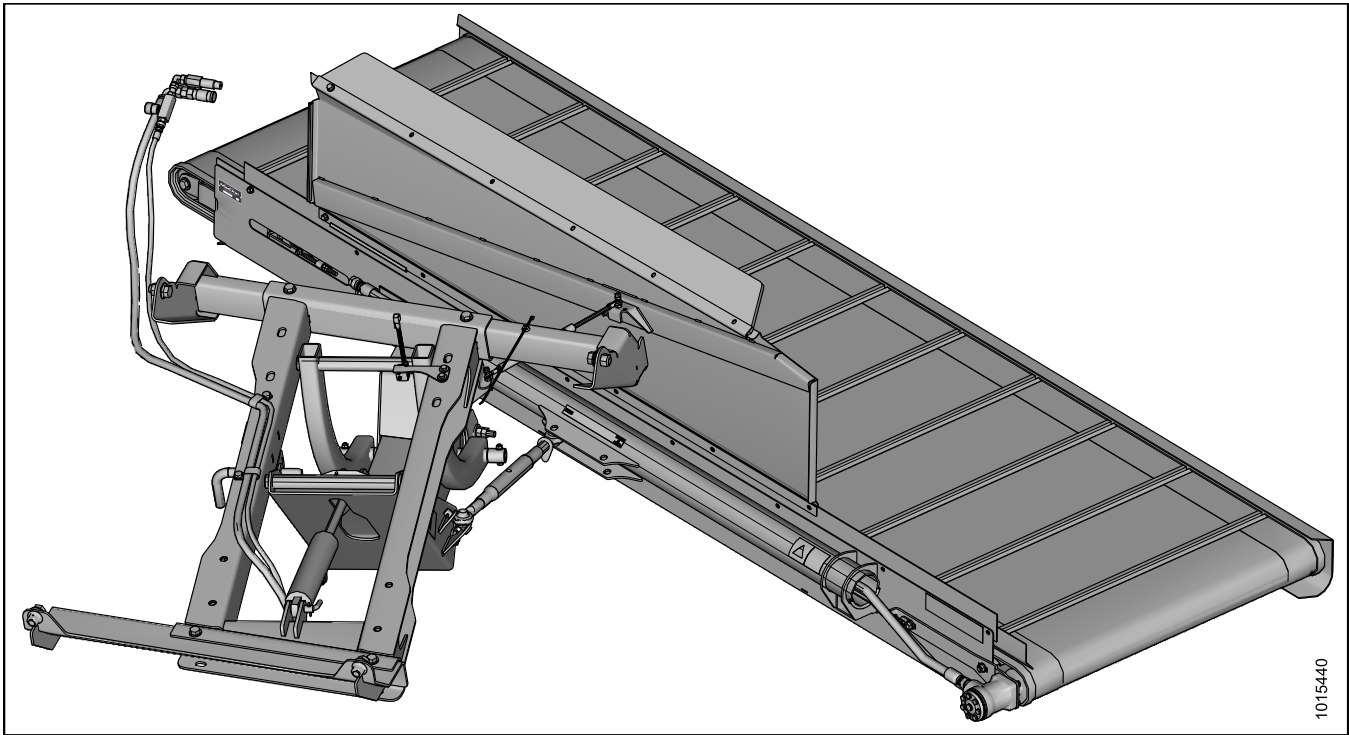


# **Double Windrow Attachment (DWA) for M1-Series Self-Propelled Windrowers**

Setup, Operation, and Parts Manual

147795 Revision A  
Original Instruction

This instruction contains the setup procedures, operation instructions, and parts lists for the MacDon Double Windrow Attachment (DWA) for M1-Series Self-Propelled Windrowers.



Published: December, 2015

## Introduction

The Double Windrow Attachment (DWA) provides the ability to place two windrows of conditioned material close together to be picked up by a forage chopper. The DWA can be mounted on the following MacDon Self-Propelled Windrowers:

- M1240

The DWA is for use with the following headers:

- A-Series Auger Headers
- R-Series Rotary Disc Header

When the DWA system is engaged, the conditioned crop is deposited onto the side draper and placed to the side of the windrower. Raising the side delivery disengages the DWA, allowing the crop to be deposited between the windrower's wheels.

### **NOTE:**

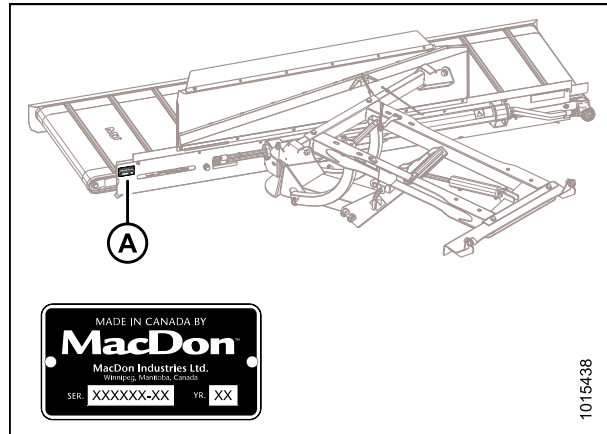
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# Serial Number Location

Record the serial number of the Double Windrow Attachment (DWA) in the space provided.

**DWA serial number:** \_\_\_\_\_

The serial number plate is located on the deck (A).



**Figure 1: Serial Number Location**

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# 1 Safety

## 1.1 Safety Alert Symbols

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

This symbol means:

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

Carefully read and follow the safety message accompanying this symbol.

### Why is safety important to you?

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



Figure 1.1: Safety Symbol

## 1.2 Signal Words

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

### **DANGER**

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

### **WARNING**

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

### **CAUTION**

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



## 1.3 General Safety

### CAUTION

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

Protect yourself.

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

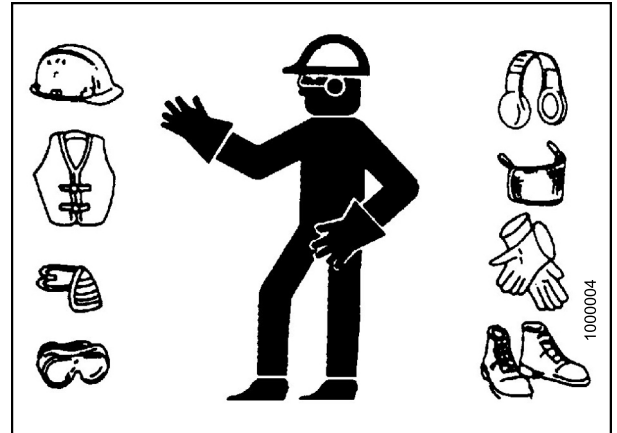


Figure 1.2: Safety Equipment



Figure 1.3: Safety Equipment

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

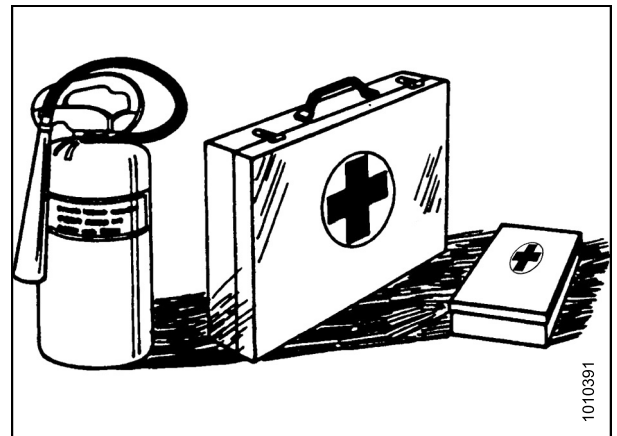


Figure 1.4: Safety Equipment

## SAFETY

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



Figure 1.5: Safety around Equipment

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

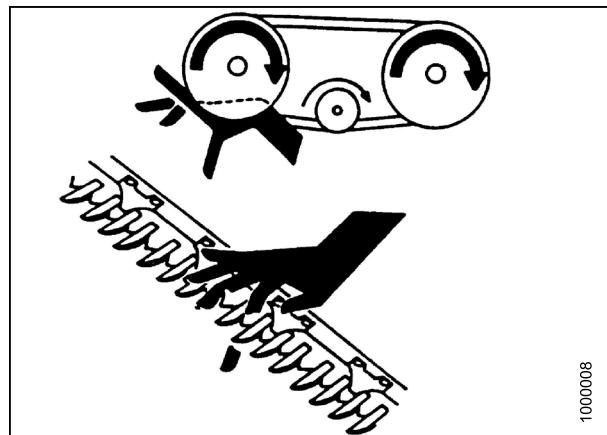


Figure 1.6: Safety around Equipment

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



Figure 1.7: Safety around Equipment

## 1.4 Maintenance Safety

To ensure your safety while maintaining the machine:

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



Figure 1.8: Safety around Equipment

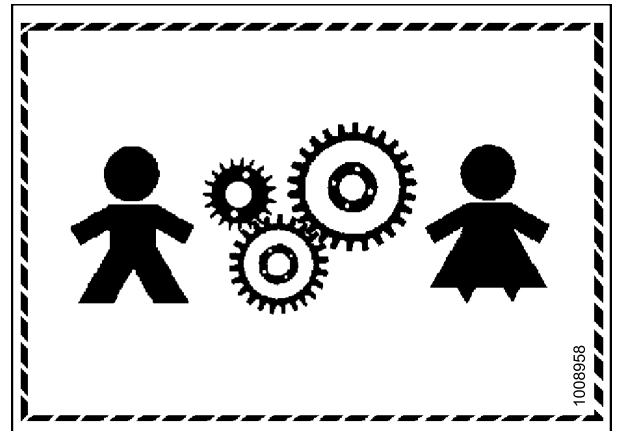


Figure 1.9: Equipment NOT Safe for Children

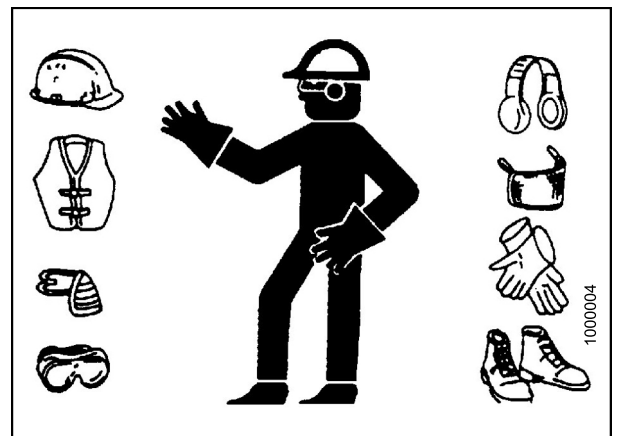


Figure 1.10: Safety Equipment

## 1.5 Hydraulic Safety

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

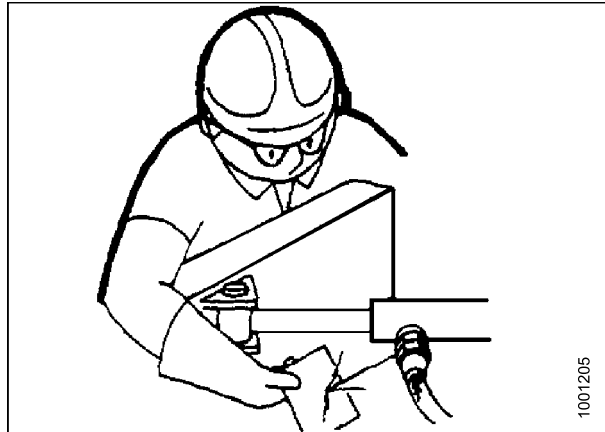


Figure 1.11: Testing for Hydraulic Leaks

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



Figure 1.12: Hydraulic Pressure Hazard

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

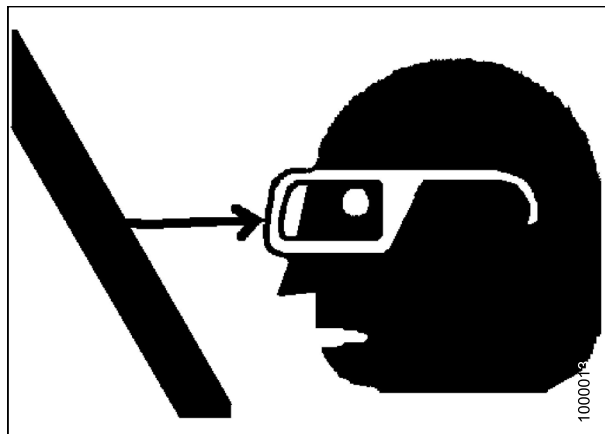
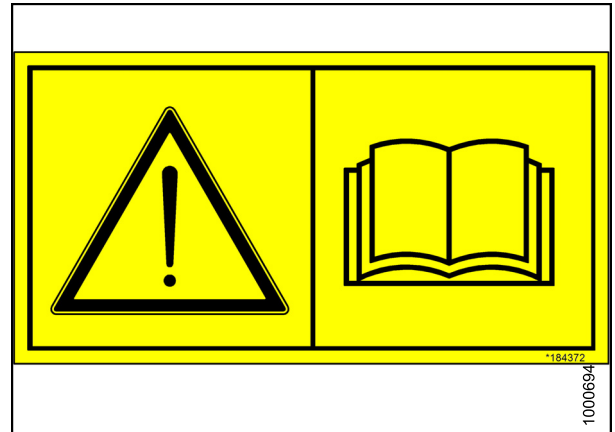


Figure 1.13: Safety around Equipment

## **1.6 Safety Signs**

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



**Figure 1.14: Operator's Manual Decal**

### **1.6.1 Installing Safety Decals**

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

## SAFETY

### 1.7 Safety Sign Decals

MD #166466

HIGH PRESSURE HYDRAULICS

#### DO NOT GO NEAR LEAKS

Located on deck

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

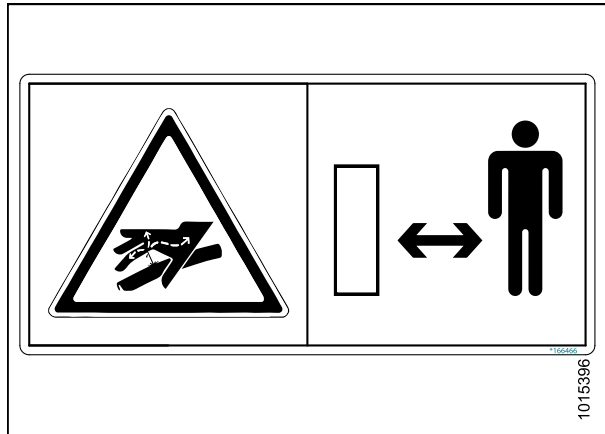


Figure 1.15: MD #166466

MD #174683

PINCH POINT - MOVING PARTS

#### STAND CLEAR

Located on linkage arm (both sides)



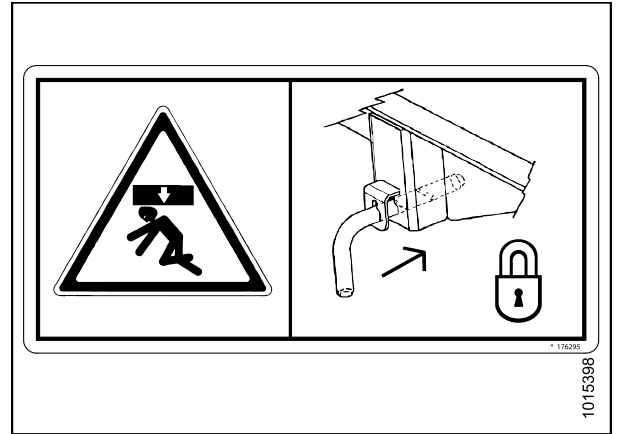
Figure 1.16: MD #174683

**SAFETY**

MD #176295

DECK LIFT LOCK

Located on deck linkage



**Figure 1.17: MD #176295**





## 2 Assembly/Setup Instructions

### NOTE:

The BNG 260 Double Windrow Attachment (DWA) will only fit windrower models listed in the [Introduction, page i](#).

### 2.1 Raising and Lowering the Right-Hand Stairs

The right-hand stairs need to be raised when installing or operating the Double Windrow Attachment (DWA) in either a lowered or raised position.

To raise and lock the stairs follow these steps:

1. Lift stairs (A) by hand until spring loaded latch (B) locks steps in the upright position. Rubber bumper (C) stops the stairs from going past the upright position.

### NOTE:

Stairs are held in the down position by the extension of the gas shock (D).

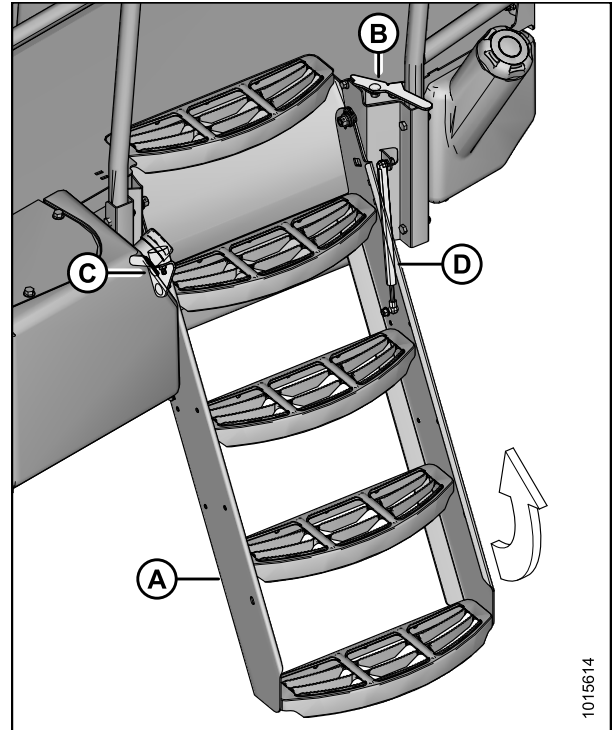


Figure 2.1: Right-Hand Stairs – Down Position

To lower stairs follow these steps:

2. Release stairs by pulling spring loaded latch handle (A) to the left. Lower by hand.
3. Push stairs down until gas shock extension holds stairs in the down position.

### NOTE:

DWA deck should not be used as a step or a platform.

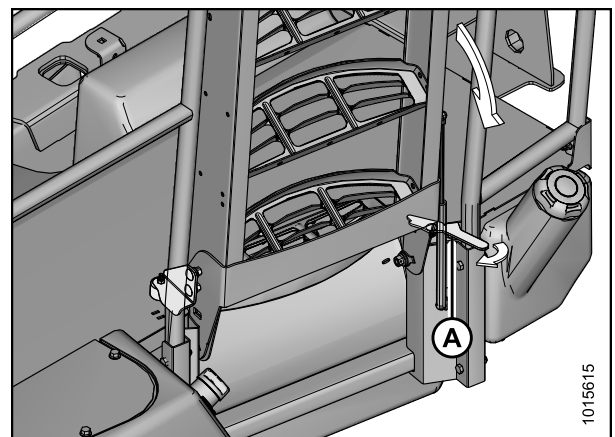


Figure 2.2: Right-Hand Stairs – Up Position

## 2.2 Installing the Linkage

To install the linkage on a M1240 windrower, follow these steps:

1. Remove four bolts (A), two washers (B) and two nuts (C) that are loosely installed on the DWA linkage. Keep hardware for mounting.

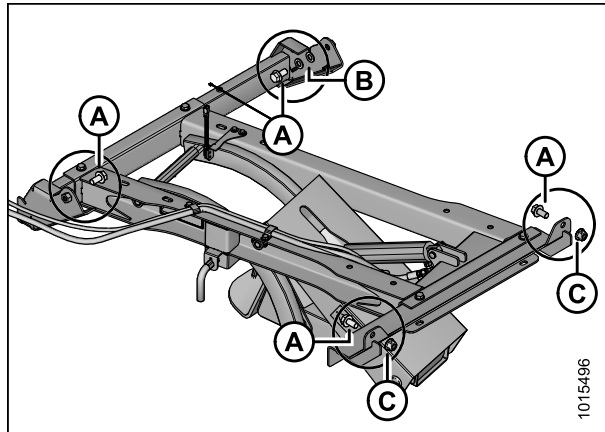


Figure 2.3: Linkage Support

2. Support linkage assembly (A) with a forklift (B) and lift into place under windrower.

**NOTE:**

Approach the windrower with the forklift from the right-hand cab forward side. With the stairs lifted this will be the easiest to access. Make sure the forks do not lift against the cylinder fitting.

