

Group 05A - Safety

Recognize Safety Information



Safety-alert symbol

This is a safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.

Understand Signal Words



▲ WARNING

▲ CAUTION

Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

Follow Safety Instructions

Group 00 - Component Removal and Installation

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 20—00](#)

[Specifications 20—00](#)

[Remove Engine—9.0 L](#)

[Install Engine—9.0 L](#)

[Remove Engine—13.5 L](#)

[Install Engine—13.5 L](#)

[Remove Engine—15 L](#)

[Install Engine—15 L](#)

[Remove and Install Engine Oil Pan](#)

Essential, Recommended, and Fabricated Tools 20—00

→NOTE:

For further information, see SERVICEGARD™ online tool catalog.

Below are tools listed in this group.

JDG820 Flywheel Rotation Tool

JDG11252 Front Lifting Bracket

JDG11258 Rear Lifting Bracket

JDG11324 Front Lifting Bracket

JDG11325 Rear Lifting Bracket

JT07336 Lift Sling

Group 05 - Diesel Fuel System

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 30—05](#)

[Specifications 30—05](#)

[Drain Fuel Tanks](#)

[Remove and Install Fuel Tank](#)

[Replace Fuel Filter, Fuel Pump, and Bleed Fuel System](#)

Essential, Recommended, and Fabricated Tools 30—05

→NOTE:

For further information, see SERVICEGARD™ online tool catalog.

Below are tools listed in this group.

JDG19 Lifting Eyes

JDG909 Lifting Eyes

Specifications 30—05

Item	Measurement	Specification
Double Reduction Support Bracket Cap Screws	(Initial) Torque	37 N·m (27 lb.-ft.)
Double Reduction Fuel Tank Cap Screws	Torque	320 N·m (236 lb.-ft.)
Double Reduction Support Bracket Cap Screws	(Final) Torque	530 N·m (390 lb.-ft.)
Bottom Fuel Tank Cap Screws	Torque	320 N·m (236 lb.-ft.)
Side Fuel Tank Cap Screws	Torque	320 N·m (236 lb.-ft.)

Drain Fuel Tanks

[1] -

IMPORTANT:

Use another wrench on upper fitting to prevent drain valve movement.

Group 05 - Connectors

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 40—05](#)

[Other Material 40—05](#)

[Use Electrical Insulating Compound](#)

[Using High-Pressure Washers](#)

[Installation of Repair Wire Assembly](#)

[Repair AMP™ Connector](#)

[Repair AMPSEAL 16™ Connectors](#)

[Bosch™ Connectors](#)

[Remove Connector Body from Blade Terminals](#)

[CINCH™ Control Unit Connectors](#)

[Exploded View—CINCH™ FlexBox Connectors](#)

[CINCH™ FlexBox Connectors](#)

[Repair CPC™ Blade Type Connectors](#)

[Repair CPC™, Large Mate-N-Loc™, and Metrimate™ Pin Type Connectors](#)

[Repair DEUTSCH™ Connectors](#)

[Repair DEUTSCH™ Implement Connectors](#)

[Repair ITT Connector](#)

[Repair Small Mate-N-Loc™ Socket Connector](#)

[Repair Small Mate-N-Loc™ Pin Connector](#)

[Repair \(Pull Type\) Metri-Pack™ Connectors](#)

[Repair \(Push Type\) Metri-Pack™ Connectors](#)

[Repair Molex™ Control Unit Connectors](#)

[Repair Molex™ Connector](#)

[Repair SUMITOMO™ Connectors](#)

[Repair Tyco™ Fuel Injector Connector](#)

[Repair WEATHER PACK™ Connector](#)

[Repair YAZAKI™ Connectors](#)

Essential, Recommended, and Fabricated Tools 40—05

Group 00 - Component Removal and Installation

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 50A—00](#)

[Other Material 50A—00](#)

[Specifications 50A—00](#)

[Remove Transmission—PST](#)

[Engine Repair Stand Safety Precautions](#)

[Engine Repair Stand](#)

[Engine Repair Stand—Adapter Installation](#)

[Transmission Mounting Bracket—Installation](#)

[Install and Remove Transmission to Engine Stand](#)

[Install Transmission—PST](#)

Essential, Recommended, and Fabricated Tools 50A—00

→NOTE:

For further information, see **SERVICEGARD™** online tool catalog.

D05223ST Engine Rollover Stand

JDG19 Lifting Eyes

JT05887 Transmission Mounting Adapter Set

Other Material 50A—00

Number	Name	Use
<ul style="list-style-type: none"> PM37477 (us) PM38622 (canadian) 242 Loctite™ (us) 	Thread Lock and Sealer (Medium Strength)	Used to retain cap screws and seal surfaces.

