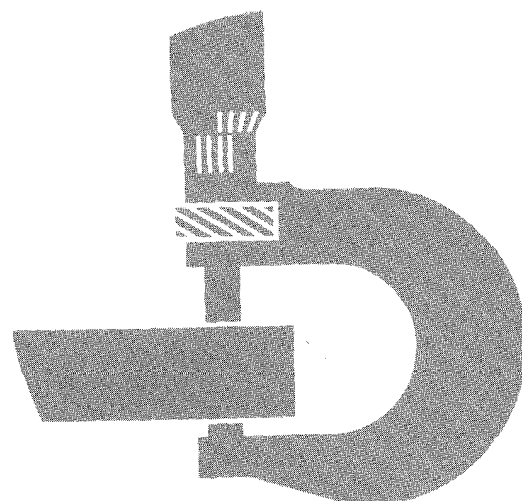


640D Skidder 648D Grapple Skidder Repair



TECHNICAL MANUAL

For complete service information also see:

640D Skidder, 648D Grapple	
Operation and Test	TM1440
6414 Engine	CTM4
Radial Piston Pumps	CTM7
Engine Assessories	CTM11

TM1440 (11SEP90)

LITHO IN U.S.A.

Contents

SECTION I—GENERAL INFORMATION

- Group I —Safety Information
- Group II —General Specifications
- Group III —Torque Values
- Group IV —Fuels and Lubricants
- Group V —Inspection Procedure

SECTION 01—WHEELS

- Group 0110—Powered Wheels and Fastenings

SECTION 02—AXLES AND SUSPENSION SYSTEM

- Group 0200—Removal and Installation
- Group 0210—Differential Or Bevel Drive
- Group 0225—Input Drive Shafts And U-Joints
- Group 0250—Axle Shaft, Bearings, And Reduction Gears
- Group 0260—Hydraulic System

SECTION 03—TRANSMISSION

- Group 0300—Removal and Installation
- Group 0315—Controls Linkage
- Group 0350—Gears, Shafts, Bearings And Power Shift Clutch
- Group 0360—Hydraulic System

SECTION 04—ENGINE

- Group 0400—Removal and Installation

SECTION 05—ENGINE AUXILIARY SYSTEMS

- Group 0505—Cold Weather Starting Aids
- Group 0510—Cooling Systems
- Group 0515—Speed Controls
- Group 0520—Intake System
- Group 0530—External Exhaust System
- Group 0560—External Fuel Supply System

SECTION 07—CLUTCH

- Group 0715—Controls Linkage
- Group 0752—Elements

SECTION 09—STEERING SYSTEM

- Group 0930—Secondary Steering

- Group 0960—Hydraulic System

SECTION 10—SERVICE BRAKES

- Group 1011—Active Elements
- Group 1060—Hydraulic System

SECTION 11—PARK BRAKE

- Group 1111—Active Elements
- Group 1115—Controls Linkage
- Group 1160—Hydraulic System

SECTION 16—ELECTRICAL SYSTEM

- Group 1671—Batteries, Supports and Cables
- Group 1672—Alternator, Regulator and Charging System Wiring
- Group 1673—Lighting System
- Group 1674—Wiring Harness and Switches
- Group 1676—Instruments and Indicators

SECTION 17—FRAME, CHASSIS OR SUPPORT STRUCTURE

- Group 1740—Frame Installation
- Group 1746—Frame Bottom Guards

SECTION 18—OPERATOR'S STATION

- Group 1800—Removal and Installation
- Group 1810—Operator Enclosure
- Group 1821—Seat and Seat Belt
- Group 1830—Heating and Air Conditioning

SECTION 19—SHEET METAL AND STYLING

- Group 1910—Hood or Engine Enclosure
- Group 1921—Grille and Grille Housing

SECTION 20—SAFETY, CONVENIENCE AND MISCELLANEOUS

- Group 2004—Horn and Warning Devices

SECTION 21—MAIN HYDRAULIC SYSTEM

- Group 2160—Hydraulic System

Continued on next page

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

TM1440-19-11SEP90

COPYRIGHT® 1990
DEERE & COMPANY
Moline, Illinois
All rights reserved
A John Deere ILLUSTRATION™ Manual
Previous Editions
Copyright® 1988 Deere & Company

SECTION 30—WINCH

- Group 3000—Removal and Installation
- Group 3015—Controls Linkage
- Group 3050—Drive and Clutch
- Group 3060—Hydraulic System

SECTION 32—BULLDOZERS (STACKING AND TRAILBUILDING BLADES)

- Group 3201—Blades
- Group 3215—Controls Linkage
- Group 3260—Hydraulic System

SECTION 37—ARCH OR BOOM

- Group 3740—Frames

SECTION 38—GRAPPLE

- Group 3803—Grapple Mechanism
- Group 3815—Controls Linkage
- Group 3840—Frames
- Group 3860—Hydraulic System

SECTION 40—WINCH DRIVE

- Group 4025—Input Drive Shaft

SECTION 99—DEALER FABRICATED TOOLS

- Group 9900—Dealer Fabricated Tools

Section I GENERAL INFORMATION

Contents

	Page
Group I —Safety Information	I-I -1
Group II —General Specifications	I-II -1
Group III —Torque Values	I-III -1
Group IV —Fuels and Lubricants	I-IV -1
Group V —Inspection Procedure	I-V -1

HANDLE FLUIDS SAFELY—AVOID FIRES

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



DX,FLAME -19-04JUN90

TS227
-UN-23AUG88

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



DX,SPARKS -19-04JUN90

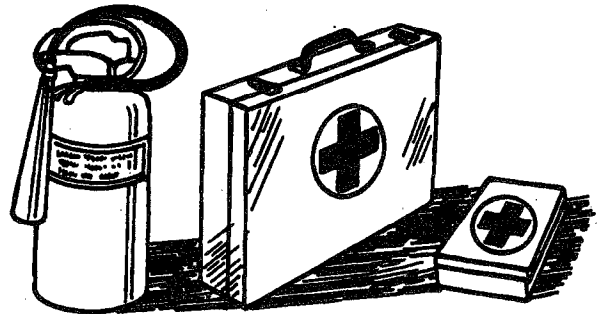
TS204
-UN-23AUG88

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



DX,FIRE2 -19-04JUN90

TS291
-UN-23AUG88

PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

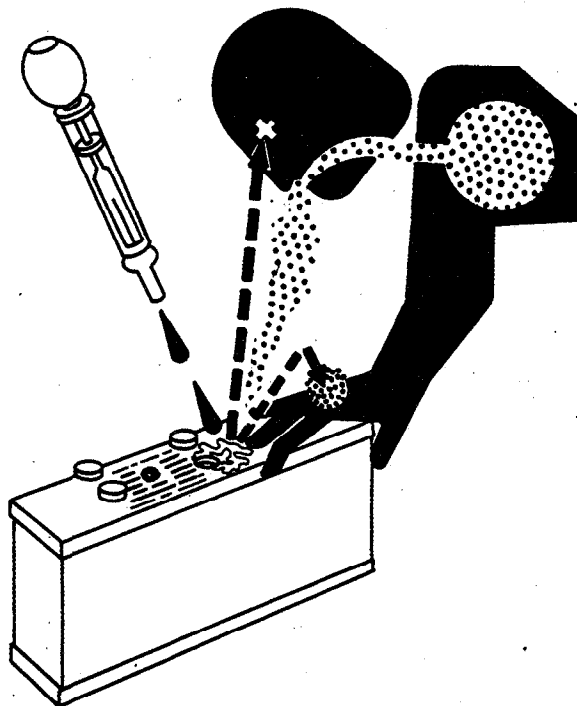
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 10—15 minutes. Get medical attention immediately.

