Prentice

PARTS AND INSTRUCTION BOOK FOR

HOBC Serial # 08027

MANUFACTURED BY

PRENTICE HYDRAULICS, INC.

PRENTICE, WISCONSIN
54556

Important

To prevent delay in processing your orders and to guard against error in shipment, please read the following directions carefully before ordering:

1. **Indicate on your order the model and serial number of your machine.**
2. **Clearly specify part numbers on your order.**

Company service policy is to process all orders and ship the same day received.

HOBC 08027

WARRANTY

The Prentice Hydraulics, Inc. warrants that it will repair, F.O.B. its factory, or furnish without charge, F.O.B. its factory, a similar part to replace any material in its new machinery which within 3 months after date of sale by the dealer, is proven to the satisfaction of Prentice Hydraulics, Inc. to have been defective at the time it was sold, provided that all parts claimed defective shall be returned properly identified to the Prentice Hydraulics, Inc. factory, charges prepaid.

Operation & Maintenance Instructions For The Prentice Loader

PREVENTIVE MAINTENANCE

There is more to the operation of a machine than knowing which control is which. A good operator doesn't just handle his loader well -- he also makes sure that it is properly cared for. A poorly - maintained piece of hoisting equipment may end up costing a lot more than money.

PROCEDURES

1. Before starting the day's work, make a brief inspection of cylinders, tank and pump and look at the ground where the Loader is parked for signs of leakage. Check oil level in Loader reservoir and truck engine after warm-up. (see item 2)

2. In cold weather (below 0°F/-18°C especially), allow time for engine warm-up, then engage the pump drive and run the Loader for a time with all controls in neutral, to warm the hydraulic oil. If oil is too cold for efficient operation, the pump will make more noise than usual; After oil has been warmed to operating temperature, the pump should quiet down. Check oil level before beginning work.

3. Certain parts of the machine should be lubricated daily (see Lubrication Instructions). When greasing pump drive shaft joints, check universals, slip joint, and carrier bearing (if present) for free play. Check pump shaft seal for leakage. In cooler climates especially, we recommend that the Loader be lubricated at midday, to insure that old grease is warm and that new grease is worked into bearings before quitting time.

4. After the day's work, set down the boom. The Loader should never be left with its boom up. Disengage Pump Drive before shutting off engine. Check oil level in truck and Loader. If there is dirt around the oil tank air breather, clean it away. Wash breather filter in kerosene or non-flammable solvent weekly or as needed.

5. Once a week, carefully inspect hydraulic lines, hoses, and fittings for leakage or signs of damage (refer to "Service Tips").

OPERATION OF THE LOADER

CAUTIONS TO OBSERVE ON THE ROAD

(1) When driving between jobs, be sure Power-Take-Off is disengaged. NEVER drive truck while the Loader is "live".

(2) NEVER move truck while operator is on the Loader, unless so ordered by operator, for purpose of spotting. When spotting for the operator,
PROTECT HIM FROM TREE LIMBS, OVERHEAD WIRES, AND TRESTLES.

(3) Know the overall height of your rig at all times. NEVER approach a questionable overhead at high speed. Do not drive truck with boom raised.

(4) Always raise stabilizers before moving truck.

SPOTTING

When approaching jobsite, remember not to pull too close. Between 6 and 12 feet is standard, depending upon stabilizer reach.
Align the Loader "A" Frame with the midpoint of the stockpile or loading area, as this will put you in the best position to load more without having to move the truck.

