

R85 Rotary Disc 13 Foot Pull-Type Mower Conditioner

OPERATOR'S MANUAL

169454 Rev. C

\$15



R85 13 FOOT PULL-TYPE ROTARY DISC MOWER CONDITIONER

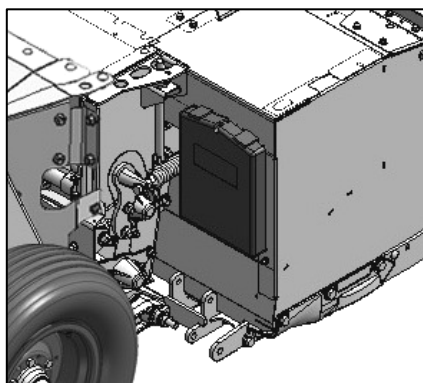
1 INTRODUCTION

This instructional manual describes the operating and maintenance procedures for the MacDon Model R85 Rotary Disc 13 Foot Pull-Type Mower Conditioner. Your new MacDon rotary disc mower conditioner is designed to cut, condition, and lay a wide variety of grasses and hay crops in windrows.

CAREFULLY READ ALL THE MATERIAL PROVIDED BEFORE ATTEMPTING TO UNLOAD, ASSEMBLE, OR USE THE MACHINE.

Use this manual as your first source of information about the machine. If you follow the instructions given in this manual, your mower conditioner will work well for many years. A Parts Catalog is also supplied with your new mower conditioner. If you require more detailed service information, a Service Manual is available from your Dealer.

Use the Table of Contents and the Index to guide you to specific areas. Study the Table of Contents to familiarize yourself with how the material is organized. Keep this manual handy for frequent reference, and to pass on to new Operators or Owners. Call your Dealer if you need assistance, information, or additional copies of this manual.

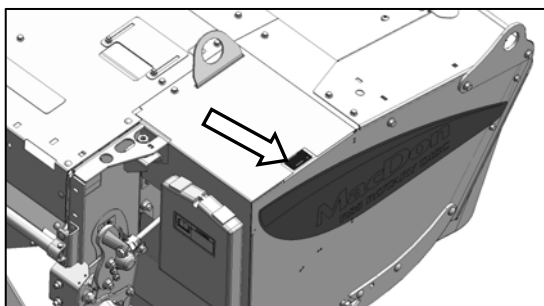


Store the Operator's Manual and the Parts Catalog in the plastic manual case at the right aft end of the header.

RECORD THE SERIAL NUMBERS OF THE HEADER AND ARTICULATED POWER TURN (APT) HITCH IN THE SPACES BELOW.

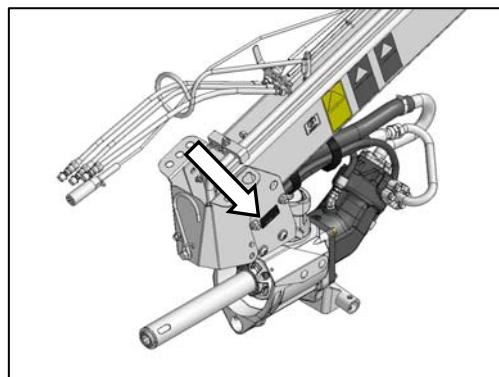
HEADER SERIAL NUMBER:

Serial Number plate is located on the top surface at the right hand end of the header.



APT SERIAL NUMBER:

Serial Number plate is located at the left front side of the APT hitch.



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2 SAFETY

2.1 SAFETY ALERT SYMBOL



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.

2.2 SIGNAL WORDS

Note the use of the signal words **DANGER**, **WARNING**, and **CAUTION** with safety messages. The appropriate signal word for each message 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 is also used to alert against unsafe practices.



CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It is also used as a reminder of good safety practices.

2.3 SAFETY SIGNS

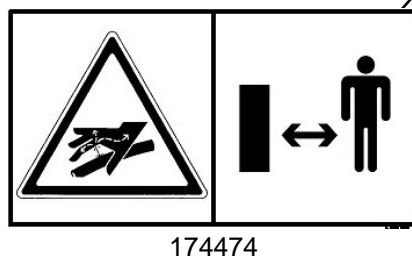
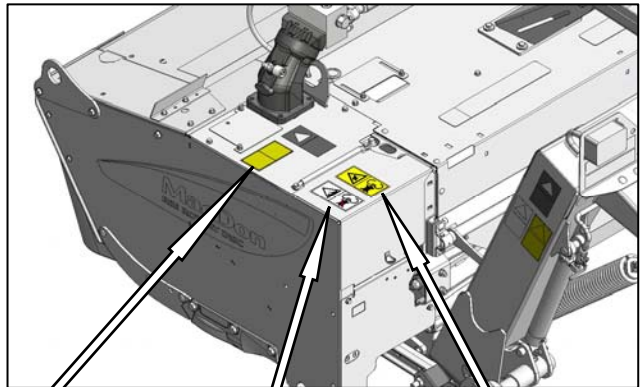
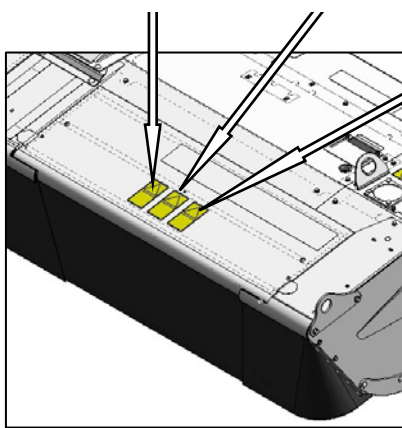
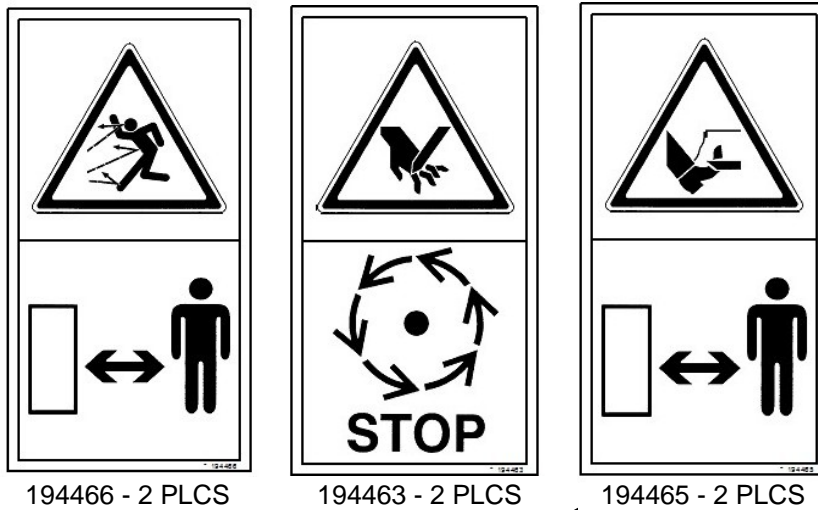
- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or become illegible.
- If original parts on which a safety sign was installed are replaced, be sure the repair part also bears the current safety sign.
- Safety signs are available from your Dealer Parts Department.

2.3.1 Safety Sign Installation

- a. Be sure the installation area is clean and dry.
- b. Decide on the exact location before you remove the decal backing paper.
- c. Remove the smaller portion of the split backing paper.
- d. Place the sign in position, and slowly peel back the remaining paper, smoothing the sign as it is applied.
- e. Small air pockets can be smoothed out or pricked with a pin.

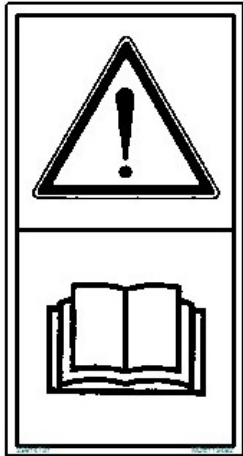
SAFETY

2.3.2 Safety Sign Location



SAFETY

Safety Sign Location (cont'd)



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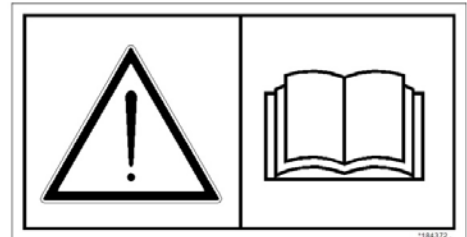
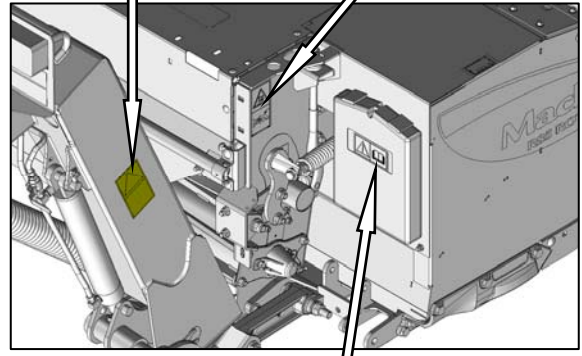
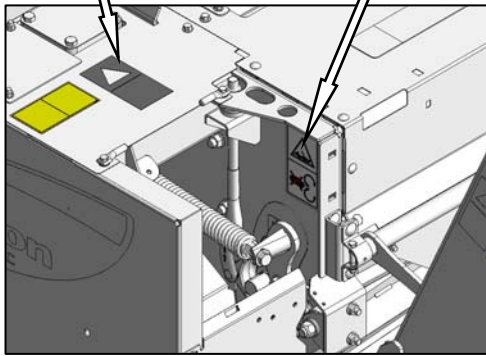
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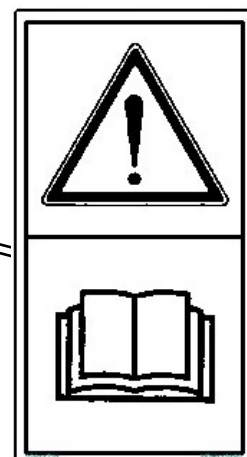
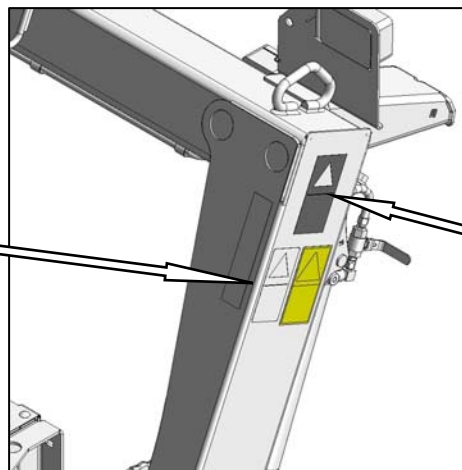
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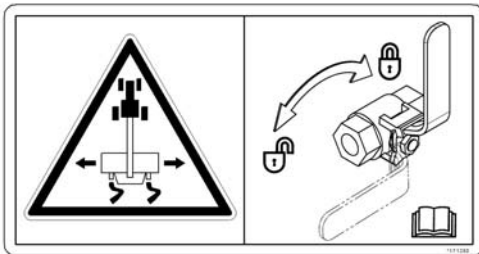
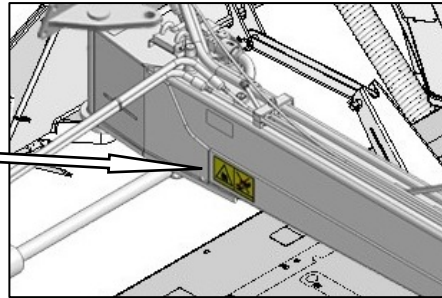
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SAFETY

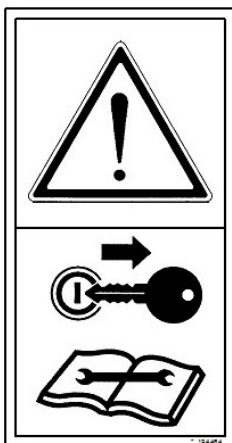
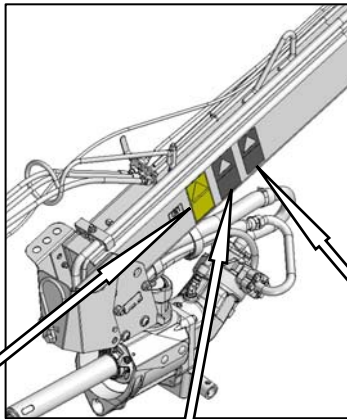
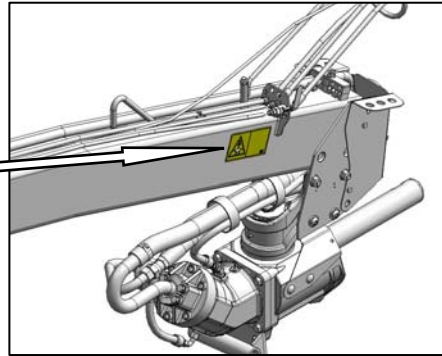
Safety Sign Location (cont'd)



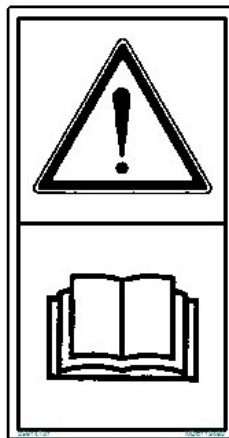
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SAFETY

2.3.3 Safety Sign Definitions

The following is a general list of decal definitions. Decals that are defined are not necessarily applicable to your machine.

General Hazard Pertaining To Machine Operation And Servicing.

CAUTION

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



113482

- 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.
- Shut off engine, and remove 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.

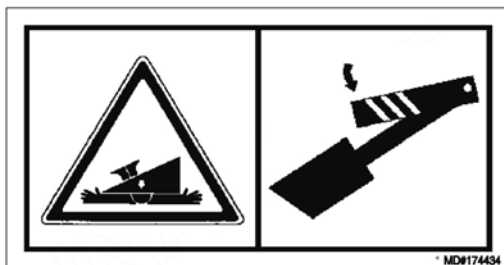


174432

Reel Hazard

WARNING

- To avoid injury from fall of raised reel; fully raise reel, stop engine, remove key, and engage mechanical lock on each reel support arm before working on or under reel.
- See Operator's Manual.



174434

Header Hazard

DANGER

- Rest header on ground, or engage mechanical locks before going under unit.

SAFETY

Safety Sign Definitions (cont'd)



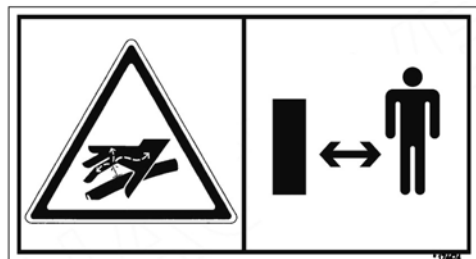
174436

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.



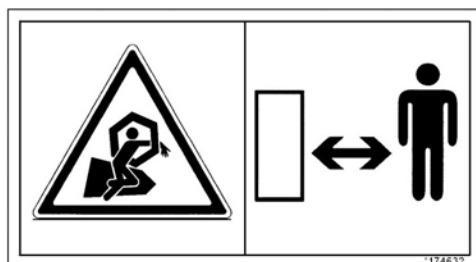
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Hydraulic Oil Pressure Hazard

CAUTION

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 pressure before loosening fittings.



174632

Reel Entanglement Hazard

CAUTION

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



174682

Auger Entanglement Hazard

CAUTION

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

SAFETY

Safety Sign Definitions (cont'd)



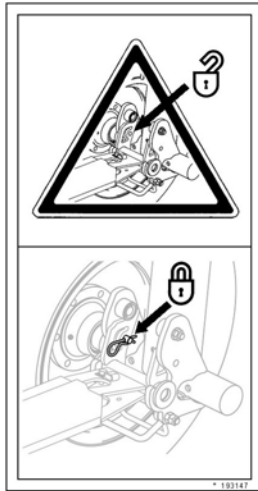
174684

Sharp Component Hazard

CAUTION

Knife Sections are Sharp

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



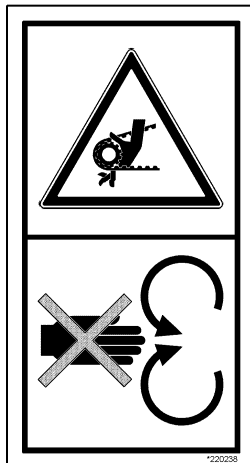
193147

Transport/Roading Hazard

WARNING

Before Transporting

- Ensure tow-bar lock mechanism is locked.



220238

Keep Shields in Place Hazard

WARNING

- To avoid injury, stop engine before opening power drive system shield.
- Keep all shields in place.

SAFETY

Safety Sign Definitions (cont'd)



184386

Pinch Area

WARNING

Keep Away

- Failure to comply could result in death or serious injury.



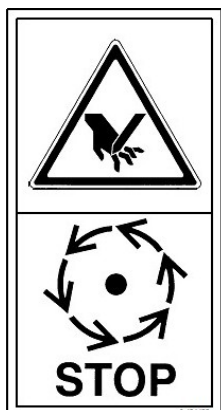
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Slippery Surface

WARNING

Don't Place Foot

- Do not use this area as a step or platform.
- Failure to comply could result in serious injury or death.



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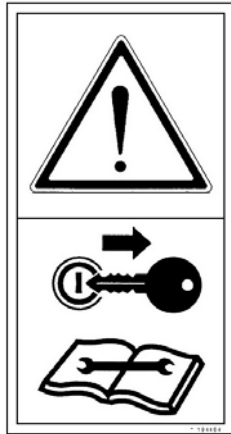
Rotating Blades

WARNING

- Disengage PTO, shut off tractor, and remove key before opening covers.
- Listen and look for evidence of rotation before lifting cover.
- Rotating cutters may continue to rotate after power is shut off.

SAFETY

Safety Sign Definitions (cont'd)



194464

Shut Down for Service

WARNING

- Remove key from ignition.
- Read tractor manufacturer's and mower manufacturer's manuals for inspection and maintenance instructions.



194465

Rotating Cutters

WARNING

Stand Clear

- Disengage PTO, and shut off tractor.
- Listen and look for evidence of rotation before lifting cover.
- Rotating cutters may continue to rotate after power is shut off.
- Failure to comply could result in serious injury or death.



194466

Rotating Flails Under Hood

WARNING

Stand Clear

- Crop materials exiting at high speed.
- Stop machine, look, listen, and wait for all movement to stop before approaching.
- Failure to comply could result in death or serious injury.

SAFETY

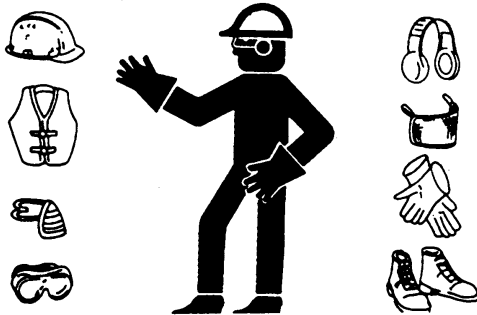
2.4 GENERAL SAFETY



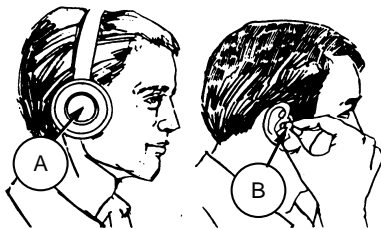
CAUTION

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:



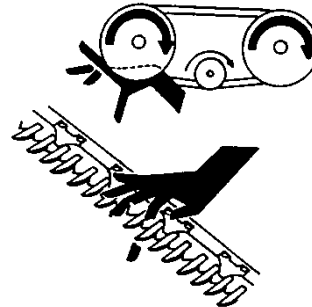
- a hard hat.
- protective shoes with slip resistant soles.
- protective glasses or goggles.
- heavy gloves.
- wet weather gear.
- respirator or filter mask.



- hearing protection. Be aware that prolonged exposure to loud noise can cause impairment or loss of hearing. Wearing a suitable hearing protective device such as ear muffs (A) or ear plugs (B) protects against objectionable or loud noises.



- Provide a first-aid kit for use in case of emergencies.
- Keep a fire extinguisher on the machine. Be sure the extinguisher is properly maintained and be familiar with its proper use.
- Keep young children away from machinery at all times.
- Be aware that accidents often happen when the Operator is tired or in a hurry to get finished. Take the time to consider the safest way. Never ignore warning signs of fatigue.
- Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.



- 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.
- Keep all shields in place. Never alter or remove safety equipment. Make sure that the 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.

(continued next page)

SAFETY

- Do NOT modify the machine. Unauthorized modifications may impair the function and/or safety and affect machine life.
- Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.



- Keep the area used for servicing machinery 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.
- Use adequate light for the job at hand.
- Keep machinery clean. 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.

GENERAL

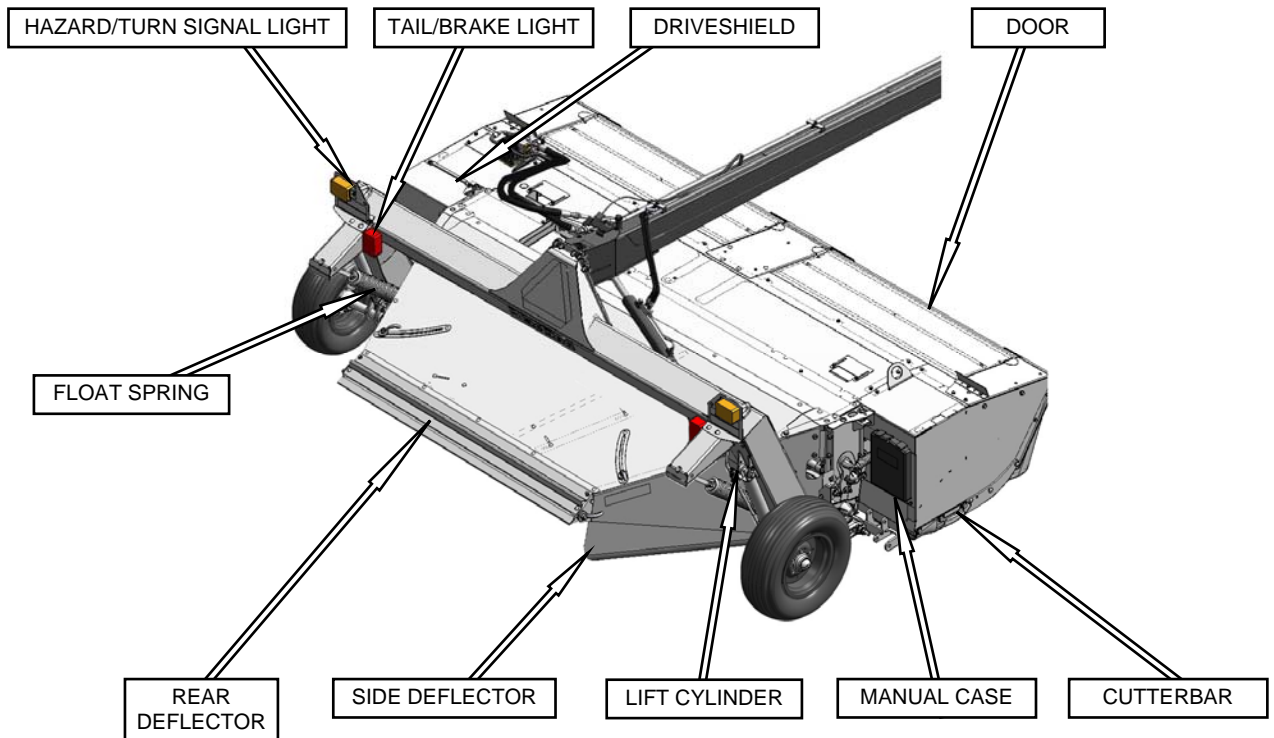
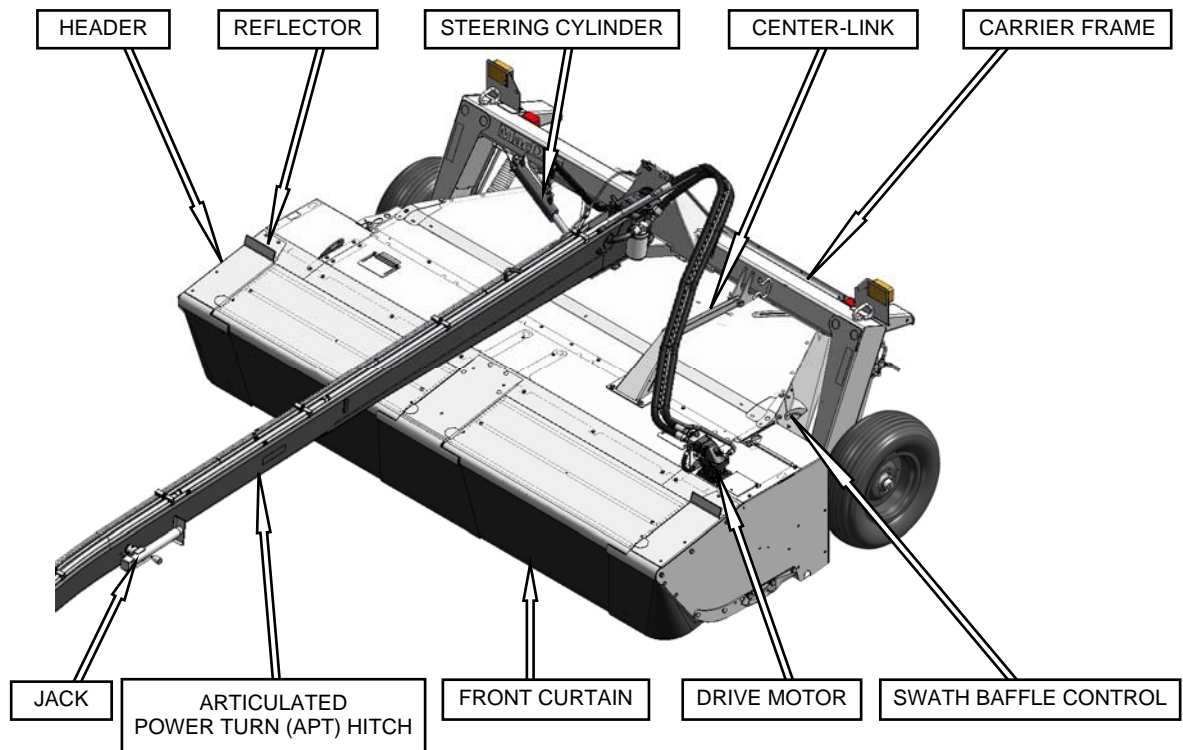
3 DEFINITIONS

The following terms may be used in this manual:

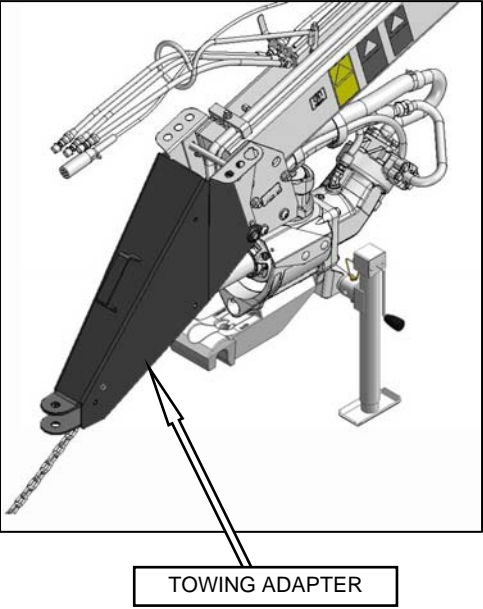
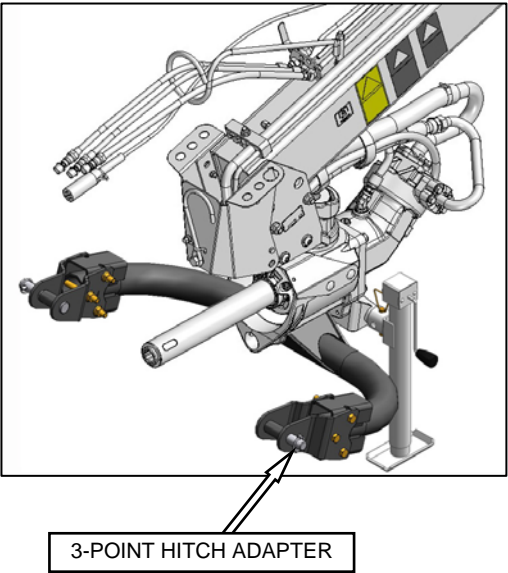
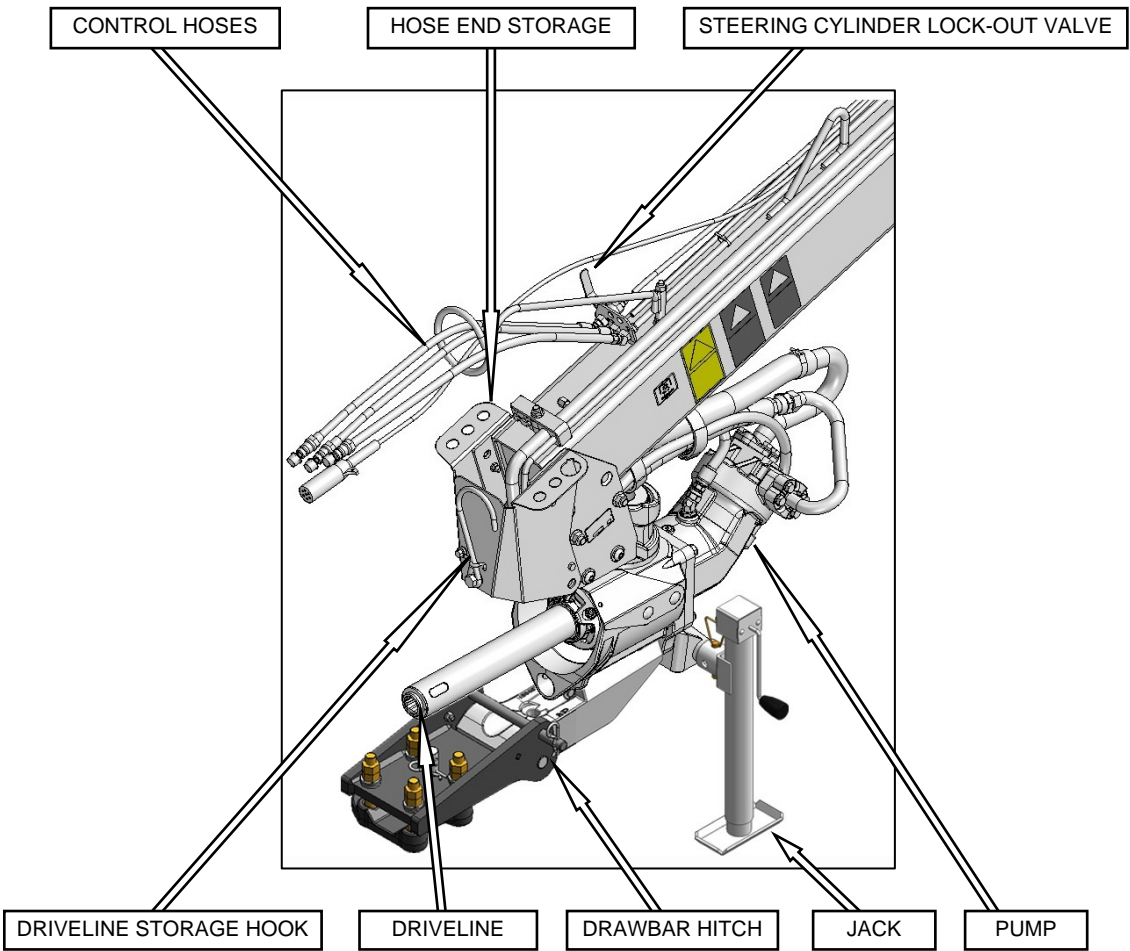
TERM	DEFINITION
API	American Petroleum Institute
APT	Articulated Power Turn
ASTM	American Society Of Testing And Materials
Center-link	A hydraulic cylinder or turnbuckle type link between the header and the carrier frame that tilts the header.
Header or Rotary Header	The part of the mower conditioner that cuts and conditions the crop.
Mower Conditioner	A machine that cuts and conditions hay, and is pulled by an agricultural tractor.
PTO	Power Take-Off
rpm	Revolutions Per Minute
SAE	Society Of Automotive Engineers
Sickle or Knife	A cutting device which uses a reciprocating cutter.
Tractor	Agricultural type tractor.
Truck	A four-wheel highway/road vehicle weighing no less than 7,500 lb (3,400 kg).

GENERAL

4 COMPONENT IDENTIFICATION



GENERAL



GENERAL

5 SPECIFICATIONS

MOWER CONDITIONER MODEL	R85 - 13 FT
FRAME and STRUCTURE	
Width	13 ft-0 in. (3,952 mm)
Weight (estimated)	4,380 lb (1,989 kg)
Carrier	Pull-Type
Lighting	Two Amber Transport and Two Red Tail-Lights
Wheels/Tires	15 in. / 11L x 15SL - 8 Ply
Tread Width	143 in. (3,265 mm)
Manual Storage	Plastic Case On Header RH Backsheet
CUTTERBAR	
Quantity Of Cutting Discs	8
Knives Per Disc	Two 18 Degrees Bevel Down Reversible
Disc Speed	2,530 rpm
Knife Tip Speed Range	184 mph (82.9 m/s)
Effective Cutting Width	12 ft-9.37 in. (3,895 mm)
Cutting Height	7/8 in. (23 mm)
Oil Capacity (Maximum)	3.4 quarts (US) (3.25 Liters)
Cutting Angle Range	0–7 Degrees Below Horizontal
Skid Shoes	Two Adjustable
Geartrain Protection	Shearable Disc Spindles
Deflectors	2 Cage Type Converging
DRIVES	
Tractor PTO	1.375 in. (35 mm) Dia. 21 Spline or 1.75 in. (44 mm) Dia. 20 Spline
Hydraulic Connections	Quick Attachment Coupling
Hydraulic Pump	9.76 cu in. (160 cc) Pump
Hydraulic Motor	3.9 cu in. (64 cc) To Gearbox
Power Developed (max)	143 hp (107 kW)
Normal Operating Pressure	2,000 psi (13.71 MPa)
CONDITIONER	
Drive	Bevel Gearbox To Belt Driven Enclosed Timing Gearbox and Driveline.
Bevel Gearbox Lube Capacity	0.41 quarts (US) (400 ml)
Roll Type	Intermeshing Steel Bars
Roll Diameter	9.00 in. (229 mm) / 7.0 in. (179 mm) Tube
Roll Length	118 in. (3,000 mm)
Roll Speed	1,012 rpm
Swath Width	36–102 in. (915–2,540 mm)
Forming Shields	Header Mounted Adjustable Baffle, Fixed Side Deflectors, and Header Mounted Adjustable Forming Shield System.

(continued next page)

GENERAL

MOWER CONDITIONER MODEL		R85 - 13 FT
GROUND SPEED		
Recommended Cutting		8–11 mph (13–18 km/h)
Recommended Transport		20 mph (30 km/h)
TRACTOR REQUIREMENTS		
PTO Power - Minimum		110 hp (82 kW)
Hydraulics	Pressure	2,000 psi (13.71 MPa)
	Controls	Two Double-Acting / One Single-Acting
Hitch		Draw Bar, 3-Point or Quick Attach

- NOTES:
1. Specifications and design are subject to change without notice or obligation to revise previously sold units.
 2. Tractor must be equipped with a cab.

OPERATION

6 OPERATION

6.1 OWNER/OPERATOR RESPONSIBILITIES



CAUTION

- It is your responsibility to read and understand this manual completely before operating the mower conditioner. 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 mower conditioner, 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.
- The safety information given in this manual does not replace safety codes, insurance needs, or laws governing your area. Be sure your machine meets the standards set by these regulations.
- Ensure that the tractor is properly equipped to safely operate the mower conditioner. This may include adding ballast according to tractor operator's manual requirements for attachments of this size and mass.

6.2 OPERATIONAL SAFETY

Follow these safety precautions:



CAUTION

- Follow all safety and operational instructions given in tractor operator's Manual. If you do not have a tractor manual, get one from your Dealer, and read it thoroughly.
- Never attempt to start the tractor engine or operate the mower conditioner except from the tractor seat.
- Check the operation of all controls in a safe clear area before starting work.
- Do not allow riders on tractor or mower conditioner.
- 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 mower conditioner hits an obstruction, the front of the tractor will usually swerve towards the ditch.
- When working on inclines, travel uphill or downhill when possible. Be sure to keep tractor transmission in gear when travelling downhill.
- Never attempt to get on or off a moving tractor.
- Do NOT get off the tractor while the mower conditioner is in operation.
- Stop forward movement of the tractor, and stop the PTO.
- Stop tractor engine, and remove key before adjusting or removing plugged material from the machine. A child or even a pet could engage the drive.

(continued next page)

OPERATION

- Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect the machine. Follow proper shutdown procedure:
 - engage tractor brake.
 - disengage PTO.
 - turn off engine, and remove key.
 - wait for all movement to stop.
 - dismount, and close lift cylinder valves before inspecting raised machine.
- Operate only in daylight or good artificial light.
- Keep everyone several hundred feet away from your operation. Ensure bystanders are never in line with the front or rear of the machine. Stones or other foreign objects can be ejected from either end with force.



- Extreme care must be exercised to avoid injury from thrown objects. Do NOT, under any circumstances, operate the mower conditioner when other people are in the vicinity. Stones and other objects can be thrown great distances by the rotating cutting blades.
- The cutterbar curtains are very important to reduce the potential for thrown objects. Always keep these curtains down when operating the mower conditioner. Replace the curtains if they should become worn or damaged.

OPERATION

6.2.1 Lift Cylinder Lock-out Valves

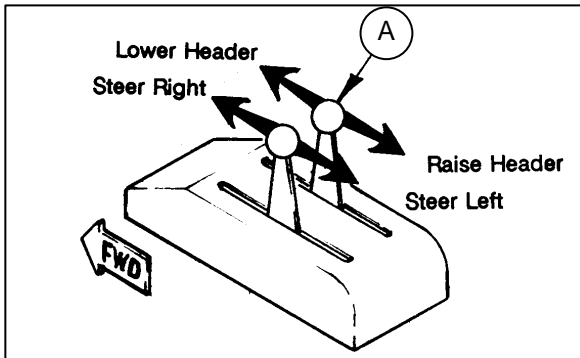


WARNING

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

Lock-out the lift cylinders as follows:

- Raise machine to maximum height by activating remote cylinder control valve in tractor.



