JOHNSON

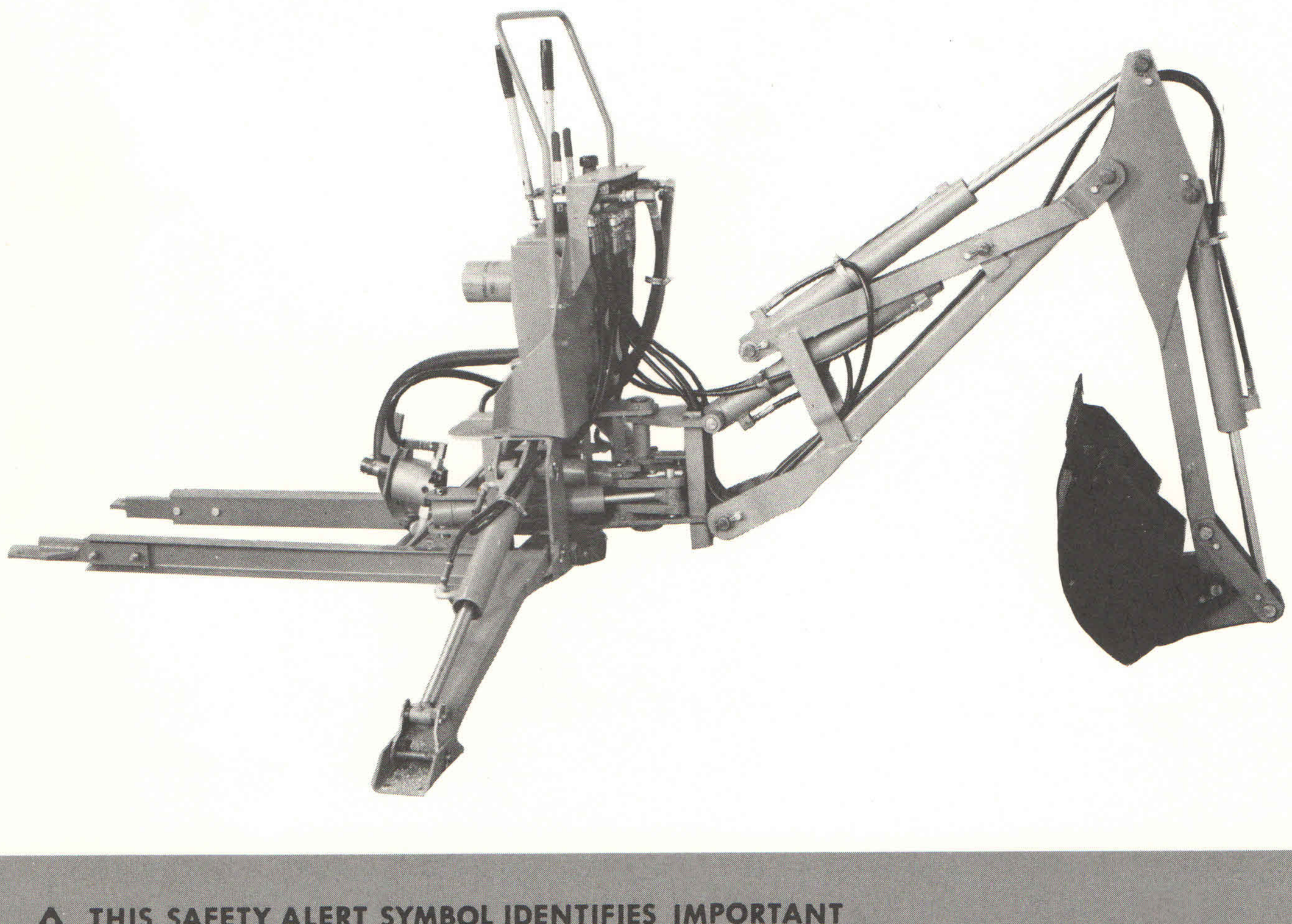
"Work Horse"®

series 710 backhoe

SERIAL NO. 1001 AND LATER

This Manual Includes:

W200 BASIC BACKHOE
W209 BUCKET, 9"
W210 BUCKET, 13"
W211 BUCKET, 16"
W212 BUCKET, 19"



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

FORM W200 278

purchase and service record:

contents:

Safety Precautions..... 1, 2

Operation..... 3 - 6

Service..... 7, 8

Hydraulic Trouble Shooting..... 9, 10

Removal and Storage..... 11

Hydraulic Valve Service..... 12 - 14

Parts Drawings and Parts Lists:

- Hose Diagram..... 15, 16
- Backhoe - Main Frame and Swing Frame..... 17, 18
- Backhoe - Boom, Dipperstick, and Bucket.... 19, 20
- Hydraulic Cylinders..... 21, 22

Specifications..... 23, 24

Warranty..... Back Cover

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.

PREPARATION -

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.

Be sure the area is clear of underground obstructions.

Position a barricade around the work area.

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

Keep all bystanders a safe distance away.

Decal, 9456 opposite, is located on the operator's console.

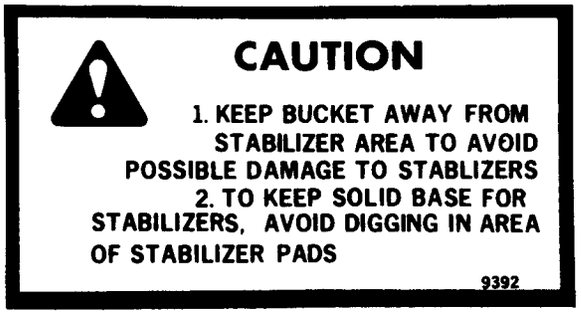
OPERATION -

Operate the backhoe from the operator's seat only.

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

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. The following decal is located on the operator's console:



Watch for overhead wires. Do not touch wires with any part of the backhoe.

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 before leaving the backhoe seat.

Never leave the tractor unattended with the engine running.

TRANSPORTATION -

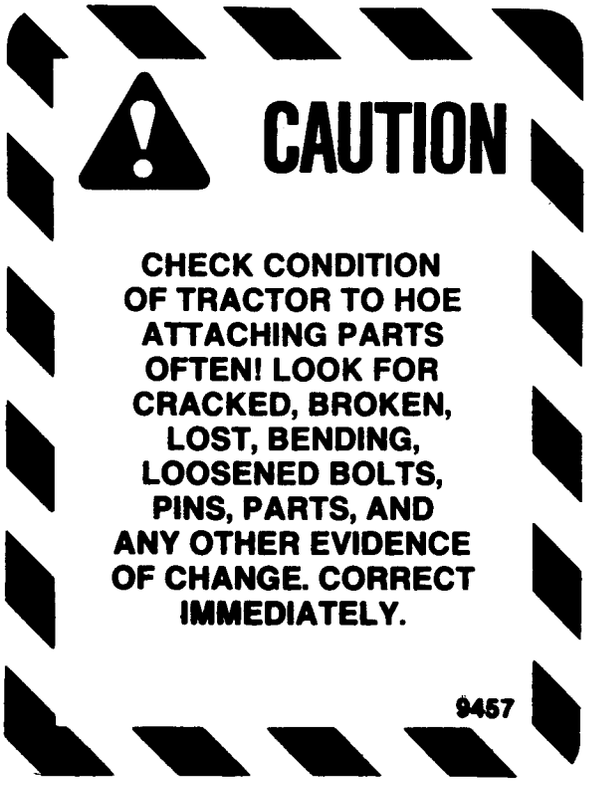
Do not drive the tractor near the edge of a ditch or excavation.

The rate of travel and the orientation of the backhoe on hillsides and curves should always be such that there is no danger of tipping.

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. The following decal is located on the operator's console:



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. The following decal is located on the operator's console:

OPERATION

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

1. Be sure area is clear of underground obstructions.
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 are determined from the position of the operator when seated in the operating position on the backhoe.

ENGINE SPEED -

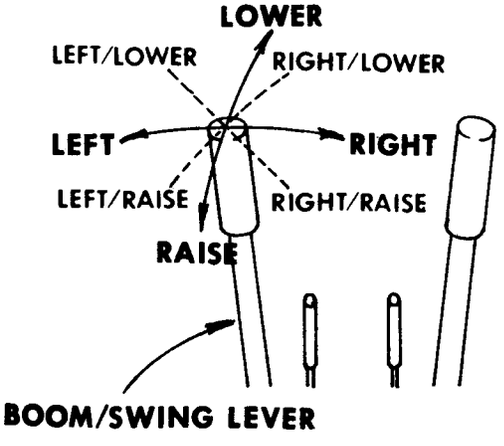
The speed at which the backhoe operates is partially dependent upon engine RPM. Use moderate engine speed to start and increase it as your experience permits.

CONTROLS -

The Model 712 Backhoe has two major control levers plus the stabilizer control levers. These controls are located on the control panel directly ahead of the operator. Following is a list of the controls with the function of each reading from left to right:

1. Boom/Swing:

The boom/swing control lever, shown below, controls four functions - raising or lowering the boom and swinging it to the left or right.



LOWER the boom by pushing the control lever forward. RAISE the boom by pulling lever back.

SWING LEFT by moving the lever left and SWING RIGHT by moving the lever to the right.

