

SERVICE MANUAL

DISASSEMBLY AND ASSEMBLY
950 VEHICLE
SYSTEMS



INTRODUCTION

This publication has instructions and procedures for the subject on the front cover. The information, specifications, and illustrations in this publication are on the basis of information that was current at the time this issue was written.

The "Alphabetical Index" is a list of all components and service operations in this manual section. It gives page numbers and also the operations numbers as found in the "Service Index".

The "Service Index" is a list of all component operations found in this manual section. All operations in the column "Component Operation" are removal and installation instructions, unless other descriptions are given for the operation. The arrangement of the components in this list is by location on the machine or engine. The column "Other Needed Operations" gives the number of all other component operations that are necessary to do the respective job.

Correct operation, maintenance, test and repair procedures will give this product a long service life. Before starting a test, repair or rebuild job, the serviceman must read the respective sections of the Service Manual, and know all the components he will work on.

Your safety, and the safety of others, is at all times very important. When you see this symbol  or this symbol  in the manual, you must know that caution is needed for the procedure next to it. The symbols are warnings. To work safely, you must understand the job you do. Read all instructions to know what is safe and what is not safe.

It is very important to know the weight of parts. Do not lift heavy parts by hand. Use a hoist. Make sure heavy parts have a good stability on the ground. A sudden fall can cause an accident. When lifting part of a machine, make sure the machine has blocks at front and rear. Never let the machine hang on a hoist, put blocks or stands under the weight.

When using a hoist, follow the recommendation in the manual. Use correct lift tools as shown in illustrations to get the correct balance of the component you lift. This makes your work safer at all times.

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**ALWAYS INSTALL LIFT ARM SUPPORT
BEFORE WORKING UNDER RAISED
LIFT ARMS OR BUCKET**



**DISCONNECT BATTERIES
BEFORE PERFORMANCE
OF ANY SERVICE WORK**

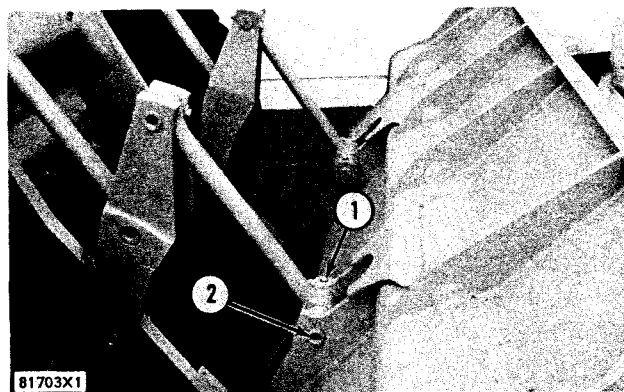
BUCKET

REMOVE BUCKET

11-6101

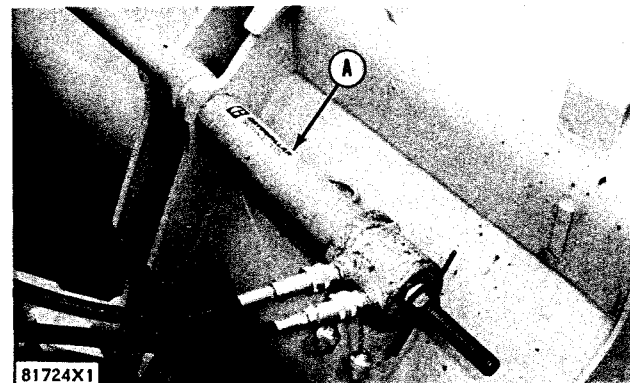
Tools Needed		A
7F9540	Hydraulic Puller	1
9S5559	Stud	1
9S5565	Sleeve	1
1P543	Nut	1
9S5800	Pump Group	1

1. Remove the four bolts (1) that hold the bucket pins (2).



2. Remove the four pins with tooling (A).

3. Remove the bucket with a hoist. Weight is 2010 lb. (912 kg).

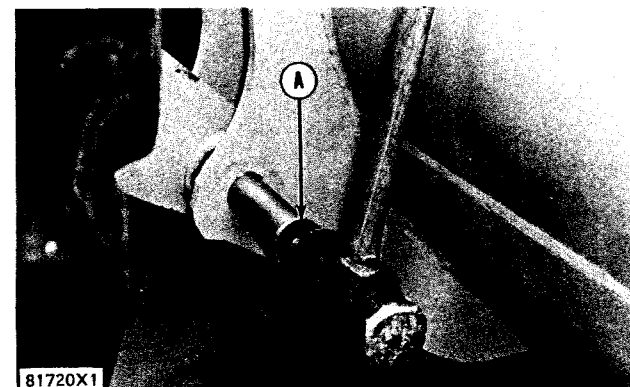
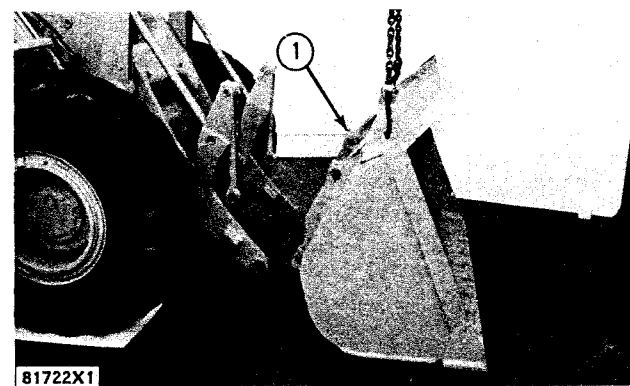


INSTALL BUCKET

12-6101

Tools Needed		A
9S5563	Cap	1

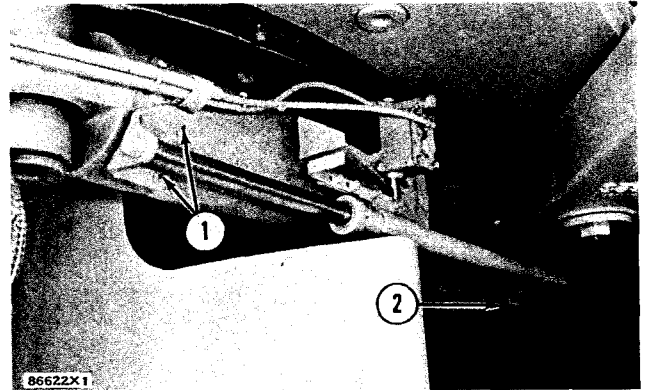
1. Put the bucket (1) in position with hoist.
2. Install the washers, as needed, to fill the clearance between arms and bucket. Install the bucket pins with cap (A) and a hammer.
3. Install the four bolts that hold the buck pins.



BUCKET POSITIONER, BUCKET POSITIONER MASTER CYLINDER

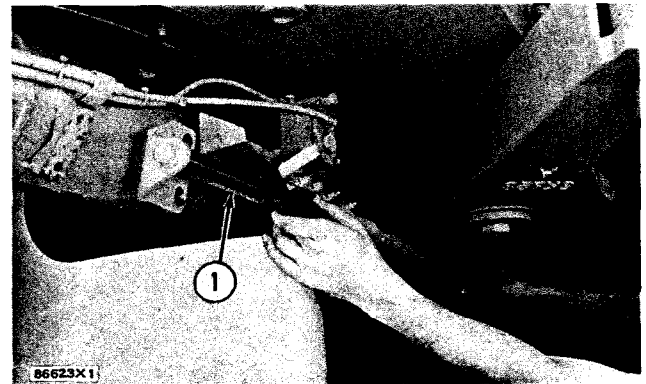
REMOVE BUCKET POSITIONER 11-5112

1. Remove bolt (2) and two screws (1).
2. Remove bucket positioner.



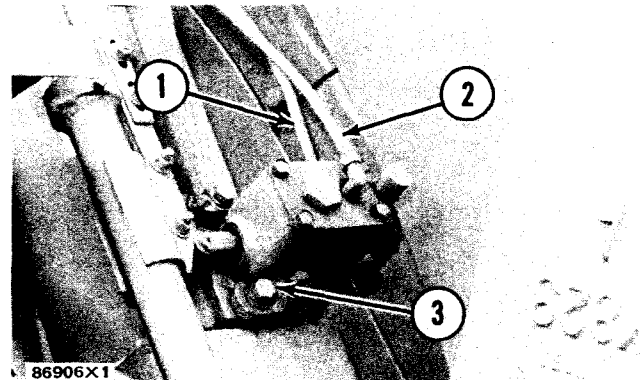
INSTALL BUCKET POSITIONER 12-5112

1. Put bucket positioner (1) into position and install two screws and bolt. Tighten bolt to a torque of 240 ± 30 lb.ft. (33.6 ± 4.1 mkg).



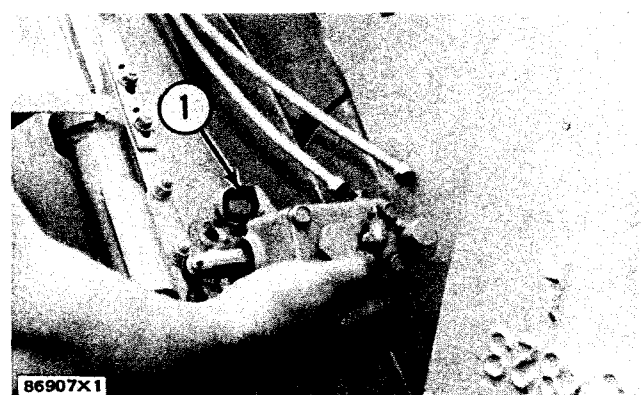
REMOVE BUCKET POSITIONER MASTER CYLINDER 11-5100

1. Disconnect lines (1) and (2).
2. Remove two bolts (3). Remove master cylinder.



INSTALL BUCKET POSITIONER MASTER CYLINDER 12-5100

1. Put master cylinder (1) into position and install two bolts that hold it to the tilt cylinder.
2. Connect lines to master cylinder.
3. Fill master cylinder with fluid to correct level.
4. Remove air from the system. See REMOVING AIR FROM THE HYDRAULIC SYSTEM in TESTING AND ADJUSTING.



BUCKET POSITIONER MASTER CYLINDER

DISASSEMBLE BUCKET POSITIONER MASTER CYLINDER

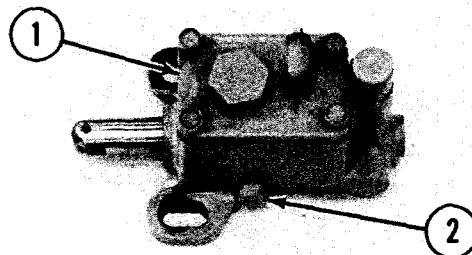
15-5100

start by:

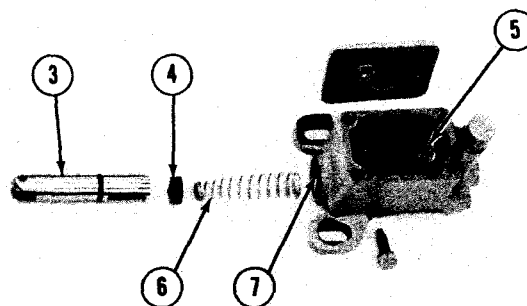
- a) install bucket positioner master cylinder

1. Remove cover (1) from valve body.
2. Remove bolt (2) from valve body.
3. Remove piston (3), cup (4), spring (6) and retainer from valve body.
4. Remove seal (7) from valve body.
5. Remove check valve (5) and gasket.

NOTE: To make an adjustment to the relief valve, see BUCKET POSITIONER in LOADER HYDRAULIC PORTION of TESTING AND ADJUSTING.



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86621X2

ASSEMBLE BUCKET POSITIONER MASTER CYLINDER

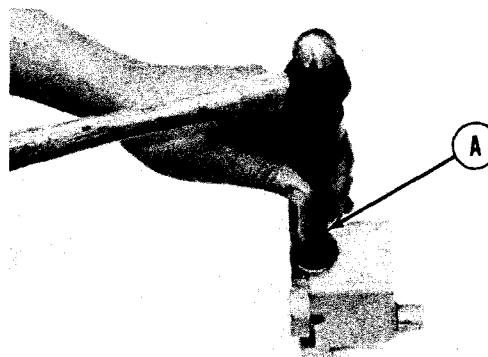
16-5100

Tools Needed		A
1P529	Handle	1
1P464	Drive Plate	1
1P459	Drive Plate	1

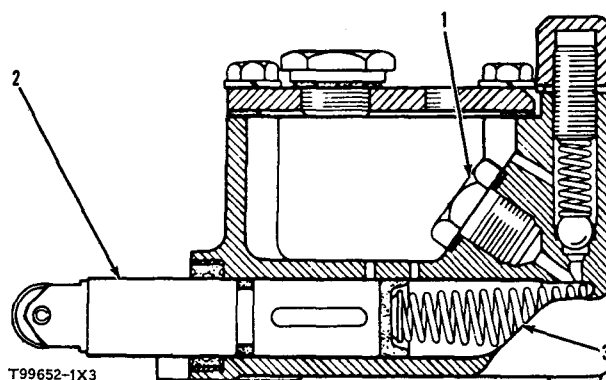
1. Inspect seals and install new seals as needed.
2. Install check valve (1) and gasket.
3. Install seal in valve body with tooling (A).
4. Install spring (3), retainer, cup, and piston (2).
5. Install bolt that prevents piston from coming out of the valve body.
6. Install cover on valve body. Tighten bolts in cover to a torque of 10 ± 2 lb.ft. (1.4 ± 0.3 mkg).

end by:

- a) remove bucket positioner master cylinder



86626X1



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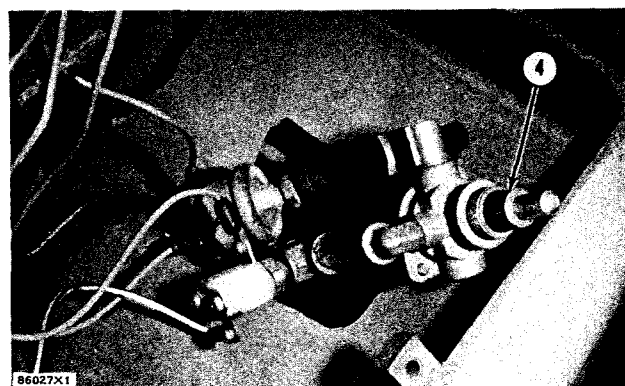
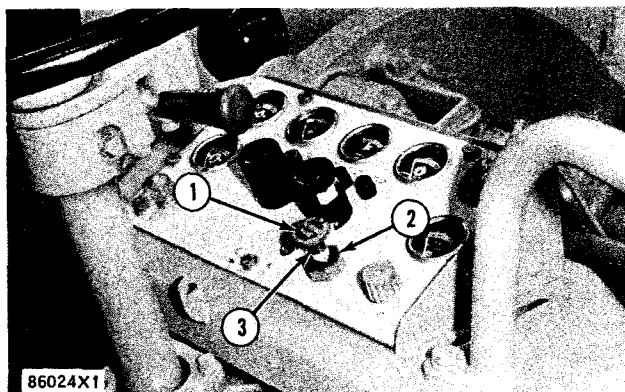
EMERGENCY AND PARKING BRAKE CONTROL VALVE

REMOVE EMERGENCY AND PARKING BRAKE CONTROL VALVE 11-4278

1. Open valve on air tank and remove air from air system.
2. Remove pin (3) from knob (1) and remove knob from valve.
3. Remove nut (2) from valve.
4. Remove bolts from dash panel. Make lines and wires free from clip on right side of frame. Lift the dash panel up and toward the front of machine.

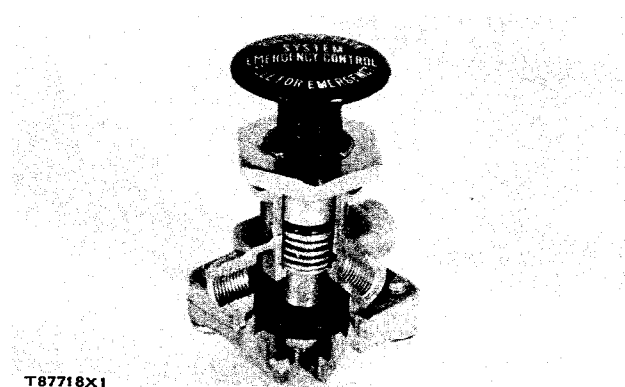
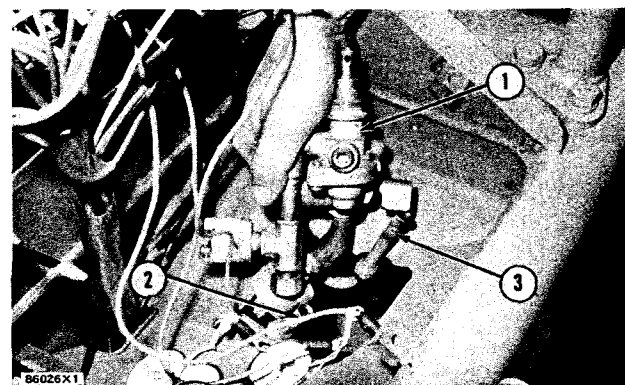
CAUTION: Disconnect switch must be in the "OFF" position before removing dash panel.

5. Disconnect wires from switches and put identification on them for installation purpose.
6. Disconnect air lines from valve.
7. Remove control valve (4) and switches as a unit.



INSTALL EMERGENCY AND PARKING BRAKE CONTROL VALVE 12-4278

1. Put valve (1) and switches into position in machine.
2. Connect air lines (2) and (3) to valve.
3. Connect wires to the switches.
4. Put dash panel in position and install bolts.
5. Install nut, knob and pin on valve.
6. Start machine and operate emergency and parking brake and check for air leaks.

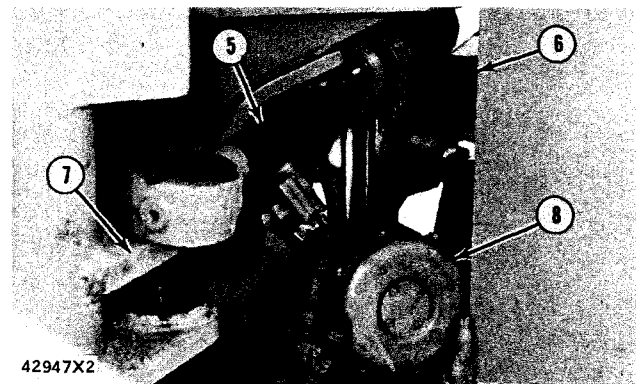
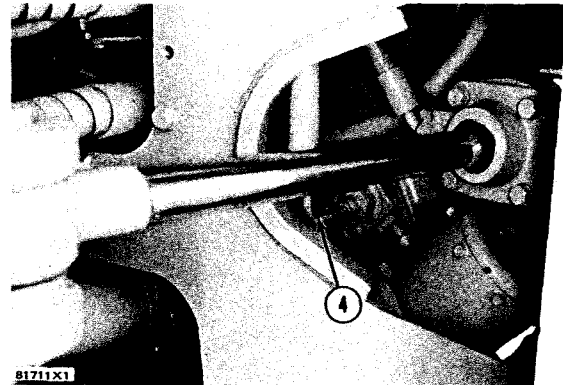
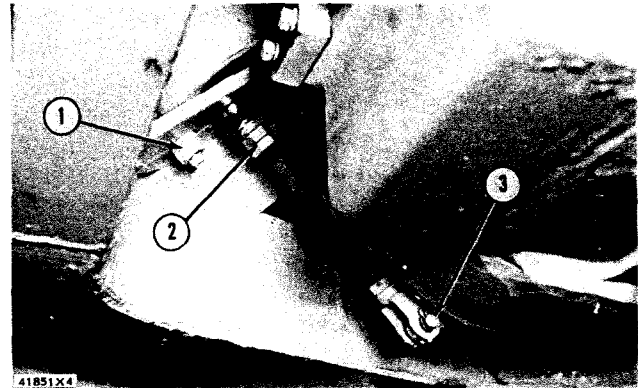


PARKING BRAKE AIR CHAMBER

REMOVE PARKING BRAKE AIR CHAMBER

11-4262

1. Remove air pressure from air tank.
2. Loosen nuts (2) until pin (3) is loose.
3. Remove pin (3) from lever.
4. Remove nuts (1) from air chamber.
5. Disconnect line (4) from valve.
6. Remove pins from rod end and head end of steering cylinder.
7. Put rod end (5) of steering cylinder on top of bracket (7).
8. Put the head end of cylinder on block (6) and remove brake air chamber (8) and valve as a unit.



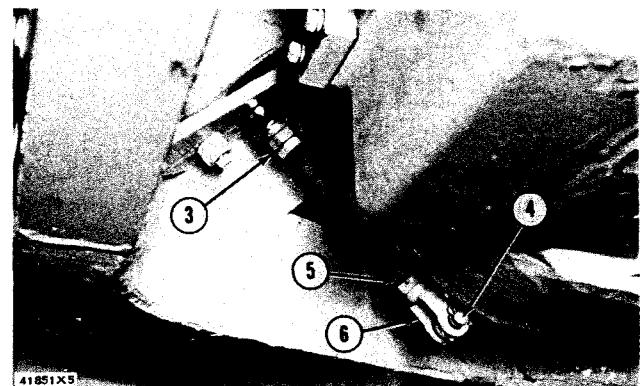
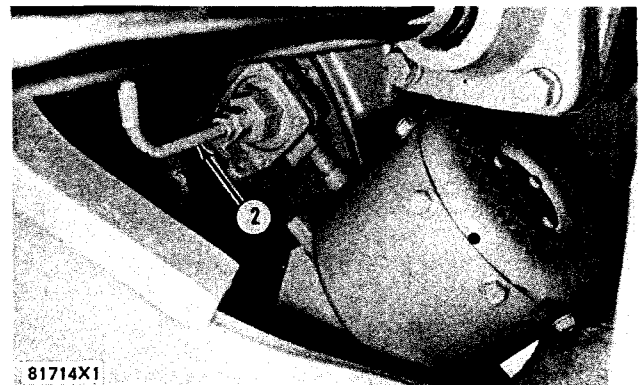
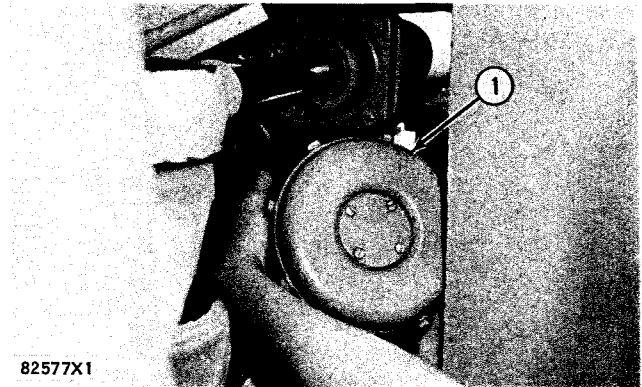
PARKING BRAKE AIR CHAMBER

INSTALL PARKING BRAKE AIR CHAMBER

12-4262

1. Put chamber (1) and valve into position on machine and install nuts that hold chamber to bracket.
2. Connect line (2) to valve.
3. Put steering cylinder in position and install pins.
4. Install pin in brake lever.
5. Tighten nuts (3) on chamber.
6. Connect shop air to the air tank to maintain a constant pressure. Release the parking brake and check adjustment as follows.
7. Loosen yoke locknut (5) and remove pin (4).
8. Pull lever down by hand until brake linings make contact with drum.
9. Turn yoke (6) on rod until holes in yoke are in alignment with hole in lever.

CAUTION: With lever pulled down, pin must slide freely into yoke and lever holes. Brake lining must be free from drum.



PARKING BRAKE AIR CHAMBER

DISASSEMBLE PARKING BRAKE AIR CHAMBER

15-4262

Tools Needed		A
7S6704	Spring Compressor Assembly	1

start by:

a) remove parking brake air chamber

1. Remove valve (1) from air chamber.
2. Remove yoke (2) and locknut.
3. Remove cover (5) from end of chamber.
4. Remove nuts (4) and rod (3) from chamber.
5. Install tool (A) and tighten nut (6) to hold spring force.
6. Remove bolts (7) from around chamber.
7. Loosen nut (6) to release spring force. When all spring force has been released, remove the spring compressor assembly.
8. Remove support, spring and piston.
9. Remove seals from piston.
10. Remove seals from chamber.

ASSEMBLE PARKING BRAKE AIR CHAMBER

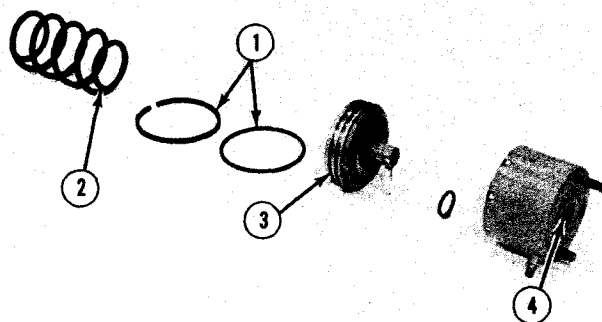
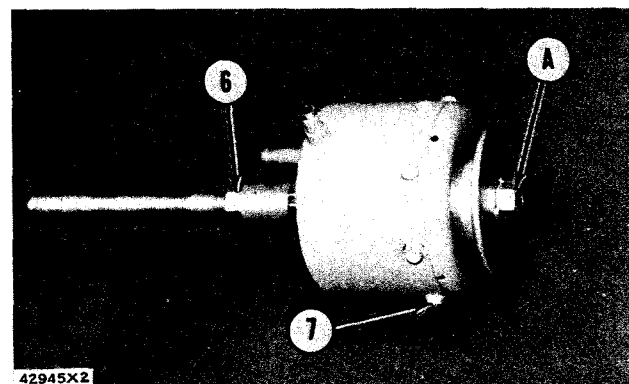
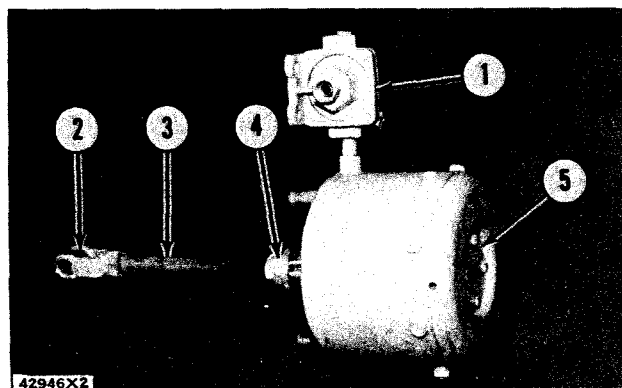
16-4262

Tools Needed		A
7S6704	Spring Compressor Assembly	1

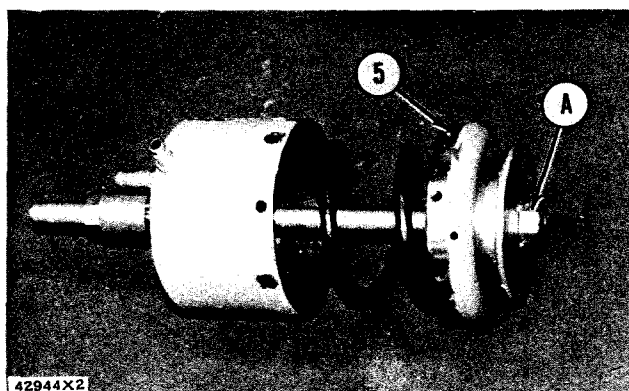
1. Install seals (4) in chamber.
2. Install seals (1) on piston.
3. Install piston (3) and spring (2) in chamber.
4. Install end support (5) and tool (A). Push the spring together with tool (A) and install bolts around chamber.
5. Remove tool (A) and install rod and nuts.
6. Install locknut and yoke.
7. Install valve on chamber.

end by:

a) install parking brake air chamber



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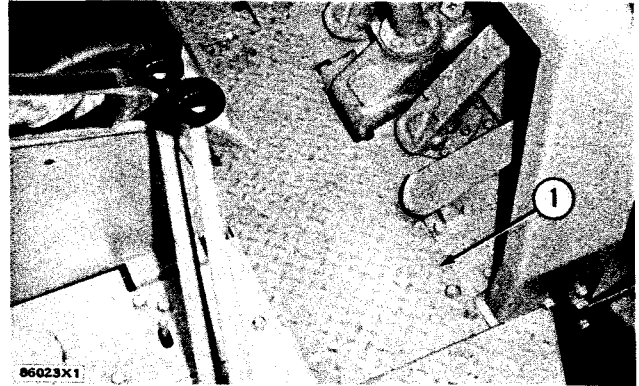


BRAKE CONTROL VALVES

REMOVE BRAKE CONTROL VALVES

11-4265

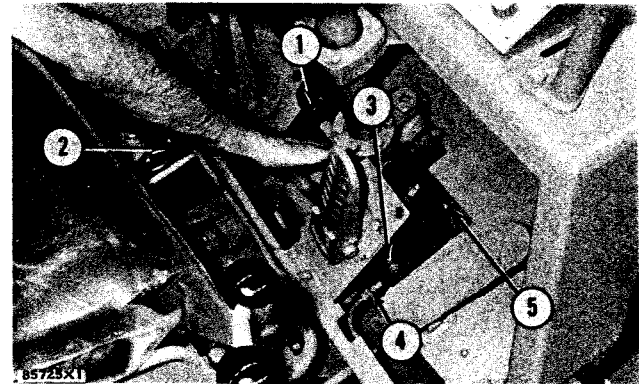
1. Open valve on air tank and remove air from air system.
2. Remove floor plate (1) in front of the seat.
3. Disconnect two air lines from left control valve.
4. Disconnect three air lines from right control valve.
5. Remove floor plate and the two valves as a unit.



