

**R113**  
**4.0 m (13 ft.) SP Disc Header**

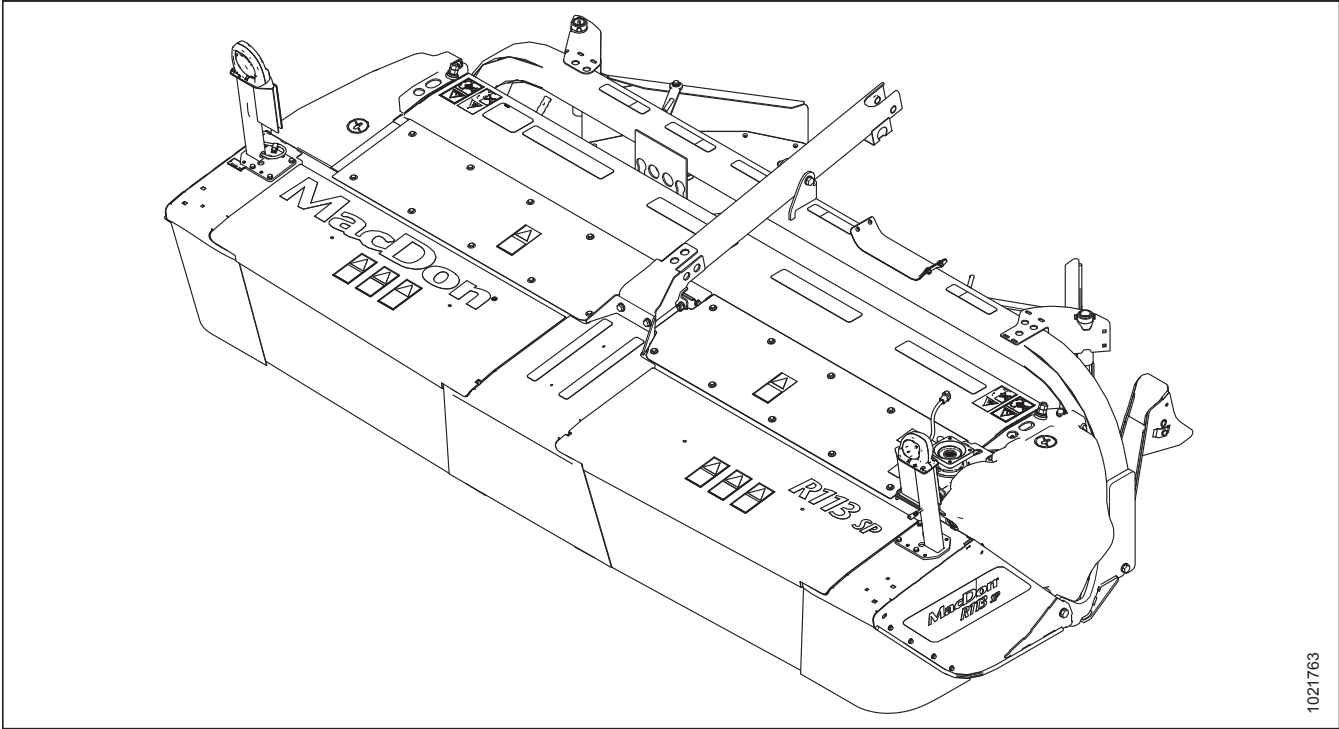
Unload and Assembly Instructions

214502 Revision A

2018 Model Year

Original Instruction

R113 SP Disc Header



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# Introduction

This instruction manual describes the unloading, setup, and predelivery requirements for the MacDon R113 SP Disc Header.

To ensure your customers receive the best performance and safety from this product, carefully follow the unload and assembly procedure from the beginning through to completion.

Retain this instruction for future reference.

**Carefully read all the material provided before attempting to unload, assemble, or use the machine.**

## **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 instruction is available only in English and can be ordered from MacDon, downloaded from our Dealer Portal, or from our International website (<http://www.macdon.com/world>).



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# 1 Unloading the Header

## CAUTION

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

## CAUTION

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

Table 1.1 Lifting Vehicle

Minimum Capacity <sup>1</sup>	3630 kg (8000 lb.)
Minimum Fork Length	198 cm (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.

## WARNING

Be sure forks are secure before moving away from load. Stand clear when lifting.

1. Remove hauler's tie-down straps and chains.
2. Approach header from its underside and slide forks in under the lifting framework as far as possible.

### IMPORTANT:

Do not damage the hydraulic hoses hanging below the header.

3. Raise header off the deck.

### IMPORTANT:

If unloading a header from a two-unit load, take care to avoid contacting or damaging the other header.

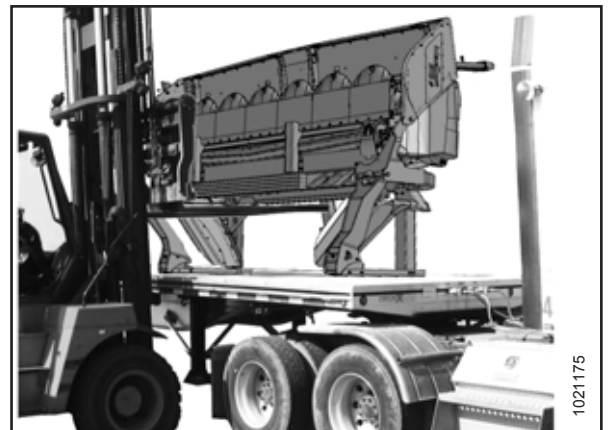


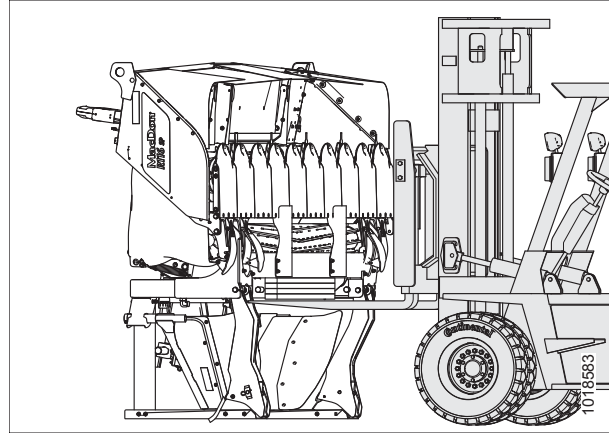
Figure 1.1: Lifting Header off Trailer

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

## UNLOADING THE HEADER

4. Back up until the header clears the trailer, and slowly lower to 150 mm (6 in.) from the ground.
5. Take to storage or setup area.
6. Set header down on secure, level ground.
7. Check for shipping damage and missing parts.



**Figure 1.2: Moving Header with Forklift**



## 2 Assembling the Header

Follow each procedure in this chapter in order.

### 2.1 Removing Lower Shipping Support

1. Support the wood brace (B) before cutting the three shipping straps (A).

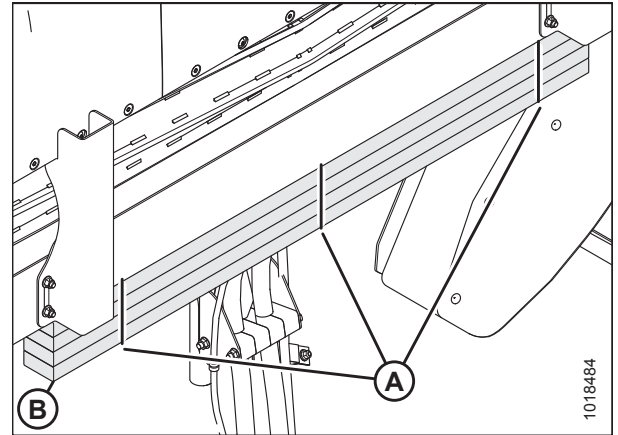


Figure 2.1: Shipping Support

2. Remove four bolts (A) on both vertical supports (B).
3. Remove both vertical supports (B).

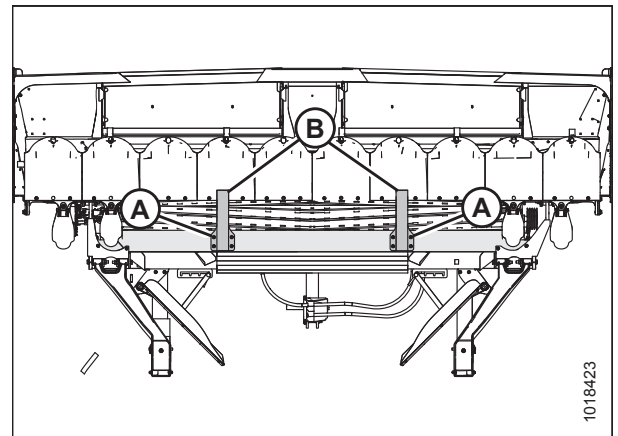


Figure 2.2: Shipping Support

## ASSEMBLING THE HEADER

### NOTE:

Four meter (13 foot) headers have one skid shoe on each side.

5. Remove bolt (A) at skid shoe (B). Retain bolt for reinstallation.

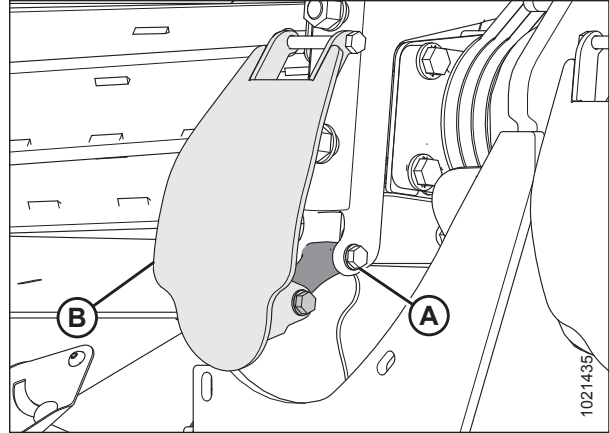


Figure 2.3: Skid Shoe (Left Side Shown)

6. Lift skid shoe (B) and support it with wire (A). Repeat at opposite skid shoe.

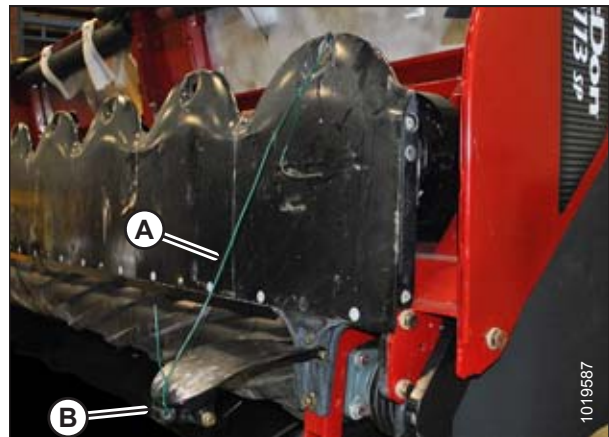
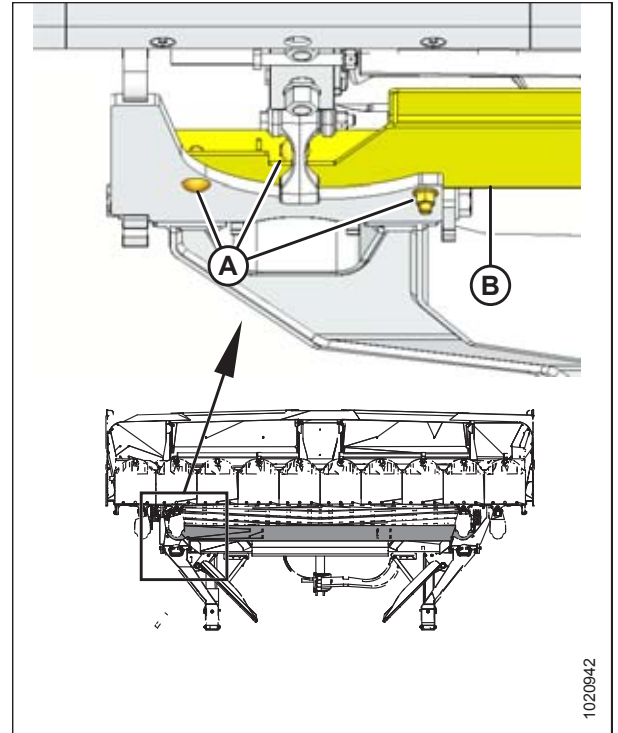


Figure 2.4: Supported Skid Shoe (Left Side Shown)

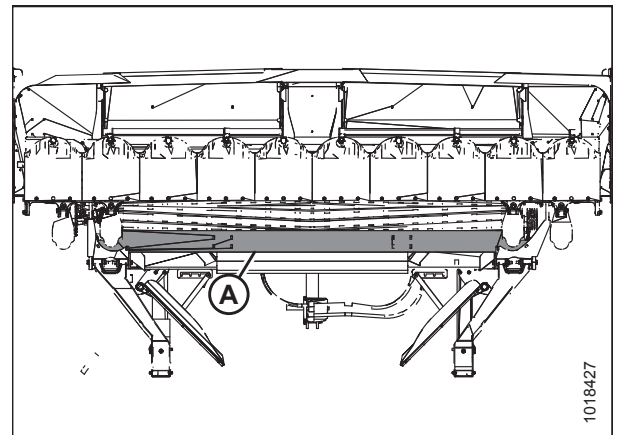
## ASSEMBLING THE HEADER

7. Remove three bolts (A) per side on the base support (B). Repeat at opposite end of the base support.



**Figure 2.5: Base Shipping Support (Right Side Shown)**

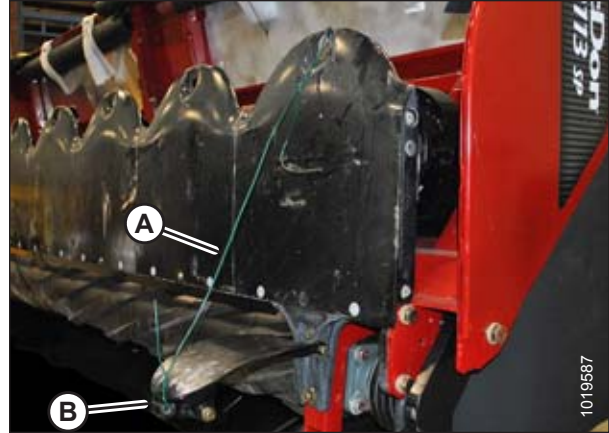
8. Remove the base support (A).



**Figure 2.6: Base Shipping Support**

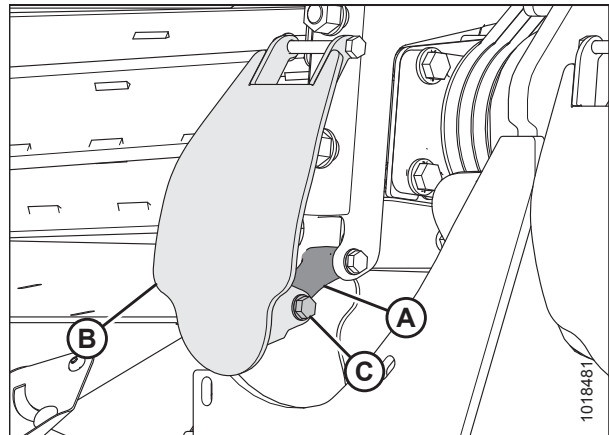
## ASSEMBLING THE HEADER

9. Remove wire (A) that is holding skid shoe (B).



**Figure 2.7: Skid Shoe Supported (Left Side Shown)**

10. Tilt skid shoe (B) inward, and align link (A) with the mounting hole in skid shoe.
11. Install bolt, washer, and nut (C).
12. Push the skid shoe towards the header, and tighten nut (C).
13. Repeat previous four steps for opposite side.



**Figure 2.8: Skid Shoe (Left Side Shown)**

## 2.2 Lowering the Header

1. Attach spreader bar (A) to forks.

**IMPORTANT:**

Length of spreader bar must be approximately 4600 mm (180 in.).

**CAUTION**

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

Table 2.1 Lifting Vehicle

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

2. Drive lifting vehicle to approach the header from its underside.
3. Attach chains to hooks (B) on either side of the header.

**CAUTION**

Stand clear when lowering the disc header.

**IMPORTANT:**

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

**IMPORTANT:**

Chain length must be sufficient to provide a minimum 1219 mm (48 in.) (C) between spreader bar and header.

4. Raise forks until lift chains are fully tensioned.

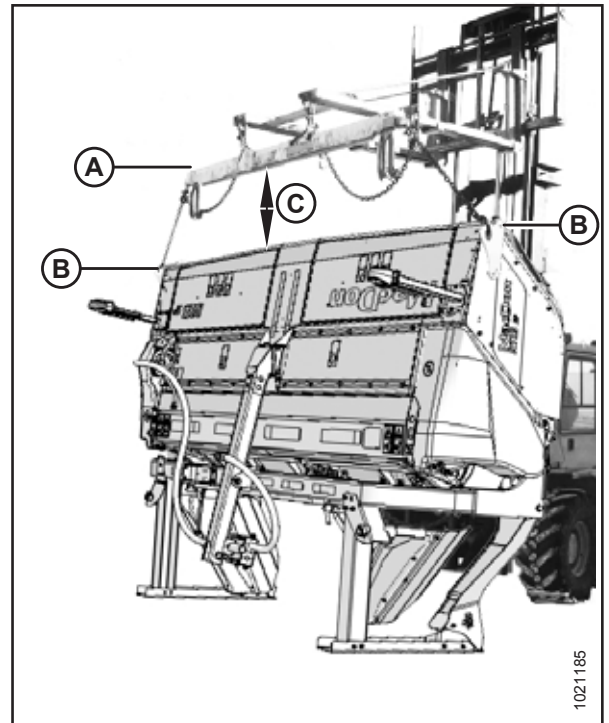


Figure 2.9: Spreader Bar Attached to Header

## ASSEMBLING THE HEADER

5. Back up **SLOWLY**, while simultaneously lowering the header until cutterbar rests on ground.
6. Remove chains from the header.

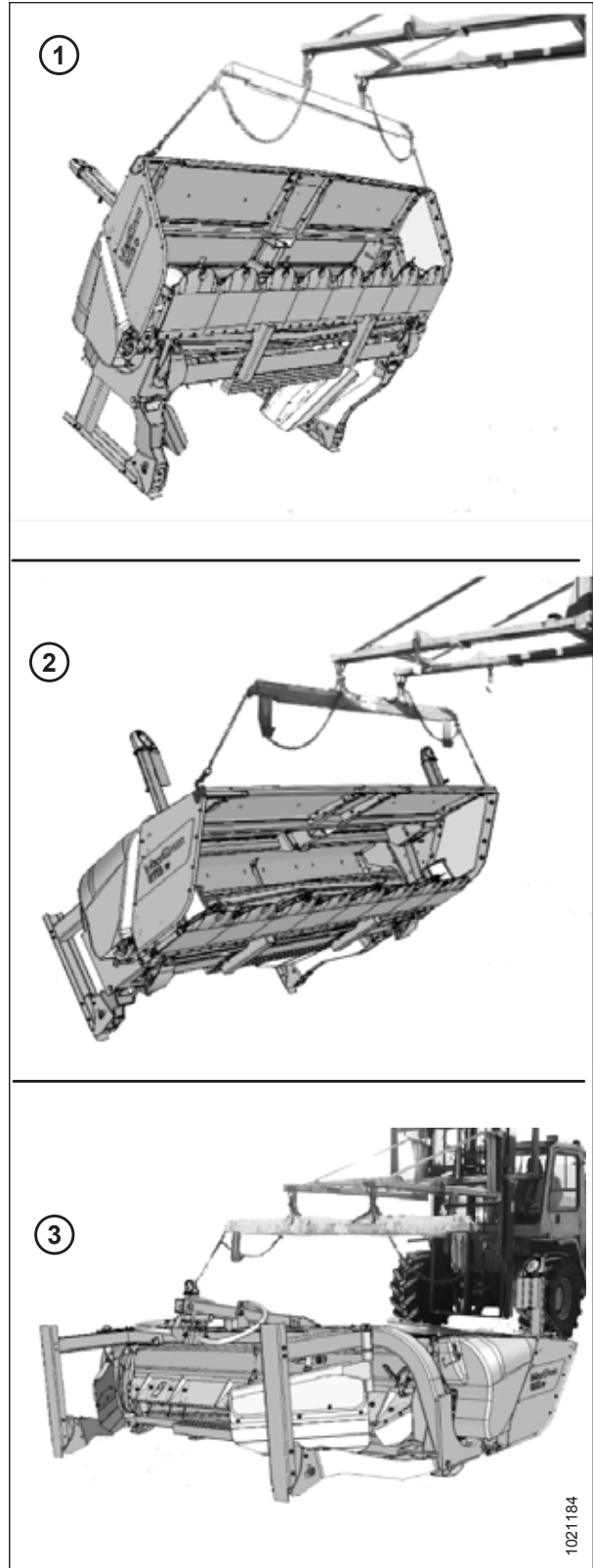


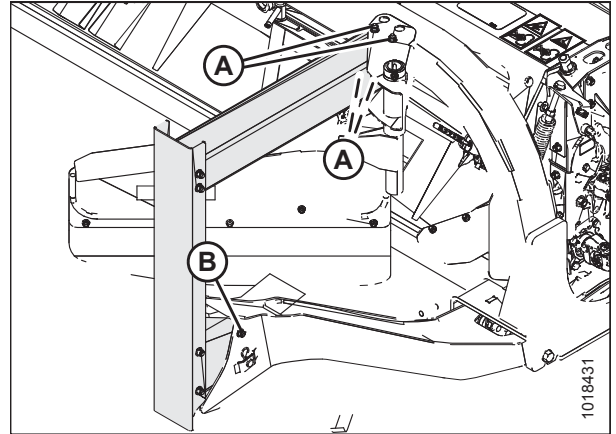
Figure 2.10: Lowering Header to the Ground

## 2.3 Removing Shipping Stands

**NOTE:**

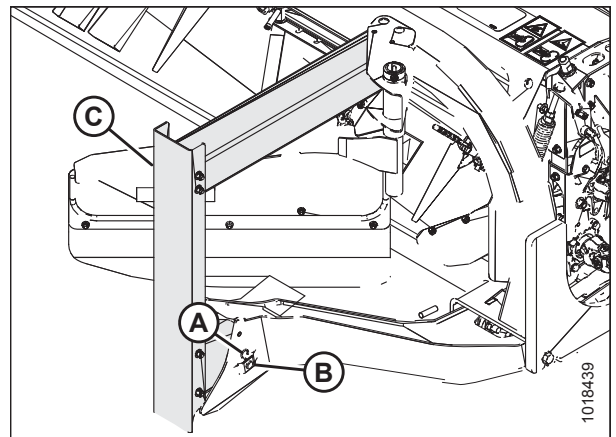
This procedure must be completed on both sides of the header near the forming shields.

1. Remove bolts (A).
2. Remove bolt (B).



**Figure 2.11: Shipping Stands (Right Side Shown – Left Side Opposite)**

3. Cut any shipping wire from the legs of the header.
4. Remove hair pin (A) from clevis pin (B).
5. Hold shipping stand (C) and remove clevis pin (B).
6. Remove stand (C) and discard. Reinsert pin (B) in header lifting arm and secure with hair pin (A).

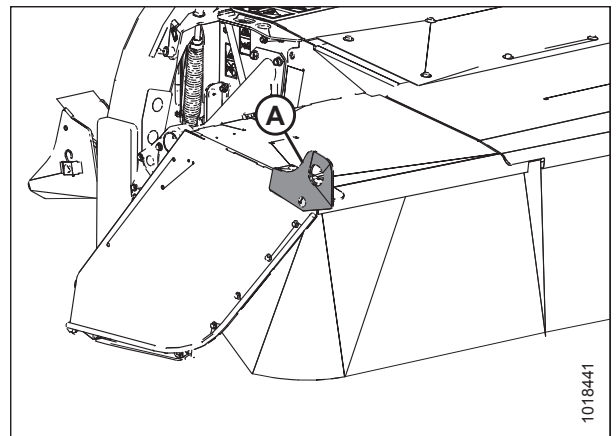


**Figure 2.12: Shipping Stands (Right Side Shown – Left Side Opposite)**

7. Remove hooks (A) from front corners and reinstall hardware.

**NOTE:**

If tall crop divider option will be installed, do not reinstall hardware.



**Figure 2.13: Shipping Hook**

## 2.4 Unpacking Hoses for M1170 Windrower

To unpack the hydraulic hoses for connecting an R113 disc header to an M1170 windrower, follow these steps:

1. Remove shipping wire/banding and packing (A) around hydraulic hoses.
2. Remove bolt (C) from support (B) and discard bolt.
3. Remove hose support (B) from the frame.

**NOTE:**

Unlike an R113 disc header designed for the M155E4 windrower, an R113 disc header designed for the M1170 windrower has a built-in hose support (B) that slots into the windrower's frame when it's time to connect to the windrower.

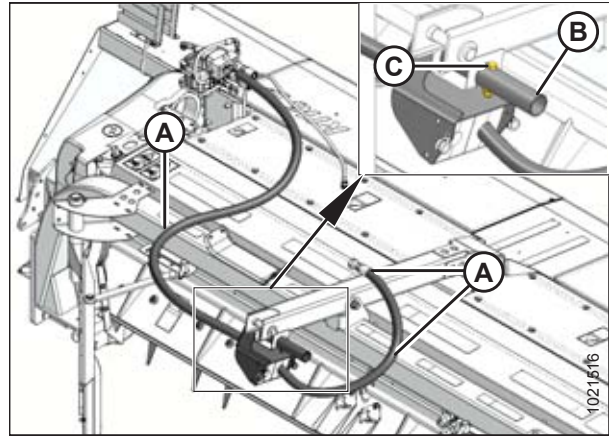


Figure 2.14: Unpacking Hoses (Not All Hoses Shown)

4. Lay the hose and electrical bundle (A) on the ground between the two header supports.
5. Remove shipping wire securing baffle (B) and leave in lowered position.

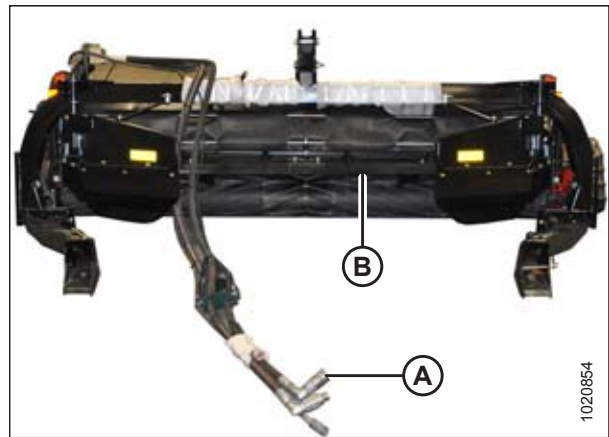


Figure 2.15: Hoses and Baffle



## 2.5 Unpacking Hoses for M155 or M155E4 Windrower

1. Remove shipping wire/banding and packing securing pressure hose (A) to header hose support (B). Lay hose on top of header.

**NOTE:**

Shipping wire/banding and packing not shown in illustration at right.

2. Install header hose support (B) on header. Refer to [2.6 Installing Hose Support for M155 or M155E4 Windrower](#), page 12 for instructions.

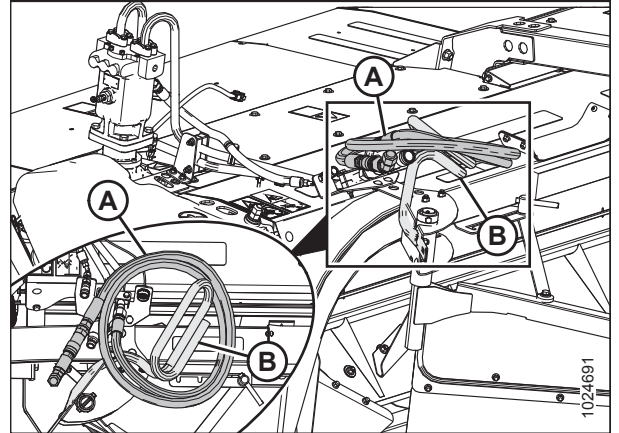


Figure 2.16: Unpacking Hoses

## 2.6 Installing Hose Support for M155 or M155E4 Windrower

The hose support ships bolted to the header's carrier frame and needs to be installed in an upright position before routing the header's hydraulic hoses. Follow these steps to install the hose support:

1. Remove bolt (A).
2. Loosen bolt (B) and rotate hose support (C) to upright position.

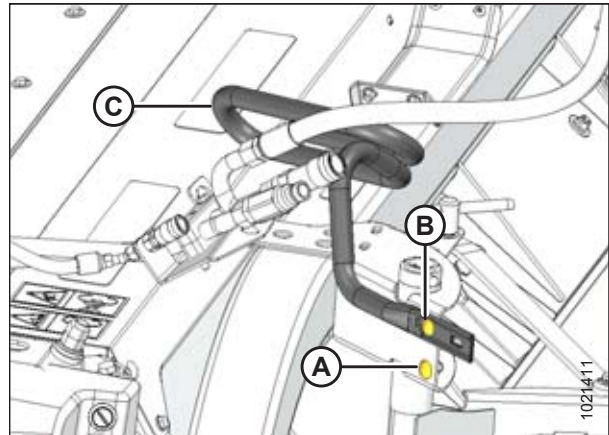


Figure 2.17: Hose Support

3. Install bolt (A). Tighten both bolts.
4. Remove shipping material from hose (B), and route hose through hose support (C). Lay hose on header.

