

R216

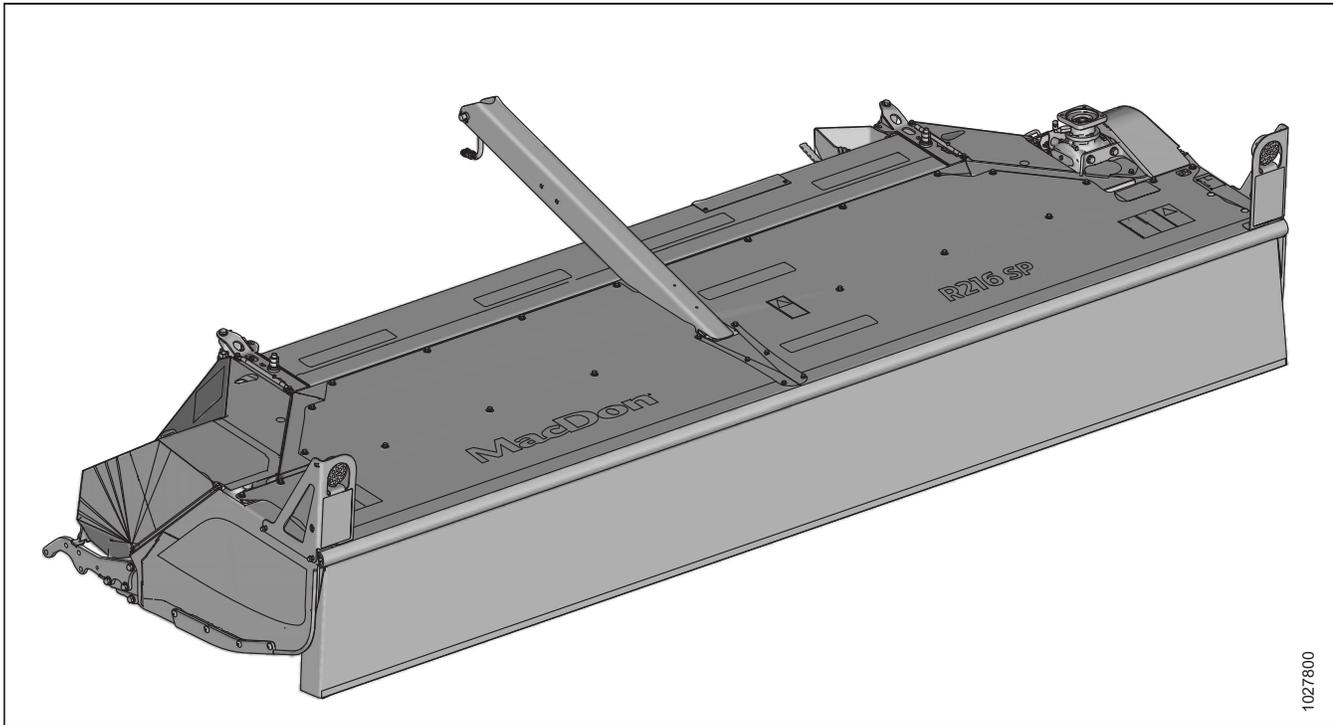
Rotary Disc Header

Gearbox Service Kit (MD #307801) Installation Instructions

214870 Revision C

Original Instruction

R216 Rotary Disc Header



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Introduction

Gearbox Service Kit (MD #307801) is used to replace the gearbox on a MacDon R216 Rotary Disc Header.

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 header is the side that faces the crop; the back of the header is the side that connects to 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 can be downloaded from our website www.macdon.com or from our Dealer-only site (<https://portal.macdon.com>) (login required).

NOTE:

This document is currently available in English only.

Summary of Changes

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

Section	Summary of Change	Internal Use Only
<i>3.7 Closing Left Driveshield, page 28</i>	Updated driveshield lock latch illustration.	Engineering
<i>3.4 Installing Header Drive Gearbox, page 18</i>	Updated procedure steps.	Engineering

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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 information or advice.

1.2 General Safety

CAUTION

The following general farm safety precautions 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 the job at hand. Do **NOT** take chances. You may need the following:

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

In addition, take the following precautions:

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

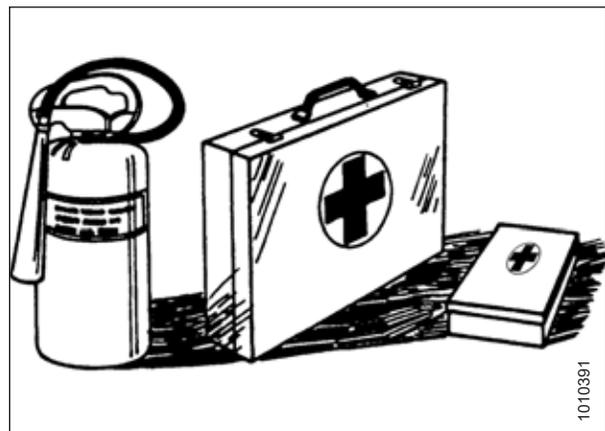


Figure 1.3: Safety Equipment

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 the engine is running.
- Do **NOT** modify the machine. Unauthorized modifications may impair machine function and/or safety. It may also shorten the machine's life.
- To avoid 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.

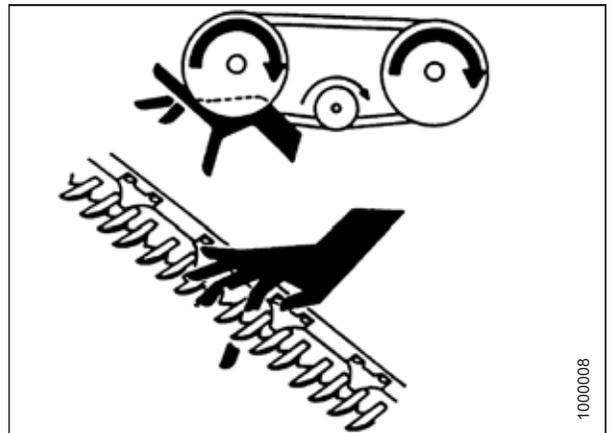


Figure 1.5: Safety around Equipment

- Keep service area clean and dry. Wet and/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 are fire hazards. 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.

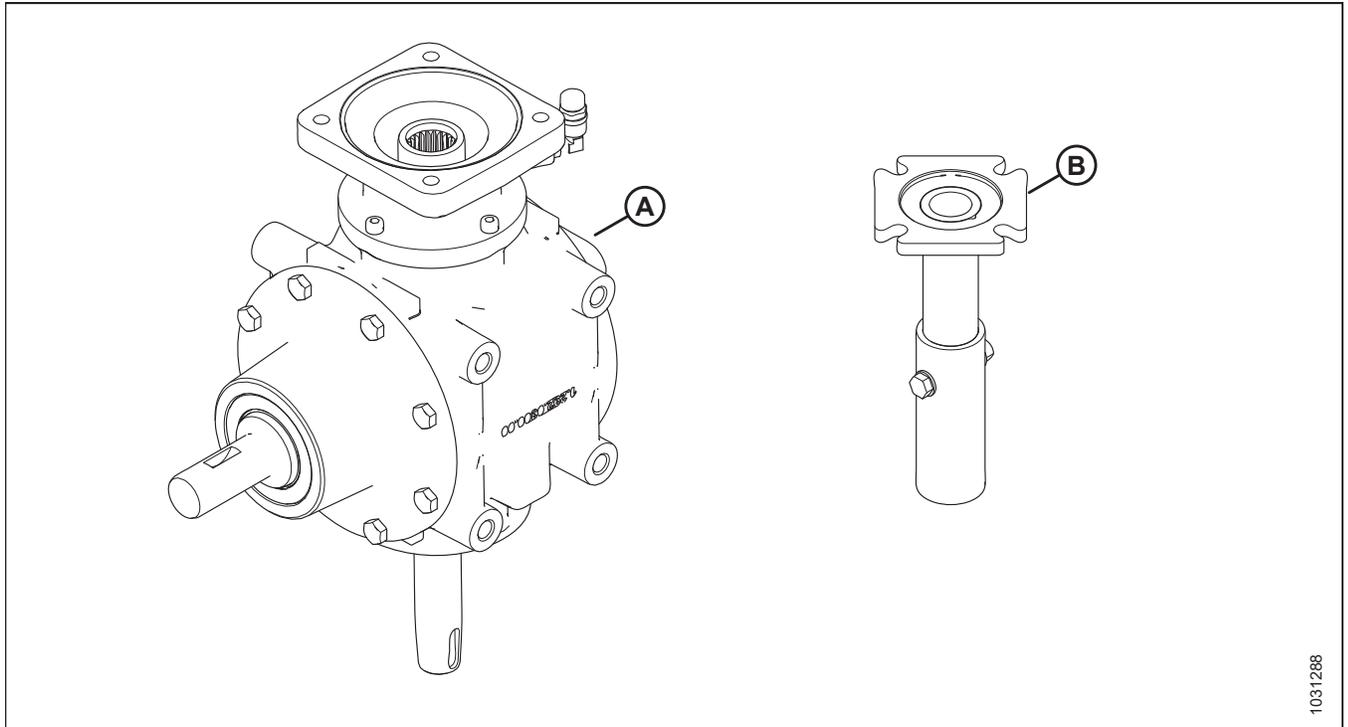


Figure 1.6: Safety around Equipment

Chapter 2: Parts List

The following parts are included in this kit:

Figure 2.1: Parts Included in Gearbox Kit



1031288

Ref	Part Number	Description	Quantity
A	NSS ¹	GEARBOX – DRIVE, 90 DEGREE	1
B	325683	TOOL ASSEMBLY – DRIVE ALIGNMENT	1

1. Not sold separately.

Chapter 3: Installation Instructions

To install the Gearbox kit, follow these procedures in order.