INSTALL BRAKE CONTROL VALVES

12-4265

1. Put floor plate and control valves into position on machine.
2. Connect air lines (1) and (2) to left control valve.
3. Connect air lines (3), (4) and (5) to right control valve. Install bolts in floor plate.
4. Start loader and operate brakes. Check for air leaks.
5. Install floor plate in front of seat.



BRAKE CONTROL VALVES

DISASSEMBLE BRAKE CONTROL VALVES

15-4265

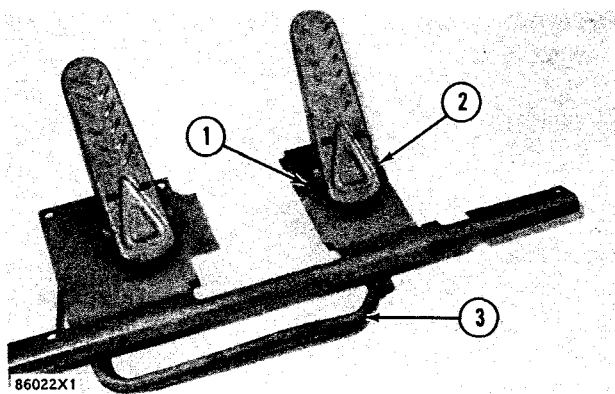
Tools Needed		A
1P1862	Pliers	1

start by:

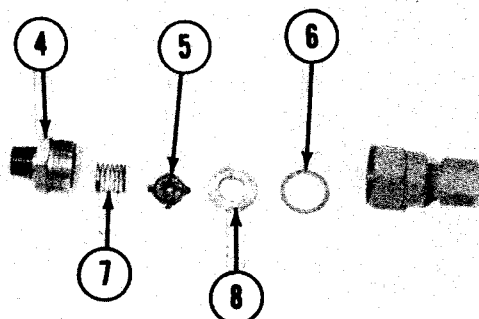
a) remove brake control valves

1. Remove pin (2). Remove pedal, boot and plunger from control valve.
2. Disconnect lines (3) from check valves.
3. Remove three bolts (1) that hold valve to floor plate.
4. Remove check valve from double check valve.
5. Remove double check valve from control valve.
6. Remove cap (4), spring (7), disc (5), seat (8) and washer (6) from check valve.
7. Remove cap (9), gasket (10) and seat retainer (11) from double check valve.
8. Remove retainer (12), piston (19) and spring (14) from body.
9. Remove bolt, washer, seat (18) and rubber spring (13) from piston.
10. Remove snap ring (17) from body with tool (A).
11. Remove washer (21), valve and seat as a unit.
12. Remove valve (20) and spring from seat (16).
13. Remove seal (15) from seat.

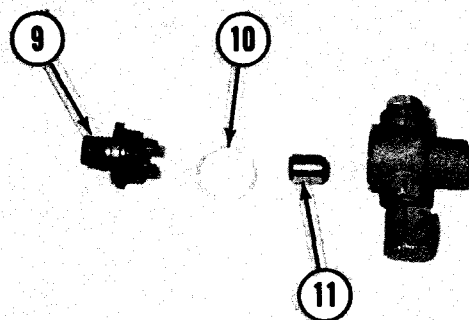
NOTE: The two control valves are the same except for the two check valves.



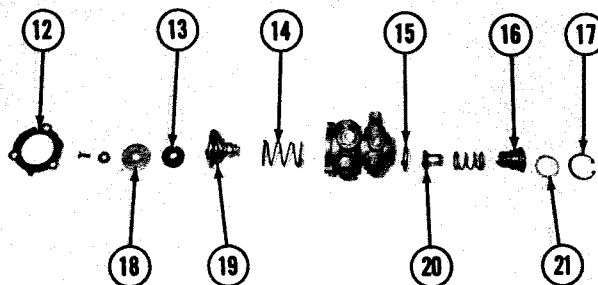
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86020X1

BRAKE CONTROL VALVES

ASSEMBLE BRAKE CONTROL VALVES

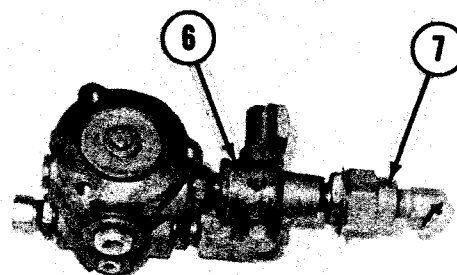
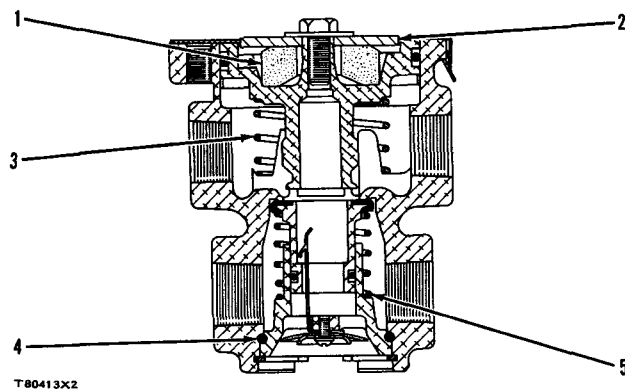
16-4265

Tools Needed		A
1P1862	Pliers	1

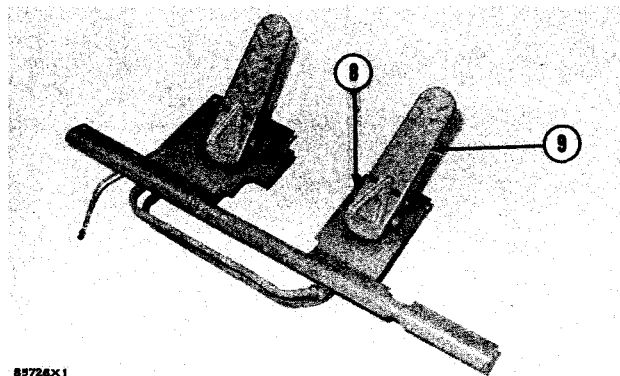
1. Install seal (4), spring (5) and valve on seat.
2. Install valve and seat in housing as a unit.
3. Install washer and snap ring with tool (A).
4. Install rubber spring (1), seat (2), washer and bolt in piston.
5. Install spring (3), piston and retainer in body.
6. Install seat retainer, gasket and cap in body of double check valve.
7. Install double check valve (6) on body of control valve.
8. Install seat, disc, spring, washer and cap on body of check valve.
9. Install check valve (7) on double check valve.
10. Install control valve on floor plate (8).
11. Install plunger, boot and pedal (9) on control valve.

end by:

- a) install brake control valves



85728X1



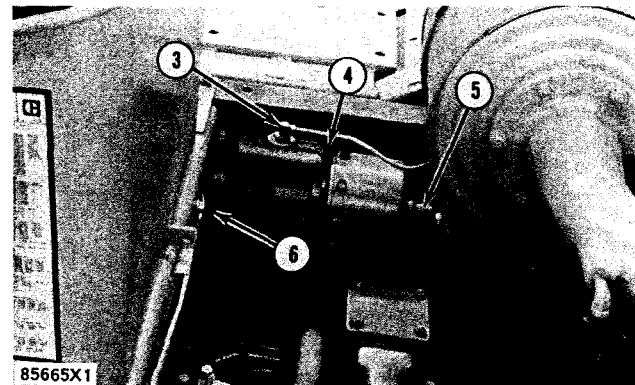
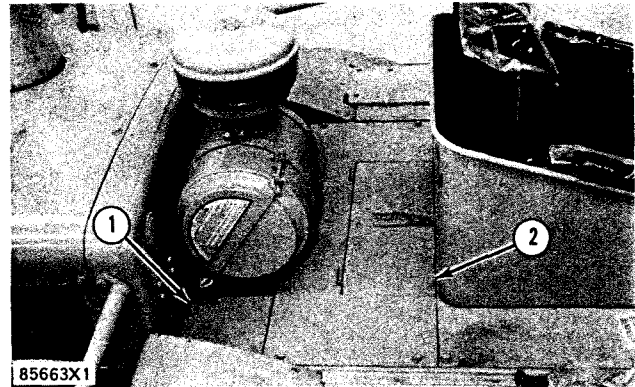
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BRAKE MASTER CYLINDERS AND CHAMBERS

REMOVE BRAKE MASTER CYLINDERS AND CHAMBERS

11-4277

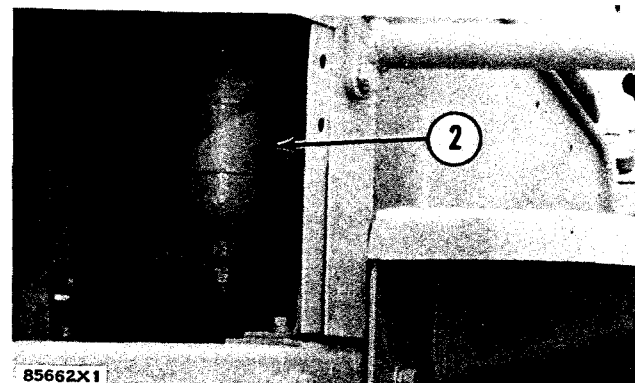
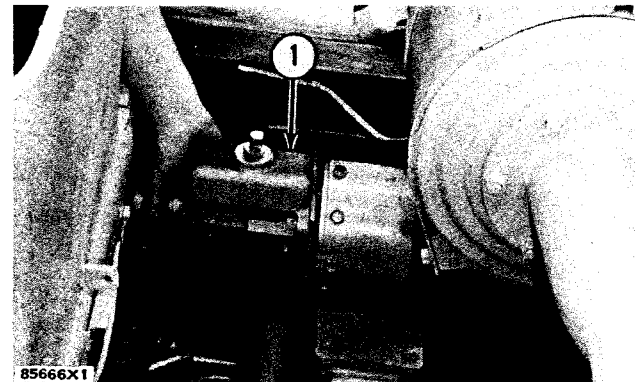
1. Open valve on air tank and remove air from air system.
2. Remove floor plates (1) and (2).
3. Disconnect lines (3), (4) and (6).
4. Disconnect wires for stoplights from master cylinders.
5. Remove bolts that connect bracket (4) to side of machine.
6. Remove master cylinder and chamber as a unit.
7. Remove master cylinder and chamber from bracket.



INSTALL BRAKE MASTER CYLINDERS AND CHAMBERS

12-4277

1. Install master cylinder and chamber on bracket.
2. Put master cylinder (1) and chamber into position on machine and install bolts that hold bracket to the side.
3. Connect the three lines to the master cylinder and chamber.
4. Connect wires for stoplights to master cylinder.
5. Install floor plates.
6. Fill the master cylinder and reservoir (2) with brake fluid.
7. Remove air from brake system. See BLEEDING (removing air) BRAKES in TESTING AND ADJUSTING SECTION.



BRAKE CHAMBERS

DISASSEMBLE BRAKE CHAMBERS 15-4259

start by:

- a) remove brake master cylinders and chambers

1. Remove bolts (3) that hold head to body (1).



WARNING: Head (2) has spring tension. When removing bolts (3), hold head in place.

2. Remove head, boot (6), spring (5), and piston (4).

3. Inspect cup seal and felt seal on piston. Inspect seals and install new seals as needed.

ASSEMBLE BRAKE CHAMBERS 16-4259

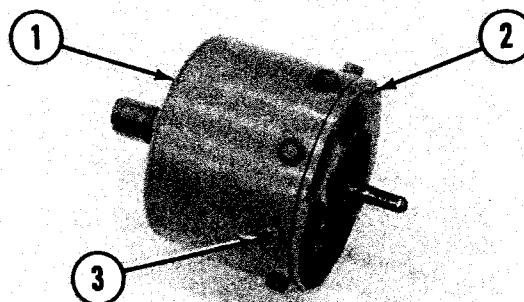
1. Install piston (2) and seals in cylinder (1).

2. Install spring, boot and head.

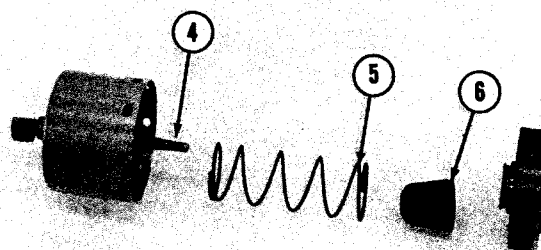
3. Install bolts that hold head to body.

end by:

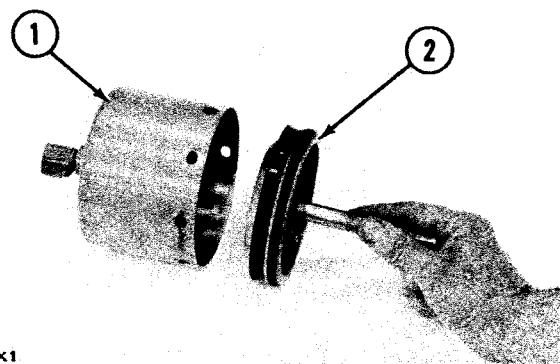
- a) install brake master cylinders and chambers



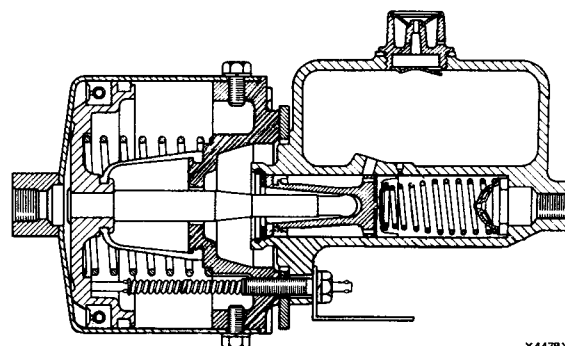
85669X1



85670X1

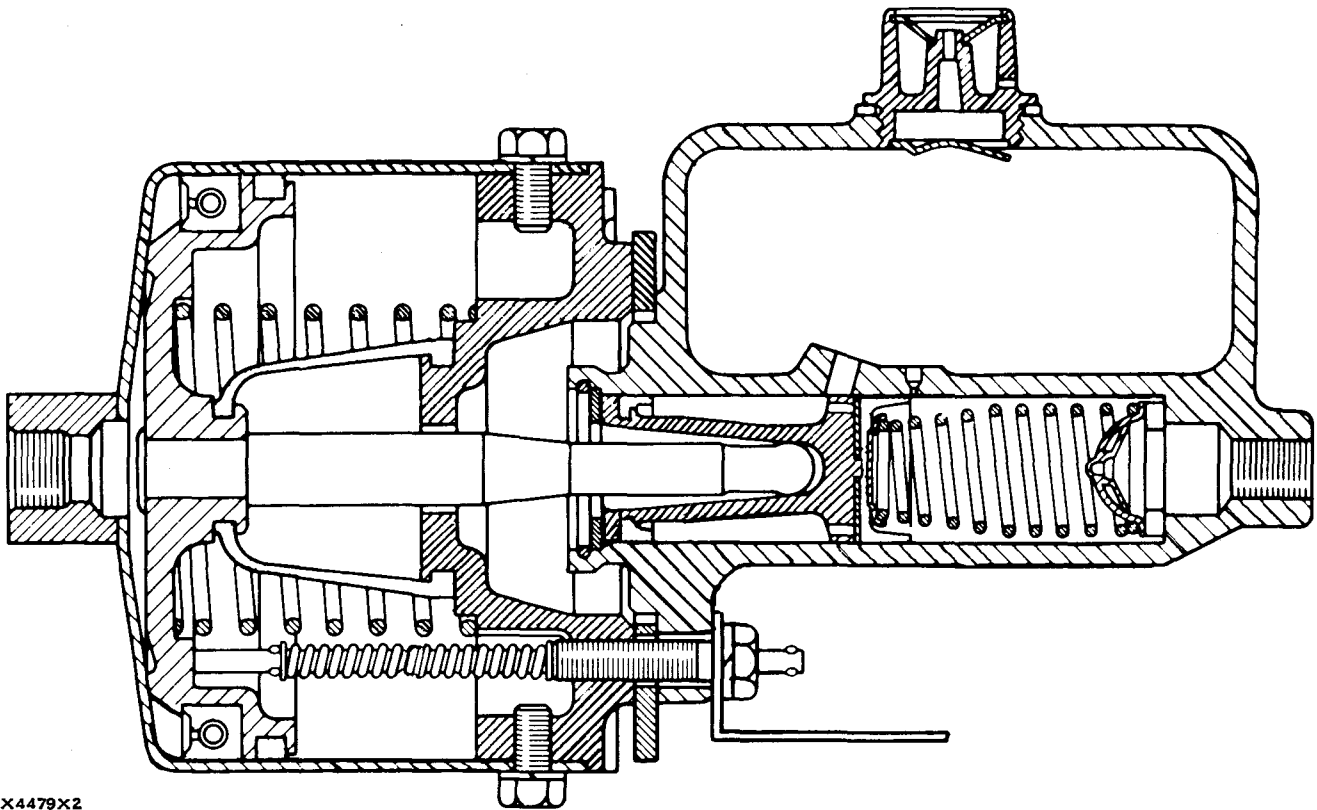


85671X1



X4479X1

BRAKE MASTER CYLINDERS AND BRAKE CHAMBERS



BRAKE MASTER CYLINDERS, STEERING VALVE

DISASSEMBLE BRAKE MASTER CYLINDERS

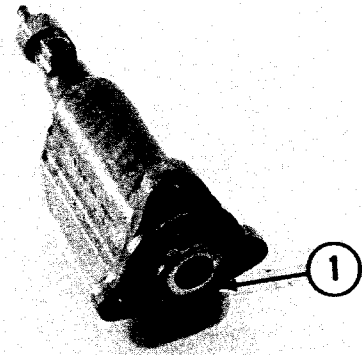
15-4258

start by:

- a) remove brake master cylinders and chambers

1. Remove lockwire (1), plate, piston, cup, spring, valve and rubber seat from cylinder.

85733X1



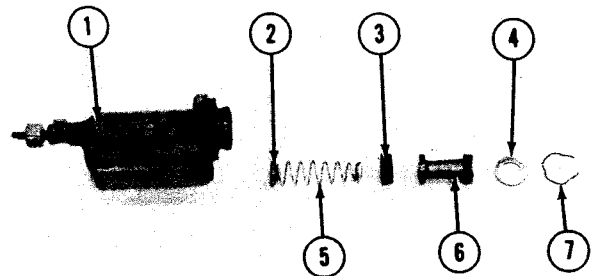
ASSEMBLE BRAKE MASTER CYLINDERS

16-4258

1. Install rubber seat in the bottom of the bore in cylinder (1).
2. Install valve (2), spring (5) and cup (3) in cylinder.
3. Install piston (6), plate (4) and lockwire (7).

end by:

- a) install master cylinders and chambers

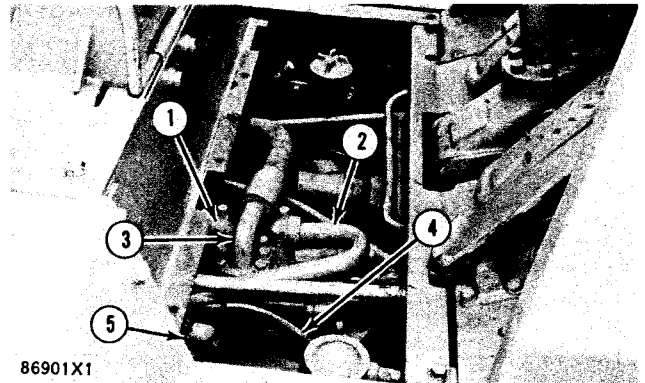


85734X1

REMOVE STEERING VALVE

11-4307

1. Remove floor plate in front of seat.
2. Disconnect lines (1), (2), (3), (4) and (5).
3. Disconnect control linkage from valve.
4. Remove bolts that hold valve to bracket. Move valve toward the front of machine and down between front and rear frames. Weight of valve is 45 lb. (20 kg).



86901X1

INSTALL STEERING VALVE

12-4307

1. Put valve (1) into position and install bolts that hold valve to bracket.
2. Connect lines and control linkage to valve.
3. Install floor plate.



86905X1

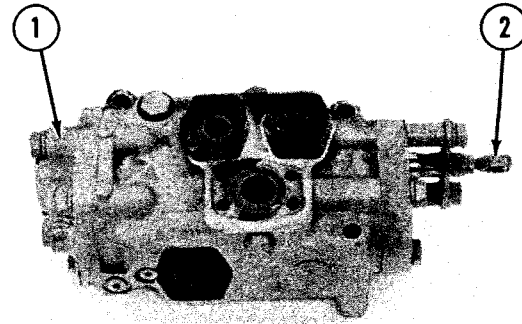
STEERING VALVE

DISASSEMBLE STEERING VALVE 15-4307

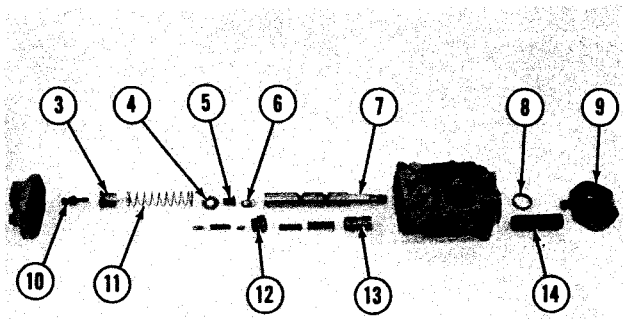
start by:

a) remove steering valve

1. Remove rod end (2) from valve spool.
2. Remove cover (1) from housing.
3. Remove valve spool (7) and centering spring as a unit.
4. Remove bolt (10), retainer (3), spring (11), washer (4), retainer (5) and shims (6) from valve spool.
5. Remove shims, spring, valve, seat (12), two springs and spool (13) from housing.
6. Remove cover (9), pilot (8) and spacer (14).
7. Remove seal from cover (9).



86902X1



86903X1

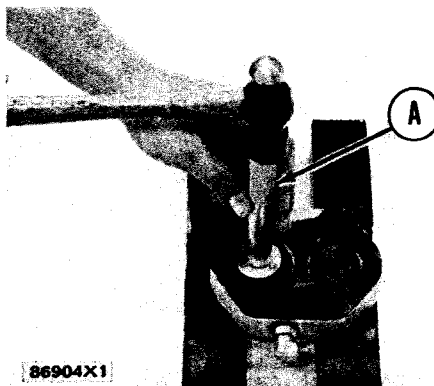
ASSEMBLE STEERING VALVE 16-4307

Tools Needed		A
1P529	Handle	1
1P460	Drive Plate	1
1P469	Drive Plate	1

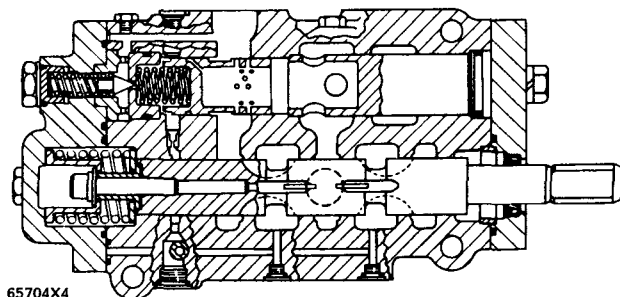
1. Inspect all O-ring seals and install new seals as needed.
2. Install seal in cover with tooling (A).
3. Install spacer, pilot and cover.
4. Install shims, retainer, washer, spring, retainer and bolt on valve spool. Install valve spool in housing.
5. Install valve spool, springs, valve seat, valve, spring and shims.
6. Install cover on housing.
7. Install rod end on valve spool.

end by:

a) install steering valve



86904X1



65704X4

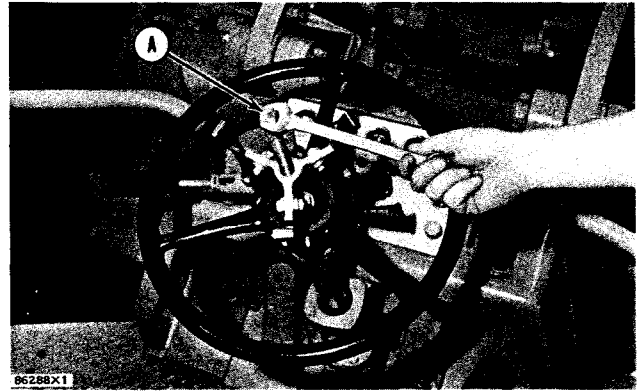
STEERING WHEEL

REMOVE STEERING WHEEL

11-4309

Tools Needed		A
8B7560	Step Plate	1
1P2321	Puller Assembly	1

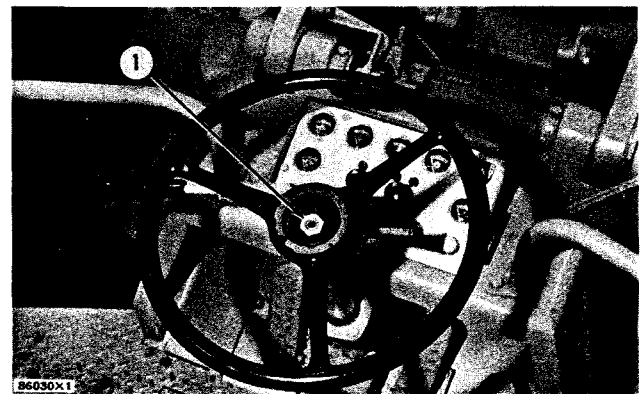
1. Remove cover from steering wheel.
2. Loosen nut until it is even with the end of shaft.
3. Install tooling (A) and loosen steering wheel from shaft.
4. Remove nut and steering wheel.



INSTALL STEERING WHEEL

12-4309

1. Install steering wheel on shaft.
2. Install nut (1) and tighten nut to a torque of 43 ± 3 lb.ft. (5.9 ± 0.4 mkg).
3. Install cover on wheel.



STEERING GEAR

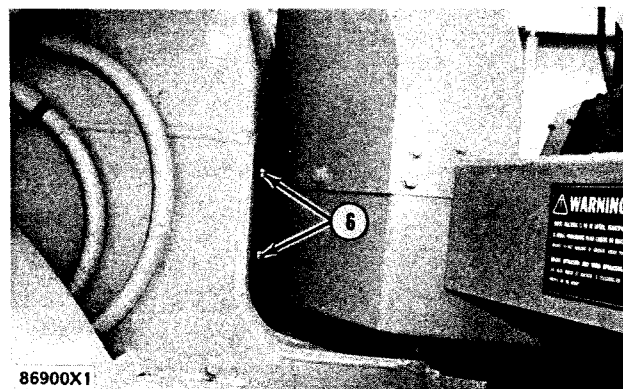
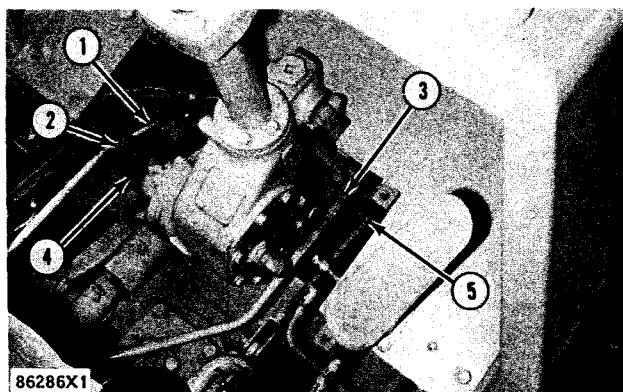
REMOVE STEERING GEAR

11-4301

start by:

- a) remove brake control valves

1. Disconnect transmission control linkages (1) and (3).
2. Disconnect control linkage (5) for steering control valve.
3. Remove nut (2) and arm (4) from steering gear.
4. Fasten a hoist and remove bolts (6) that hold bracket for steering gear to dash.
5. Remove bolts that hold steering column to dash. Remove steering gear and column as a unit. Weight is 150 lb. (68 kg).



