ARPS

OWNER'S MANUAL

model 80 backhoe

THIS MANUAL INCLUDES:

W365 BASIC BACKHOE

W209 - BUCKET, 9"
W210 - BUCKET, 13"
W211 - BUCKET, 16"
W213 - BUCKET, 19"
W214 - BUCKET, 24"

SERIAL NO. 1001 AND LATER

THIS SAFETY ALERT SYMBOL IDENTIFIES IMPORTANT SAFETY MESSAGES IN THIS MANUAL.

AMEREQUIP CORPORATION

NEW HOLSTEIN OPERATIONS
1711 WISCONSIN AVENUE
NEW HOLSTEIN, WISCONSIN 53061
414/898-4291

FORM W365 387
NO. 9983

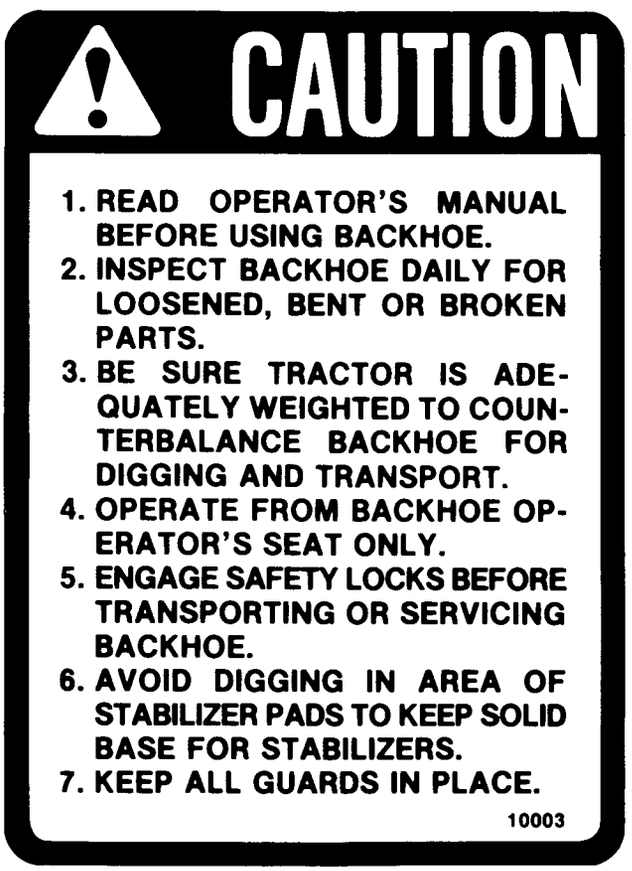
Printed in U.S.A.

CONTENTS

SAFETY PRECAUTIONS

The safety of the operator was a prime consideration in the design of this backhoe. Proper shielding convenient controls, simple adjustments, and other safety features have been built into this backhoe.

The following decals are located on the top of the seat bracket:



Accidents can be avoided if the following safety rules are observed:

Preparation:

DO NOT operate the backhoe unless it is rigidly attached to the tractor.

KNOW YOUR controls. Read this operator's manual and the manual provided with your tractor. Learn how to stop the tractor, the engine, and the backhoe quickly in an emergency.

PROVIDE adequate front end weight to counter-balance the backhoe at all times.

BE SURE the area is clear of underground utilities or other hazards.

POSITION a barricade around the work area.

KEEP ALL bystanders a safe distance away.

Operation:

DO NOT attempt to enter operators platform of backhoe by using stabilizers as a step.

OPERATE from the backhoe operator's seat only.

ALLOW only one person to operate the backhoe at any time.

DISENGAGE safety locks before attempting to operate the backhoe.

NEVER dig with the backhoe unless the stabilizers are properly set.

DO NOT dig under stabilizers or tractor-backhoe. Soft ground or sandy soil can cause cave-ins.

KEEP BUCKET away from stabilizer area to avoid possible stabilizer damage.

ALWAYS swing bucket uphill to dump when on a hillside and keep loaded bucket low.

SET BRAKES and block wheels when operating on hills and banks to avoid dangerous run-away.

WATCH for overhead wires. DO NOT touch wires with any part of the backhoe.

Safety Precautions - continued

NEVER allow a person to work under a raised bucket.

NEVER lift a person with the backhoe.

DO NOT use the backhoe bucket as a battering ram.

ALWAYS lower the bucket to the ground when not digging.

NEVER leave the tractor unattended with the engine running.

Transportation:

ALWAYS engage safety locks before transporting backhoe.

DO NOT drive the tractor near the edge of a ditch or excavation.

ALWAYS use accessory lights and devices, when transporting on a road or highway, to warn operators of other vehicles. Check your local government regulations.

BE SURE that the SMV emblem is visible to the rear.

Adjustments and Inspection:

CHECK pins that attach backhoe to tractor and all pivot pins for tightness several times daily. Replace any parts which are bent, broken, or missing.

ALWAYS engage safety locks before servicing backhoe.

DO NOT oil, grease, or adjust the backhoe while it is in motion.

DO NOT change any backhoe relief valve settings. They are factory set for best backhoe performance and safety.

ESCAPING FLUID under pressure can have sufficient force to penetrate the skin and cause serious injury. Be sure to relieve all pressure before disconnecting lines. Be sure all connections are tight and that lines, pipes, and hoses are not damaged before applying pressure to the system.

FLUID ESCAPING from a very small hole can be almost invisible. Use a piece of cardboard or wood - not your hands - to search for suspected leaks.

SEE A DOCTOR AT ONCE if injured by escaping fluid. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

PROTECT YOUR EYES - WEAR SAFETY GLASSES.

GUARD AGAINST INJURY when driving connecting pins or performing any repair in which particles can chip from work piece or striking tool.

DO NOT REMOVE ANY GUARDS on backhoe or tractor.

BASIC ASSEMBLY INSTRUCTIONS

General:

The backhoe has been partially disassembled and strapped to a skid for shipping purposes. Initial installation on the tractor will require a hoist or other device capable of safely lifting the entire backhoe from the skid. Once the initial installation is complete the backhoe can serve as its own erecting hoist, by lowering stabilizers and bucket to the ground, and additional lifting devices will not be required for normal removal and reattaching.

Assembly Procedure:

NOTE - The terms RIGHT and LEFT for all backhoe components are determined from the position of the operator when seated in the operating position on the backhoe.

1. Remove top and sides from crate base, being careful not to disturb support which is fastened to boom.

⚠ *CAUTION - DO NOT cut any strapping that fastens the backhoe mainframe to the crate base or fastens the boom and dipperstick to the boom support at this time.*

2. Remove the stabilizer assembly, box of parts, and any other miscellaneous items which have been fastened to the crate and conveniently arrange these items.

IMPORTANT - Tighten all hardware to torque requirements specified in Torque Chart, Page 33, of this manual.

3. Assemble control handles (A) to the backhoe, making sure that they are adjusted so that they are approximately 10 inches apart. Tighten jam nuts.

4. Assemble handle loop (B) to valve shroud using four 5/16 NF x 1" bolts and lockwashers.

5. Attach seat plate assembly (C) to backhoe using one 5/8 NC x 5" bolt and locknut.

6. Assemble seat (D) to backhoe in any of the three sets of holes, using four 5/16 NC x 3/4 bolts and lockwashers.

7. Attach RH stabilizer (E) to mainframe using pin and hardware assembled to mainframe.

8. Attach RH stabilizer cylinder (F) to stabilizer and mainframe using pins and hardware provided. Be sure cylinder and hoses are oriented in the same manner as the LH stabilizer.

9. Support boom (G) with hoist and remove strapping and wood support from boom and dipperstick (H) only. Install dipperstick on boom, as shown if Fig 2 and 13 being careful not to stretch or pinch hydraulic hoses. Attach dipperstick cylinder to dipperstick at point (I) using pin and hardware provided with wood support plus one 5/16 NF x 1-1/4 bolt, one 5/16 x 1-1/2 cotter pin, locknut, and washers from parts bag. Note that the hydraulic hoses are routed <u>under</u> cylinder rod bushing.

⚠ *CAUTION - Be sure hoist being used is suitable, has sufficient capacity, and is in the proper position. Do not allow anyone under a backhoe member that is supported by the hoist.*

10. Manually extend <u>RH</u> swing cylinder (J) slightly and attach base end to mainframe with pins provided. Then move <u>RH</u> swing linkage to the approximate position shown in Fig 1.

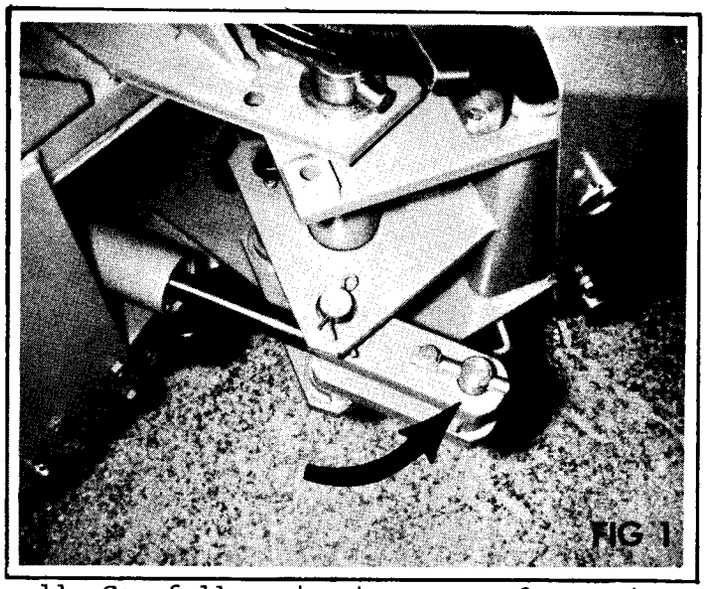


FIG 1

11. Carefully swing boom away from mainframe until centered, using hoist to prevent the backhoe from tipping. Move swing control lever to "SWING RIGHT" position and manually force <u>LH</u> swing links against swing frame while moving boom to center position. Place swing transport pin in position, to keep boom from swinging further.

12. Lower boom and dipperstick to the ground using hoist. Move control handle to "BOOM DOWN" position as required to aid movement.

13. Attach LH bumper (K) to mainframe using two 5/16 NF x 1-1/4 bolts, washers, and lockwashers.

14. Attach bucket (L) to dipperstick using a 1" diameter x 7-3/8 inch pin, two 5/16 NF x 1" bolts, two 5/16 x 1-1/2 cotter pins, locknuts, and necessary washers.

15. Attach bucket link (M) to bucket using same hardware as listed for #14.

16. Remove remaining strapping and use hoist to raise mainframe. Remove crate base using caution to prevent tipping of backhoe. Raise backhoe mainframe approximately 10 inches and block securely.

17. Follow the Attaching Kit Assembly Instructions to mount the backhoe to the tractor. Check the installation carefully making sure that all members are correctly installed and securely fastened.

18. Continue with the "GENERAL OPERATION" Section to familiarize yourself with the backhoe controls and with safe operating practices.

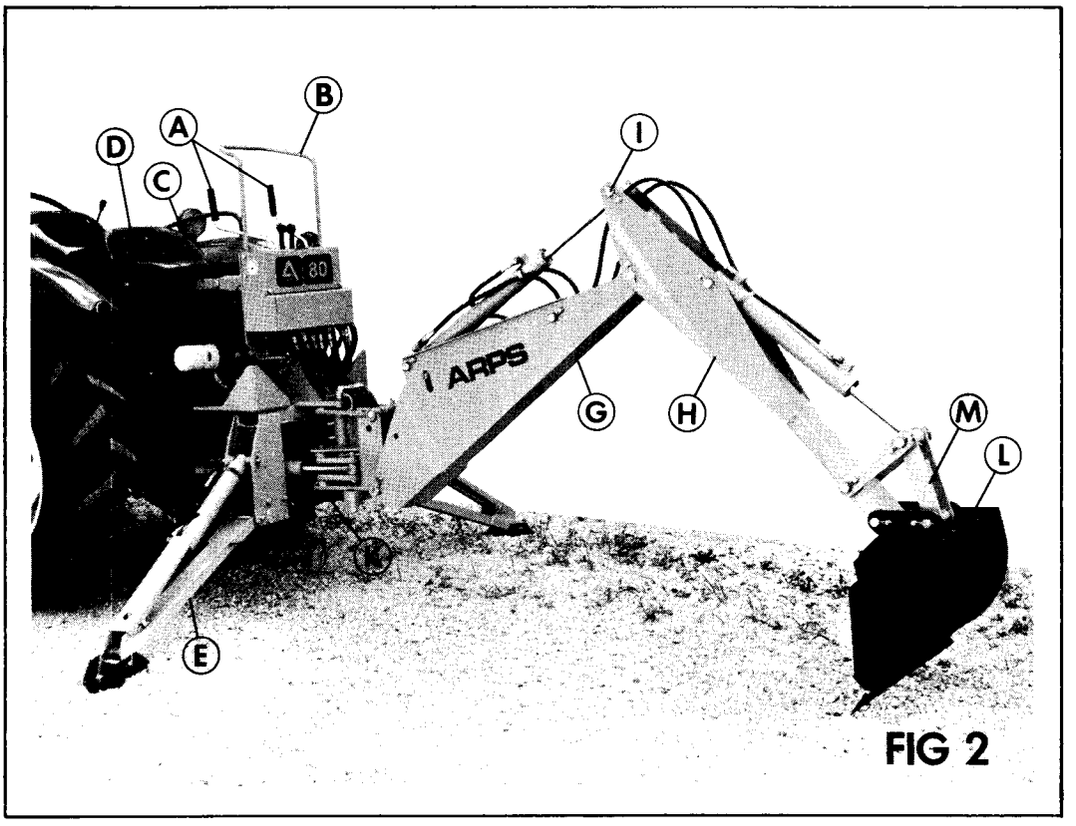


FIG 2

GENERAL OPERATION

CAUTION - To avoid possible injury, observe the following safety rules BEFORE OPERATING the backhoe:

1. BE SURE area is clear of underground utilities or other hazards.
2. POSITION a barricade around work area.
3. PROVIDE adequate front end weight to counter-balance backhoe at all times.
4. KEEP bystanders a safe distance away.

Directions:

The terms right, left, front, and back shall be determined from the position of the operator when seated in the operating position on the backhoe.

