

M155 Self-Propelled Windrower

Oil Cooler Bypass Kit (MD #183518) Installation Instructions

147595 Revision B
Original Instruction

Published: January 2016

Introduction

The Oil Cooler Bypass kit (MD #183518) is used to replace the cooler bypass manifold and the hardware on the wheel motor servo on an M155 Self-Propelled Windrower. This document explains how to install the kit.

Refer to the parts list to ensure you have all required items before installing this kit.

Installation Time

Installation time for this kit is approximately six hours.

Conventions

The following conventions are followed in this document:

- Right-hand (RH) and left-hand (LH) are determined from the operator's position, facing forward with the windrower in cab-forward position.
- Unless otherwise noted, use the standard torque values provided in the windrower 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 not currently available in any language except 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
Created topic.	3.1.5 Testing Cooler Bypass Pressure, page 12

TABLE OF CONTENTS

Introduction	i
List of Revisions	ii
1 Safety	1
1.1 Signal Words.....	1
1.2 General Safety	2
2 Parts List.....	5
3 Installation Instructions	9
3.1 Cooler Bypass Manifold	9
3.1.1 Preparing Kit Components for Installation	9
3.1.2 Changing the Hydraulic Oil	9
3.1.3 Replacing Cooler Bypass Manifold	10
3.1.4 Refilling Hydraulic Reservoir	12
3.1.5 Testing Cooler Bypass Pressure.....	12
3.2 Wheel Drive Motor Servo Hardware (2014 and Prior Only)	14
3.2.1 Removing Drive Wheel.....	14
3.2.2 Replacing Servo Hardware	15
3.2.3 Reinstalling Drive Wheel.....	19

1 Safety

1.1 Signal Words

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

DANGER

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

WARNING

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

CAUTION

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

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

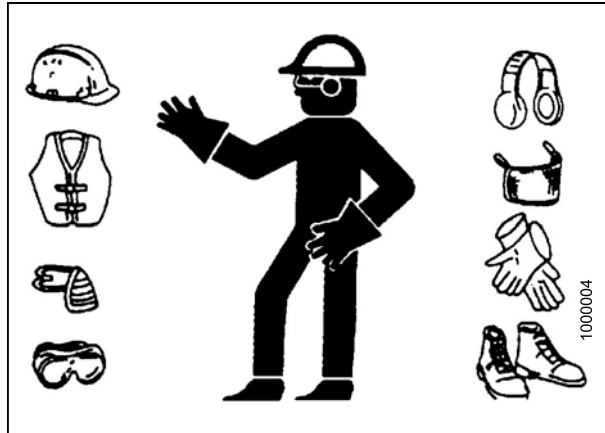


Figure 1.1: Safety Equipment



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

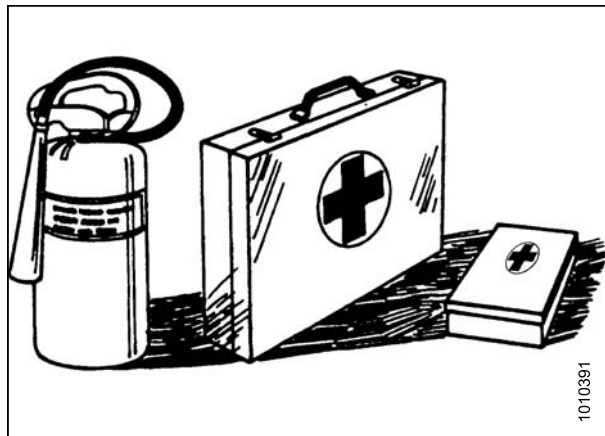


Figure 1.3: Safety Equipment

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



Figure 1.4: 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. Non-authorized modifications may impair machine function and/or safety. It may also shorten the machine's life.
- To avoid bodily injury or death from unexpected startup of machine, always stop the engine and remove the key from ignition before leaving operator's seat for any reason.

