

Servicing International Harvester Series A, C and Cub Hydraulic "Touch Control" System

The hydraulic power lift ("Touch Control") system is composed of three basic units: The gear type pump, which is gear driven from the timing gear train; a single or double work cylinder and valves unit which is mounted on the torque tube; and one or two rockshaft assemblies bolted to the forward end of the valves unit.

The system used on early model C has two work cylinders, twin rockshafts and four rockshaft power arms. The Super A, Super AV, Super C and late model C systems are similar except that three rockshaft power arms are used.

The "Touch Control" system which is used on the Cub is similar in operation to the above models except that the system is smaller and a single rockshaft and one rockshaft operating (work) cylinder is used.

Note: The maintenance of absolute cleanliness of all parts is of utmost importance in the operation and servicing of the hydraulic system. Of equal importance is the avoidance of nicks or burrs on any of the working parts.

LUBRICATION AND BLEEDING

535. To refill the reservoir and bleed the system, after the system has been drained, proceed as follows: Refill the reservoir with IH "Touch Control" Fluid. Start the engine and run at approximately 650 rpm. With the filler plug removed, move the control levers back and forth 10-12 times; then, place the levers in the rear position and stop the engine. Add sufficient fluid to bring the reservoir fluid level to within $\frac{1}{2}$ inch of the filler opening. Capacity of the complete system is approximately $8\frac{1}{4}$ pints for series A and C and $4\frac{1}{4}$ pints for the Cub.

CAUTION: If the system is to be flushed, do not use kerosene. It is recommended that IH "Touch Control" Fluid be used.

TROUBLE SHOOTING

536. If the "Touch Control" system does not operate properly, it is advisable to apply a few quick checks to determine which unit is at fault. To check the system, install a Schrader (IH No. SE-1338-A) gage or equivalent in the position shown in Fig. IH520 for Series A and C or in the upper port of the rear manifold flange for the Cub. Load the system with two rear wheel weights attached to the rear rockshaft arm of a rear mounted implement rockshaft. Start the engine, operate the lift system and refer to the trouble diagnosis chart which follows:

Note: Keep in mind that the gage should show high pressure (1100-1500 psi) only during the movement of rockshaft arms. When the rockshaft arms have completed their travel, the system will return to low pressure (15-40 psi). The fact that this low range of pressure will not be

indicated on the SE-1338-A gage is of no importance, since the low range of pressure is not a factor in the trouble shooting procedure.

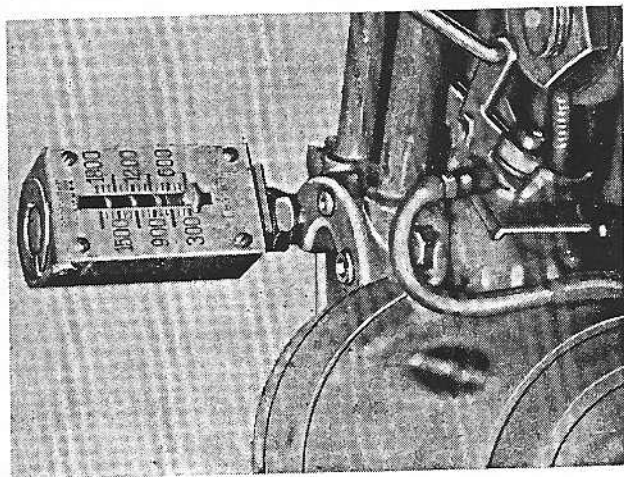
A. System Will Not Lift Load, High Gage Pressure.

1. Binding or scored rockshaft bearings.
2. Damaged implement.
3. Defective cylinder head gasket.

B. System Will Not Lift Load, Low Gage Pressure.

1. No oil in system—check for leaks.
2. Faulty pump.
3. Regulator and/or safety valves stuck.
4. Weak or broken safety valve spring.

Fig. IH 520—Schrader (IH No. SE-1338-A) gage installed on series A and C. Gage installation on Cub is similar, except the gage is installed in the upper port of the flange.



