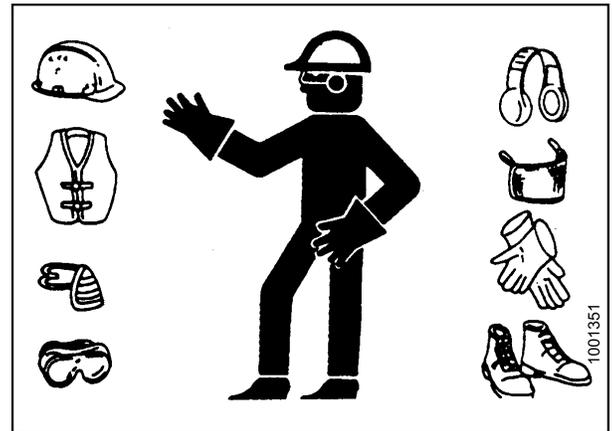


Figure 3.22: Safety Devices

3.3 Break-in Period

CAUTION

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

NOTE:

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

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

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

NOTE:

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

2. Refer to [5.3.2 Break-In Inspection, page 104](#) and perform all the specified tasks.

3.4 Shutting down the Machine

DANGER

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

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

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

3.5 Cab Controls

CAUTION

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

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

- Header engage/disengage control
- Header height
- Header angle
- Ground speed
- 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 XL header are available as options that can be installed at your MacDon Dealer. Refer to [6 Options and Attachments, page 215](#) for descriptions of available items.

3.6.2 Header Settings

Table [3.2 Recommended Header Settings, page 41](#) provides a guideline for setting up the D1 XL-Series Self—Propelled Draper Header; however, the suggested settings can be changed to suit various crops and conditions not covered in the table.

Refer also to [3.6.3 Reel Settings, page 42](#).

Table 3.2 Recommended Header Settings

Crop Type	Stubble Height in. (mm)	Crop Condition	Divider Rods	Header Angle ³	Knife Speed ⁴	Reel Cam ⁵	Reel Speed % ⁶	Reel Position ⁷	Skid Shoe Position ⁸	Stabilizer Wheels ⁹	Upper Cross Auger	Float lbf (N) ¹⁰
Cereals	<4 (102)	Light	On	0–3	High	2	10–15	6 or 7	Up or middle	Storage	Not required	70 (311)
		Normal			Medium		10					
		Heavy		4–7	3	5–10	4 or 5					
		Lodged										
	4–8 (102–203)	Light	On	0–3	High	2	10–15	6 or 7	Middle or down	As required	Not required	70 (311)
		Normal			Medium		10					
		Heavy		4–7	3	5–10	4 or 5					
		Lodged						Down				
	10+ (254+)	Light	On	0–3	High	2	10–15	6 or 7	Not applicable	As required	Not required	150 (667)
		Normal			Medium		10					
		Heavy		4–7	3	5–10	4 or 5					
		Lodged										

3. Set header angle as shallow as possible (setting A) with center-link and skid shoes while maintaining cutting height. Refer to [3.7.3 Header Angle, page 51](#).
4. Refer to [3.7.7 Knife Speed, page 54](#).
5. Refer to [Reel Cam Settings, page 56](#).
6. Percentage above ground speed. Refer to [Reel Speed](#).
7. Refer to [3.7.9 Reel Fore-Aft Position, page 55](#).
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 [Adjusting Skid Shoes, page 49](#).
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 Wheels, page 47](#).
10. Force required to lift header at ends. Refer to your windrower operator’s manual for adjustment procedures.

OPERATION

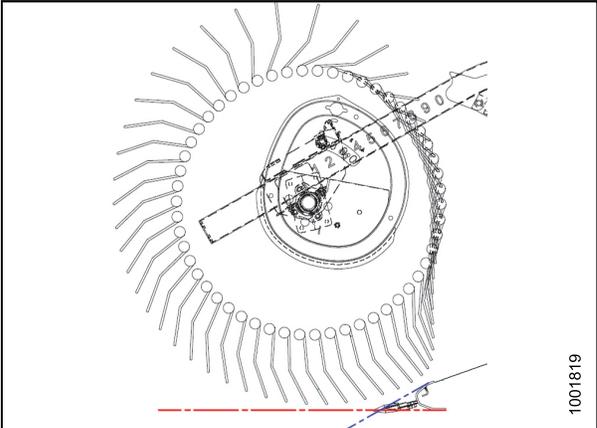
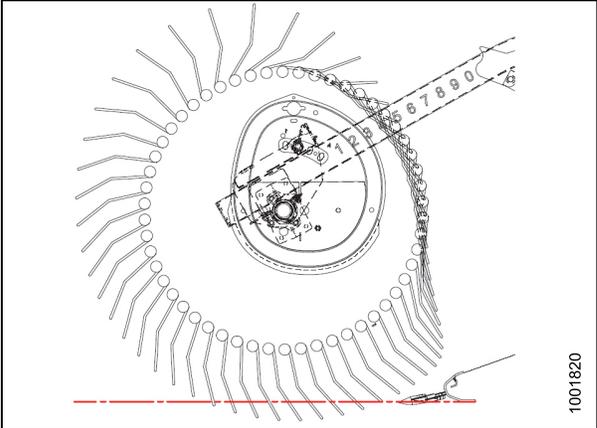
Crop Type	Stubble Height in. (mm)	Crop Condition	Divider Rods	Header Angle ³	Knife Speed ⁴	Reel Cam ⁵	Reel Speed % ⁶	Reel Position ⁷	Skid Shoe Position ⁸	Stabilizer Wheels ⁹	Upper Cross Auger	Float lbf (N) ¹⁰
Canola	4–8 (102–203)	Light	On	8–10	Medium	2	5–10	6 or 7	Down	As required	Not required	70–100 (311–445)
		Normal			Low	1	10		Middle or down			
		Heavy				2	5–10	3 or 4	Down		Recommended	
		Lodged			Middle or down							
	10+ (254+)	Light	On	8–10	Medium	3	5–10	6 or 7	Not applicable	As required	Not required	
		Normal			Low	2	10					
		Heavy				3	5–10	3 or 4			Recommended	
		Lodged										
Flax	2–6. (51–153)	Light	On	4–7	High	2	5–10	6 or 7	Middle or down	As required	Not required	70–100 (311–445)
		Normal		0–3			10					
		Heavy		4–7								
		Lodged		8–10			Down					
Edible Beans		Light	Off	8–10	Medium	2	5–10	3 or 4	Up or middle	Storage	Not required	100 (445)
		Normal										
		Heavy				3						
		Lodged										
Grass		Light	On	Variable	High	2	10	6 or 7	Up or middle	Storage	Not required	70–100 (311–445)
		Normal										
		Heavy				10–15						
		Lodged										
Alfalfa		Light	On	Variable	High	3	10	6 or 7	Up or middle	Storage	Not required	70–100 (311–445)
		Normal				2						
		Heavy				3	10–15					
		Lodged										

3.6.3 Reel Settings

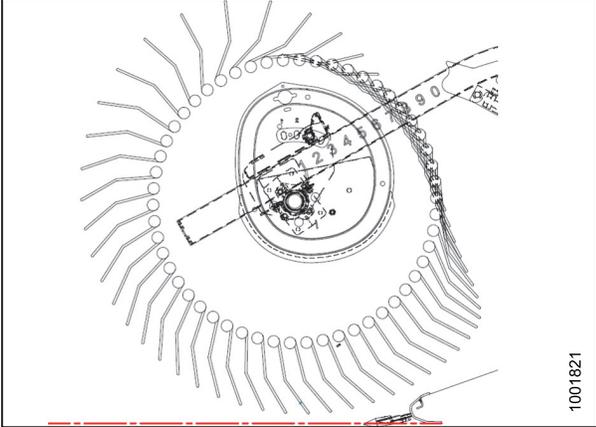
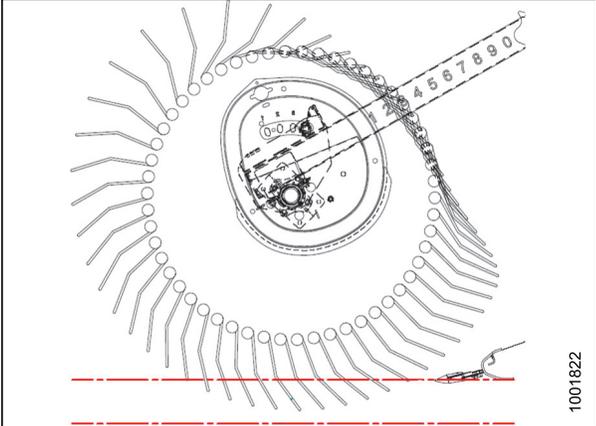
Table 3.3 *Recommended Reel Settings*, page 43 illustrates the profile of the reel at each cam or finger pitch setting as well as the reel position relative to the ground at different positions on the reel arm. Refer to 3.6.2 *Header Settings*, page 41 for the applicability of each finger pattern and reel position.

OPERATION

Table 3.3 Recommended Reel Settings

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

OPERATION

Cam Setting Number (Finger Speed Gain)	Reel Position Number	Reel Finger Pattern
3 (30%)	6 or 7	
4 (35%)	2 or 3	

NOTE:

- Adjust the reel forward to get closer to the ground while tilting the header back. Fingers/tines will dig into the ground at extreme reel-forward positions, so adjust skid shoes or header angle to compensate. Adjust the reel rearwards to position the reel further away from the ground when tilting the header forward.
- Header tilt can be increased to position the reel closer to the ground, or decreased to position the reel further from the ground, while keeping material flowing onto drapers.
- To leave the maximum amount of stubble behind in lodged crop, raise the header and increase the header tilt to keep the reel close to the ground. Position the reel fully forward.
- The reel may have to be moved back to prevent lumps or plugging on the cutterbar in thinner crops.
- Minimum crop carrying capacity (minimum area of exposed draper between the reel and the header backsheet) occurs with the reel in the furthest aft position.
- Maximum crop carrying capacity (maximum area of exposed draper between the reel and the header backsheet) occurs with the reel in the furthest forward position.
- The tip speed of the fingers/tines at the cutterbar becomes higher than the reel speed at higher cam settings due to the nature of the cam action. Refer to [Table 3.3 Recommended Reel Settings, page 43](#).

3.7 Header Operating Variables

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

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

The variables listed in Table [3.4 Operating Variables, page 45](#) and detailed on the following pages will affect the performance of your header.

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

Table 3.4 Operating Variables

Variable	Refer to
Cutting Height	3.7.1 Cutting Height, page 45
Header Float	3.7.2 Header Float, page 50
Header Angle	3.7.3 Header Angle, page 51
Reel Speed	Reel Speed
Ground Speed	3.7.5 Ground Speed, page 52
Reel Height	3.7.8 Reel Height, page 54
Reel Fore-Aft Position	3.7.9 Reel Fore-Aft Position, page 55
Reel Tine Pitch	3.7.10 Reel Tine Pitch, page 56
Crop Divider Rods	3.7.12 Crop Divider Rods, page 63

3.7.1 Cutting Height

The header design allows you to cut the crop above the ground in relation to the desired stubble height or to cut the crop at ground level with the header on the ground. Cutting height will vary depending on the type of crop, crop conditions, etc.

Cutting off the Ground

The stabilizer wheel system is designed to minimize bouncing at the header ends and may be used to float the header to achieve an even cutting height when cutting above ground level in cereal grains. 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 D1 XL-Series header stabilizer wheel system (or stabilizer/slow speed transport wheel system) is available for all header widths.

If stabilizer wheels are installed, refer to [Adjusting Stabilizer Wheels, page 47](#) to change the wheel position.

If stabilizer/slow speed transport wheels are installed, refer to [Adjusting Stabilizer/Slow Speed Transport Wheels, page 46](#) to change the wheel position.

OPERATION

Adjusting Stabilizer/Slow Speed Transport Wheels

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

Refer to [3.6.2 Header Settings, page 41](#) for recommended use in specific crops and crop conditions.

DANGER

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

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

CAUTION

Handle may be under tension, especially when the wheels are on the ground. Raise header so that wheels are off the ground before making adjustments.

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

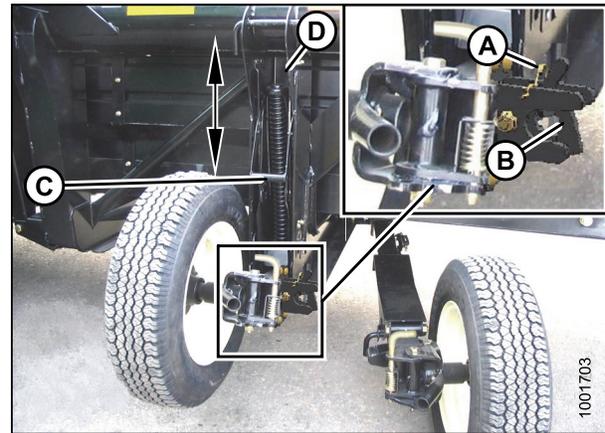


Figure 3.23: Right Wheel

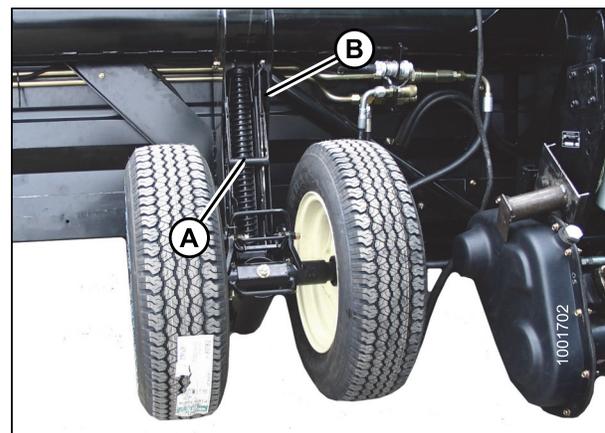


Figure 3.24: Left Wheel

OPERATION

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

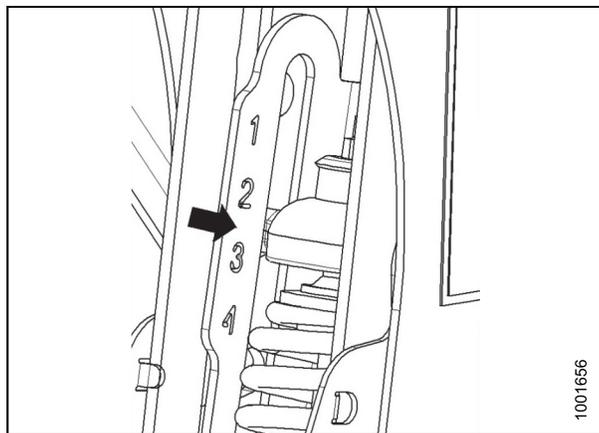


Figure 3.25: Load Indicator

IMPORTANT:

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

14. Adjust the header angle to the desired working angle using the windrower header angle controls. If header angle is not critical, set it to mid-position.
15. Use the windrower Harvest Performance Tracker (HPT) controls to automatically maintain cutting height. Refer to your windrower operator's manual for details.

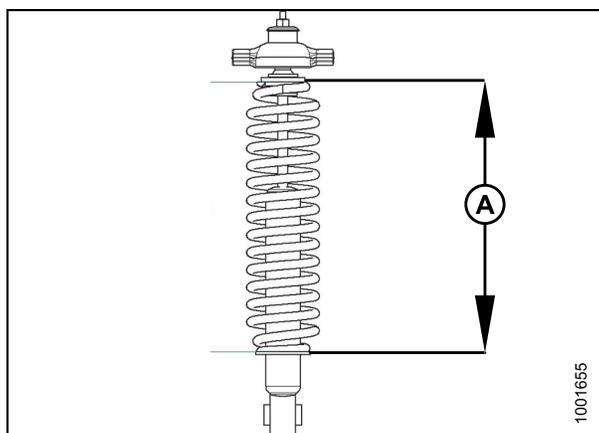


Figure 3.26: Spring Compression

Adjusting Stabilizer Wheels

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

Refer to [3.6.2 Header Settings, page 41](#) for recommended use in specific crops and crop conditions.

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 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.

CAUTION

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

OPERATION

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

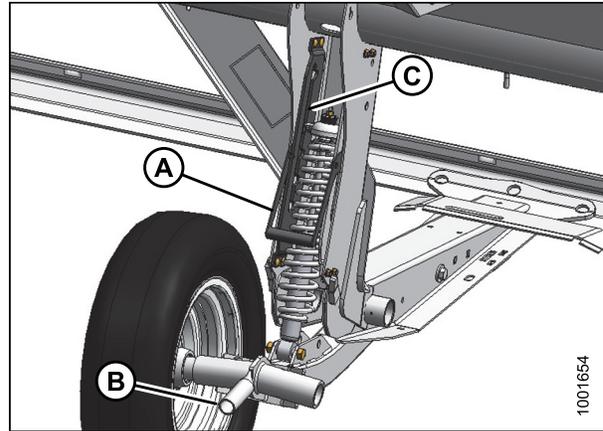


Figure 3.27: Stabilizer Wheel

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

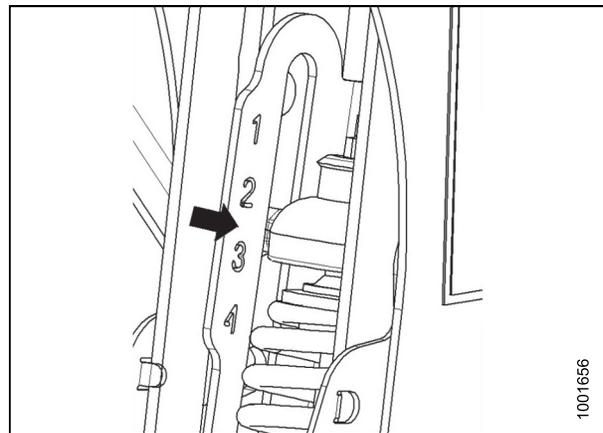


Figure 3.28: Load Indicator

IMPORTANT:

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

7. Adjust the header angle to the desired working angle with the windrower header angle controls. If angle is not critical, set it to mid-position.
8. Use the windrower Harvest Performance Tracker (HPT) controls to automatically maintain cutting height. Refer to your windrower operator's manual for details.

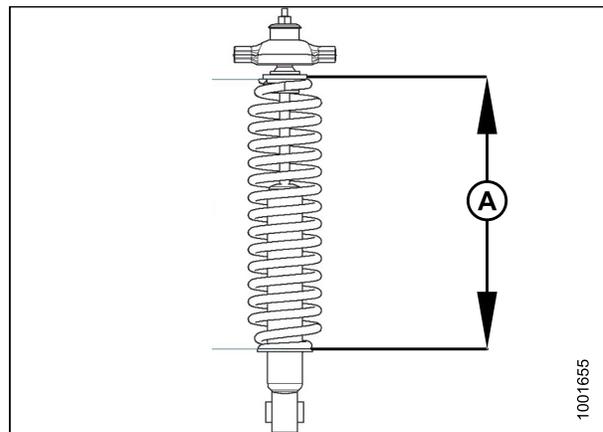


Figure 3.29: Spring Compression

OPERATION

Cutting on the Ground

Cutting on the ground is performed with the header fully lowered and the cutterbar on the ground. The orientation of the knife and knife guards relative to the ground (header angle) is controlled by the skid shoes and the center-link—it is **NOT** controlled by the header lift cylinders. The skid shoes and center-link allow the Operator 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:

- [3.6.2 Header Settings, page 41](#)
- [Adjusting Skid Shoes, page 49](#)
- [3.7.2 Header Float, page 50](#)

Adjusting 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/Slow Speed Transport Wheels, page 46](#)
 - [Adjusting Stabilizer Wheels, page 47](#)

OPERATION

IMPORTANT:

Note the adjustment hole position on support (A) and ensure each skid shoe is set to the same position.

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

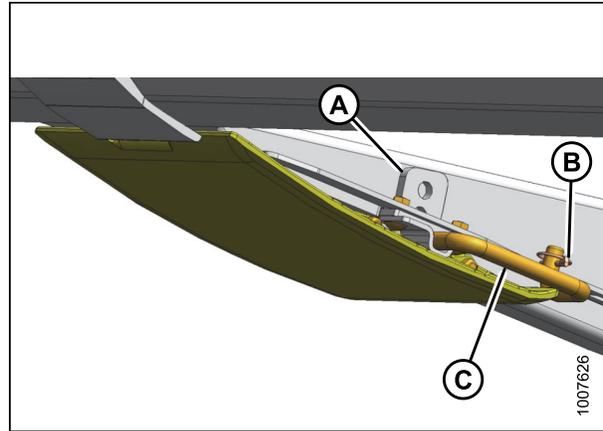


Figure 3.30: Inner Skid Shoe

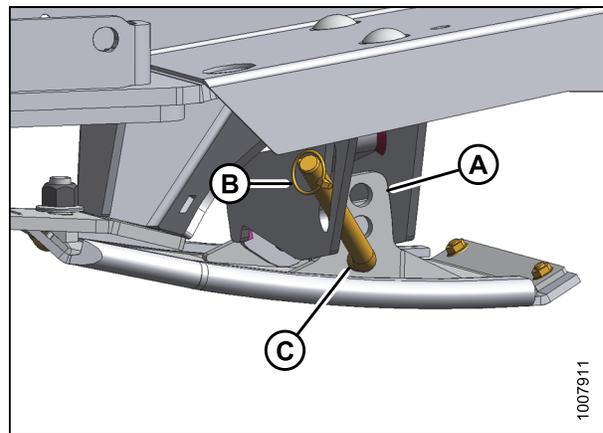


Figure 3.31: Outer Skid Shoe

3.7.2 Header Float

Headers are designed to ride on skid shoes while cutting on the ground. The windrower float system, however, reduces the ground pressure at the cutterbar allowing the header to float over obstacles and follow ground contours instead of being supported by the windrower lift cylinders. Refer to your windrower operator's manual for details about header float adjustments.

OPERATION

3.7.3 Header Angle

Header angle is adjustable to accommodate different crop conditions and/or soil types.

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

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

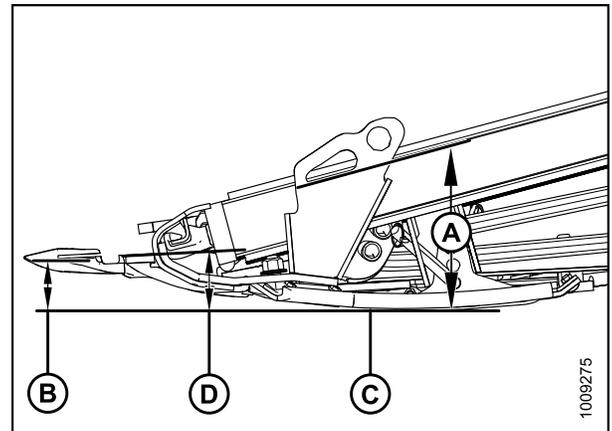


Figure 3.32: Header Angle

Adjusting Header Angle

Header angle can be adjusted using the center-link between the windrower and the header.

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

3.7.4 Reel Speed

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

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

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

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

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

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

Refer to [3.6.2 Header Settings, page 41](#) 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.

OPERATION

Optional Reel Drive Sprockets

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

The header is factory-equipped with a 19-tooth sprocket that drives the reel and it is suitable for most crop conditions. Other sprockets are available that provide more torque to the reel in heavy cutting conditions or allow for higher reel speeds in light crops when operating at increased ground speeds. See your MacDon Dealer for ordering information.

For installation details, refer to [5.9.3 Replacing Reel Drive Sprocket, page 202](#).

3.7.5 Ground Speed

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

Refer to [3.10 Windrow Types, page 68](#) 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 3.0–3.5 mph (4.8–5.8 km/h) and adjust as required.

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

Figure [3.33: Ground Speed vs Acres, page 53](#) illustrates the relationship between ground speed and area cut for the various sized headers.

OPERATION

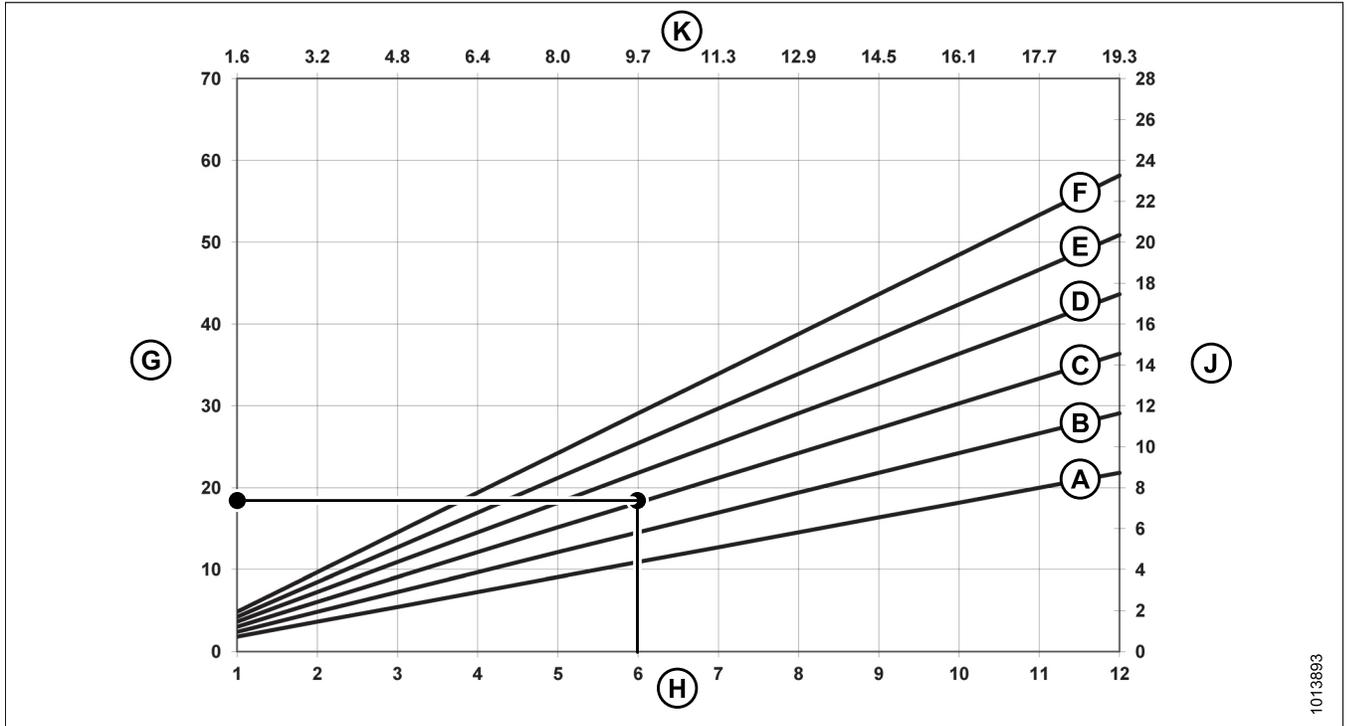


Figure 3.33: Ground Speed vs Acres

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

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

3.7.6 Draper Speed

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

The draper speed is controlled with the windrower Harvest Performance Tracker (HPT). Refer to your windrower operator's manual for instructions.

Adjust the draper speed to achieve good feeding of crop for a good windrow. Excessive draper speed will reduce draper life.

3.7.7 Knife Speed

The header knife drive is powered by the windrower hydraulic pump and is controlled using the windrower Harvest Performance Tracker (HPT) (refer to your windrower operator's manual). The default speed is 1200 strokes per minute (spm).

Table 3.5 D1 XL-SeriesSP Knife Speed

Header Size (ft.)	Recommended Knife Speed Range (spm)
30	1200–1600
35	1200–1400
40	1100–1400
45	1100–1400

3.7.8 Reel Height

Crop type and crop condition determine the operating height of the reel. You can create preset reel height positions using the Headland Management feature on either an M1170 or M1240 Self-Propelled Windrower. To set up this feature, refer to your windrower operator's manual. Set the reel height and fore-aft position to carry material past the knife and onto the drapers with minimal damage to the crop. Refer to [3.7.9 Reel Fore-Aft Position, page 55](#).

The reel height can be controlled manually using switches inside the windrower cab, or assigned to button presets on the ground speed lever (GSL). Refer to your windrower operator's manual for instructions on controlling reel height or setting up auto reel height presets.

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 41](#) to determine recommended reel heights for specific crops and crop conditions.

IMPORTANT:

Maintain adequate clearance to prevent fingers contacting the knife or the ground. Refer to [5.8.1 Reel Clearance to Cutterbar, page 175](#).

3.7.9 Reel Fore-Aft Position

Reel fore-aft position is a critical factor for achieving the best results in adverse conditions. The reel position is factory-set for normal conditions, but it can be adjusted forwards or backwards as required using the controls inside the cab. You can create preset reel fore-aft positions using the Headland Management feature on either an M1170 or M1240 Self-Propelled Windrower. To set up this feature, refer to your windrower operator's manual.

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 [3.7.3 Header Angle, page 51](#) for adjustment instructions. Adjust reel position only if header angle adjustments are not satisfactory.

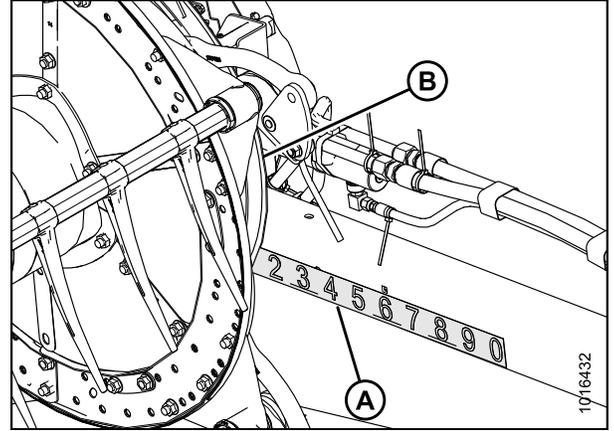


Figure 3.34: Fore-Aft Decal

Refer to [3.6.2 Header Settings, page 41](#) for recommended reel positions in specific crops and crop conditions.

NOTE:

In crops that are difficult to pick up such as rice, or severely lodged crops that require full forward positioning of the reel, set the reel tine pitch to provide proper placement of the crop onto the drapers. Refer to [3.7.10 Reel Tine Pitch, page 56](#) for adjustment details.

Adjusting Reel Fore-Aft Position

1. Operate the hydraulics to move the reel to the desired position while using the gauge as a reference.
2. 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 175](#)
 - [Adjusting Reel Frown, page 177.](#)

IMPORTANT:

Operating with the reel too far forward can result in the fingers contacting the ground. When operating with the reel in this position, lower the skid shoes or adjust the header tilt as required to prevent damaging the fingers.

3.7.10 Reel Tine Pitch

IMPORTANT:

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

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

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

For the best results, use the minimum cam setting that delivers the crop past the rear edge of the cutterbar and onto the drapers. Refer to [3.6.2 Header Settings, page 41](#).

Reel Cam Settings

The following outlines the function of each cam setting and provides set-up guidelines for various crop conditions.

The setting numbers are visible above the slots on the cam disc. Refer to [Adjusting Reel Cam, page 58](#).

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

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

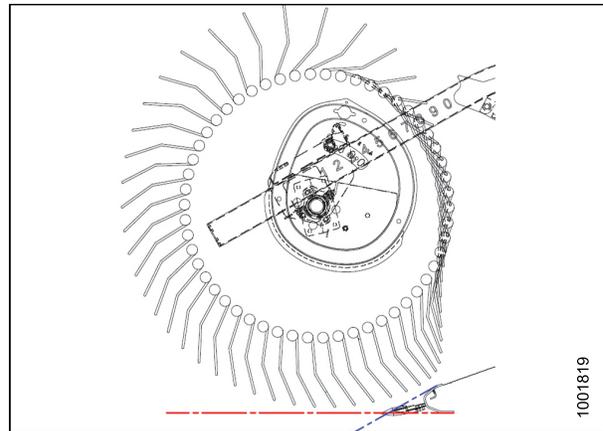


Figure 3.35: Finger Profile – Position 1

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

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

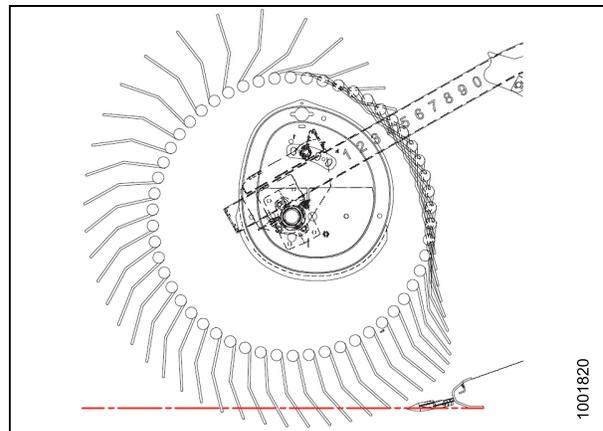


Figure 3.36: Finger Profile – Position 2

OPERATION

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

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

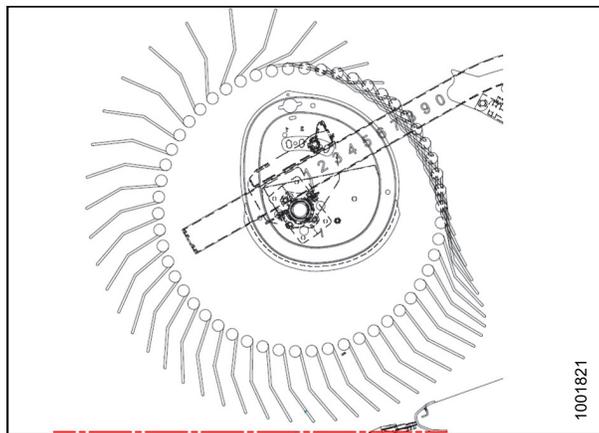


Figure 3.37: Finger Profile – Position 3

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.

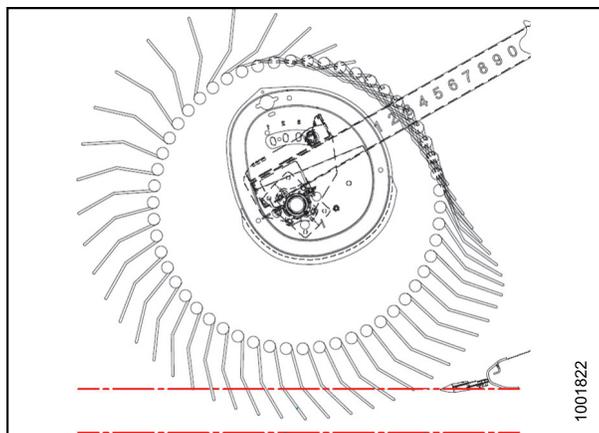


Figure 3.38: Finger Profile – Position 4

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

- Leaves a significant amount of stubble when cutting height is set to approximately 8 in. (203 mm). 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.

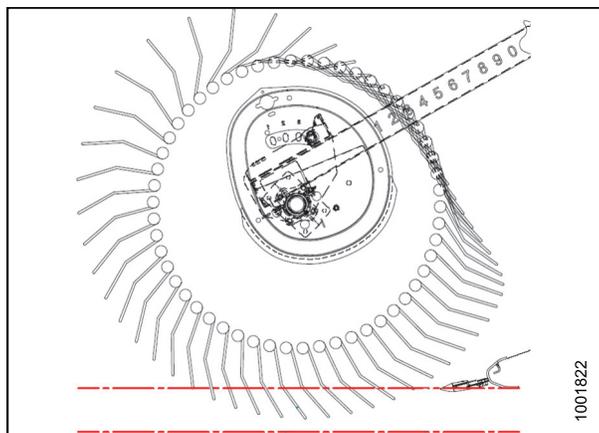


Figure 3.39: Finger Profile – Position 4

OPERATION

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 175](#)). Refer to [3.6.2 Header Settings, page 41](#) 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 the latch pin (A) counterclockwise using a 3/4 in. wrench to release the cam disc.
2. Use the wrench on bolt (B) to rotate the cam disc and align the latch pin (A) with the desired cam disc hole position (C) (1 to 4).

NOTE:

Bolt (B) is positioned through the cam disc (transparent view shown in illustration for improved clarity).

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

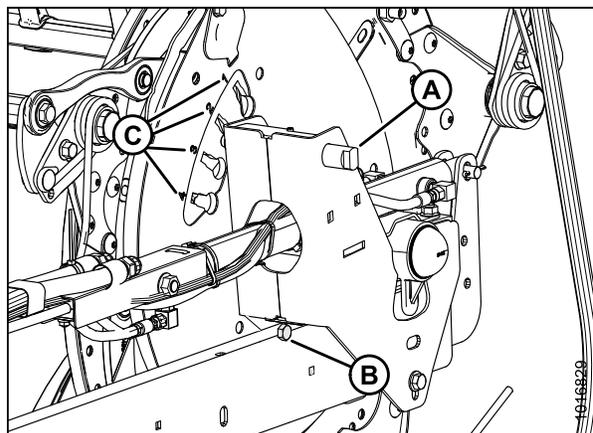


Figure 3.40: Cam Disc Positions

IMPORTANT:

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

3.7.11 Crop Dividers

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

Removing Crop Dividers with Latch Option from Header

DANGER

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

1. Lower reel, raise header, stop engine, remove key, and engage header safety props. Refer to your windrower operator's manual for instructions.
2. Open or remove endshields. Refer to [3.2.3 Endshields, page 31](#).

OPERATION

3. Lift safety lever (A).
4. Hold onto crop divider (B), push lever (C) to open latch, and lower crop divider.

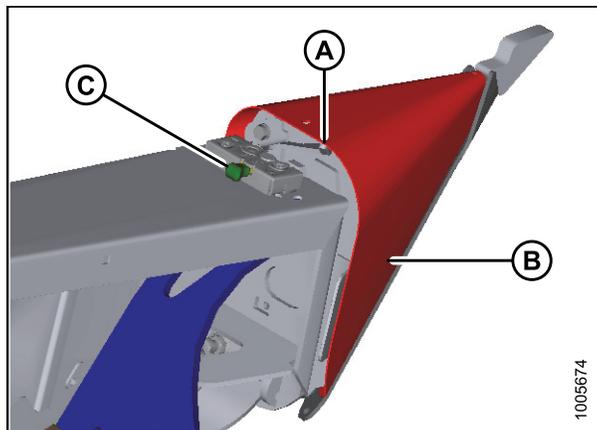


Figure 3.41: Crop Divider

5. Lift crop divider off endsheet and store as follows:
 - a. Insert pin (A) on crop divider into hole in endsheet at location shown.
 - b. Lift crop divider and position lugs (B) on crop divider into bracket on endsheet. Ensure lugs engage bracket.
6. Close or install endshields. Refer to [3.2.3 Endshields, page 31](#).

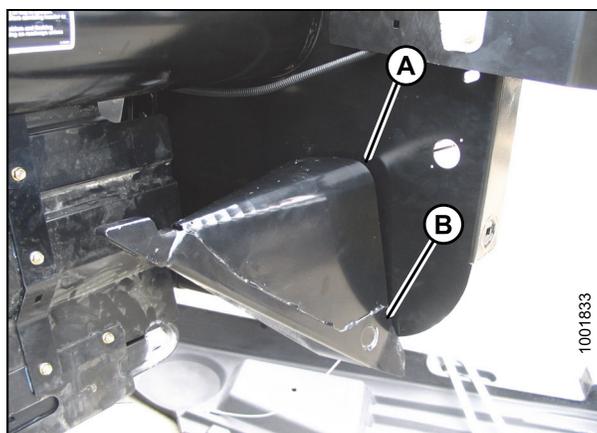


Figure 3.42: Stored Crop Divider

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 and raise header. Refer to your windrower operator's manual for instructions.
2. Stop engine and remove key.
3. Engage safety props. Refer to your windrower operator's manual for instructions.
4. Open or remove endshields. Refer to [3.2.3 Endshields, page 31](#).

OPERATION

5. Remove bolt (A), lock washer, and flat washer.
6. Lower crop divider (B) and then lift to remove from endsheet.
7. Close or install endshields. Refer to [3.2.3 Endshields, page 31](#).

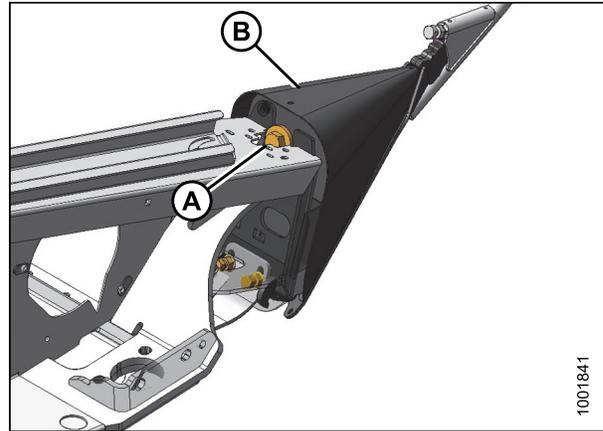


Figure 3.43: Crop Divider

Installing Crop Dividers with Latch Option onto Header

⚠ DANGER

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

1. Lower reel and raise header. Refer to your windrower operator's manual for instructions.
2. Stop engine and remove key.
3. Engage safety props. Refer to your windrower operator's manual for instructions.
4. Open or remove endshields. Refer to [3.2.3 Endshields, page 31](#).
5. 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.

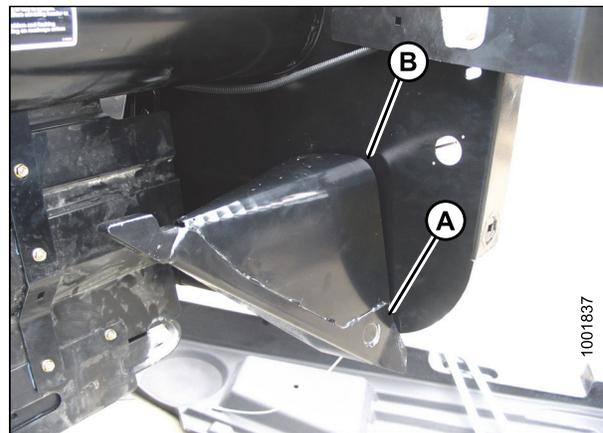


Figure 3.44: Stored Crop Divider

OPERATION

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

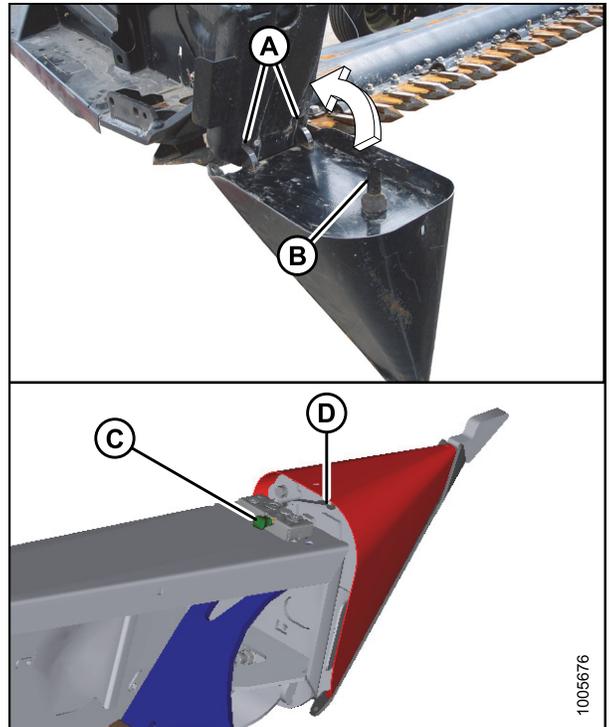


Figure 3.45: Crop Divider

9. 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.
10. Close or install endshields. Refer to [3.2.3 Endshields, page 31](#).

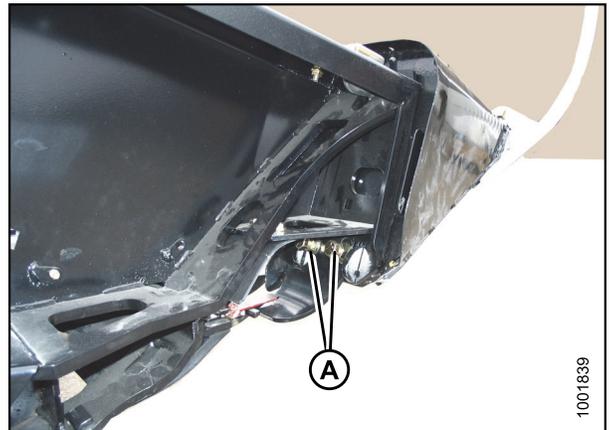


Figure 3.46: Crop Divider

Installing Crop Dividers without Latch Option onto Header

⚠ DANGER

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

1. Lower reel and raise header. Refer to your windrower operator's manual for instructions.
2. Stop engine and remove key.
3. Engage safety props. Refer to your windrower operator's manual for instructions.
4. Open or remove endshields. Refer to [3.2.3 Endshields, page 31](#).

OPERATION

5. 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.

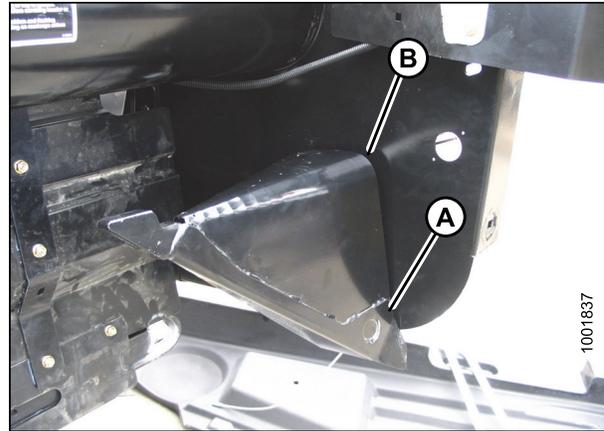


Figure 3.47: Stored Crop Divider

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

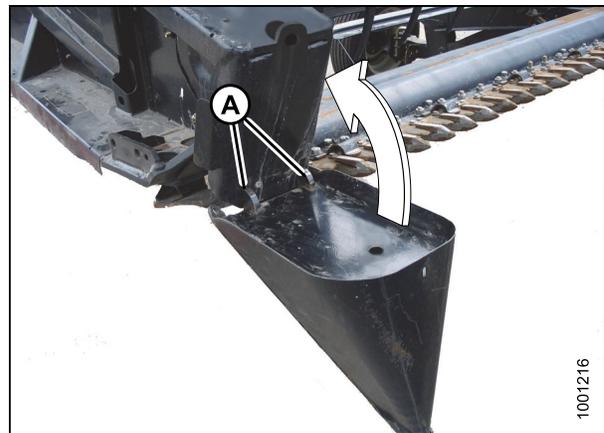


Figure 3.48: Crop Divider

7. Lift forward end of crop divider and install bolt (A) and special stepped washer (B) (step towards divider). Tighten bolt.
8. 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.
9. Close or install endshields. Refer to [3.2.3 Endshields, page 31](#).

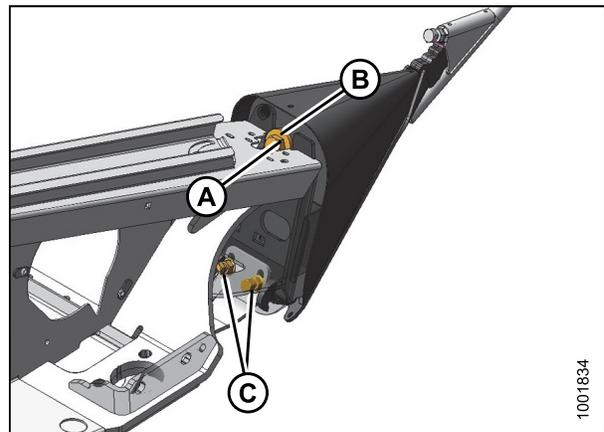


Figure 3.49: Crop Divider

3.7.12 Crop Divider Rods

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

Table 3.6 Crop Divider Rods Recommended Use

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

Removing Crop Divider Rods

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

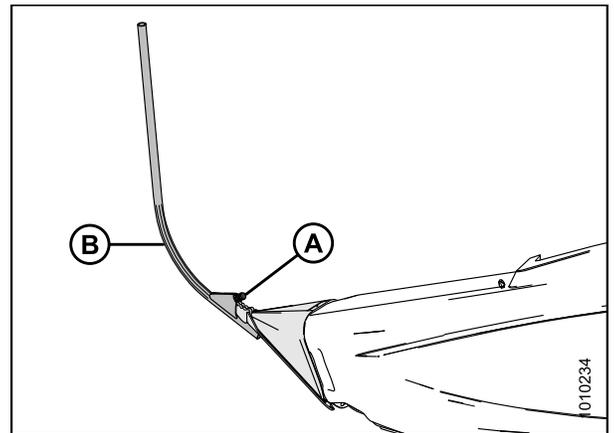


Figure 3.50: Crop Divider Rod

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

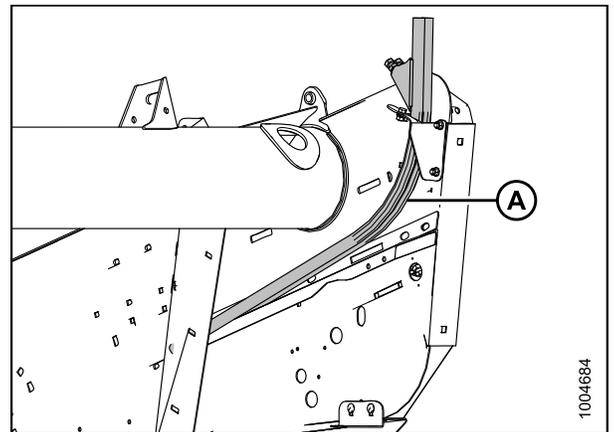


Figure 3.51: Right Side Endsheet

OPERATION

Installing Crop Divider Rods

1. Remove crop divider rods from storage location on inboard of right side endsheet.

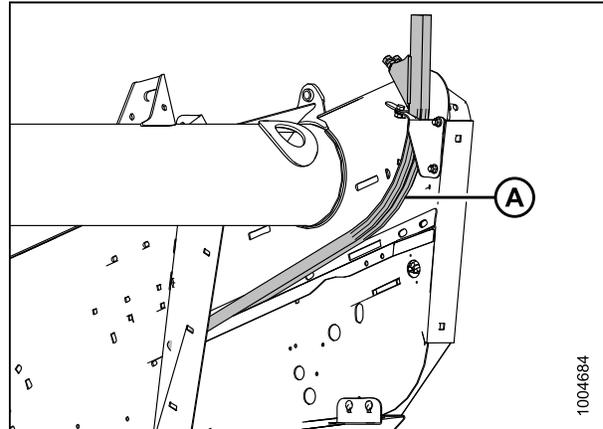


Figure 3.52: Right Side Endsheet

2. Position crop divider rod (B) on tip of crop divider as shown and tighten bolt (A).
3. Repeat procedure at opposite end of header.

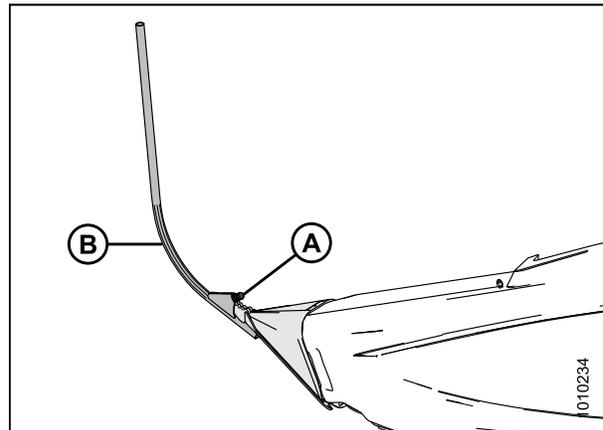


Figure 3.53: Divider Rod on Crop Divider

3.8 Delivery Opening

The width and location of the delivery opening affects the width and configuration of the windrow.

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

- Windrower pick-up capability
- Type and yield of crop
- Weather conditions (rain, humidity, wind, etc.)
- Available drying time

Refer to [3.10 Windrow Types, page 68](#) for the pros and cons of various windrow configurations with respect to these factors, and also refer to [3.9 Double Windrowing, page 67](#).

3.8.1 Adjusting Delivery Opening on Header

Both decks can be moved manually to adjust the delivery opening between 67-1/8 – 76-11/16 in. (1720–1950 mm).

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

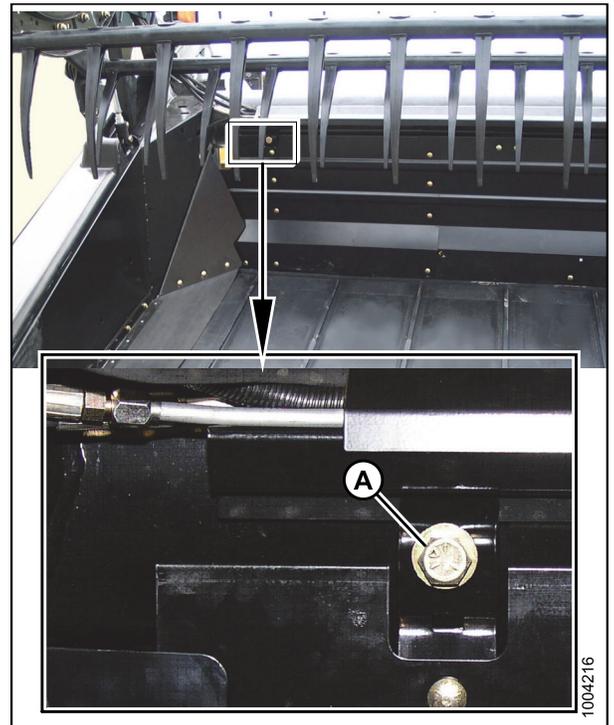


Figure 3.54: Manual Deck Shift

3.8.2 Adjusting Delivery Opening on Header using Hydraulic Deck Shift

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

Adjusting Inboard Deck Shift Stop

1. Remove two 1/4 in. hex head bolts (A) and nuts.
2. Slide stop (B) outboard to decrease the maximum opening size, or slide stop inboard to increase the maximum opening size.

CAUTION

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

3. Install two 1/4 in. hex head bolts (A) and nuts and tighten.

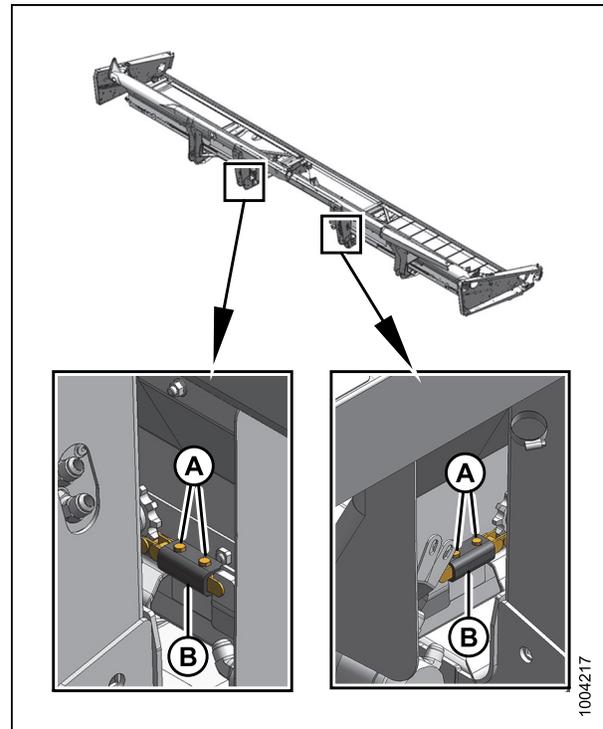


Figure 3.55: Inboard Hydraulic Deck Shift Stops

Adjusting Outboard Deck Shift Stop

4. Remove two 1/4 in. hex head bolts (A) and nuts.
5. To prevent decks from contacting each other, slide stop (B) inboard to move decks away from each other, or outboard to move decks closer to each other.
6. Install two 1/4 in. hex head bolts (A) and nuts and tighten.

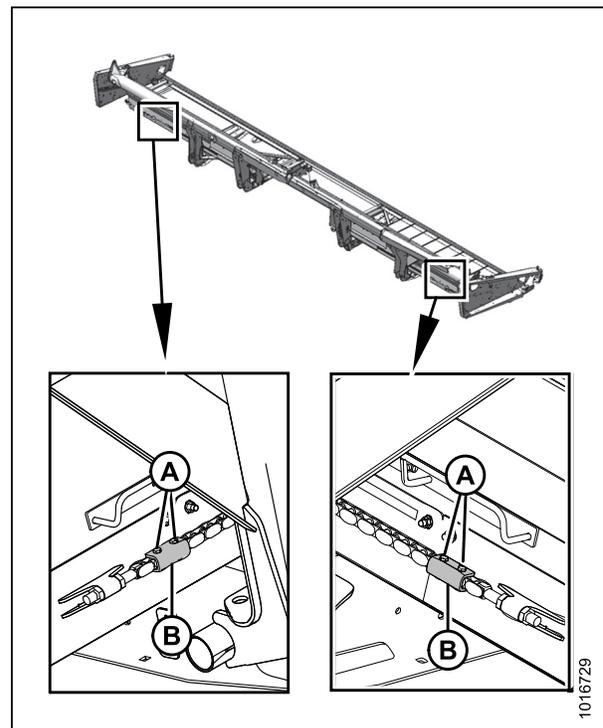


Figure 3.56: Inboard Hydraulic Deck Shift Stops

3.9 Double Windrowing

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

Double windrowing is performed using the D1 XL-Series Draper Header's deck shifting ability.

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 67.

3.9.1 Shifting Decks Hydraulically

The hydraulic deck shift feature allows the Operator to select center, left, or right delivery from the windrower cab. It is available only on 30- and 35-foot headers.

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

Laying a Double Windrow

1. Use the deck shift control in the windrower to position decks at the left end of header and deliver crop from right end (A), or shift the decks to the right end of the header and deliver crop from left end (B).

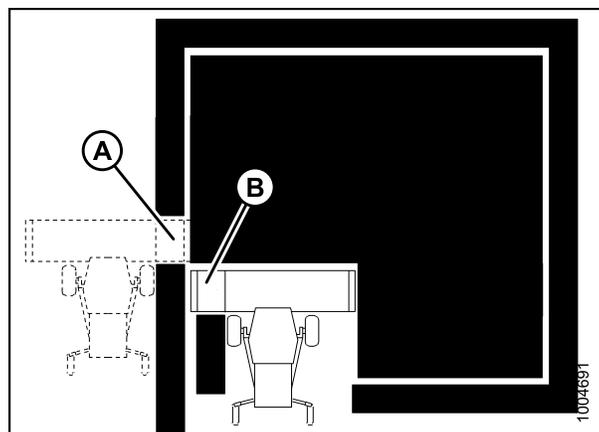


Figure 3.57: Left and Right End Crop Delivery

NOTE:

Raise transport or stabilizer system wheels on 30-foot headers to avoid interference with windrow.

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

NOTE:

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

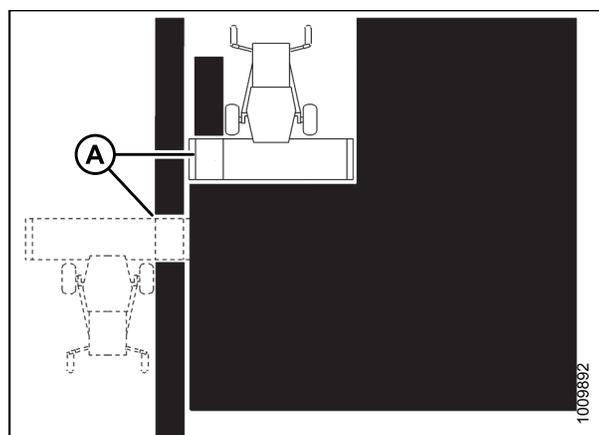


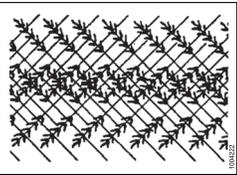
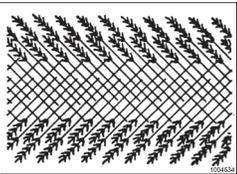
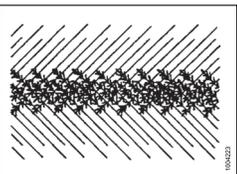
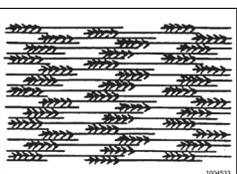
Figure 3.58: Double Windrowing

3.10 Windrow Types

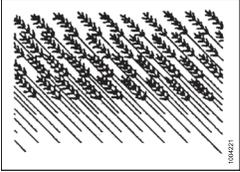
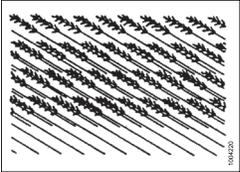
The following criteria determine windrow quality:

- **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 Types

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

OPERATION

Windrow Type	Description	Weight Distribution	Curing	Weatherability	Machine Setting Guidelines
<p>45° Diagonal</p> 	<p>The stalks are lined along one edge and heads are lined along opposite edge, 45° to windrow perpendicular. This windrow can be formed by end deliver or by center delivery if the crop is leaning to one side.</p>	<p>Poor</p>	<p>Fair</p>	<p>Poor</p>	<ul style="list-style-type: none"> • Low reel speed • Less aggressive tine pitch • End deliver or center delivery if crop is leaning
<p>75° Diagonal</p> 	<p>The stalks are closer to parallel than the 45° windrow. Stalk tips are lined along one edge with heads opposite, 75° to windrow perpendicular. This windrow can be formed by end deliver or by center delivery if the crop is leaning to one side.</p>	<p>Fair</p>	<p>Good</p>	<p>Fair</p>	<ul style="list-style-type: none"> • Low reel speed • Less aggressive tine pitch • End deliver or center delivery if crop is leaning

3.11 Haying Tips

3.11.1 Curing

Curing crops quickly helps maintain the highest quality because for each day that hay lies on the ground, 5% of the protein is lost.