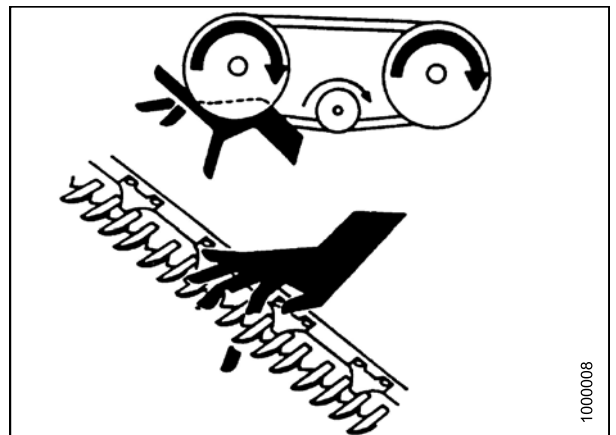


Figure 1.5: Safety around Equipment

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

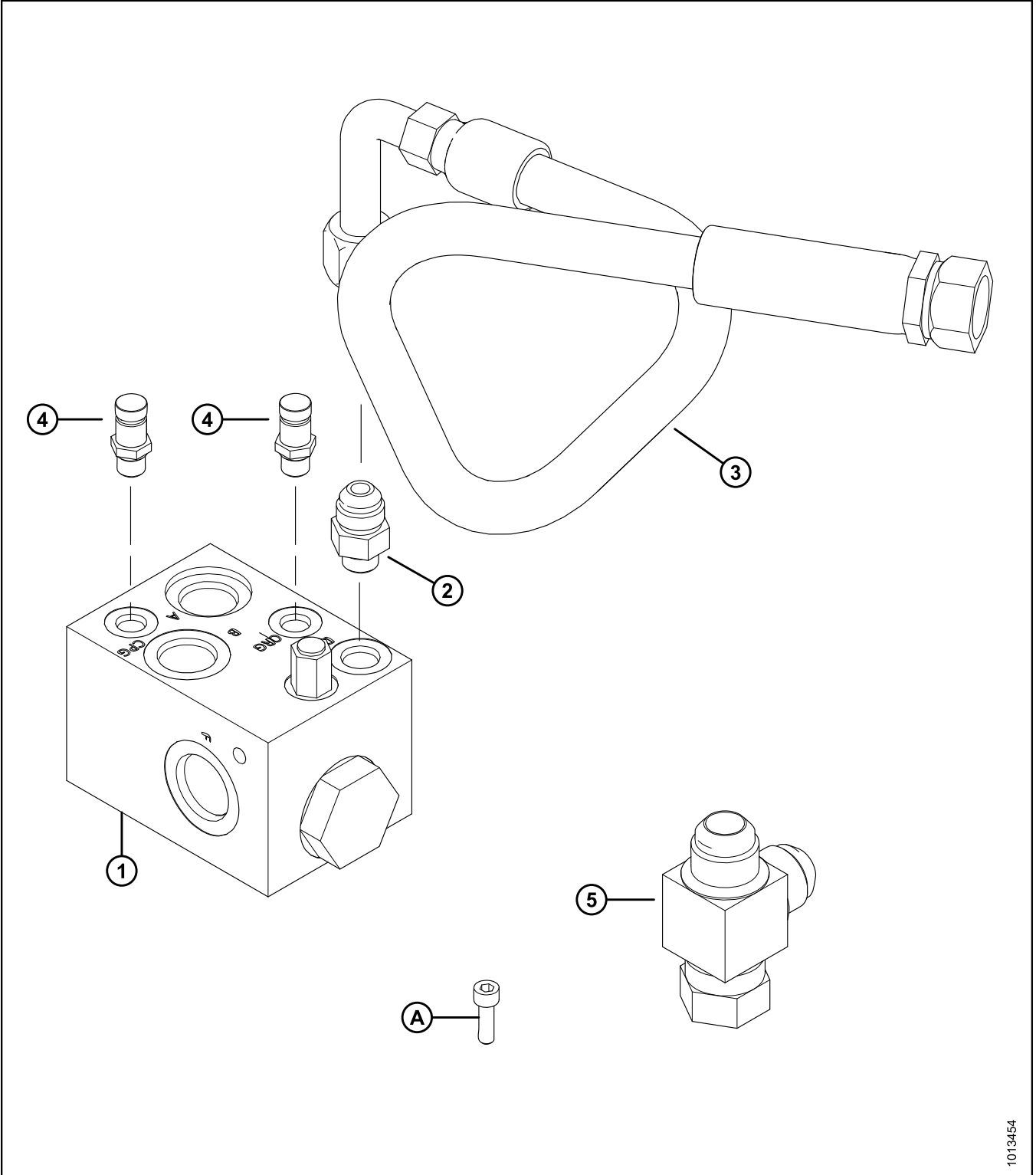


Figure 1.6: Safety around Equipment

2 Parts List

The following parts are included in this kit.

PARTS LIST



1013454

Figure 2.1: Parts Included in Oil Cooler Bypass Kit (MD #183518)

PARTS LIST

Ref	Part Number	Description	Quantity
1	183494	MANIFOLD – COOLER BYPASS	1
2	21031	FITTING – ADAPTER HYDRAULIC	1
3	183493	HOSE	1
4	134437	FITTING – COUPLING HYDRAULIC TEST PORT	2
5	50086	FITTING – HYDRAULIC TEE	1
A	136652	SCREW – HEX SOC HD M6 X 1.00 X 20-12.9-A2L	16

3 Installation Instructions

To install the Oil Cooler Bypass kit (MD #183518), follow these procedures in order.

IMPORTANT:

Do NOT attempt to install the Oil Cooler Bypass kit in the field. The hydraulic hose and fittings must be kept clean during installation to avoid hydraulic system damage.

IMPORTANT:

Protect the ends of hoses, fittings, and ports from contamination with clean, lint-free towels or clean plastic bags.

3.1 Cooler Bypass Manifold

3.1.1 Preparing Kit Components for Installation

To prepare the cooler bypass manifold components for installation, follow these steps:

1. As shown in the illustration at right, attach the two test port fittings (MD #134437) (A) to ports CRG and CPG on the new cooler bypass manifold (MD #183494) (B). All parts are provided in the kit.
2. Attach the adapter fitting (MD #21031) (C) provided in the kit to port DR on the manifold.

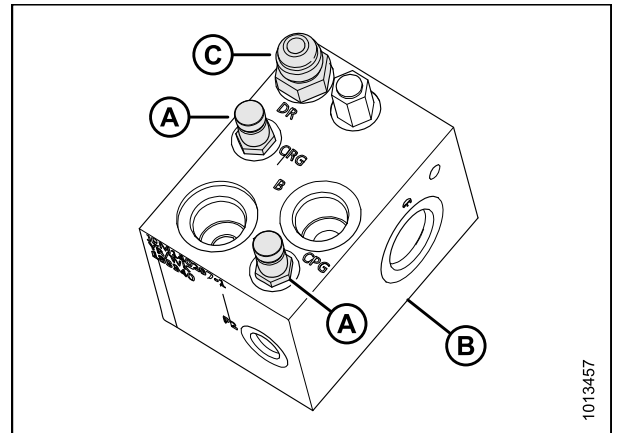


Figure 3.1: New Cooler Bypass Manifold with Fittings

3.1.2 Changing the Hydraulic Oil

DANGER

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

To drain hydraulic oil, follow these steps:

INSTALLATION INSTRUCTIONS

1. Park the windrower on level ground, and lower the header and reel so that the lift cylinders are fully retracted.
2. Stop the engine and remove the key.
3. Open the hood.
For instructions, refer to the windrower operator's manual or technical manual.
4. Place a clean container (at least 20 US gallons [75 liters]) under drain at the bottom of the hydraulic reservoir to collect the oil.
5. Remove drain plug (A) and allow oil to drain.
6. Inspect particles and clean off any metal debris that may have accumulated on magnetic plug. Wipe plug with a clean cloth. Check O-ring condition. Look for cracking, breakage, or deformation that may impede sealing ability and replace as required.
7. Install drain plug (A), torque to 59 ft-lbf (80 N·m).