Engine Speed:

The speed at which the backhoe operates is partially dependent on engine RPM. Use a moderate engine speed to start and increase it as your experience permits. Refer to "SPECIFICATIONS" for hydraulic flow volume requirements. When powering from tractor systems with higher output, reduce engine RPM to obtain acceptable backhoe operating speed.

Controls:

The backhoe has two major control levers plus the stabilizer control levers. These controls are located on the control panel directly ahead of the operator, see Fig 3. Following is a list of the controls, with the function of each, reading from left to right.

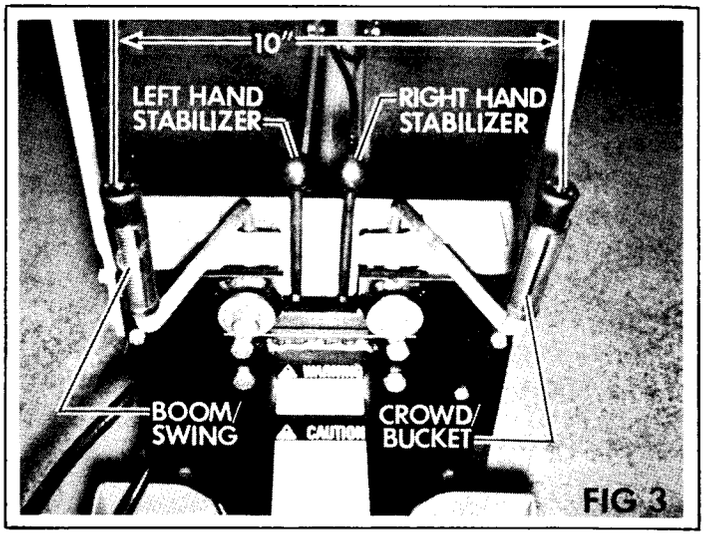


FIG 3

1. Boom/Swing:

Push lever forward, the boom moves down, away from the operator. Pull lever back, the boom moves up, toward the operator.

Move lever to left, the backhoe swings to the left. Move lever to right, the backhoe swings to the right.

By moving the lever tc one of the intermediate positions, the boom can be swung left or right at the same time it is being raised or lowered, performing the two operations simultaneously.

SWING LEFT AND LOWER the boom by moving the control lever forward and to the left.

SWING LEFT AND RAISE the boom by moving the control lever back and to the left.

SWING RIGHT AND LOWER the boom by moving the lever forward and to the right.

SWING RIGHT AND RAISE the boom by moving the lever back and to the right.

2. Left Hand Stabilizer:

Push lever forward, the LH stabilizer lowers. Pull lever back, the LH stabilizer raises.

3. Right Hand Stabilizer:

Push lever forward, the RH stabilizer lowers. Pull lever back, the RH stabilizer raises.

4. Crowd/Bucket:

Push lever forward, the dipperstick moves out, away from the operator. Pull lever back, the dipperstick moves in, toward the operator.

Move lever to left, the bucket curls in. Move lever to right, the bucket extends out.

By moving the lever to one of the intermediate positions, the dipperstick can be extended or retracted at the same time the bucket is being loaded or dumped.

EXTEND AND LOAD the bucket by moving the lever forward and to the left.

RETRACT AND LOAD the bucket by moving the lever back and to the left.

EXTEND AND DUMP the bucket by moving the lever forward and to the right.

RETRACT AND DUMP the bucket by moving the lever back and to the right.

The two operations of the boom lever, combined with the two operations performed by the bucket and dipperstick control lever provide four simultaneous operations from the two levers, keeping cycle time at a minimum.

In general, the direction of movement of a control lever corresponds to the movement of the operating member.

Operating The Backhoe:

CAUTION - To avoid possible injury, observe the following safety rules WHEN OPERATING the backhoe:

1. DISENGAGE safety locks before attempting to operate the backhoe.

2. OPERATE from the backhoe operator's seat only.

3. LOWER the stabilizers until the rear of the tractor is totally supported by them.

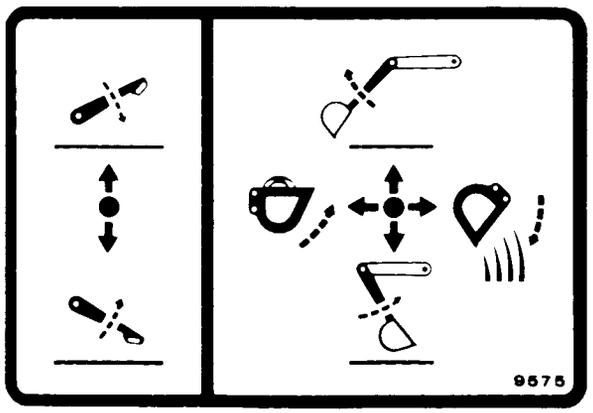
4. DO NOT dig near the stabilizers.

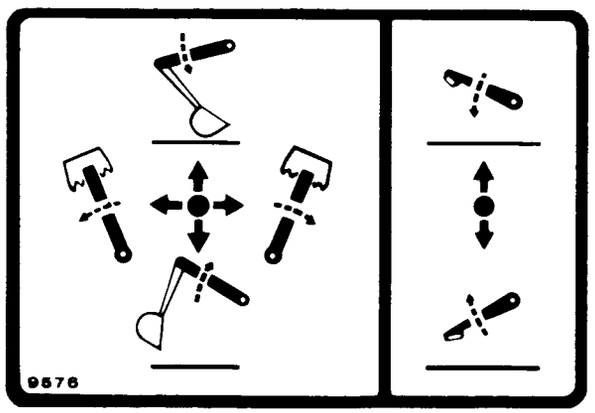
5. DO NOT touch overhead wires with any part of the backhoe.

6. DO NOT attempt to raise the tractor off the ground or move the tractor forward or backward using the backhoe dipperstick or bucket.

7. DO NOT lose stability by swinging the bucket downhill when positioned on a slope.

It is not difficult to become an efficient operator. Control lever operating decals are located in front of the control levers. Study these decals; they will assist you in becoming familiar with the controls.





Smooth, light handling of the controls will result in the most efficient backhoe operation.

Operate the backhoe control levers to become familiar with their speed and movements. The engine speed and the size of the hydraulic system will determine the speed of cylinder operation. When powering from tractor systems with higher output than required, reduce engine RPM to obtain acceptable backhoe operating speed.

Swing the boom several times to practice controlling the speed of swing. Do not operate the swing more than 45 degrees each way for the first few times, then gradually increase the arc.

IMPORTANT - To avoid damage to the backhoe, do not slam swing unit into the rubber bumper pads.

Best results are obtained by digging near the center of the swing arc so material can be dumped on either side.

As the operator becomes more familiar with the operation of the backhoe, it will be common practice to operate two controls at one time. For example; with the bucket extended and the dipperstick extended, the lift control and crowd control can be operated together to bring the bucket toward the operator with down pressure on it. As the dipperstick approaches the operator, the crowd and bucket controls can be operated to close the bucket and trap the material. At the end of the stroke, the lift and crowd controls are operated to move the load up and away from the operator to save time in clearing the excavation.

This dual operation of controls will speed and simplify the digging operation. Normally the two or more movements will not be equal or even simultaneous but as pressure within the cylinders change, and the resistance on an operating member of the hoe lessens, it will begin to move. It is balancing the force of one member against the other.

NOTE - Actuating the bucket is the key to powerful digging. Operating the crowd and bucket controls simultaneously will insure a full bucket and prevent waste motion and time.

Transporting The Backhoe:

⚠ *CAUTION - To avoid possible injury, observe the following safety rules <u>WHEN TRANSPORTING</u> the backhoe:*

1. ALWAYS engage safety locks when transporting backhoe.
2. TRAVEL SLOWLY over rough terrain, on hillsides, and around curves to prevent tipping.
3. DO NOT drive the tractor near the edge of a ditch or excavation.
4. USE accessory lights and SMV emblem when traveling on highways.

Before leaving backhoe operator's seat, position the backhoe for transport by raising boom, crowding dipperstick in, curling bucket in, swinging to center, and raising the stabilizers.

When transporting for long distances, periodically examine the backhoe and raise stabilizers and bucket back up to full transport height. It is normal for the hoe to slowly settle while being transported.

SERVICE

CAUTION - To avoid possible injury, observe the following safety rules WHEN SERVICING the backhoe:

1. ENGAGE safety locks before servicing the backhoe.

2. DO NOT oil, grease, or adjust the backhoe while it is in motion.

3. DO NOT change any backhoe relief valve settings. They are factory set for best backhoe performance and safety.

4. ESCAPING FLUID under pressure can have sufficient force to penetrate the skin and cause serious injury. Be sure to relieve all pressure before disconnecting lines. Be sure all connections are tight and that lines, pipes, and hoses are not damaged before applying pressure to the system.

5. FLUID ESCAPING from a very small hole can be almost invisible. Use a piece of cardboard or wood - not your hands - to search for suspected leaks.

6. SEE A DOCTOR AT ONCE if injured by escaping fluid. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

7. PROTECT YOUR EYES - WEAR SAFETY GLASSES. Guard against injury when driving connecting pins or performing any repair in which particles can chip from work piece or striking tool.

Beginning Of Season:

Remove all protective covering.

Check hydraulic hoses for deterioration and, if necessary, replace.

Lubricate all grease fittings and oil handle linkage.

Check hydraulic system for loss of fluid and, if necessary, fill to proper level.

Tighten all loose bolts, nuts, and setscrews.

Inspect bucket teeth and, if necessary, sharpen or replace them.

Operate the backhoe slowly for a short time before placing the unit under full load.

Bleeding Backhoe-Hydraulic System:

If the hydraulic hoses have been disconnected from the backhoe or tractor, all trapped air must be removed after the hoses are connected. Start tractor engine and operate backhoe through all movements fully, several times, to purge the system of air.

Hydraulic System Hoses:

Oil leaks in the pressure side of the system can be located by carefully inspecting the external area of the hoses and fittings.

Check the return side of the system for leaks by examining the oil in the reservoir. If air is being drawn into the system, the oil will contain air bubbles and appear to foam.

When tightening connections always use two wrenches.

IMPORTANT - Do not over-tighten fittings. Make them just tight enough to eliminate leaks.

NEVER use teflon tape on pipe thread fittings. Always use a paste type sealer.

Hoses on any backhoe are very severely worked and will fail in time. Examine them regularly and replace any that show signs of failure. Pay careful attention to the routing of hoses so they can move fully and freely, without kinking, and can not be pinched or cut by any part of the backhoe.

Hydraulic System Reservoir:

On PTO pump self-contained systems, maintain the reservoir fluid level at 1 inch below the tank top when the bucket is extended to full reach, bucket rolled back for loading and resting on the ground, and stabilizers fully raised. Do not over-fill, fluid may be forced out of the breather filler cap.

Service - continued

Fill with:

SAE 10W40 engine oil with API "SD" classification in northern climates.

SAE 40W engine oil with API "SD" classification in southern climates.

Change oil every 200 hours or more often if necessary.

If the tractor system supplies the hydraulic power, service according to the tractor instruction manual.

Bucket Tooth Points:

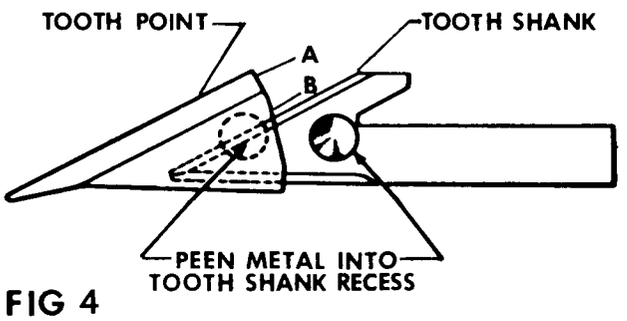


FIG 4

The bucket tooth points are self-sharpening and will require little attention; however, these points on the bucket shanks can be replaced when they become badly worn or broken.

A tooth point can be removed from the welded tooth shank by hammering at "A" on the tooth point or by driving a chisel at "B", just between the tooth point box section and the tooth shank. Install the new point and anchor it to the shank by peening at the location shown.

If a tooth shank breaks off, becoming lost or damaged so that it can not hold a tooth point, a new shank should be welded to the bucket in its place.

Tightening Nuts And Bolts:

Periodically, check to be sure all bolts and nuts are tight, see Torque Chart, Page 33.

Check all pivot pins for cotter pins, washers, and retainers; if missing - replace.

Lubrication:

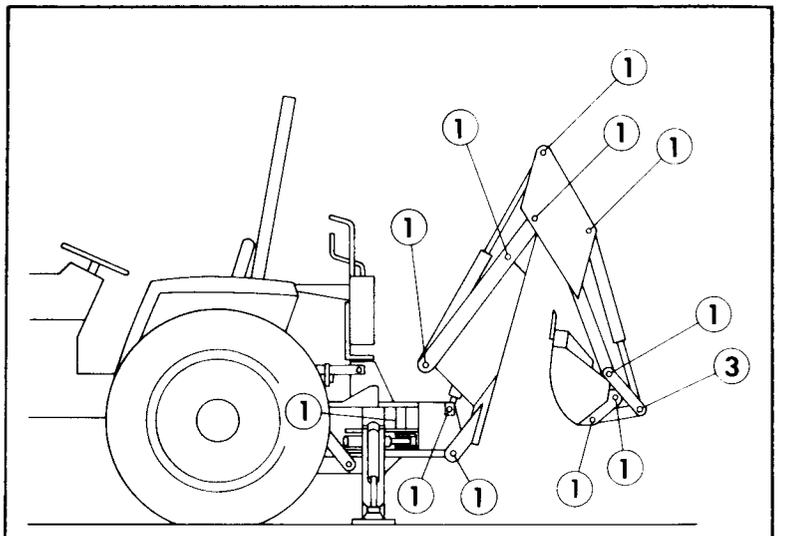


FIG 5

Economical and efficient operation of any machine is dependent upon regular and proper lubrication of all moving parts with a quality lubricant.

All parts provided with grease fittings should be lubricated with a good quality chassis lube type grease. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

Lubricate all grease fittings at least twice daily, once at the beginning of operation and again approximately halfway through the work day.

See Fig 5, for the location of most grease fittings. In addition to those fittings shown, the following must also be greased twice daily:

A. Stabilizer cylinder pivot pins (2 each cylinder).
B. Swing cylinder pivot pins (2 each cylinder).
C. Swing linkage (2 each side).

