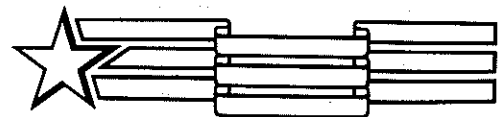


# Ingersoll

**HYDRAULIC CYLINDER  
COMPACT TRACTORS  
Service Manual 9-99833**

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**QUALITY IN THE AMERICAN TRADITION**

**Ingersoll Equipment Co., Inc.**

**Winneconne, Wisconsin 54986-9576**

# DOUBLE ACTING HYDRAULIC LIFT AND THREE POINT HITCH CYLINDERS

## REMOVAL

### Hydraulic Lift Cylinder

1. "Extend" the cylinder and stop the engine. Tie the lift lever in the "raise" position. Remove the hoses (28 & 29) from the control valve. Cover or plug the exposed fittings to keep out dirt.
2. Remove the mounting pin (24) from the piston rod end of the cylinder.
3. Tie up the height adjusting arm (27) (early models only) to keep it in place, remove the pin (25) and remove the cylinder.

### Three Point Hitch Cylinder

1. "Retract" the cylinder and stop the engine. Remove the hoses (3 & 4) from the control valve. Cover or plug the exposed fittings to keep out dirt.
2. Remove the mounting pins from the piston rod and tube ends of the cylinder. Remove the cylinder assembly from the hitch.

## DISASSEMBLY

1. Remove the hoses from the cylinder and cover or plug the exposed ports to keep out dirt.
2. After draining the cylinder, and cleaning paint and/or rust from inside the base end of the cylinder tube, push or tap the piston assembly (35) and end cap (36) through the base end of the cylinder. See Inset "A".
3. Remove and discard wiper ring (37), "O" ring (38) and "O" rings (39).

## INSPECTION

1. Thoroughly clean and air dry all parts before inspection. Remove all paint from the inside base end of the cylinder tube.
2. Inspect the cylinder tube and piston rod assembly for score marks or scratches. Light scratches may be removed with a hone or crocus cloth. If scratches cannot be polished out, the affected part must be replaced since the "O" rings will be quickly damaged and leakage will result.
3. To protect the piston and end cap "O" rings during assembly, break the inside sharp edges of the two mounting pin holes in the cylinder tube with crocus cloth. Also check the base of the tube for burrs or sharp edges.

## ASSEMBLY

1. Dip all new seals in clean oil.
2. Install new "O" ring (38) in the cylinder tube.
3. Install new wiper seal (37) in the cylinder tube, lip side out.
4. Install a new "O" ring (39) on the piston (35).
5. Install new "O" ring (39) on the end cap (36).
6. Apply a light coat of grease to the inside of the cylinder tube and the O.D. of the piston and end cap with particular attention to the area of the mounting pin holes and the "O" rings.
7. Carefully install the rod and piston assembly into the cylinder tube making certain the "O" ring is not nicked by the mounting pin holes.

**NOTE:** If an "O" ring particle is observed in either of cylinder tube mounting pin holes following installation of the piston assembly, the piston must be removed, a new "O" ring installed and step 3 under "Inspection" repeated.

8. Carefully install the end cap (36) in the same manner just far enough to permit installation of the mounting pin. Refer to "NOTE" following paragraph 7.
9. Either repaint or heavily grease the lower inside end of the cylinder tube to prevent corrosion.

## INSTALLATION

### Hydraulic Lift Cylinder:

1. Connect the hoses (28) and (29) to the cylinder. The "shorter" hose is connected to the port at the rod end of the cylinder. When tightened, the tube ends of the hoses must face straight upward as illustrated with the cylinder in the position it will be installed on the tractor.
2. With the cylinder somewhat forward from its normal position, thread the hose and tube assemblies through between the steering support and the upper right side frame rail.
3. With the cylinder rod "fully" extended and "positioned between" its mounting lugs, install the mounting pins, first through the tube and then the rod.

4. Connect the tube ends of the hoses to the control valve fittings.
5. After operating cylinder to full open and closed positions several times, check oil level in hydraulic reservoir. Cylinder must be in the "closed" position when checking oil level. Refer to your tractor operators manual for proper oil level and type.

