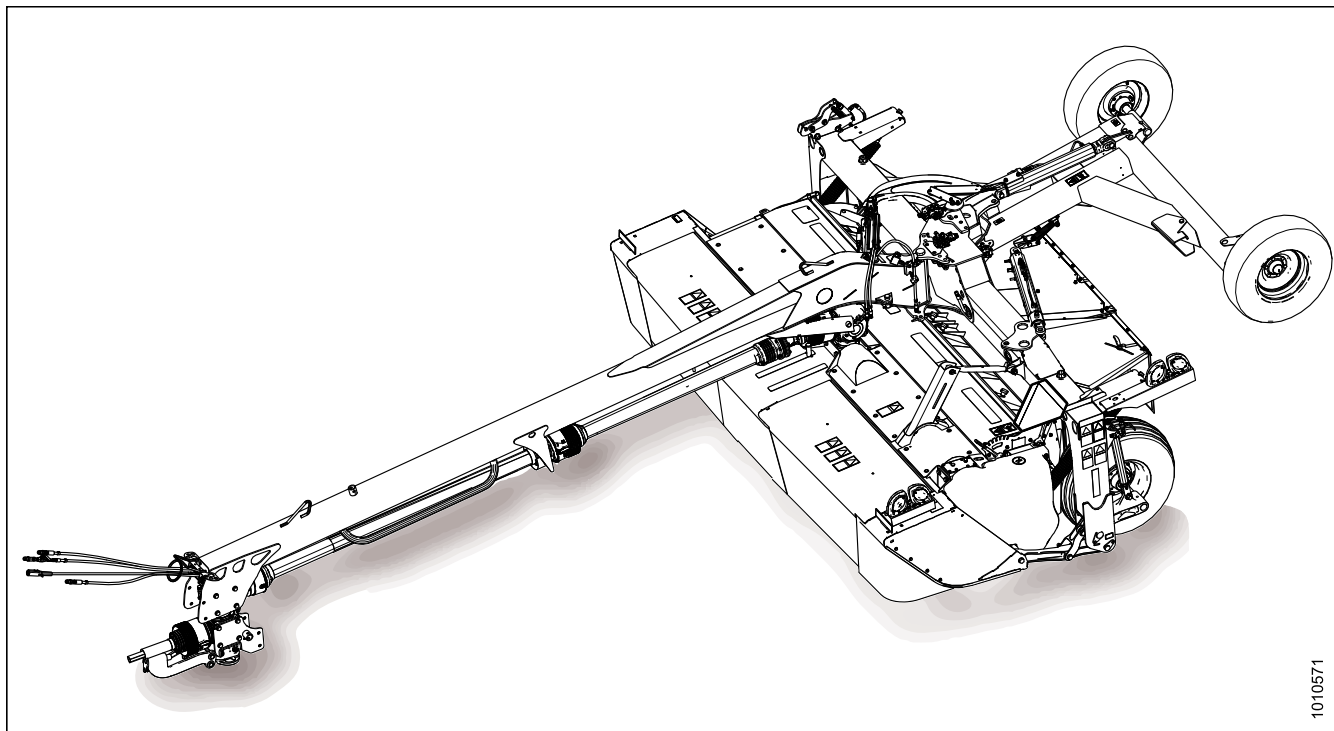


# **R1 Series Pull-Type Disc Mowers**

**Driveline Shield Replacement Kit (MD #281531)  
Installation Instructions**

214176 Revision D  
Original Instruction

R1 Series Pull-Type Disc Mower



1010571

Published March, 2018

# Introduction

The Driveline Shield Replacement kit (MD #281531) is used to replace the shield on the hitch driveline. 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 of this kit should take approximately 2 hours.

## Conventions

The following conventions are used in this document:

- Right and left are determined from the operator's position. The front of the mower conditioner is the side that faces the crop.
- Unless otherwise noted, use the standard torque values provided in the mower conditioner 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.

## 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
Updated driveline phasing illustrations and figure captions	<a href="#">3.3 Installing Hitch Driveline, page 17</a>

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# 1 Safety

## 1.1 Signal Words

Three signal words, **DANGER**, **WARNING**, and **CAUTION**, are used to alert you to hazardous situations. 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.

## 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.

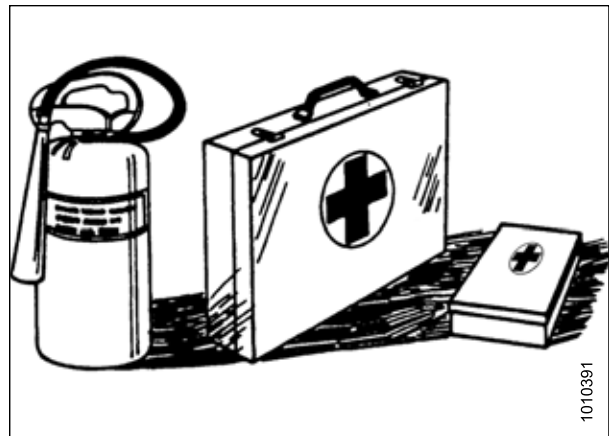


Figure 1.3: Safety Equipment



## 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.

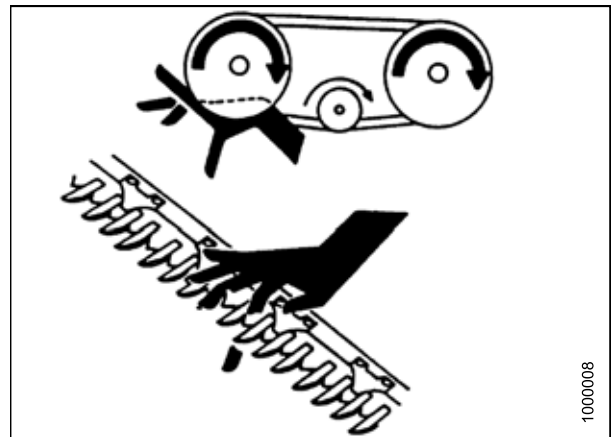


Figure 1.5: Safety around Equipment

- 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

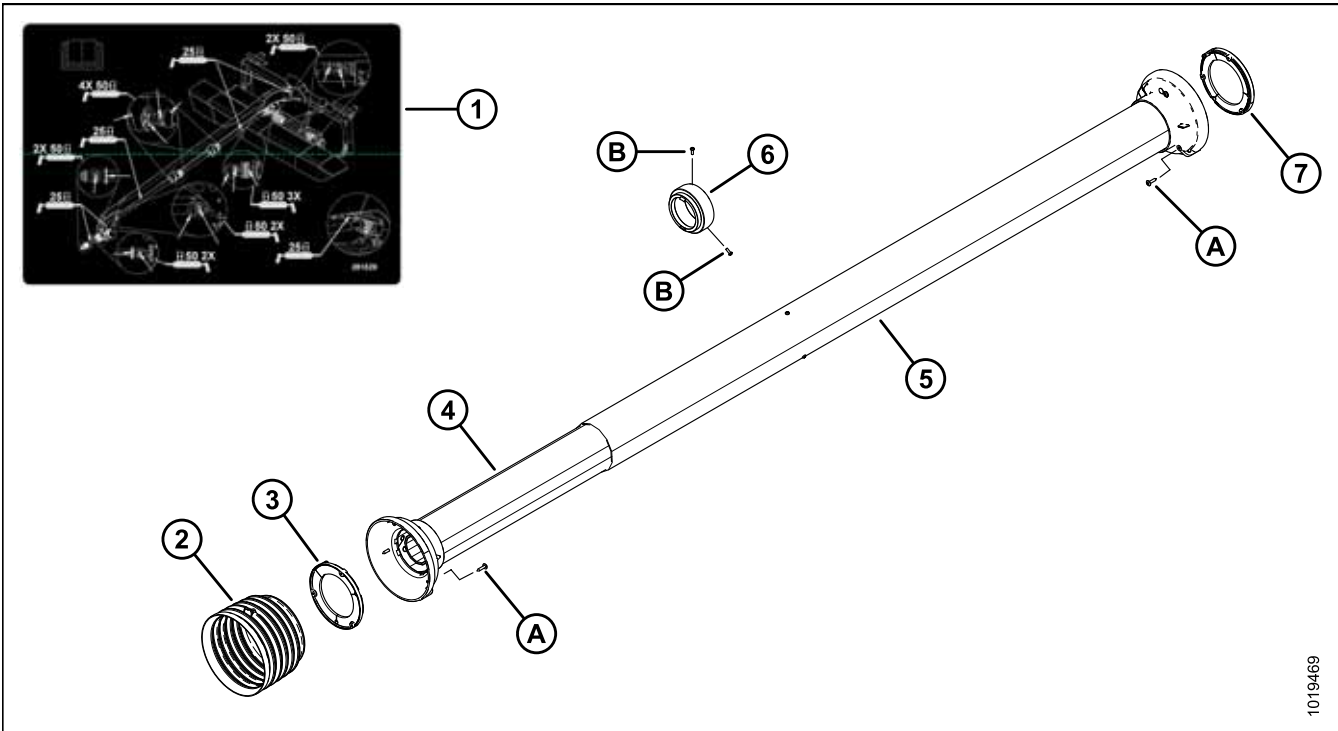


## 2 Parts List

The following parts are included in this kit.