If acid is swallowed:

1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.



TS208
-UN-23AUG88

DX,POISON -19-04JUN90

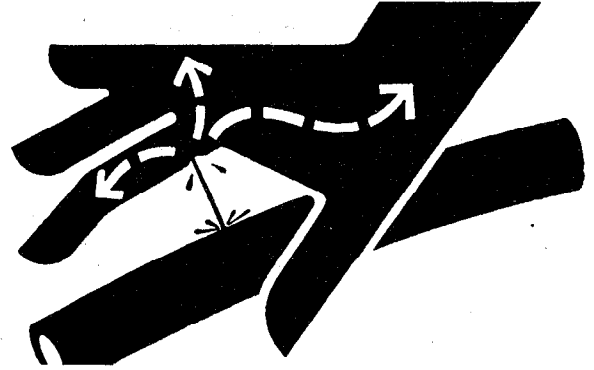
AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.



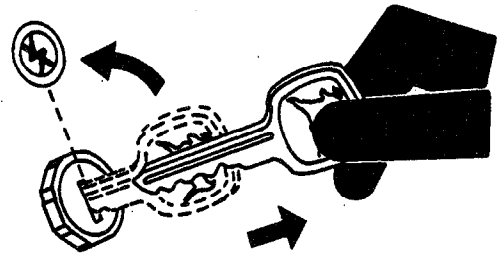
X9811 -JUN-23AUG88

DX,FLUID,NA -19-11JUN90

PARK MACHINE SAFELY

Before working on the machine:

- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap.
- Hang a "DO NOT OPERATE" tag in operator station.



TS230 -JUN-24MAY88

DX,PARK -19-04JUN90

REMOVE FRONT DIFFERENTIAL AND AXLE ASSEMBLY

NOTE: Remove differential and axles as one assembly.

1. Install frame lock bar.

NOTE: Bottom of main frame must be approximately 457 mm (18 in.) plus the lowered height of service jack used.

2. Raise unit. Install two floor stands under frame.

3. Disconnect battery ground cable.

4. Operate control valves to release pressure in the hydraulic system. Pump the brake pedal to discharge brake accumulator. Operate park brake handle to discharge brake accumulator.

5. Remove wheels. (See procedure in Group 0110.)

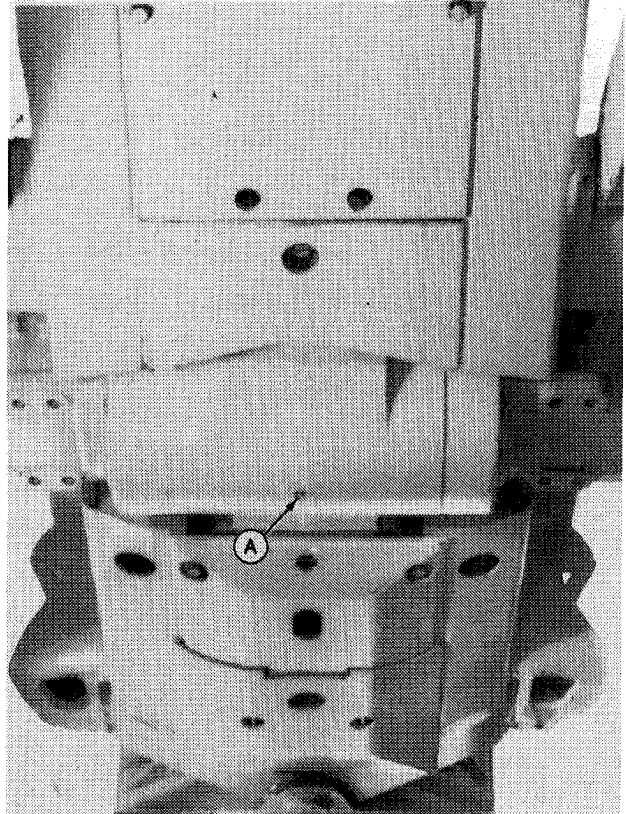
6. Remove drain plug (A). Drain oil and install plug. Hydraulic oil capacity is approximately 17 L (4.5 gal).

⚠ CAUTION: The approximate weights of engine frame bottom guards are:

Front Guard 129 kg (285 lb)
Rear Guard 23 kg (50 lb)

Weight may increase due to the buildup of mud and debris.

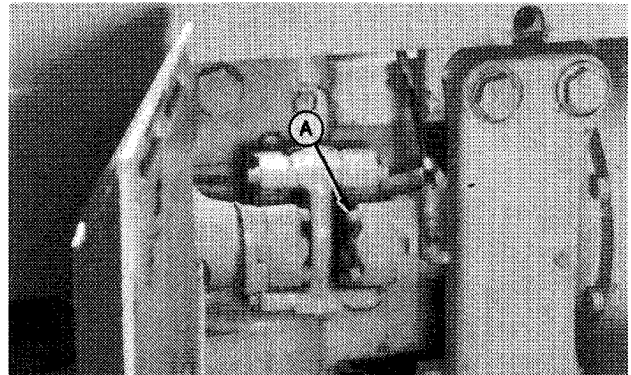
7. Remove front and rear engine frame bottom guards.



T5938AG -JUN-27OCT88

T47,0200,M6 -19-14MAY88

8. Remove four special cap screws (A) to disconnect front differential drive line.



T5876AG -JUN-27OCT88

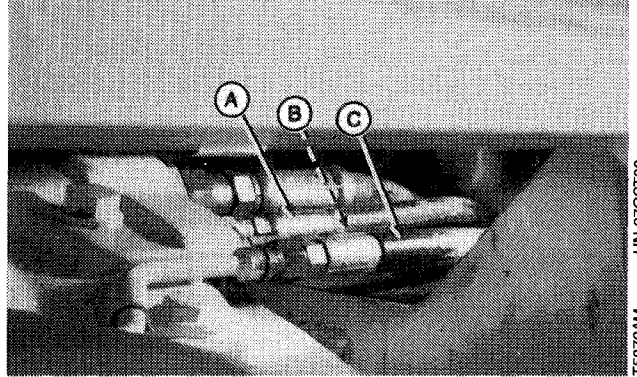
T47,0200,93 -19-11JUN84

Removal and Installation/Front Differential and Axle Assembly

9. Lower and block right axle to provide clearance under the frame.

10. Disconnect lines (A, B, and C). Close all openings with caps and plugs.

- A—Differential Lock Valve Line
- B—Intake Manifold Line (Turbocharger)
- C—Brake Valve Line



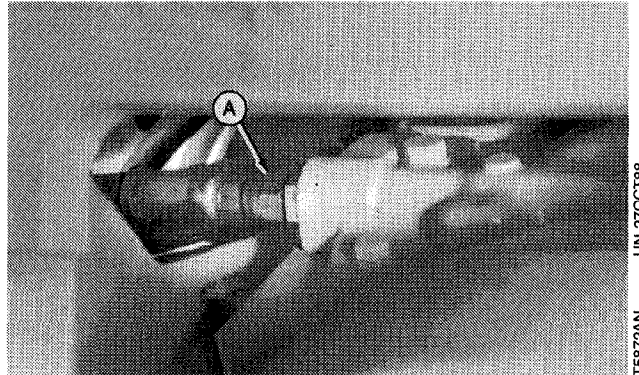
T47,0200,94 -19-11JUL90

T5872AM -JUN-27OCT88

11. Lower and block left axle.

12. Disconnect line (A).

- A—Differential Lock Return-to-Reduction Gear Housing Line (640D), Differential Lock Return-to-Reservoir Line (648D)

