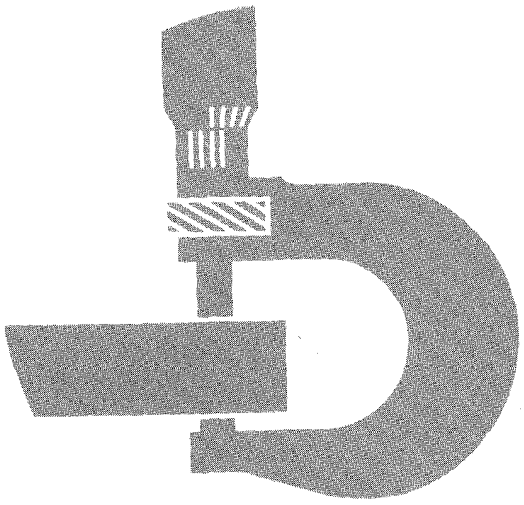
640D Skidder
648D Grapple Skidder
Repair



TECHNICAL MANUAL

For complete service information also see:

TM1440 (11SEP90)

LITHO IN U.S.A.

Contents

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

Section I
GENERAL INFORMATION

Contents

Page

120990

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.

TS227 -UN-23AUG88

DX,FLAME -19-04JUN90

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).

TS204 -UN-23AUG88

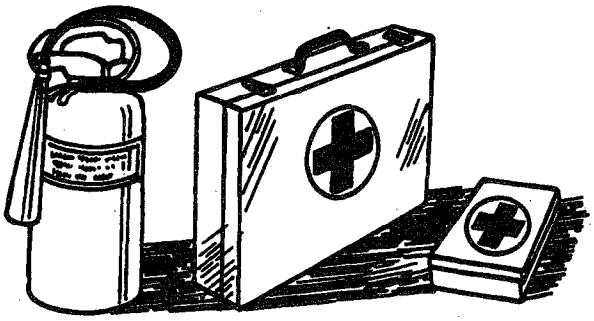
DX,SPARKS -19-04JUN90

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.



TS291 -UN-23AUG88

DX,FIRE2 -19-04JUN90

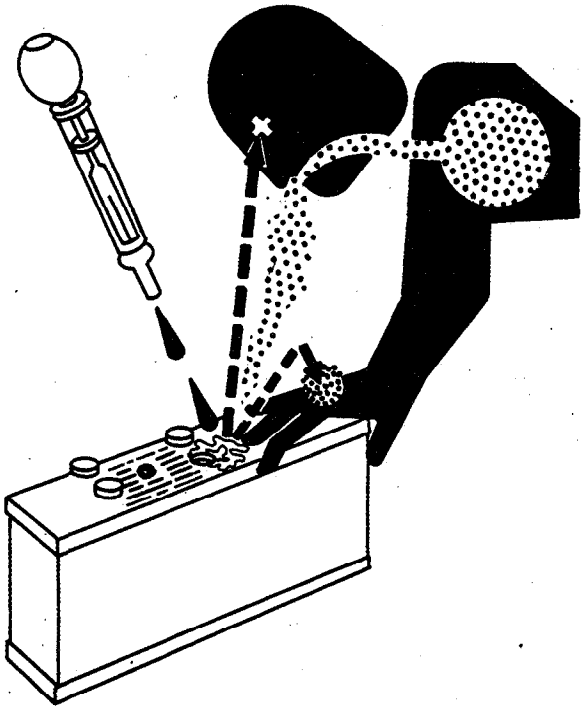
PREVENT ACID BURNS

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.

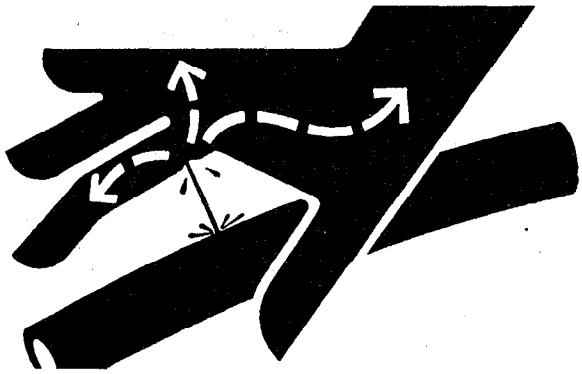
If acid is swallowed:
1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.



TS203 -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.

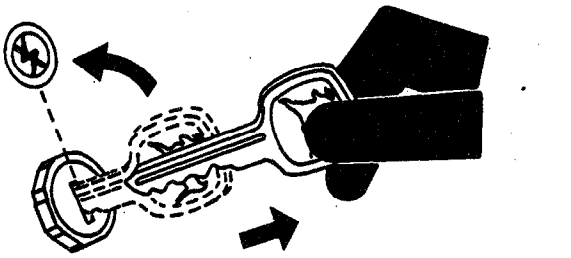
Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

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.

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.



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.)