Group 00 - Component Removal and Installation

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 50B—00](#)

[Specifications 50B—00](#)

[Remove and Install PTO Clutch](#)

[PTO-to-Transmission Alignment](#)

[Remove and Install PTO Drop Box Assembly](#)

Essential, Recommended, and Fabricated Tools 50B—00

→NOTE:

For further information, see **SERVICEGARD™** online tool catalog.

Below are tools listed in this group.

[DFRW257—PTO Drive Shaft Measuring Tool](#)

JDG1006 PTO Clutch Housing Lifting Fixture

JDG1327 Alignment Tool Set

Group 00 - Component Removal and Installation

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 50C—00](#)

[Specifications 50C—00](#)

[Axle Vertical Play—Quick Check—Single Reduction Axles](#)

[Remove and Install Front Axle Assembly—Single Reduction Axles](#)

[Remove and Install Rear Axle Assembly—Single Reduction Axles](#)

[Remove and Install Axle Assembly Onto Repair Stand—Single Reduction Axles](#)

Essential, Recommended, and Fabricated Tools 50C—00

→NOTE:

For further information, see **SERVICEGARD™** online tool catalog.

Below are tools listed in this group.

[DFRW255—Gudgeon Oscillation Stop—SR Axle](#)

D05223ST Engine Rollover Stand

JDG882 Mounting Guide Pins

JDG924 Yoke Holding Tool

JDG927 Axle Support Bracket

JDG1005 Axle Support Bracket Adapter Set

JDG1083 Axle Transport Cart

JT02044 Support Stands

JT05706 Torque Multiplier Wrench

JT05725 Universal Support Stand

Group 00 - Component Removal and Installation

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 50D—00](#)

[Specifications 50D—00](#)

[Identify Axles](#)

[Axle Vertical Play—Quick Check—Double Reduction Axles](#)

[Remove and Install Front Axle Assembly—Double Reduction Axles](#)

[Remove and Install Rear Axle Assembly—Double Reduction Axles](#)

[Remove and Install Axle Assembly Onto Repair Stand—Double Reduction Axles](#)

[Remove and Install Valve Housing—Double Reduction Axles](#)

Essential, Recommended, and Fabricated Tools 50D—00

→NOTE:

For further information, see SERVICEGARD™ online tool catalog.

Below are tools listed in this group.

[DFRW254—Gudgeon Oscillation Stop—DR Axle](#)

D05223ST Engine Rollover Stand

JDG1083 Axle Transport Cart

JDG10227 Axle Mounting Bracket

JDG11799 Suspension Bushing/Seal Installer

JT02044 Support Stands

JT05706 Torque Multiplier Wrench

JT05725 Universal Support Stand

Group 05 - Service Brakes

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 60A—05](#)

[Other Material 60A—05](#)

[Specifications 60A—05](#)

[General Repair Procedures 60A—05](#)

[Remove and Install Brake Rod](#)

[Remove and Install Brake Valve](#)

[Repair Brake Valve](#)

[Remove and Install Secondary Brake Valve](#)

[Repair Secondary Brake Valve](#)

[Bleed Brakes](#)

[Check Brakes](#)

[Manually Release Park Brake—PST](#)

Essential, Recommended, and Fabricated Tools 60A—05

→NOTE:

For further information, see SERVICEGARD™ online tool catalog.

Below are tools listed in this group.

[DFRW165—PST Park Brake Pump Off Hose Adapter](#)

[DFRW213—Hydraulic Trailer Brake Test / Bleed Assembly](#)

D01045AA Disk Set

JDG1666 Park Brake Release Hand Pump Kit

JDG11237 Extension Lead Harness Adapter

JT03473 Coupler

JT05412 Universal Pressure Test Kit

JT07115 Master Hydraulic Kit

JT07115SUP Supplemental Master Hydraulic Kit

Group 05 - Steering Column

List of References

Below is a list of all items within this group.

- [Specifications 60B—05](#)
- [Remove and Install Control Support](#)
- [Repair Steering Column](#)

Other Material

Number	Name	Use
• PM37418 (us)	242 Medium Strength Loctite	Used on threads of clutch cap screw

Specifications 60B—05

Item	Measurement	Specification
Rear Control Support-to-Cab Floor Cap Screw	Torque	125 N·m (92 lb.-ft.)
Front Control Support-to-Cab Floor Cap Screw	Torque	35 N·m (25 lb.-ft.)
Foot Rest-to-Control Support Cap Screw	Torque	35 N·m (25 lb.-ft.)
Foot Rest-to-Cab Floor Cap Screw	Torque	35 N·m (25 lb.-ft.)
Steering Wheel Nut	Torque	30 N·m (265 lb.-in.)