The following locations should be oiled with SAE 30 oil:

A. Control valve handle linkage.
B. Seat bracket pivot.

IMPORTANT - Avoid excessive greasing. Dirt collects on exposed grease and increases wear greatly. After greasing wipe off excessive grease from fittings.

HYDRAULIC TROUBLE SHOOTING

The trouble shooting material presented in this section is offered as a guide to diagnosing probable causes and remedies for general operational problems. Match your problem with the typical problem examples given, and note the numbers given in the possible cause column. These numbers correspond with the possible cause and correction paragraphs that follow.

NOTE - When using the following chart if it is decided that overhaul of components or pressure adjustments are necessary, to correct malfunctioning, it is recommended that your dealer make these repairs. He is equipped to do this work.

PROBLEM	POSSIBLE CAUSE
A. Machine fails to operate when started initially	1, 2, 5, 7, 16, 24
B. Machine loses power after operating satisfactorily initially	1, 8, 10, 14, 16, 24
C. Loss of power in lift or crowd cylinder, but other cylinders function properly	23, 25, 30
D. Loss of power in any one cylinder including lift and crowd	8, 9, 10, 11, 12, 13, 23, 25, 26
E. Loss of power or loss of cushioning action in swing cylinders, but other cylinders function properly	8, 9, 10, 11, 12, 13, 23, 24, 26, 27
F. Maximum swing action can not be obtained	12, 15
G. Slow operation of machine (lack of power) all cylinders	1, 4, 6, 14, 16, 24
H. Spongy or jerking action of cylinders and/or noisy operation	1, 3, 4, 5
I. Lift, crowd, or bucket cylinders drop under load when control spools are shifted from neutral	28, 30
J. Load drops or settles	8, 10, 13, 26, 28
K. Leaky cylinders	10, 11, 12, 13
L. Leaky valve	8, 16, 17, 29
M. Sticky valve spool	17, 20, 21, 22
N. Unable to push valve spool in	17, 18, 20, 21, 22
O. Spring centered spools do not return to neutral	17, 18, 19, 20, 21, 22

POSSIBLE CAUSE:	AND CORRECTION -
1. Low oil level in reservoir	fill reservoir to proper level.
2. No oil supply to machine	oil is not being diverted from the prime mover hydraulic system. Be sure that the proper controls are actuated on the prime mover.
3. Air in system	bleed all circuits of air by operating machine at maximum oil flow and through full movements.
4. Oil viscosity too heavy, or oil is not at operating temperature.	use recommended hydraulic fluid. Run machine until oil reaches operating temperature.
5. Pump not running	check pump drive to be sure it is engaged.
6. Insufficient pumping	advance engine throttle.
7. Improper hose connection	*IMPORTANT - Be sure inlet and return hoses are hooked up correctly. Improper hook-up will result in damage to the backhoe valve.*
8. Loose oil line connections, leaks in lines, or broken lines.	tighten all hose connections and replace any damaged O-rings at leaking O-ring fittings. Check and replace any damaged hoses and lines.
9. Restrictions in oil lines	check and replace any damaged hoses and lines. Check for pinched hoses.
10. Oil is bypassing cylinder piston, scored piston, worn piston packing, or defective piston assembly.	replace or rebuild the cylinder; replace damaged parts.
11. Scored piston rods and worn rod guides in cylinder.	replace or rebuild the cylinder; replace damaged parts.
12. Bent piston rod in cylinder	replace or rebuild the cylinder; replace damaged parts.
13. Worn or damaged rod seals on cylinder; external leaks.	repack cylinder. Rebuild cylinder, replacing damaged parts as necessary.
14. Diverter valve on prime mover leaking externally or bypassing oil internally through valve to reservoir.	diverter valve may need rebuilding or replacing.
15. Something jamming the swing linkage	remove interference.
16. Excessive back pressure	relieve condition. May be restriction from outlet to reservoir.

Hydraulic Trouble Shooting - continued

POSSIBLE CAUSE:	AND CORRECTION -
17. Paint on valve spool, sticking valve spool, or scored valve spool.....	clean valve spool. Binding is usually caused from an over tightened plug, mounting bolt, fitting in valve body, or tie rod bolt. If a plug or fitting in valve body is leaking do not over tighten in an effort to stop leak. This will distort body casting and cause spools to bind. Instead, the plug or fitting should be removed from valve body and be reconnected, using a new O-ring. Do not apply excessive pressure on mounting bolts. The rods should be torqued to 20 ft-lb. Never force spool, if binding occurs, see item 31 at the end.
18. Oil leakage past spool seal into spool cap.....	remove cap, if it contains oil, replace spool seal O-rings. Check O-ring retainer to see if it is flat. If it has been "belled" check for restriction from outlet to reservoir of valve which would cause excessive back pressure, see item 31 at the end and Fig 8.
19. Broken return springs.....	replace springs, see item 31 at the end and Fig 8.
20. Bent spool.....	~~return for factory repair, or~~ replace with new spool section. See item 31 at the end and Fig 9, 10, and 11.
21. Foreign particles.....	clean system and valve.
22. Misalignment of control handle..... linkage.	check linkage for binding condition.
23. Spool not moved to full stroke.....	check travel, should be 5/16 inch either way or a total of 5/8 inch. See item 31 at the end.
24. Relief valve setting in backhoe control valve too low or defective.....	relief pressure will have to be checked and corrections made. Backhoe system pressure is 1700 PSI. Relief valve may need cleaning and overhauling, or entire cartridge must be replaced. See item 31 at the end and Fig 12.
25. Overload relief valve in the control valve stuck open or malfunctioning.....	clean relief carefully but do not disturb its pressure setting as it can not be field calibrated, or replace cartridge. See item 31 at the end and Fig 9 and 10.
26. Worn control valve.....	replace the control valve.

POSSIBLE CAUSE:	AND CORRECTION -
27. A cross over relief in swing circuit is leaking or malfunctioning. Raise the machine on one side by fully extending the left or right stabilizer cylinder. Raise the bucket clear of the ground with the boom and dipperstick in transport position. If the boom swings toward the low side of the machine, oil is bypassing the cross over relief valve.	clean reliefs carefully but do not disturb their pressure setting as they can not be field calibrated, or replace the entire cross over relief assembly.
28. Check poppet in the control valve not holding.	clean check poppet(s) carefully, being sure that it moves freely with good spring action and seats properly or replace. See item 31 at the end and Fig 9, 10, and 11.
29. Damaged or worn spool seals	replace spool end seals, see item 31 at the end and Fig 9, 10, and 11.
30. Check ball in anti-cavitation check valve is stuck or not seating properly.	clean anti-cavitation valve carefully, being sure that checks move freely and seat properly, or replace cartridge. See item 31 next, and Fig 9 and 10.

31. Problems involving the control valve proper.....

This valve is a precision device and is not intended for any extensive field adjustment or repair. Field replacement parts are limited to Seal Kits, Cartridges, Valve Sections, and Tie Rods. Anything beyond the replacement of these parts, the opening of check cavities and certain relief valve cavities to examine for trapped dirt, or the resetting of the main relief valve with the use of a good pressure gauge, should be referred back to the factory for an exchange. The malfunctioning valve must then be returned to its manufavturer for service.

Dirt and shreds of packing material are the usual causes of valve malfunction. Be sure that the reservoir oil supply is kept clean and only factory supplied packings are used in cylinder repair. Everything must be clean and free of dirt during the oil line removal and replacement and during any cylinder work.

Pages 14 and 15, Valve Repair - Disassembly, explain the procedure to follow for valve repair. Pages 16 through 22 illustrate various portions of the valve and list the part numbers.

PAY CLOSE ATTENTION TO ALL CAUTION AND WARNING NOTES SO THE VALVE WILL NOT HAVE TO BE RETURNED TO THE FACTORY AND THEN TO THE MANUFACTURER FOR RECONDITIONING.

Careful use of this information, after the warranty period, by qualified individuals with valve service training and experience, can correct minor problems which may develop.

THE INCLUSION OF THIS INFORMATION AND ITS USE DOES NOT IMPLY THAT THE WARRANTY WILL REMAIN EFFECTIVE ON THE VALVE IF IT IS TAMPERED WITH DURING THE WARRANTY PERIOD.

(Revise Para 70)

REMOVAL FROM TRACTOR-STORAGE

The backhoe is self-assisting during the installation and removal procedures. For removal and storage follow these steps:

1. Put the stabilizers down and lift the hoe slightly.

2. Stretch out the boom, dipper arm, and bucket, as shown in Fig 6 and 7. Lower the bucket to the ground so that it rests there solidly.

3. Place suitable blocking under the backhoe frame to support it adequately, as shown in Fig 6 and 7.

4. Detach the backhoe from the tractor mechanically only, not hydraulically at this point, and move the tractor a few inches away from the backhoe.

NOTE - To facilitate this procedure, the backhoe can still be hydraulically moved, raised or lowered, to release the connection points of the carrying forces.

5. Gently lower the backhoe onto the blocking as shown in Fig 6 and 7. Leave the stabilizers outstretched and firmly in contact with the ground for added stability.

6. The hydraulic system can now be deactuated.

a. On PTO pump self-contained systems, the pump should be removed from the PTO shaft. The hydraulic system should always remain complete. No hoses or oil lines should be disconnected during correct removal and storage procedure.

b. On systems that tap into the tractor for hydraulic power, these lines can be disconnected now.

IMPORTANT - Be sure to mark the lines to prevent mix up, during hook-up, when the hoe is again attached to the tractor.

Be sure to cap the ends of the lines to keep clean while in storage.

7. Now slowly drive the tractor forward and away from the backhoe. Be careful that all parts clear each other during separation.

8. Refer to the installation instructions for the attaching kit, this will help with the removal and reattaching.

9. For long term storage, coat exposed lift, swing, and stabilizer cylinder rods with grease.

10. Lubricate all grease fittings and oil complete handle linkage.

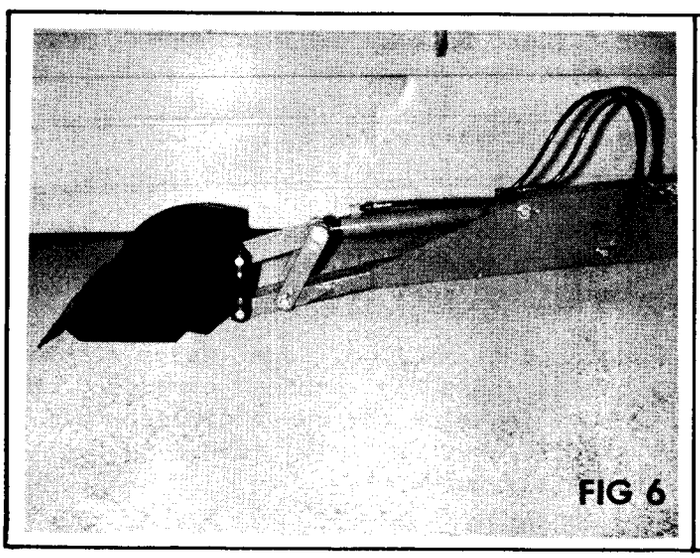


FIG 6

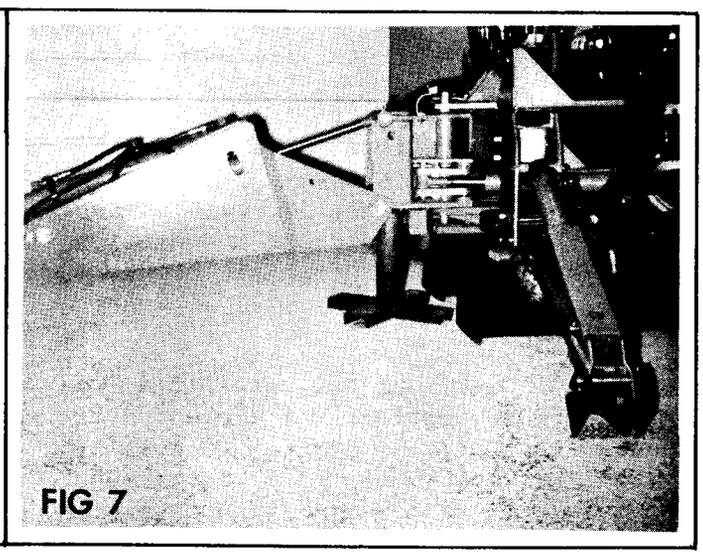


FIG 7

VALVE REPAIR - DISASSEMBLY

Replace Center Section Assemblies:

NOTE - For the purpose of these instructions, we will consider the section containing the MAIN RELIEF VALVE as the left side of the valve.

1. Remove control valve from the backhoe.

2. Thoroughly clean the exterior of the valve before beginning disassembly procedures.

3. Since the valve will be assembled in the same order, each section should be marked numerically so that they can be reassembled in the same sequence.

4. Mount the valve vertically in a vise to facilitate disassembly and assembly.

5. Remove the three tie rod nuts from the right end section, using a thin-wall socket.

6. Valve sections can now be removed by sliding the sections along the tie rods.

7. Thoroughly clean the O-ring counter-bores and the ground surfaces of each section. Place O-ring seals; 10318 (exhaust) and 10317 (pressure) in proper counter-bores. For better sealing it is recommended that all O-rings, used in the counter-bores, are replaced with new parts.

8. Replace the sections on tie rods with the O-ring counter-bores facing the right end of the valve. Be careful replacing the sections so that the section O-rings are not moved from the counter-bores.

9. When all sections are assembled on the tie rods, tighten the tie rod nuts equally to 20 ft-lb torque, *NO MORE - NO LESS*, or spools may bind and stick.

Replacing Spool Seals:

NOTE - For the purpose of these instructions, we will consider the control handle side of the valve as the FRONT, and the opposite side the BACK.

1. Remove control valve from the backhoe.

2. Thoroughly clean the exterior of the valve before beginning disassembly procedures.

3. At the BACK of the valve remove all bonnet assembly parts which are connected to the spool, keep parts in the order of disassembly. See Fig 8 for the parts involved in the make-up of the bonnet assembly.

IMPORTANT - DO NOT remove the spool from the valve. The seals can be replaced externally. Prevent spool from turning or moving by inserting a screw driver through clevis slot, or by running a rod through the pin hole and using the rod as a handle. DO NOT hold the spool with a wrench. This will destroy the finish.