3.1 Removing Header Drive Motor

Before replacing the gearbox, you will need to remove the header drive motor. Follow these steps:

WARNING

To avoid bodily injury or death from the unexpected startup of the machine, always stop the engine and remove the key before making adjustments to the machine.

1. Lower the header to the ground.
2. Shut down the engine, and remove the key from the ignition.
3. Locate header drive motor (A) on top of the header.
4. Remove four bolts (B).
5. Use a sling and a lifting device to remove motor (A).

NOTE:

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

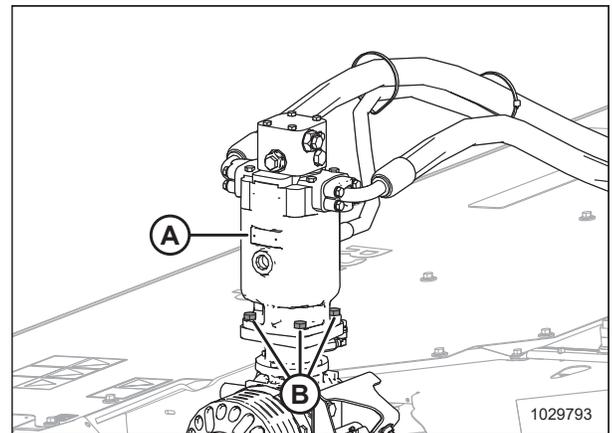


Figure 3.1: Hydraulic Motor

3.2 Opening Left Driveshield

CAUTION

To reduce the risk of personal injury, do NOT operate the machine without the driveshields in place and secured.

To open the left driveshield, follow these steps:

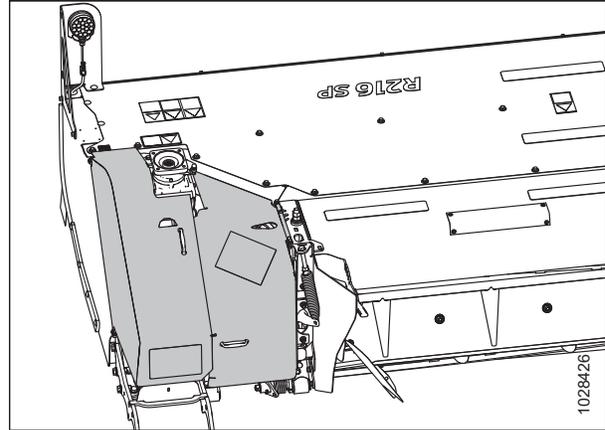


Figure 3.2: Left Driveshield

1. Push down on release lever (A) to disengage the release latch and pull handle (B).

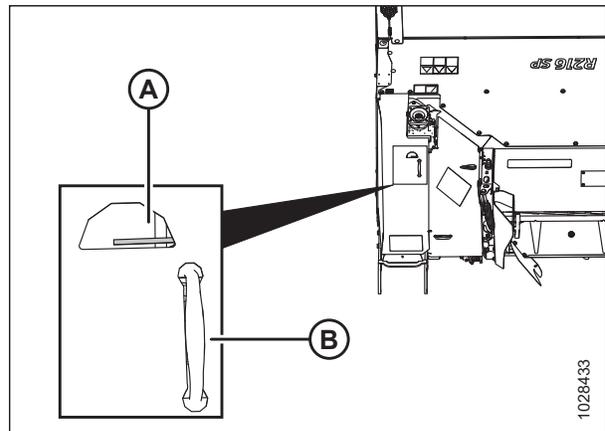


Figure 3.3: Driveshield Latch and Handle

2. Lift outboard driveshield panel (A) in an outboard direction toward the end of the header.

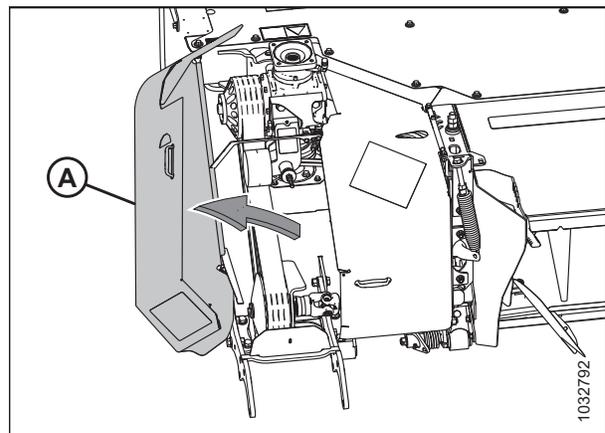


Figure 3.4: Opening Driveshield – Outboard Panel

INSTALLATION INSTRUCTIONS

3. Pull handle (A) and lift inboard driveshield panel (B) toward the middle of the header.

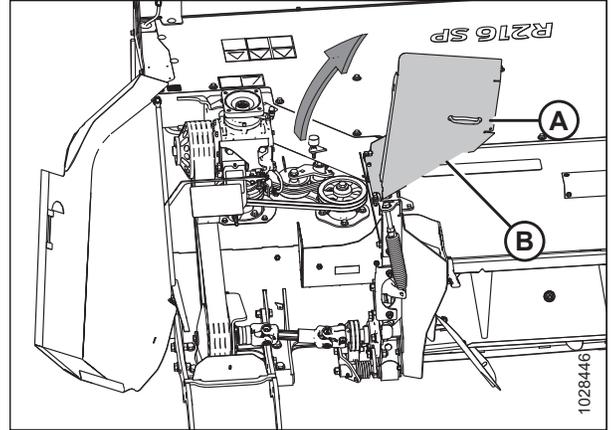


Figure 3.5: Driveshield – Inboard Panel

3.3 Removing Existing Header Drive Gearbox

To remove the existing header drive gearbox, follow these steps:

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

NOTE:

The connector on the end of speed sensor (B) is hidden behind the gearbox in the illustration at right.

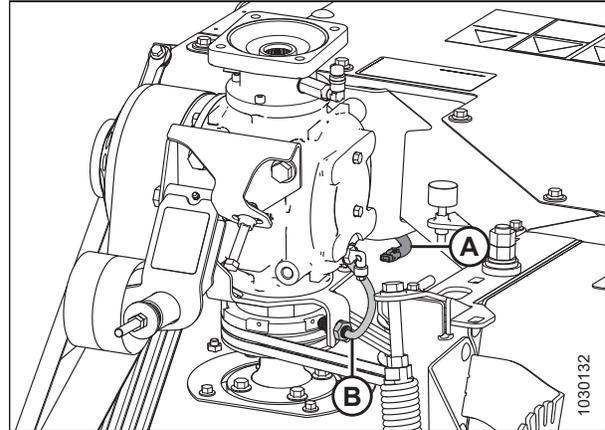


Figure 3.6: Speed Sensor Assembly

2. Turn jam nut (A) counterclockwise to unlock the tension adjustment.
3. Turn jam nut (A) and adjuster nut (B) counterclockwise to fully extend tensioner spring (C), and release the tension from conditioner drive belt (D).
4. Fully loosen hardware, then slide threaded rod (E) forward and down to disengage the rod pivot point from the disc speed sensor bracket.

NOTE:

The threaded rod pivot point must be disengaged from the disc speed sensor bracket to allow the tensioner assembly to rotate enough to remove the drive belt.