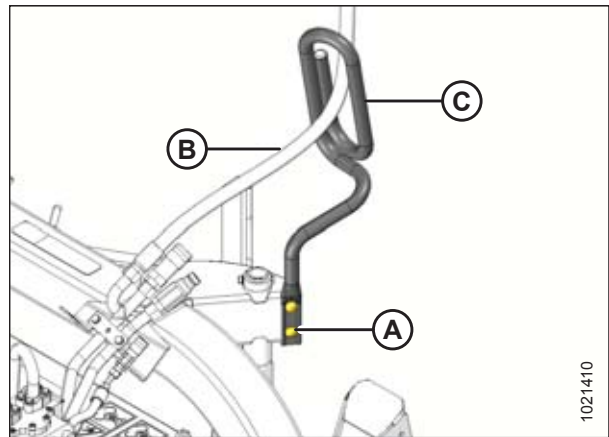


Figure 2.18: Hose Support

## 2.7 Assembling Hazard Lights

1. Detach hazard light bracket (A) from shipping bracket (B) by removing the four bolts (C), washers (D), and nuts (E) securing it in place. Discard hardware.

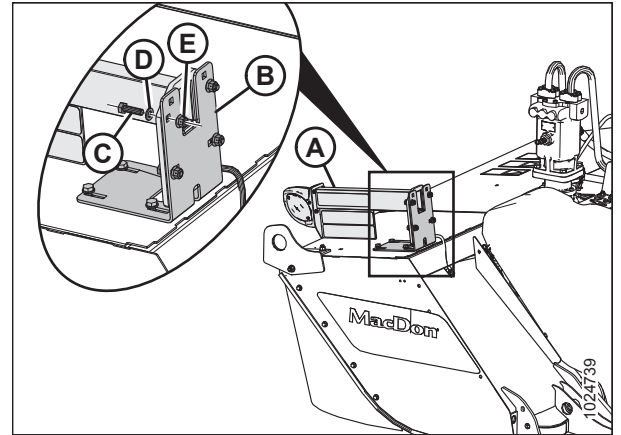


Figure 2.19: Hazard Light, Shipping Bracket at Right Side of Header (Left Side Opposite)

2. Detach shipping bracket (A) from header by removing the four bolts (B), washers (C), and nuts (D) securing the bracket in place. Retain hardware.

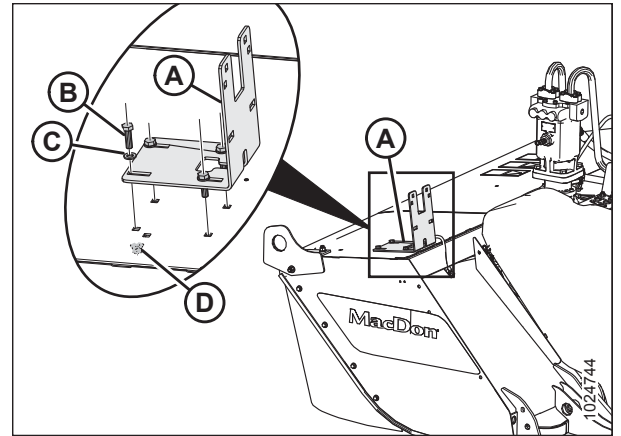


Figure 2.20: Hazard Light, Shipping Bracket at Right Side of Header (Left Side Opposite)

3. Install hazard light bracket (A) onto header with hardware retained from Step 1, page 13. Install four bolts (B) and washers (C) on header exterior and four nuts (D) on header interior.

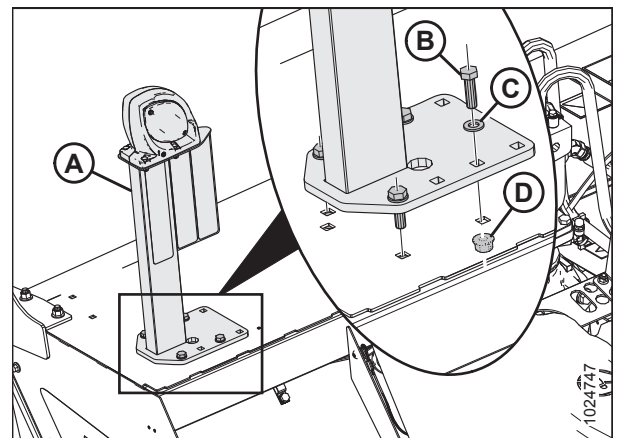


Figure 2.21: Hazard Light at Right Side of Header (Left Side Opposite)



## 3 Attaching Header to Windrower

### 3.1 Attaching R1 Series Disc Header to M1 Series Windrower

The windrower hydraulic center-link may be equipped with a self-aligning option that allows the Operator to control the vertical position of the center-link from the cab.

#### **DANGER**

To avoid bodily injury or death from 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. **Hydraulic Center-Link without Self-Alignment:**  
Remove pin (A) and raise center-link (B) until hook is above the attachment pin on header. Replace pin (A) to hold center-link in place.

#### **IMPORTANT:**

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

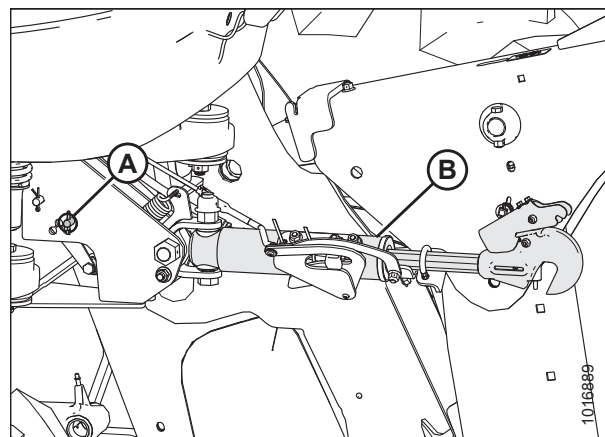


Figure 3.1: Hydraulic Center-Link

2. Remove hairpin (A) from clevis pin (B), and remove pin from header support (C) on both sides of header.

#### **CAUTION**

Check to be sure all bystanders have cleared the area.

3. Start windrower engine.

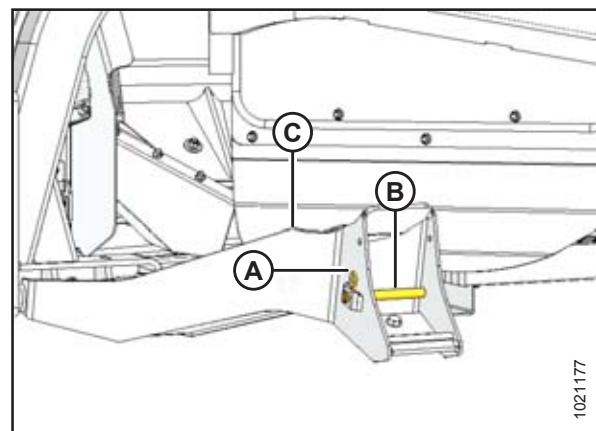


Figure 3.2: Header Support

## ATTACHING HEADER TO WINDROWER

### CAUTION

When lowering header lift legs without a header or weight box attached to the windrower, ensure the float springs tension is fully released to prevent damage to the header lift linkages.

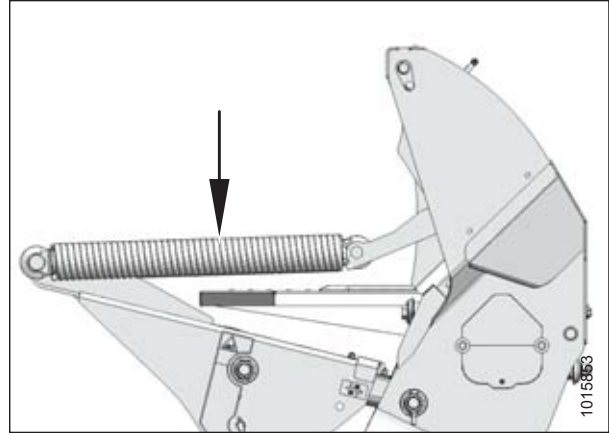


Figure 3.3: Header Float Spring

4. Press rotary scroll knob (A) on the HPT display to highlight QuickMenu options.
5. Rotate scroll knob (A) to highlight the HEADER FLOAT symbol (B), and press scroll knob to select. The header float adjust screen displays.



Figure 3.4: HPT Display

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

#### NOTE:

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



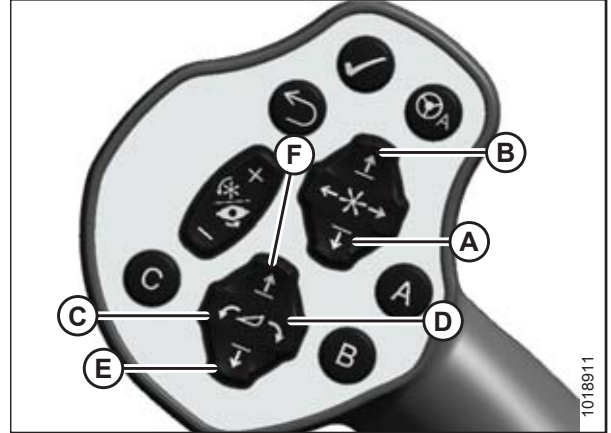
Figure 3.5: HPT Display

## ATTACHING HEADER TO WINDROWER

7. Press HEADER DOWN switch (E) on the ground speed lever (GSL) to fully retract header lift cylinders.
8. **Self-Aligning Hydraulic Center-Link:** Press the REEL UP switch (B) on the GSL to raise the center-link until the hook is above the attachment pin on the header.

**IMPORTANT:**

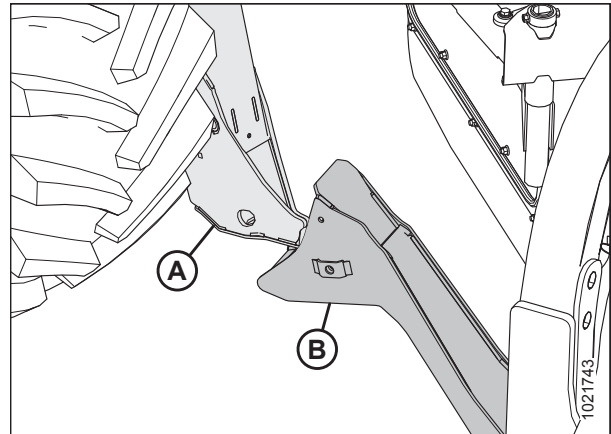
If the center-link is too low, it may contact the header as the windrower approaches the header for hookup.



**Figure 3.6: GSL**

- |                      |                    |
|----------------------|--------------------|
| A - Reel Down        | B - Reel Up        |
| C - Header Tilt Down | D - Header Tilt Up |
| E - Header Down      | F - Header Up      |

9. Drive the windrower slowly forward until the feet (A) enter the supports (B). Continue to drive slowly forward until feet engage the supports and header nudges forward.
10. Ensure that feet (A) are properly engaged in supports (B).



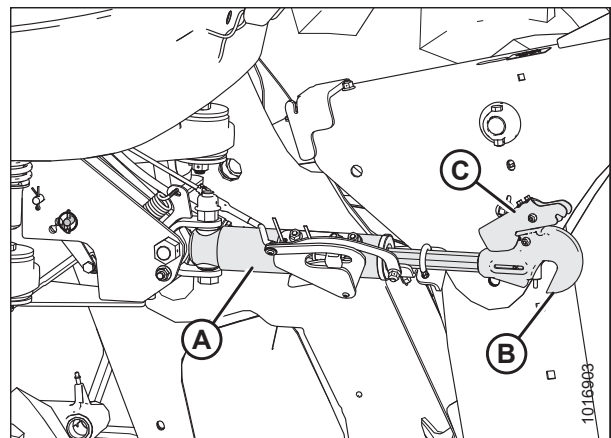
**Figure 3.7: Header Support**

11. **Self-Aligning Hydraulic Center-Link:**
  - a. Adjust position of the center-link cylinder (A) with the switches on the GSL until hook (B) is above the header attachment pin.

**IMPORTANT:**

Hook release (C) must be down to enable self-locking mechanism.

- b. If the hook release (C) is open (up), stop the engine and remove the ignition key. Manually push the hook release (C) down after the hook engages the header pin.
- c. Lower center-link (A) onto the header with REEL DOWN switch on the GSL until the center-link locks into position and the hook release (C) is down.
- d. Check that center-link is locked onto header by pressing the REEL UP switch on the GSL.



**Figure 3.8: Hydraulic Center-Link**

## ATTACHING HEADER TO WINDROWER

### 12. Hydraulic Center-Link without Self-Alignment:

- Press HEADER TILT UP or HEADER TILT DOWN cylinder switches on the GSL to extend or retract center-link cylinder until the hook is aligned with the header attachment pin.
- Stop the engine and remove the key.
- Push down on rod end of link cylinder (B) until hook engages and locks onto header pin.

#### IMPORTANT:

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

- Check that center-link (A) is locked onto header by pulling upward on rod end (B) of cylinder.

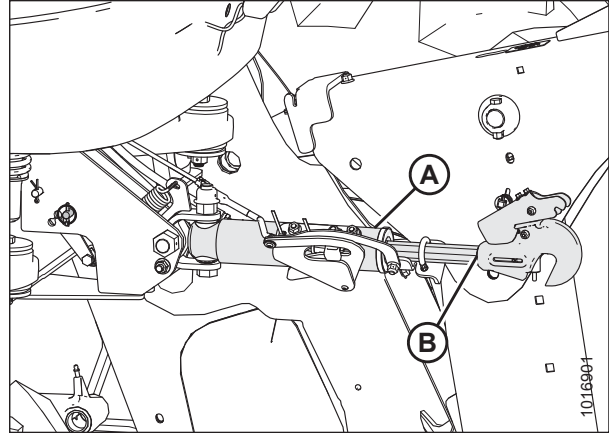


Figure 3.9: Hydraulic Center-Link

### CAUTION

Check to be sure all bystanders have cleared the area.

- Start engine.

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

#### NOTE:

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

- Press and hold the HEADER UP switch (A) until both cylinders stop moving.
- Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

- Stop the engine and remove the key.



Figure 3.10: GSL

- Engage safety prop on the windrower's lift cylinder as follows:

- Pull lever (A) and rotate toward header to release, and lower safety prop onto cylinder.
- Repeat for opposite lift cylinder.

#### IMPORTANT:

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

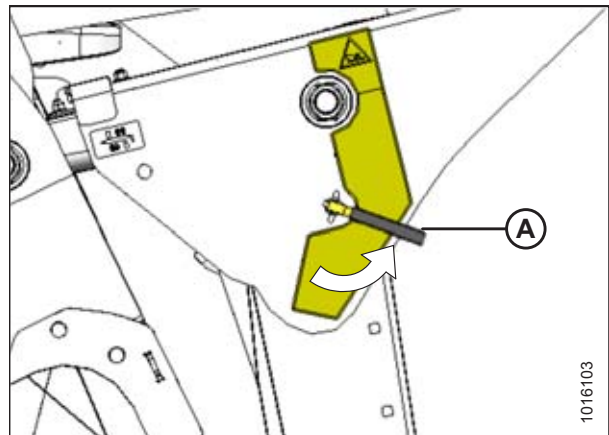


Figure 3.11: Cylinder Safety Prop



## ATTACHING HEADER TO WINDROWER

16. Install clevis pin (A) through support and windrower lift arm and secure with hairpin (B). Repeat for opposite side.

**IMPORTANT:**

Ensure clevis pin (A) is fully inserted, and hairpin is installed behind bracket.

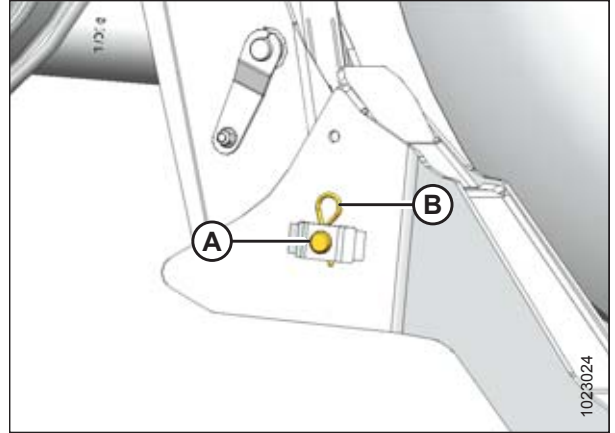


Figure 3.12: Header Support

17. Disengage safety props by turning lever (A) away from the header to raise the safety prop until the lever locks into vertical position. Repeat for opposite cylinder.

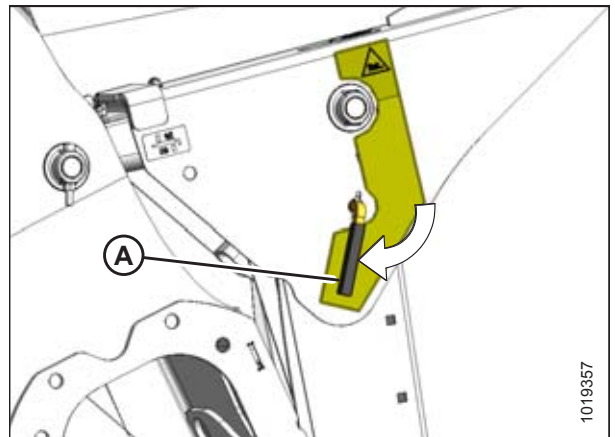


Figure 3.13: Safety Props

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



Figure 3.14: GSL

## ATTACHING HEADER TO WINDROWER

19. If not prompted by the HPT display to restore header float, restore header float manually by doing the following:
  - a. Press rotary scroll knob (A) on Harvest Performance Tracker (HPT) to highlight QuickMenu options.
  - b. Rotate scroll knob (A) to highlight the HEADER FLOAT symbol (B), and press scroll knob to select. Screen changes.



Figure 3.15: HPT Display

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

**NOTE:**

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

21. Stop the engine and remove the key.
22. Grasp one end of the header and lift. Lifting force should be 426–471 N (95–105 lbf) and should be the same at both ends.



Figure 3.16: HPT Display

### 3.2 Attaching R1 Series Disc Header to M155 or M155E4 Windrowers with Hydraulic Center-Link and Optional Self-Alignment

#### CAUTION

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

1. Remove hairpin (B) from clevis pin (A) and remove clevis pin from the header supports (C) on both sides of the header.

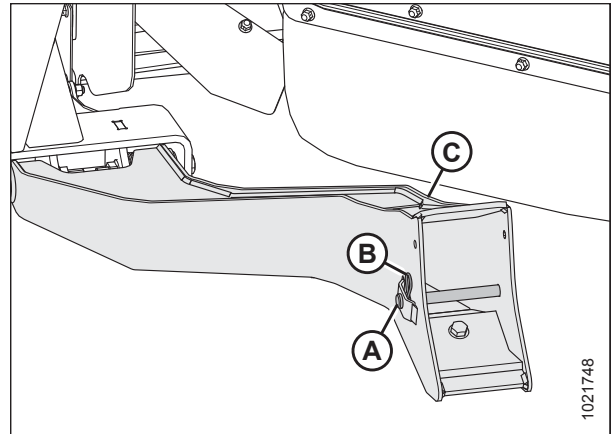


Figure 3.17: Header Support

#### CAUTION

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to the windrower, ensure the float engagement pin is installed in storage position (B) and NOT in engaged position (A).

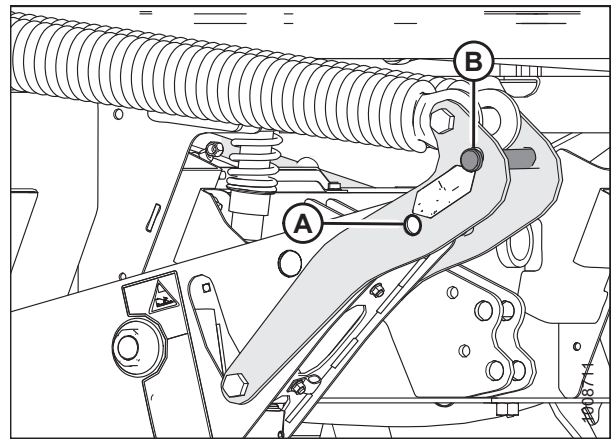


Figure 3.18: Float Linkage

## ATTACHING HEADER TO WINDROWER

### CAUTION

Check to be sure all bystanders have cleared the area.

2. Start the engine and press the HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.

#### IMPORTANT:

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

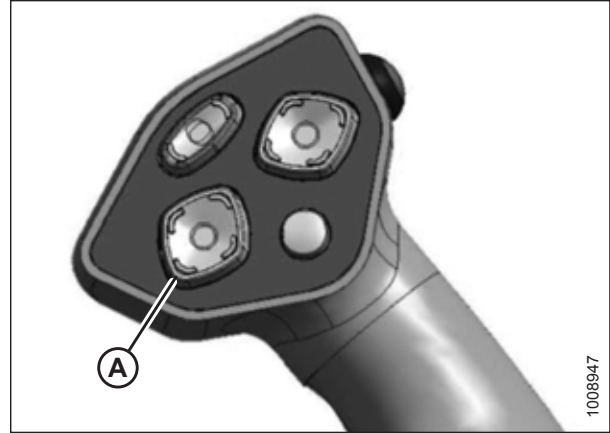


Figure 3.19: Ground Speed Lever

3. Press the REEL UP switch (A) on the GSL to raise the center-link until the hook is above the attachment pin on the header.



Figure 3.20: Ground Speed Lever

4. Drive the windrower slowly forward until the windrower feet (A) enter the header supports (B). Continue driving slowly forward until the feet engage the supports and the header nudges forward.

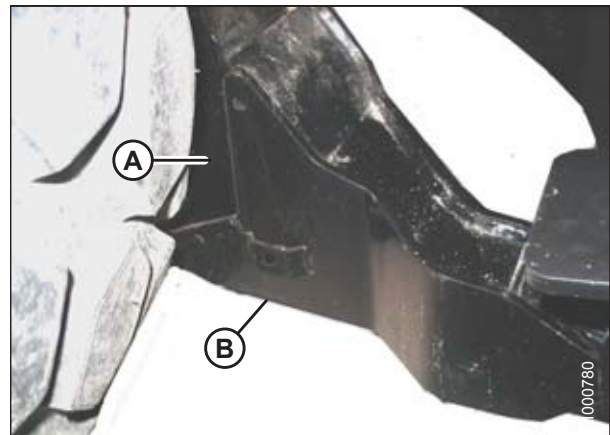


Figure 3.21: Header Support

## ATTACHING HEADER TO WINDROWER

5. Use the following GSL functions to position the center-link hook above the header attachment pin:
  - REEL UP (A) to raise the center-link
  - REEL DOWN (B) to lower the center-link
  - HEADER TILT UP (C) to retract the center-link
  - HEADER TILT DOWN (D) to extend the center-link

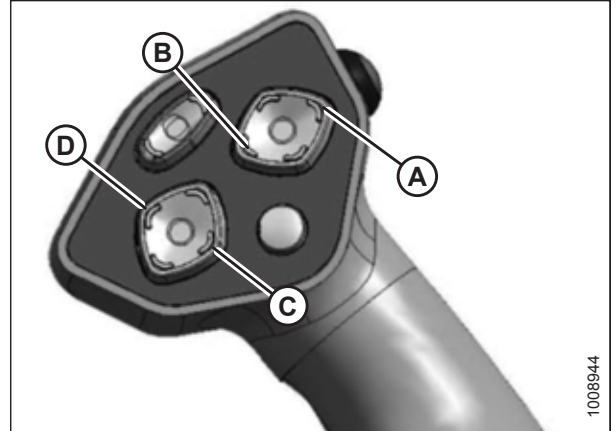


Figure 3.22: Ground Speed Lever

6. Adjust center-link cylinder (A) position with the REEL UP and REEL DOWN switches on the GSL until the hook is positioned above the header attachment pin.

### IMPORTANT:

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

7. Lower center-link (A) onto the header with REEL DOWN switch until the center-link locks into position and the hook release (B) is down.
8. Check that center-link is locked onto header by pressing the REEL UP switch on the GSL.

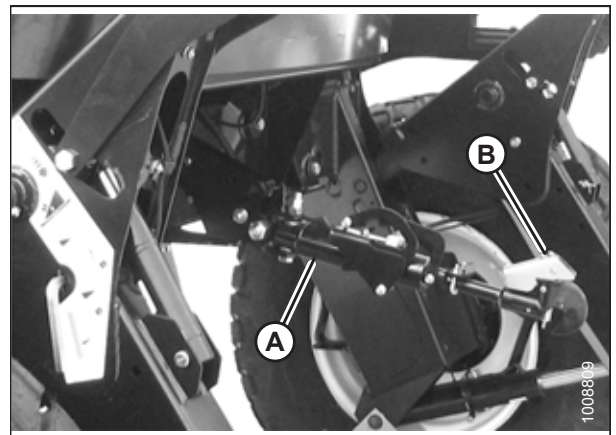


Figure 3.23: Hydraulic Center-Link

### CAUTION

Check to be sure all bystanders have cleared the area.

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

### NOTE:

It may be necessary to repeat this procedure if there is air in the system.



Figure 3.24: Ground Speed Lever

## ATTACHING HEADER TO WINDROWER

11. Engage the safety props on both lift cylinders as follows:
  - a. Stop engine and remove key from ignition.
  - b. Pull lever (A) and rotate towards the header to release and lower safety prop (B) onto the lift cylinder.
  - c. Repeat for opposite lift cylinder.

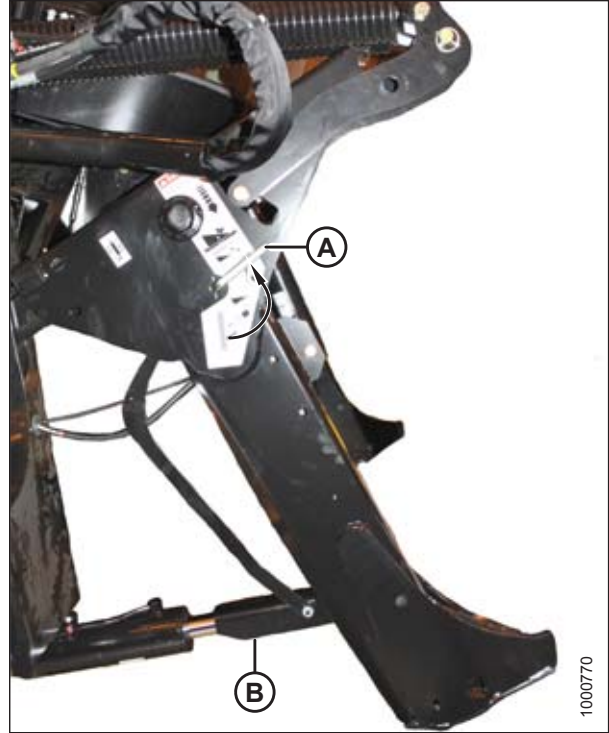


Figure 3.25: Safety Prop

12. Install clevis pin (A) through support and windrower lift member, and secure with hairpin (B). Repeat for opposite side.

**IMPORTANT:**

Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.

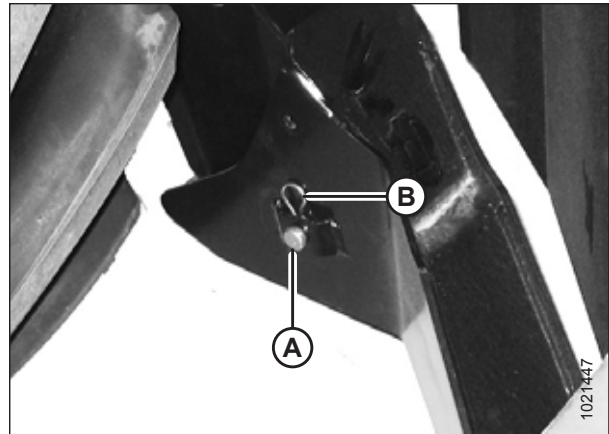


Figure 3.26: Header Support

## ATTACHING HEADER TO WINDROWER

13. Remove the clevis pin from storage position (B) in linkage and insert into hole (A) to engage the float springs. Secure with hairpin.

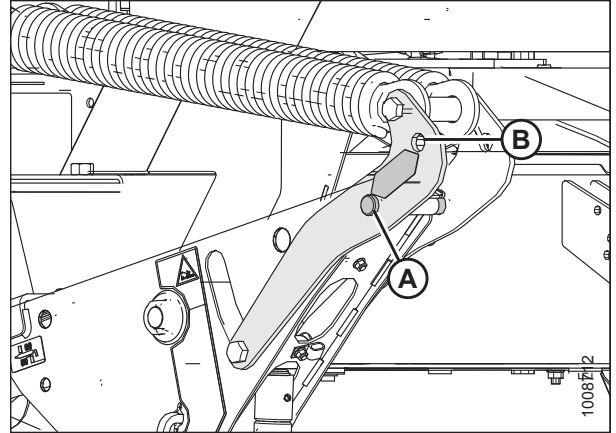


Figure 3.27: Header Float Linkage

14. Disengage the safety prop by turning lever (A) downwards until lever locks into vertical position.
15. Repeat for opposite safety prop.

