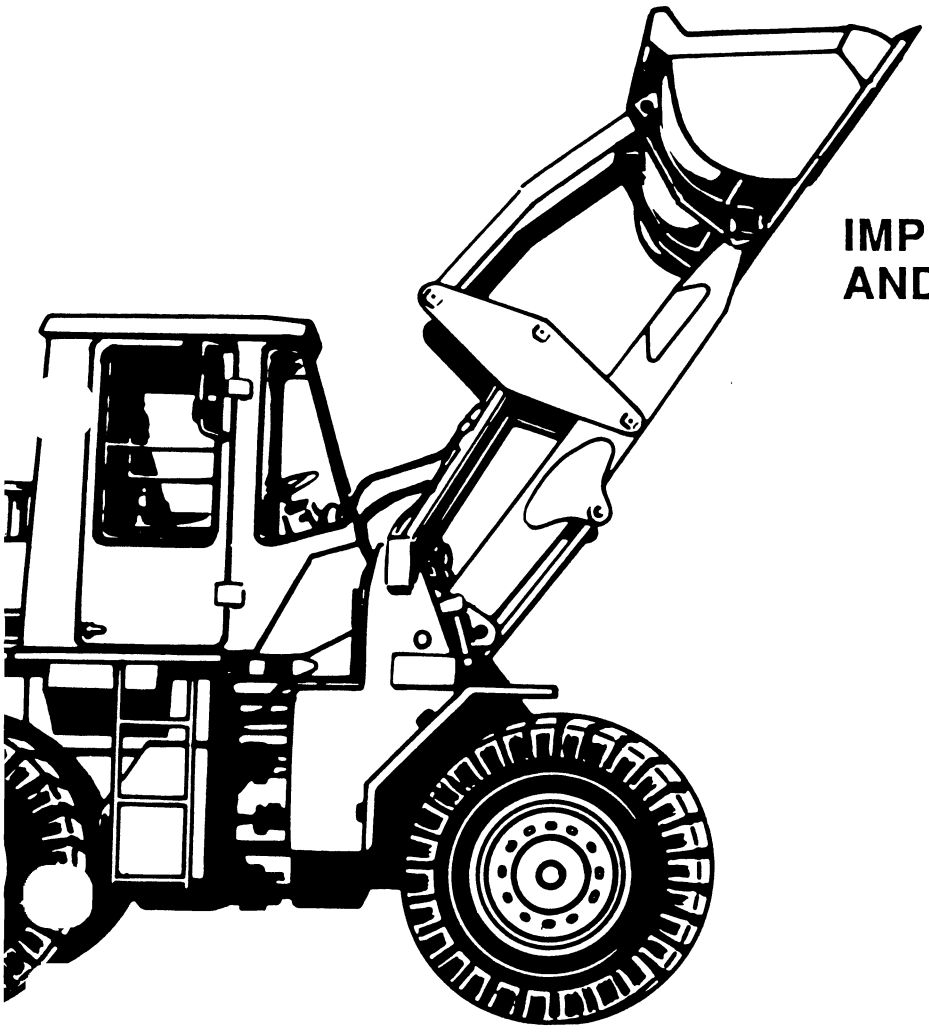
FIATALLIS

FR10
FR12
FR15

WHEEL LOADER



IMPLEMENT HYDRAULICS AND POWER STEERING

Service manual

Form 73142921 English

SAFETY RULES

In lifting and handling heavy parts, slings must be of adequate strength for the purpose intended and must be in good condition.

Handle all parts with extreme care. Keep hands and fingers from between parts. Wear authorized protective equipment such as safety glasses, heavy gloves, safety shoes.

When using compressed air for cleaning parts use safety glasses with side shields or goggles. Limit the pressure to 207 kPa (30psi) according to local or national requirements.

Wear welders protective equipment such as dark safety glasses, helmets, protective clothing, gloves and safety shoes when welding or burning. Wear dark safety glasses near welding. DO NOT LOOK AT ARC WITHOUT PROPER EYE PROTECTION.