OPERATION OF THE LOADER

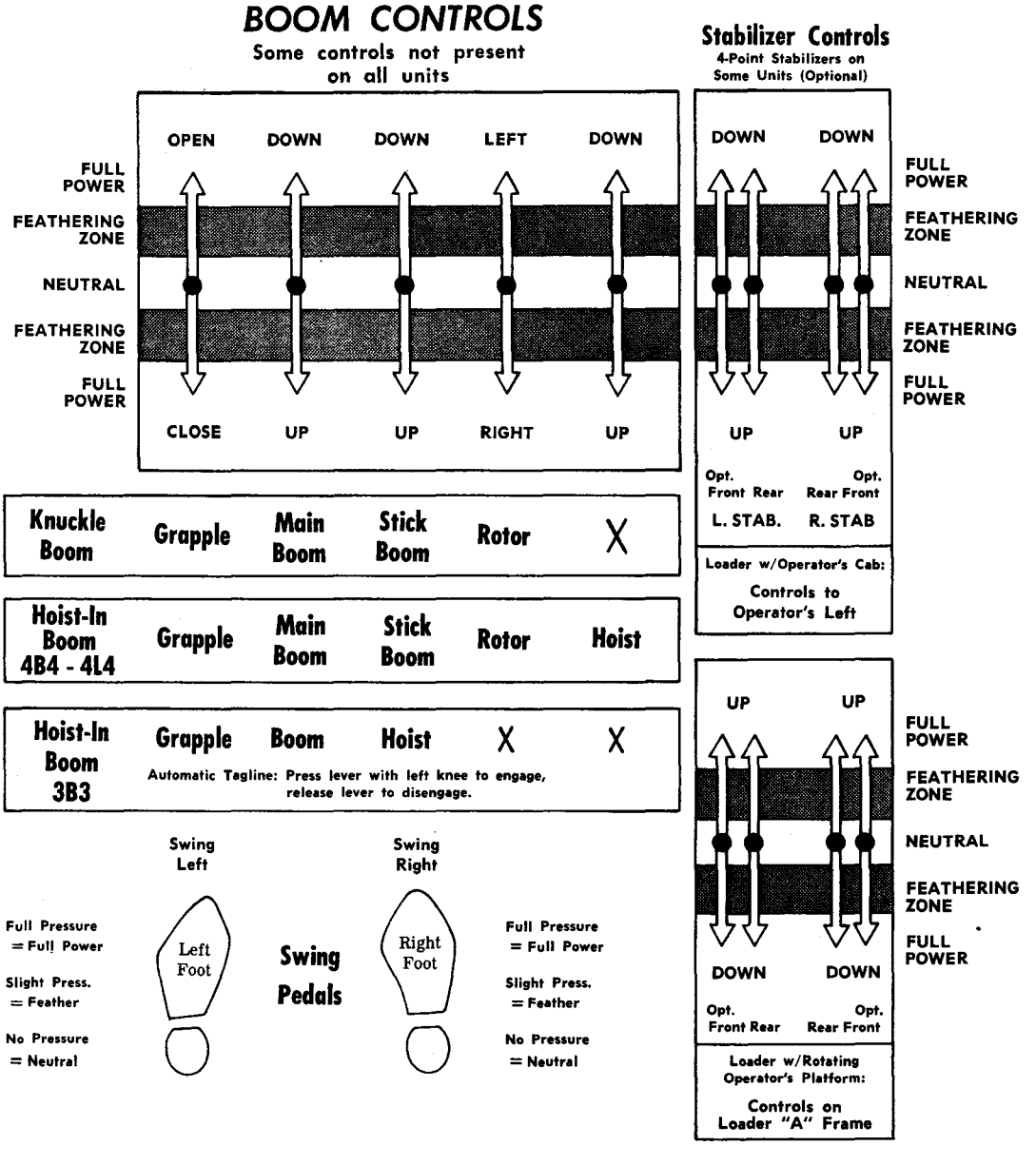
EXPLANATION OF DIAGRAM

The diagram on this page shows the controls of all standard Prentice Loaders. Loaders and their control functions are listed below the diagram. An X in the row naming the controls of your machine means that the control is not used, and will not be found on your Loader. The diagram itself is intended to show how the controls work. The solid circles indicate valve closed, or "neutral", the double lines with arrowheads stand for control lever travel.

OPERATION TECHNIQUE: HOW TO FEATHER

When working the Loader, don't jerk control levers to "full power", or from one extreme to the other. When starting a motion of the Loader, move the control just a little ways from "neutral" in order to get it started easily, then move the control to the extreme for full power. Do the same when stopping a motion. This method is the one used by experts, and is known as feathering; it works on all hydraulic controls, including SWING. You can actually work faster by feathering controls than by jerking them.

OPERATION DIAGRAM



OPERATION OF THE LOADER

FEATHERING, continued

There is no fixed "feathering" position, but you will soon discover how far to move each control for the desired effect. Practice with this technique will give you a smooth working cycle, with well-blended, positively controlled motions.

It is especially important to feather SWING and ROTOR controls near extremes of rotation.

Remember: First Your Safety, Then the Job!

A Skillful and Careful Operator Is The Best Safety Device On Any Machine

Safety First **Prentice Hydraulics, Inc.**

CAUTIONS TO OBSERVE WHILE LOADING

(1) Always set truck parking brake or Brake Lock before engaging Power-Take-Off. Lower stabilizers before loading, if your unit is so equipped. Make a test lift before starting work, to check ground condition under stabilizer.

(2) NEVER move truck while operator is on Loader, unless so ordered by operator, for the purpose of spotting. When spotting truck for the operator, PROTECT OPERATOR FROM TREE LIMBS, OVERHEAD WIRES, AND TRESTLES.

(3) Before swinging boom, LOOK AROUND! There may be people or objects standing in its path.

(4) Warn people away from loading area. NEVER let anyone stand under load or raised boom.

(5) Always lower grapple to truck frame or to ground before dismounting. If Loader is to stand idle, disengage Power-Take-Off. NEVER leave a "live" Loader unattended.

(6) When picking up a single log with the grapple, "pinch" it between jaws. Do not try to pick up more wood, or less wood, than the grapple can hold firmly.

CAUTIONS, continued

(7) Never try to raise a load so high that end of bundle strikes boom when grapple is rotated. The operator who aligns bundle with boom and raises load till boom forces the bundle to slant, is inviting a stick to come down on his rig, and possibly on himself.

(8) Cable Loaders: Run cable out to full length once daily, to check it for frays or kinks. Kinks may cause cable to "hang up" inside of boom, delaying work. Frayed cable may break at any time. Keep record of cable inspections. For cable replacement, see "Service Tips".