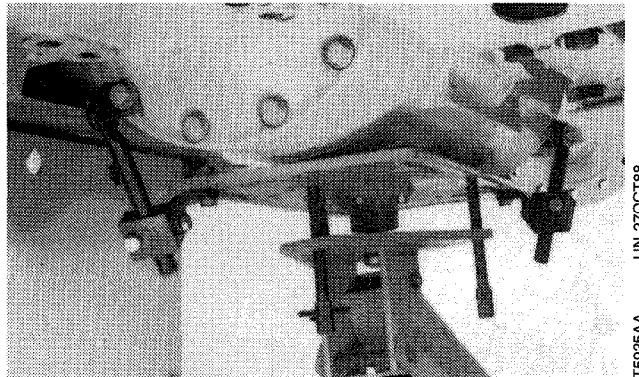


T47,0200,139 -19-02AUG90

T5872AN -JUN-27OCT88

CAUTION: Differential with axles weighs approximately 794 kg (1750 lb).

13. Install a suitable service jack under differential section.



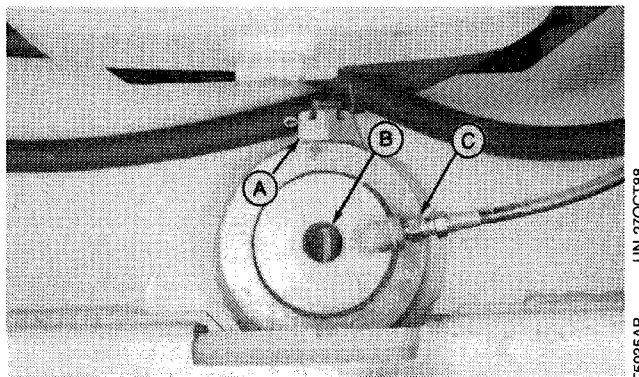
T47,0200,140 -19-17SEP84

T5935AA -JUN-27OCT88

14. Disconnect line (C).

15. Remove cotter pin and nut (A) to remove cap screw.

16. Install cap screw or a slide hammer in threaded hole in pin (B) and remove pin.

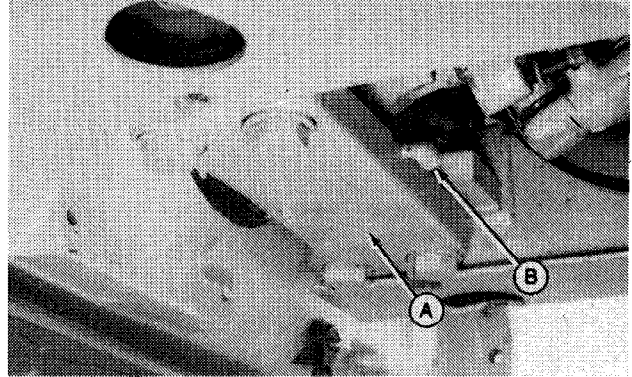


T47,0200,141 -19-14MAY88

T5935AB -JUN-27OCT88

Removal and Installation/Front Differential and Axle Assembly

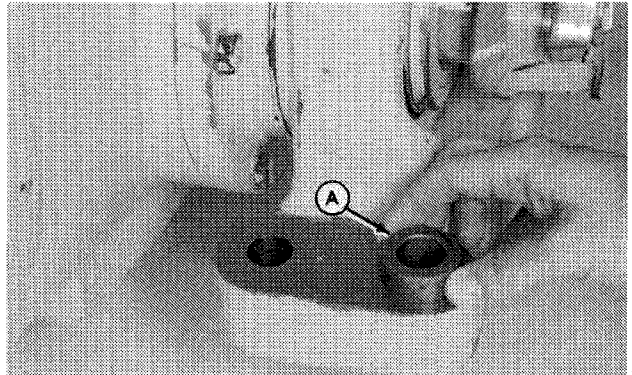
17. Disconnect grease line (B).
18. Remove rear oscillating support (A)-to-frame cap screws.
19. Carefully lower differential axle assembly.



T47,0200,98 -19-14MAY88

T8672AQ -UN-27OCT88

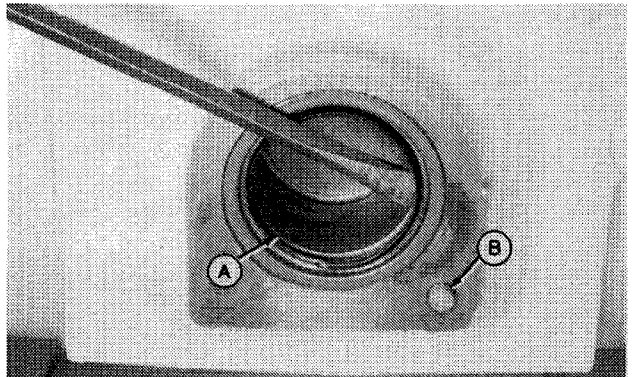
20. Inspect dowels (A) for looseness, wear or damage. Replace if necessary.



T47,0200,125 -19-12JUN84

T95399 -UN-27OCT88

21. Remove grease seal.
22. Inspect bushing (A). Remove only if replacement is necessary.
23. Inspect pin (B) for looseness or damage.

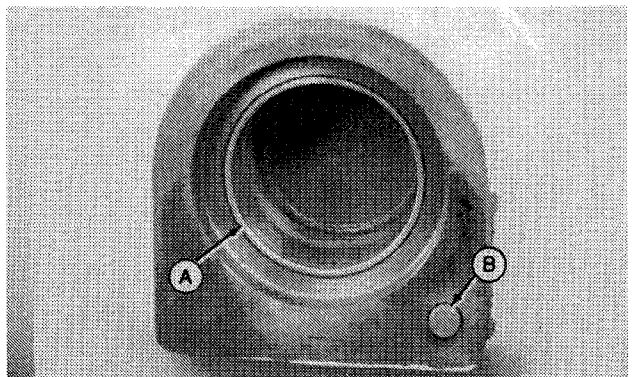


T47,0200,99 -19-12JUN84

T8672AR -UN-27OCT88

INSTALL AND ADJUST FRONT DIFFERENTIAL AND AXLE ASSEMBLY

1. Install new pin (B), if removed or case is being replaced. Install pin until 5 mm (0.20 in.) of pin protrudes from mounting surface.
2. Install new bushing (A) if removed, using 76 mm and 85 mm disks. Install bushing even with outside edge of inner bore.



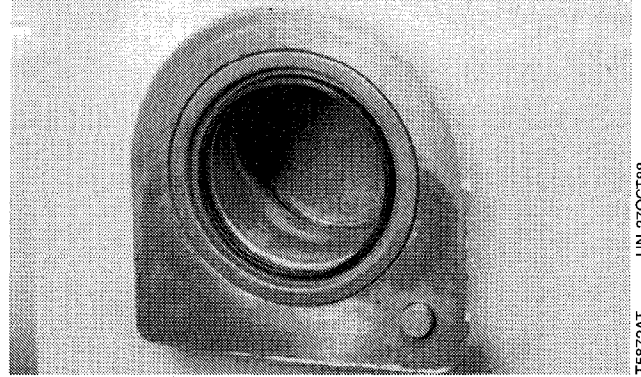
T47,0200,100 -19-14MAY88

T8672AS -UN-23FEB89

Removal and Installation/Front Differential and Axle Assembly

3. Put grease seal in clean hydraulic oil for at least one hour before installing.

4. Install grease seal with sealing lips toward outside. Use 75 mm and 110 mm disks to install seal even with outside edge of bore.



