

Disassembly & Assembly

Lift Trucks Vehicle Systems

B20S-2, B25S-2, B30S-2

BC20S-2, BC25S-2, BC30S-2

Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Read and understand all safety precautions and warnings before operating or performing lubrication, maintenance and repair on this product.

Basic safety precautions are listed in the "Safety" section of the Service or Technical Manual. Additional safety precautions are listed in the "Safety" section of the owner/operation/maintenance publication. Specific safety warnings for all these publications are provided in the description of operations where hazards exist. WARNING labels have also been put on the product to provide instructions and to identify specific hazards. If these hazard warnings are not heeded, bodily injury or death could occur to you or other persons. Warnings in this publication and on the product labels are identified by the following symbol.



Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Operations that may cause product damage are identified by NOTICE labels on the product and in this publication.

DAEWOO cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by DAEWOO is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or repair procedures you choose.

The information, specifications, and illustrations in this publication are on the basis of information available at the time it was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the complete and most current information before starting any job. DAEWOO dealers have the most current information available.

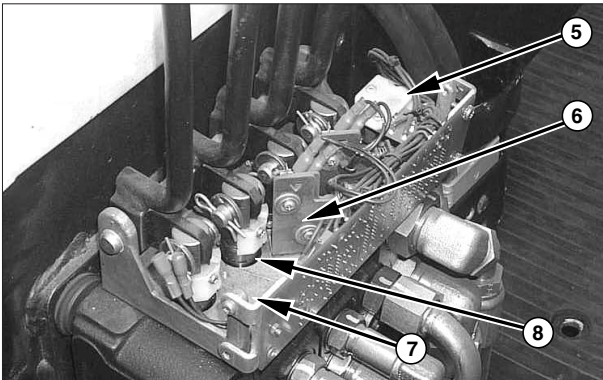
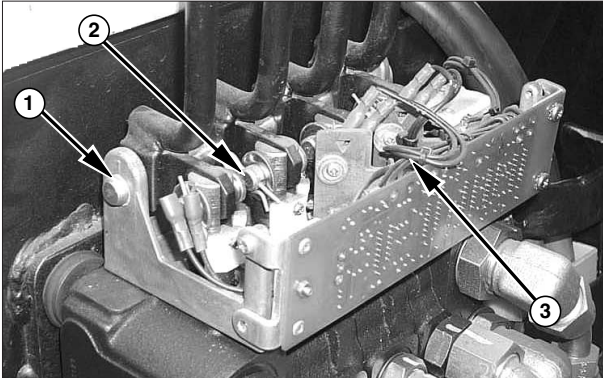
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Disassembly And Assembly

Hydraulic Control Valve Switch Group

Remove And Install Hydraulic Control Valve Switch Group



1. Remove the cover over the hydraulic control valve. Disconnect connector (3). Remove the bolt, washer and rod assembly (1).
2. Remove the cotter pins, pins (2), the washers and the lever assemblies.
3. Remove the screws, nuts, lockwashers and cams (8). Remove three bolt that hold the switch group.
4. If necessary, remove switches (6), sensor (5) and board assembly (7) from the bracket.

NOTE: The following steps are for installation of the hydraulic control valve switch group.

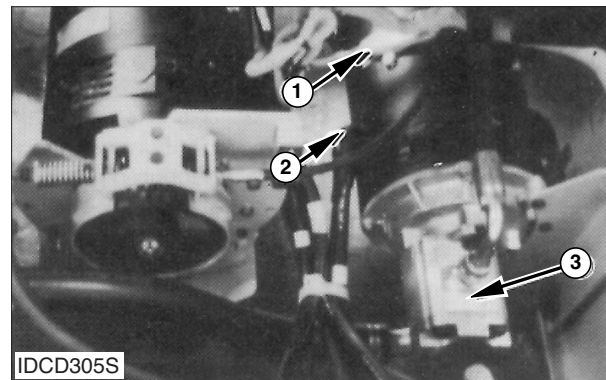
5. Install the switches, sensor and board assembly on the bracket if they were removed. Install the switch group on the control valve.
6. Put cams (8) in position on the spools. Install the screws, lockwashers and nuts.
7. Put the lever assemblies in position on the spools. Install pins (2), the washers and cotter pins.
8. Install rod assembly (1), the wire harness clip, bolt and washer. Connect connector (3). Adjust the switch group if necessary. See Lift Sensor Adjustment and Tilt And Auxiliary Switch Adjustment in the Micro Command Control System.

Hydraulic Pump Motor

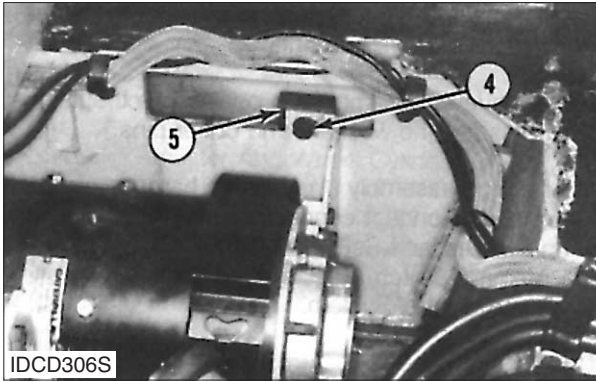
Remove And Install Hydraulic Pump Motor

Tools Needed	A
Hook	1
Shackle	1
Link Bracket	2

NOTE: Photos shown are of an BC series truck, the B series truck is similar.

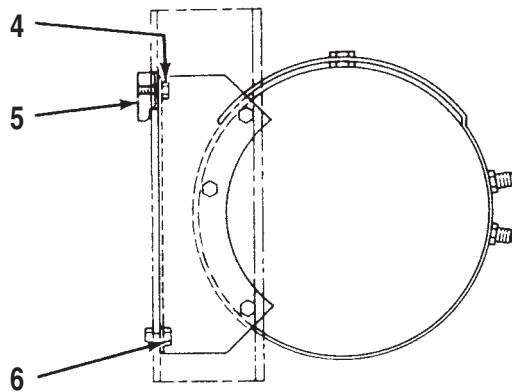


1. Remove the battery, the plate under the battery and the floor plates. Mark the wires and cables for proper installation. Disconnect two wires (1) and two cables (2) from the hydraulic pump motor.
2. Remove two bolts and hydraulic pump (3) from the pump motor. Remove the pump coupling if necessary. Pull the pump away from the motor, but keep the pump above the level of the hydraulic tank to prevent oil leakage from the pump.



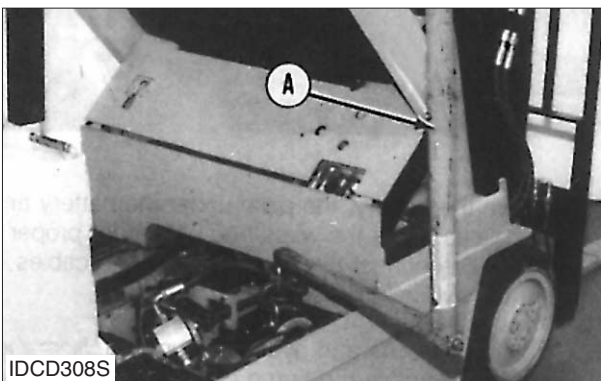
NOTE: The following steps are for installation of the hydraulic pump motor.

5. Install the two plates and blocks on the pump motor if they were removed. Put the pump motor in position in the lift truck with tooling (A) and a hoist.
6. Slide the pump motor to the front of the lift truck. Install two lower bolts (6). Tighten bolts (4) and (6).
7. Put hydraulic pump (3) in position on the pump motor. Make sure the coupling is in alignment with the pump motor armature. Install the two bolts that hold the pump on the pump motor.
8. Connect two cables (2) and wires (1) to the pump motor. Install the plate over the motors, the battery and floor plates.



NOTE: If upper bolts (4) are removed, blocks (5) will fall inside the channel.

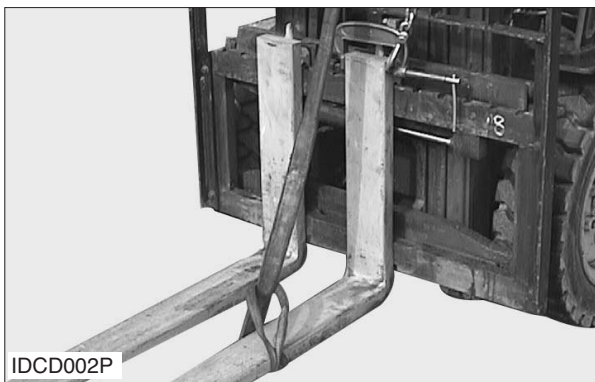
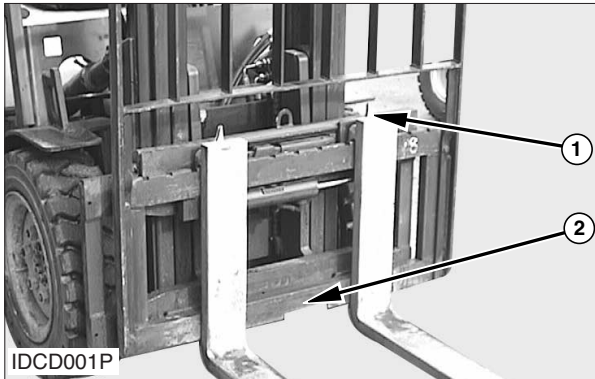
3. Loosen, but do not remove, upper two mounting bolts (4). Remove lower two mounting bolts (6), and slide the pump motor and plates to the rear of the truck.



4. The weight of the pump motor is 48 kg (105 lb). Attach tooling (A) and a hoist to the pump motor, and remove it from the lift truck. Remove the two plates and blocks from the motor if necessary.

Forks

Remove & Install Forks



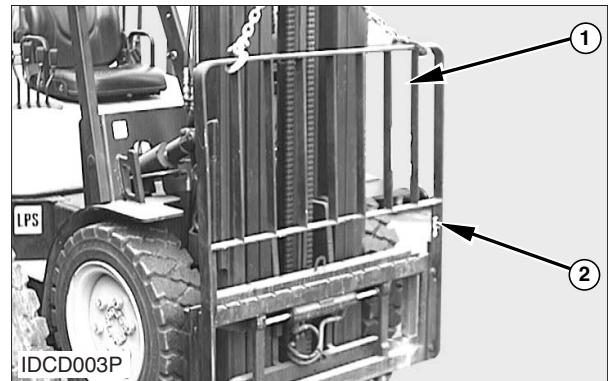
1. Lift fork pin(1).
2. Use a suitable C-clamp, strap and hoist to support the fork as shown.
3. Slide the fork to slot(2) in the middle of the carriage.
4. Remove the fork. The weight of the fork is **50 kg (110 lb)**.
5. Repeat steps 1 through 4 for the remaining fork.
6. Install the forks in the reverse order of removal.
7. Put the forks in position. Lower both fork pins(1) to lock the forks in position.

Backrest

Remove & Install Backrest

Start By:

- a. Remove forks.



1. Fasten a hoist to the backrest. Remove bolts(2) that fasten the backrest to the carriage.
2. Remove backrest (1). Backrest(1) weighs 40kg (90lb).
3. Install backrest(1) in the reverse order of removal.

End By:

- a. Install forks.

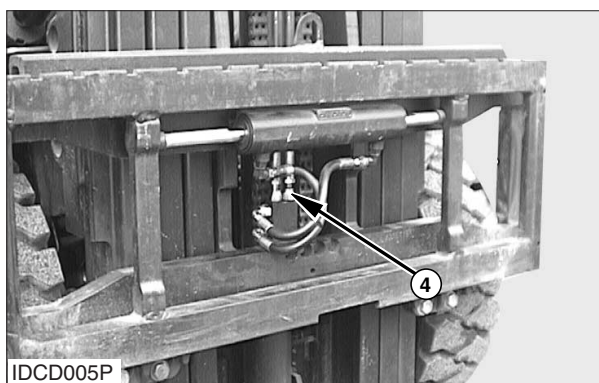
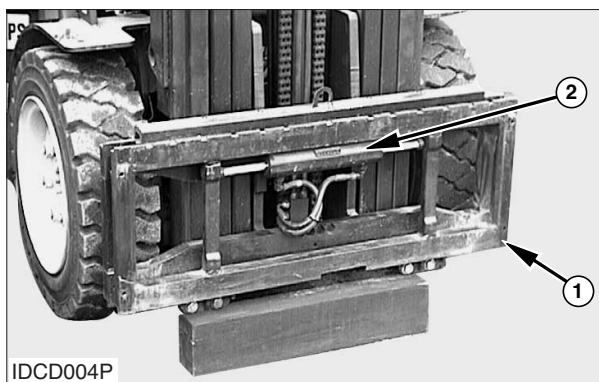
Carriage

Remove & Install Carriage

Tools Needed	A
Retaining Ring Pliers	1

Start By:

- a. Remove forks.
- b. Remove backrest.

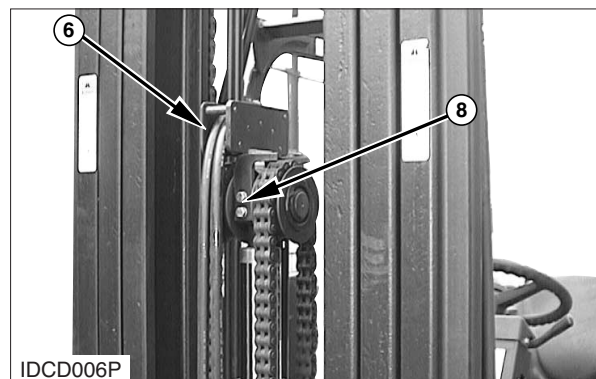


1. Raise carriage(1). Position a wooden block as shown. Lower carriage(1) onto the wooden block.
2. Disconnect two hydraulic lines(4) from side shifter cylinder (2). Plug and cap all openings to prevent contamination and debris from entering system.

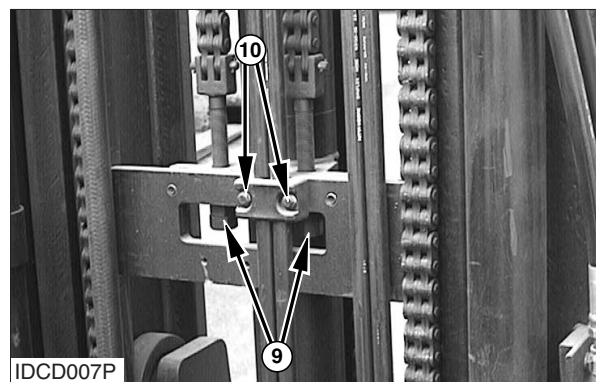
WARNING

To prevent personal injury be sure pressure in the hydraulic system has been released before disconnecting any hydraulic lines. Slowly loosen the cap of the hydraulic tank to release any pressure in the tank. Be cautious of hot hydraulic oil when any lines are disconnected in the hydraulic system.

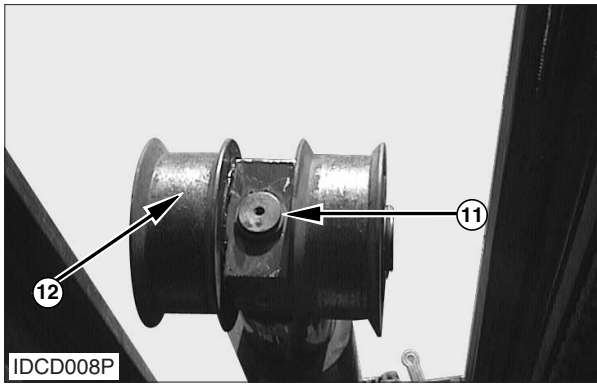
NOTE: For purposes of reassembly, identify and mark all hydraulic lines and connectors before removing or disconnecting.



3. Remove four bolts(8) from the chain guard/hose support assembly(6). Set the hoses aside, clear of the primary cylinder and cross head.

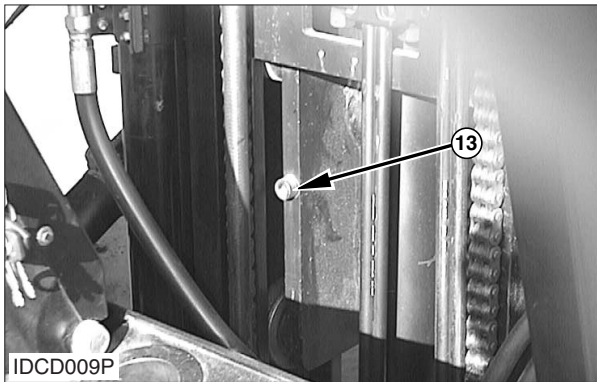


4. Remove two bolts (10) from the hose mounting bracket. Set the hoses aside. Remove two nuts(9) from the chain anchors. Set the chains aside, clear of the mast.

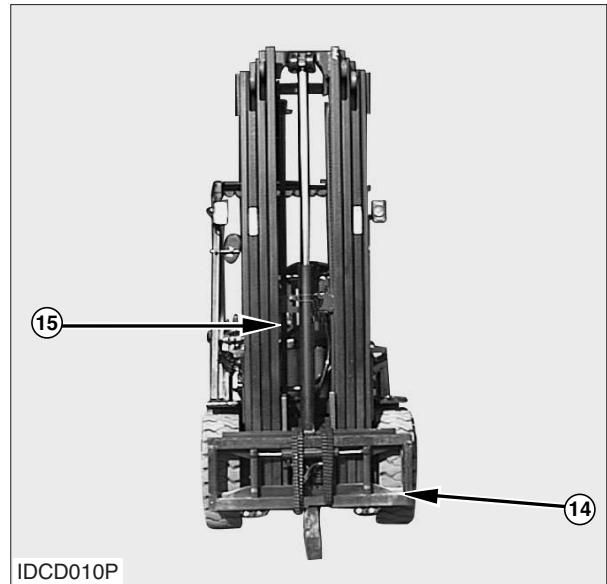


Typical Example

5. Use tool(A) to remove retainer ring(11) from the cross head shaft.
6. Remove cross head(12) from the shaft.



7. Remove carriage bolts(13).

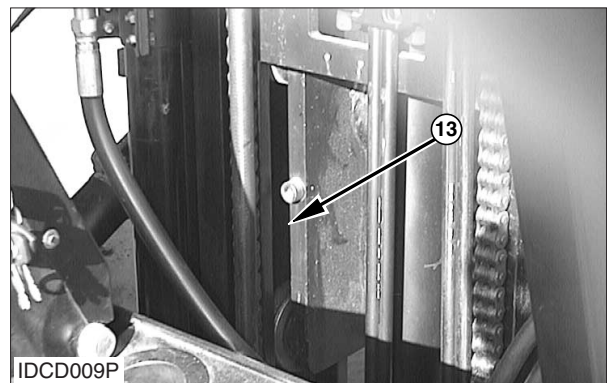


8. Raise the inner mast to pull out carriage as shown.

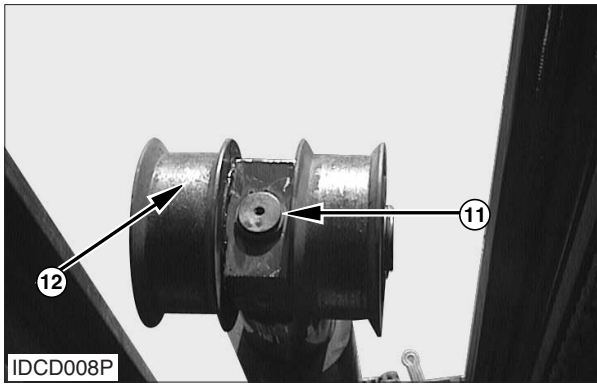
9. Remove carriage from bottom of inner mast(15). Carriage(14) weighs **116kg(255 lb)**.

NOTE: Use the following steps to install the carriage.

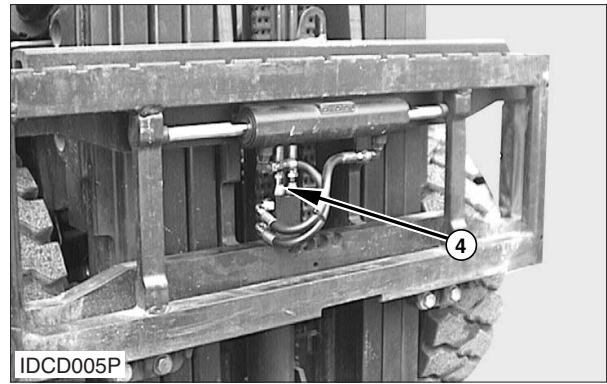
10. Raise the inner mast to put in the carriage onto the mast, and lower the inner mast to cover carriage(1) bearing fully.



11. Install carriage bolts(13).



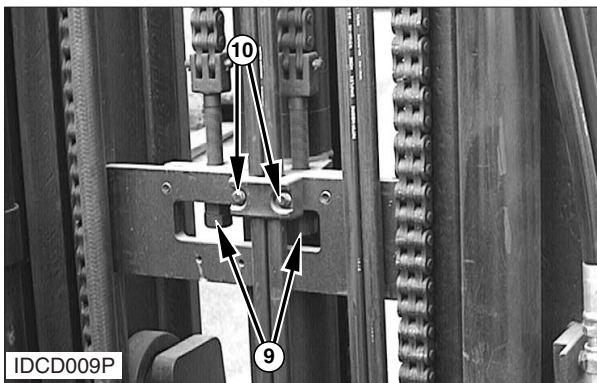
12. Install cross head(12) and retaining ring(11).



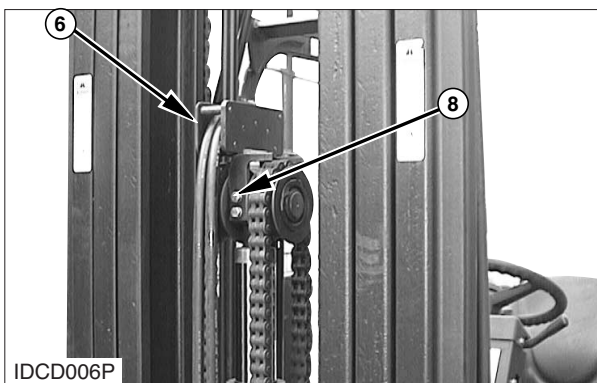
15. Connect two hydraulic line(4) in their original positions.

End By:

- a. Install backrest.
- b. Install forks.



13. Put the chains in position over cross head(12).
Install nuts(9) onto the chain anchors.
Install bolts(10) onto the hose mounting bracket.

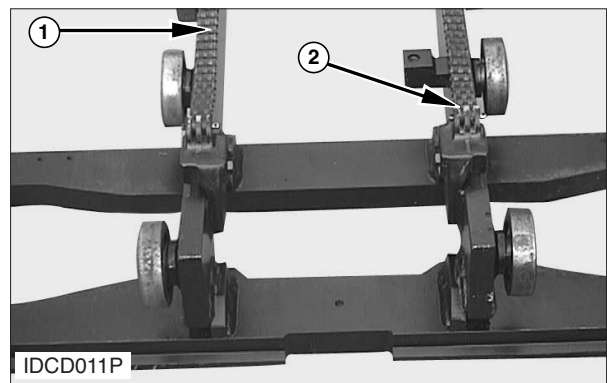


14. Install chain guard/hose support assembly(6) and four bolts(8).

Disassemble Carriage

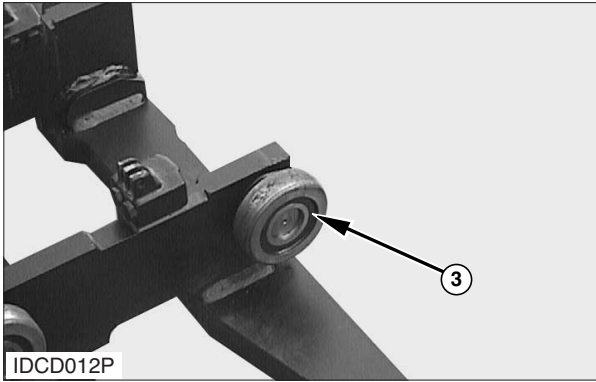
Start By:

- a. Remove carriage.

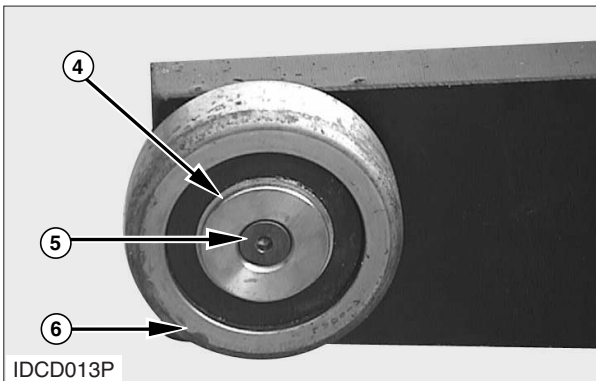


Typical Example

- 1. Remove the roll pins and pins(2) to disconnect chains(1).



2. Remove four lower roller bearings(3) and the shims from the carriage.



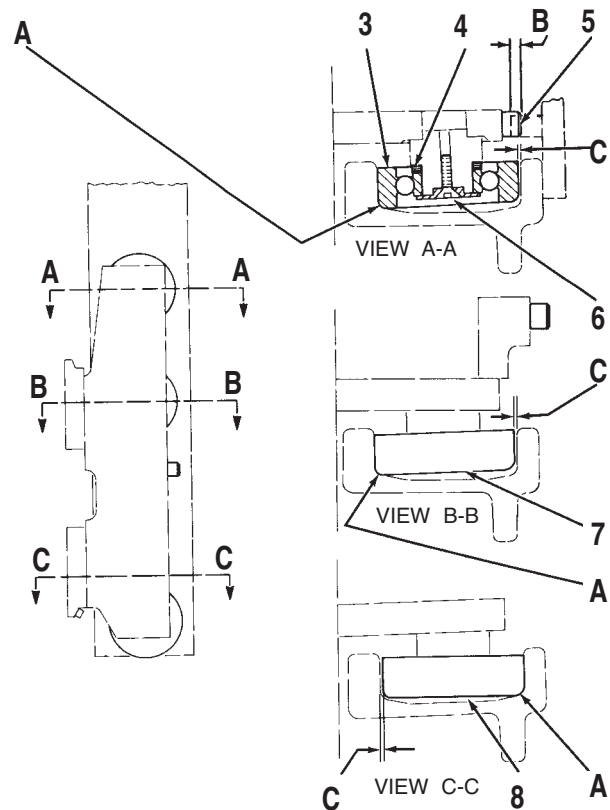
3. Remove screw(5) and washer(4). Remove top roller bearings(6) and the shims.

Assemble Carriage

NOTE : The standard, Full Free Lift and Full Free Triple Lift carriage load bearings are all adjusted the same way. The Full Free Triple Lift carriage is shown in the following illustrations.

To make the carriage clearance adjustments, carriage must be removed from the mast.

Use the procedure that follows to adjust carriage load bearings.



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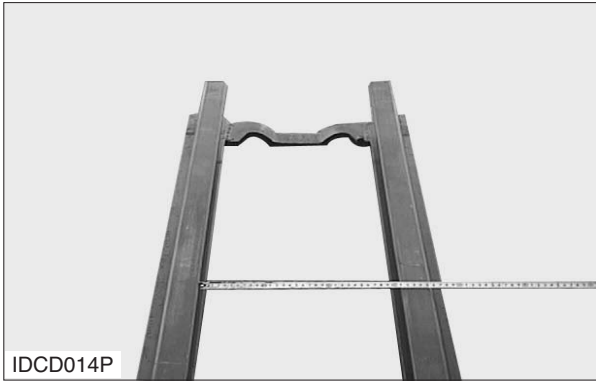
Carriage Adjustment

- (3) Upper bearings. (4) Shims. (5) Bolt. (6) Screw.
 (7) Middle bearings. (8) Lower bearings. (A) Zero clearance.
 (B) 6.0 to 9.0 mm. (.236 to .354 in) clearance.
 (C) Minimum clearance.