Leaving the windrow as wide and fluffy as possible results in the quickest curing. Cured hay should be baled as soon as possible.

3.11.2 Topsoil Moisture

Table 3.8 Topsoil Moisture Levels

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

- 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.
- 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.
- Cut hay will dry only to the moisture level of the ground beneath it, 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 do north sloping fields. If hay is baled and chopped, consider baling the south facing fields and chopping those facing north.
- When relative humidity is high, the evaporation rate is low and hay dries slowly.
- If there is no wind, saturated air becomes trapped around the windrow. Raking or tedding will expose the hay to fresh, less saturated air.
- Cut hay perpendicular to the direction of the prevailing winds if possible.

3.11.4 Windrow Characteristics

Producing windrows with the recommended characteristics will achieve the greatest results. Refer to [3.7 Header Operating Variables, page 45](#) for instructions on adjusting the header.

OPERATION

Table 3.9 Recommended Windrow Characteristics

Characteristic	Advantage
High and fluffy	Enables airflow through windrow which is more important to the curing process than direct sunlight
Consistent formation (not bunching)	Permits an even flow of material into the baler, chopper, etc.
Even distribution of material across windrow	Results in even and consistent bales to minimize handling and stacking problems
Properly conditioned	Prevents excessive leaf damage

3.11.5 Driving on Windrow

Driving on previously cut windrows that will not be raked can lengthen drying time by a full day. If practical, set forming shields to produce a narrower windrow that the machine can straddle.

NOTE:

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

3.11.6 Raking and Tedding

Raking or tedding speeds up drying; however, the resulting leaf loss may outweigh the benefits. 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 moisture levels reach 40–50%. Hay should not be raked or tilled at moisture levels below 25%, however, or excessive yield loss will result.

3.11.7 Using Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces and enabling water to escape and evaporate faster. However, treated hay lying on wet ground will absorb ground moisture faster.

Before deciding to use a drying agent, carefully compare the relative costs and benefits for your area.

3.12 Levelling the Header

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

NOTE:

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

If the header is not level, check the pressure of the windrower's tires to ensure proper inflation (refer to your windrower operator's manual).

If the windrower's tires are properly inflated and the header is still not level, adjust the windrower linkages as required (refer to the appropriate section in the windrower operator's manual).

3.13 Unplugging the Cutterbar

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

Wear heavy gloves when working around or handling knives.

CAUTION

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

1. Stop the forward movement of the machine and disengage the header drives.
2. Raise the header to prevent it from filling with dirt, and engage the header drive clutch.
3. Disengage the header drive clutch and fully raise the header if plug does **NOT** clear.
4. Shut off the engine, remove the key from the ignition, and engage the park brake.
5. Engage the header safety props.
6. Clean off the cutterbar by hand.

NOTE:

If cutterbar plugging persists, refer to [8 Troubleshooting, page 227](#).

3.14 Upper Cross Auger (UCA)

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

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

IMPORTANT:

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

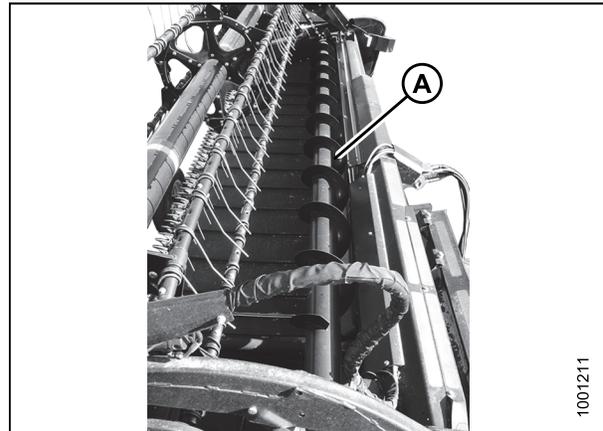


Figure 3.59: Upper Cross Auger

3.14.1 Removing Beater Bars

Beater bars are standard on 45-foot header 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.

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.

IMPORTANT:

Lift reel and engage safety props if working on double reel header.

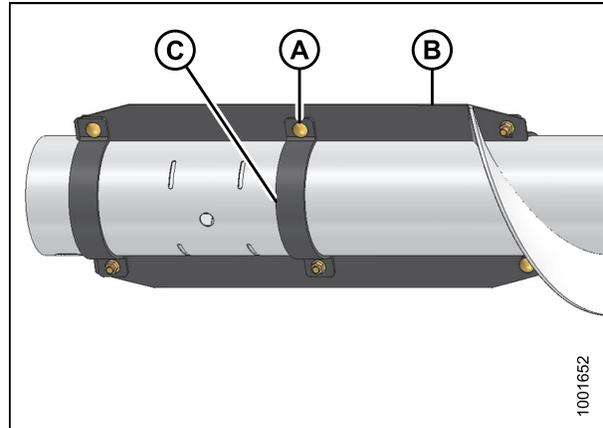


Figure 3.60: Beater Bars

3.14.2 Installing Beater Bars

Beater bars are standard on 45-foot header 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.

OPERATION

1. Lower the header to the ground, stop the engine, and remove the key from the ignition.

IMPORTANT:

Lift reel and engage safety props if working on double reel header.

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.

NOTE:

To avoid contacting the reel, position beater bars outboard as far as possible.

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 (D) in clamp sets (C) and secure with carriage bolts (D) and nuts.
5. Tighten bolts.

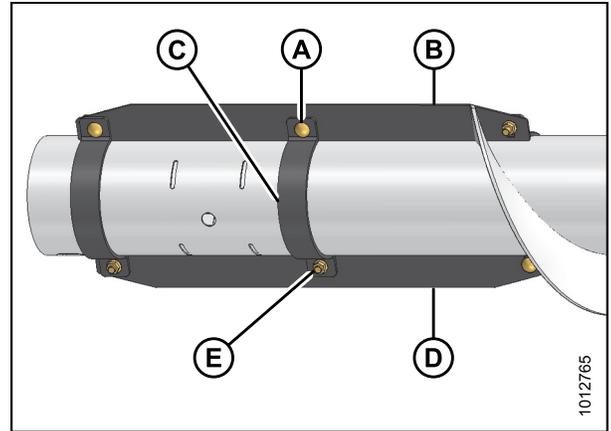


Figure 3.61: Beater Bars

3.15 Transporting Header

WARNING

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

3.15.1 Transporting Header on Windrower

CAUTION

- Check local laws for width regulations and lighting or marking requirements before transporting on roads.
- Follow all recommended procedures in your windrower operator's manual for transporting, towing, etc.
- Disengage header drive clutch when travelling to and from the field.
- Before driving windrower on a roadway, be sure flashing amber lamps, red tail lamps, and head lamps are clean and working properly. Pivot amber lamps for best visibility by approaching traffic. Always use lamps when travelling 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 signs and reflectors, adjust rear view mirrors, and clean windows.
- Lower the reel fully and raise the 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 to provide maximum stability if forward momentum is stopped for any reason. Raise header completely at bottom of grade to avoid contacting the ground.
- Travel at safe speeds to ensure complete machine control and stability 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 windrower operator's manual for instructions.

OPERATION

Attaching Header to Towing Vehicle

CAUTION

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

- Weight of towing vehicle must exceed header weight to ensure adequate control and braking performance.
- Do NOT tow with any highway-capable vehicle. Use only an agricultural tractor, agricultural combine, or a properly configured MacDon windrower.
- Ensure reel is fully lowered and back on support arms to increase header stability during transport. For headers with hydraulic reel fore-aft, never connect the fore-aft couplers to each other or the circuit will be complete and the reel could creep forward during transport.
- Check that all pins are properly secured in transport position at wheel supports, cutterbar support, and hitch.
- Check tire condition and pressure prior to transporting.
- Connect hitch to towing vehicle using a proper hitch pin with a spring locking pin or other suitable fastener.
- Attach hitch safety chain to towing vehicle. Adjust safety chain length to provide only enough slack to permit turning.
- Connect header 7-pole plug wiring harness to mating receptacle on towing vehicle. (The 7-pole receptacle is available from your MacDon Dealer parts department).
- Ensure lights are functioning properly and clean the slow moving vehicle sign and other reflectors. Use flashing warning lights unless prohibited by law.

Towing the Header

CAUTION

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

- Do NOT exceed 25 mph (40 km/h). Reduce transport speed to less than 5 mph (8 km/h) for corners and slippery or rough conditions.
- Turn corners at only very low speeds (5 mph [8km/h] or less). Header stability is reduced while cornering because front wheel moves to the left.
- Do NOT accelerate when making or coming out of a turn.
- Obey all highway traffic regulations in your area when transporting on public roads. Use flashing amber lights unless prohibited by law.

OPERATION

3.15.3 Converting from Transport to Field Position

Removing Tow-Bar

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

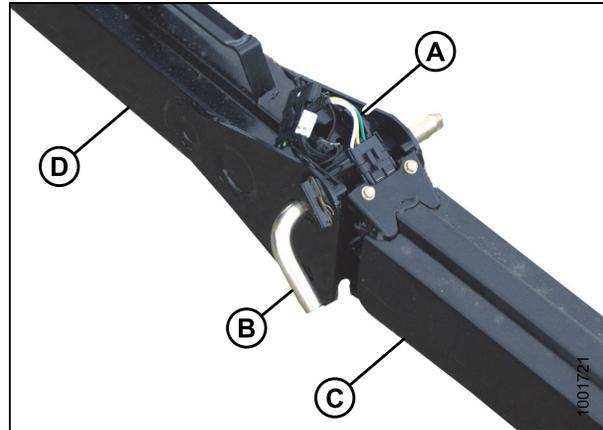


Figure 3.62: Tow-Bar Assembly

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



Figure 3.63: Wiring Connector

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

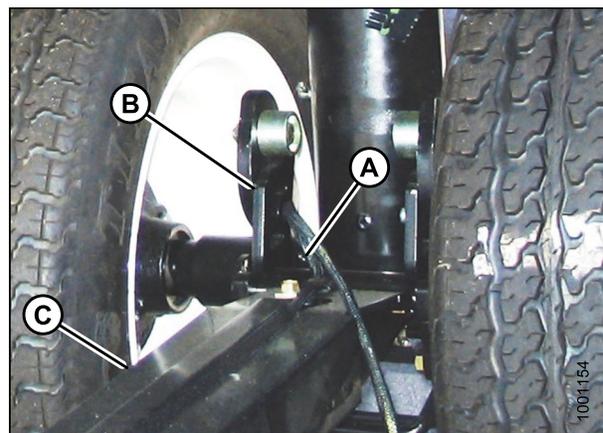


Figure 3.64: Tow-Bar Latch

OPERATION

Storing the Tow-Bar

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

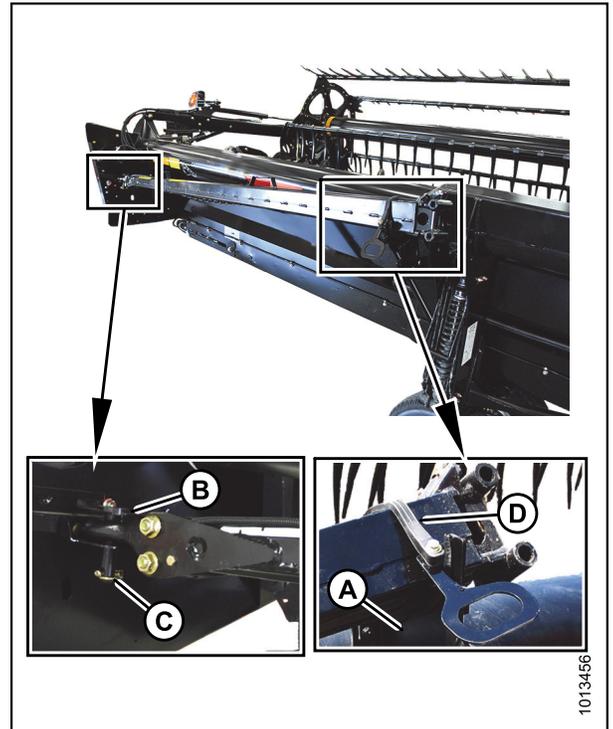


Figure 3.65: Tow-Bar Storage – Left Side

4. Place the inner end of the outer half of the tow-bar into the cradle (A) on the right side of the header backtube.
5. Secure the tube end of the tow-bar in support (B) on the endsheet using hitch pin (C). Secure with hairpin.
6. Install the rubber strap (D) on the cradle (A).

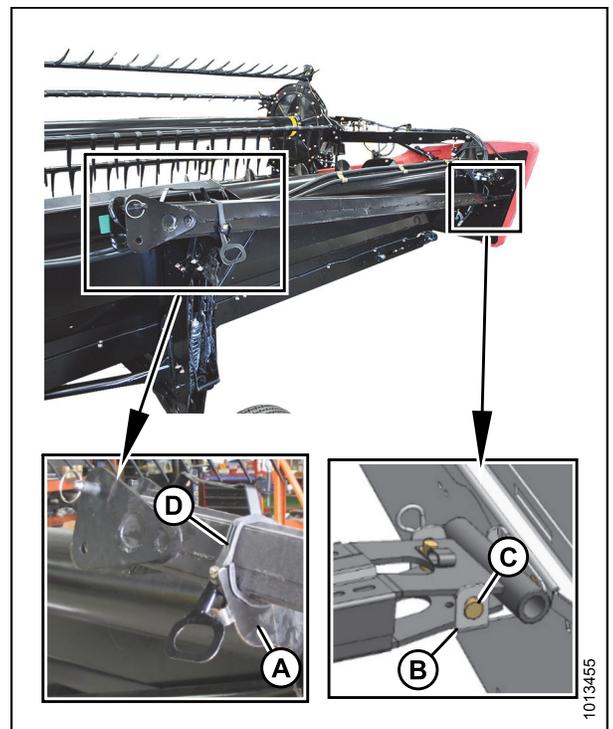


Figure 3.66: Tow-Bar Storage – Right Side

OPERATION

7. At the **right end of the 35- and 40-ft. header:**
 - a. Place the inner end of the inner half of the tow-bar in cradle (A) on header backtube.
 - b. Secure tube end in support (B) with clevis pin (C). Secure with hairpin.
 - c. Install rubber strap (D) on cradle (A).

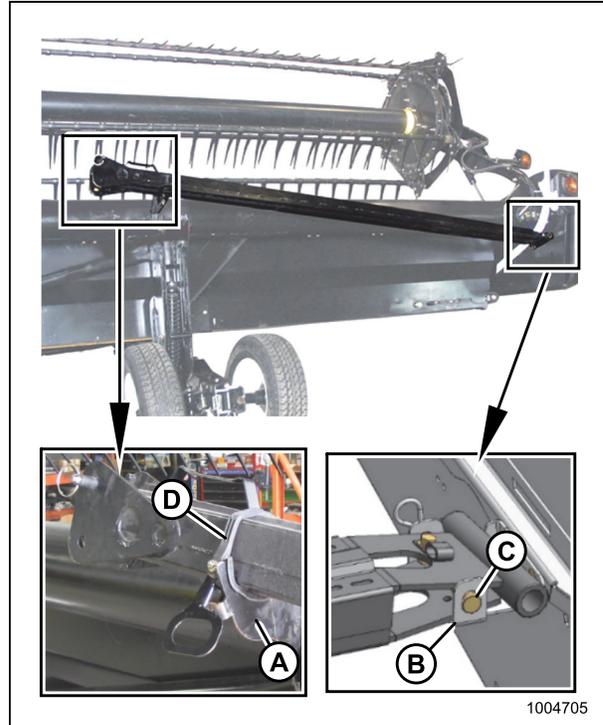


Figure 3.67: 35- and 40-ft. Header

8. At the **right end of the 30-ft. header:**
 - a. Place the inner end of the inner half of the tow-bar in cradle (A) on header backtube.
 - b. Secure tube end in support (B) with pin (C).
 - c. Install rubber strap on cradle (A).

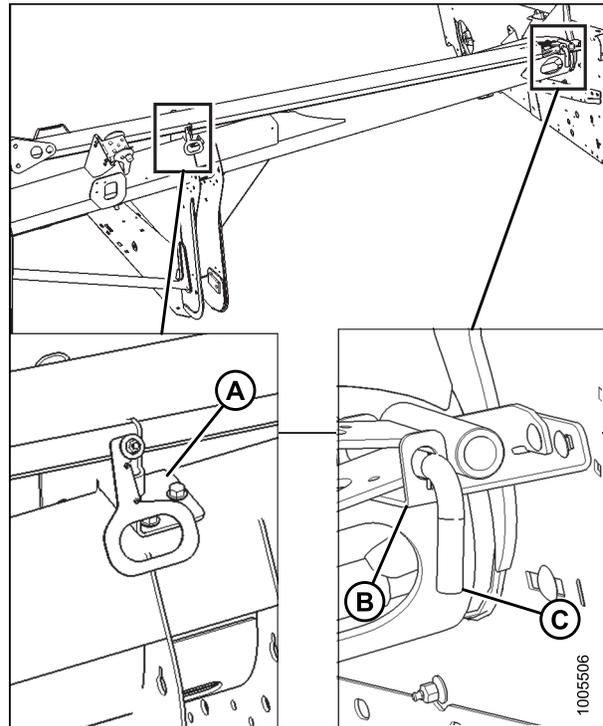


Figure 3.68: 30-ft. Header

OPERATION

9. 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.

10. Place the transport wheels into field position. Refer to the following:
 - *Moving Front (Left) Wheels into Field Position, page 81*
 - *Moving Rear (Right) Wheels into Field Position, page 82*

Moving Front (Left) Wheels into Field Position

DANGER

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

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

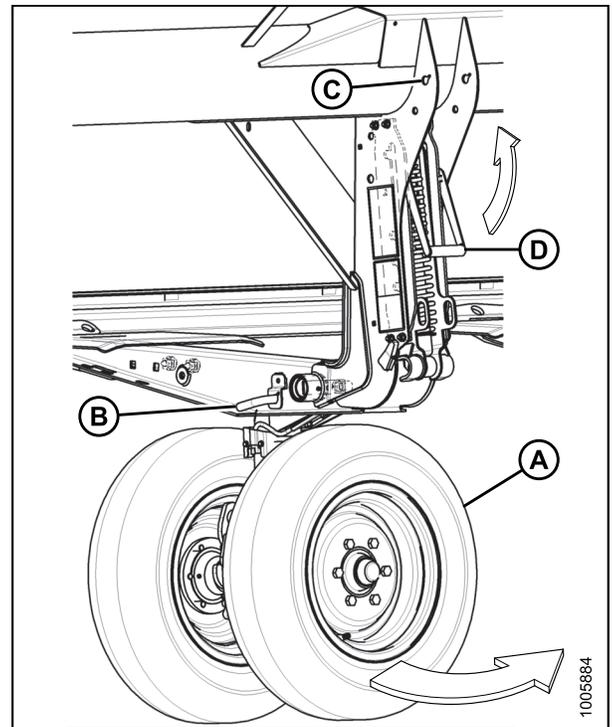


Figure 3.69: Front (Left) Wheels

OPERATION

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

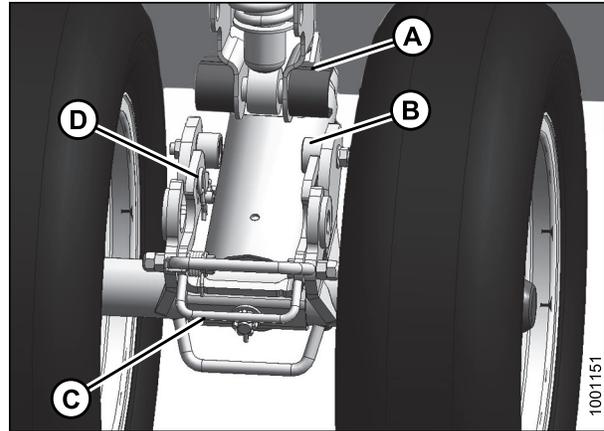


Figure 3.70: Front (Left) Wheels

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

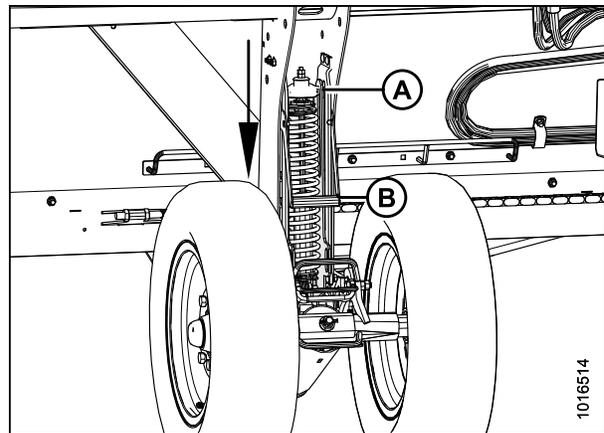


Figure 3.71: Front (Left) Wheels

Moving Rear (Right) Wheels into Field Position

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

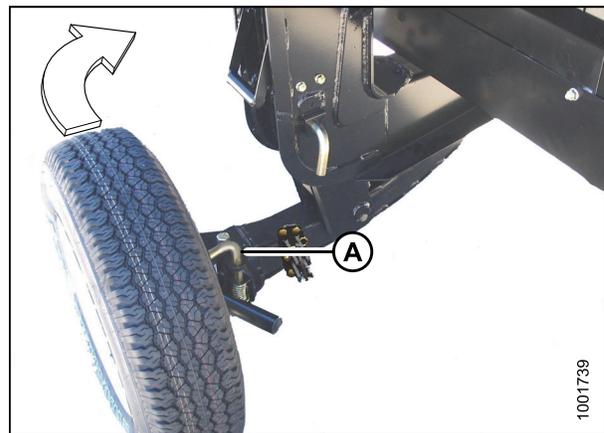


Figure 3.72: Rear Wheel - Left Side

OPERATION

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

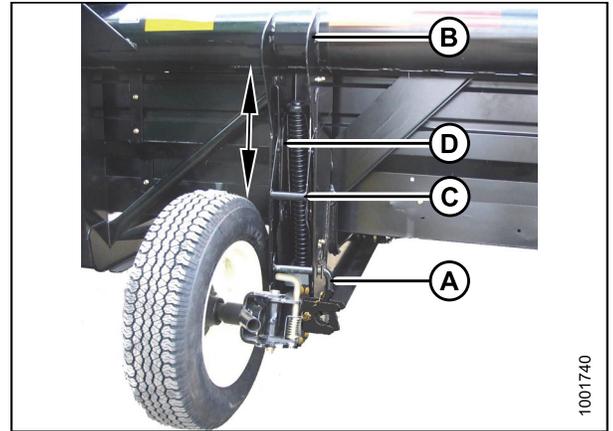


Figure 3.73: Rear Wheel – Left Side

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

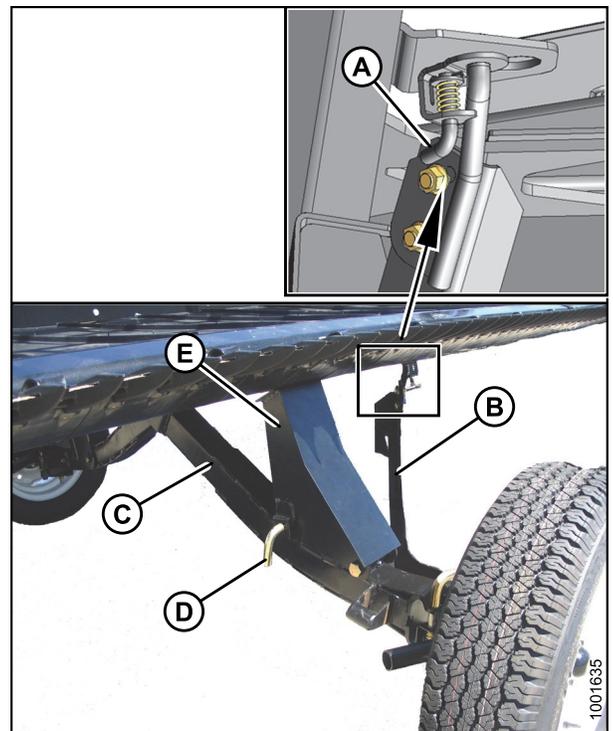


Figure 3.74: Right Rear Axle

OPERATION

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

NOTE:

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

IMPORTANT:

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

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

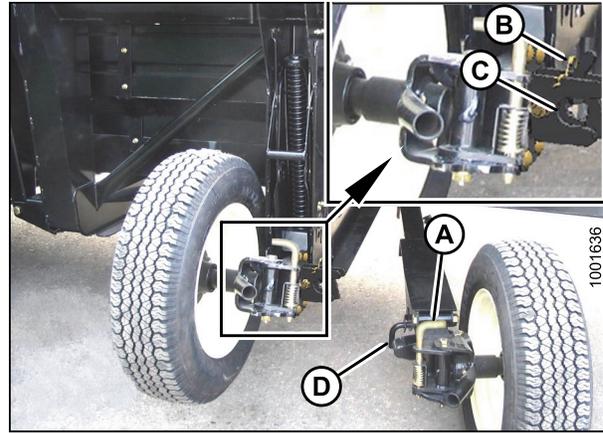


Figure 3.75: Rear Axles

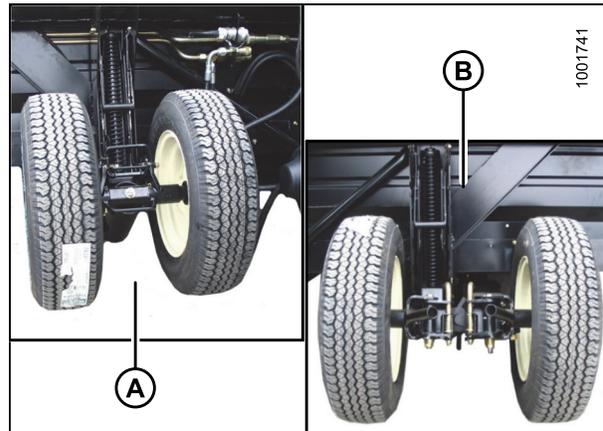


Figure 3.76: Field Position

3.15.4 Converting from Field to Transport Position

Moving Front (Left) Wheels into Transport Position

⚠ DANGER

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

⚠ CAUTION

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

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

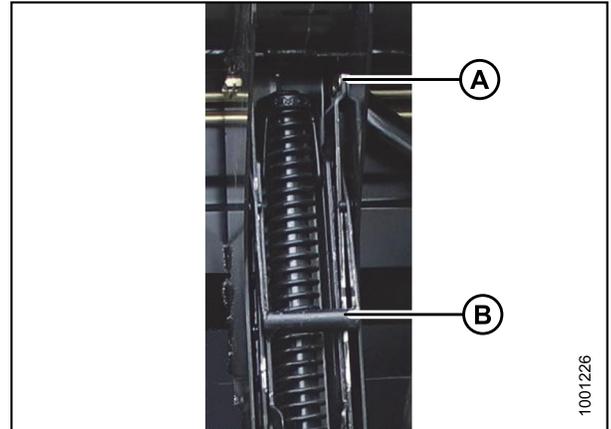


Figure 3.77: Suspension Linkage

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

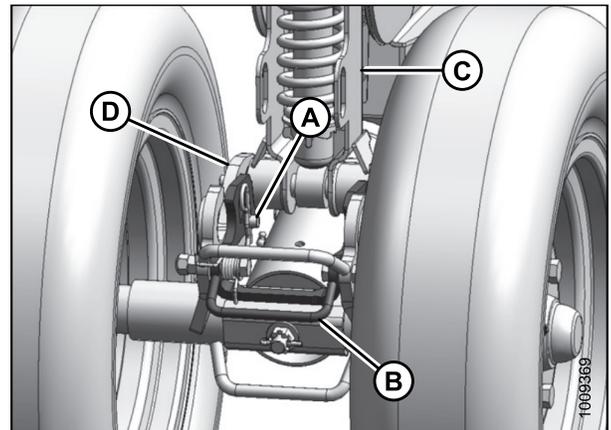


Figure 3.78: Left Front Wheels

6. Lower the handle (B) to lock.

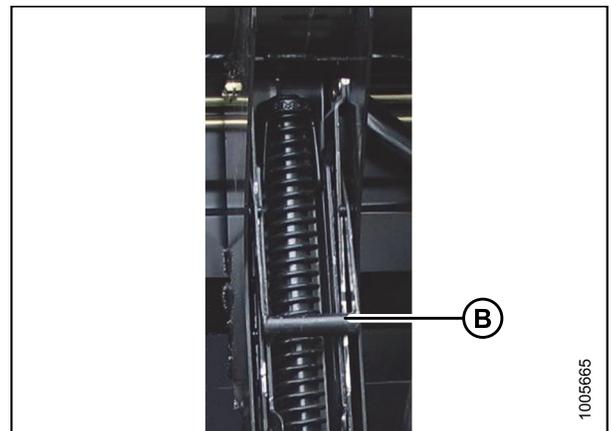


Figure 3.79: Suspension Linkage

OPERATION

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

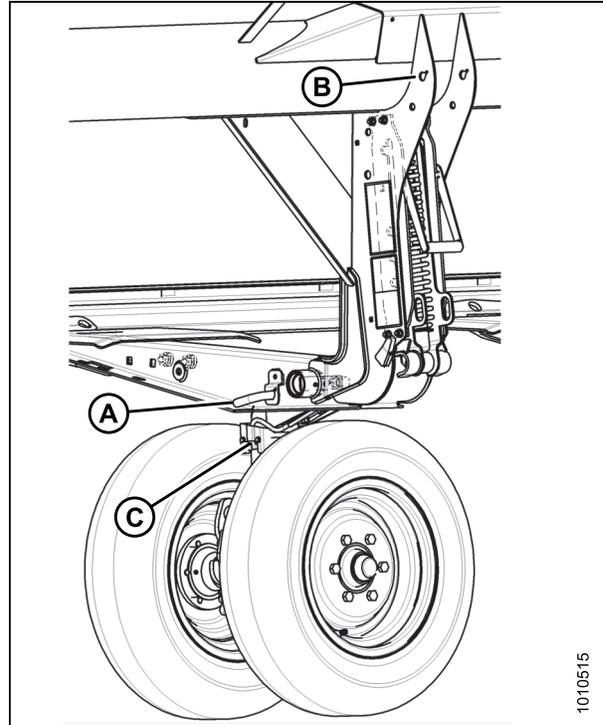


Figure 3.80: Left Front Wheels

Moving Rear (Right) Wheels into Transport Position

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

CAUTION

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

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

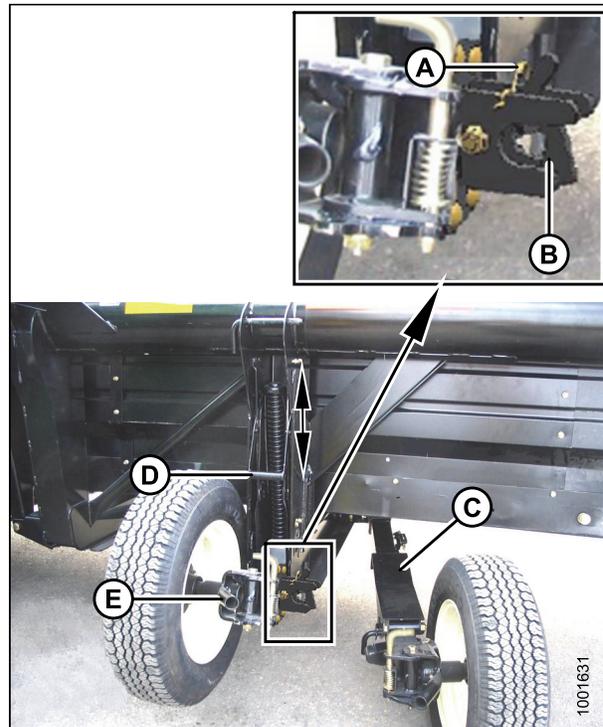


Figure 3.81: Separating Axles

OPERATION

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

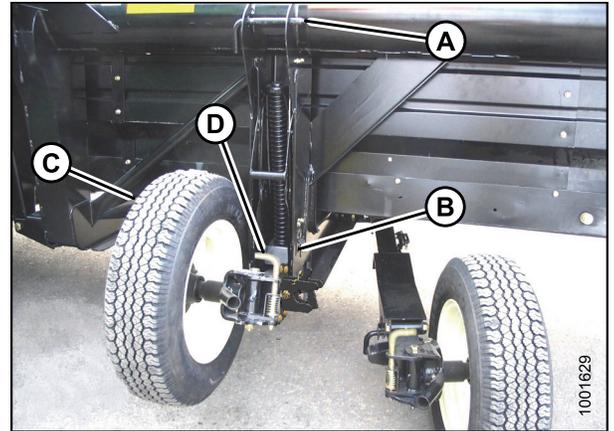


Figure 3.82: Wheel Position

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



Figure 3.83: Left Wheel in Transport Position

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

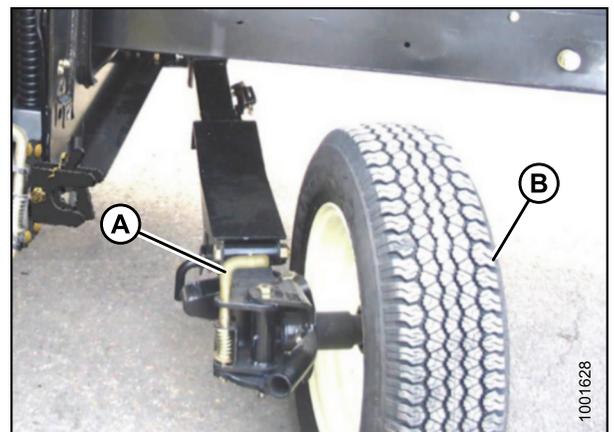


Figure 3.84: Right Rear Wheel

OPERATION

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

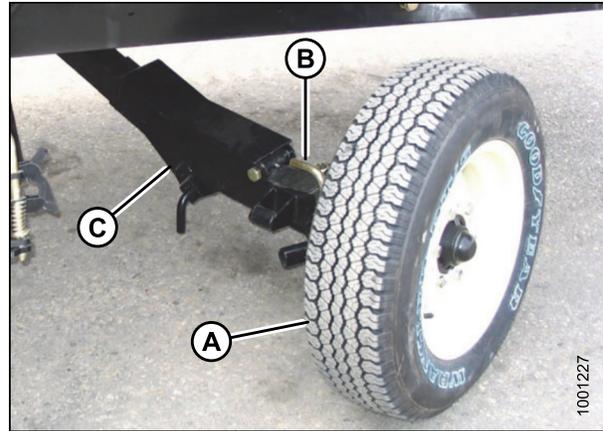


Figure 3.85: Right Rear Wheel

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

IMPORTANT:

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

12. Swing the brace (C) into the position shown and insert the brace into the slot (D) behind the cutterbar. Position the brace so that pin (E) engages the hole in the bracket (F). The right hand wheel is now in transport position.
13. Disengage the header cylinder lift stops.
14. Detach the header's hydraulic and electrical connections from the windrower. Refer to [4 Header Attachment/Detachment, page 93](#).
15. Start the windrower and lower the header to the ground.

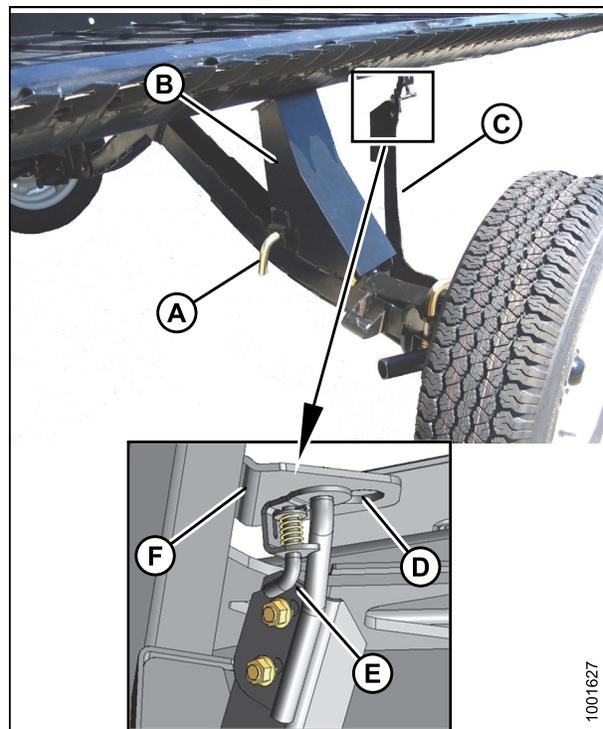


Figure 3.86: Right Rear Wheel Position

OPERATION

Attaching Tow-Bar

The tow-bar consists of two sections making for easier storage and handling.

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

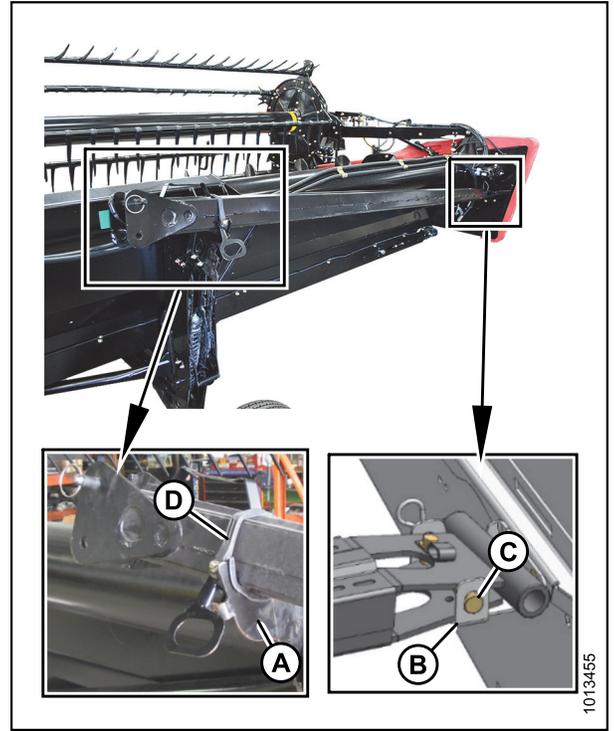


Figure 3.87: Tow-Bar Removal – Right Side

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

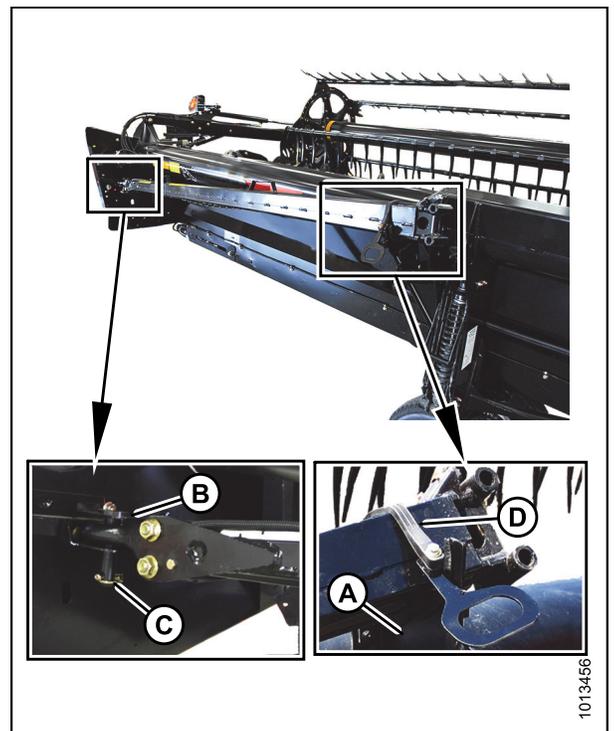


Figure 3.88: Tow-Bar Removal – Left Side

OPERATION

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

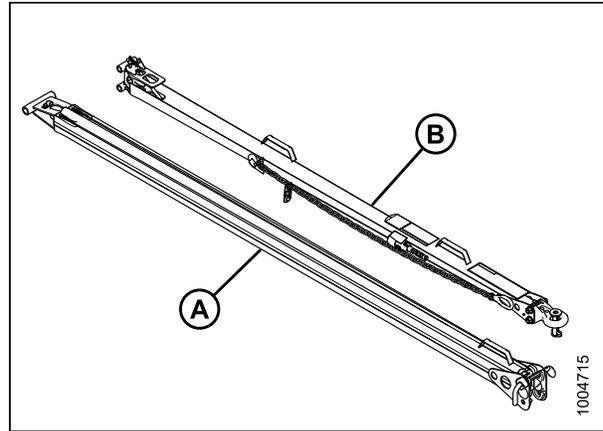


Figure 3.89: Tow-Bar Assembly

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

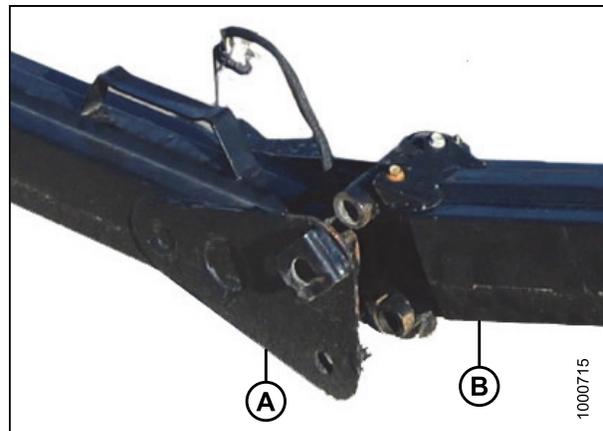


Figure 3.90: Tow-Bar Assembly

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

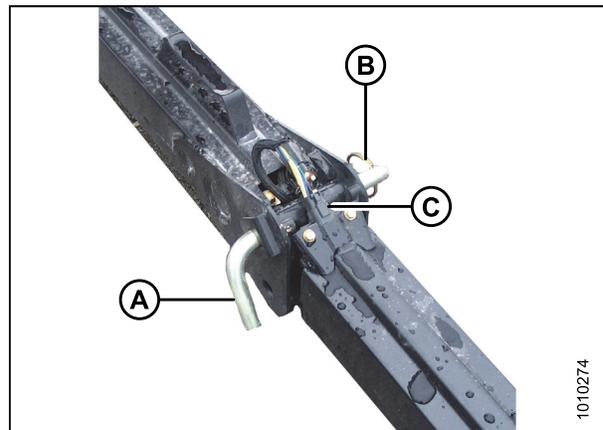


Figure 3.91: Tow-Bar Assembly

OPERATION

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

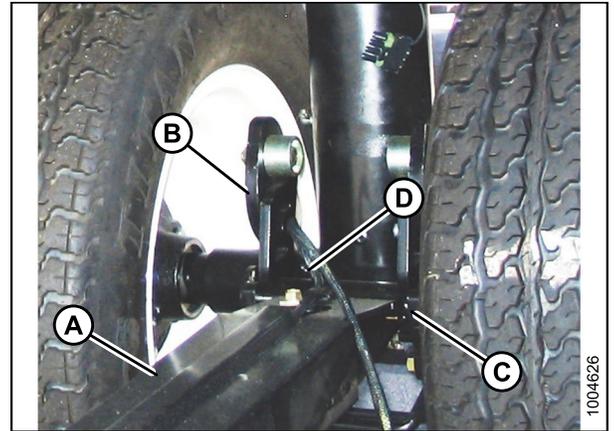


Figure 3.92: Attaching Tow-Bar

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

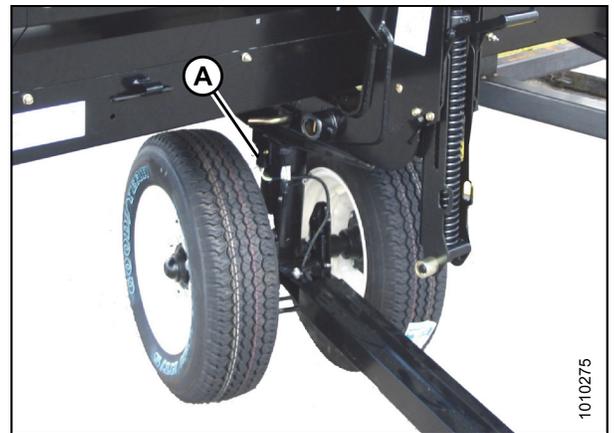


Figure 3.93: Harness Connection

4 Header Attachment/Detachment

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

4.1 Attaching Header to M1170/M1240 Self-Propelled Windrower

NOTE:

Attaching the D1 XL-Series header to an M1170 or M1240 windrower requires the installation of the hydraulic hose management arm onto the header (see your MacDon Dealer). Refer to your windrower operator's manual for procedures to mechanically attach the header to the self-propelled windrower.

1. Swing the left side windrower platform backwards.
Refer to windrower operator's manual.

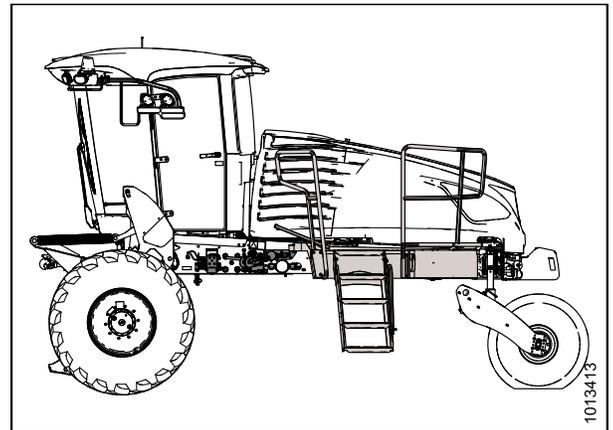


Figure 4.1: Left Side Windrower Platform

2. Pull handle (A) to move the hydraulic hose management arm rearwards and disengage the left-hand ball stud (B) from the ball stud support (C) on the knife coupler cover.

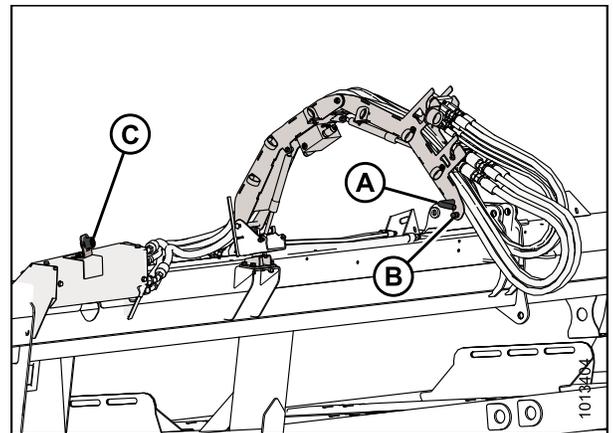


Figure 4.2: Hydraulic Hose Management Arm

HEADER ATTACHMENT/DETACHMENT

3. Connect the hydraulic hose management arm (A) to the left-hand outer leg of the windrower by pushing the right-hand ball stud (B) into the ball stud latch (C).

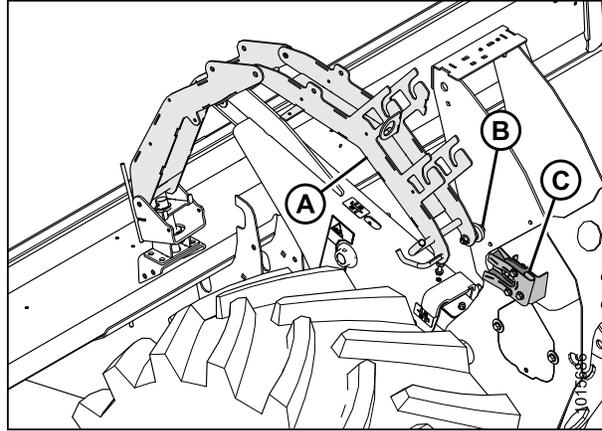


Figure 4.3: Windrower Left-Hand Outer Leg

4. Check connectors and ensure they are clean before connecting hydraulics and electrical harnesses.
5. Retrieve draper drive and reel control multicoupler (A) from hose management arm.
6. Push knob (B) on hydraulic receptacle and pull handle (C) fully away from windrower.
7. Open cover (D) and position coupler onto receptacle. Align pins in coupler with slots in handle (C) and push handle toward windrower so that coupler is locked onto receptacle and knob (B) snaps out.
8. Remove cover from electrical connector (E), push electrical connector onto receptacles, and secure by turning collar on electrical connector clockwise.
9. Retrieve knife and reel drive multicoupler (A) from hose management arm.
10. Push knob (B) on hydraulic receptacle and pull handle (C) fully away from windrower.
11. Open cover (D) and position coupler onto receptacle. Align pins in coupler with slots in handle (C) and push handle toward windrower so that coupler is locked onto receptacle and knob (B) snaps out.

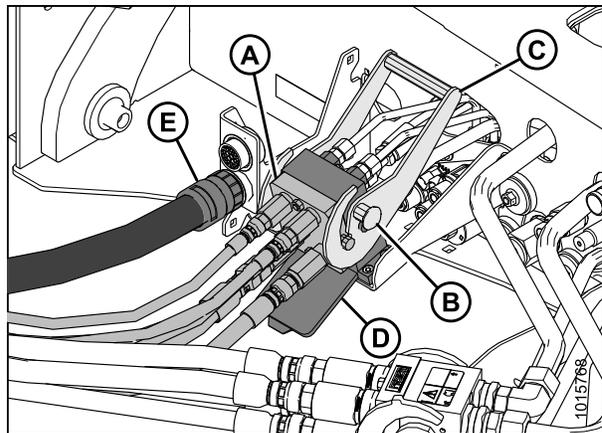


Figure 4.4: Draper/Reel Multicoupler

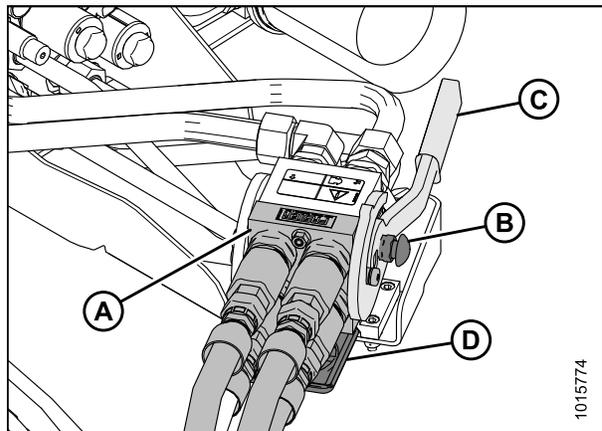


Figure 4.5: Knife/Reel Drive Multicoupler

HEADER ATTACHMENT/DETACHMENT

12. Swing the left side windrower platform forwards. Refer to windrower operator's manual.

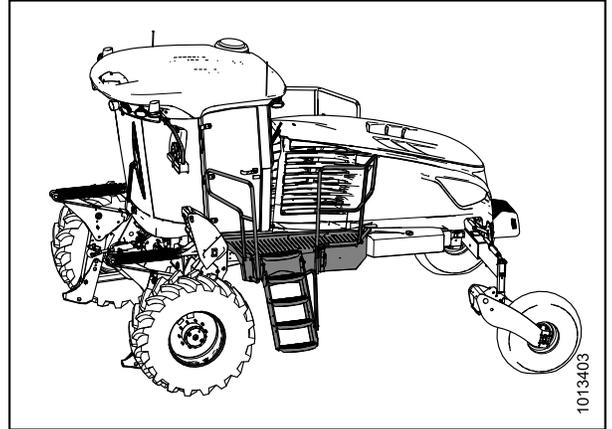


Figure 4.6: Left Side Windrower Platform

13. Ensure hydraulic hose routing is as straight as possible and avoids potential rub/wear points.

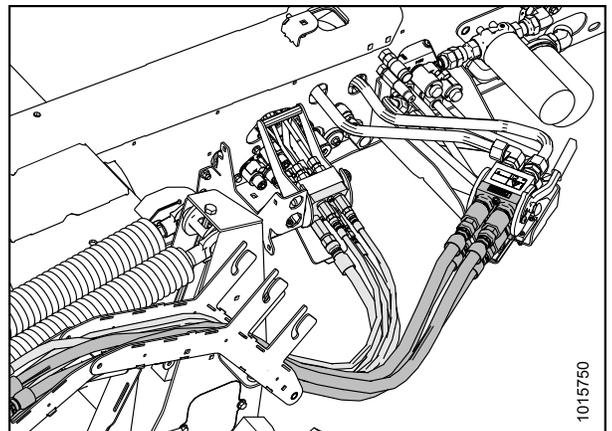


Figure 4.7: Hydraulic Multicouplers and Hose Routing

4.2 Detaching Header from M1170/M1240 Windrower

1. Lower the reel fully.
2. Swing the left side windrower platform backwards. Refer to windrower operator's manual.

NOTE:

Firmly hold handle (C) when disconnecting the multicoupler (A). Pressure may cause the handle to kick back with force.

3. Push lock button (B) and pull handle (C) to disengage multicoupler (A) and disconnect the hydraulics from the windrower knife/reel drive receptacle.
4. Remove any debris that may have accumulated on the receptacle, and close the cover (D).
5. Route hose bundle with multicoupler (A) back to the storage position on the hydraulic hose management arm.
6. Push lock button (B), and pull handle (C) to disengage multicoupler (A) and disconnect the hydraulics from the windrower draper/reel receptacle.
7. Remove any debris that may have accumulated on the windrower front receptacle, and close cover (D).
8. Disconnect electrical connector (E).
9. Route hose bundle with multicoupler back to the storage position on the hydraulic hose management arm.

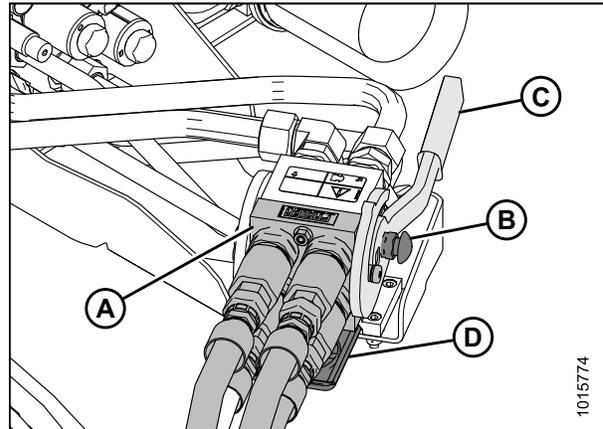


Figure 4.8: Knife/Reel Drive Multicoupler

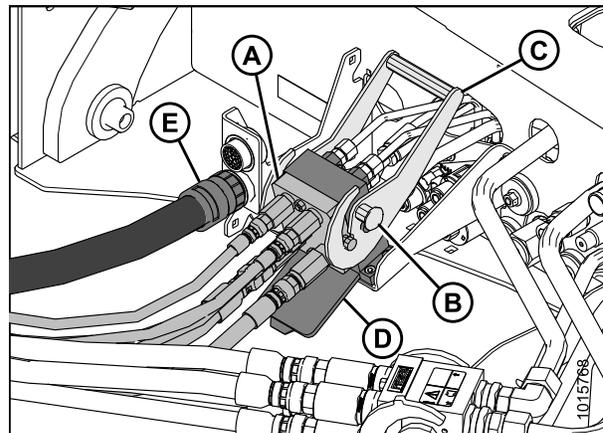


Figure 4.9: Draper/Reel Multicoupler

10. Disconnect the hydraulic hose management arm (A) from the left-hand outer leg of the windrower by pulling ball stud latch handle (C) to disengage the ball stud (B) from the support.

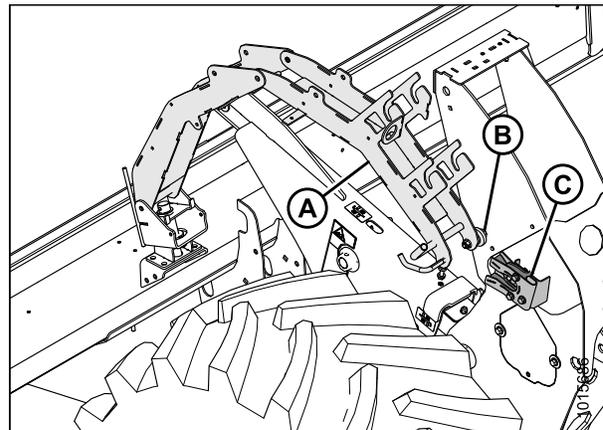


Figure 4.10: Windrower Left-Hand Outer Leg

HEADER ATTACHMENT/DETACHMENT

11. Pull handle (A) to move the hydraulic hose management arm forward, and engage the left-hand ball stud (B) into the ball stud support (C) on the knife coupler cover.

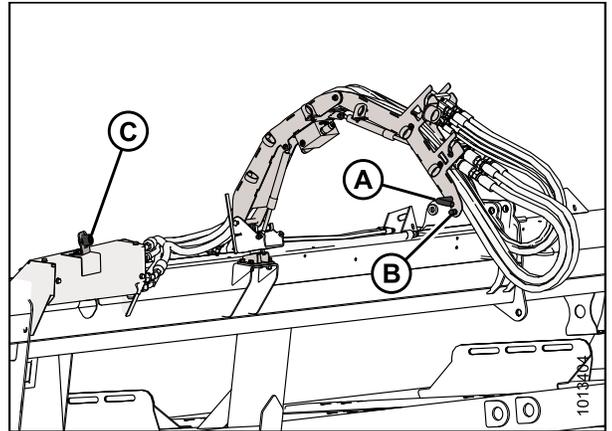


Figure 4.11: Hydraulic Hose Management Arm

12. Swing the left side windrower platform forwards. Refer to windrower operator's manual.
13. Detach header from windrower. Refer to the windrower operator's manual.

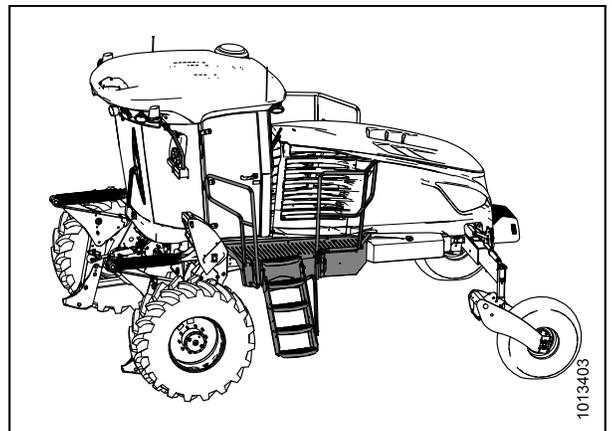


Figure 4.12: Left Side Windrower Platform

5 Maintenance and Servicing

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

Log hours of operation and use the maintenance record provided (refer to) to keep track of your scheduled maintenance.

5.1 Preparing Machine for Servicing

DANGER

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

CAUTION

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

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

5.2 Maintenance Specifications

5.2.1 Recommended Fluids and Lubricants

Ensure your machine operates at top efficiency by using clean fluids and lubricants only.

- Use clean containers to handle all fluids and lubricants.
- Store fluids and lubricants in an area protected from dust, moisture, and other contaminants.