5. Excessive safety valve clearance in its bore.
- C. Lift Cycle Slow (More than 2 seconds required to lift load), Low Gage Pressure.
1. Same as 2, 3, 4 and 5 under condition B.
 2. Orifice plug opening too large (more than 0.030).
 3. Internal pipe plugs (clean-out plugs) loose or missing.
- D. Gage Shows High Pressure When Control Levers Are Stopped At Either Of The Extreme Positions, Low Pressure When Levers Are Stopped At Intermediate Positions.
1. Faulty implement. Implement preventing full rockshaft travel.
 2. Stop clips out of adjustment.
- E. Gage Shows High Pressure With Control Levers And Rockshaft In Any Position.
1. Orifice plug stopped up.
 2. Stuck regulator valve.
 3. Internal pipe plugs (clean-out plugs) loose or missing.
 4. Cracked or faulty work cylinder block.
- F. Load Oscillates When Engine Is Running, Drops Slowly When Engine Is Stopped.
1. Oil leaking past work cylinder piston due to:
 - a. Check valves not seating in bushings.
 - b. Defective seal rings on check valve bushings (Not Cub).
 - c. Defective work cylinder piston seal rings.
 - d. Defective cylinder head gasket.
 - e. Cracked or faulty work cylinder block or head.
- G. Same As Condition F, Except Load Stays In Raised Position.
1. Refer to condition F.
 2. Work cylinder piston inner seal ring leaking.
 3. Leak at weld between piston head and sleeve.
 4. Thermal relief valves leaking.
- H. Loss Of Oil From System, No External Leaks.
1. Pump drive shaft seal leaking oil into crankcase.
- I. Control Levers Creep When Rockshaft Is In Motion.
1. Insufficient friction at control levers.
 2. Sprung or bent control rods.
 3. Binding control spool—free up walking beam.

J. Gage Pressure Too High (More than 1500 psi).

1. Stuck or binding safety valve.
2. Faulty safety valve spring (free length, 1 15/16 inches; should be 1 1/4 inches long under 61-67 lbs.).

ADJUSTMENT

537. **STOP CLIPS SERIES A-C.** To adjust the "Touch Control" stop clips on series A and C, proceed as follows: Install a Schrader (IH No. SE-1338-A) gage or equivalent in place of the 1/4 inch Allen head pipe plug in the pump output side of the manifold rear flange as shown in Fig. IH520. Place the left hand control lever and its front stop about mid-position of the quadrant, tighten the stop thumb screw and wire the control lever to the stop. Start engine and run at half speed. Slip the right front quadrant stop past the right hand control lever and move the control lever fully forward. At this time, when the rockshaft has completed its stroke, the system should remain on high pressure (1100-1500 psi) as shown on the gage. If the system does not remain on high pressure, adjust the length of the right hand control rod until proper condition is obtained. Now, watching the gage, slowly move the right hand control lever toward rear until system returns to low pressure but not far enough to move the rockshaft from its extreme position. Then, scribe a line across the top edge of both rockshaft arm shields. Now, again move the right hand control lever toward rear until the outer rockshaft arm has moved back approximately 1/2 inch as shown by the distance between the scribed lines on the rockshaft arm shields.

Without moving the rockshaft arms from the previously mentioned position, move the right hand stop clip (T—Fig. IH521) forward until the clip firmly contacts the control valve operating lever pin and lock the clip

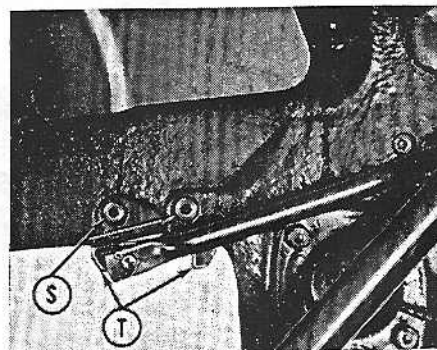


Fig. IH 521—Adjust "Touch Control" stop clip (T) with cap screws (S).

in this position with the two Allen head cap screws (S).

Operate the right hand control lever back and forth several times and check the extreme forward position of the rockshaft to make certain that the scribe lines on the arm shields stop 1/2 inch apart. Note: It may be necessary to readjust the clip slightly to maintain the 1/2 inch dimension. Paint over the scribe lines so as not to confuse with new lines made when adjusting the left stop.

Procedure for adjustment of the left hand stop clip is the same as for the right, except the right hand control lever must be wired in its mid-position on the quadrant.