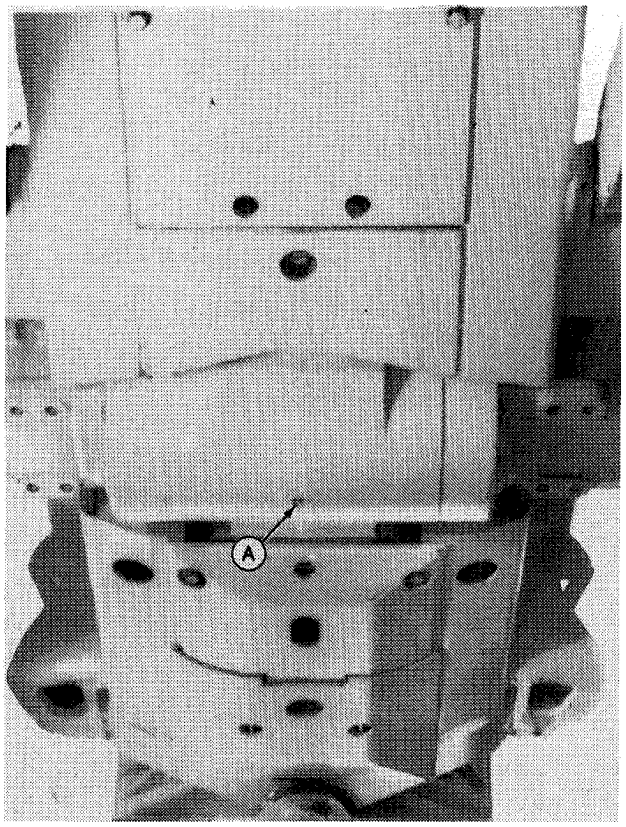
6. Remove drain plug (A). Drain oil and install plug. Hydraulic oil capacity is approximately 17 L (4.5 gal).

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

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

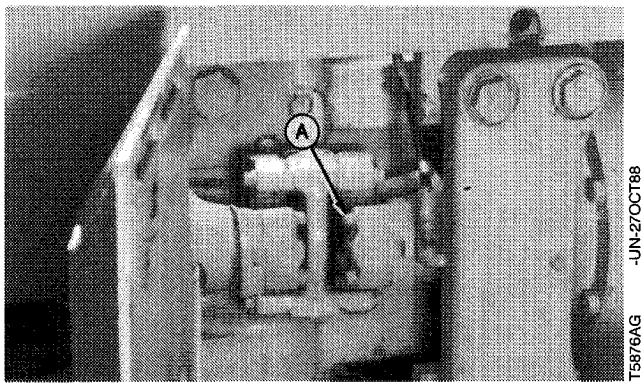
Weight may increase due to the buildup of mud and debris.

7. Remove front and rear engine frame bottom guards.



T47,0200,M6 -19-14MAY88

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

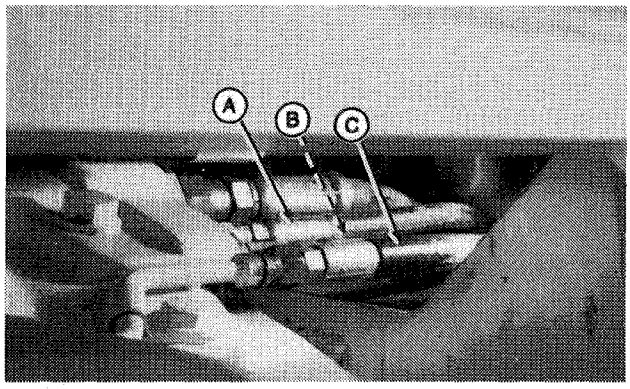


T47,0200,93 -19-11JUN84

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

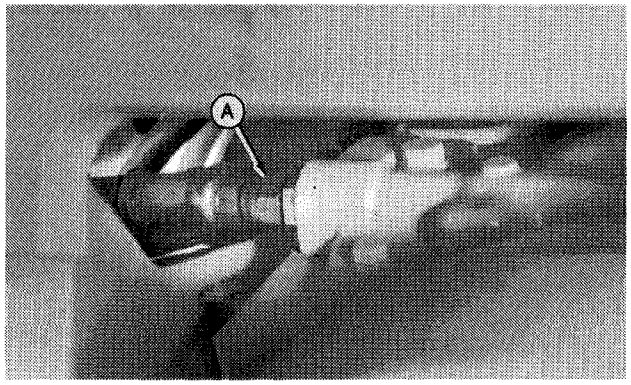


T47,0200,94 -19-11JUL90

11. Lower and block left axle.

12. Disconnect line (A).

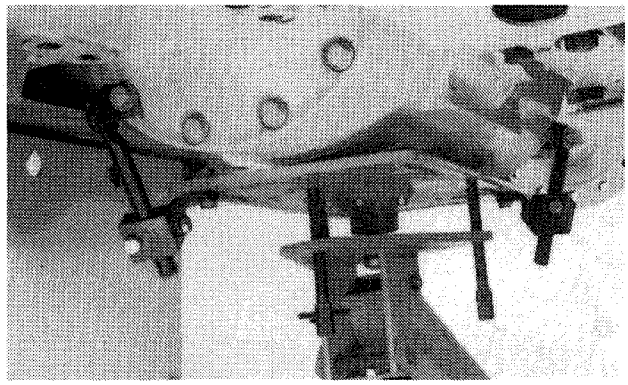
A—Differential Lock Return-to-Reduction Gear Housing Line (640D), Differential Lock Return-to-Reservoir Line (648D)



T47,0200,139 -19-02AUG90

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

13. Install a suitable service jack under differential section.

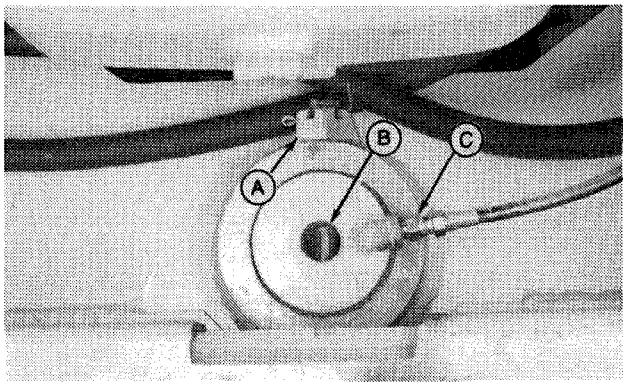


T47,0200,140 -19-17SEP84

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.