Table 5.1 Recommended Fluids and Lubricants

Lubricant	Specification	Description	Use	Capacities
Grease	SAE multi-purpose	High temperature extreme pressure (EP) performance with 1% max. Molybdenum Disulphide (NLGI Grade 2) lithium base	As required unless otherwise specified	—
Gear lubricant	SAE 85W-140	API service class GL-5	Knife drive box	2.3 quarts (2.2 liters)

5.2.2 Installing a Roller Chain

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

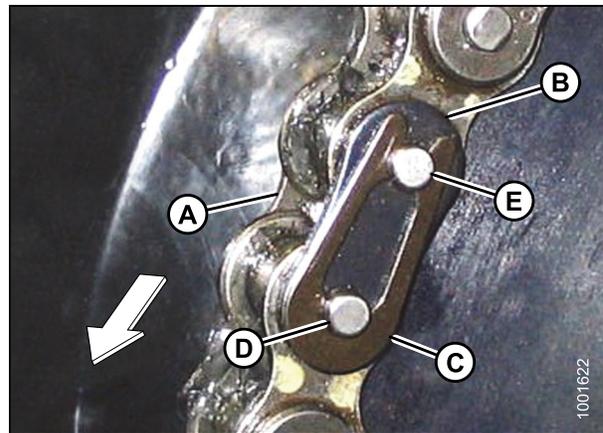


Figure 5.1: Chain

5.2.3 Installing a Sealed Bearing

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

NOTE:

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

3. Install, but do not tighten, the flangette bolts (E).
4. Position the shaft correctly, and lock the lock collar with a punch. Lock the collar in the same direction the shaft rotates, and tighten the setscrew in the collar.
5. Tighten the flangette bolts (E).
6. Loosen the flangette bolts on the mating bearing one turn and then retighten. This will enable the bearing to properly line up.

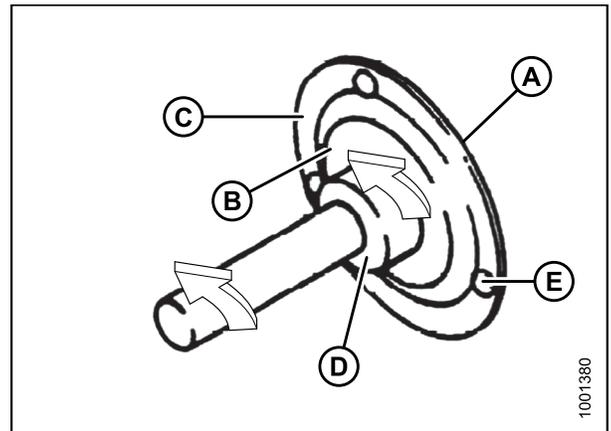


Figure 5.2: Sealed Bearing

5.3 Maintenance Requirements

Periodic maintenance requirements are organized according to service intervals.

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

When servicing the machine, refer to the specific headings in this section and use only fluids and lubricants specified in [5.2.1 Recommended Fluids and Lubricants, page 100](#).

Log hours of operation, use the maintenance record, and keep copies of your maintenance records (refer to [5.3.1 Maintenance Schedule/Record, page 103](#)).

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

MAINTENANCE AND SERVICING

5.3.1 Maintenance Schedule/Record

ACTION:	✓ - Check	◆ - Lubricate	▲ - Change															
Hour Meter Reading																		
Service Date																		
Serviced By																		
FIRST USE			Refer to 5.3.2 Break-In Inspection, page 104															
END OF SEASON			Refer to 5.3.4 End-of-Season Service, page 105															
10 HOURS OR DAILY																		
✓	Hydraulic Hoses and Lines - Refer to 5.3.5 Checking Hydraulic Hoses and Lines, page 106 .	NOTE: MacDon recommends keeping a record of daily maintenance as evidence of a properly maintained machine; however, daily maintenance records are not required to meet normal warranty conditions.																
✓	Knife Sections, Guards, and Hold-Downs - Refer to 5.5 Cutterbar, page 116 .																	
✓	Tire Pressure - Refer to 5.10.3 Checking Tire Pressure, page 213 .																	
◆	Knife (except in sandy conditions) - Refer to 5.5 Cutterbar, page 116 .																	
25 HOURS																		
◆	Knifehead(s) - Refer to 5.5 Cutterbar, page 116 .	NOTE: MacDon recommends keeping a record of daily maintenance as evidence of a properly maintained machine; however, daily maintenance records are not required to meet normal warranty conditions.																
50 HOURS																		
✓	Draper Roller Bearings - Refer to 5.7.6 Header Draper Roller Maintenance, page 163 .																	
▲	Knife Drive Box Lubricant (First 50 Hours Only) - Refer to 5.6.1 Knife Drive Box, page 128 .																	
250 HOURS																		
✓	Draper Seal - Refer to 5.7.2 Installing Drapers, page 155 .																	
◆	Reel Drive U-Joint - Refer to 5.9 Reel Drive, page 198 .																	
◆	Transport Axle Pivot Bushings - Refer to 5.10 Transport System (Optional), page 211 .																	
◆	Upper Cross Auger Center Support and U-Joint - Refer to 3.14 Upper Cross Auger (UCA), page 74 .																	
500 HOURS																		

MAINTENANCE AND SERVICING

✓	Draper Seal - Refer to 5.7.2 Installing Drapers, page 155 .																		
●	Reel Drive U-Joint - Refer to 5.9 Reel Drive, page 198 .																		
●	Stabilizer/Slow Speed Transport Wheel Bearings - Refer to 5.10 Transport System (Optional), page 211 .																		
1000 HOURS																			
▲	Knife Drive Box Lubricant - Refer to 5.6.1 Knife Drive Box, page 128 .																		

5.3.2 Break-In Inspection

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

Inspection Interval	Item	Refer to
5 Hours	Check for loose hardware and tighten to required torque.	9.1 Torque Specifications, page 241
	Check knife drive belts tension (check periodically for first 50 hours).	Tensioning Non-Timed Knife Drive Belts, page 142
10 Hours	Check knife drive box mounting bolts.	Checking Mounting Bolts, page 129
50 Hours	Change knife drive box lubricant.	Changing Oil in Knife Drive Box, page 139

5.3.3 Preseason Servicing

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 [5.3.6 Lubrication and Servicing, page 106](#).
 2. Adjust the tension on the drive belts. Depending on your equipment, refer to [Tensioning Non-Timed Knife Drive Belts, page 142](#) or [Tensioning Timed Knife Drive Belts, page 147](#).

MAINTENANCE AND SERVICING

3. Perform all the annual maintenance. Refer to [5.3.1 Maintenance Schedule/Record, page 103](#).

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 [9.1 Torque Specifications, page 241](#).

5.3.5 Checking Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

WARNING

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

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

IMPORTANT:

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



Figure 5.3: Hydraulic Pressure Hazard

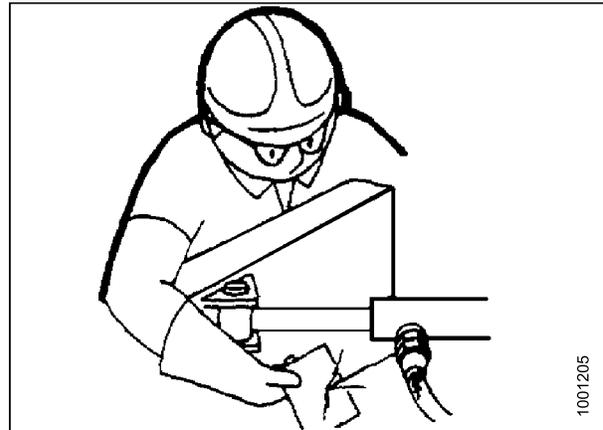


Figure 5.4: Testing for Hydraulic Leaks

5.3.6 Lubrication and Servicing

WARNING

To avoid personal injury, before servicing mower conditioner or opening drive covers, refer to [5.1 Preparing Machine for Servicing, page 99](#).

MAINTENANCE AND SERVICING

Greasing points are marked on the machine by decals showing a grease gun and the grease interval in hours of operation.

Refer to [5.2.1 Recommended Fluids and Lubricants, page 100](#) 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 103](#).

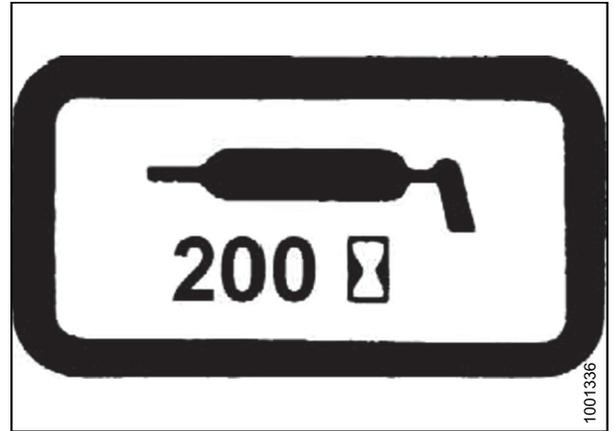


Figure 5.5: Grease Interval Decal

Greasing Procedure

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. Open driveshields at ends of header to access greasing points. Refer to [Opening Endshields, page 31](#).
2. Use only recommended lubricants specified in this manual. Refer to [5.2.1 Recommended Fluids and Lubricants, page 100](#).
3. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
4. Inject grease through fitting with grease gun until grease overflows fitting, except where noted.
5. Leave excess grease on fitting to keep out dirt.
6. Replace any loose or broken fittings immediately.
7. Remove and thoroughly clean any fitting that will not take grease. Also clean lubricant passageway. Replace fitting if necessary.
8. Use clean High Temperature Extreme Pressure grease only.

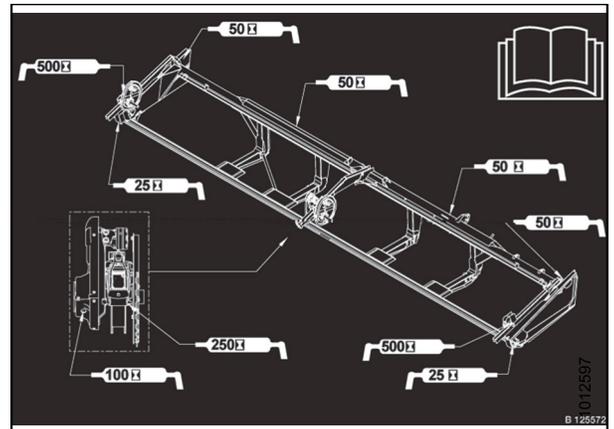


Figure 5.6: Grease Point Location Decal

MAINTENANCE AND SERVICING

Service Intervals

Every 10 Hours

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

Knife: Lubricate the knife every 10 hours or daily, except in sandy conditions.

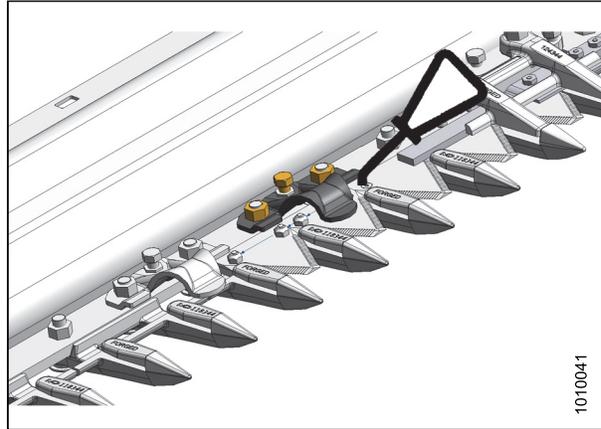


Figure 5.7: Every 10 Hours or Daily

MAINTENANCE AND SERVICING

Every 25 Hours

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

Knifehead: Lubricate the knifehead every 25 hours. Check for signs of excessive heating on the first few guards after greasing. If required, relieve the pressure by pressing the check-ball in the grease fitting.

IMPORTANT:

To prevent binding and/or excessive wear caused by knife pressure on the guards, do **NOT** over-grease the knifehead (A). Apply only one to two pumps using a mechanical grease gun (do **NOT** use an electric grease gun). If more than six to eight pumps of the grease gun are required to fill the cavity, replace the seal in the knifehead. Refer to [5.5.3 Removing Knifehead Bearing](#), page 117.

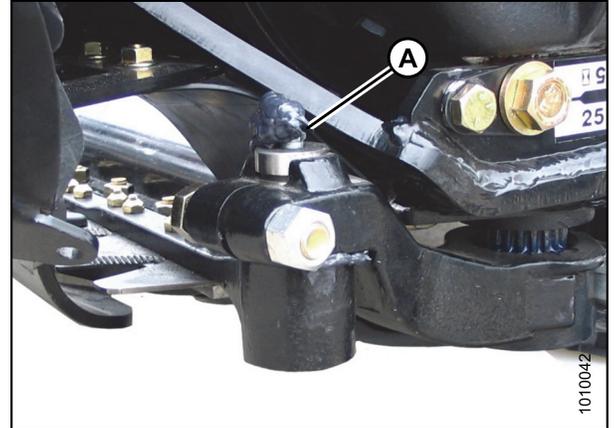


Figure 5.8: Every 25 Hours

MAINTENANCE AND SERVICING

Every 100 Hours

NOTE:

Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

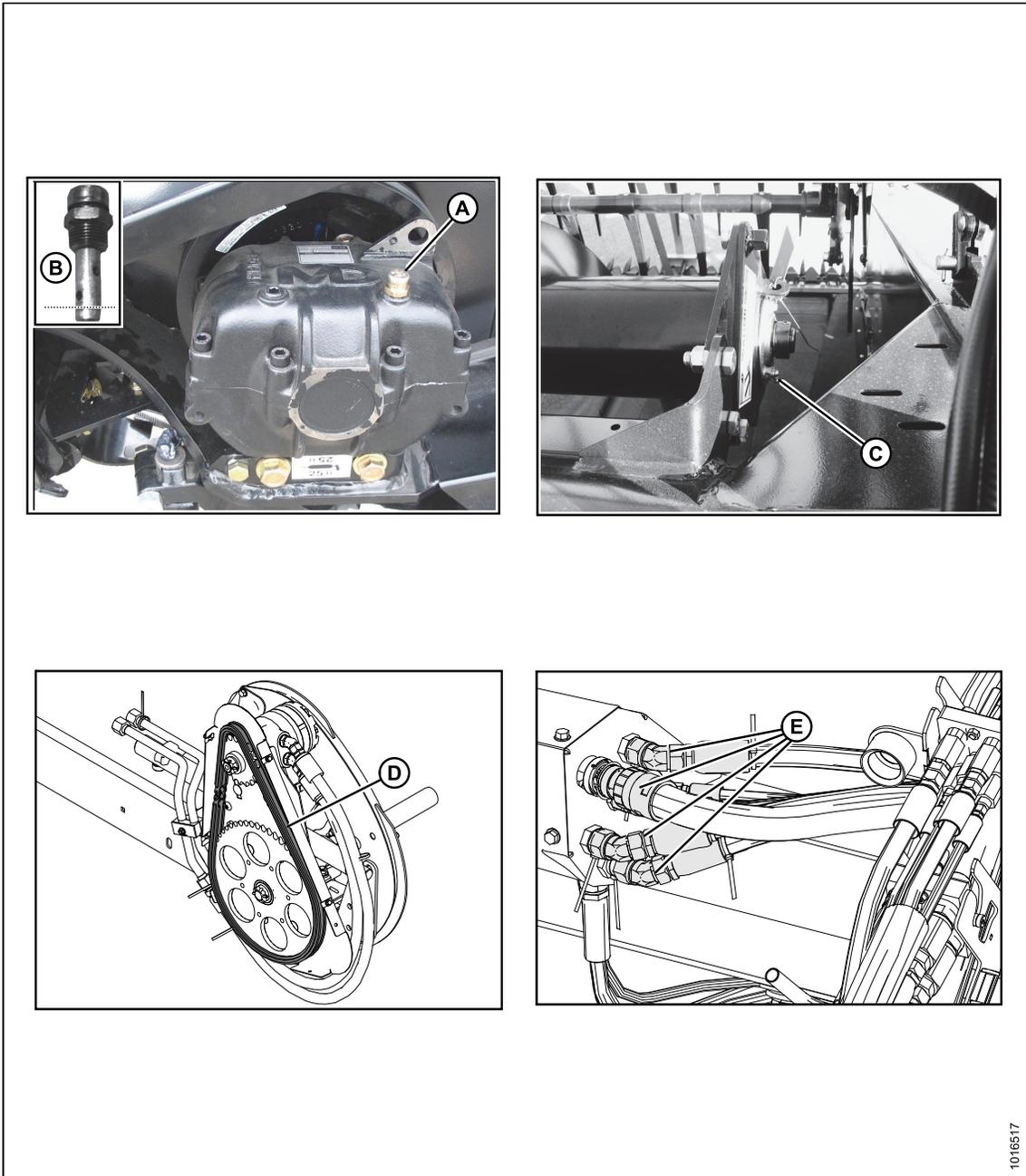


Figure 5.9: Every 100 Hours

- A - Knife Drive Box (Check Oil Level with Top of Knife Drive Box in Horizontal Position)
- B - Dipstick (Level between Lower Hole and End of Dipstick)
- C - Upper Cross Auger Bearing
- D - Reel Drive Chain
- E - Hydraulic Couplers (Use WD40® or Equivalent)

MAINTENANCE AND SERVICING

Every 250 Hours

NOTE:

Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

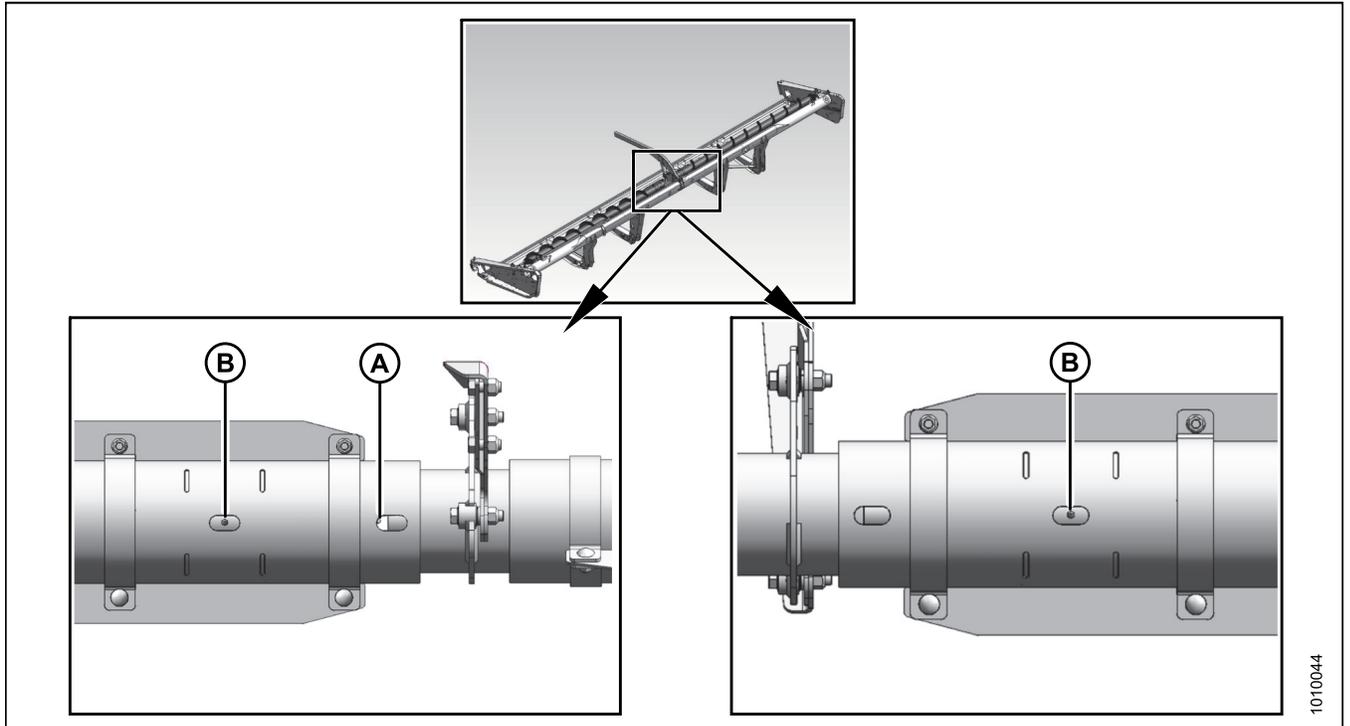


Figure 5.10: Every 250 Hours

A - Upper Cross Auger U-Joint¹¹

B - Upper Cross Auger Bearing (Two Places)¹²

11. 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.
12. Use High Temperature Extreme Pressure (EP2) Performance With 1.5–5.0% Molybdenum Disulphide (NLGI Grade 2) Lithium Base Grease

MAINTENANCE AND SERVICING

NOTE:

Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

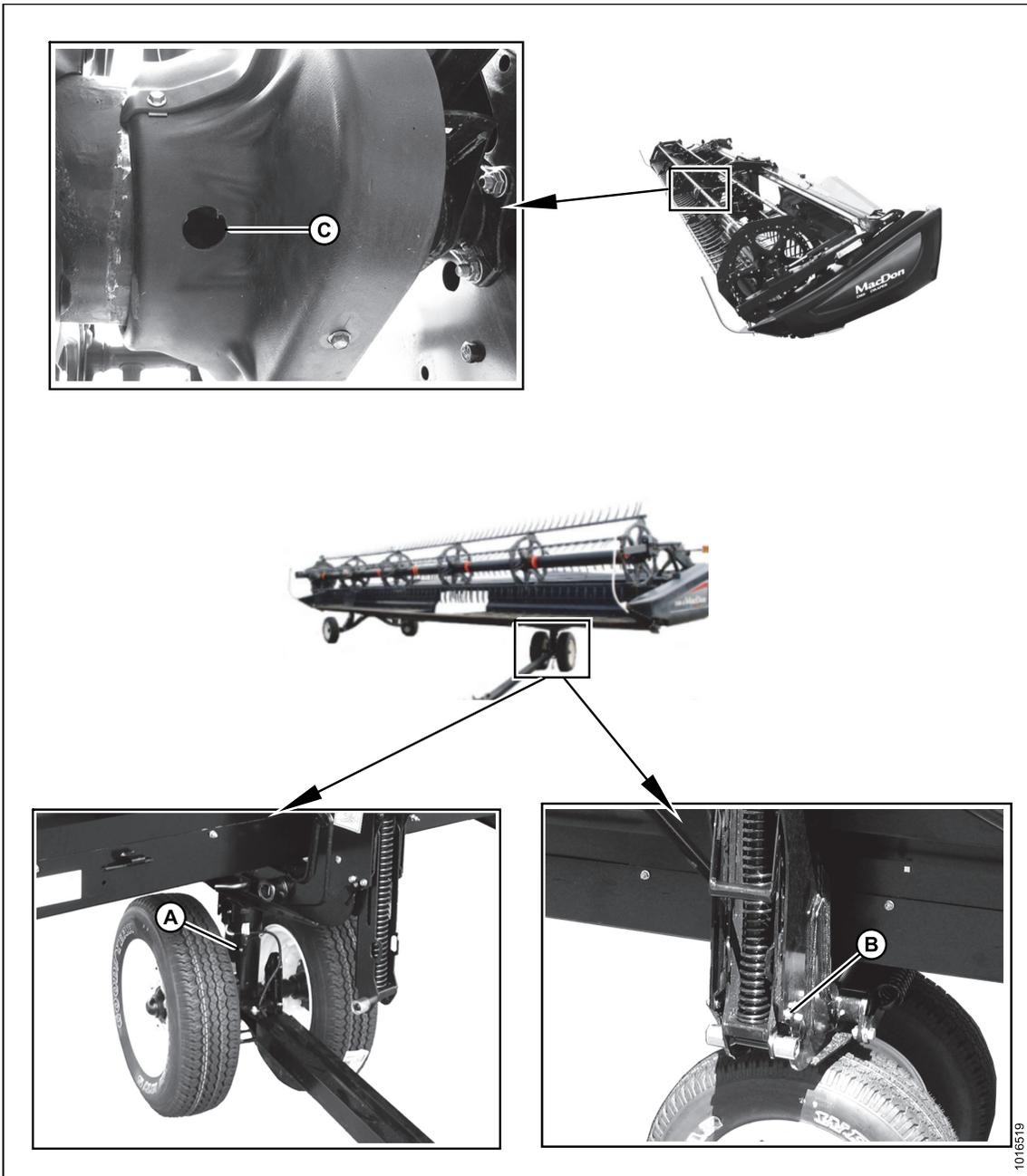


Figure 5.11: Every 250 Hours

B - Front Wheel Pivot

D - Double Reel U-Joint¹³

C - Frame/Wheel Pivot - Both Sides

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

MAINTENANCE AND SERVICING

Every 500 Hours

NOTE:

Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

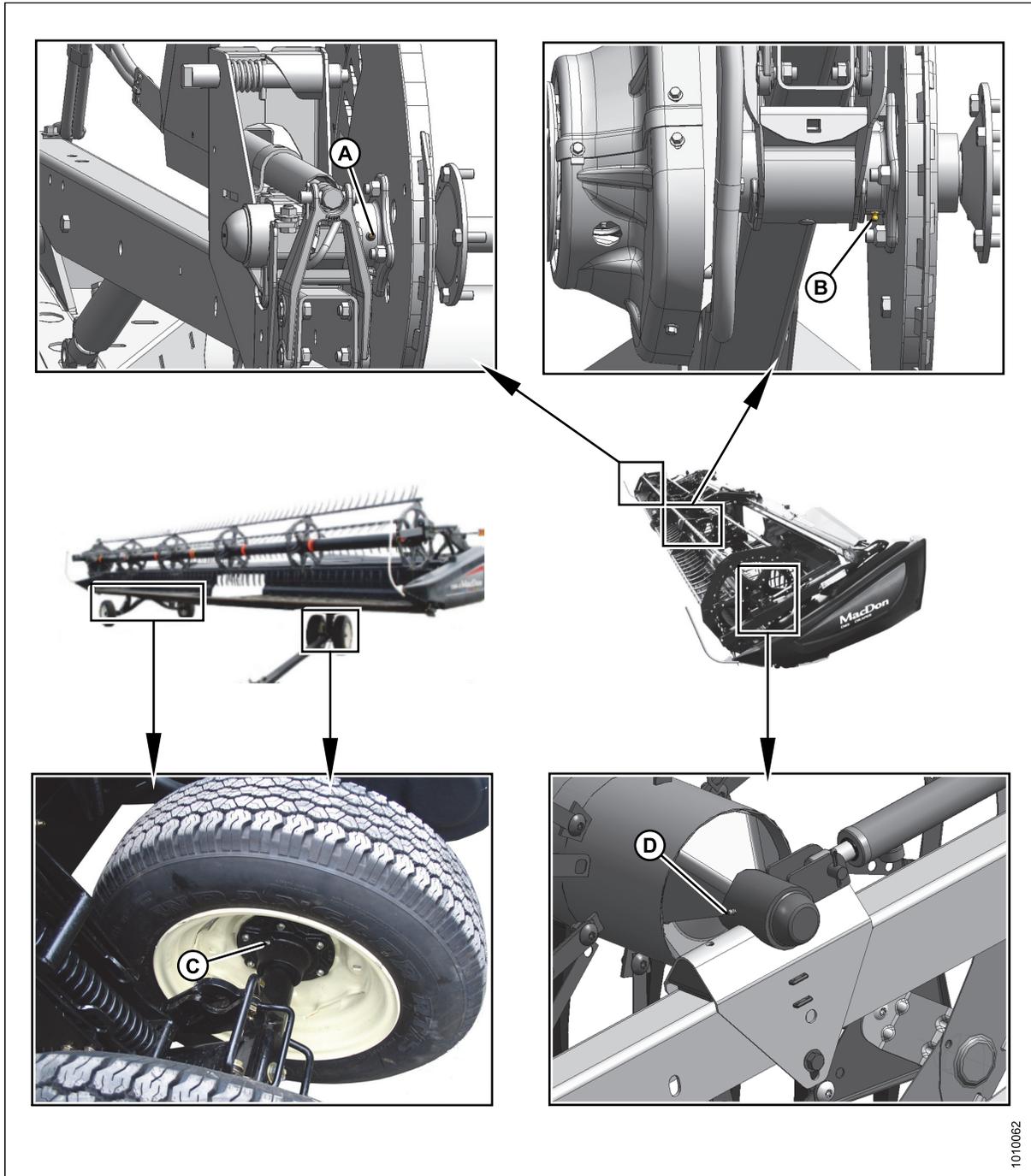


Figure 5.12: Every 500 Hours

A - Reel – Right Side Bearing

B - Reel – Center Bearing

C - Wheel Bearings (Four Places)

D - Reel – Left Bearing

5.4 Electrical System

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

Keep lights clean and replace defective bulbs.

5.4.1 Replacing Light Bulbs

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

NOTE:

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

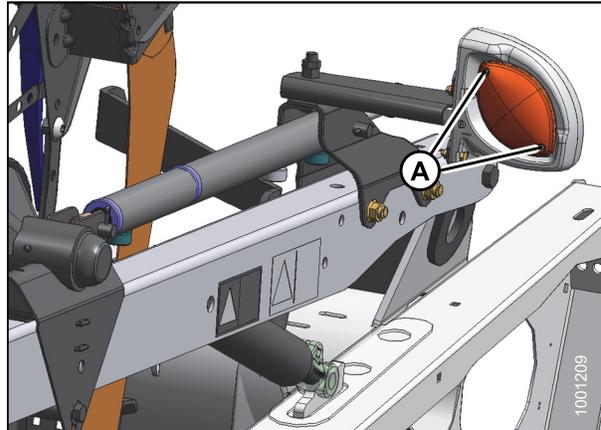


Figure 5.13: Clearance Light

5.4.2 Adjusting Reel Height Sensor

⚠ 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.

IMPORTANT:

Ensure reel height is properly set before adjusting reel height sensor. Refer to [5.8.1 Reel Clearance to Cutterbar](#), [page 175](#).

MAINTENANCE AND SERVICING

1. Lower the reel fully, shut down engine, and remove key from ignition.
2. Loosen two center lock flange nuts (A), and adjust sensor mounting bracket (B) until the threaded rod (C) is parallel with the sensor arm (D). Tighten center lock flange nuts.

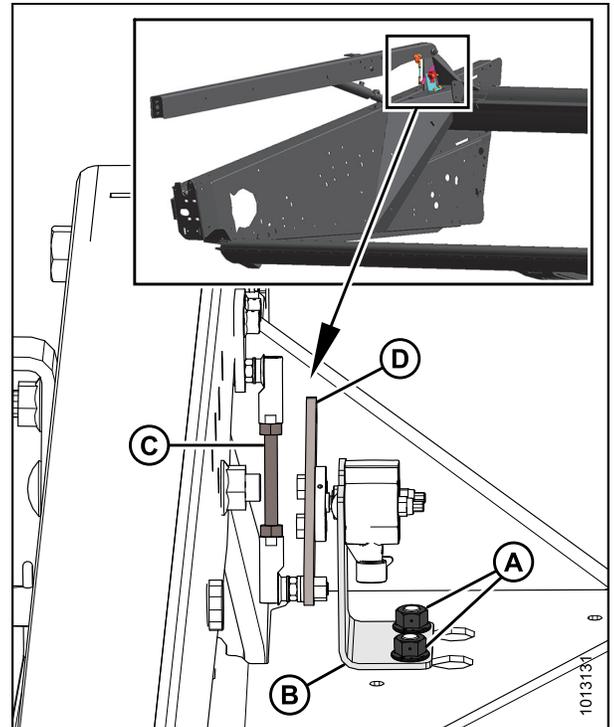


Figure 5.14: Reel Height Sensor – Right-Hand Reel Arm

3. Lower the reel fully.
4. Use the windrower display or a voltmeter (if measuring the sensor manually) to measure the upper voltage range between the ground (Pin 2) and signal (Pin 3) wires at the reel height sensor (C).
5. Adjust length of threaded rod (A) to achieve an upper voltage range of 4.1–4.5 V.
6. Raise the reel fully and use windrower display or a voltmeter (if measuring the sensor manually) to measure the lower voltage range. Loosen two M5 hex nuts (B) and rotate sensor (C) to achieve a lower voltage range of 0.5–0.9 V.
7. Lower the reel fully and recheck the upper voltage range to ensure it is still within the 4.1–4.5 V tolerance. If the upper voltage range is not within the correct tolerance, repeat adjustment procedure from Step 5., [page 115](#).

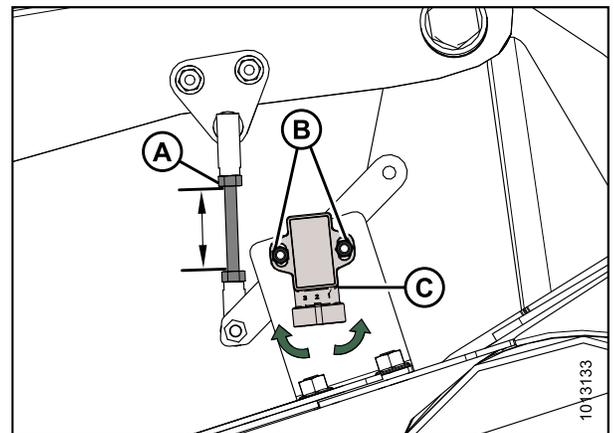


Figure 5.15: Reel Height Sensor – Right-Hand Reel Arm

5.5 Cutterbar

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 99](#).

CAUTION

Wear heavy gloves when working around or handling knives.

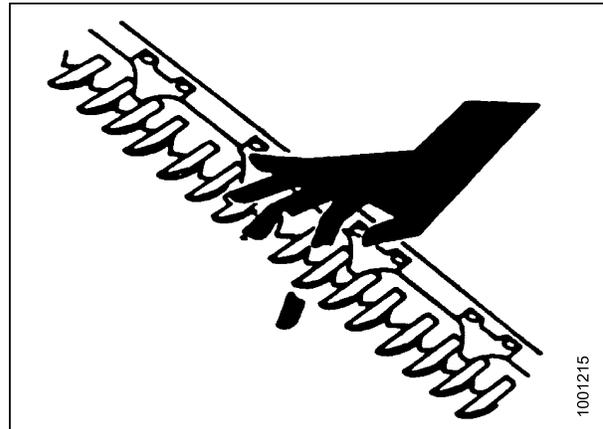


Figure 5.16: Cutterbar Hazard

5.5.1 Replacing Knife Section

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

1. Shut down the windrower, and remove the key from the ignition.
2. Stroke the knife as required to center the knife section (A) between the guards.
3. Remove nuts (B).
4. Remove bars (C) and lift the knife section off the knife bar.
5. Remove the splice bar (D) if knife section is under the bar.
6. Clean dirt off the knife back, and position the new knife section onto the knife.
7. Reposition bars (C) and/or (D) and install the 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 7 ft·lbf (9.5 N·m).

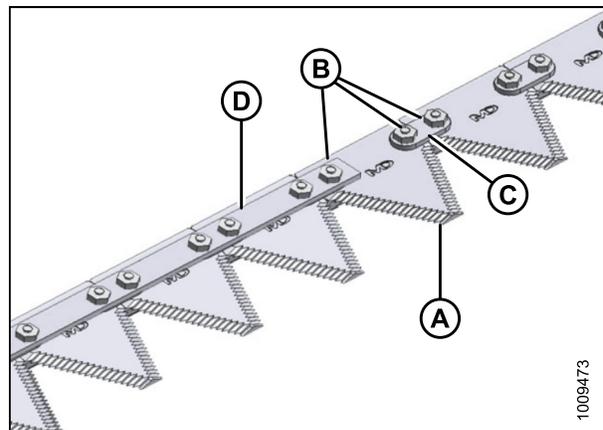
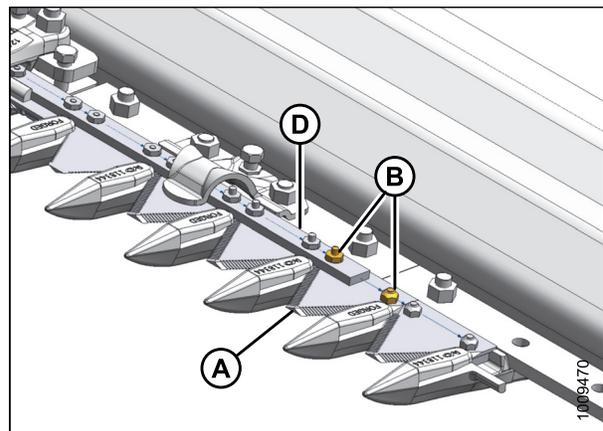


Figure 5.17: Cutterbar

5.5.2 Removing Knife

WARNING

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

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

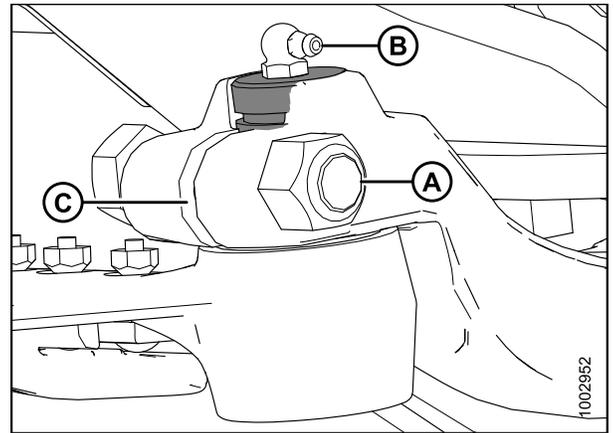


Figure 5.18: Knifehead

5.5.3 Removing Knifehead Bearing

WARNING

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

IMPORTANT:

Repeat this procedure for each knife.

MAINTENANCE AND SERVICING

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the knife. Refer to [5.5.2 Removing Knife, page 117](#).

NOTE:

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

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

NOTE:

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

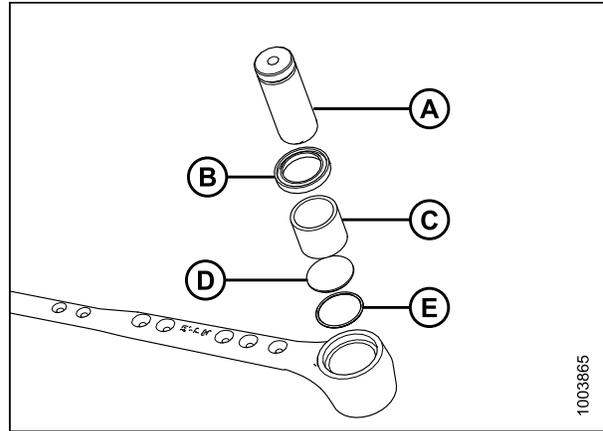


Figure 5.19: Knifehead Bearing Assembly

5.5.4 Installing Knifehead Bearing

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

IMPORTANT:

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

2. Use a flat-ended tool (A) with the same approximate diameter as the bearing (C), and push the bearing into the knifehead until the top of the bearing is flush with the step in the knifehead.
3. Install seal (B) into knifehead with the lip facing outwards.

IMPORTANT:

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

4. Install the knife. Refer to [5.5.5 Installing Knife, page 118](#).

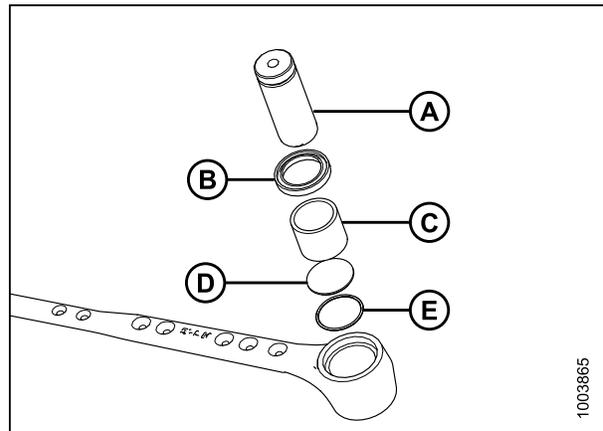


Figure 5.20: Knifehead Bearing Assembly

5.5.5 Installing Knife

WARNING

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

MAINTENANCE AND SERVICING

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

NOTE:

Remove the grease zerk from the knifehead pin for easier removal and installation of knifehead pin.

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

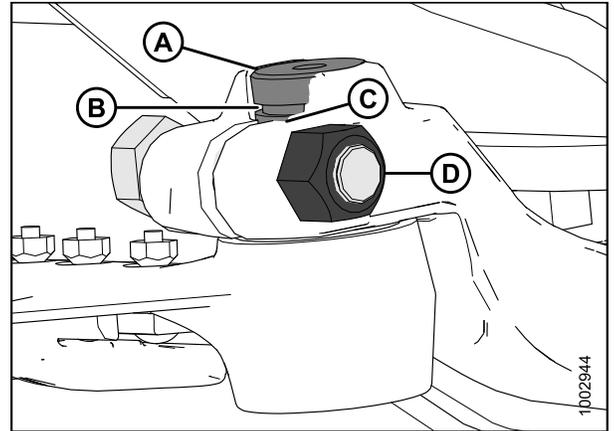


Figure 5.21: Knifehead

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

IMPORTANT:

Slowly apply grease to the knifehead until slight downward movement of the knifehead is observed. Do **NOT** over-grease the knifehead. Over greasing leads to knife misalignment causing excessive heating of guards and overloading of drive systems. If over greasing occurs, remove the grease zerk to release pressure.

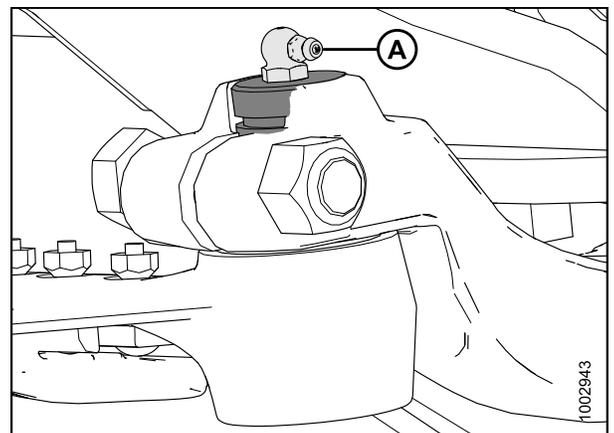


Figure 5.22: Knifehead

5.5.6 Spare Knife

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

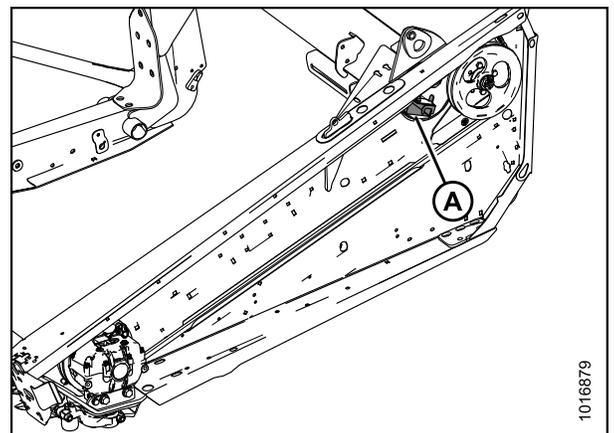


Figure 5.23: Spare Knife

5.5.7 Knife Guards

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

Adjusting Knife Guards

NOTE:

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

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



Figure 5.24: Upward Adjustment

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

TIP:

If material is tough to cut, install stub guards with top guard and adjuster plate. A kit is available from your MacDon Dealer. Refer to [6.2.3 Stub Guard Conversion Kit](#), page 218.

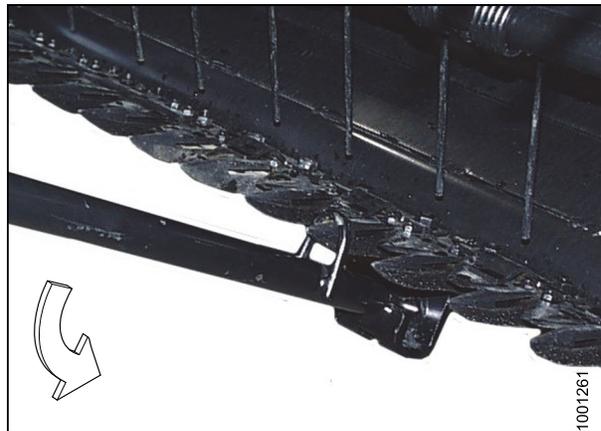


Figure 5.25: Downward Adjustment

Replacing Pointed Guards

Normal and Drive Side Guard Replacement

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

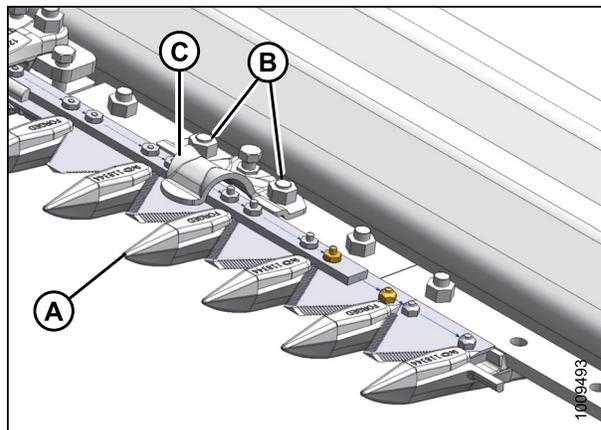


Figure 5.26: Pointed Guards

MAINTENANCE AND SERVICING

IMPORTANT:

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

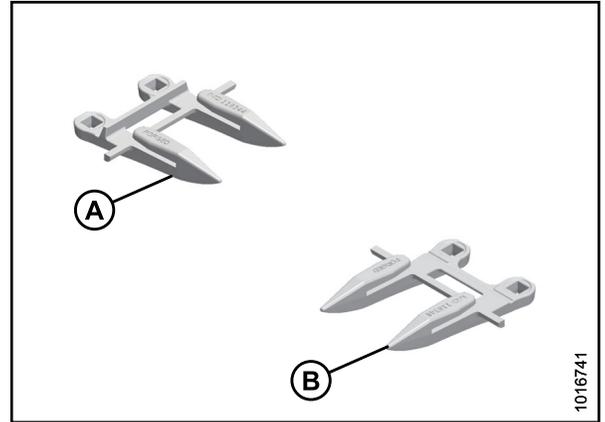


Figure 5.27: Pointed Guards

A - Normal

B - Drive Side

C - Half Guard (End)

5. Position the new guard (A), hold-down (C), and plastic wear plate (if applicable) onto the cutterbar. Secure with two nuts (B) and bolts, but do **NOT** tighten.
6. Check and adjust the clearance between the hold-downs and the knife. Refer to [Checking Knife Hold-Downs, page 124](#).

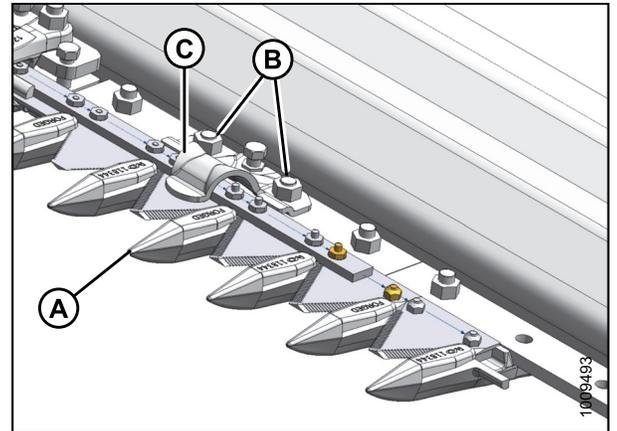


Figure 5.28: Pointed Guards

Center Guard Replacement

NOTE:

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

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

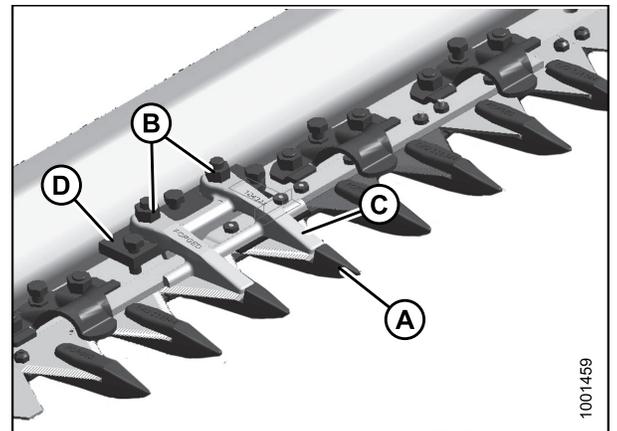


Figure 5.29: Center Guards

MAINTENANCE AND SERVICING

4. Position the plastic wear plate (if applicable), replacement center guard (A), adjuster bar, and top guide (B) onto the cutterbar. Install bolts, but do **NOT** tighten.

IMPORTANT:

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

NOTE:

The top guide (B) must accommodate the two overlapping knives at the center guard location. Ensure the proper replacement guard is installed at this location.

5. Check and adjust the clearance between the hold-down and knife. Refer to [Checking Knife Hold-Downs, page 124](#).

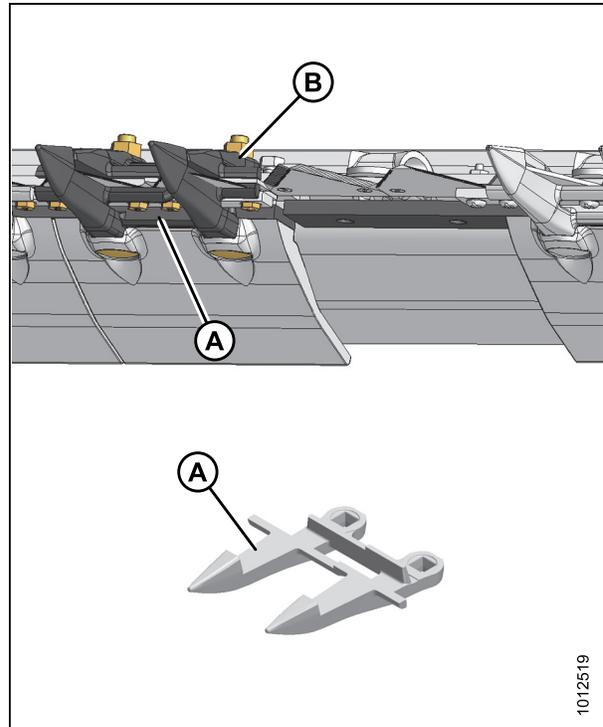


Figure 5.30: Center Guards

Replacing Stub Guards

Stub guards, complete with top guides and adjuster plates, are designed to cut tough crops and are factory-installed at the outer ends of specific headers.

Normal, Drive Side, and End Guard Replacement

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

IMPORTANT:

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

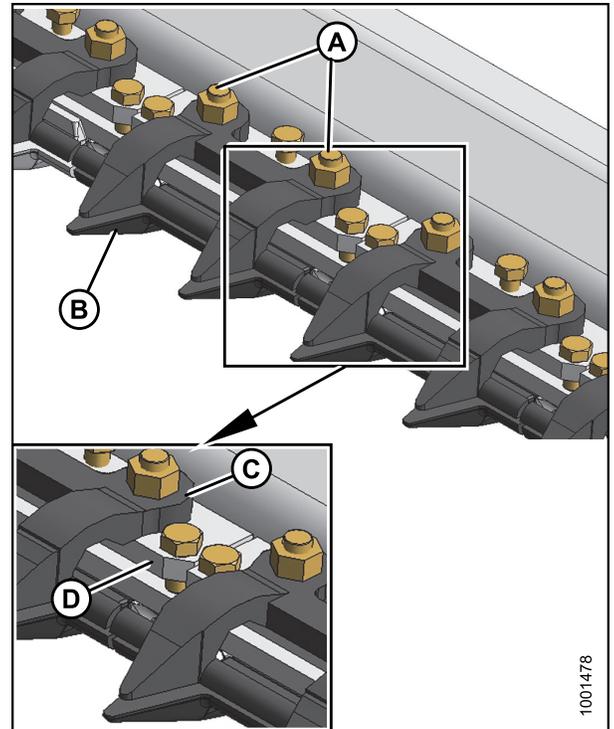


Figure 5.31: Stub Guards

IMPORTANT:

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

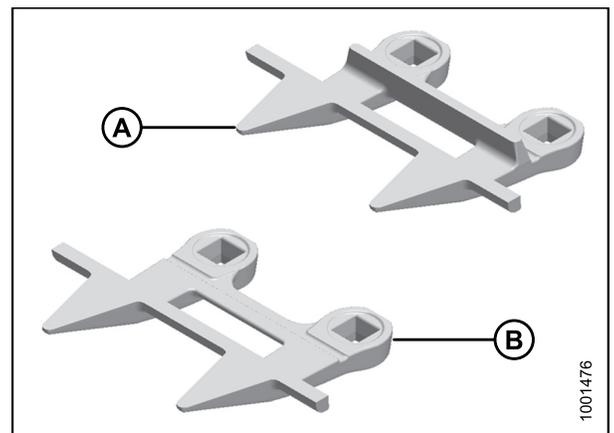


Figure 5.32: Stub Guards

A - Normal Guard

B - Drive Side Guard

MAINTENANCE AND SERVICING

5. Position the plastic wear plate (if applicable), replacement guard (B), adjuster bar (D), top guide (C), and install bolts and nuts (A). Do **NOT** tighten.
6. Check and adjust the clearance between the hold-downs and the knife. Refer to [Checking Knife Hold-Downs, page 124](#).

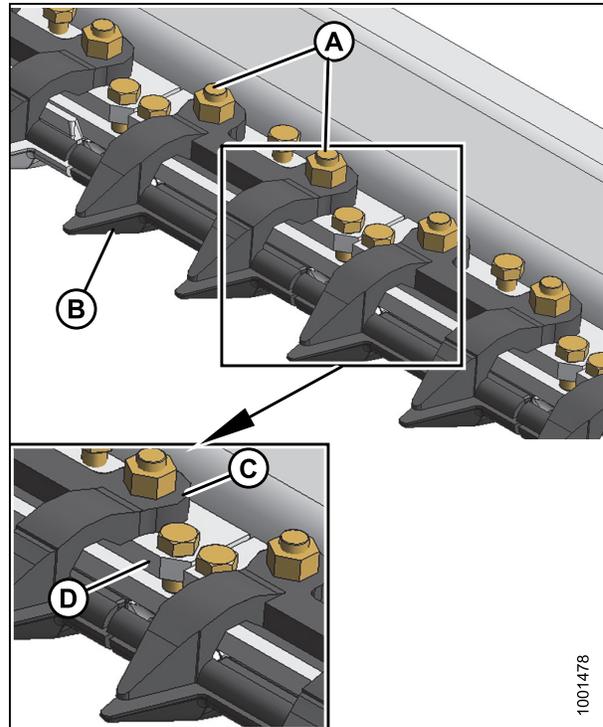


Figure 5.33: Stub Guards

Checking Knife Hold-Downs

Perform daily inspections to ensure the knife hold-downs are preventing the knife sections from lifting off the guards while permitting the knife to slide without binding. Use a feeler gauge to measure the clearance between the hold-downs and knife sections and refer to the following for adjustment procedures:

- [Adjusting Hold-Downs with Pointed Guards, page 124](#)
- [Adjusting Hold-Downs with Stub Guards, page 126](#)

NOTE:

Align guards prior to adjusting the hold-downs. Refer to [Adjusting Knife Guards, page 120](#).

Adjusting Hold-Downs with Pointed Guards

WARNING

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

MAINTENANCE AND SERVICING

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

NOTE:

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

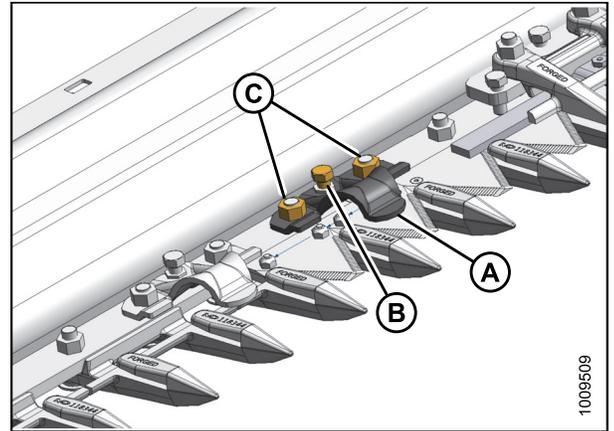


Figure 5.34: Normal Guard Hold-Down

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

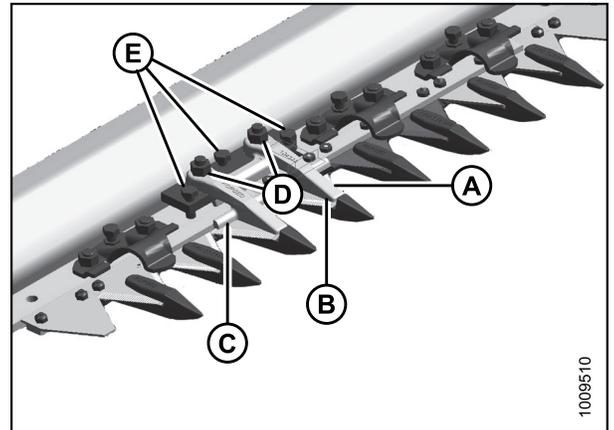


Figure 5.35: Center Guard Hold-Down

WARNING

Check to be sure all bystanders have cleared the area.

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

NOTE:

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

Adjusting Hold-Downs with Stub Guards

WARNING

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

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

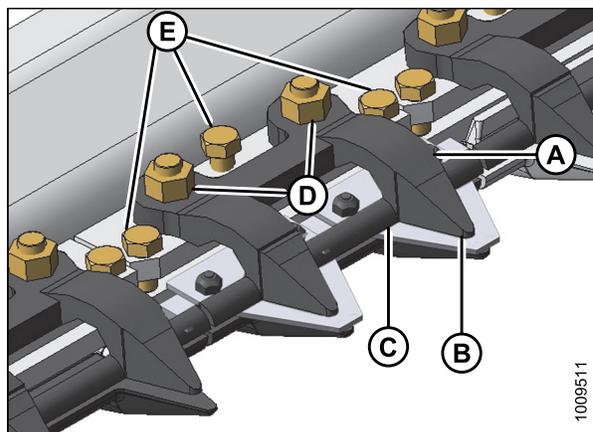


Figure 5.36: Stub Guards

WARNING

Check to be sure all bystanders have cleared the area.

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

NOTE:

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

5.5.8 Knifehead Shield

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

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

IMPORTANT:

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

Installing Knifehead Shield

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

⚠ DANGER

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

⚠ CAUTION

Wear heavy gloves when working around or handling knives.

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

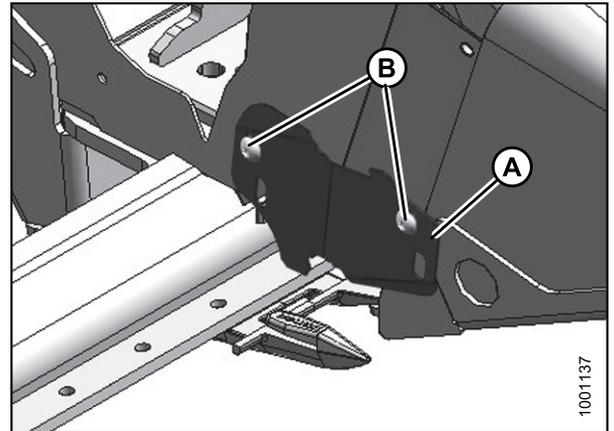


Figure 5.37: Knifehead Shield

5.6 Knife Drive

5.6.1 Knife Drive Box

CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing, page 99](#).

Knife drive boxes are located at both ends of the header, are belt driven by a hydraulic motor, and convert rotational motion into the reciprocating motion of the knife.