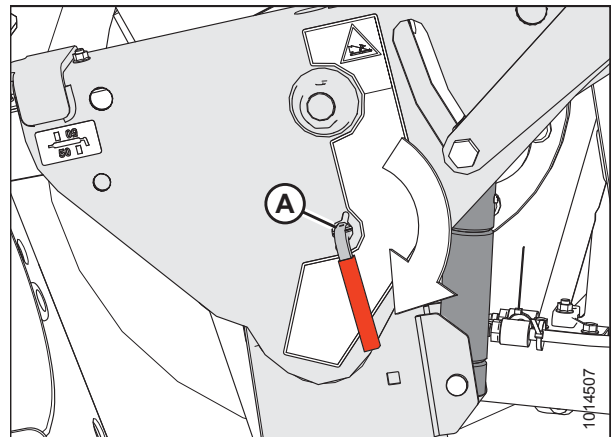


Figure 3.28: Safety Prop Lever

### CAUTION

Check to be sure all bystanders have cleared the area.

16. Start the engine and press HEADER DOWN switch (A) on the GSL to fully lower the header.
17. Stop engine and remove key from ignition.

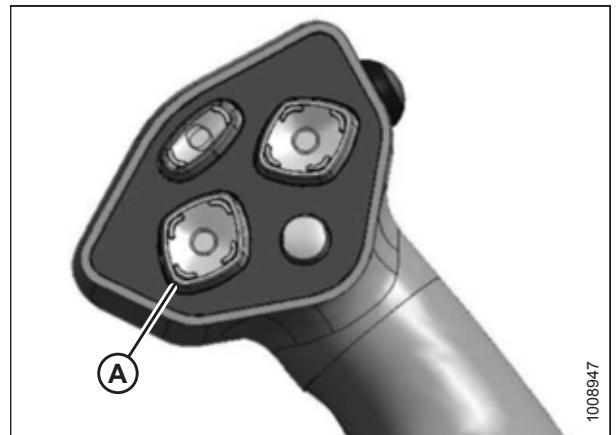


Figure 3.29: Ground Speed Lever

### 3.3 Attaching an R1 Series Disc Header to an M155 or M155E4 Windrower: Hydraulic Center-Link without Optional Self-Alignment

**⚠ DANGER**

To avoid bodily injury or death from 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. Remove hairpin (B) from clevis pin (A), and then remove clevis pin from header supports (C) on both sides of the header.

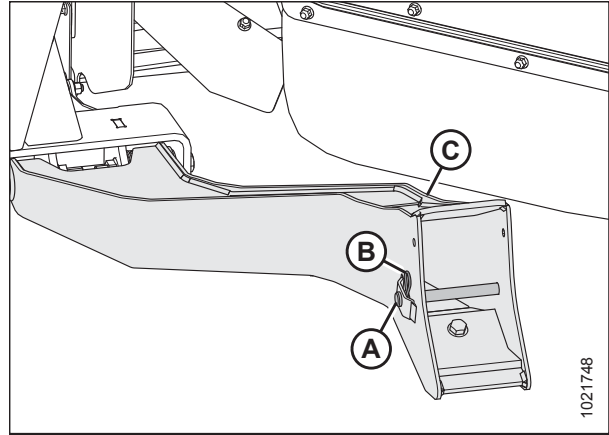


Figure 3.30: Header Support

**⚠ CAUTION**

To prevent damage to the lift system when lowering header lift linkages without a header or weight box attached to the windrower, ensure the float engagement pin is installed in storage position (B) and NOT in engaged position (A).

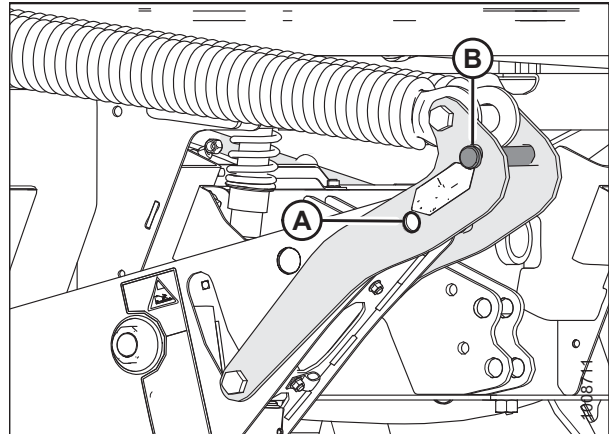


Figure 3.31: Header Float Linkage



## ATTACHING HEADER TO WINDROWER

### CAUTION

Check to be sure all bystanders have cleared the area.

2. Start the engine, and press HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.

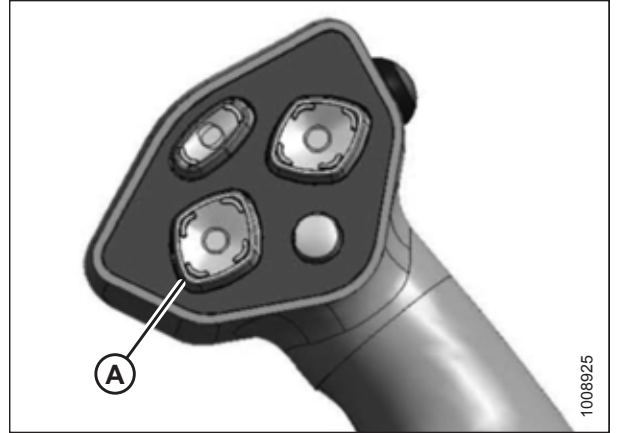


Figure 3.32: Ground Speed Lever

3. Remove pin (A) pin in frame linkage and raise center-link (B) until hook is above the attachment pin on header. Replace pin (A) to hold center-link in place.

#### IMPORTANT:

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

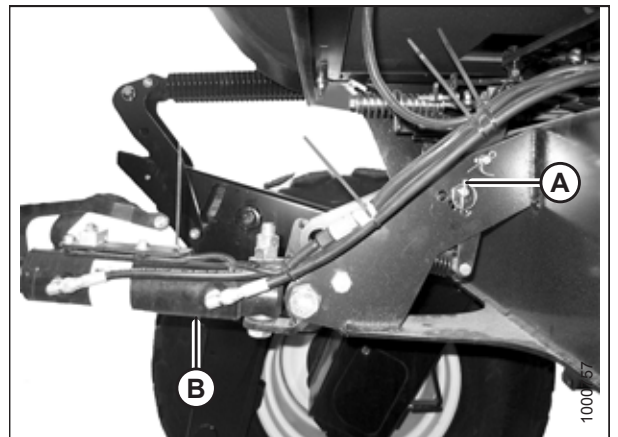


Figure 3.33: Hydraulic Center-Link

4. Drive the windrower slowly forward until the windrower feet (A) enter the header supports (B). Continue driving slowly forward until the feet engage the supports and the header nudges forward.

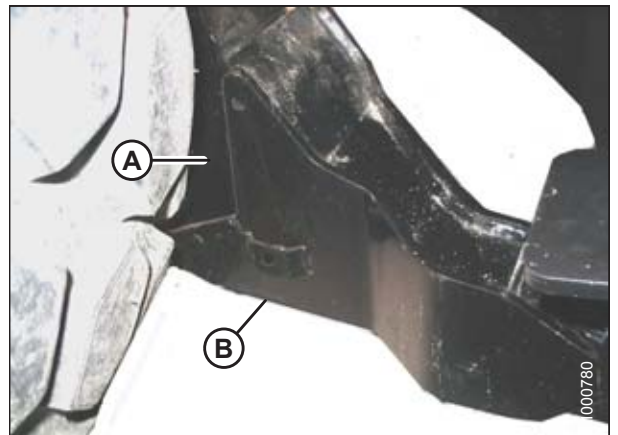


Figure 3.34: Header Support

## ATTACHING HEADER TO WINDROWER

5. Use the following GSL functions to position the center-link hook above the header attachment pin:
  - HEADER TILT UP (A) to retract the center-link
  - HEADER TILT DOWN (B) to extend the center-link
6. Stop engine, and remove key from ignition.

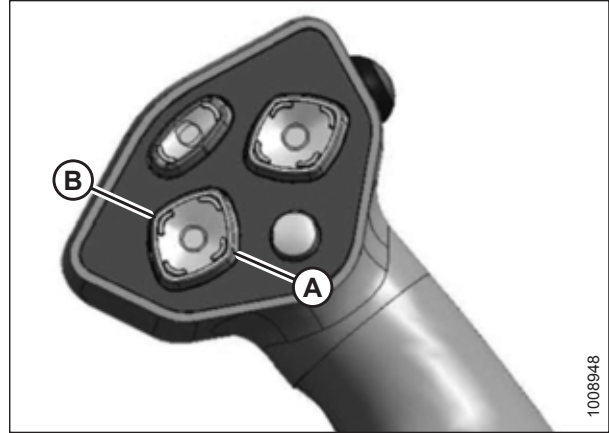


Figure 3.35: Ground Speed Lever

7. Push down on rod end of link cylinder (B) until hook engages and locks onto header pin.

**IMPORTANT:**  
The hook release must be down to enable the self-locking mechanism. If the release is open (up), manually push it down after hook engages header pin.
8. Check that center-link (A) is locked onto the header by pulling upward on rod end (B) of cylinder.

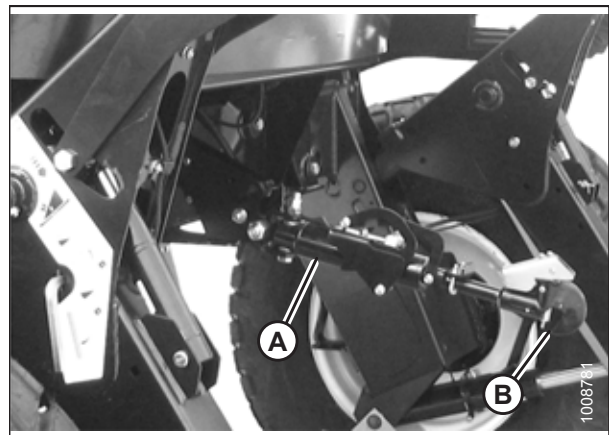


Figure 3.36: Hydraulic Center-Link

### CAUTION

Check to be sure all bystanders have cleared the area.

9. Start the engine.
10. Press HEADER UP switch (A) to raise the header to maximum height.
11. If one end of the header does **NOT** fully raise, rephase the lift cylinders as follows:
  - a. Press and hold the HEADER UP switch until both cylinders stop moving.
  - b. Continue to hold the switch for 3–4 seconds. Cylinders are now phased.

### NOTE:

It may be necessary to repeat this procedure if there is air in the system.



Figure 3.37: Ground Speed Lever

## ATTACHING HEADER TO WINDROWER

12. Engage the safety props on both lift cylinders as follows:
  - a. Stop engine and remove key from ignition.
  - b. Pull lever (A) and rotate towards the header to release and lower safety prop (B) onto the lift cylinder.
  - c. Repeat for opposite lift cylinder.

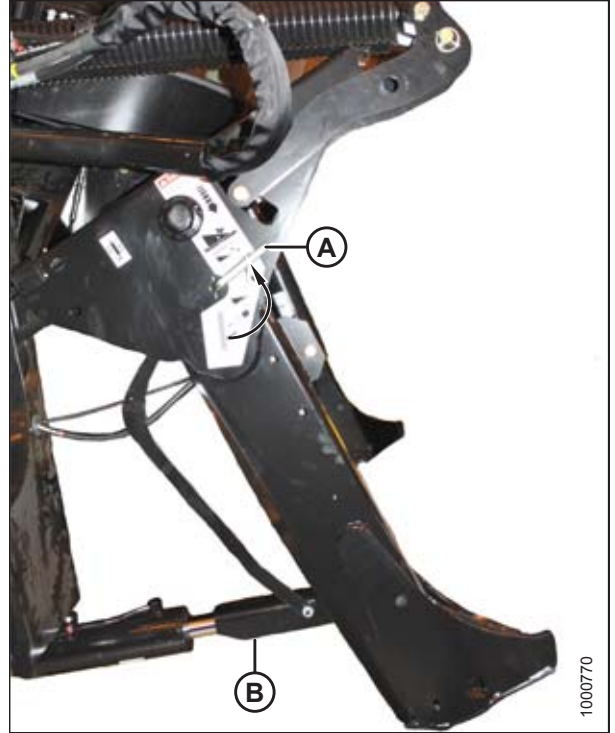


Figure 3.38: Safety Prop

13. Install clevis pin (A) through the support and windrower lift member, and secure with hairpin (B). Repeat for opposite side.

**IMPORTANT:**

Ensure clevis pin (A) is fully inserted and hairpin is installed behind bracket.

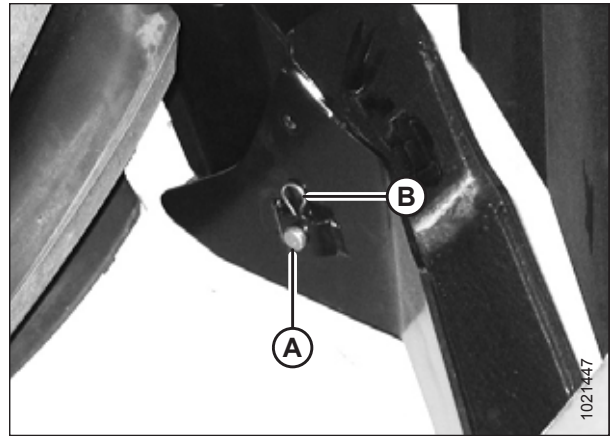


Figure 3.39: Header Support

## ATTACHING HEADER TO WINDROWER

14. Remove the clevis pin from storage position (B) in linkage and insert into hole (A) to engage the float springs. Secure with hairpin.

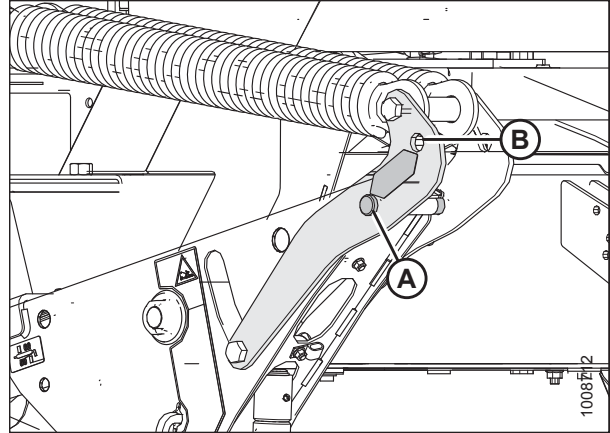


Figure 3.40: Header Float Linkage

15. Disengage the safety prop by turning lever (A) downwards until lever locks into vertical position.
16. Repeat for opposite safety prop.

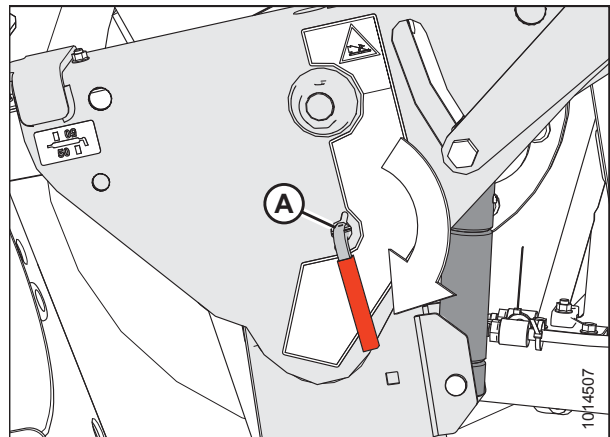


Figure 3.41: Safety Prop Lever

### CAUTION

Check to be sure all bystanders have cleared the area.

17. Start the engine and press HEADER DOWN switch (A) on the GSL to fully lower the header.
18. Stop engine and remove key from ignition.

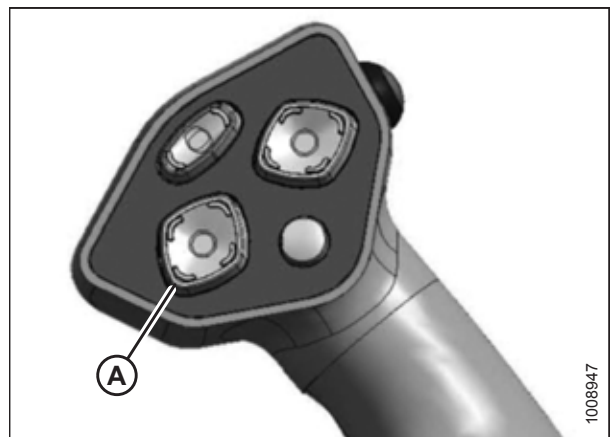


Figure 3.42: Ground Speed Lever

### 3.4 Attaching Hydraulics and Electrical Connections

The procedure for attaching the header hydraulic and electrical connections depends on the windrower model. Refer to the appropriate procedure:

- 3.4.1 M1170 Windrowers, page 31
- 3.4.2 M155 or M155E4 Windrowers, page 37

#### 3.4.1 M1170 Windrowers

**IMPORTANT:**

To prevent contamination of the hydraulic system, use a clean rag to remove dirt and moisture from all (fixed and movable) hydraulic couplers.

1. Open the windrower's left side platform. For instructions, refer to windrower operator's manual.
2. Retrieve the hydraulic hoses from the header.
3. Attach hose support (A) to the frame near the windrower left cab-forward leg, and route hoses under frame.

**NOTE:**

Route hoses as straight as possible and avoid rub/wear points that could damage hydraulic hoses.

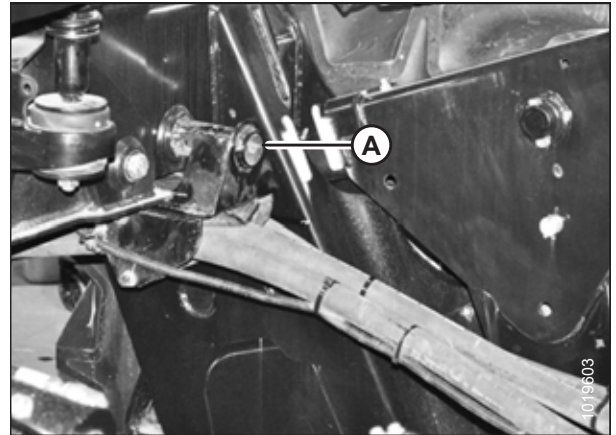


Figure 3.43: Hose Support Attachment

4. Disconnect male coupler (A) from pressure hose.
5. Disconnect female coupler and fitting (B) from return hose.

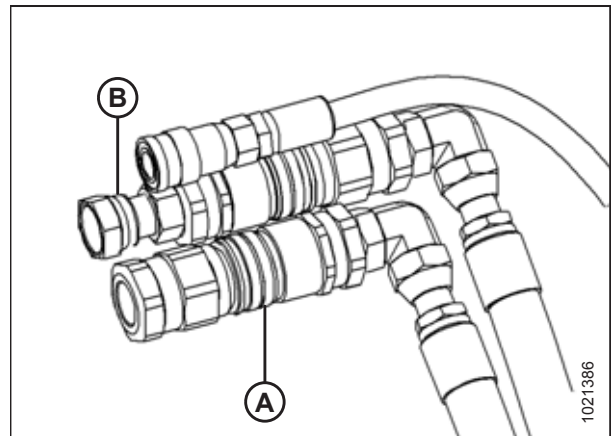


Figure 3.44: Hoses from Header

## ATTACHING HEADER TO WINDROWER

6. Remove coupling and cap (A) and plug (B) from fittings on windrower.

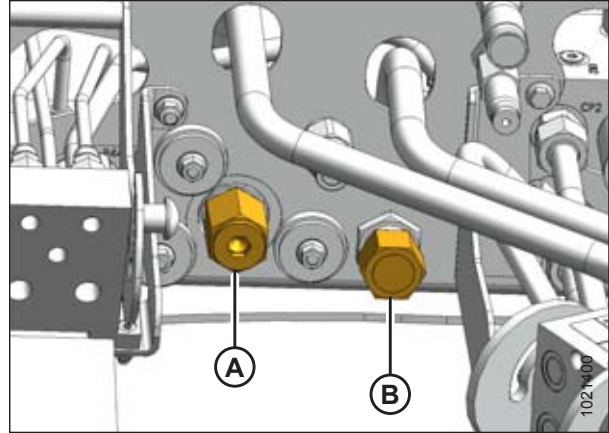


Figure 3.45: Windrower Hydraulics

7. Install male coupler onto pressure fitting (A), and female coupler onto return fitting (B) on windrower.
8. Tighten couplers onto fittings.

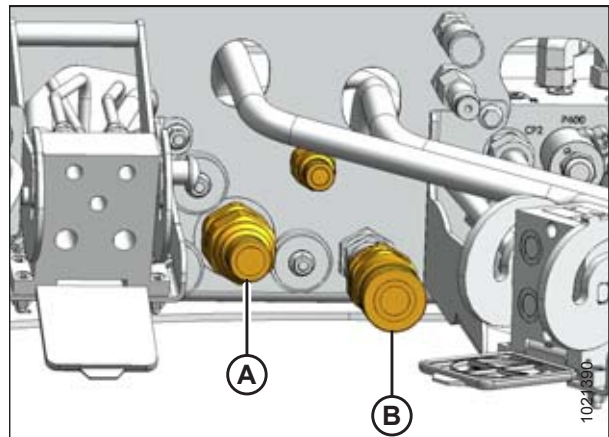
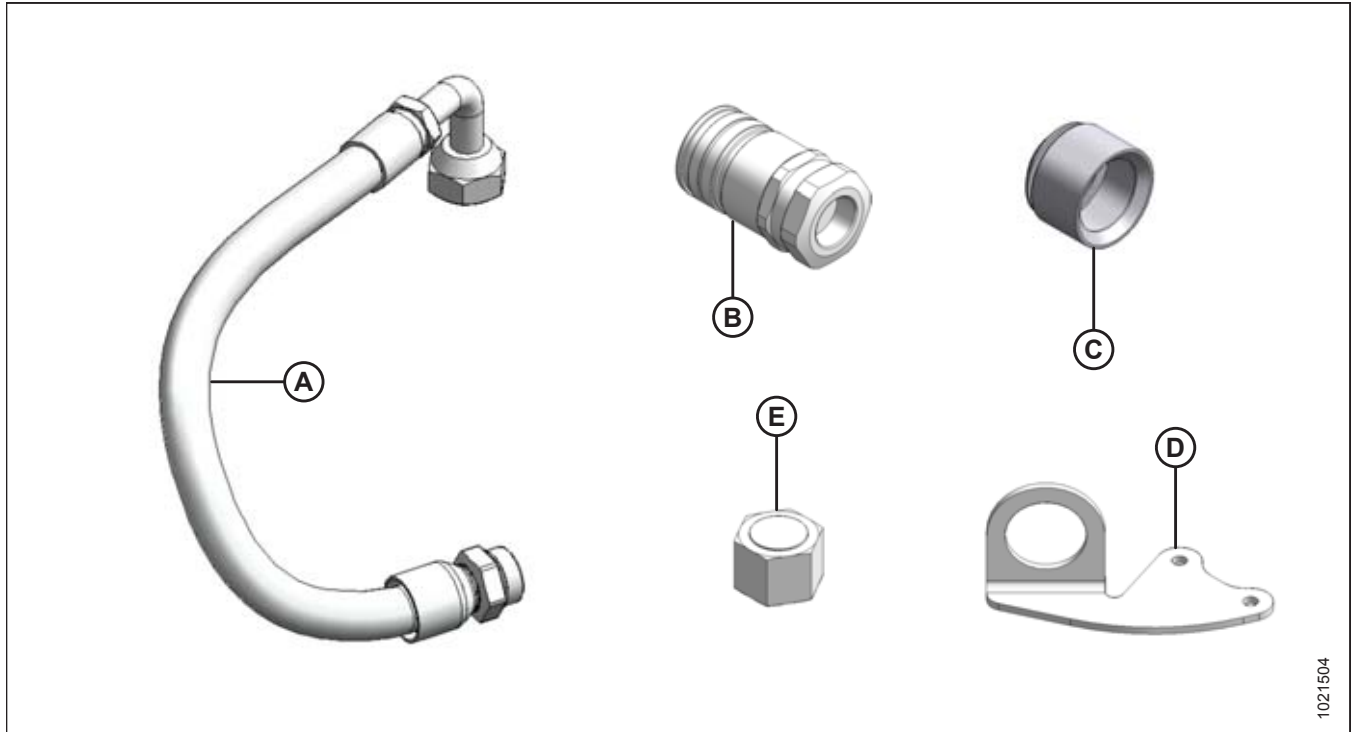


Figure 3.46: Couplers

## ATTACHING HEADER TO WINDROWER

9. Retrieve following parts from the bag located inside left header support:

**Figure 3.47: Hydraulic Drive Parts**

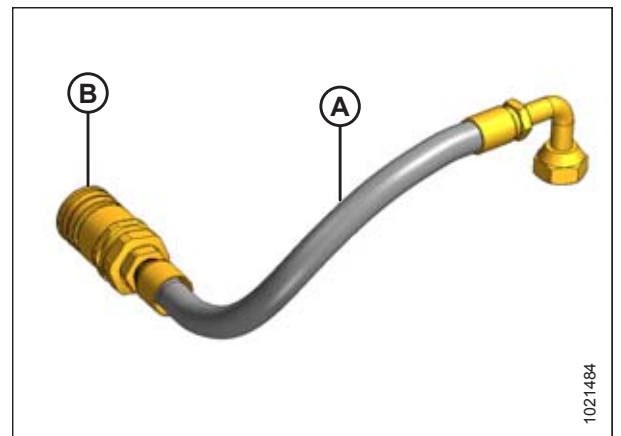


A - 253785, Hose, Hyd, Knife Pressure (1)  
D - 253783, Bracket, Coupler Holder (1)

B - 136413, Fitting, Coupling, Female (1)  
E - 135718, Cap, Hyd, SAE-16 ORFS (1)

C - 243604, Cap, Harness (1)

10. Connect female coupler (B) to hose (A).



**Figure 3.48: Pressure Hose Assembly**

## ATTACHING HEADER TO WINDROWER

11. Disconnect steel line (A) from elbow (B) and tee (C) (inside frame) and remove line. Discard line.

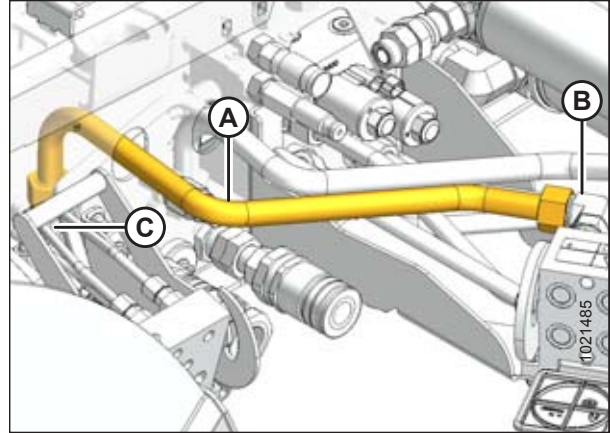


Figure 3.49: Tractor Couplers

12. Install cap (A) on tee.
13. Reposition elbow (B) as shown.

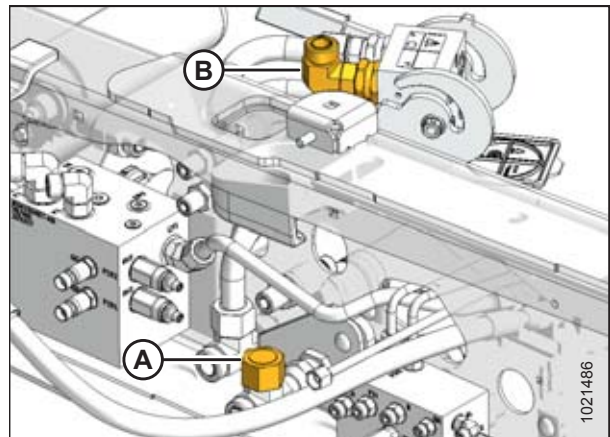


Figure 3.50: Tractor Header Drive

14. Remove two existing nuts (A) securing multicoupler to bracket (B).
15. Position new bracket (C) onto existing bolts and secure with existing nuts (A).
16. Install rubber coupler holder (D) into bracket (C).

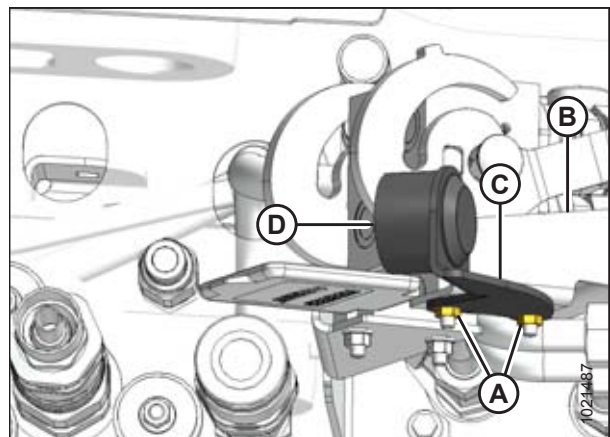


Figure 3.51: Tractor Couplers



## ATTACHING HEADER TO WINDROWER

17. Connect hose fitting (A) to elbow (B).
18. Place female coupler (C) in coupler holder (D).

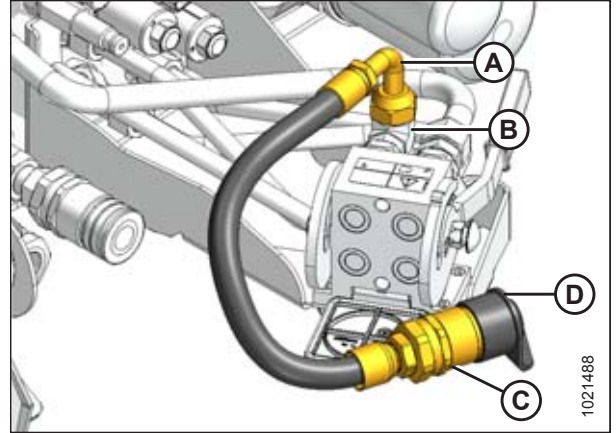


Figure 3.52: Tractor Coupler

19. Attach couplers to receptacles on windrower as follows:
  - a. Connect pressure hose female coupler to receptacle (A)
  - b. Connect return hose male coupler to receptacle (B)
  - c. Connect case drain hose coupler to receptacle (C)
  - d. Connect the electrical harness to receptacle (D)

**NOTE:**

The hydraulic hoses should have enough slack to pass by the multicoupler (E) without coming into contact with it. This will protect the hoses from rubbing against the multicoupler and becoming damaged. You can increase slack in the hoses by loosening and adjusting the hose holder on the front windrower leg, and pulling the hoses backward toward the windrower.

