

# **A40D and A40DX Auger Headers**

Unloading and Assembly Instructions

262848 Revision A

Original Instruction

## A40D Auger Header



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## Introduction

This instructional manual describes the unloading, setup, and predelivery requirements for the MacDon A40D and A40DX Auger Headers, including a Grass Seed version for both models.

Refer to the Table of Contents and follow the provided procedures in the order given.

**Carefully read all of the instructions provided before attempting to unload, assemble, or operate the header.**

### **Conventions**

The following conventions are used in this document:

- Right and left are determined from the operator's position. The front of the auger header faces the crop.
- Unless otherwise noted, use the standard torque values provided in this manual.

If the shipment is damaged or is missing parts, contact the following according to your region:

- North America: [shortageanddamage@macdon.com](mailto:shortageanddamage@macdon.com)
- Australia: [service@macdon.com.au](mailto:service@macdon.com.au)
- Brazil: [garantia-brasil@macdon.com](mailto:garantia-brasil@macdon.com)
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Retain this instruction for future reference.

### **NOTE:**

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

This document is currently available in English only.

## Summary of Changes

At MacDon, we're continuously making improvements, and occasionally these improvements affect product documentation. The following list provides an account of major changes from the previous version of this document.

Section	Summary of Change	Internal Use Only
<i>Introduction, page i</i>	Updated European shortage and damages email contact.	Technical Publications
<i>3.2 Installing Skid Shoes, page 12</i>	Added note for secondary skid shoe set.	Product Support
<i>3.18 Attaching A40DX Auger Header to M1 Series Windrowers, page 79</i>	Added topic.	Technical Publications
<i>3.19 Attaching A40DX Auger Header to M2 Series Windrowers, page 85</i>	Added Step.	Technical Publications
<i>5.5.4 Setting Float Options with Fixed Deck – M1 Series Windrowers, page 107</i>	Added topic.	Technical Publications

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# Chapter 1: Safety

Understanding and consistently following these safety procedures will help to ensure the safety of those operating the machine and of bystanders.

## 1.1 Safety Alert Symbols

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

This symbol means:

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

Carefully read and follow the safety message accompanying this symbol.

### Why is safety important to you?

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



Figure 1.1: Safety Symbol

## 1.2 Signal Words

Three signal words, **DANGER**, **WARNING**, and **CAUTION**, are used to alert you to hazardous situations. Two signal words, **IMPORTANT** and **NOTE**, identify non-safety related information.

Signal words are selected using the following guidelines:

### **DANGER**

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

### **WARNING**

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

### **CAUTION**

Indicates a potentially hazardous situation that, if it is not prevented, may result in minor or moderate injury. It may also be used to alert you to unsafe practices.

#### **IMPORTANT:**

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

#### **NOTE:**

Provides additional information or advice.

## 1.3 General Safety

Operating, servicing, and assembling machinery presents several safety risks. These risks can be reduced or eliminated by following the relevant safety procedures and wearing the appropriate personal protective equipment.

### CAUTION

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

Wear all protective clothing and personal safety devices that could be necessary for the job at hand. Do **NOT** take chances. You may need the following:

- Hard hat
- Protective footwear with slip-resistant soles
- Protective glasses or goggles
- Heavy gloves
- Wet weather gear
- Respirator or filter mask

In addition, take the following precautions:

- Be aware that exposure to loud noises can cause hearing impairment. Wear suitable hearing protection devices such as earmuffs or earplugs to help protect against loud noises.



Figure 1.2: Safety Equipment



Figure 1.3: Safety Equipment

- Provide a first aid kit in case of emergencies.
- Keep a properly maintained fire extinguisher on the machine. Familiarize yourself with its use.
- Keep young children away from machinery at all times.
- Be aware that accidents often happen when Operators are fatigued or in a hurry. Take time to consider the safest way to accomplish a task. **NEVER** ignore the signs of fatigue.

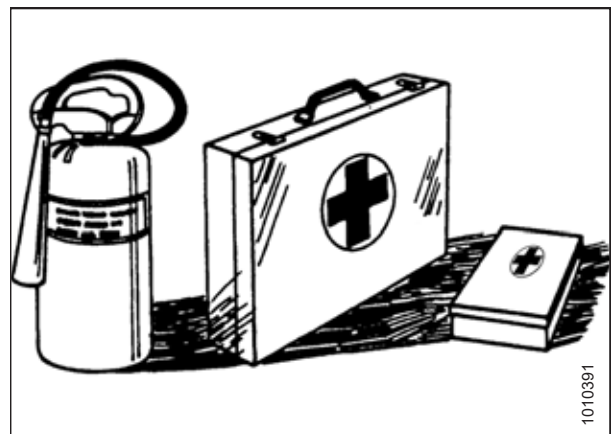


Figure 1.4: Safety Equipment

## SAFETY

- Wear close-fitting clothing and cover long hair. **NEVER** wear dangling items such as hoodies, scarves, or bracelets.
- Keep all shields in place. **NEVER** alter or remove safety equipment. Ensure that the driveline guards can rotate independently of their shaft, and that they can telescope freely.
- Use only service and repair parts made or approved by the equipment manufacturer. Parts from other manufacturers may not meet the correct strength, design, or safety requirements.



Figure 1.5: Safety around Equipment

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

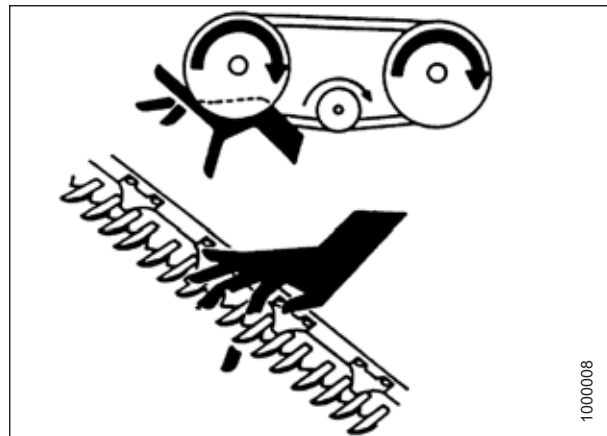


Figure 1.6: Safety around Equipment

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



Figure 1.7: Safety around Equipment

## 1.4 Operational Safety

Follow all the safety and operational instructions given in this manual.



### CAUTION

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



### CAUTION

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

- Engage the windrower brake.
- Disengage the power take off (PTO).
- Shut down the engine, and remove the key from the ignition.
- Wait for all movement to stop.
- Dismount and engage the cylinder stops before inspecting the raised machine.

## 1.5 Hydraulic Safety

Because hydraulic fluid is under extreme pressure, hydraulic fluid leaks can be very dangerous. Follow the proper safety procedures when inspecting hydraulic fluid leaks and servicing hydraulic equipment.

- Always place all hydraulic controls in **NEUTRAL** before leaving the operator's seat.
- Ensure that all of the components in the hydraulic system are kept clean and in good condition.
- Replace any worn, cut, abraded, flattened, or crimped hoses and steel lines.
- Do **NOT** attempt any makeshift repairs to hydraulic lines, fittings, or hoses by using tapes, clamps, cements, or welding. The hydraulic system operates under extremely high pressure. Makeshift repairs can fail suddenly and create hazardous conditions.



Figure 1.8: Testing for Hydraulic Leaks

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



Figure 1.9: Hydraulic Pressure Hazard

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

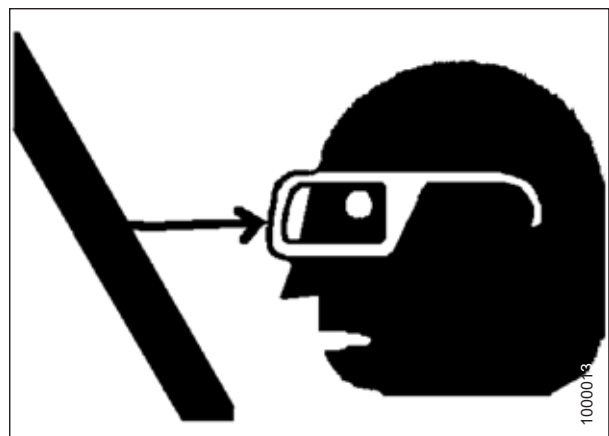


Figure 1.10: Safety around Equipment

## 1.6 Safety Signs

Safety signs are decals placed on the machine where there is a risk of personal injury, or where the Operator should take extra precautions before operating the controls. They are usually yellow.

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or illegible.
- If the original part on which a safety sign was installed is replaced, ensure that the repair part displays the current safety sign.

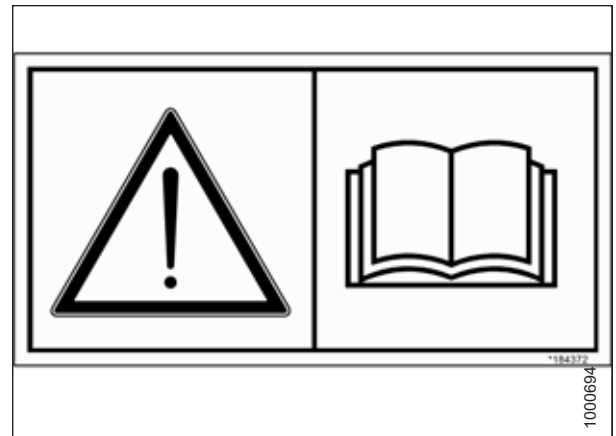


Figure 1.11: Operator's Manual Decal





# Chapter 2: Unloading Machine

Follow each procedure in this chapter in order.

## 2.1 Unloading Header

Ensure that the unloading equipment meets the necessary weight capacity to safely move the header.

 **DANGER**

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

 **DANGER**

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

Table 2.1 Lifting Vehicle

Minimum capacity <sup>1</sup>	8000 lb. (630 kg)
Minimum fork length	1981 mm (78 in.)

**IMPORTANT:**

Forklifts are normally rated for a load located 610 mm (24 in.) ahead of back end of the forks. To obtain the forklift capacity at 1220 mm (48 in.), check with your forklift distributor.

 **DANGER**

Ensure that the forks on the forklift are secure and that no bystanders are present.

### 2.1.1 Unloading Header from a Truck Flatbed

Remove the header from the transport before assembly.

**IMPORTANT:**

Do NOT unload using lean bar for lifting. The chain hook slots in lean bar are only for laying the machine over into working position after it is on the ground.

**NOTE:**

Take care not to bend parts on the backtube.

---

1. At 1220 mm (48 in.) from back end of forks.

## UNLOADING MACHINE

To unload the header, follow these steps:

1. Remove the hauler's tie-down straps and chains.
2. With a forklift, approach the header from either its underside or topside and slide forks (A) in underneath the lifting framework as far as possible.

**IMPORTANT:**

When possible, approach from the underside to minimize potential for scratching the unit.

3. Raise the header off the deck.

**IMPORTANT:**

If there are two headers on the flatbed, take care not to contact the other machine while unloading.

4. Back up until the unit clears the truck flatbed and slowly lower to 150 mm (6 in.) from the ground.
5. Using the forklift, take the header to a designated storage or setup area and securely set it down on the ground.
6. Repeat for the other header if required.
7. Check for shipping damage and missing parts.

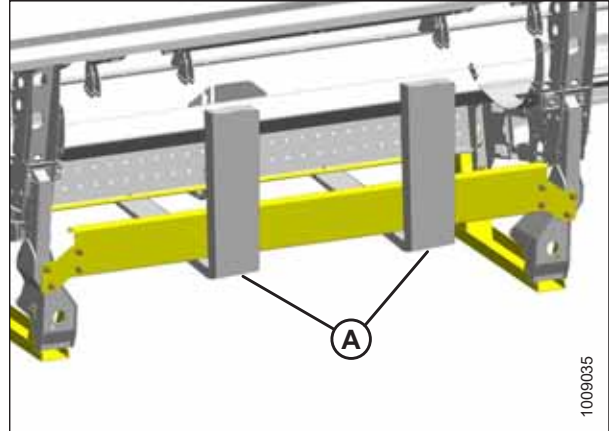


Figure 2.1: Forks in Position



Figure 2.2: Topside of Header in Shipping Configuration

## Chapter 3: Assembling Machine

Once all unloading procedures have been completed, it is time to set up the machine. Follow each procedure in this chapter in order.

### 3.1 Removing Underside Shipping Stand

Many tasks need to be completed to prepare the header for use in the field.

#### CAUTION

Keep feet clear when removing final bolts.

1. Remove four bolts (A) and remove shipping stand (B). Discard the stand and hardware.

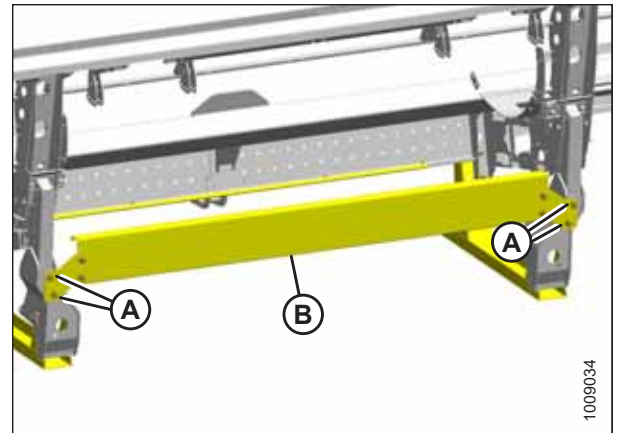


Figure 3.1: Underside Shipping Stand

## 3.2 Installing Skid Shoes

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

If the Skid Shoes kit is **NOT** supplied, proceed to . Otherwise, proceed as follows:

**NOTE:**

This kit may be installed later in the header assembly sequence, but it may be easier prior to laying the header down.

**NOTE:**

Inboard skid shoes are standard, and optional skid shoe set B4594 can be ordered and installed.

1. Unpack the skid shoe bundle.
2. Remove two clevis pins (A) from each skid shoe.
3. Remove and retain nuts, bolts, and clips (B) from skid shoe.

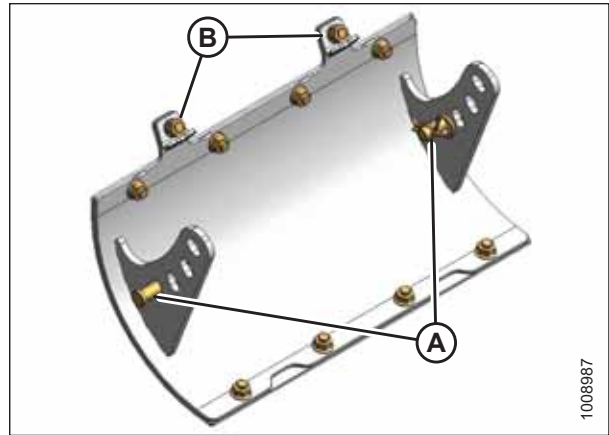


Figure 3.2: Skid Shoe Bundle

4. Position the skid shoe below cutterbar and insert the tabs on skid shoe into slots (A) in the frame. Secure with clevis pin (B).

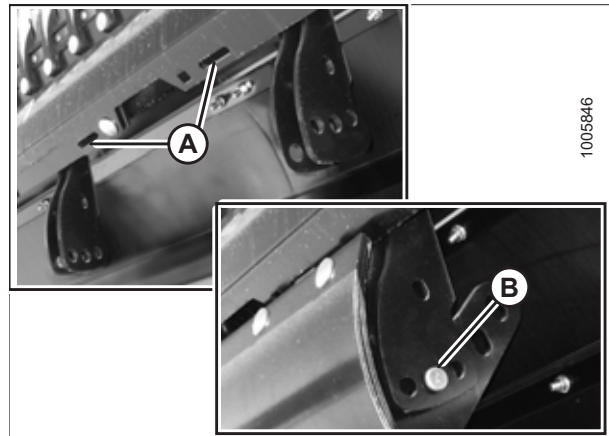


Figure 3.3: Skid Shoe Hardware

## ASSEMBLING MACHINE

5. Attach clips (A) with bolts and nuts removed earlier in this procedure to secure the skid shoe to the cutterbar.

**NOTE:**

Use a socket and ratchet wrench to access the nuts.

6. Tighten the nuts.
7. Remove clevis pin (B) and adjust the skid shoe to the desired height. Reinstall two clevis pins (B) and secure with the lynch pins.
8. Repeat the previous steps for the opposite side. Set both skid shoes to the same position.

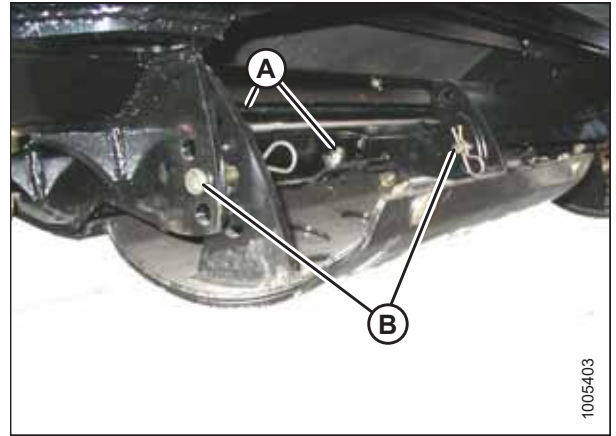


Figure 3.4: Skid Shoe Installed

### 3.3 Installing Gauge Rollers

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

If the Gauge Rollers kit is **NOT** supplied, proceed to . Otherwise, proceed as follows.

**NOTE:**

This kit may be installed later in the header assembly sequence, but it may be easier prior to laying the header down.

1. Unpack gauge roller bundle.
2. Remove two locking pins (A) from each assembly.
3. Remove nuts, bolts, and clips (B) from assembly.

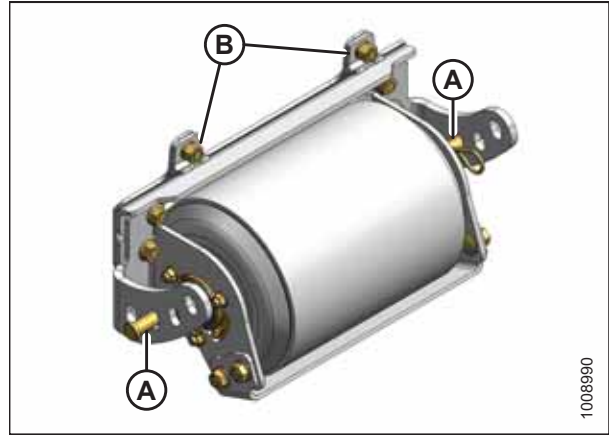


Figure 3.5: Gauge Roller in Shipping Configuration

4. Insert tabs on roller assembly into slots (A) on cutterbar at outboard mounting locations on frame.

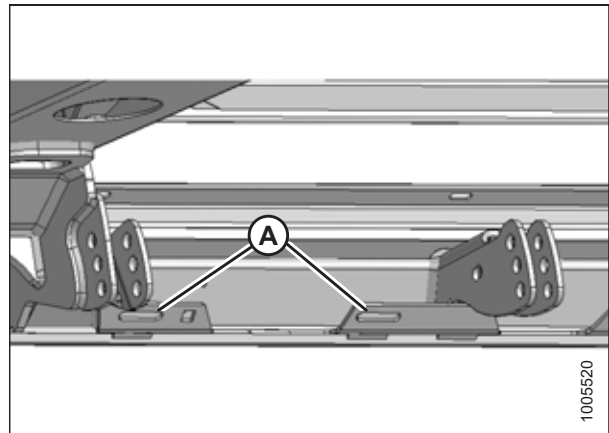


Figure 3.6: Gauge Roller Mounting Location

## ASSEMBLING MACHINE

5. Secure the gauge roller assembly to support bracket with locking pin (B) at lowest position.
6. Attach clips (A) with bolts and nuts removed earlier in this procedure to secure roller assembly to cutterbar.
7. Tighten nuts.

**NOTE:**

Use a socket and ratchet wrench to access the nuts.

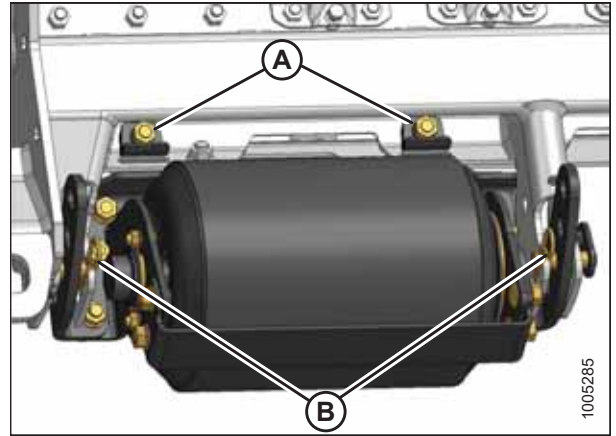


Figure 3.7: Gauge Roller

8. Remove locking pin (A) and adjust rollers to desired height. Reinstall both locking pins (A).
9. Ensure that nut (B) on each pin registers in adjacent hole in support bracket.
10. Secure pins with hairpins (C).
11. Repeat previous steps for opposite side. Set both gauge rollers to the same position.

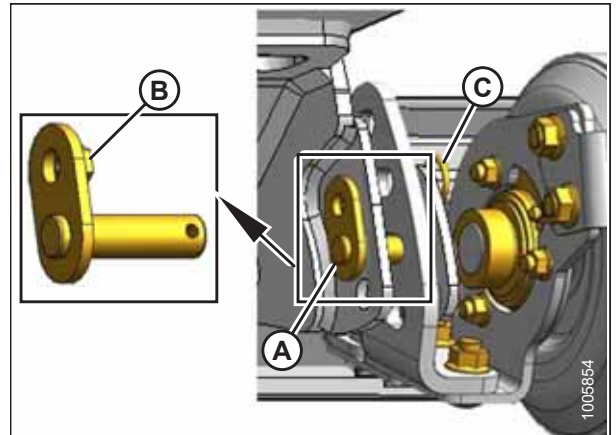


Figure 3.8: Gauge Roller and Locking Pin

### 3.4 Tilting Header into Field Position

The machine must be safely rotated from the upright position, into the field position.

 **DANGER**

Ensure that all bystanders have cleared the area.

 **DANGER**

Ensure spreader bar or chain is secured to the forks so that it cannot slide off the forks or towards the mast as the header is tilted to the ground.

To tilt the header into the field position, follow these steps:

1. Attach either a spreader bar or chain to forks.
2. Drive the lifting vehicle to approach header from its underside.

**Table 3.1 Chain Specifications**

<b>Chain Type</b>	Overhead lifting quality (1/2 in.)
<b>Minimum Working Load</b>	2270 kg (5000 lb.)



## ASSEMBLING MACHINE

3. Attach the chain hooks to the lean bar at slots (A) as shown.

### IMPORTANT:

Refer to Table 3.1, page 16 for minimum chain specifications. Also, the chain length must be sufficient to provide a **MINIMUM** 1.2 m (4 ft.) vertical chain height (B) when the chains are **FULLY TENSIONED**.

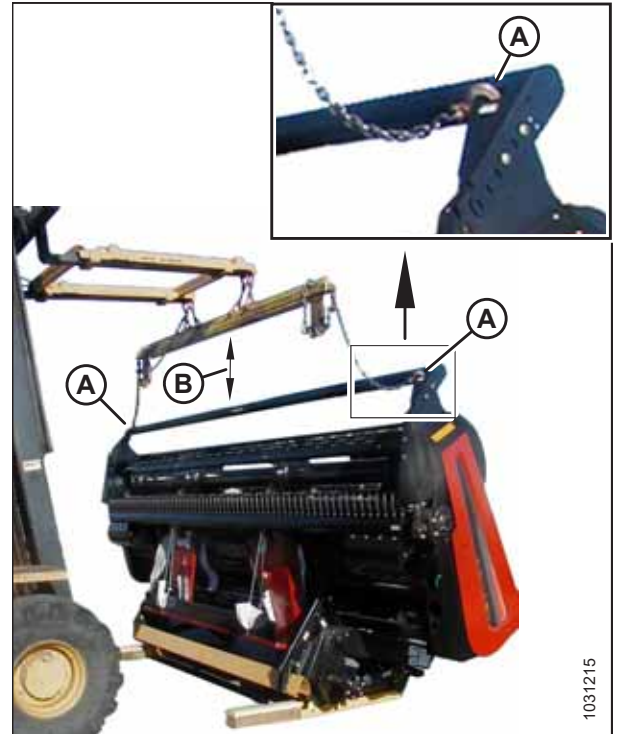


Figure 3.9: Header with Forklift

B- 1.2 m (48 in.) Minimum

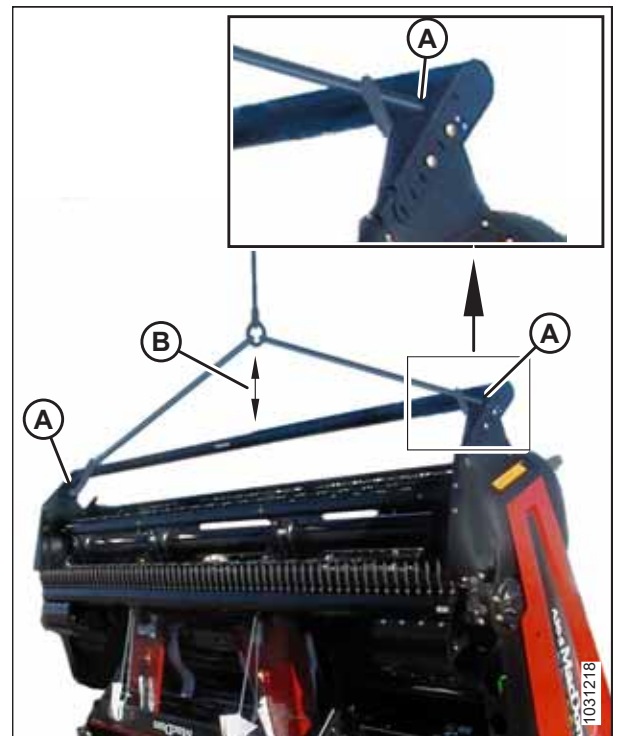


Figure 3.10: Header with Crane

A - 1.2 m (48 in.) Minimum

**CAUTION**

Stand clear when tilting the header, as the header may swing.

**IMPORTANT:**

Do **NOT** lift at lean bar when unloading from the trailer. This procedure is only for **TILTING** the machine over into the working position.

4. Raise the forks until the lift chains are fully tensioned.
5. Back up **SLOWLY**, while simultaneously tilting the machine, so that the cutterbar skid shoes rest on blocks (A).
6. Remove the chain hooks from the lean bar.

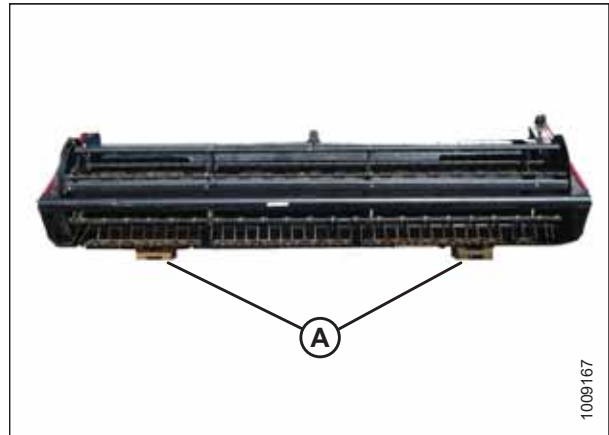


Figure 3.11: Header on Blocks

7. Attach the chain to center-link anchor (A) on frame tube and raise the rear of header approximately 305 mm (12 in.) off the ground.

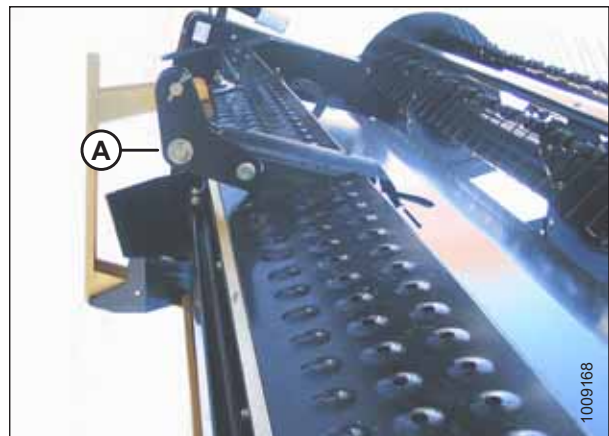


Figure 3.12: Center-Link Anchor

## ASSEMBLING MACHINE

8. Remove the lynch pin from clevis pin (A) in header stand at the right side of the header.
9. Hold stand (B) and remove clevis pin (A).

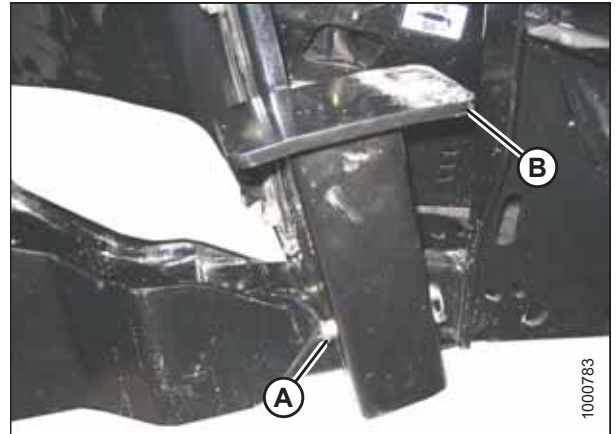


Figure 3.13: Header Stand in Shipping Position

10. Invert stand (A) and reinstall on the header leg in upper hole location with clevis pin (B). Secure clevis pin (B) with lynch pin.

**NOTE:**

In soft conditions, use a wooden block under the stand.

11. Lower the header onto stand (A).

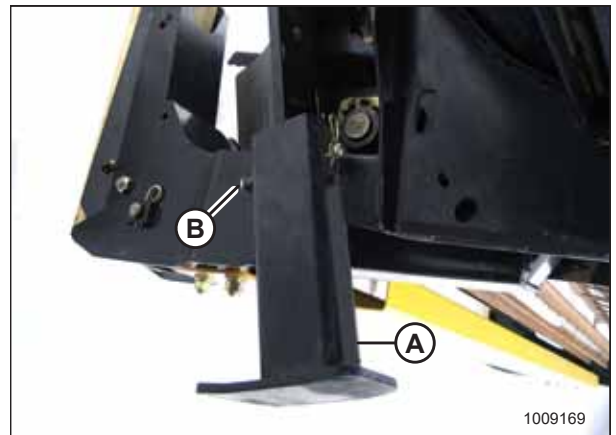


Figure 3.14: Header Stand

### 3.5 Removing Shipping Stands

The supports must be removed to continue assembly.

1. **A40D headers:** Remove and discard two bolts and nuts (A) from each shipping stand (B) at the right and left sides of the header.

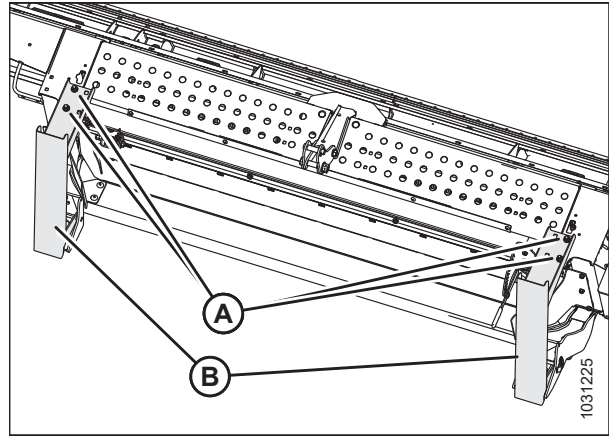


Figure 3.15: A40D Shipping Stands

2. **A40DX headers:** Remove and **RETAIN** two bolts and nuts (A) from shipping stand (B) at the left side of the header. Remove and discard the two bolts and nuts (C) from shipping stand (D) at the right side of the header.

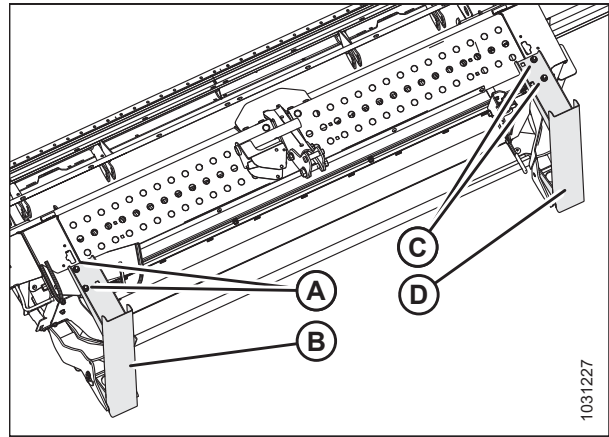


Figure 3.16: A40DX Shipping Stands

## ASSEMBLING MACHINE

3. Remove the hairpin from pin (A) and hold shipping stand (B) steady.
4. Remove and retain pin (A). Remove the shipping stand from header and reinstall pin (A), and secure with the hairpin retained from Step 3, page 21. Repeat step for the other stand.

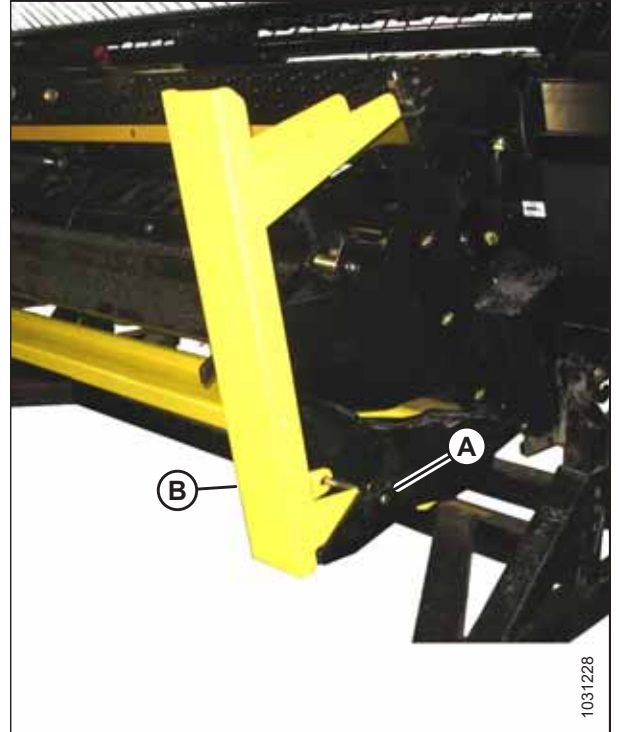


Figure 3.17: Right Side Shipping Stand — Left Side Opposite

5. **A40DX headers:** Secure hose bracket (A) with two bolts (B) and nuts retained from Step 2, page 20. Torque hardware (B) to 76–183 Nm (56–135 lbf·ft).

**IMPORTANT:**

Ensure bolt heads (B) face upward to avoid damaging the routed hose bundle.

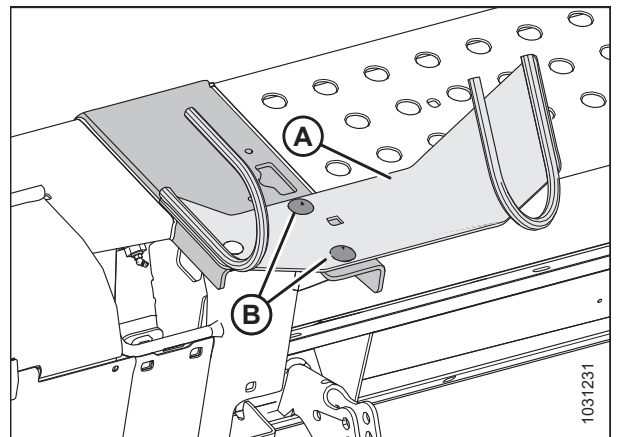


Figure 3.18: A40DX Hose Bracket

## ASSEMBLING MACHINE

6. Remove four bolts (A) and remove angle (B). Discard angle and hardware.

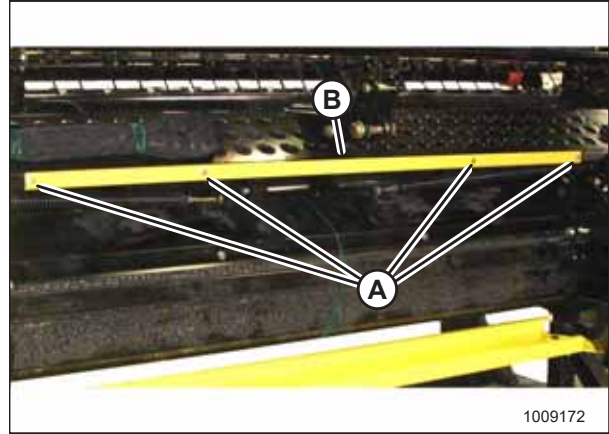


Figure 3.19: Shipping Stands

7. **Non-GSS headers:** Remove the straps that attach center deflector (A) to the conditioner.

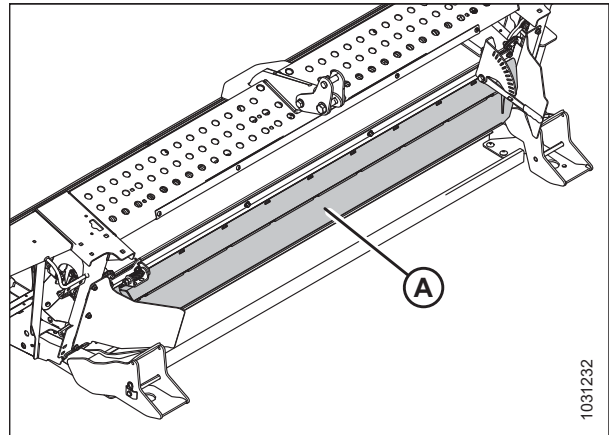


Figure 3.20: Center Deflector – Non-GSS

## ASSEMBLING MACHINE

8. **Non-GSS headers:** Pull baffle handle (A) towards the right of the header, and rotate handle until tab (B) locks into desired slot (C), based on the desired amount of crop throw.

**NOTE:**

The baffle is completely open when the tab is locked in top slot (C) as shown. A completely open baffle will cause the conditioner to throw the crop as far as possible. Adjust the baffle position according to the type of crop and/or windrower attachment. For example, if harvesting heavy crop using a windrower equipped with a double windrow attachment (DWA), you might have to open the baffle fully so the conditioner can throw the heavy crop properly onto the DWA deck.

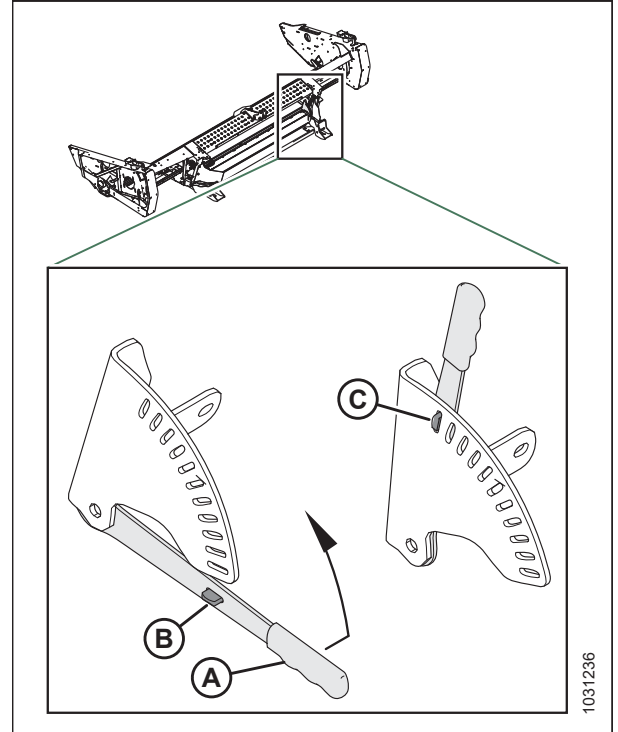


Figure 3.21: Center Deflector – Non-GSS

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### 3.6 Installing Tall Crop Divider Kit

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

If the Tall Crop Divider kit is **NOT** supplied, proceed to . Otherwise, proceed as follows:

1. Unpack the kit and disassemble hardware from the divider.

**NOTE:**

If tall crop extension angles are not required, proceed to Step 5, page 24.

2. Remove hardware (A) on both sides of the lean bar, and then remove the lean bar from the auger header.

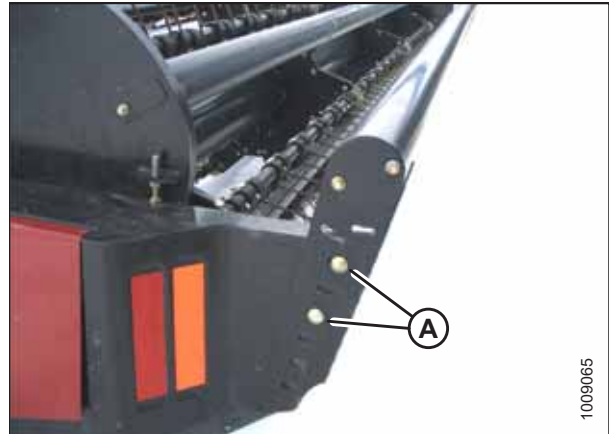


Figure 3.22: Lean Bar

3. Attach extension angles (A) to each end of lean bar (B) with four 1/2 x 1.0 in. hex bolts (C) and nuts provided.
4. Reinstall the lean bar on the header with the existing hardware. Tighten bolts.

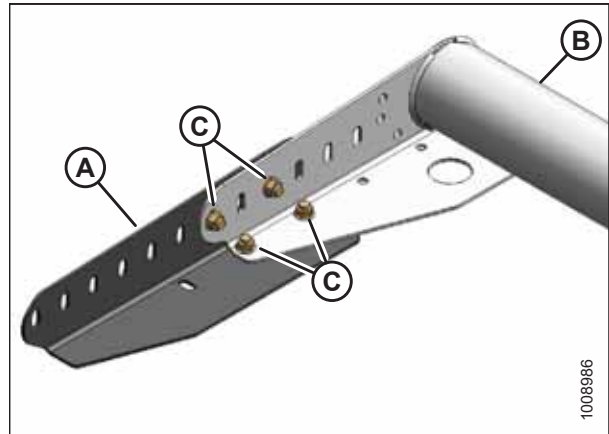


Figure 3.23: Extension Angles Attached to Ends of Lean Bar

5. Position left divider (C) at left side of the lean bar and attach with U-bolt (A), two 3/8 in. nuts, and two 1/2 x 1.0 in. hex bolts (B) and nuts provided.

**NOTE:**

The divider may be positioned as shown or using the optional mounting hole (D).

6. Adjust to desired position and tighten the hardware.
7. Repeat the previous two steps for the right side.

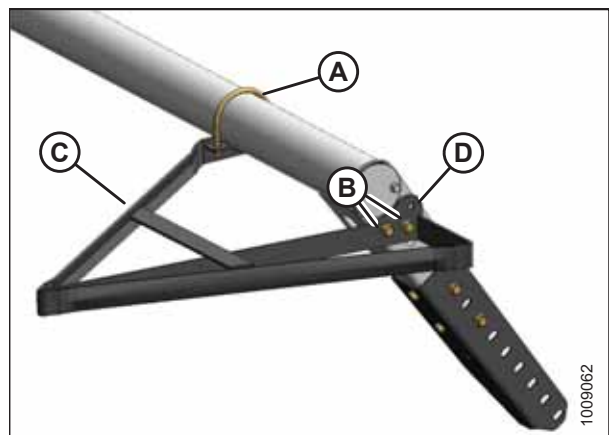


Figure 3.24: Tall Crop Divider Installed



### 3.7 Adjusting Lean Bar

The lean bar is fully retracted for shipping.

Adjust as follows:

**NOTE:**

If optional tall crop divider kit is supplied, it can be installed prior to reinstalling the lean bar. Refer to [3.6 Installing Tall Crop Divider Kit, page 24](#).

1. Remove hardware (A) on both sides and install lean bar in field position. Check that the field position is suitable for the crop (normally 2/3 of crop height).