## PARTS LIST

**Figure 2.1: Parts Included in Driveline Shield Kit**



1019469

Ref	Part Number	Description	Quantity
1	281529	DECAL – GREASE, PT DRIVES	1
	281508	KIT – SHIELD (includes the following parts)	1
2	NSS <sup>1</sup>	CONE – SHIELD	1
3	NSS	SUPPORT – INNER SHIELD	1
4	NSS	TUBE – INNER SHIELD (102 x 1652 mm)	1
5	NSS	TUBE – OUTER SHIELD (108.2 x 1652 mm)	1
6	NSS	STABILIZER	1
7	NSS	SUPPORT – OUTER SHIELD	1
8	NSS	GREASE FITTING (not illustrated)	1
9	NSS	GUARD CHAINS (not illustrated)	2
A	NSS	SCREW – M4 X 22	6
B	NSS	SCREW – M4 X 12	3
C	NSS	WASHER (not illustrated)	1

<sup>1</sup>. Not sold separately.

### 3 Installation Instructions

To install the new driveline shield and decal, follow these procedures in order.

#### 3.1 Removing Hitch Driveline

##### CAUTION

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

1. Stop engine, and remove key from ignition.
2. Release two lever clamps (A) using a screwdriver or similar prying tool.
3. Unhook safety chain (B) from hitch, and ensure that chain is secured to the shield cone and metal plate (C).

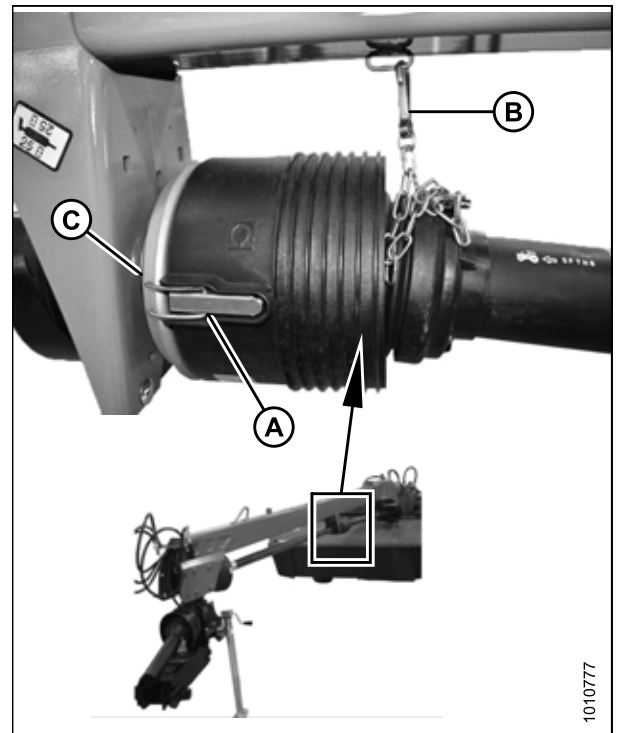


Figure 3.1: Driveline Shield Cone

4. Remove driveline shield cone from metal plate, and slide driveline shield cone (A) away from center support.
5. Loosen nut (B) and use a hammer to release yoke from taper pin lock.
6. Slide clutch driveline (A) off hitch driveline, and gently lower to the ground.

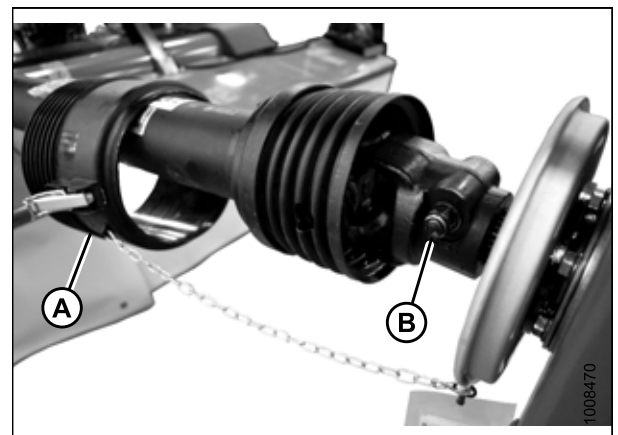
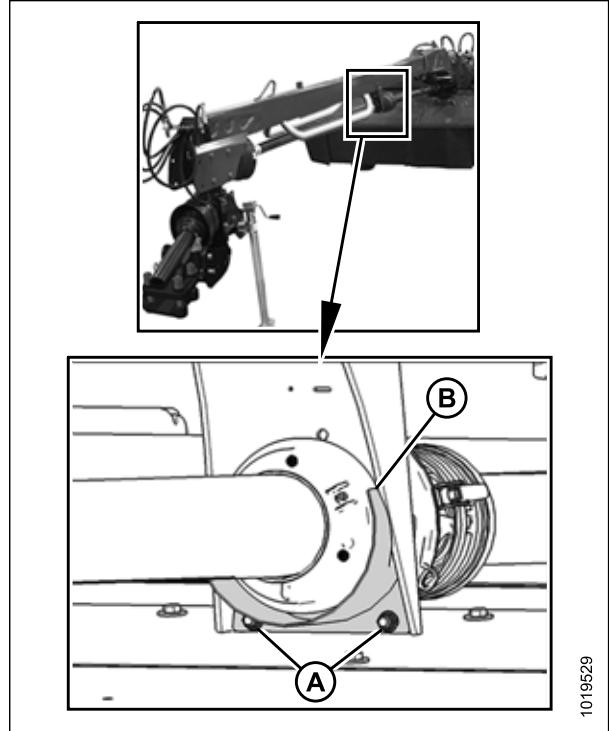


Figure 3.2: U-Joint

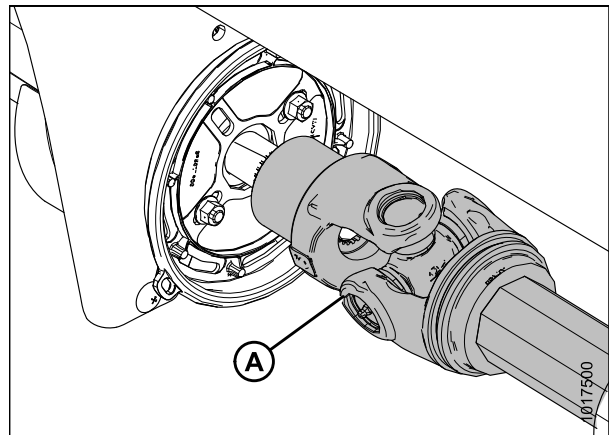
## INSTALLATION INSTRUCTIONS

7. Remove two bolts (A), and slide the metal shield (B) away from center support.



**Figure 3.3: Driveline Cover and Shield Installed at Center Support**

8. Remove mid-drive yoke (A) from hitch driveshaft.



**Figure 3.4: Mid-Driveshaft Yoke**

## INSTALLATION INSTRUCTIONS

- Remove two nuts (A) that secure metal plate (B) to the center support, and then remove metal plate (B).

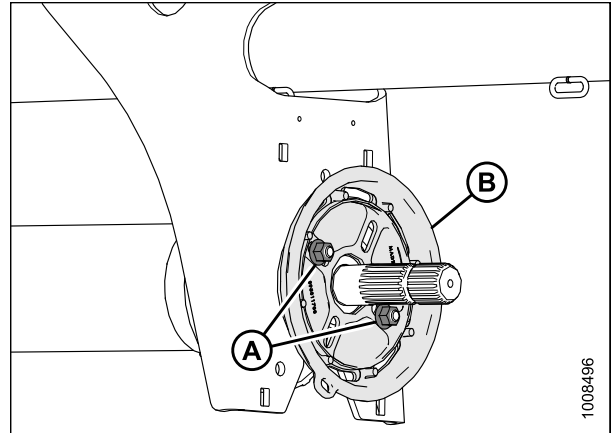


Figure 3.5: Metal Plate

- Remove spacer (A).

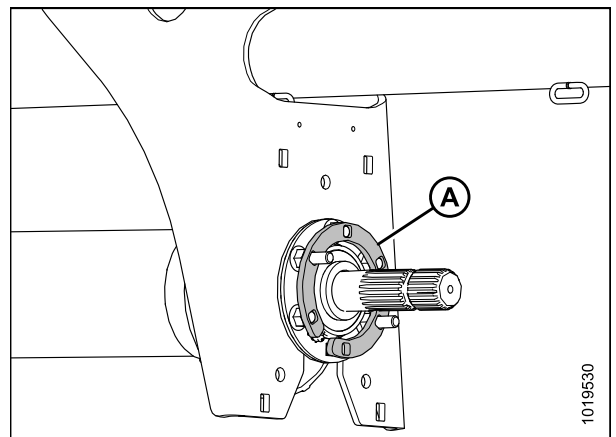


Figure 3.6: Spacer

- Support driveline and remove five nuts (A), flange (B) with grease fitting, ball bearing (C), and second flange (D).