20. Push latch (B) to unlock platform (A).

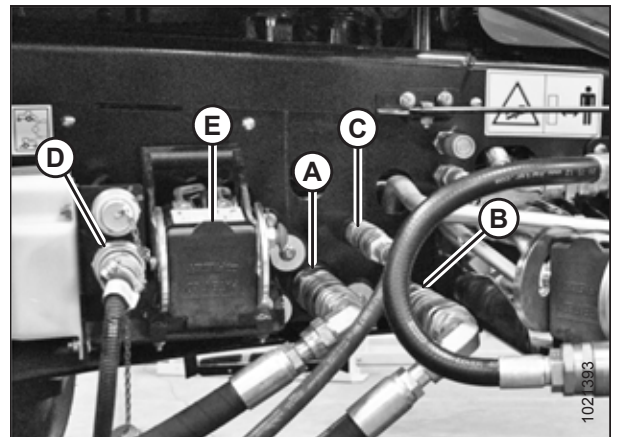


Figure 3.53: Hydraulic and Electrical Connections

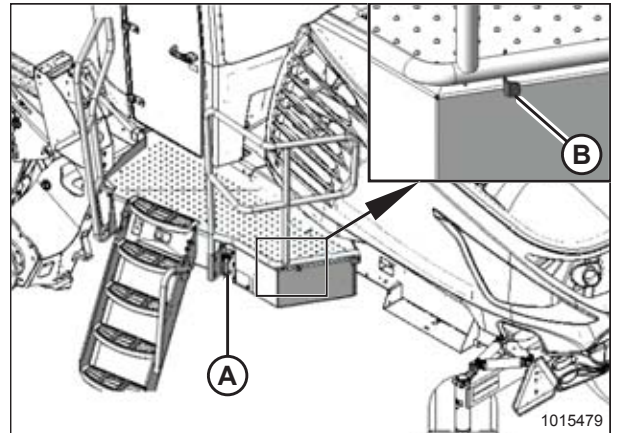


Figure 3.54: Left Cab-Forward Platform

21. Calibrate the knife pump on the M1170 windrower. For instructions, refer to [Calibrating M1170 Windrower Knife Drive and Header on the HPT Display](#), page 36.

## ATTACHING HEADER TO WINDROWER

### Calibrating M1170 Windrower Knife Drive and Header on the HPT Display

When an R113 SP disc mower is attached to an M1170 windrower, the Harvest Performance Tracker (HPT) will recognize the header ID and calibrate the knife drive accordingly. This is done to ensure that the knife drive pump output is accurate.

#### NOTE:

To calibrate the knife drive, the header must be attached and engaged. If the header is disengaged when calibration is selected, the message ENGAGE HEADER will appear on the screen.

#### CAUTION

**Before starting the machine, check to be sure all bystanders have cleared the area.**

1. Start the engine, and engage the header.
2. Press soft key 5 (A) to open the main menu.
3. To scroll to the settings icon (C), use the HPT scroll knob (B) or the ground speed lever (GSL) scroll wheel (not shown).
4. Press the HPT scroll knob (B) or the GSL SELECT button (not shown) to activate the settings menu options.

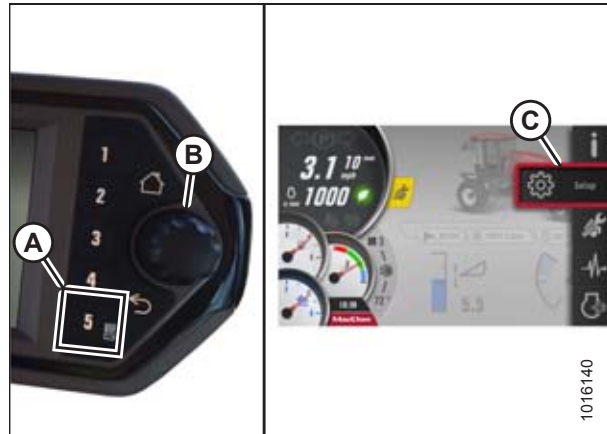


Figure 3.55: Opening the Main Menu

5. Scroll to the WINDROWER SETTINGS icon (A) and press SELECT.
6. Scroll to the CALIBRATION icon (B), and press SELECT to open the adjustment page.

#### NOTE:

The F3 shortcut button on the operator's console also will open the WINDROWER SETTINGS menu.

7. Select KNIFE DRIVE.

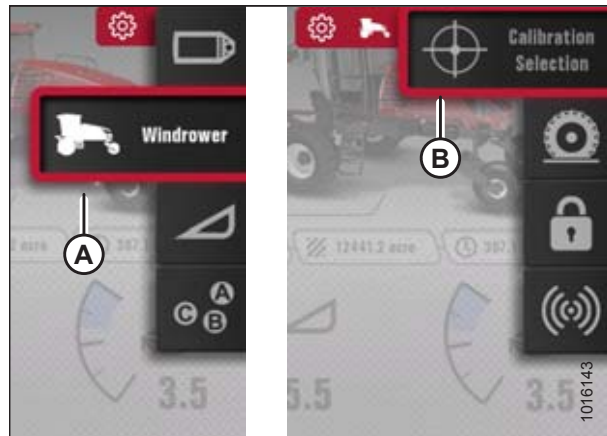


Figure 3.56: Windrower Settings Icon and Calibration Submenu Icon

## ATTACHING HEADER TO WINDROWER

8. Press PLAY button to begin the calibration process.

**NOTE:**

During the calibration sequence, the engine rpm and header speed will increase and decrease multiple times.

**NOTE:**

Press the X button (A) on the screen or use the header Disengage Switch at any time during the calibration process to exit calibration without saving. The engine speed will return to the original rpm prior to starting the calibration process.

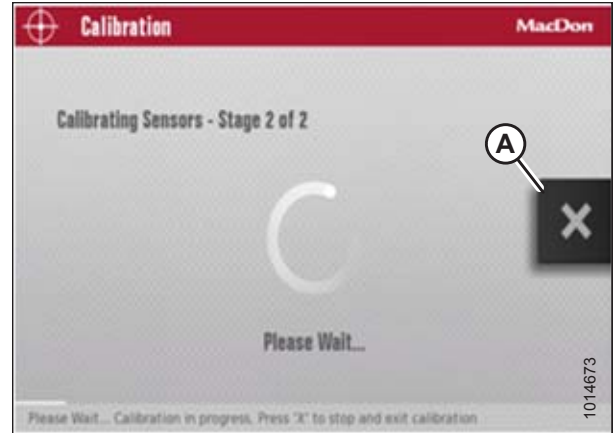


Figure 3.57: Calibration Page

### 3.4.2 M155 or M155E4 Windrowers

#### DANGER

To avoid bodily injury or death from 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.

**NOTE:**

The disc drive manifold kit (MD #B4657) is required to hydraulically connect an R113 disc header to an M155E4 windrower.

**NOTE:**

1. Disengage and rotate lever (A) counterclockwise to FULLY-UP position.
2. Remove cap (B) securing the electrical connector to the frame.

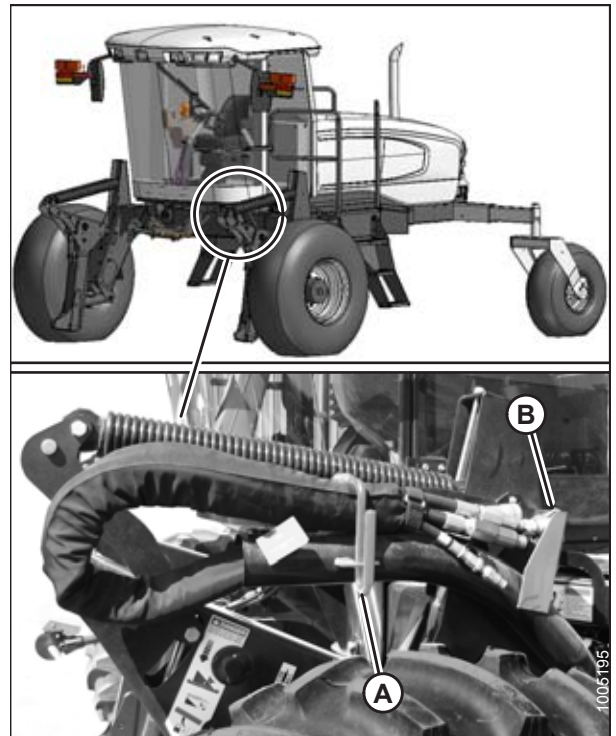


Figure 3.58: Hose Bundle

## ATTACHING HEADER TO WINDROWER

3. Move hose bundle (A) from the windrower and rest the bundle on the header.

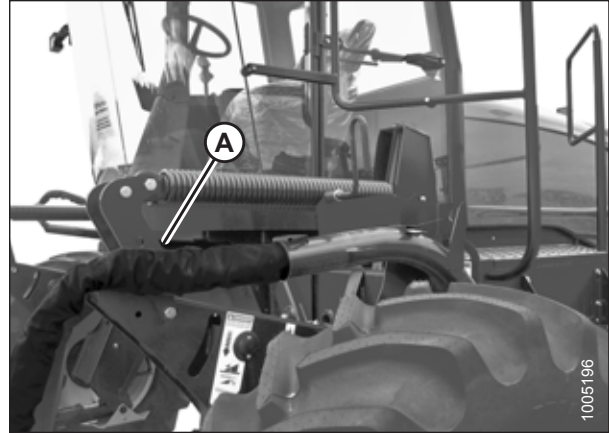


Figure 3.59: Hose Bundle

4. Position the hose support with lower bolt (A) in the forward hole, as shown. Loosen both bolts, and adjust as required.

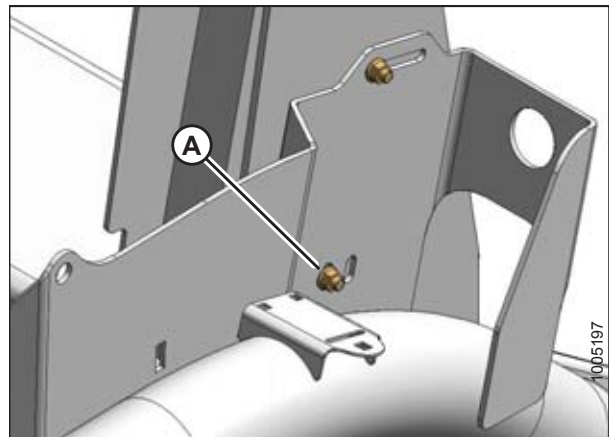


Figure 3.60: Hose Support

## ATTACHING HEADER TO WINDROWER

5. Move the windrower's left-side (cab-forward) platform (A) to the OPEN position. For instructions, refer to the windrower operator's manual.

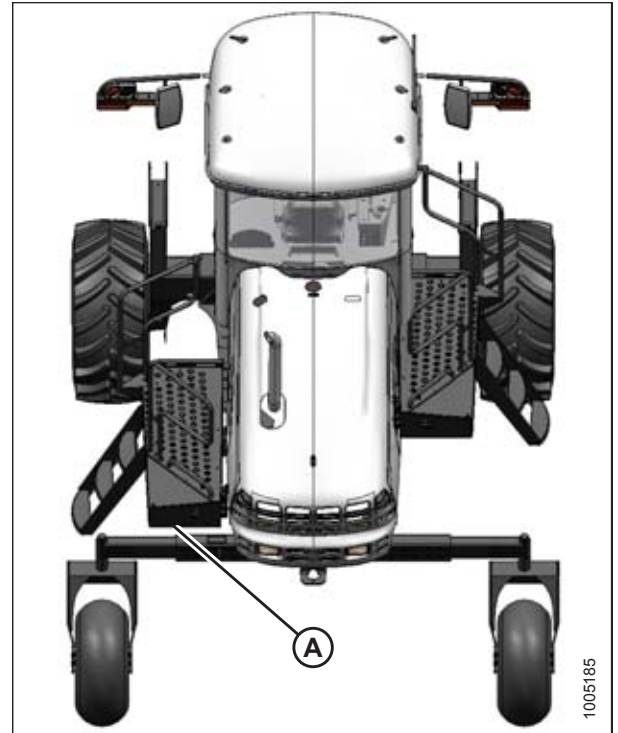


Figure 3.61: Windrower Left Platform in Open Position

6. Route windrower hose bundle (A) through hose support (B) on the header.
7. Route pressure hose (C) from the header through support (B) to the windrower.

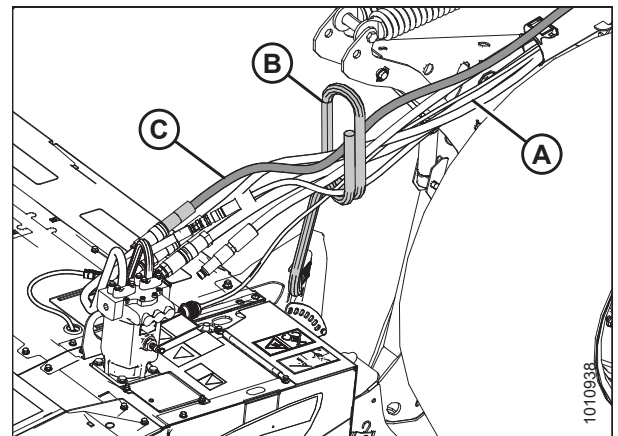


Figure 3.62: Hose Bundle

## ATTACHING HEADER TO WINDROWER

### IMPORTANT:

Keep open lines and ports clean.

8. Connect pressure hose (A) routed from the header to port M2 on the disc drive valve (middle block).

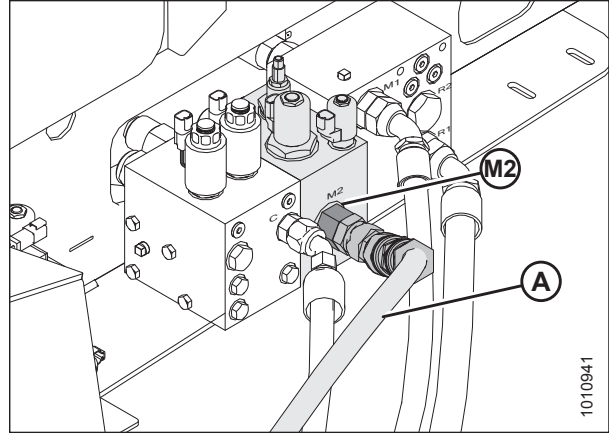


Figure 3.63: Hydraulic Connections

9. Remove caps and plugs on hoses from the windrower and lines on the header.
10. Connect pressure hose (B) from drive manifold port M1 to the steel line attached to motor port A.

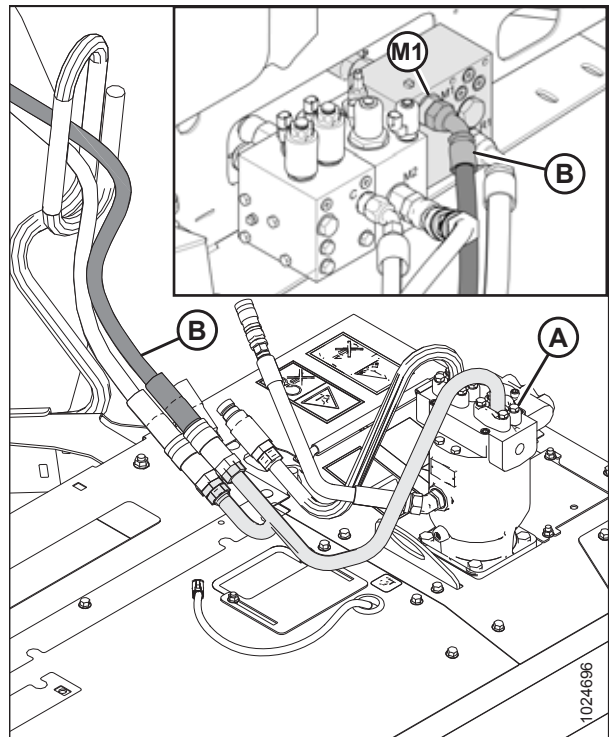


Figure 3.64: Hydraulic Connections

## ATTACHING HEADER TO WINDROWER

11. Connect the return hose (A) from the drive manifold port R1 to the steel line attached to motor port B.

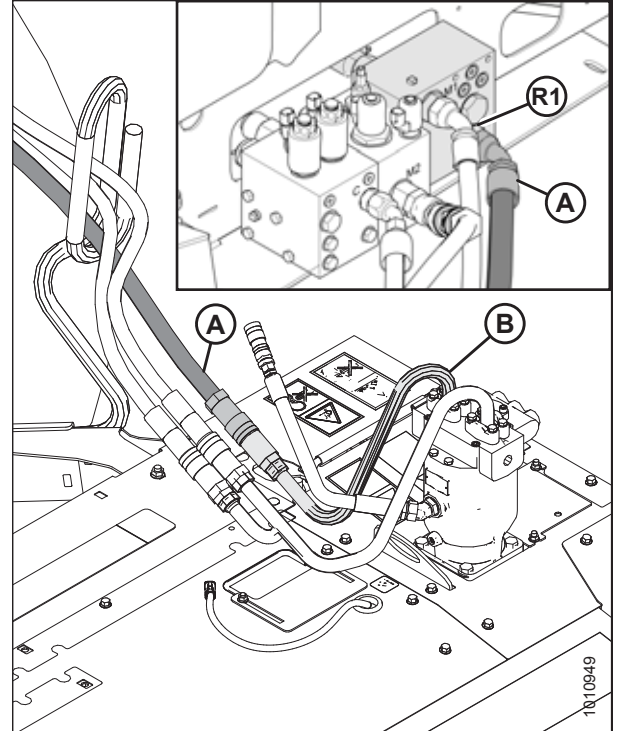


Figure 3.65: Hydraulic Connections

**NOTE:**

If the windrower is equipped with a reverser valve (A) for an auger header, route the return hose (B) from port R1 on the reverser valve to the steel line attached to motor port C.

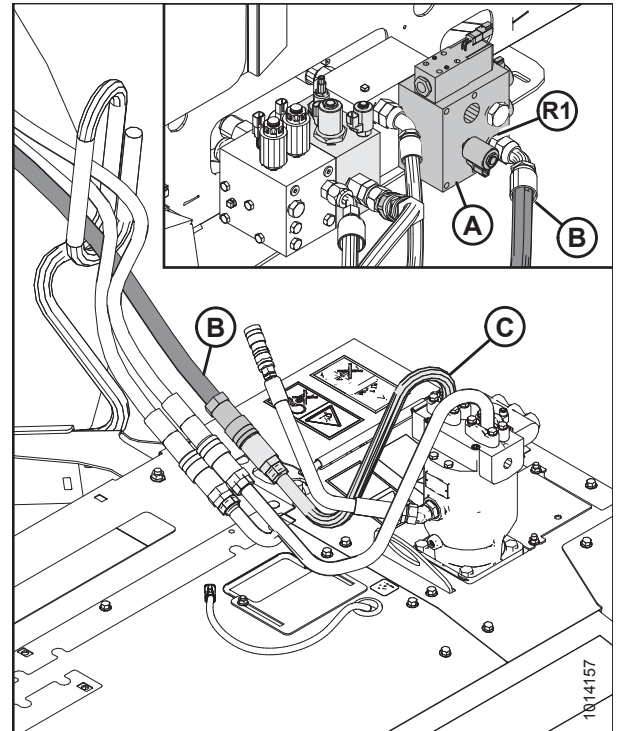


Figure 3.66: Windrower Hose Connections with Reverser

## ATTACHING HEADER TO WINDROWER

13. Connect case drain hose (A) from the lift manifold port T3 to the fitting attached to motor port D.

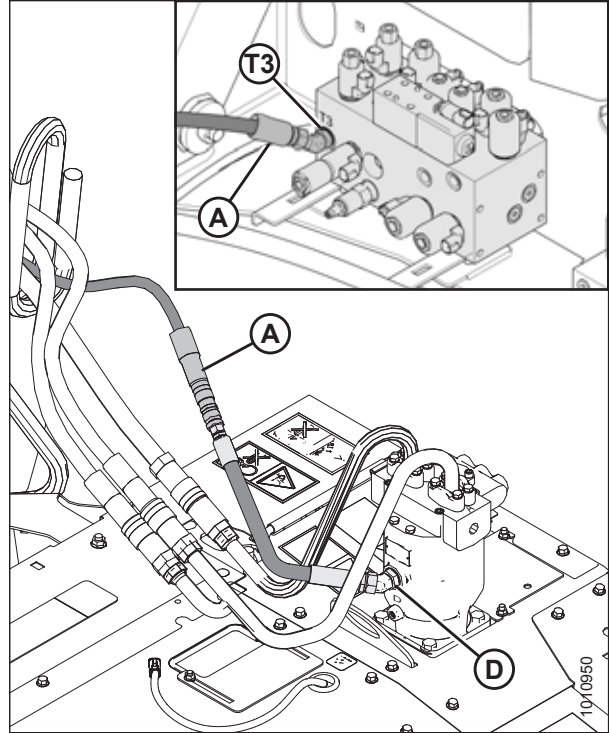


Figure 3.67: Hydraulic Connections

14. Connect electrical harness (A) from the windrower to the electrical connector on the header.

**NOTE:**

Hydraulic hoses removed from the illustration to improve clarity.

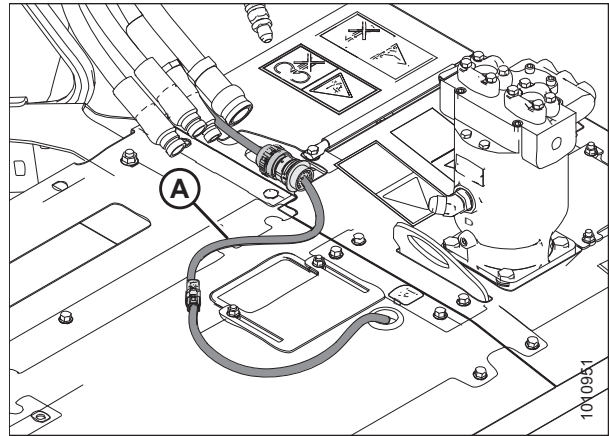


Figure 3.68: Electrical Connection



## ATTACHING HEADER TO WINDROWER

15. Lower and lock lever (A). Secure hose (B) with three cinch straps (C).

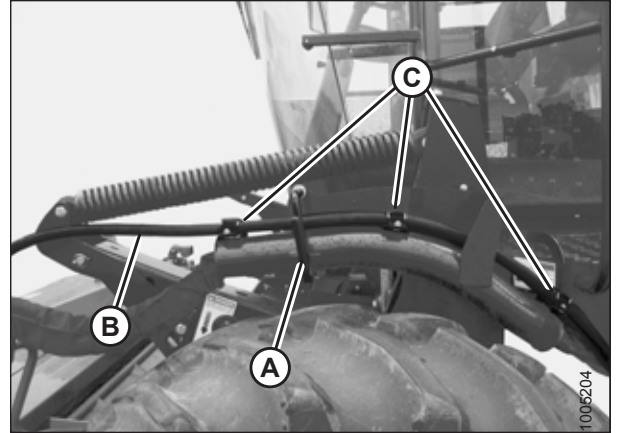


Figure 3.69: Hose Bundle

16. Move platform (A) to the CLOSED position.

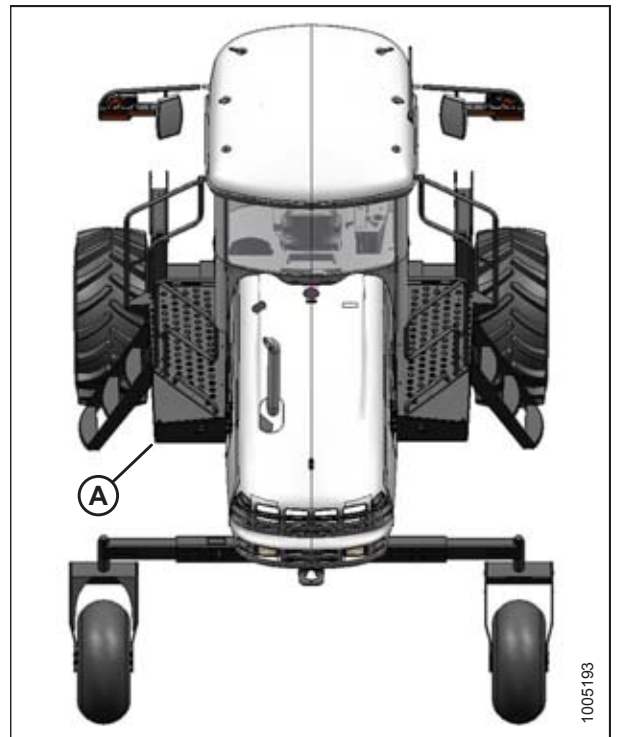


Figure 3.70: Top View of Windrower



## 4 Unpacking Curtains

1. Remove two bolts (A) securing cutterbar doors to frame.

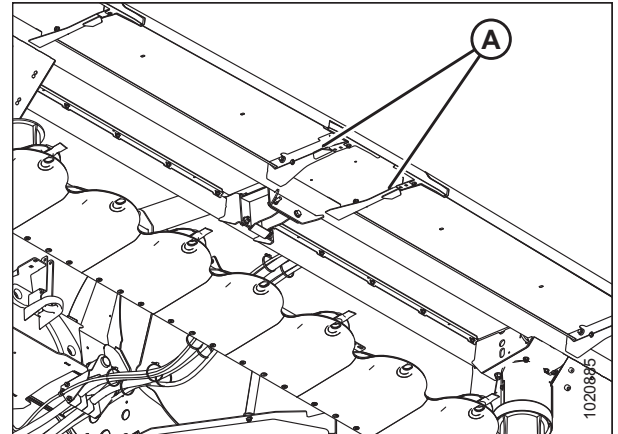


Figure 4.1: Cutterbar Doors (View Looking Up)

2. Remove shipping wire (A) around curtains.

### **WARNING**

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

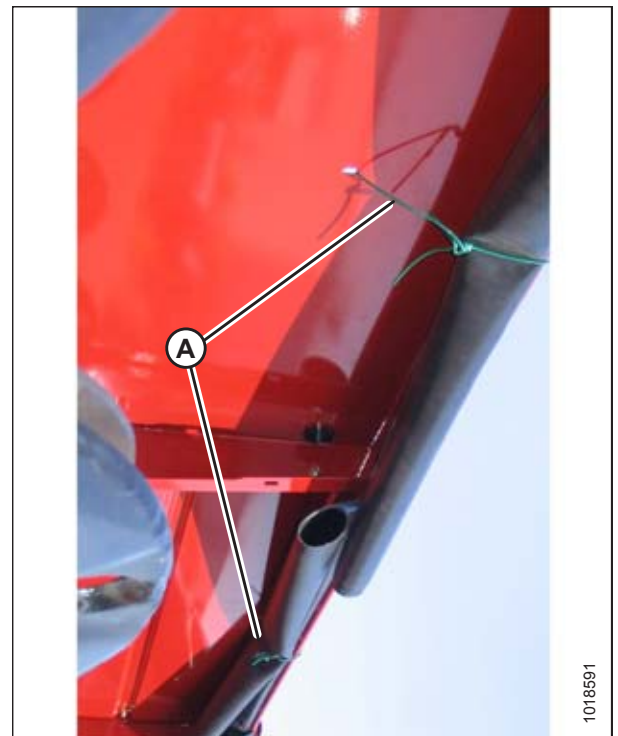


Figure 4.2: Curtain Secured for Shipping

## UNPACKING CURTAINS

3. Open cutterbar doors. Refer to [9.3.1 Opening Cutterbar Doors, page 92](#).
4. Check cutterbar area for debris and foreign objects. Ensure all material is removed.

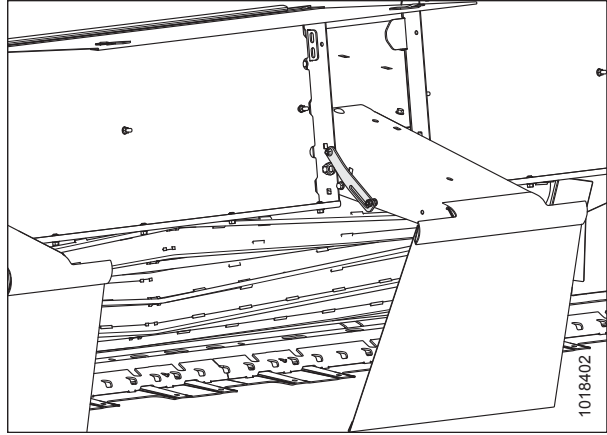


Figure 4.3: Cutterbar Doors Open

5. Close cutterbar doors. Refer to [9.3.3 Closing Cutterbar Doors, page 94](#).
6. Ensure that curtains hang properly and completely enclose cutterbar area. Minor creases in curtains will eventually straighten out.