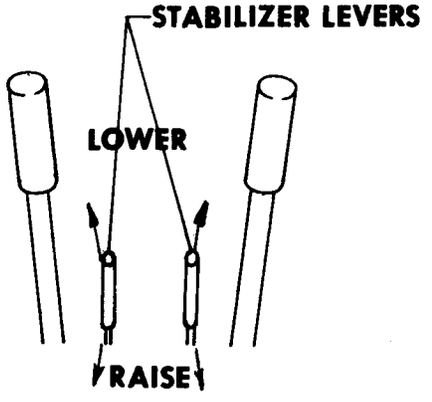
By moving the lever to one of the intermediate positions, the boom can be swung left or right at the same time it is being raised or lowered.

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:

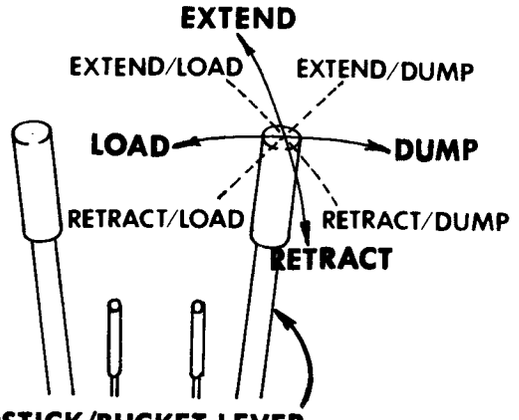
LOWER the LH stabilizer by pushing the control lever forward. RAISE the LH stabilizer by pulling lever back.

3. Right Hand Stabilizer:

LOWER the RH stabilizer by pushing the control lever forward. RAISE the RH stabilizer by pulling lever back.

4. Dipperstick/Bucket:

The dipperstick/bucket control lever, shown at the top of Page 4, controls four functions - extending or retracting the dipperstick and loading or dumping the bucket.



DIPPERSTICK/BUCKET LEVER

EXTEND the dipperstick by pushing the control lever forward. RETRACT it by pulling the lever back.

LOAD the bucket by moving the control lever to the left. DUMP it by moving the lever to the right.

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.

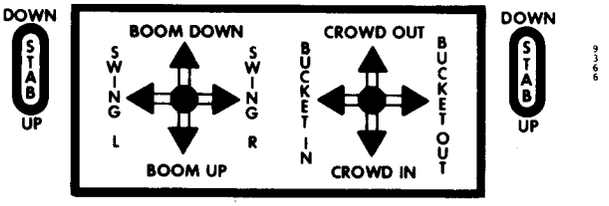
In general the direction of movement of a control lever corresponds to the movement of the operating member.

OPERATING THE BACKHOE -

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

1. Operate the backhoe from the operator's seat only.
2. Lower the stabilizers until the rear of the tractor is totally supported by them.
3. Do not dig near the stabilizers.
4. Do not touch overhead wires with any part of the backhoe.
5. Do not attempt to raise the tractor off the ground or move the tractor forward or backward using the backhoe dipperstick or bucket.
6. Do not lose stability by swinging the bucket downhill when positioned on a slope.

It is not difficult to become an efficient operator. A control lever operating decal is located behind the control levers. Study this decal; it will help you to become familiar with the controls.



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

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

IMPORTANT - To avoid damage to the backhoe, do not slam the 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 become common practice to operate two controls at one time. For example; with the bucket extended and the dipperstick extended, the lift control and the dipperstick control can be operated together to bring the bucket toward the operator with down pressure on it. As the dipperstick approaches the operator,

the dipperstick and bucket controls can be operated to close the bucket and trap the material. At the end of the stroke, the dipperstick and the boom controls can be operated to move the bucket up and away, to save time clearing the excavation.

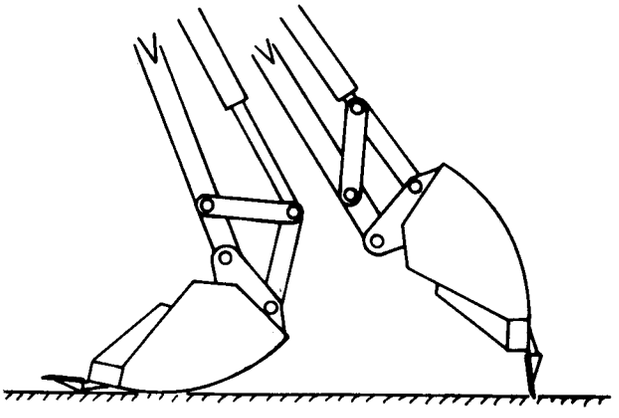
The dual operation of controls will speed and simplify the digging operation. Normally, the two or more movements will not be equal or even simultaneous, but as the pressure within cylinders change, and the resistance on an operating member of the hoe lessens, it will begin to move. It is balancing the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

DIGGING METHODS -

Two digging methods, bucket digging and dipperstick digging, can be used. Ground conditions and type of bucket being used will determine the best method.

1. Using The Bucket To Dig:

Lower the bucket to the digging area, with bucket pivot 18 to 24 inches forward of the boom/dipper pivot, see diagram. Using down pressure on the bucket bottom, force the bucket into the ground.



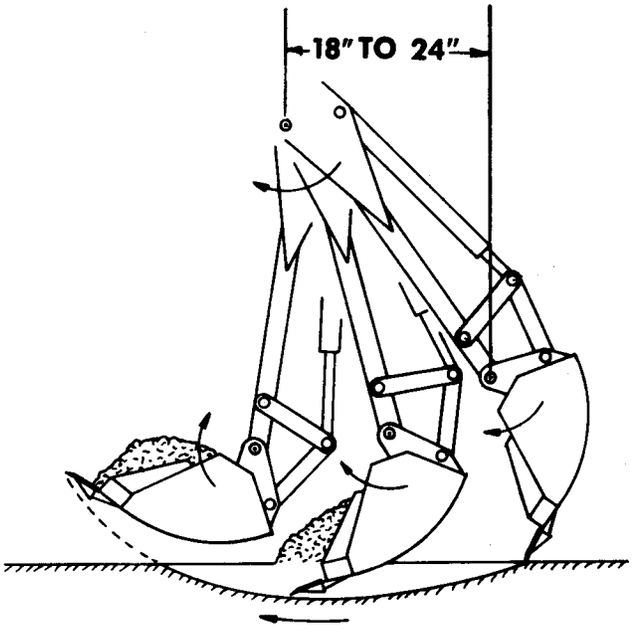
BUCKET TOO FAR FORWARD

BUCKET TOO FAR BACK

It is important for the bucket to be in the proper position when starting to dig. Never attempt to dig with the bucket in the wrong position - too far forward or too far back - as shown.

With the bucket in the ground, simultaneously retract the dipperstick and load the bucket until it is full.

If the bucket stalls, raise the boom slightly and continue to dig until the bucket is full.



Raise the bucket to the top of the trench and dump it on the spoil pile. With a little practice, raising, swinging, and dumping can be accomplished in one smooth operation.

When loading high, continue rolling the bucket, as it is being raised, to prevent spilling the contents.

2. Using The Dipperstick To Dig:

Lower the bucket to the digging area, with bucket pivot 18 to 24 inches forward of the boom/dipper pivot, see diagram. Rotate the bucket until the cutting edge teeth are flat on the ground.

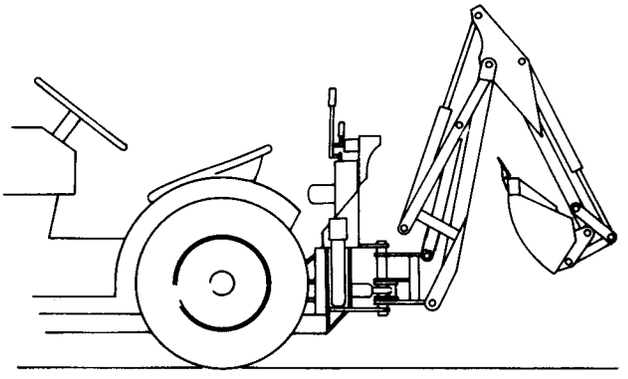
Using only the dipperstick cylinder, retract the dipperstick, dragging the bucket through the trench until it is about half full. Begin to roll the bucket while you continue to retract the dipperstick,

Raise the bucket and swing the boom until the bucket can be dumped in the spoil area.

TRANSPORTING THE BACKHOE -

CAUTION - To avoid possible injury, observe the following safety rules when transporting the backhoe:

1. Travel slowly over rough terrain, on hillsides, and around curves to prevent tipping.
2. Do not drive the tractor near the edge of a ditch or excavation.
3. Use accessory lights and SMV emblem when traveling on highways.



Before mounting tractor, position the backhoe for transport by raising boom, crowding dipperstick in, curling bucket in, and raising the stabilizers, as shown.

When transporting for long distances, periodically examine the backhoe and raise it 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. Do not oil, grease, or adjust the backhoe while it is in motion.
2. Do not change any backhoe relief valve settings. They are factory set for best backhoe performance and safety.
3. 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.
4. 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.
5. See a doctor at once if injured by escaping fluid. Serious infection or reaction can develop if proper medical treatment is not administered immediately.
6. 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 replace if necessary.

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

Lubricate all grease fittings and oil handle linkage.

Tighten all loose bolts, nuts, and setscrews.

Inspect bucket teeth and sharpen or replace them if necessary.

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 prevent 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 -

Maintain the reservoir fluid level at 2-1/2 inches below the tank top when the bucket is extended to full reach, bucket rolled back for loading and resting on the ground, stabilizers fully raised. Do not over-fill, fluid may be forced out of the breather filler cap.