538. **STOP CLIP CUB.** To adjust the "Touch Control" stop clip on the Cub, proceed as follows: Install a Schrader (IH No. SE-1338-A) gage or equivalent in the upper port of the rear manifold flange. Loosen the stop clip retaining cap screws. Start engine and run at half speed. Move the control lever fully forward. At this time, when the rockshaft has completed its stroke, the system should remain on high pressure (1100-1500 psi) as shown on the gage. If the system does not remain on high pressure, adjust the length of the control rod until the proper condition is obtained. Now, watching the gage, slowly move the control lever toward rear until the system returns to low pressure, but not far enough to move the rockshaft from its extreme position. Then, with the rockshaft in the extreme forward position, measure the distance between the pin in the rockshaft arm and the carburetor bowl cover and remember the measurement. With rule in same position, move the control lever rearward until rockshaft has moved rearward 3/8 inch.

Without moving the rockshaft arms from the previously mentioned position, move the stop clip forward against the yoke pin and tighten the clip retaining cap screws.

Operate the control lever several times and check to make certain that the 3/8 inch differential is maintained. Note: It may be necessary to readjust the clip slightly to maintain the 3/8 inch differential.

PUMP UNIT

539. **REMOVE AND REINSTALL.** To remove the gear type hydraulic pump, which is gear driven from the camshaft gear, drain the hydraulic system and remove the hydraulic lines (manifold). Remove the pump attaching cap screws and lift pump from tractor.

Install the hydraulic pump by reversing the removal procedure and bleed the "Touch Control" system as outlined in paragraph 535.

540. OVERHAUL. See Fig. IH522. Overhaul of the hydraulic pump is limited to disassembling, cleaning and installing a gasket and seals package. If parts, other than gaskets and seals are excessively worn or damaged, it will be necessary to renew the complete pump unit which is available from the International Harvester Co. on an exchange basis.

To renew the pump gaskets and seals, proceed as follows: Mark the pump body and cover so they can be reassembled in the same relative position and remove the cover. Mark the exposed end of the driven (idler) gear so it can be installed in the same position and remove the drive and driven gears. Identify the bearings with respect to the pump body and cover so they can be reinstalled in the same position and remove the bearings. The procedure for further disassembly is evident after an examination of the unit.

Check the pump parts against the values given below. If any of the parts are worn in excess of the values listed, the pump should be exchanged.
 Clearance between body bore and gears0.0005-0.004

Clearance between shaft journals and bearing bores.....0.0015-0.005

Gear thickness (Series A & C)0.420-0.425

Gear thickness (Cub)....0.434-0.4385

Body bearing flange thickness (Series A & C).....0.180-0.187

Body bearing flange thickness (Cub)0.150-0.156

Cover bearing flange thickness (Series A & C).....0.370-0.3755

Cover bearing flange thickness (Cub)0.365-0.380

Clearance between bearing journals and recesses in body and cover0.001-0.006

Diametral clearance between bearing flange and flange recess in cover (Series A & C)...0.0015-0.006

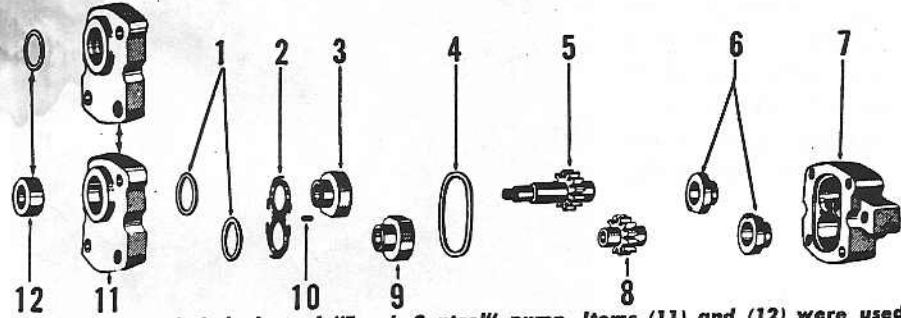


Fig. IH 522—Exploded view of "Touch Control" pump. Items (11) and (12) were used on early production pumps only; the parts shown above items (11 & 12) are typical of the later construction.