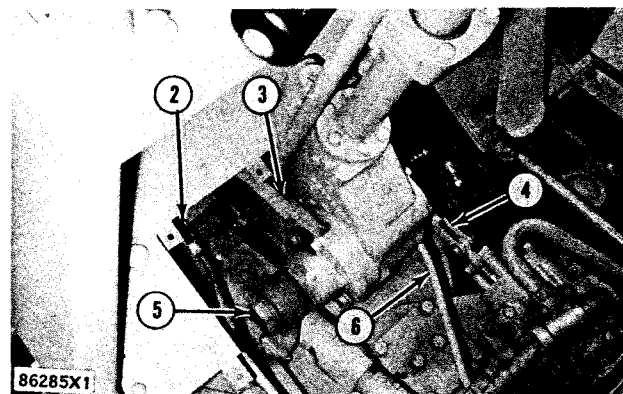
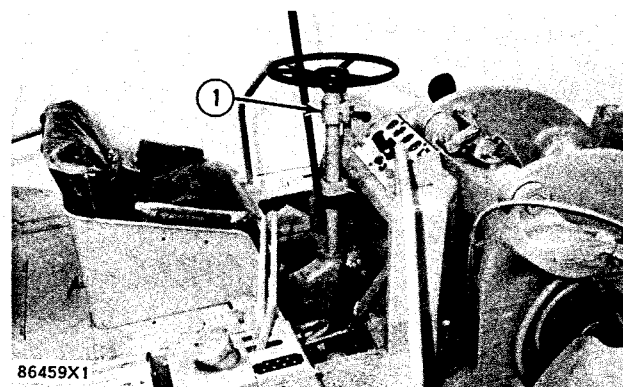
INSTALL STEERING GEAR

12-4301

1. Put steering gear and column (1) into position in machine.
2. Install bolts that hold steering column to dash.
3. Install bolts that hold bracket (3) to dash.
4. Connect transmission control linkages (2) and (6).
5. Connect control linkage (4) for steering valve.
6. Install arm and nut (5) on steering gear. Tighten nut to a torque of 450 ± 25 lb.ft. (62.2 ± 3.5 mkg).

end by:

- a) install brake control valves



STEERING GEAR

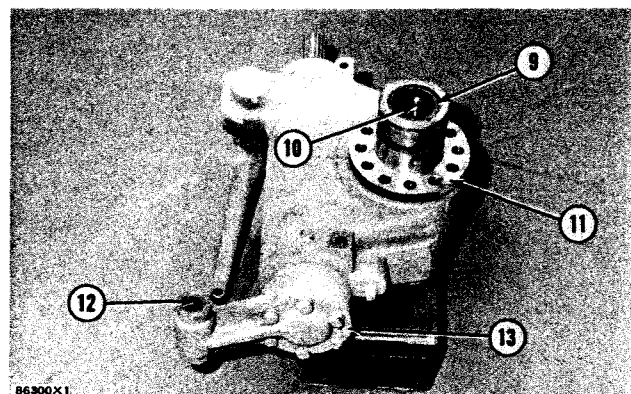
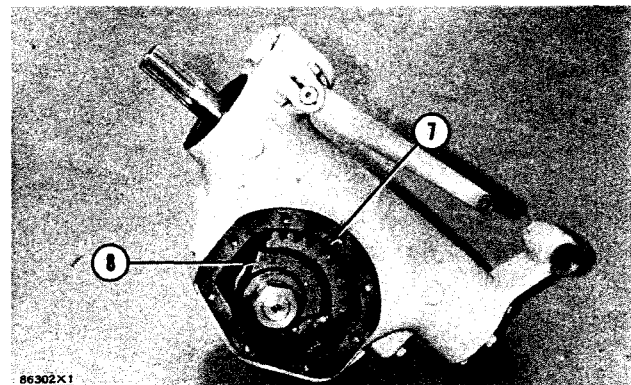
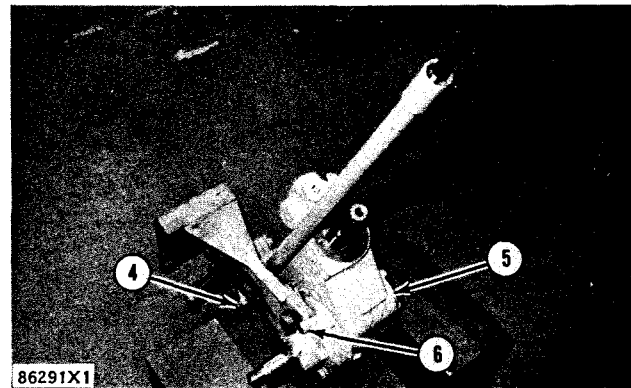
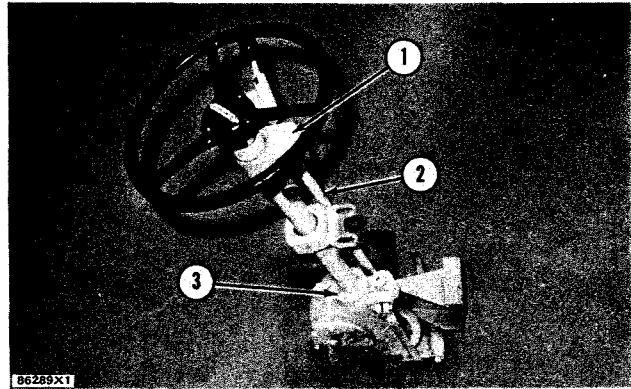
DISASSEMBLE STEERING GEAR 15-4301

Tools Needed		A
1P3075	Puller Assembly	1

start by:

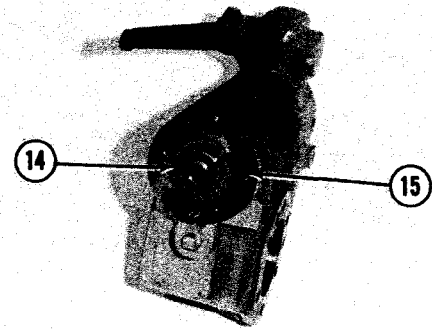
a) remove steering gear

1. Remove oil from steering gear.
2. Put a mark on shifting tube (2) and housing (1) for installation purposes.
3. Remove bolts (3). Remove steering column and wheel as a unit.
4. Remove pin (4) from linkage.
5. Remove bolts (6) from bracket and remove bracket and tube as a unit.
6. Remove cover (5) from sector gear housing.
7. Remove key from shaft.
8. Put alignment marks on sector gear (8) and nut gear (7) for installation purposes.
9. Remove sector gear (8) and shaft as a unit.
10. Remove nut and sector gear from shaft.
11. Remove shaft housing (11) from steering gear housing.
12. Remove seal (9) with tool (A).
13. Remove bearings (10) from shaft housing.
14. Remove end cover (13). Remove bearing (12) with hammer and punch.



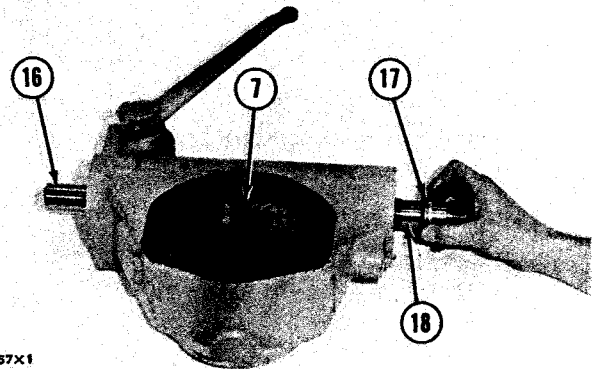
STEERING GEAR

15. Remove ring from nut (14). Remove nut, washer and retainer (15).



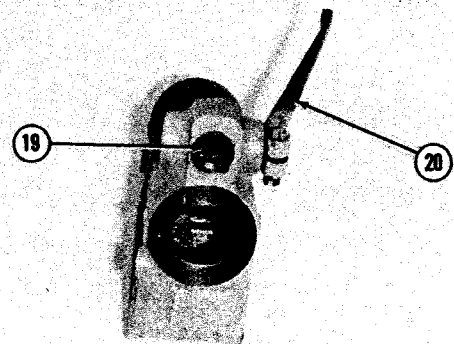
86296X1

16. Push shaft (16) down and remove ring, nut (17) and spacer from shaft (18).



86467X1

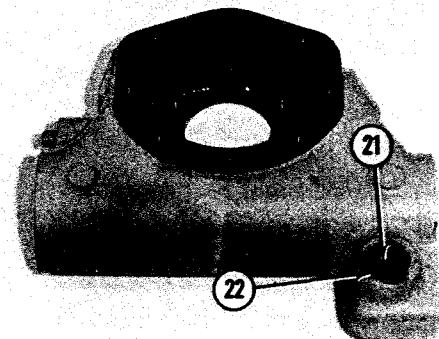
18. Remove plug and bolt (19) from housing.



86304X1

19. Remove lever (20) and shaft as a unit.

20. Remove lever from inside of the housing.



86468X1

21. Remove seal (22) and bearings (21) from housing.

STEERING GEAR

ASSEMBLE STEERING GEAR

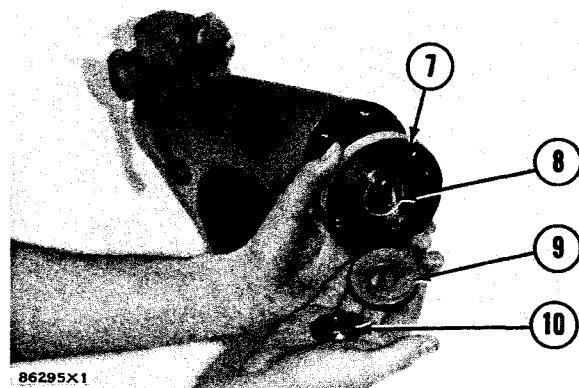
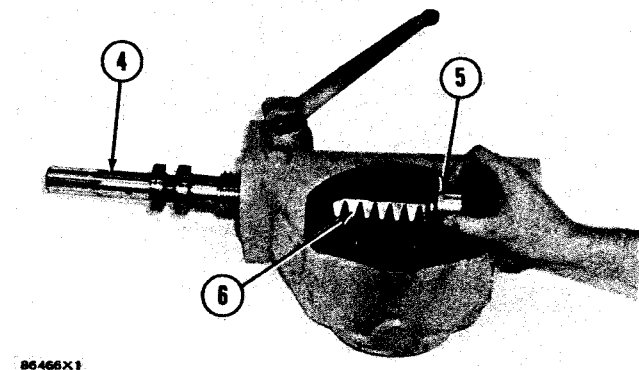
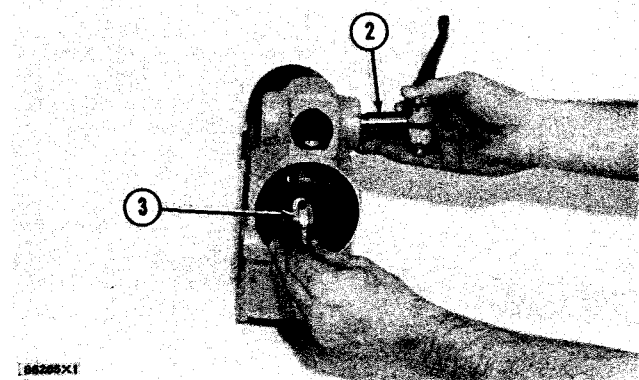
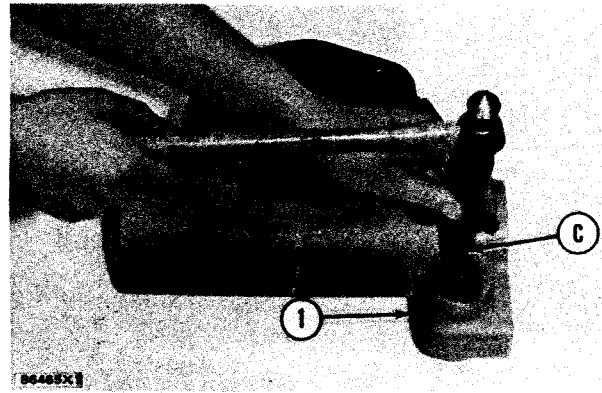
16-4301

Tools Needed		A	B	C	D	E	F	G
1P529	Handle	1	1	1	1	1	1	1
1P461	Drive Plate	1						
1P457	Drive Plate	1						
1P459	Drive Plate		1			1		
1P463	Drive Plate		1					
1P468	Drive Plate			1				
1P474	Drive Plate				1		1	
1P467	Drive Plate				1			
1P464	Drive Plate					1		
1P489	Drive Plate							1
1P472	Drive Plate							1
1P470	Drive Plate						1	

1. Install bottom bearing in housing (1) with tooling (A).
2. Install top bearing in housing (1) with tooling (B).
3. Install seal in housing with tooling (C).
4. Put lever (3) in housing and install shaft (2) through lever.
5. Install bolt in lever (3).
6. Put nut gear (6) in housing and turn shaft (4) through nut gear.
7. Install spacer (5) and push shaft and nut gear to bottom of housing.
8. Install nut and lock ring on shaft.

NOTE: If a new shaft has been installed it will be necessary to drill a hole in the shaft .094 in. (2.38 mm) in diameter and .030 in. (0.76 mm) deep for ring that locks the nut.

9. Install bearing (8) in retainer with tooling (D).
10. Install retainer (7), washer (9), nut (10) and lock ring on shaft.

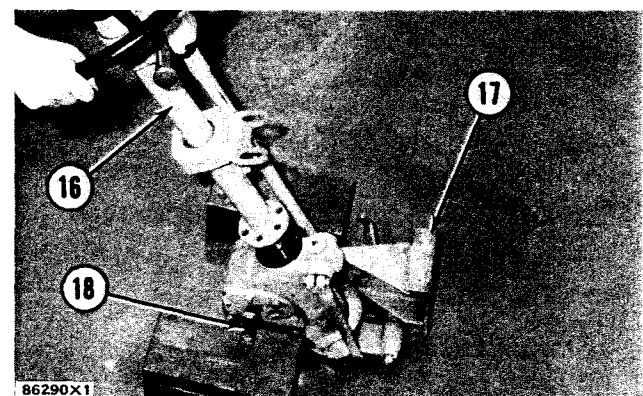
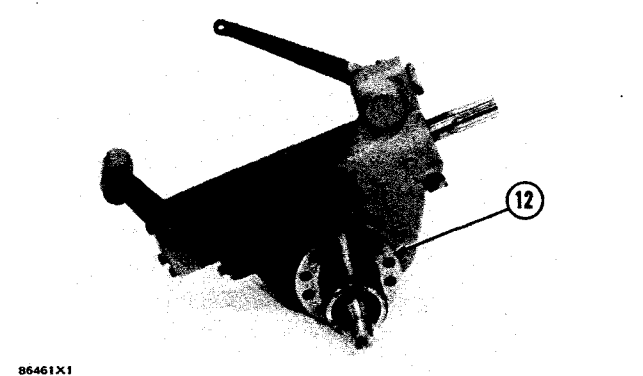
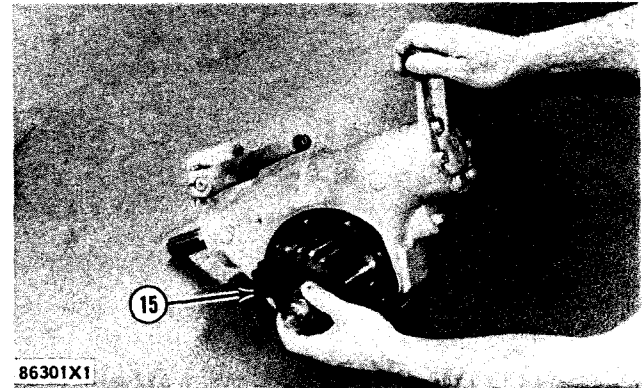
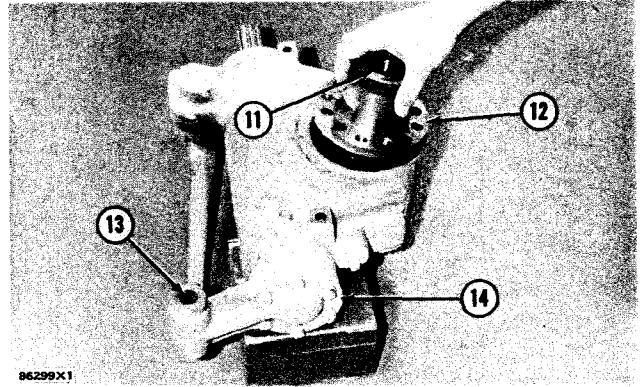


STEERING GEAR

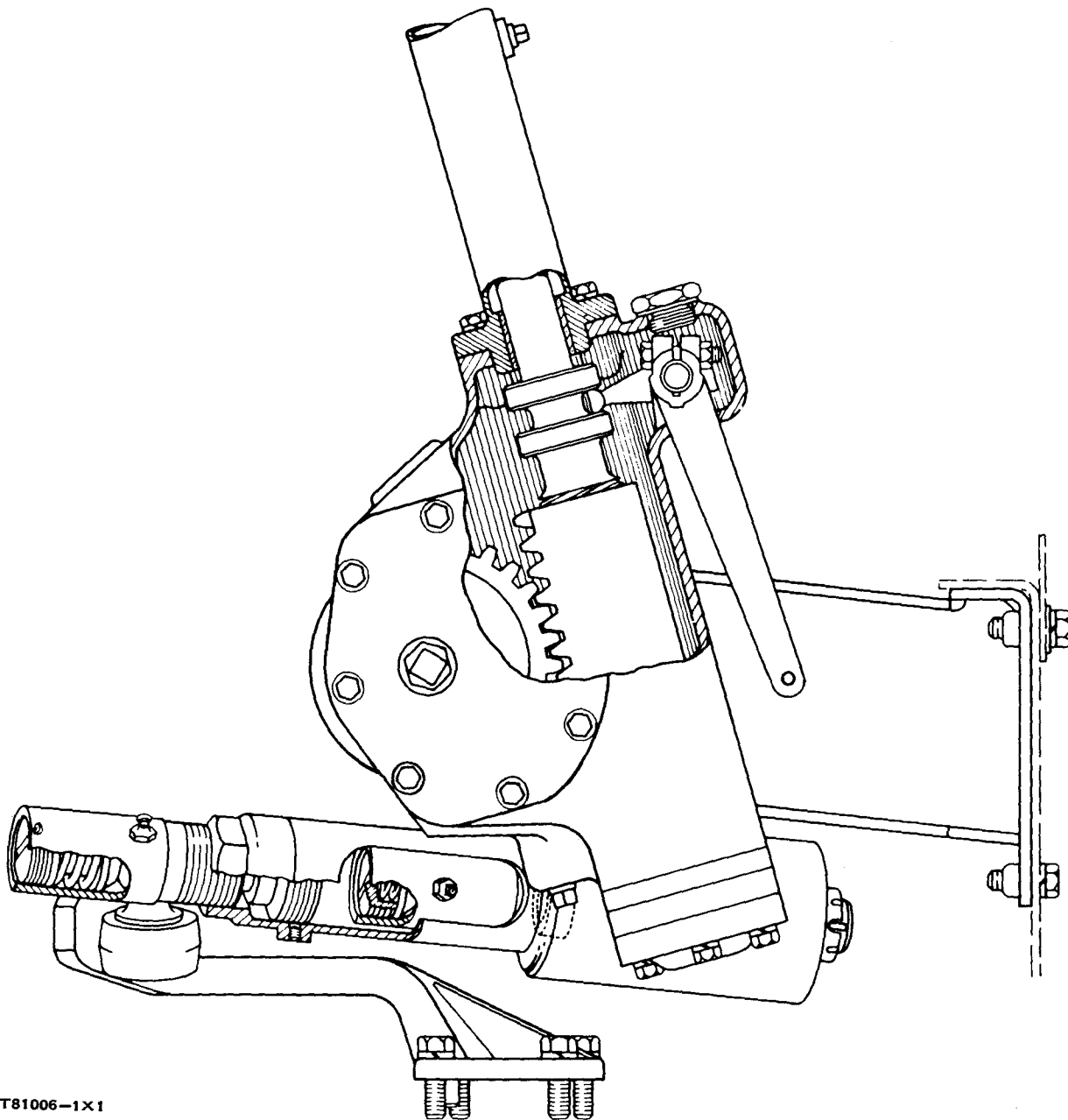
11. Use tooling (E) to install two bearings (13) in cover, one from each side and even with the outer surface.
12. Install cover (14) on housing.
13. Install two bearings in shaft housing with tooling (F).
14. Install seal (11) in shaft housing with tooling (G).
15. Install shaft housing (12) on housing of steering gear.
16. Install sector gear (15) and shaft in housing with center tooth of sector gear in alignment with center tooth space on nut gear.
17. Install cover over sector gear.

NOTE: The bolts and bolt holes for the sector cover must be clean and free of oil. Put 9S3264 Pipe Sealant Compound on the threads of the bolts before installation.

18. Check the gear clearance (backlash) between the sector gear and the nut gear. If gear clearance is not .000 to .006 in. (0.00 to 0.15 mm), turn housing (12) toward the plus (+) or minus (−) marks on housing until there is correct gear clearance.
19. Install shifting tube and bracket (17).
20. Loosen the locknut (18) in cover. Tighten the setscrew until it is against the sector gear. Loosen the setscrew 1/8 of a turn. After adjustment of setscrew, tighten locknut to 50 ± 5 lb.ft. (6.9 ± 0.7 mkg).
21. Install steering column (16) and wheel.
22. Fill steering gear with oil to correct level.
end by:
a) install steering gear



STEERING GEAR AND FOLLOW-UP LINKAGE

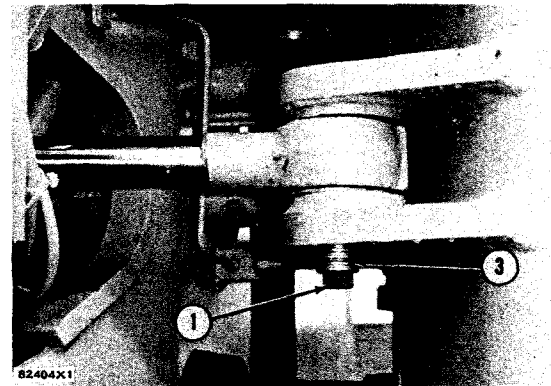
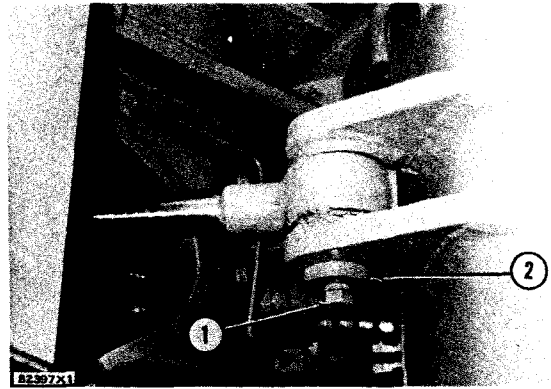


T81006-1X1

STEERING CYLINDER

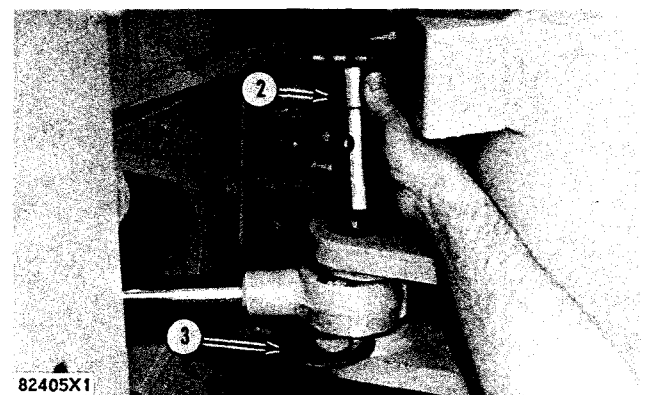
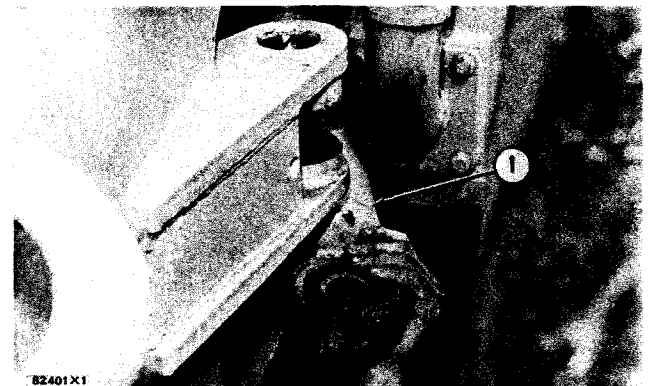
REMOVE STEERING CYLINDERS 11-4303

1. Connect safety link.
2. Disconnect the hydraulic hoses from the cylinder. Put plugs in the openings in the hoses and the cylinder.
3. Remove bolt (1) and washer (2) from the pin. Install washers (3) on the bolt (1) as a spacer. Install bolt and washer in pin. Hit the bolt with a hammer to loosen the pin from the frame.
4. Remove pin, washers and bolt as a unit.
5. Do Steps 3 and 4 to remove the pin from the head end of cylinder.
6. Remove the cylinder toward the back and out of the machine.



INSTALL STEERING CYLINDERS 12-4303

1. Install the cylinder (1) from the back of the machine.
2. Install the washers (3) and pin (2) in each end of cylinder.
3. Install washer and bolt that hold the pins in place.
4. Connect the hydraulic hoses.
5. Remove safety link.
6. Start the machine and turn it several times to remove air from the hydraulic system.
7. Fill the hydraulic tank to correct level.



STEERING CYLINDERS

DISASSEMBLE STEERING CYLINDERS

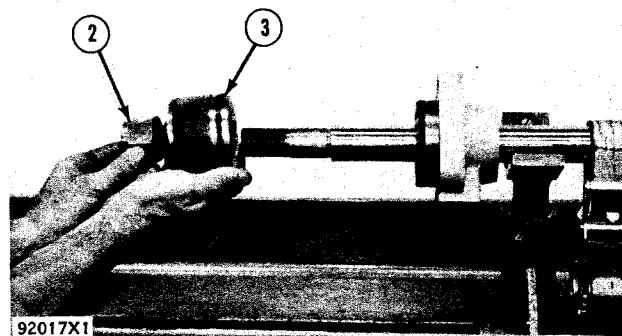
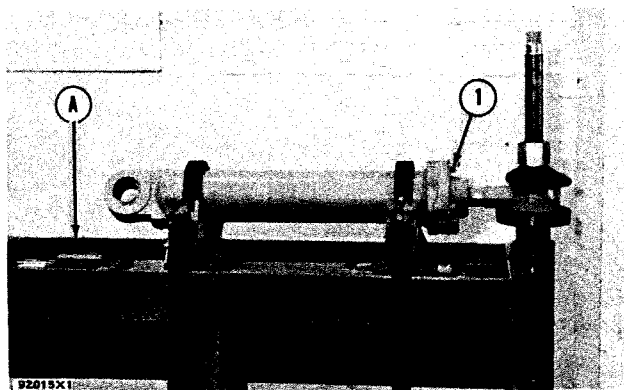
15-4303

Tools Needed		A
1P1784	Hydraulic Cylinder Repair Stand	1

start by:

a) remove steering cylinders

1. Install cylinder on tool (A).
2. Remove bolts (1) from head of cylinder.
3. Remove rod, piston and head from cylinder.
4. Remove nut (2) and piston (3) from rod.
5. Remove seal and ring from piston.
6. Remove seals and ring from head of cylinder.
7. Inspect seals and install new seals as needed.