4. At the BACK of the valve, remove seal retainer, back-up washer, and spool O-ring seal.

5. Thoroughly clean counter-bore.

6. Lightly oil new O-ring seal. Slide O-ring seal over valve spool and insert in seal counter-bore. Replace back-up washer and seal retainer.

7. At the BACK of the valve replace bonnet assembly parts, reversing the order in which they were disassembled in step 3. Use 12 ft-lb torque to tighten assembly screw.

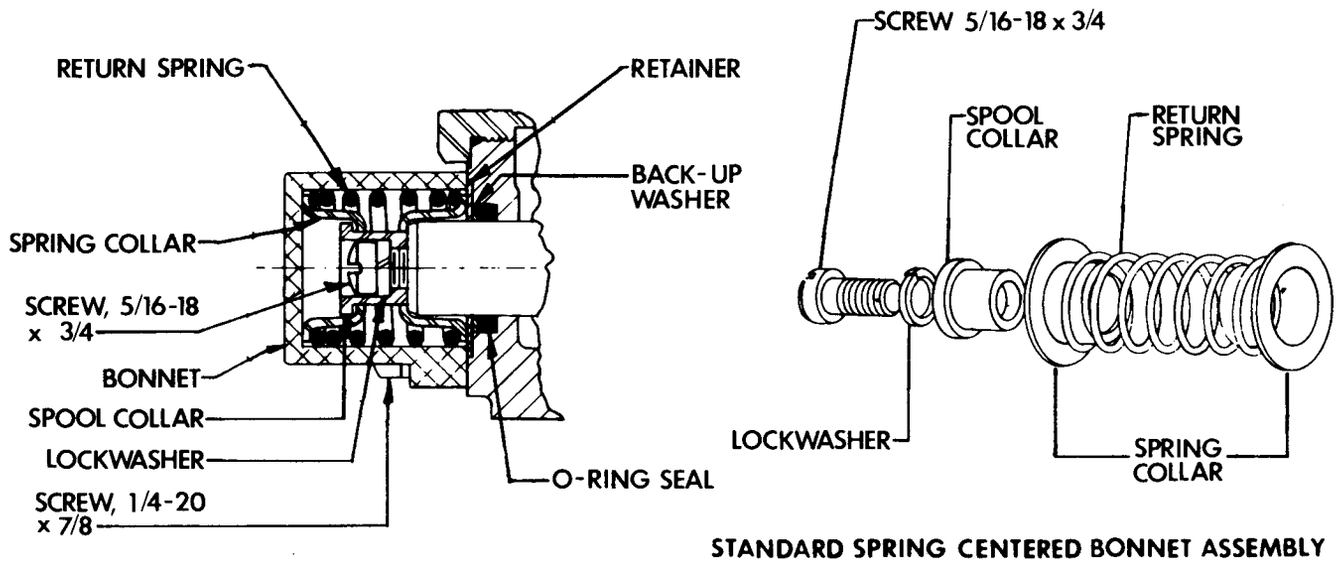


FIG 8

8. At the FRONT of the valve remove all parts connected to the spool (handle, linkage, etc.).

9. At the FRONT of the valve remove seal plate retainer, seal retainer, back-up washer, and spool O-ring seal.

10. Thoroughly clean counter-bore.

11. Lightly oil new O-ring seal. Slide O-ring seal over valve spool and insert in seal counter-bore. Replace back-up washer, seal retainer, and seal plate retainer.

12. Reattach all parts connected to the spool (handle, linkage, etc.).

CONTROL VALVE SECTION

TYPICAL SECTION FOR LIFT CIRCUIT

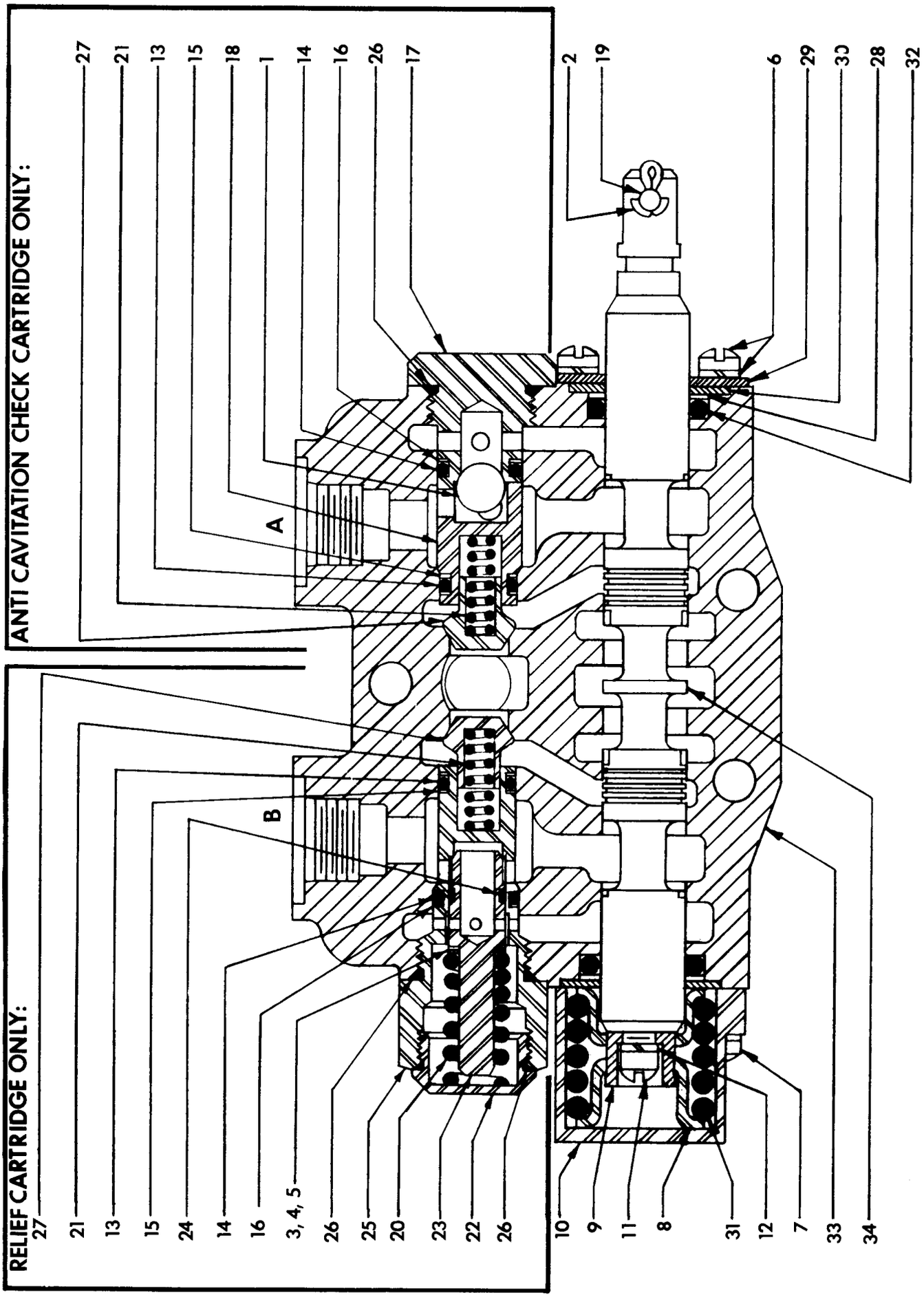


FIG 9

CONTROL VALVE SECTION - LIFT CIRCUIT

PARTS LIST - FIG 9

Index No.	ARPS Part No.	Description	Quantity Per Section
1	*	7/16" Steel Ball	1
2	*	Handle Pin Cotter	1
3	*	Shim, .040" Thick)	
4	*	Shim, .020" Thick)	as required
5	*	Shim, .010" Thick)	
6	*	Machine Screw and Lockwasher	2
7	*	Bonnet Screw	2
8	*	Stop Collar	2
9	*	Spool Collar	1
10	*	Bonnet	1
11	*	Spool Assembly Screw	1
12	*	Spool Assembly Screw Lockwasher	1
13	**	O-Ring Seal (Inner)	2
14	**	O-Ring Seal (Outer)	2
15	**	Back-Up Washer (Inner)	4
16	**	Back-Up Washer (Outer)	2
17	*	Anti-Cavitation Check Body	1
18	*	Check Ball Retainer	1
19	*	Handle Pin	1
20	*	Spring (1751 - 2200 PSI Crack)	1
21	*	Check Spring	2
22	*	Relief Cap	1
23	**	Relief Poppet	1
24	**	Piston Ring	1
25	*	Relief Body	1
26	**	O-Ring Seal	3
27	*	Steel Check	2
28	**	Back-Up Washer	2
29	*	Seal Plate Retainer	1
30	*	Seal Retainer	2
31	*	Centering Spring	1
32	**	Spool O-Ring Seal	2
33	*	Center Section Housing	1
34	*	Four-Way Spool	1
	10145	Control Valve Section - Lift Circuit, consisting of above listed parts. *NOTE - One Orifice Plate (10257) must be added to "A" port to complete lift section.*	1
	10315	Control Valve Section Seal Kit - Lift Circuit, consisting of:32(quan-2), 13(quan-2), 14(quan-2), 15(quan-4), 16(quan-2), 26(quan-2),pressure section seal(quan-2),and exhaust section seal(quan-2) ..	1
	10316	Spool Seal Kit; consisting of: 32(quan-2) and 28(quan-2)	1
	10147	Relief Cartridge (2000 PSI), as shown	1
	10313	Relief Cartridge Seal Kit; consisting of: 13(quan-1), 14(quan-1), 15(quan-2), 16(quan-1), and 26(quan-2)	1
	10177	Poppet Seal Kit, consisting of: 23(quan-1) and 24(quan-1)	1
	10304	Anti-Cavitation Check Cartridge, as shown	1
	10313	Anti-Cavitiation Check Seal Kit, same as Relief Cartridge Seal Kit listed above	1

* Not available as a separate repair part, order complete section or cartridge.
** Not available as a separate repair part, order seal kit.

CONTROL VALVE SECTION

TYPICAL SECTION FOR CROWD CIRCUIT

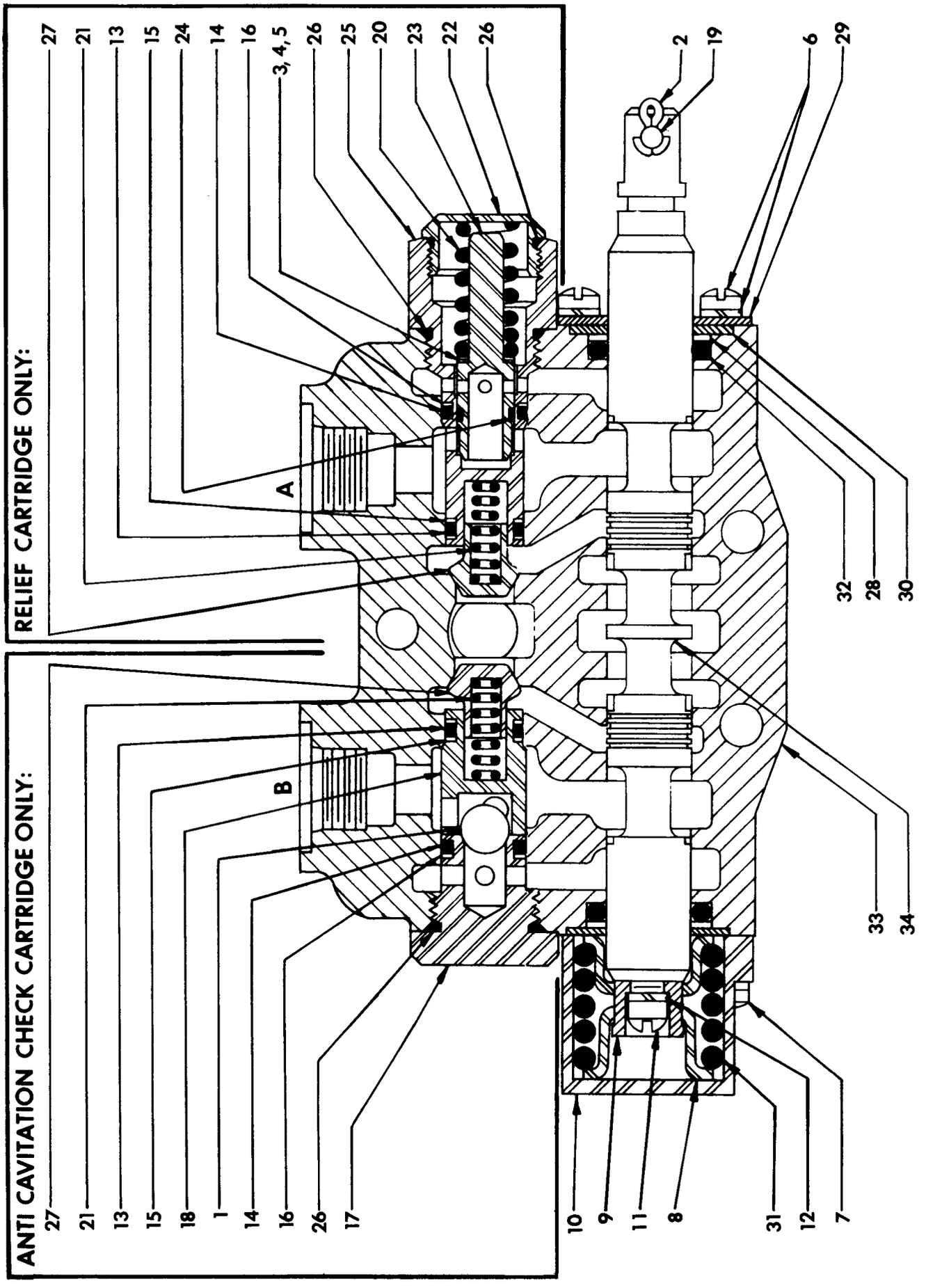


FIG 10

CONTROL VALVE SECTION - CROWD CIRCUIT

PARTS LIST - FIG 10

Index No.	ARPS Part No.	Description	Quantity Per Section
1	*	7/16" Steel Ball	1
2	*	Handle Pin Cotter	1
3	*	Shim, .040" Thick)	
4	*	Shim, .020" Thick)	as required
5	*	Shim, .010" Thick)	
6	*	Machine Screw and Lockwasher	2
7	*	Bonnet Screw	2
8	*	Stop Collar	2
9	*	Spool Collar	1
10	*	Bonnet	1
11	*	Spool Assembly Screw	1
12	*	Spool Assembly Screw Lockwasher	1
13	**	O-Ring Seal (Inner)	2
14	**	O-Ring Seal (Outer)	2
15	**	Back-Up Washer (Inner)	4
16	**	Back-Up Washer (Outer)	2
17	*	Anti-Cavitation Check Body	1
18	*	Check Ball Retainer	1
19	*	Handle Pin	1
20	*	Spring (175l - 2200 PSI Crack)	1
21	*	Check Spring	2
22	*	Relief Cap	1
23	**	Relief Poppet	1
24	**	Piston Ring	1
25	*	Relief Body	1
26	**	O-Ring Seal	3
27	*	Steel Check	2
28	**	Back-Up Washer	2
29	*	Seal Plate Retainer	1
30	*	Seal Retainer	2
31	*	Centering Spring	1
32	**	Spool O-Ring Seal	2
33	*	Center Section Housing	1
34	*	Four-Way Spool	1
	10146	Control Valve Section - Crowd Circuit, consisting of above listed parts	1
	10315	Control Valve Section Seal Kit - Crowd Circuit, consisting of: 32(quan-2), 13(quan-2), 14(quan-2), 15(quan-4), 16(quan-2), 26(quan-2), pressure section seal(quan-2), and exhaust section seal(quan-2)	1
	10316	Spool Seal Kit; consisting of: 32(quan-2) and 28(quan-2)	1
	10147	Relief Cartridge (2000 PSI), as shown	1
	10313	Relief Cartridge Seal Kit; consisting of: 13(quan-1), 14(quan-1), 15(quan-2), 16(quan-1), and 26(quan-2)	1
	10177	Poppet Seal Kit, consisting of: 23(quan-1) and 24(quan-1)	1
	10304	Anti-Cavitation Check Cartridge, as shown	1
	10313	Anti-Cavitation Check Seal Kit, same as Relief Cartridge Seal Kit listed above	1