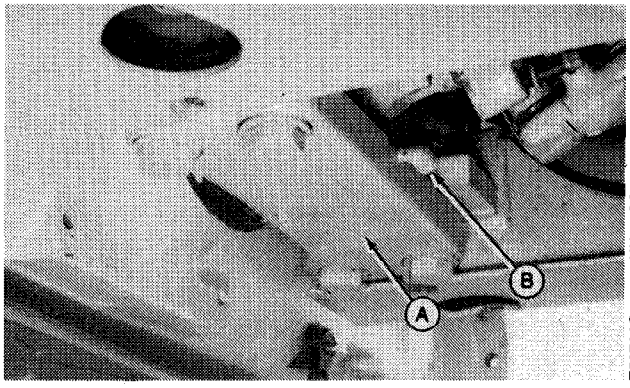


T47,0200,141 -19-14MAY88

17. Disconnect grease line (B).

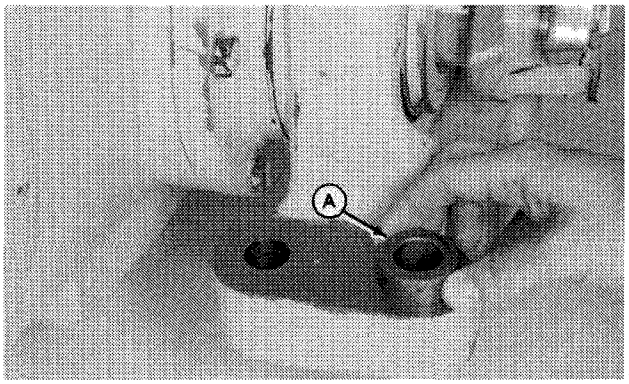
18. Remove rear oscillating support (A)-to-frame cap screws.

19. Carefully lower differential axle assembly.



T47,0200,98 -19-14MAY88

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

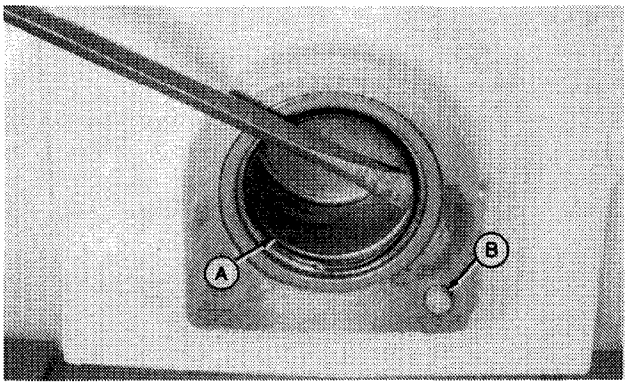


T47,0200,125 -19-12JUN84

21. Remove grease seal.

22. Inspect bushing (A). Remove only if replacement is necessary.

23. Inspect pin (B) for looseness or damage.

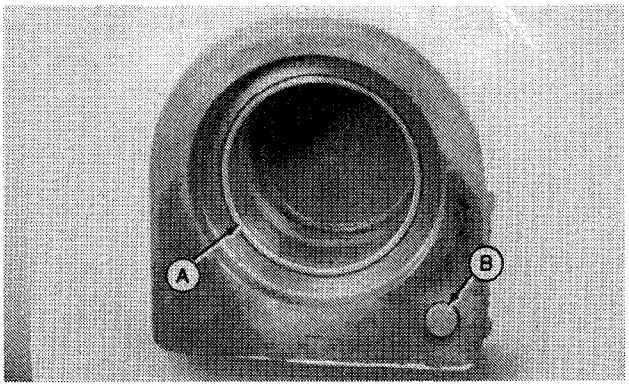


T47,0200,99 -19-12JUN84

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.

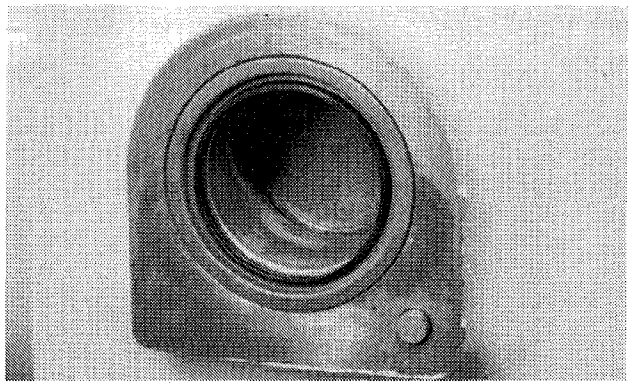
2. Install new bushing (A) if removed, using 76 mm and 85 mm disks. Install bushing even with outside edge of inner bore.



T47,0200,100 -19-14MAY88

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.



T5872AT -UN-27OCT88

T47,0200,101 -19-26MAY88

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

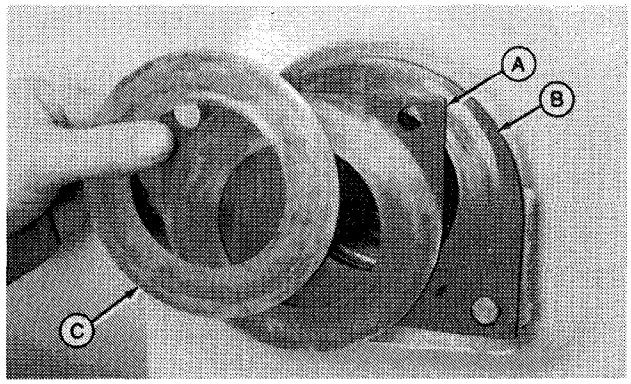
6. Install and tighten rear oscillating support cap screws to approximately 136 N·m (100 lb-ft).

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.