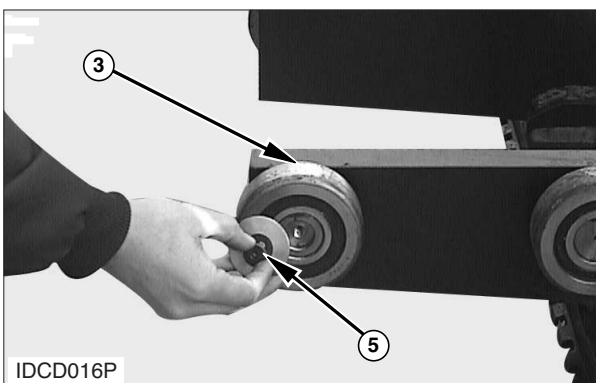
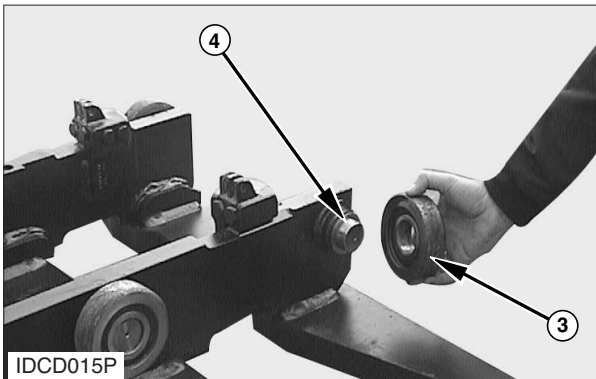
1. Select lower bearings from the chart to obtain minimum clearance (B) between bearings and channel leg for full channel length. Use same bearing in all six locations.

Mast And Carriage Bearings		
Part No.	Bearing Size	Bearing O.D.*
D581814	Under Size	108.6 mm (4.276 in)
D581815	Standard	109.6 mm (4.135 in)
D581816	Over Size	110.7 mm (4.358 in)

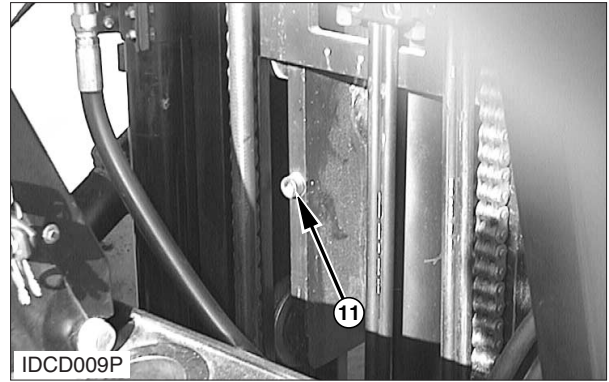
* Permissible tolerance ± 0.08 mm (.003in)



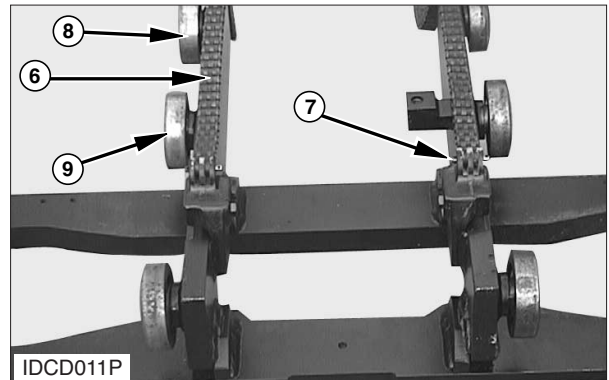
2. Find narrowest point by ruler on the inner mast in the area where the bearings make contact.
3. Install enough shims (4) that have been divided into two equal groups behind bearings (3). At installation, there is to be contact [zero clearance (A)] between the bearings and the narrowest point of inner mast.
4. Do step 2 through 3 for other sets of bearings (8), (9).



5. Tighten screw (5) that holds the top bearings to the carriage to a torque of $34 \pm 7 \text{ N}\cdot\text{m}$ ($25 \pm 5 \text{ lb}\cdot\text{ft}$)



6. Shim stop bolt (11) as required to obtain a 6 to 9 mm (.24 to .35 in) lap with top carriage stop on the inner upright.



7. Position chains(6) on the carriage. Install pins(7) and the roll pins.

End By:

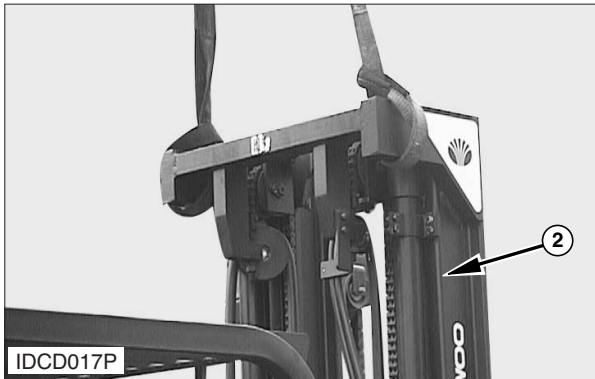
- a. Install carriage, raise the inner mast and insert the carriage from the bottom of inner mast.

Mast

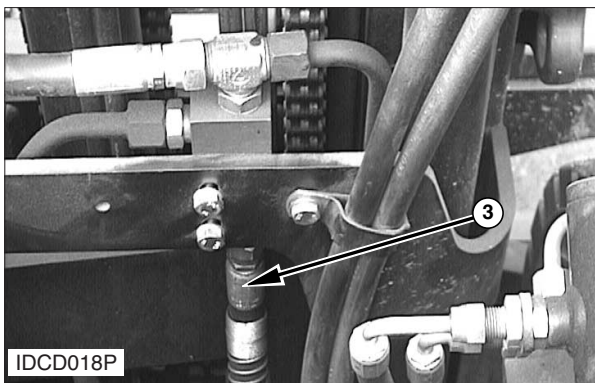
Remove & Install Mast

Start By:

- a. remove forks
- b. drain the hydraulic oil to tank



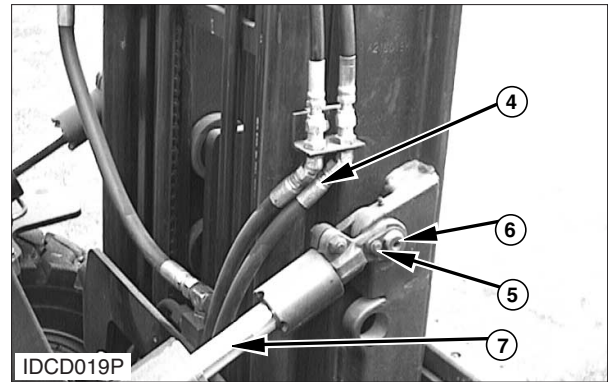
1. Support mast assembly(2) with a hoist and two straps as shown.



NOTICE

Place identification marks on all hydraulic connectors and hoses to assure proper installation. Plug and cap all hydraulic connectors and hoses to avoid debris and contamination from entering the system.

2. Disconnect hose(3).

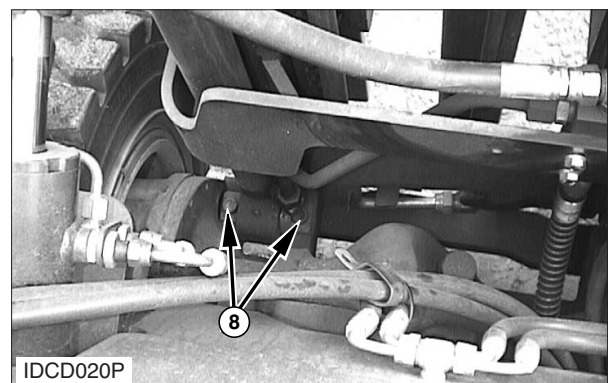


3. Disconnect two hydraulic lines(4).

⚠ WARNING

Tilt cylinders(7) can drop when pin(6) is removed. To avoid component damage or personal injury, support tilt cylinder(7) while removing pin(6).

4. Remove bolt(5) from each side of mast assembly(2).
5. Remove pin(6) from the tilt cylinders on each side of the mast assembly(2).



6. Tilt forward mast assembly(2) about 8° with the hoist.
Remove bolts(8) from each side of the base of mast assembly(2).

WARNING

Loose the tension of straps to be connected with hoist when mast assembly(2) is tilted forward. If straps are too tight, mast assembly(2) could be got off when bolts(8) are removed.

7. Use the hoist to remove mast assembly(2) from the machine.

8. Install the mast in the reverse order of removal.

End By:

a. Install forks.

b. Fill hydraulic oil to tank*.

* Refer to the Operation And Maintenance Manual for further information.

Disassemble Mast

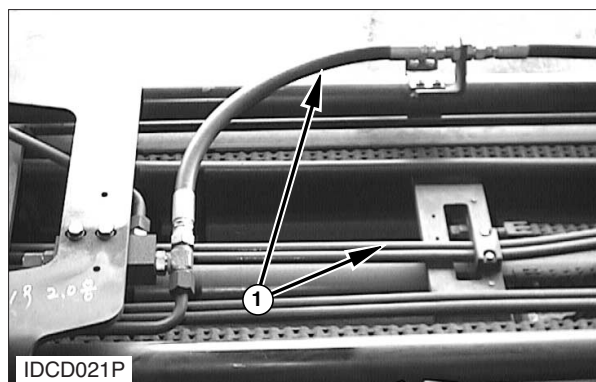
Start By:

a. Remove primary lift cylinder.

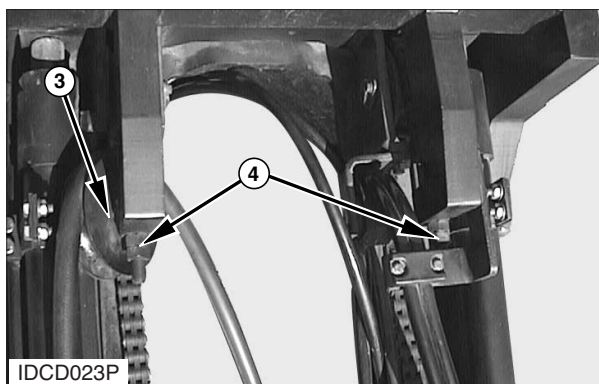
b. Remove side shift cylinder.

c. Remove mast.

NOTE: The following disassembly and assembly procedure is for a full free triple lift mast.

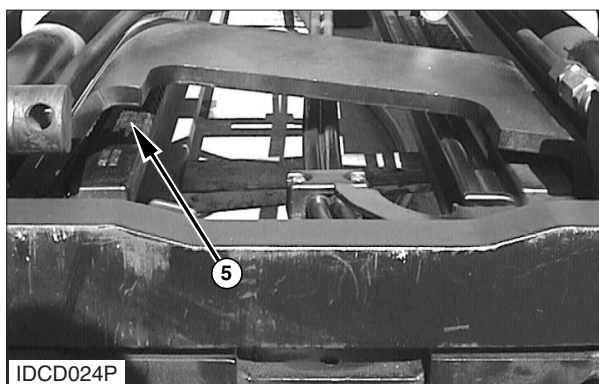


1. Remove hoses(1) along with the hose support clamps.

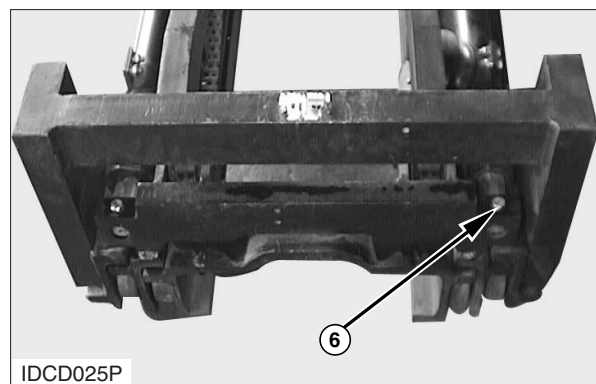


2. Remove hose sheave (3).

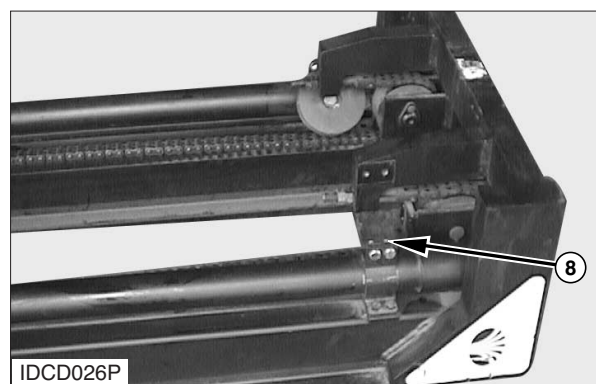
3. Remove chain nut(4) from the top of the mast(each side).



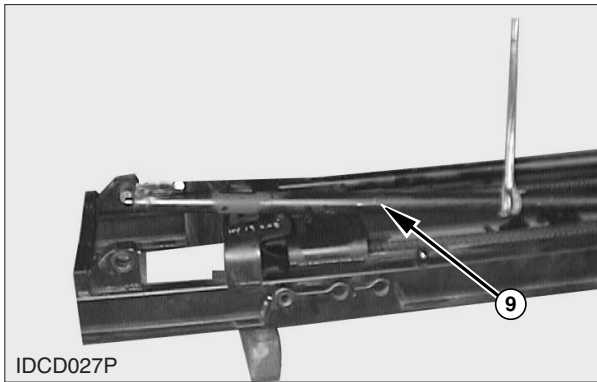
4. Disconnect and remove chains(5) from the bottom of the mast.



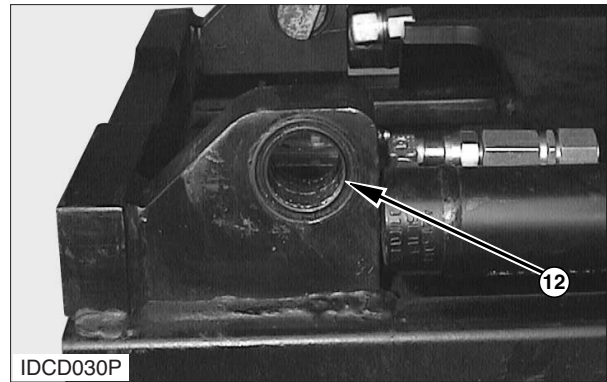
5. Remove top cylinder retainer bolt(6) from each side of the mast.



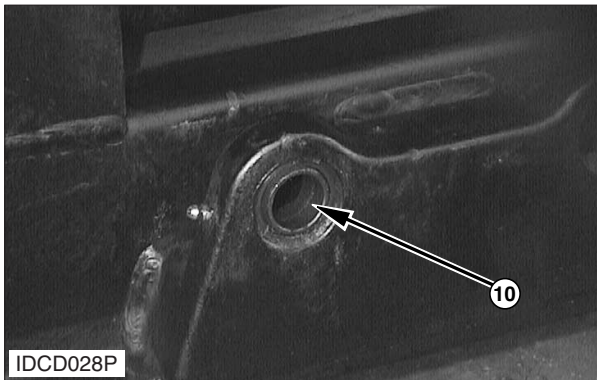
6. Remove cylinder retainer brackets(8) from each cylinder.



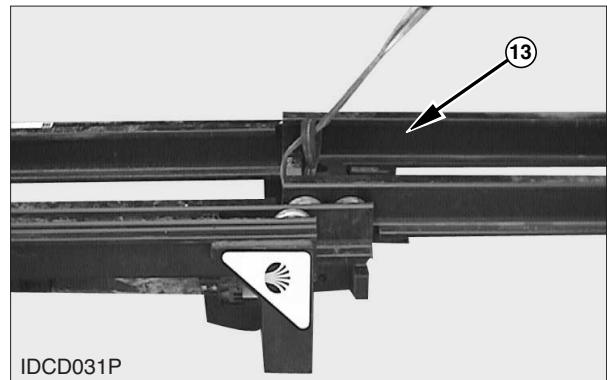
7. Fasten a nylon strap and hoist to secondary cylinder(9) as shown. Remove secondary cylinders(9). Each cylinder weighs 50 kg(110 lb).



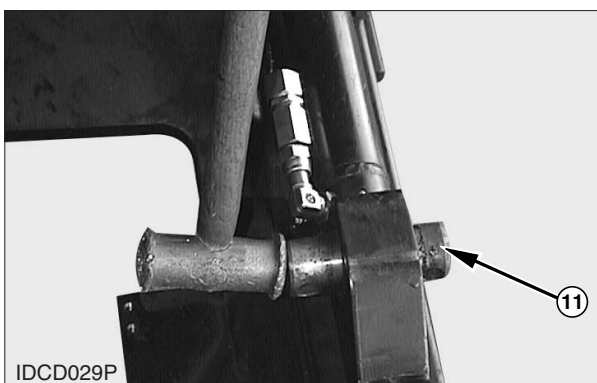
10. Check the condition of the seals and bearings(12) located in each of the mast mounting bores. Replace the seals and bearings(12) with new if worn or damaged. Seal lips should be forward outside



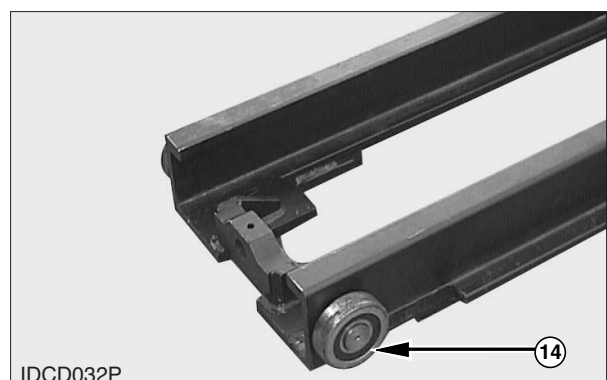
8. Check the condition of bearings(10) located in each of the tilt cylinder pin bores. Replace bearings(10) with new if worn or damaged.



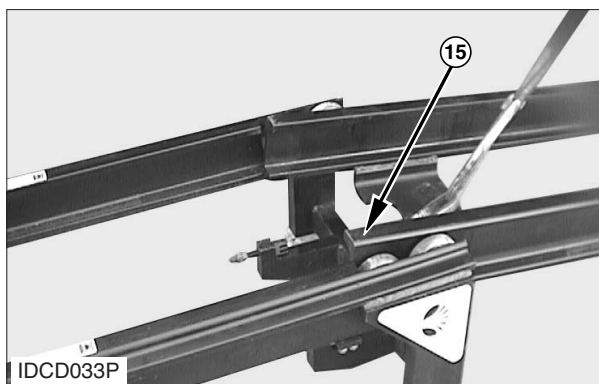
11. Fasten nylon straps and hoist to inner channel(13). Remove inner channel(13). The weight of the inner channel is 150kg(330 lb).



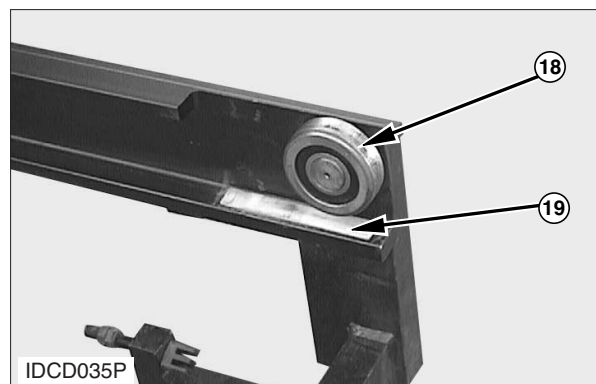
9. Remove mast mounting pins(11) from the mast mounting bores.



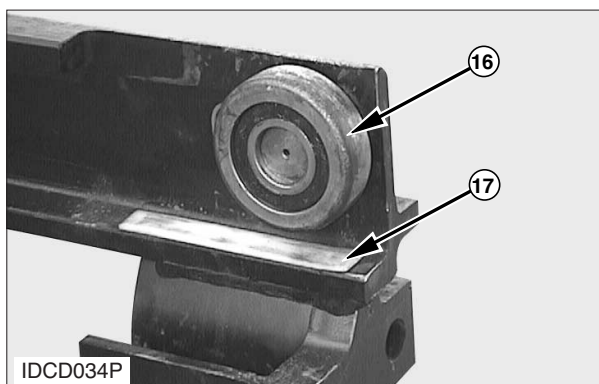
12. Remove rollers(14) and the shims from the inner channel mast.



- 13.** Fasten nylon straps and a hoist to the intermediate mast channel(15). Remove mast channel(15). The intermediate mast channel weighs **168kg (370 lb)**.



- 16.** Remove rollers(18) and the shims from the stationary mast channel.
- 17.** Remove nylon pads(19) and the shims.



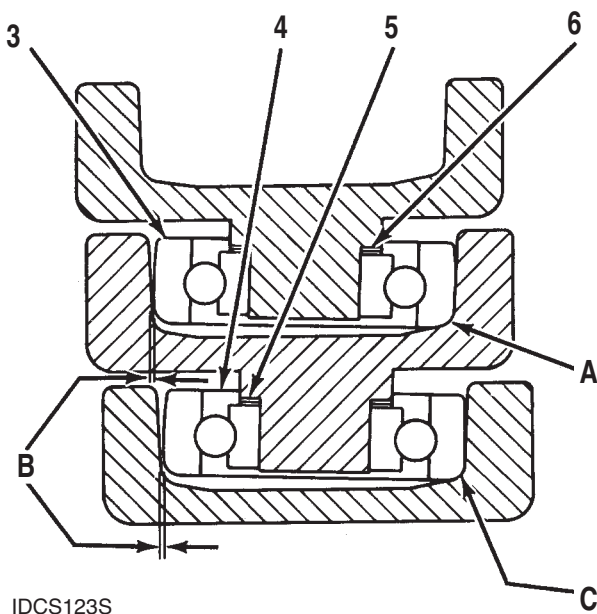
- 14.** Remove rollers(16) and the shims from the intermediate mast channel.
- 15.** Remove nylon pads(17) and the shims.

Assemble Mast

NOTE: The standard, Full Free Lift and Full Free Triple Lift mast load bearings are all adjusted the same way. The mast shown in the following illustrations is the Full Free Triple Lift mast.

1. Make sure all parts are clean and free of dirt and foreign material.
2. Check all parts for damage, use new parts for replacement.

A. Lower Bearing Adjustment of Intermediate Mast

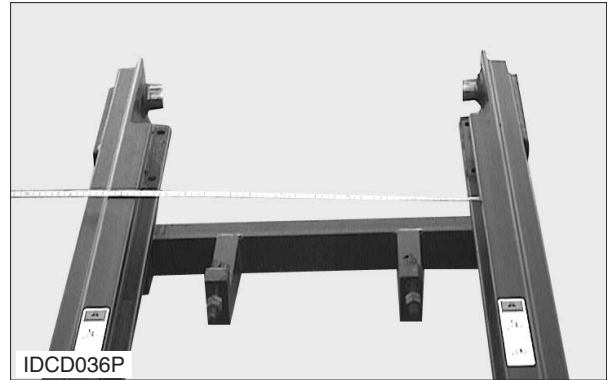


Mast Adjustment Lower Bearings
(A) Zero clearance. (B) Minimum clearance. (C) Zero clearance.
(3) Bearing. (4) Bearing. (5) Shims. (6) Shims.

3. Select lower bearings (3) and (4) from the chart to obtain minimum clearance (B) between bearing and channel leg for full channel length. Must use same bearing on left and right side.

Mast And Carriage Bearings		
Part No.	Bearing Size	Bearing O.D.*
D581814	Under Size	108.6 mm (4.276 in)
D581815	Standard	109.6 mm (4.135 in)
D581816	Over Size	110.7 mm (4.358 in)

* Permissible tolerance ± 0.08 mm (.003 in)



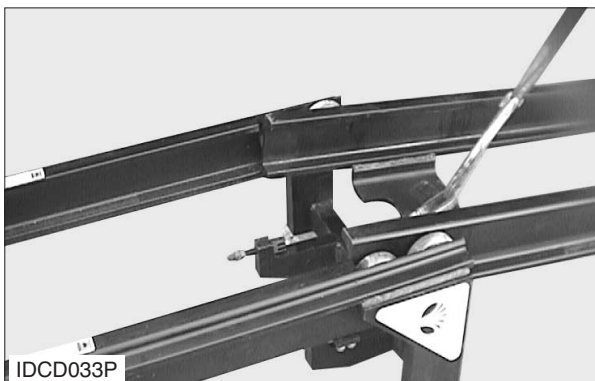
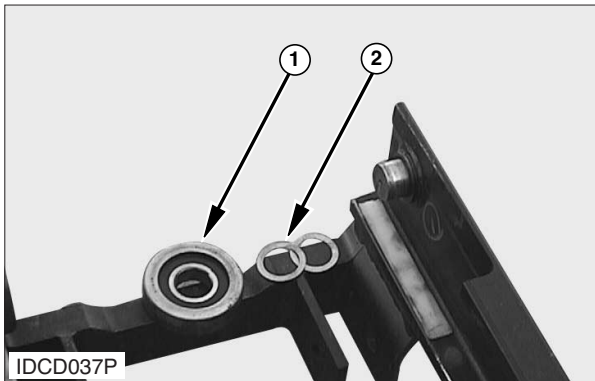
4. Find narrowest point by ruler on the stationary mast in the area where the bearings make contact at 475 mm (18.7 in) channel lap.

NOTE: When installing shims (2) behind bearings (1), make sure the amount of shim is divided equally when positioned behind each bearing (1).

5. Install the correct amount of shim (2) behind rollers until contact (zero clearance) is made between the rollers.

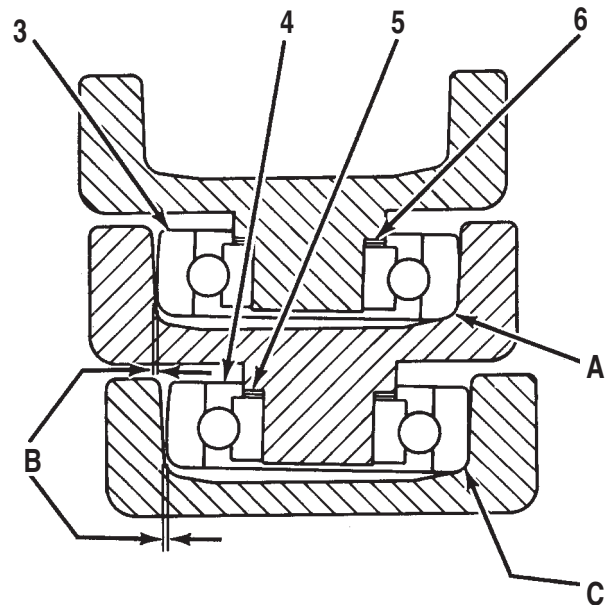
NOTICE

When the correct amount of shim has been installed behind rollers (1) there will be contact (zero clearance) between the rollers and the inner mast at most narrow point of mast (refer to step 4)



6. Install 1 mm shim to each bearing of intermediate lower and stationary upper basically. Lifting by crane, insert intermediate mast into stationary mast from the upper side.

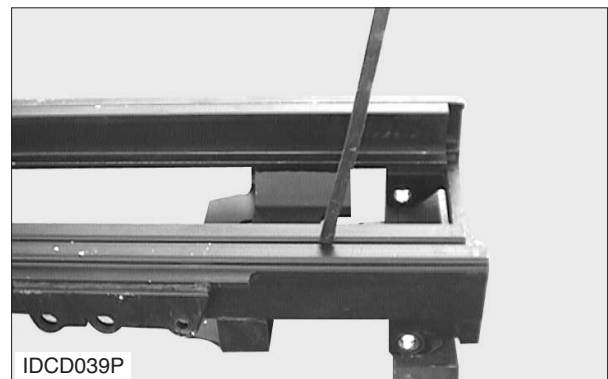
NOTE: When installing shims (5) behind bearings (4), make sure the amount of shim is divided equally when positioned behind each bearing (4).



