



International Harvester

Service Manual

**1000, 2000, 2001,
3120, 330 & 3140
Loader/Backhoes**

Service Manual

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IH-S-3120+

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INTRODUCTION

This manual was prepared in order to familiarize service personnel with the operating principles and proper servicing techniques for the IH Model 3120 and 3140 Backhoe and 1000, 2000 and 3000 Series Loaders.

The cause of most backhoe and loader problems is usually found in the hydraulic system. Failure or improper adjustment of hydraulic components will result in faulty operation and can cause structural failure.

Correcting structural failures will not be a problem for the average serviceman. Installing and operating instructions in the Operator's Manual can be used as a guide when structural service requires disassembly or removal.

For purposes of locating and identifying parts on the backhoe and loaders, the exact meaning of "left" and "right" must be clearly understood. "Left" or "right" on the backhoe and loader is determined as if seated on the operator's seat of the equipment being serviced.

A tremendous amount of force can be transmitted to the mechanical linkage by hydraulic cylinders. The cylinder specifications show the amount of force that can be developed by each cylinder. If structural members become bent or distorted, the applied force should be compared with the load conditions. Structural damage will not occur under normal conditions, with proper operation, unless pins and bushings are worn badly, or unless nuts and bolts are allowed to loosen.

It is important to have a full knowledge of the operating instructions (see Operator's Manual) when analyzing service complaints, as it is not always the machine that is at fault.

High standards of cleanliness are essential, and cannot be overemphasized.

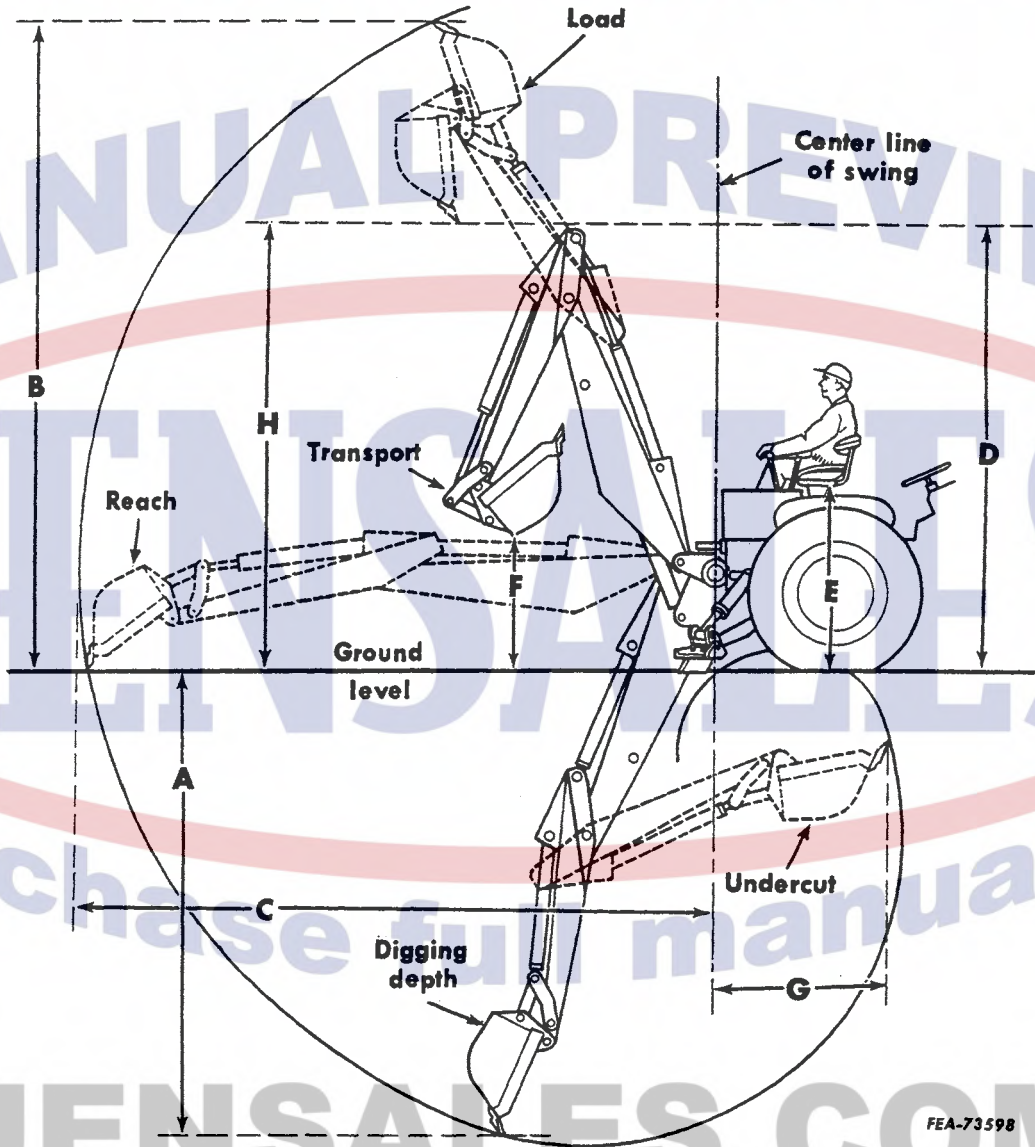
Information on operating principles of pumps, flow dividers, and other hydraulic components which are not a part of the backhoe or loader will be found in appropriate tractor hydraulic system service manuals. Also, Blue Ribbon Service Manuals GSS-1277, 1278 and 1284 will be of value in servicing these components.