T5872AV -UN-27OCT88

T47,0200,102 -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

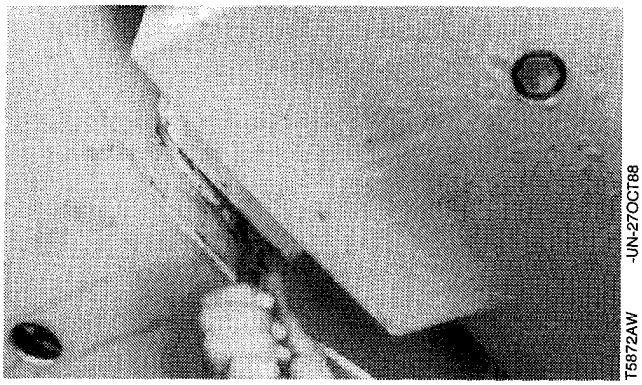
End play . . . . . 0.03—0.56 mm (0.001—0.022 in.)

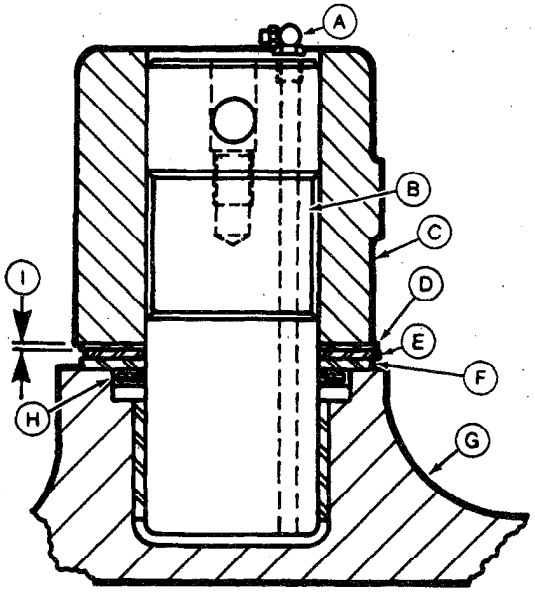
12. A force of 667 N (150 lb) maximum, measured at the axle flange without tires or rims, must move the front differential assembly freely. If a force of more than 667 N (150 lb) is required do end play adjustment again.

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

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).


T5872AW -UN-27OCT88



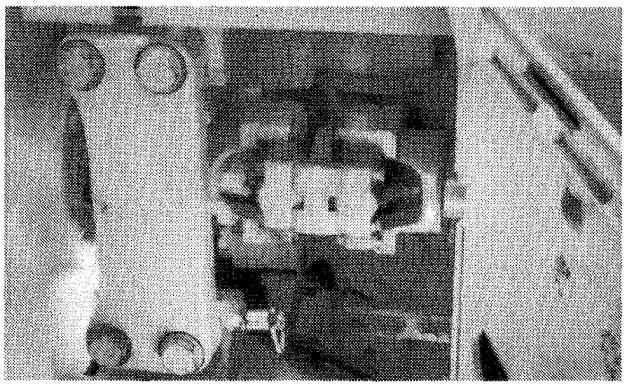
T6780AI -UN-27OCT88

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

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).

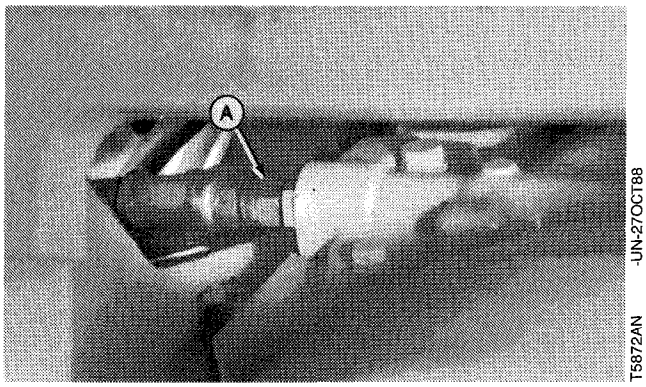
17. Install engine frame rear bottom guard. Tighten cap screws to 230 N·m (170 lb-ft).


T5872AL -UN-27OCT88

T47,0200,104 -19-14MAY88

18. Connect line (A).

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



T47,0200,142 -19-03JUL90

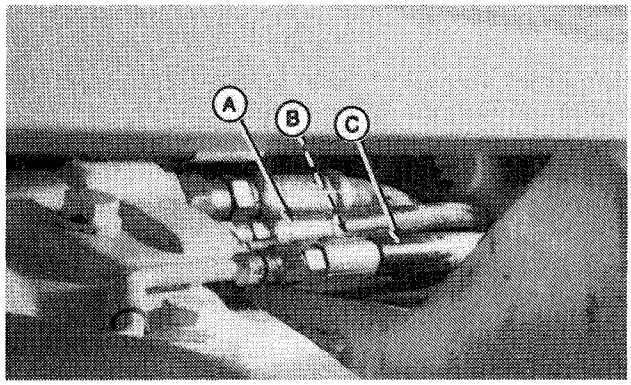
19. Connect lines (A, B, and C).

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.)

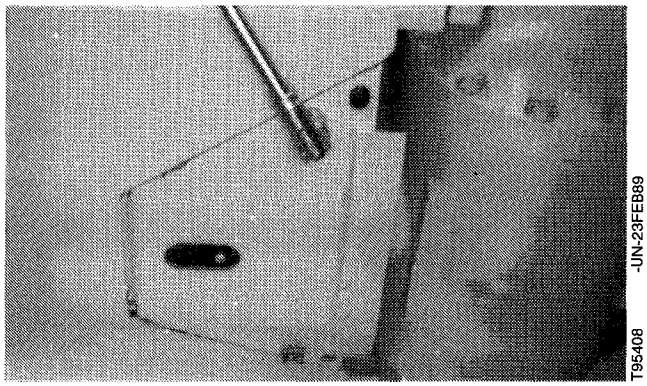
22. Connect battery ground cable.