WHAT TO DO IF YOU GROUND A POWER LINE

(9) LOOK OUT FOR OVERHEAD POWER LINES! Current in a high-voltage line may arc some distance to jump from the wire to a nearby "ground", so merely not touching power lines is not enough. Keep clear of them.

If you know the boom has contacted a high wire, try to swing boom away without downing wires. If this is not successful, WARN OTHERS NOT TO TOUCH THE TRUCK OR THE LOADER, and to keep clear of area if wires are downed.

If you must leave the Loader, do not touch machine and ground at the same time; jump clear, avoiding any downed lines.

Get in touch with the power company, giving them the number of the nearest numbered pole. If you suspect that the Loader is still grounding current, don't allow anyone to touch it or the carrier until qualified help arrives.

Some states require more clearance than shown below. CHECK THE LAW.

RECOMMENDED CLEARANCE Assume all transmission lines to be uninsulated. You'll be safer.	
Local Transmission Lines (750 Volts or Less): 8'	High Tension Lines (750 - 7500 Volts): 10'
Long Distance Transmission Lines (7500 Volts & Up): 10' + 1/10 - foot for each 1000V over 7500.	

SERVICE OF THE LOADER

ADJUSTMENTS

1. Mounting Bolts: Check after first week of operation, and every 3 months thereafter. On 5/8" mounting bolts, torque wrench reading should be 110 foot pounds; on 1" mounting studs, torque wrench reading should be no more than 500 foot pounds.

2. Swing Hub Pad & Clamp: Check after first week of operation and every 3 months thereafter. Torque wrench reading should be 690 foot pounds.

3. Swing Rack Wear Shoe: Check after first week of operation and every 3 months thereafter. Remove lock plate, tighten until snug, then back off 1/2 turn. Put locking plate back in place.

4. Relief Valves: Check only when malfunction is suspected. Relief valves should not be adjusted needlessly. Refer to Installation Manual Section P for checking instructions. Operate a machine at non-standard relief-settings ONLY with written permission from Prentice Hydraulics, Inc..

5. Colorflow Valves: Colorflow valves are located in the swing cylinder circuits of most units. Control knobs are held at setting by setscrews. To adjust, loosen setscrew and turn knob counter-clockwise for faster swing, clockwise for slower swing. On each complete turn, a different band of color shows on stem next to control knob. #7 on green band (about 3/4 - turn from "closed") is a setting preferred by many operators.

6. SR Loaders, and some special units, have colorflow controls on Grapple Rotator Circuit. Adjustment procedure is same as above. #5 on green band (about 1/2 - turn from "closed") is a setting frequently used.

SERVICE TIPS

1. Loss of Power: If only one function of the machine seems sluggish, chances are that trouble is in the valve, or in the component. To check condition of component, (if grapple is working normally) hose it to the GRAPPLE valve section and check operation. GRAPPLE valve section has no port reliefs, so if any function is sluggish when operated by this valve, trouble is probably in the work circuit. If pump malfunction is suspected, check relief pressure at full throttle (no more than 1200 pump r.p.m.) then at idle (about 500 pump r.p.m.). If there is more than 25% difference in pressure readings, pump is either malfunctioning or not getting enough oil. Drain system, clean oil filter, and repeat the above test.
   For valve Service, refer to Service Manual in Parts & Instruction Book.

2. Cavitation: A noisy, sluggish pump may indicate cavitation (air bubbles in oil passing through pump). Cavitation may be caused by (a) clogged oil filter; (b) leak in pump intake line; (c) leak in pump shaft seal; (d) pump running overspeed.
   (a) Drain system, clean oil filter.
   (b) Pour hydraulic fluid over suspected leaks in oil line while pump is running at operating speed. If pump quiets down while oil covers suspected leak, the problem can be cleared up by tightening fittings or replacing intake line.
   (c) Replace pump shaft seal (refer to pump Service Manual in Parts & Instruction Book).
   (d) Run PTO in lower gear. Recommended Pump Speed is 1200 r.p.m. maximum. Do not exceed without written permission from Prentice Hydraulics, Inc..

3. Fittings and Hoses: Usually, a leaky fitting just needs tightening. If repeated tightening is necessary, the fitting may require replacement. Check lines and hoses near a problem fitting for signs of damage. Replace damaged lines, hoses, or fittings immediately. A continuous oil leak can cause low oil level, which will damage pump if neglected.

4. Hydraulic Cylinders: A good hydraulic cylinder will leave a film of oil on the extended rod; this film is necessary for lubrication. Any other condition indicates packing out of adjustment or damaged. Consult your Dealer.

5. Cable Replacement(3B3, 4B4, etc.): Do not "spiral" new cable off roll. Reel it off the spool, or if it is coiled, unroll the coil like a hoop. Don't lay new cable where it might be run over, or where it can pick up dirt, shavings or other foreign matter. It is not necessary to let hoist cable out to full length in order to replace it. Just remove cable from grapple, and leave grapple to mark correct length. Cable is anchored by a bolted clamp at base end of boom. Remove bolts and remove cable from clamp. Butt-weld new cable to old at this end. Pull cable through boom until weld reaches grapple. Cut off new cable at base of boom and secure end by fitting it into channel in clamp and bolting clamp together. Break weld and fasten new cable to grapple.