* Not available as a separate repair part, order complete section or cartridge.
** Not available as a separate repair part, order seal kit.

CONTROL VALVE SECTION

TYPICAL SECTION FOR ACTUATE (BUCKET), SWING, AND STABILIZER CIRCUITS

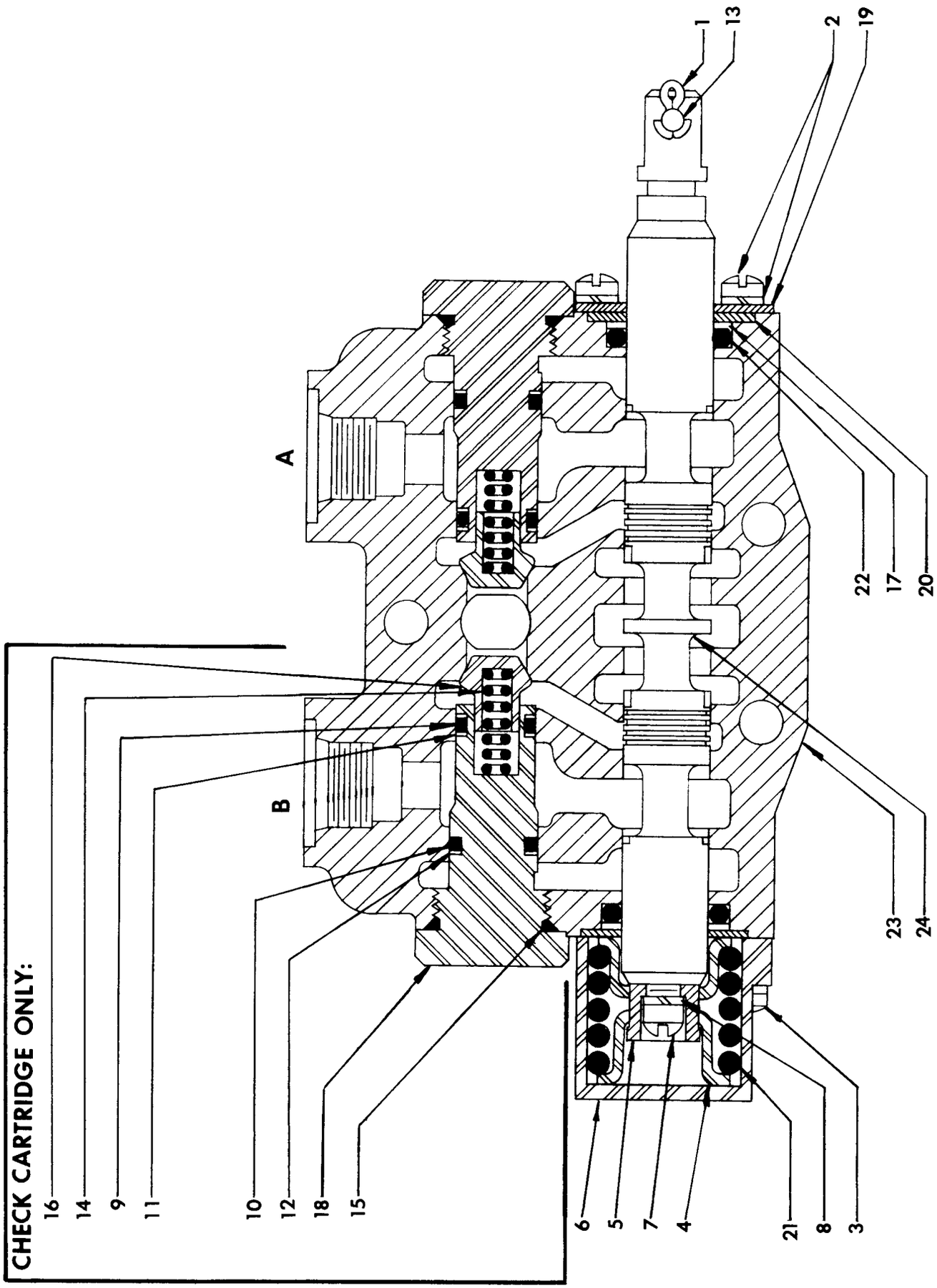


FIG 11

CONTROL VALVE SECTION - ACTUATE (BUCKET), SWING, AND STABILIZER CIRCUITS

PARTS LIST - FIG 11

Index No.	ARPS Part No.	Description	Quantity Per Section
1	*	Handle Pin Cotter	1
2	*	Machine Screw and Lockwasher	2
3	*	Bonnet Screw	2
4	*	Stop Collar	2
5	*	Spool Collar	1
6	*	Bonnet	1
7	*	Spool Assembly Screw	1
8	*	Spool Assembly Screw Lockwasher	1
9	**	Check Plug O-Ring Seal (Inner)	2
10	**	Check Plug O-Ring Seal (Outer)	2
11	**	Back-Up Washer (Inner)	4
12	**	Back-Up Washer (Outer)	2
13	*	Handle Pin	1
14	*	Lift Check Spring	2
15	**	Lift Check Plug O-Ring Seal	2
16	*	Lift Check Poppet	2
17	**	Back-Up Washer	2
18	*	Lift Check Plug	2
19	*	Seal Plate Retainer	1
20	*	Seal Retainer	2
21	*	Centering Spring	1
22	**	Spool O-Ring Seal	2
23	*	Center Section Housing	1
24	*	Four-Way Spool	1
	10156	Control Valve Section - Actuate (Bucket), Swing, and Stabilizer Circuits, consisting of above listed parts	1
		NOTE - Two Orifice Plates (10257) must be added to complete Swing Section.	
	10315	Control Valve Section Seal Kit - Actuate (Bucket), Swing, and Stabilizer Circuits, consisting of: 22(quan-2), 9(quan-2), 10(quan-2), 11(quan-4), 12(quan-2), 15(quan-2), pressure section seal (quan-2), and exhaust section seal(quan-2)	1
	10316	Spool Seal Kit; consisting of: 22(quan-2) and 17 (quan-2)	1
	10305	Check Cartridge, as shown	2
	10313	Check Cartridge Seal Kit; consisting of: 9(quan-1), 10(quan-1), 11(quan-2), 12(quan-1), and 15(quan-2)	2

* Not available as a separate repair part, order complete section or cartridge.
** Not available as a separate repair part, order seal kit.

MAIN SYSTEM RELIEF VALVE (1700 PSI)

LOCATION: LEFT HAND VALVE COVER

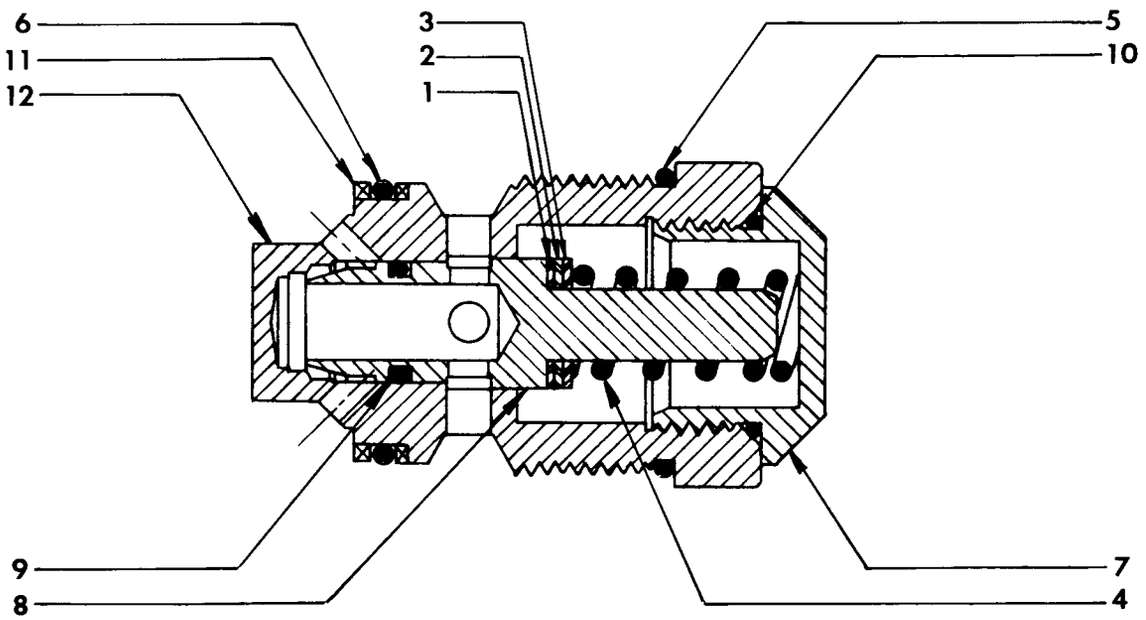


FIG 12

MAIN SYSTEM RELIEF VALVE

PARTS LIST - FIG 12

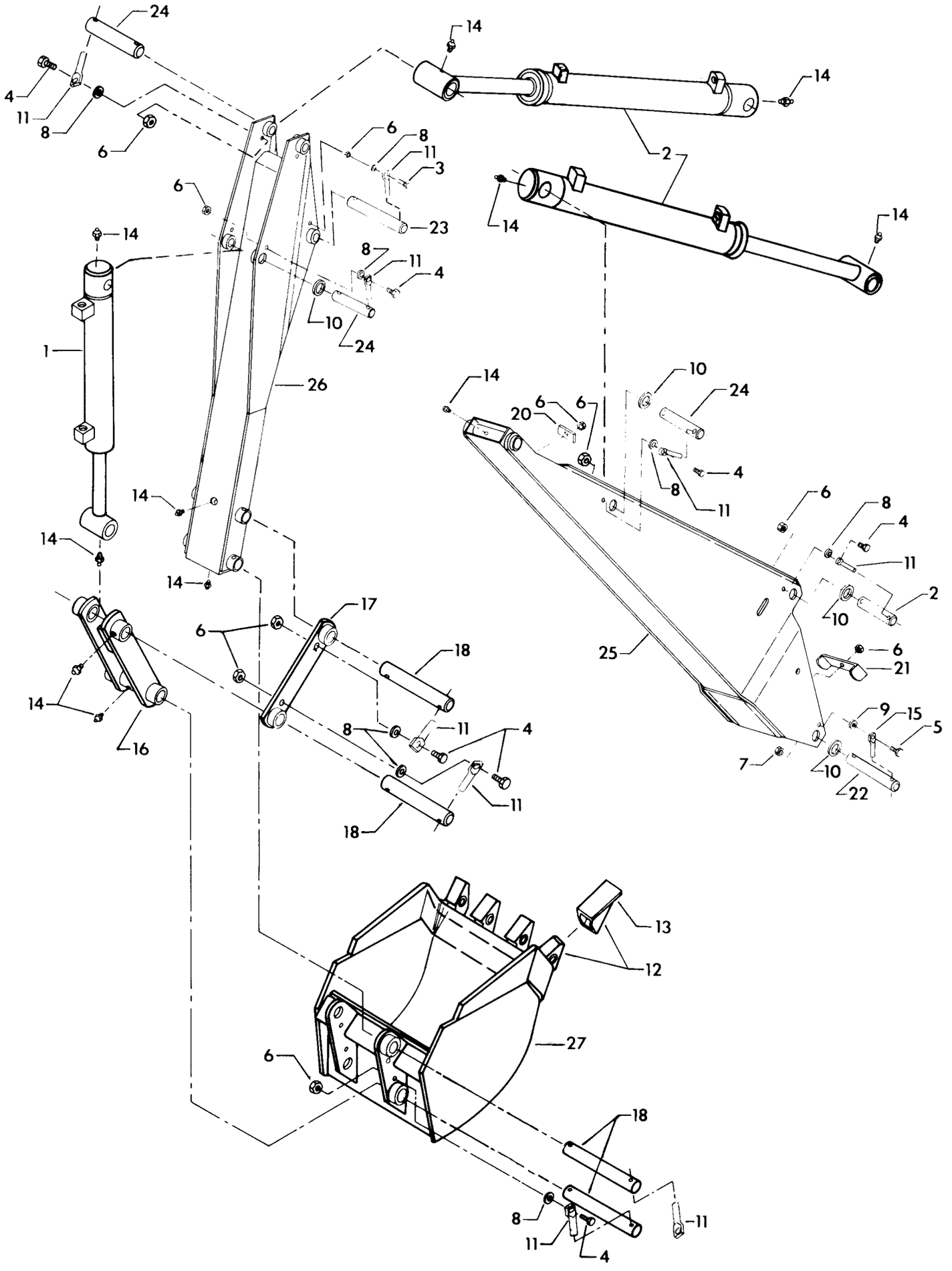
Index No.	ARPS Part No.	Description	Required
1	*	Shim, .040" Thick)	
2	*	Shim, .020" Thick).....	as required
3	*	Shim, .010" Thick)	
4	*	Spring (1351 - 1750 PSI Crack).....	1
5	**	O-Ring Seal.....	1
6	**	O-Ring Seal.....	1
7	*	Relief Cap.....	1
8	**	Relief Poppet.....	1
9	**	Piston Ring.....	1
10	**	O-Ring Seal.....	1
11	**	Back-Up Washer.....	2
12	*	Body.....	1
	10148	Main System Relief Valve, consisting of above listed parts.....	1
	10172	Seal and Service Kit; consisting of: 5(quan-1), 6(quan-1), 8(quan-1), 9(quan-1), 10(quan-1), and 11(quan-2).....	1

* Not available as a separate repair part, order complete Main System Relief Valve.
** Not available as a separate repair part, order Seal and Service Kit.