Figure 4.4: Curtain – Unacceptable



Figure 4.5: Curtain – Acceptable

## 5 Installing Options

### 5.1 Installing Tall Crop Divider

To install the tall crop divider kit (MD #B5800), follow these steps:

#### DANGER

To avoid bodily injury or death from 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. Lower disc header fully.
2. Stop the engine, and remove the key.
3. Unpack kit.
4. Open cutterbar doors.
5. Remove the four bolts (A) from divider (B).

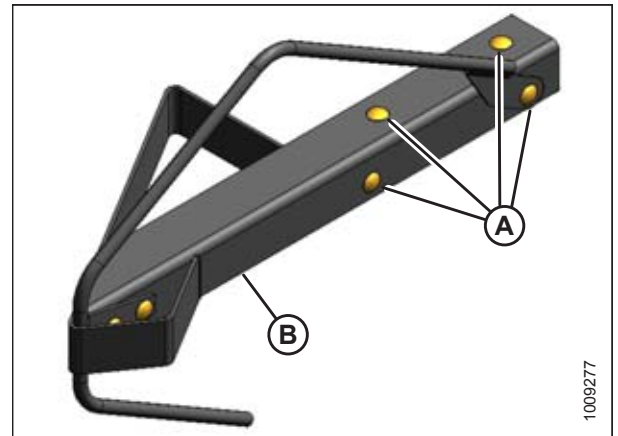


Figure 5.1: Tall Crop Divider Kit (Left Shown – Right Opposite)

6. Position left divider (B) on rotary disc header left front corner, and install with four bolts (A) and nuts in existing holes. Tighten hardware.

#### NOTE:

Mounting holes in rotary disc header should be vacant. If necessary, remove fasteners.

7. Repeat for right side.
8. Close the cutterbar doors.

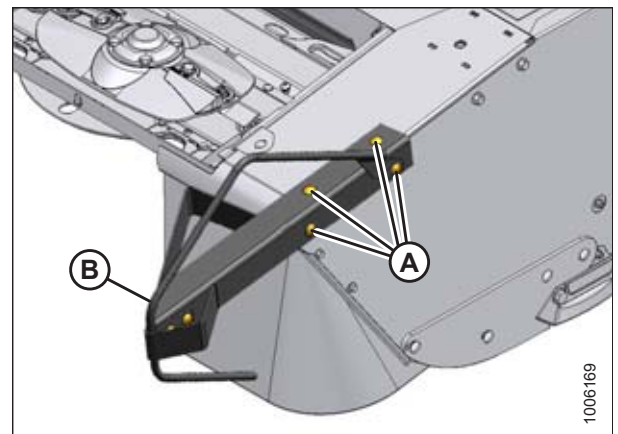


Figure 5.2: Tall Crop Divider (Left Shown – Right Opposite)

## 5.2 Installing Optional Steel Roll Conditioner

If installing a steel roll conditioner, refer to [8 Changing the Conditioner, page 73](#).

## 5.3 Installing Optional Polyurethane Roll Conditioner

If installing a polyurethane roll conditioner, refer to [8 Changing the Conditioner, page 73](#).





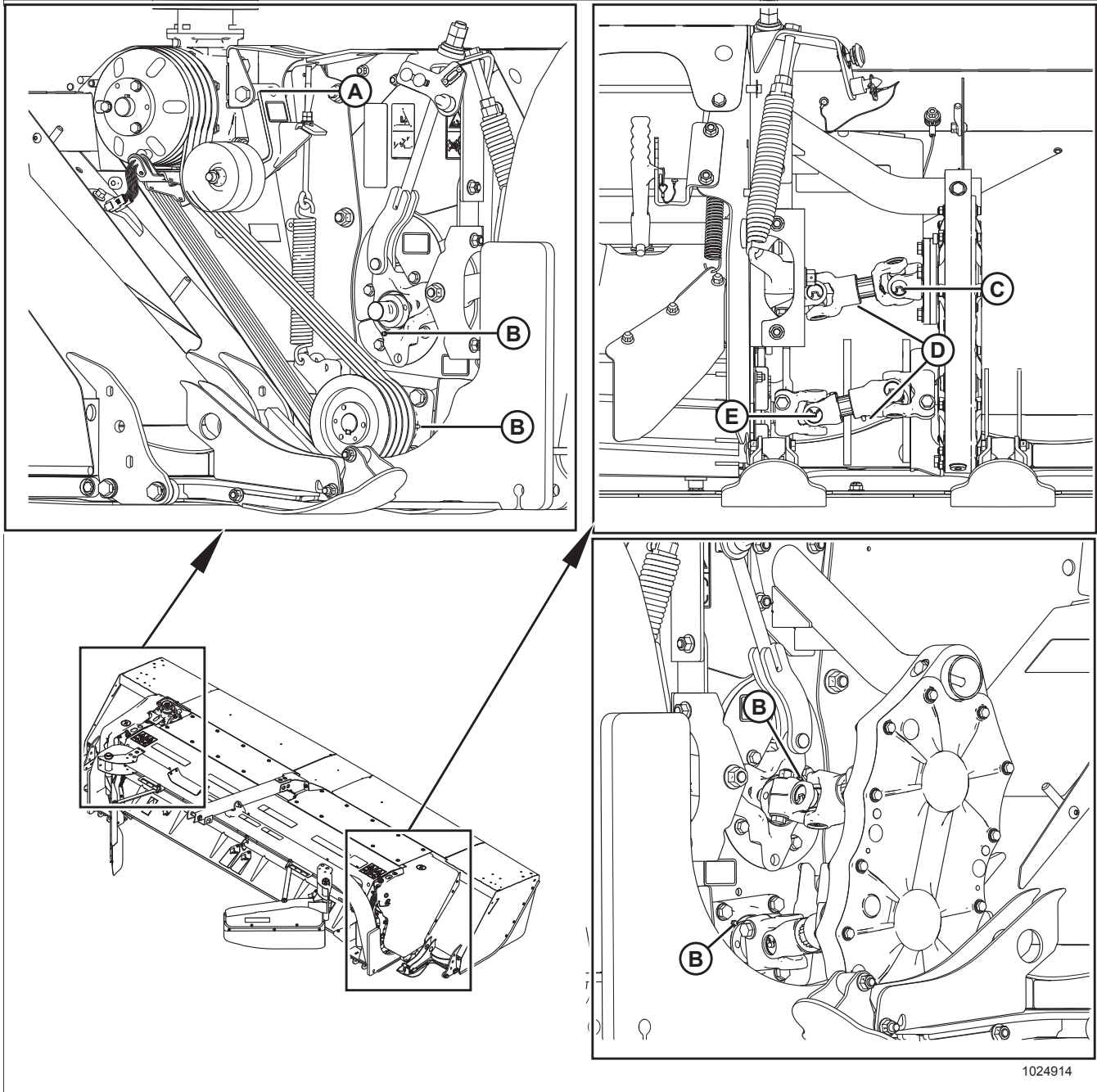
## 6 Lubricating the Disc Header

### DANGER

**To avoid bodily injury or death from 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.**

The disc header has been lubricated at the factory. However, you should lubricate the disc header prior to delivery to offset the effects of weather during outside storage and transport, and to familiarize yourself with the machine. Unless otherwise specified, use high-temperature, extreme-pressure (EP2) performance grease with 1% max molybdenum disulphide (NLGI grade 2) lithium base.

## 6.1 Lubrication Locations



A - Idler/Tensioner Pivot  
 D - Slip Joints, Conditioner Drivelines<sup>2</sup>

B - Bearing, Roller Conditioner (2 Places)  
 E - U-Joint, Lower Driveline (2 Places)

C - U-Joint, Upper Driveline (2 Places)

2. Use high-temperature, extreme pressure (EP2) performance grease with 10% max molybdenum disulphide (NLGI grade 2) lithium base

## 7 Performing Predelivery Checks

### DANGER

To avoid bodily injury or death from 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. Perform final checks and adjustments as listed on the yellow sheet attached at the back of this instruction, to ensure the machine is field-ready. Refer to the referenced pages as indicated on the checklist for detailed instructions.
2. The Operator or the Dealer should retain the completed checklist.

### 7.1 Checking Conditioner Drive Belt

#### DANGER

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

1. Open left driveshield. For instructions, refer to [9.1 Opening Driveshields, page 89](#).
2. Check that belt (A) is properly positioned on the pulleys and tensioned. Overall spring length (B) should be 365 mm (14-3/8 in.). If adjustment is required, refer to [7.1.1 Adjusting Conditioner Drive Belt, page 54](#).
3. Check that adjuster nuts (C) are tight.
4. Close driveshield. For instructions, refer to [9.2 Closing Driveshields, page 91](#).

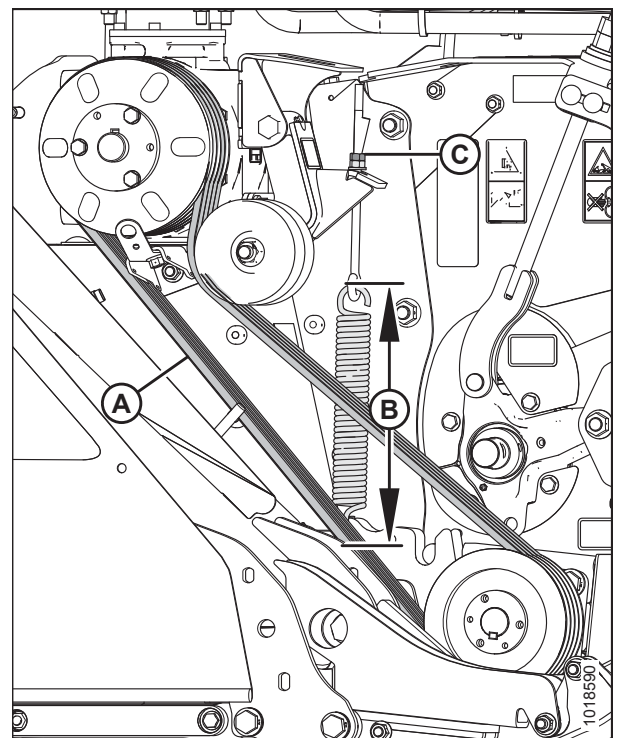


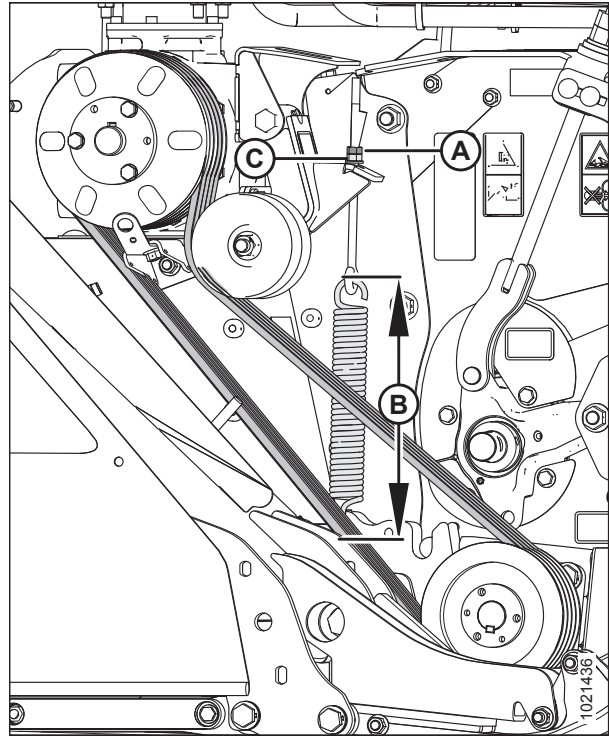
Figure 7.1: Conditioner Drive Belt

## 7.1.1 Adjusting Conditioner Drive Belt

### **⚠ DANGER**

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

1. Shut down the engine, and remove the key from the ignition.
2. Open the left driveshield. For instructions, refer to [9.1 Opening Driveshields, page 89](#).
3. Turn jam nut (A) counterclockwise to unlock tension adjustment.
4. Turn adjuster nut (C) clockwise to increase spring length (tension) or counterclockwise to decrease spring length (relax).
5. Set overall spring length (B) to 365 mm (14-3/8 in.).
6. Close driveshield. For instructions, refer to [9.2 Closing Driveshields, page 91](#).



**Figure 7.2: Conditioner Drive Belt**

## 7.2 Checking Skid Shoes

All skid shoes (A) should be at the same position, either up (shown) or down.

**NOTE:**

The 4.0 m (13 ft.) rotary disc header is equipped with one skid shoe at each end.

If adjustment is required. Refer to the disc mower operator's manual.

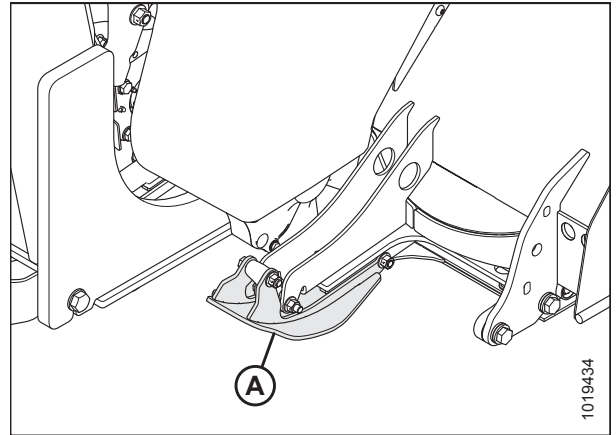


Figure 7.3: Skid Shoe 4.0 M (13 Ft.)

## 7.3 Checking Roll Timing

Check roll timing if excessive noise is coming from the conditioner rolls.

### DANGER

To avoid bodily injury or death from 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.

Roll timing is factory-set and should not require adjustment; however, if there is excessive noise coming from the conditioner rolls, the timing will need to be adjusted. Refer to the disc header operator's manual.

### 7.3.1 Adjusting Roll Timing

1. Shut down the engine and remove the key.
2. Loosen four bolts (A) in slots of yoke plate (B) on upper roll universal shaft.

**NOTE:**

Only three of the four bolts are shown in the illustration.

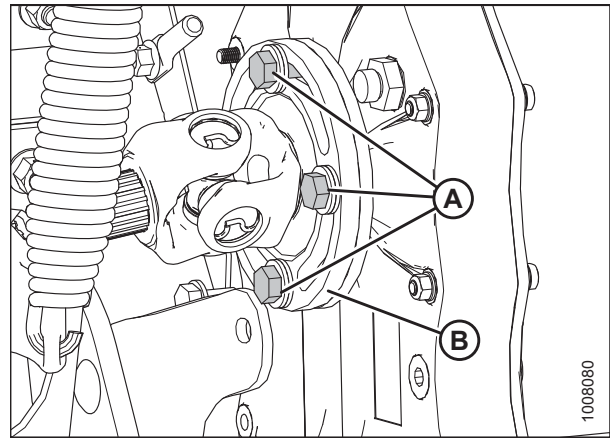


Figure 7.4: Conditioner Drive

3. Secure bottom roll (A).
4. Manually rotate upper roll (B) in a counterclockwise direction until it stops.
5. Make a mark (C) across yoke (D) and gearbox flange (E).

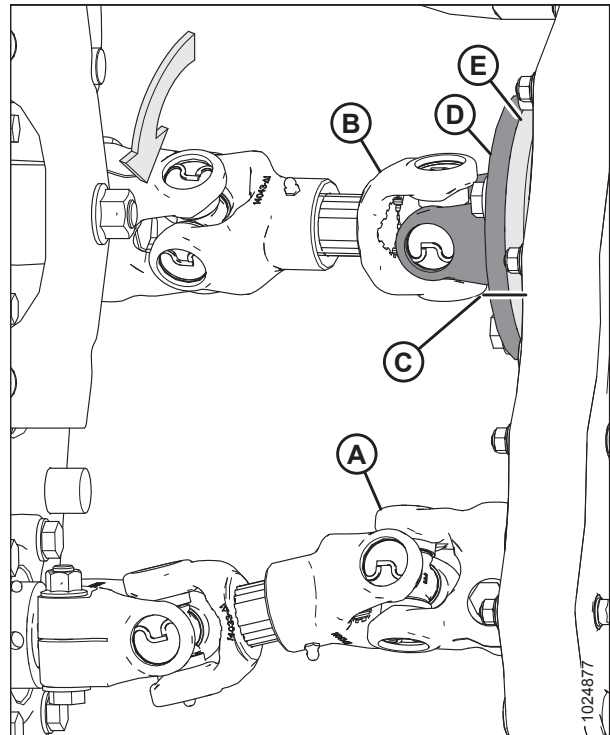


Figure 7.5: Conditioner Drive

## PERFORMING PREDELIVERY CHECKS

6. Manually rotate upper roll (A) in a clockwise direction until it stops. Make a second mark (B) on the yoke flange, and align it with the mark on the gearbox flange.

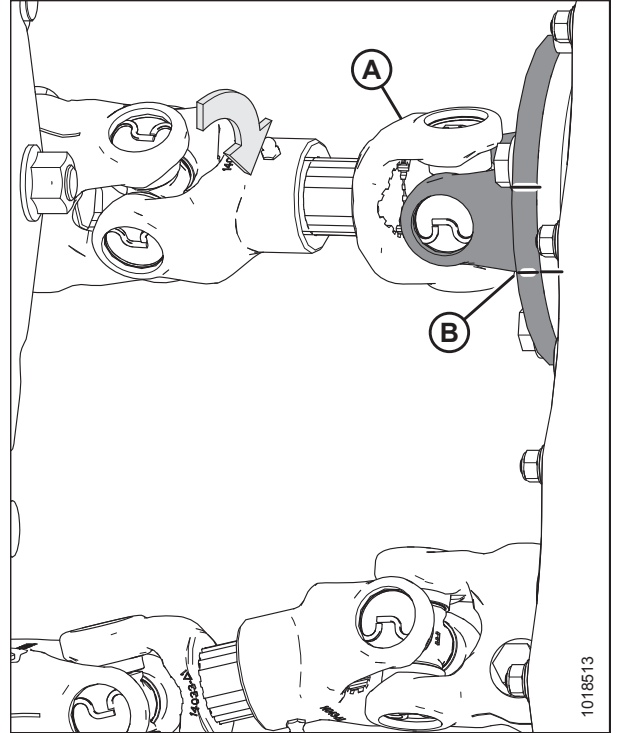


Figure 7.6: Conditioner Drive

7. Determine the center point (A) between the two marks on the yoke plate, and place a third mark.
8. Rotate upper roll (B) in the counterclockwise direction until the bolt lines up with the third (center) mark.

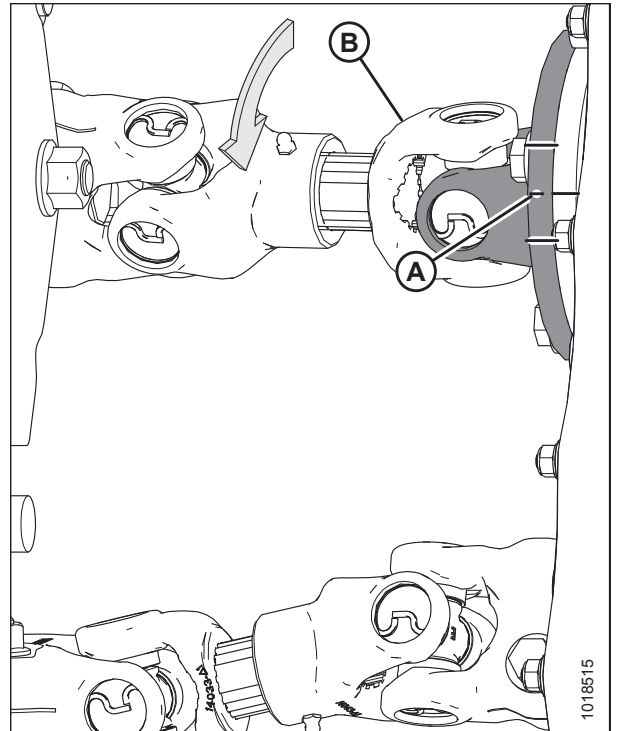
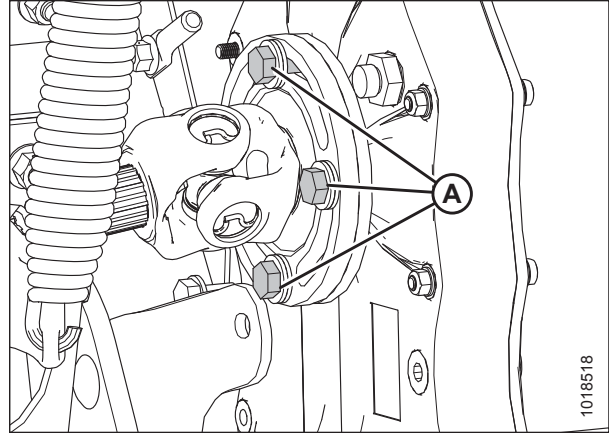


Figure 7.7: Conditioner Drive

## PERFORMING PREDELIVERY CHECKS

9. Ensure threads on four bolts (A) are clean and free of lubricant (fourth bolt not shown in illustration at right).
10. Apply medium-strength threadlocker (Loctite® 242 or equivalent), and tighten bolts (A). Torque to 95 Nm (70 lbf·ft).



**Figure 7.8: Conditioner Drive**



## 7.4 Checking and Adding Conditioner Roll Timing Gearbox Lubricant

The conditioner roll timing gearbox is located inside the drive compartment at the right side of the disc header.

### DANGER

To avoid bodily injury or death from 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:

Check the conditioner roll timing gearbox lubricant level when the lubricant is warm. If the lubricant is cold, idle the machine for approximately 10 minutes prior to checking.

1. Lower disc header to the ground, and adjust header angle with center-link so that cutterbar is level. Turn off the engine, and remove key.
2. Open a cutterbar door. Refer to [9.3.1 Opening Cutterbar Doors, page 92](#).
3. Use a spirit (bubble) level and check that cutterbar is level in fore-aft direction. Adjust header angle as required.
4. Open the right driveshield. Refer to [9.1 Opening Driveshields, page 89](#).
5. Clean around lubricant sight glass (A) and breather plug (B) on inboard side of the conditioner roll timing gearbox.
6. Ensure that the lubricant level is at the top of the sight glass. If necessary, add lubricant through plug (B). Refer to for lubricant information.
7. Replace plug (B) and tighten.
8. Close right driveshield. For instructions refer to [9.2 Closing Driveshields, page 91](#).
9. Close the cutterbar door. Refer to [9.3.3 Closing Cutterbar Doors, page 94](#).

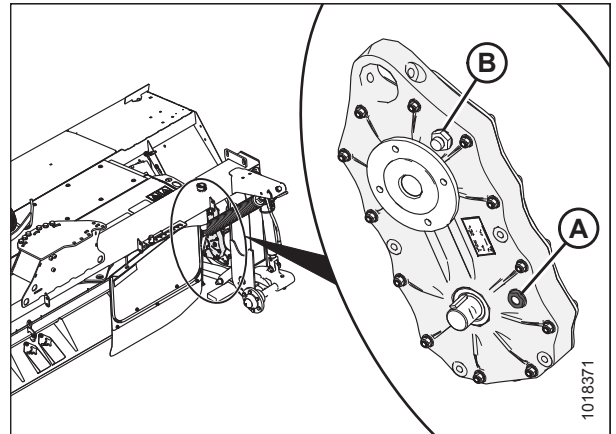


Figure 7.9: Roll Timing Gearbox

## 7.5 Checking and Adding 90-Degree Gearbox Lubricant

The disc header header drive gearbox is located on the left side of the header.

### DANGER

To avoid bodily injury or death from 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. Lower header until the top of the header is parallel with the ground. Turn engine off, and remove key.
2. Open left cutterbar door. For instructions refer to [9.3.1 Opening Cutterbar Doors, page 92](#).
3. The gearbox is located inside the cutterbar area at the top right corner (looking into cutterbar area from front). Clean area around check plug (A).
4. Remove plug (A) with a 13 mm (1/2 in.) socket.
5. Ensure lubricant slightly runs out of hole (A).
6. If necessary, remove plug (B) and add lubricant (SAE 80W-140) to gearbox through hole (B) until lubricant runs out of hole (A).
7. Reinstall plugs and tighten.
8. Close left cutterbar door. For instructions, refer to [9.3.3 Closing Cutterbar Doors, page 94](#).

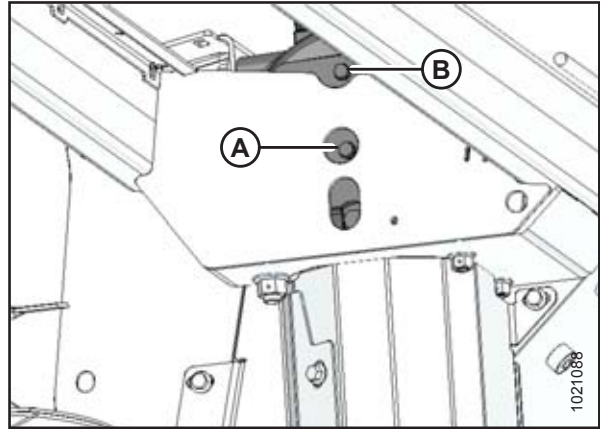


Figure 7.10: Header Drive Gearbox (Model Year 2017)

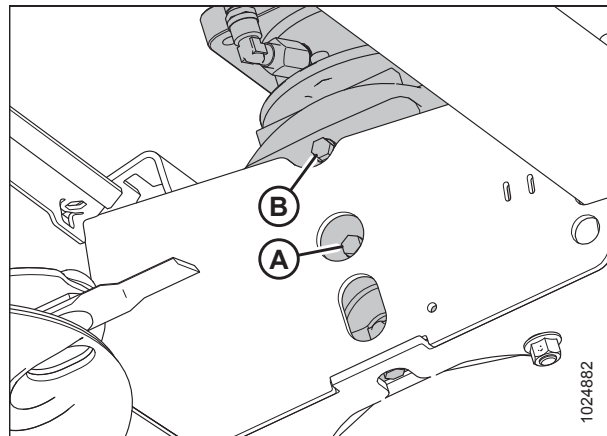


Figure 7.11: Header Drive Gearbox (Model Year 2018)

## 7.6 Checking and Adding Cutterbar Lubricant

### DANGER

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

### CAUTION

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

1. Park machine on level ground.
2. Position disc header so that the cutterbar is approximately level.
3. Shut down engine, and remove key.
4. Open cutterbar doors (A). Refer to [9.3.1 Opening Cutterbar Doors](#), page 92.

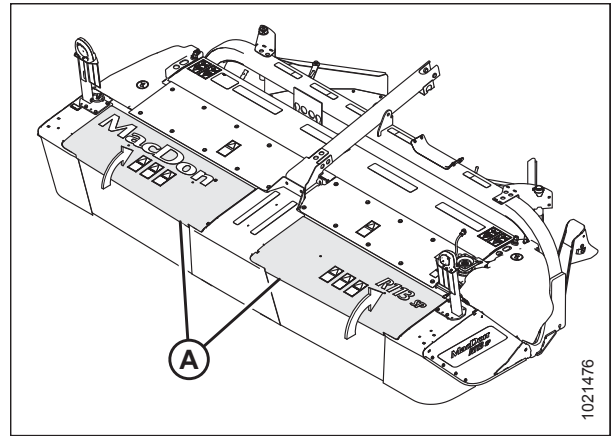


Figure 7.12: R113 SP Header

5. Use a spirit (bubble) level (A) to ensure the cutterbar is level in both directions. Raise or lower the disc header accordingly.

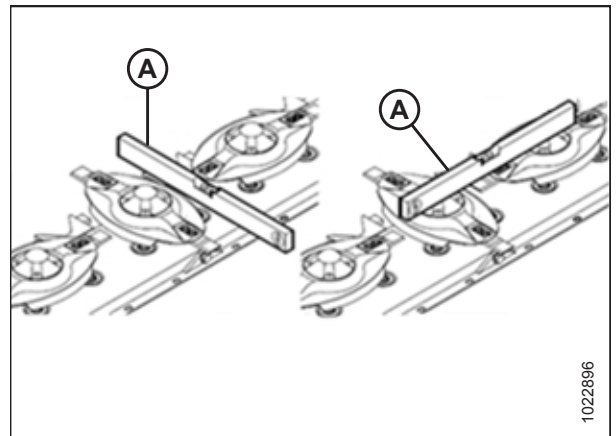


Figure 7.13: Spirit Level on Cutterbar

## PERFORMING PREDELIVERY CHECKS

6. Remove oil level inspection plug (A) and O-ring (B) from cutterbar. Oil level must be up to the bore.

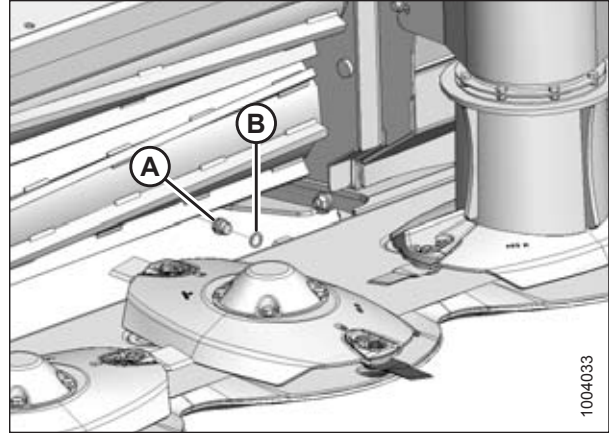


Figure 7.14: Cutterbar Oil Inspection Plug

7. If required, replace inspection plug removed in Step 6, [page 62](#) and add lubricant as per the following steps. Otherwise, proceed to step [13, page 63](#).