Three Point Hitch Cylinder:

1. Reconnect the hoses (3) and (4) to the cylinder. The "longer" hose is connected to the port at the rod end of the cylinder.

2. Install the cylinder so the cotter pin on the lower mounting pin can be installed between the cylinder tube and the right hand mounting lug. Connect the hoses to the control valve fittings (5).

3. After operating cylinder to full open and closed positions several times, check oil level in hydraulic reservoir. Cylinder must be in the "closed" position when checking oil level. Refer to your tractor operators manual for proper oil level and type.

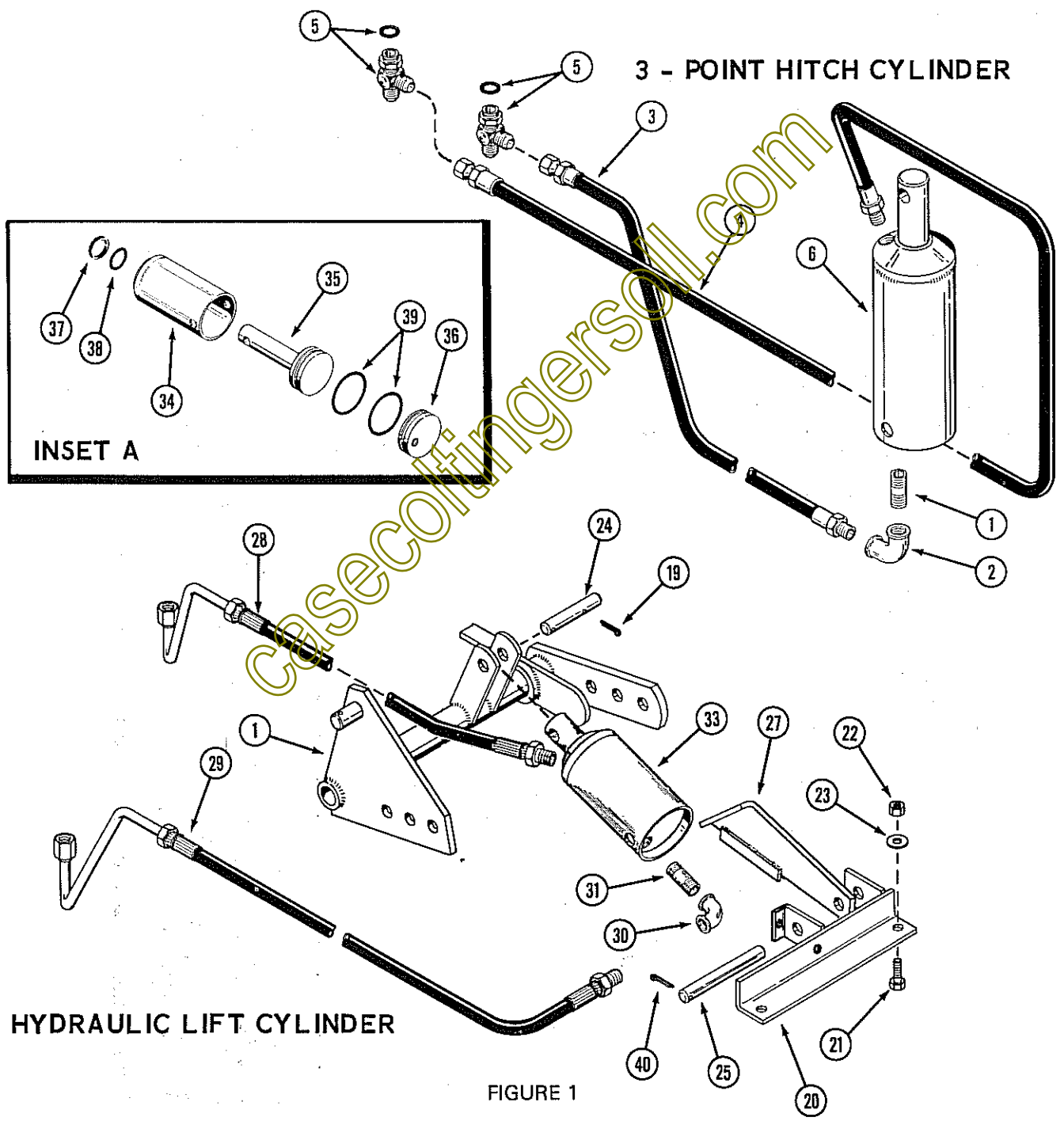


FIGURE 1

# SINGLE ACTING THREE POINT HITCH CYLINDER

## REMOVAL

1. Retract the cylinder and stop the engine. Remove the hose (4) from the lift valve at fitting (3). Cover or plug the exposed fittings to keep out dirt.
2. Remove the two mounting pins and remove the cylinder assembly from the hitch.
3. Remove the hose from the elbow (5) at the base of the cylinder. Clean paint and/or rust from inside the base end of the cylinder tube.

## DISASSEMBLY

1. After draining the cylinder, push or tap the piston assembly (10) and end cap (13) through the base end of the cylinder.
2. Remove and discard wiper ring (8), back up washers (11) and "O" rings (12).

## INSPECTION

1. Thoroughly clean and air dry all parts before inspection.