IMPORTANT

Hoses should be connected so that moving control lever (A) backward raises the header. See Section 6.4.3 Hydraulic Connections for more information.



- Close the lock-out valve on each lift cylinder by turning the handle to the horizontal position.

Return to normal operation as follows:

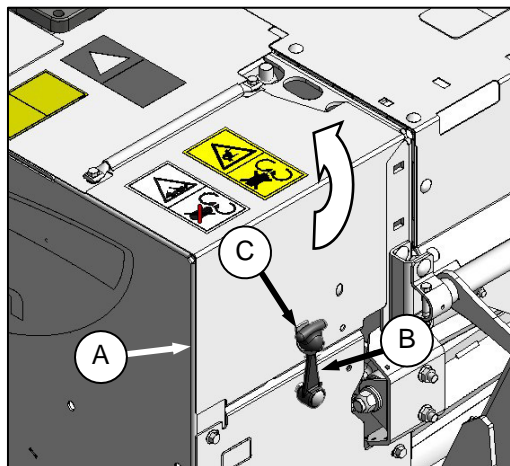


- Turn the handle on the lock-out valves to the vertical position.
- Lower machine by activating the remote cylinder control in tractor.

OPERATION

6.2.2 Driveshield

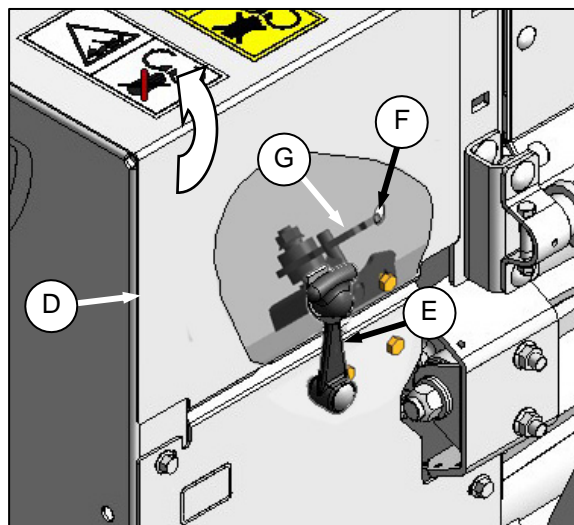
6.2.2.1 North American Headers



- To open drive shield (A), disengage rubber latch (B) from hook (C), and lift shield to open position.
- To close drive shield, lower shield (B) so that tabs at lower end of shield engage holes in lower panel.
- Engage rubber latch (A).

6.2.2.2 Export Headers

- To open drive shield (D):



- Release rubber latch (E).
- Insert a screwdriver (or equivalent) through hole (F) in shield into notch in latch (G), and push to disengage latch.
- Open shield (D).

- To close drive shield:
 - Lower shield (D) so that tabs at lower end of shield engage holes in lower panel, and latch (G) re-engages shield.
 - Engage rubber latch (E).

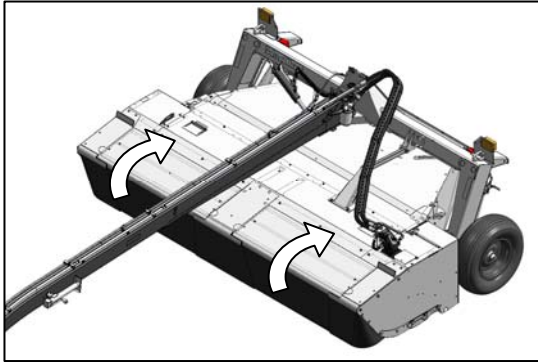
OPERATION

6.2.3 Cutterbar Doors



CAUTION

Do NOT operate the machine without all the cutterbar doors down, curtains installed and in good condition.



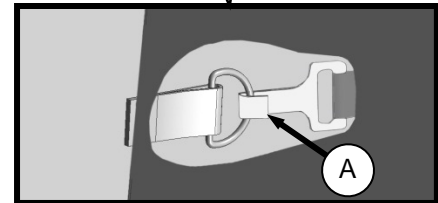
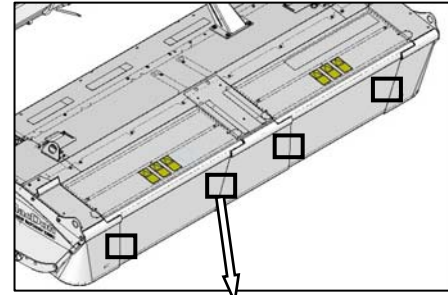
There are two doors to provide access to the cutterbar area.

Rubber curtains are attached to each door, and at the front corners and center fixed cover. Latches at the lower corners of the curtains keep the curtains together, and minimize the risk of thrown objects. Always keep these curtains down and latched when operating the mower conditioner.

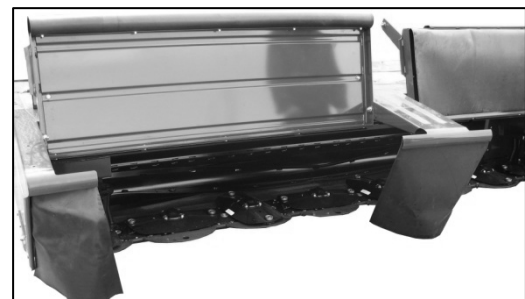
Replace the curtains if they should become worn or damaged. Refer to your Dealer or the Technical Service Manual for replacement instructions.

6.2.3.1 North American (N.A.) Headers

a. To open door:



1. Unhook curtain latches (A).



2. Lift at front of door to open position.

b. To close door:



CAUTION

To avoid injury, keep hands and finger away from corners of doors when closing.

1. Pull at top, and move to closed position.

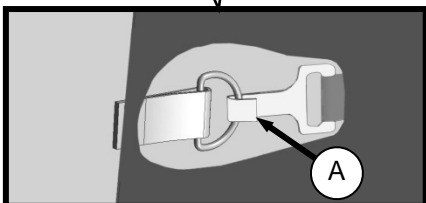
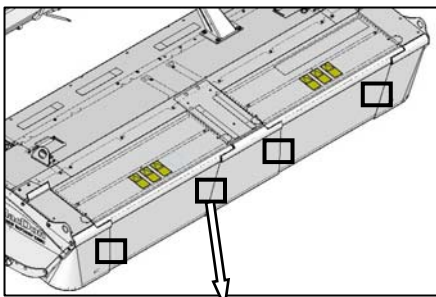
2. Hook curtain latches (A).

c. Ensure that curtains hang properly, and completely enclose cutterbar area.

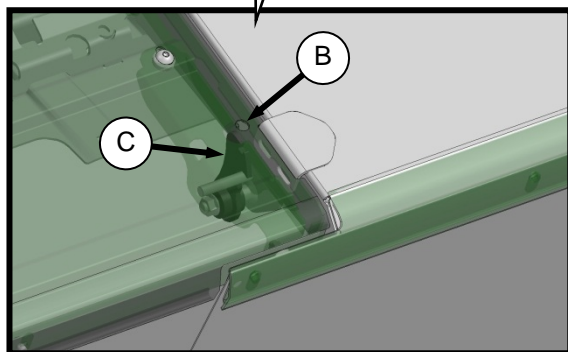
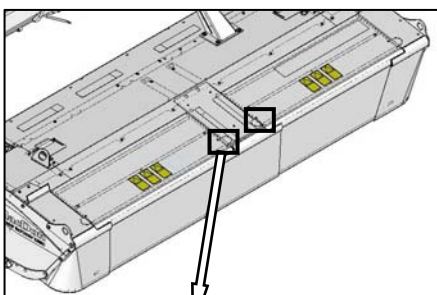
OPERATION

6.2.3.2 Export Headers

a. To open door:



1. Unhook curtain latches (A).



2. Insert a screwdriver or equivalent through hole (B) in door into notch in latch (C), and push latch to disengage.
3. Lift at front of door to open position.

b. To close door:



CAUTION

To avoid injury, keep hands and finger away from corners of doors when closing.

1. Pull at top, and move to closed position. Ensure latch (C) has engaged door.
2. Hook curtain latches (A).

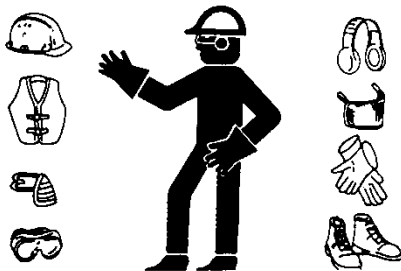
6.2.4 Daily Start-Up Check

Do the following each day before start-up:



CAUTION

- Be sure tractor and mower conditioner are properly attached, all controls are in NEUTRAL, and tractor brake is engaged.
- Clear the area of other persons, pets etc. Keep children away from machinery. Walk around the mower conditioner to be sure no one is under, on or close to it.
- Wear close fitting clothing and protective shoes with slip resistant soles.
- Remove foreign objects from the machine and surrounding area.
- As well, carry with you any protective clothing and personal safety devices that **COULD** be necessary through the day. Don't take chances.
- You may need:



- a hard hat.
- protective glasses or goggles.
- heavy gloves.
- respirator or filter mask.
- wet weather gear.
- Protect against noise. Wear a suitable hearing protective device such as ear muffs or ear plugs to protect against objectionable or uncomfortable loud noises.



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

NOTE:

Use proper procedure when searching for pressurized fluid leaks. Refer to Section 7.7.4 Hoses and Lines.

- b. Clean all lights and reflective surfaces on the machine. Check lights for proper operation.
- c. Perform all daily maintenance. Refer to Section 7.4.1 Maintenance Schedule/Record.

OPERATION

6.3 TRACTOR SETUP

6.3.1 Tractor Requirements

R85 MODEL	MINIMUM POWER	MINIMUM DRAWBAR CAPACITY	MINIMUM HYDRAULICS
13 FT	110 HP (82 kW)	As per ASAE	2000 psi (13.7 MPa)

NOTE

Tractor must be equipped with a seven terminal outlet to supply power to the mower conditioner's hazard lights.

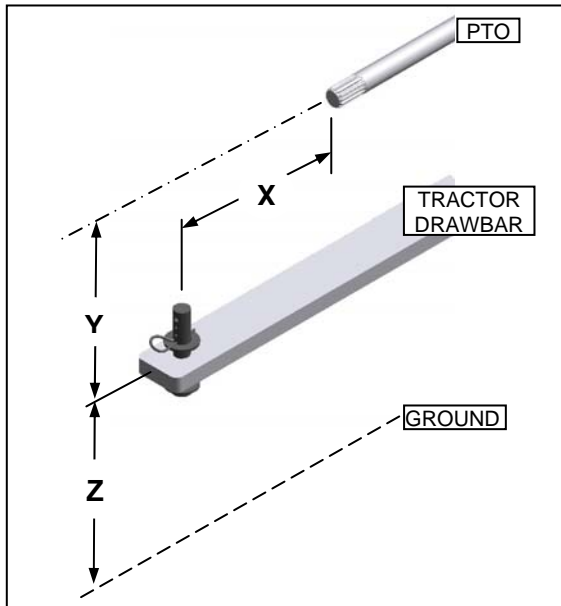
6.3.2 Drawbar Adjustment



CAUTION

Shut off tractor, engage parking brake, and remove key before working around hitch.

Adjust tractor drawbar to meet ASAE Standard specifications as listed below.



DIMENSION	1000 RPM PTO	
	1.37 INCH DIA.	1.75 INCH DIA.
X	16 in. (406 mm)	20 in. (508 mm)
Y	6–12 in. (152–305 mm) 8 in. (203 mm) Recommended	
Z	13–17 in. (330–432 mm) 16 in. (406 mm) Recommended	

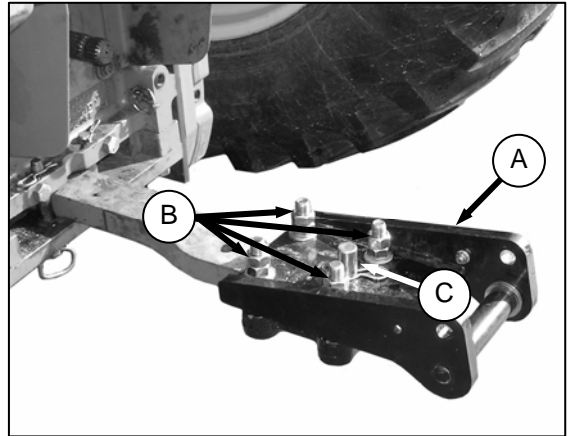
6.3.3 Drawbar Hitch Setup



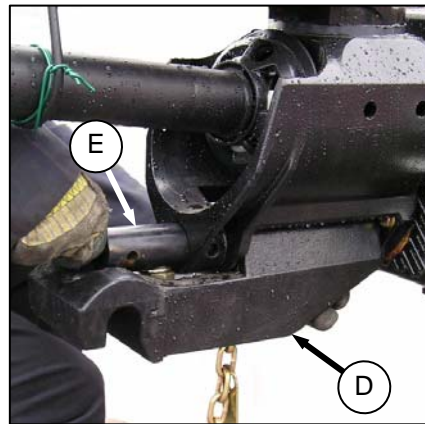
CAUTION

Shut off tractor, engage parking brake, and remove key before working around hitch.

- Secure the tractor drawbar so the hitch pin hole is directly below the driveline.



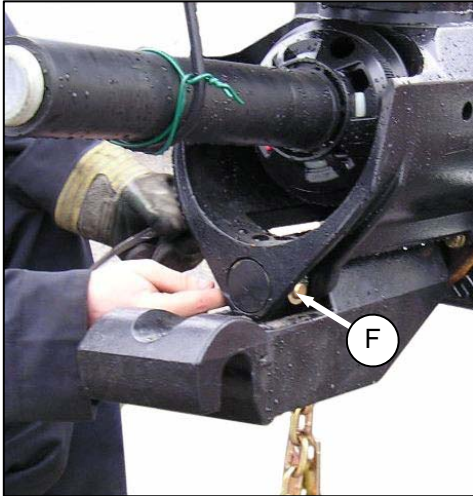
- Loosen bolts (B) on extension assembly (A), and slide onto drawbar.
- Install pin (C) through drawbar and extension from underside, and secure with hairpin.
- Gradually tighten the four bolts to 265 ft·lbf (359 N·m).



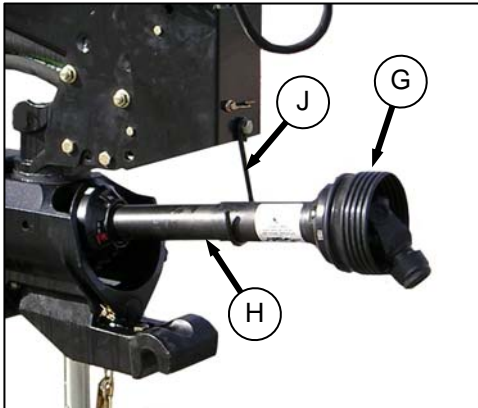
- Attach the swivel APT member (D) with pin (E) onto the APT.

(continued next page)

OPERATION



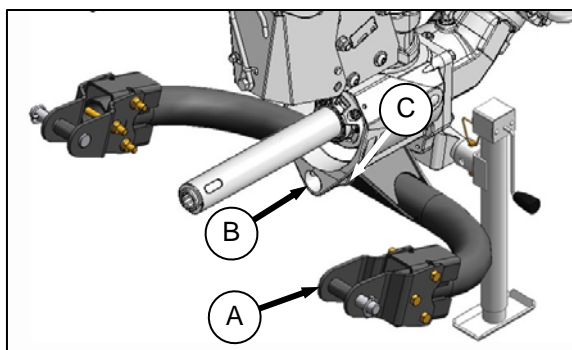
- f. Secure pin with clevis pin (F), washers, and cotter pin.



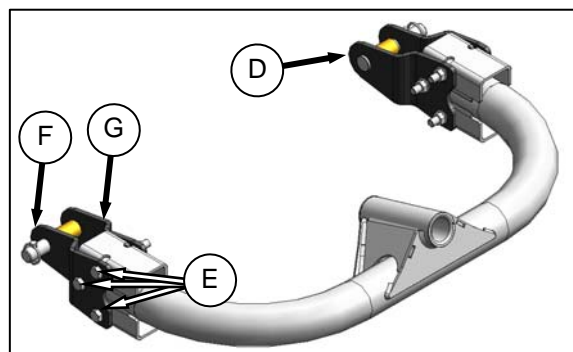
- g. Assemble PTO driveline male half (G) onto PTO shaft (H) on APT. Push male half so that PTO shaft is at its fully compressed length.
- h. Locate PTO (H) shaft in hook (J).

OPERATION

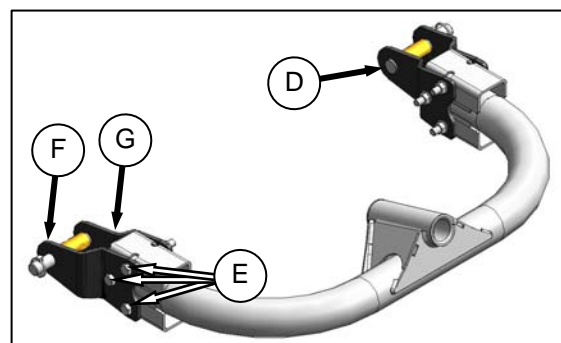
6.3.4 3-Point Hitch (Cat. II, III, IIIN) Setup



- Attach the 3-point hitch adapter (A) to the APT with pin (B). The installation is similar to that described in the previous section.
- Secure pin (B) with clevis pin (C), washers, and cotter pin.
- The arms on the adapter (A) can be set up to suit Category II and IIIN, or Category III tractor hitch arms:



CATEGORY II or IIIN



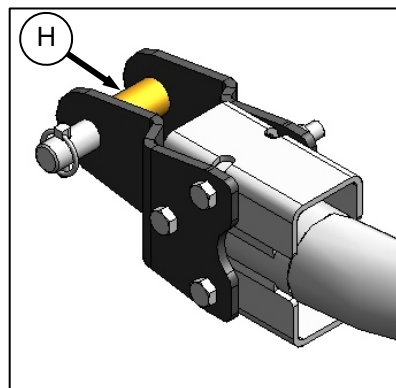
CATEGORY III

- Remove pins (D).
- Remove bolts (E) (3 per side).
- Flip outer plate (F) and inner plate (G) on each arm.

IMPORTANT

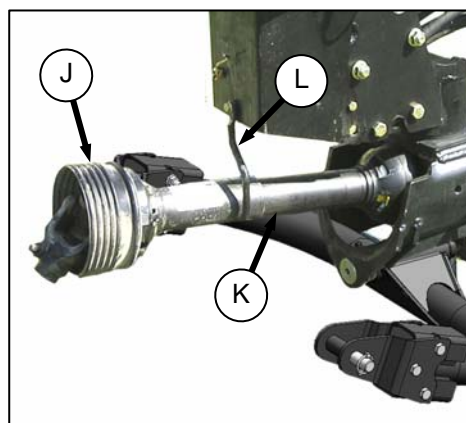
The inner plate (G) has a smaller joggle than the outer plate (F). Always maintain the proper locations.

- Re-install bolts (E).
- Replace pins (D).



NOTE

Bushings (H) on pins can be removed to suit hole size in tractor hitch arms.



- Assemble PTO driveline male half (J) onto PTO shaft (K) on APT. Push male half so that PTO shaft is at its fully compressed length.
- Locate PTO shaft in hook (L).

OPERATION

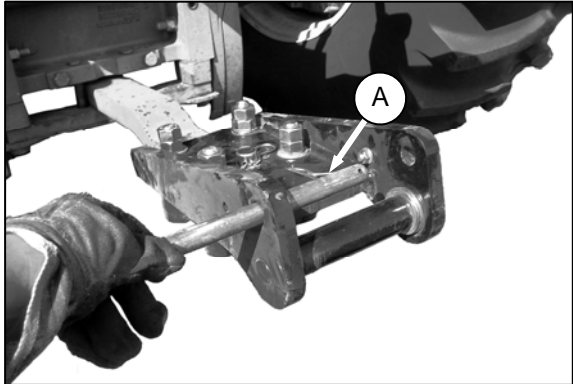
6.4 MOWER CONDITIONER/TRACTOR HOOKUP

6.4.1 Drawbar Hookup

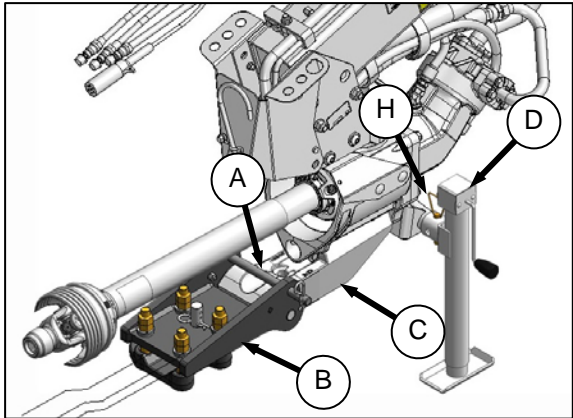


CAUTION

Shut off tractor, engage parking brake, and remove key before working around hitch.



- a. Remove pin (A).

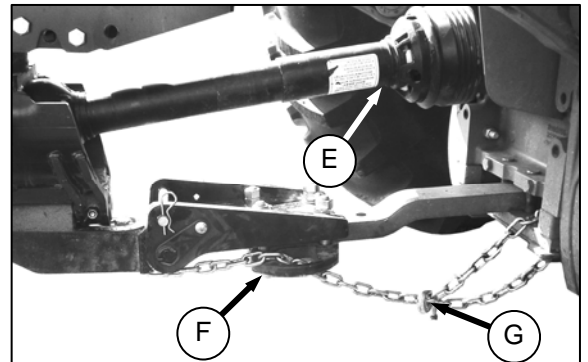


- b. Position tractor to align drawbar extension (B) with arm (C) on mower conditioner.
c. Lower hitch with jack (D) to engage arm (C) on drawbar extension (B).
d. Install hitch pin (A), and secure with hairpin.

IMPORTANT

If the tractor has a three-point hitch, lower the lower links as low as possible to prevent damage to articulated power turn (APT) hitch.

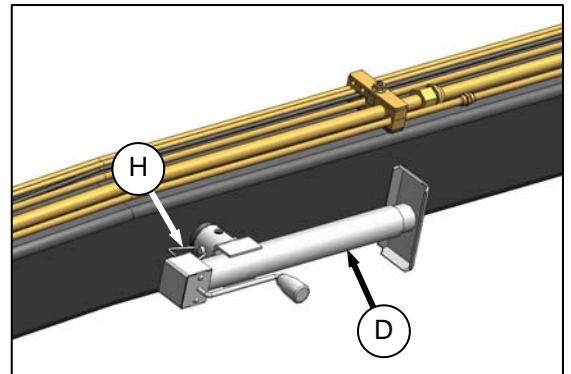
- e. Attach driveline (E) to tractor PTO shaft as follows:



1. Position driveline (E) onto tractor PTO shaft.
 2. Pull back collar on driveline, and push driveline until it locks. Release collar.
- f. Route safety chain from mower conditioner through chain support (F), around drawbar support, and lock the hook (G) on chain.

IMPORTANT

Adjust chain length to remove all slack except what is needed for turns.



- g. Raise jack (D), pull pin (H) and move jack to storage position on side of APT hitch.
h. Secure jack with pin (H).
i. Proceed to Section 6.4.3 Hydraulic Connections.

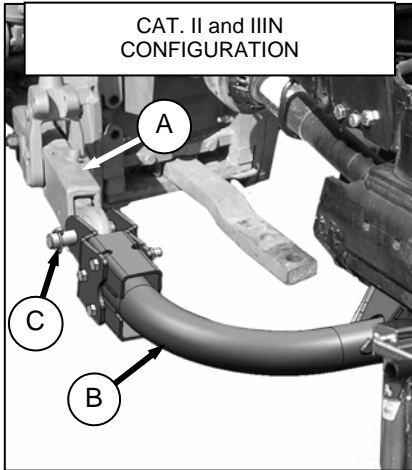
OPERATION

6.4.2 3-Point Hitch (Cat. II, III, IIIN) Hookup



CAUTION

Shut off tractor, engage parking brake, and remove key before working around hitch.

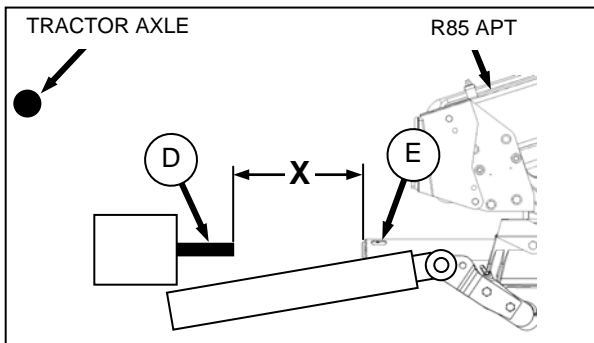


- Position tractor, and align tractor hitch arms (A) with hitch adapter (B). Shut off tractor, and remove key.
- Remove pins (C) from hitch adapter, and use the jack to adjust height of APT so that pins (C) can be re-installed.

NOTE

If tractor is equipped with a quick hitch system, pins (C) do not need to be removed.

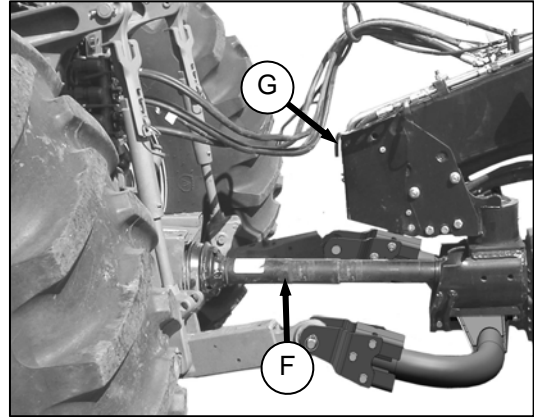
- Secure pins (C) with lynch pins.
- Install anti-sway bars on tractor hitch to stabilize lateral movement of hitch arms (A). Refer to your tractor operator's manual.



- Check distance 'X' between tractor PTO shaft (D) and implement input shaft (E) (without the front half of the driveline attached).

- The measurement must NOT exceed the dimensions listed:

DRIVELINE SHAFT SIZE	DISTANCE 'X'
1.375 in. (34 mm)	27 in. (685 mm)
1.75 in. (43 mm)	31 in. (790 mm)

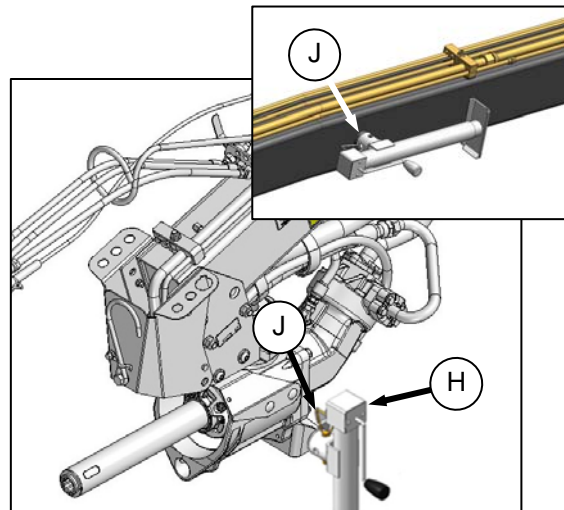


- Position driveline (F) onto tractor PTO shaft. Driveline should be approximately level.

IMPORTANT

Front half of driveline (F) for 3-point hitch is longer than the driveline for draw-bar hitch. Ensure proper length driveline is used.

- Pull back collar on driveshaft, and push driveshaft until it locks. Release collar.
- Rotate driveline storage hook (G) to upward position.



- Raise jack (H), pull pin (J), and move jack to storage position on side of APT hitch. Secure jack with pin (J).

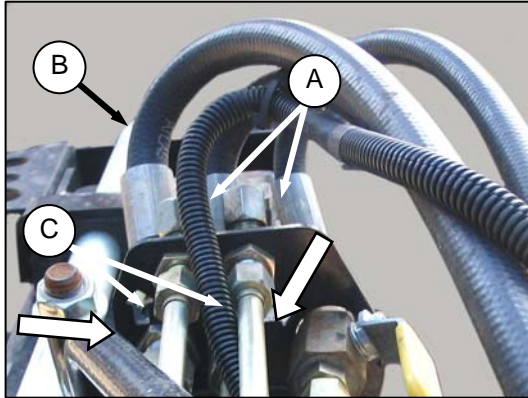
OPERATION

6.4.3 Hydraulic Connections



WARNING

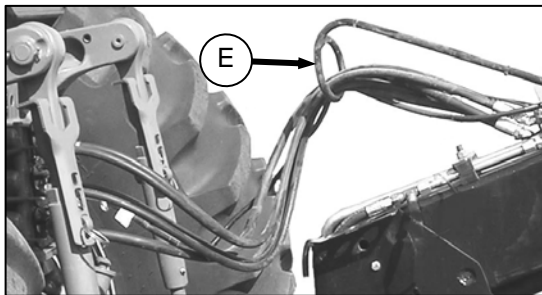
Do NOT use remote hydraulic system pressures over 3,000 psi (20,684 kPa). Check your tractor operator's manual for remote system pressure.



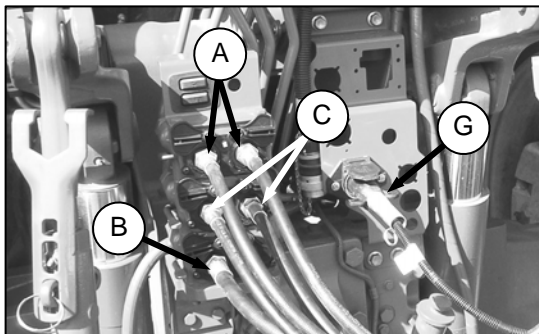
SYSTEM	HOSE	TRACTOR HYDRAULICS
Steering	A (2 Hoses)	Control 1
Lift	B (1 Hose)	Control 2
Header Tilt	C (2 Hoses)	Control 3

NOTE

Arrows cut into plate indicate system for hoses. LIFT ↑ STEERING ↔



- Ensure hoses are routed through guide (E) to provide proper hose arc (as shown).



- Connect two STEERING cylinder hoses (A) as follows:

CONTROL LEVER POSITION	CYLINDER MOVEMENT	MOWER CONDITIONER DIRECTION
Forward	Extend	Right
Backward	Retract	Left

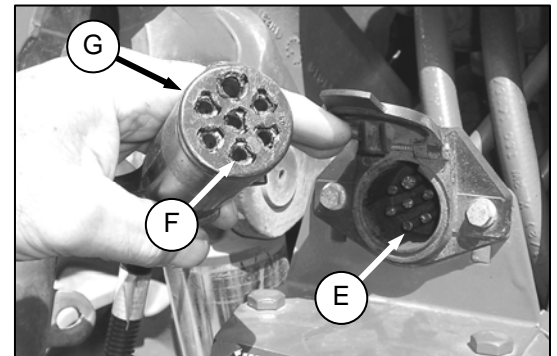
- Connect one LIFT cylinder hose (B) as follows:

CONTROL LEVER POSITION	CYLINDER MOVEMENT	HEADER MOVEMENT
Forward	Retract	Lower
Backward	Extend	Raise

- Connect two HEADER TILT cylinder hoses (C) as follows: (Not required with mechanical center-link).

CONTROL LEVER POSITION	CYLINDER MOVEMENT	HEADER MOVEMENT
Forward	Retract	Lower
Backward	Extend	Raise

6.4.4 Electrical Connection



- Check that Pin #4 (E) in the tractor receptacle is NOT constantly energized - see your tractor operator's manual, and remove the appropriate fuse if required.

IMPORTANT

Older model tractors will have Pin #4 (E) energized as an accessory circuit. The R85 mower conditioner uses this pin position (F) for brake lights.

- Connect the mower conditioner wiring harness connector (G) to tractor. The connector is designed to fit tractors equipped with a round 7-pin receptacle (SAE J560).

OPERATION

6.5 MOWER CONDITIONER/TRACTOR UNHOOK

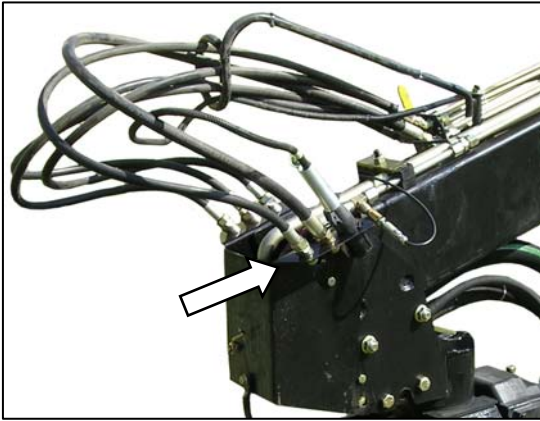
6.5.1 Drawbar Unhook



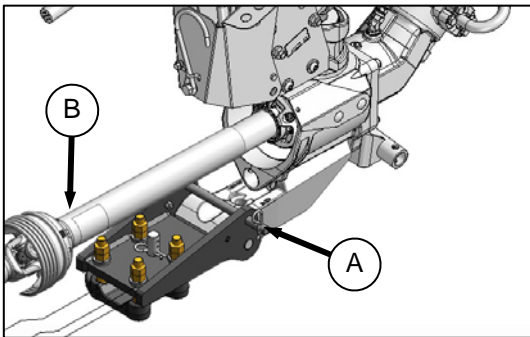
CAUTION

- To prevent accidental movement of tractor, shut off engine, engage parking brake, and remove key.
- To maintain stability, always lower the machine completely. Block mower conditioner wheels before detaching from tractor.

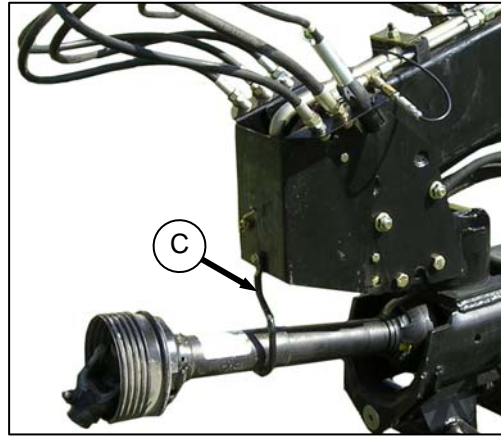
- a. Park machine on flat level surface.
- b. Lower header onto blocks, or leave header raised. Engage lift cylinder lock-out valves if leaving in raised position.
- c. Move remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.



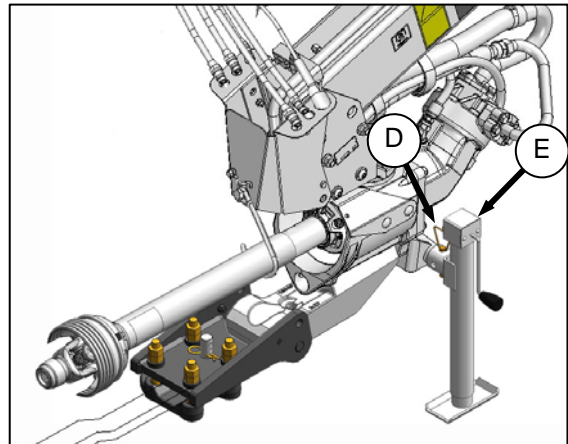
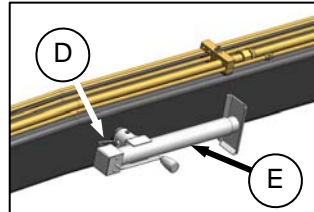
- d. Disconnect hydraulic hoses and electrical harness. Store hose ends and electrical connector in holes at front of APT hitch as shown.



- e. Remove pin (A).
- f. Pull back collar on driveline (B), and slide coupler off tractor PTO shaft, and rest driveline on drawbar.



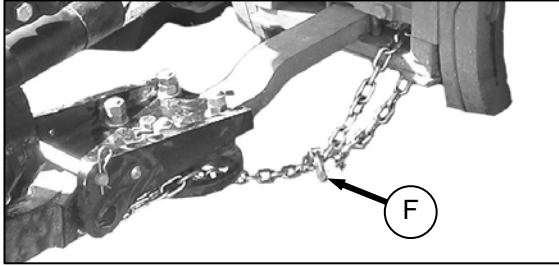
- g. Rotate hook (C) to lower position, and position driveline in hook.



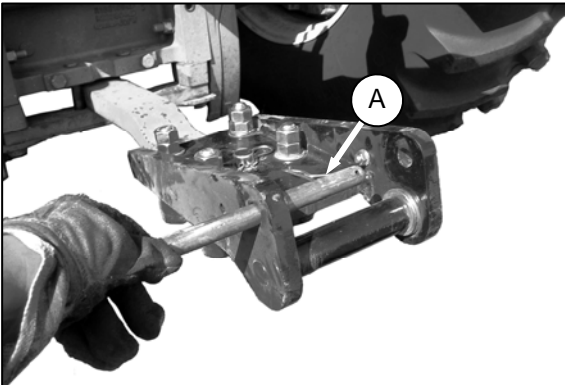
- h. Pull pin (D) securing jack (E) at storage location, and move to working position at front of APT hitch. Secure jack with pin (D).
- i. Lower jack to take weight off tractor drawbar.

(continued next page)

OPERATION



- j. Remove chain lock (F), and unhook safety chain from tractor. Wrap chain around APT hitch for storage.
- k. Lower jack to raise hitch clear of tractor drawbar.
- l. Slowly drive tractor away from mower conditioner.



- m. Replace hitch pin (A), and secure with hairpin.

OPERATION

6.5.2 3-Point Hitch Unhook

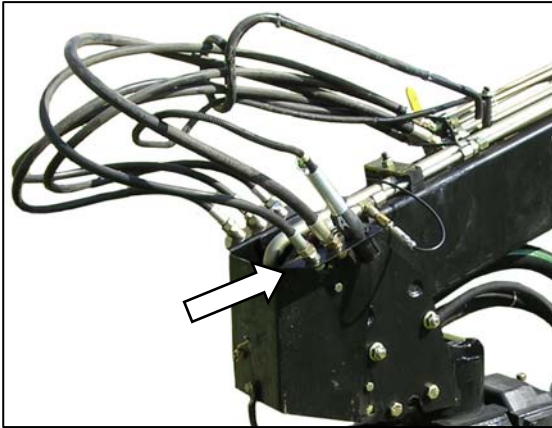
- a. Park machine on flat level surface.
- b. Lower header onto blocks, or leave header raised. If leaving in raised position, engage lift cylinder lock-out valves.