### **CAUTION**

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

8. Start windrower engine, and raise header slightly.
9. Lower header onto blocks so that left end is slightly higher than right end.
10. Remove breather (A) at left end.

#### **IMPORTANT:**

Do **NOT** remove bolts (B).

11. Add sufficient lubricant (SAE 80W-90) to required level.

#### **IMPORTANT:**

Do **NOT** overfill the cutterbar. Overfilling can cause overheating, damage, or failure of cutterbar components.

12. Replace and torque breather (A) to 30 Nm (22 lbf-ft), and recheck oil level.

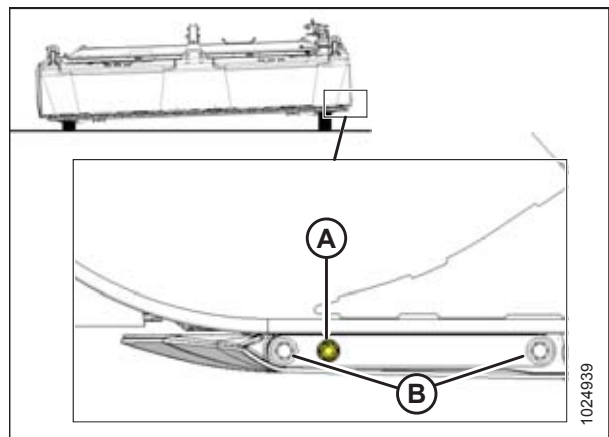


Figure 7.15: Adding Lubricant

## PERFORMING PREDELIVERY CHECKS

13. Check O-ring (B) for breaks or cracks, and replace if necessary.
14. Install plug (A) and O-ring (B). Tighten securely.

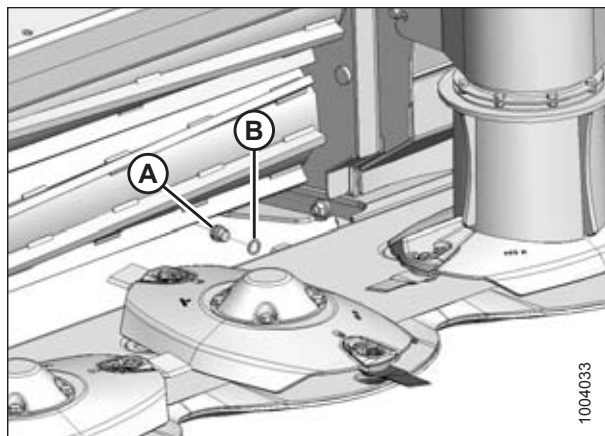


Figure 7.16: Cutterbar Oil Inspection Plug

## 7.7 Checking Roll Gap

Check factory-set roll gap as follows:

### DANGER

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

1. Lower the disc header to the ground.
2. Stop the engine, and remove the key from the ignition.
3. **Steel Rolls:** The length of thread (A) extending above the jam nut on the adjustment rods can be used as an approximation of roll gap, but does **NOT** provide consistent roll gap measurements. To ensure roll gap is at the factory setting, refer to [7.7.1 Adjusting Roll Gap: Steel Rolls, page 64](#).
4. **Polyurethane Rolls:** Insert a feeler gauge between rolls from either front or rear of header. Factory setting is 3 mm (1/8 in.). If adjustments are required, refer to [7.7.2 Adjusting Roll Gap: Polyurethane Rolls, page 65](#).

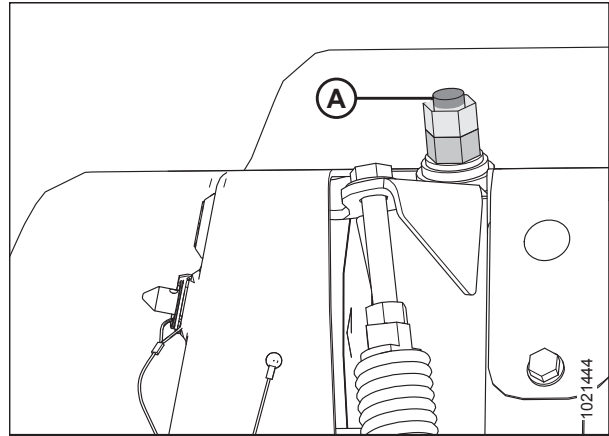


Figure 7.17: Roll Gap Adjustment

### 7.7.1 Adjusting Roll Gap: Steel Rolls

The length of thread extending above the jam nut on the adjustment rods can be used as an approximation of roll gap but does **NOT** provide consistent roll gap measurements. To ensure roll gap is at the factory setting, follow the procedure below:

### DANGER

To avoid bodily injury or death from 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. Lower the disc header to the ground.
2. Stop the engine, and remove the key from the ignition.

## PERFORMING PREDELIVERY CHECKS

3. Loosen jam nut (A) on both sides of conditioner.
4. Turn lower nut (B) counterclockwise until upper roll rests on lower roll. Ensure rolls intermesh.
5. Turn lower nut (B) two and a half full turns clockwise to raise upper roll and achieve a 6 mm (1/4 in.) roll gap.
6. Hold nut (B) and tighten jam nut (A) on both sides of the header.

**IMPORTANT:**

Make sure roll gap adjustment nuts are adjusted equally on both sides of the header to achieve a consistent gap across the rolls.

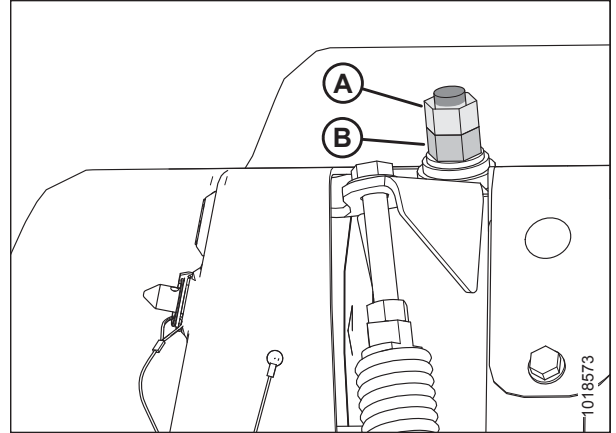


Figure 7.18: Roll Gap Adjustment

### 7.7.2 Adjusting Roll Gap: Polyurethane Rolls

**⚠ DANGER**

To avoid bodily injury or death from 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. Lower the disc header to the ground.
2. Stop the engine, and remove the key from the ignition.
3. Loosen upper jam nut (A) on both sides of conditioner.
4. Turn lower nut (B) counterclockwise until upper roll rests on lower roll.
5. Turn lower nut (B) one full turn clockwise to raise the upper roll and achieve a 3 mm (1/8 in.) roll gap.
6. Hold nut (B) and tighten jam nut (A) on both sides of the header.

**IMPORTANT:**

Make sure roll gap adjustment nuts are adjusted equally on both sides of the header to achieve a consistent gap across the rolls.

7. Rotate the rolls manually and use a feeler gauge at the ends of the rolls to check that the actual gap is no less than 2 mm (5/64 in.) and no more than 4 mm (5/32 in.).

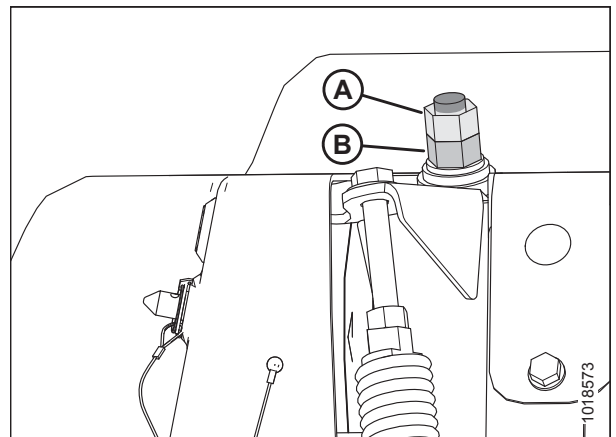


Figure 7.19: Roll Gap Adjustment

## 7.8 Checking Roll Tension

Roll tension is indicated by the exposed thread on the roll tension adjuster bolt.

1. Measure the amount of exposed thread on the roll tension adjuster bolt (A) at each end of the conditioner. Measurement (B) should be 12–15 mm (1/2–9/16 in.) for both polyurethane and steel roll conditioners.
2. If the tension requires adjusting, refer to [7.8.1 Adjusting Roll Tension, page 66](#).

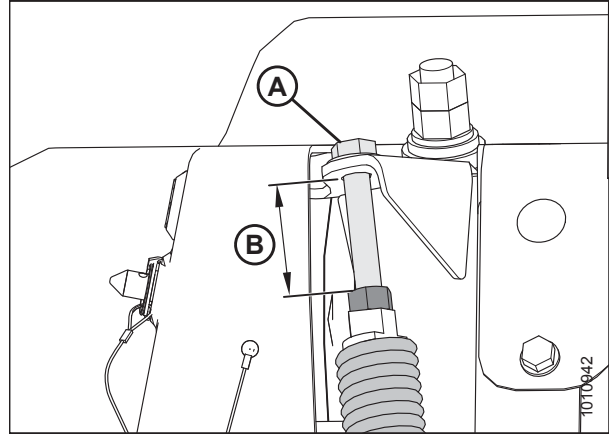


Figure 7.20: Roll Tension Adjuster

### 7.8.1 Adjusting Roll Tension

To adjust roll tension, follow these steps:

#### DANGER

To avoid bodily injury or death from 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. Lower the disc header to the ground.
2. Stop the engine, and remove the key from the ignition.
3. Loosen jam nut (A) on both sides of conditioner.
4. Turn the spring drawbolt (B) clockwise to tighten spring (C) and **INCREASE** roll tension.
5. Turn the spring drawbolt (B) counterclockwise to loosen spring (C) and **DECREASE** roll tension.
6. Measure the amount of exposed thread on spring drawbolt (B) at each end of the conditioner. Measurement (D) should be 12–15 mm (1/2–9/16 in.) for both polyurethane and steel roll conditioners.

#### IMPORTANT:

Turn each bolt equally. Each turn of the bolt changes the roll tension by approximately 32 N (7.2 lbf).

7. Tighten jam nuts (A) on each end of the conditioner.

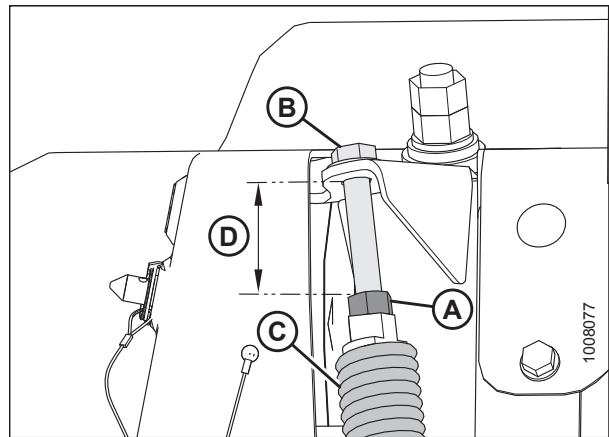


Figure 7.21: Left Side Shown – Right Side Opposite



## 7.9 Adjusting Conditioner Baffle Position

The conditioner baffle determines the height of the windrow, but can also affect the width of the windrow. Factory-recommended setting is to set at the middle position.

1. Remove clip (A).
2. Move baffle adjustment handle (B) to the middle position (C) on the adjustment plate.
3. Install clip (A).

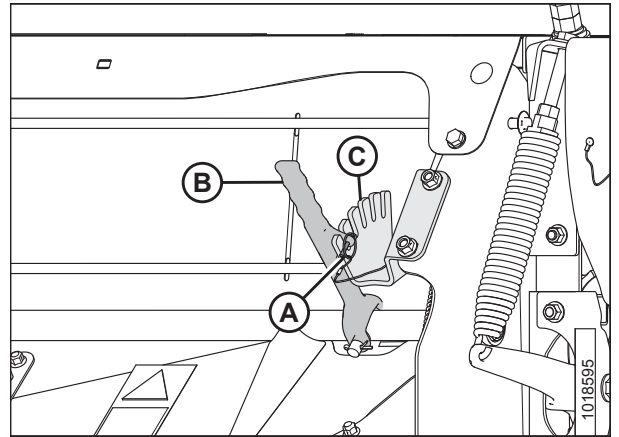


Figure 7.22: Conditioner Baffle Adjuster

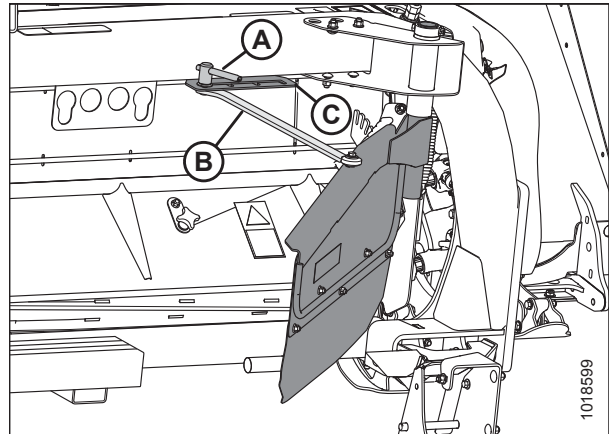
## 7.10 Checking and Adjusting Forming Shield Deflector Position

The position of the side deflectors controls the width and placement of the windrow. Both side deflectors must be evenly set at the same position. If the side deflectors are not evenly set, follow the steps below to adjust them:

### DANGER

To avoid bodily injury or death from 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. Loosen the locking handle (A).
2. Slide the adjuster bar (B) along adjuster plate (C) to the desired deflector position, and engage the bar (B) into a notch in the adjuster plate.
3. Tighten locking handle (A).
4. Repeat for other side deflector.



**Figure 7.23: Forming Shield Side Deflector (Right Side Shown)**

## 7.11 Checking Lights

1. Check light mountings (A) for security and damage.
2. Check operation of hazard lights (B) during machine run-up.

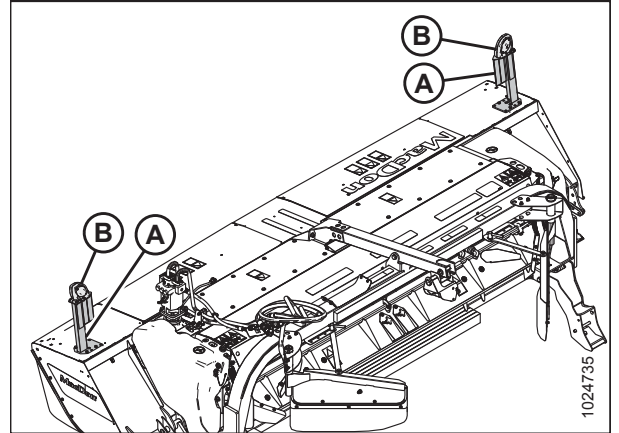


Figure 7.24: Lights

## 7.12 Checking Manuals

The following manuals should be stored in the manual storage case (A) at the right end of the disc mower:

- R113 SP Disc Header Operator's Manual
- R113 SP Disc Header Parts Catalog
- R113 SP Disc Header Quick Card

Open the right driveshield to access the case. Refer to [9.1 Opening Driveshields, page 89](#).

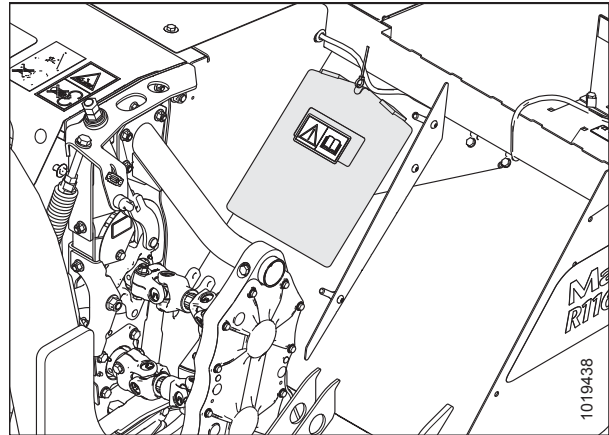


Figure 7.25: Manual Case

## 7.13 Running up the Header

### DANGER

- Keep everyone several hundred feet away from your operation. Ensure bystanders are never in line with the front or rear of the machine. Stones and other foreign objects can be ejected from either end with force.
- Take extreme care to avoid injury from thrown objects. Do NOT, under any circumstances, operate the disc header when other people are nearby.
- Check cutterbar area carefully for loose parts and hardware on the cutterbar. These objects can be ejected with considerable force when the machine is started, and may result in serious injury or machine damage.
- Cutterbar curtains reduce the potential for thrown objects. Always keep these curtains down when operating the disc header. Replace the curtains if they become worn or damaged.

### DANGER

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

### CAUTION

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

#### NOTE:

Higher engine rpm may be required to engage the header. Do **NOT** exceed 1800 rpm.

1. Start the windrower.
2. Set header 152–305 mm (6–12 in.) above the ground and adjust center-link to mid-position.
3. Run the machine slowly for 5 minutes, watching, and listening **FROM THE OPERATOR'S SEAT** for binding or interfering parts.
4. Run the machine at operating speed for 15 minutes. Listen for any unusual sounds or abnormal vibration.
5. Perform the run-up check as listed on the Predelivery Checklist (yellow sheet inside the back cover of this instruction) to ensure the machine is field-ready.
6. Retain the Checklist and (if desired), retain this instruction for future reference.



## 8 Changing the Conditioner

This section applies only to machines that require a conditioner change prior to delivery to the customer. If the change is **NOT** required, proceed to [6 Lubricating the Disc Header, page 51](#).

The R113 SP Disc Header can be operated either with no conditioner, with a polyurethane roll conditioner, or with a steel roll conditioner. If the disc header is not conditioner equipped, a shield must be installed.

Follow these instructions to change conditioners.

### NOTE:

These instructions apply to all conditioners. Exceptions are identified where applicable.

### 8.1 Removing the Conditioner

This procedure is applicable when the header is not attached to the windrower. If necessary, detach the header from the windrower before proceeding.

1. Remove the driveshields.
2. Remove the conditioner drive belt. Refer to [8.3.1 Removing Conditioner Drive Belt, page 83](#).
3. **M1170:** Move hose bundle (A) clear of frame and lay on header.

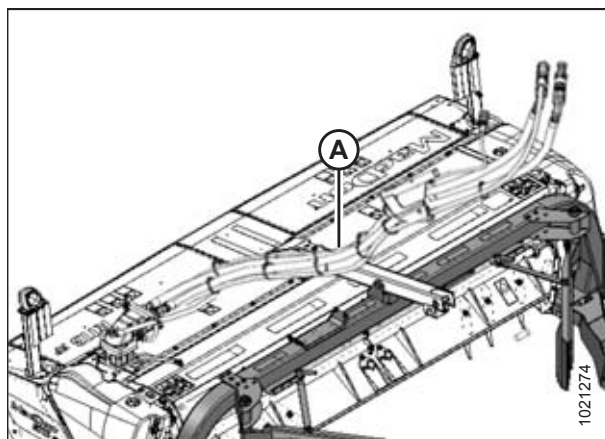


Figure 8.1: M1170 Hose Bundle

4. **M155 and M155E4:** Remove two bolts (A) attaching hose bracket (B) to header frame. Place hose bundle and bracket onto header. Do **NOT** disconnect hoses from motor.

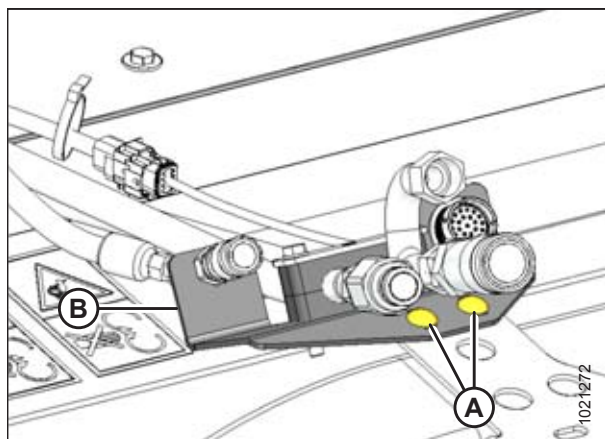


Figure 8.2: M155 and M155E4 Hoses

## CHANGING THE CONDITIONER

5. Attach straps (A) to adapter frame (B) and forklift forks. Use straps with a minimum working load of 454kg (1000 lb.).

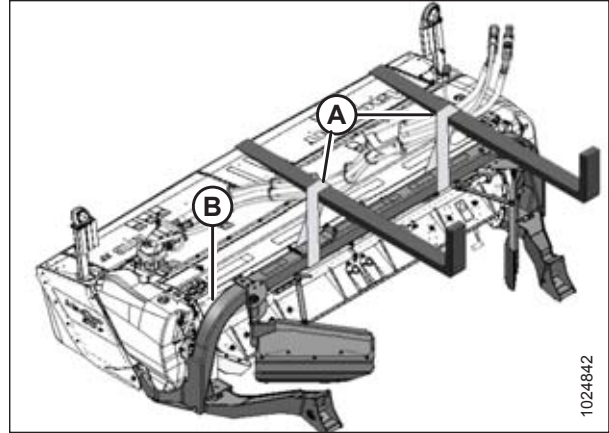


Figure 8.3: Supporting Frame

### 6. Alternate Method

- a. To protect the finish on the frame, wrap packing foam (A) around frame at approximate shown locations.
- b. Position forks (B) under the packing foam on the frame as shown at right. Raise forks and lift frame slightly. The forks should not directly contact the frame.
- c. To secure frame to forks, wrap chain (C) around end of forks and attach to forklift.

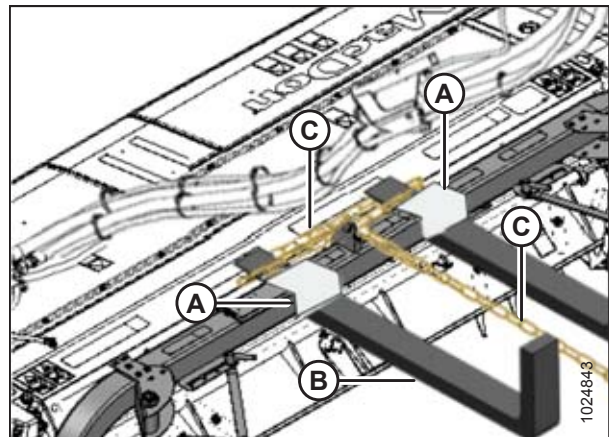


Figure 8.4: Supporting Frame

## WARNING

To prevent frame from slipping off forks, ensure frame is secured to forks. Failure to do so could result in death or serious injury.

7. Lift header with forklift and place 150 mm (6 in.) wooden blocks (A) under skid shoes. Lower header onto blocks and allow header to tilt forward.

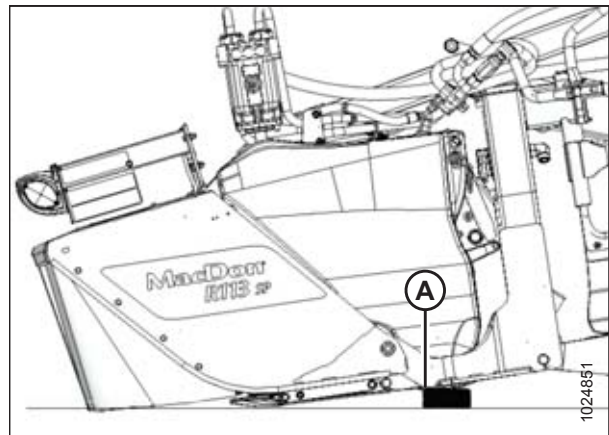


Figure 8.5: Header on Blocks



## CHANGING THE CONDITIONER

- Remove nut (A), securing bolt (B), washer (C), and washer shims (D) from the center-link support. If necessary, adjust height of forks lifting the frame. Retain hardware for reinstallation.

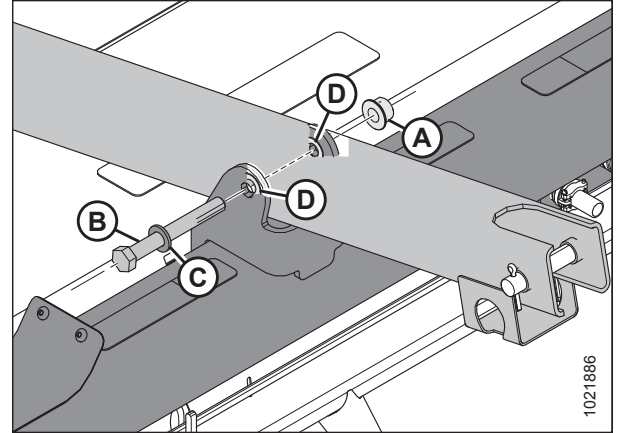


Figure 8.6: Center-Link Support

- Remove nut (B).

### **WARNING**

To prevent straps from slipping off forks, ensure straps are securely attached to forks. Failure to do so could result in death or serious injury.

### **CAUTION**

Stand clear when detaching frame as frame may shift when bolts are removed.

- Remove bolt (A) from frame (C). If necessary, adjust the height of forks to improve access to and to loosen bolt (A). Repeat at opposite side of frame. Retain hardware for reinstallation.
- Slowly and carefully back forklift away from header until frame is clear of header. Move frame away from work area, lower to ground and disconnect from forklift.
- Attach a spreader bar (A) to a forklift or equivalent, and attach chains to lugs (B) on conditioner (C). Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).

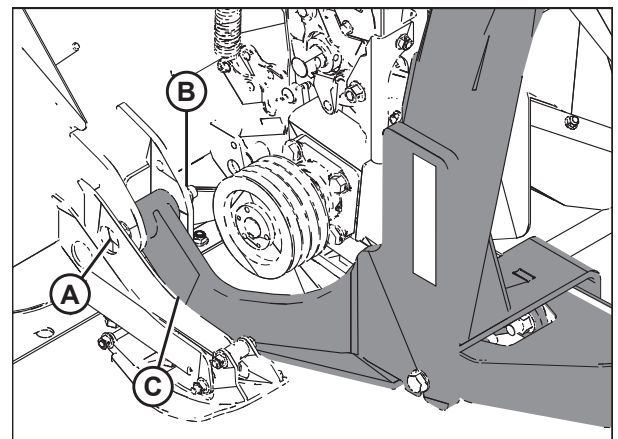


Figure 8.7: Left Side of Adapter Frame

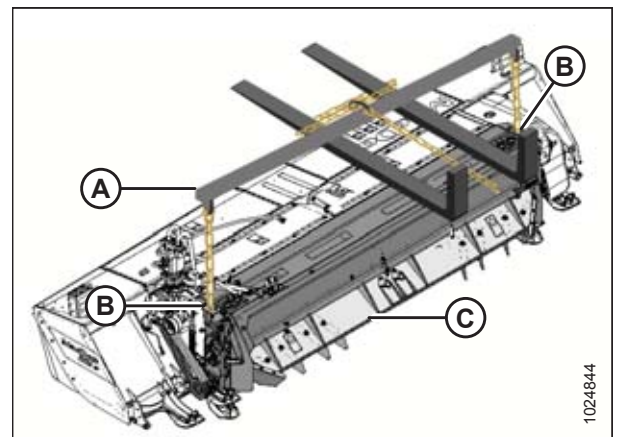


Figure 8.8: Spreader Bar

## CHANGING THE CONDITIONER

- Loosen two M16 hex head bolts (A) at each side of conditioner that secure it to header.

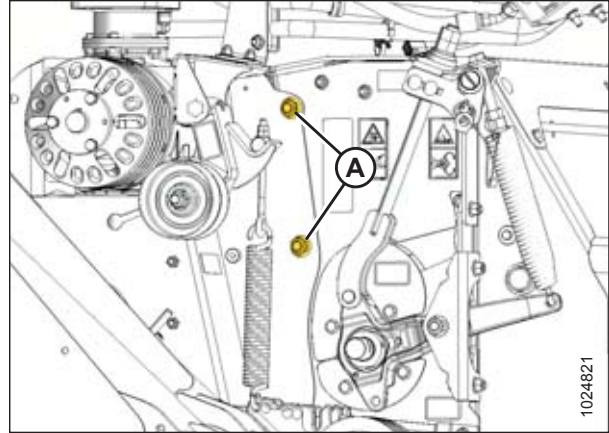


Figure 8.9: Conditioner Left Side – Right Side Similar

- Loosen two carriage bolts (A) securing conditioner gearbox support (B) to header.

### **WARNING**

To prevent the conditioner from falling backward, ensure lifting chains are secure and tight. Failure to do so may result in death or serious injury.

### **CAUTION**

Stand clear when detaching frame as frame may shift when bolts are removed.

- Adjust the height of forks to raise the conditioner slightly. Remove the loosened bolts and retain hardware for reinstallation.

### **WARNING**

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the header. Failure to do so could result in death or serious injury.

- Using the forklift, lift conditioner (A) off header (B). Avoid contact between top of conditioner and center-link anchor (C).
- Move frame away from work area, set on ground, and remove chains securing conditioner to spreader bar.