T47,0200,101 -19-26MAY88

T5872AT
-JUN-27OCT88

5. Carefully raise differential into position. Make sure front pivot pin hole in differential case is aligned with pivot pin hole in engine frame.

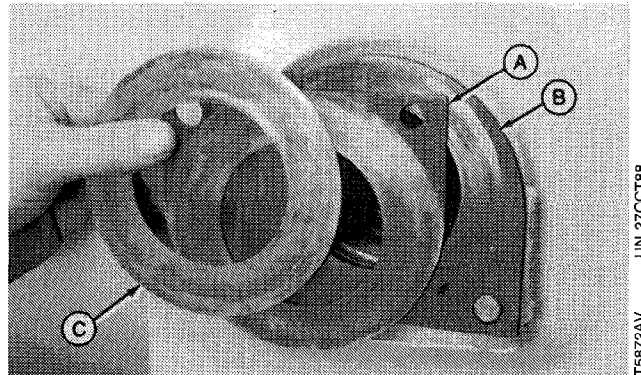
6. Install and tighten rear oscillating support cap screws to approximately 136 N·m (100 lb-ft).

7. Apply NEVER-SEEZ lubricant or equivalent to pin, pin bore in frame, thrust plates, and thrust plate mating surface on differential case.

NOTE: Differential shown removed for clarity of photograph.

8. Install thrust plates (A and B) and washer (C) as shown.

9. Install pin; care must be taken not to damage grease seal.



T47,0200,102 -19-03JUL90

T5872AV
-JUN-27OCT88

10. Move differential rearward as far as possible using a pry bar.

11. Measure differential end play using a feeler gauge. Adjust end play by adding or removing shims between frame and first thrust plate.

END PLAY SPECIFICATIONS

End play 0.03—0.56 mm
(0.001—0.022 in.)

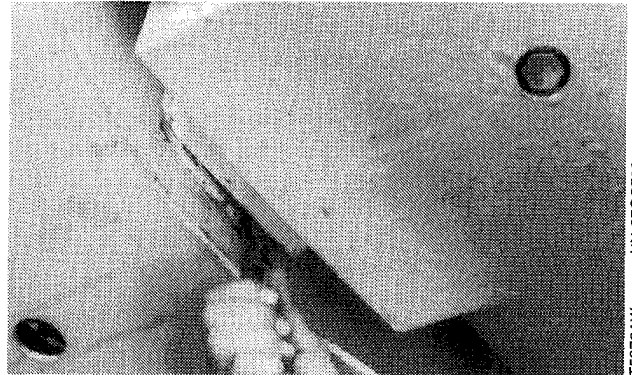
12. A force of 667 N (150 lb) maximum, measured at the axle flange without tires or rims, must move the front differential assembly freely. If a force of more than 667 N (150 lb) is required do end play adjustment again.

13. Tighten oscillating support cap screws to 929 N·m (685 lb-ft).

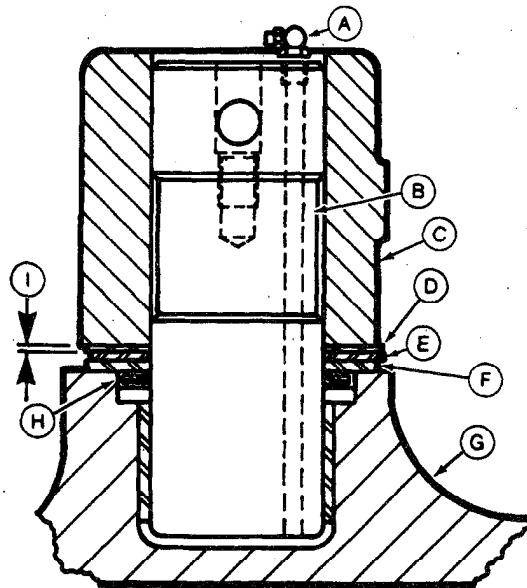
14. Install and tighten front pivot pin cap screw.

15. Install engine frame front bottom guard. Tighten cap screws to 230 N·m (170 lb-ft).

- | | |
|--|---|
| A—Grease Fitting | E—Rear Thrust Plate |
| B—Pin | F—Front Thrust Plate |
| C—Oscillating Differential Front Support | G—Differential Case |
| D—Special Washer and Shims (as required) | H—Grease Seal |
| | I—End Play 0.03—0.56 mm (0.001—0.022 in.) |



T5872AW -JUN-27OCT88

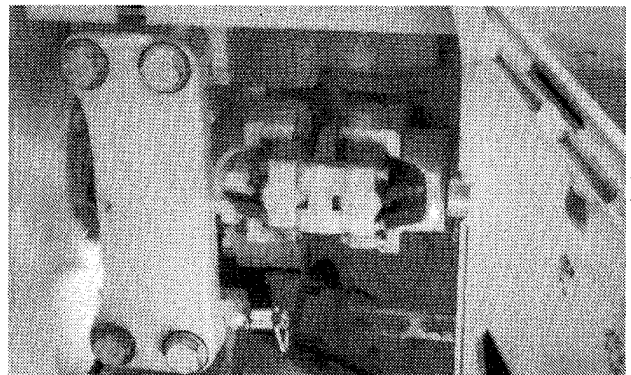


T6780AI -JUN-27OCT88

T47,0200,103 -19-06JUN88

16. Connect front differential drive line. Install and tighten four special cap screws to 95 N·m (70 lb-ft) using a 406 mm (16 in.) torque wrench and JD292 Torque Converter Box Wrench. If special tool JD292 is not used, tighten cap screws to 129 N·m (95 lb-ft).

17. Install engine frame rear bottom guard. Tighten cap screws to 230 N·m (170 lb-ft).



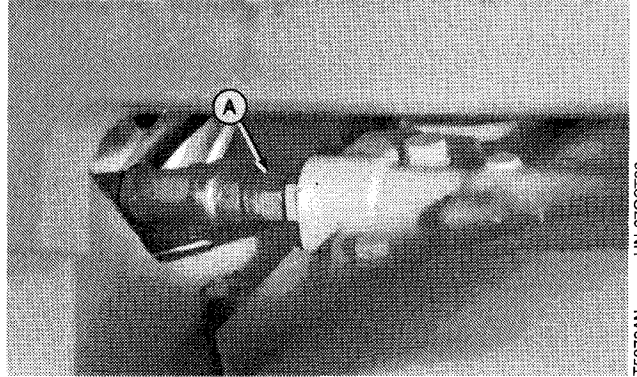
T5872AL -JUN-27OCT88

T47,0200,104 -19-14MAY88

Removal and Installation/Front Differential and Axle Assembly

18. Connect line (A).

**A—Differential Lock
Return-to-
Reduction Gear
Housing Line (640D),
Differential Lock
Return-to-Reservoir
Line (648D)**



T5872AM
-JUN-27OCT88

T47,0200,142 -19-03JUL90

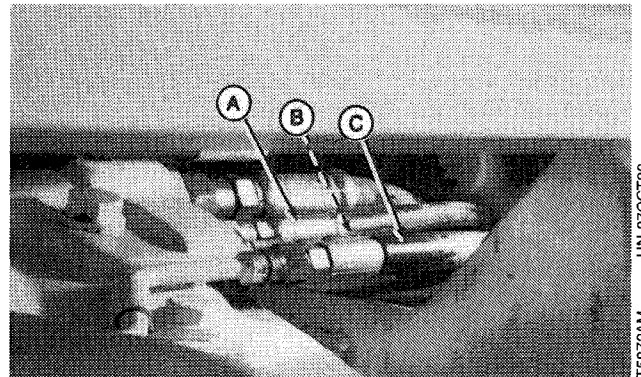
19. Connect lines (A, B, and C).