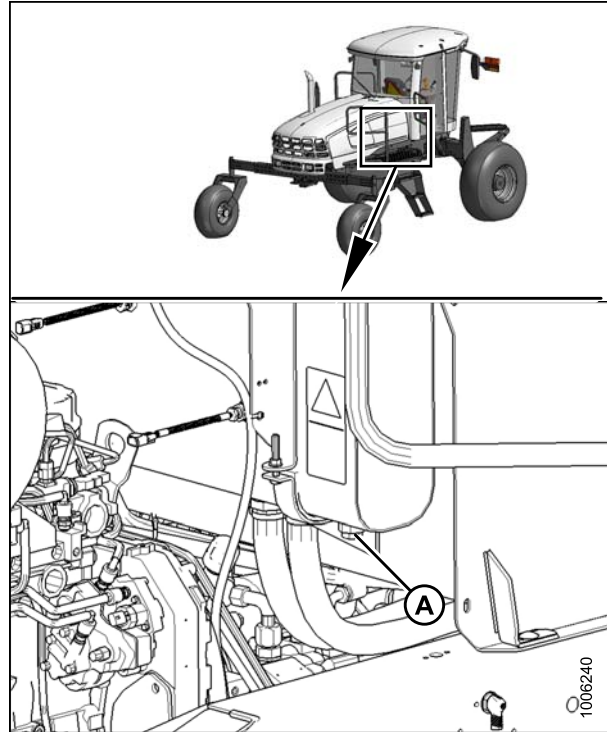


Figure 3.2: Hydraulic Oil Drain Plug

3.1.3 Replacing Cooler Bypass Manifold

To replace the cooler bypass manifold, follow these steps:

1. At the bottom of the hydraulic reservoir, detach hose (A) from elbow fitting (B).
2. Remove elbow fitting (B) and replace with hydraulic tee fitting (MD #50086) from the kit. Discard elbow fitting.

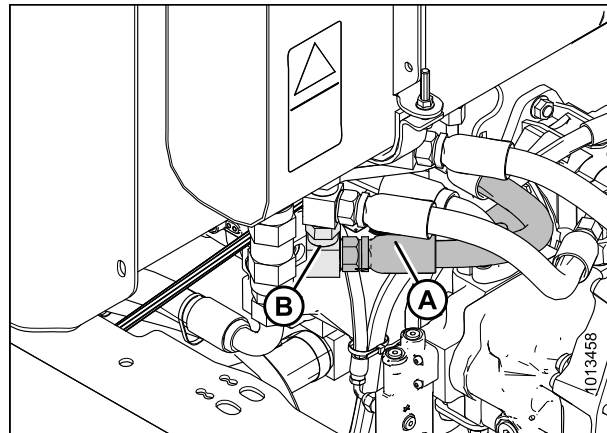


Figure 3.3: Bottom LH End of Hydraulic Reservoir

INSTALLATION INSTRUCTIONS

3. Reattach hose (A) from the reel and conveyor pump to the middle of the new tee fitting (B).
4. Attach hose (MD #183493) (C), provided in kit, to the open end of tee fitting (B).

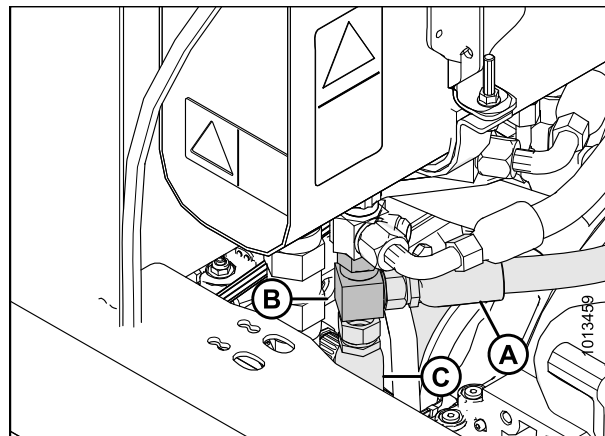


Figure 3.4: Bottom LH End of Hydraulic Reservoir

5. On the left side of the windrower, inside the frame, attach a cable tie (not provided in kit) to hose (A) or mark the hose to ensure that you remember where to reattach it later.
6. Disconnect hoses and lines (A) and (D) attached to the existing cooler bypass manifold (B).
7. Disconnect the existing cooler bypass manifold (B) from the filter (C) next to it.
8. One at a time, transfer fittings from the old manifold (B) to the new manifold (MD #183494) provided in the kit. Fittings should be positioned as shown in [Figure 3.6: Hydraulic Ports on New Cooler Bypass Manifold, page 11](#). Discard the old manifold.

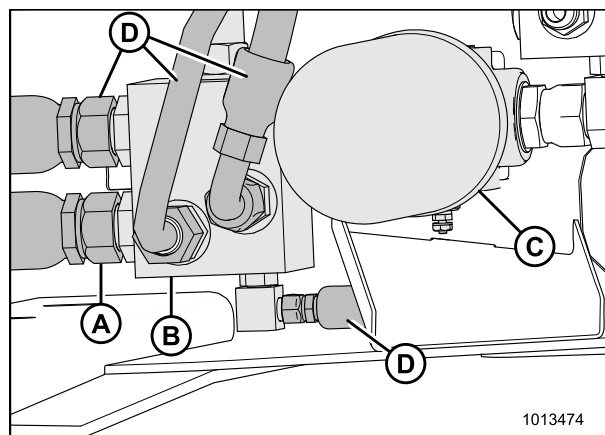


Figure 3.5: Inside LH Frame (View from Below)

9. Install the new manifold in place of the old. Port F on the new manifold connects to the filter head.
10. Connect the hoses and lines disconnected in [Step 6., page 11](#) to the new manifold as follows:
 - Port CR – the cooler return hose
 - Port CP – the hose from the oil cooler marked in [Step 5., page 11](#)
 - Port A – the steel line from Port T2 on the multifunction control block
 - Port B – the 5/8 in. hose from the inboard gear pump
 - Port P2 – the 1/4 in. hose from the lift manifold block
11. Attach the new hose from [Step 4., page 11](#) to the adapter fitting in Port DR of the new manifold.

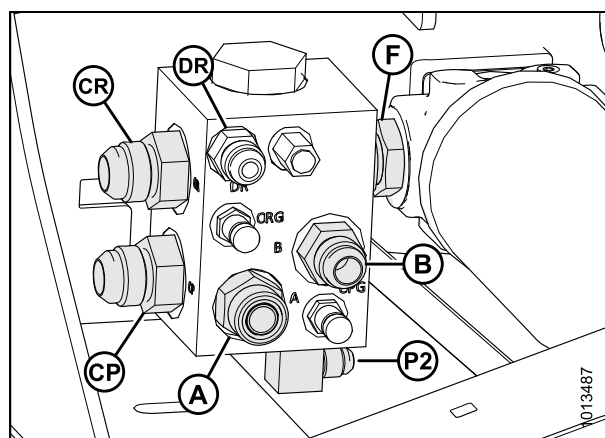


Figure 3.6: Hydraulic Ports on New Cooler Bypass Manifold

INSTALLATION INSTRUCTIONS

3.1.4 Refilling Hydraulic Reservoir

To refill the hydraulic reservoir, follow these steps:

1. Stand on left-hand platform to access the filler pipe.
2. Turn filler cap (A) counterclockwise to unlock cap and remove dipstick.