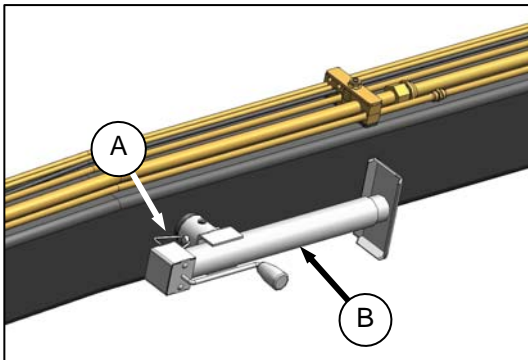
CAUTION

- To prevent accidental movement of tractor, shut off engine, engage parking brake, and remove key.
- To maintain stability, always lower the machine completely. Block mower conditioner wheels before detaching from tractor.

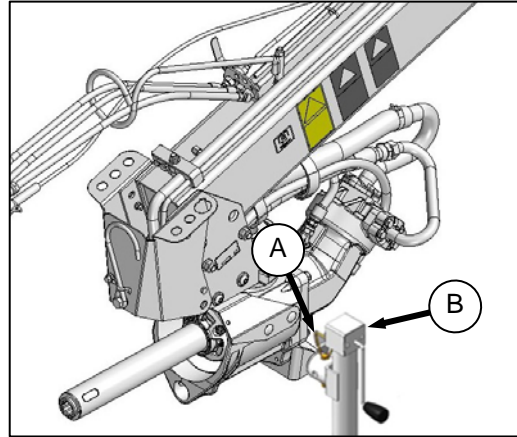
- c. Shut off engine, and remove key.
- d. Move remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.



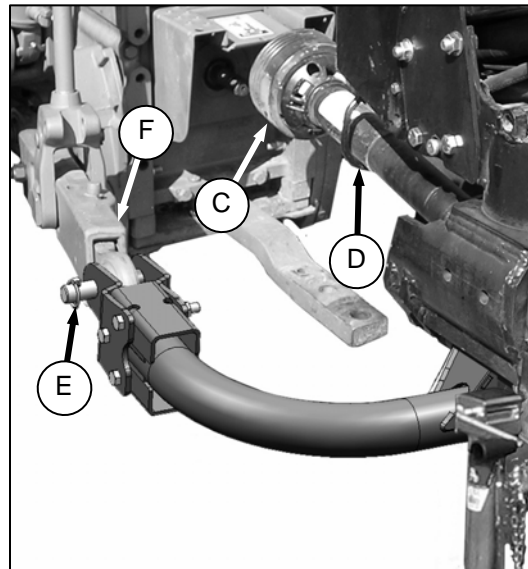
- e. Disconnect hydraulic hoses and electrical harness. Store hose ends in holes at front of APT hitch as shown.



- f. Pull pin (A) securing jack (B) at storage location.



- g. Move jack (B) to working position at front of APT hitch. Secure jack with pin (A).



- h. Pull back collar on driveline (C), and slide coupler off tractor PTO shaft.
- i. Rotate hook (D) to lower position, and place driveline in hook.
- j. Lower jack to raise APT hitch, and take weight off hitch arms.

NOTE

If tractor is equipped with a quick hitch system, pins (E) do not need to be removed.

- k. Remove lynch pins, and remove pins (E)
- l. Swing hitch arms (F) clear of APT.
- m. Replace pins (E) in mower conditioner hitch.
- n. Slowly drive tractor away from mower conditioner.

OPERATION

6.6 BREAK-IN PERIOD

- After attaching mower conditioner to tractor for the first time, operate the machine slowly for 5 minutes, watching and listening FROM THE TRACTOR SEAT for binding or interfering parts.

NOTE

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



CAUTION

Before investigating an unusual sound or attempting to correct a problem, shut off tractor, engage parking brake, and remove key.

- Perform the items specified in to Section 7.4.2 Break-In Inspections.

6.7 ENGAGING THE PTO



DANGER

Be sure all bystanders are clear of the machine before engaging the PTO. Never leave tractor seat with the PTO engaged.

- Engage the PTO slowly, just before the mower conditioner is moved up to the standing crop.
- Be sure tractor PTO is running at 1000 rpm before starting to cut.
- Disengage the PTO when not operating the mower conditioner.
- To prevent pump cavitation, run machine at low tractor idle for approximately 10 minutes when ambient temperature is 50°F (10°C) or less.

6.8 RAISING AND LOWERING HEADER

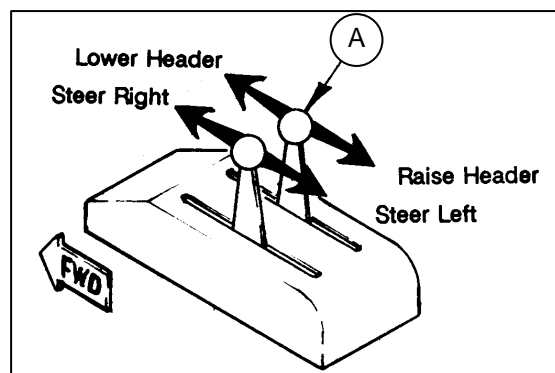
The header raise/lower control is not normally used to control cutting height since cutting is usually performed with the cutterbar on the ground.

This control is used to raise the header to clear obstacles and windrows during field operation, to adjust the header height for maintenance, and to raise the header for transport behind a tractor, or for storage.



DANGER

Be sure all bystanders are clear of the machine before raising or lowering header.



- Raise or lower header by activating cylinder control lever (A) in tractor.

IMPORTANT

Hoses should be connected so that moving control lever (A) backward raises the header. See Section 6.4.3 Hydraulic Connections for more information.

6.9 SHUTDOWN PROCEDURE



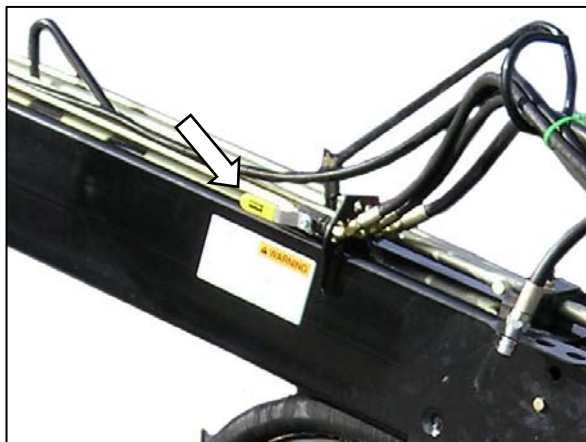
CAUTION

Before leaving the tractor seat for any reason:

- Park on level ground if possible.
- Lower the mower conditioner fully.
- Place all controls in NEUTRAL or PARK.
- Disengage PTO.
- Engage the park brake.
- Stop engine, and remove key from ignition.
- Wait for all movement to stop.
- Lock tractor anti-vandalism covers and closures when leaving the machine unattended.

OPERATION

6.10 STEERING

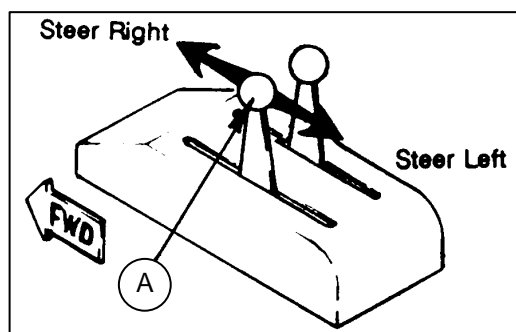


IMPORTANT

The valve on the APT must be in the working or open position (handle in line with APT) for the steering system to be operational.

Steering is controlled by the tractor remote hydraulic system. The APT hitch provides the Operator with the ability to:

- move the mower conditioner into field position easily,
- make right angle turns in either direction,
- steer around objects on both sides, and
- perform straight line field cutting on either side of the tractor.



IMPORTANT

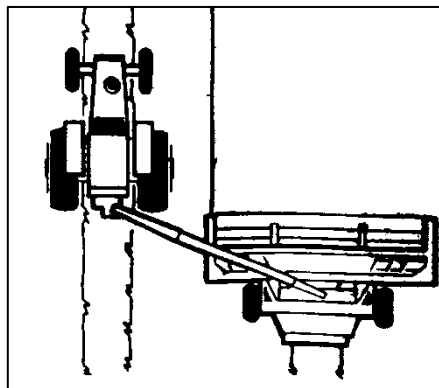
Hoses should be connected so that:

- moving tractor control lever (A) forward steers the machine to the right, and
- moving the lever (A) backward steers the mower conditioner left.

IMPORTANT

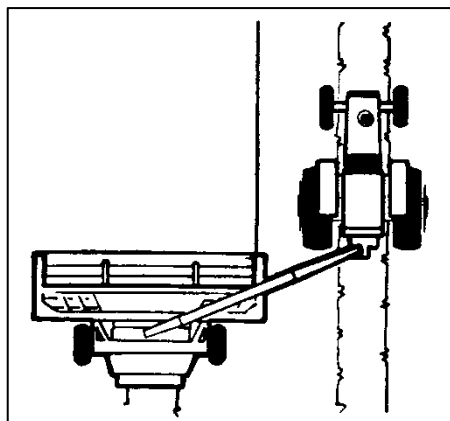
The control (A) is operated momentarily for steering, and must be returned to OFF or NEUTRAL position as soon as the mower conditioner reaches the desired path of travel.

6.10.1 Right Side Operation



Move steering lever forward to achieve desired position of mower conditioner on right side of tractor.

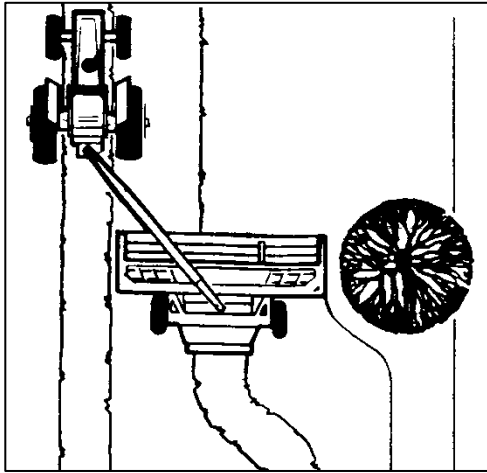
6.10.2 Left Side Operation



Move steering lever backward to achieve desired position of mower conditioner on left side of tractor.

OPERATION

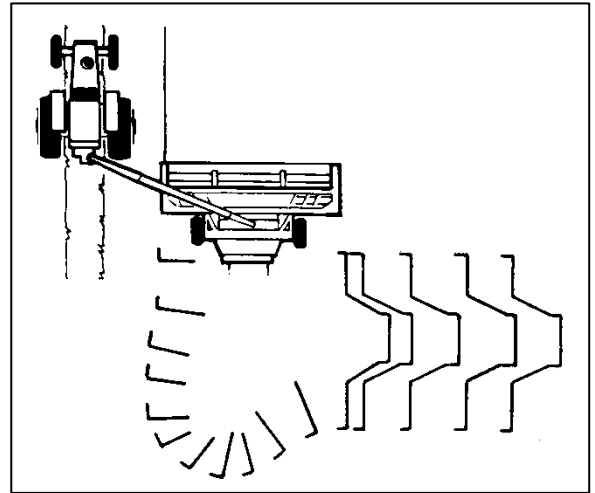
6.10.3 Avoiding Obstacles



Move steering lever as required to avoid obstacles.

6.10.4 Square Corners

The following procedure is intended only as a guide to developing a turning procedure for the tractor being used. Specific distances are not given due to the variances in tractor manoeuvrability.



- As the tractor approaches the corner, guide the tractor sharply away from the crop. Steer the mower conditioner to maintain a straight cut ahead as the tractor moves away from the crop.
- As soon as the header cuts past where the new corner will be, raise the header sufficiently for skid shoes to clear the ground, then steer the mower conditioner to the extreme direction away from the uncut crop.
- As the tractor passes the corner, steer it sharply back towards the uncut crop, taking care that the inside tractor tire does NOT contact the APT hitch.
- Guide the tractor to straddle the last cut windrow. As the mower conditioner finishes turning, steer it back towards the uncut crop, align the header with the crop edge, and lower header to cutting height.

OPERATION

6.10.5 180 Degree Turn

NOTE

When cutting back and forth on one side of the field, approximately 50 ft. (15 m) is required at each end of the field to make a 180° turn-around.

- a. Beginning at position (A), the tractor is guided away from the uncut crop, while the mower conditioner is guided straight ahead until cutting through the end.
- b. As soon as the header cuts through, raise the header to lift the skid shoes clear of the ground, and steer the mower conditioner to the extreme direction away from the uncut crop.

NOTE

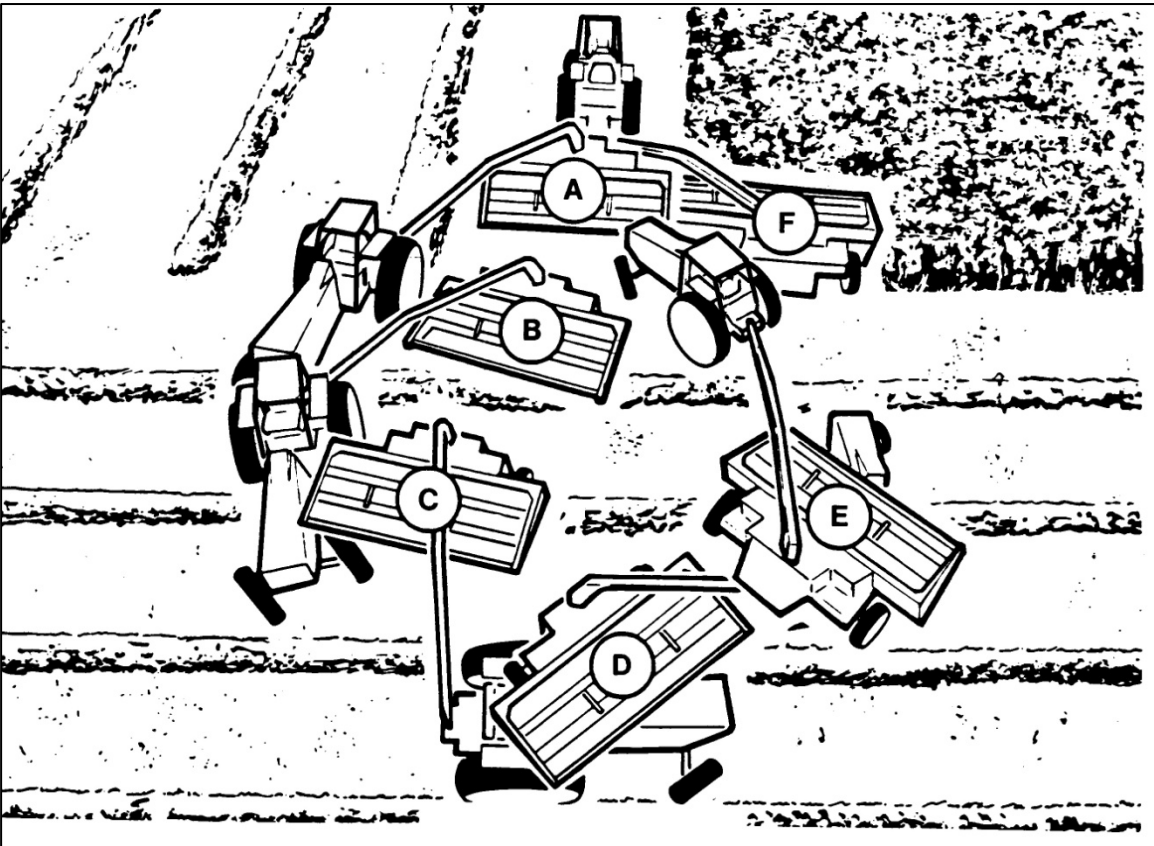
For ease of operation, both levers can be activated with one hand, and held until steering cylinder completes its stroke.

- c. At position (B), start turning the tractor back towards the uncut crop.

IMPORTANT

When turning, take care that the inside tractor tire does NOT contact mower conditioner APT hitch.

- d. In positions (C) and (D), continue turning towards the uncut crop, (with the mower conditioner steered towards the outside of the turning circle), being aware of APT-to-tire clearance.
- e. At position (E), the tractor completes the circle, and the front wheels are turned to straddle the last cut windrow. At this point, steer the mower conditioner to line up with the edge of the uncut crop.
- f. At position (F), lower header to cutting height, and begin a new cut through the field.



OPERATION

6.11 TRANSPORTING MOWER CONDITIONER

The R85 Mower Conditioner can be transported on public roads by towing with a tractor or a truck. Proceed to Section 6.11.1 Transporting With A Tractor, or 6.11.2 Transporting With A Truck.



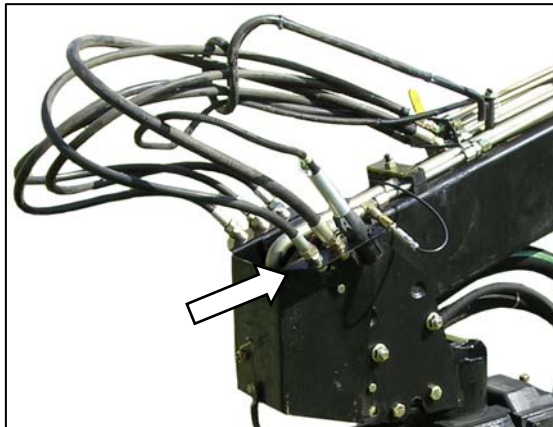
CAUTION

- Be aware of roadside obstructions, oncoming traffic and bridges.
- Travel speed should be such that complete control and machine stability are maintained at all times. Do NOT exceed 20 mph (32 km/h). Reduce speed for corners and slippery conditions.
- When transporting on roads, use tractor lights and mower conditioner flashing amber and red tail-lights to provide adequate warning to operators of other vehicles.
- Do NOT transport the mower conditioner on a road or highway at night, or in conditions, which reduce visibility, such as fog or rain.

6.11.1 Transporting With a Tractor

If the mower conditioner is in Transport Mode, proceed as follows. Otherwise, see Section 6.11.4 Preparing Mower Conditioner for Transport.

- a. Hook-up mower conditioner to tractor. See Section 6.4 MOWER CONDITIONER/TRACTOR HOOKUP for details on attaching the mower conditioner to the tractor.

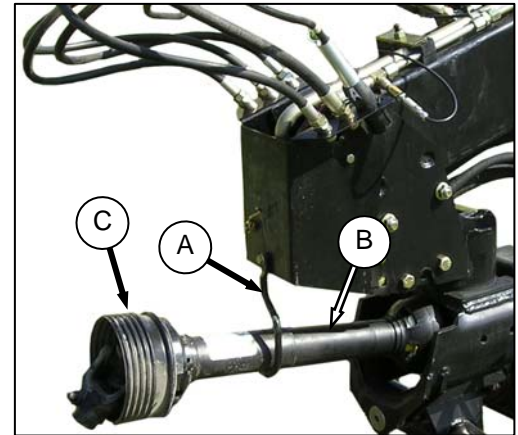


NOTE

The hydraulic hoses do not need to be attached to the tractor for towing. Ensure they are securely stored on the APT hitch.

NOTE

The PTO does not need to be attached for towing purposes.



- b. If not attached, lower hook (A), store driveline (B) on hook, and remove forward half of driveline. Store forward half in cab for transport.



- c. Ensure that APT hitch safety chain (D) is properly attached to towing vehicle. Provide only enough slack in chain to permit turning.
- d. Check local laws for width regulations and lighting or marking requirements before transporting on roads.
- e. Do NOT exceed 20 mph (32 km/h).

OPERATION

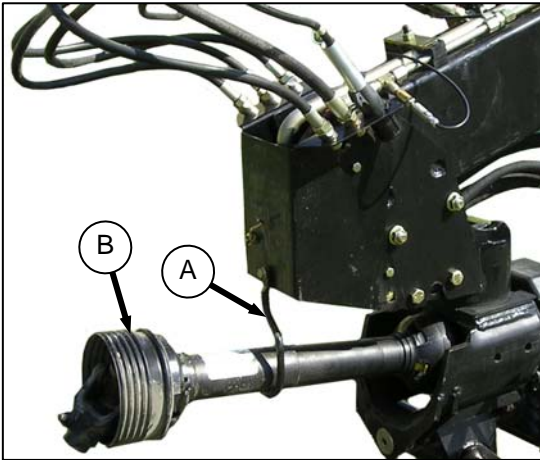
6.11.2 Transporting With a Truck



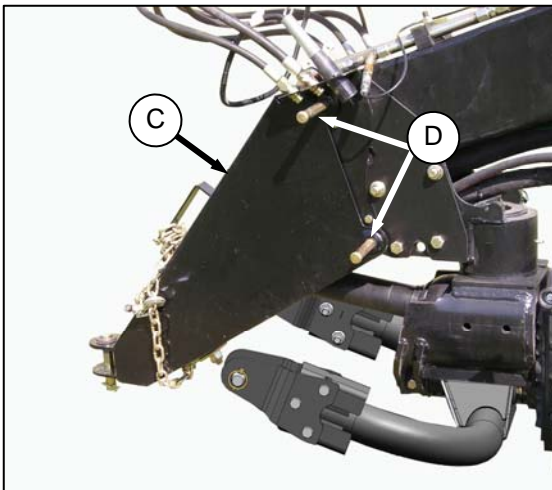
CAUTION

Do NOT tow with a vehicle weighing less than 7,500 lb. (3,400 kg). Ensure that the capacity of the towing vehicle is sufficient to maintain control.

If the mower conditioner is in Transport Mode, proceed as follows. Otherwise, see Section 6.11.4 Preparing Mower Conditioner for Transport.

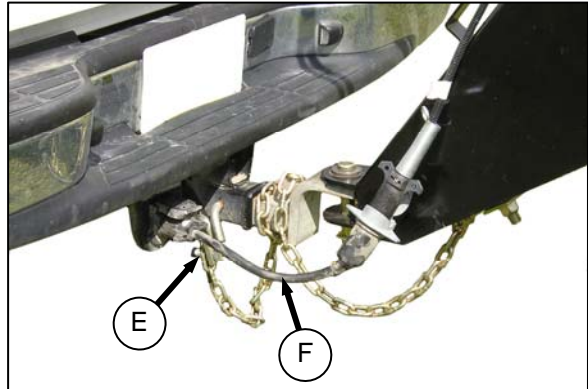


- Store hydraulic hoses on the APT as shown.
- Lower hook (A), and place driveline in hook.
- Remove the forward half (B) of driveline, and store in truck for transport.



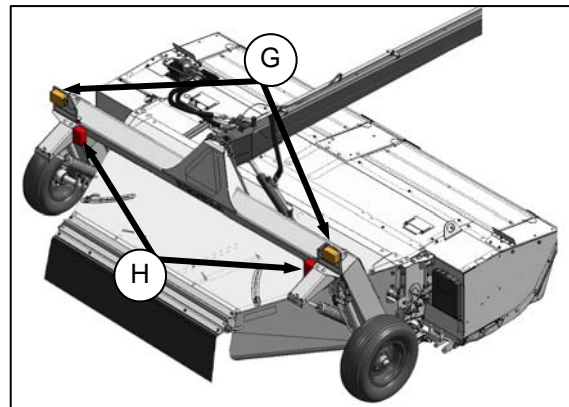
- Position towing adapter (C) on APT hitch, and secure with pins (D).

- Attach mower conditioner to truck.
- Remove jack from working position, and store on APT hitch. Secure with pin.



- Wrap safety chain around APT hitch, and attach to truck frame (E).
- Connect electrical harness (F).
- Check local laws for width regulations and lighting or marking requirements before transporting on roads.
- Do NOT exceed 20 mph (32 km/h).

6.11.3 Lighting



The mower conditioner is equipped with two amber lights (G) located on the extremities of the carrier frame, that also function as flashing hazard lights and turn signals.

Red tail lights (H) are located at the rear of the carrier frame, and also function as brake lights. Refer to Section 6.4.4 Electrical Connection for connection details for your tractor.

OPERATION

6.11.4 Preparing Mower Conditioner for Transport

- a. Charge the steering circuit as follows:
 1. Connect the two APT steering cylinder hoses to a tractor hydraulic circuit.
 2. Steer the header completely to the left, then right. Repeat three or four times.
- b. Steer the mower conditioner so that it is centered behind the towing vehicle.



- c. Close the lock-out valve on the APT hitch.



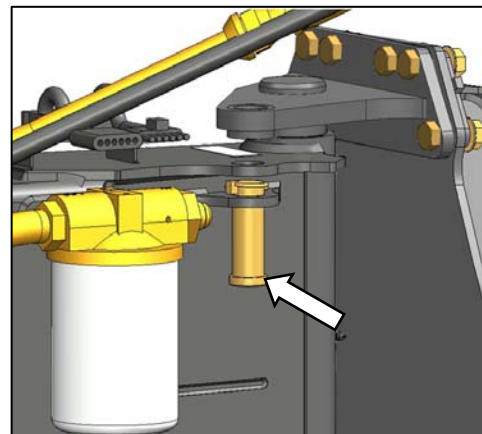
- d. Raise the header fully, and engage both header lift cylinder lock-out valves.



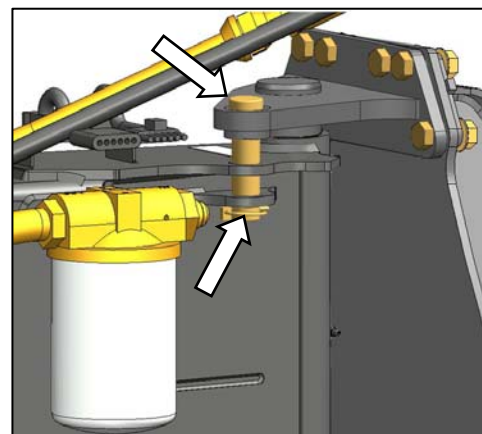
WARNING

- Do NOT tow unless the steering cylinder is fully charged. If steering cylinder is not fully charged, loss of control can result in injury or death.
- Use the temporary transport lock pin if machine must be towed without a fully charged steering cylinder.

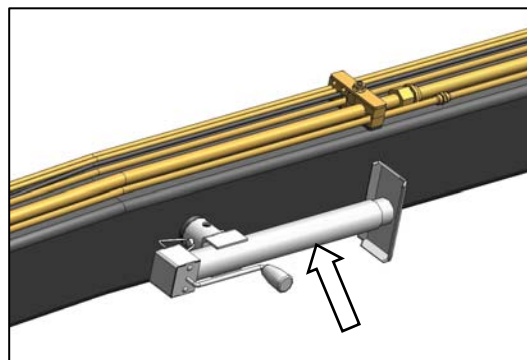
- e. If steering cylinder is not fully charged, install temporary transport lock pin as follows: Otherwise, proceed to step f.



1. Remove pin from storage at aft end of APT hitch.



2. Line up holes in APT hitch and frame, and install transport lock pin as shown.
3. Secure with lynch pin.



- f. Check that jack is properly attached in storage position on APT hitch.
- g. Ensure tires are properly inflated.
- h. Keep SMV sign, reflectors, and lights clean and visible at rear of mower conditioner.

OPERATION

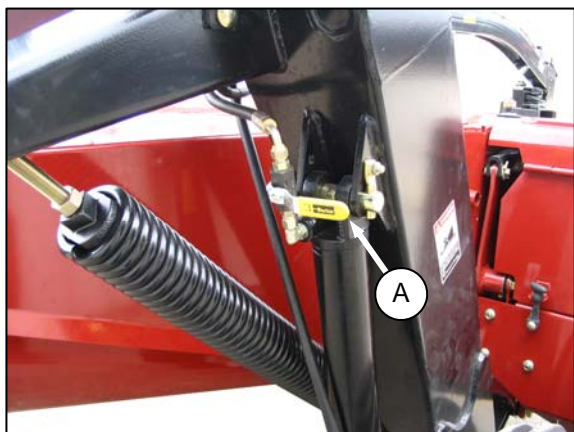
6.11.5 Flatbed



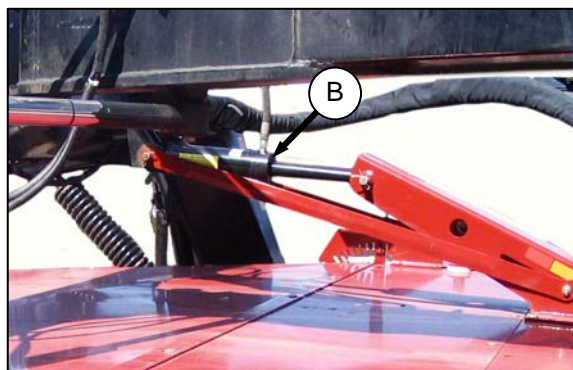
CAUTION

Use the following procedure when transporting the mower conditioner on a flatbed trailer.

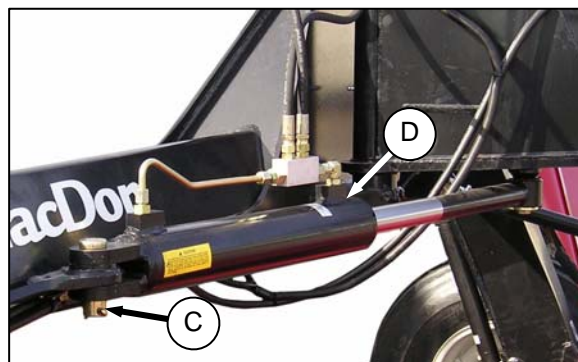
6.11.5.1 Loading



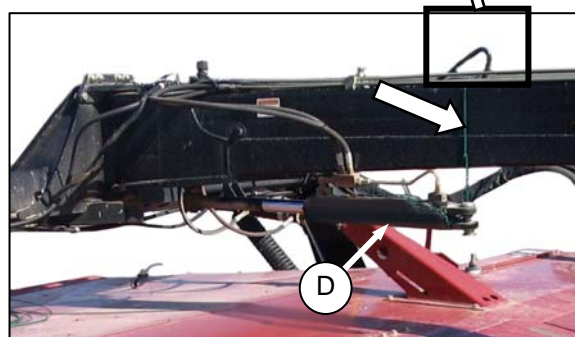
- a. Lower the header to the ground, and engage lift cylinder lock-out valves (A).



- b. Retract header angle control link (B) to minimum length.
- c. Unhook tractor from mower conditioner. See Section 6.5 MOWER CONDITIONER/TRACTOR UNHOOK.



- d. Remove pin (C) attaching steering cylinder (D) at frame, and swing cylinder under APT hitch. Store pin in barrel end of cylinder.



- e. Secure cylinder (D) to APT hitch with shipping wire (or equivalent).

IMPORTANT

Ensure shipping wire is NOT over the hydraulic lines.

(continued next page)

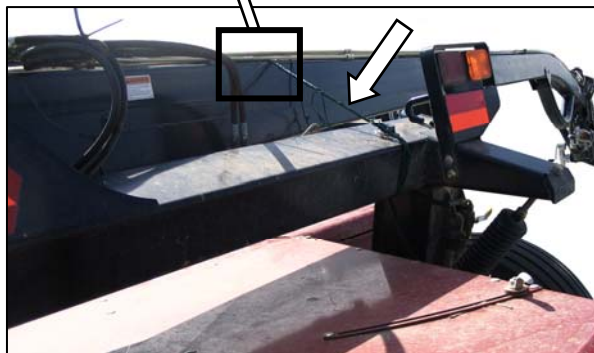
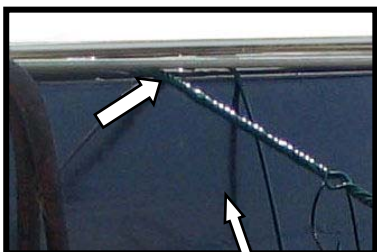
OPERATION



- f. Attach a chain to front of APT hitch, and other end to a forklift (or equivalent).
- g. Lift front of APT hitch, and slowly swing hitch aft until it is approximately parallel with carrier frame. Lower APT, and remove chain.

IMPORTANT

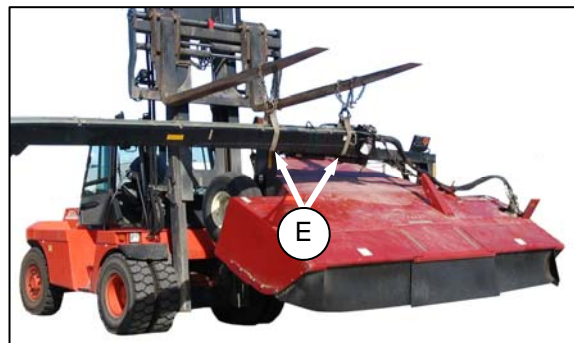
Ensure hoses on carrier frame are free to move when APT hitch is moved to transport position.



- h. Tie APT hitch to frame back tube with shipping wire (or equivalent).

IMPORTANT

Ensure shipping wire is NOT over the hydraulic lines.



- i. Locate two lifting slings (E) around APT hitch and frame approximately as shown, and attach to forklift with chains.

NOTE

Adjust position of slings so that mower conditioner is lifted evenly.



CAUTION

To avoid injury to bystanders from being struck by machinery, do NOT allow people to stand in loading area.



CAUTION

Equipment used for unloading must meet or exceed the requirements specified below. Using inadequate equipment may result in chain breakage, vehicle tipping or machine damage.

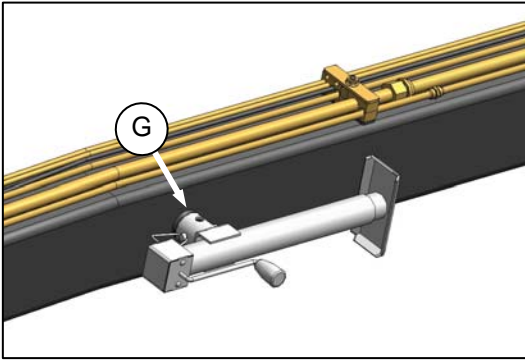
LIFTING VEHICLE	
Minimum Capacity	8,000 lb. (3,630 kg)
Minimum Lifting Height	15 ft. (4.5 m)

CHAIN	
Overhead Lifting Quality (1/2 Inch)	5,000 lb. (2,270 kg) Minimum Working Load

(continued next page)

OPERATION

- j. Lift mower conditioner slightly to take weight off APT hitch.



- k. Remove jack from forward end of APT hitch, and move to storage location (G) on hitch. Secure with pin.



- l. Slowly drive to flatbed, and raise mower conditioner.
m. Lower mower conditioner onto flatbed. Blocking is not required. Remove slings from mower conditioner.



- n. Secure mower conditioner to flatbed with straps.

6.11.5.2 Unloading

- a. Remove tie downs.
b. Approach mower conditioner from backside with forklift.



- c. Locate two lifting slings around APT hitch and frame approximately as shown, and attach to forklift with chains.

NOTE

Adjust position of slings so that mower conditioner is lifted evenly.



CAUTION

To avoid injury to bystanders from being struck by machinery, do NOT allow persons to stand in loading area.



CAUTION

Equipment used for unloading must meet or exceed the requirements specified below. Using inadequate equipment may result in chain breakage, vehicle tipping or machine damage.

LIFTING VEHICLE	
Minimum Capacity	8,000 lb. (3,630 kg)
Minimum Lifting Height	15 ft. (4.5 m)

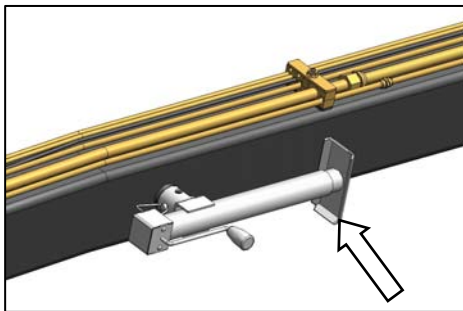
CHAIN	
Overhead Lifting Quality (1/2 Inch)	5,000 lb. (2,270 kg) Minimum Working Load

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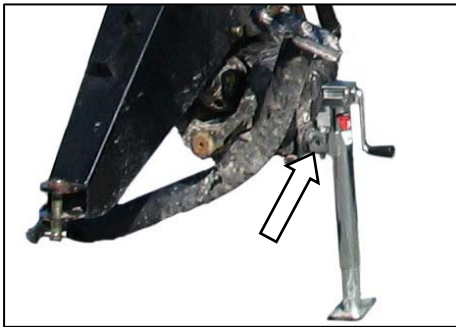
OPERATION



- d. Lift mower conditioner off flatbed, and back away slowly.
- e. Lower mower conditioner to slightly above ground.



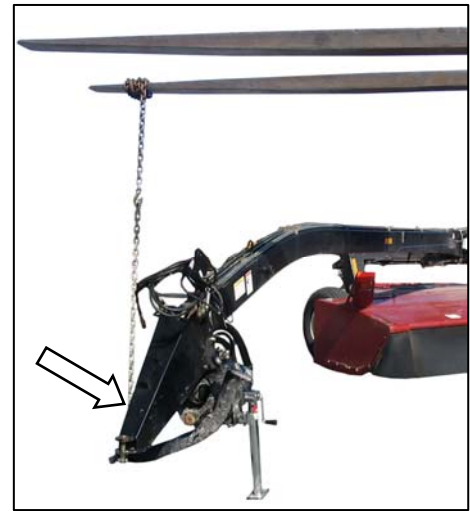
- f. Remove jack from storage location on APT hitch.



- g. Install jack at working position at front of hitch.
- h. Lower mower conditioner to ground, and remove slings.



- i. Cut shipping wire securing APT hitch to carrier frame.

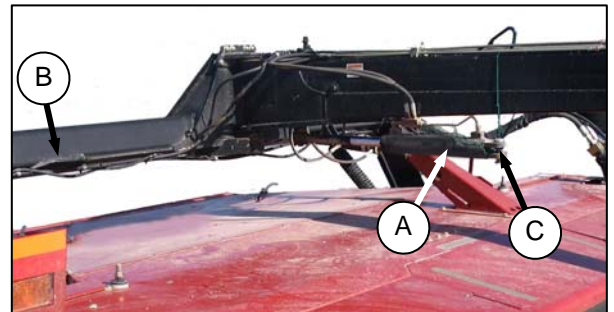


- j. Attach a chain to front of APT hitch, and other end to a forklift (or equivalent).