SPECIFICATIONS

Backhoes

General Specifications

Operating Range Dimensions (with 24 or 28 inch modified grader tires) (Illustration 1)



Illust. 1. Schematic of backhoe operating ranges.

	Model 3120	Model 3140
A. Maximum reach below grade	12 ft., 7 in.	14 ft., 7 in.
B. Maximum height	17 ft., 3 in.	19 ft., 6 in.
C. Reach (from centerline of swing)	16 ft., 2-1/2 in.	18 ft., 2 in.
D. Transport height	11 ft., 7 in.	12 ft., 6-1/2 in.
E. Seat to ground	5 ft.	5 ft.
F. Bucket clearance, transport	3 ft., 8 in.	3 ft., 5 in.
G. Undercut (from centerline of swing)	5 ft., 4 in.	6 ft., 2 in.
H. Maximum loading height	11 ft., 11 in.	14 ft.

These valves are factory pre-set, and are not adjustable; and they must not be disassembled and repaired.

Swing Mechanism (Illust. 5)

The swing mechanism is a rack and pinion device. The swing shaft is splined

at the top and the splines engage a bracket which is tightly bolted to the main frame of the backhoe. This prevents the swing shaft from turning.

Hydraulic pressure applied through the decelerator valve against the swing piston forces the swing piston to turn itself around the swing shaft, thus turning the entire swing frame (Illust. 5a).