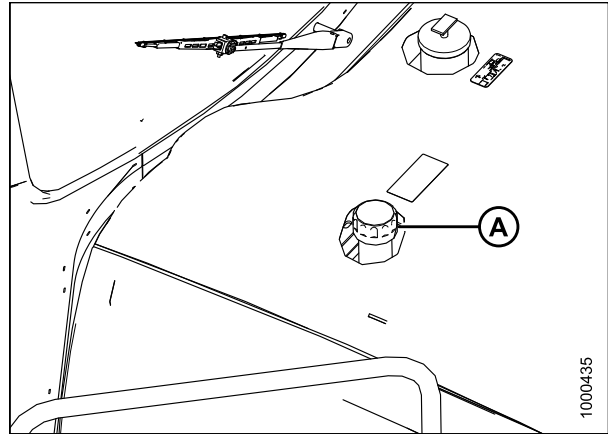


Figure 3.7: Windrower Hood

3. Add oil to maintain a level between the LOW and FULL marks, and make sure that no debris falls into the reservoir.
 - **Oil type:** SAE 15W-40 compliant with SAE specs for API Class SJ and CH-R engine oil
 - **Reservoir capacity:** 17.2 U.S. gallons (66 liters)
4. Reinstall dipstick and filler cap, and turn clockwise to tighten/lock.
5. Close the hood. For instructions, refer to the windrower operator's manual or technical manual.

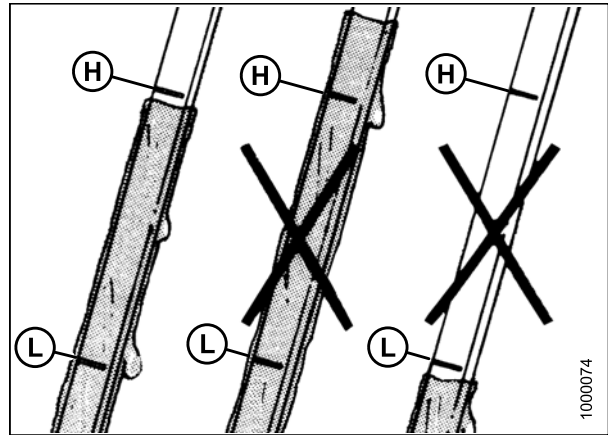


Figure 3.8: Hydraulic Oil Level

3.1.5 Testing Cooler Bypass Pressure

IMPORTANT:

Make sure you check CP and CR pressure after installing the new Oil Bypass Cooler kit, and adjust as necessary.

INSTALLATION INSTRUCTIONS

1. To measure CR pressure, attach a 1000 psi (7000 kPa) pressure gauge to the test fitting at port CRG (A).
2. To measure CP pressure, do one of the following:
 - Attach a 1000 psi (7000 kPa) pressure gauge to the test fitting at port CPG (B); **OR**
 - Attach a flow meter capable of reading flow as high as 28 gpm (106 lpm) and a 1000 psi (7000 kPa) pressure gauge between port CP and cooler. The test equipment must attach to the #12 JIC fitting at port CP on the cooler bypass manifold.
3. Start engine and run at high idle (wide open throttle) until hydraulic oil temperature is between 135–145°F (57–63°C). If using a flow meter, the reading should be between 20–24 gpm (76–91 lpm).
4. Record CP and CR pressures. CP pressure should be between 500–605 psi (3447–4171 kPa).
5. If CP pressure is not between 500–605 psi (3447–4171 kPa), adjust pressure by removing cap (C) and increasing or decreasing cooler bypass setting by turning adjustment screw.

NOTE:

CR pressure is not adjustable.

6. When CP pressure is in the correct range, subtract the CR pressure reading from the CP pressure reading. The differential pressure should range between 80–200 psi (552–1380 kPa). A differential pressure lower than 80 psi (552 kPa) indicates a possible defective hydraulic cooler.

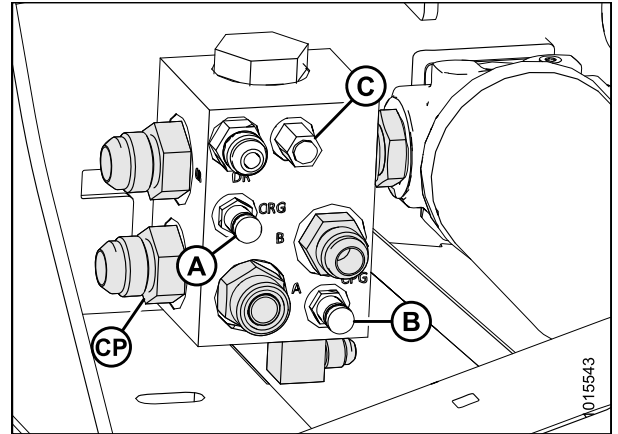


Figure 3.9: Hydraulic Ports on New Cooler Bypass Manifold

3.2 Wheel Drive Motor Servo Hardware (2014 and Prior Only)

Along with the parts required to replace the cooler bypass manifold, the kit also includes 16 hex socket head screws. These are needed to replace the hardware on both wheel drive motor servos on windrowers from model years 2014 and earlier. Follow the remaining procedures twice: once for the right-hand wheel drive and once for the left-hand wheel drive.

NOTE:

These procedures are NOT required for 2015 windrowers. The motors on these windrowers already have the required hardware.

3.2.1 Removing Drive Wheel

To remove the drive wheel, follow these steps:

⚠ 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. Place ground speed lever (GSL) in N-DETENT (A), shut down engine, and remove key.



Figure 3.10: Ground Speed Lever

⚠ CAUTION

Jack stand must be capable of supporting a minimum of 5000 lb. (2268 kg).