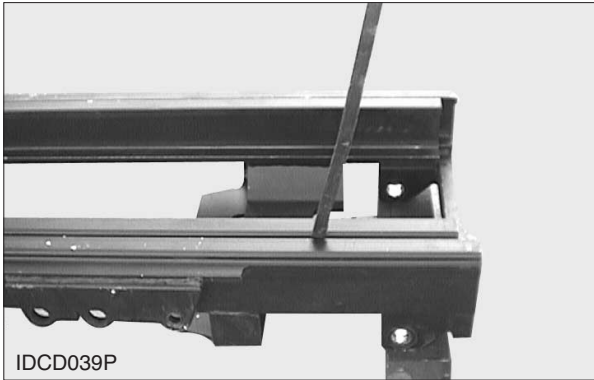
IDCS123S

Mast Adjustment Lower Bearings

(A) Zero clearance. (B) Minimum clearance. (C) Zero clearance.
(3) Bearing. (4) Bearing. (5) Shims. (6) Shims.

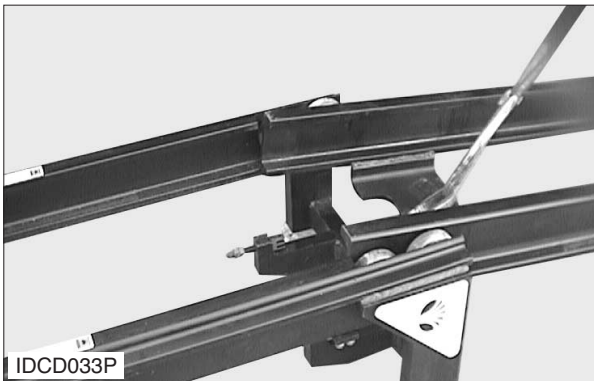


7. Make sure whether intermediate mast lower bearings are properly shimmed in the stationary mast by rolling up and down and moving intermediate mast to right and left. If clearance between both masts can be detected, pull out the intermediate mast from the stationary mast with crane and add shim 0.5 mm or 1 mm to both intermediate lower bearings.

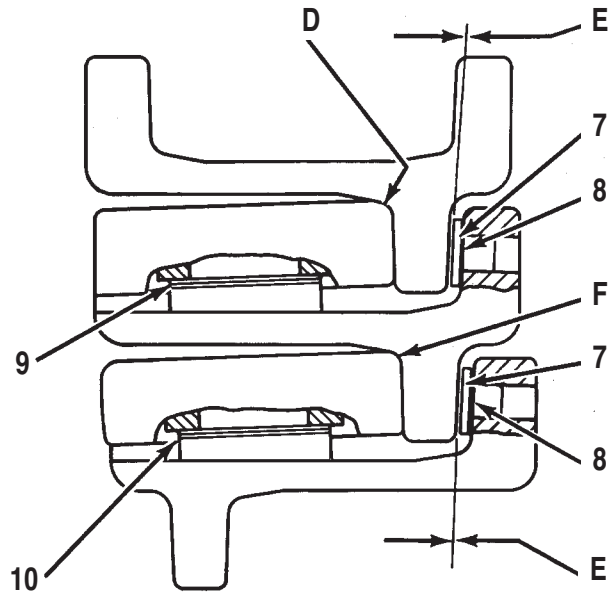


8. In case of standard and full free mast, inner lower bearings can be easily extruded by pulling down the inner mast from the bottom of stationary mast. If intermediate mast is stuck and do not move rolling up and down, there might be excessive shim. Pull out the intermediate mast from the stationary mast and remove shim 0.5 mm to both intermediate lower bearings. Repeat same procedure of above until properly shimmed. There is to be contact zero clearance (C) between intermediate lower bearings and stationary channel at approximately 475 mm (18.7 in) channel lap.

B. Upper Bearing Adjustment of Stationary Mast



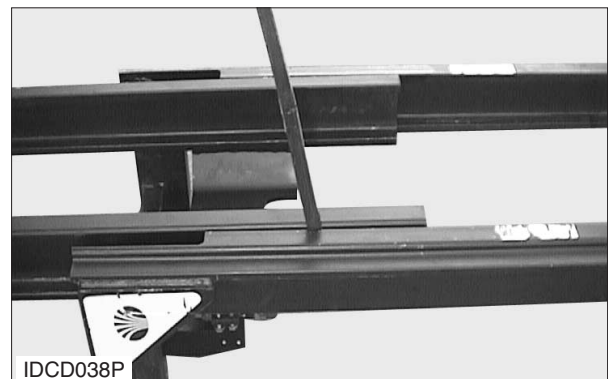
9. Lifting by crane, and pull out intermediate mast from stationary mast. Install 1 mm shim to each bearing of stationary mast upper basically. Bearing should be selected D581814 under size bearing.



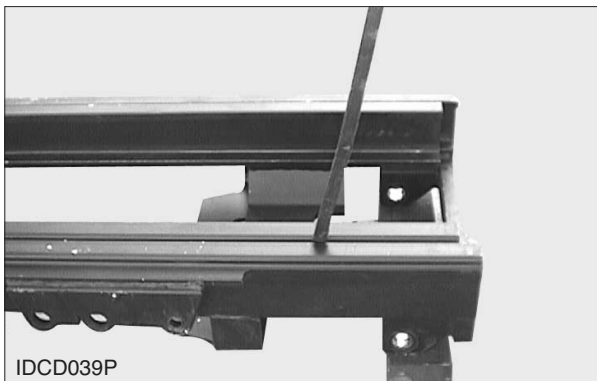
IDCS124S

Mast Adjustment Upper Bearings

- (D) Zero clearance. (E) 0.80 mm (.031 in) Clearance maximum. (F) Zero clearance. (7) Pads. (8) Shims. (9) Shims. (10) Shims.

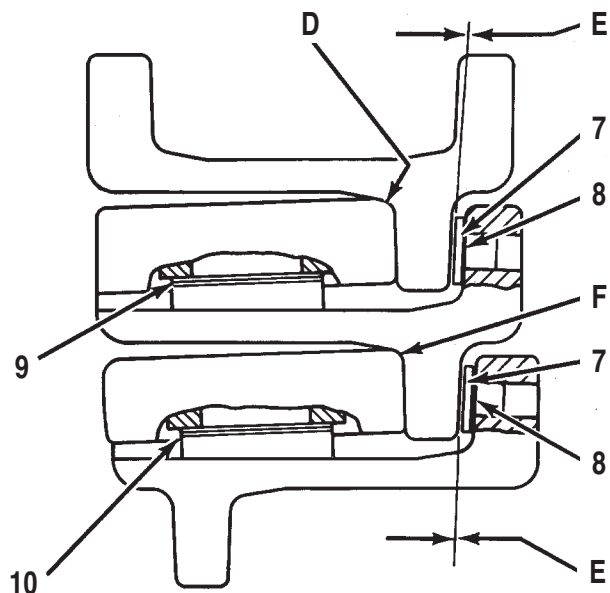


10. Make sure whether stationary mast upper bearings are properly shimmed by rolling up and down and moving intermediate mast to right and left. If clearance between both masts can be detected, pull out the intermediate mast from the stationary mast with crane and add shim 0.5 mm or 1 mm to both stationary upper bearings.



11. In case of standard and full free mast, stationary upper bearings can be easily extruded by pulling down the inner mast from the bottom of stationary mast. If intermediate mast is stuck and do not move rolling up and down, there might be excessive shim. Pull out the intermediate mast from the stationary mast and remove shim 0.5 mm to both stationary upper bearings. Repeat same procedure of above until properly shimmed. There is to be contact zero clearance (C) between stationary upper bearings and the widest point of intermediate mast to be checked before.

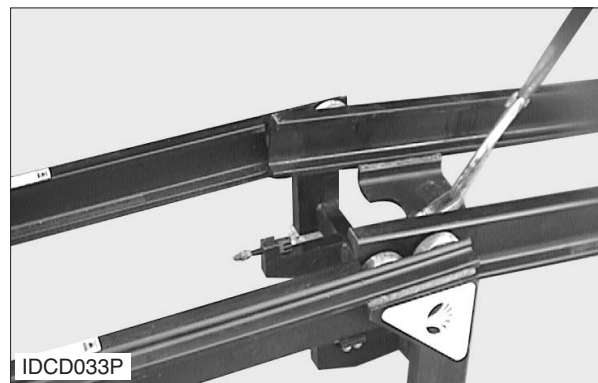
C. Upper Pad Adjustment



IDCS124S

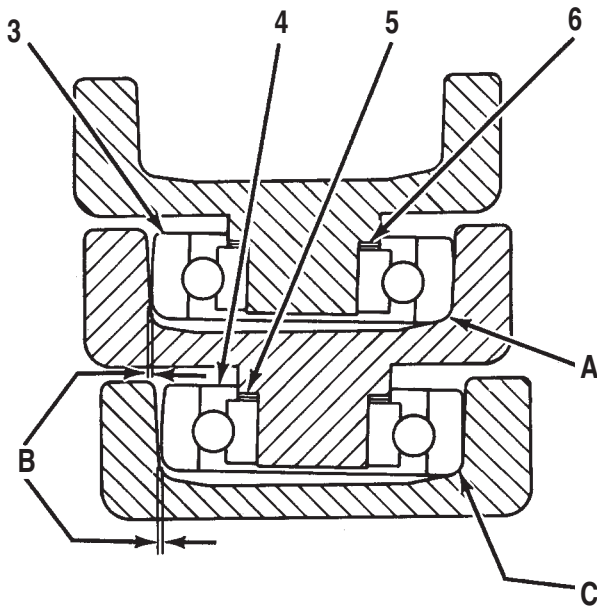
Mast Adjustment Upper Bearings

(D) Zero clearance. (E) 0.80 mm (.031 in) Clearance maximum. (F) Zero clearance. (7) Pads. (8) Shims. (9) Shims. (10) Shims.



12. Install shims (8) behind each pad (7) until there is 0.80 mm (.031 in) maximum clearance (E) between the pads and the inner and intermediate masts with the masts at full extension. Lifting by crane, and pull out intermediate mast from stationary mast and insert the shims behind each pad. In case of standard and full free mast, the pads of stationary upper can be easily extruded by pulling down the inner mast from the bottom of stationary mast.

D. Lower Bearing Adjustment of Inner Mast



IDCS123S

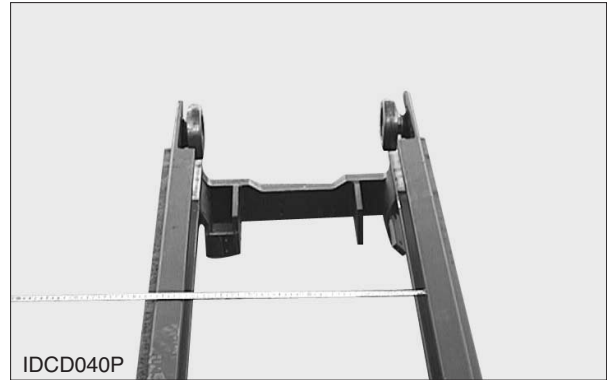
Mast Adjustment Lower Bearings

(A) Zero clearance. (B) Minimum clearance. (C) Zero clearance. (3) Bearing. (4) Bearing. (5) Shims. (6) Shims.

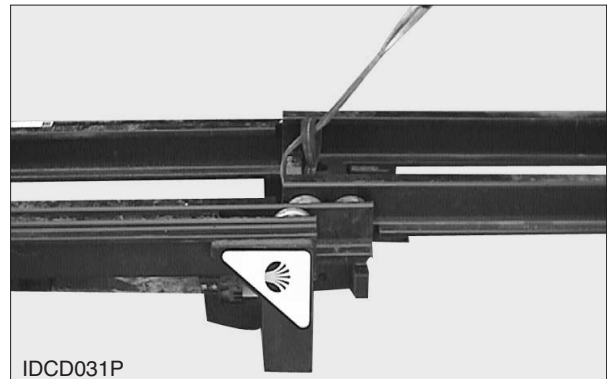
13. Select lower bearings (3) and (4) from the chart to obtain minimum clearance (B) between bearing and channel leg for full channel length. Must use same bearing on left and right side.

Mast And Carriage Bearings		
Part No.	Bearing Size	Bearing O.D.*
D581814	Under size	108.6 mm (4.276 in)
D581815	Standard	109.6 mm (4.135 in)
D581816	Over size	110.7 mm (4.358 in)

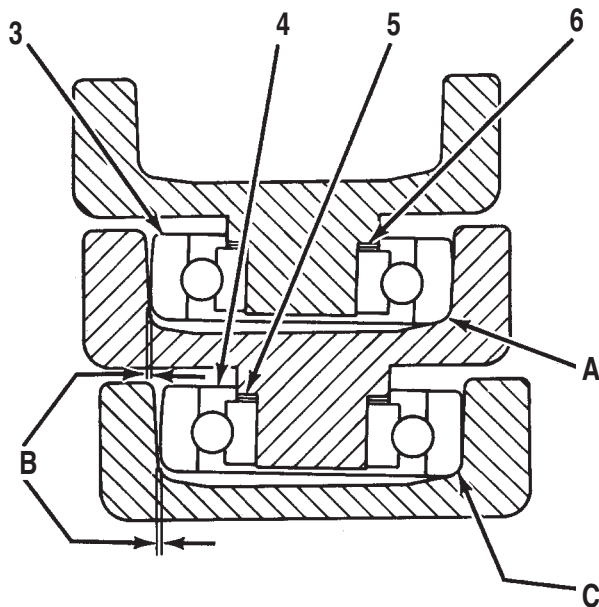
* Permissible tolerance $\pm 0.08\text{mm}$ (.003in)



14. Find narrowest point by ruler on the intermediate mast in the area where the inner lower bearings make contact full length of intermediate mast excluding minimum channel lap 475 mm (18.7 in).



15. Install 1 mm shim to each bearing of inner lower and intermediate upper basically. Lifting by crane, insert inner mast into intermediate mast from the upper side.



IDCS123S

Mast Adjustment Lower Bearings

(A) Zero clearance. (B) Minimum clearance. (C) Zero clearance.
(3) Bearing. (4) Bearing. (5) Shims. (6) Shims.

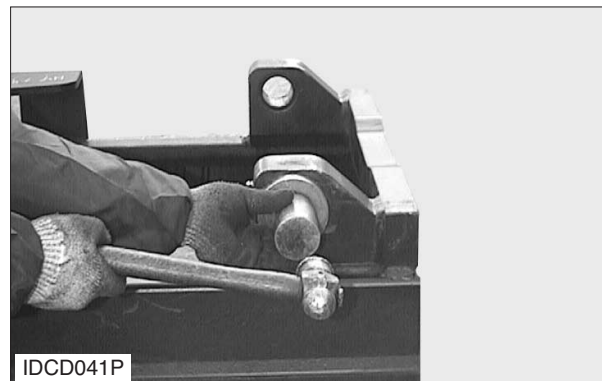
16. Make sure whether inner mast lower bearings are properly shimmed in the intermediate mast by rolling up and down and moving inner mast to right and left. If clearance between both masts can be detected, pull down the inner mast from the bottom of intermediate mast. Inner lower bearings can be easily extruded. Add shim 0.5 mm or 1 mm to both inner lower bearings. If inner mast is stuck and do not move rolling up and down, there might be excessive shim. Pull out the inner mast from the intermediate mast and remove shim 0.5 mm to both inner lower bearings. Repeat same procedure of aboves until properly shimmed. There is to be contact zero clearance (C) between inner lower bearings and intermediate channel at narrowest point.

E. Upper Bearing Adjustment of intermediate Mast

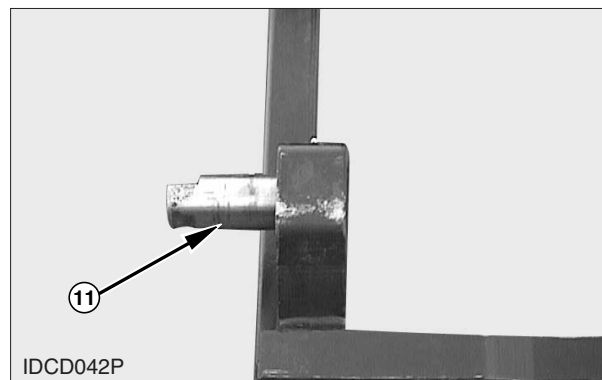
Follow same procedure with above B.

F. Upper Pad Adjustment of Intermediate Mast

Follow same procedure with above C.



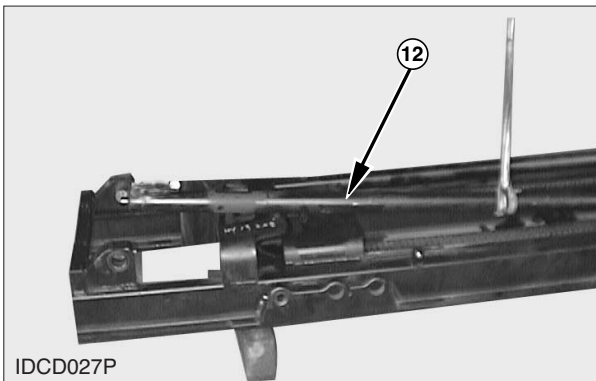
17. If the seals and bearings were removed from the mast mounting blocks, install new ones.



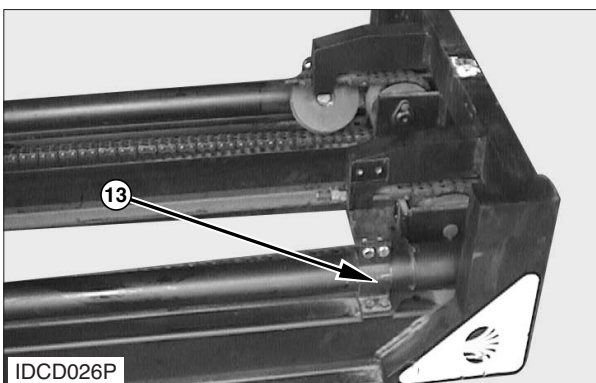
18. Put a small amount of clean grease on mounting pins (11). Install mounting pins (11) into mast mounting blocks.



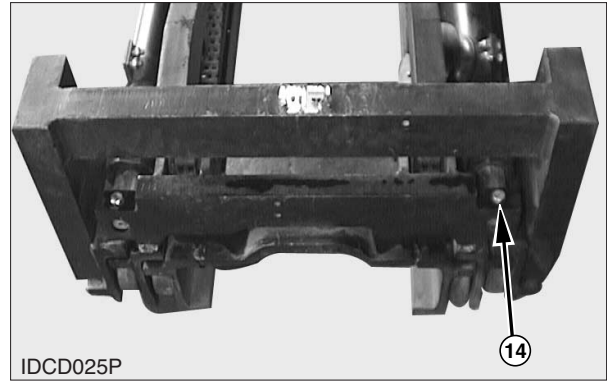
19. If the bearings were removed from the tilt cylinder pin bores, install new ones.



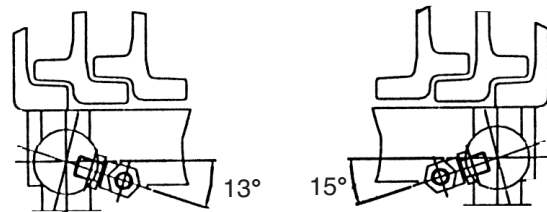
20. Fasten a hoist and nylon strap to secondary cylinder (12). Install secondary cylinders (12) into the stationary mast.



21. Install secondary cylinder mounting brackets (13) over the secondary cylinders.

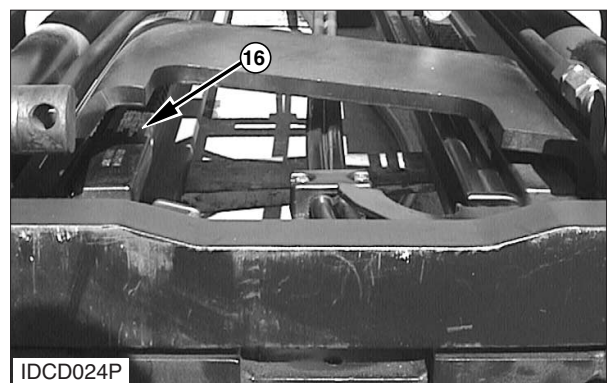


22. Install top retainer bolts (14) for the secondary cylinders.

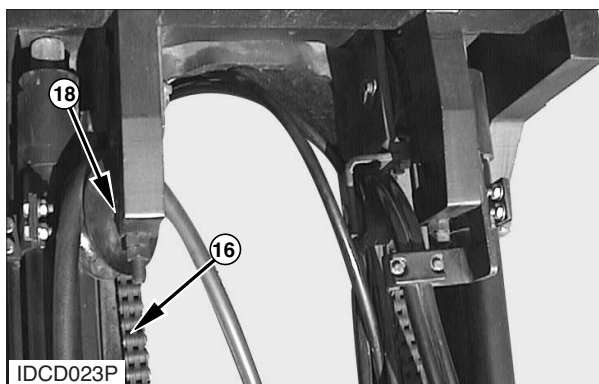


IDCD322S

23. Install hydraulic steel tube to each secondary cylinder. When install the steel tube, assembling angle should be kept as shown in above figure.

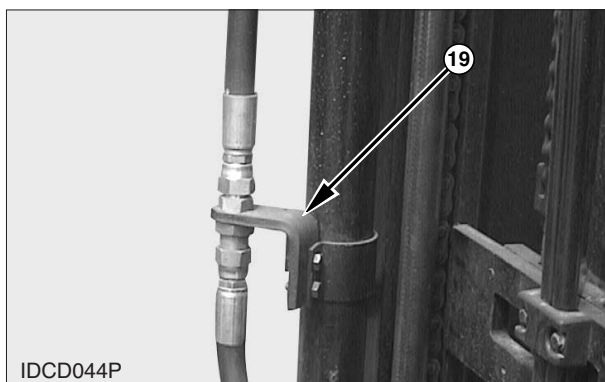


24. Connect chains (16) at the bottom of the mast.

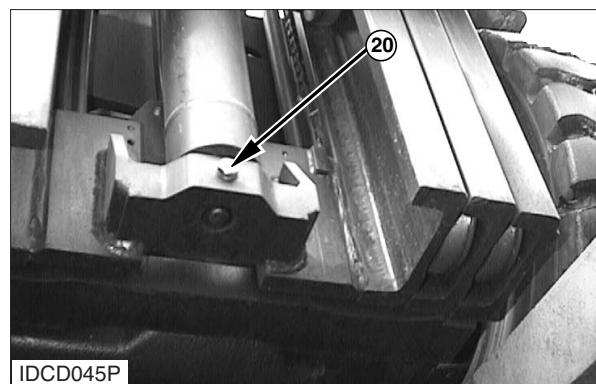


25. Connect chains (16) at the chain bracket of stationary mast upper.

26. Install sheave (18) of lift hose.



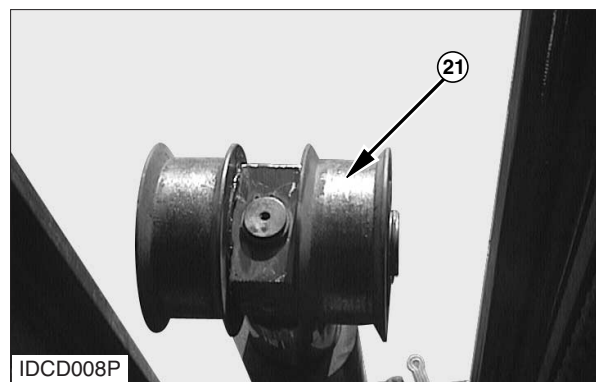
27. Install the lift hose support bracket(19) and hoses.



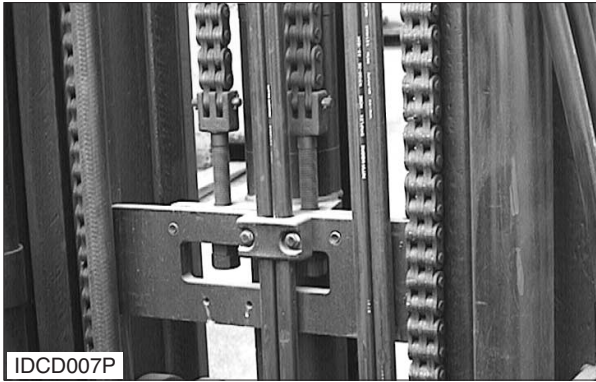
28. Install primary lift cylinder. Assemble primary lift cylinder retainer bolt(20).



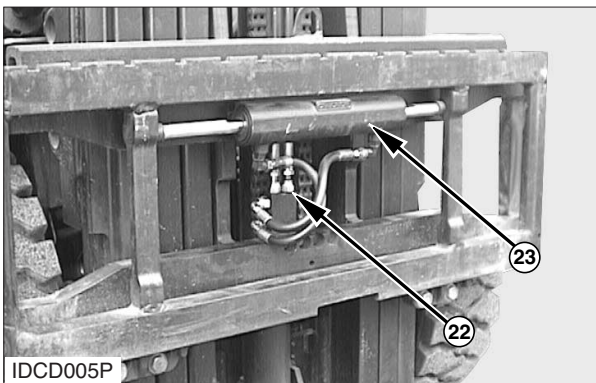
29. Install carriage assembly from the bottom of inner mast.



30. Install cross head(21) to primary lift cylinder.



31. Install carriage chains to primary lift cylinder.



32. Install hydraulic hose (22) of side shifter to side shifter cylinder (23).



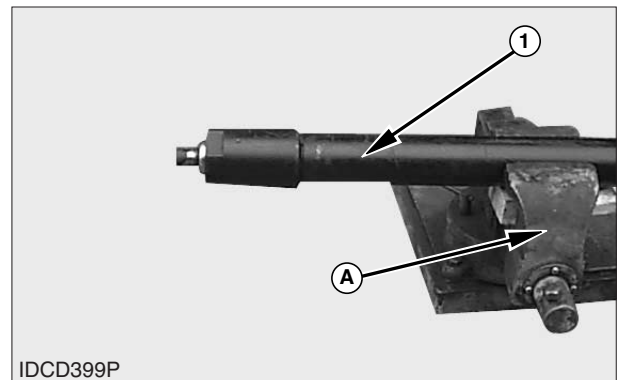
33. Install mast to lift truck.

Standard Lift Cylinders

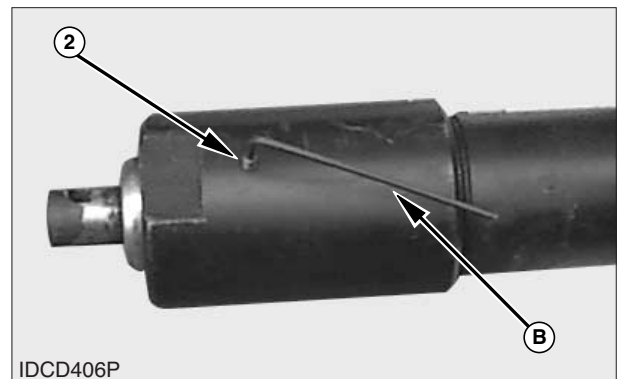
Disassemble Standard Lift Cylinders

Start By:

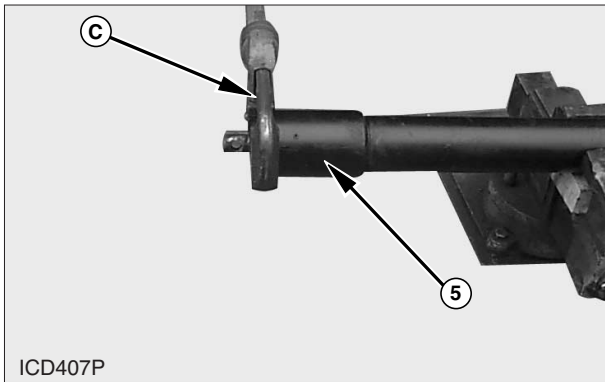
a. Remove standard lift cylinders.



