MacDon

A40-D Self-Propelled Windrower Auger Headers

Operator's Manual

147912 Revision A

2017 Model Year

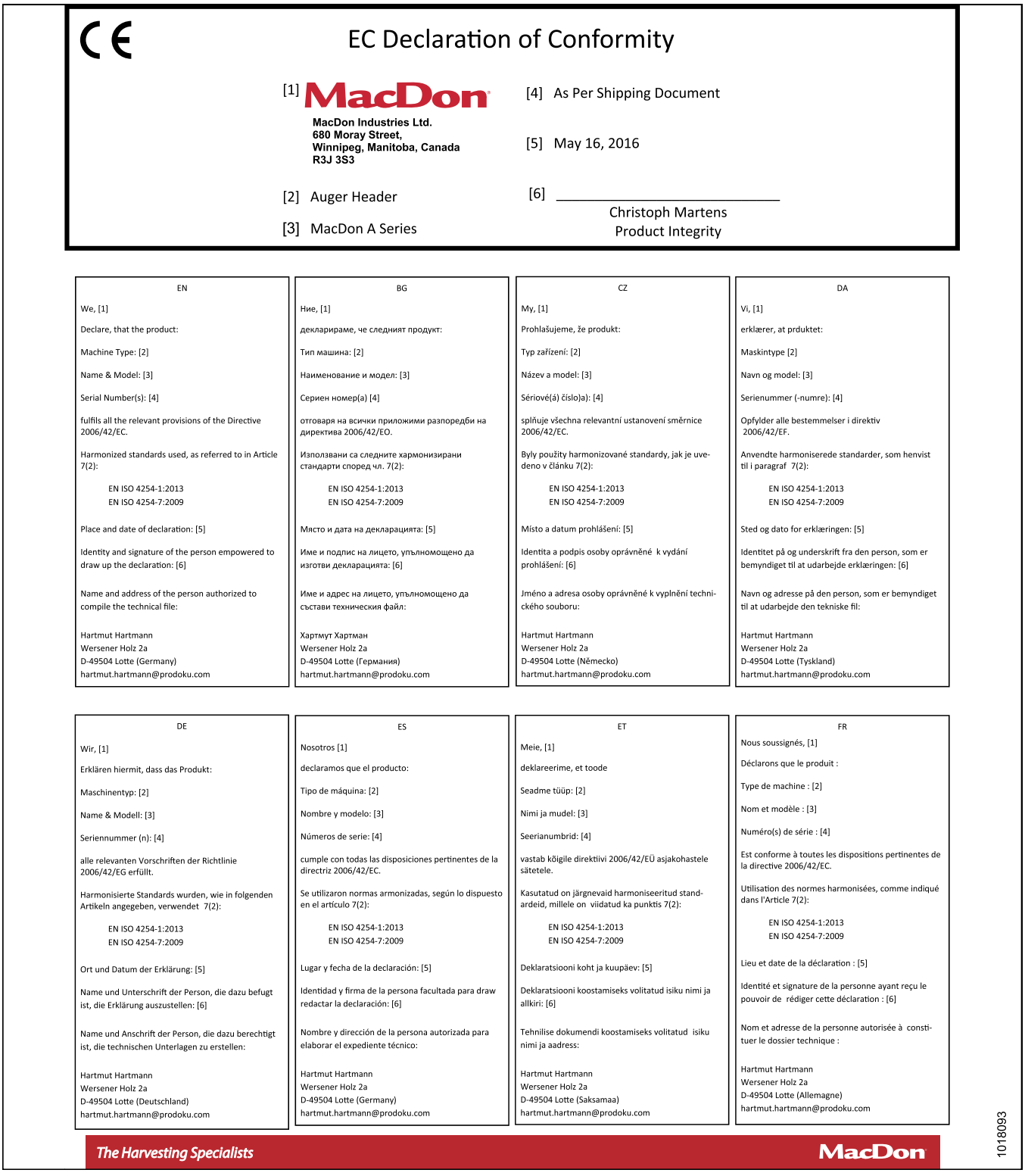
Original Instruction

The harvesting specialists.

MacDon A40-D Self-Propelled Auger Header

Published: May, 2016

EC Declaration of Conformity



EC Declaration of Conformity

[1] MacDon

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

[2] Auger Header

[3] MacDon A Series

[4] As Per Shipping Document

[5] May 16, 2016

[6] _____
Christoph Martens
Product Integrity

EN

We, [1]

Declare, that the product:

Machine Type: [2]

Name & Model: [3]

Serial Number(s): [4]

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

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

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

Place and date of declaration: [5]

Identity and signature of the person empowered to draw up the declaration: [6]

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

Hartmut Hartmann
Wersener Holz 2a
D-49504 Lotte (Germany)
hartmut.hartmann@prodoku.com

BG

Ние, [1]

декларираме, че следният продукт:

Тип машина: [2]

Наименование и модел: [3]

Сериен номер(а) [4]

отговаря на всички приложими разпоредби на директива 2006/42/ЕО.

Използвани са следните хармонизирани стандарти според чл. 7(2):

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

Място и дата на декларацията: [5]

Име и подпис на лицето, упълномощено да изготви декларацията: [6]

Име и адрес на лицето, упълномощено да състави техническия файл:

Хартмут Хартман
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D-49504 Lotte (Германия)
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CZ

My, [1]

Prohlašujeme, že produkt:

Typ zařízení: [2]

Název a model: [3]

Sériové(á) číslo)a): [4]

splňuje všechna relevantní ustanovení směrnice 2006/42/EC.

Byly použity harmonizované standardy, jak je uvedeno v článku 7(2):

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

Místo a datum prohlášení: [5]

Identita a podpis osoby oprávněné k vydání prohlášení: [6]

Jméno a adresa osoby oprávněné k vyplnění technického souboru:

Hartmut Hartmann
Wersener Holz 2a
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DA

Vi, [1]

erklærer, at prduktet:

Maskintype [2]

Navn og model: [3]

Serienummer (-numre): [4]

Opfylder alle bestemmelser i direktiv 2006/42/EF.

Anvendte harmoniserede standarder, som henvist til i paragraf 7(2):

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

Sted og dato for erklæringen: [5]

Identitet på og underskrift fra den person, som er bemyndiget til at udarbejde erklæringen: [6]

Navn og adresse på den person, som er bemyndiget til at udarbejde den tekniske fil:

Hartmut Hartmann
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D-49504 Lotte (Tyskland)
hartmut.hartmann@prodoku.com

DE

Wir, [1]

Erklären hiermit, dass das Produkt:

Maschinentyp: [2]

Name & Modell: [3]

Seriennummer (n): [4]

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

Harmonisierte Standards wurden, wie in folgenden Artikeln angegeben, verwendet 7(2):

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

Ort und Datum der Erklärung: [5]

Name und Unterschrift der Person, die dazu befugt ist, die Erklärung auszustellen: [6]

Name und Anschrift der Person, die dazu berechtigt ist, die technischen Unterlagen zu erstellen:

Hartmut Hartmann
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D-49504 Lotte (Deutschland)
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ES

Nosotros [1]

declaramos que el producto:

Tipo de máquina: [2]

Nombre y modelo: [3]

Números de serie: [4]

cumple con todas las disposiciones pertinentes de la directriz 2006/42/EC.

Se utilizaron normas armonizadas, según lo dispuesto en el artículo 7(2):

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

Lugar y fecha de la declaración: [5]

Identidad y firma de la persona facultada para draw redactar la declaración: [6]

Nombre y dirección de la persona autorizada para elaborar el expediente técnico:

Hartmut Hartmann
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ET

Meie, [1]

deklareerime, et toode

Seadme tüüp: [2]

Nimi ja mudel: [3]

Seerianumbrid: [4]

vastab kõigile direktiivi 2006/42/EÜ asjakohastele sätetele.

Kasutatud on järgnevaid harmoniseeritud standardeid, millele on viidatud ka punktis 7(2):

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

Deklaratsiooni koht ja kuupäev: [5]

Deklaratsiooni koostamiseks volitatud isiku nimi ja allkiri: [6]

Tehnilise dokumendi koostamiseks volitatud isiku nimi ja aadress:

Hartmut Hartmann
Wersener Holz 2a
D-49504 Lotte (Saksamaa)
hartmut.hartmann@prodoku.com

FR

Nous soussignés, [1]

Déclarons que le produit :

Type de machine : [2]

Nom et modèle : [3]

Numéro(s) de série : [4]

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

Utilisation des normes harmonisées, comme indiqué dans l'Article 7(2):

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

Lieu et date de la déclaration : [5]

Identité et signature de la personne ayant reçu le pouvoir de rédiger cette déclaration : [6]

Nom et adresse de la personne autorisée à constituer le dossier technique :

Hartmut Hartmann
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D-49504 Lotte (Allemagne)
hartmut.hartmann@prodoku.com

The Harvesting Specialists MacDon

1018093

Figure 1: EC Declaration of Conformity Page 1

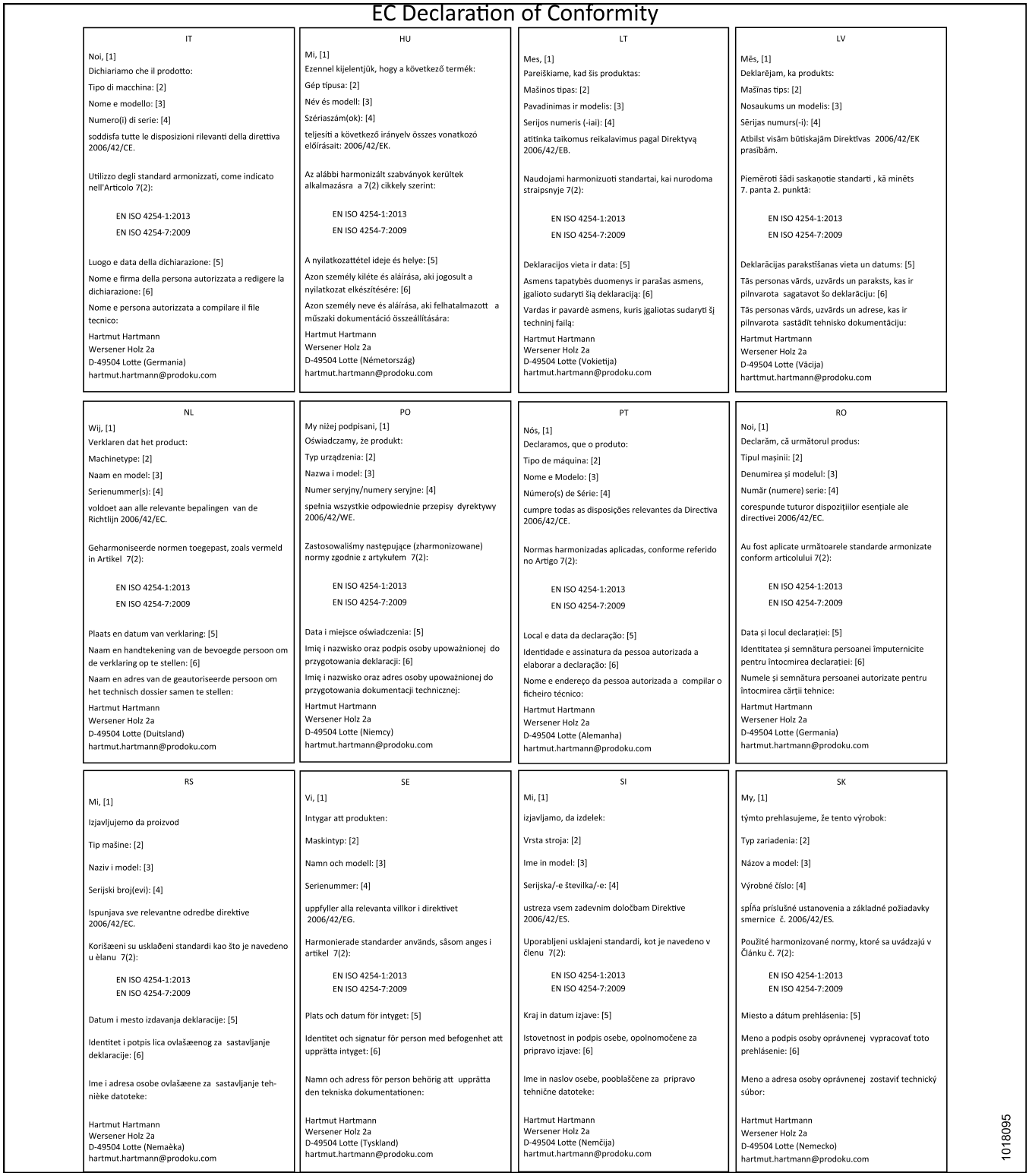

Figure 2: EC Declaration of Conformity Page 2

Introduction

This Operator's Manual describes the operating and maintenance procedures for MacDon model A40-D Self-Propelled Windrower Auger Headers, including a Grass Seed version.

These auger headers are designed to cut, condition, and lay windrows in a wide variety of grasses and hay crops. The double-knife feature expands the operational envelope, especially in heavier crops.

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

Model	Description	Configuration	Knife	Size (ft.)	Features
A40-D	Auger header with conditioner	Self-propelled only	Double	14, 16, and 18	Separate hydraulic auger, knife, and reel drives, grass seed option

Use this manual as your first source of information about the machine. Use the Table of Contents and the Index to guide you to specific topics. Study the Table of Contents to familiarize yourself with how the information is organized. If you follow the instructions provided here, your header will work well for many years.

Keep this manual handy for frequent reference, and to pass on to new Operators or Owners. Contact your Dealer if you need assistance, information, or additional copies of this manual.

CAREFULLY READ THE INFORMATION PROVIDED IN THIS MANUAL BEFORE ATTEMPTING TO OPERATE OR MAINTAIN AN A40-D AUGER HEADER.

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

NOTE:
A Russian translation of this manual can be ordered from MacDon, downloaded from the MacDon Dealer Portal (*https://portal.macdon.com*) (login required), or downloaded from the MacDon international website (*http://www.macdon.com/world*).

Model and Serial Number

Record the model number, serial number, and model year of the header in the space below. The header serial number plate is located on the top of the left-hand end frame (A).

Header Model Number: _____

Header Serial Number: _____

Year: _____

(If 2015, indicate early-build or later-build unit: _____)

NOTE:
Early-build 2015 model A40-D SP windrower headers have a round reel motor (as do 2014 and earlier model year units). Later-build 2015, 2016 and later models have a square-shaped reel motor. For a visual, refer to *2.2.1 A40-D, page 21*.

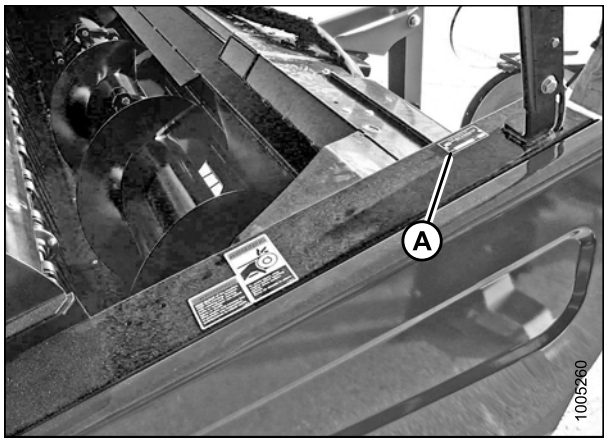

Figure 3: Header Serial Number Plate Location

List of Revisions

The following list provides an account of major changes from the previous version of this document.

Summary of Change	Location
Added EC Declaration of Conformity.	*EC Declaration of Conformity, page i*
Removed A30-D Pull-Type content.	Throughout the publication

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.

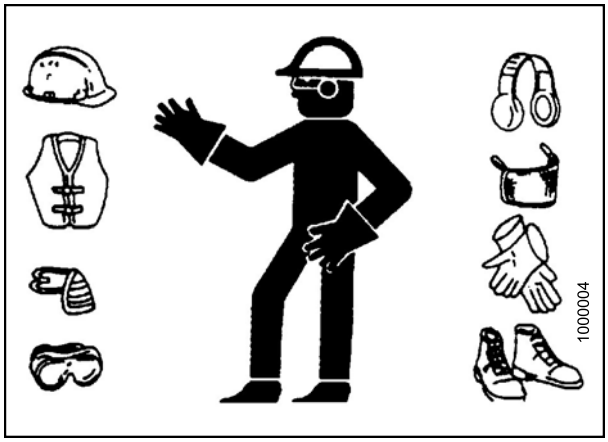

Figure 1.2: Safety Equipment

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.

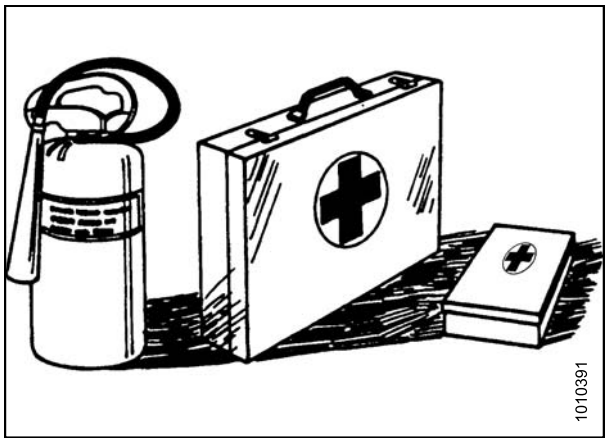

Figure 1.4: Safety Equipment

- 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.

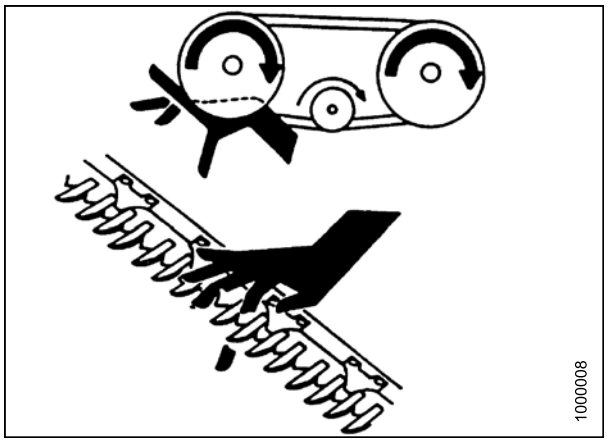

Figure 1.6: Safety around Equipment

- 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

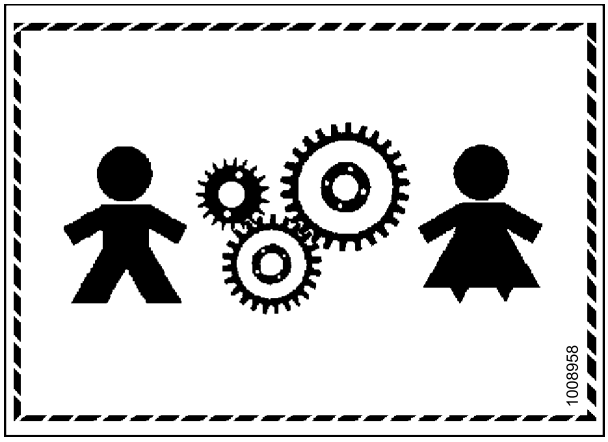

Figure 1.9: Equipment NOT Safe for Children

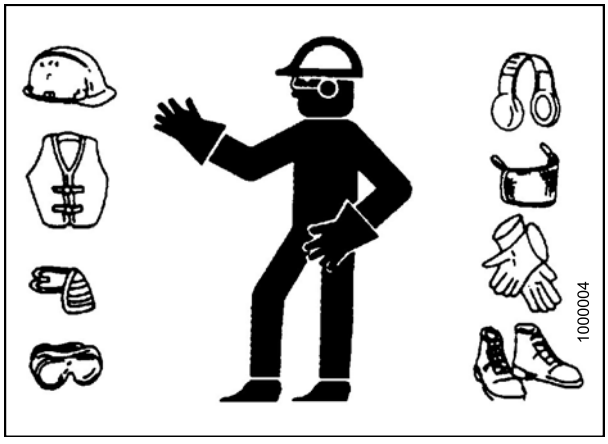

Figure 1.10: Safety Equipment

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.

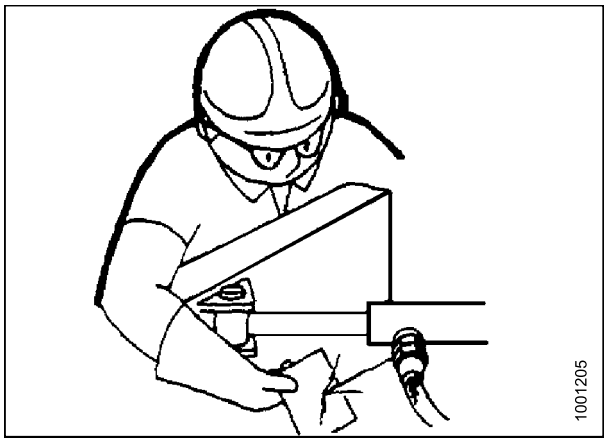

Figure 1.11: Testing for Hydraulic Leaks

- 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.

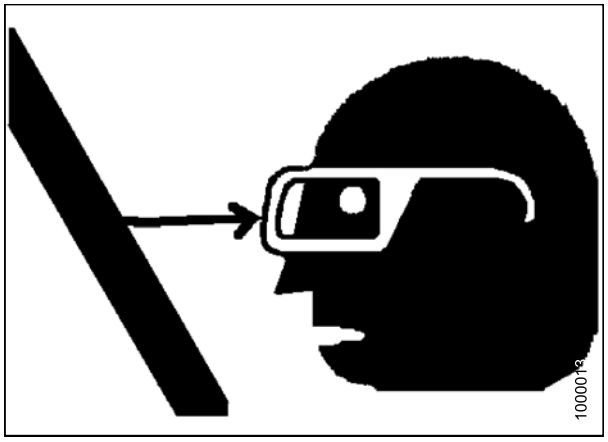

Figure 1.13: Safety around Equipment

1.6 Safety Signs

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

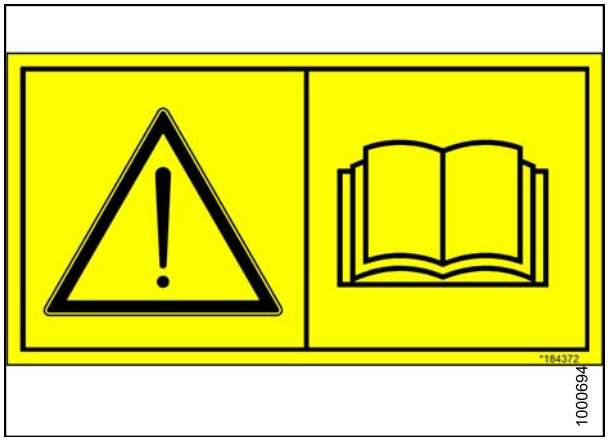

Figure 1.14: Operator's Manual Decal

1.6.1 Installing Safety Decals

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

1.7 Safety Sign Locations: Self-Propelled Windrower Header

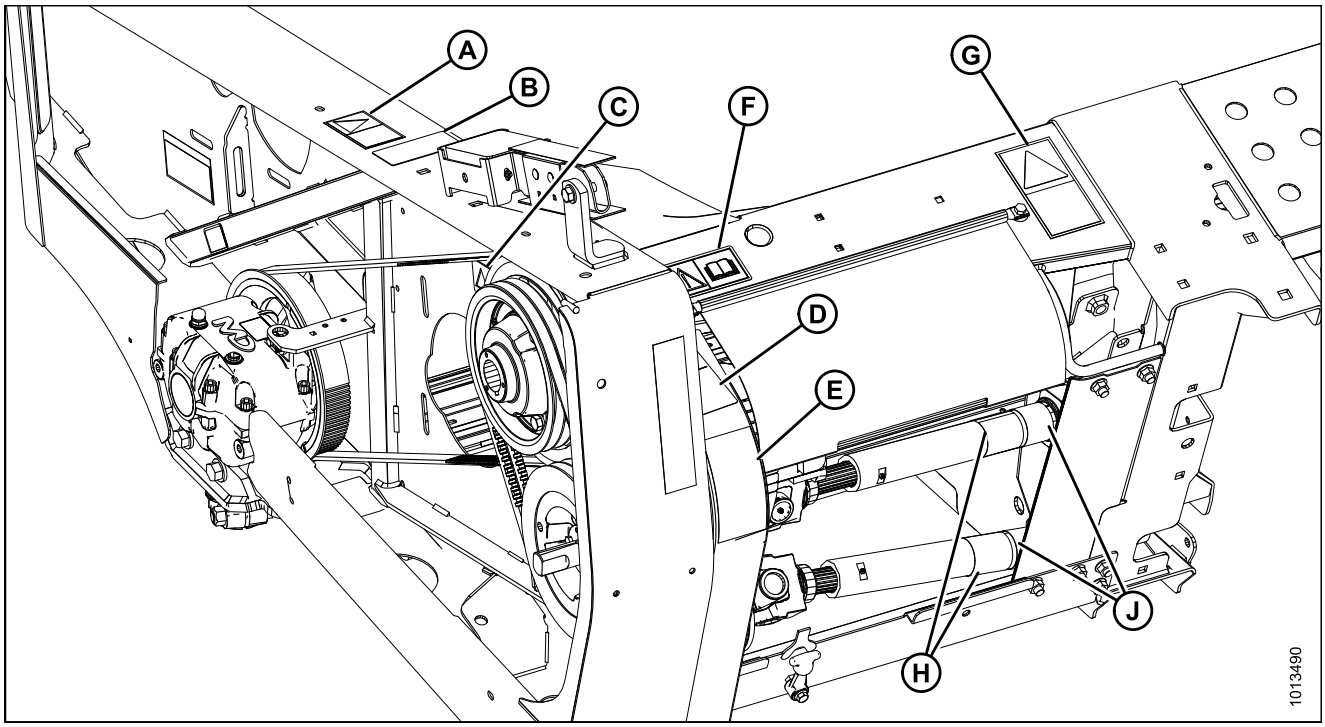

Figure 1.15: Left Side Locations

A - MD #174632
B - MD #184422
C - MD #166452
D - MD #174436
E - MD #171288
F - MD #184372
G - MD #194464
H - MD #194521
J - MD #36651

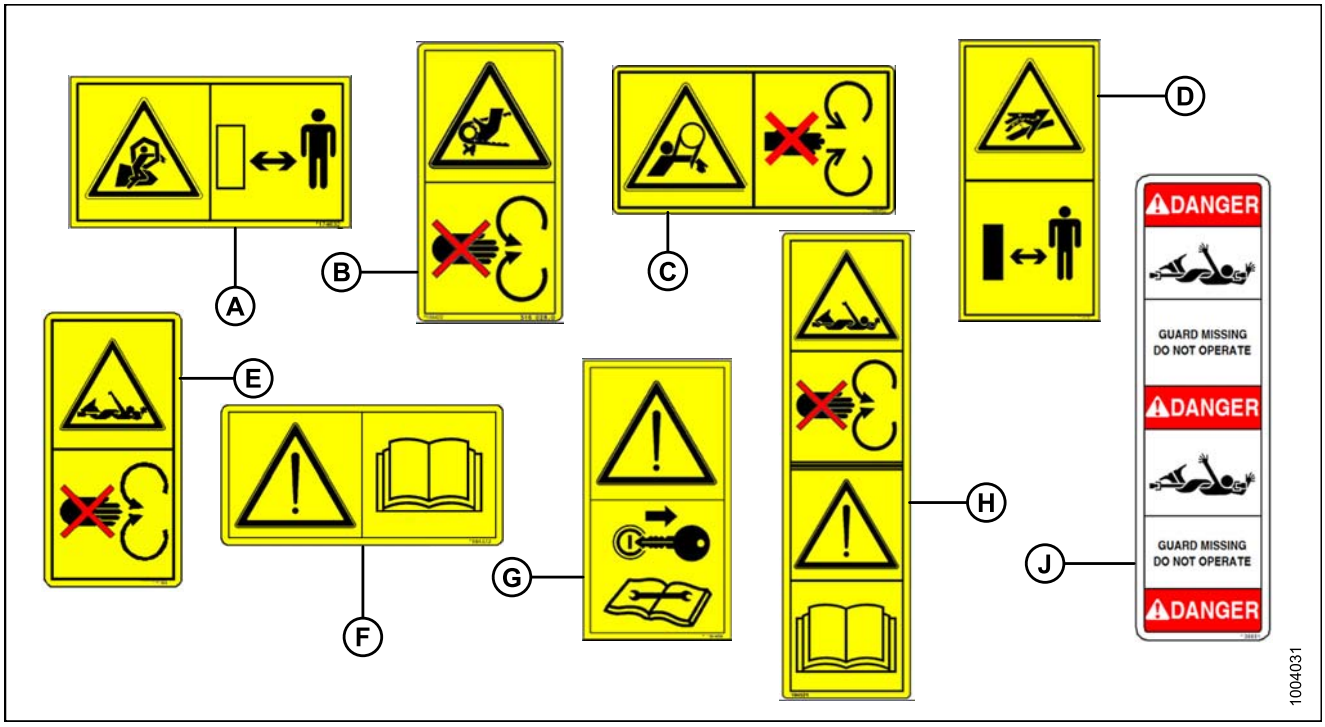

Figure 1.16: Left Side Decals

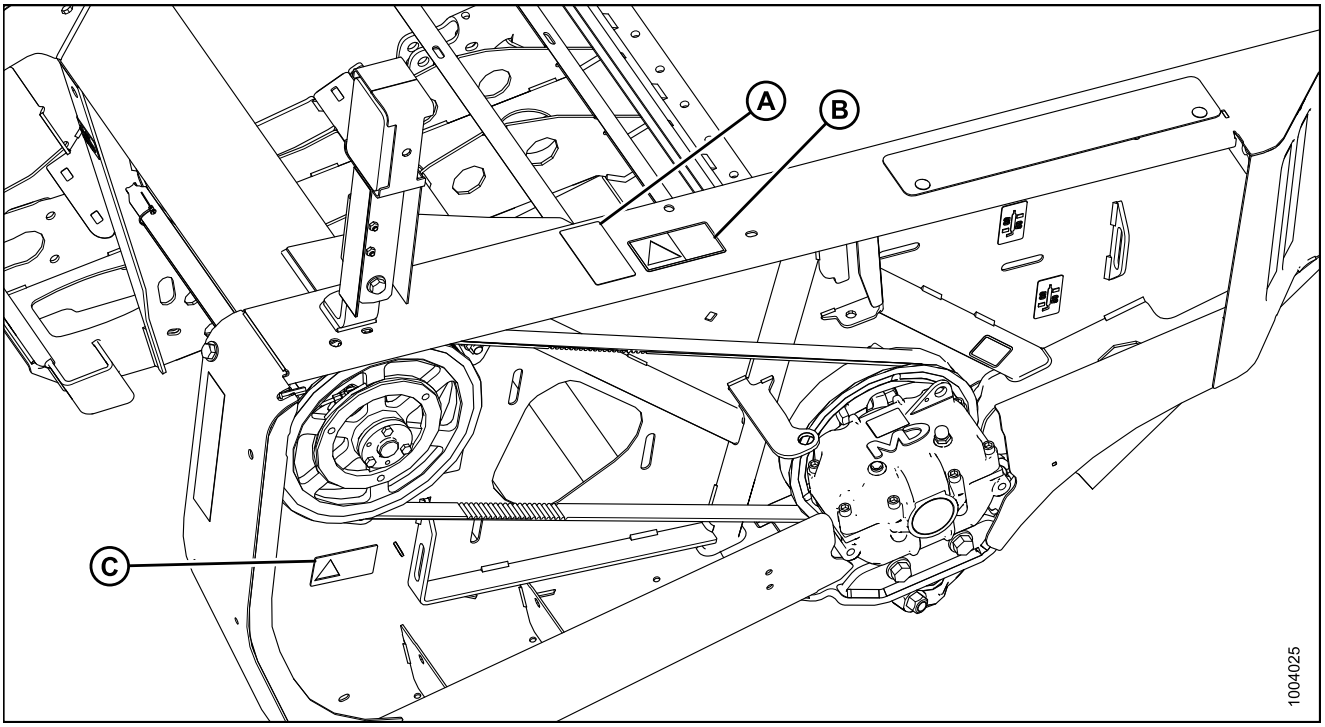

Figure 1.17: Right Side Locations

A - MD #184422 **B - MD #174632** **C - MD #166452**

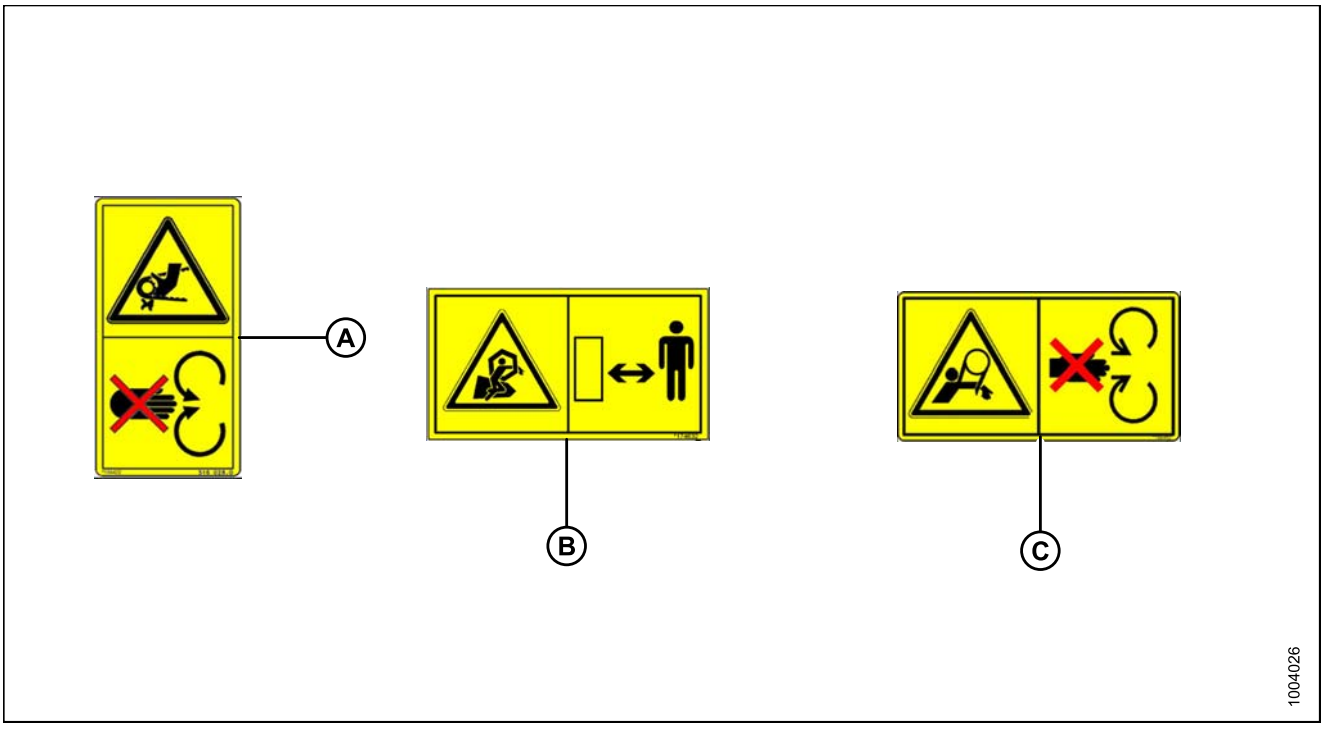

Figure 1.18: Right Side Decals

1.8 Understanding Safety Signs

MD #36651

Rotating driveline

DANGER

- Rotating driveline contact can cause death—**keep away**!

Do not operate without:

- Stopping the engine and removing the key before opening shield.
- All driveline guards, tractor, and equipment shields in place.

Figure 1.19: MD #36651

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.

Figure 1.20: MD #113482

MD #166452

Pinch point hazard

WARNING

- To avoid injury, stop the engine and remove the key before opening engine hood.

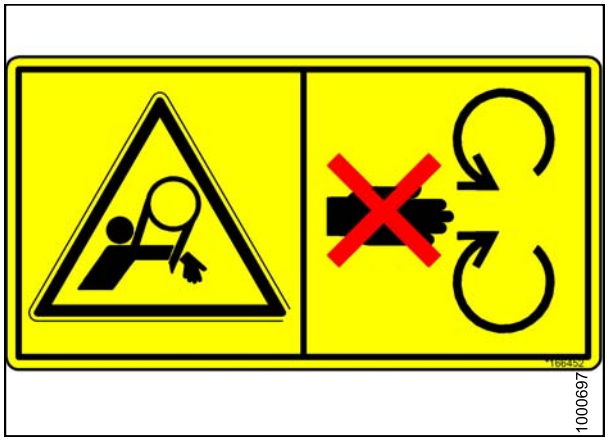

Figure 1.21: MD #166452

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 1.22: MD #166466

MD #171279

Crushing hazard

DANGER

- Read the operator's manual and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
- Rest header on ground or engage hydraulic lock-out valves before going under unit.

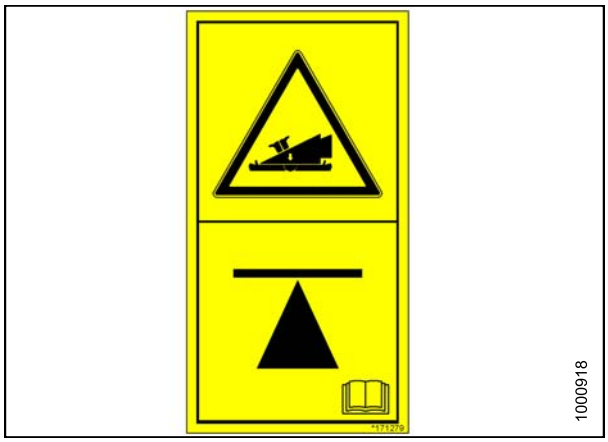

Figure 1.23: MD #171279

MD #171281

Hot fluid under pressure

CAUTION

- Coolant is under pressure and may be hot. Never remove radiator cap when engine is hot.

Figure 1.24: MD #171281

MD #171286

Lock pull-type hydraulic for transport

WARNING

- Charge cylinder with oil before towing.
- Rotate valve handle to lock in transport position.
- Maximum towing speed 32 km/h (20 mph).
- Failure to comply could result in death or serious injury.

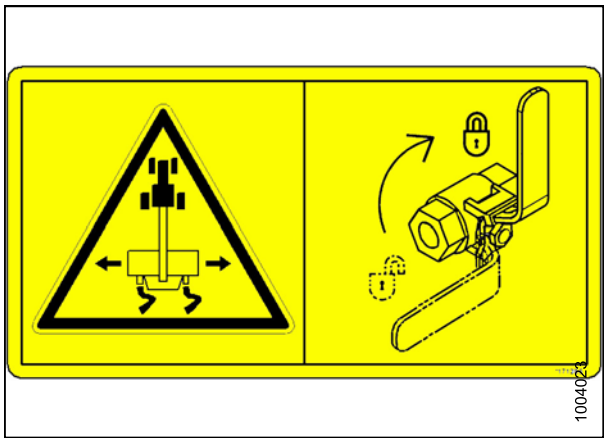

Figure 1.25: MD #171286

MD #171287

Install lock panel

WARNING

- Rotate valve handle to lock before going under unit.
- Failure to comply could result in death or serious injury.

Figure 1.26: MD #171287

MD #171288

Entanglement hazard

CAUTION

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

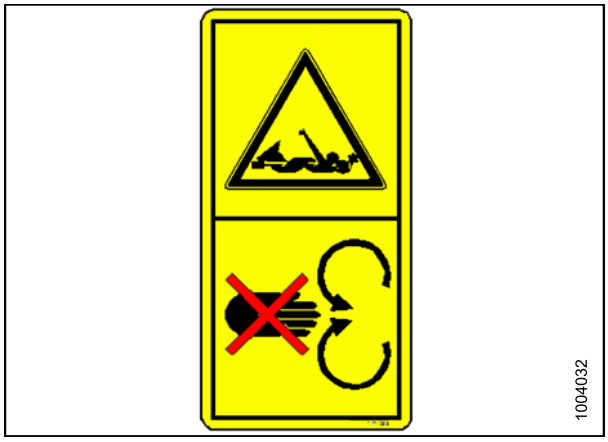

Figure 1.27: MD #171288

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 1.28: 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 1.29: MD #174632

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.

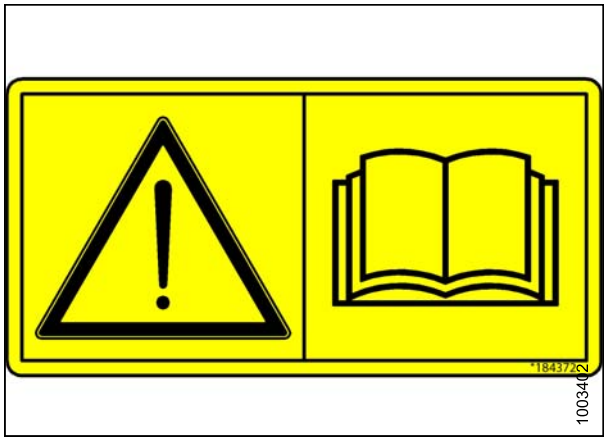

Figure 1.30: MD #184372

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.

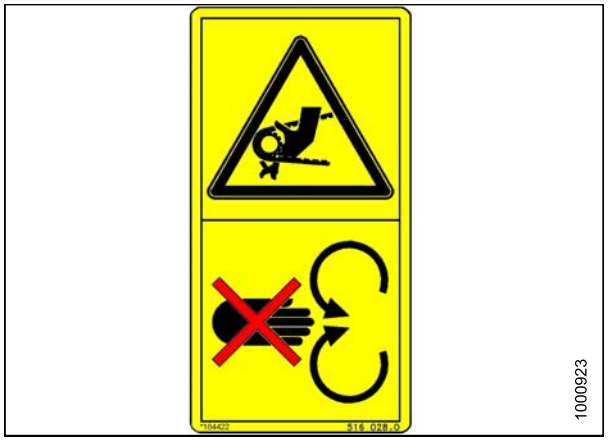

Figure 1.31: MD #184422

MD #194464

Shut down for service

WARNING

- Stop the engine and remove the key.
- Read tractor and mower manufacturer's manuals for inspection and maintenance instructions.
- Read the windrower and header manuals for inspection and maintenance instructions.

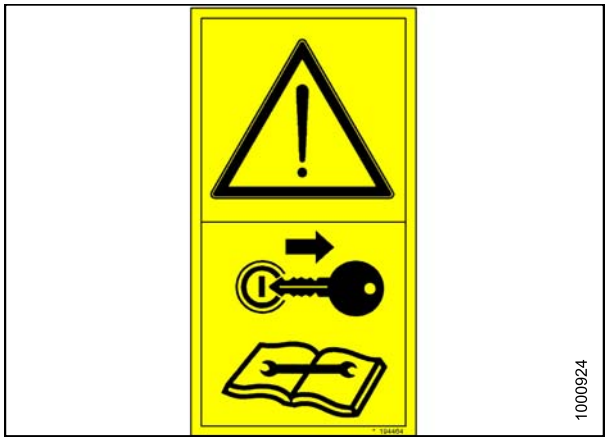

Figure 1.32: MD #194464

MD #194521

Auger entanglement hazard

CAUTION

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

General hazard pertaining to machine operation and servicing.

CAUTION

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

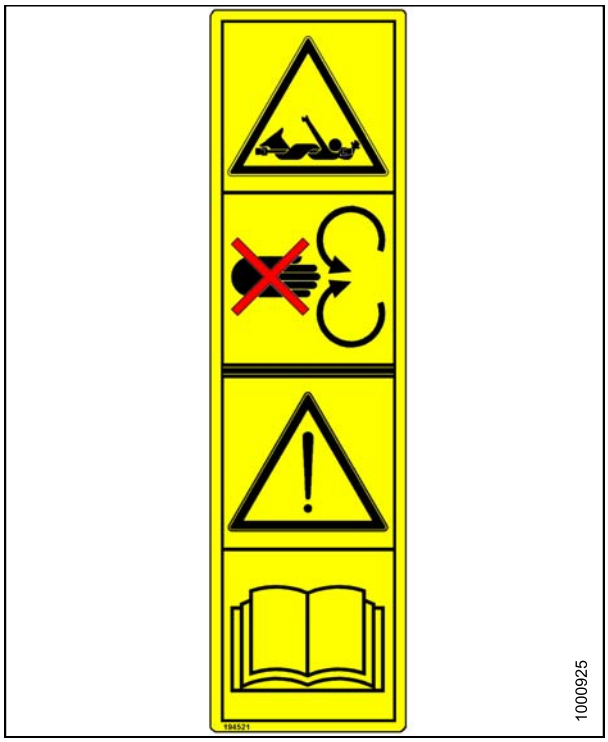

Figure 1.33: MD #194521

1.9 Owner/Operator Responsibilities

CAUTION

- **It is your responsibility to read and understand this manual completely before operating the header. Contact your Dealer if an instruction is not clear to you.**
- **Follow all safety messages in the manual and on safety signs 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 and affect machine life.**
- **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.**
- **Ensure that windrower is properly equipped to safely operate header. This may include adding ballast according to the tractor operator's manual requirements for attachments of this size and mass.**

1.10 Operational Safety

CAUTION

- **Follow all safety and operational instructions given in your operator's manual. If you do not have a windrower manual, get one from your Dealer and read it thoroughly.**
- **Never attempt to start windrower engine or operate the machine, except from the operator’s seat.**
- **Check the operation of all controls in a safe clear area before starting work.**
- **Do not allow riders on windrower.**
- **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.**
- **If cutting ditch banks, use extreme caution. If the header hits an obstruction, front of the windrower will usually swerve towards the ditch.**
- **When working on inclines, travel uphill or downhill when possible. Be sure to keep windrower transmission in gear when travelling downhill.**
- **Never attempt to get on or off a moving windrower.**
- **Do not get off the windrower while the machine is in operation.**
- **To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before adjusting or removing plugged material from the machine.**
- **Operate only in daylight or good artificial light.**

CAUTION

Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect machine. Follow proper shutdown procedure as follows:

- **Engage windrower brake.**
- **Disengage PTO.**
- **Turn engine OFF, and remove key.**
- **Wait for all movement to stop**
- **Dismount and engage cylinder stops before inspecting raised machine.**

2 Product Overview

2.1 Definitions

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

Term	Definition
A-Series header	MacDon auger header
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut
Cab-forward	Windrower operation with Operator and cab facing in direction of travel
CDM	Cab display module on a self-propelled windrower
Center-link	A hydraulic cylinder link between header and machine to which it is attached: It is used to change header angle
CGVW	Combined vehicle gross weight
DK	Double knife
DKD	Double-knife drive
DWA	Double Windrow Attachment
ECM	Engine control module
ECU	Electronic control unit
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 fitting has been tightened to a point where fitting is no longer loose
FFFT	Flats from finger tight
GSL	Ground speed lever
GSS	Grass Seed Special
GVW	Gross vehicle weight
Hard joint	A joint made with the use of a fastener where joining materials are highly incompressible
Header	A machine that cuts and lays crop into a windrow and is attached to a 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 head (internal-wrenching hexagon drive)
hp	Horsepower
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting
Knife	A cutting device which uses a reciprocating cutter (also called a sickle)
n/a	Not applicable

Term	Definition
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 use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc platings)
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread in one of mating parts
Self-Propelled (SP) Windrower	Self-propelled machine consisting of a power unit with a header
SK	Single knife
SKD	Single-knife drive
Soft joint	A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time
spm	Strokes per minute
Timed knife drive	Synchronized motion applied at cutterbar to two separately driven knives from a single hydraulic motor
Tension	Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)
TFFT	Turns from finger tight
Torque	The product of a force X lever arm length, usually measured in Newton-meters (N·m) or foot-pounds (ft·lbf)
Torque angle	A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned further a number of degrees or a number of flats to achieve its final position
Torque-tension	The relationship between assembly torque applied to a piece of hardware and axial load it induces in bolt or screw
Untimed knife drive	Unsynchronized motion applied at 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 Model Identification

This section assists in identifying the various MacDon A-Series auger header models.

2.2.1 A40-D

The A40-D is a double-knife header using a hydraulically-driven auger, reel, and cutterbar that can be used only on an M-Series Self-Propelled Windrower. For the 2015 model year, there are two types: one with a square motor and one with a round reel motor.

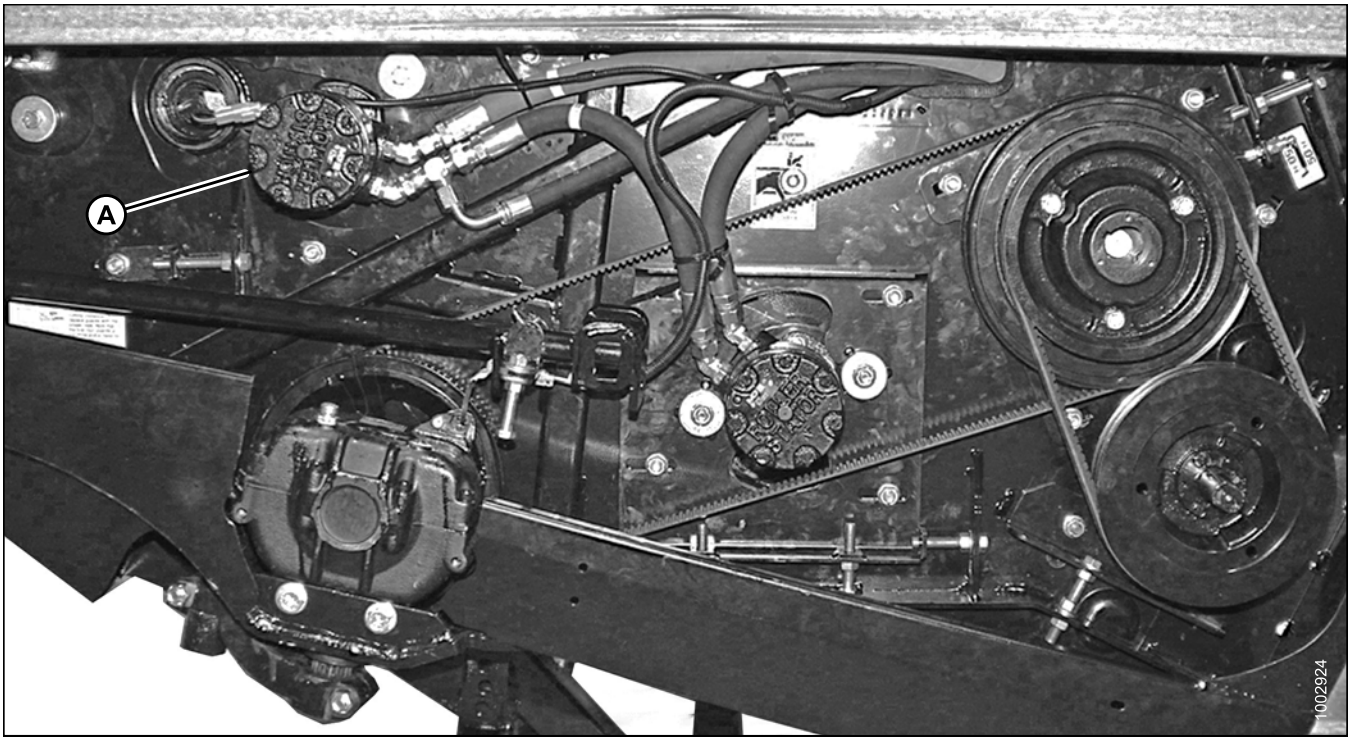

Figure 2.1: A40-D Left Side (Early-Build 2015, 2014 and Earlier) (Round Reel Motor)

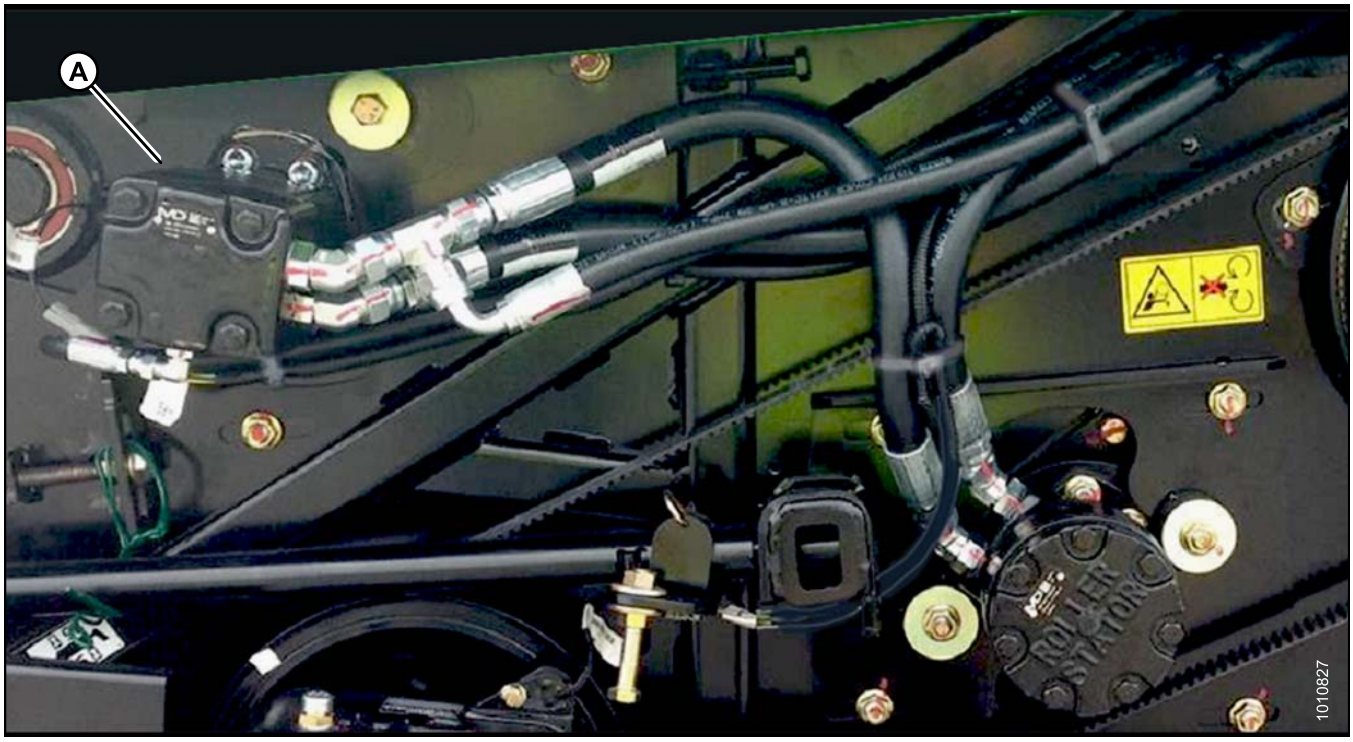

Figure 2.2: A40-D Left Side (Later-Build 2015, 2016 and later) (Square Reel Motor)

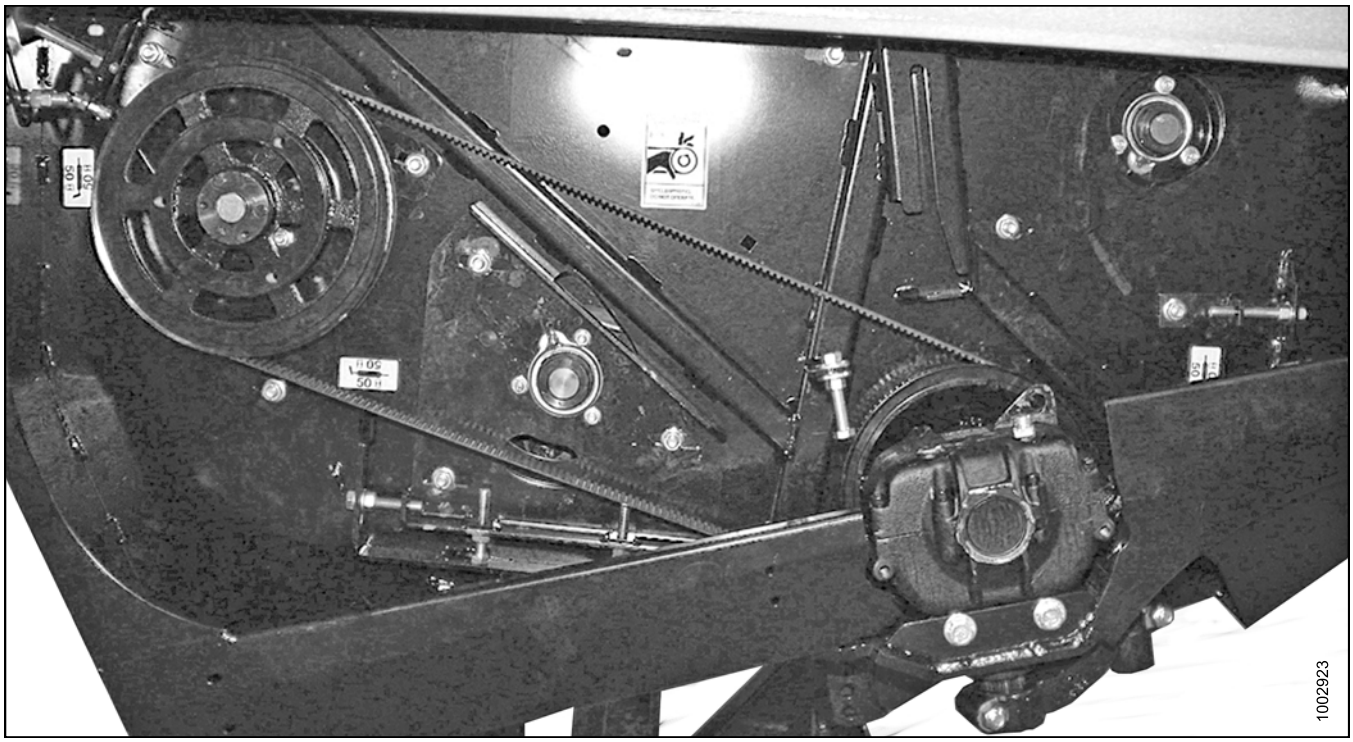

Figure 2.3: A40-D Right Side (All Years)

2.3 Product Specifications

NOTE:
Specifications and design are subject to change without notice, or obligation to revise previously sold units.

Table 2.1 A40-D SP Windrower Auger Header Specifications

Cutterbar			
Effective cutting width	14-foot header		4496 mm (14 ft–9 in.)
	16-foot header		4953 mm (16 ft–3 in.)
	18-foot header		5410 mm (17 ft–9 in.)
Double-knife drive: hydraulic motor to two “B” belts/timing belts to enclosed heavy duty (MD) knife drive boxes			Standard
Knife stroke			76 mm (3 in.)
Knife speed (strokes per minute)	Factory	No load	1400–1950
		Load	
	Switching pulleys	No load	
		Load	
Double heat-treated forged pointed guards			Standard
Bolted over-serrated knife sections – 9 serrations per inch			
Center overlap			3 mm (1/8 in.)
Cutterbar lift range (measured at guard tip)	Below ground		150 mm (5-3/4 in.)
	Above ground		900 mm (35-3/8 in.)
Guard angle (cutterbar on ground)			7 to 17-1/2 degrees
Replaceable, abrasion-resistant cutterbar wear plates			Standard
Inner skid shoes, adjustable set of two (can be relocated to outboard location)			Standard
Outer skid shoes or gauge rollers			Optional
Outer gauge rollers			Optional
Auger			
Diameter	Overall		508 mm (20 in.)
	Tube O.D.		254 mm (10 in.)
Undershot, center feed			Standard
Flighting	Width		127 mm (5 in.)
	Thickness		6 mm (1/4 in.)
Pitch			590 mm (23-1/4 in.)
Rubber feed fingers			Standard
Stripper bars (three per side)			Standard

Auger drive	Hydraulic, 15.9 cu in. (261 cc) per rev direct mounted motor	Standard
Auger speed	SP windrower	230–320 rpm
Replaceable high density polyethylene auger pans: two-piece design		Standard
Rock drop tines at discharge opening with discharge angle adjustment		
Delivery opening width		2430 mm (95-11/16 in.)
Reel		
Oval closed section bats with end caps. **NOTE:** A40-D Grass Seed Special model has standard seven-bat reel		6 bats optional 7 bat
Steel fingers		6 mm (1/4 in.) diameter
Reel radius (to finger tip)		540 mm (22 in.)
Single piece tine bar with replaceable polyethylene bearings		N/A
Sectioned tine bar with regreasable ball bearings		Standard
Drive	Mechanical, two “B” belts from auger to 60H roller chain	N/A
	Hydraulic motor: 14.2 cu in. (232 cc) /rev to enclosed gearbox	Standard
Reel speed	M100/M105/M205 SP hydraulic variable	50–85 rpm
	M150/M155/M200 SP hydraulic variable	15–85 rpm
Hay Conditioner		
Roll-type		Intermeshing steel bars
Roll size	Length	2590 mm (102 in.)
	Overall	233 mm (9-3/16 in.)
	Tube	168 mm (6-5/8 in.)
Drive: 44 cc. hydraulic piston motor to enclosed gearbox		Standard
Roll speed	SP windrower	601–810 rpm
Plug Prevention / Unplugging		
Self-propelled	Reverse hydraulic flow to three motors (reverses knife, auger, reel, and conditioner)	Optional
Swath Forming Shield		
Swath width range		915 mm (36 in.) to 2540 mm (100 in.)
Header-mounted adjustable baffle		Standard
Attachment		Windrower
Adjustable side deflectors		Standard

Frame And Structure	
Two amber transport lights	Standard
Header width	Nominal cut width plus 480 mm (18-7/8 in.)
Header attachment	Windrower
Spare knife storage	Lean bar
Tool and parts storage compartment	N/A
Header Hydraulics Connection	
Direct coupled hoses	N/A
Hydraulic quick couplers	Standard
Attachments And Accessories	
Header reversing wrench and guard straightening tool	Standard
Double Windrow Attachment (DWA) M150/M155/M200/M205 windrowers	Optional

3 Operation: A40-D Self-Propelled Windrower Auger Header

This chapter will describe the operating procedures of the A40-D SP Windrower Auger Header.