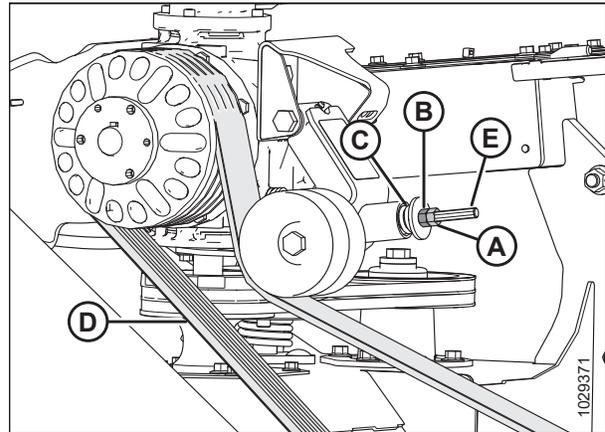


Figure 3.7: Conditioner Drive

5. Remove drive belt (D).
6. Remove three bolts (C) and washers from taper lock hub (B) and drive pulley (A).

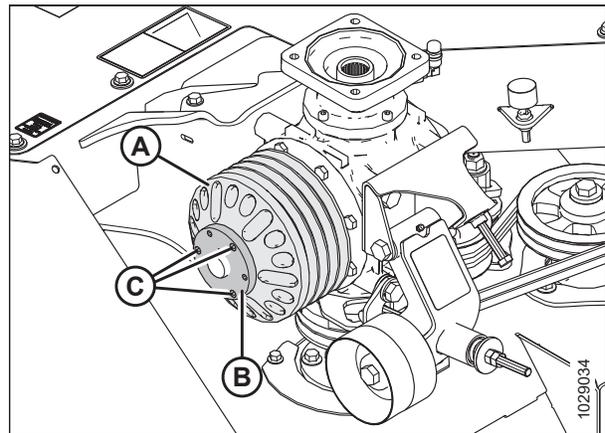


Figure 3.8: Drive Pulley

INSTALLATION INSTRUCTIONS

- Remove pulley (A) and taper lock hub (B). For instructions to remove the hub, refer to [3.3.1 Replacing Taper Lock Hub](#), [page 15](#). Retain shaft key (C) for reassembly.

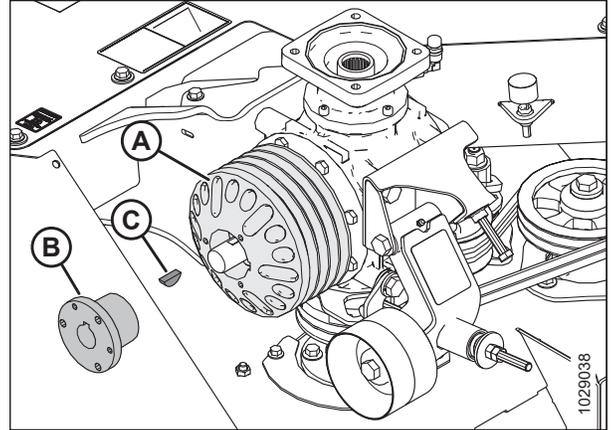


Figure 3.9: Drive Pulley

- Open the cutterbar curtain. For instructions, refer to the header operator's manual or technical manual.
- Remove four M10 hex flange head bolts (A) and loosen two M10 hex flange head bolts (B). Remove driveline shield (C).

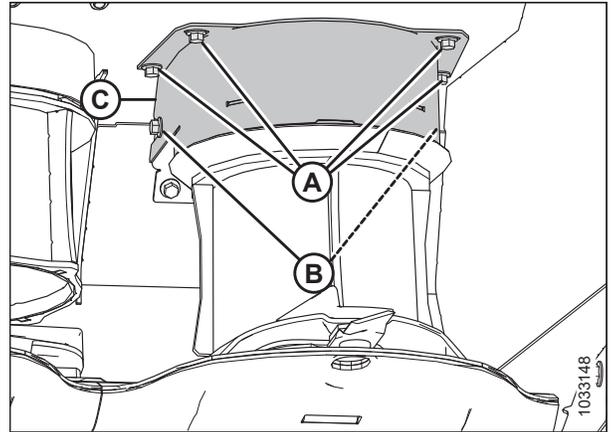


Figure 3.10: Driveline Shield

- Remove two M10 hex flange head bolts (A) and remove driveline shield (B).

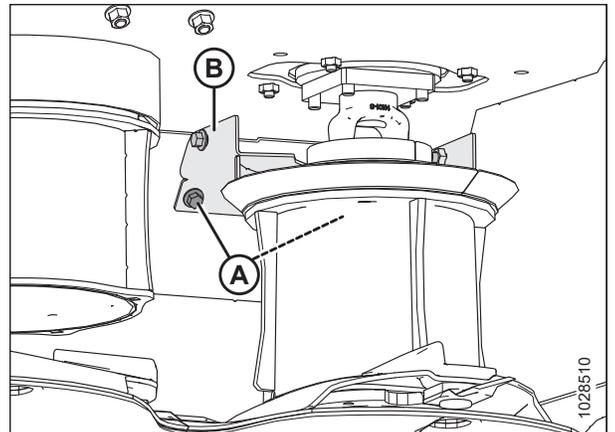


Figure 3.11: Driveline Shield

INSTALLATION INSTRUCTIONS

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

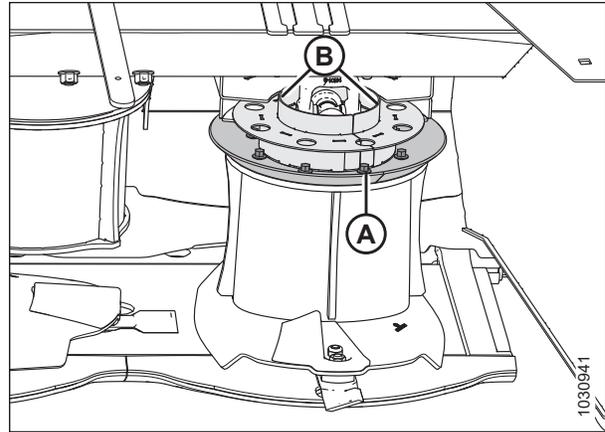


Figure 3.12: Driveline Shields

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

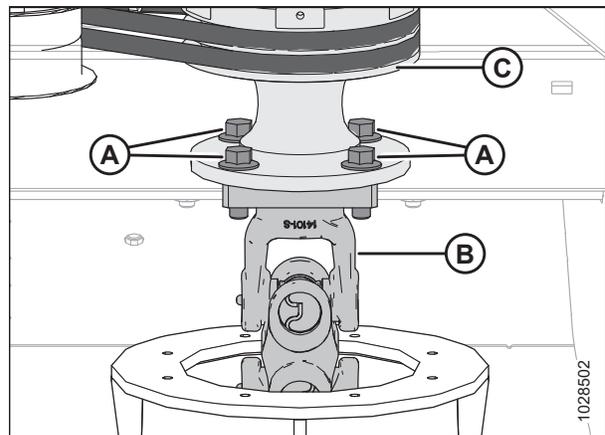


Figure 3.13: Driveline

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

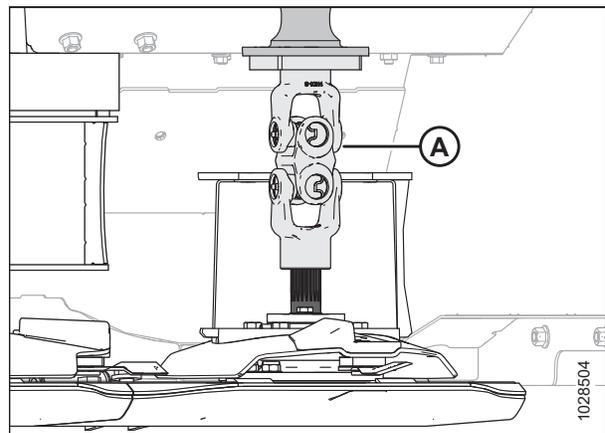


Figure 3.14: Drum and Tube Shield – Cutaway View

INSTALLATION INSTRUCTIONS

14. Locate the left suspended drum drive on the left side of the header. Remove four M10 hex flange head bolts (C), and remove shield plate (D).

NOTE:

Shield plate (D) is open on the front side.

15. Release tension using a 1/2 in. drive ratchet at location (A) to turn the tensioner arm clockwise, and then remove belt (B).

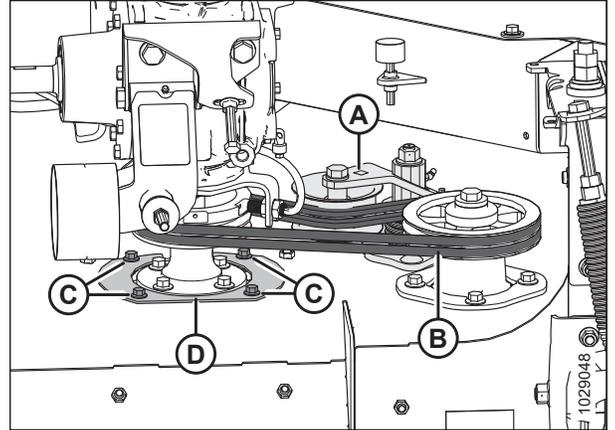


Figure 3.15: Left Suspended Drum Drive – View from Rear

16. Remove two M16 hex flange bolts (A) and washers (B), and then remove conditioner drive belt tensioner assembly (C) from gearbox (D).