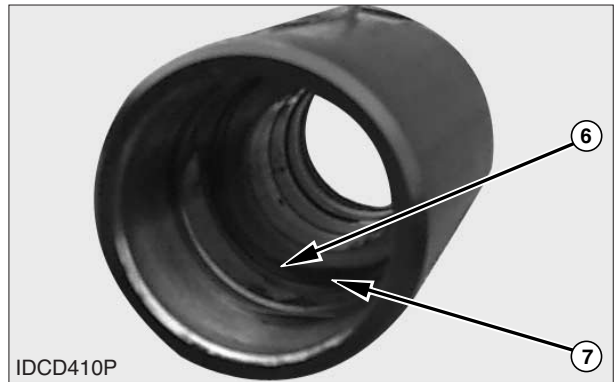
1. Put standard lift cylinder (1) in position on vise (A).



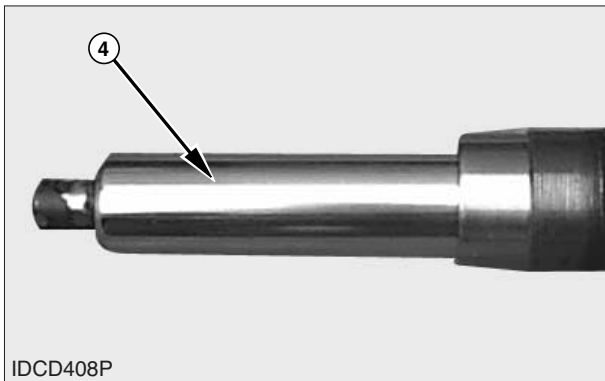
2. Loosen set screw (2) with wrench (B).



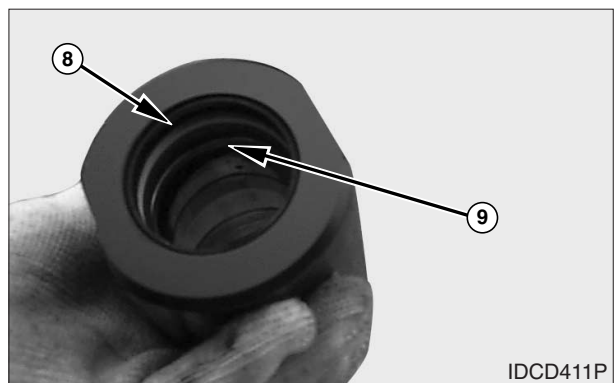
3. Remove bearing (3) with wrench (C).



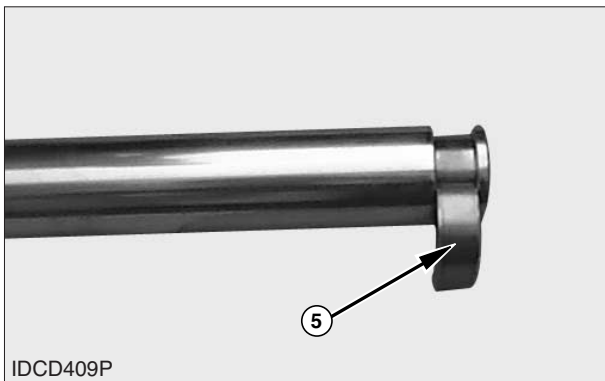
6. Remove O-ring seal (6) and back-up ring (7) from the bearing.



4. Remove rod (4) from the cylinder body.

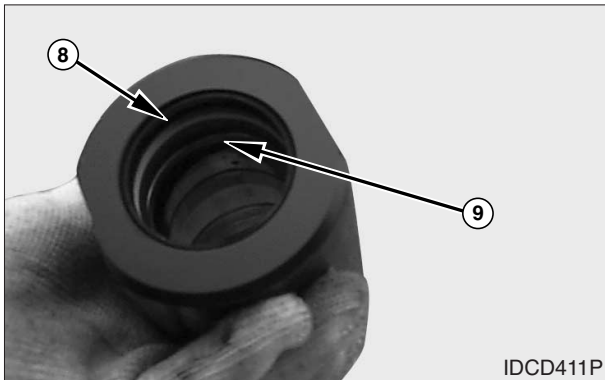


7. Remove wiper seal (8) and seal (9) from the bearing.

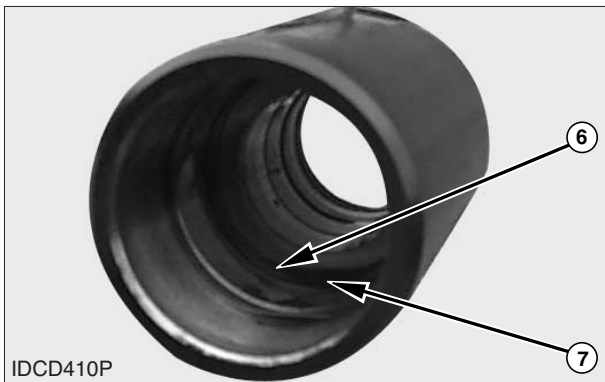


5. Remove split rings (5) from the cylinder rod.

Assemble Standard Lift Cylinders

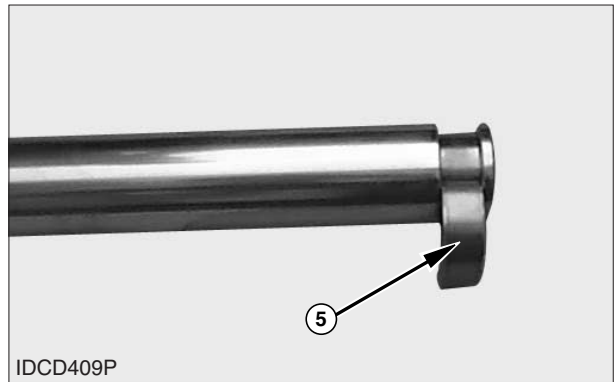


1. Install seal (2) in the bearing.
2. Install wiper seal (1). Install the seal with the lip toward the outside.

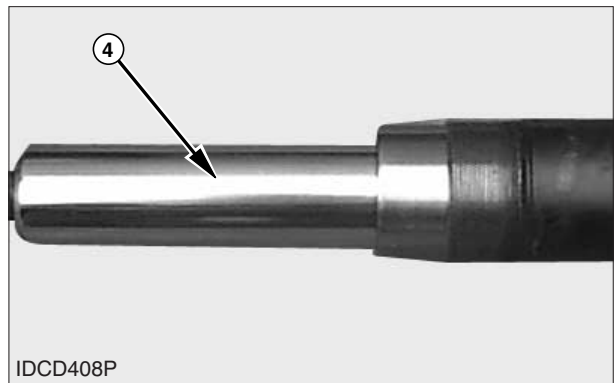


NOTE : Install back-up ring (4) with the curved side contacting the O-ring seal.

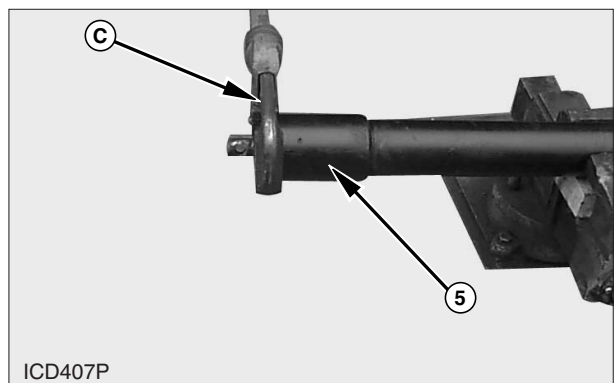
3. Install O-ring seal (3) and back up ring (4) into the bearing.



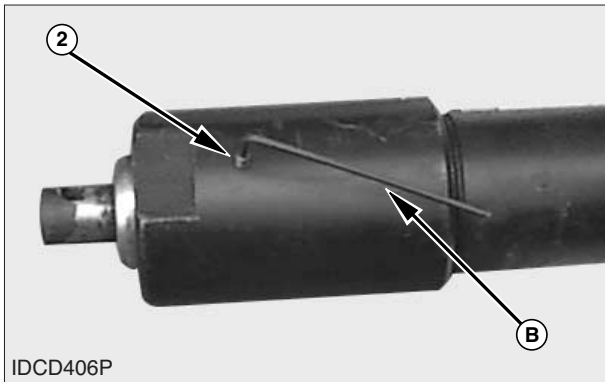
4. Install split rings (5) on the cylinder rod.



5. Install cylinder rod (6) in the cylinder body.



6. Install bearing (7) on the cylinder rod and tighten using wrench (C).



7. Tighten setscrew (8) with wrench (B) to a torque of $6 \pm 1 \text{ N}\cdot\text{m}$ ($53 \pm 9 \text{ lb}\cdot\text{in}$).

End By:

a. Install standard lift cylinders.

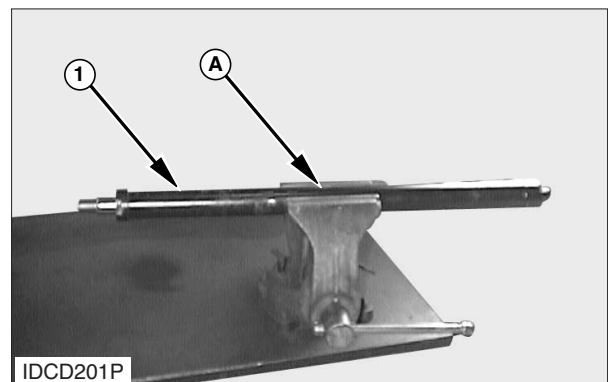
Secondary Lift Cylinders

Disassemble Secondary Lift Cylinders

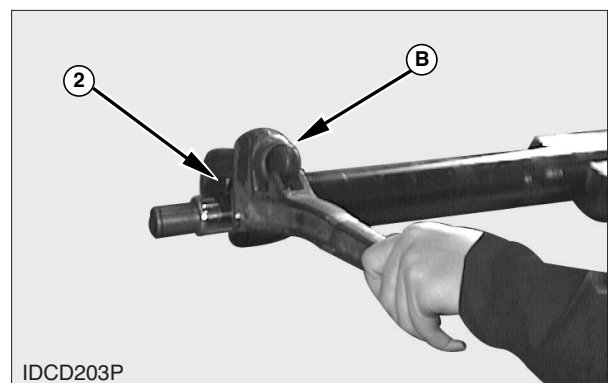
Tools Needed	A	B
Hydraulic Cylinder Repair Stand	1	
Wrench Assembly		1

Start By:

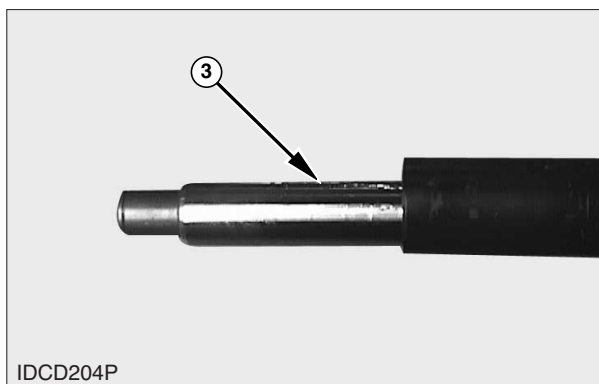
a. Remove standard lift cylinders.



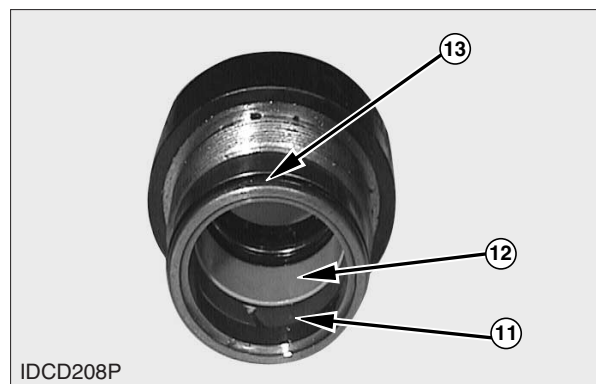
1. Put standard lift cylinder (1) in position on tool (A).



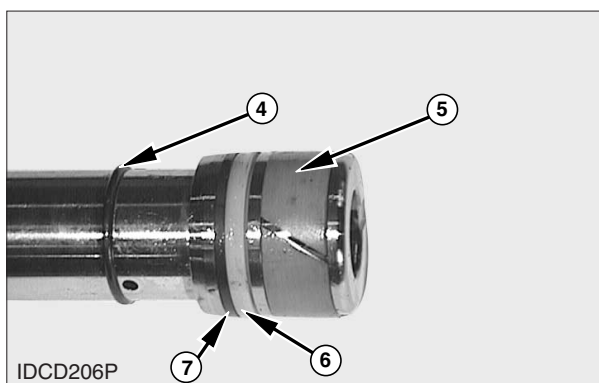
2. Remove bearing (2) with tool (B).



3. Remove rod (4) from the cylinder body.

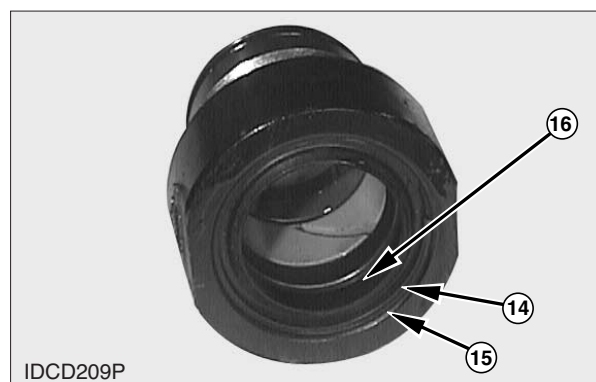


7. Remove slyd ring (11), wear ring (12) and O-ring (13) from the bearing.



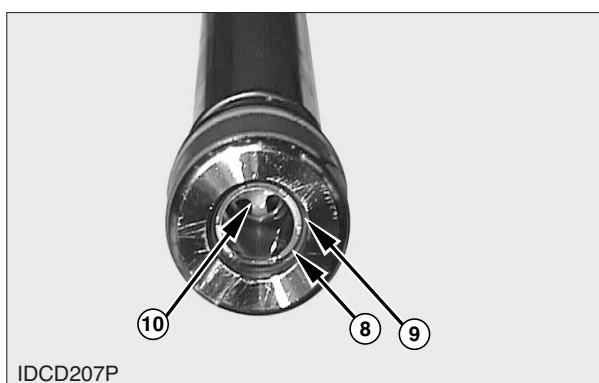
4. Remove stop ring (4) from the cylinder rod.

5. Remove wear ring (5), U-packing (6) and backup ring (7).



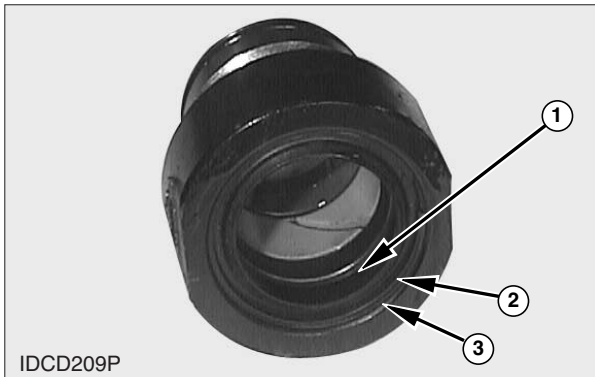
8. Remove wiper seal (14) and retaining ring (15) from the bearing.

9. Remove U-packing (16).

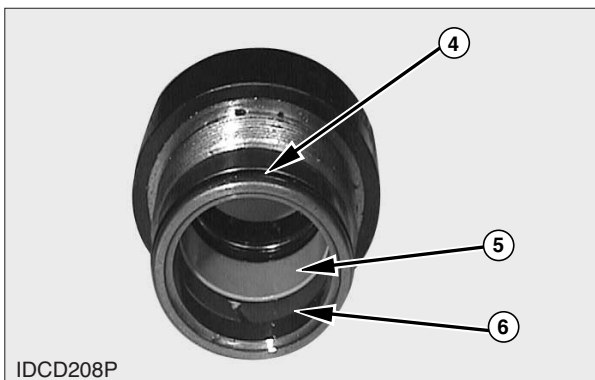


6. Remove retaining ring (8), spacer (9) and check valve (10).

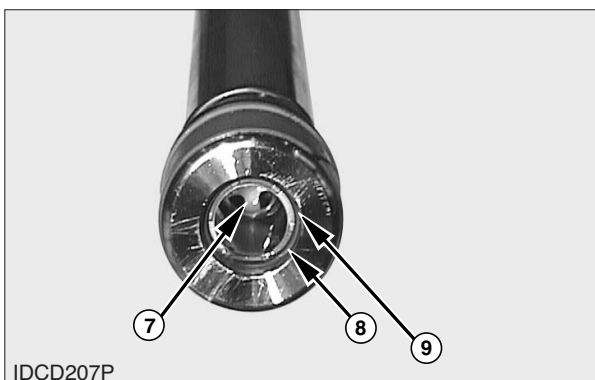
Assemble Secondary Lift Cylinders



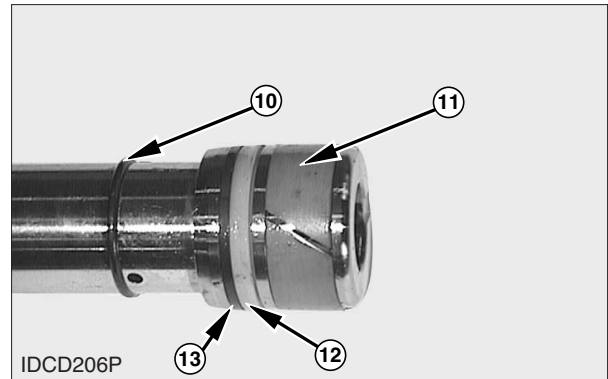
1. Install U-packing (1) in the bearing.
2. Install wiper seal (2) and retaining ring (3). Install the seal with the lip toward the outside.



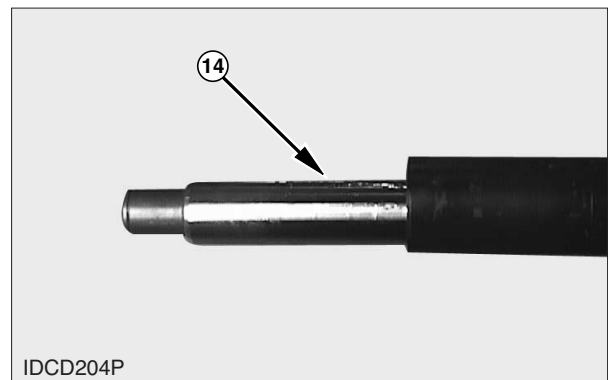
3. Install O-ring (4), wear ring (5) and slyd ring (6) in the bearing.



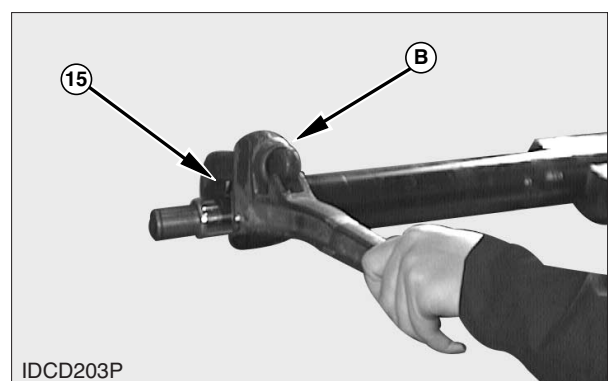
4. Install check valve (7), retaining ring (8) and spacer (9).



5. Install stop rings (10) on the cylinder rod.
6. Install wear ring (11), U-packing (12) and backup ring (13).



7. Install cylinder rod (14) in the cylinder body.



8. Install bearing (15) on the cylinder rod and tighten using tool (B).

End By :

- a. Install secondary lift cylinders *

* Refer to the topic "Assemble Mast" in this module.

Primary Lift Cylinder

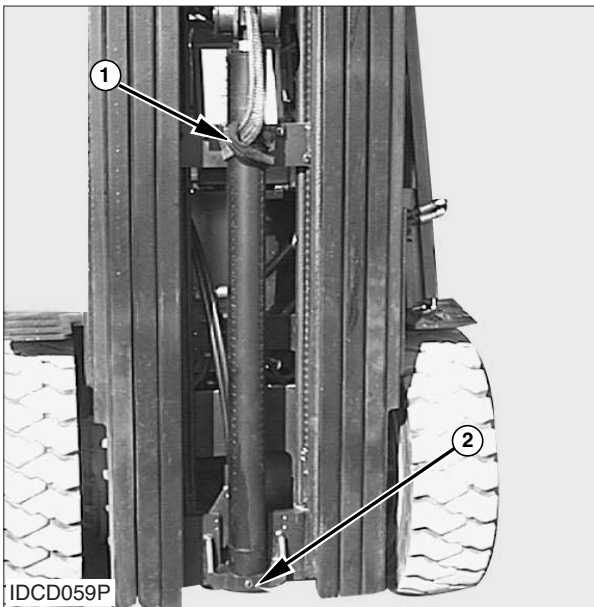
Remove & Install Primary Lift Cylinder

Start By:

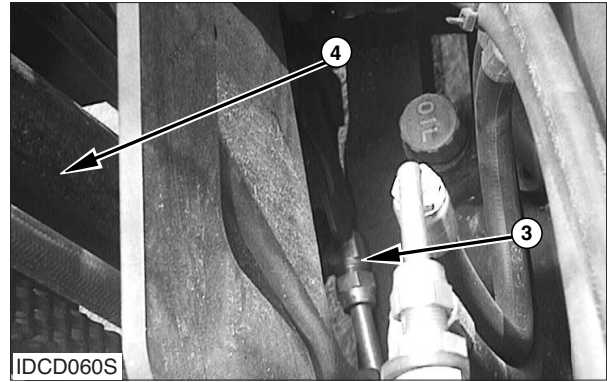
- a. Remove carriage.

WARNING

To prevent personal injury, move the control levers backward and forward to release any pressure in hydraulic system. Slowly loosen the cap of the hydraulic tank to release any pressure in the tank. Be cautious of hot hydraulic oil when any lines are disconnected in the hydraulic system.



1. Fasten nylon straps and hoist to the primary lift cylinder.
2. Remove bolts (1).
3. Remove bolt (2).



4. Pull the cylinder out far enough to disconnect elbow (3). Remove primary lift cylinder (4). Weight is 27 kg (60 lb).

NOTE : The following steps are for the installation of the primary lift cylinder.

5. Put primary lift cylinder (4) in position on the mast.
6. Connect elbow (3).
7. Install bolt (2), and bolts (1).

End By:

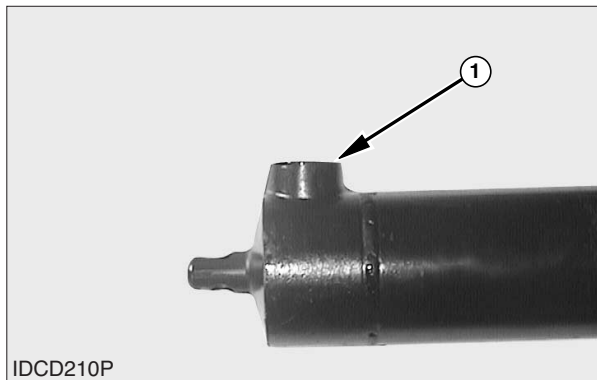
- a. Install carriage.

Disassemble Primary Lift Cylinders

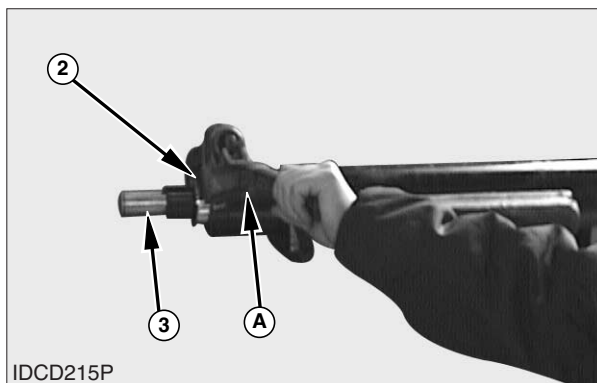
Tools Needed	A	B
Hydraulic Cylinder Repair Stand	1	
Wrench Assembly		1

Start By:

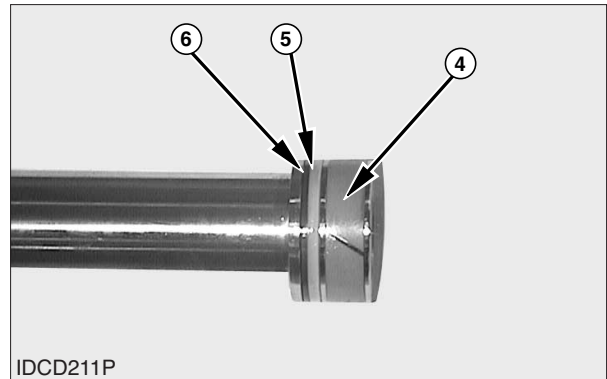
- a. Remove primary lift cylinder.



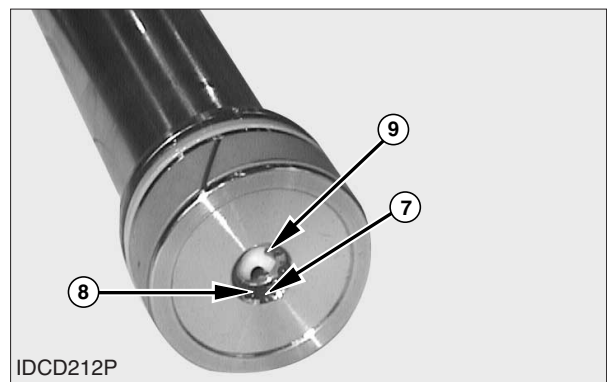
1. Remove flow protector valve (1) from the cylinder body.



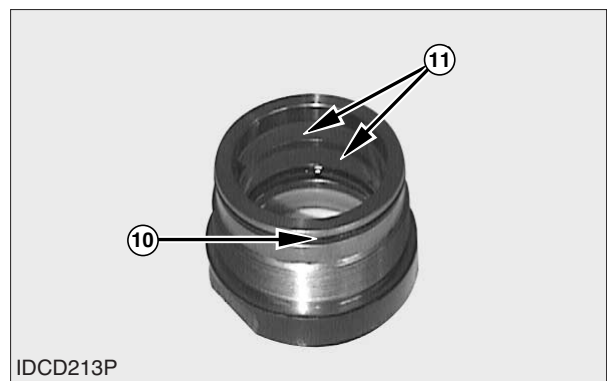
2. Remove bearing (2) with tool (A).
3. Remove rod (3) from the cylinder body.



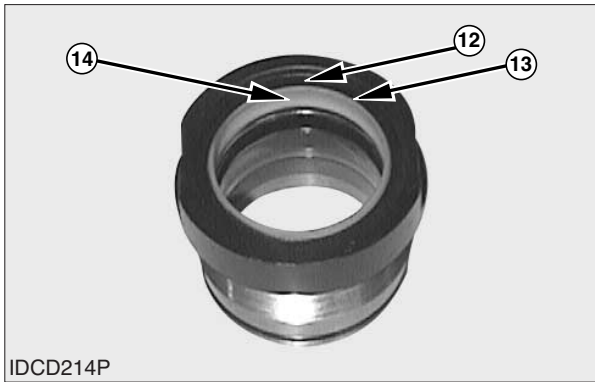
4. Remove wear ring (4), U-packing (5) and backup ring (6).