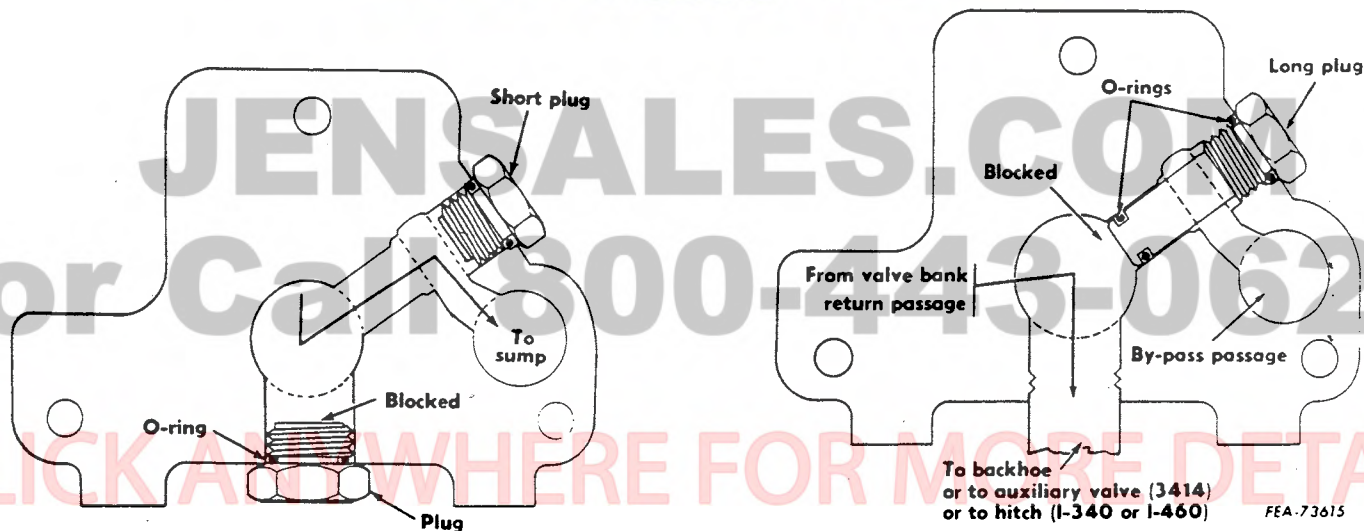


Illust. 5. Cutaway view of swing mechanism

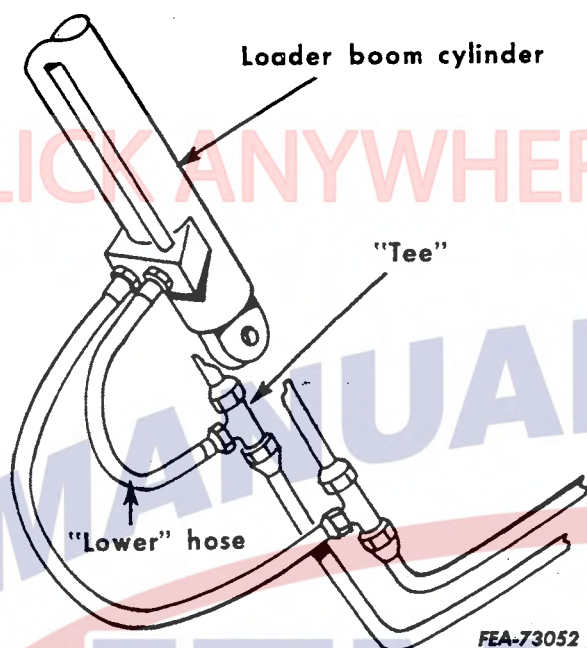


Illust. 16. Pressure and return lines for backhoe valves.

- | | |
|---------------------------------------|---------------------------|
| oooo = High pressure from large pump. | --- = Swing drain line. |
| == = High pressure cross-over. | => = Return to reservoir. |
| = High pressure from small pump. | ->>> = Direction of flow. |



Illust. 17. Schematic of loader valve bank end cover, showing effect of two lengths of end plug.



Illust. 19. Boom "lower" hose and tee.

5. Disconnect the cylinder "lower" hose from the tee (Illust. 19). Do not plug either hose or tee.

6. Start the tractor and hydraulically retract the bucket cylinder to allow the boom to rest on hydraulic pressure in the boom cylinder.

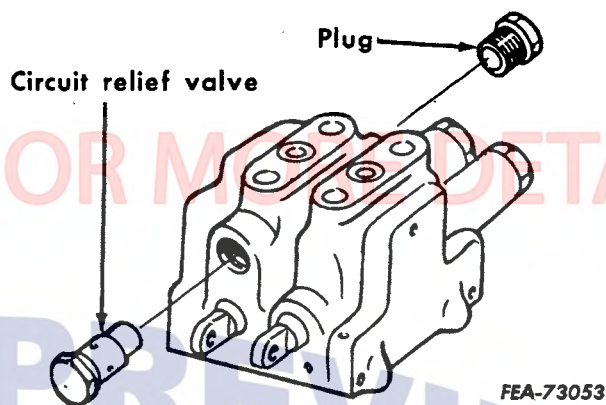
7. Visually inspect the boom cylinder "lower" hose and tee for excessive leakage. The hose will show leakage from the right hand cylinder, the tee will show leakage from the left hand cylinder.

NOTE: Allow some time at the beginning of the test for excessive fluid to drain from opened lines.

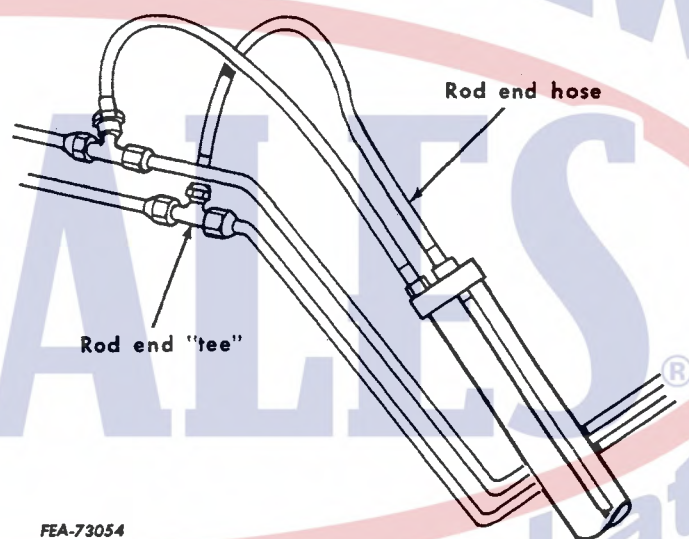
8. If leakage is not excessive from either boom cylinder, connect the boom hoses back to their proper locations, as it is now proven that excessive leak-down is through the boom control valve.