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.

HYDRAULIC SYSTEM FILTER -

Use any good quality automotive filter:

AC.....PF2
APCO.....KF-1/APH-8A

FRAM.....PH8A
HASTING.....P115
NAPA.....1015
PUROLATOR.....PER-1
WIX.....PC-15

Change filter every time oil is changed.

HYDRAULIC SYSTEM PRESSURE -

The hydraulic system is set to operate up to 1500 PSI by the relief valve in the backhoe control valve.

⚠ CAUTION - Never adjust the relief valve setting to above 1500 PSI. The backhoe becomes unstable and could upset the tractor causing injury and equipment damage.

BUCKET TOOTH POINTS -

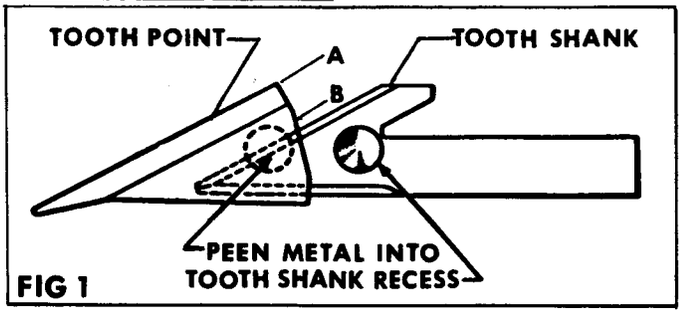


FIG 1

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, Fig 1.

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.

Regularly (daily when hoe is new) check the four bolts that hold the top bearing plate to the frame channel. Bolts are located under the reservoir. Keep these bolts torqued to 140 ft lbs, Fig 2.

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

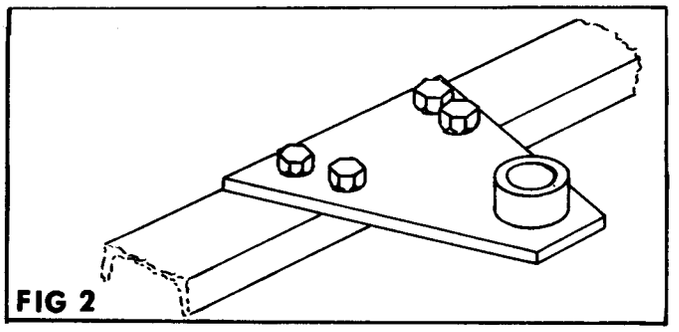


FIG 2

LUBRICATION -

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 3 for the location of all grease fittings; each swing cylinder: three on rod end and one on base end, each stabilizer cylinder: one on rod end and one on base end.

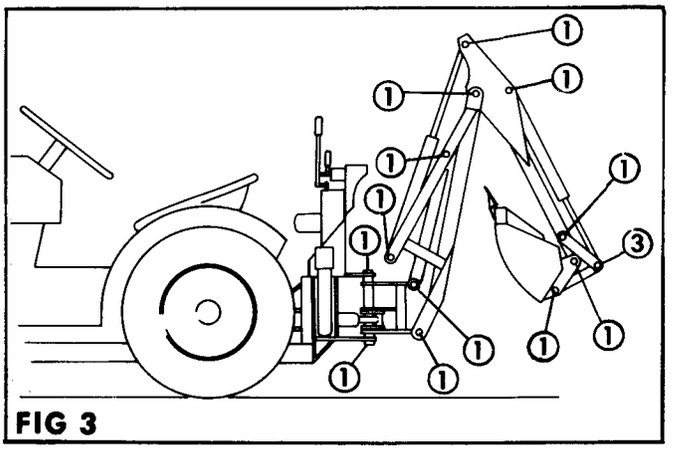


FIG 3

The following locations should be oiled with SAE 30 oil:

1. Control valve handle linkage.
2. Stabilizer leg pivots.

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

HYDRAULIC TROUBLE SHOOTING

PROBLEM:	POSSIBLE CAUSE -	AND CORRECTION:
Backhoe fails to lift or swing:	Low oil supply.....	add oil.
	Pump not running.....	engage PTO drive.
	Improper hose hook-up.....	check hydraulic diagram and reinstall hoses properly.
	Worn control valve section.....	replace section.
	Pump damaged or worn.....	replace pump.
	Broken hydraulic line.....	check for leaks and replace line.
	Faulty relief valve.....	clean or replace valve.
	Lift or swing restrictors improperly assembled.....	assemble correctly.
	Jammed swing linkage.....	remove interference.
	Bent piston rod.....	replace or repair cylinder.
Backhoe lifting or swinging too slowly:	Cold oil.....	warm oil with engine at idle.
	Engine speed too slow.....	open throttle.
	Oil leaking past control valve.....	replace or repair worn section.
	Oil too heavy.....	use recommended oil.
	Scored cylinder.....	replace cylinder.
	Pump damaged or worn.....	replace or repair pump.
	Oil leaking past cylinder packings.....	replace packings.
	Pinched supply hose.....	replace hose, route to prevent kinking or pinching.
Backhoe fails to hold up load; note - all loads will settle down over a period of time, this is normal.	Broken hydraulic lines.....	check for leaks and replace line.
	Oil leaking past cylinder packings.....	replace packings.
	Oil leaking past control valve.....	replace or repair worn section.
Oil heating:	Dirty oil.....	drain oil, replace filter, and refill.
	Control valve handle held open too long.....	return control handle to neutral position when not in use.

PROBLEM:	POSSIBLE CAUSE - AND CORRECTION:
Oil heating - continued	Oil too light in hot weather.....use recommended oil. Engine running too fast....reduce throttle. Damaged hydraulic lines....replace damaged lines.
External leakage:	Damaged O-rings between valve sections.....repair control valve. Damaged O-rings on valve spools.....repair control valve. Cylinder seals damaged.....repair cylinder. Broken hydraulic line.....check for leaks and replace line.
Swing cylinder malfunctioning:	Oil leaking past packing or seals.....replace packing or seals. Swing restrictors improperly assembled.....assemble correctly. Faulty cross-over relief valve.....clean or replace.
Control valve sticking or working hard:	Scored bore or bent spool.....replace valve section. Control linkage misaligned.....correct misalignment. Return spring binding or broken.....replace spring. Foreign matter in spool bore.....clean valve. Dirty oil.....drain oil, replace filter, and refill.
Spongy or jerking action of cylinders and/or very noisy pump action:	Low oil supply.....add oil. Cold oil too stiff.....use recommended oil. Air in system.....purge system of air by operating machine at maximum oil flow and through full movements. Pinched suction line to pump.....replace hose, route to prevent kinking or pinching.

REMOVAL AND STORAGE

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

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

2. Move the boom and dipperstick, with or without bucket, to a near vertical position, see drawing. Rest the dipperstick, with a little down force, solidly on the floor.

3. Place blocking under the frame at (A) to support the hoe. The round cross-shaft should be aligned with the hooks as shown at (B).

4. Remove two bolts at (C). Move the tractor a few inches away from the hoe. To facilitate this procedure the hoe can still be hydraulically; raised, lowered, or moved to release the connection points of the carrying force.

5. With the hoe supported by blocking at (A), drop the frame about an inch at (D) by increasing the boom down pressure. Add blocking (E) under the swing frame.

6. Leave the stabilizers firmly in contact with the floor for added stability. The dipperstick should remain on the floor.

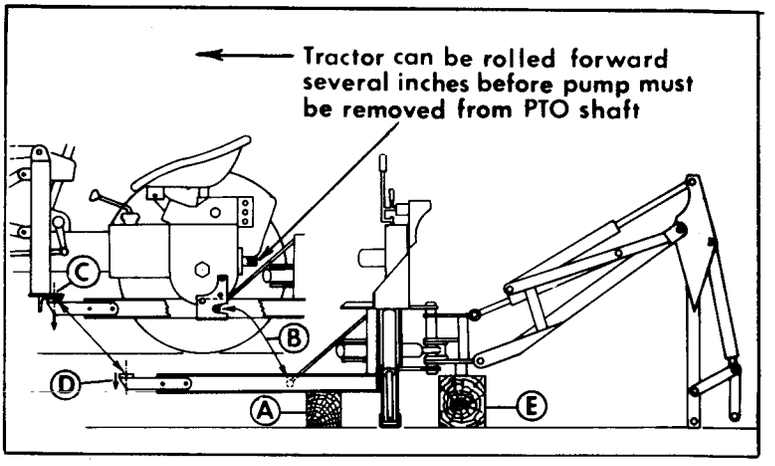
7. The hydraulic system can now be deactuated. Remove the pump from the PTO shaft. Hoses and oil lines will not be disconnected during correct removal and storage procedure. The hydraulic system should always remain complete.

8. Slowly drive the tractor forward, away from the backhoe. Be careful that all parts clear during separation and the backhoe remains solidly supported by blocking.

9. The seat adapter can remain in place on the tractor.

10. Refer to the attaching kit instructions for help with the removal and reattaching.

11. Reverse this procedure to reattach backhoe. Do not remove any blocking or raise the dipperstick or stabilizers until the round cross-shaft is in place on the hooks at (B) and the hoe is bolted to the loader at (C).



END OF THE SEASON -

If disconnected install caplugs on any pressure and return hoses to prevent contamination of the hydraulic fluid system.

Drain hydraulic system and replace with new hydraulic fluid. Replace the hydraulic filter.