3.1 Attaching A40-D Header to SP Windrower

Refer to your windrower operator's manual for procedures to mechanically attach the auger header to the self-propelled windrower and for modifications if required to the windrower hydraulic connections.

Refer to the following procedures for electrical and hydraulic connections. Header drive hydraulic hoses and electrical harness are located on the left-hand cab-forward side of the windrower.

IMPORTANT:
For M150, M155, M155*E4*, and M200 Windrowers with Reverser kit **MD #B4656** installed, hose plumbing to the reverser valve must be changed if switching between a D-Series Draper Header with a conditioner and an A40-D Auger Header to prevent draper header reel damage and improper operation. Refer to *3.1.5 Configuring Reverser Valve Jumper Hose, page 48* and if necessary to instruction MD #169213 (Reverser Kit Installation Instructions), available from our Dealer-only site (*https://portal.macdon.com*) (login required).

NOTE:
Header reel motor hose routing must be properly configured before attaching the header to a windrower. The header is factory-configured for M150, M155, M155*E4*, and M200 Windrowers. For M100, M105, or M205 Windrowers, refer to:

- *3.1.1 Attaching to M100 or M105, page 27*
- *3.1.4 Attaching to M205, page 43*

3.1.1 Attaching to M100 or M105

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

M100 and M105 Self-Propelled Windrowers are factory-equipped with four header drive hoses on the left-hand side (A).

Figure 3.1: Header Drive Hoses

1. Disengage rubber latch (A) and open driveline shield (B).

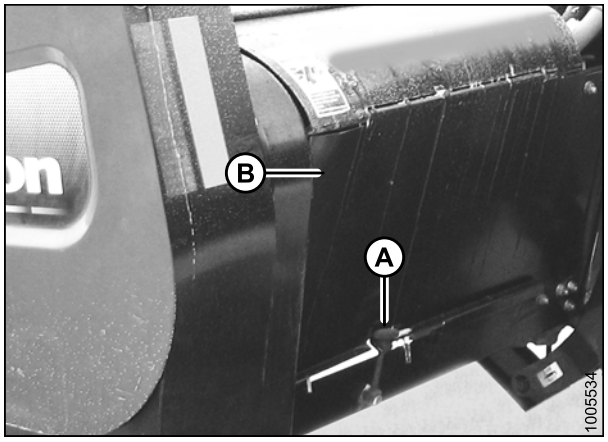

Figure 3.2: Driveline Shield

2. Remove the cap (A) from electrical connector and remove connector from support bracket.
3. Disengage and rotate lever (B) counterclockwise to fully up position to release the hose bundle (C).

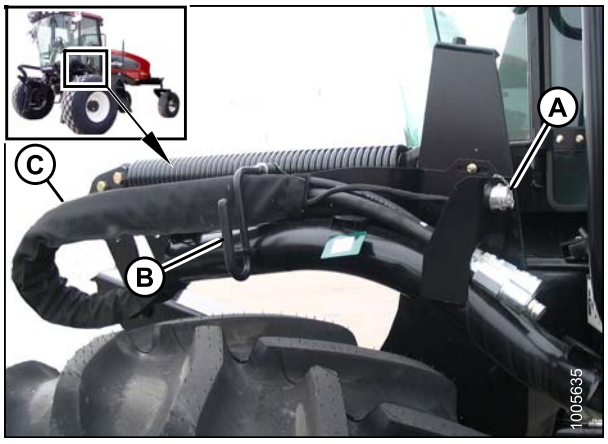

Figure 3.3: Support Bracket and Hose Bundle

4. Move hose/electrical bundle (A) to header.
5. Route bundle (A) from windrower through support (B) and access hole (C) in header frame alongside existing hose bundle (D) from header.
6. Remove cover on header electrical receptacle (E).
7. Push connector onto receptacle and turn collar on connector to lock it in place.
8. Attach cover to mating cover on windrower wiring harness.
9. Remove caps from hydraulic couplers. Clean if necessary.

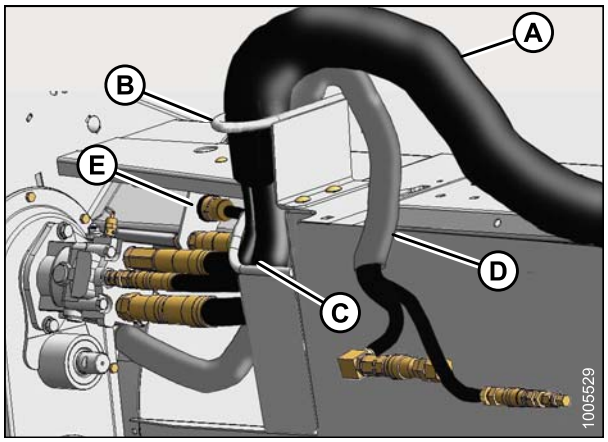

Figure 3.4: Hose and Electrical Bundle – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

NOTE:
At location (C), later-built 2015, 2016 and later units will have a “tee” going to case drain on square reel motor only.

10. Push hose connectors onto mating receptacles as shown until collars on receptacles snap into lock position.

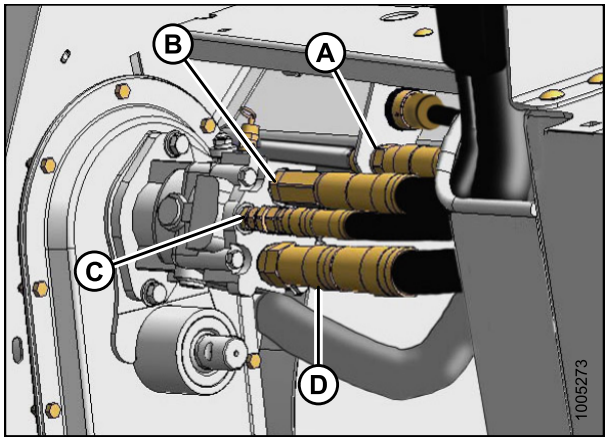

Figure 3.5: Early-Build 2015, 2014 and Earlier Standard Header – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

A - Reel Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

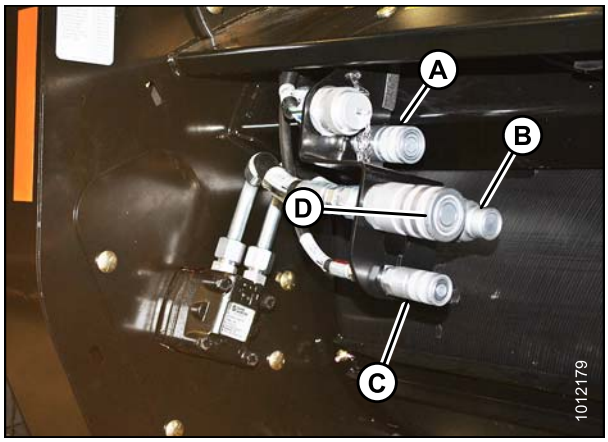

Figure 3.6: 2015 Grass Seed Header Hose Connectors

A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

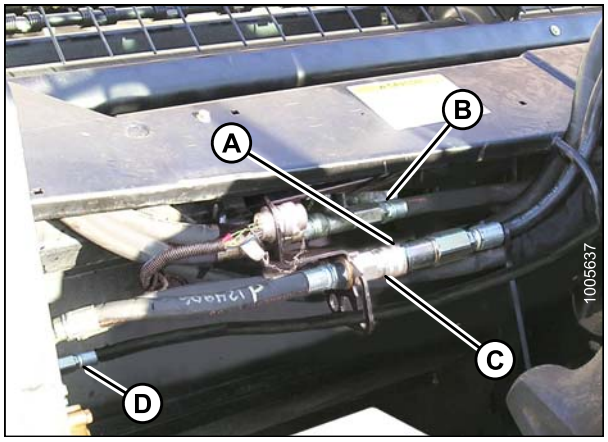

Figure 3.7: 2014 and Earlier Grass Seed Header

A - Knife Return (Male Fitting at Header) (Hidden in this Image)
B - Auger and Reel Pressure
C - Knife Pressure (Female Fitting at Header)
D - Case Drain

11. Route auger return and reel pressure hose bundle (A) from header to windrower, and position bundle above existing hose support (C) as shown.
12. Secure with three straps (D), and lower lever (B).

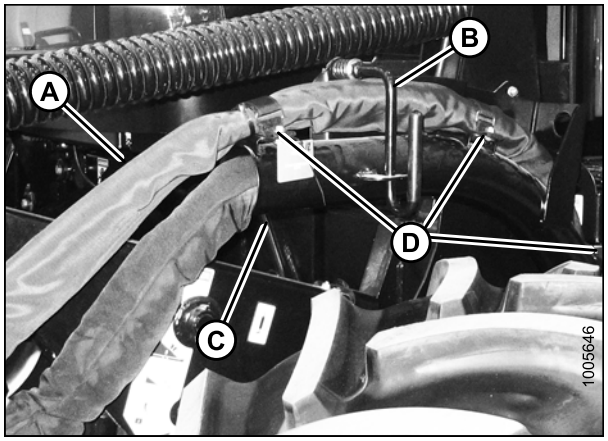

Figure 3.8: Auger Return and Reel Pressure Hose Bundle

13. If valve blocks are **NOT** configured as shown (A), install required fittings as described in the A40-D Auger Self-Propelled Windrower Header Unloading and Assembly Instructions that were supplied with your A40-D Auger Header.

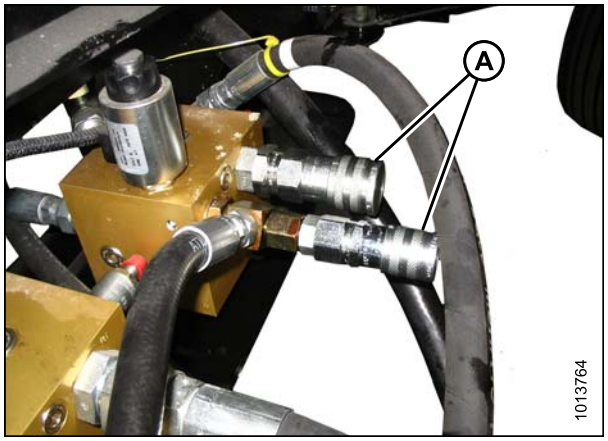

Figure 3.9: Valve Block Configuration

14. Push auger/reel pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on valve block until collar on receptacle snaps into lock position.

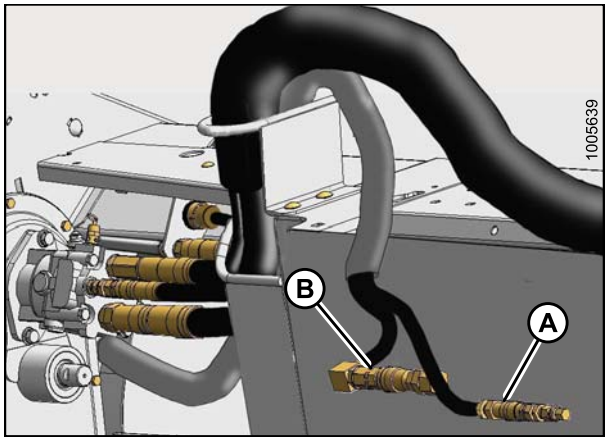

Figure 3.10: Auger/Reel Pressure and Auger/Reel Return Hose Couplers – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

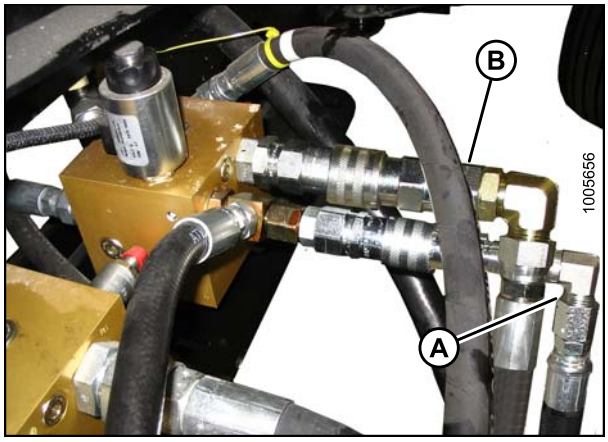

Figure 3.11: Auger/Reel Pressure and Auger/Reel Return Valve Block Receptacles

15. Open header left driveshield and check hose routing at the reel motor.

    NOTE:
    Reel drive motor may not be exactly as shown. Later-build 2015, 2016 and later A40-D units have a square reel motor; Early-build 2015 A40-D (and 2014 and earlier units) have a round reel motor. The image at the right shows a square reel motor and so is a later-build model.

The hose routing depends on which windrower model the header is being attached to. The header is factory-configured for M150, M155, and M200 Windrowers.

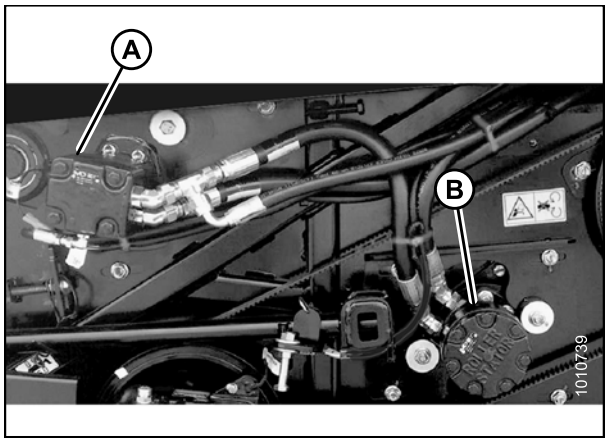

Figure 3.12: Factory Routing M150, M155, and M200 – Later-Build 2015 shown

A - Reel Motor **B - Auger Motor**

16. For procedure to change hose routing for M100 or M105 Windrowers, refer to the section based on the year of manufacture:
    - Later-build 2015, 2016 and later: *3.1.7 Hydraulic Drive Hose Routing (Later-Build 2015, 2016 and later A40-D Units), page 51*
    - Early-build 2015, 2014 and earlier: *3.1.6 Hydraulic Drive Hose Routing (Early-Build 2015, 2014 and Earlier A40-D), page 49*

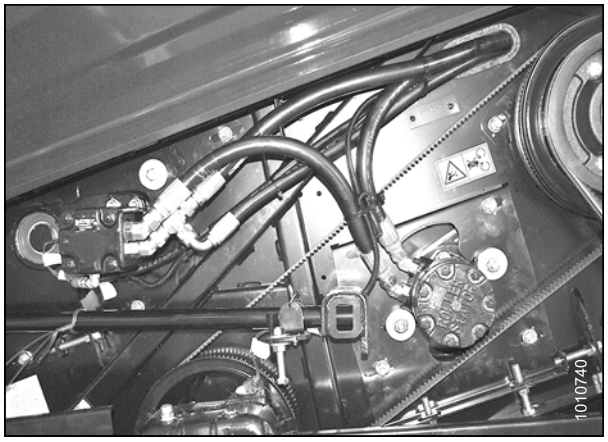

Figure 3.13: Modified Routing M100, M105, and M205 – Later-Build 2015 shown

3.1.2 Attaching to M150, M155, or M155*E4*

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

M150, M155, and M155*E4* self-propelled windrowers are factory-equipped with four header drive hoses on the left-hand side (A).

Figure 3.14: Header Drive Hoses

1. Disengage rubber latch (A) and open driveline shield (B).

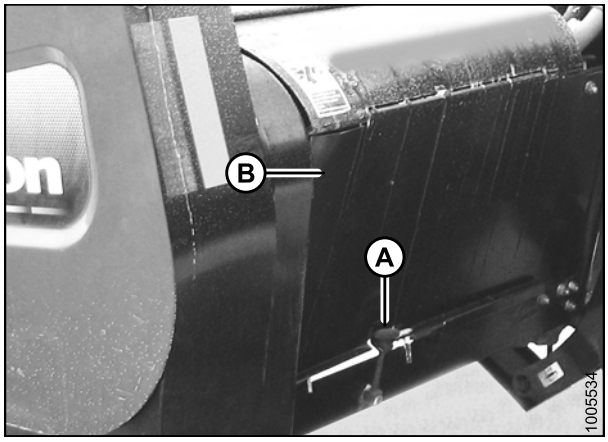

Figure 3.15: Driveline Shield

2. Remove the cap (A) from electrical connector and remove connector from support bracket.
3. Disengage and rotate lever (B) counterclockwise to fully up position to release the hose bundle (C).

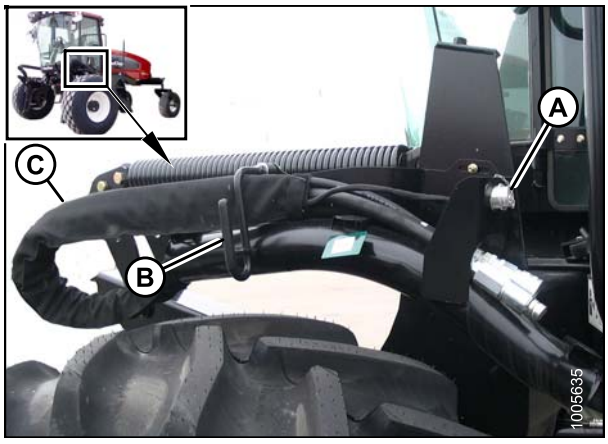

Figure 3.16: Support Bracket and Hose Bundle

4. Move hose/electrical bundle (A) to header.
5. Route bundle (A) from windrower through support (B) and access hole (C) in header frame alongside existing hose bundle (D) from header.
6. Remove cover on header electrical receptacle (E).
7. Push connector onto receptacle and turn collar on connector to lock it in place.
8. Attach cover to mating cover on windrower wiring harness.
9. Remove caps from hydraulic couplers. Clean if necessary.

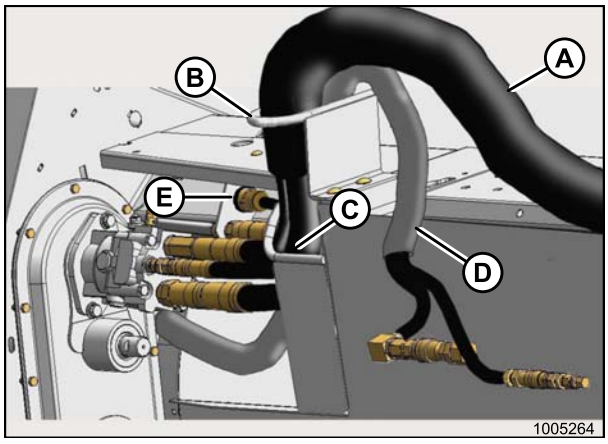

Figure 3.17: Hose and Electrical Bundle – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

NOTE:
At location (C), later-built 2015, 2016 and later units will have a “tee” going to case drain on square reel motor only.

10. Push hose connectors onto mating receptacles as shown until collars on receptacles snap into lock position.

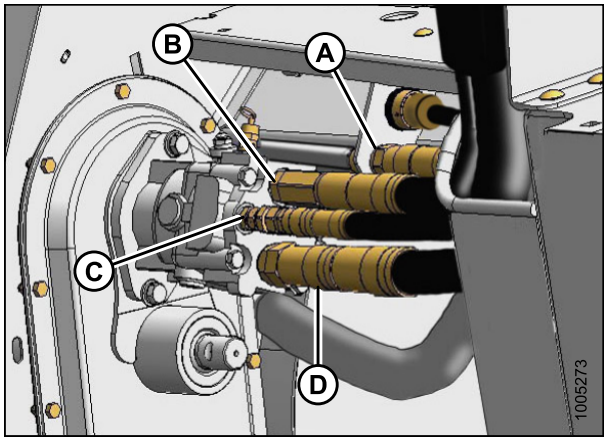

Figure 3.18: Early-Build 2015, 2014 and Earlier Standard Header – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

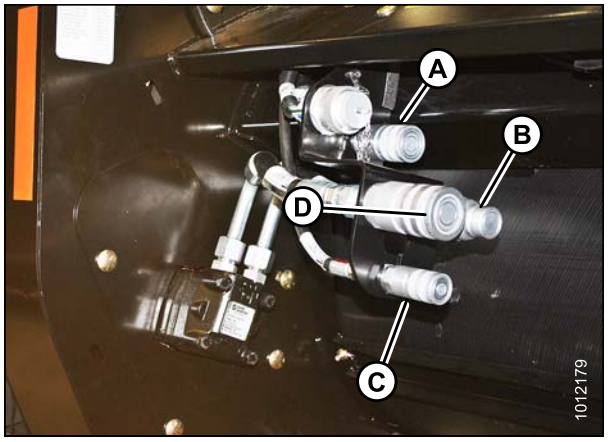

Figure 3.19: 2015 Grass Seed Header Hose Connectors

A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

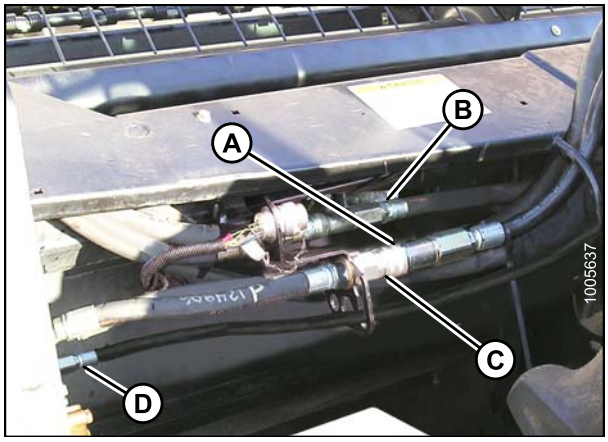

Figure 3.20: 2014 and Earlier Grass Seed Header

A - Knife Return (Male Fitting at Header) (Hidden in this Image)
B - Auger and Reel Pressure
C - Knife Pressure (Female Fitting at Header)
D - Case Drain

11. Route auger return and reel pressure hose bundle (A) from header to windrower and position bundle above existing hose support (C) as shown.
12. Secure with three straps (D), and lower lever (B).

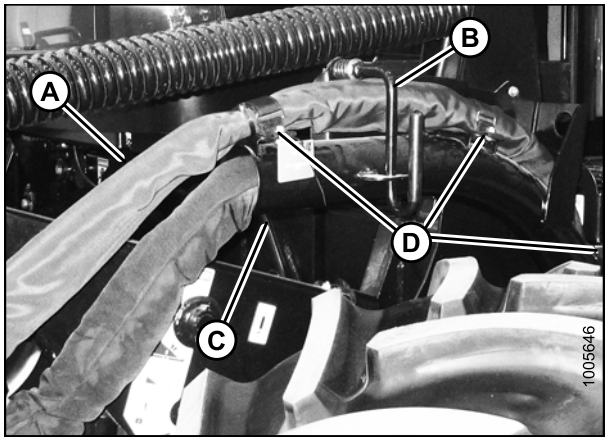

Figure 3.21: Auger Return and Reel Pressure Hose Bundle

13. If valve blocks are **NOT** configured as shown at right, install required fittings as described in the A40-D Auger Self-Propelled Windrower Header Unloading and Assembly Instructions, which were supplied with your A40-D Auger Header.

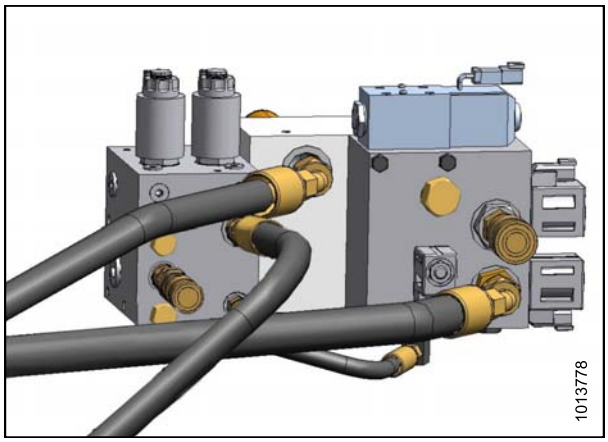

Figure 3.22: M150/M155/M155*E4* with Reverser Valve

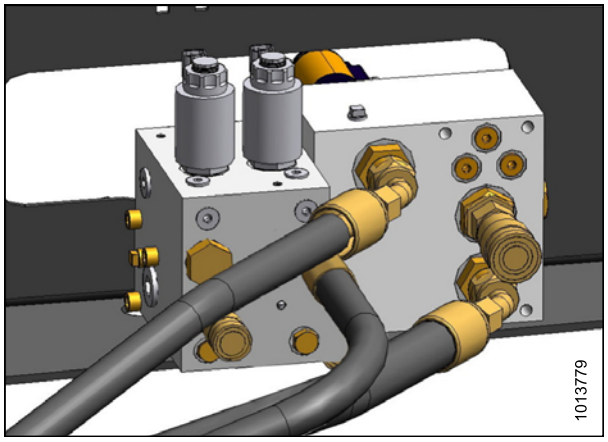

Figure 3.23: M150/M155/M155*E4* without Reverser Valve

14. Locate the auger pressure (A) and auger/reel return (B) hoses.
15. Proceed to *3.1.5 Configuring Reverser Valve Jumper Hose, page 48*.

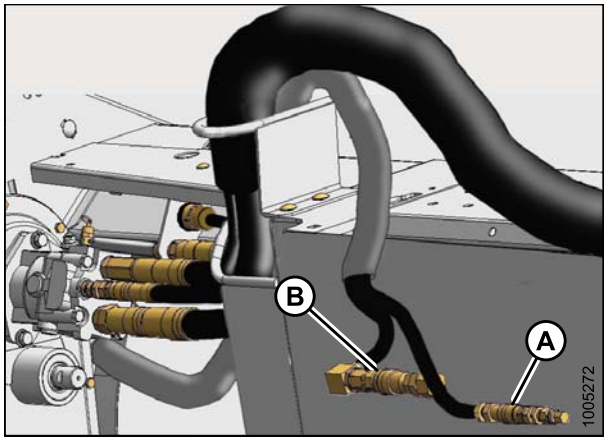

Figure 3.24: Auger Pressure and Auger/Reel Return Hose Couplers – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

16. Push auger pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on valve block until collar on receptacle snaps into lock position.

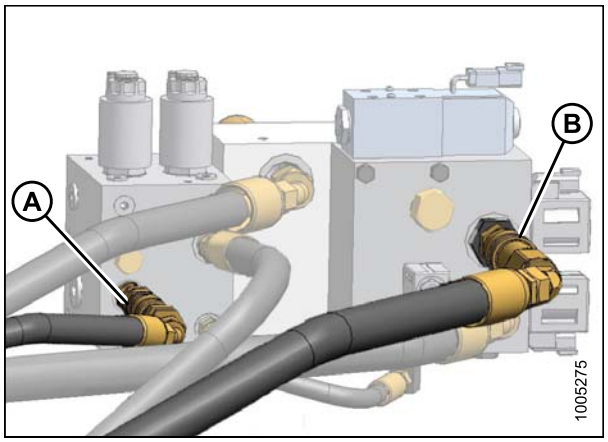

Figure 3.25: M150/M155/M155*E4* with Reverser Valve

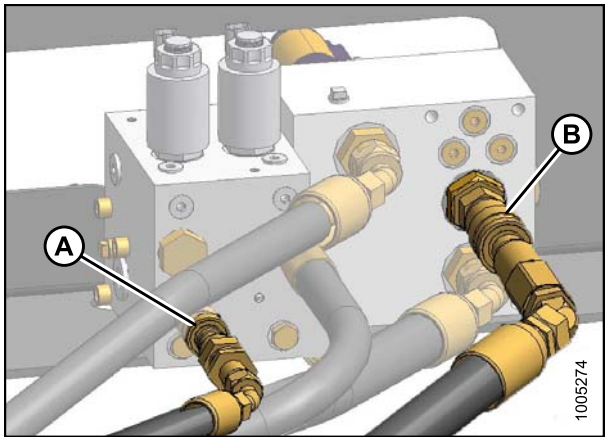

Figure 3.26: M150/M155/M155*E4* without Reverser Valve

3.1.3 Attaching to M200

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

The M200 Windrower requires four drive hoses (A) to run an A40-D Auger Header.

Figure 3.27: Drive Hoses

If only three drive hoses are present, before following the procedure below, configure the M200 to run an A40-D Auger Header by installing kit MD #B4651. The kit includes an additional hose (A), hardware, and installation instructions.

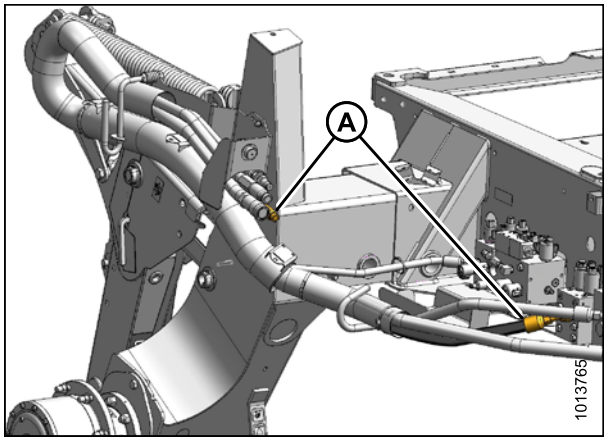

Figure 3.28: Kit MD #B4651

1. Disengage rubber latch (A), and open driveline shield (B).

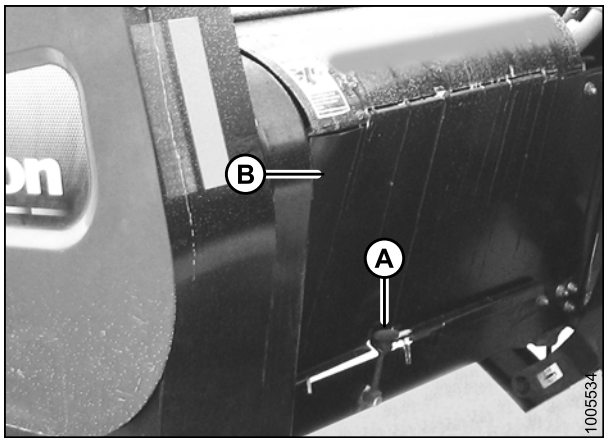

Figure 3.29: Driveline Shield

2. Remove cap (A) from electrical connector, and remove connector from support bracket.
3. Disengage and rotate lever (B) counterclockwise to fully up position to release the hose bundle (C).

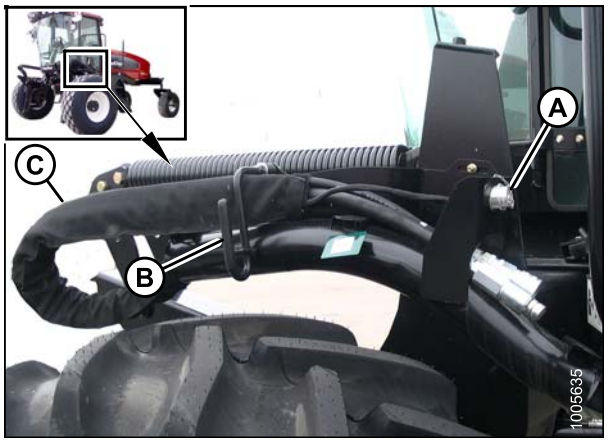

Figure 3.30: Support Bracket and Hose Bundle

4. Move hose/electrical bundle (A) to header.
5. Route bundle (A) from windrower through support (B) and access hole (C) in header frame alongside existing hose bundle (D) from header.
6. Remove cover on header electrical receptacle (E).
7. Push connector onto receptacle, and turn collar on connector to lock it in place.
8. Attach cover to mating cover on windrower wiring harness.
9. Remove caps from hydraulic couplers. Clean if necessary.

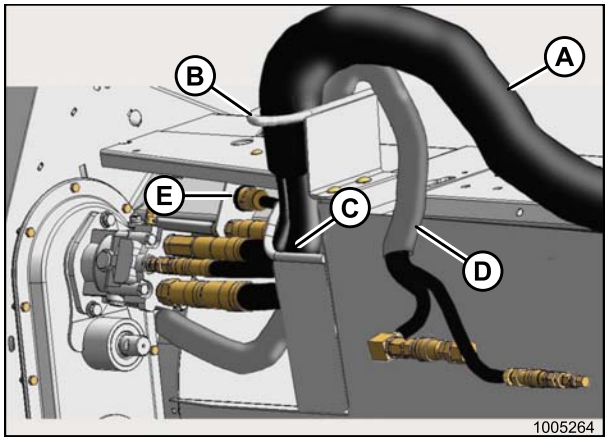

Figure 3.31: Hose and Electrical Bundle – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

NOTE:
At location (C), later-build 2015, 2016 and later units will have a “tee” going to case drain on square reel motor only.

10. Push hose connectors onto mating receptacles as shown until collars on receptacles snap into lock position.

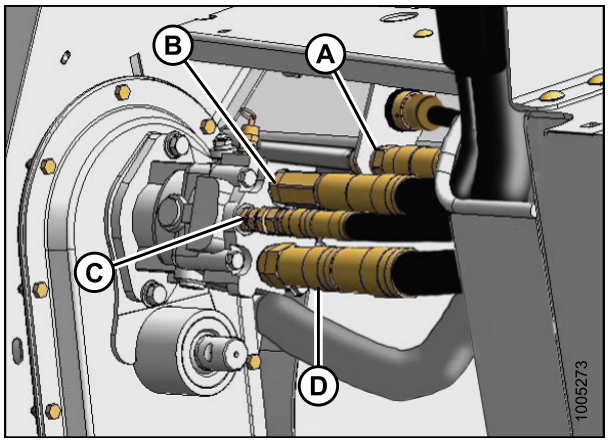

Figure 3.32: Early-Build 2015, 2014, and Earlier Standard Header – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

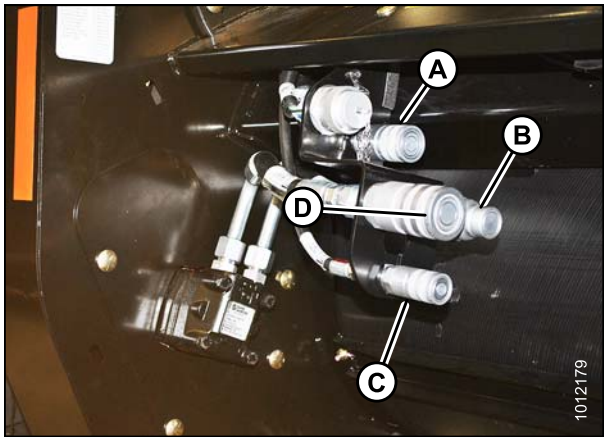

Figure 3.33: 2015 Grass Seed Header Hose Connectors

A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

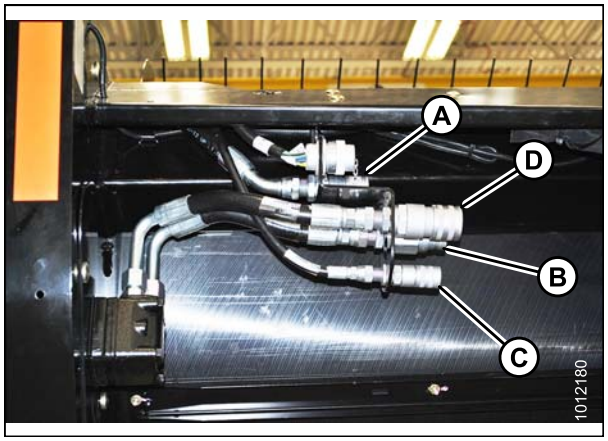

Figure 3.34: 2015 Grass Seed Header Hose Connectors Side View

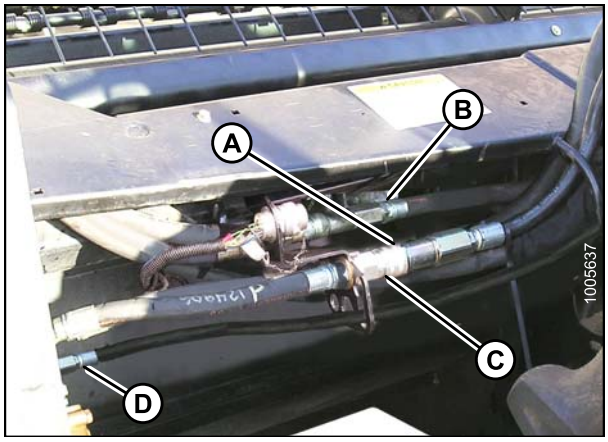

Figure 3.35: 2014 and Earlier Grass Seed Header

A - Knife Return (Male Fitting at Header) (Hidden in This Image)
B - Auger and Reel Pressure
C - Knife Pressure (Female Fitting at Header)
D - Case Drain

11. Route auger return and reel pressure hose bundle (A) from header to windrower, and position bundle above existing hose support (C) as shown.
12. Secure with three straps (D), and lower lever (B).

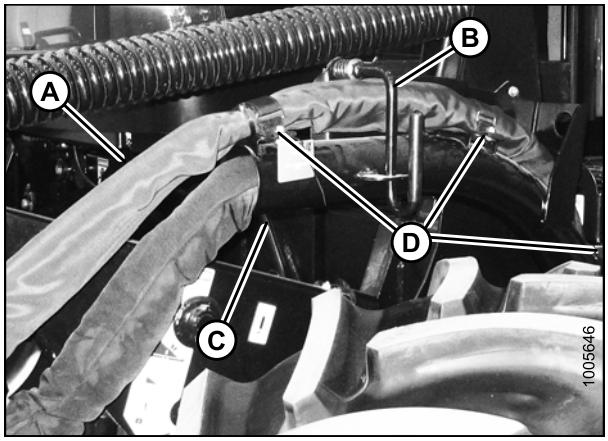

Figure 3.36: Auger Return and Reel Pressure Hose Bundle

13. If valve blocks are **NOT** configured as shown at right, install required fittings as described in the A40-D Auger Self-Propelled Windrower Header Unloading and Assembly Instructions, which were supplied with your A40-D Auger Header.

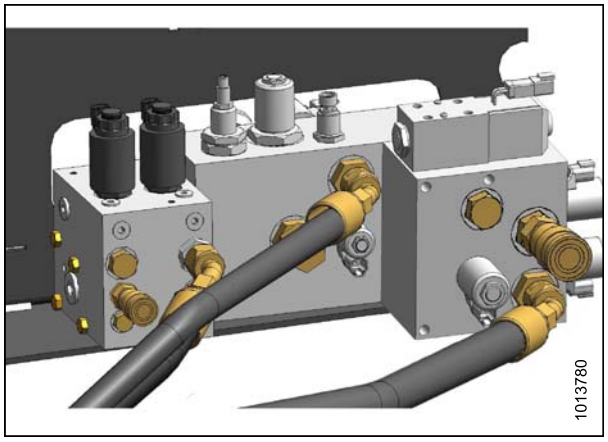

Figure 3.37: M200 with Reverser Valve

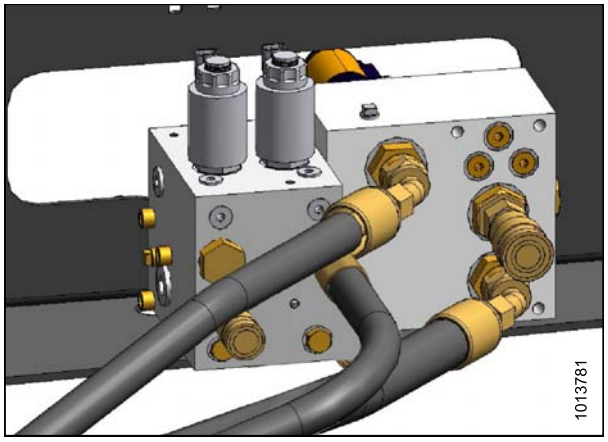

Figure 3.38: M200 without Reverser Valve

14. Locate the auger pressure (A) and auger/reel return (B) hoses.

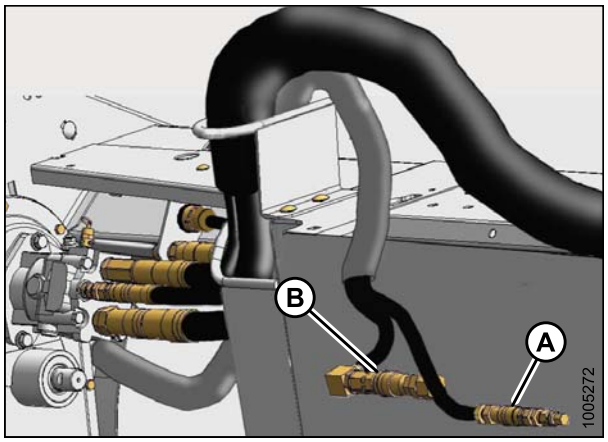

Figure 3.39: Auger Pressure and Auger/Reel Return Hose Couplers – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

15. Push auger pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on valve block until collar on receptacle snaps into lock position.
16. If valve blocks are **NOT** configured as shown above, install required fittings as described in the A40-D Auger Self-Propelled Windrower Header Unloading and Assembly Instructions, which were supplied with your A40-D Auger Header.
17. Proceed to *3.1.5 Configuring Reverser Valve Jumper Hose, page 48*.

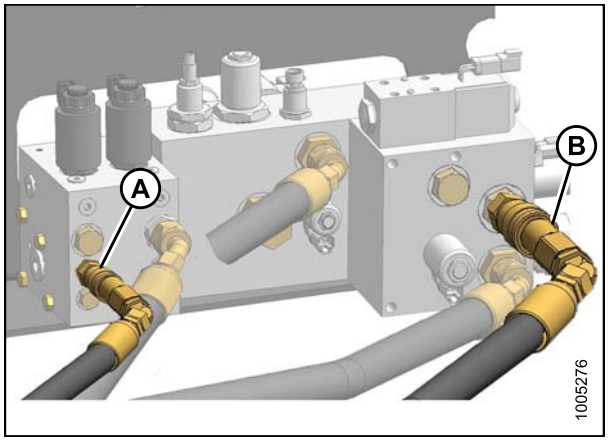

Figure 3.40: M200 with Reverser Valve

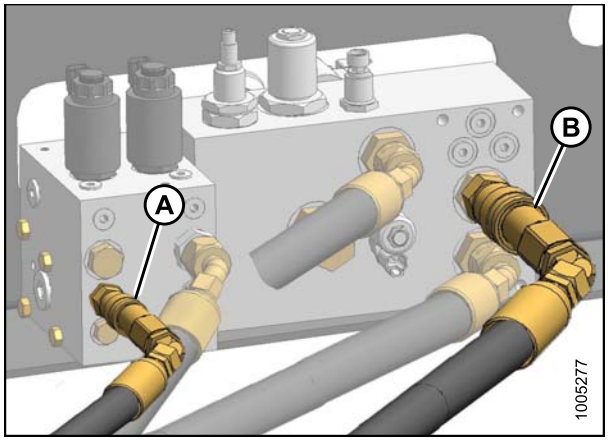

Figure 3.41: M200 without Reverser Valve

3.1.4 Attaching to M205

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

The M205 Windrower must be equipped with an auger drive basic kit and a completion kit as shown at right. If necessary, obtain the following kits from your MacDon Dealer and install them in accordance with the instructions supplied with the kits.

Kit Description	MacDon Part Number
Base kit	MD #B5491
Reverser kit[1]	MD #B5492
Coupler	MD #B5497

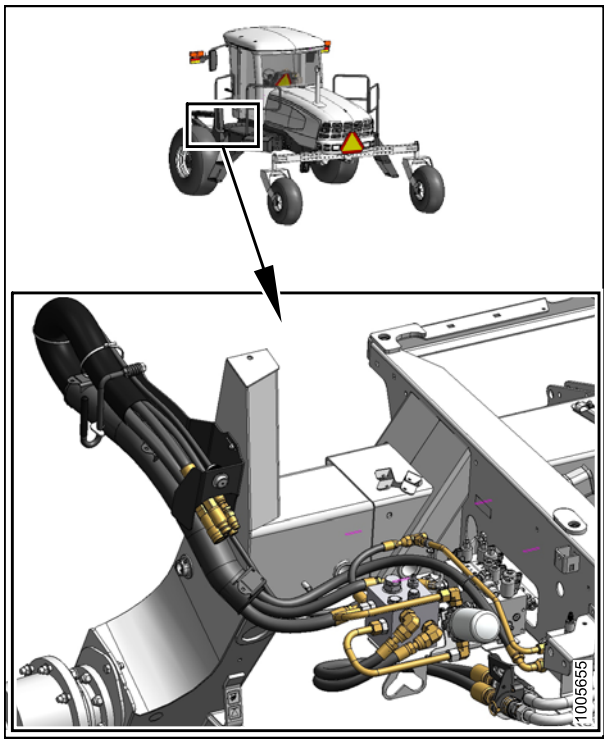

Figure 3.42: Auger Drive Basic Kit and Completion Kit Installed

1. Disengage rubber latch (A), and open driveline shield (B).

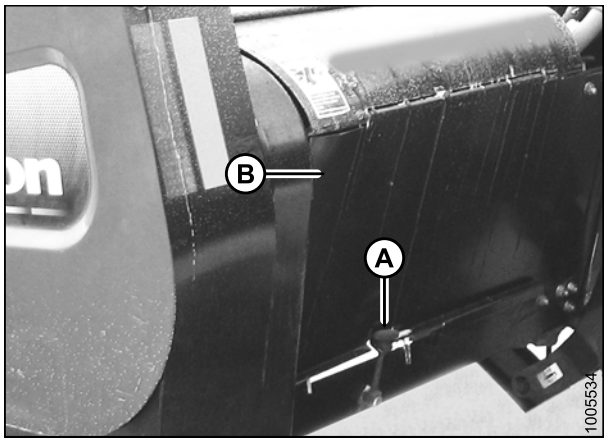

Figure 3.43: Driveline Shield

1. Reverser kit is optional and not required, although most A40-D Headers have a Reverser kit (MD #B5492) ordered for the windrower. Check with your Dealer, and install prior to hook-up if required.

2. Remove cap (A) from the electrical connector, and remove the connector from the support bracket.
3. Disengage and rotate lever (B) counterclockwise to fully up position to release the hose bundle (C).
4. Move hose/electrical bundle (C) to header.

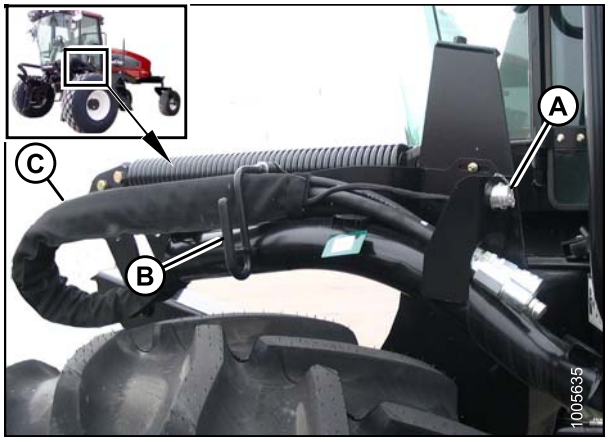

Figure 3.44: Support Bracket and Hose Bundle

5. Route bundle (A) from windrower through support (B) and access hole (C) in header frame alongside existing hose bundle (D) from header.
6. Remove cover on header electrical receptacle (E).
7. Push connector onto receptacle, and turn collar on connector to lock it in place.
8. Attach cover to mating cover on windrower wiring harness.
9. Remove caps from hydraulic couplers. Clean if necessary.

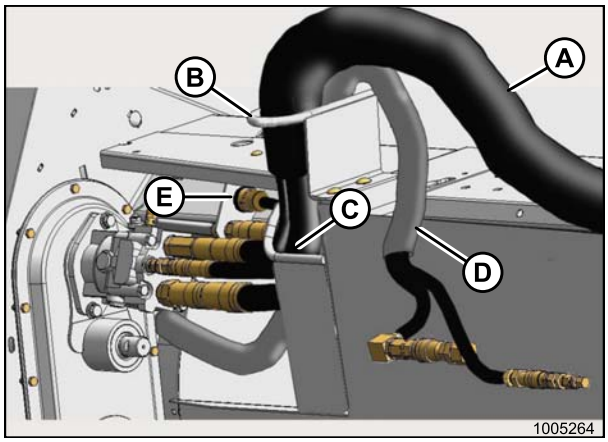

Figure 3.45: Hose and Electrical Bundle – 14-ft. and 16-Ft. Header Shown (18-Ft. Similar)

NOTE:
At location (C), later-build 2015, 2016 and later units will have a “tee” going to case drain on square reel motor only.

10. Push hose connectors onto mating receptacles as shown until collars on receptacles snap into lock position.

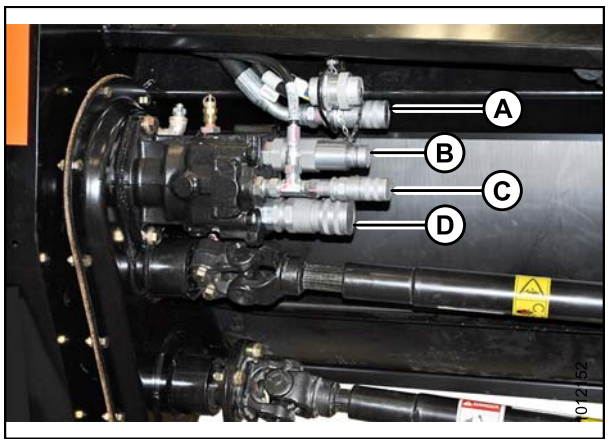

Figure 3.46: Early-Build 2015, 2014 and Earlier Standard Header – 14-Ft. and 16-Ft. Header Shown (18-Ft. Similar)

A - Reel/Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

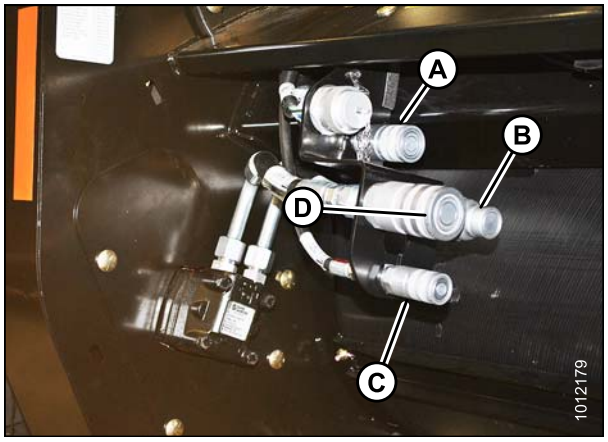

Figure 3.47: 2015 Grass Seed Header Hose Connectors

A - Reel and Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

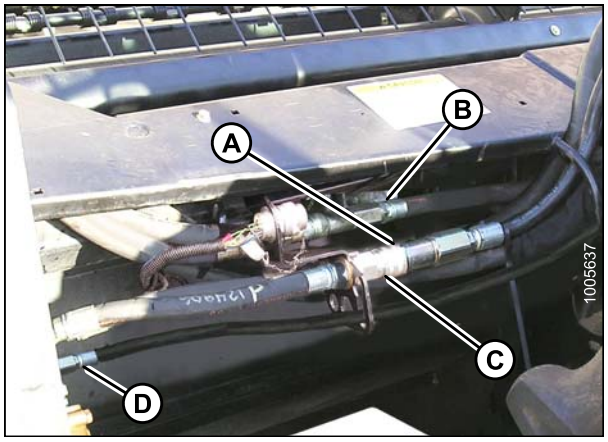

Figure 3.48: 2014 and Earlier Grass Seed Header

A - Knife Return (Male Fitting at Header) (Hidden in this Image)
B - Auger and Reel Pressure
C - Knife Pressure (Female Fitting at Header)
D - Case Drain

11. Route auger return and reel pressure hose bundle (A) from header to windrower, and position bundle above existing hose support (C) as shown.
12. Secure with three straps (D), and lower lever (B).

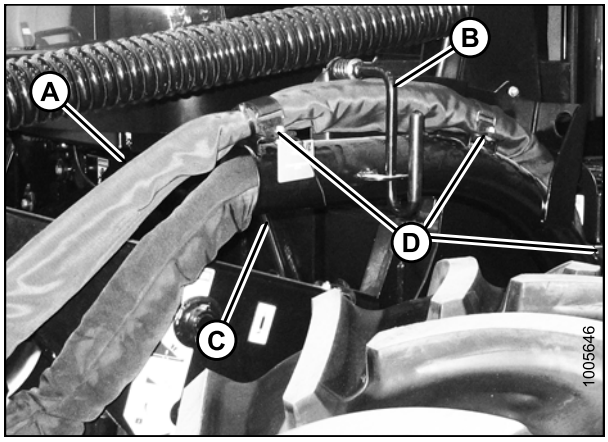

Figure 3.49: Auger Return and Reel Pressure Hose Bundle

13. Push auger/reel pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on valve block until collar on receptacle snaps into lock position.

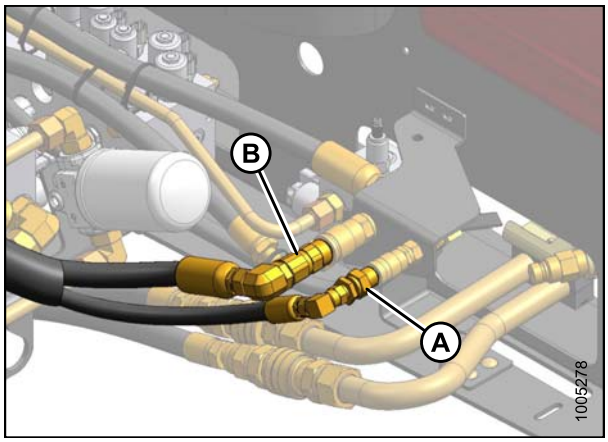

Figure 3.50: Auger/Reel Pressure and Auger/Reel Return Hose Couplers

14. Check hose routing at the reel motor (A). The hose routing depends on which windrower model the header is being attached to. The header is factory-configured for M150, M155, M155*E4*, and M200 Windrowers.

    NOTE:
    Reel drive motor may not be exactly as shown.

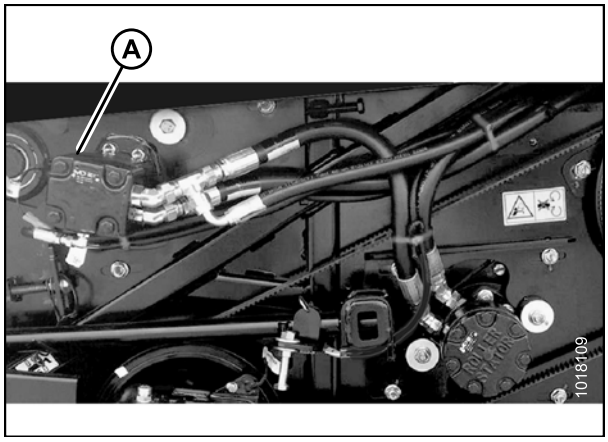

Figure 3.51: Later-build 2015 Factory Routing M150, M155, M155*E4*, and M200

15. For the procedure to change hose routing for M205 Windrowers, refer to the section based on the year of manufacture:
    - Later-build 2015, 2016 and later: *3.1.7 Hydraulic Drive Hose Routing (Later-Build 2015, 2016 and later A40-D Units), page 51*
    - Early-build 2015, 2014 and earlier: *3.1.6 Hydraulic Drive Hose Routing (Early-Build 2015, 2014 and Earlier A40-D), page 49*.

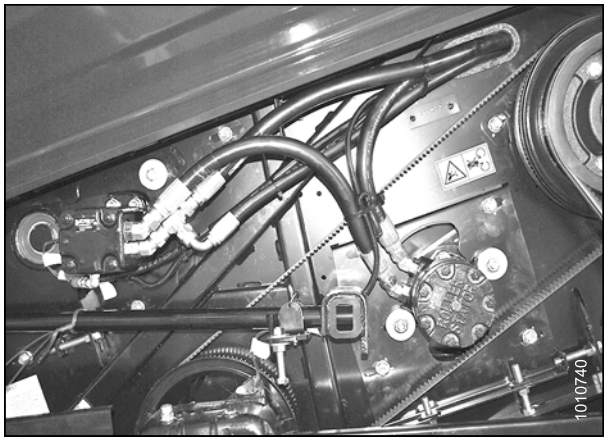

Figure 3.52: Modified Routing M100, M105, and M205

3.1.5 Configuring Reverser Valve Jumper Hose

An optional reverser valve block (A) to reverse the header drive in the event of plugging may have been installed on M150, M155, and M200 Self-Propelled Windrowers. A jumper hose on this valve block has a specific routing for each model of auger header.

IMPORTANT:
If a reverser valve block (A) has been installed, the jumper hose (B) must be routed for the correct header model. Do **NOT** operate the header unless hose is routed as shown.

IMPORTANT:
ONLY for draper headers with conditioner installed and ONLY for M150, M155 and M200 windrowers: CR is routed to port ‘R4’ (not shown) on reverser block. When switching from draper header to auger header, jumper hose (B) must be routed according to header being operated to prevent draper header reel damage and improper operation.

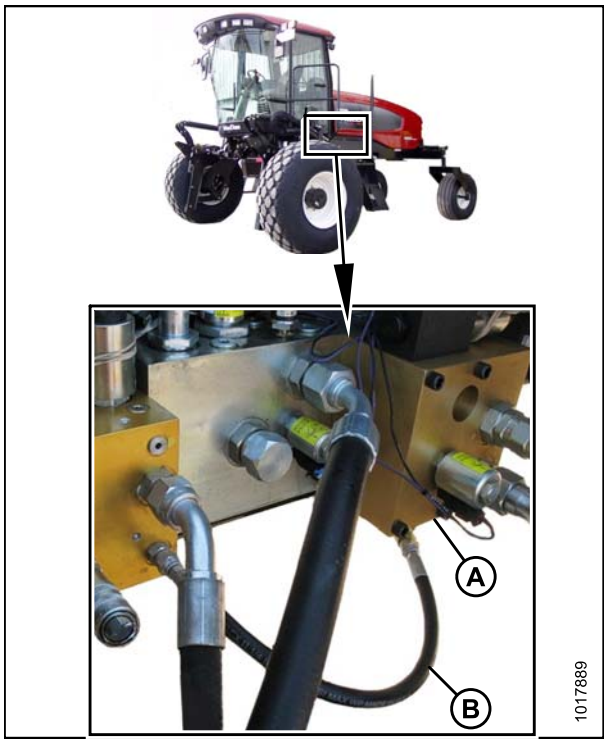

Figure 3.53: A40-D Hose (B) Position (M200 Shown; M150, M155, M155*E4* Similar)

To reroute jumper hose from draper header position to A40-D position, follow these steps:

1. Move left-hand windrower platform to open position to expose hydraulic valve blocks.
2. Disconnect jumper hose (B) from 90 degree fitting (C) at port R4 on the reverser valve block (A).
3. Rotate 90 degree fitting (D) under reverser valve block so that hose can be routed to port C2 at (C) as shown in figure *3.55: Connected Jumper Hose, page 49* on the next page.

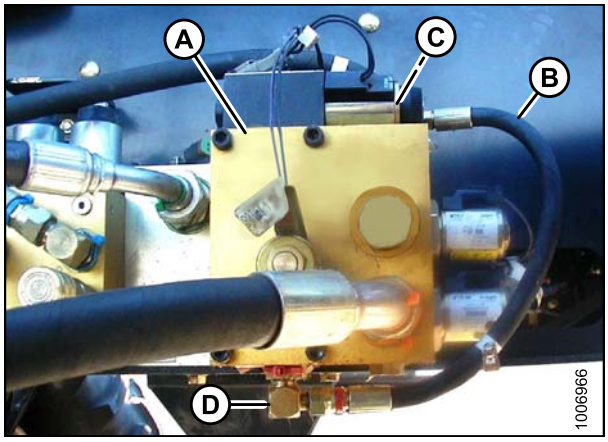

Figure 3.54: Draper Header Hose Position (M150 Shown; M200, M155, and M155*E4* Similar)

4. Remove cap from port C2 fitting (A) on header drive valve block (B).
5. Connect jumper hose (C) to port C2 fitting (A) on header drive valve block (B).
6. Install previously removed cap onto 90 degree fitting in port R4 on reverser valve block (D).
7. Move left-hand windrower platform back to normal operating position.

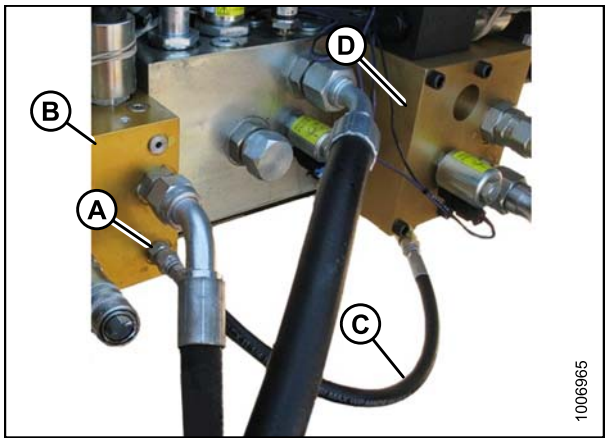

Figure 3.55: Connected Jumper Hose

3.1.6 Hydraulic Drive Hose Routing (Early-Build 2015, 2014 and Earlier A40-D)

The A40-D Auger Header drive hose routing depends on the windrower model to which the header is being attached. Early build A40-D Headers are for use on M100, M105 and M205 Windrowers Only.