Group 00 - Component Removal and Installation

List of References

Below is a list of all items within this group.

- [Essential, Recommended, and Fabricated Tools 70—00](#)
- [Specifications 70—00](#)
- [Remove and Install Hydraulic Pump—Standard Flow Hydraulic System](#)
- [Remove and Install Hydraulic Pump—High-Flow Hydraulic System](#)
- [Fill Hydraulic Pump Crankcase](#)

Essential, Recommended, and Fabricated Tools 70—00

→NOTE:

For further information, see SERVICEGARD™ catalog.

Below are tools listed in this group:

JDG861 Wrench Adapter

Specifications 70—00

Item	Measurement	Specification
Hydraulic Pump Retaining Nuts	Torque	90 N·m (66 lb.-ft.)
Outlet Manifold Cap Screws	Torque	73 N·m (54 lb.-ft.)
Valve Retaining Cap Screws	Torque	87 N·m (64 lb.-ft.)
Drive Shaft Shield Cap Screws	Torque	320 N·m (236 lb.-ft.)
Outlet Manifold Cap Screws	Torque	50 N·m (37 lb.-ft.)
High Flow Line Cap Screws	Torque	58 N·m (42 lb.-ft.)

Group 05 - Hood and Side Panels

List of References

Below is a list of all items within this group.

[Specifications 80A—05](#)

[Position Hood Forward](#)

[Remove and Install Hood](#)

[Remove and Install Hood Screens](#)

[Remove and Install Hood Side Panels](#)

[Remove and Install Hood Latch](#)

[Adjust Fingerguard](#)

[Remove and Install Grille and Headlight Assembly](#)

[Adjusting Front Grille Lights](#)

[Aiming Head Lights](#)

Group 05 - Hinge

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 80B—05](#)

[Other Material 80B—05](#)

[Specifications 80B—05](#)

[Replace Hinge Pins and Bushings](#)

Essential, Recommended, and Fabricated Tools 80B—05

→NOTE:

For further information, see **SERVICEGARD™** online tool catalog.

Below are tools listed in this group.

D01045AAA Disc Set

DFRW254—Gudgeon Oscillation Stop—DR Axle

DFRW255—Gudgeon Oscillation Stop—SR Axle

JDG19 Lifting Eye

JDG537 Driver Handle

JDG758 Bushing Installer

JT05723 Medium-Duty Splitting Stand

JT05725 Universal Support Stand

JT07336 Lift Sling

Other Material 80B—05

Number	Name	Use
<ul style="list-style-type: none"> PM37477 (us) PM38621 (canadian) 242 Loctite™ (us) 	Thread Lock and Sealer (Medium Strength)	Used to retain cab mount cap screws.

Specifications 80B—05

Item	Measurement	Specification
Hinge Pin Retainer Cap Screws	Torque	128 N·m (94 lb.-ft.)
PTO Clutch Drive Shaft Cap Screws	Torque	150 N·m (110 lb.-ft.)
Rear PTO Clutch Drive Shaft Shield Cap Screws	Torque	73 N·m (54 lb.-ft.)
Front PTO Clutch Drive Shaft Shield Cap Screws	Torque	320 N·m (236 lb.-ft.)
Cab Mount Cap Screws	Torque	300 N·m (221 lb.-ft.)

Group 00 - Component Removal and Installation

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 80C—00](#)

[Specifications 80C—00](#)

[Remove and Install Suspension System](#)

Essential, Recommended, and Fabricated Tools 80C—00

→NOTE:

For further information, see SERVICEGARD™ online tool catalog.

Below are tools listed in this group:

JT02044 Jack Stand

Specifications 80C—00

Item	Measurement	Specification
Suspension System Support Bracket Cap Screws	Torque	310 N·m (229 lb.-ft.)

Group 00 - Component Removal and Installation

List of References

Below is a list of all items within this group.

[Essential, Recommended, and Fabricated Tools 90—00](#)

[Other Material 90—00](#)

[Specifications 90—00](#)

[Remove Cab](#)

[Install Cab](#)

[Repair Cab](#)

[Remove Inner Roof](#)

[Install Inner Roof](#)

[Remove and Install Left Hand Armrest](#)

Essential, Recommended, and Fabricated Tools 90—00

→NOTE:

For further information, see SERVICEGARD™ online tool catalog.