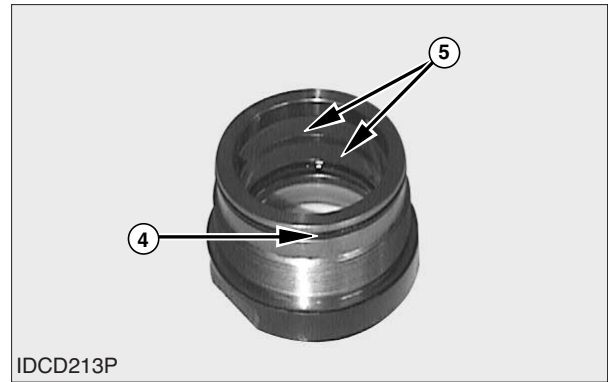
5. Remove retaining ring (7), spacer (8) and check valve (9).



6. Remove O-ring (10) and two slyd-rings (11).



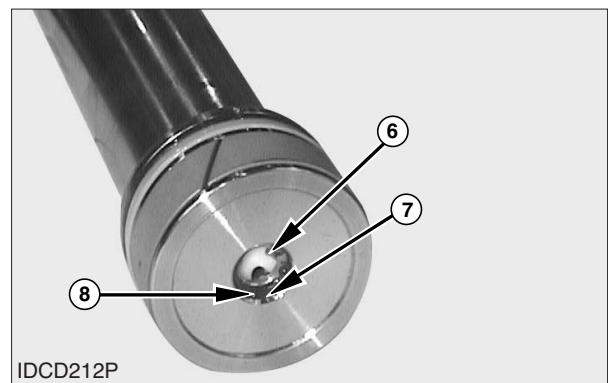
7. Remove wiper seal (12) and retaining ring (13) and U-packing (14) from the bearing.



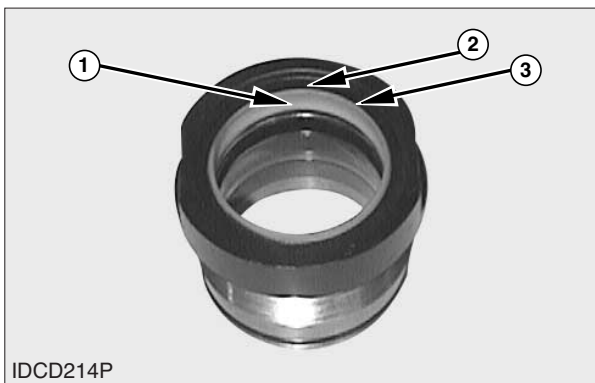
3. Install O-ring seal (4) and two slyd-rings(5).

Assemble Primary Lift Cylinders

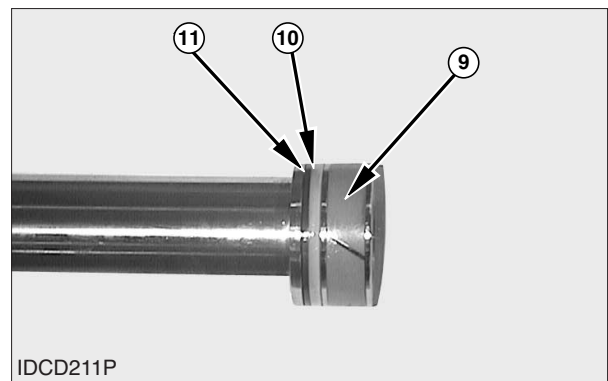
Tools Needed	A	B
Hydraulic Cylinder Repair Stand	1	
Wrench Assembly		1



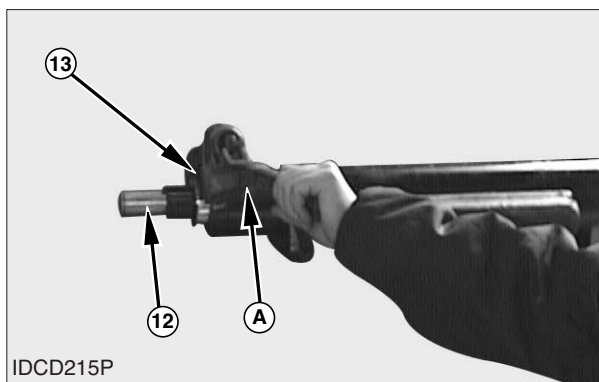
4. Install check valve (6), retaining ring (7) and spacer (8).



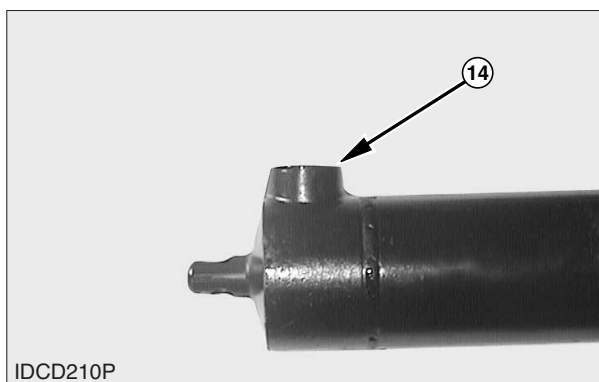
1. Install U-packing (1) in the bearing.
2. Install wiper seal (2) and retaining ring (3). Install the seal with the lip toward the outside.



5. Install wear ring (9), U-packing (10) and back up ring (11) on the cylinder rod.



6. Install cylinder rod (12) in the cylinder body.
7. Install bearing (13) on the cylinder body. Use tool (A) to tighten bearing.



8. Install flow protector valve (14) on the cylinder body.

End By:

- a. install primary lift cylinder.

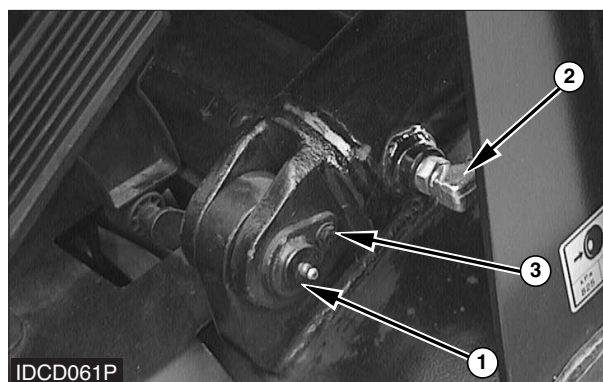
Tilt Cylinders

Remove & Install Tilt Cylinders

NOTE : The procedure for removing and installing the tilt cylinders is the same for both cylinders.

WARNING

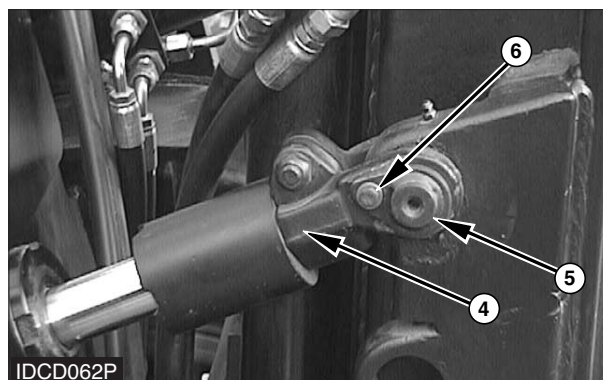
If both tilt cylinders are removed at the same time the mast can fall. To avoid possible personal injury, make sure the mast is securely held in place or supported by a hoist before removing the tilt cylinders.



WARNING

To prevent personal injury, move the control levers backward and forward to release any pressure in hydraulic system. Slowly loosen the cap of the hydraulic tank to release any pressure in the tank. Be cautious of hot hydraulic oil when any lines are disconnected in the hydraulic system.

1. Disconnect elbow (2). Remove retainer bolt (3) and pin (1).



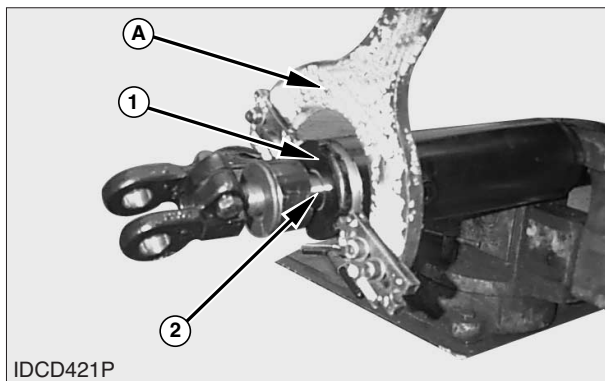
2. Remove retainer bolt (6) from pin (5). Remove pin (5).
3. Remove tilt cylinder (4).
4. Install the tilt cylinder in the reverse order of removal.

Disassemble & Assemble Tilt Cylinders

Tools Needed	A
Spanner Wrench	1

Start By:

a. Remove tilt cylinder.

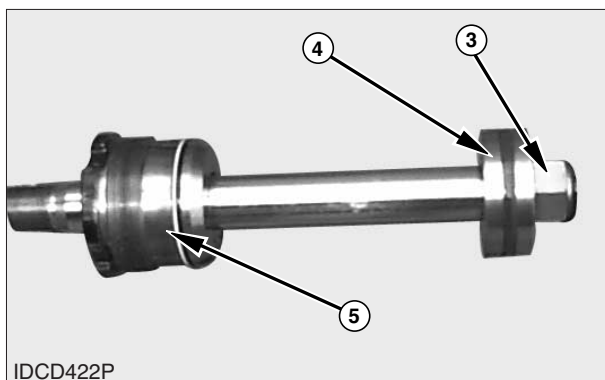


1. Use tool (A) to remove head (1) from the cylinder body.

NOTICE

Use extra care not to damage the highly finished surface of the cylinder rod and the bore of the cylinder body during disassembly and assembly of the tilt cylinder.

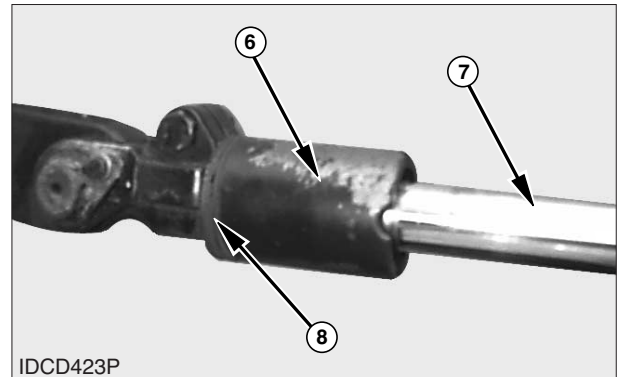
2. Remove rod assembly (2) from the cylinder body.



3. Remove nut (3) from the cylinder rod.

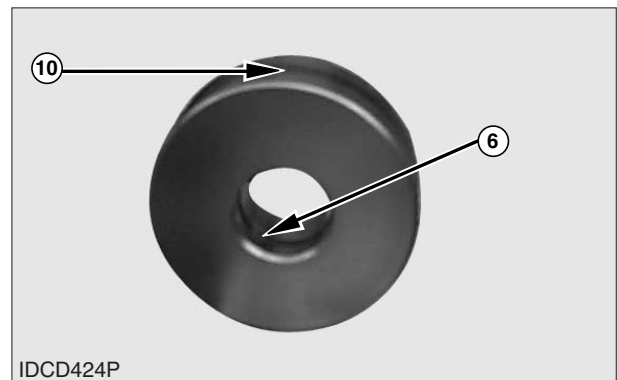
4. Remove piston and seal assembly (4) from the cylinder rod.

5. Remove head assembly (5).

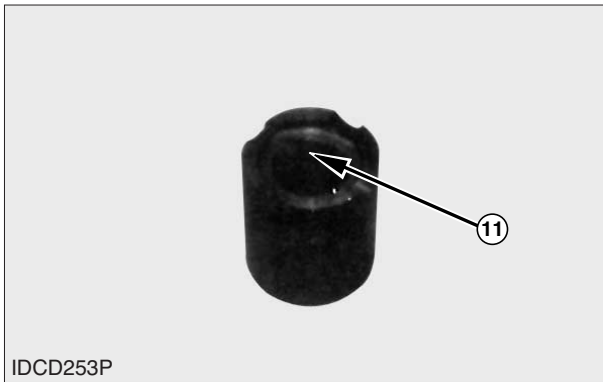


6. Remove spacer (6) from the cylinder rod.

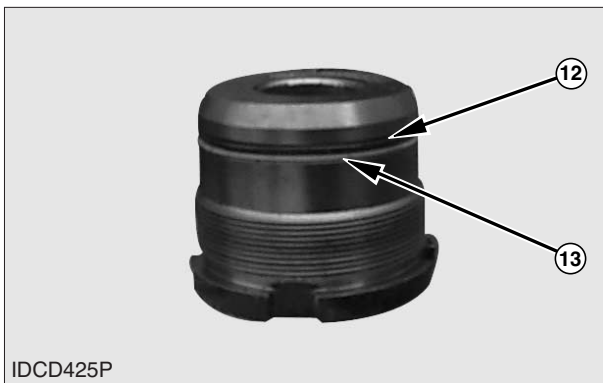
7. Loosen the nut and bolt on the rod eye. Remove cylinder rod (7) and shims (8).



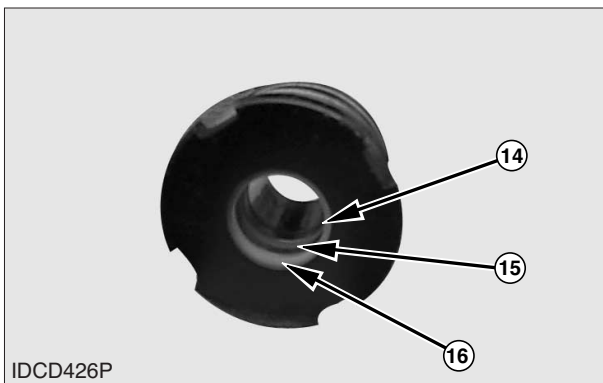
8. Remove seal assembly (10) and O-ring seal (9) from the piston.



9. Remove seal (11) from the spacer.

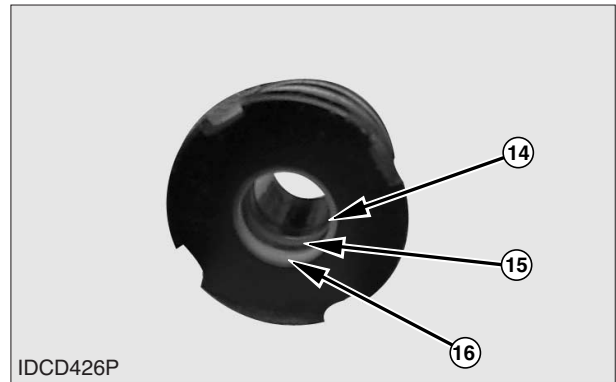


10. Remove O-ring seal (12) and back-up ring (13) from the head.



11. Remove seals (14), (15), and (16) from the head.

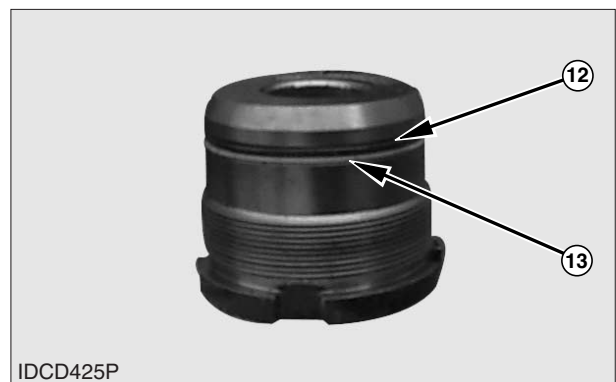
NOTE: Use the following steps to assemble the tilt cylinder.



12. Install seal (14) in the head. Position the lip of the seal toward the inside of the head.

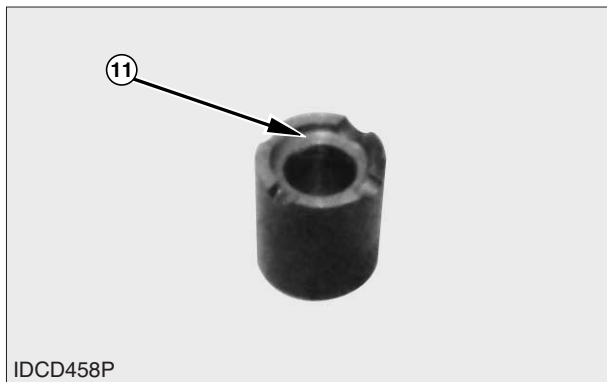
13. Install seal (15).

14. Install seal (16) in the cylinder head. Position the lip of seal (16) toward the outside of the cylinder head.

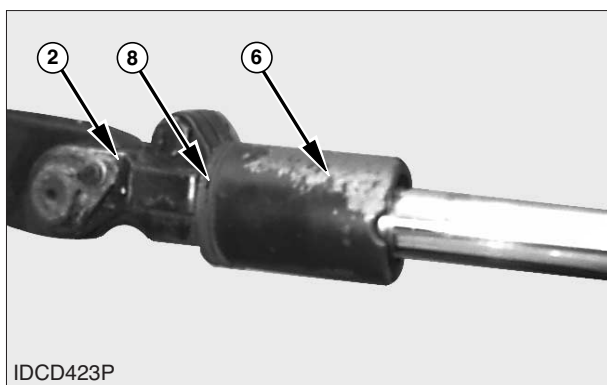


NOTE: The curved side of back up ring (13) should contact O-ring seal (12).

15. Install O-ring seal (12) and back-up ring (13). Make sure the curved side of back-up ring (13) is in contact with O-ring seal (12).

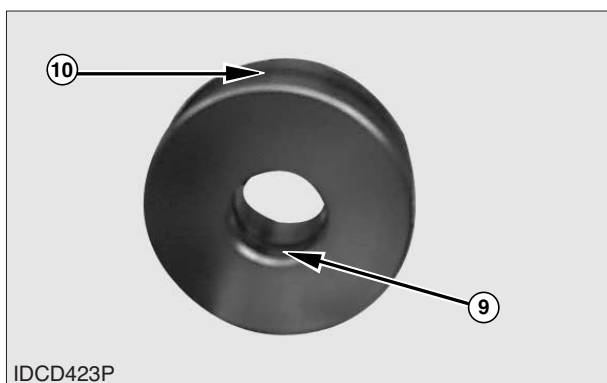


16. Install seal (11) in the spacer.

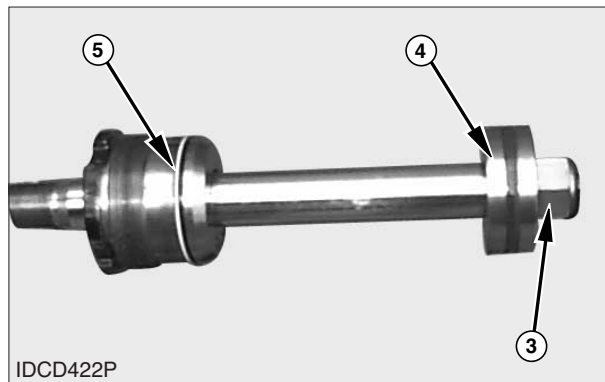


17. Install spacer (6).

18. Install shims (8) and rod eye (2). Tighten the bolt on rod eye (2) to a torque of $95 \pm 15 \text{ N}\cdot\text{m}$ ($70 \pm 11 \text{ lb}\cdot\text{ft}$).



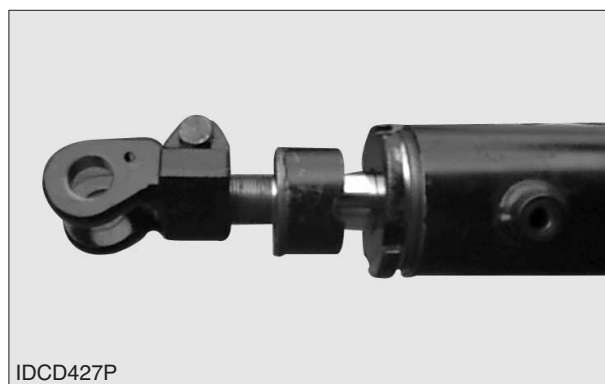
19. Install seals (10) and O-ring seal (9) on the piston



20. Install head assembly (5) on the cylinder rod.

21. Install piston assembly (4) onto the cylinder rod.

22. Install nut (3). Tighten nut (3) to a torque of $270 \pm 30 \text{ N}\cdot\text{m}$ ($200 \pm 22 \text{ lb}\cdot\text{ft}$).



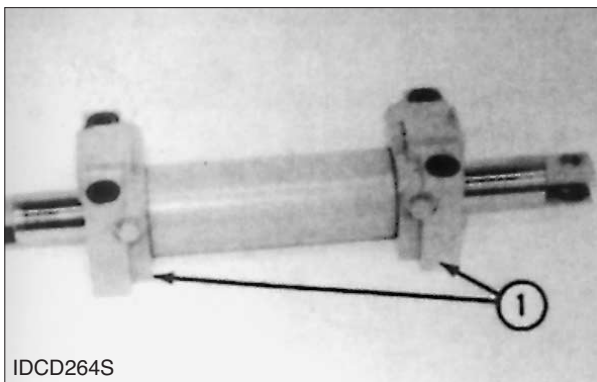
23. Install the rod assembly in the cylinder body.

Steering Cylinder

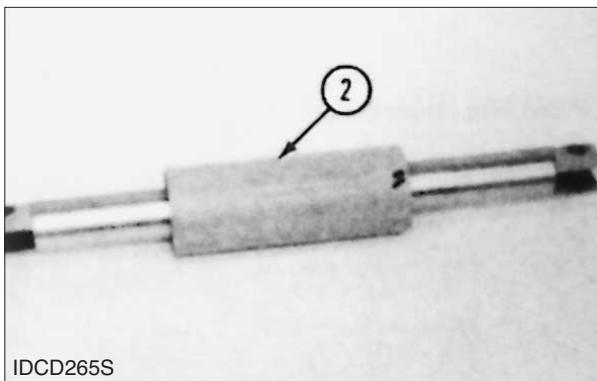
Disassemble Steering Cylinder

Tools Needed	A
Pliers	1

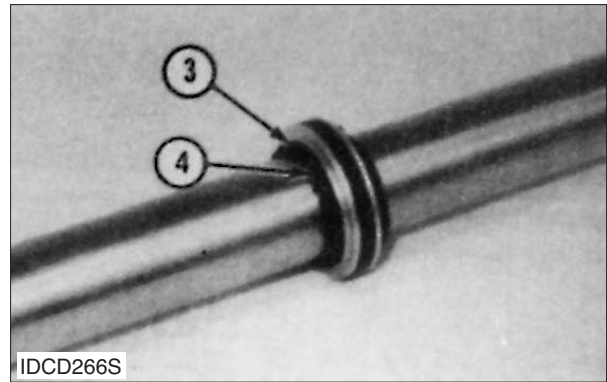
NOTE : Steering cylinder has two rods positioned between the cylinder end caps. These rods are attached to the cylinder end caps with nuts at each end. Remove the nuts and rods (A) before removing the cylinder end caps from the cylinder tube.



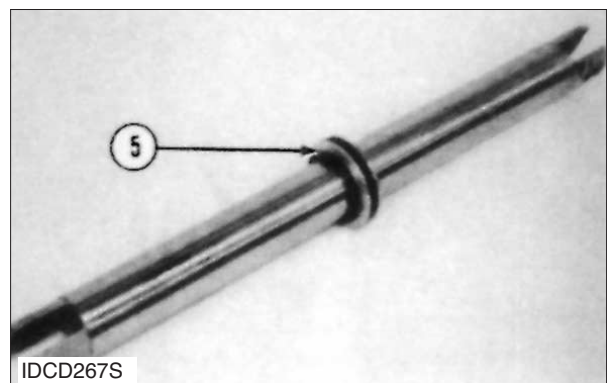
1. Put location marks on end caps (1) as to their position on the steering cylinder tube.
2. Remove end caps (1) from the steering cylinder.



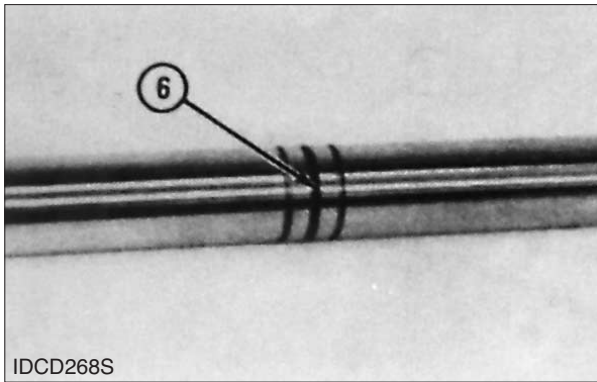
3. Remove cylinder tube (2) from the rod assembly.



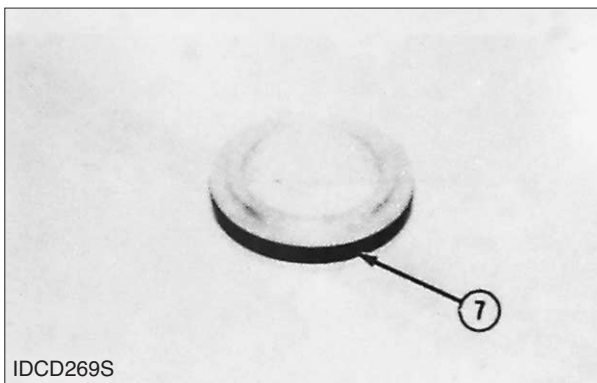
4. Use tool (A) to remove retaining rings (4) and rings (3) from the cylinder rod.



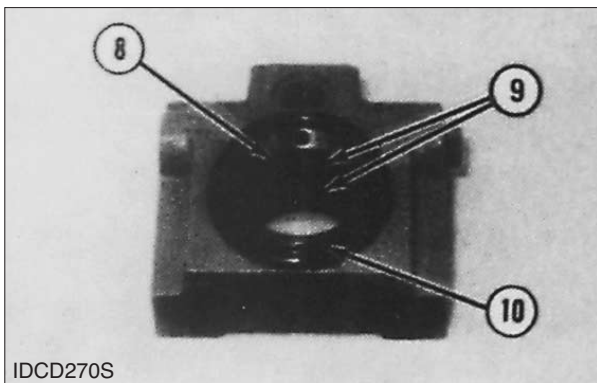
5. Remove piston (5) from the cylinder rod.



6. Remove and inspect O-ring seal (6).



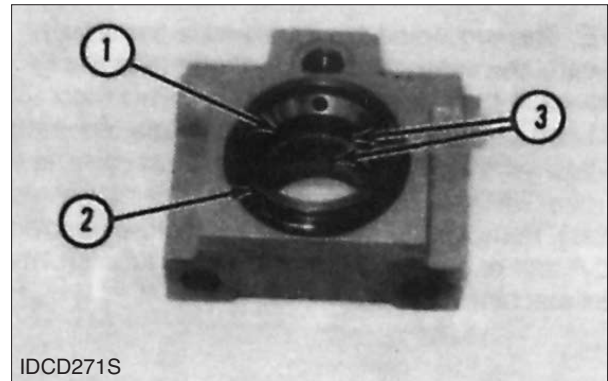
7. Remove seal (7) from the piston.



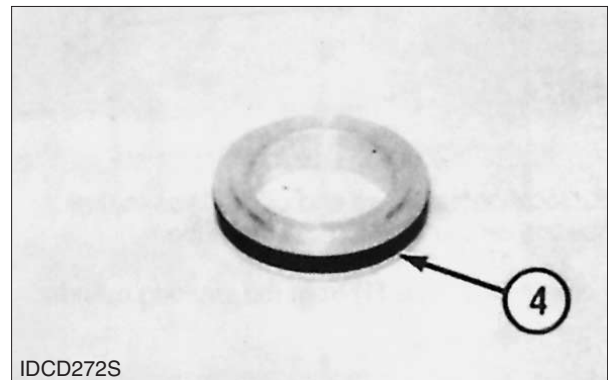
8. Disassemble each end cap as follows ;
 a. Remove O-ring seal (10).
 b. Remove wear ring (8).
 c. Remove u-cup seal (9).