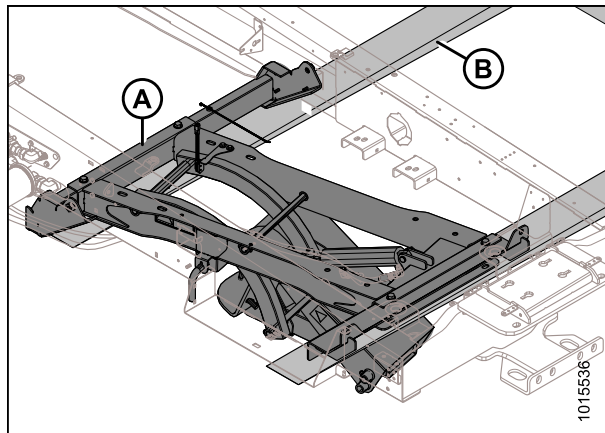


Figure 2.4: DWA Linkage

3. Line-up DWA linkage with windrower connection points.

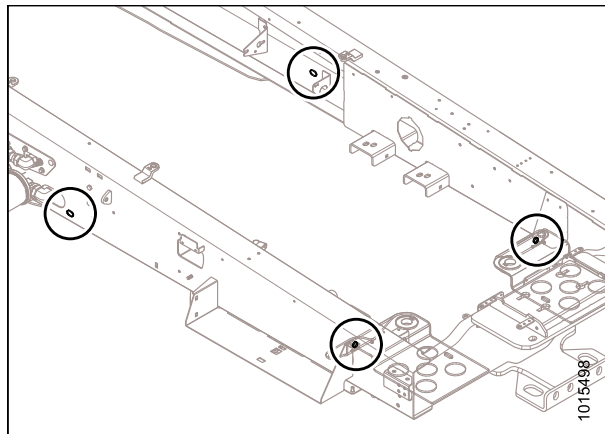


Figure 2.5: Windrower Connection Points

## ASSEMBLY/SETUP INSTRUCTIONS

4. Install hardware (removed in step 1) to attach linkage assembly to windrower frame. Torque to 340 ft·lbf (461 N m).

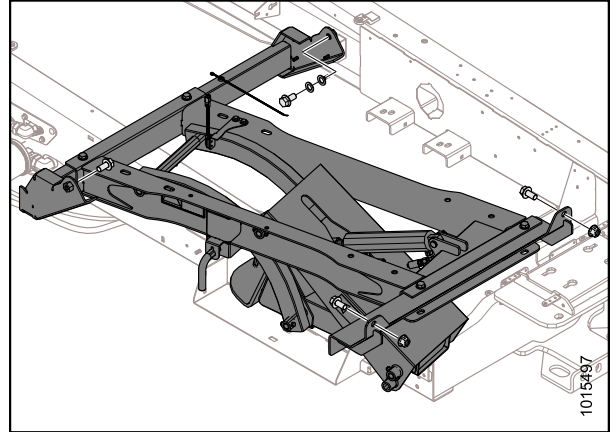


Figure 2.6: Linkage Support Under Windrower

**NOTE:**

Windrower not shown for clarity.

5. Lower linkage by pulling out safety pin (A) on the left-hand side of linkage. Allow frame to lower.
6. Replace safety pin (A).

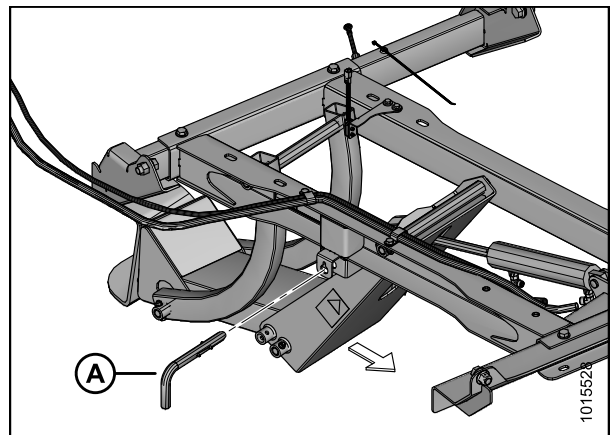


Figure 2.7: DWA Linkage

7. Secure the lift cylinder pivot (A) into the correct hole depending on header type:
  - For R-Series header: insert pin in the upper hole (B)
  - For A-Series: insert pin in the lower hole (C)

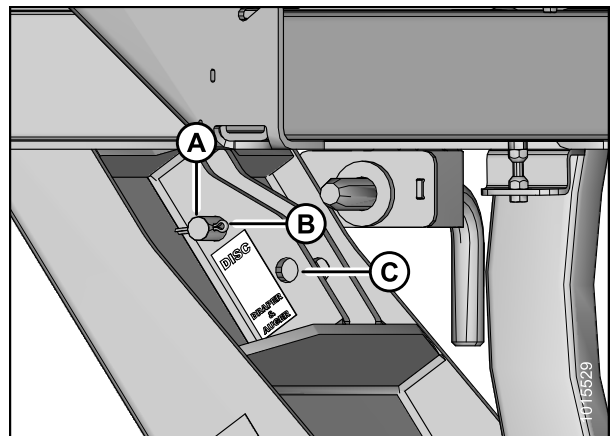


Figure 2.8: Lift Cylinder Pivot

## 2.3 Installing the Deck

To install the DWA deck, follow these steps:

1. Remove the shipping boards (A) by removing the transport banding (B) and discard.

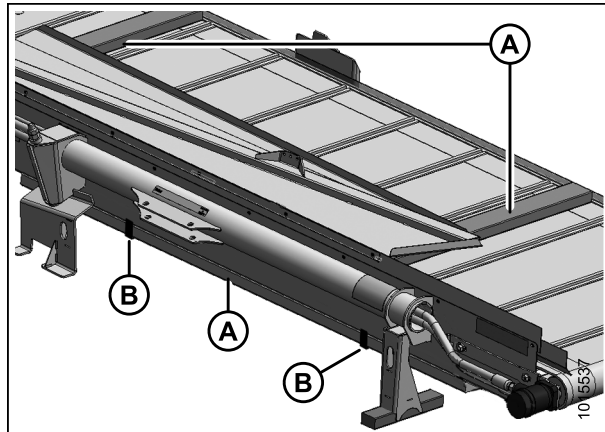


Figure 2.9: DWA Deck

2. Support the deck with a fork lift. Forks (C) should be inboard of shipping stand (A).
3. Remove the two shipping stands (A) from the front of the deck by removing nut (B).
4. Reinstall nut (B) with a washer. Washers are supplied in hydraulic kit.

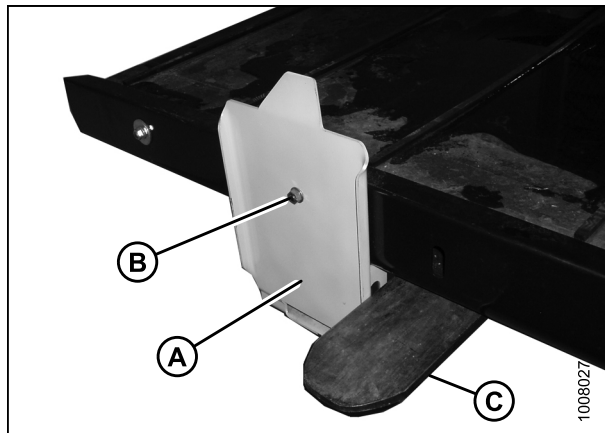


Figure 2.10: Deck Shipping Stand

5. Remove the shipping stand (A) from the rear of the deck by removing the two nuts (B) and washers (C).

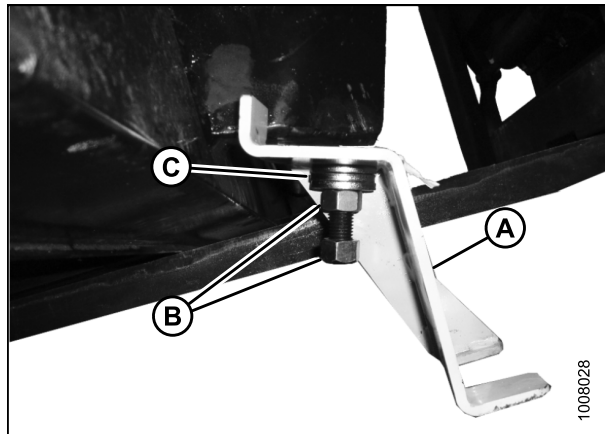
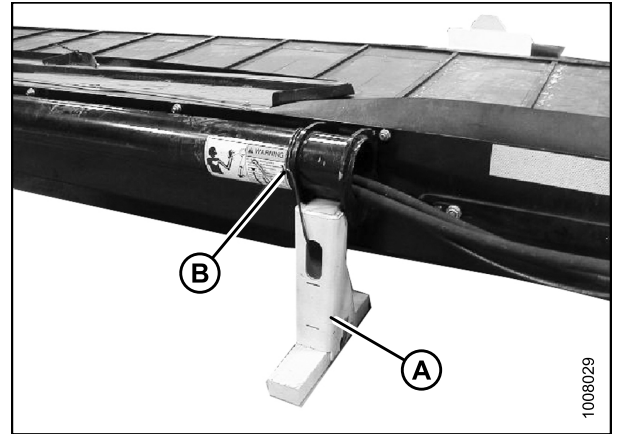


Figure 2.11: Deck Shipping Stand

## ASSEMBLY/SETUP INSTRUCTIONS

6. Remove the shipping stand (A) by removing the transport wire (B).



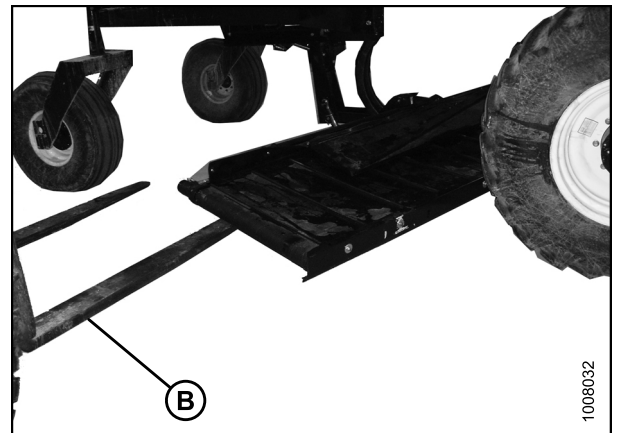
**Figure 2.12: Deck Shipping Stand**

The DWA deck is now ready to be assembled to the linkage underneath the windrower.

7. Position the DWA deck on the right-hand side of the windrower.
8. Support the deck with a floor jack (A) or a fork lift (B) at each end.



**Figure 2.13: DWA Deck Supported with Floor Jack**



**Figure 2.14: DWA Deck Supported with Fork Lift**

## ASSEMBLY/SETUP INSTRUCTIONS

9. Position the deck pivot (A) into the linkage clevis (B).

**NOTE:**

Make sure there is a loose bushing inside the deck pivot (A).

10. Align the deck pivot (A) with the holes in the clevis (B) by raising or lowering the floor jack, and insert shaft (C) with preinstalled hex nut (D) and lock nut (E) through the top.
11. Install a regular hex nut (D) to the bottom of the deck pivot shaft and torque the nut to 250 ft·lbf (339 N·m).
12. Install a lock nut (E), and tighten against nut (D).

**IMPORTANT:**

Apply proper torque to nuts.

13. Add grease to grease zerck (F).

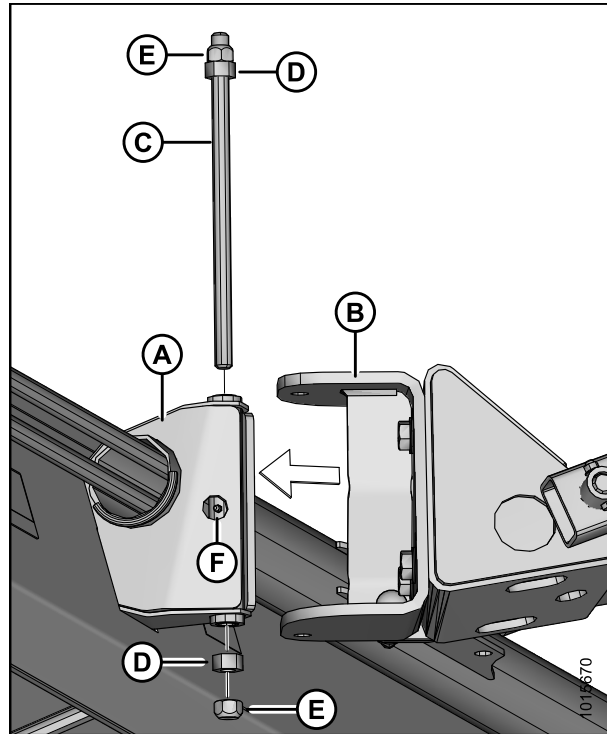


Figure 2.15: Deck Pivot and Linkage Clevis

14. Attach turnbuckle (A) from linkage to deck.
- If used with an R-Series Rotary Disc Header, use the inner pivot (B)
  - If used with an A-Series Auger, use the outer pivot (C)

**NOTE:**

The turnbuckle length should be approximately:

- 21 in. (530 mm) long for a R-Series Rotary Disc Header
- 25 in. (630 mm) long for a A-Series Auger Header

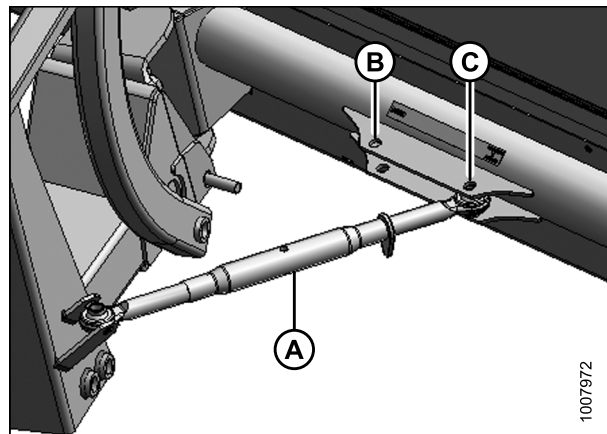


Figure 2.16: Adjustable Turnbuckle

## ASSEMBLY/SETUP INSTRUCTIONS

- Adjust the turnbuckle length so the space (A) between the deck and the right-hand drive tire is approximately 4 in. (100 mm).

**NOTE:**

The single-acting lift cylinder is pressurized with the draper drive circuit. Therefore, when the deck is set up for the rotary disc headers, the windrower needs to be running for the deck to be in its most forward position. This adjustment can be fine-tuned when the hydraulics setup is complete.

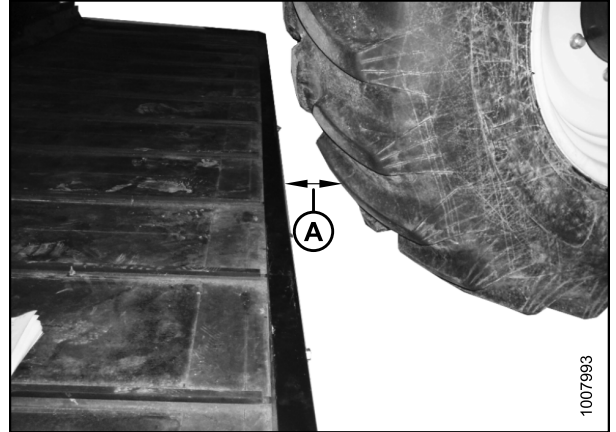


Figure 2.17: Deck and Right-Hand Drive Wheel

- Raise backsheet (A) on the deck and remove the top nut (B) and tapered nut (C).

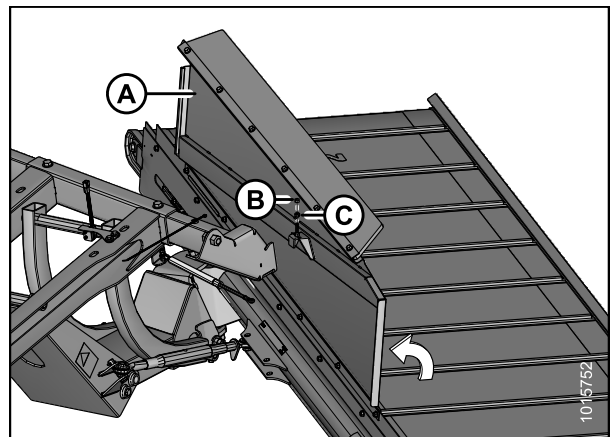


Figure 2.18: Backsheet

- Install the gas shock (D) onto the bolt on the backsheet. Install tapered nut (C) and torque the nut to 218–241 in·lbf (24–27 N·m). Install nut (B) and torque the nut to 218–241 in·lbf (24–27 N·m).

**IMPORTANT:**

Make sure the taper of nut (C) is facing the gas shock rod end as shown.

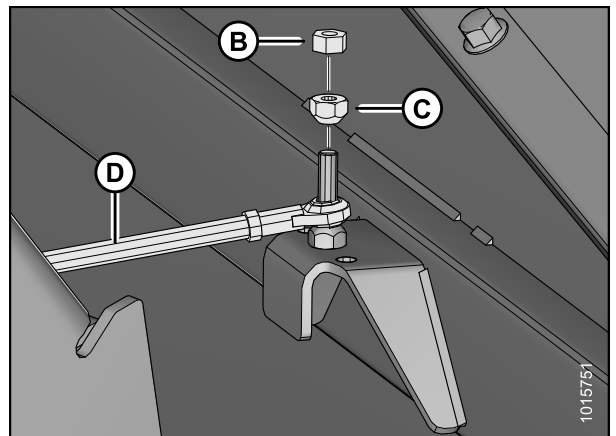


Figure 2.19: Gas Shock

## 2.4 Installing the Hydraulics to M1240 Windrower

To install the DWA hydraulics, follow these steps:

Install the DWA linkage hydraulics to windrower.

1. Route hoses (A) underneath both filters as shown.
2. Connect linkage quick couplers (B) to quick couplers on windrower frame (C).

**NOTE:**

Linkage and windrower have quick couplers preinstalled for easy connection.

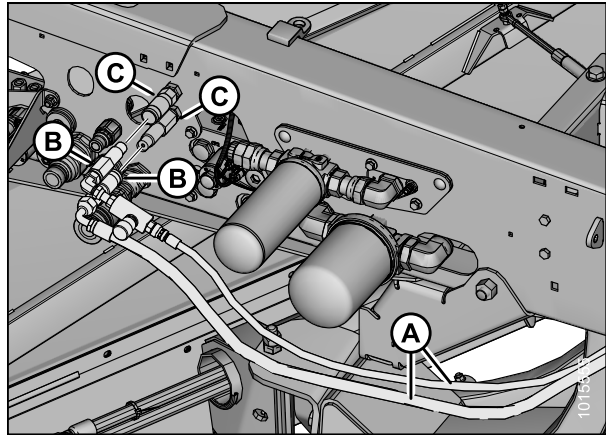


Figure 2.20: DWA linkage hydraulics

Install the DWA deck hydraulics to windrower.

3. Install 45° fittings (A) and torque to 90 ft·lbf (125 N·m).

**NOTE:**

Fittings need to be oriented at 60 degrees to the frame as shown.

4. Install hoses (B) to 45° fittings ensuring that hose with ziptie (C) is installed on the top fitting. Torque to 63 ft·lbf (85 N·m).

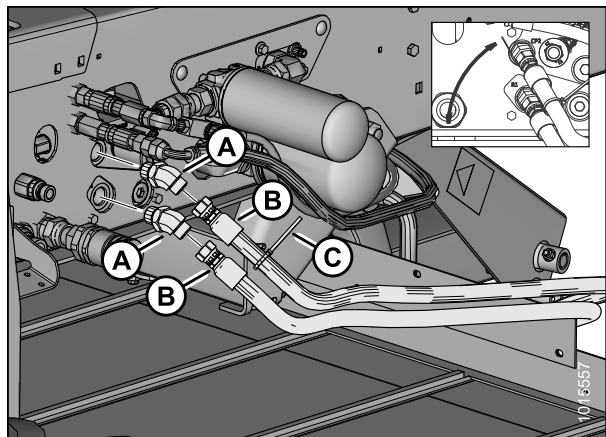


Figure 2.21: DWA deck hydraulics to M1240



## 2.5 Connecting the Proximity Sensor

To connect the proximity sensor for the Double Windrow Attachment (DWA), follow these steps:

**NOTE:**

The proximity sensor comes preinstalled on the DWA linkage.

1. Remove ziptie binding DWA extension (A) to chassis harness (B) from windrower.
2. Connect DWA extension (A) to DWA proximity sensor (C) and secure to linkage with fir tree ziptie (D).

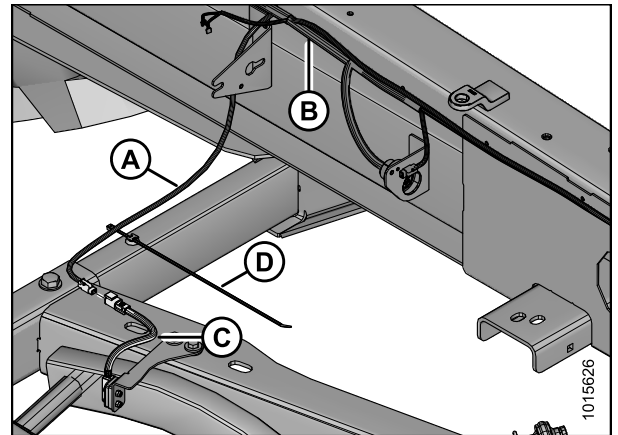


Figure 2.22: DWA extension to DWA proximity sensor

## 2.6 Activating the Double Windrow Attachment (DWA)

**NOTE:**

DWA is associated with the header ID setup. For more information on header setup see your header or windrower manual.