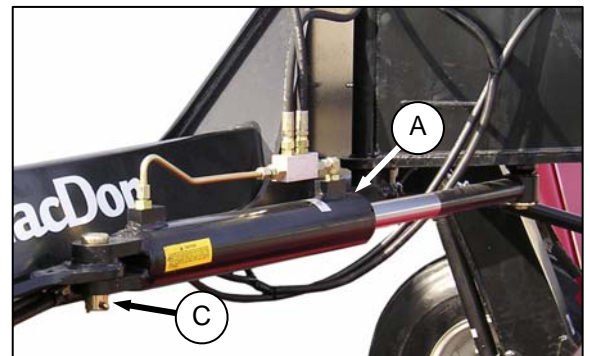
IMPORTANT

Ensure hoses on carrier frame are NOT pinched when APT hitch is moved to working position.

- k. Lift front of hitch, and slowly swing hitch forward until it is approximately perpendicular with carrier frame. Lower hitch, and remove chain.



- l. Cut shipping wire securing steering cylinder (A) to APT hitch. Swing cylinder to attachment bracket (B) on frame.



- m. Remove pin (C) from cylinder.
- n. Align yoke on cylinder with bracket (B), and install pin (C). Secure with cotter pin.
- o. Attach mower conditioner to tractor or towing vehicle.

OPERATION

6.12 MOWER CONDITIONER OPERATION

Satisfactory operation of the mower conditioner in all situations requires making proper adjustments to suit various crops and conditions.

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

The variables listed below and detailed on the following pages will affect the performance of the mower conditioner. You will quickly become adept at adjusting the machine to give you the desired results. Most of the adjustments have been set at the factory, but if desired, the settings can be changed to suit crop conditions.

VARIABLE	SECTION
Header Float	6.12.1
Roll Gap	6.12.2
Roll Tension	6.12.3
Roll Timing	6.12.4
Forming Shields	6.12.5
Header Angle	6.12.6
Cutting Height	6.12.7
Ground Speed	6.12.8

OPERATION

6.12.1 Header Float

Header float springs are normally set so 95–105 lbf (426–471 N) is required to lift either end of the header just off the ground. In rough or stony conditions, it may be desirable to maintain a lower force to protect cutting components.

NOTE

When float setting is light, it may be necessary to use a slower ground speed to avoid excessive bouncing, and leaving a ragged cut.

6.12.1.1 Float Adjustment

IMPORTANT

Float setting (or lifting force) **MUST** be equal on both ends of the header. Left and right ends require different spring lengths to achieve equal float at both ends.

- Center mower conditioner directly behind the tractor.
- Raise header fully, shut off engine, and remove key.



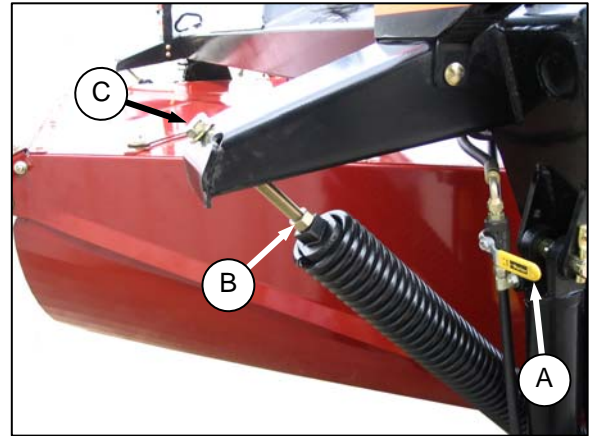
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.



WARNING

To avoid bodily injury or death from unexpected start-up or fall of raised machine: stop engine, remove key, and engage lift cylinder lock-out valves before going under machine.



- Close lift cylinder lock-out valves (A).
- Back jam nut (B) away from spring.
- To increase float, turn adjuster bolt (C) **CLOCKWISE** (further into spring).
- To decrease float, turn adjuster bolt (C) **COUNTERCLOCKWISE** (out of spring).
- Tighten jam nut (B) against spring insert to secure the setting.
- Open lock-out valves (A).
- Lower header, and check header float at each end.

NOTE

Other operating variable adjustments may affect float setting.

Check the float, and re-adjust if necessary after adjusting cutting height or header angle.

Also, if using a tractor with drawbar height different than 16 inches (406 mm), float will be affected. Adjust as required.

OPERATION

6.12.2 Roll Gap

Steel rolls condition the crop by crimping and crushing the stem in several places. This allows moisture release for quicker drying. The degree to which the crop is conditioned as it passes through the rolls is controlled by roll gap, which is factory set at 1/2 inch (13 mm).

Correct conditioning of alfalfa, clover and other legumes is usually indicated when 90% of the stems show cracking, but no more than 5% of the leaves are damaged. Set enough roll gap to achieve this result.

A larger gap (up to 1 inch [25 mm]) may be desirable in thick stemmed cane-type crops; however, too large a gap may cause feeding problems.

Grass type crops may require less gap for proper feeding and conditioning.

IMPORTANT

If settings below the factory setting are used, it is recommended that the actual gap be visually checked.

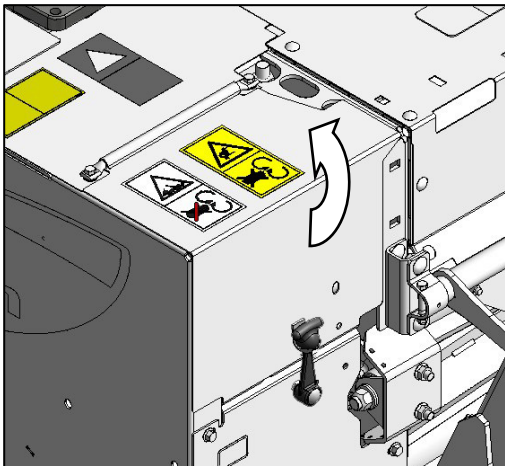
To check roll gap, proceed as follows:



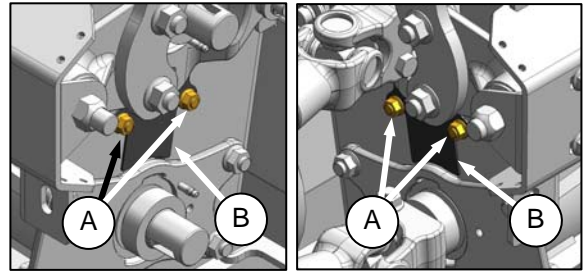
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

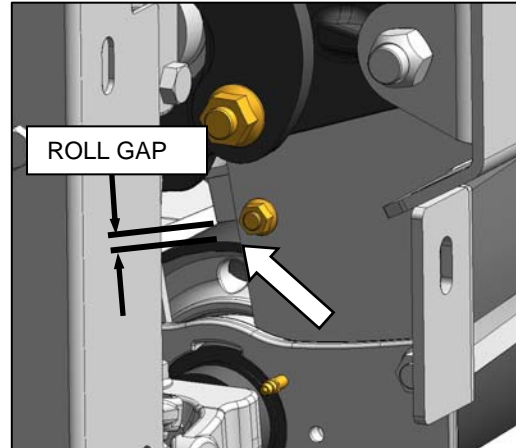
- Lower header fully.
- Stop engine, and remove key.



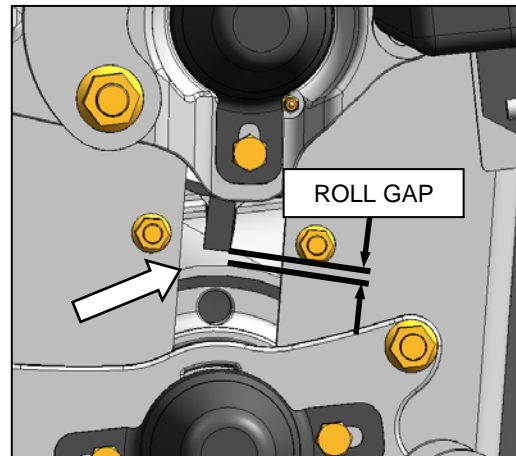
- Open driveshield at LEFT end of header. See Section 6.2.2 Driveshield.



- At each end of rolls, loosen nuts (A), and slide cover (B) upwards to expose observation hole.



LEFT END



RIGHT END

- Check the gap at each end of the rolls to verify setting, and adjust as necessary.

IMPORTANT

Roll timing is critical when the roll gap is decreased because:

- Conditioning is affected, and
- The bars may contact each other.

Refer to Section 6.12.4 Roll Timing.

- Re-position covers (B), and tighten nuts (A).
- Close driveshield.

OPERATION

6.12.2.1 Roll Gap Adjustment

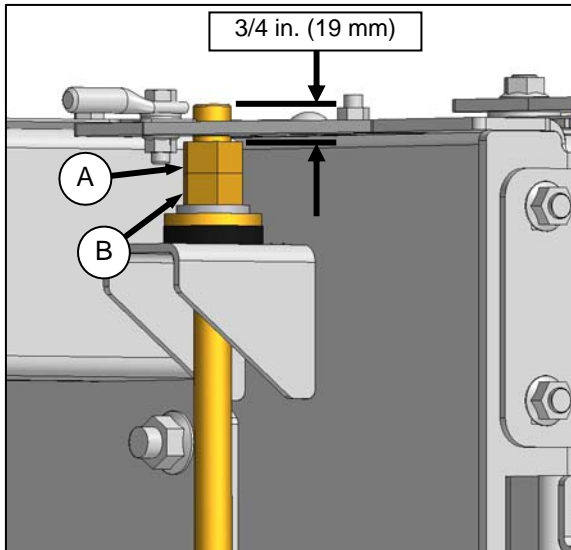
- a. Lower header fully.



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- b. Stop engine, and remove key.



- c. Loosen and back off upper jam nut (A) on both sides of conditioner.
- d. To increase roll gap, turn lower nut (B) CLOCKWISE.

NOTE

The amount of thread protruding through jam nut indicates roll gap. Factory setting is 3/4 in. (19 mm) which equates to 1/2 in (13 mm) of roll gap.

NOTE

When adjusting roll gap, be sure that the thread protruding is the same on both sides of the conditioner roll to achieve a consistent gap across the rolls.

- e. To decrease the roll gap, turn lower nut (B) COUNTERCLOCKWISE.
- f. Tighten jam nuts (A) on both sides.

OPERATION

6.12.3 Roll Tension

The roll tension (the force holding the rolls together) is factory set to MAXIMUM, and is adjustable.

Heavy crops or tough forage that tend to separate the rolls require the maximum roll tension to ensure that material is sufficiently crimped.

Light alfalfa and short grasses would require less roll tension to lessen over-conditioning.

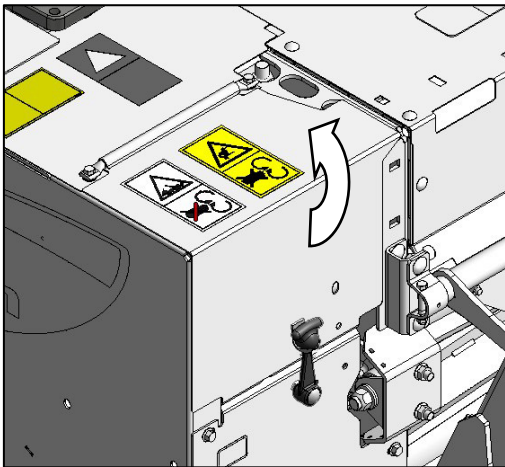
6.12.3.1 Roll Tension Adjustment



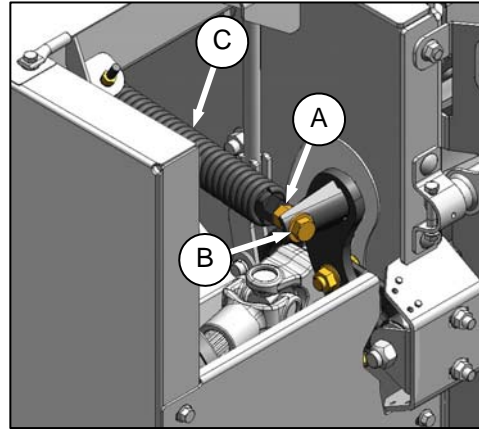
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- a. Lower header to ground, shut down mower conditioner and tractor, and remove key.



- b. Open driveshield at LH end of header. See Section 6.2.2 Driveshield.



LH SHOWN

- c. To increase the roll tension, loosen jam nut (A), and turn the spring draw-bolt (B) **CLOCKWISE** to tighten the spring (C).
- d. Repeat above step for opposite end of roll.
- e. To decrease the roll tension, turn the spring draw-bolts (B) **COUNTERCLOCKWISE** to loosen the springs.

IMPORTANT

Turn each bolt equal amounts. Each turn of the bolt changes the roll tension by approximately 6.5 lbf (29 N).

- f. Tighten jam nut (A) after adjusting tension.
- g. Close driveshield.

OPERATION

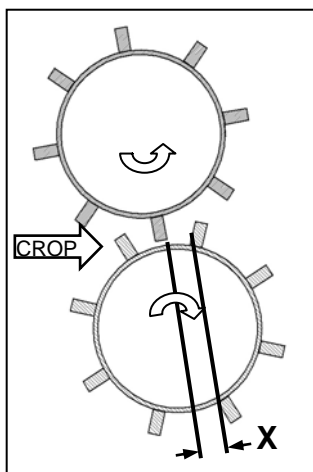
6.12.4 Roll Timing

For proper conditioning, the rolls must be properly timed with each steel bar on one roll centered between two bars of the other roll as shown. The factory setting should be suitable for most crop conditions.

IMPORTANT

Roll timing is critical when the roll gap is decreased because:

- Conditioning is affected, and
- The bars may contact each other.



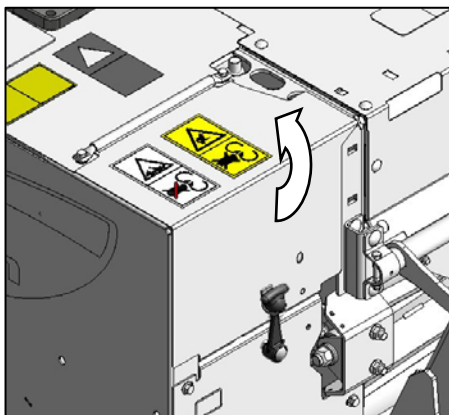
To check roll timing 'X', proceed as follows:



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- Lower header fully, stop engine, and remove key from ignition.

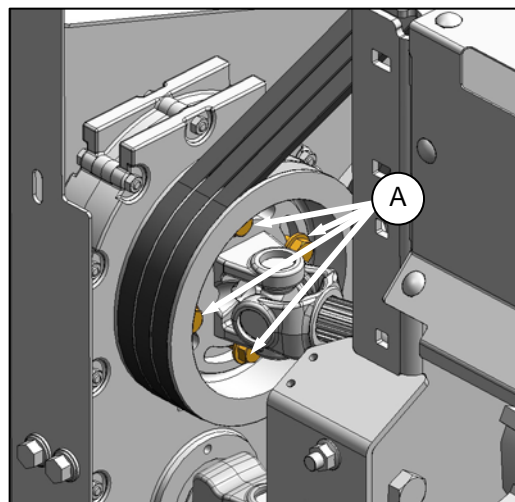


- Open the driveshield. See Section 6.2.2 Driveshield.

- Examine roll timing (distance 'X') at each end of the rolls with the header fully lowered. Each steel bar on one roll should be centered between two bars of the other roll so that distance 'X' is approximately equal on both sides of the bar.

6.12.4.1 Roll Timing Adjustment

Adjust roll timing, if necessary, as follows:



- Loosen four bolts (A) in slots of yoke plate on upper roll universal shaft.
- Manually rotate upper roll it stops. Make a mark on yoke flange to align with the center of one of the bolt (A) heads.
- Manually rotate upper roll in opposite direction until it stops. Make a second mark on yoke flange to align with the bolt.
- Determine the center between the two marks, and mark a third line on the yoke flange.
- Rotate the upper roll until the bolt lines up with the third line.
- Tighten bolts (A) to secure the position. Torque to 70 lbf·ft (95 N·m).

OPERATION

6.12.5 Forming Shields



WARNING

Keep everyone several hundred feet away from your operation. Ensure bystanders are never in line with the front or rear of the machine. Stones or other foreign objects can be ejected from either end with force.

The position of the forming shields controls the width and placement of the windrow. The decision on forming shield position should be based on the following factors:

- weather conditions (rain, sun, humidity, wind),
- type and yield of crop,
- drying time available, and
- method of processing (bales, silage, green-feed)

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 Section 6.13 HAYING TIPS, for more information.

A narrower windrow may be preferred for ease of pick-up, and when drying is not critical (for example, when cutting for silage or green-feed).

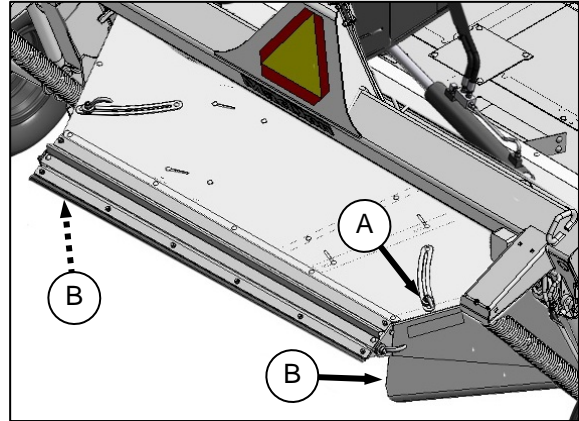
6.12.5.1 Side Deflectors

The position of the side deflectors controls the width and placement of the windrow. To ensure windrow placement is centered with respect to carrier wheels, adjust both side deflectors to the same position.



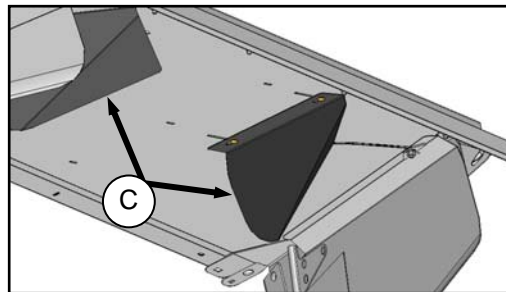
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

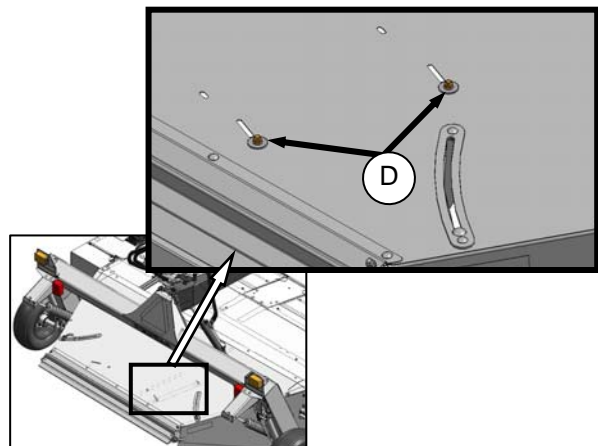


- Loosen locking handle (A).
- Move deflector (B) to desired position, and tighten handle.
- Repeat for other side.

6.12.5.2 Inboard Deflectors



The position of the inboard deflectors (C) assists in controlling the width and placement of the windrow.



- Loosen bolts (D), and move deflectors (C) to desired position.
- Tighten bolts (D).

OPERATION

6.12.5.3 Rear Deflector (Fluffer Shield)

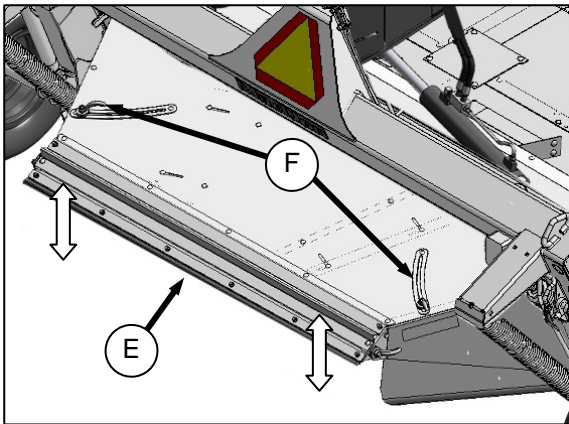
The rear deflector slows the crop exiting the conditioner rolls, directs the flow downward, and fluffs the material.

Adjust the deflector as follows:



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.



- For more crop control in light material, lower the deflector (E) by pushing down on one side of the deflector, and then on the other side.

NOTE

Locking handles (F) are located at either end of the deflector, and may be loosened slightly.

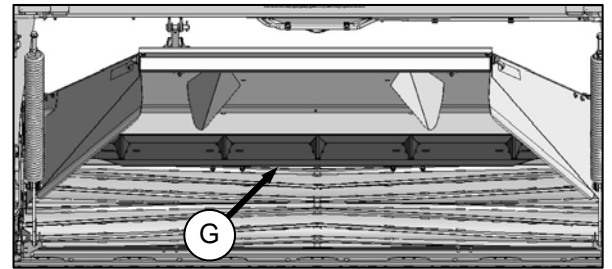
- For heavier crops, raise the deflector by pulling up on one side, and then on the other side.

NOTE

For even windrow formation, be sure the deflector is not twisted.

- Tighten handles (F) to secure deflector position.

6.12.5.4 Swath Baffle



The swath baffle (G) determines the width and height of the windrow.

It is located immediately behind and above the conditioning rolls, and can be positioned to:

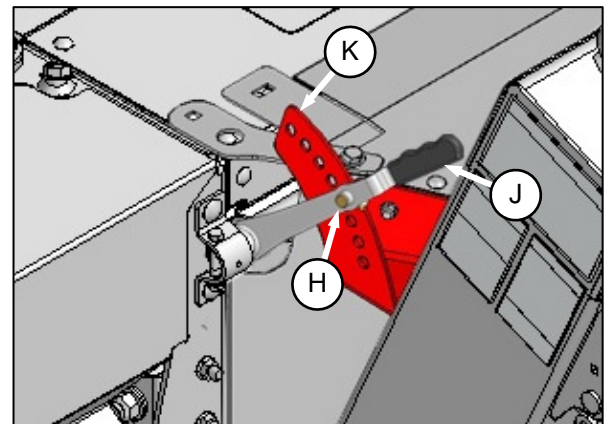
- Direct the crop flow into the forming shield for narrow and moderate width windrows, or
- Direct crop downward to form a wide swath.

Adjust the swath baffle as follows:



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.



- Remove lynch pin from pin (H), and remove pin.
- Move lever (J) to re-position swath baffle (G):
 - forward to raise baffle, or
 - backward to lower baffle.
- Re-install pin (H) through lever and bracket (K), and secure with lynch pin.

OPERATION

6.12.6 Header Angle

Header (or cutterbar) angle can be varied from 0–5° below horizontal with the mechanical center-link, and 0–8° below horizontal with the hydraulic center-link.

Choose an angle that maximizes performance for your crop and field conditions.

A flatter angle provides better clearance in stony conditions, while a steeper angle is required in down crops for better lifting action.

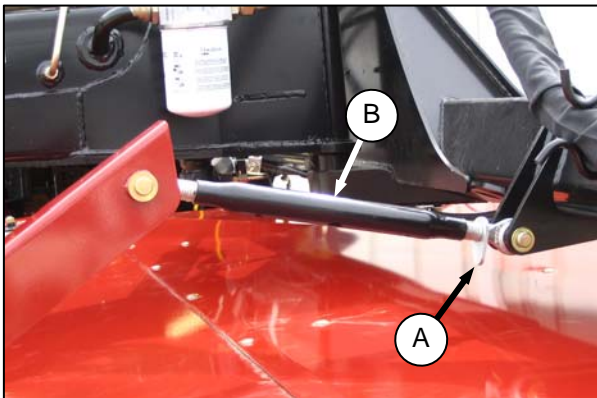


DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

6.12.6.1 Mechanical Adjustment (if equipped)

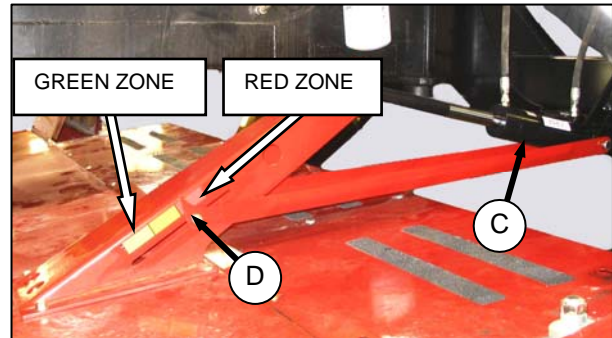
- Lower header so that cutter bar is resting on the ground.



- Loosen nut (A).
- To DECREASE (flatten) header angle, rotate the turnbuckle sleeve (B) so that the turnbuckle decreases in length.
- To INCREASE (steepen) header angle, rotate the turnbuckle sleeve (B) so that the turnbuckle increases in length.
- Snug up nut (A), but do not over-tighten. A slight tap with a small hammer is sufficient.
- Check cutting height, and adjust if required.
- Check header float, and adjust if required. Refer to Section 6.12.1 Header Float.

6.12.6.2 Hydraulic Adjustment (if equipped)

The header angle can be adjusted from the tractor without shutting down the mower conditioner.



- To DECREASE (flatten) header angle, operate tractor hydraulic control so that cylinder (C) retracts, moving the gauge (D) toward the GREEN zone.
- To INCREASE (steepen) header angle, operate tractor hydraulic control so that cylinder (C) extends, moving the gauge (D) toward the RED zone.

OPERATION

6.12.7 Cutting Height

Cutting height is determined by a combination of the angle of the cutterbar/header, and the skid shoe settings.

Cutting height should be adjusted for optimum cutting performance without allowing excessive build-up of mud and soil inside the header that can lead to poor crop flow and increased wear on cutting components.

Choose an angle that maximizes performance for your crop and field conditions. Refer to Section 6.12.6 Header Angle.

Optional adjustable skid shoes are available to also provide different cutting heights as described below: Refer to Section 9 OPTIONS AND ATTACHMENTS.

- Lowering the skid shoes or decreasing header angle increases the cutting height. This may be desirable in stony conditions, to reduce damage to cutting components. Also, a longer stubble length helps material dry faster.
- Raising the skid shoes and increasing header angle allows the crop to be shaved.

To minimize damage to cutterbar components, scooping soil, or soil build-up at the cutterbar in damp conditions, header float should be set as light as possible without causing excessive bouncing.

When the float setting is light, it may be necessary to use a slower ground speed to avoid excessive bouncing and leaving a ragged cut.

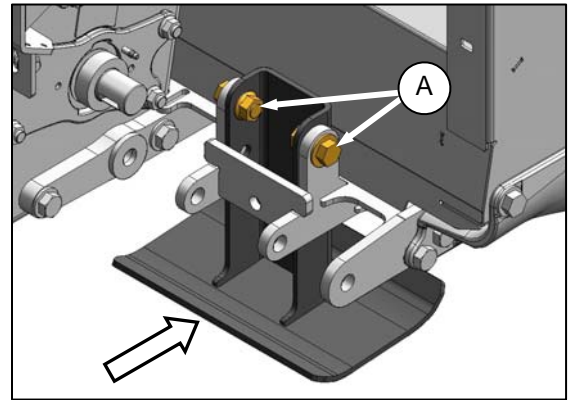
Set up the header as follows:



DANGER

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

- a. Raise header fully, stop engine, and remove key.



- b. Remove bolts (A).
- c. Raise or lower skid shoe.
- d. Re-install bolts (A).
- e. Repeat for skid shoe at opposite end of header.
- f. Check header float as described in Section 6.12.1 Header Float.
- g. Adjust header angle to desired working position using the machine's header angle controls. If angle is not critical, set it to mid-position. Refer to Section 6.12.6 Header Angle for more information.

OPERATION

6.12.8 Ground Speed



CAUTION

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

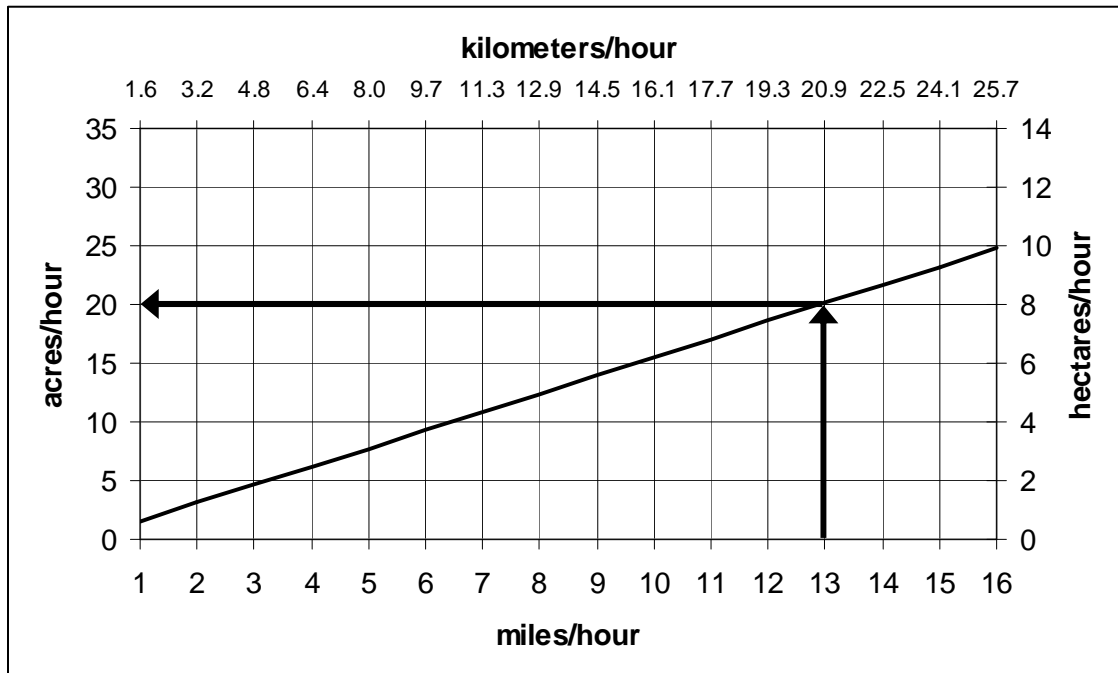
- Choose a ground speed that allows the cutterbar and conditioner to cut the crop smoothly and evenly. Try different combinations of mower conditioner speed and ground speed to suit your specific crop. Refer to your Tractor Operator's Manual for changing ground speed.
- In tough cutting conditions (such as native grasses) the disc speed will need to be at maximum.
- In light crops the mower conditioner speed can be reduced while maintaining ground speed.

NOTE

Operating the header at the minimum disc speed will extend the wear life of cutting components.

- The chart below indicates the relationship between ground speed and area cut for a 13 FT header.

Example: At ground speed of 13 mph (21 km/h), the area cut would be approximately 20 acres (8 hectares) per hour.



OPERATION

6.12.9 Tall Crop Dividers

The tall crop dividers (one on each end of header) assist in clean crop dividing and cutterbar entry in tall crops.

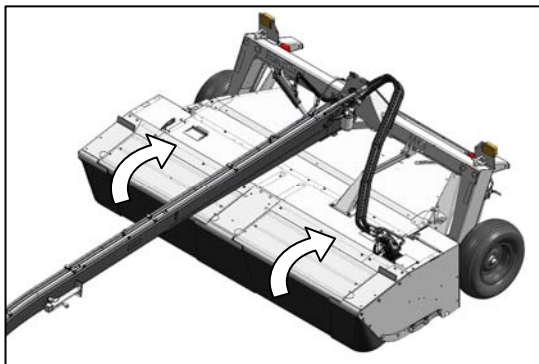
They are NOT adjustable, but can easily be removed as follows:



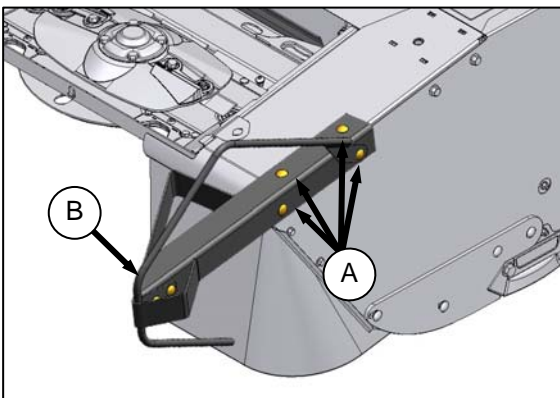
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- a. Lower header to ground, shut down mower conditioner and tractor, and remove key.



- b. Open cutterbar doors.



- c. Remove the four bolts (A), and remove deflector (B).
- d. Re-install the four bolts.
- e. Close cutterbar doors.

OPERATION

6.13 HAYING TIPS

6.13.1 Curing

- a. A quick cure will maintain top quality because:
 - Protein is lost for each day hay lies on the ground,
 - The sooner the cut hay is harvested, the earlier the start for next growth.
- b. Leaving the windrow as wide and thin as possible makes for the quickest curing.
- c. The cured hay should be baled as soon as possible.

6.13.2 Topsoil Moisture

- a. 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.
- b. 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:

LEVEL	% MOISTURE	CONDITION
Wet	Over 45%	Soil is Muddy
Damp	25–45%	Shows Footprints
Dry	Under 25%	Surface is Dusty

- c. If ground is wet due to irrigation, wait until soil moisture drops below 45%.
- d. 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.
- e. The cut hay will dry no more until the ground under it dries, so consider moving the windrow to drier ground.

6.13.3 Weather and Topography

- a. Cut as much hay as possible by mid-day, when drying conditions are best.
- b. 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.
- c. When relative humidity is high, the evaporation rate is low, and hay dries slower.
- d. If there is no wind, saturated air becomes trapped around the windrow. Raking or tedding will expose the hay to fresher, less saturated air.

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

6.13.4 Windrow Characteristics

It is recommended that a windrow with the following characteristics be produced. Refer to Section 6.12 MOWER CONDITIONER OPERATION for setup instructions.

CHARACTERISTIC	ADVANTAGE
High and Fluffy	Movement of air through windrow is more important to curing than direct sunlight.
Consistent Formation, Not Bunchy	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.

6.13.5 Driving On Windrow

Driving on previously cut windrows can lengthen drying time by a full day in hay that will not be raked.

If practical, set forming shields for a narrower windrow that can be straddled.

NOTE

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

6.13.6 Raking and Tedding

- a. Raking or tedding speeds up drying, however the benefits must be weighed against the additional leaf losses which will result. There is little or no advantage to raking or tedding if the ground beneath the windrow is dry.
- b. Large windrows on damp or wet ground should be turned over when they reach 40–50% moisture. Hay should NOT be raked or tilled at less than 25% moisture, or excessive yield losses will result.

6.13.7 Chemical Drying Agents

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

6.14 HEADER LEVELLING

The header support linkages are factory set to provide the proper level for the header, and should not normally require adjustment. The float springs are NOT used to level the header.

If the header is NOT level, check the tire pressures ensuring they are properly inflated. Refer to Section 7.9.3 Tire Inflation.

If the header cannot be leveled, damaged components in the header support system may be the cause. See your MacDon Dealer.

6.15 UNPLUGGING THE HEADER



DANGER

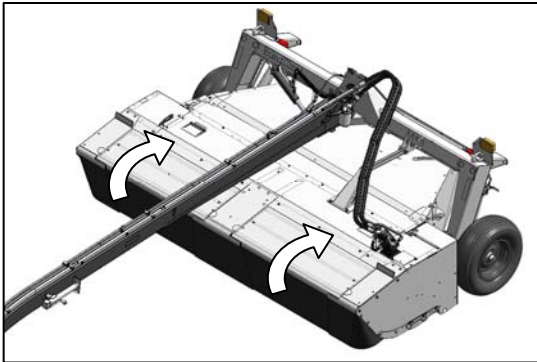
Stop tractor engine, and remove key before removing plugged material from header. A child or even a pet could engage the drive.

- Stop forward movement of the tractor, and stop the PTO.
- Raise the header fully, shut down the tractor engine, and remove the key.
- Engage lift cylinder lock-out valves.



WARNING

Wear heavy gloves when working around cutterbar.



- Open cutterbar doors, and clean off cutterbar or rolls by hand.

7 MAINTENANCE AND SERVICING

The following instructions are provided to assist the Operator in servicing the mower conditioner. Detailed maintenance and service information are contained in the Technical Service Manual that is available from your Dealer. A Parts Catalog is located in a plastic case at the right end of the header.

Log hours of operation, and use the Maintenance Checklist provided to keep a record of scheduled maintenance. Refer to Section 7.4.1 Maintenance Schedule/Record.

7.1 PREPARATION FOR SERVICING



CAUTION

To avoid personal injury, before servicing mower conditioner or opening drive covers, perform the following:

- Fully lower the header. If necessary to service in the raised position, always close lift cylinder valves.
- Disengage PTO.
- Stop engine, and remove key.
- Engage park brake.
- Wait for all moving parts to stop.

7.2 RECOMMENDED SAFETY PROCEDURES

- Park on level surface when possible. Block wheels securely if mower conditioner is parked on an incline. Follow all recommendations in your tractor operator's manual.
- Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.
- Wear protective shoes with slip-resistant soles, a hard hat, protective glasses or goggles and heavy gloves.



- 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 disc) to move. Stay clear of driven components at all times.



- Be prepared if an accident should occur. Know where the first aid kit and fire extinguishers are located, and how to use them.



- 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.
- Use adequate light for the job at hand.
- Replace all shields removed or opened for service.
- Use only service and repair parts made or approved by the equipment manufacturer. Substituted parts may not meet strength, design or safety requirements.
- Keep the machine clean. Never use gasoline, naphtha or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.

MAINTENANCE AND SERVICING

7.3 MAINTENANCE SPECIFICATIONS

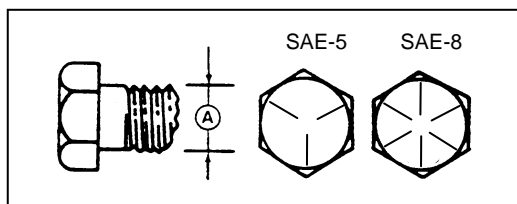
7.3.1 Recommended Torques

- Tighten all bolts to the torques specified in chart (unless otherwise noted throughout this manual).
- Check tightness of bolts periodically, using bolt torque chart as a guide.
- Replace hardware with the same strength bolt.
- Torque figures are valid for non-greased or non-oiled threads and heads unless otherwise specified. Do NOT grease or oil bolts or capscrews unless specified in this manual.
- When using locking elements, increase torque values by 5%.