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



T47,0200,106 -19-03JUL90

REMOVE REAR DIFFERENTIAL AND AXLE ASSEMBLY


T95408 -UN-23FEB89

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.

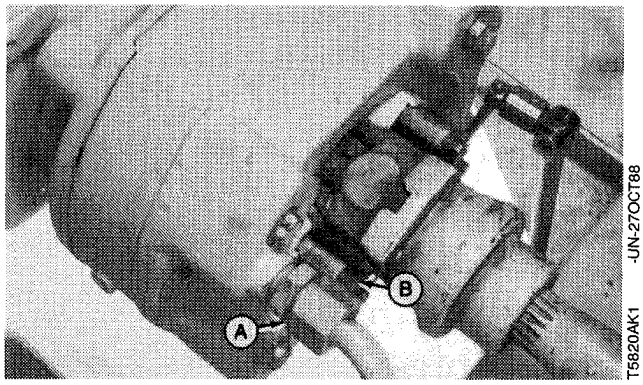
6. Remove wheels. (See Group 0110).

7. Remove equipment frame bottom guard.

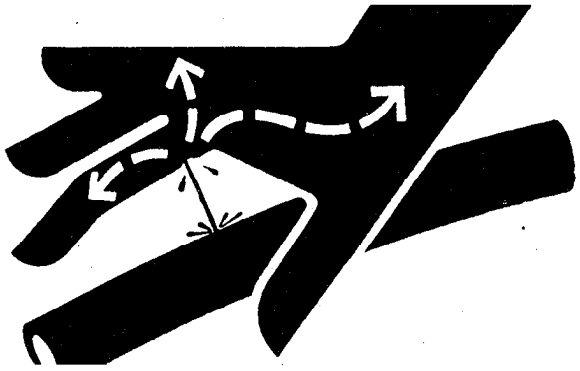
T47,0200,107 -19-14MAY88

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.



T56820AK1 -UN-27OCT88



X9811 -UN-23AUG88

NOTE: Fuel tank was removed for clarity of photograph.

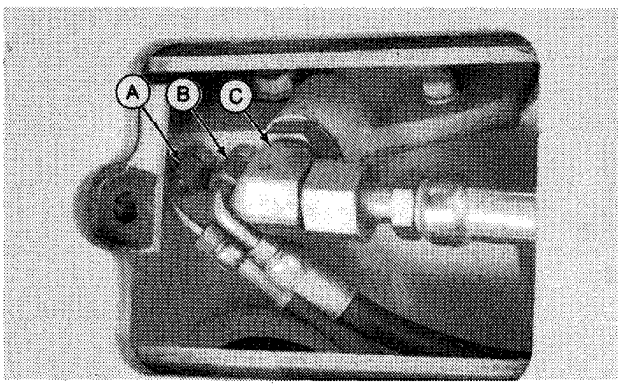
8. Disconnect park brake hydraulic line (A). Close all openings with caps and plugs.

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)



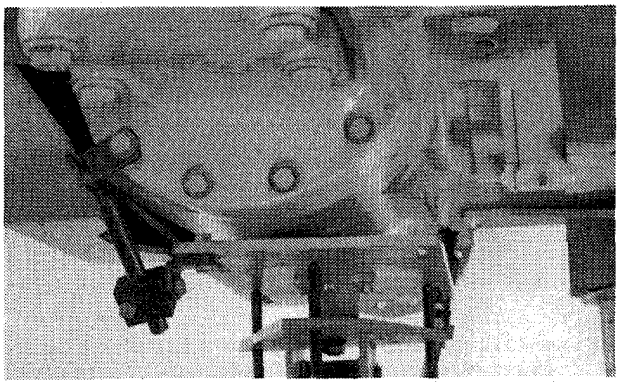
T5936AC -UN-27OCT88

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.



T5936AD -UN-27OCT88

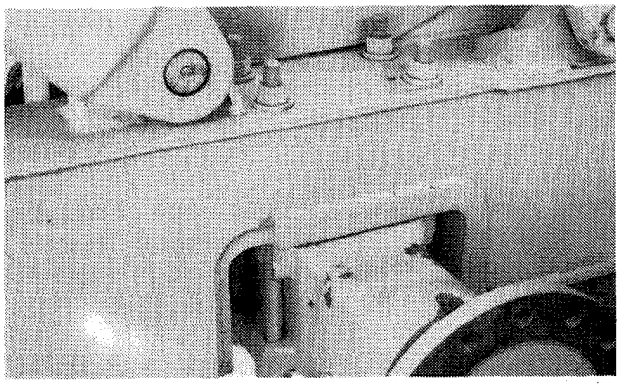
T47,0200,145 -19-03JUL90

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).

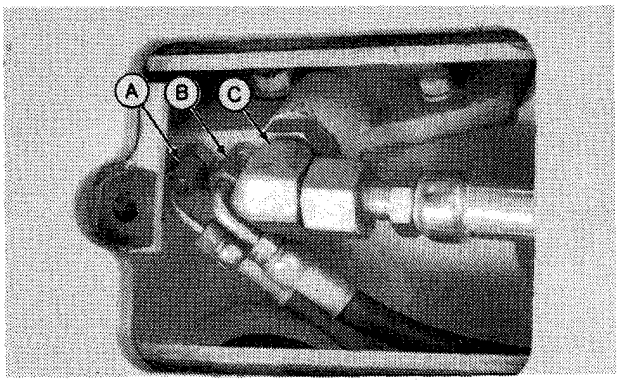


T5936AE -UN-27OCT88

T47,0200,146 -19-14MAY88

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)



T5936AC -UN-27OCT88

T47,0200,147 -19-03JUL90

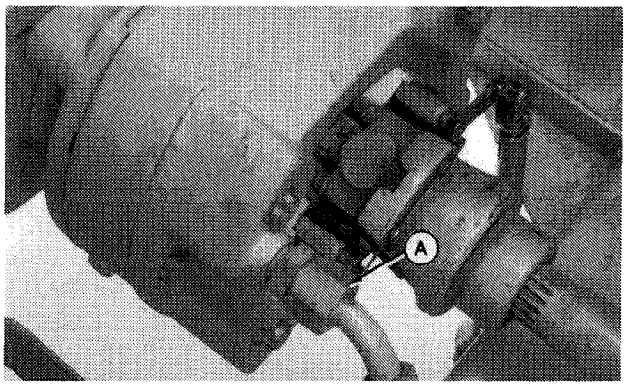
4. Connect line (A).