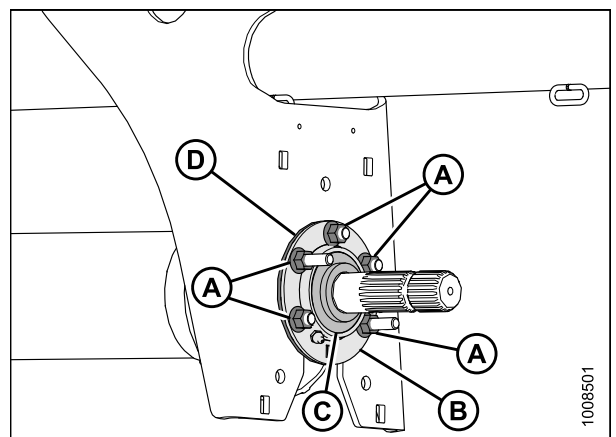


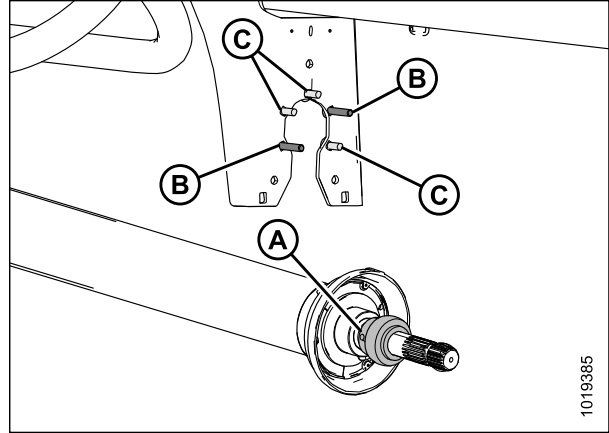
Figure 3.7: Ball Bearing and Flanges

## INSTALLATION INSTRUCTIONS

12. Unlock the bearing lock collar (A) by rotating it in the direction opposite to the rotation of the shaft.
13. Slide the bearing lock collar off the driveline shaft.
14. Lower the driveline from the center support.

**NOTE:**

If removing bolts, note position of the long bolts (B) and short bolts (C).

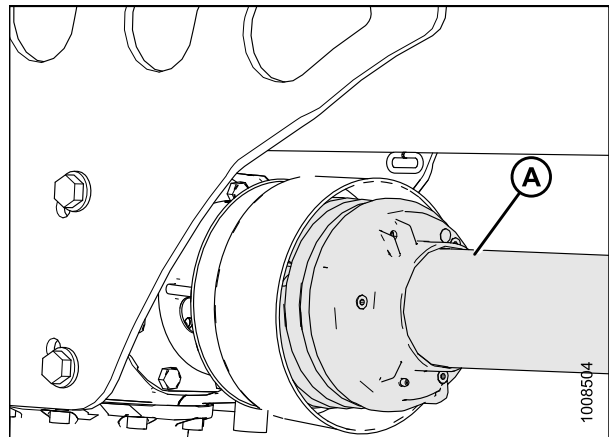


**Figure 3.8: Bearing Lock Collar**

15. Slide the forward end of hitch driveline (A) away from swivel gearbox shaft.

**NOTE:**

There are three hitch drivelines installed on R116 disc mowers.



**Figure 3.9: Forward End of Hitch**



## INSTALLATION INSTRUCTIONS

### 3.2 Replacing Driveline Shield

To replace the shield on the hitch driveline with the new one provided in the kit, follow these steps:

1. Remove the three screws (A) in the middle of the driveline. Discard.
2. Remove the three screws (B) at each end of the driveline, securing the inner and outer shield tubes to the inner and outer shield supports. Discard.

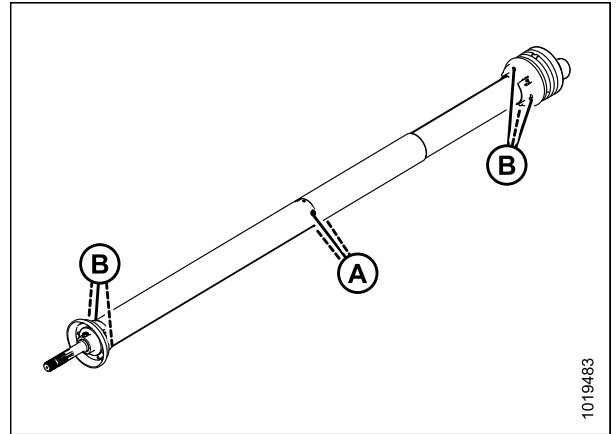


Figure 3.10: Driveline with Shield

3. Unscrew nut (A) and setscrew (B) on the outer end of the driveline, and then remove bushing (C). Retain for reassembly.

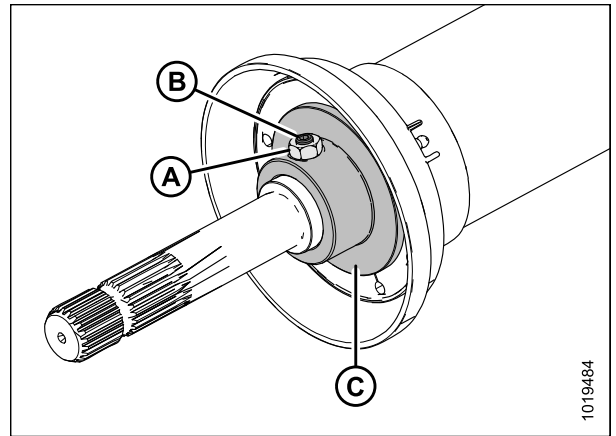


Figure 3.11: Outer End of Driveline

4. Pull the existing driveline shield (inner and outer tubes and all attached parts) (A) off the driveshaft (B). Discard.

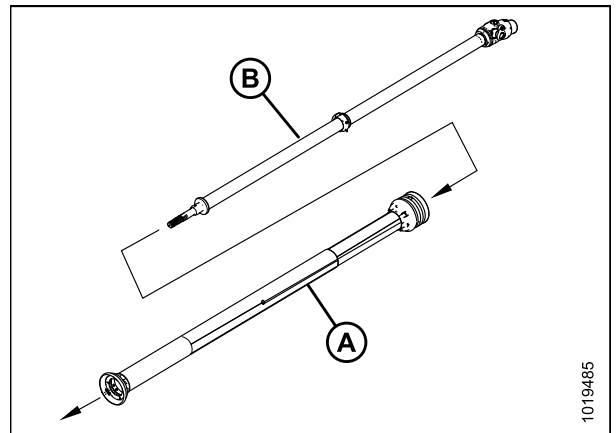


Figure 3.12: Removing Shield

## INSTALLATION INSTRUCTIONS

5. In the middle of the driveshaft, cut and remove stabilizer (A). Discard.

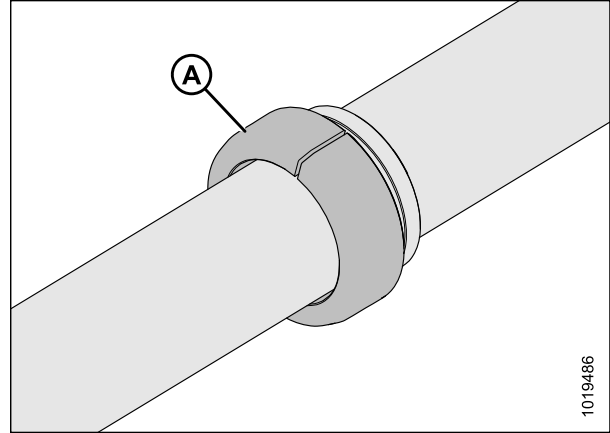


Figure 3.13: Stabilizer

6. Drill a 4 mm (3/16 in.) hole (A) in the middle of the driveshaft as shown in the illustration at right.

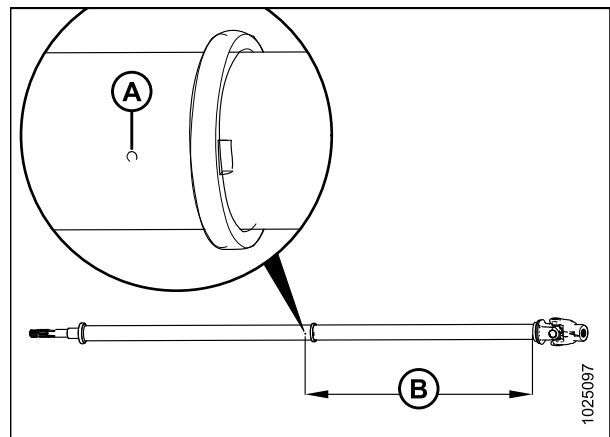


Figure 3.14: Location of Hole in Driveshaft

A - 4 mm (3/16 in.) Hole  
Shaft End

B - 1060.5 mm (41-3/4 in.)  
U-joint End

7. Place new stabilizer in a pot of tap water with a minimum temperature of 49°C (120°F), and leave it there for 15 minutes.
8. Remove new stabilizer (A) from the hot water bath, and carefully position it on the driveshaft with the chamfer on the shaft end and the hole in the stabilizer lined up with the newly drilled hole in the shaft. The stabilizer is provided in the kit.

