

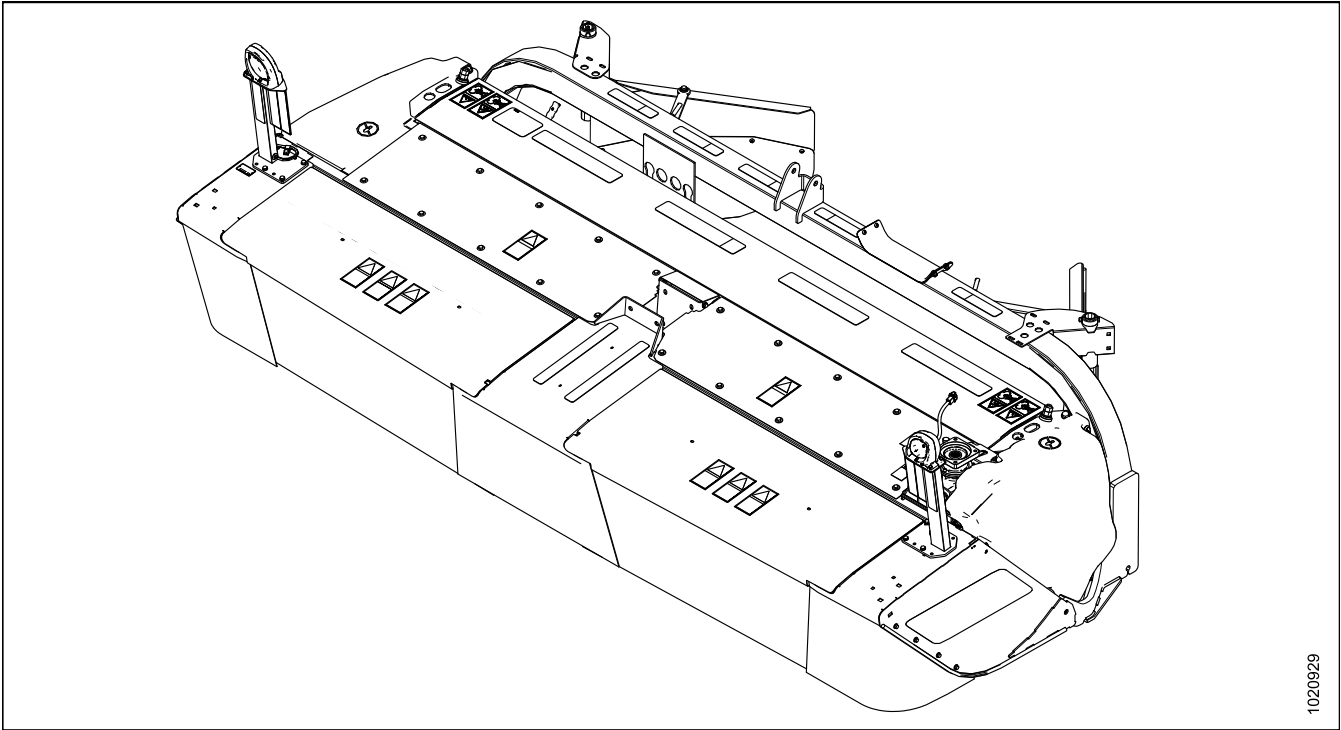
R1 SP Series Disc Header

R1 Gearbox Service Kit (MD #257174) Installation Instructions

214602 Revision B

Original Instruction

R113 SP Disc Header



Published in October 2018

1020929

Introduction

The R1 Gearbox Service kit (MD #257174) is used to replace a damaged or faulty header drive gearbox (90-degree gearbox) on a MacDon R1 SP Series Disc Header. This kit applies to 2017 model year units **ONLY**.

This document explains how to install the kit. A list of parts included in the kit is provided in Chapter *2 Parts List, page 5*.

Installation Time

Installation time for this kit is approximately 4 hours.

Conventions

The following conventions are used in this document:

- Right and left are determined from the operator's position. The front of the disc header is the side that faces the crop; the back is the side that faces the windrower.
- Unless otherwise noted, use the standard torque values provided in the header operator's manual and technical manual.

NOTE:

Keep your MacDon publications up-to-date. The most current version of this instruction can be downloaded from our Dealer-only site (<https://portal.macdon.com>) (login required).

NOTE:

This document is currently available in English only.

List of Revisions

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

Summary of Change	Location
Revision A never published.	

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Chapter 1: Safety

1.1 Signal Words

Three signal words, **DANGER**, **WARNING**, and **CAUTION**, are used to alert you to hazardous situations. Two signal words, **IMPORTANT** and **NOTE**, identify non-safety related information. Signal words are selected using the following guidelines:

DANGER

Indicates an imminently hazardous situation that, if 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.

IMPORTANT:

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

NOTE:

Provides additional nonessential information or advice.

1.2 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 protective clothing and personal safety devices that could be necessary for job at hand. Do **NOT** take chances. You may need the following:
 - Hard hat
 - Protective footwear with slip-resistant soles
 - Protective glasses or goggles
 - Heavy gloves
 - Wet weather gear
 - Respirator or filter mask
- Be aware that exposure to loud noises can cause hearing impairment or loss. Wear suitable hearing protection devices such as earmuffs or earplugs to help protect against loud noises.

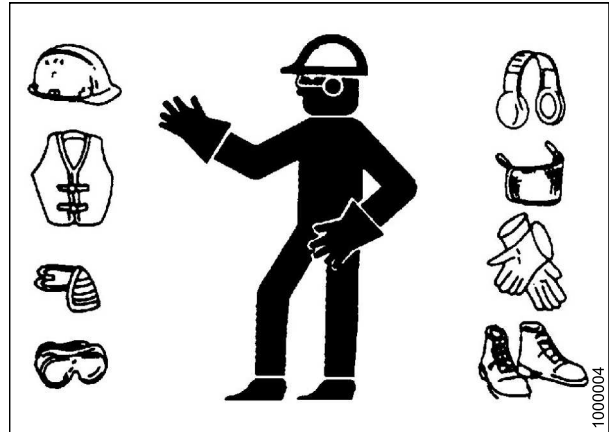


Figure 1.1: Safety Equipment



Figure 1.2: Safety Equipment

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

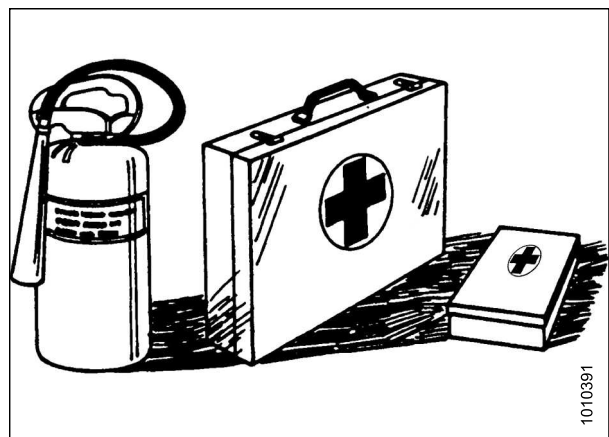


Figure 1.3: Safety Equipment

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 shaft and can telescope freely.
- Use only service and repair parts made or approved by equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.