7.3.1.1 SAE Bolts

BOLT DIA. "A" in.	NC BOLT TORQUE*			
	SAE-5		SAE-8	
	lbf-ft	N-m	lbf-ft	N-m
1/4	9	12	11	15
5/16	18	24	25	34
3/8	32	43	41	56
7/16	50	68	70	95
1/2	75	102	105	142
9/16	110	149	149	202
5/8	150	203	200	271
3/4	265	359	365	495
7/8	420	569	600	813
1	640	867	890	1205

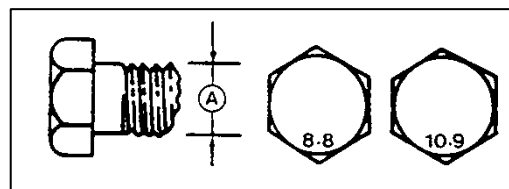
* Torque categories for bolts and capscrews are identified by their head markings.



7.3.1.2 Metric Bolts

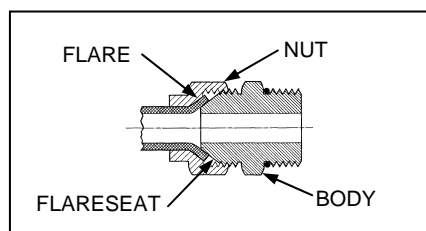
BOLT DIA. "A"	STD COARSE BOLT TORQUE*			
	8.8		10.9	
	lbf-ft	N-m	lbf-ft	N-m
M3	0.4	0.5	1.3	1.8
M4	2.2	3	3.3	4.5
M5	4	6	7	9
M6	7	10	11	15
M8	18	25	26	35
M10	37	50	52	70
M12	66	90	92	125
M14	103	140	148	200
M16	166	225	229	310
M20	321	435	450	610
M24	553	750	774	1050
M30	1103	1495	1550	2100
M36	1917	2600	2710	3675

* Torque categories for bolts and capscrews are identified by their head markings.



MAINTENANCE AND SERVICING

7.3.1.3 Flare-Type Hydraulic Fittings

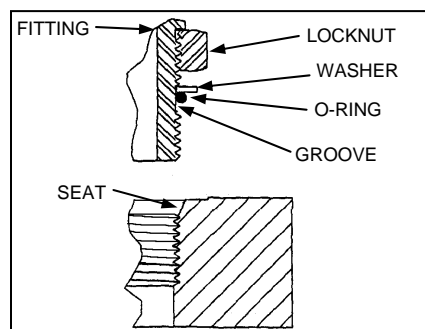


- Check flare and flare seat for defects that might cause leakage.
- Before tightening, align tube with fitting.
- Lubricate connection, and hand-tighten swivel nut until snug.
- To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body, and with the second, tighten the swivel nut to the torque shown.

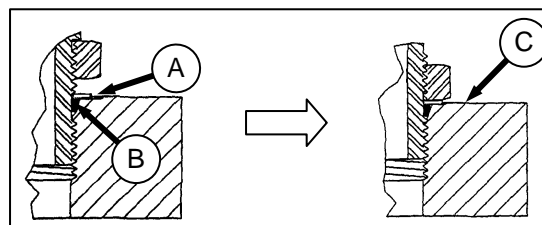
SAE NO.	TUBE SIZE O.D. (in.)	THD SIZE (in.)	NUT SIZE ACROSS FLATS (in.)	TORQUE VALUE*		RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)	
				ft-lbf	N-m	Flats	Turns
3	3/16	3/8	7/16	6	8	1	1/6
4	1/4	7/16	9/16	9	12	1	1/6
5	5/16	1/2	5/8	12	16	1	1/6
6	3/8	9/16	11/16	18	24	1	1/6
8	1/2	3/4	7/8	34	46	1	1/6
10	5/8	7/8	1	46	62	1	1/6
12	3/4	1-1/16	1-1/4	75	102	3/4	1/8
14	7/8	1-3/16	1-3/8	90	122	3/4	1/8
16	1	1-5/16	1-1/2	105	142	3/4	1/8

* Torque values shown are based on lubricated connections as in re-assembly.

7.3.1.4 O-Ring Boss (ORB) Hydraulic Fittings



- Inspect O-ring and seat for dirt or obvious defects.



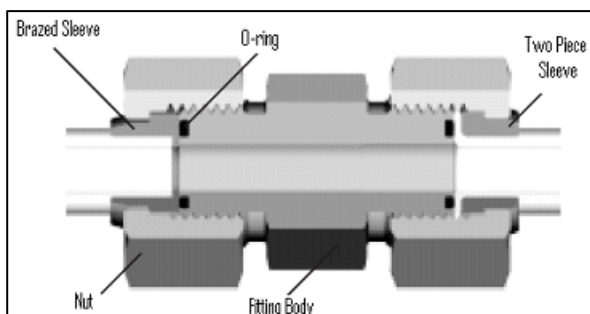
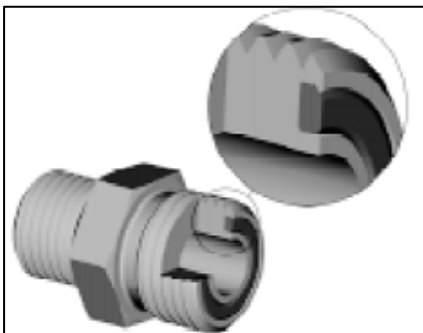
- On angle fittings, back off the lock nut until washer (A) bottoms out at top of groove (B) in fitting.
- Hand-tighten fitting until back up washer (A) or washer face (if straight fitting) bottoms on part face (C), and O-ring is seated.
- Position angle fittings by unscrewing no more than one turn.
- Tighten straight fittings to torque shown.
- Tighten angle fittings to torque shown in the following table, while holding body of fitting with a wrench.

SAE NO.	THD SIZE (in.)	NUT SIZE ACROSS FLATS (in.)	TORQUE VALUE*		RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)	
			ft-lbf	N-m	Flats	Turns
3	3/8	1/2	6	8	2	1/3
4	7/16	9/16	9	12	2	1/3
5	1/2	5/8	12	16	2	1/3
6	9/16	11/16	18	24	2	1/3
8	3/4	7/8	34	46	2	1/3
10	7/8	1	46	62	1-1/2	1/4
12	1-1/16	1-1/4	75	102	1	1/6
14	1-3/16	1-3/8	90	122	1	1/6
16	1-5/16	1-1/2	105	142	3/4	1/8
20	1-5/8	1-7/8	140	190	3/4	1/8
24	1-7/8	2-1/8	160	217	1/2	1/12

* Torque values shown are based on lubricated connections as in re-assembly.

MAINTENANCE AND SERVICING

7.3.1.5 O-Ring Face Seal (ORFS) Hydraulic Fittings



- Check components to ensure that the sealing surfaces and fitting threads are free of burrs, nicks, and scratches, or any foreign material.
- Apply lubricant (typically Petroleum Jelly) to O-ring and threads. If O-ring is not already installed, install O-ring.
- Align the tube or hose assembly. Ensure that flat face of the mating flange comes in full contact with O-ring.
- Thread tube or hose nut until hand-tight. The nut should turn freely until it is bottomed out. Torque fitting further to the specified number of F.F.F.T (Flats From Finger Tight), or to a given torque value in the table shown in the opposite column.

NOTE

If available, always hold the hex on the fitting body to prevent unwanted rotation of fitting body and hose when tightening the fitting nut.

- When assembling unions or two hoses together, three wrenches will be required.

SAE NO.	THD SIZE (in.)	TUBE O.D. (in.)	TORQUE VALUE*		RECOMMENDED TURNS TO TIGHTEN (AFTER FINGER TIGHTENING)**	
			ft-lbf	N·m	Tube Nuts	Swivel & Hose
3	***	3/16	---	---	---	---
4	9/16	1/4	11–12	14–16	1/4–1/2	1/2–3/4
5	***	5/16	---	---	---	---
6	11/16	3/8	18–20	24–27	1/4–1/2	1/2–3/4
8	13/16	1/2	32–35	43–47		
10	1	5/8	45–51	60–68		
12	1-3/16	3/4	67–71	90–95		1/3–1/2
14	1-3/16	7/8	67–71	90–95		
16	1-7/16	1	93–100	125–135		
20	1-11/16	1-1/4	126–141	170–190		
24	2	1-1/2	148–167	200–225		
32	2-1/2	2	---	---	---	---

* Torque values and angles shown are based on lubricated connection, as in re-assembly.

** Always default to the torque value for evaluation of adequate torque.

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

MAINTENANCE AND SERVICING

7.3.2 Recommended 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.

IMPORTANT

Do NOT overfill the cutterbar when adding lubricant. Overheating and failure of cutterbar components may occur if overfilled.

LUBRICANT	SPEC.	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	---
	NLGI 00	Synthetic EP	Conditioner Drive Gearbox	Lubricated For Life 16 oz. (454 grams)
Gear Lubricant	Traxon SAE LS 80W90	High Thermal and Oxidation Stability. API Service Class GL-5	Cutterbar	3.4 quarts (US) (3.25 liters)
	Traxon E 75W90	Fully Synthetic Gear Lubricant. API Service Class GL-5.	Bevel Gearbox	13.6 oz. (400 ml)
Hydraulic Oil	Single Grade Trans-Hydraulic Oil *	** See Below For List of Recommended Brand Names.	Hydraulic Drive Systems	39 gallons (US) (147 liters) ***

* **For Australian Units** - Use SAE 15W40 complying with SAE specs for API Class SJ and CH-4 engine oil.

** The following oil company and equipment manufacturer brand names are RECOMMENDED:

Petro Canada Duratran	Case IH Hy-Tran Plus®
John Deere Quatrol® J20C	Agco Power Fluid 821XL

** The following oil company and equipment manufacturer brand names are ACCEPTABLE:

New Holland Hydraul	Esso/Exxon Hydraul 56
Shell Donax TD	

*** With header drive performance improvement kit, capacity is 46.76 gallons (US) (177 liters).

MAINTENANCE AND SERVICING

7.3.3 Conversion Chart

QUANTITY	INCH-POUND UNITS		FACTOR	SI UNITS (METRIC)	
	UNIT NAME	ABBR.		UNIT NAME	ABBR.
Area	acres	acres	$\times 0.4047 =$	hectares	ha
Flow	gallons per minute (US)	gpm (US)	$\times 3.7854 =$	liters per minute	L/min
	gallons per minute (Imp)	gpm	$\times 4.5460 =$		
Force	pounds force	lbf	$\times 4.4482 =$	Newtons	N
Length	inch	in.	$\times 25.4 =$	millimeters	mm
	foot	ft	$\times 0.305 =$	meters	m
Power	horsepower	hp	$\times 0.7457 =$	kilowatts	kW
Pressure	pounds per square inch	psi	$\times 6.8948 =$	kilopascals	kPa
			$\times .00689 =$	megapascals	MPa
Torque	pound feet or foot pounds	lbf·ft or ft·lbf	$\times 1.3558 =$	newton meters	N·m
	pound inches or inch pounds	lbf·in. or in·lbf	$\times 0.1129 =$		
Temperature	degrees Fahrenheit	°F	$(^{\circ}\text{F} - 32) \times 0.56 =$	Celsius	°C
Velocity	feet per minute	ft/min	$\times 0.3048 =$	meters per minute	m/min
	feet per second	ft/s	$\times 0.3048 =$	meters per second	m/s
	miles per hour	mph	$\times 1.6063 =$	kilometers per hour	km/h
Volume	ounces	oz.	$\times 29.5735 =$	milliliters	ml
	cubic inches	in. ³	$\times 16.3871 =$	cubic centimeters	cm ³ or cc
	quarts (US) quarts (Imperial)	US qt. qt.	$\times 0.96464$ $\times 1.1365$	liters	L
	gallons (US) gallons (Imperial)	US gal. gal.	$\times 3.7854 =$ $\times 4.5460 =$		
Weight	pounds	lb	$\times 0.4536 =$	kilograms	kg

MAINTENANCE AND SERVICING

7.4 MAINTENANCE REQUIREMENTS

Periodic maintenance requirements are organized by service intervals.

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

For detailed instructions, refer to the specific headings in this section. Use the fluids and lubricants specified in Section 7.3.2 Recommended Lubricants.

Log hours of operation, and use the Maintenance Record on the next page to keep a record of scheduled maintenance.

You will want to make copies of the Maintenance Record page for this purpose.

Where a service interval is given in more than one time frame, 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 operated under adverse conditions (severe dust, extra heavy loads, etc.).



CAUTION

Carefully follow safety messages given in Section 7.2 RECOMMENDED SAFETY PROCEDURES.

MAINTENANCE AND SERVICING

7.4.1 Maintenance Schedule/Record

ACTION:		✓ - Check					⚙ - Lubricate					▲ - Change					
MAINTENANCE RECORD	Hour Meter Reading																
	Date																
	Serviced By																
FIRST USE		Refer To Section 7.4.2 Break-in Inspections															
100 HOURS OR ANNUALLY*		Also See Section 7.4.3 Pre-Season / Annual Service															
▲	Hydraulic Oil Filter First 100 H Only - Section 7.7.2																
✓	Wheel Bolt Torque - Section 7.9.1																
⚙	Wheel Hub Bearings - Section 7.4.5																
✓	Conditioner Drive Belt - Section 7.6.5																
✓	Bevel Gearbox Lube Level - Section 7.4.5																
END OF SEASON		Refer To Section 7.4.4 End of Season Service															
10 HOURS OR DAILY		NOTE: A RECORD OF DAILY MAINTENANCE IS NOT NORMALLY REQUIRED, BUT IS AT THE OWNER/OPERATOR'S DISCRETION.															
✓	Hydraulic Hoses and Lines																
✓	Cutter Blades, Deflectors and Discs - Section 7.5																
✓	Tire Pressure - Section 7.9.3																
✓	Hydraulic Oil Level - Section 7.7.1																
25 HOURS																	
⚙	Roll Universal Shafts - Section 7.4.5																
⚙	Cutterbar Driveline Universals - Section 7.4.5																
⚙	PTO Shaft and Universals - Section 7.4.5																
50 HOURS																	
▲	Cutterbar Lube First 50 and 150 hours - Section 7.5.1																
▲	Bevel Gearbox Lube First 50 and 150 hours - Section 7.6.7.1																
⚙	Drive Belt Tensioner - Section 7.4.5																
⚙	Roll Shaft Bearings - Section 7.4.5																
⚙	Lower Link Pivots - Section 7.4.5																
⚙	Lift Cylinder Pivots - Section 7.4.5																
⚙	APT Swivel - Section 7.4.5																
⚙	Steering Cylinder Pivot - Section 7.4.5																
⚙	APT Pivot - Section 7.4.5																

MAINTENANCE AND SERVICING

250 HOURS																			
▲	Cutterbar Lube - Section 7.5.1																		
▲	Bevel Gearbox Lube - Section 7.6.7																		
▲	Hydraulic Oil Filter - Section 7.7.2																		
500 HOURS OR 3 YEARS																			
▲	Hydraulic Oil - Section 7.7.1																		

* IT IS RECOMMENDED THAT ANNUAL MAINTENANCE BE DONE PRIOR TO START OF OPERATING SEASON.

MAINTENANCE AND SERVICING

7.4.2 Break-In Inspections

	ITEM	REFER TO
AT 1 HOUR	Wheel Bolts	Section 7.9.1 Wheel Bolts
AT 5 HOURS	Check For Loose Hardware. Tighten To Required Torque.	Section 7.3.1 Recommended Torques
	Check Drive Belt Tension.	Section 7.6.5 Conditioner Drive Belt
AT 25 HOURS	Check Drive Belt Tension.	Section 7.6.5 Conditioner Drive Belt
AT 50 HOURS	Check Drive Belt Tension.	Section 7.6.5 Conditioner Drive Belt
	Change Cutterbar Lubricant.	Section 7.5.1 Cutter Bar Lubrication Use Only Specified Amount. Do NOT Overfill.
	Change Bevel Gearbox Lubricant.	Section 7.6.7 Bevel Gearbox
AT 100 HOURS	Change Hydraulic Oil Filter	Section 7.7.2 Hydraulic Oil Filter
AT 150 HOURS	Change Cutterbar Lubricant.	Section 7.5.1 Cutter Bar Lubrication
	Change Bevel Gearbox Lubricant.	Section 7.6.7 Bevel Gearbox

7.4.3 Pre-Season/Annual Service

Perform the following the beginning of each operating season:



CAUTION

- Review the Operator's Manual to refresh your memory on safety and operating recommendations.
- Review all safety signs and other decals on the mower conditioner, 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 the operating characteristics of the machine.
- Check the first aid kit and fire extinguisher. Know where they are and how to use them.

- a. Lubricate machine completely. Refer to Section 7.4.5 Lubrication.
- b. Check tire pressure and adjust as required. See Section 7.9.3 Tire Inflation.
- c. Perform all annual maintenance. See Section 7.4.1 Maintenance Schedule/Record.

MAINTENANCE AND SERVICING

7.4.4 End of Season Service

Do the following at the end of each operating season:

- a. Clean the mower conditioner thoroughly.



CAUTION

Never use gasoline, naphtha or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.



CAUTION

Cover cutterbar to prevent injury from accidental contact.

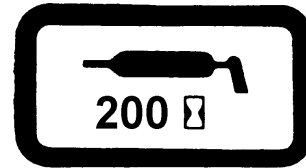
- b. Store in a dry, protected place if possible. If stored outside, always cover mower conditioner with a waterproof canvas or other protective material.
- c. Raise header, and engage lift cylinder lock-outs.
- d. If possible, block up the mower conditioner to take weight off tires.
- e. Repaint all worn or chipped painted surfaces to prevent rust.
- f. Loosen drive belt.
- g. Lubricate the mower conditioner thoroughly, leaving excess grease on fittings to keep moisture out of bearings.
- h. Apply grease to exposed threads, cylinder rods and sliding surfaces of components.
- i. Oil cutterbar components to prevent rust.
- j. Check for worn components and repair as necessary.
- k. Check for broken components and order replacements from your Dealer. Attention to these items right away will save time and effort at beginning of next season.
- l. Replace or tighten any missing or loose hardware. Refer to Section 7.3.1 Recommended Torques.
- m. Remove divider rods (if equipped) to reduce space required for inside storage.

7.4.5 Lubrication



WARNING

To avoid personal injury, before servicing mower conditioner or opening drive covers, follow procedures in Section 7.1 PREPARATION FOR SERVICING.



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

Log hours of operation and use the Maintenance Checklist provided to keep a record of scheduled maintenance. Refer to Section 7.4.1 Maintenance Schedule/Record.

7.4.5.1 Greasing Procedure



DANGER


Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

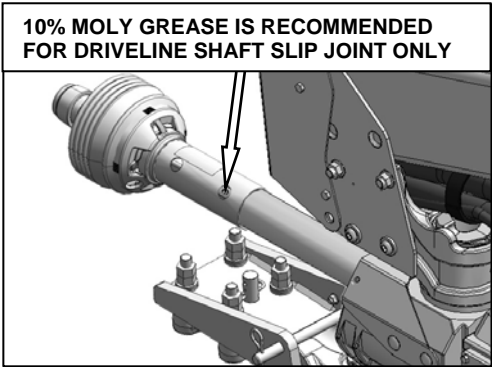
- a. Use the recommended lubricants specified in this manual. See Section 7.3.2 Recommended Lubricants.
- b. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.
- c. Inject grease through fitting with grease gun until grease overflows fitting, except where noted.
- d. Leave excess grease on fitting to keep out dirt.
- e. Replace any loose or broken fittings immediately.
- f. If fitting will NOT take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.
- g. Refer to the illustrations on the following pages to identify the various locations that require lubrication, organized by the frequency of service that is required.

MAINTENANCE AND SERVICING

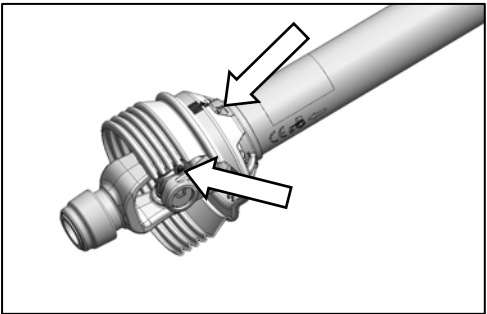
EVERY 25 HOURS

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

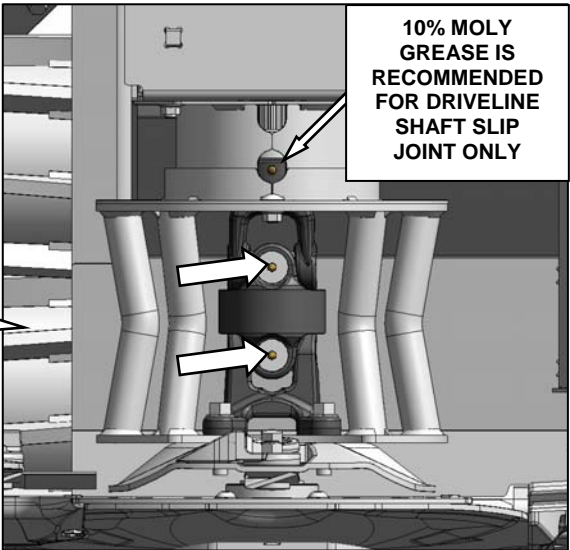
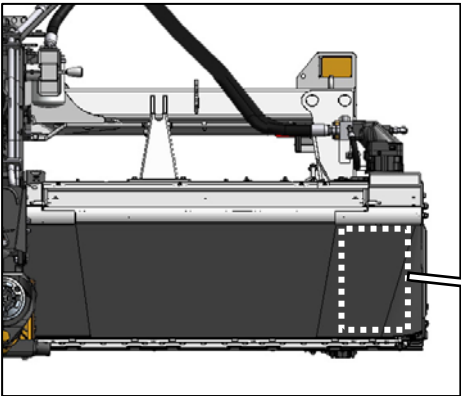




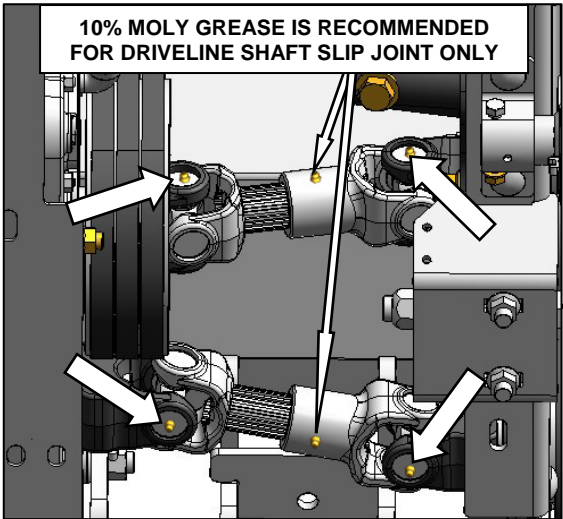
DRIVELINE



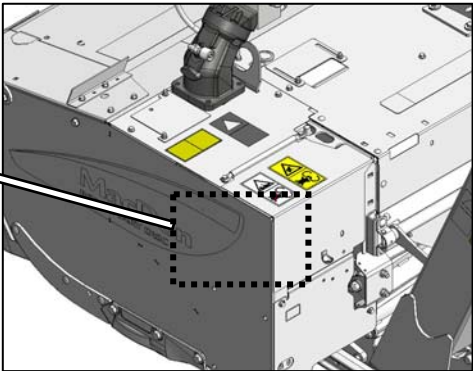
DRIVELINE - BOTH ENDS



CUTTERBAR DRIVELINE UNIVERSALS (2 PLCS)
DRIVESHAFT (1 PLC)



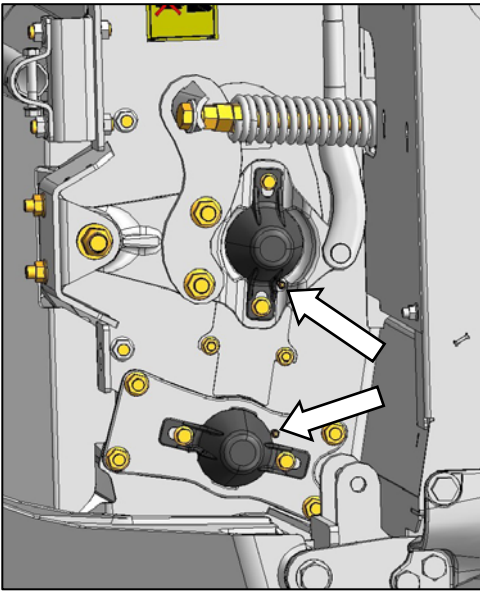
CONDITIONER DRIVELINE UNIVERSALS (4 PLCS)
DRIVELINE SHAFT (2 PLCS)



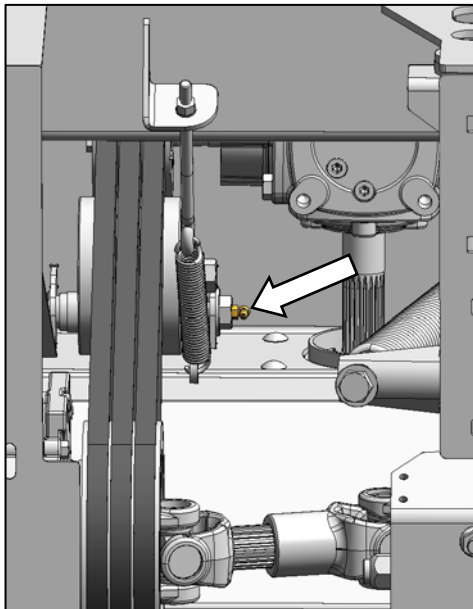
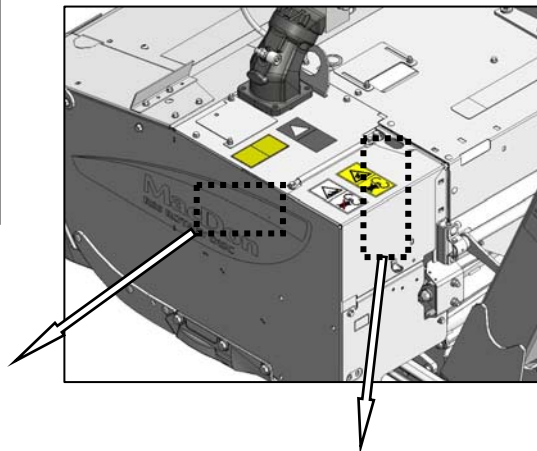
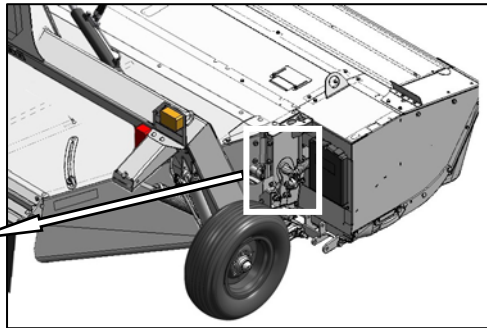
MAINTENANCE AND SERVICING

EVERY 50 HOURS

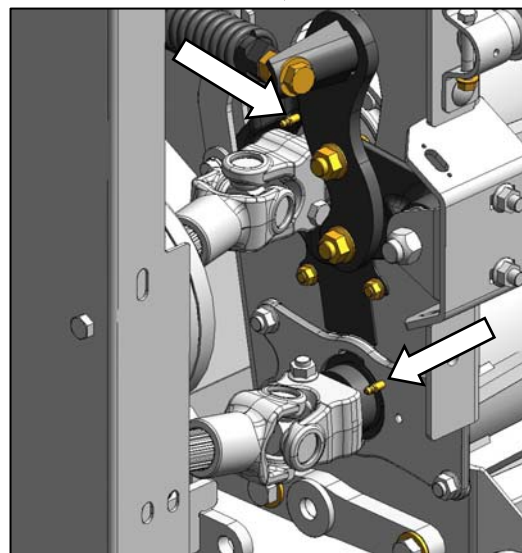
High Temperature Extreme
Pressure (EP2) Performance With
1% Max Molybdenum Disulphide
(NLGI Grade 2) Lithium Base



ROLL SHAFT BEARINGS (2 PLCS)



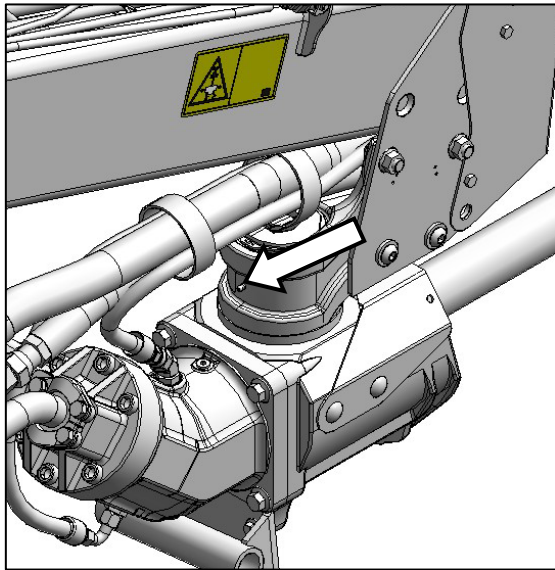
BELT TENSIONER PIVOT (1 PLC)



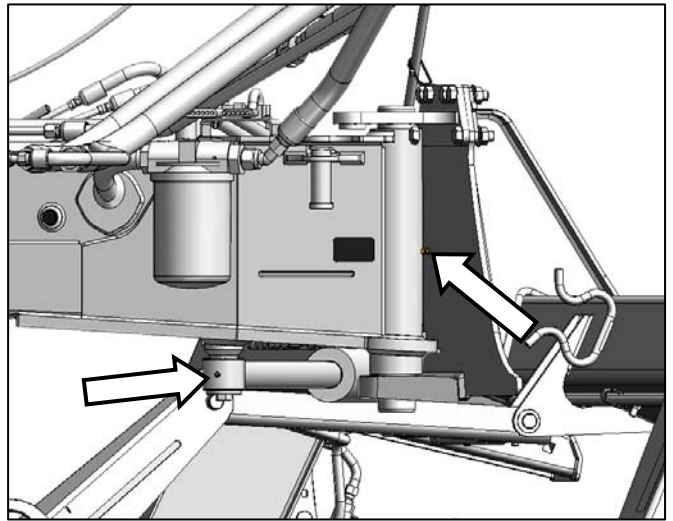
ROLL SHAFT BEARINGS (2 PLCS)

MAINTENANCE AND SERVICING

EVERY 50 HOURS (cont'd)



APT HITCH SWIVEL (1 PLC)



APT HITCH PIVOT AND STEERING CYLINDER
(2 PLCS)



LEFT LIFT CYLINDER PIVOT (1 PLC)



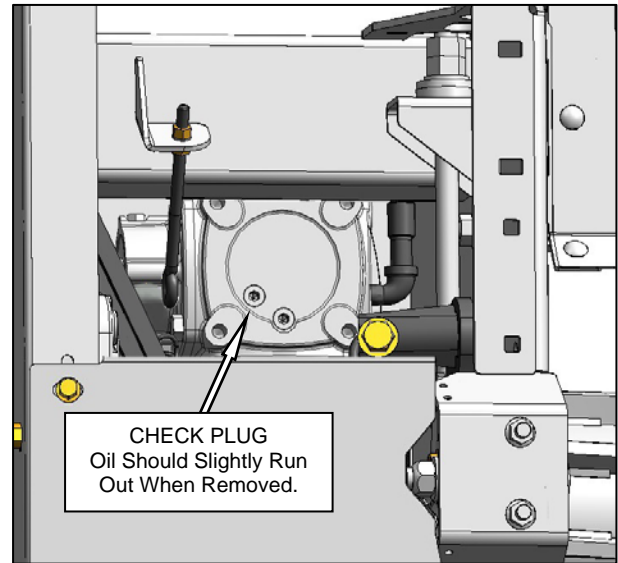
LIFT LINK (1 PLC) - BOTH SIDES

MAINTENANCE AND SERVICING

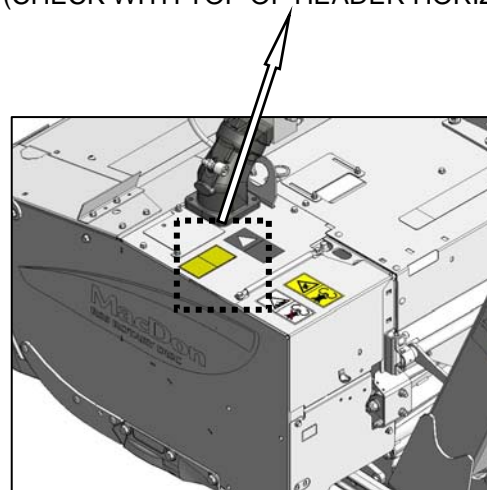
EVERY 100 HOURS OR ANNUALLY



WHEEL BEARING (1 PLC) - BOTH WHEELS

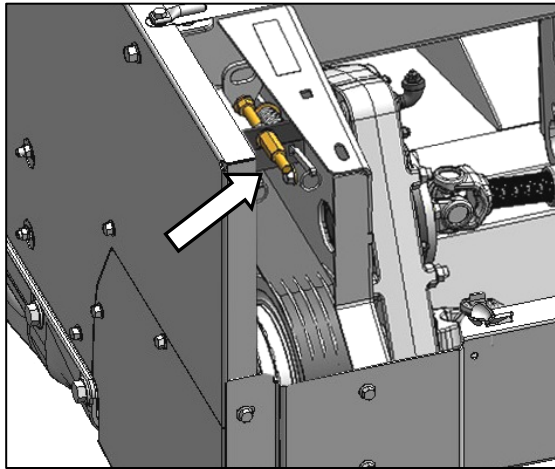


GEARBOX LUBRICANT LEVEL
(CHECK WITH TOP OF HEADER HORIZONTAL)

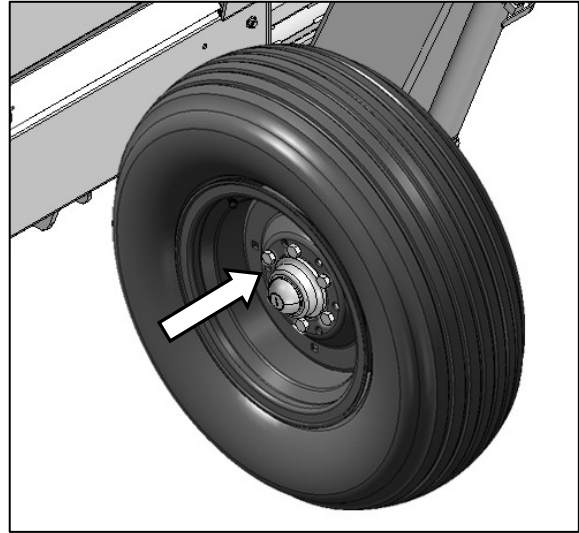


MAINTENANCE AND SERVICING

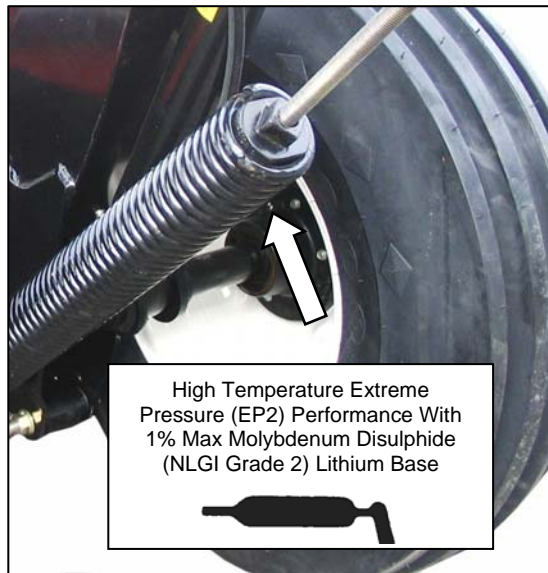
EVERY 100 HOURS OR ANNUALLY



CONDITIONER DRIVE BELT TENSION



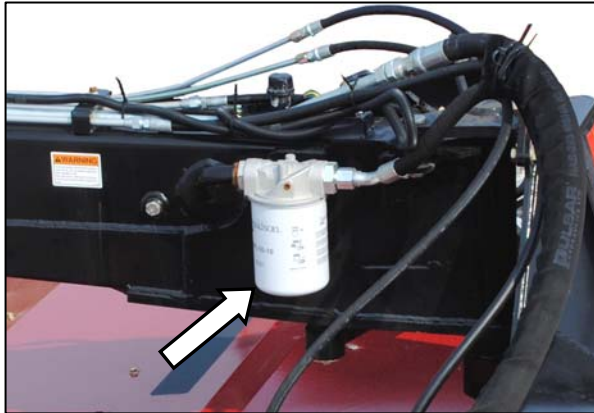
WHEEL BOLT TORQUE - 120 ft·lbf (160 N·m)



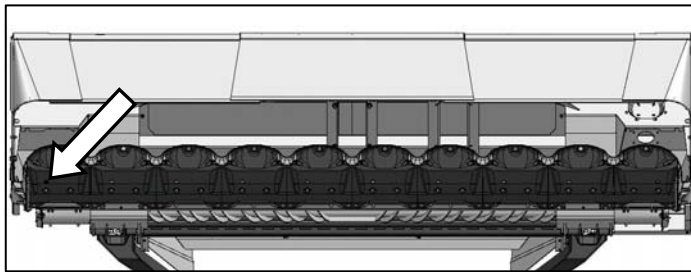
WHEEL BEARING (1 PLC) - BOTH WHEELS

MAINTENANCE AND SERVICING

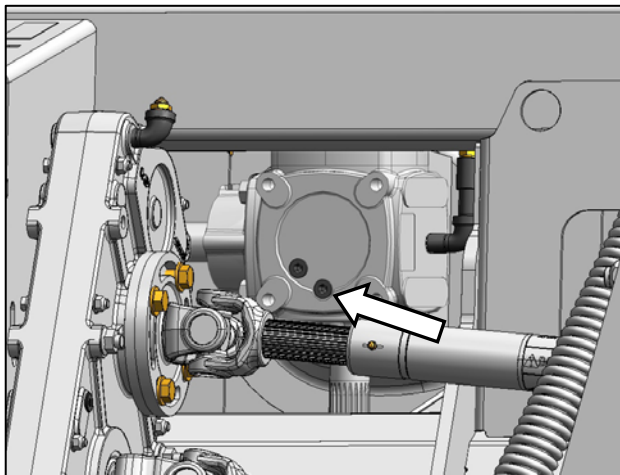
EVERY 250 HOURS



CHANGE FILTER



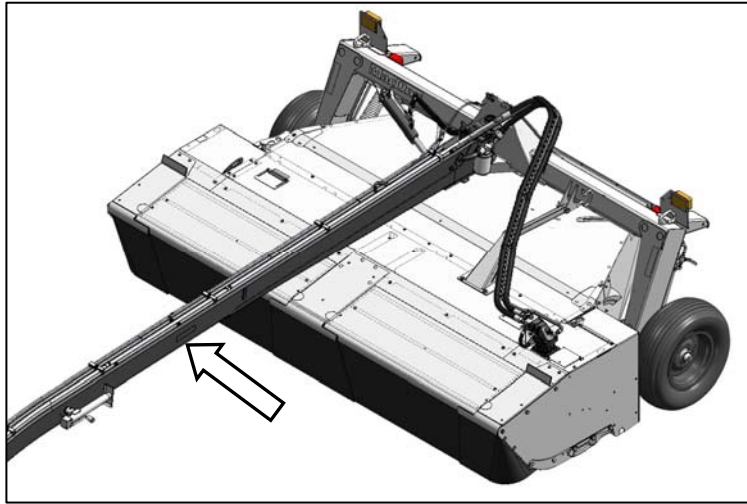
CHANGE CUTTERBAR LUBE



CHANGE BEVEL GEARBOX OIL

MAINTENANCE AND SERVICING

EVERY 500 HOURS OR 3 YEARS



CHANGE HYDRAULIC OIL

MAINTENANCE AND SERVICING

- e. Open cutterbar RH door.