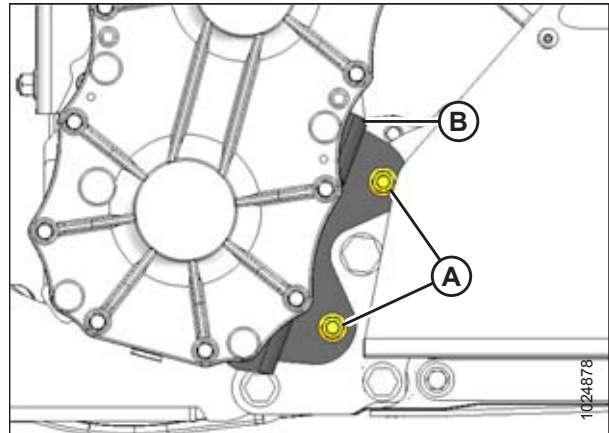


Figure 8.10: Conditioner Gearbox

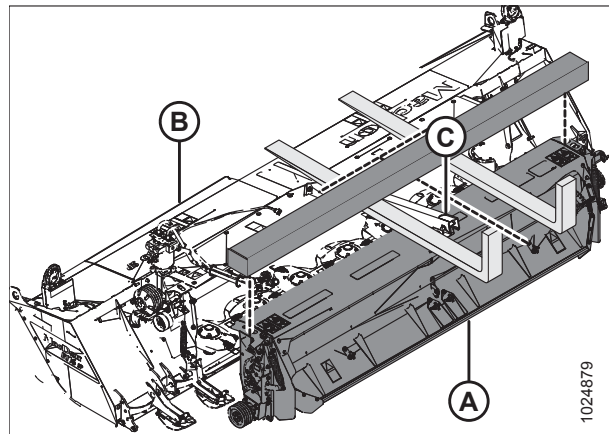


Figure 8.11: Conditioner Lift

## 8.2 Installing the Conditioner

This procedure is applicable when the header is not attached to the windrower. If necessary, detach the header from the windrower before proceeding.

1. Attach a spreader bar (A) to a forklift (or equivalent) and attach chains to lugs (B) on conditioner. Use a chain rated for overhead lifting with a minimum working load of 1135 kg (2500 lb.).

### WARNING

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the header while attaching the conditioner to the header. Failure to do so could result in death or serious injury.

2. Lift conditioner (C) and align it with the header opening.

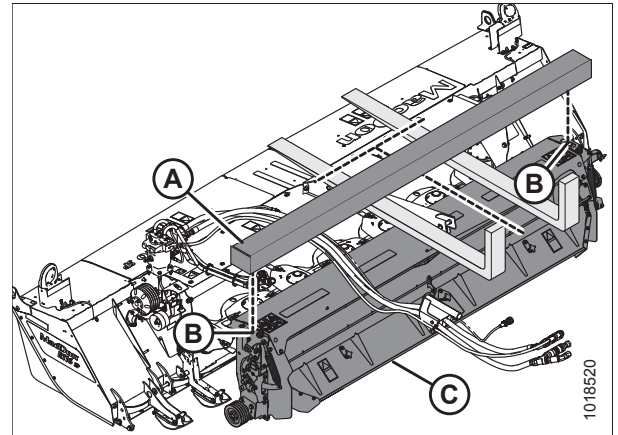


Figure 8.12: Conditioner Lift

3. Carefully align pin (B) at each end of conditioner (A) with lug (C) on disc header. Lower conditioner (A), so that pins (B) engage lugs (C) on disc header. Avoid contact between top of conditioner and center-link anchor.

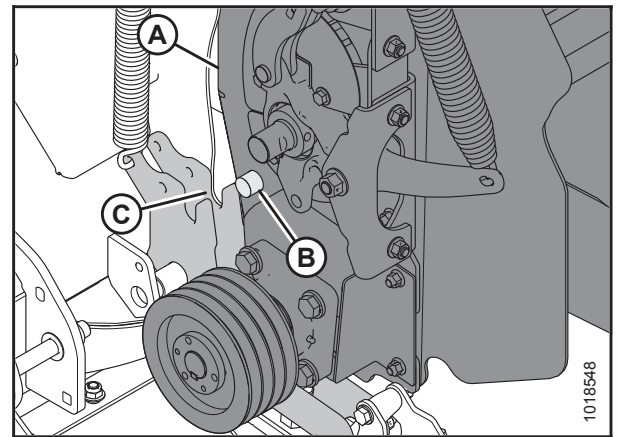


Figure 8.13: Installing Conditioner

4. Align mounting holes and install four M16 x 40 hex head bolts (A) with heads facing inboard (two per side). Secure with M16 center lock flanged nuts. Do not tighten.

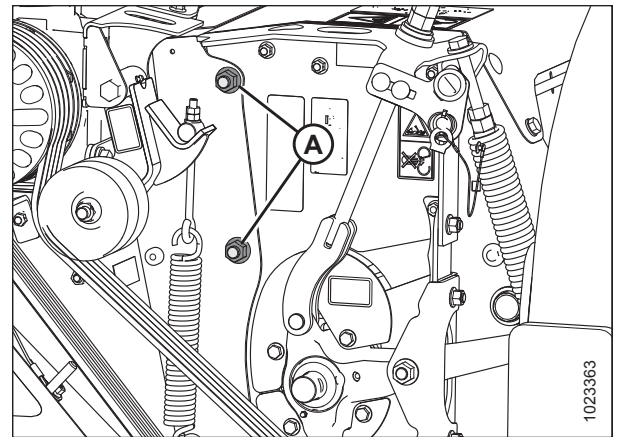


Figure 8.14: Left Side of Conditioner – Right Side Similar

## CHANGING THE CONDITIONER

5. Align holes in support (B) with mounting holes in header frame and install two carriage bolts (A) to secure conditioner gearbox support (B) to header. Bolt heads face inboard. Torque nuts to 69 Nm (51 lbf·ft).
6. Torque nuts installed in Step 4, page 77 to 170 Nm (126 lbf·ft).
7. Remove lifting chains from conditioner and move lifting device clear of work area.
8. If necessary, install conditioner drive components. Refer to 8.2.1 *Installing Conditioner Drive*, page 81.

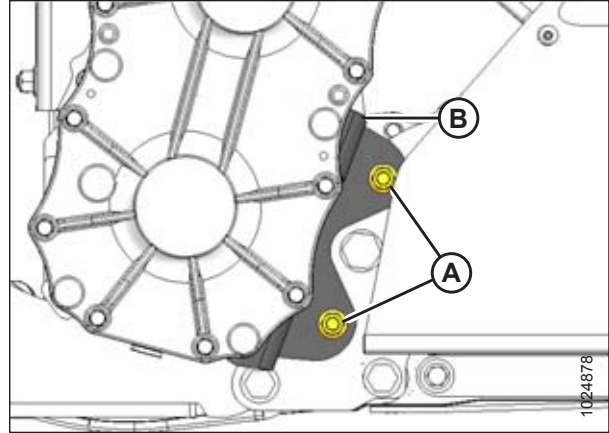


Figure 8.15: Conditioner Gearbox

9. Attach straps (A) to adapter frame (B) and forklift forks. Use straps rated for overhead lifting with a minimum working load of 454 kg (1000 lb.).

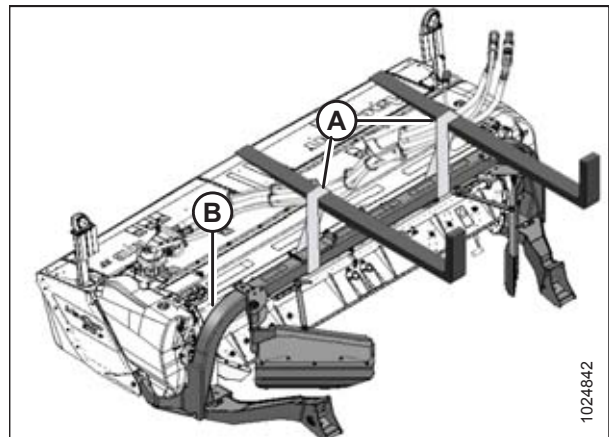


Figure 8.16: Supporting Frame

### 10. Alternate Method

- a. To protect the finish on the frame, wrap packing foam (A) (or equivalent) around frame at approximate shown locations.
- b. Position forks (B) under the packing foam on the frame as shown at right. Raise forks and lift frame slightly. The forks should not directly contact the frame.
- c. To secure frame to forks, wrap chain (C) around end of forks and attach to forklift.

### WARNING

To prevent frame from slipping off forks, ensure frame is secured to forks. Failure to do so could result in death or serious injury.

11. Pick up frame and position it against header as shown.

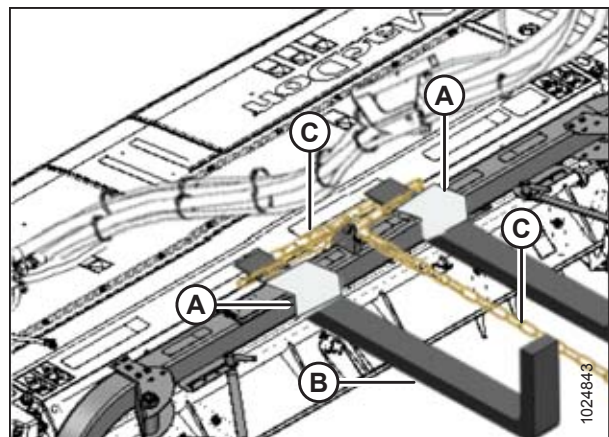


Figure 8.17: Supporting Frame

## CHANGING THE CONDITIONER

12. Slowly move forward until the lift arm (C) is lined up with the mounting holes in the frame (A) and (B).

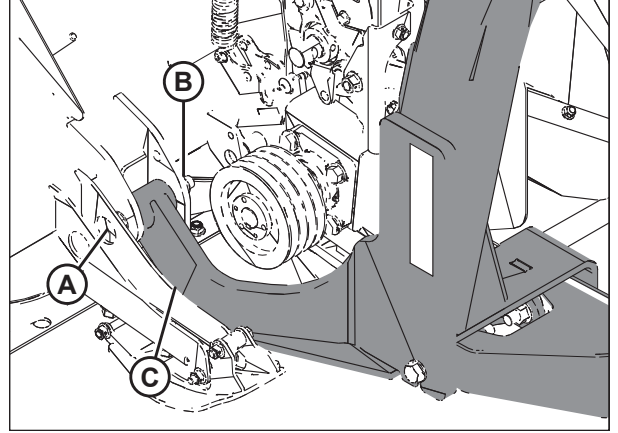


Figure 8.18: Frame (Left Side Shown)

13. Install bolt (A) through frame (B) and bushing (D) in the lift arm. Repeat for opposite side.
14. Check gap (C) between the inner steel sleeve (D) of the bushing and frame (B). If there is a gap, flat washers (1.2 mm thick) (MD #5113) will need to be installed to minimize the gap on both sides of the bushing.
15. Remove bolt (A).

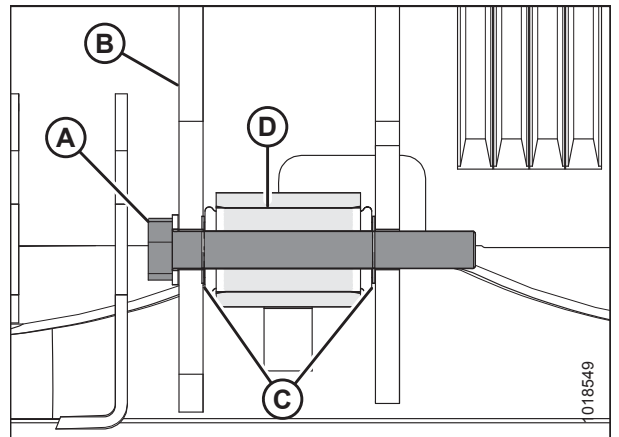


Figure 8.19: Frame Attachment (Left Side Shown)

16. Install washer (A) onto bolt (B) and apply anti-seize compound to bolt shank only. Do **NOT** apply to threads.
17. Install bolt (B) with washers (C) as determined in Step 14, page 79.
18. Install three washers (D) and nut (E) onto bolt. Torque to 332–346 Nm (245–255 lbf·ft).
19. Repeat Steps 14, page 79 to 18, page 79 for opposite side.

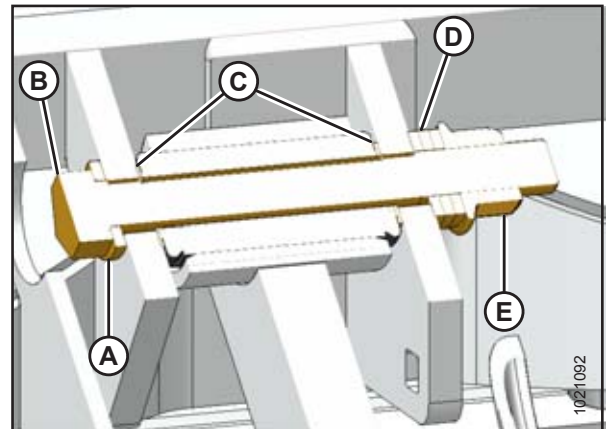


Figure 8.20: Frame Attachment (Left Side Shown)

## CHANGING THE CONDITIONER

20. With flat washer shim (A) on both sides of the center-link support, install securing bolt (B) and washer (C) through the conditioner center-link support bracket and center-link support.
21. Install nut (D) and torque to 332–346 Nm (245–255 lbf-ft).

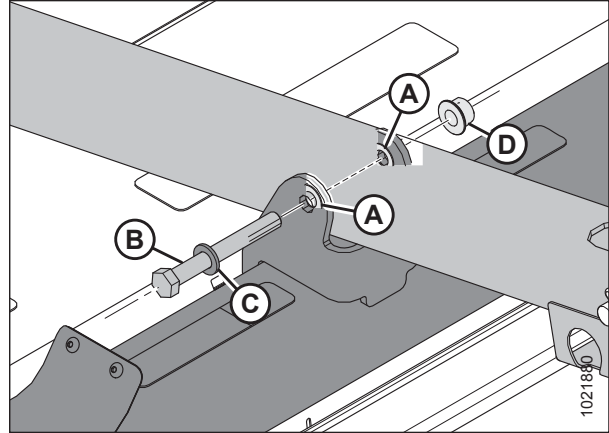


Figure 8.21: Center-Link Support

### WARNING

To prevent frame from slipping off forks, ensure frame is secured to forks. Failure to do so could result in death or serious injury.

22. Lift header and remove wooden blocks (A) under skid shoes. Lower header to ground.
23. Remove straps or chains securing frame to forks, and back forklift away from work area.

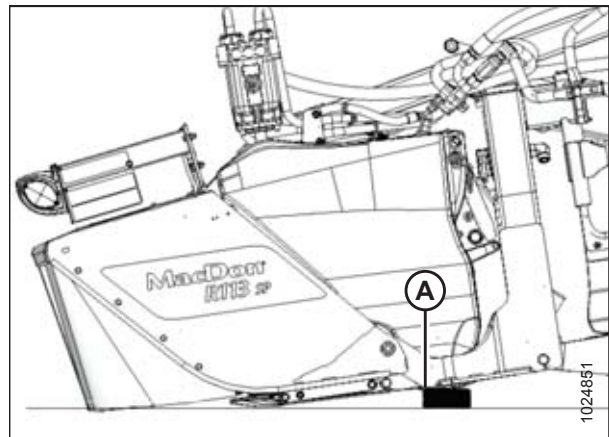


Figure 8.22: R113 SP Header

24. **M155 and M155E4:** Position hose bundle and hose support (B) onto adapter and secure with bolts (A) and nuts.

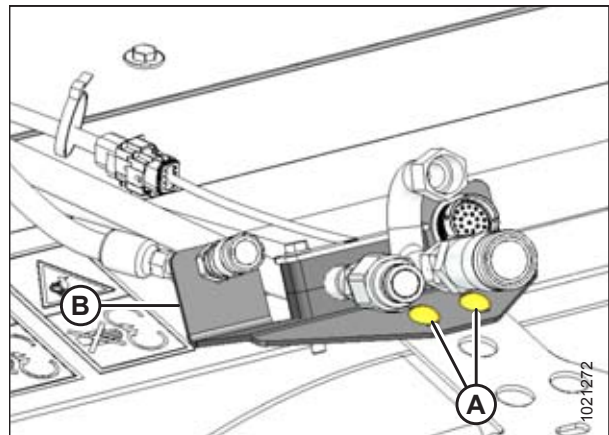


Figure 8.23: Hose Support

## CHANGING THE CONDITIONER

25. **M1170:** Reposition hose bundle on frame.
26. Install the conditioner drive belt. Refer to [8.3.2 Installing Conditioner Drive Belt, page 84](#).

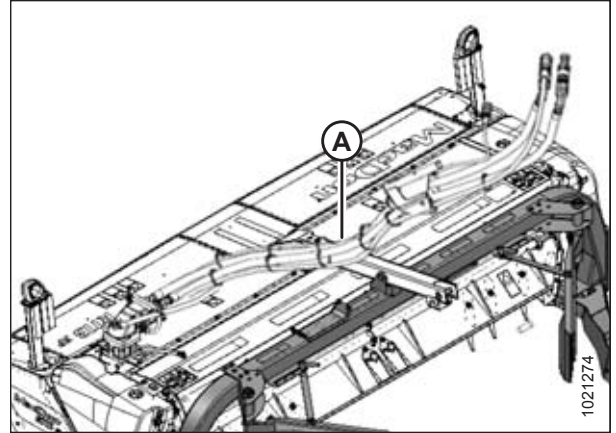


Figure 8.24: R113 SP Header

### 8.2.1 Installing Conditioner Drive

This procedure describes the installation of conditioner drive components on a machine that was originally supplied with no conditioner. If a conditioner is to be installed on the R113 SP Disc Header, refer to [8.2 Installing the Conditioner, page 77](#).

Retrieve bag containing the following parts from conditioner shipment:

- Shaft key
  - Pulley
  - Bushing with three M10 bolts
  - Tensioner assembly
  - M16 hex head bolt
  - M16 nut
  - Two M10 nuts
  - Eye bolt
  - Hardened washer
  - Spring
1. Remove drive cover (A) from left side of header by removing hex head bolt (B), flat washer (C), and nut (D), and sliding cover off pins (E).

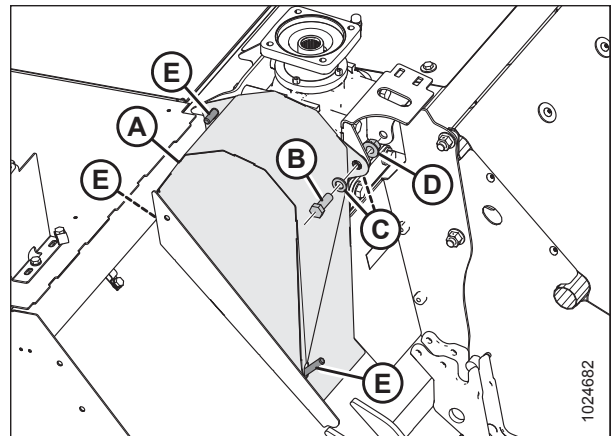


Figure 8.25: Drive Cover

## CHANGING THE CONDITIONER

2. Position tensioner assembly (A) as shown, and secure with M16 x 120 bolt (B) and nut (C). Torque nut (C) to 54 Nm (40 ft·lbf).

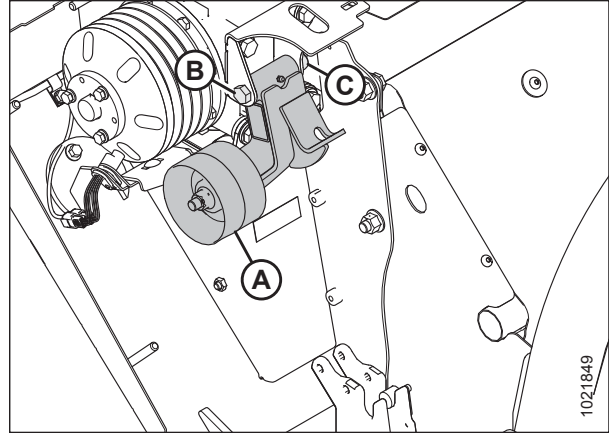


Figure 8.26: Tensioner

3. Install spring (A) into forward hole (B) in frame.
4. Install eyebolt (C) onto spring (A) and tensioner (D). Secure eyebolt (C) to tensioner (D) with hardened washer (E), and two M10 nuts (F), and straight pin (G).

**NOTE:**

Install conditioner drive belt after reattaching header to adapter.

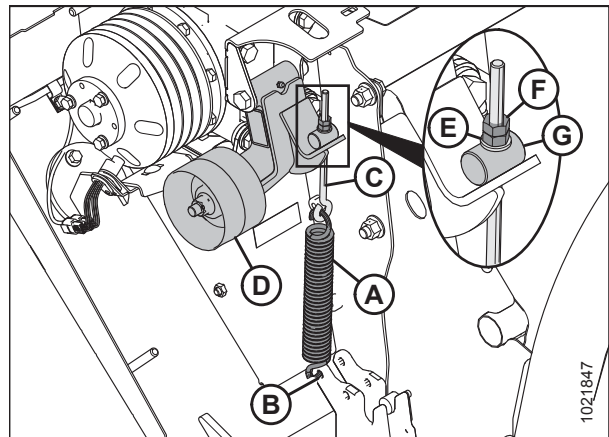


Figure 8.27: Tensioner



## 8.3 Replacing Conditioner Drive Belt

The conditioner drive belt is located inside the left driveshield and is tensioned with a spring tensioner. The tension is factory-set and should not require adjustment.

### 8.3.1 Removing Conditioner Drive Belt

#### DANGER

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

1. Lower header fully, turn off engine, and remove key.
2. Remove the left driveshield. Refer to [9.1 Opening Driveshields](#), page 89.
3. Disconnect wire harness (A) from speed sensor (B).

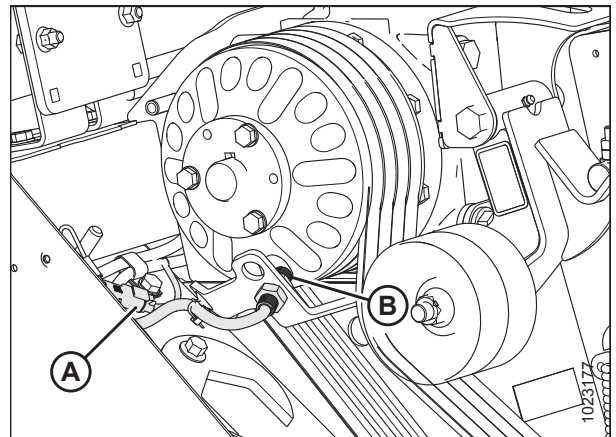


Figure 8.28: Speed Sensor Assembly

4. Turn jam nut (A) counterclockwise to unlock tension adjustment.
5. Turn jam nut (A) and adjuster nut (B) counterclockwise to fully collapse tensioner spring (C), and release the tension from conditioner drive belt (D).
6. Remove drive belt (D).

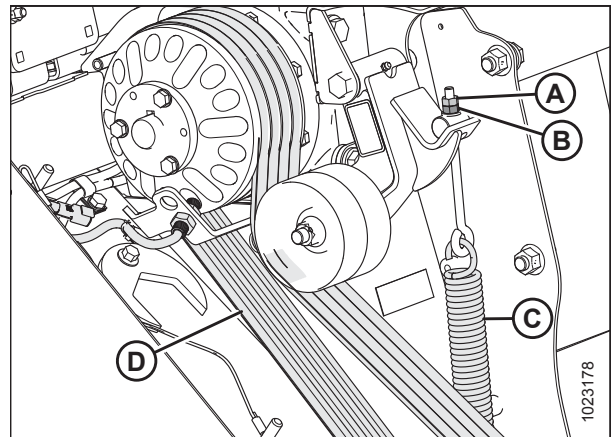


Figure 8.29: Conditioner Drive

### 8.3.2 Installing Conditioner Drive Belt

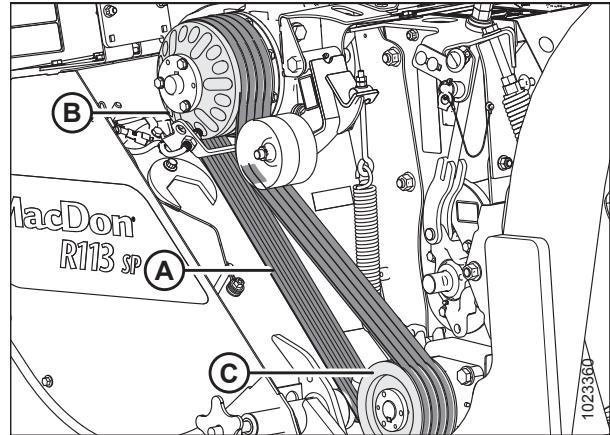
#### **⚠ DANGER**

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

1. Lower disc header fully, turn off engine, and remove key.
2. Install drive belt (A) onto driven pulley (C) first, and then onto drive pulley (B) ensuring that the belt is in the pulley grooves.

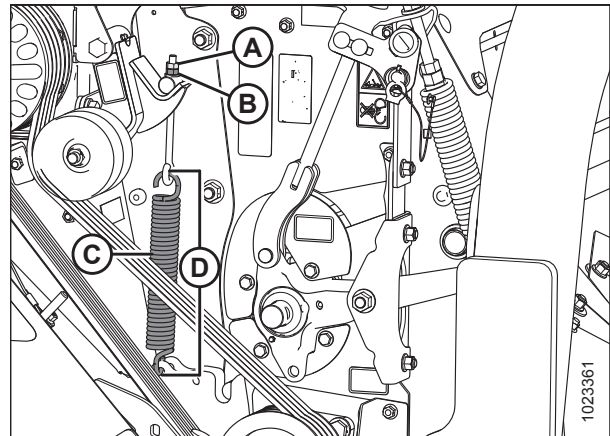
**NOTE:**

If necessary, loosen jam nut and adjuster nut to relieve spring tension.



**Figure 8.30: Conditioner Drive**

3. Measure the length of tensioner spring (C); dimension (D) should be set to 366 mm (14-3/8 in.) for proper belt tension.
4. To adjust the spring tension, loosen jam nut (A).
5. Turn adjuster nut (B) clockwise to increase spring/belt tension or turn adjuster nut (B) counterclockwise to decrease spring/belt tension.
6. Once correct spring measurement has been achieved, hold adjuster nut (B) and tighten jam nut (A) against it.



**Figure 8.31: Conditioner Drive**

## CHANGING THE CONDITIONER

7. Reconnect speed sensor (B) to wiring harness (A).
8. Close left driveshield. Refer to [9.2 Closing Driveshields](#), page 91.

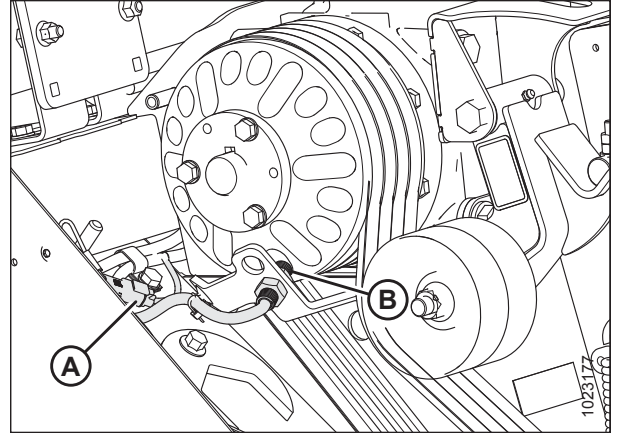


Figure 8.32: Speed Sensor

## 8.4 Discharge Shield (No Conditioner)

- If a conditioner is being installed, the discharge shield needs to be removed. Refer to .
- If a conditioner is being removed, the discharge shield needs to be installed. Refer to .

### 8.4.1 Removing Discharge Shield (No Conditioner)

Follow these steps to remove the shielding installed on a disc header configured without a conditioner:

1. Disconnect and remove the header from the windrower.
2. On both ends of the header, remove four M16 hex head bolts (A), nuts, and flat washers securing shield (B) to header (C).

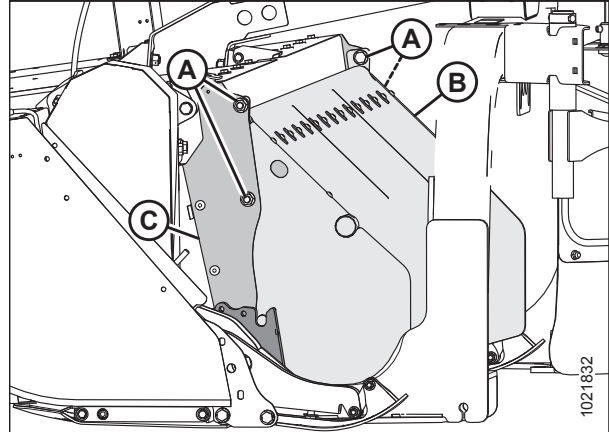


Figure 8.33: Left Side of Header (Right Opposite)

3. Lift the shield (A) until pins (B) disengage from slots in support (C).

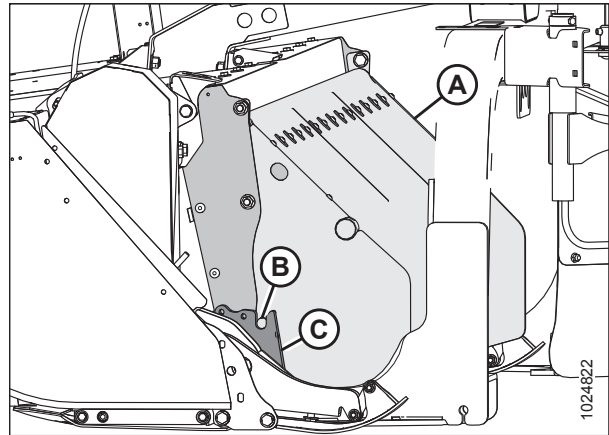


Figure 8.34: Left Side of Header (Right Opposite)

### 8.4.2 Installing Discharge Shield (No Conditioner)

Follow these steps to install the shielding on a configured without a conditioner:

1. Position shield (A) until pins (B) engage the slots in support (C) and bolt holes in shield align with holes (D) in header.