ADDITIONAL REPAIR PARTS (NOT SHOWN)

ARPS Part No.	Description	Required
10149	Left Hand End Cover with Main Relief Valve.....	1
10160	Tie Rod Kit (Six-Spool) contains three Studs and three Stud Nuts.....	1
10176	Valve Seal Kit, containing all O-Rings and Back-Up Rings for a Six-Spool Valve.....	1
10189	Six-Spool Valve.....	1
10308	Right Hand End Cover.....	1
10317	Section Seal (Pressure).....	2
10318	Section Seal (Exhaust).....	2

Purchase and Service Record


24
14
4
11
8
6
6
8
11
3
23
14
2
14
14
6
8
11
4
10
24
1
26
14
14
14
14
14
10
24
20
6
6
4
8
11
6
8
4
11
2
10
25
6
21
9
15
5
7
10
22
17
6
18
8
11
4
11
18
16
14
13
12
27
6
18
8
11
11
4

PARTS LIST - FIG 13

Index	Description	Part No.
1	Hydraulic Cylinder - Bucket	083
2	Hydraulic Cylinder - Boom/Dipperstick	091
3	Bolt, 5/16 NF x 3/4	6789
4	Bolt, 5/16 NF x 7/8	6790
5	Bolt, 3/8 NF x 1"	6851
6	Locknut, 5/16 NF	7437
7	Locknut, 3/8 NF	7466
8	Flat Washer, 5/16 SAE	8152
9	Flat Washer, 3/8 SAE	8158
10	Machine Bushing, 1-1/2 OD x 1" ID x 18 GA	8283
11	Retainer, 5/16	856249
12	Bucket Tooth and Shank	13622
13	Bucket Tooth Only	13623
14	Grease Fitting	14505
15	Pin Retainer - Small	851122
16	Bucket Link Weldment	855120
17	Guide Link Weldment	856220
18	Pin, 1" Dia. x 7-3/8	855151
20	Hose Retainer	856233
21	Hose Strap	856237
22	Pin, 1" Dia. x 8-3/16	856241
23	Pin, 1" Dia. x 6-7/8	856242
24	Pin, 1" Dia. x 5-5/8	856243
25	Boom Weldment	856615
26	Dipperstick Weldment	856630
27	Bucket Complete - 9 inch	W209
27	Bucket Complete - 13 inch	W210
27	Bucket Complete - 16 inch	W211
27	Bucket Complete - 19 inch	W213
27	Bucket Complete - 24 inch	W214

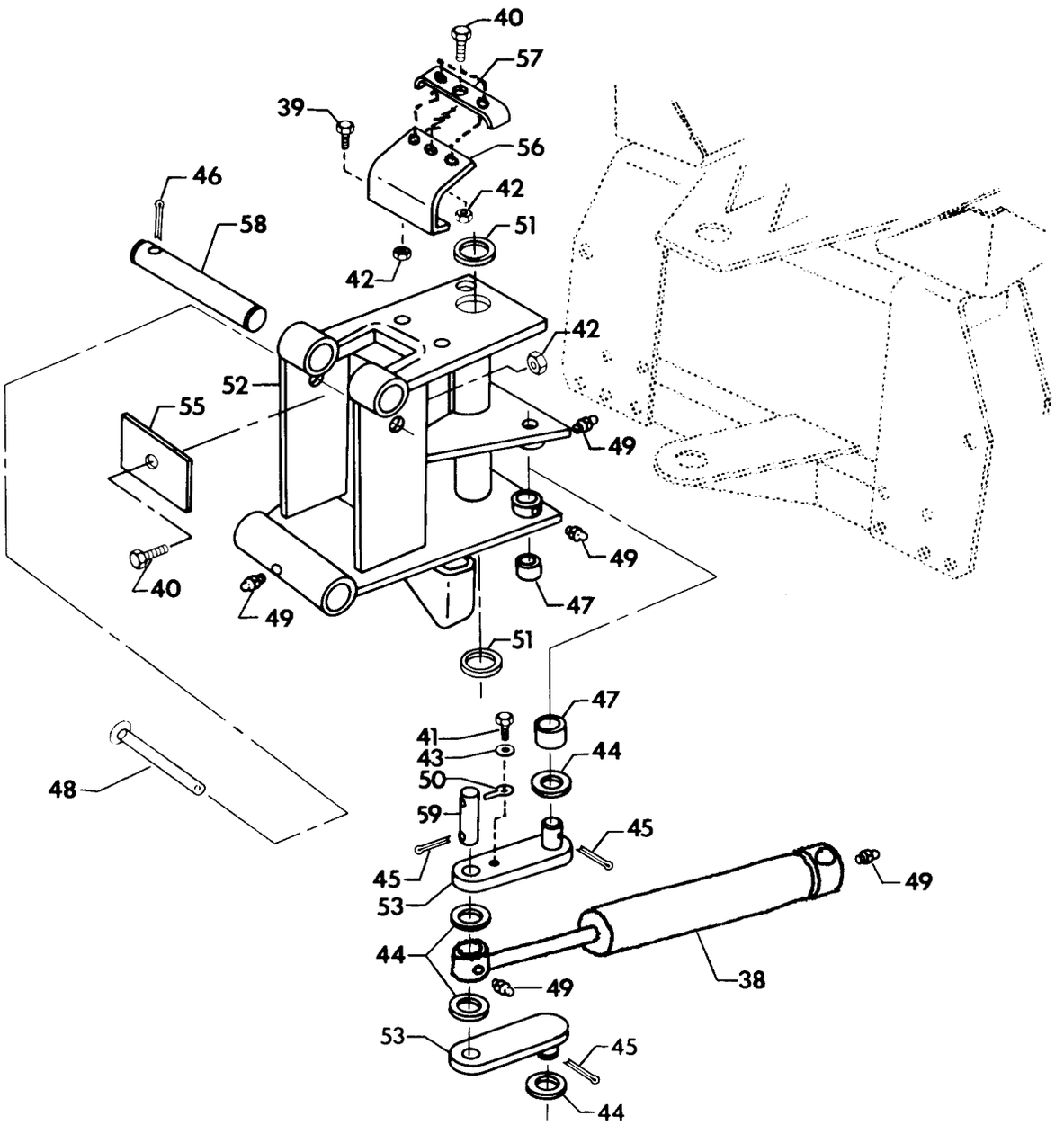


FIG 14

PARTS LIST - FIG 14

Index	Description	Part No.
38	Hydraulic Cylinder - Swing	092
39	Bolt, 5/16 NF x 1"	6795
40	Bolt, 5/16 NF x 1-1/4	6799
41	Bolt, 3/8 NF x 1"	6851
42	Locknut, 5/16 NF	7437
43	Lockwasher, 3/8	8079
44	Machine Bushing, 1-1/2 OD x 1" ID x 18 GA	8283
45	Cotter Pin, 1/4 x 1-1/2	8602
46	Cotter Pin, 5/16 x 2-1/2	8614
47	Bronze Bearing, 1-1/4 OD x 1" ID x 1"	11993
48	Quick Release Pin - Long	13495
49	Grease Fitting	14505
50	Pin Retainer - Small	851122
51	Thrust Washer	855171
52	Swing Frame Weldment	856055
53	Swing Link Weldment	856190
55	Hose Retainer	856233
56	Hose Bracket	856236
57	Hose Strap	856237
58	Pin, 1" Diameter x 5-1/2	856244
59	Pin, 1" Diameter x 4-1/8	856248

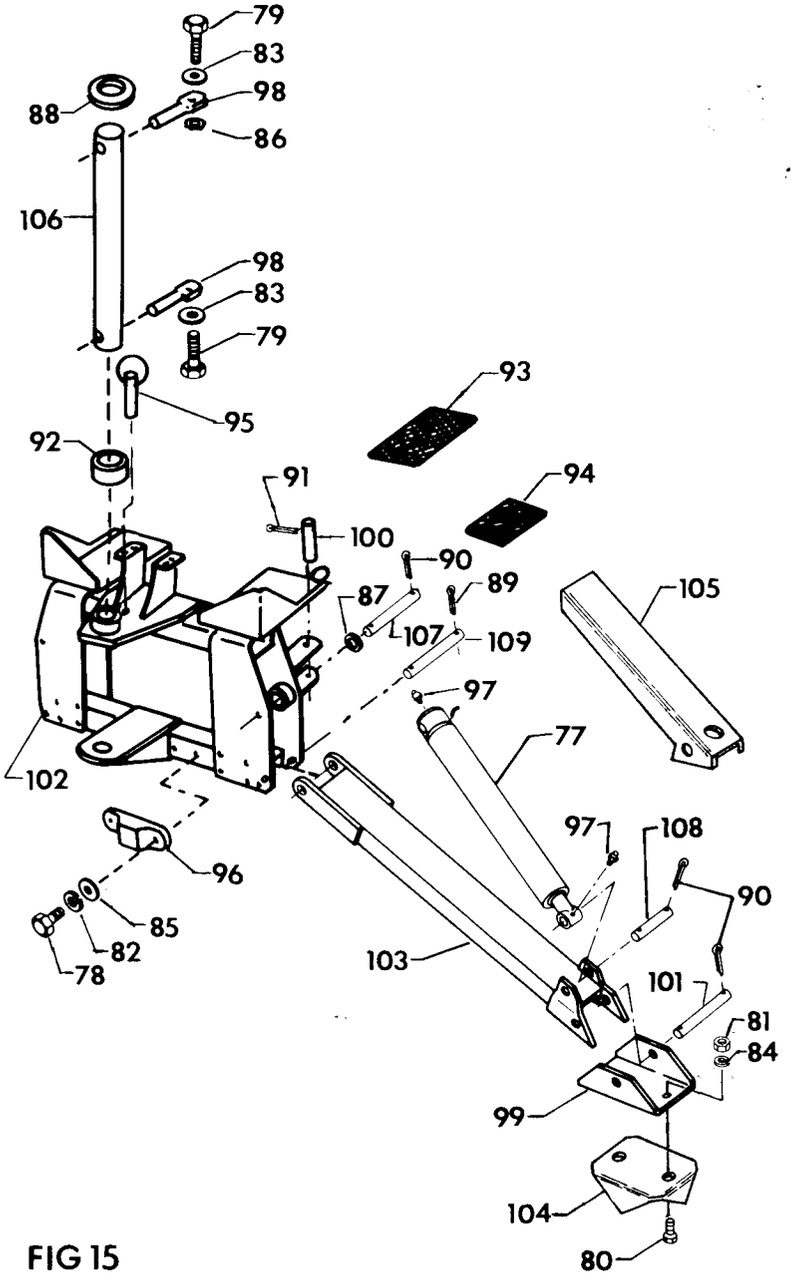


FIG 15

PARTS LIST - FIG 15

Index	Description	Part No.
77	Hydraulic Cylinder - Stabilizer	073
78	Bolt, 5/16 NF x 1-1/4	6799
79	Bolt, 1/2 NF x 1"	7012
80	Bolt, 5/8 NC x 1-1/4 Gr 5	7118
81	Nut, 5/8 NC	7531
82	Lockwasher, 5/16	8071
83	Lockwasher, 1/2 Shakeproof	8103
84	Lockwasher, 5/8	8111
85	Flat Washer, 5/16	8151
86	Flat Washer, 1/2 SAE	8173
87	Flat Washer, 5/8 SAE	8183
88	Machine Bushing, 2-1/4 OD x 1-1/2 ID x 16 GA	8232
89	Cotter Pin, 1/8 x 1-1/4	8563
90	Cotter Pin, 3/16 x 1-1/4	8582
91	Cotter Pin, 1/4 x 1-1/2	8602
92	Bronze Bearing, 1-3/4 OD x 1-1/2 ID x 1"	11994
93	Foot Pad - Large	12906
94	Foot Pad - Small	12907
95	Quick Release Pin - Short	13492
96	Bumper	13681
97	Grease Fitting	14505
98	Pin Retainer - Large	851123
99	Stabilizer Pad	855141
100	Pin, 1" Diameter x 4-1/4	855147
101	Pin, 5/8 Dia. x 4-15/16	855174
102	Mainframe Weldment	856000
103	Stabilizer Weldment	856140
104	Stabilizer Shoe	856231
105	Stabilizer Shield	856232
106	Main Pivot Shaft	856238
107	Pin, 5/8 Dia. x 5-5/8	856246
108	Pin, 5/8 Dia. x 3-7/8	856247
109	Pin, 5/8 Dia. x 5-3/16	856548