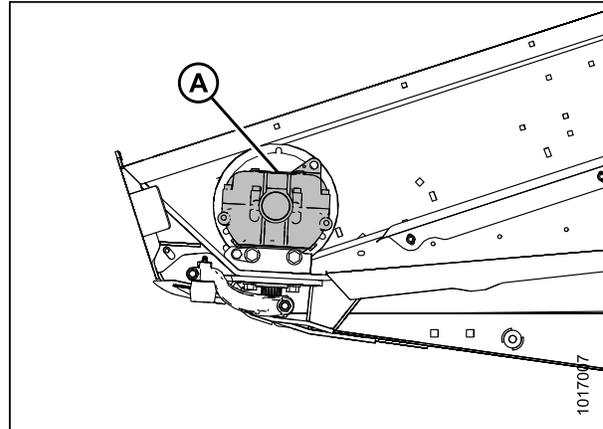


Figure 5.38: Left Side Knife Drive Box Shown – Right Side Similar

Checking Mounting Bolts

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

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

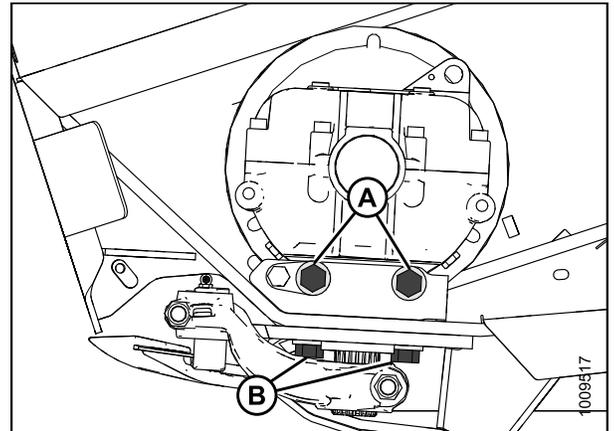


Figure 5.39: Knife Drive Box

Removing Knife Drive Box

For 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 31](#).
3. Loosen the two nuts (A) enough to allow the idler pulleys (B) to pivot.
4. Loosen the jam nut (C).
5. Turn flange nut (A) counterclockwise on adjuster bolt (B) to relieve knife drive belt tension.
6. Proceed to Step [12., page 130](#).

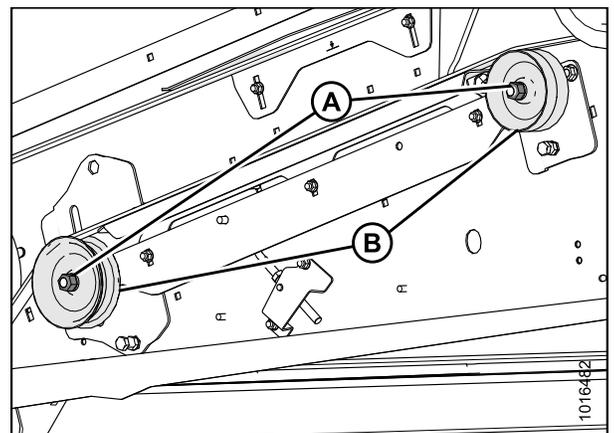


Figure 5.40: Timed Double-Knife Drive

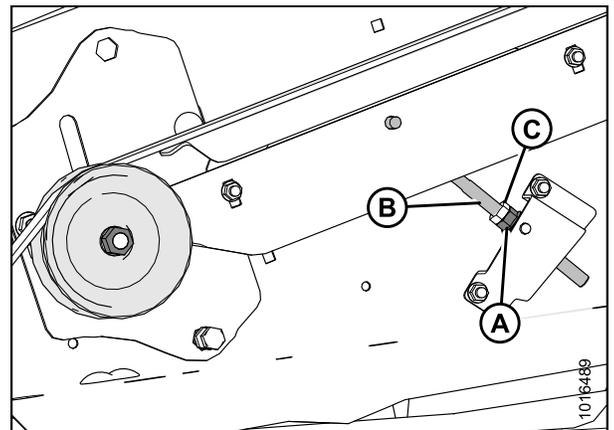


Figure 5.41: Timed Double-Knife Drive

MAINTENANCE AND SERVICING

For Single and Untimed Double-Knife Headers:

7. Shut down the windrower, and remove the key from the ignition.
8. Open the endshield. Refer to [Opening Endshields, page 31](#).
9. Loosen the two bolts (A) securing the motor assembly to the header endsheet.
10. Loosen the belt tension by turning the tensioning bolt (B) counterclockwise.
11. Proceed to Step [12., page 130](#).

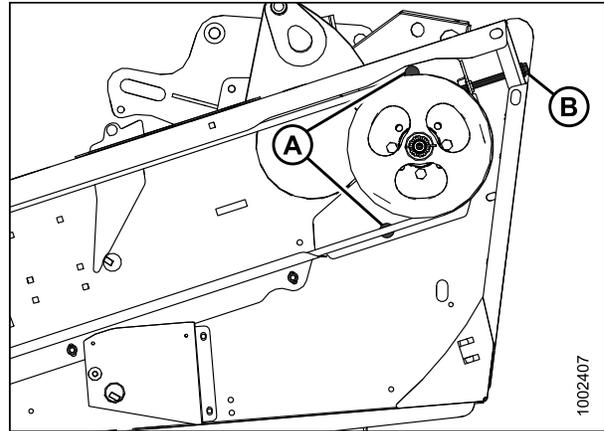


Figure 5.42: Single and Untimed Double-Knife Drive

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

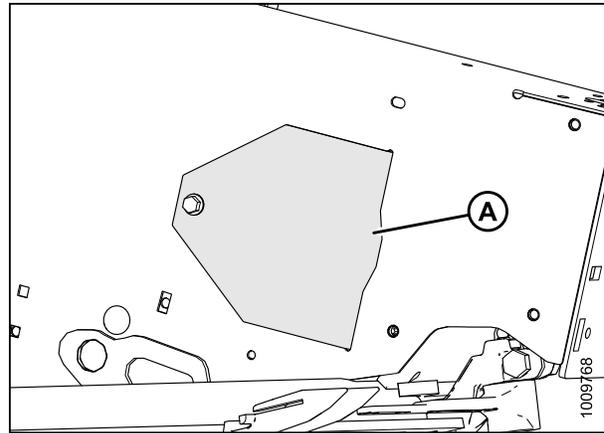


Figure 5.43: Access Cover

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

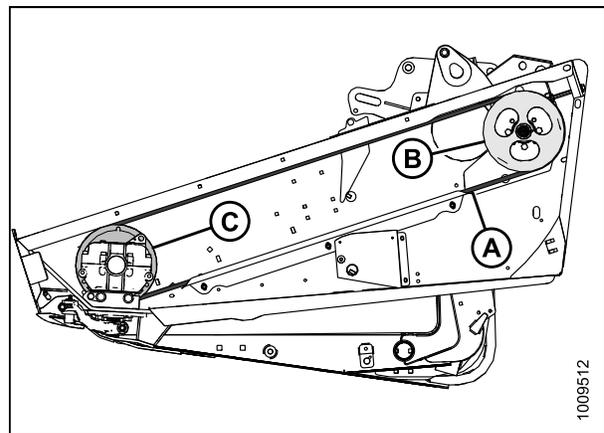


Figure 5.44: Knife Drive

MAINTENANCE AND SERVICING

15. Stroke the knife manually to its outer limit.
16. Clean the area around the knifehead.
17. Remove bolt (A).
18. Remove the grease zerk (B) from the pin.
19. Use a screwdriver or chisel in slot (C) to release the load on the knifehead pin.
20. Use a screwdriver or chisel to pry the pin upwards in the pin groove until the pin is clear of the knifehead.
21. Push the knife assembly inboard until it is clear of the output arm.
22. Seal the knifehead bearing with plastic or tape unless it is being replaced.
23. Remove the bolt (A) that clamps the knife drive arm to the knife drive box output shaft.
24. Remove the knife drive arm (B) from the knife drive box output shaft.
25. Remove the four knife drive box mounting bolts (C, D).

NOTE:

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

CAUTION

Knife drive box with pulley weighs over 65 lb (35 kg). Use care when removing or installing. Lug (L) can be used for lifting.

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

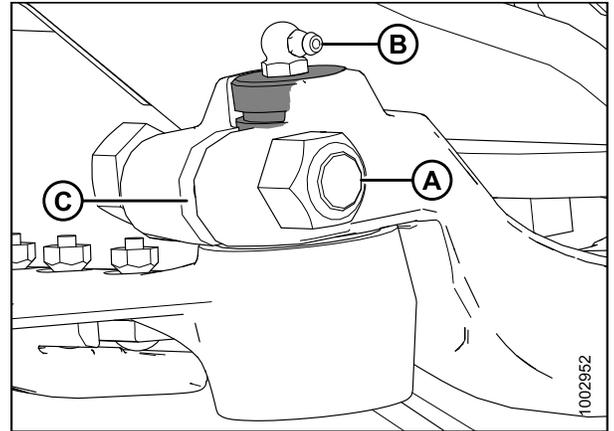


Figure 5.45: Knifehead

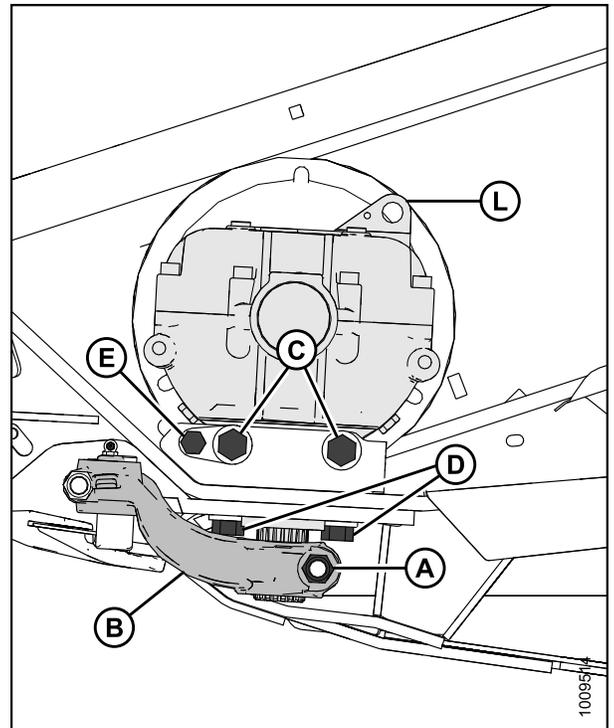


Figure 5.46: Knife Drive Box

MAINTENANCE AND SERVICING

Removing Knife Drive Box Pulley

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

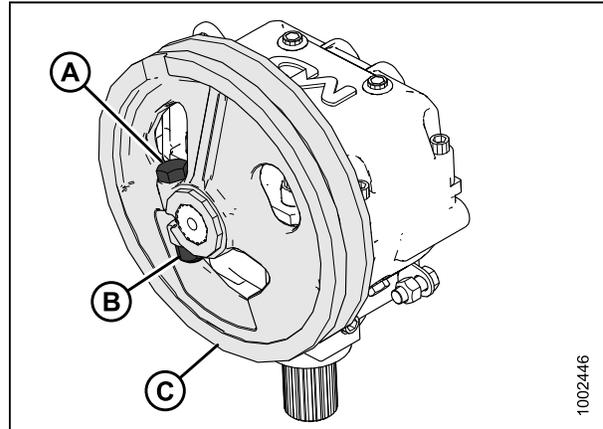


Figure 5.47: Knife Drive Box and Pulley

Installing Knife Drive Box Pulley

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

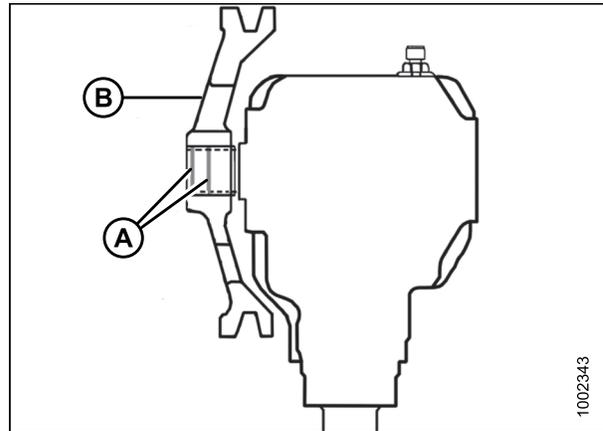


Figure 5.48: Knife Drive Box

Installing Knife Drive Box

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

NOTE:

If the pulley was removed from the knife drive box, refer to [Installing Knife Drive Box Pulley, page 132](#). If the pulley was not removed, proceed to Step 1., [page 133](#).

CAUTION

Knife drive box with pulley weighs over 65 lb (35 kg). 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 the knife drive box side bolts (A) slightly, then tighten the bottom bolts (B) to ensure proper contact with the vertical and horizontal mounting surfaces. Do **NOT** torque the bolts at this time.

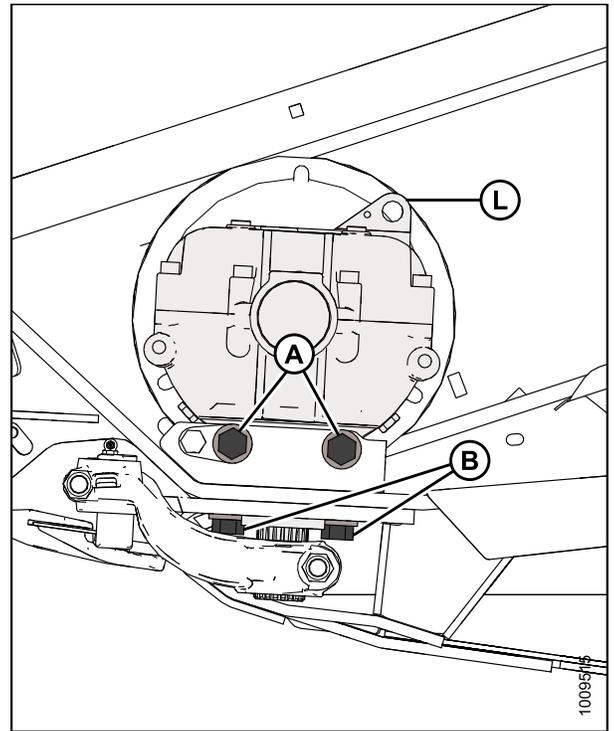


Figure 5.49: Knife Drive Box

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

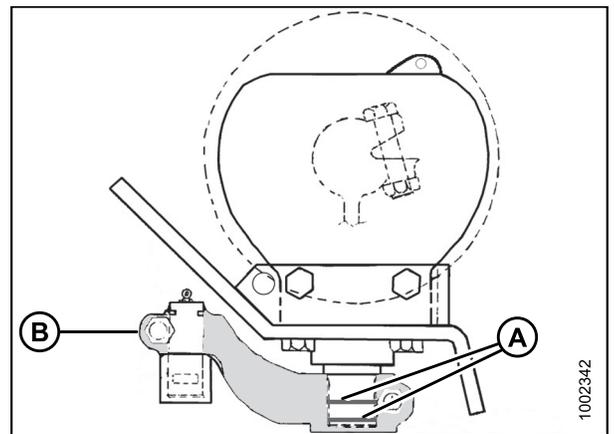


Figure 5.50: Knife Drive Box

MAINTENANCE AND SERVICING

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

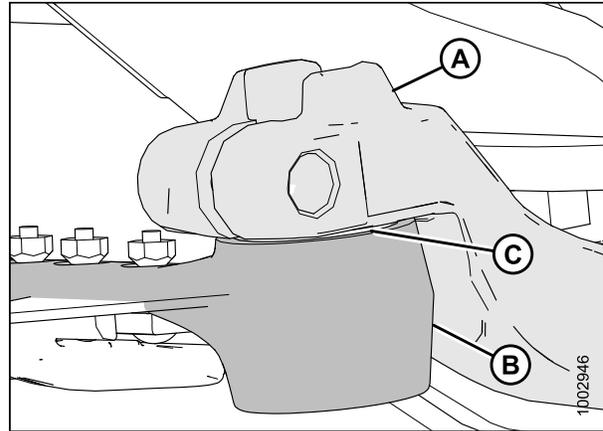


Figure 5.51: Knifehead

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

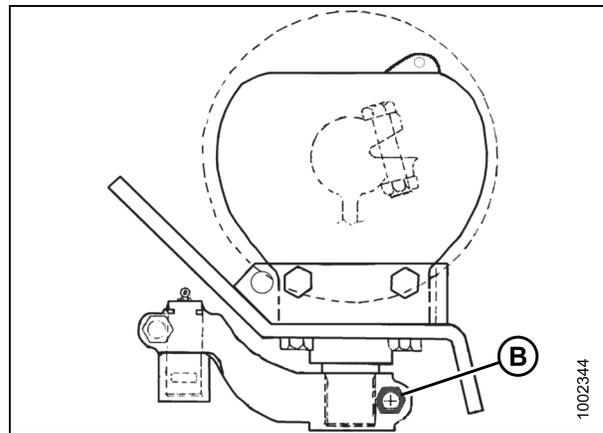


Figure 5.52: Knife Drive Box

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

NOTE:

Remove the grease zerk from the knifehead pin for easier removal and installation of knifehead pin.

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

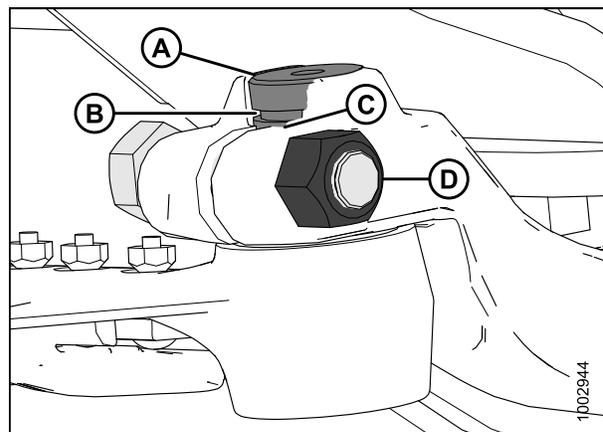


Figure 5.53: Knifehead

MAINTENANCE AND SERVICING

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

IMPORTANT:

Slowly apply grease to the knifehead until slight downward movement of the knifehead is observed. Do **NOT** over-grease the knifehead. Over greasing leads to knife misalignment causing excessive heating of guards and overloading of drive systems. If over greasing occurs, remove the grease zerk to release pressure.

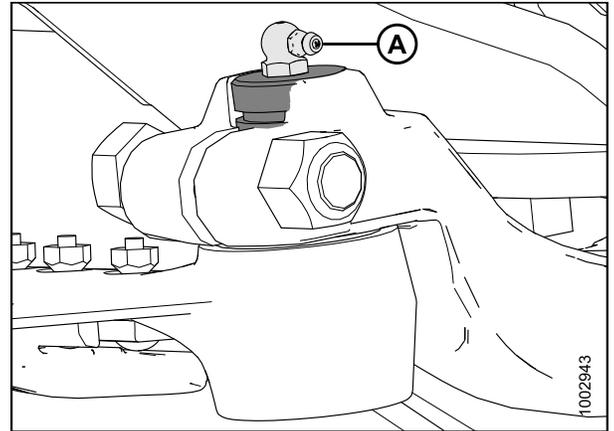


Figure 5.54: Knifehead

12. Check the alignment of the knife drive box pulley and the drive pulley. If pulleys require adjustment, contact your MacDon Dealer.
13. Tighten the knife drive box side bolts (A) first, then tighten the bottom bolts (B). Torque to 200 ft·lbf (271 N·m).
14. Move the output arm to the mid-stroke position, and ensure the knife bar doesn't contact the front of the first guard. If the knife drive box requires adjustment, contact your MacDon Dealer.
15. Install and tension the knife drive belts. For untimed belts refer to *Tensioning Non-Timed Knife Drive Belts, page 142*, for timed belts refer to *Tensioning Timed Knife Drive Belts, page 147*. For timed double-knife headers, also check the knife timing, refer to *Adjusting Double-Knife Timing, page 148*.
16. Close the endshield. Refer to *Closing Endshields, page 32*.

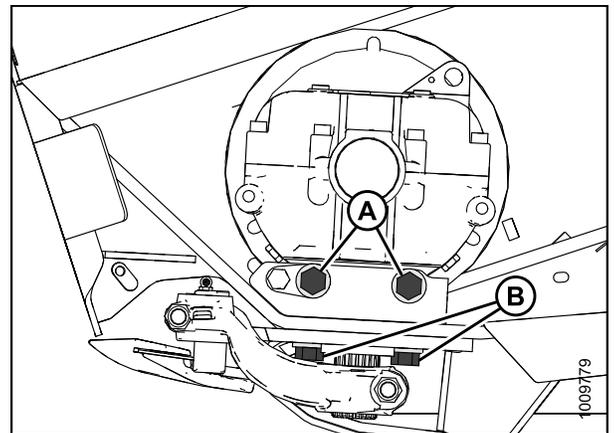


Figure 5.55: Knife Drive Box

MAINTENANCE AND SERVICING

Knife Drive Box Squareness

1. Place a straight edge (A) along the face of the knife drive box pulley and measure a distance of 39-3/8 in. (1000 mm) between points (B) and (C). Ensure the distance is within a tolerance of +/- 3/8 in. (3 mm).

NOTE:

There could be some deformation in the end panel if the distance is too large.

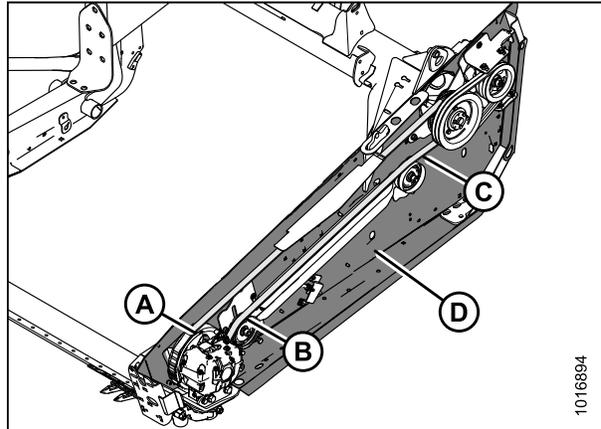


Figure 5.56: Knife Drive Box

2. Measure the distance between point (B) on the knife drive belt and the endsheet (A). Repeat this measurement for point (C).
3. Install a shim if the difference between measurements at point (B) and point (C) is greater than 3/16 in. (5 mm).

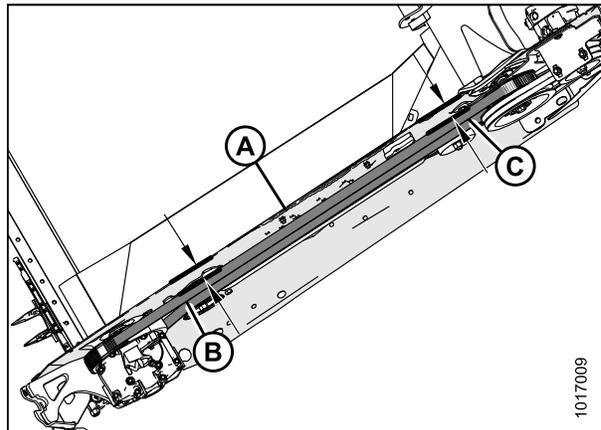


Figure 5.57: Header Top View

4. Remove four bolts (A) securing the knife drive box to the frame.

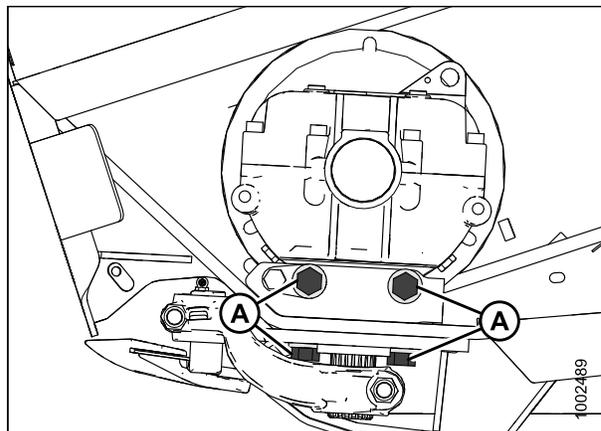


Figure 5.58: Knife Drive Box

MAINTENANCE AND SERVICING

5. Manufacture a u-shaped shim (A) to fit under the side bolts securing the knife drive box to the frame. Place the shim between the header mount and the knife drive box. Shim the drive box as required to align the pulley.
6. Refer to [Installing Knife Drive Box, page 132](#) for bolt installation instructions.
7. Tighten bolts and recheck squareness.
8. Refer to [Tensioning Non-Timed Knife Drive Belts, page 142](#) for belt tensioning instructions.

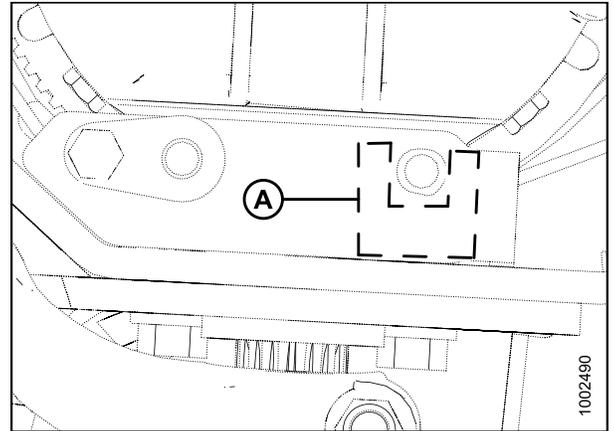


Figure 5.59: U-Shaped Shim

Knife Drive Box Fore-Aft

Perform this procedure if there is contact between the guard and the knife bar or if adjustments have been made to the alignment tab.

1. Identify the location of the contact between the guard and the knife bar to determine which direction to move the knife drive box.

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.

2. Shut down the windrower, and remove the key from the ignition.
3. Open the endshield. Refer to [Opening Endshields, page 31](#).
4. Loosen the two nuts (A) enough to allow the idler pulleys (B) to pivot.

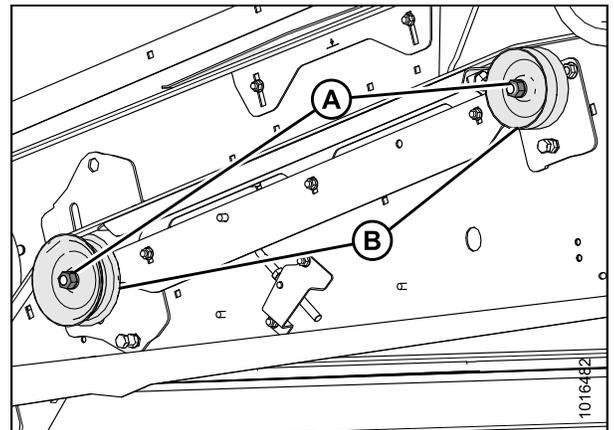


Figure 5.60: Timed Double-Knife Drive

5. Loosen the jam nut (C).
6. Turn flange nut (A) counterclockwise on adjuster bolt (B) to relieve knife drive belt tension.

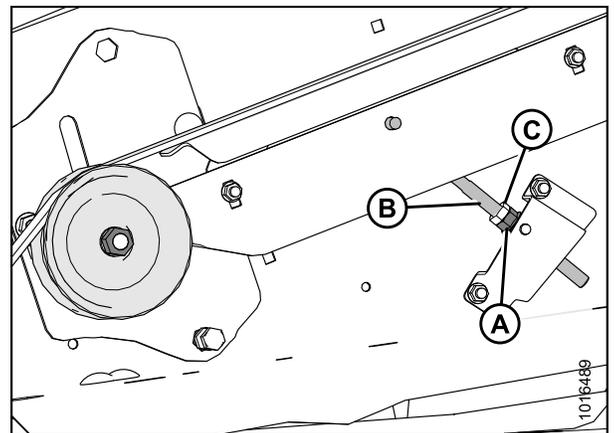


Figure 5.61: Timed Double-Knife Drive

MAINTENANCE AND SERVICING

7. Loosen four bolts (A) securing the knife drive box to the mount.
8. Loosen bolt (C) securing the knife drive box locating tab (B).

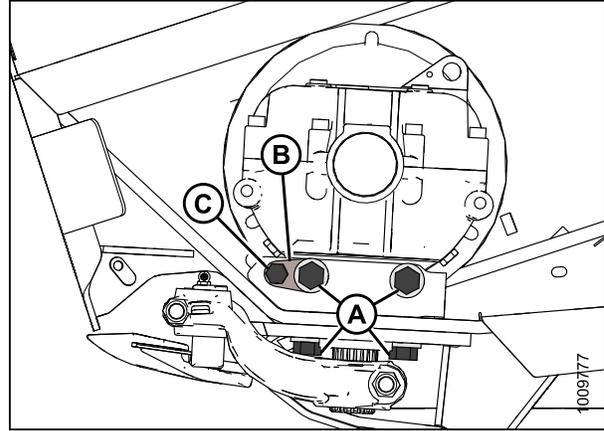


Figure 5.62: Knife Drive Box

9. Move the output arm to the mid-stroke position, and adjust the knife drive box until there is a $1/32$ – $1/16$ in. (1–2 mm) gap (B) between the front of knife bar (A) and guard (C).

NOTE:

If the knife bar (A) makes contact with the front of the guard (C), move the knife drive box rearwards. If the knife bar makes contact with the rear of the guard, move the knife drive box forwards.

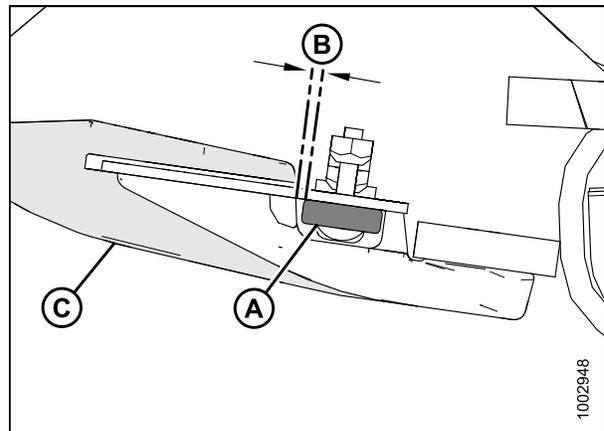


Figure 5.63: Clearance Between Guard and Front of Knife Bar

10. Tighten bolt (A) securing the knife drive box locating tab (B).

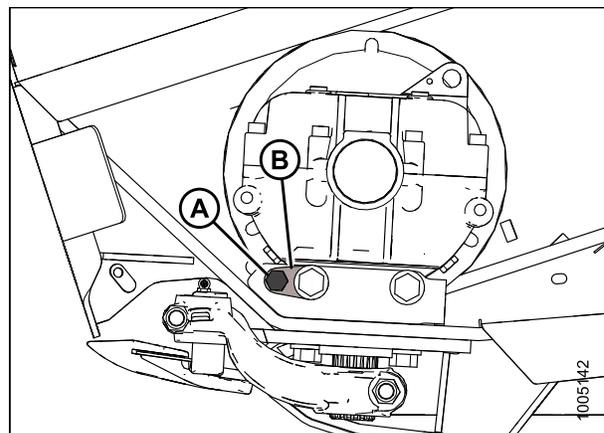


Figure 5.64: Knife Drive Box

MAINTENANCE AND SERVICING

11. Tighten knife drive box side bolts (A) first, then tighten the bottom bolts (B). Torque to 200 ft-lbf (271 N·m).
12. Install and tension the knife drive belts. For untimed belts refer to [Tensioning Non-Timed Knife Drive Belts, page 142](#), for timed belts refer to [Tensioning Timed Knife Drive Belts, page 147](#).

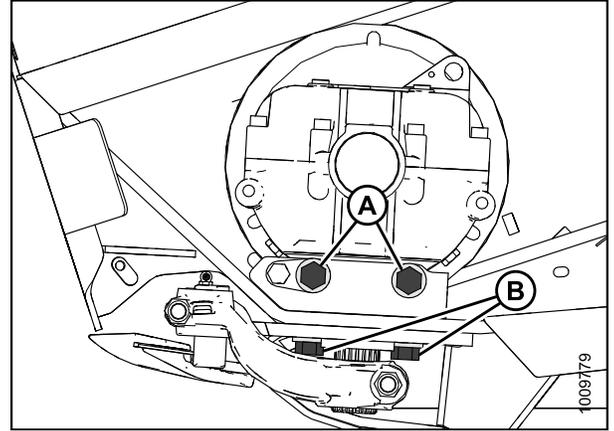


Figure 5.65: Knife Drive Box

Changing Oil in Knife Drive Box

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

1. Shut down the windrower, and remove the key from the ignition.
2. Raise the header to allow a suitably sized container to fit under the knife box drain and collect the oil.
3. Open the endshield. Refer to [Opening Endshields, page 31](#).
4. Remove the breather/dipstick (A) and the drain plug (B).
5. Allow the oil to drain.
6. Reinstall the drain plug (B).
7. Add oil to the knife drive box. Refer to [5.2.1 Recommended Fluids and Lubricants, page 100](#).
8. Close the endshield. Refer to [Closing Endshields, page 32](#).

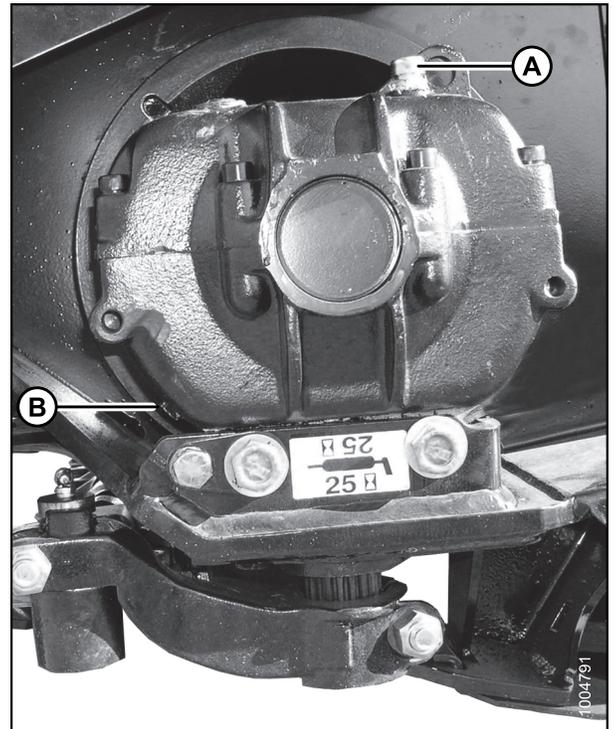


Figure 5.66: Knife Drive Box

5.6.2 Knife Drive Belts

Non-Timed Knife Drive Belts

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

Removing Non-Timed Knife Drive Belt

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to [Opening Endshields, page 31](#).
3. Loosen the two bolts (A) securing the motor assembly to the header endsheet.
4. Loosen the belt tension by turning the tensioning bolt (B) counterclockwise.

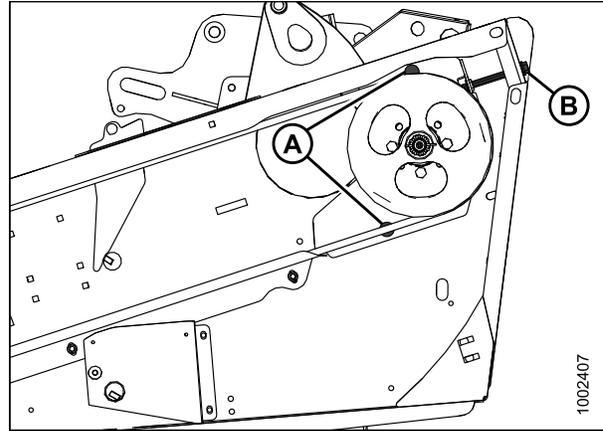


Figure 5.67: Single and Untimed Double-Knife Drive

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

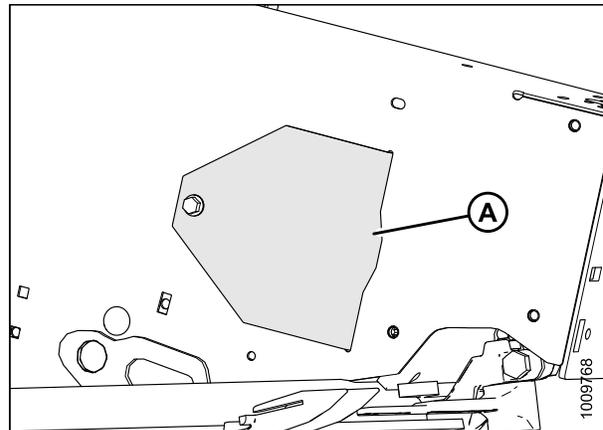


Figure 5.68: Access Cover

MAINTENANCE AND SERVICING

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

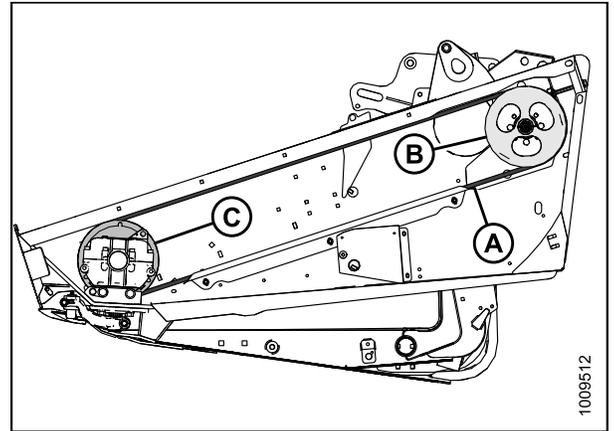


Figure 5.69: Knife Drive

Installing Non-Timed Knife Drive Belts

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

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

NOTE:

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

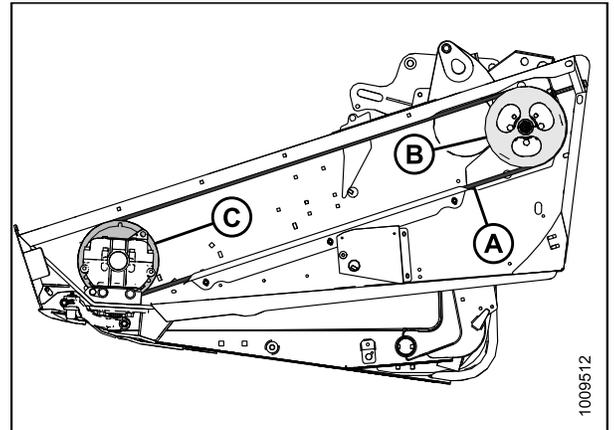


Figure 5.70: Knife Drive

3. Tension the knife drive belt. Refer to [Tensioning Non-Timed Knife Drive Belts, page 142](#).
4. Install the access cover (A) and secure with bolt.
5. Close the endshield. Refer to [Closing Endshields, page 32](#).

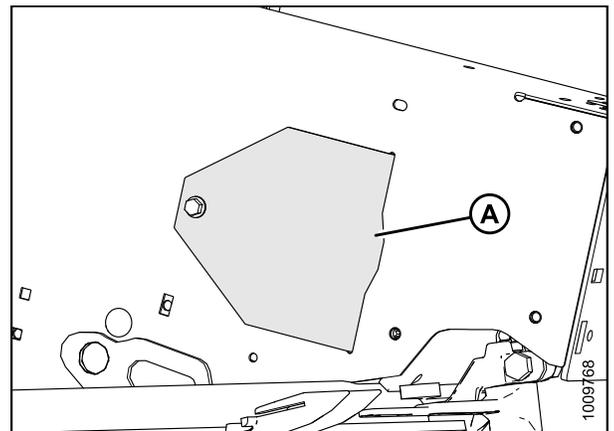


Figure 5.71: Access Cover

MAINTENANCE AND SERVICING

Tensioning Non-Timed Knife Drive Belts

IMPORTANT:

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to [Opening Endshields, page 31](#).
3. Loosen the two bolts (A) securing the motor assembly to the header endsheet.
4. Turn the adjuster bolt (B) clockwise to move the drive motor until a force of 30 lbf (133 N) deflects the belt (C) 61/64–1-3/32 in. (24–28 mm) at the mid-span.

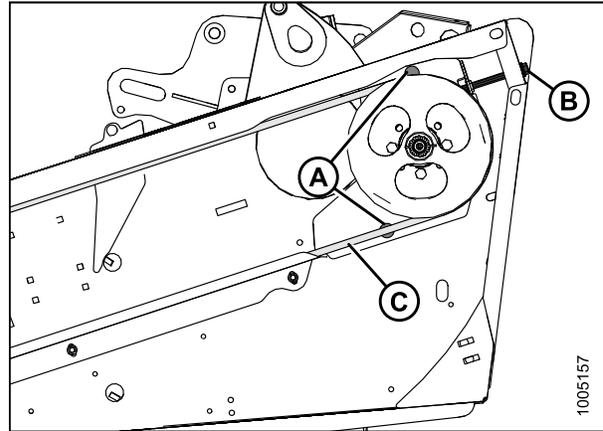


Figure 5.72: Left-Hand Shown – Right-Hand Opposite for Double-Knife Headers

5. Ensure the clearance between the belt (A) and the belt guide (B) is 3/64 in. (1 mm).
6. Loosen the three bolts (C), and adjust the position of the guide (B) as required.
7. Tighten the three bolts (C).
8. Close the endshield. Refer to [Closing Endshields, page 32](#).

NOTE:

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

9. Close the endshield.
10. Repeat procedure for the other side of the header.

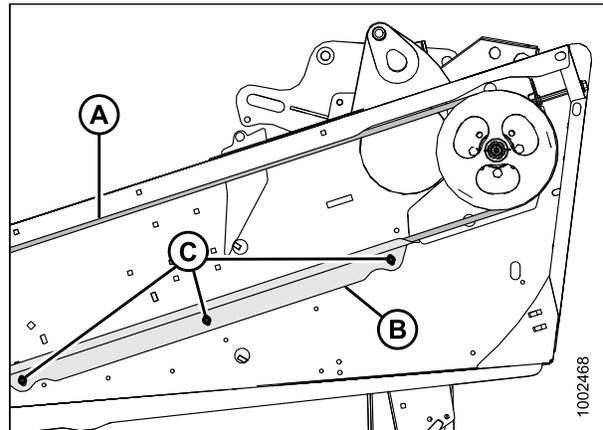


Figure 5.73: Knife Drive

Timed Double-Knife Drive Belts

Removing Timed Drive V-Belts

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to [Opening Endshields, page 31](#).
3. Loosen the two bolts (A) securing the motor assembly to the header endsheet.
4. Turn the adjuster bolt (B) counterclockwise to loosen and remove the two V-belts (C).

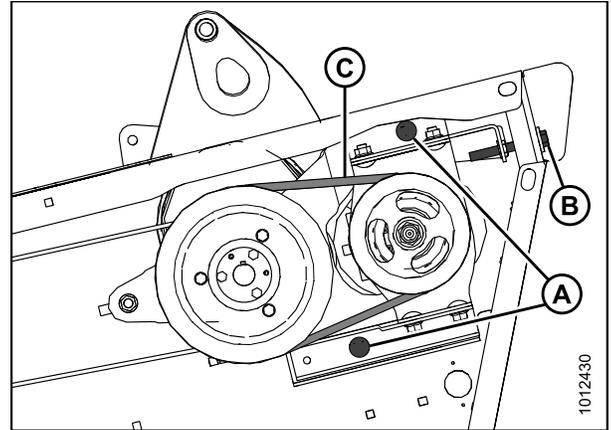


Figure 5.74: Knife Drive V-Belts

Installing Timed Drive V-Belts

NOTE:

Install new V-belts in matching pairs.

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

NOTE:

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

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

IMPORTANT:

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

4. Tighten the two bolts (A) on the endsheet.
5. Close the endshield. Refer to [Closing Endshields, page 32](#).
6. Check the tension of the new V-belts after a short run-in period (about five hours).

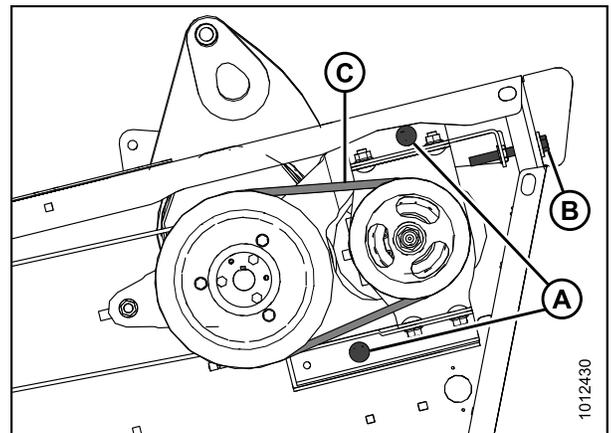


Figure 5.75: Knife Drive V-Belts

Removing Timed Knife Drive Belt

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to *Opening Endshields*, page 31.
3. Loosen the two nuts (A) enough to allow the idler pulleys (B) to pivot.

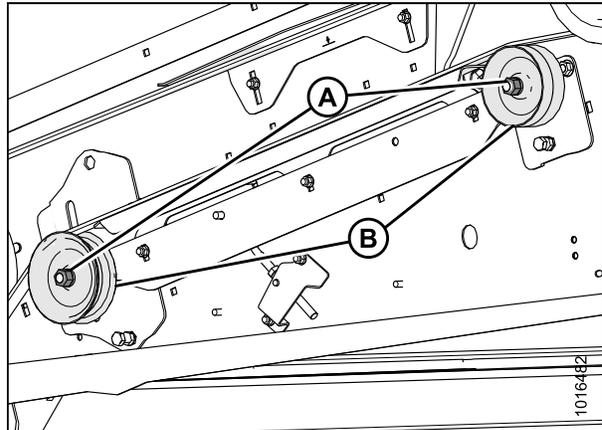


Figure 5.76: Knife Drive

4. Loosen the jam nut (C).
5. Turn flange nut (A) counterclockwise on adjuster bolt (B) to relieve knife drive belt tension.

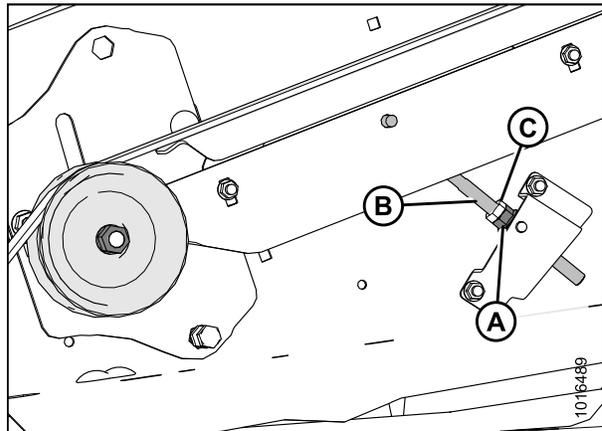


Figure 5.77: Timed Double-Knife Drive

NOTE:

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

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

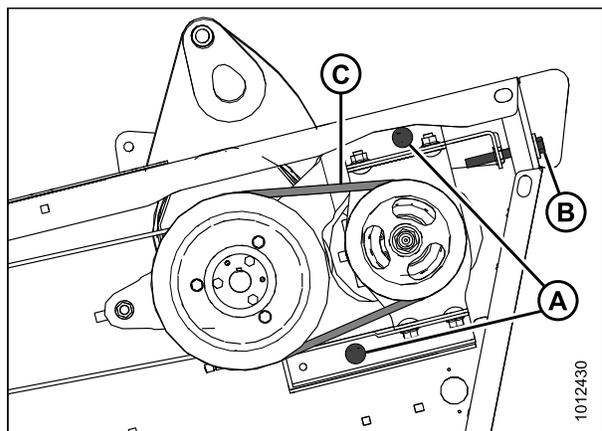


Figure 5.78: Knife Drive V-Belts

MAINTENANCE AND SERVICING

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

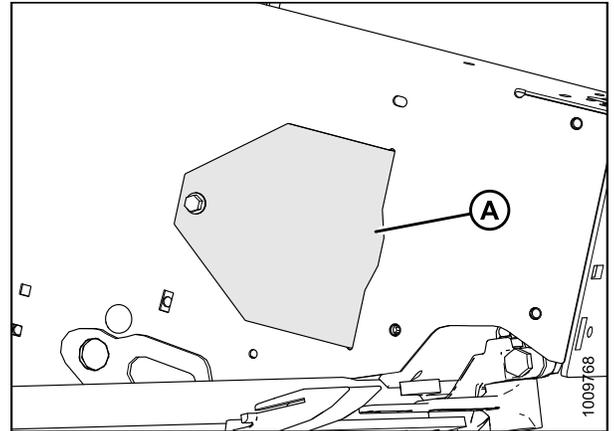


Figure 5.79: Access Cover

Installing Timed Knife Drive Belt

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

If the belt is out of alignment, refer to [Adjusting Belt Tracking, page 151](#).

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

NOTE:

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

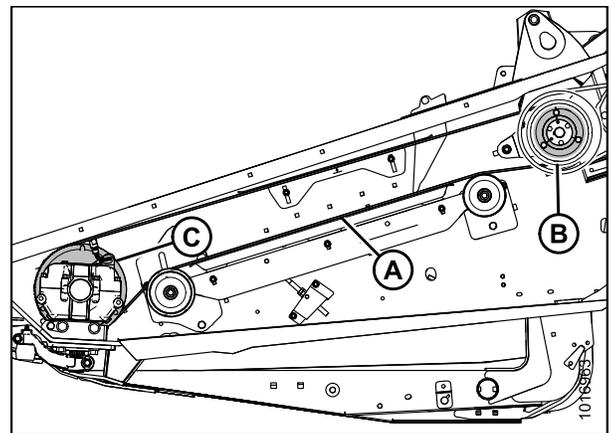


Figure 5.80: Left Side Shown – Right Side Similar

MAINTENANCE AND SERVICING

NOTE:

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

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

NOTE:

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

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

IMPORTANT:

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

5. Tighten the two bolts (A) on the endsheet.
6. Ensure the knives are timed before tightening the belt. Refer to [Adjusting Double-Knife Timing, page 148](#).
7. Slide pulley (A) up on support bracket (B) to take-up the slack in the timing belt and tighten adjuster nut (B).

NOTE:

Ensure idler pulley (A) is as high as possible in the support bracket (B) slot.

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

9. Tension the knife drive belt. Refer to [Tensioning Timed Knife Drive Belts, page 147](#).

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

11. Close the endshield. Refer to [Closing Endshields, page 32](#).

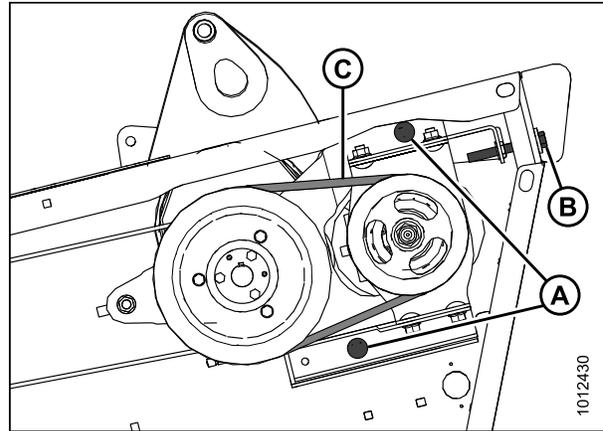


Figure 5.81: Knife Drive V-Belts

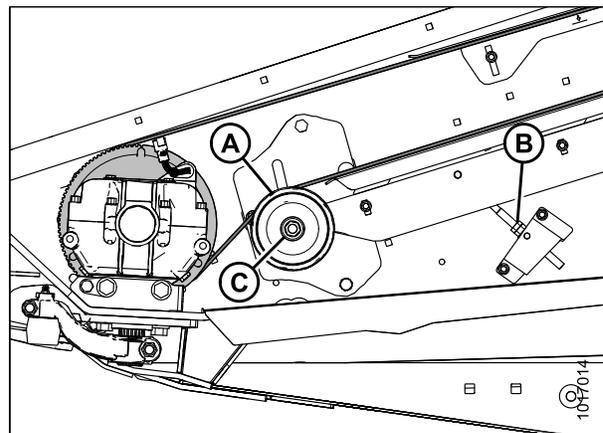


Figure 5.82: Knife Drive

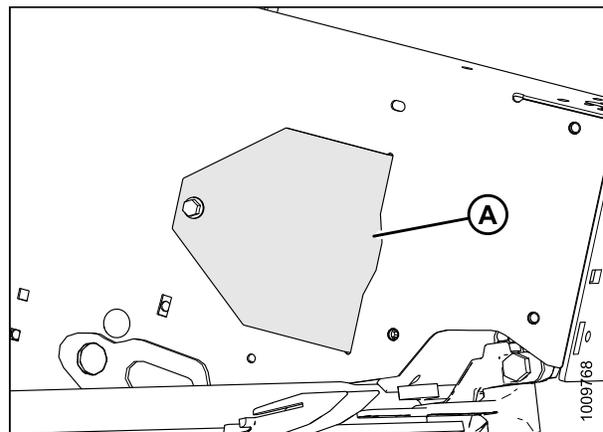


Figure 5.83: Access Cover

MAINTENANCE AND SERVICING

Tensioning Timed Knife Drive Belts

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

IMPORTANT:

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

IMPORTANT:

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open the endshield. Refer to [Opening Endshields](#), page 31.
3. Loosen hex nuts (A) enough to allow the idler pulleys (B) to pivot.

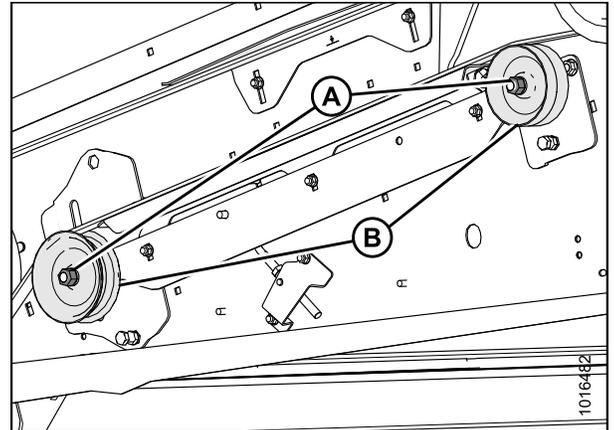


Figure 5.84: LH Knife Drive

4. Pull the idler pulley (A) as high as possible by hand.
5. Thread flange nut (B) down adjuster bolt (C) to achieve final tension.

NOTE:

Tension is checked at mid-span of the belts. The belts should deflect 11/16–14/16 in. (18–22 mm) with 20 lbf (89 N) of force applied to belt.

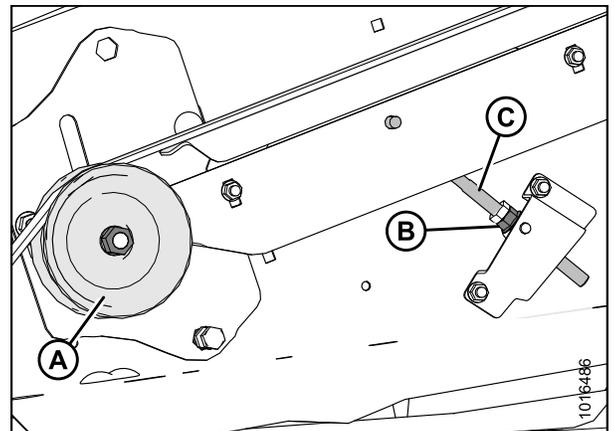


Figure 5.85: LH Knife Drive

MAINTENANCE AND SERVICING

6. Tighten hex nuts (A) on idler pulleys (B).

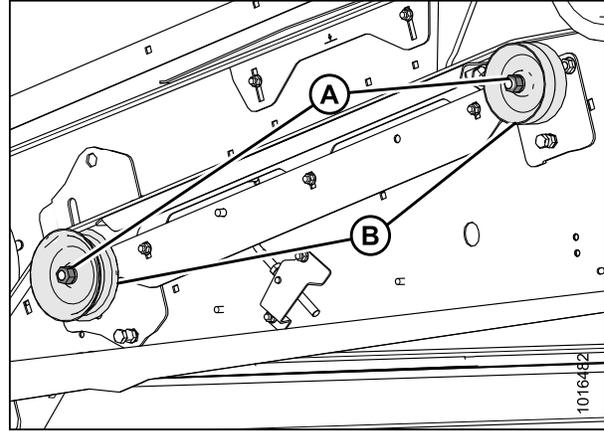


Figure 5.86: LH Knife Drive

7. Loosen flange nut (A) until adjuster bolt (B) is just snug, then tighten jam nut (C) to prevent loosening of the adjuster bolt.

NOTE:

If flange nut and adjuster bolt is not loosened, the lower guide will not be parallel to the belt.

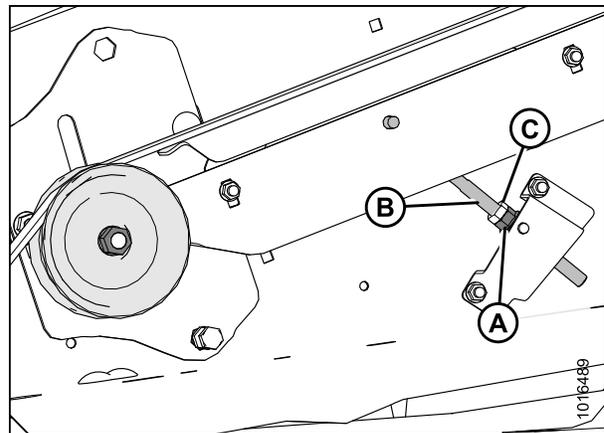


Figure 5.87: LH Knife Drive

8. Ensure there is a clearance of $7/64$ – $9/64$ in. (2.5–3.5 mm) between the lower belt (A) and lower guide (B).
9. If necessary, loosen the three bolts (C) and adjust lower guide (B) as required. Tighten bolts.
10. Check that upper belt (D) and upper guide (E) also has a clearance of $1/16$ – $3/32$ in. (1.5–2.5 mm). If necessary, loosen the two bolts (F) and adjust as required. Tighten bolts.
11. Close the endshield.
12. Repeat procedure for other side of header.

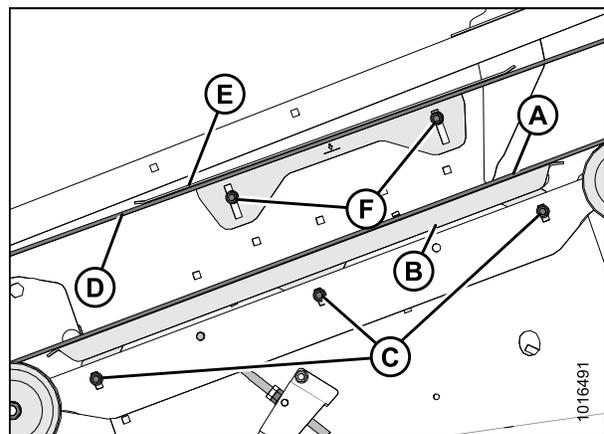


Figure 5.88: LH Knife Drive

Adjusting Double-Knife Timing

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

1. Shut down the windrower, and remove the key from the ignition.
2. Open both endshields. Refer to [Opening Endshields, page 31](#).

MAINTENANCE AND SERVICING

3. Remove the right-hand belt. Refer to *Removing Timed Knife Drive Belt, page 144*.
4. Rotate the left knife drive box driven pulley clockwise until the left knife (A) is at the center of the inboard stroke (B) (moving towards the center of the header).

NOTE:

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

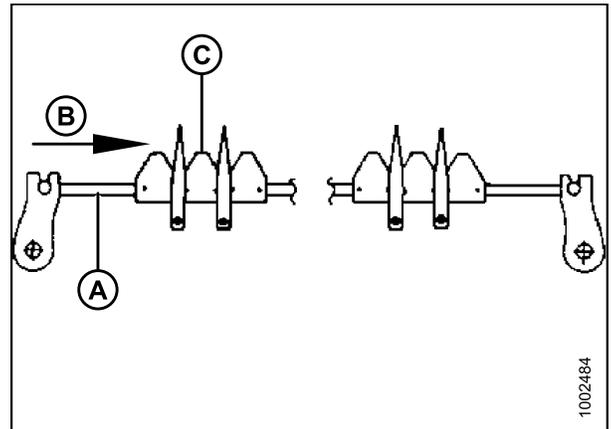


Figure 5.89: Adjusting Timing – Left Side

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

NOTE:

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

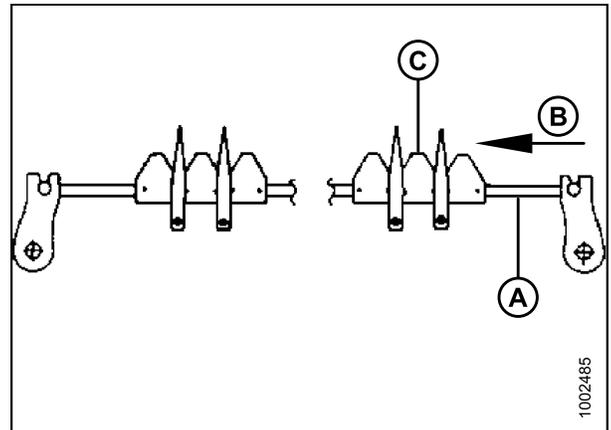


Figure 5.90: Adjusting Timing – Right Side

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

NOTE:

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

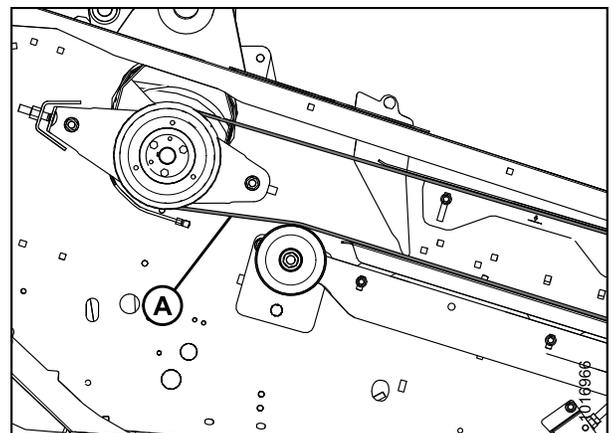


Figure 5.91: Right Side Knife Drive

MAINTENANCE AND SERVICING

- Slide the idler pulley (A) up by hand to remove most of the belt slack. Tighten the nut (B).