Assemble Steering Cylinder

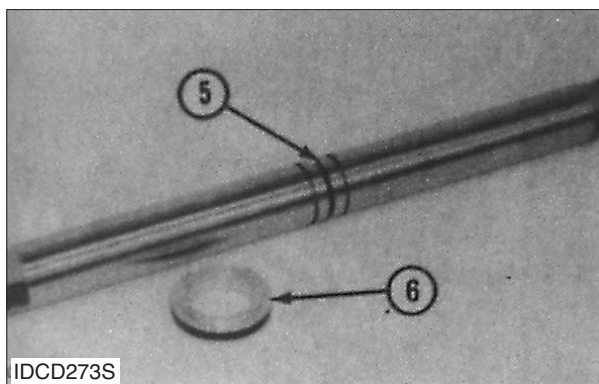
Tools Needed	A
Pliers	1



1. Assemble each end cap as follows ;
 a. Install O-ring seal (2).
 b. Install wear ring (1).
 c. Install u-cup seal (3).

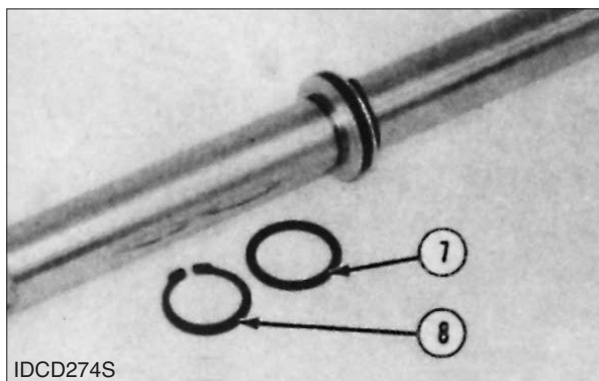


2. Install seal (4) on the piston.



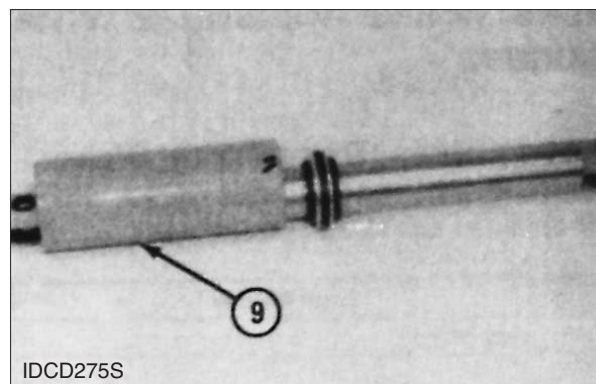
3. Install O-ring seal (5) on the cylinder rod.

4. Install piston (6) on the cylinder rod.

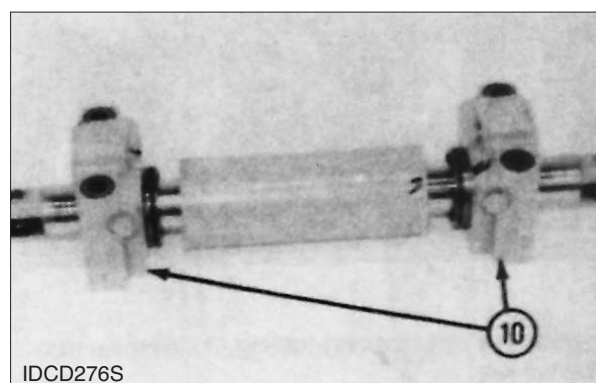


5. Install rings (7).

6. Use tool (A) to install retaining rings (8) on each side of the piston.



7. Install cylinder tube (9) on the rod assembly.



NOTE : Install the nuts and rods (A) on steering cylinder after installing the cylinder end caps. (see "Remove & Install Steering Cylinder" in this module)

8. Install end caps (11) on cylinder tube (10).

End By :

a. Install the steering cylinder.

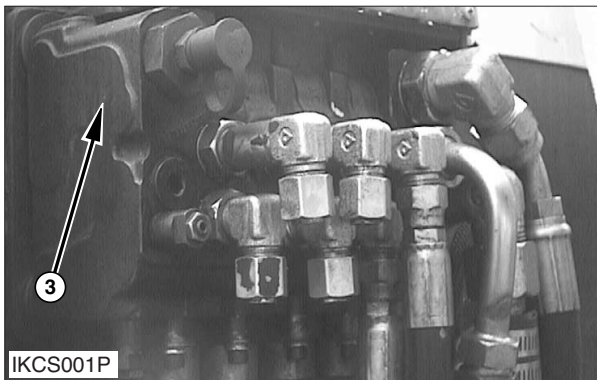
Hydraulic Control Valves

Remove & Install Hydraulic Control Valves

WARNING

Hydraulic oil under pressure can remain in the hydraulic system after the engine and pump have been stopped. Personal injury can result if the pressure is not released before any work is done to the hydraulic system. To prevent possible personal injury, turn the engine off and move the control levers to make sure the hydraulic pressure is released before any fitting, plug, hose or component is loosened, tightened, removed or adjusted. Always move the lift truck to a clean and level location away from the travel of other machines.

1. Drain the hydraulic tank.



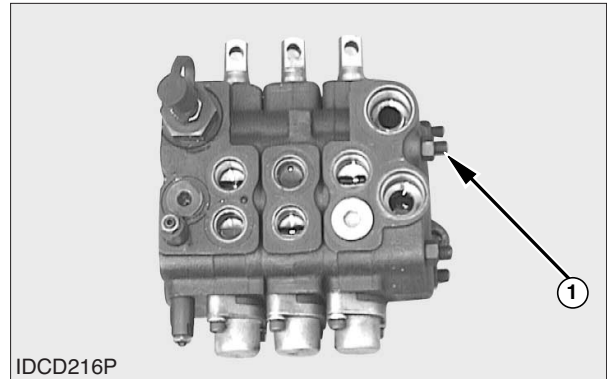
NOTE : For purposes of reassembly, put identification marks on all lines, tubes and hoses before any disconnections are made.

2. Disconnect seven hydraulic lines from control valve (3).
3. Support control valve (3). Remove two bolts and control valve.
4. Install the control valve in the reverse order of removal.
5. Fill the hydraulic tank to the correct level with fluid. Refer to the Operation And Maintenance Manual for further information.

Disassemble Hydraulic Control Valves

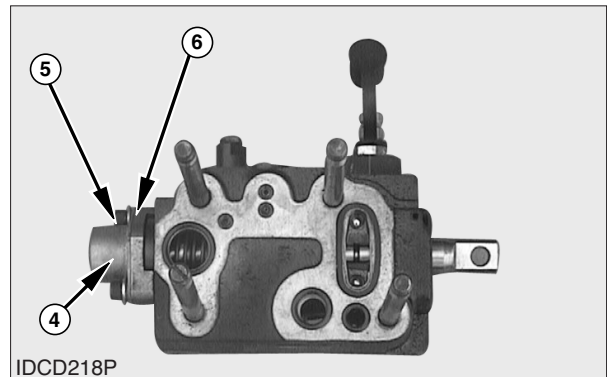
Start By :

- a. Remove hydraulic control valve.

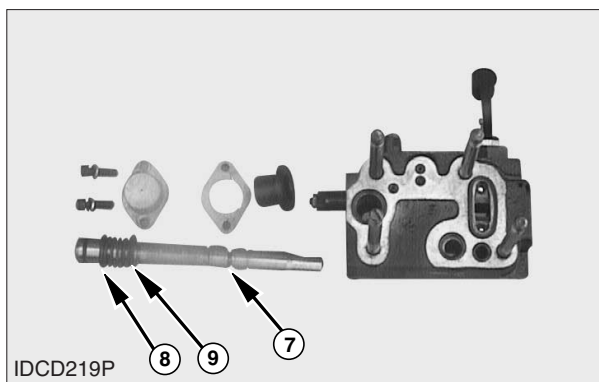


NOTE : For purposes of assembly, put identification marks on all valve sections.

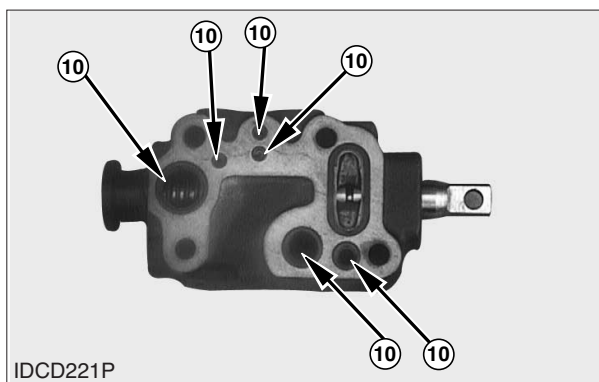
1. Remove bolts (1) to separate the valve sections.



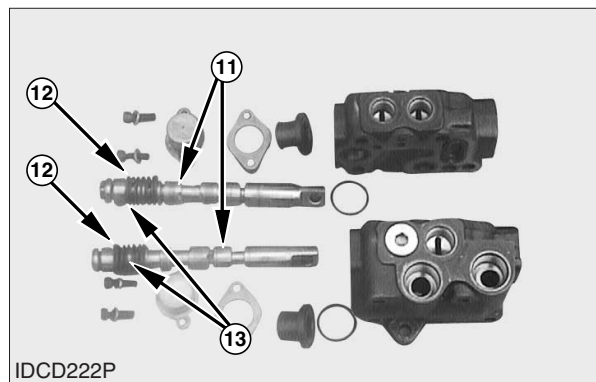
2. Remove dust cover (45), bolts (5) and retainer (6) from the valve.



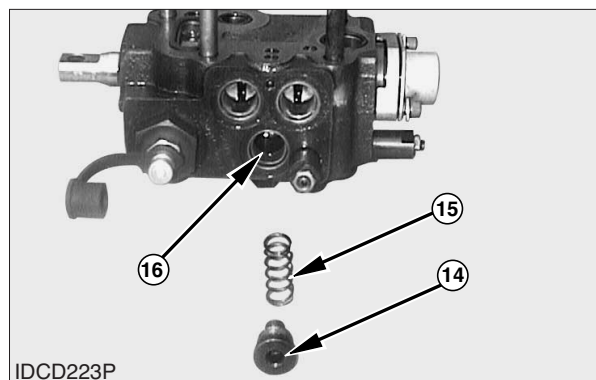
3. Remove side shift spool (7) from the valve body.
4. Remove seal (8) and spring (9) from the valve spool.



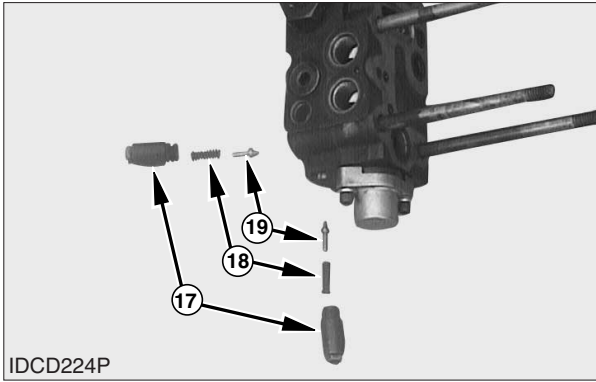
5. Remove O-ring seals (10) from the valve body.



6. Remove lift and tilt valve spool assemblies (11) from the valve body.
7. Remove seals (12) from the valve spools.
8. Remove springs (13) from the valve spools.

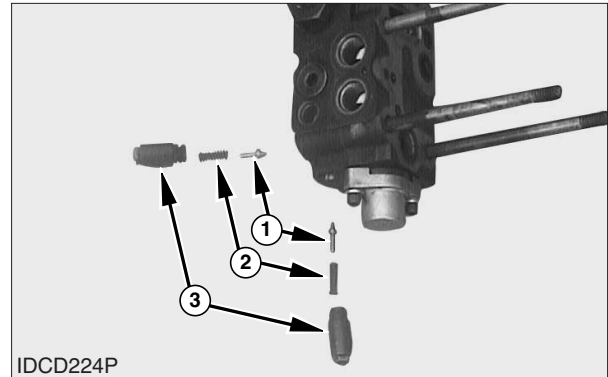


9. Remove plug (14) and spring (15).
10. Remove hydrostat (16).

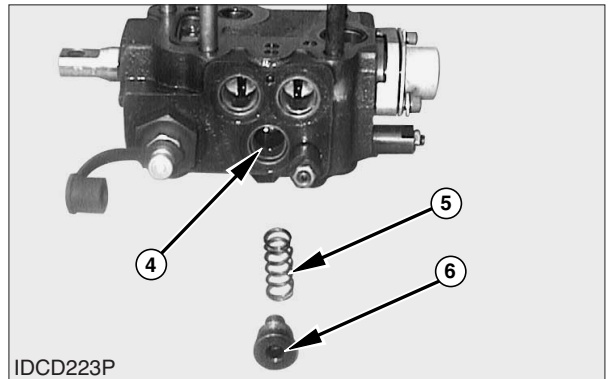


- 11.** Remove relief plugs (17), springs (18) and poppets (19).

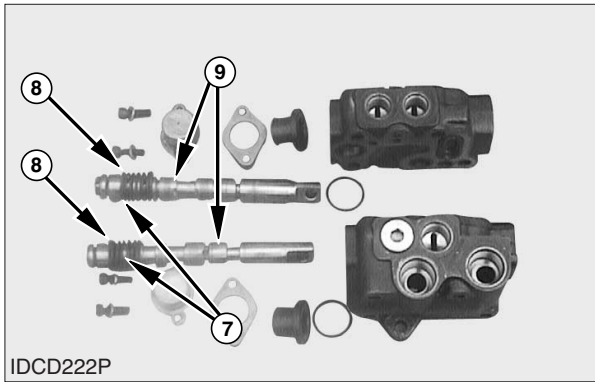
Assemble Hydraulic Control Valves



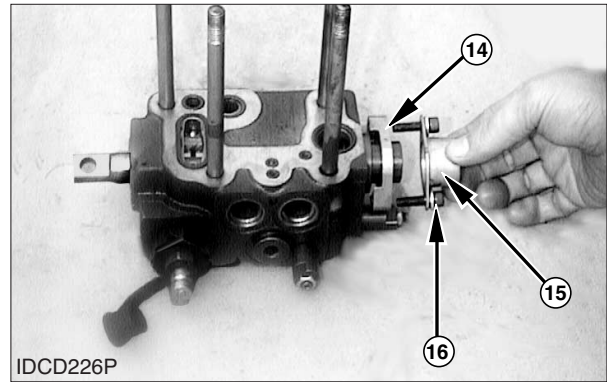
- 1.** Make sure all valve parts are clean and free of dirt.
- 2.** Install poppets (1), springs (2), and relief plugs (3).



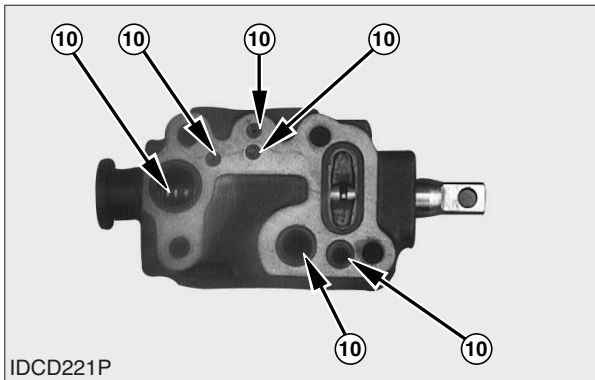
- 3.** Install hydrostat (4).
- 4.** Install spring (5) and plug (6).



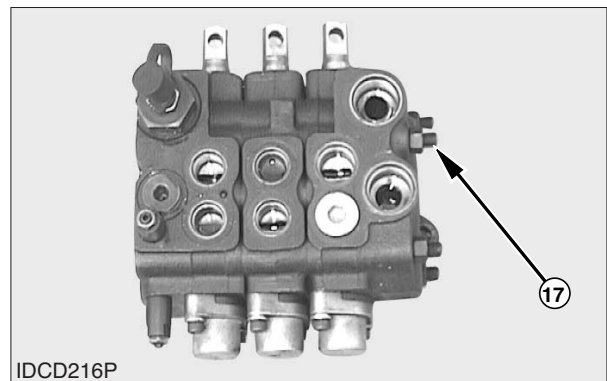
5. Install springs (7) and seals (8) on the valve spools.
6. Install lift and tilt spool assemblies (9) to the valve body.



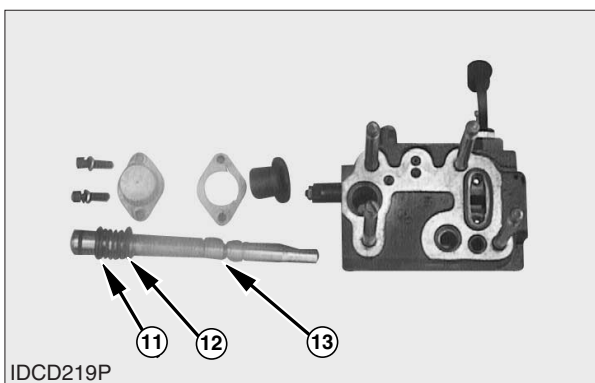
10. Install retainer (14), dust cover (15) and bolt (16) to each section.



7. Install O-ring seals (10) to the valve body.



11. Install bolts (17) to assemble the valve sections.



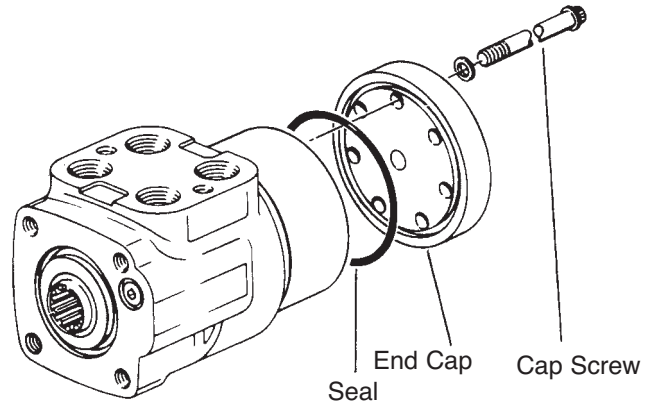
8. Install seal (11) and spring (12) to the attachment valve spool (13).
9. Install valve spool (13) to the valve body.

Steering Unit

Disassemble Steering Unit

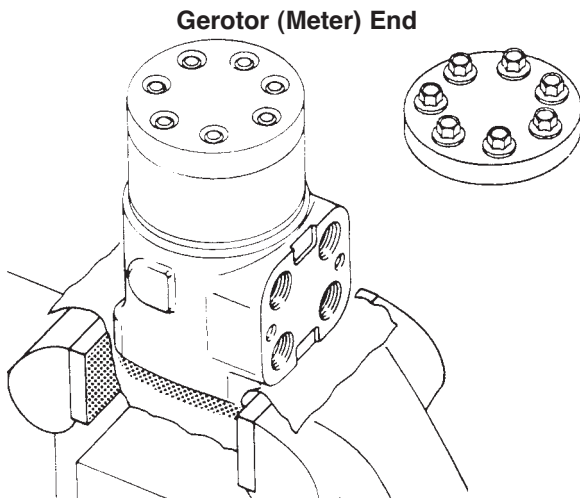
Cleanliness is extremely important when repairing a steering unit. Work in a clean area. Before disconnecting lines, clean port area of unit thoroughly. Use a wire brush to remove foreign material and debris from around exterior joints of the unit.

Although not all drawings show the unit in a vise, we recommend that you keep the unit in the vise during disassembly. Follow the clamping procedures explained throughout the manual.



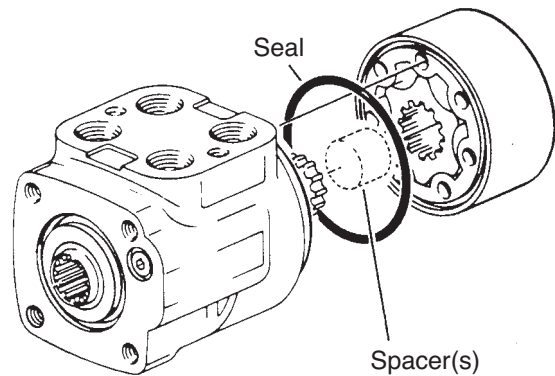
IDCD279S

2. Remove 5/16 inch cap screws and washers if applicable (7 each).
3. Remove end cap.
4. Remove seal from end cap.



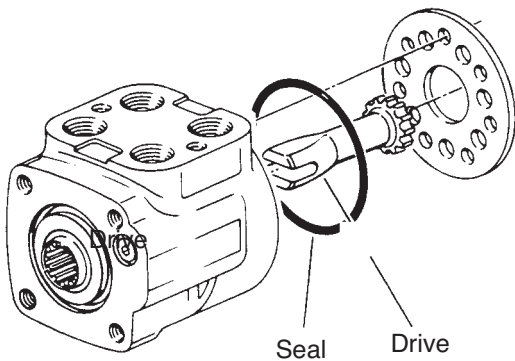
IDCD278S

1. Clamp unit in vise, meter end up. Clamp lightly on edges of mounting area. Use protective material on vise jaws. Housing distortion could result if jaws are overtightened.



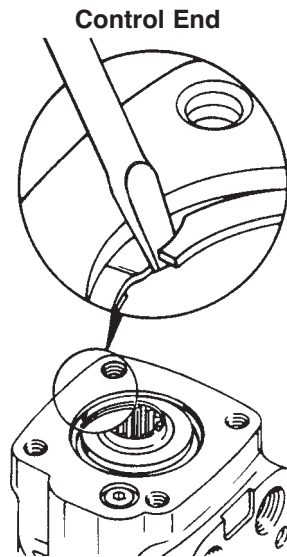
IDCD280S

5. Remove meter. Be careful not to drop star.
6. Remove seal from meter.
7. Remove drive spacer(s).



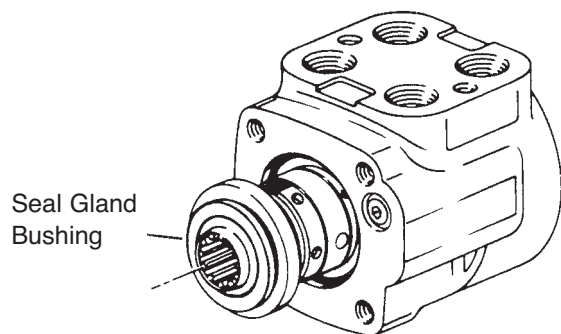
IDCD281S

- 8. Remove drive.
- 9. Remove spacer plate.
- 10. Remove seal from housing.



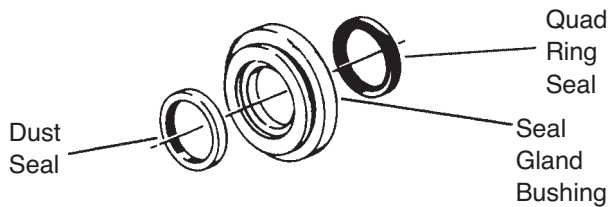
IDCD282S

- 11 Remove housing from vise. Place housing on a clean soft cloth to protect surface finish. Use a thin bladed screwdriver to pry retaining ring from housing.



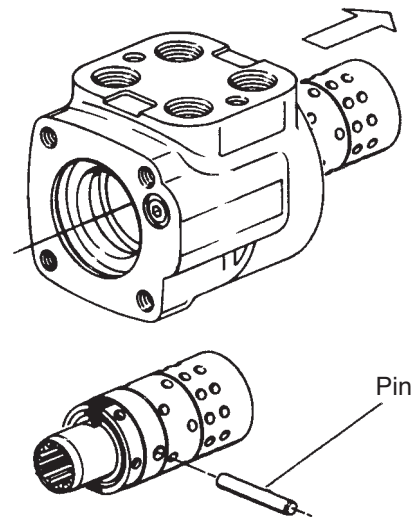
IDCD283S

- 12. Rotate spool and sleeve until pin is horizontal. Push spool and sleeve assembly forward with your thumbs just far enough to free gland bushing from housing. Remove bushing.



IDCD284S

13. Remove quad ring seal from seal gland bushing.
14. Use a thin bladed screwdriver to pry dust seal from seal gland bushing. Do not damage bushing.

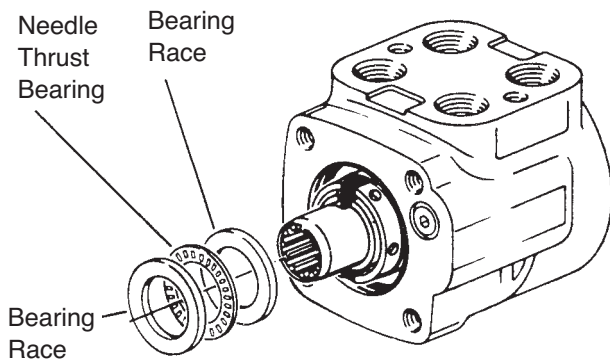


IDCD286S

16. Remove spool and sleeve assembly from 14 hole end of housing.

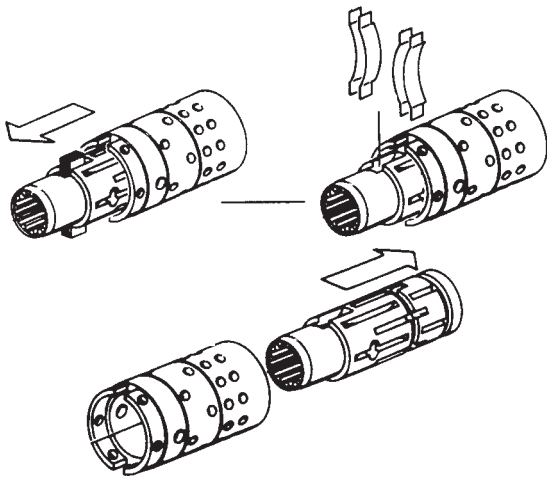
ATTENTION: Do not bind spool and sleeve in housing. Rotate spool and sleeve assembly slowly when removing from housing.

17. Push pin from spool and sleeve assembly.



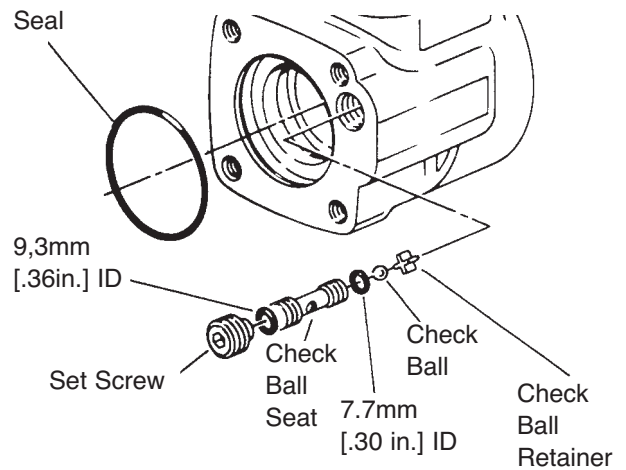
IDCD285S

15. Remove 2 bearing races and the needle thrust bearing from spool and sleeve assembly.



IDCD287S

- 18.** Push spool partially from control end of sleeve, then remove 4 centering springs from spool carefully by hand.
- 19.** Push spool back through and out of sleeve. Rotate spool slowly when removing from sleeve.
- 20.** Remove seal from housing.



IDCD288S

- 21.** Remove set screw from housing.
- 22.** Screw a #10-24 machine screw into end of check ball seat. Then by pulling on screw, with a pliers, lift seat out of housing.
- 23.** Remove 2 seals from check valve seat.
- 24.** Tip housing to remove check ball and check ball retainer.