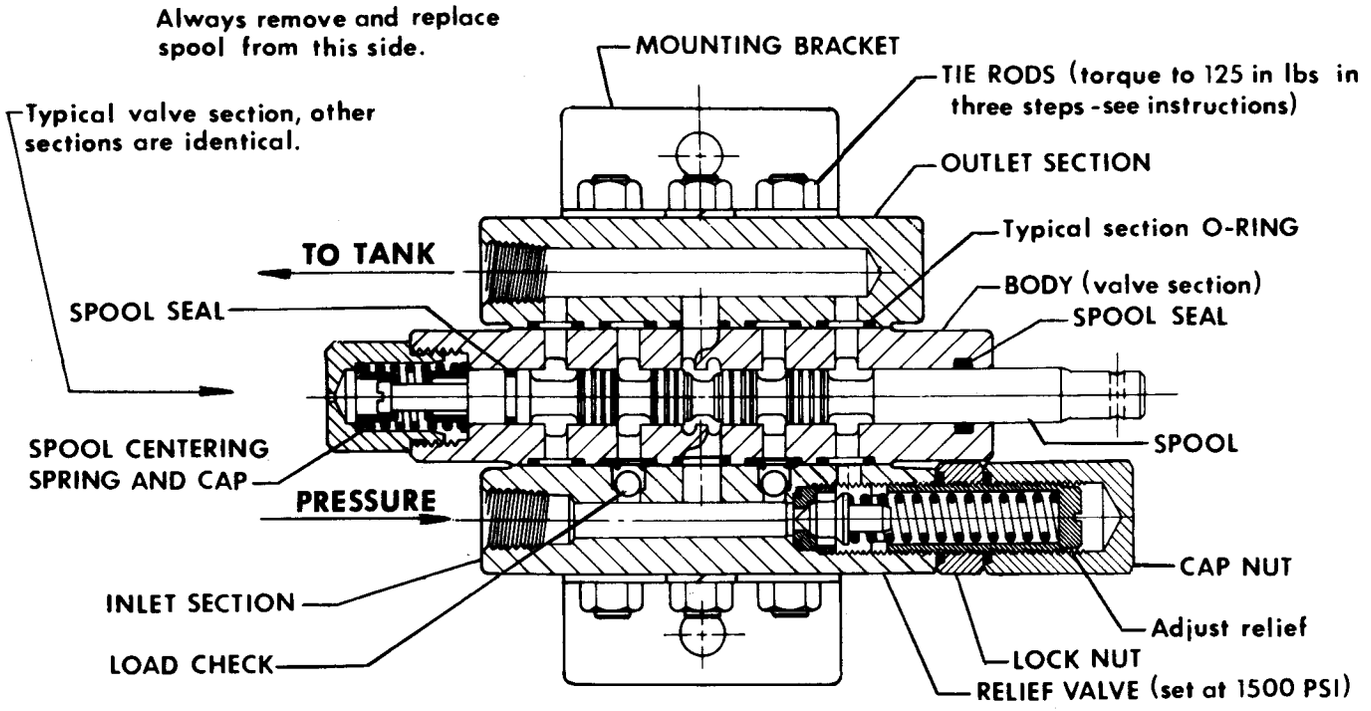
Coat the exposed piston rods of all hydraulic cylinders with a grease or corrosion preventive.

Lubricate all grease fittings and oil all pivots requiring oil; control handle linkage and stabilizer pivot pins.

Clean the exterior of the unit to remove all dirt, grease, and any other foreign material. To prevent rust touch up painted surfaces that have been scratched or chipped.

If possible, store the backhoe in a dry, protected place. If it is necessary to store the backhoe outside cover it with a protective material.

HYDRAULIC VALVE SERVICE



DISASSEMBLY -

1. Remove the valve from the backhoe and clean the exterior thoroughly.

2. Before progressing further, be sure the work area is very clean.

3. Remove nuts, mounting bracket, and washer from inlet end of valve.

NOTE - When removing the inlet section which will have load checks, watch for the check balls. They will fall free from the inlet section when removed. Remove ball retainers from the inlet side of the first valve section too.

4. Remove the inlet section. Between the inlet, each center section and the outlet, are three (3) mylar shims, one over each tie rod. Keep these shims, they will be needed during assembly.

5. Remove valve sections, one at a time, removing O-rings and mylar shims between each section.

6. After all valve sections are removed, detach stabilizer handle assemblies from sections two and five.

7. Remove the spring cap from the valve section.

8. Remove the spool from the body. Push spool on handle end, remove from spring cap end. Keep body and spool together, they are a matched set. Do NOT interchange.

9. Remove O-ring from inside bore on handle end of body.

10. To remove the O-ring on the spool, remove the spring centering assembly, then remove the O-ring.

11. Wash all parts in clean solvent, then dry with a low pressure air hose.

ASSEMBLY -

1. Inspect all parts before assembly. Remove any nicks or burrs from body and spool. Remove pipe sealant from ports. Replace any parts or components that are worn or damaged.

2. Lubricate all O-rings with clean hydraulic system oil. Note, it is wise to use all new O-rings.

3. Replace O-ring on handle end of body. Be sure O-ring is not twisted in groove.

4. Replace O-ring on spool making sure it is not twisted.

5. Replace spring centering assembly on end of spool. Torque to 30 in lbs.

6. Lubricate spool with clean hydraulic system oil. Place spool in its bore with a slight twisting action, this will prevent the possibility of O-ring shearing.

NOTE - No O-ring is used on the centering spring cap.

7. Replace the centering spring cap.

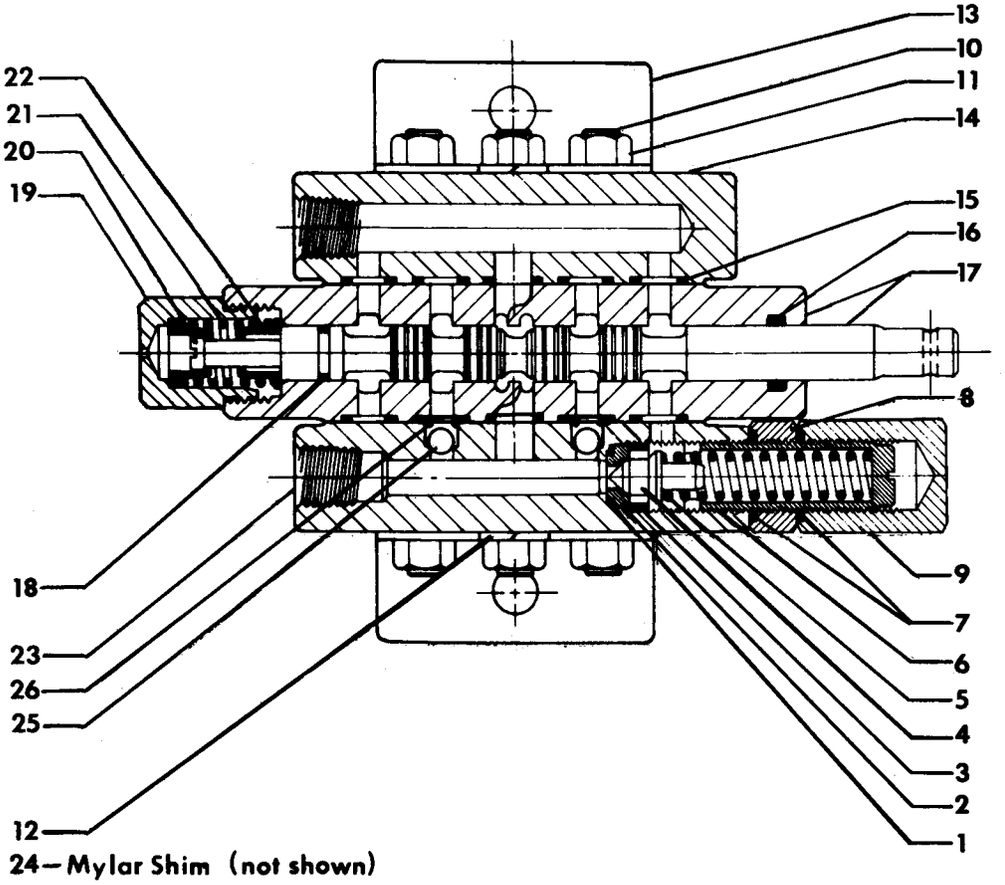
8. Replace the handle assemblies on sections two and five for stabilizers.

9. Install one nut on each tie rod. Place two tie rods through the mounting bracket. Place one flat washer on the third tie rod. Push the tie rods through the outlet section. An aid in assembling sections is to place the mounting bracket in a vice or on the edge of a flat surface with the tie rods in a vertical position. Replace O-rings on outlet section. Place one mylar shim over each tie rod and push them down onto the outlet sections. Install a valve section over the tie rods. Place the O-rings and mylar shims on this section. Replace remaining sections as above.

10. Installation of load checks; before installing O-rings in the section next to the inlet place the ball retainers, with center prongs up, in the flow passages on both sides of the center flow passage. Do not place retainers in the two outside passages. Place O-rings in the counter-bores. Place the mylar shims, one over each tie rod, on the section. Then stand the ball on the retainers.

11. Install the inlet section. Place the mounting bracket over the lower tie rods and install the two nuts. Place the flat washer over the top tie rod and install the nut.