### IMPORTANT:

Be careful when spreading new stabilizer open during installation. Overstressing it could cause it to break.

9. Secure stabilizer in place with one M4 x 12 screw (B) provided in the kit.

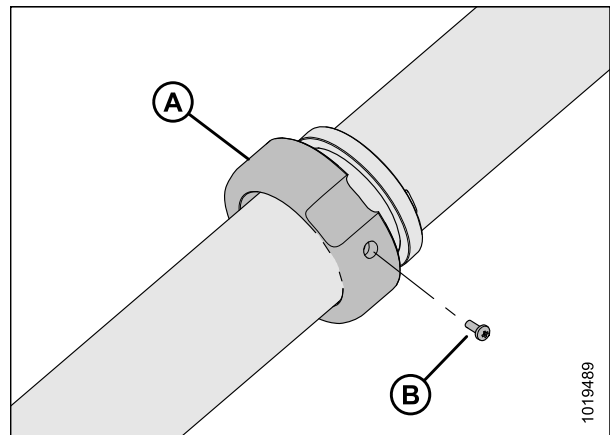


Figure 3.15: New Stabilizer

## INSTALLATION INSTRUCTIONS

- Place the inner shield support on the universal joint end of the driveshaft, then the shield cone (A), and then the inner shield tube (B). The support, cone, and tube are all provided in the kit. Refer to parts list illustration.

**NOTE:**

The inner shield support and the outer shield support are very similar. The inner shield support has a slightly smaller hole in the middle.

**NOTE:**

The inner shield support is not visible in the illustration. It is hidden beneath the flared end of the inner shield tube (B).

- Secure the inner shield tube (B) to the inner shield support with three of the M4 x 22 screws (C) provided in the kit.
- Turn the inner shield tube until the M4 locking screw in the stabilizer is visible through the 13 mm (1/2 in.) hole (A) in the tube.

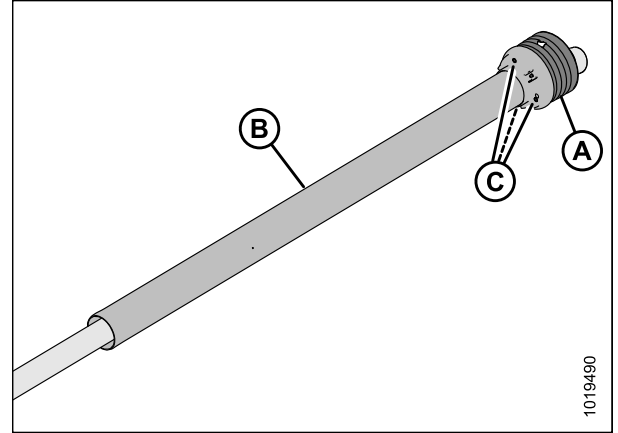


Figure 3.16: Inner Shield Tube

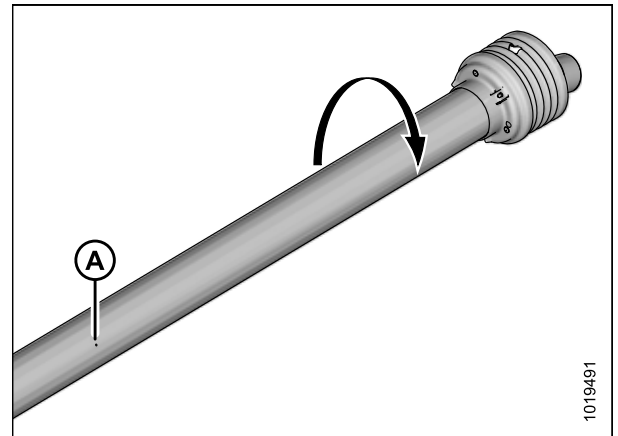


Figure 3.17: Turning Inner Shield Tube

- Install the outer shield tube (A) onto the driveshaft so that it overlaps the inner shield tube (B).
- Install the outer shield support (C) on the driveshaft, inside the plastic shield on the end of the outer shield tube (A).

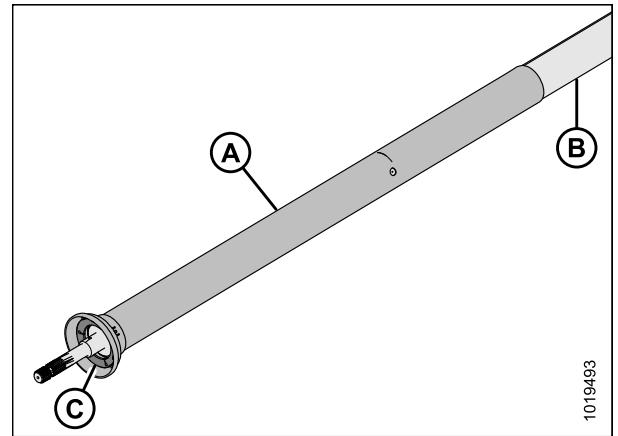


Figure 3.18: Outer Shield Tube and Outer Shield Support

## INSTALLATION INSTRUCTIONS

15. Replace the bushing (C) on the outer end of the driveshaft, and line up the hole in the bushing with the hole in the driveshaft. (The bushing was removed in Step 3, page 11.)
16. Insert the setscrew (B) (removed in Step 3, page 11) through the hole in the bushing (C) and into the hole in the driveshaft.
17. Use the nut (A) (removed in Step 3, page 11) to secure the setscrew in place.

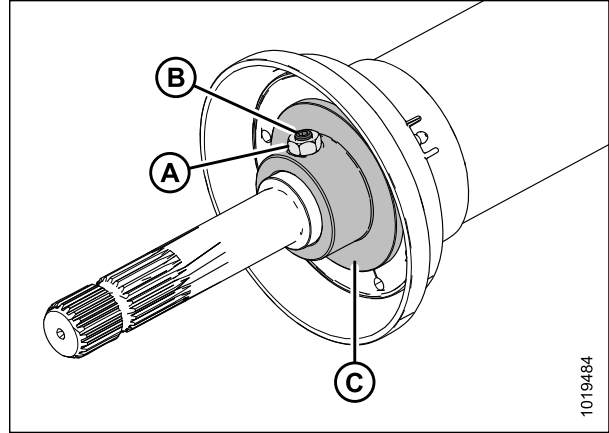


Figure 3.19: Outer End of Driveshaft

18. Secure the plastic shield on the end of the outer shield tube (A) to the outer shield support with three M4 x 22 screws (B) provided in the kit.

**NOTE:**

Only two of the screws are visible in the illustration.

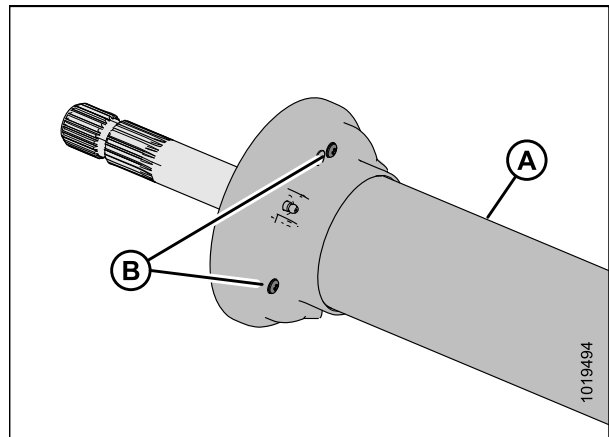


Figure 3.20: Outer End of Driveshaft

19. Turn the outer shield tube until the M4 locking screw in the stabilizer is visible through the 15 mm (9/16 in.) hole (A) in the tube.

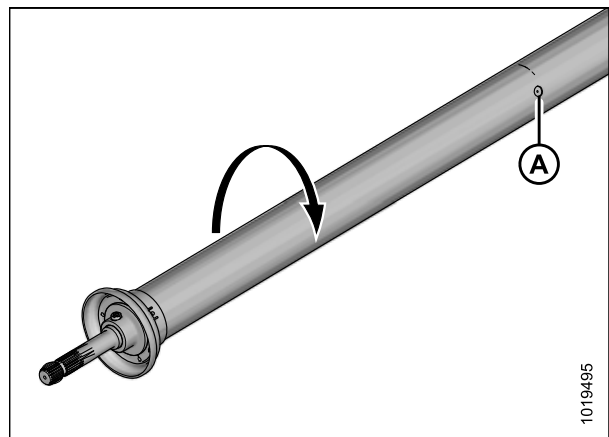


Figure 3.21: Turning Outer Shield Tube

## INSTALLATION INSTRUCTIONS

20. In the middle of the driveline, drill one 3.25 mm (1/8 in.) hole (B) through a pilot hole in the outer shield tube, the inner shield tube, and into the stabilizer. To ensure the hole goes into the stabilizer, line up the hole with the existing hole (A) in the tubes.
21. Install one M4 x 12 screw provided in the kit in the new hole (B).