2. Inspect the cylinder tube and piston rod assembly for score marks or scratches. Light scratches may be removed with a hone or crocus cloth. If scratches cannot be polished out, the affected part must be replaced since the "O" rings will be quickly damaged and leakage will result.

3. To protect the piston and end cap "O" rings during assembly, break the inside sharp edges of the two mounting pin holes in the cylinder tube with crocus cloth. Also check the base of the tube for burrs or sharp edges.

## ASSEMBLY

1. Dip all new seals in clean oil.
2. Install new wiper seal (8) into cylinder tube, lip side out.
3. Install new "O" ring (12) and back up washers (11) on piston.
4. Place new "O" ring (12) on end cap.
5. Apply a light coat of grease to the inside of the cylinder tube and the O.D. of the piston with particular attention to the area of the mounting pin holes and the "O" ring.
6. Carefully install the rod and piston assembly into the cylinder tube making certain the "O" ring is not nicked by the mounting pin holes.

**NOTE:** If an "O" ring particle is observed in either of the cylinder tube mounting pin holes following installation of the piston assembly, the piston must be removed, a new "O" ring installed and step 3 under "Inspection" repeated.

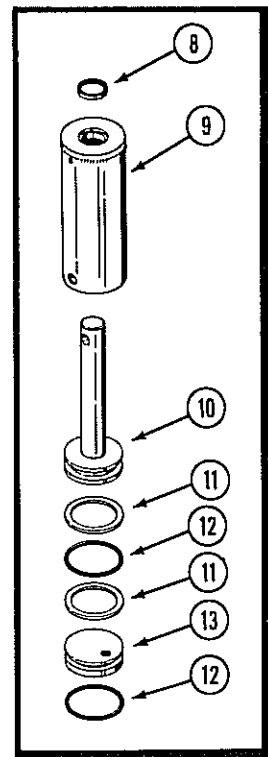
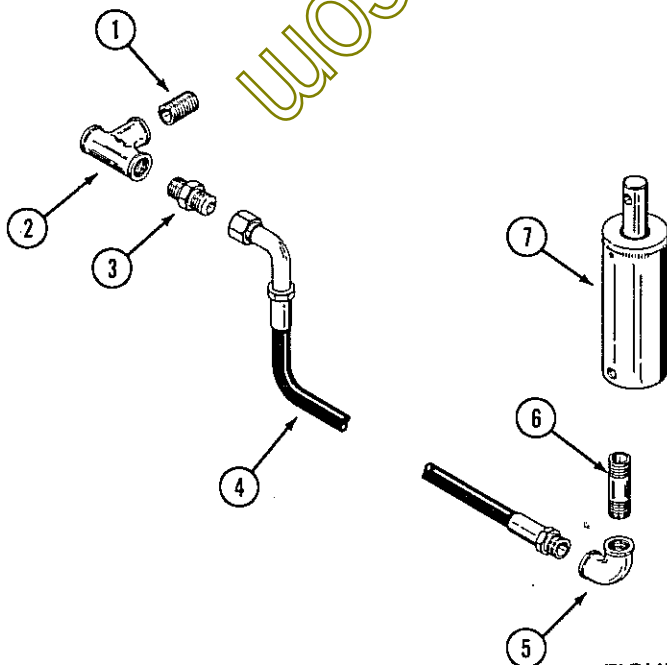