Figure 1.4: Safety around Equipment

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

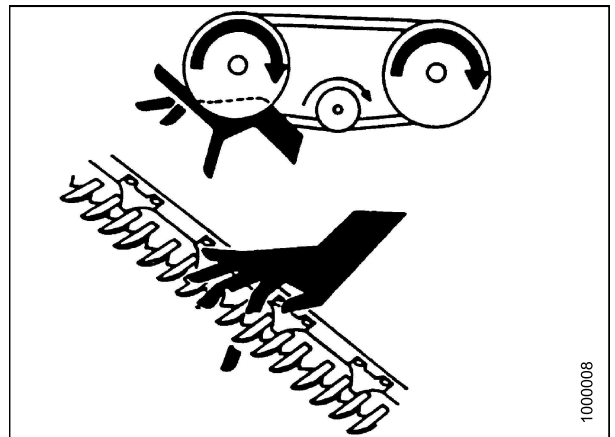


Figure 1.5: Safety around Equipment

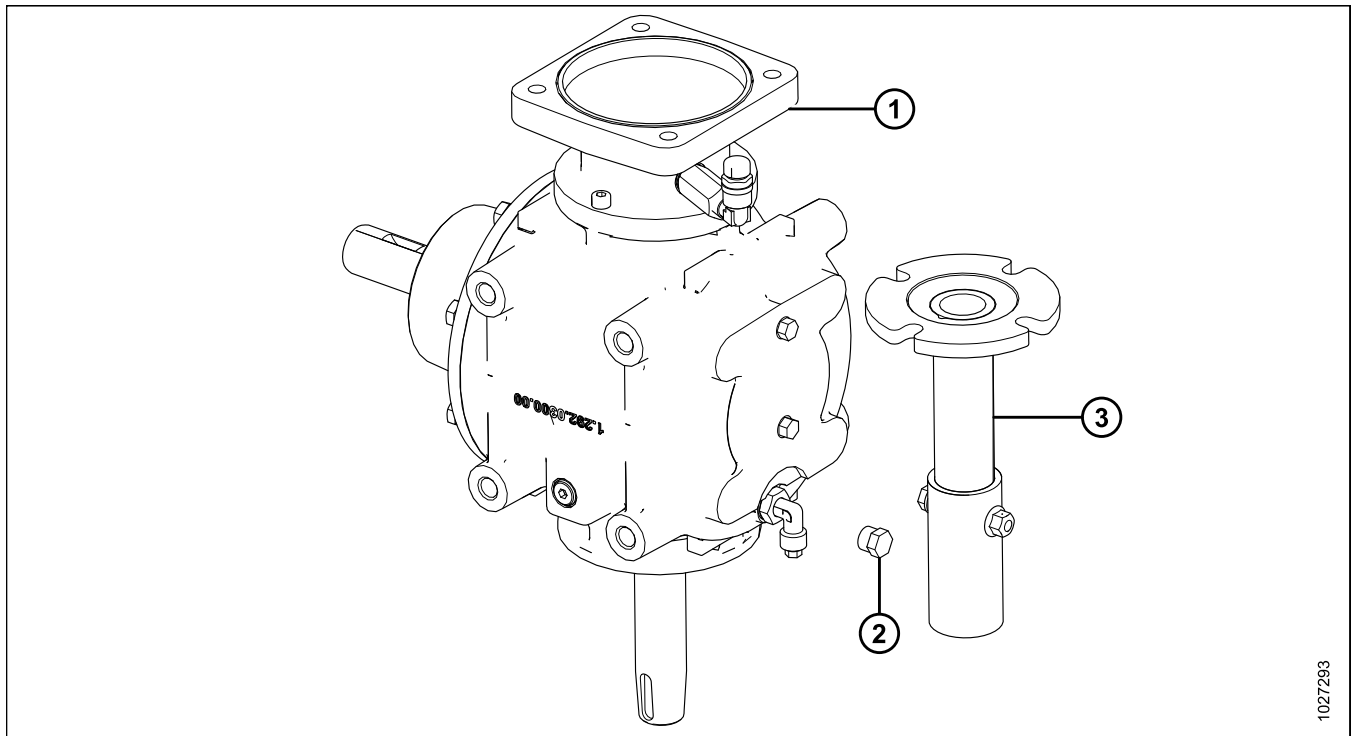
- Keep service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Be sure all electrical outlets and tools are properly grounded.
- Keep work area well lit.
- Keep machinery clean. Straw and chaff on a hot engine is a fire hazard. Do **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 1.6: Safety around Equipment

Chapter 2: Parts List

The following parts are included in this kit.



1027293

Ref	Part Number	Description	Quantity
1	NSS ¹	GEARBOX-DRIVE – 90 DEGREE	1
2	307769	TOOL ASSEMBLY – DRIVE ALIGNMENT	1
3	257060	PLUG – MAGNETIC	1

1. Not sold separately.

Chapter 3: Installation Instructions

To install the R1 Gearbox Service kit (MD #257174), follow these procedures in order.

3.1 Removing Hydraulic Motor

WARNING

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. If the machine is connected to a windrower, lower to the ground.
2. Stop the engine, and remove the key.
3. Disconnect case drain hose (A) from motor (B).
4. Disconnect pressure and return hoses at fittings (C).

IMPORTANT:

To protect the motor from contamination and prevent spillage of excess fluid, install caps and plugs on open fittings and hoses.

5. Remove four bolts (D).
6. Use a sling and a lifting device to remove the motor.

NOTE:

The motor weighs approximately 20 kg (44 lb.).

7. Cover gearbox opening (A) with a rag or plastic.

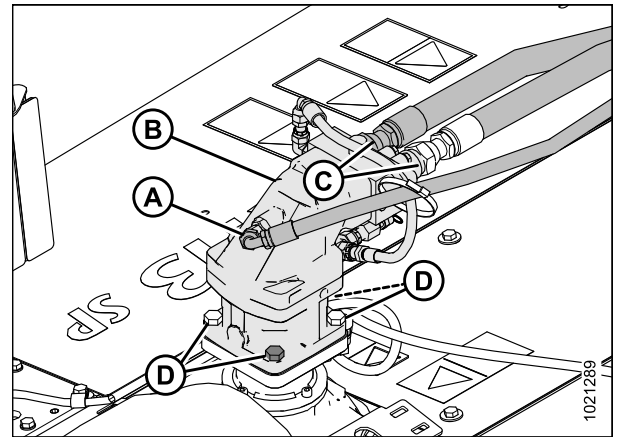


Figure 3.1: Hydraulic Motor

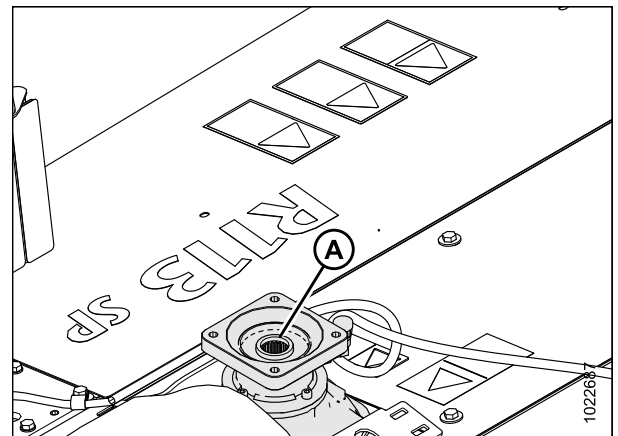


Figure 3.2: Hydraulic Motor Removed

3.2 Removing Left Driveshield

Remove left driveshield (A) as follows:

⚠ CAUTION

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

1. Lower disc mower, shut off engine, and remove key from ignition.
2. Remove lynch pin (A) and tool (B) from pin (C).

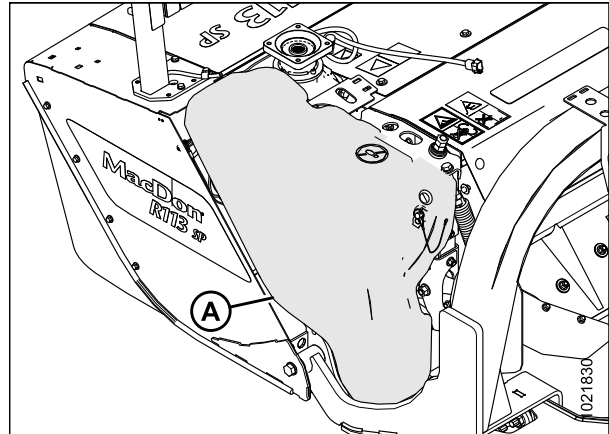


Figure 3.3: Left Driveshield

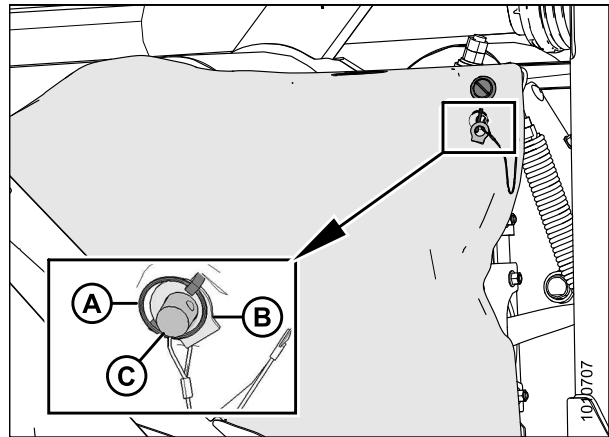


Figure 3.4: Tool to Unlock Driveshield

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

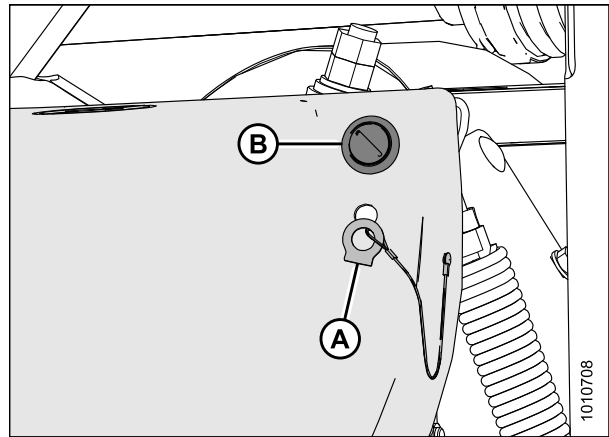


Figure 3.5: Tool to Unlock Driveshield and Latch

INSTALLATION INSTRUCTIONS

4. Pull the top of driveshield (A) away from the header and lift off the pins at the base of the shield to remove.

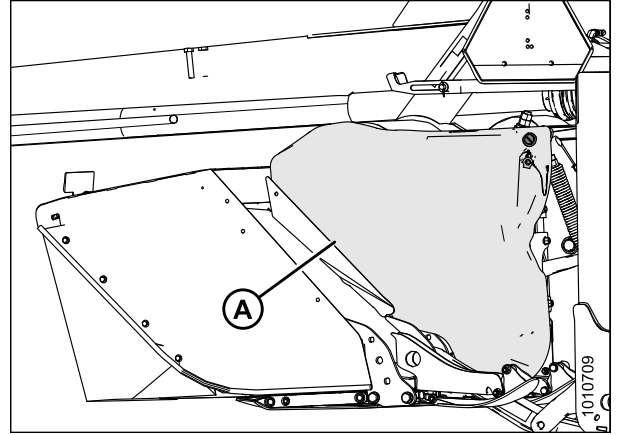


Figure 3.6: Driveshield

3.3 Removing Conditioner Drive Belt

On the left side of the header, remove the conditioner drive belt as follows:

1. Disconnect wire harness (A) from speed sensor (B).

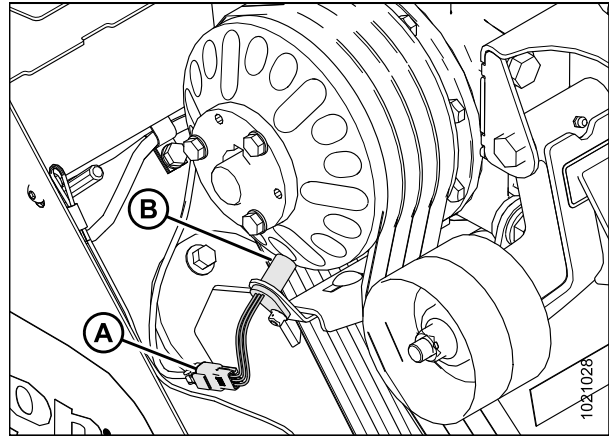


Figure 3.7: Speed Sensor Assembly

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

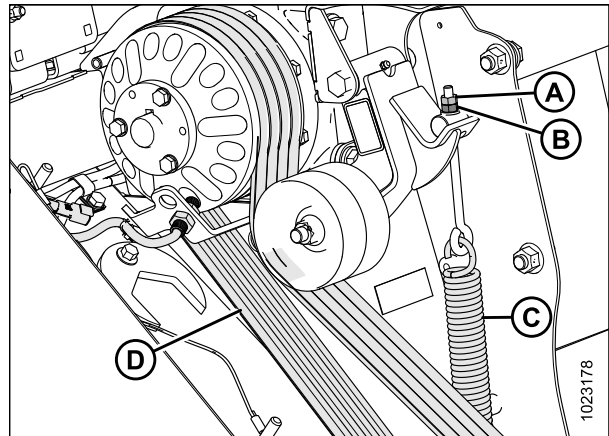


Figure 3.8: Speed Sensor Assembly

3.4 Removing Header Drive Gearbox

Remove the existing header drive gearbox as follows:

1. Lift cutterbar doors (A) at front to open.

NOTE:

If the header was sold outside of North America, you will need to locate the latch access holes for each door, insert a screwdriver, and press down on the latch to release the doors. For more information, refer to the header operator's manual or technical manual.

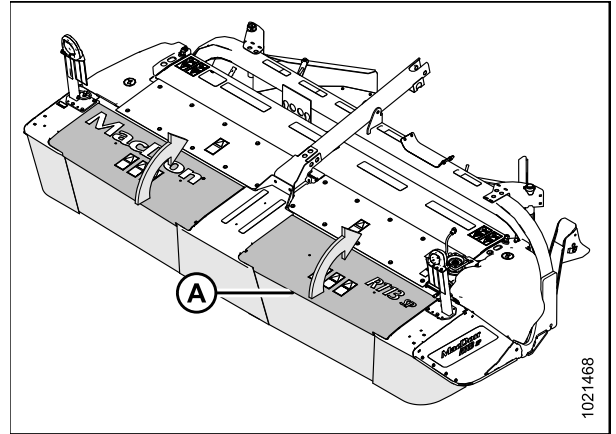


Figure 3.9: Cutterbar Doors

2. Remove bolt with nut (A) and remove speed sensor bracket. The sensor's electrical connector was disconnected from the header harness while removing the conditioner drive belt.
3. Remove three bolts (B) and washers from conditioner drive belt pulley.
4. Remove tapered lock hub (C). For more detailed instructions, refer to the header technical manual.