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|-------------------------|-------------------|----------------------|
| 1. Cover seal rings | 4. Body seal ring | 8. Driven gear |
| 2. Cover bearing spring | 5. Drive gear | 10. Bearing seal pin |
| 3 & 9. Cover bearings | 6. Body bearings | 11. Pump cover |
| | 7. Pump body | 12. Drive shaft seal |

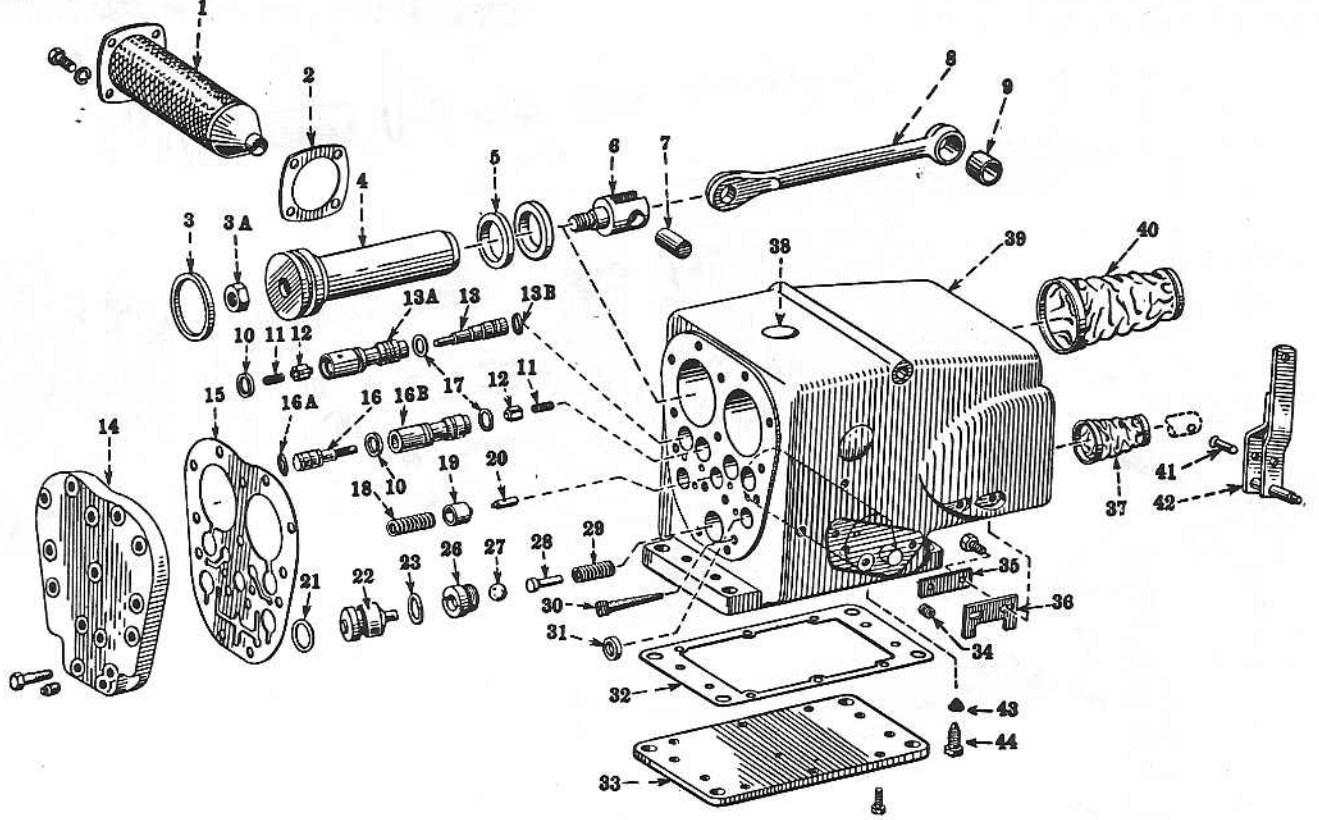


Fig. IH 523—Exploded view of series A and C—hydraulic cylinder and valves unit.

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|-----------------------|--|--|---|-----------------------------|-------------------------|
| 1. Strainer | 10. Check valve center bushing seal ring | 16. Valve actuator | 21. Pressure regulator valve piston seal ring | 27. Ball | 35. Stop clip block |
| 2. Gasket | 11. Check valve spring | 16A. Actuator seal ring | 22. Pressure regulator valve piston | 28. Ball rider | 36. Stop clip |
| 3. Piston head seal | 12. Check valve | 16B. Check valve front bushing | 23. Pressure regulator valve seat seal ring | 29. Rider spring | 37. Control valve boot |
| 3A. Conn. rod nut | 13. Valve actuator | 17. Check valve bushing center seal ring | 26. Pressure regulator valve seat | 30. Orifice plug & screen | 38. Expansion plug |
| 4. Piston | 13A. Check valve rear bushing | 18. Safety valve spring | | 31. Control valve seal ring | 39. Cylinder block |
| 5. Piston sleeve seal | 13B. Actuator seal ring | 19. Safety valve sleeve | | 32. Gasket | 40. Piston sleeve boot |
| 6. Yoke | 14. Cylinder head | 20. Safety valve piston | | 33. Cover | 41. Control valve pin |
| 7. Yoke pin | 15. Head gasket | | | 34. Plug | 42. Operating lever |
| 8. Connecting rod | | | | | 43. Relief valve screen |
| 9. Rod bushing | | | | | 44. Relief valve |