20. Fill differential with the recommended oil (See Section I, Group IV). Oil capacity is approximately 17 L (4.5 gal).

21. Install wheels. (See Group 0110.)

22. Connect battery ground cable.

**A—Differential Lock
Valve Line C—Brake Valve Line
B—Intake Manifold Line
(Turbocharger)**



T5872AM
-JUN-27OCT88

T47,0200,106 -19-03JUL90

REMOVE REAR DIFFERENTIAL AND AXLE ASSEMBLY

NOTE: An alternate method of removal is to disconnect axle housings from frame after disconnecting drive shaft, lifting frame enough to roll assembly out.

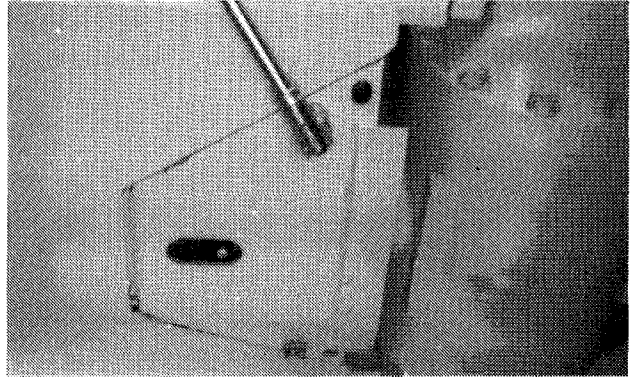
1. Install frame lock bar.
2. Disconnect battery ground cable.
3. Operate control valves to release pressure in the hydraulic system. Pump the brake pedal to discharge brake accumulator.

Operate the park brake lever at least 50 times to release pressure in the park brake accumulator.

4. Remove drain plug. Drain oil and install plug. Hydraulic oil capacity is approximately 17 L (4.5 gal).

NOTE: The bottom of main frame must be approximately 457 mm (18 in.) above the floor, plus the lowered height of service jack used.

5. Raise unit. Install two floor stands.
6. Remove wheels. (See Group 0110).
7. Remove equipment frame bottom guard.



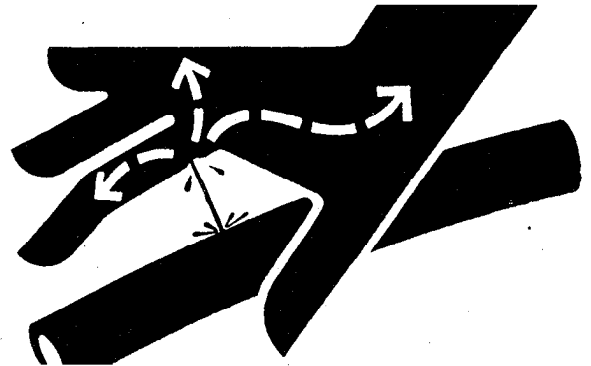
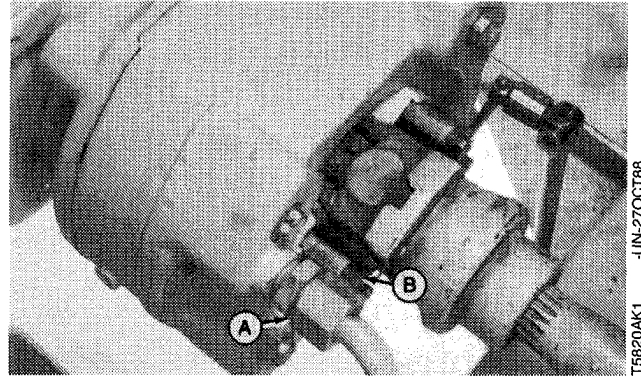
CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.

NOTE: Fuel tank was removed for clarity of photograph.

8. Disconnect park brake hydraulic line (A). Close all openings with caps and plugs.

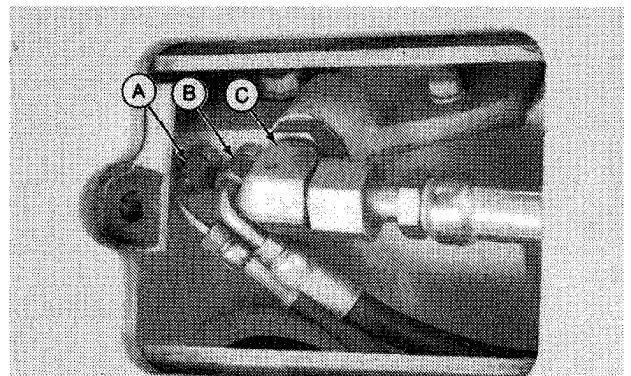
9. Remove four special cap screws (B) to disconnect rear differential drive line.



T47,0200,108 -19-11JUL90

10. Disconnect lines (A, B, and C).

- A—Intake Manifold Line (Turbocharger)
- B—Differential Lock Valve Line
- C—Differential Lock Return-to-Reduction Gear Housing Line (640D), Differential Lock Return-to-Reservoir Line (648D)

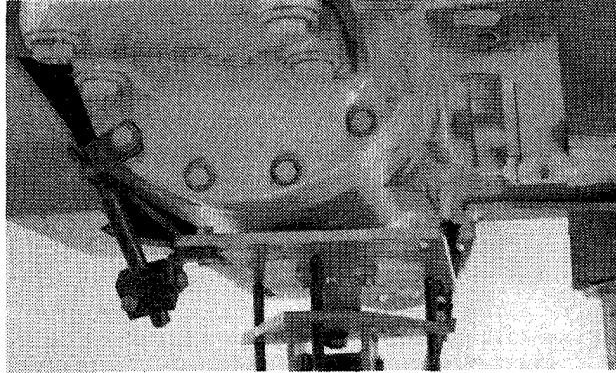


T47,0200,144 -19-03JUL90

CAUTION: Approximate weight of differential with axles and parking brake is 795 kg (1750 lb).

11. Install a suitable service jack under differential section.

12. Remove four cap screws and nuts from each side of axle and carefully remove differential.



T47,0200,145 -19-03JUL90

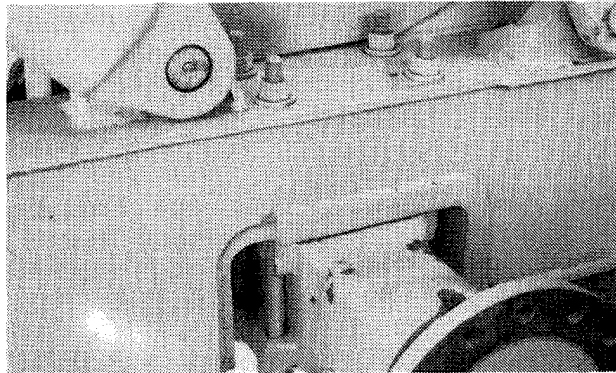
T5936AD -UN-27OCT88

INSTALL REAR DIFFERENTIAL AND AXLE ASSEMBLY

1. Carefully install differential with axles.

IMPORTANT: "Snug" all nuts on a side then tighten nuts on other side to specification.