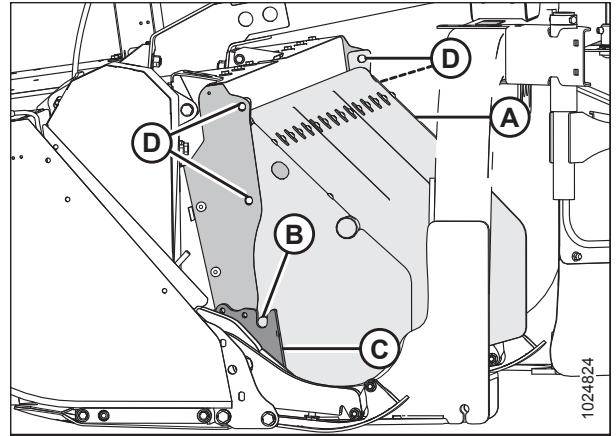


Figure 8.35: Left Side of Header (Right Opposite)

2. Secure shield (B) to the header with four M16 hex head bolts (A), nuts, and flat washers.
3. Ensure bolt heads face inboard and torque nuts to 224–298 Nm (165–220 ft·lbf).

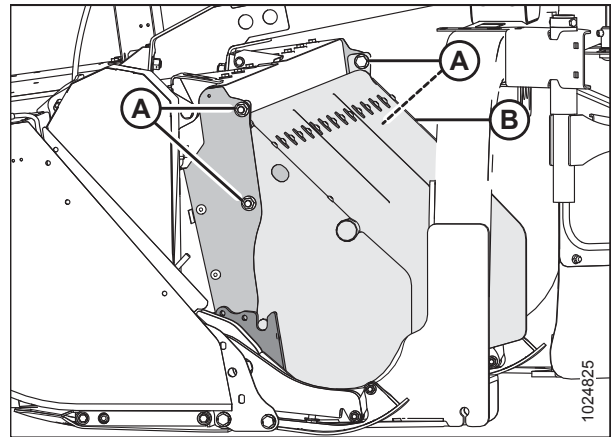


Figure 8.36: Left Side of Header (Right Opposite)



## 9 Reference

### 9.1 Opening Driveshields

#### CAUTION

Do NOT operate the machine without the driveshields in place and secured.

#### NOTE:

Images shown in this procedure are for left driveshield—right driveshield is similar.

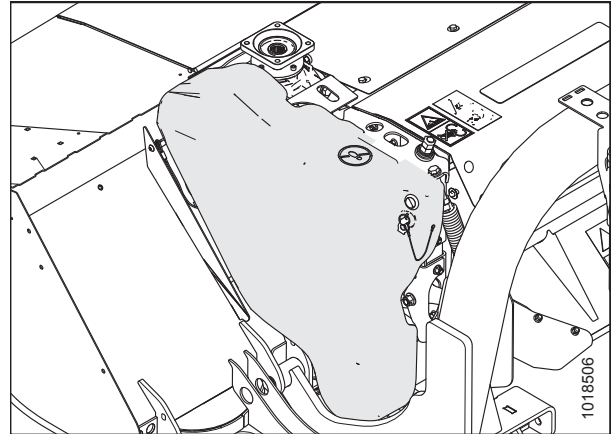


Figure 9.1: Left Driveshield

1. Remove lynch pin (A) and tool (B) from pin (C).

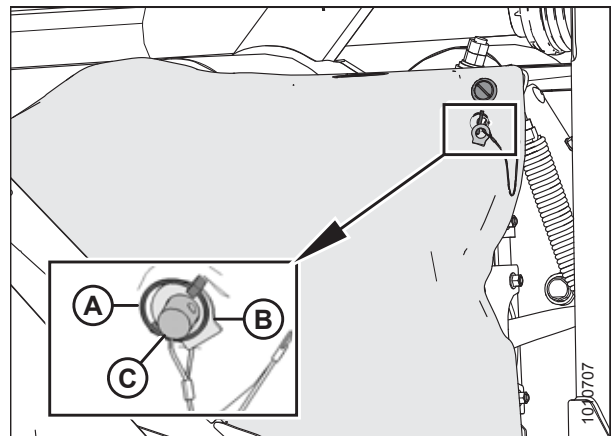
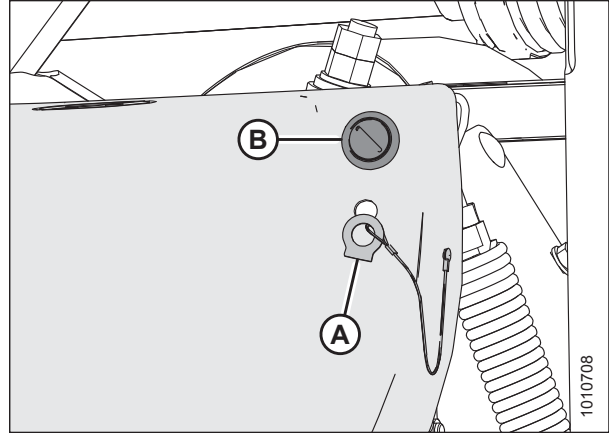


Figure 9.2: Left Driveshield

## REFERENCE

2. Insert flat end of tool (A) into latch (B) and turn it counterclockwise to unlock.

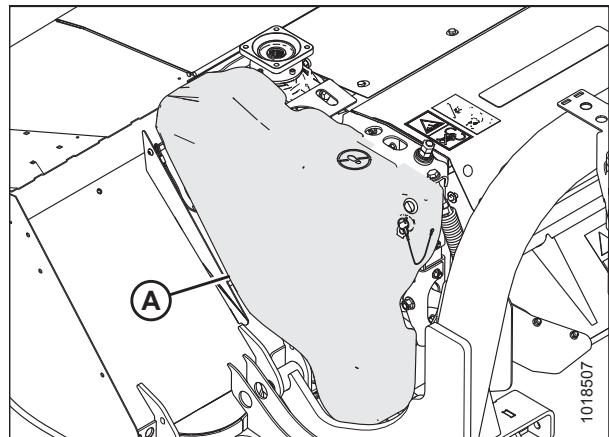


**Figure 9.3: Driveshield Latch**

3. Pull top of driveshield (A) away from header to open.

**NOTE:**

For improved access, lift driveshield off the pins at the base of the shield, and lay the shield on the header.



**Figure 9.4: Left Driveshield**



## 9.2 Closing Driveshields

### CAUTION

Do NOT operate the machine without the driveshields in place and secured.

#### NOTE:

Images shown in this procedure are for left driveshield—right driveshield is similar.

1. Position driveshield onto pins at base of driveshield (if necessary).
2. Push driveshield (A) to engage latch (B).
3. Check that driveshield is properly secured.

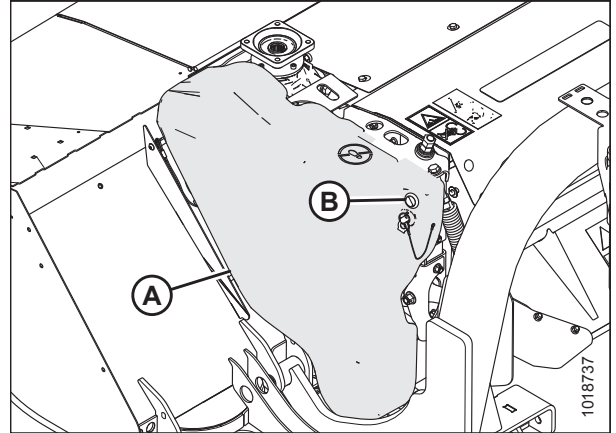


Figure 9.5: Left Driveshield

4. Replace tool (B) and lynch pin (A) on pin (C).

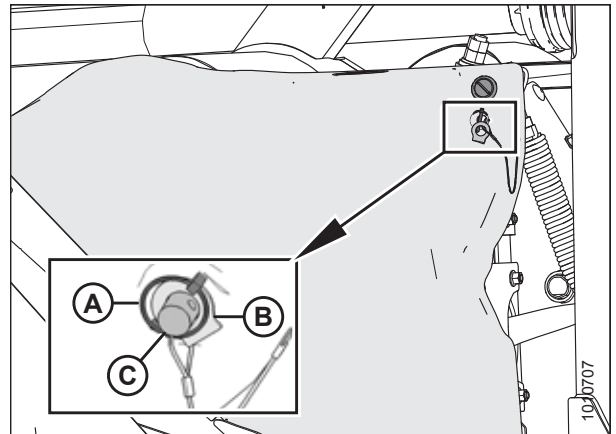


Figure 9.6: Left Driveshield

## 9.3 Cutterbar Doors

### **⚠** WARNING

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

Two doors (A) with rubber curtains provide access to the cutterbar area.

Curtains (B) and (C) are attached to each front corner and at the center respectively. Always keep curtains lowered when operating the disc header.

Rotary disc headers sold outside of North America have latches on the cutterbar door.

#### **IMPORTANT:**

Replace curtains if they become worn or damaged.

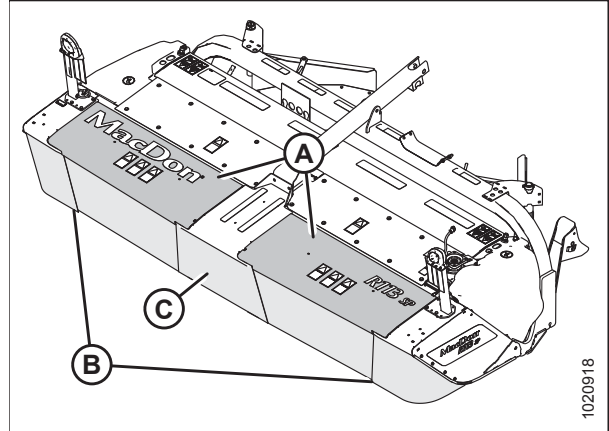


Figure 9.7: Cutterbar Doors and Curtains

### 9.3.1 Opening Cutterbar Doors

#### **⚠** DANGER

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

1. Lift door (A) at front to open.

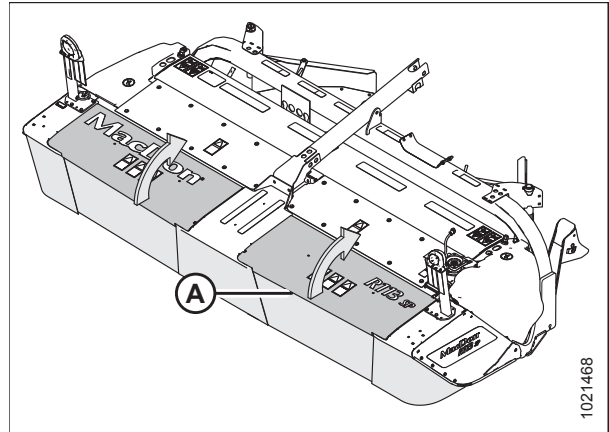


Figure 9.8: Cutterbar Doors and Curtains

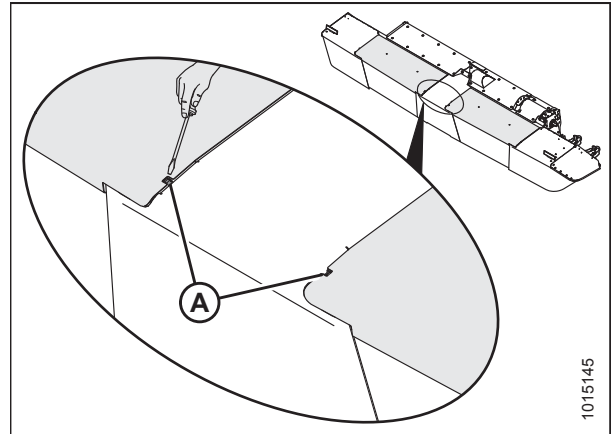
### 9.3.2 Opening Cutterbar Doors: Export Latches

Headers sold outside North America require a tool-operated latch on the cutterbar doors. Follow these steps to open cutterbar doors with export latches:

**⚠ DANGER**

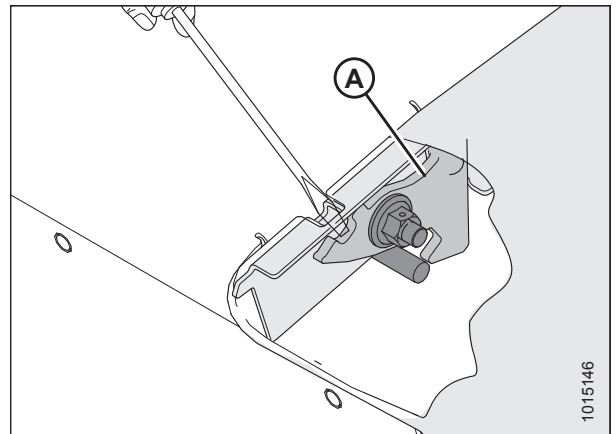
To avoid bodily injury or death from unexpected startup of machine, always stop engine and remove key from ignition before leaving operator's seat for any reason.

1. Locate the latch access holes (A) for each door.



**Figure 9.9: Cutterbar Door Latch Access Hole (Export Only)**

2. Use a rod or screwdriver to press down on the latch (A) and release the cutterbar door.



**Figure 9.10: Cutterbar Door Latch (Cutaway View)**

## REFERENCE

3. Lift up on door (A) while pressing down on latch.

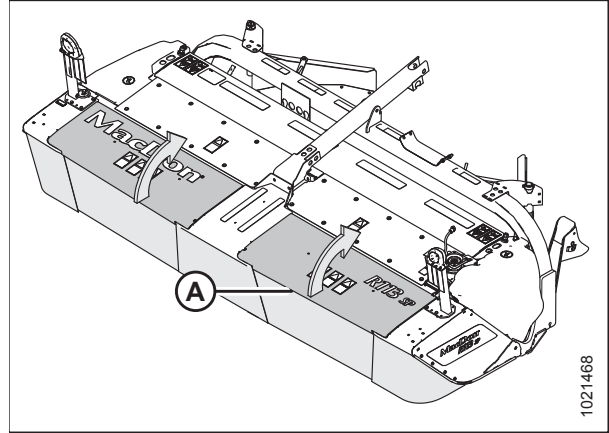


Figure 9.11: Left Cutterbar Door Open

### 9.3.3 Closing Cutterbar Doors

#### CAUTION

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

1. Pull door (A) at top to close.
2. Ensure that curtains hang properly and completely enclose cutterbar area.

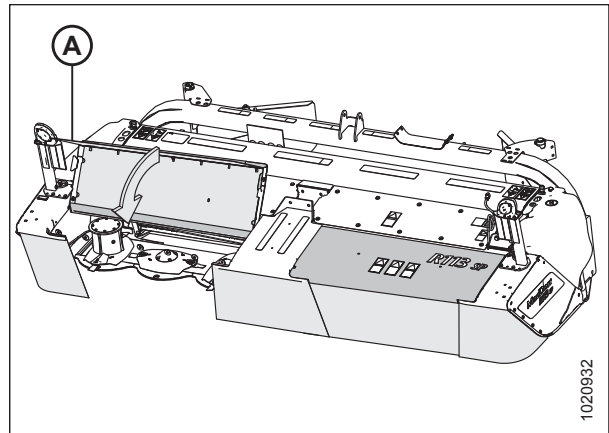


Figure 9.12: R113 SP Header

## 9.4 Torque Specifications

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

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

### Jam nuts

When applying torque to finished jam nuts, multiply the torque applied to regular nuts by  $f=0.65$ .

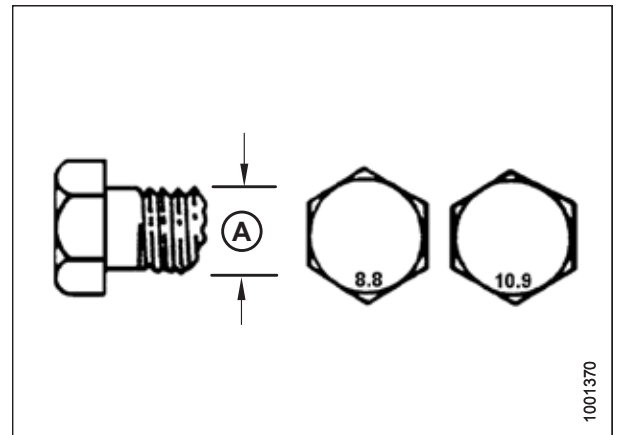
### Self-tapping screws

Standard torque is to be used (**NOT** to be used on critical or structurally important joints).

### 9.4.1 Metric Bolt Specifications

**Table 9.1 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 9.13: Bolt Grades**

REFERENCE

Table 9.2 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

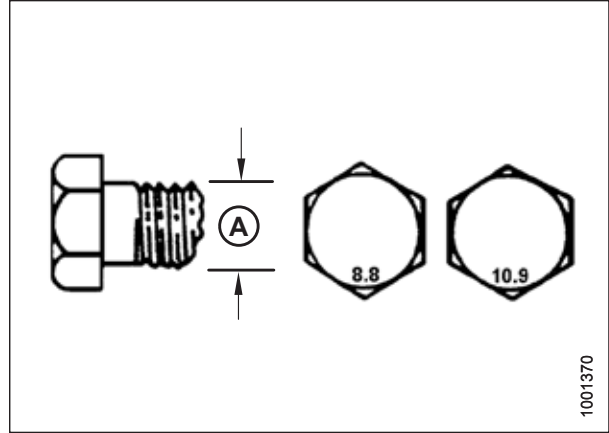


Figure 9.14: Bolt Grades

Table 9.3 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

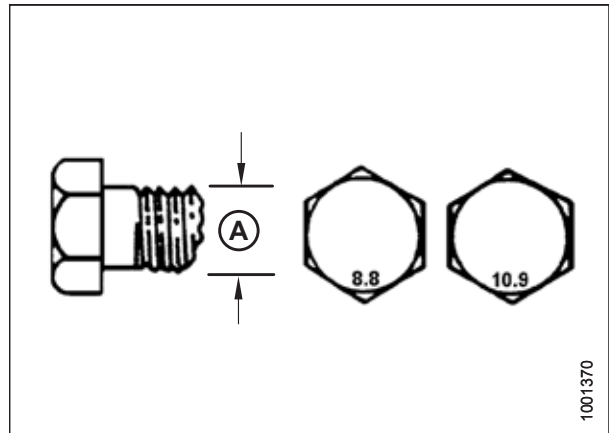


Figure 9.15: Bolt Grades

REFERENCE

Table 9.4 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

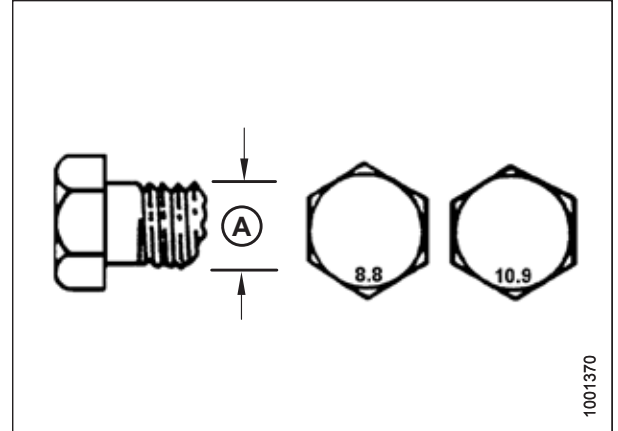


Figure 9.16: Bolt Grades

### 9.4.2 Metric Bolt Specifications Bolting into Cast Aluminum

Table 9.5 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	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	–	–	–	–

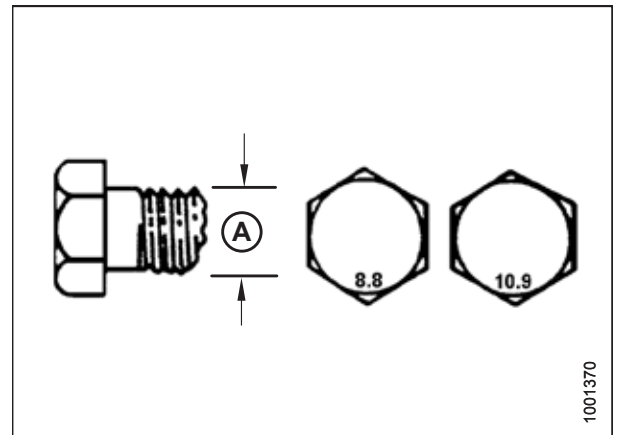


Figure 9.17: Bolt Grades

## REFERENCE

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

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

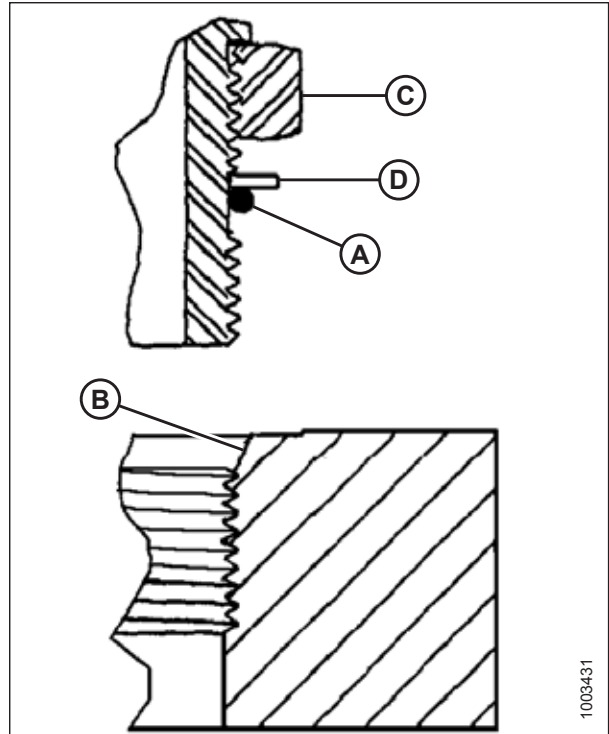


Figure 9.18: Hydraulic Fitting

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

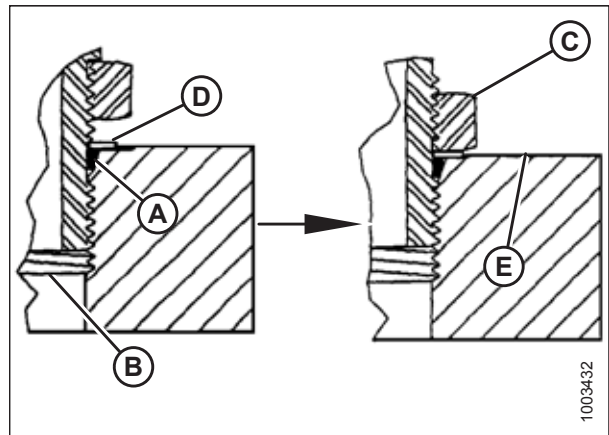


Figure 9.19: Hydraulic Fitting



**REFERENCE**

**Table 9.6 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)**

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

---

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

REFERENCE

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

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on threads and adjust if necessary.
3. Apply hydraulic system oil to O-ring.
4. Install fitting (C) into port until fitting is hand-tight.
5. Torque fitting (C) according to values in Table 9.7, page 100.
6. Check final condition of fitting.

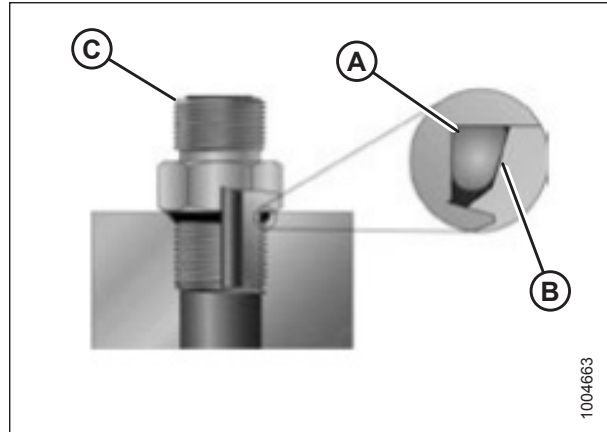


Figure 9.20: Hydraulic Fitting

Table 9.7 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

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

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

## REFERENCE

### 9.4.5 O-Ring Face Seal (ORFS) Hydraulic Fittings

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



Figure 9.21: Hydraulic Fitting

2. Apply hydraulic system oil to O-ring (B).
3. Align tube or hose assembly so that flat face of sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to values in Table 9.8, page 101.

**NOTE:**

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

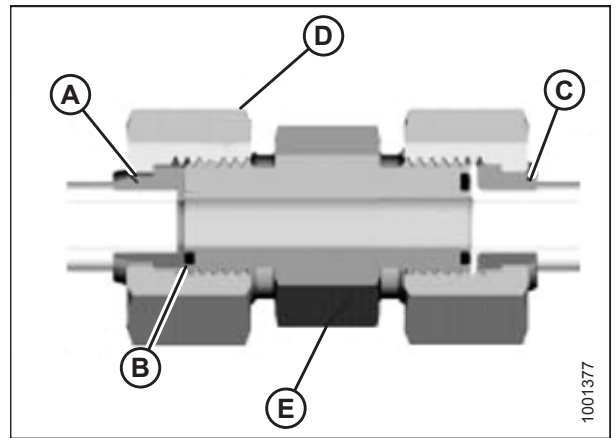


Figure 9.22: Hydraulic Fitting

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

**Table 9.8 O-Ring Face Seal (ORFS) Hydraulic Fittings**

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>5</sup>	
			Nm	lbf-ft
-3	Note <sup>6</sup>	3/16	–	–
-4	9/16	1/4	25–28	18–21
-5	Note <sup>6</sup>	5/16	–	–
-6	11/16	3/8	40–44	29–32
-8	13/16	1/2	55–61	41–45
-10	1	5/8	80–88	59–65
-12	1-3/16	3/4	115–127	85–94

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

## REFERENCE

**Table 9.8 O-Ring Face Seal (ORFS) Hydraulic Fittings (continued)**

SAE Dash Size	Thread Size (in.)	Tube O.D. (in.)	Torque Value <sup>7</sup>	
			Nm	lbf·ft
-14	Note <sup>6</sup>	7/8	–	–
-16	1-7/16	1	150–165	111–122
-20	1-11/16	1-1/4	205–226	151–167
-24	1–2	1-1/2	315–347	232–256
-32	2-1/2	2	510–561	376–414

### 9.4.6 Tapered Pipe Thread Fittings

Assemble pipe fittings as follows:

1. Check components to ensure that fitting and port threads are free of burrs, nicks and scratches, or any form of contamination.
2. Apply pipe thread sealant (paste type) to external pipe threads.
3. Thread fitting into port until hand-tight.
4. Torque connector to appropriate torque angle. The Turns From Finger Tight (T.F.F.T.) values are shown in Table 9.9, page 102. Make sure that tube end of a shaped connector (typically 45° or 90°) is aligned to receive incoming tube or hose assembly. Always finish alignment of fitting in tightening direction. Never back off (loosen) pipe threaded connectors to achieve alignment.
5. Clean all residue and any excess thread conditioner with appropriate cleaner.
6. Assess final condition of fitting. Pay special attention to possibility of cracks to port opening.
7. Mark final position of fitting. If a fitting leaks, disassemble fitting and check for damage.

**NOTE:**

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

**Table 9.9 Hydraulic Fitting Pipe Thread**

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

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

REFERENCE

## 9.5 Conversion Chart

Table 9.10 Conversion Chart

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

## REFERENCE

### 9.6 Definitions

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

Term	Definition
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut
Center-link	A hydraulic cylinder link between header and machine used to change header angle
CGVV	Combined gross vehicle weight
FFFT	Flats from finger tight
Finger tight	Finger tight is a reference position where sealing surfaces or components are making contact with each other, and fitting has been tightened to a point where fitting is no longer loose
GVW	Gross vehicle weight
Hard joint	A joint made with use of a fastener where joining materials are highly incompressible
Hex key	A tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in head (internal-wrenching hexagon drive); also known as an Allen key and various other synonyms
hp	Horsepower
JIC	Joint Industrial Council: A standards body that developed standard sizing and shape for original 37° flared fitting
n/a	Not applicable
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 that is designed to be paired with a bolt
ORB	O-ring boss: A style of fitting commonly used in port opening on manifolds, pumps, and motors
ORFS	O-ring face seal: A style of fitting commonly used for connecting hoses and tubes This style of fitting is also commonly called ORS, which stands for O-ring seal
R1 Series header	MacDon R113 SP disc headers of windrowers
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread into a mating part
Soft joint	A joint made with use of a fastener where joining materials are compressible or experience relaxation over a period of time
SP disc header	Rotary disc header that connects to a self-propelled machine (windrower, etc.)
Tension	Axial load placed on a bolt or screw, usually measured in Newtons (N) or pounds (lb.)

## REFERENCE

<b>Term</b>	<b>Definition</b>
TFFT	Turns from finger tight
Torque	The product of a force X lever arm length, usually measured in Newton-meters (Nm) or foot-pounds (lbf-ft)
Torque angle	A tightening procedure where fitting is assembled to a precondition (finger tight) and then nut is turned farther a number of degrees to achieve its final position
Torque-tension	The relationship between assembly torque applied to a piece of hardware and axial load it induces in bolt or screw
Washer	A thin cylinder with a hole or slot located in the center that is to be used as a spacer, load distribution element, or a locking mechanism







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