VALVE MOUNT, CONTROLS, AND SEAT

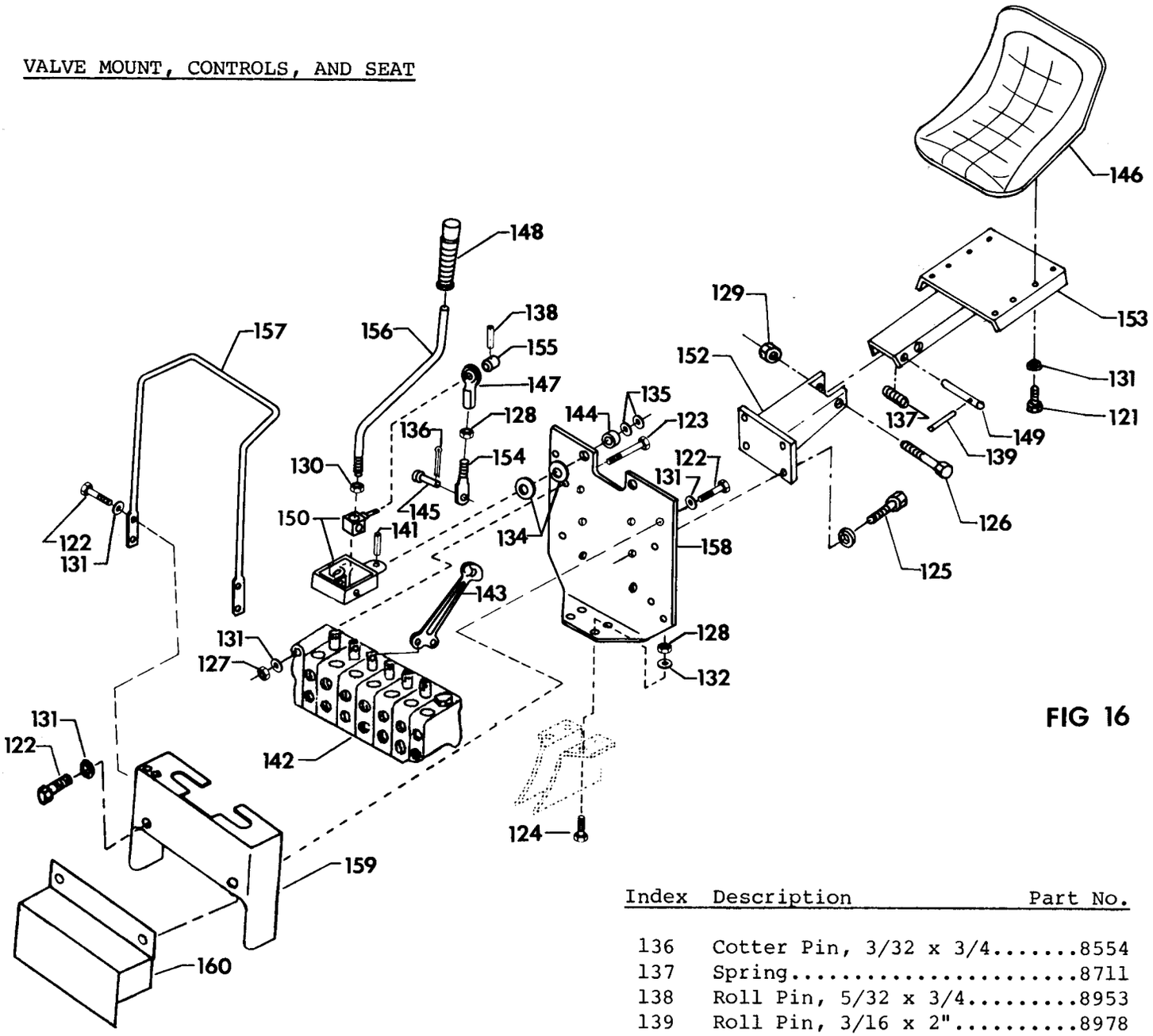


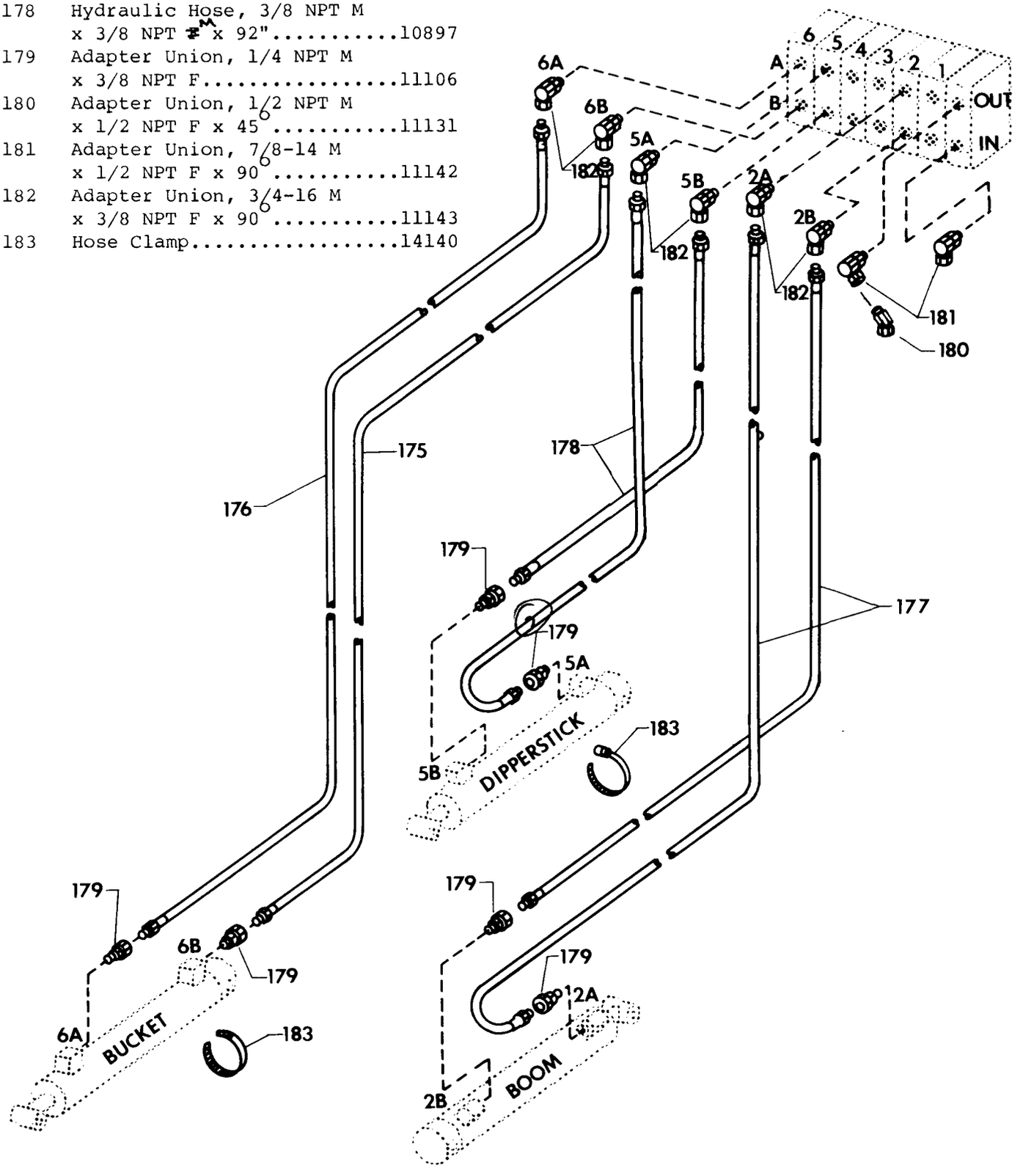
FIG 16

PARTS LIST - FIG 16

Index	Description	Part No.
121	Bolt, 5/16 NC x 3/4	6787
122	Bolt, 5/16 NF x 1"	6795
123	Bolt, 5/16 NC x 2-3/4	6819
124	Bolt, 3/8 NF x 1-1/4 Gr 8	6860
125	Bolt, 1/2 NF x 1"	7012
126	Bolt, 5/8 NC x 5"	7184
127	Nut, 5/16 NC	7431
128	Nut, 3/8 NF Gr 5	7461
129	Locknut, 5/8 NC	7532
130	Jam Nut, 1/2 NC	7666
131	Lockwasher, 5/16	8071
132	Lockwasher, 3/8	8079
133	Lockwasher, 1/2	8101
134	Flat Washer, 1" SAE	8203
135	Machine Bushing, 1-1/2 OD x 1" ID x 18 GA	8283
136	Cotter Pin, 3/32 x 3/4	8554
137	Spring	8711
138	Roll Pin, 5/32 x 3/4	8953
139	Roll Pin, 3/16 x 2"	8978
141	Roll Pin, 3/8 x 1-3/4	9018
142	Control Valve, Complete	10189
143	Stabilizer Handle, Complete	10144
144	Bronze Bushing, 1-1/4 OD x 1" ID x 1"	11993
145	Clevis Pin, 1/4 Dia. x 7/8	13436
146	Seat	13918
147	Ball Joint, 3/8 NF Female	14029
148	Handle Grip	14071
149	Slide Pin	851988
150	Linkage Pivot Weldment	858390
152	Seat Bracket Weldment	856175
153	Seat Plate with pins and spring	856180
154	Handle Link	856226
155	Retainer Bushing	856227
156	Control Handle	856228
157	Handle Loop	856229
158	Valve Plate, less bearings	857115
159	Shroud Weldment	857185
160	Fitting Cover Weldment	857190

PARTS LIST - FIG 17

Index	Description	Part No.
175	Hydraulic Hose, 3/8 NPT M x 3/8 NPT F x 100"	10886
176	Hydraulic Hose, 3/8 NPT M x 3/8 NPT F x 118"	10888
177	Hydraulic Hose, 3/8 NPT M x 3/8 NPT F x 65"	10895
178	Hydraulic Hose, 3/8 NPT M x 3/8 NPT F x 92"	10897
179	Adapter Union, 1/4 NPT M x 3/8 NPT F	11106
180	Adapter Union, 1/2 NPT M x 1/2 NPT F x 45°	11131
181	Adapter Union, 7/8-14 M x 1/2 NPT F x 90°	11142
182	Adapter Union, 3/4-16 M x 3/8 NPT F x 90°	11143
183	Hose Clamp	14140



PARTS LIST - FIG 18

Index	Description	Part No.
197	Bolt, 5/16 NC x 2-1/2	6813
198	Nut, 5/16 NC	7431
199	HYD Street Elbow, 3/8 NPT x 90°	~~7861~~ 11179
200	Lockwasher, 5/16	8071
201	Cross-Over Relief, 1075 psi	10530
202	Hydraulic Hose, 3/8 NPT M x 3/8 NPT F x 20"	10885
203	Hydraulic Hose, 3/8 NPT M x 3/8 NPT F x 45"	10893
204	Adapter Union, 1/4 NPT M x 3/8 NPT F	11106
205	Adapter Union, 1/4 NPT M x 3/8 NPT F x 90°	11126
206	Adapter Union, 3/4-16 M x 3/8 NPT F x 90°	11143
207	Hose Clamp	14140

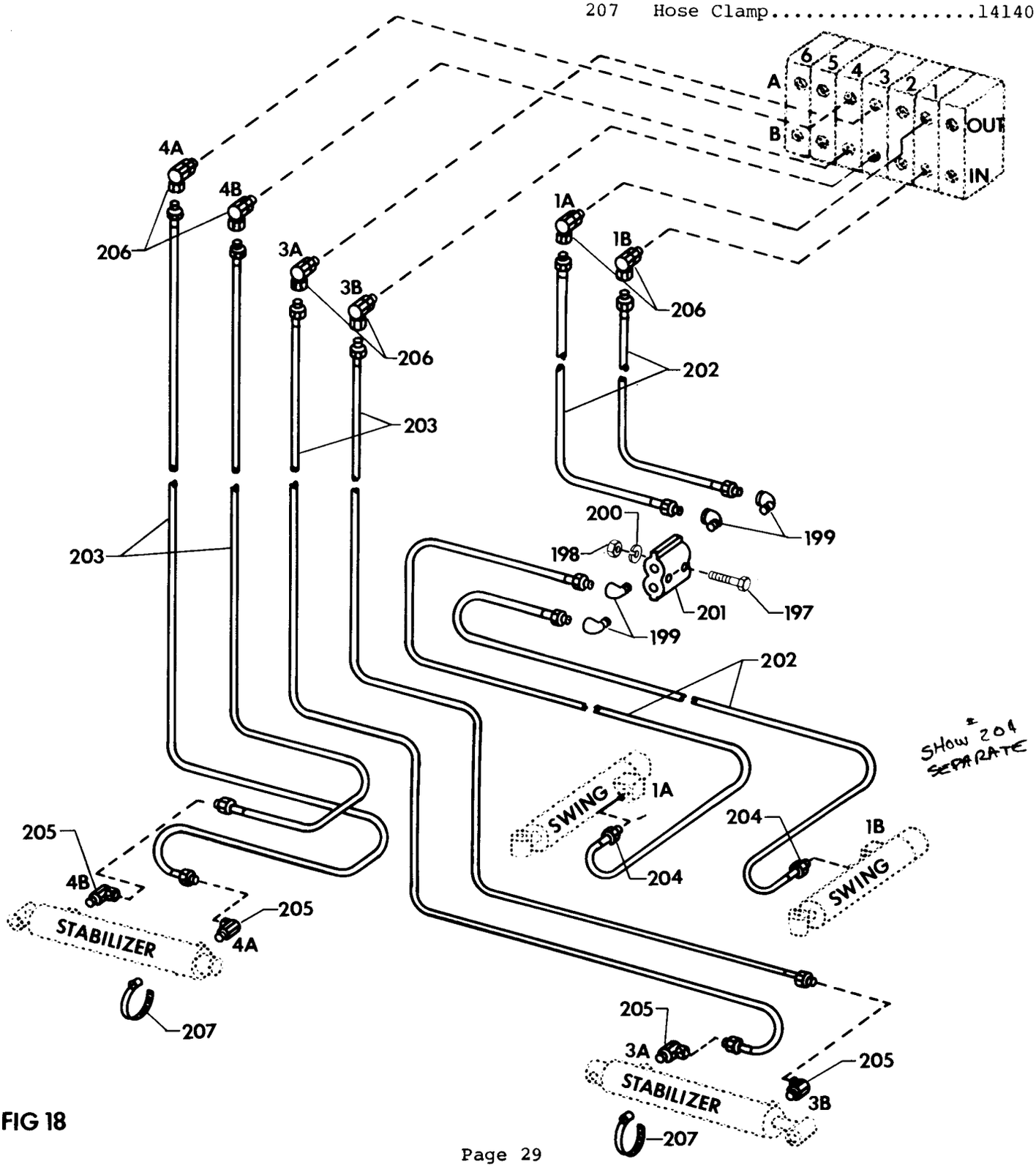
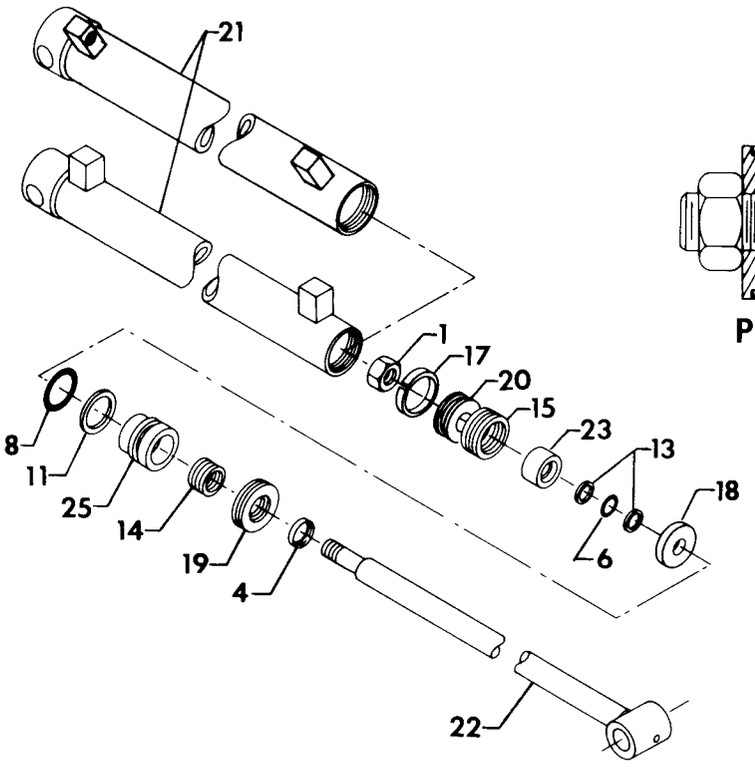
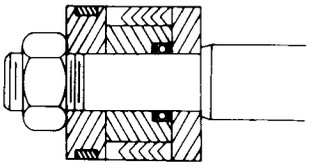