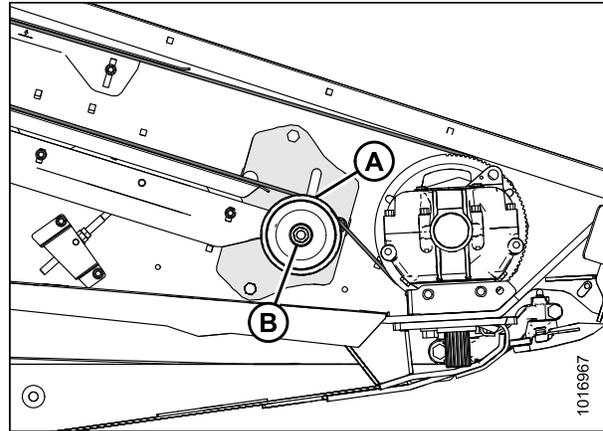


Figure 5.92: Right Side Knife Drive

- Pull the idler pulley (A) as high as possible by hand.
- Thread flange nut (B) down adjuster bolt (C) to achieve final tension.

NOTE:

Tension is checked at mid-span of the belts. The belts should deflect 11/16–14/16 in. (18–22 mm) with 20 lbf (89 N) of force applied to belt.

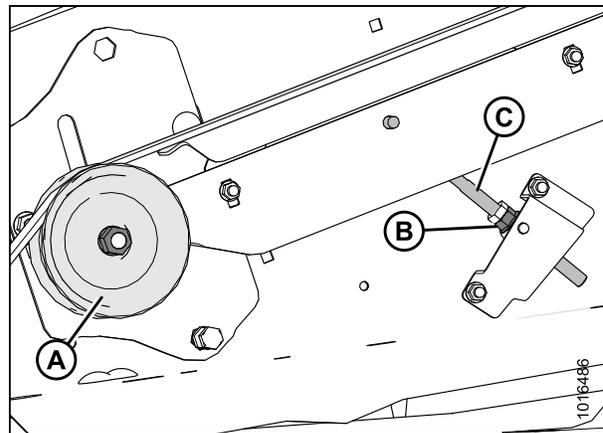


Figure 5.93: Left Side Shown — Right Side Opposite

- Tighten hex nuts (A) on idler pulleys (B).
- 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.

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

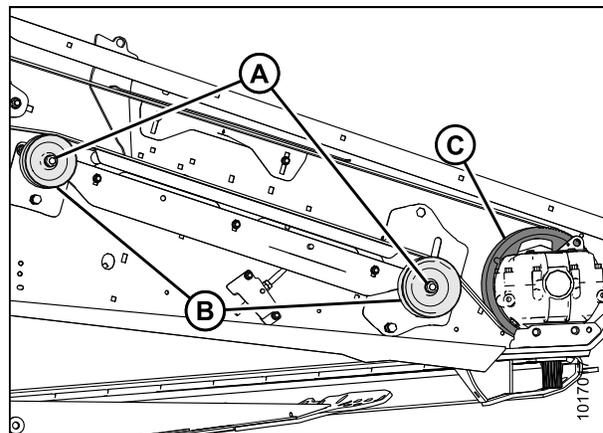


Figure 5.94: RH Knife Drive

MAINTENANCE AND SERVICING

13. Ensure the drive pulleys don't rotate, and tension the right side drive belts (refer to Step [10.](#), [page 150](#) to Step [11.](#), [page 150](#)).

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 150](#)) and readjust if necessary (refer to Step [12.](#), [page 150](#)).
15. Close both endshields. Refer to [Closing Endshields](#), [page 32](#).

Adjusting Belt Tracking

The procedure for adjusting belt tracking is the same for both sides of timed knife headers.

IMPORTANT:

Belts that are not tracking properly are subject to premature failure—ensure the pulleys are aligned and parallel. Follow the belt tensioning procedures in this manual to prevent misalignment.

Cogged timing belts should be centered on the knife drive box pulley and positioned at least 3/32 in. (2 mm) from either edge of the pulley when the header is running (a gap should be visible between the belt and the edge of the pulley).

NOTE:

The belt should not make continuous contact with the flanges of the drive pulley, but occasional contact is acceptable.

 **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.

MAINTENANCE AND SERVICING

1. Open both endshields. Refer to *Opening Endshields*, page 31.

CAUTION

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

2. Operate the header and observe the belt tracking on both the drive pulley and the knife drive box pulley on both sides of the header. Shut down the windrower and remove the key from the ignition before making any adjustments.
3. Proceed to Step 6., page 153 if the belt is tracking towards the inboard side of the drive pulley. The likely cause is a toe-out problem (A, B) (belt tends to move towards the low tension [inboard] side of the pulley).
4. Proceed to Step 6., page 153 if the belt is tracking towards the outboard side of the drive pulley. The likely cause is a toe-in problem (C, D) (belt tends to move towards the high tension [outboard] side of the pulley).
5. Proceed to Step 7., page 153 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).

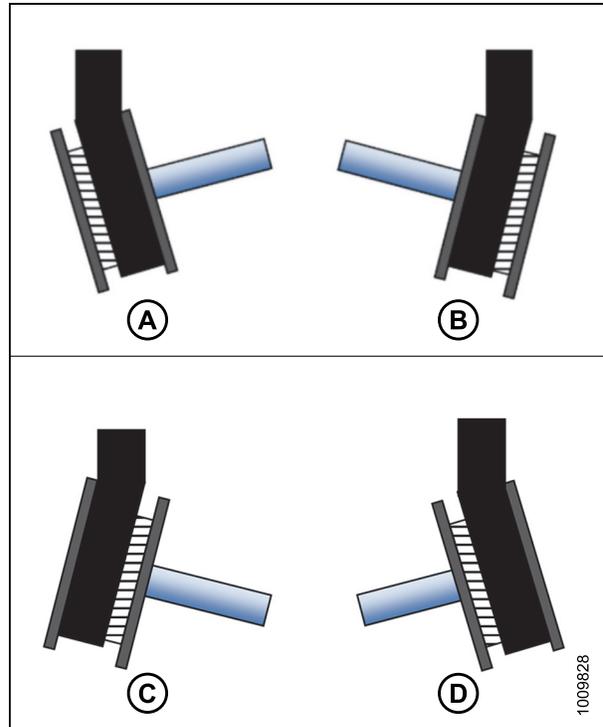


Figure 5.95: Knife Drive Pulley

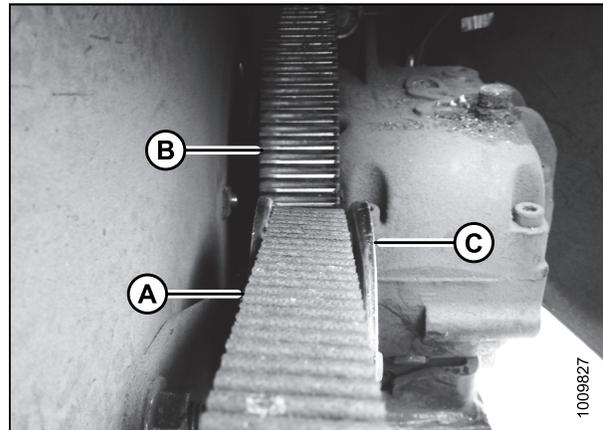


Figure 5.96: Knife Drive Belt

MAINTENANCE AND SERVICING

6. Correct the tracking problem on the drive pulley by adjusting the position of the cross shaft support tube as follows:
 - a. Loosen nut (A) on the support assembly (B).
 - b. Slide the support assembly (B) rearwards in slot (C) to correct the toe-out condition, or forward to correct the toe-in condition.
 - c. Tighten nut (A).
 - d. Operate the header and check the belt tracking. Adjust the support assembly as required.
 - e. Proceed to Step 8., [page 154](#) if the belt tracking problems continue.

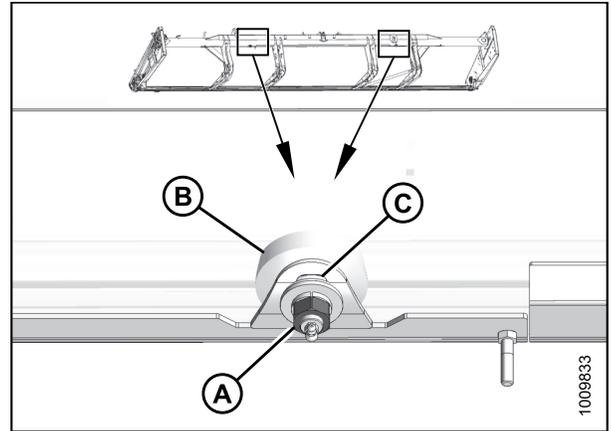


Figure 5.97: Cross-Shaft Support

7. Correct the tracking problem on the knife drive box pulley by adjusting idler positions as follows:
 - a. Loosen jam nuts (A).
 - b. Loosen jam nut and adjuster bolt (B) to relieve belt tension.
 - c. Turn bolts (C) and (D) clockwise to move belt inboard or counterclockwise to move belt outboard.

NOTE:

Bolts must touch end sheet to prevent vibration.

NOTE:

Check that belt does not ride against flanges on pulley (E).

- d. Tighten jam nuts (A).
- e. Tension the belt. Refer to [Tensioning Timed Knife Drive Belts, page 147](#).
- f. Operate the header and check the belt tracking.

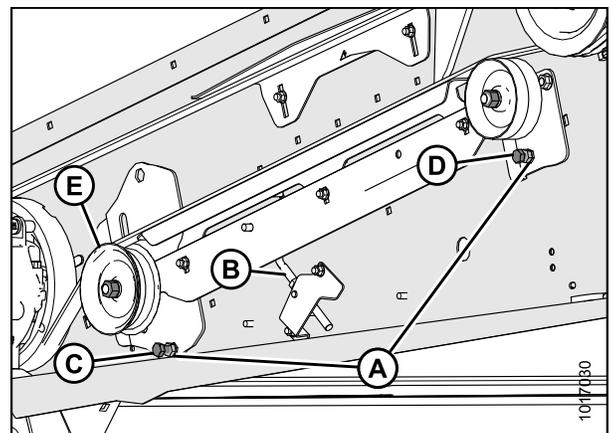


Figure 5.98: Knife Drive – Left Side

MAINTENANCE AND SERVICING

8. If further adjustment is required to correct drive pulley tracking, proceed as follows:
 - a. Loosen jam nuts (A).
 - b. Loosen jam nut and adjuster bolt (B) to relieve belt tension.
 - c. Loosen nuts (C) at the drive pulley location.
 - d. Turn the adjuster bolt (D) clockwise to enable the belt to track inboard and correct the toe-in problems.
 - e. Turn the adjuster bolt (D) counterclockwise to enable the belt to track outboard and correct the toe-out problems.
 - f. Tighten the nuts (C) at the drive pulley location.
 - g. Tension the belt. Refer to [Tensioning Timed Knife Drive Belts, page 147](#).
 - h. Operate the header, check the belt tracking, and readjust the drive pulley as necessary.

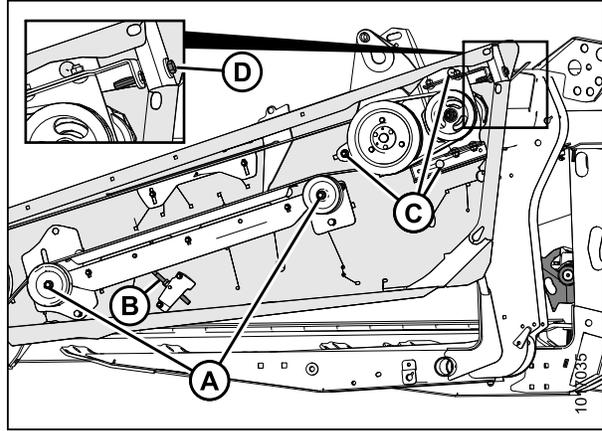


Figure 5.99: Knife Drive – Left Side

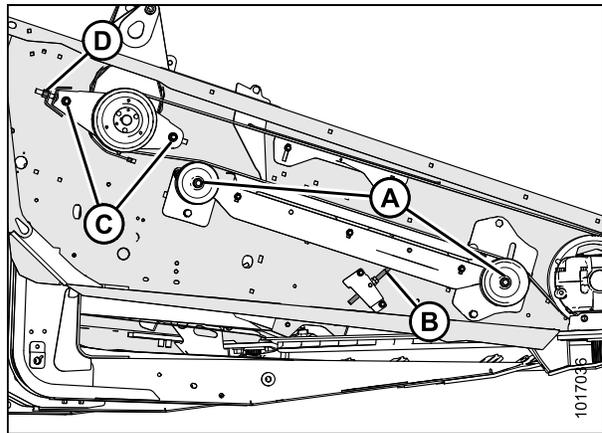


Figure 5.100: Knife Drive – Right Side

5.7 Drapers

Replace drapers if torn, cracked, or missing slats.

5.7.1 Removing Header Drapers

DANGER

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

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

NOTE:

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

4. Stop the engine and remove the key from the ignition.
5. Release the tension on the draper. Refer to [5.7.3 Adjusting Draper Tension, page 157](#).
6. Remove the screws (A) and tube connectors (B) at the draper joint.
7. Pull the draper from deck.

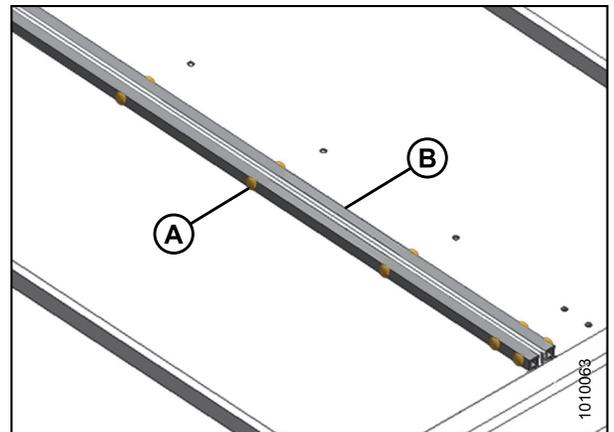


Figure 5.101: Draper Connector

5.7.2 Installing 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 160](#).

MAINTENANCE AND SERVICING

1. Apply talc, baby powder, or talc/graphite lubricant mix to the draper surface that forms the seal with the cutterbar and to the underside of the draper guides.
2. Insert the draper into the deck at the outboard end under the rollers. Pull the draper into the deck while feeding it at the end.
3. Feed in the draper until it can be wrapped around the drive roller.
4. Insert the opposite end of the draper into the deck over the rollers. Pull the draper fully into the deck.



Figure 5.102: Installing Draper

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

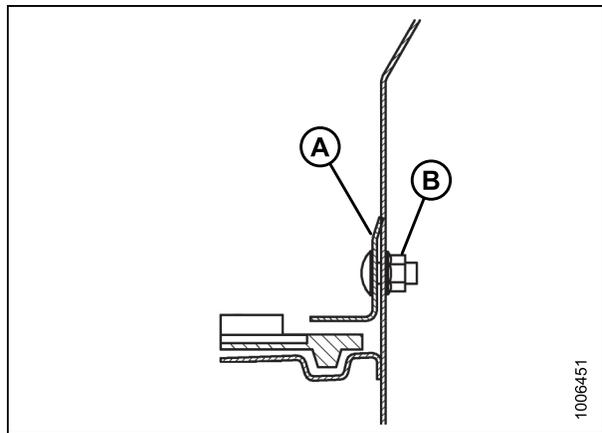


Figure 5.103: Draper Seal

6. Attach the ends of the draper with tube connectors (B), screws (A) (with the heads facing the center opening), and nuts.
7. Adjust the draper tension. Refer to [5.7.3 Adjusting Draper Tension, page 157](#).

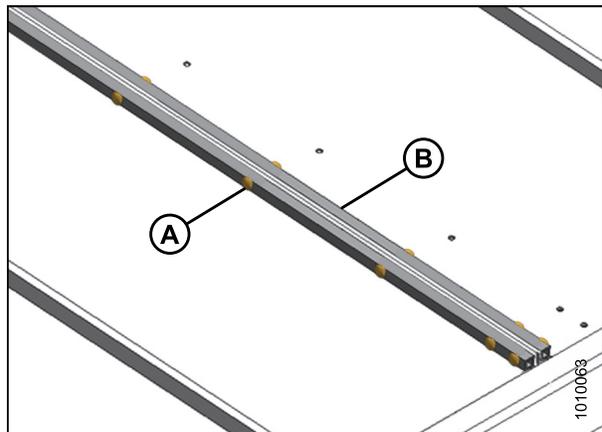


Figure 5.104: Draper Connector

MAINTENANCE AND SERVICING

8. Check the draper seal between the drapers and the cutterbar. Ensure there is a 0.04–0.08 in. (1–2 mm) gap (A) between the cutterbar (C) and the draper (B).
9. Refer to [5.7.5 Adjusting Deck Height, page 160](#) to achieve the proper gap.

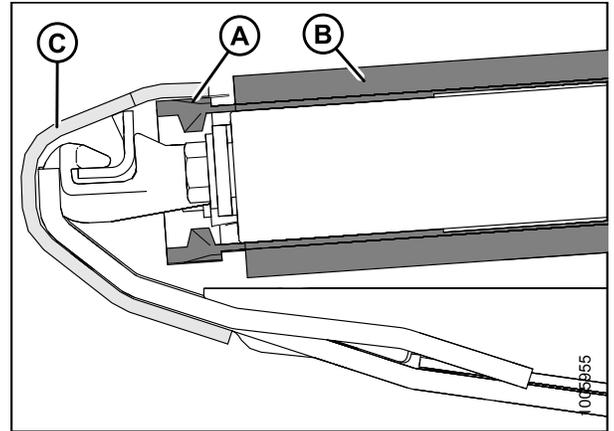


Figure 5.105: Draper Seal

10. Adjust the backsheet deflector (A) (if required) by loosening nut (D) and moving the deflector until there is a 1/32–5/16 in. (1–7 mm) gap (C) between the draper (B) and the deflector.
11. Operate the drapers with the engine at idle so the talc or talc/graphite lubricant makes contact and adheres to the draper seal surfaces.

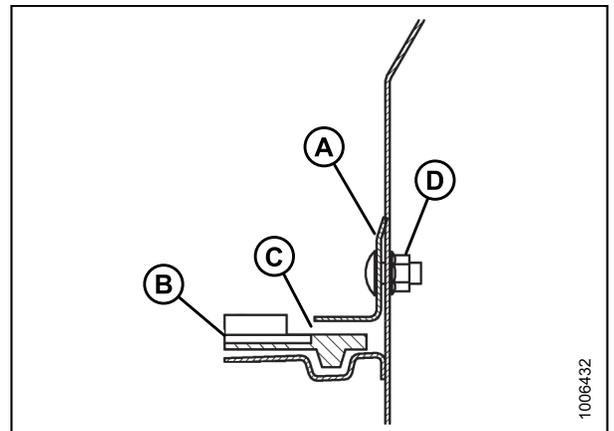


Figure 5.106: Draper Seal

5.7.3 Adjusting Draper Tension

WARNING

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

NOTE:

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

MAINTENANCE AND SERVICING

1. Ensure the white indicator bar (A) is at the halfway point in the window.

WARNING

Check to be sure all bystanders have cleared the area.

2. Start the engine and raise the header.
3. Stop the engine, remove the key from the ignition, and engage the header safety props.

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

5. Ensure the idler roller (A) is between the draper guides (B).

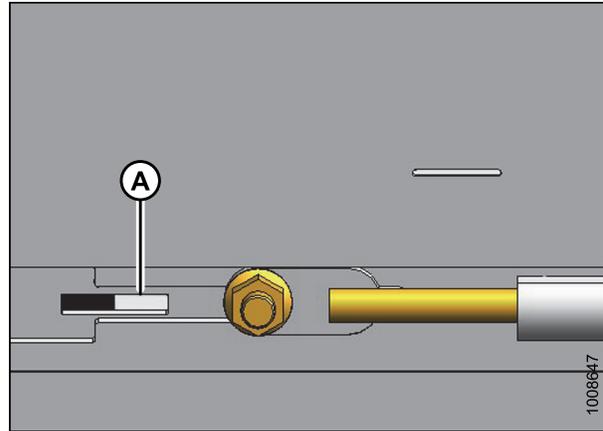


Figure 5.107: Left-Hand Tension Adjuster Shown – Right-Hand Opposite

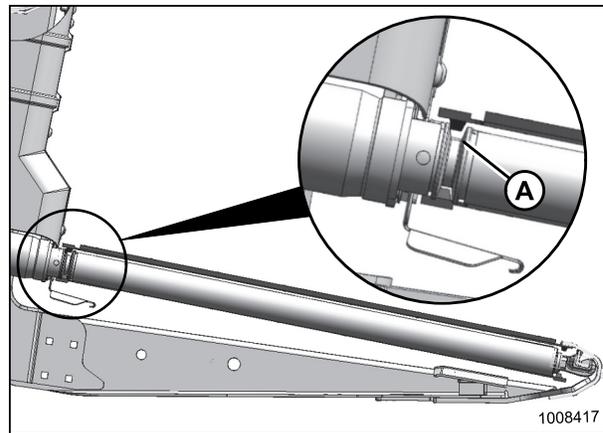


Figure 5.108: Drive Roller

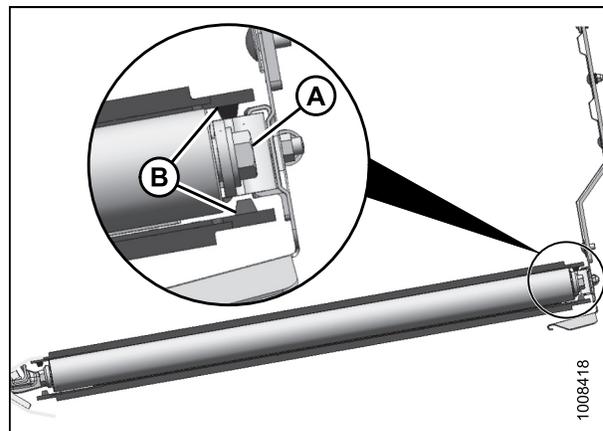


Figure 5.109: Idler Roller

IMPORTANT:

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

6. Turn the adjuster bolt (A) counterclockwise to loosen. The white indicator bar (B) will move outboard in the direction of arrow (D) to indicate that the draper is loosening. Loosen until the white indicator bar is at the halfway point in the window.
7. Turn the adjuster bolt (A) clockwise to tighten. The white indicator bar (B) will move inboard in the direction of arrow (E) to indicate that the draper is tightening. Tighten until the white indicator bar is at the halfway point in the window.

IMPORTANT:

- To avoid premature failure of the draper, draper rollers, and/or tightener components, do not operate with the tension set so the white bar is not visible.
- To prevent scooping dirt, ensure the draper is tight enough that it does not sag below the point where the cutterbar contacts the ground.

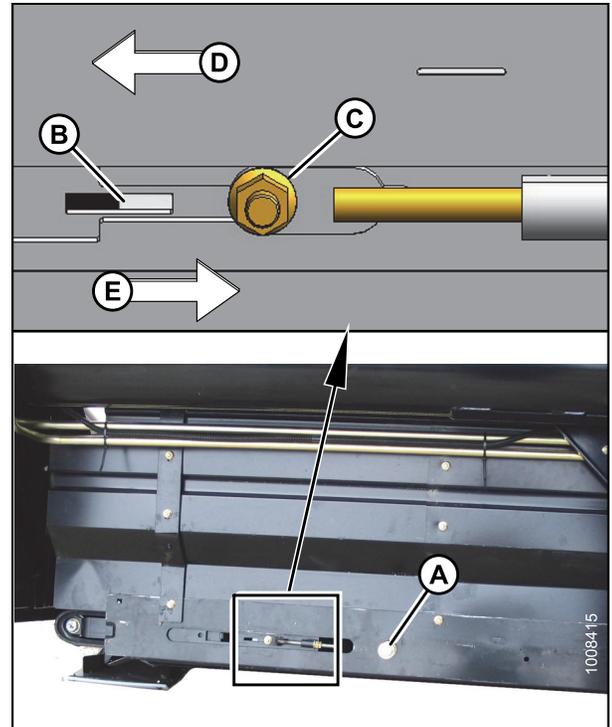


Figure 5.110: Left-Hand Tension Adjuster Shown – Right-Hand Opposite

5.7.4 Adjusting Draper Tracking

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

CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing, page 99](#).

Table 5.2 Header Draper Tracking

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

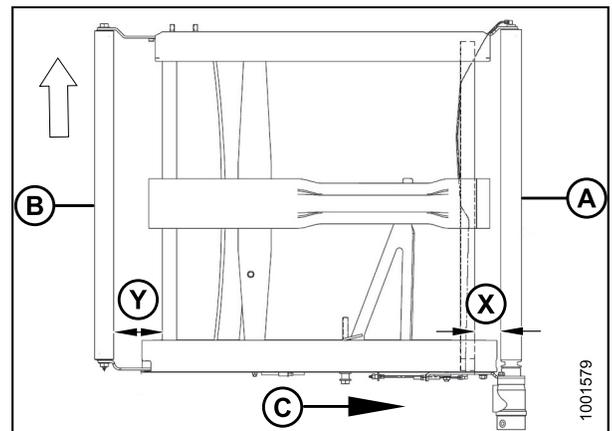


Figure 5.111: Draper Tracking Adjustments

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

MAINTENANCE AND SERVICING

1. Refer to Table [5.2 Header Draper Tracking, page 159](#) to determine which roller requires adjustment and which adjustments are necessary.

NOTE:

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

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

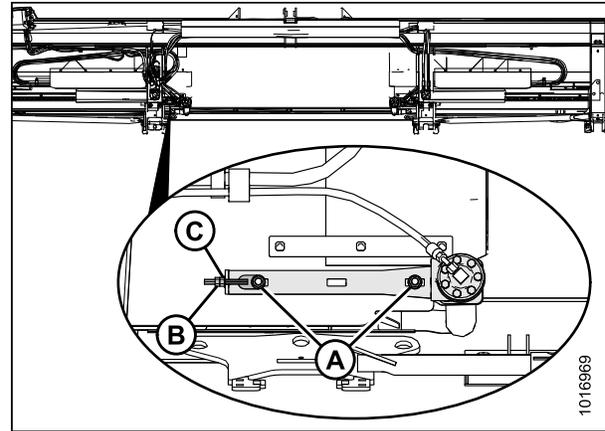


Figure 5.112: Left Side Drive Roller (Leg Removed for Clarity)

3. Adjust the **idler** roller **Y** as follows:
 - a. Loosen nut (A) and jam nut (B).
 - b. Turn the adjuster nut (C).

NOTE:

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

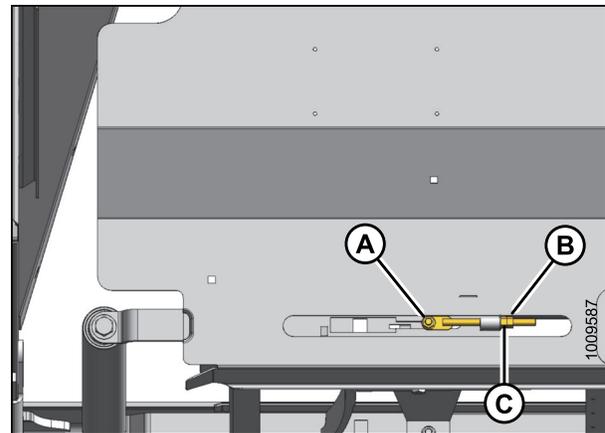


Figure 5.113: Left Side Idler Roller

5.7.5 Adjusting Deck Height

Maintain the deck height so that the draper runs just below the cutterbar. With a new header or newly installed draper, set the initial gap to 1/8 in. (3 mm). To prevent material from entering the drapers and cutterbar, you may need to decrease the deck clearance to 0–1/32 in. (0–1 mm) after the initial break-in period of approximately 50 hours.

⚠ DANGER

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

MAINTENANCE AND SERVICING

1. Shut down the windrower, and remove the key from the ignition.
2. Check the deck height and ensure the draper (B) runs just below the cutterbar (C) with a gap (A) of 1/8 in. (3 mm) between the top of the deck front track and the cutterbar.

NOTE:

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

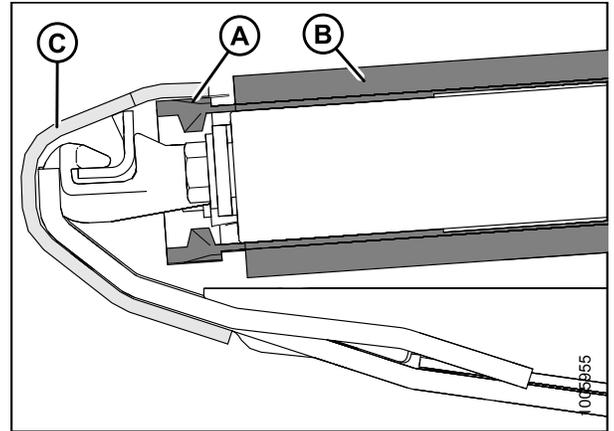


Figure 5.114: Draper Seal

3. Loosen the draper tension. Refer to [5.7.3 Adjusting Draper Tension, page 157](#).
4. Lift the front edge of the draper (A) past the cutterbar (B) to expose the deck support.
5. Measure and note the thickness of the draper belt.

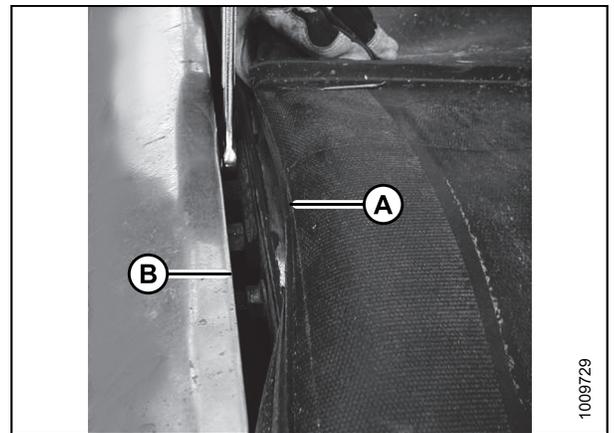


Figure 5.115: Draper Adjustment

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

NOTE:

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

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

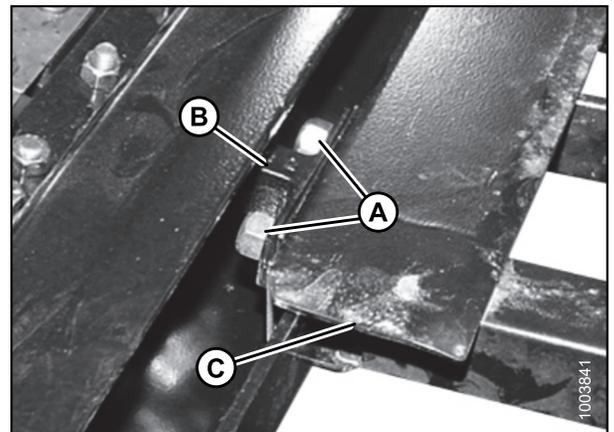


Figure 5.116: Deck Support

MAINTENANCE AND SERVICING

8. Set the deck (A) to a gap (B) of 1 mm + measurement noted in Step 5., page 161 below the cutterbar (C) to create a seal.
9. Tighten the deck support hardware (D).
10. Recheck the gap (B) to ensure it is properly set. Refer to Step 8., page 162.
11. Tension the draper. Refer to 5.7.3 *Adjusting Draper Tension*, page 157.

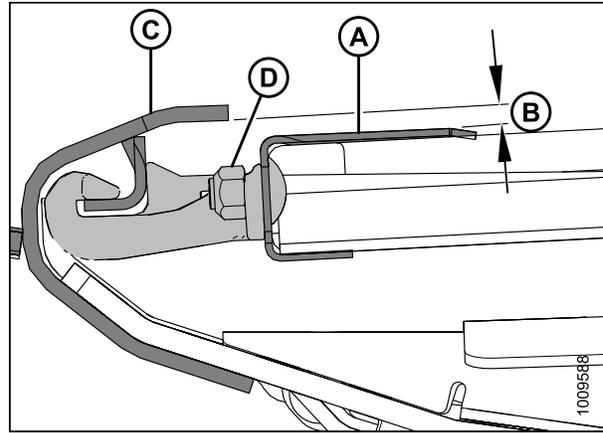


Figure 5.117: Deck Support

12. Adjust the backsheet deflector (A) (if required) by loosening nut (D) and moving the deflector until there is a 1/32–5/16 in. (1–7 mm) gap (C) between the draper (B) and the deflector.

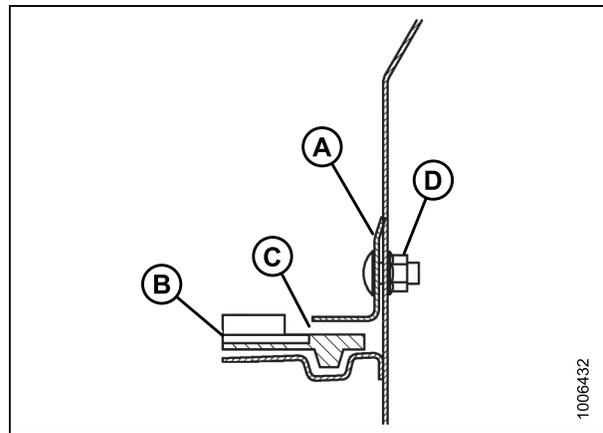


Figure 5.118: Backsheet Deflector

5.7.6 Header Draper Roller Maintenance

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

Inspecting Draper Roller Bearing

Using an infrared thermometer, check for bad draper roller bearings as follows:

1. Engage the header and run the drapers for approximately three minutes.
2. Check the temperature of the draper roller bearings at each of the roller arms (A), (B), and (C) on each deck. Ensure the temperature does not exceed 80°F (44°C) above the ambient temperature.

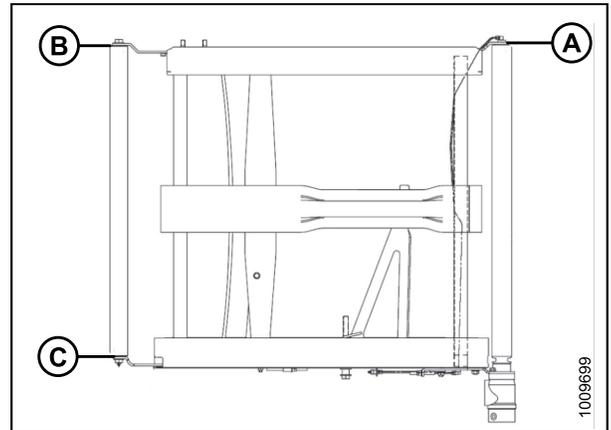


Figure 5.119: Roller Arms

Draper Deck Idler Roller

Removing Draper Idler Roller



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

NOTE:

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

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

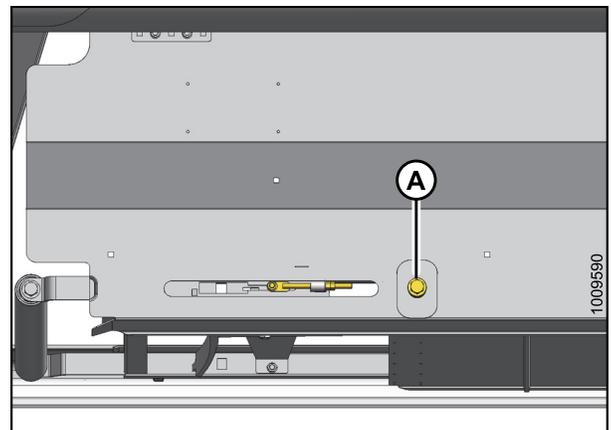


Figure 5.120: Tensioner

MAINTENANCE AND SERVICING

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

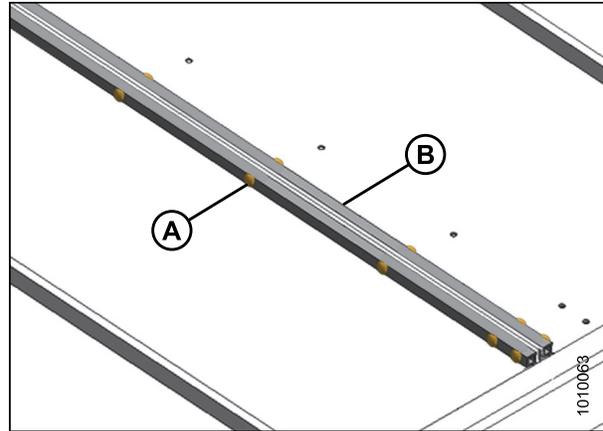


Figure 5.121: Draper Connector

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

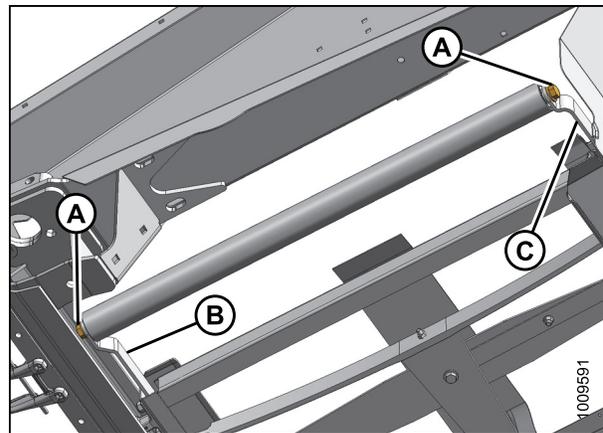


Figure 5.122: Idler Roller

Replacing Draper Deck Idler Roller Bearing

1. Remove two bolts (A) holding the roller to the idler arms.
2. Remove seal (B).
3. Use a slide hammer to remove bearing (C) from the roller.

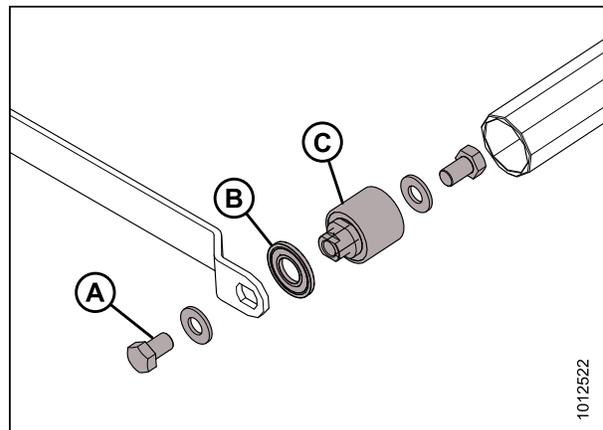


Figure 5.123: Idler Roller Assembly

MAINTENANCE AND SERVICING

4. Install the new bearing assembly (C) by pressing the outer race of the bearing into the tube until it is $9/16$ – $19/32$ in. (14–15 mm) (B) from the outside edge of the tube.

NOTE:

Before installing new seal, fill area (A) with 8 cc of grease.

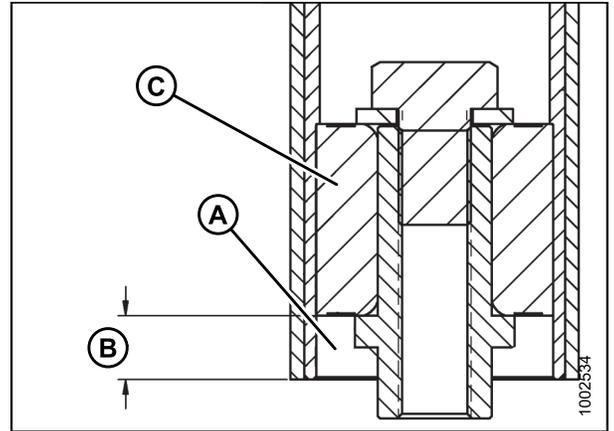


Figure 5.124: Idler Roller Bearing Diagram

5. Install new seal (A) by pressing on the inner and outer race of the seal until it is $1/8$ – $3/16$ in. (3–4 mm) (B) from the outside edge of the tube.

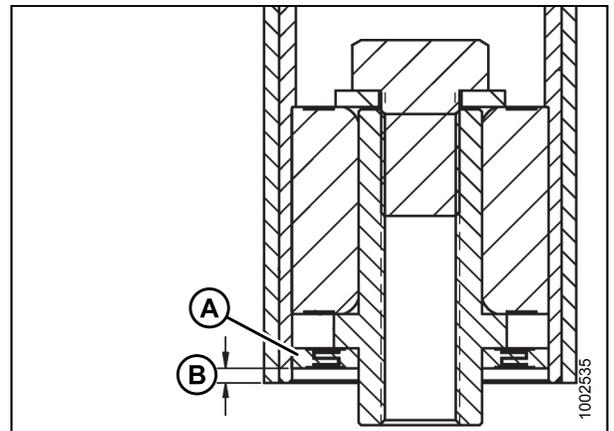


Figure 5.125: Idler Roller Bearing Diagram

6. Install the idler roller (A) between the idler arms and secure with two bolts (B). Torque bolts to 70 ft·lbf (95 N·m).

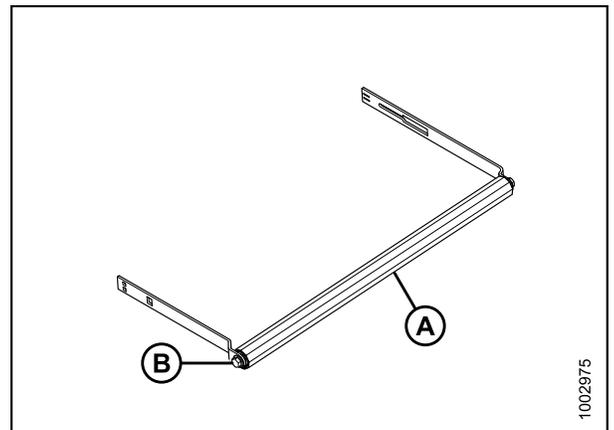


Figure 5.126: Idler Roller

MAINTENANCE AND SERVICING

Installing Draper Deck Idler Roller

1. Install the idler roller (A) into the channels on the feed deck (B).
2. Connect the ends of the draper together with the connector slat.

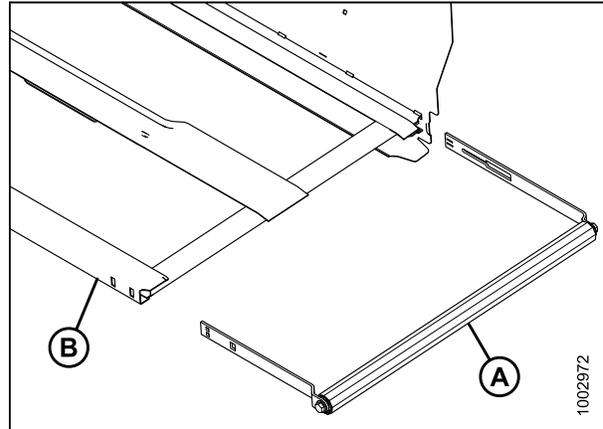


Figure 5.127: Idler Roller and Feed Deck

3. Tension the draper. Locate adjuster bolt (A) and follow the directions on the decal for proper draper tensioning or refer to [5.7.3 Adjusting Draper Tension, page 157](#).
4. Disengage the reel and header safety props.
5. Start the engine and lower the header and reel.
6. Run machine to verify that draper tracks correctly. Refer to [5.7.4 Adjusting Draper Tracking, page 159](#) if further adjustment is necessary.

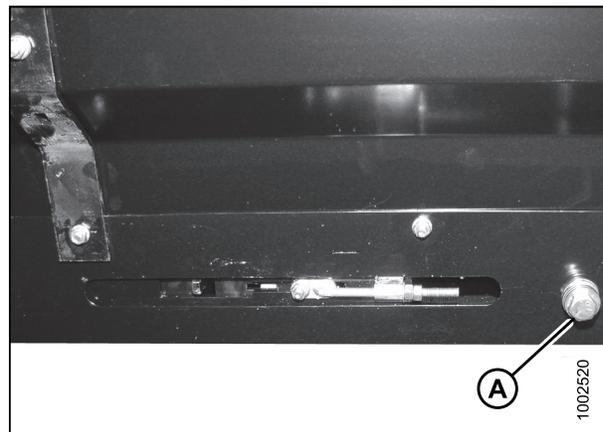


Figure 5.128: Tension Adjuster

Draper Deck Drive Roller

Removing Draper Drive Roller

DANGER

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

NOTE:

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

MAINTENANCE AND SERVICING

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

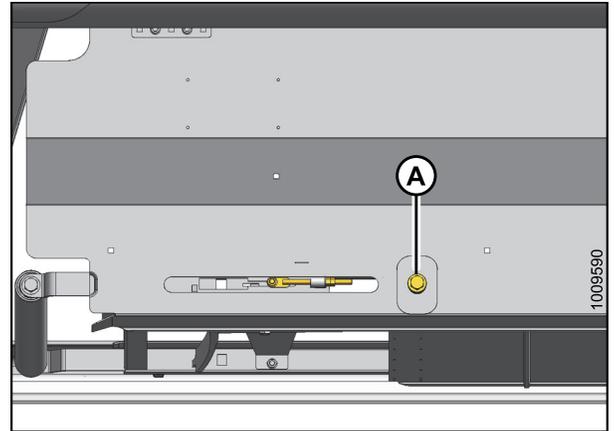


Figure 5.129: Tensioner

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

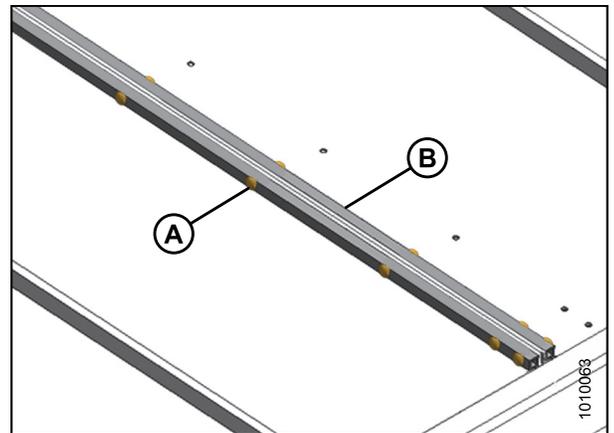


Figure 5.130: Draper Connector

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

NOTE:

The setscrews are 1/4 turn apart.

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

NOTE:

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

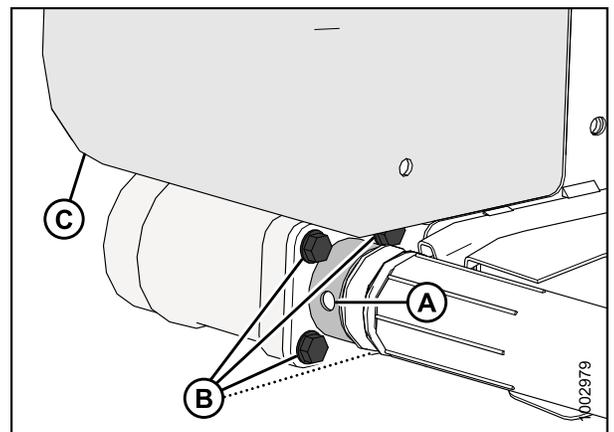


Figure 5.131: Drive Roller

MAINTENANCE AND SERVICING

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

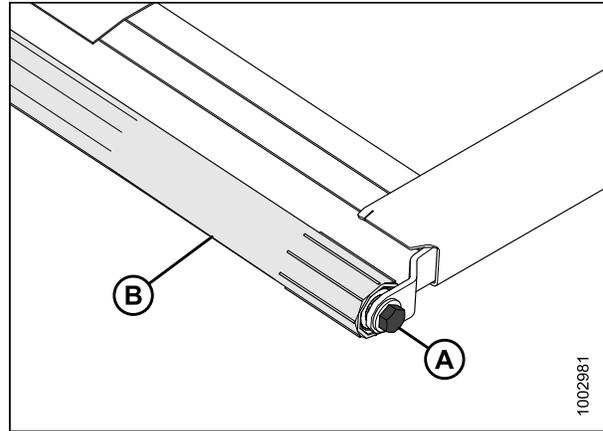


Figure 5.132: Drive Roller

Replacing Draper Drive Roller Bearing

1. Remove draper idler roller assembly. Refer to [Removing Draper Idler Roller, page 163](#).
2. Remove bearing assembly (A) and seal (B) from roller tube (C) as follows:
 - a. Attach a slide hammer (D) to threaded shaft (E) in bearing assembly.
 - b. Tap out the bearing assembly (A) and seal (B).
3. Clean inside of roller tube (C). Check tube for wear or damage and replace if necessary.

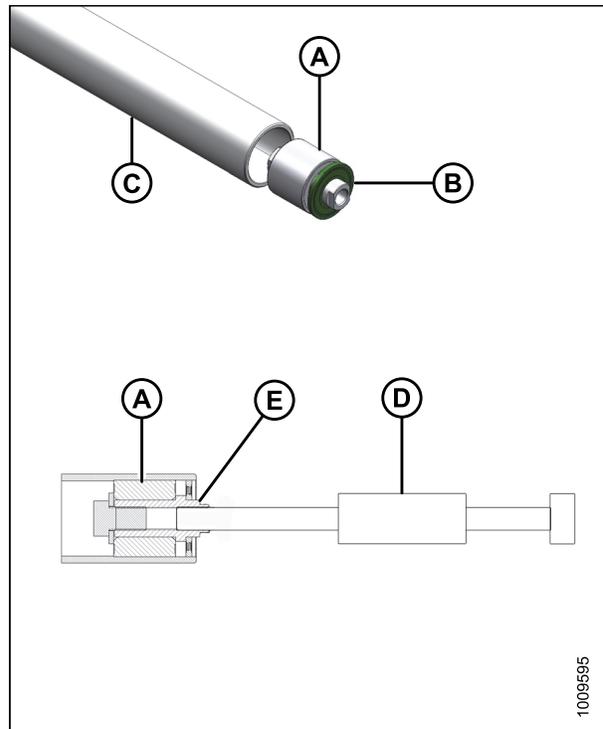


Figure 5.133: Drive Roller Bearing

MAINTENANCE AND SERVICING

4. Install new bearing assembly (A) into roller by pushing on the outer race of the bearing. The bearing is properly positioned when a dimension of 9/16 in. (14 mm) (B) is achieved.
5. Apply the recommended grease in front of bearing. Refer to [5.2.1 Recommended Fluids and Lubricants](#), page 100.
6. Position seal (C) at roller opening, and position a flat washer (1.0 in. I.D. x 2.0 in. O.D.) onto seal.
7. Tap seal into roller opening using a suitable socket on the washer until it seats on the bearing assembly (A). Seal (C) is properly positioned when a dimension of 1/8 in. (3 mm) (D) is achieved.

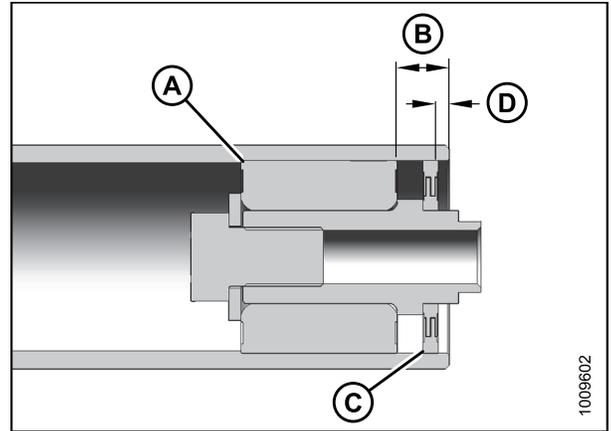


Figure 5.134: Drive Roller Bearing

Installing Draper Drive Roller

1. Position the drive roller (B) between the roller support arms.
2. Install the bolt (A) to secure the drive roller to the arm closest to the cutterbar. Torque bolt to 70 ft·lbf (95 N·m).
3. Grease the motor shaft and insert into the end of the drive roller (B).

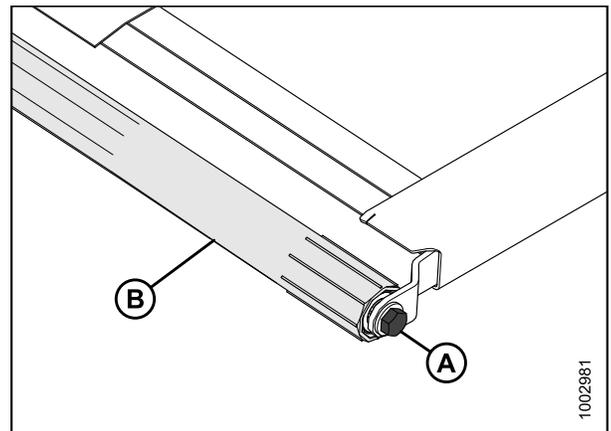


Figure 5.135: Drive Roller

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

NOTE:

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

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

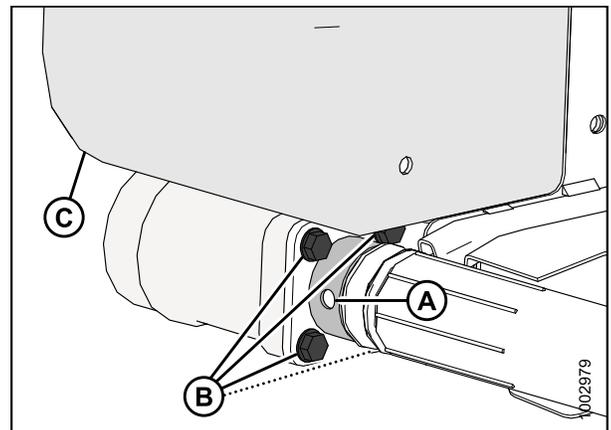


Figure 5.136: Drive Roller

MAINTENANCE AND SERVICING

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

NOTE:

The heads of the screws must face the center opening.

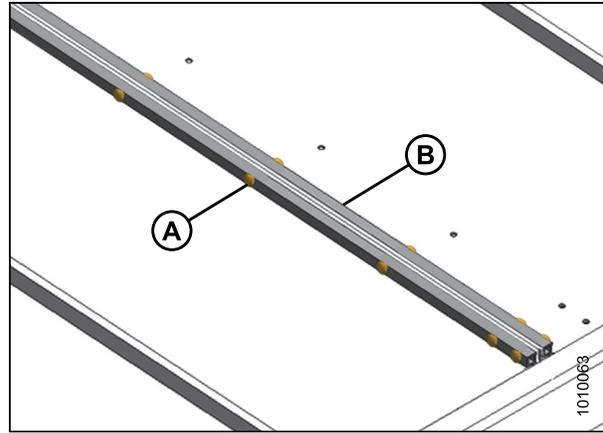


Figure 5.137: Draper Connector

7. Tension the draper. Locate adjuster bolt (A) and follow the directions on the decal for the proper draper tensioning or refer to [5.7.3 Adjusting Draper Tension, page 157](#).
8. Disengage the reel and header safety props.
9. Start the engine and lower the header and reel.
10. Run the machine to verify the draper tracks correctly. Refer to [5.7.4 Adjusting Draper Tracking, page 159](#) if further adjustment is necessary.

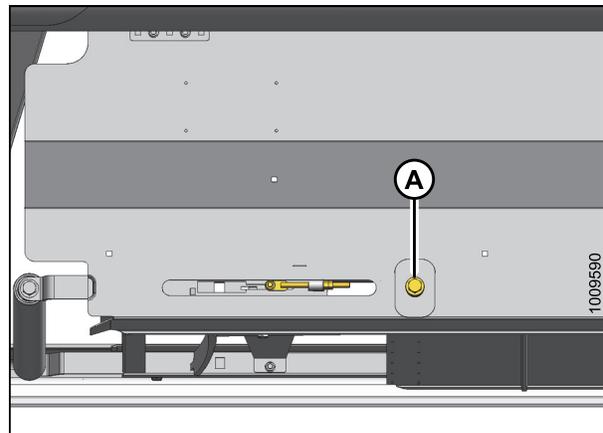


Figure 5.138: Draper Tensioner

5.7.7 Replacing Draper Deflectors

Removing Wide Draper Deflectors

⚠ DANGER

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

1. Raise reel fully and lower header to ground.
2. Shift decks to create work space at one end of header if hydraulic deck shift is installed; otherwise, move decks manually after shutting down windrower.
3. Stop engine, remove key, and engage reel safety props.

MAINTENANCE AND SERVICING

4. Open endshield. Refer to *Opening Endshields, page 31*.
5. Loosen nuts (A) on cutterbar until retainer (B) is loose.

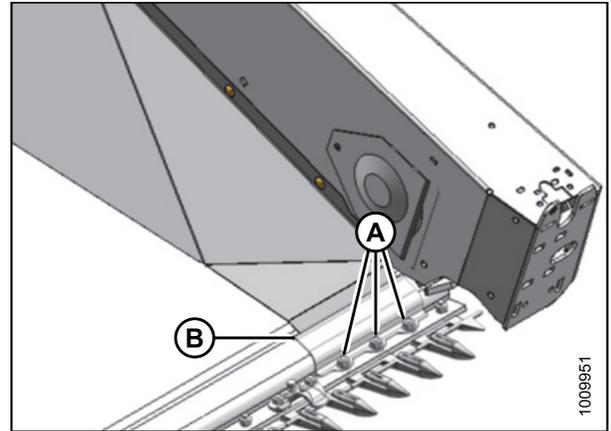


Figure 5.139: Deflector Retainer

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

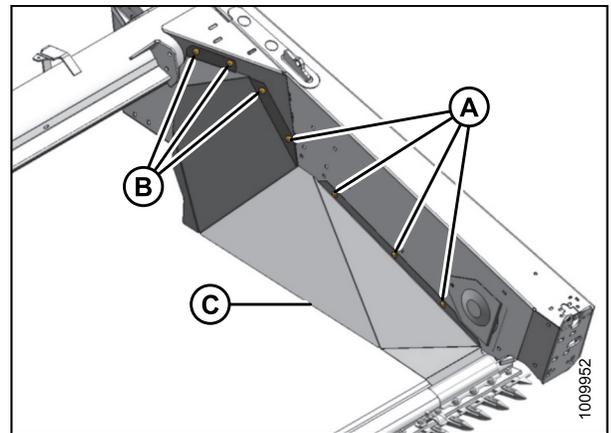


Figure 5.140: Wide Deflector

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

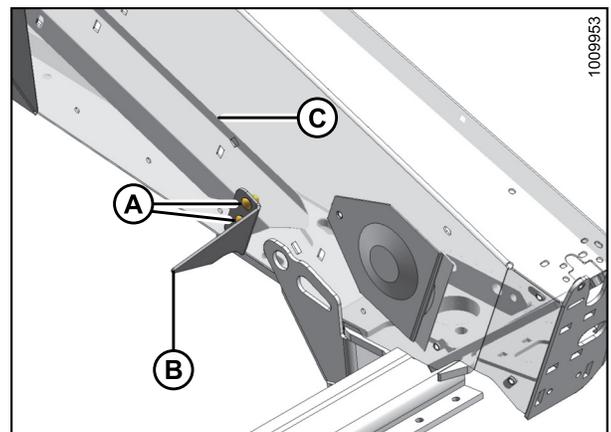


Figure 5.141: Deflector Support

Installing 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.