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).



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.

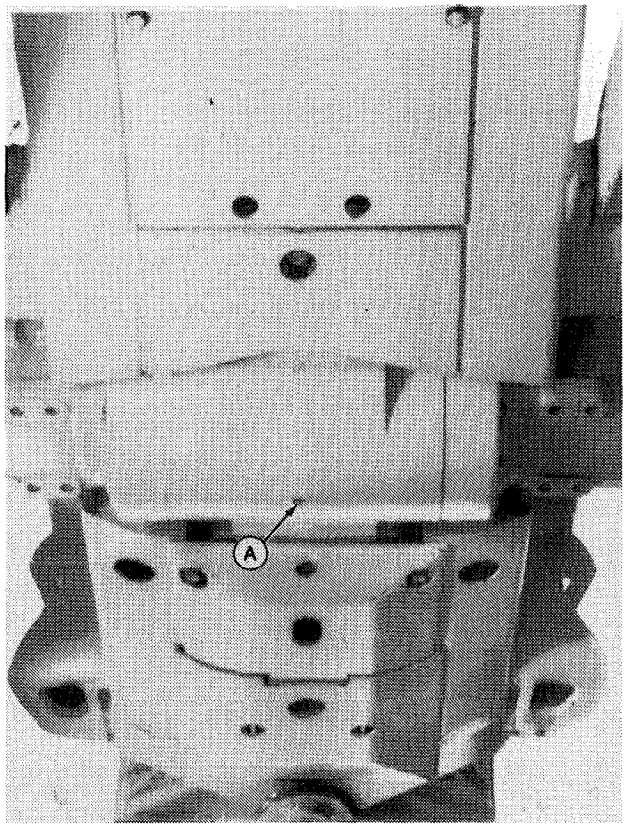
3. Remove drain plug (A). Drain oil and install plug. Hydraulic oil capacity is approximately 17 L (4.5 gal).

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.



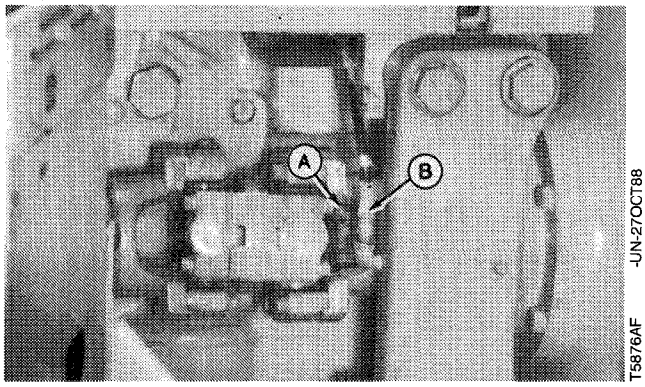
T47,0200,149 -19-14MAY88

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

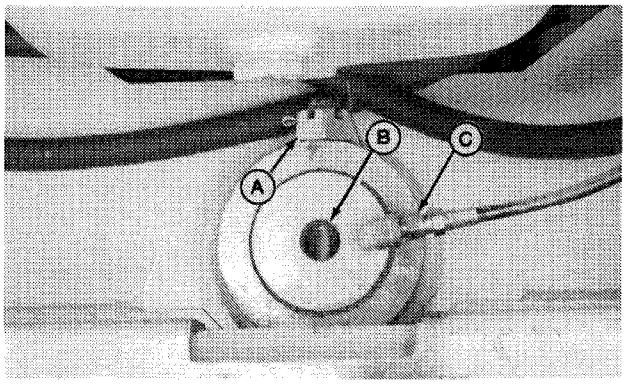
9. Operate control valves to release pressure in hydraulic system. Operate park brake and brake valves to release pressure in accumulator.

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.