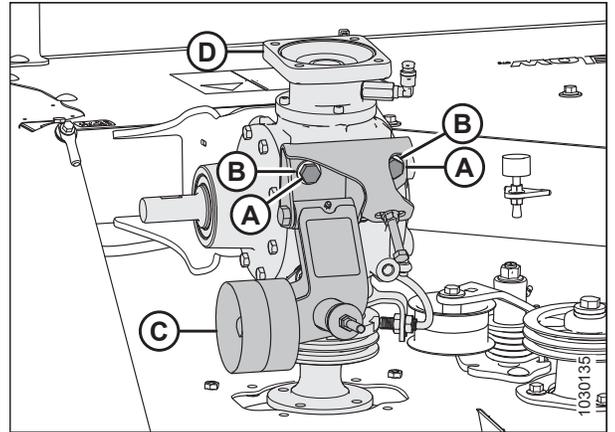


Figure 3.16: Conditioner Drive Belt Tensioner Assembly

17. Remove M10 hex washer screw (A), and remove cover plate (B).

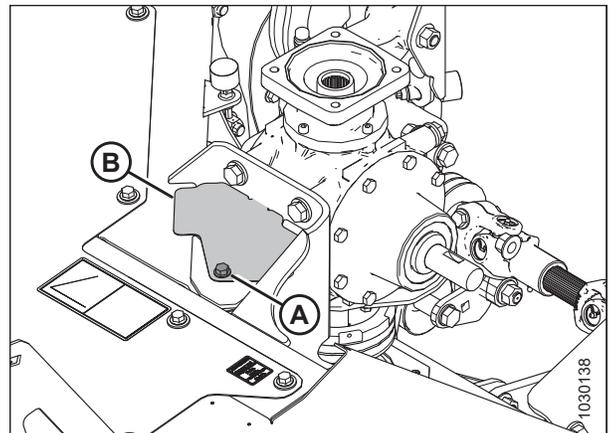


Figure 3.17: Cover Plate



CAUTION

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

INSTALLATION INSTRUCTIONS

18. Position a sling and lifting device to support gearbox (B).
19. Remove four M16 hex flange bolts and washers (A) from the front of the gearbox mount, and lift gearbox (B) out of the header.

NOTE:

Some header frame parts have been removed from the illustration for clarity.

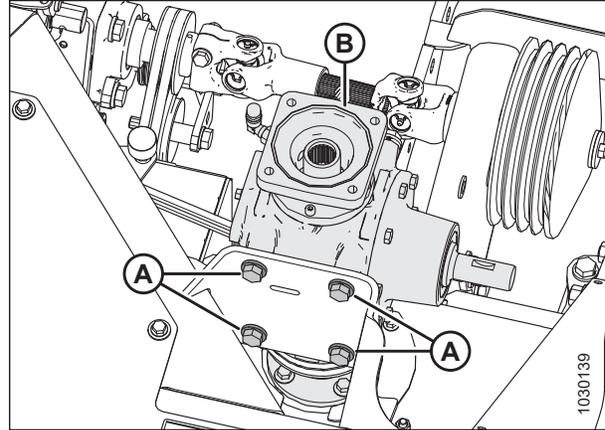


Figure 3.18: Header Drive Gearbox

20. Remove M14 bolt (A) and flat washer (B) from the bottom of the gearbox shaft, then detach hub (C) from the gearbox. Retain bolt, washer, and hub for reinstallation on the new gearbox.
21. Remove M16 hex head bolt and washer (E) as well as two M10 bolts securing speed sensor bracket (G) to the bottom of the gearbox. Remove speed sensor bracket (G) and spacer plate (F). Retain all parts for reinstallation.

NOTE:

The M10 bolts are not visible in the illustration at right. They are on the bottom of the gearbox.

NOTE:

Do **NOT** remove speed sensor (H) from speed sensor bracket (G).

22. Discard the gearbox and the O-ring on top. Retain key (D) for reinstallation.

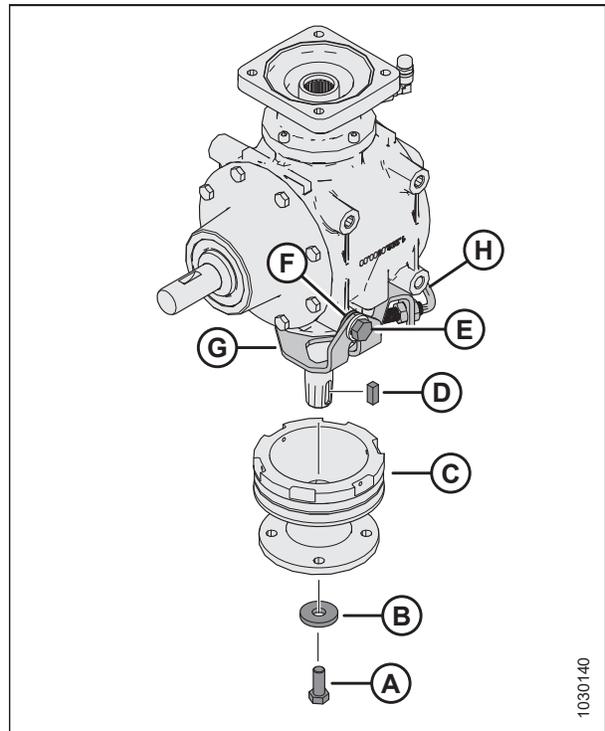


Figure 3.19: Gearbox Removed from Header

INSTALLATION INSTRUCTIONS

3.3.1 Replacing Taper Lock Hub

A typical pulley is shown here, but the same steps apply to any taper hub.

1. If only removing the pulley or taper lock and not moving the shaft, measure position as shown. If replacing bearing and/or shaft, measure the end of shaft from the end frame after the taper lock and pulley have been removed, before undoing lock collars.

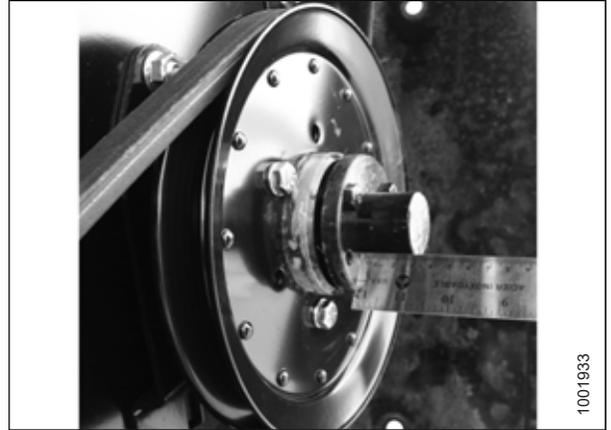


Figure 3.20: Shaft Measurement

2. Remove three bolts (A).

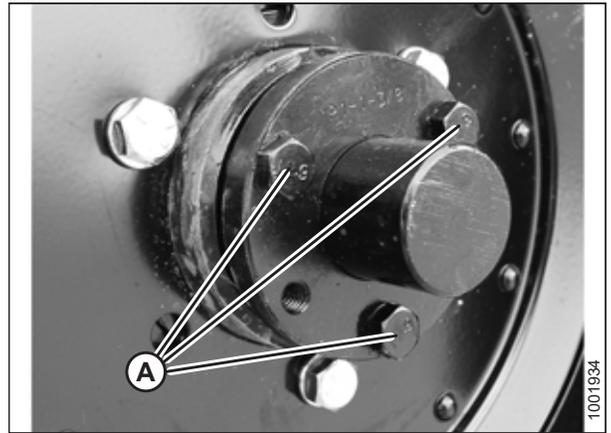


Figure 3.21: Taper Lock Hub Bolts

3. Install two of three bolts (A) into the two threaded holes, and tighten evenly. This will push the pulley off the hub.

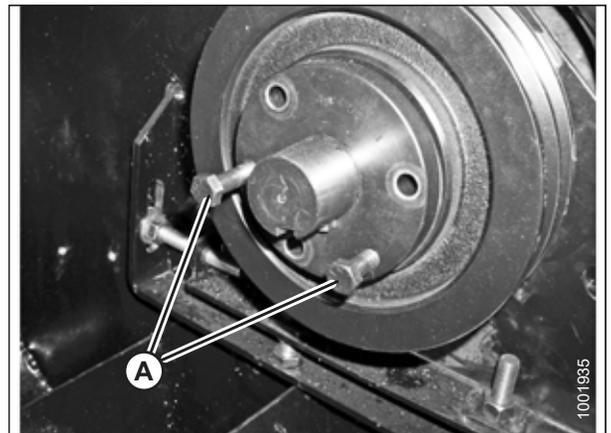


Figure 3.22: Split Hub and Pulley

INSTALLATION INSTRUCTIONS

4. Before removing the hub, use an emery cloth to clean the paint off the shaft.



Figure 3.23: Shaft Cleaning

5. Remove the taper hub. Use a puller if necessary.
6. Remove the pulley.

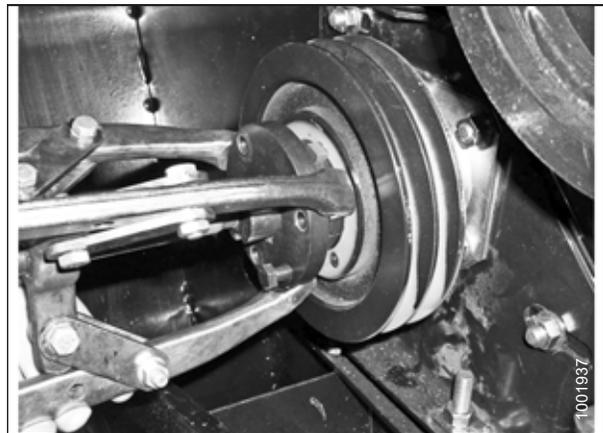


Figure 3.24: Hub Removal

7. Place the pulley on the shaft, and tap taper lock hub to the premeasured position that was taken in Step 1, [page 15](#).