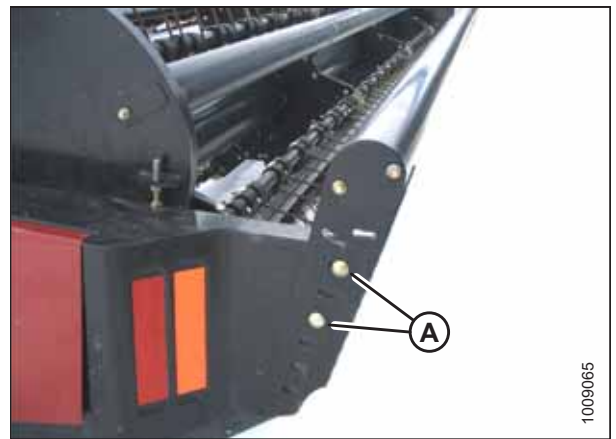


Figure 3.25: Lean Bar

### 3.8 Installing and Adjusting Pan Extensions

Follow this procedure to install the pan extensions.

1. Remove deflectors (A) from their shipping positions on the header and unwrap them.

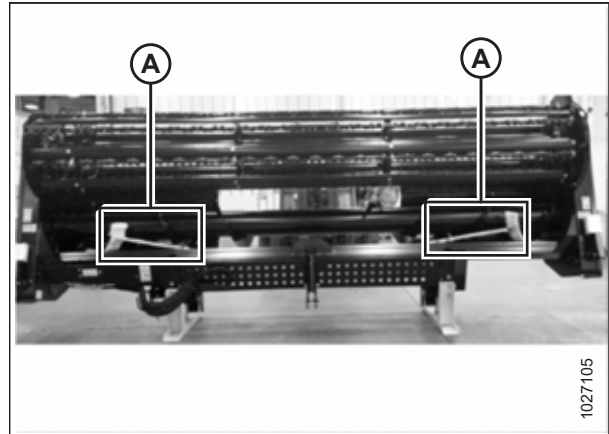


Figure 3.26: Shipping Configuration

2. Remove nut and bolt (A), nut and washers (B), and nuts (C) from the pan extension. Retain the hardware.

**NOTE:**

The illustrations in this procedure show the left pan extension. The instructions are similar for installing and adjusting the right pan extension.

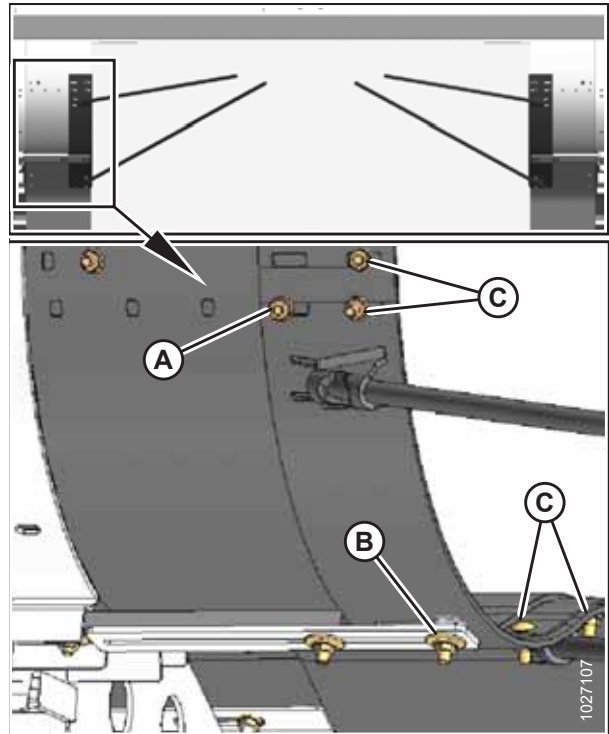


Figure 3.27: Pan Extension – Wide Setting

## ASSEMBLING MACHINE

3. Install left deflector (A) using nuts and bolts (B) and nut, bolt, and five washers (C) retained from the previous step. Torque all the nuts to 11.5 Nm (8 lbf-ft [102 lbf-in]).

**NOTE:**

Do **NOT** install nut (D) if the pan extension's width will be adjusted.

**NOTE:**

Do **NOT** torque nuts if the pan extension's width will be adjusted.

4. Repeat the steps for installing the pan extension on the opposite side of the header.

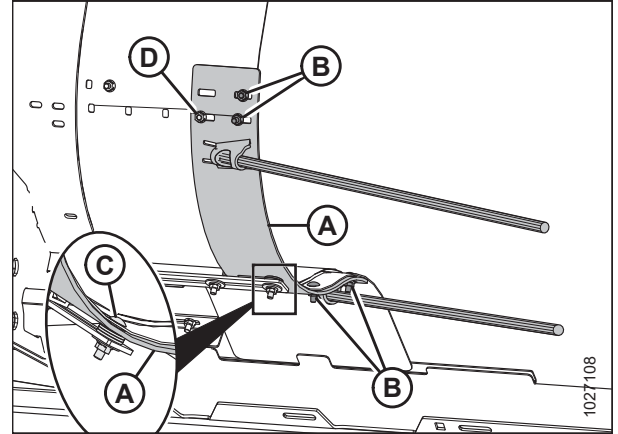


Figure 3.28: Left Side Deflector and Hardware

### *Adjusting the pan extension's width*

5. Remove nut and bolt (A).
6. Loosen nut (B), but do **NOT** remove it.
7. Slide pan extension (C) with the swath forming rods inboard to the desired position, aligning the holes on the pan extension and the header.

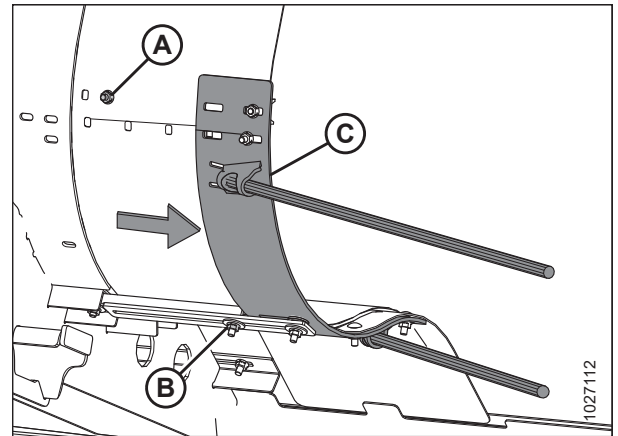


Figure 3.29: Left Side Pan Extension

8. Replace bolt and nut (A). Torque nut (A) and nut (B) to 11.5 Nm (8 lbf-ft [102 lbf-in]).
9. Install nut and bolt (C) and torque it to 11.5 Nm (8 lbf-ft [102 lbf-in]).
10. Repeat the steps for adjusting the pan extension on the right side of the header.

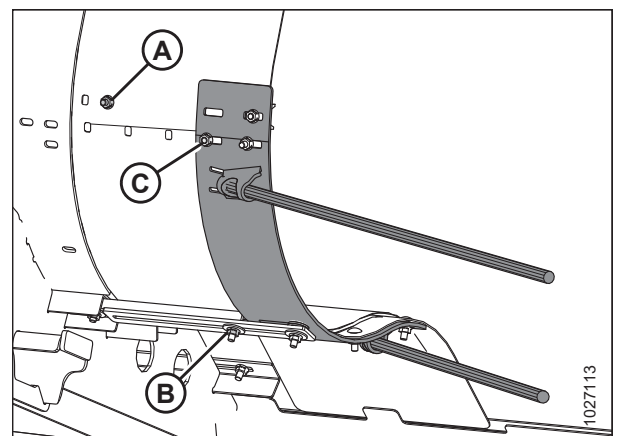


Figure 3.30: Left Side Pan Extension

### 3.9 Adjusting Transport Lights

1. Position amber light support (A) perpendicular to the header.
2. Check that pivot bolt (B) is tight enough to hold light support (A) in upright position, yet allows the light to pivot out of the way of obstructions.

**NOTE:**

Do **NOT** overtighten mounting hardware.

3. Ensure the base of the light housings and the bolted connections on the light supports provide proper electrical grounding.

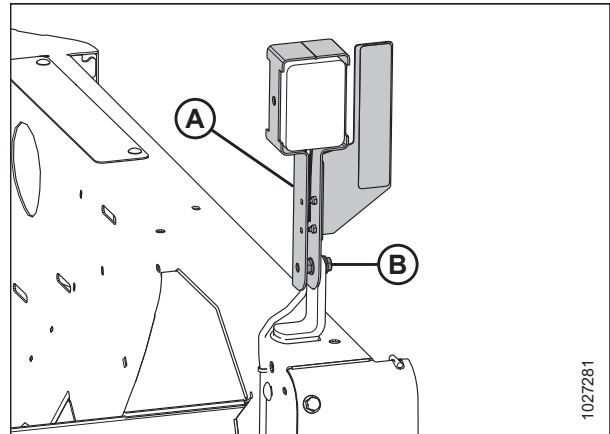


Figure 3.31: Amber Hazard Light

### 3.10 Assembling Forming Shield

1. Unpack and remove the shipping material.
2. Remove bolts (A) from side deflectors (B).

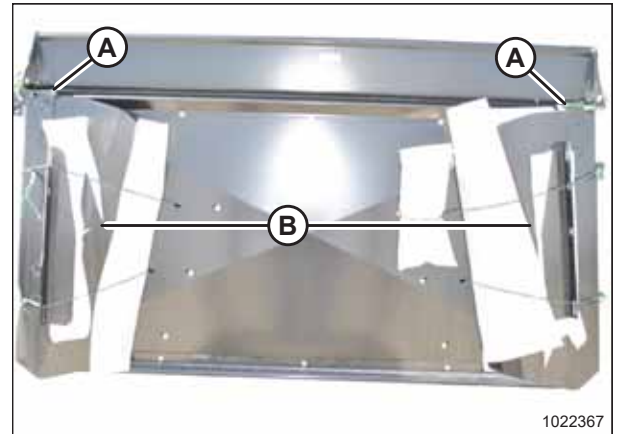


Figure 3.32: Forming Shield in Shipping Configuration

3. Install rubber strap (A) to side bracket (B) using bolt (C), washer (D), and nut (E).
4. Repeat for the other side.

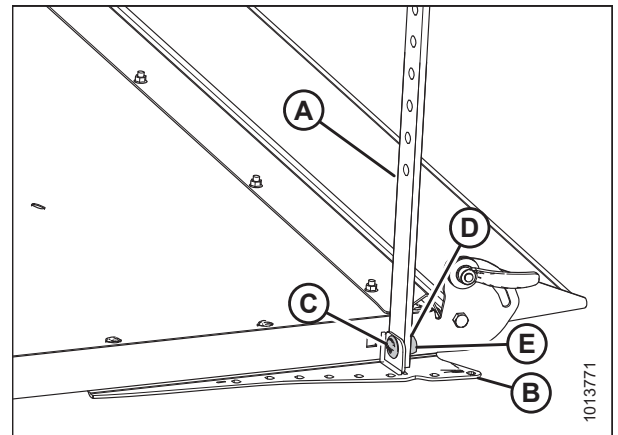


Figure 3.33: Rubber Strap

5. Lay cover (A) upside down on a flat surface.
6. Install center deflectors (B) using three bolts (C) on each side.

**NOTE:**

Arrange deflectors (B) so that narrow end (D) is toward the front of cover (A) and deep end (E) is toward the rear as shown in the illustration at right.

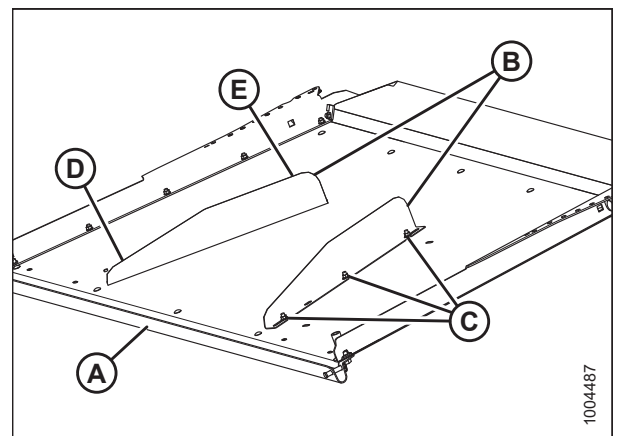


Figure 3.34: Center Deflectors

## ASSEMBLING MACHINE

7. Assemble side deflectors (C) to cover with bolt (B), jam nut (E), washer (D), and nut (A) from previous step.
8. Tighten flange nut (A) enough to hold deflectors (C) in position, but still allow deflectors to move.
9. Tighten jam nut (E) against cover while holding bolt (B).

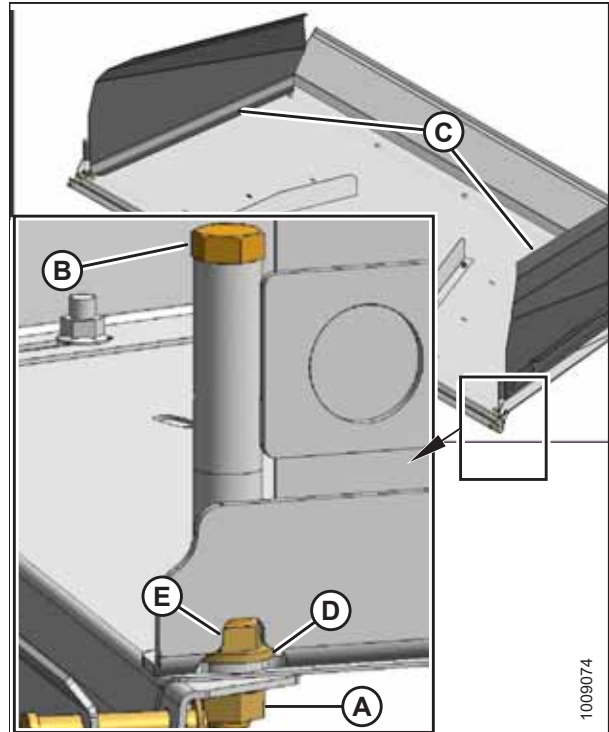


Figure 3.35: Side Deflectors

10. Remove lynch pin (A) from adjuster rod (B) and locate rod in hole in side deflector (C). Secure with lynch pin (A).
11. Repeat for the other deflector.

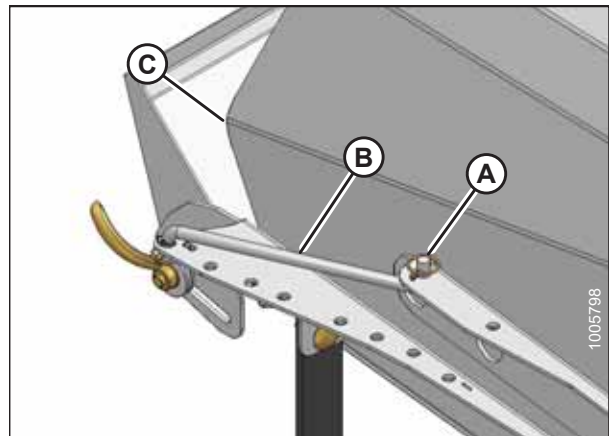


Figure 3.36: Adjuster Rod

## ASSEMBLING MACHINE

12. Invert the forming shield to installation position as shown.

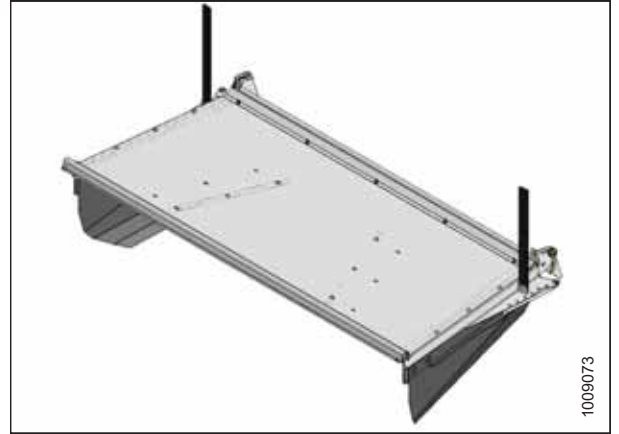


Figure 3.37: Forming Shield in Installation Position

### 3.11 Installing Forming Shield

Follow this procedure when installing the forming shield.

**NOTE:**

Forming shields are not compatible with narrow transport windrowers.

**NOTE:**

Do **NOT** install the two triangular-shaped plates from the forming shield kit. The triangular plates are used with the rotary headers.

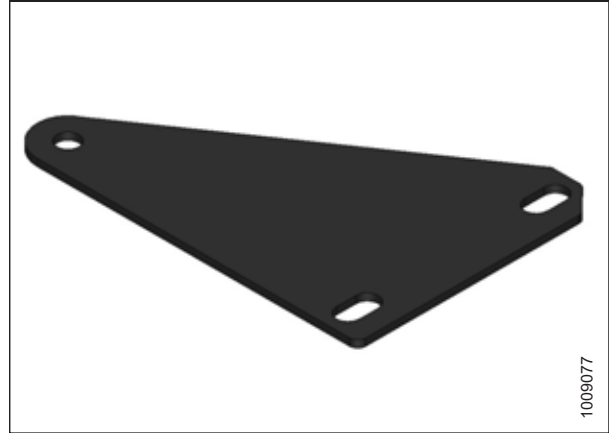


Figure 3.38: Triangular Plate

1. Install bolt (A) with spacer (B) and nut on each windrower leg in the upper hole.

**NOTE:**

This hardware is supplied with the forming shield kit.

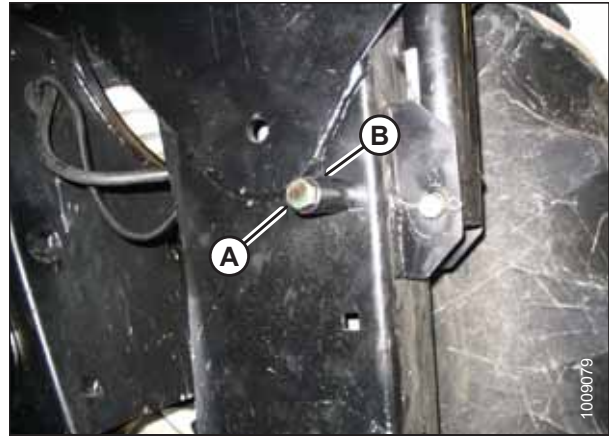


Figure 3.39: Windrower Leg

2. Remove two clevis pins (A) from the forward end of the forming shield.

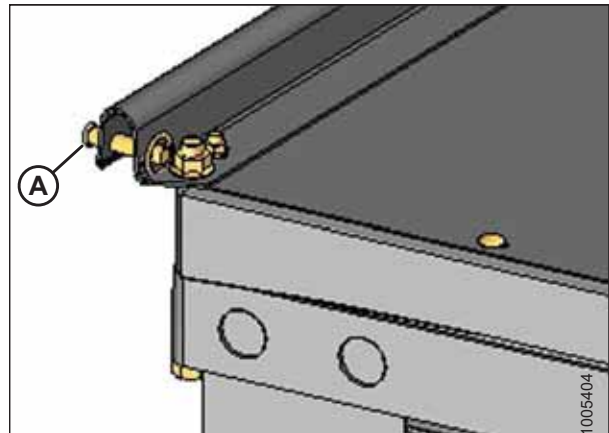


Figure 3.40: Forming Shield



## ASSEMBLING MACHINE

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

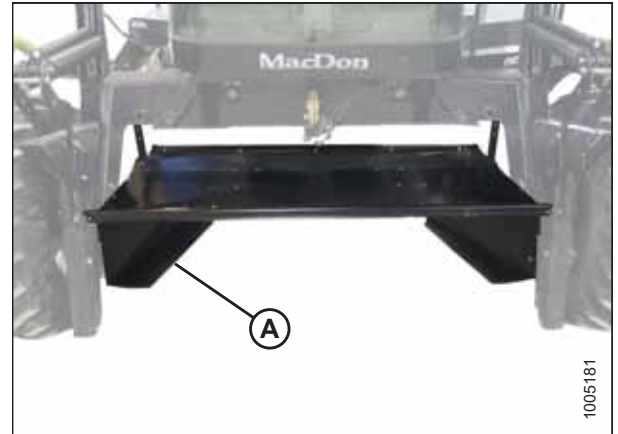


Figure 3.41: Forming Shield under the Windrower

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

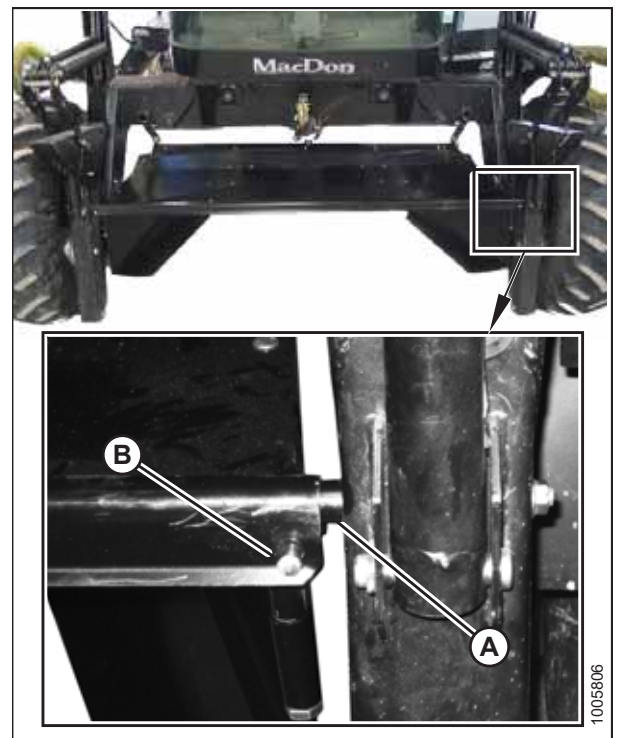
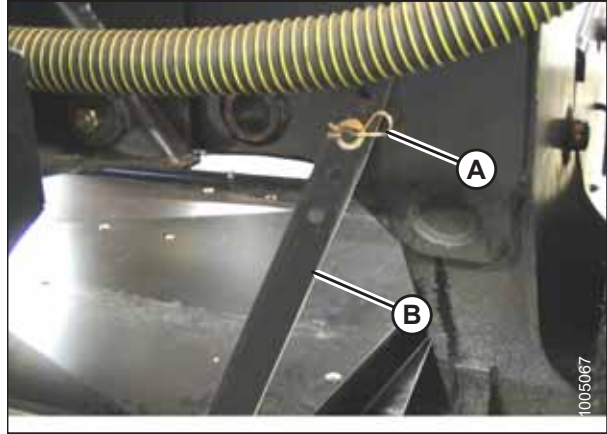


Figure 3.42: Forming Shield Attached to the Windrower Legs

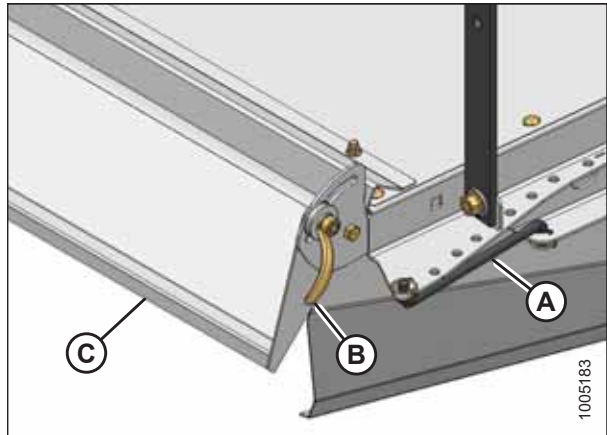
## ASSEMBLING MACHINE

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



**Figure 3.43: Forming Shield Attached to the Windrower Frame**

6. Set the forming shield side deflectors to the desired width by positioning adjuster bars (A). Use the same hole location on both sides.
  - Position the deflectors at the narrowest setting for a narrow windrow (silage for example).
  - Position the deflectors at the widest setting for a wide windrow.
7. Adjust fluffer shield (C) to the middle position. Loosen handles (B) if required.



**Figure 3.44: Side Deflectors and Fluffer Shield**

## 3.12 Attaching A40D Auger Headers to M Series Self-Propelled Windrowers

The header drive hydraulic hoses and electrical harness are located on the left cab-forward side of the windrower.

### IMPORTANT:

M150, M155, M155E4, and M200 Self-Propelled Windrowers with the M Series Reverser kit (B4656) installed need to have the reverser valve hose plumbing changed if switching between a D Series Draper Header with a conditioner to an A40D Auger Header. Changing this plumbing prevents improper operation and damage to the reel drive motor.

Refer to *3.14 Routing Reverser Manifold Jumper Hose – M Series Self-Propelled Windrower, page 67* and (if necessary) to M Series Reverser Kit Installation Instructions (MD #169213), available from our dealer-only site (<https://portal.macdon.com>) (login required).

### NOTE:

Header reel motor hose routing must be properly configured before attaching the header to a windrower. Hose routing on the header is factory-configured for M150, M155, M155E4, and M200 Self-Propelled Windrowers. Header hose routing must be reconfigured if the header is being used on M100, M105, or M205 Self-Propelled Windrowers.

Refer to the following procedures:

- *3.12.1 Attaching A40D Header to an M100 or M105 Self-Propelled Windrower, page 35*
- *3.12.2 Attaching A40D to an M150, M155, or M155E4 Self-Propelled Windrower, page 41*
- *3.12.3 Attaching A40D Header to an M200 Self-Propelled Windrower, page 46*
- *3.12.4 Attaching A40D Auger Header to an M205 Self-Propelled Windrower, page 53*

Refer to your windrower operator's manual for procedures to mechanically attach the auger header to the windrower, and for modifications (if required) to the windrower hydraulic connections.

### 3.12.1 Attaching A40D Header to an M100 or M105 Self-Propelled Windrower

#### DANGER

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

M100 and M105 Windrowers are factory-equipped with four header drive hoses (A) and an electrical harness (B) on the left side.

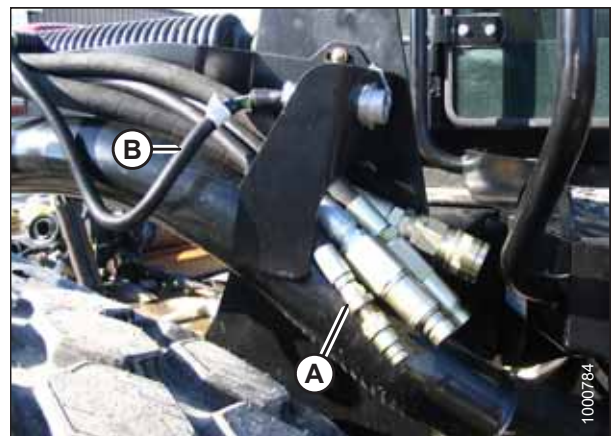
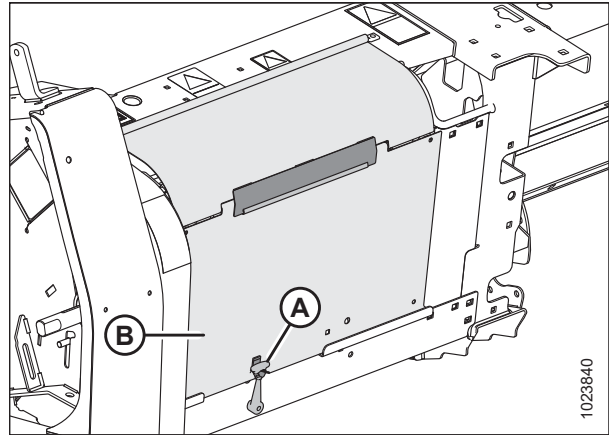


Figure 3.45: Header Drive Hoses

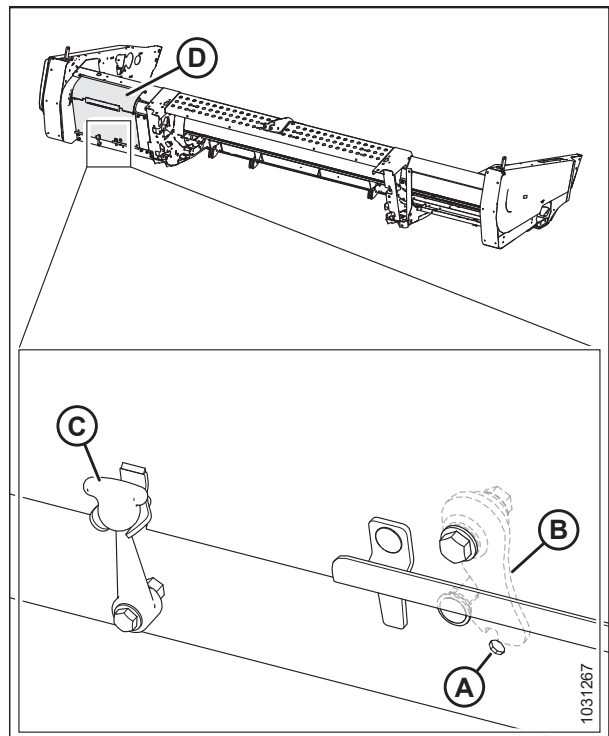
## ASSEMBLING MACHINE

1. Shut down the engine, and remove the key from the ignition.
2. **Headers sold in North America:** Disengage rubber latch (A) and open driveshield (B).



**Figure 3.46: Driveshield – Headers Sold in North America**

3. **Headers sold outside North America:** Insert a tool into hole (A) and pry to release latch (B). Disengage rubber latch (C) and open driveshield (D).



**Figure 3.47: Driveshield – Headers Sold outside North America**

## ASSEMBLING MACHINE

The driveshield is shown in the open position.

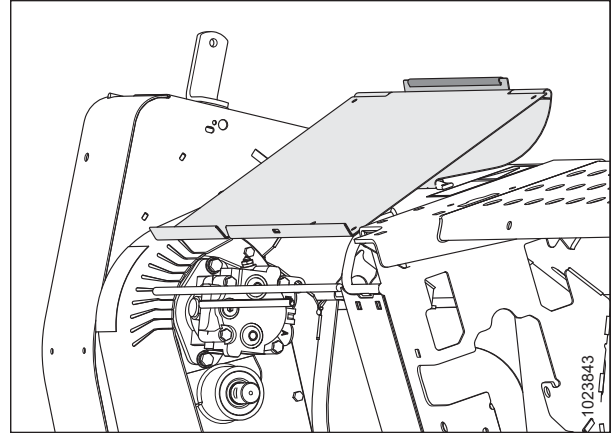


Figure 3.48: Driveshield Open

4. Remove cap (A) from the electrical connector and remove the connector from the support bracket.
5. Disengage and rotate lever (B) counterclockwise to the raised position to release the hose bundle (C).



Figure 3.49: Support Bracket and Hose Bundle

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

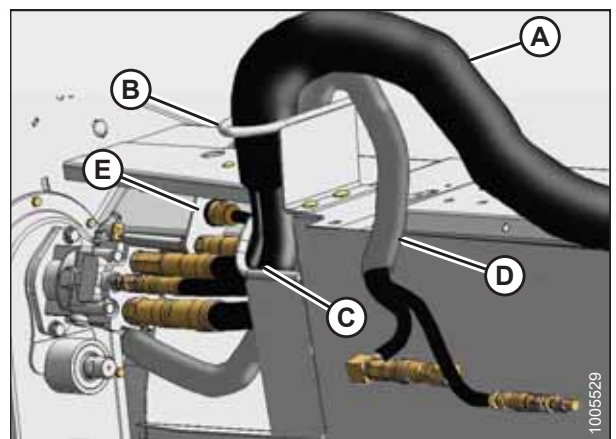


Figure 3.50: Hose and Electrical Bundle – 4.9 m (16 ft.) Header Shown, 5.5 m (18 ft.) Header Similar

## ASSEMBLING MACHINE

12. **A40D standard headers:** Push the following hose connectors onto the mating receptacles as shown until the collars on the receptacles snap into lock position:

- Reel/auger pressure (A)
- Knife and conditioner return (B)
- Case drain (C)
- Knife and conditioner pressure (D)

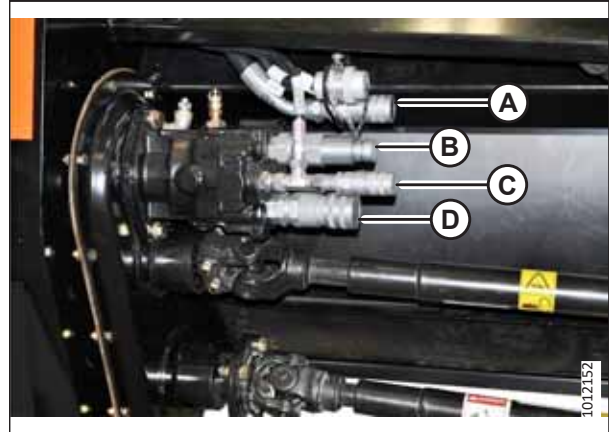


Figure 3.51: A40D Hose Connections – 4.9 m (16 ft.) Header Shown



Figure 3.52: A40D Hose Connections – 5.4 m (18 ft.) Header Shown

13. **A40D GSS headers:** Push the following hose connectors onto the mating receptacles as shown until the collars on the receptacles snap into lock position:

- Reel/auger pressure (A)
- Knife and conditioner return (B)
- Case drain (C)
- Knife and conditioner pressure (D)

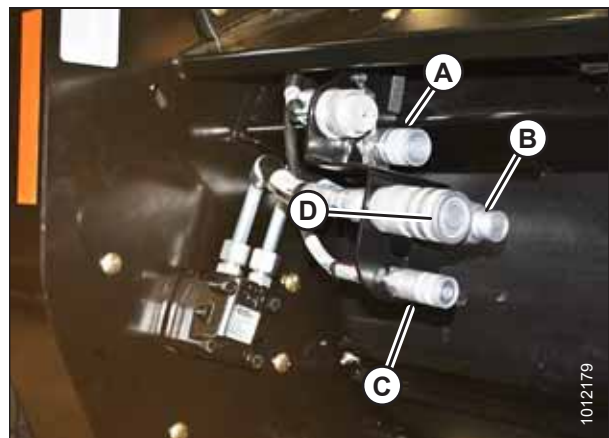


Figure 3.53: A40D GSS Hose Connections – 4.9 m (16 ft. header)



## ASSEMBLING MACHINE

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

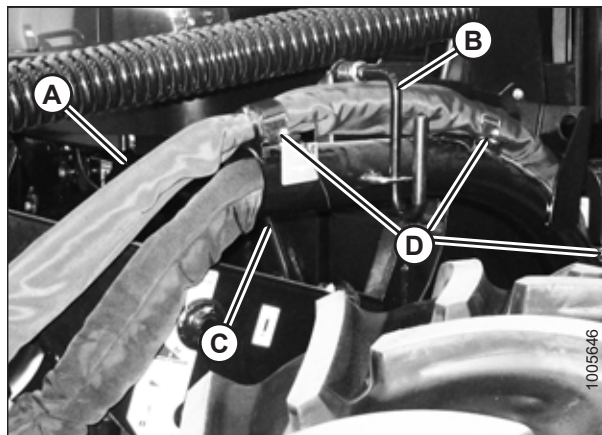


Figure 3.54: Auger Return and Reel Pressure Hose Bundle

16. If manifolds are **NOT** configured as shown (A), refer to [3.13.1 Modifying Hydraulics – M100, and M105 Self-Propelled Windrowers, page 58](#).

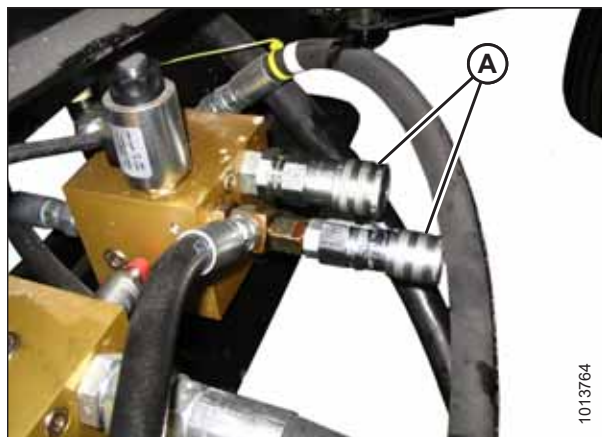


Figure 3.55: Manifolds Configuration

## ASSEMBLING MACHINE

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

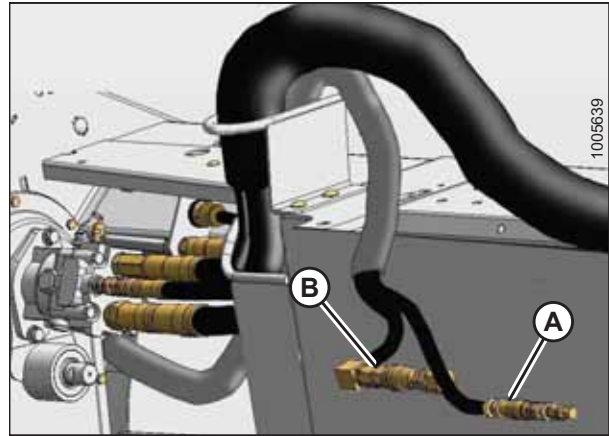


Figure 3.56: Auger/Reel Pressure and Auger/Reel Return Hose Couplers

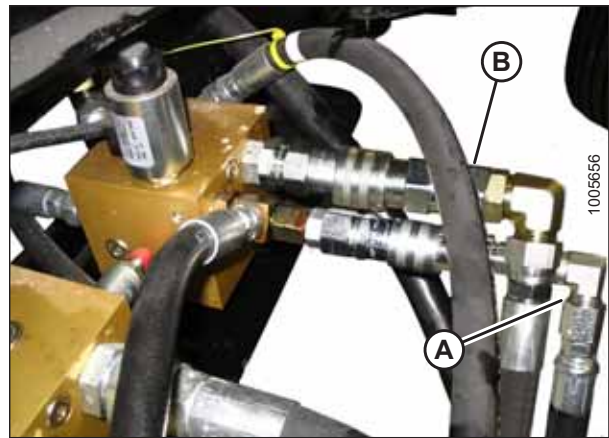


Figure 3.57: Auger/Reel Pressure and Auger/Reel Return Manifold Receptacles

18. Open the header left endshield.
19. Check reel pressure line (A) connection to the reel drive motor (B). Connect the reel pressure line to a different port on the reel motor port depending on the model of windrower:

- If attaching the header to an M150, M155, M155E4, or M200, do **NOT** change the reel pressure connection to the motor, **UNLESS** switching to windrower models M100, M105, or M205. All model years of A40D / A40D GSS are factory-configured for M150, M155, M155E4, and M200.
- Before attaching the header to an **M100, M105, or M205**, move the reel pressure line connection (A) to the other port (C). Refer to [3.15.1 Hydraulic Drive Hose Routing – A40D Header and M100, M105, and M205 Self-Propelled Windrowers](#), page 69.

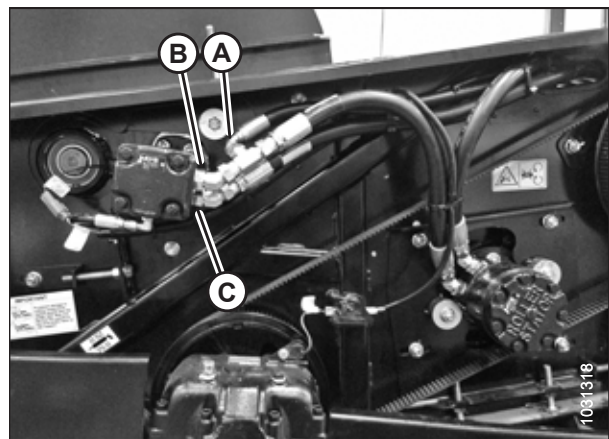


Figure 3.58: A40D/A40D GSS Header – Factory Configuration for M150, M155, M155E4 and M200



### 3.12.2 Attaching A40D to an M150, M155, or M155E4 Slef-Propelled Windrower

**⚠ DANGER**

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

Four header drive hoses (A) and an electrical harness (B) are located on the left side of the windrower.

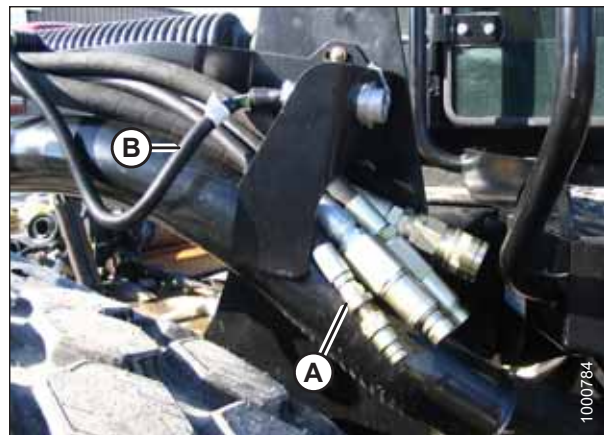


Figure 3.59: Header Drive Hoses

1. Shut down the engine, and remove the key from the ignition.
2. **Headers sold in North America:** Disengage rubber latch (A) and open driveshield (B).

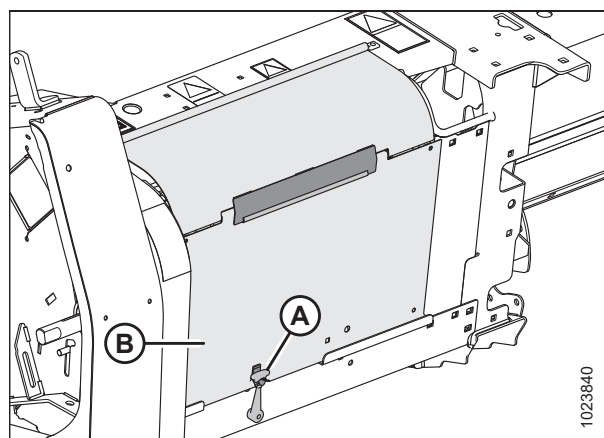
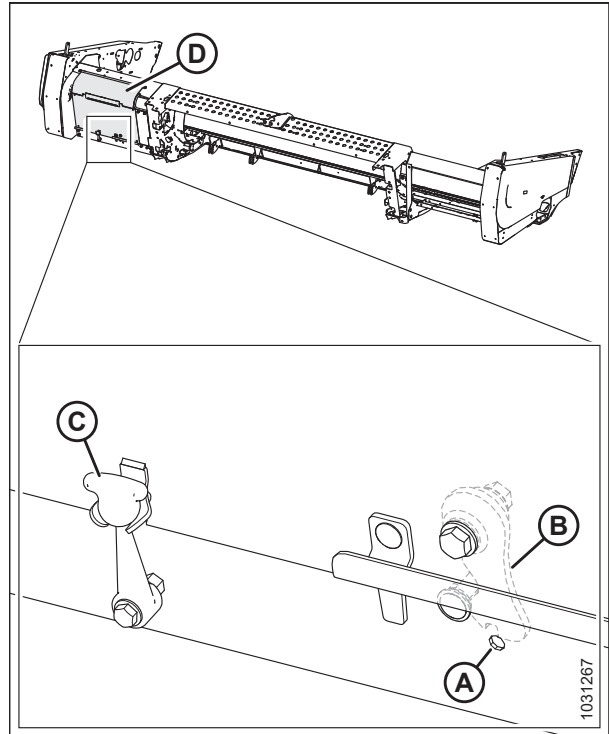


Figure 3.60: Driveshield – Headers Sold in North America

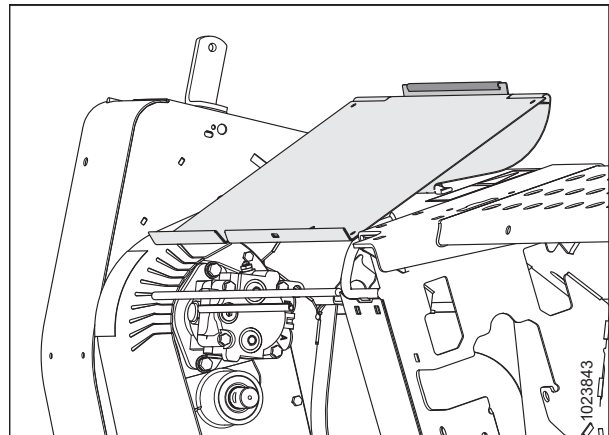
## ASSEMBLING MACHINE

3. **Headers sold outside North America:** Insert a tool into hole (A) and pry to release latch (B). Disengage rubber latch (C) and open driveshield (D).



**Figure 3.61: Driveshield – Headers Sold outside North America**

Driveshield shown in the open position.