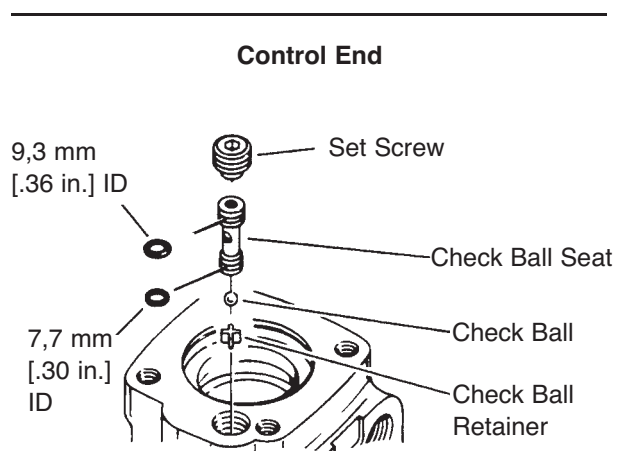
Assemble Steering Unit

Check all mating surfaces. Replace any parts that have scratches or burrs that could cause leakage. Clean all metal parts in clean solvent. Blow dry with air. Do not wipe dry with cloth or paper towel because lint or other matter can get into the hydraulic system and cause damage. Do not use a coarse grit or try to file or grind these parts.

NOTE: Lubricate all seals with clean petroleum jelly such as Vaseline.

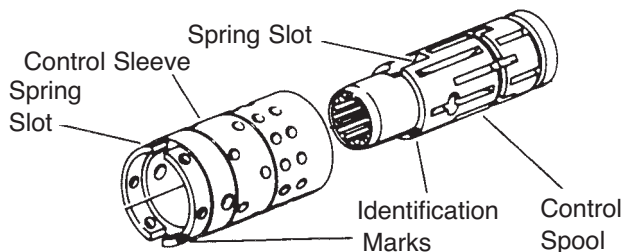
Do not use excessive lubricant on seals for meter section.

Refer to parts listings covering your steering unit when ordering replacement parts. A good service policy is to replace all old seals with new seals.



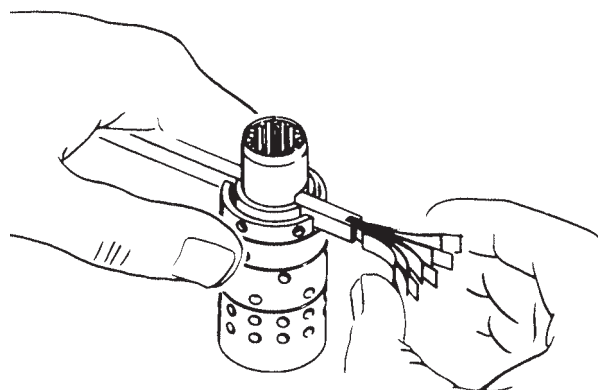
IDCD289S

1. Use a needle nose pliers to lower check ball retainer into check valve hole of housing. Make sure retainer is straight (not tilted on edge) in housing.
2. Install check ball in housing
3. Lubricate 9.3 mm [.36 in.] ID seal and 7.7 mm [.30 in.] ID seal. Install seals on check ball seat as shown.
4. Lubricate check ball seat and seals thoroughly before installing seat in housing. When installing seat do not twist or damage seals. Install check ball seat in housing, insert open end of seat first. Push check ball seat to shoulder of hole.
5. Install set screw. Use a 1/4 inch hex key to torque set screw to 11 N·m [100 lb·in]. To prevent interference make sure top of set screw is slightly below housing mounting surface.



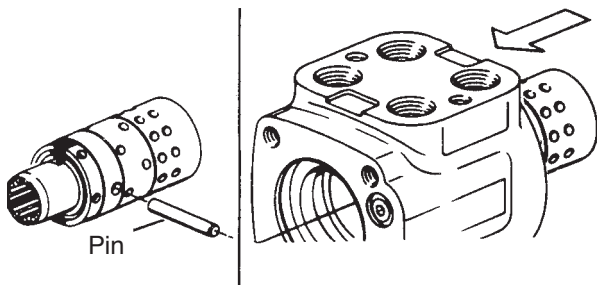
IDCD290S

6. Assemble spool and sleeve carefully so that the spring slots line up at the same end. Rotate spool while sliding parts together. Some spool and sleeve sets have identification marks, align these marks. Test for free rotation. Spool should rotate smoothly in sleeve with finger tip force applied at splined end.



IDCD291S

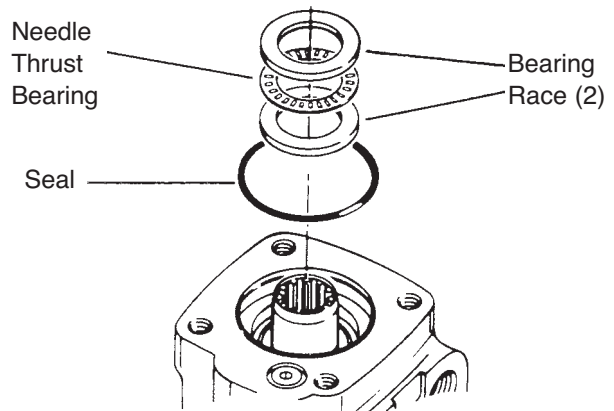
7. Bring spring slots of both parts in line and stand parts on end of bench. Insert spring installation tool through spring slots of both parts. Tool is. Position 2 pairs of centering springs on bench so that extended edge is down and arched center section is together. In this position, insert one end of entire spring set into spring installation tool, with spring notches facing sleeve.
8. Compress extended end of centering spring set and push into spool sleeve assembly withdrawing installation tool at the same time.
9. Center the spring set in the parts so that they push down evenly and flush with the upper surface of the spool and sleeve.
10. Install pin through spool and sleeve assembly until pin becomes flush at both sides of sleeve.



IDCD292S

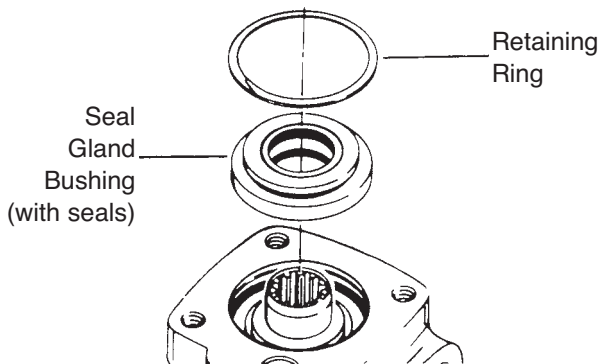
11. Position the spool and sleeve assembly so that the splined end of the spool enters the 14 hole end of housing first.

ATTENTION: Be extremely careful that the parts do not tilt out of position while inserting. Push parts gently into place with slight rotating action, keep pin nearly horizontal. Bring the spool assembly entirely within the housing bore until the parts are flush at the meter end or 14 hole end of housing. Do not pull the spool assembly beyond this point to prevent the cross pin from dropping into the discharge groove of the housing. With the spool assembly in this flush position, check for free rotation within the housing by turning with light finger tip force at the splined end.



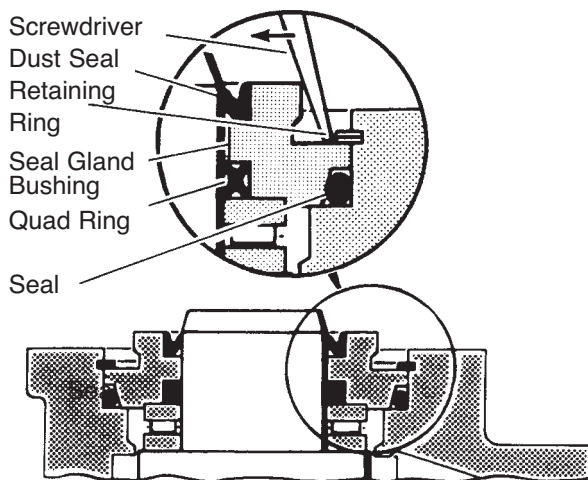
IDCD293S

12. Place housing on clean lint free cloth. Install 47,5 mm [1.86 in.] ID seal in housing.
13. Install 2 bearing races and the needle thrust bearing in the order shown.
14. Install 25 mm [1 in.] ID dust seal in seal gland bushing, flat or smooth side must face down towards bushing.
15. Install the quad ring seal in seal gland bushing. Smooth seal in place with your finger. Do not use any seal that falls freely into pocket of bushing.



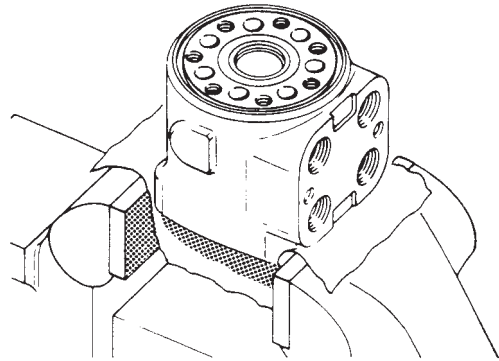
IDCD294S

16. Install seal gland bushing over the spool end with a twisting motion. Tap the bushing in place with a rubber hammer. Make sure the bushing is flush against the bearing race.



IDCD295S

17. Install retaining ring in housing. After installing ring, tap on ring end or pry with screwdriver around entire circumference of ring to properly seat ring in groove.

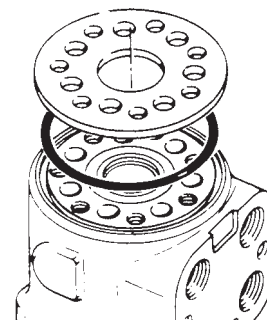


IDCD296S

18. Clamp housing in vise. Clamp lightly on edges of mounting area. Do not over tighten jaws.

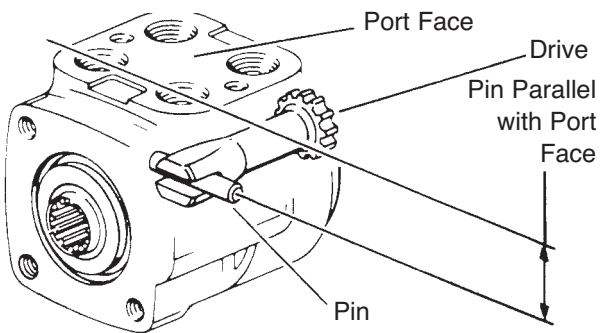
NOTE: Check to insure that the spool and sleeve are flush or slightly below the 14 hole surface of the housing.

ATTENTION: Clean the upper surface of the housing by wiping with the palm of clean hand. Clean each of the flat surfaces of the meter section parts in a similar way when ready for reassembly. Do not use cloth of paper to clean surfaces.



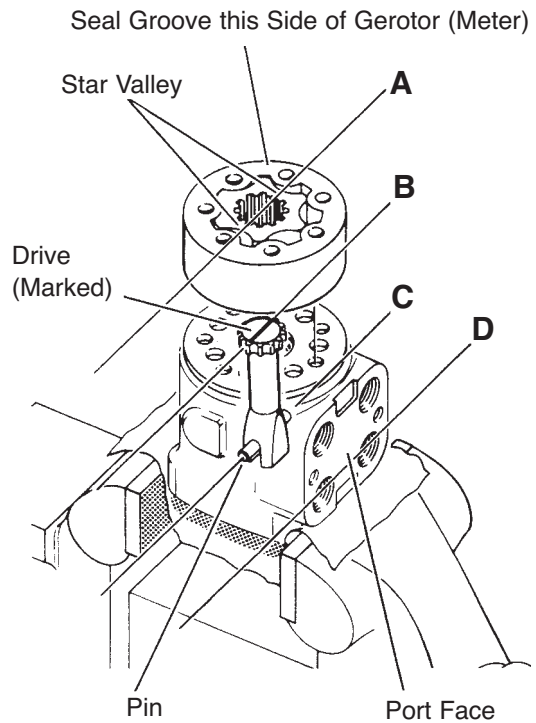
IDCD297S

19. Install 73.5 mm [2.89 in.] ID seal in housing.
20. Install spacer plate. Align bolt holes in spacer plate with tapped holes in housing.



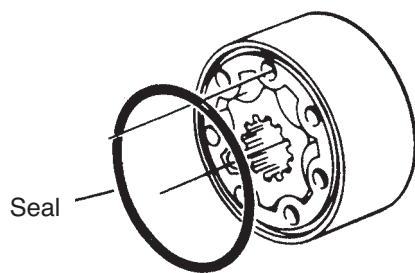
IDCD298S

- 21.** Rotate spool and sleeve assembly until pin is parallel with port face. Install drive, make sure you engage drive with pin, To assure proper alignment, mark drive as shown. Note relationship between slotted end of drive to splined end of drive when marking.



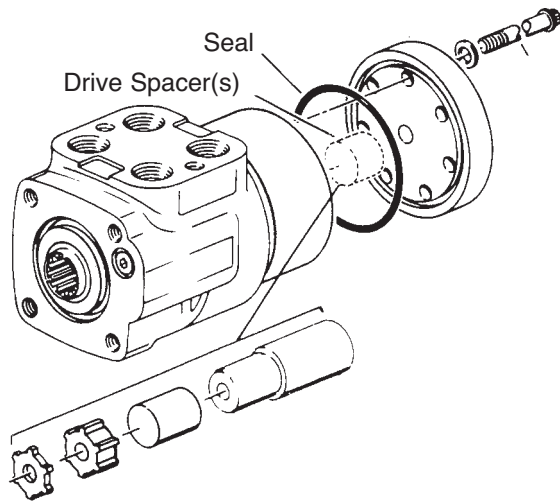
IDCD300S

- 23.** With seal side of meter toward spacer plate, align star valleys on drive. Note the parallel relationship of reference lines A, B, C, and D. Align bolt holes without disengaging meter from drive.



IDCD299S

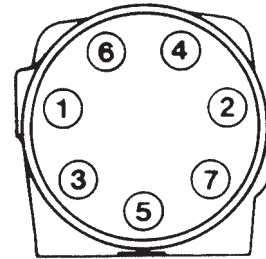
- 22.** Install 73,5 mm [2.89 in.] ID seal in spacer plate or gerotor (meter).



24. Install drive spacer (s) when used, in meter.

25. Install 73.5 mm [2.89 in.] ID seal in gerotor (meter) or end cap, see notes.

26. Install end cap on gerotor, align holes.



IDCD301P

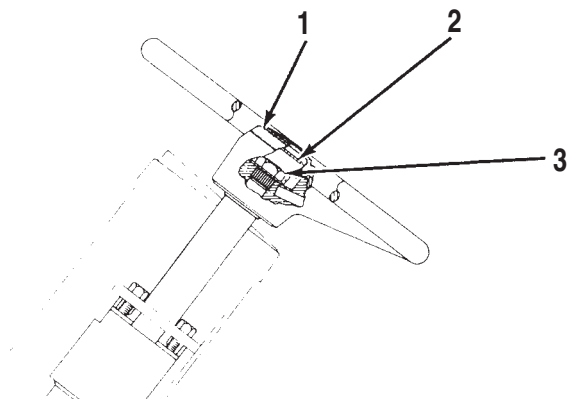
Actual Displacement cm ³ /r(in ³ /r)	Spacer
	Length mm[in.]
45[2.8]	None
60[3.6]	None
75[4.5]	None
95[5.9]	3.56[.140]
120[7.3]	6.10[.240]
145[8.9]	10.29[.405]
160[9.7]	12.19[.480]
185[11.3]	15.62[.615]
230[14.1]	21.97[.865]
295[17.9]	28.45[1.120]
370[22.6]	41.15[1.620]
460[28.2]	53.67[2.113]
590[35.9]	66.37[2.613]
740[45.1]	91.77[3.613]

IDCD302P

27. Install 7 dry cap screws in end cap. Pretighten screws to 11 to 17 N·m [100 to 150 lb·in] then torque screws to specifications.

Steering Wheel

Remove And Install Steering Wheel



1. Remove cap (1) from the steering wheel.
2. Remove nut (3) and cup (2) from the steering wheel.
3. Use a suitable puller to remove the steering wheel. Later models will have threaded holes in the steering wheel to install a puller.

NOTE: The following steps are for installation of the steering wheel.

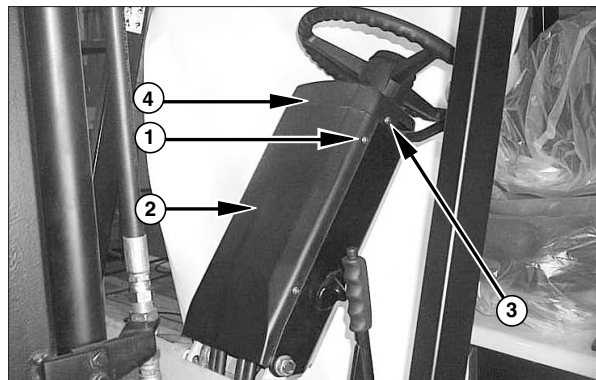
4. Put the steering wheel in position on the shaft. Install cup (2) and nut (3). Tighten the nut to a torque of $80 \pm 7 \text{ N}\cdot\text{m}$ ($60 \pm 5 \text{ lb}\cdot\text{ft}$).
5. Install cap (1) on the steering wheel.

Steering Column

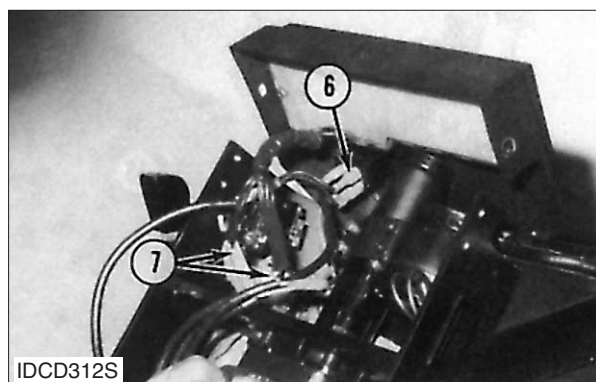
Remove Steering Column

Start By:

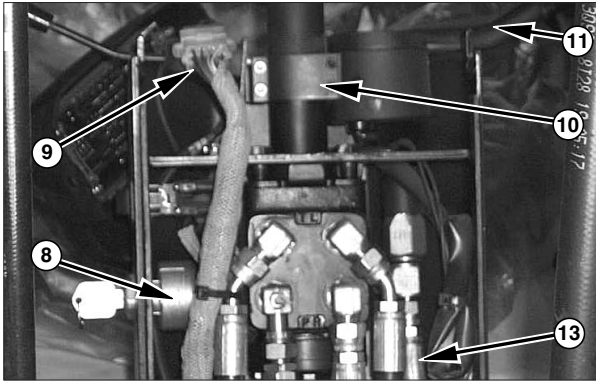
- a. remove steering wheel.



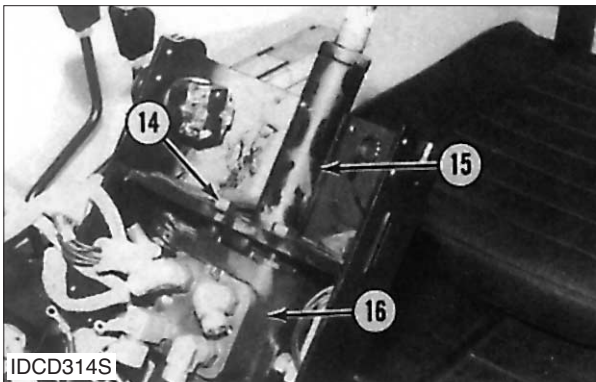
1. Remove bolts (1) and front cover (2).
2. Remove bolts (3), and top cover and instrument group assembly (4) from the support assembly.



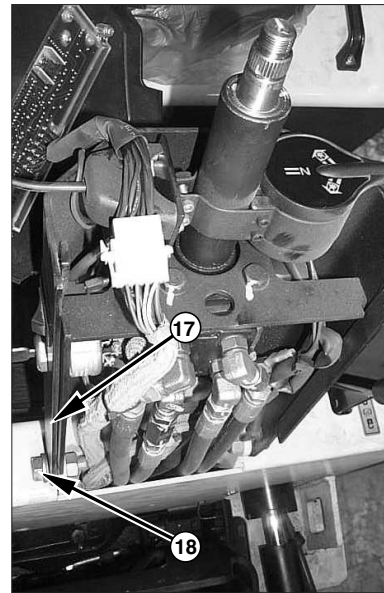
3. Put identification marks on all hoses and wires for installation purposes. Disconnect four connectors (6) from the light switch (if equipped). Disconnect two wiring harness connectors (7). Remove the cover and instrument group assembly from the steering column.



4. Disconnect the four steering gear hoses. Disconnect wires (8) from the ignition switch.
5. Disconnect all kinds of connector (9).
6. Remove bolts, clamp (10) and directional switch (11) from the steering column. Disconnect hose (13) from the steering gear.

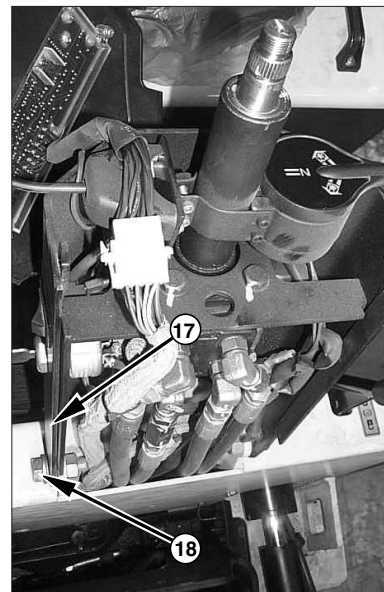


7. Remove four bolts (14), and separate steering gear (16) from steering column (15). Remove steering column (15) from the support assembly.

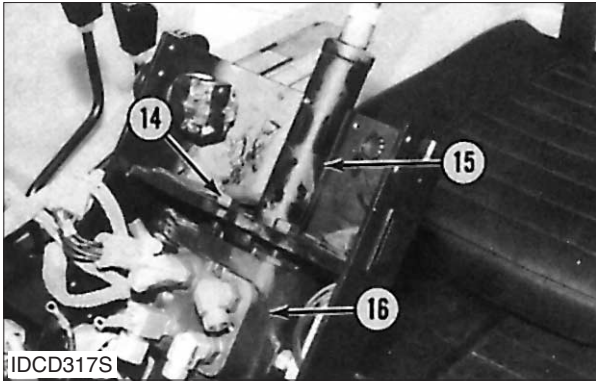


8. Remove the nuts, washers and bolts (18). Remove the bushings if a replacement is necessary. Remove support assembly (17) from the cowl. Remove ignition switches if necessary.

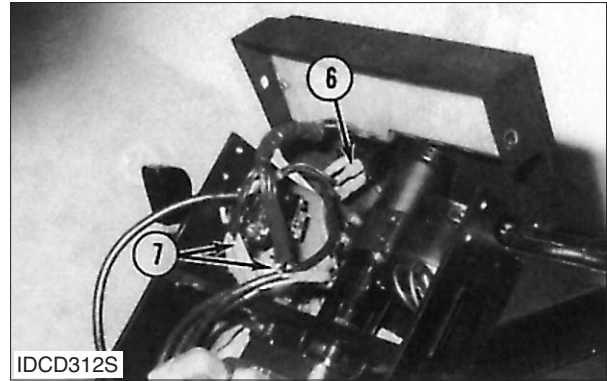
Install Steering Column



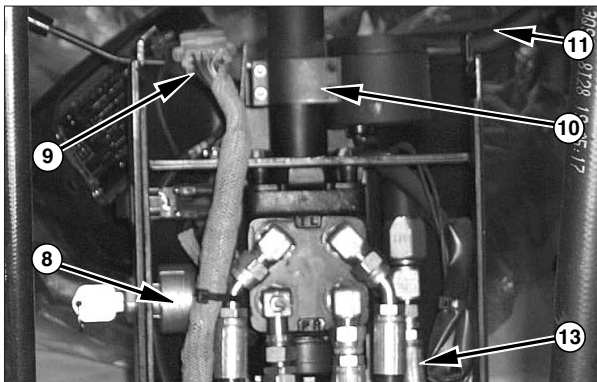
1. Install ignition switches into support assembly (17) if they were removed. Install the bushings if they were removed. Put the support assembly in position on the cowl. Install bolts (18), washers, nuts.



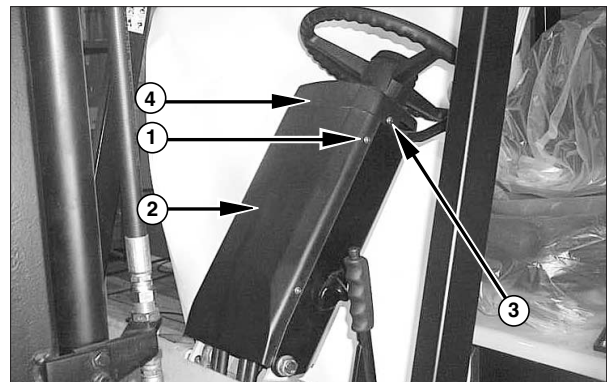
2. Put steering column (15) in position in the support assembly. Connect steering gear (16) to column (15), and install four bolts (14) that hold the steering gear and column together. Tighten the bolt to a torque of 15 ~ 20 N•m.



6. Put the cover and instrument group assembly in position over the steering column. Connect two wiring harness connectors (7). Connect four connectors (6) to the light switch (if equipped).



3. Connect hose (13) to the steering gear. Put directional switch (11) in position on the steering column. Position clamp (10), and install bolts.
4. Connect all kinds of connector (9).
5. Connect wires (8) to the ignition switch. Connect the four steering gear hoses to the steering gear.



7. Put front cover (2) in position on the support assembly. Install bolts (1).
8. Put top cover and instrument group assembly (4) in position on the top of the support assembly. Install bolts (3).

End By:

- a. Install steering wheel.

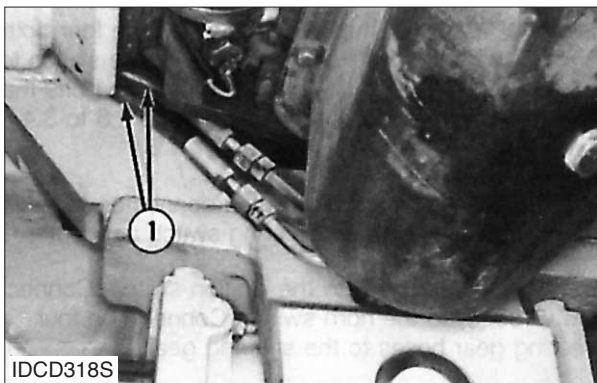
Steer Axle

Remove Steer Axle

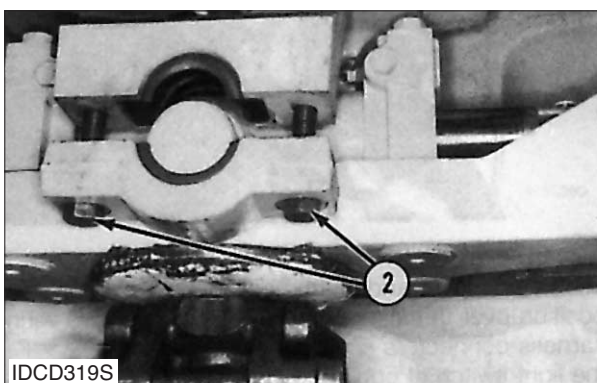
Tools Needed	A
Jack Stand	4

⚠ WARNING

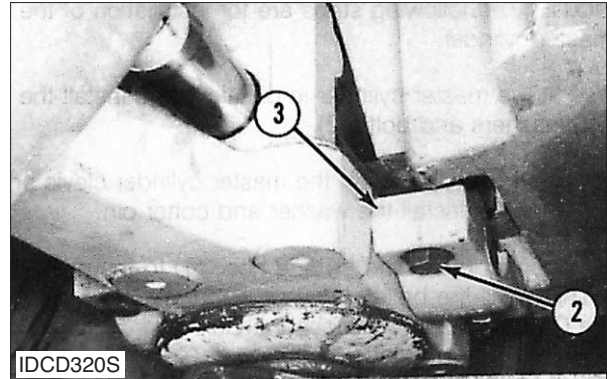
Be sure the pressure in the hydraulic system is released before any lines or hoses are disconnected.