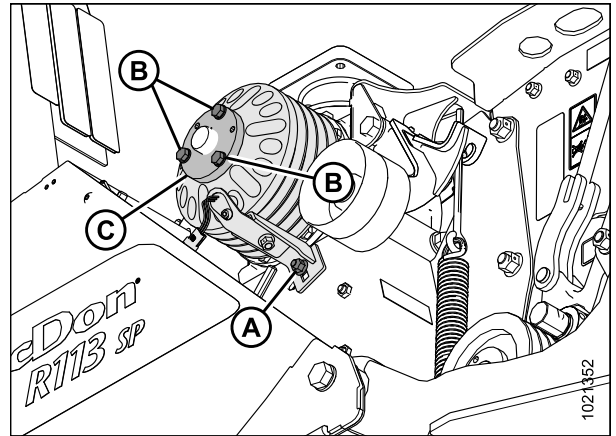


Figure 3.10: Conditioner Belt Pulley

5. Retain shaft key (C) for reassembly after removing tapered lock hub (B), and remove pulley (A).

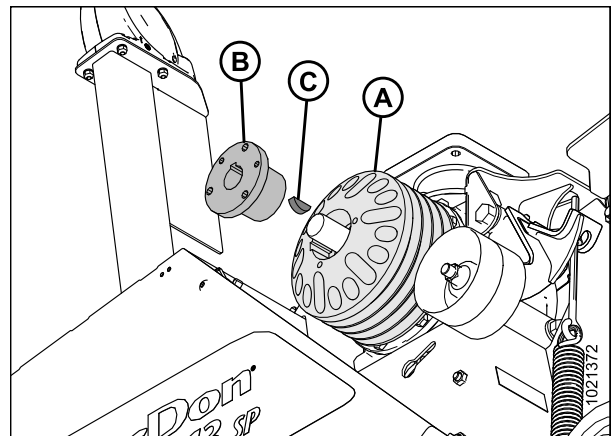


Figure 3.11: Conditioner Belt Pulley

INSTALLATION INSTRUCTIONS

6. Below the gearbox, remove four M10 hex flange head bolts (A) and remove vertical driveshield (B).

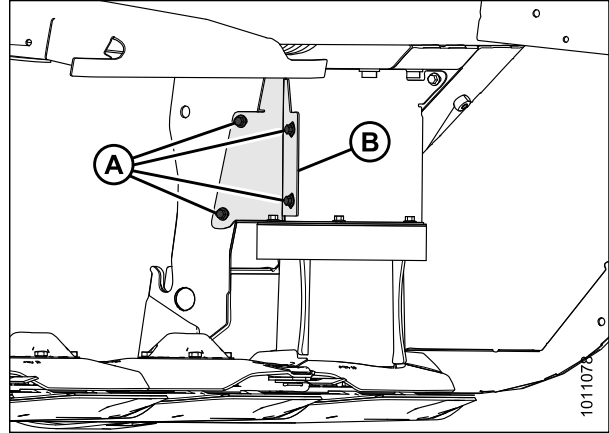


Figure 3.12: Driven Drum

7. Remove two M10 hex flange head bolts (A) and remove cover plate (B).

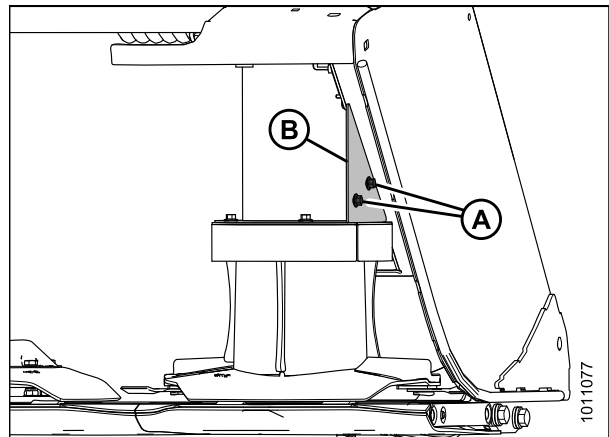


Figure 3.13: Driven Drum

8. Remove four M10 hex flange head bolts (A), and remove top plate (B) and drum top (C).

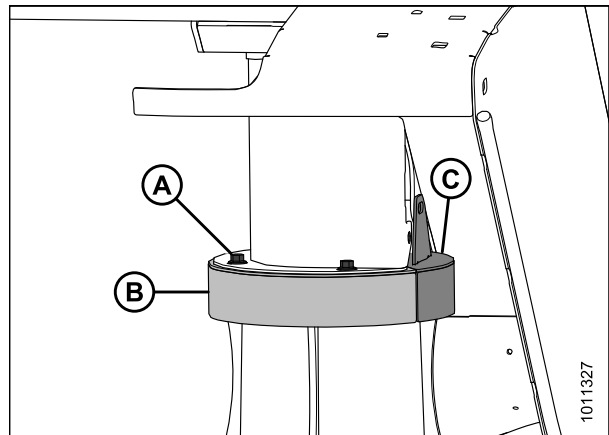


Figure 3.14: Driven Drum

INSTALLATION INSTRUCTIONS

9. Remove one 20 mm M10 hex flange head bolt (A), two 16 mm M10 hex flange head bolts (B), and vertical shield (C).

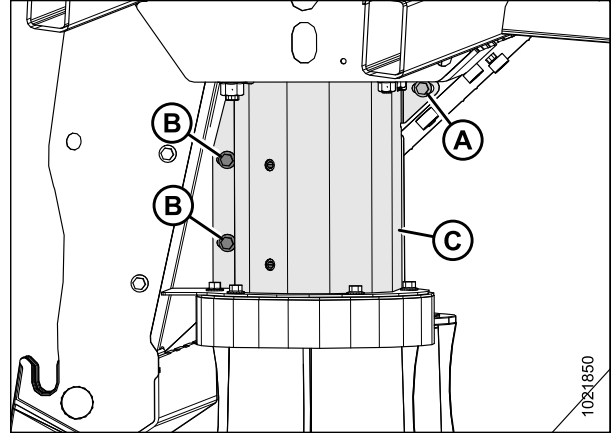


Figure 3.15: Driven Drum

10. Remove eight M8 hex flange head bolts (A), and remove two drum shields (B).

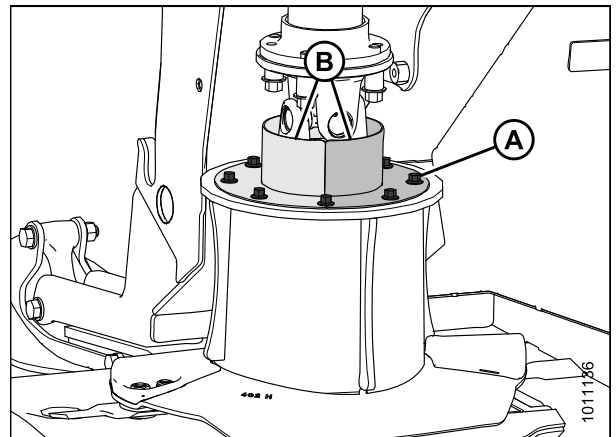


Figure 3.16: Driven Drum

11. Remove four M12 hex flange head bolts (A) and spacers securing driveline assembly (B) to hub drive (C).

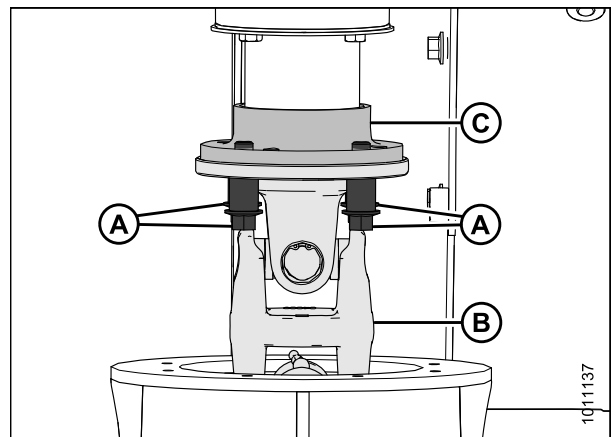


Figure 3.17: Driven Drum

INSTALLATION INSTRUCTIONS

- Slide driveline (A) downwards, tilt it to the side, and pull driveline up and out of drum.

NOTE:

For clarity, illustration shows a cutaway view of drum and tube shield.

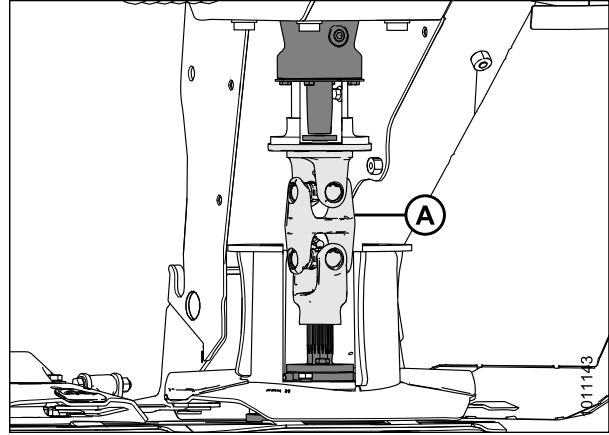


Figure 3.18: Driven Drum

- Remove M14 hex head bolt (A) with washer (B), and then partially reinstall bolt (A) (do not make contact with pulley).

NOTE:

Replacing the bolt will prevent thread damage in bolt hole while using the gear puller in the next step.

- Using gear puller, remove hub (C) from the gearbox vertical shaft. Retain shaft key (D) for reassembly.
- Remove four bolts (F) and remove the shield (E).

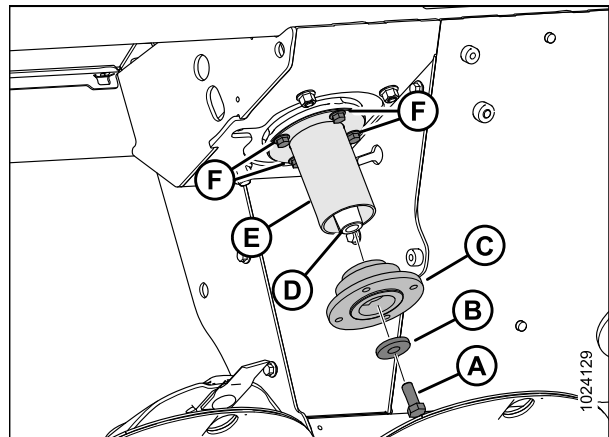


Figure 3.19: Gearbox Vertical Shaft

- Remove the adjustment nut and lock nut (A) to detach the tensioner spring from the belt tension pulley assembly (B).

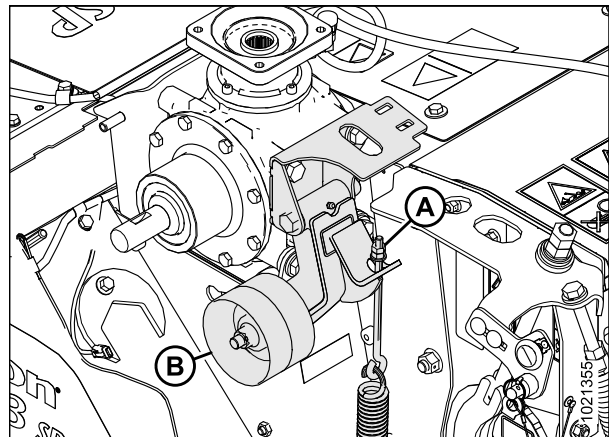


Figure 3.20: Tension Pulley Assembly

INSTALLATION INSTRUCTIONS

17. Remove four M16 hex head bolts and washers (A) from front gearbox mount.

IMPORTANT:

Gearbox weighs approximately 40 kg (88 lb.). Use a sling and a lifting device to support gearbox before loosening bolts and lifting gearbox away from header.

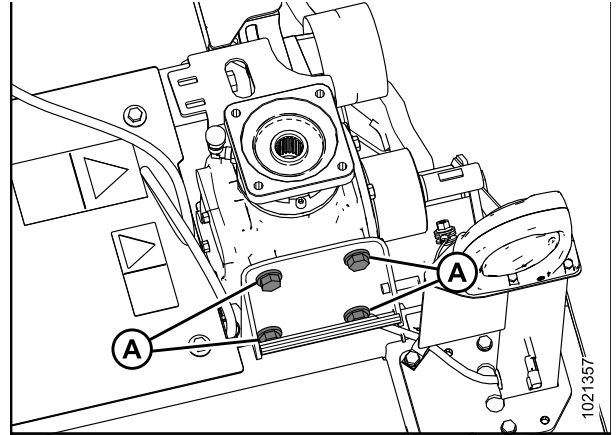


Figure 3.21: Header Drive Gearbox

18. From below the gearbox, remove nuts and washers (A). The gearbox can now be lifted away from the header.

NOTE:

Some parts have been removed from the illustration for clarity.

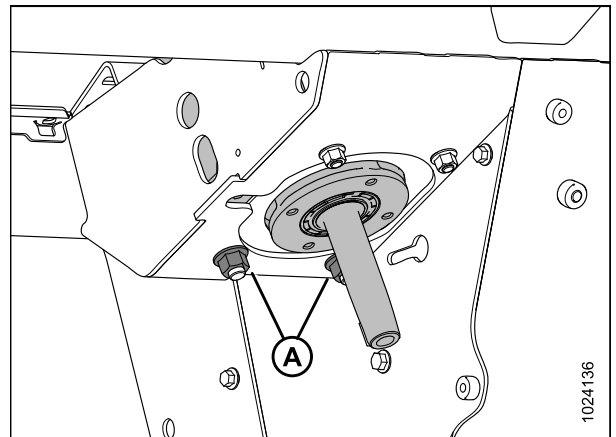


Figure 3.22: Gearbox Install

19. Remove bolts and washers (A) from top mounting holes of the gearbox (B), and remove the conditioner belt tensioner assembly (C).
20. Remove bolts and washers (D) from lower mounting holes to remove bracket (E) and shim (F). Retain parts for reassembly.

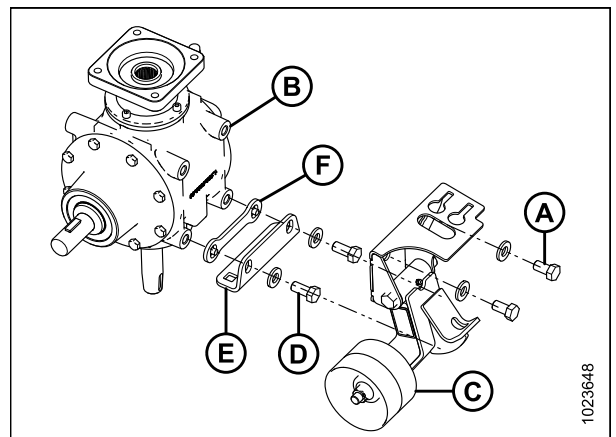


Figure 3.23: Gearbox Mounting Bolts

3.5 Installing Header Drive Gearbox

To install the new gearbox provided in the kit, follow these steps:

IMPORTANT:

Gearbox weighs approximately 40 kg (88 lb.). Use a sling and a lifting device to lift gearbox onto header.