**Figure 3.62: Driveshield Open**

## ASSEMBLING MACHINE

4. Remove cap (A) from the electrical connector and remove the connector from the support bracket.
5. Disengage and rotate lever (B) counterclockwise to the raised position to release the hose bundle (C).



Figure 3.63: Support Bracket and Hose Bundle

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

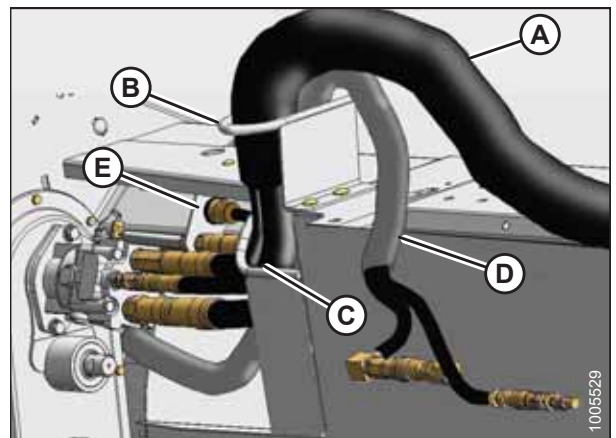


Figure 3.64: Hose and Electrical Bundle – 4.9 m (16 ft.) Header Shown, 5.5 m (18 ft.) Header Similar

## ASSEMBLING MACHINE

12. **A40D standard headers:** Push the following hose connectors onto the mating receptacles as shown until the collars on the receptacles snap into lock position:

- Reel/auger pressure (A)
- Knife and conditioner return (B)
- Case drain (C)
- Knife and conditioner pressure (D)

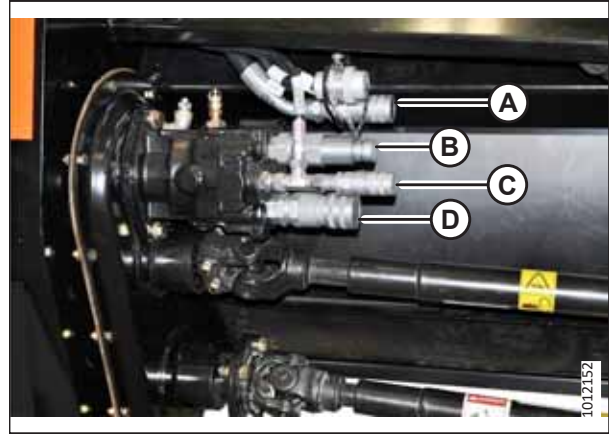


Figure 3.65: A40D Hose Connections – 4.9 m (16 ft.) Header Shown



Figure 3.66: A40D Hose Connections – 5.4 m (18 ft.) Header Shown

13. **A40D GSS headers:** Push the following hose connectors onto the mating receptacles as shown until the collars on the receptacles snap into lock position:

- Reel/auger pressure (A)
- Knife and conditioner return (B)
- Case drain (C)
- Knife and conditioner pressure (D)

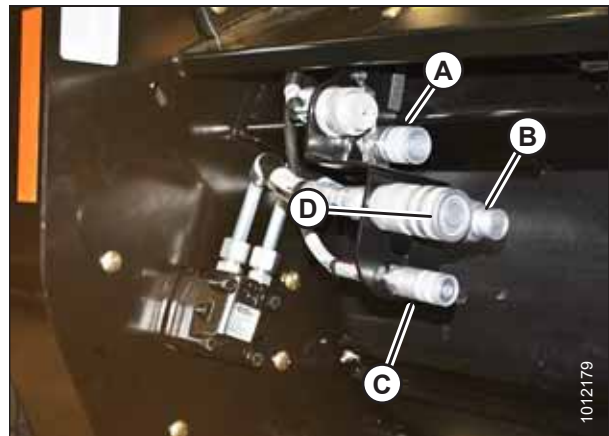


Figure 3.67: A40D GSS Hose Connections – 4.9 m (16 ft. header)

## ASSEMBLING MACHINE

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

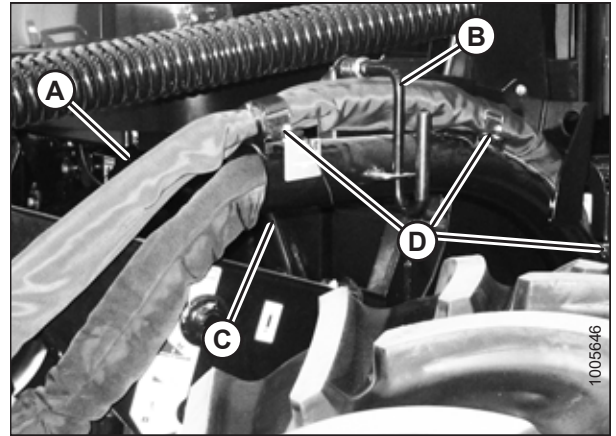


Figure 3.68: Auger Return and Reel Pressure Hose Bundle

- If manifolds are **NOT** configured as shown, refer to [3.13.2 Modifying Hydraulics – M150, M155, and M155E4 Self-Propelled Windrowers, page 61](#).

Figure 3.69: M150/M155/M155E4 with Reverser Valve

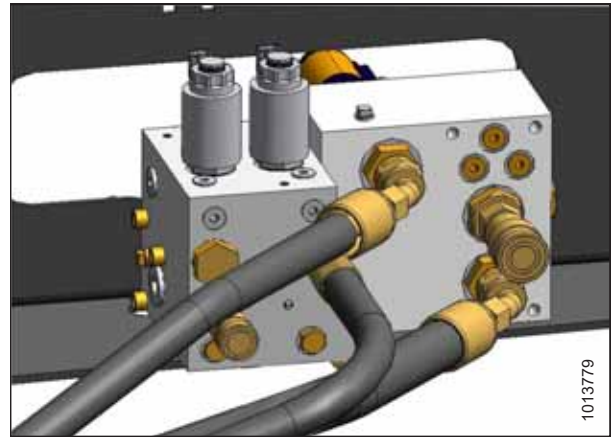


Figure 3.70: M150/M155/M155E4 without Reverser Valve

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

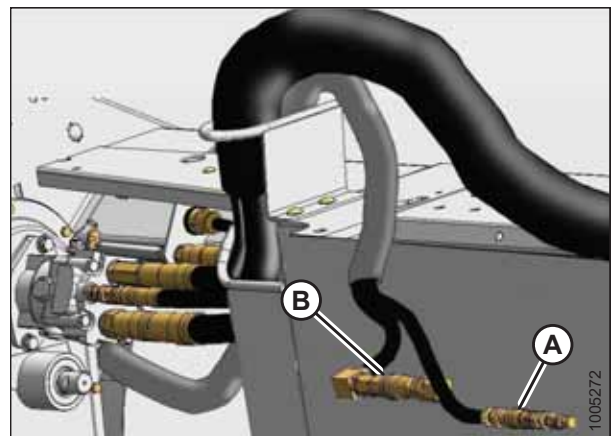


Figure 3.71: Auger Pressure and Auger/Reel Return Hose Couplers – 4.9 m (16 ft.) Header Shown (5.5 m [18 ft.] Similar)

## ASSEMBLING MACHINE

18. Push auger pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on manifolds until collar on receptacle snaps into lock position.
19. Proceed to [3.14 Routing Reverser Manifold Jumper Hose – M Series Self-Propelled Windrower](#), page 67.

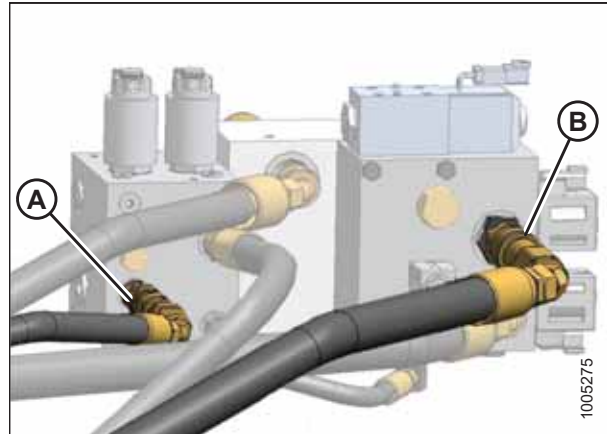


Figure 3.72: M150/M155/M155E4 with Reverser Valve

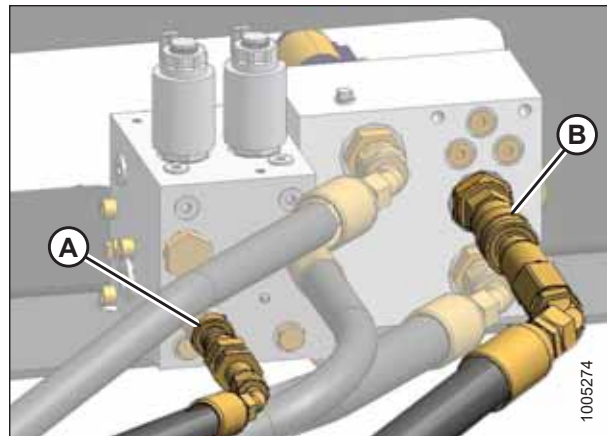


Figure 3.73: M150/M155/M155E4 without Reverser Valve

### 3.12.3 Attaching A40D Header to an M200 Self-Propelled Windrower

#### DANGER

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



## ASSEMBLING MACHINE

The M200 Windrower requires four drive hoses (A) to run an A40D Auger Header. An electrical harness (B) is located on the left side of the windrower.

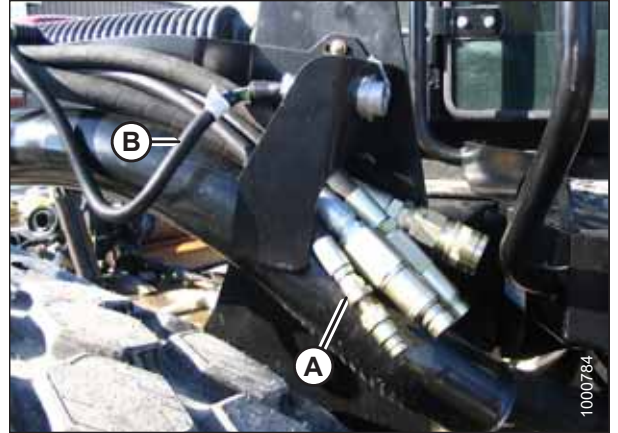


Figure 3.74: Drive Hoses

If only three drive hoses are present, before following the procedure below, configure the M200 to run an A40D Auger Header by installing kit B4651. The kit includes an additional hose (A), hardware, and installation instructions.

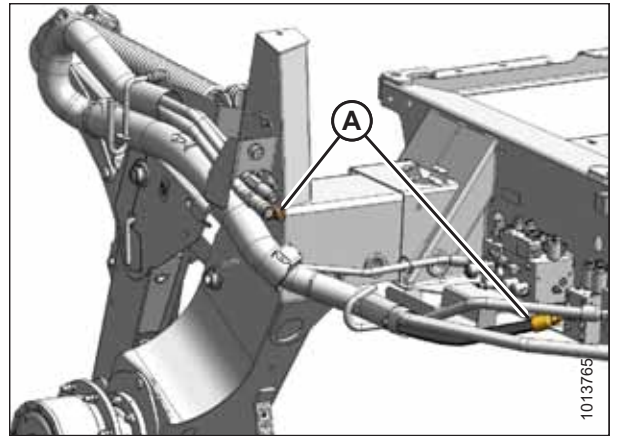


Figure 3.75: Auger Header Drive and Draper Header Reel Drive and Lift Plumbing Kit (B4651)

1. Shut down the engine, and remove the key from the ignition.
2. **Headers sold in North America:** Disengage rubber latch (A) and open driveshield (B).

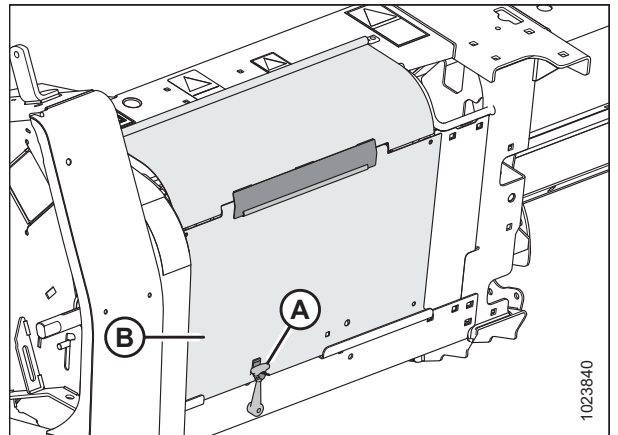
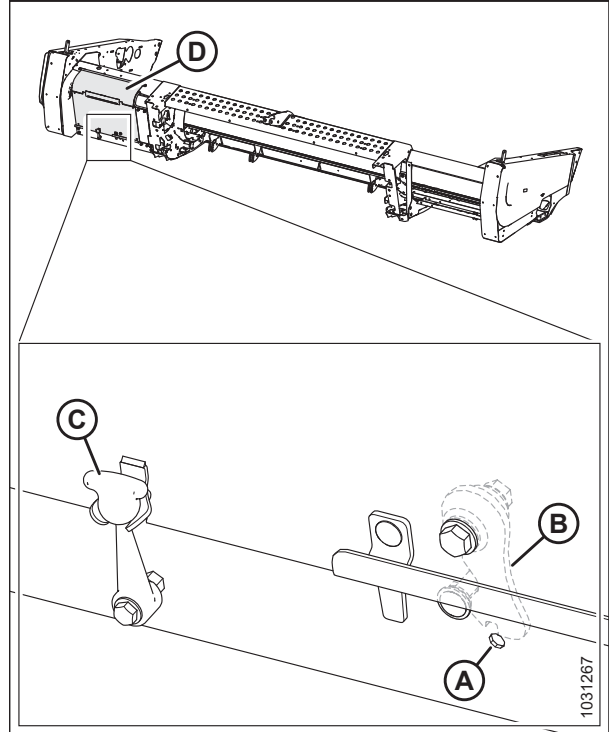


Figure 3.76: Driveshield – Headers Sold in North America

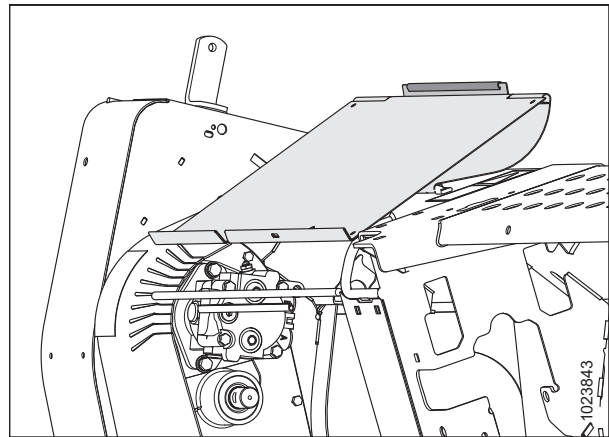
## ASSEMBLING MACHINE

3. **Headers sold outside North America:** Insert a tool into hole (A) and pry to release latch (B). Disengage rubber latch (C) and open driveshield (D).



**Figure 3.77: Driveshield – Headers Sold outside North America**

Driveshield shown in the open position.



**Figure 3.78: Driveshield Open**



## ASSEMBLING MACHINE

4. Remove cap (A) from the electrical connector and remove the connector from the support bracket.
5. Disengage and rotate lever (B) counterclockwise to the raised position to release the hose bundle (C).



Figure 3.79: Support Bracket and Hose Bundle

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

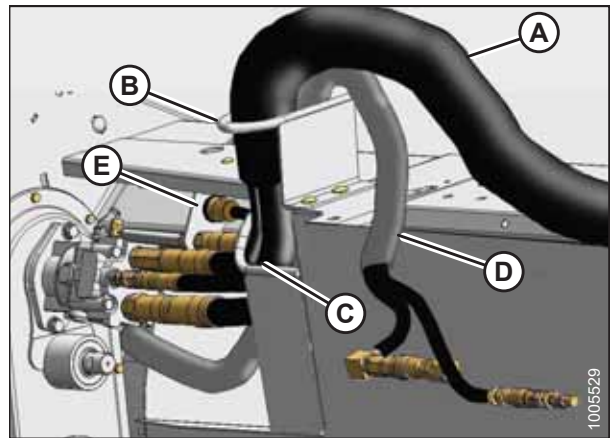


Figure 3.80: Hose and Electrical Bundle – 4.9 m (16 ft.) Header Shown, 5.5 m (18 ft.) Header Similar

## ASSEMBLING MACHINE

12. **A40D standard headers:** Push the following hose connectors onto the mating receptacles as shown until the collars on the receptacles snap into lock position:

- Reel/auger pressure (A)
- Knife and conditioner return (B)
- Case drain (C)
- Knife and conditioner pressure (D)

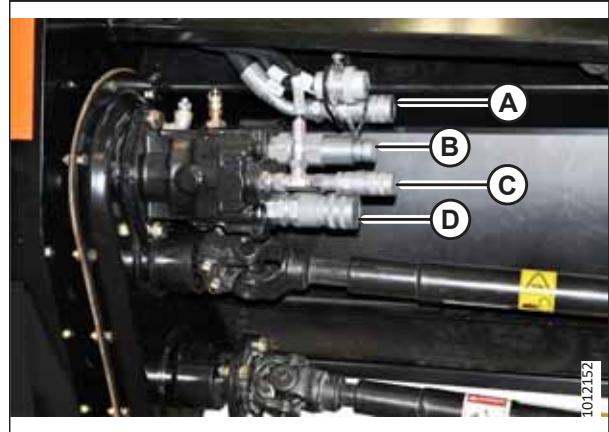


Figure 3.81: A40D Hose Connections – 4.9 m (16 ft.) Header Shown



Figure 3.82: A40D Hose Connections – 5.4 m (18 ft.) Header Shown

13. **A40D GSS headers:** Push the following hose connectors onto the mating receptacles as shown until the collars on the receptacles snap into lock position:

- Reel/auger pressure (A)
- Knife and conditioner return (B)
- Case drain (C)
- Knife and conditioner pressure (D)

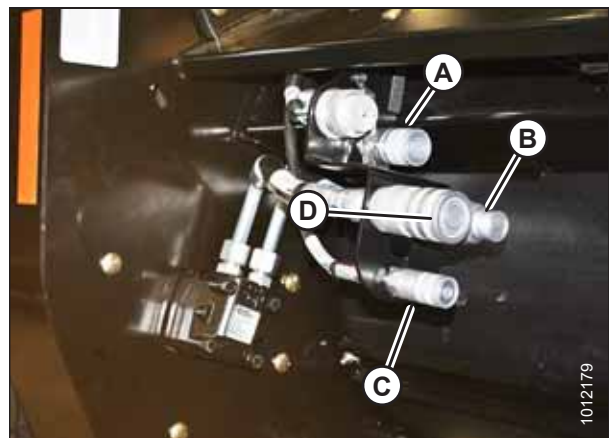


Figure 3.83: A40D GSS Hose Connections – 4.9 m (16 ft. header)

## ASSEMBLING MACHINE

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

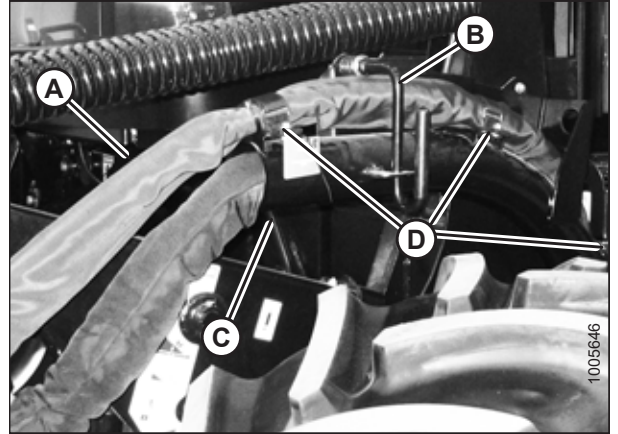


Figure 3.84: Auger Return and Reel Pressure Hose Bundle

16. If manifolds are **NOT** configured as shown, refer to the relevant procedure for your windrower:
  - [3.13.3 Modifying Hydraulics – M200 Self-Propelled Windrower with Reverser Manifold, page 62](#)
  - [3.13.4 Modifying Hydraulics – M200 Self-Propelled Windrower without Reverser Manifold, page 64](#)

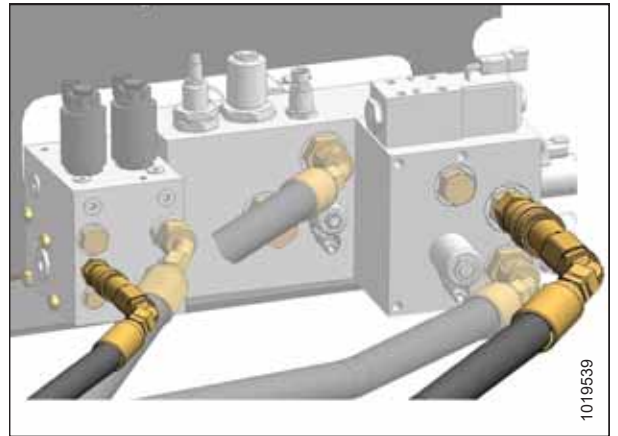


Figure 3.85: M200 With Reverser Valve

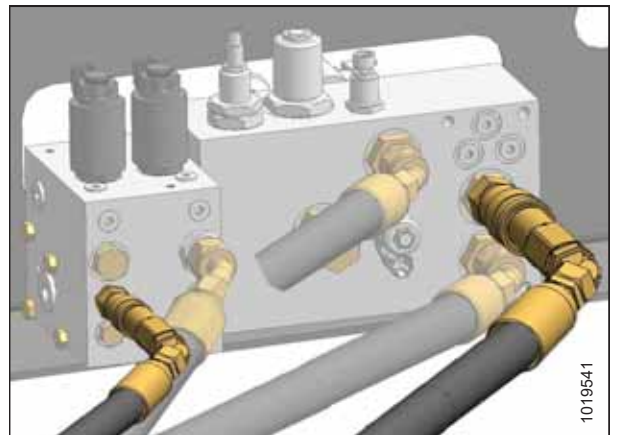


Figure 3.86: M200 without Reverser Valve

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

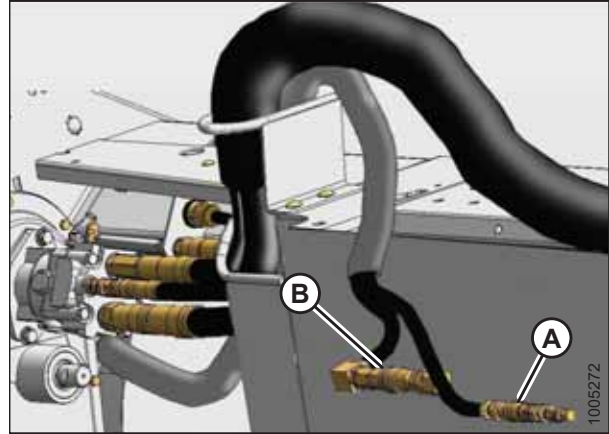


Figure 3.87: Auger Pressure and Auger/Reel Return Hose Couplers – 4.9 m (16 ft.) Header Shown, 5.5 m (18 ft.) Header Similar

18. Push auger pressure (A) and auger/reel return (B) hose couplers onto mating receptacles on manifolds until collar on receptacle snaps into lock position.
19. Proceed to [3.14 Routing Reverser Manifold Jumper Hose – M Series Self-Propelled Windrower, page 67](#).

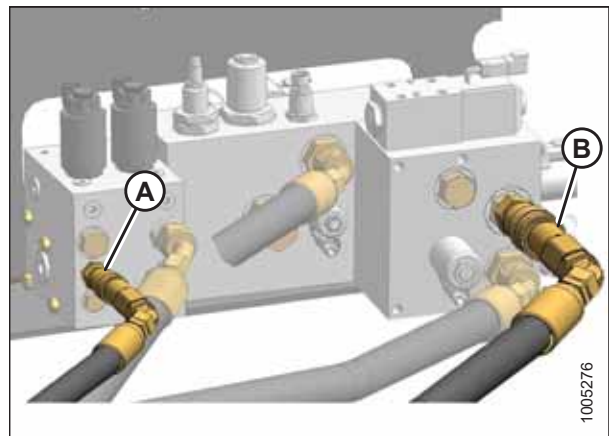


Figure 3.88: M200 with Reverser Valve

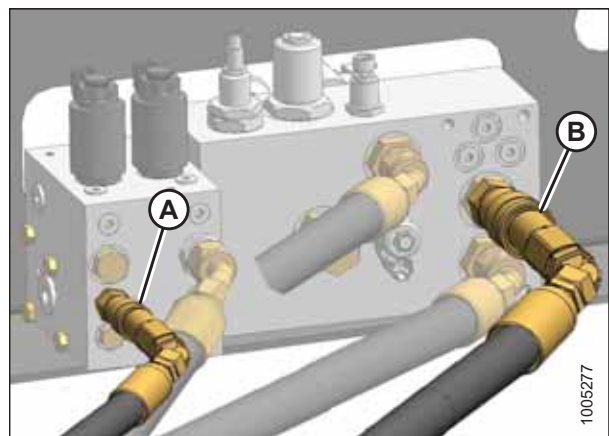


Figure 3.89: M200 without Reverser Valve

### 3.12.4 Attaching A40D Auger Header to an M205 Self-Propelled Windrower

The header's hydraulic multicoupler must be connected to the windrower before operation.

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

**⚠ DANGER**

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

The M205 Self-Propelled Windrower must be equipped with an auger drive basic kit and a completion kit as shown at right. If necessary, order and install the following kits shown in the table below. Installation instructions are supplied with the kits.

Kit Description	MacDon Part Number
Base kit	B5491
The reverser kit is <b>REQUIRED</b> . Install it prior to header attachment.	B5492
Coupler	B5497

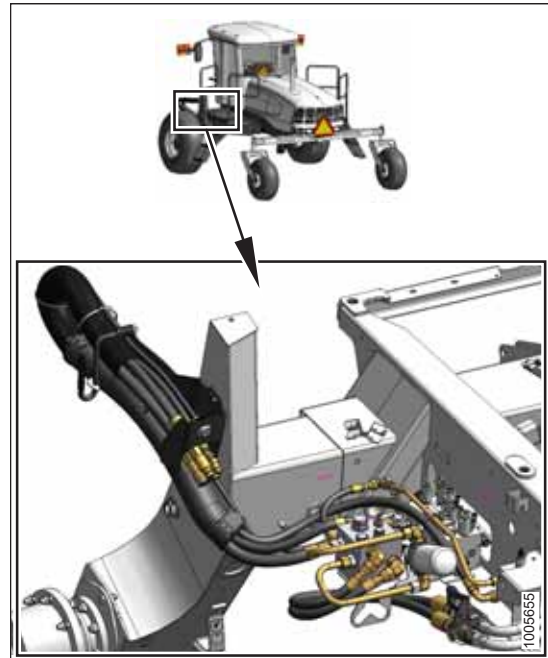


Figure 3.90: Auger Drive Basic Kit and Completion Kit Installed

1. Shut down the engine, and remove the key from the ignition.
2. **Headers sold in North America:** Disengage rubber latch (A) and open driveshield (B).

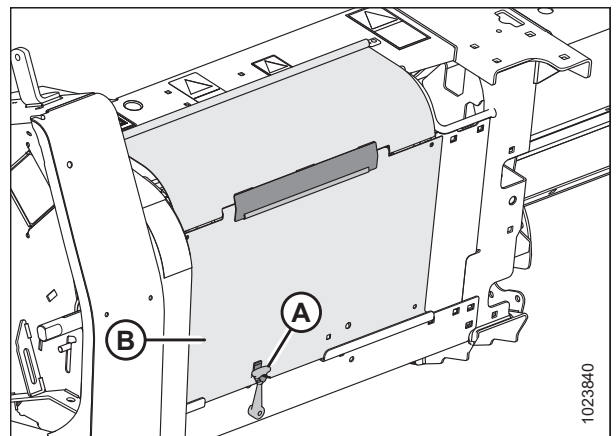
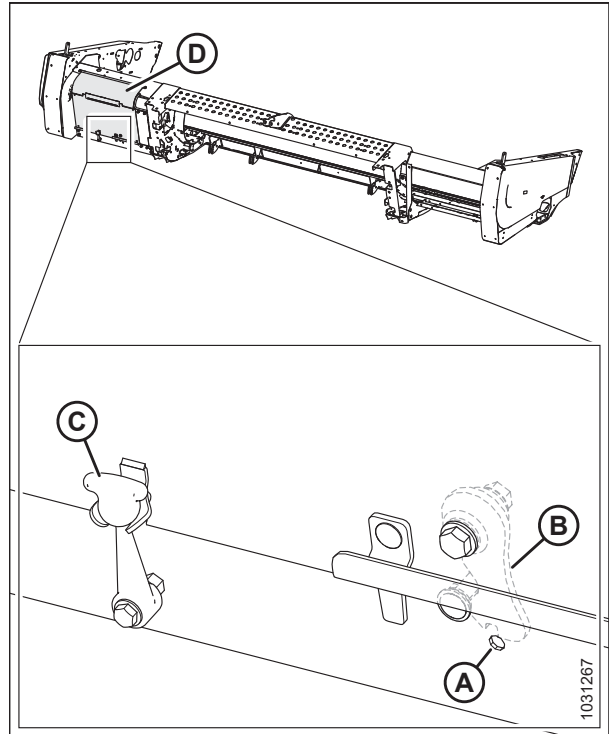


Figure 3.91: Driveshield – Headers Sold in North America

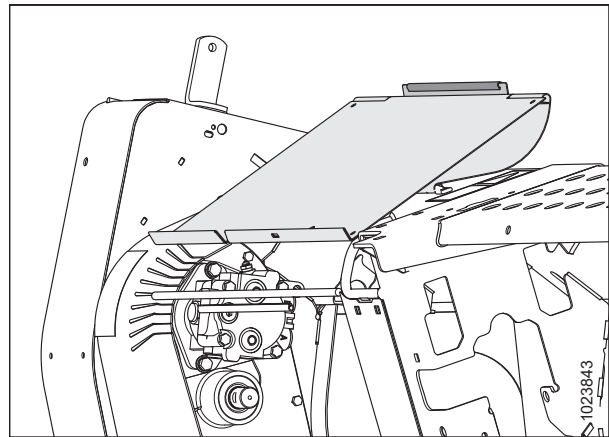
## ASSEMBLING MACHINE

3. **Headers sold outside North America:** Insert a tool into hole (A) and pry to release latch (B). Disengage rubber latch (C) and open driveshield (D).



**Figure 3.92: Driveshield – Headers Sold outside North America**

The driveshield is shown in the open position.



**Figure 3.93: Driveshield Open**



## ASSEMBLING MACHINE

4. Remove cap (A) from the electrical connector and remove the connector from the support bracket.
5. Disengage and rotate lever (B) counterclockwise to the raised position to release the hose bundle (C).



Figure 3.94: Support Bracket and Hose Bundle

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

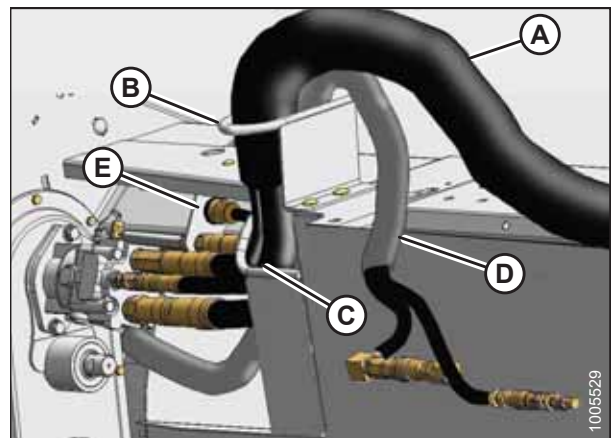


Figure 3.95: Hose and Electrical Bundle – 4.9 m (16 ft.) Header Shown, 5.5 m (18 ft.) Header Similar

## ASSEMBLING MACHINE

12. **A40D standard headers:** Push the following hose connectors onto the mating receptacles as shown until the collars on the receptacles snap into lock position:

- Reel/auger pressure (A)
- Knife and conditioner return (B)
- Case drain (C)
- Knife and conditioner pressure (D)

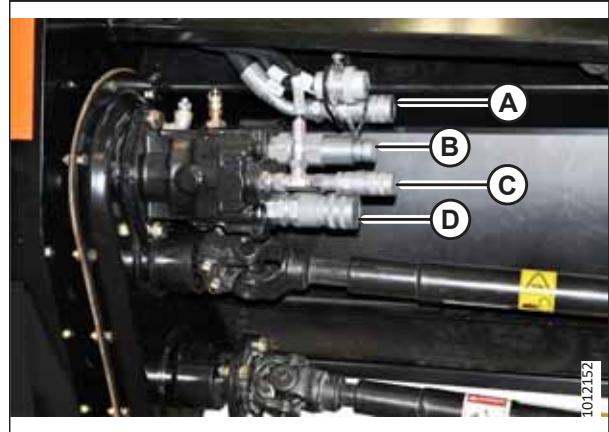


Figure 3.96: A40D Hose Connections – 4.9 m (16 ft.) Header Shown



Figure 3.97: A40D Hose Connections – 5.4 m (18 ft.) Header Shown

13. **A40D GSS headers:** Push the following hose connectors onto the mating receptacles as shown until the collars on the receptacles snap into lock position:

- Reel/auger pressure (A)
- Knife and conditioner return (B)
- Case drain (C)
- Knife and conditioner pressure (D)

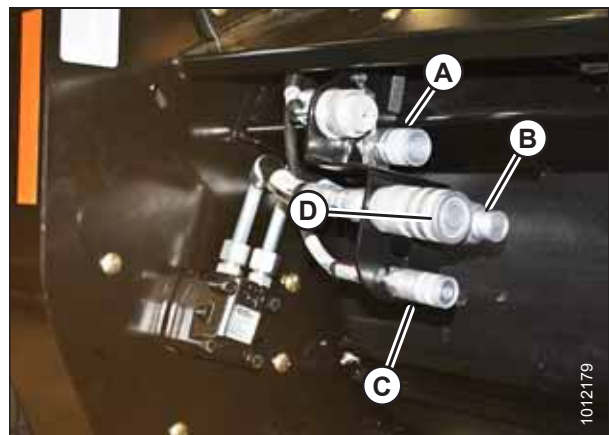


Figure 3.98: A40D GSS Hose Connections – 4.9 m (16 ft. header)



## ASSEMBLING MACHINE

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

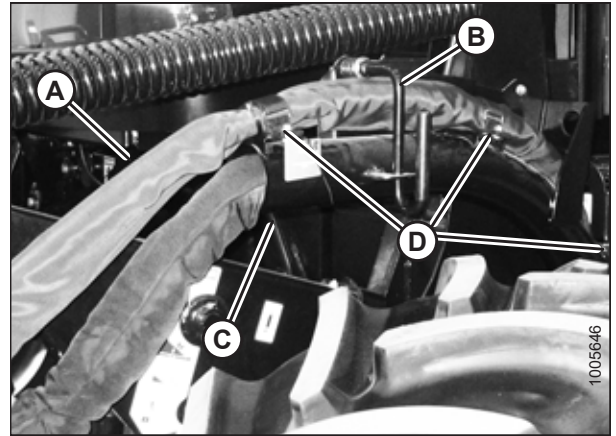


Figure 3.99: Auger Return and Reel Pressure Hose Bundle

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

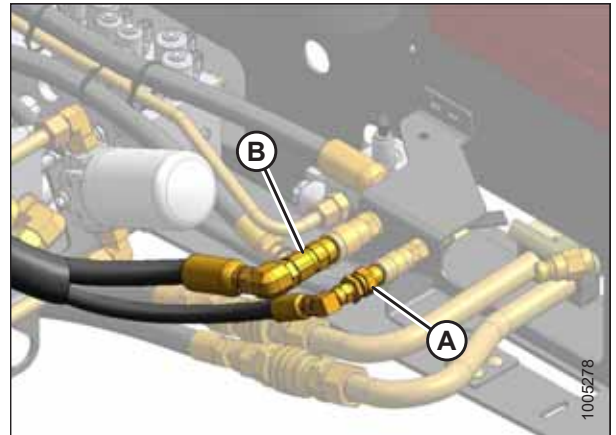


Figure 3.100: Auger/Reel Pressure and Auger/Reel Return Hose Couplers

17. Check reel pressure line (A) connection to the reel drive motor (B). Connect the reel pressure line to a different port on the reel motor port depending on the model of windrower:
  - If attaching the header to an M150, M155, M155E4, or M200, do **NOT** change the reel pressure connection to the motor, **UNLESS** switching to windrower models M100, M105, or M205. All model years of A40D / A40D GSS are factory-configured for M150, M155, M155E4, and M200.
  - Before attaching the header to an **M100, M105, or M205**, move the reel pressure line connection (A) to the other port (C). Refer to [3.15.1 Hydraulic Drive Hose Routing – A40D Header and M100, M105, and M205 Self-Propelled Windrowers](#), page 69.

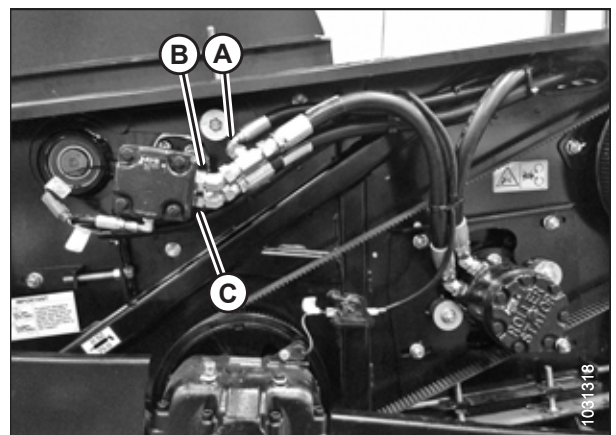


Figure 3.101: A40D/A40D GSS Header – Factory Configuration for M150, M155, M155E4 and M200

### 3.13 Modifying Hydraulics – A40D Header

The windrower hydraulics must be modified to work correctly with an A40D Auger Header.

Follow the instructions in the relevant section for your windrower model:

- *3.13.1 Modifying Hydraulics – M100, and M105 Self-Propelled Windrowers, page 58*
- *3.13.2 Modifying Hydraulics – M150, M155, and M155E4 Self-Propelled Windrowers, page 61*
- *3.13.3 Modifying Hydraulics – M200 Self-Propelled Windrower with Reverser Manifold, page 62*
- *3.13.4 Modifying Hydraulics – M200 Self-Propelled Windrower without Reverser Manifold, page 64*

#### 3.13.1 Modifying Hydraulics – M100, and M105 Self-Propelled Windrowers

1. Open left maintenance platform on windrower.
2. At valve (A) on the manifold, remove cap (B) from port R1 fitting (R1) and plug (C) from DWA tee fitting (DWA). Ports may not be labelled.

**NOTE:**

Check valve (D) is required when attaching an A40D Header to an M100 or M105 Windrower. All M105 Windrowers made in 2012 and later come factory-installed with check valve (D). If required, check valve (MD #167344) can be ordered from MacDon Parts.

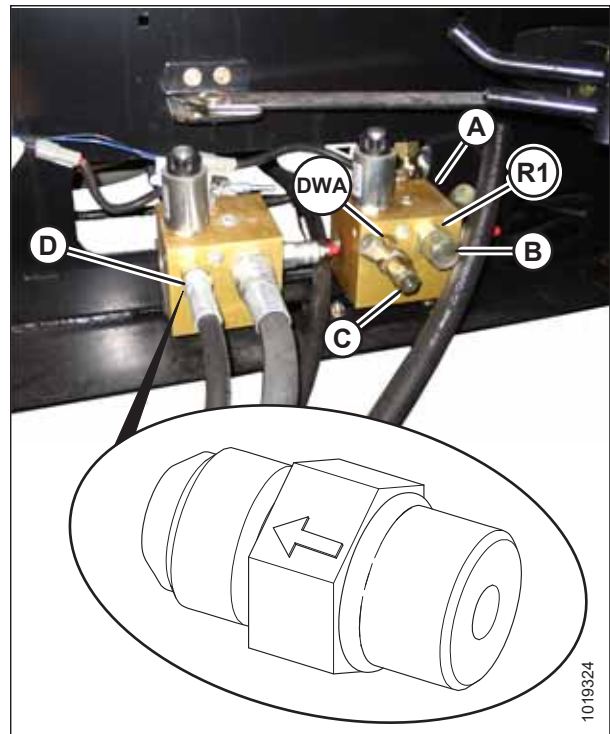


Figure 3.102: Manifolds in Factory Configuration

## ASSEMBLING MACHINE

3. Remove female coupler assemblies (A) and (B) from auger return and reel pressure hose bundle (C) from header.

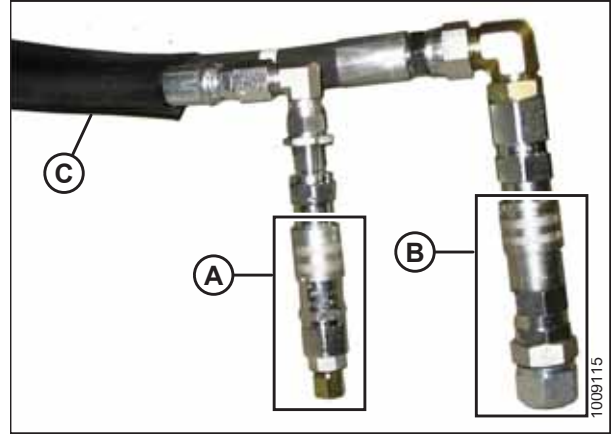


Figure 3.103: Auger Return and Reel Pressure Hose Bundle

4. Remove and discard cap (C) and adapter fitting (B) with O-ring from the large coupler (A).

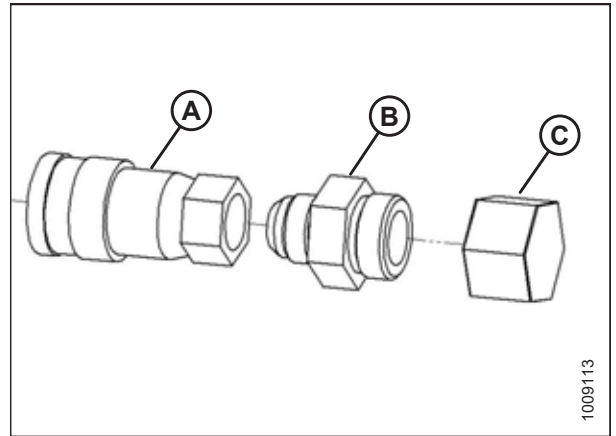


Figure 3.104: Large Coupler Assembly

5. Install large coupler (A) onto the fitting at port R1 on manifold (B).

**IMPORTANT:**

Make sure the O-ring is on JIC threads in port R1 to ensure a proper seal with coupler (A). If the O-ring is missing, reuse the O-ring from the discarded adapter fitting in Step 4, [page 59](#).

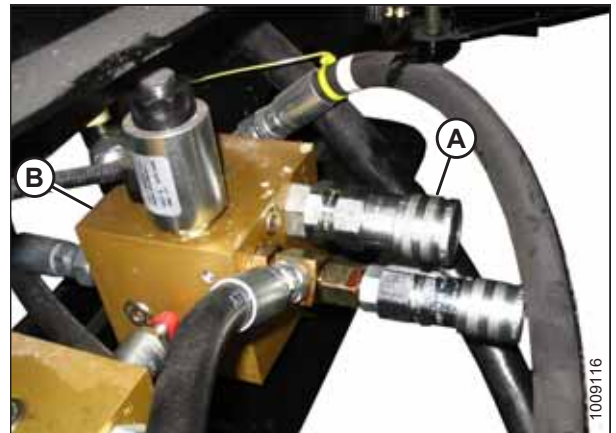


Figure 3.105: Manifold Configured for Auger Header

## ASSEMBLING MACHINE

- Remove and discard cap (A), O-ring (B), and adapter fitting (C) from small coupler assembly (D).