To activate the DWA, follow these steps:

1. During header setup, scroll down and select attachments (A).

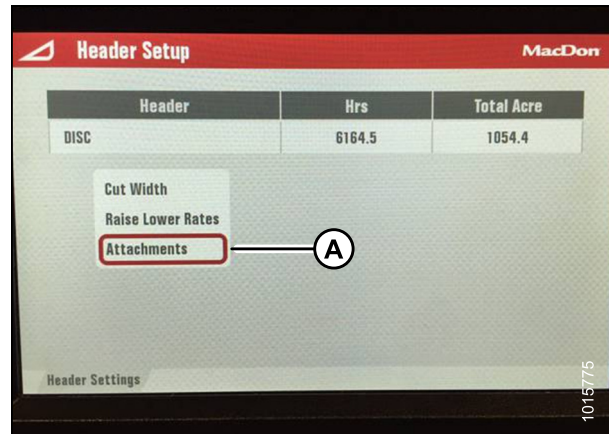


Figure 2.23: Header Setup – Attachments

2. Select DWA and the display will show an image of the buttons to be used to control the DWA with each particular header. DWA is now activated.

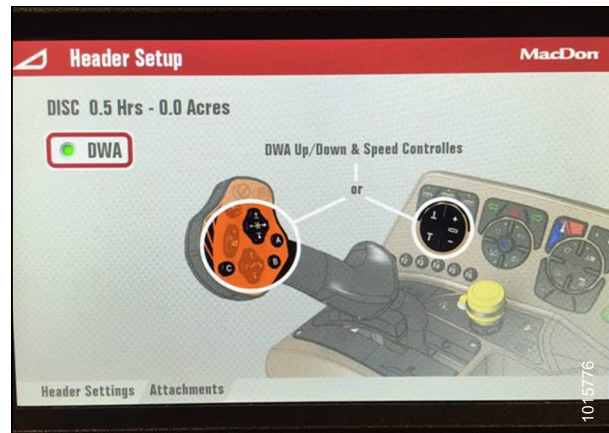


Figure 2.24: Selecting DWA

### 2.6.1 Setting Headland Management Buttons (A, B, C)

Headland Management buttons (“A”, “B”, and “C” on the ground speed lever [GSL] handle) allows you to choose and apply three presets.

Open the main menu, follow these steps:

1. Press softkey 5 (A) to open the main menu.
2. Use the harvest performance tracker (HPT) scroll knob (B) or the ground speed lever (GSL) scroll wheel (not shown) to place the red cursor over the Settings icon (C).
3. Press the HPT scroll knob (B) or the GSL select button (not shown) to select the highlighted icon.

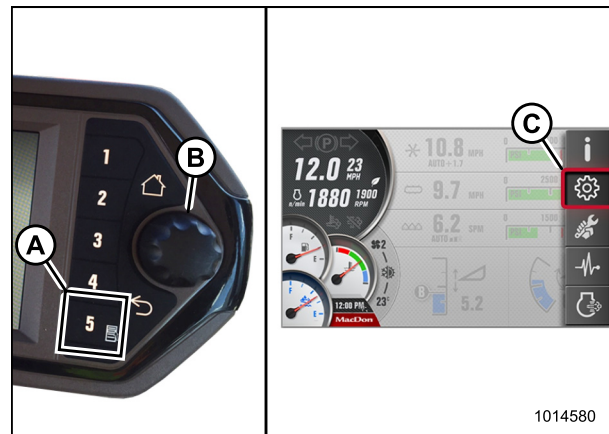


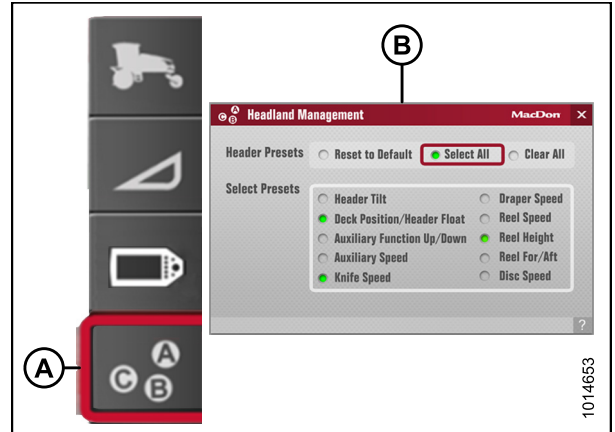
Figure 2.25: Opening the Main Menu

## ASSEMBLY/SETUP INSTRUCTIONS

4. Scroll to the headland management icon (A), press the HPT scroll knob (B) or the GSL select button (not shown) to open the headland management menu list (B).

**NOTE:**

The F2 shortcut button on the operator's console also will open the headland management menu list (B).



**Figure 2.26: Headland Management Icon and Headland Management Menu List**

To program the Headland Management buttons, press and hold button “A”, “B”, or “C” on the GSL handle for 3 seconds until an audible tone is heard, indicating the current header settings are saved to that button.

The Headland Management buttons will always save header height settings, but you can also save the following settings for the DWA:

- DWA up/down
- DWA speed

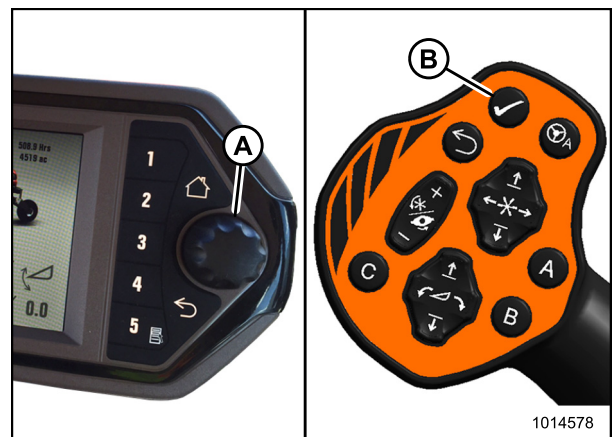
Refer to your windrower manual for more detailed Headland Management information.



**Figure 2.27: Headland Management Buttons on the GSL**

### 2.6.2 Setting Draper Pressure Alarm

1. Press the scroll knob (A) on the Harvest Performance Tracker (HPT) or the select button (B) on the ground speed lever (GSL) while in any run screen to open the QuickMenu system.



**Figure 2.28: HPT Scroll Knob and GSL Select Button**

## ASSEMBLY/SETUP INSTRUCTIONS

2. Scroll to place the red cursor over the DWA draper pressure icon (A).
3. Adjust alarm setpoint (B) to desired value by scrolling until the pressure reaches the desired alarm point. Alarm can also be turned off completely by scrolling to the right-hand end of the pressure graph. The display replaces the digital value with three dashed lines, indicating that it's possible to adjust the alarm setpoint value.

Refer to your windrower manual for more detailed alarm setting information.



**Figure 2.29: QuickMenu / Draper Pressure Alarm**

## 3 Operation

### 3.1 Operational Safety

#### CAUTION

To avoid bodily injury:

- Review the safety sections of your windrower and header operator's manuals.
- Keep all shields in place.
- Engage the deck safety pin when deck is raised fully for transport, service, and storage—or before going under deck for any reason.
- Keep away from moving draper and rollers.
- Keep clear of the deck while it is being raised or lowered.

## 3.2 Engaging the Deck Safety Pin

Engage the deck safety pin as follows:

1. Raise the Double Windrow Attachment (DWA) deck.
2. Push pin (A) inward until both roll pins (B) are inside the channel. Rotate the pin (A) 90 degrees.

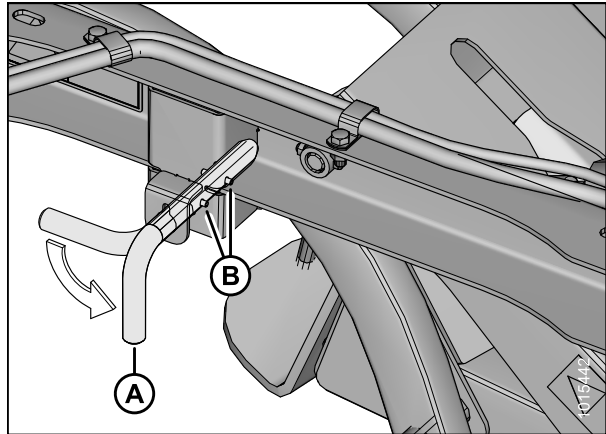


Figure 3.1: DWA Deck Safety Pin

### 3.3 Raising and Lowering the Deck

**NOTE:**

Use extra caution when raising the deck for the first time. The deck rotates as it rises and lowers, and the backsheet folds onto the deck. Make sure the deck and backsheet are not interfering with windrower parts or the forming shield. If interference does occur the proximity sensor will need to be adjusted. Refer to Section [3.3.2 Adjusting the Proximity Sensor](#), page 27.

DWA raise and lower can be controlled in three ways:

1. Raise and lower the DWA deck by using the reel raise button (A) and the reel lower button (B) respectively on the ground speed lever (GSL). The operator can interrupt the raising and lowering of the deck by letting go of the buttons.

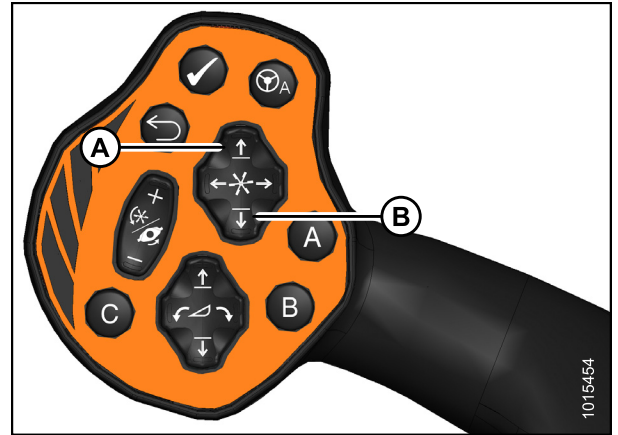


Figure 3.2: GSL

2. Raise the DWA deck by pressing button (A) or lower the deck by pressing button (B) on the operator's console. The operator can interrupt the raising and lowering of the deck by letting go of the buttons. The operator can interrupt the raising and lowering of the deck by letting go of the buttons.

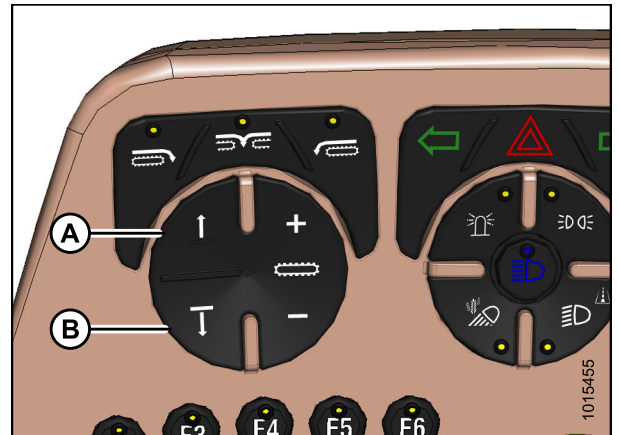


Figure 3.3: Operator's Console

## OPERATION

3. Raise and lower can be controlled with the GSL buttons A, B, and C. Unlike the control through GSL or console, up and down will be express, meaning completely up or down. Refer to Section [2.6.1 Setting Headland Management Buttons \(A, B, C\)](#), page 20.



Figure 3.4: GSL – Headland Management

The DWA's deck height is displayed on the Harvest Performance Tracker (HPT) as shown. The DWA is normally either up or down, so only one of these will show on screen at any given time. It is possible to stop raising or lowering the deck by letting go of the buttons. In this case, the DWA defines up or down as disengaged or engaged respectively.



Figure 3.5: Harvest Performance Tracker (HPT)

### 3.3.1 Adjusting the Deck Lift Speed

Finding the proper Double Windrow Attachment (DWA) deck lift speed is essential to its proper operation. The deck must lift fast enough to clear a windrow, and slow enough not to stop abruptly against the bottom of the windrower.

The deck lift valve uses an hex socket screw (A) to lock the adjusting knob into position. Loosen locking screw enough to allow the adjustment valve knob (B) to turn. Do **NOT** remove screw. Tighten screw after adjustments.

Refer to the following to adjust the deck lift speed:

- If the deck lift speed is too fast, turn the adjuster valve knob (B) to the right.
- If the deck lift speed is too slow, turn the adjuster valve knob (B) to the left.

#### NOTE:

The lift valve only restricts the lift speed of the DWA. The DWA deck drop speed remains constant.

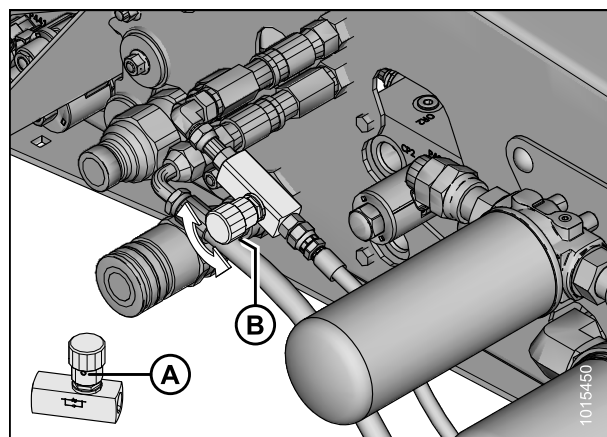


Figure 3.6: Deck Lift Speed Valve



### 3.3.2 Adjusting the Proximity Sensor

To adjust the proximity sensor, follow these steps:

The draper shuts off automatically when the deck is raised about 2/3 of the way. If the deck does not shut off soon enough (resulting in backsheet touching draper before it shuts off), the proximity sensor (A) at the linkage needs to be lowered:

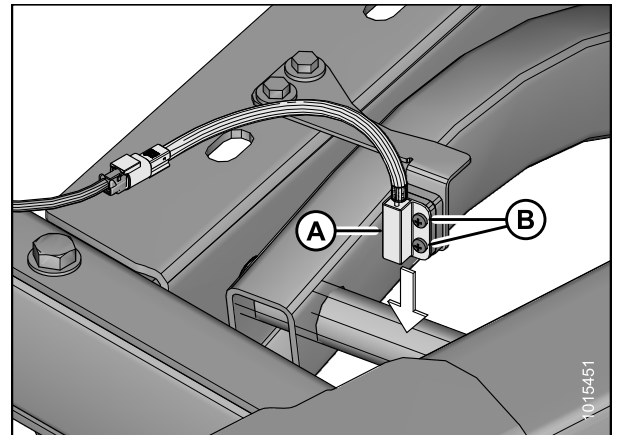
**NOTE:**

Carefully adjust the proximity sensor when running up the DWA for the first time.

1. Loosen screws (B) to lower the switch.
2. Tighten screws (B) when the adjustment is complete.

**NOTE:**

Do not over tighten the screws or the sensor will not work.



**Figure 3.7: Proximity Sensor**

### 3.4 Setting Draper Speed

DWA draper speed can be controlled in three ways:

1. Adjust draper speed by using the reel fore/aft buttons on the GSL. Press the reel fore button (A) to increase speed and the reel aft button (B) to decrease speed.

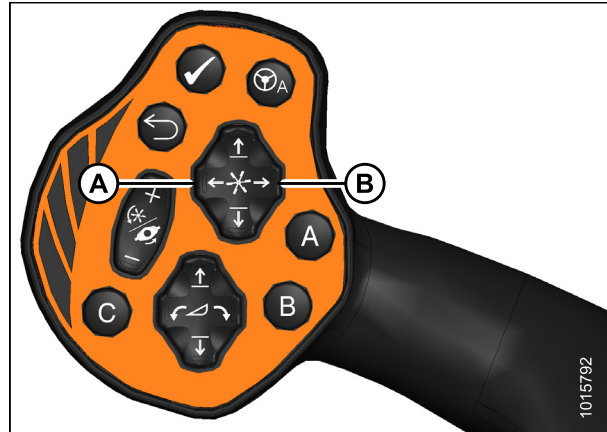


Figure 3.8: GSL

2. Adjust draper speed from the operator's console by pressing button (A) to increase the speed or pressing button (B) to decrease the speed.

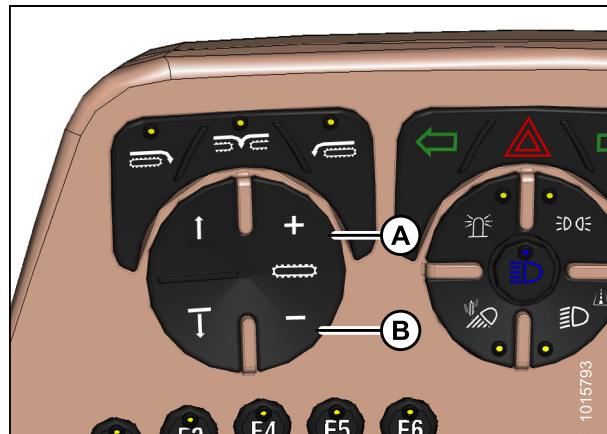


Figure 3.9: Operator's Console

3. Speed can be controlled with the GSL buttons A, B, and C. Refer to Section [2.6.1 Setting Headland Management Buttons \(A, B, C\)](#), page 20.



Figure 3.10: GSL – Headland Management

## OPERATION

The DWA's draper speed is displayed on the Harvest Performance Tracker (HPT) as shown.



Figure 3.11: Harvest Performance Tracker (HPT)

## 3.5 Adjusting Deck Angle

The Double Windrow Attachment (DWA) deck angle can be adjusted to maximize performance and prevent contact with the windrower.

To adjust the deck angle relative to the right drive tire, refer to [3.5.1 Adjusting Deck Angle Relative to the Drive Tire](#), [page 30](#).

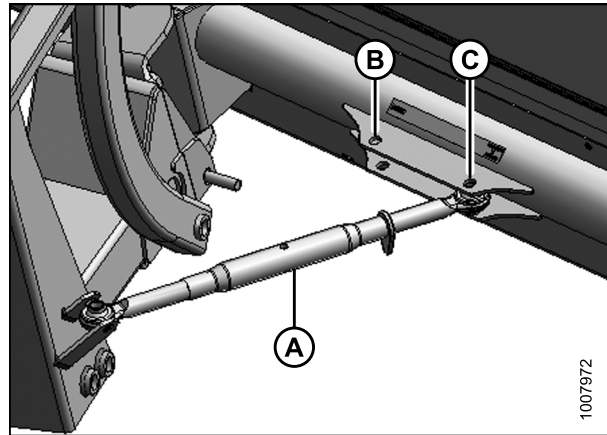
To adjust the deck angle relative to the ground, refer to [3.5.2 Adjusting Deck Angle Relative to the Ground](#), [page 31](#).

### NOTE:

If set up with an R-Series Rotary Disc Header, the DWA deck will only be in its most forward position when the windrower is running. The lift cylinder is single acting and not pressurized when the windrower is shut off. When the windrower is running, a supply of low pressure oil moves the deck forward.

### 3.5.1 Adjusting Deck Angle Relative to the Drive Tire

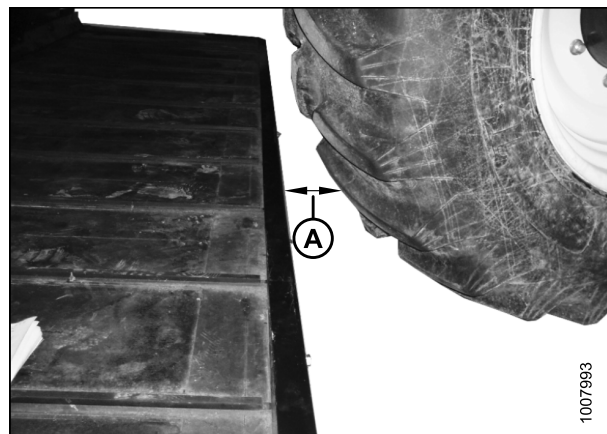
The deck angle, relative to the right-hand drive tire, is adjustable with turnbuckle (A).



**Figure 3.12: Deck Angle Turnbuckle**

A - Turnbuckle                      B - Use for R-Series Header  
C - Use for A-Series or D-Series Header

1. Adjust the turnbuckle length so the space (A) between the deck and the right-hand drive tire is approximately 4 in. (100 mm).



**Figure 3.13: Distance from Deck to Tire**

## OPERATION

To adjust the deck angle relative to the right-hand drive tire, follow these steps:

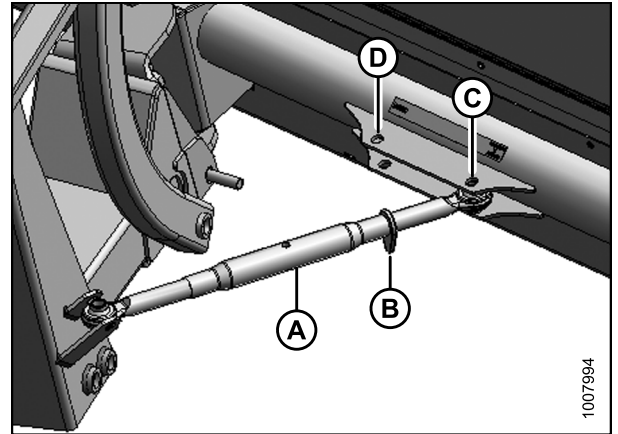
2. Loosen the locking tab (B) on the adjustable turnbuckle.
3. Rotate the center tube (A) to the desired length.