ASSEMBLE STEERING CYLINDERS

16-4303

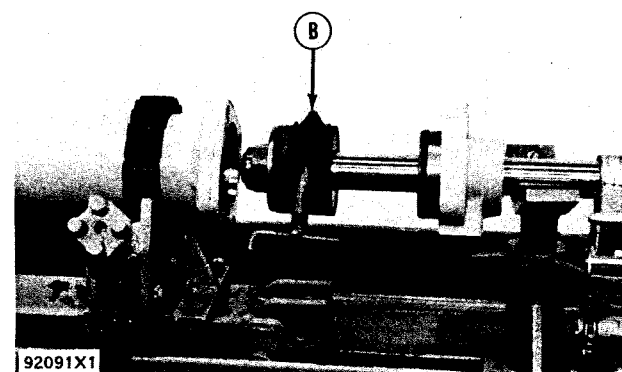
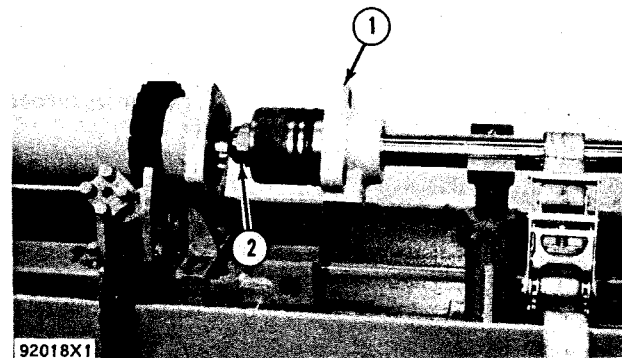
Tools Needed		A	B	C
1P763	Seal Guide	1		
4S9458	Tool Group		1	
1P1784	Hydraulic Cylinder Repair Stand			1

1. Install seals and ring on piston and in head. Install outer seal in head with lip of seal toward the outside.
2. Install head (1) on rod using tool (A) as a guide.
3. Install piston and nut (2) on rod. Tighten nut to a torque of 900 ± 90 lb.ft. (124.5 ± 12.4 mkg).
4. Install tool (B) on piston and push piston into cylinder. Put head into position and install bolts.

NOTE: Keep piston close to head during assembly. The piston will keep cylinder and head in better alignment.

end by:

a) install steering cylinders



SUPPLEMENTAL STEERING DIVERTER VALVE

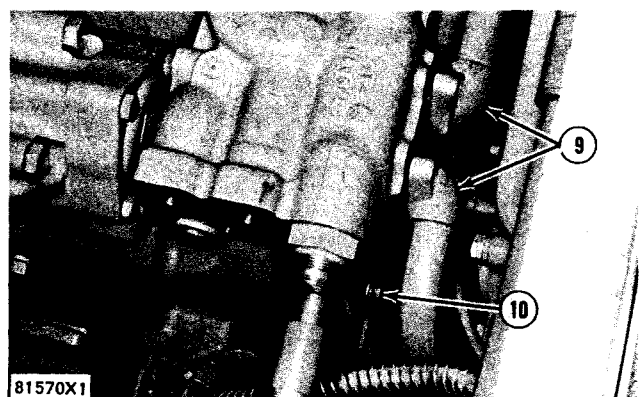
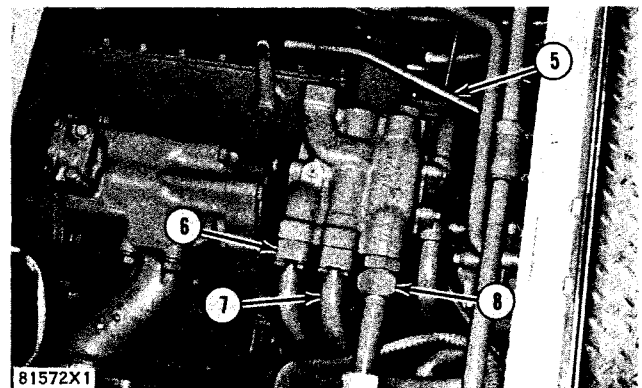
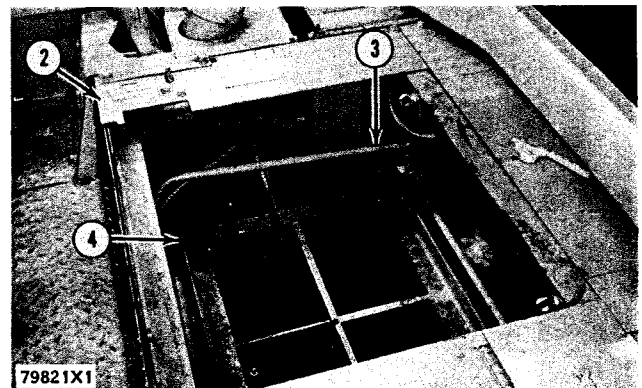
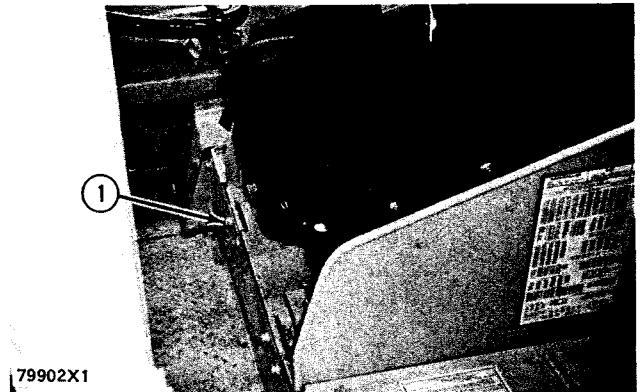
REMOVE SUPPLEMENTAL STEERING DIVERTER VALVE

11-4307

1. Remove bolts (1) that hold seat frame to the platform.
2. Release the lever behind the seat and tilt the seat forward.

CAUTION: When removing the seat be careful to prevent damage to the batteries.

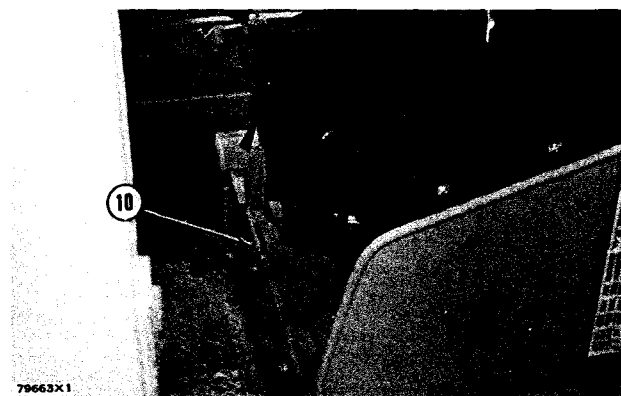
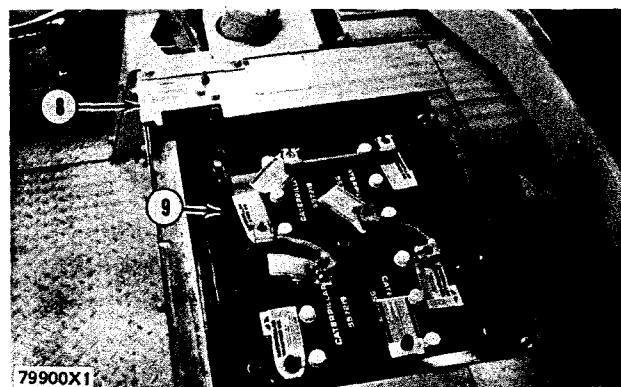
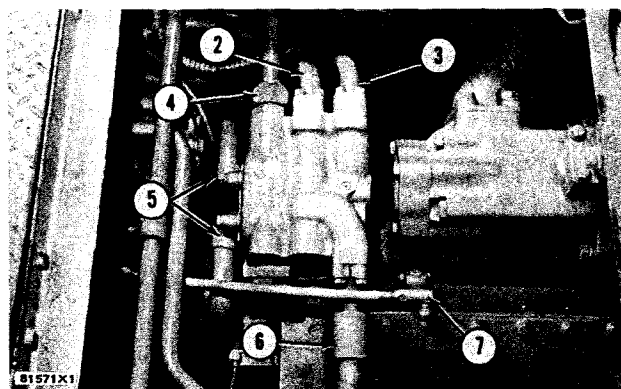
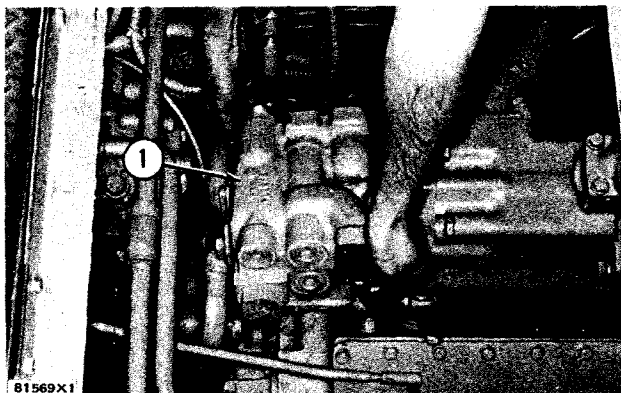
3. Lift the seat out of the seat platform. Weight of seat is 120 lb. (54 kg).
4. Disconnect all battery cables.
5. Remove the frame that holds the batteries down.
6. Remove the four batteries.
7. Remove strip (2) from platform.
8. Disconnect governor control linkage (3).
9. Remove support plate (4) for batteries.
10. Disconnect control linkage (5) for transmission.
11. Disconnect hose from diverter valve and put it to one side.
12. Remove tubes (6) and (7) from machine.
13. Disconnect tube (8) from valve.
14. Disconnect the two tubes (9) for pump.
15. Remove two bolts (10) that hold pump bracket to transmission.
16. Remove valve and bracket as a unit.



SUPPLEMENTAL STEERING DIVERTER VALVE

INSTALL SUPPLEMENTAL STEERING DIVERTER VALVE 12-4307

1. Put valve (1) and bracket into position and install bolts in bracket but do not tighten bolts.
2. Connect tubes (3) and (5) to valve but do not tighten bolts before tubes (2) and (4) are connected.
3. After all metal tubes are connected to valve tighten all connections and bolts in bracket.
4. Connect hose (6) to valve.
5. Connect control linkage (7) for transmission.
6. Install support plate for batteries.
7. Connect governor control linkage.
8. Install metal strip (8) on platform.
9. Install the four batteries.
10. Install the frame (9) that holds the batteries down.
11. Connect all battery cables.
12. Put seat in position and install bolts (10) that hold seat to platform.



SUPPLEMENTAL STEERING DIVERTER VALVE

DISASSEMBLE SUPPLEMENTAL STEERING DIVERTER VALVE 15-4307

start by:

- a) remove supplemental steering diverter valve

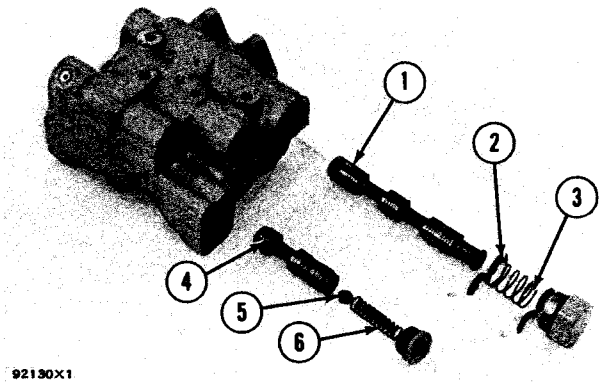
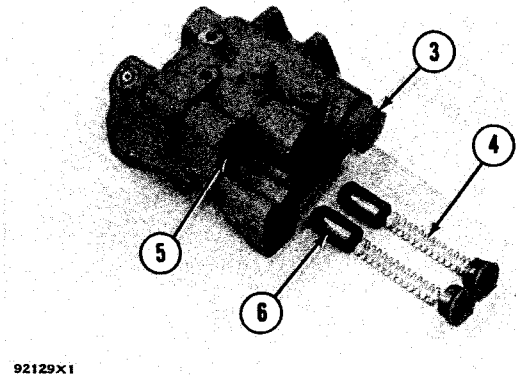
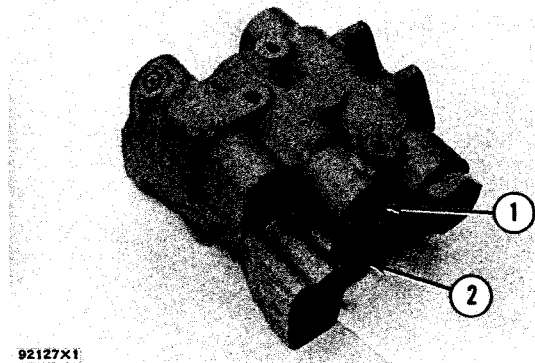
1. Remove plugs (1) and (2).
2. Remove two springs (4) and two check valves (6).
3. Remove plug (5), spring, shims and diverter spool.
4. Remove plug (3), spring, retainers and reversing spool.

ASSEMBLE SUPPLEMENTAL STEERING DIVERTER VALVE 16-4307

1. Install reversing spool (1), retainers (2), spring (3) and plug.
2. Install diverter spool (4), shims (5), spring (6) and plug.
3. Install the two check valves, springs and plugs.

end by:

- a) install supplemental steering diverter valve



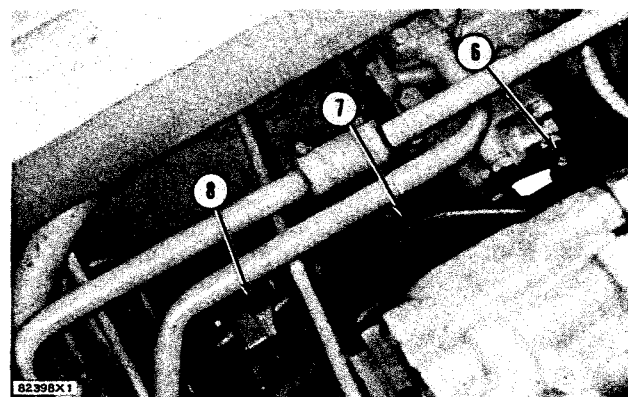
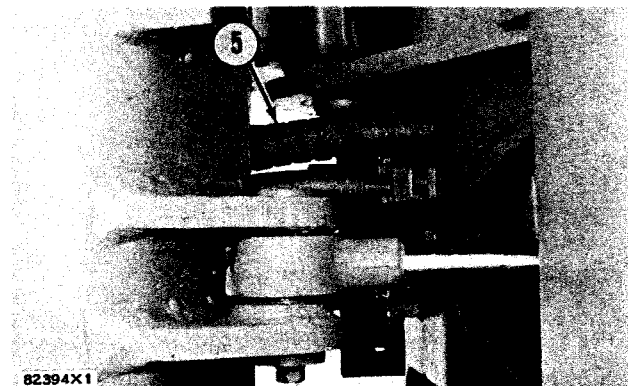
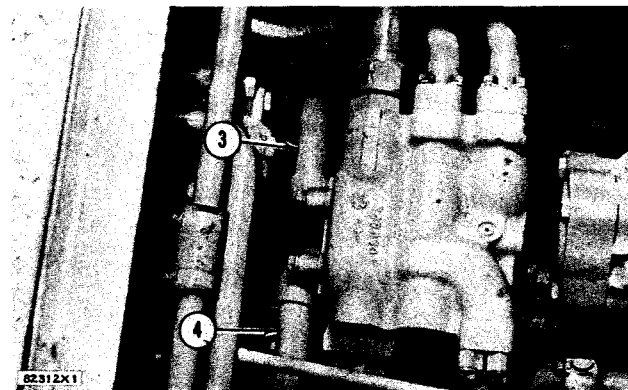
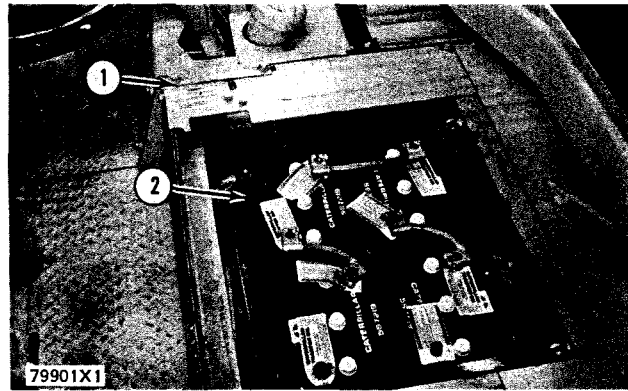
SUPPLEMENTAL STEERING PUMP

REMOVE SUPPLEMENTAL STEERING PUMP (If So Equipped) 11-4324

1. Remove bolts that hold seat frame to platform.
2. Release the lever behind the seat and tilt the seat forward.

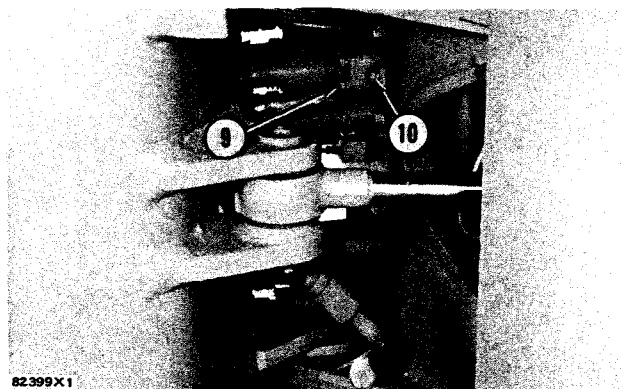
CAUTION: When removing seat, use care to prevent causing damage to batteries.

3. Remove the seat from the platform. Weight of seat is 120 lb. (54 kg).
4. Disconnect the battery cables from the batteries.
5. Remove hold down frame (2) and batteries.
6. Remove metal strip (1) from platform.
7. Disconnect governor linkage.
8. Remove support plate for batteries.
9. Remove tubes (3) and (4) from pump and valve.
10. Disconnect hose (5) at flange (8) and pull hose out and put it down along frame.
11. Disconnect tube (7) at flange (6) and (9).



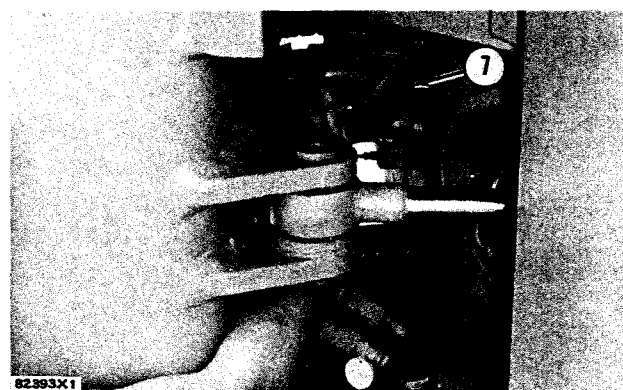
SUPPLEMENTAL STEERING PUMP

12. Remove bolt (10) that holds tube to frame.

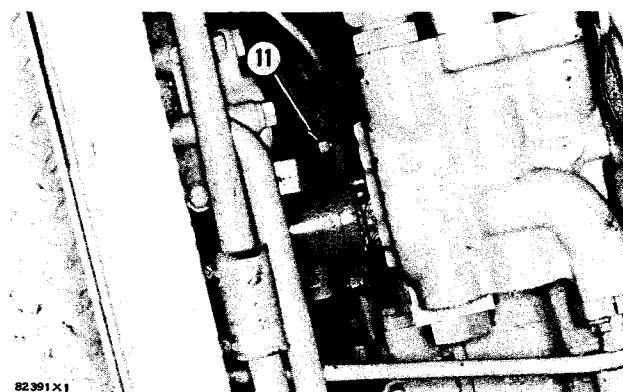


13. Remove tube (7) out of rear frame into front frame, then remove tube from front frame.

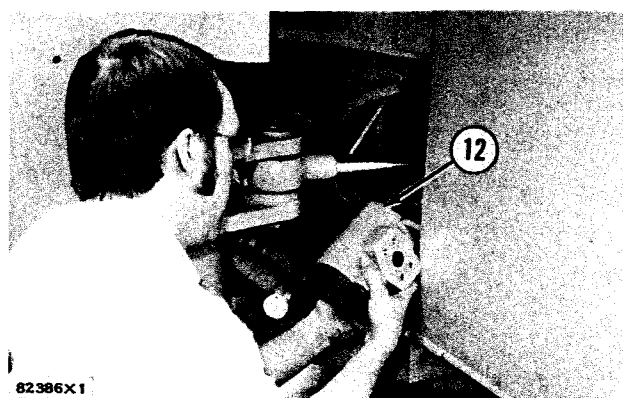
NOTE: No other tubes or lines have to be disconnected or removed to remove pump.



14. Remove nuts (11) that hold pump to transmission.



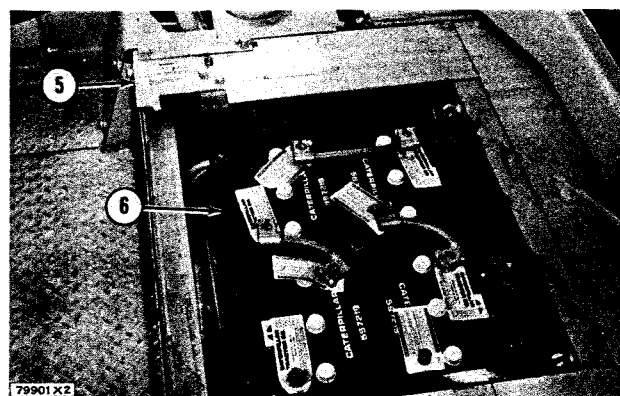
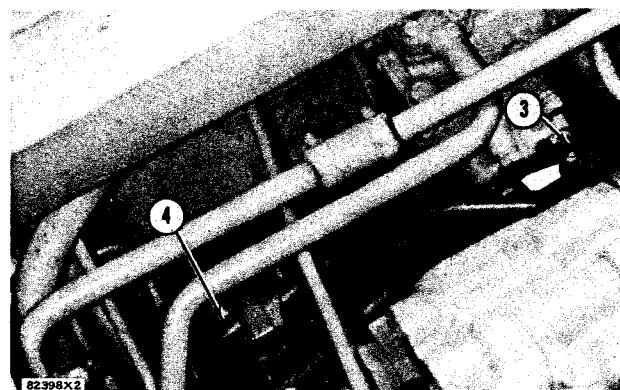
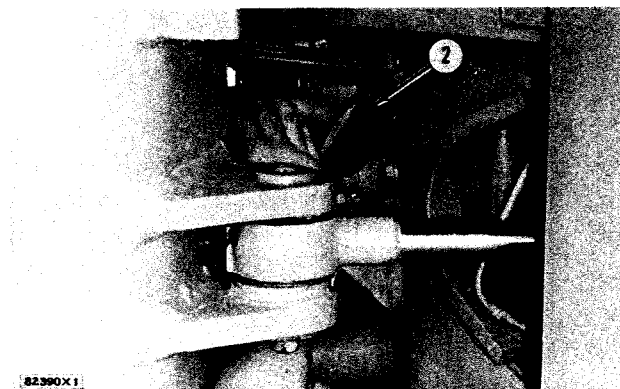
15. Remove pump (12) through hole in frame.



SUPPLEMENTAL STEERING PUMP

INSTALL SUPPLEMENTAL STEERING PUMP (If So Equipped) 12-4324

1. Put the pump (1) through hole in frame and into position on transmission. Install nuts that hold pump to the transmission.
2. Put tube (2) into front frame, then into rear frame and connect to tube (3).
3. Connect hose to tube (2) and install bolt that hold tube to frame.
4. Put top hose into position and connect to tube (4).
5. Install two tubes between pump and valve.
6. Install support plate for batteries and connect governor control linkage.
7. Install batteries and hold down frame (6).
8. Connect battery cables.
9. Install metal strip (5) on platform.
10. Install seat frame on platform.



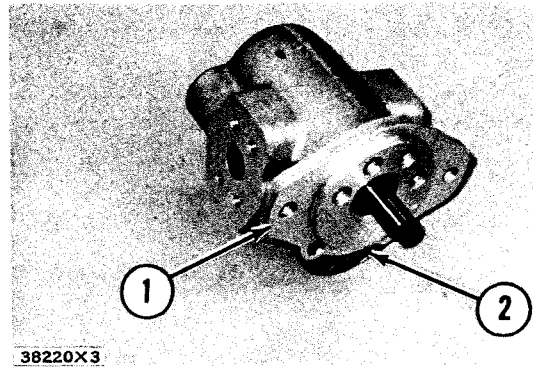
SUPPLEMENTAL STEERING PUMP

DISASSEMBLE SUPPLEMENTAL STEERING PUMP 15-4324

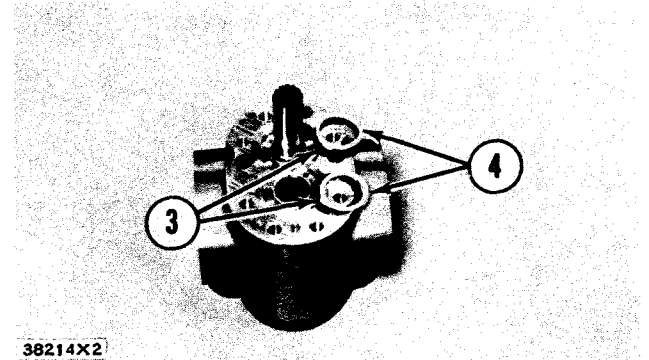
start by:

a) remove supplemental steering pump

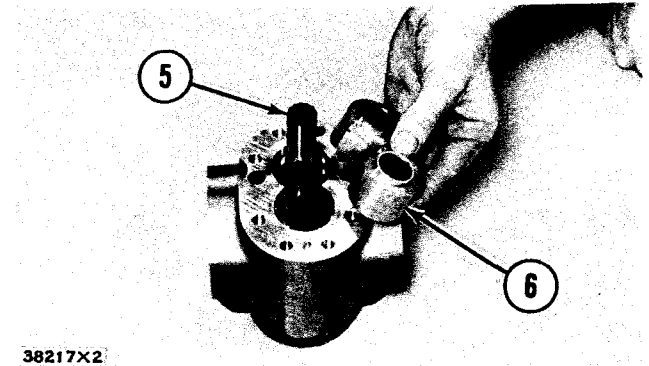
1. Remove the hollow head bolts (2). Remove flange (1) from body of pump.



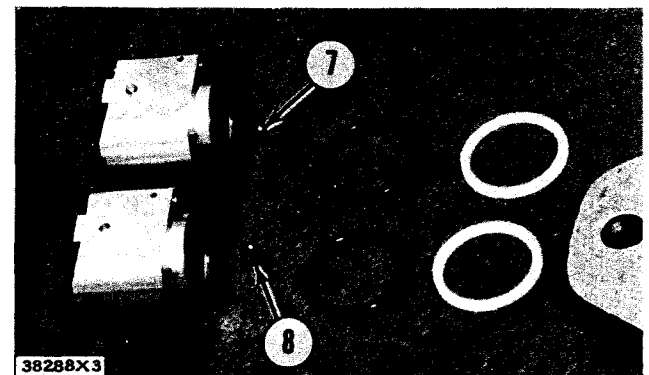
2. Remove seals (4) and rings (3) from the bushings.



3. Lift drive gear (5) part of the way out of the body of the pump. If the drive gear is not free in the bore turn the gear to make it free. Remove bushings (6) from the shafts.



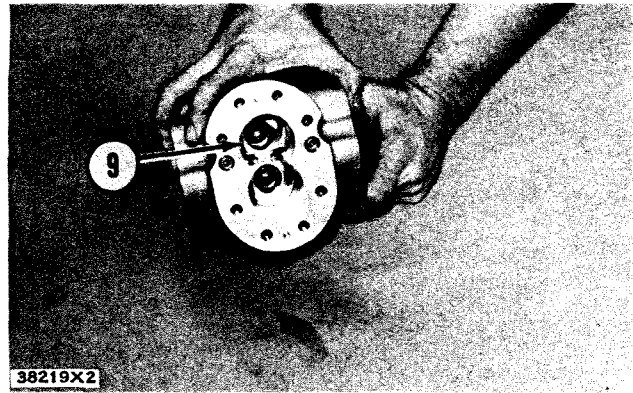
4. Remove roll pin (8) and ball (7) from each bushing.



5. Remove the drive gear (5) and idler gear from the body of the pump.

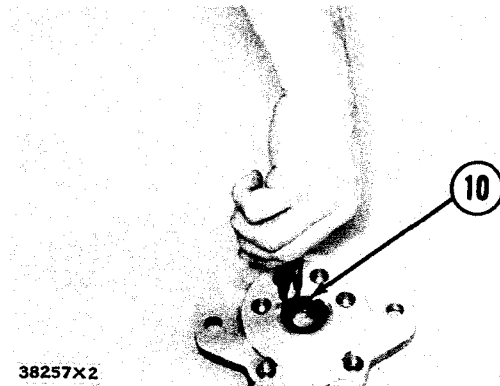
SUPPLEMENTAL STEERING PUMP

6. Turn the open end of the body down. Let the body fall against a block of wood until bushings fall from body. Be careful not to cause damage to face of the body that fits against the flange.