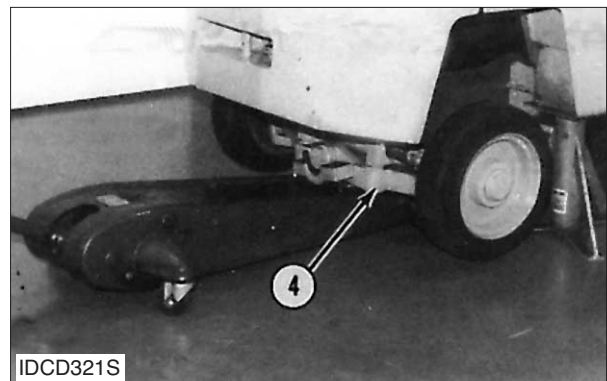
1. Put the lift truck in position on tooling (A).
2. Put identification marks on hoses (1); then disconnect them.



3. Put a floor jack in position under the steer axle.
4. Loosen axle mounting bolts (2) until approximately two bolt threads are left in the mounting bosses.
5. Lower the steer axle onto the bolt heads with the floor jack. disconnect the hydraulic lines from the steering cylinder.



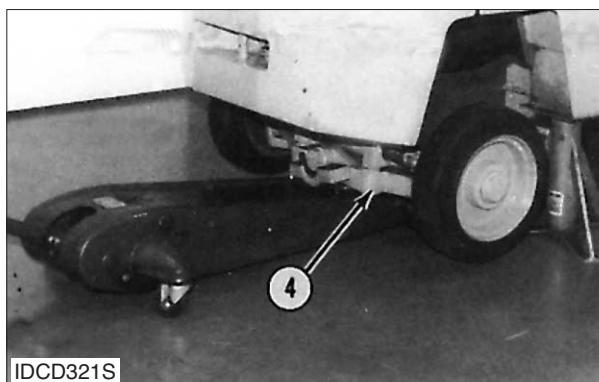
6. Remove bolts (2) and mounting caps (3) from the steer axle.



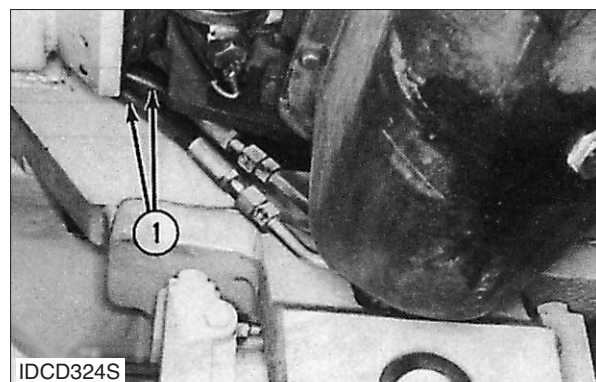
7. Remove steer axle (4). Weight of the steer axle is 200 kg(440 lb).

Install Steer Axle

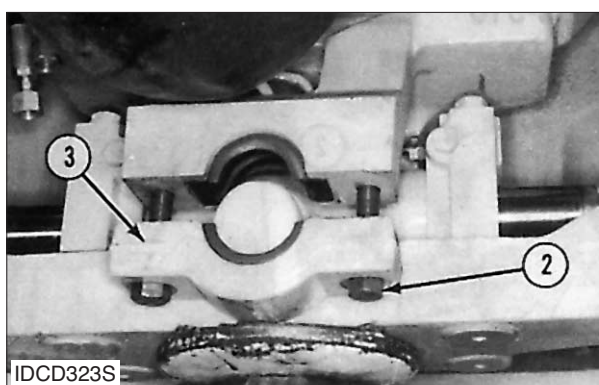
Tools Needed	A
Jack Stand	4



1. Put steer axle (4) in position with a floor jack.



5. Connect hoses (1) to the steering lines.

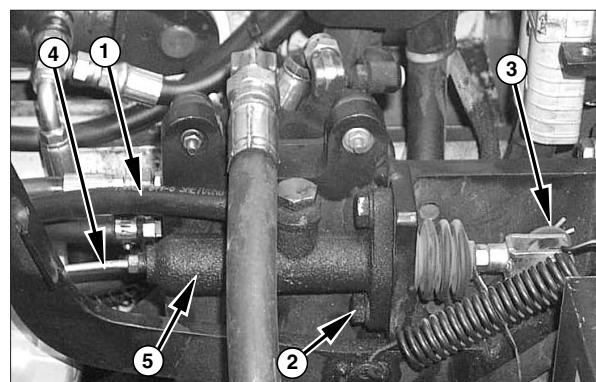


NOTE: Install bolts (2) with approximately two bolt threads into the mounting bosses.

2. Install bolts (2) and caps (3) in the mounting bosses.
3. Connect the hydraulic lines to the steering cylinder.
4. Raise the steer axle with the floor jack, then tighten bolts (2).

Master Cylinder

Remove And Install Master Cylinder



1. Remove the rear floor plate from the lift truck. Drain the brake fluid from the brake reservoir. Disconnect hose (1) and line (4) from master cylinder (5).
2. Remove the cotter pin, washer and pin (3) from the clevis and brake pedal.
3. Remove two bolts (2), the washers and master cylinder (5) from the lift truck.

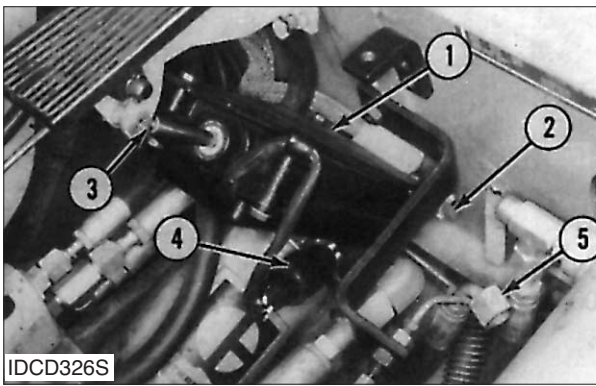
NOTE: The following steps are for installation of the master cylinder.

4. Put the master cylinder in position, and install the two washers and bolts (2).
5. Install pin (3) through the master cylinder clevis and brake pedal. Install the washer and cotter pin.

6. Connect brake line (4) and hose (1) to the master cylinder. Fill the brake reservoir with brake fluid. See the Operation And Maintenance Manual.
7. Bleed the brake system, and if necessary, adjust the pedal free travel. See Brake System Air Removal And Pedal Adjustment in Testing And Adjusting.

Accelerator Control Switch

Remove And Install Accelerator Control Switch



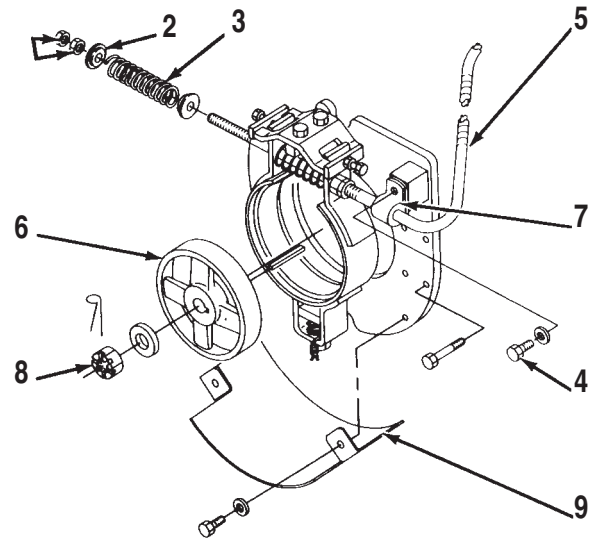
1. Remove the floor plates. Disconnect connector (4).
2. Disconnect hose (5) from the tilt cylinder so the lower mounting pin is easier to remove.
3. Remove the cotter pins, washers and pins (2) and (3). Remove accelerator control switch group (1) from the lift truck.

NOTE: The following steps are for installation of the accelerator control switch group.

4. Put accelerator control switch group (1) in position in the lift truck.
5. Install pins (2) and (3), the washers and cotter pins to hold the accelerator switch in position.
6. Connect hose (5) to the tilt cylinder. connect connector (4). If necessary, adjust the accelerator control linkage. See Accelerator Control Linkage Adjustment in the MicroCommand Control System module.

Parking Brake

Remove And Install Parking Brake

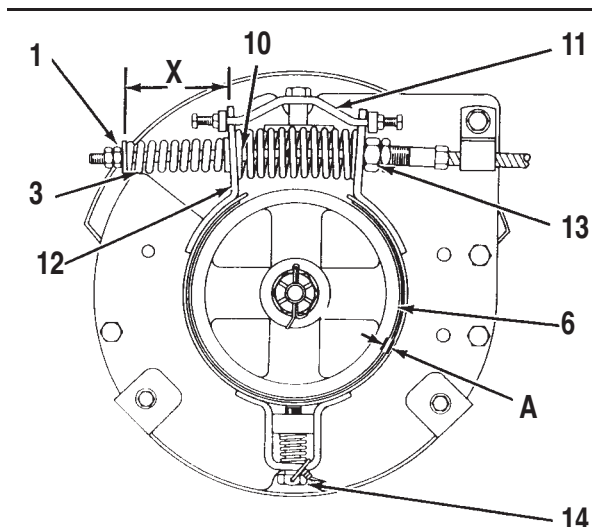


IDCD327S

1. Remove the battery and the plate under the battery. Remove two nuts (1), two washers (2) and spring (3).
2. Remove the bolt (4) and clip (7), and pull cable assembly (5) away from the parking brake. Remove plate (9).
3. Remove the three bolts and the parking brake from the back of the drive motor.
4. Remove the cotter pin, locknut (8), the washer, drum (6) and the key from the drive motor. If necessary, use a puller to remove the drum.

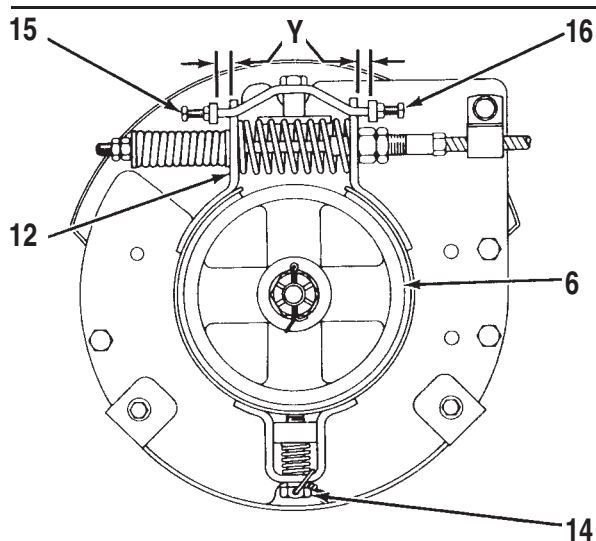
NOTE: The following steps are for installation of the parking brake.

5. Put the key and drum (6) in position on the drive motor armature. Install the washer and locknut (8). Tighten the locknut to a torque of $50 \pm 20 \text{ N}\cdot\text{m}$ ($37 \pm 15 \text{ lb}\cdot\text{ft}$), and install the cotter pin.
6. Put the parking brake on the back of the drive motor. Install the three bolts. Install plate (9).
7. Position cable assembly (5) through the parking brake, and install washers (2), spring (3) and nuts (1). Install clip (4).



IDCD328S

Brake Off



IDCD329S

Brake On

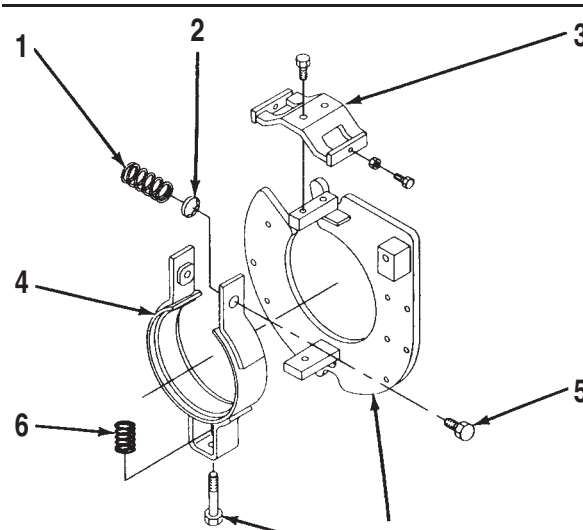
8. Adjust the parking brake as follows: adjust drum (6) to the strap assembly lining clearance with bolt (14). Adjust bolt (14) until the clearance at point (A) is 0.25 to 0.50 mm (.010 to .020 in). Install the wire to hold the adjustment.

9. With the parking brake lever assembly in the "OFF" position and cable assembly shoulder (10) seated against strap assembly (12), as shown in BRAKE OFF, adjust nuts (1) until spring (3) over travel (X) is $70.0 \pm 0.5\text{mm}$ ($2.76 \pm .02\text{ in}$).
10. With the parking brake applied, adjust off position stop bolts (15) and (16) until there is a clearance (Y) of 6.0 mm (.24 in) maximum between strap assembly (12) and bracket assembly (11). Tighten the nuts to hold the adjustment.
11. With the parking brake lever assembly in the "OFF" position, adjust retaining nut (13) so that the lever assembly returns to the full off position and strap assembly (12) contacts stop bolts (15) and (16).

Disassemble And Assemble Parking Brake

Start By:

- a. remove parking brake



IDCD330S

1. Remove the wire, bolt (7) and spring (6). Remove retaining nut (5), spring (1) and ring (2).
2. Remove bracket assembly (3). Remove strap assembly (4) from bracket assembly (8).

NOTE: The following steps are for assembly of the parking brake.

3. Put the strap assembly in position on bracket assembly (8). Install bracket assembly (3).
4. Install spring (6), bolt (7) and the wire. Install ring (2), spring (1) and retaining nut (5).

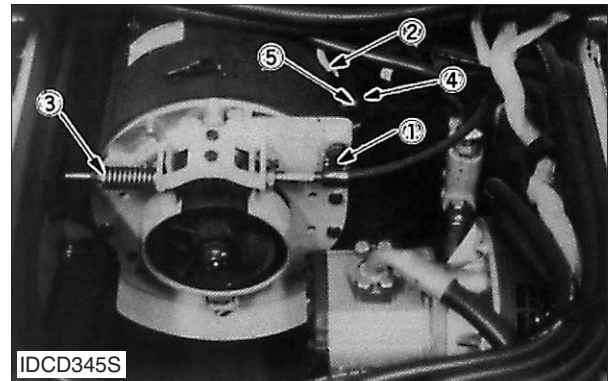
End By:

- a. Install parking brake.

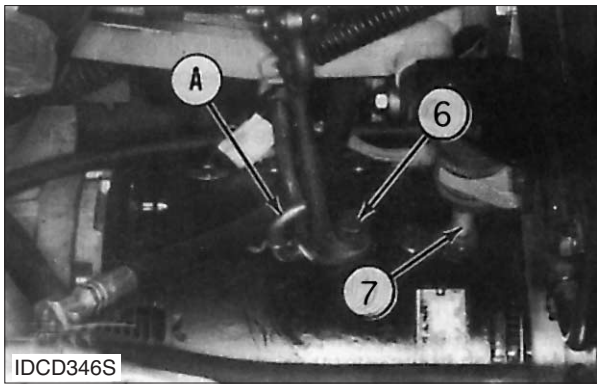
Drive Motor

Remove And Install Drive Motor

Tools Needed	A	B
Link Bracket	1	
Socket		1

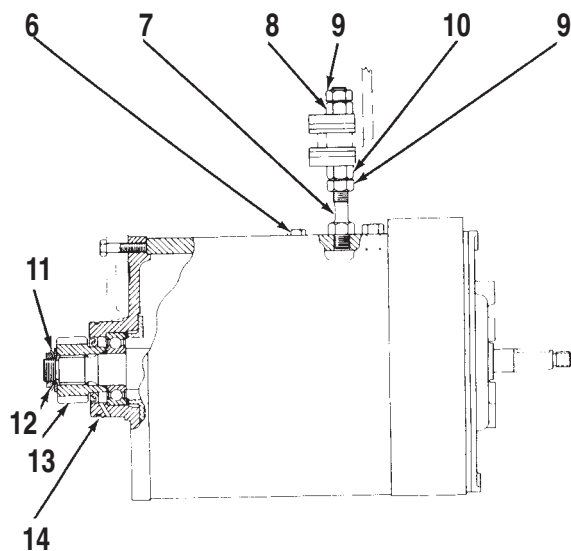


1. Remove the battery, the plate under the battery and the floor plates. Drain the hydraulic tank. Disconnect the hydraulic pump and steering pump hoses from the hydraulic tank.
2. Remove nut (3) and the spacers from the end of the parking brake cable assembly. Loosen the bolt and clamp (1), and pull the cable assembly away from the parking brake.
3. Disconnect thermal switch connector (2). Disconnect brush wear indicator wire (4). Disconnect four cables (5) (two at the back and two at the front) from the drive motor.



4. The weight of the drive motor is 101 kg(223 lb). Remove bolt (6) and install tool (A) and a hoist. Remove motor mount (7). Remove the six bolts that hold the drive motor to the transaxle. Remove the drive motor from the transaxle, and lower it to the floor.
5. Raise the lift truck, and remove the drive motor from under it.

(B-Series)



IDCD347S

6. Bend lockwasher (11) tab away from nut (12). Remove nut (12) with tool (B), the lockwasher, washer and gear (13). Remove O-ring seal (14) if necessary.

The following steps are for installation of the drive motor.

7. Put O-ring seal (14) on the drive motor, and put clean SAE 10W oil on it. Install gear (13), the lockwasher, washer and nut (12). Tighten the nut with tool (B) to a torque of $100 \pm 15 \text{ N}\cdot\text{m}$ ($75 \pm 11 \text{ lb}\cdot\text{ft}$), and the lock the nut in position.
8. Raise the lift truck, and put the drive motor in position under it. Attach a hoist to tool (A), and put the drive motor in position in the transaxle. Install the six bolts that hold the drive motor to the transaxle.
9. Install rear mount (7). Tighten lower nut (10) to a torque of 4 to 8 $\text{N}\cdot\text{m}$ (3 to 6 $\text{lb}\cdot\text{ft}$). Tighten upper nut (8) to a torque of 8 to 16 $\text{N}\cdot\text{m}$ (6 to 12 $\text{lb}\cdot\text{ft}$). Tighten both jam nuts (9) to a torque of $110 \pm 30 \text{ N}\cdot\text{m}$ (80 $\pm 22 \text{ lb}\cdot\text{ft}$).
10. Connect four cables (5), brush wear indicator wire (4) and thermal switch connector (2).
11. Put the parking brake cable assembly in position in the parking brake, and install the spacers and nut (3). Tighten the bolt and clamp (1). Adjust the parking brake cable assembly. See Parking Brake control Group Adjustment in Testing And Adjusting.
12. Connect the hydraulic pump hoses to the hydraulic tank. Fill the hydraulic tank with oil to the correct level. See the Operation And Maintenance Manual. Install the plate over the motors, the battery and floor plates.

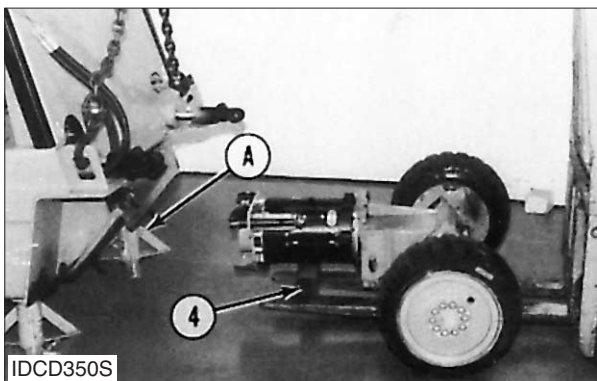
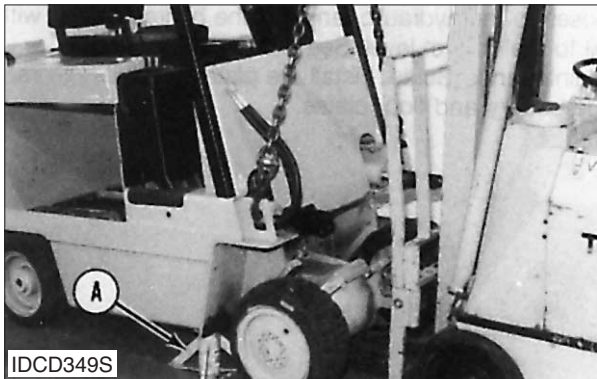
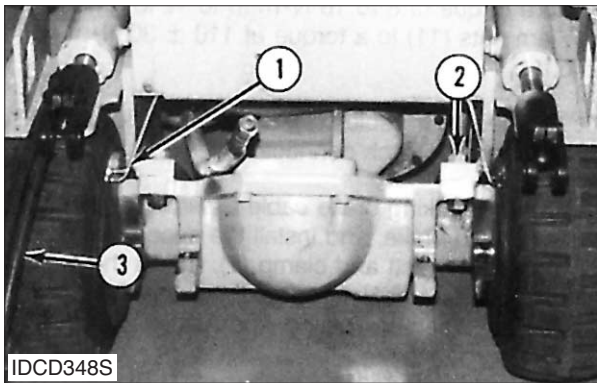
Transaxle

Remove And Install Transaxle

Tools Needed	A	B
Jack Stand	2	
Link Bracket		1

Start By:

a. Remove mast.



1. Remove the battery and the plate under the battery. Disconnect the four cables and wires (if equipped) from the drive motor. Disconnect the parking brake cable assembly and the two wires from the parking brake switch (see Parking Brake in this module). Drain the brake fluid reservoir.
2. Support two sidershifter hoses (3) (if equipped) away from the transaxle so they do not interfere during removal. Disconnect four brake lines (1).
3. Put a lift truck in position under the transaxle as shown. Put wood block (4) on the forks under the drive motor for support. Attach a hoist to the lift truck as shown. Remove the floor plate, and remove the rear drive motor mount.
4. Remove four bolts (2), the nuts and washers. Raise the lift truck off of the transaxle, and roll the transaxle from under the lift truck.
5. Put tooling (A) under the lift truck, and lower it onto the tooling as shown.
6. The weight of the drive motor is 105 kg (232 lb)

Install tool (B) and a hoist, and remove the bolts and the drive motor [see Drive Motor in this module for placement of tool (B)].

NOTE: The following steps are for installation of the transaxle.

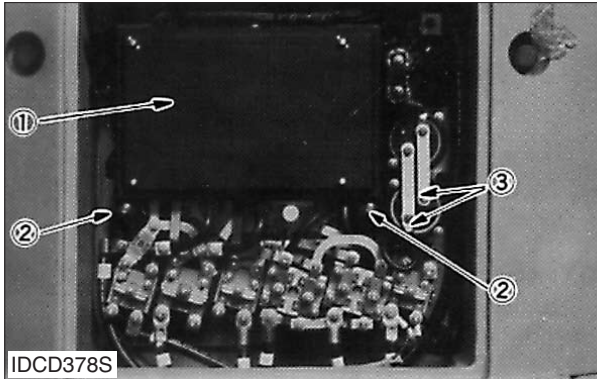
7. Put the drive motor in position in the transaxle with tool (B) and on hoist. Install the bolts that hold the drive motor to the transaxle.
8. Put a lift truck with wood block (4) on its forks, under the transaxle as shown. Raise the lift truck off of tooling (A), and roll the transaxle under it. Remove tooling (A), and lower the truck onto the transaxle. Install bolts (2), the washers and nuts, and tighten them to $488 \pm 27 \text{ N}\cdot\text{m}$ ($360 \pm 20 \text{ lb}\cdot\text{ft}$).
9. Install the rear drive motor mount. Connect brake lines (1). Connect the parking brake switch wires and the parking brake cable assembly.
10. Connect the cables and wires (if equipped) to the drive motor. Install the plate over the motors, and install the battery. Fill the brake reservoir to the correct level. See the Operation And Maintenance Manual. Bleed the brakes. See Brake System Air Removal in Testing And Adjusting.

End By:

a. Install mast.

Control Panel

Remove And Install Control Panel

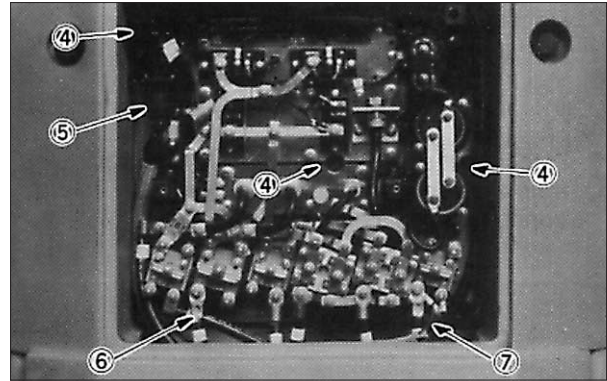


Typical Example

WARNING

Battery voltage and high amperage are present. Injury to personnel is possible. Disconnect the battery. The head capacitor (HEAD CAP) must be discharged before any contact with the control panel is made. Disconnect the battery and discharge HEAD CAP.

1. Remove the protector cover from the counterweight. Disconnect the battery and discharge HEAD CAPS (3). See Discharging Head Capacitor in the MicroController Control System module. Mark all cables and wires for correct installation.
2. Loosen two screws (2) and position logic group (1) on top of the counterweight.



Typical Example

3. Disconnect wiring harness connector (5). Disconnect seven cables (6) and two wires (7) from the contactors at the bottom of the control panel.
4. Loosen the two lower corner mounting bolts for the control panel. Remove remaining five bolts (4). There is one in the center of the control panel.
5. Reattach logic group (1) to its bumpers. The weight of the control panel is 29 kg (65 lb). Use two people to remove the control panel.

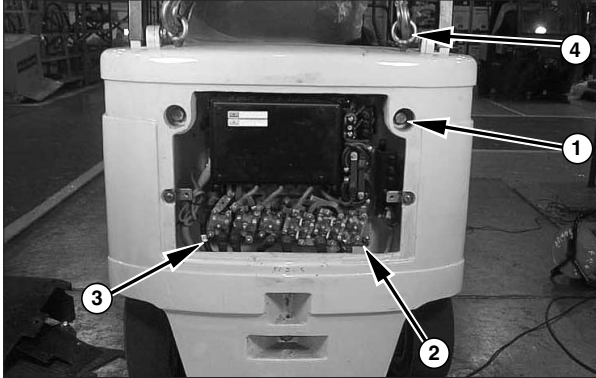
NOTE: The following steps are for installation of the control panel.

6. Put the control panel in position on the lift truck. Put the logic group on the counterweight. Install five bolts (4) and tighten all the bolts.
7. Connect two wires (7) and seven cables (6) to the contactors at the bottom of the control panel. Connect wiring harness connector (5).
8. Put logic group (1) on its bumpers and tighten two screws (2).
9. Install the protector cover on the counterweight. Connect the battery.

Counterweight

Remove And Install Counterweight

Tools Needed	A
Link Bracket	2



WARNING

Battery voltage and high amperage are present. Injury to personnel is possible. The head capacitor (HEAD CAP) must be discharged before any contact with the control panel is made. Disconnect the battery and discharge HEAD CAP.

1. Remove the protector cover from the counterweight. Disconnect the battery and discharge the HEAD CAP. See Discharging Head Capacitor in the MicroCommand Control System module.
2. Disconnect positive battery cable (3) and negative battery cable (2) from the control panel.
3. Install tooling (A) in the two holes at the top of the counterweight. Attach a hoist. The approximate weight of the counterweight is as follows:

BC20S	430 kg (948 lb)
BC25S, BC30S.....	570 kg (1257 lb)
B20S	252 kg (556 lb)
B25S, B30S	349 kg (770 lb)

4. Remove three bolts (1) and the counterweight.

NOTE: The following steps are for installation of the counterweight.

5. Put the counterweight in position on the lift truck and install three bolts (1).
6. Connect negative battery cable (2) and positive battery cable (3) to the control panel.
7. Install the protector cover on the counterweight.