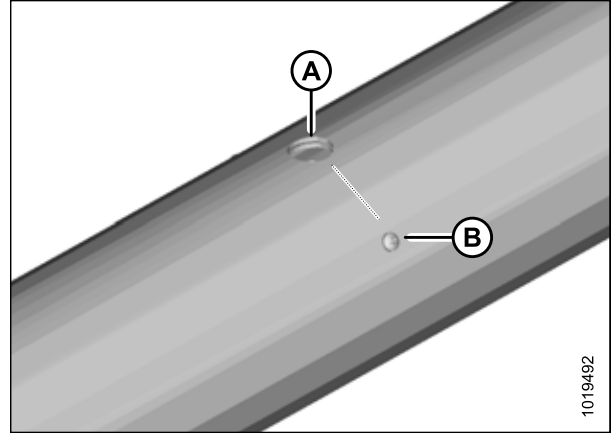


Figure 3.22: First Drilled Hole

22. On the other side of the original hole (A), drill a second 3.25 mm (1/8 in.) hole (C) through a pilot hole in the outer shield tube, the inner shield tube, and into the stabilizer. To ensure the hole goes into the stabilizer, line up the hole with the existing holes (A) and (B).
23. Install a second M4 x 12 screw (provided in the kit) in the new hole.

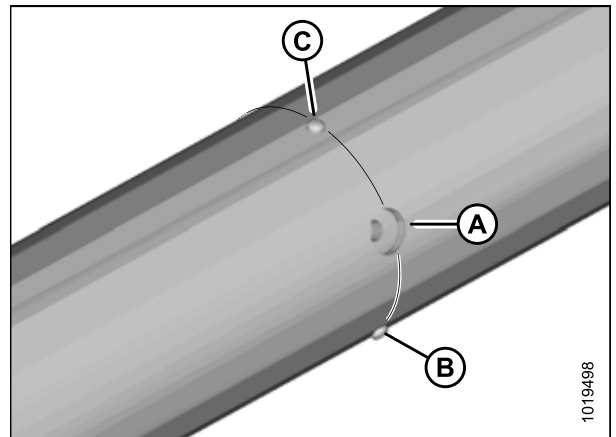


Figure 3.23: Second Drilled Hole

24. In line with holes (A) and (B), drill one 5.1 mm (3/16 in.) hole (C) through a pilot hole in the outer shield tube, the inner shield tube, and into the stabilizer.
25. Install washer and grease fitting (D) (both provided in kit) into the new hole (C).
26. Remove and retain the M4 x 12 screw from hole (A) (previously installed in Step 9, page 12).

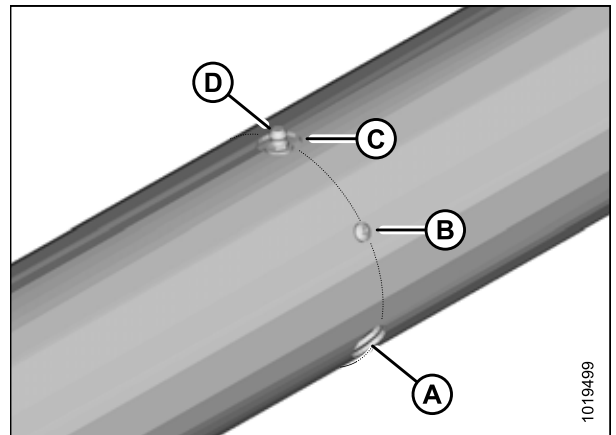


Figure 3.24: Grease Fitting

## INSTALLATION INSTRUCTIONS

27. In line with holes (A) and (B), drill a third 3.25 mm (1/8 in.) hole (C) through a pilot hole in the outer shield tube, the inner shield tube, and into the stabilizer.
28. Install the M4 x 12 screw removed in Step 26, [page 15](#) in this new hole (C).

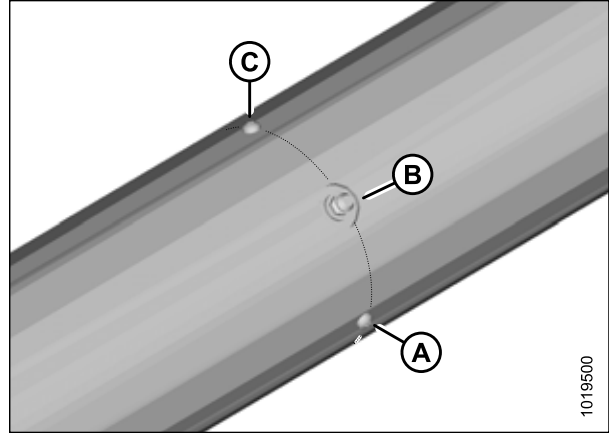


Figure 3.25: Last Hole

### NOTE:

Illustration at right shows how the bolts are lined up inside the driveline.

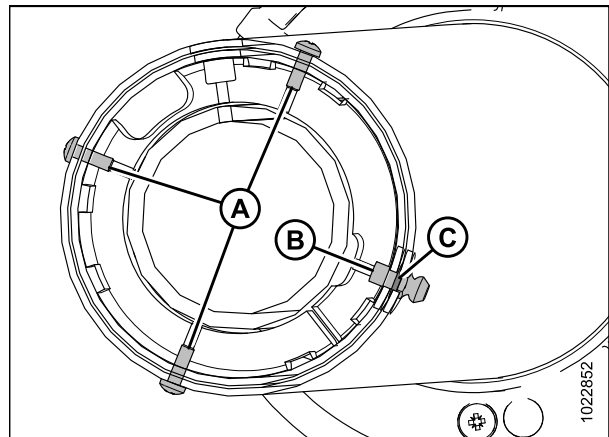


Figure 3.26: Driveline Cutout

- A - Screw M4 X12
- B - Lube Fitting
- C - Washer

29. Check to make sure that the completed shield turns freely around the driveshaft.
30. Grease shield bearings and stabilizer.

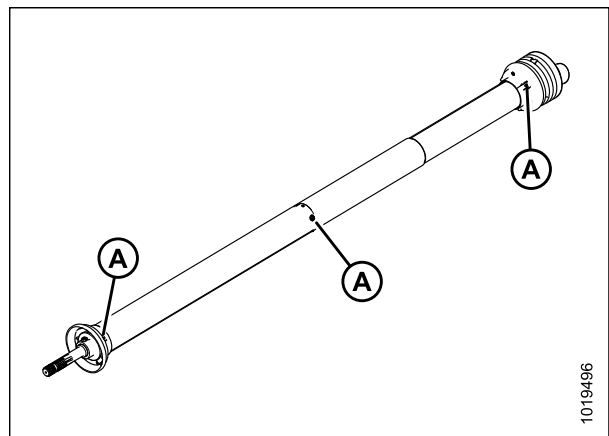


Figure 3.27: Driveline with New Shield

- A - Grease Points

### 3.3 Installing Hitch Driveline

**⚠ CAUTION**

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

1. Orient U-joint (A) as shown.
2. Position forward end of hitch driveline (B) onto hitch swivel gearbox shaft and push onto shaft.

**IMPORTANT:**

Ensure all U-joints are in phase. This will reduce driveline vibration.