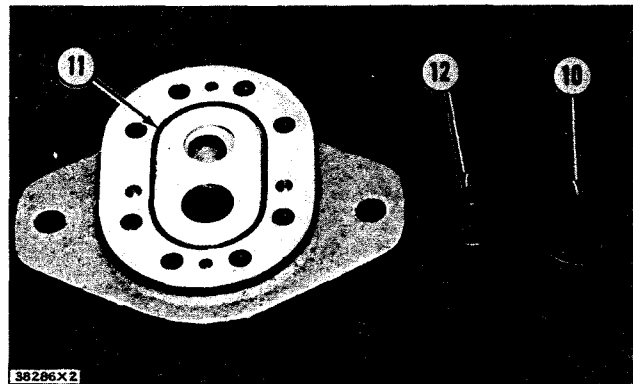


7. Check the bores (9) in body for wear. If the wear is more than .015 in. (0.38 mm) replace the body.

8. Remove snap ring (10) from flange.



9. Remove O-ring (11) and seal (12) from flange.



10. Inspect all seals and install new seals as needed.

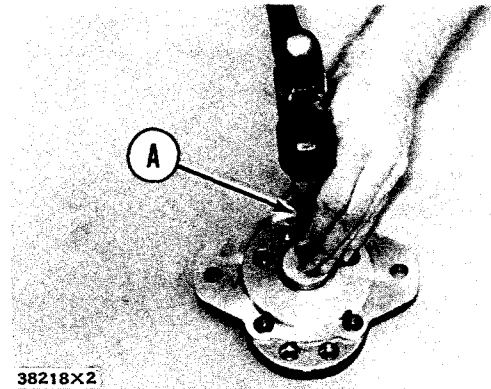
SUPPLEMENTAL STEERING PUMP

ASSEMBLE SUPPLEMENTAL STEERING PUMP

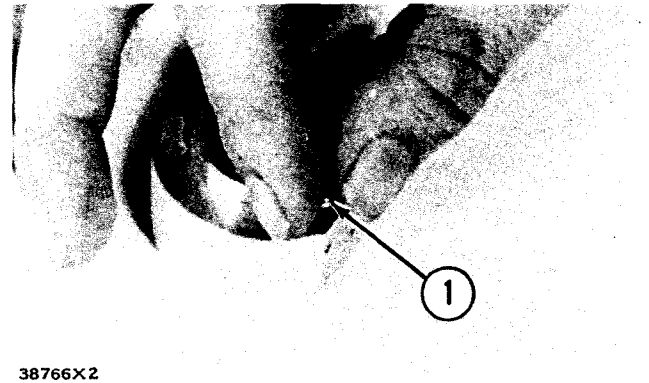
16-4324

Tools Needed		A
1P463	Drive Plate	1
1P529	Handle	1

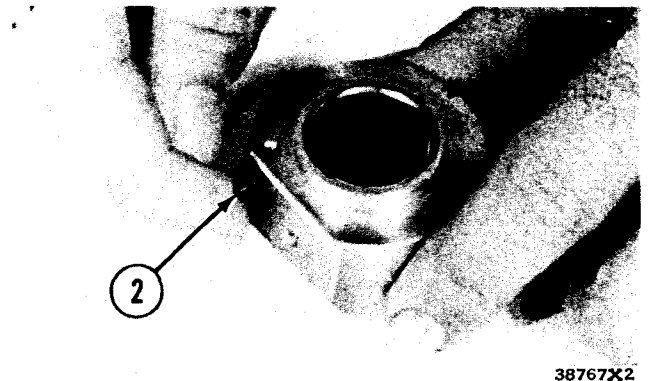
1. Install lip-type seal in flange with tool (A). Install snap ring to hold seal in place.



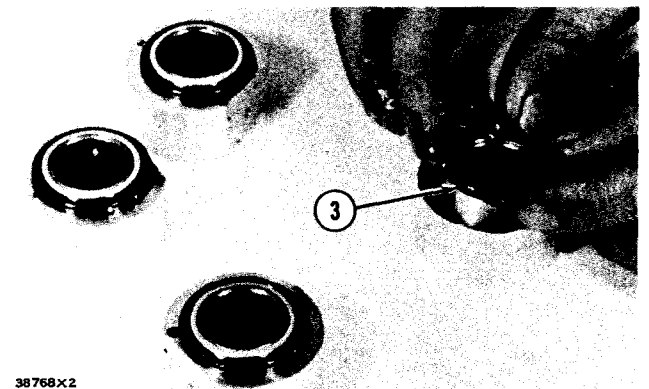
2. Install O-ring seal in flange.



3. Install a ball (1) and roll pin (2) in each of the bushings. Put a small amount of clean grease in the hole for the roll pins to keep the pins from falling out.



4. Put a small amount of clean grease on the O-ring seals (3) and install seals on bushings.

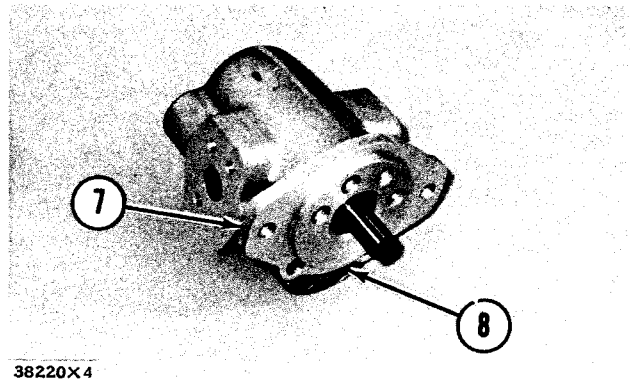
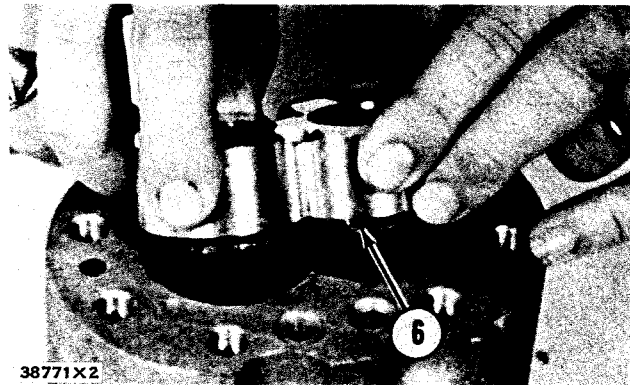
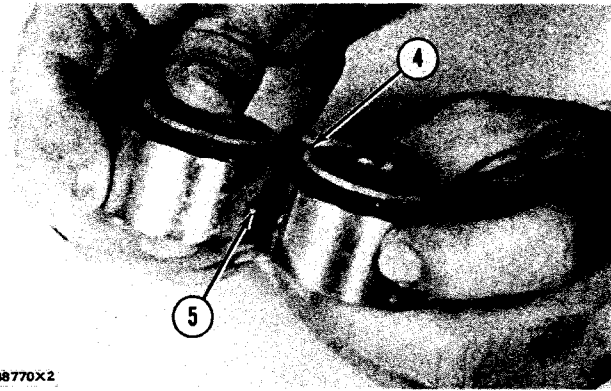


SUPPLEMENTAL STEERING PUMP

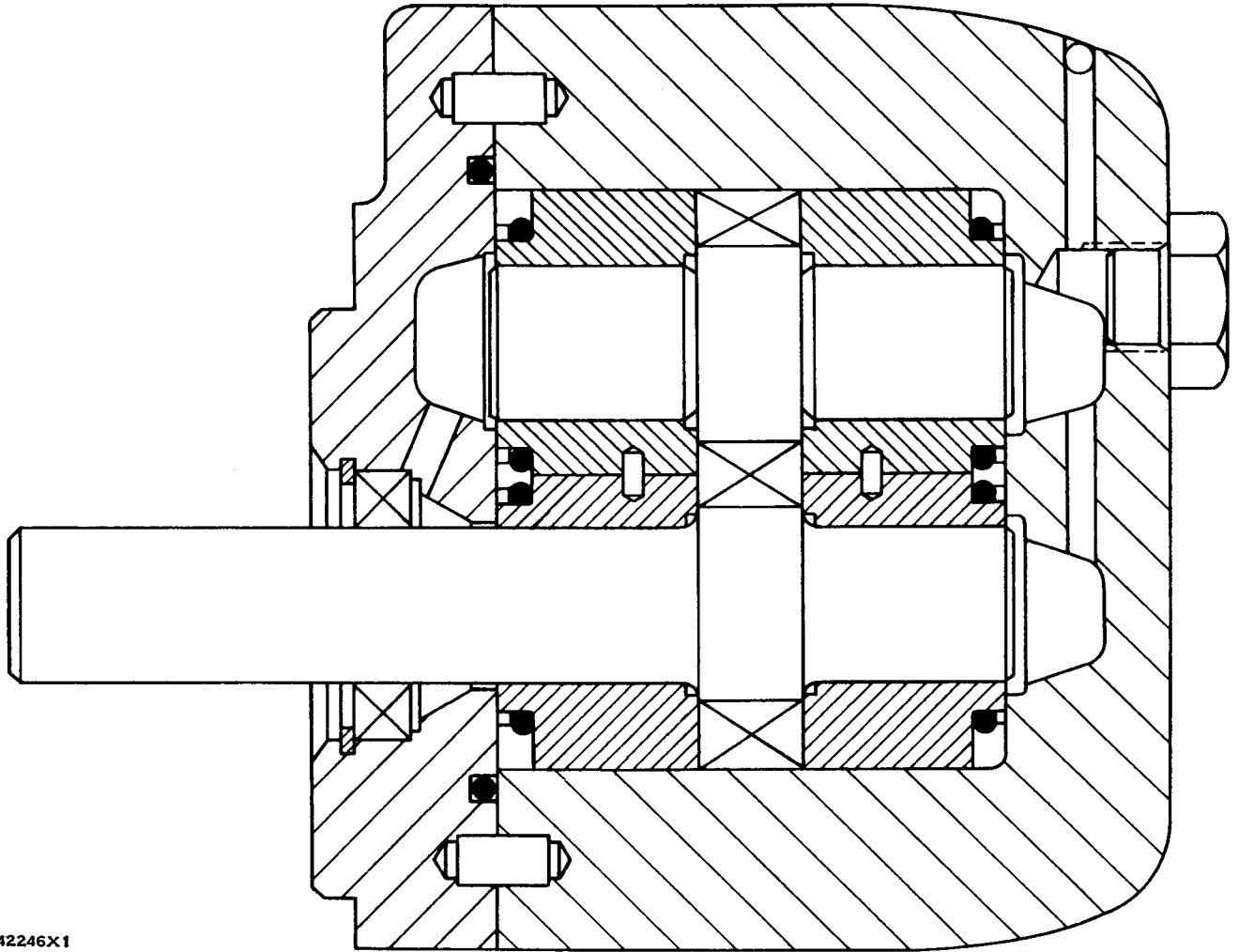
5. Put a small amount of clean grease on the backup rings (4) and install them on the bushings.
6. Install dowel (5) in one of the bushings. Put the flat side of the other bushing in a position so its dowel hole will fit over the dowel. The ends of the bushings that have the seals must be side by side.
7. Put a small amount of clean oil in the bores of the body. Install two bushings (6) in the body of the pump. The ends with the seals must be against the bottom of the bore.
8. Install drive gear and idler gear in body.
9. Do Step 6 again. Install the two bushings in the body. The ends of the bushings with the seals must be toward the flange.
10. Put flange (7) in position so dowel holes in flange fit dowels in pump body.
11. Install bolts (8) in flange and tighten bolts to a torque of 30 to 35 lb.ft. (4.1 to 4.8 mkg).

end by:

- a) install supplemental steering pump



SUPPLEMENTAL STEERING PUMP



42246X1

HYDRAULIC PUMP

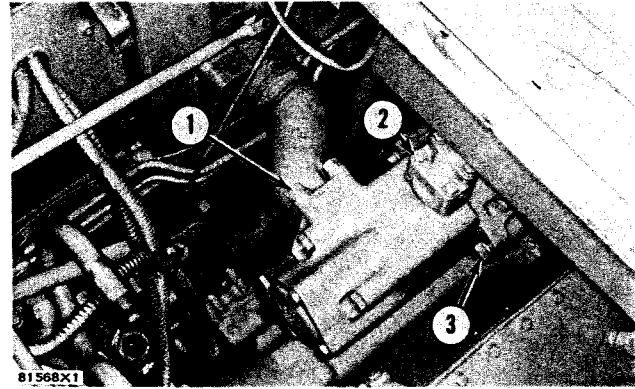
REMOVE HYDRAULIC PUMP

11-5055

start by:

- a) remove supplemental steering diverter valve

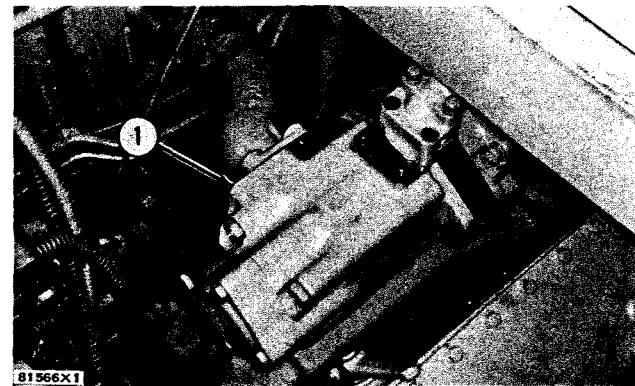
1. Remove the four bolts (1) from suction elbow.
2. Disconnect the outlet line (2) from pump.
3. Remove the two bolts (3) that hold pump to transmission.
4. Remove the hydraulic pump. Weight of pump is 70 lb. (31 kg).



INSTALL HYDRAULIC PUMP

12-5055

1. Put the pump (1) in position on transmission and install the two bolts that hold it to the transmission.
 2. Connect outlet line to pump.
 3. Install bolts in suction line.
- end by:
- a) install supplemental steering diverter valve



HYDRAULIC PUMP

DISASSEMBLE HYDRAULIC PUMP

15-5055

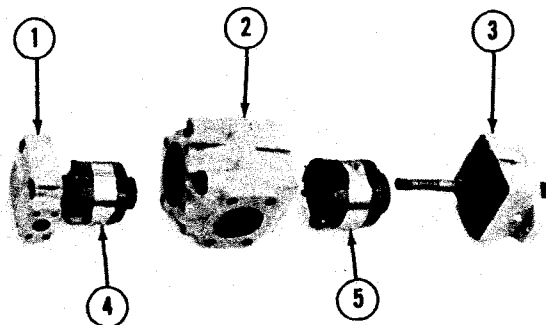
start by:

a) remove hydraulic pump

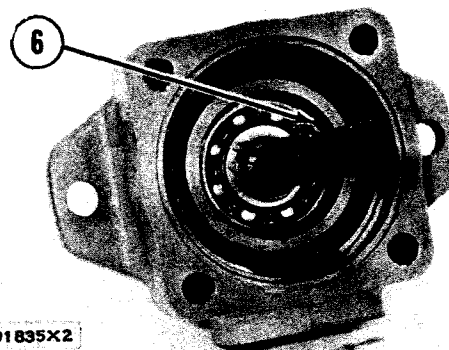
1. Put a mark on covers and body for installation purpose.
2. Remove bolts that hold pump together.
3. Remove end cover (1), small cartridge (4), cover (2) and large cartridge (5) from body (3).

NOTE: The parts for the cartridges cannot be ordered separately. Make a replacement of the cartridges as a unit if needed.

4. Remove snap ring (6). Remove shaft and bearing from body as a unit.
5. Remove snap ring and bearing from shaft.
6. Remove seal from body.



91838X1



91835X2



91837X1

ASSEMBLE HYDRAULIC PUMP

16-5055

Tools Needed		A
1P492	Drive Plate	1
1P529	Handle	1

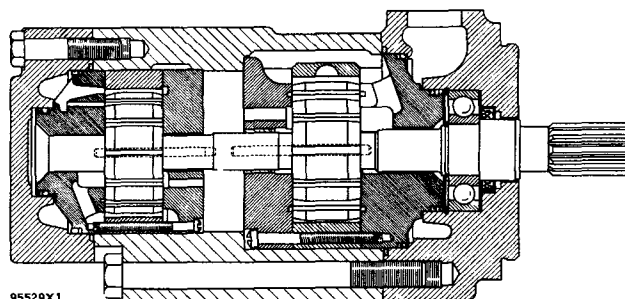
1. Install seal in body with tooling (A). The lip of seal must be toward the inside of pump.
2. Install bearing and snap ring on shaft.
3. Install shaft and bearing in body as a unit.
4. Install cartridges and covers.

NOTE: The cartridges must be installed so the mark (arrow) on the cartridges are in the same direction as the pump turns.

5. Install bolts that hold pump together. Tighten short bolts to a torque of 70 ± 5 lb.ft. (9.7 ± 0.7 mkg) and long bolts to a torque of 150 ± 10 lb.ft. (20.7 ± 1.4 mkg).

end by:

a) install hydraulic pump



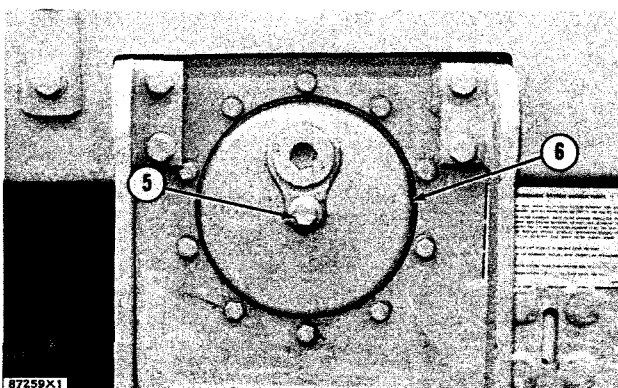
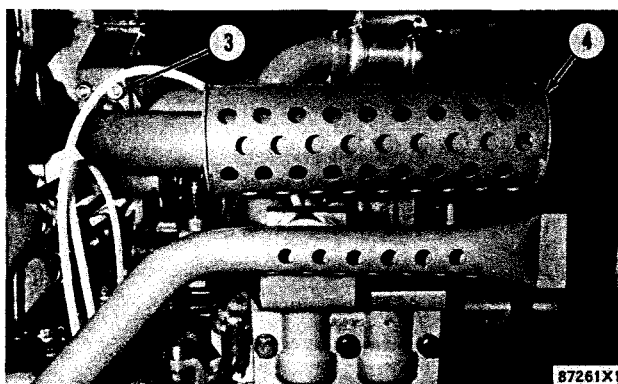
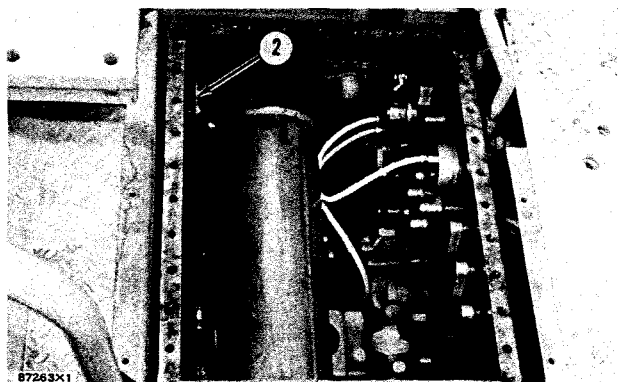
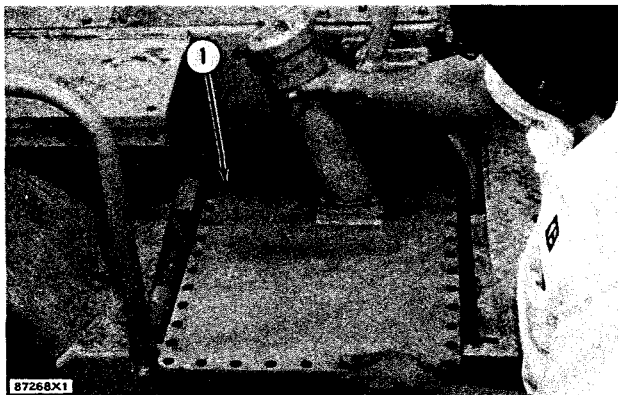
95529X1

HYDRAULIC FILTER HOUSING

REMOVE HYDRAULIC FILTER HOUSING

11-5068

1. Remove hydraulic oil from tank.
2. Remove floor plates from over tank.
3. Remove the hydraulic tank top cover (1).
Weight of cover is 35 lb. (16 kg).
4. Remove bolts that hold bracket (2) to side of tank.
5. Remove bottom cover from hydraulic tank.
6. Remove nuts (3) that hold tube (4) to filter housing.
7. Remove tube and bracket from bottom of tank.
8. Remove bolt (5), cover (6) and filter from housing.
9. Remove bolts that hold filter housing to tank.
10. Remove filter housing and seal.
11. Inspect seal and install new seal if needed.

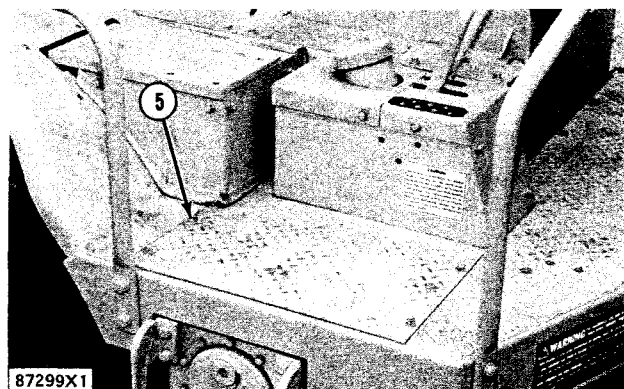
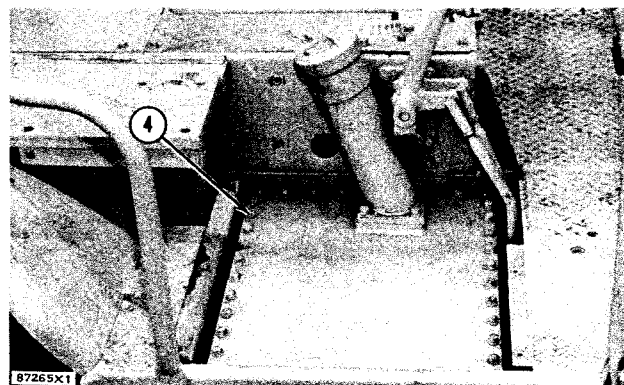
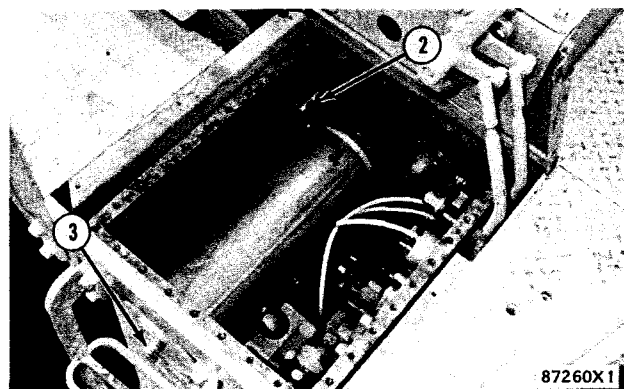
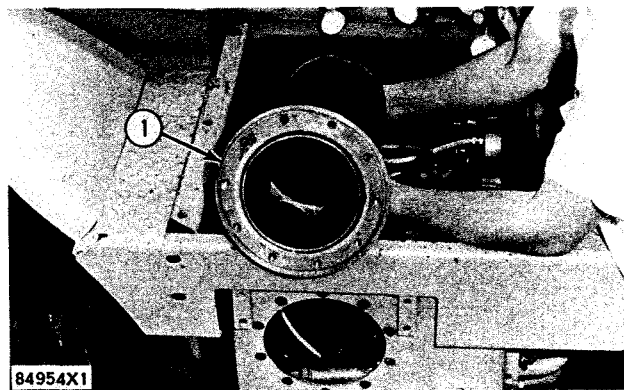


HYDRAULIC FILTER HOUSING

INSTALL HYDRAULIC FILTER HOUSING

12-5068

1. Put filter housing (1) and seal into position in tank. Install bolts that hold housing to tank.
2. Install filter, cover and bolt (3).
3. Put tube and bracket in position in bottom of tank and install nuts that hold bracket and tube to filter housing. Tighten nuts to a torque of 43 ± 5 lb.ft. (5.9 ± 0.7 mkg).
4. Install bolts (2) in bracket.
5. Install top and bottom covers on tank. Tighten bolts (4) in covers to a torque of 43 ± 5 lb.ft. (5.9 ± 0.7 mkg).
6. Install floor plate (5) over tank.
7. Fill hydraulic tank with oil to correct level.

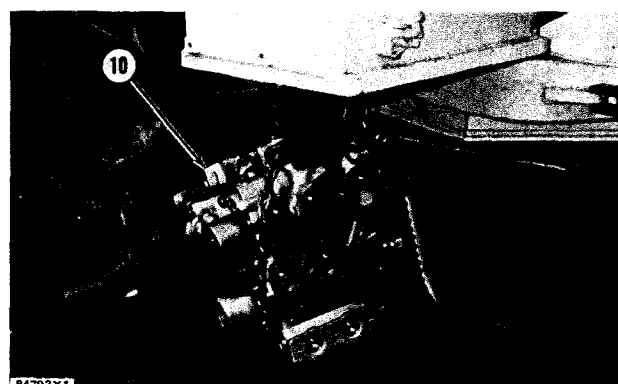
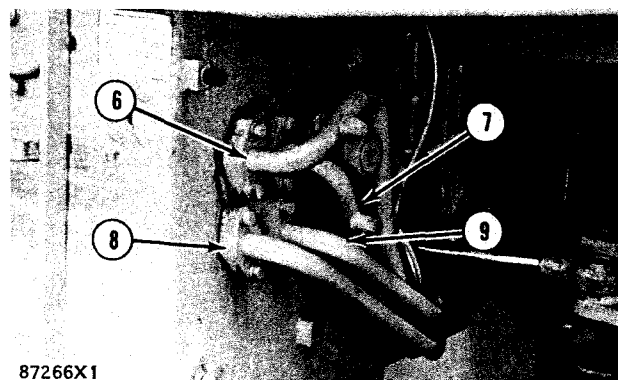
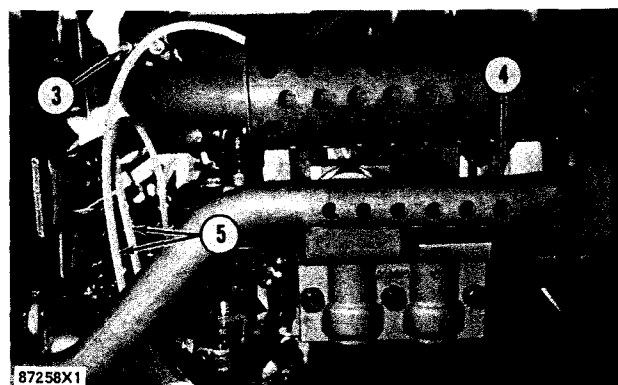
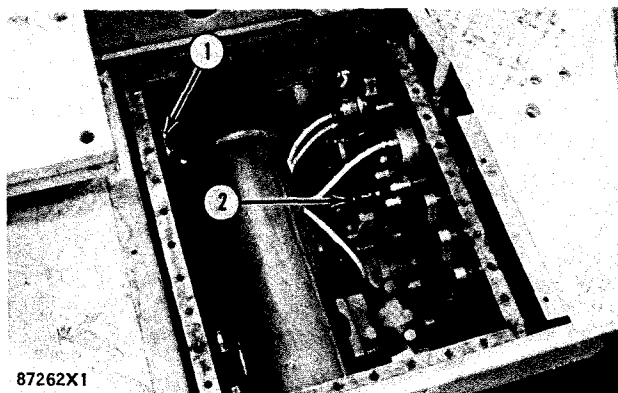


LIFT AND TILT CONTROL VALVE

REMOVE LIFT AND TILT CONTROL VALVE

11-5076

1. Remove oil from hydraulic tank.
2. Remove floor plate over tank.
3. Remove tank top and bottom covers.
4. Remove two bolts from bracket (1).
5. Remove bolt (2) from lever.
6. Disconnect linkage from top valve spool.
7. Remove tube (4) from bottom of tank.
8. Remove four nuts (3) from tube. Remove tube and bracket.
9. Remove tube between valve and filter housing.
10. Disconnect two tubes (5) from control valve.
11. Disconnect linkage from lower valve spool.
12. Remove guard from side of tank.
13. Disconnect tubes (6), (7), (8) and (9) from tank.
14. Fasten a hoist to the control valve and remove the two bolts that hold the valve to the side of tank. Lower the control valve (10) out of tank. Weight of valve is 185 lb. (84 kg).
15. Inspect all O-ring seals and install new seals as needed.