**NOTE:**

The turnbuckle length should be approximately:

- 21 in. (530 mm) long for an R-Series Rotary Disc Header
- 25 in. (630 mm) long for an A-Series Auger Header

4. Retighten the locking tab against the center tube.



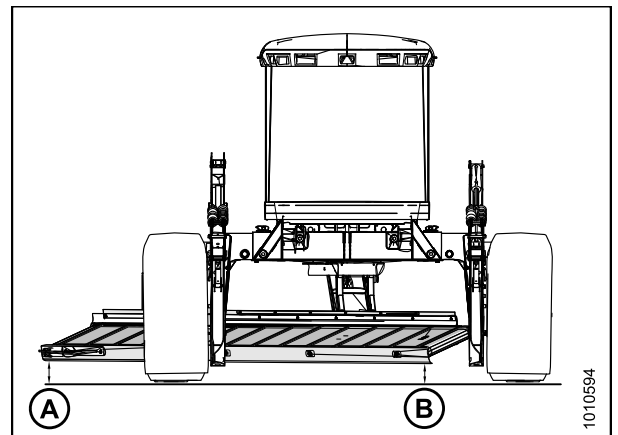
**Figure 3.14: Adjust Turnbuckle**

A - Center Tube  
B - Locking Tab  
C - Connection Point for A-Series Header  
D - Connection Point for R-Series Disc Header

### 3.5.2 Adjusting Deck Angle Relative to the Ground

The deck angle should be horizontal or at a slight incline relative to the ground. Distance (A) should be equal to or greater than (B).

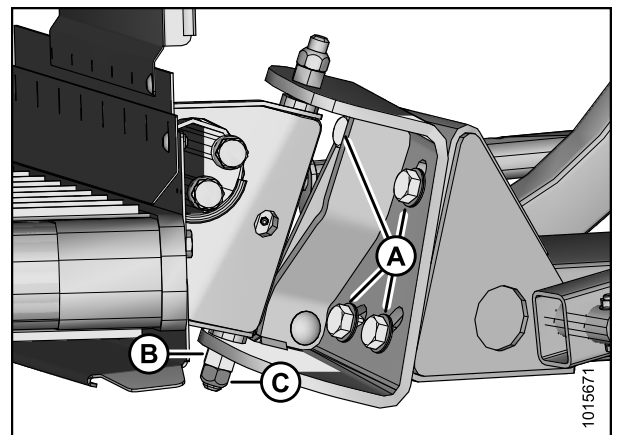
- If used with an R-Series Rotary Disc Header in lighter crop, distance (A) should be equal to (B)
- If the crop needs to be thrown farther, increase distance (A)



**Figure 3.15: DWA Deck**

To adjust deck angle:

1. Loosen the four 3/4 in. bolts (A).
2. Loosen the locking nut (C).
3. To increase distance between the ground and the deck tighten nut (B).
4. To decrease distance between the ground and the deck loosen nut (B).
5. After adjustment, tighten nut (C).
6. Torque the four 3/4 in. bolts (A) to 245 ft·lbf (332 N·m).



**Figure 3.16: Deck Pivot**

### 3.6 Adjusting Deck Height

The deck should never touch the ground or excessive wear could occur to some deck components.

If the deck is too low to the ground, raise it as follows:

1. Lower linkage by fully extending cylinder.
2. Move bottom pivot pin to lower position (A).

This will raise the front of the deck approximately 4 in. (100 mm).

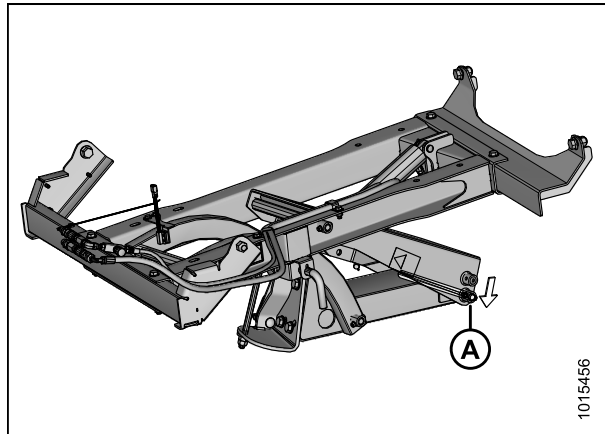
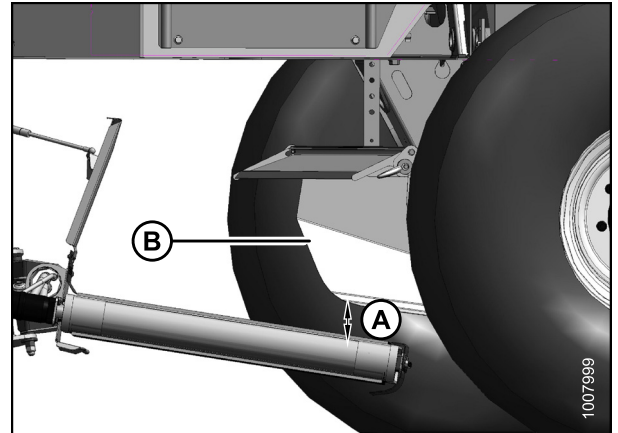


Figure 3.17: DWA Linkage

### 3.7 Positioning the Conditioner Forming Shield

To adjust the position of the conditioner forming shields, follow these steps:

Make sure the forming shield (B) is high enough to clear the deck when it is lowered (A).



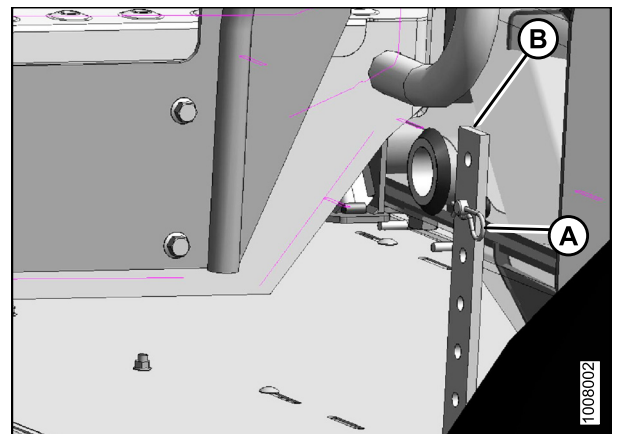
**Figure 3.18: Deck Lowered**

A - Distance between Forming Shield (B) and the Deck

1. Remove the hairpin (A).
2. Adjust strap (B) to achieve the ideal position.

**NOTE:**

The forming shield should be as low as possible without interfering with deck.



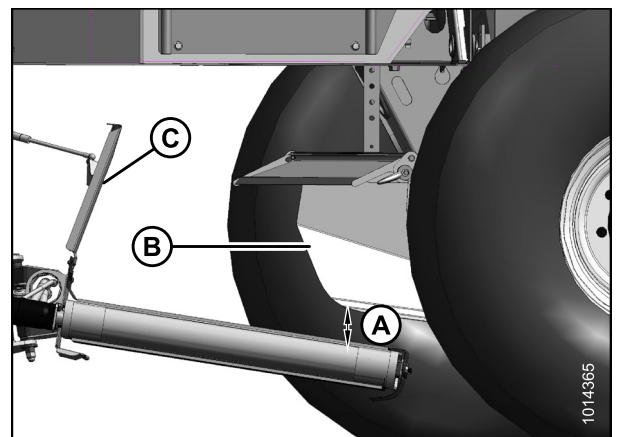
**Figure 3.19: Forming Shield**

3. Adjust the left-hand side deflector (B) to direct crop towards the inboard side of the DWA back sheet (C).

**NOTE:**

If center delivering, the left-hand deflector (B) can be moved inward to form a narrower windrow.

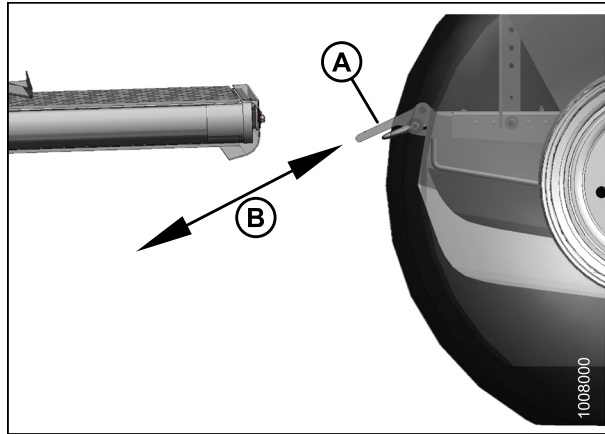
4. Adjust the right-hand side deflector to the widest position without affecting crop flow. This is where the deck is farthest from the conditioner rolls.



**Figure 3.20: Deck Lowered**

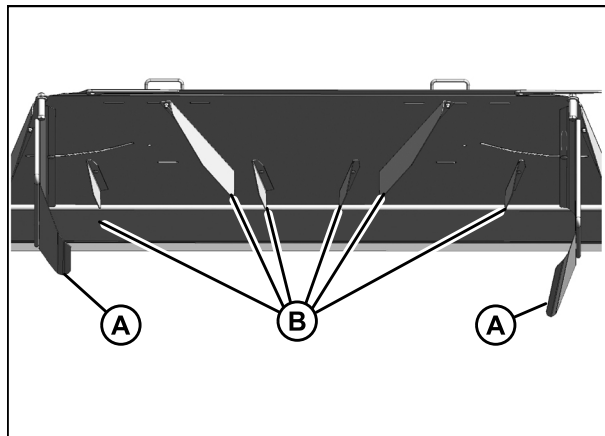
## OPERATION

5. Adjust the rear deflector baffle (A) so crop flow (B) does not interfere with the deck when fully raised.



**Figure 3.21: Deck Raised**

The fins (B) under the forming shield can interfere with crop flow, especially with an R-Series Header in light crop. If necessary remove fins (B).



**Figure 3.22: Fins Under Forming Shield**

A - Side Deflector

B - Fins Under Forming Shield



### 3.8 Positioning the Conditioner Rolls

The gap between the conditioner rolls needs to be small enough to properly throw the crop onto the double windrow attachment.

The gap size depends on the crop type and yield.

- A gap that is too small for a heavy crop will use excessive engine power and be hard on affected components.
- A gap that is too large will not throw the crop with enough velocity to reach the side delivery deck.

Refer to the conditioner roll adjustment procedure in your A-Series, R-Series, or HC10 operator's manual.

## 3.9 Operating Recommendations

### 3.9.1 Operating with 15-, 16-, 18-, 20-Foot Headers

Refer to the following operating recommendations when using the Double Windrow Attachment (DWA) with 15–20 ft. headers:

- On the first pass, raise the side delivery system and deposit the crop between the wheels of the windrower.
- On the return pass, lower the side delivery system and deposit the crop beside the previously laid windrow.
- With a center-delivered crop, the position of the crop can be adjusted by using the side deflectors on the forming shields.
- With a side-delivered crop, the position of the crop can be adjusted by adjusting the draper speed (faster draper speeds will throw the crop farther).

### 3.9.2 Operating with 25- and 30-Foot Headers

Refer to the following operating recommendations when using the Double Windrow Attachment (DWA) with 25–30 ft. headers:

- When using 25 and 30 ft. headers on light crop, the side delivery system can be used to lay windrows side by side.

**NOTE:**

Adjust the position of a side delivered crop by varying the draper speed.

- When using 25 and 30 ft. headers on heavy crop, double windrowing may not be desired. Raise the DWA deck to lay single windrows between the windrower's wheels.

### 3.9.3 Operating with an R-Series Rotary Disc Header

Because the conditioner rolls on an R-Series Header are farther ahead than all other headers, delivering light crop from the conditioner rolls to the side delivery deck on the Double Windrow Attachment (DWA) may require special attention.

The following three areas can affect crop flow to the deck:

#### Crop flow from the cutterbar to the rolls

- Header cut width must be kept as full as possible on the right-hand side. Any less than 75% may have adverse effects on feeding.
- Feed plates must be installed for appropriate crop. They are required for forage but not for alfalfa (refer to the header operator's manual).
- Higher ground speeds will usually result in better crop flow from the conditioner rolls to the deck. Ground speed should be a minimum of 6 mph (10 km/h) for light crops.
- Disc speed must be within the recommended range for the specific crop/yield (refer to the header operator's manual).

#### Crop flow from the conditioner rolls to the forming shield

- The rear baffle on the R-Series Header should be in the uppermost position. However, it may need to be lowered for center windrowing.
- Remove the fins on the rear baffle to prevent interference with the crop flow.
- The crop trajectory arc is higher with a steeper header angle. Header angle should be set such that the crop is projected at a maximum arc height without excessive contact with the top forming shield.
- It may be possible to shoot crop above the forming shield with extreme header angle and rear baffle positions.
- In rocky conditions where a DWA is necessary, a high skid shoe kit or adjustment to gauge rollers may be required to achieve correct stubble height while maintaining proper crop trajectory.
- Header height affects the header angle. Ideally the lift linkage should be fully down at all times.
- The roll gap should be small enough to properly grab the crop and throw it.
- The roll speed is mechanically tied to the disc speed and can affect how fast the crop is projected. Roll speed should be in the recommended range.

#### Forming shield settings

- Make sure forming shield (B) is installed correctly with bracket (A).
- Buildup of sticky crop residue on deflector sliding surfaces should be periodically removed.
- Refer to [3.7 Positioning the Conditioner Forming Shield](#), page 33.

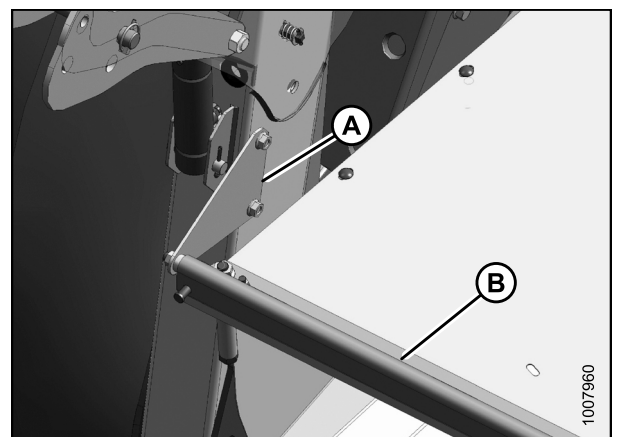


Figure 3.23: Forming Shield



## 4 Maintenance and Servicing

### 4.1 Draper Maintenance

#### 4.1.1 Adjusting Draper Tension

Adjust the draper tension enough to prevent slipping and eliminate sagging.

Set draper tension as follows:

1. Check that draper guide (rubber track on underside of draper) is properly engaged in groove of drive roller, and that idler roller is between the guides.
2. Turn bolt (A) clockwise (tighten).

**NOTE:**

The white indicator bar (B) will move to the right, indicating the draper is tightening. Tighten until the white indicator sits halfway within the window.

**IMPORTANT:**

To avoid premature failure of the draper, draper rollers, and/or tightener components, do not operate when the white tension indicator bar is not visible.

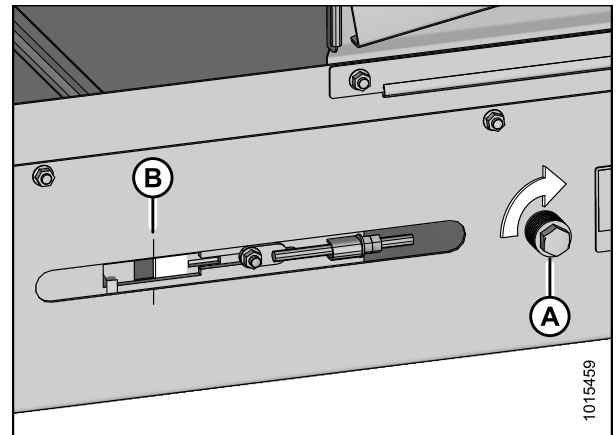


Figure 4.1: Draper Tension

#### 4.1.2 Checking the Draper Tracking

Draper tracking needs to be checked when the draper is first run up otherwise damage to the draper can occur. Refer to [4.1.3 Adjusting Draper Tracking, page 39](#) to adjust the tracking.

#### 4.1.3 Adjusting Draper Tracking

The draper deck has one fixed drive roller and one spring-loaded idler roller. The spring loaded idler roller is located at the same end of the deck as the draper tensioner. Both rollers can be aligned with adjuster rods to adjust draper tracking.

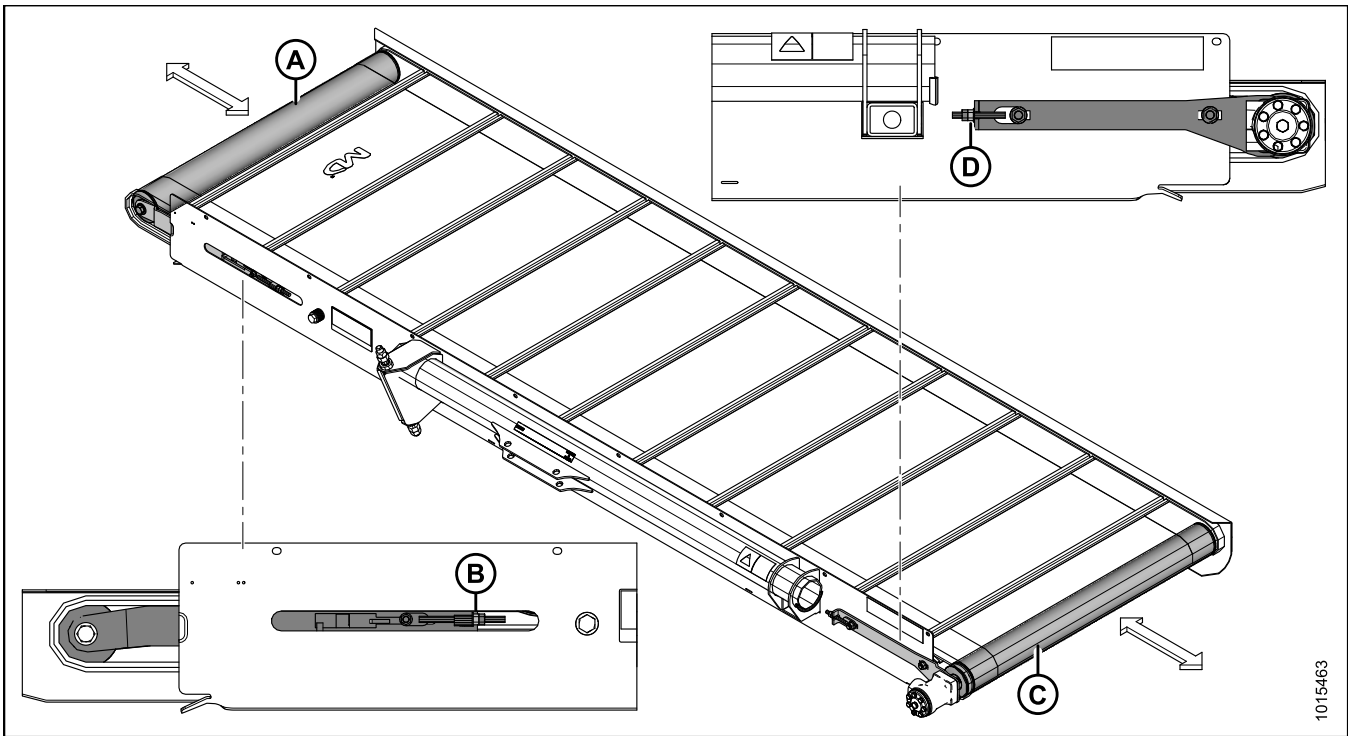
**⚠ DANGER**

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

If the draper is tracking incorrectly, use the following table to adjust the rollers:

## MAINTENANCE AND SERVICING

**Table 4.1 Draper Tracking Adjustments**

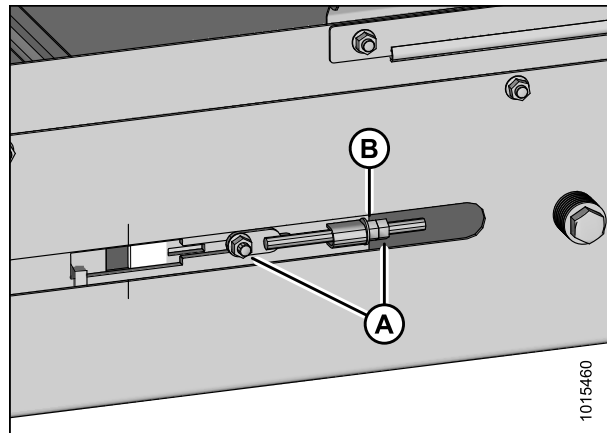


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Tracking	At Location	Adjustment	Method
Rearward	Idler roller	Move roller (A) outward	Tighten nut (B)
Forward		Move roller (A) inward	Loosen nut (B)
Rearward	Drive roller	Move roller (C) outward	Tighten nut (D)
Forward		Move roller (C) inward	Loosen nut (D)

To adjust tracking on the idler roller side:

1. Loosen the two nuts (A).
2. Adjust nut (B) according to [Table 4.1 Draper Tracking Adjustments, page 40](#).
3. Secure the idler roller by tightening the two nuts (A).
4. After adjusting draper tracking, readjust the draper tension. Refer to [4.1.1 Adjusting Draper Tension, page 39](#).



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**Figure 4.2: Idler Roller**

## MAINTENANCE AND SERVICING

To adjust tracking on the drive roller side:

1. Loosen the three locking nuts (A).
2. Adjust nut (D) according to Table [4.1 Draper Tracking Adjustments, page 40](#).
3. Tighten the three nuts (A) to secure the drive roller.
4. After adjusting draper tracking, adjust the draper tension. Refer to [4.1.1 Adjusting Draper Tension, page 39](#).