7.5 CUTTERBAR

7.5.1 Cutter Bar Lubrication

The lubricant level in the cutterbar cannot be checked. If in doubt as to the quantity of lubricant in the cutterbar, do NOT add lubricant. Drain the cutterbar, and refill with new clean lubricant as follows:

IMPORTANT

Drain the cutterbar when the lubricant is warm. If the lubricant is cold, idle the machine for about 10 minutes prior to draining.



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.



CAUTION

Exercise caution when working around the blades. Blades are sharp, and can cause serious injury. Wear gloves when handling blades.

7.5.1.1 Draining

- a. Park the machine on level ground, raise header fully, stop engine, and remove key.



DANGER

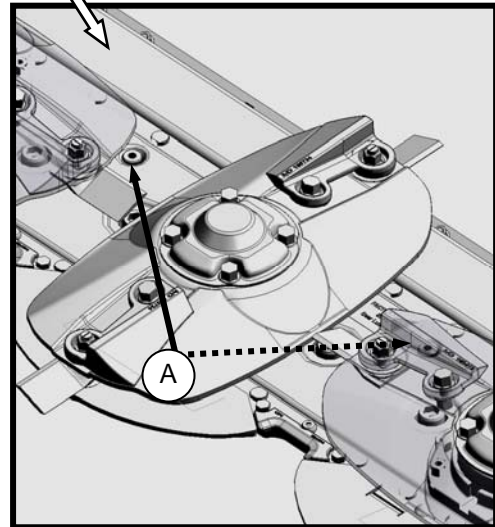
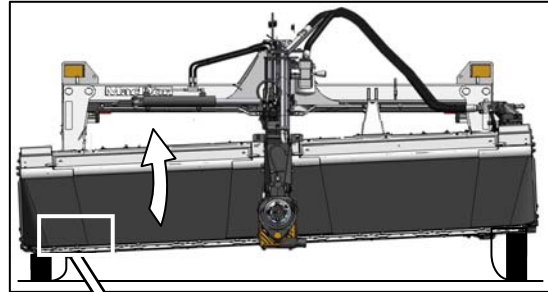
To avoid bodily injury or death from unexpected start-up or fall of raised machine: stop engine, remove key, and engage header lift cylinder stops before going under machine for any reason.

- b. Close lift cylinder valve lock-outs.
c. Place a block under each end of the header.

NOTE

The block under the left end of the header should be higher than the right end.

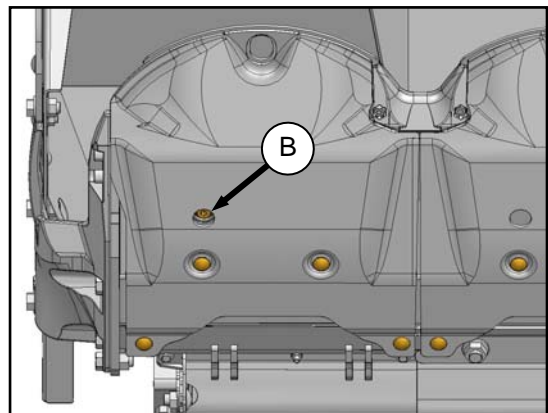
- d. Open lift cylinder valve lock-outs, start tractor, and lower header onto blocks. Shut down tractor, and remove key.



- f. Clean around either filler (A), and remove plug with an 8 mm hex L-Key.

NOTE

If necessary, rotate disc to expose filler.



- g. Place a suitably sized container under the cutterbar drain hole (B).

(continued next page)

MAINTENANCE AND SERVICING

- h. Remove plug (B) with an 8 mm hex L-Key, and allow sufficient time for lubricant to drain.

IMPORTANT

Do NOT flush the cutterbar.

- i. Replace drain plug (B), and tighten.
- j. Safely dispose of lubricant.

7.5.1.2 Filling



DANGER

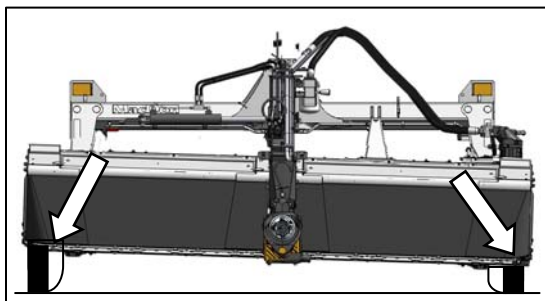
To avoid bodily injury or death from unexpected start-up or fall of raised machine: stop engine, remove key, and engage header lift cylinder stops before going under machine for any reason.



CAUTION

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

- a. Start engine, and raise header. Stop engine, and engage header lift cylinder lock-outs.



- b. Move higher block to right end of header, and remove used lubricant container.

NOTE

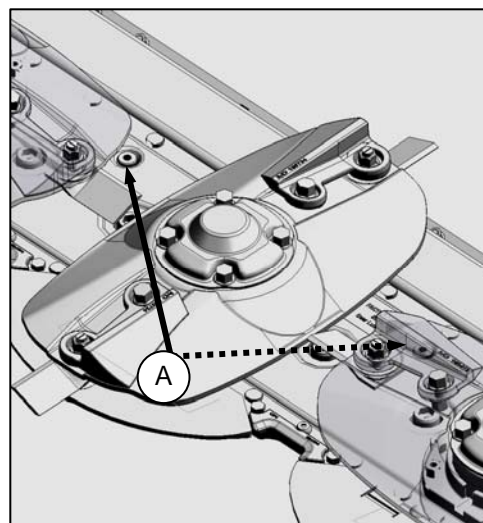
Having the fill end higher allows for quicker filling of cutterbar.

- c. Disengage header lift cylinder lock-outs.
- d. Start engine, and lower header onto blocks. Stop engine, and remove key.



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.



- e. Remove filler plug at either location (A).
- f. Add EXACTLY 3.37 quarts (US) (3.25 liters) of Traxon SAE 80W90 lubricant through filler hole (A).

IMPORTANT

Do NOT overfill the cutterbar. Overfilling can cause overheating, and damage to or failure of cutterbar will occur.

- g. Replace filler plug (A).
- h. Close cutterbar doors.
- i. Start engine, and raise header.
- j. Stop engine, and engage header lift cylinder lock-outs.
- k. Remove blocks.

MAINTENANCE AND SERVICING

7.5.2 Rock Guards

The R85 is equipped with a rock guard at each cutting disc location. The rock guard prevents the cutterbar from digging into the ground, and protects the disc from coming in contact with stones and other debris.



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.



DANGER

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

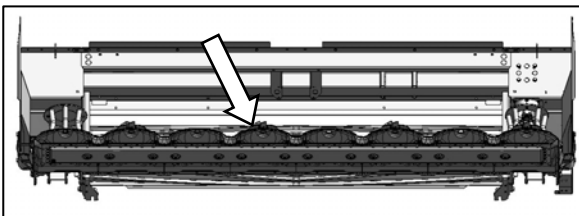


CAUTION

Exercise caution when working around the blades. Blades are sharp, and can cause serious injury. Wear gloves when handling blades.

Check rock guards periodically for severe damage or wear as follows:

- Raise header fully, stop engine, and remove key.
- Engage header lift cylinder locks.



- Inspect rock guards for severe damage, wear, and distortion. The guards should be replaced if severely damaged or worn.
- Check for loose or missing fasteners, and tighten or replace fastener if missing.
- See the Technical Manual or your MacDon Dealer for replacement procedures.

7.5.3 Disc Maintenance

Check daily that discs are not damaged by rocks or worn excessively from abrasive working conditions.

They are interchangeable, and a disc can be moved to a spindle that rotates in the opposite direction, as long as it is in a useable condition.

The discs are NOT repairable, and must be replaced if severely damaged or worn.

IMPORTANT

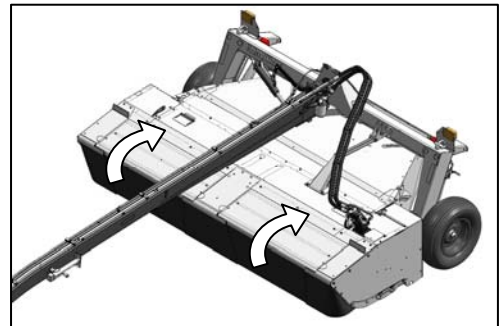
If holes appear in a disc, replace the disc immediately. Do NOT attempt to repair the discs. Always use factory replacement parts.



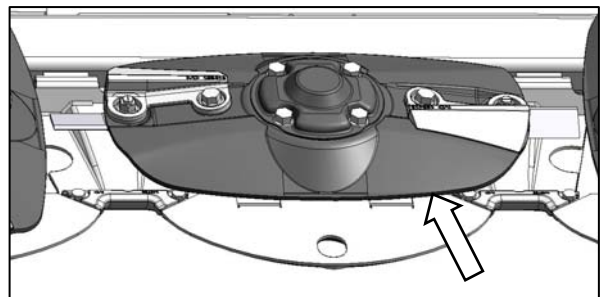
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- Lower header to ground, shut off engine and remove key.



- Open cutterbar doors.



- Check discs for damage or loose fasteners.
- Replace damaged discs. Refer to following section.
- Replace damaged fasteners. Tighten loose fasteners.
- Close cutterbar doors.

MAINTENANCE AND SERVICING

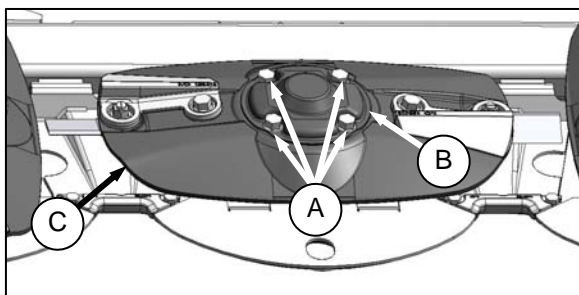
7.5.3.1 Disc Removal/Installation



CAUTION

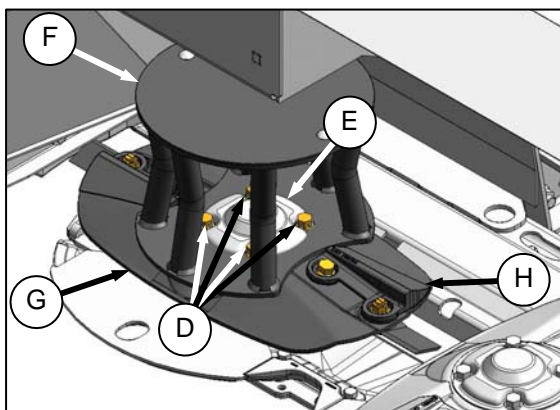
Exercise caution when working around the blades. Blades are sharp, and can cause serious injury. Wear gloves when handling blades.

- Place a block of wood between two discs to prevent disc rotation while loosening blade bolts.
- Replacing a disc:



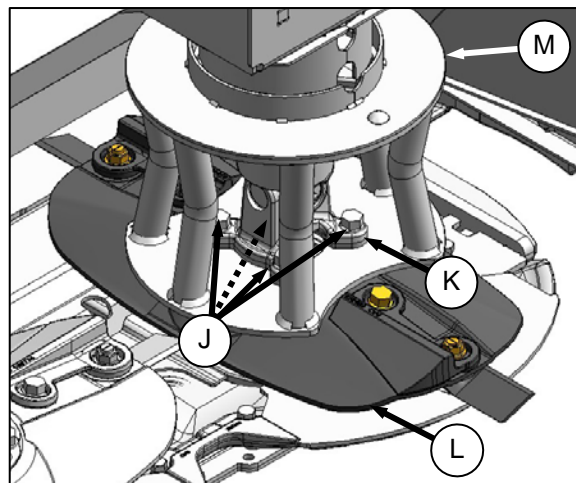
- Remove four bolts (A) on disc cover (B), and remove cover and disc (C).
- Position new disc (C) on spindle ensuring it is 90 degrees to the adjacent discs.
- Install cover (B), and secure with four bolts (A). Tighten bolts to 92 ft·lbf (125 N·m).

- Replacing disc under driven deflector:

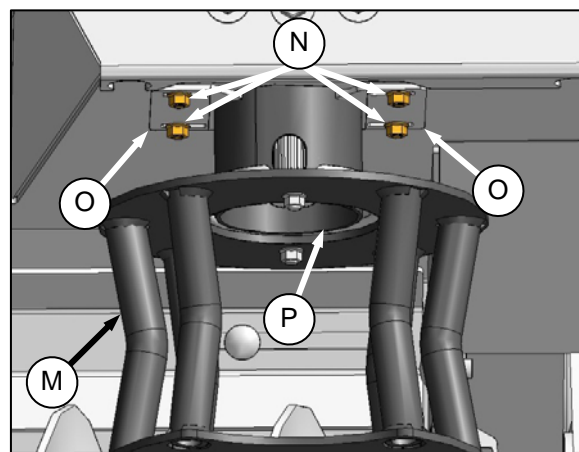


- Remove four bolts (D).
- Remove cover (E), deflector (F), and disc (G).
- Position new disc (G) on spindle, ensuring it is 90 degrees to adjacent discs.
- Position deflector (F) on spindle so that it clears accelerators (H).
- Install cover (E), and secure with four bolts (D). Tighten bolts to 92 ft·lbf (125 N·m).

- Replacing the driveline disc:



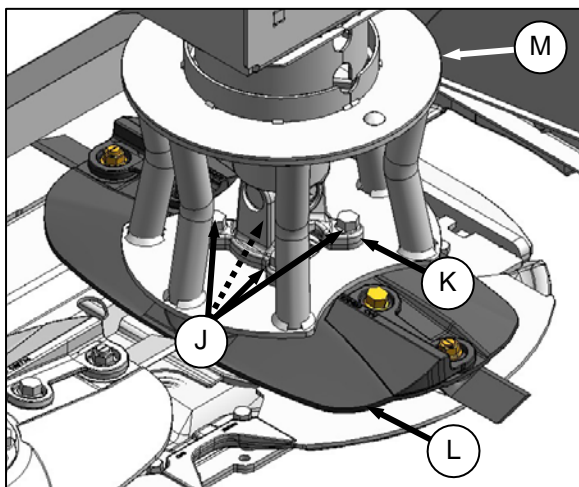
- Remove the four bolts (J) that secure the driveline (K) and disc (L) to the spindle.
- Rotate the deflector (M) as required so that large opening in deflector faces you.
- Remove the driveline (K) through the larger opening in the deflector.



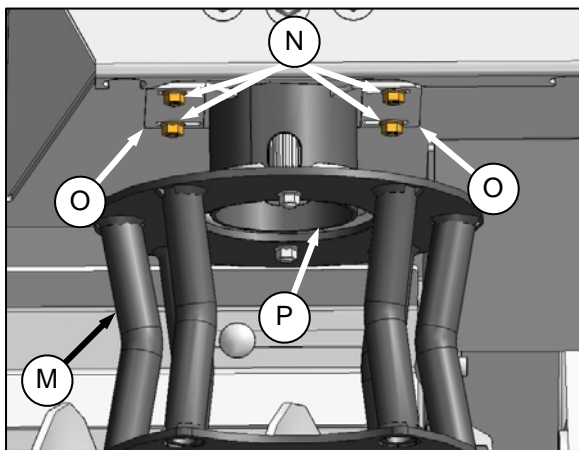
- Loosen the four bolts (N) in the two plates (O) that hold the upper driveline shield (P) in place.
- Move the plates (N) so that shield (P) can be lowered into deflector (M).
- Remove the deflector (M) and upper driveline shield (P).
- Remove disc.
- Position new disc (L) on spindle ensuring it is 90 degrees to the adjacent discs.
- Locate deflector (M) and upper driveline shield (P) onto spindle.
- Raise upper driveline shield (P) into position, and move plates (O) into slots in shield. Do NOT tighten bolts.

(continued next page)

MAINTENANCE AND SERVICING



11. Insert driveline (K) into deflector (M) and install onto shaft. Ensure that driveline (K) grease zerks will be accessible through large opening in deflector.
12. Align mounting holes in deflector (M), spindle, and driveline (K), and re-install four bolts (J).
13. Torque bolts to 92 ft-lbf (125 N·m).



14. Adjust the upper driveline shield (P) to achieve consistent gap around deflector shield (M).
 15. Tighten bolts (N) on shield plates (O).
- e. Remove block of wood (if used).



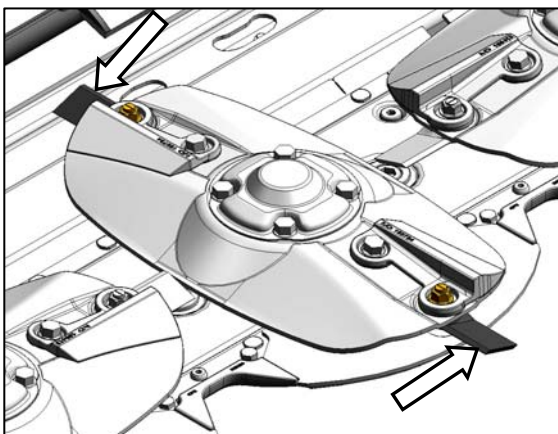
WARNING

Ensure cutterbar is completely clear of foreign objects. These objects can be ejected with considerable force when the machine is started, and may result in serious injury or machine damage.

- f. Close doors.

MAINTENANCE AND SERVICING

7.5.4 Cutter Blades



Each disc has two cutter blades attached to either end, and are free to swivel horizontally on a specially designed shoulder bolt.

The blade, with two cutting edges, can be flipped over so that the blade does not need to be replaced as often.

The blades are NOT repairable, and must be replaced if severely damaged or worn.

IMPORTANT

Always use factory replacement parts.

7.5.4.1 Inspection



CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp, and can cause serious injury. Wear gloves when handling blades.



CAUTION

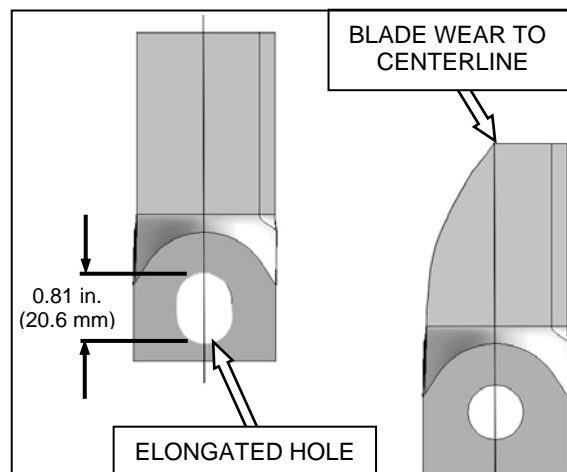
Damaged blades may damage the cutterbar, and result in poor cutting performance. Replace damaged blades at earliest possible opportunity.



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

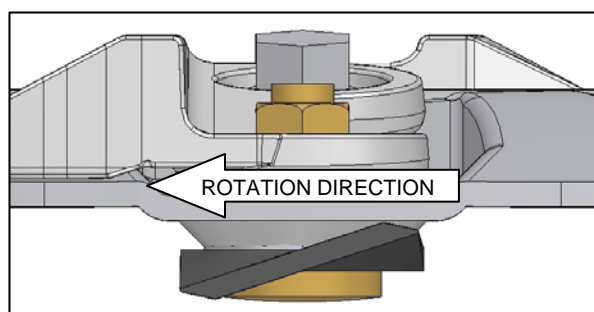
- Check daily that the cutter blades are securely attached to the disc.



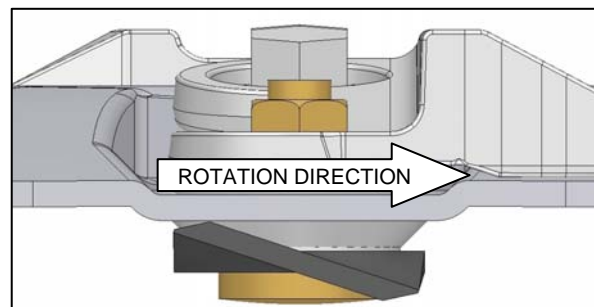
- Check blades for cracks, wear beyond safe operating limits, and distortion.
- Replace blades immediately if any of these problems occur.

IMPORTANT

Blades should be replaced in pairs, otherwise the disc may be unbalanced, and damage the cutterbar.



CLOCKWISE DISC



COUNTERCLOCKWISE DISC

IMPORTANT

The cutter blades have cutting edges on both edges so that the blade can be turned over and re-used. The twist in each blade determines if its cutting direction is clockwise or counterclockwise.

MAINTENANCE AND SERVICING

7.5.4.2 Replacement



CAUTION

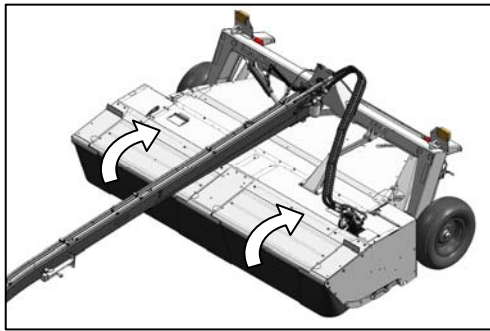
Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp, and can cause serious injury. Wear gloves when handling blades.



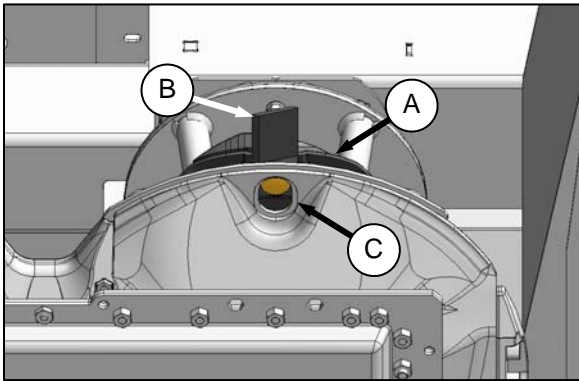
DANGER

To avoid bodily injury or death from unexpected start-up or fall of raised machine: stop engine, remove key, and engage lift cylinder lock-out valves before going under machine for any reason.

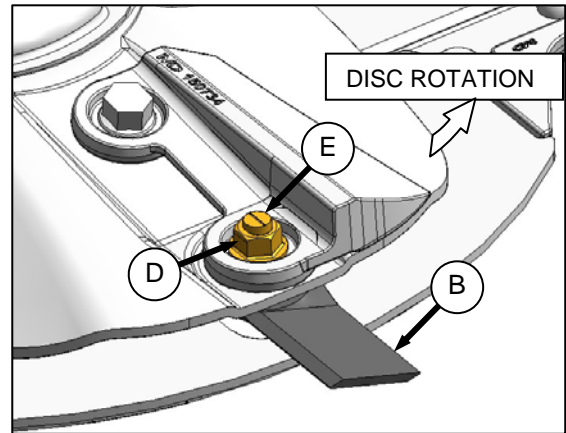
- Raise header fully, shut off engine, and remove key.
- Engage lift cylinder lock-out valves.



- Open cutterbar door(s).



- Rotate disc (A) so that blade (B) faces forward, and lines up with hole (C) in rock guard.
- To prevent disc rotation while loosening blade bolts, place a block of wood between two discs.
- Clean debris from blade attachment area.



- Remove nut (D).
- Remove shoulder bolt (E), and blade (B).
- Install new or reversed blade (B) with shoulder bolt (E) onto disc.
- Install nut (D). Tighten nut to 100 ft·lbf (135 N·m).
- Remove block of wood (if used).



WARNING

Ensure cutterbar is completely clear of foreign objects. These objects can be ejected with considerable force when the machine is started, and may result in serious injury or machine damage.

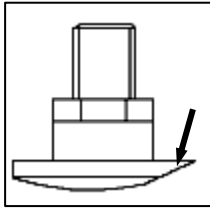
- Close doors.

MAINTENANCE AND SERVICING

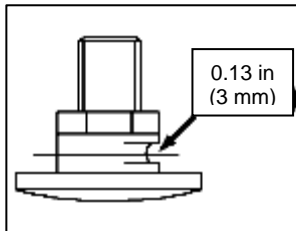
7.5.4.3 Cutter Blade Hardware

Check blade attachment hardware each time blades are changed. Refer to previous section for hardware replacement procedure.

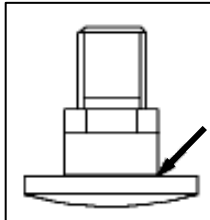
- a. Check bolts for wear or damage, and replace bolt if any of the following conditions occur:
 1. Bolt has been removed and installed five times.



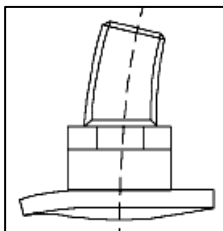
2. Head is worn flush with bearing surface of blade.



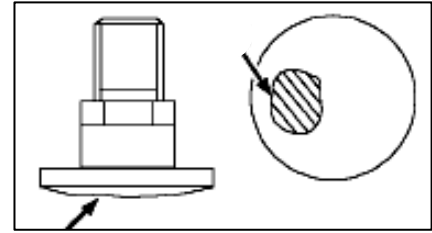
3. Diameter of bolt neck is worn out of specification.



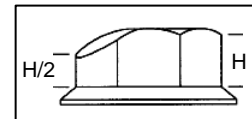
4. Bolt is cracked.



5. Bolt is visibly distorted.



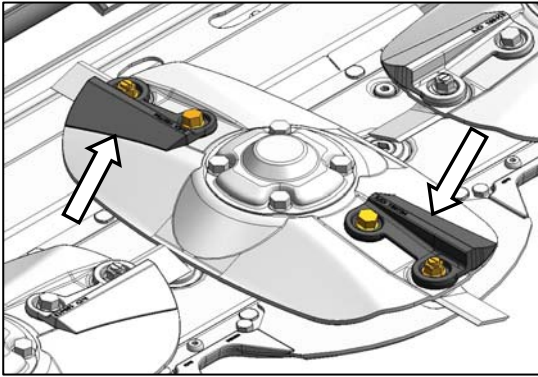
6. Evidence of interference with adjacent parts.
- b. Check nuts for wear or damage, and replace nut if:



- Worn height is less than half total height.
- Cracked.
- Nut has been removed and installed five times.

MAINTENANCE AND SERVICING

7.5.5 Accelerators



Two accelerators are mounted on each disc, and are designed to quickly move the cut material off the disc and into the auger and conditioner.

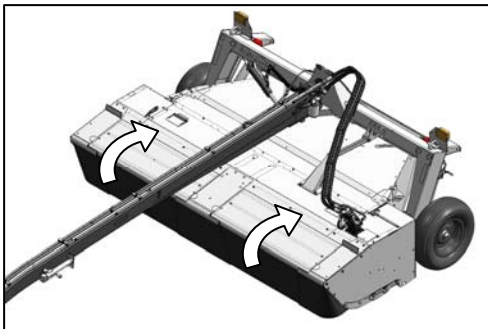
They are replaceable, and should be periodically inspected for damage and loose or missing fasteners.



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- Raise header fully, stop engine, and remove key.
- Engage header lift cylinder locks.



- Open cutterbar doors.



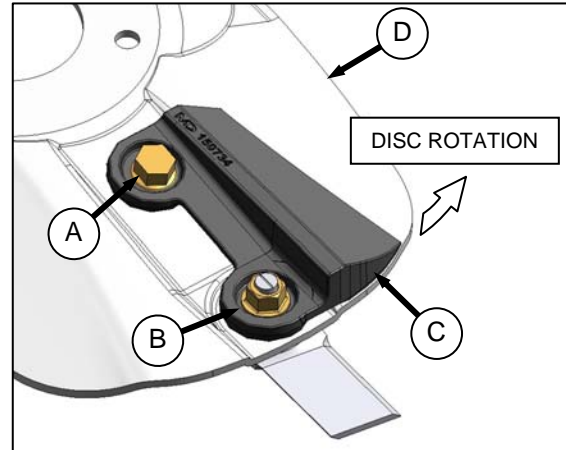
CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

- Inspect accelerators for damage and wear. They should be replaced if severely damaged or worn.
- Check for loose or missing fasteners, and tighten or replace fastener if missing.

7.5.5.1 Replacing Accelerators

- Raise header fully, shut off engine, and remove key.
- Engage lift cylinder lock-out valves.
- Remove disc. See Section 7.5.3.1 Disc Removal/Installation.



- Remove bolt and nut (A), and nut (B), and remove accelerator (C) from disc (D).

IMPORTANT

Do NOT remove cutter blade bolt unless it or the blade are being replaced. Repeat for other accelerator.

- Locate new accelerator on disc onto existing cutter blade bolt. Install nut (B).

NOTE

Accelerators are handed for clockwise or counterclockwise operation. Verify the direction of disc before installing accelerators.

- Install hex bolt (A) and nut at inboard hole. Bolt head faces UP.
- Tighten both nuts to 100 ft-lbf (135 N-m).
- Repeat for other accelerator.
- Re-install disc (D) on spindle. Refer to Section 7.5.3.1 Disc Removal/Installation.
- Remove block of wood (if used).



WARNING

Ensure cutterbar is completely clear of foreign objects. These objects can be ejected with considerable force when the machine is started, and may result in serious injury or machine damage.

- Close cutterbar doors.

MAINTENANCE AND SERVICING

7.5.6 Rotary Deflectors

The rotary converging cage deflectors are designed to deliver the cut material from the ends of the cutterbar into the auger, and to assist in maintaining the even flow of crop into the conditioner.

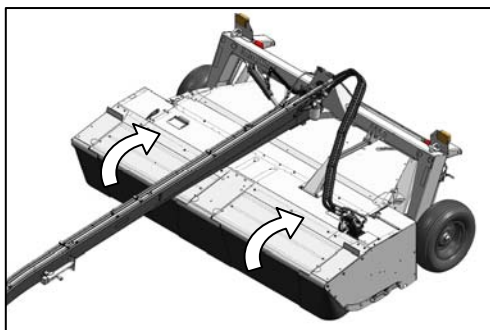
They should be checked daily for damage or wear.



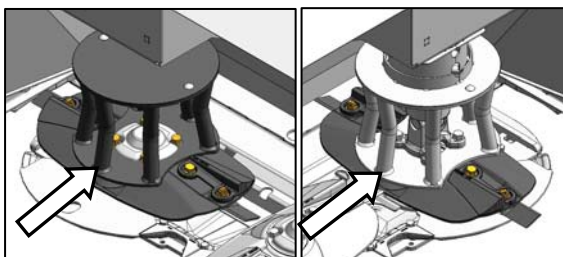
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- a. Lower header to ground, shut off engine, and remove key.



- b. Open cutterbar doors.



- c. Check that deflectors are not damaged or bent by rocks, and for loose fasteners.
- d. Replace deflectors if they are severely damaged or worn. See next section. Do NOT repair.
- e. Tighten loose fasteners.



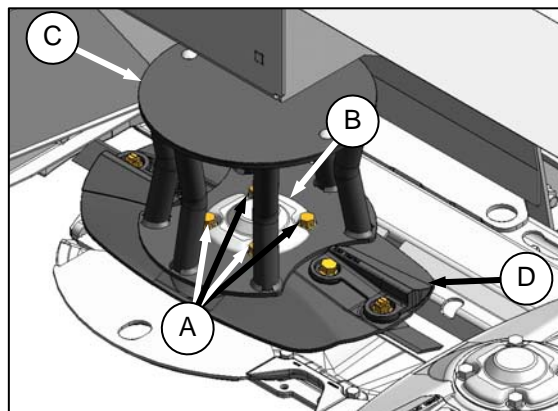
WARNING

Ensure cutterbar is completely clear of foreign objects. These objects can be ejected with considerable force when the machine is started, and may result in serious injury or machine damage.

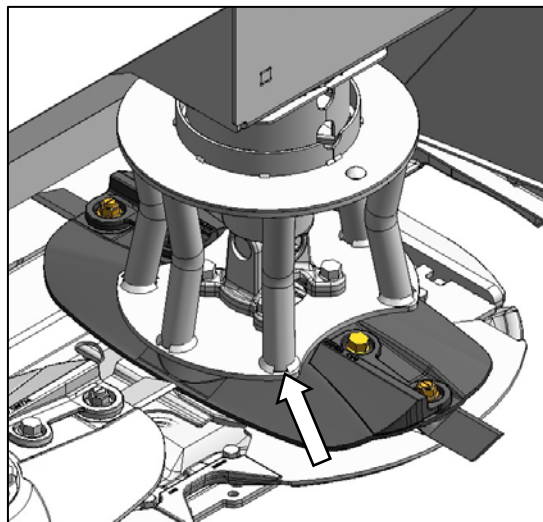
- f. Close cutterbar doors.

7.5.6.1 Deflector Removal/Installation

- a. Place a block of wood between two discs to prevent disc rotation while loosening bolts.
- b. To replace driven deflector:



1. Remove four bolts (A).
 2. Remove cover (B) and deflector (C).
 3. Position new deflector (C) on spindle so that it clears accelerators (D).
 4. Install cover (B), and secure with four bolts (A).
 5. Tighten bolts to 92 ft·lbf (125 N·m).
 6. Close cutterbar doors.
- c. To replace driveline deflector:



Refer to Section 7.5.3.1 Disc Removal/Installation, step d.

MAINTENANCE AND SERVICING

7.5.7 Spindles

To prevent damaging the cutterbar and drive systems, each disc is attached to a spindle which incorporates a key that shears if the disc contacts a large stone, a stump, or other large object. In the event of a sheared key, the disc stops rotating, but remains attached to the spindle.

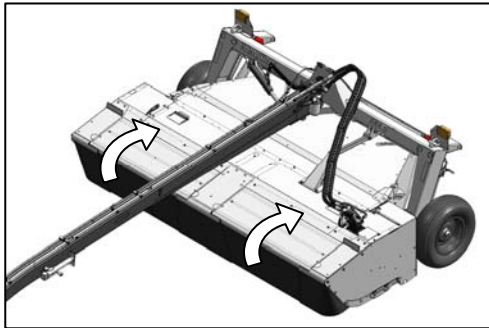
Replace the key as follows:



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- a. Lower header to ground, shut off engine, and remove key.

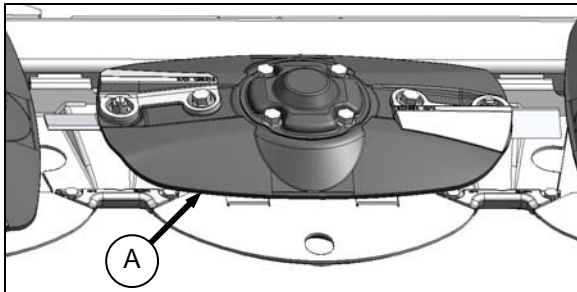


- b. Open cutterbar doors.

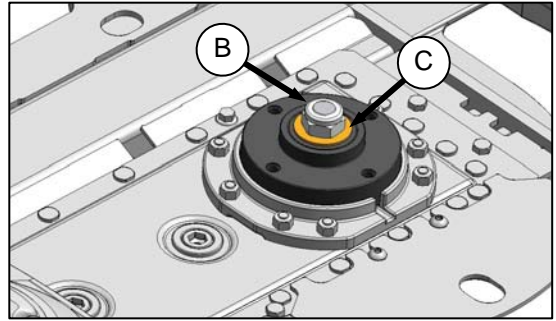


CAUTION

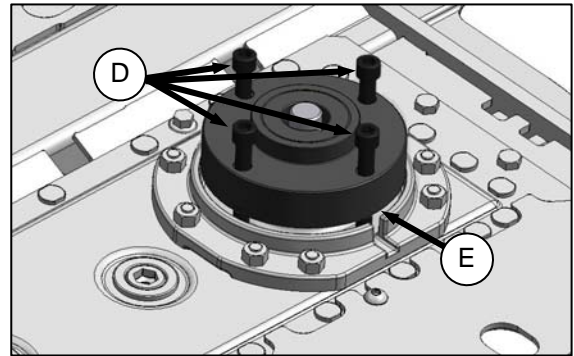
Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp, and can cause serious injury. Wear gloves when handling blades.



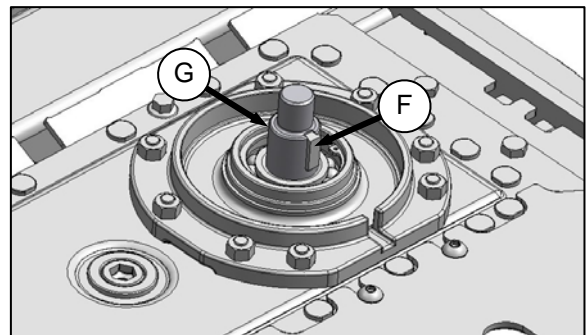
- c. Remove disc (A) from failed spindle. Refer to Section 7.5.3.1 Disc Removal/Installation.