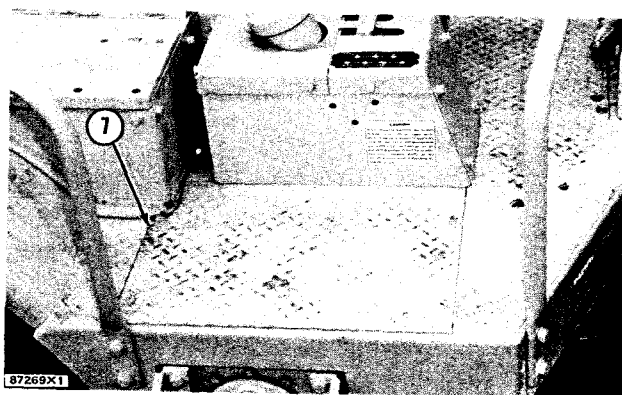
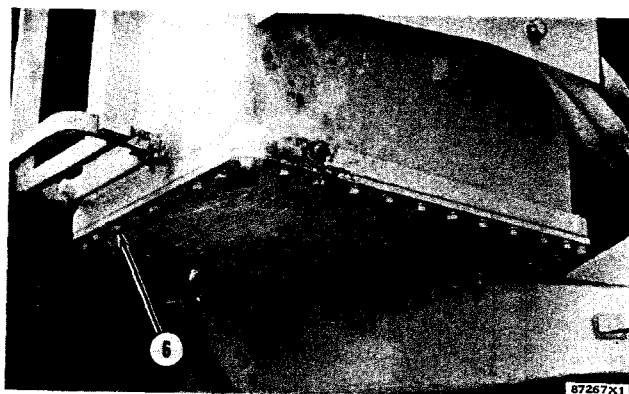
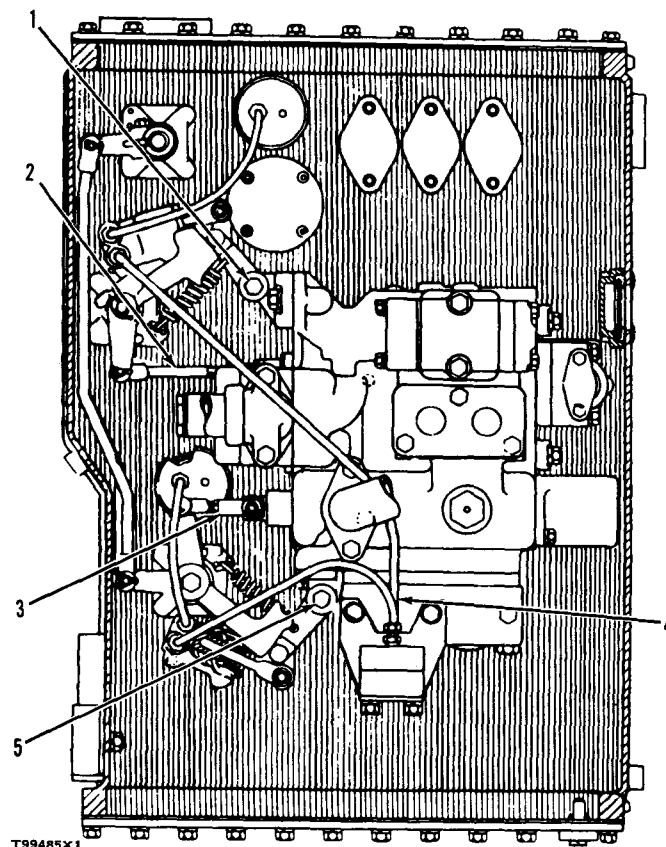


LIFT AND TILT CONTROL VALVE

INSTALL LIFT AND TILT CONTROL VALVE

12-5076

1. Put a small amount of grease on the O-ring seals to hold the seals in place during installation.
2. Fasten a hoist to control valve and lift it into position in tank.
3. Install the bolts that hold valve to side of tank.
4. Connect tubes to side of tank.
5. Connect linkage (3) to lower valve spool.
6. Install bolt (5) in lever.
7. Connect two tubes (4) to valve.
8. Install tube between valve and filter housing. Tighten bolts in tube to a torque of 60 ± 2 lb.ft. (8.3 ± 0.3 mkg).
9. Install bolt (1) in lever.
10. Install tube in bottom of tank.
11. Install two bolts in filter housing bracket.
12. Connect linkage (2) to top valve spool.
13. Install top and bottom covers on tank. Tighten bolts in covers (6) to a torque of 43 ± 5 lb.ft. (5.9 ± 0.7 mkg).
14. Install floor plate (7) over tank.
15. Install side guard on tank.
16. Fill hydraulic tank with oil to correct level.



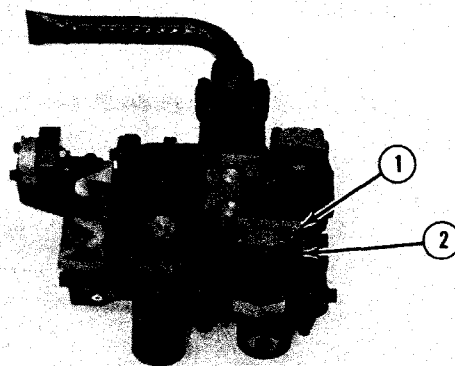
LIFT AND TILT CONTROL VALVE

DISASSEMBLE LIFT AND TILT CONTROL VALVE 15-5076

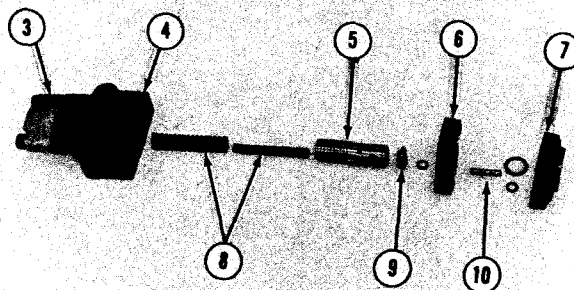
start by:

a) remove lift and tilt control valve

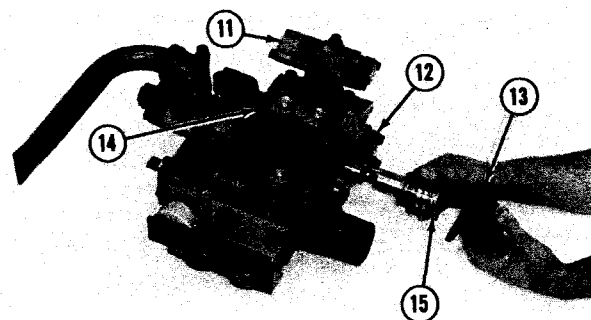
1. Remove relief valve (2) and baffle from valve body.
2. Remove baffle (1) from valve.
3. Remove cover (7), piston (10), block (6), spacer (9), valve spool (5), and springs (8) from body (4).
4. Remove retainer (3) and shims from body. Keep shims together for installation purpose.
5. Remove retainer (13) from valve body.
6. Remove valve spool (15) and spring as a unit.
7. Remove spring from valve spool.
8. Follow procedure in Steps 5, 6, and 7 for other valve spool.
9. Remove two flanges (12), plugs, springs and check valves from body.
10. Remove relief valve (11) from housing of make-up valves.
11. Remove cover (20), piston (22), block (19), spacer (21), valve spool (18) and springs (17) from body.
12. Remove retainer (16) and shims from body.
13. Remove housing (14), springs and two make-up valves.



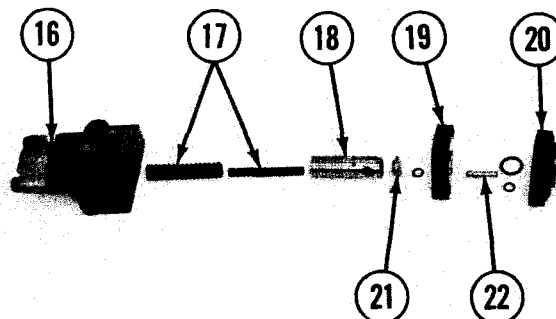
84798X1



84953X1



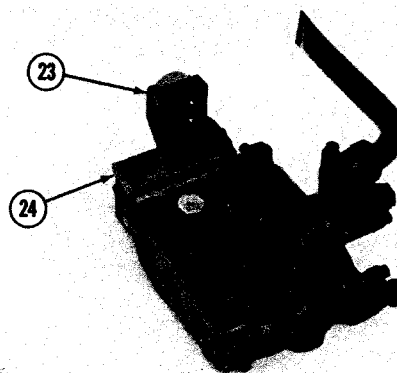
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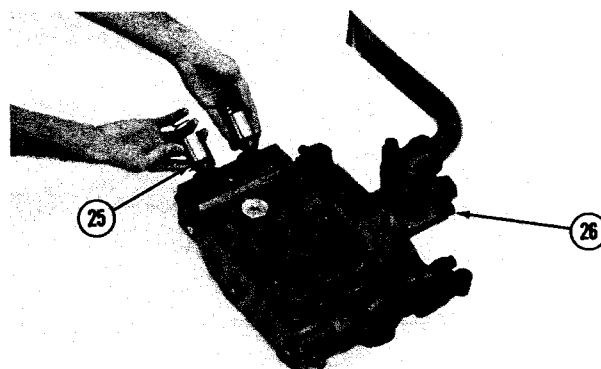
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LIFT AND TILT CONTROL VALVE

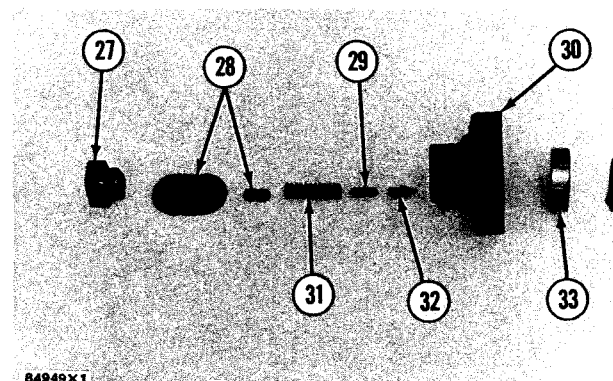
14. Remove make-up valve assembly (23).
15. Remove cover (24) from the two make-up valves.
16. Remove the two springs and two valves (25) from body.
17. Remove relief valve (26) from valve body.
18. Remove plug (27), shims (28), spring (31), rod (29), valve (32) and seat (33) from body (30).
19. Remove seat (35), valve (36) and spring (37) from housing.
20. Remove tube (34) from housing.



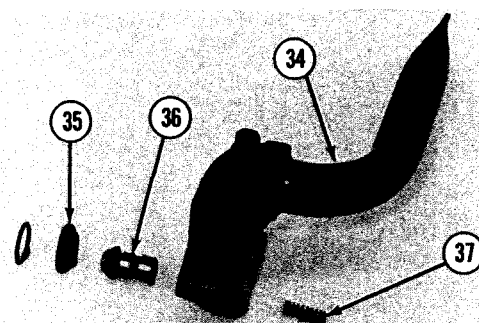
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84949X1



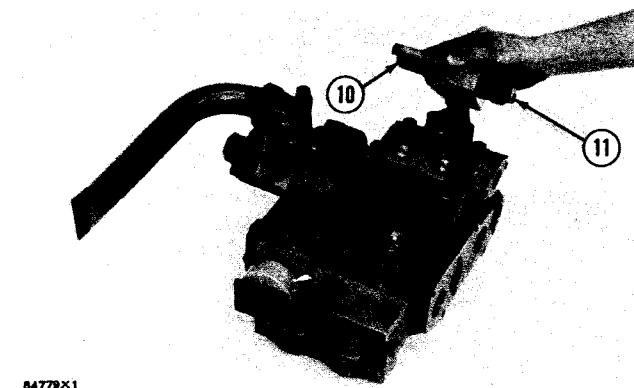
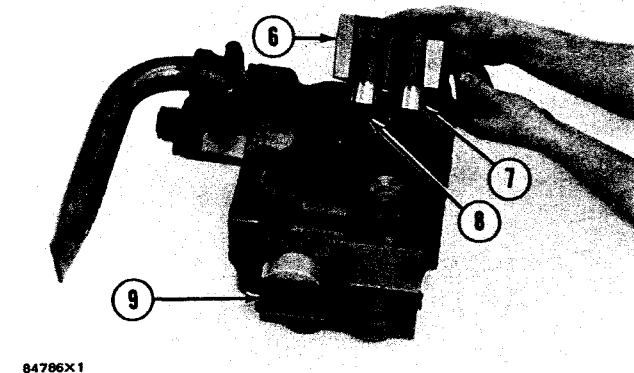
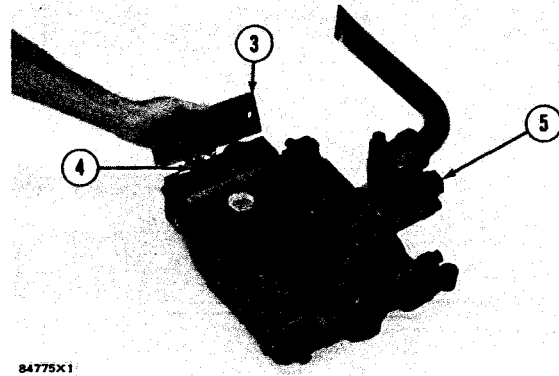
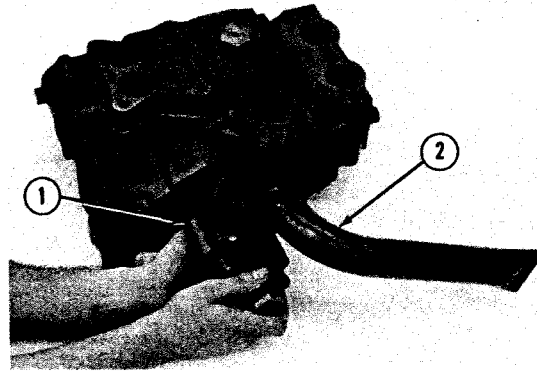
84948X1

LIFT AND TILT CONTROL VALVE

ASSEMBLE LIFT AND TILT CONTROL VALVE

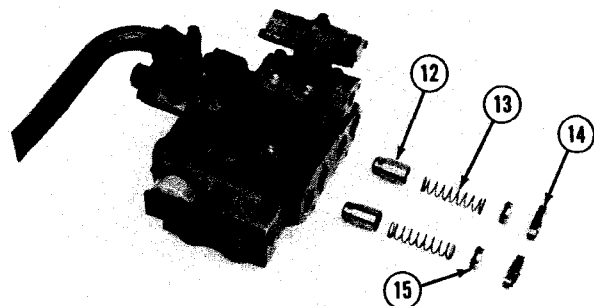
16-5076

1. Inspect all O-rings and install new seals as needed.
2. Install tube (2) on housing (1).
3. Install spring, valve and seat in housing (1).
4. Install seat, valve, rod, spring, shims and plug (5) in body. Tighten plug to a torque of 80 ± 5 lb.ft. (11.1 ± 0.7 mkg).
5. Install relief valve assembly on valve body.
6. Install two make-up valves and two springs (4) in body.
7. Install cover (3) and make-up valve assembly (9).
8. Install valve spools (7), springs (8) and make-up housing (6) on control valve housing. Tighten bolts to a torque of 60 ± 2 lb.ft. (8.3 ± 0.3 mkg).
9. Install shims and retainer (10) on body of relief valve.
10. Install springs, valve spool, spacer, block, piston, cover (11) on body. Tighten bolt in cover to a torque of 27 ± 2 lb.ft. (3.7 ± 0.3 mkg).
11. Install relief valve on control valve body and tighten bolts to a torque of 39 ± 2 lb.ft. (5.4 ± 0.3 mkg).



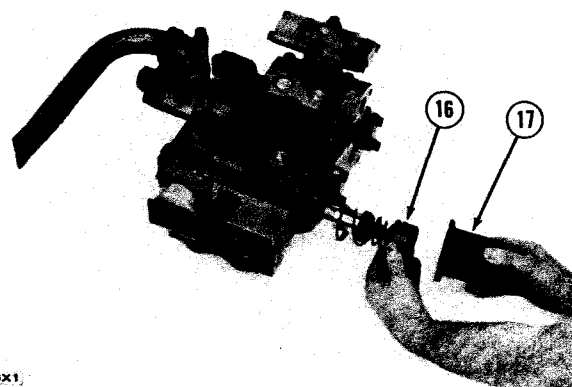
LIFT AND TILT CONTROL VALVE

12. Install two valves (12), two springs (13), two plugs (15) and two retainers (14) in control valve body.



84781X1

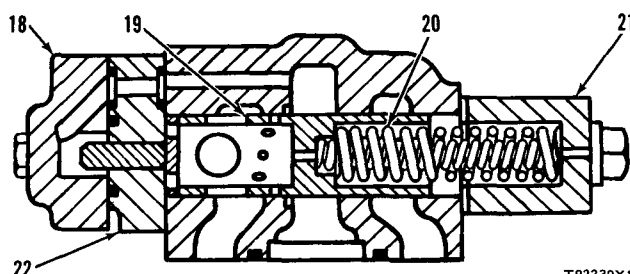
13. Install springs on the two valve spools. Install the valve spools (16) in housing.



84783X1

14. Install the two retainers (17).

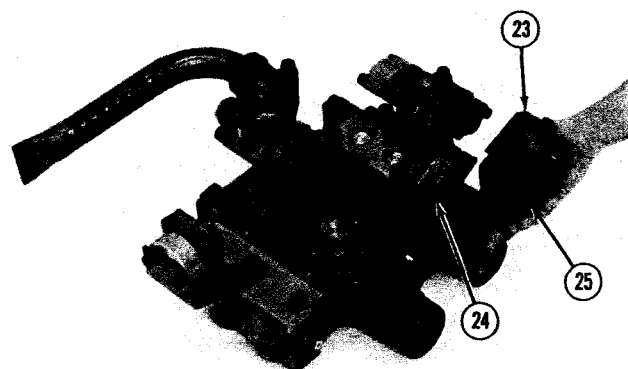
15. Install shims and retainer (21) on relief valve body.



T92239X1

NOTE: Do not tighten cover bolts before valve is installed.

16. Install relief valve (25) on make-up valve body. Tighten bolts to a torque of 39 ± 2 lb.ft. (5.4 ± 0.3 mkg).



84797X1

17. Move the baffle (23) so it is tight against the make-up valve body (24). Tighten cover bolts to a torque of 27 ± 2 lb.ft. (3.7 ± 0.3 mkg).

end by:

- a) install lift and tilt control valve

LIFT ARMS AND BUCKET

REMOVE LIFT ARMS AND BUCKET

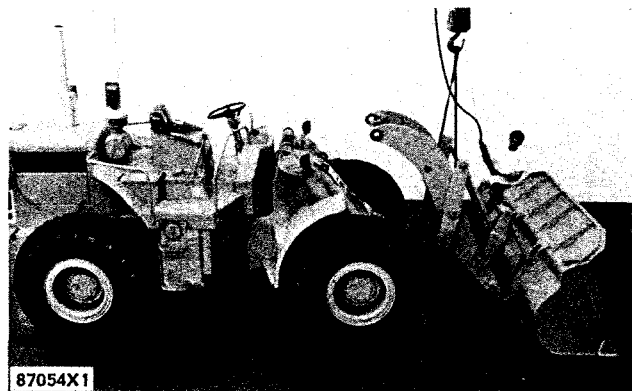
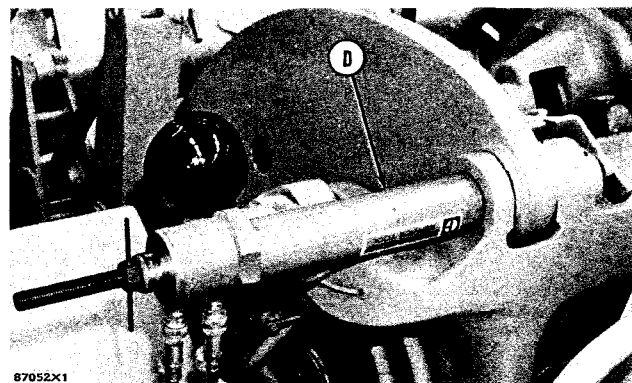
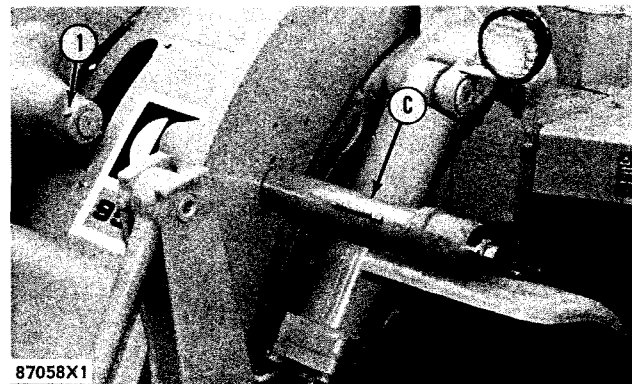
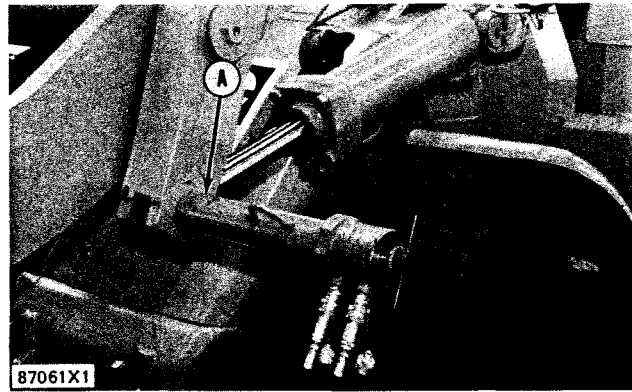
11-6119 & 6101

Tools Needed		A	B	C	D
9S5800	Pump Group	1	1	1	1
7F9540	Hydraulic Puller	1	1	1	1
9S5565	Sleeve	1	1	1	1
9S5559	Stud	1	1	1	1
1P543	Nut	1	1		1
8S6588	Adapter		1		
8S6587	Adapter				1

start by:

a) remove bucket positioner

1. Lift and block lift arms and bucket so the tilt cylinders are above the tires.
2. Remove bolts (1) that hold tilt cylinder pins in position.
3. Fasten a hoist to rod end of the left tilt cylinder.
4. Install tooling (A) and remove pin from rod end of left tilt cylinder.
5. Fasten a hoist to rod end of the right tilt cylinder.
6. Install tooling (B) and remove pin from the rod end of the right tilt cylinder.
7. Lower lift arms and bucket to floor. Install tooling (C) and remove pins from lift cylinders.
8. Fasten a hoist to the cross support on the lift arms as a support.
9. Install tooling (D) and remove pins from frame.
10. Remove lift arms and bucket as a unit. Weight is 4010 lb. (1817 kg).



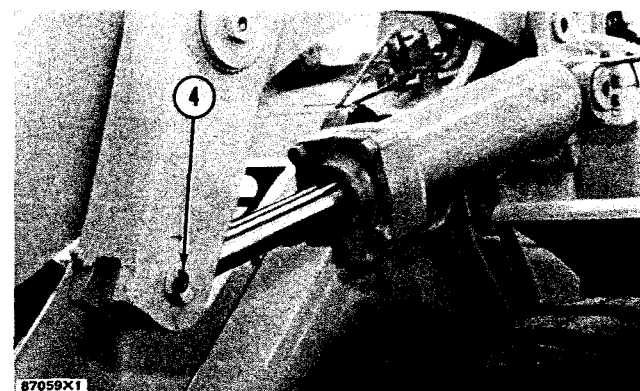
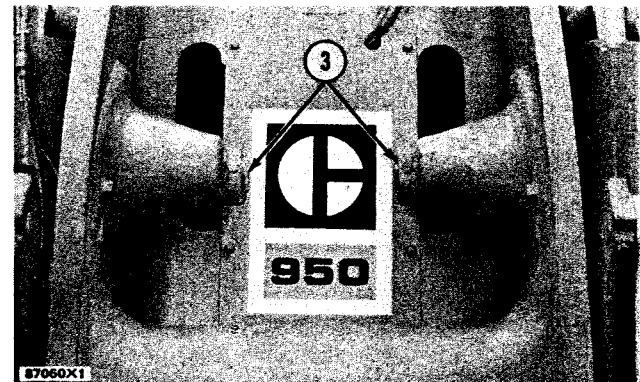
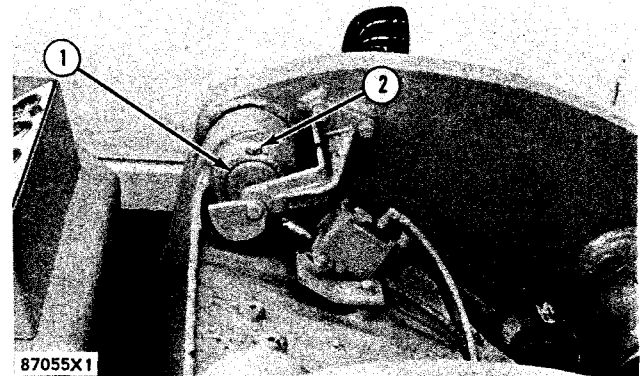
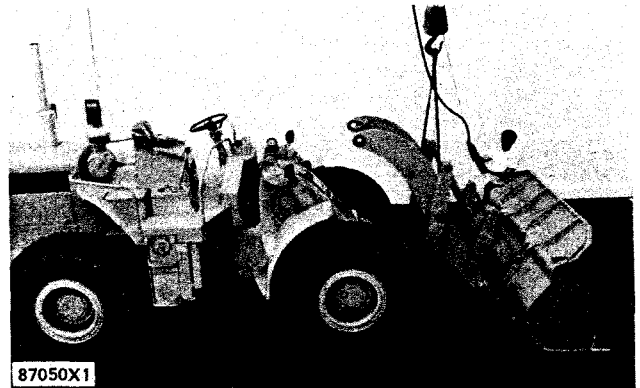
LIFT ARMS AND BUCKET

INSTALL LIFT ARMS AND BUCKET

12-6119 & 6101

Tools Needed		A	B
9S5562	Cap	1	
9S5563	Cap		1

1. Put lift arms and bucket into position on machine and install frame pins (1) with tool (B).
2. Install bolts (2) that hold frame pins into position.
3. Put lift cylinders into position and install pins (3) with tool (B).
4. Install bolts that hold lift cylinder pins into position.
5. Lift the bucket and lift arms up and install the tilt cylinder pins (4) with tooling (A) and (B).
6. Install bolts that hold the tilt cylinder pins into position.
end by:
a) install bucket positioner



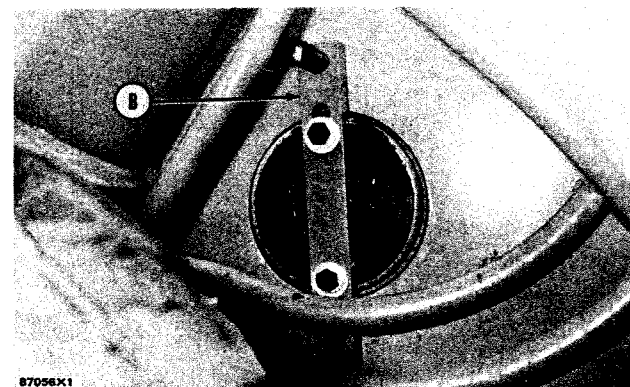
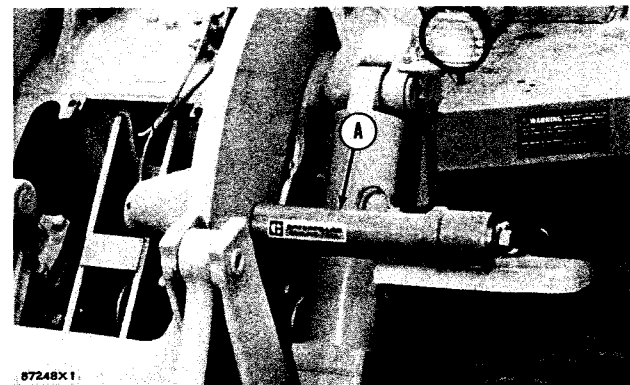
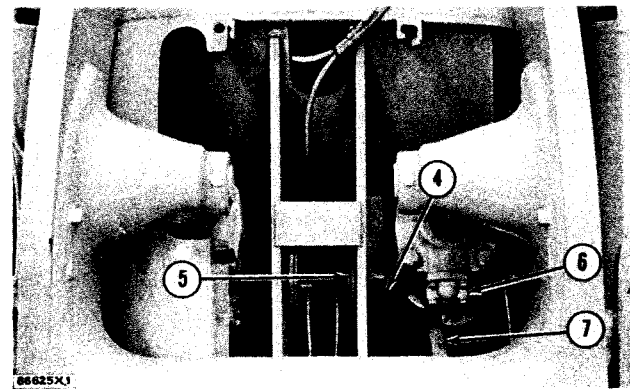
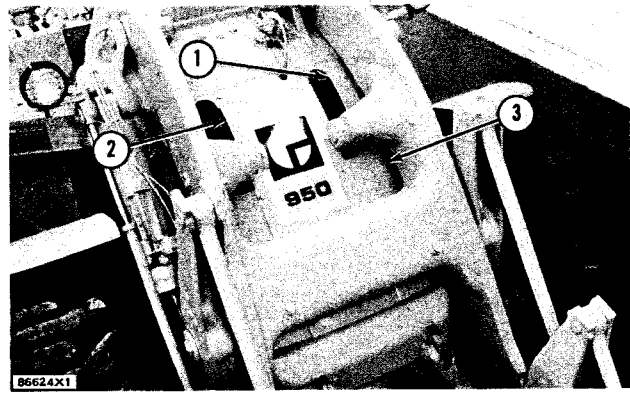
LIFT CYLINDERS

REMOVE LIFT CYLINDERS

11-5102

Tools Needed		A	B	C
9S5800	Pump Group	1		
9S5559	Stud	1		
9S5565	Sleeve	1		
7S9540	Hydraulic Puller	1		
1P543	Nut	1		
FT886	Adapter		1	
S1587	Bolts		2	
8B7554	Bearing Puller			1
8H684	Ratchet Box Wrench			1
8B7548	Push Puller			1
8B7549	Legs			2

1. Put the bucket in position on blocks that are eight inch (203.2 mm) high. Remove pressure from the hydraulic system.
2. Remove covers (1), (2), and (3).
3. Disconnect lines (6) and (7) from lift cylinder.
4. Remove cover (5) from each of the two bearing retainers.
5. Remove bars (4) from retainers.
6. Remove bolt from pin. Remove pin with tooling (A).
7. Remove two opposite bolts from the top of cylinder and install two 3/4"-10NC forged eyebolts.
8. Fasten a hoist to the eyebolts as a support.
9. Remove the inside and outside retainers with tool (B) and two 3/4"-10NC forcing screws 4" long.
10. Remove lift cylinder from machine. Weight of cylinder is 250 lb. (113 kg).
11. Remove seals and bearings from retainers with tooling (C).