NOTE:

The pulley or sprocket will draw onto the hub and move as much as 2–3 mm (1/8 in.).



Figure 3.25: Hub and Pulley Reinstallation

INSTALLATION INSTRUCTIONS

8. Install three bolts (A), and tighten evenly. Once tight, use a hammer and brass drift or block of wood and tap the hub; this will help seat the taper lock. Torque the bolts as follows:

- If bolts are 1/4 in., torque to 6.2 Nm (55 lbf·in)
- If bolts are 3/8 in., torque to 19.8 Nm (175 lbf·in)

NOTE:

The hub does **NOT** move when bolts are tightened. The pulley is pulled onto the hub.

NOTE:

If the original problem was poor alignment, align the belt from pulley to pulley using a straight edge. On a long span, ensure incoming belt alignment is as straight as possible. The belt leaving the pulley need not be as straight in some circumstances.

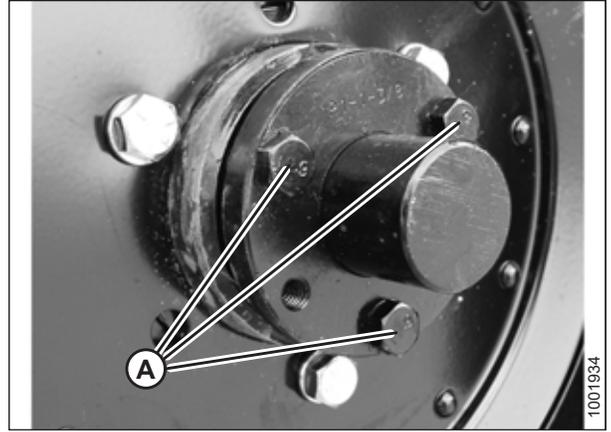


Figure 3.26: Taper Lock Hub Bolts

3.4 Installing Header Drive Gearbox

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

1. Install spacer plate (F) and speed sensor bracket (G), and secure with washer and M16 hex head bolt (E).
2. Secure speed sensor bracket (G) to bottom of gearbox with two M10 bolts (not shown in illustration).
3. Install key (D) (retained from old gearbox) in the gearbox shaft, and then slide hub (C) onto the shaft, taking care not to dislodge the key. Secure the hub in place with flat washer (B) and M14 bolt (A).

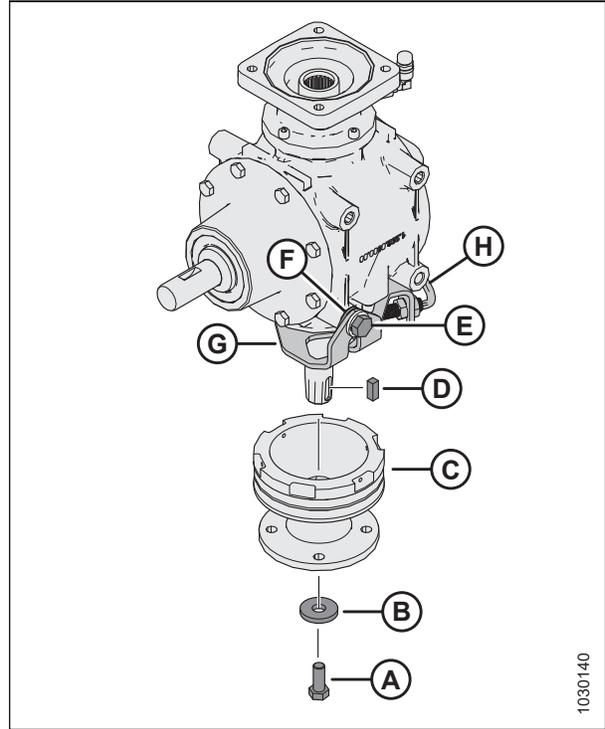


Figure 3.27: Installing Speed Sensor and Hub on Gearbox

CAUTION

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

4. Using a sling and a lifting device, lower gearbox (B) onto the header and secure it to the gearbox mount as shown using four M16 hex head bolts and washers (A). Bolts should be snug but still allow for positioning of the gearbox.

NOTE:

Some header frame parts have been removed from the illustration for clarity.

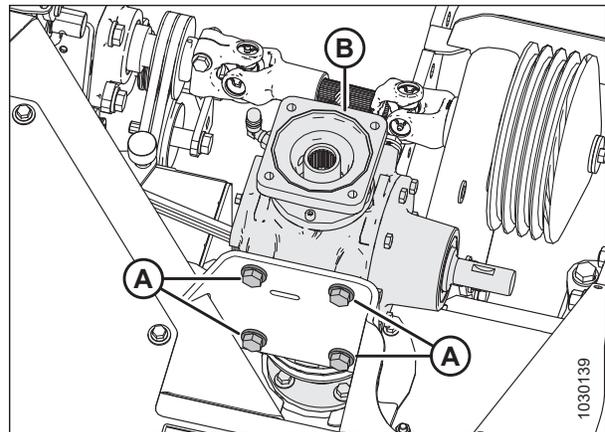


Figure 3.28: Header Drive Gearbox

INSTALLATION INSTRUCTIONS

WARNING

Wear heavy gloves when working around or handling knives. Blades are sharp and can cause serious injury.

IMPORTANT:

Vertical drive alignment is crucial for proper cutterbar operation. Always use the drive alignment tool (MD #325683) when installing a header drive gearbox.

5. Remove bolt, washer, and nut (A) from the drive alignment tool (MD #325683), 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.

6. Attach drive alignment tool to left drive hub (B) with four M12 bolts, and tighten until snug.

IMPORTANT:

If the alignment tool is not secured to the gearbox using all four bolts, the drive hub will be misaligned.

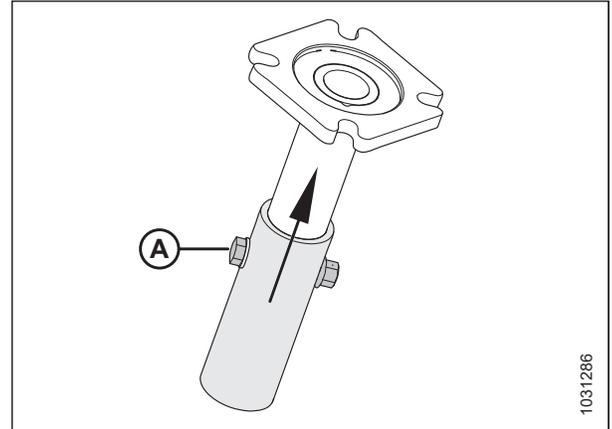


Figure 3.29: Drive Alignment Tool (MD #325683)

7. On the left side of the cutterbar, slide drive alignment tool (A) over the cutterbar driveshaft.

NOTE:

Drive alignment tool may need to be rotated to clear the hub to be able to insert it inside the drum.

8. Adjust the position of the header drive gearbox until the alignment tool's bottom tube slides freely over the cutterbar driveshaft.
9. Torque the four gearbox mount M16 bolts to 95 Nm (70 lbf-ft). It is likely the gearbox will shift during tightening. Make sure alignment tool (A) stays centered over the cutterbar driveshaft, and does not bind.
10. Remove bolts securing alignment tool (A) to drive hub (B). Lift the lower tube and remove the tool.