C. Checking for leakage in loader boom control valve:

1. Rest the bucket on the ground to take all weight off the boom cylinders.



Illust. 20. Loader boom control valve plug and relief valve.



Illust. 21. Bucket cylinder "rod end" connections.

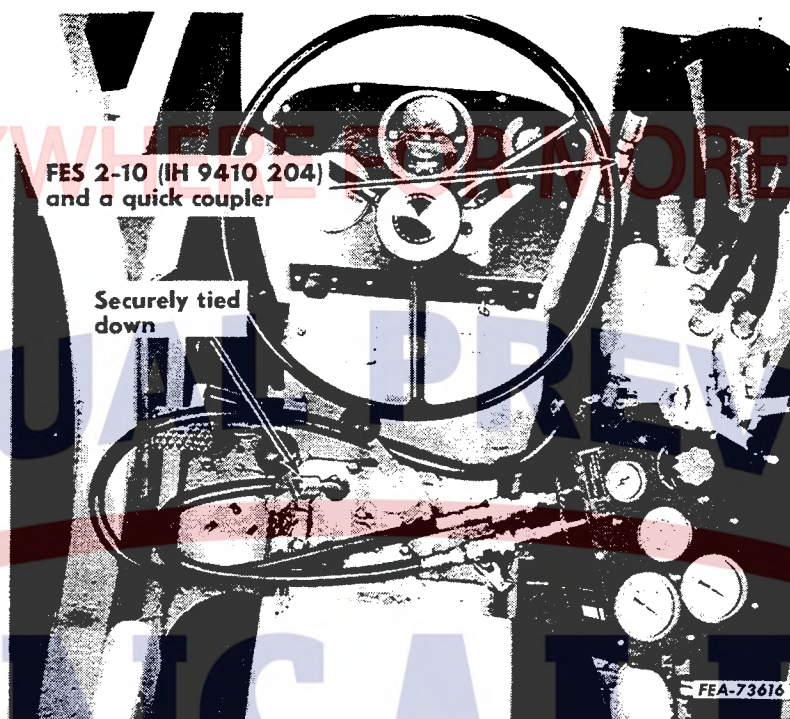
2. Remove the circuit relief valve and plug from the valve and install them in opposite ports (Illust. 20). Do not "drop catch" loader while in this condition -- a burst hose may be the least costly result.

3. Raise the boom hydraulically.

4. If the leak-down is reduced, the relief valve is the cause of high leakage, and it must be replaced.

5. If the leak-down is the same, check the relief valve O-rings for damage.

6. If there is no O-ring damage, the control valve spool or body is damaged, and the entire valve must be replaced.



Illust. 28. Test connection — 17 gpm pump.



Illust. 29. Test connection — 7 gpm pump.

Finally, on tractors which do not use a diverter valve on the power steering system, attach the Flo-Rater inlet hose to

one of the outlets for a stabilizer cylinder. Attach the outlet to the reservoir (Illust. 29). Test the flow, and record the results.

Add the results of the two or three tests made to determine pump efficiency. Check against Specifications.

NOTE: In tractors equipped only with a loader, it is necessary only to test at the loader valve bank.

(c) Correct any defects found as necessary, and if the complaint is not corrected, proceed with the remainder of the test. Pump repair information will be found in the hydraulic service manual for the tractor involved, and in Blue Ribbon Service Manual GSS-1284, "Pumps".

2. Having determined pump efficiency and made sure it is correct, the remainder of testing may be accomplished with the use of a 3000 p.s.i. gauge along. Simply plumb the gauge into the line in which the relief valve to be tested is found, using a tee.

(a) To test circuit relief valves which exceed system pressure, it will be necessary to do one of two things:

(1) Install a 3000 p.s.i. gauge (on a tee) in the circuit between the control valve and the cylinder port. With the con-

trol valve in neutral, apply an external force to a structural member to build pressure in the locked circuit, and read the gauge.