MAINTENANCE OF THE LOADER

SCHEDULED MAINTENANCE SAVES HEADACHES

This chart was prepared in order to help you keep your machine on the job. It has been proved that well-maintained machines do not break down as frequently as machines receiving only occasional care, or no attention at all. The simplest way to be sure that your Prentice Loader is well maintained is to set up a time table on the machine, and use it to keep track of all maintenance work.

It only takes a few minutes to give your Prentice Loader the amount of care it should have. Take the time - - your machine will pay you back with many hours of faithful service.
The time intervals given in the Maintenance Schedule stand for the average lengths of time that various parts of the Prentice Loader should go without service. Maintenance Intervals should be shortened whenever the machine is faced with extremes in weather or poor working conditions.

MAINTENANCE SCHEDULE

SPECIAL MAINTENANCE (for new machines only): After the intervals mentioned here, regular maintenance intervals should be used.

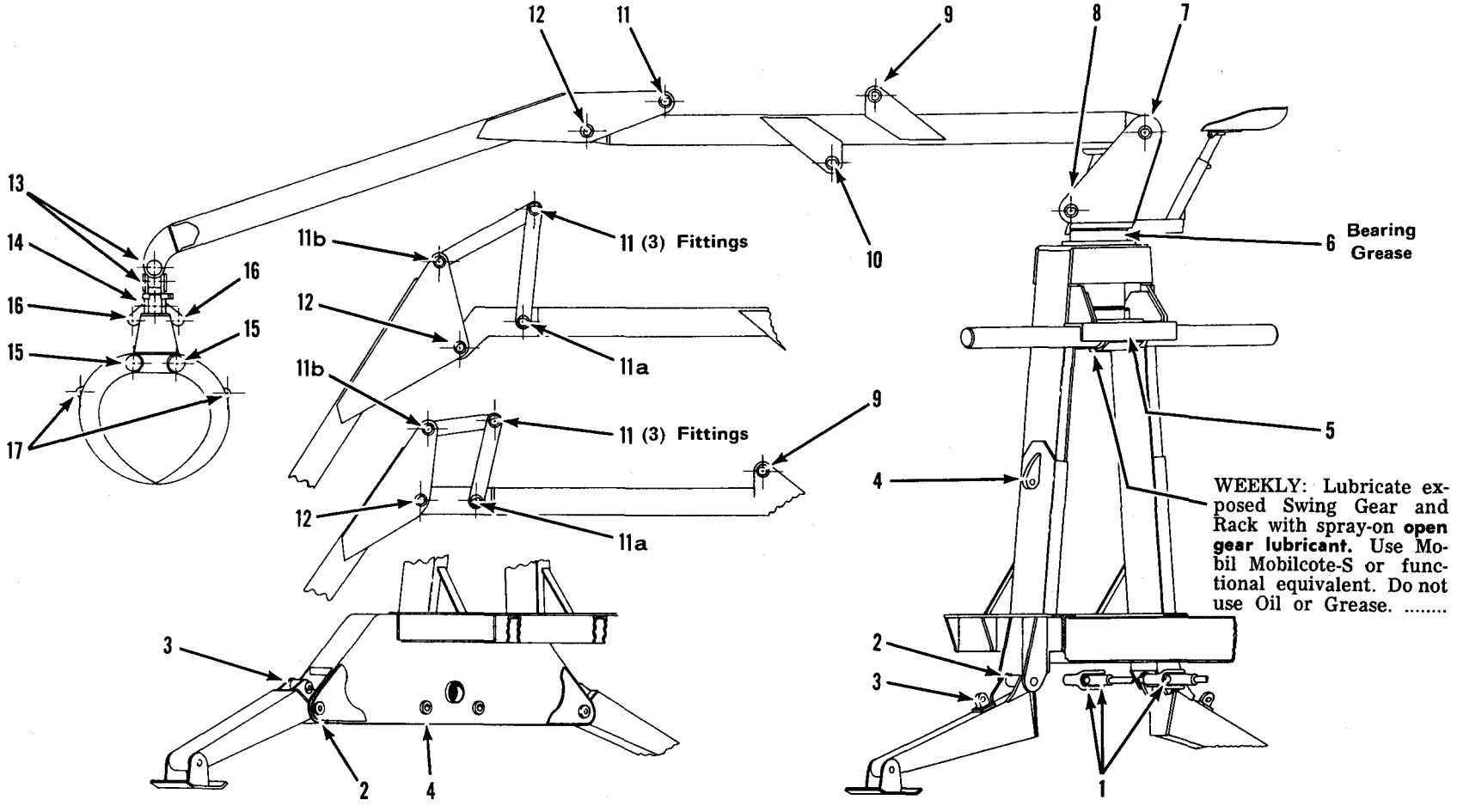
After FIRST 50 hours or first week of operation (new machine)	- Check Mounting Bolts (page 4 item 1). - Check Swing Hub Clamp Bolts (page 4 item 2). - Check Swing Rack Wear Shoe Adjustment (page 4 item 3).
After FIRST 300 hours of operation (new machine):	- Drain hydraulic system, clean filter and inside of oil tank. Refill system with new hydraulic oil.