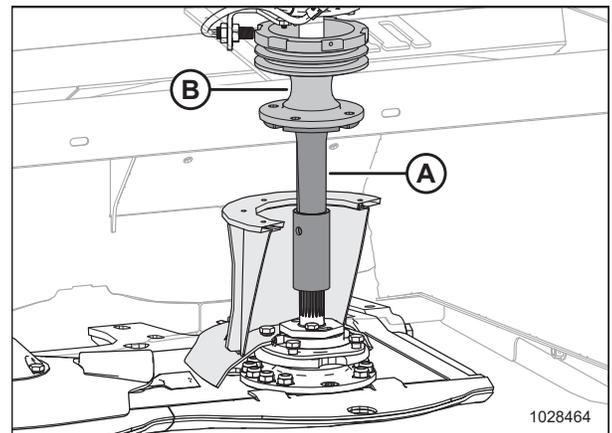


Figure 3.30: Alignment Tool on Left Driven Drum

INSTALLATION INSTRUCTIONS

11. Install bolt, washer, and nut (A) onto the drive alignment tool for storage.

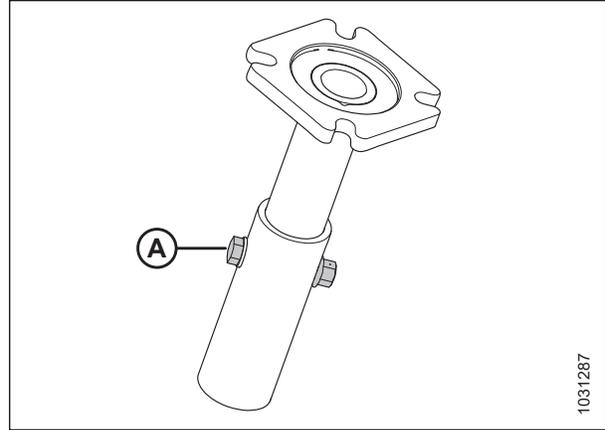


Figure 3.31: Drive Alignment Tool (MD #325683)

12. Removing one bolt at a time, apply high-strength threadlocker (Loctite® 262 or equivalent) to each of the four M16 hex flange bolts (A), and then replace them and the washers. Torque bolts to 270 Nm (199 lbf-ft).

NOTE:

Some header frame parts have been removed from the illustration for clarity.

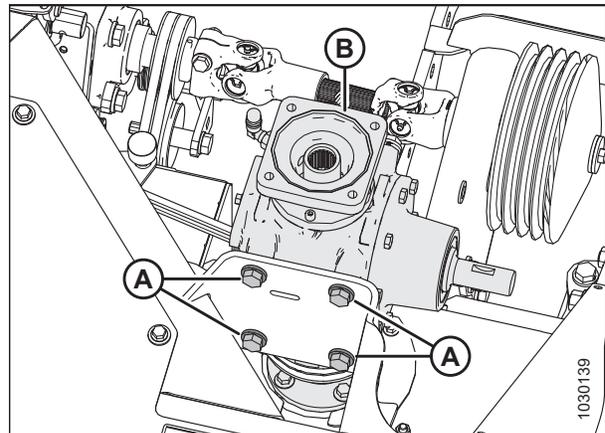


Figure 3.32: Header Drive Gearbox

13. Insert tab on cover plate (B) into slot in gearbox mount as shown, and secure the cover plate using M10 hex washer screw (A).

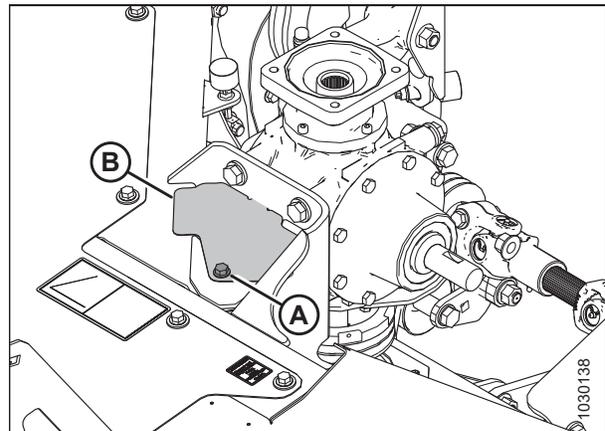


Figure 3.33: Cover Plate

INSTALLATION INSTRUCTIONS

14. Install conditioner drive belt tensioner assembly (C) onto gearbox (D) with two M16 hex flange bolts (A) and washers (B). Do **NOT** tighten.

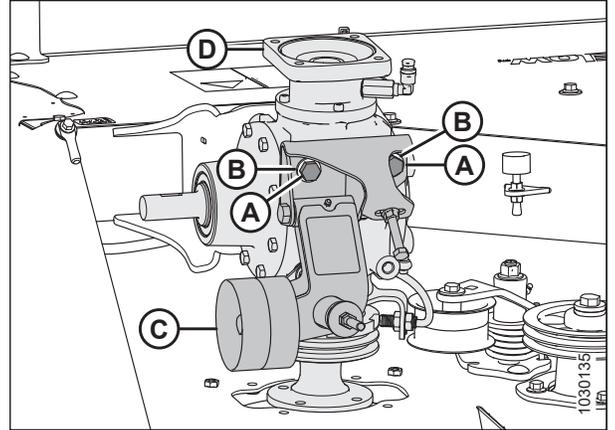


Figure 3.34: Conditioner Drive Belt Tensioner Assembly

15. Release tension using a 1/2 in. drive ratchet at location (A) to turn the tensioner arm clockwise, and then install belt (B). Release tensioner arm to tension belt.
16. Install shield plate (D) using four M10 hex flange head bolts (C).

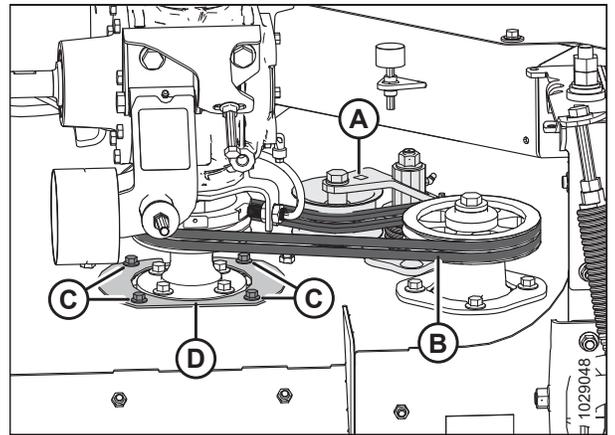


Figure 3.35: Left Suspended Drum Drive

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

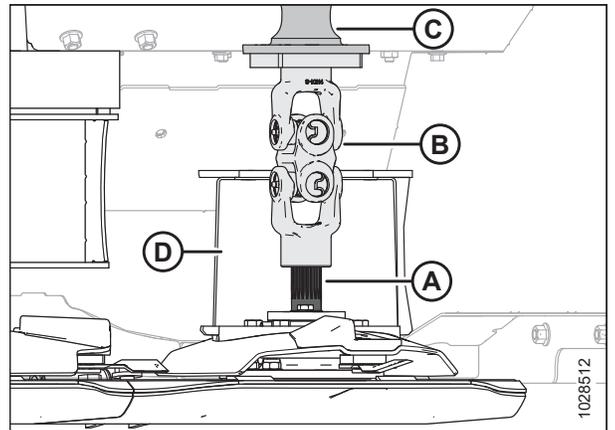


Figure 3.36: Drum and Tube Shield – Cutaway View

INSTALLATION INSTRUCTIONS

19. Place a bead of high-strength threadlocker (Loctite® 262 or equivalent) around the threads of four M12 hex flange head bolts (A). Use the bolts to secure driveline assembly (B) to hub drive (C). Torque bolts to 100 Nm (74 lbf·ft).

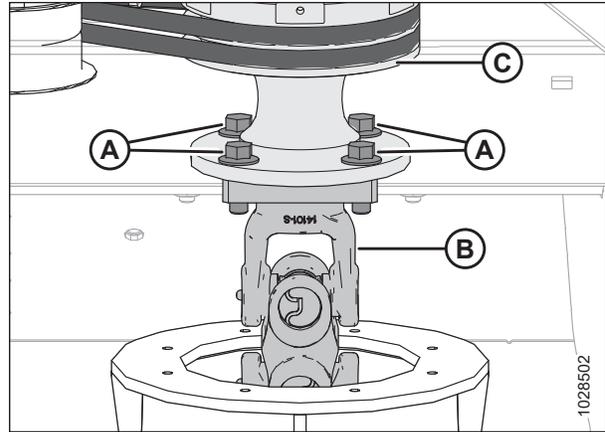


Figure 3.37: Driveline

20. Position driveline shield (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of two M10 hex flange head bolts (A). Use bolts (A) to secure driveline shield (B) in place.

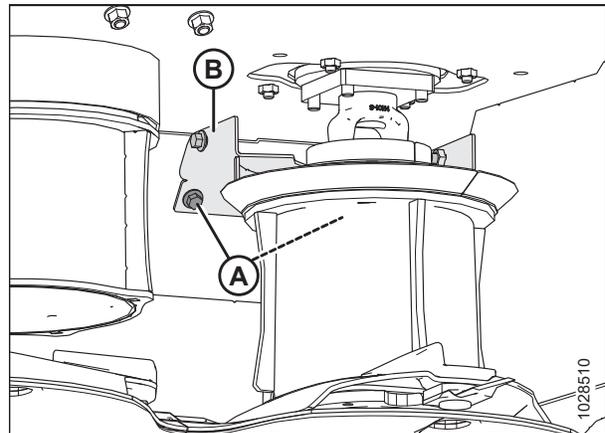


Figure 3.38: Driveline Shield

21. Position two drum shields (B) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of eight M8 hex flange head bolts (A). Use the bolts to secure the drum shields in place. Torque hardware to 27 Nm (20 lbf·ft).