2. Place a jack under the leg jack point (A), and raise the drive wheel until it is slightly off ground. Place a jack stand beneath the lift cylinder mount (B).

NOTE:

Do NOT place jack stand under the cylinder. Use a small metal plate on top of the jack stand.

3. Lower the windrower onto the jack stand.

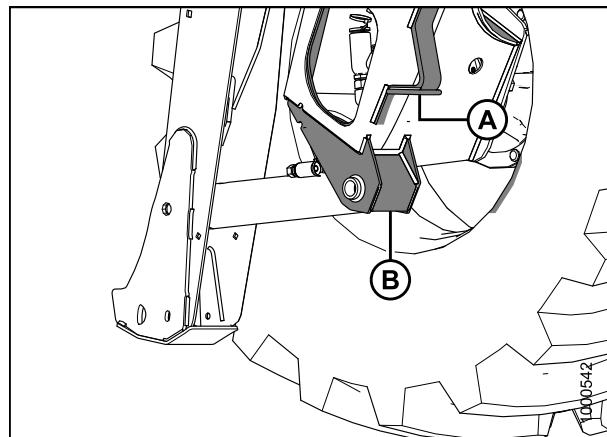


Figure 3.11: Drive Wheel Jack Point

INSTALLATION INSTRUCTIONS

4. Remove the wheel nuts (B).
5. Remove the drive wheel (A).

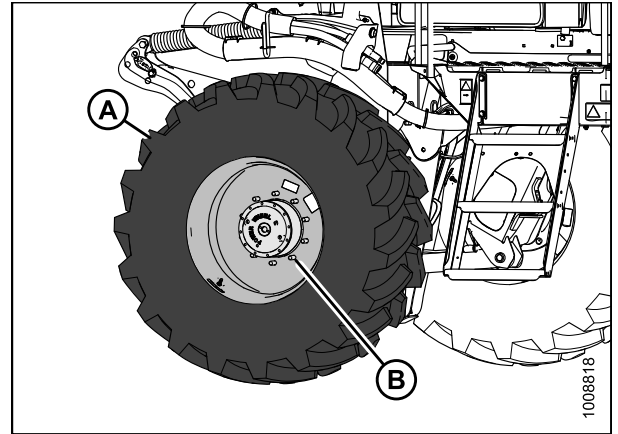


Figure 3.12: Drive Wheel

3.2.2 Replacing Servo Hardware

To replace the hardware on the wheel drive motor servo with the new hardware provided in the kit, repeat the following steps until all 16 hex socket head screws (MD #136652) (A) provided in the kit have been installed.

Illustrations show the procedure for the left-hand windrower leg. Repeat all steps on the right-hand windrower leg.

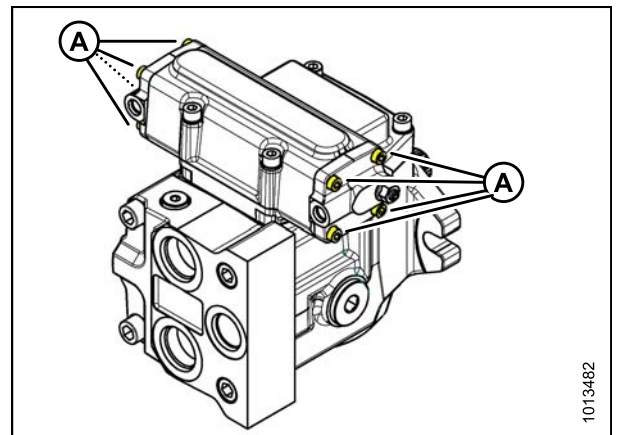


Figure 3.13: Wheel Drive Motor

1. Use a chain (A) and a suitable lifting device capable of lifting 1000 lbs (454 kg). Support the wheel drive by lifting it from one of the wheel studs. Secure it with a wheel nut. You will need to move the wheel drive side to side to pull it out of the housing as the hydraulic motor is still attached. Do not disconnect any hydraulic lines.
2. Remove bolt (B).

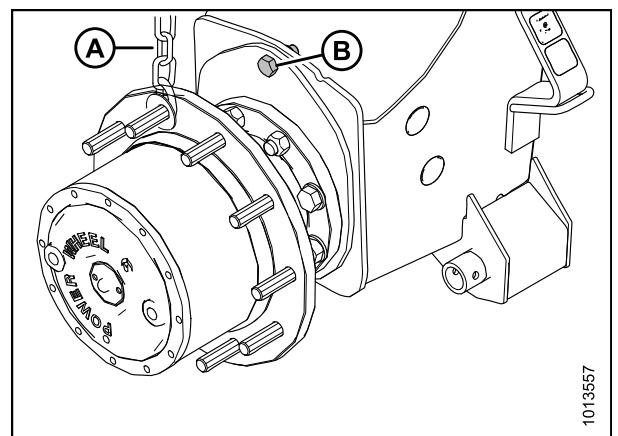


Figure 3.14: Wheel Drive Supported by Chain

INSTALLATION INSTRUCTIONS

3. To disengage drive wheel and allow wheel to rotate, remove the two hex bolts (A) at the center of the drive wheel. Remove cap (B), and flip over so that the dished side faces in. Replace bolts (A). The cap will press on a pin that disengages the gearbox.

NOTE:

Disengaging the drive wheel will make it possible for you to remove the bolts in the next step.

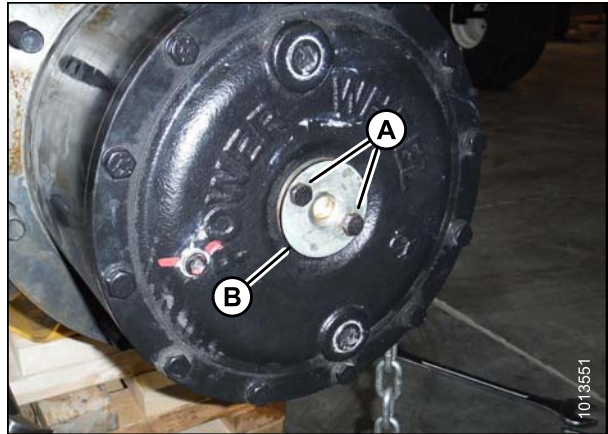


Figure 3.15: Drive Wheel Motor with Center Cap Disengaged

4. Remove the lower six bolts (A) that hold the wheel drive to the windrower leg. Do NOT remove the two nuts (B) located at the top of the wheel drive.