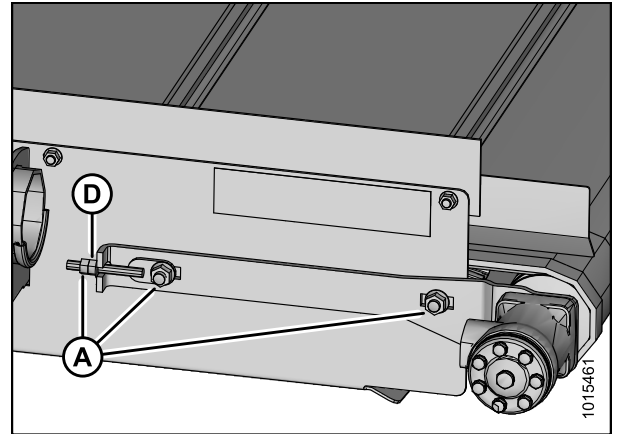


Figure 4.3: Drive Roller

### 4.1.4 Replacing Draper

#### DANGER

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

1. Raise the deck up enough to increase the space between the deck and the right-hand drive tire.
2. Remove the front skid (A) by removing five nuts (B).
3. Loosen the draper tension, and push the idler roller inward as far as possible.

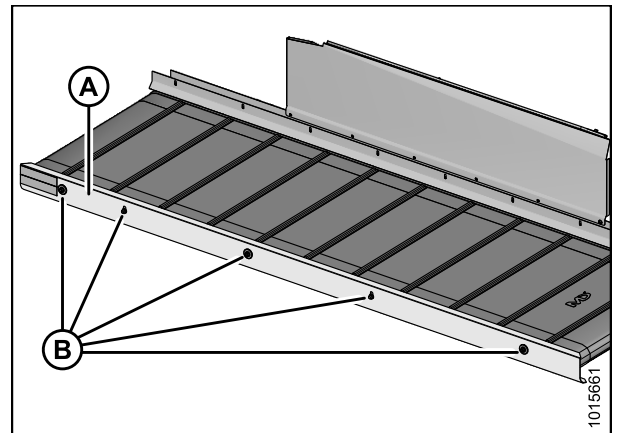


Figure 4.4: Front Skid

4. Disconnect turnbuckle (A) and allow the deck to rotate rearward to increase the space between the deck and tire.
5. Pull off the old draper and slide on the new one. The draper is bidirectional so orientation does not matter.
6. Tension the draper. Refer to [4.1.1 Adjusting Draper Tension, page 39](#).
7. Reinstall turnbuckle (A) and the front skid.
8. Adjust the front skid to achieve a 1/16–1/8 in. (1.5–3.0 mm) gap to draper.
9. Run the new draper and check alignment. Adjust alignment if necessary.
10. Recheck draper tension after it has run for a few hours.

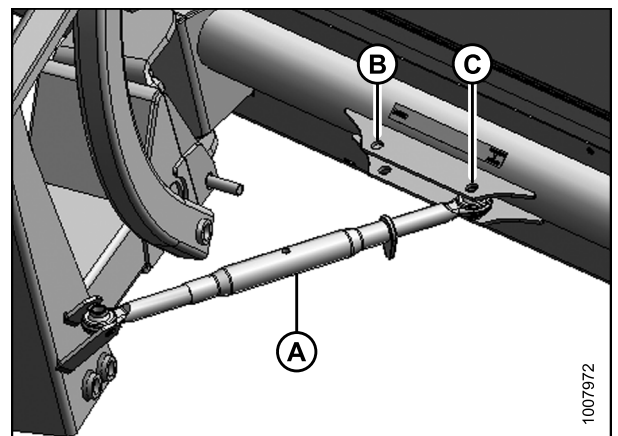


Figure 4.5: Deck Angle Turnbuckle

### 4.1.5 Adjusting Front Skid

To adjust the front skid (A) follow these steps:

1. Loosen five nuts (B) on the front of the skid.

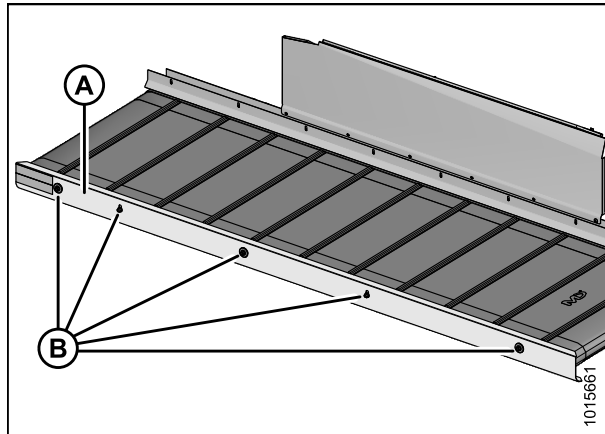


Figure 4.6: Draper Deck Front Skid

2. Adjust the front skid (A) so skid height (C) is 1/16–1/8 in. (1.5–3 mm) above the draper.

**NOTE:**

Improper skid height can result in draper wear or excessive crop build up.

- Constant contact between the skid and draper will cause excessive heat and melt the draper.
- If gap is too large, crop can enter the draper.

3. Tighten nuts (B).

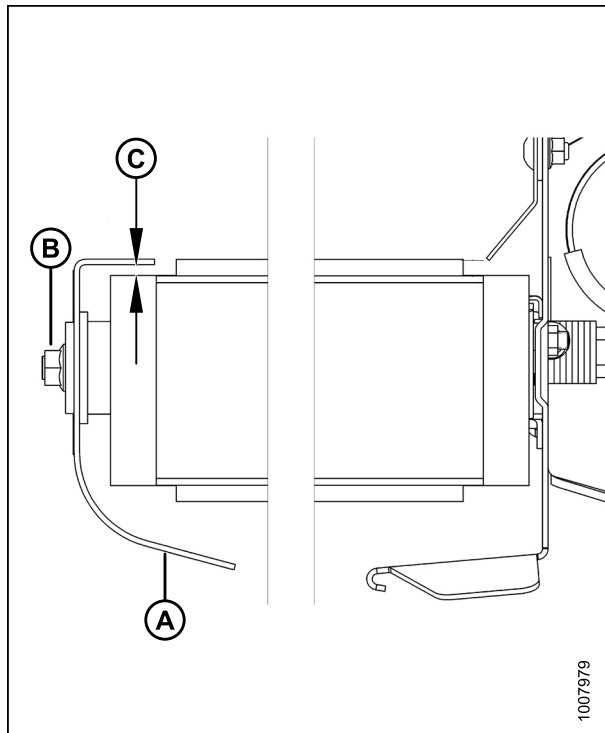


Figure 4.7: Draper Deck Cross Section



### 4.1.6 Adjusting Rear Deflector

The rear deflector (A) prevents crop from entering inside draper. To adjust the rear deflector, follow these steps:

1. Loosen all 8 nuts (B) along the length of the deck.
2. Set the deflector height (C) to be 1/16–5/16 in. (1.5–8 mm) above the draper.
3. Tighten nuts (B).

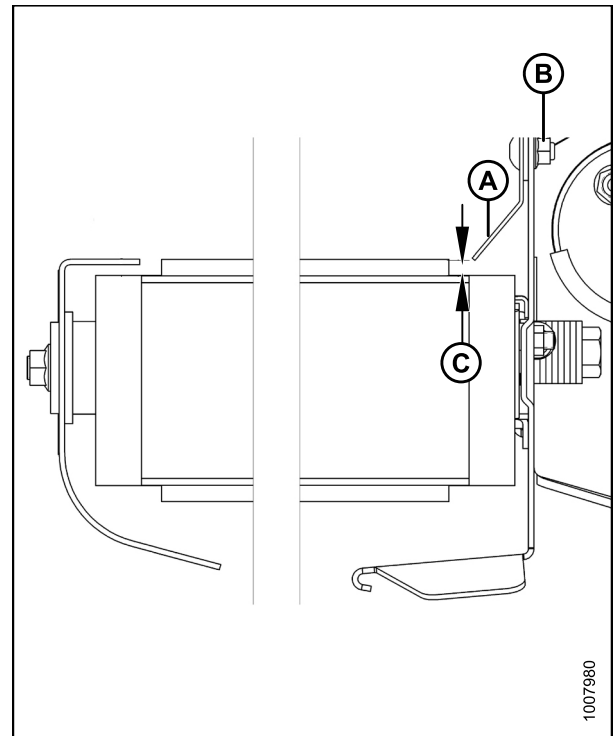


Figure 4.8: Draper Deck Cross Section

### 4.1.7 Maintaining the Draper Roller

The draper rollers have non-greaseable bearings. The external seal should be checked every 200 hours or more frequently in sandy conditions to obtain the maximum bearing life. Remove front skid to inspect seals.

#### *Removing and Reinstalling the Drive Roller*

#### **DANGER**

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

## MAINTENANCE AND SERVICING

To remove the drive roller from the deck, follow these steps:

1. Raise deck, and engage safety pin (A).
2. Remove front skid, loosen and remove draper. Refer to [4.1.5 Adjusting Front Skid, page 42](#).

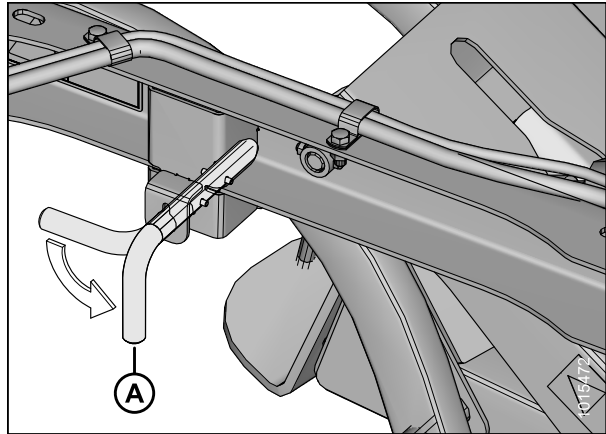


Figure 4.9: Safety Pin

3. Loosen the two jam nuts (A) and two set screws (B).

**NOTE:**

The second jam nut and set screw are on the opposite side and are not visible in this illustration.

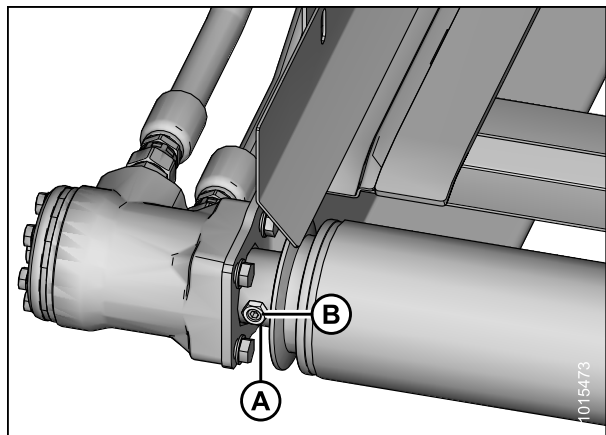


Figure 4.10: Draper Drive Roller

4. Remove the drive roller (A) by removing bolt and washer (B) at end of the roller.
5. Slide the drive roller off the motor shaft.
6. If you need to repair the bearing or seal, refer to [4.1.8 Replacing Draper Roller Bearing/Seal, page 46](#).

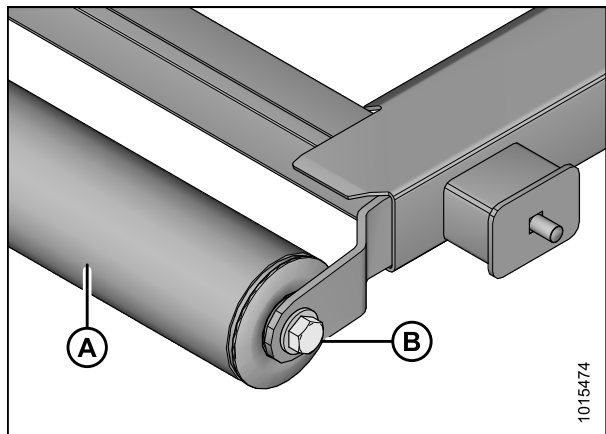


Figure 4.11: Draper Drive Roller

## MAINTENANCE AND SERVICING

To reinstall the drive roller on the deck, follow these steps:

1. Slide the drive roller onto the motor shaft. Make sure it is fully engaged.

**NOTE:**

The drive roller should be 1-1/3 in. (33 mm) (A) from the face of the motor.

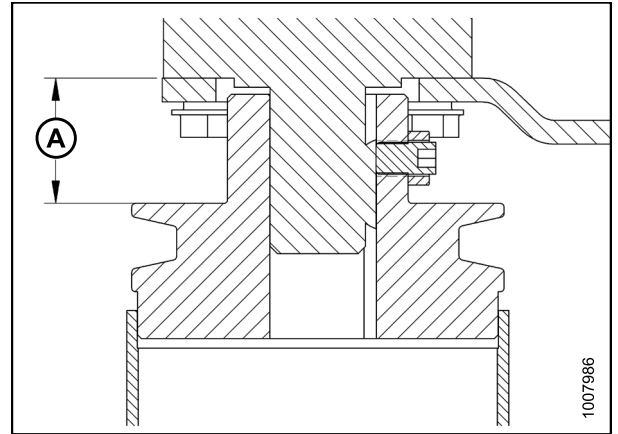


Figure 4.12: Drive Roller Cross Section

2. Install the two set screws (B) and torque to 20 ft·lbf (27 N·m).
3. Install the two jam nuts (A).

**NOTE:**

The second jam nut and set screw are on the opposite side and are not visible in this illustration.

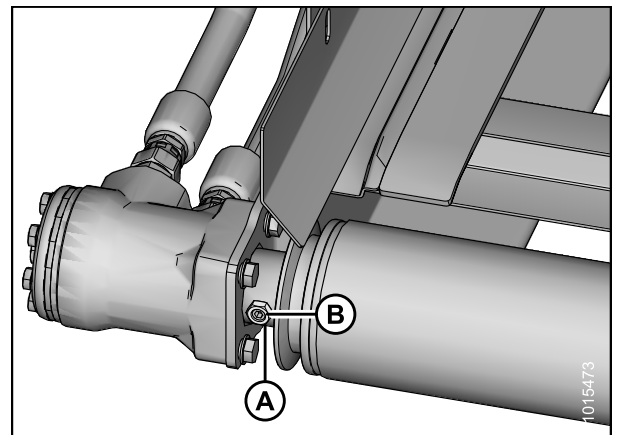


Figure 4.13: Draper Drive Roller

4. Install washer and bolt (B) into drive roller (A) and torque to 70 ft·lbf (95 N·m).

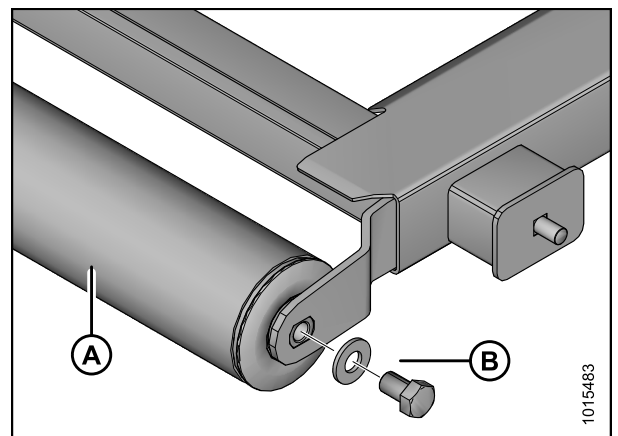


Figure 4.14: Draper Drive Roller

### Removing and Reinstalling the Idler Roller

**⚠ DANGER**

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

## MAINTENANCE AND SERVICING

To remove the idler roller (A) follow these steps:

1. Raise the deck and engage the safety pin.
2. Remove the front skid. Refer to [4.1.5 Adjusting Front Skid, page 42](#).

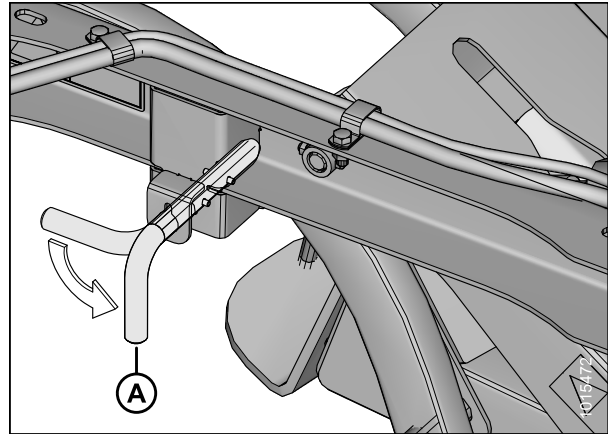


Figure 4.15: Safety Pin

3. Loosen the draper.

**NOTE:**

Draper does not need to be removed, but removal will ease roller disassembly. Roller removed in illustration.

4. Remove the idler roller (A) by removing bolt and washer (B) at each end of the roller.

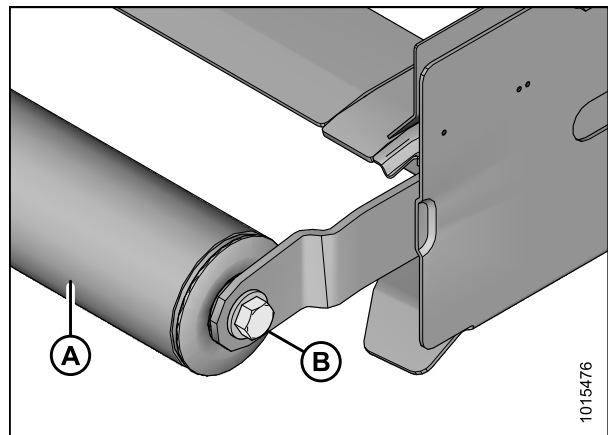


Figure 4.16: Idler Roller

To reinstall the idler roller (A), follow these steps:

1. Reattach bolt and washer (B) at each end of the idler roller (A). Torque bolts to 70 ft·lbf (95 N·m).
2. Tighten the draper. Refer to [4.1.1 Adjusting Draper Tension, page 39](#).
3. Reattach the front skid. Refer to [4.1.5 Adjusting Front Skid, page 42](#).

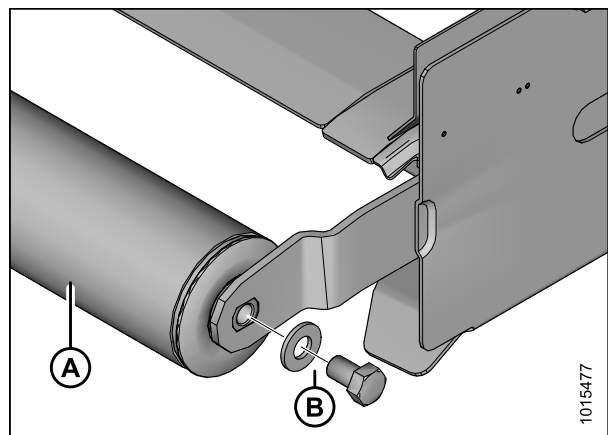


Figure 4.17: Idler Roller

### 4.1.8 Replacing Draper Roller Bearing/Seal

To replace the draper roller bearing and seal, follow these steps:

1. Remove the roller assembly. Refer to [4.1.7 Maintaining the Draper Roller, page 43](#).

## MAINTENANCE AND SERVICING

2. Remove bearing assembly (B) and seal (A) from roller tube (C) as follows:
  - a. Attach a slide hammer (D) to threaded shaft.
  - b. Tap out the bearing assembly.
3. Clean inside the roller tube (C) and check for wear or damage. Replace if necessary.

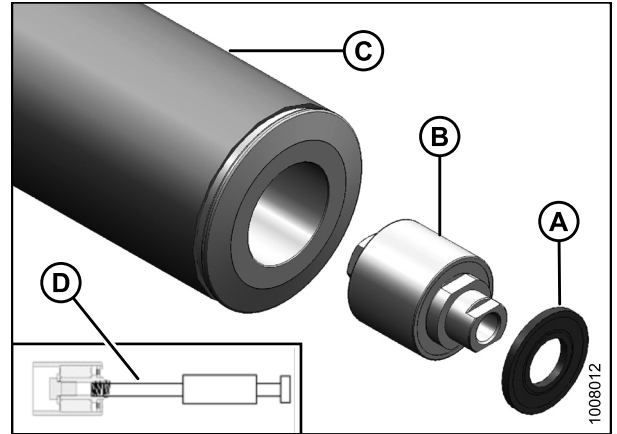


Figure 4.18: Roller Bearing

4. Install the bearing assembly (B) into roller by pushing on the outer race of bearing.

**NOTE:**

The bearing is fully positioned when the 0.55 in. (14 mm) dimension (D) is achieved.

5. Apply grease in front of the bearing.
6. Install seal (A) into roller by pushing on the outer and inner race of the seal.

**NOTE:**

The seal is fully positioned when the 0.12 in. (3 mm) dimension (C) is achieved. A flat washer (1.0 in. ID x 2.0 in. OD) works well to push against the seal.