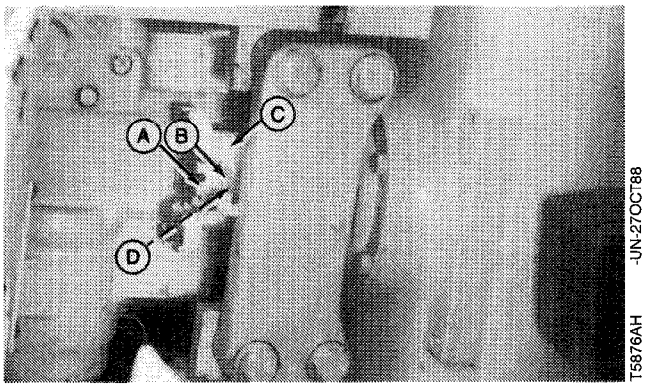


T47,0200,150 -19-14MAY88

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



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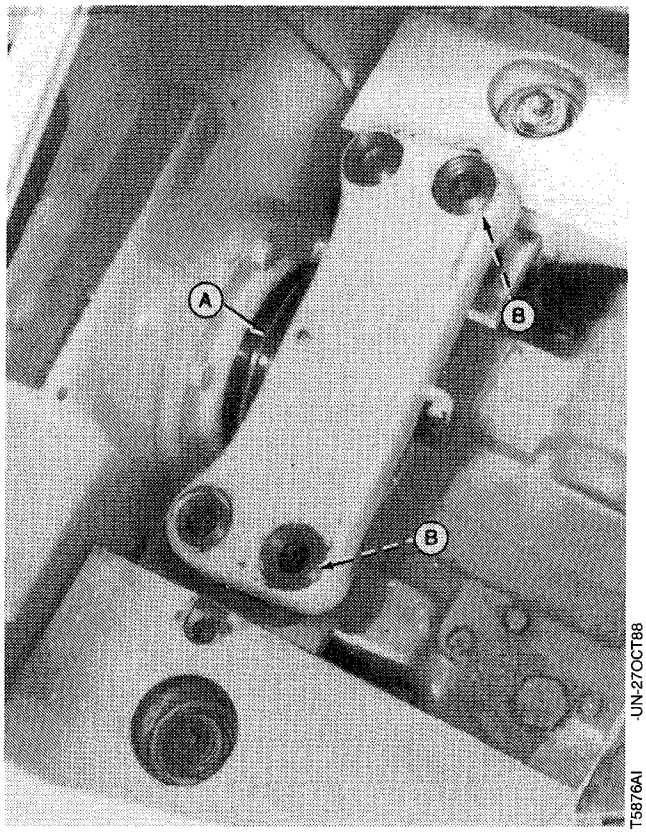
16. Lower differential just enough to allow clearance for support dowels (B).

17. Remove support and thrust washer (A).



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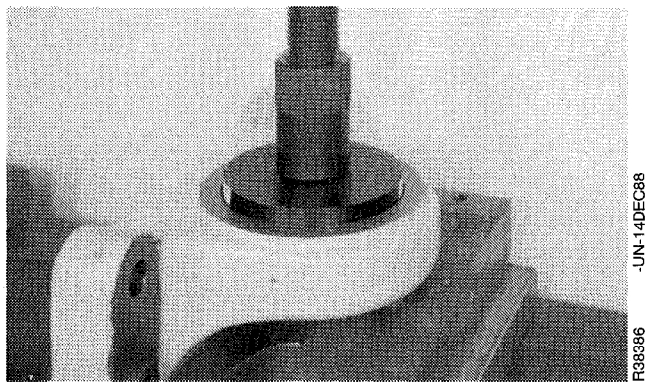
18. Remove bushing using 135 mm disk or JDG92 Bearing Cup Installer.

Early Units Shown



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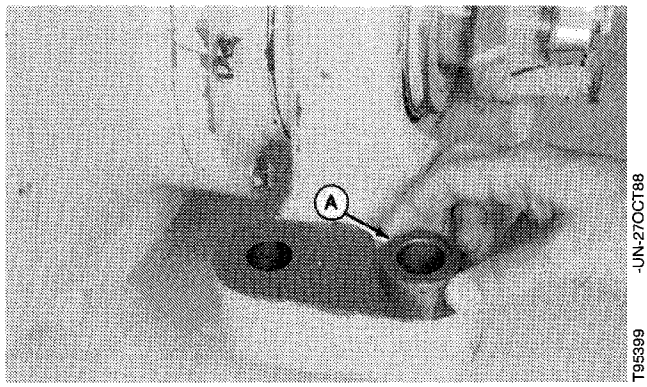
19. Inspect dowels (A) for looseness or damage.



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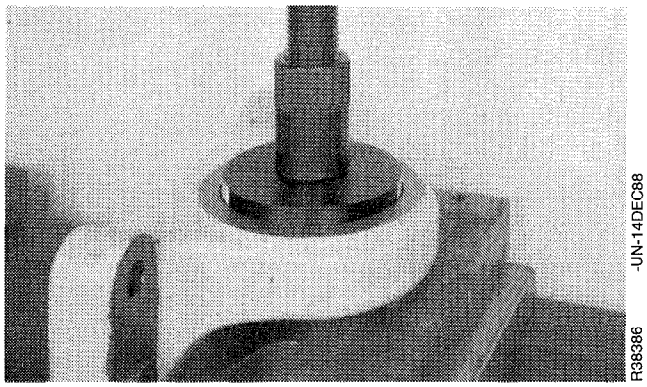
ASSEMBLE AND INSTALL FRONT DIFFERENTIAL OSCILLATING SUPPORT

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.)



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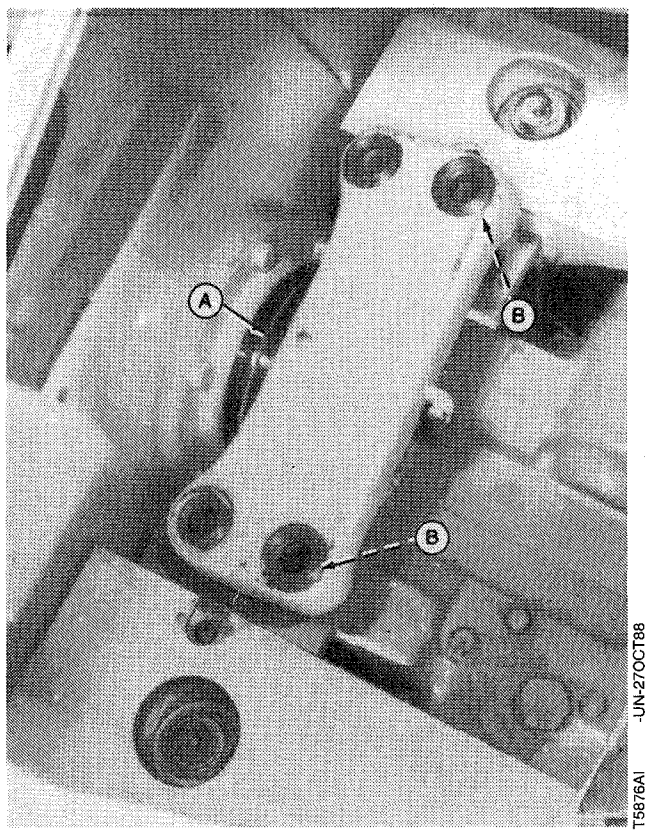
3. Install thrust washer (A) and support with dowels (B).