IMPORTANT:
If you have a 2015 A40-D SP windrower header, confirm whether you have an early-build or a later-build 2015 unit. If the reel motor is **square**, (A) then it is a later-build 2015 model. Refer to *3.1.7 Hydraulic Drive Hose Routing (Later-Build 2015, 2016 and later A40-D Units), page 51*. If the reel motor is **round**, (B) then use the following procedure:

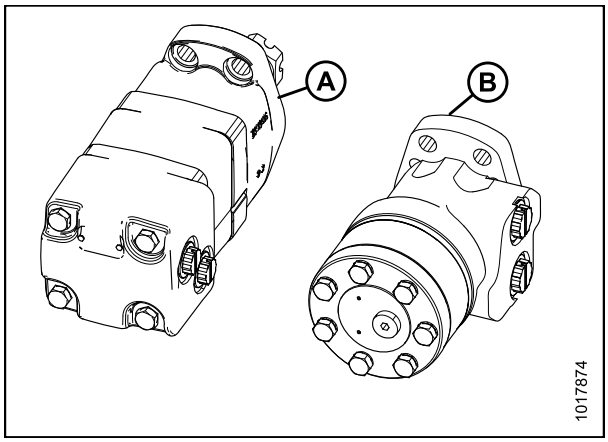

Figure 3.56: Auger Drive Motor

1. Press screwdriver against latch in opening (A) and lift to open header left-hand driveshield. Shield will latch at (B) to stay open.
2. Check hose routing at the reel motor. The header is factory-configured for M150, M155, and M200 Windrowers as shown in Figure *3.58: Early-Build 2015, 2014 and Earlier Factory Configuration (M150, M155, and M200), page 50*.

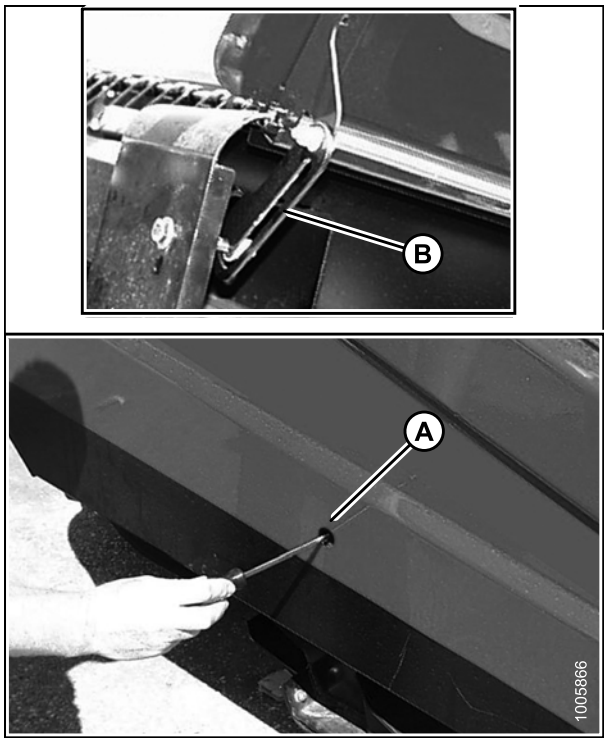

Figure 3.57: LH Driveshield

To route hoses on early-build 2015, 2014 and earlier A40-D Headers for use on M100, M105, and M205 Windrowers, proceed as follows.

3. Disconnect hoses as follows:
   a. Disconnect hose (A) from tee (C).
   b. Disconnect hose (B) from reel motor upper port.
   c. Disconnect tee (C) from reel motor lower port.
4. Reconnect hoses as follows:
   a. Relocate tee (C) to reel motor upper port.
   b. Connect hose (B) to tee (C).
   c. Connect hose (A) to reel motor lower port.

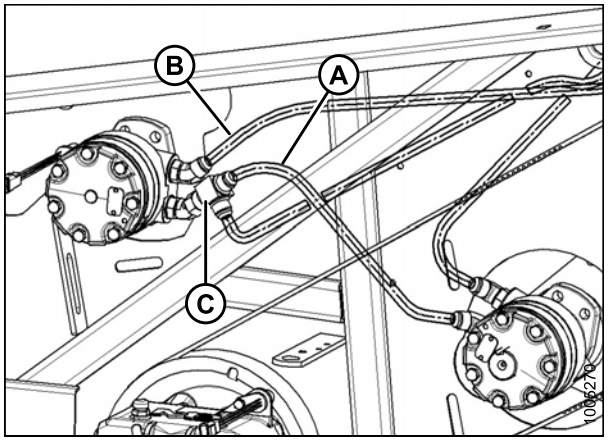

Figure 3.58: Early-Build 2015, 2014 and Earlier Factory Configuration (M150, M155, and M200)

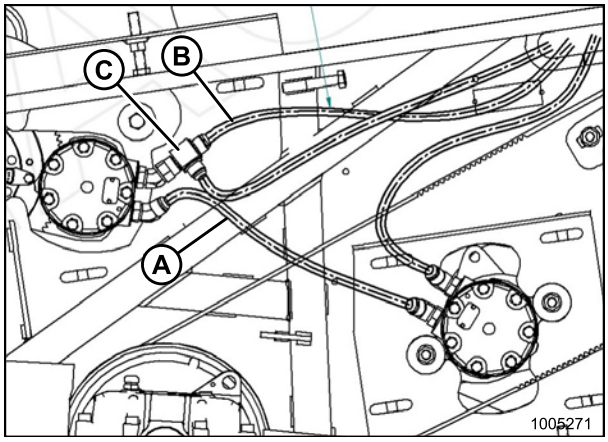

Figure 3.59: Adjusted Configuration (M100, M105, and M205)

5. Close driveline shield before engaging header.

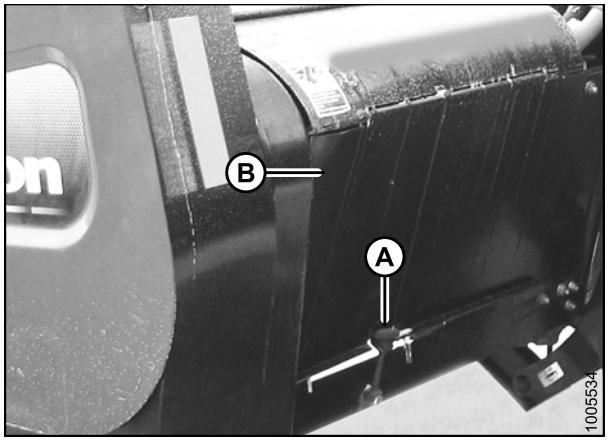

Figure 3.60: Driveline Shield

3.1.7 Hydraulic Drive Hose Routing (Later-Build 2015, 2016 and later A40-D Units)

The A40-D Auger Header hydraulic drive hose routing depends on the windrower model to which the header is being attached.

The header is factory-configured for M150, M155, M155*E4*, and M200 SP Windrowers as shown in Figure *3.66: Factory Configuration (M150, M155, M155E4, and M200), page 53*. To route hoses for M100, M105, and M205 Windrowers, proceed as follows:

IMPORTANT:
If you have a 2015 A40-D SP windrower header, confirm whether you have an early-build or a later-build 2015 unit. If the reel motor is **round** (B), then it is an earlier-build 2015 model. Refer to *3.1.6 Hydraulic Drive Hose Routing (Early-Build 2015, 2014 and Earlier A40-D), page 49*.
If the reel motor is **square** (A), then use the following procedure:

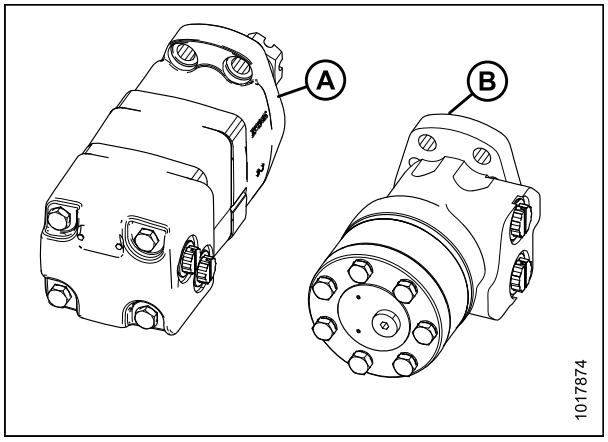

Figure 3.61: Auger Drive Motor

1. Press screwdriver against latch in opening (A) and lift to open header left-hand driveshield. Shield will latch at (B) to stay open.

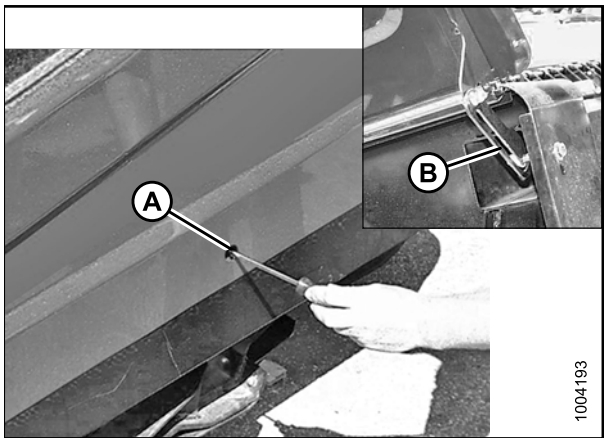

Figure 3.62: LH Driveshield

2. Disengage rubber latch (A), and open driveline shield (B).

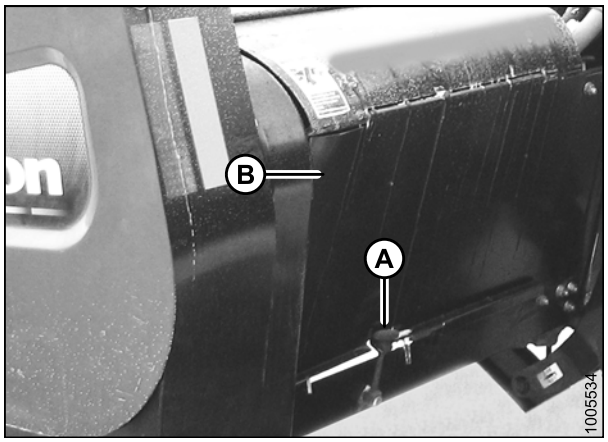

Figure 3.63: Driveline Shield

3. Loosen bulkhead nut (A) on auger and reel pressure coupler (B). This allows auger and reel pressure hose (C) to rotate freely.

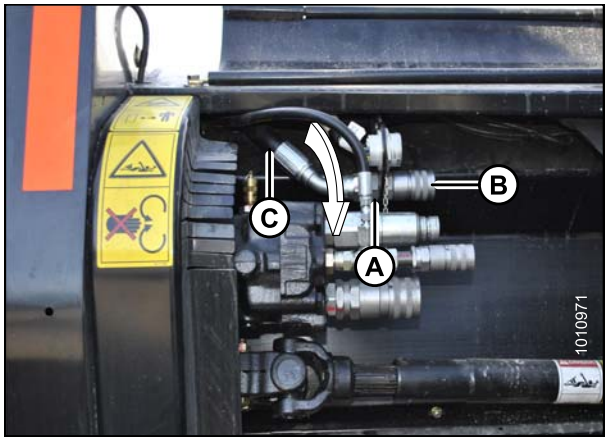

Figure 3.64: Auger and Reel Pressure Coupler and Hose – 14-Ft. and 16-Ft. Header Shown

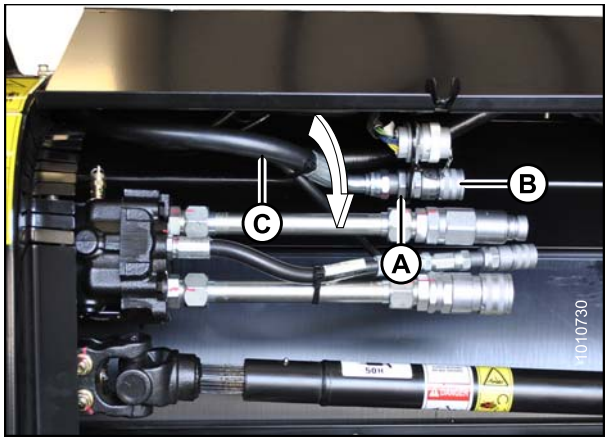

Figure 3.65: Auger and Reel Pressure Coupler and Hose – 18-Ft. Header Shown

4. Disconnect hoses as follows:
   a. Disconnect hose (A) from tee (B).
   b. Disconnect tee (B) from reel motor upper port.
   c. Disconnect hose (C) from reel motor lower port.
5. Cut cable ties (D) at locations shown in illustration.

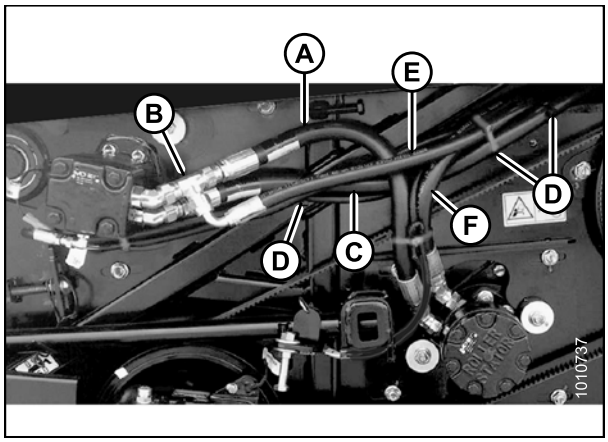

Figure 3.66: Factory Configuration (M150, M155, M155*E4*, and M200)

6. Reconnect hoses as follows:

   a. Reroute hose (E) behind hose (A) and (F) to hose (C) and connect tee (B) to lower port fitting.

   b. Reroute hose (C) above hose (E) and (F) and connect hose (C) to tee (B). Tighten hose (C).

   c. Loosen 45 degree fittings at both ports. This allows room for wrenches when tightening tee (B) to lower port.

   d. Connect hose (A) to upper port fitting as shown and check orientation of 45 degree fitting.

      NOTE:
      Ensure that hose (A) is routed in front of hose (C) and (E).

   e. Confirm orientation of upper port 45 degree fitting, back-off tee (B), and tighten upper port fitting in position determined. Tighten hose (A).

   f. Check orientation of lower port 45 degree fitting and tighten.

   g. Connect tee (B) to lower port 45 degree fitting and tighten.

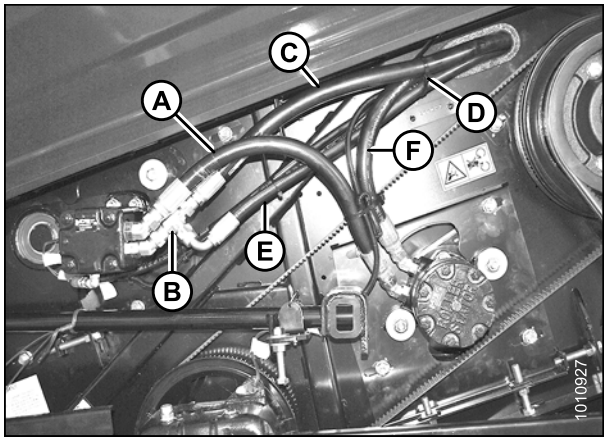

Figure 3.67: Adjusted Configuration (M100, M105, and M205)

7. Secure electrical harness (B), motor case drain hose (C), and hose (D) together with cable ties (A), as shown.

   IMPORTANT:
   Ensure there is at least 25 mm (1 in.) clearance between hose bundle (E) and knife drive timing belt (F).

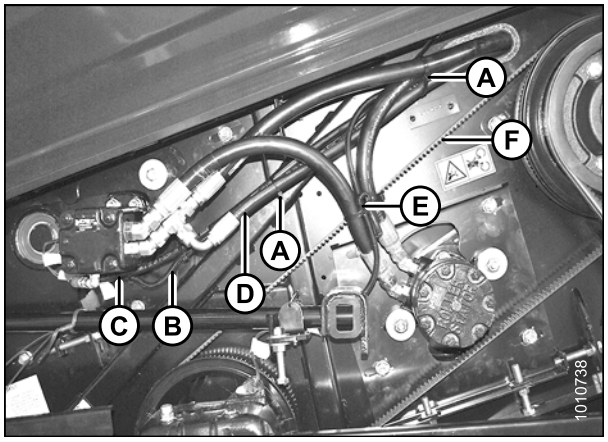

Figure 3.68: Adjusted Configuration (M100, M105, and M205)

8. Rotate coupler (B) and hose (C) downward as shown until slack has been sufficiently reduced. Tighten bulkhead nut (A).

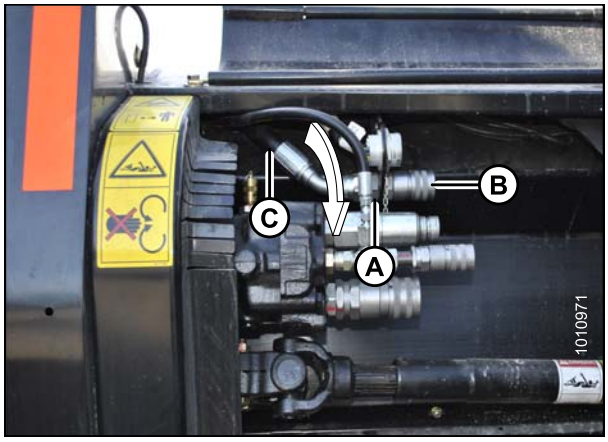

Figure 3.69: Auger and Reel Pressure Coupler and Hose – 14-Ft. and 16-Ft. Header Shown

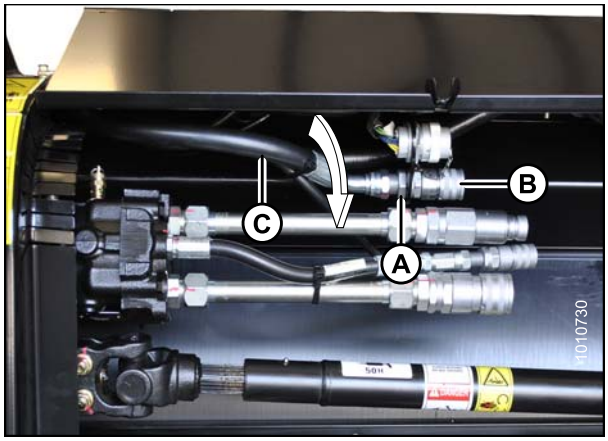

Figure 3.70: Auger and Reel Pressure Coupler and Hose – 18-Ft. Header Shown

9. Close driveline shield (B) and engage rubber latch (A).
10. Close driveshield before engaging header.

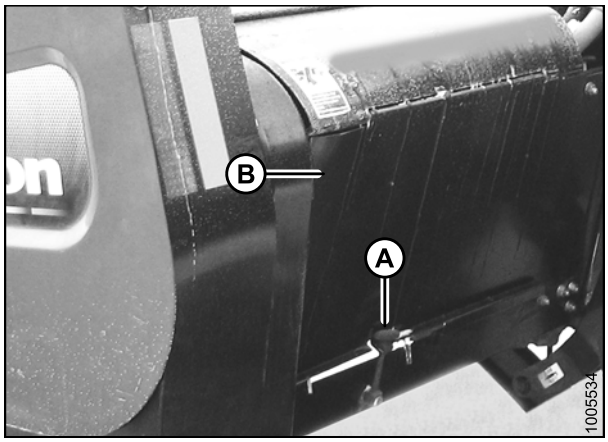

Figure 3.71: Driveline Shield

3.2 Detaching A40-D Header from Windrower

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Move left-hand cab-forward platform to rear of windrower.
2. Disconnect the two hydraulic hoses (A) and (B) from windrower valve(s).

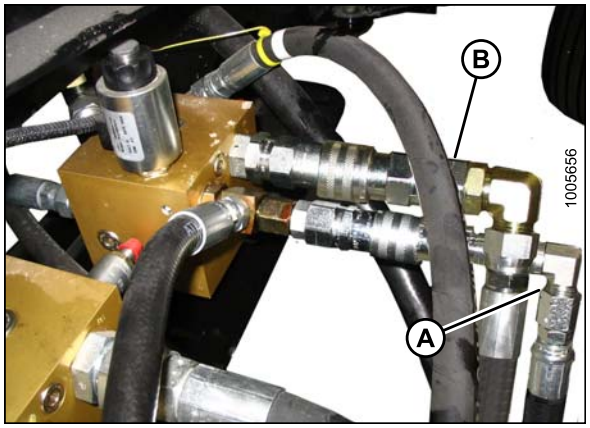

Figure 3.72: M100, M105

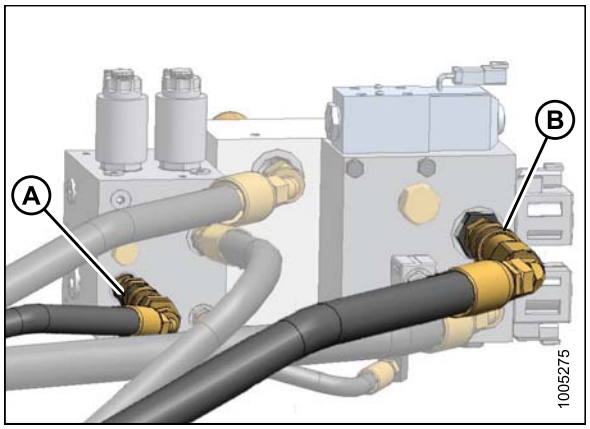

Figure 3.73: M150 with Reverser Valve (M155 and M155*E4* Similar)

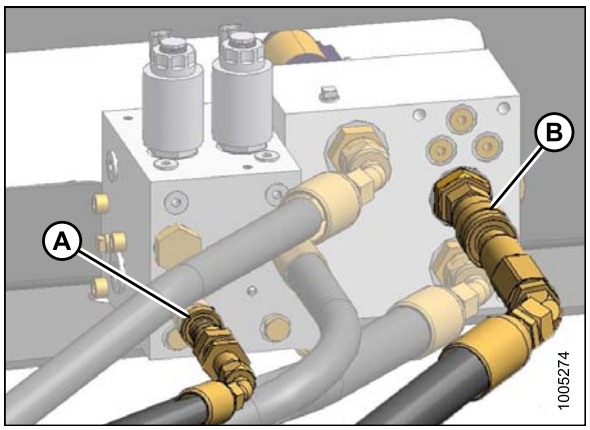

Figure 3.74: M150 without Reverser Valve (M155 and M155*E4* Similar)

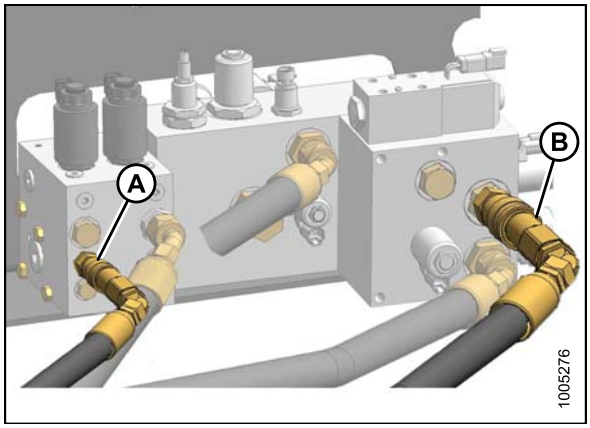

Figure 3.75: M200 with Reverser Valve

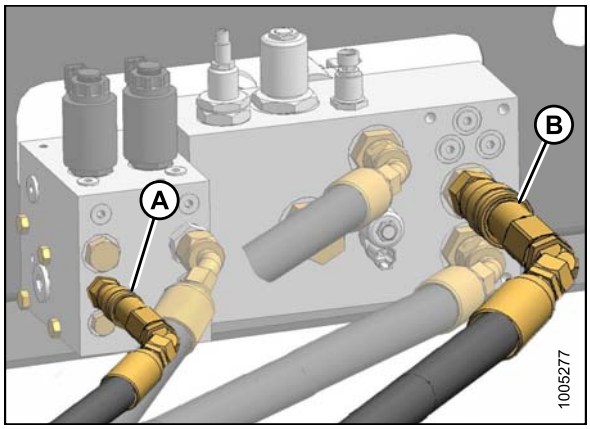

Figure 3.76: M200 without Reverser Valve

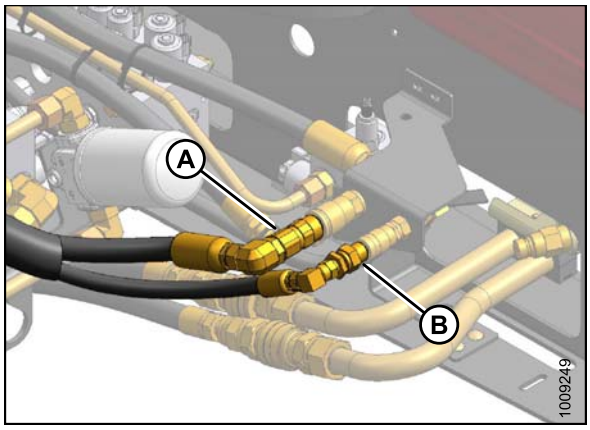

Figure 3.77: M205

3. Raise lever (B), and undo adjustable straps (D).
4. Move hose bundle (A) to store on header walkway.

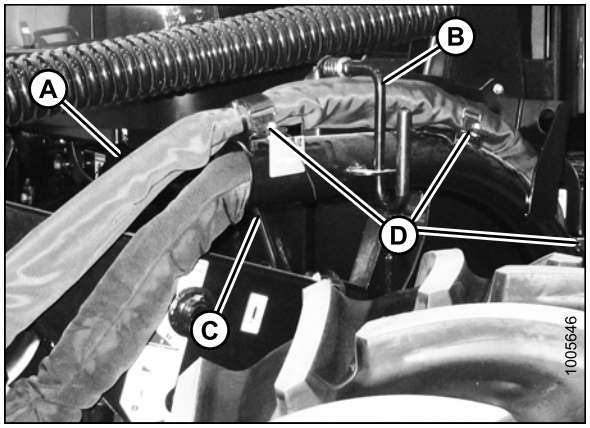

Figure 3.78: Hose Bundle

A - Auger Return and Reel Pressure Hose Bundle
B - Lever
D - Three Straps

5. Install caps on connectors and hose ends (if equipped).
6. At the header, disconnect electrical connector by turning collar counterclockwise, and pulling connector to disengage.
7. Disconnect hoses from hydraulic motor, auger, and reel pressure hose.

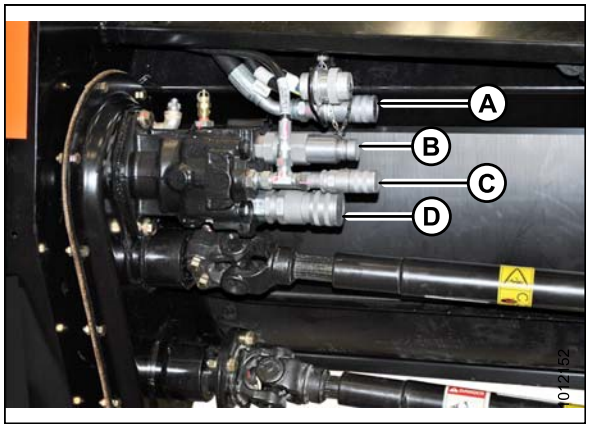

Figure 3.79: Standard Header

A - Reel/Auger Pressure
B - Knife and Conditioner Return
C - Case Drain
D - Knife and Conditioner Pressure

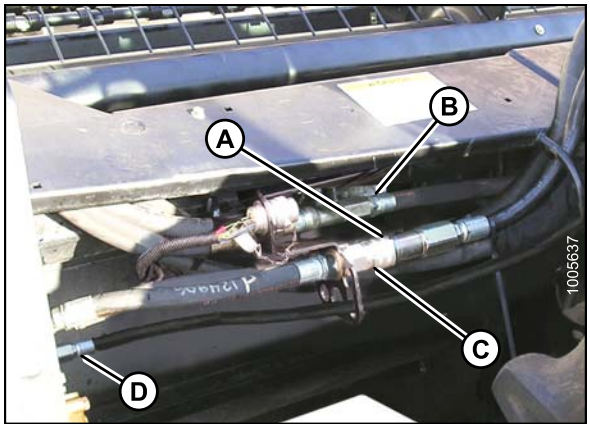

Figure 3.80: Grass Seed Header

A - Knife Return (Male Fitting at Header) (Hidden in this image)
B - Auger and Reel Pressure
C - Knife Pressure (Female Fitting at Header)
D - Case Drain

8. Move hose bundle (A) from header, and position on windrower left-hand side with hose ends in support (B) and under lever (C).
9. Rotate lever (C) clockwise, and push to engage bracket.
10. Position electrical harness through support (B), and attach cap to electrical connector.
11. Close driveline shield, and move windrower platform to closed position.
12. Check to ensure hoses and electrical harness clear tire.
13. Detach header from windrower. For instructions, refer to your windrower operator's manual.

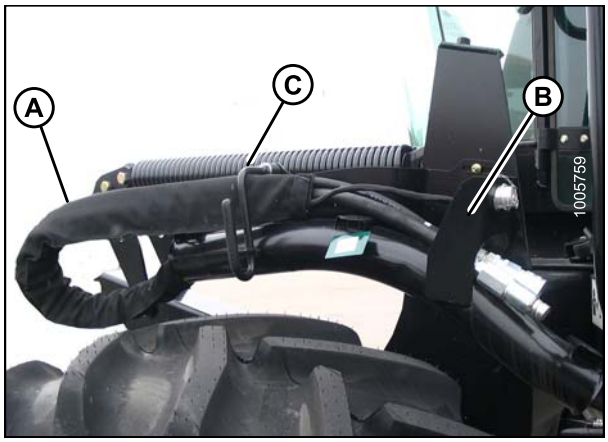

Figure 3.81: Hose Bundle Storage

3.3 Transporting A40-D Header with Windrower

Refer to your windrower operator's manual for information about transporting headers when attached to a windrower. The orientation of the reflectors on the hazard light fixtures is dependent on the direction of travel for Dual Direction® windrowers.

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

The amber reflectors **MUST** always face the direction of travel (C), and are changed as follows:

1. Lower header to the ground, shut off engine and remove key from ignition.
2. Remove bolts (A) from reflector assembly (B), and remove assembly from light fixture. Retrieve spacers (nuts).

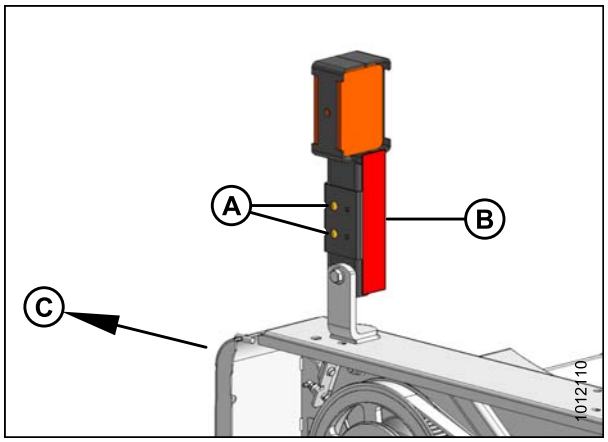

Figure 3.82: Engine-Forward Mode

3. Flip reflector assembly (B), and reinstall ensuring amber side is facing direction of travel (C).

   NOTE:
   Ensure reflector assembly is installed as shown. Otherwise it will interfere with the driveshield in the open position.
4. Secure with bolts (A), spacers, and nuts.
5. Repeat above steps for other light.

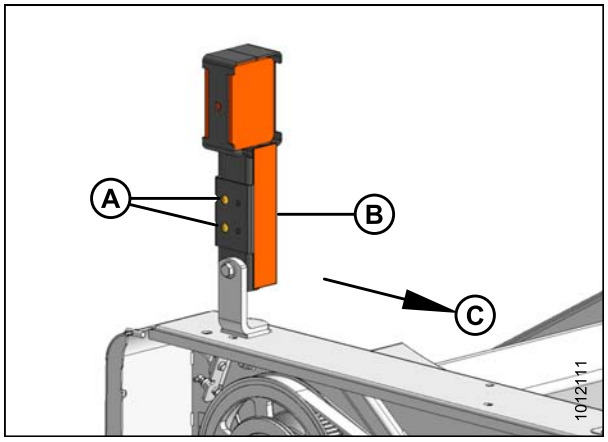

Figure 3.83: Cab-Forward Mode

3.4 Header Lift Cylinder Lock-Out Valves

Refer to your windrower operator’s manual for details on the lift cylinder locks.

3.5 Operating Variables for A40-D

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

Correct operation reduces crop loss and allows cutting of more acres. As well, proper adjustments and timely maintenance will increase the length of service you receive from the machine.

The variables listed below and detailed on the following pages will affect the performance of the header. You will quickly become adept at adjusting the machine to give you the desired results.

Table 3.1 Header Adjustments

Variable	Refer to
Lean bar position	*3.5.1 Setting Lean Bar, page 63*
Auger speed	*3.5.2 Adjusting Auger Speed, page 63*
Reel speed	*3.5.3 Adjusting Reel Speed, page 63*
Auger position	*3.5.4 Setting Auger Position, page 63*
Reel position	*3.5.5 Setting Reel Position, page 66*
Tine aggressiveness adjustment	*3.5.6 Setting Tine Aggressiveness, page 70*
Cutting height	*3.5.8 Setting Cutting Height, page 71*
Header angle	*3.5.7 Adjusting Header Angle of A40-D, page 71*
Header float	*3.5.9 Checking/Adjusting Float, page 72*
Feed pan / rock drop tine position	*3.5.10 Setting Feed Pan and Rock Drop Tine Position, page 73*
Roll gap/timing/alignment	*3.5.11 Adjusting Conditioner Roll Gap, page 73*, *4.13.10 Checking/Adjusting Roll Alignment, page 172*, and *4.13.11 Checking/Adjusting Roll Timing, page 174*
Roll tension	*3.5.12 Adjusting Conditioner Roll Tension, page 74*
Forming shields	*3.5.13 Positioning the Forming Shields, page 76*
Tall crop dividers	*3.10.1 Adjusting Tall Crop Dividers, page 87*
Ground speed	*3.9 Selecting Ground Speed, page 86*

3.5.1 Setting Lean Bar

Use the lean bar adjustment to accommodate different crop heights. The lean bar (A) should strike the upper portion of the crop (roughly 2/3 of the crop height), leaning it away from the header, and exposing the stalks to the knife.

IMPORTANT:
To prevent structural damage to the header, do NOT operate with lean bar removed.

To extend or retract lean bar (A), reposition hardware in adjustment holes as required.

In crops over 1.52 m (5 ft.) high, an optional tall crop divider kit (MD #B4690) is available that includes lean bar extensions to raise the lean bar. For more information refer to *3.10.1 Adjusting Tall Crop Dividers, page 87*.

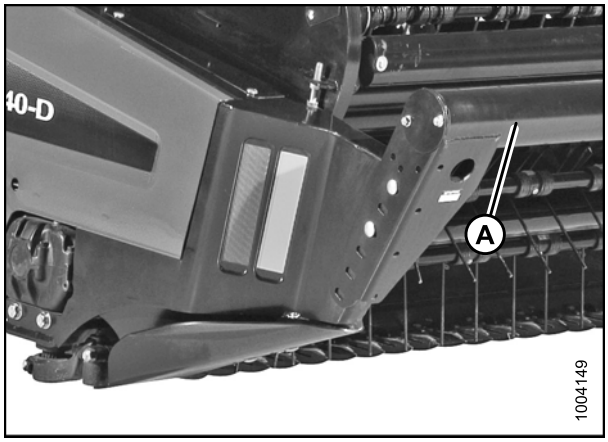

Figure 3.84: Auger Header Lean Bar

3.5.2 Adjusting Auger Speed

The A40-D auger header features a hydraulic direct drive auger with operating speed range of 230 to 320 rpm, and is controlled from the operator's station on the self-propelled windrower.

For instructions, refer to your windrower operator's manual.

3.5.3 Adjusting Reel Speed

The A40-D auger header features a hydraulic direct drive reel with operating speed range of 15 to 85 rpm (M150 and M155), 50 to 85 rpm (M100, M105, M200, M205), and is controlled from the operator's station on the self-propelled windrower.

For instructions, refer to your windrower operator's manual.

3.5.4 Setting Auger Position

CAUTION

To avoid personal injury, before servicing header or opening drive covers, follow procedures in *4.1 Preparing for Servicing, page 93*.

Auger position has been factory-set, and should not normally require adjustment.

For nearly all conditions, the auger performs best when set as close as possible to the stripper bars without rubbing. This is especially important in grass and other crops that have a tendency to wrap.

Component wear may cause clearances to become excessive, resulting in feeding problems and uneven windrows.

To make adjustments to auger position, refer to these sections depending on your equipment:

- *Adjusting Auger Fore-Aft Position, page 64*
- *Adjusting Vertical Position, page 65*

NOTE:
In heavier crops it may be necessary to remove the front stripper bar for smoother crop flow across the auger. Refer to *4.12 Stripper Bar, page 155*.

NOTE:
The auger should clear the stripper bars on the auger pan by approximately 1–4 mm (1/32–5/32 in.). Shimming the stripper bars may be required. Refer to *4.12 Stripper Bar, page 155*.

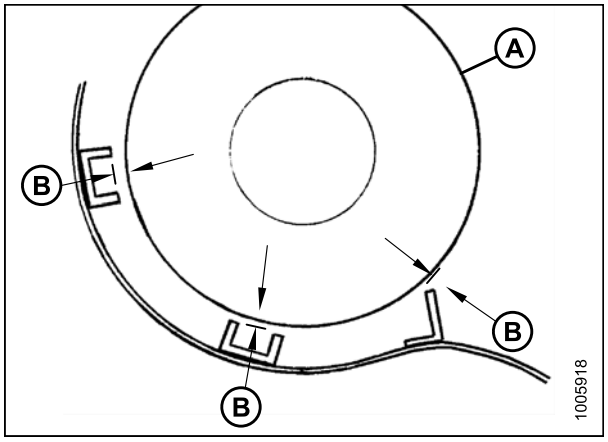

Figure 3.85: Clearance between Auger and Stripper Bars on the Auger Pan

A - Auger
B - Clearance 1–4 mm (1/32–5/32 in.)

Adjusting Auger Fore-Aft Position

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open left-hand endshield.
3. Loosen four nuts (A).
4. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust auger fore-aft position.
5. Tighten jam nut.
6. Tighten nuts (A).

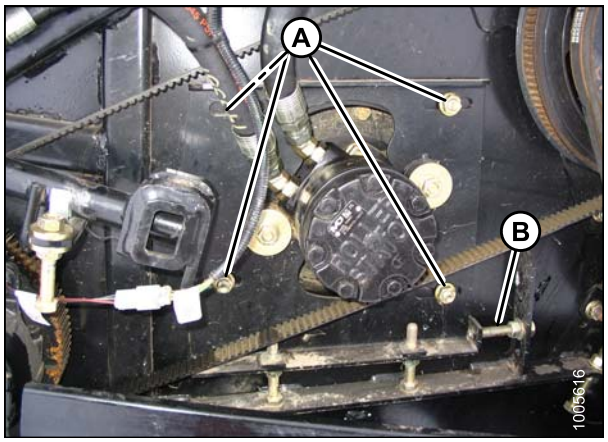

Figure 3.86: A40-D Left Side

7. Open right-hand endshield.
8. Loosen four nuts (A).
9. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust auger fore-aft position.
10. Tighten jam nut.
11. Tighten nuts (A).
12. Close shields before engaging header.

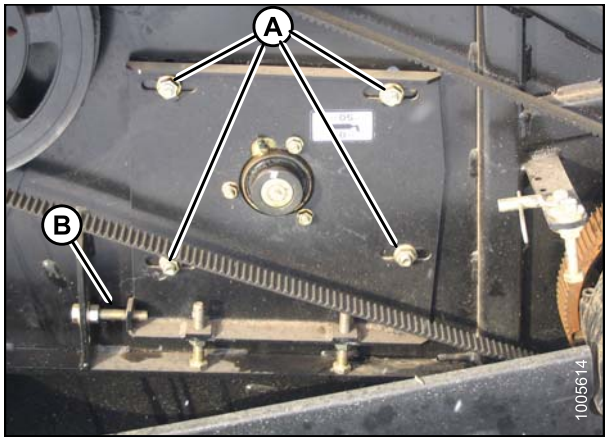

Figure 3.87: A40-D Right Side

Adjusting Vertical Position

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open left-hand endshield
3. Loosen four nuts (A).
4. Loosen jam nuts on adjuster bolt (B), and turn bolt (B) to adjust auger vertical position.
5. Tighten jam nuts.
6. Tighten nuts (A).

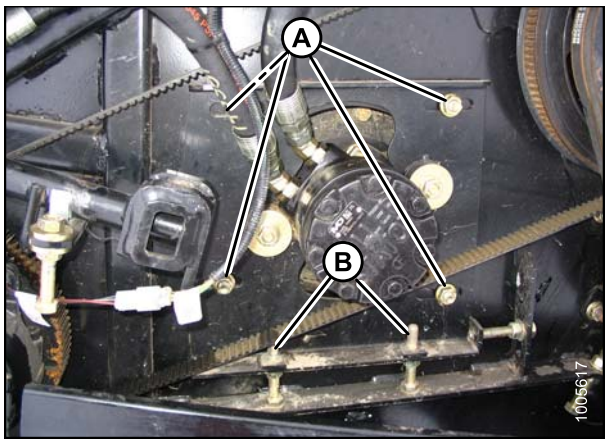

Figure 3.88: A40-D Left Side

7. Open right-hand endshield.
8. Loosen four nuts (A).
9. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust auger fore-aft position.
10. Tighten jam nut.
11. Tighten nuts (A).
12. Close shields before engaging header.

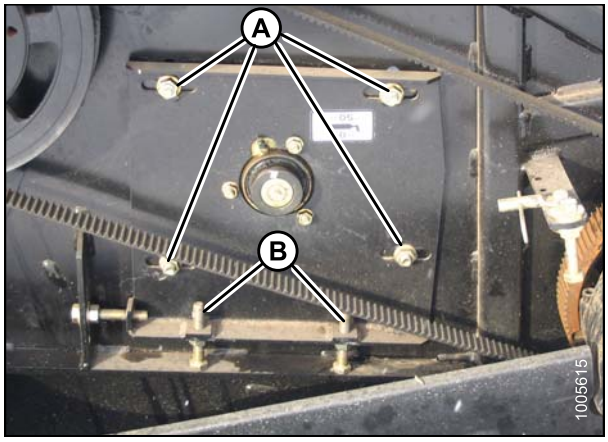

Figure 3.89: A40-D Right Side

3.5.5 Setting Reel Position

Reel position has been found to be a critical factor in achieving good results in adverse conditions. Reel position is factory-set for average straight standing crop. It can be adjusted both vertically and horizontally (fore-aft) for different crop conditions.

See table below for recommended reel position in unusual crop conditions:

Crop Condition	Reel Position
Crop down or lodged	Forward and down (also increase reel speed)
Wet or dead material collects on cutterbar and plugs knife	Back and down (close to guards)
Short crop	Back
Thick stemmed or heavy standing	Up and forward

To make adjustments to reel position, refer to the following sections:

- *Adjusting Reel Fore-Aft Position, page 66*
- *Adjusting Reel Vertical Position, page 67*

Adjusting Reel Fore-Aft Position

The reel fore-aft offset is factory-set to 816 mm (32-3/8 in.) as measured from the inside edge of the reel tube to the back frame member as shown in the illustration at right.

Figure 3.90: Reel Fore-Aft Offset

NOTE:
The reel must be adjusted equally on both sides.

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open left-hand endshield.
3. Loosen four nuts (A).
4. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust reel fore-aft position.
5. Tighten jam nut.
6. Tighten nuts (A).

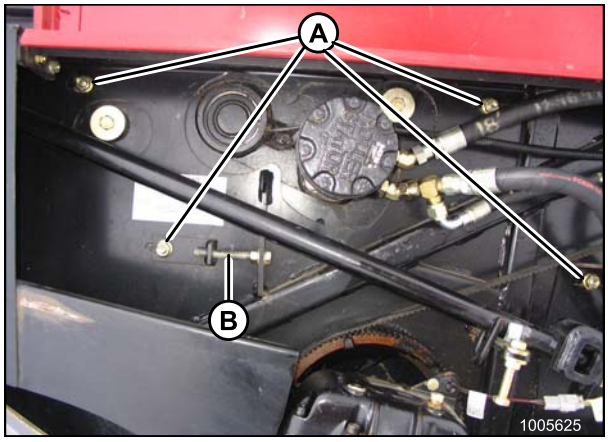

Figure 3.91: A40-D Left Side

7. Open right-hand endshield.
8. Loosen four nuts (A).
9. Loosen jam nut on adjuster bolt (B), and turn bolt (B) to adjust reel fore-aft position.
10. Tighten jam nut.
11. Tighten nuts (A).
12. Close driveshields before engaging header.

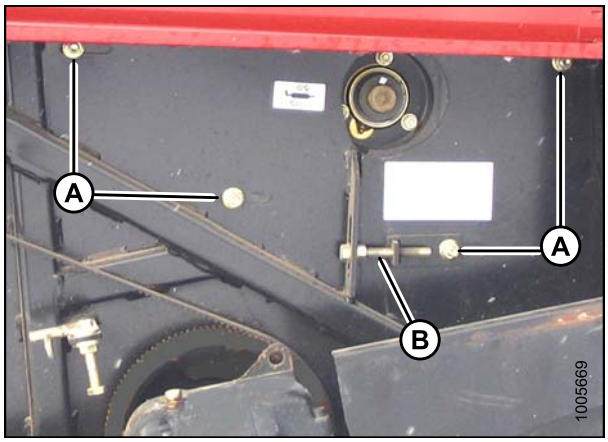

Figure 3.92: A40-D Right Side

Adjusting Reel Vertical Position

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open left-hand endshield.
3. Loosen four nuts (A).

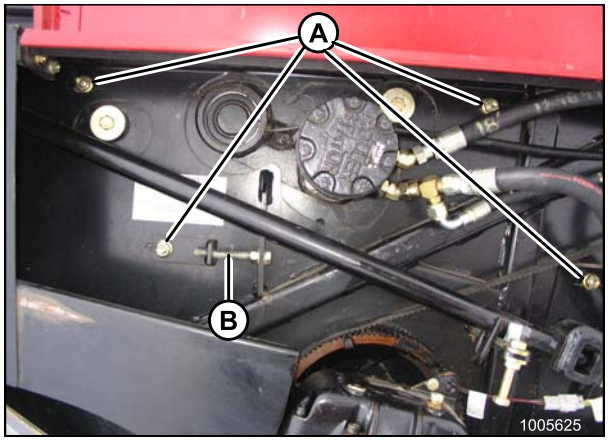

Figure 3.93: A40-D Left Side

4. Loosen jam nuts on adjuster bolts (A), and turn bolts (A) to raise or lower reel.
5. Tighten jam nuts (A).

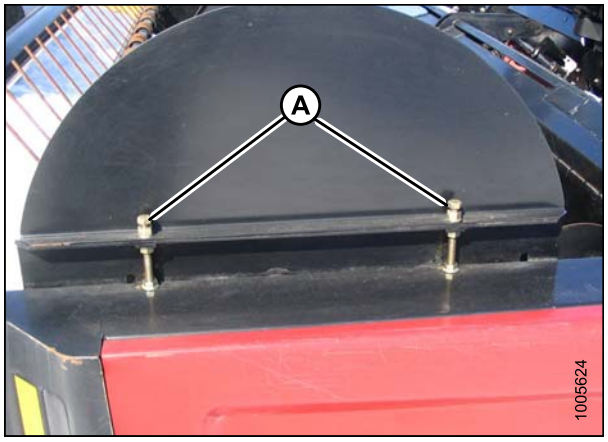

Figure 3.94: A40-D Left Side

6. Tighten nuts (A).

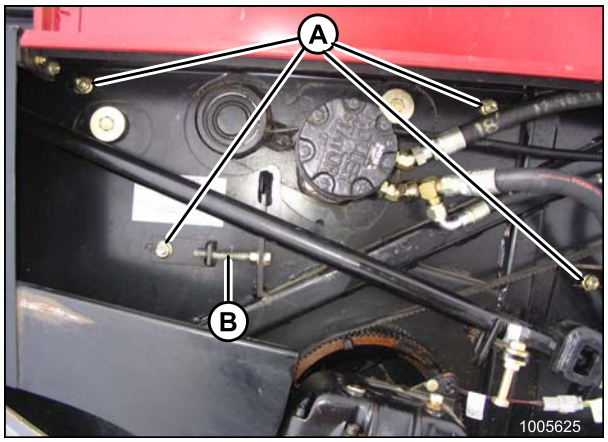

Figure 3.95: A40-D Left Side

7. Open right-hand endshield.
8. Loosen four nuts (A).

Figure 3.96: A40-D Right Side

9. Loosen jam nuts on adjuster bolts (A), and turn bolts (A) to adjust reel vertical position.

   NOTE:
   The factory setting at forward adjuster bolt should be 12 mm (15/32 in.) lower than at rear adjuster bolt. If tine aggressiveness has changed then the adjuster bolt offset may not equal factory settings. Always measure the adjuster bolt offset and maintain throughout the vertical adjustment.

10. Tighten jam nut.

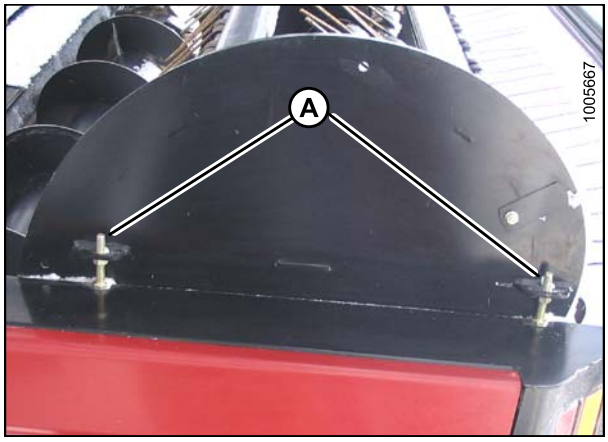

Figure 3.97: A40-D Left Side

11. Tighten nuts (A).
12. Close shields before engaging header.
13. Check that the reel rotates freely.

    NOTE:
    Manually rotate reel, and ensure that tines do not contact header pan, otherwise damage to pan will result. If necessary, grind off excessive length from tine if tine length varies considerably. Remove any sharp edges or burrs from tine.

14. Check that reel is evenly adjusted.

Figure 3.98: A40-D Right Side

Checking Reel Tine to Header Pan Clearance

IMPORTANT:
The dimensions at right are provided as guidelines only. Tines may slightly contact the guards, but **NOT** the knife sections or the auger pan.

1. Rotate reel slowly by hand, and check tine clearance at knife and pan. Flex tines to simulate crop-loaded position to ensure tine clearances to knife sections and auger pan are adequate for working conditions.
2. Check that reel rotates freely.

   NOTE:
   If there are a few reel tines that are touching the pan while the rest are at the correct height, trim the longer tines to match the rest. Be sure to adjust both sides of the reel. Ensure that tines do **NOT** contact plastic header pan.

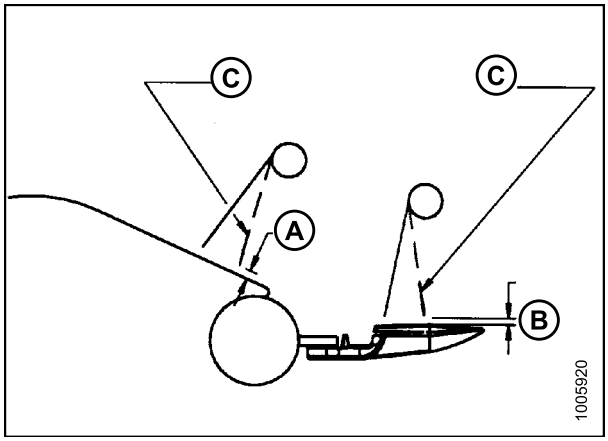

Figure 3.99: Reel Tine Clearance

A - 2–10 mm (2/25–2/5 in.)
B - 2 mm (2/25 in.) Minimum to Knife Section
C - Flex Fingers Back when Checking Clearance

3.5.6 Setting Tine Aggressiveness

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. Open right-hand endshield.
3. At right side of reel (cam end) **ONLY**, loosen four nuts (A).

Figure 3.100: A40-D Right Side

4. Loosen jam nuts on bolts (A), and turn bolts to rotate cam to desired position. Viewed from right side, rotate cam clockwise to obtain more aggressive tine action.

   NOTE:
   The factory setting at forward adjuster bolt should be 12 mm (0.47 in.) lower than at rear adjuster bolt. If tine aggressiveness has changed then the adjuster bolt offset may not equal factory settings. Always measure the adjuster bolt offset and maintain throughout the vertical adjustment.

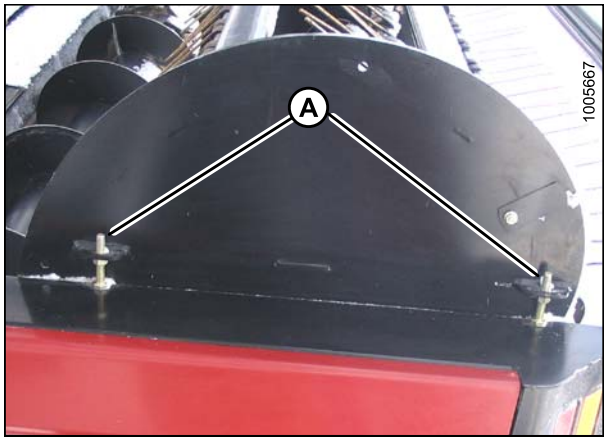

Figure 3.101: A40-D Right Side

5. Tighten nuts (A), and jam nuts on bolts.
6. Check that chain and/or belt have **NOT** become over-tight. Adjust to recommended tension if required.
   .
7. Check reel tine to header pan clearance to ensure that there is no contact between reel tines and the header pan. Refer to *Checking Reel Tine to Header Pan Clearance, page 69*.

Figure 3.102: A40-D Right Side

3.5.7 Adjusting Header Angle of A40-D

Header angle can be hydraulically adjusted from the cab using hydraulic cylinder (A), without shutting down the windrower.

NOTE:
Some M100, M105, M150, and M155 models are equipped with a mechanical link. For instructions on adjusting header angle, refer to your windrower operator's manual.

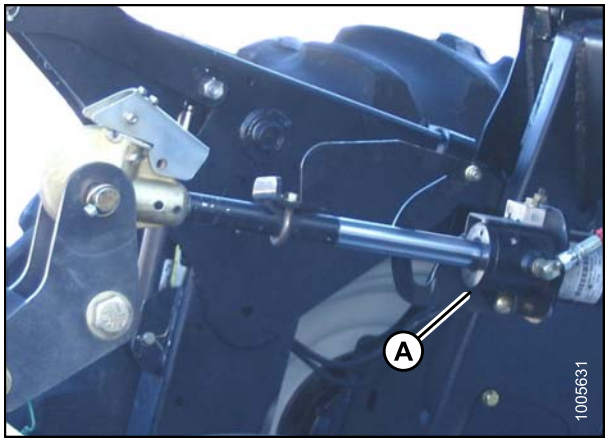

Figure 3.103: Header Angle Hydraulic Cylinder

3.5.8 Setting Cutting Height

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Raise header, and engage header lift cylinder lock-out valves.
2. Remove pins (A) at each skid shoe or gauge roller.
3. Raise or lower skid shoe or gauge roller to desired position.
4. Replace pins (A).

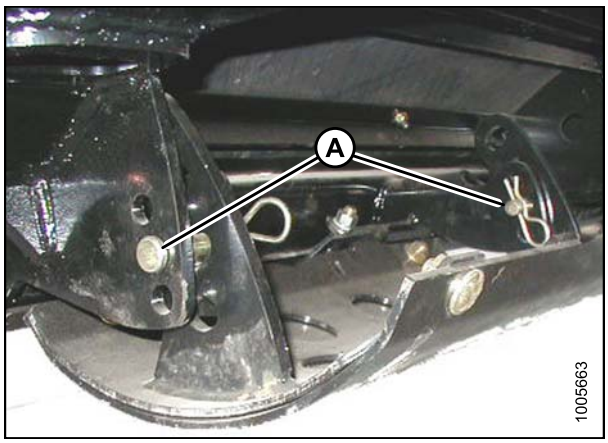

Figure 3.104: Skid Shoe

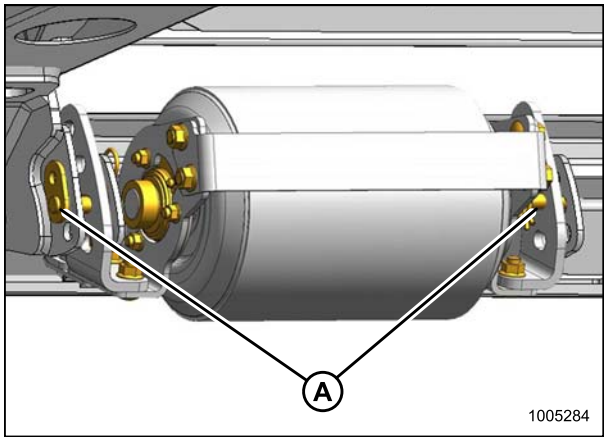

Figure 3.105: Gauge Roller

5. Check that skid shoes or gauge rollers are adjusted to the same position.
6. Check header float, and adjust if required. Refer to *3.5.9 Checking/Adjusting Float, page 72* for more information.

NOTE:
The two inboard skid shoes are standard equipment. The inboard shoes can be moved to the outboard position OR outboard positions can be fitted with either gauge rollers or skid shoes.

3.5.9 Checking/Adjusting Float

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

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

To adjust the float, follow these steps:

1. Check float by grasping the lean bar and lifting. Lifting force should be 335–380 N (75–85 lbf) and should be approximately the same at both ends.
2. If necessary, perform the following steps to adjust the float:
   a. Raise header fully, shut down engine, and remove key.
   b. Turn drawbolt (A) clockwise to increase float (makes header lighter) or counterclockwise to decrease float (makes header heavier).
   c. Recheck the float.

Figure 3.106: Drawbolt – Top of Windrower Wheel Leg Member Shown

3.5.10 Setting Feed Pan and Rock Drop Tine Position

The rear of the feed pan is adjustable up and down to raise or lower the feed pan and rock drop tines.

- Lowering the feed-pan helps prevent plugging in heavy crop.
- Raising the feed-pan helps to form an even windrow in light crop.

WARNING

To avoid bodily injury or death from fall of raised machine, always lock-out lift cylinders before going under header for any reason.

1. Raise header fully, and engage safety props.
2. Stop engine and remove key.
3. Loosen nut (A) both sides, and align pointer (B) at each side of rock drop tine support with one of the slots (C) to match crop condition.

Crop Condition	Light	Normal	Heavy
Slot	Upper	Center	Lower

4. Tighten hardware on both sides.
5. Disengage header lift cylinder stops.

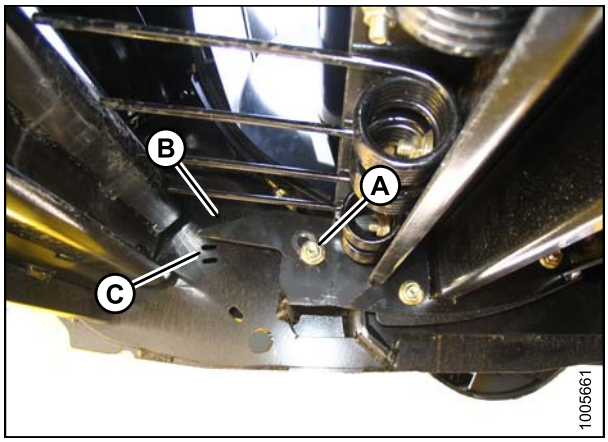

Figure 3.107: Rock Drop Tine Support

3.5.11 Adjusting Conditioner Roll Gap

The roll gap determines the amount of conditioning:

- To reduce conditioning, increase roll gap.
- To increase conditioning, decrease roll gap.

The conditioner roll gap is factory-set at 6 mm (1/4 in.).

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Loosen and back-off upper jam nut (A), on both sides of conditioner.
2. **To increase roll gap,** turn lower nut (B) to raise link, and increase the gauge (C) setting.
3. **To decrease roll gap,** turn lower nut (B) to lower link, and decrease the gauge (C) setting.
4. Tighten jam nuts (A), both sides.

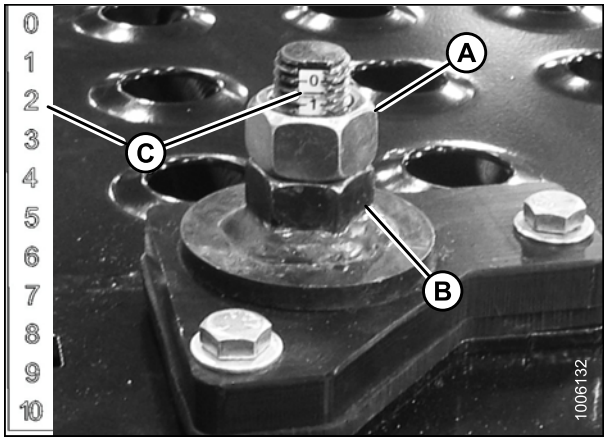

Figure 3.108: Roll Gap Adjustment Gauge

5. Loosen bolt (A), and rotate cover (B) to expose access port (C).
6. Inspect space between roll bars at both ends of the rolls at access port (C).

   IMPORTANT:
   Roll timing and alignment are critical when the roll gap is decreased because:

   - Conditioning is affected
   - The bars may contact each other

7. Check roll timing and alignment when reducing roll gap. Refer to:

   - *4.13.11 Checking/Adjusting Roll Timing, page 174*
   - *4.13.10 Checking/Adjusting Roll Alignment, page 172*

8. Close cover (B), and tighten bolt (A).

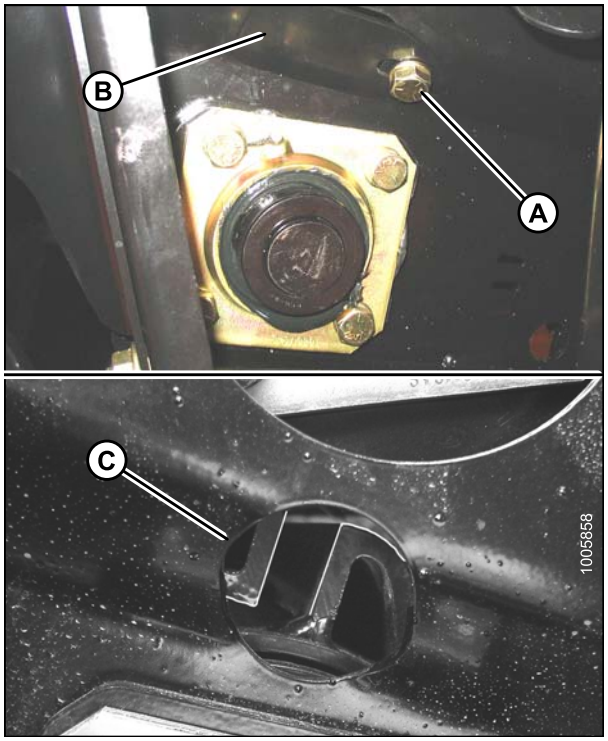

Figure 3.109: Conditioner Roll Access Port

3.5.12 Adjusting Conditioner Roll Tension

The roll tension (the force holding the rolls together) is factory-set, and is adjustable. There is a spring for each end of the roll.