MAINTENANCE AND SERVICING

1. Raise reel fully and lower header to ground.
2. Shift decks to create work space at one end of header if hydraulic deck shift is installed; otherwise, move decks manually after shutting down windrower.
3. Stop engine, remove key, and engage reel safety props.
4. Open endshield. Refer to [Opening Endshields, page 31](#).
5. Loosen nuts (A) on cutterbar until retainer (B) is loose.
6. Remove existing bolt securing belt guide (C) to opposite side of endsheet.
7. Position support (D) as shown and secure with bolt (E) and lock nut.
8. Install a second 3/8 in. x 3/4 carriage bolt (F) and lock nut. Do not tighten bolts.

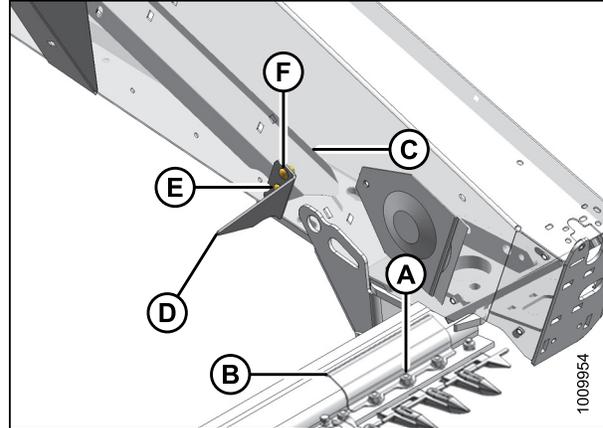


Figure 5.142: Deflector Support

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 (A) to endsheet. Bolt heads must face inboard.
11. Adjust position of deflector (A) to achieve the best fit at the cutterbar and aft edge. Tighten bolts (C) to maintain best fit.
12. Tighten bolts (D) on retainer (B). Torque to 65 ft·lbf (88 N·m).

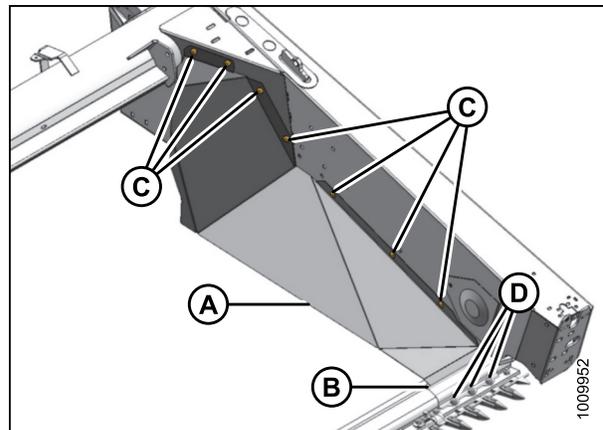


Figure 5.143: Wide Deflector

13. Adjust position of support (A) so the tip contacts deflector (B). Tighten bolts (C).
14. Repeat for opposite end of header.

NOTE:

Draper deflector may be damaged by reel tines if reel height is set incorrectly. Refer to [3.7.8 Reel Height, page 54](#).

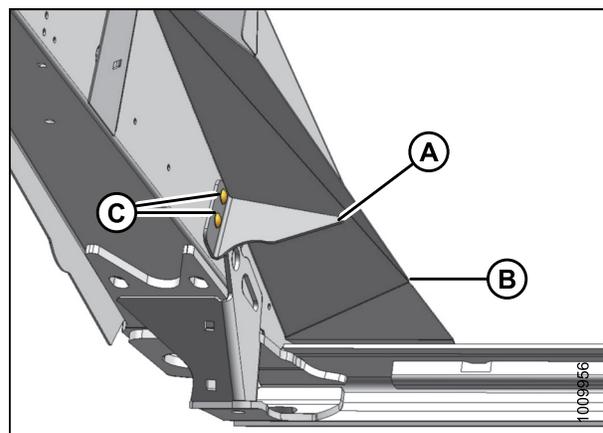


Figure 5.144: Deflector Support

Removing Narrow Draper Deflectors

Narrow draper deflectors can replace wide deflectors if bunching occurs at the ends of the header when decks are set for center delivery.

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 31](#)
5. Remove two Torx® head screws (A) and lock nuts.
6. Remove three carriage bolts (B) and lock nuts and remove the aft deflector (C).

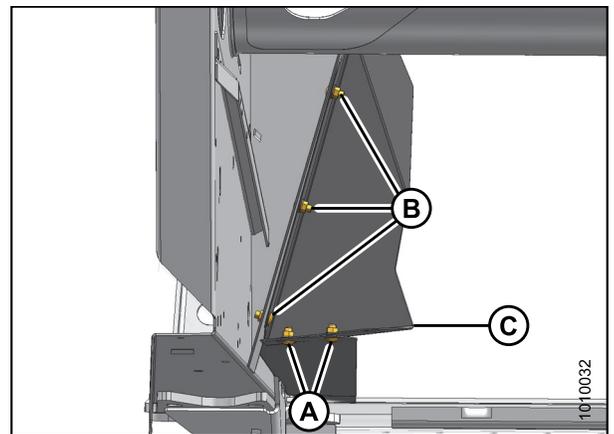


Figure 5.145: Aft Deflector

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

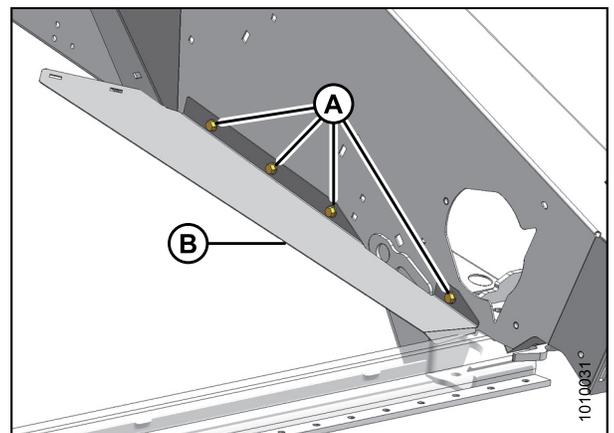


Figure 5.146: Forward Deflector

Installing Narrow Draper Deflectors

Narrow draper deflectors can replace wide deflectors if bunching occurs at the ends of the header when decks are set for center delivery.

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 31](#).
5. Position the forward deflector (B) onto the endsheet and temporarily install forward and aft 3/8 in. x 5/8 in. self tapping screws (A).
6. Check the fit of the forward end of the deflector (B) on the cutterbar and ensure there is no gap between the deflector and cutterbar. Remove and bend the deflector as required to obtain the best fit.
7. Install two 3/8 in. x 5/8 in. self tapping screws (A) and tighten all four screws.
8. Position the aft deflector (C) as shown and install three 3/8 in. x 3/4 in. carriage bolts (B) and lock nuts.
9. Install two Torx® head screws (A) and lock nuts with the heads facing down.
10. Tighten all fasteners.
11. Repeat for the opposite end of the header.

NOTE:

Draper deflector may be damaged by reel tines if reel height is set incorrectly. Refer to [3.7.8 Reel Height, page 54](#).

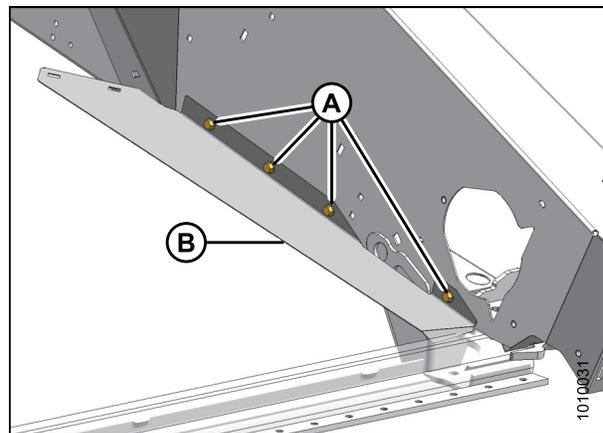


Figure 5.147: Forward Deflector

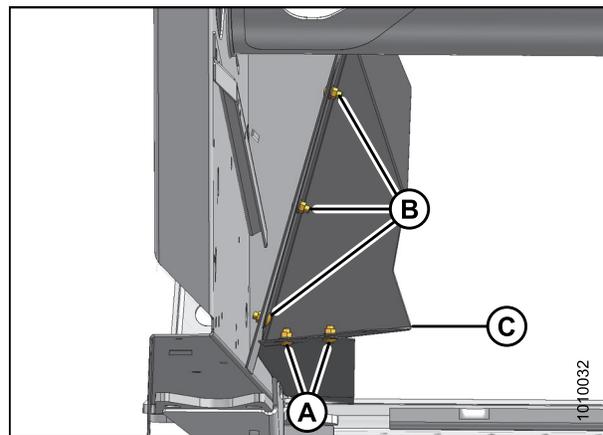


Figure 5.148: Aft Deflector

5.8 Reel

CAUTION

To avoid personal injury, before servicing machine or opening drive covers, refer to [5.1 Preparing Machine for Servicing, page 99](#).

5.8.1 Reel Clearance to Cutterbar

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

The finger to guard/cutterbar clearances with reels fully lowered are shown in [Table 5.3 Finger to Guard/Cutterbar Clearance, page 175](#).

Table 5.3 Finger to Guard/Cutterbar Clearance

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

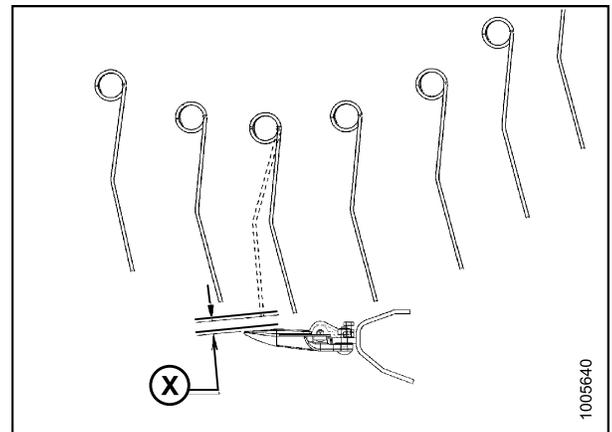


Figure 5.149: Finger Clearance

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

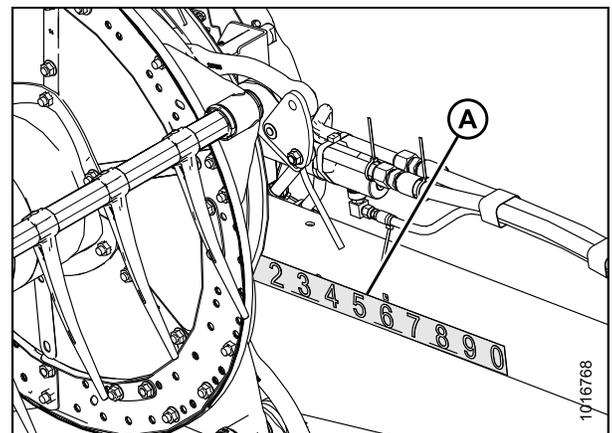


Figure 5.150: Fore-Aft Position

MAINTENANCE AND SERVICING

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

NOTE:

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

6. Check all possible points of contact between points (B) and (C). Depending on the reel fore-aft position, minimum clearance can result at the guard tine, hold-down, or cutterbar.
7. Adjust the reel if necessary. Refer to [Adjusting Reel Clearance](#), page 176.

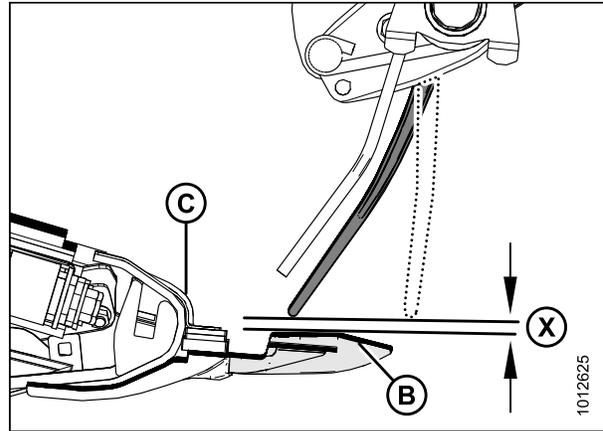


Figure 5.151: Reel Clearance

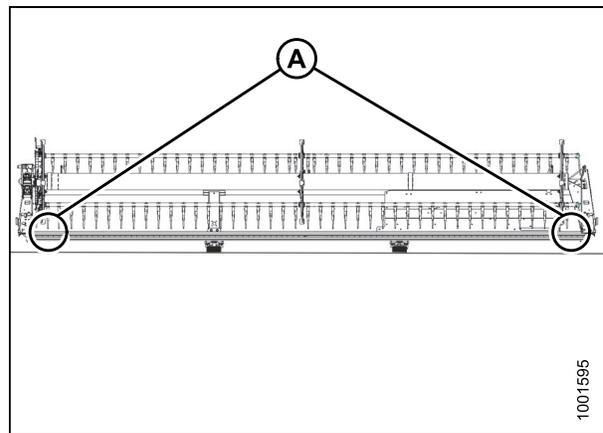


Figure 5.152: Single Reel Measurement Locations (Two Places)

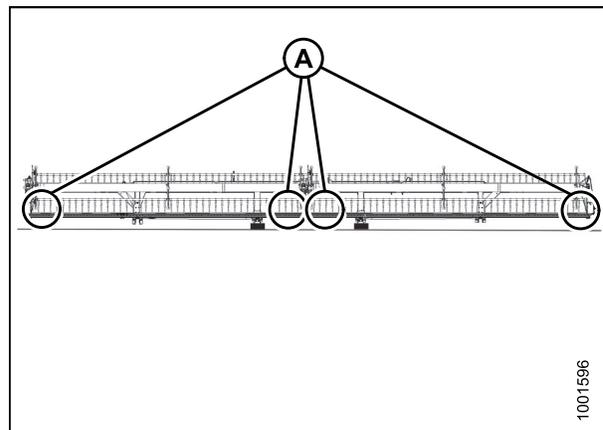


Figure 5.153: Double Reel Measurement Locations (Four Places)

Adjusting 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.

MAINTENANCE AND SERVICING

1. Adjust outboard reel arm lift cylinders to set clearance at outboard ends of reel as follows:
 - a. Loosen bolt (A).
 - b. Turn cylinder rod (B) out of clevis to raise reel and increase clearance to cutterbar, or turn cylinder rod into clevis to lower reel and decrease clearance.
 - c. Tighten bolt (A).
 - d. Repeat at opposite side.

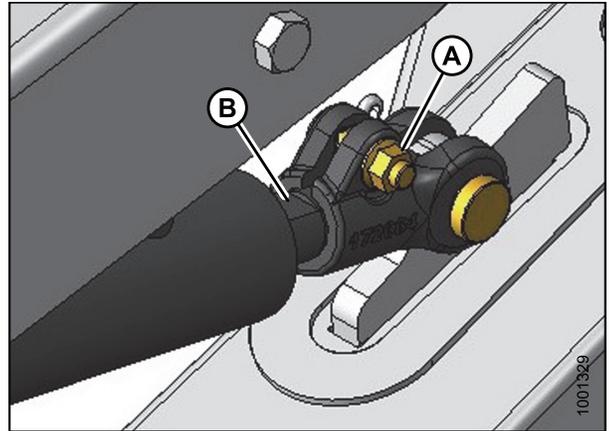


Figure 5.154: Outside Reel Arm

2. **For Double Reel Only:** Adjust center arm lift cylinder stop (A) to change clearance at inboard ends of reels as follows:

NOTE:

Instructions apply to double-reel headers only and are performed from the underside of the arm.

- a. Loosen nut (B).
- b. Turn nut (C) counterclockwise to raise reel and increase clearance to cutterbar, or clockwise to lower reel and decrease clearance.
- c. Tighten nut (B).

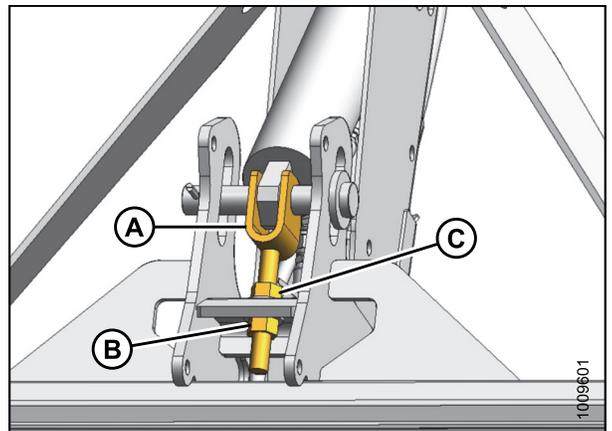


Figure 5.155: Looking up at Arm Underside

5.8.2 Reel Frown

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

Adjusting Reel Frown

Adjust the frown by repositioning the hardware connecting the reel tube arms to the reel discs.

NOTE:

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

MAINTENANCE AND SERVICING

1. Position the reel over the cutterbar (between 4 and 5 on the fore-aft position decal) (A) to provide adequate clearance at all reel fore-aft positions.
2. Record the measurement at each reel disc location for each reel tube.

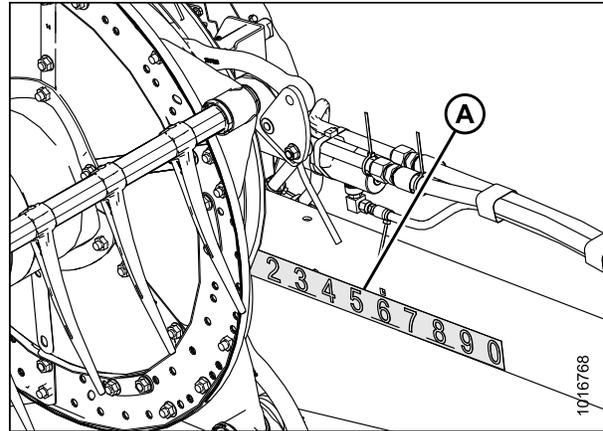


Figure 5.156: Fore-Aft Position Decal

3. Start with the reel disc closest to the center of the header and proceed outward towards the ends adjusting the header profile as follows:
 - a. Remove bolts (A).
 - b. Loosen the bolt (B) and adjust arm (C) until the desired measurement is obtained between the reel tube and cutterbar.

NOTE:

Allow the reel tubes to curve naturally and position the hardware accordingly.

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

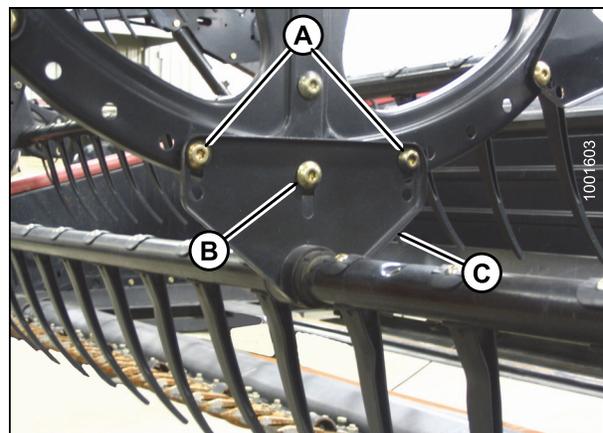


Figure 5.157: Reel Arm

5.8.3 Centering the Reel

To check and center the reel, 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.

⚠ CAUTION

Never start or move the machine until you are sure all bystanders have cleared the area.

Centering Double Reels

1. Loosen bolts (A) on each brace (B) located on both sides of the reel support arm (C).
2. Move the forward end of the reel center support arm (C) laterally as required, to center both reels.
3. Tighten bolts (A) and torque to 265 ft·lbf (359 N·m).

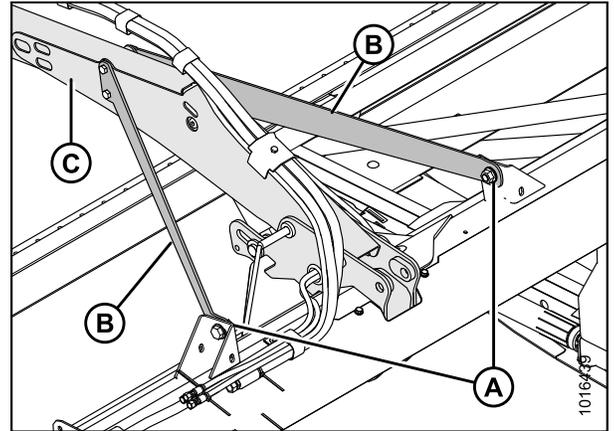


Figure 5.158: Reel Center Support Arm

Centering Single Reels

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 bolts (A) and torque to 265 ft·lbf (359 N·m).

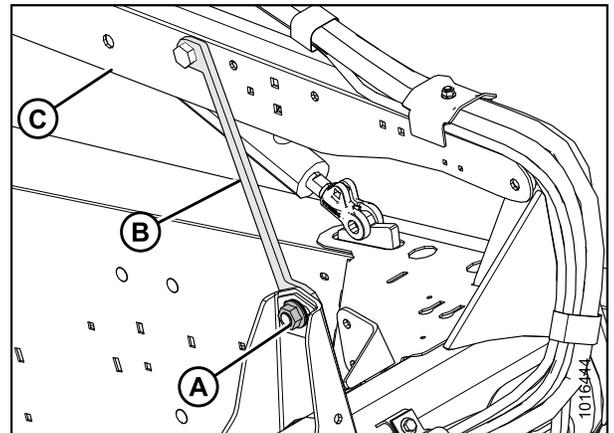


Figure 5.159: Reel Support Arm

5.8.4 Reel Tines

IMPORTANT:

Keep the reel tines in good condition and straighten or replace them as necessary.

Removing Steel Tines



WARNING

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

IMPORTANT:

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

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 182*.
4. Attach reel arms (B) (temporarily) to the reel disc at the original attachment locations (A).
5. Cut the damaged tine so it can be removed from the tine tube.
6. Remove bolts from the existing tines and slide the tines over to replace the tine that was cut off in Step 4., *page 180* (remove the reel arms [B] from the tine tubes as necessary).

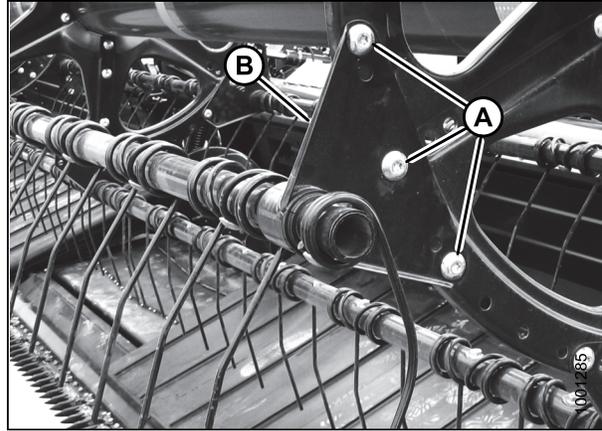


Figure 5.160: Reel Arm

Installing Steel Tines

WARNING

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

IMPORTANT:

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

1. Remove the applicable tine. Refer to *Removing Steel Tines, page 179*.
2. Slide the new tines and reel arm (A) onto the end of the tube.
3. Install the tine tube bushings. Refer to *5.8.5 Tine Tube Bushings, page 182*.
4. Attach the tines to the tine bar with bolts and nuts (B).

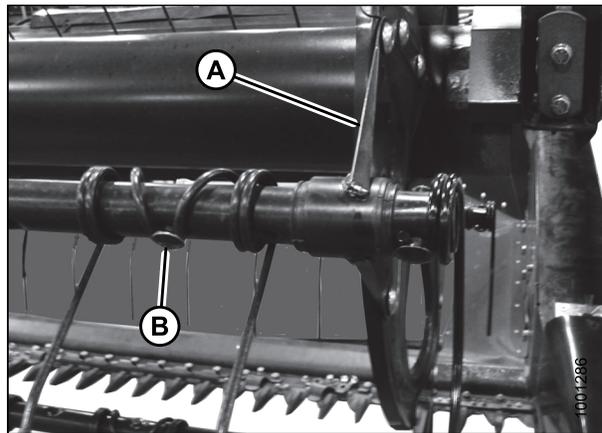


Figure 5.161: Tine Tube

Removing Plastic Fingers

WARNING

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

MAINTENANCE AND SERVICING

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

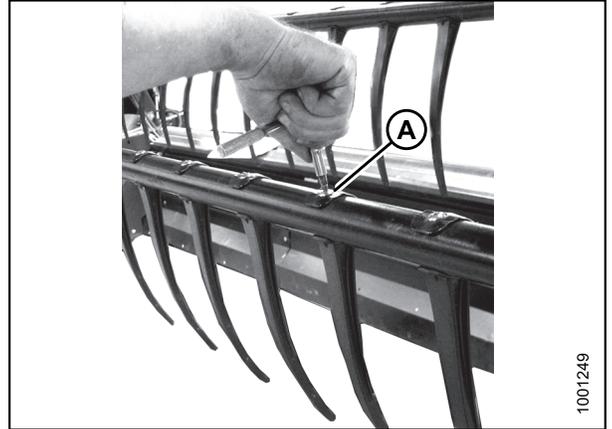


Figure 5.162: Removing Plastic Finger

2. Push the clip at the top of the finger back towards the reel tube and remove the finger from the tube.



Figure 5.163: Removing Plastic Finger

Installing Plastic Fingers

WARNING

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

1. Position the finger on the rear of the finger tube and engage the lug at the bottom of the finger in the lower hole in the finger tube.
2. Lift the top flange gently and rotate the finger until the lug in the top of the finger engages the upper hole in the finger tube.



Figure 5.164: Installing Finger

MAINTENANCE AND SERVICING

IMPORTANT:

Do **NOT** apply force to the finger prior to tightening the mounting screw. Applying force without tightening the mounting screw will break the finger or shear the locating pins.

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

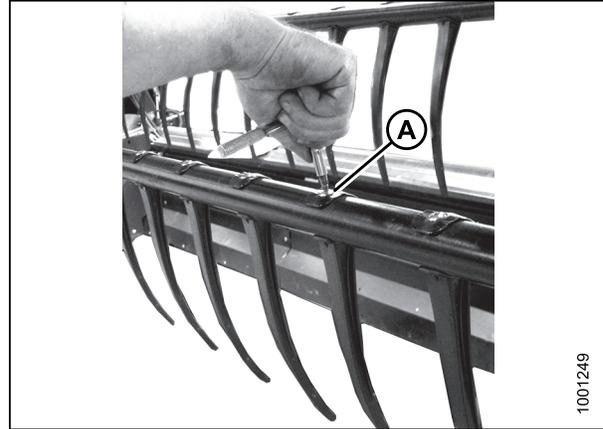


Figure 5.165: Installing Finger

5.8.5 Tine Tube Bushings

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

WARNING

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

IMPORTANT:

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

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

NOTE:

If replacing only the cam end bushing, refer to Step 8., [page 183](#).

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.

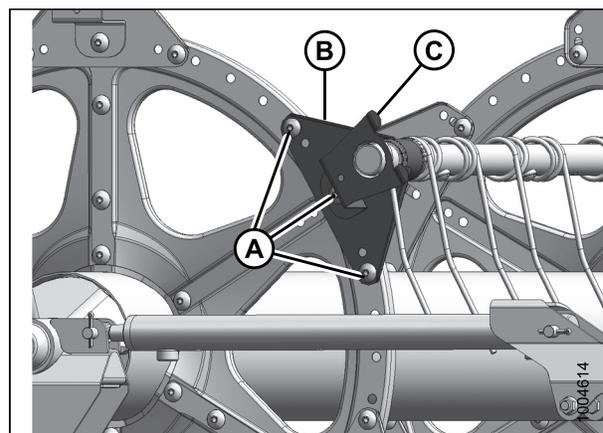


Figure 5.166: Tail End

MAINTENANCE AND SERVICING

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

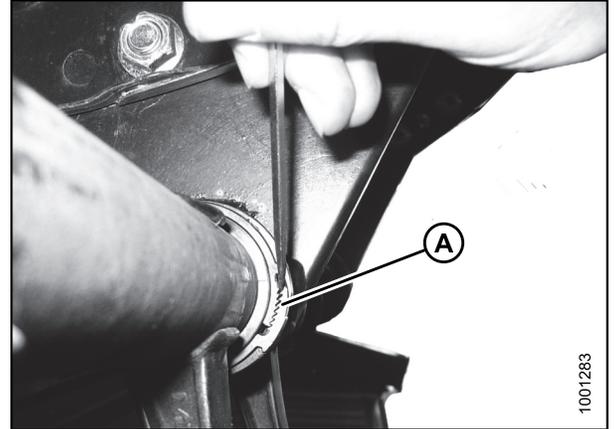


Figure 5.167: Bushing Clamp

6. Rotate the arm (A) until clear of the disc and slide the arm inboard off of bushing (B).
7. Remove the bushing halves (B). If required, remove the next tine or plastic finger so the arm can slide off the bushing. Refer to the following procedures as necessary:
 - [Removing Plastic Fingers, page 180](#)
 - [Removing Steel Tines, page 179](#)

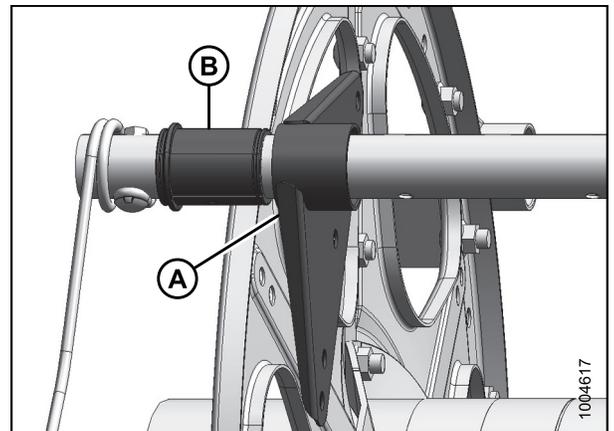


Figure 5.168: Bushing

Cam End Bushings

8. Remove the endshields and endshield support (A) at the applicable tine tube location on the cam end.

NOTE:

Removing cam end bushings requires the tine tube be moved through the disc arms to expose the bushing.

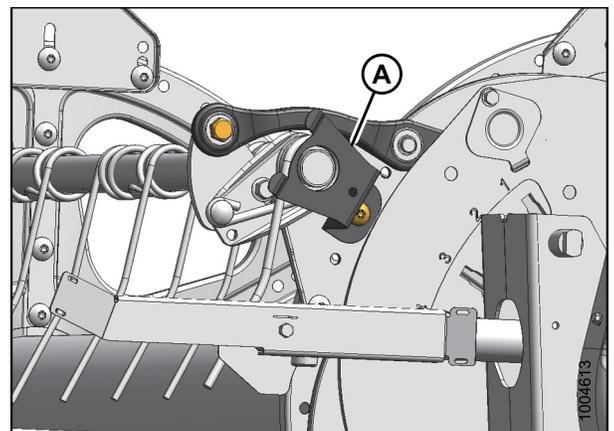


Figure 5.169: Cam End

MAINTENANCE AND SERVICING

- 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.

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

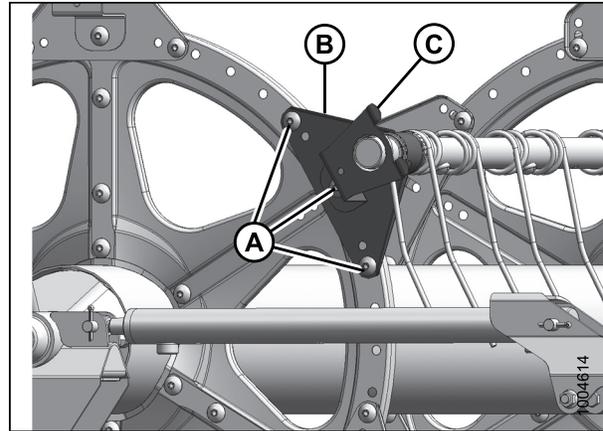


Figure 5.170: Tail End

- Release the bushing clamps or disconnect the support channels from the tine tube support (if installed) depending on which tine tube is being moved. Three tine tubes (B) require channel disconnection and two tine tubes (C) require only bushing clamp removal.

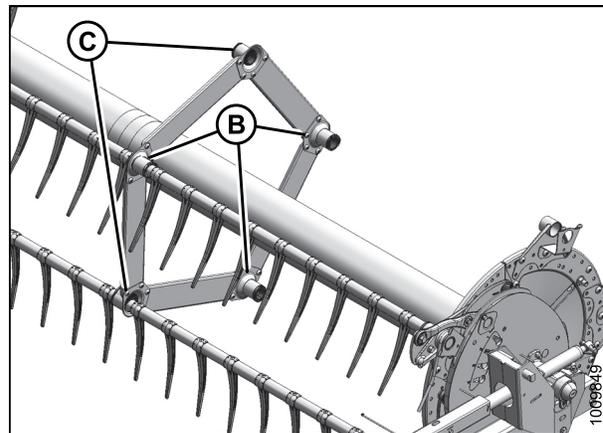


Figure 5.171: Tine Tube Supports

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

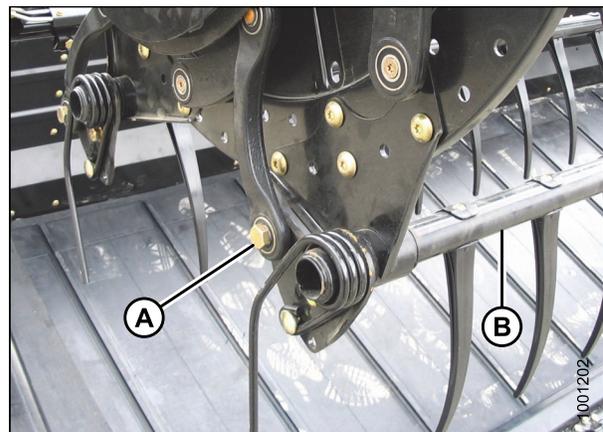


Figure 5.172: Cam End

MAINTENANCE AND SERVICING

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

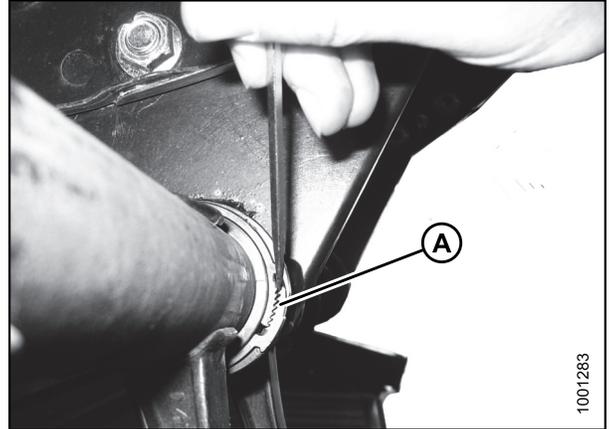


Figure 5.173: Bushing Clamp

14. Slide the tine tube (A) outboard to expose the bushing (B).
15. Remove the bushing halves (B). If required, remove the next tine or plastic finger so the arm can slide off the bushing. Refer to the following procedures if necessary:
 - [Removing Plastic Fingers, page 180](#)
 - [Removing Steel Tines, page 179](#)

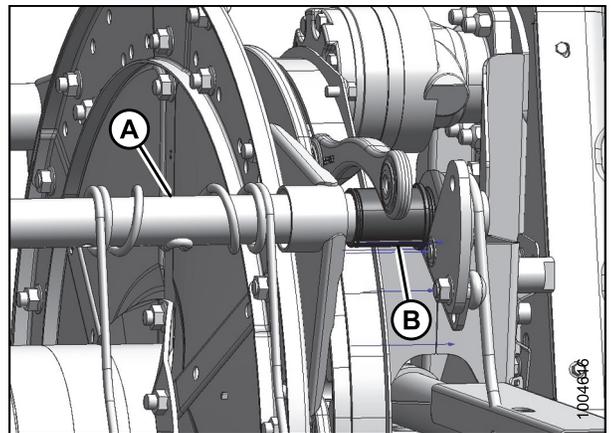


Figure 5.174: Cam End

Tine Tube Bushings (If Installed)

16. Locate the support (A) that requires a new bushing.
17. Remove the four bolts (B) securing channels (C) to the support (A).
18. Remove screw (E) and remove the finger (D) if it is too close to the support to allow access to the bushing. Refer to [Removing Plastic Fingers, page 180](#).

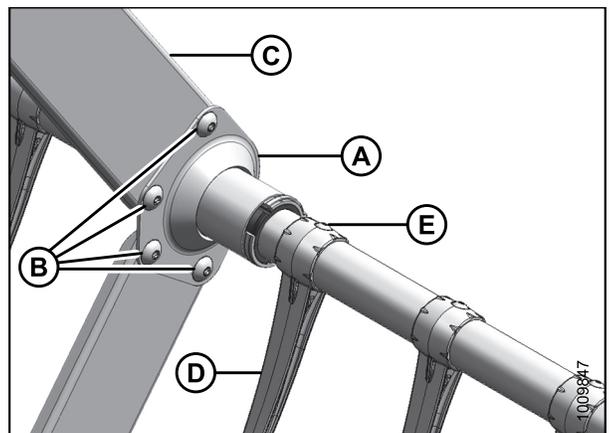


Figure 5.175: Tine Tube Support

MAINTENANCE AND SERVICING

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

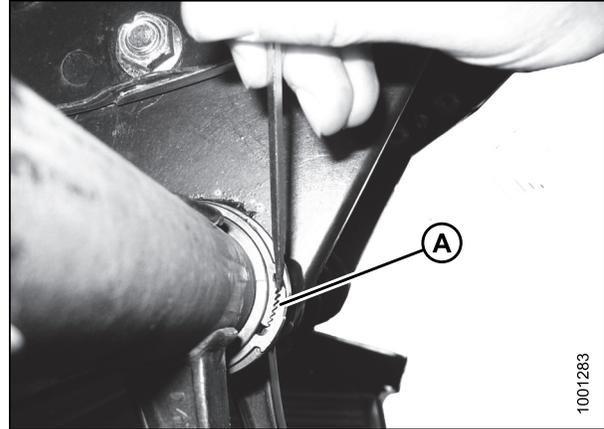


Figure 5.176: Bushing Clamp

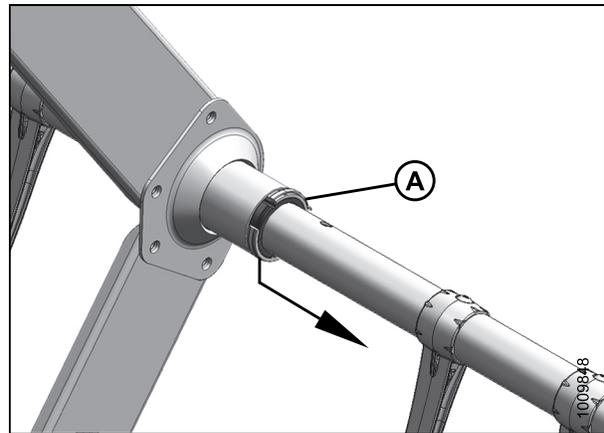


Figure 5.177: Bushing Clamp

MAINTENANCE AND SERVICING

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

NOTE:

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

21. Remove the bushing halves (B).

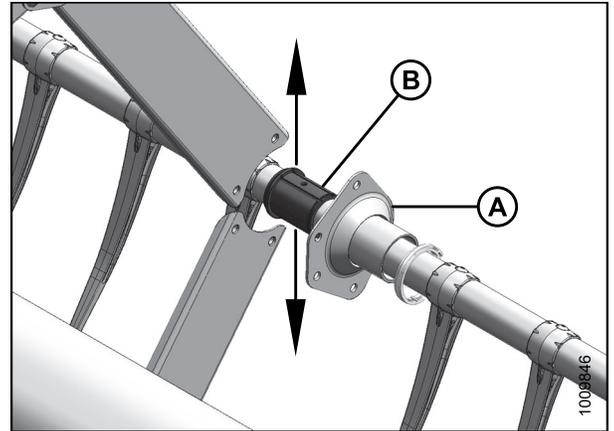


Figure 5.178: Support

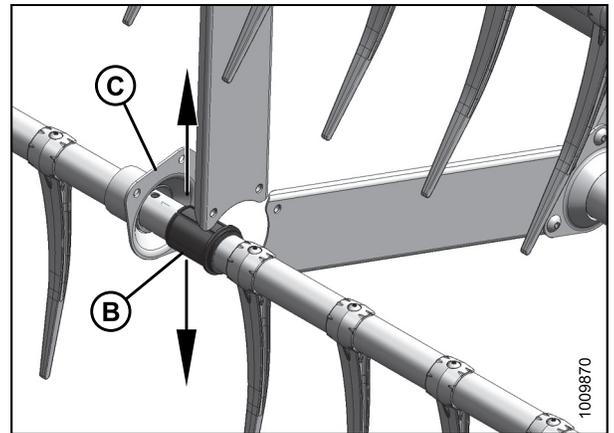


Figure 5.179: Opposite Support

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

⚠ WARNING

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

IMPORTANT:

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

MAINTENANCE AND SERVICING

NOTE:

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

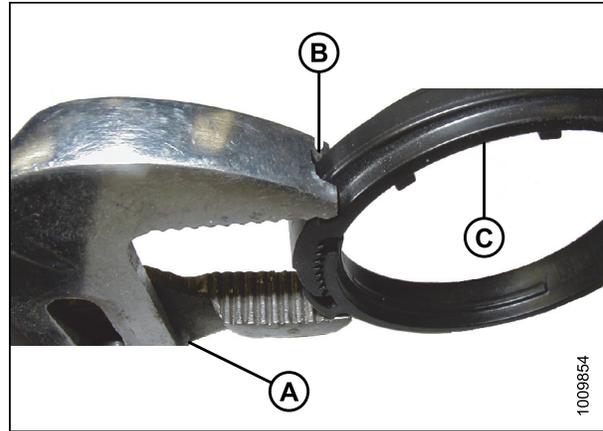


Figure 5.180: Modified Pliers

Cam End Bushings

1. Position the bushing halves (B) on the tine tube with the flangeless end adjacent to the reel arm, and position the lug in each bushing half into the hole in the tine tube.
2. Slide the tine tube (A) towards the tail end of the reel to insert the bushing (B) into the reel arm. If the tine tube supports are installed, ensure the bushings at those locations slide into the support.
3. Reinstall the previously removed fingers or tines. Refer to the following procedures as necessary:
 - [Removing Plastic Fingers, page 180](#)
 - [Removing Steel Tines, page 179](#)
4. Install the bushing clamp (A) onto the tine tube adjacent to the flangeless end of the bushing (B).
5. Position the clamp (A) on the bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

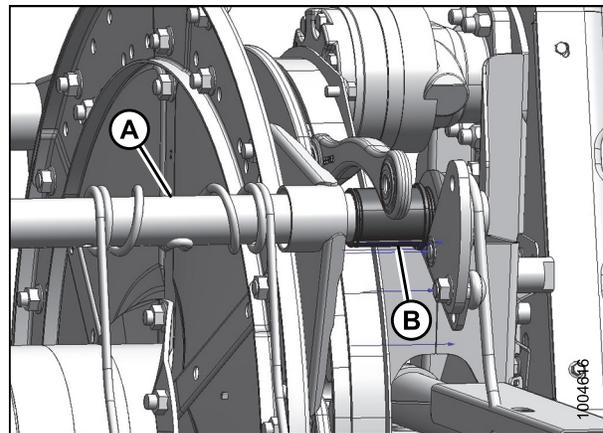


Figure 5.181: Cam End

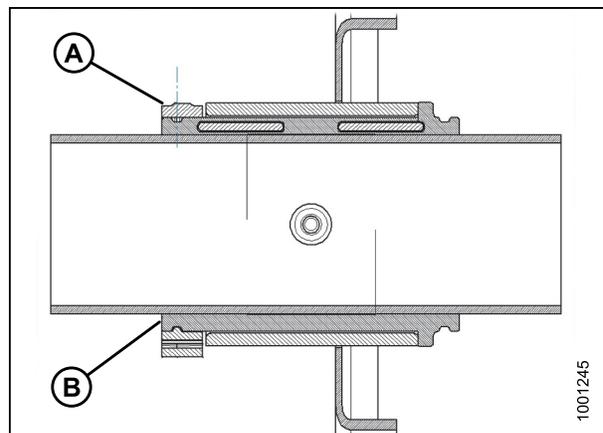


Figure 5.182: Bushing

MAINTENANCE AND SERVICING

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

IMPORTANT:

Over-tightening clamp may result in breakage.

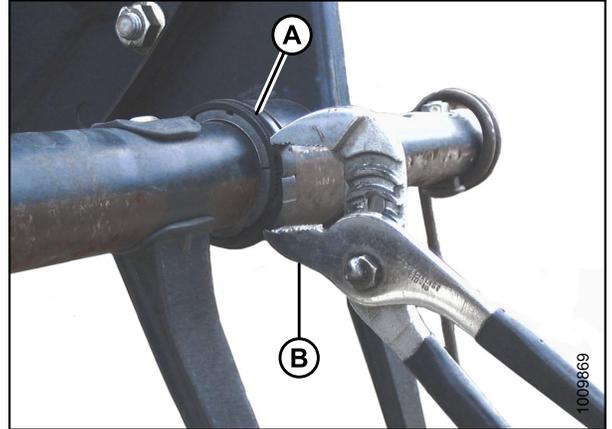


Figure 5.183: Installing Clamp

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

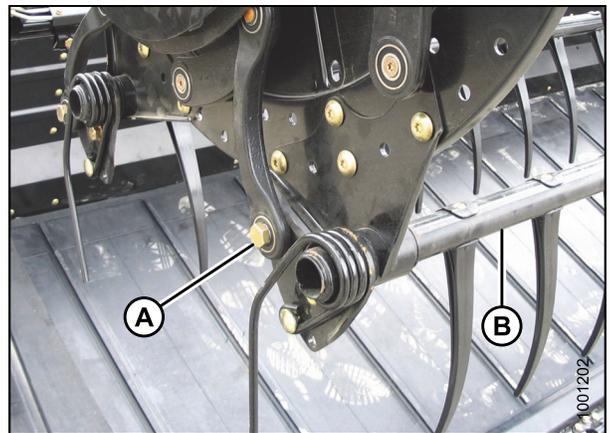


Figure 5.184: Cam End

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

NOTE:

There are no endshields on the center discs.

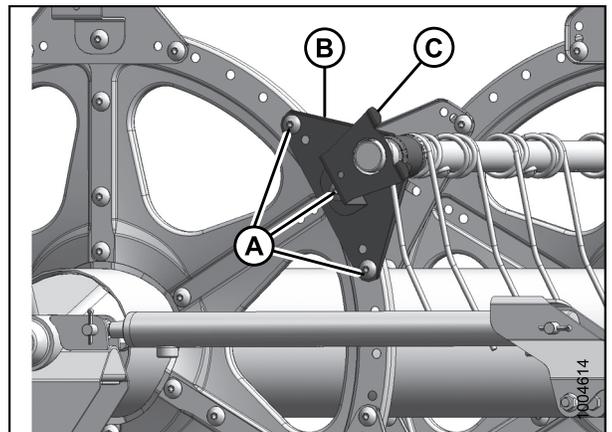


Figure 5.185: Tail End

MAINTENANCE AND SERVICING

10. Install the endshield support (A) at the applicable tine tube location at the cam end.
11. Reinstall the reel endshields. Refer to [5.8.6 Reel Endshields, page 194](#).

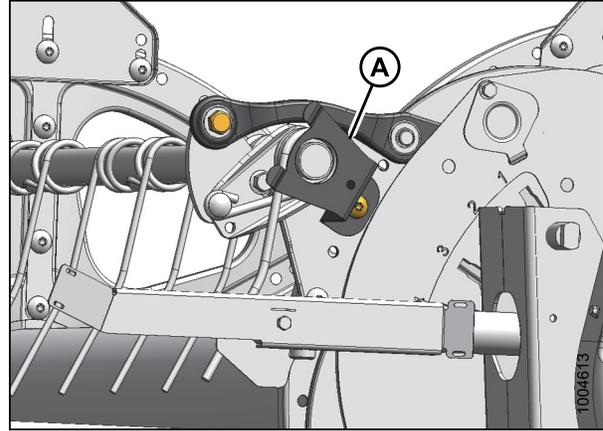


Figure 5.186: Cam End

Center Disc and Tail End Bushings

12. Position the bushing halves (B) on the tine tube with the flangeless end adjacent to the reel arm, and position the lug in each bushing half into the hole in the tine tube.
13. Slide the reel arm (A) onto the bushing (B) and position against the disc at the original location.
14. Reinstall the previously removed fingers or tines. Refer to the following procedures as necessary:
 - [Removing Plastic Fingers, page 180](#)
 - [Removing Steel Tines, page 179](#)

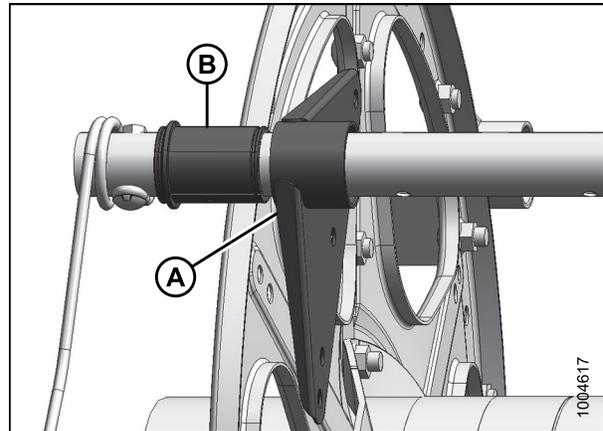


Figure 5.187: Tail End

15. Install the bushing clamp (A) onto the tine tube adjacent to the flangeless end of the bushing (B).
16. Position the clamp (A) on the bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

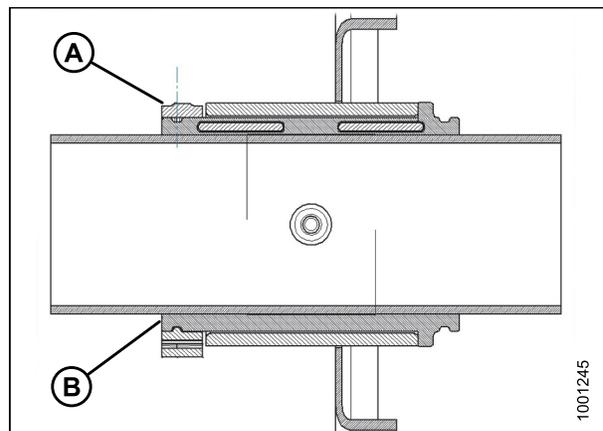


Figure 5.188: Bushing

MAINTENANCE AND SERVICING

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

IMPORTANT:

Over-tightening clamp may result in breakage.

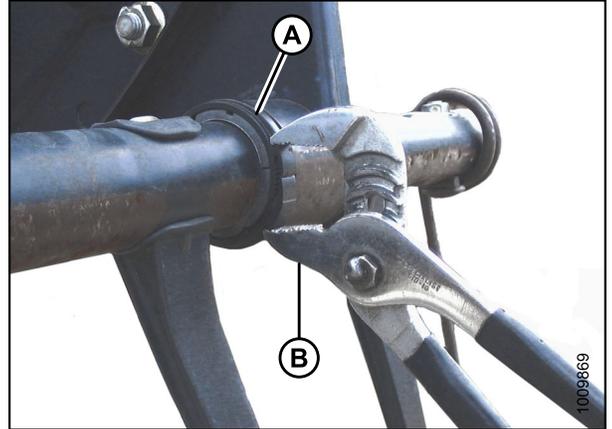


Figure 5.189: Installing Clamp

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

NOTE:

There are no endshields on the center discs.

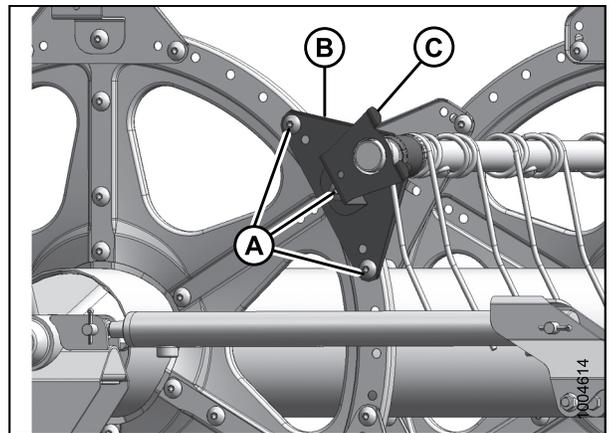


Figure 5.190: Tail End

MAINTENANCE AND SERVICING

Tine Tube Support (If installed) Bushings

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

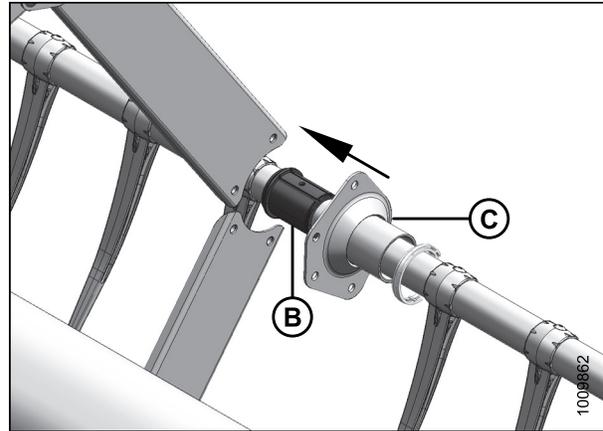


Figure 5.191: Support

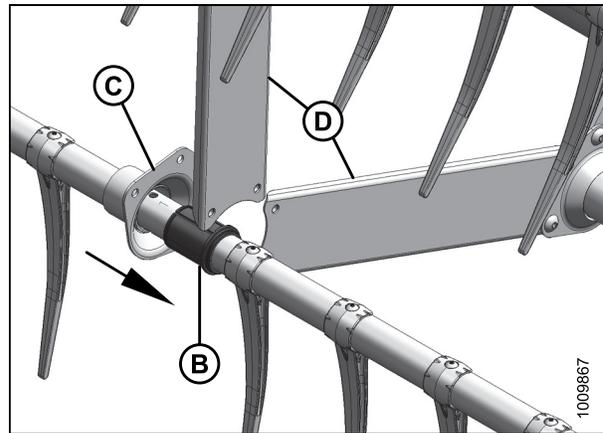


Figure 5.192: Opposite Support

22. Install the bushing clamp (A) onto the tine tube adjacent to the flangeless end of the bushing (B).
23. Position the clamp (A) on the bushing (B) so the edges of the clamp and bushing are flush when the clamp is fit into the groove on the bushing and the lock tabs are engaged.

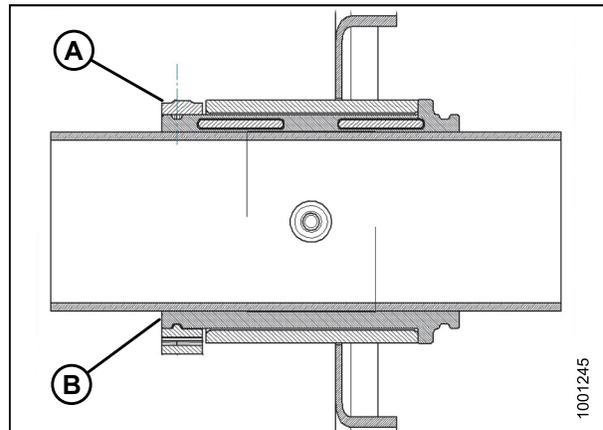


Figure 5.193: Bushing Clamp

MAINTENANCE AND SERVICING

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

IMPORTANT:

Over-tightening clamp may result in breakage.

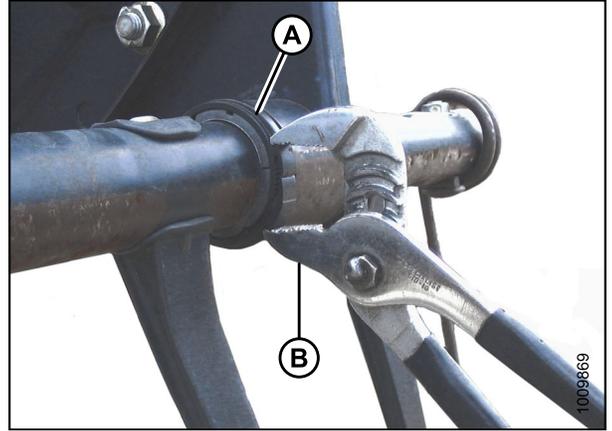


Figure 5.194: Installing Clamp

25. Reattach the channels (C) to the support (A) with screws (B) and nuts. Torque screws to 32 ft·lbf (43 N·m).
26. Reinstall any fingers (D) that were previously removed using screws (E). Refer to [Installing Plastic Fingers](#), page 181.

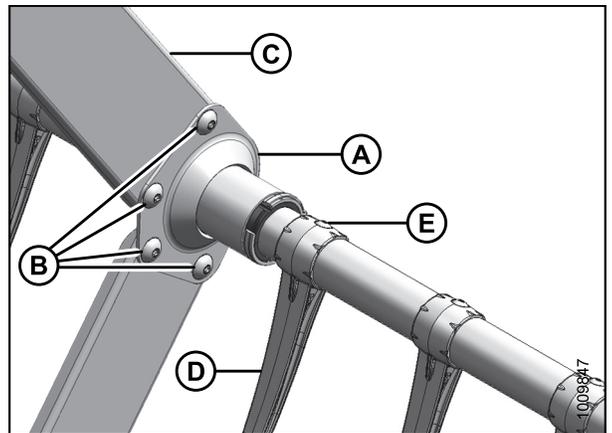


Figure 5.195: Support

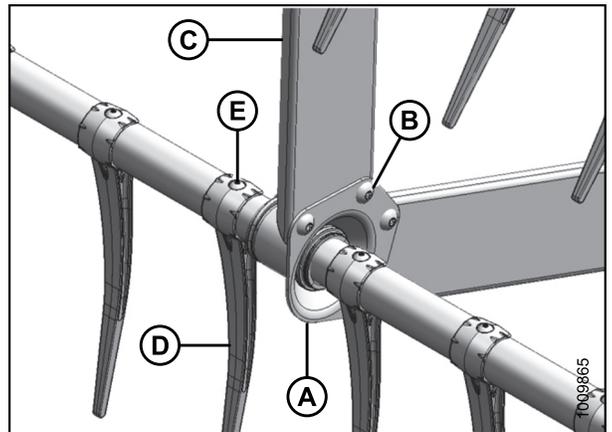


Figure 5.196: Opposite Support

5.8.6 Reel Endshields

Reel endshields and supports do not require regular maintenance, but they should be checked periodically for damage and loose or missing fasteners. Slightly dented or deformed endshields and supports are repairable, but it's necessary to replace severely damaged components.