12. Torque the tie rods in three steps of; 75 in lbs, 100 in lbs, and finally 125 in lbs each.



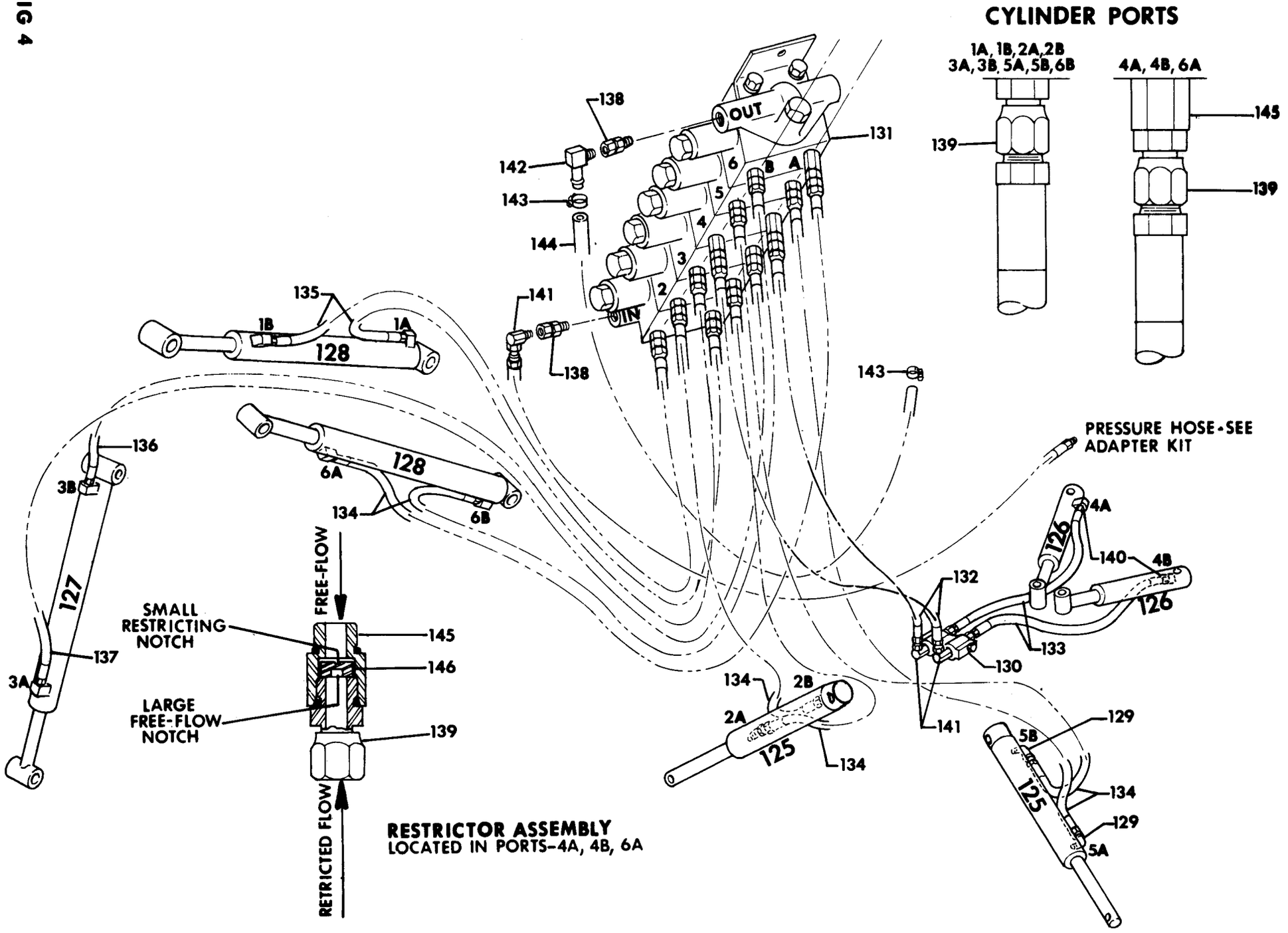
24—Mylar Shim (not shown)

Hydraulic Valve – Parts List:

Index	Quantity	Description	Part No.
1	1 per valve	O-Ring	*
2	1 per valve	Seat	*
3	1 per valve	Retainer	*
4	1 per valve	Poppet	*
5	1 per valve	Spring	*
6	1 per valve	Adjusting Screw	*
7	2 per valve	O-Ring	*
8	1 per valve	Lock Nut	*
9	1 per valve	Cap Nut	*
10	3 per valve	Tie Rod, Six-Spool	10237
11	6 per valve	Nut, 5/16 NC	7431
12	2 per valve	Washer, 5/16 SAE	8152
13	2 per valve	Bracket	10238
14	1 per valve	Outlet	10239
15	5 per section	O-Ring	**
16	1 per section	O-Ring	**
17	6 per valve	Body and Spool (matched)	*
18	1 per section	O-Ring	**
19	1 per section	Spring Cap	10240
20	1 per section	Spring Shaft	10241
21	1 per section	Spring	10242
22	2 per section	Spring Guide	10243
23	1 per section	Inlet with Relief, set at 1500 PSI	10244
24	3 per section	Mylar Shim	**
25	2 per valve	Load Check Ball	**
26	2 per valve	Load Check Retainer	**
[redacted]			
	1 per section	Section Seal Kit, consisting of: parts 15, 16, 18, 24	10370
	1 per valve	Load Check Kit, consisting of: parts 25, 26	10371
	6 per valve	Valve Section Complete	10246
	1	Six-Spool Valve Complete	10470

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

FIG 4


CYLINDER PORTS
1A, 1B, 2A, 2B
3A, 3B, 5A, 5B, 6B
4A, 4B, 6A
139
145
139
OUT
IN
131
138
142
143
144
141
138
135
1B
1A
128
143
PRESSURE HOSE - SEE ADAPTER KIT
136
3B
127
3A
137
6A
128
6B
134
FREE-FLOW
SMALL RESTRICTING NOTCH
145
146
LARGE FREE-FLOW NOTCH
139
RETRICTED FLOW
RESTRICTOR ASSEMBLY
LOCATED IN PORTS-4A, 4B, 6A
4A
126
140
4B
126
132
133
130
134
2B
2A
125
134
141
129
5B
125
134
129
5A

PARTS LIST - FIG 4:

Index	Description	Part No.
125	Hydraulic Cylinder, 2" Dia....	073
126	Hydraulic Cylinder, 2" Dia....	082
127	Hydraulic Cylinder, 2" Dia....	083
128	Hydraulic Cylinder, 2" Dia....	084
129	Street Elbow, 1/4 NPT x 90°	7813
130	Cushion Valve, 1000 PSI.....	10469
131	Hydraulic Control Valve, Six-Spool, 1500 PSI.....	10470
132	Hydraulic Hose, 1/4 NPT x 3/8 NPT x 13".....	10854
133	Hydraulic Hose, 1/4 NPT x 3/8 NPT x 20".....	10869
134	Hydraulic Hose, 1/4 NPT x 1/4 NPT x 42".....	10870
135	Hydraulic Hose, 1/4 NPT x 1/4 NPT x 65".....	10871
136	Hydraulic Hose, 1/4 NPT x 1/4 NPT x 92".....	10872
137	Hydraulic Hose, 1/4 NPT x 1/4 NPT x 108".....	10873
138	Adapter Union, 9/16-18 O-Ring x 3/8 NPT.....	11091
139	Adapter Union, 9/16-18 O-Ring x 1/4 NPT.....	11092
140	Adapter Union, 1/4 NPT x 1/4 NPT.....	11103
141	Adapter Union, 3/8 NPT x 3/8 NPT x 90°.....	11127
142	Insert Adapter, 3/8 NPT x 1/2 Hose Barb x 90°.....	11260
143	Hose Clamp, 9/16 - 1-1/16...	14120
144	Return Hose, 1/2 ID x 32".....	605417
145	Restrictor Housing.....	855168
146	Oriface Plate.....	855169