Below are tools listed in this group.

JDG19 Lifting Eyes

JDG1419 Lifting Bridle

JT07336 Lift Sling

Other Material 90—00

Number	Name	Use
<ul style="list-style-type: none"> PM37477 (us) PM38622 (canadian) 242 Loctite™ (us) 	Thread Lock and Sealer (Medium Strength)	Used to retain cap screw.

Specifications 90—00

Item	Measurement	Specification
Cab Mount Cap Screws [Zinc-Flake Coated]	Torque	300 N·m (221 lb.-ft.)
Inner Roof Retaining Nuts	Torque	40 N·m (30 lb.-ft.)
Ground Wire Cap Screw	Torque	40 N·m (30 lb.-ft.)

Group 05 - Dealer Fabricated Tools

List of References

This list contains fabricated tools used in this manual.

Fabricated Tools

[DF1057—Axle Adjusting Tool](#)

[DFRW7—Differential Lifting Tool](#)

[DFRW30A—Axle Jacking Tool](#)

[DFRW63 - DFRW64 - DFRW65 - DFRW66 - DFRW81—Tap-Out Harnesses](#)

[DFRW72—Gudgeon Spindle Cooling Box](#)

[DFRW92—Mounting Guide Pins](#)

[DFRW94—Rear Axle Support Stand](#)

[DFRW103—Yoke Holding Tool](#)

[DFRW117—Transmission-Hydraulic Flusher](#)

[DFRW132—Differential Side Bevel Gear End Play Tool](#)

[DFRW147—Screw Jack](#)

[DFRW148—ActiveSeat™ Control Valve Holding Tool](#)

[DFRW150—SCV-Hitch Valve Stack Lifting Bracket](#)

[DFRW164—Axle Adjusting Tool](#)

[DFRW165—PST Park Brake Pump Off Hose Adapter](#)

[DFRW213—Hydraulic Trailer Brake Test / Bleed Assembly](#)

[DFRW219—Wheel Tightening Stand](#)

[DFRW254—Gudgeon Oscillation Stop—DR Axle](#)

[DFRW255—Gudgeon Oscillation Stop—SR Axle](#)

[DFRW256—Spindle Removal Tool Set—HD Gudgeon](#)

[DFRW257—PTO Drive Shaft Measuring Tool](#)

Fabricated Tools

Fabricated tools are tools identified by the factory as necessary for proper servicing that can be made at the dealership.

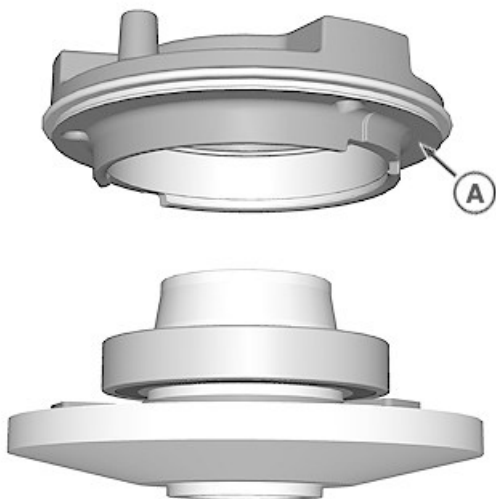
Use the information in this section to fabricate the tools required to perform service correctly.

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[22] -

LEGEND:

A Shift Collar



Inner Sheave

Remove shift collar(A) from bearing.

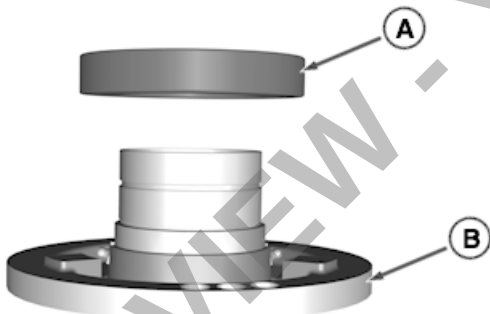
[23] -

→NOTE:

If removed from sheave, bearing (A) cannot be reused.