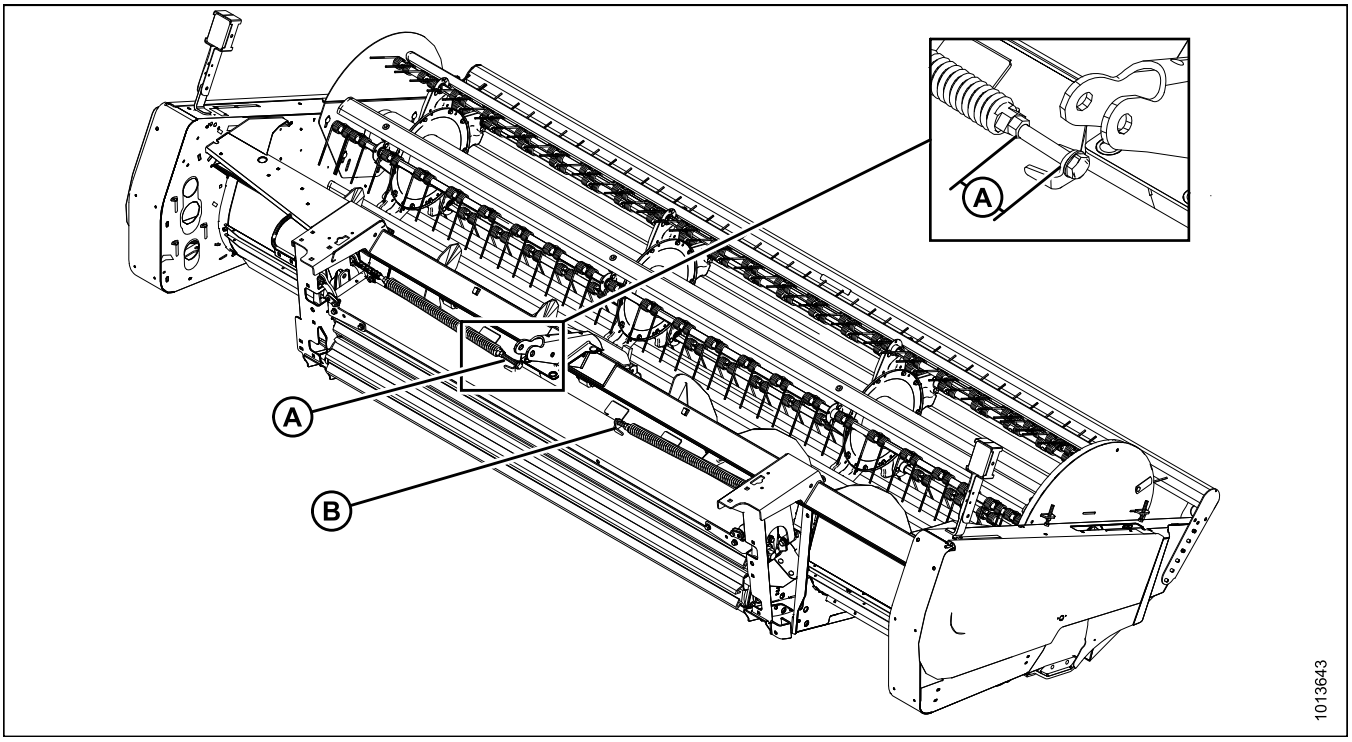

Figure 3.110: Conditioner Roll Tension Springs

Table 3.2 Conditioner Roll Tension Factory Settings

Left-hand spring (A)	81–91 mm (3-3/16 – 3-9/16 in.)
Right-hand spring (B)	41–51 mm (1-5/8 – 2 in.)

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Lower header fully.
2. Stop engine, and remove key.
3. **To increase the roll tension,** loosen jam nut (B) at spring insert, and turn spring drawbolt (C) clockwise to tighten the spring. Tighten jam nut (B).
4. **To decrease the roll tension,** loosen jam nut (B) at spring insert, and turn spring drawbolt (C) counterclockwise to loosen the spring. Tighten jam nut (B).

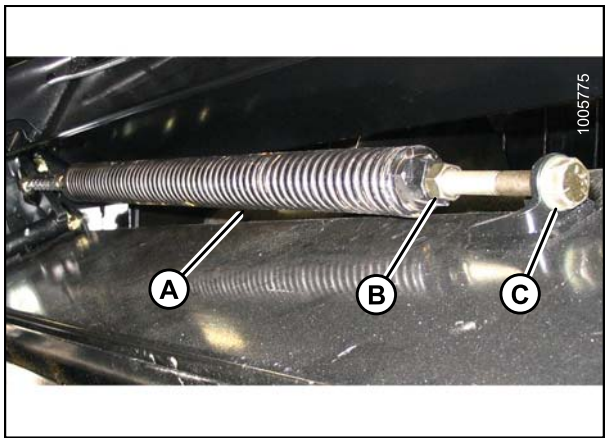

Figure 3.111: Roll Tension Spring

3.5.13 Positioning the Forming Shields

WARNING

Keep hands and feet away from discharge opening. Keep everyone several hundred feet away from your operation. Never direct the discharge toward anyone. Stones or other foreign objects can be ejected with force.

The position of the forming shields controls the width and placement of the windrow. The decision on forming shield position (settings between 915–2346 mm [36–92 in.]) should be made based on the following factors:

- Weather conditions (rain, sun, humidity, wind)
- Type and yield of crop
- Drying time available
- Method of processing (“green-feed”, bales, silage)

A wider windrow will generally dry faster and more evenly, resulting in less protein loss. Fast drying is especially important in areas where the weather allows only a few days to cut and bale. Refer to *3.11 Haying, page 90* for more information.

Where weather conditions permit or when drying is not critical, for example, when cutting for silage or green-feed, a narrower windrow may be preferred for ease of pick-up.

Positioning Side Deflectors – Self-Propelled

The position of the side forming shields controls the width and placement of the windrow.

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

To ensure windrow placement is centered with respect to carrier/drive wheels, adjust both side deflectors to the same hole position on the adjuster bar.

1. Set forming shield side deflectors to desired width by repositioning adjuster bars as follows:
   a. Remove lynch pin (A).
   b. Move adjuster bar (B) to another hole.
   c. Reinstall lynch pin (A).

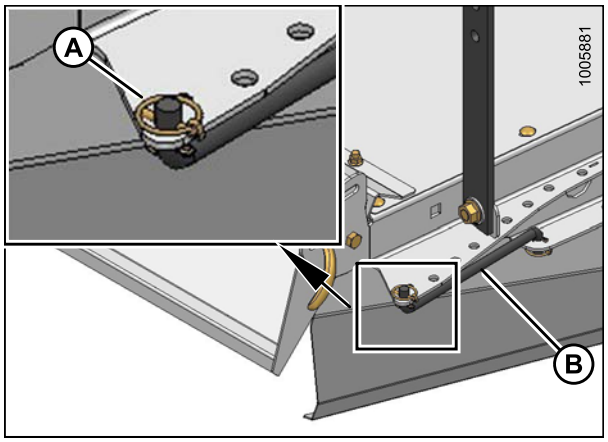

Figure 3.112: Forming Shield Side Deflector

2. If forming shield attachment is too tight or too loose, tighten or loosen nut (A) as required.

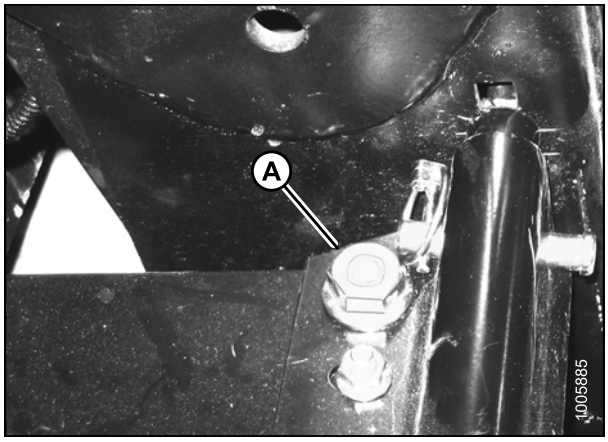

Figure 3.113: Forming Shield Adjustment Nut

Positioning Rear Deflector (Fluffer Shield)

The rear deflector (A) slows the crop exiting the conditioner rolls, directs the flow downward, and fluffs the material.

CAUTION

To prevent accidental movement of windrower, return ground speed lever (GSL) to N-DETENT, center steering wheel to lock, shut off engine, and remove key.

1. Shut off engine and remove key.
2. For more crop control in light material, lower the deflector (A) by pushing down on one side of the deflector, and then on the other side. Locking handles (B) are located at either end of deflector, and may be loosened slightly.
3. For heavier crops, raise the deflector (A) by pulling up on one side, and then on the other side.

   NOTE:
   For even windrow formation, be sure the deflector is **NOT** twisted.

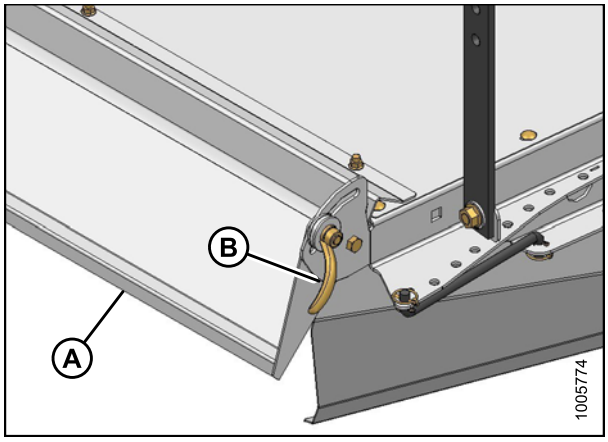

Figure 3.114: A40-D Rear Deflector

3.6 Recommended Operating Settings

These settings are intended as a starting point. Operators should fine-tune to crop and field conditions.

The settings chart continues on the next page.

Table 3.3 Recommended Operating Settings

Field Conditions				Operating Variables						
Crop Type	**Crop Condition (tons per acre)**	**Terrain**	**Stubble Height mm (in.)**	**Header Angle**	**Knife Speed (spm)**	**Reel Speed (rpm)**	**Auger Speed**	**Float**	**Feed Pan Position**	**Roll Gap mm (in.)**
Alfalfa	>3	Smooth	0	Steep	1600 –1800	73–77	High	Normal	Lower Slot	16 (5/8)
		Rocky		Shallow				Light		
	2–3	Smooth		Steep		70–75	Normal	Normal	Center Slot	13 (1/2)
		Rocky		Shallow				Light		
	<2	Smooth		Steep		65–70	Low	Normal/ Heavy	Upper Slot	10 (3/8)
		Rocky		Shallow				Light		
	Lodged	Smooth		Steep		73–77	High	Heavy	Variable	See Above
		Rocky		Shallow				Light/ Normal		
Timothy	>2.5	Smooth	64–76 (2.5–3)	Steep	1850 –1950	70–75	Normal/ High	Normal	Lower Slot	10 (3/8)
		Rocky		Shallow				Light		
	<2.5	Smooth		Steep		65–70	Low	Normal	Center Slot	6 (1/4)
		Rocky		Shallow				Light		
	Lodged	Smooth		Steep		70–75	Normal/ High	Heavy	Variable	See Above
		Rocky		Shallow				Light/ Normal		
Sudan/ Tall Crop	>3	Smooth	152 (6)	Steep	1700 –1850	70–75	High	Normal	Lower Slot	19 (3/4)
		Rocky		Shallow				Light		
	<3	Smooth		Steep		65–70	Low	Normal	Center Slot	16 (5/8)
		Rocky		Shallow				Light		
	Lodged	Smooth		Steep		70–75	Normal/ High	Heavy	Variable	See Above
		Rocky		Shallow				Light/ Normal		

Field Conditions				Operating Variables						
Crop Type	**Crop Condition (tons per acre)**	**Terrain**	**Stubble Height mm (in.)**	**Header Angle**	**Knife Speed (spm)**	**Reel Speed (rpm)**	**Auger Speed**	**Float**	**Feed Pan Position**	**Roll Gap mm (in.)**
Triticale (winter forage)	>10	Smooth	0	Steep	1600 –1800	70–75	High	Normal	Lower Slot	25 (1)
		Rocky		Shallow				Light		
	>10	Smooth		Steep		60–65	Normal/ High	Normal/ Heavy	Center Slot	25 (1)
		Rocky		Middle				Light		
	Lodged	Smooth		Steep		70–75	Normal/ High	Heavy	Variable	See Above
		Rocky		Middle				Light/ Normal		
Wild/ Grass Hay	>3.5	Smooth	0	Steep	1850 –1950	73–77	High	Normal	Lower Slot	10 (3/8)
		Rocky		Shallow				Light		
	2–3	Smooth		Steep		70–75	Normal	Normal	Center Slot	6 (1/4)
		Rocky		Shallow				Light		
	<2	Smooth		Steep		65–70	Low/ Normal	Normal/ Heavy	Upper Slot	6 (1/4)
		Rocky		Middle				Light/ Normal		
	Lodged	Smooth		Steep		73–77	Normal/ High	Heavy	Variable	See Above
		Rocky		Middle				Light/ Normal		

3.7 Unplugging Conditioner and Knife: Self-Propelled

If your windrower is equipped with the optional Header Drive Reverser (MD #B4656), reverse the hydraulic flow to the knife, auger, reel, and conditioner hydraulic motors to help remove any plugged material from the header.

If reverser is not installed, proceed through the following instructions.

CAUTION

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

1. Stop forward movement of windrower, and shut down header.
2. Lift cutterbar about 300 mm (12 in.).
3. Back up about 1 m (3 ft.) while slowly engaging the header.
4. If plug does not clear; raise machine, apply windrower brake, shut off engine, and remove key.
5. Engage lift cylinder lock-outs.

WARNING

Wear heavy gloves when working around or handling knife.

6. Clean off cutterbar and area under reel by hand.
7. Retrieve wrench (A) from storage inside the left-hand drive compartment.

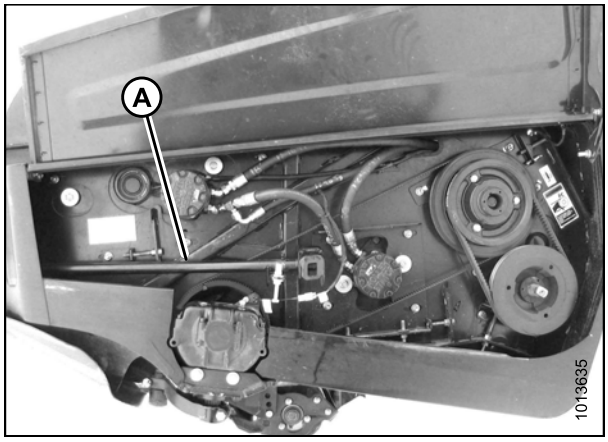

Figure 3.115: Wrench Location: A40-D

8. Use wrench on left-hand end of primary driveshaft (A) to turn rolls forward until plug clears.
9. Return wrench to storage location, and secure in place with pin.

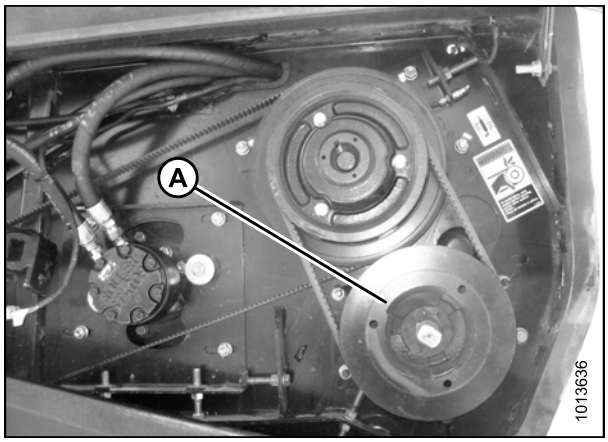

Figure 3.116: Primary Driveshaft

WARNING

Return unplug wrench to storage location, and close left-hand driveshield before restarting machine.

NOTE:
If plugging persists, refer to *7 Troubleshooting, page 185*.

3.8 Grass Seed Special A40-D

The grass seed auger header has several features to adapt it to this special application. These features include:

3.8.1 Stub Guards and Hold-Downs

The cutterbar is equipped with stub guards for effective cutting in tough grass crops. Refer to *4.7.7 Guards, page 112* for maintenance of these components.

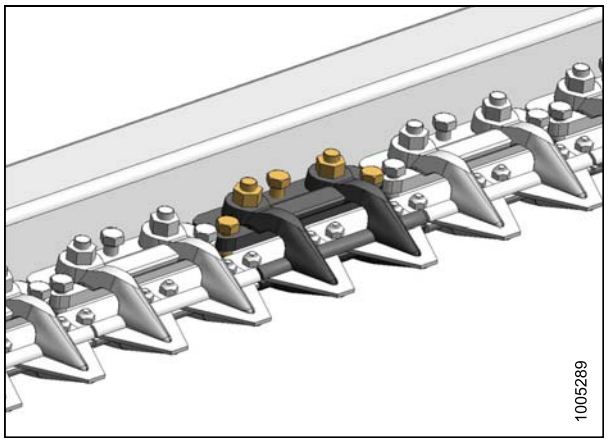

Figure 3.117: Cutterbar Stub Guards

3.8.2 Special Auger Design for Grass Seed Special A40-D

The center beaters and beater supports have been removed to reduce auger wrapping.

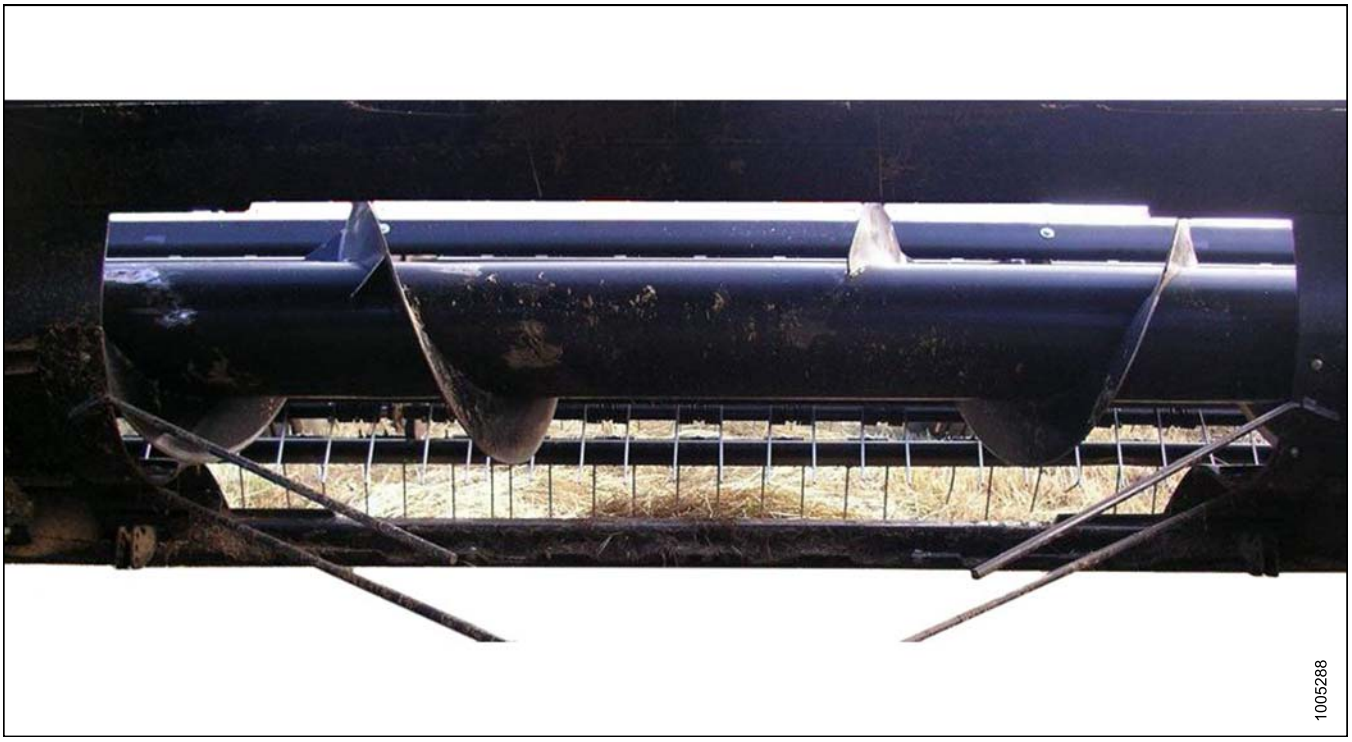

Figure 3.118: A40 Grass Seed Auger

3.8.3 Seven-Bat Reel

A seventh bat is added to the reel body, for smoother reel action and better crop feed into the header.

Figure 3.119: A40 Grass Seed Reel

3.8.4 Auger Pan Extensions

The grass seed header is equipped with adjustable auger pan extensions that allow adjustment of delivery opening to vary the windrow characteristics.

Adjusting Pan Extensions: Grass Seed Special

The grass seed header auger pan extensions are factory-installed for the widest delivery. Adjust as follows:

1. Remove two bolts (A) and loosen bolt (B).

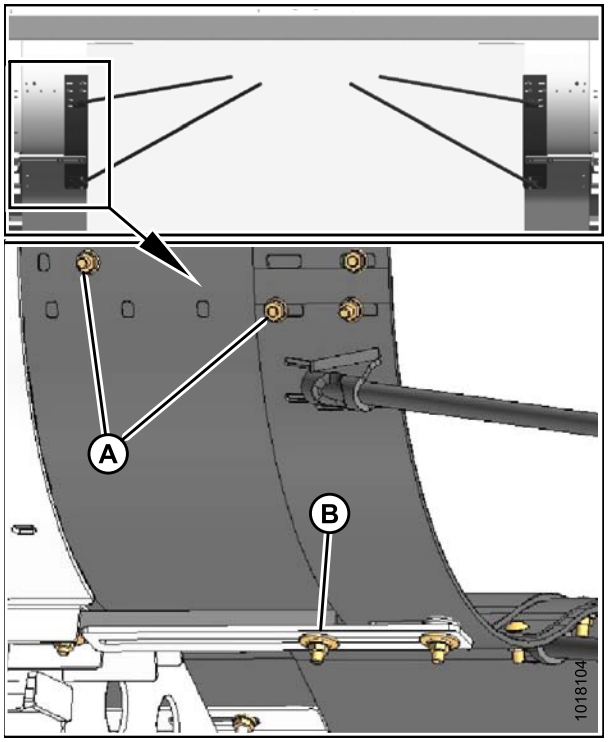

Figure 3.120: Pan Extension – Wide Setting

2. Slide pan extensions (C) and swath forming rods inboard to desired position and align holes.
3. Reinstall two bolts (A). Tighten bolts (A) and (B).
4. Repeat for opposite pan extension.

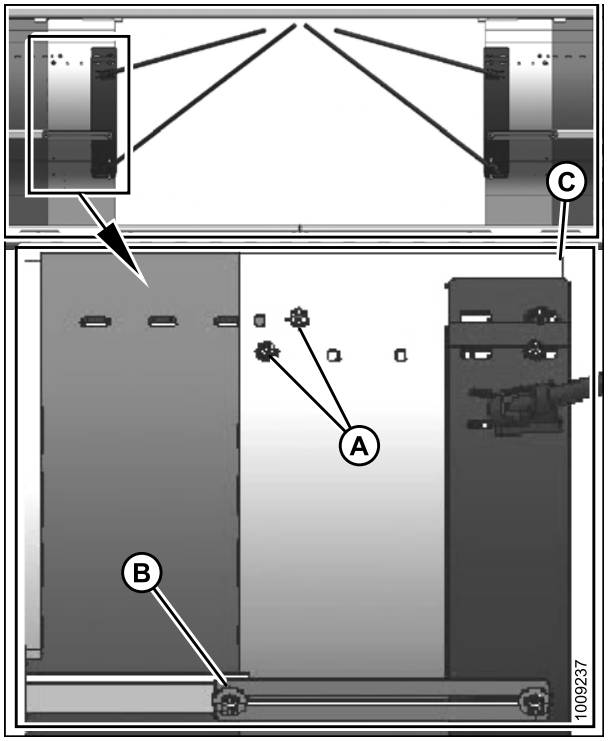

Figure 3.121: Pan Extension – Narrow Setting

3.8.5 Windrow Forming Rods

Forming rods are provided to assist in forming the narrow windrows preferred for this application.

Bend rods to modify the windrow shape. Use forming rods in conjunction with auger pan extensions to achieve the width and shape of windrows you desire.

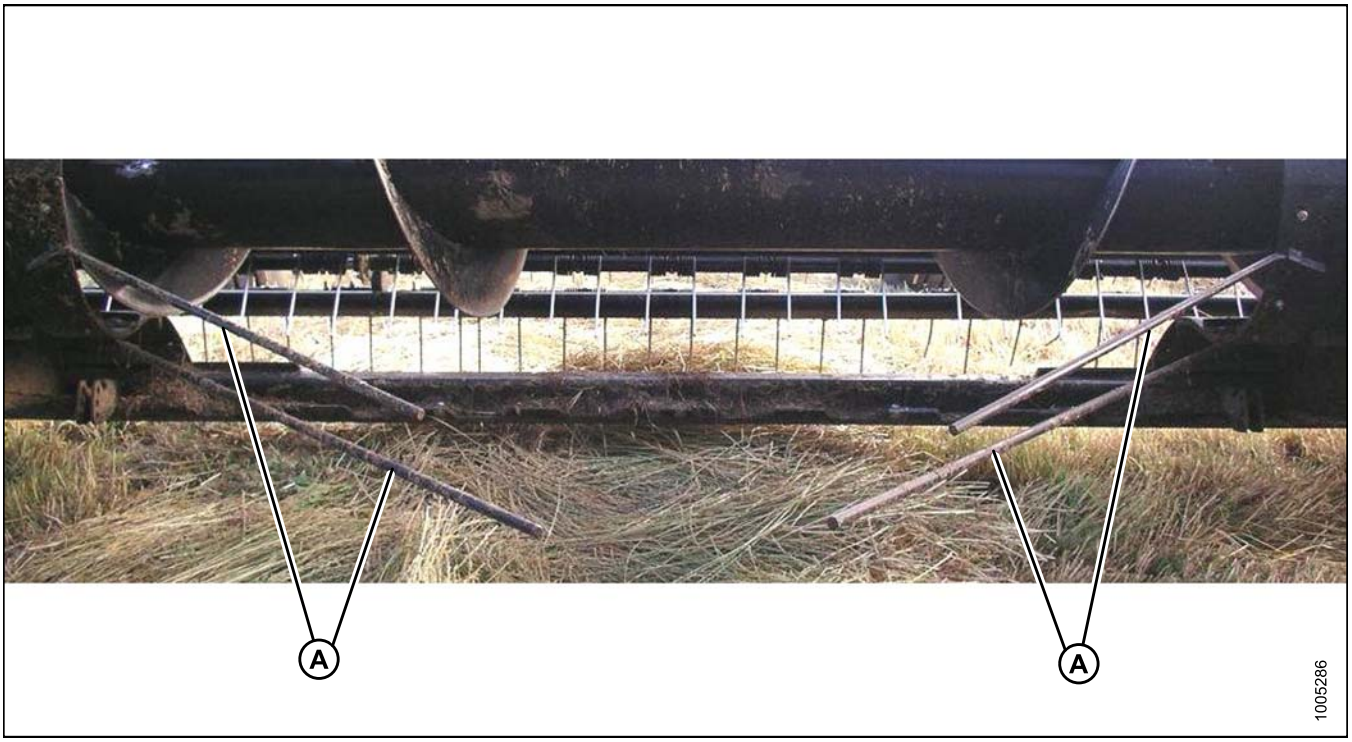

Figure 3.122: Windrow Forming Rods

3.9 Selecting Ground Speed

CAUTION

Reduce speed when turning, crossing slopes, or when travelling over rough ground.

Windrower ground speed **SHOULD NOT EXCEED** 13 km/h (8 mph). For most crop conditions a ground speed of 8 km/h (5 mph) has been found satisfactory.

Choose a ground speed that allows the knife to cut the crop smoothly and evenly.

The chart below indicates the relationship between ground speed and area cut for three header sizes. For example, at a ground speed of 8 km/h (5 mph) with a 16-foot header, the area cut would be approximately 4 hectares (10 acres) per hour.

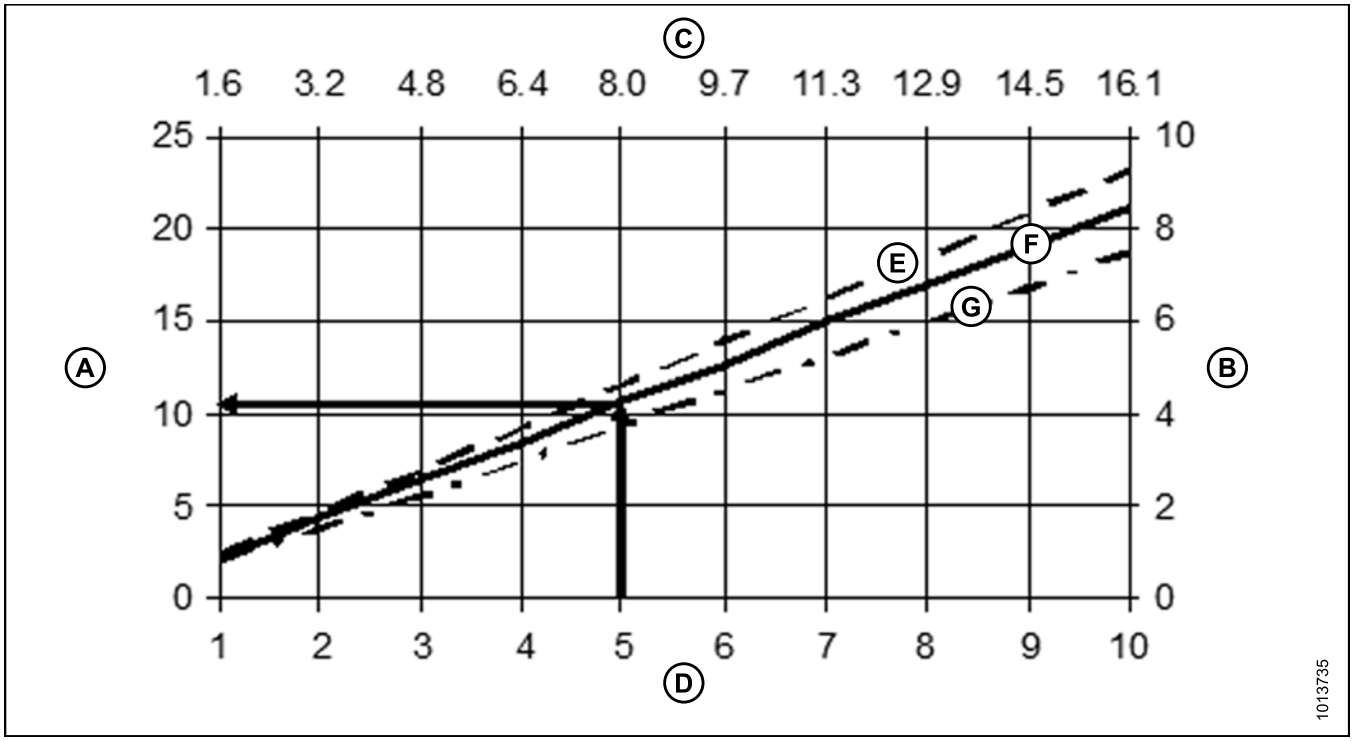

Figure 3.123: Ground Speed and Area Cut

A – Acres/Hour **B – Hectares/Hour** **C – Kilometers/Hour** **D – Miles/Hour**

E – 18 ft **F – 16 ft** **G – 14 ft**

3.10 Tall Crop Dividers

The tall crop dividers attach to the ends of the header for clean crop dividing, and reel entry in tall crops. They can be easily adjusted to suit the crop, or removed when not required.

3.10.1 Adjusting Tall Crop Dividers

1. Loosen U-bolt (A).
2. Remove bolts (B), and reposition divider (C) to align with alternate hole location (D).
3. Reinstall bolts (B), and tighten.
4. Tighten U-bolt (A)

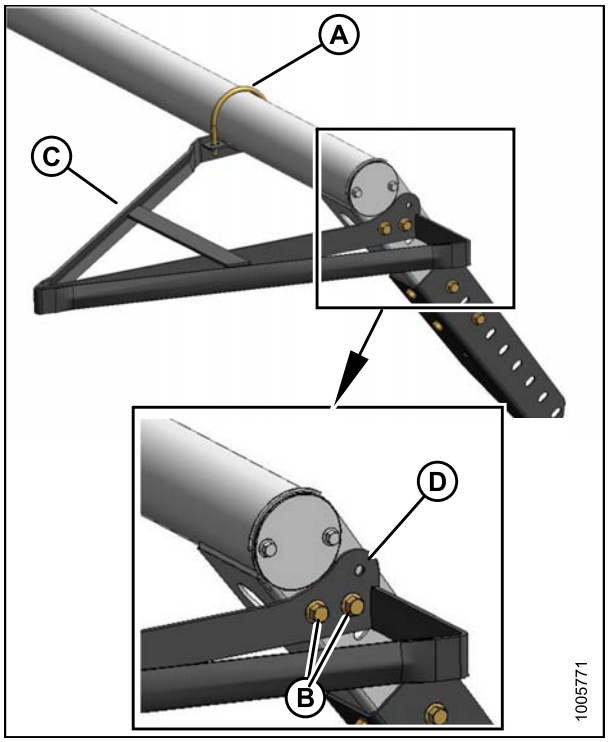

Figure 3.124: Tall Crop Divider

3.10.2 Removing Tall Crop Dividers

1. Remove U-bolt (A) and bolts (B), and remove divider. Repeat for other divider.
2. Remove bolts attaching lean bar to header.

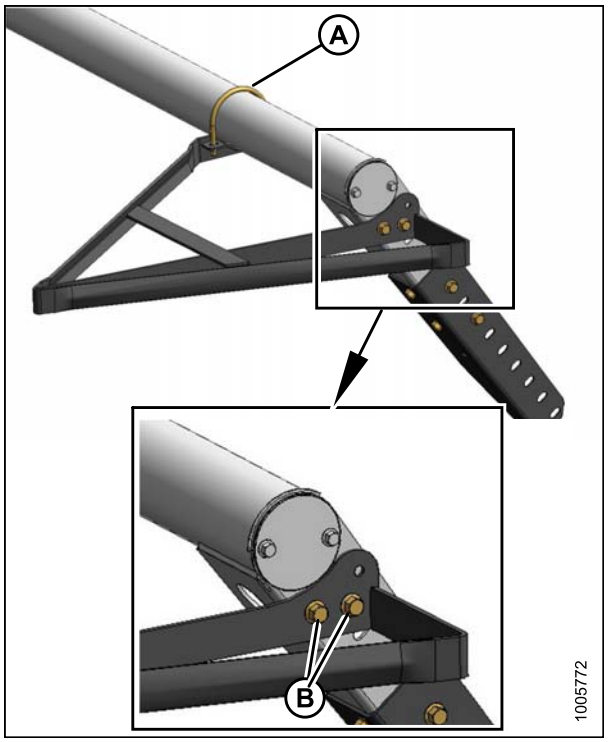

Figure 3.125: Tall Crop Divider

3. Remove bolts (A) attaching extensions (B) to lean bar (C), and remove extensions.

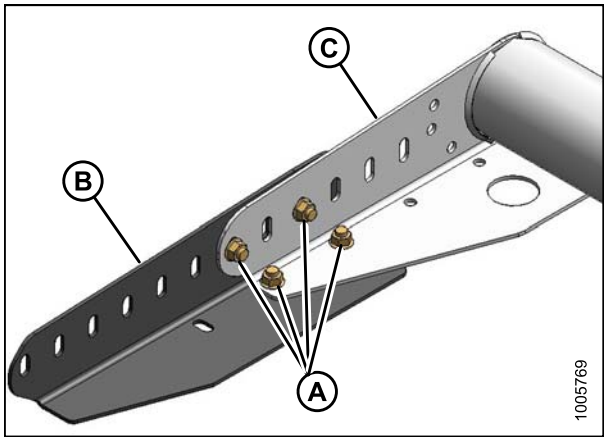

Figure 3.126: Lean Bar

4. Reposition lean bar on header at desired height, and install existing carriage bolts (A)—two per side. Tighten bolts.

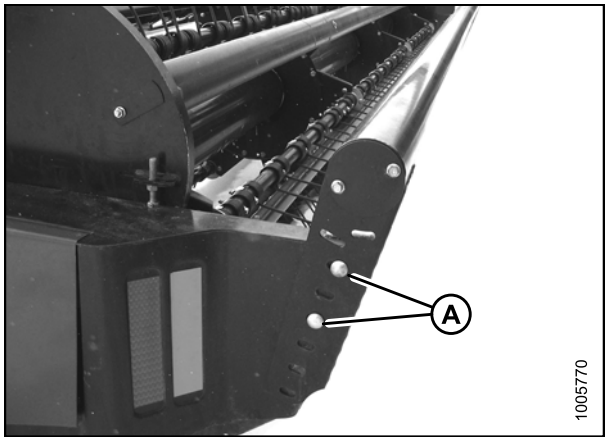

Figure 3.127: Lean Bar

3.11 Haying

3.11.1 Haying Tips

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.

Topsoil Moisture

Table 3.4 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.

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.

Windrow Characteristics

Producing windrows with the recommended characteristics will achieve the greatest results. Refer to *3.5 Operating Variables for A40-D, page 62* for instructions on adjusting the header.

Table 3.5 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

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.

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 tedded at moisture levels below 25%, however, or excessive yield loss will result.

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.

4 Maintenance and Servicing

The following instructions are provided to assist you in the use of the header. Detailed maintenance and service information is contained in the technical service manual that is available from your Dealer. A parts catalog is provided with your shipment.

4.1 Preparing for Servicing

CAUTION

To avoid personal injury, before servicing header or opening drive covers:

- **Fully lower the header. If necessary to service in the raised position, always engage lift cylinder stops.**
- **Place all controls in NEUTRAL or PARK.**
- **Stop engine and remove key.**
- **Wait for all moving parts to stop.**

4.2 Driveshields

This procedure is for opening and closing the endshields at each end of the machine, and the driveshield over the conditioner drivelines.

To open endshields:

CAUTION

Ensure shield lock engages in the open position as shown at (B) before letting go of shield.

1. Insert screwdriver or equivalent into opening (A) at base of endshield and push to release latch.
2. Pull bottom and lift endshield until shield support (B) engages bolt. Check that support (B) is engaged before releasing hold on shield.

To close endshields:

3. Grasp endshield at top and push slightly and move support (B) inboard to disengage.
4. Lower endshield to about 300 mm (12 in.) from closed position.
5. Release endshield so that it drops to closed position and shield will self-latch.

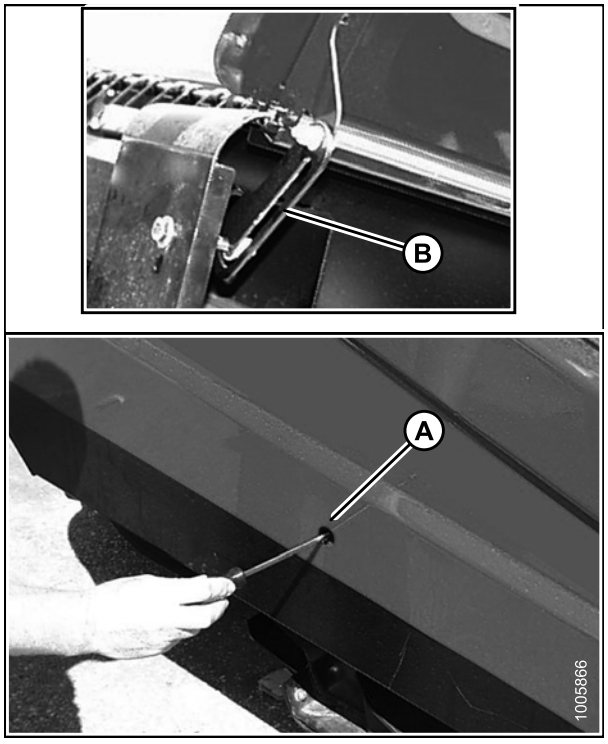

Figure 4.1: Screwdriver against Latch

To open driveline shield:

6. Disengage rubber latch (A).
7. Open shield (B).

To close driveline shield:

8. Lower shield (B).
9. Engage rubber latch (A).

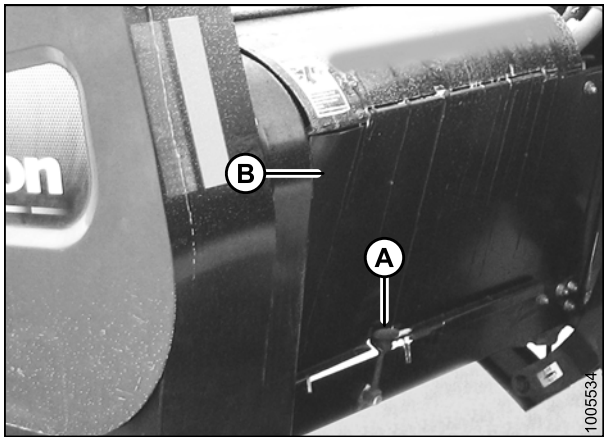

Figure 4.2: Driveline Shield

4.3 Maintenance Specifications

4.3.1 Recommended Fluids and Lubricants

Your machine can operate at top efficiency **ONLY** if clean lubricants are used.

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

Lubricant	Specification	Description	Use	Capacities
Grease	SAE Multi-Purpose	High temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2). Lithium base.	As required unless otherwise specified	—
		High temperature extreme pressure (EP) performance with 10% max molybdenum disulphide (NLGI Grade 2). Lithium base.	Driveline slip-joints	
Gear lubricant	SAE 85W-140	API service class GL-5	Knife drive box	2.2 liters (2.3 quarts)
			Conditioner drive gearbox	1 liter (1.06 quarts)
Hydraulic oil	SAE 15W-40	Compliant with SAE specs for API class SJ And CH-4 engine oil.	Lift and header drive systems reservoir	126 liters (33 gal US)

4.4 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 *4.3.1 Recommended Fluids and Lubricants, page 95*.

Log hours of operation, use the maintenance record, and keep copies of your maintenance records. Refer to *4.4.1 Maintenance Schedule/Record: Self-Propelled, page 97*.

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 all safety messages, refer to *1 Safety, page 1*.

4.4.1 Maintenance Schedule/Record: Self-Propelled

Self-Propelled Windrower Header																
Maintenance Record	Action:	✓ - Check					♦ - Lubricate					▲ - Change				
Hour meter reading																
Date																
Serviced by																
Break-in		Refer to *4.4.2 Break-In Inspection, page 98*.														
100 Hours or Annually																
✓	Conditioner drive gearbox lubricant level															
✓	Knife drive box bolt torque															
✓	Knife drive box Lubricant level															
End of Season		Refer to *4.4.4 Storage, page 99*.														
10 Hours or Daily																
✓	Hydraulic Hoses and Lines[2]															
♦	Sections, guards, And hold-downs[2]															
✓	Knife hold-downs[2]															
✓	Knife assembly[2]															
✓	Knife drive box bolt torque - First 10 hours only															
25 Hours																
♦	Knifehead															
50 Hours																
♦	Auger shaft bearings															
♦	Gauge roller bearings															
♦	Main driveshaft bearings															
♦	Tine bar bearings															
♦	Reel shaft bearings															
▲	Conditioner gearbox oil - First 50 hours only															

2. A record of daily maintenance is not normally required, but is at the owner/operator's discretion.

Self-Propelled Windrower Header																	
Maintenance Record	Action:	✓ - Check				♦ - Lubricate						▲ - Change					
50 Hours (continued)																	
♦	Conditioner universal shafts																
♦	Roll pivots																
♦	Conditioner shaft bearings																
♦	Knife drive cross-shaft																
▲	Knife drive box oil - First 50 hours only																
1000 Hours or 3 Years																	
▲	Conditioner drive gearbox lubricant																
▲	Knife drive box lubricant																

4.4.2 Break-In Inspection

Hours	Item	Check	Reference
5	Hardware	Torque	*8.1 Recommended Torques, page 193*
5, 25, and 50	Knife drive belt	Tension	*4.8.1 Knife Drive – A40-D, page 131*
10	Knife drive box mounting bolts	Torque	*Mounting Bolts, page 123*

Replace or tighten any missing or loose hardware. Refer to *8.1 Recommended Torques, page 193*.

4.4.3 Preseason Checks

CAUTION

- **Review the operator's manual to refresh your memory on safety and operating recommendations.**
- **Review all safety signs and other decals on the header and note hazard areas.**
- **Be sure all 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.**

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

1. Adjust tension on knife drive belt. Refer to *4.7 Cutterbar, page 108*.
2. Check oil levels and lubricate bearings. Refer to the following sections:
   - *4.5.3 Knife and Gearbox Oil, page 105*
   - *4.5.2 Lubrication Points, page 100*
3. Perform all annual maintenance. Refer to *4.4.1 Maintenance Schedule/Record: Self-Propelled, page 97*.

4.4.4 Storage

Do the following 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 in a dry, protected place if possible. If stored outside, always cover header with a waterproof canvas or other protective material.
3. Raise header, and engage lift cylinder lock-outs.
4. If possible, block up the header to take weight off tires.
5. Repaint all worn or chipped painted surfaces to prevent rust.
6. Loosen drive belts.
7. Lubricate header thoroughly, leaving excess grease on fittings to keep moisture out of bearings. Apply grease to exposed threads, cylinder rods, and sliding surfaces of components. Oil knife components to prevent rust.
8. Check for worn components, and repair.
9. Check for broken components and order replacement from your Dealer. Attention to these items right away will save time and effort at beginning of next season.
10. Replace or tighten any missing or loose hardware. Refer to *8.1 Recommended Torques, page 193*.
11. Remove divider rods (if equipped) to reduce space required for inside storage.

4.5 Lubrication

CAUTION

To avoid personal injury, before servicing header or opening drive covers, follow procedures in *4.1 Preparing for Servicing, page 93*.

CAUTION

Refer to *4.3.1 Recommended Fluids and Lubricants, page 95* for recommended greases.

Log hours of operation and use the Maintenance Checklist provided to keep a record of scheduled maintenance. Refer to *4.4.1 Maintenance Schedule/Record: Self-Propelled, page 97*.

4.5.1 Greasing Procedure

WARNING

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

The greasing points are marked on the machine by decals showing a grease gun (A) and grease interval (B) in hours of operation.

Use the recommended lubricants specified in this manual. Refer to *4.3.1 Recommended Fluids and Lubricants, page 95*.

1. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.
2. Inject grease through fitting with grease gun until grease overflows fitting, except where noted.
3. Leave excess grease on fitting to keep out dirt.
4. Replace any loose or broken fittings immediately.
5. If fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

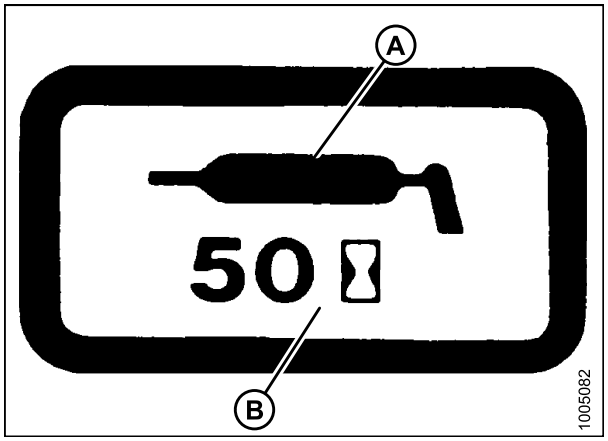

Figure 4.3: Grease Interval Decal

4.5.2 Lubrication Points

Lubrication requirements depend on the model of header that is being serviced. Refer to lubrication points for your specific model:

- *Lubrication Points: A40-D SP Windrower Headers, page 101*
- *Lubrication Points: Hay Conditioner, page 103*
- *Lubrication Points: Drivelines, page 104*

Lubrication Points: A40-D SP Windrower Headers

NOTE:
High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base. To prevent binding and/or excessive wear caused by knife pressing on guards, do **NOT** over-grease. If more than 6 to 8 pumps of grease gun are required to fill the cavity, replace the seal in the knifehead.

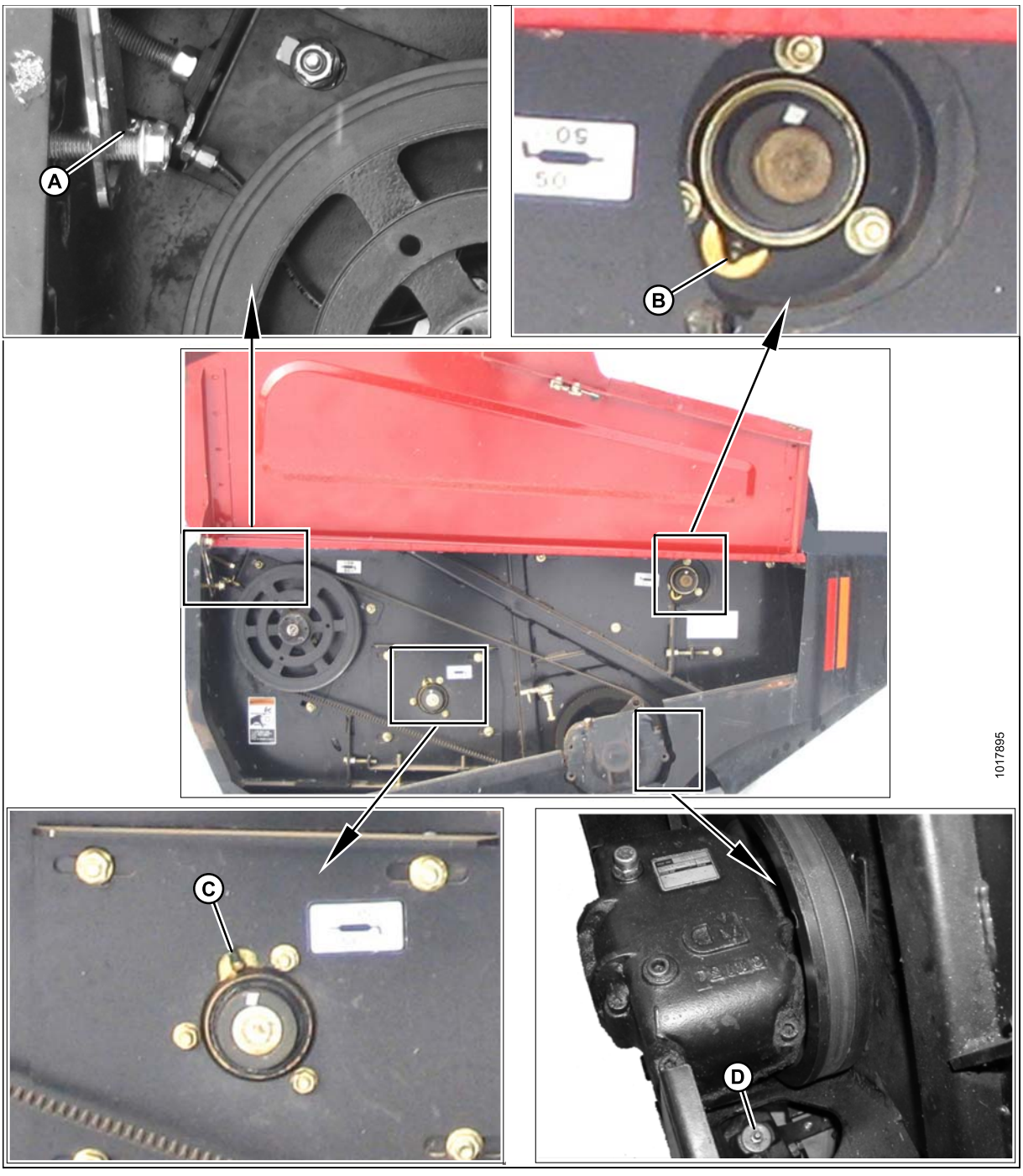

Figure 4.4: A40-D Header Right Side

A - Knife Drive Bearing (1 Place) (50 Hours)
B - Reel Shaft Bearing (1 Place) (50 Hours)
C - Auger Shaft Bearing (1 Place) (50 Hours)
D - Knifehead Bearing (1 Place) (25 Hours)

NOTE:
High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base. To prevent binding and/or excessive wear caused by knife pressing on guards, do **NOT** over-grease. If more than 6 to 8 pumps of grease gun are required to fill the cavity, replace the seal in the knifehead.

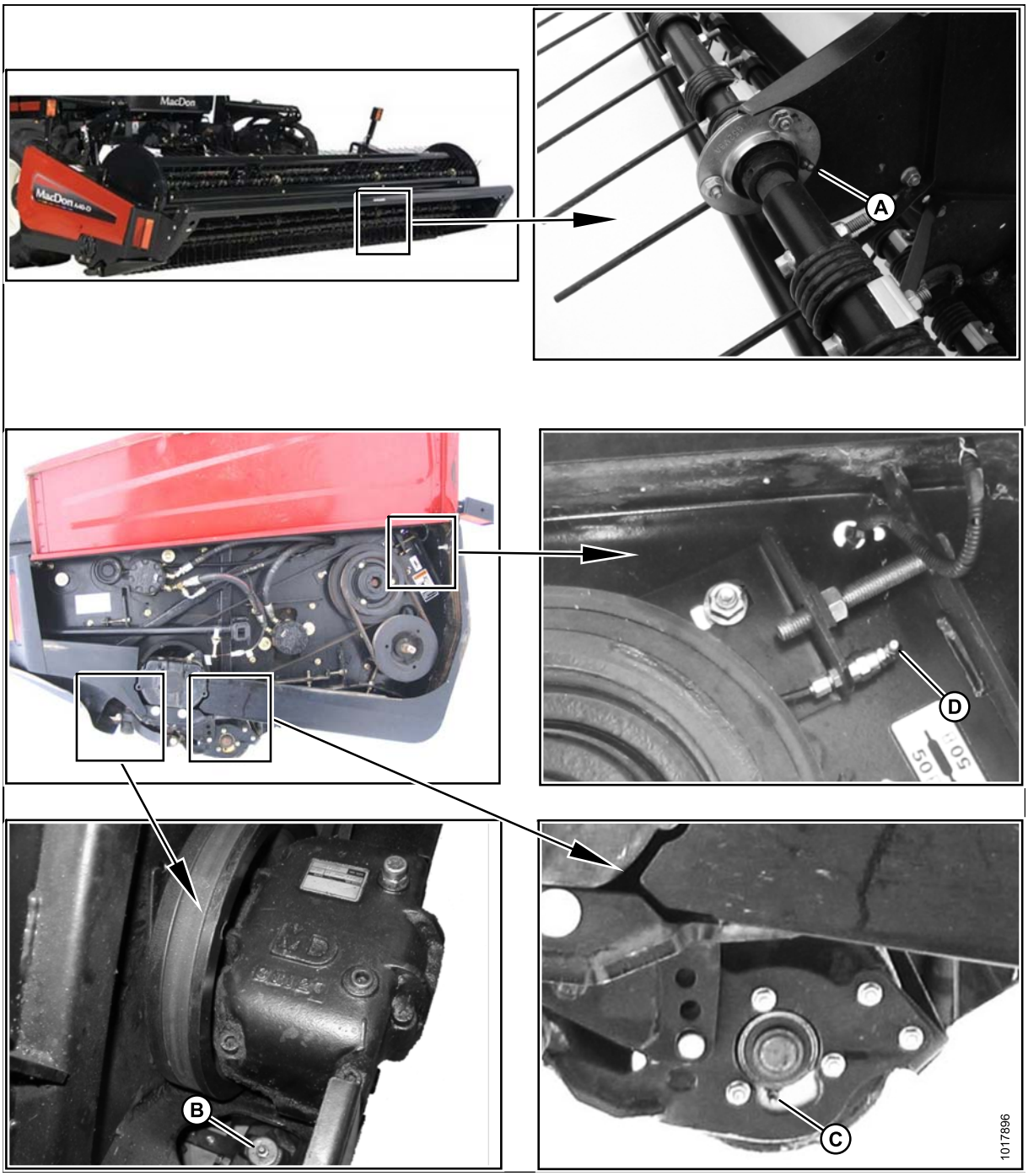

Figure 4.5: A40-D Header Left Side

A - Tine Bar Bearing (4 Places Each Tine Bar) (50 Hours)
B - Knifehead Bearing (1 Place) (25 Hours)
C - Gauge Roller Bearings (2 Places) Both Sides - if Installed (50 Hours)
D - Knife Drive Bearing (1 Place) (50 Hours)

Lubrication Points: Hay Conditioner

NOTE:
High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base.

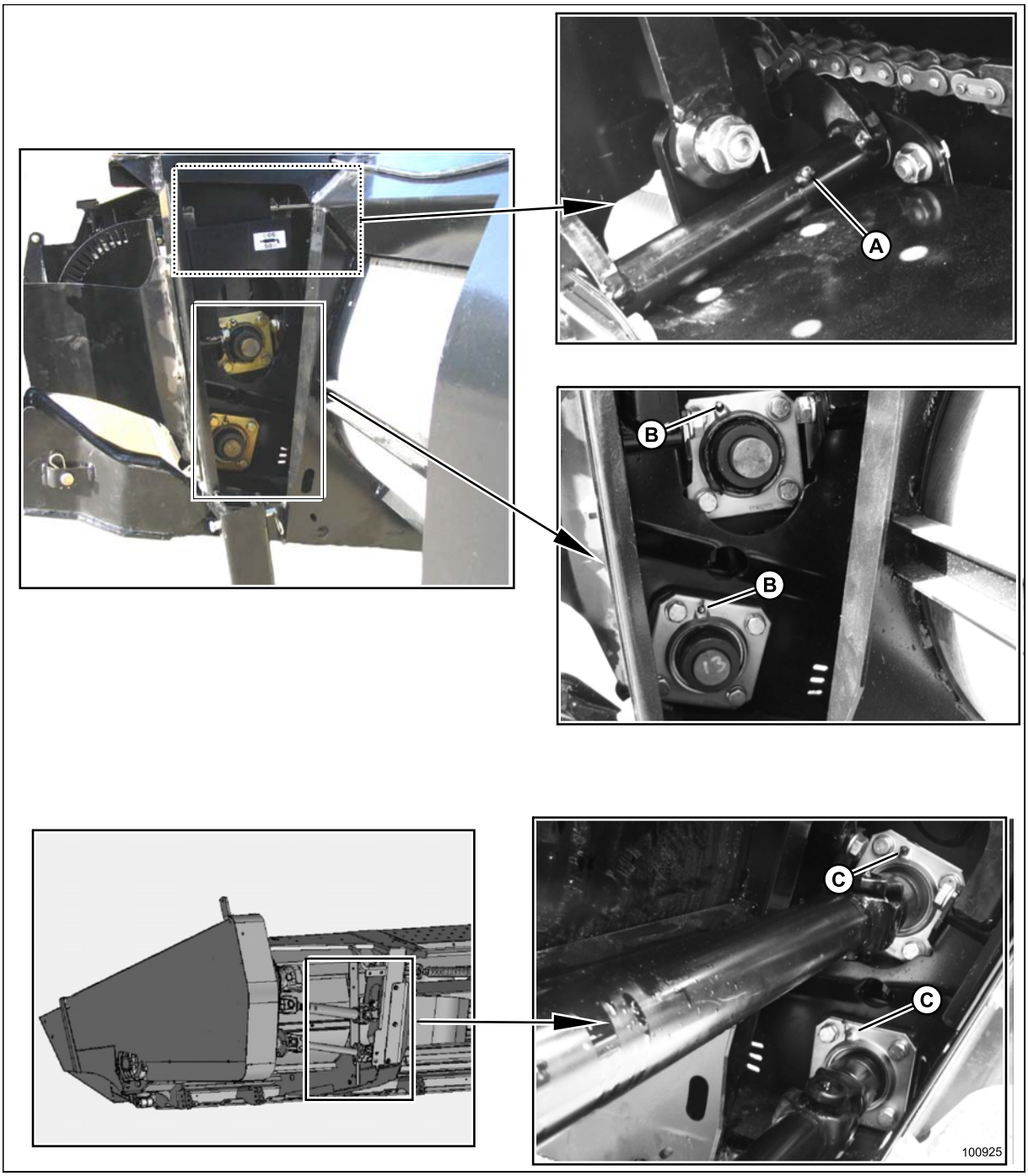

Figure 4.6: Hay Conditioner

A - Roll Pivot (1 Place - Both Sides) **B - Roll Shaft Bearings (2 Places)** **C - Roll Shaft Bearings (2 Places)**

Lubrication Points: Drivelines

NOTE:
High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base. To prevent binding and/or excessive wear caused by knife pressing on guards, do **NOT** over-grease. If more than 6 to 8 pumps of grease gun are required to fill the cavity, replace the seal in the knifehead.