7. Ensure the bearing and seal turn freely.
8. Reinstall roller assembly in to deck.

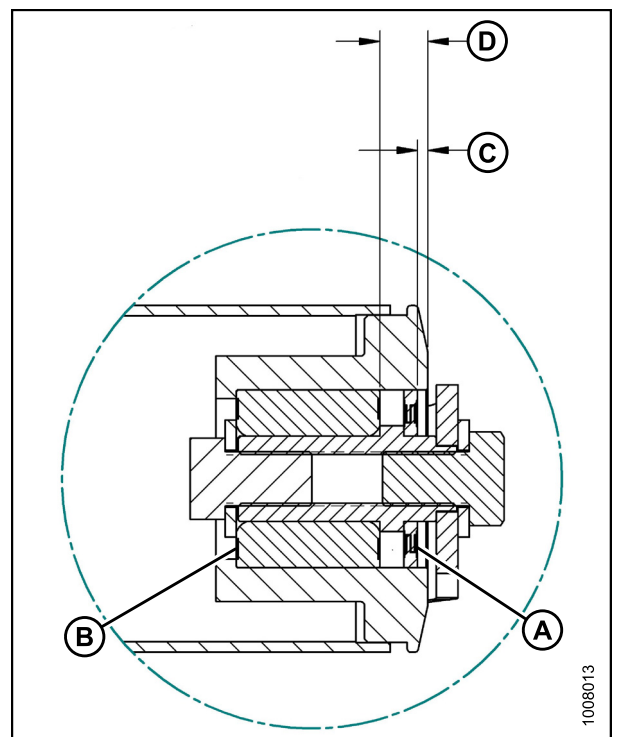


Figure 4.19: Roller Bearing Cross Section

## 4.2 Lubrication

Grease the following five pivot points (A) every 250 hours and/or at the end of each season.

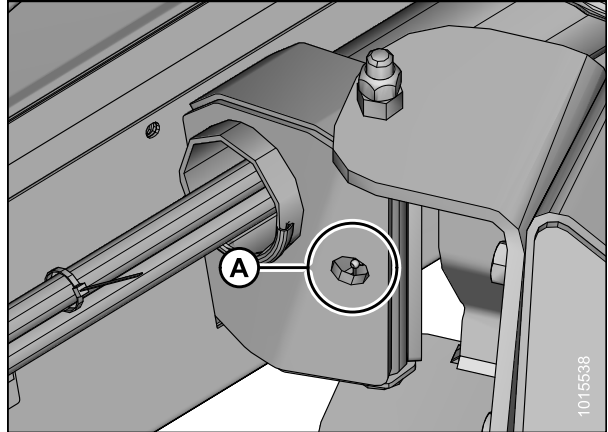


Figure 4.20: Deck Pivot

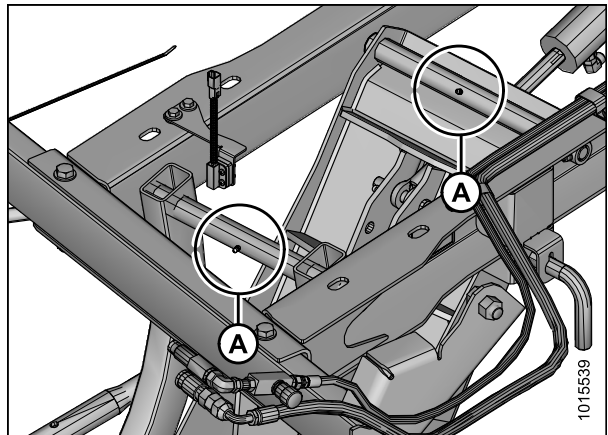


Figure 4.21: Linkage Pivot

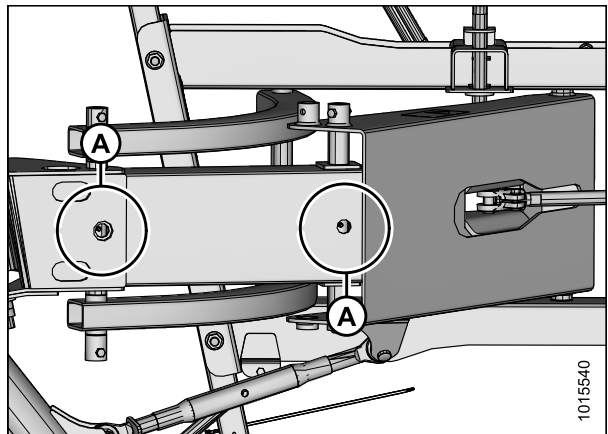
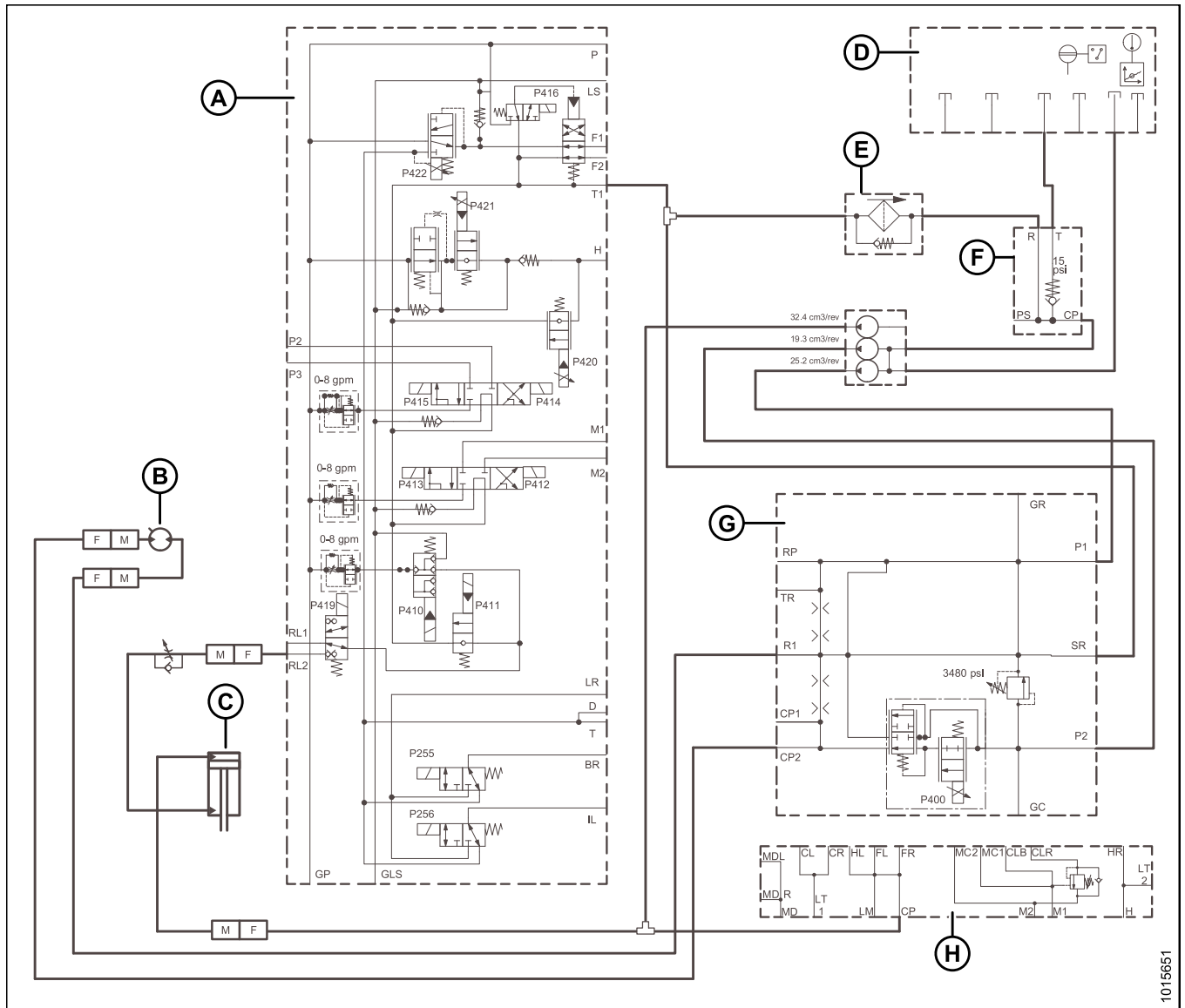


Figure 4.22: Linkage Pivot: Bottom View of DWA

### 4.3 Hydraulic Schematic

For detailed hydraulic schematics, refer to your windrower technical manual.



**Figure 4.23: DWA Hydraulic Schematic**

- A - Lift Manifold
- B - DWA Drive Motor
- C - DWA Lift Cylinder
- E - Hydraulic Filter Element
- G - Drive Manifold

- D - Hydraulic Tank
- F - Inlet Manifold
- H - Junction Manifold

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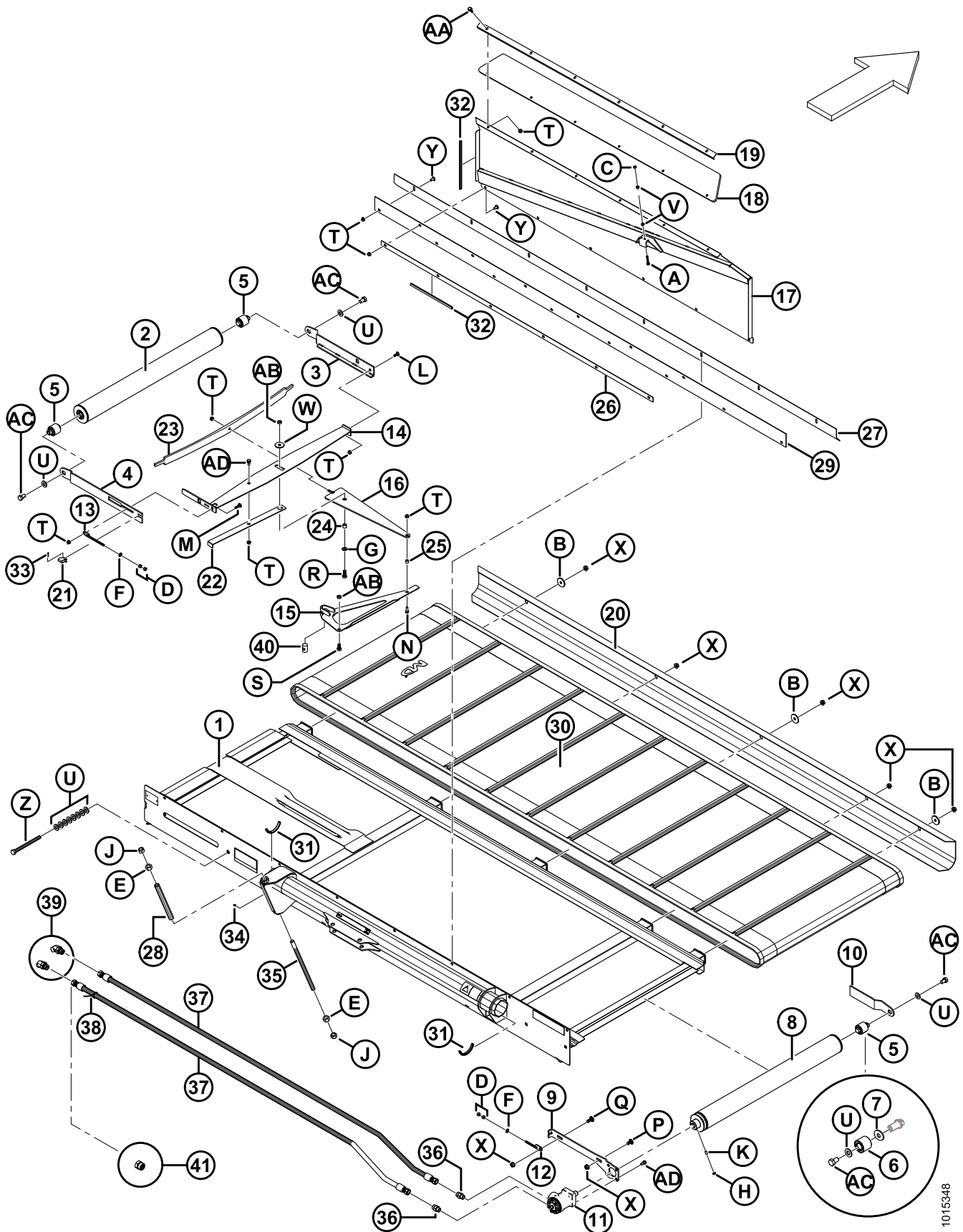
## 5 Repair Parts

This section lists all the replacement parts that can be ordered for a Double Windrow Attachment (DWA) for M1-Series Self-Propelled Windrowers.

When ordering, be sure the complete and proper part number is given.

# REPAIR PARTS

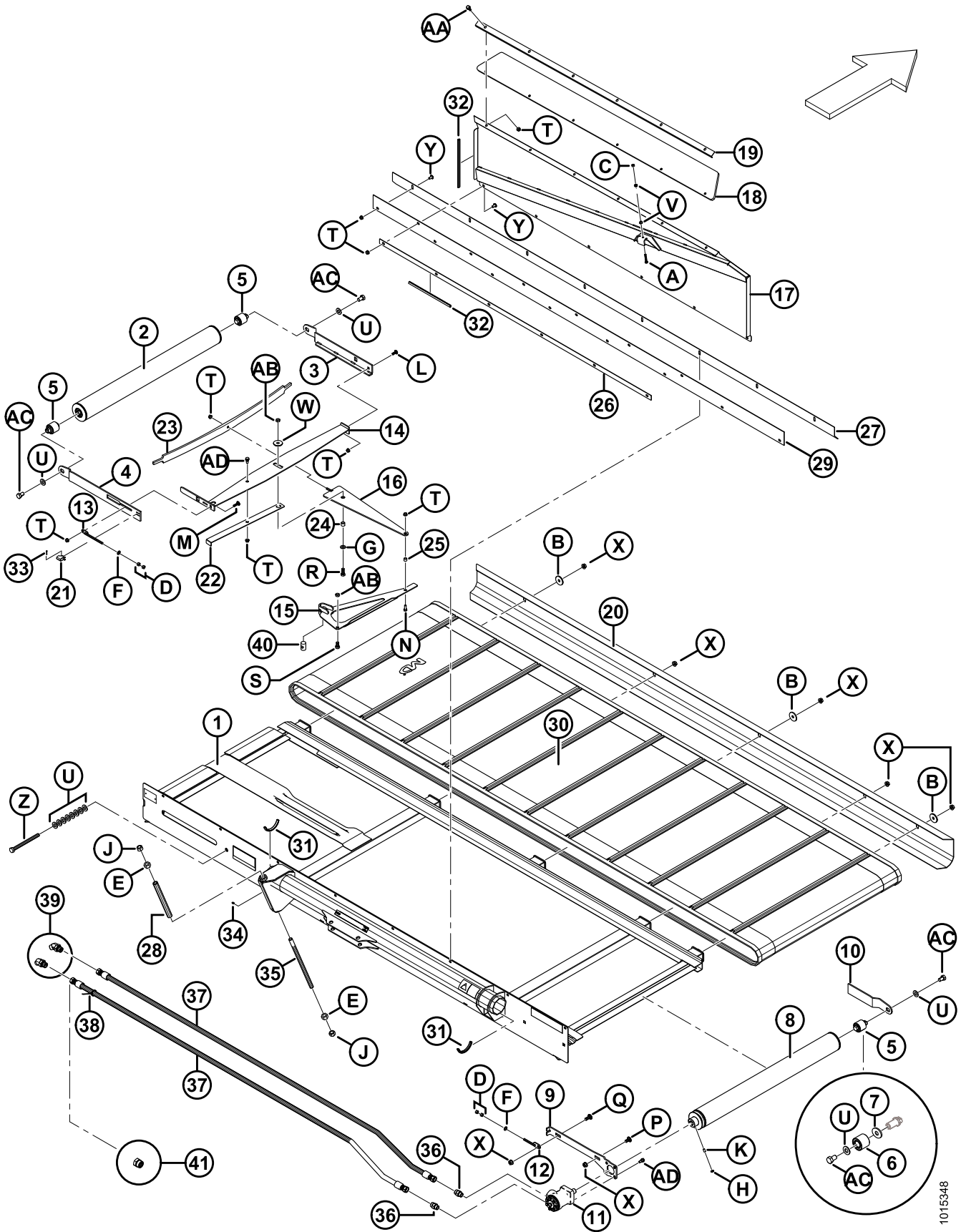
## 5.1 Deck, Draper, and Rollers



## REPAIR PARTS

Ref	Part Number	Description	Qty	Serial Number
1	172730	DECK – C/W DECALS	1	
2	144833	ROLLER – IDLER WELDT	1	
3	176000	ARM SUPPORT WELDT FRONT	1	
4	144837	ARM SUPPORT REAR	1	
5	165735	PIN ASSY – DRAPER ROLLER	3	
6	132607	BEARING – DOUBLE ROW BALL 52 OD X 25 BORE	3	
7	120845	SEAL – NILOS LSTO STEEL DISK	3	
8	144494	ROLLER – DRIVE WELDT	1	
9	144501	ARM – SUPPORT, REAR	1	
10	144499	ARM – ROLLER SUPPORT, FRONT	1	
11	176508	MOTOR – HYD DANFOSS	1	
12	145593	ROD – ADJUSTER WELDT	1	
13	145345	ROD – ADJUSTER WELDT	1	
14	120449	MEMBER – LH STABILIZER WELDT	1	
15	120451	BELL CRANK WELDT – LH	1	
16	120462	MEMBER – COMPRESSION WELDT	1	
17	176520	PANEL – REAR WELDT	1	
18	176523	SHIELD – DUST	1	
19	176532	FLANGE	1	
20	172747	SKID – ASSY, C/W DECALS	1	
21	145357	BRACKET – IDLER ARM	1	
22	145428	INDICATOR	1	
23	145548	SPRING – LEAF (TENSIONER)	1	
24	132531	SPACER	1	
25	132532	SPACER	1	
26	144652	BAR – STIFFENER	1	
27	144851	DEFLECTOR – SEAL	1	
28	144558	BUSHING – STEEL	1	
29	144597	SEAL – BACKSHEET	1	
30	165304	DRAPER – ENDLESS 30 FT	1	
31	109791	MOULDING	2	
32	37687	MOULDING	2	
33	18604	PIN – COTTER 3/32 DIA X 3/4 ZP	1	