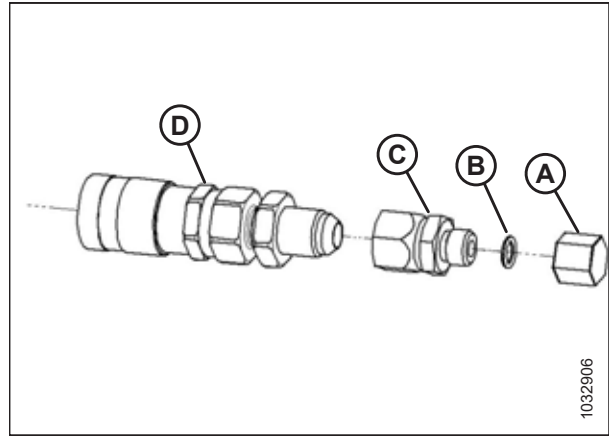


Figure 3.106: Small Coupler Assembly

- Install small coupler subassembly (A) onto tee (B) on manifold (C).

**NOTE:**

Position of adjacent hoses may require slight adjustment to allow access for new hoses.

- Return to Step 18, page 40.

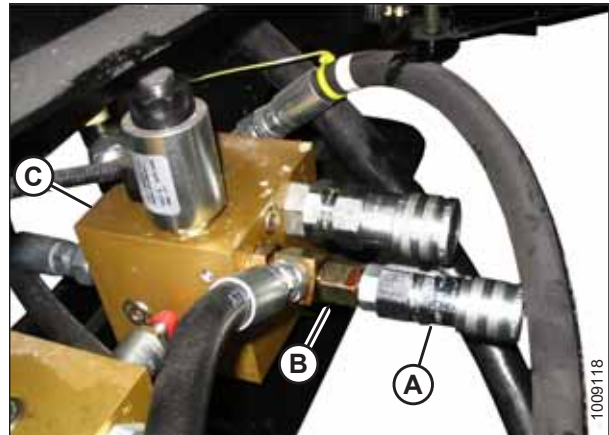


Figure 3.107: Manifold Configured for Auger Header

### 3.13.2 Modifying Hydraulics – M150, M155, and M155E4 Self-Propelled Windrowers

1. Open left maintenance platform on windrower.
2. Remove the plugs from ports R2 (R2) on manifolds (A) and (B). Ports may not be labelled.

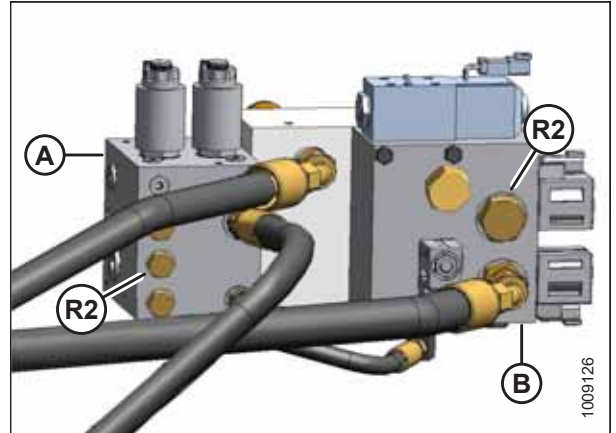


Figure 3.108: Manifolds with Reverser Valve

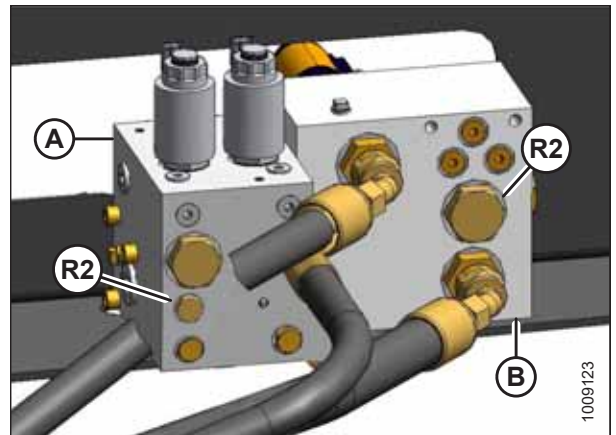


Figure 3.109: Manifolds without Reverser Valve in Factory Configuration

3. Remove female coupler assemblies (A) and (B) from hoses in bundle (C) from header, and remove caps.

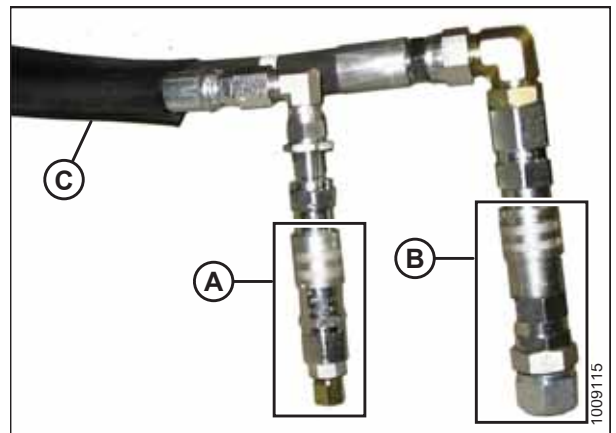


Figure 3.110: Header Hose Bundle

## ASSEMBLING MACHINE

4. Install smaller coupler assembly (C) in port R2 on manifold (A) and the larger coupler assembly (D) in port R2 on manifold (B).
5. Return to Step 18, page 45.

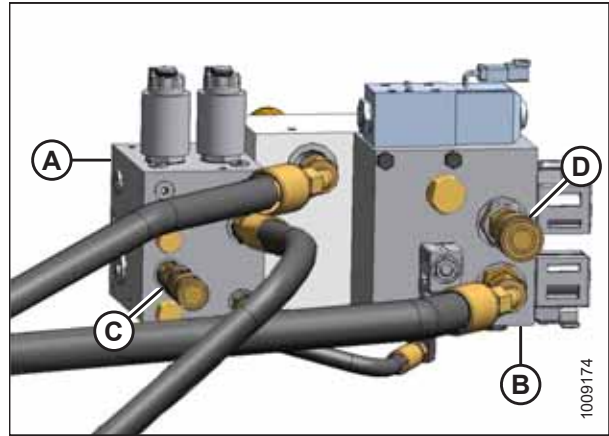


Figure 3.111: Manifolds with Reverser Valve Configured for Auger Header

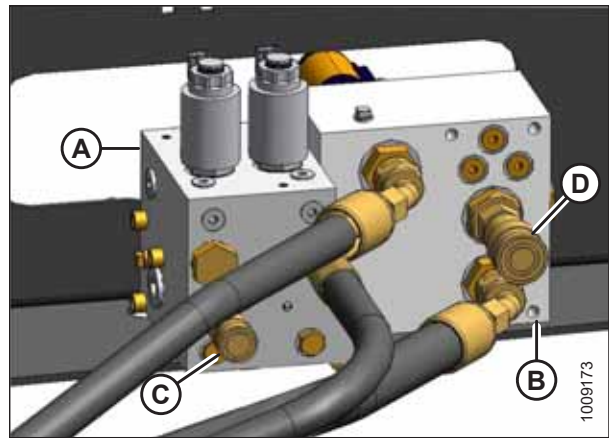


Figure 3.112: Manifolds without Reverser Valve Configured for Auger Header

### 3.13.3 Modifying Hydraulics – M200 Self-Propelled Windrower with Reverser Manifold

#### IMPORTANT:

For windrowers with Reverser kit (B4656) installed, to prevent draper header reel damage and improper operation, hose plumbing to reverser manifold must be changed to suit the header type if switching between A40D Auger Header and draper header. Refer to kit installation instruction for proper plumbing procedures for each header type.



## ASSEMBLING MACHINE

1. Open left maintenance platform on windrower.
2. Remove the plugs from ports R2 (R2) on manifolds (A) and (B).

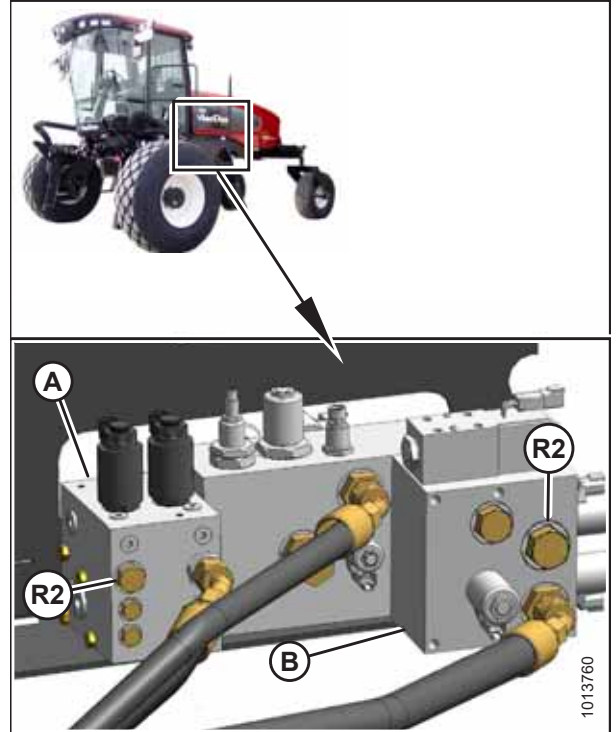


Figure 3.113: Manifolds with Reverser Manifold in Factory Configuration

3. Remove female coupler assemblies (A) and (B) from hoses in bundle (C) from header, and remove caps.

**NOTE:**

To avoid contact with platform support, the reel/auger return hose uses a 45° fitting (MD #50098).

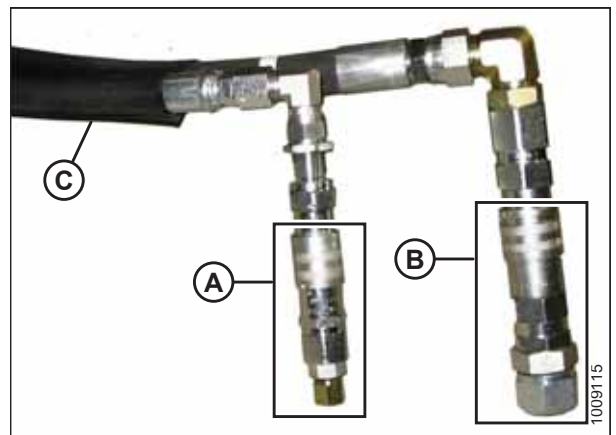


Figure 3.114: Header Hose Bundle

## ASSEMBLING MACHINE

4. Install smaller coupler assembly (C) in port R2 on manifold (A) and the larger coupler assembly (D) in port R2 on manifold (B).

**NOTE:**

Position of adjacent hoses may require slight adjustment to allow access for new hoses. Align larger coupler assembly (D) with R1 hose (E).

5. Return to Step 18, page 52.

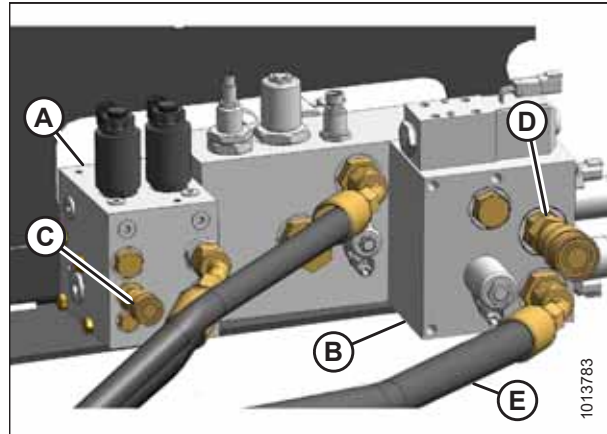


Figure 3.115: Manifolds with Reverser Manifold Configured for Auger Header

### 3.13.4 Modifying Hydraulics – M200 Self-Propelled Windrower without Reverser Manifold

1. Open left maintenance platform on windrower.
2. Remove the plug from port R2 (R2) on manifold (A) and the cap from fitting in port R2 (R2) on manifold (B). Ports may not be labelled.

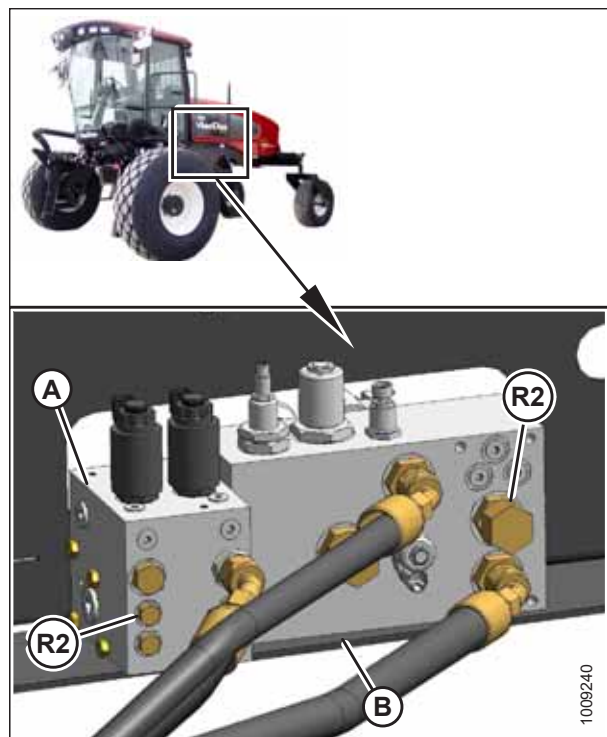


Figure 3.116: Manifolds without Reverser Manifold in Factory Configuration



## ASSEMBLING MACHINE

3. Remove female coupler assemblies (A) and (B) from hoses in bundle (C) from header.

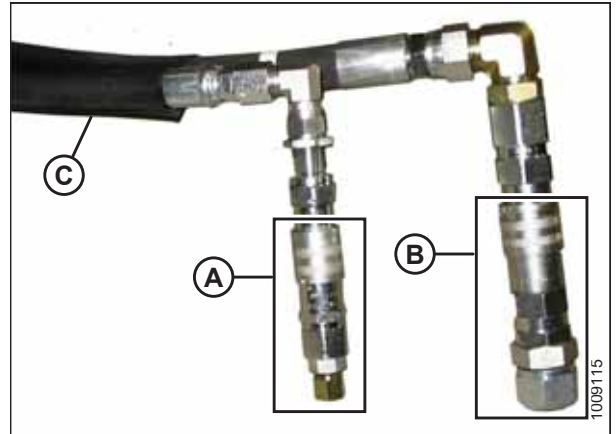


Figure 3.117: Header Hose Bundle

4. Remove and discard cap (A) and adapter fitting (B) (including O-ring) from large coupler (C).

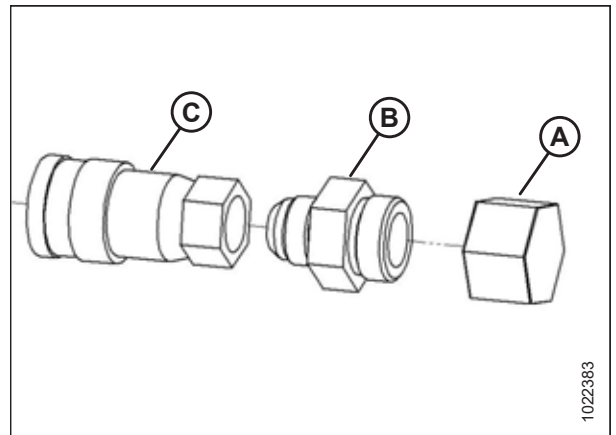


Figure 3.118: Large Coupler Assembly

5. Install larger coupler (D) onto fitting at port R2 on manifold (B).
6. Remove cap from smaller coupler assembly (C) and install assembly in port R2 on manifold (A).

### IMPORTANT:

Make sure O-ring is on JIC threads in port R1 to ensure a proper seal with coupler (D). If O-ring is missing, reuse O-ring from discarded adapter fitting in Step 4, page 65.

7. Return to Step 18, page 52.

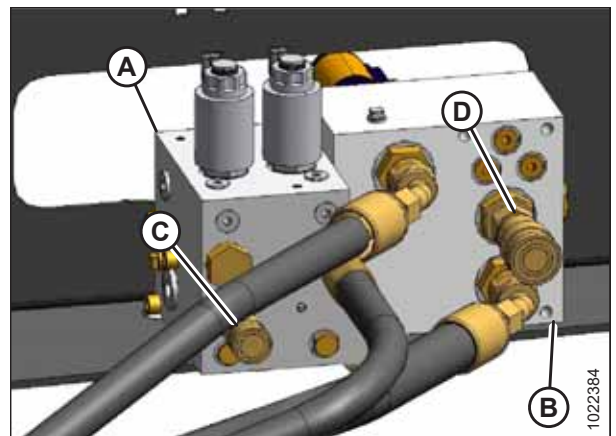


Figure 3.119: Manifolds without Reverser Manifold Configured for Auger Header – M155 Shown, M200 Similar

### 3.13.5 Modifying Hydraulics – M205 Self-Propelled Windrower

The M205 hydraulics need to be modified to accept an A40D Auger Header. Kits B5491, B5492, and B5497 should have been supplied with your header.

1. Install kits in accordance with the instructions that were supplied with the kits to achieve the configuration shown at right.

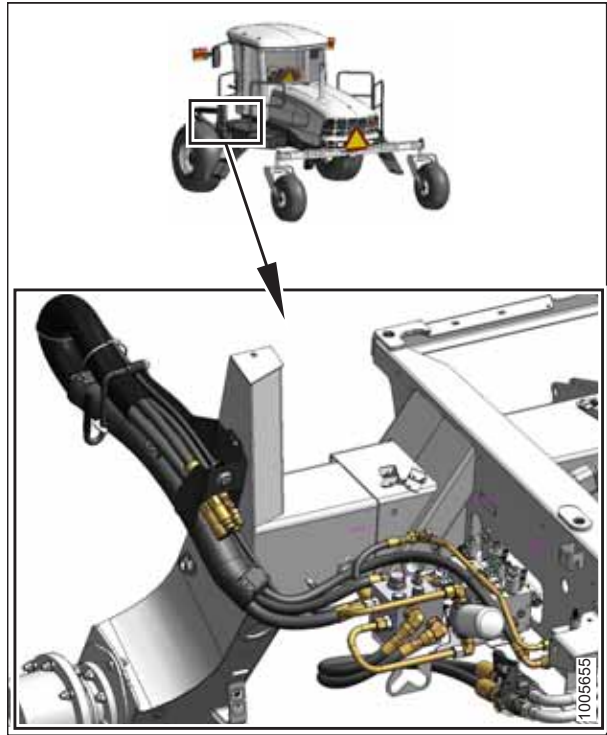


Figure 3.120: Auger Header Hydraulics

### 3.14 Routing Reverser Manifold Jumper Hose – M Series Self-Propelled Windrower

An optional manifold (A) to reverse the header drive in the event of plugging may have been installed on an M150, M155, M155E4, or M200 windrower. If reverser manifold (A) is installed, proceed as follows; otherwise, disregard this procedure.

**IMPORTANT:**

Jumper hose routing (B) on the reverser manifold is specific for each model of header. Do **NOT** operate the header unless the jumper hose is routed correctly.

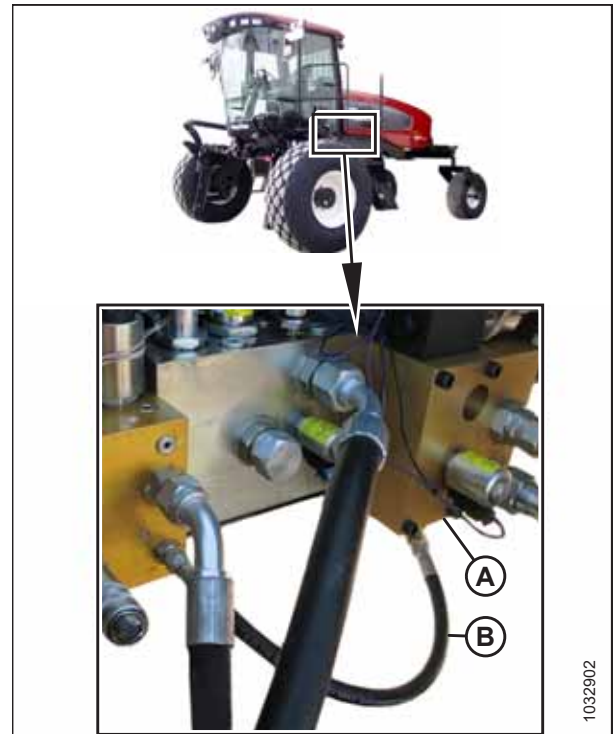


Figure 3.121: Reverser Manifold – A40D on M200 Shown (M150, M155, and M155E4 Similar)

## ASSEMBLING MACHINE

1. Move the left windrower platform to the open position to expose the hydraulic manifolds.
2. Route jumper hose (B) from C2 conveyor circuit (C) to port CR on reverser manifold (A) as shown.

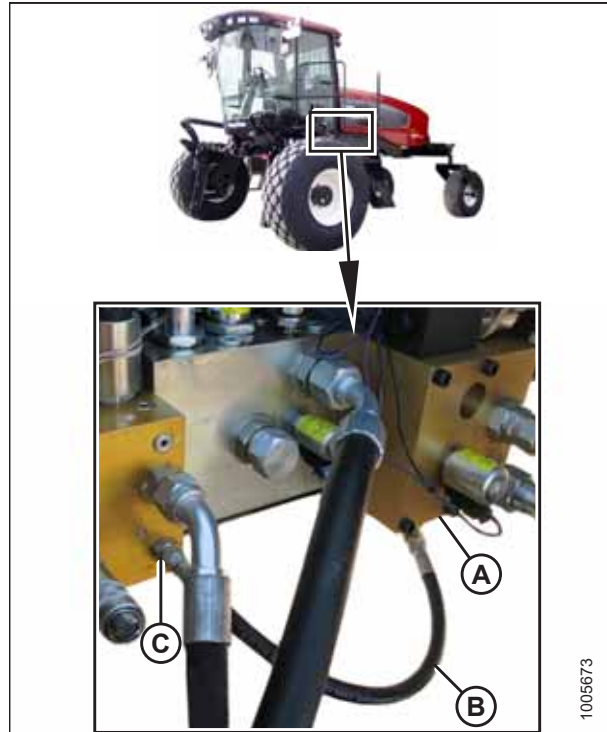


Figure 3.122: Jumper Hose Position – A40D on M200 Shown (M150, M155, and M155E4 Similar)

### IMPORTANT:

For draper headers, port CR is routed to port R4 (as shown in image at right) on reverser manifold. Reroute jumper hose (B) when switching between draper and auger headers. This prevents draper header reel damage and improper operation, which occurs if reel runs backwards.

### NOTE:

Jumper hose rerouting is unnecessary if hay conditioner is **NOT** installed on draper header. The draper header reverser function is suppressed unless hay conditioner is activated in Windrower Setup using the cab display module (CDM).

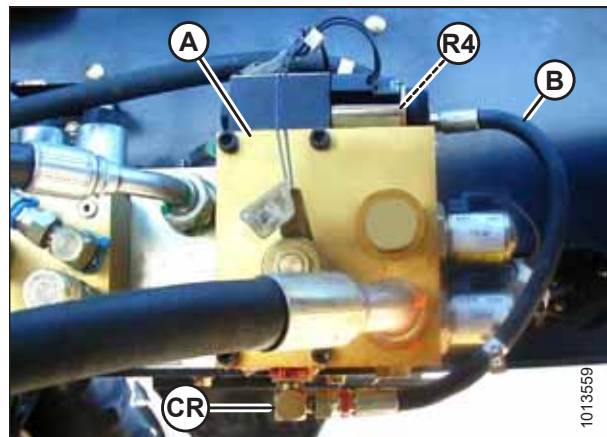


Figure 3.123: Jumper Hose Position – Draper Header on M150 Shown (M155, M155E4, and M200 Similar)

3. Proceed to [3.20 Repositioning Knife Drive Box Breathers](#), page 93.

### 3.15 Hydraulic Drive Hose Routing – M Series Self-Propelled Windrowers

**IMPORTANT:**

Only A40D and A40D GSS Headers are factory-configured for operation with M Series Windrowers.

#### 3.15.1 Hydraulic Drive Hose Routing – A40D Header and M100, M105, and M205 Self-Propelled Windrowers

The A40D Auger Header hydraulic drive hose routing depends on the windrower model to which the header is being attached.

A40D Headers are factory-configured for M150, M155, M155E4, and M200 Self-Propelled Windrowers as shown in Figure 3.130, page 71.

To route hoses for M100, M105, and M205 Self-Propelled Windrowers, proceed as follows:

**⚠ DANGER**

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

1. Shut down the engine, and remove the key from the ignition.
2. Press a screwdriver against the latch in opening (A) and lift it to open the header left endshield. The shield will latch at location (B) to stay open.

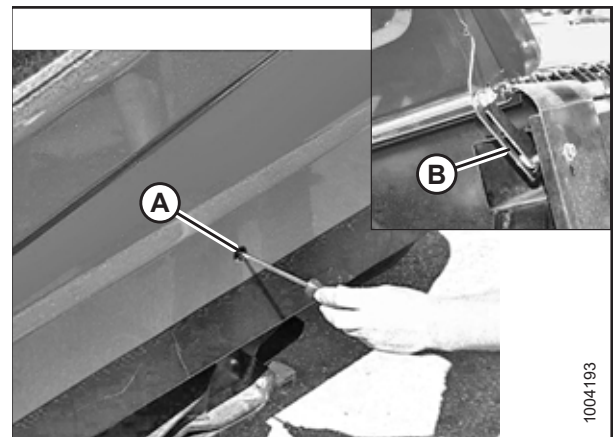


Figure 3.124: Left Endshield

3. **Headers sold in North America:** Disengage rubber latch (A) and open driveshield (B).

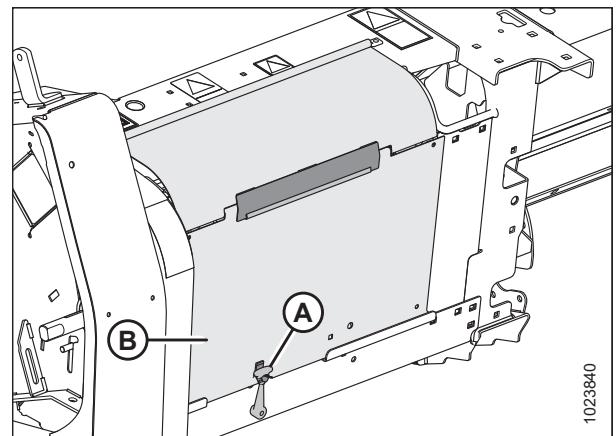
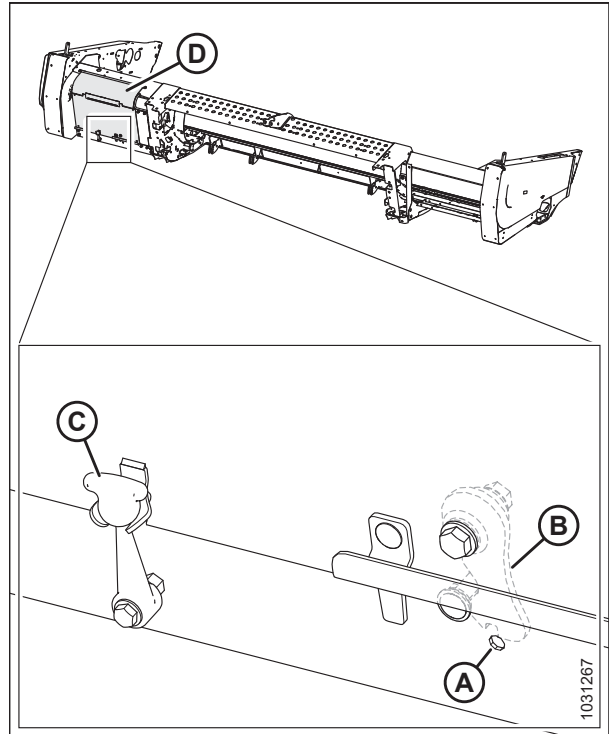


Figure 3.125: Driveshield – Headers Sold in North America

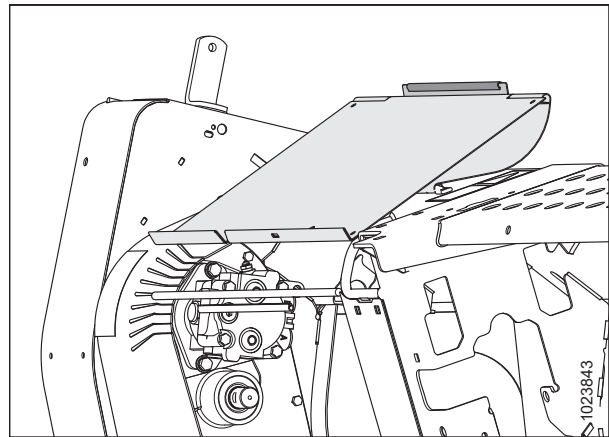
## ASSEMBLING MACHINE

4. **Headers sold outside North America:** Insert a tool into hole (A) and pry to release latch (B). Disengage rubber latch (C) and open driveshield (D).



**Figure 3.126: Driveshield – Headers Sold outside North America**

The driveshield is shown in the open position.



**Figure 3.127: Driveshield Open**

## ASSEMBLING MACHINE

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

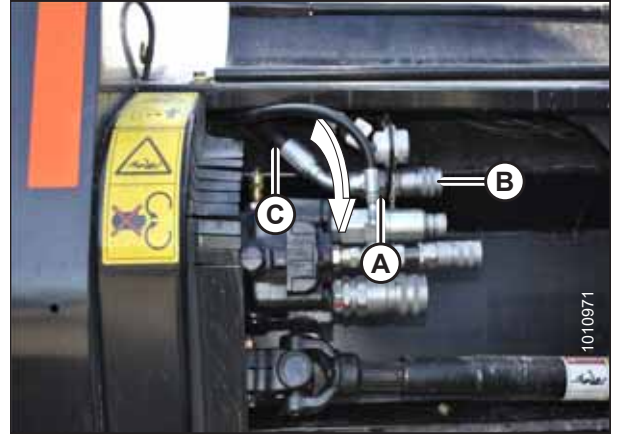


Figure 3.128: Auger and Reel Pressure Coupler and Hose – 4.9 m (16 ft.) Header Shown

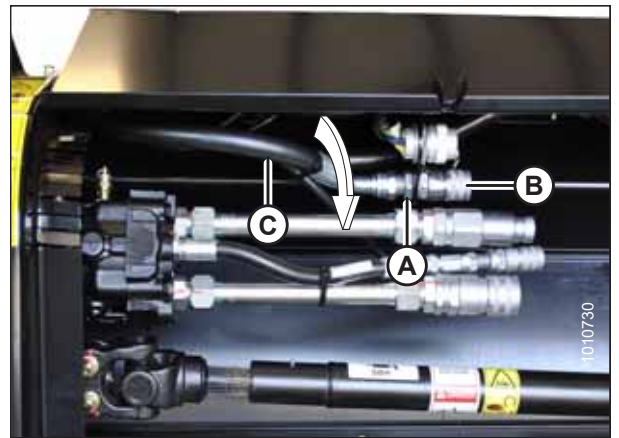


Figure 3.129: Auger and Reel Pressure Coupler and Hose – 5.5 m (18 ft.) Header Shown

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

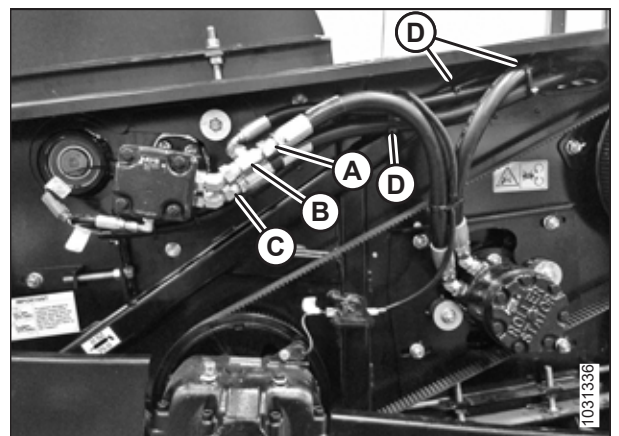


Figure 3.130: Factory Configuration – M150, M155, M155E4, and M200



## ASSEMBLING MACHINE

8. Reconnect the hoses as follows:
  - a. Reroute hose (E) behind hose (A) and (F) to hose (C) and connect tee (B) to the lower port fitting.
  - b. Reroute hose (C) above hose (E) and (F) and connect hose (C) to tee (B). Tighten hose (C).
  - c. Loosen the 45° fittings at both ports. This allows room for wrenches when tightening tee (B) to the lower port.
  - d. Connect hose (A) to the upper port fitting as shown and check the orientation of the 45° fitting.

**NOTE:**

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

- e. Confirm the orientation of the upper port 45° fitting, back-off tee (B), and tighten the upper port fitting in the position determined. Tighten hose (A).
  - f. Check the orientation of the lower port 45° fitting and tighten it.
  - g. Connect tee (B) to the lower port 45° fitting and tighten it.
9. Secure the hose routing with cable ties (A) as shown.

**IMPORTANT:**

Ensure that electrical harness (B) and reel motor case drain hose (C) are secured to hose (D) and that there is at least 25 mm (1 in.) clearance between hose bundle (E) and knife drive timing belt (F).

**IMPORTANT:**

Ensure there is enough clearance between the hoses and any hardware that may need to be accessed to adjust the reel or auger.

10. Orient the fittings and, if necessary, use a cable tie to ensure a minimum clearance of 20 mm (3/4 in.) between hoses and bolt at location (G).
11. Orient the fittings to provide a minimum of 10 mm (3/8 in.) clearance between the hoses and unplug the tool at location (H).
12. Orient the fittings to provide a minimum of 200 mm (7 7/8 in.) clearance between the end panel and the hoses in location (J).

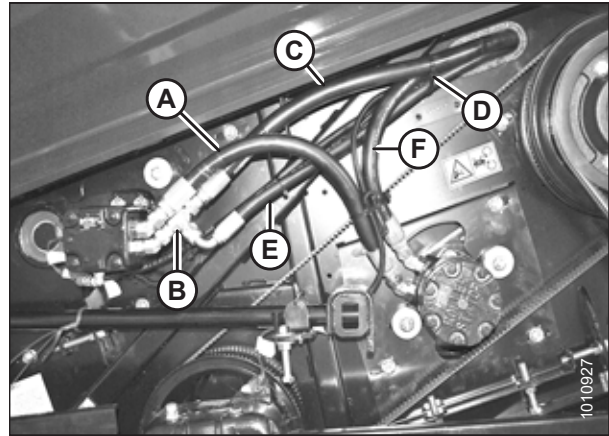


Figure 3.131: Adjusted Configuration – M100, M105, and M205

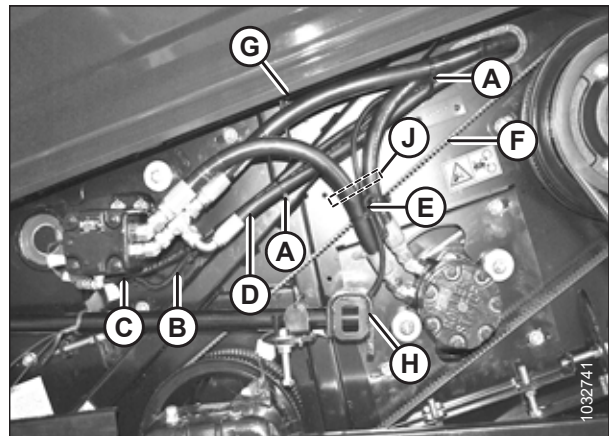


Figure 3.132: Adjusted Configuration – M100, M105, and M205



## ASSEMBLING MACHINE

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

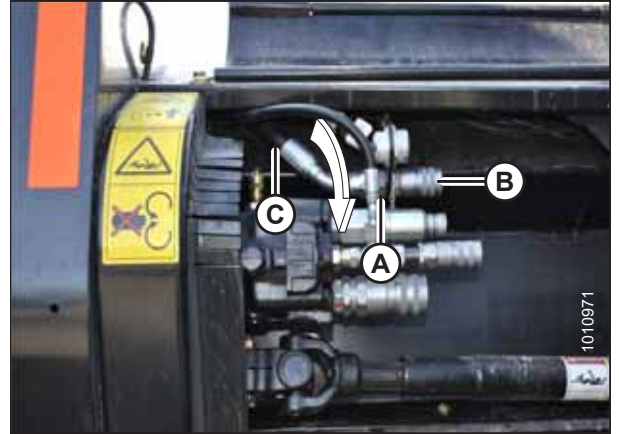


Figure 3.133: Auger and Reel Pressure Coupler and Hose – 4.9 m (16 ft.) Header Shown

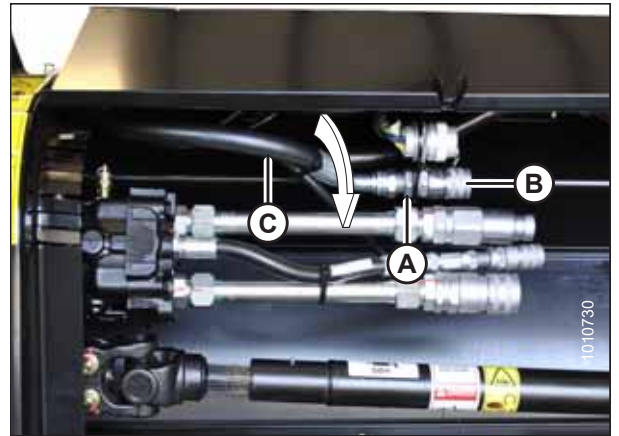


Figure 3.134: Auger and Reel Pressure Coupler and Hose – 5.5 m (18 ft.) Header Shown

14. **Headers sold in North America:** Close driveshield (B) and engage rubber latch (A).

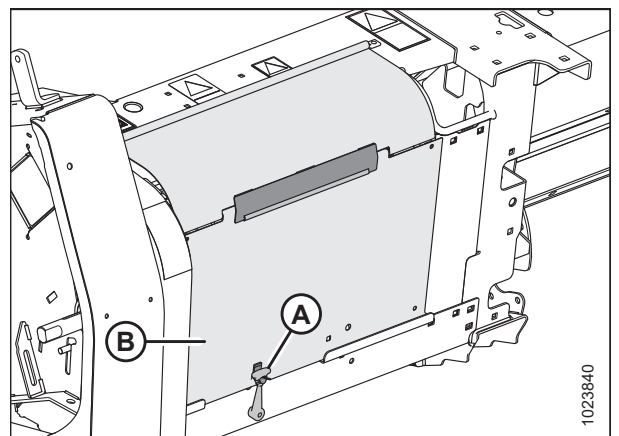
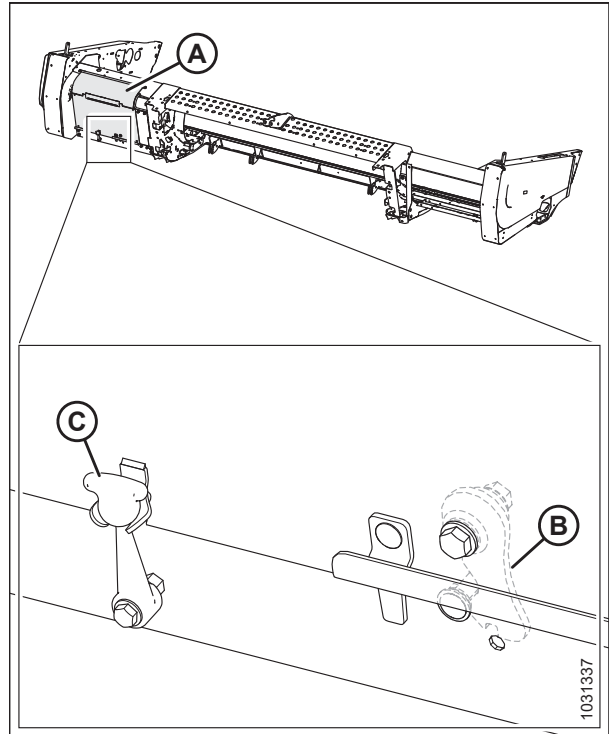


Figure 3.135: Driveshield – Headers Sold in North America

## ASSEMBLING MACHINE

15. **Headers sold outside North America:** Close driveshield (A). Latch (B) will automatically latch. Engage rubber latch (C).
16. Close the driveshield before engaging the header.
17. Proceed to [3.20 Repositioning Knife Drive Box Breathers](#), page 93.



**Figure 3.136: Driveshield – Headers Sold outside North America**

### 3.16 Attaching A40DX Auger Header Hydraulics to M1 and M2 Series Windrowers

The header's hydraulic multicoupler must be connected to the windrower before operation.

#### DANGER

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

This procedure is for A Series Headers equipped with the Auger Header Compatibility kit (B5998) or the A40D SP Grass Seed Auger Conversion kit (B6384). Kits B5998 and B6384 include a new manifold and hose bundle required for operation with an M1 and M2 Series Windrower, and effectively convert an A40D header into an A40DX header.

Refer to your windrower operator's manual for instructions for mechanically attaching an A40DX Auger Header to an M1 or M2 Series Windrower and for modifications to the windrower's hydraulic connections (if required).

Header drive hydraulic hoses and electrical harness are located on the left, cab-forward side of the windrower. To connect the hydraulic and electrical bundle from an A40DX header to an M1 or M2 Series Windrower, follow these steps:

1. Shut down the engine, and remove the key from the ignition.
2. Route header hose bundle through hose guide (A) on header as shown.

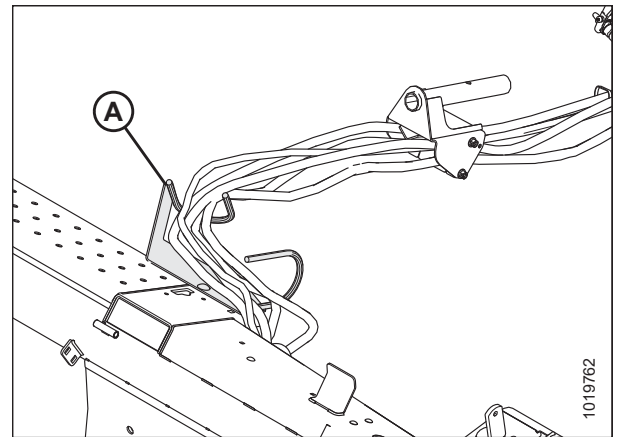


Figure 3.137: Hose Bundle

3. Insert hose support (B) into hole (A) in the windrower left leg, and route header hose bundle (C) under the windrower to the hydraulic and electrical couplers.

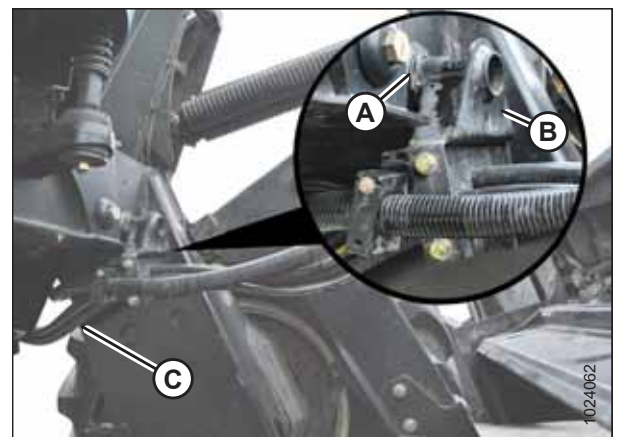


Figure 3.138: Hose Support

## ASSEMBLING MACHINE

- If attaching to a rotary disc-ready windrower, ensure knife drive hose (A) is connected to coupler (B).

### NOTE:

Hose (A) provides power to run the knife/conditioner.

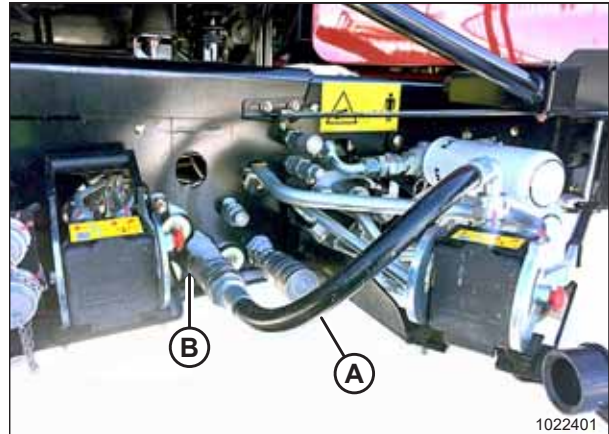


Figure 3.139: M1170/M1240 – Rotary Disc Header Configured

### NOTE:

M1170, M170 NT, M170 NT5, M2170, and M2170 NT Windrowers with standard auger/drafter configuration do **NOT** require the knife drive hose; only the two multicouplers (A) are used to connect the auger header.