LEGEND:

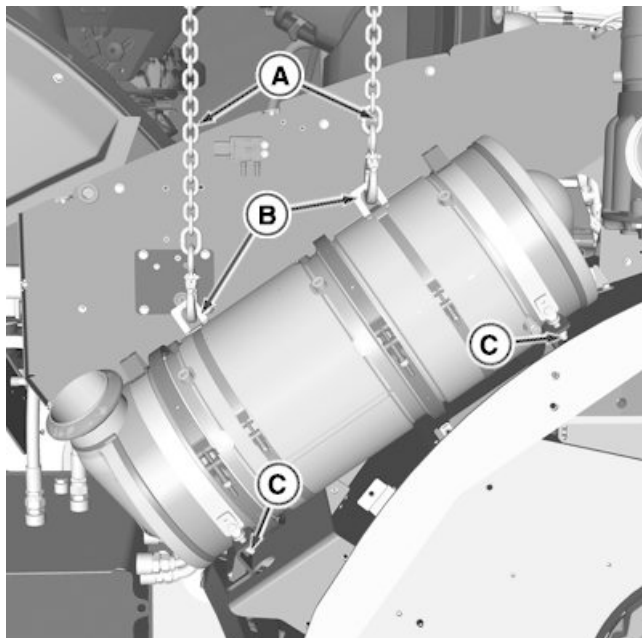
A Bearing
B Sheave



Bearing

Remove bearing (A) from sheave (B).

[24] -

**LEGEND:**

- A Chains
- B DOC/DPF Lifting Points (2 used)
- C DOC/DPF Mounting Straps (2 used)

DOC/DPF

Attach chains (A) to DOC/DPF lifting points (B).

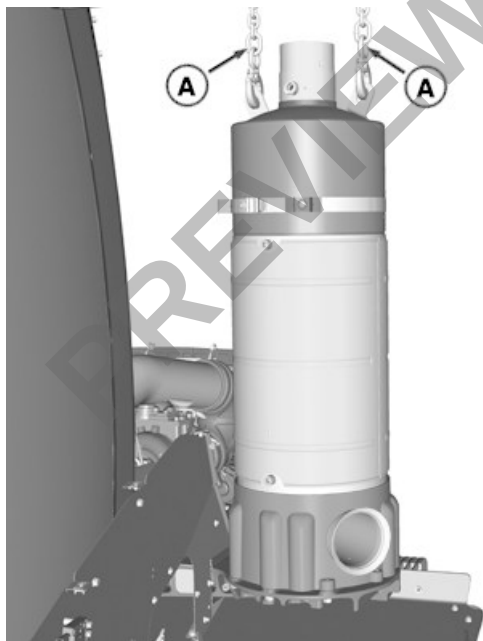
[36] - Slowly loosen and remove DOC/DPF mounting straps (C).

[37] - Lift and remove DOC/DPF assembly.

[38] -

IMPORTANT:

SCR weighs approximately 85 kg (190 lb.).

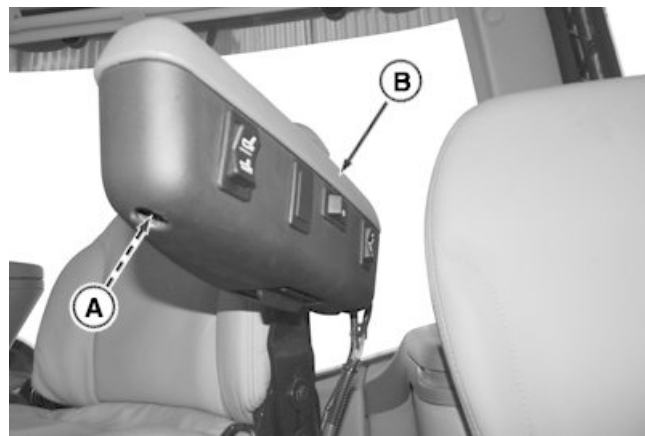
**LEGEND:**

- A Chains
- B SCR Mounting Cap Screws (6 used)