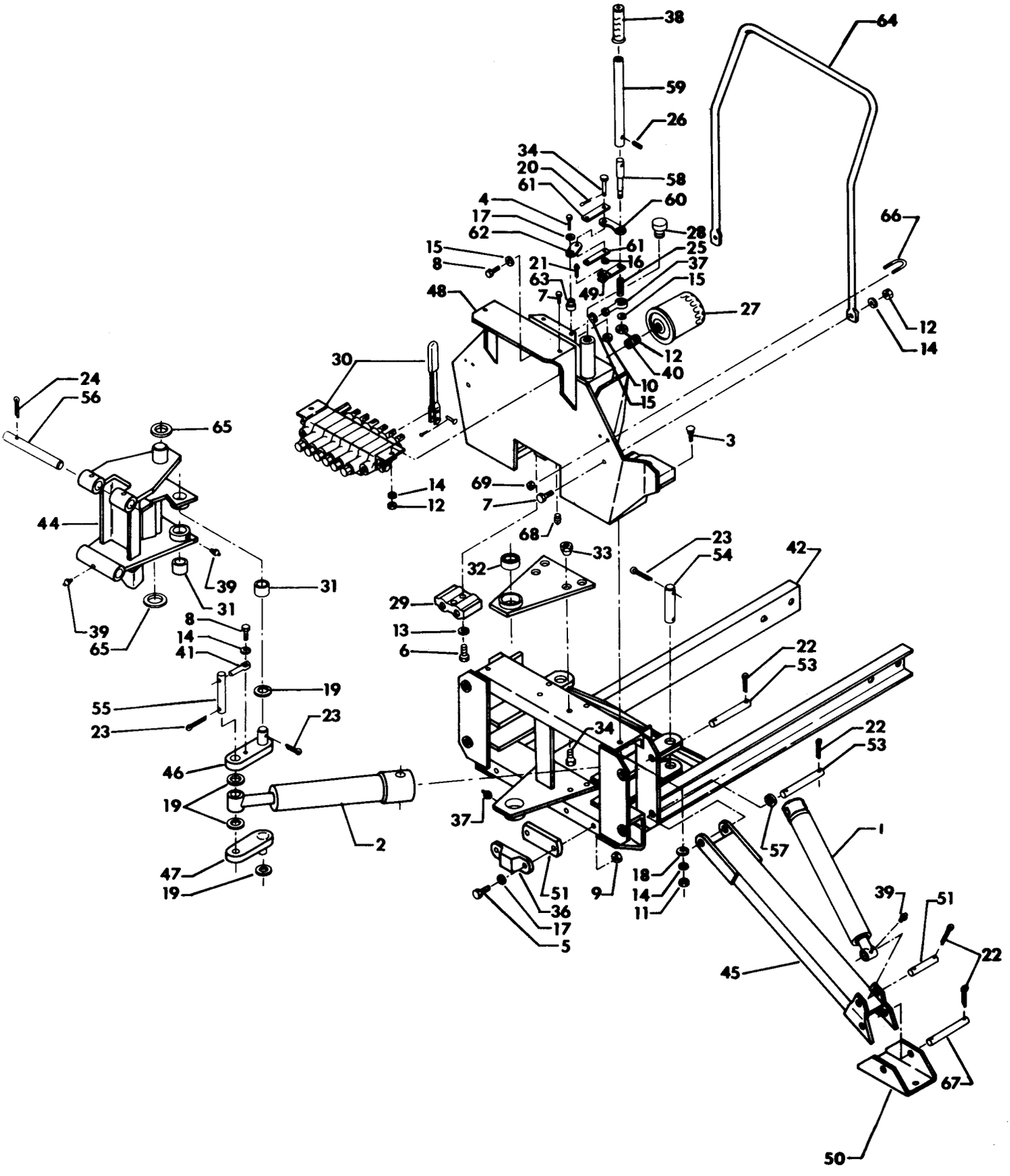

38
64
59
26
34
20
61
58
4
60
17
62
28
66
15
61
25
8
21
16
37
63
49
15
7
48
27
12
14
12
40
30
10
15
24
56
65
3
14
69
12
7
44
68
23
54
42
32
33
39
31
29
31
39
8
65
14
41
13
6
22
53
19
55
23
23
34
22
53
46
19
37
2
57
1
47
19
18
14
11
9
51
36
17
5
39
51
45
22
67
50

FIG 5

PARTS LIST - FIG 5:

Index	Description	Part No.
1	Hydraulic Cylinder, 2" Diameter	073
2	Hydraulic Cylinder, 2" Diameter	082
3	Carriage Bolt, 3/8 NC x 1"	6608
4	Bolt, 5/16 NF x 1-1/2	6802
5	Bolt, 5/16 NC x 1-3/4	6805
6	Bolt, 5/16 NC x 2"	6810
7	Bolt, 3/8 NF x 7/8	6838
8	Bolt, 3/8 NF x 1"	6851
9	Lock Nut, 5/16 NC	7433
10	Lock Nut, 5/16 NF	7437
11	Nut, 3/8 NC	7451
12	Nut, 3/8 NF	7461
13	Lockwasher, 5/16	8071
14	Lockwasher, 3/8	8079
15	Lockwasher, 3/8 Shakeproof	8081
16	Flat Washer, 1/4	8146
17	Flat Washer, 5/16	8151
18	Flat Washer, 3/8	8156
19	Machinery Bushing, 1-1/2 OD x 1" ID x 18 ga	8283
20	Cotter Pin, 3/32 x 3/4	8554
21	Cotter Pin, 9/64 x 1", Hardened	8571
22	Cotter Pin, 3/16 x 1-1/4	8582
23	Cotter Pin, 1/4 x 1-1/2	8602
24	Cotter Pin, 5/16 x 2-1/2	8614
25	Spring, 7/16 ID x 16 ga x 1-3/4	8711
26	Roll Pin, 3/16 x 1"	8966
27	Oil Filter	10372
28	Breather	10385
29	Cushion Valve, 1000 PSI	10469
30	Six-Spool Valve, 1500 PSI	10470
31	Bronze Bearing, 1-1/4 OD x 1" ID x 1"	11993
32	Bronze Bearing, 1-3/4 OD x 1-1/2 ID x 1"	11994
33	Wheel Nut, 9/16-18	13148
34	Wheel Bolt, 9/16-18 x 1-1/8	13200
35	Clevis Pin, 1/4 x 7/8	13436
36	Bumper	13681
37	Ball Joint	14029
38	Handle Grip	14067
39	Grease Fitting, 1/4 Self-tapping	14505
40	Filter Nipple	659527
41	Pin Retainer	851122
42	Main Frame Weldment	855000
43	Pivot Plate Assembly	855015
44	Swing Frame Weldment	855025
45	Stabilizer Weldment	855075
46	Upper Swing Link Weld	855085
47	Lower Swing Link Weld	855090
48	Reservoir Weldment	855100
49	Yoke Link Weldment	855125
50	Stabilizer Pad	855141
51	Bumper Spacer	855143
52	Pin, 5/8 Dia. x 3-1/2	855144
53	Pin, 5/8 Dia. x 5-7/8	855146
54	Pin, 1" Dia. x 4-1/4	855147
55	Pin, 1" Dia. x 4-1/4	855148
56	Pin, 1" Dia. x 7-1/8	855153
57	Flat Washer, 5/8 SAE	8183
58	Handle Base	855158
59	Handle Pipe	855159
60	Cross Link	855161
61	Center Link	855162
62	Pivot Link	855163
63	Spacer, 5/8 OD x 21/64 ID x 7/8	855164
64	Handle Loop	855167
65	Thrust Washer	855171
66	U-Bolt, with nuts	14002
67	Pin, 5/8 Dia. x 4-15/16	855174
68	Pipe Plug, 1/4 NPT	7795
69	Nut, 1/4 NC	7401

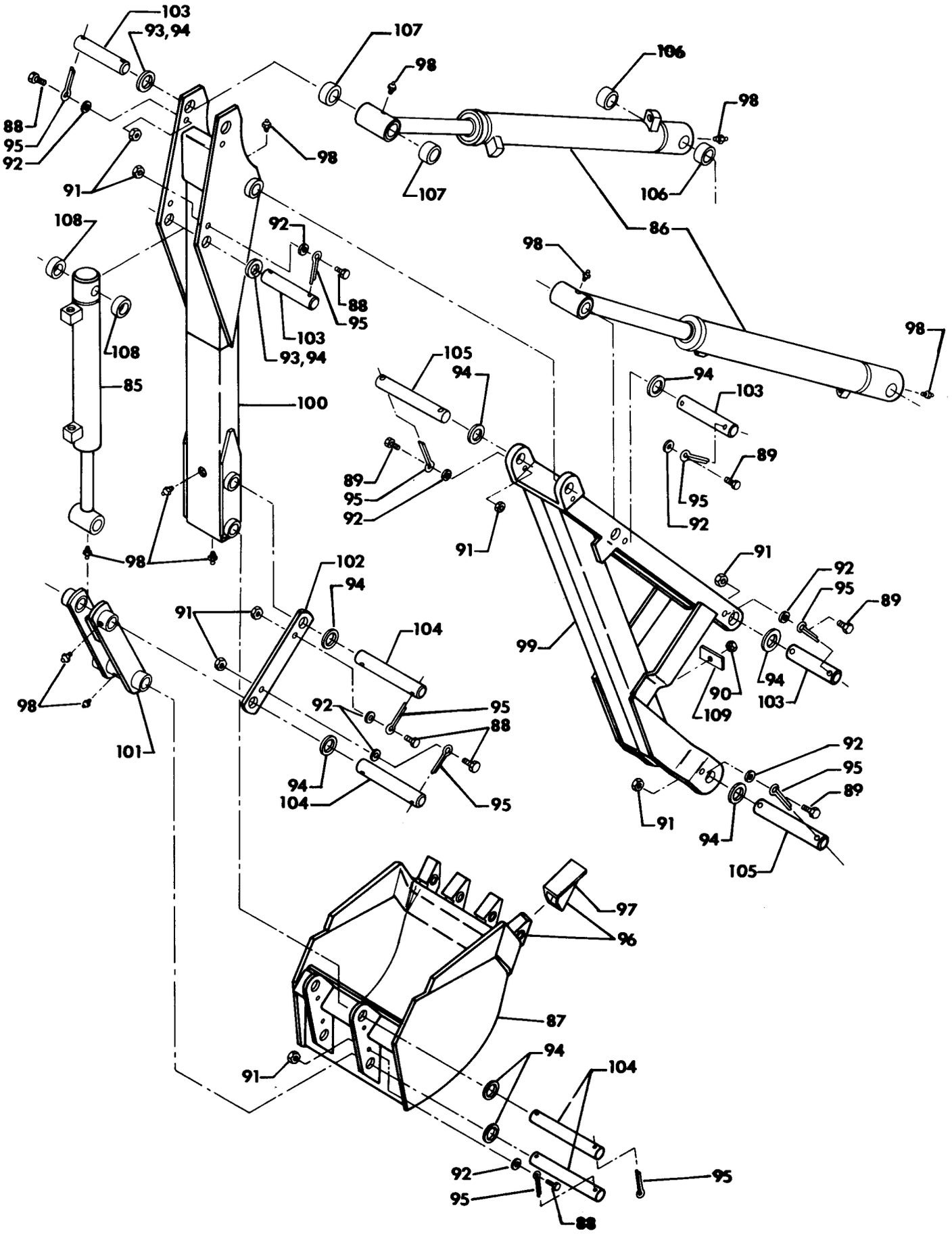

103
93,94
107
98
106
88
95
92
91
108
86
85
100
105
94
89
102
104
99
90
109
101
97
96
87