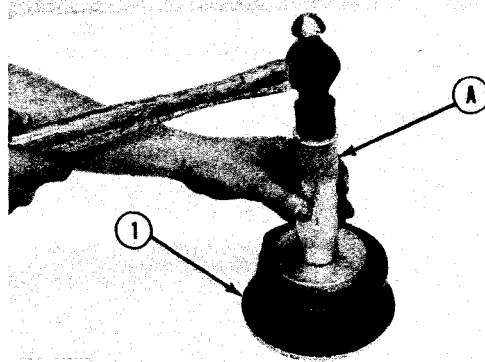
LIFT CYLINDERS

INSTALL LIFT CYLINDERS

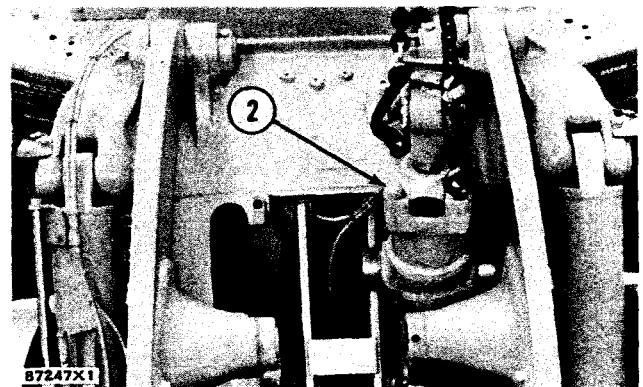
12-5102

Tools Needed		A
1P532	Handle	1
1P514	Drive Plate	1

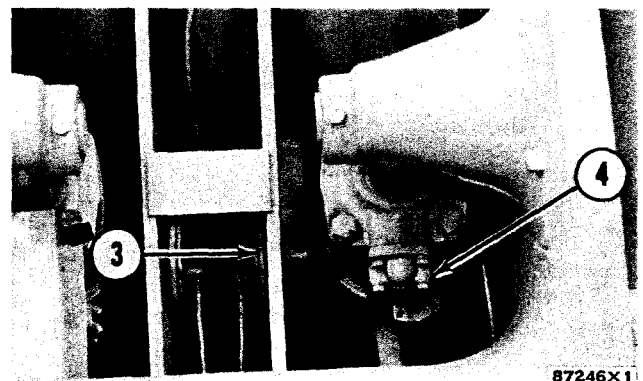
1. Lower the temperature of the bearings. Install the bearings in the retainers (1) $.375 \pm .010$ in. (9.525 ± 0.250 mm) from the outer face.
2. Install seals in retainers (1) with tooling (A). The lip of seal must be toward the inside.
3. Put cylinder (2) into position in machine and install the two retainers.
4. Install bar on each retainer.
5. Disconnect hoist and remove eyebolts. Install two bolts in top of cylinder.
6. Install cover (3) on each of the two retainers.
7. Connect two hydraulic lines (4) to cylinder.
8. Install pin into rod end of cylinder and install bolt that holds pin in position.
9. Install cover (5), (6), and (7).
10. Remove blocks from under bucket.
11. Start machine and check hydraulic oil level.



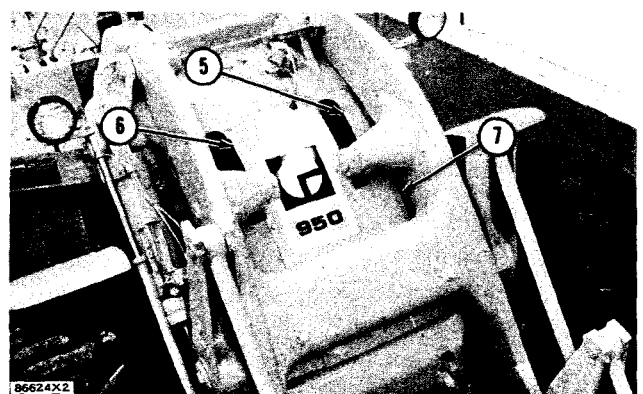
87240X1



87247X1



87246X1



86624X2

LIFT CYLINDERS

DISASSEMBLE LIFT CYLINDERS

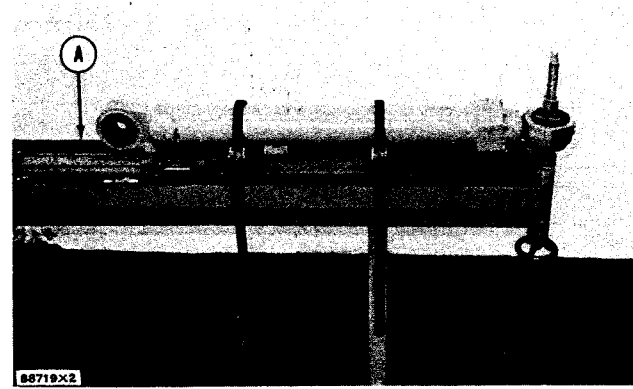
15-5102

Tools Needed		A
1P1784	Hydraulic Cylinder Repair Stand	1

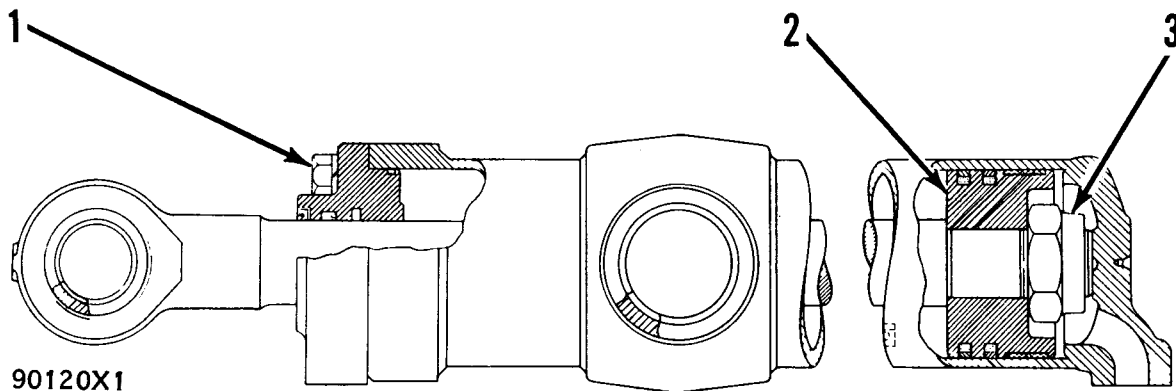
start by:

a) remove lift cylinders

1. Install cylinder on tool (A).
2. Remove bolts (1) from head of cylinder.
3. Remove rod and head from cylinder as a unit.
4. Remove nut (3), piston (2) and head from rod.
5. Remove seals and ring from piston.
6. Remove seals and packing from head.
7. Inspect seals and install new seals as needed.



TYPICAL EXAMPLE

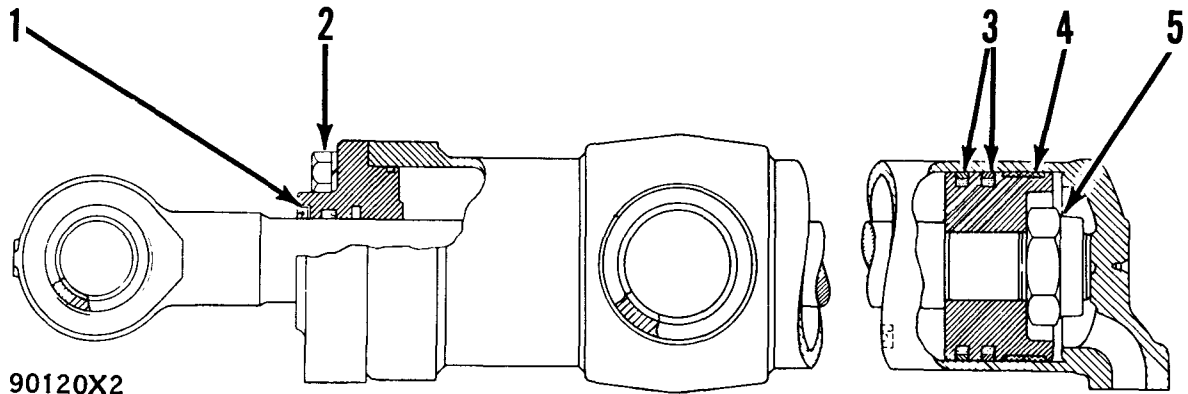


LIFT CYLINDERS

ASSEMBLE LIFT CYLINDERS

16-5102

Tools Needed		A	B	C
1P1784	Hydraulic Cylinder Repair Stand	1		
1P768	Guide		1	
9S289	Compressor			1



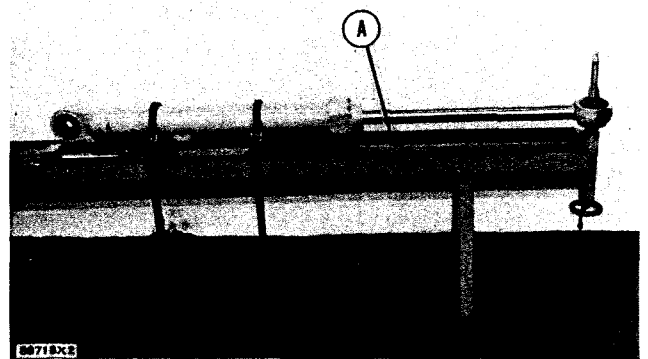
1. Install seals (3) and ring (4) on piston.
2. Install seals and packing in head of cylinder. Install lip seal (1) with lip of seal toward the outside.
3. Install head on rod using tool (B) to prevent damage to seals.
4. Install piston and nut on rod. Tighten nut (5) to a torque of 2000 ± 200 lb. ft. (276.6 ± 27.7 mkg).
5. Install head and piston in the cylinder with tool (C).

NOTE: The bolts in head must be tightened with the rod fully extended. This will keep cylinder, piston and head in better alignment.

6. Install bolts (2) in head of cylinder.

end by:

- a) install lift cylinders



TYPICAL EXAMPLE

TILT CYLINDERS

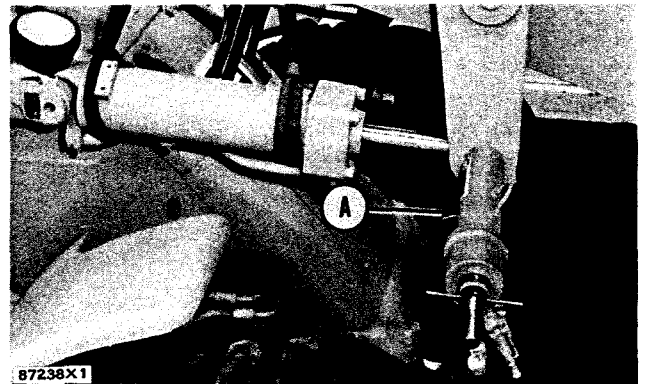
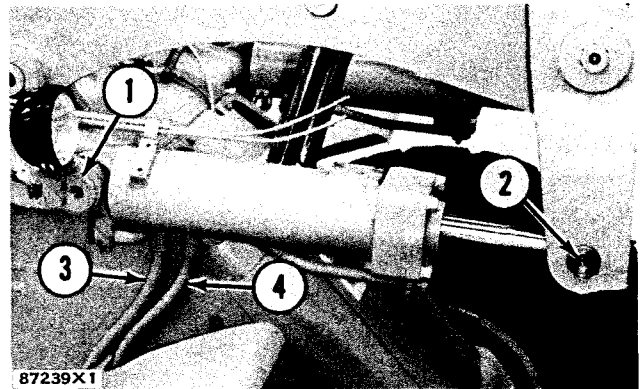
REMOVE TILT CYLINDERS

11-5104

Tools Needed		A	B
9S5565	Sleeve	1	1
8S6588	Adapter	1	
9S5559	Stud	1	1
1P543	Nut	1	1
7F9540	Hydraulic Puller	1	1
9S5800	Pump Group	1	1

start by:

- a) remove bucket positioner
 - b) remove bucket positioner master cylinder
1. Put the tilt cylinders in a horizontal position and install blocks or stands under lift arms and bucket.
 2. Remove bracket that holds pin (1) in the frame.
 3. Disconnect lines (3) and (4) from cylinder.
 4. Remove bolt that holds pin (2) into position.
 5. Fasten a hoist to the cylinder as a support.
 6. Remove front pin with tooling (A).
 7. Remove rear pin with tooling (B).
 8. Remove tilt cylinder. Weight is 160 lb. (82 kg).



INSTALL TILT CYLINDERS

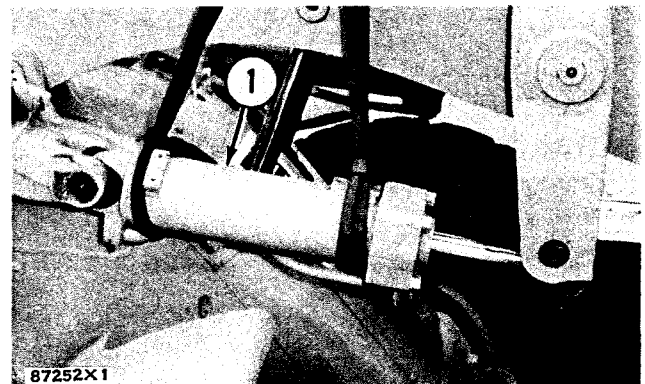
12-5104

Tools Needed		A
9S5562	Cap	1

1. Put the tilt cylinder (1) into position and install pins with tool (A).
2. Install bolt in front pin.
3. Install bracket that holds rear pin in place.
4. Connect lines to cylinder.
5. Remove block or stands from under lift arms and bucket.

end by:

- a) install bucket positioner master cylinder
- b) install bucket positioner



TILT CYLINDERS

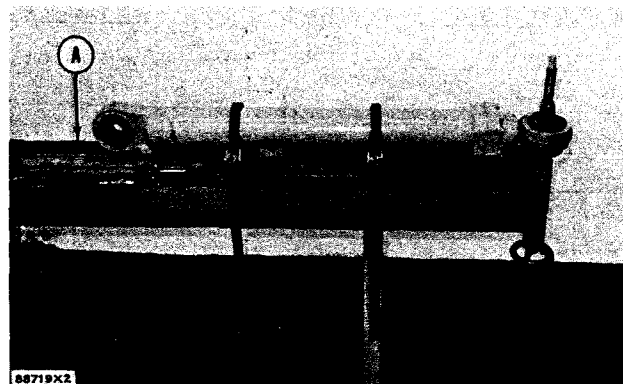
DISASSEMBLE TILT CYLINDERS 15-5104

Tools Needed		A
1P1784	Hydraulic Cylinder Repair Stand	1

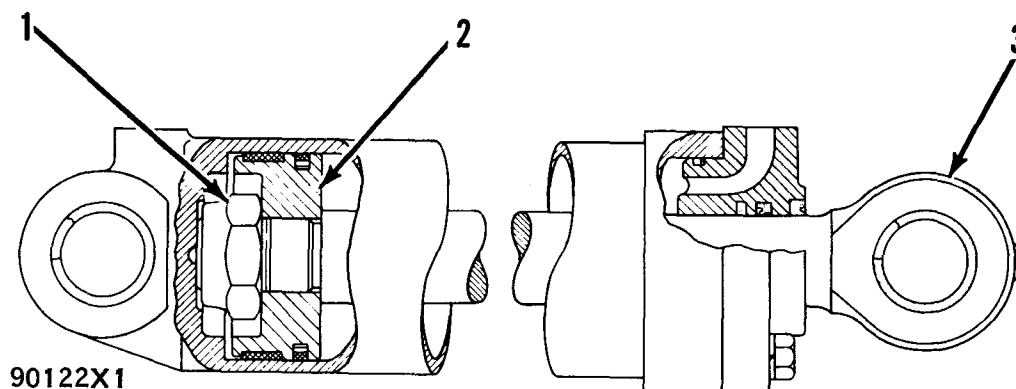
start by:

a) remove tilt cylinders

1. Install cylinder on tool (A).
2. Remove bolts from head of cylinder.
3. Remove rod and head from cylinder as a unit.
4. Remove nut (1), piston and head (2) from rod (3).
5. Remove seal and ring from piston.
6. Remove seals and packing from head.
7. Inspect seals and install new seals as needed.



TYPICAL EXAMPLE

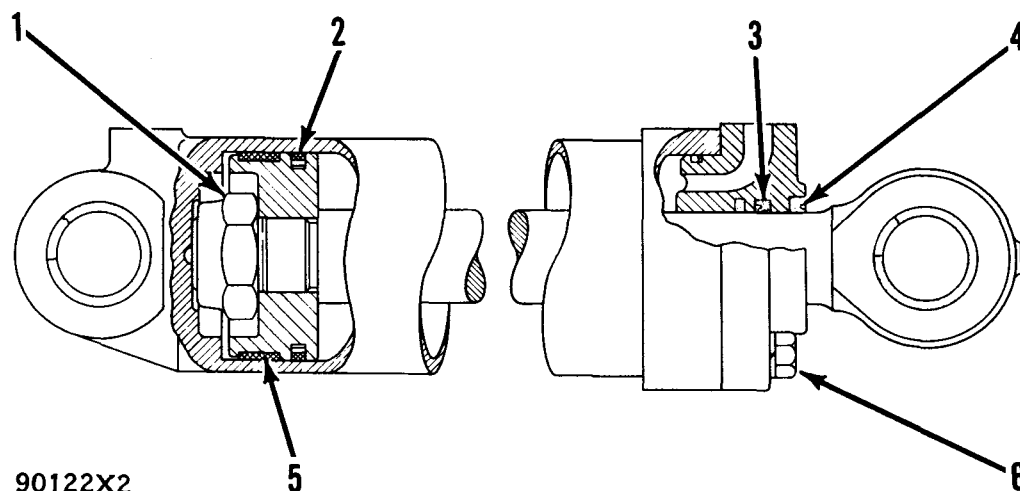


TILT CYLINDERS

ASSEMBLE TILT CYLINDERS

16-5104

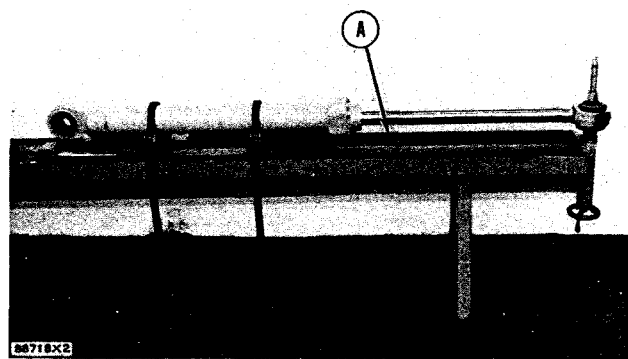
Tools Needed		A	B	C
1P1784	Hydraulic Cylinder Repair Stand	1		
1P768	Guide		1	
9S289	Compressor			1



1. Install seals (2) and ring (5) on piston.
2. Install seals (3) and packing in head of cylinder. Install lip seal (4) with lip of seal toward the outside.
3. Install head on rod using tool (B) to prevent damage to seals.
4. Install piston and nut (1) on rod. Tighten nut to a torque of 2000 ± 200 lb.ft. (276.6 ± 27.7 mkg).
5. Install head and piston in the cylinder with tool (C).

NOTE: The bolts in head must be tightened with the rod fully extended. This will keep cylinder, piston and head in better alignment.

6. Install bolts (6) in head of cylinder.
end by:
 - a) install tilt cylinders



TYPICAL EXAMPLE

LIFT AND TILT CYLINDER BEARINGS

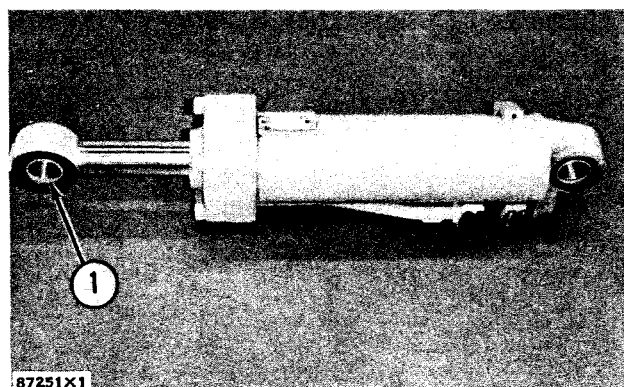
REMOVE LIFT AND TILT CYLINDER BEARINGS

Tools Needed		A	B
1P1834	Pulling Adapter	1	
9S5800	Pump Group	1	1
9S5559	Stud	1	
9S5565	Sleeve	1	
7F9540	Hydraulic Puller	1	
1P543	Nut	1	
9S5558	Stud		1
1P544	Nut		1
9S5564	Sleeve		1
5H9817	Hydraulic Puller		1
1P1835	Pulling Adapter		1

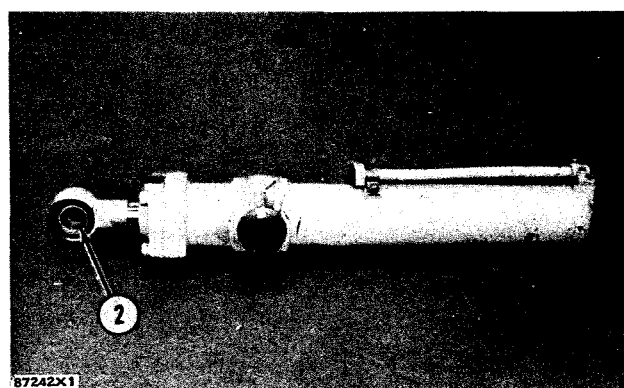
start by:

- a) remove lift cylinder
- b) remove tilt cylinder

1. Remove seals (1) from tilt cylinder.

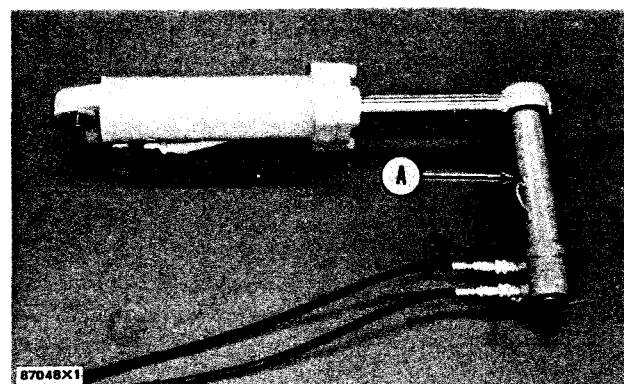


TILT CYLINDER

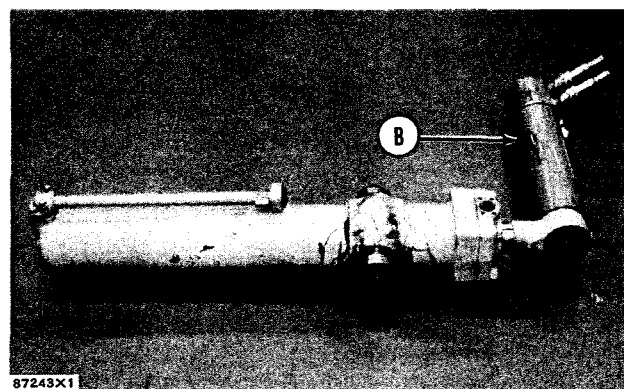


LIFT CYLINDER

2. Remove seals (2) from lift cylinder.



3. Remove bearings from tilt cylinder with tooling (A).



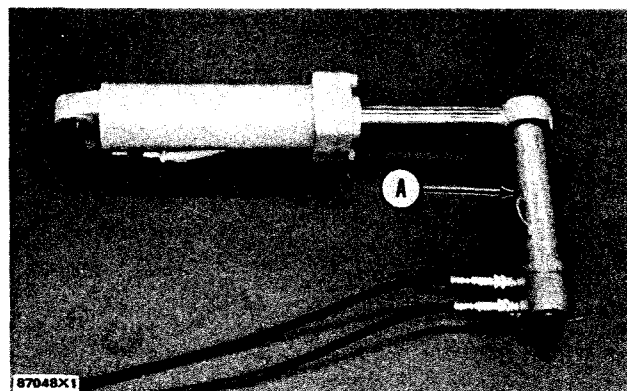
4. Remove bearings from left cylinder with tooling (B).