Diametral clearance between bearing flange and flange recess in cover (Cub)0.0009-0.006

Note: Small nicks and/or scratches can be removed from the body cover, shafts and gears, and bearings by using crocus cloth or an oil stone, providing the limits given above are not exceeded. When dressing the bearing flanges, however, make certain that the flange thickness of both bearings in either pair are identical.

Lubricate all pump parts with IH "Touch Control" Fluid prior to reassembly. When bearings are installed in the pump body and cover, make certain that the clearance between the bearing flats does not exceed 0.0005. On early production pumps (pumps equipped with a lip-type drive shaft seal) use caution when installing the shaft through the seal to avoid damaging the seal.

CYLINDER AND VALVES UNIT

542. REMOVE AND REINSTALL. To remove the hydraulic cylinder and valves unit, drain the system and remove the hydraulic lines (manifold). Remove the hood and fuel tank and

disconnect wires and control rods from the cylinder. On models so equipped, remove the heat indicator sending unit from the cylinder block. Remove the cap screws retaining the unit to the torque tube and lift the unit from the tractor.

Note: On some models, the "Touch Control" heat indicator sending unit was soldered to the cylinder block strainer. When such cases are encountered, it is advisable to remove the sending unit and strainer, as an assembly, from the cylinder block.

Fig. IH 527—Rear view of series A and C "Touch Control" cylinder block with cylinder head removed. Refer to Fig. IH 523 for legend. Control valves are shown at (50).