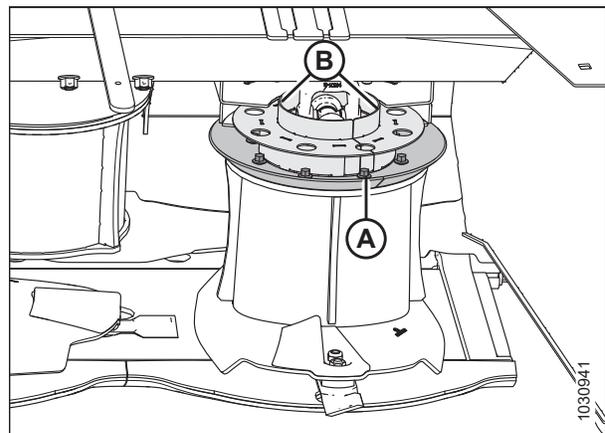


Figure 3.39: Driveline Shields

INSTALLATION INSTRUCTIONS

22. Position driveline shield (C) as shown. Apply a bead of medium-strength threadlocker (Loctite® 243 or equivalent) around the threads of four M10 hex flange head bolts (A) and two M10 hex flange head bolts (B). Use bolts (A) and (B) to secure driveline shield (C) in place.
23. Tighten all hardware on driveline shields.



WARNING

Ensure the 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.

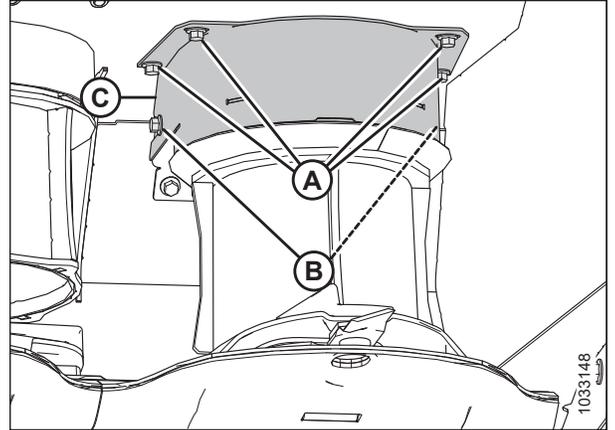


Figure 3.40: Driveline Shield

24. Install conditioner drive belt pulley (A) onto gearbox shaft. Install taper lock hub (B) onto shaft with shaft key (C). For instructions to install the hub, refer to [3.3.1 Replacing Taper Lock Hub, page 15](#).

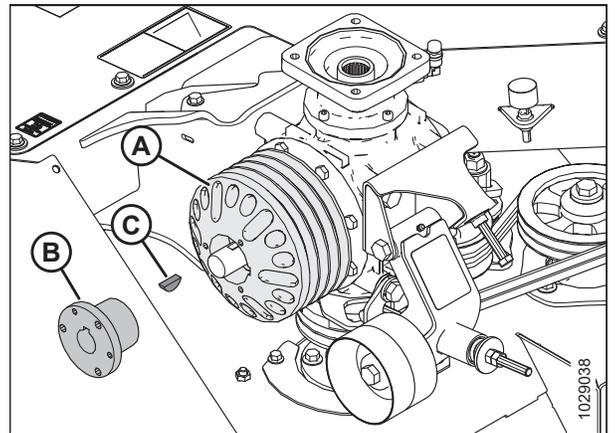


Figure 3.41: Conditioner Drive Belt Pulley

25. Align and tighten the three taper lock hub bolts (C) onto pulley (A). Torque bolts to 39 Nm (29 lbf-ft).

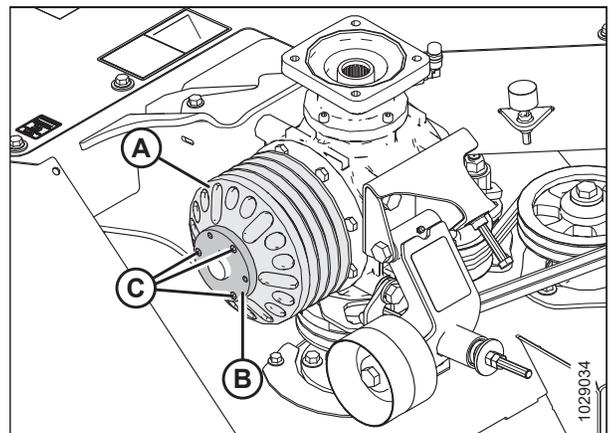


Figure 3.42: Conditioner Drive Belt Pulley

INSTALLATION INSTRUCTIONS

26. Check pulley alignment and adjust if necessary. The inboard sides of the top pulley (A), idler pulley (B), and bottom pulley (C) should be aligned and the surface of idler pulley (B) should be perpendicular to the center of the top pulley (A), as shown in the illustration at right. If necessary, adjust the position of the idler pulley by adjusting the position of the tensioner bracket.

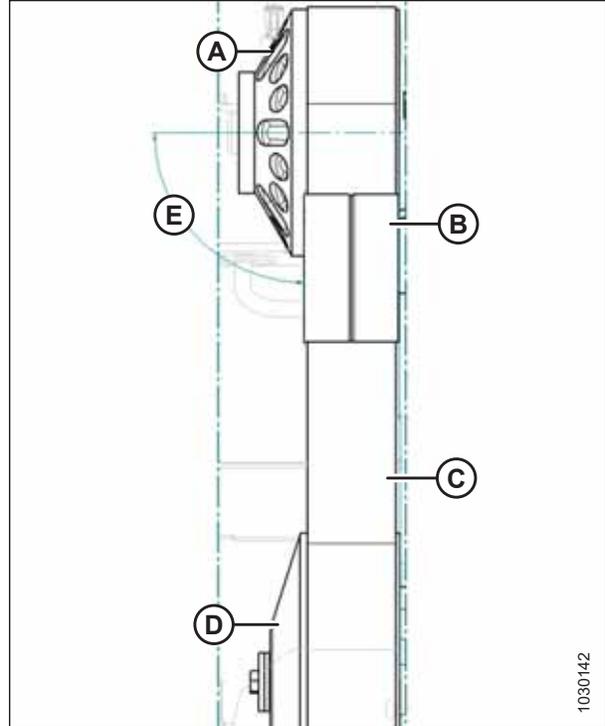


Figure 3.43: Pulley Alignment – Rear View

A - Top Pulley

B - Idler Pulley

C - Conditioner Drive Belt

D - Bottom Pulley

E - 85–95°

27. Apply high-strength threadlocker (Loctite® 262 or equivalent) to two M16 hex flange bolts (A) and washers (B). Torque bolts to 270 Nm (199 lbf·ft).

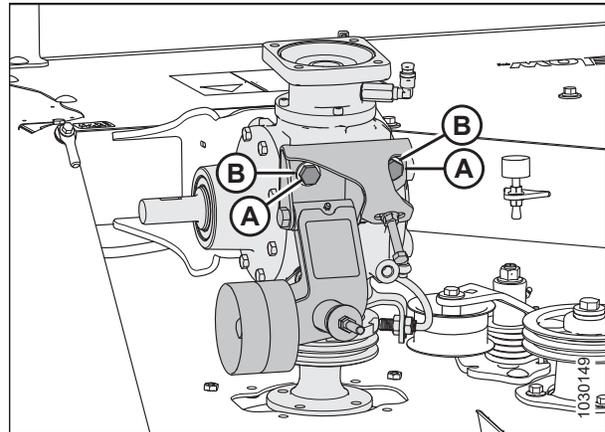


Figure 3.44: Conditioner Drive Belt Tensioner Assembly

INSTALLATION INSTRUCTIONS

28. Reconnect speed sensor (B) to wiring harness (A).

NOTE:

The connector on the end of speed sensor (B) is hidden behind the gearbox in the illustration at right.

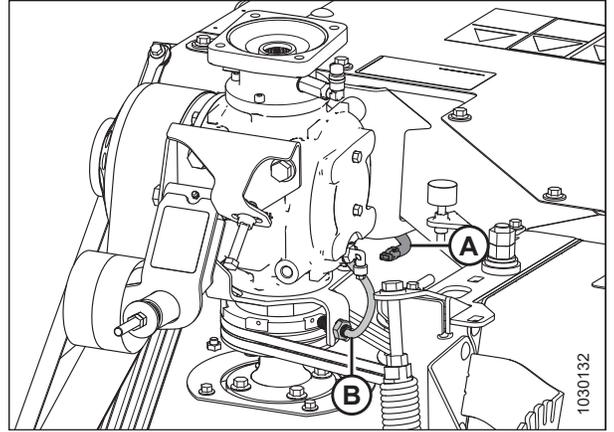


Figure 3.45: Speed Sensor Assembly

29. Close cutterbar curtain.

3.5 Reinstalling Conditioner Drive Belt

To reinstall the conditioner drive belt, follow these steps:

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 the jam nut and adjuster nut to relieve the spring tension.