2. Install cap screws (A) and nuts. Tighten nuts to 908 N·m (670 lb-ft).

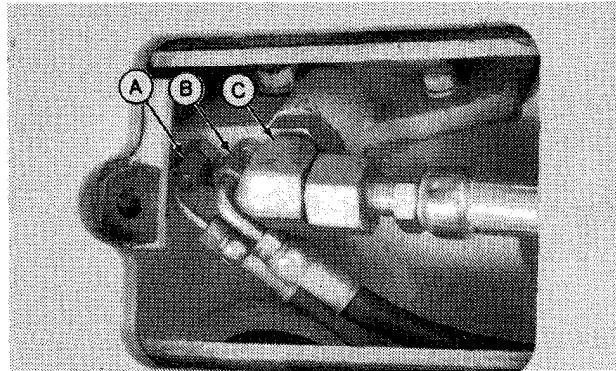


T47,0200,146 -19-14MAY88

T5939AE -UN-27OCT88

3. Connect lines (A, B, and C).

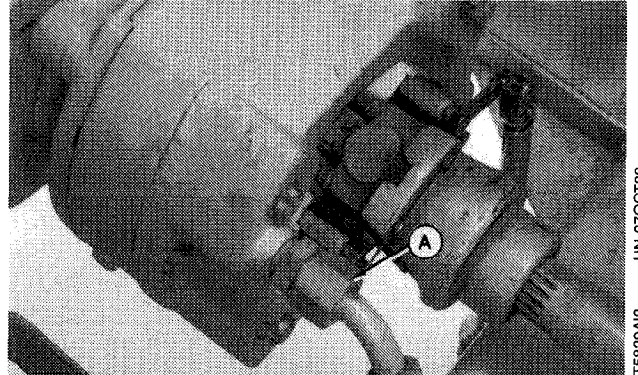
- A—Intake Manifold Line (Turbocharger)
- B—Differential Lock Valve Line
- C—Differential Lock Return-to-Reduction Gear Housing Line (640D), Differential Lock Return-to-Reservoir Line (648D)



T47,0200,147 -19-03JUL90

T5936AC -UN-27OCT88

4. Connect line (A).
5. Connect drive line. Apply high strength thread lock sealer to threads of cap screws. Install and tighten cap screws to 129 N·m (95 lb-ft).
6. Install equipment frame bottom guard and cap screws. Tighten cap screws to 407 N·m (300 lb-ft).
7. Connect battery ground cable.
8. Fill differential with recommended oil (Section I, Group IV). Oil capacity is approximately 17 L (4.5 gal).



T5820A12 -JUN-27OCT88

T47,0200,148 -19-14MAY88

REMOVE AND DISASSEMBLE FRONT DIFFERENTIAL OSCILLATING SUPPORT

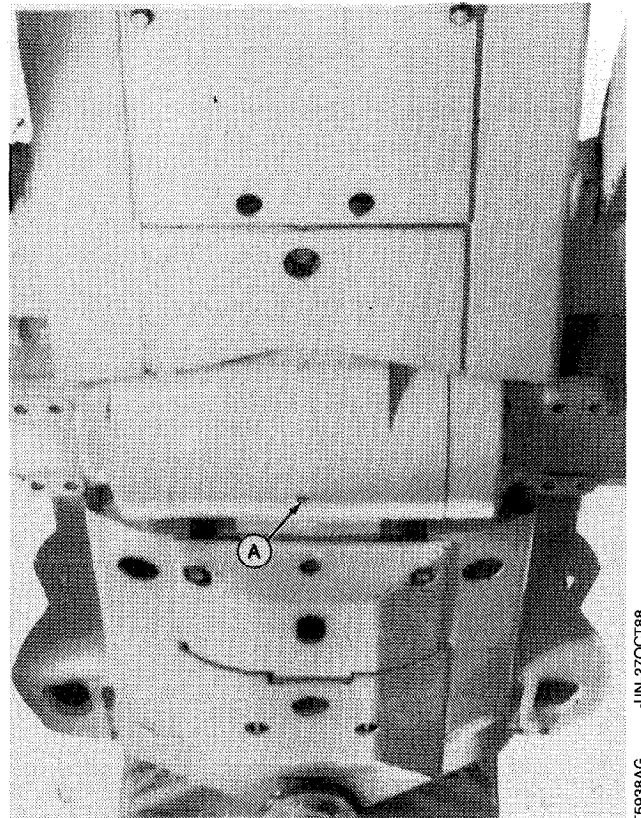
1. Install frame locking bar.
2. Put a DO NOT operate tag on steering wheel.
3. Remove drain plug (A). Drain oil and install plug. Hydraulic oil capacity is approximately 17 L (4.5 gal).

⚠ CAUTION: The approximate weights of engine frame bottom guards are:

Front Guard 129 kg (285 lb)
Rear Guard 23 kg (50 lb)

Weight may increase due to the buildup of mud and debris.

4. Remove front and rear engine frame bottom guards.

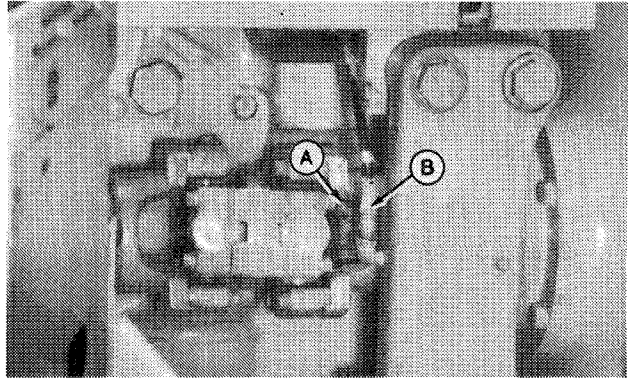


T5938AG -JUN-27OCT88

T47,0200,149 -19-14MAY88

Removal and Installation/Oscillating Support

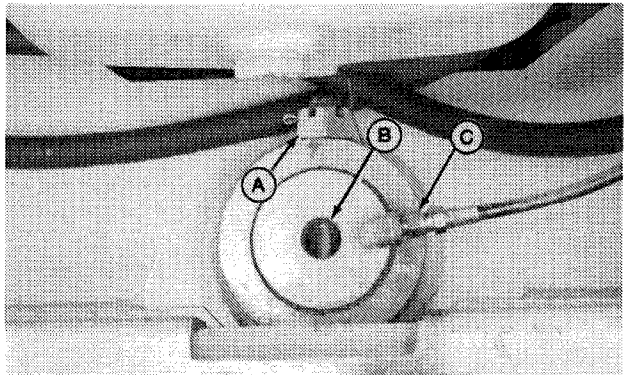
5. Disconnect line (B).
6. Remove drive shaft.
7. Make a mark so yoke-to-input shaft nut can be installed in exact spot on shaft. Remove cotter pin to loosen nut (A).
8. Raise unit just enough to allow oscillating support dowels to clear frame. Install two floor stands under frame and a service jack under differential.



T47,0200,113 -19-14MAY88

T5876AF -JUN-27OCT88

9. Operate control valves to release pressure in hydraulic system. Operate park brake and brake valves to release pressure in accumulator.
10. Disconnect battery ground cable.
11. Disconnect line (C).
12. Remove cotter pin and nut (A) to remove cap screw.
13. Install cap screw or a slide hammer in hole in pin (B) and remove pin.