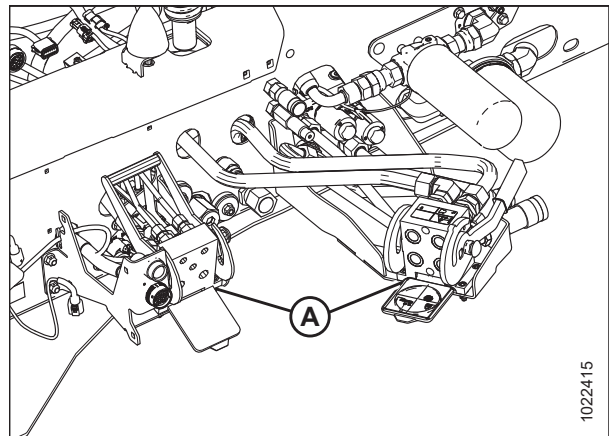


Figure 3.140: M1170 Standard Configuration – Auger/Drafter Ready

- Clean the multicouplers and the receptacles to prevent contamination.
- Push button (A) on the rear multicoupler receptacle and pull handle (B) away from the windrower.
- Open cover (C) and position multicoupler (D) onto the receptacle. Align the pins in the coupler with the slots in handle (B), and push the handle towards the windrower so that the coupler is locked onto the receptacle and button (A) snaps out.
- Push button (E) on the front multicoupler receptacle and pull handle (F) away from the windrower.
- Open cover (H) and position multicoupler (G) onto the receptacle. Align the pins in the coupler with the slots in the handle, and push handle (F) towards the windrower so that the coupler is locked onto the receptacle and button (E) snaps out.

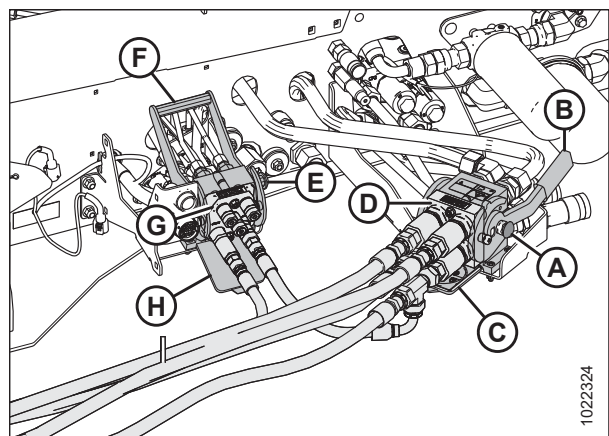


Figure 3.141: Multicouplers

## ASSEMBLING MACHINE

10. Remove the cover from receptacle (A) and connect the electrical harness from the header.

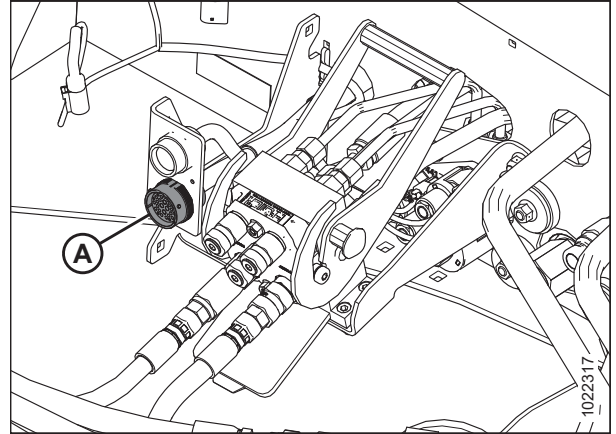


Figure 3.142: Windrower Electrical Connector

### *A40DX Grass Seed headers and A40DX headers equipped with Reel Speed Control kit (B6604)*

#### **NOTE:**

A40DX Grass Seed headers have a factory-installed reel speed kit and includes a second electrical connection required for attaching to an M1 or M2 Series Windrower. The Reel Speed Control kit (B6604) is an available option for an A40DX header.

11. **M1 or M2 Series only:** Remove the cover from receptacle (A) on the windrower and connect electrical harness (B) from the header.

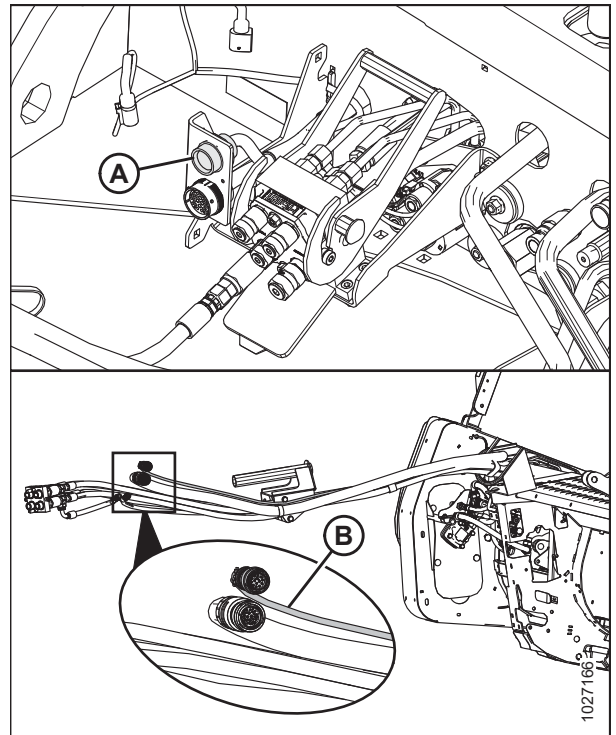


Figure 3.143: Electrical Connection

### 3.17 Hydraulic Drive Hose Routing – M1 and M2 Series Windrowers

Only A40DX and A40DX GSS headers are factory-configured for operation with M1 and M2 Series Windrowers.

**IMPORTANT:**

If attempting to attach an A40D Header to an M1170 or M1240 Windrower, the M1 Series Conversion kit (B5998) or the A40D SP Grass Seed Auger Conversion kit (B6384) must first be installed. These kits include a new manifold and hydraulic hose bundle required for operation with an M1 Series Windrower, and effectively convert an A40D header into an A40DX header.

**IMPORTANT:**

The Reel Speed Control kit (B6604) is standard on A40DX GSS headers starting in model year 2019. This kit can be ordered separately for A40DX GSS headers prior to model year 2019, and for A40DX headers.

A40DX and A40DX GSS hose routing does **NOT** require adjustment.

### 3.18 Attaching A40DX Auger Header to M1 Series Windrowers

The windrower's support feet and center-link will need to be connected to the auger header. The windrower may be equipped with an optional self-aligning hydraulic center-link, which allows control over the vertical position of the center-link from the cab.

#### DANGER

To prevent bodily injury or death from the unexpected startup of the machine, stop the engine and remove the key from the ignition before leaving the operator's seat.

#### DANGER

Ensure that all bystanders have cleared the area.

1. Remove hairpin (A) from pin (B). Remove the pin from header supports (C) on both sides of the header.
2. Start the engine.

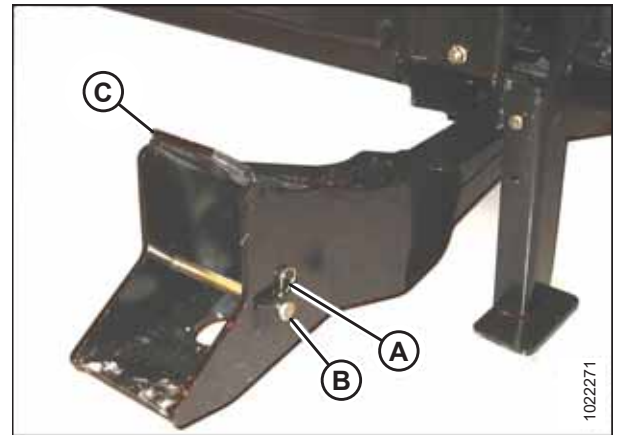


Figure 3.144: Header Support

3. If the header lift legs will be lowered **WITH** a header or weight box attached to the windrower, proceed to Step 7, [page 80](#).

If the header lift legs will be lowered **WITHOUT** a header or weight box attached to the windrower, fully release the tension in header float springs (A):

- If the Harvest Performance Tracker (HPT) displays a message saying that the float should be removed, then remove the float and proceed to Step 7, [page 80](#).
- If the HPT does **NOT** display a message saying that the float should be removed, then proceed to Step 4, [page 80](#) to remove the float manually.

#### IMPORTANT:

To lower the header lift legs without a header or a weight box attached to the windrower, ensure that the tension on the float springs is fully released. This will prevent damage to the header lift linkages.

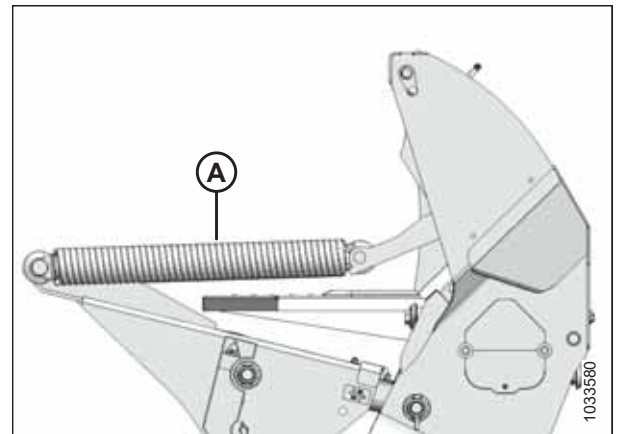


Figure 3.145: Header Float Springs



## ASSEMBLING MACHINE

4. Press HPT scroll knob (A) to highlight QuickMenu options.
5. Rotate HPT scroll knob (A) to highlight HEADER FLOAT symbol (B) and press the scroll knob to select it.



Figure 3.146: HPT Display

6. On the FLOAT ADJUST PAGE, press soft key 3 (A) to disable the float.



Figure 3.147: HPT Display

7. Press HEADER DOWN switch (A) on the ground speed lever (GSL) to fully retract the header lift cylinders.
8. **If the hydraulic center-link self-alignment kit is installed:** press REEL UP switch (B) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

### IMPORTANT:

Ensure that the center-link is positioned high enough that it does not contact the header as the windrower approaches the header.



Figure 3.148: GSL



9. **If the hydraulic center-link self-alignment kit is NOT installed:** relocate pin (A) in the frame linkage as needed to raise center-link (B) until the hook is above the attachment pin on the header.

**IMPORTANT:**

If the center-link is too low, it may contact the header as the windrower approaches the header.

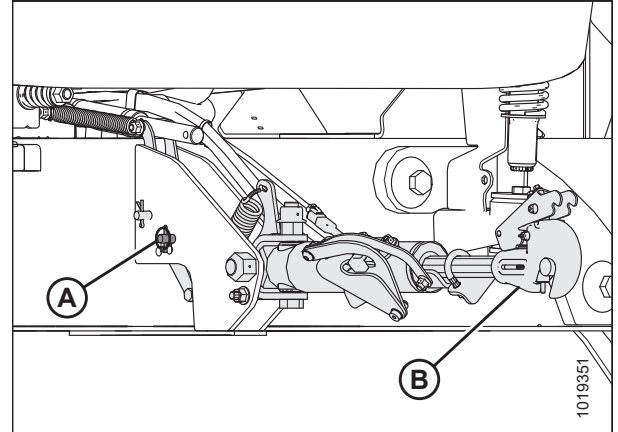


Figure 3.149: Hydraulic Center-Link without Self-Alignment Kit

10. Drive the windrower forward slowly, until feet (A) on the windrower enter supports (B) on the header. Continue to drive forward until the feet engage the supports and the header is nudged forward.

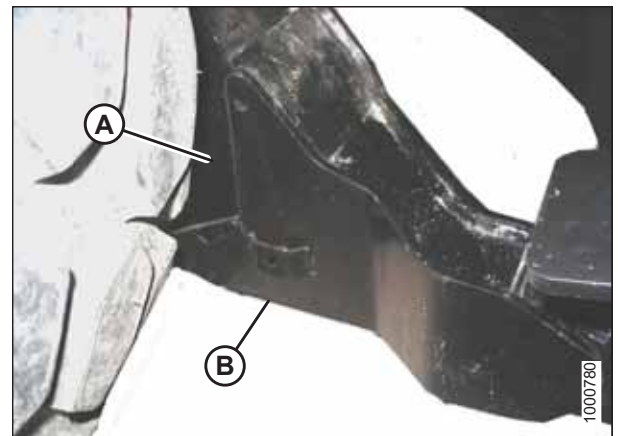


Figure 3.150: Header Support

11. **If the hydraulic center-link self-alignment kit is installed:** adjust the position of center-link cylinder (A) until hook (B) is above the header attachment pin.

12. **If the hydraulic center-link self-alignment kit is NOT installed:** push down on the rod end of link cylinder (C) until the hook engages and locks onto the header pin.

**IMPORTANT:**

Hook release (D) must be down to enable the self-locking mechanism. If the release is open (up), manually push it down after the hook engages the header pin.

13. **If the hydraulic center-link self-alignment kit is installed:** lower center-link (A) onto the header with the REEL DOWN switch on the GSL until it locks into position and hook release (D) is in the down position.

14. **If the hydraulic center-link self-alignment kit is installed:** check that the center-link is locked onto the header by pressing the REEL UP switch on the GSL.

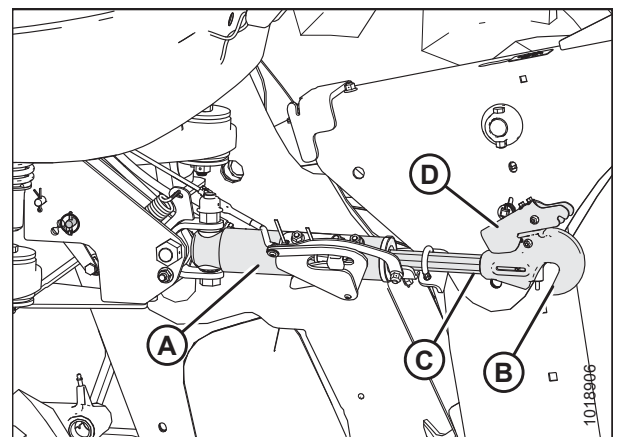


Figure 3.151: Hydraulic Center-Link

## ASSEMBLING MACHINE

15. Press HEADER UP switch (A) to raise the header to its maximum height.
16. If one end of the header does **NOT** fully rise, rephase the lift cylinders as follows:
  - a. Press and hold HEADER UP switch (A) until both cylinders stop moving.
  - b. Continue to hold the switch for 3-4 seconds. The lift cylinders are now phased.

### NOTE:

Repeating this procedure might be necessary if there is air in the hydraulic system.

17. Shut down the engine, and remove the key from the ignition.
18. Engage the safety props on both lift cylinders as follows:
  - a. Pull lever (A) toward you to release it, then rotate it toward the header to lower the safety prop onto the cylinder.
  - b. Repeat the previous step for the opposite lift cylinder.

### IMPORTANT:

Ensure that the safety props engage over the cylinder piston rods. If the safety prop does **NOT** engage properly, raise the header until the safety prop fits over the rod.

19. Install clevis pin (A) through the support and the foot, and secure it with a hairpin. Repeat this step for the opposite support.

### IMPORTANT:

Ensure that clevis pin (A) is fully inserted into the support and foot holes, and that the hairpin is installed behind the bracket.

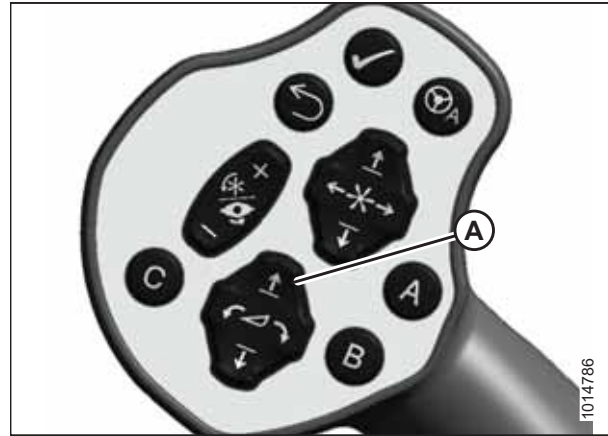


Figure 3.152: GSL

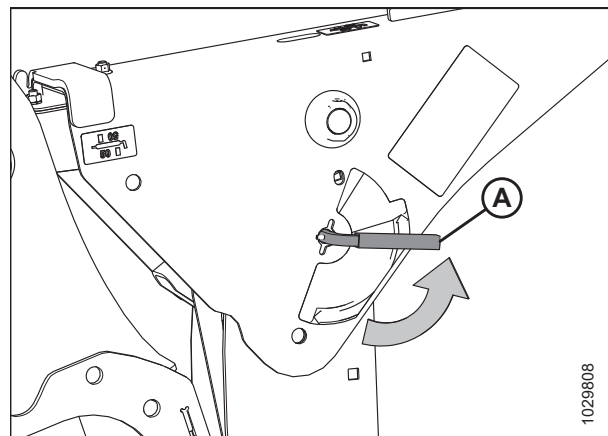


Figure 3.153: Safety Prop Lever

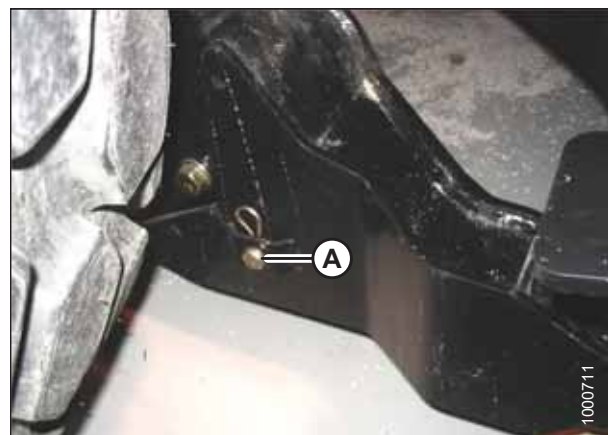


Figure 3.154: Header Support

## ASSEMBLING MACHINE

20. Remove the lynch pin from clevis pin (A) in stand (B).
21. Hold stand (B) and remove pin (A).
22. Move the stand to its storage position by inverting it and positioning it onto the bracket as shown. Reinsert clevis pin (A) and secure it with the lynch pin.

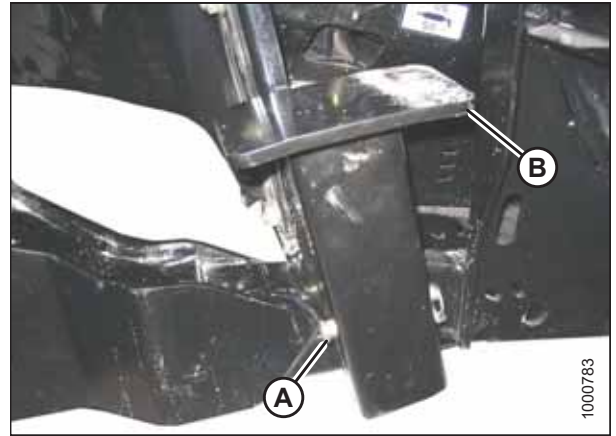


Figure 3.155: Header Stand

23. Disengage the safety props on both lift cylinders as follows:
  - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
  - b. Repeat the previous step for the opposite cylinder.

**NOTE:**

If the safety prop will **NOT** disengage, raise the header to release the prop.

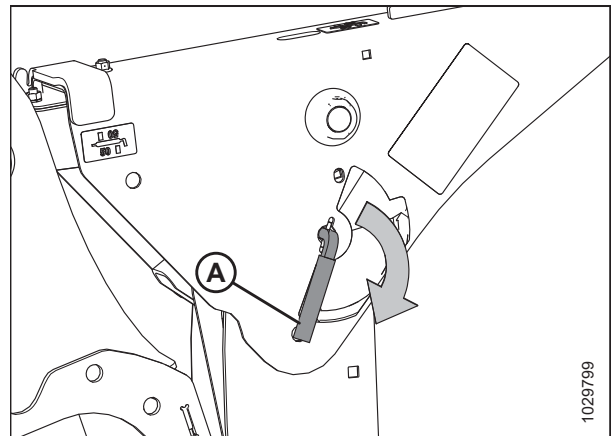


Figure 3.156: Safety Prop Lever

24. Start the engine and press HEADER DOWN switch (A) on the GSL to fully lower the header.

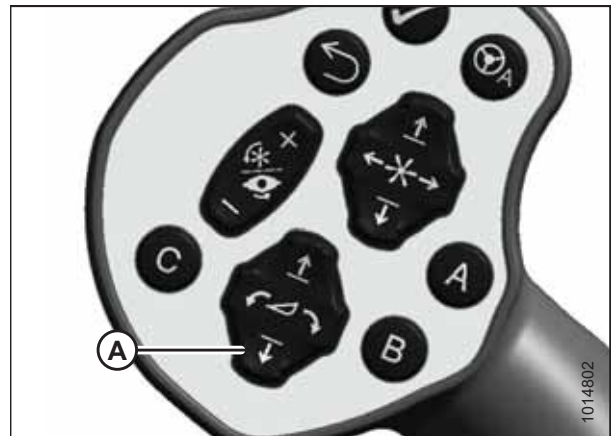


Figure 3.157: GSL

## ASSEMBLING MACHINE

25. Press rotary scroll knob (A) on the HPT to highlight the QuickMenu options.
26. Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B). Press the scroll knob to select it.



Figure 3.158: HPT Display

27. Turn scroll knob (A) to highlight left float (B) or right float (C). Press knob (A) to activate the selection.
28. Rotate scroll knob (A) to adjust the float setting. Press the knob to confirm the selection.

### IMPORTANT:

Adjusting the float by increments of 1.0 (out of 10) changes the header weight at the cutterbar by approximately 91 kg (200 lb.). Adjust the float in increments of 0.05 to fine-tune the float setting.

29. Shut down the engine, and remove the key from the ignition.
30. Grasp one end of the auger header and lift it. The lifting force used should be 357 N (80 lbf). Repeat this step on the other side of the header.



Figure 3.159: HPT Display

### 3.19 Attaching A40DX Auger Header to M2 Series Windrowers

The windrower's lift linkage and center-link will need to be connected to the header.

#### DANGER

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

#### DANGER

Ensure that all bystanders have cleared the area.

1. Shut down the engine, and remove the key from the ignition.
2. Remove hairpin (A) from pin (B). Remove the pin from header supports (C). Repeat this step at the opposite side of the header.
3. Start the engine.

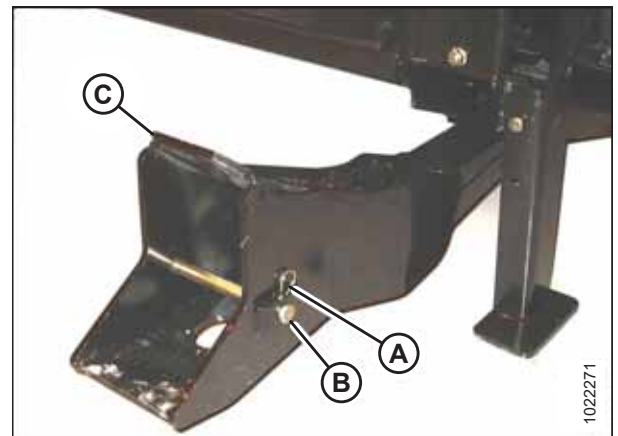
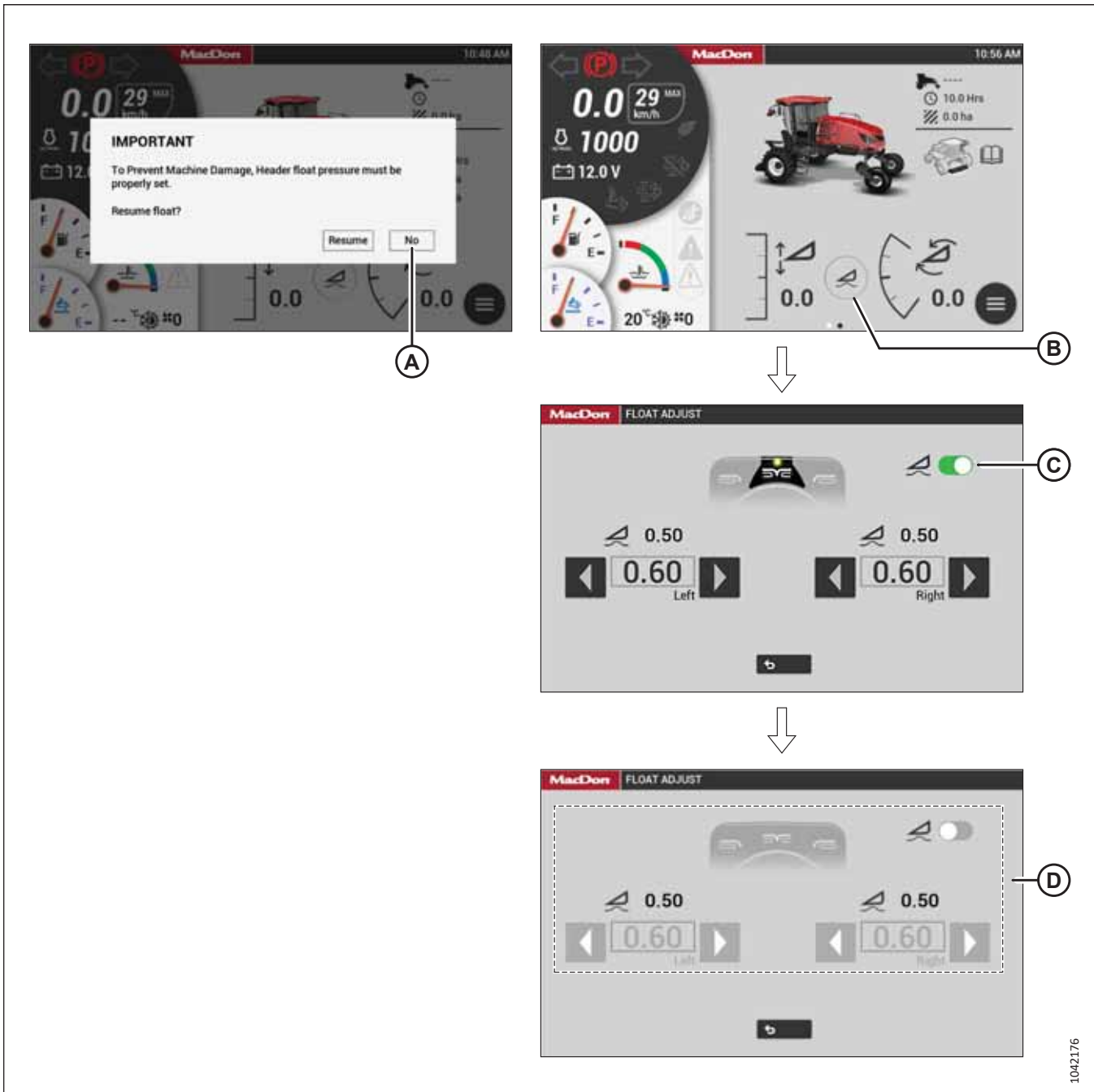


Figure 3.160: Header Support



**Figure 3.161: Float Removal**

4. Remove the float as follows:

- If the HarvestTouch™ Display shows the message “Resume Float?”, then select NO (A).
- If the HarvestTouch™ Display does **NOT** show the message, then select FLOAT ADJUST (B), select switch (C), and confirm the switch and float settings (D) are grayed out.

**IMPORTANT:**

Removing the float will release the tension in the float springs. This will prevent damage to the header lift linkages when lowering the legs without a header or weight box attached to the windrower.

## ASSEMBLING MACHINE

5. Prepare the center-link as follows:

- **If not equipped with the Center-Link Alignment kit:** Relocate pin (A) in the frame linkage as needed to raise center-link (B) until the hook is above the attachment pin on the header.
- **If equipped with the Center-Link Alignment kit:** Press REEL UP switch (D) on the ground speed lever (GSL) to raise the center-link until the hook is above the attachment pin on the header.

**IMPORTANT:**

Ensure that the center-link is positioned high enough that it does not contact the header as the windrower approaches the header.

6. Press HEADER DOWN switch (C) on the GSL until the windrower lift linkages are fully lowered.

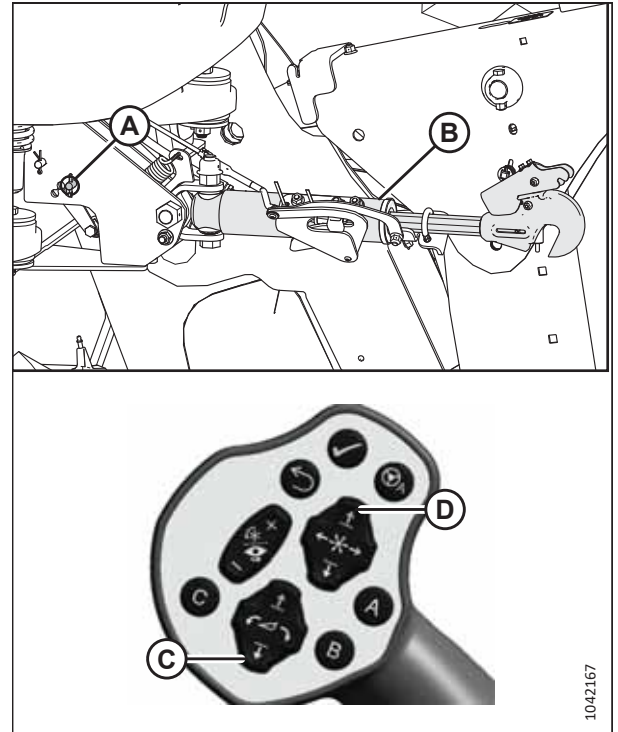


Figure 3.162: Center-Link without Self-Alignment

7. Drive the windrower forward slowly, until feet (A) on the windrower enter supports (B) on the header. Continue to drive forward until the feet engage the supports and the header is nudged forward.

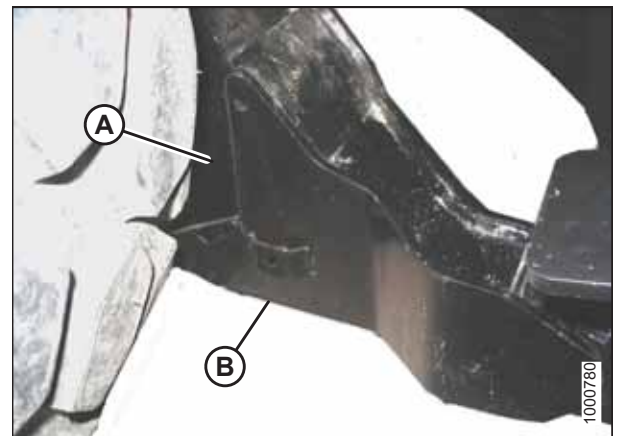


Figure 3.163: Header Support



8. Windrowers equipped with the Center-Link Alignment kit:

- a. Press HEADER TILT UP (A) or HEADER TILT DOWN (B) switches on the GSL to extend or retract the center-link cylinder until hook (C) is aligned with the header attachment pin.
- b. Lower the center-link onto the header with REEL DOWN (D) switch on the GSL until the center-link locks into position and hook release (E) is down.

**IMPORTANT:**

The hook release must be down to enable the self-locking mechanism. If the hook release is open (in the up position), manually push it down after the hook engages the pin.

- c. Check that the center-link is locked onto the header by pressing REEL UP (F) switch on the GSL.

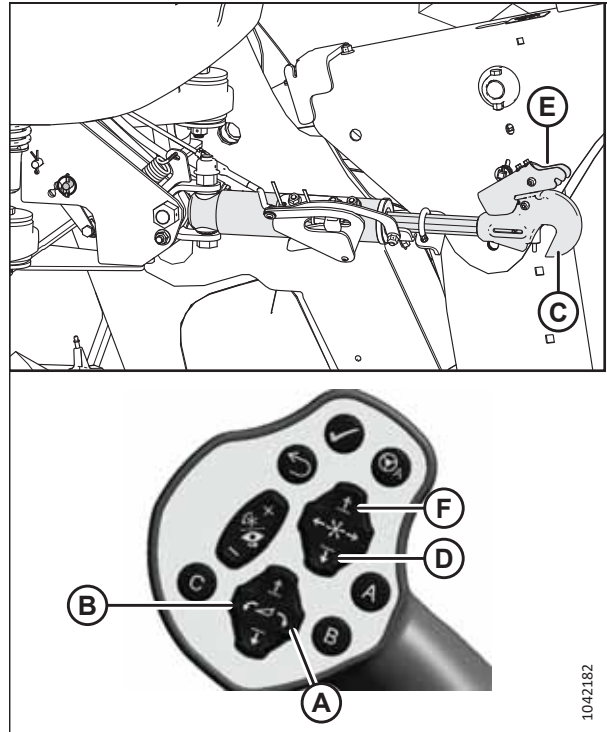


Figure 3.164: Hydraulic Center-Link

9. Windrowers without the Center-Link Alignment kit:

- a. Press HEADER TILT UP (A) or HEADER TILT DOWN (B) switches on the GSL to extend or retract the center-link cylinder until the hook is aligned with the header attachment pin.
- b. Shut down the engine, and remove the key from the ignition.
- c. Push down on rod end (C) of the link cylinder until hook (D) engages and locks onto the header pin.

**IMPORTANT:**

Hook release (E) must be down to enable the self-locking mechanism. If the hook release is open (in the up position), manually push it down after the hook engages the pin.

- d. Check that the center-link is locked onto the header by pulling upward on rod end (C) of the cylinder.
- e. Start the engine.

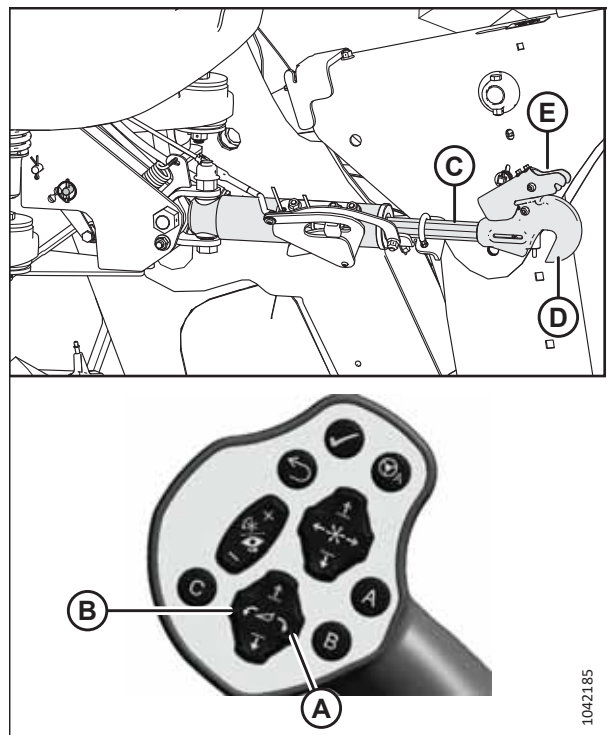


Figure 3.165: Hydraulic Center-Link



## ASSEMBLING MACHINE

10. Press HEADER UP switch (A) to raise the header to its maximum height.

**NOTE:**

If one end of the header does **NOT** fully rise, rephase the lift cylinders as follows:

- a. Press and hold HEADER UP switch (A) until both cylinders stop moving.
  - b. Continue to hold the switch for 3–4 seconds. The cylinders are now phased.
11. Shut down the engine, and remove the key from the ignition.

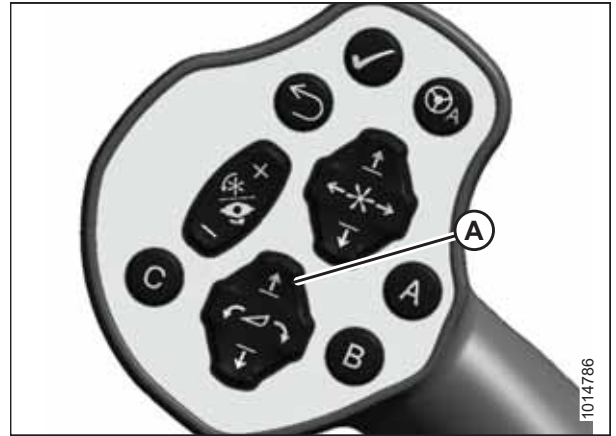


Figure 3.166: Ground Speed Lever (GSL)

12. Engage the safety props on both lift cylinders as follows:

- a. Pull lever (A) toward you to release it, then rotate it toward the header to lower the safety prop onto the cylinder.
- b. Repeat the previous step for the opposite lift cylinder.

**IMPORTANT:**

Ensure that the safety props engage over the cylinder piston rods. If the safety prop does **NOT** engage properly, raise the header until the safety prop fits over the rod.

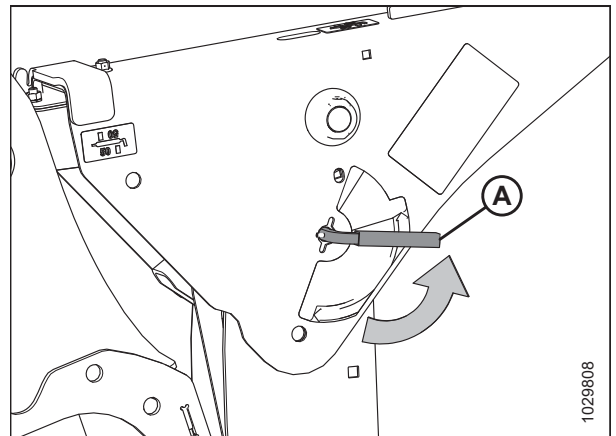


Figure 3.167: Safety Prop Lever

13. Install clevis pin (A) through the support and the foot, and secure it with a hairpin. Repeat this step for the opposite support.

**IMPORTANT:**

Ensure that clevis pin (A) is fully inserted into the support and foot holes, and that the hairpin is installed behind the bracket as shown.

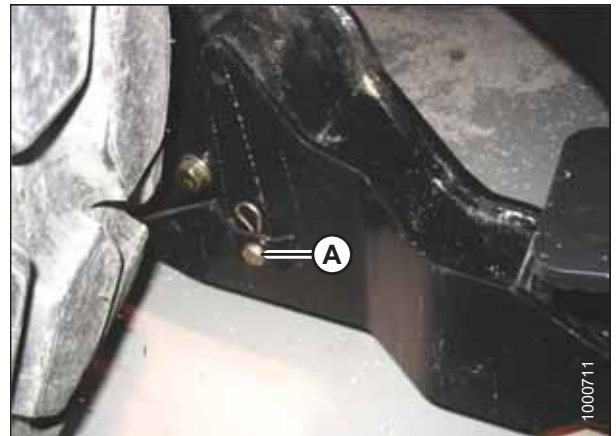


Figure 3.168: Header Support

## ASSEMBLING MACHINE

14. Remove the lynch pin from clevis pin (A) in stand (B).
15. Hold stand (B) and remove clevis pin (A).
16. Move the stand to its storage position by inverting it and positioning it onto the bracket as shown. Reinsert clevis pin (A) and secure it with the lynch pin.

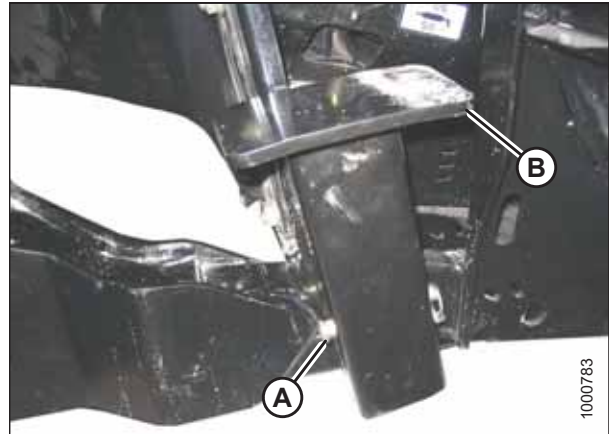


Figure 3.169: Header Stand in Storage Position

17. Disengage the safety props on both lift cylinders as follows:
  - a. Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
  - b. Repeat the previous step for the opposite cylinder.

**NOTE:**

If the safety prop will **NOT** disengage, raise the header to release the prop.

18. Start the engine.

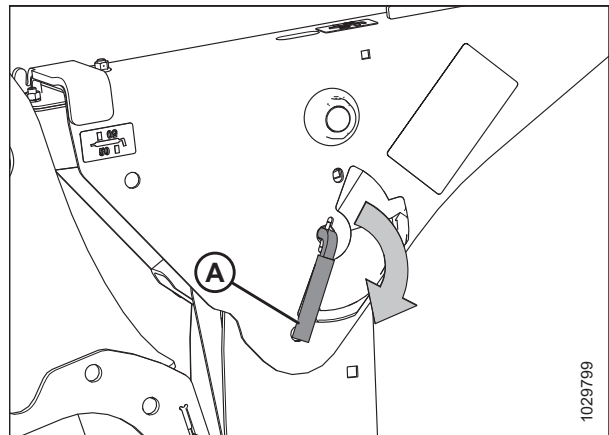


Figure 3.170: Safety Prop Lever

19. Press HEADER DOWN switch (A) on the GSL to fully lower the header.

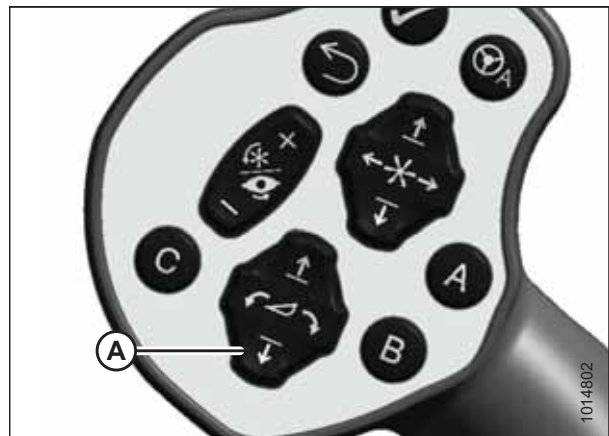


Figure 3.171: Ground Speed Lever (GSL)

20. Select FLOAT ADJUST (A).

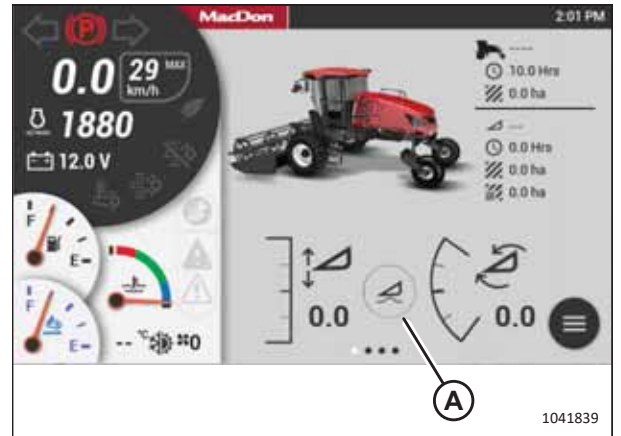


Figure 3.172: HarvestTouch™ Display

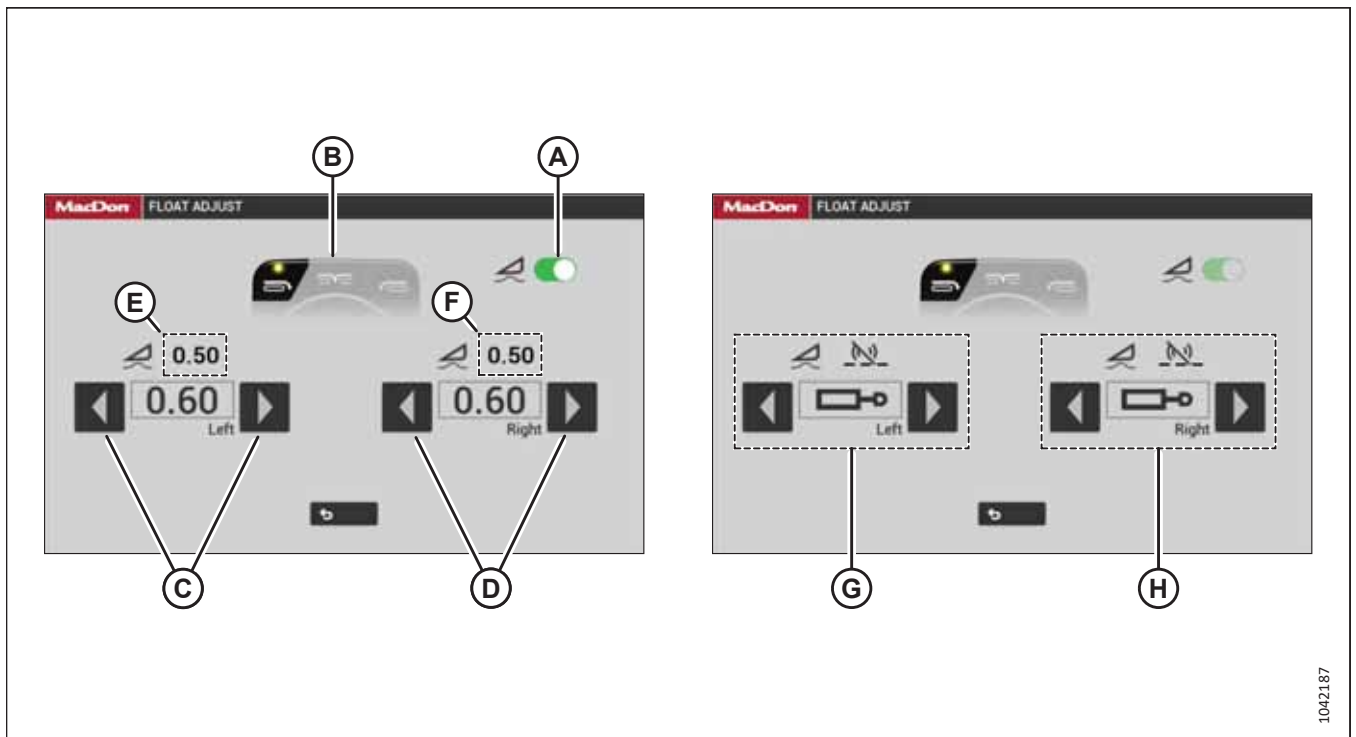


Figure 3.173: Float Adjustment

## ASSEMBLING MACHINE

21. Select switch (A), so that it turns green, to activate the float.
22. If the float is not already set up, set the float as follows:
  - a. The float preset, which is selected using the operator's console, is displayed at location (B). Confirm if the desired preset is selected.
  - b. Select arrows (C) to set the target float for the left side of the header. Value (E) is the actual amount of float (measured by the left float sensor).
  - c. Select arrows (D) to set the target float for the right side of the header. Value (F) is the actual amount of float (measured by the left float sensor).