FIGURE 2

7. Carefully install the end cap in the same manner just far enough to permit installation of the mounting pin.

8. Either repaint or heavily grease the lower inside end of the cylinder tube to prevent corrosion.

#### INSTALLATION

1. Connect the cylinder to the hitch with the two mounting pins so the cotter pin on the lower mounting pin can be installed between the cylinder tube and the right hand mounting lug.

2. Connect the hose (4) to the cylinder and control valve fitting (3).

3. After operating cylinder to full open and closed positions several times, check oil level in hydraulic reservoir. Cylinder(s) must be in the "closed" position when checking oil level. Refer to your tractor operator's manual for proper oil level and type.

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## DOUBLE ACTING LIFT CYLINDER - SIDE MOUNTED

### REMOVAL

1. With the cylinder in the closed position, disconnect the two hoses from the street elbows on the cylinder.
2. Disconnect the clevis pin from the rod end of the cylinder.
3. Remove the retainer ring from the pin at the cylinder base and remove the cylinder.

### DISASSEMBLY

1. Note the position of the street elbows and remove them from the cylinder heads (2) and (3) and drain the cylinder.
2. Pull the piston rod assembly (1) and cylinder head (2) out of the tube.
3. Turn the clevis (5) off the piston rod (1) and remove the cylinder head (3).
4. Remove and discard all "O" rings (6) and (7), and back up washers (8).

### INSPECTION

1. Thoroughly clean and air dry all parts before inspection.
2. Inspect the cylinder tube and piston rod assembly for scratches or score marks. Light scratches may be removed with a hone or crocus cloth. If scratches cannot be polished out, the affected part must be replaced since the new "O" rings will be quickly damaged and leakage will result.
3. Inspect the bore of the cylinder head (3) for scratches or wear. If the bore is worn, the head must be replaced since leakage will result. If the cylinder head bore is worn out of round; check for interference with the pump suction line. A shorter suction port fitting 1-5/8" long (P/N 218-5065) can be installed if interference exists.
4. To protect the piston and cylinder head seals during assembly, break the inside sharp edges of the street elbow holes in the tube with crocus cloth. Also check the ends of the tube for burrs or sharp edges.

### ASSEMBLY

1. Dip all new seals in clean oil.
2. Install new "O" rings (6) and (7) on the head (3). Install new "O" rings (6) on the head (2).
3. Place the head (3) onto the piston rod and install the clevis (5) with loctite.
4. Install new back up washers (8) and "O" ring (6) on the piston.
5. Apply a light coat of grease to the inside of the cylinder tube, O.D. of the piston and O.D. of the heads with particular attention to the area of the seals and tube ports.
6. Carefully place the piston assembly into the end of the tube which has the port located 1" from the end. Carefully insert the heads (2) and (3) so the ports are in line with the ports in the tube. Make certain none of the "O" rings (6) are nicked by the tube ports.

**NOTE:** If an "O" ring particle is observed in either of the tube ports following installation of the piston and heads, the affected part(s) must be removed new "O" ring(s) installed and step 4 under "Inspection" repeated.

7. Apply thread sealer to all pipe threads. Install the street elbows and tighten them to their original positions.
8. Install the cylinder on the tractor and connect the hoses to the street elbows.
9. After operating cylinder to full open and closed position several times, check oil level in hydraulic reservoir. Cylinder(s) must be in the "closed" position when checking oil level. Refer to your tractor operator's manual for proper oil level and type.