Wear proper protective equipment such as safety goggles or safety glasses with side shields, hard hat, safety shoes, heavy gloves when metal or other particles are apt to fly or fall.

Use only grounded auxiliary power source for heaters, chargers, pumps and similar equipment to reduce the hazards of electrical shock.

Keep maintenance area CLEAN and DRY. Remove water or oil slicks immediately.

Remove sharp edges and burrs from reworked parts.

Be sure all mechanics tools are in good condition. DO NOT use tools with mushroomed heads. Always wear safety glasses with side shields.

Do not strike hardened steel parts with anything other than a soft iron or non-ferrous hammer.

1. Boom cylinders
2. Bucket cylinders
3. One-way check valves
4. Anti-cavitation valve
5. Boom Spool
6. Regenerative check valve
7. Backdragging relief valve
8. Relief piston
9. Sump return check valve
10. Bucket spool
10a. Relief piston
11. Dozing relief valve
12. Check valves
13. Special equipment spool
14. Check valves
15. Main relief valve piston
16. Spring
17. Relief piston
18. Spring
19. Implement pump (section)
20. Steering pump (section)
21. Oil tank
22. Main priority valve
23. One way check valve
23a. One way check valve
24. Steering control valve
25. Gerotor (metering valve)
26. Cross-over valves
27. Steering cylinders
28. Cushion valve

1.3.10 EMERGENCY STEERING CONTROL (Fig. 1-3) Special Equipment

NOTE: The conditions under which emergency steering will automatically become effective are:

. Engine off
. Machine moving
. Steering wheel turning

The ground drive pump (29) draws oil from the reservoir (21) through the check valve block (30); the purpose of the block is to allow emergency steering in either a forward or backward direction.

Oil from the pump (29) flows through the block to the secondary priority valve (31) and to the pressure switch and warning light (32); the switch is activated (closed) by pressurized oil to turn on the warning light (if the ignition switch is on.).

Oil flows through the secondary priority valve (31), opens the check valve (23a) and flows to the steering control valve (24); a portion of the oil flows through a small check valve (in the control valve) and flows back to the secondary priority valve (to hold it in position for directing oil to the steering valve). The main flow goes to the gerotor (meter) valve (25) which directs the oil to the cross-over valves (26) cushion valve (28) and steering cylinders (27). Refer to paragraph 1.3.7 and 1.3.8 for an explanation of cross-over and cushion valves.

When normal steering is taking place, engine running, the main pump flow is blocked from the secondary priority valve (31) by a one-way check valve (23A). But, the oil can flow to the right end of valve (31) pushing the valve to the left, opening emergency pump flow to sump; this, of course lowers the pressure in the emergency system and the warning light goes out.

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⚠ WARNING Observe all start up and shut down procedures and WARNINGS listed in the Operation and Maintenance Instruction Manual.

Start the engine and set it at mid-throttle. Allow the temperature of the hydraulic oil to reach approximately 71-82°C (160-180°F).

With the flow meter load valve open, place the boom control lever to the "raise" position. No pressure will register on the flow meter, only oil flow volume. Volume should be:

FR10, 12 -- 106-119 L/MIN (28-31.4 gpm)
FR15 ------ 162-182 L/MIN (43-48 gpm)

Record the volume indicated.

NOTE: Since there is no resistance to oil flow through the meter, and considerable resistance through the boom cylinders, all oil will flow through the meter at this time. Thus, the boom will not "raise" until a load is applied with the flow meter load valve.

IMPORTANT: When performing the following tests and adjustments, never hold the flow meter load valve in the engaged position for more than 10 seconds at a time. In this condition, the hydraulic pump is working against main relief valve pressure. This will cause the hydraulic oil to overheat and may damage hydraulic system components.