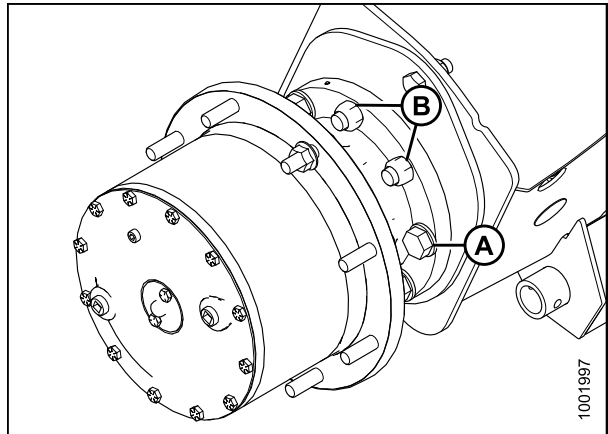


Figure 3.16: Wheel Drive

5. Remove hex bolts (A) at the center of the drive wheel. Remove cap (B), and flip over so that the dished side faces in. Replace bolts. The drive wheel is re-engaged.

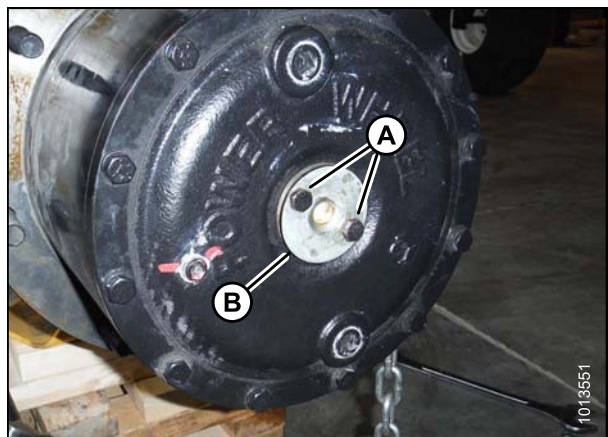


Figure 3.17: Drive Wheel Motor with Center Cap Disengaged

INSTALLATION INSTRUCTIONS

6. Remove upper plug (A) on both sides of windrower leg, opening access holes through which you can access the wheel drive motor servo.

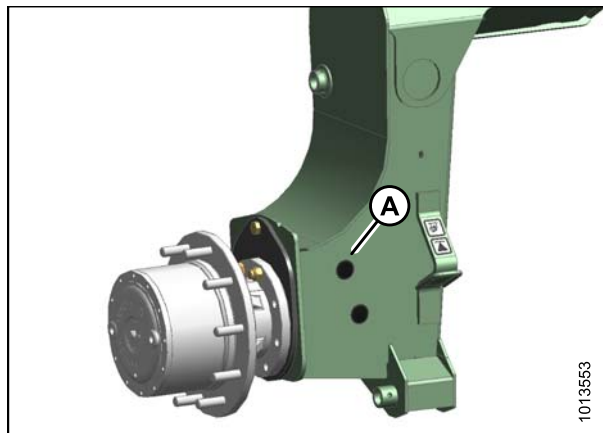


Figure 3.18: Plugs in Windrower Leg

7. Through one of the access holes, remove one of the existing servo bolts (A) with a 5 mm hex wrench and replace it with one of the hex socket head screws (MD #136652) provided in the kit. If your wrench does not line up, use a wrench on lock nut (B) to move the hydraulic motor inside the leg. Only replace the first bolt that can be accessed on each side of the windrower leg.
8. Torque to 150–153 in·lbf (16.8–17.3 N·m).
9. Loosen the chain and twist motor using wrench at (B) to rotate wheel motor to access the other bolt at (C). Replace with one of the hex socket head screws (MD #136652) provided in the kit. Repeat on the other side of the windrower leg.
10. Torque to 150–153 in·lbf (16.8–17.3 N·m).
11. Once you have replaced two servo bolts on each side of the windrower leg, continue on to the next step.
12. Ease out the wheel drive motor assembly so that you can just access the brake line fitting (A). Loosen and turn line from vertical and lay over horizontally for the next few steps.

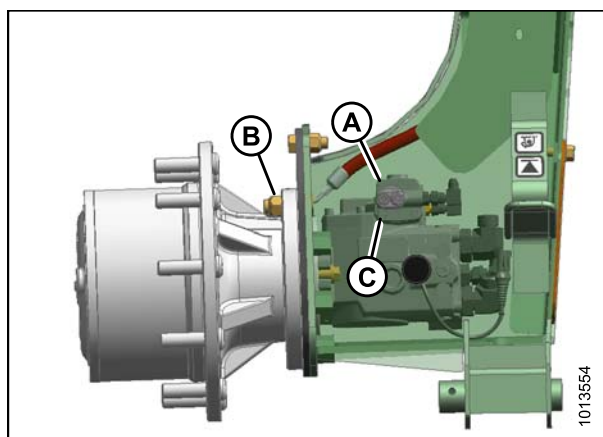


Figure 3.19: Windrower Leg Illustrated as if Transparent

NOTE:

On the left-hand wheel motor there is a speed sensor, make sure not to damage it when removing the wheel drive.

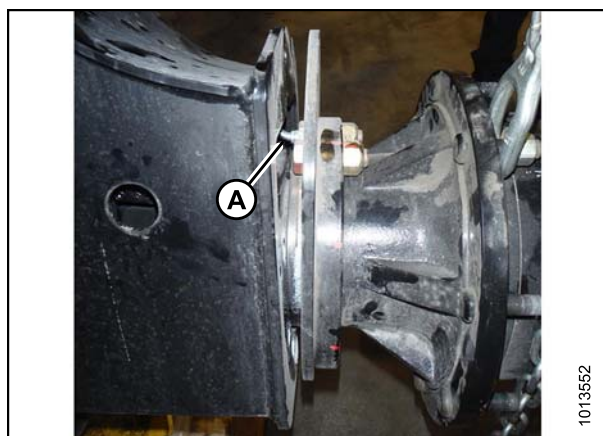


Figure 3.20: Wheel Drive Motor Assembly with Brake Line Fitting Visible

INSTALLATION INSTRUCTIONS

- To access the remaining bolts on the servo, pull out the wheel drive assembly approx. 1-1/2 in. (38 mm). Rotate the wheel motor with wrench on lock nut (A) to align servo bolts on both sides. Wedge a 2 x 4 (B) in top or bottom as necessary. Through the access holes (C), one at a time, replace the remaining servo bolts with the hex socket head screws (MD #136652) provided in the kit.
- Repeat Steps [7.](#), [page 17](#) to [10.](#), [page 17](#).