- d. Using a 34 mm socket wrench, remove nut (B) and washer (C) from spindle.



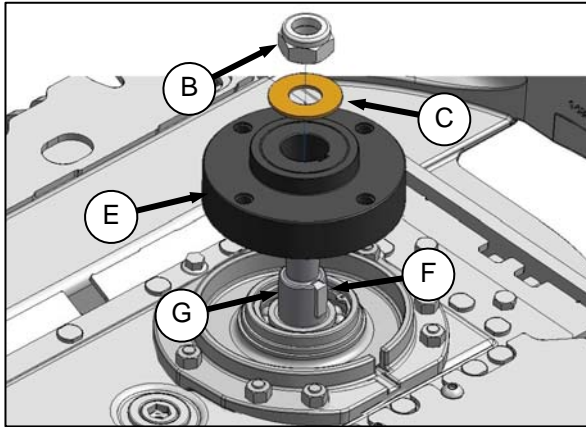
- e. Install four M12 x 60 mm long bolts (D) into holes in plate (E).
- f. Use bolts (D) as jacking screws to remove plate (E) from gear. Remove bolts from plate.



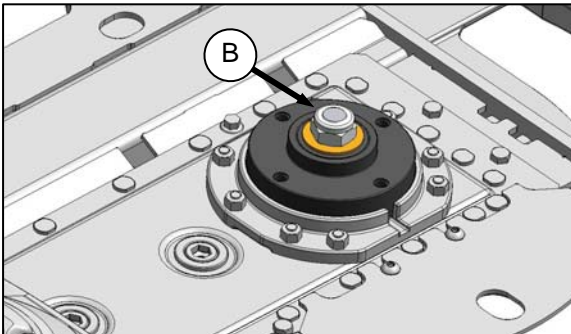
- g. Pry out failed key (F) from gear (G) and plate (E).
- h. Thoroughly clean metal debris from disassembled components and cutterbar.

(continued next page)

MAINTENANCE AND SERVICING



- i. Inspect plate (E) and gear shaft (G) for damage. If seriously damaged, replace entire spindle assembly. Refer to the Technical Service Manual or your MacDon Dealer.
- j. Install new key (F) into gear (G) keyway as shown.
- k. Align keyway in plate (E) with key in gear (G), and install plate onto gear until sufficient threads are exposed to install washer (C) and nut (B).



- l. Tighten nut (B) until plate is in final position. Torque nut to 325 lbf·ft (440 (N·m).
- m. Re-install disc. Refer to Section 7.5.3.1 Disc Removal/Installation.

MAINTENANCE AND SERVICING

7.5.8 Cutterbar Doors

7.5.8.1 Curtains and Latches

Replace the curtains if they should become worn or damaged. Refer to your Dealer or the Technical Service Manual for replacement instructions.

7.5.8.2 Door Latches (Export Only)

The cutterbar door latches should operate smoothly and remain engaged when the doors are down. Tighten latch hardware if loose.

If the rubber bushing is damaged or does not allow the latch to operate properly, the latch should be replaced.

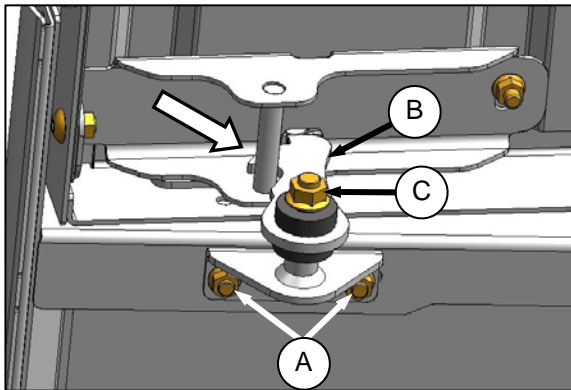


DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

7.5.8.2.1 Adjustment

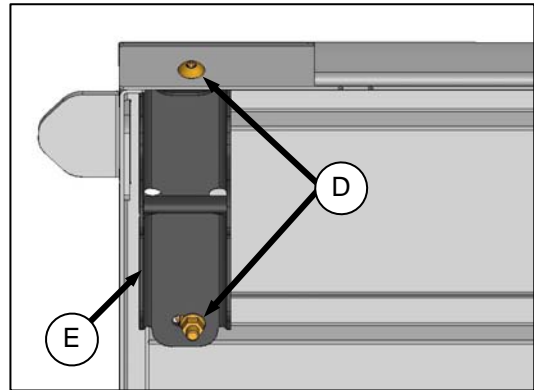
- Unlatch and lift curtain.



- Loosen bolts (A), and move latch assembly to position as shown so that latch (B) engages pin.
- Tighten bolts (A).
- If necessary, loosen nut (C), and rotate latch (B) to position as shown.
- Tighten nut (C).

7.5.8.2.2 Replacement

- Unlatch and lift curtain.
- Remove bolts (A), and remove latch assembly from frame.
- Locate new latch assembly on frame, and re-install bolts (A).
- Adjust to position shown, and tighten bolts (A).
- Open cutterbar door.



- Remove bolts (D), washers, and nuts, and remove latch bracket (E) from door.
- Locate new latch bracket (E) on door, and re-install bolts (D), washers and nuts. Use three washers on aft bolt as spacers between bracket (E) and door.
- Close door, and check alignment with latch. Adjust as necessary, and tighten bolts (D).

MAINTENANCE AND SERVICING

7.6 DRIVE SYSTEMS

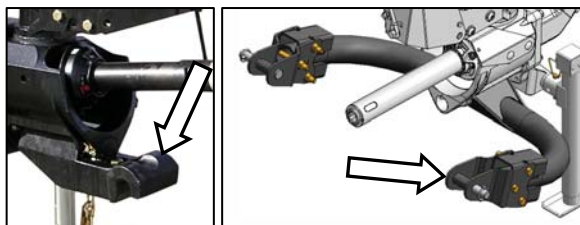
7.6.1 Driveline

The driveline normally remains attached to the mower conditioner, and is stored on the hook provided when not in use. Apart from normal lubrication, no maintenance or servicing is necessary. If driveline is damaged or worn, replace it.

Ensure driveline guard is not damaged and is in good condition. Replace it if damaged or improper fitment. Refer to Section 7.6.2 Driveline Guard.

7.6.1.1 Removal

- Park mower conditioner on level ground, lower header to ground, and block the wheels.
- Shut off engine, and remove key from ignition.
- Support front of hitch with wooden blocks (or equivalent).

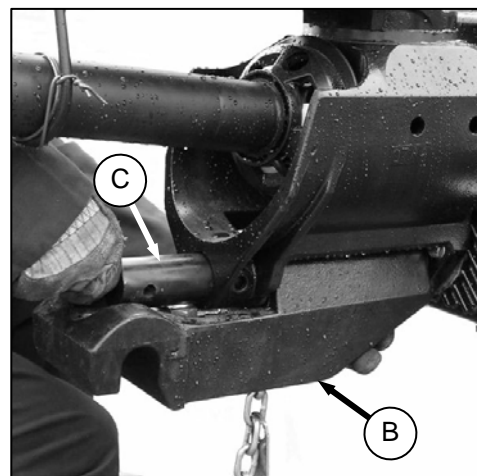


- Remove the hitch drawbar adapter or 3-point hitch adapter as follows:

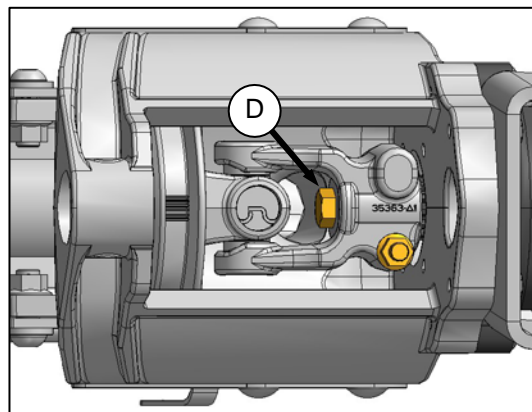


DRAWBAR ADAPTER SHOWN

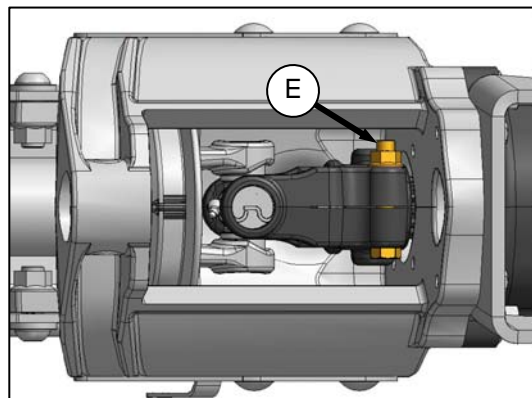
- Remove cotter pin and washer on clevis pin (A), and remove clevis pin.



- Hold hitch adapter (B), and remove swivel pin (C).
- Remove hitch adapter.



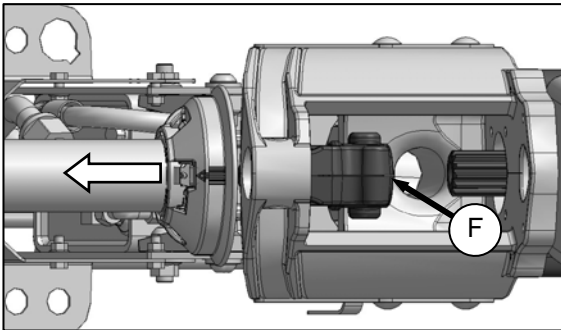
- Turn driveline so that bolt (D) is accessible from underside of casting.
- Use a large wrench to keep driveline from turning, and remove bolt (D) and washers with a 15/16 in. wrench.



- Rotate driveline 1/4 turn so that clamp bolt (E) in yoke is accessible.
- Remove clamp bolt (E) with a 3/4 in. wrench.

(continued next page)

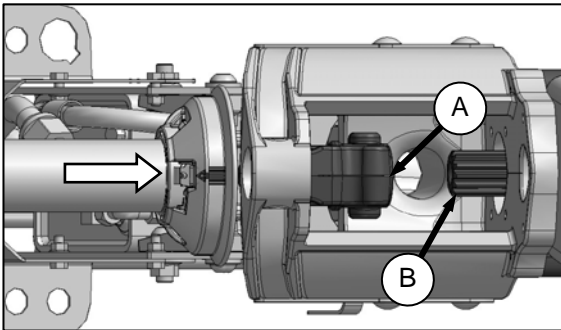
MAINTENANCE AND SERVICING



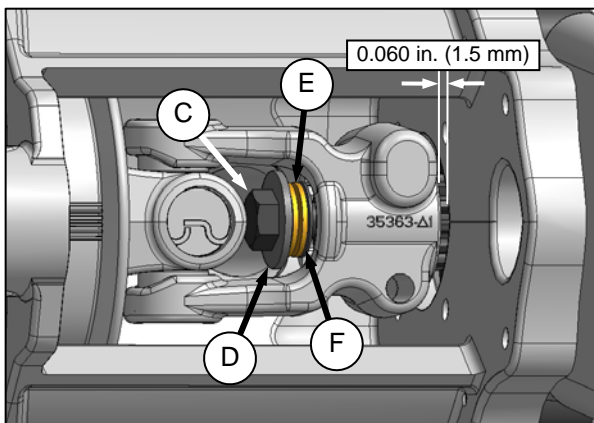
- h. Insert a wedge into the split (F) to loosen yoke.
- i. Slide driveline forward until clear of splined pump shaft.
- j. Remove wedge (if necessary), and remove driveline from casting.

7.6.1.2 Installation

- a. Insert driveline into casting.



- b. Drive a small wedge into split (A) in yoke.
- c. Push yoke onto end of splined pump shaft (B).
- d. Remove the wedge, and rotate driveline so that opening in yoke is accessible.



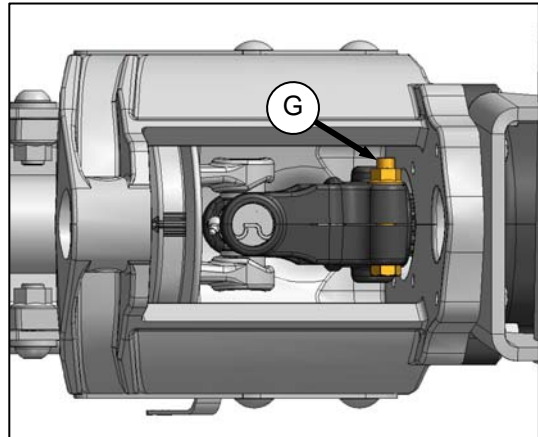
- e. Insert bolt (C) with large washer (D) under head, two small washers (E), and one thin washer (F) into yoke, and thread onto pump shaft (B).

- f. Tighten bolt (C) with a 15/16 in. wrench so that driveline is drawn onto pump shaft.

NOTE

Ensure there is 0.060 in. (1.5 mm) minimum clearance between the yoke and the casting. Add extra washer if necessary.

- g. Torque bolt (C) to 150 lbf·ft (203 N·m).
- h. Rotate driveline 1/4 turn so that clamp bolt can be installed.



- i. Install clamp bolt (G) and nut with a 3/4 in. wrench, and torque to 55 lbf·ft (75 N·m).
- j. Re-install the drawbar adapter or 3-point hitch adapter.

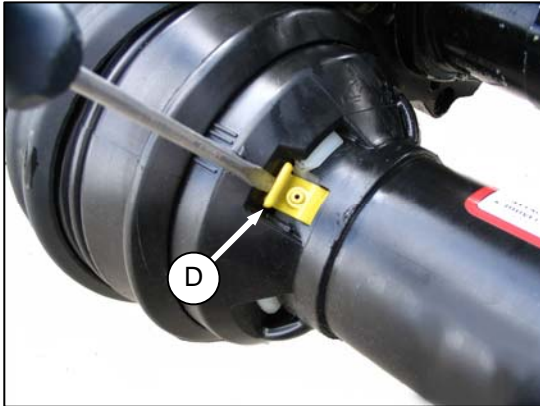
MAINTENANCE AND SERVICING

7.6.2 Driveline Guard

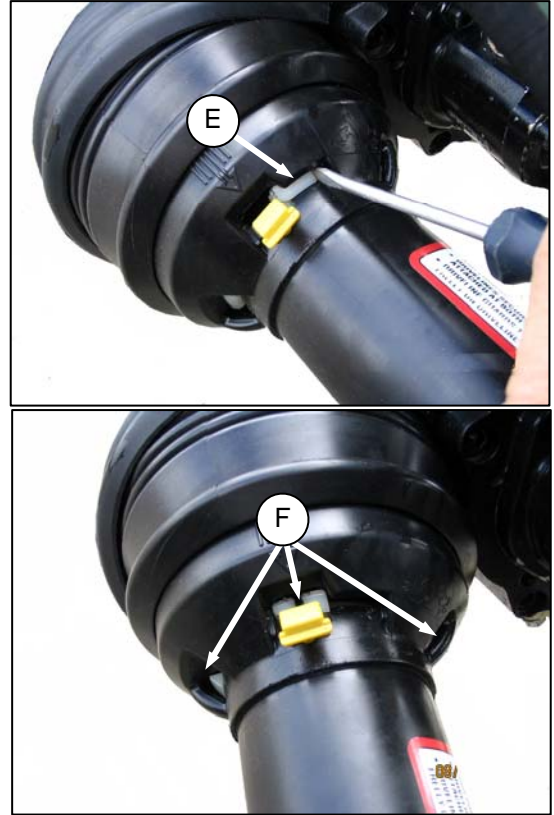
7.6.2.1 Removal



- a. Lift driveline (A) from hook (B), and extend driveline until it separates. Hold aft part (C) of driveline to prevent it from dropping.



- b. Release grease zerk/lock (D) with a screwdriver.



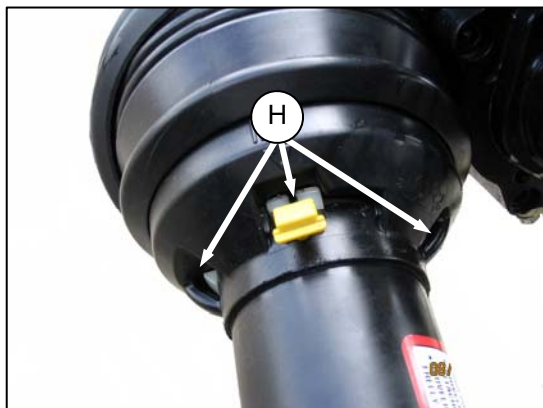
- c. Rotate guard locking ring (E) counterclockwise with a screwdriver until lugs (F) line up with slots in guard.
d. Pull guard off driveline.
e. Repeat above steps b. to d. for the other driveline guard.

MAINTENANCE AND SERVICING

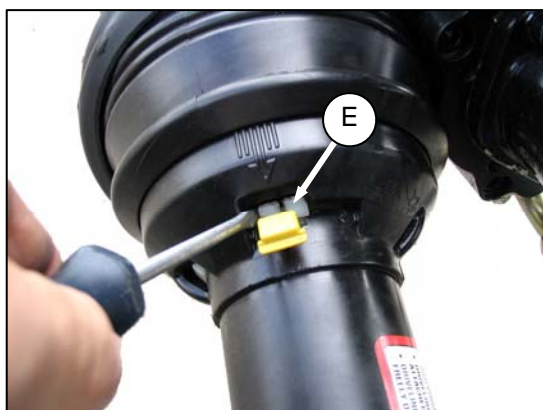
7.6.2.2 Guard Installation



- a. Slide guard onto driveline, and line up slotted lug on guard locking ring (E) with arrow (G) on guard.



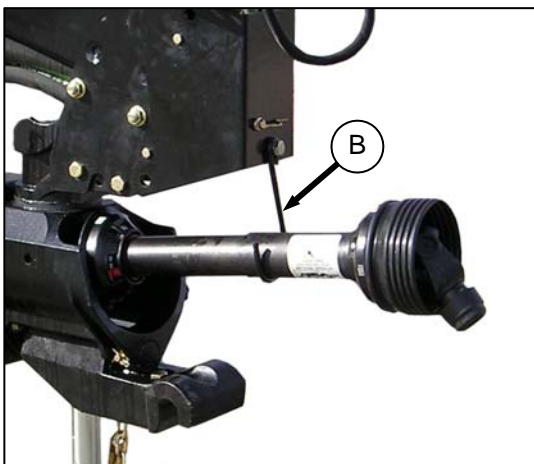
- b. Push guard onto ring until locking ring is visible in slots (H).



- c. Rotate ring (E) clockwise with a screwdriver to lock ring in guard.



- d. Push grease zerk (D) back into guard.
e. Repeat steps a. to d. for the other guard.
f. Re-assemble driveline.



- g. Replace driveline in hook (B) or connect to mower conditioner.

MAINTENANCE AND SERVICING

7.6.3 Pump

The main drive pump does not require normal maintenance or servicing. If repairs are required, it should be removed and serviced at your Dealer.

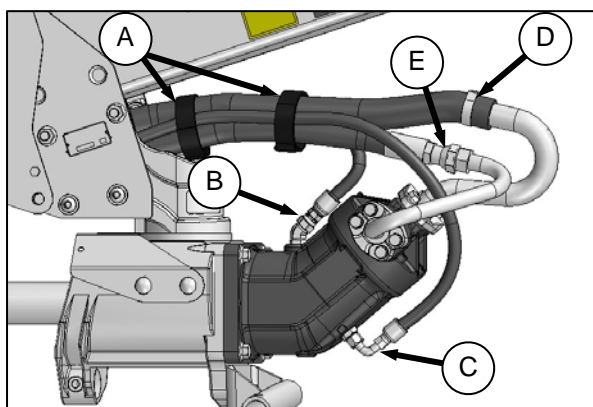
7.6.3.1 Removal



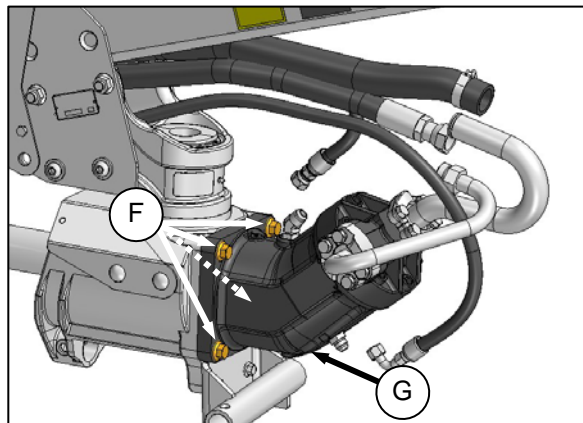
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- If machine is connected to the tractor, lower header to ground, turn off engine, and remove key.

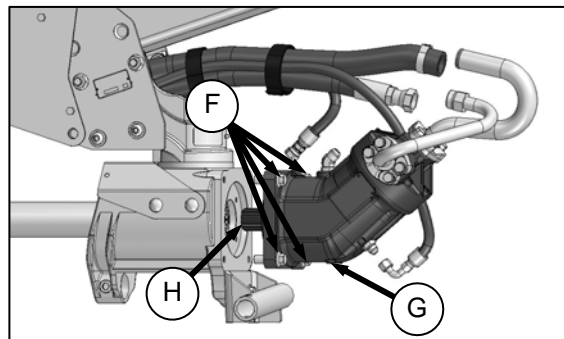


- Remove straps (A) to ease removal and handling of hydraulic hoses.
- Disconnect hoses (B) and (C) from pump, and install caps on hose ends and pump ports.
- Loosen clamp (D), and remove supply hose. Plug supply hose immediately to minimize loss of oil. Do NOT remove bolted fittings. Plug pump inlet line.
- Disconnect pressure line at fitting (E). Do NOT remove bolted fittings. Plug open lines.
- Remove driveline from pump shaft. Refer to Section 7.6.1 Driveline.

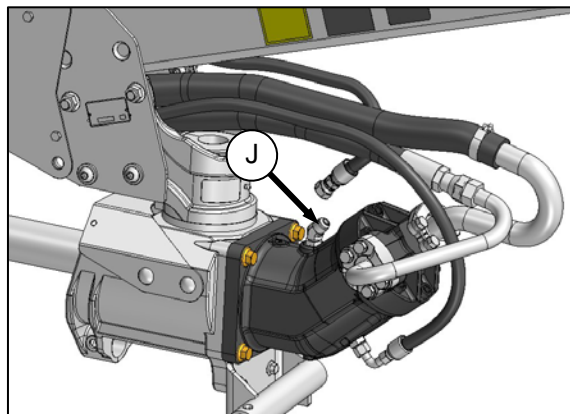


- Remove four bolts (F), and remove pump (G).

7.6.3.2 Installation



- Apply SAE multi-purpose extreme pressure grease to pump spline (H), and position pump (G) on housing.
- Re-install four bolts (F), and torque to 92 ft-lbf (125 N·m).



- Re-connect hoses, EXCEPT at fitting (J), to pump.
- Fill pump case with clean hydraulic oil at fitting (J).
- Attach case drain hose to fitting (J), and tighten.
- Install hose straps (A).
- Re-install driveline. See Section 7.6.1 Driveline.
- Check reservoir oil level, and add oil if required. See Section 7.7.1 Reservoir.

MAINTENANCE AND SERVICING

7.6.4 Hydraulic Motor

The main drive hydraulic motor does not require normal maintenance or servicing. If repairs are required, it should be removed and serviced at your Dealer.

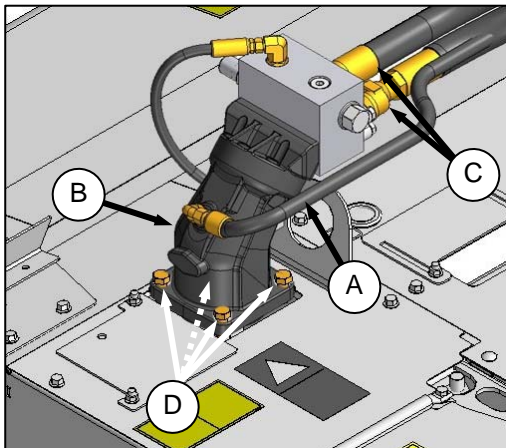
7.6.4.1 Removal



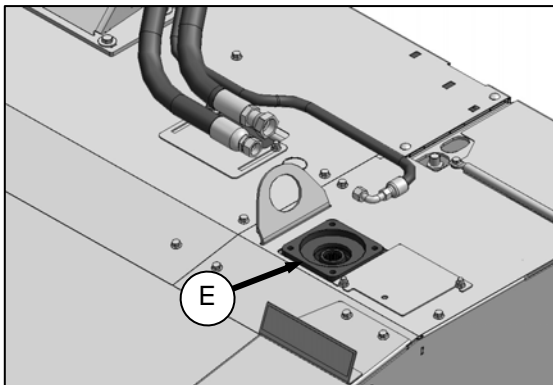
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- If machine is connected to the tractor, lower header to ground, turn off engine, and remove key.



- Disconnect case drain hose (A) from motor (B), and install caps on hose end and motor port.
- Disconnect pressure and return hoses at threaded fittings (C). Do NOT remove bolted fittings. Install caps and plugs on open fittings.
- Remove four bolts (D), and remove motor.



- Cover gearbox opening (E) with a rag or plastic.

7.6.4.2 Installation

- Remove covering from gearbox (E) opening.
- Place motor (B) on gearbox (E) flange. See illustration opposite.
- Install four bolts (D). Torque to 103 ft-lbf (140 N·m).
- Remove caps from motor ports and hoses, and re-connect hoses to motor.

MAINTENANCE AND SERVICING

7.6.5 Conditioner Drive Belt

The conditioner drive belt (A) is located inside the drive compartment at the left hand side of the header, and is tensioned with a spring tensioner. The tension is factory set, so should not require adjusting.

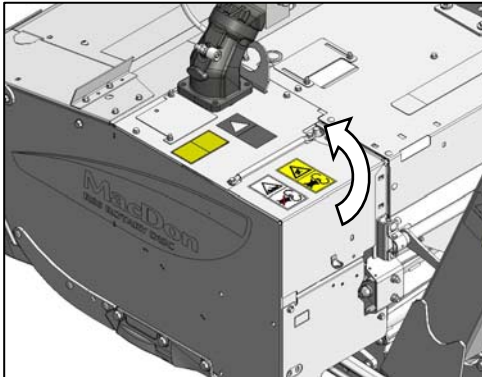
Check the belt tension, and inspect for damage or wear every 100 hours or annually (preferably before the start of the cutting season).



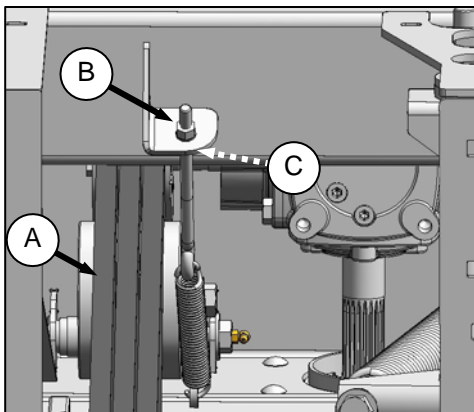
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

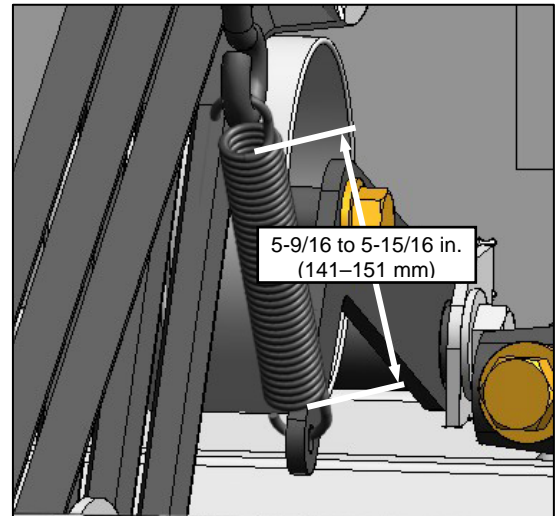
- a. Lower header to ground, turn off engine, and remove key.



- b. Open the driveshield. See Section 6.2.2 Driveshield.



- c. Check that adjuster nuts (B) and (C) are tight.



- d. When properly tensioned, tensioner spring should measure approximately 5-9/16 to 5-15/16 in. (141-151 mm) in length.
- e. If necessary, adjust tension as follows:
1. Loosen jam nut (C).
 2. Turn nut (B):
 - CLOCKWISE to increase spring length (tension), or
 - COUNTERCLOCKWISE to decrease length (loosen).
 3. Tighten jam nut (C).
- f. Close driveshield.

MAINTENANCE AND SERVICING

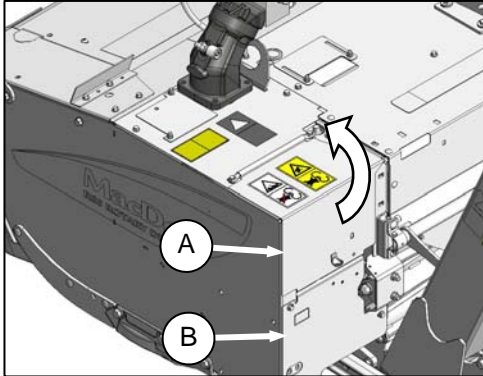
7.6.5.1 Replacing Conditioner Drive Belt



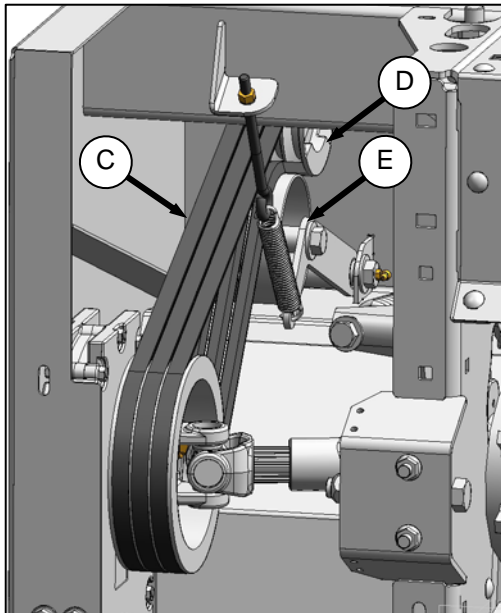
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- Lower header to ground, turn off engine, and remove key.

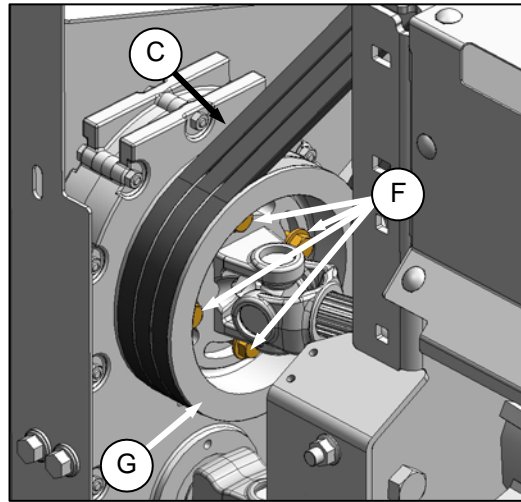


- Open the driveshield (A). See Section 6.2.2 Driveshield. Lower shield (B) can also be removed to ease access to drive compartment.



- Release tension on conditioner drive belt (C). See previous section.

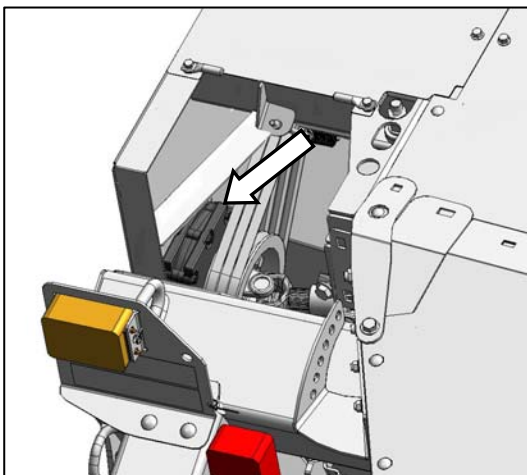
- Remove conditioner drive belt (C) from drive pulley (D). Tensioner (E) can be forced away from belt to ease removal.



- Remove the four bolts (F), and washers attaching upper driveline to driven pulley (G), and slide driveline away from pulley.
- Remove drive belt (C) from driven pulley.
- Install new belt (C) onto driven pulley (G) first, and then onto drive pulley (D), ensuring they are in the pulley grooves.
- Tension belt (C). See previous section.
- Re-attach upper driveline to driven pulley with bolts (F) and washers. Check roll timing before fully tightening bolts. See Section 6.12.4 Roll Timing.
- Torque bolts to 75 lbf-ft (102 N·m).
- Re-install lower driveshield (B).
- Close driveshield (A).

MAINTENANCE AND SERVICING

7.6.6 Conditioner Gearbox



The conditioner gearbox, which transfers power from the bevel gearbox to the conditioner rolls, is located inside the drive compartment at the left end of the header.

The gearbox does not require normal maintenance or servicing.

If repairs are required, it should be removed and serviced at your Dealer. See your MacDon Dealer or Technical Service Manual.

7.6.7 Bevel Gearbox

The bevel gearbox, which transfers power from the hydraulic motor to the header drives, is located inside the drive compartment at the left end of the header.

If repairs are required, it should be removed and serviced at your Dealer. See your MacDon Dealer or Technical Service Manual.

The only regular servicing required is maintaining the lubricant level, and changing the lubricant according the intervals specified in this manual.

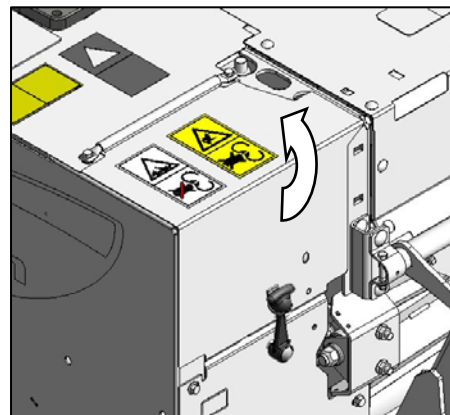
7.6.7.1 Changing Lubricant



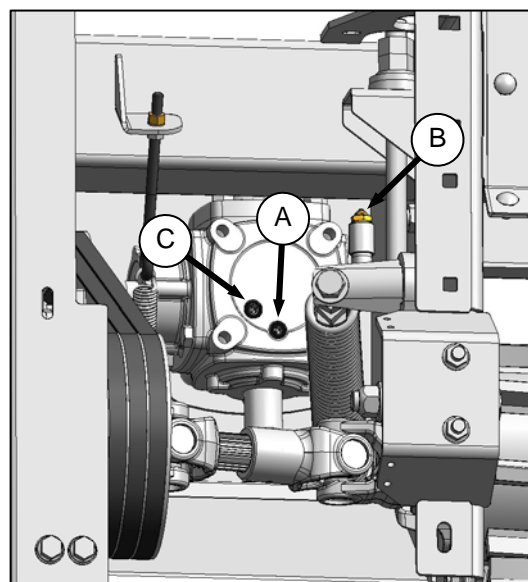
DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

- Drain the gearbox when the lubricant is warm. If the lubricant is cold, idle the machine for about 10 minutes prior to draining.
- Raise header to full height, and engage header lift cylinder locks. Stop engine, and remove key.



- Open the driveshield. See Section 6.2.2 Driveshield.



- Place a suitable container under drain plug (A).
- Remove plug (A).
- Allow sufficient time for lubricant to drain.
- Disengage header lift cylinder locks, start engine, and lower header so that it is level. Stop engine, and remove key.
- Remove breather and bushing from filler elbow (B) and plug (C).
- Add 13.5 oz. (400 ml) of Traxon E 75W90 gear lubricant to gearbox through elbow (B). Lubricant should slightly run out of port (C) when at the proper level.
- Replace plug (C), bushing and breather (B), and tighten.
- Properly dispose of used lubricant, and clean up any spilled lubricant.
- Close driveshield.

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7.7 HYDRAULICS

The pull-type mower conditioner is hydraulically powered using the following systems:

- A self-contained hydraulic system to operate the header functions.
- The tractor remote system to operate the header lift cylinders, steering, and header tilt (if equipped).

7.7.1 Reservoir

The mower conditioner's self-contained hydraulic system uses the APT hitch for the hydraulic oil reservoir.

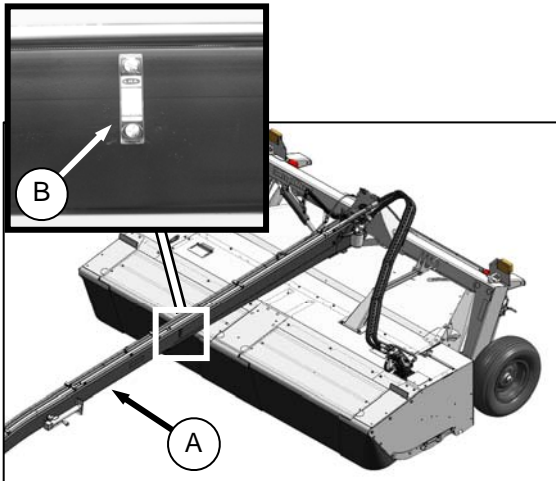
7.7.1.1 Oil Level

- a. Park mower conditioner on level ground to ensure top of APT hitch is horizontal. Check oil level daily (before start-up) when the oil is COLD.
- b. If header drive performance improvement system is installed, proceed to step c. Otherwise proceed as follows:



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.



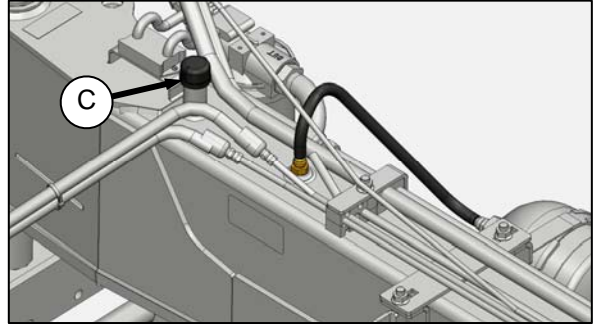
1. Check the sight gauge (B) near the middle of the APT hitch (A).
2. Oil level should be at or near FULL mark on the gauge (B).
3. To add oil, proceed to Section 7.7.1.2 Adding Hydraulic Oil.