With boom control lever in the "lower" position, gradually apply a load (with the flow meter load valve) and record oil flow volume at each of the following pressure points (in chart).

bar	34.5	68.9	103.4
kg/cm^2	35.1	70.3	105.4
psi	500	1000	1500
Boom "lower"			
Boom "raise"			
Bucket "retract"			
Bucket "dump"			

Repeat this procedure with the boom control lever in the "raise" position, and record the results. Make certain that engine speed remains constant for each test.

NOTE: Refer to paragraph 4.6.2 for boom circuit test analysis.

With the bucket control lever in the "retract" position, gradually apply a load with the flow meter load valve and record oil flow at each (charted) pressure point. Repeat this procedure with the bucket control lever in the "dump" position, and record the results. Make certain that engine speed remains constant for each test.

5.4 IMPLEMENT/STEERING PUMP DISASSEMBLY/ASSEMBLY NOTES (FR10,12)

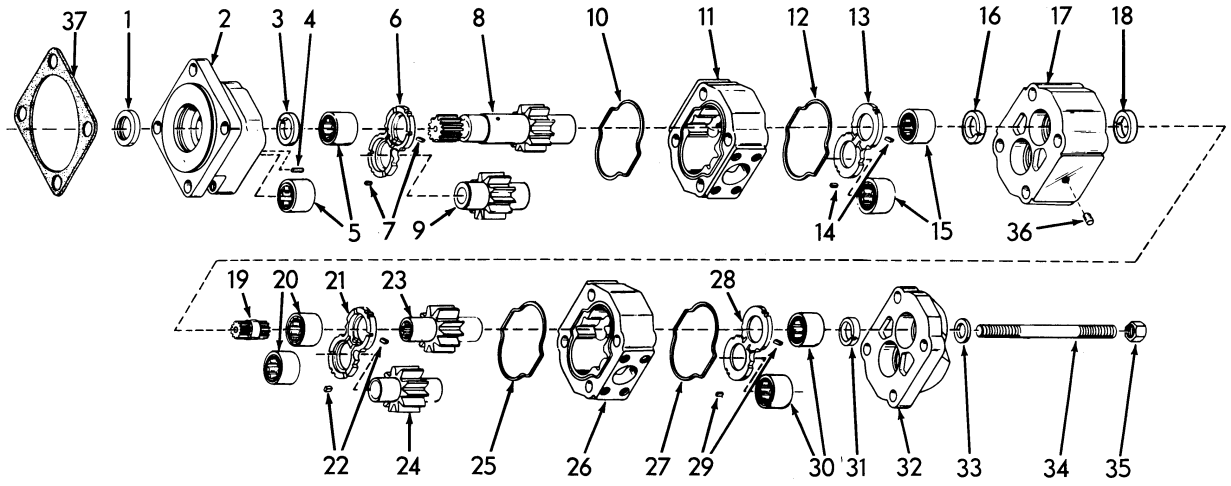

FIG.5-4 IMPLEMENT/STEERING PUMP (FR10,12) T-70664

1. End cover oil seal
2. Front end cover
3. Seal ring, bronze
4. Set screw
5. Roller bearing
6. Wear plate
7. Pocket seal
8. Drive shaft assy.
9. Driven gear
10. O-ring
11. Front gear housing
12. O-ring
13. Wear plate
14. Pocket seal
15. Roller bearing
16. Seal ring, bronze
17. Bearing carrier
18. Seal ring, bronze
19. Connecting shaft
20. Roller bearing
21. Wear plate
22. Pocket seal
23. Drive gear
24. Driven gear
25. O-ring
26. Rear gear housing
27. O-ring
28. Wear plate
29. Pocket seal
30. Roller bearing
31. Seal ring, bronze
32. Rear end cover
33. Washer
34. Pump stud
35. Nut
36. Pipe plug
37. Gasket

SERVICE NOTES:

A. Mark all housing sections and when re-assembling use matching components, so the parts will fit in the original positions.