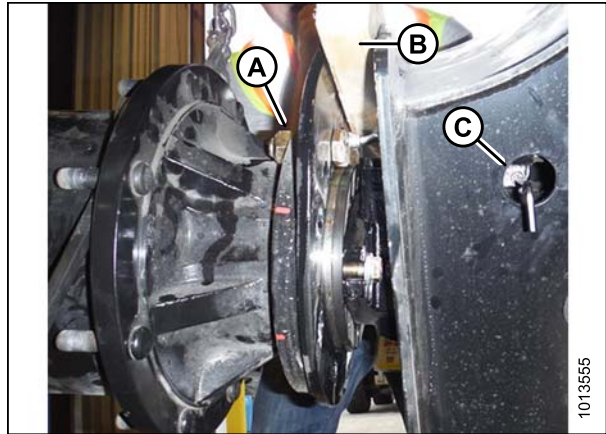


Figure 3.21: Wheel Drive Assembly Pulled Out of Windrower Leg

- Ease the wheel drive assembly back into the windrower leg, but don't push it all the way in tight. Adjust brake line so that it is once again vertical, and tighten fitting (A). Push wheel in until you can still see the bolt heads at (A), leaving a gap of about 1/4 in. (6 mm).

NOTE:

On the left-hand wheel motor there is a speed sensor. Be careful not to damage it when reinstalling the wheel drive.

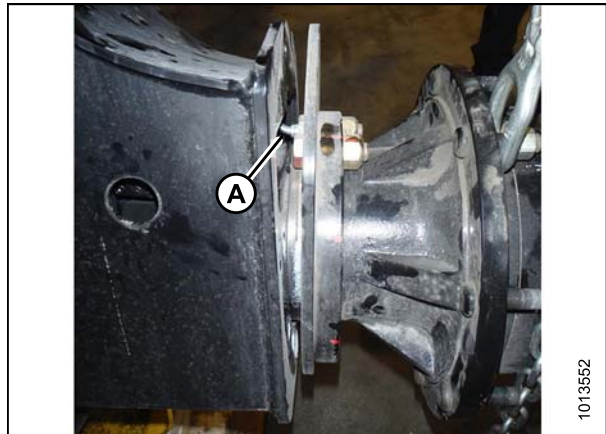


Figure 3.22: Wheel Drive Motor Assembly with Brake Line Fitting Visible

- To disengage drive wheel and allow wheel to rotate, remove the two hex bolts (A) at the center of the drive wheel. Remove cap (B), and flip over so that the dished side faces in. Replace bolts (A). The cap will press on a pin that disengages the gearbox.

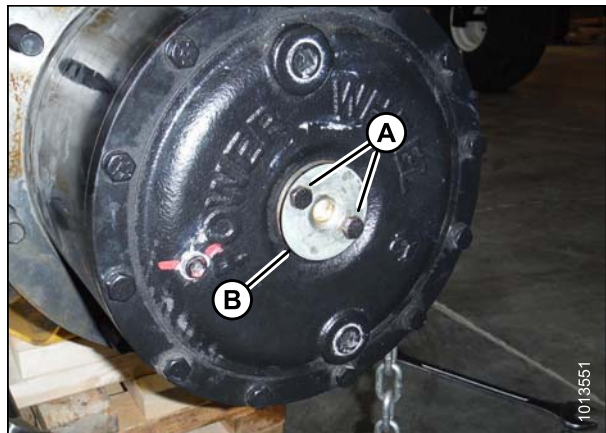


Figure 3.23: Drive Wheel Motor with Center Cap Disengaged

INSTALLATION INSTRUCTIONS

17. Reinstall the lower six bolts (A) that hold the wheel drive to the windrower leg. Use Loctite® 243 on the threads. Install bolt and nut removed at (B), just securing nut to engage threads. Loosen tension on chain (D) or vary tension as necessary to align holes for bolt installation. Do not close up gap until you have three or more bolts positively engaged or you will have difficulty lining up all the bolts. When you have three or more started, the remaining bolts should thread in more easily and you can push the drive wheel flush to windrower leg.
18. Torque bolts (A) to 250 ft-lbf (339 N·m).
19. Re-engage drive wheel.
20. Tighten bolt and lock nut at (B).
21. Replace plugs (C) in access holes in windrower legs.
22. Remove chain (D) supporting the wheel drive.

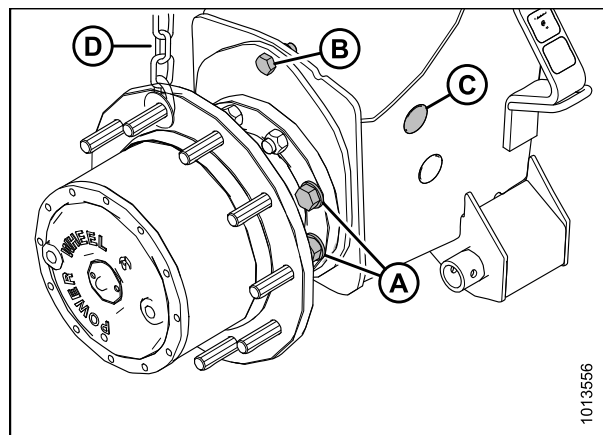


Figure 3.24: Wheel Drive

3.2.3 Reinstalling Drive Wheel

To reinstall the drive wheel, follow these steps:

IMPORTANT:

For model year 2014 and prior windrowers: Before installing wheel hardware, inspect nuts and washers. Verify that they are L9 by checking for markings (A). If the current hardware is **NOT** L9, order kit MD #166590 consisting of new hardware and decals.