LIFT AND TILT CYLINDER BEARINGS

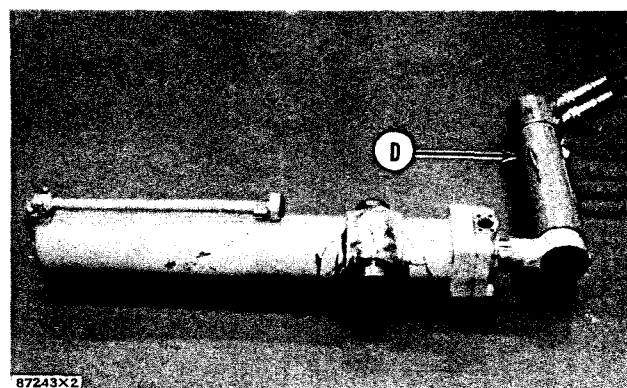
INSTALL LIFT AND TILT CYLINDER BEARINGS

Tools Needed		A	B	C	D	E	F
1P1834	Pulling Adapter	1					
9S5800	Pump Group	1			1		
9S5559	Stud	1					
9S5565	Sleeve	1					
7F9540	Hydraulic Puller	1					
1P543	Nut	1					
1P529	Handle		1	1		1	1
1P495	Drive Plate		1				
1P482	Drive Plate		1	1			
1P490	Drive Plate			1			
9S5558	Stud				1		
1P544	Nut				1		
9S5564	Sleeve				1		
5H9817	Hydraulic Puller				1		
1P1835	Pulling Adapter				1		
1P486	Drive Plate					1	
1P499	Drive Plate					1	1
1P495	Drive Plate						1

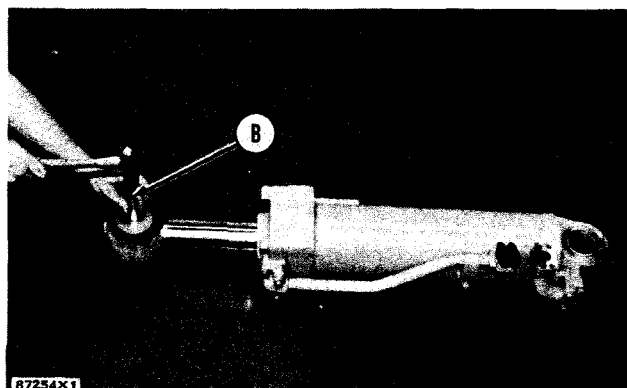
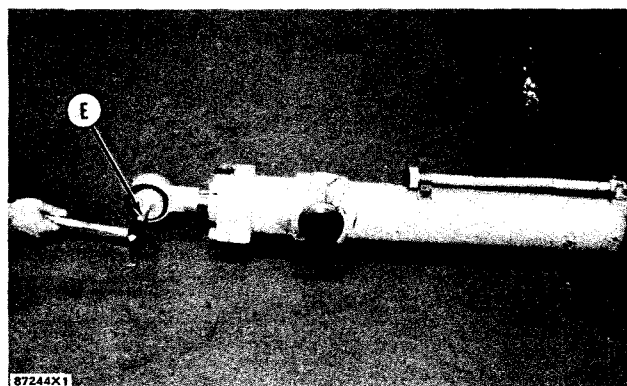
1. Install bearings in tilt cylinder with tooling (A).
 2. Install bearings in lift cylinder with tooling (D).
 3. Install seals in the tilt cylinder even with the bore surface with tooling (B) and .060" (1.52 mm) below the surface with tooling (C). The lip of seals must be toward the outside.
 4. Install seals in the lift cylinder even with the bore surface with tooling (E) and .060" (1.52 mm) below the surface with tooling (F). The lip of seals must be toward the outside.
- end by:
- a) install tilt cylinder
 - b) install lift cylinder



TILT CYLINDER



LIFT CYLINDER

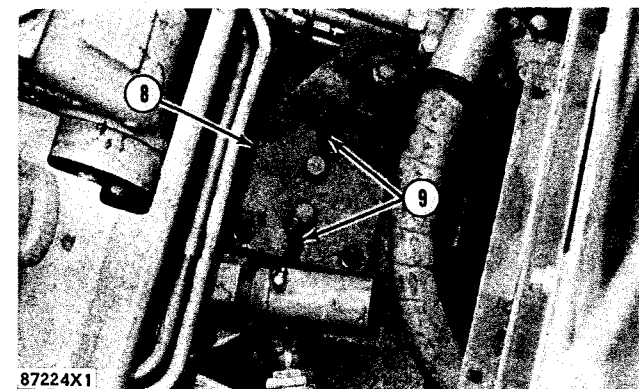
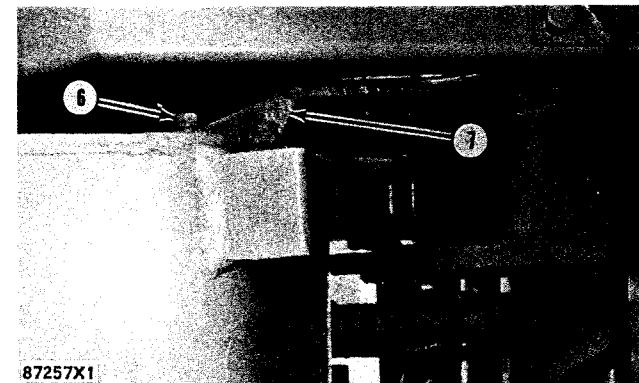
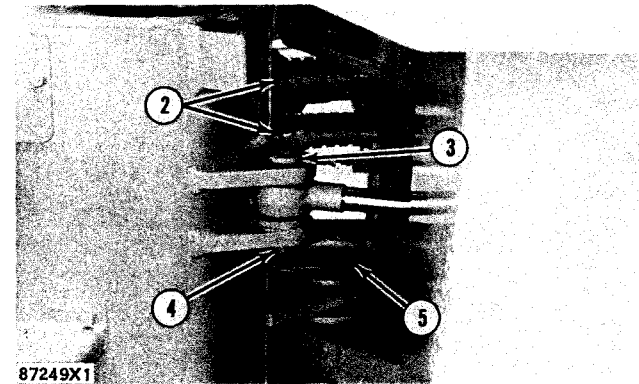
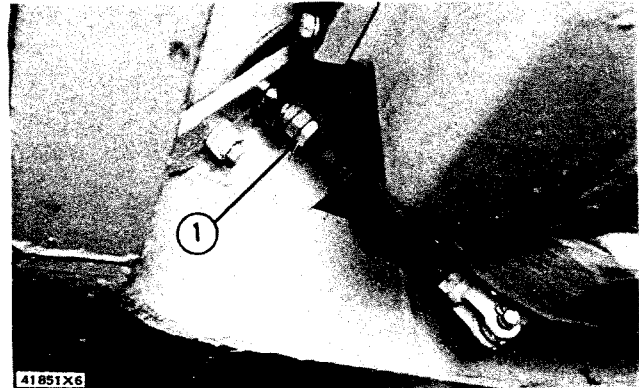


MAIN FRAMES

SEPARATION OF MAIN FRAMES 11-7051

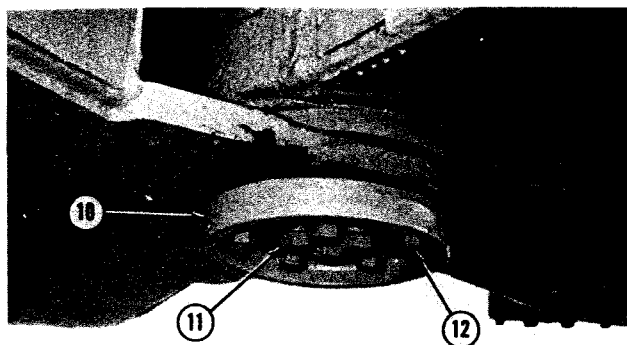
1. Remove the pressure from hydraulic system before disconnecting any lines. Remove oil from hydraulic tank. Put blocks under the front and rear of front tires.
2. Loosen nuts (1) to release the parking brake.
3. Remove bolts (4) and washers from each of the steering cylinders. Remove pins (3).
4. Remove the drive shaft (5).
5. Disconnect hydraulic lines (2) and put identification on lines for installation purpose.
6. Disconnect brake line from block.
7. Remove the floor plate in front of seat.
8. Disconnect light wires and transmission control linkage.
9. Remove bolts (6) that hold anchor assembly (7) for steering linkage to front main frame. Move anchor and steering linkage away from front main frame.
10. Remove the four bolts that hold the upper pivot pin (8) to rear frame.
11. Install two hydraulic jacks under rear of the front main frame. Lift frame until upper pivot pin (8) is free in bore.
12. Install two 1/2"-13NC forcing screws (9) in pivot pin and remove pin from frame.

NOTE: A hydraulic jack can be used to push the pin out of the frame.



MAIN FRAMES

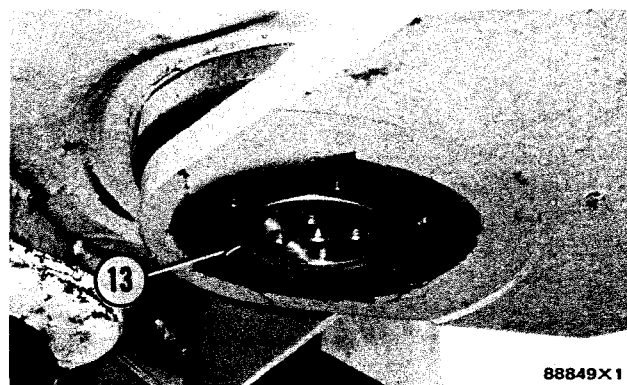
13. Remove bolts (11) and (12) that hold plate (10) to frame and pin.



14. Put a lift truck or wheel loader in position at rear of the machine.

15. Put a floor jack (14) in position under the front of rear frame.

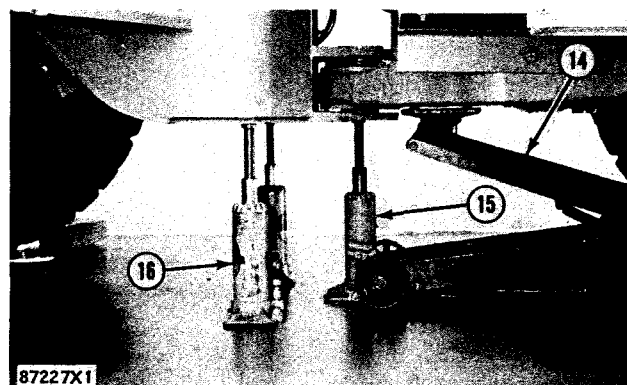
16. Lift or lower the frames with jacks (16) to make the lower pivot pin free in the bore.



17. Push the lower pivot pin out of the bore with jack (15).

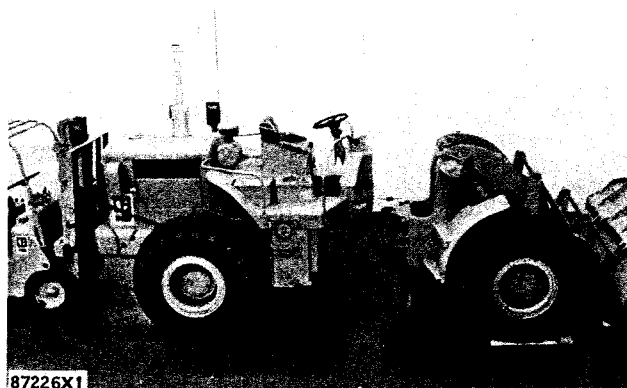
18. Remove spacer (13).

NOTE: The spacer must be removed before a separation of the frames can be made.



19. Install a block between the rear frame and rear axle housing on each side of the machine to prevent side movement of rear frame.

20. Use the lift truck and floor jack to move the rear frame away from the front frame.

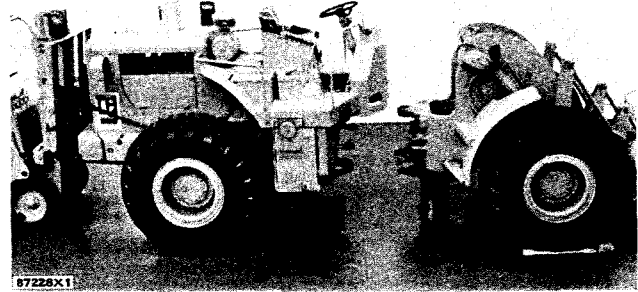


21. Install blocks under front and rear frames and remove lift truck and jacks.

MAIN FRAMES

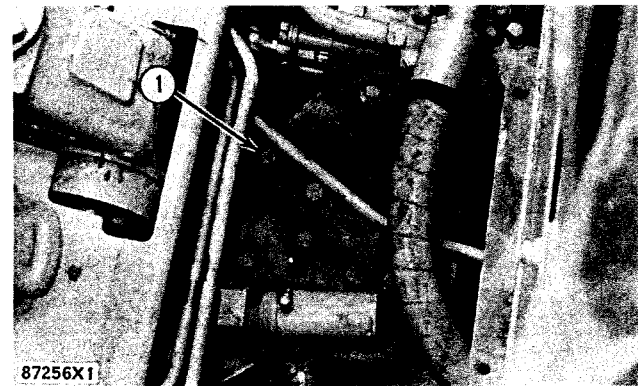
CONNECTION OF MAIN FRAMES 12-7051

1. Put the lift truck and floor jack into position under the front and rear of the rear frame.



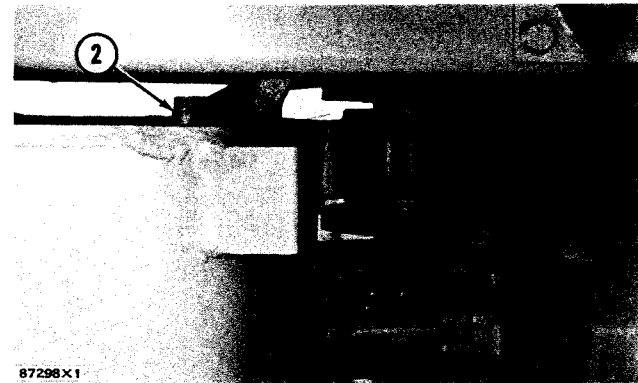
2. Move the rear frame into position on the front frame.

3. Lift or lower the frames with jacks to get the pin bores in alignment.



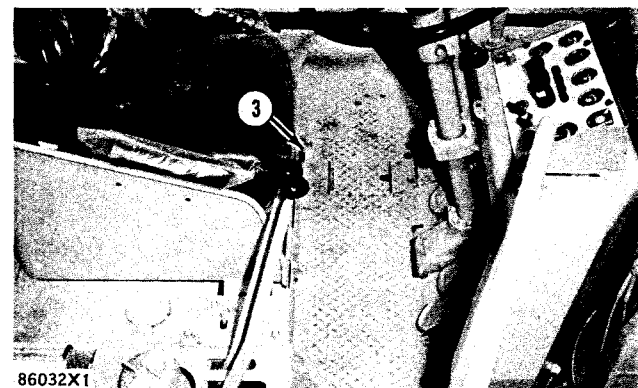
4. Install lower and upper pivot pins.

5. Install the four bolts (1) that hold the upper pin to the frame. Tighten bolts evenly to a torque of 50 ± 5 lb.ft. (6.9 ± 0.7 mkg).



6. Put steering linkage and anchor assembly (2) in position on front frame and install the bolts.

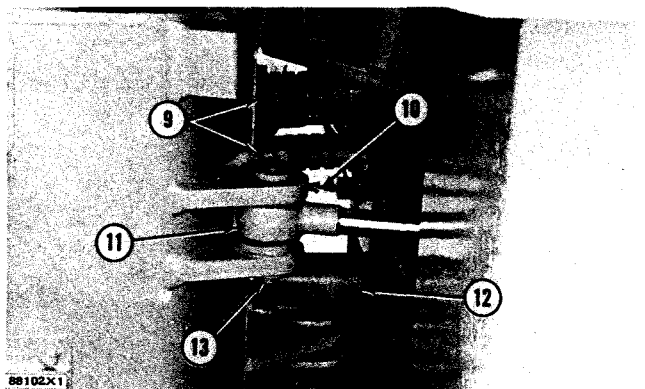
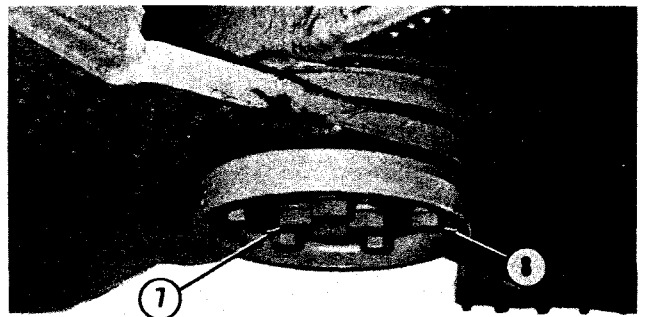
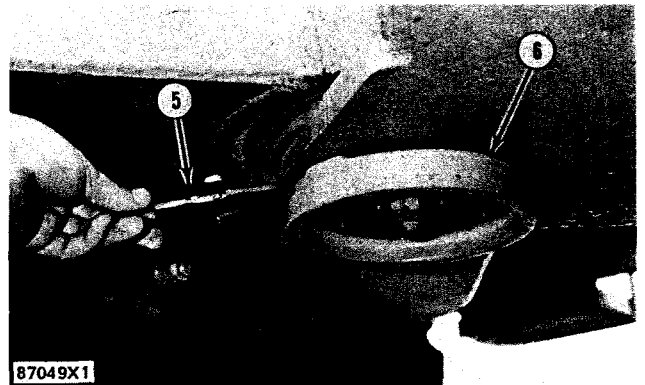
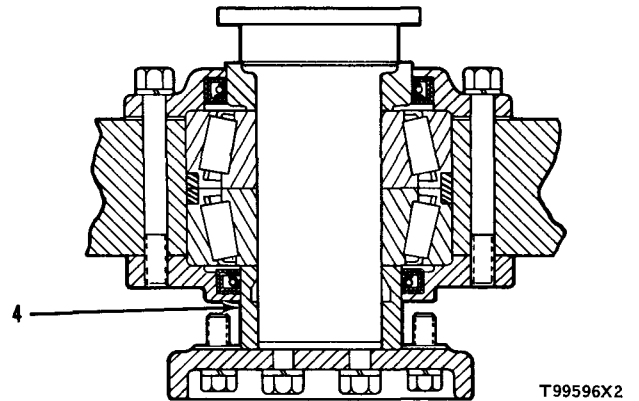
7. Connect light wires and transmission control linkage.



8. Install floor plate (3).

MAIN FRAMES

9. Install spacer (4) on the lower pivot pin.
10. Install plate (6) without shims using two bolts 180° apart. Tighten the two bolts to 100 ± 10 lb.ft. (13.8 ± 1.4 mkg).
11. Use a feeler gauge (5) to get a measurement of the gap between plate and frame 360° around the plate. Remove plate (6).
12. Install plate (6) with shims of the same thickness as minimum gap measurement minus .010 in. (0.35 mm). Install and tighten the four inner bolts (7) to 150 ± 20 lb.ft. (20.7 ± 2.8 mkg).
13. Install and tighten the six outer bolts (8) to 75 ± 10 lb.ft. (10.4 ± 1.4 mkg).
14. Install drive shaft (12). Install and tighten the bolts that hold drive shaft to 98 ± 10 lb.ft. (13.6 ± 1.4 mkg).
15. Connect the hydraulic lines (9) to the rear section of machine.
16. Connect brake line (10).
17. Put the steering cylinders (11) into position on front main frame. Install pins, washers, and bolts (13).
18. Tighten nuts on the rod of the chamber for parking brake.
19. Fill the hydraulic tank with oil to correct level.



LOWER PIVOT PIN BEARINGS

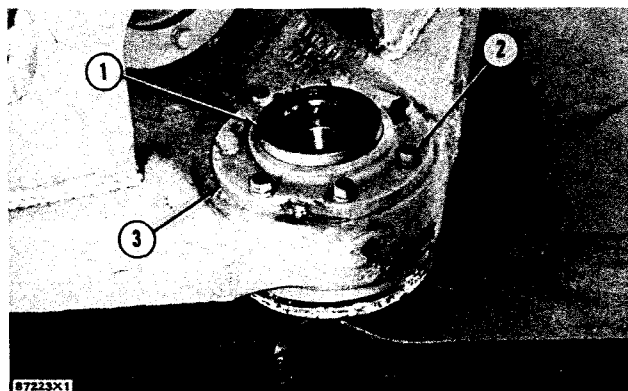
REMOVE LOWER PIVOT PIN BEARINGS

11-7057

start by:

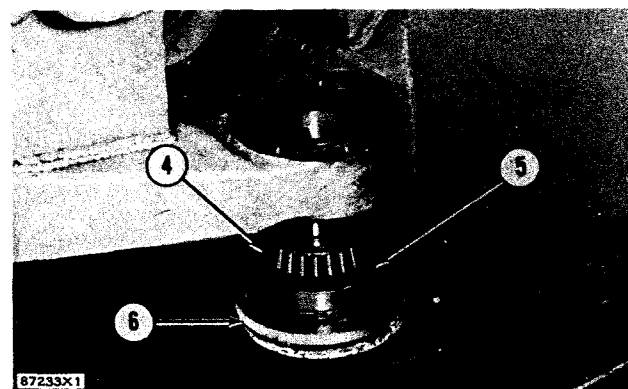
a) separation of main frames

1. Put a floor jack in position under lower cap.



2. Remove spacer (1) from top of bearing.

3. Remove bolts (2) from upper cap.



4. Remove upper cap (3) and shims. Put identification on shims for installation purpose.

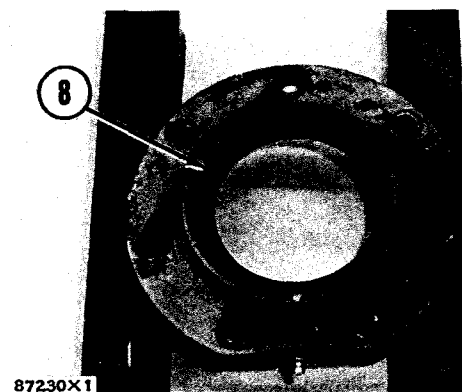
5. Lower the floor jack and remove cap (6), lower bearing cone and cup (5), and upper bearing cone (4).



6. Remove upper bearing cup (7) and spacer from frame with punch and hammer.

NOTE: Make a replacement of the lower bearings as a unit if needed. These bearings can not be ordered separately.

7. Remove the lip-type seal (8) from the upper and lower caps.



LOWER PIVOT PIN BEARINGS

INSTALL LOWER PIVOT PIN BEARINGS

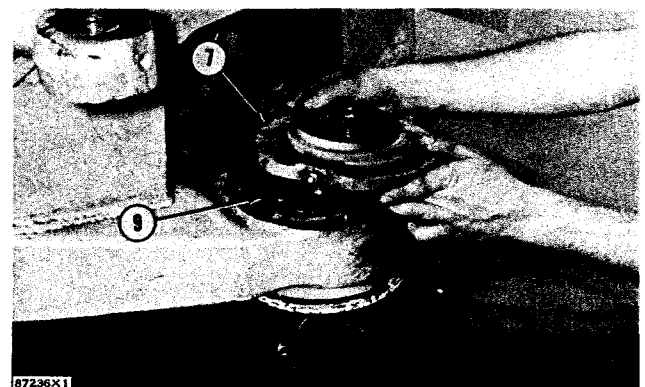
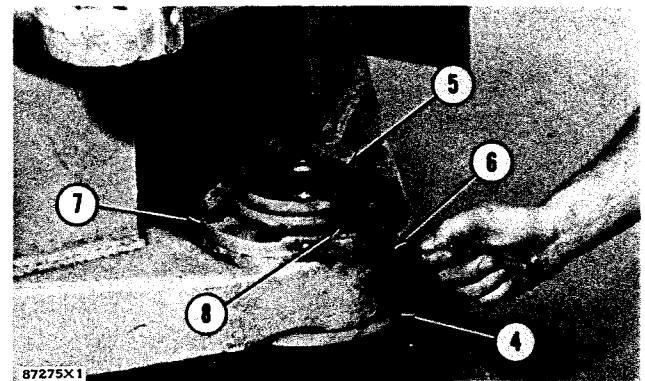
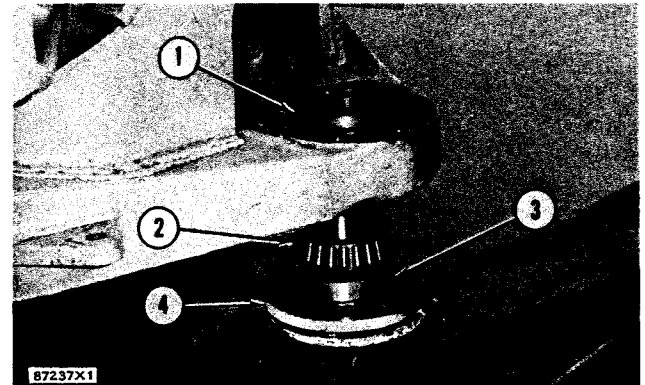
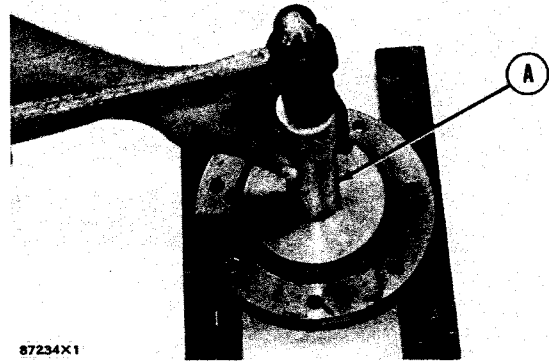
12-7057

Tools Needed			A
1P532	Handle	1	
1P509	Drive Plate	1	
1P523	Drive Plate	1	

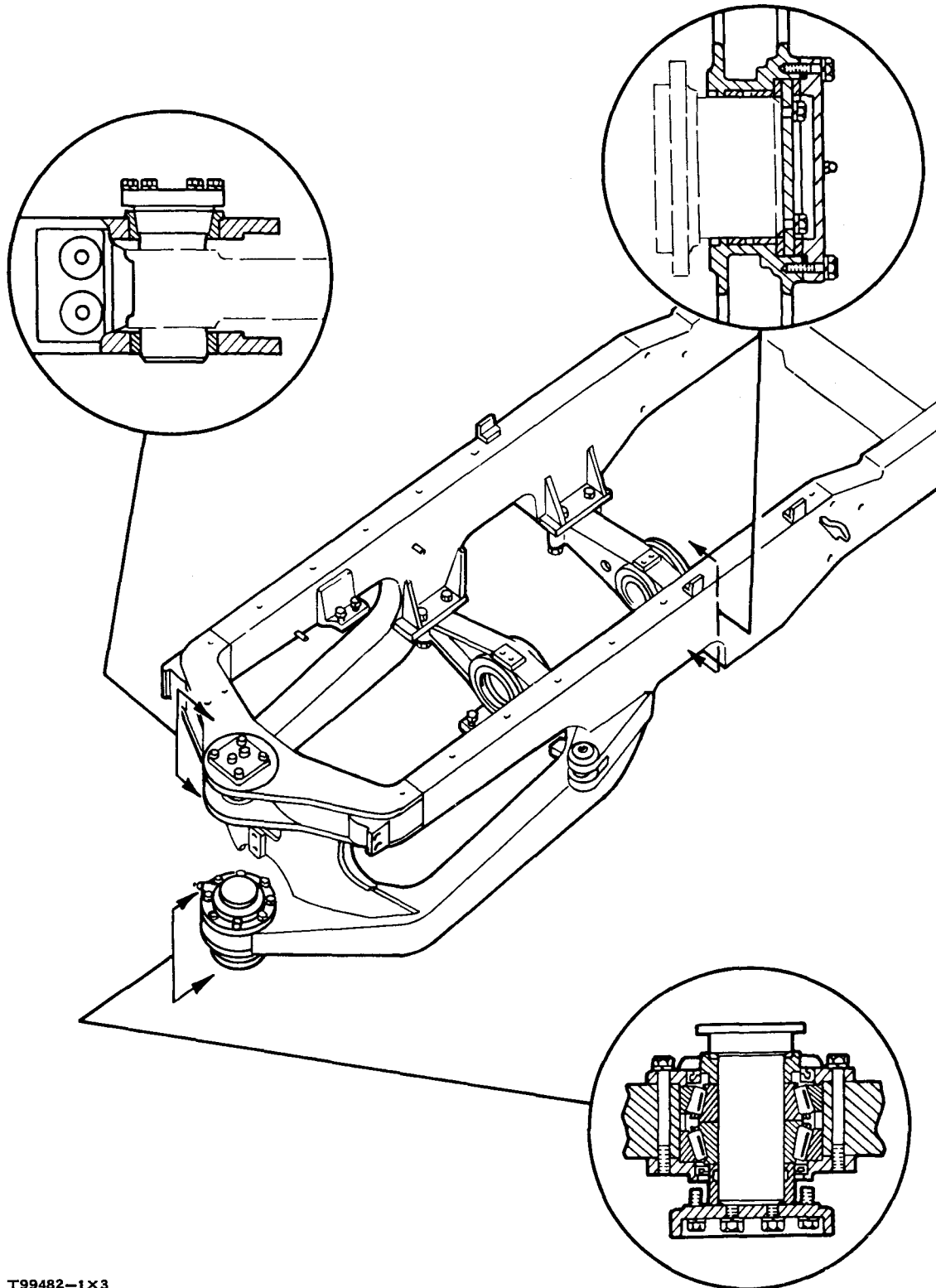
1. Install the seals in the upper and lower caps with tooling (A). Install seals so the lip of seal is away from bearing cones when caps are installed.
2. Put a multipurpose type grease on lip of seals and on the upper and lower bearing cones of pivot pin.
3. Install spacer and upper bearing cup (1) in frame.
4. Put the lower cap (4), lower bearing cone, cup (3) and upper bearing cone (2) on the floor jack.
5. Lift the bearing cones, cup, and cap into position in frame.
6. Install spacer (5) and upper cap (7) without shims. Install three bolts (8) as shown and tighten bolts evenly to a torque of 65 ± 5 lb.ft. (9.0 ± 0.7 mkg).
7. Check to be sure lower cap (4) is tight against the frame.
8. Check the gap between the upper cap and frame with a feeler gauge (6) at each of the three bolt locations.
9. Remove the upper cap (7). Install shims (9) with the same thickness as the minimum gap measured. Install cap and bolts. Tighten bolts for upper cap to 75 ± 10 lb.ft. (10.4 ± 1.4 mkg).

end by:

- a) connection of main frames



PIVOT PIN BEARINGS



T99482-1X3



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