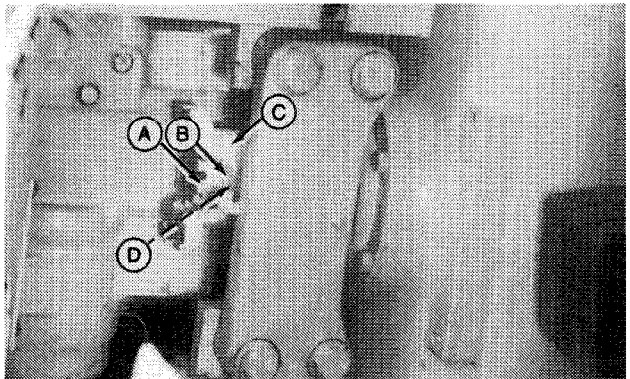


T47,0200,150 -19-14MAY88

T5855AB -JUN-27OCT88

14. Remove nut (A), washer (B), O-ring (D), and yoke (C).
15. Remove four support to frame cap screws.

A—Nut
B—Washer
C—Yoke
D—O-Ring



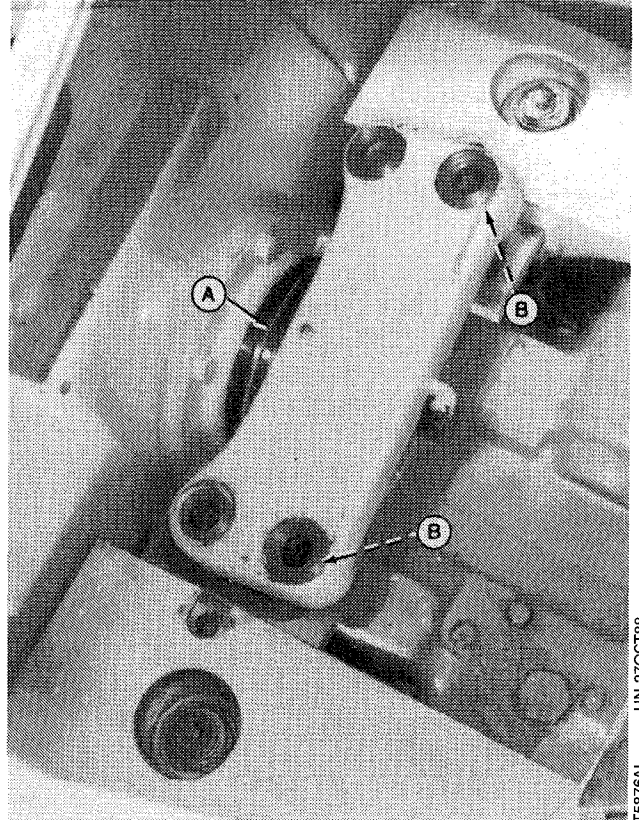
T47,0200,115 -19-12JUN84

T5876AH -JUN-27OCT88

Removal and Installation/Oscillating Support

16. Lower differential just enough to allow clearance for support dowels (B).

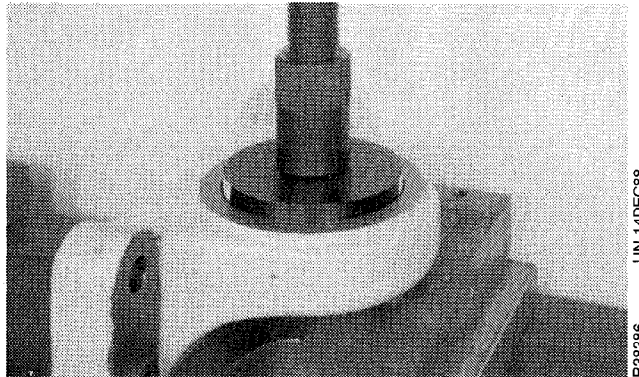
17. Remove support and thrust washer (A).



T5876A1 -JUN-27OCT88

T47,0200,116 -19-12JUN84

18. Remove bushing using 135 mm disk or JDG92 Bearing Cup Installer.

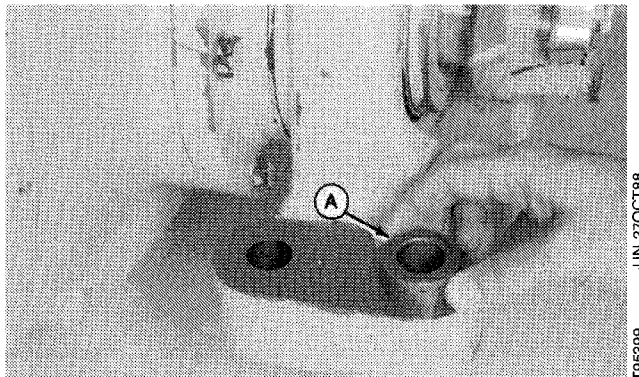


R38386 -JUN-14DEC88

Early Units Shown

T47,0200,117 -19-14MAY88

19. Inspect dowels (A) for looseness or damage.



T95399 -JUN-27OCT88

T47,0200,118 -19-12JUN84

**Thank you very much for
your reading. Please Click
Here. Then Get COMPLETE
MANUAL. NO WAITING**



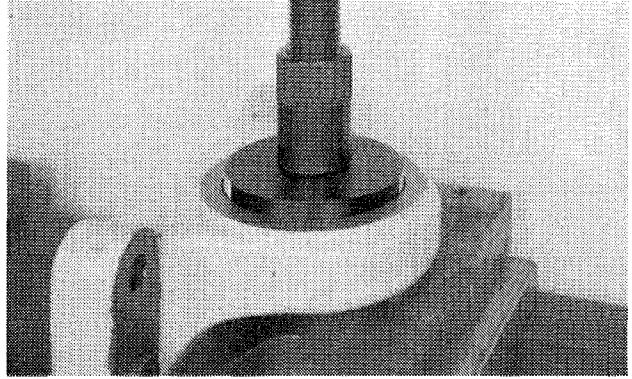
NOTE:

**If there is no response to
click on the link above,
please download the PDF
document first and then
click on it.**

ASSEMBLE AND INSTALL FRONT DIFFERENTIAL OSCILLATING SUPPORT

1. Install new dowels, if necessary.
2. For early units, install new bushing using 135 mm disk or JDG92 Bearing Cup Installer.

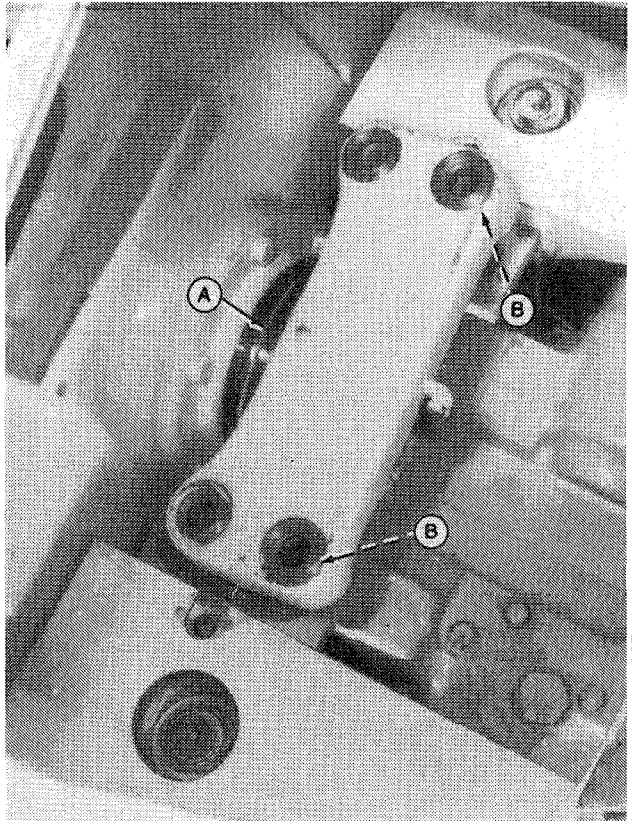
For later units, install bushing even with thrust washer contact surfaces. (See procedure in Group 0210 for installation of V-ring seals.)