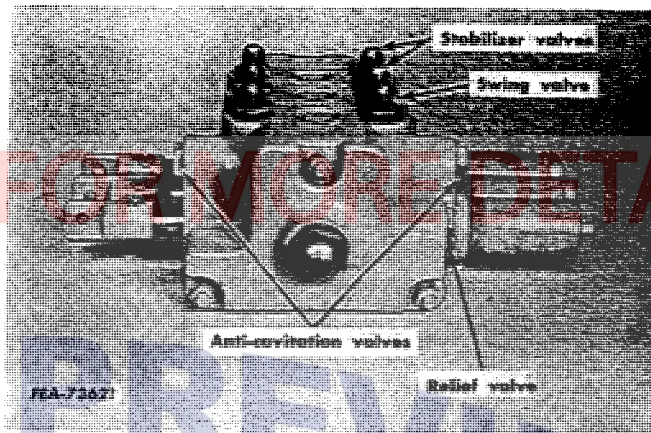
Illust. 30. Pilot operated and circuit relief valve test connection.



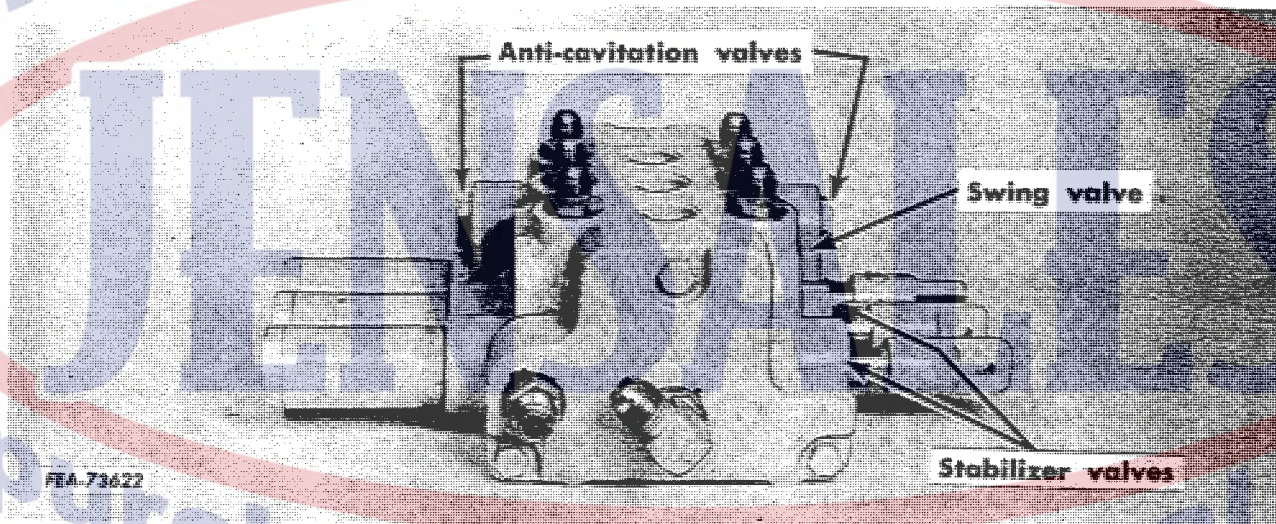
Illust. 31. Swing cylinder cushion valve test connection.

Disassembly

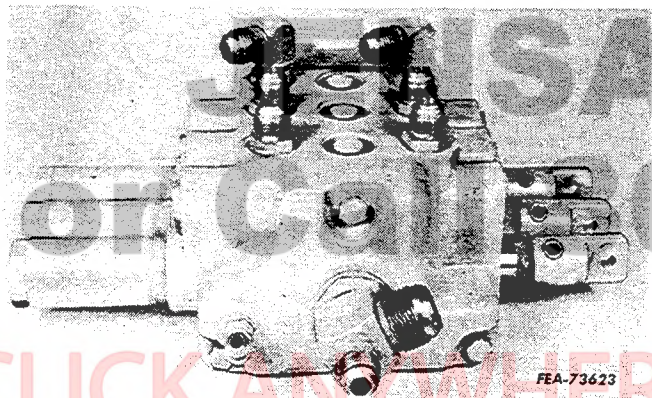
1. Remove the control handles (loader valve bank only).
2. Remove the three bolts holding the valve bank together.
3. Remove the end cap and sleeve and valve spool as a unit (Illusts. 44, 45 and 46).