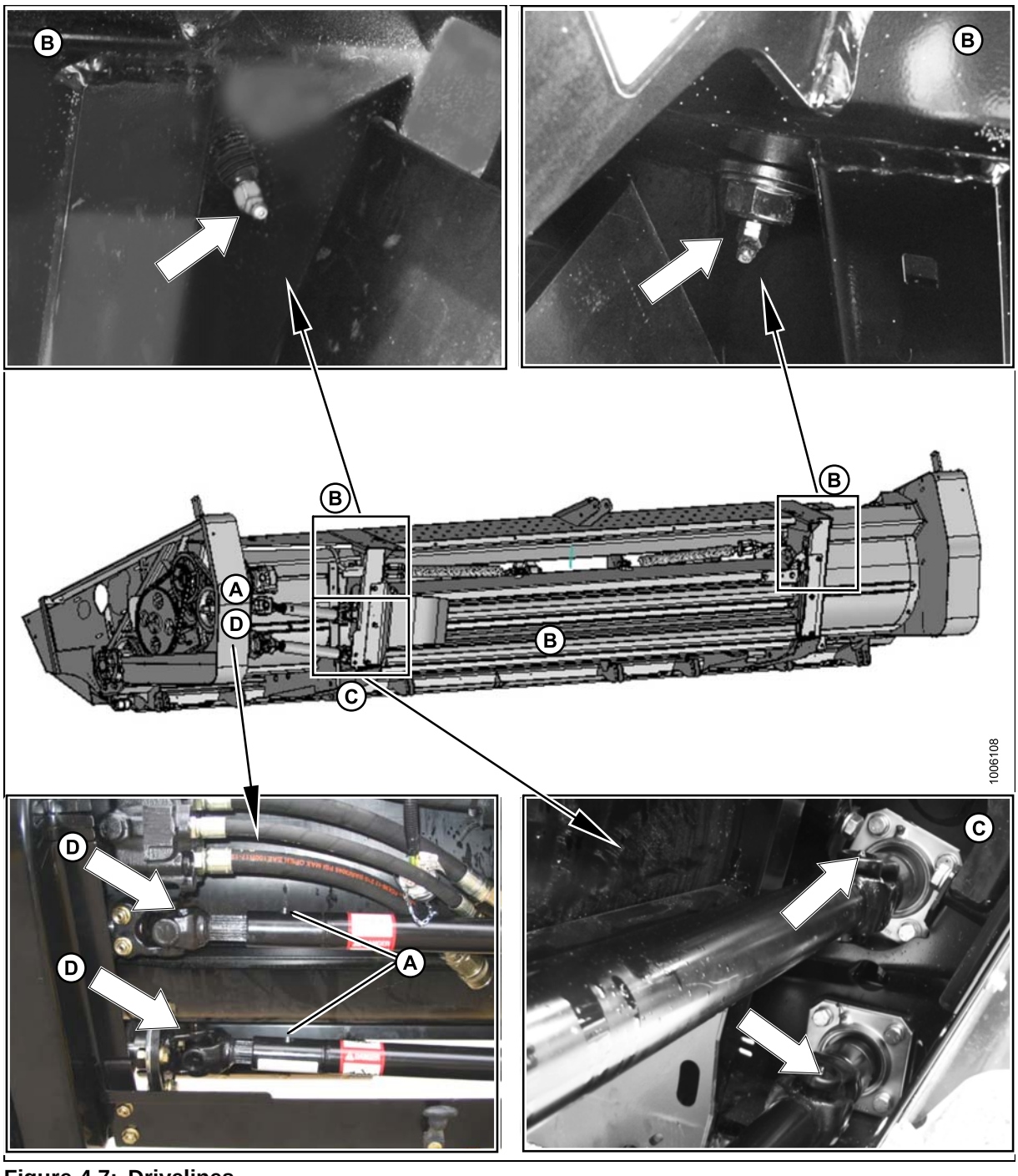

Figure 4.7: Drivelines

A - Driveline Shafts (2 Places) (50 hours) - NOTE: 10% Moly Grease Is Recommended For Driveline Shaft Slip Joints ONLY.
B - Cross Shafts (2 Places) (50 hours) C - Driveline Universals (2 Places) (50 hours) D - Driveline Universals (2 Places) (50 hours)

4.5.3 Knife and Gearbox Oil

Refer to the following illustration to identify the various locations that require lubrication. See *4.3.1 Recommended Fluids and Lubricants, page 95* for proper oil. Use SAE 30 oil.

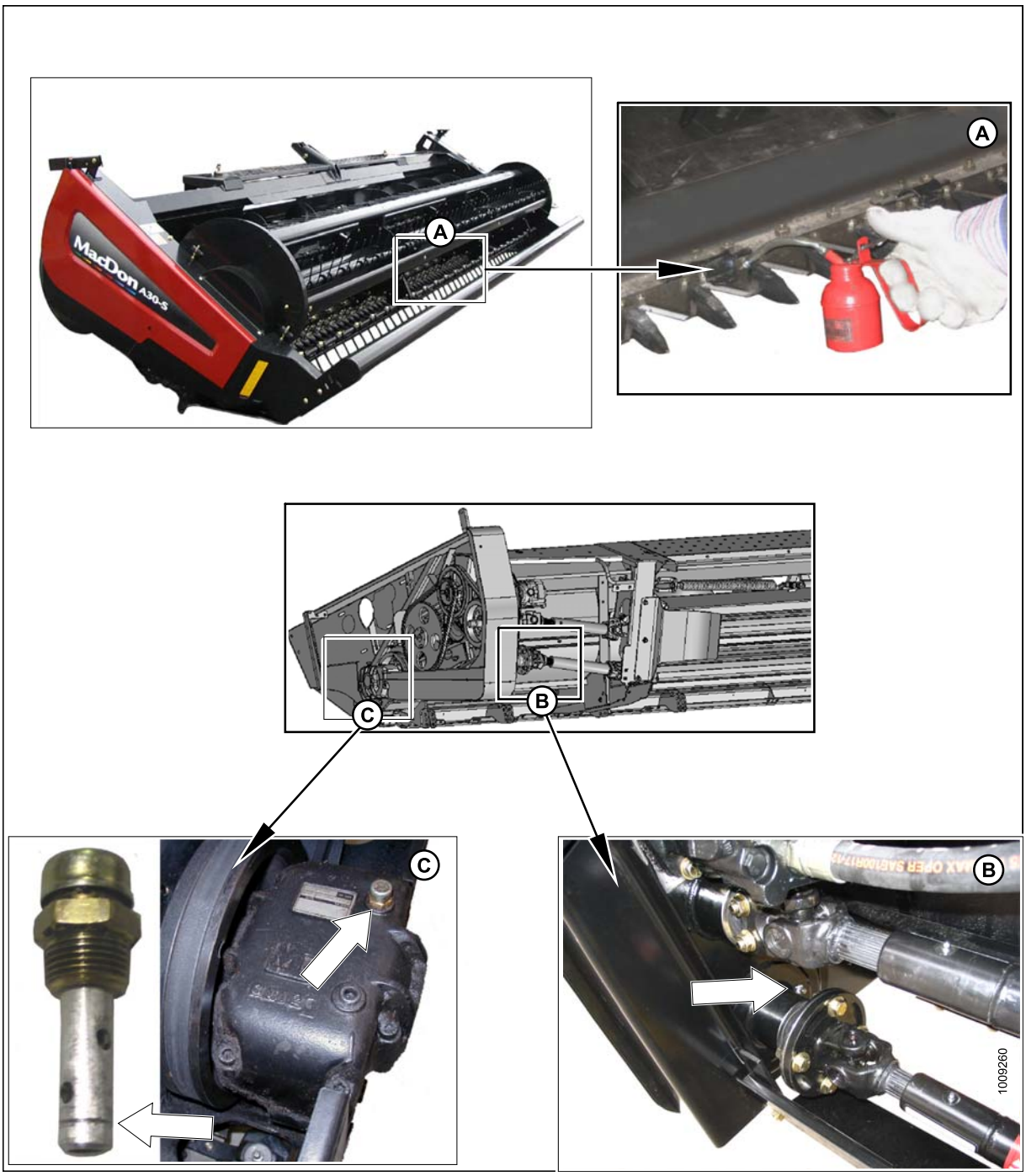

Figure 4.8: Knife and Gearbox Oil

A - Oil Knife Daily Except in Sandy Soil (SAE 30)
B - Check Roll Gearbox (1 Place) (Lower Header to the Ground).
C - Knife Drive Box (2 Places) (Check Oil Level with Knife Drive Box Horizontal)

4.5.4 Installing Sealed Bearings

Follow these steps to install sealed bearings:

1. Clean shaft and coat with rust preventative.
2. Install flangette (A), bearing (B), second flangette (C), and lock collar (D).

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

3. Install (but do **NOT** tighten) the flangette bolts (E).
4. When the shaft is correctly located, lock the lock collar with a punch.

   NOTE:
   The collar should be locked in the same direction the shaft rotates. Tighten the setscrew in the collar.

5. Tighten the flangette bolts.
6. Loosen the flangette bolts on the mating bearing one turn and retighten. This will allow the bearing to line up.

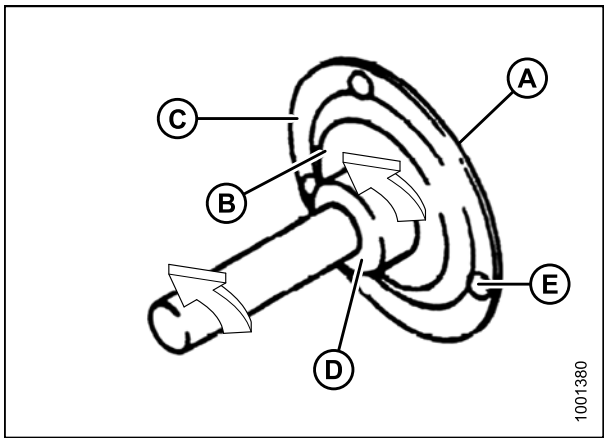

Figure 4.9: Sealed Bearing

4.6 Hydraulics

For hydraulics information about self-propelled windrower headers, contact your Dealer.

4.6.1 Servicing A40-D Hydraulics

Refer to your windrower operator's manual for hydraulic system maintenance procedures for self-propelled windrower headers.

4.6.2 Checking 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.**

Figure 4.10: Hydraulic Pressure Hazard

IMPORTANT:
Keep hydraulic coupler tips and connectors clean. Dust, dirt, water and foreign material are the major causes of hydraulic system damage. DO NOT attempt to service hydraulic system in the field. Precision fits require WHITE ROOM CARE during overhaul.

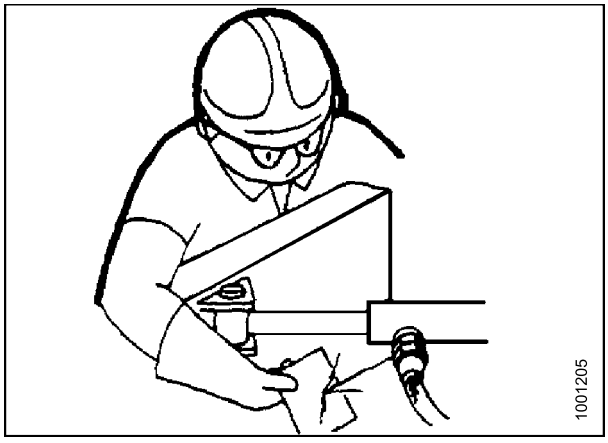

Figure 4.11: Cardboard to Search for Leaks

4.7 Cutterbar

CAUTION

To avoid personal injury, before servicing header or opening drive covers, follow procedures in *4.1 Preparing for Servicing, page 93*.

WARNING

Wear heavy gloves when working around or handling knife.

WARNING

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

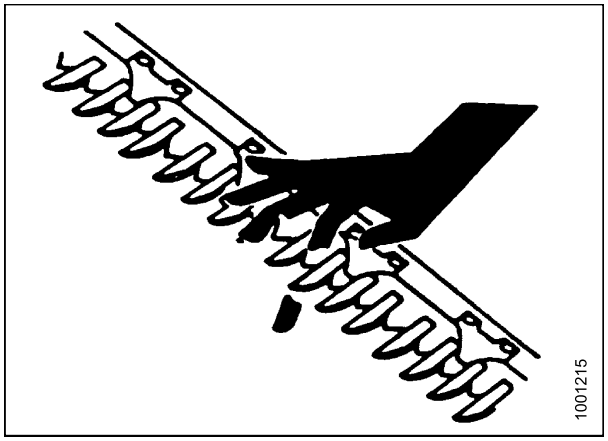

Figure 4.12: Safety around Equipment

4.7.1 Replacing Knife Section

Check daily that sections are firmly bolted to the knife back, and are not worn or broken. Replace as required. A worn or broken knife section can be replaced without removing knife from cutterbar.

WARNING

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

WARNING

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

1. Turn off engine and remove key.
2. Stroke knife as required to expose knife sections.
3. Remove lock nuts (A), and lift section (B) off of bolts.

   IMPORTANT:
   Do NOT mix heavy and light knife sections on same knife.

4. Clean any dirt off of knife back, and position new knife section on bolts.
5. Secure with lock nuts, and tighten to required torque.

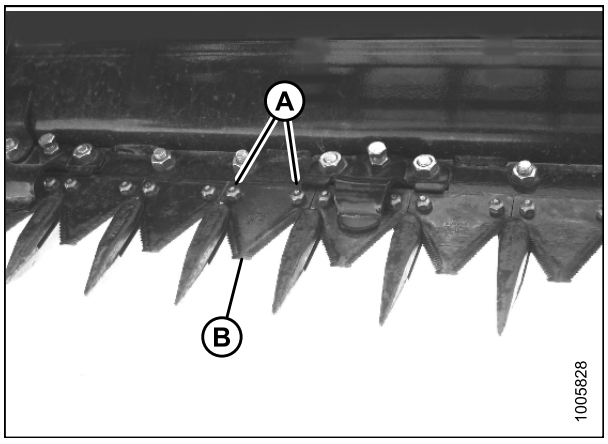

Figure 4.13: Knife Section

4.7.2 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.

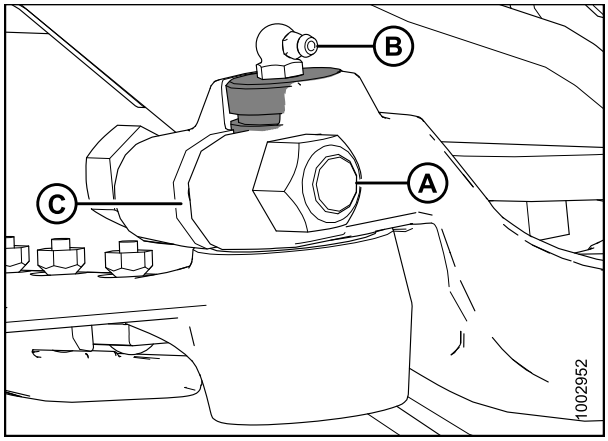

Figure 4.14: Knifehead

4.7.3 Installing Knife

WARNING

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

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 1.5 mm (1/16 in.) above the output arm (C). Secure with 5/8 in. x 3 in. hex head bolt and nut (D), and torque to 217 N·m (160 ft·lbf)..

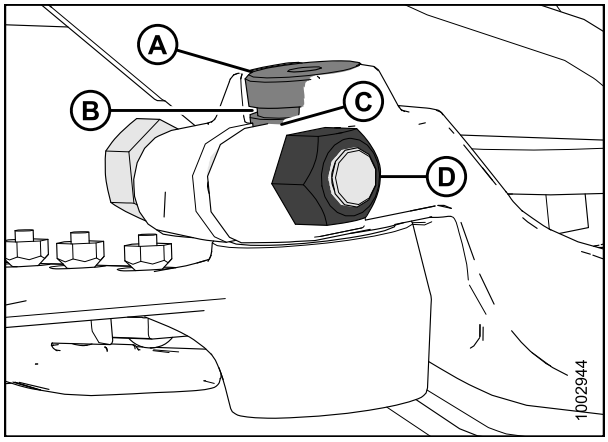

Figure 4.15: Knifehead

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.

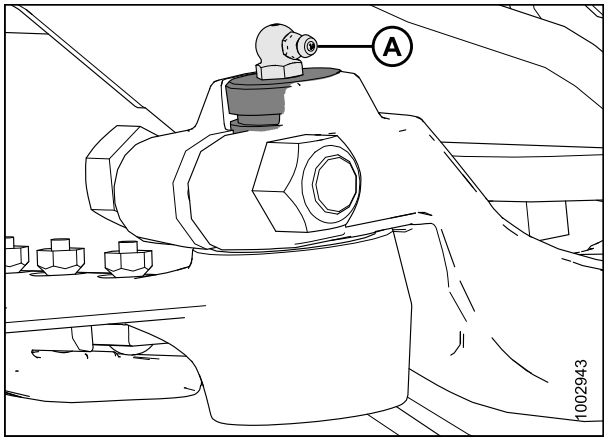

Figure 4.16: Knifehead

4.7.4 Removing Knifehead Bearing

1. Remove knife. Refer to *4.7.2 Removing Knife, page 109*.
2. Using a flat-ended tool (A) with approximately the same diameter as the plug (D), tap out the seal (B), bearing (C), plug (D), and O-ring (E) from the underside of the head.

   NOTE:
   The seal can be replaced without removing the bearing. When changing seal, check pin and needle bearing for wear. Replace if necessary.

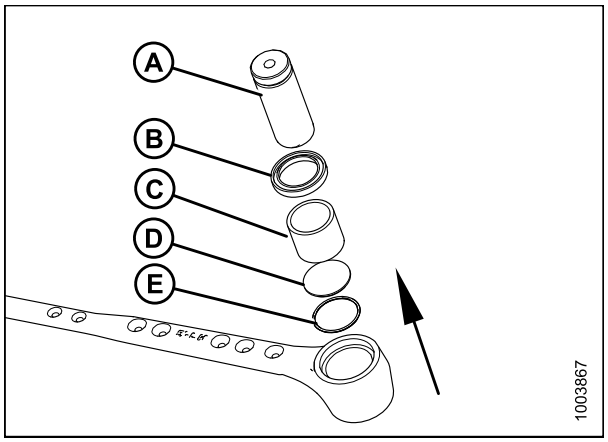

Figure 4.17: Bearing Removal

4.7.5 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 *4.7.3 Installing Knife, page 109*.

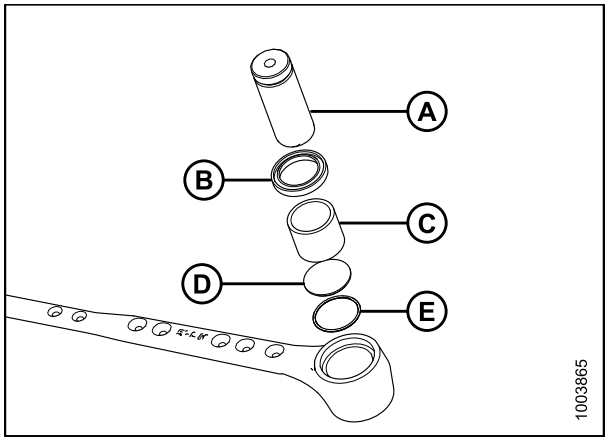

Figure 4.18: Knifehead Bearing Assembly

4.7.6 Removing Spare Knife from Storage

For double knife headers, a spare knife with knifehead may be stored inside the lean bar (A):

- The left knife is stored at the left end of the lean bar
- The right knife is stored at the right end of the lean bar.

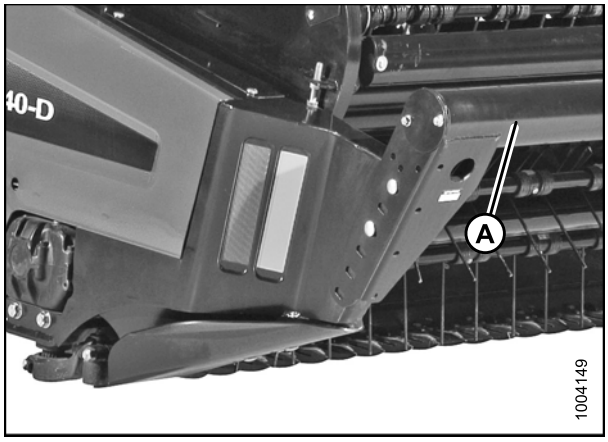

Figure 4.19: Spare Knife Location – Double Knife

CAUTION

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

1. Remove bolts (A) from lean bar end cap.
2. Pull out end cap and plastic storage tube assembly with the knife inside.
3. Slide knife from storage tube.
4. Replace storage tube inside lean bar.
5. Reinstall bolts (A), and tighten.

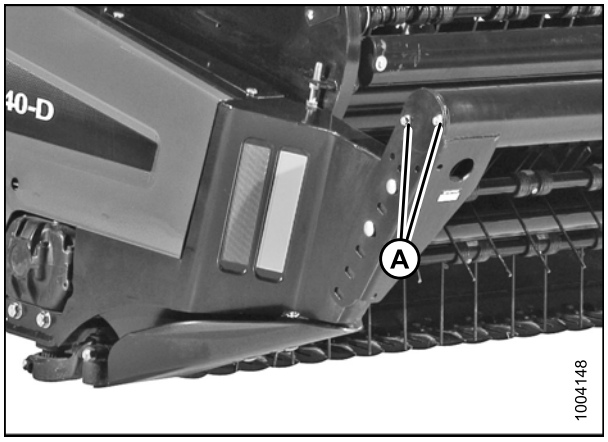

Figure 4.20: Spare Knife – Double-Knife

4.7.7 Guards

Guards protect the knife from damage from rocks and other objects and provide a surface for the knife to cut against, much like a pair of scissors. It is important that guards are adjusted properly.

Auger headers can be equipped with two types of guards: pointed or stub.

- Pointed guards are suitable for most standing crops and cutting conditions.
- Stub guards improve cutting performance in tough, stringy grass type crops, and crops that need to be cut close to the ground.

Guards are also designed slightly differently depending on where they are installed along the cutterbar:

- *Outboard Left* – Located at left end of cutterbar. Does not have a ledger to allow for slight fore/aft motion from the knife drive box.
- *Outboard Right* – Located at right end of cutterbar. Does not have a ledger to allow for slight fore/aft motion from the knife drive box (double-knife headers).
- *Center* – Located at center of cutterbar on double-knife headers. Has a stepped ledger to allow for knife overlap.
- *Drive End* – Located at the drive end of cutterbar, next to outboard guard. Similar to standard but does not have a ledger to allow for slight fore/aft motion from the knife drive box.
- *Standard* – Standard guard used at all other locations.

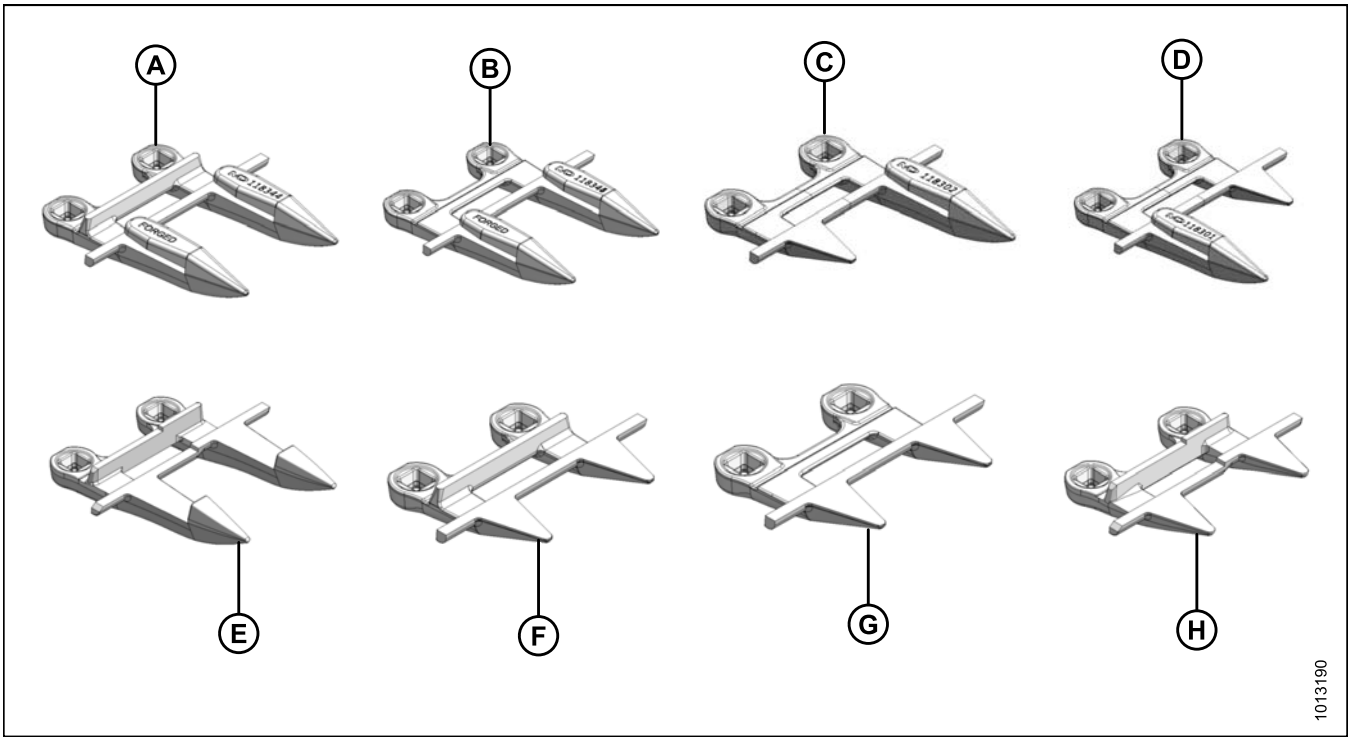

Figure 4.21: Guard Configurations

A - Pointed Standard (MD #118344)
B - Pointed Drive End (No Ledger) (MD #118345)
C - Pointed Right Outboard (MD #118302)
D - Pointed Left Outboard (MD #118301)
E - Pointed Center (MD #124338)
F - Stub Standard (MD #118346)
G - Stub Drive End (No Ledger) (MD #118347)
H - Stub Center (MD #124775)

CAUTION

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

Check daily that guards are firmly bolted to the cutterbar, and not worn or broken. Replace as required. A worn or broken guard can be replaced without removing knife from cutterbar.

Aligning Guard

Check **DAILY** that guards are aligned to obtain proper shear cut between knife section and guard. Knife sections should contact shear surface of each guard.

1. Retrieve tool (A) from left-hand side of header.

Figure 4.22: Wrench Location

2. To adjust guard tips downward, position tool as shown at right, and push down.

Figure 4.23: Guard Tip – Downward Adjustment

3. To adjust guard tips upward, position tool as shown at right, and pull up.
   TIP: If trouble is encountered cutting tangled, or fine-stemmed material, replace guards with stub guards.

   If material is tough to cut, install stub guards with top guard and adjuster plate. A stub guard conversion kit for the header is available from your Dealer.

Figure 4.24: Guard Tip – Upward Adjustment

Replacing Pointed Guards and Hold-Downs

Check daily that guards are firmly bolted to the cutterbar, and not worn or broken. Replace as required. A worn or broken guard can be replaced without removing knife from cutterbar. This procedure describes the replacement of pointed guards and hold-downs on single and double knife headers.

Pointed Standard Guard and Hold-Down

Follow this procedure to replace standard pointed guards and hold-downs on single- and double-knife headers, except the double knife center guard and hold-down. Refer to *Double Knife Pointed Center Guard and Hold-Down* in this section.

1. Stroke the knife so that knife sections are spaced midway between the guards.
2. Remove two nuts (A), and carriage bolts (B) that attach guard (C), and hold-down (D) to the cutterbar.
3. Remove the guard (C), and the hold-down (D).
4. Position new guard (B) on cutterbar, and install carriage bolts (B).
5. Install hold-down (D), and secure with nuts (A). Tighten nuts to 68 N·m (50 ft·lbf).
6. Check and adjust clearance between hold-down and knife. Refer to *4.7.8 Hold-Downs, page 121*.

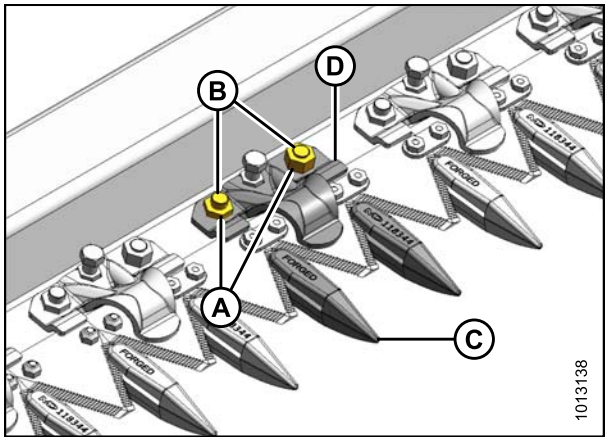

Figure 4.25: Pointed Guards

IMPORTANT:
The second, third, and fourth outboard guards (A) on drive side of the header do **NOT** have a ledger (B) as shown for normal guard (C). Ensure that the proper replacement is installed.

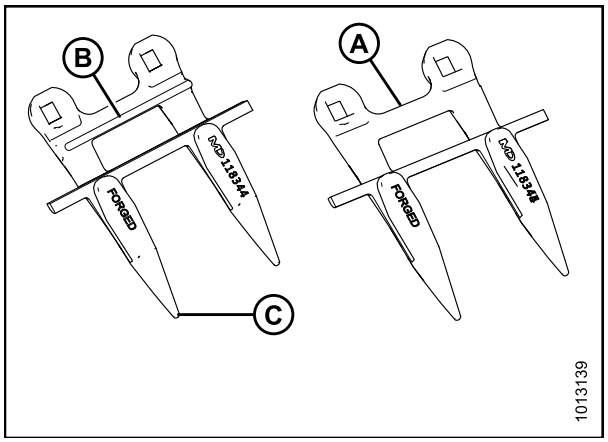

Figure 4.26: Pointed Guards

Double Knife Pointed Center Guard and Hold-Down

IMPORTANT:
Ensure center guard (B) has offset (A) in ledgers and that hold-down accommodates overlapping knives.

NOTE:
Replace adjacent guards when replacing center guard.

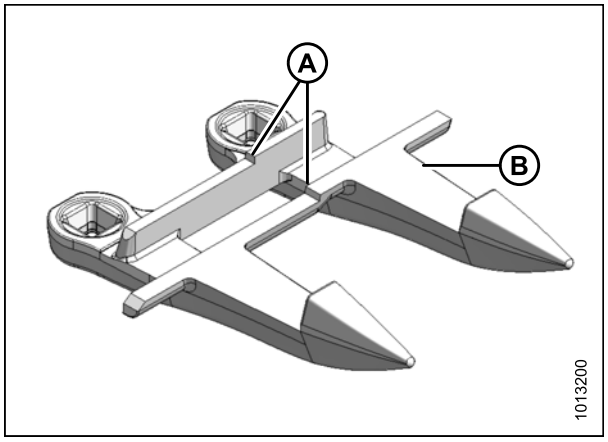

Figure 4.27: Pointed Center Guard

7. Remove two nuts (A), and carriage bolts (B) that attach guard (C), adjuster bar (D) and hold-down (E) to the cutterbar.
8. Remove the guard (C), the hold-down (E) and adjuster bar (D).
9. Position new guard (C) on cutterbar, and install carriage bolts (B).
10. Install adjuster bar (D) and hold-down (E), and secure with nuts (A). Tighten nuts to 68–92 N·m (50–68 ft·lbf).

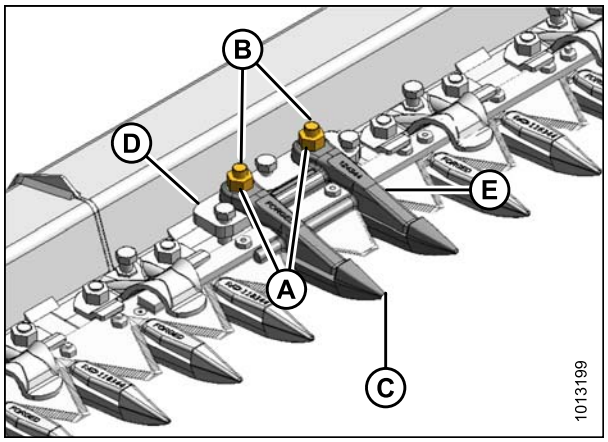

Figure 4.28: Center Guard

11. Check that cutting surfaces (A) of center and adjacent guards are aligned. Adjust as required as per *Aligning Guard, page 114*.
12. Check and adjust clearance between hold-down and knife. Refer to *4.7.8 Hold-Downs, page 121*.

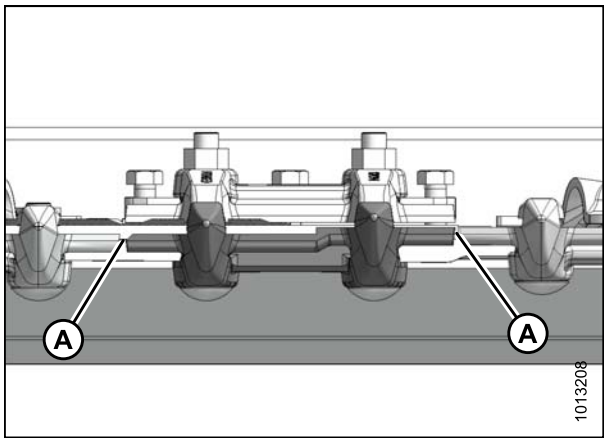

Figure 4.29: Guard Alignment

Replacing Pointed Center Guard on Double-Knife Header

Check daily that guards are firmly bolted to the cutterbar, and not worn or broken. Replace as required. A worn or broken guard can be replaced without removing knife from cutterbar. This procedure applies to the center guard where the two knives overlap on a double-knife header.

IMPORTANT:
Replace adjacent guards when replacing center guard.

IMPORTANT:
Ensure center guard (A) has offset (B) cutting surface.

IMPORTANT:
Ledger surfaces of center, and adjacent guards must be vertically aligned to avoid interference with knife sections.

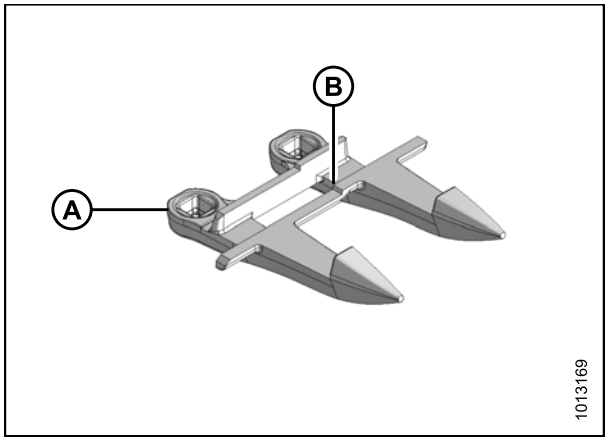

Figure 4.30: Center Guard: Double Knife

IMPORTANT:
Hold-down (A) must accommodate the two overlapping knives at center guard location on double-knife header. Ensure replacement is the correct part.

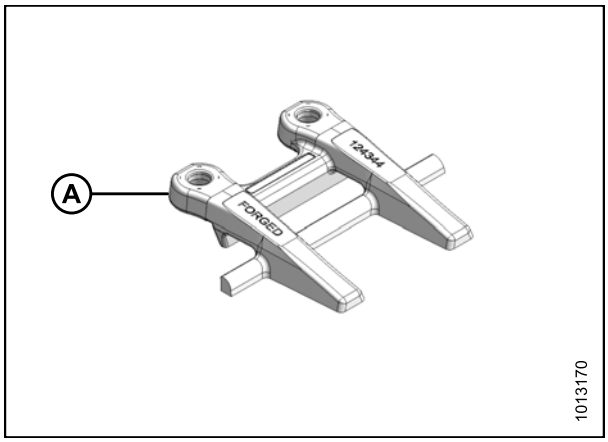

Figure 4.31: Center Hold-Down: Double Knife

1. Stroke the knife so that knife sections are spaced midway between the guards.
2. Remove two nuts (A), and bolts (B) that attach center guard (C), and hold-down (D) to cutterbar.
3. Remove guard (C), hold-down (D), and adjuster bar (E).
4. Position new guard (C) on cutterbar and install two 7/16 x 2-3/4 in. carriage bolts (B).
5. Position adjuster bar (E) and hold-down (D) on cutterbar and install nuts (A).
6. Torque nuts to 68–92 N·m (50–68 lbf·ft).
7. Check clearance between hold-down (D) and section. Refer to *Adjusting Knife Hold-Down: Pointed Guard – Double-Knife Header, page 122*.

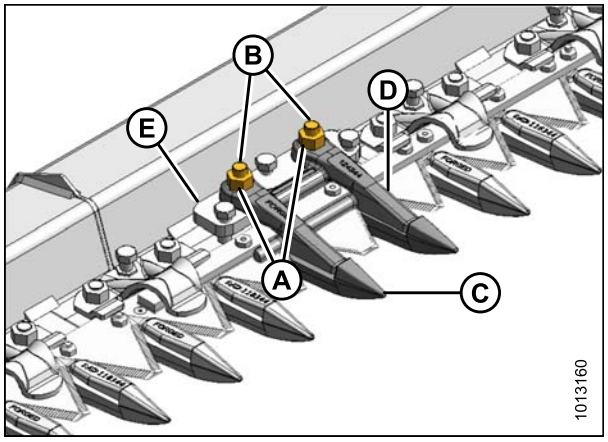

Figure 4.32: Pointed Center Guard

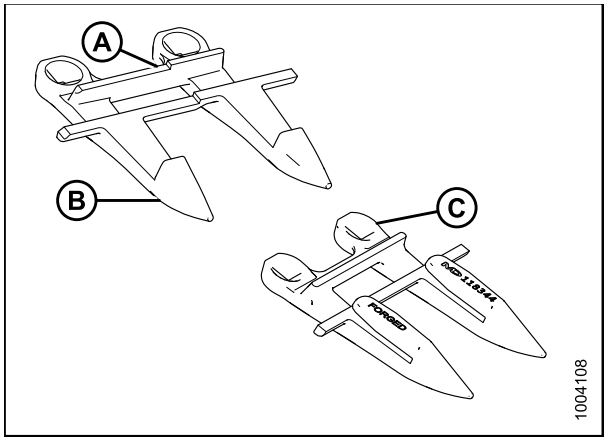

Figure 4.33: Pointed Guard Identification

A - Offsets **B - Center** **C - Normal**

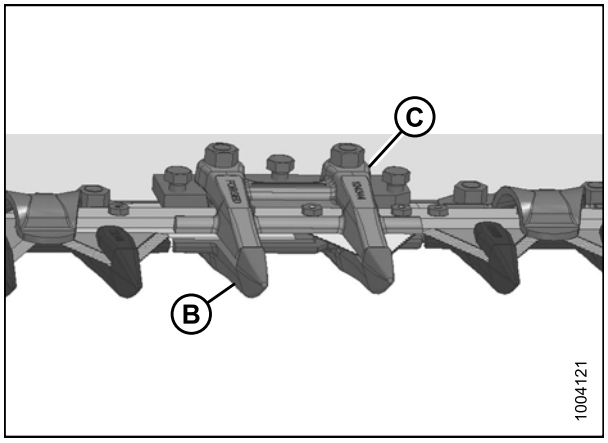

Figure 4.34: Pointed Guard Identification

Replacing Center Stub Guard on Double-Knife Header

Check daily that guards are firmly bolted to the cutterbar, and not worn or broken. Replace as required. A worn or broken guard can be replaced without removing knife from cutterbar. This procedure applies to the center guard where the two knives overlap on a double-knife header.

IMPORTANT:
Replace adjacent guards when replacing center guard.

IMPORTANT:
Ensure center guard (A) has offset cutting surface (B).

IMPORTANT:
Ledger surfaces of center, and adjacent guards must be vertically aligned to avoid interference with knife sections.

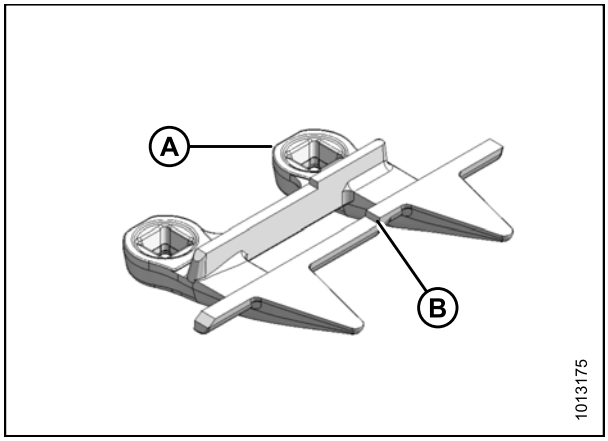

Figure 4.35: Center Guard: Double Knife

IMPORTANT:
Hold-down (A) must accommodate the two overlapping knives at center guard location on double-knife header. Ensure replacement is the correct part. Hold-down is actually an inverted stub guard (MD # 118346).

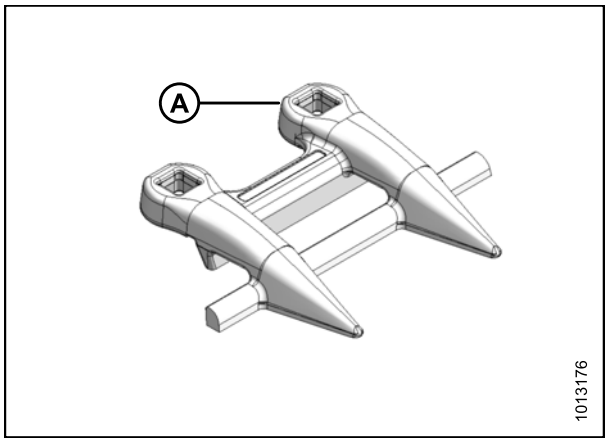

Figure 4.36: Center Hold-Down: Double Knife

1. Remove two nuts (A) and bolts that attach center guard (B) and top guide (C) to cutterbar.
2. Remove guard, top guide, and adjuster bar (D).

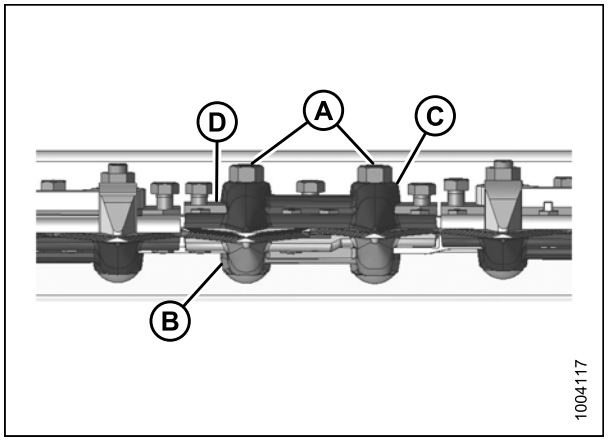

Figure 4.37: Stub Guard Replacement

IMPORTANT:
Ensure center guard (B) has offset cutting surfaces. Refer to illustration.

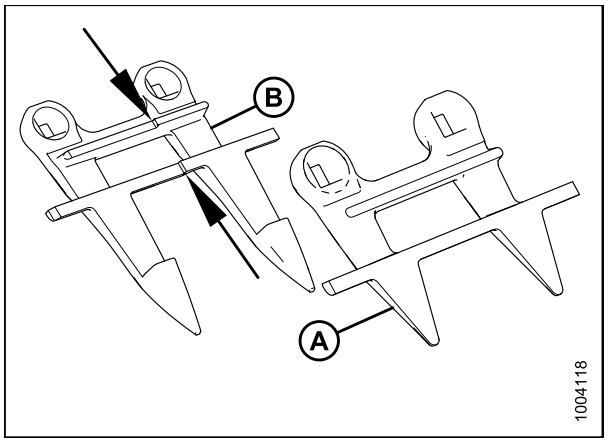

Figure 4.38: Stub Guard Identification

A - Normal **B - Center**

NOTE:
Top guide (C) (which is an inverted stub guard) must accommodate the two overlapping knives at center guard location on double-knife header. Ensure replacement is correct part.

IMPORTANT:
Ledger surfaces of center, and adjacent guards must be vertically aligned to avoid interference with knife sections.

3. Position replacement guard (B), adjuster bar (D), top guide (C), and install bolts and nuts (A). Do **NOT** tighten.
4. Check and adjust clearance between hold-down, and knife. Refer to *4.7.8 Hold-Downs, page 121*.

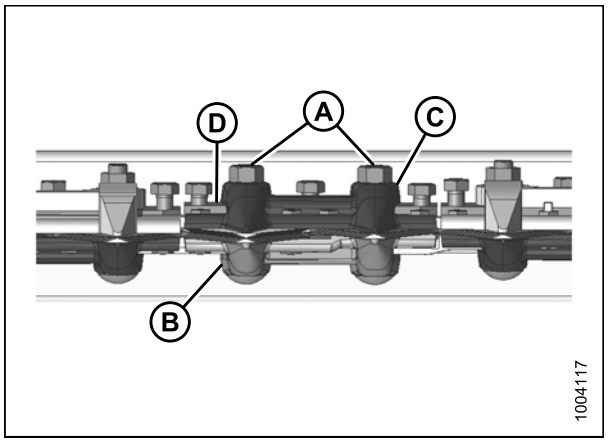

Figure 4.39: Stub Guard Adjustment

4.7.8 Hold-Downs

Hold-downs, also referred to as guides, keep the knife in contact with the guard cutting surface. It is important that the hold-downs are adjusted properly.

Hold-downs are designed to accommodate specific guard locations and guard types:

- Center – Located at center of cutterbar on double-knife headers. Allows for knife overlap.
- Standard – Used at all other locations.

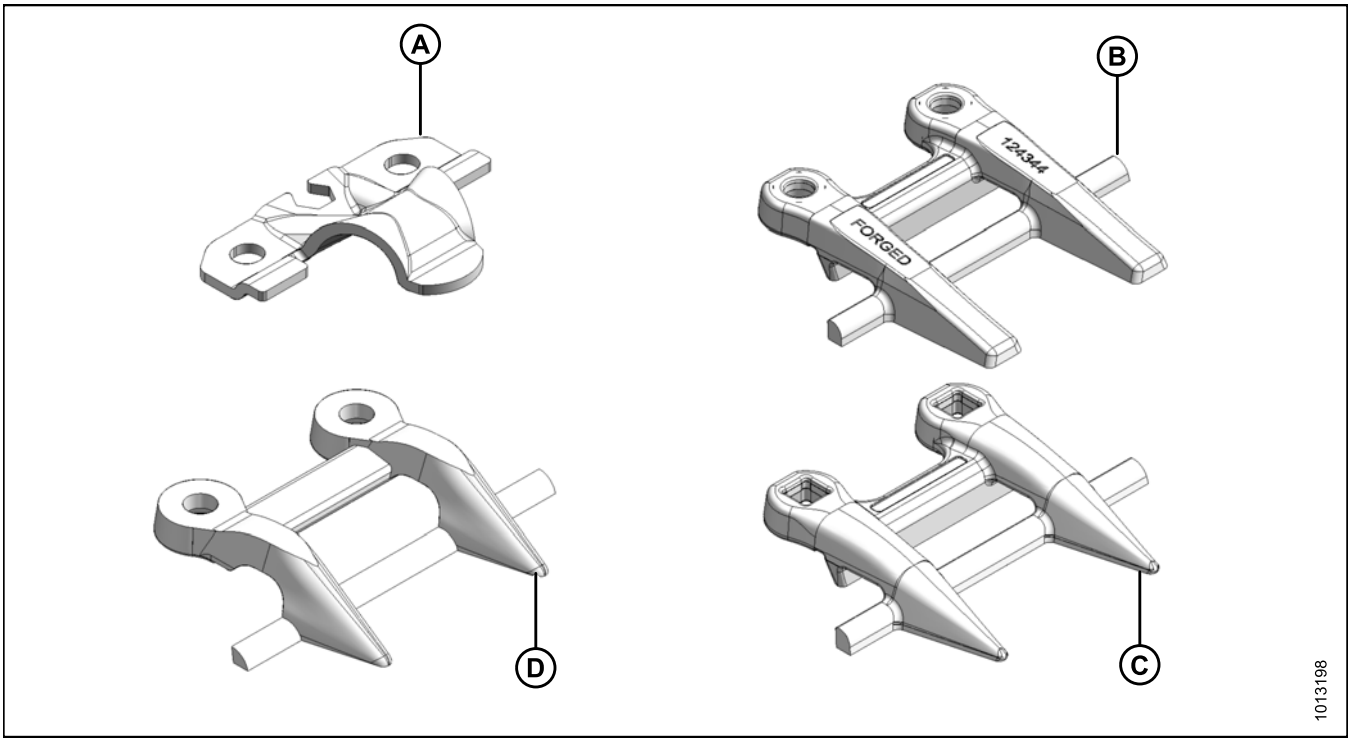

Figure 4.40: Hold-Downs

A - Pointed Standard (MD #118162)
B - Pointed Center Double Knife (MD #124344)
C - Stub Center Double Knife (MD #118346)
D - Stub Standard (MD #034359)

CAUTION

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

Check daily that knife hold-downs are set to prevent knife sections from lifting off guards, but still permit the knife to slide without binding.

Adjusting Knife Hold-Down: Pointed Guard – Double-Knife Header

1. Torque nuts (A) to 46 N·m (35 ft·lbf).
2. Turn adjuster bolts (B). Using feeler gauge, clearance from hold-down to knife section (C) should be:
   - 0.1–0.4 mm (0.004–0.016 in.) at the guide tip (C)
   - 0.1–1.0 mm (0.004–0.040 in.) at rear of guide (D)
3. Torque nuts (A) to 72 N·m (53 ft·lbf).
4. After adjusting all hold-downs, run header at a low engine speed, and listen for noise due to insufficient clearance. Insufficient clearance will also result in overheating of the knife and guards.

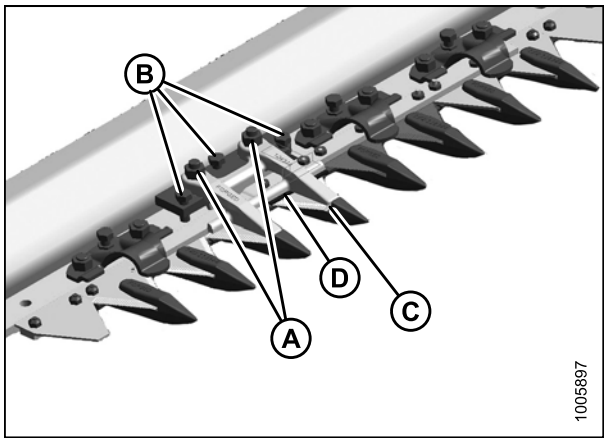

Figure 4.41: Knife Hold-Down – Double Knife

Adjusting Center Knife Hold-Down: Stub Guard – Double-Knife Header

1. Torque nuts (A) to 46 N·m (35 ft·lbf).
2. Turn adjuster bolts (B). Using a feeler gauge, clearance from hold-down to knife section should be:
   - 0.1–0.4 mm (0.004–0.016 in.) at the guide tip (C)
   - 0.1–1.0 mm (0.004–0.040 in.)) at rear of guide (D)
3. Torque nuts (A) to 72 N·m (53 ft·lbf).
4. After adjusting all hold-downs, run header at a low engine speed, and listen for noise due to insufficient clearance. Insufficient clearance will also result in overheating of the knife and guards.

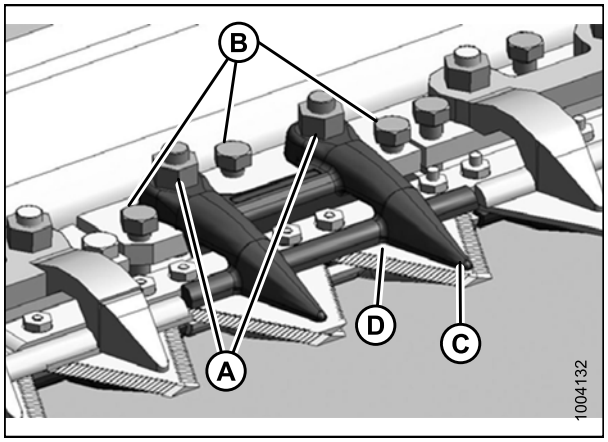

Figure 4.42: Stub Guard – Double Knife

4.7.9 Knife Drive Box

The knife drive box converts rotational motion from the windrower header driveshaft to reciprocating motion for the knife.

The heavy-duty, oil bath, knife drive box uses tapered roller bearings on the input shaft and yoke for increased durability. The pulley and drive arm connections are straight splines with clamping bolts to ensure a tight fit.

The oil level in the knife drive box is checked with a dipstick that is incorporated into the breather.

Figure 4.43: Knife Drive Box

Mounting Bolts

CAUTION

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

Check torque of four knife drive box mounting bolts (A) after the first 10 hours operation, and every 100 hours thereafter. Torque bolts to 270 N·m (200 ft·lbf). When tightening, start with the side mounting bolts.

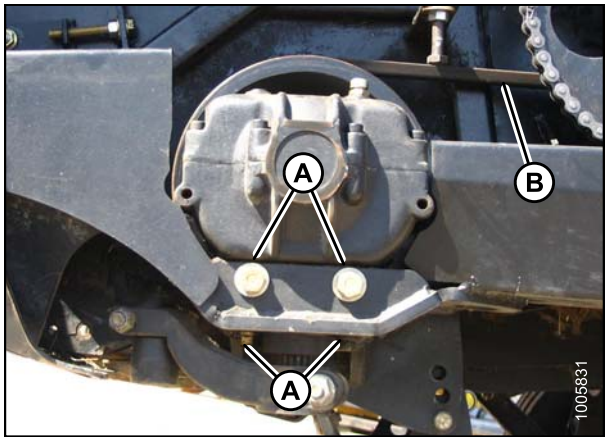

Figure 4.44: Knife Drive Box

Removing Knife Drive Box

1. Loosen knife drive belt (B), and slip off knife drive box pulley. Refer to the following sections:
   - *Checking/Adjusting Timing Belt Tension – A40-D Left Side, page 132*
   - *Checking/Adjusting Timing Belt Tension – A40-D Right Side, page 136*

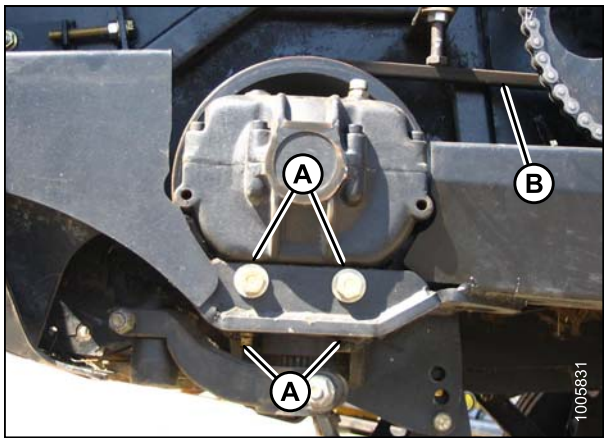

Figure 4.45: Knife Drive Box

2. Stroke knife to its outer limit.
3. Clean area around knifehead.
4. Remove grease zerk (A) from knifehead pin (B).
5. Remove nut and bolt (C).
6. Insert screwdriver in groove of pin (B), and pry up on pin to free knife. Pin does not have to be removed from arm.

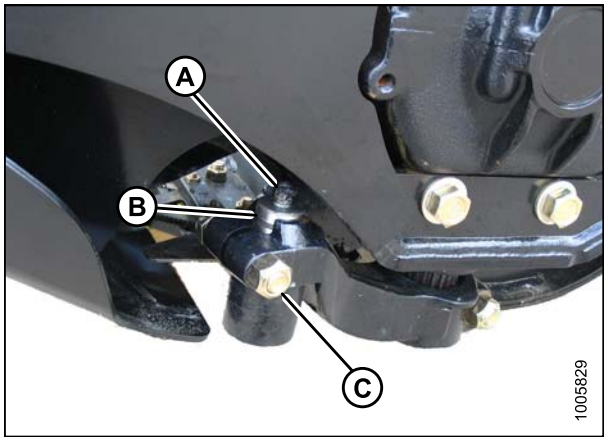

Figure 4.46: Knifehead

7. Remove bolt (A) from pitman arm.
8. Remove pitman arm (B) from knife drive box output shaft.

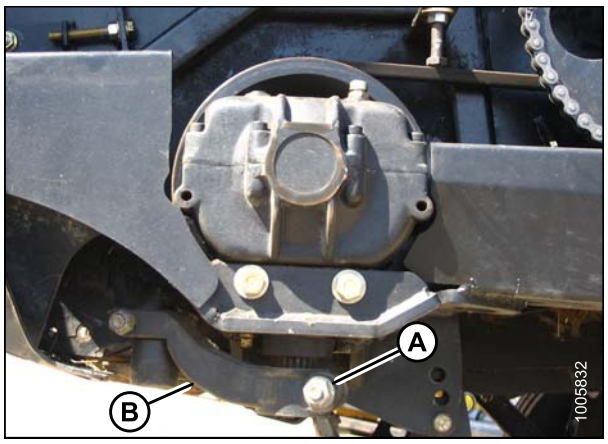

Figure 4.47: Pitman Arm

9. Remove bolts (A) attaching knife drive box to frame.
10. Remove knife drive box.

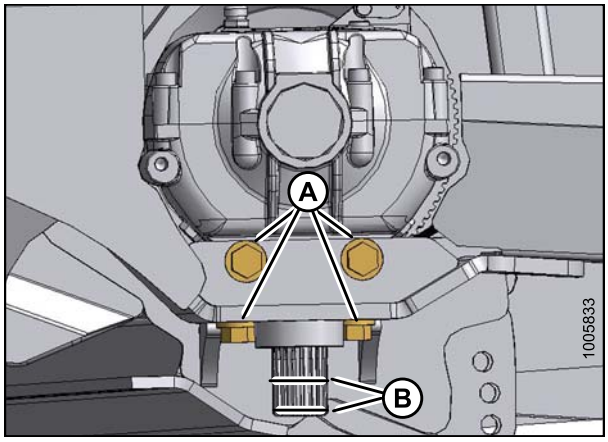

Figure 4.48: Knife Drive Box Bolts

Installing Knife Drive Box

1. Position knife drive box as shown, and install four bolts (A). Torque side bolts, and then torque bottom bolts to 270 N·m (200 ft·lbf).

   IMPORTANT:
   Use only Grade L9 bolts and flat washers.

2. Apply Loctite® #243 adhesive (or equivalent) in two bands (B) around shaft as shown, with one band at end of shaft, and one band approximately mid-way.

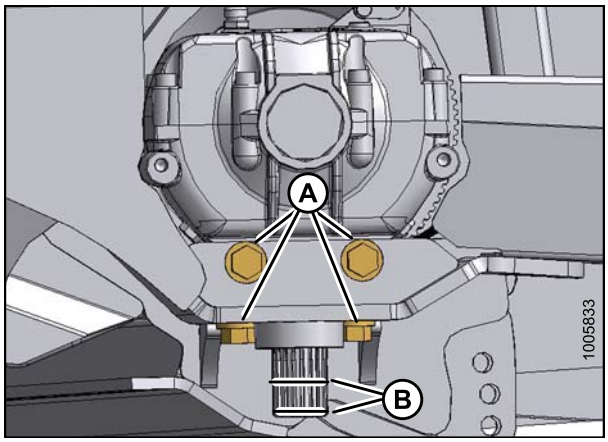

Figure 4.49: Knife Drive Box

3. Slide pitman arm (B) onto knife drive box output shaft.
4. Rotate knife drive box pulley to ensure pitman arm just clears frame to ensure proper placement on splines. Remove arm (B), and reposition on splines as required.
5. Rotate knife drive box pulley to locate pitman arm at furthest outboard position.

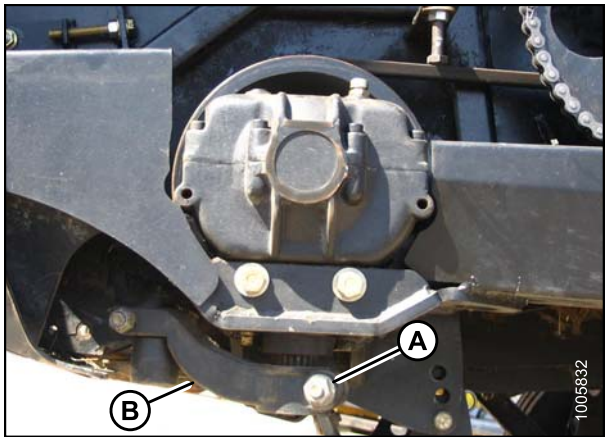

Figure 4.50: Pitman Arm

6. Slide pitman arm (C) up or down on shaft until it just contacts knifehead (B), (0.25 mm [0.010 in.]) gap.
7. Install bolt (E) and nut, and torque to 217 N·m (160 ft·lbf).
8. Align knifehead (B) with pitman arm (C).
9. Install knifehead pin (A) in pitman arm (C), and tap it down into the knifehead, ensuring pin is bottomed out in the knifehead.
10. Tap underside of the knifehead until the pin is flush with the upper face of the pitman arm (C).
11. Carefully adjust to achieve a 0.25 mm (0.010 in.) gap at (D) with the knife laying flat on the first few guards.