R38386 -UN-14DEC88

T47,0200,119 -19-14MAY88

3. Install thrust washer (A) and support with dowels (B).
4. Carefully raise differential into position. Make sure front pivot pin hole in differential case is aligned with pivot pin hole in engine frame.
5. Install and tighten four support to frame cap screws to approximately 136 N·m (100 lb-ft).
6. Apply NEVER-SEEZ lubricant or equivalent to pin and pin bore in frame.



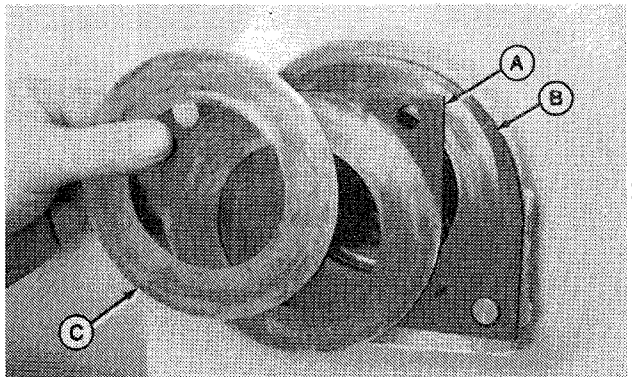
T5876A1 -UN-27OCT88

T47,0200,120 -19-11JUL90

7. Apply NEVER-SEEZ lubricant or equivalent to thrust plates, if removed.
8. Check to be sure thrust plates (A and B) and washer (C) are installed correctly.

NOTE: Differential shown removed for clarity of photograph.

9. Install front pivot pin; care must be taken not to damage grease seal in differential case.



T5872AV -UN-27OCT88

T47,0200,121 -19-03JUL90

10. Move differential rearward as far as possible, using a pry bar.

11. Measure differential end play using a feeler gauge. Adjust end play by adding or removing shims between frame and first thrust plate.

END PLAY SPECIFICATIONS

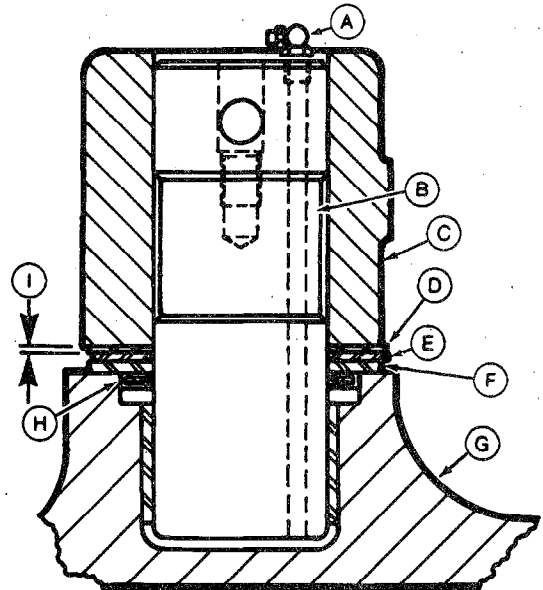
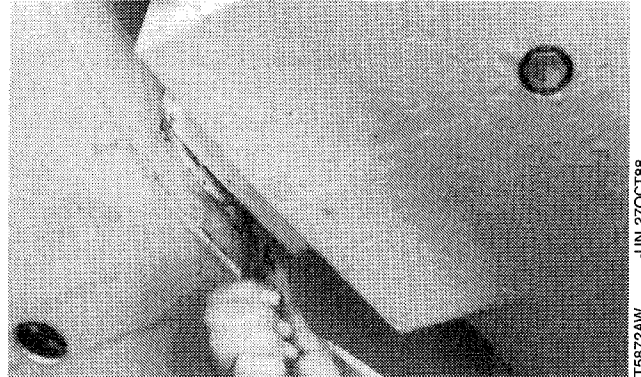
End play 0.03—0.56 mm
(0.001—0.022 in.)

12. A force of 667 N (150 lb) maximum, measured at the axle flange without tires or rims must move the front differential assembly freely. If a force of more than 667 N (150 lb) is required, do end play adjustment again.

13. Tighten oscillating support cap screws to 929 N·m (685 lb-ft). Connect grease line.

14. Install and tighten front pivot pin cap screw.

- | | |
|--|-----------------------------------|
| A—Grease Fitting | E—Rear Thrust Plate |
| B—Pin | F—Front Thrust Plate |
| C—Oscillating Differential Front Support | G—Differential Case |
| D—Special Washer and Shims (as required) | H—Grease Seal |
| | I—End play |
| | 0.03—0.56 mm
(0.001—0.022 in.) |

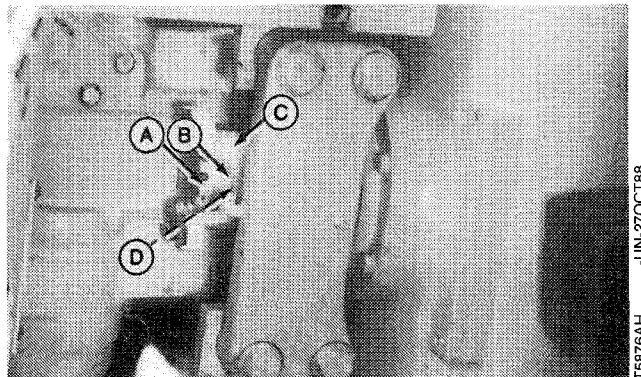


T47,0200,122 -19-26MAY88

15. Install yoke (C), O-ring (D), washer (B), and nut (A). Tighten nut until it is the same position that it was before being removed. With nut in this position it must be tightened to 305—407 N·m (225—300 lb-ft).

16. Install cotter pin. DO NOT bend ends of pin over end of shaft; bend ends of cotter pin against flats of nut.

- | | |
|----------|----------|
| A—Nut | C—Yoke |
| B—Washer | D—O-Ring |



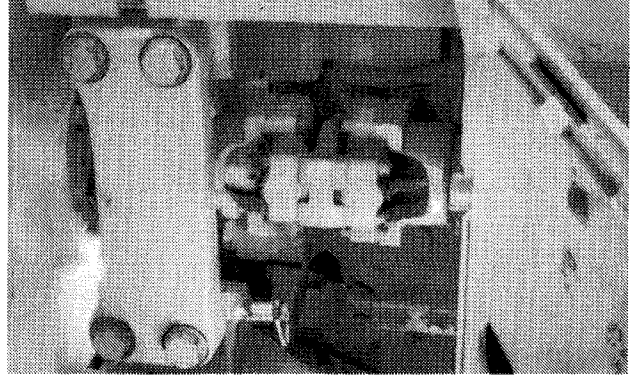
T47,0200,123 -19-14MAY88

Removal and Installation/Oscillating Support

17. Install differential drive shaft. Install and tighten special cap screws to 95 N·m (70 lb-ft) using a 406 mm (16 in.) torque wrench and JD292 Torque Converter Box Wrench. If special tool JD292 is not used, tighten cap screws to 129 N·m.

18. Install engine frame bottom guards. Tighten cap screws to 230 N·m (170 lb-ft).

19. Fill differential with recommended oil (See Section I, Group IV). Oil capacity is approximately 17 L (4.5 gal).



T47,0200,124 -19-26MAY88