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

Replacing Reel Endshields

DANGER

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

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

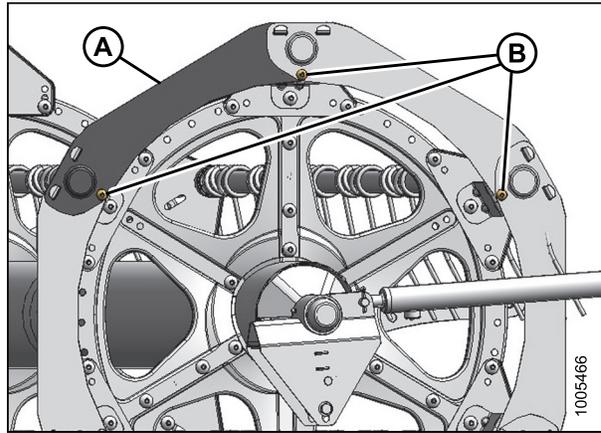


Figure 5.197: Reel Endshields

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

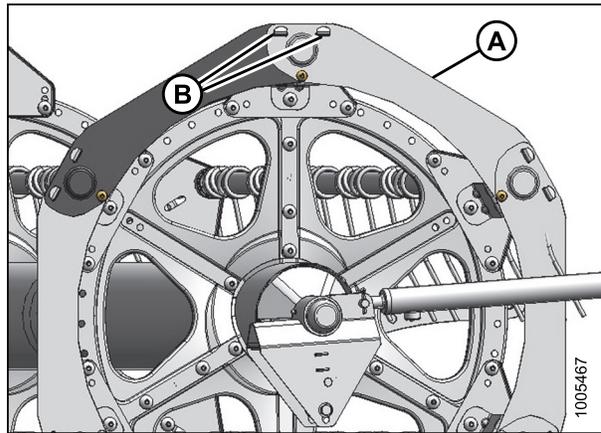


Figure 5.198: Reel Endshields

MAINTENANCE AND SERVICING

5. Remove the reel endshield from the supports.

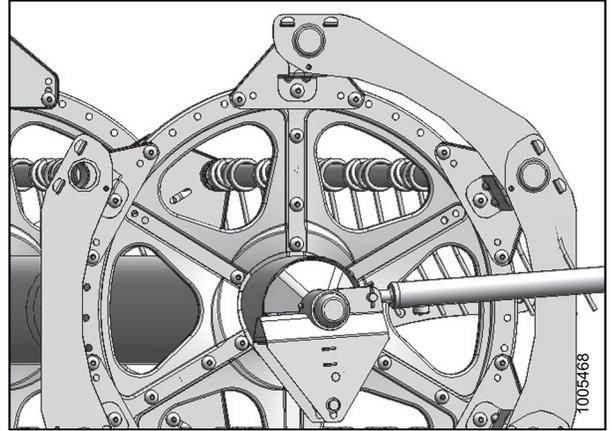


Figure 5.199: Reel Endshields

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

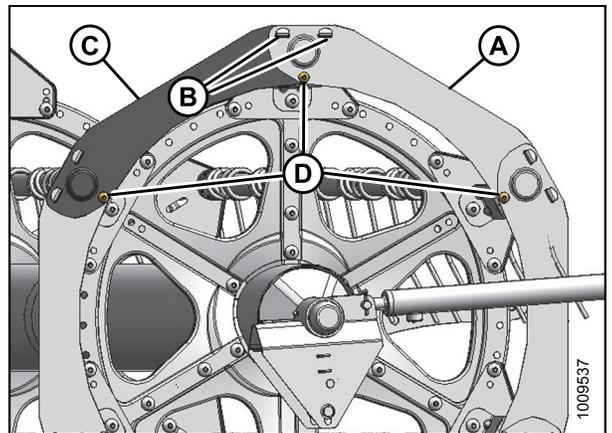


Figure 5.200: Reel Endshields

Replacing Reel Endshields – Right-Hand Reel on Double Reel 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.

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

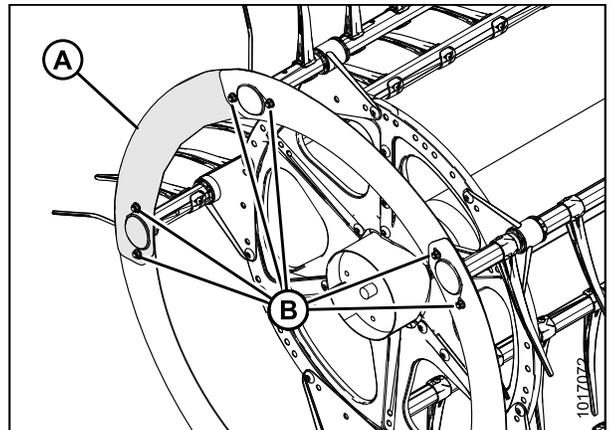


Figure 5.201: Reel Endshields

MAINTENANCE AND SERVICING

4. Lift end of reel endshield (A) off endshield (E) and rotate down.
5. Remove bolt (B), steel tine (C), and bushing (D). Retain hardware.
6. Remove the reel endshield (E).

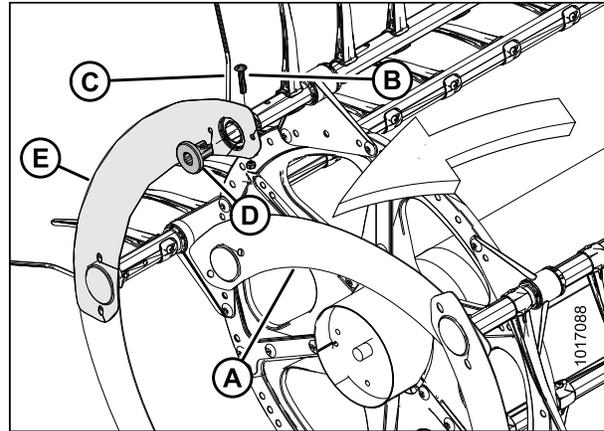


Figure 5.202: Reel Endshields

7. Install new reel endshield (A) onto reel.
8. Reattach bushing (B) and steel tine (C) using retained hardware (D).

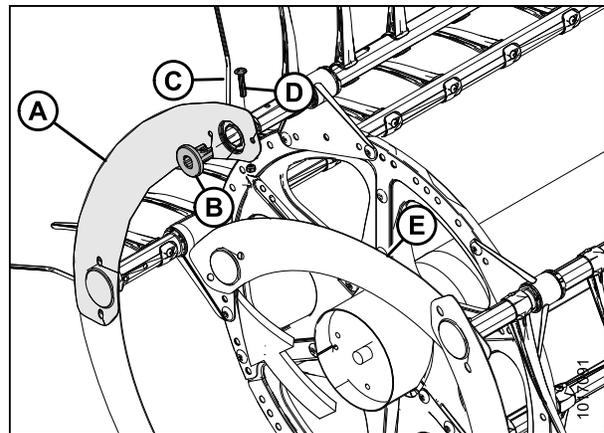


Figure 5.203: Reel Endshields

9. Reinstall bolts (A).
10. Tighten all hardware.

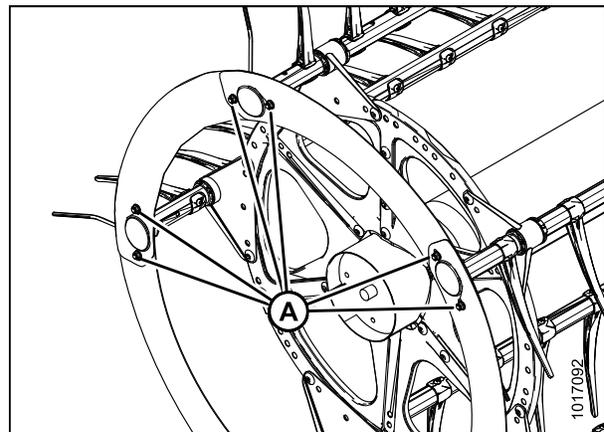


Figure 5.204: Reel Endshields

Replacing Reel Endshield Supports

DANGER

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

MAINTENANCE AND SERVICING

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

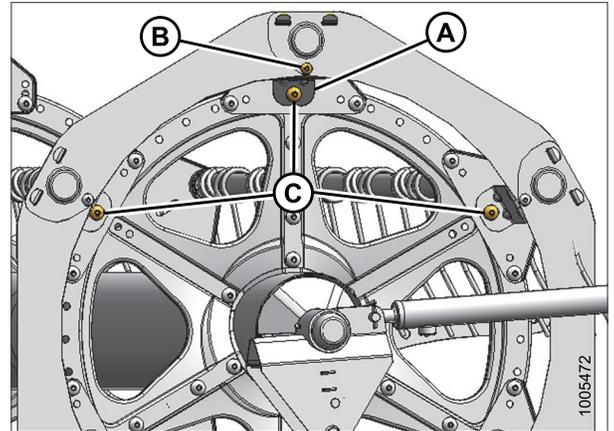


Figure 5.205: Reel Endshield Supports

5. Move the reel endshields (A) away from the tine tube and rotate the support (B) towards the reel to remove it.
6. Insert tabs of new support (B) into the slots in the reel endshields (A). Ensure the tabs engage both reel endshields.
7. Secure support (B) to the disc with bolt (C) and nut. Do not tighten.
8. Secure the reel endshields (A) to support (B) with bolt (C) and nut. Do not tighten.
9. Reattach the supports with bolts (C) and nuts.
10. Check the clearance between the tine tube and reel endshield support and adjust if necessary.
11. Torque nuts to 20 ft·lbf (27 N·m).

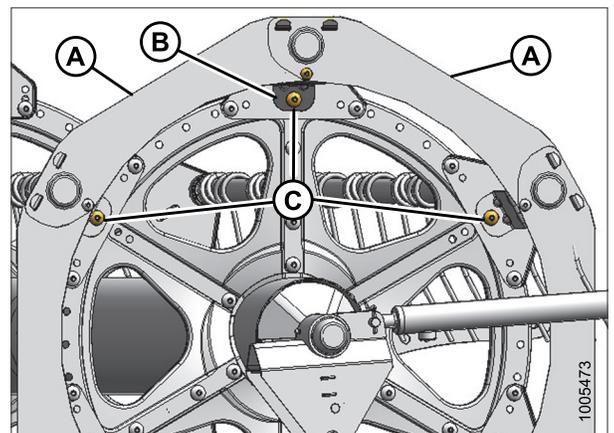


Figure 5.206: Reel Endshield Supports

5.9 Reel Drive

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

5.9.1 Replacing Reel Drive Cover

Removing Reel Drive Cover

⚠ DANGER

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

Single Reel Drive:

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

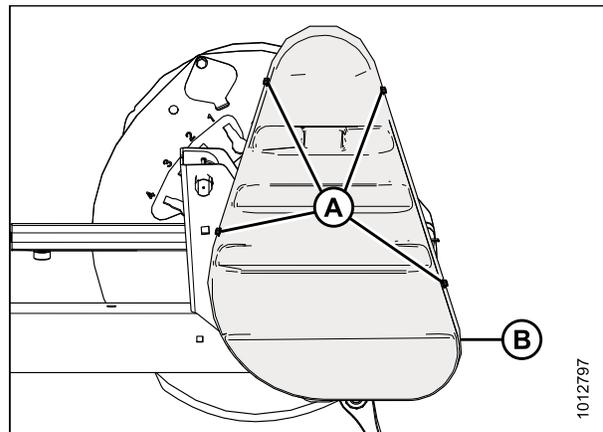


Figure 5.207: Drive Cover – Single Reel

Double Reel Drive:

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

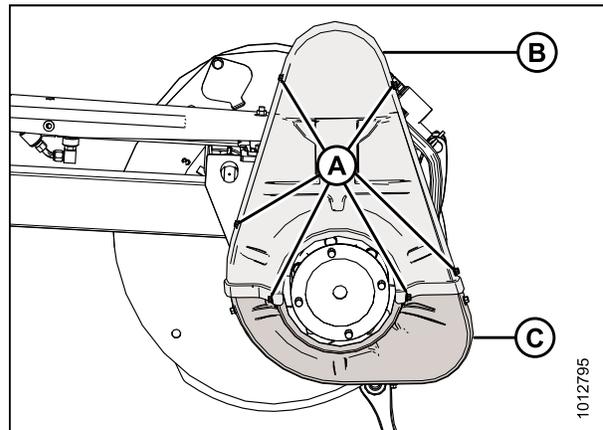


Figure 5.208: Drive Cover – Double Reel

MAINTENANCE AND SERVICING

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

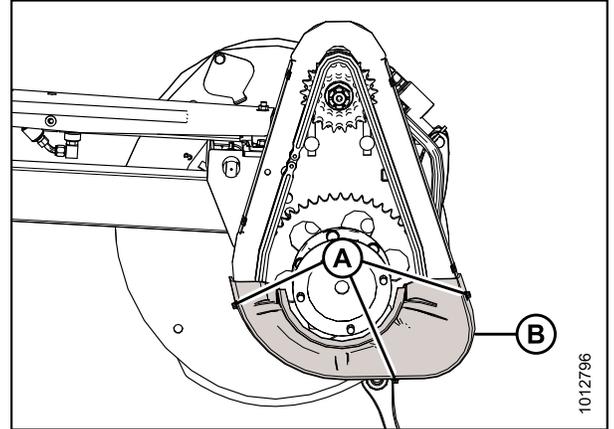


Figure 5.209: Drive Cover – Double Reel

Installing Reel Drive Cover

Single Reel Drive:

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

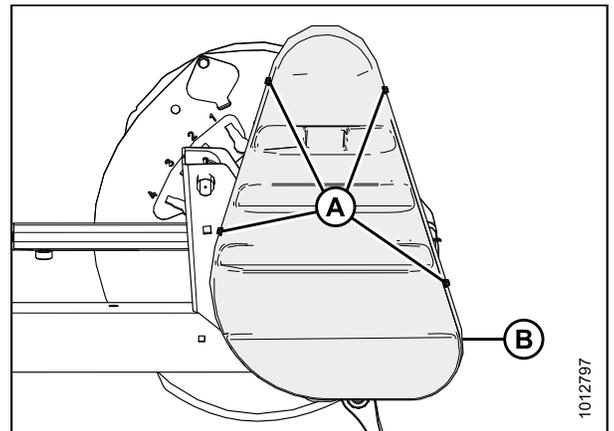


Figure 5.210: Drive Cover – Single Reel

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

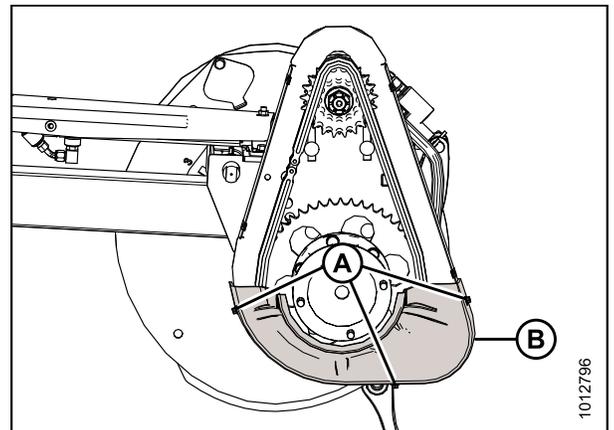


Figure 5.211: Drive Cover – Double Reel

MAINTENANCE AND SERVICING

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

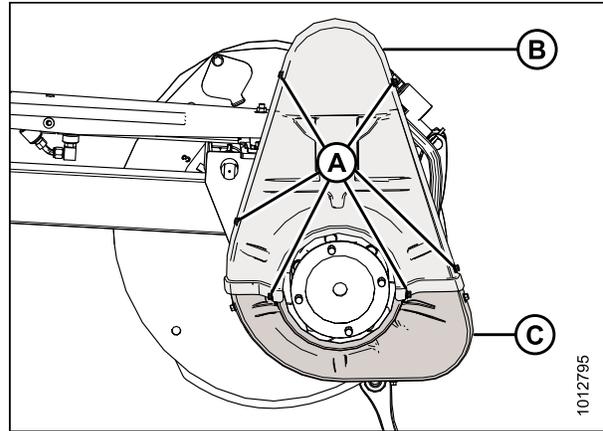


Figure 5.212: Drive Cover – Double Reel

5.9.2 Adjusting Reel Drive Chain Tension

Loosening Reel Drive Chain

1. Shut down the windrower, and remove the key from the ignition.
2. Remove the drive cover. Refer to [Removing Reel Drive Cover, page 198](#).
3. Loosen six nuts (A). Slide the motor (B) and motor mount (C) down towards the reel shaft.

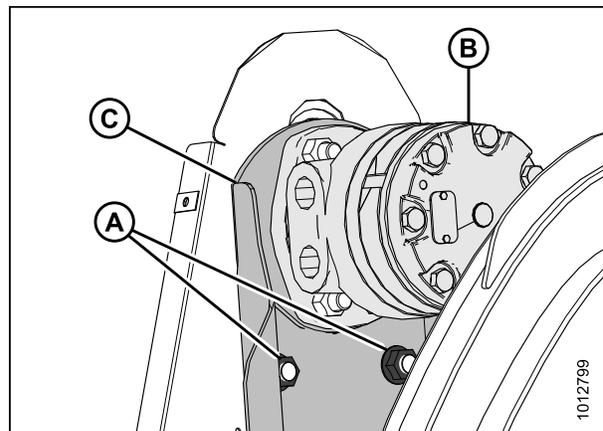


Figure 5.213: Single-Reel Drive Shown – Double-Reel Drive Similar

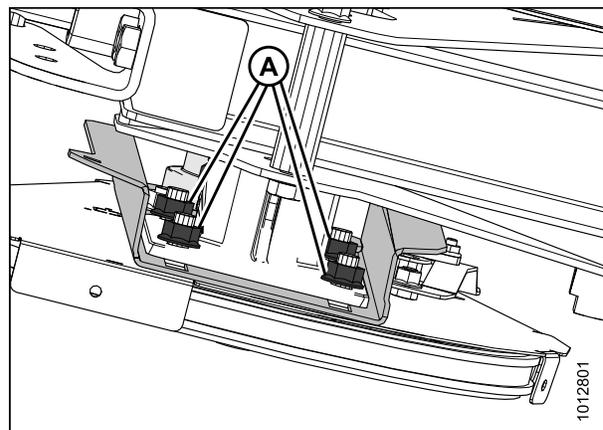


Figure 5.214: Single-Reel Drive – Viewed from Underside of Reel

MAINTENANCE AND SERVICING

Tightening Reel Drive Chain

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

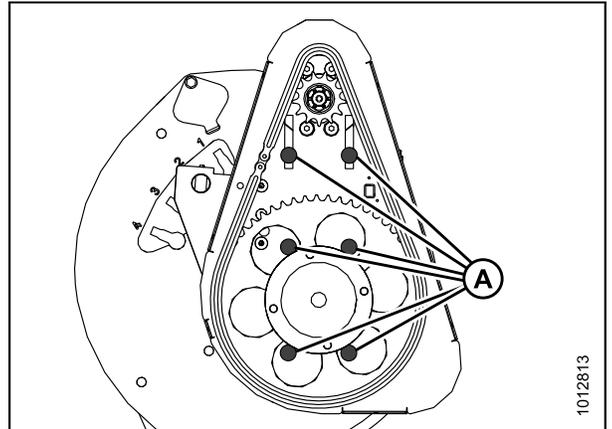


Figure 5.215: Single-Reel Drive Shown – Double Reel Similar

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

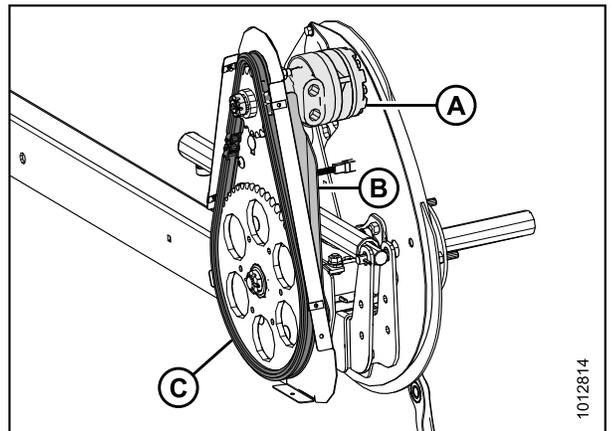


Figure 5.216: Single-Reel Drive Shown – Double Reel Similar

MAINTENANCE AND SERVICING

4. Tighten six nuts (A).
5. Ensure there is 1/8 in. (3 mm) of slack at the chain midspan. Adjust if necessary.
6. Torque nuts (A) to 54 ft-lbf (73 N·m).
7. Install the drive cover. Refer to [Installing Reel Drive Cover, page 199](#).

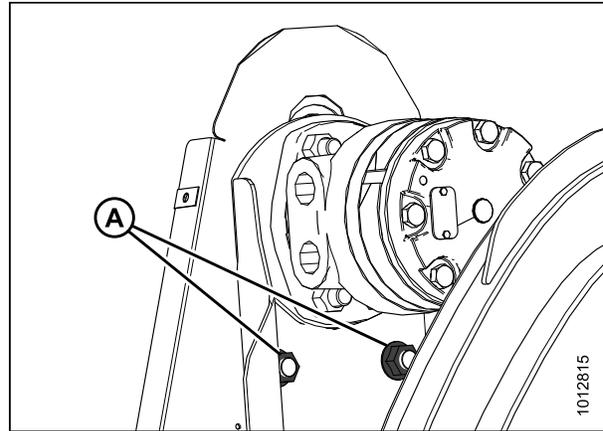


Figure 5.217: Single-Reel Drive Shown – Double Reel Similar

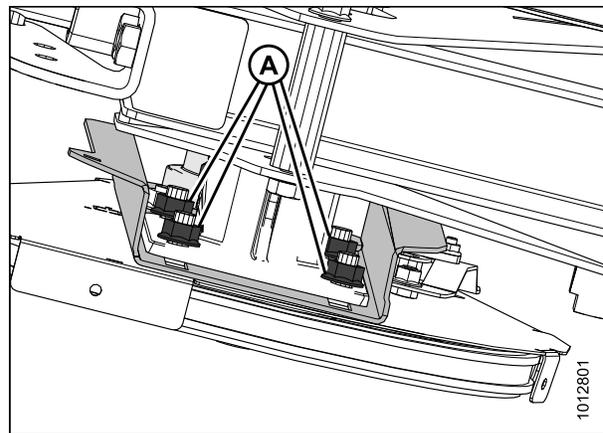


Figure 5.218: Single-Reel Drive – Viewed from Underside of Reel

5.9.3 Replacing Reel Drive Sprocket

Removing Reel Drive Sprocket

1. Shut down the windrower, and remove the key from the ignition.
2. Loosen the drive chain. Refer to [Loosening Reel Drive Chain, page 200](#).
3. Remove the drive chain (A) from the drive sprocket (B).

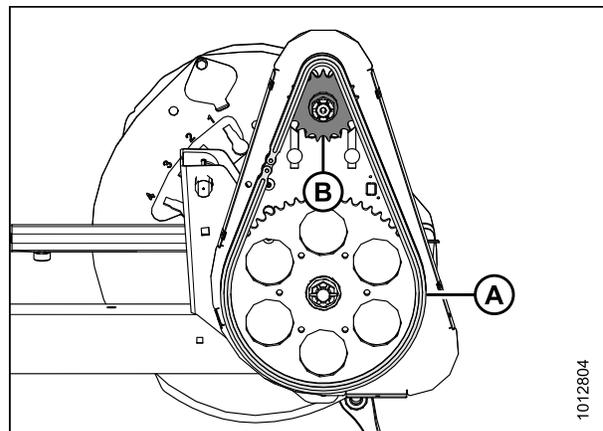


Figure 5.219: Reel Drive

MAINTENANCE AND SERVICING

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

IMPORTANT:

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

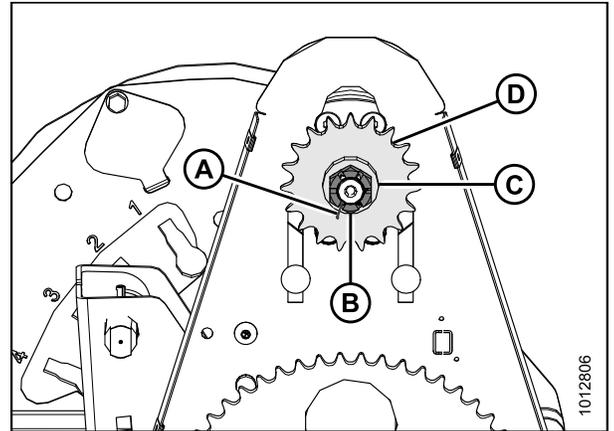


Figure 5.220: Reel Drive

Installing Reel Drive Sprocket

1. Align the keyway in sprocket (D) with the key on the motor shaft, and slide the sprocket onto the shaft. Secure with flat washer (C) and slotted nut (B).
2. Torque slotted nut (B) to 40 ft-lbf (54 N-m).
3. Install cotter pin (A). If necessary, tighten the slotted nut (B) to the next slot to install the cotter pin.

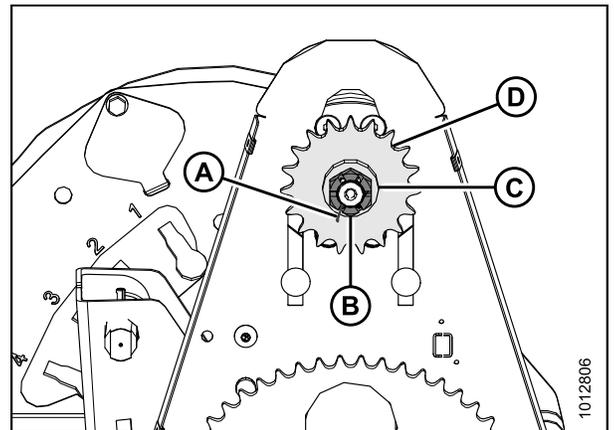


Figure 5.221: Reel Drive

4. Install the drive chain (A) onto the drive sprocket (B).
5. Tighten the drive chain. Refer to [Tightening Reel Drive Chain, page 201](#).

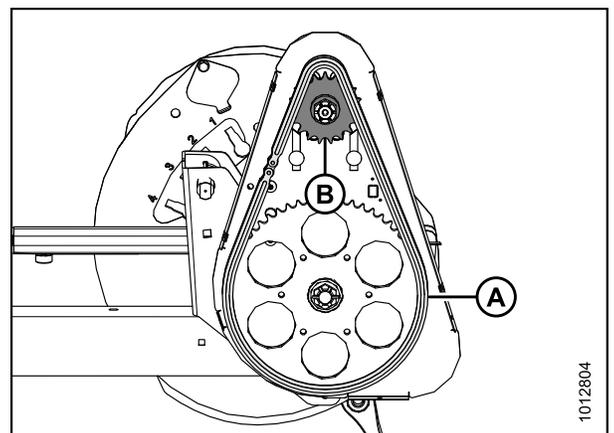


Figure 5.222: Reel Drive

5.9.4 Replacing Double-Reel U-Joint

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

Lubricate the U-joint according to the specifications. Refer to [5.3.6 Lubrication and Servicing, page 106](#).

Replace the U-joint if severely worn or damaged. Refer to [Removing Double-Reel U-Joint, page 204](#).

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 198](#).
3. Support the inboard end of the right reel with a front end loader and nylon slings (A) (or equivalent lifting device).

IMPORTANT:

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

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

NOTE:

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

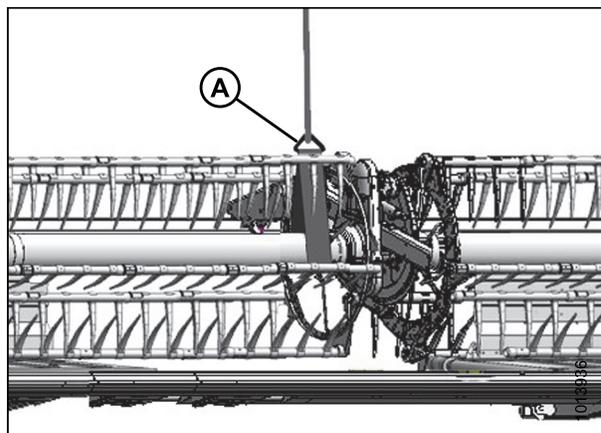


Figure 5.223: Supporting Reel

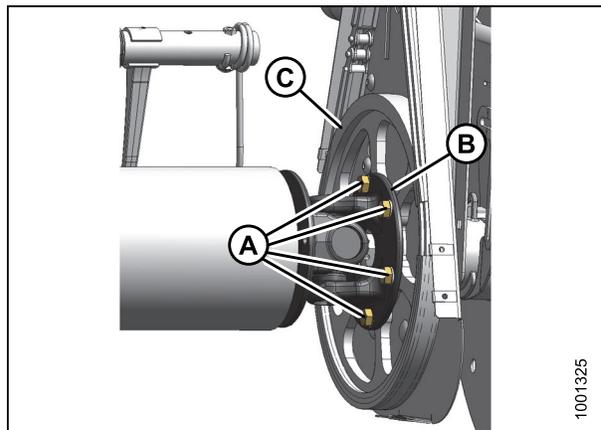


Figure 5.224: U-Joint

Installing Double-Reel U-Joint

NOTE:

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

MAINTENANCE AND SERVICING

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

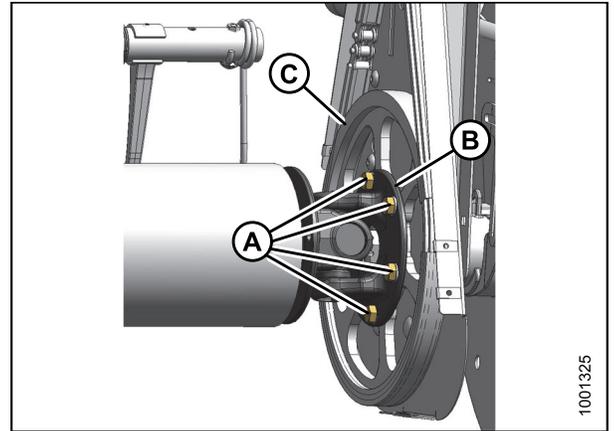


Figure 5.225: U-Joint

2. Position the right-hand reel tube against the reel drive and engage the stub shaft into the U-joint pilot hole.
3. Rotate the reel until the holes in the end of the reel tube and U-joint flange (B) line up.
4. Apply Loctite® #243 (or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.
5. Torque to 75–85 ft·lbf (102–115 N·m).

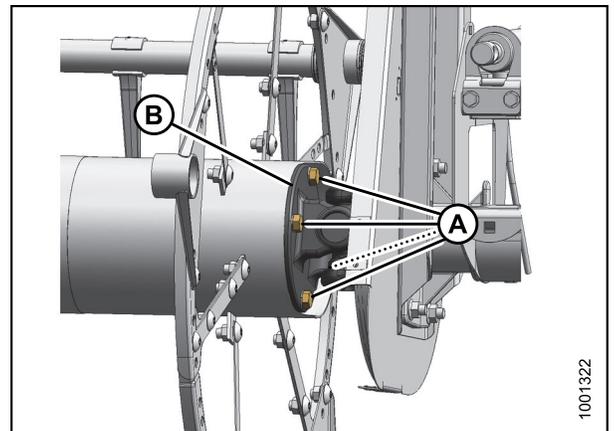


Figure 5.226: U-Joint

6. Remove the temporary reel support (A).
7. Install the drive cover. Refer to [Installing Reel Drive Cover, page 199](#).

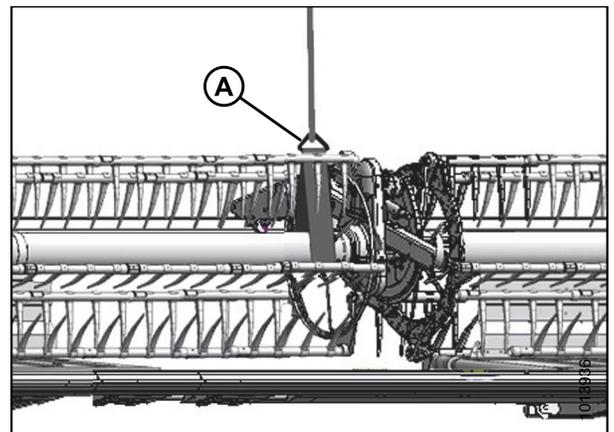


Figure 5.227: Supporting Reel

5.9.5 Replacing Reel Drive Motor

The reel drive motor does not require regular maintenance or servicing. If problems occur with the motor, remove it and have it serviced at your MacDon Dealer.

Removing Reel Drive Motor

1. Shut down the windrower, and remove the key from the ignition.
2. Loosen the drive chain. Refer to [Loosening Reel Drive Chain, page 200](#).
3. Remove the drive sprocket. Refer to [Removing Reel Drive Sprocket, page 202](#).
4. Disconnect the hydraulic lines (A) at the motor (B). Cap or plug open ports and lines.

NOTE:

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

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

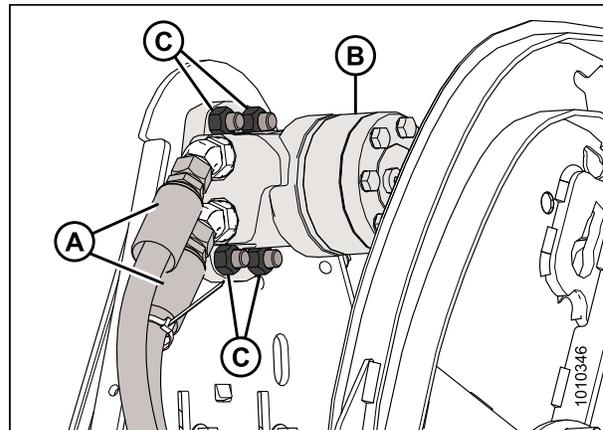


Figure 5.228: Reel Motor and Hoses

Installing Reel Drive Motor

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

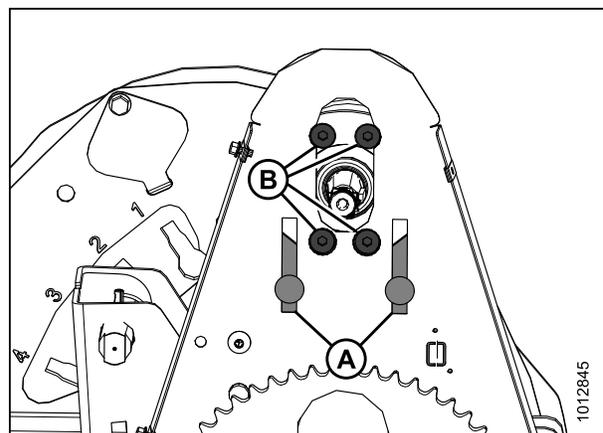


Figure 5.229: Reel Drive Motor Mounting Holes

MAINTENANCE AND SERVICING

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

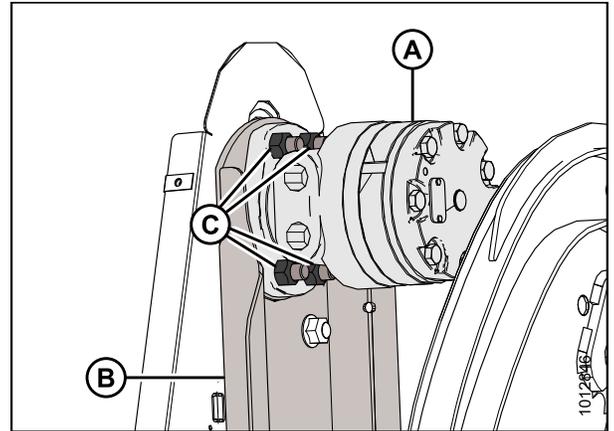


Figure 5.230: Reel Drive Motor

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

NOTE:

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

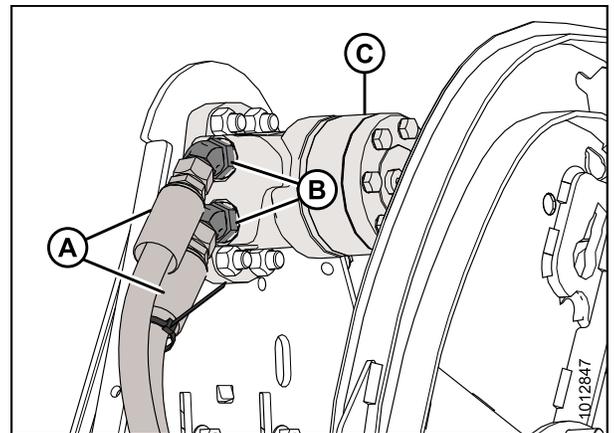


Figure 5.231: Reel Motor and Hoses

6. Install the drive sprocket. Refer to [Installing Reel Drive Sprocket, page 203](#).
7. Tighten the drive chain. Refer to [Tightening Reel Drive Chain, page 201](#).

5.9.6 Replacing Drive Chain on Double Reel

Refer to the following two methods for replacing the drive chain on a high torque double-reel drive:

- [Replacing Chain Using the Reel Drive Method, page 207](#)
- [Replacing Chain Using Breaking the Chain Method, page 209](#)

NOTE:

Both procedures are acceptable, but disconnecting the reel drive method is preferable because it doesn't affect the chain's integrity.

Replacing Chain Using the Reel Drive Method

1. Loosen the drive chain. Refer to [Loosening Reel Drive Chain, page 200](#).

MAINTENANCE AND SERVICING

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

IMPORTANT:

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

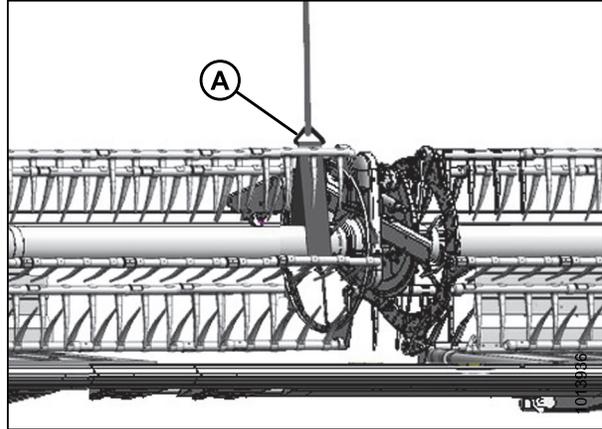


Figure 5.232: Supporting Reel

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

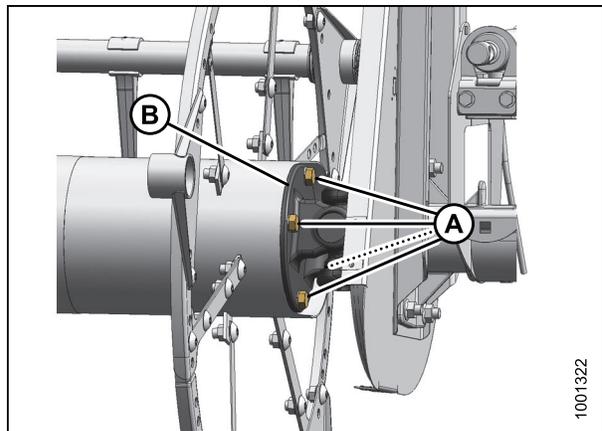


Figure 5.233: U-Joint

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

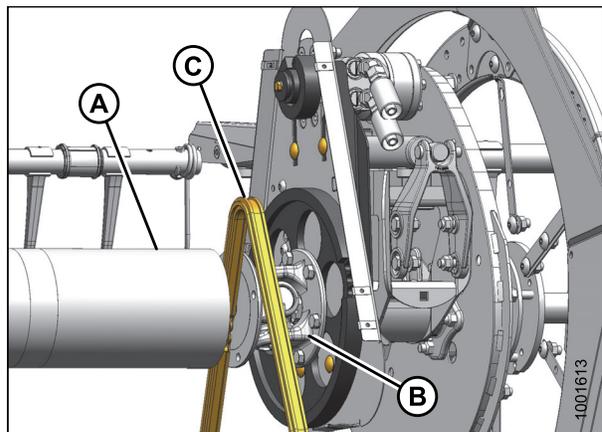


Figure 5.234: Replacing Chain

MAINTENANCE AND SERVICING

7. Position the right-hand reel tube (A) against the reel drive and engage the stub shaft into the U-joint pilot hole.
8. Rotate the reel until the holes in end of the reel tube and U-joint flange (B) line up.
9. Apply Loctite® #243 (or equivalent) to four 1/2 in. bolts (A) and secure with lock washers.
10. Torque to 75–85 ft·lbf (102–115 N·m).

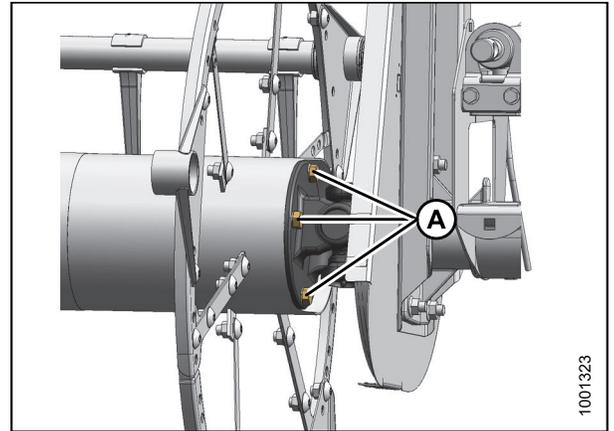


Figure 5.235: U-Joint

11. Remove the temporary reel support (A).

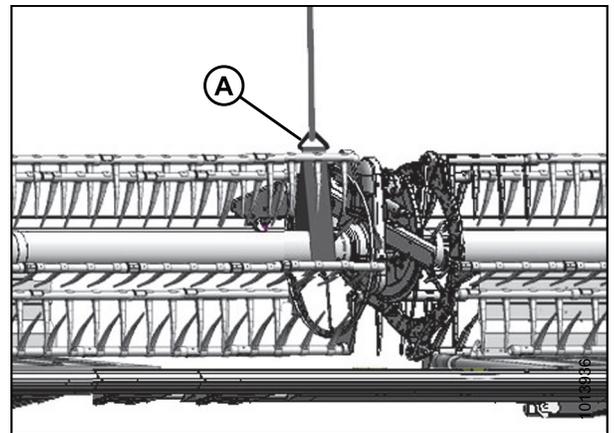


Figure 5.236: Supporting Reel

Replacing Chain Using Breaking the Chain Method

1. Grind off the head of a link rivet on the chain (A), punch out the rivet, and remove the chain.
2. Grind off the head of a link rivet on the new chain, punch out the rivet, and separate the chain.
3. Position the ends of the new chain onto the sprocket (B).

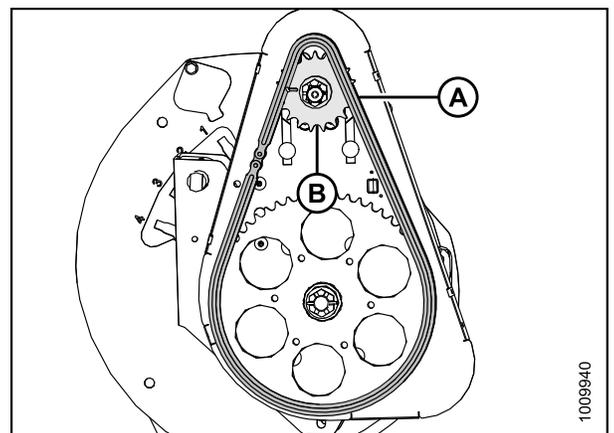


Figure 5.237: Reel Drive

MAINTENANCE AND SERVICING

4. Install the pin connector (A) (not available as a MacDon part) into the chain (preferably from the backside of the sprocket).
5. Install connector (B) onto pins.
6. Install the spring clip (C) onto the front pin (D) with the closed end of the spring clip facing the direction of the sprocket rotation.
7. Position one leg of the spring clip (C) into the groove of the aft pin (E).
8. Press the other leg of the spring clip (C) over the face of the aft pin (E) until it slips into the groove. Do **NOT** press the spring clip lengthwise from the closed end.
9. Ensure the spring clip (C) is seated into the grooves of the front pin (D) and aft pin (E).
10. Tighten the drive chain. Refer to *Tightening Reel Drive Chain, page 201*.

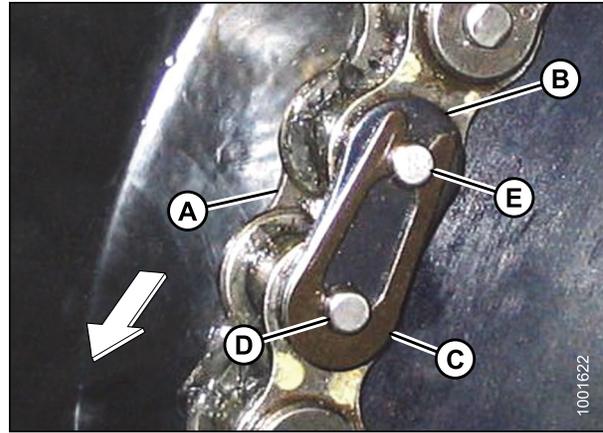


Figure 5.238: Chain

5.9.7 Replacing Drive Chain on Single Reel

1. Loosen the drive chain. Refer to *Loosening Reel Drive Chain, page 200*.
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 201*.

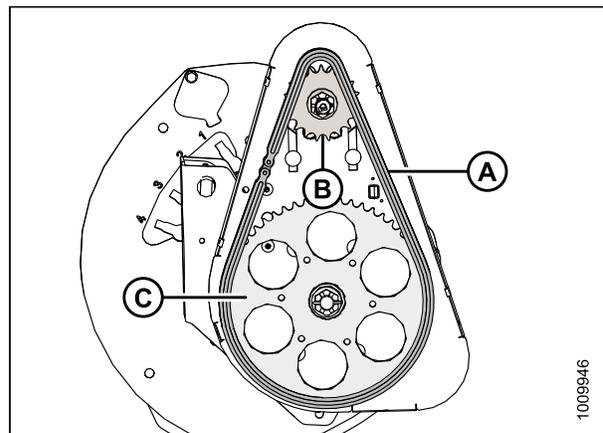


Figure 5.239: Reel Drive

5.10 Transport System (Optional)

Refer to [6.3.3 Stabilizer/Slow Speed Transport Wheels](#), page 220 for more information.

5.10.1 Checking Wheel Bolt Torque

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

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

IMPORTANT:

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

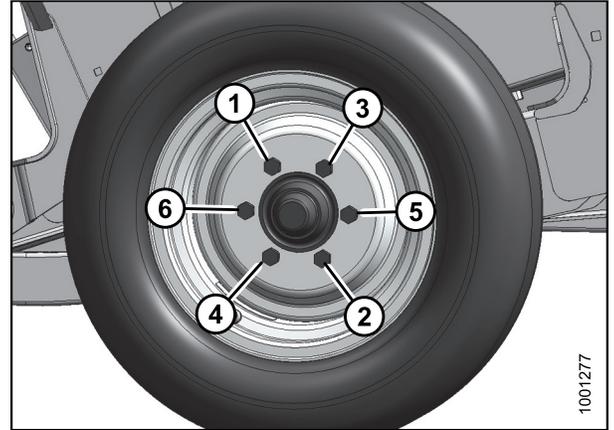


Figure 5.240: Bolt Tightening Sequence

5.10.2 Checking Axle Bolt Torque

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

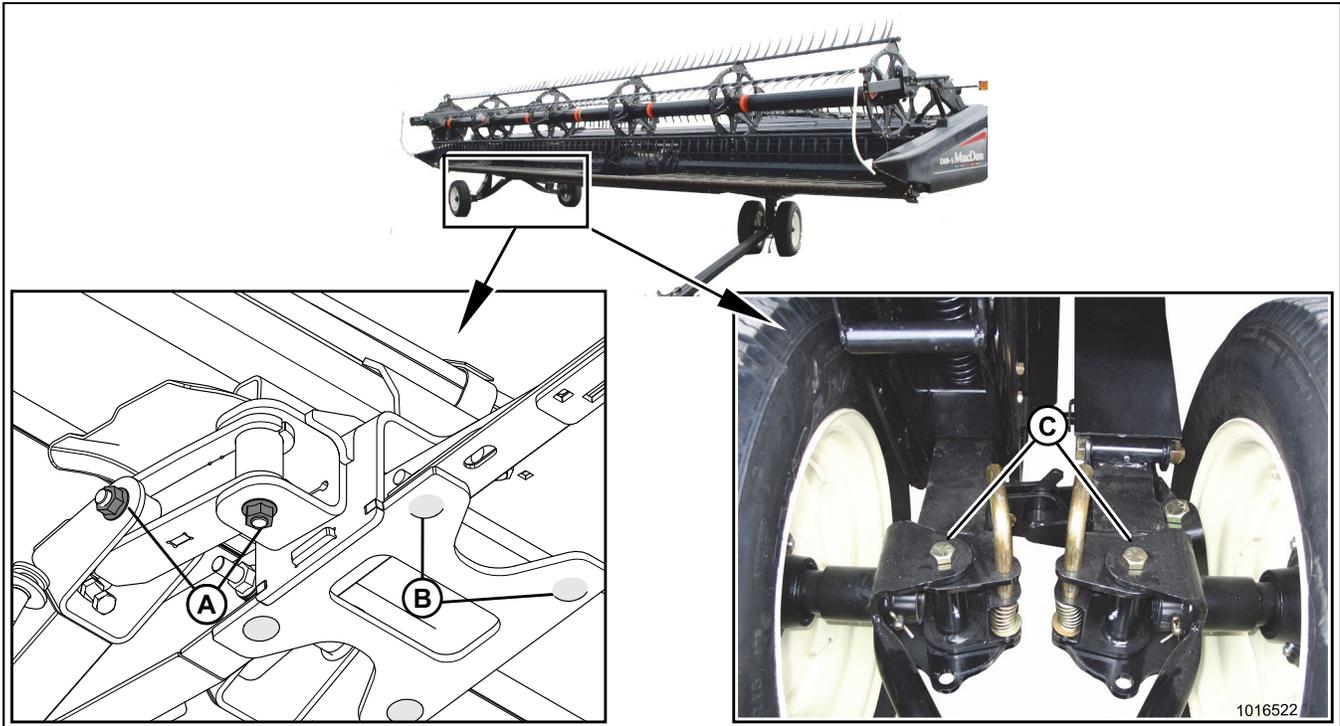


Figure 5.241: Axle Bolts

1. Check and tighten axle bolts **DAILY** until torque is maintained as follows:

- (A): 180 ft·lbf (244 N·m)
- (B): 150 ft·lbf (203 N·m)
- (C): 180 ft·lbf (244 N·m)

5.10.3 Checking Tire Pressure

Check the tire inflation pressure and inflate according to the information provided in Table 5.4 *Tire Pressure*, page 213.

Table 5.4 Tire Pressure

Size	Load Range	Pressure
ST205/75 R15	D	65 psi (448 kPa)
	E	80 psi (552 kPa)

WARNING

- Service tires safely.
- A tire can explode during inflation which could cause serious injury or death.
- Do NOT stand over tire. Use a clip-on chuck and extension hose.
- Do NOT exceed maximum inflation pressure indicated on tire label or sidewall.
- Replace tires that have defects.
- Replace wheel rims that are cracked, worn, or severely rusted.
- Never weld a wheel rim.
- Never use force on an inflated or partially inflated tire.
- Make sure the tire is correctly seated before inflating to operating pressure.
- If the tire is not correctly positioned on the rim or is overinflated, the tire bead can loosen on one side causing air to escape at high speed and with great force. An air leak of this nature can thrust the tire in any direction endangering anyone in the area.
- Make sure all the air is removed from the tire before removing the tire from the rim.
- Do NOT remove, install, or repair a tire on a rim unless you have the proper equipment and experience to perform the job.
- Take the tire and rim to a qualified tire repair shop.

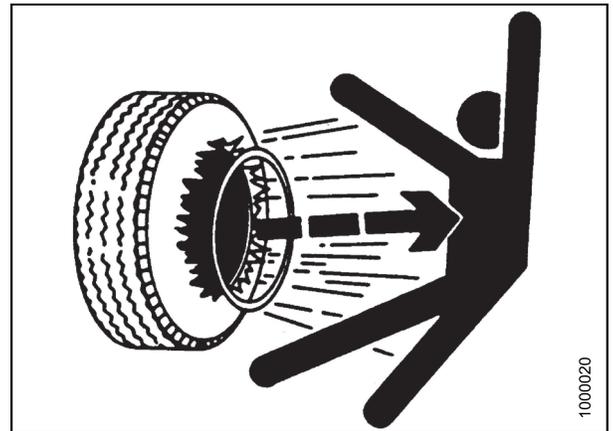


Figure 5.242: Inflation Warning

6 Options and Attachments

The following options and attachments are available for use with your header. See your MacDon Dealer for availability and ordering information.

6.1 Reel

6.1.1 Lodged Crop Reel Finger Kit

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

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

MD #B4831

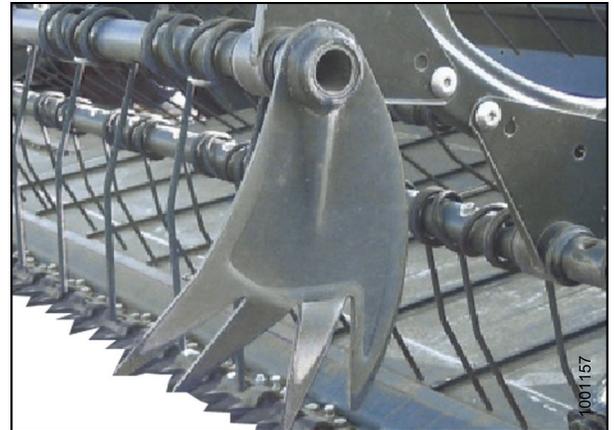


Figure 6.1: Lodged Crop Finger

6.1.2 Reel Endshield Kit

The steel shields provided in the Reel Endshield kit attach to the ends of the reels and help to clear material in heavy, hard-to-cut crops. They are standard equipment on all headers (except nine-bat reels). Hardware and installation instructions are included in the kit.

See your MacDon Dealer for more information.

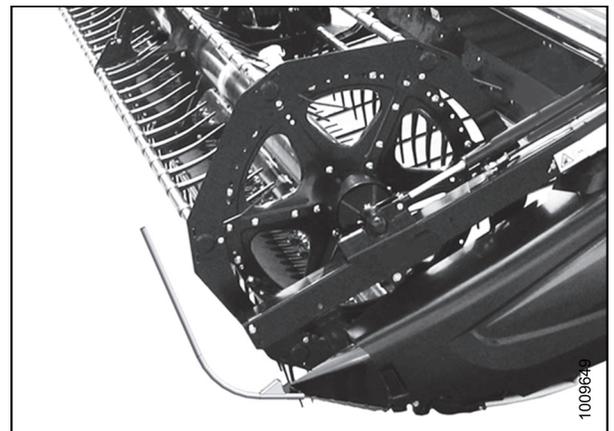


Figure 6.2: Reel Endshields

6.1.3 Tine Tube Reinforcing Kit

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

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

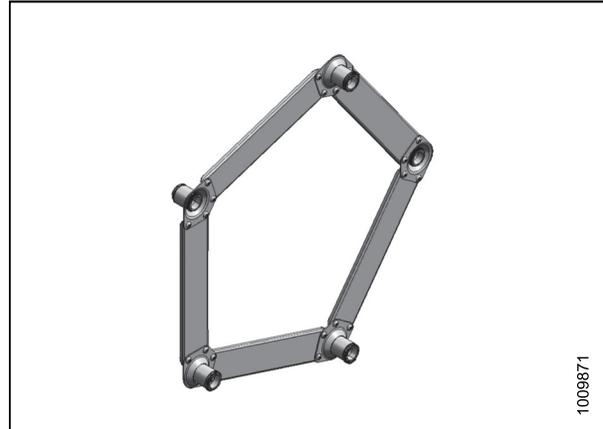


Figure 6.3: Five-Bat Reinforcing Kit Shown – Six-Bat Reinforcing Kit Similar

6.2 Cutterbar

6.2.1 Cutterbar Wearplate

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

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

- 30 foot – MD #B4839
- 35 foot – MD #B4840
- 40 foot – MD #B4841
- 45 foot – MD #B5114



Figure 6.4: Cutterbar Wearplates

6.2.2 Knifehead Shield

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

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

Regular Guards

- 30 foot and larger – MD #220101

Stub Guards

- 30 foot and larger – MD #220103

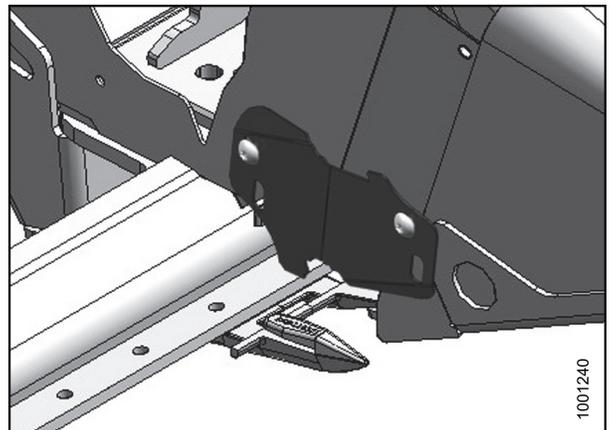


Figure 6.5: Knifehead Shield

6.2.3 Stub Guard Conversion Kit

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

Installation and adjustment instructions are included in the kit.

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

- 30 foot – MD #B5012
- 35 foot – MD #B5013

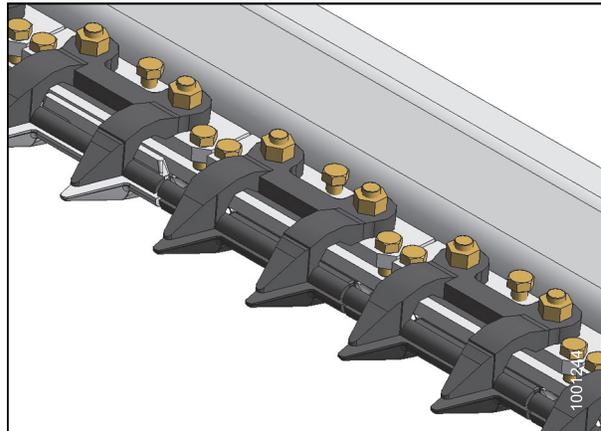


Figure 6.6: Stub Guards

6.2.4 Vertical Knife Mounts

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

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

Installation and adjustment instructions are included in the bundle.

Order the following bundles according to left or right side:

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

NOTE:

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

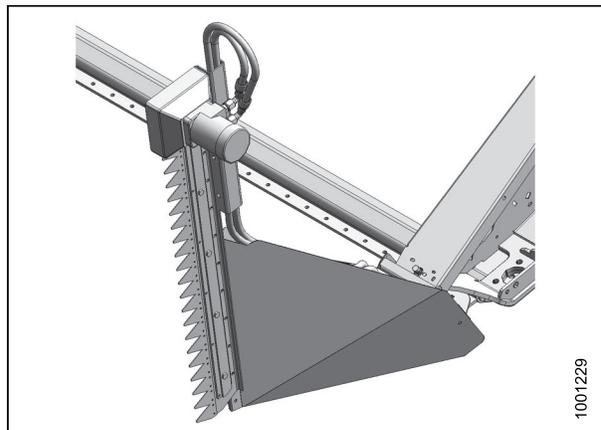


Figure 6.7: Vertical Knife Mount

6.3 Header

6.3.1 Divider Latch Kit

Divider latch kits attach to the endsheets. They allow for quick removal and storage of endsheet divider cones and, if required, reduce the transport width of the header. Installation instructions are included in the kit.

MD #B5607

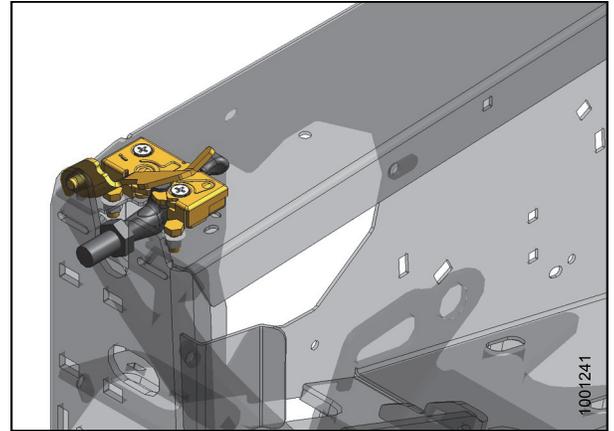


Figure 6.8: Divider Latch

6.3.2 Stabilizer Wheels

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

MD #C1986

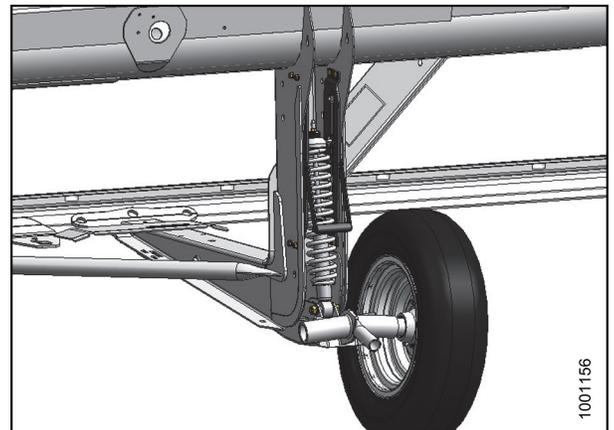


Figure 6.9: Stabilizer Wheel

6.3.3 Stabilizer/Slow Speed Transport Wheels

Stabilizer/slow speed transport wheels help to stabilize the header in field conditions that would otherwise cause the header to bounce, resulting in uneven cutting heights. This system is similar to the Stabilizer Wheel option. Refer to [6.3.2 Stabilizer Wheels, page 219](#).

Stabilizer/slow speed transport wheels are used to convert the header into transport mode for slow-speed towing behind a properly configured windrower (or agricultural tractor). A tow pole and installation instructions are included in the kit.

This option is available for use with 30-, 35-, and 40-foot headers.

MD #C2009



Figure 6.10: Stabilizer/Transport Wheels

6.4 Crop Delivery

6.4.1 Double Draper Drive (DDD) Kit

The DDD kit provides power to four draper rollers instead of the usual two in order to minimize draper slipping when using the side delivery feature in heavy forage crops.

Installation instructions are included with the kit.

Available for 30- to 40-foot headers.