Chains

Replace Seat Firmness Switch—ActiveSeat™

[1] -



- LEGEND:
- A

B

C

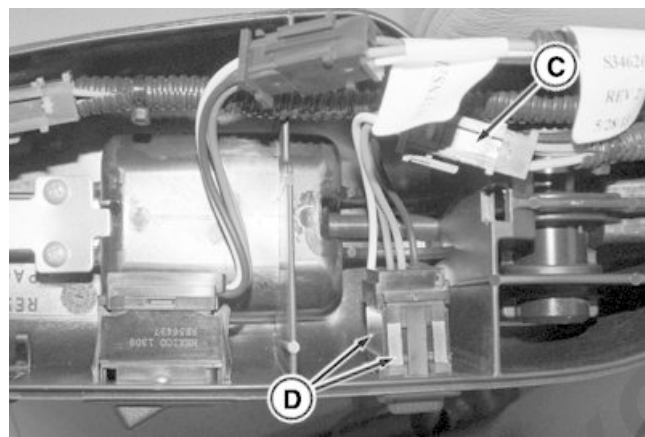
D
- Screw

Armrest Pad

Connector

Tabs

Left-Hand Armrest



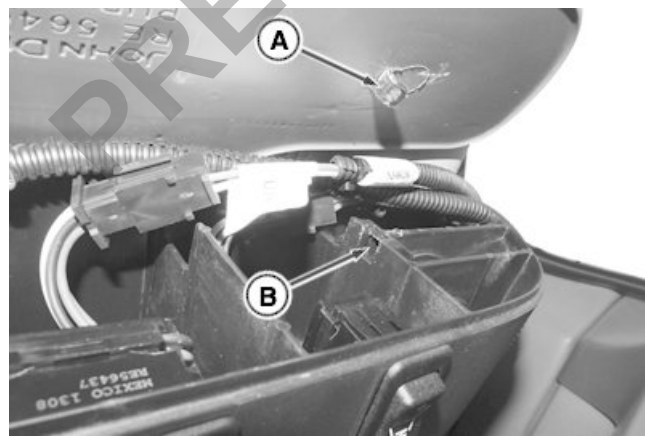
Seat Firmness Switch

Remove screw (A) and armrest pad (B).

[2] - Disconnect connector (C).

[3] - Depress tabs (D) and remove switch from armrest.

[4] -



- LEGEND:
- A

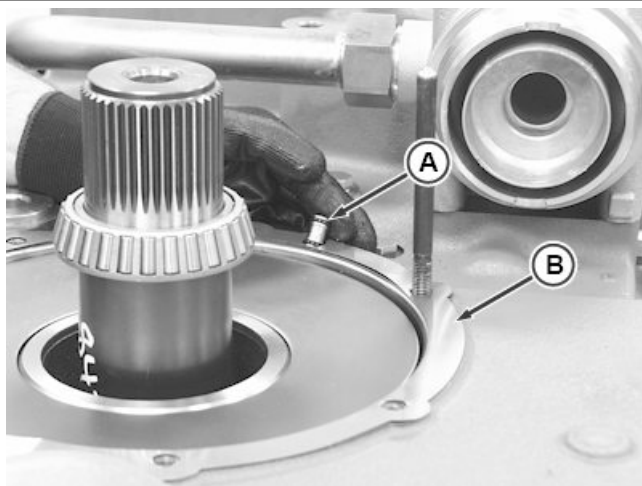
B

C
- Tab

Notch

Screw

Armrest Pad

**LEGEND:**A
BOil Tube
Shims**9572**

Install **NEW** O-rings onto oil tube.

[31] - Install oil tube assembly.

[32] -

→NOTE:

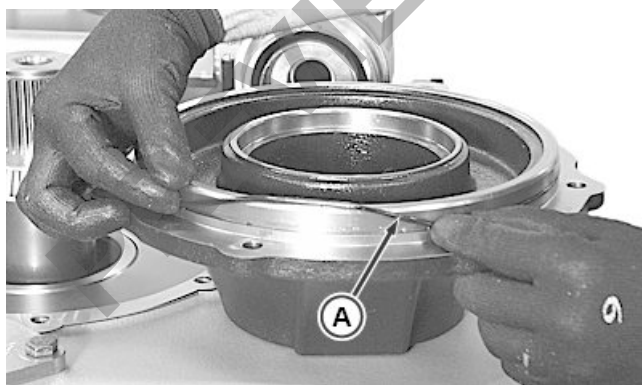
Refer to Adjust Output Shaft Assembly Bearing in Group 15 for determined shims. Compare and use shims that were removed when internal park brake was disassembled.

Install guide pins and shims (B).

[33] -

→NOTE:

Check oil tube and brake housing align.

**LEGEND:**

A

O-ring

9573

Lubricate **NEW** O-ring (A) with transmission fluid and install onto brake housing.

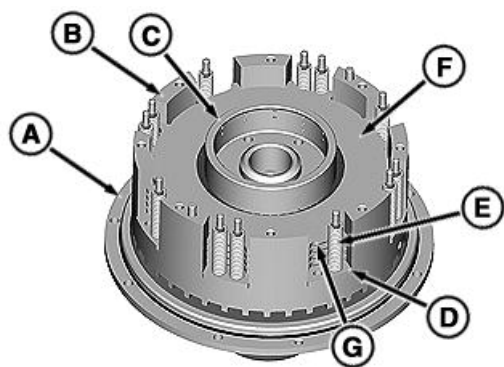
[34] -

[45] - To remove inner bearing, remove seal (E) and snap ring (F). Press output shaft (D) and outer bearing (G) outward from housing.