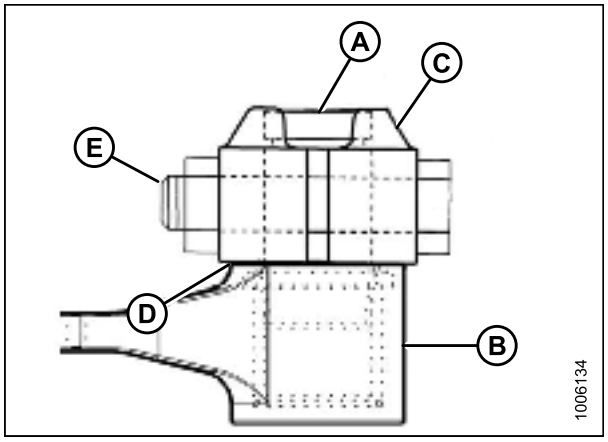

Figure 4.51: Knifehead

A - Knifehead Pin **B - Knifehead** **C - Pitman Arm**
D - GAP: 0.25 mm (0.010 in.) **E - Bolt**

12. Replace bolt (C) and nut.
13. Tighten nut to 220 N·m (160 ft·lbf).
14. Replace grease zerk (A) in pin.
15. Install drive belt onto knife drive box pulley and tighten. Refer to the following sections:
    - *Checking/Adjusting Timing Belt Tension – A40-D Left Side, page 132*
    - *Checking/Adjusting V-Belt Tension on Left Side – A40-D, page 131*
    - *Checking/Adjusting Timing Belt Tension – A40-D Right Side, page 136*

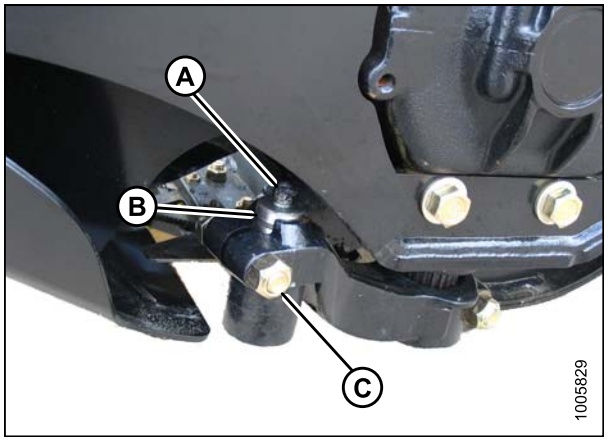

Figure 4.52: Knifehead

Removing Pulley

1. Remove knife drive box. Refer to *Removing Knife Drive Box, page 124*.
2. Loosen nut and bolt (A) from pulley.
3. Remove pulley using a three-jaw puller.

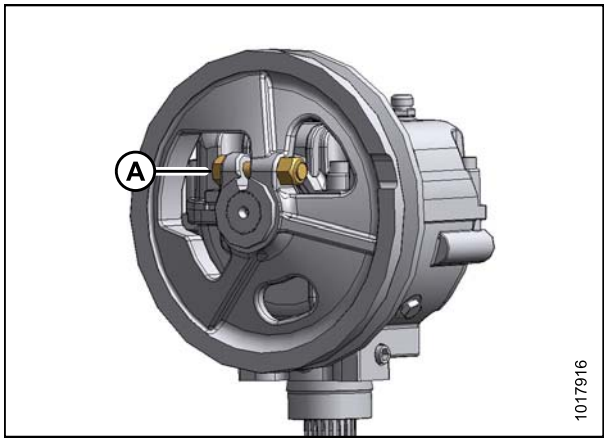

Figure 4.53: Knife Drive Box Pulley

Installing Pulley

1. Remove any rust or paint from inner spline. For replacement parts, remove oil/grease with degreasing agent.
2. Apply Loctite® #243 adhesive (or equivalent) in two bands around shaft (A), with one band at end of spline, and one band approximately mid-way.

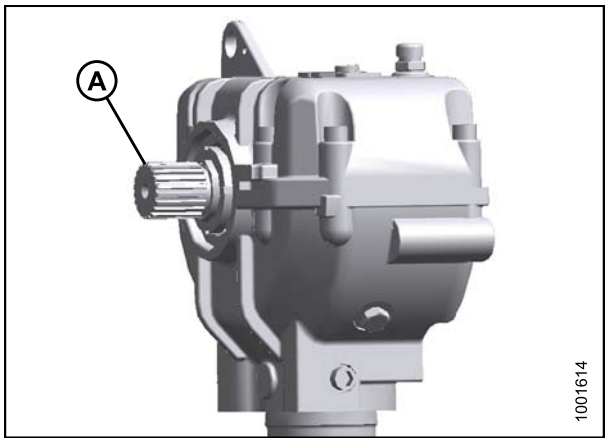

Figure 4.54: Knife Drive Box

3. Install pulley on shaft until flush with end of shaft, and secure with bolt (A) and nut. Torque bolts to 217 N·m (160 ft·lbf).

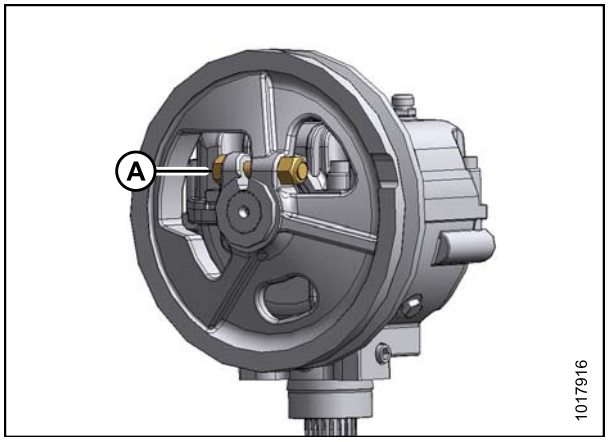

Figure 4.55: Knife Drive Box Pulley

Changing Knife Drive Box Oil

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

To change lubricant, follow these steps:

⚠ CAUTION

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

1. Raise header and then place a suitable container under the knife drive box drain to collect oil.

2. Engage header lift cylinder stops.
3. Remove breather/dipstick (A) and drain plug (B), and allow oil to drain.
4. Replace drain plug and add oil to required level. Use gear lubricant, SAE 85W-140, API Service Class GL-5, 2.2 liters (2.3 quarts).
5. Disengage lift cylinder stops.

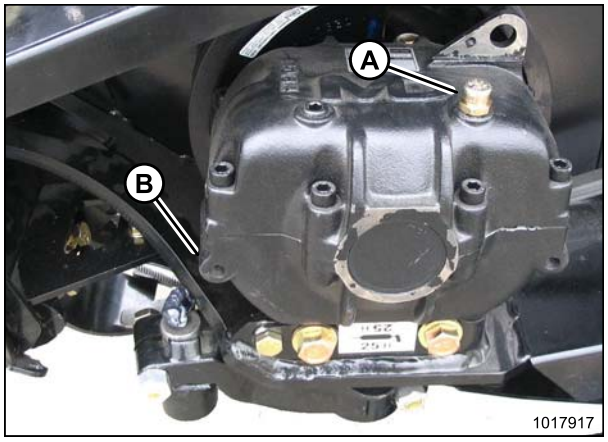

Figure 4.56: Knife Drive Box Breather

4.7.10 Adjusting Knife Timing

Double-knife A40-D headers require that the knives are properly timed to move in opposite directions. Knives moving in the same direction will result in unnecessary vibration.

To adjust the knife timing, follow these steps:

1. Remove the right-side knife drive belt (A), if it is not already removed.

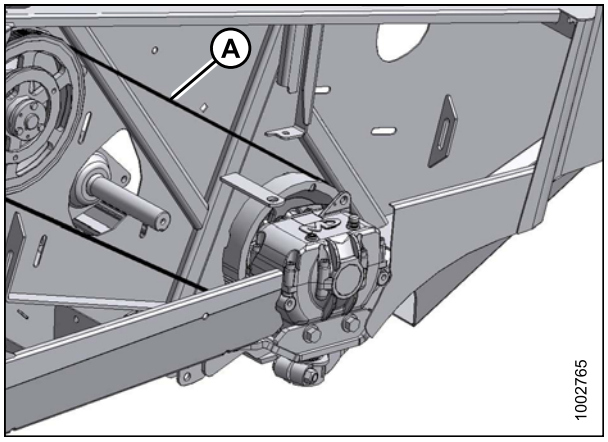

Figure 4.57: Right Knife Drive Belt

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

   NOTE:
   Center stroke is when the knife points are centered between guard points.

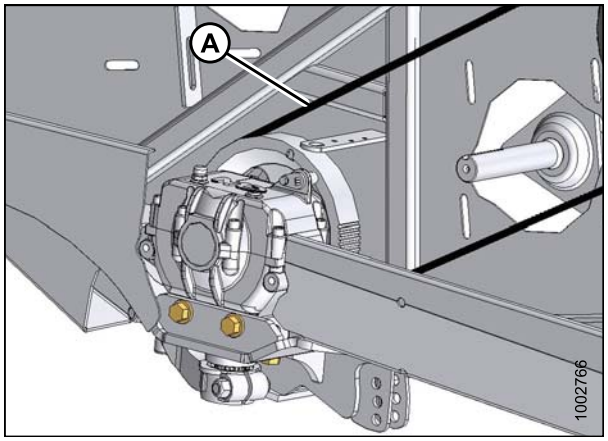

Figure 4.58: Knife Position Adjustment

3. Rotate the right-side knife drive box pulley counterclockwise until the right-side knife is at the center of the inboard stroke.

   NOTE:
   Secure knives to prevent movement when installing the belts.

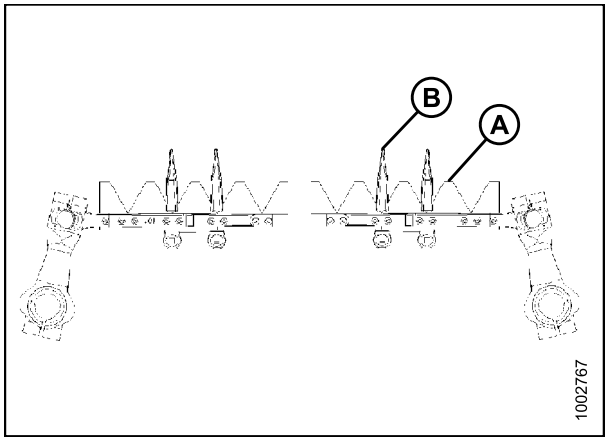

Figure 4.59: Knife Sections Centered Between Guard Points

A - Knife Point **B - Guard Point**

4. Install the right-side knife drive box drive belt and tension.

CAUTION

To maintain timing, knife drive box driver and driven pulleys must NOT rotate as the belt is tightened.

5. Check that the timing belt (A) is properly seated in the grooves on both driver and driven pulley on the right-hand side, and is tensioned correctly. The belt should be tensioned to a 14 mm (9/16 in.) deflection, this is achieved by applying 22–30 N (5–6.5 lbf) to the belt at mid-span.

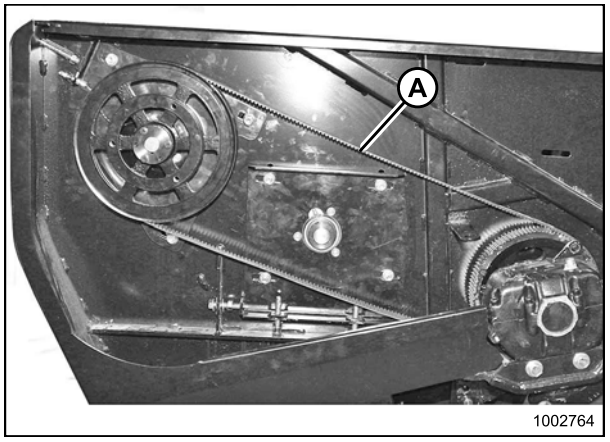

Figure 4.60: Timing Belt – Right Side

6. Check for correct knife timing by rotating the driveshaft (A) slowly with an unplugging wrench (B), and observe knives where they overlap at the center of the header.

   IMPORTANT:
   Knives must move in opposite directions, and must begin moving at exactly the same time.

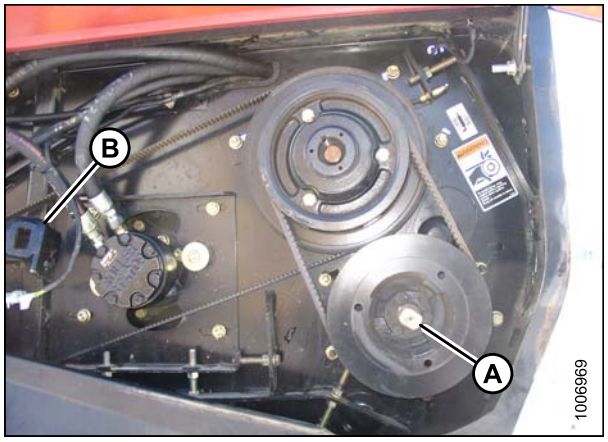

Figure 4.61: Knife Timing

7. If timing is correct, skip the remaining steps.
8. If timing is off, loosen right-side timing belt sufficiently to allow skipping the belt one or more teeth as required.
   a. **If right knife LEADS left knife,** rotate RIGHT HAND driven pulley (C) clockwise.
   b. **If right knife LAGS left knife,** rotate RIGHT HAND driven pulley (C) counterclockwise.
   c. Tighten right-side timing belt.

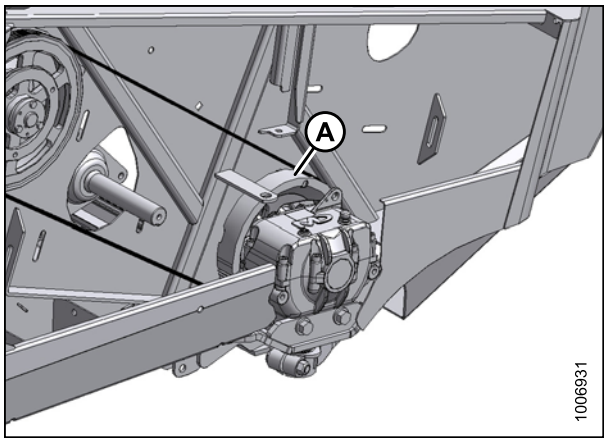

Figure 4.62: Knife Timing

4.8 A40-D Drive Systems

4.8.1 Knife Drive – A40-D

The A40-D double-knife header is driven by a windrower-powered hydraulic motor that drives each knife with two belt-driven knife drive boxes.

Checking/Adjusting V-Belt Tension on Left Side – A40-D

CAUTION

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

1. Turn off engine and remove key.
2. Open left endshield.
3. Apply a force of 35–50 N (8–12 lbf) on each belt at mid-span (D). Belt should deflect 4 mm (3/16 in.). If necessary, adjust as follows:
   a. Loosen three nuts (A), and jam nut on adjuster bolt (B).
   b. Turn adjuster bolt (B) to move pulley (C) to achieve required deflection at (D).
   c. Tighten jam nut at (B), and three nuts (A).
4. Close endshield.

NOTE:
Readjust tension of new belts after about 5 hours of operation.

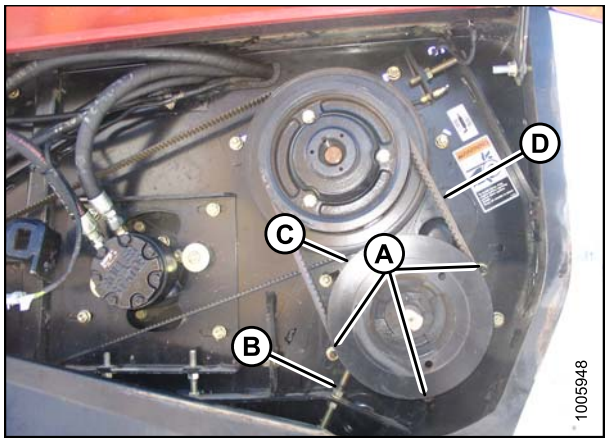

Figure 4.63: LH V-Belt

Removing Double V-Belts on Left Side – A40-D

This procedure is applicable to A40-D Grass Seed and A40-D standard headers.

CAUTION

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

1. Turn off engine and remove key.
2. Open left endshield.
3. Loosen three nuts (A), and jam nut on adjuster bolt (B).
4. Turn adjuster bolt (B) so that drive belts (C) can be slipped off pulleys (D) and (E).

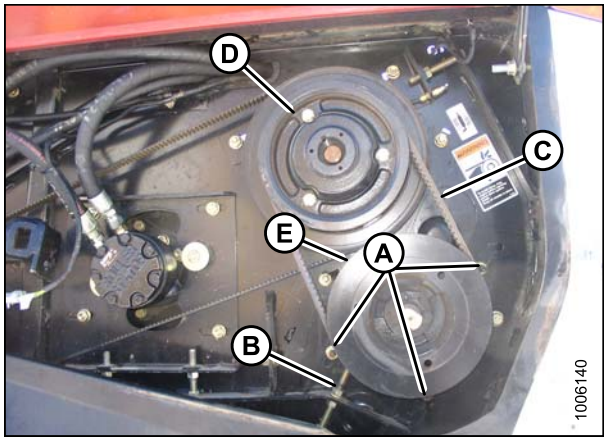

Figure 4.64: LH V-Belt

Installing Double V-Belts – A40-D Left Side

This procedure is applicable to A40-D Grass Seed and A40-D standard headers.

IMPORTANT:
Belts are a matched set. Replace both drive belts even if only one needs replacing.

NOTE:
When installing new belt, never pry belt over pulley. Be sure adjusting screw is fully loosened, then tension belt.

1. Slip belts (A) onto pulleys (B) and (C).

   IMPORTANT:
   To prolong belt and drive life, do not overtighten belts.

2. Turn adjuster bolt (D) to move pulley (B) until a force of 35–50 N (8–12 lbf) applied at mid-span to each belt deflects each belt (A) 4 mm (3/16 in.).
3. Tighten jam nut at (D), and three nuts (E).
4. Close endshield.

   NOTE:
   Readjust tension of a new belt after a short run-in period (about 5 hours).

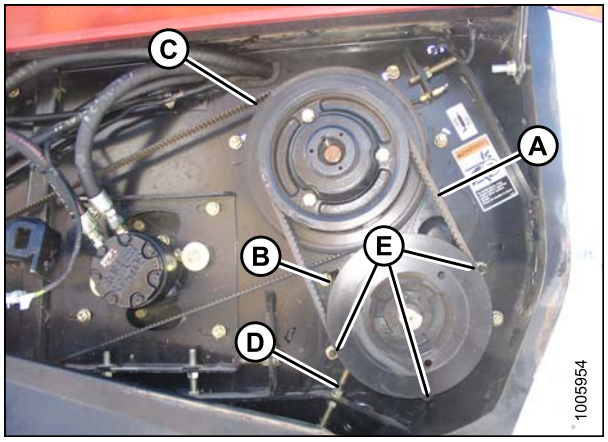

Figure 4.65: Left V-Belt

Checking/Adjusting Timing Belt Tension – A40-D Left Side

IMPORTANT:
To prolong belt and drive lift, do not overtighten belt.

⚠ CAUTION

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

1. Turn off engine and remove key.
2. Open left endshield.
3. Apply a force of 22–30 N (5–6.5 lbf) on belt (A) at mid-span. Belt should deflect 14 mm (9/16 in.). If necessary, adjust as follows:
   a. Loosen three nuts (B), and jam nut on adjuster bolt (C).
   b. Turn adjuster bolt (C) to move pulley (D) until required tension is achieved.
   c. Tighten jam nut at (C), and three nuts (B).
4. Close endshield.

NOTE:
Readjust tension of new belt after about 5 hours of operation.

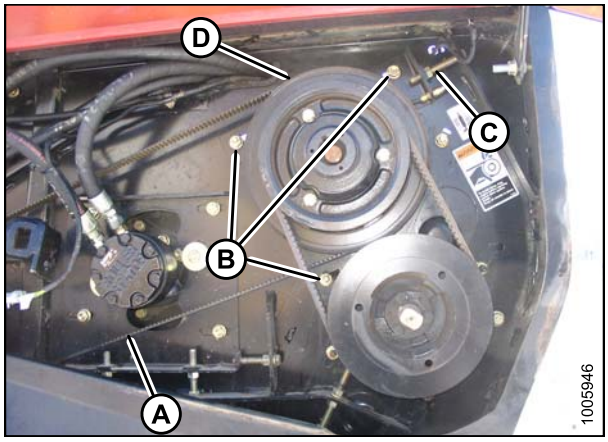

Figure 4.66: LH Timing Belt

Removing Timing Belt on Left Side

To remove the knife drive timing belt from the left side of an A40-D header, follow these steps:

1. Turn off engine and remove key.
2. Open shield on left-hand of the header.
3. Loosen the three bolts (A) that lock the bottom drive pulley in place.
4. Loosen adjusting bolt (B); this will loosen the belts.

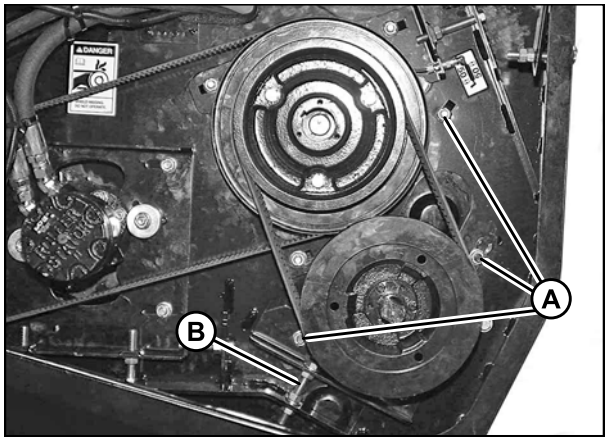

Figure 4.67: Gearbox Locking Bolts

5. Loosen the three bolts (A) that lock the pulley in position.
6. Loosen adjusting bolt (B); this will loosen the knife drive belt.
7. Remove the two belts (C) that drive the cross shaft.
8. Remove the knife drive timing belt (D) from the rear pulley.

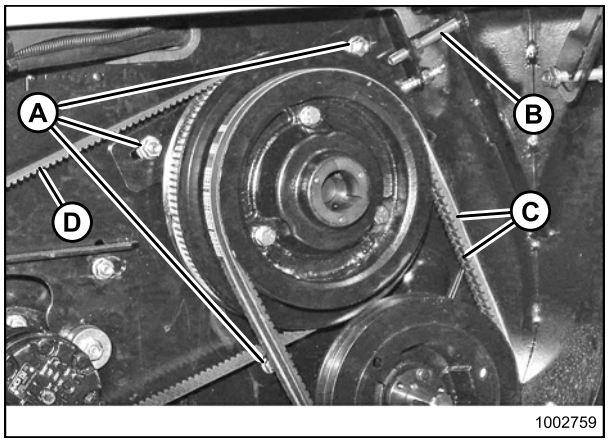

Figure 4.68: Belts Tension Bolts

9. Open the access panel (A) located beside the knife drive box. Line up the belt with the notch machined into the knife drive box pulley. Rotate the pulley with the belt in the notch until it is free for removal.

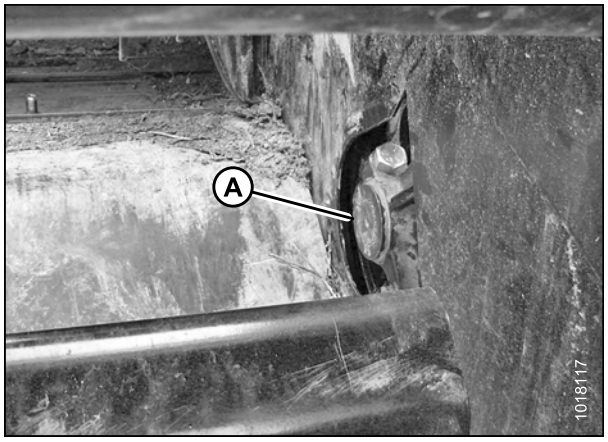

Figure 4.69: Knife Drive Belt Access Panel

NOTE:
Mark the ports and hoses and place port caps or plastic bags with tie wraps to prevent contamination.

10. To completely remove the belt, you will need to remove the two hoses (A) off of the auger drive motor, and disconnect the knife speed harness (B).

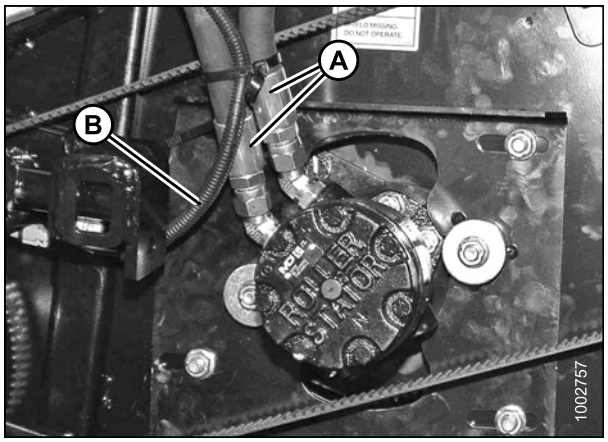

Figure 4.70: Auger Hoses

Installing Timing Belt – A40-D Left Side

This procedure is applicable to A40-D Grass Seed and A40-D Standard headers.

⚠ CAUTION

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

1. Route knife drive timing belt from inboard side of endsheet through opening (A).

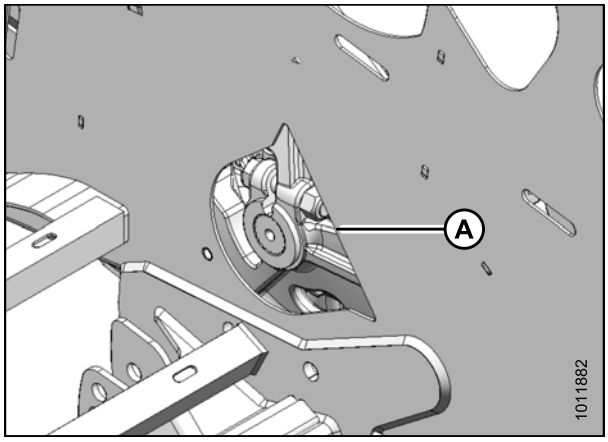

Figure 4.71: LH Inboard Opening

2. Locate knife drive belt (D) onto knife drive box pulley (F).
3. Route knife drive belt (D) onto knife drive pulley (E).

NOTE:
When installing new belt, never pry belt over pulley. Be sure adjusting screw is fully loosened, then tension belt.

IMPORTANT:
To prolong belt and drive life, do not overtighten belts.

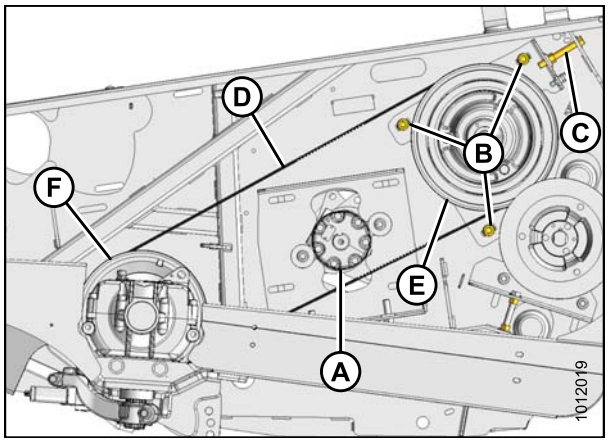

Figure 4.72: LH Timing Belt

4. Turn adjuster bolt (C) to move pulley (E) until a force of 22–30 N (5–6.5 lbf) deflects belt 14 mm (9/16 in.) at mid-span (D).
5. Tighten jam nut at (C), and three nuts (B).
6. Reconnect hoses onto hydraulic motor (A).
7. Install knife drive V-belts. Refer to *Installing Double V-Belts – A40-D Left Side, page 132*.
8. Install cover (B) in endsheet and secure with bolt (A).
9. Close endshield.

NOTE:
Readjust tension of a new belt after a short run-in period (about 5 hours).

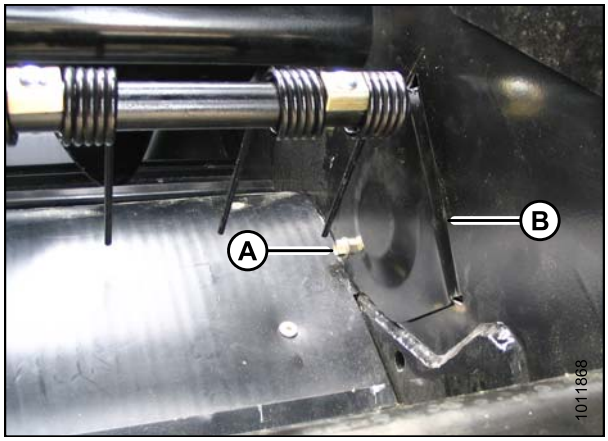

Figure 4.73: LH Inboard Cover

Checking/Adjusting Timing Belt Tension – A40-D Right Side

IMPORTANT:
To prolong belt and drive life, do not overtighten belt.

⚠ CAUTION

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

1. Turn off engine and remove key.
2. Open right endshield.
3. Apply a force of 22–30 N (5–6.5 lbf) on belt (D) at mid-span. Belt should deflect 14 mm (9/16 in.). If necessary, adjust as follows:
   a. Loosen three nuts (A), and jam nut on adjuster bolt (B).
   b. Turn adjuster bolt (B) to move pulley (C) until required tension is achieved.
   c. Tighten jam nut at (B), and three nuts (A).
4. Close endshield.

NOTE:
Readjust tension of new belt after about 5 hours of operation.

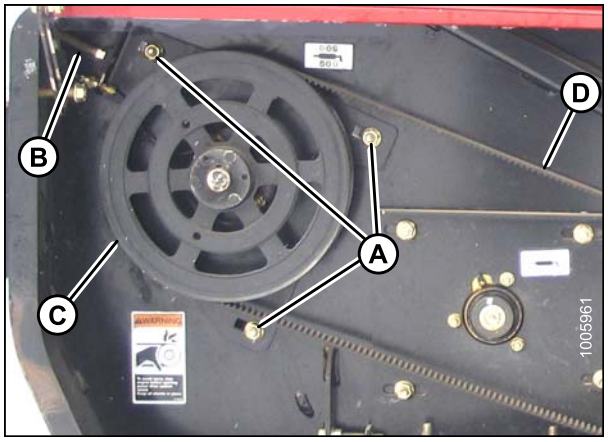

Figure 4.74: RH Timing Belt

Removing Timing Belt – A40-D Right Side

⚠ CAUTION

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

1. Remove bolt (A) and remove cover (B) in right endsheet.

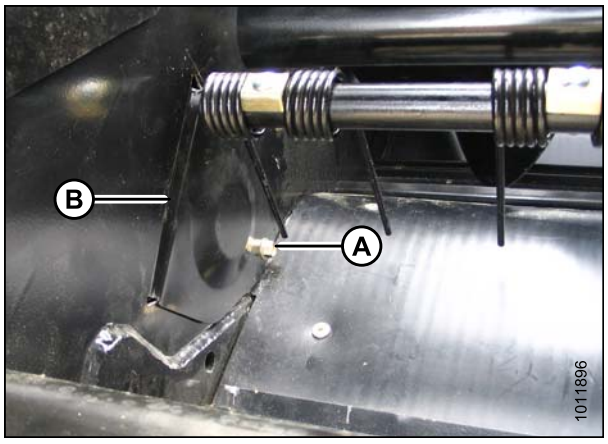

Figure 4.75: Right Inboard Cover

2. Open right endshield.
3. Loosen three nuts (A), and jam nut on adjuster bolt (B).
4. Turn adjuster bolt (B) so that knife drive belt (C) can be slipped off pulley (D).
5. Remove belt (C) from pulley (E) and remove belt through hole in endsheet.

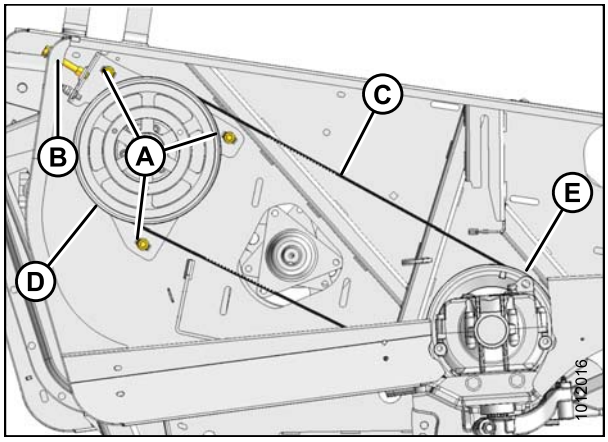

Figure 4.76: Right Timing Belt

Installing Timing Belt – A40-D Right Side

CAUTION

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

1. Route knife drive timing belt from inboard side of endsheet through opening (A).

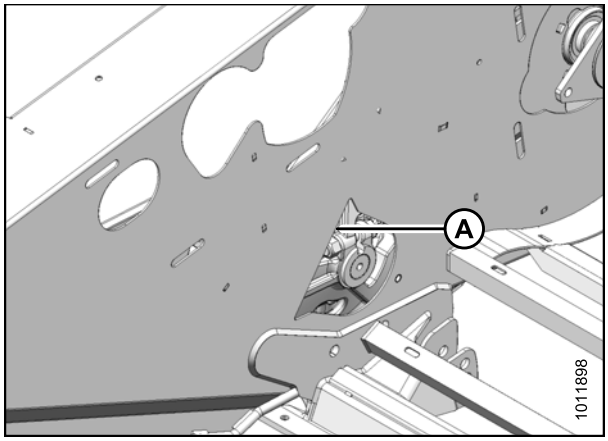

Figure 4.77: Right Inboard Opening

2. Locate belt (C) onto knife drive box pulley (E) and knife drive pulley (D) as shown.

   NOTE:
   When installing new belt, **NEVER** pry belt over pulley. Be sure adjusting screw is fully loosened, then tension belt.

3. Turn adjuster bolt (B) to move pulley (C) until a force of 22–30 N (5–6.5 lbf) deflects belt (C) 14 mm (9/16 in.) at mid-span.
4. Tighten jam nut at (B), and three nuts (A).

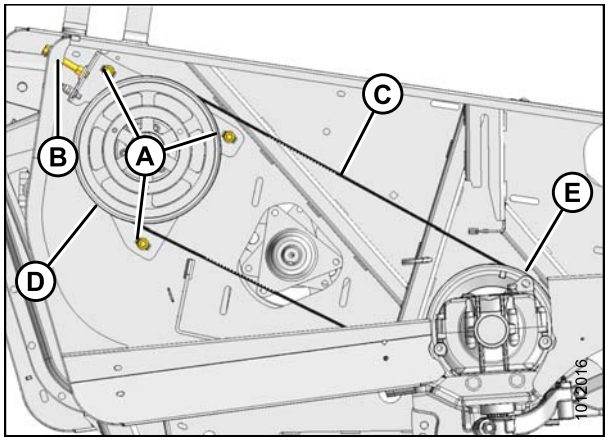

Figure 4.78: Right Timing Belt

5. Install cover (B) in endsheet at knife drive box and secure with bolt (A).
6. Close endshield.

NOTE:
Readjust tension of a new belt after a short run-in period (about 5 hours).

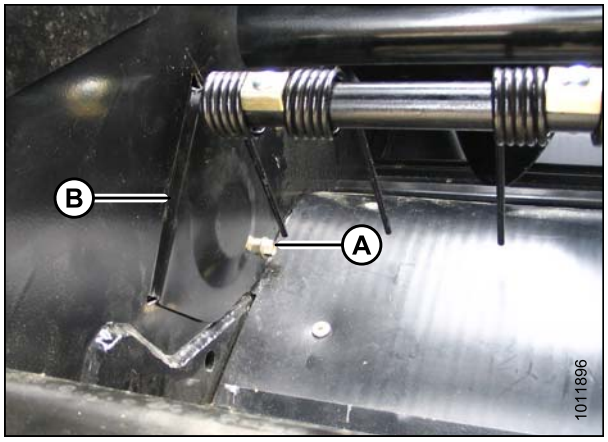

Figure 4.79: Right Inboard Cover

4.8.2 Reel Drive – A40-D

The reel drive gearbox and hydraulic motor are a factory-assembled unit. The gearbox is sealed, and requires no scheduled maintenance. If service is required for either the gearbox or motor, see your Dealer.

4.8.3 Auger Drive – A40-D

The A40-D header auger is driven directly from a hydraulic motor that is powered by the windrower hydraulics.

4.9 Reel Tines and Tine Bar Bearings – A40-D

Separate procedures are required to replace reel tines, depending on their location on the reel.

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

4.9.1 Replacing Tine and Bearing – A40-D: Cam End – Disc #1

NOTE:
It is recommended that a light coating of anti-sieze compound be applied to tine tube connections and all bolts prior to reassembly.

Replace tines and bearing at disc #1 (A) as follows:

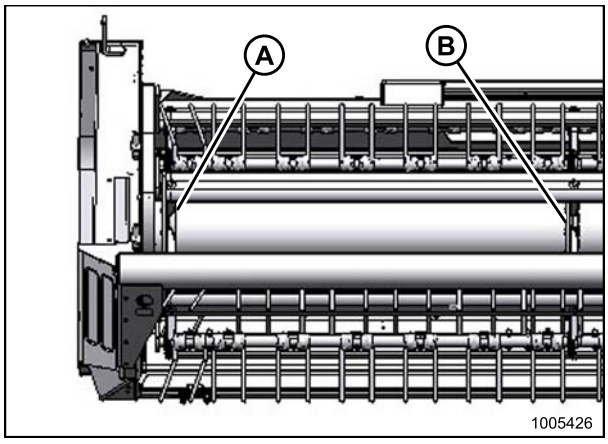

Figure 4.80: Cam End Discs

1. Loosen bolt on cover (A), and slide cover to expose hole in cam disc. Rotate reel, and align bearing with hole.

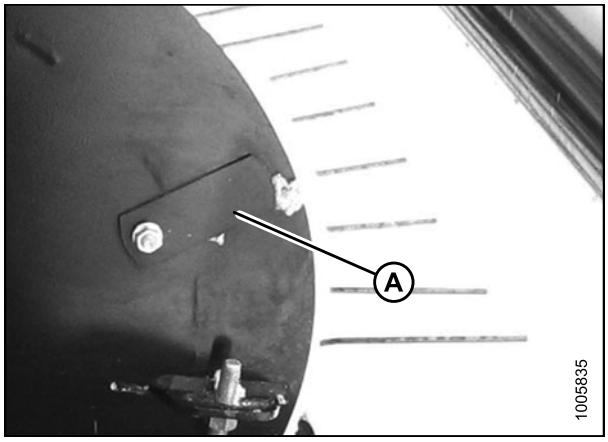

Figure 4.81: Cam Disc

2. Remove cam follower bearing bolt (A), bearing (B), and nut.
3. Disengage cam arm (C) from the cam track with a pry bar.
4. Remove flangette mounting bolts (D).

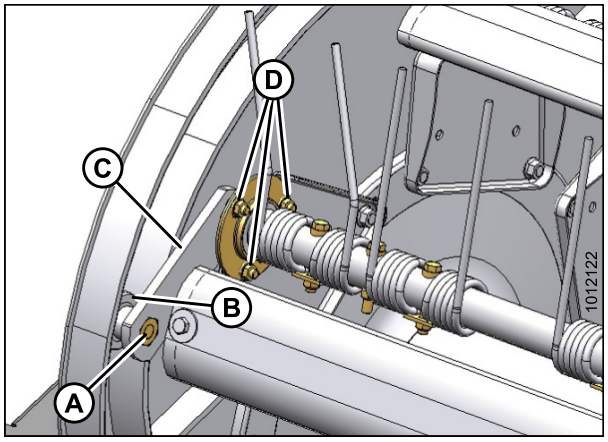

Figure 4.82: Cam Follower

5. Remove nuts (A), keepers (B), and shoulder bolts (C) that connect cam arm (D) and end tines (E) to tine bar.

   IMPORTANT:
   Tine attachment hardware and configuration may vary. Identify locations so that tine hardware will be reinstalled at same locations.

6. Position end of tine bar clear of cam disc, and remove cam arm assembly (D), complete with bearing assembly.

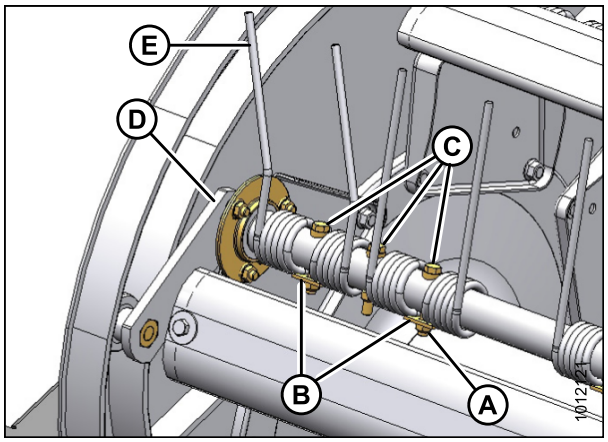

Figure 4.83: Tine Bar Type B

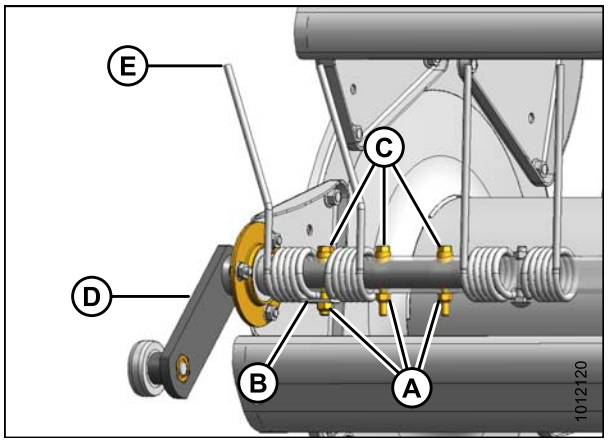

Figure 4.84: Tine Bar Type A

7. Replace bearing (A). Refer to *4.5.4 Installing Sealed Bearings, page 106*.

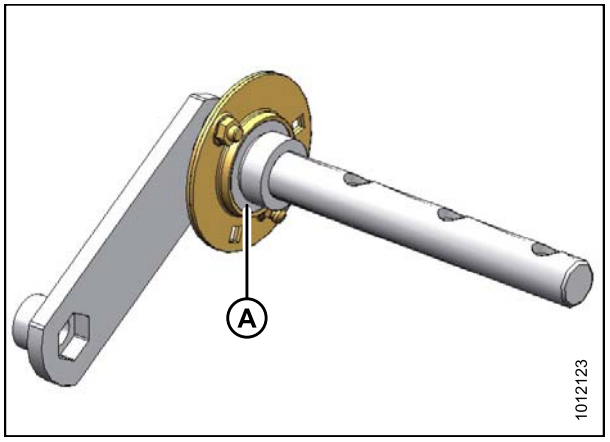

Figure 4.85: Cam Arm Assembly

8. Replace tines as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install replacement tine on tine bar and secure with bolt (A) and keeper (B). Install nut with flat side against tine bar.
   e. Slide remaining tines onto tine bar and attach to tine bar. Do **NOT** install bolts in end tines at this time.
9. Install cam arm assembly (A), complete with bearing onto tine bar.
10. Engage cam arm (A) into cam track as shown.
11. Attach bearing flangettes with bolts (B). Tighten bolts to 31–36 N·m (23–26 ft·lbf).
12. Lock the bearing.

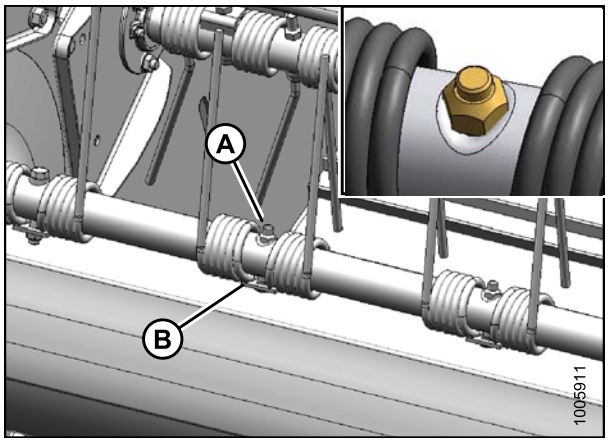

Figure 4.86: Tine Installation

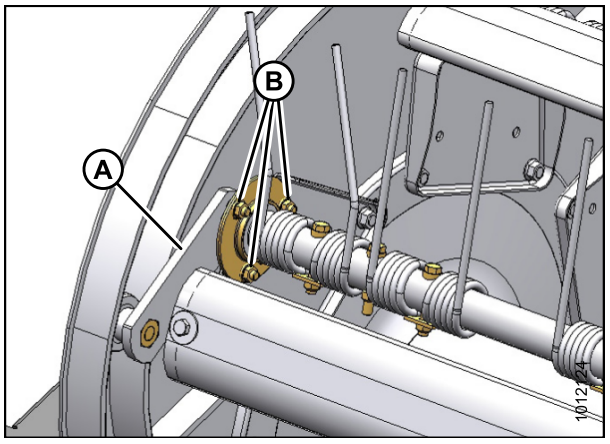

Figure 4.87: Cam End Tine Bar Early-Build 2015 with Shoulder Bolts (B) Tine Bar Shown

IMPORTANT:
It is recommended to replace hardware at cam end of tine bar with hardware as specified in the following steps.

13. Position tines as shown and install bolts (A) with keepers, spacers (B) and nuts (C).
14. Install bolts (D), spacers (B), and nuts (C) between tines as shown.
15. Alternate hardware configuration for later-build 2015, 2016 and later units:
    a. 5/16 x 2-1/2 Carriage Bolt (A), MD #136348
    b. Spacer (B), MD #170622
    c. Lock Nut (C), MD #018690
    d. 5/16 x 2 Hex Head Bolt (D), MD #21569

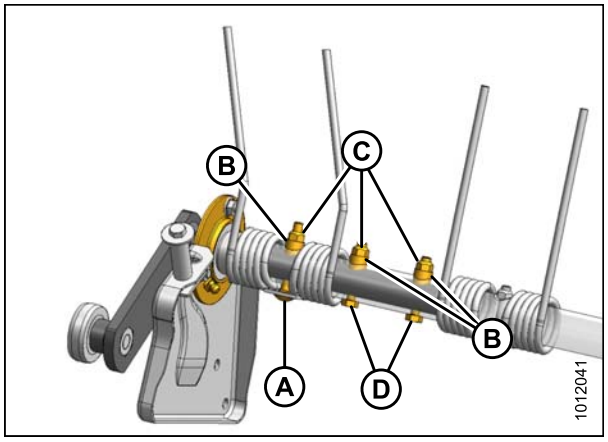

Figure 4.88: Type A Tine Bar – Later-Build 2015 Shown

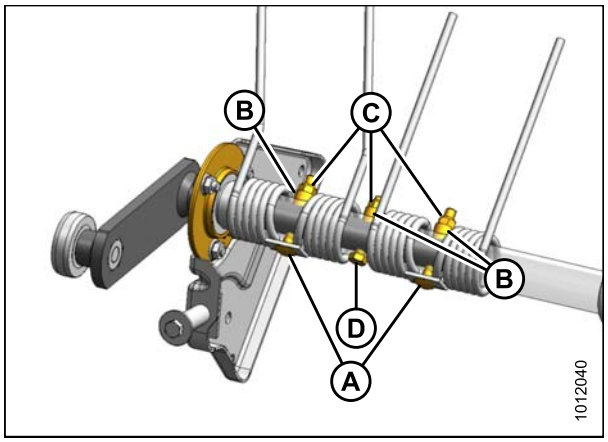

Figure 4.89: Type B Tine Bar – Later-Build 2015 Shown

16. Install cam follower bearing (A) with bolt (B). Apply Loctite® #262 (or equivalent) to bolt threads, and torque to 122 N·m (90 ft·lbf).

    IMPORTANT:
    Install nut with distorted thread **TOWARDS** bolt head.

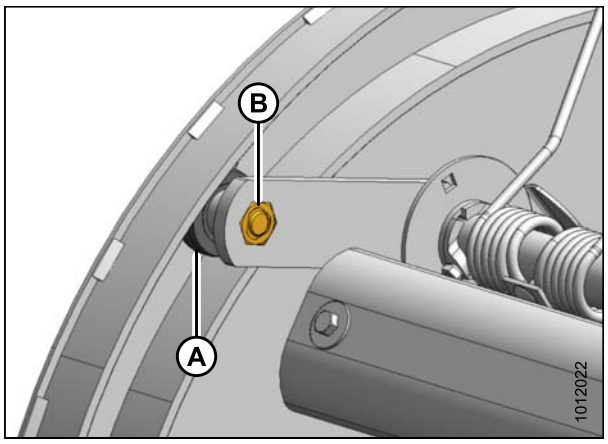

Figure 4.90: Cam Arm Bearing

17. Reposition cover (A) on cam, and tighten bolt.

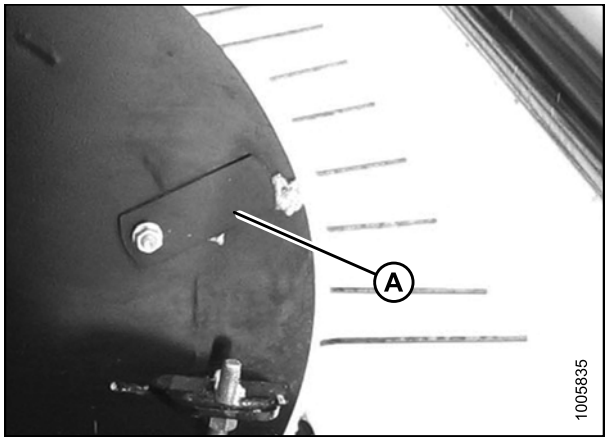

Figure 4.91: Cover

4.9.2 Replacing Tine and Bearing – A40-D: Disc #2

Replace tine and bearing at disc #2 (B) as follows:

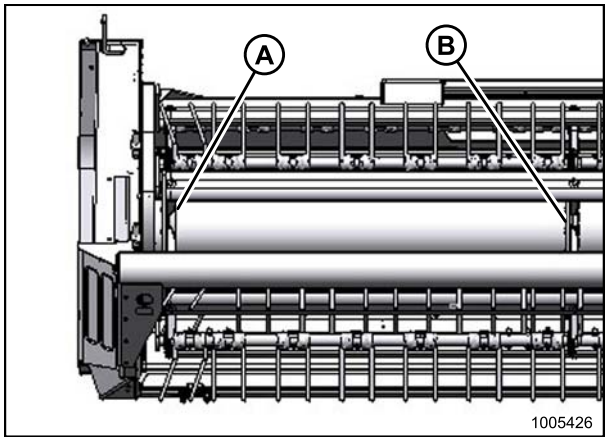

Figure 4.92: Cam End Discs

Type A Tine Bars

1. Remove flangette mounting bolts (A) at reel disc #2.
2. Remove shoulder bolts (B) and keeper (C) from tine bar.
3. Separate left tine bar (D) with bearing from center tine bar (E).
4. Remove tine from center tine bar (E).

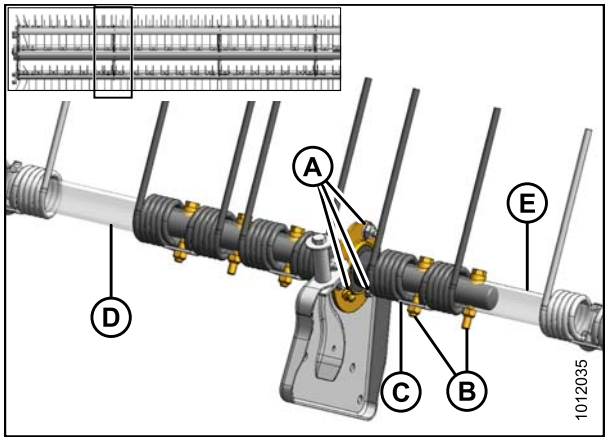

Figure 4.93: Tine Bar Type A

5. Remove bearing (A) from tine bar connecting shaft (B). Refer to *4.5.4 Installing Sealed Bearings, page 106*.
6. Remove nuts (C), shoulder bolts (D), keepers (E) from left tine bar (F) and remove tines (G).

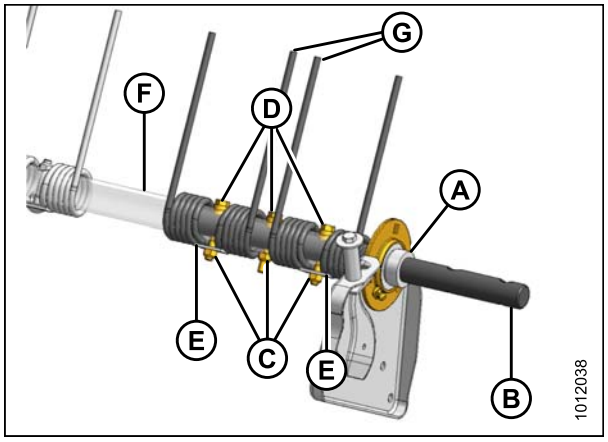

Figure 4.94: Tine Bar Type A

7. Replace tines as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install replacement tine on tine bar and secure with bolt (A) and keeper (B). Install nut with flat side against tine bar.
   e. Slide remaining tines onto tine bar and attach to tine bar. Do **NOT** install bolts in end tines at this time.
8. Install end tines (G) onto left tine bar (F) with shoulder bolts (D), keepers (E) and nuts (C).
9. Assemble new bearing (A) with flangettes onto connecting shaft (B). Refer to *4.5.4 Installing Sealed Bearings, page 106*.

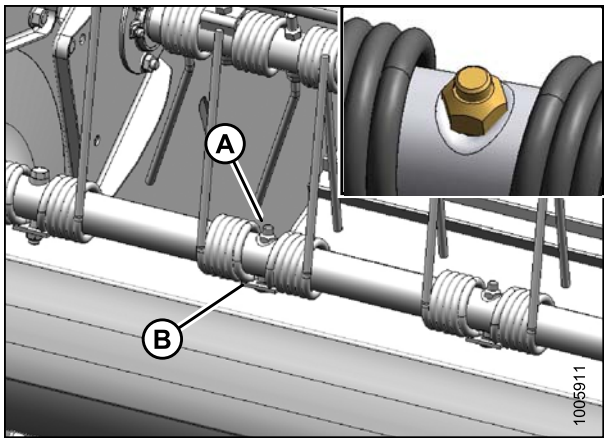

Figure 4.95: Tine Installation

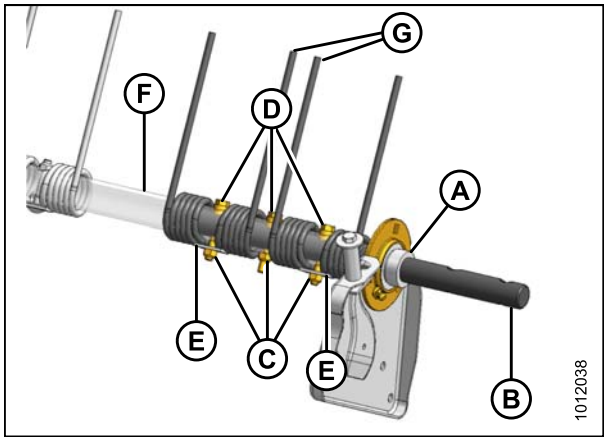

Figure 4.96: Tine Bar Type A

10. Slip new tine onto center tine bar (E).
11. Assemble left tine bar (D) to center tine bar (E) and secure with shoulder bolts (B), keeper (C), and nuts.
12. Install tine bar onto reel disc with hardware (A). Tighten bolts to 31–36 N·m (23–26 ft·lbf).

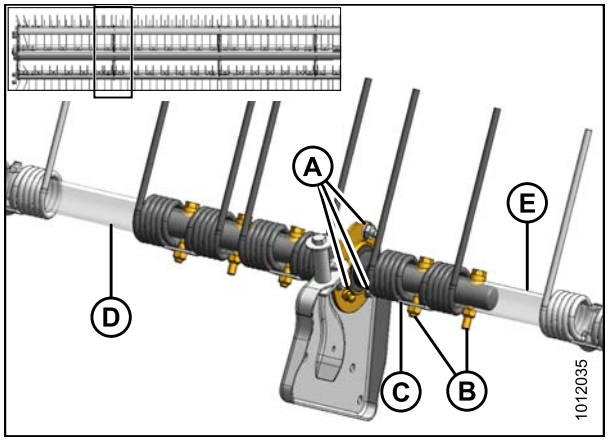

Figure 4.97: Tine Bar Type A

Type B Tine Bars

13. Remove flangette mounting bolts (A) at reel disc #2.
14. Remove shoulder bolts (B) and keeper (C) from tine bar.
15. Separate left tine bar (D) with bearing from center tine bar (E).
16. Remove tine from center tine bar (E).

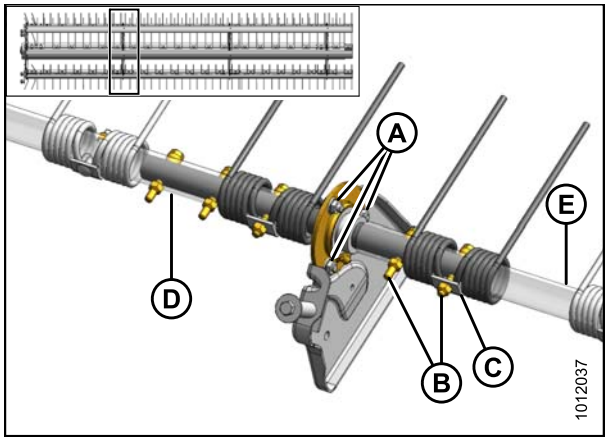

Figure 4.98: Tine Bar Type B

17. Remove bearing (A) from tine bar connecting shaft (B). Refer to *4.5.4 Installing Sealed Bearings, page 106*.
18. Remove nut (C), shoulder bolt (D), keeper (E) from left tine bar (F) and remove tine (G).

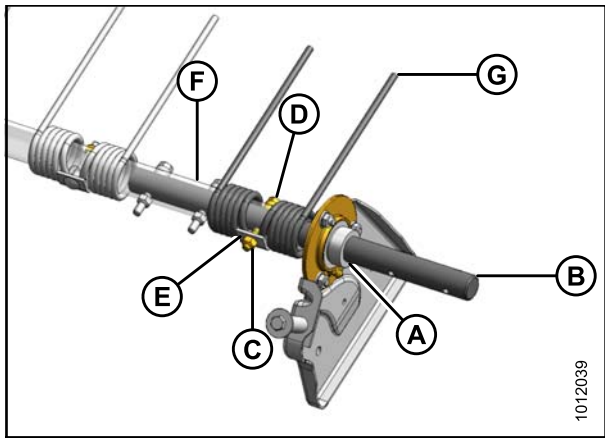

Figure 4.99: Tine Bar Type B

19. Install new tine (G) onto left tine bar (F) with shoulder bolt (D), keeper (E) and nut (C).
20. Assemble new bearing (A) with flangettes onto connecting shaft (B). Refer to *4.5.4 Installing Sealed Bearings, page 106*.

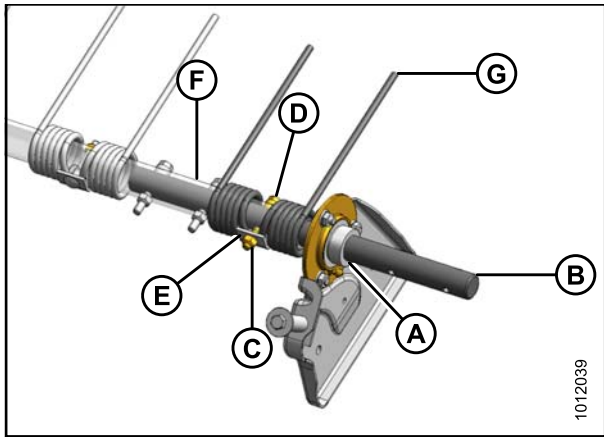

Figure 4.100: Tine Bar Type B

21. Replace tines as follows:
    a. Remove bolt (A) and keeper (B) on tine to be replaced.
    b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
    c. Slide tines off tine bar.
    d. Install replacement tine on tine bar and secure with bolt (A) and keeper (B). Install nut with flat side against tine bar.
    e. Slide remaining tines onto tine bar and attach to tine bar. Do **NOT** install bolts in end tines at this time.
22. Slip new tine onto center tine bar (E).
23. Assemble left tine bar (D) to center tine bar (E) and secure with shoulder bolt (B) and nut.
24. Secure tine onto center tine bar (E) with shoulder bolt (B), keeper (C) and nut.
25. Install tine bar onto reel disc with hardware (A). Tighten bolts to 31–36 N·m (23–26 ft·lbf).