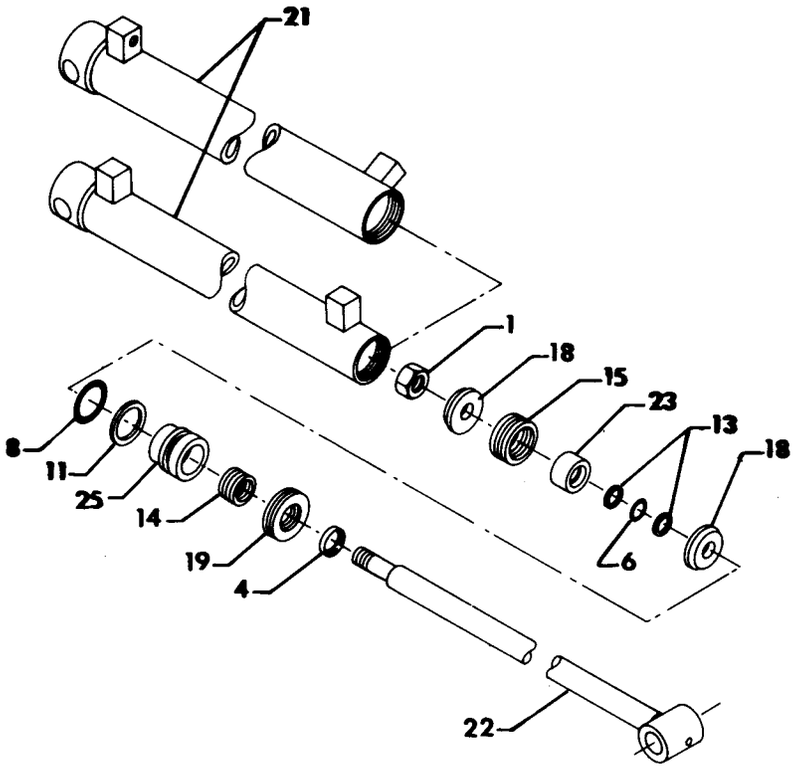
FIG 6

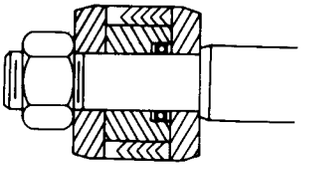
PARTS LIST - FIG 6:

Index	Description	Part No.
85	Hydraulic Cylinder, 2" Diameter	083
86	Hydraulic Cylinder, 2" Diameter	084
87	Bucket, 9"	W209
87	Bucket, 13"	W210
87	Bucket, 16"	W211
87	Bucket, 19"	W212
88	Bolt, 5/16 NF x 1"	6795
89	Bolt, 5/16 NF x 1-1/4	6799
90	Lock Nut, 5/16 NC	7433
91	Lock Nut, 5/16 NF	7437
92	Flat Washer, 5/16 SAE	8152
93	Flat Washer, 1" SAE	8203
94	Machinery Bushing, 1-1/2 OD x 1" ID x 18 ga	8283
95	Cotter Pin, 5/16 x 1-1/2	8615
96	Bucket Tooth and Shank Assembly	13622
97	Bucket Tooth	13623
98	Grease Fitting, 1/4 Self-tapping	14505
99	Boom Weldment	855055
100	Dipperstick Weldment	855065
101	Bucket Link Weldment	855120
102	Bucket Guide Link	855142
103	Pin, 1" Dia. x 5-3/4	855149
104	Pin, 1" Dia. x 7-3/8	855151
105	Pin, 1" Dia. x 7-7/8	855152
106	Spacer, 1-7/16 OD x 1-1/8 ID x 7/16	855154
107	Spacer, 1-7/16 OD x 1-1/8 ID x 3/16	855156
108	Spacer, 1-7/16 OD x 1-1/8 ID x 11/16	855166
109	Hose Retainer	855173

084 Cylinder
Lift and Crowd

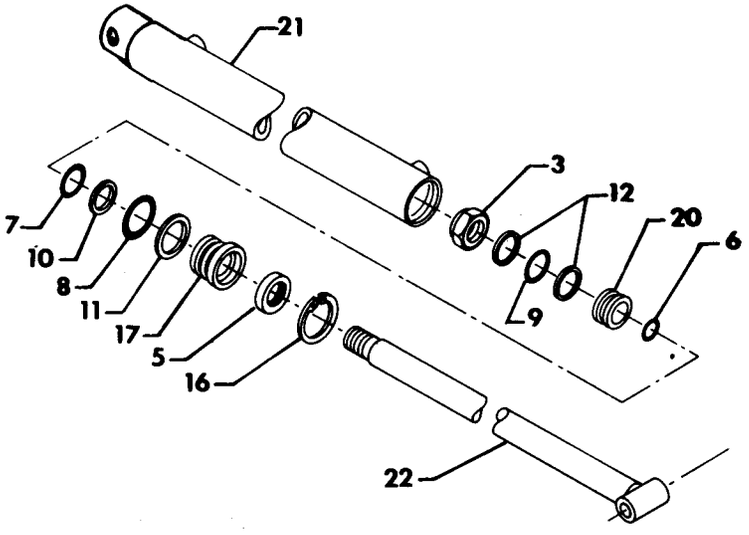
083 Cylinder
Bucket

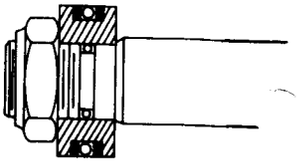




Proper Piston Assembly

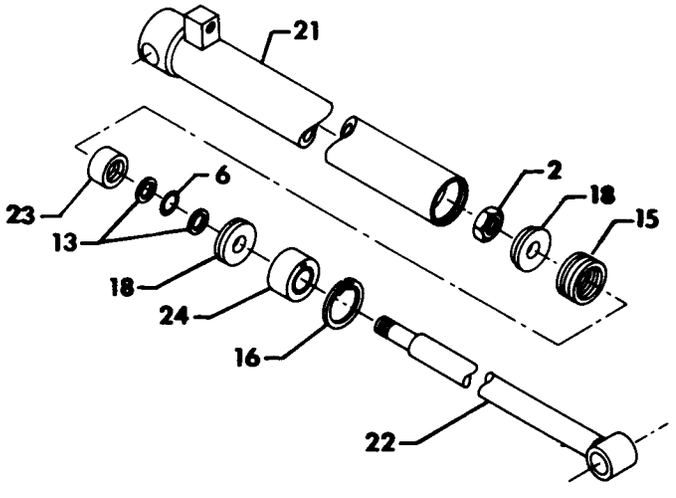
073 Cylinder
Stabilizer

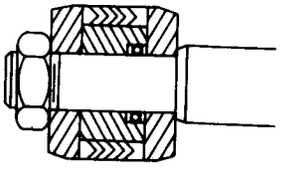




Proper Piston Assembly

082 Cylinder
Swing





Proper Piston Assembly

Hydraulic Cylinders – Parts Lists:

Index	Description	084:	083:	073:	082:
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.....	11569	11569		
5	Oil Seal, 1-5/8 OD x 1-1/8 ID.....			11605	
6	O-Ring, 1" OD x 3/4 ID.....	11733	11733	11733	11733
7	O-Ring, 1-3/8 OD x 1-1/8 ID.....			11740	
8	O-Ring, 2" OD x 1-3/4 ID.....	11748	11748	11748	
9	O-Ring, 2" OD x 1-5/8 ID.....			11769	
10	Leather Washer, 1-3/8 OD x 1-1/8 ID.....			11805	
11	Back-Up Ring, 2" OD x 1-3/4 ID.....	11807	11807	11807	
12	Back-Up Ring, 2" OD x 1-5/8 ID.....			11808	
13	Back-Up Ring, 1" OD x 3/4 ID.....	11812	11812		11812
14	Packing Assembly, 1-3/8 OD x 1" ID x .647.....	11830	11830		
15	Packing Assembly, 2" OD x 1-1/2 ID x .824.....	11857	11857		11857
16	Retaining Ring, Internal.....			13406	13406
17	Gland.....			904232	
18	Piston Washer.....	904052	904052		904052
19	Gland Nut.....	904053	904053		
20	Piston.....			904231	
21	Cylinder Tube Weldment.....	904465	904450	904365	904435
22	Piston Rod Weldment.....	904470	904460	904375	904440
23	Piston Spacer, with O-Ring and Back-Ups.....	904430	904430		904430
24	Rod Guide Assembly.....				904445
25	Gland, with O-Ring and Back-Up.....	904030	904030		
	For Complete Cylinder, order.....	084	083	073	082
	Seal Repair Kit (includes all Packings, Wear Rings, O-Rings, Back-Up Rings, Wipers, and Snap Rings for one cylinder).....	904485	904485	904260	904480