B. Use extreme care when removing wear plates from blind bores - do not force or pry on the plates.

C. When rebuilding pump, replace all seals, wear plates, isolation plates and o-rings.

D. Maximum allowable gear track depth in gear housings is 0.38 mm (.015"). Nominal depth is 0.20 mm (.008"). If housings are worn 0.38 mm (.015") replace housings and bushings.

MEMO

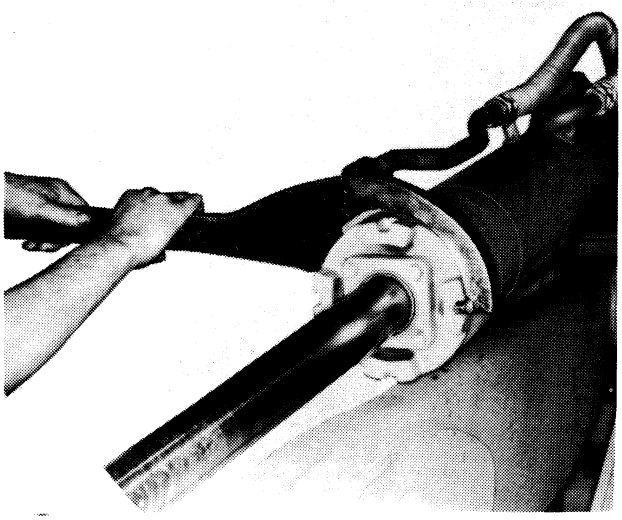

FIG. 7-1 LOOSENING CYLINDER T-76501

stand. After boom is fully supported, move the control levers to each position several times to relieve hydraulic pressure. Turn master electrical switch to the "OFF" position.

IMPORTANT: If for some reason your hoist is not capable of raising the boom and bucket weight (and only one lift cylinder has failed) disconnect and block the failed cylinder hoses at the upper manifold. To block the hoses, use the same o-ring and flange connections, and steel plates (in place of the connecting hose). The one good cylinder is capable of lifting the boom and bucket.

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⚠ **WARNING - Do not work under the boom unless it is additionally supported.**

7.1.2 With spanner wrench, loosen cylinder head assembly unit, similar to Fig. 7-1, whether it is a complete or partial tear down. Block up or brace cylinder to keep from damaging the cylinder or pinching hoses when pulling pin on rod end. After rod end is loose, finish unscrewing cylinder head assembly, Fig. 7-2 (12).

7.1.3 Pull piston rod assembly (6) from cylinder tube (1). Clamp the piston rod assembly in a soft jaw vise. Remove rod nut and slide all parts from the piston rod.

7.1.4 Remove the capscrews and lock washers that secure end plate (15) to cylinder head (12). Remove rod wiper (16) from end plate.

7.1.5 Remove rod packing set (13) from the bore in cylinder head (12). Remove o-ring (10) and back-up ring (11) from the cylinder head.

7.1.6 Remove Teflon seal ring (8) rubber seal ring (7) and wear ring (5) from piston (6).

7.1.7 Replacing piston rod bushing. Weld two or three beads across the inner surface of bushing. These welds will shrink the bushing so they may be driven out. Press new bushing into place so ends are flush with face of equal distance on each side.

7.2 ASSEMBLY OF CYLINDERS

7.2.1 Fig. 7-2. Clean the bore in end plate (15) and press a new rod wiper (16) into the end plate with the sealing lip facing out.

7.2.2 Clean the bore in cylinder head (12). Insert rod packing set (13). Place the four shims (14) and end plate (15) into position on the cylinder head. Install the end plate capscrews and lockwashers and tighten hand tight only.

NOTE: FR10,12,15 steering cylinder rod packing is not adjustable. The seals and wear rings must be replaced if leakage occurs. Dump and lift rod packing is adjustable.

7.2.3 Install back-up ring (11) and o-ring (10) over the threaded end of the cylinder head. Make certain they are firmly seated in their groove.