[46] - Remove inner bearing (C) from housing.

[47] - Remove outer bearing (G) from shaft using a knife-edge puller and a press.

[48] -



LEGEND:

- A Rear Cover
- B Clutch Drum
- C Hub
- D Clutch Plate
- E Springs (12 used)
- F Clutch Disks (5 used)
- G Separator Plates (4 used)

Clutch Drum and Rear Cover

Assemble PTO clutch by installing clutch drum (B) onto rear cover (A). Be careful not to damage seal in rear cover.

[49] - Install hub (C) with deep dish of hub facing up.

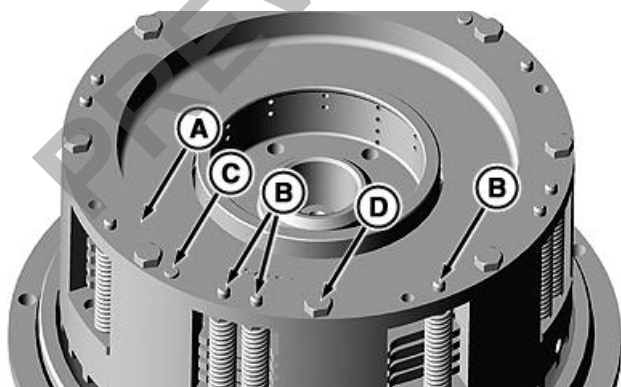
[50] - Install clutch plate (D) and springs (E).

[51] - Install clutch disks (F) alternating with separator plates (G).

[52] -

IMPORTANT:

Dowel pins (C) must be aligned between clutch drum plate (A) and clutch drum. Correctly align plate during installation to avoid damage.



LEGEND:

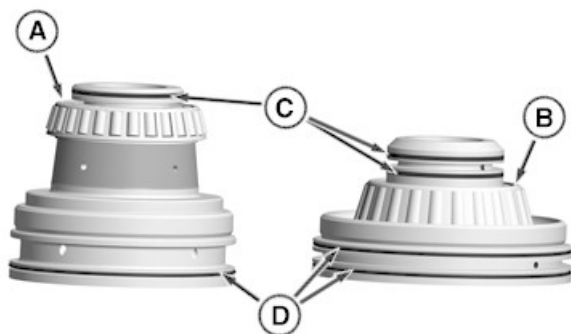
- A Clutch Drum Plate
- B Pins (12 used)
- C Dowel Pins (2 used)
- D Clutch Drum Plate Cap Screws (8 used)

Clutch Drum Plate, Pins, and Cap Screws

Install clutch drum plate (A) making sure pins (B) and dowel pins (C) are correctly aligned.

[53] - Install clutch drum plate cap screws (D). Tighten to specification.

[34] -



LEGEND:

- A Bearing Cone
- B Bearing Cone
- C Sealing Rings (3 used)
- D O-rings (3 used)

Differential Bearing Cones

Remove bearing cones (A and B).

[35] -

IMPORTANT:

Lubricate bearing rollers with hydraulic oil.

→NOTE:

Ensure bearing is seated against shoulder using a 0.050 mm feeler gage.

Install bearing cone (A) onto quill using JDG1407 Bearing Installer.

Bearing Installer

JDG1407

50D Double Reduction Axles

[36] -



CAUTION:

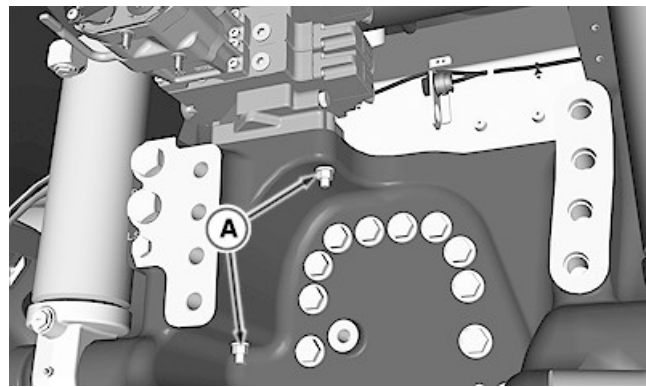
Heat bearing cone in a bearing heater. Use a thermometer and do not exceed 150 °C (300 °F).

Heat bearing cone (B) and install onto quill. Allow to cool and seat bearing cone using a brass drift.

[37] - Remove and install **NEW** differential lock sealing rings (C).

[38] - Install **NEW** O-rings (D).