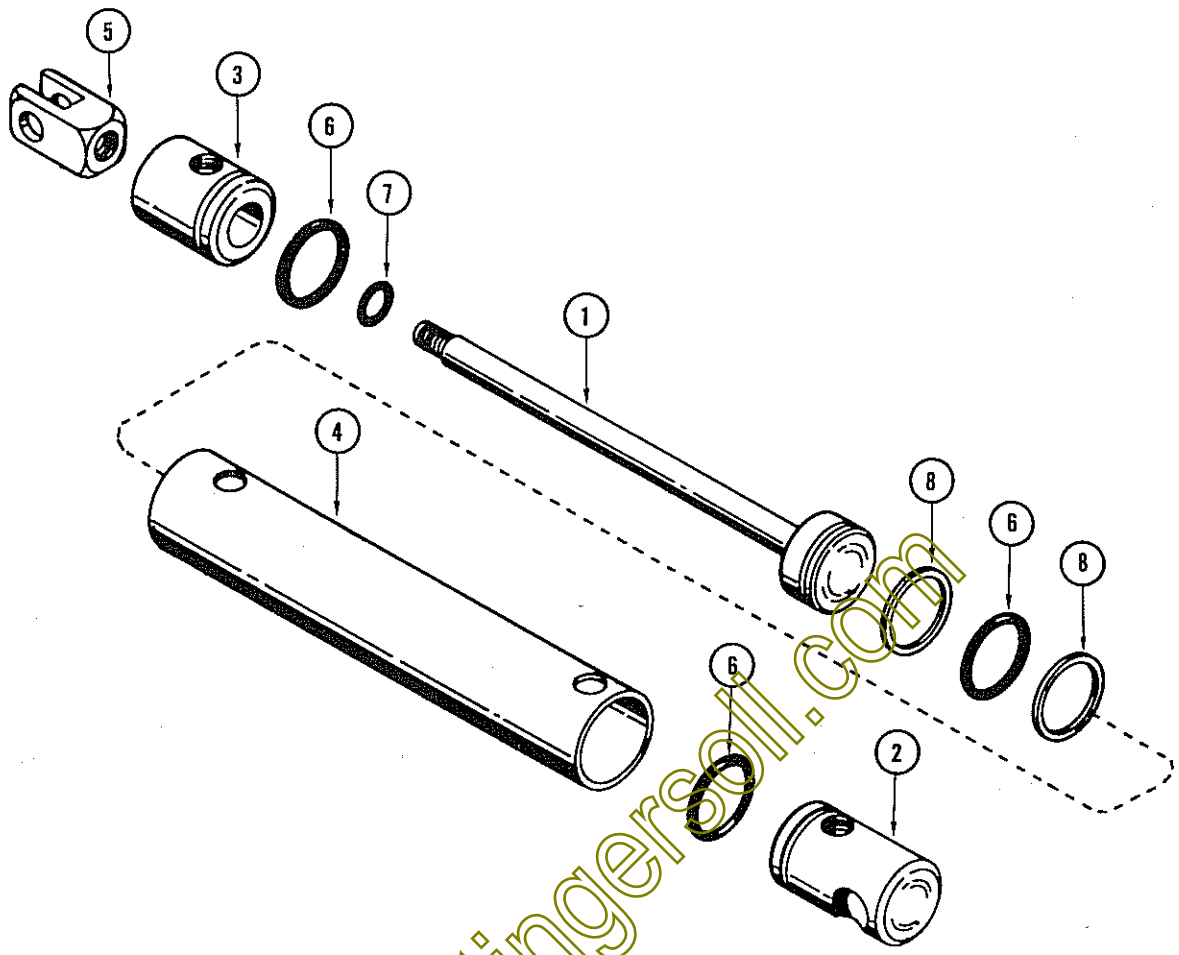


FIGURE 3

## LOADER LIFT AND BUCKET CYLINDERS FOR CYLINDERS WITH GLAND RETAINED WITH RING

### REMOVAL

1. Lower the loader lift arms and put bucket flat on the ground.
2. Stop engine.
3. Relieve pressure in the cylinders and lines by moving the loader control handle several times in all positions.
4. Remove the hoses from the cylinders.
5. Cover or plug the exposed fittings to keep out dirt.
6. To remove the lift cylinders, remove the pins from both ends.
7. To remove the bucket cylinder body, remove the two pins from the ends of the bucket cylinder links and spread the links.