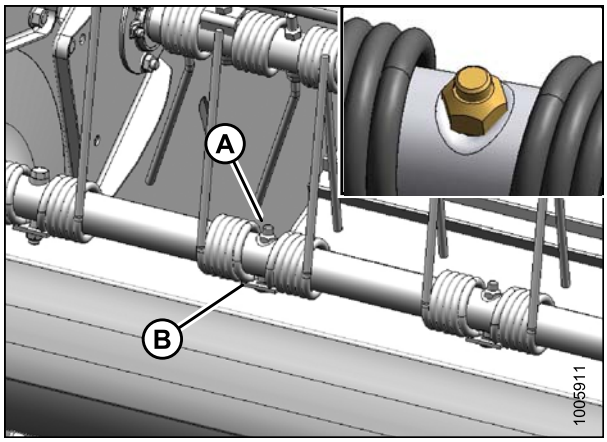

Figure 4.101: Tine Installation

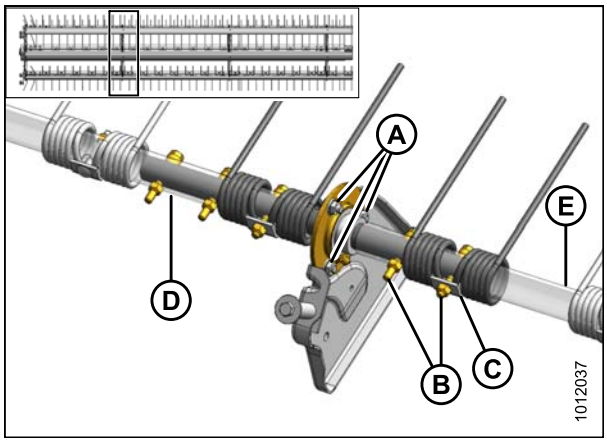

Figure 4.102: Tine Bar Type B

4.9.3 Replacing Tine and Bearing – A40-D: Center Section X

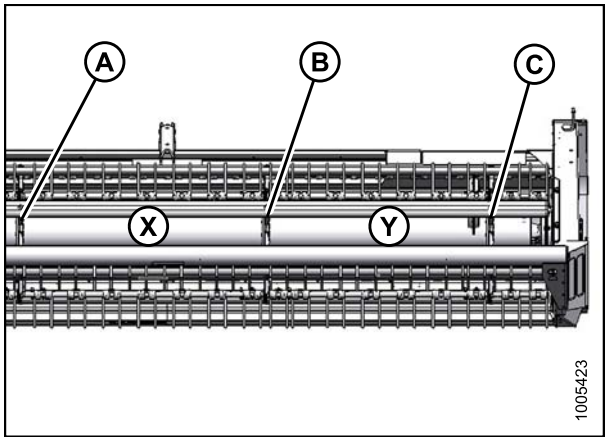

Figure 4.103: Center Section X

A - Disc #2
B - Disc #3
C - Disc #4
X - Section X
Y - Section Y

1. Remove flangette mounting bolts (A) at reel discs #3 and #4.

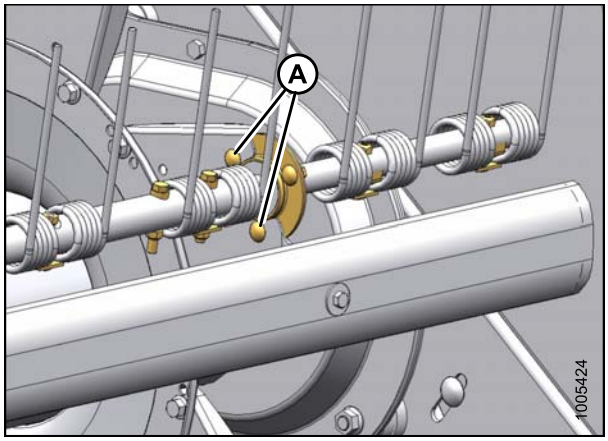

Figure 4.104: Disc #4

2. Remove shoulder bolts (B) and keeper (C) connecting tine bar sections '**X**' and '**Y**' at reel disc #3.
3. Lift tine bar away from reel arms, and remove complete tine bar section '**Y**' (including reel bearings at discs #3 and #4).
4. To replace tine bar bearing, refer to *4.5.4 Installing Sealed Bearings, page 106*.

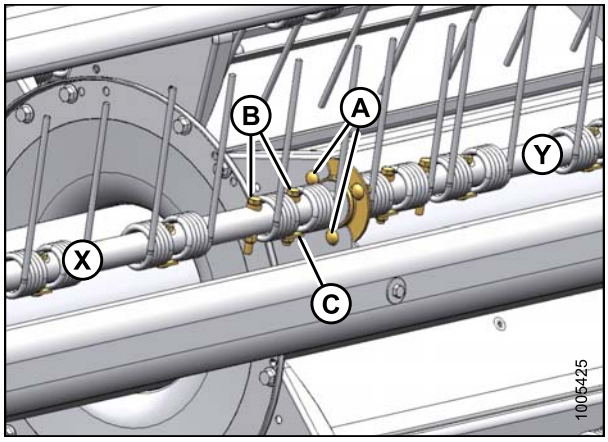

Figure 4.105: Disc #3

A - Flangette Mounting Bolts
B - Shoulder Bolts
C - Keeper
X - Section X
Y - Section Y

5. Remove tine as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install tines on tine bar, and secure with bolts (A) and keepers (B). Install nut with tapered side against tine bar. Do **NOT** install bolts in end tines at this time.

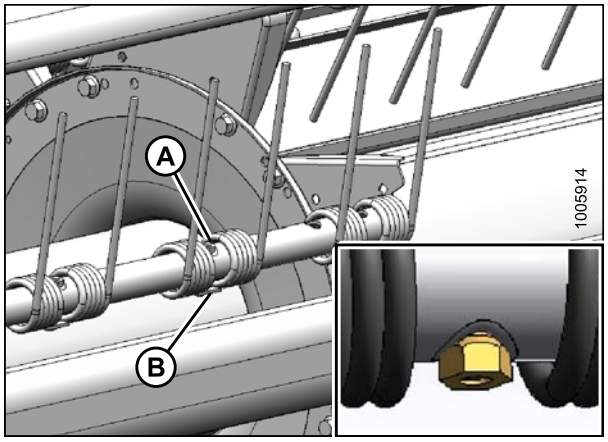

Figure 4.106: Disc #3

6. Assemble tine bar section '**Y**' (including reel bearings at discs #3 and #4) to tine bar section '**X**' at reel disc #3.
7. Position tines as shown, and install shoulder bolts (B) with keeper (C).

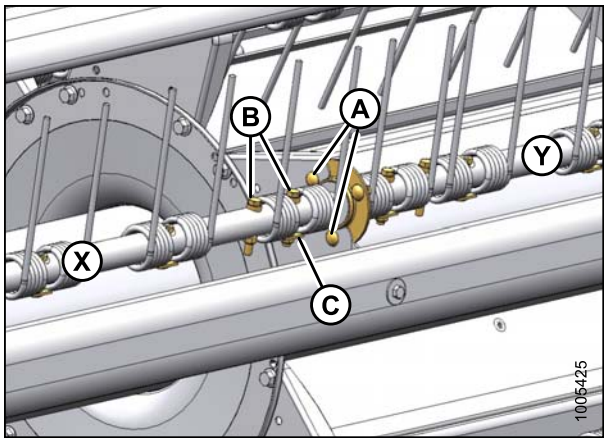

Figure 4.107: Disc #3

A - Flangette Mounting Bolts **B - Shoulder Bolts**
C - Keeper **X - Section X**
Y - Section Y

8. Attach bearing flangettes to reel arm at discs #3 and #4 with bolts (A). Tighten bolts to 31–36 N·m (23–26 ft·lbf).

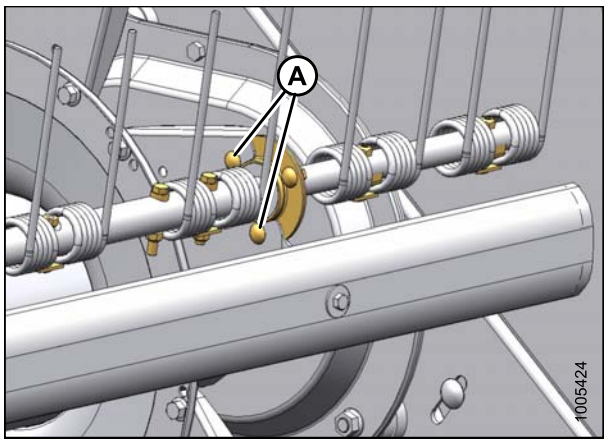

Figure 4.108: Disc #4

4.9.4 Replacing Tine and Bearing – A40-D: Opposite Cam – Section Y

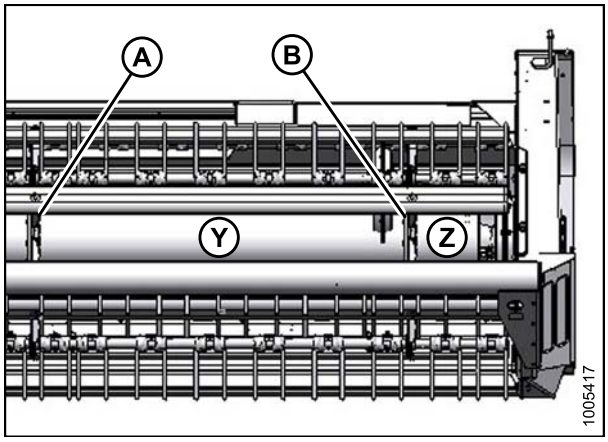

Figure 4.109: Opposite Cam – Section Y

A - Disc #3
B - Disc #4
Y - Section Y
Z - Section Z

1. Remove shoulder bolts (A) and keeper (B) connecting tine bar sections '**Z**' and '**Y**' at reel disc #4.
2. Remove flangette mounting bolts (C) at reel disc #4.
3. Lift tine bar away from reel arms, and remove complete tine bar section '**Z**', complete with bearing assembly.
4. To replace tine bar bearing, refer to *4.5.4 Installing Sealed Bearings, page 106*.

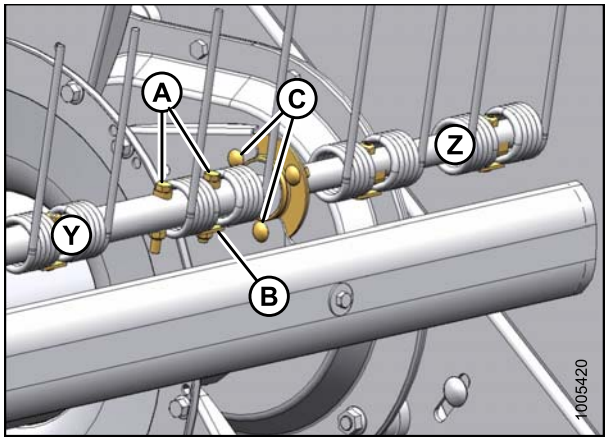

Figure 4.110: Disc #4

A - Shoulder bolts
B - Keeper
C - Flangette Mounting Bolts
Y - Section Y
Z - Section Z

5. Replace tine as follows:
   a. Remove bolt (A) and keeper (B) on tine to be replaced.
   b. Remove bolts and keepers on tines as required to facilitate replacement of damaged or worn tine.
   c. Slide tines off tine bar.
   d. Install tines on tine bar, and secure with bolts (A) and keepers (B). Install nut with tapered side against tine bar. Do **NOT** install bolts in end tines at this time.
6. Install tine bar extension '**Z**' including bearing to section '**Y**' at reel disc #4.

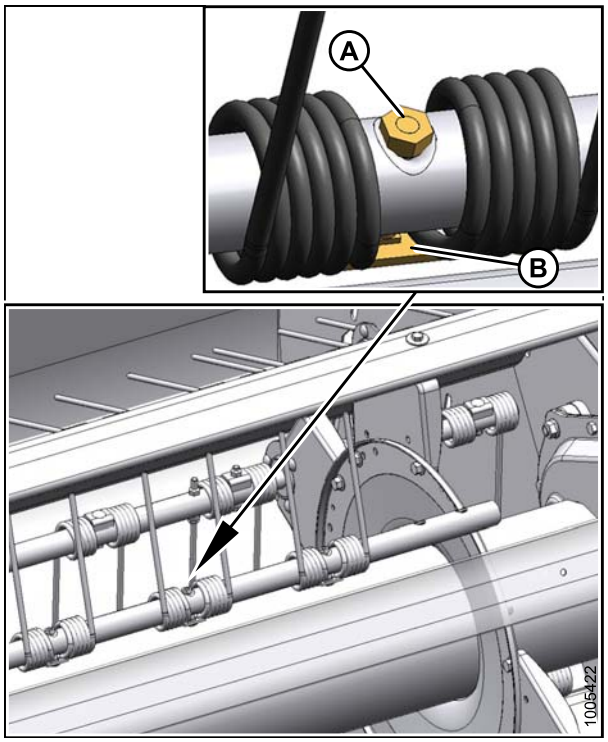

Figure 4.111: Disc #4

A - Bolt **B - Keeper**
Y - Section Y

7. Install shoulder bolts (A) and keeper (B) with tine to connect tine bar extension.
8. Install flangette mounting bolts (C) at reel disc #4. Tighten to 21–27 N·m (16–20 ft·lbf).

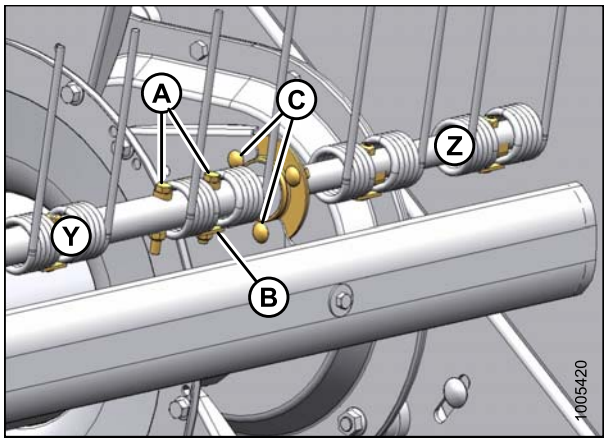

Figure 4.112: Disc #4

A - Shoulder Bolts **B - Keeper**
C - Flangette Mounting Bolts **Y - Section Y**
Z - Section Z

4.9.5 Replacing Tine – A40-D: Tine Bar Extension – Section Z

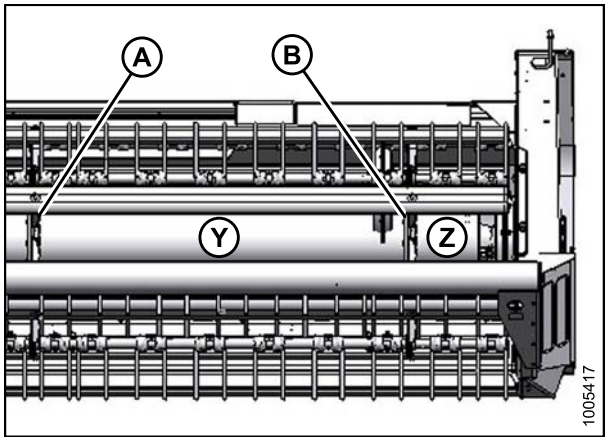

Figure 4.113: Tine Bar Extension – Section Z

A - Disc #3 **B - Disc #4**
Y - Section Y **Z - Section Z**

1. Remove bolt (A) and keepers (B) on tine to be replaced, and slide tines off tine bar.

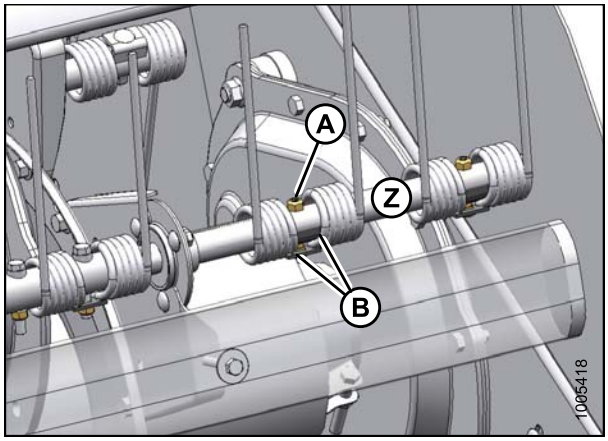

Figure 4.114: Disc #4

A - Bolt **B - Keepers**
Z - Section Z

2. Install tines on tine bar, and secure with bolt (A) and two keepers (B). Tine (C) must be clamped between keepers (B). Install nut with flat side against tine bar extension.

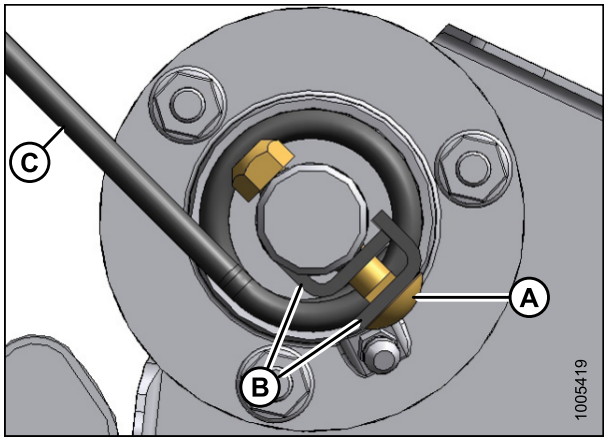

Figure 4.115: End View of Tine Bar

A - Bolt **B - Keepers**
C - Tine

4.10 Straightening Auger Pans

The high density polyethylene auger pans are repairable and replaceable. Refer to your Dealer for details on replacing the pans.

IMPORTANT:
To prolong the life of the auger pan, be sure to check that reel tines do not contact the pans when adjusting the reel position or tine pitch.

Stones and other debris can deform the polyethylene pans. If this occurs, the pans can be straightened.

CAUTION

To avoid personal injury, before servicing header or opening drive covers, follow procedures in *4.1 Preparing for Servicing, page 93*, and *1 Safety, page 1*.

1. Heat the deformed area with a heat gun until the polyethylene is almost sticky.
2. Push out the dent, and then apply a cold wet rag. Keep wetting the rag in cold water, and applying it on the area until cool. This ensures the polyethylene retains its shape.

NOTE:
If the dent is too severe, and has stretched the polyethylene, it may be necessary to locally remove the polyethylene. Use a plastic welder to rejoin the material. Replacement pans are also available from your Dealer.

4.11 Replacing Rubber Fingers

Rubber fingers should be replaced if missing or damaged.

To replace a rubber finger, follow these steps:

1. Remove nut and bolt (A), and then remove finger (B).
2. Position new finger in holder, and then install bolt and nut. Rubber finger should be free to move after bolt is tightened.

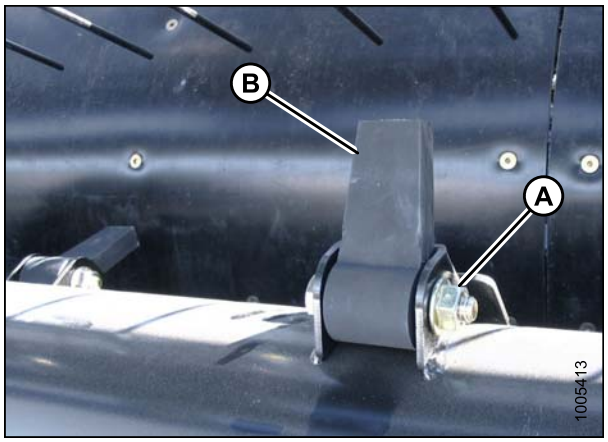

Figure 4.116: Auger Finger

4.12 Stripper Bar

Stripper bars help prevent the crop from wrapping around the auger and improve crop flow into the conditioner.

To maintain 1–4 mm (1/32–5/32 in.) clearance (B) between auger (A) flighting and stripper bars, bars may need replacing due to wear or damage. Shims may also need to be installed to compensate for local irregularities in the structure.

If after adjusting stripper bars, auger position needs to be adjusted, refer to *3.5.4 Setting Auger Position, page 63*.

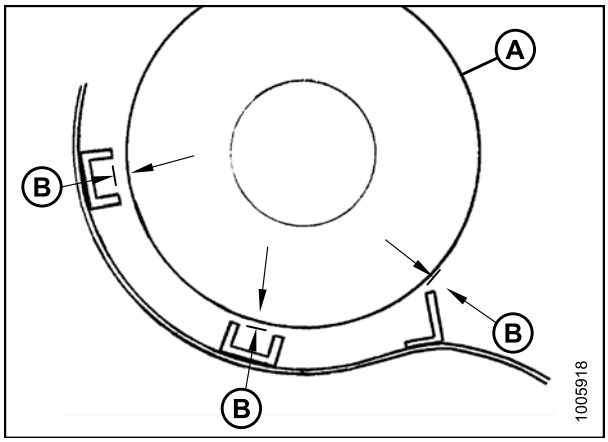

Figure 4.117: Auger to Stripper Bar Clearance

4.12.1 Removing Stripper Bar

Heavy crops may cause plugging across the auger due to restricted flow at the stripper bars. To address this problem, remove the lower stripper bar (A), and if necessary, the center stripper bar (B) at each end of the header.

WARNING

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

WARNING

To avoid bodily injury or death from fall of raised machine, always lock-out lift cylinders before going under header for any reason.

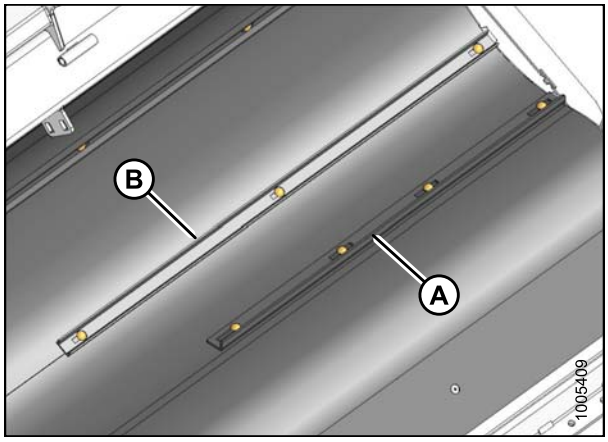

Figure 4.118: Stripper Bars

To remove a stripper bar, follow these steps:

1. Turn off engine and remove key.
2. Remove bolts attaching stripper bar to pan.
3. Remove four nuts and bolts (A) that secure stripper bar (B) to the pan.
4. Replace bolts in pan.

NOTE:
Special countersunk bolts are available from your Dealer.

4.12.2 Replacing Stripper Bars

WARNING

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

1. Remove four nuts and bolts (A) that secure each stripper bar (B) (left-hand and right-hand) to the pan, and remove bars. There are six bars in total.
2. Position new bars (B) on pan as shown, with upper flange on front bar facing forward.
3. Install three bolts and nuts (A) in each bar, and torque to 203 N·m (150 ft·lbf).
4. Check clearance between auger and stripper bars.
5. Loosen bolts (A), and add shims between stripper bars and pan at bolt locations as required to obtain clearance as shown.
6. Retighten bolts to specified torque.

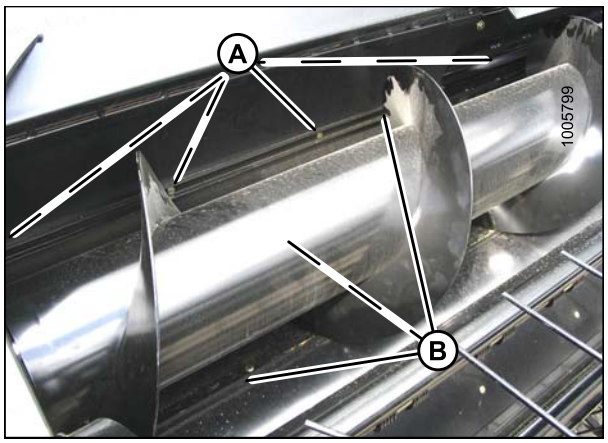

Figure 4.119: Stripper Bars

4.12.3 Installing Front Stripper Bar Extensions

Extensions for the front stripper bar are provided for installation (if required for certain crop conditions), especially in tall crops that cause material to bunch up at the ends of the conditioner rolls.

Stripper bar extensions will allow the auger to carry the crop more towards the center, rather than prematurely feeding it to the conditioner.

WARNING

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

To install front stripper bar extensions, follow these steps:

1. Turn of engine and remove key.
2. Raise header, and engage lift cylinder stops.
3. Remove nuts and carriage bolts (A) securing the two extensions (B) to underside of header pan support, and retain for reinstallation.

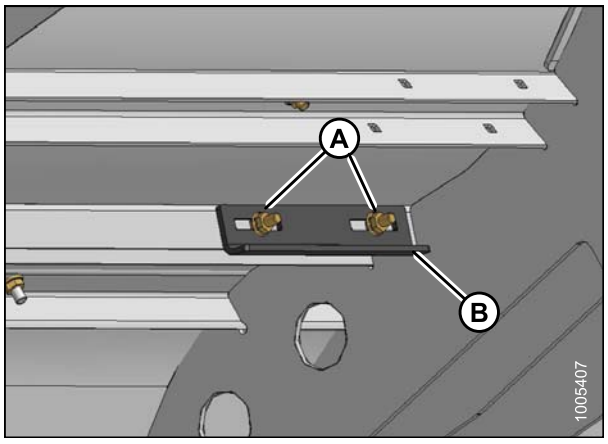

Figure 4.120: Stripper Bar Extension

4. Position extension (D) at inboard end of front stripper bars (E), and mark locations of the two holes onto the plastic pan.
5. Drill two 8 mm (5/16 in.) holes at these locations.
6. Install extension with previously removed carriage bolts (C).
7. Repeat above steps for other extension.

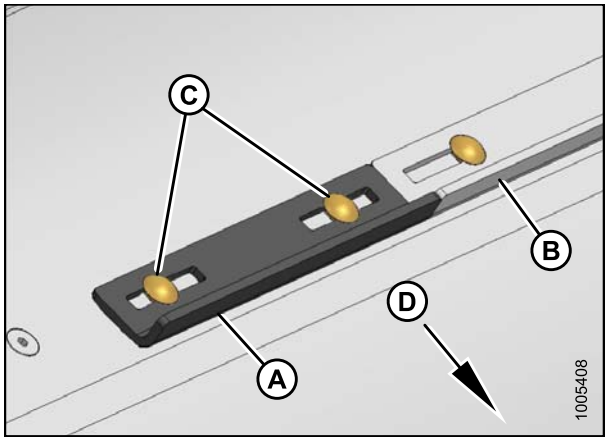

Figure 4.121: Stripper Bar Extension

A - Stripper Bar Extension **B - Stripper Bar**
C - Carriage Bolts **D - Forward**

4.13 Conditioner

CAUTION

To avoid personal injury, before servicing header or opening drive covers, follow procedures in *4.1 Preparing for Servicing, page 93*.

4.13.1 Changing Gearbox Oil

NOTE:
Change conditioner drive gearbox lubricant after the first 50 hours of operation, and every 1000 hours (or 3 years) thereafter.

To change the oil in the conditioner gearbox, follow these steps:

1. Lower header to ground.
2. Turn off engine and remove key.
3. Open driveline shield (A).

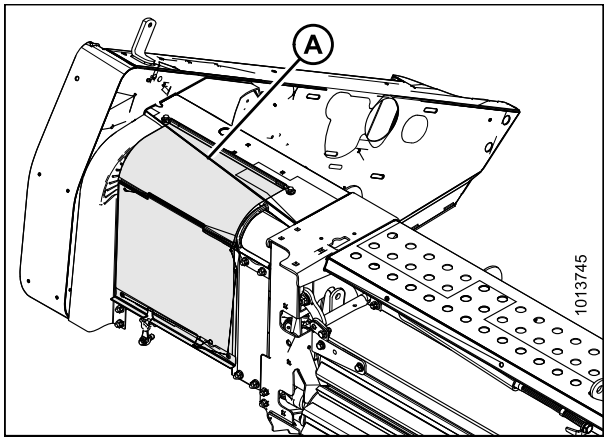

Figure 4.122: Driveline Shield

4. Place a suitable container under gearbox drain to collect oil.
5. Remove breather (A) and check plug (B).

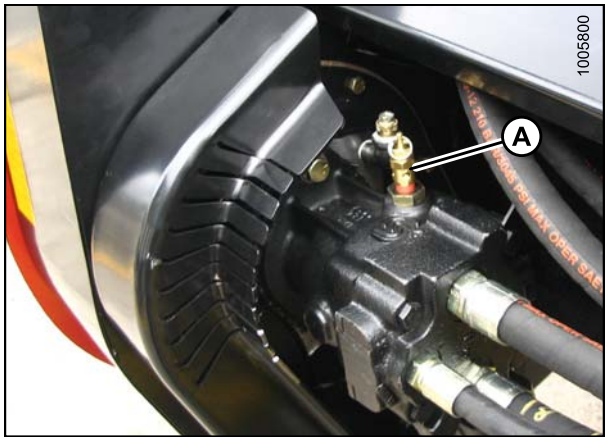

Figure 4.123: Gearbox Breather

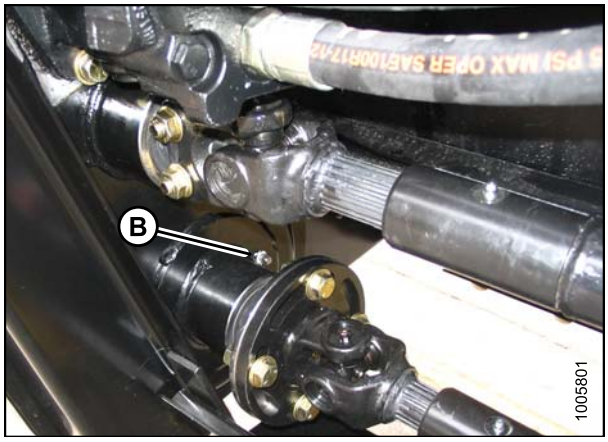

Figure 4.124: Check Plug

6. Remove drain plug (C) and allow oil to drain.
7. Replace drain plug (C), and add oil at (A) to required level. Use gear lubricant, SAE 85W-140, API Service Class GL-5, 1.4 liters (1.5 quarts).
8. Oil is at required level when it runs out of check plug (B).

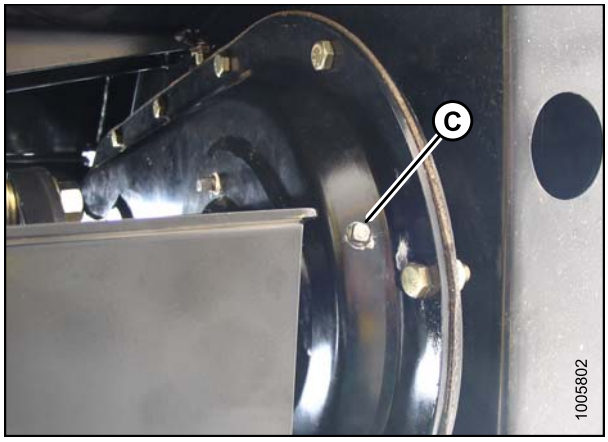

Figure 4.125: Gearbox Drain

4.13.2 Removing Forming Shield – A40-D

1. Turn off engine and remove key.
2. Remove hairpins (B), and washers that secure straps (A) to frame.
3. Hold onto forming shield, and slip straps off pins. Lower forming shield to ground.

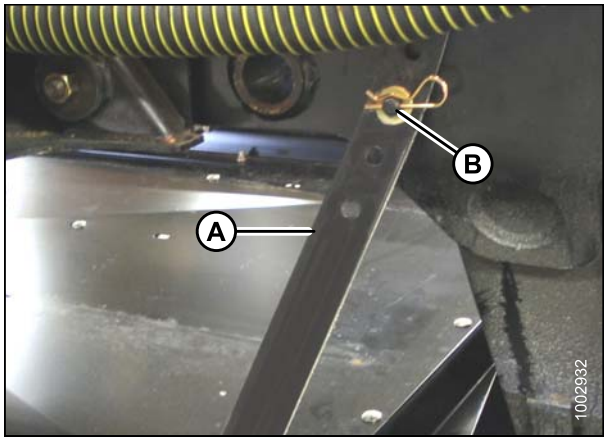

Figure 4.126: Forming Shield

4. Remove two clevis pins (B) from forming shield forward end.
5. Lift forming shield off bolts (A) in windrower legs, and lower to ground. Replace clevis pins in forming shield.
6. Slide forming shield out from under windrower, or drive windrower away from forming shield.

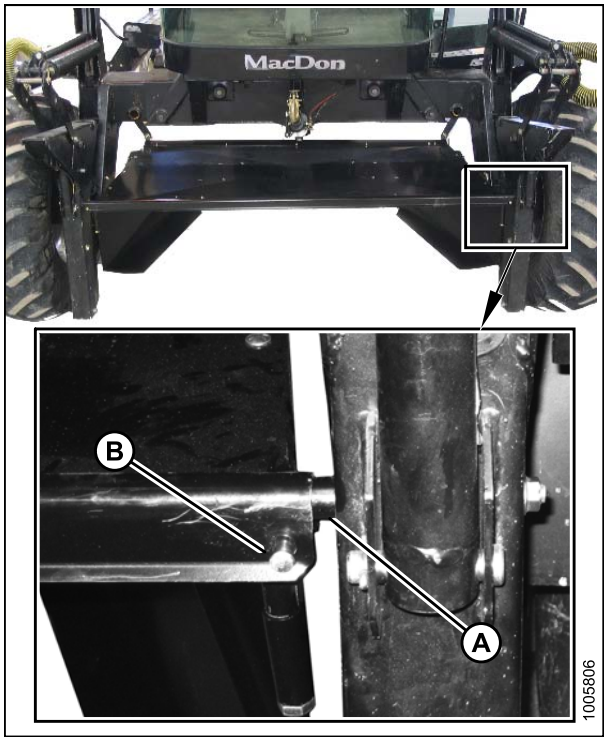

Figure 4.127: Forming Shield

4.13.3 Disassembling Forming Shield – A40-D

To disassemble the forming shield, follow these steps:

1. Invert forming shield onto top.
2. Remove lynch pin (A) from adjuster rods (B), and disassemble rods from side deflectors (C).

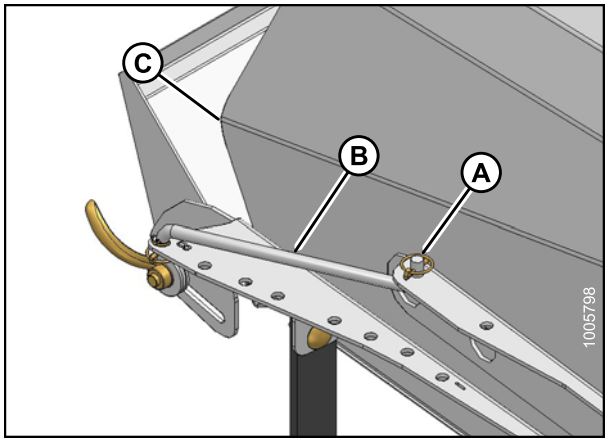

Figure 4.128: Forming Shield

3. Disassemble nut (A) from bolt (B), and lift deflector (C) and washer (D) off forming shield. Repeat for other deflector.

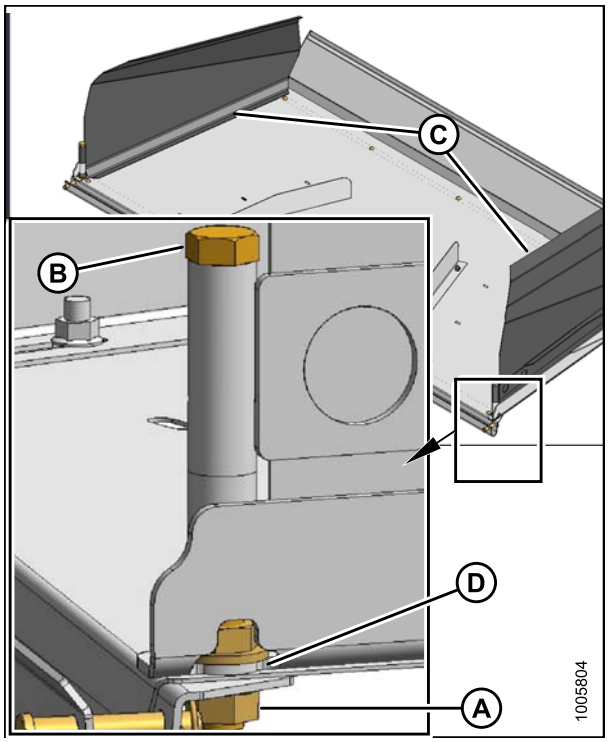

Figure 4.129: Forming Shield

4. Disassemble locking handles (A), and remove bolts.
5. Disassemble fluffer shield (B) from forming shield cover.

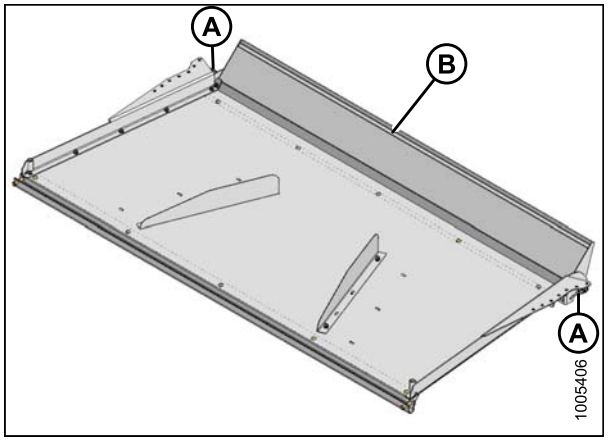

Figure 4.130: Cover

6. Remove bolts (A) to remove deflector fins (B) from cover.

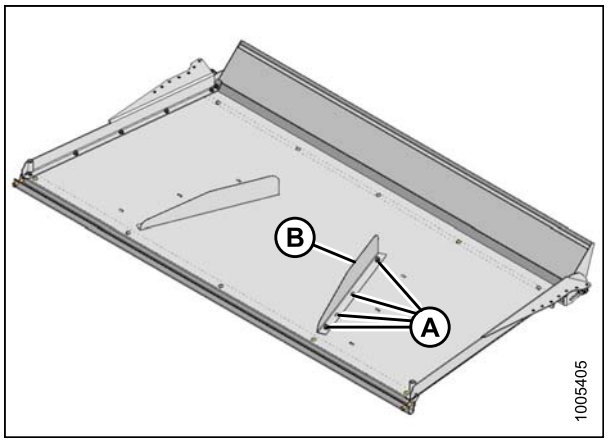

Figure 4.131: Cover

4.13.4 Assembling Forming Shield – A40-D

To assemble the forming shield, follow these steps:

1. Attach deflector fins (B) to forming shield cover with bolts (A).

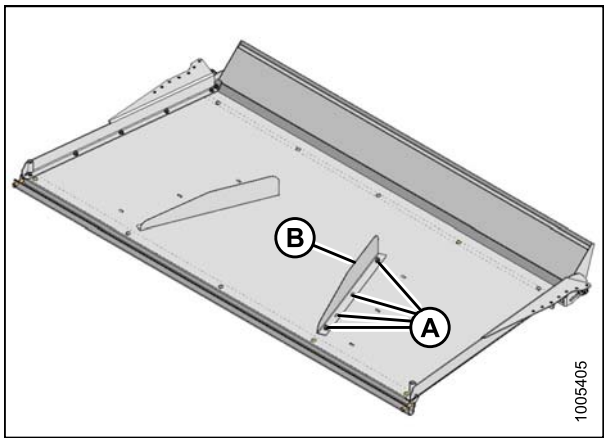

Figure 4.132: Cover

2. Attach fluffer shield (B) to forming shield cover.
3. Attach locking handles (A) to forming shield cover with bolts.

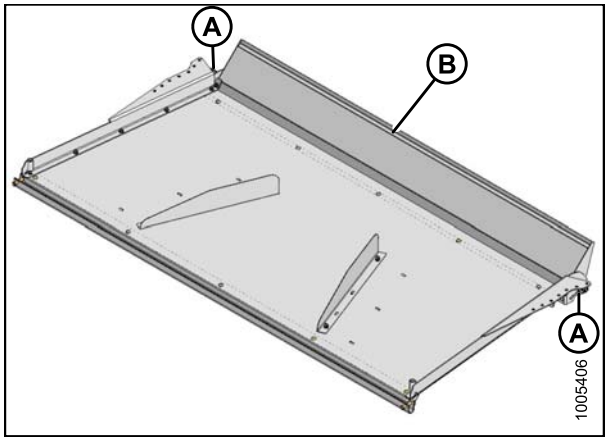

Figure 4.133: Cover

4. Attach deflectors (C) and washers (D) to forming shield cover with nuts (A) and bolts (B).

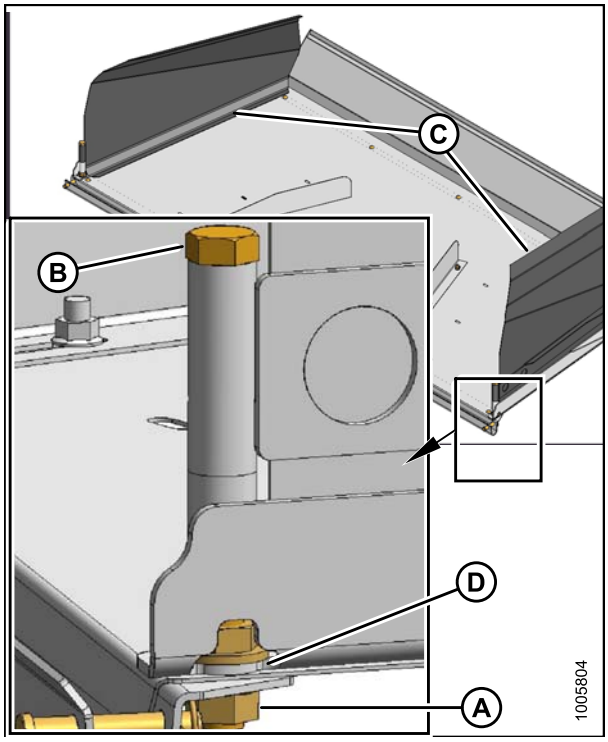

Figure 4.134: Forming Shield

5. Attach adjuster rods (B) to side deflectors (C) with lynch pin (A).

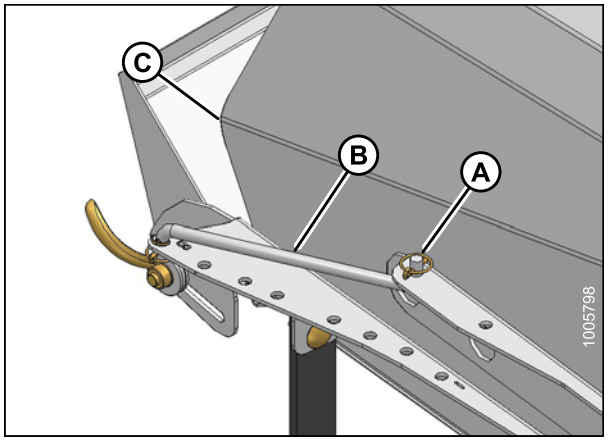

Figure 4.135: Forming Shield

4.13.5 Installing Forming Shield – A40-D

To install forming shield, follow these steps:

1. Turn off engine and remove key.
2. Remove two clevis pins (A) from forming shield forward end.

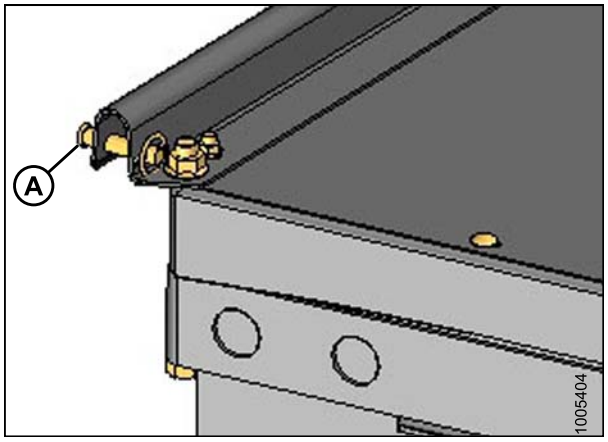

Figure 4.136: Forming Shield

3. Position forming shield (A) under the windrower frame.

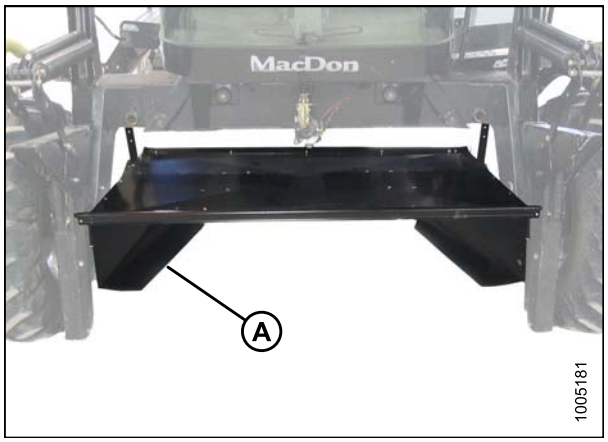

Figure 4.137: Forming Shield

4. Lift forming shield onto bolts (A) in windrower legs, and secure with clevis pins (B) and hairpin.

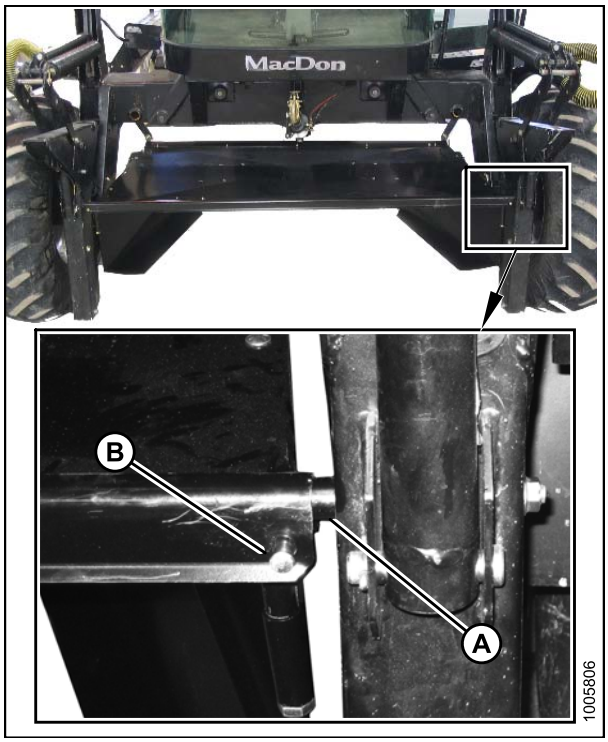

Figure 4.138: Forming Shield

5. Lift aft end of forming shield, and attach straps (A) to pins (B) on windrower frame. Install washer and hairpin to secure strap. Use the middle hole, and adjust height to suit the crop.

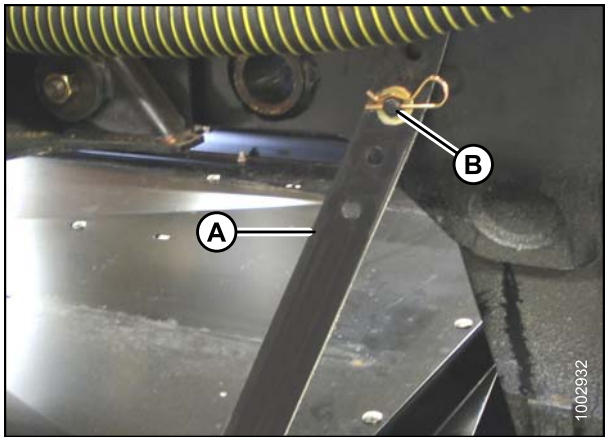

Figure 4.139: Straps

6. Set forming shield side deflectors to desired width by repositioning adjuster bars (A). Use the same hole location on both sides.
7. Adjust fluffer shield (B) to middle position. Loosen handles (C) if required.

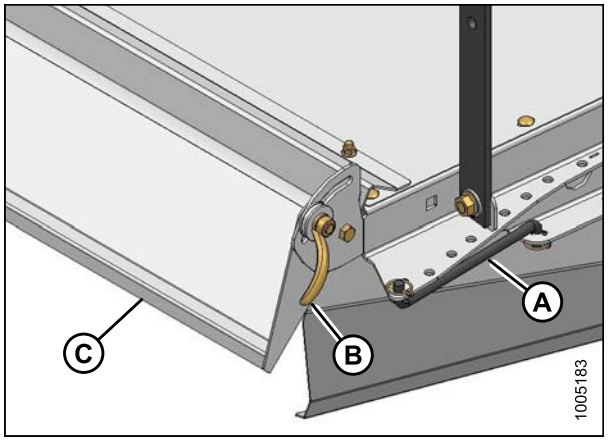

Figure 4.140: Forming Shield

4.13.6 Removing Header Drive Motor

This procedure applies to A40-D (except Grass Seed) double-knife headers.

CAUTION

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

1. Shut down the engine and remove key from ignition.
2. Open conditioner drive shield.

   IMPORTANT:
   Mark hoses and make a diagram of hose routing. This is useful during reassembly.

3. Disconnect hoses at couplers on motor.
4. Remove two bolts (A) securing motor to gearbox, and remove motor.

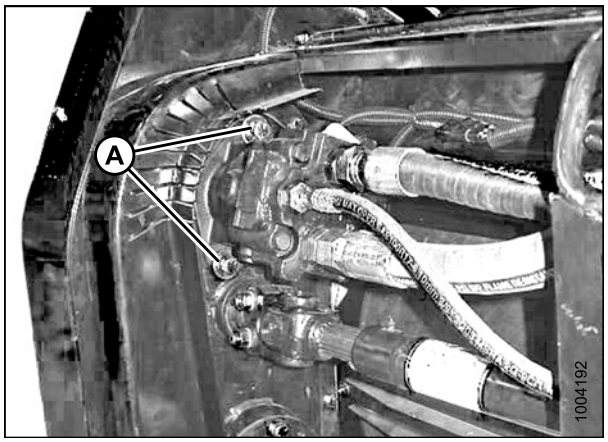

Figure 4.141: Header Drive Motor

4.13.7 Installing Header Drive Motor

This procedure applies to A40-D (except Grass Seed) double-knife headers.

CAUTION

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

Install hydraulic motor onto the gearbox as follows:

1. Turn off engine and remove key.
2. Apply light coat of silicone to motor flange, and position motor on gearbox as shown until mounting holes are aligned, and pinion engages gear in gearbox.
3. Clean off excess sealant from motor flange and gearbox face.
4. Install bolts (A) and washers, and torque to 102 N·m (75 ft·lbf).
5. Reconnect hoses to motor.

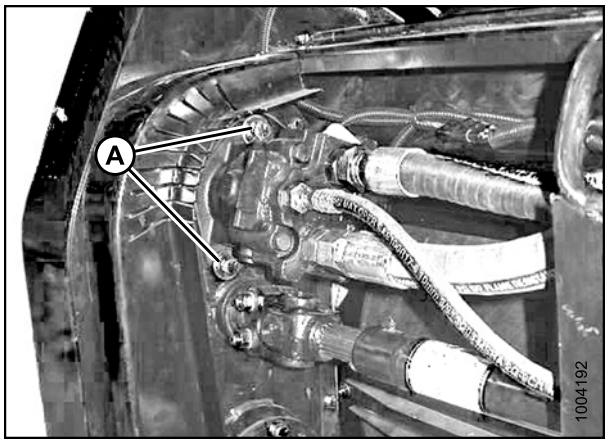

Figure 4.142: Motor: Single Knife

4.13.8 Removing Conditioner Gearbox – A40-D

To remove the conditioner drive gearbox from an A40-D header, follow these steps:

1. Open the conditioner drive shield and header left endshield.
2. Remove two bolts (A) securing channel (B) to frame.

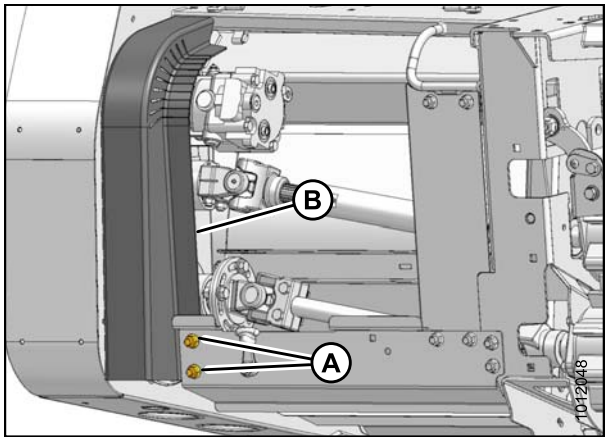

Figure 4.143: Conditioner Drive

3. Remove two hex bolts (A), and one carriage bolt (B) securing channel (C) to endsheet and remove channel (C).

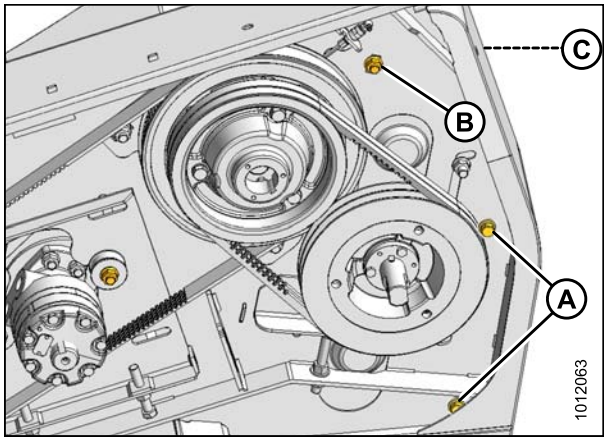

Figure 4.144: Header Drive

4. Remove two bolts (A) securing motor (B) to gearbox. Do **NOT** disconnect hoses.

   NOTE:
   Hoses not shown for clarity.

5. Carefully pull motor (B) from gearbox and move it clear of work area.

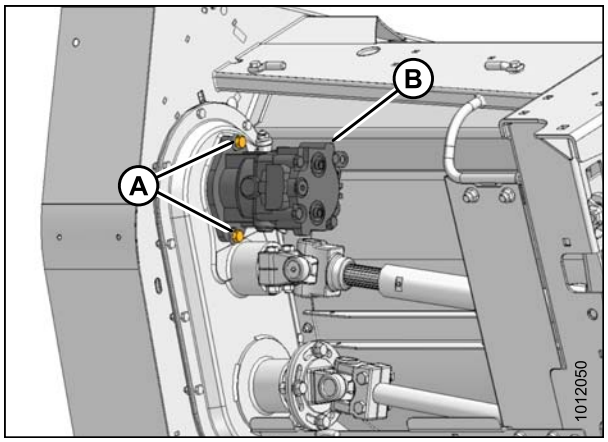

Figure 4.145: Gearbox Motor

6. Remove two bolts (A) in upper driveline (B).
7. Pull driveline (B) off gearbox. If necessary, use a screwdriver or equivalent to spread yoke. Move driveline clear of work area.
8. Remove four bolts (C) from flange on lower driveline (D) and remove driveline from gearbox. Move driveline clear of work area.

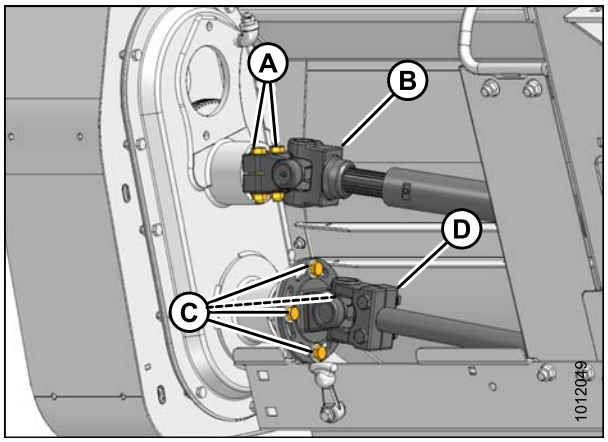

Figure 4.146: Drivelines

9. Remove knife drive V-belts (A). Refer to *Removing Double V-Belts on Left Side – A40-D, page 131*.
10. Remove the three bolts (B) from the tapered bushing (D).
11. Install two bolts (B) in the two threaded holes (C) in bushing (D) and tighten to release the bushing.
12. Remove bushing (D) and key.
13. Remove pulley (E).

CAUTION

Be sure to support the gearbox when removing the nuts. Gearbox weighs 34 kg (79 lb.).

14. Remove three nuts (A) securing gearbox (B) to frame and remove gearbox (B).

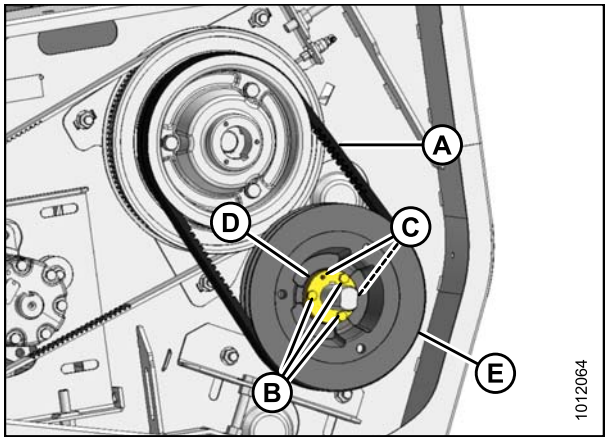

Figure 4.147: Knife Drive Belts

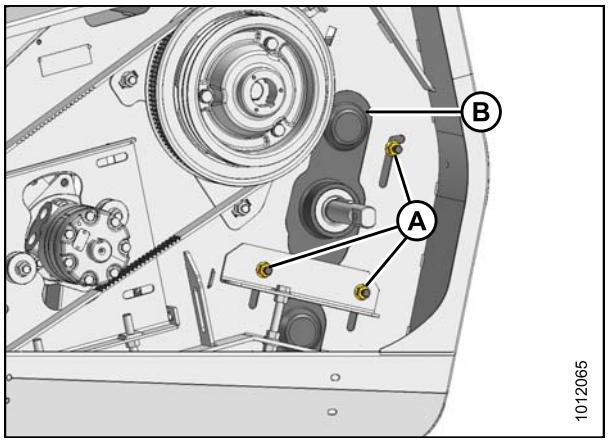

Figure 4.148: Conditioner Detachment

4.13.9 Installing Conditioner Gearbox – A40-D

To install the conditioner drive gearbox on an A40-D header, follow these steps:

1. Position gearbox (B) as shown, picking up the three holes in the end sheet and secure with three flanged lock nuts (A). Do not fully tighten.

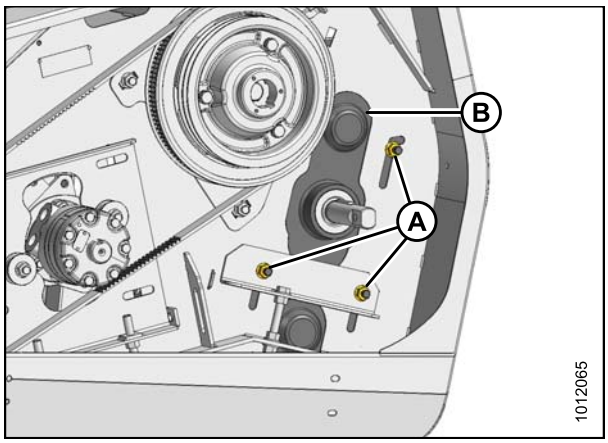

Figure 4.149: Conditioner Gearbox

2. Locate key (A) in shaft.
3. Place pulley (B) onto shaft.

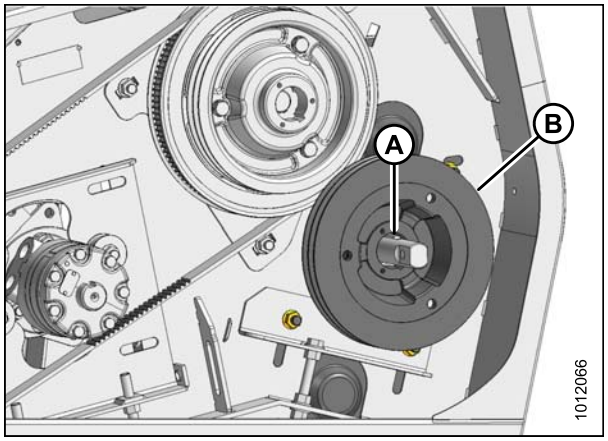

Figure 4.150: Gearbox Pulley

4. Place tapered bushing (A) onto shaft, align with key (B) in shaft and push bushing (A) into place.
5. Align slot in pulley (C) with key (D) in tapered bushing and slide pulley (C) onto bushing (A).
6. Align pulley (C) and countershaft pulley (F) faces to within 1.5 mm (1/16 in.).
7. Install three bolts (E) in tapered bushing (A) and tighten to 25 N·m (18 ft·lbf).
8. Tap bushing (A) and torque bolts. Repeat until bolts no longer turn at 25 N·m (18 ft·lbf).

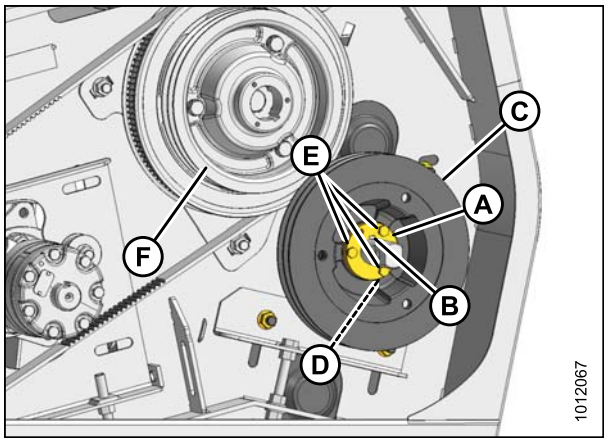

Figure 4.151: Gearbox Pulley

9. Install knife drive V-belts (B). Refer to *Installing Double V-Belts – A40-D Left Side, page 132*.

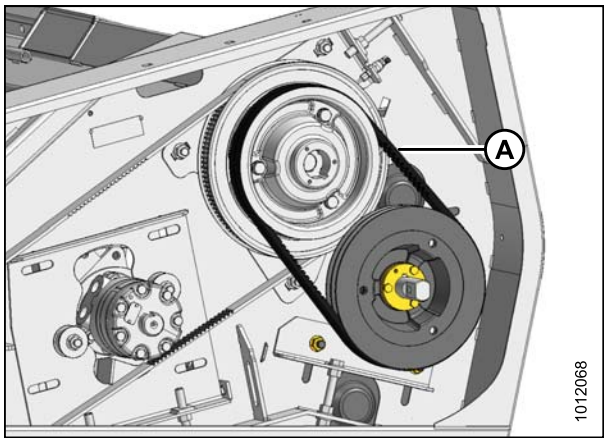

Figure 4.152: Header Drive

10. Remove oil level check plug in gear box. If oil does not run out, add oil to required level. Refer to your header operator's manual.

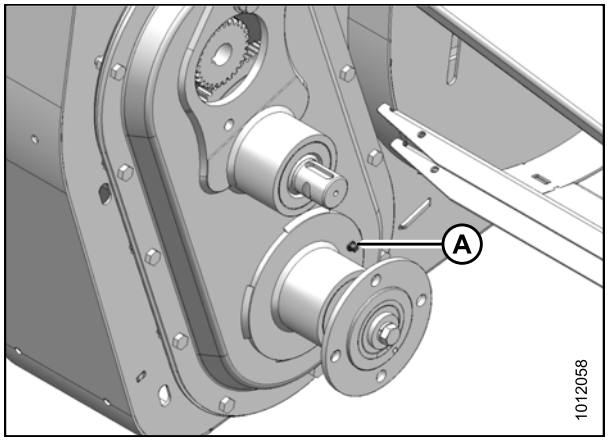

Figure 4.153: Gearbox

11. Align keyway in upper driveline yoke (B) with key in gearbox shaft and attach yoke (B) to shaft.
12. Install two hex head bolts (A) and flanged lock nuts to secure yoke. Tighten bolts.
13. Install timing flange on lower driveline (D) onto lower shaft on gearbox with four hex head bolts (C), two flat washers (E) under each bolt head, lock washers (F) and plain nuts (G). Do not tighten.