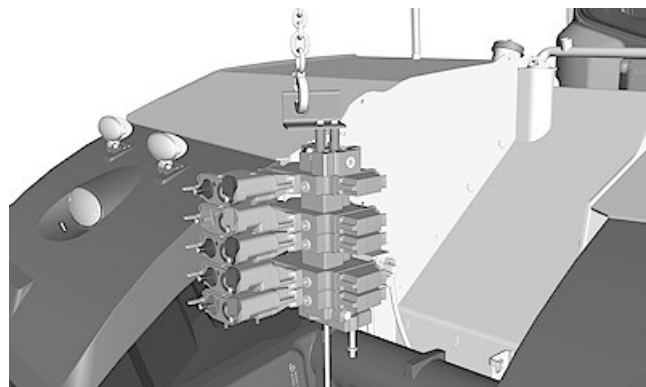
[4] -



Valve Stack-to-Tractor Mounting Nuts

Remove valve stack-to-tractor mounting nuts (A).

[5] -



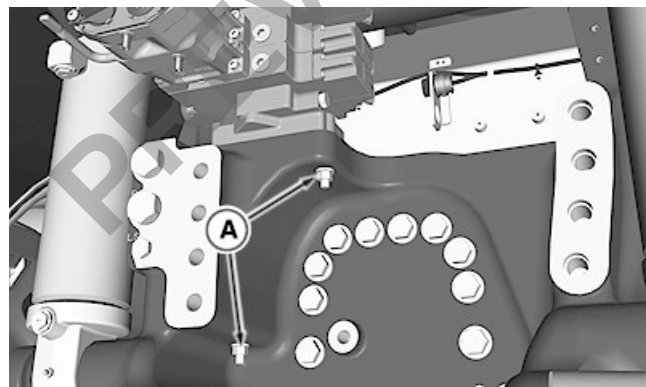
Valve Stack

Remove valve stack.

[6] - Move valve stack to work bench.

[7] - Perform repair in the vertical position.

[8] -



Valve Stack-to-Tractor Mounting Cap Screws

Install valve stack and valve stack-to-tractor mounting nuts (A). Tighten to specification.

Item	Measurement	Specification
Valve Stack-to-Tractor Mounting Nuts	Torque	100 N·m

LEGEND:
A Valve Stack-to-Tractor Mounting Nuts (2 used)

[4] - Remove rod guide using JDG347A Spanner Wrench

JDG347A

Spanner Wrench

80c-HydraCushion™ Suspension System

and JDG10784 Pin Set (C).

JDG10784

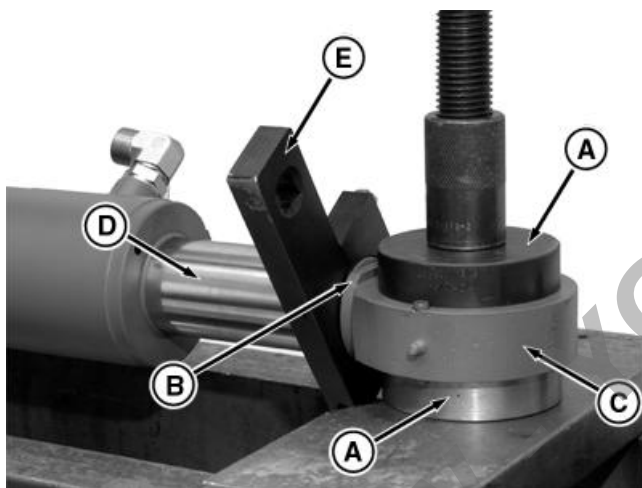
Pin Set

80c-HydraCushion™ Suspension System

[5] -

IMPORTANT:

Use JDG1553-2 Installers to avoid damage to bushings.



LEGEND:

- A JDG1553-2 Installers (2 used)
- B Rod Eye-to-Rod Thread Area
- C Bearing Eye
- D Piston Rod
- E JDG1554 Piston Rod Wrench

Remove Bearing Eye from Piston Rod

Place cylinder assembly in a press using JDG1553-2 Installers (A) on rod eye. DO NOT apply clamping force to bushing.

[6] - Pull piston rod out of cylinder assembly.

[7] -



CAUTION:

Use extreme care when applying heat to ensure adequate ventilation. DO NOT exceed 150°C (300°F).

Inactivate retaining compound by heating rod eye-to-rod thread area (B). (About 25 mm (1 in.) from piston end.)

[8] - Remove bearing eye (C) from piston rod (D) using JDG1554 Piston Rod Wrench (E).

JDG1554

Piston Rod Wrench

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