### DISASSEMBLY

1. Remove retaining ring (16) from gland (6).
2. Push gland into body far enough to remove spacer (12).
3. Remove retaining ring (15) from inside of body.
4. Secure the body of the cylinder in vise being careful not to distort or damage it.
5. Pull the rod out of the cylinder body complete with piston (2) and gland (6).
6. Remove the nut (13) from the rod.
7. Remove the bucket cylinder piston by pulling it off the end of the rod. Remove the lift cylinder piston by unscrewing it from the end of the rod.
8. Remove the gland and all o-rings and seals. Note the arrangement of the o-rings and seals to aid you during reassembly.

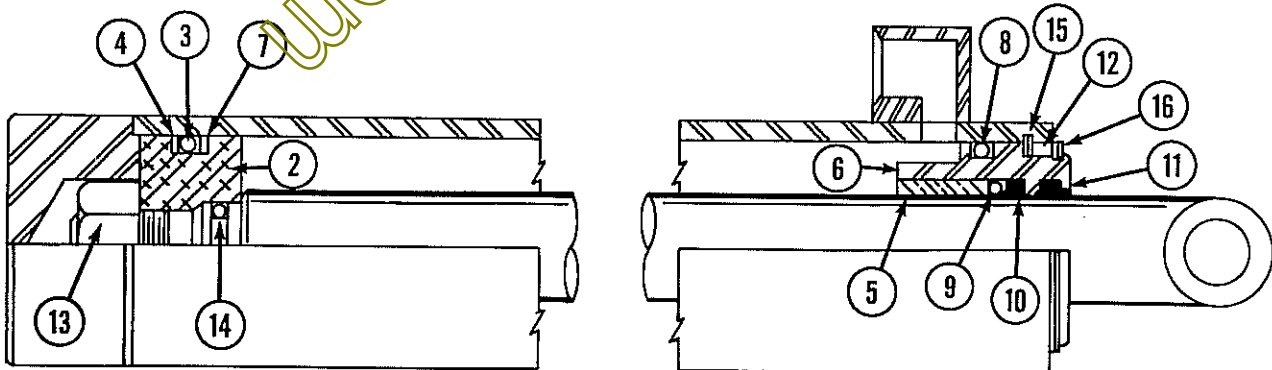


FIGURE 4

Cylinder with Gland Retained with Ring



## INSPECTION

1. Thoroughly clean and air dry all parts before inspection.
2. Inspect the cylinder body and piston rod for scratches, dents or score marks. Light scratches may be removed with a hone or crocus cloth. If scratches cannot be polished out, the affected part must be replaced or the "O" rings will be quickly damaged and leakage will result.
3. Inspect the cylinder gland bushing (5) for wear and replace if necessary.

## ASSEMBLY

1. Dip all new seals in clean oil.
2. Assemble Gland (6)
  - a. Install one rod wiper (10) into the inner groove, in gland with the lip facing the piston end.
  - b. Install "O" ring (9) and bushing (5).
  - c. Install second rod wiper (11) in outer groove with lip facing out.
  - d. Install "O" ring (8) in the groove on outer circumference of head.
3. Slide the gland onto the rod with the retaining ring groove toward pin hole end of rod.
4. Install "O" ring (14) in groove in threaded end of rod.
5. Assemble piston (2)
  - a. Place the new seals in hot water for a few minutes to make them more flexible.
  - b. Install the first backup washer (4) by stretching it over the piston and into the groove.
  - c. Roll the "O" ring (3) into the groove so it is against the rough side of the backup washer.
  - d. Install the second backup washer (7) by stretching it over the piston and into the groove so its rough side is also against the "O" ring.
  - e. Work the backup washers (4 & 7) down into the groove.
6. Screw piston (lift cylinder) or push piston (bucket cylinder) on rod so that counterbore in the piston goes over the shoulder and "O" ring on the rod.
7. Screw nut (13) onto rod, tighten nut and stake end of rod.
8. Push rod into body being careful not to damage backup washers (4 & 7) and "O" rings (3) and (8) on piston and gland.
9. Install retaining ring (15) in groove inside of tube.
10. Install spacer ring (12).
11. Pull rod out of body as far as possible to expose ring groove in cylinder gland and install retaining ring (16).