REGULAR MAINTENANCE

Daily or Every 10 Hours:	- Check Hydraulic oil Level - Grease fittings on Boom and Grapple (see lube chart) - Grease fitting on Swing Rack Housing - Lubricate Pump Drive Shaft Fittings.
Twice Weekly or Every 25 Hours:	- Lubricate Swivel Couplings on Hoses leading through Spindle - Grease Stabilizer fittings
Weekly or Every 50 Hours:	- Clean Oil Tank Breather. - (Cab Only) Grease Control Fittings. - Grease Spindle Bearing Fittings, Swing Rack & Pinion - Inspect Hoses for Damage or Abrasion - Check Hydraulic Connections for Leaks
Every 3 Months or 600 Hours:	- Check Mounting Bolts (page 4 item 1). - Check Swing Hub Clamp Bolts (page 4 item 2). - Check Swing Rack Wear Shoe Adjustment (page 4 item 3).
Twice a Year or Every 1200 Hours: (preferably Spring and Fall)	- Drain Hydraulic System, clean Filter and inside of Oil Tank. Refill System with new hydraulic oil.

LUBRICATION POINTS

Grease - fitting locations are called out by number in the drawing below. The list gives the number, the time interval, and the location for each fitting; on some, instructions are included.



SPECIAL NOTE: Where available, we recommend the use of Mobilgrease 77 or functional equivalent* in all bearings.

If your Loader is subject to abrasive or corrosive conditions (loading lime, cement, compost fertilizer, dredging in salt water, etc.), fittings on end of boom and on grapple should be greased more frequently.

On the Spindle Bearings, use wheel Bearing Grease, NGLI Grade #2 or equivalent. On all other fittings, use any good grade of gun - Grease, such as you would use on your truck chassis.

# On Chart	Time Interval	Location & Instructions
1.	Daily	PTO Shaft Slip Joint & U-joint fittings. Three (3) fittings.
2.	Twice Weekly	Stabilizer Hinge Pin fitting, located on bushing, facing up; for access, lower stabilizer. One (1) fitting on each stabilizer.
3.	Twice Weekly	Stabilizer Cylinder Rod End Pin fitting, located on pinhead. One (1) fitting on each stabilizer.
4.	Twice Weekly	Stabilizer Cylinder Base End Pin fitting, located on pinhead. One (1) fitting on each stabilizer.
5.	Daily	Swing Rack Wear Shoe Fitting, located at center of swing cylinder housing, on opposite side of rack from swing gear. One (1) fitting.

INSTRUCTIONS: Rack should be lubricated at three (3) points. Position boom midway between extremes of swing and give fitting three (3) shots. Swing boom 90° to left and to right from midpoint, and give fitting three (3) shots in each position.

6.	Weekly	Spindle Bearing fittings, located on spindle housing just above "A" frame. Three (3) fittings, spaced around housing. Give each fitting five (5) shots of Bearing Grease.
7.	Daily	Main Boom Hinge Pin Fitting, located on bushing, facing to rear; access through hole in base of main boom when lowered. One (1) fitting.
8.	Daily	Main Boom Cylinder Base End Pin fitting, located on bushing, facing up; lower boom for access. One (1) fitting.
9.	Daily	Main Boom Cylinder Rod End Pin fitting, located on bushing, facing down; lower boom for access. One (1) fitting.
10.	Daily	Stick Boom Cylinder Base-end Pin fitting, located on bushing, facing down; for access, lower boom to ground. One (1) fitting.
11.	Daily	Stick Boom Cylinder Rod-end Pin fitting, located on bushing, facing down; for access lower stick boom part way, then lower main boom till grapple touches ground. One (1) fitting.

NOTE: On Loader with Linkage Boom , three (3) fittings.

# On Chart	Time Interval	Location & Instructions
11a	Daily	Linkage to Main Boom Pin fitting (Linkage Boom Loader Only), located on bushing; access through hole in bottom of main boom. One (1) fitting.
11b	Daily	Linkage to Stick Boom Pin fitting (Linkage Boom Loaders Only), located on bushing, facing down; for access, lower stick boom part way, then lower main boom till grapple touches ground. One (1) fitting.
12.	Daily	Stick Boom Hinge Pin fitting, located on bushing, facing down; for access, lower boom to ground. One (1) fitting.
13.	Daily	Grapple Mounting U-Joint Pin fittings, located on upper and lower knuckles of U-Joint. One (1) fitting on each knuckle, Total of two (2) fittings.
14.	Daily	Grapple Swivel Pin fitting, located on side of grapple head, opposite rotation stop. One (1) fitting.
15.	Daily	Grapple Jaw Hinge Pin fittings, located on sides of bushings in grapple head, facing up. Two (2) fittings.
16.	Daily	Grapple Cylinder Base-end Pin fittings, located in pin heads. Two (2) Fittings.
17.	Daily	Grapple Cylinder Rod-end Pin fittings, located in pin heads. Two (2) fittings.