# REPAIR PARTS

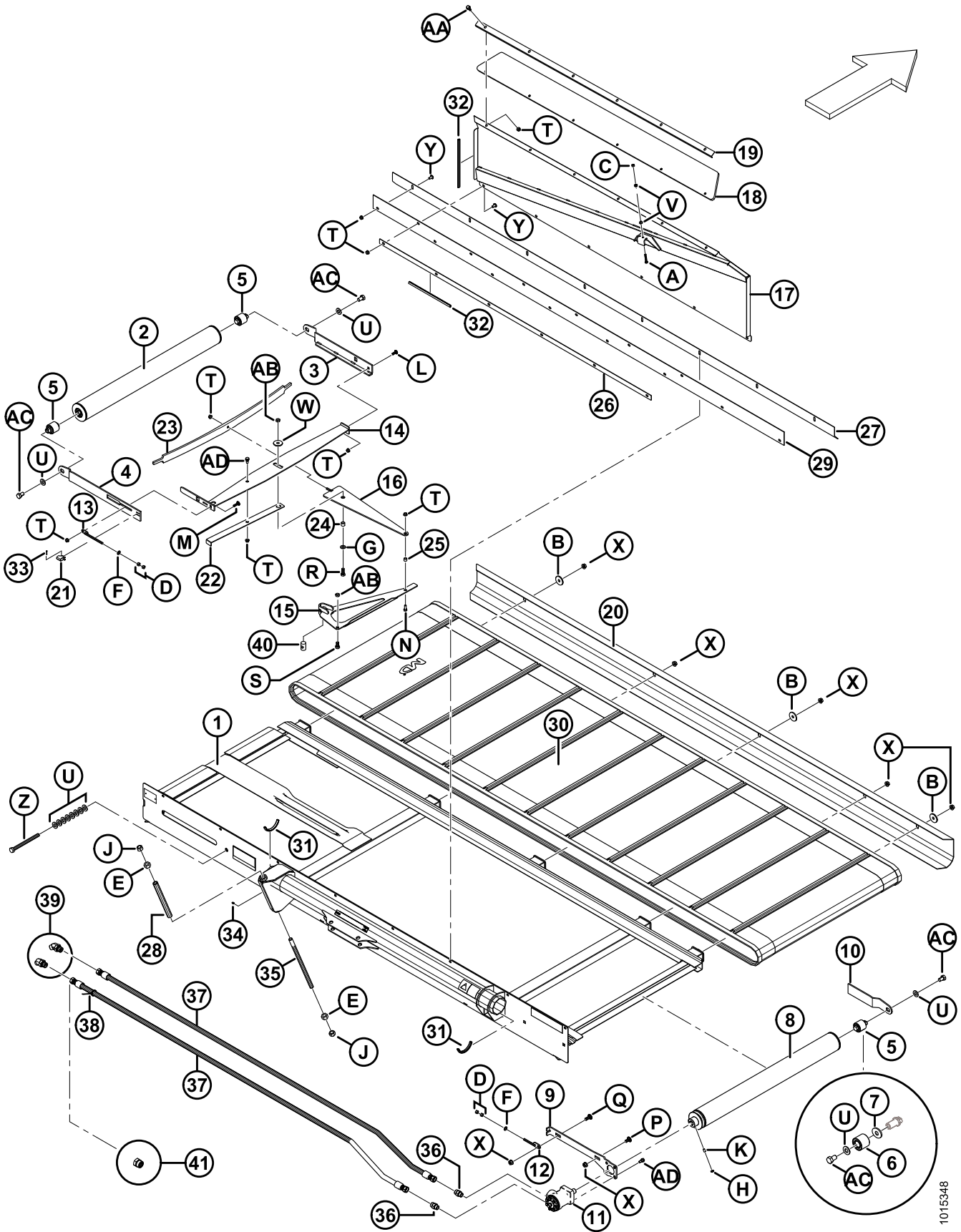


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## REPAIR PARTS

Ref	Part Number	Description	Qty	Serial Number
34	18671	FITTING – LUBE 1/4 - 28 UNF	1	
35	176063	SHAFT	1	
36	184461	FITTING – ADAPTER 10 MORFS X 10 MORB	2	
37	176534	HOSE – HYDRAULIC	2	
38	135266	FASTENER – CABLE TIE (LIGHT BLUE)	1	
39	136458	FITTING – ELBOW 45° HYD (M1240 ONLY)	2	
40	145361	NUT – SPECIAL	1	
41	136266	PLUG – HYD SAE, 10 ORFS (SHIPPING ONLY)	2	
A	176067	BOLT – HH 5/16 NC X 1.75 TFL GR5 ZP		
B	11695	WASHER – FLAT		
C	18589	NUT – HEX 5/16 - 18 UNC GR5 ZP		
D	18590	NUT – HEX 3/8 - 16 UNC GR5 ZP		
E	18593	NUT – HEX 3/4 - 10 UNC GR5 ZP		
F	18598	WASHER – SAE FLAT 13/32 ID X 13/16 IN OD ZP		
G	18599	WASHER – SAE FLAT 17/32 ID X 1 1/16 IN OD ZP		
H	18664	NUT – HEX JAM 3/8 - 16 UNC GR5 ZP		
J	18689	NUT – HEX LOCK DT .750-10 UNC		
K	18709	SCREW – SET HEX SOC CUP PT 3/8 NC X 5/8 LG		
L	19965	BOLT – RHSN 3/8 NC X 1.0 GR5 ZP		
M	19966	BOLT – RHSN 3/8 NC X 1.25 LG GR5 ZP		
N	20077	BOLT – HEX HD 3/8 NC X 1.0 LG GR5 ZP		
P	21066	BOLT – RHSN 1/2 NC X 1 GR5 ZP		
Q	21471	BOLT – RHSN 1/2 NC X 1.25 GR5 ZP		
R	21491	BOLT – HH 1/2 NC X 1.25 LG GR5 ZP		
S	21575	BOLT – HH 1/2 NC X 1.0 GR 5 ZP		
T	30228	NUT – FLANGE DT SMOOTH FACE 0.375-16 UNC		
U	30441	WASHER – HARDENED		
V	35689	NUT – SPECIAL		
W	42592	WASHER – FLAT		

# REPAIR PARTS

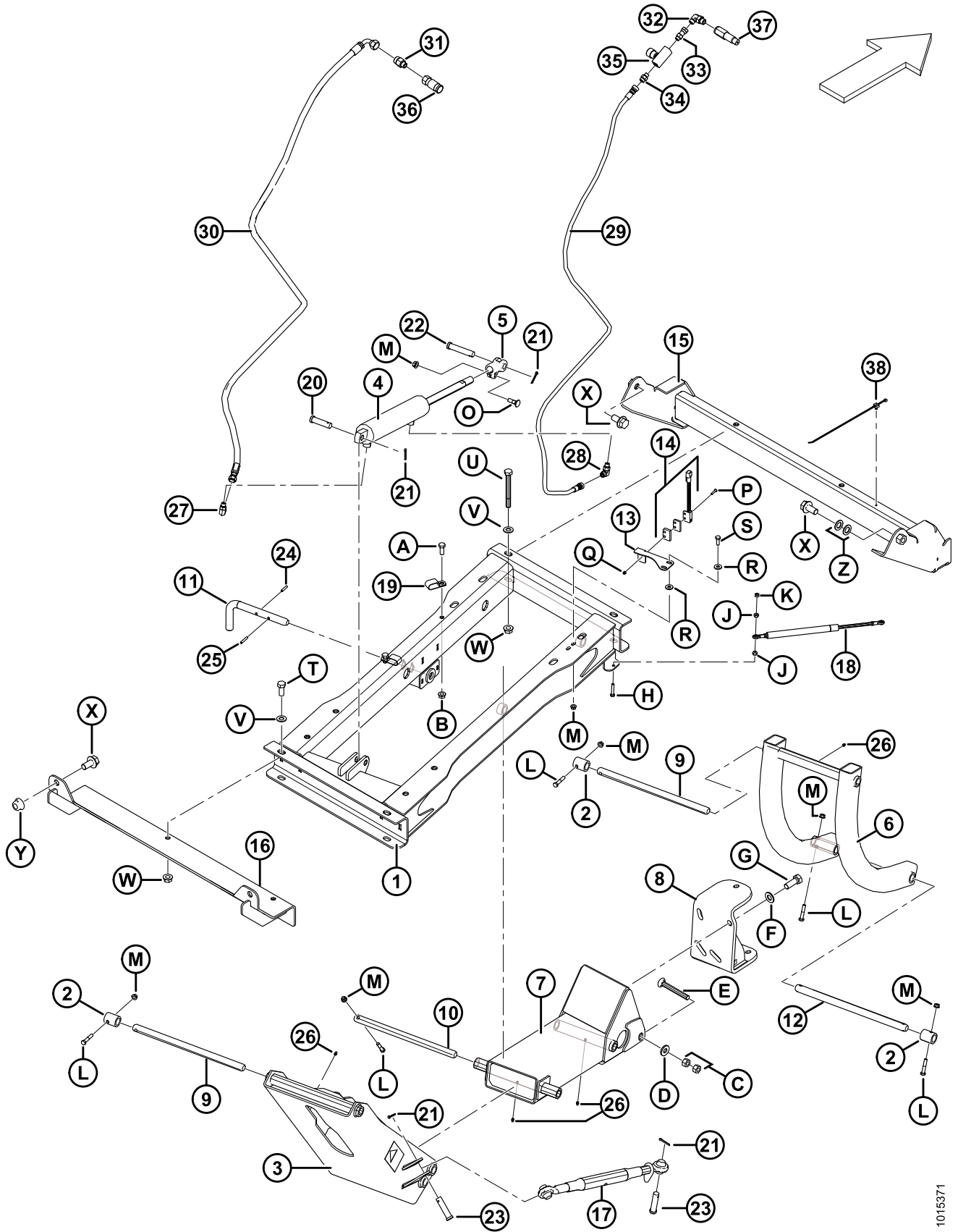


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## REPAIR PARTS

<b>Ref</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty</b>	<b>Serial Number</b>
X	50186	NUT – FLANGE LOCK SM FACE DT 0.500-13 UNC GR5		
Y	135157	SCREW – MACHINE		
Z	135906	BOLT – HH 5/8 NC X 7.5 LG TFL GR 5 ZP		
AA	135966	BOLT – HH FLG (SM FACE) 3/8 NC X 1.0 GR5 ZP		
AB	137727	NUT – HEX JAM - DIST THD. 1/2-13 UNC GR5 ZP		
AC	145249	BOLT – HH 5/8 NF X 1.0 LG GR5 ZP		
AD	172259	BOLT – SHOULDER .375-16 UNC		

## 5.2 Linkage and Deck Support

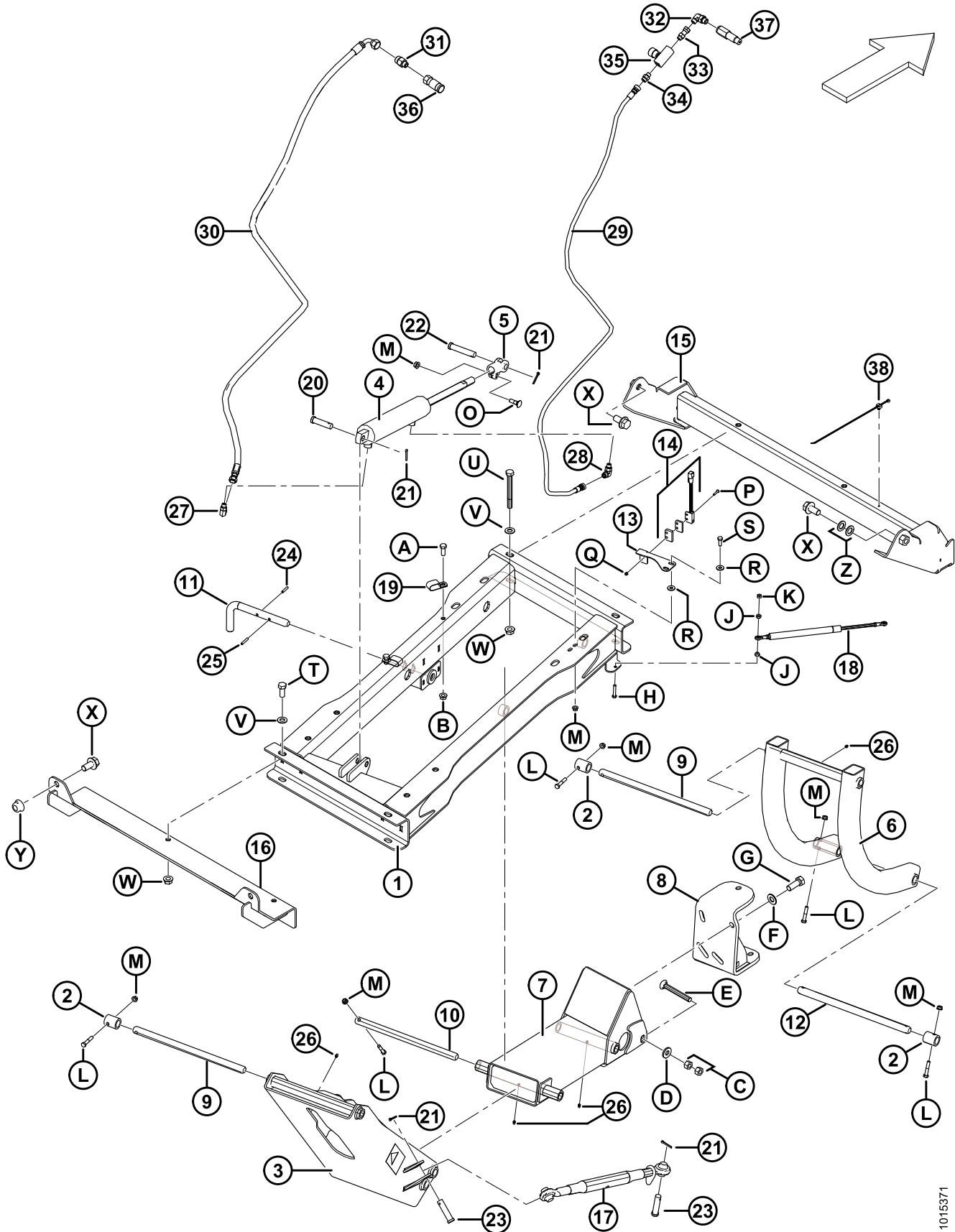




## REPAIR PARTS

Ref	Part Number	Description	Qty	Serial Number
1	176440	SUPPORT – DWA WELDT	1	
2	172903	TUBE	3	
3	172746	ARM – ASSY, C/W DECALS	1	
4	208966	CYLINDER – HYD	1	
	176031	SEAL KIT		
5	172664	CLEVIS	1	
6	144592	ARM – FRONT WELDT	1	
7	144593	ARM – BOTTOM WELDT	1	
8	144594	CLEVIS – WELDT	1	
9	172910	SHAFT – 25 MM OD, 450 MM LG	2	
10	176018	SHAFT – 25 MM OD, 420 MM LG	1	
11	176016	PIN – L	1	
12	176023	SHAFT – 25 MM OD, 420 MM LG	1	
13	176524	SUPPORT – DWA PROXIMITY SWITCH	1	
14	200974	SWITCH – PROXIMITY, C/W SPACERS	1	
15	176462	SUPPORT – FRONT WELDT	1	
16	176509	SUPPORT – REAR WELDT, DWA	1	
17	144996	JOINT ASSEMBLY	1	
18	176066	CYLINDER – GAS SPRING	1	
19	103738	CLAMP – PVC INSULATED 13/16 IN. TUBE SIZE	2	
20	30463	PIN – CLEVIS, 18.89 MM - 58 MM	1	
21	18648	PIN – COTTER 3/16 DIA X 1.25 ZP	4	
22	20312	PIN – CLEVIS, 18.89 MM - 82 MM	1	
23	18627	PIN – CLEVIS, 18.89 MM - 64 MM	2	
24	16266	PIN – SPRING 1/4 DIA X 1.25 LG	1	
25	2147	PIN – SPRING 1/4 DIA X 1.5 LG	1	
26	18671	FITTING – LUBE 1/4 - 28 UNF	4	
27	136238	FITTING – ELBOW 90° HYD	1	
28	136095	FITTING – ELBOW 90° HYD	1	
	50219	O-RING – #6 ORB		
	135865	O-RING – #12 ORB		
29	176498	HOSE – HYD, 1/4 IN ID, 2050 MM LG	1	
30	176497	HOSE – HYD, 1/2 IN ID, 2100 MM LG	1	

# REPAIR PARTS

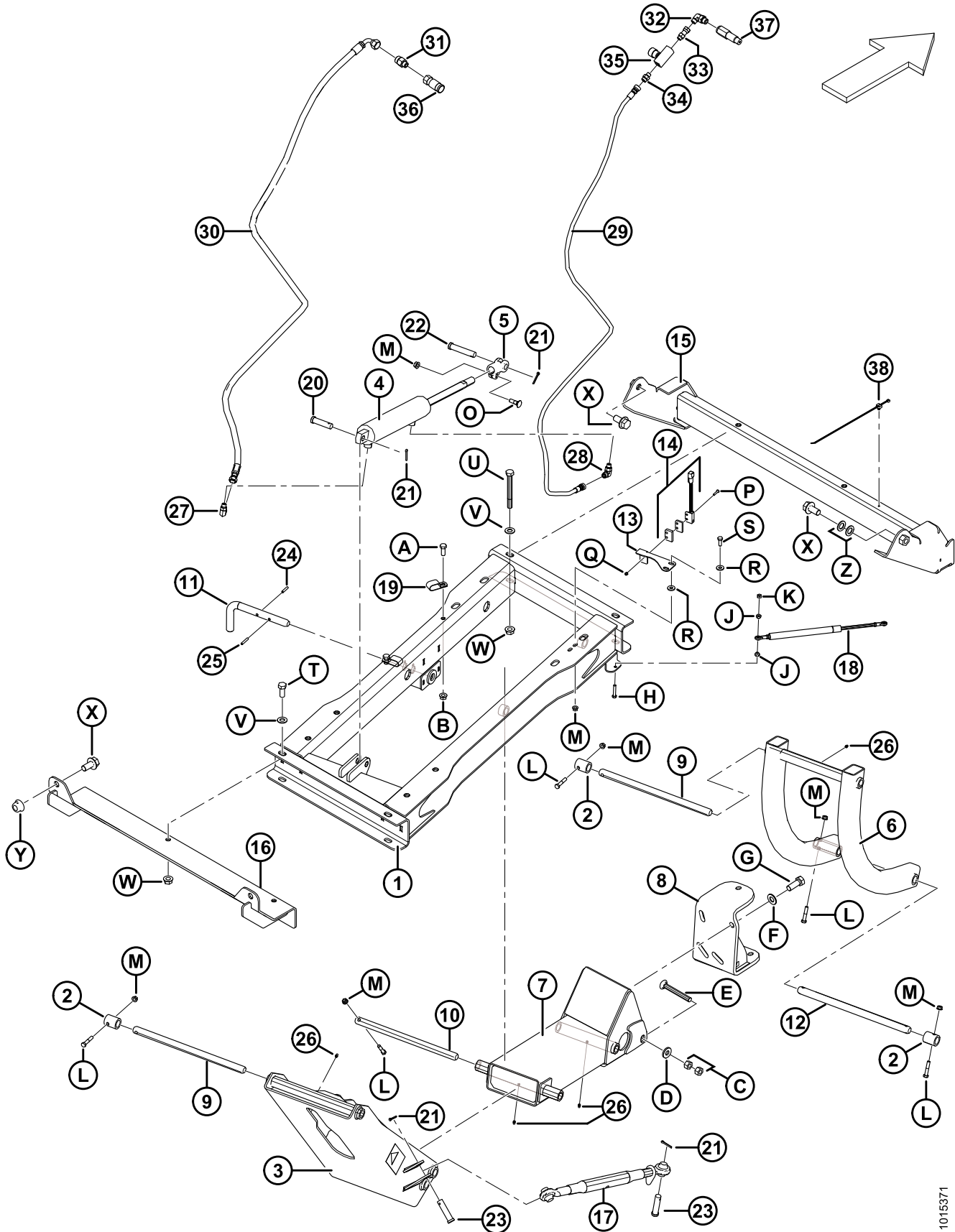


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**REPAIR PARTS**

<b>Ref</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty</b>	<b>Serial Number</b>
31	135781	FITTING – ADAPTER	1	
	44209	O-RING – #8 ORB		
	135867	O-RING – #10 ORFS		
32	136149	FITTING – ELBOW 90° HYD C/W O-RINGS	1	
	50219	O-RING – #6 ORB		
	135865	O-RING – #12 ORB		
33	136147	FITTING – CONNECTOR HYD	1	
	50219	O-RING – #6 ORB		
34	135778	FITTING – ADAPTER	1	
	50219	O-RING – #6 ORB		
	135865	O-RING – #12 ORB		
35	183211	VALVE – HYD FLOW CONTROL	1	
36	135312	COUPLER – FEMALE HYD. 3/8 IN. FLAT FACE	1	
37	135386	COUPLER – MALE HYD. 3/8 IN. FLAT FACE	1	
38	136655	FASTENER – FIR TREE MOUNT, W/ CABLE TIE	1	
A	21491	BOLT – HH 1/2 NC X 1.25 LG GR5 ZP		
B	50186	NUT – FLANGE LOCK SM FACE DT 0.500-13 UNC GR5		
C	18592	NUT – HEX 5/8 - 11 UNC GR5 ZP		
D	22072	WASHER – FLAT		
E	30816	BOLT – RHSN TFL 5/8-11 X 5-GR5-ZP		
F	176009	WASHER – NORDLOCK 3/4 IN. SP		
G	30512	BOLT – HH 3/4 NC X 2.0 LG GR5 ZP		
H	176067	BOLT – HH 5/16 NC X 1.75 TFL GR5 ZP		
J	35689	NUT – SPECIAL		
K	18589	NUT – HEX 5/16-18 UNC GR5 ZP		
L	21354	BOLT – HH 3/8 NC X 2.0 LG GR5 ZP		
M	30228	NUT – FLANGE DT SMOOTH FACE 0.375-16 UNC		
N	19966	BOLT – RHSN 3/8 NC X 1.25 LG GR5 ZP		
P	252183	SCREW – PAN HD ISO 7045 M5 X 0.8 X 25-4.8-A2L		
Q	197230	NUT – HEX NYLOC M5 X 0.8-8-A2L		
R	20535	WASHER – FLAT		
S	20077	BOLT – HEX HD 3/8 NC X 1.0 LG GR5 ZP		
T	21594	BOLT – HEX HD 0.625 -11 UNC X 1.50		