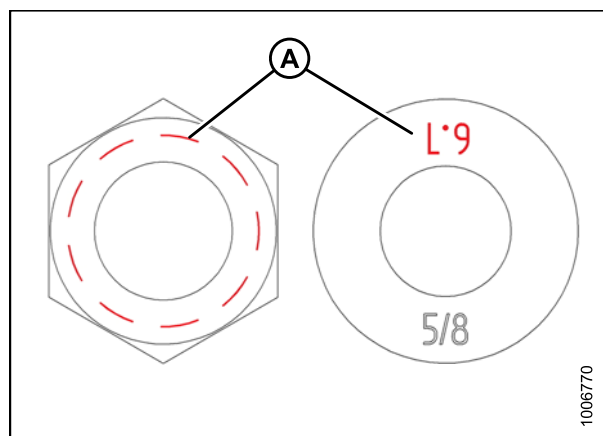


Figure 3.25: L9 Hardware (2014 and Prior)

INSTALLATION INSTRUCTIONS

1. Position drive wheel (A) against wheel drive hub (B) such that air valve (C) is on the outside and tire tread (D) points forward when windrower is in cab forward position. For turf tires (diamond tread), be sure arrow on sidewall points in forward rotation when windrower is in cab-forward.
2. Lift wheel on hub with lifting device. Lower lifting device.

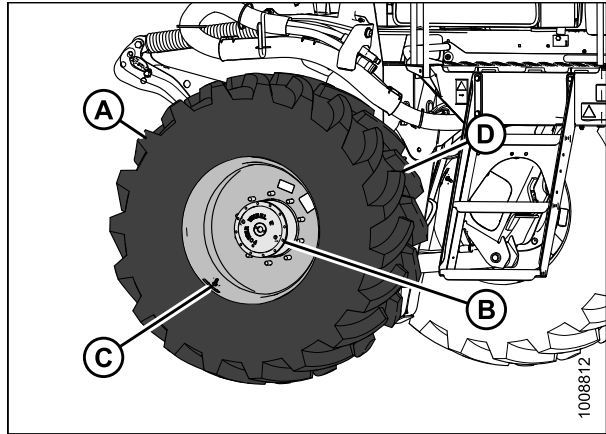


Figure 3.26: Drive Wheel

3. Line up the holes in the rim with the studs on the wheel drive hub and install wheel nuts (A).
4. **Ten-bolt wheels only:** Tighten drive wheel nuts (A). Ensure nuts and studs are dry with no lubricant or Never-Seez® compound. Torque each to 375 ft-lbf (510 N·m) using the tightening sequence as shown. Repeat torque procedure every hour until two consecutive checks produce no movement of the nuts.

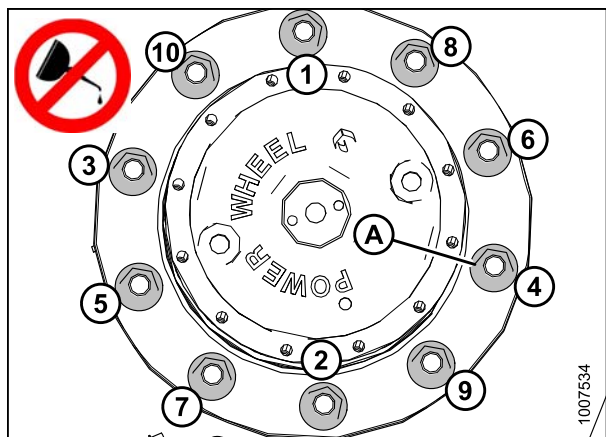


Figure 3.27: Ten-Bolt Drive Wheel

5. **Eight-bolt wheels with L9 hardware only:** Tighten drive wheel nuts (A) to 170 ft-lbf (230 N·m) using the tightening sequence as shown. Repeat sequence three times.

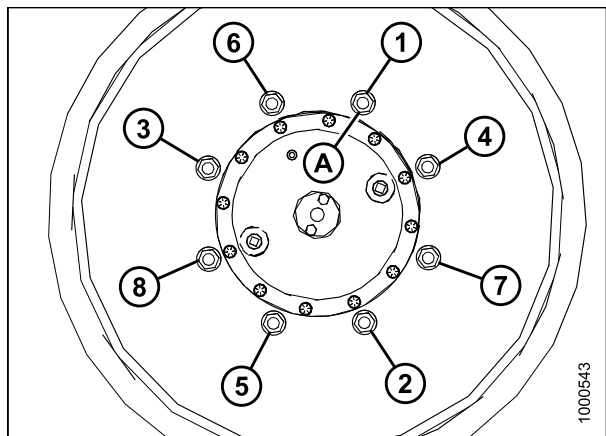


Figure 3.28: Eight-Bolt Drive Wheel (2014 and Prior)

INSTALLATION INSTRUCTIONS

CAUTION

Jack stand must be capable of supporting a minimum of 5000 lb (2268 kg).

6. Place a jack under the leg jack point (A) and raise the drive wheel slightly off the jack stand.
7. Remove the jack stand from under the cylinder lift mount (B) and lower the drive wheel to the ground.
8. Remove the jack.

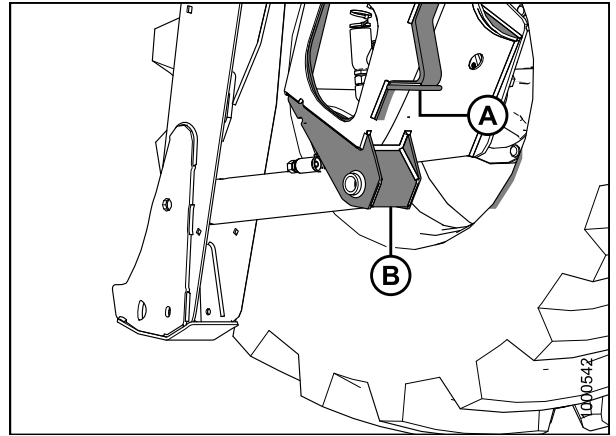


Figure 3.29: Drive Wheel Leg Jacking Point

9. After one hour of operation, retorque the wheel nuts. Then check every hour until two consecutive checks produce no movement of the nuts.

MacDon Industries Ltd.

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

MacDon, Inc.

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

MacDon Australia Pty. Ltd.

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

LLC MacDon Russia Ltd.

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

CUSTOMERS

MacDon.com

DEALERS

Portal.MacDon.com

Trademarks of products are the marks of their respective manufacturers and/or distributors.

Printed in Canada