**NOTE:**

Adjusting the float by increments of 1.0 (out of 10) changes the header weight at the cutterbar by approximately 91 kg (200 lb.). Adjust the float in increments of 0.05 to fine-tune the header's performance.

**NOTE:**

Symbols (G) and (H) mean the left and right float sensors are not working. You can still manually set the float, but you should first check if the sensors were disabled through the HarvestTouch™ Display (refer to MENU > SETUP > HEADER > SENSORS), or if another problem is causing the sensors to fail.

23. Shut down the engine, and remove the key from the ignition.
24. Check the float as follows:
  - a. Grasp one end of the draper header and lift it. The lifting force should be 335–380 N (75–85 lbf) (with stabilizer/transport wheels raised, if they are equipped).
  - b. Repeat this step on the other side of the header.
25. Proceed to .

### 3.20 Repositioning Knife Drive Box Breathers

There is one knife drive box at each end of the auger header. The knife drive boxes sit at different angles when in shipping and field positions. When the position is changed, the breathers need to be moved to make sure oil does **NOT** leak from the knife drive boxes.

1. Move breathers/dipsticks (A) to back port and install plug (B) in forward port of knife drive boxes.

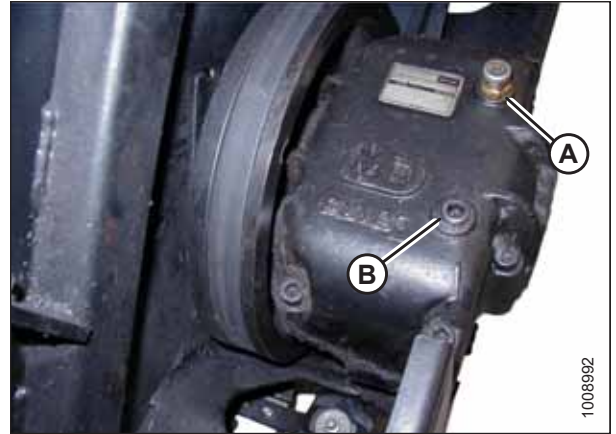


Figure 3.174: Top View of Knife Drive Box

2. With the top of the knife drive box horizontal, check the oil level. It should be between lower hole (A) and the end of the dipstick.
3. If required, add SAE 85W-140 lubricant.

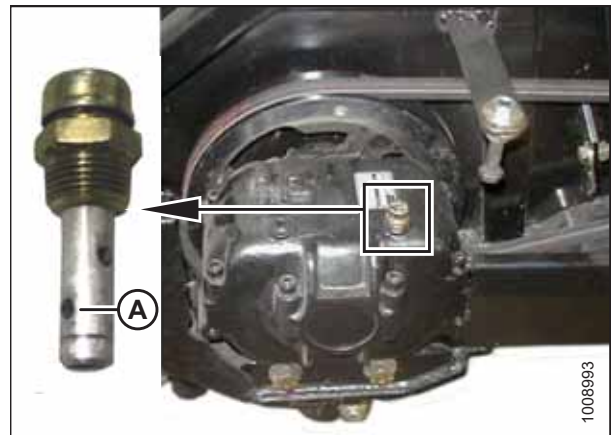


Figure 3.175: Side View of Knife Drive Box and Close-up of Dipstick



## Chapter 4: Lubricating the Machine

### 4.1 Greasing Procedure

#### DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. If the header is raised, engage the header safety props.
3. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
4. Inject grease through fitting with grease gun until grease overflows fitting, except where noted.
5. Leave excess grease on fitting to keep out dirt.
6. Replace any loose or broken fittings immediately.
7. If fitting will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

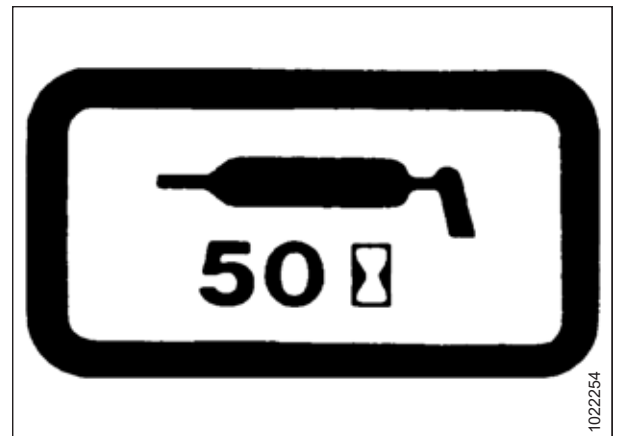


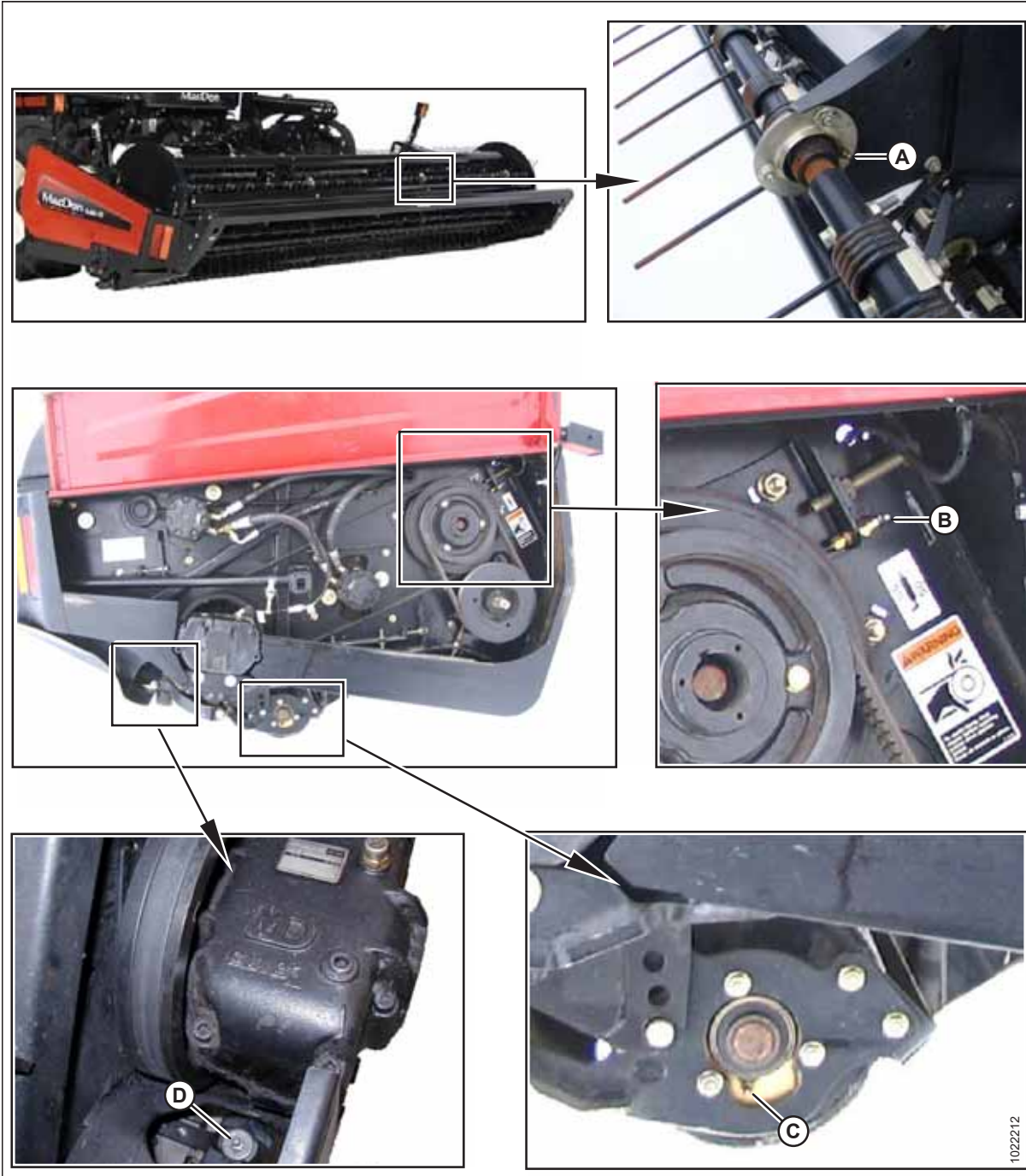
Figure 4.1: Grease Interval Decal

## 4.2 Lubrication Points – Left Side of Header

**NOTE:**

Use high temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2) lithium base. To prevent binding and/or excessive wear caused by knife pressing on guards, do **NOT** over-grease. If more than 6 to 8 pumps of grease gun are required to fill the cavity, replace the seal in the knifehead.

Figure 4.2: Header Left Side



A - Tine Bar Bearing (4 Places – Each Tine Bar)  
 C - Gauge Roller Bearing (2 Places) (Both Sides if Installed)

B - Knife Drive Bearing (1 Place)  
 D - Knifehead Bearing (1 Place)



### 4.3 Lubrication Points – Right Side of Header

**NOTE:**

Use high temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2) lithium base. To prevent binding and/or excessive wear caused by knife pressing on guards, do **NOT** over-grease. If more than 6 to 8 pumps of grease gun are required to fill the cavity, replace the seal in the knifehead.

Figure 4.3: Header Right Side



A - Knife Drive Bearing (1 Place)  
C - Auger Shaft Bearing (1 Place)

B - Reel Shaft Bearing (1 Place)  
D - Knifehead Bearing (1 Place)

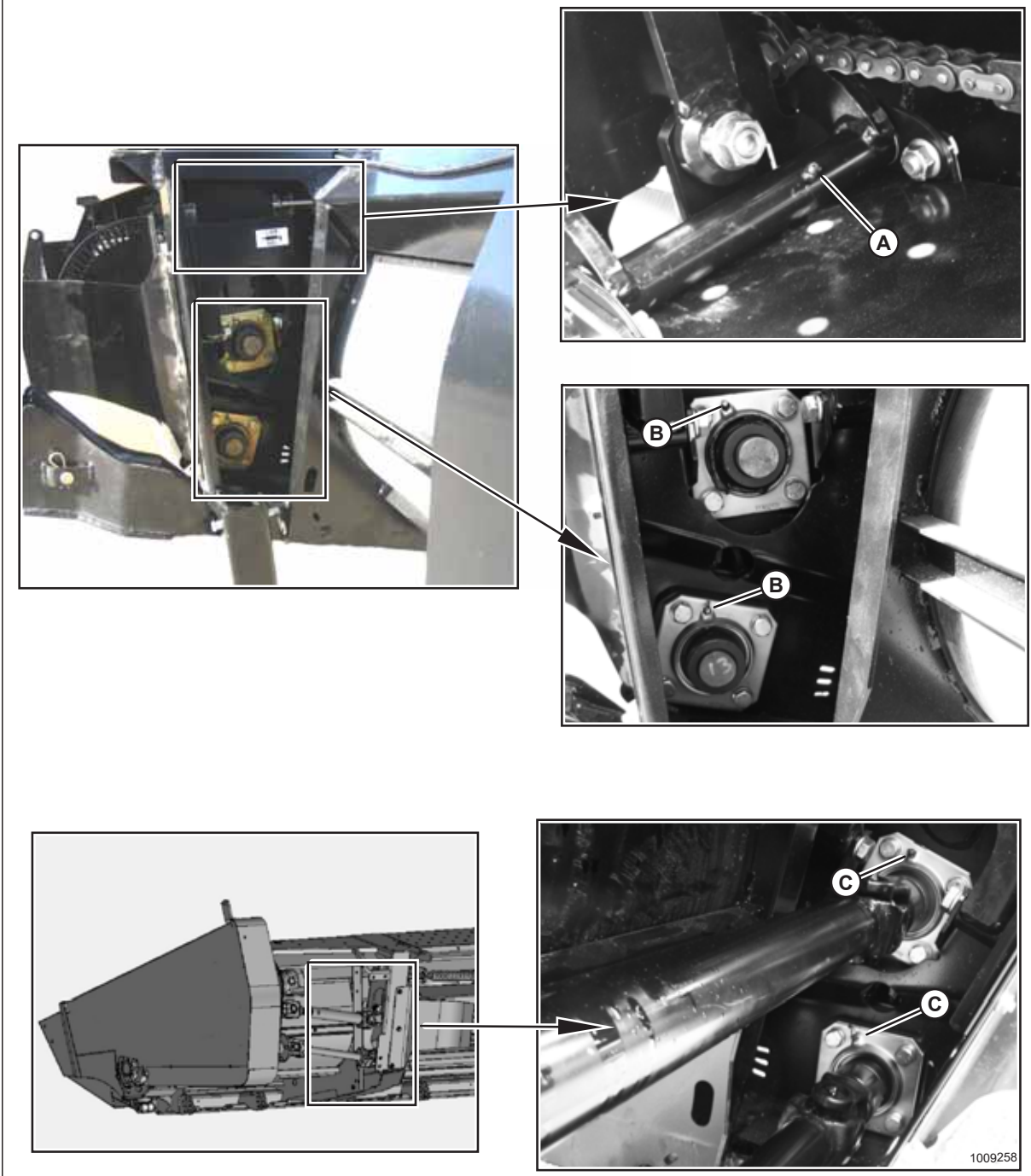
### 4.4 Lubrication Points – Hay Conditioner

There are several points on the hay conditioner which will require lubrication.

**NOTE:**

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

Figure 4.4: Hay Conditioner



A - Roll Pivot (1 Place - Both Sides)

B - Roll Shaft Bearings (2 Places)

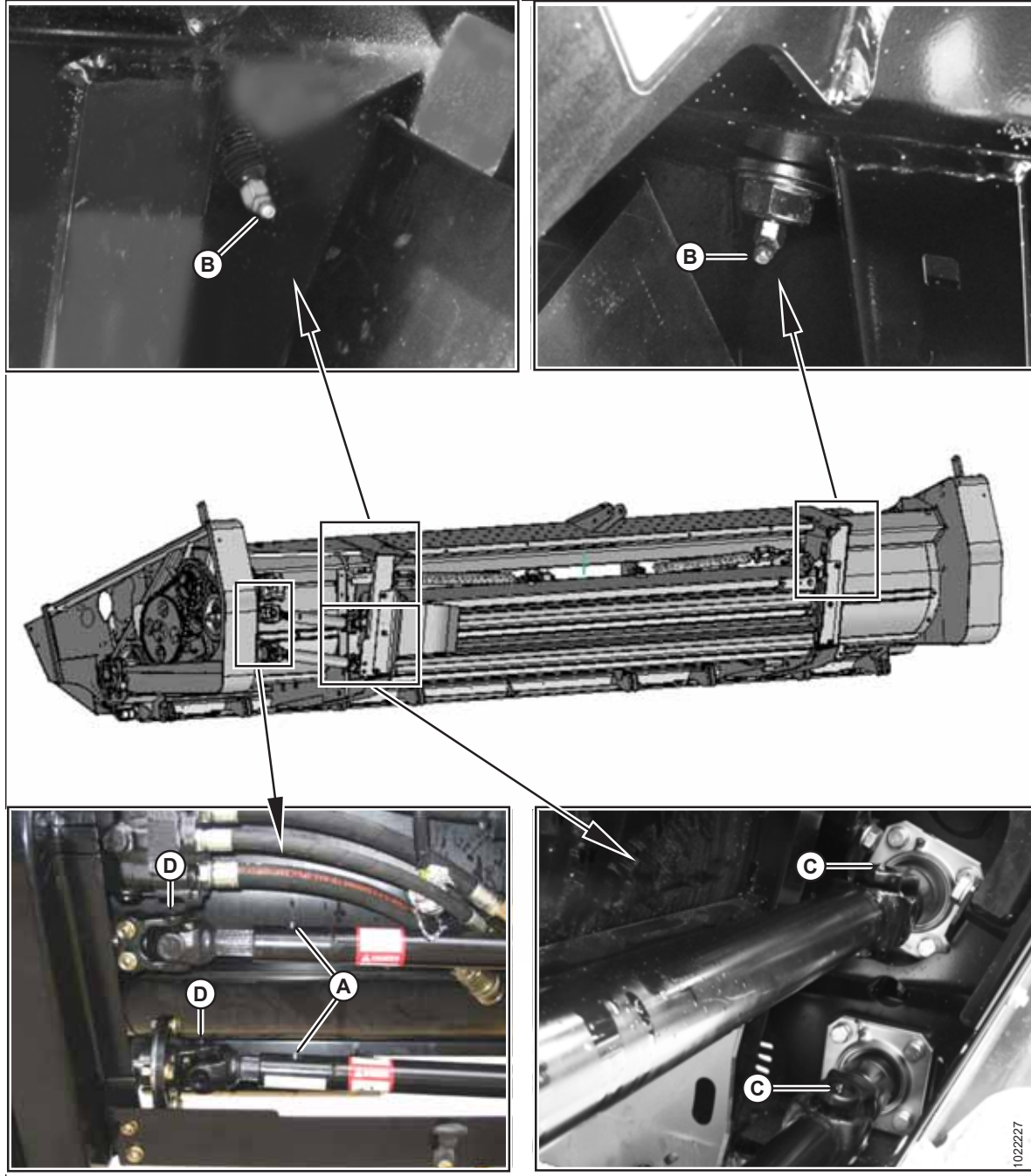
C - Roll Shaft Bearings (2 Places)

## 4.5 Lubrication Points – Drivelines

**NOTE:**

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

Figure 4.5: Drivelines



A - Driveline Shafts (2 Places)<sup>2</sup>  
 D - Driveline Universals (2 Places)

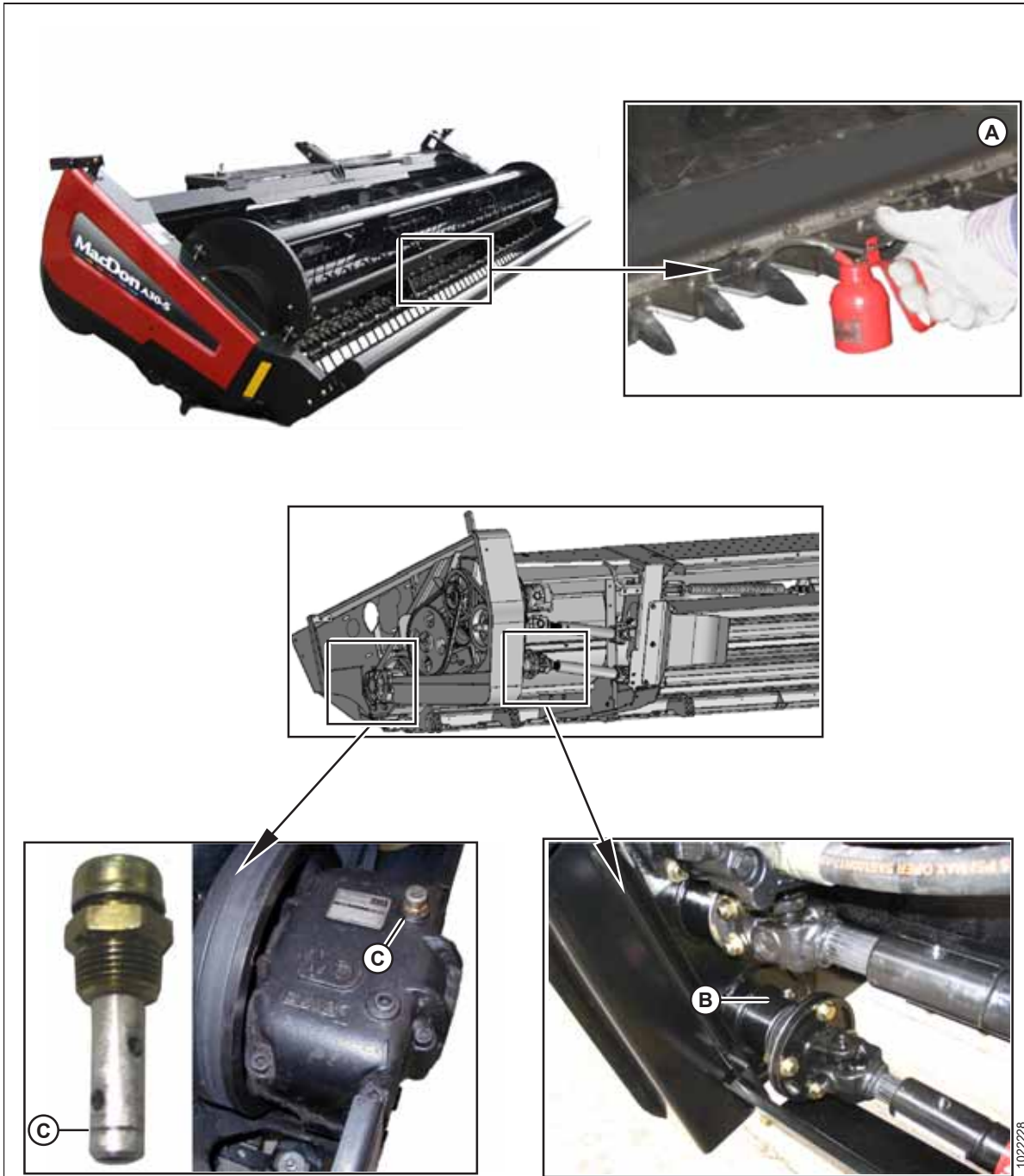
B - Cross Shafts (2 Places)

C - Driveline Universals (2 Places)

2. 10% moly grease is recommended for driveline shaft slip joints **ONLY**.

## 4.6 Lubrication Points – Knife and Gearbox

There are several points on the knife and the gear which will require lubrication.



**Figure 4.6: Knife and Gearbox**

A - Oil the Knife Daily Except in Sandy Soil (SAE 30)

B - Check the Roll Gearbox (1 Place)<sup>4</sup>

C - Knife Drive Box (2 Places)<sup>3</sup>

3. Check oil level with the header down on level ground.

4. Header should be on the ground.



## Chapter 5: Performing Predelivery Checks

### DANGER

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

#### IMPORTANT:

To avoid machine damage, check that no shipping dunnage has fallen down between auger and pans.

1. Perform final checks and adjustments as listed on the Predelivery Checklist (yellow sheet attached to back of this instruction – *Predelivery Checklist, page 155*) to ensure the machine is field-ready. Refer to the following pages for detailed instructions as indicated on the checklist.
2. The completed checklist should be retained either by the Operator or the Dealer.

### 5.1 Checking Drive Belts and Chains

1. Open endshield on header right side.
2. Check knife drive timing belt (A). It should deflect 14 mm (9/16 in.) when a load of 22–30 N (5–6.5 lbf) is applied mid span.

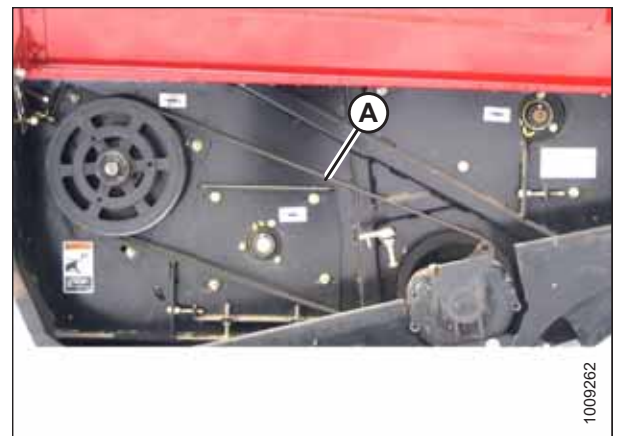


Figure 5.1: A40D Header Right Side

3. Open endshield on header left side.
4. Check knife drive timing belt (A). It should deflect 14 mm (9/16 in.) when a load of 22–30 N (5–6.5 lbf) is applied mid span.
5. Check knife drive V-belts (B). They should deflect 4 mm (3/16 in.) when a load of 35–40 N (8–12 lbf) is applied to each belt mid span.
6. Close endshields.



Figure 5.2: A40D Header Left Side

## 5.2 Checking Auger Stripper Bar Clearance

1. Check for signs of auger flighting (A) rubbing stripper bars (B) after run-up.

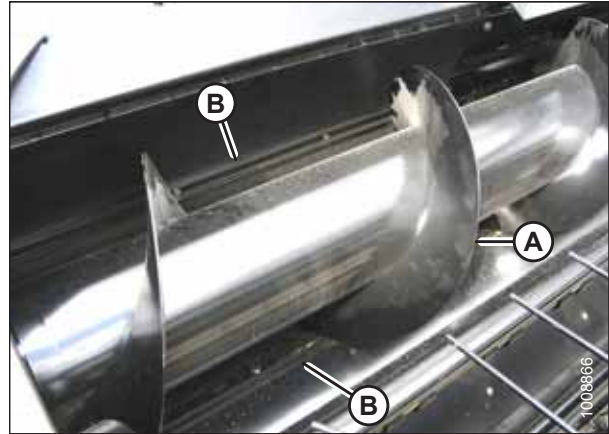


Figure 5.3: Auger

2. Check clearance between auger flighting (A) and stripper bars (B).

**NOTE:**

The auger flighting (A) should clear the stripper bars (B) on the auger pan by approximately 1–4 mm (1/32–5/32 in.). Shimming the stripper bars may be required.

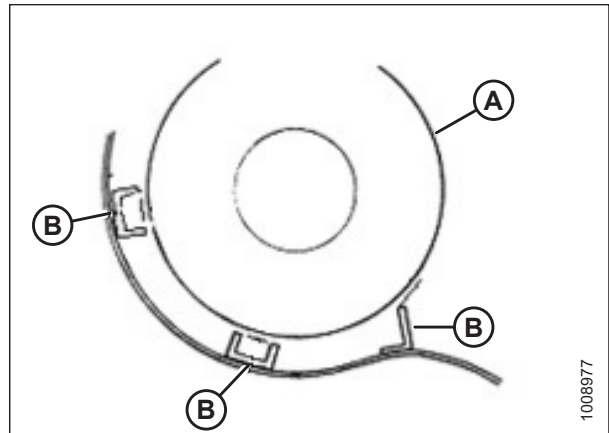


Figure 5.4: End View Diagram Showing Auger and Stripper Bars

### 5.3 Checking Reel Tine to Header Pan Clearance

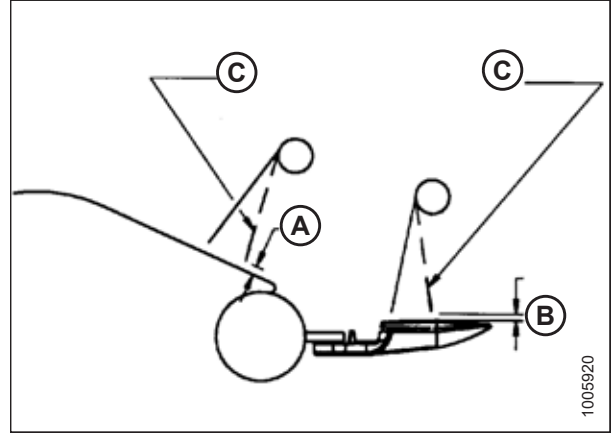
**IMPORTANT:**

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

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

**IMPORTANT:**

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



**Figure 5.5: Reel Tine to Header Pan Clearance**

A - 2–10 mm (1/16–3/8 in.) Clearance

B - 2 mm (1/16 in.) Minimum to Knife Section

C - Flex Tines Back When Checking Clearance



## 5.4 Checking and Adjusting Float – M Series Self-Propelled Windrowers

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

### DANGER

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

### DANGER

Ensure that all bystanders have cleared the area.

#### NOTE:

Always check the float with the header set in the working position (with the header fully lowered to the ground and the header angle set to the desired cutting height per crop type and conditions).

To check and adjust the float, follow these steps:

1. Using the header tilt switches on the in-cab controls, set the header center-link to the mid-range position (5.0 on the cab display module). Refer to your windrower operator's manual for detailed instructions.
2. Lower the header fully with the lift cylinders fully retracted.
3. Set left and right float fine adjustments to mid-range position (5.0 on the cab display module). For instructions, refer to your windrower operator's manual.
4. Shut down the engine, and remove the key from the ignition.
5. Check the float by grasping the lean bar and lifting. The lifting force should be 335–380 N (75–85 lbf) and should be approximately the same at both ends.
6. If necessary, perform the following steps to adjust the float:
  - a. Raise the header fully, shut down the engine, and remove the key from the ignition.
  - b. Turn drawbolt (A) clockwise to increase the float (makes the header lighter) or counterclockwise to decrease the float (makes the header heavier).

#### NOTE:

The illustration shows the top of the windrower wheel leg member.

- c. Recheck the float.



Figure 5.6: Drawbolt

## 5.5 Checking and Adjusting Float – M1 Series Windrowers

Header float on M1 and Windrowers are completely adjustable from the cab through Harvest Performance Tracker (HPT).

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

### 5.5.1 Checking Float – M1 Series Windrowers

You can check the header float setting by measuring the force required to lift the header.

#### DANGER

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

#### DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Use HEADER TILT switches (A) on the ground speed lever (GSL) to set the center-link to the mid-range position.
3. Using HEADER DOWN switch (B), lower the header fully. The header lift cylinders will fully retract.
4. Ensure the header is level with the ground with zero tilt.

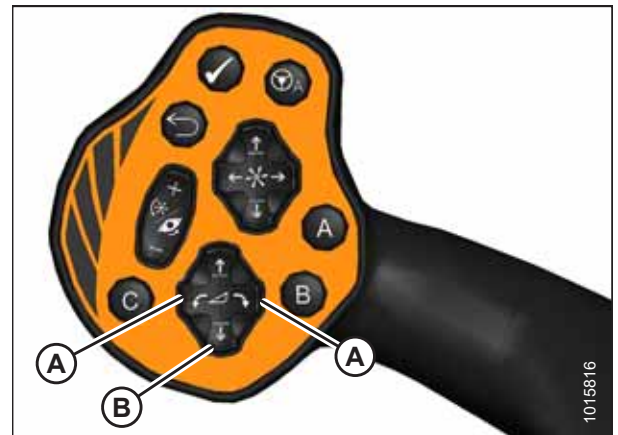


Figure 5.7: Ground Speed Lever (GSL)

5. Shut down the engine, and remove the key from the ignition.
6. Grasp one end of the header and lift it up. The lifting force should be 335–380 N (75–85 lbf) and should be the same at both ends.
7. Restart the engine, and adjust the float as needed. For instructions on adjusting the float with M1 Series Windrowers, refer to [5.5.2 Setting Float – M1 Series Windrowers, page 106](#).

#### NOTE:

Increasing the float makes the header feel lighter.

## 5.5.2 Setting Float – M1 Series Windrowers

The float can be set for windrowing with the cutterbar on the ground.

The optimum float setting lets the header follow the contour of the terrain.

1. Set the center-link to the mid-range position (5.0 on the Harvest Performance Tracker [HPT]). For instructions, refer to the windrower operator's manual.
2. Lower the header until the cutterbar is on the ground.

**NOTE:**

To minimize scooping rocks when operating at the flattest header angle, lower the header skid shoes. For instructions, refer to the header operator's manual.

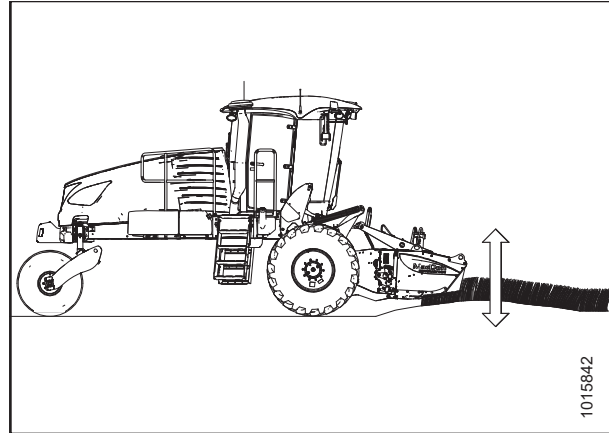


Figure 5.8: Header Float – Cutterbar on Ground

3. Press rotary scroll knob (A) on the to display the QuickMenu page.
4. Rotate scroll knob (A) to highlight header float icon (B) and press the scroll knob to select.



Figure 5.9: HPT Run Screen

5. Turn scroll knob (A) to highlight left (B) or right float (C) and press knob (A) to activate the selection.
6. Rotate scroll knob (A) to adjust the float setting and press the knob.

**NOTE:**

Float adjustments of 1.0 (out of 10) change the header weight at the cutterbar by approximately 91 kg (200 lb.). Adjust the float in increments of 0.05 to optimize field performance.

7. Press soft key 3 (D) to remove or resume the header float.



Figure 5.10: HPT Float Settings

### 5.5.3 Removing and Restoring Float – M1 Series Windrowers

The header float can be removed and restored using the Harvest Performance Tracker (HPT).

1. To display the QuickMenu page, press rotary scroll knob (A) on the HPT or press F1 on the console.
2. Rotate scroll knob (A) to highlight HEADER FLOAT icon (B) and press the scroll knob to select.



Figure 5.11: HPT Run Screen

3. Press soft key 3 (A) to remove or restore the header float.

**NOTE:**

If the header float is active, the icon at soft key 3 will say REMOVE FLOAT; if the header float has been removed, the icon will say RESTORE FLOAT.



Figure 5.12: HPT Display – Adjusting Float

### 5.5.4 Setting Float Options with Fixed Deck – M1 Series Windrowers

When an M1 Series Windrower not equipped with the deck shift feature is paired with an A40DX Auger Header, the DECK SHIFT buttons can be used to store three different float settings. This is useful when cutting in varying ground conditions, or when having one side lighter is desirable (such as cutting along wheel tracks or irrigation borders).

**⚠ DANGER**

Ensure that all bystanders have cleared the area.

## PERFORMING PREDELIVERY CHECKS

1. Start the engine and use HEADER TILT switches (A) and (B) on the ground speed lever (GSL) to set header tilt to the mid-range position.

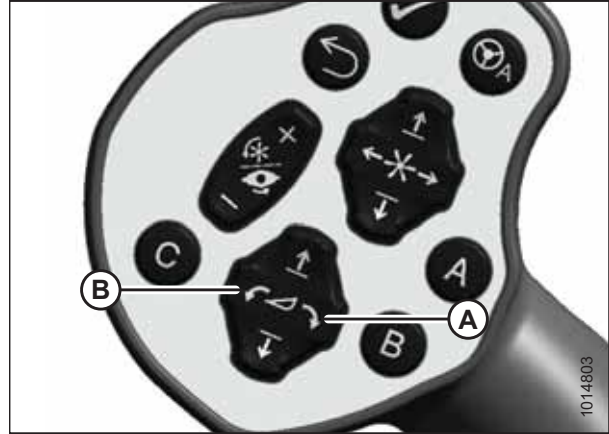


Figure 5.13: GSL

2. Engage the header by pushing and holding down HEADER ENGAGE switch (A), and pulling up on collar (B).



Figure 5.14: Header Engage Switch

3. Select one of the following deck positions using the DECK SHIFT switches on the operator's console:
  - Right-side delivery (A)
  - Center delivery (B)
  - Left-side delivery (C)

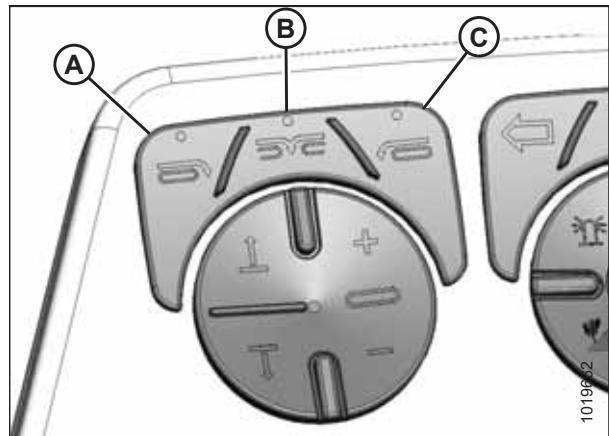


Figure 5.15: Header Deck Shift Switches

## PERFORMING PREDELIVERY CHECKS

4. Disengage the header by pushing down on HEADER ENGAGE switch (A).
5. Adjust the float setting for the selected deck position. For instructions, refer to [5.5.2 Setting Float – M1 Series Windrowers, page 106](#).
6. Repeat previous steps for the other deck positions.



Figure 5.16: Header Engage Switch

## 5.6 Checking and Adjusting Float – M2 Series Windrowers

The windrower is equipped with float springs that are fully adjustable with hydraulic cylinders. Spring tension is adjustable from zero to maximum tension through the HarvestTouch™ Display.

The header float feature allows the header to follow the contours of the ground closely as the windrower moves forward. The header is able to respond to sudden changes in elevation or obstacles quickly. The float setting is ideal when the cutterbar rides along the ground with minimal bouncing, and without scooping or pushing soil.

### IMPORTANT:

- Configure the header float setting to be as light as possible, while limiting the amount of bouncing produced by the header. Doing so will reduce the amount of wear placed on knife components, and will prevent the header from scooping soil.
- Prevent the header from bouncing excessively by operating at a slower ground speed when the float setting is light. A bouncing header results in raggedly cut crop.
- Adjust the float when adding or removing optional attachments.

### 5.6.1 Checking Float – M2 Series Windrowers

The instructions in this section will show you how to check the header float setting by measuring the force required to lift the header.

#### DANGER

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

#### DANGER

Ensure that all bystanders have cleared the area.

1. Use HEADER TILT switches (A) on the ground speed lever (GSL) to set the center-link to the mid-range position (5.0) on the HarvestTouch™ Display.
2. Using HEADER DOWN switch (B), lower the header fully.
3. Ensure the header is level with the ground with zero tilt.

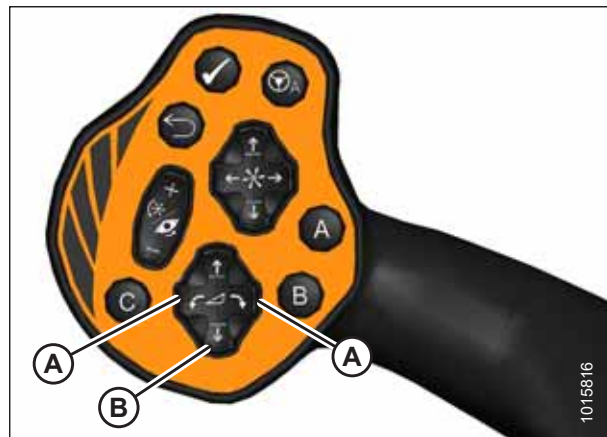


Figure 5.17: GSL

4. Shut down the engine, and remove the key from the ignition.
5. Grasp one end of the header and lift it up. Lifting force should be 335–380 N (75–85 lbf) and should be the same at both ends.



## PERFORMING PREDELIVERY CHECKS

- Restart the engine and adjust the float as needed. For instructions, refer to [5.6.2 Setting Float – M2 Series Windrowers](#), page 111.

### NOTE:

Increasing the float value on the HarvestTouch™ Display makes the header feel lighter.

## 5.6.2 Setting Float – M2 Series Windrowers

The float can be set for windrowing with the cutterbar on the ground.

The optimum float setting lets the header follow the contour of the terrain.

- Set the center-link to the mid-range position (**5.0** on the HarvestTouch™ Display). For instructions, refer to the windrower operator's manual.
- When cutting on the ground, lower the header until the cutterbar is on the ground.

### NOTE:

To minimize scooping rocks when operating at the flattest header angle, lower the header skid shoes. For instructions, refer to the header operator's manual.

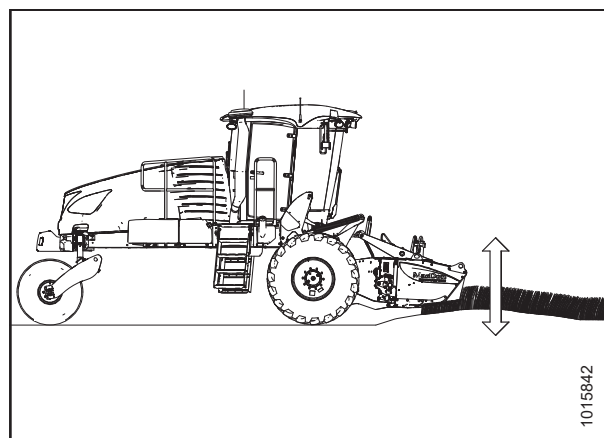


Figure 5.18: Header Float – Cutterbar on Ground

- Press FLOAT SETTINGS icon (A) on the HarvestTouch™ Display to show the float setting page.

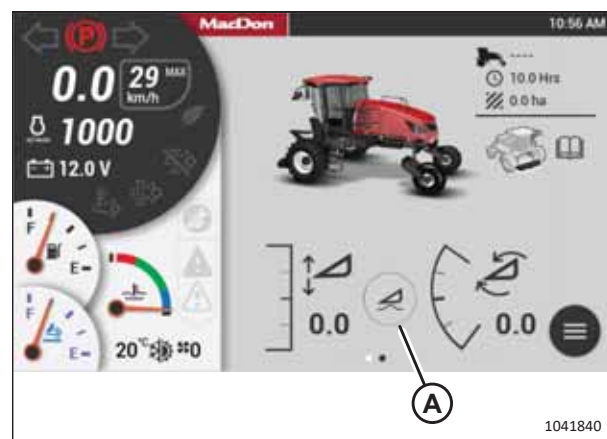


Figure 5.19: HarvestTouch™ Display

## PERFORMING PREDELIVERY CHECKS

- Press arrows (A) to adjust left or right float settings.

### NOTE:

Float adjustments of 1.0 (out of 10) change the header weight at the cutterbar by approximately 91 kg (200 lb.). Adjust the float in increments of 0.05 to optimize field performance.