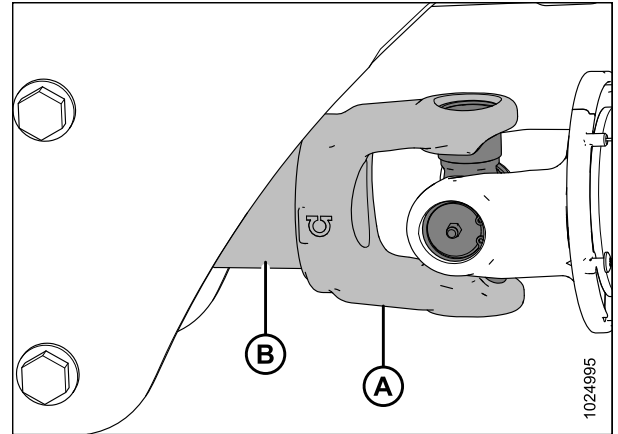
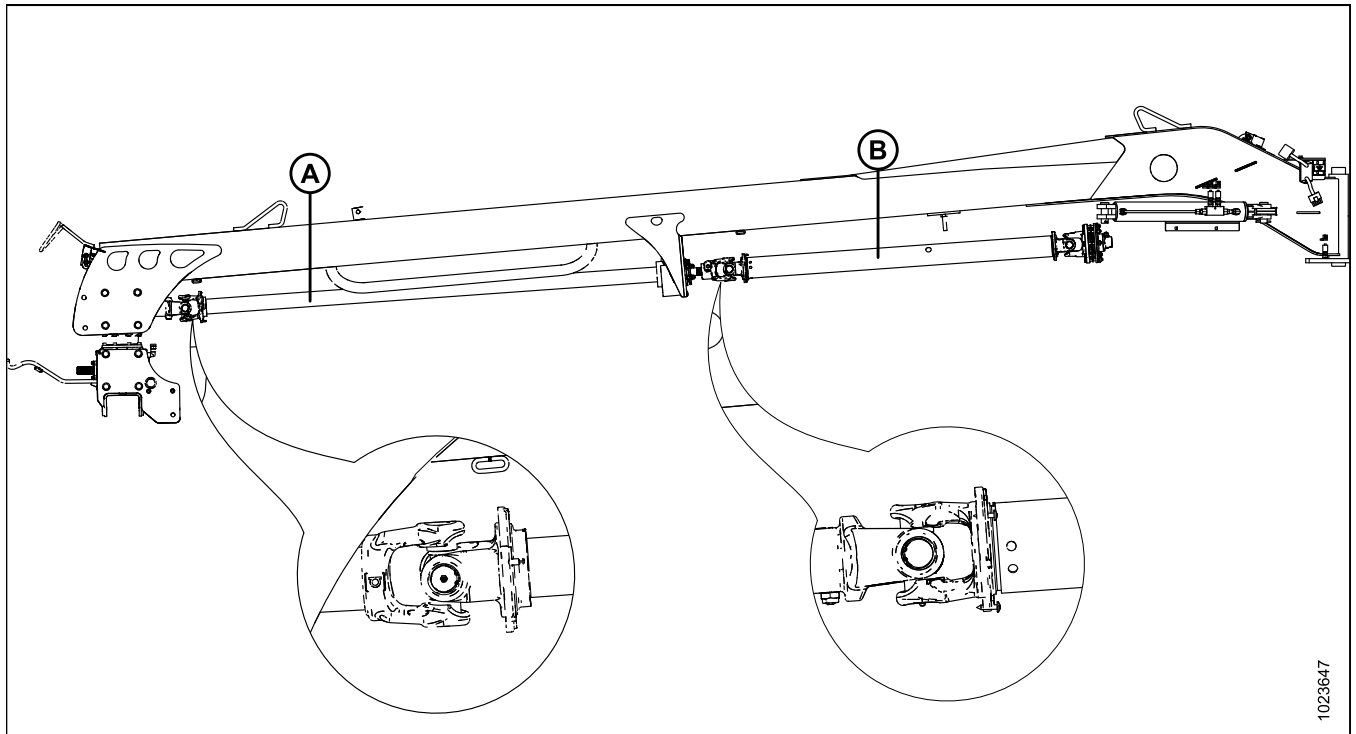


Figure 3.28: Forward End of Hitch

Figure 3.29: 3.9 m (13 ft.) Mower Driveline Phasing

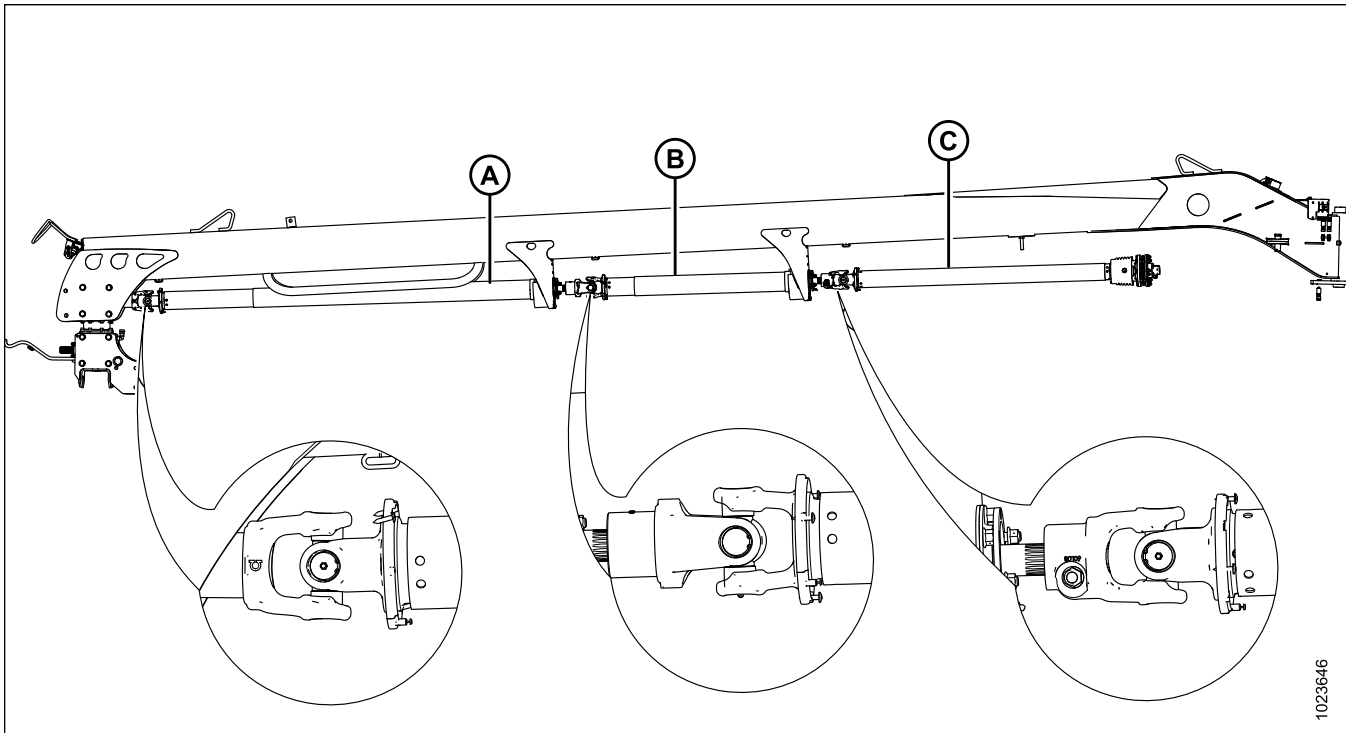


A - Front Driveline

B - Clutch Driveline

## INSTALLATION INSTRUCTIONS

Figure 3.30: 4.9 m (16 ft.) Mower Driveline Phasing



A - Front Driveline

B - Middle Driveline

C - Clutch Driveline

3. Slide lock collar (A) on shaft.
4. Position shaft end of the driveline onto the hitch support bracket, and support the driveline to hold it in place.

**IMPORTANT:**

Ensure the locking collar (A) is on the backside of the support bracket.

5. Install two long bolts (B) and three short bolts (C) exactly as shown.

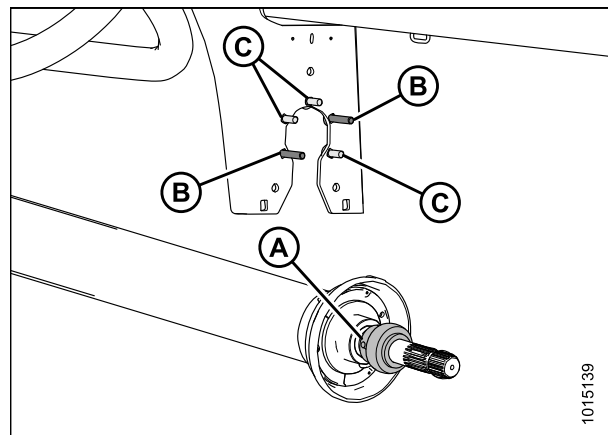


Figure 3.31: Long and Short Bolts



## INSTALLATION INSTRUCTIONS

6. Install flange (A).
7. Ensure distance (B) between the tip of the shaft and the front face of the center support is 136 mm to 144 mm (5-3/8 in. to 5-11/16 in.).

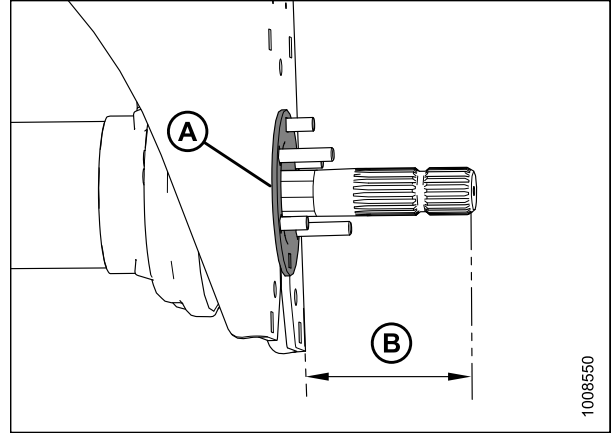


Figure 3.32: Flange Installed at Center Support

8. Install ball bearing (C).
9. Tighten the locking collar in the direction of the shaft rotation.
10. Install flange (B) with grease fitting (D), and five nuts (A).

**IMPORTANT:**

Grease fitting (D) must be positioned 90 degrees from long bolts as shown.