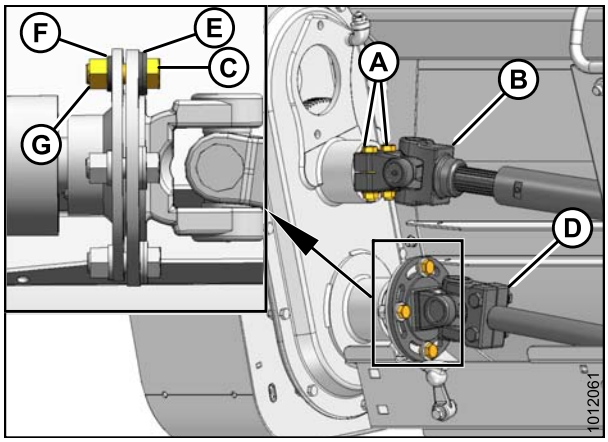

Figure 4.154: Upper and Lower Drivelines

14. Apply a light coat of silicone to motor flange.
15. Position hydraulic motor (A) onto gearbox as shown and secure with two hex head bolts (B) with thread locking compound, two flat washers (C), and two lock washers (D). Torque to 112 N·m (83 lbf·ft).
16. Time the rolls. Refer to *4.13.11 Checking/Adjusting Roll Timing, page 174*.

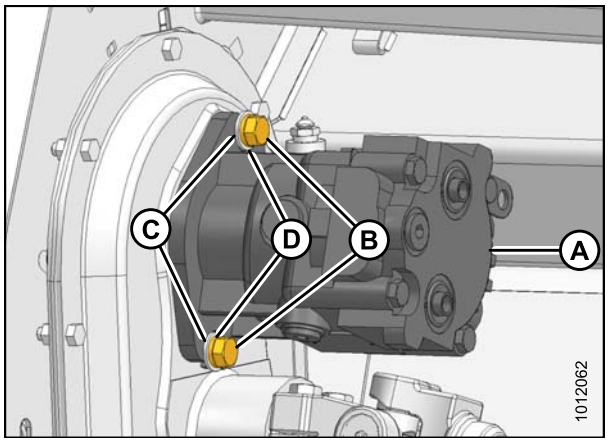

Figure 4.155: Hydraulic Motor

17. Position channel (B) against endsheet as shown, picking up the three holes in endsheet.
18. Install two carriage bolts and nuts (A) in lower two holes.

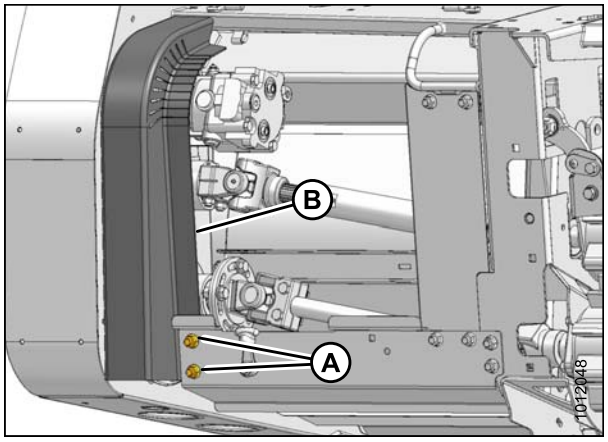

Figure 4.156: Conditioner Drive

19. Install carriage bolt and nut in upper hole (B) with head facing inboard.
20. Install two hex bolts with lock washers, and flat washers in remaining locations (A).
21. Tighten hardware.
22. Close conditioner driveline shield and endshield.

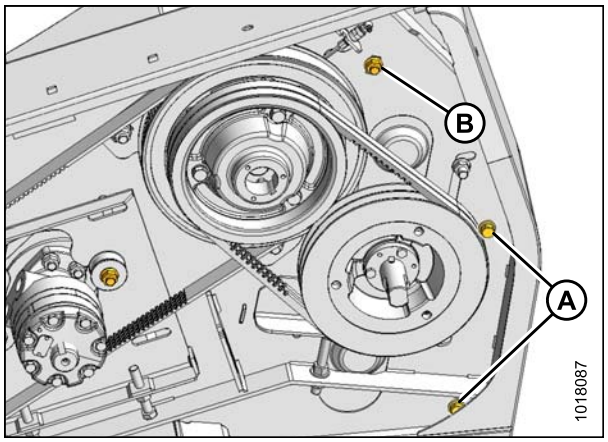

Figure 4.157: Header Drive

4.13.10 Checking/Adjusting Roll Alignment

Rolls are aligned at the factory, but adjustment is provided in case the rolls become misaligned during operation.

1. Lower header until it rests on the ground.
2. Open conditioner driveshield.
3. Locate roll alignment cover (A).

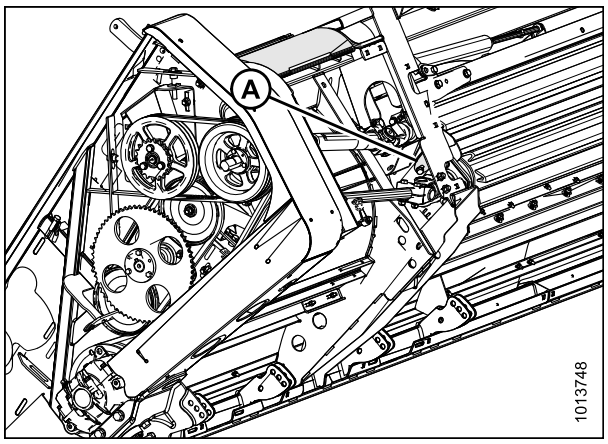

Figure 4.158: Roll Alignment Cover

4. Loosen bolt (A), and rotate cover (B) to expose access port.

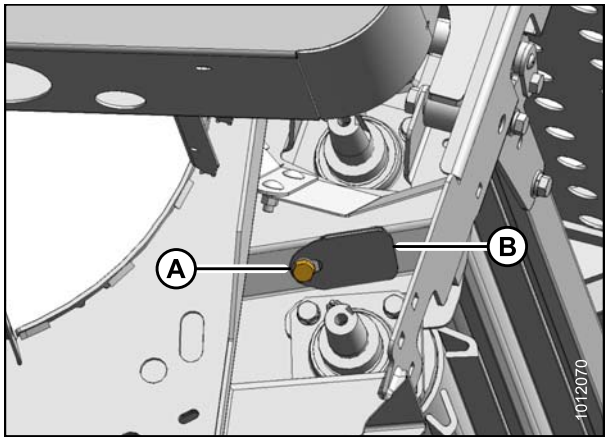

Figure 4.159: Roll Alignment

5. Examine roll bar spacing '**X**' at each end of the rolls. The rolls are aligned if '**X**' varies less than 1.6 mm (1/16 in.) from one end to the other.

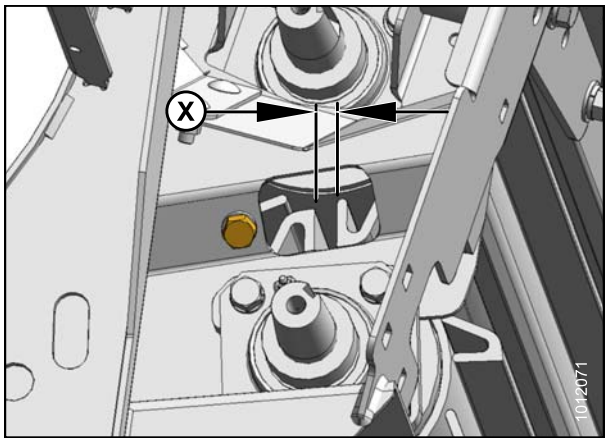

Figure 4.160: Roll Bar Spacing

6. If '**X**' varies more than 1.6 mm (1/16 in.), align rolls as follows:

   a. Remove nuts and bolts (A), and remove shims (B). The shims can be lifted off the pivot rod.

   b. Move upper roll until dimension '**X**' at both ends looking through port (as shown in previous step 4. above) is within 1.6 mm (1/16 in.).

   c. Reinstall shims, ensuring hardened washer (C) is against the pivot tube.

   d. Reinstall bolts (A) and nuts.

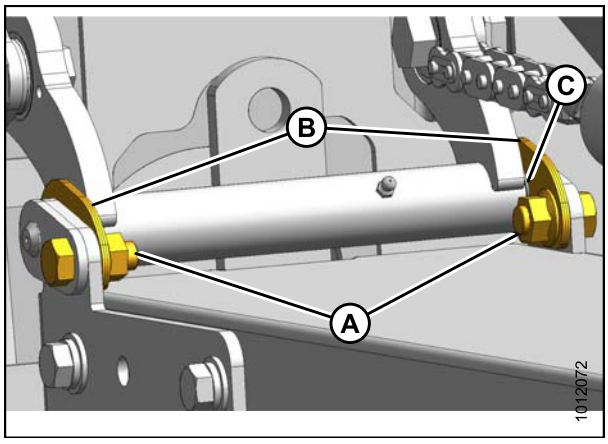

Figure 4.161: Adjustment

7. Operate header, and recheck alignment.
8. Close cover (B), and tighten bolt (A).
9. Close conditioner driveshield.

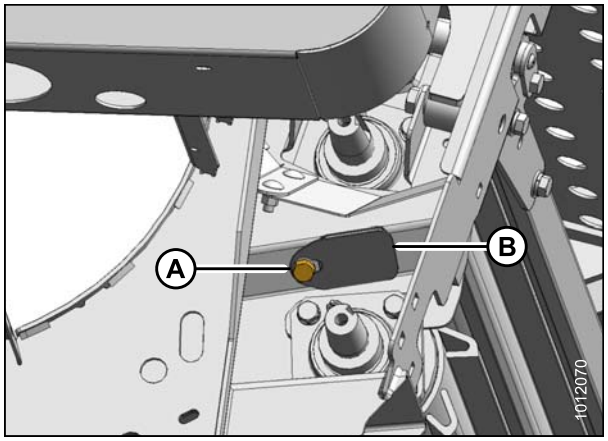

Figure 4.162: Access Cover

4.13.11 Checking/Adjusting Roll Timing

The rolls must be correctly timed with each steel bar on one roll centered between two bars of the other roll.

WARNING

To avoid bodily injury or death from fall of raised machine, always lock-out lift cylinders before going under header for any reason.

1. Open conditioner driveshield at left end of conditioner.
2. Loosen bolt (A), and rotate cover (B) to expose access port (C) at each end of conditioner.

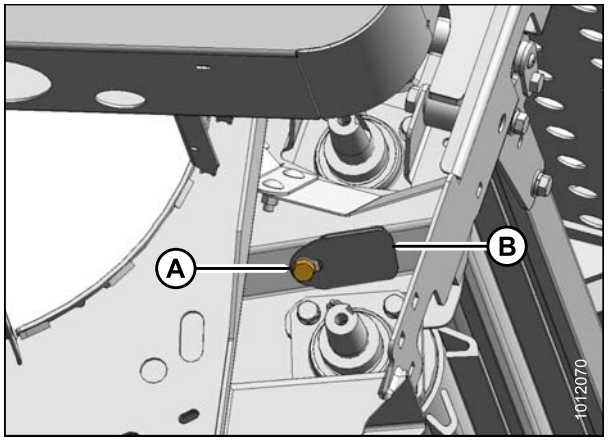

Figure 4.163: Access Cover

3. Examine roll timing (distance '**X**') at each end of the rolls with header fully lowered. Each steel bar on one roll should be centered between two bars of the other roll so that distance '**X**' is 12 mm (1/2 in.).

   NOTE:
   If the distance '**X**' varies more than 1.6 mm (1/16 in.) from one end to the other, the rolls should be re-aligned. Refer to *4.13.10 Checking/Adjusting Roll Alignment, page 172*.

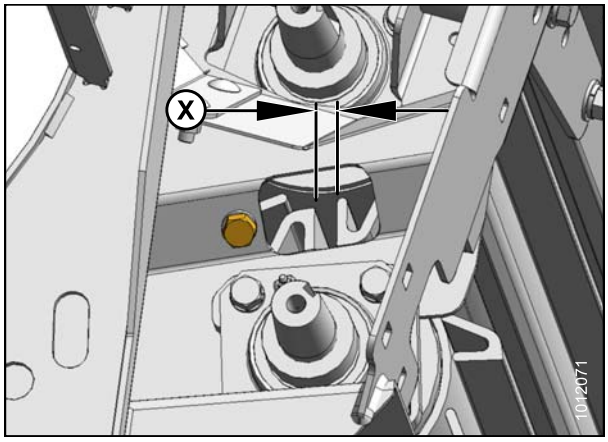

Figure 4.164: Roll Timing

4. If required, adjust the roll timing as follows:
   a. Loosen four bolts (A) in slots of yoke plate on lower driveline.
   b. Turn rolls to achieve best timing.
   c. When roll timing is satisfactory, tighten bolts (A) to secure the position.

   Recheck distance between the bars at both ends of the rolls at (C).

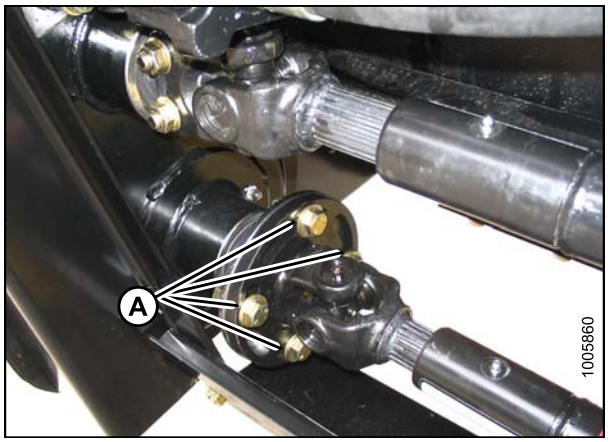

Figure 4.165: Timing Flange

5. Close cover (B), and tighten bolt (A).
6. Close driveshield.

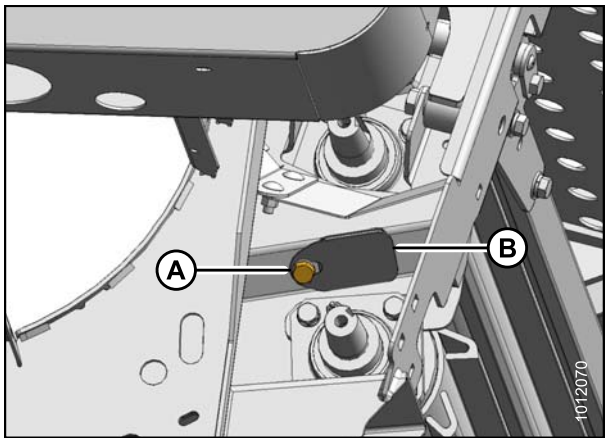

Figure 4.166: Access Cover

4.14 Replacing Skid Shoe Wear Plate

Skid shoes are equipped with replaceable wear plates that can be reversed for increase service life. It is recommended that wear plates be replaced when the skid shoe weldment becomes exposed.

CAUTION

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

To replace skid shoe wear plates, follow these steps:

1. Raise header, and engage lift cylinder stops.
2. Turn off engine and remove key.
3. Remove bolts and clips (A) from forward edge of skid shoe.

   NOTE:
   Use a socket and ratchet wrench to access the nuts.
4. Remove clevis pins (B), and disengage tabs on skid shoe from slots in cutterbar.

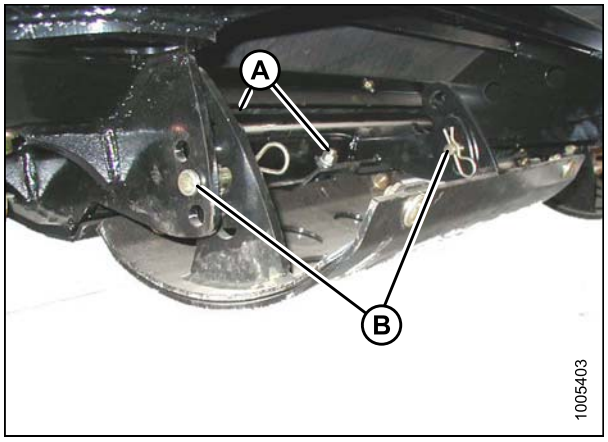

Figure 4.167: Skid Shoe

5. Remove eight bolts (A), and remove wear plates (B).
6. Position replacement wear plate (B) as shown. (The same wear plate can be reinstalled, but in the reverse position).
7. Secure wear plate with bolts and nuts (A).

   IMPORTANT:
   If bolt heads are worn down, replace them with new 1/2 in. x 1 carriage bolts.

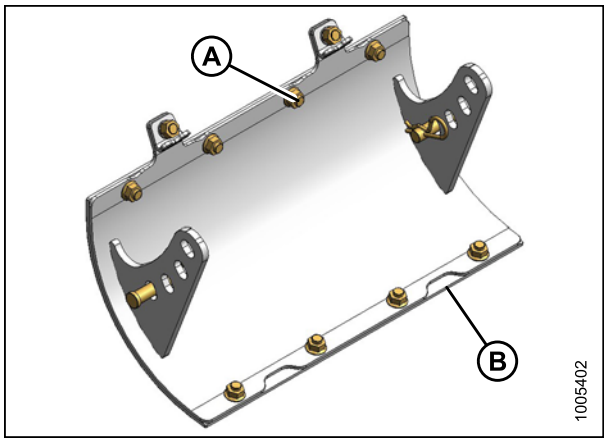

Figure 4.168: Replacement Wear Plate

8. Insert tabs on skid shoe into slots (A) on cutterbar at inboard mounting locations on frame, and secure with clevis pin (B).

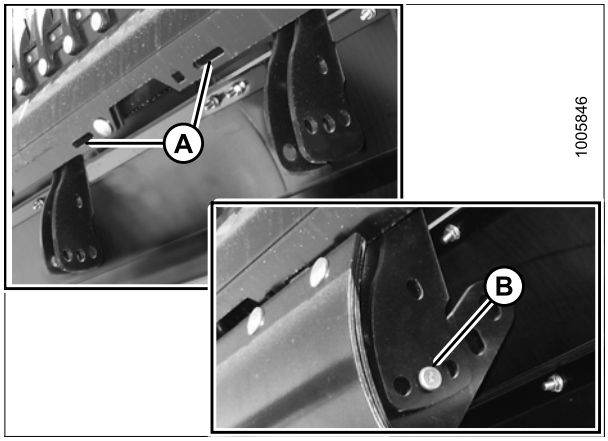

Figure 4.169: Inboard Cutterbar Mounting Location

9. Reinstall clips (A) with bolts and nuts removed at Step *3, page 176* to secure skid shoe to cutterbar.

   NOTE:
   Use a socket and ratchet wrench to access the nuts.

10. Remove clevis pin (B), adjust skid shoe to desired height, and reinstall two clevis pins. Secure with lynch pins.

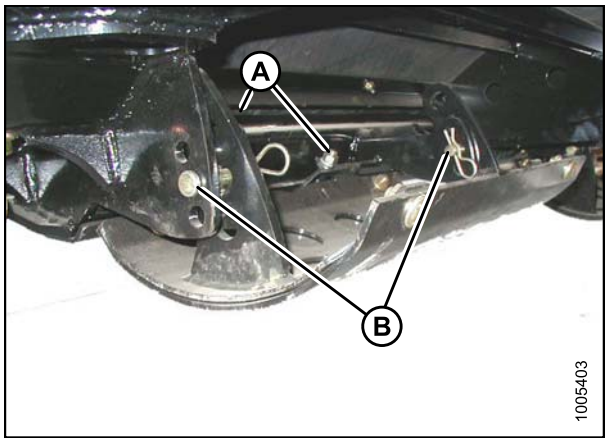

Figure 4.170: Skid Shoe

4.15 Gauge Rollers

Gauge rollers can be removed for replacement or repair.

4.15.1 Removing Gauge Rollers

CAUTION

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

1. Raise header, and engage lift cylinder stops.
2. Turn off engine and remove key.
3. Remove bolts and clips (A) from forward edge of gauge roller assembly.

   NOTE:
   Use a socket and ratchet wrench to access the nuts.
4. Remove hairpins on pins (B).
5. Support gauge roller, and remove pins (B).
6. Disengage tabs on mounting plate from slots in cutterbar to remove roller assembly.

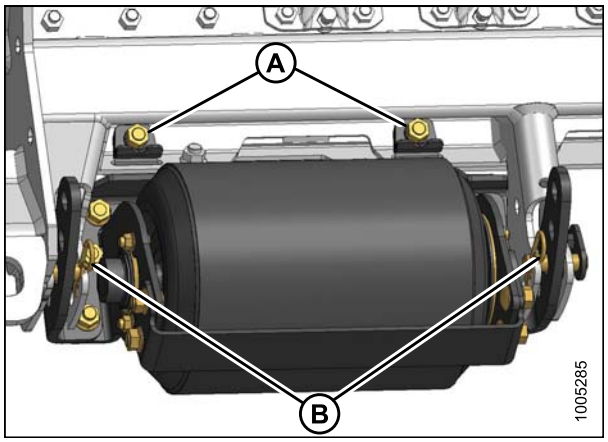

Figure 4.171: Gauge Roller

4.15.2 Installing Gauge Rollers

To install gauge rollers, follow these steps:

1. Position gauge roller assembly below cutterbar, and insert tabs on roller assembly into slots (A) in frame.

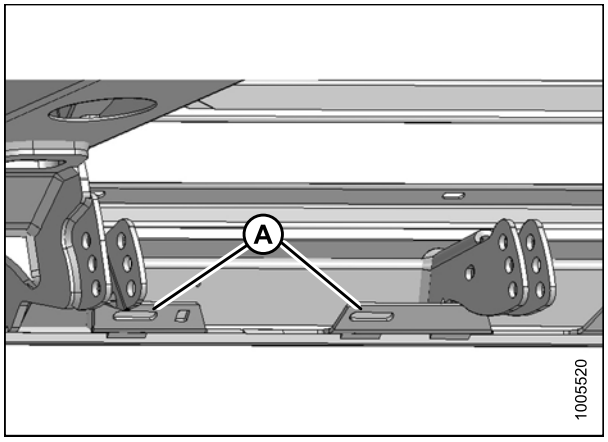

Figure 4.172: Gauge Roller Frame Location

2. Secure with two pins (B) at lowest position.
3. Attach clips (A) with bolts and nuts to secure roller assembly to cutterbar.

   NOTE:
   Use a socket and ratchet wrench to access the nuts.

4. Tighten nuts.

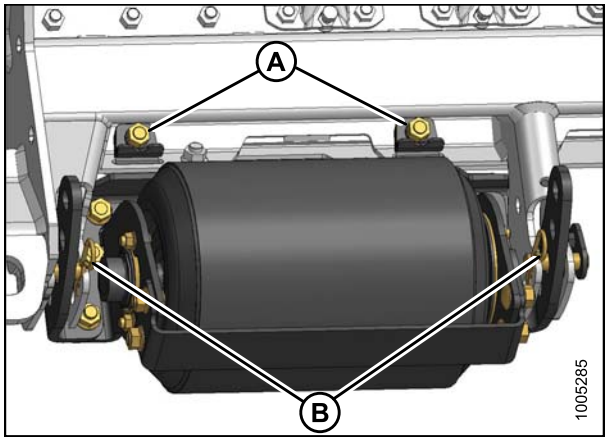

Figure 4.173: Gauge Roller Assembly

5. Remove pins (A), and adjust rollers to desired height. Reinstall the two pins (A).
6. Ensure that nut (B) on each pin registers in adjacent hole in support bracket.
7. Secure pins with hairpins (C).

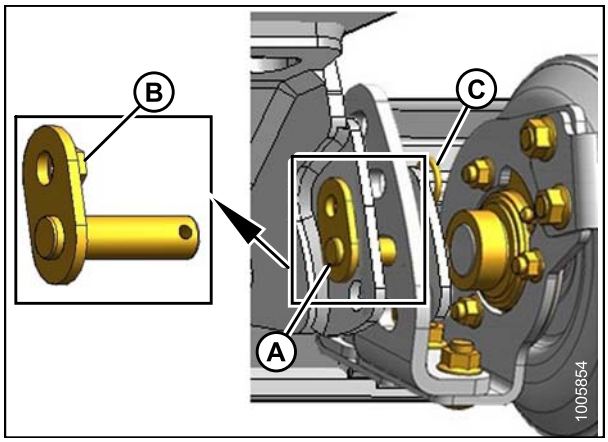

Figure 4.174: Support Bracket

4.16 Maintaining the Electrical System

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

Keep lights clean, and replace defective bulbs.

To replace light bulbs, follow these steps:

1. Using a Phillips screwdriver, remove screws (A) from fixture, and remove plastic lens.
2. Replace bulb, and reinstall plastic lens and screws.

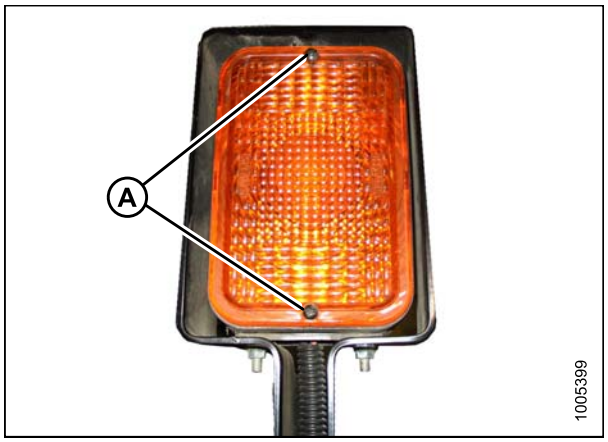

Figure 4.175: A40-D Hazard Light

5 Optional Equipment

5.1 Options and Attachments

5.1.1 Additional Skid Shoes

In addition to the standard skid shoes, two additional skid shoes may be added for extra control of cutting height and protection of cutting components.

Figure 5.1: MD #B4594

5.1.2 Gauge Roller Kit

The gauge roller kit replaces the outer skid shoes with rollers. They can be adjusted for varying cutting heights.

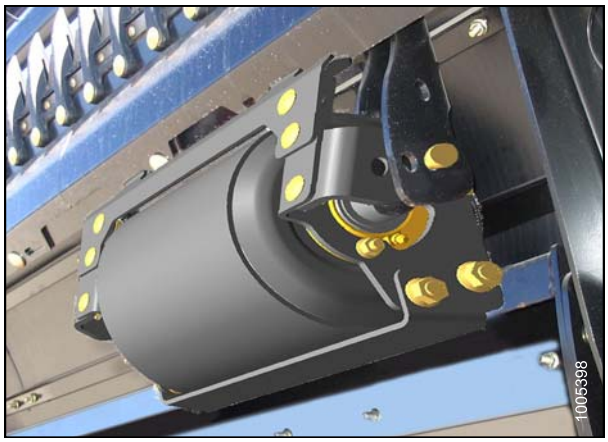

Figure 5.2: MD #B4593

5.1.3 Replacement Reel Bat Kit

This kit consists of one complete bat assembly for ease of replacement. Separate kits are available for different header widths.

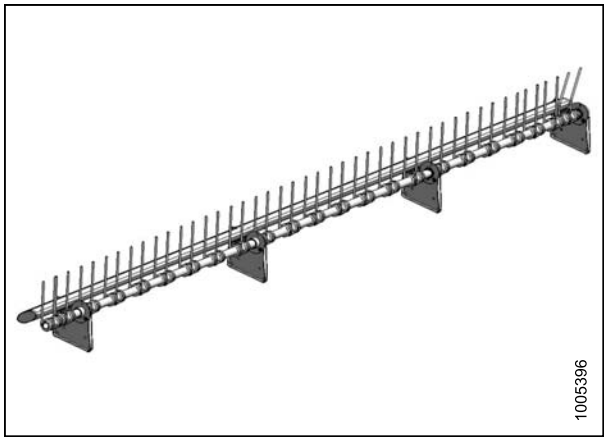

Figure 5.3: Reel Bat Assembly

5.1.4 Stub Guard Conversion Kit

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

Separate kits are available for different header widths. Installation and adjustment instructions are included with the kit.

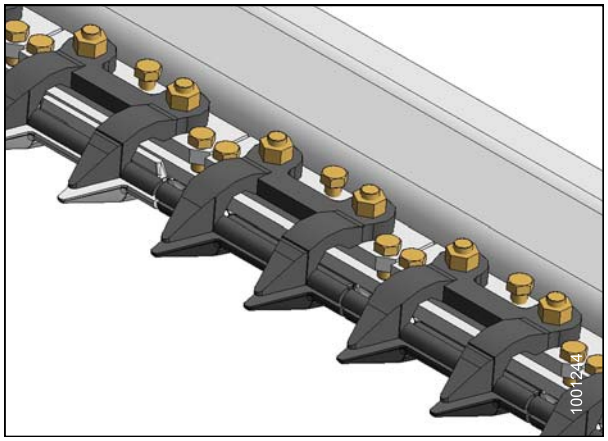

Figure 5.4: Stub Guards

5.1.5 Tall Crop Divider Kit

Tall crop dividers attach to the ends of the header for clean crop dividing and reel entry in tall crops. The kit includes left and right dividers, lean bar extensions and attachment hardware.

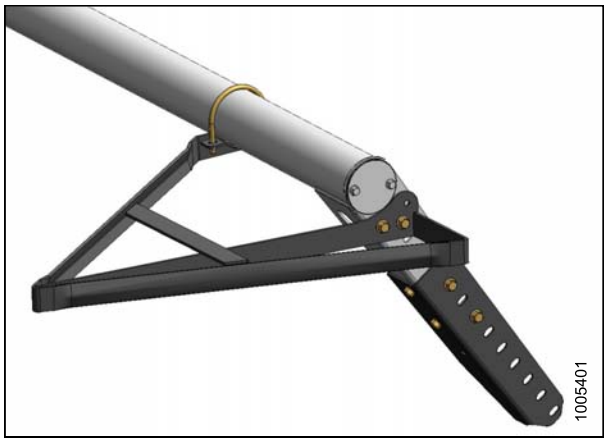

Figure 5.5: MD #B4690

6 Unloading and Assembly

Header-specific instructional manuals for unloading, assembly and set-up procedures are included with your shipment.

Header Description	Used on	Instruction Part Number
A40-D	Self-Propelled Windrower	MD #147913

7 Troubleshooting

7.1 Header Performance

Symptom	Problem	Solution	Section
Carryover of crop on reel	Reel speed too fast	Reduce reel speed (sprocket size).	*3.5.3 Adjusting Reel Speed, page 63*
Material build-up on header frame	Auger speed too fast	Reduce auger speed (sprocket size).	*3.5.2 Adjusting Auger Speed, page 63*
	Very light crop	Reduce windrower rpm.	—
Insufficient conditioning of stems	Roll gap too large	Decrease roll gap.	*3.5.11 Adjusting Conditioner Roll Gap, page 73*
Leaves damaged, crushed or stripped off stems	Reel speed too fast	Reduce reel speed.	*3.5.3 Adjusting Reel Speed, page 63*
	Roll gap too small	Increase roll gap.	*3.5.11 Adjusting Conditioner Roll Gap, page 73*
	Rolls improperly timed	Adjust roll timing.	*4.13.11 Checking/Adjusting Roll Timing, page 174*
Slow crop drying	Rolls not crimping crop sufficiently	Decrease roll gap.	*3.5.11 Adjusting Conditioner Roll Gap, page 73*
	Crop is spread too narrow	Adjust forming shields for wider swath.	*3.5.13 Positioning the Forming Shields, page 76*
	Crop is bunched in windrow	Adjust forming shields/baffle.	
Excessive drying or bleaching of crop	Excessive crimping	Increase roll gap.	*3.5.11 Adjusting Conditioner Roll Gap, page 73*
	Crop is spread too wide in windrow	Adjust forming shields.	*3.5.13 Positioning the Forming Shields, page 76*
Leaving small strip of flattened, uncut material	Crowding of the uncut material	Steer windrower slightly away from uncut crop.	—
	Reel position incorrect	Move reel forward and down.	*3.5.5 Setting Reel Position, page 66*
	Knife sections or guards are worn or broken	Replace worn or broken parts.	*4.7.1 Replacing Knife Section, page 108* and *4.7.7 Guards, page 112*

Symptom	Problem	Solution	Section
Long stubble in down crop	Cutting height too high	Lower cutting height with skid shoes.	*3.5.8 Setting Cutting Height, page 71*
	Ground speed too fast	Slow down.	*3.9 Selecting Ground Speed, page 86*
	Header angle too flat for guards to pick up down crop	Increase header angle.	*3.5.7 Adjusting Header Angle of A40-D, page 71*
	Reel position incorrect	Move reel forward and down.	*3.5.5 Setting Reel Position, page 66*
	Tine aggressiveness too low	Rotate cam clockwise (viewed from RH end) for more aggressive tine action.	*3.5.6 Setting Tine Aggressiveness, page 70*
Pulling material by the roots or tall material leaning into machine	Ground speed too slow	Increase ground speed.	*3.9 Selecting Ground Speed, page 86*
	Reel position incorrect	Move reel forward and down.	*3.5.5 Setting Reel Position, page 66*
Ragged or uneven cutting of crop	Bent or misaligned guards causing poor shearing action	Align guards for proper shearing action.	*Aligning Guard, page 114*
	Bent knife causing binding	Straighten bent knife. Check alignment, and adjust if necessary.	*4.7.2 Removing Knife, page 109*
	Ground speed too fast	Slow down. Ground speed should not exceed 13 km/h (8 mph).	*3.9 Selecting Ground Speed, page 86*
	Header angle too flat for guards to pick up down crop	Increase header angle.	*3.5.7 Adjusting Header Angle of A40-D, page 71*
	Header float too light, causing bouncing	Adjust to heavier float setting.	*3.5.9 Checking/Adjusting Float, page 72*
Ragged or uneven cutting of crop (cont'd)	Reel position incorrect	Move reel forward and down.	*3.5.5 Setting Reel Position, page 66*
	Relief valve pressure too low	Replace valve.	See Dealer
	Knife drive belt too loose	Increase belt tension.	*4.8.1 Knife Drive – A40-D, page 131*
	Knife sections or guards are worn or broken	Replace worn or broken parts.	*4.7.1 Replacing Knife Section, page 108* and *4.7.7 Guards, page 112*

Symptom	Problem	Solution	Section
Conditioner plugging; knife plugging; uneven formation and bunching of windrow	Ground speed too fast	Slow down.	*3.9 Selecting Ground Speed, page 86*
	Roll gap too large for proper feeding	Decrease roll gap.	*3.5.11 Adjusting Conditioner Roll Gap, page 73*
	Roll gap too small in thick stemmed cane-type crops	Increase roll gap.	—
	Rolls improperly timed	Adjust roll timing.	*4.13.11 Checking/Adjusting Roll Timing, page 174*
	Extremely thick or wet undergrowth	Raise cutting height to clear undergrowth.	*3.5.8 Setting Cutting Height, page 71*
		Consider use of stub guards.	*4.7.7 Guards, page 112*
	Header float too heavy	Adjust to lighter float setting.	*3.5.9 Checking/Adjusting Float, page 72*
	PTO speed too slow (pull-type)	Maintain proper rpm on PTO. Check for proper match of pump and gear-drive at PTO.	
	Wet undergrowth	Cut when undergrowth is dry.	—
	Reel position incorrect	Move reel back and down (close to guards).	*3.5.5 Setting Reel Position, page 66*
	Knife drive belt too loose	Adjust belt tension.	*4.8.1 Knife Drive – A40-D, page 131*

Symptom	Problem	Solution	Section
Conditioner plugging; knife plugging; uneven formation and bunching of windrow (cont'd)	Knife hold-downs improperly adjusted	Adjust hold-downs so knife works freely.	*4.7.8 Hold-Downs, page 121*
	Knife sections or guards are worn or broken	Replace worn or broken parts.	*4.7.1 Replacing Knife Section, page 108*, *4.7.7 Guards, page 112*,
	Reel not feeding properly in heavy crops	Decrease ground speed.	*3.9 Selecting Ground Speed, page 86*
	Bent or misaligned guards causing poor shearing action	Align guards for proper shearing action.	*Aligning Guard, page 114*
	Forming shields improperly adjusted - fluffer too low	Adjust forming shields, raise fluffer.	*3.5.13 Positioning the Forming Shields, page 76*
	Fluffer bypassing or dragging crop	Adjust fluffer for proper crop control.	
	Auger to stripper clearance too wide	Adjust auger to stripper bars clearance.	*3.5.4 Setting Auger Position, page 63*
	Roll gap too large	Adjust roll gap.	*3.5.11 Adjusting Conditioner Roll Gap, page 73*
	Conditioner running too slow	Maintain rated knife/conditioner speed.	*2.3 Product Specifications, page 23*
	Uneven crop flow across auger	Remove front stripper bar or stripper bar extension if installed.	*4.12 Stripper Bar, page 155*
	Excessive center feeding of crop	Remove front stripper bar extensions if installed.	
	Build up of crop at ends of rolls, especially in tall crops	Add front stripper bar extension.	
Uneven windrow formation in light crop	Rear of feed pan too low	Raise rock drop tine bar.	*3.5.10 Setting Feed Pan and Rock Drop Tine Position, page 73*

Symptom	Problem	Solution	Section
Reel causes seed loss (e.g. Grass seed)	Reel speed too fast	Adjust flow control on windrower.	*3.5.3 Adjusting Reel Speed, page 63*
	Header angle too steep, causing tines to contact ground	Flatten header angle, and check header float.	*3.5.9 Checking/Adjusting Float, page 72*
	Reel not correctly positioned	Lower reel speed, move reel rearward, as close as possible to auger, and downward as close as possible to knife and pan.	*3.5.3 Adjusting Reel Speed, page 63* and *3.5.5 Setting Reel Position, page 66*
Auger plugging in heavy grass seed	Poor crop flow across auger	Remove lower stripper bar and middle stripper bar if necessary.	*4.12 Stripper Bar, page 155*
Plugging at delivery opening in heavy grass seed	Opening too narrow	Move pan extensions to widest position.	*3.8 Grass Seed Special A40-D, page 82*
Grass seed windrow too wide or too narrow	Pan extensions not adjusted properly	Adjust pan extensions.	

7.2 Mechanical

Symptom	Problem	Solution	Section
Auger and/or conditioner rolls damaged by stones	Feed pan doesn't allow stones to fall through.	Lower rock-drop tines.	*3.5.10 Setting Feed Pan and Rock Drop Tine Position, page 73*
Excessive breakage of knife sections or guards	Ground speed too high in stony conditions	Reduce ground speed.	*3.9 Selecting Ground Speed, page 86*
	Cutting height too low in stony conditions	Raise cutting height with skid shoes.	*3.5.8 Setting Cutting Height, page 71*
	Header angle too steep in stony conditions	Decrease header angle.	*3.5.7 Adjusting Header Angle of A40-D, page 71*
	Header float too heavy in stony conditions	Adjust to lighter float setting.	*3.5.9 Checking/Adjusting Float, page 72*
	Knife speed too slow	Maintain proper rpm on PTO. Check for proper match of pump and gear-drive at PTO.	*2.3 Product Specifications, page 23*
	Guards, knife and hold-downs misaligned	Straighten guards, align hold-downs.	*4.7.7 Guards, page 112 4.7.8 Hold-Downs, page 121*
Excessive heating of hydraulic oil	Relief pressure too low	Replace relief valve.	See Dealer
Header stalling in extremely tall, heavy crop (6+ tons per acre)	Insufficient crop clearance at rear of feed pan	Lower rock drop tines (rear of header pan).	*3.5.10 Setting Feed Pan and Rock Drop Tine Position, page 73*, or *3.5.9 Checking/Adjusting Float, page 72*
		Remove rubber fingers from auger at delivery opening.	*4.11 Replacing Rubber Fingers, page 154*
		Increase roll gap.	*3.5.11 Adjusting Conditioner Roll Gap, page 73*
	Feeding aids for shorter, lighter crop impede flow of heavy or thick stemmed crops (cane, sudan grass etc.)	Remove front set of stripper bars.	*4.12 Stripper Bar, page 155*

Symptom	Problem	Solution	Section
Header turns while unloaded but slows or stops when starting to cut	Low reservoir oil level	Add oil to reservoir.	*4.6.1 Servicing A40-D Hydraulics, page 107*
	Defective motor	Repair motor.	See Dealer
	Defective O-ring inside relief valve	Replace relief valve.	
	Defective pump	Repair pump.	
	Defective relief valve	Repair relief valve.	
Knocking in knife drive	Worn needle bearing in knifehead	Replace	*4.7.4 Removing Knifehead Bearing, page 110*
	Worn knifehead pin		*4.7.3 Installing Knife, page 109*
	Incorrect end guards	Replace with special end guards.	*4.7.7 Guards, page 112*
Header turns while unloaded but slows or stops when starting to cut	Cold oil in system	Reduce ground speed until oil reaches operating temperature.	*3.9 Selecting Ground Speed, page 86*
Knife back breakage	Dull knife	Replace	*4.7.4 Removing Knifehead Bearing, page 110*
	Worn knife head pin		*4.7.3 Installing Knife, page 109*
	Bent or broken guard	Straighten or replace	*4.7.7 Guards, page 112*
	Incorrect end guards at knifehead	Replace with correct number of special guards.	
Windrower side drift	Header is dragging on one end and pulling to that side.	Adjust skid shoes to prevent cutterbar dragging.	*3.5.8 Setting Cutting Height, page 71*
		Adjust header float.	*3.5.9 Checking/Adjusting Float, page 72*
Lights malfunctioning	Improper ground	Check for proper grounding between light base and header.	*4.16 Maintaining the Electrical System, page 180*
	Burned out bulb	Replace bulb.	
	Poor connection	Check connector at windrower.	—

8 Reference

8.1 Recommended Torques

8.1.1 Torque Specifications

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

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

SAE Bolt Torque Specifications

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

Table 8.1 SAE Grade 5 Bolt and Grade 5 Free Spinning Nut

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

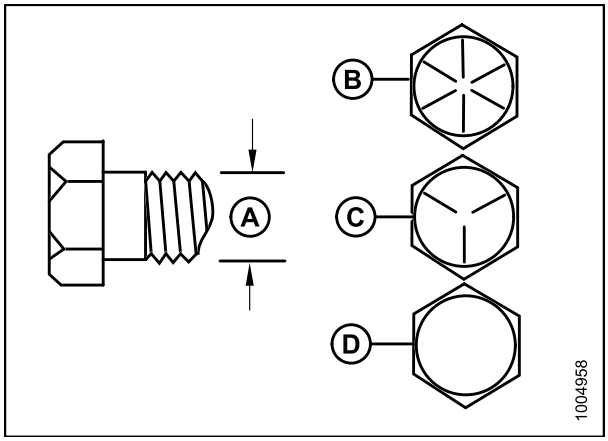

Figure 8.1: Bolt Grades

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

Table 8.2 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

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

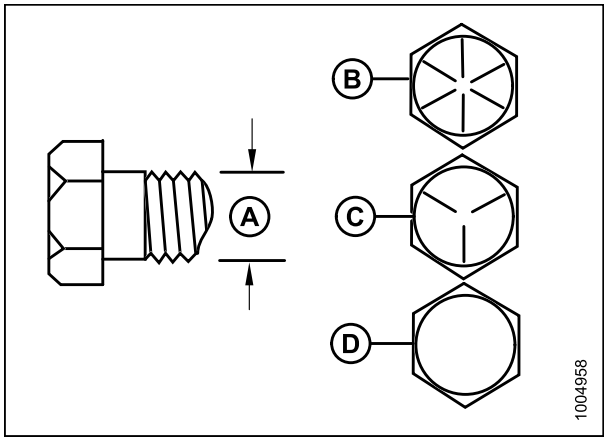

Figure 8.2: Bolt Grades

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

Table 8.3 SAE Grade 8 Bolt and Grade G Distorted Thread Nut

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

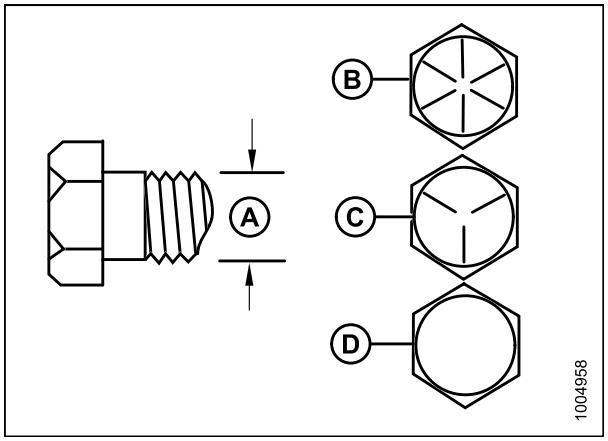

Figure 8.3: Bolt Grades

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

Table 8.4 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

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

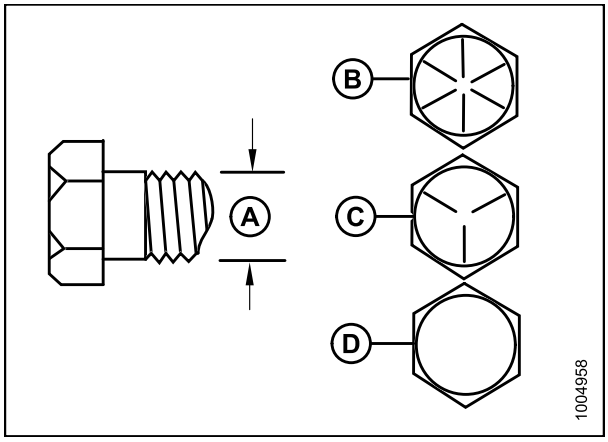

Figure 8.4: Bolt Grades

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

Metric Bolt Specifications

Table 8.5 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
3-0.5	1.4	1.6	*13	*14
3.5-0.6	2.2	2.5	*20	*22
4-0.7	3.3	3.7	*29	*32
5-0.8	6.7	7.4	*59	*66
6-1.0	11.4	12.6	*101	*112
8-1.25	28	30	20	23
10-1.5	55	60	40	45
12-1.75	95	105	70	78
14-2.0	152	168	113	124
16-2.0	236	261	175	193
20-2.5	460	509	341	377
24-3.0	796	879	589	651

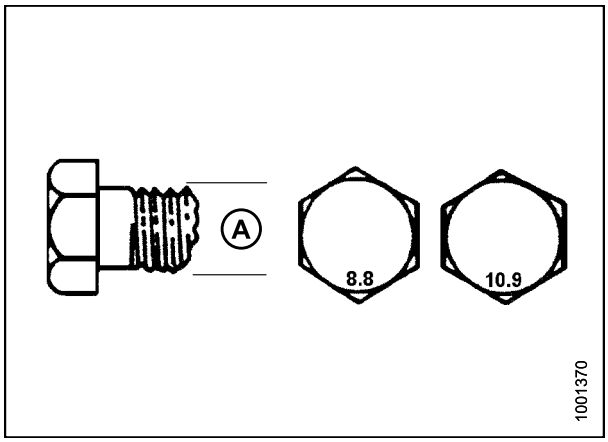

Figure 8.5: Bolt Grades

Table 8.6 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
3-0.5	1	1.1	*9	*10
3.5-0.6	1.5	1.7	*14	*15
4-0.7	2.3	2.5	*20	*22
5-0.8	4.5	5	*40	*45
6-1.0	7.7	8.6	*69	*76
8-1.25	18.8	20.8	*167	*185
10-1.5	37	41	28	30
12-1.75	65	72	48	53
14-2.0	104	115	77	85
16-2.0	161	178	119	132
20-2.5	314	347	233	257
24-3.0	543	600	402	444

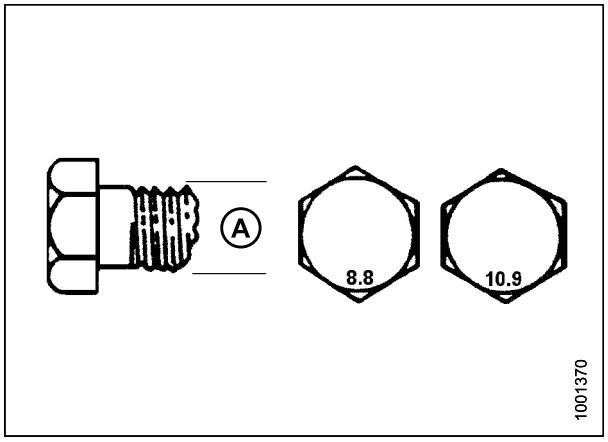

Figure 8.6: Bolt Grades

Table 8.7 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
3-0.5	1.8	2	*18	*19
3.5-0.6	2.8	3.1	*27	*30
4-0.7	4.2	4.6	*41	*45
5-0.8	8.4	9.3	*82	*91
6-1.0	14.3	15.8	*140	*154
8-1.25	38	42	28	31
10-1.5	75	83	56	62
12-1.75	132	145	97	108
14-2.0	210	232	156	172
16-2.0	326	360	242	267
20-2.5	637	704	472	521
24-3.0	1101	1217	815	901

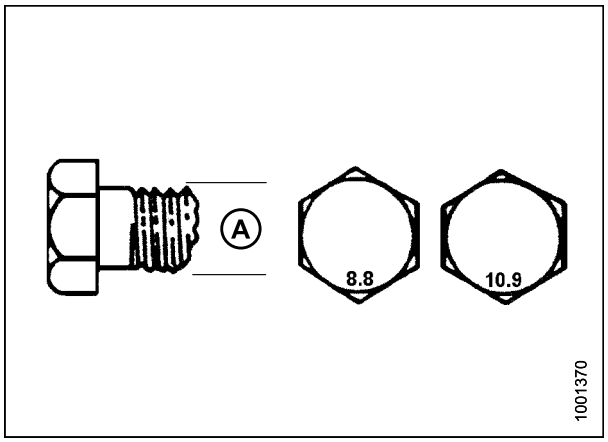

Figure 8.7: Bolt Grades

Table 8.8 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

Nominal Size (A)	Torque (N·m)		Torque (ft·lbf) (*in·lbf)	
	Min.	Max.	Min.	Max.
3-0.5	1.3	1.5	*12	*13
3.5-0.6	2.1	2.3	*19	*21
4-0.7	3.1	3.4	*28	*31
5-0.8	6.3	7	*56	*62
6-1.0	10.7	11.8	*95	*105
8-1.25	26	29	19	21
10-1.5	51	57	38	42
12-1.75	90	99	66	73
14-2.0	143	158	106	117
16-2.0	222	246	165	182
20-2.5	434	480	322	356
24-3.0	750	829	556	614

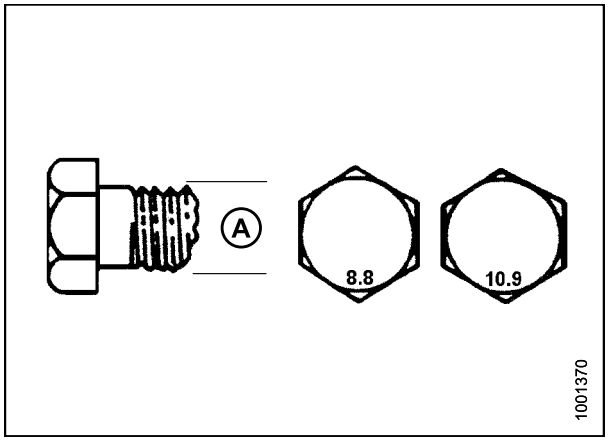

Figure 8.8: Bolt Grades

Metric Bolt Specifications Bolting into Cast Aluminum

Table 8.9 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	N·m	ft·lbf	N·m	ft·lbf
M3	–	–	–	1
M4	–	–	4	2.6
M5	–	–	8	5.5
M6	9	6	12	9
M8	20	14	28	20
M10	40	28	55	40
M12	70	52	100	73
M14	–	–	–	–
M16	–	–	–	–

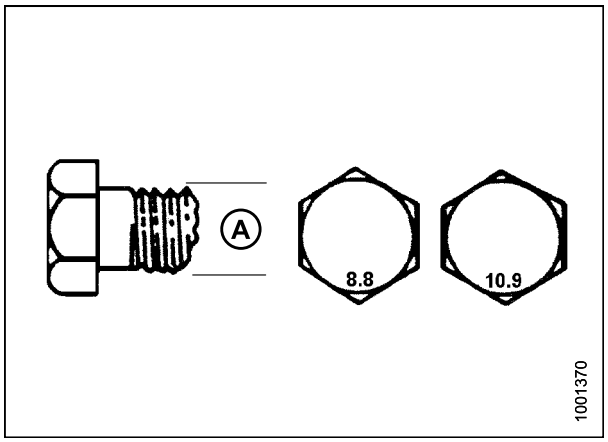

Figure 8.9: Bolt Grades

Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between flared surfaces.
3. Torque fitting nut (E) to specified number of flats from finger tight (FFFT) or to a given torque value in Table *8.10 Flare-Type Hydraulic Tube Fittings, page 199*.
4. Use two wrenches to prevent fitting (D) from rotating. Place one wrench on fitting body (D) and tighten nut (E) with other wrench to torque shown.
5. Assess final condition of connection.

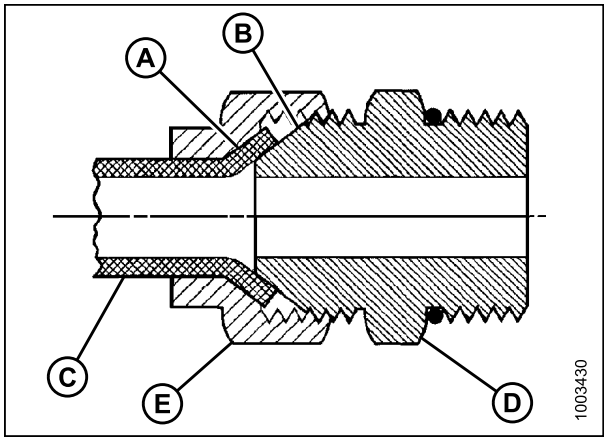

Figure 8.10: Hydraulic Fitting

Table 8.10 Flare-Type Hydraulic Tube Fittings

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

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

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

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Back off lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward lock nut (C) as far as possible.
3. Check that O-ring (A) is **NOT** on threads and adjust if necessary.
4. Apply hydraulic system oil to O-ring (A).

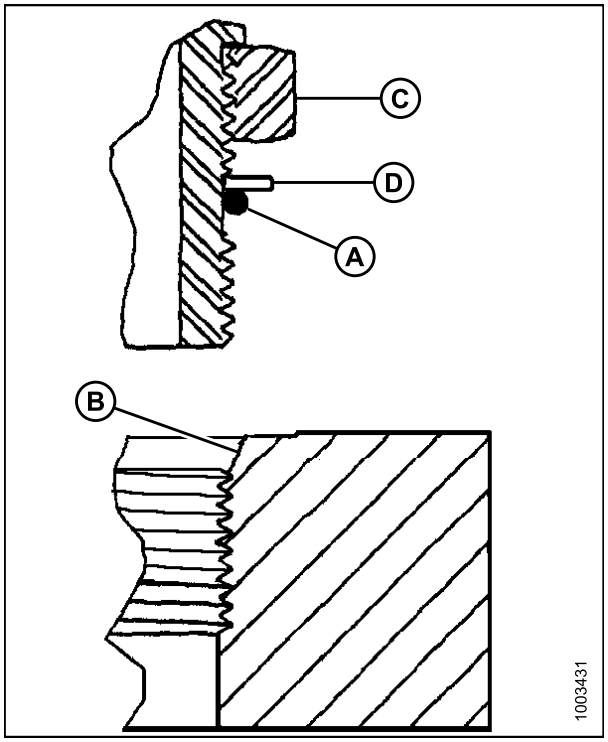

Figure 8.11: Hydraulic Fitting

5. Install fitting (B) into port until back up washer (D) and O-ring (A) contact part face (E).
6. Position angle fittings by unscrewing no more than one turn.
7. Turn lock nut (C) down to washer (D) and tighten to torque shown. Use two wrenches, one on fitting (B) and other on lock nut (C).
8. Check final condition of fitting.

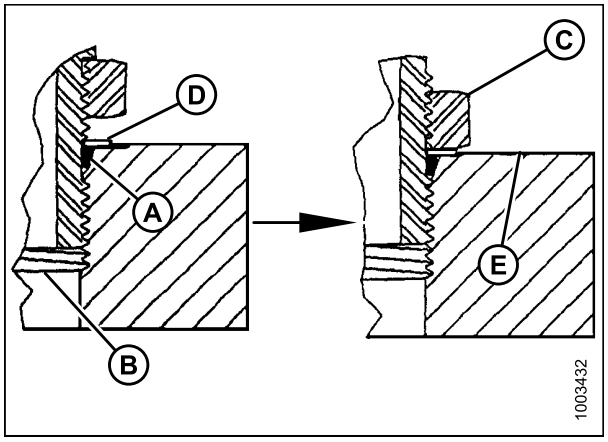

Figure 8.12: Hydraulic Fitting

Table 8.11 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value[4]	
		N·m	ft·lbf (*in·lbf)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1-1/16–12	120–132	88–97
-14	1-3/8–12	153–168	113–124
-16	1-5/16–12	176–193	130–142
-20	1-5/8–12	221–243	163–179
-24	1-7/8–12	270–298	199–220
-32	2-1/2–12	332–365	245–269

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

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

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on threads and adjust if necessary.
3. Apply hydraulic system oil to O-ring.
4. Install fitting (C) into port until fitting is hand tight.
5. Torque fitting (C) according to values in Table *8.12 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable), page 202*.
6. Check final condition of fitting.

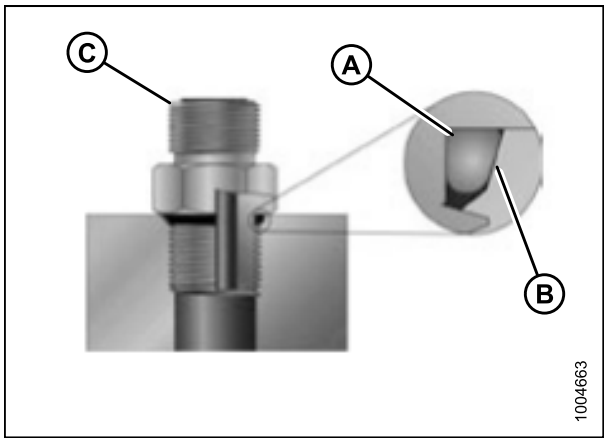

Figure 8.13: Hydraulic Fitting

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

SAE Dash Size	Thread Size (in.)	Torque Value[5]	
		N·m	ft·lbf (*in·lbf)
-2	5/16–24	6–7	*53–62
-3	3/8–24	12–13	*106–115
-4	7/16–20	19–21	14–15
-5	1/2–20	21–33	15–24
-6	9/16–18	26–29	19–21
-8	3/4–16	46–50	34–37
-10	7/8–14	75–82	55–60
-12	1-1/16–12	120–132	88–97
-14	1-3/8–12	153–168	113–124
-16	1-5/16–12	176–193	130–142
-20	1-5/8–12	221–243	163–179
-24	1-7/8–12	270–298	199–220
-32	2-1/2–12	332–365	245–269

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

O-Ring Face Seal (ORFS) Hydraulic Fittings

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

Figure 8.14: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to values in Table *8.13 O-Ring Face Seal (ORFS) Hydraulic Fittings, page 204*.

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

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

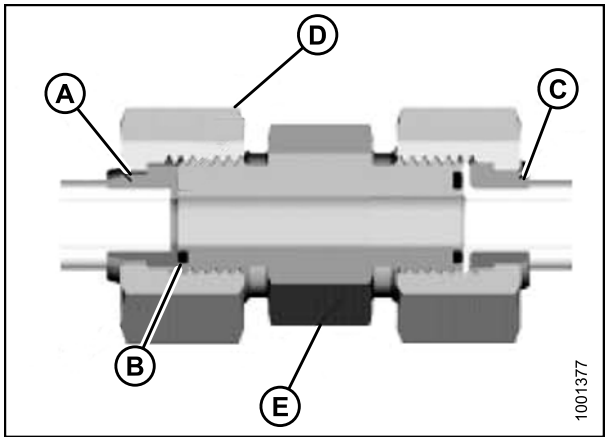

Figure 8.15: Hydraulic Fitting

Table 8.13 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value[6]	
			N·m	ft·lbf
-3	Note[7]	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note[7]	5/16	–	–
-6	11/16	3/8	40–44	29–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1-3/16	3/4	115–127	85–94
-14	Note[7]	7/8	–	–
-16	1-7/16	1	150–165	111–122
-20	1-11/16	1-1/4	205–226	151–167
-24	1–2	1-1/2	315–347	232–256
-32	2-1/2	2	510–561	376–414

6. Torque values and angles shown are based on lubricated connection as in reassembly.
7. O-ring face seal type end not defined for this tube size.

Tapered Pipe Thread Fittings

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks and scratches, or any form of contamination.
2. Apply pipe thread sealant (paste type) to external pipe threads.
3. Thread fitting into port until hand-tight.
4. Torque connector to appropriate torque angle. The Turns From Finger Tight (TFFT) values are shown in Table *8.14 Hydraulic Fitting Pipe Thread, page 205*. Make sure that tube end of a shaped connector (typically 45º or 90º) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

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

Table 8.14 Hydraulic Fitting Pipe Thread

Tapered Pipe Thread Size	Recommended T.F.F.T	Recommended F.F.F.T
1/8–27	2–3	12–18
1/4–18	2–3	12–18
3/8–18	2–3	12–18
1/2–14	2–3	12–18
3/4–14	1.5–2.5	12–18
1–11 1/2	1.5–2.5	9–15
1 1/4–11 1/2	1.5–2.5	9–15
1 1/2–11 1/2	1.5–2.5	9–15
2–11 1/2	1.5–2.5	9–15

8.2 Conversion Chart

Table 8.15 Conversion Chart

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

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