- Press switch (B) to remove or resume the header float.

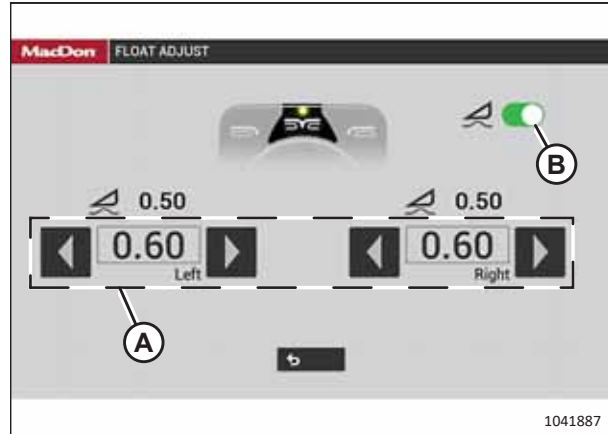


Figure 5.20: HarvestTouch™ Display

### 5.6.3 Removing and Restoring Float – M2 Series Windrowers

The header float can be removed and restored using the HarvestTouch™ Display.

#### DANGER

Ensure that all bystanders have cleared the area.

#### DANGER

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

- Disengage the safety props on both lift cylinders as follows:
  - Turn lever (A) away from the header to raise the safety prop until the lever locks into the vertical position.
  - Repeat the previous step for the opposite cylinder.

### NOTE:

If the safety prop will **NOT** disengage, raise the header to release the prop.

- Start the engine.

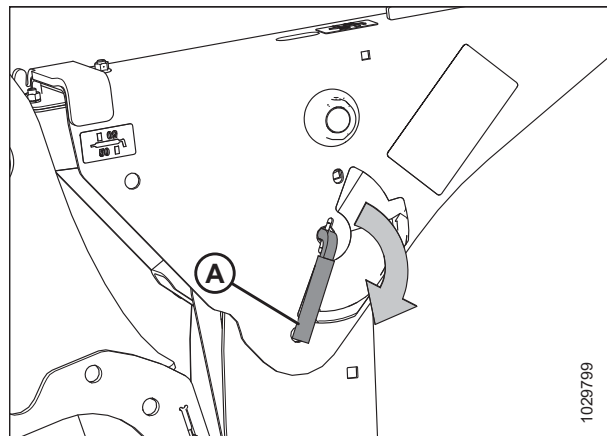


Figure 5.21: Safety Prop Lever

## PERFORMING PREDELIVERY CHECKS

3. Press HEADER DOWN switch (A) on the ground speed lever (GSL) to fully lower the rotary disc header.

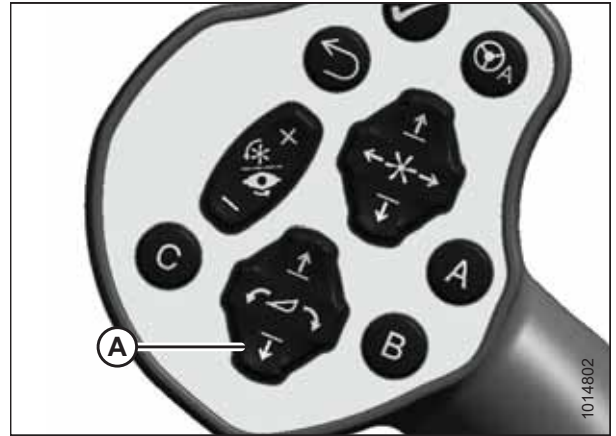


Figure 5.22: Ground Speed Lever (GSL)

4. Press FLOAT SETTINGS icon (A) on the HarvestTouch™ Display to show the float setting page.

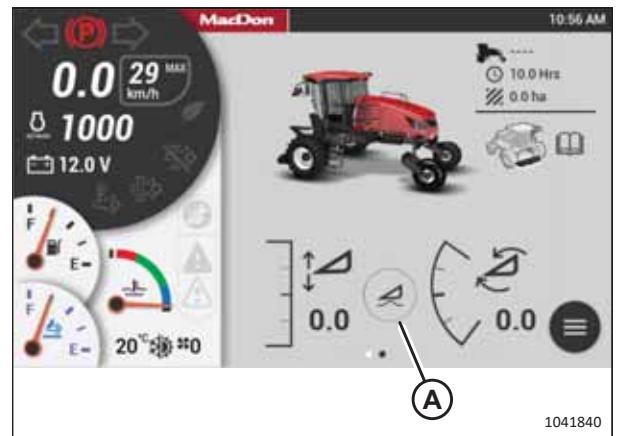


Figure 5.23: HarvestTouch™ Display

5. Press float switch (A) on the FLOAT ADJUST page to remove or restore the header float.
6. Shut down the engine, and remove the key from the ignition.



Figure 5.24: HarvestTouch™ Display

### 5.6.4 Setting Float Options with Fixed Deck – M2 Series Windrowers

When using an auger header, the DECK SHIFT buttons can be used to store three float settings. This is useful when ground conditions vary, or when having one side lighter is desirable (such as cutting along wheel tracks or irrigation borders).

**DANGER**

Ensure that all bystanders have cleared the area.

1. Use HEADER TILT switches (A) and (B) on the ground speed lever (GSL) to set header tilt to the mid-range position.

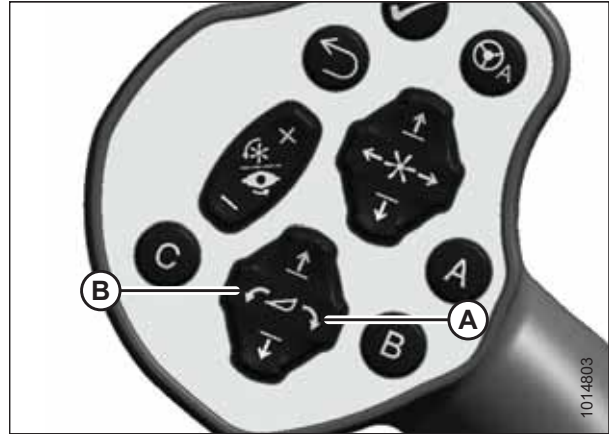


Figure 5.25: GSL

2. Engage the header by pushing and holding down HEADER ENGAGE switch (A), and pulling up on collar (B).

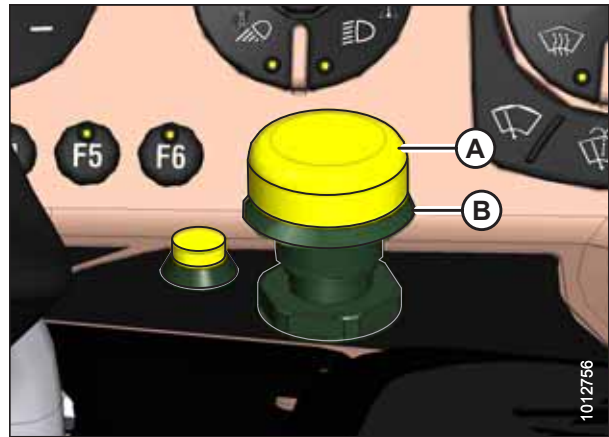


Figure 5.26: Header Engage Switch

3. Select one of the following deck positions using the DECK SHIFT switches on the operator's console:
  - Right-side delivery (A)
  - Center delivery (B)
  - Left-side delivery (C)

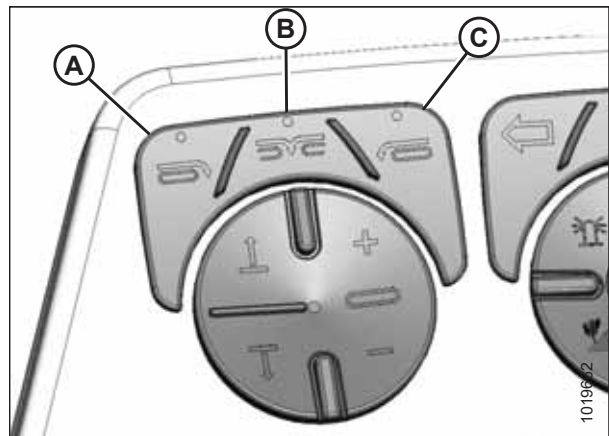


Figure 5.27: Header Deck Shift Switches

## PERFORMING PREDELIVERY CHECKS

4. Disengage the header by pushing down on HEADER ENGAGE switch (A).
5. Adjust the float setting for the selected deck position. For instructions, refer to [5.6.2 Setting Float – M2 Series Windrowers, page 111](#).
6. Repeat the previous steps for the other deck positions.



Figure 5.28: Header Engage Switch

## 5.7 Leveling Header – M Series Self-Propelled Windrower

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

If the header is **NOT** level, do the following steps before adjusting the levelling linkages. The float springs are **NOT** used to level the header.

### DANGER

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

1. Park windrower on level ground.
2. Check windrower tire pressures.
3. Raise header fully and hold momentarily to allow lift cylinders to rephase.
4. Shut down the engine, and remove the key from the ignition.
5. Place float pins (A) in locked out position.



Figure 5.29: Float Pin

### DANGER

Check to be sure all bystanders have cleared the area.

6. Start engine and set header approximately 150 mm (6 in.) off ground.
7. Check that member (A) is against link (B).
8. Note which end of header is high and which is low.

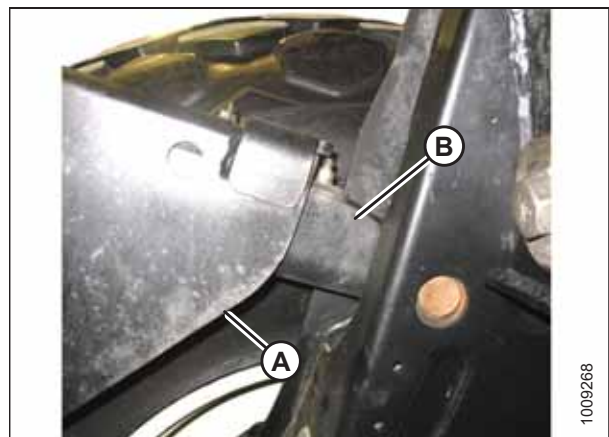


Figure 5.30: Member and Link

## PERFORMING PREDELIVERY CHECKS

- Place wooden blocks (A) under header cutterbar and legs.

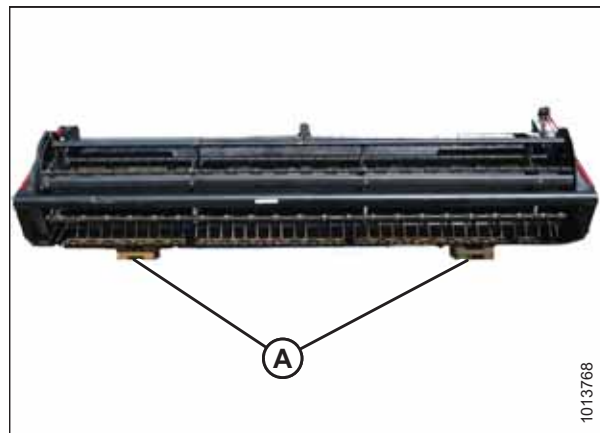


Figure 5.31: Header on Blocks

- Lower header onto blocks so that members (A) lift off of links (B).
- Shut down the engine, and remove the key from the ignition.

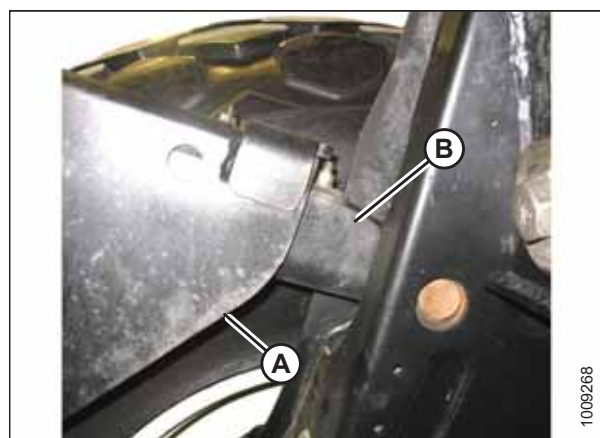


Figure 5.32: Member and Link

- Remove nut, washer, and bolt (A) that attach shims (B) to link at the header high end.
- Remove one or both shims (B) and reinstall the hardware (A).
- Start engine and raise header slightly. Check if the header is level.
- If additional levelling is required, install the removed shim on the opposite linkage.

**NOTE:**

If required, additional shims (MD #110853) can be ordered from your MacDon Dealer.

**NOTE:**

Float does **NOT** require adjustment after levelling header.

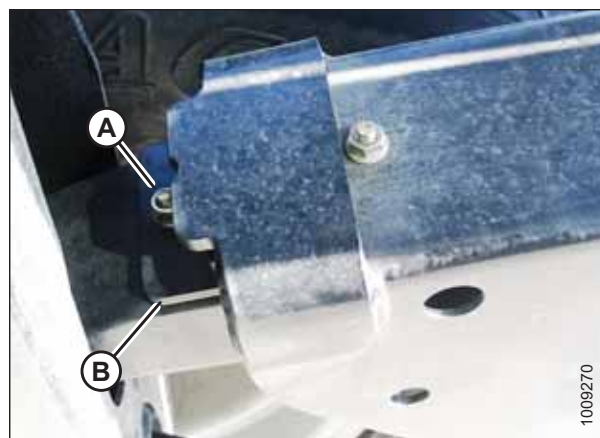


Figure 5.33: Shims



## 5.8 Leveling Header – M1 Series Windrower

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

### DANGER

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

### DANGER

Ensure that all bystanders have cleared the area.

1. Start the engine.
2. Press rotary scroll knob (A) on Harvest Performance Tracker (HPT) to display the QuickMenu page.
3. Rotate scroll knob (A) to highlight HEADER FLOAT symbol (B) and press scroll knob to select. The SET-UP FLOAT page displays.



Figure 5.34: HPT Display

4. Press soft key 3 (A) to remove float.



Figure 5.35: HPT Display

## PERFORMING PREDELIVERY CHECKS

5. Park the windrower on level ground.
6. Press HEADER RAISE button (A) on the ground speed lever (GSL). When the header reaches its maximum height, continue to hold the header raise button to rephase the lift cylinders.

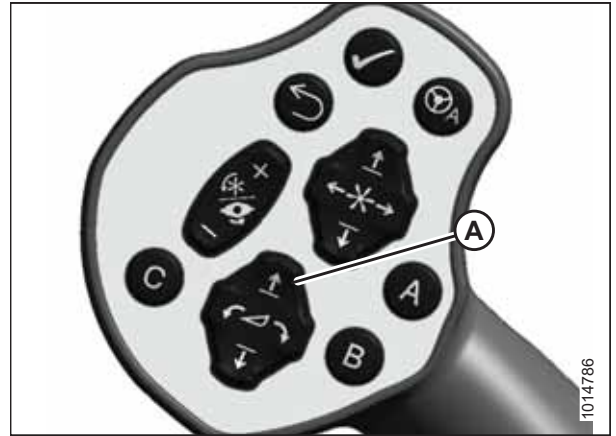


Figure 5.36: Ground Speed Lever (GSL)

7. Lower the header to approximately 150 mm (6 in.) off the ground.
8. Ensure that channel (A) is against link (B).
9. Shut down the engine, and remove the key from the ignition.
10. Measure the distance to the ground at both ends of the header to determine if the header is level.
11. If adjustment is necessary, start the engine and resume float. Lower the header onto the ground until channel (A) lifts away from the link (B) on both sides.
12. Shut down the engine, and remove the key from the ignition.
13. On the side that is higher, remove hardware (A) attaching shims (B) to the linkage.
14. Remove one or both shims (B) and reinstall hardware (A).
15. Repeat Step 6, page 119 to Step 10, page 119 to rephase the cylinders and check the header level.
16. If additional adjustment is required, repeat Step 11, page 119 to Step 14, page 119, and install one of the removed shims on the opposite linkage.

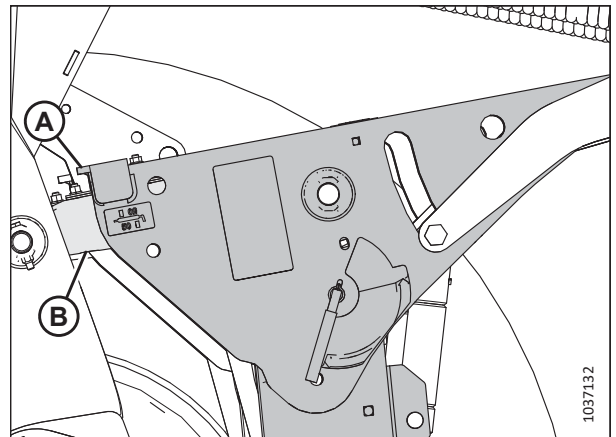


Figure 5.37: Lift Linkage

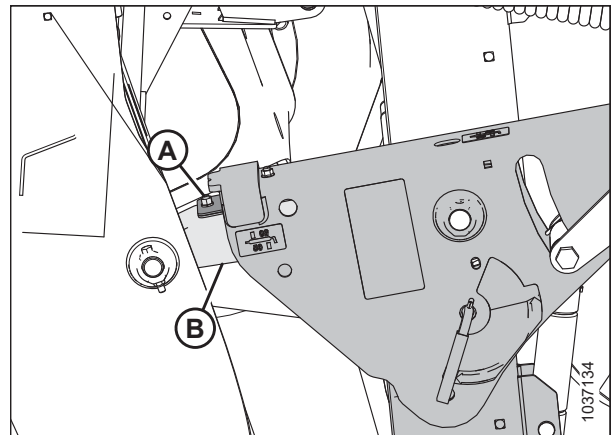


Figure 5.38: Lift Linkage Shims

17. Reset the header float. For instructions, refer to [5.5.2 Setting Float – M1 Series Windrowers, page 106](#).

## 5.9 Leveling Header – M2 Series Windrower

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

### DANGER

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

If the header level needs to be adjusted, follow these steps:

1. Remove the float spring tension to ensure that the lift windrower linkages are not affected by the float springs. For instructions, refer to [5.6.3 Removing and Restoring Float – M2 Series Windrowers, page 112](#).

### DANGER

Ensure that all bystanders have cleared the area.

2. Park the windrower on level ground.
3. Press header raise button (A) on the ground speed lever (GSL) until the header reaches maximum height. Continue to hold the header raise button for 3–4 seconds to rephase the lift cylinders.

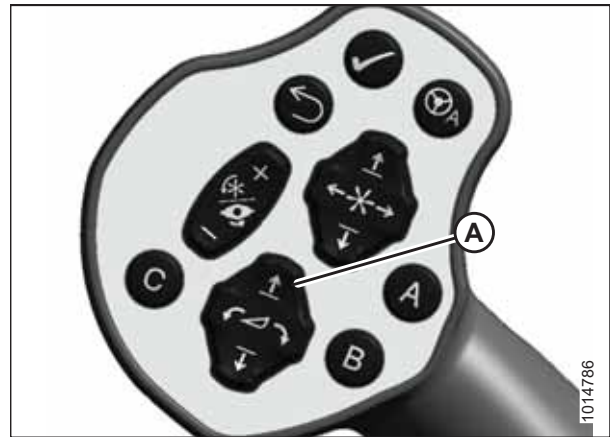


Figure 5.39: Ground Speed Lever (GSL)

4. Lower the header to approximately 150 mm (6 in.) off the ground.
5. Ensure that member (A) is against link (B).
6. Shut down the engine, and remove the key from the ignition.
7. Measure the distance to the ground at both ends of the header to determine if the header is level.

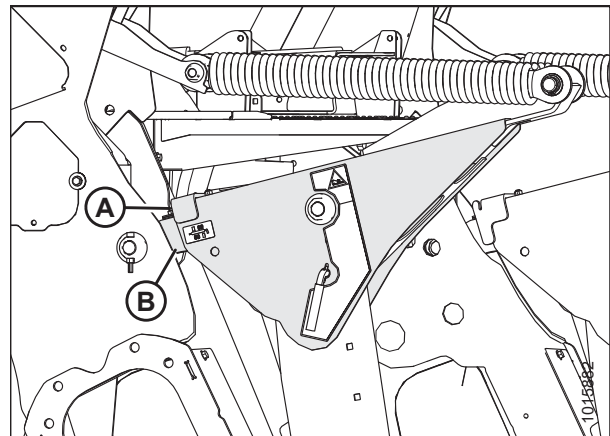


Figure 5.40: Lift Linkage

## PERFORMING PREDELIVERY CHECKS

8. If adjustment is necessary, start the engine and resume the float. For instructions, refer to [5.6.3 Removing and Restoring Float – M2 Series Windrowers, page 112](#).
9. Lower the header onto the ground until member (A) lifts away from link (B) on both sides of the machine.
10. Shut down the engine, and remove the key from the ignition.

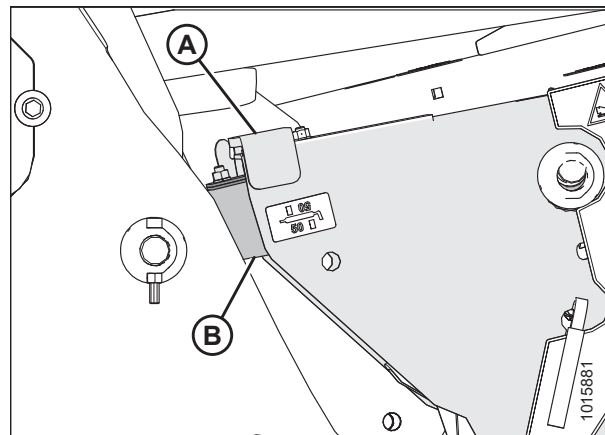


Figure 5.41: Lift Linkage

11. On the side of the machine that is higher, remove nut, washer, and bolt (A) that attaches shims (B) to the linkage.
12. Remove one or both of shims (B) and reinstall hardware (A).
13. Repeat Step [3, page 120](#) to Step [7, page 120](#) to rephase the cylinders and check the header level.
14. If additional adjustment is required, repeat Step [8, page 121](#) to Step [11, page 121](#), and install one of the removed shims on the opposite linkage.

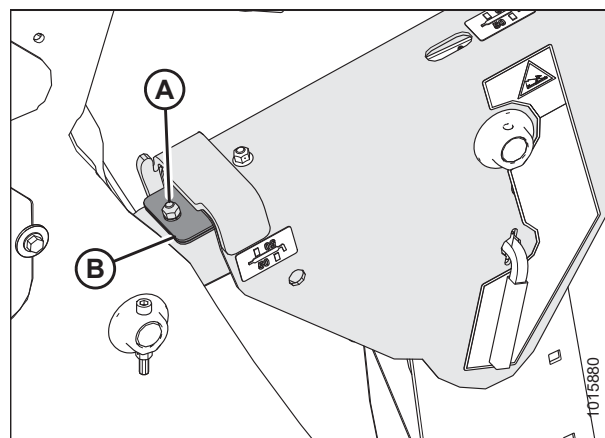


Figure 5.42: Lift Linkage Shims

15. Reset the header float. For instructions, refer to [5.6.2 Setting Float – M2 Series Windrowers, page 111](#).

### NOTE:

Additional shims are available from your Dealer.

## 5.10 Checking Conditioner Rolls

### DANGER

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

### DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header.
2. Shut down the engine, and remove the key from the ignition.
3. Check that nut (A) is tight and top of nut (A) is at 2 on decal (C).
4. If required, adjust gap by loosening nut (A) and turning adjuster (B). Retighten nut (A).

**NOTE:**

When adjusting roll gap, be sure that the decal reading is the same on both sides of the conditioner roll to achieve consistent intermesh across the rolls.

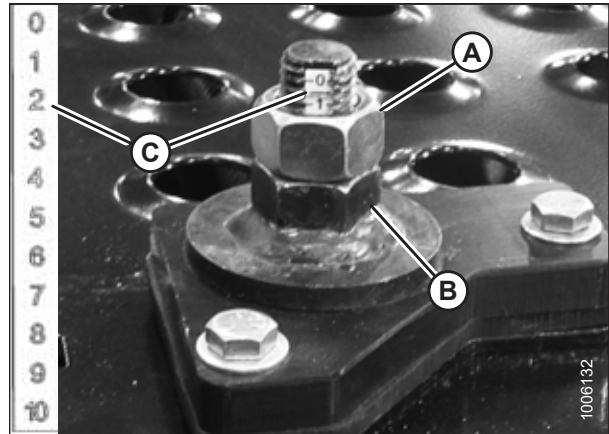


Figure 5.43: Roll Gap Adjustment Hardware

5. Loosen bolt (A) and rotate cover (B) to expose access port (C).
6. Check roll timing by examining distance X at each end of the rolls (C). Each steel bar on one roll should be centered between two bars of the other roll, so that distance X is 12 mm (1/2 in.).

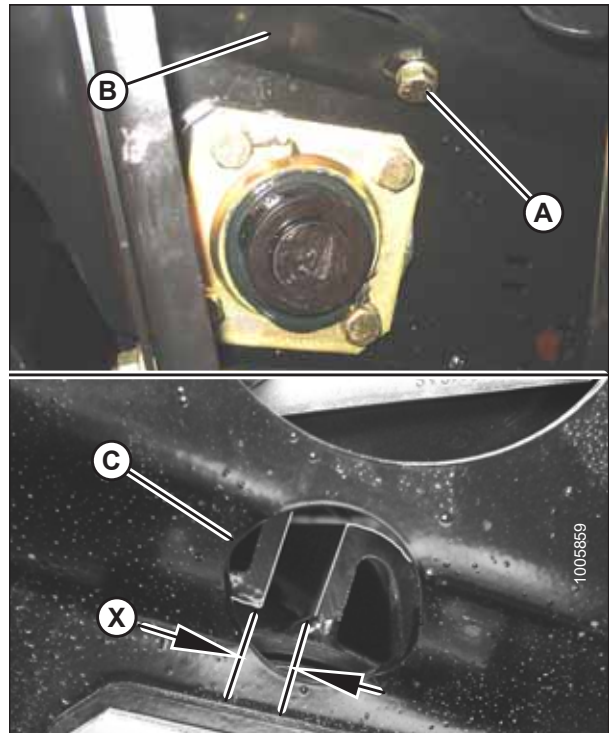


Figure 5.44: Access Port – Exposed

## PERFORMING PREDELIVERY CHECKS

If required, adjust the roll timing as follows:

7. Loosen four bolts (A) in slots of yoke plate on lower roll universal shaft.
8. Turn rolls to achieve best timing.
9. When roll timing is satisfactory, tighten bolts (A) to secure the position.

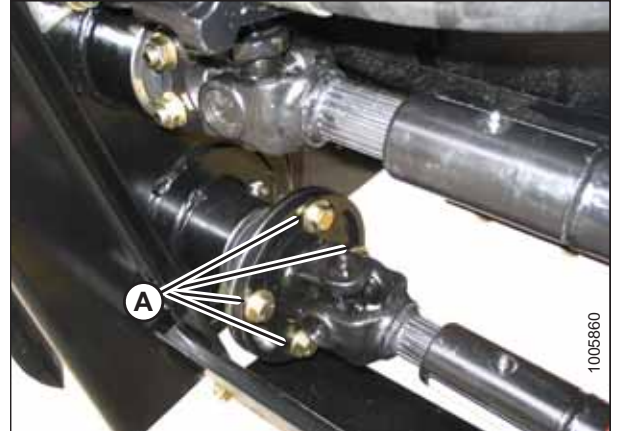


Figure 5.45: Roll Timing Adjustment Hardware

10. Reposition cover (A), and tighten bolt (B).

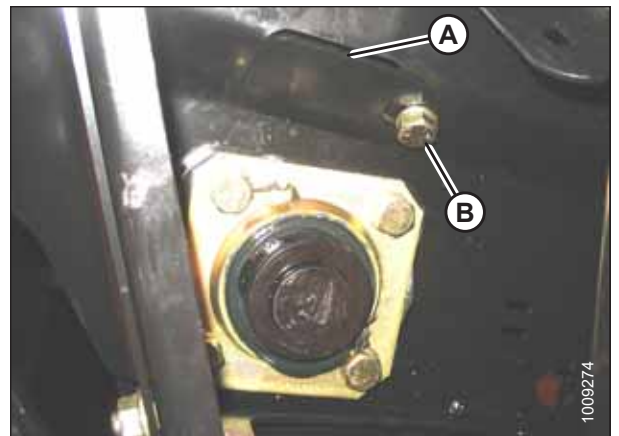


Figure 5.46: Access Port – Covered

## 5.11 Checking Oil Level in Conditioner Gearbox

### DANGER

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

### DANGER

Ensure that all bystanders have cleared the area.

1. Lower the header.
2. Shut down the engine, and remove the key from the ignition.
3. Ensure that the gearbox is level with ground.
4. Remove check plug (A) and ensure that oil runs out. If oil does not run, fill the conditioner gearbox using SAE 85W-140.
5. Replace check plug (A).

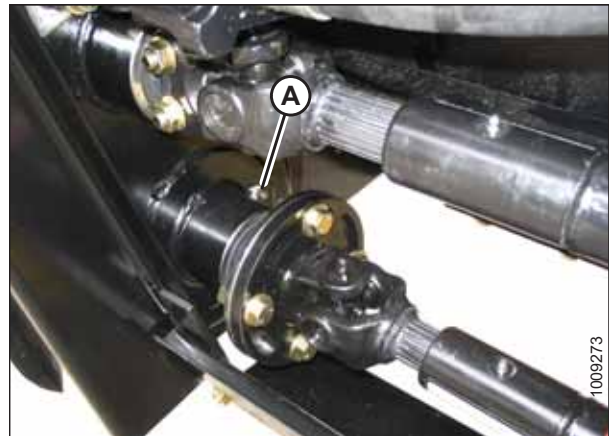


Figure 5.47: Check Plug



## 5.12 Checking Optional Skid Shoes / Gauge Rollers

### DANGER

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

### DANGER

Ensure that all bystanders have cleared the area.

1. Raise the header fully.
2. Shut down the engine, and remove the key from the ignition.
3. Engage the header safety props. For instructions, refer to the windrower operator's manual.
4. Check that pins (A) are installed in the same position in all skid shoes (B).

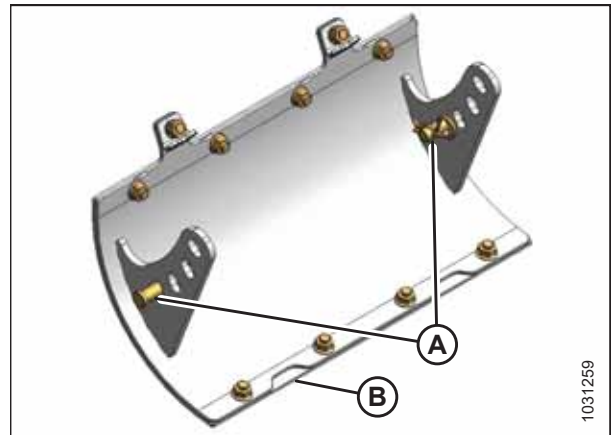


Figure 5.48: Skid Shoe

5. Check that pins (A) are installed in the same position in all gauge rollers (B).

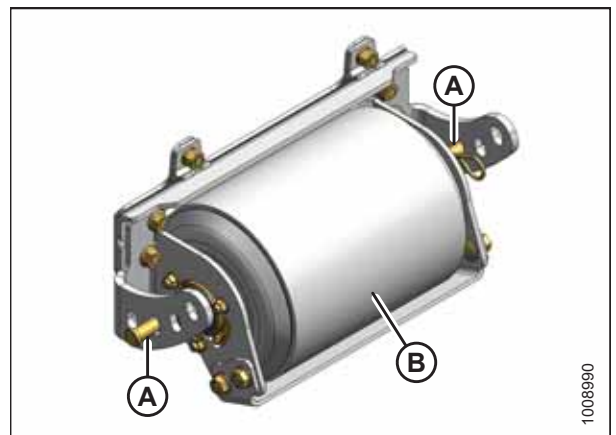


Figure 5.49: Gauge Roller

## 5.13 Checking Lights

Hazard lights, which are mounted on both ends of the header, are activated by switches in the windrower cab.

1. Check that pivot bolt (A) is tight enough to hold light support (B) in an upright position, but will still allow the light to pivot out of the way of obstructions.

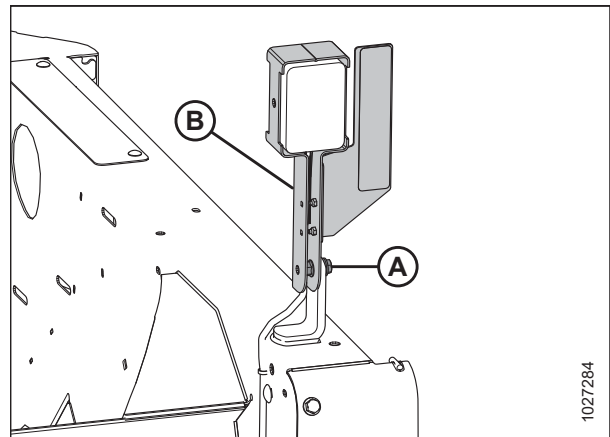


Figure 5.50: Hazard Light

## 5.14 Running up Header

### DANGER

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

### DANGER

Ensure that all bystanders have cleared the area.

1. Start windrower and operate header slowly for 5 minutes, watching and listening **FROM THE WINDROWER SEAT** for binding, interfering parts, or unusual noises.
2. Run the machine for 15 minutes at maximum engine operating rpm and perform the run-up check as listed on the Predelivery Checklist (yellow sheet attached to this manual – *Predelivery Checklist, page 155*) to ensure machine is field-ready.
3. Proceed as follows:
  - **M Series Self-Propelled Windrower:** To calibrate the knife drive, refer to the windrower operators manual.
  - **M1 Series Windrower:** Proceed to Step *5.14.1 Calibrating Knife Drive – M1 Series Windrower, page 127*.
  - **M2 Series Windrowers:** Proceed to Step *5.14.2 Calibrating Knife Drive – M2 Series Windrower, page 129*.

### 5.14.1 Calibrating Knife Drive – M1 Series Windrower

A total of nine stages is involved in the knife drive calibration with checks at three knife drive flows at three different engine speeds.

The calibration is done at three knife drive flows:

- Low flow – an estimate amount of flow required to reach the minimum adjustable speed for the attached header
- Medium flow – an estimate amount of flow for the knife speed in between the minimum and maximum adjustable speed for the attached header
- High flow – an estimate amount of flow for the maximum adjustable speed for the attached header

The three knife drive flows are done at three engine speeds – 1800, 2000, and 2300 rpm.

### DANGER

Ensure that all bystanders have cleared the area.

1. Start the windrower, and engage the header.

## PERFORMING PREDELIVERY CHECKS

- Press soft key 5 (A) to open the main menu.

**NOTE:**

Calibrations **MUST** be performed with the engine running. Some calibrations will not be available with the engine off.

- Use HPT scroll knob (B) or the ground speed lever (GSL) scroll wheel (not shown) to highlight SETTINGS icon (C).
- Press HPT scroll knob (B) or the GSL SELECT button (not shown) to activate the settings menu options.

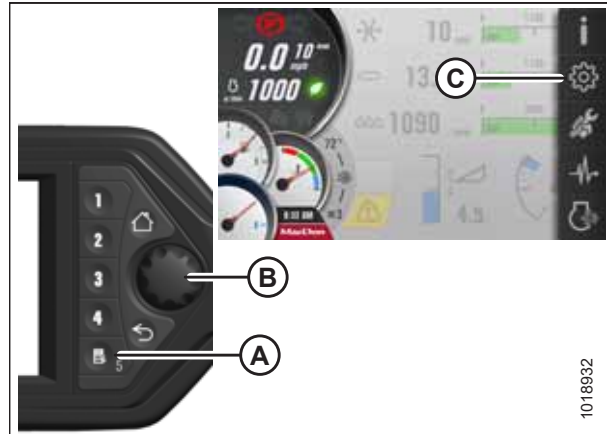


Figure 5.51: Opening the Main Menu

- Scroll to WINDROWER (A) and press the HPT scroll knob to select it.
- Scroll to CALIBRATION SELECTION (B) and press the scroll knob to select it.

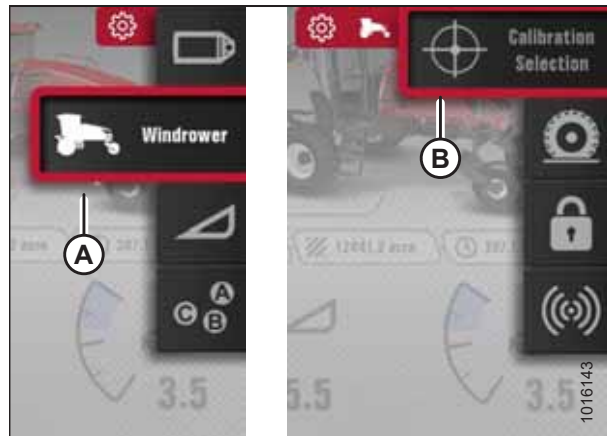


Figure 5.52: Windrower Settings Icon and Calibration Submenu Icon

- On the CALIBRATION SELECTION page, scroll to KNIFE DRIVE (A) and press the scroll knob to select it.

**NOTE:**

When the calibration process is initiated, the engine ramps up to its desired speed (+/- 20 rpm) and the header to its desired flow (+/- 0.1 gpm). When the system reaches the desired ranges and has a steady oil flow of less than 0.45 gpm for 3 seconds, the current is locked in. The knife then ramps up to the next target flow and the process is repeated. Once the three target flows are completed, the engine speed ramps up to the next rpm and the process is repeated until all nine points have been locked in.

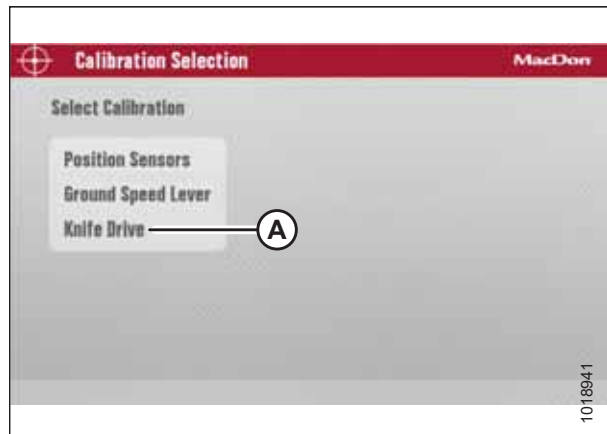


Figure 5.53: Calibration Selection Page

## PERFORMING PREDELIVERY CHECKS

### NOTE:

The display will change to show that the calibration has started. Pressing X icon (A) at any time during the calibration process will stop and exit the calibration.

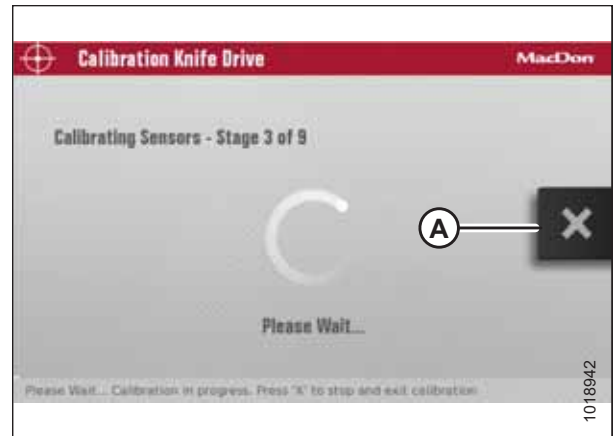


Figure 5.54: Knife Drive Calibration Page

- When the calibration is complete, press X icon (A) to save the calibration and exit the page.

### NOTE:

This calibration procedure can also be done when the machine is in normal operation; however, this will result in more erratic knife speeds. Performing a deliberate calibration prior to normal operation will make sure that the calibration is automatically maintained and adjusted as performance varies. This also ensures that the system constantly or periodically monitors the relationship of the engine speed, the knife speed, the valve current, and the pressure.



Figure 5.55: Knife Drive Calibration Page

### 5.14.2 Calibrating Knife Drive – M2 Series Windrower

When a header is attached to the windrower, the windrower's HarvestTouch™ Display will recognize the header ID and choose the appropriate settings for that header. Before it can be operated, however, the header's knife drive must be calibrated to ensure that the knife drive pump output is accurate.

#### **DANGER**

Ensure that all bystanders have cleared the area.

### NOTE:

This calibration **MUST** be performed with the engine running and the header engaged.

## PERFORMING PREDELIVERY CHECKS

1. Start the engine.
2. Engage the header.

**NOTE:**

Once the header is engaged, header gauges (A) will appear on the HarvestTouch™ Display home page.

3. Select MENU icon (B).

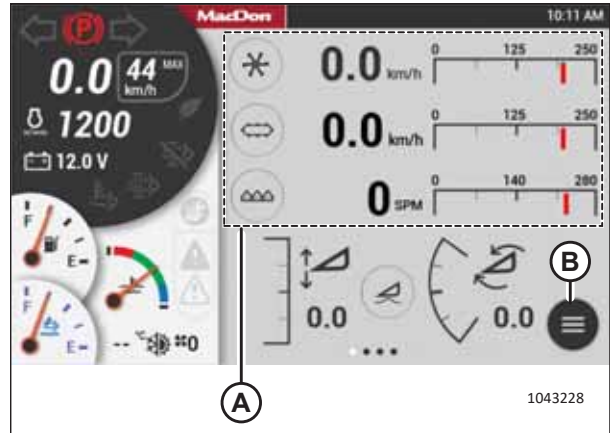


Figure 5.56: HarvestTouch™ Display

4. Select SETUP (A).

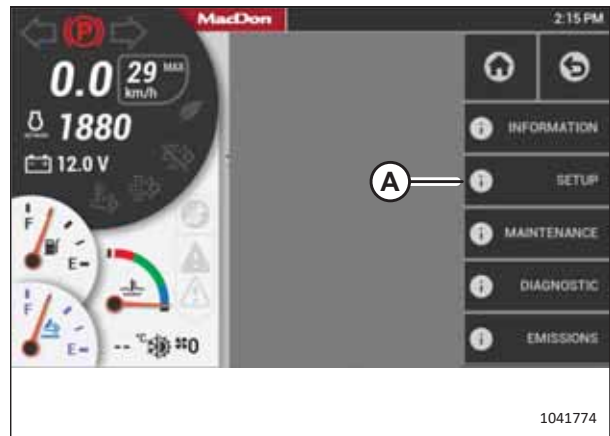


Figure 5.57: Main Menu

5. Select WINDROWER (A).



Figure 5.58: Setup Menu

## PERFORMING PREDELIVERY CHECKS

6. Select CALIBRATION (A).



Figure 5.59: Setup Menu

7. Select KNIFE DRIVE (A).



Figure 5.60: Calibration Selection Page

8. Select PLAY icon (A).

**NOTE:**

The PLAY icon will only appear if the header is engaged.



Figure 5.61: Engage Header Warning



## PERFORMING PREDELIVERY CHECKS

9. The display changes to show that calibration has started. The process should automatically proceed through all nine stages.

**NOTE:**

If the engine speed is less than 1500 rpm before calibration, the system will raise the engine speed to 1500 rpm.

**NOTE:**

During the calibration process, the speed of the header, and the engine will fluctuate.

**NOTE:**

Select X icon (A) on the screen or use the HEADER DISENGAGE switch at any time during the calibration process to exit the procedure without saving your progress. The engine will resume the speed at which it was operating before the calibration process began.

**NOTE:**

If error message (A) appears during the calibration process, follow the instructions in the message to fix the error. Select X icon (B) to exit the message. If the knife calibration process fails:

- Confirm that the engine and the hydraulics are at operating temperature.
- Confirm that the hydraulic system is free of any restrictions and is in working order.
- Confirm that the throttle is working:
  - Check the engine codes to confirm that the engine is not derated or throttle-inhibited.
  - The throttle is controlled via the powertrain’s CAN network 1. Check the network’s wiring and connectors for an open or intermittent connection.
- Confirm that the sensor mounting is secured properly and that the sensor’s gap is set correctly.
- Check the sensor wiring and connectors for an intermittent connection.
- Replace the sensor.