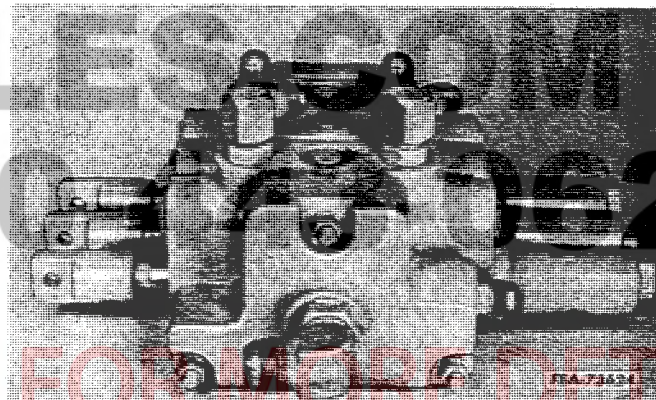
Illust. 38. Right side valve bank from bottom.



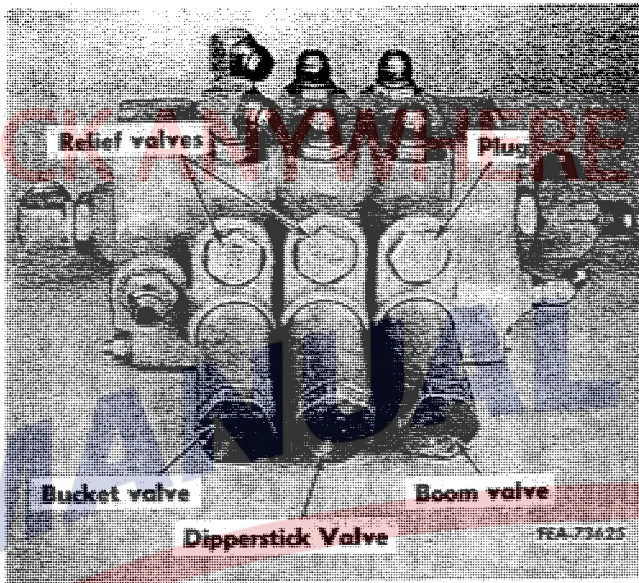
Illust. 39. Right side valve bank from top.



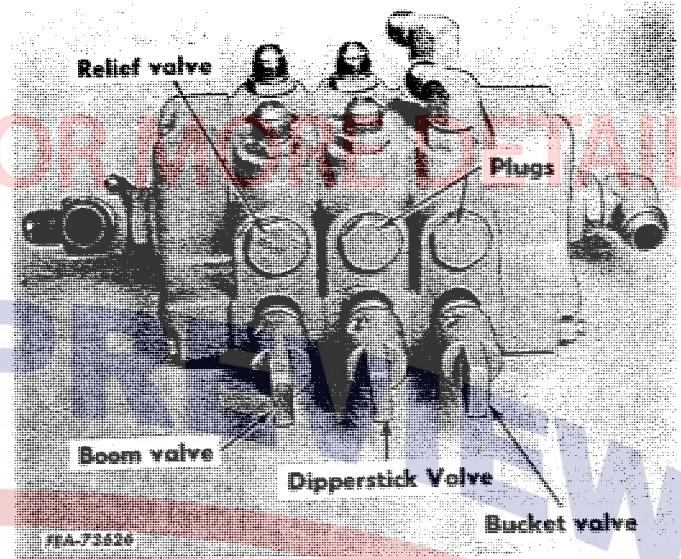
Illust. 40. Left side valve bank from bottom.



Illust. 41. Left side valve bank from top.



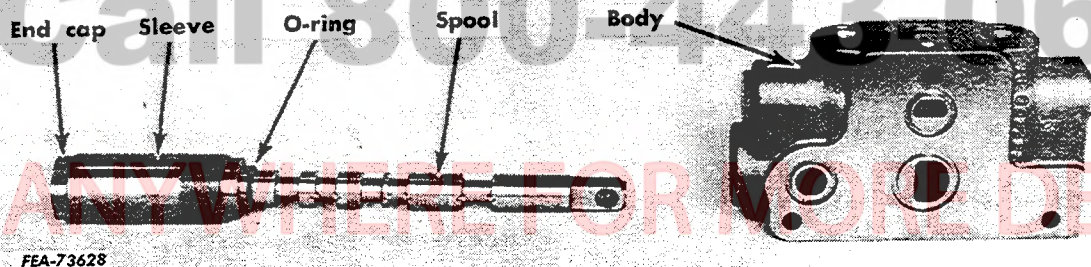
Illust. 42. Left side valve bank from rear.



Illust. 43. Left side valve bank from front.



Illust. 44. Two types of auxiliary valves.



Illust. 45. Long sleeve with spool, removed from body.