MD #B6039¹⁴

6.4.2 Draper Deflector (Narrow)

Narrow metal draper deflectors attach to the inboard side of the endsheets to prevent material from falling through the gap between the endsheet and the draper while minimizing reel carryover in bushy crops.

NOTE:

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

Refer to your parts catalog for the necessary parts.

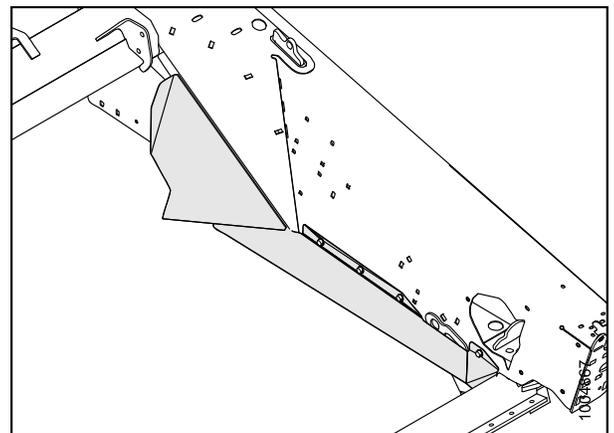


Figure 6.11: Draper Deflector (Narrow)

6.4.3 Draper Deflector (Wide)

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

NOTE:

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

Refer to your parts catalog for the necessary parts.

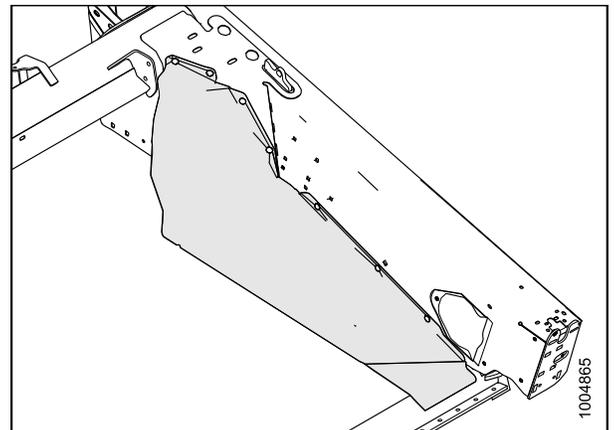


Figure 6.12: Draper Deflector (Wide)

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

6.4.4 Draper Extension Kit

The draper extension kit increases the inboard length of each deck up to 10 in. (250 mm) 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 #B5407¹⁵

6.4.5 Swath Deflector Rods (End Delivery)

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

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

Installation and adjustment instructions are included with the bundle.

Order bundles according to left or right side:

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

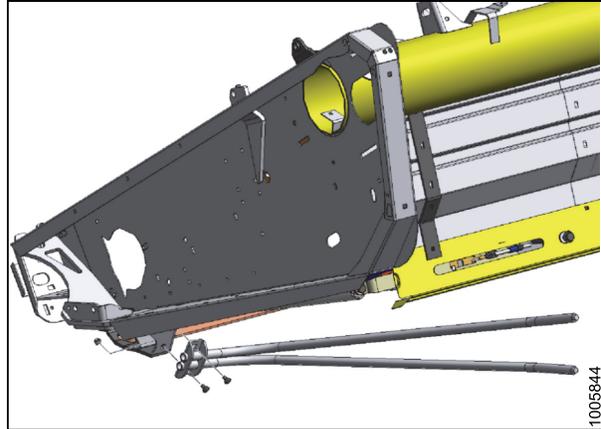


Figure 6.13: Swath Deflector

6.4.6 Hydraulic Deck Shift Package

The hydraulic deck shift package enables the Operator to shift the decks using the operator's console when double swathing.

Installation and adjustment instructions are included with the kit.

MD #B5664

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

6.4.7 Upper Cross Auger (UCA)

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

Order from the following bundles¹⁶ according to your header size:

- 30 foot – MD #B5965
- 35 foot – MD #B5966
- 40 and 45 foot – MD #B5967

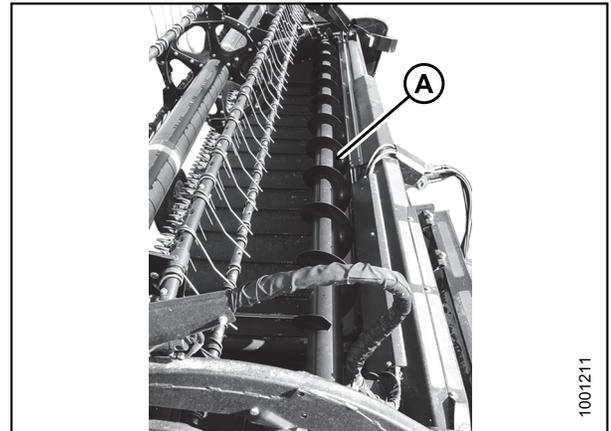


Figure 6.14: Upper Cross Auger

6.4.8 Upper Cross Auger Hydraulic Kit for Double Draper Drive

The upper cross auger (UCA) hydraulic kit is required to provide hydraulic power to the UCA on headers with both UCA and double draper drive kits installed. Operating both options without this kit can result in damage to the UCA motor and inadequate power delivery to the draper drive system. This kit is not applicable to M100 and M105 windrowers.

MD #B5606

6.4.9 Upper Cross Auger Case Drain Kit for Single Draper Drive

This case drain kit is intended for single draper drive headers equipped with an upper cross auger and is applicable to all M-Series windrowers except the M205.

MD #5842

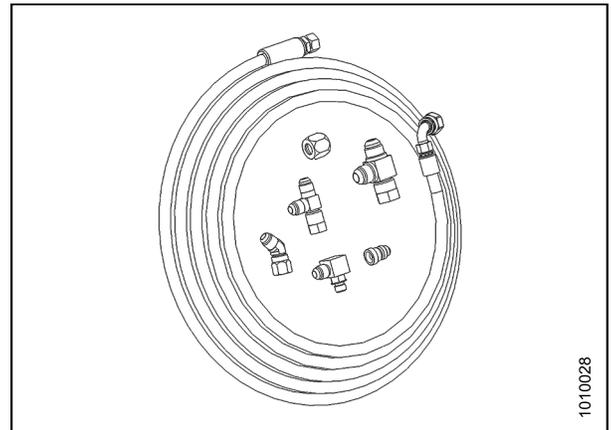


Figure 6.15: Case Drain

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

6.4.10 Rice Divider Rods

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

MD #B5609



Figure 6.16: Rice Divider Rod

7 Unloading and Assembly

Refer to the header-specific instructions for unloading, assembly, and setup procedures that are included with your shipment.

Table 7.1 Unloading and Assembly Instruction

Shipping Destination	Header Description
North America	D1 XL-Series Draper Header for Windrowers

8 Troubleshooting

8.1 Crop Loss at Cutterbar

Symptom	Problem	Solution	Refer to
Does not pick up down crop	Cutterbar too high	Lower cutterbar	3.7.1 Cutting Height, page 45
	Header angle too low	Increase header angle	3.7.3 Header Angle, page 51
	Reel too high	Lower reel	3.7.8 Reel Height, page 54
	Reel too far back	Move reel forward	3.7.9 Reel Fore-Aft Position, page 55
	Ground speed too fast for reel speed	Reduce ground speed or increase reel speed	3.7.4 Reel Speed, page 51 and 3.7.5 Ground Speed, page 52
	Reel fingers not lifting crop sufficiently	Increase finger pitch aggressiveness	
Install lifter guards			See your MacDon Dealer
Heads shattering or breaking off	Reel speed too fast	Reduce reel speed	3.7.4 Reel Speed, page 51
	Reel too low	Raise reel	3.7.8 Reel Height, page 54
	Ground speed too fast	Reduce ground speed	3.7.5 Ground Speed, page 52
	Crop too ripe	Operate at night when humidity is higher	—
Material accumulating in gap between cut-out in endsheet and knifehead	Crop heads leaning away from knifehead hole in endsheet	Add knifehead shields (except in damp or sticky soils)	5.5.8 Knifehead Shield, page 126
Strips of uncut material	Crowding uncut crop	Allow enough room for crop to be fed to cutterbar	—
	Broken knife sections	Replace broken sections	5.5.1 Replacing Knife Section, page 116
Excessive bouncing at normal field speed	Float set too light	Adjust header float	3.7.2 Header Float, page 50
Divider rod running down standing crop	Divider rods too long	Remove divider rod	3.7.11 Crop Dividers, page 58

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Crop not being cut at ends	Reel not frowning or not centered in header	Adjust reel frown or reel horizontal position	3.7.9 Reel Fore-Aft Position, page 55 and 5.8.2 Reel Frown, page 177
	Knife hold-downs not adjusted properly	Adjust hold-downs so knife works freely but still keep sections from lifting off guards	Checking Knife Hold-Downs, page 124
	Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	5.5 Cutterbar, page 116
	Header is not level	Level header	3.12 Levelling the Header, page 72
	Reel fingers not lifting crop properly ahead of knife	Adjust reel position and/or finger pitch	3.7.9 Reel Fore-Aft Position, page 55 and 3.7.10 Reel Tine Pitch, page 56
	Divider runs down thick crop at ends preventing proper feeding due to material bridging the cutter guards	Replace 3–4 end guards with stub guards	5.5.7 Knife Guards, page 119 and 6.2.3 Stub Guard Conversion Kit, page 218 or see your MacDon Dealer
Bushy or tangled crop flows over divider rod, builds up on endsheets	Divider rods providing insufficient separation	Install long divider rods	3.7.11 Crop Dividers, page 58
Cut grain falling ahead of cutterbar	Ground speed too slow	Increase ground speed	3.7.5 Ground Speed, page 52
	Reel speed too slow	Increase reel speed	3.7.4 Reel Speed, page 51
	Reel too high	Lower reel	3.7.8 Reel Height, page 54
	Cutterbar too high	Lower cutterbar	3.7.1 Cutting Height, page 45
	Reel too far forward	Move reel back on arms	3.7.9 Reel Fore-Aft Position, page 55
	Cutting at speeds over 6 mph (10 km/h) with high torque (10-tooth) reel drive sprocket	Replace with standard torque (19-tooth) reel drive sprocket	5.9.3 Replacing Reel Drive Sprocket, page 202
	Worn or broken knife components	Replace components	5.5 Cutterbar, page 116

TROUBLESHOOTING

8.2 Cutting Action and Knife Components

Symptom	Problem	Solution	Refer to
Ragged or uneven cutting of crop	Knife hold-downs not properly adjusted	Adjust hold-downs	<i>Checking Knife Hold-Downs, page 124</i>
	Knife sections or guards are worn or broken	Replace all worn and broken cutting parts	<i>Checking Knife Hold-Downs, page 124</i>
	Knife is not operating at recommended speed	Check engine speed of windrower	Refer to your windrower operator's manual
	Ground speed too fast for reel speed	Reduce ground speed or increase reel speed	<i>Reel Speed and 3.7.5 Ground Speed, page 52</i>
	Reel fingers not properly lifting crop ahead of knife	Adjust reel position and/or finger pitch	<i>3.7.9 Reel Fore-Aft Position, page 55 and 3.7.10 Reel Tine Pitch, page 56</i>
	Cutterbar too high	Lower cutting height	<i>3.7.1 Cutting Height, page 45</i>
	Header angle too flat	Steepen header angle	<i>3.7.3 Header Angle, page 51</i>
	Bent knife causing binding of cutting parts	Straighten bent knife and align guards	<i>5.5.7 Knife Guards, page 119</i>
	Cutting edge of guards not close enough or parallel to knife sections	Align guards	
	Tangled crop tough to cut	Install stub guards	<i>5.5.7 Knife Guards, page 119 and 6.2.3 Stub Guard Conversion Kit, page 218 or see your MacDon Dealer</i>
	Reel too far back	Move reel forward	<i>3.7.9 Reel Fore-Aft Position, page 55</i>
Loose knife drive belt	Adjust drive belt tension	<i>Tensioning Non-Timed Knife Drive Belts, page 142 or Tensioning Timed Knife Drive Belts, page 147</i>	

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Knife plugging	Reel too high or too far forward	Lower reel or move reel rearward	3.7.8 Reel Height, page 54 and 3.7.9 Reel Fore-Aft Position, page 55
	Ground speed too slow	Increase ground speed	3.7.5 Ground Speed, page 52
	Loose knife drive belt	Adjust drive belt tension	Tensioning Non-Timed Knife Drive Belts, page 142 or Tensioning Timed Knife Drive Belts, page 147
	Improper knife hold-down adjustment	Adjust hold-down	Checking Knife Hold-Downs, page 124
	Dull or broken knife sections	Replace knife sections	5.5.1 Replacing Knife Section, page 116
	Bent or broken guards	Align or replace guards	5.5.7 Knife Guards, page 119
	Reel fingers not properly lifting crop ahead of knife	Adjust reel position and/or finger pitch	3.7.9 Reel Fore-Aft Position, page 55 and 3.7.10 Reel Tine Pitch, page 56
	Steel pick-up fingers contacting knife	Increase reel clearance to cutterbar or adjust frown	Measuring Reel Clearance, page 175 and 5.8.2 Reel Frown, page 177
	Float is set too heavy	Adjust springs for lighter float	3.7.2 Header Float, page 50
	Mud or dirt build-up on cutterbar	Raise cutterbar by lowering skid shoes	Cutting on the Ground, page 49
Install cut-out sections		See your MacDon Dealer	
Flatten header angle		Adjusting Header Angle, page 51	
Knife is not operating at recommended speed	Check engine speed of windrower	Refer to your windrower operator's manual	
Knife back breakage	Bent or broken guard	Straighten or replace guard	5.5.7 Knife Guards, page 119
	Worn knifehead pin	Replace knifehead pin	5.5.3 Removing Knifehead Bearing, page 117
	Dull knife	Replace knife	5.5.2 Removing Knife, page 117 and 5.5.5 Installing Knife, page 118

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Excessive header vibration	Knife hold-downs not properly adjusted	Adjust hold-downs	<i>Checking Knife Hold-Downs, page 124</i>
	Knives on double-knife drive not timed	Adjust knife timing	<i>Adjusting Double-Knife Timing, page 148</i>
	Knife not operating at recommended speed	Check engine speed of windrower	Refer to your windrower operator's manual
	Excessive knife wear	Replace knife	<i>5.5.2 Removing Knife, page 117 and 5.5.5 Installing Knife, page 118</i>
	Loose or worn knifehead pin or drive arm	Tighten or replace parts	<i>5.5.3 Removing Knifehead Bearing, page 117 and 5.6.1 Knife Drive Box, page 128</i>
	Bent cutterbar	Straighten cutterbar	See your MacDon Dealer
Excessive breakage of knife sections or guards	Knife hold-downs not properly adjusted	Adjust hold-downs	<i>Checking Knife Hold-Downs, page 124</i>
	Cutterbar operating too low in stony conditions	Raise cutterbar using skid shoes	<i>Cutting on the Ground, page 49</i>
	Float is set too heavy	Adjust springs for lighter float	<i>3.7.2 Header Float, page 50</i>
	Bent or broken guard	Straighten or replace guard	<i>5.5.7 Knife Guards, page 119</i>
	Header angle too steep	Flatten header angle	<i>Adjusting Header Angle, page 51</i>

TROUBLESHOOTING

8.3 Reel Delivery

Symptom	Problem	Solution	Refer to
Reel not releasing material in normal standing crop	Reel speed too fast	Reduce reel speed	3.7.4 Reel Speed, page 51
	Reel too low	Raise reel	3.7.8 Reel Height, page 54
	Reel tines too aggressive	Reduce cam setting	3.7.10 Reel Tine Pitch, page 56
	Reel too far back	Move reel forward	3.7.9 Reel Fore-Aft Position, page 55
Reel not releasing material in lodged and standing crop (reel fully lowered)	Reel tines too aggressive for standing crop	Reduce cam setting	3.7.10 Reel Tine Pitch, page 56
Wrapping on reel end	Reel tines too aggressive	Reduce cam setting	3.7.10 Reel Tine Pitch, page 56
	Reel too low	Raise reel	3.7.8 Reel Height, page 54
	Reel speed too fast	Reduce reel speed	Reel Speed
	Crop conditions	Install optional endshields	See your MacDon Dealer
	Reel not centered in header	Center reel in header	5.8.3 Centering the Reel, page 178
Reel releases crop too quickly	Reel tines not aggressive enough	Increase cam setting	3.7.10 Reel Tine Pitch, page 56
	Reel too far forward	Move reel back	3.7.9 Reel Fore-Aft Position, page 55
Reel will not lift	Reel lift couplers are incompatible or defective	Change quick coupler	—
Reel will not turn	Control set at '0'	Activate reel speed control	3.7.4 Reel Speed, page 51
	Quick couplers not properly connected	Connect couplers	4 Header Attachment/Detachment, page 93
	Reel drive chain disconnected	Connect reel drive chain	5.9.7 Replacing Drive Chain on Single Reel, page 210
Reel motion uneven under no load	Excessive slack in reel drive chain	Tighten drive chain	5.9.2 Adjusting Reel Drive Chain Tension, page 200

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Reel motion is uneven or stalls in heavy crops	Reel speed too fast	Reduce reel speed	Reel Speed
	Reel fingers not aggressive enough	Move to a more aggressive finger pitch notch	3.7.10 Reel Tine Pitch, page 56
	Reel too low	Raise reel	3.7.8 Reel Height, page 54
	Relief valve on windrower has low relief pressure setting	Increase relief pressure to manufacturer's recommendations	Refer to the windrower operator's manual
	Low oil level in reservoir on windrower NOTE: There may be more than one reservoir.	Fill to proper level	
	Relief valve malfunction	Replace relief valve	
Cutting tough crops with standard torque (19-tooth) reel drive sprocket	Replace with high torque (10-tooth) or 14-tooth reel drive sprocket	5.9.3 Replacing Reel Drive Sprocket, page 202	
Plastic fingers cut at tip	Insufficient reel to cutterbar clearance	Increase clearance	5.8.1 Reel Clearance to Cutterbar, page 175
Plastic fingers bent rearward at tip	Reel digging into ground with reel speed slower than ground speed	Raise header	3.7.1 Cutting Height, page 45
		Decrease header tilt	3.7.3 Header Angle, page 51
		Move reel aft	3.7.9 Reel Fore-Aft Position, page 55
Plastic fingers bent forward at tip (opposite of above)	Reel digging into ground with reel speed faster than ground speed	Raise header	3.7.1 Cutting Height, page 45
		Decrease header tilt	3.7.3 Header Angle, page 51
		Move reel aft	3.7.9 Reel Fore-Aft Position, page 55
Plastic fingers bent close to tine tube	Excessive plugging at cutterbar with wads of crop accumulating at cutterbar while maintaining reel operation	Correct plugging and cutting issues	3.13 Unplugging the Cutterbar, page 73
		Stop reel before plugging becomes excessive	—

TROUBLESHOOTING

8.4 Header and Drapers

Symptom	Problem	Solution	Refer to
Header lift insufficient	Low relief pressure	Increase relief pressure	See your MacDon Dealer
Insufficient draper speed	Speed control set too low	Increase speed control setting	3.7.6 Draper Speed, page 53
	Relief pressure too low	Increase relief pressure to recommended setting	See your MacDon Dealer
	windrower header drive too slow	Adjust to correct speed for windrower model	Refer to the windrower operator's manual
	Worn out gear pump	Replace gear pump	See your MacDon Dealer
	Pressure compensator (V7) set too low	Adjust to increase setting	Refer to the windrower operator's manual
Draper will not move	Drapers are loose	Tighten drapers	5.7.3 Adjusting Draper Tension, page 157
	Drive or idler roller wrapped with material	Loosen draper and clean rollers	
	Slat or connector bar jammed by frame or material	Loosen draper and clear obstruction	
	Roller bearing seized	Replace roller bearing	5.7.6 Header Draper Roller Maintenance, page 163
	Low hydraulic oil	Fill windrower hydraulic oil reservoir to full level	Refer to the windrower operator's manual
	Incorrect relief setting at flow control valve	Adjust relief setting	See your MacDon Dealer
Draper stalling	Material not feeding evenly off knife	Lower reel	3.7.8 Reel Height, page 54
		Install stub guards	5.5.7 Knife Guards, page 119 and 6.2.3 Stub Guard Conversion Kit, page 218 or see your MacDon Dealer
Hesitation in flow of bulky crop	Header angle too low	Increase header angle	3.7.3 Header Angle, page 51
	Material overload on drapers	Increase side draper speed	3.7.6 Draper Speed, page 53
		Install upper cross auger	3.14 Upper Cross Auger (UCA), page 74
		Add fighting extensions	See your MacDon Dealer

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Drapers back-feed	Drapers running too slow in heavy crop	Increase draper speed	<i>3.7.6 Draper Speed, page 53</i>
Crop is thrown across opening and under opposite side draper	Drapers running too fast in light crop	Reduce draper speed	
Material accumulates inside or under front edge of draper	Deck height improperly adjusted	Adjust deck height	<i>5.7.5 Adjusting Deck Height, page 160</i>
Material wrapping at upper cross auger beater bars	Crop conditions do not require beater bars	Remove beater bars	<i>3.14.1 Removing Beater Bars, page 74</i>
Material accumulating on end deflectors and releasing in bunches	End deflectors too wide	For headers with manual deck shift only, trim deflector or replace with narrow deflector (MD #172381)	<i>3.13 Unplugging the Cutterbar, page 73</i>

TROUBLESHOOTING

8.5 Cutting Edible Beans

Symptom	Problem	Solution	Refer to
Plants being stripped and complete or partial plants left behind.	Header off ground	Lower header to ground and run on skid shoes and/or cutterbar	<i>Cutting on the Ground, page 49</i>
	Float set too light—rides on high spots and does not lower soon enough	Set float for the following conditions: - Dry ground: 100–150 lbf - Wet ground: 50–100 lbf	<i>3.7.2 Header Float, page 50</i>
	Reel too high	Fully retract reel cylinders	<i>3.7.8 Reel Height, page 54</i>
	Reel too high with cylinders fully retracted	Adjust reel height	<i>3.7.8 Reel Height, page 54</i>
	Finger pitch not aggressive enough	Adjust finger pitch	<i>3.7.10 Reel Tine Pitch, page 56</i>
	Reel too far aft	Move reel forward until the fingertips skim the soil surface with header on the ground and the center-link properly adjusted	<i>3.7.9 Reel Fore-Aft Position, page 55</i>
	Header angle too shallow	Lengthen center-link	<i>Adjusting Header Angle, page 51</i>
		Increase header angle can by fully retracting lift cylinders (if cutting on ground)	
	Reel too slow	Adjust reel speed to be marginally faster than ground speed	<i>3.7.4 Reel Speed, page 51</i>
	Ground speed too fast	Lower ground speed	<i>3.7.5 Ground Speed, page 52</i>
	Skid shoes too low	Raise skid shoes to highest setting	<i>Cutting on the Ground, page 49</i>
	Dirt packs on bottom of cutterbar and raises cutterbar off the ground	Install plastic wear strips on bottom of cutterbar and skid shoes	See your MacDon Dealer
	Dirt packing on bottom of cutterbar with plastic wear strips on cutterbar and raises cutterbar off the ground	Ground too wet – allow soil to dry	—
Manually clean the bottom of cutterbar when excessive accumulation occurs			

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Plants being stripped and complete or partial plants left behind.	Plastic wear strip for cutterbar has been installed over top of steel wear plates	Remove steel cutterbar wear plates when installing the plastic wear strips for cutterbar	—
	Header not level	Level header	
	Worn or damaged knife sections	Replace sections or replace knife	5.5 Cutterbar, page 116
	Parts of vines get caught in pointed guard tip. (Occurs more in row-cropped beans that are hilled from cultivating.)	Install stub guard conversion kit	6.2.3 Stub Guard Conversion Kit, page 218
Excessive losses at dividers	Divider rod running down crop and shattering pods	Remove divider rod	3.7.11 Crop Dividers, page 58
	Vines and plants build up on endsheet	Install divider rod	
Plant vines pinched between top of draper and cutterbar	Cutterbar fills with debris when draper to cutterbar gap is properly adjusted	Raise header fully at each end of field (or as required) and shift decks back and forth to help clean out cutterbar	—
	Shifting the decks with header raised does not clean out cutterbar debris.	Manually remove debris from cutterbar cavity to prevent damaging the drapers	
Crop accumulating at guards and not moving rearward onto drapers	Reel finger pitch not aggressive enough	Increase finger aggressiveness (cam position)	3.7.10 Reel Tine Pitch, page 56
	Reel too high	Lower reel	3.7.8 Reel Height, page 54
	Minimum reel clearance to cutterbar setting too high	Adjust minimum reel height with cylinders fully retracted	5.8.1 Reel Clearance to Cutterbar, page 175
	Reel too far forward	Reposition reel	3.7.9 Reel Fore-Aft Position, page 55
Crop wrapping around reel	Reel too low	Raise reel	3.7.8 Reel Height, page 54

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Reel shattering pods	Reel too far forward	Reposition reel	3.7.9 Reel Fore-Aft Position, page 55
	Reel speed too high	Reduce reel speed	3.7.4 Reel Speed, page 51
	Bean pods are too dry	Cut at night when heavy dew is present and pods have softened	—
	Reel finger pitch not aggressive enough	Increase finger aggressiveness (cam position)	3.7.10 Reel Tine Pitch, page 56
Cutterbar guards breaking	Float insufficient	Increase float	3.7.2 Header Float, page 50
	Excessive number of rocks in field	Consider installing optional stub guards Tip: Install a few guards on one section of the cutterbar and compare the performance of the two different guard styles	5.5.7 Knife Guards, page 119 and 6.2.3 Stub Guard Conversion Kit, page 218
Cutterbar pushing too much debris and dirt	Header too heavy	Readjust float to make header lighter	3.7.2 Header Float, page 50
	Header angle too steep	Decrease header angle with lift cylinders	3.7.3 Header Angle, page 51
		Shorten the center-link	
	Regular guards push dirt and plug with debris or plug with debris and then push dirt	Install stub guard kit	6.2.3 Stub Guard Conversion Kit, page 218
Insufficient support for header	Install center skid shoes on header	Cutting on the Ground, page 49	
Crop wrapping around reel ends	Uncut crop interfering on reel ends	Add reel endshields	Refer to the header parts catalog.
Cutterbar fills up with dirt	Excessive gap between top of front of draper and cutterbar	Adjust front deck supports to achieve proper clearance between cutterbar and draper	5.7.5 Adjusting Deck Height, page 160
		Raise header fully at each end of field (or as required) and shift decks back and forth to help clean out cutterbar	—

TROUBLESHOOTING

Symptom	Problem	Solution	Refer to
Reel occasionally carries over plants in same location	Reel fingers (steel) bent and hooking plants from crop flow on drapers	Straighten fingers (steel)	—
	Dirt accumulation on end of fingers preventing plants from dropping off fingers onto drapers	Raise reel	3.7.8 Reel Height, page 54
		Adjust reel fore-aft position to move fingers out of the ground	3.7.9 Reel Fore-Aft Position, page 55
Cutterbar pushing too much dirt in certain locations for length of field	Tire tracks or row crop ridges	Cut at angle to crop rows or ridges to allow knife and guards to clean out more effectively	—
	Rolling land along length of field	Cut at 90° to undulations (provided knife floats across without digging in)	
Reel carries over an excessive amount of plants or wads	Excessive accumulation of crop on drapers (up to height of reel center tube)	Increase draper speed	3.7.6 Draper Speed, page 53
	Finger pitch too retarded	Increase finger pitch	3.7.10 Reel Tine Pitch, page 56

TROUBLESHOOTING

8.6 Windrow Formation

Symptom	Problem	Solution	Section
Heads on ground and scattered	Draper speed too slow	Increase draper speed.	3.7.6 Draper Speed, page 53
	Draper angle too flat	Increase header angle.	3.7.3 Header Angle, page 51
	Ground speed too slow	Increase ground speed.	3.7.5 Ground Speed, page 52
	Crop too ripe	Cut material before too mature.	—
Hollow in center	Draper speed too slow	Increase draper speed.	3.7.6 Draper Speed, page 53
	Delivery opening too wide	Decrease delivery opening width.	3.8 Delivery Opening, page 65
All heads in center	Draper speed too fast or header angle too steep	Reduce draper speed and/or decrease header angle.	3.7.6 Draper Speed, page 53
			3.7.3 Header Angle, page 51
	Ground speed too fast	Reduce ground speed.	3.7.5 Ground Speed, page 52
	Crop too green	Allow to mature.	—
All heads to one side	Crop leaning to one side and reel too slow	Increase reel speed to re-orient crop parallel to draper slats and/or increase finger pitch aggressiveness.	3.7.4 Reel Speed, page 51 3.7.10 Reel Tine Pitch, page 56
Uneven windrow (any crop condition)	Ground speed too fast for drapers, causing heads to fan out and crop to leave drapers unevenly	Reduce ground speed or increase draper speed.	3.7.5 Ground Speed, page 52 3.7.6 Draper Speed, page 53
	Reel too low	Raise reel.	3.7.8 Reel Height, page 54
	Reel speed too fast	Reduce reel speed.	3.7.4 Reel Speed, page 51

9 Reference

9.1 Torque Specifications

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

- Tighten all bolts to the torque values specified in the charts (unless otherwise noted throughout this manual).
- Replace hardware with the same strength and grade of bolt.
- Use the 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.

9.1.1 Metric Bolt Specifications

Table 9.1 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
3-0.5	*13	*14	1.4	1.6
3.5-0.6	*20	*22	2.2	2.5
4-0.7	*29	*32	3.3	3.7
5-0.8	*59	*66	6.7	7.4
6-1.0	*101	*112	11.4	12.6
8-1.25	20	23	28	30
10-1.5	40	45	55	60
12-1.75	70	78	95	105
14-2.0	113	124	152	168
16-2.0	175	193	236	261
20-2.5	341	377	460	509
24-3.0	589	651	796	879

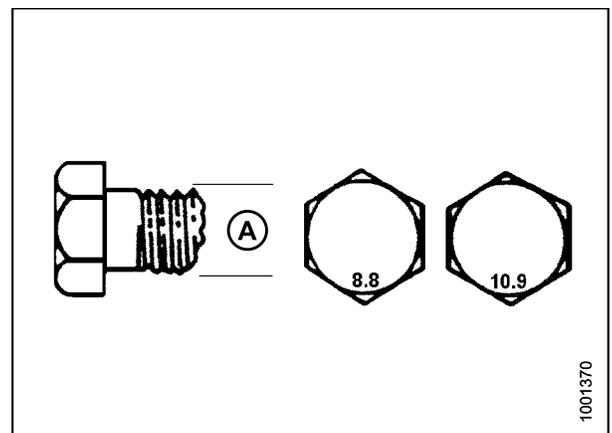


Figure 9.1: Bolt Grades

REFERENCE

Table 9.2 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
3-0.5	*9	*10	1	1.1
3.5-0.6	*14	*15	1.5	1.7
4-0.7	*20	*22	2.3	2.5
5-0.8	*40	*45	4.5	5
6-1.0	*69	*76	7.7	8.6
8-1.25	*167	*185	18.8	20.8
10-1.5	28	30	37	41
12-1.75	48	53	65	72
14-2.0	77	85	104	115
16-2.0	119	132	161	178
20-2.5	233	257	314	347
24-3.0	402	444	543	600

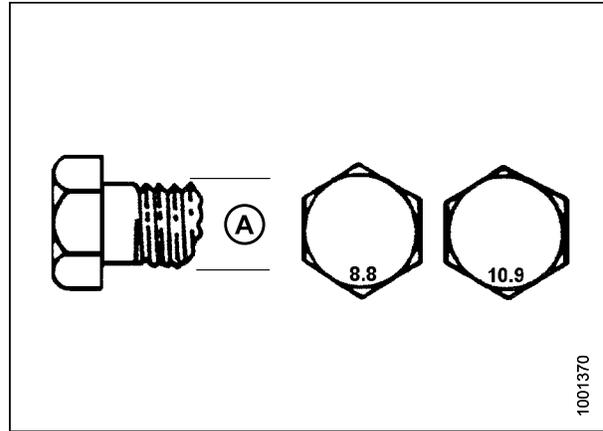


Figure 9.2: Bolt Grades

Table 9.3 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
3-0.5	*18	*19	1.8	2
3.5-0.6	*27	*30	2.8	3.1
4-0.7	*41	*45	4.2	4.6
5-0.8	*82	*91	8.4	9.3
6-1.0	*140	*154	14.3	15.8
8-1.25	28	31	38	42
10-1.5	56	62	75	83
12-1.75	97	108	132	145
14-2.0	156	172	210	232
16-2.0	242	267	326	360
20-2.5	472	521	637	704
24-3.0	815	901	1101	1217

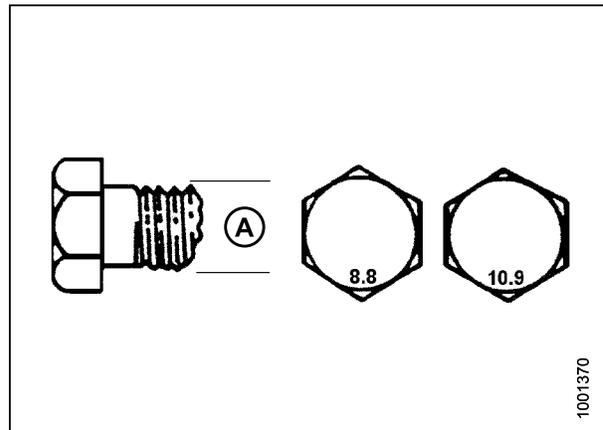


Figure 9.3: Bolt Grades

REFERENCE

Table 9.4 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
3-0.5	*12	*13	1.3	1.5
3.5-0.6	*19	*21	2.1	2.3
4-0.7	*28	*31	3.1	3.4
5-0.8	*56	*62	6.3	7
6-1.0	*95	*105	10.7	11.8
8-1.25	19	21	26	29
10-1.5	38	42	51	57
12-1.75	66	73	90	99
14-2.0	106	117	143	158
16-2.0	165	182	222	246
20-2.5	322	356	434	480
24-3.0	556	614	750	829

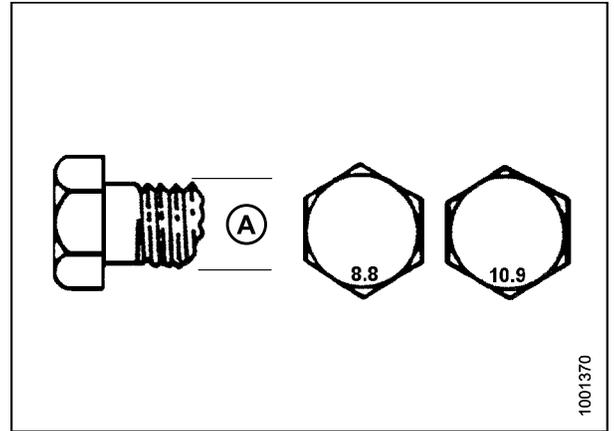


Figure 9.4: Bolt Grades

9.1.2 Metric Bolt Specifications Bolting into Cast Aluminum

Table 9.5 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	ft·lbf	N·m	ft·lbf	N·m
M3	–	–	1	–
M4	–	–	2.6	4
M5	–	–	5.5	8
M6	6	9	9	12
M8	14	20	20	28
M10	28	40	40	55
M12	52	70	73	100
M14	–	–	–	–
M16	–	–	–	–

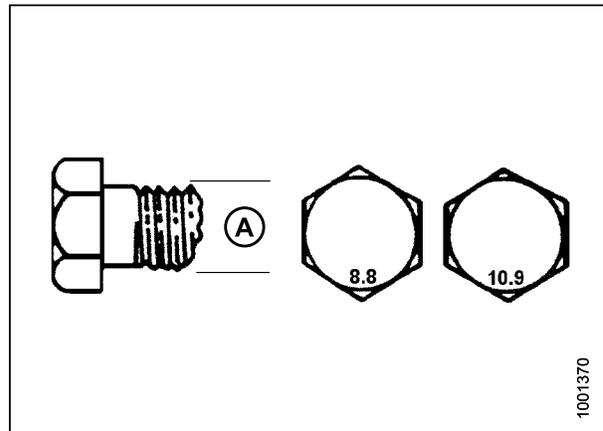


Figure 9.5: Bolt Grades

9.1.3 Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between the flared surfaces.
3. Torque the fitting nut (E) to the specified number of flats from finger tight (FFFT) or to a given torque value in [Table 9.6 Flare-Type Hydraulic Tube Fittings, page 245](#).
4. Use two wrenches to prevent fitting (D) from rotating. Place one wrench on the fitting body (D) and tighten nut (E) with the other wrench to the torque shown.
5. Assess the final condition of the connection.

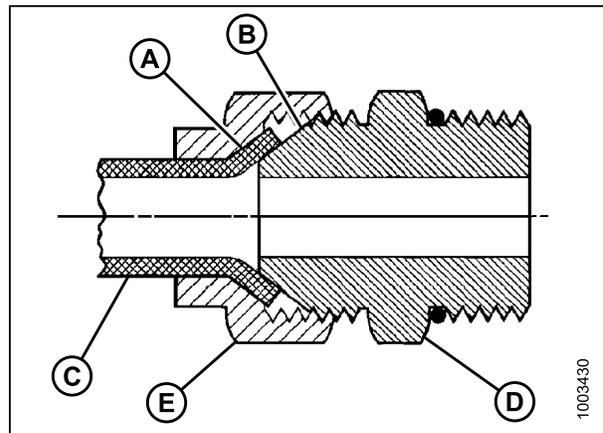


Figure 9.6: Hydraulic Fitting

REFERENCE

Table 9.6 Flare-Type Hydraulic Tube Fittings

SAE Dash Size	Thread Size (in.)	Torque Value ¹⁷		Flats from Finger Tight (FFFT)	
		ft·lbf	N·m	Tube	Swivel Nut or Hose
-2	5/16–24	3–4	4–5	—	—
-3	3/8–24	5–6	7–8	—	—
-4	7/16–20	13–14	18–19	2-1/2	2
-5	1/2–20	14–15	19–21	2	2
-6	9/16–18	22–24	30–33	2	1-1/2
-8	3/4–16	42–46	57–63	2	1-1/2
-10	7/8–14	60–66	81–89	1-1/2	1-1/2
-12	1-1/16–12	83–91	113–124	1-1/2	1-1/4
-14	1-3/16–12	100–110	136–149	1-1/2	1-1/4
-16	1-5/16–12	118–130	160–176	1-1/2	1
-20	1-5/8–12	168–184	228–250	1	1
-24	1-7/8–12	195–215	264–291	1	1
-32	2-1/2–12	265–291	359–395	1	1
-40	3–12	—	—	1	1

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

REFERENCE

9.1.4 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Back off the lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward the lock nut (C) as far as possible.
3. Check that O-ring (A) is **NOT** on the threads and adjust if necessary.
4. Apply hydraulic system oil to the O-ring (A).

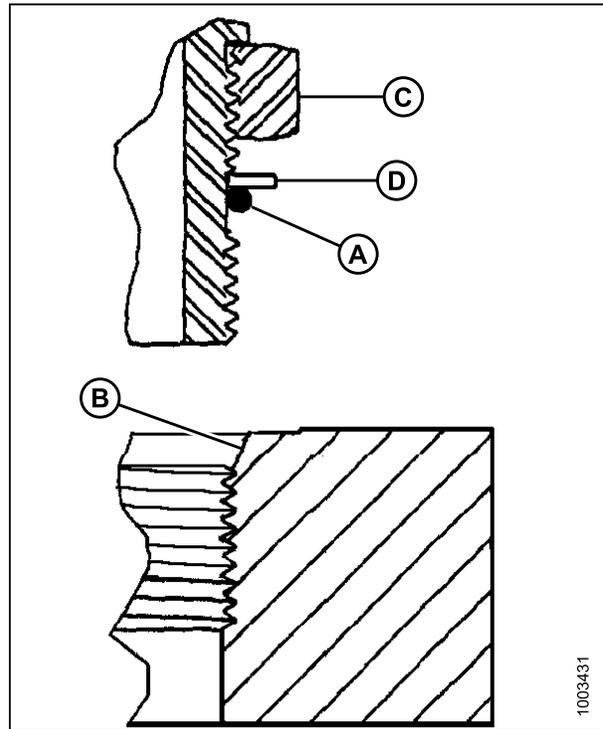


Figure 9.7: Hydraulic Fitting

5. Install fitting (B) into port until back up washer (D) and O-ring (A) contact the 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 the other on lock nut (C).
8. Check the final condition of the fitting.

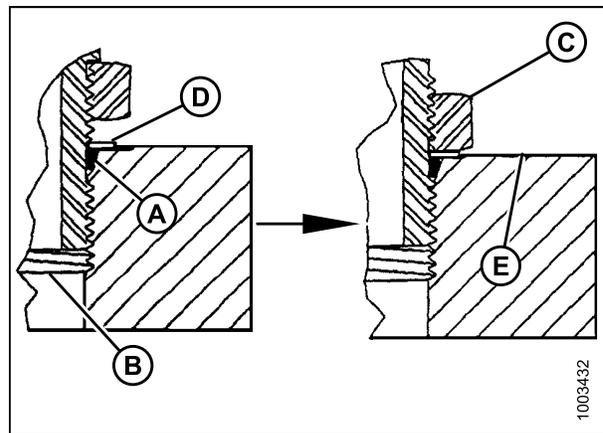


Figure 9.8: Hydraulic Fitting

REFERENCE

Table 9.7 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value ¹⁸	
		ft·lbf (*in·lbf)	N·m
-2	5/16–24	*53–62	6–7
-3	3/8–24	*106–115	12–13
-4	7/16–20	14–15	19–21
-5	1/2–20	15–24	21–33
-6	9/16–18	19–21	26–29
-8	3/4–16	34–37	46–50
-10	7/8–14	55–60	75–82
-12	1-1/16–12	88–97	120–132
-14	1-3/8–12	113–124	153–168
-16	1-5/16–12	130–142	176–193
-20	1-5/8–12	163–179	221–243
-24	1-7/8–12	199–220	270–298
-32	2-1/2–12	245–269	332–365

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

REFERENCE

9.1.5 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 the threads and adjust if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into port until fitting is hand tight.
5. Torque fitting (C) according to the values in Table 9.8 *O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)*, page 248.
6. Check the final condition of the fitting.

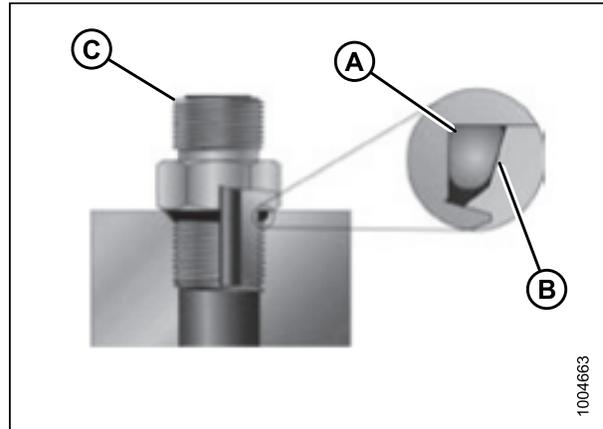


Figure 9.9: Hydraulic Fitting

Table 9.8 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value ¹⁹	
		ft·lbf (*in·lbf)	N·m
-2	5/16–24	*53–62	6–7
-3	3/8–24	*106–115	12–13
-4	7/16–20	14–15	19–21
-5	1/2–20	15–24	21–33
-6	9/16–18	19–21	26–29
-8	3/4–16	34–37	46–50
-10	7/8–14	55–60	75–82
-12	1-1/16–12	88–97	120–132
-14	1-3/8–12	113–124	153–168
-16	1-5/16–12	130–142	176–193
-20	1-5/8–12	163–179	221–243
-24	1-7/8–12	199–220	270–298
-32	2-1/2–12	245–269	332–365

¹⁹ Torque values shown are based on lubricated connections as in reassembly.

REFERENCE

9.1.6 O-Ring Face Seal (ORFS) Hydraulic Fittings

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



Figure 9.10: Hydraulic Fitting

2. Apply hydraulic system oil to the O-ring (B).
3. Align the tube or hose assembly so that the flat face of the 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 the values in Table 9.9 *O-Ring Face Seal (ORFS) Hydraulic Fittings, page 250*.

NOTE:

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

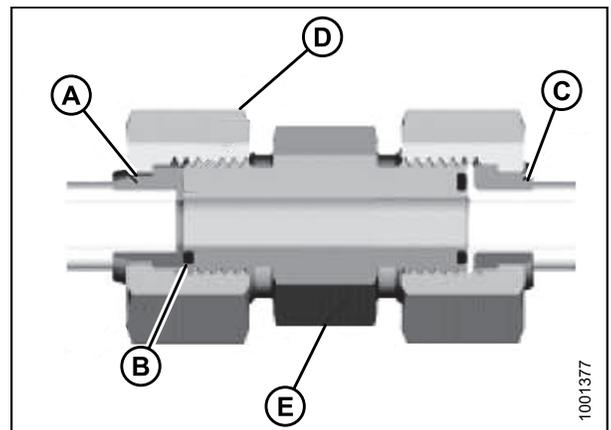


Figure 9.11: Hydraulic Fitting

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

REFERENCE

Table 9.9 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value ²⁰	
			ft·lbf	N·m
-3	Note ²¹	3/16	–	–
-4	9/16	1/4	18–21	25–28
-5	Note ²¹	5/16	–	–
-6	11/16	3/8	29–32	40–44
-8	13/16	1/2	41–45	55–61
-10	1	5/8	59–65	80–88
-12	1-3/16	3/4	85–94	115–127
-14	Note ²¹	7/8	–	–
-16	1-7/16	1	111–122	150–165
-20	1-11/16	1-1/4	151–167	205–226
-24	1–2	1-1/2	232–256	315–347
-32	2-1/2	2	376–414	510–561

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

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

REFERENCE

9.2 Conversion Chart

Table 9.10 Conversion Chart

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

Index

A

API	
definitions	19
ASTM	
definitions	19
axle bolts	212

B

bearings	
draper decks	
drive rollers.....	168
idler rollers.....	164
beater bars	
installing	74
removing	74
belts	
knife drive	140
adjusting belt tracking.....	151
non-timed	140–141
tensioning non-timed drive belts.....	142
tensioning timed drive belts	147
timed.....	143–145
timed v-belts	143
knife timing	
adjusting	148
break-in inspections.....	104
break-in periods.....	38

C

cab-forward	
definitions	19
cams	
adjusting.....	58
center-links	19
<i>See also</i> , hydraulic links	
definitions	19
chains	
reel drives	
adjusting tension.....	200
component identification.....	22
conversion charts	251
crop delivery	
options	221
crop divider rods.....	63
installing	64
removing	63
crop dividers.....	58
installing on header without latch option.....	61

installing onto header with latch option.....	60
removing from header with latch option.....	58
removing from header without latch option	59
cutterbar wearplates	217
cutterbars.....	116
options	217
unplugging.....	73
cutting	
height.....	45
off the ground.....	45
adjusting stabilizer wheels	47
adjusting stabilizer/slow speed transport	
wheels.....	46
on the ground.....	49

D

D1 XL-Series headers	
definitions	19
daily start-up checks	37
decals locations	9
definition of terms	19
delivery openings.....	65
adjusting using hydraulic deck shift.....	66
adjusting using manual deck shift	65
divider latch kits.....	219
divider rods	63
installing	64
removing	63
DK	
definitions	19
double draper drives	221
DR	
definitions	19
draper deck drive rollers.....	166
draper deck idler rollers.....	163
draper decks	
adjusting height.....	160
drive roller bearings	
replacing	168
idler roller bearings	
replacing	164
idler rollers	
installing.....	166
shifting decks hydraulically.....	67
draper deflectors	
narrow	221
installing.....	174
removing	173
replacing.....	170
wide	221

INDEX

- draper extension kits 222
- draper roller bearings
 - inspecting 163
- drapers 155
 - adjusting tension 157
 - adjusting tracking 159
 - drive roller
 - installing 169
 - removing 166
 - drive rollers
 - removing 166
 - idler roller
 - removing 163
 - idler rollers
 - removing 163
 - installing 155
 - removing 155
 - speed 53
 - wide deflector
 - installing 171
 - removing 170
- drive rollers
 - draper
 - installing drive roller 169
 - removing 166
 - draper decks
 - replacing bearings 168
 - drapers
 - removing 166
- drying agents 71
- DWA
 - definitions 19
- E**
- electrical
 - reel height sensor
 - adjusting 114
- electrical system
 - maintenance 114
 - replacing light bulbs 114
- endshields 31
 - checking and adjusting 34
 - closing 32
 - installing 33
 - opening 31
 - removing 33
- engine-forward
 - definitions 19
- G**
- glossary 19
- greasing
 - every 10 hours 108
 - every 100 hours 110
 - every 25 hours 109
 - every 250 hours 111
 - every 500 hours 113
 - maintenance schedule/records 103
- ground speeds 52
- guards
 - adjusting knife guards 120
 - knife guards 119
 - replacing pointed guards 120
 - replacing stub guards 123
 - stub guard conversion kits 218
- H**
- haying tips 70
 - chemical drying agents 71
 - curing 70
 - driving on windrows 71
 - raking and tedding 71
 - topsoil moisture 70
 - weather and topography 70
 - windrow characteristics 70
- header angle
 - adjusting 51
 - adjustment range 51
- header drapers
 - draper roller maintenance 163
- header float 50
- header safety props 29
- headers
 - assembly 225
 - attaching headers
 - M1170 windrowers 93
 - M1240 windrowers 93
 - attachments 41
 - controls 40
 - deck heights
 - adjusting 160
 - definitions 19
 - detaching headers
 - M1170 windrowers 96
 - M1240 windrowers 96
 - operating variables 45
 - options 219
 - recommended settings 41
 - setup 41
 - towing the header 76
 - transporting 76
 - transporting on windrowers 76
- hold-downs, *See* knife hold-downs
 - adjusting hold-downs with pointed guards 124
 - adjusting hold-downs with stub guards 126

INDEX

- hoses and lines
 - hydraulic 106
- hydraulic deck shift packages 222
- hydraulic deck shifts 67
- hydraulics
 - fittings
 - flare-type 244
 - O-ring boss (ORB) adjustable 246
 - O-ring boss (ORB) non-adjustable 248
 - O-ring face seal (ORFS) 249
 - hoses and lines 106
 - hydraulic safety 6
- I**
- idler rollers
 - draper
 - removing idler roller 163
 - draper decks
 - installing 166
 - replacing bearings 164
- inspections
 - break-in inspections 104
 - maintenance schedule/records 103
- K**
- knife drive belts, *See* belts
- knife drive boxes 128
 - changing oil 139
 - fore-aft adjustment 137
 - installing 132
 - installing pulley 132
 - mounting bolts 129
 - removing 129
 - removing pulley 132
 - squareness 136
- knife drives 128
 - adjusting timing of double knives 148
- knifehead shields 126, 217
 - installing 127
- knives
 - adjusting 120
 - adjusting hold-downs with pointed guards 124
 - adjusting hold-downs with stub guards 126
 - checking 124
 - guards 120
 - hold-downs 124
 - installing 118
 - knife guards
 - checking 119
 - replacing pointed guards 120
 - replacing stub guards 123
 - knife sections
 - replacing 116
 - knife speed 54
 - knifehead bearings
 - installing 118
 - removing 117
 - knifehead shields 126
 - installing 127
 - removing 117
 - spare knife location 119
- L**
- light bulbs
 - replacing 114
- lodged crop reel finger kits 215
- lubrication and servicing 106
- M**
- maintenance and servicing 99
 - electrical system 114
 - lubrication 108
 - maintenance requirements 102
 - maintenance specifications 100
 - preparing for servicing 99
 - preseason servicing 104
 - schedule 103
 - service intervals 108
- maintenance requirements
 - lubrication and servicing 106
 - greasing procedure 107
 - maintenance records 103
 - service
 - end of season servicing 105
 - servicing
 - break-in inspections 104
- maintenance safety 5
- maintenance schedule/records 103
- metric bolts
 - torque specifications 241
- model numbers
 - records iii
- moisture 70
- motors
 - reel drives 206
- mounting bolts
 - knife drive boxes 129
- O**
- oils
 - knife drive box
 - changing 139
- operating variables

INDEX

- headers 45
 - operations 27
 - operator responsibilities 27
 - options 215
 - crop delivery 221–223
 - draper deflectors (narrow) 221
 - draper deflectors (wide) 221
 - upper cross augers 223
 - cutterbars 217–218
 - cutterbar wearplates 217
 - knifehead shields 217
 - vertical knife mount kits 218
 - double draper drives 221
 - draper extension kits 222
 - headers 219
 - divider latch kits 219
 - rice divider rods 224
 - stabilizer/slow speed transport wheels 220
 - hydraulic deck shift 222
 - knifehead shields 126–127
 - PR15 pick-up reels
 - reel endshield kits 215
 - reel drive sprockets 52
 - reels 215
 - lodged crop reel finger kits 215
 - reel endshield kits 215
 - tine tube kits 216
 - stabilizer wheels 219
 - stub guard conversion kits 218
 - swath forming rods (end delivery) 222
 - transport systems 211
 - upper cross auger case drain kits 223
 - upper cross auger hydraulic kits 223
 - upper cross augers 74
 - owner responsibilities 27
- P**
- pick-up reels, See PR15 pick-up reels
 - PR15 pick-up reels 175
 - adjusting cam 58
 - centering 179
 - double reels 179
 - drive chains
 - adjusting tension 200
 - replacing chain on double-reel drives 207
 - using break chain method 209
 - replacing chain on single-reel drives 210
 - frown 177
 - adjusting 177
 - options 215
 - plastic fingers
 - installing 181
 - removing 180
 - reel clearance 175
 - adjusting 176
 - measuring 175
 - reel drive motors 206
 - installing 206
 - removing 206
 - reel drives 198
 - covers
 - installing 199
 - removing 198
 - replacing 198
 - drive chains
 - loosening 200
 - tightening 201
 - drive sprockets
 - installing 203
 - removing 202
 - installing double-reel U-joints 204
 - removing double-reel U-joints 204
 - replacing chain on double-reel drives
 - using reel method 207
 - replacing double-reel U-joints 204
 - sprockets
 - replacing 202
 - reel endshields 194
 - replacing 194–195
 - replacing endshield supports 196
 - reel safety props 29
 - disengaging 30
 - engaging 29
 - reel settings 56
 - reel speed 51
 - reel tine pitch 56
 - reel tines 179
 - single reels 179
 - steel tine
 - installing 180
 - steel tines
 - removing 179
 - tine tube bushings 182
 - installing on 5-, 6- or 9-bat reels 187
 - removing from 5-, 6-, or 9-bat reels 182
 - preseason servicing 104
 - product overview 19

R

 - raking 71
 - recommended fluids and lubricants 100
 - recommended settings
 - header 41
 - reels 42
 - reel
 - centering 178

INDEX

- reel drives 198
 - drive chains
 - replacing chain on double-reel drives 207
 - using break chain method 209
 - using reel method 207
 - replacing chain on single-reel drives 210
 - sprockets 52
 - reel endshield kits 215
 - reel endshields
 - replacing 194–195
 - replacing endshield supports 196
 - reel fore-aft positions 55
 - adjusting 55
 - reel height sensor
 - adjusting 114
 - reel safety props 29
 - disengaging 30
 - engaging 29
 - reel speeds 51
 - reels
 - fore-aft positions
 - adjusting 55
 - height 54
 - recommended settings 42
 - reference
 - maintenance requirements 102
 - references
 - definition of terms 19
 - rice divider rods 224
 - roller chains
 - installing 100
 - rpm
 - definitions 19
- S**
- SAE
 - definitions 19
 - safety 1
 - alert symbols 1
 - battery safety 7
 - daily start-up checks 37
 - decals 9
 - general safety 3
 - header safety props 29
 - hydraulic safety 6
 - maintenance and servicing 5
 - operational 28
 - reel safety props 29
 - safety sign decals 8
 - installing decals 8
 - interpreting decals 13
 - signal words 2
 - sealed bearings
 - installing 101
 - serial numbers
 - locations iii
 - records iii
 - service intervals
 - lubrication 108
 - servicing, *See* maintenance and servicing
 - setting up the header 225
 - shutting down procedures 39
 - SK
 - definitions 19
 - skid shoes, *See* cutting on the ground
 - adjusting 49
 - spare knives 119
 - specifications 23
 - torque specifications 241
 - speed
 - draper speed 53
 - ground speed 52
 - reel speed 51
 - spm
 - definitions 19
 - sprockets 198–201, 203
 - adjusting reel drive chain tension 200
 - optional reel drive sprockets 52
 - removing drive sprocket 202
 - replacing reel drive sprockets 202
 - SR
 - definitions 19
 - stabilizer wheels 219
 - adjusting 47
 - stabilizer/slow speed transport wheels 220
 - adjusting 46
 - start-up
 - daily checks 37
 - steel tines
 - installing 180
 - removing 179
 - stub guard conversion kits 218
 - swath forming rods (end delivery)
 - options 222
- T**
- tedding 71
 - tine tubes
 - bushings
 - installing on 5-, 6- or 9-bat reels 187
 - removing from 5-, 6- or 9-bat reels 182
 - tine tube kits 216
 - tire inflation/pressures 213
 - topography 70
 - torque specifications 241
 - axle bolts 212

INDEX

- flare-type hydraulic fittings 244
 - metric bolt specifications 241
 - bolting into cast aluminum 244
 - O-ring boss (ORB) fittings
 - (non-adjustable) 248
 - O-ring boss (ORB) hydraulic fittings
 - (adjustable) 246
 - O-ring face seal (ORFS) fittings 249
 - tow-bars
 - attaching 89
 - removing 78
 - storing 79
 - towing
 - attaching header to towing vehicle 77
 - attaching tow-bars 78, 89
 - converting from field to transport 85
 - converting from transport to field 78
 - moving front (left) wheels to field position 81
 - moving front (left) wheels to transport position 85
 - moving rear (right) wheels to field position 82
 - moving rear (right) wheels to transport position 86
 - towing the header 76–77
 - tractors
 - definitions 19
 - transport systems 211
 - axle bolt torques 212
 - converting from field to transport 85
 - moving front (left) wheels to transport position 85
 - moving rear (right) wheels to transport position 86
 - converting from transport to field 78
 - moving front (left) wheels to field position 81
 - moving rear (right) wheels to field position 82
 - tire inflation/pressures 213
 - tow-bars
 - attaching 89
 - removing 78
 - storing 79
 - wheel bolt torques 211
 - troubleshooting 227
 - crop loss at cutterbar 227
 - cutting action and knife components 229
 - cutting edible beans 236
 - header and drapers 234
 - reel delivery 232
 - windrow formation 240
 - trucks
 - definitions 19
- ### U
- U-joints
 - reel drives 204
 - unloading 225
 - unplugging the cutterbar 73
 - upper cross auger case drain kits 223
 - upper cross auger hydraulic kits 223
 - upper cross augers 74, 223
 - installing beater bars 74
 - removing beater bars 74
- ### V
- vertical knife mount kits 218
- ### W
- weather 70
 - wheels and tires
 - tires
 - tire inflation/pressures 213
 - wheel bolt torques 211
 - windrowers
 - attaching headers
 - M1170 windrowers 93
 - M1240 windrowers 93
 - definitions 19
 - detaching headers
 - M1170 windrowers 96
 - M1240 windrowers 96
 - header attachment/detachment 93
 - transporting headers 76
 - windrows
 - delivery openings 65
 - double windrowing 67
 - driving on windrows 71
 - types of windrows 68
 - windrow characteristics 70
 - wobble boxes, See knife drive boxes

MacDon Industries Ltd.

680 Moray Street
Winnipeg, Manitoba
Canada R3J 3S3
t. (204) 885-5590
f. (204) 832-7749

MacDon, Inc.

10708 N. Pomona Avenue
Kansas City, Missouri
United States 64153-1924
t. (816) 891-7313
f. (816) 891-7323

MacDon Australia Pty. Ltd.

A.C.N. 079 393 721
P.O. Box 243, Suite 3, 143 Main Street
Greensborough, Victoria, Australia 3088
t. 03 9432 9982
f. 03 9432 9972

LLC MacDon Russia Ltd.

123317 Moscow, Russia
10 Presnenskaya nab, Block C
Floor 5, Office No. 534, Regus Business Centre
t. +7 495 775 6971
f. +7 495 967 7600

CUSTOMERS

MacDon.com

DEALERS

Portal.MacDon.com

Trademarks of products are the marks of their respective manufacturers and/or distributors.

Printed in Canada