LOADERS WITH ROTATING - OPERATORS PLATFORM (400° Swing)

18.	Twice Weekly	Hose Swivel Coupler fittings, located on hydraulic hoses just under spindle. (Not Illustrated). Four (4) fittings on standard unit, single circuit Five (5) fittings on standard unit, tandem circuit Eight (8) fittings on unit with cab, single circuit Nine (9) fittings on unit with cab, tandem circuit

NOTE: These swivels don't require a large amount of grease, but new grease will keep swivels clean. Give each fitting a short shot.

19.	Weekly	Loaders w/ Cab Only: Grease Control Fittings; access under cab floor. One (1) fitting per lever, three (3) on swing pedal linkage. (Not Illustrated).

*Mobilgrease 77, or its functional equivalent, is one of the new rust-resistant lubricants, which meet the following specifications: (1) Dana Corp. Special Ep Grease, (2) GM Truck Grease Spec. No. 37732R, (3) Caterpillar Multipurpose Grease Spec. No. 1E325.

MAINTENANCE OF THE LOADER

HYDRAULIC SYSTEM MAINTENANCE

Check Hydraulic Oil Level Daily

After running the Loader for long enough to warm the oil, straighten the boom and lower it until the grapple touches the ground. Shut off the Loader by stopping engine or disengaging PTO. Oil tank dipstick is on the fill - cap with the breather. Clean around fill cap before removing. If oil is below "F", add oil until correct level is reached. Refer to "Oil Specifications", below.

Once a week, Clean Oil Tank Breather in fuel oil or non-flammable solvent.

Change Hydraulic Oil Every Spring and Fall

Hydraulic Oil should be changed after the break-in-period (first 300 hours of operation), and every six (6) Months after that. Use the following method:

To Drain:

Raise the boom all the way and straighten it. Shut off the engine. Remove the drain plug from the bottom of the oil tank and let the oil run out (catch-basin should hold about 25 gallons).

Push the STICK BOOM control to let stick boom drop, forcing oil from stick boom cylinder.

Push the MAIN BOOM control to let main boom drop, forcing oil from main boom cylinder.

To Clean:

Remove the filter screen from the oil tank by taking out mounting capscrews, removing cleanout cover and unscrewing filter from nipple on tank outlet. Clean around cover before removing.

NOTE: On most models, filter screens are mounted on cleanout cover, but some tanks have cleanout cover on top; filters must be unscrewed from side of tank after cover is removed.

Clean any shavings, dirt and other sediment from inside of tank. Clean magnetic drain plug. Clean filter by rinsing it in kerosene or non-flammable solvent, and dry it thoroughly with compressed air or by shaking vigorously. Do not strike the screen against a hard surface.

Replace gaskets, if damaged, and re-install filter screen. Put magnetic drain plug back in place.

To Refill:

Refill the hydraulic system with the proper oil for the season to come (see "Oil Specifications"). Oil should be poured through a clean, fine-mesh screen. Never use a cloth.

First fill the tank, then start the Loader and let it run with all valves in neutral until the pump quiets down. Add more oil, then stand by the hydraulic tank with more oil while the operator works all functions of the Loader, in order to work air from the system. Straighten boom, lower it, and check oil level. Add oil as required.

WARNING: DO NOT LET OIL DROP BELOW LEVEL OF PUMP SUPPLY LINE, because this will result in serious damage to the pump.

Put fill caps back in place, run the Loader for a while, then check oil level again. Add oil if necessary.

Hydraulic Oil Requirements

Hydraulic oil used in Prentice Hydraulic Machinery should have a viscosity index of 90 or higher, and an SSU viscosity of 140 or higher at 100° F and 37° C. Aniline point should be 165 or higher. Oil should have anti-foam and anti-oxidation additives.

The Following Oils Meet our Requirements. Use these oils or their functional equivalent. Your lubricant dealer can help you.

In Summer (Average outside temperature above 32° F and 0° C).