2. Check position of the bracket, center-to-center distance (C) between drive pulley (D) and driven pulley (E) should be 723 mm (28 7/16 in.). If not, loosen M16 hex head bolt and lock nuts (A) on pulley mount bracket (B), and adjust the position of the bracket.
3. Torque hardware to 170 Nm (126 lbf-ft).

4. With hardware fully loosened, slide threaded rod (E) up and backward into the disc speed sensor bracket, then snug the hardware to engage the rod pivot point with the bracket.
5. Measure the length of tensioner spring (C). For proper belt tension, dimension (D) should be set to 17 mm (11/16 in.).
6. To adjust spring tension, loosen jam nut (A) by turning it counterclockwise.
7. Turn adjuster nut (B) clockwise to increase tensioner spring/belt tension or turn adjuster nut (B) counterclockwise to decrease tensioner spring/belt tension.
8. Once the correct spring measurement has been achieved, hold adjuster nut (B) in place and tighten jam nut (A) against it by turning the jam nut clockwise.

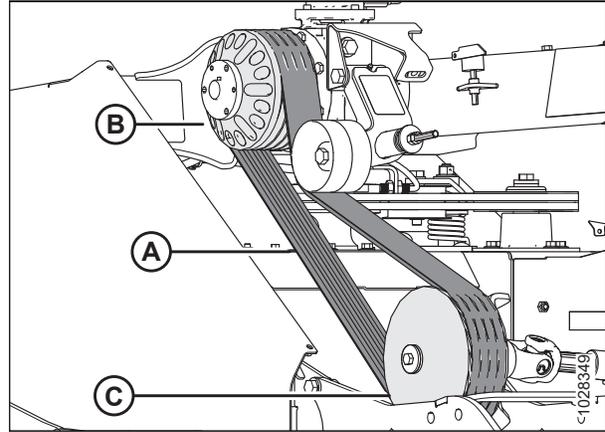


Figure 3.46: Conditioner Drive

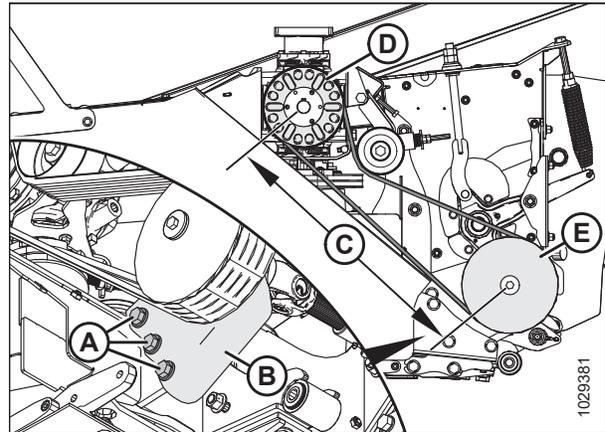


Figure 3.47: Conditioner Drive

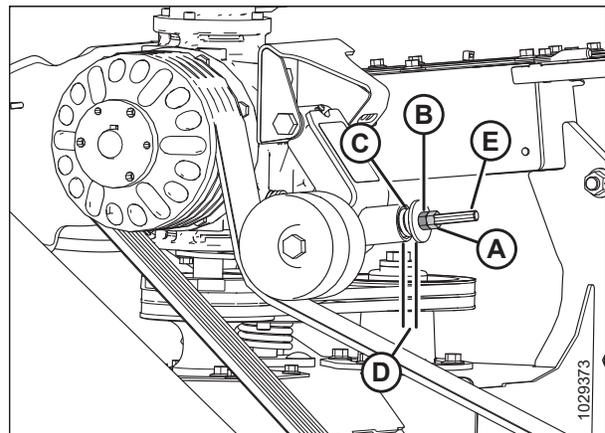


Figure 3.48: Conditioner Drive

3.6 Reinstalling Header Drive Motor

To reinstall the header drive motor, follow these steps:

1. Ensure O-ring is evenly seated on the gearbox flange machined groove (A).

NOTE:

You can use silicone-based grease to help keep the O-ring evenly seated during installation of the motor.

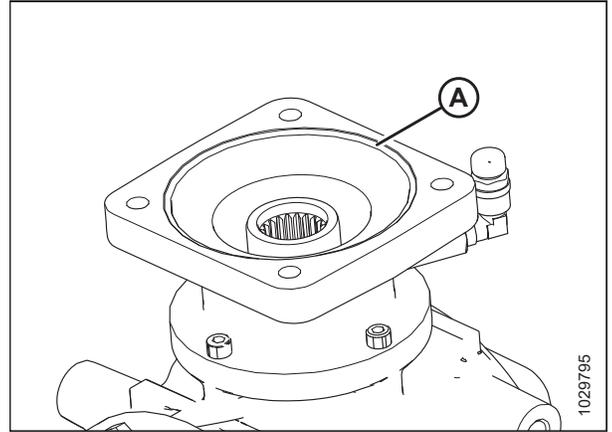


Figure 3.49: Gearbox O-ring

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

3. Lower motor (B) onto the gearbox opening.
4. Install four bolts (D). Torque to 160 Nm (118 lbf-ft).
5. Fill gearbox with oil. For instructions, refer to the header technical manual.

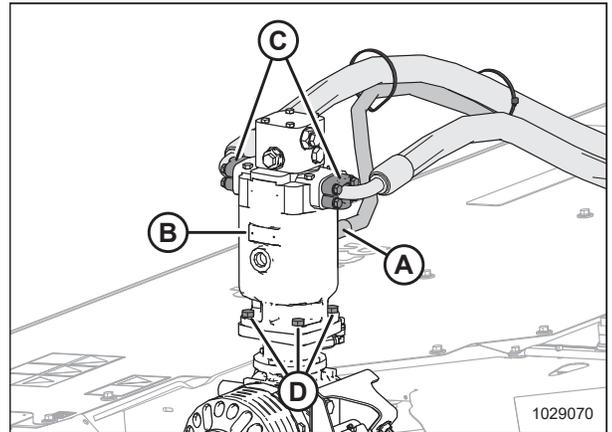


Figure 3.50: Hydraulic Motor

3.7 Closing Left Driveshield

Close the left driveshield as follows:

1. While lifting driveshield, lift lock latch (A) to disengage driveshield lock.

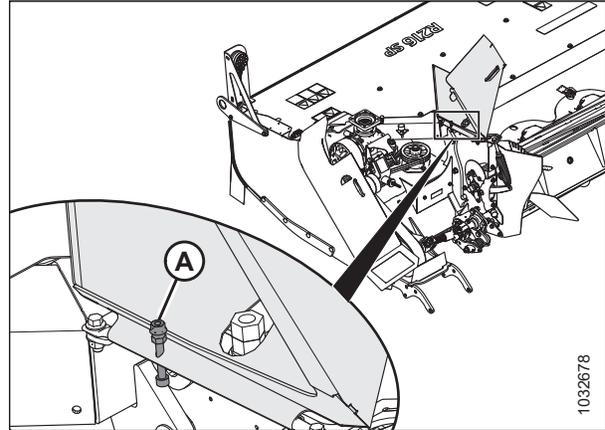


Figure 3.51: Driveshield Lock Latch

2. Move inboard half of driveshield (A) back to closed position.

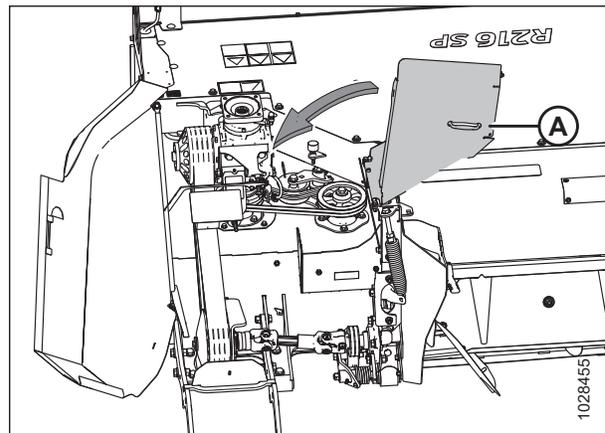


Figure 3.52: Left Driveshield

3. Move outboard half of driveshield (A) back to closed position.

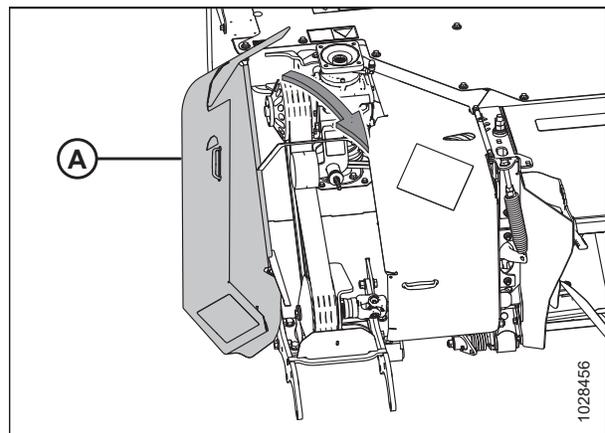


Figure 3.53: Left Driveshield

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