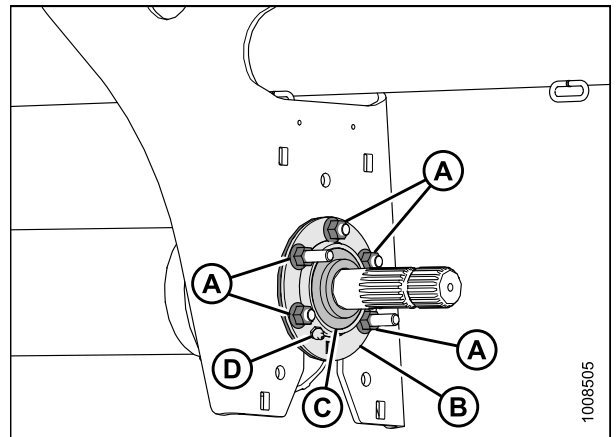


Figure 3.33: Flange, Bearing, and Grease Fitting

11. Install spacer (A) with cutout in spacer aligned with grease fitting (B).

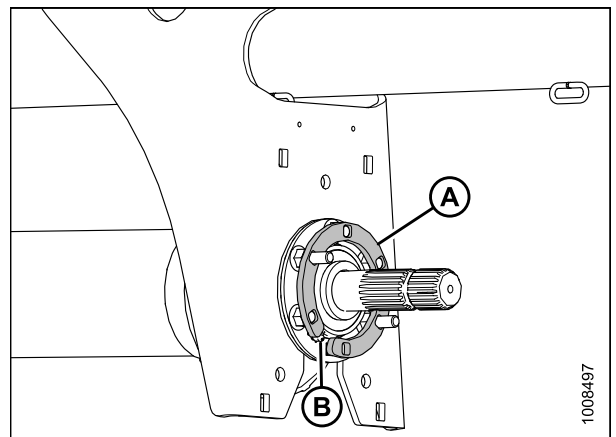
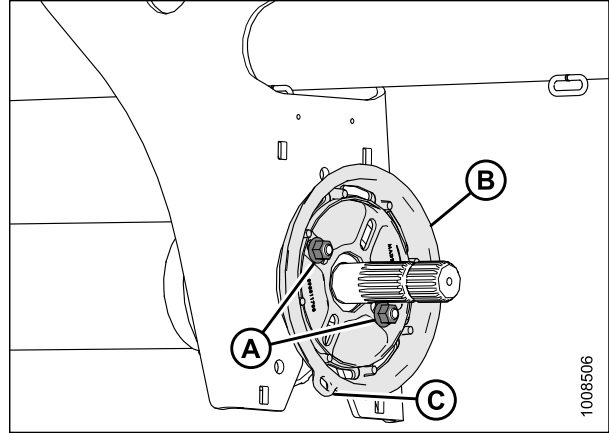


Figure 3.34: Spacer Installed at Center Support

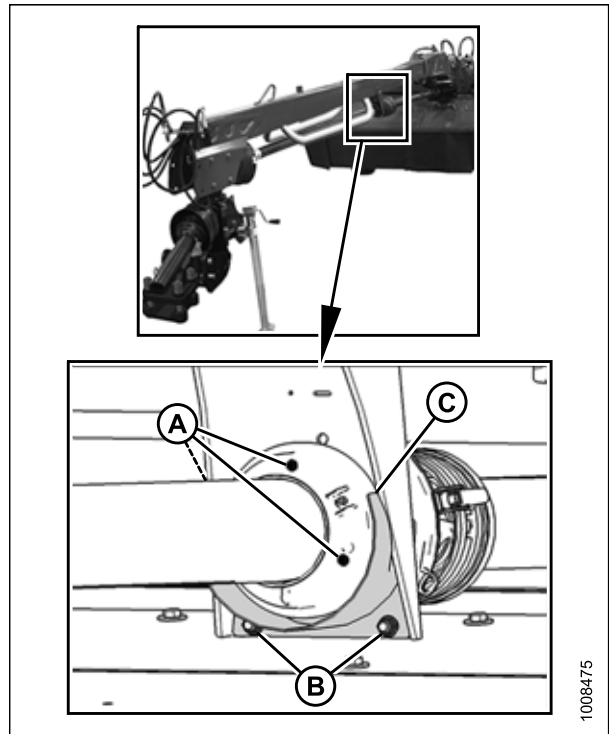
## INSTALLATION INSTRUCTIONS

12. Position metal plate (B) on center support.
13. Apply medium-strength threadlocker (Loctite® 243 or equivalent) to two nuts (A), and then use them to secure metal plate (B) while ensuring loop on metal plate (C) is positioned on lower side as shown.
14. Torque nuts (A) to 20 Nm (15 lbf·ft).



**Figure 3.35: Metal Plate Attached to Center Support**

15. Position driveshield cover on center support and secure with three screws (A).
16. Install metal shield (C) with two bolts (B).



**Figure 3.36: Driveline Cover and Shield Installed at Center Support**

## INSTALLATION INSTRUCTIONS

17. Move the shield cone to expose the U-joint.

**NOTE:**

Shield cone not shown in illustration at right.

18. Clean the taper pin threads.
19. Install taper pin so groove on pin is aligned with groove on shaft. Ensure there is no grease on taper pin threads after installing into yoke.
20. Torque the taper pin nut (A) to 150 Nm (110 lbf·ft). Pin should be recessed 9–11 mm (3/8–7/16 in.) into yoke.

**IMPORTANT:**

Check taper pin torque every 25 hours until it stops moving, then check before every season.

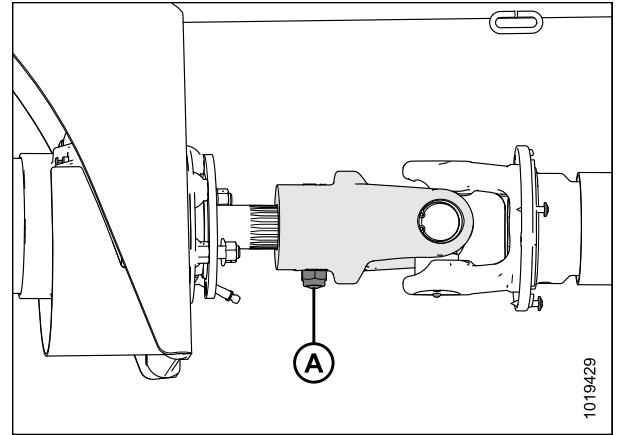


Figure 3.37: R113 Disc Mower Clutch Driveline

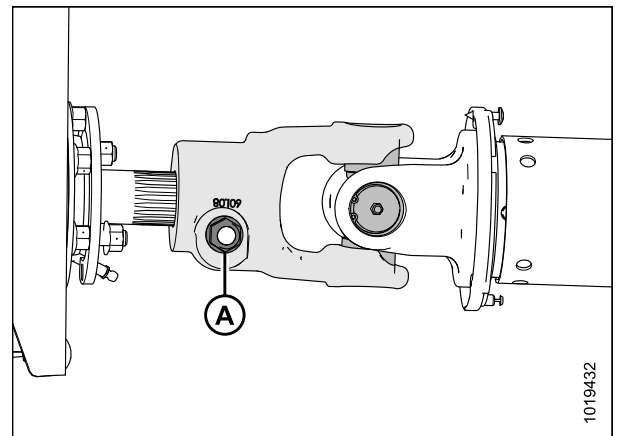


Figure 3.38: R116 Disc Mower Clutch Driveline

## INSTALLATION INSTRUCTIONS

- Slide shield cone onto metal plate (B) attached to center support, secure with two lever clamps (A).

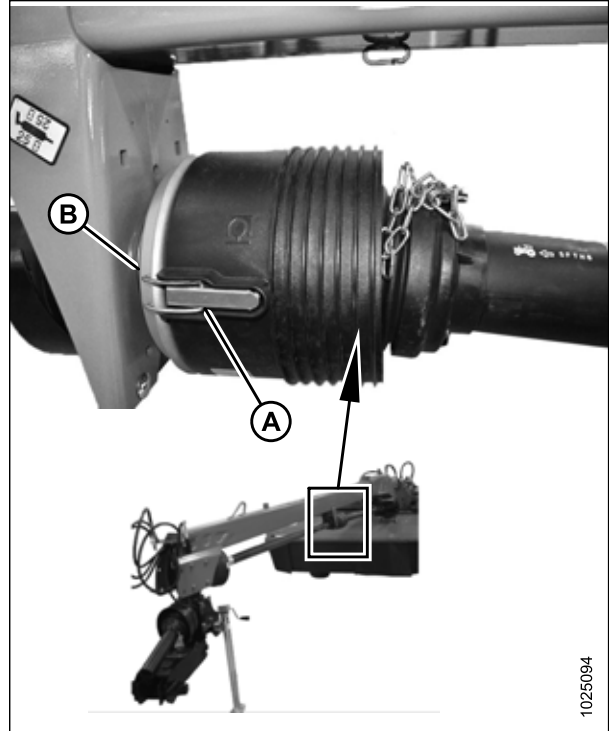


Figure 3.39: Driveline Guard

### IMPORTANT:

The driveline safety chain must be shortened to ensure it does **NOT** wrap around the driveline guard.