1. Remove and discard elbow fitting and drain plug (A) from new gearbox.

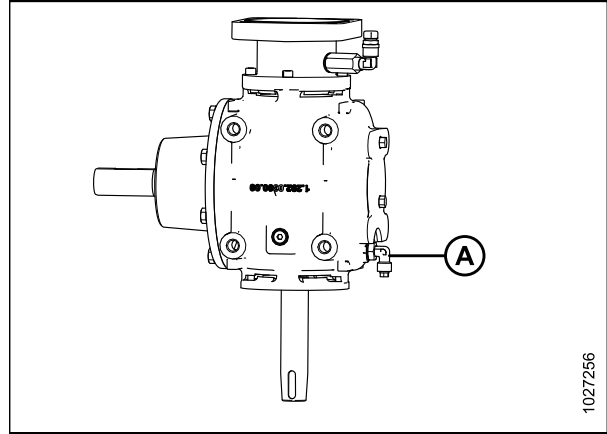


Figure 3.24: New Header Drive Gearbox

2. Install magnetic plug (A) (MD #257060) in place of the elbow fitting and drain plug.

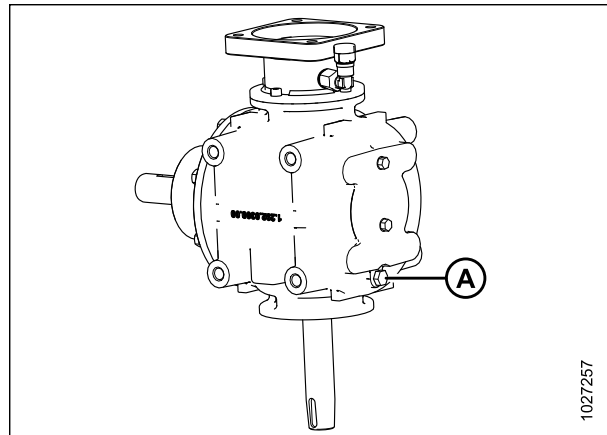


Figure 3.25: New Header Drive Gearbox with Magnetic Plug

3. Install shim (F) and bracket (E) onto gearbox (B), and secure with bolts (D) and washers. Apply high-strength threadlocker (Loctite® 262 or equivalent) to bolts and torque to 271 Nm (200 lbf-ft).
4. Install conditioner belt tensioner assembly (C) onto gearbox with bolts (A) and washers. Apply high-strength threadlocker (Loctite® 262 or equivalent) to bolts and torque to 271 Nm (200 lbf-ft).

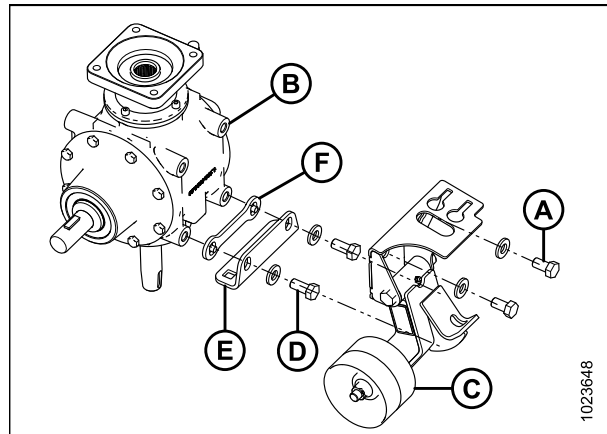


Figure 3.26: Header Drive Gearbox

INSTALLATION INSTRUCTIONS

- Using a sling and a lifting device, lower the gearbox onto the header.
- Install four M16 hex head bolts and washers (A). Bolts should be snug but still allow for positioning of the gearbox.

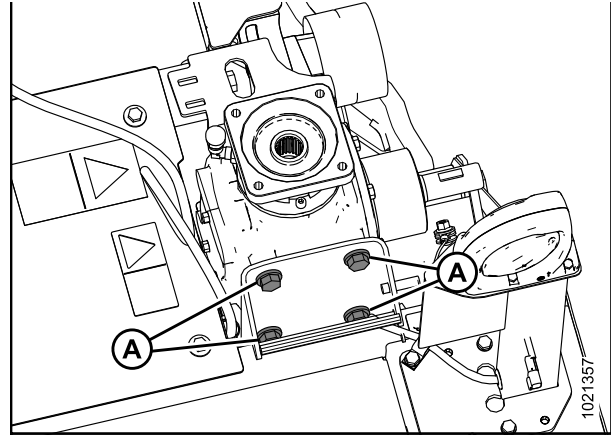


Figure 3.27: Header Drive Gearbox

- Install two M16 hex head bolts with nuts and washers (A). Bolts should be snug but still allow for positioning of the gearbox.

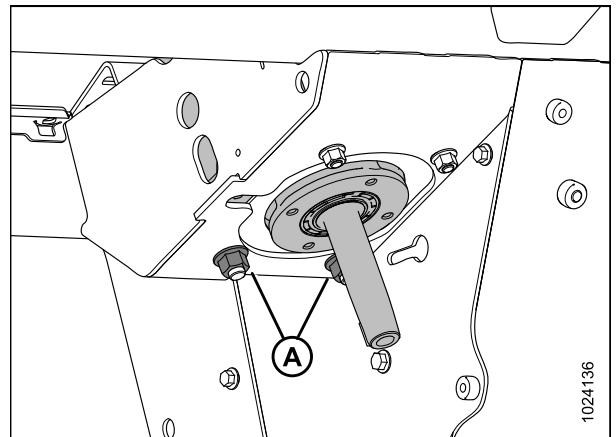


Figure 3.28: Header Drive Gearbox

- Install shield (E) with four bolts (F). Apply medium-strength threadlocker (Loctite® 243 or equivalent) and torque to 52 Nm (38 lbf-ft).
- Insert shaft key (D) and install hub (C) on tapered shaft. Tap with a dead-blow hammer or mallet. Ensure key has remained in keyway.
- Secure hub (C) in place with M14 hex head bolt (A) and washer (B). Apply medium-strength threadlocker (Loctite® 243 or equivalent) and torque to 122 Nm (90 lbf-ft).

IMPORTANT:

Vertical drive alignment is crucial for proper cutterbar operation. Always use the drive alignment tool (MD #307769) when installing the header drive gearbox.

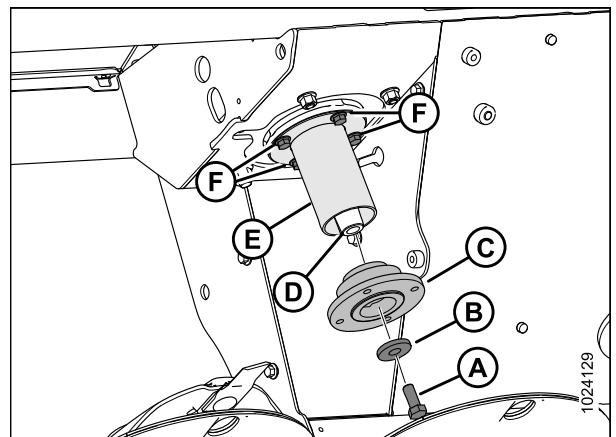


Figure 3.29: Gearbox Vertical Shaft

INSTALLATION INSTRUCTIONS

11. Remove bolt, washer, and nut (A) from the drive alignment tool (MD #307769), and slide the bottom tube up.

NOTE:

The bolt, washer, and nut are provided for storage reasons only. They are not needed for drive alignment.

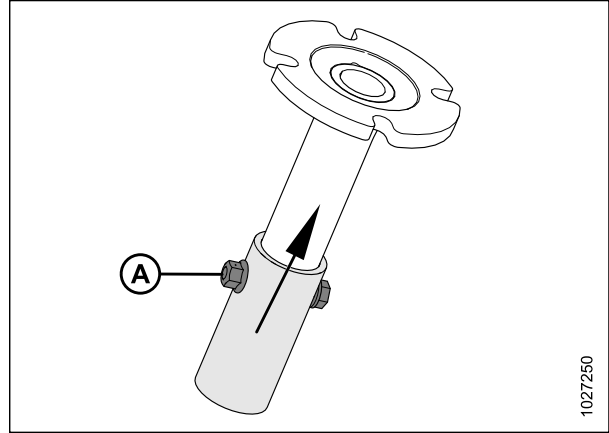


Figure 3.30: Drive Alignment Tool – MD #307769

12. Attach drive alignment tool (A) to the 90-degree gearbox drive hub (B), and tighten. Slide the bottom tube down over the cutterbar driveshaft.

IMPORTANT:

Tighten all four alignment tool bolts with a wrench (hand tight is not sufficient). If the alignment tool is not secured to the gearbox using all four bolts, the drive hub will be misaligned.