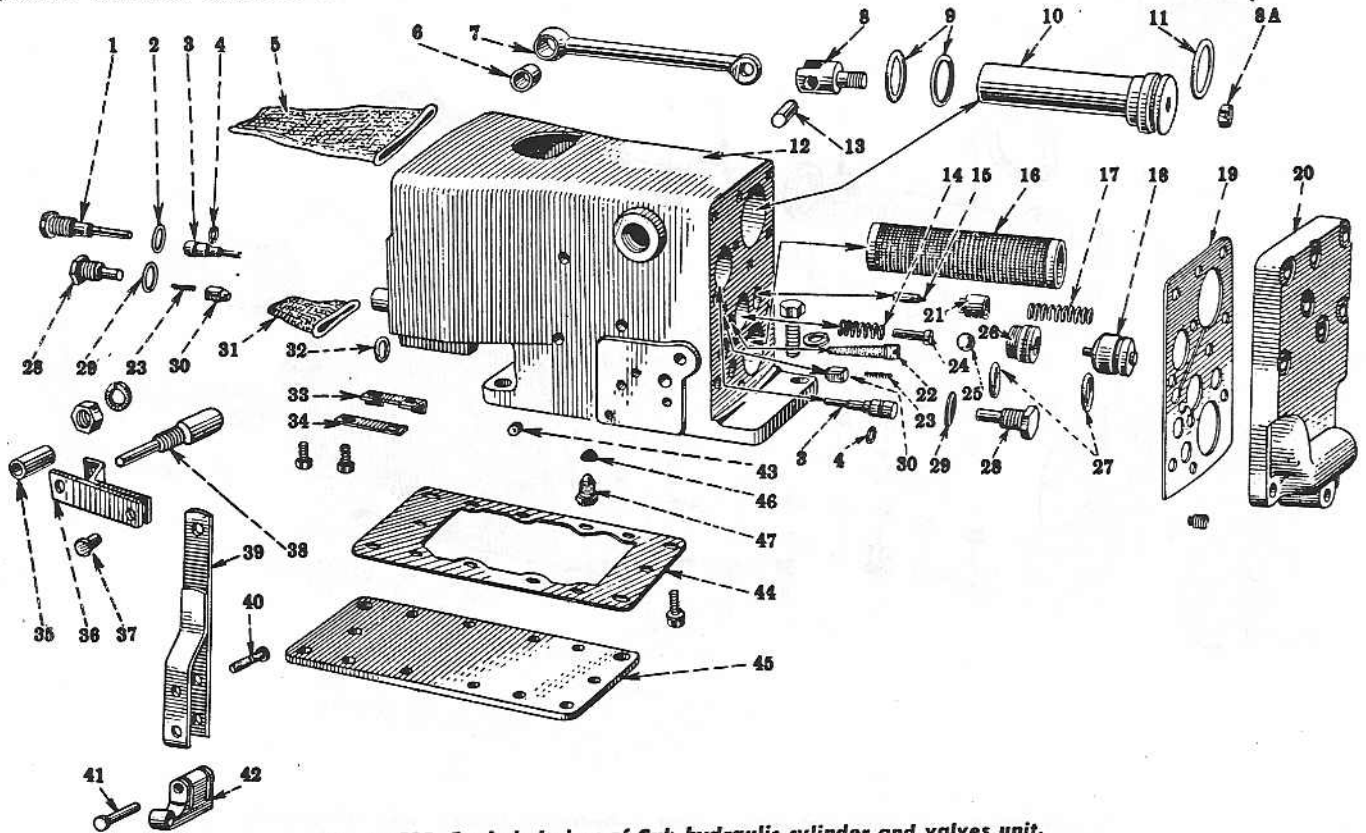
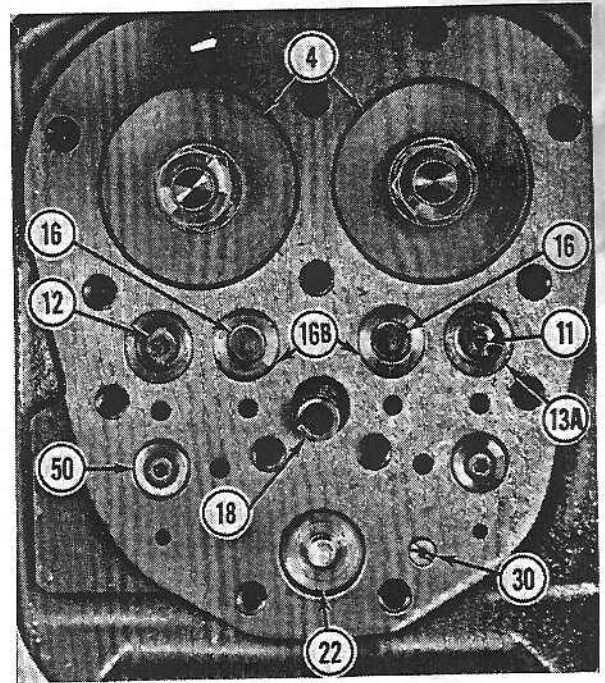


Fig. IH 525—Exploded view of Cub hydraulic cylinder and valves unit.

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|------------------------------------|----------------------------|-------------------------------------|--------------------------------------|----------------------------------|---------------------------------------|
| 1. Check valve actuator lower stop | 8A. Yoke nut | 17. Safety valve spring | 25. Ball | 32. Control valve seal ring | 38. Connecting rod pin |
| 2. Stop washer | 9. Piston sleeve seal ring | 18. Pressure regulator valve piston | 26. Regulator valve seat | 33. Stop clip | 39. Operating lever |
| 3. Check valve actuator | 10. Piston | 19. Head gasket | 27. Regulator valve piston seal ring | 34. Stop clip lock | 40. Control valve pin |
| 4. Actuator seal ring | 11. Piston head seal ring | 20. Cylinder head | 28. Check valve actuator plug | 35. Operating valve link spacer | 41. Control valve operating lever pin |
| 5. Piston sleeve boot | 12. Cylinder block | 21. Safety valve sleeve | 29. Actuator plug washer | 36. Control valve operating link | 42. Control rod yoke |
| 6. Connecting rod bushing | 13. Yoke pin | 22. Orifice plug & screen | 30. Check valve | 37. Control valve link pin | 43. Pipe plug |
| 7. Connecting rod | 14. Rider spring | 23. Check valve rider | 31. Control valve boot | | 44. Gasket |
| 8. Yoke | 15. Safety valve piston | 24. Valve ball rider | | | 45. Cover |
| | 16. Strainer | | | | 46. Relief valve screen |
| | | | | | 47. Relief valve |