Figure 5.62: Calibration Page

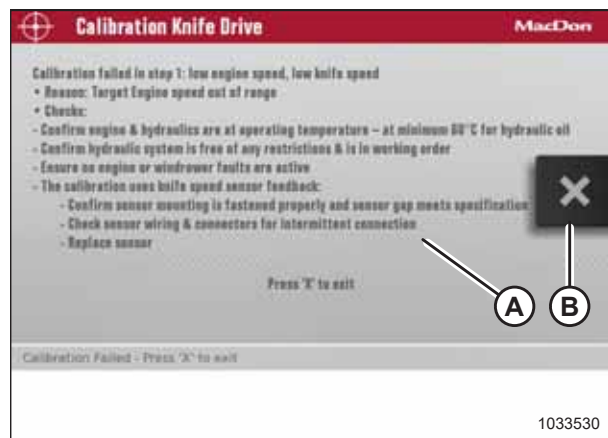


Figure 5.63: Calibration Page

## PERFORMING PREDELIVERY CHECKS

- Once the calibration process completes all nine stages, the message CALIBRATING COMPLETED appears. Select X icon (A) to exit the page.

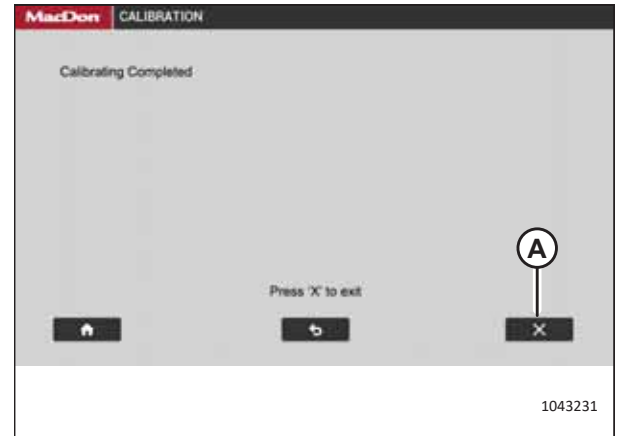


Figure 5.64: Calibration Page

## 5.15 Checking Knife Speed

### A40D

Refer to the following sections to check the header knife speed when attaching an A40D Auger Header to an M100 or M105 Self-Propelled Windrower.

Refer to the windrower operator’s manual to check the header knife speed in the windrower cab display module (CDM) when attaching an A40D Auger Header to an M150, M155, M155E4, M200, or M205 Self-Propelled Windrower.

### A40DX

Refer to the windrower operator’s manual to check the header knife speed on Harvest Performance Tracker (HPT) or HarvestTouch™ Display when attaching an A40DX Auger Header to an M1 Series or M2 Series.

### 5.15.1 Setting Knife Speed – M100 or M105 Self-Propelled Windrower

The knife speed has been preset at the factory to the lowest rpm. Change the knife speed by making adjustments to the knife drive pump.

For optimum performance, set the knife speed within the range specified. Refer to Table 5.1, page 134.

#### NOTE:

When attaching an A40D Auger Header to an M100 or M105 Windrower for the first time, knife speed should be set to the **MAXIMUM** setting.

**Table 5.1 A40D Auger Header Knife Speed**

Header Description		Knife Speed			
Type	Size	Minimum		Maximum	
		rpm <sup>5</sup>	spm <sup>6</sup>	rpm <sup>5</sup>	spm <sup>6</sup>
Auger A40D	All	700	1400	975	1950

5. rpm = speed of knife drive box pulley (revolutions per minute)

6. spm = strokes per minute of knife (rpm x 2)

*Setting Knife Speed with Expansion Module (B4666) – M100 or M105 Self-Propelled Windrower*

**⚠ DANGER**

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

1. Press SELECT button (B) on the ground speed lever (GSL) until the CDM (A) displays the knife speed in spm. This indicates that optional expansion module (B4666) is installed.
2. If knife speed is **NOT** displayed, the optional expansion module is not installed. Proceed to *Setting Knife Speed without Expansion Module (B4666) – M100 or M105 Self-Propelled Windrower, page 136.*
3. Compare reading to Table 5.1, page 134.



Figure 5.65: Operator Console

If required, adjust the knife speed as follows:

4. Shut down the engine, and remove the key from the ignition.
5. Open engine hood.
6. Locate knife drive pump (A) and knife speed adjuster screw (B) under the right (cab-forward) side of the windrower.

**NOTE:**

The knife speed adjuster screw may have a plastic cap (B) covering it. Pull this cap off to expose the screw.

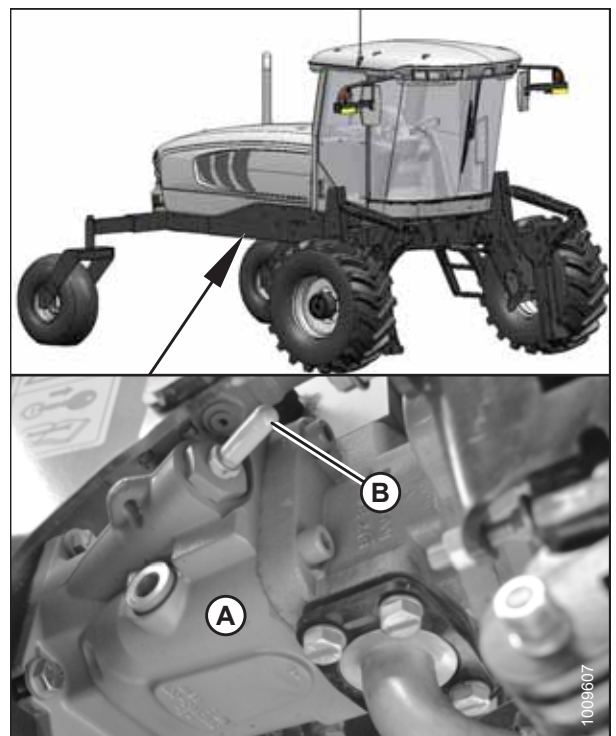


Figure 5.66: Knife Drive Pump

## PERFORMING PREDELIVERY CHECKS

7. Loosen jam nut (A).
8. Turn adjuster screw (B) clockwise (screw in) to decrease knife speed, and counterclockwise (screw out) to increase the knife speed.

### NOTE:

One turn of adjuster screw (B) will change the knife speed by approximately 116 spm, or the knife drive box pulley speed by 58 rpm.

9. Once adjustment has been made, torque jam nut (A).
10. Close hood, start engine, and recheck knife speed.

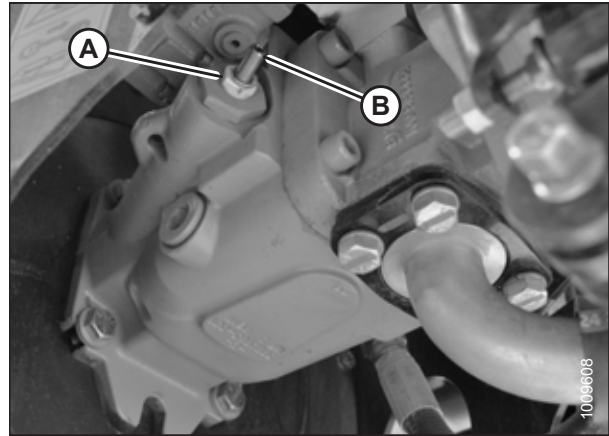


Figure 5.67: Knife Speed Adjuster Screw

### *Setting Knife Speed without Expansion Module (B4666) – M100 or M105 Self-Propelled Windrower*

1. Check header knife drive box pulley speed with a handheld tachometer.
2. Multiply the rpm reading by two to obtain the knife speed in strokes per minute.
3. Compare reading to Table 5.1, page 134.
4. If required, adjust knife speed. Refer to Step 4, page 135 to Step 10, page 136.

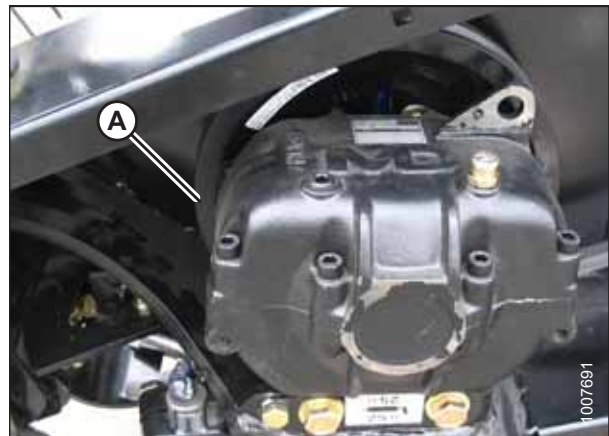


Figure 5.68: Knife Drive Box on Header

## 5.16 Adjusting Knife and Guards

### DANGER

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

1. Shut down the engine, and remove the key from the ignition.
2. Check guards for signs of heating during run-up due to insufficient clearance between guard and knife.
3. Using a feeler gauge, check for a 0.25 mm (.01 in.) gap between knifehead (A) and pitman arm (B). If gap is incorrect, adjust by loosening bolt (C), and tapping knifehead (A) with a hammer. Retighten bolt.

#### NOTE:

If a feeler gauge is not available, a business card should slide easily through gap.

#### IMPORTANT:

Over-greasing can cause the knife to bend and make contact with the guards closest to the knifehead. Check for signs of excessive heating on first few guards after greasing. If required, relieve some pressure by pressing the check-ball in grease fitting or remove grease fitting.

4. Adjust guard alignment as necessary using guard straightening tool (MD #140135). Adjust guard tips upwards by positioning tool as shown and pulling up.

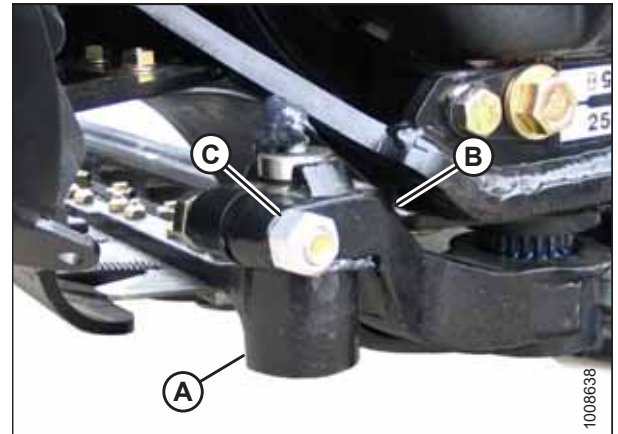


Figure 5.69: Knifehead and Pitman Arm



Figure 5.70: Guard Tips – Upward Adjustment

## PERFORMING PREDELIVERY CHECKS

5. Adjust guard tips downward by positioning tool as shown and pushing down.

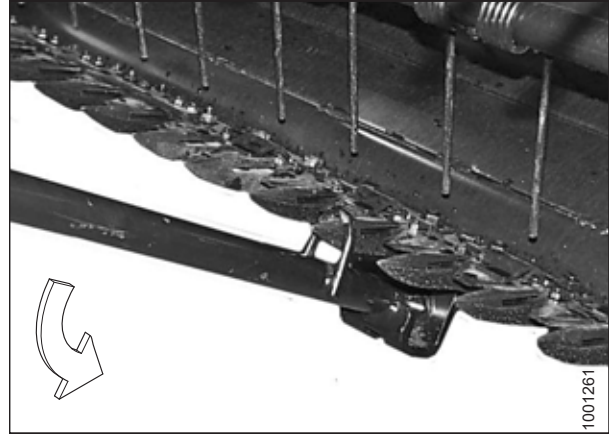


Figure 5.71: Guard Tips – Downward Adjustment



## 5.17 Checking Manuals

The manual case is located inside the right endshield.

1. Open right endshield (A) and remove cable tie (B) from manual case (C).

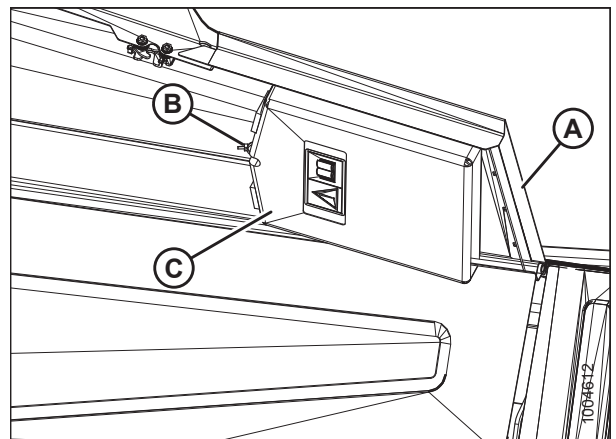


Figure 5.72: Manual Case

2. Ensure the following manuals are stored in the manual case:
  - A40D/A40DX Auger Header Quick Card
  - A40D/A40DX Auger Header Operator's Manual
  - A Series Auger Header Parts Catalog
3. Replace cable tie on manual case and close endshield.



Figure 5.73: Manuals



# Chapter 6: Reference

The reference chapter provides additional information such as the torque specification and a unit conversion chart.

## 6.1 Torque Specifications

The following tables provide torque values for various bolts, cap screws, and hydraulic fittings. Refer to these values only when no other torque value has been specified in a given procedure.

- Tighten all bolts to the torque values specified in the charts below, unless you are directed otherwise in this manual.
- Replace removed hardware with hardware of the same strength and grade.
- Refer to the torque value tables as a guide when periodically checking the tightness of bolts.
- Understand the torque categories for bolts and cap screws by reading the markings on their heads.

### Jam nuts

Jam nuts require less torque than nuts used for other purposes. When applying torque to finished jam nuts, multiply the torque applied to regular nuts by 0.65 to obtain the modified torque value.

### Self-tapping screws

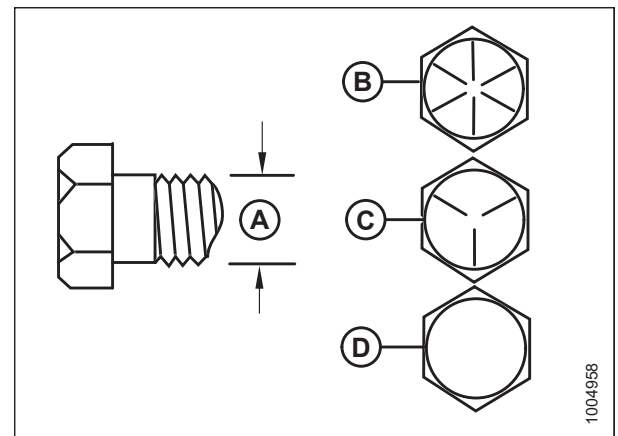
Refer to the standard torque values when installing the self-tapping screws. Do **NOT** install the self-tapping screws on structural or otherwise critical joints.

### 6.1.1 SAE Bolt Torque Specifications

The torque values provided in the following SAE bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** grease or oil bolts or cap screws unless directed to do so in this manual.

**Table 6.1 SAE Grade 5 Bolt and Grade 5 Free Spinning Nut**

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



**Figure 6.1: Bolt Grades**

A - Nominal Size  
C - SAE-5

B - SAE-8  
D - SAE-2

REFERENCE

Table 6.2 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

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

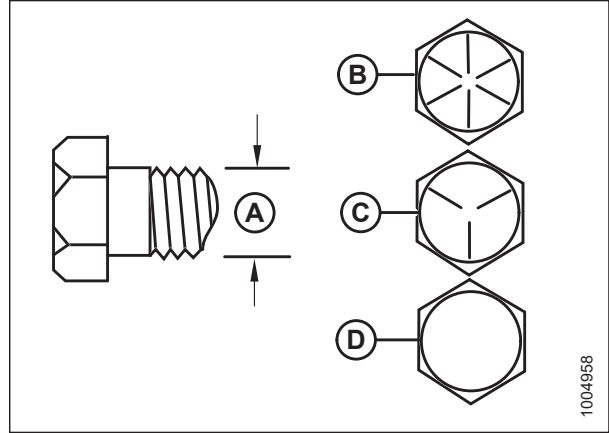


Figure 6.2: Bolt Grades

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

Table 6.3 SAE Grade 8 Bolt and Grade G Distorted Thread Nut

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

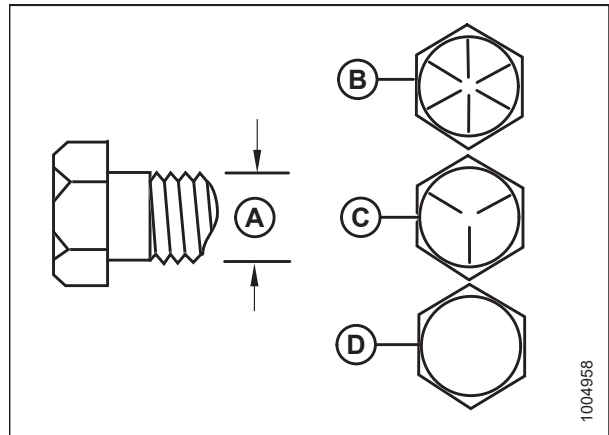


Figure 6.3: Bolt Grades

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

Table 6.4 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

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

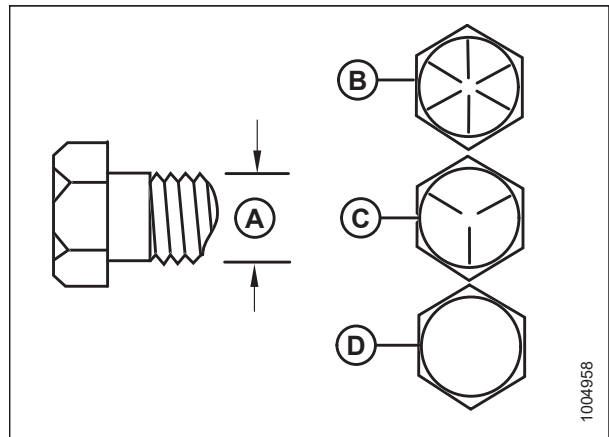


Figure 6.4: Bolt Grades

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

### 6.1.2 Metric Bolt Specifications

Specifications are provided for the appropriate final torque values to secure various sizes of metric bolts.

**NOTE:**

The torque values provided in the following metric bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** add grease, oil, or threadlocker to bolts or cap screws unless you are directed to do so in this manual.

**Table 6.5 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut**

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

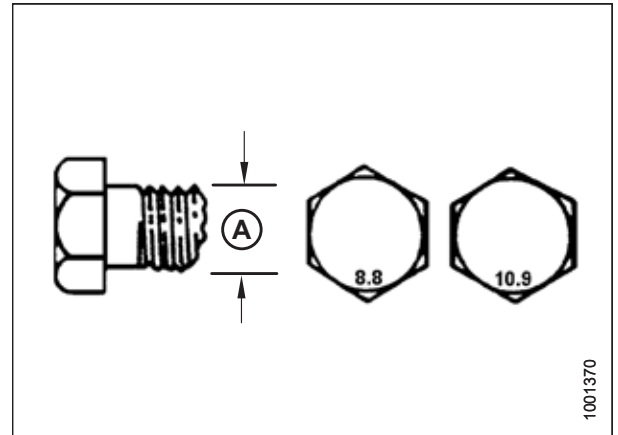


Figure 6.5: Bolt Grades

**Table 6.6 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut**

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

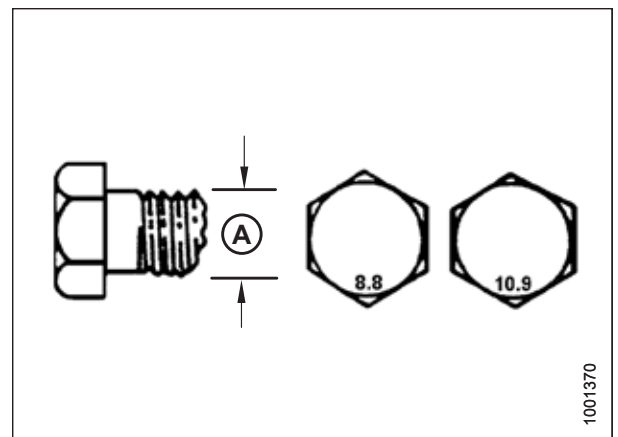


Figure 6.6: Bolt Grades

REFERENCE

Table 6.7 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

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

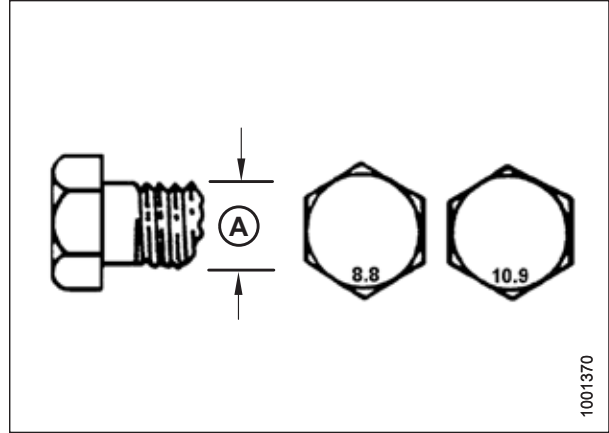


Figure 6.7: Bolt Grades

Table 6.8 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

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

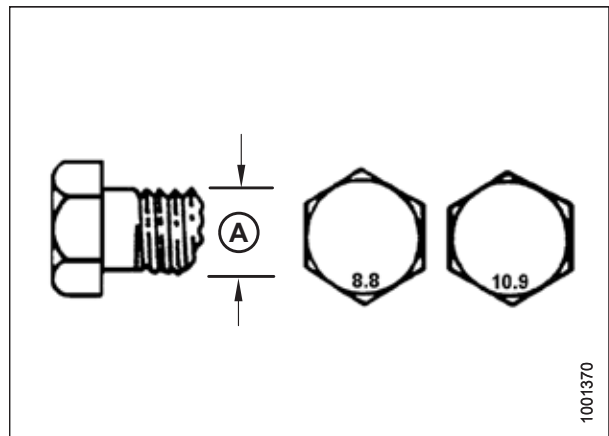


Figure 6.8: Bolt Grades

### 6.1.3 Metric Bolt Specifications – Cast Aluminum

Specifications are provided for the appropriate final torque values for various sizes of metric bolts in cast aluminum.

**NOTE:**

The torque values provided in the following metric bolt torque tables apply to hardware installed dry; that is, hardware with no grease, oil, or threadlocker on the threads or heads. Do **NOT** add grease, oil, or threadlocker to bolts or cap screws unless you are directed to do so in this manual.

REFERENCE

Table 6.9 Metric Bolt Bolting into Cast Aluminum

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

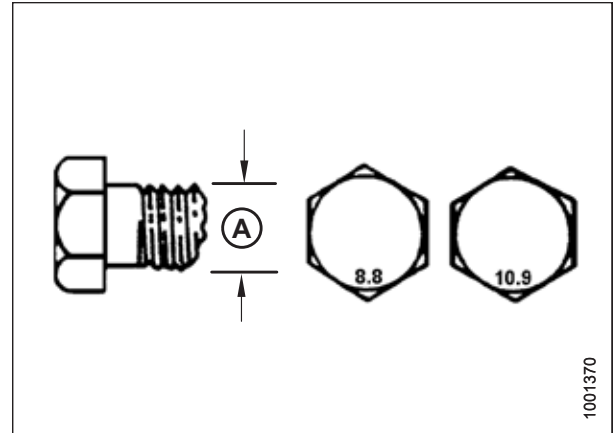


Figure 6.9: Bolt Grades

### 6.1.4 Flare-Type Hydraulic Fittings

The standard torque values are provided for flare-type hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

1. Inspect flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto the fitting without lubrication until contact is made between the flared surfaces.
3. Torque fitting nut (E) to the specified number of flats from finger tight (FFFT) or to a given torque value in Table 6.10, page 145.
4. Secure fitting (D) with two wrenches. Place one wrench on fitting body (D), and tighten nut (E) with the other wrench to the torque value shown in Table 6.10, page 145.
5. Verify the final condition of connection.

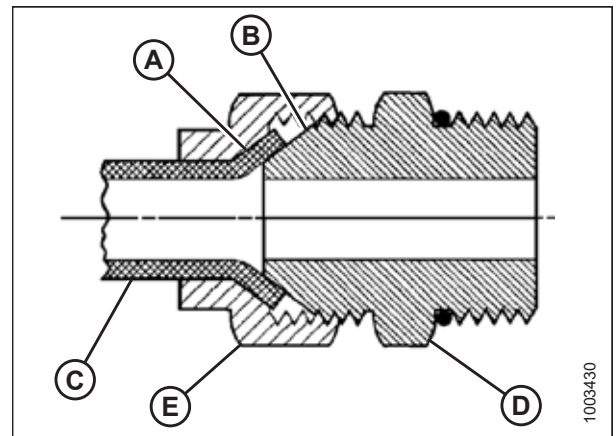


Figure 6.10: Hydraulic Fitting

Table 6.10 Flare-Type Hydraulic Tube Fittings

SAE Dash Size	Thread Size (in.)	Torque Value <sup>7</sup>		Flats from Finger Tight (FFFT)	
		Nm	lbf-ft	Tube	Swivel Nut or Hose
-2	5/16–24	4–5	3–4	–	–
-3	3/8–24	7–8	5–6	–	–
-4	7/16–20	18–19	13–14	2 1/2	2
-5	1/2–20	19–21	14–15	2	2
-6	9/16–18	30–33	22–24	2	1 1/2
-8	3/4–16	57–63	42–46	2	1 1/2
-10	7/8–14	81–89	60–66	1 1/2	1 1/2

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



REFERENCE

Table 6.10 Flare-Type Hydraulic Tube Fittings (continued)

SAE Dash Size	Thread Size (in.)	Torque Value <sup>8</sup>		Flats from Finger Tight (FFFT)	
		Nm	lbf-ft	Tube	Swivel Nut or Hose
-12	1 1/16-12	113-124	83-91	1 1/2	1 1/4
-14	1 3/16-12	136-149	100-110	1 1/2	1 1/4
-16	1 5/16-12	160-176	118-130	1 1/2	1
-20	1 5/8-12	228-250	168-184	1	1
-24	1 7/8-12	264-291	195-215	1	1
-32	2 1/2-12	359-395	265-291	1	1
-40	3-12	—	—	1	1

### 6.1.5 O-Ring Boss Hydraulic Fittings – Adjustable

The standard torque values are provided for adjustable hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

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

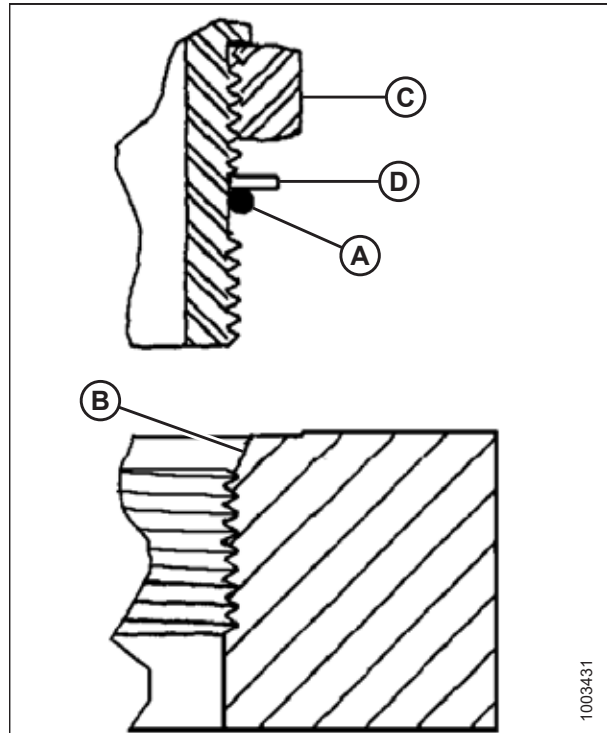


Figure 6.11: Hydraulic Fitting

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

REFERENCE

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

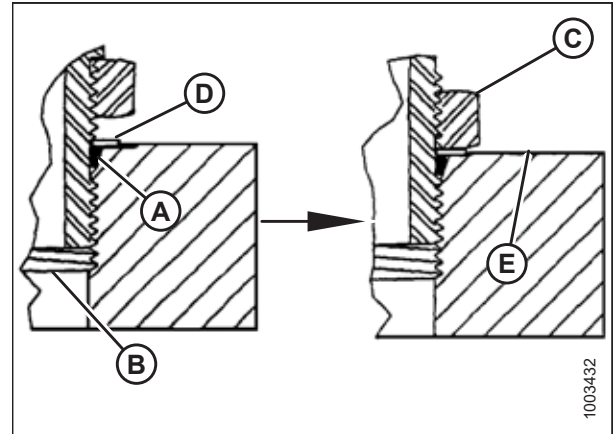


Figure 6.12: Hydraulic Fitting

Table 6.11 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable and Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value <sup>9</sup>	
		Nm	lbf·ft (*lbf·in)
-2	5/16-24	10-11	*89-97
-3	3/8-24	18-20	*159-177
-4	7/16-20	29-32	21-24
-5	1/2-20	32-35	24-26
-6	9/16-18	40-44	30-32
-8	3/4-16	70-77	52-57
-10	7/8-14	115-127	85-94
-12	1 1/16-12	183-201	135-148
-14	1 3/16-12	237-261	175-193
-16	1 5/16-12	271-298	200-220
-20	1 5/8-12	339-373	250-275
-24	1 7/8-12	414-455	305-336
-32	2 1/2-12	509-560	375-413

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

### 6.1.6 O-Ring Boss Hydraulic Fittings – Non-Adjustable

The standard torque values for non-adjustable hydraulic fittings are provided. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, use the value specified in the procedure instead.

1. Inspect O-ring (A) and seat (B) for dirt or defects.
2. Ensure that O-ring (A) is **NOT** on the threads. Adjust O-ring (A) if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into the port until the fitting is hand-tight.
5. Torque fitting (C) according to values in Table 6.12, page 148.
6. Verify the final condition of the fitting.

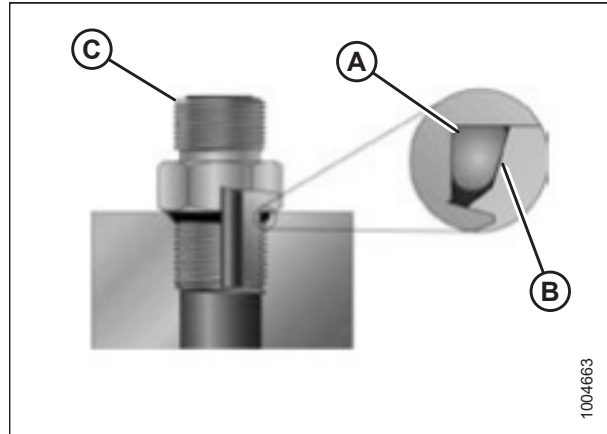


Figure 6.13: Hydraulic Fitting

Table 6.12 O-Ring Boss (ORB) Hydraulic Fittings – Adjustable and Non-Adjustable

SAE Dash Size	Thread Size (in.)	Torque Value <sup>10</sup>	
		Nm	lbf·ft (*lbf·in)
-2	5/16-24	10-11	*89-97
-3	3/8-24	18-20	*159-177
-4	7/16-20	29-32	21-24
-5	1/2-20	32-35	24-26
-6	9/16-18	40-44	30-32
-8	3/4-16	70-77	52-57
-10	7/8-14	115-127	85-94
-12	1 1/16-12	183-201	135-148
-14	1 3/16-12	237-261	175-193
-16	1 5/16-12	271-298	200-220
-20	1 5/8-12	339-373	250-275
-24	1 7/8-12	414-455	305-336
-32	2 1/2-12	509-560	375-413

### 6.1.7 O-Ring Face Seal Hydraulic Fittings

The standard torque values are provided for O-ring face seal hydraulic fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

Torque values are shown in the Table 6.13, page 149.

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

## REFERENCE

1. Ensure that the sealing surfaces and the fitting threads are free of burrs, nicks, scratches, and any foreign material.



Figure 6.14: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align the tube or hose assembly so that the flat face of sleeve (A) or (C) comes into full contact with O-ring (B).
4. Thread tube or hose nut (D) until it is hand-tight. The nut should turn freely until it bottoms out.
5. Torque the fittings according to values in Table 6.13, page 149.

**NOTE:**

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

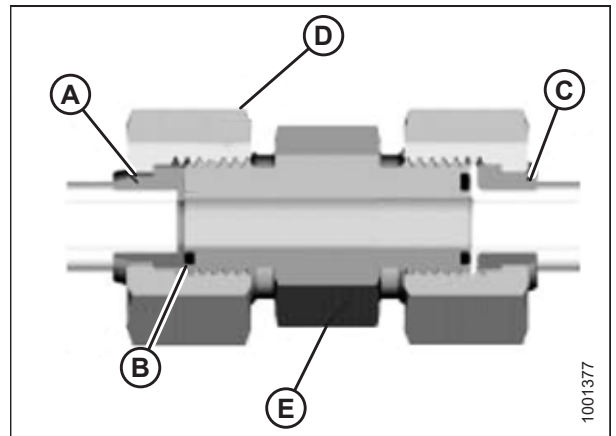


Figure 6.15: Hydraulic Fitting

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

**Table 6.13 O-Ring Face Seal (ORFS) Hydraulic Fittings**

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>11</sup>	
			Nm	lbf-ft
-3	Note <sup>12</sup>	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note <sup>12</sup>	5/16	–	–
-6	11/16	3/8	40–44	30–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1 3/16	3/4	115–127	85–94
-14	Note <sup>12</sup>	7/8	–	–
-16	1 7/16	1	150–165	111–122

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

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

## REFERENCE

**Table 6.13 O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)**

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>13</sup>	
			Nm	lbf-ft
-20	1 11/16	1 1/4	205–226	151–167
-24	2	1 1/2	315–347	232–256
-32	2 1/2	2	510–561	376–414

### 6.1.8 Tapered Pipe Thread Fittings

The standard torque values are provided for tapered pipe thread fittings. If a procedure specifies a different torque value for the same type and size of fitting found in this topic, refer to the value specified in the procedure instead.

Assemble pipe fittings as follows:

1. Ensure that the fitting and the port threads are free of burrs, nicks, scratches, and any other form of contamination.
2. Apply paste-type pipe thread sealant to the external pipe threads.
3. Thread the fitting into the port until it is hand-tight.
4. Torque the connector to the appropriate torque angle. The turns from finger tight (TFFT) and flats from finger tight (FFFT) values are shown in Table 6.14, page 150. Ensure that the tube end of a shaped connector (typically a 45° or 90° elbow) is aligned to receive the incoming tube or hose assembly. Always finish the alignment of the fitting in the direction of tightening. Never loosen the threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with an appropriate cleaner.
6. Inspect the final condition of the fitting. Pay special attention to the possibility of cracks in the port opening.
7. Mark the final position of the fitting. If a fitting leaks, disassemble the fitting and check it for damage.

**NOTE:**

The failure of fittings due to over-torquing may not be evident until the fittings are disassembled and inspected.

**Table 6.14 Hydraulic Fitting Pipe Thread**

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

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

## 6.2 Conversion Chart

This manual uses both SI units (including metric) and US customary units (sometimes referred to as standard units) of measurement. A list of those units along with their abbreviations and conversion factors is provided here for your reference.

**Table 6.15 Conversion Chart**

Quantity	SI Units (Metric)		Factor	US Customary Units (Standard)	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	hectare	ha	x 2.4710 =	acre	acres
Flow	liters per minute	L/min	x 0.2642 =	US gallons per minute	gpm
Force	Newton	N	x 0.2248 =	pound force	lbf
Length	millimeter	mm	x 0.0394 =	inch	in.
Length	meter	m	x 3.2808 =	foot	ft.
Power	kilowatt	kW	x 1.341 =	horsepower	hp
Pressure	kilopascal	kPa	x 0.145 =	pounds per square inch	psi
Pressure	megapascal	MPa	x 145.038 =	pounds per square inch	psi
Pressure	bar (Non-SI)	bar	x 14.5038 =	pounds per square inch	psi
Torque	Newton meter	Nm	x 0.7376 =	pound feet or foot pounds	lbf-ft
Torque	Newton meter	Nm	x 8.8507 =	pound inches or inch pounds	lbf-in
Temperature	degrees Celsius	°C	(°C x 1.8) + 32 =	degrees Fahrenheit	°F
Velocity	meters per minute	m/min	x 3.2808 =	feet per minute	ft/min
Velocity	meters per second	m/s	x 3.2808 =	feet per second	ft/s
Velocity	kilometers per hour	km/h	x 0.6214 =	miles per hour	mph
Volume	liter	L	x 0.2642 =	US gallon	US gal
Volume	milliliter	mL	x 0.0338 =	ounce	oz.
Volume	cubic centimeter	cm <sup>3</sup> or cc	x 0.061 =	cubic inch	in. <sup>3</sup>
Weight	kilogram	kg	x 2.2046 =	pound	lb.

## 6.3 Definitions

The following terms, abbreviations, and acronyms are used in this instruction.

**Table 6.16 Definitions**

Term	Definition
A Series Header	MacDon A30S, A30D, A40D, A40DX, standard and Grass Seed auger headers
API	American Petroleum Institute
Bolt	A headed and externally threaded fastener designed to be paired with a nut
Cab-forward	Windrower operation mode in which the operator's seat faces the header
CDM	The cab display module in an M Series Windrower
Center-link	A hydraulic cylinder or manually adjustable turnbuckle type connection between the header and the vehicle, which is used to change the angle of the header relative to the vehicle
CGVW	Combined gross vehicle weight
DK	Double knife
DWA	Double Windrow Attachment
Engine-forward	Windrower operation with Operator and engine facing in direction of travel
Export header	The header configuration typical outside North America
FFFT	Flats from finger tight
Finger tight	A reference position in which the given sealing surfaces or components are making contact with each other. The fitting has been tightened by hand to a point where the fitting is no longer loose and cannot be tightened further by hand
GSS	Grass Seed
GVW	Gross vehicle weight
Header	A machine that cuts and lays crop into a windrow when attached to a windrower
Hex key	A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in the head (internal-wrenching hexagon drive); also known as an Allen key
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for the original 37° flared fitting
Knife	A cutting device found on a header's cutterbar which uses a reciprocating cutter (also called a sickle) to cut crop so that it can be fed into the header
M Series Windrowers	MacDon M100, M105, M150, M155, M155E4, M200, and M205 Self-Propelled Windrowers
M1 Series Windrowers	MacDon M1170, M1170 NT, M1170 NT5, and M1240 Windrowers
M2 Series Windrowers	MacDon M2170, M2170 NT, and M2260 Windrowers
n/a	Not applicable
N-DETENT	The slot opposite the NEUTRAL position on the operator's console of M Series SP Windrowers
North American header	The header configuration typical in North America
NPT	National Pipe Thread: A style of fitting used for low-pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit
Nut	An internally threaded fastener designed to be paired with a bolt
ORB	O-ring boss: A style of fitting commonly used in port openings on manifolds, pumps, and motors
ORFS	O-ring face seal: A style of fitting commonly used for connecting hoses and tubes. This style of fitting is also commonly called ORS, which stands for O-Ring Seal



REFERENCE

**Table 6.16 Definitions (continued)**

Term	Definition
RoHS (Reduction of Hazardous Substances)	A directive by the European Union to restrict use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc platings)
rpm	Revolutions per minute
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread when it is inserted into a mating part
Self Propelled (SP) Windrower	Self-propelled machine consisting of a power unit and a header. It is designed to cut and lay crops into windrows for later harvest
spm	Strokes per minute
Tension	An axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.). This term can also be used to describe the force a belt exerts on a pulley or sprocket
TFFT	Turns from finger tight
Timed (knife drive)	Synchronized motion applied at the cutterbar to two separately driven knives from a single hydraulic motor
Torque	The product of a force * the length of a lever arm, usually measured in Newton-meters (Nm), foot-pounds (lbf-ft), or inch-pounds (lbf-in)
Torque angle	A tightening procedure in which a fitting is assembled to a specified tightness (usually finger tight) and then the nut is turned farther by a specified number of degrees until it achieves its final position
Torque-tension	The relationship between the assembly torque applied to a piece of hardware and the axial load it induces in a bolt or screw
Washer	A thin cylinder with a hole or a slot located in the center, used as a spacer, a load distribution element, or a locking mechanism
Windrower	The power unit for a header



# Predelivery Checklist

Perform these checks and adjustments prior to delivery to your Customer. If adjustments are required, refer to the appropriate page number in this manual. The completed checklist should be retained by either the Operator or the Dealer.



## CAUTION

Carefully follow the instructions given. Be alert for safety-related messages that bring your attention to hazards and unsafe practices.

Header Serial Number:

---

Table .17 A40D, A40DX Predelivery Checklist

✓	Item	Reference
	Check for shipping damage or missing parts. Be sure all shipping dunnage is removed.	—
	Check for loose hardware. Tighten to required torque if applicable.	
	Check knife drive belt tension.	<i>5.1 Checking Drive Belts and Chains, page 101</i>
	Check reel tine to header pan and knife clearance.	<i>5.3 Checking Reel Tine to Header Pan Clearance, page 103</i>
	Check auger stripper bar clearance.	<i>5.2 Checking Auger Stripper Bar Clearance, page 102</i>
	If mechanical link, set header angle to middle of adjustment range for first use.	—
	Check that header is level.	<ul style="list-style-type: none"> <li>• <i>5.7 Leveling Header – M Series Self-Propelled Windrower, page 116</i></li> <li>• <i>5.8 Leveling Header – M1 Series Windrower, page 118</i></li> </ul>
	Check header float: 335–380 N (75–85 lbf).	<ul style="list-style-type: none"> <li>• <i>5.4 Checking and Adjusting Float – M Series Self-Propelled Windrowers, page 104</i></li> <li>• <i>5.5 Checking and Adjusting Float – M1 Series Windrowers, page 105</i></li> </ul>
	Check lean bar is adjusted to a setting appropriate for first crop.	<i>3.7 Adjusting Lean Bar, page 25</i>
	Check skid shoes are evenly adjusted at a setting appropriate for first crop.	<i>5.12 Checking Optional Skid Shoes / Gauge Rollers, page 125</i>
	Check knife drive box lube level and breather position.	<i>3.20 Repositioning Knife Drive Box Breathers, page 93</i>
	Check that rear and side forming shields are evenly set to desired position.	<i>3.10 Assembling Forming Shield, page 29</i>
	Grease all bearings and drivelines.	<i>4 Lubricating the Machine, page 95</i>
	Check conditioner gear case lube level.	<i>5.11 Checking Oil Level in Conditioner Gearbox, page 124</i>
	Check conditioner roll gap, timing, and alignment.	<i>5.10 Checking Conditioner Rolls, page 122</i>
	Check roll intermesh hardware is securely tightened.	<i>5.10 Checking Conditioner Rolls, page 122</i>

**REFERENCE**

<b>RUN-UP PROCEDURE</b>		<i>5.14 Running up Header, page 127</i>
	Check hydraulic hose and wiring harness routing for clearance when raising or lowering header and when retracting or extending center-link.	—
	Check knife speed.	<i>5.15 Checking Knife Speed, page 134</i>
	Check that amber flasher and signal lights are functional.	<i>5.13 Checking Lights, page 126</i>
	Check header ID on windrower.	—
<b>POST RUN-UP CHECKS. STOP ENGINE.</b>		
	Check for hydraulic leaks.	—
	Check belt and chain drives for idler alignment and heated bearings.	<i>5.1 Checking Drive Belts and Chains, page 101</i>
	Check knife sections for discoloration caused by misalignment of components.	<i>5.16 Adjusting Knife and Guards, page 137</i>
	Check manuals in the right header endshield.	<i>5.17 Checking Manuals, page 139</i>

**Date Checked:**

**Checked by:**

## Recommended Fluids and Lubricants

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

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

Lubricant	Specification	Description	Use	Capacities
Grease	SAE Multi-Purpose	High temperature extreme pressure (EP2) performance with 1% max molybdenum disulphide (NLGI Grade 2). Lithium base.	As required unless otherwise specified	—
Grease	SAE Multi-Purpose	High temperature extreme pressure (EP) performance with 10% max molybdenum disulphide (NLGI Grade 2). Lithium base.	Driveline slip-joints	—
Gear lubricant	SAE 85W-140	API service class GL-5	Knife drive box	2.1 L (2.2 US qts)
Gear lubricant	SAE 85W-140	API service class GL-5	Conditioner drive gearbox	1 L (1.06 US qts)
Hydraulic oil	SAE 15W-40	Compliant with SAE specs for API class SJ And CH-4 engine oil.	Steering, lift, and header drive systems reservoir	126 L (33 US gal)

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