MOBIL MOTREX NO. 101
SHELL ROTELLA NO. 54001
SHELL ROTELLA T NO. 54101
TEXACO REGAL B R&O

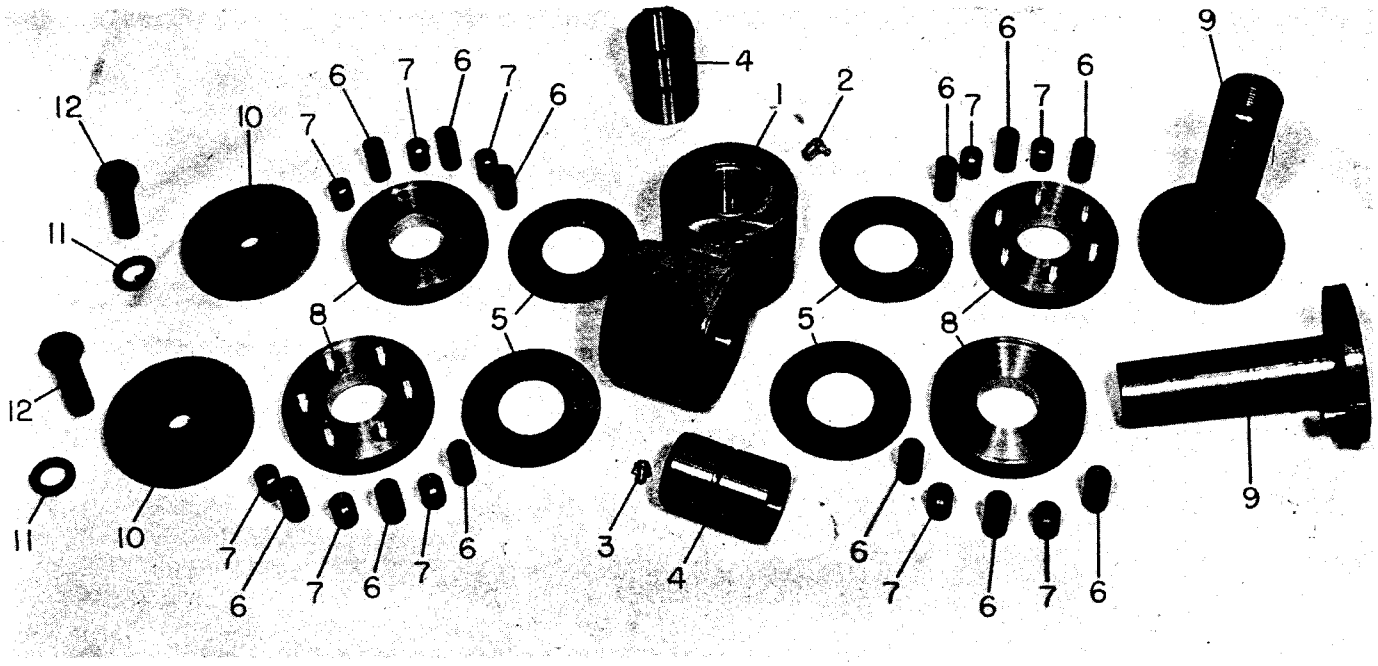
In Winter (Temperatures below - 20° F and - 29° C expected).

MOBIL MOTREX NO. 119
SHELL DONAX T-6
SHELL DONAX T-5
TEXACO REGAL A R&O

All Season Oil (if outside air temperatures cover a wide range the year round).

MOBIL DTE NO. 23
Pour Point - 40° F to + 250° F
- 40° C to + 107° C

For further information, refer to Section M of Installation Manual.



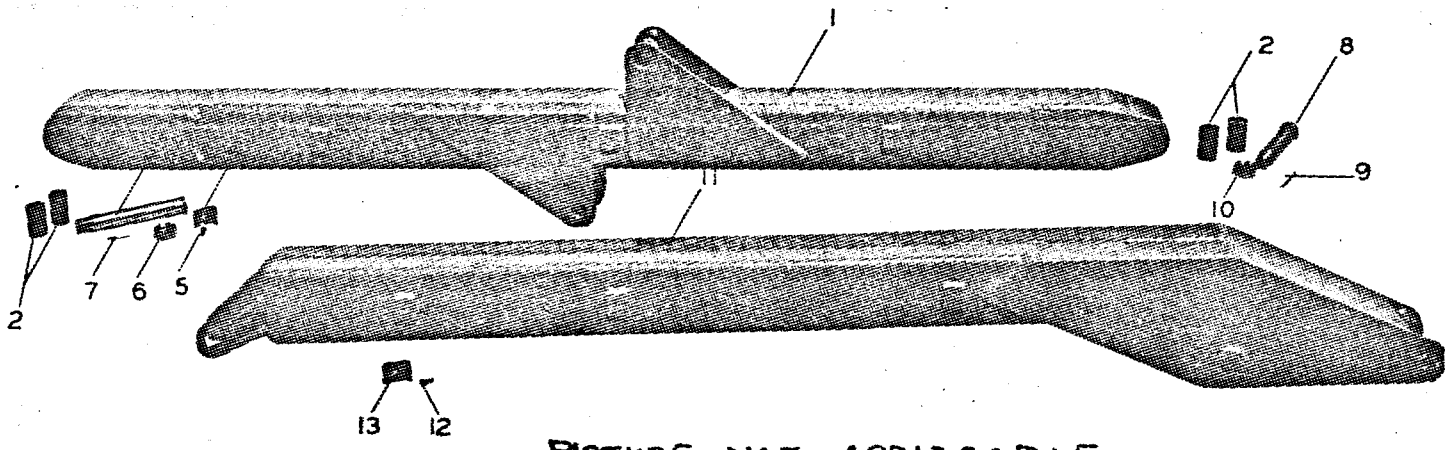
GRAPPLE MOUNTING U-JOINT

166800 Brake Knuckle

(Standard on all units built after 28 March 66)

Item No.	Name of Part	No. Req.	Part No.
1	Knuckle	1	166804
2	Grease Fitting	1	121003
3	Grease Fitting	1	121005
4	Bushing	2	102504
5	Brake Lining	4	101308
6	Springs	12	922
7	Plate Pins	10	166806
8	Pressure Plate	4	166805
9	Mounting Pin	2	136084
10	Mounting Pin Washer	2	136056
11	Lock Washer	2	305008
12	Cap Screw	2	300809

When ordering parts please show model and serial number of loader and parts book form number.