13. Adjust the position of the gearbox so that bottom tube of the alignment tool slides freely over the cutterbar driveshaft.
14. Tighten all gearbox mounting bolts and recheck shaft alignment. Refer to Steps 6, page 17 and 7, page 17.
15. When shaft alignment is complete, apply high-strength threadlocker (Loctite® 262 or equivalent) to bolts (A) one-by-one, and torque to 271 Nm (200 lbf-ft).

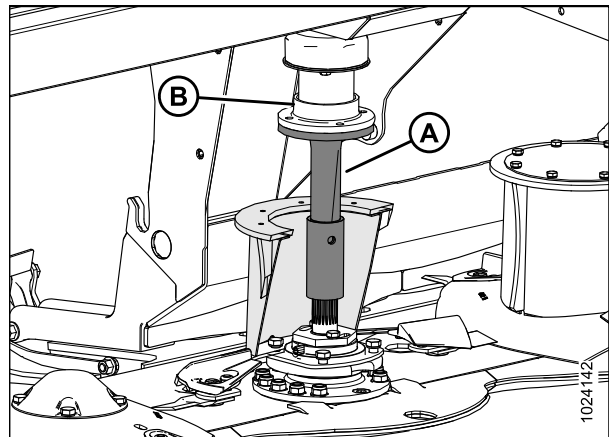


Figure 3.31: Alignment Tool on Driven Drum

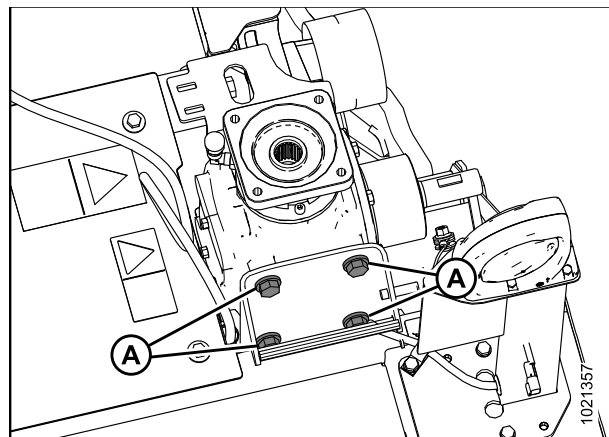


Figure 3.32: Header Drive Gearbox

INSTALLATION INSTRUCTIONS

- Torque nuts (A) to 234 Nm (173 lbf·ft).

NOTE:

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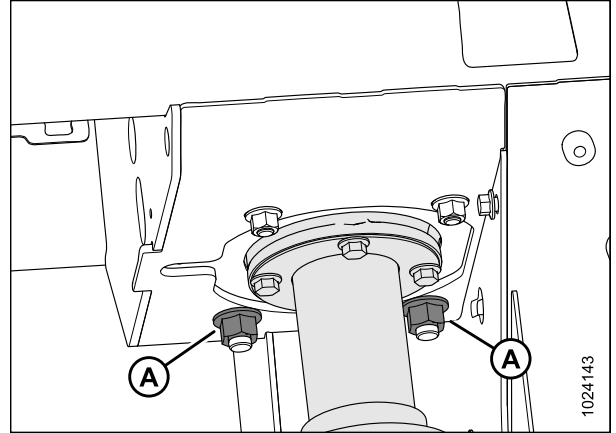


Figure 3.33: Gearbox Install

- Remove bolts securing alignment tool (A) to drive hub (B). Lift lower tube and remove tool.

NOTE:

When aligned properly, the lower tube on tool (A) will slide freely over the cutterbar driveshaft.

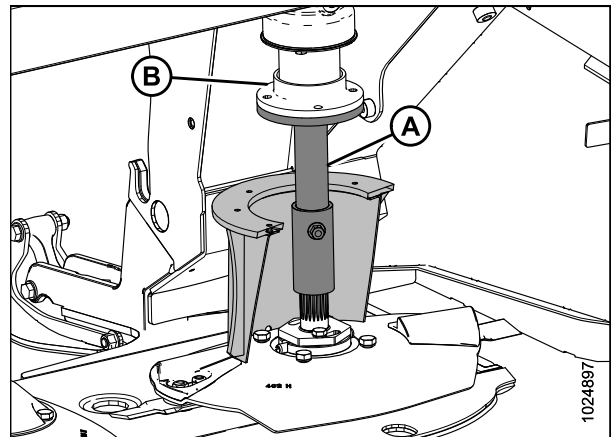


Figure 3.34: Alignment Tool on Driven Drum

- Lubricate spindle splines (A). For specifications, refer to the header technical manual.

NOTE:

The driveline U-joints were greased at the factory and considered to be lubricated for life. No further lubrication is required.

NOTE:

For clarity, illustration shows cutaway view of drum and tube shield.

- Insert driveline (B) at an angle and guide it past hub drive (C) and drum (D).
- Insert splined spindle end (A) into splined bore of driveline (B).

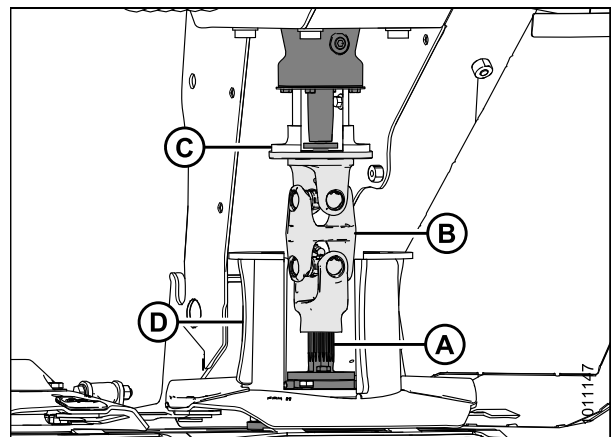


Figure 3.35: Driven Drum

INSTALLATION INSTRUCTIONS

21. Place a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and install four M12 hex flange head bolts (A) and spacers to secure driveline assembly (B) to hub drive (C). Torque bolts to 100 Nm (74 lbf-ft).

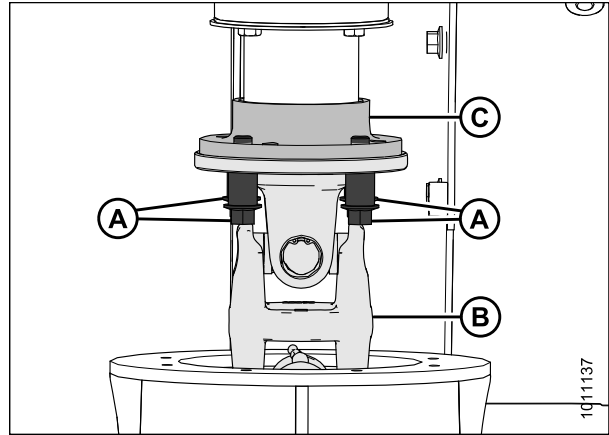


Figure 3.36: Driven Drum

22. Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and use eight M8 hex flange head bolts (A) to secure drum shields in place. Torque to 29 Nm (21 lbf-ft).

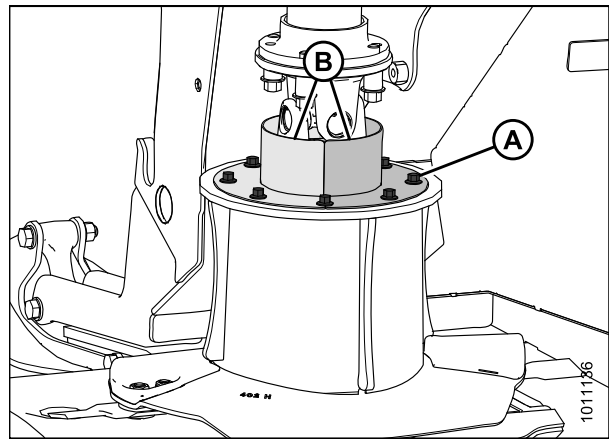


Figure 3.37: Driven Drum

23. Position vertical shield (A) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use one 20 mm M10 hex flange head bolt (B) and two 16 mm M10 hex flange head bolts (C) to secure vertical shield in place. Torque to 57.5 Nm (42 lbf-ft).

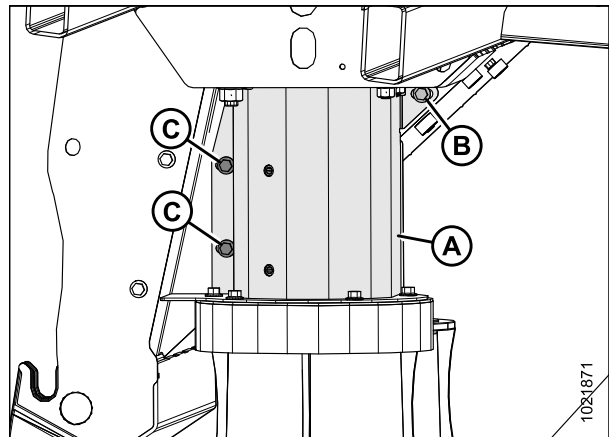


Figure 3.38: Driven Drum

INSTALLATION INSTRUCTIONS

24. Position top plate (B) and drum top (C) onto drum as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use four M10 hex flange head bolts (A) to secure the top plate and drum top in place.