FIG 18

091 Cylinder
Lift and Crowd

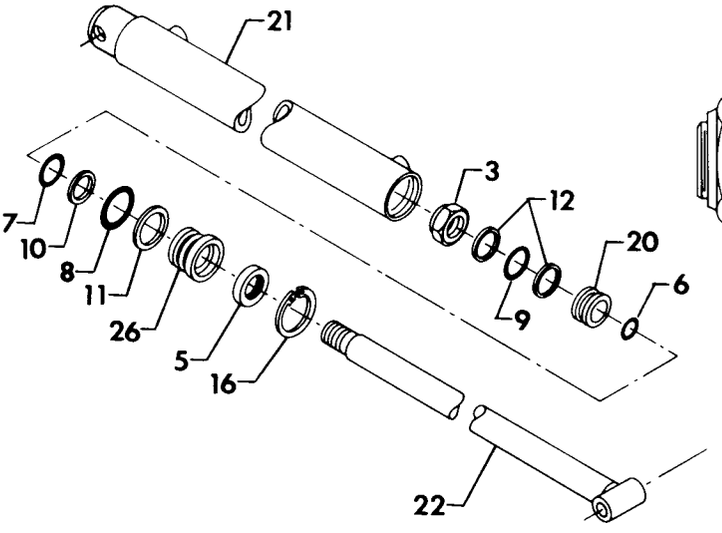
083 Cylinder
Bucket

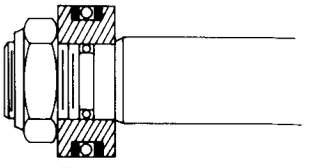




Proper Piston Assembly

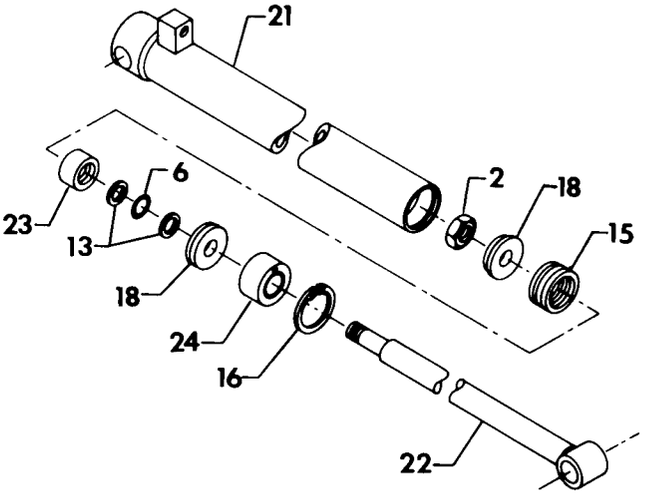
073 Cylinder
Stabilizer

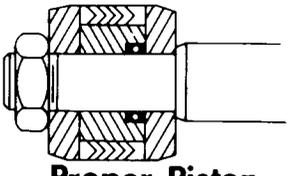




Proper Piston Assembly

092 Cylinder
Swing





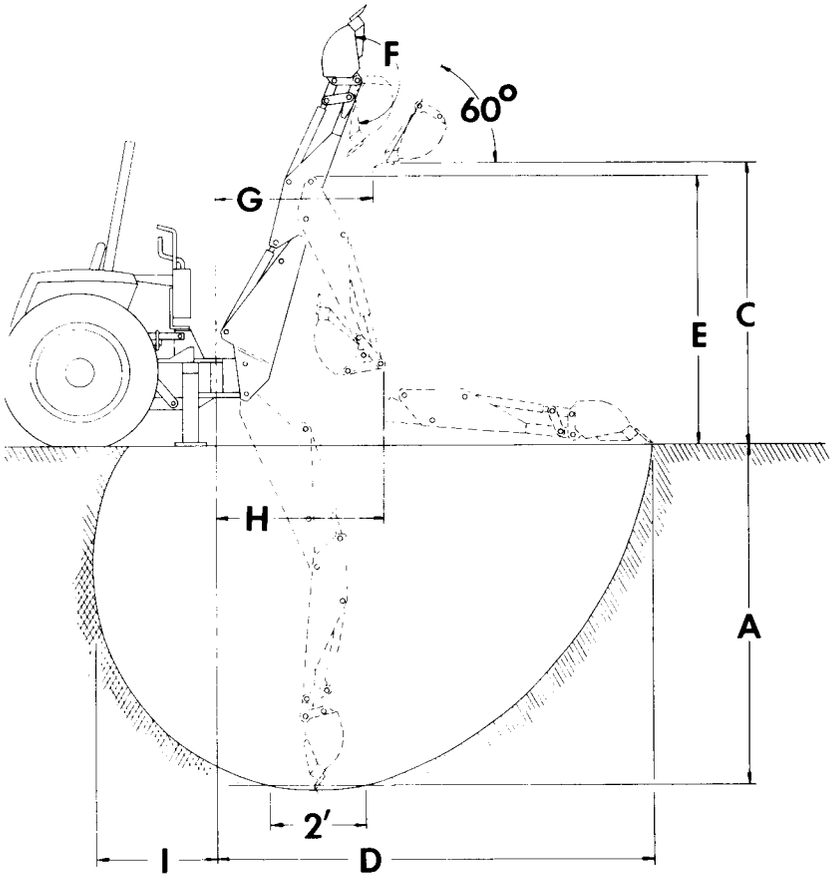
Proper Piston Assembly

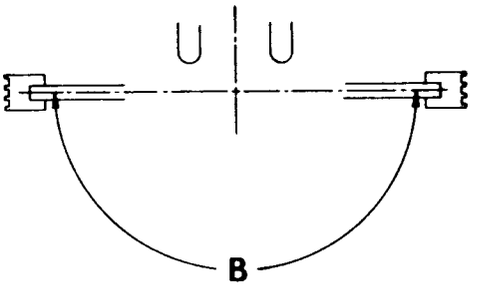
HYDRAULIC CYLINDERS - PARTS LISTS

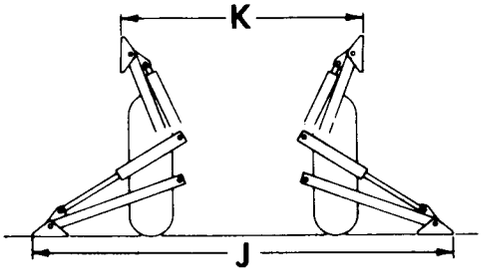
Index	Description	091:	083:	073:	092:
1	Lock Nut, 3/4 NF Nyloc.....	7574	7574		
2	Jam Nut, 3/4 NF Nyloc.....				7679
3	Jam Nut, 1" NF Nyloc.....			7712	
4	Oil Seal, 1-1/4 OD x 1" ID.....	*	*		
5	Oil Seal, 1-5/8 OD x 1-1/8 ID.....			*	
6	O-Ring, 1" OD x 3/4 ID.....	*	*	*	*
7	O-Ring, 1-3/8 OD x 1-1/8 ID.....			*	
8	O-Ring, 2" OD x 1-3/4 ID.....	*	*	*	
9	O-Ring, 2" OD x 1-5/8 ID.....			*	
10	Back-Up Ring, 1-3/8 OD x 1-1/8 ID.....			*	
11	Back-Up Ring, 2" OD x 1-3/4 ID.....	*	*	*	
12	Back-Up Ring, 2" OD x 1-5/8 ID.....			*	
13	Back-Up Ring, 1" OD x 3/4 ID.....	*	*		*
14	Packing Assembly, 1-3/8 OD x 1" ID.....	*	*		
15	Packing Assembly, 2" OD x 1-1/2 ID.....	*	*		*
16	Retaining Ring, Internal.....			*	13406
17	Wear Ring, 2" OD x 1-3/4 ID x 3/8.....	*	*		
18	Piston Washer.....	904467	904467		904052
19	Gland Nut.....	904053	904053		
20	Piston.....	904466	904466	904231	904567
21	Cylinder Tube Weldment.....	904550	904450	904365	904565
22	Piston Rod Weldment.....	904560	904460	904375	904570
23	Piston Spacer, with O-Ring and Back-Ups.....	904430	904430		
24	Rod Guide Assembly.....				904445
25	Gland, with O-Ring, Back-Up, and Packing.....	904540	904540		
26	Gland.....			904232	
	For Complete Cylinder, order.....	091	083	073	092
	Seal Repair Kit (includes all Packings, Wear Rings, O-Rings, Back-Up Rings, and Wipers for one cylinder).....	904485	904485	904260	904575

* Not available as a separate repair part - order seal repair kit.

SPECIFICATIONS
General Data:







A. Digging Depth.....7' 6"
(two foot flat bottom)

B. Swing Arc.....180°

C. Loading Height.....5' 10"
(bucket at 60°)

D. Reach from Center Line of
Swing Pivot.....9' 6"

E. Transport Height (maximum).....5' 9"

F. Bucket Rotation.....180°

G. Loading Reach.....3' 7"
(bucket at 60°)

H. Transport Overhang.....3' 6"

I. Undercut.....2' 6"

J. Stabilizer Spread,
down position.....7' 1"

K. Stabilizer Spread,
up position.....4' 2"

Maximum Lift Capacity -
full reach.....200 lbs.

Bucket Roll Force.....2400 lbs.

Bucket Pry-Out Force.....
.....in excess of 4000 lbs.

Shipping Weight
(less bucket).....780 lbs.

Hydraulic Volume
Requirements.....4 to 5 GPM

Hydraulic Pressure
Requirements.....1700 psi

SPECIFICATIONS

Bucket Data:

BUCKET	WIDTH	SAE STRUCK CAPACITY	HEAPED CAPACITY	SHIPPING WEIGHT
W209	9 in.	0.50 cu. ft.	0.63 cu. ft.	33 lbs.
W210	13 in.	0.75 cu. ft.	1.00 cu. ft.	39 lbs.
W211	16 in.	0.94 cu. ft.	1.25 cu. ft.	44 lbs.
W213	19 in.	1.13 cu. ft.	1.50 cu. ft.	53 lbs.
W214	24 in.	1.44 cu. ft.	2.00 cu. ft.	62 lbs.

Cylinder Data:

CYLINDER	PISTON DIA.	STROKE	RETRACTED LENGTH	EXTENDED LENGTH	ROD DIA.	PIVOT PIN DIA.	TYPE OF ACTION
*091 - BOOM	2	18-1/2	26-3/4	45-1/4	1	1	DA
*091 - DIPPERSTICK	2	18-1/2	26-3/4	45-1/4	1	1	DA
083 - BUCKET	2	13-1/8	20-5/8	33-3/4	1	1	DA
073 - STABILIZER	2	11-1/4	17	28-1/4	1-1/8	5/8	DA
092 - SWING	2	9-7/8	17-3/16	27-1/16	1	1	SA

* Identical cylinders used for both functions.

TORQUE VALUES

Common bolts and nuts. Tightening Torque ± 20%

SIZE	GRADE 2	GRADE 5	GRADE 8
1/4-20 NC	70 in lb	115 in lb	165 in lb
1/4-28 NF	85 in lb	140 in lb	200 in lb
5/16-18 NC	150 in lb	250 in lb	350 in lb
5/16-24 NF	165 in lb	270 in lb	30 ft lb
3/8-16 NC	260 in lb	35 ft lb	50 ft lb
3/8-24 NF	300 in lb	40 ft lb	60 ft lb
7/16-14 NC	35 ft lb	55 ft lb	80 ft lb
7/16-20 NF	45 ft lb	75 ft lb	105 ft lb
1/2-13 NC	50 ft lb	80 ft lb	115 ft lb
1/2-20 NF	70 ft lb	105 ft lb	165 ft lb
9/16-12 NC	75 ft lb	125 ft lb	175 ft lb
9/16-18 NF	100 ft lb	165 ft lb	230 ft lb
5/8-11 NC	110 ft lb	180 ft lb	260 ft lb
5/8-18 NF	140 ft lb	230 ft lb	330 ft lb
3/4-10 NC	150 ft lb	245 ft lb	350 ft lb
3/4-16 NF	200 ft lb	325 ft lb	470 ft lb

NOTE - See tractor instruction manual or your tractor dealer for tightening of metric bolts.

be careful.....
avoid accidents