# LOADER LIFT AND BUCKET CYLINDERS FOR CYLINDERS WITH THREADED GLAND

## REMOVAL

1. Lower the loader lift arms and put bucket flat on the ground.
2. Stop engine.
3. Relieve pressure in the cylinders and lines by moving the loader control handle several times in all positions.
4. Remove the hoses from the cylinders.
5. Cover or plug the exposed fittings to keep out dirt.
6. To remove the lift cylinders, remove the pins from both ends.
7. To remove the bucket cylinder body, remove the two pins from the ends of the bucket cylinder links and spread the links.

## DISASSEMBLY

1. Use a suitable spanner to engage the holes on the O.D. of the gland and unthread the gland(1) from the body(2).
2. Secure the body of the cylinder in a vise being careful not to distort or damage it.
3. Pull the rod out of the cylinder body complete with piston(3) and gland(1).
4. Remove the nut(4) from the rod.
5. Remove the piston, gland, and all o-rings and seals. Note the arrangement of the o-rings and seals to aid you during reassembly.

## INSPECTION

1. Thoroughly clean and air dry all parts before inspection.

2. Inspect the cylinder body and piston rod for scratches, dents or score marks. Light scratches may be removed with a hone or crocus cloth. If scratches cannot be polished out, the affected part must be replaced or the "O" rings will be quickly damaged and leakage will result.

## ASSEMBLY

1. Dip all new seals in clean oil.
2. Assemble Gland (1)
  - a. Place the new seals in hot water for a few minutes to make them more flexible.
  - b. Install the rod seal (5) with the expander ring (6) into the cavity in the gland. The expander ring must face the piston end. Do not use sharp tools that may damage the seal.
  - c. Install the new rod wiper (7).
  - d. Install the new "O" ring (8).
3. Coat the inside of the gland with grease and slide in onto the rod.
4. Install the piston with cup packing (9) and "O" ring (10) as illustrated. Tighten the nut (4) securely.
5. Coat the threads on the inside of the cylinder body with heavy grease to protect the cup packing.
6. Insert the piston being careful not to damage the cup packing.
7. Use a suitable spanner to engage the holes on the O.D. of the gland and tighten the gland securely.

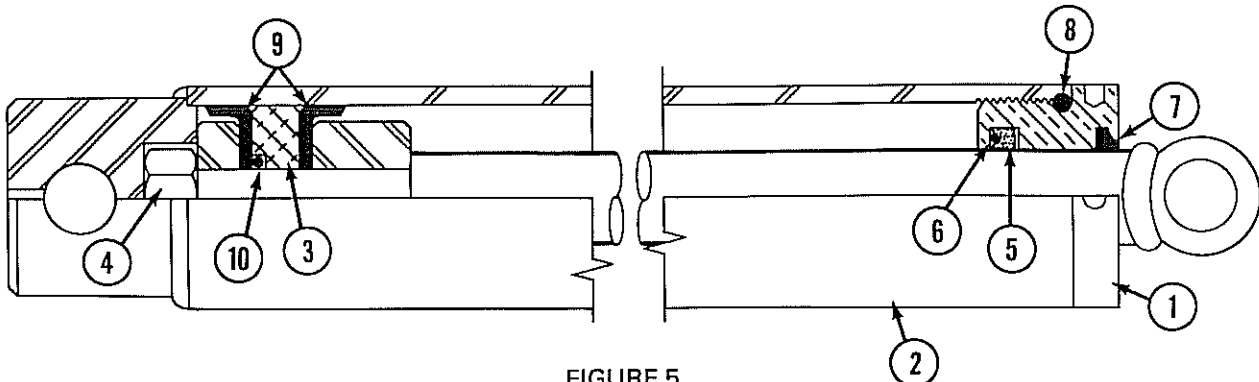


FIGURE 5  
Cylinder with Threaded Gland

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