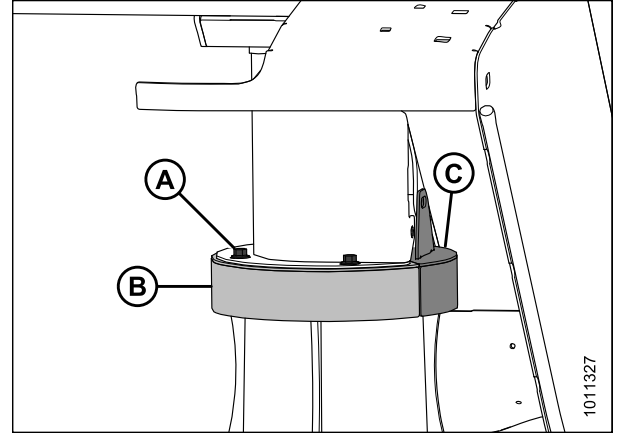


Figure 3.39: Driven Drum

25. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then install top M10 hex flange head bolt (B) through cover plate (A) and top plate (C).
26. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then install lower M10 hex flange head bolt (D) through cover plate (A) and vertical shield (E).
27. Tighten bolts (B) and (D).

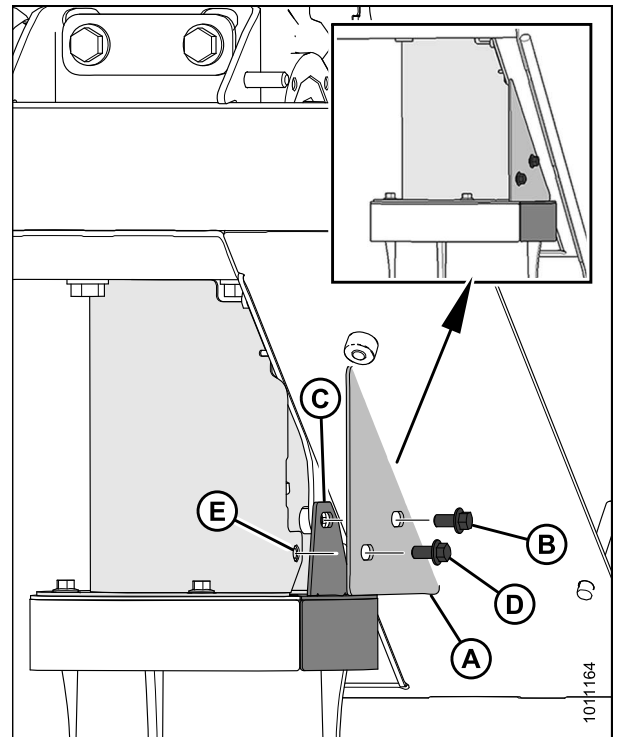


Figure 3.40: Driven Drum

INSTALLATION INSTRUCTIONS

28. Position vertical driveshield (B) as shown at right. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around threads, and then use four M10 hex flange head bolts (A) to secure vertical driveshield in place.

WARNING

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

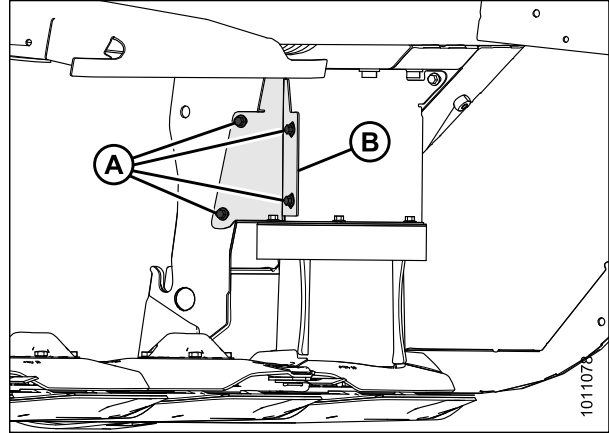


Figure 3.41: Driven Drum

29. Reattach the spring (A) to the belt tension pulley assembly (B) with straight pin (C), washer, adjustment nut, and lock nut (D).

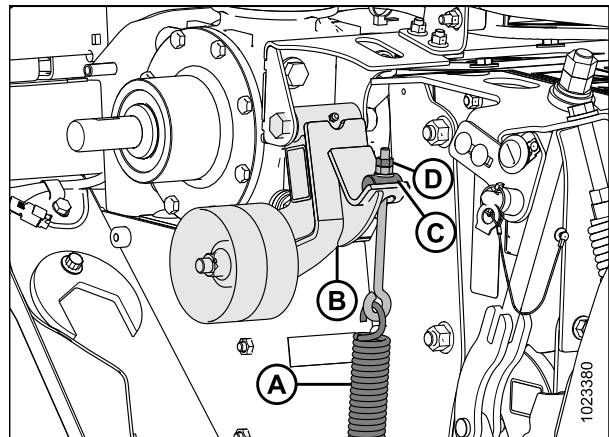


Figure 3.42: Tension Pulley Assembly

30. Install pulley (A) on gearbox shaft. Install tapered lock hub (B) onto shaft with shaft key (C).

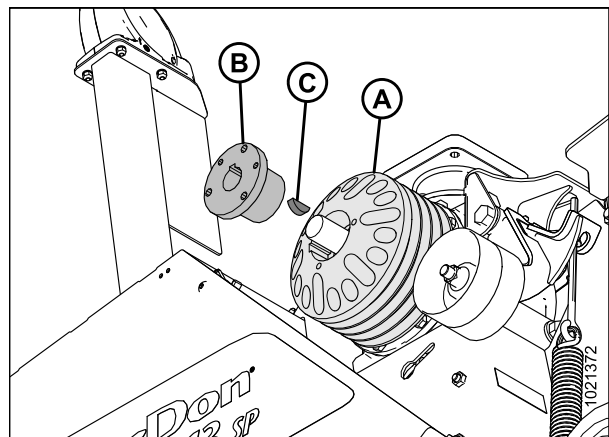


Figure 3.43: Conditioner Belt Pulley

INSTALLATION INSTRUCTIONS

31. Align pulley (A) with pulley (B). The pulleys should be aligned within 6 mm (1/4 in.) of each other.

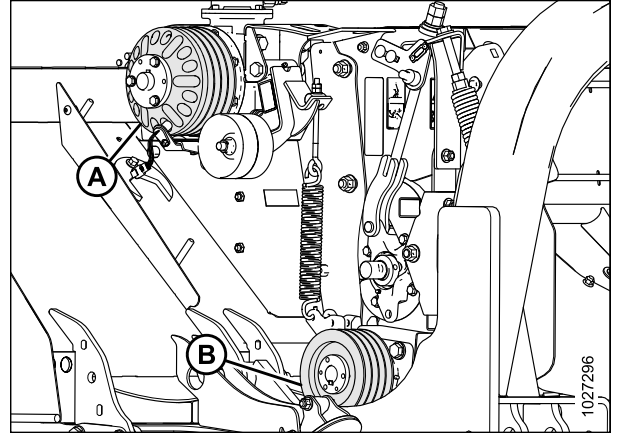


Figure 3.44: Conditioner Belt Pulley Alignment

32. Install taper lock hub (C) with three bolts (B). For more detailed instructions, refer to the header technical manual.
33. Attach speed sensor bracket with bolt and nut (A) so that sensor is parallel with face of pulley. There are two possible bracket positions. Ensure the bracket is positioned correctly for the windrower being used.
 - If the header will be used with an M155 or M155E4 Self-Propelled Windrower, install the bracket in the upper position (with bolt and nut [A] at the bottom of the slot).
 - If the header will be used with an M1170 Windrower, install the bracket in the lower position (with bolt and nut [A] at the top of the slot), as shown in the illustration at right.

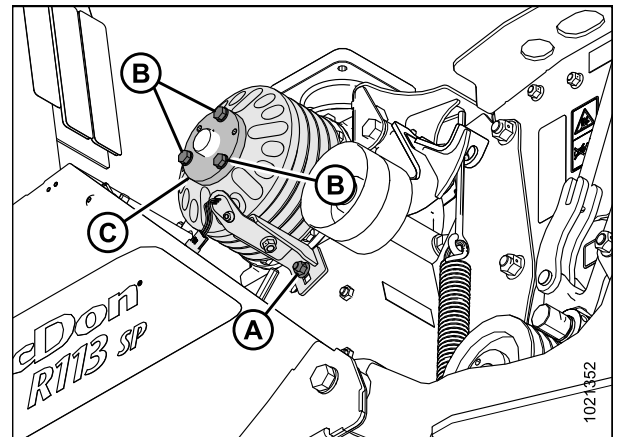


Figure 3.45: Conditioner Belt Pulley

34. Torque nuts to 57 Nm (42 lbf-ft).

3.6 Reinstalling Conditioner Drive Belt

Reinstall the conditioner drive belt as follows:

1. 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.