904475

specification – general data:

A. Digging Depth.....6' 1"
(two foot flat bottom)

B. Swing Arc.....180°

C. Loading Height.....5' 0"

D. Reach from Center Line of Swing Pivot.....8' 4"

E. Transport Height (maximum).....5' 1"

F. Bucket Rotation.....180°

G. Bucket Roll Force.....2400 lbs.
(at 1500 PSI)

H. Bucket Pry-Out Force.....
.....in excess of 4000 lbs.
(depending on fulcrum established by bucket attitude)

I. Transport Overhang.....3' 7"

J. Undercut.....1'11"
(from center line of swing pivot)

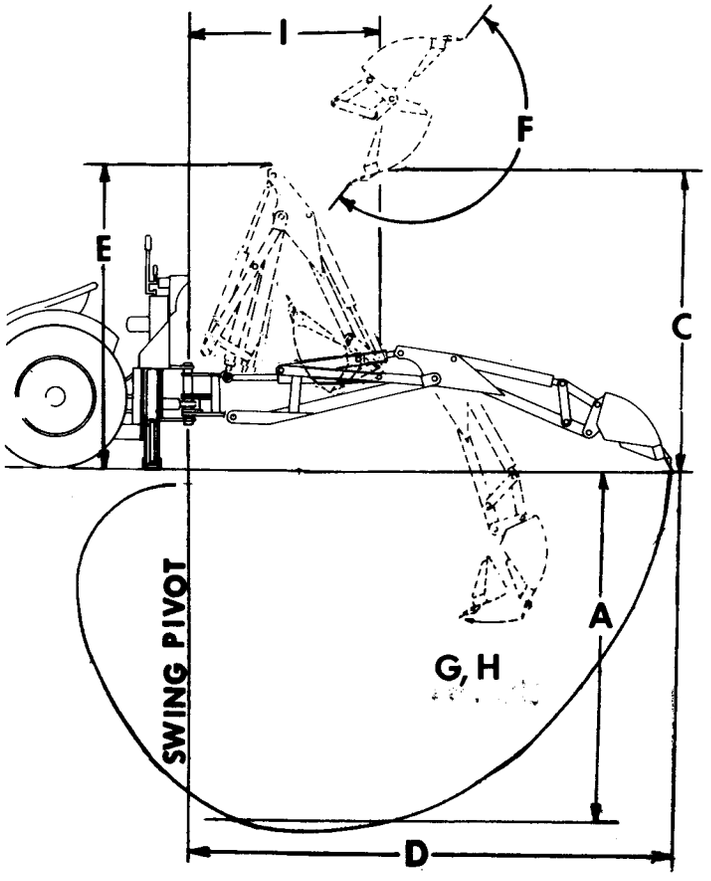
K. Hydraulic Stabilizer Spread, down - approximately.....6' 0"

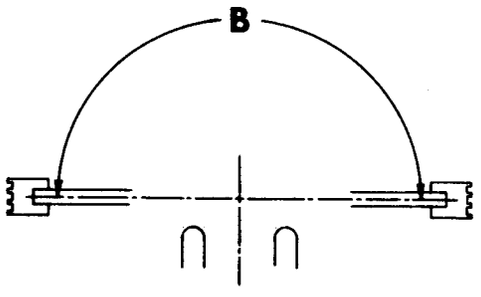
L. Hydraulic Stabilizer Spread, up - approximately.....3' 6"

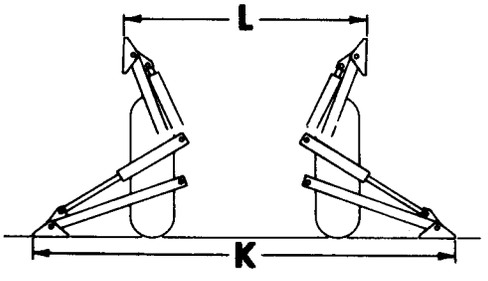
M. Dipperstick Lift Ability.....400 lbs.
(boom up, lifting with dipper cylinder only, weight attached as shown, at 1500 PSI)

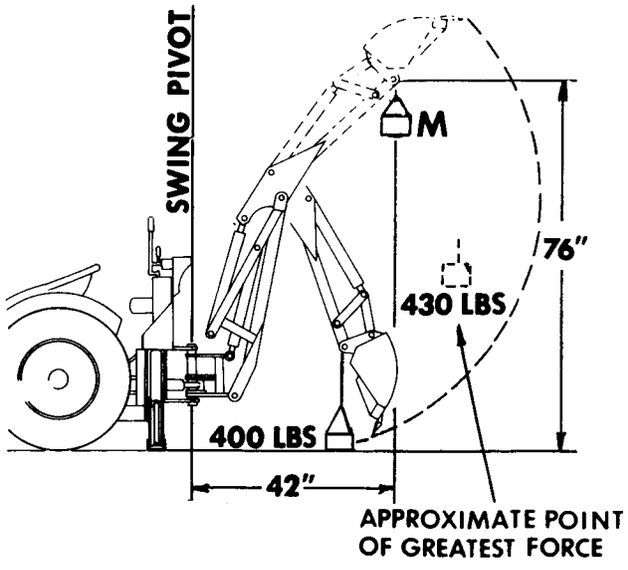
N. Boom Lift Ability.....150 lbs.
(dipper arm and boom extended, lifting with boom cylinder only, weight attached as shown, at 1500 PSI)

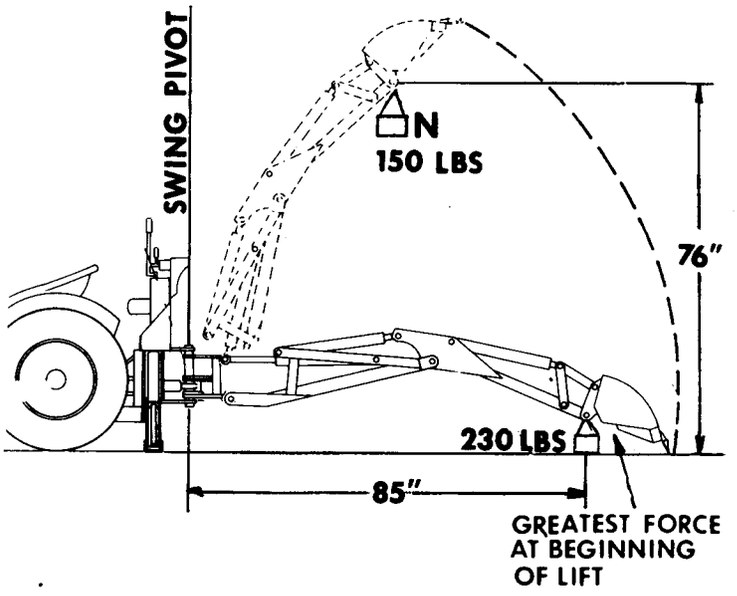
O. Shipping Weight.....710 lbs.
(less bucket)











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.	38 lbs.
W211	16 in.	0.94 cu.ft.	1.25 cu.ft.	43 lbs.
W212	19 in.	1.13 cu.ft.	1.50 cu.ft.	48 lbs.

cylinder data:

CYLINDER	PISTON DIA.	STROKE	RETRACTED LENGTH	EXTENDED LENGTH	ROD DIA.	PIVOT PIN DIA.	TYPE OF ACTION
*084 - BOOM	2	15-3/4	23-1/2	39-1/4	1	1	DA
*084 - DIPPER	2	15-3/4	23-1/2	39-1/4	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
082 - SWING	2	8-9/16	15	23-9/16	1	1	SA

* Identical cylinders used for both functions.

Limited WARRANTY — 90 Day

ARPS DIVISION OF CHROMALLOY WARRANTS EACH NEW PRODUCT TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF 90 DAYS FROM THE DATE OF DELIVERY TO THE ORIGINAL RETAIL PURCHASER OR DATE OF FIRST RENTAL.

LIMITATIONS:

1. Obligation under this warranty is limited to repair or replacement of parts which ARPS determines to be defective.

2. This warranty does not apply to components or other trade accessories not manufactured by ARPS. Customer shall rely solely on the existing warranty, if any, of the respective manufacturers thereof.

3. Products which have been operated improperly, subjected to abuse, negligence, accident, or upon which unauthorized repairs or alterations have been made, are not covered by warranty. It does not cover depreciation or damage caused by normal wear.

4. ARPS is not liable for warranty or service transportation expenses incurred between the customer and dealer.

5. Parts may not be returned to ARPS without authorization. Warranty shipping charges between the dealer and ARPS, will be paid by ARPS, if authorization has been given to the dealer.

6. Form AWAR-674 must be received by ARPS within 30 days of the date of repair to be considered for warranty.

7. This warranty is in lieu of all other warranties, expressed or implied, and there are no warranties of merchantability or of fitness for a particular purpose; in no event will ARPS be liable for consequential or special damages.

8. In keeping with ARPS' policy of constant improvement, we reserve the right to change our specifications or design at any time.

1-78

ARPS

ARPS DIVISION OF CHROMALLOY

NEW HOLSTEIN WISCONSIN 53061 U.S.A.
PHONE 414/898-4291