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.



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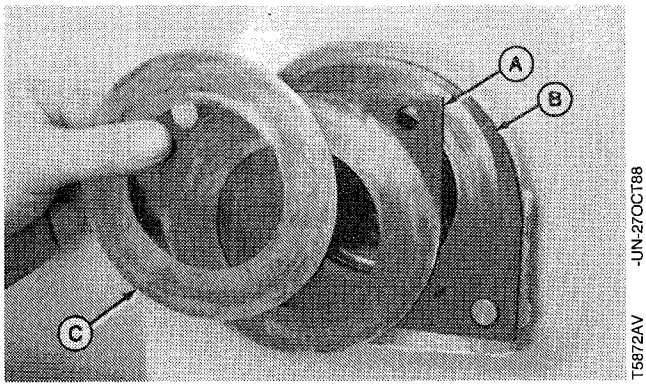
7. Apply NEVER-SEEZ lubricant or equivalent to thrust plates, if removed.

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.



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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.

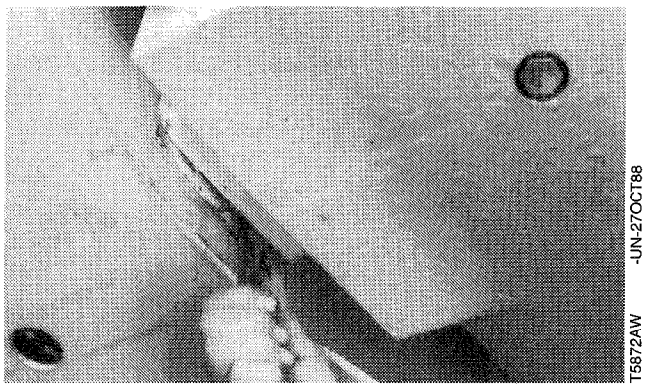
END PLAY SPECIFICATIONS

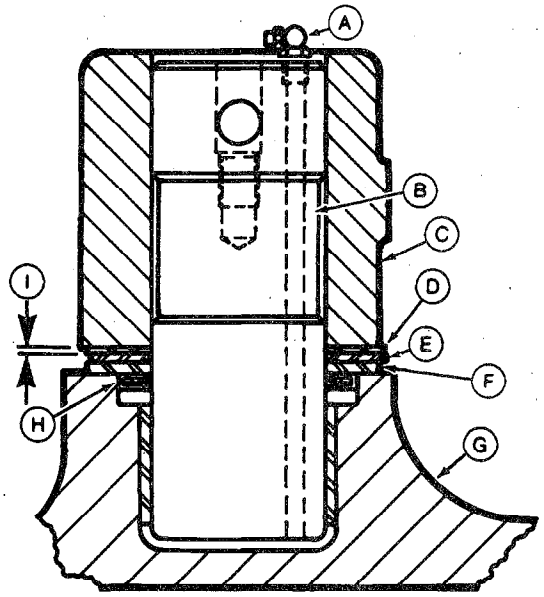
End play	0.03—0.56 mm (0.001—0.022 in.)

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

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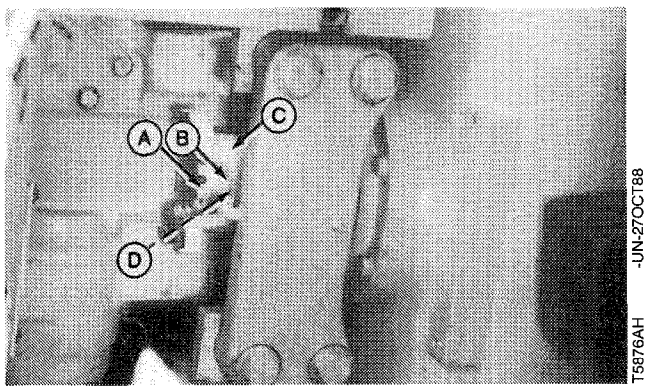
15. Install yoke (C), O-ring (D), washer (B), and nut (A). Tighten nut until it is the same position that it was before being removed. With nut in this position it must be tightened to 305—407 N·m (225—300 lb-ft).

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
B—Washer
C—Yoke
D—O-Ring

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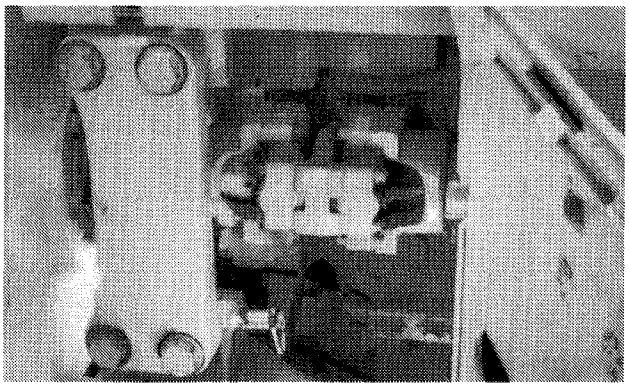
17. Install differential drive shaft. Install and tighten special cap screws to 95 N·m (70 lb-ft) using a 406 mm (16 in.) torque wrench and JD292 Torque Converter Box Wrench. If special tool JD292 is not used, tighten cap screws to 129 N·m.

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).



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