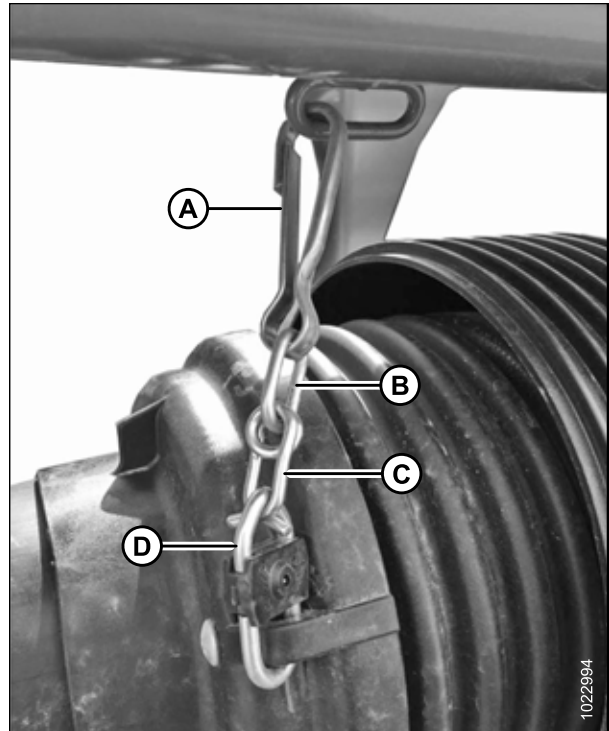


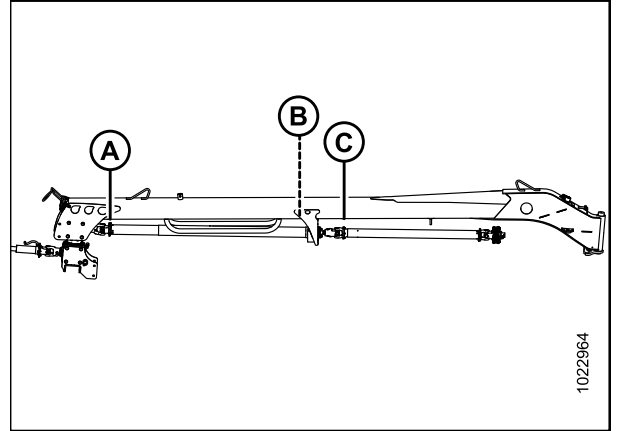
Figure 3.40: Shortened Safety Chain

A - Clip  
C - Safety Link

B - Chain Link  
D - Coupler Link

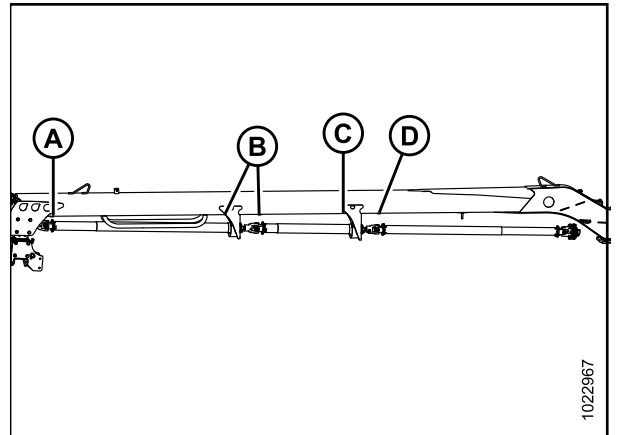
## INSTALLATION INSTRUCTIONS

22. To shorten the driveline safety chain on R113 header in locations (A), (B), and (C), retain clip, safety link, **ONE** chain link, and coupler link. Remove remaining chain links.



**Figure 3.41: R113 Driveline Safety Chain Locations**

23. Shorten the driveline safety chain on R116 header at the following locations:
- For location (A), retain clip, safety link, one chain link, and coupler link. Remove remaining chain links.
  - For locations (B), retain clip, safety link, one chain link, and coupler link. Remove remaining chain links.
  - For location (C), retain clip, safety link, two chain links, and coupler link. Remove remaining chain links.
  - For location (D), retain clip, safety link, four chain links, and coupler link. Remove remaining chain links.



**Figure 3.42: R116 Driveline Safety Chain Locations**

## INSTALLATION INSTRUCTIONS

24. Hook safety chain (A) on hitch, and ensure that chain is secured to the shield cone.

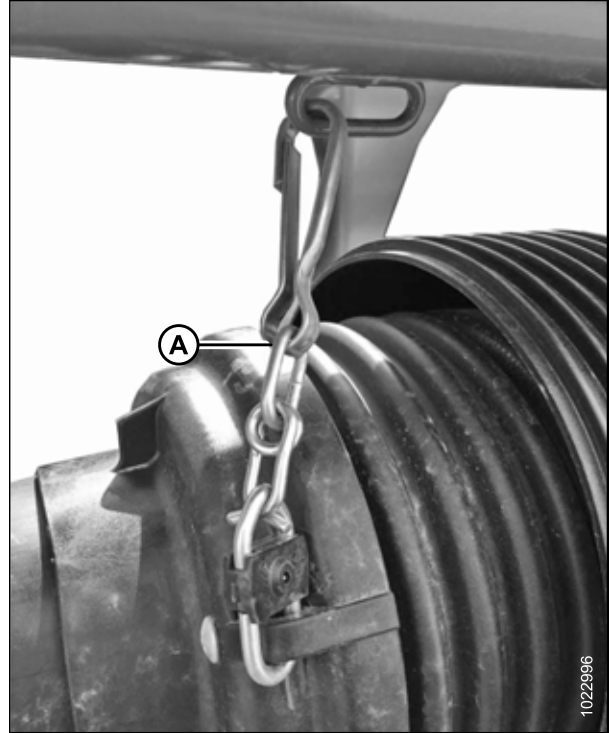


Figure 3.43: Safety Chain on Hitch

## INSTALLATION INSTRUCTIONS

### 3.4 Replacing Decal

1. Locate the existing grease decal (A), near the tractor end of the hitch, next to the MacDon logo.
2. Heat the decal with a heat gun, and peel it off.

**IMPORTANT:**

Do not overheat or the paint may be damaged.

3. Clean the surface with degreaser.

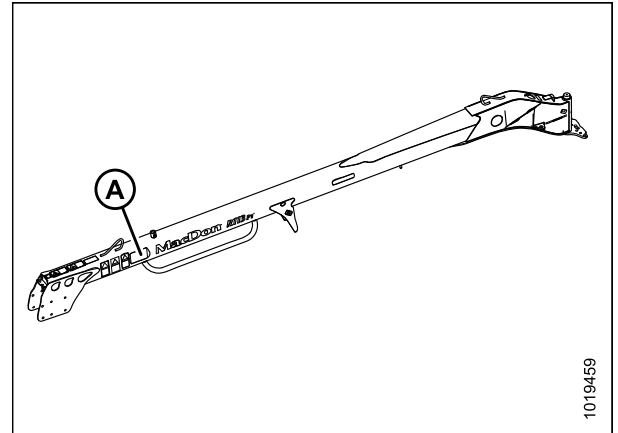


Figure 3.44: R113 PT Hitch (R116 PT is Similar)

4. Lay the new decal (MD #281529) graphic side up against the hitch in place of the one you removed.
5. The decal backing paper is split into two pieces. Bend the decal at the score line and flick a corner to separate the backing paper from the decal. Remove only as much of the backing paper as is required for the next step.

**IMPORTANT:**

Keep your fingers away from the edge of the decal. Contamination on the adhesive edge may cause the decal edges to lift after installation.

6. Using light finger pressure, tack top corners of decal to the side of the hitch.
7. Slowly peel back the remaining backing paper, smoothing the decal as it is applied.
8. Prick small air pockets with a pin and smooth out.

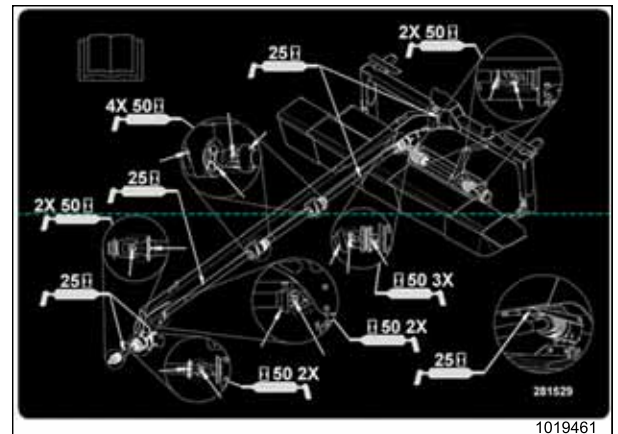


Figure 3.45: Decal MD #281529







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