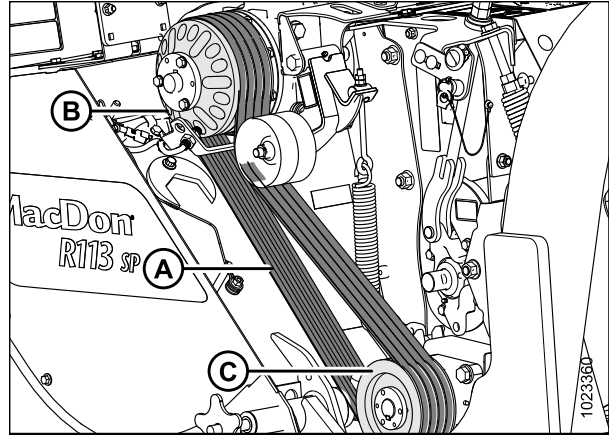


Figure 3.46: Conditioner Drive

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

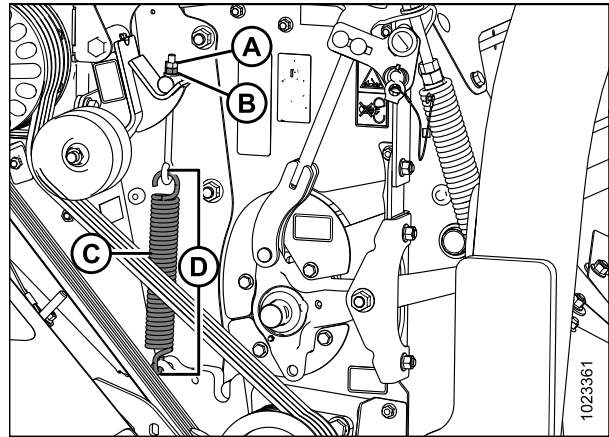


Figure 3.47: Conditioner Drive

6. Reconnect the speed sensor (B) to wiring harness (A).

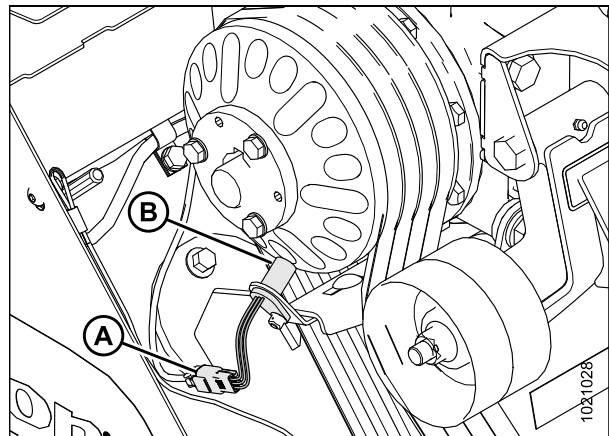


Figure 3.48: Speed Sensor

INSTALLATION INSTRUCTIONS

7. Check clearance between speed sensor (A) and pulley (B). If necessary, adjust sensor nuts to ensure that there is a 2–3 mm gap (C) between the speed sensor and the pulley. Ensure the sensor is parallel with the pulley.

NOTE:

Big gap adjustments can be made by moving the speed sensor bracket. Small adjustments can be made by adjusting the sensor nuts.

8. Tighten sensor nuts to 12 Nm (9 lbf·ft).

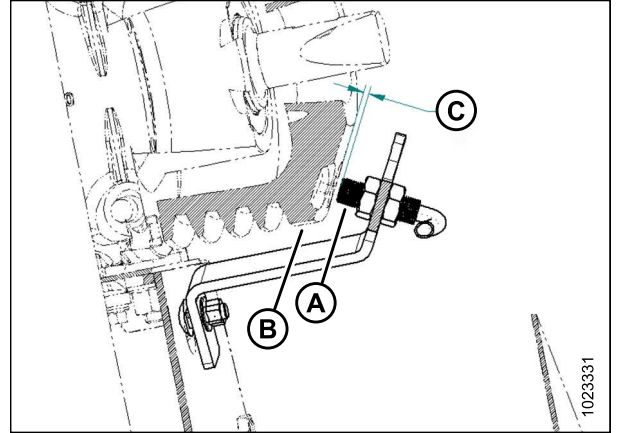


Figure 3.49: Gap between Sensor and Pulley

3.7 Reinstalling Left Driveshield

To reinstall the left driveshield, follow these steps:

⚠ CAUTION

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

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

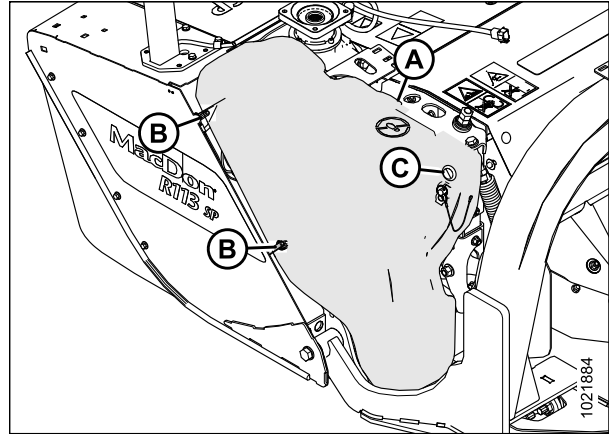


Figure 3.50: Driveshield and Latch

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

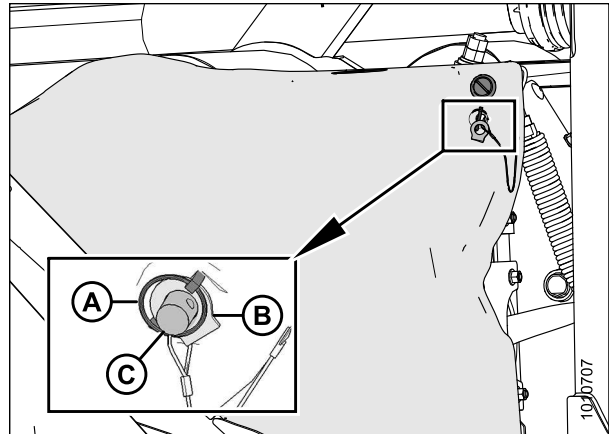


Figure 3.51: Tool to Unlock Driveshield

3.8 Adding Header Drive Gearbox Lubricant

1. 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).
2. Remove plug (A) with a 13 mm (1/2 in.) socket.
3. Remove plug (B) and add lubricant (SAE 80W-140) to gearbox through hole (B) until lubricant runs out of hole (A).
4. Reinstall plugs and tighten.

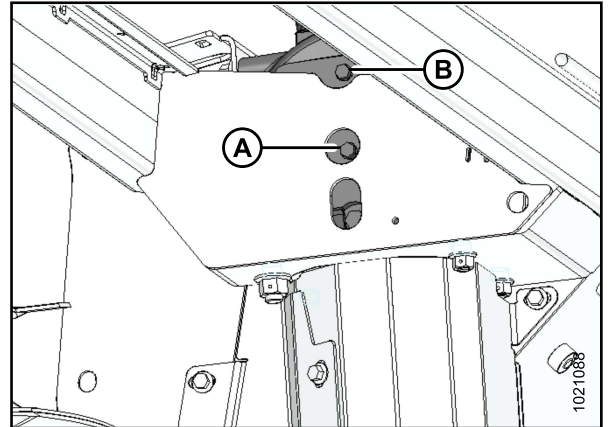


Figure 3.52: Header Drive Gearbox

CAUTION

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

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

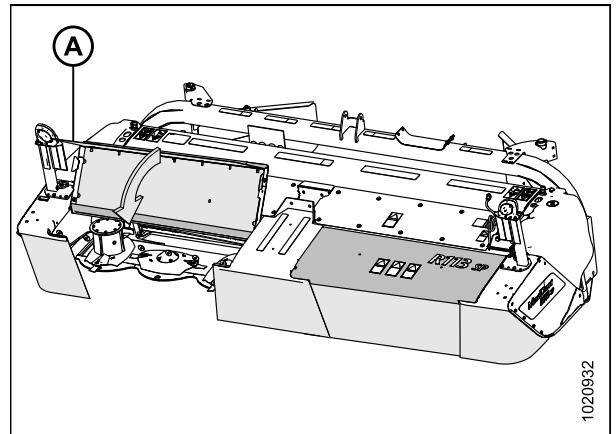


Figure 3.53: Cutterbar Doors

3.9 Installing Hydraulic Motor

1. Attach a sling to the motor with the opposite end attached to a lifting device.

IMPORTANT:

Do **NOT** use the hydraulic lines to lift the motor.

NOTE:

The motor weighs approximately 20 kg (44 lb.).

2. Lower the motor (B) onto gearbox opening.
3. Install four bolts (D). Torque to 140 Nm (103 lbf-ft).
4. Remove caps from motor ports and hoses and reconnect hoses (A) and (C) to motor.

NOTE:

Hydraulic connections vary depending on the windrower. Refer to the specific instructions supplied with your hydraulic drive kit.

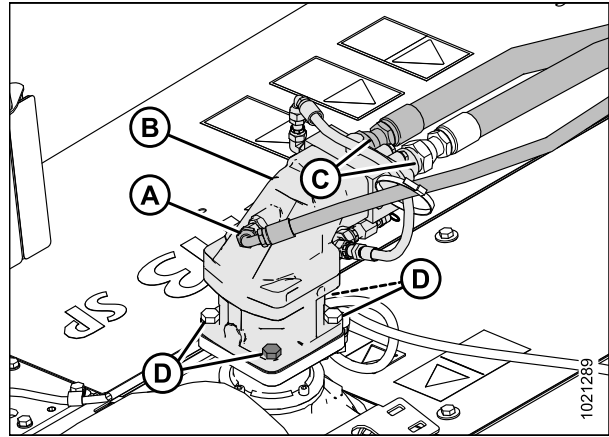


Figure 3.54: Hydraulic Motor

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