WARNING

To avoid injury from contact with hot oil, do NOT remove cap when system is hot. When removing cap, unscrew it slowly to vent the build-up of air pressure in the reservoir.

- c. If header drive performance improvement system is installed:

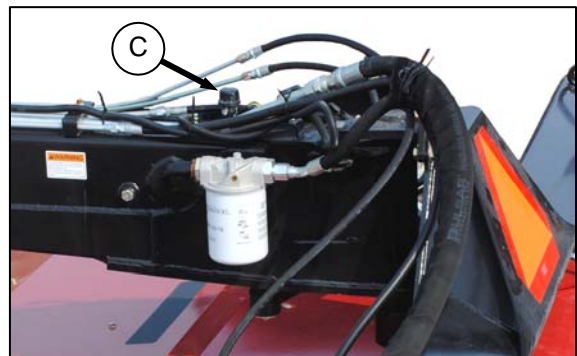


1. Remove filler cap (C).
2. Oil level should be approximately 3-3/4 to 4-1/8 inches (97–104 mm) below top surface of filler pipe. Ensure APT hitch is level.
3. Replace filler cap (C).
4. To add oil, proceed to Section 7.7.1.2 Adding Hydraulic Oil.

7.7.1.2 Adding Hydraulic Oil

Use single grade trans-hydraulic oil. See Section 7.3.2 Recommended Lubricants.

- a. Level APT hitch by parking on level ground, or with the jack.
- b. If header drive performance improvement system is installed, proceed to step c. Otherwise proceed as follows:

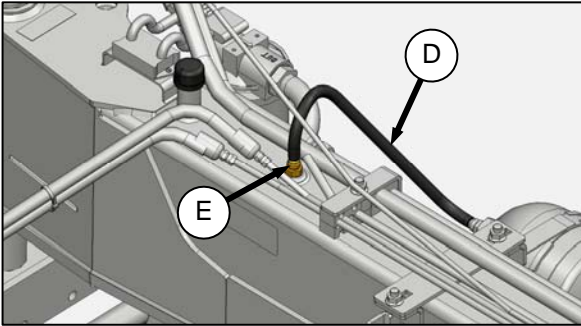


1. Slowly unscrew cap (C) from filler tube.
2. Add oil until level is between ADD and FULL marks on gauge (B).
3. Replace cap (C).

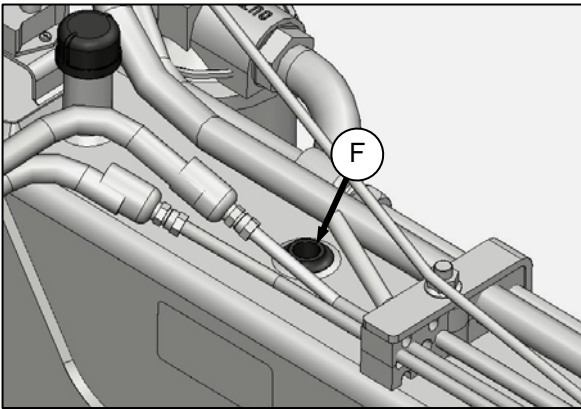
(continued next page)

MAINTENANCE AND SERVICING

- c. If header drive performance improvement system is installed:



1. Clean area around hose (D) and fitting (E) on APT.
2. Loosen the hose (D) at fitting (E).
3. Remove fitting (E).



4. Add oil through port (F) until level is approximately 1 to 1-1/4 inches (25–32 mm) below top face of port. Ensure APT hitch is level.
5. Replace fitting (E), and tighten hose (D).

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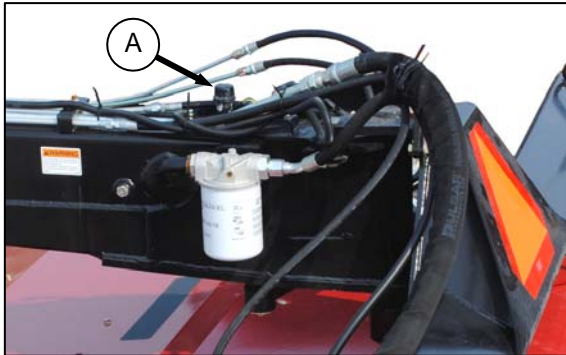
7.7.1.3 Changing Hydraulic Oil

NOTE

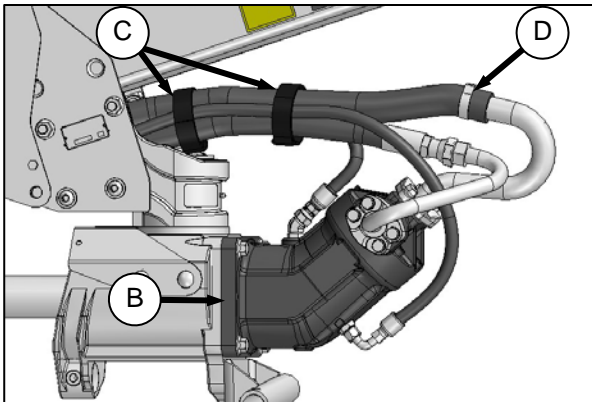
Change hydraulic oil every 500 hours or three years. See Section 7.3.2 Recommended Lubricants.

NOTE

Mower conditioner must be disconnected from tractor. Refer to Section 6.5 MOWER CONDITIONER / TRACTOR UNHOOK.

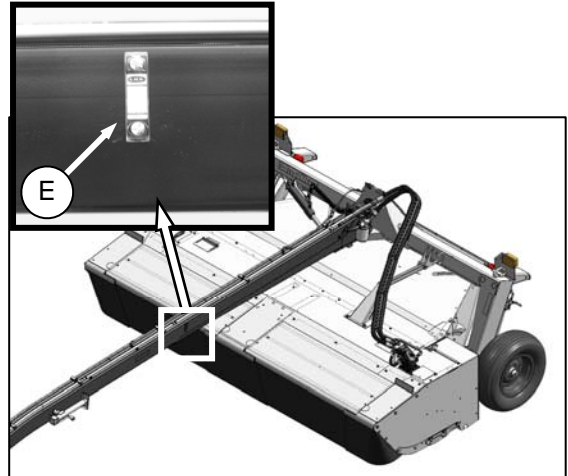


- Unscrew cap from filler pipe (A).
- Lower APT hitch as low as possible with jack.

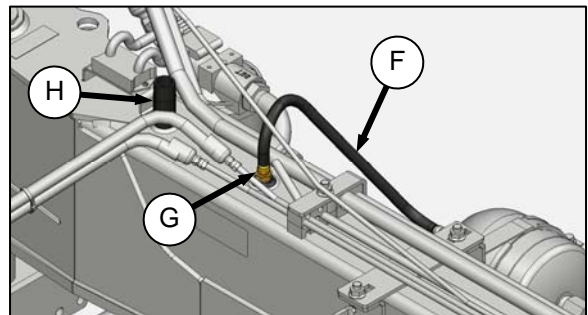


- Place a 50 gallon (190 liters) drain pan under pump (B).
- Loosen straps (C) and hose clamp (D) on the pump suction hose, and pull the hose off the fitting.
- Allow oil to drain into container.

- Reconnect pump suction hose to pump. Tighten clamp (D), and straps (C).
- Level APT hitch with the jack.
- If header drive performance improvement system is installed, proceed to step i. Otherwise, proceed as follows:
 - Fill with approximately 39 gallons (US) (147 liters) of clean single grade trans-hydraulic oil through filler pipe (A).



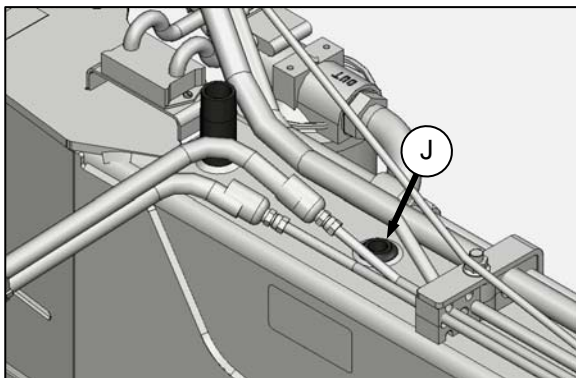
- Check sight glass (E) for proper oil level.
 - Replace cap on filler pipe.
- If header drive performance improvement system is installed:



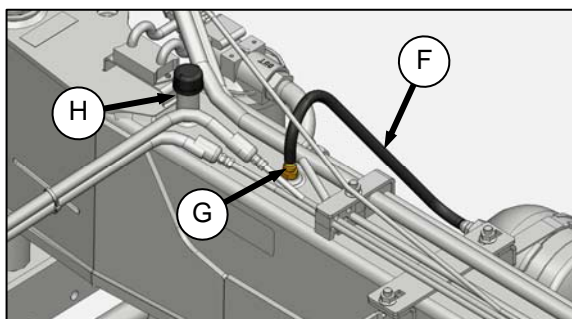
- Clean area around hose (F) and fitting (G) on APT.
- Loosen the hose (F) at fitting (G).
- Remove fitting (G).
- Add approximately 46 gallons (US) (174 liters) of clean single grade trans-hydraulic oil through filler pipe (H) until level reaches bottom of filler pipe (H).

(continued next page)

MAINTENANCE AND SERVICING



5. Top up through port (J) until level is approximately 1 to 1-1/4 inches (25–32 mm) below top face of port (J). Ensure APT hitch is level.

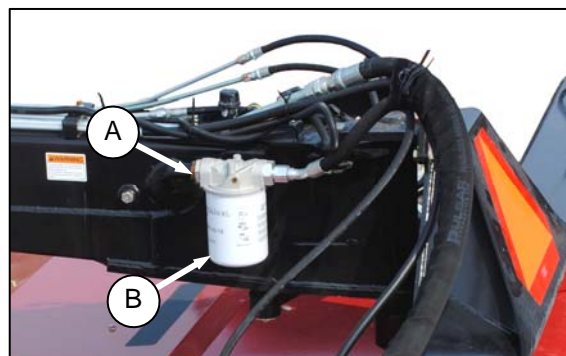


6. Replace fitting (G), and tighten hose (F).
7. Replace cap on filler pipe (H).

7.7.2 Hydraulic Oil Filter

NOTE

Change hydraulic oil filter after the first 100 hours operation, and every 250 hours thereafter.



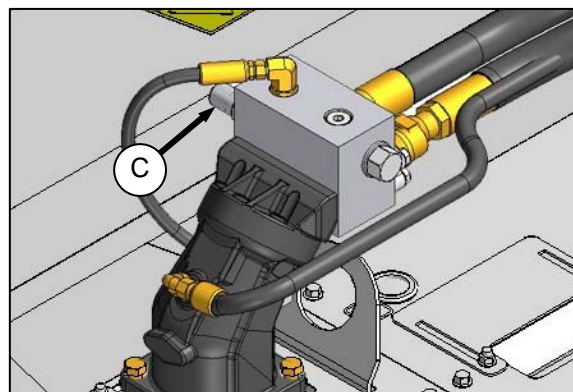
- a. Clean around the filter head (A).
- b. Remove the filter (B), and clean the gasket surface of the filter head. If oil runs out of filter head, lower the front of APT hitch as low as possible.
- c. Apply a thin film of clean oil to the gasket on the new filter.
- d. Install new filter. Turn the filter onto the mount until the gasket contacts the filter head. Tighten the filter an additional 1/2 to 3/4 turn by hand.

IMPORTANT

Do NOT use a filter wrench to install the filter. Over-tightening can damage gasket and filter.

7.7.3 Pressure Relief Valve

A possible cause of poor cutting performance and/or excessive heating of hydraulic oil is low relief pressure.



The relief valve (C) is factory set at 5,800 psi (40 MPa). See your Dealer for adjustment or service.

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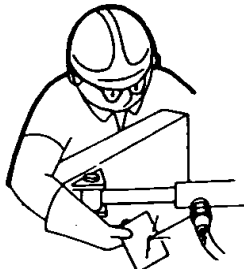
7.7.4 Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.



WARNING

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



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

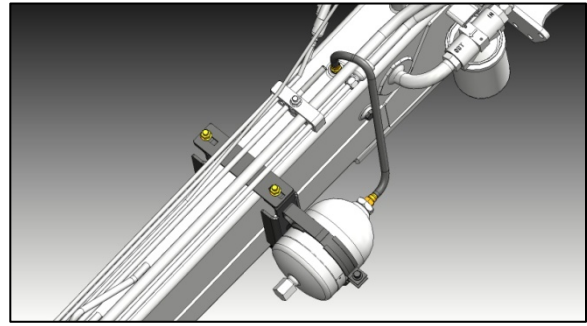
IMPORTANT

Keep hydraulic coupler tips and connectors clean. 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.

7.7.5 Optional Header Drive Performance Kit



The optional header drive performance system does not require normal maintenance or servicing.

- Periodically check the accumulator tank attachment straps, and hose connections for looseness or damage. Tighten hardware or hose connections as necessary.
- If the hose or supports are damaged, they should be repaired or replaced.
- If the tank is damaged, replace it.
- If the tank needs to be re-charged with nitrogen, it should be performed **ONLY** by a qualified individual.

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7.8 ELECTRICAL

- Use electrical tape and wire clips as required to prevent wires from dragging or rubbing.
- Keep lights clean, and replace defective bulbs.

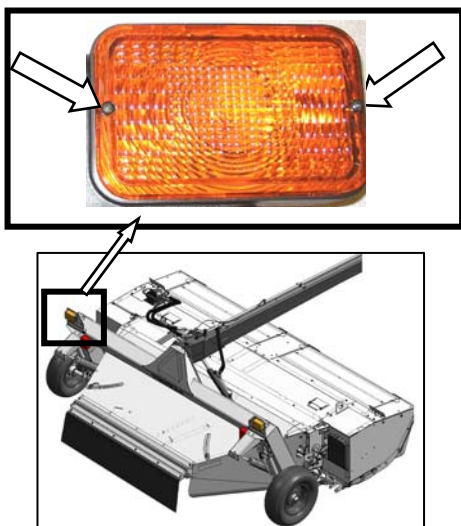


DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

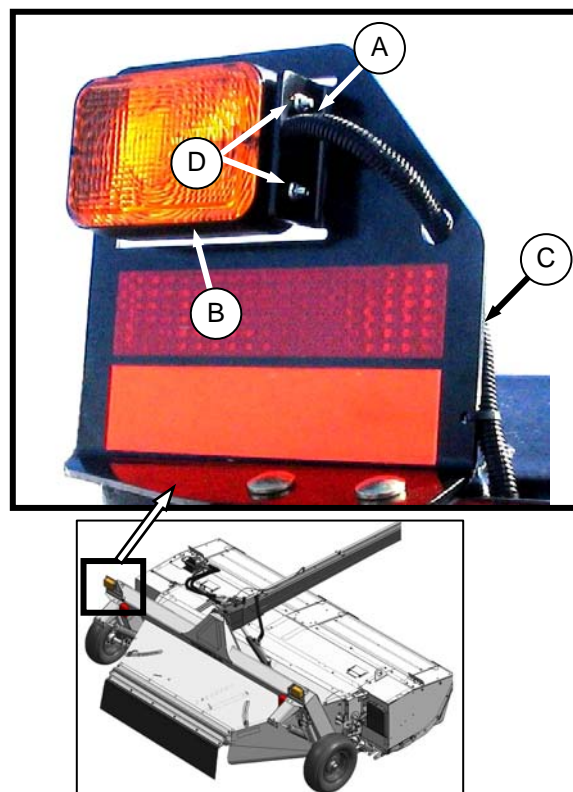
7.8.1 Amber Hazard/Signal Lights

7.8.1.1 Light Bulb Replacement



- Using a Phillips screwdriver, remove screws from fixture, and remove plastic lens.
- Replace bulb, and re-install plastic lens and screws. Bulb - Trade #1157.

7.8.1.2 Fixture Replacement

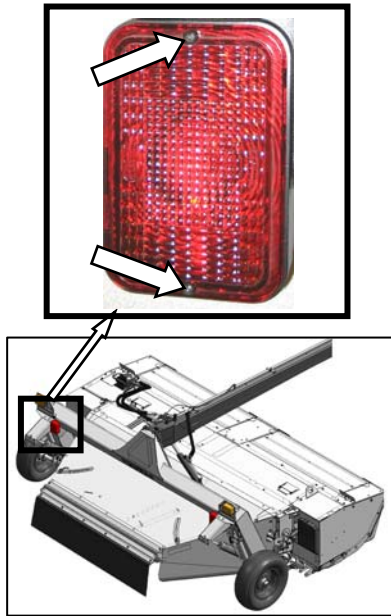


- Cut plastic cable ties (A) securing harness covering to light (B).
- Retrieve connections (C) from inside harness covering (approximately 6 inches (150 mm) from light), and disconnect wires. If necessary, remove tape.
- Remove the two nuts (D) securing light to bracket, and remove light. Pull wires through hole in bracket.
- Feed connectors of new light (B) through hole in bracket, and position light onto bracket.
- Install nuts (D), and tighten.
- Connect wires to connectors (C) in harness, and re-secure harness covering with tape and plastic tie (A) as required.

MAINTENANCE AND SERVICING

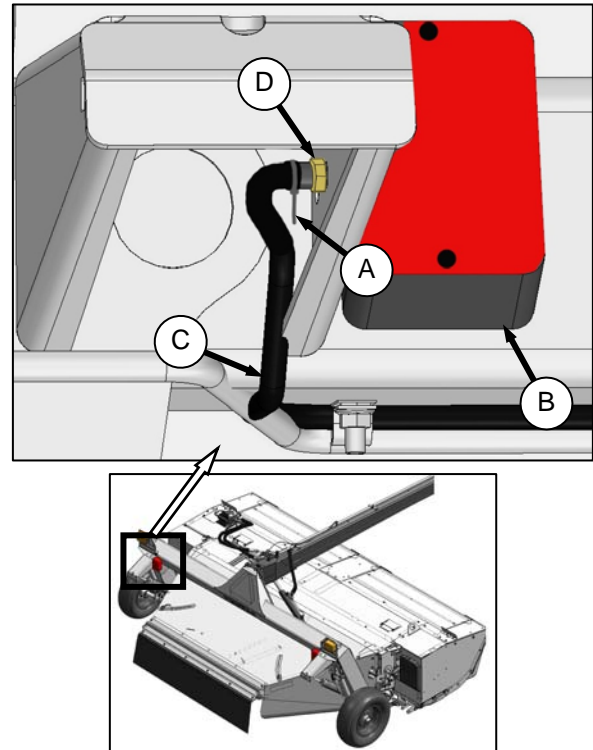
7.8.2 Red Tail/Brake Lights

7.8.2.1 Light Bulb Replacement



- Using a Phillips screwdriver, remove screws from fixture, and remove plastic lens.
- Replace bulb, and re-install plastic lens and screws. Bulb - Trade #1157.

7.8.2.2 Fixture Replacement



- Cut plastic cable tie (A) securing harness covering to light (B).
- Retrieve connections (C) from inside harness covering approximately 6 inches (150 mm) from light, and disconnect wires. If necessary, remove tape.
- Remove nut (D) securing light to frame, and remove light. Pull wires through hole in frame.
- Feed connectors of new light (B) through hole in bracket, and position light onto frame.
- Install nut (D), and tighten.
- Connect wires to connectors (C) in harness, and re-secure harness covering with tape and plastic tie (A) as required.

MAINTENANCE AND SERVICING

7.9 WHEELS AND TIRES



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

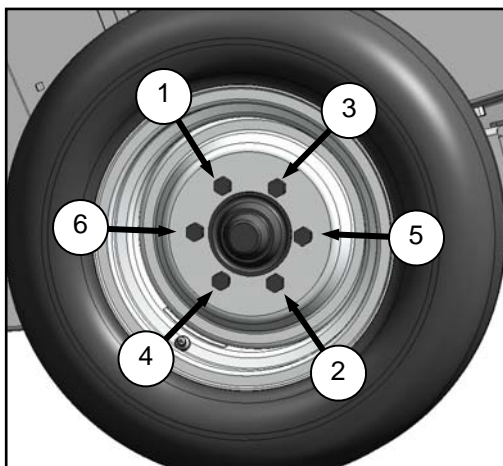
7.9.1 Wheel Bolts

IMPORTANT

Check and tighten wheel bolts after the first hour of operation, and every 100 hours thereafter.

IMPORTANT

Maintain 120 ft-lbf (160 N·m) torque using tightening sequence as shown below.



IMPORTANT

Whenever a wheel is removed and re-installed, check torque after one hour of operation.

7.9.2 Wheel - Removal/Installation



DANGER

Stop engine, and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

7.9.2.1 Removal

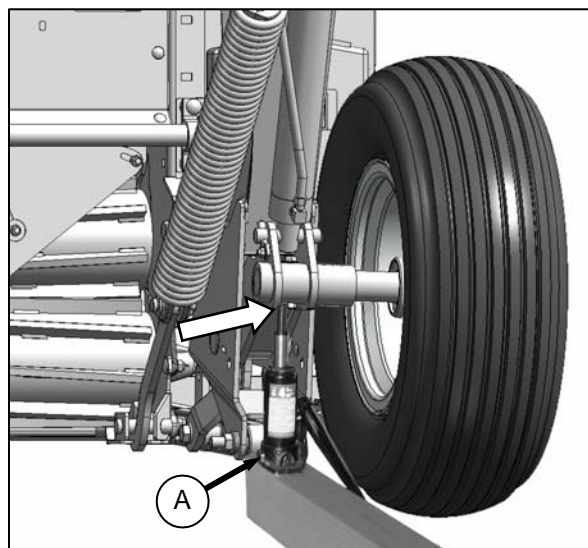
- Loosen wheel bolts slightly.
- Jack up the mower conditioner using one of the following three recommended procedures:

NOTE

Minimum jack capacity: 5,000 lb. (2,270 kg).

Bottle Jack (Field Application):

- Lower header to the ground.



- Position a bottle jack (A) and a block under frame leg (as shown).

IMPORTANT

Ensure jack locates on flat area under frame.

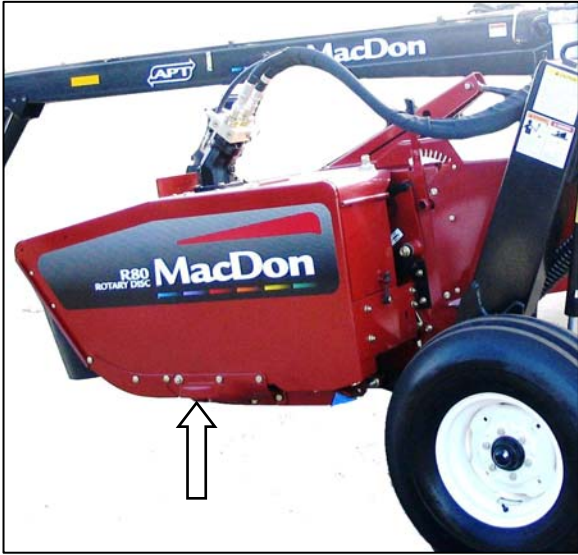
- Operate jack to raise wheel off ground.

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MAINTENANCE AND SERVICING

Bottle Jack (Field or Road Application)

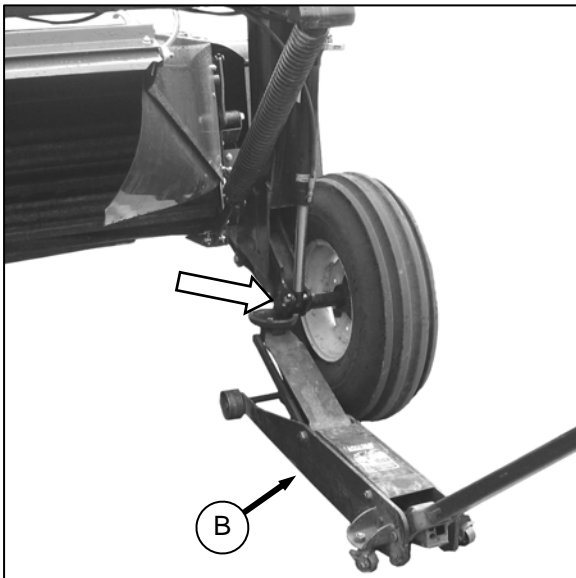
1. Raise header to full height (if header is in working position).



2. Locate a bottle jack (or equivalent) under end of mower conditioner where shown. If ground is soft, use a block under jack.
3. Operate jack to raise wheel off ground.

Floor Jack (Shop Application):

1. Raise header to full height.



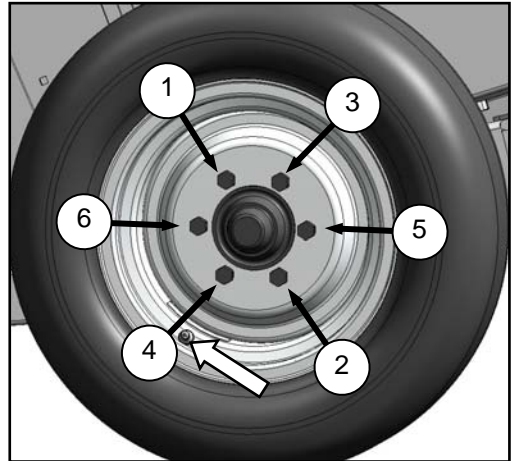
2. Position floor jack (B) under frame leg as shown.
 3. Operate jack to raise wheel off ground.
- c. Place blocks or a stand under frame leg.
 - d. Remove wheel bolts, and remove wheel.

7.9.2.2 Installation



CAUTION

When installing wheel be sure to use the holes that are countersunk to match bolt head profile. The un-countersunk holes do NOT seat the bolts correctly.



IMPORTANT

Be sure valve stem points away from wheel support.

- a. Position wheel on spindle, and install bolts. Partially tighten.
- b. Remove blocks or stand, and lower jack until tire contacts the ground.
- c. Torque bolts to 120 ft-lbf (160 N·m) in accordance with tightening sequence shown above.
- d. Lower jack completely, and remove from work area.

MAINTENANCE AND SERVICING

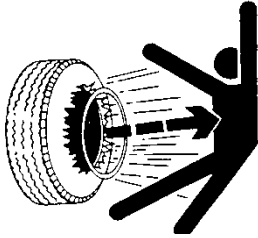
7.9.3 Tire Inflation

Check tire pressure daily. Maintain pressure at 30 psi (207 kPa).



WARNING

- Service tires safely.



- A tire can explode during inflation and cause serious injury or death.
- Do NOT stand over tire. Use a clip-on chuck and extension hose.
- Never increase air pressure beyond 35 psi (241 kPa) to seat the bead on the rim.
- Do NOT exceed maximum inflation pressure as per label on tire.

- Replace the tire if it has a defect.
- Replace a wheel rim, which has cracks, wear or severe rust.
- Never weld a wheel rim.
- Never use force on an inflated or partially inflated tire.
- Make sure the tire is correctly seated before inflating to operating pressure.
- If the tire is not in correct position on the rim, or is too full of air, the tire bead can loosen on one side, causing air to leak at high speed and with great force. An air leak of this nature can thrust the tire in any direction, endangering anyone in the area.
- Make sure all the air is removed from a tire before removing the tire from a rim.
- Do NOT remove, install or make repairs to a tire on a rim unless you have the proper equipment and experience to perform the job.
- Take the tire and rim to a qualified tire repair shop.

TROUBLESHOOTING

8 TROUBLESHOOTING

8.1 MOWER PERFORMANCE

SYMPTOM	PROBLEM	SOLUTION	SECTION
Cutterbar Plugging.	Dull, bent, or badly worn blades.	Replace blades.	7.5.4.2
	Build-up of dirt between rock guards.	Decrease header angle and increase float. In some conditions it may be necessary to carry header slightly with header lift cylinders.	6.12.6 & 6.12.1
	Conditioner drive belt slipping.	Adjust conditioner drive belt tension.	7.6.5
Ragged Or Uneven Cutting Of Crop.	Header angle too flat for guards to pick up down crop.	Increase header angle.	6.12.6
	Downed crop.	Adjust header angle to cut closer to ground.	
	Header float too light, causing bouncing.	Adjust to heavier float setting.	6.12.1
	Excessive ground speed.	Reduce ground speed.	Tractor Operator's Manual
Strips Of Uncut Crop Left On Field.	Bent cutter blades.	Replace blades.	7.5.4.2
	Build-up of dirt between rock guards.	Decrease header angle, and increase float.	6.12.6 & 6.12.1
	Foreign object on cutterbar.	Disengage mower conditioner. Stop engine. When all moving parts are completely stopped, remove foreign object.	6.15
	Disc not turning.	Replace spindle key.	7.5.7
	Ground speed too slow.	Increase ground speed.	Tractor Operator's Manual
Conditioner Rolls Plugging.	Ground speed too fast.	Reduce ground speed.	
	Roll gap too large for proper feeding.	Decrease roll gap.	6.12.2
	Roll gap too small in thick stemmed cane-type crops.	Increase roll gap.	
	Swath baffle set too low.	Raise swath baffle.	6.12.5.4
	Roll speed too low.	Maintain rated PTO speed.	6.7
	Foreign object between rolls.	Disengage header and stop engine. When all moving parts are completely stopped, remove foreign object.	6.15

(continued next page)

TROUBLESHOOTING

SYMPTOM	PROBLEM	SOLUTION	SECTION
Conditioner Rolls Plugging (cont'd).	Cutting height too low.	Decrease header angle to raise cutting height.	6.12.6
	Backing into windrow.	Raise header before backing up.	6.8
	Rolls improperly timed.	Adjust roll timing.	6.12.4
Uneven Formation And Bunching Of Windrow.	Rear deflector bypassing or dragging crop.	Adjust rear deflector for proper crop control.	6.12.5.3
	Forming shields improperly adjusted.	Adjust forming shields.	6.12.5
	Roll gap too large.	Adjust roll gap.	6.12.2
	Conditioner rolls running too slow.	Maintain rated PTO speed.	Tractor Operator's Manual
Uneven Windrow Formation In Light Crop.	Uneven feeding.	Reduce PTO speed.	
Plugging Behind End Hourglass Deflectors.	Ground speed too slow.	Increase ground speed.	
	Not cutting full header width.	Cut full header width.	---
Not Cutting Short Enough In Down Crop.	Ground speed too fast.	Reduce ground speed.	Tractor Operator's Manual
	Broken, bent or dull blades.	Replace blades or turn blades over.	7.5.4.2
	Cutting height too high.	Adjust header angle to lower cutting height, if field conditions allow.	6.12.6
Material Being Pulled Out By Roots When Cutting Tall Crop Leaning Into Machine.	Crop in conditioner rolls before crop is cut.	Increase roll gap.	6.12.2
Damaged Leaves And Broken Stems.	Insufficient roll gap.		
	Roll timing off.	Check roll timing, and adjust if necessary.	6.12.4
Slow Crop Drying.	Crop is bunched in windrow.	Adjust forming shields/baffle.	6.12.5
	Rolls not crimping crop sufficiently.	Decrease roll gap.	6.12.2
Excessive Drying Or Bleaching Of Crop.	Excessive crimping.	Increase roll gap.	
	Crop is spread too wide in windrow.	Adjust forming shields.	6.12.5
Poorly Formed Or Bunchy Windrows.	Forming shields not properly adjusted.		
Cutting Height Varies From One Side To The Other.	Float not properly balanced.	Adjust header float.	6.12.1

TROUBLESHOOTING

8.2 MECHANICAL

SYMPTOM	PROBLEM	SOLUTION	SECTION
Excessive Noises.	Bent cutter blade.	Replace blade.	7.5.4.2
	Conditioner roll timing off.	Check roll timing, and adjust if necessary.	6.12.4
	Bent rotary deflector.	Replace deflector.	7.5.6
	Conditioner roll gap too small.	Check gap, and adjust if necessary.	6.12.2
Excessive Vibration Or Noise In Header.	Conditioner rolls contacting each other.	Increase roll gap.	
		Check roll timing.	6.12.4
	Mud deposits on conditioner rolls.	Clean rolls.	---
Excessive Heat In Cutterbar.	Too much lubricant in cutterbar.	Drain lubricant, and refill with specified amount.	7.5.1
Frequent Blade Damage.	Mud on cutterbar.	Remove mud from cutterbar. Do NOT allow mud to dry on cutterbar.	6.15
	Spindle bearing failure.	Replace spindle bearing.	See MacDon Dealer.
	Material wrapped around spindle.	Remove disc, and remove material.	7.5.3.1
	Cutting too low in rocky field conditions.	Decrease header angle. Increase float.	6.12.6 & 6.12.1
	Header float set too heavy.	Increase float.	6.12.1
	Ground speed too high in rocky field conditions. Note: high ground speed tends to dig rocks from ground instead of floating over them.	Reduce ground speed.	Tractor Operator's Manual
	Blade incorrectly mounted.	Check all blade mounting hardware to ensure blades are free to move.	7.5.4.3
Excessive Wear Of Cutting Components.	Header angle too steep.	Reduce header angle.	6.12.6
	Crop residue and dirt deposits on cutterbar.	Clean cutterbar.	6.15
	Mud on cutterbar.	Remove mud from cutterbar. Do NOT allow mud to dry on cutterbar.	

(continued next page)

TROUBLESHOOTING

SYMPTOM	PROBLEM	SOLUTION	SECTION
Machine Pulling To One Side.	Header dragging on one end, and pulling to that side.	Adjust header float on both ends.	6.12.1
	Low tire pressure on one side.	Check and correct tire pressure (30 psi [207 kPa]).	7.9.3
Breakage Of Conditioner Drive Belt.	Improper belt tension.	Adjust conditioner drive belt tension.	7.6.5
	Belt not in proper groove in pulley.	Move belt to proper groove.	7.6.5.1
	Belt pulleys and idlers misaligned.	Align pulleys and idler.	See MacDon Dealer.
	Foreign object between rolls.	Disengage header, and stop engine. When all moving parts are completely stopped, remove foreign object.	6.15
Discs Do Not Turn When Engaging Header.	Mud on cutterbar.	Remove mud from cutterbar. Do NOT allow mud to dry on cutterbar.	
	Hoses not connected.	Connect hoses.	6.4.3
Header Slows When Going Uphill.	Hydraulic oil level in reservoir is low.	Install header drive performance improvement kit.	9.7
		Add oil to reservoir.	7.7.1
Header Runs While Unloaded But Slows Or Stops When Starting To Cut.	Hydraulic oil level in reservoir is low.	Add oil to reservoir.	
	Defective hydraulic motor.	Repair/replace hydraulic motor.	See MacDon Dealer.
	Defective pump on mower conditioner.	Repair/replace pump.	
	Defective relief valve.	Repair/replace relief valve.	
	PTO slipping on tractor.	Repair tractor PTO system.	---
	Cold oil in hydraulic drive system.	Reduce ground speed until oil reaches operating temperature.	---
Lights Malfunctioning.	Improper ground connection.	Check for proper grounding between light base and header.	7.8
	Defective bulb.	Replace bulb.	
	Poor connection.	Check connector at tractor.	6.4.4

OPTIONS AND ATTACHMENTS

9 OPTIONS AND ATTACHMENTS

9.4 HYDRAULIC CENTER-LINK KIT



This kit allows the header angle to be adjusted hydraulically with a cylinder replacing the standard mechanical link, and uses a separate hydraulic circuit from the tractor. Installation instructions are included with the kit.

9.5 PRESSURE GAUGE KIT



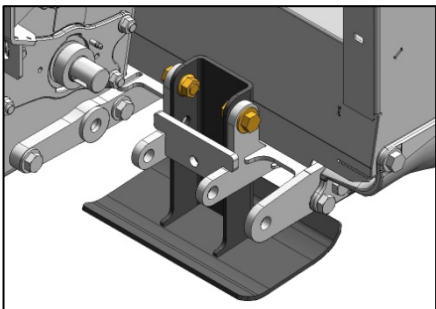
This kit allows the Operator to monitor the header operating load on the machine with the installation of a pressure gauge on the APT hitch. Installation instructions are included with the kit.

9.6 TRUCK TRANSPORT HITCH



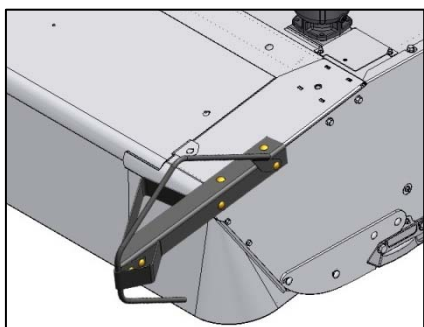
This kit allows the mower conditioner to be attached to a truck for towing on the road. The kit includes the transport hitch, attachment hardware, and safety chain.

9.1 SKID SHOE KIT



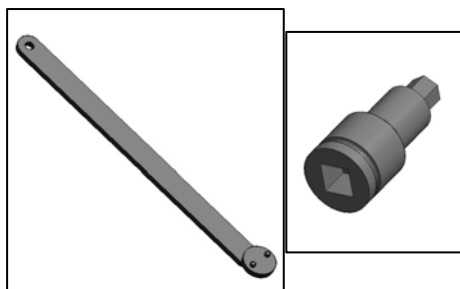
The skid shoe kit installs at either end of the cutterbar. The shoes can be adjusted to vary cutting height. The kit includes two skid shoe assemblies and attachment hardware.

9.2 TALL CROP DIVIDER KIT



The 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, and attachment hardware.

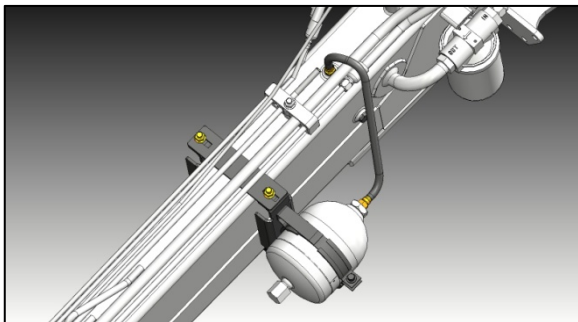
9.3 CUTTERBAR REPAIR TOOL KIT



The cutterbar repair tool kit contains the necessary tools for replacement of the cutterbar idler gears. Refer to the Technical Service Manual for instructions.

OPTIONS AND ATTACHMENTS

9.7 **HEADER DRIVE PERFORMANCE IMPROVEMENT KIT**



This kit improves the performance of the header drive hydraulic system when operating the mower conditioner on hilly land. It consists of an accumulator tank that is mounted on the side of the APT hitch, and pressurizes the hydraulic oil reservoir. The kit includes all the necessary hardware and installation instructions.

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