# REPAIR PARTS

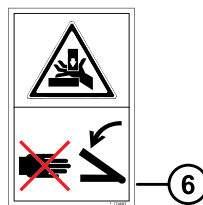
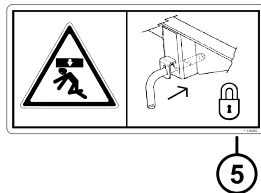
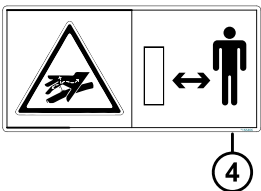
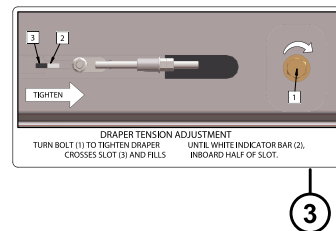
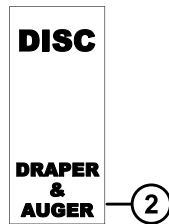
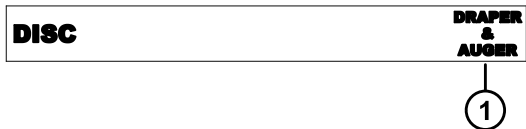
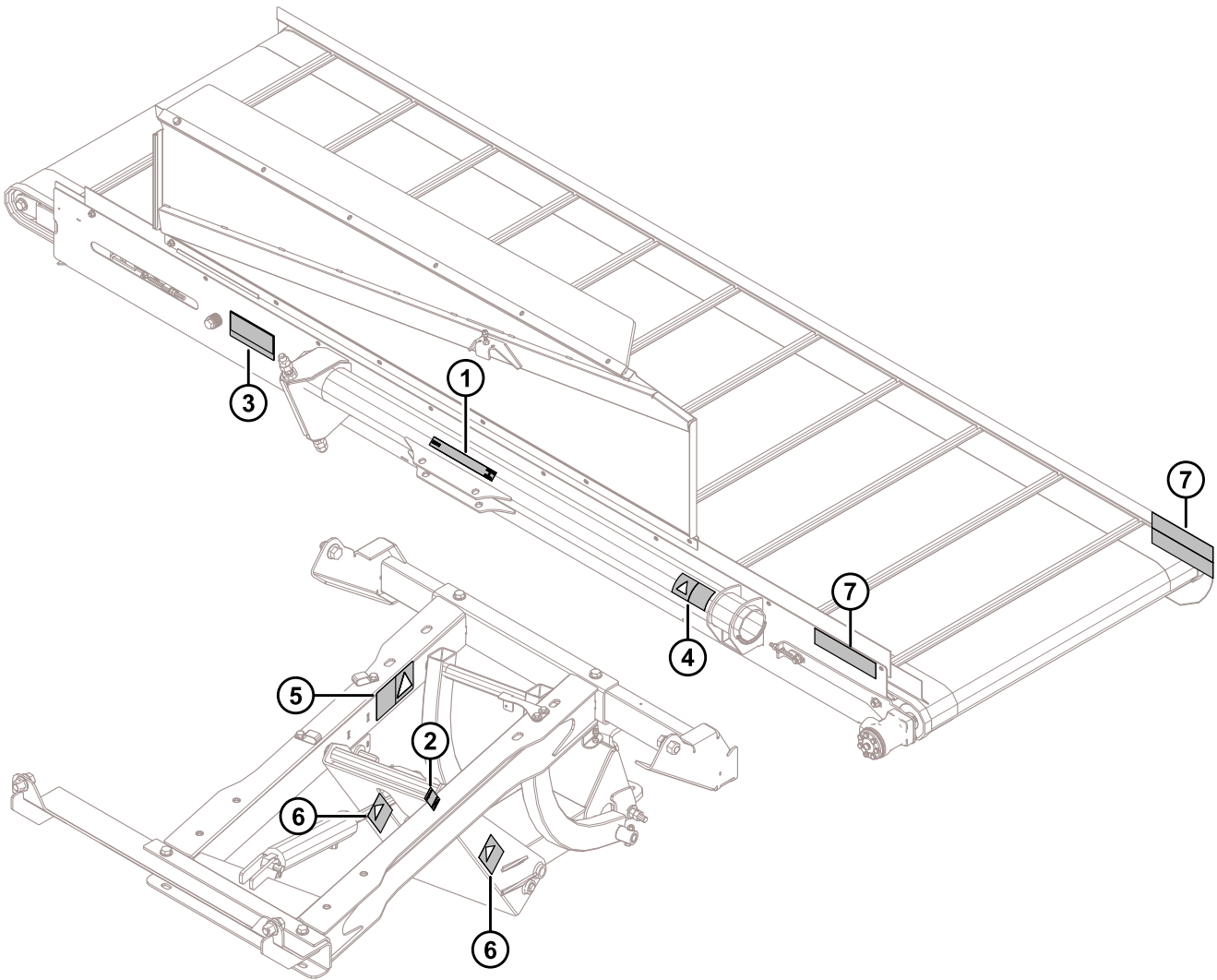


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## REPAIR PARTS

Ref	Part Number	Description	Qty	Serial Number
U	50163	BOLT – HH 5/8 NC X 5.5 LG GR5 ZP		
V	18600	WASHER – SAE FLAT 21/32 ID X 15/16 IN OD ZP		
W	50225	NUT – FLANGE DT SMOOTH FACE .625-11 UNC		
X	136133	BOLT – HEX FLG HD TFL M20 X 40-10.9-A3L ASTM568M		
Y	136122	NUT – HEX FLG CTR LOC M20 X 2.5-10-A3L		
Z	136477	WASHER – FLAT REG M20-200HV-A3L		

### 5.3 Decals and Reflectors



## REPAIR PARTS

<b>Ref</b>	<b>Part Number</b>	<b>DESCRIPTION</b>	<b>Qty</b>	<b>Serial Number</b>
1	176071	DECAL – HEADER POSITION, HORIZONTAL FORMAT		
2	176072	DECAL – HEADER POSITION, VERTICAL FORMAT		
3	220084	DECAL – DRAPER TENSION		
4	166466	DECAL – WARNING, HIGH PRESSURE HYDRAULICS		
5	176295	DECAL – DECK LIFT LOCK		
6	174683	DECAL – WARNING DWA LINKAGE PINCH POINT		
7	115145	REFLECTOR – FLUORESCENT RED-ORANGE		
	115146	REFLECTOR – AMBER		
	115147	REFLECTOR – RED		





## 6 Reference

### 6.1 Torque Specifications

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

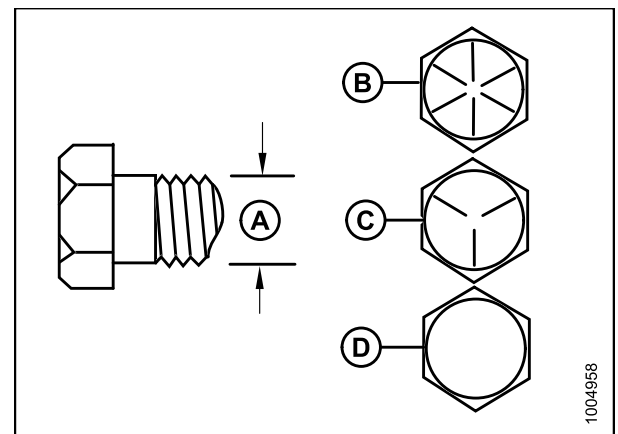
- Tighten all bolts to the torque values specified in the charts (unless otherwise noted throughout this manual).
- Replace hardware with the same strength and grade of bolt.
- Use the torque value tables as a guide and periodically check tightness of bolts.
- Understand torque categories for bolts and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

#### 6.1.1 SAE Bolt Torque Specifications

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

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

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



**Figure 6.1: Bolt Grades**

A - Nominal Size  
C - SAE-5

B - SAE-8  
D - SAE-2

1004958

REFERENCE

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

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

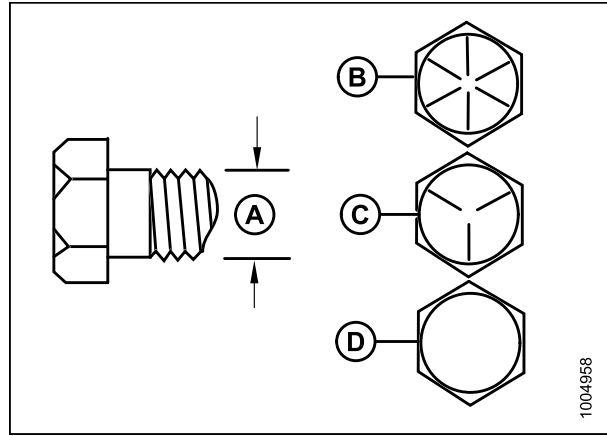


Figure 6.2: Bolt Grades

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

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

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

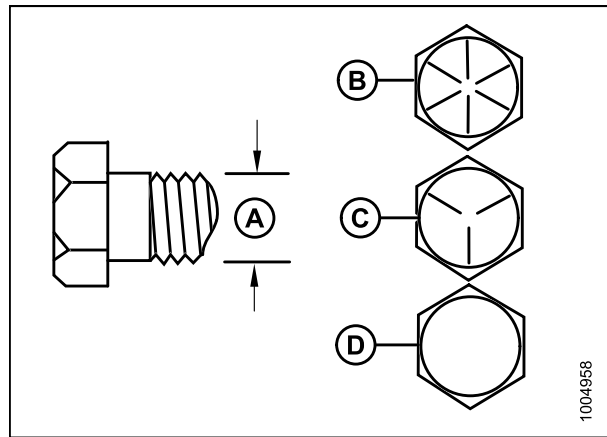


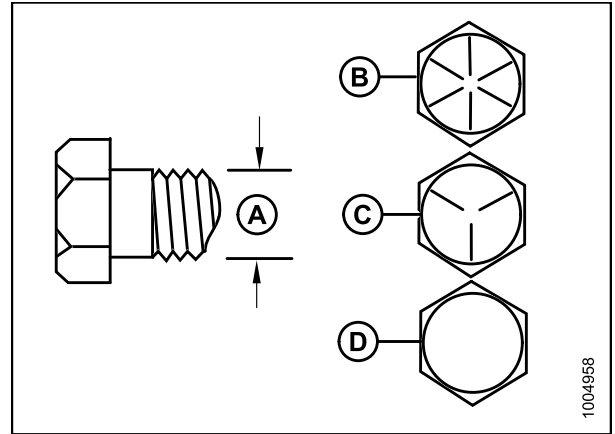
Figure 6.3: Bolt Grades

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

## REFERENCE

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

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



**Figure 6.4: Bolt Grades**

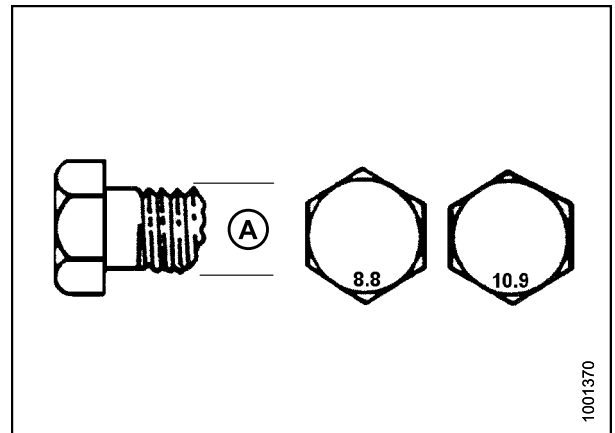
A - Nominal Size  
C - SAE-5

B - SAE-8  
D - SAE-2

### 6.1.2 Metric Bolt Specifications

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

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



**Figure 6.5: Bolt Grades**

REFERENCE

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

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

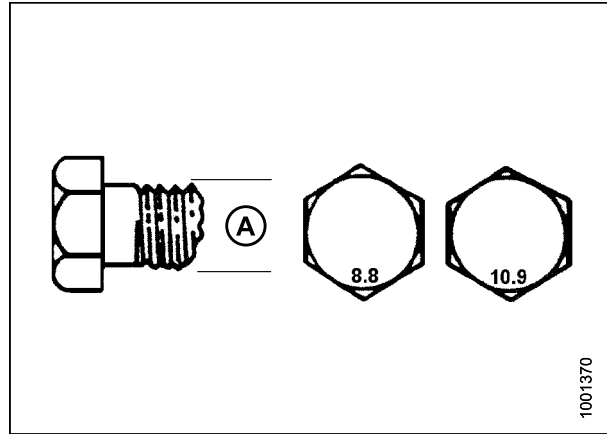


Figure 6.6: Bolt Grades

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

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

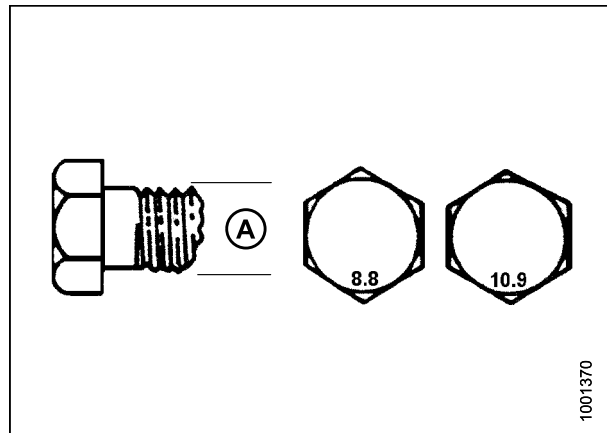


Figure 6.7: Bolt Grades

REFERENCE

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

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

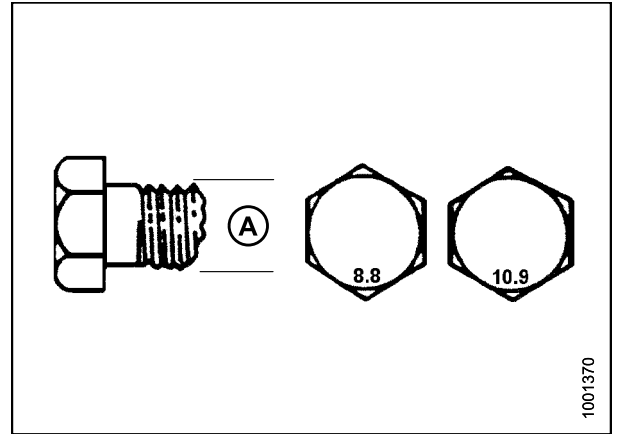


Figure 6.8: Bolt Grades

### 6.1.3 Metric Bolt Specifications Bolting into Cast Aluminum

Table 6.9 Metric Bolt Bolting into Cast Aluminum

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

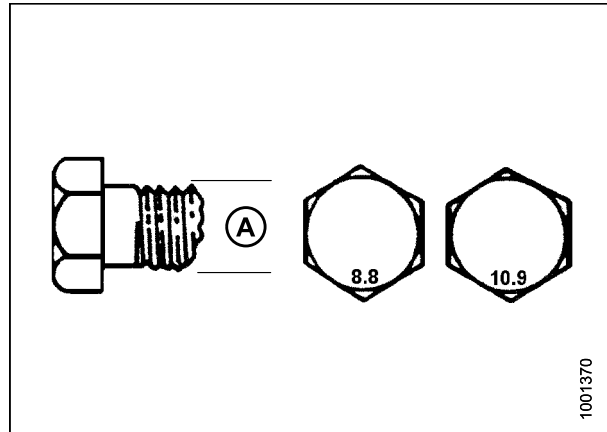


Figure 6.9: Bolt Grades

### 6.1.4 Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between the flared surfaces.
3. Torque the fitting nut (E) to the specified number of flats from finger tight (FFFT) or to a given torque value in [Table 6.10 Flare-Type Hydraulic Tube Fittings, page 73](#).
4. Use two wrenches to prevent fitting (D) from rotating. Place one wrench on the fitting body (D) and tighten nut (E) with the other wrench to the torque shown.
5. Assess the final condition of the connection.

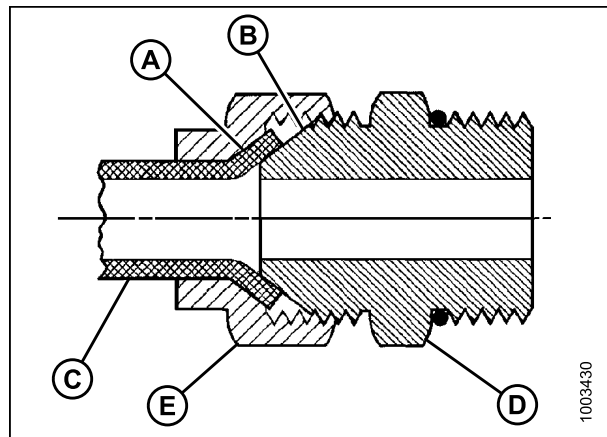


Figure 6.10: Hydraulic Fitting

**REFERENCE**

**Table 6.10 Flare-Type Hydraulic Tube Fittings**

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

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

## REFERENCE

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

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

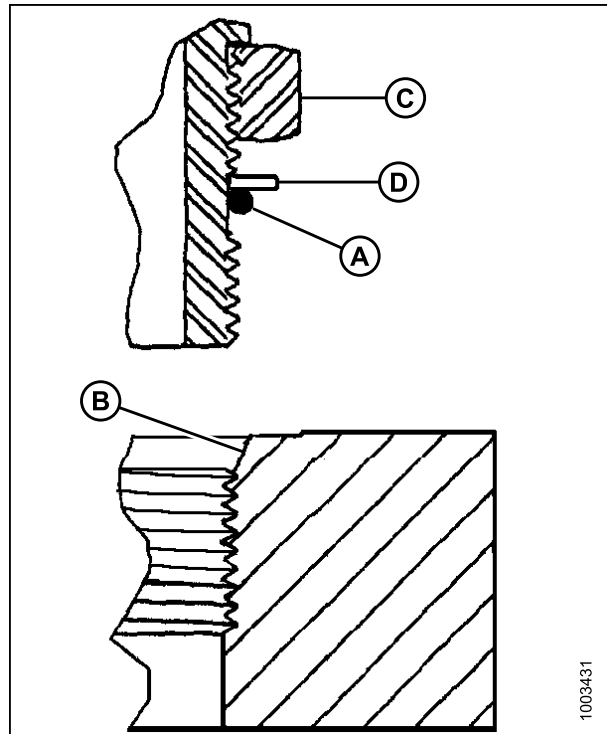


Figure 6.11: Hydraulic Fitting

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

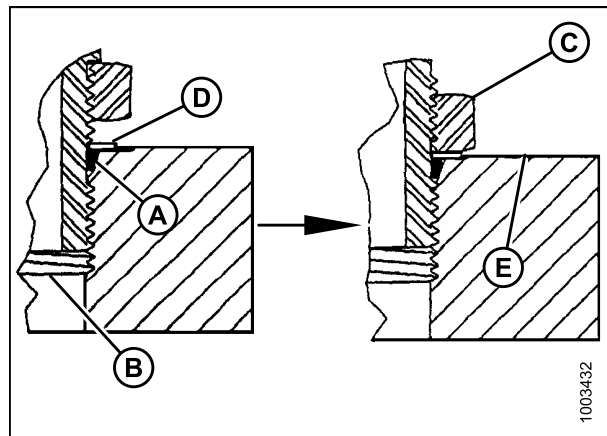


Figure 6.12: Hydraulic Fitting



**REFERENCE**

**Table 6.11 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)**

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

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

## REFERENCE

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

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on the threads and adjust if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into port until fitting is hand tight.
5. Torque fitting (C) according to the values in Table 6.12 *O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)*, page 76.
6. Check the final condition of the fitting.

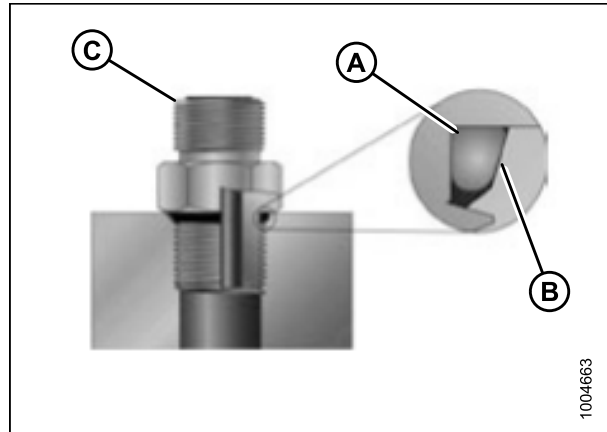


Figure 6.13: Hydraulic Fitting

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

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

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

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

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



Figure 6.14: Hydraulic Fitting

2. Apply hydraulic system oil to the O-ring (B).
3. Align the tube or hose assembly so that the flat face of the sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to the values in Table [6.13 O-Ring Face Seal \(ORFS\) Hydraulic Fittings, page 78](#).

**NOTE:**

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

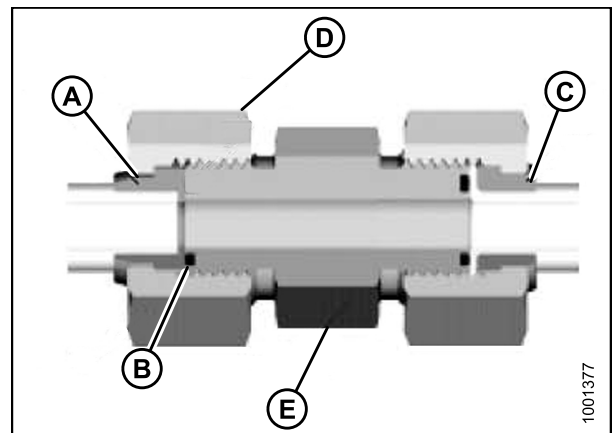


Figure 6.15: Hydraulic Fitting

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

**REFERENCE**

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

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

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

REFERENCE

## 6.2 Conversion Chart

Table 6.14 Conversion Chart

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



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30816	61	144833	53
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37687	53	144851	53
42592	55	144996	59
44209	61	145249	57
50163	63	145345	53
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50219	59, 61	145361	55
50225	63	145428	53
103738	59	145548	53
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**MacDon Industries Ltd.**

680 Moray Street  
Winnipeg, Manitoba  
Canada R3J 3S3  
t. (204) 885-5590  
f. (204) 832-7749

**MacDon, Inc.**

10708 N. Pomona Avenue  
Kansas City, Missouri  
United States 64153-1924  
t. (816) 891-7313  
f. (816) 891-7323

**MacDon Australia Pty. Ltd.**

A.C.N. 079 393 721  
P.O. Box 243, Suite 3, 143 Main Street  
Greensborough, Victoria, Australia 3088  
t. 03 9432 9982  
f. 03 9432 9972

**LLC MacDon Russia Ltd.**

123317 Moscow, Russia  
10 Presnenskaya nab, Block C  
Floor 5, Office No. 534, Regus Business Centre  
t. +7 495 775 6971  
f. +7 495 967 7600

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