PICTURE NOT APPLICABLE

H O B C

7" P. C. BOOM

Item No.	Name of Part	Part No.
1	Main Boom 9'-6"	206022
	Main Boom 10'	206047
	Main Boom 10'-6"	206046
	Main Boom 11'	206057
	Main Boom 11'-6"	206048
2	Bushings (4 req.)	102504
3	Pin, stick boom pivot	[illegible] 136145
4 & 13	Holder	130016
5 & 12	Cap Screw (lockwasher 300503)	300306
6 & 10	[illegible] Nut self-locking	[illegible] 304515
[illegible]	[illegible]	[illegible]
8	Pin, main boom pivot	[illegible] 136155
11	Stick Boom - Reg. Ears 8'-6"	206023
	Stick Boom - Reg. Ears 9'	206050
	Stick Boom - Reg. Ears 9'-6"	206049
	Stick Boom - Reg. Ears 10'	206051
	Stick Boom - Reg. Ears 10'-6"	206052
	Stick Boom - Brake Ears 8'-6"	206044
	Stick Boom - Brake Ears 9'	206053
	Stick Boom - Brake Ears 9'-6"	206054
	Stick Boom - Brake Ears 10'	206055
	Stick Boom - Brake Ears 10'-6"	206056
	Stick Boom-Heel (Push Type)	206087
	Jib Boom	206090
	Bushing -- base end pivot	102505
	Fitting, grease	121005
	Pin, jib boom cyl. rod end	136117
	Nut, self-locking	304515

1 Heel Assembly 206099
4 Capscrew 300809
4 Nut, self-lock 304516

When ordering parts please show model and serial number of loader and parts book form number.

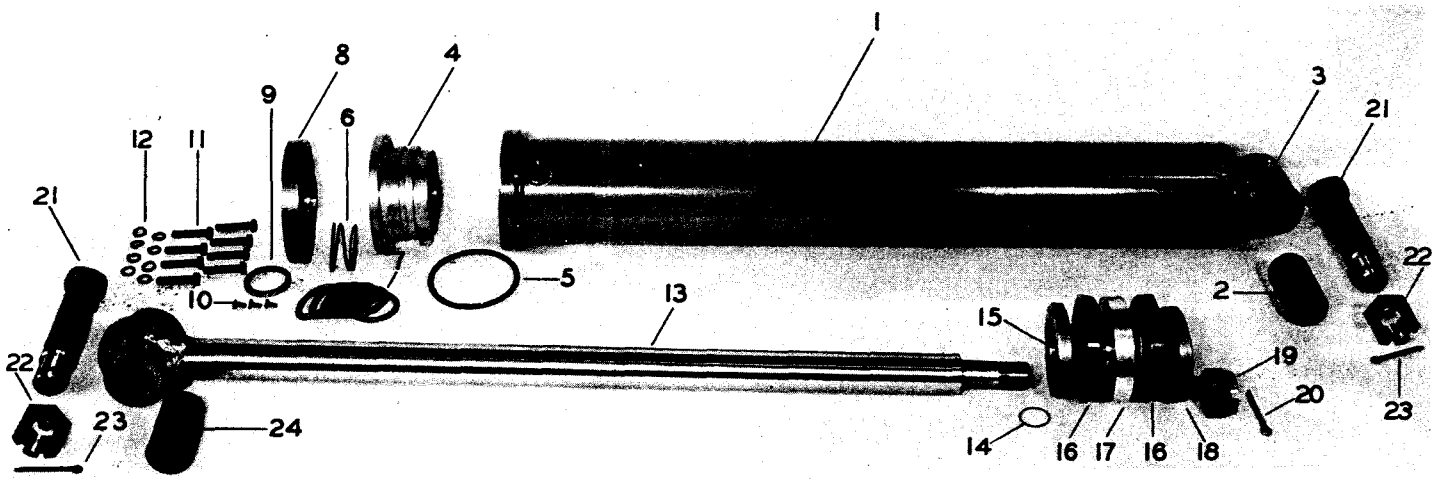
"PUSH TYPE " JIB BOOM CYLINDER
"100" Series Loader
(4-1/2" Bore--2" Rod--29" Stroke)

This cylinder is broken down into major components under ITEM, at far left. Parts of these components are listed to the right.

ITEM	QTY	PART NO.	DESCRIPTION
1 Cyl.	1	110077	CYLINDER
2 Body	1	111088	BODY, cylinder
	1	102506	BUSHING, steel-base end pin
	1	121004	FITTING, grease--base end bushing
3 Rod	1	112058	ROD
	1	102505	BUSHING, rod end pin
	1	121004	FITTING, grease--rod end bushing
4 Head	1	113016	CAP, cylinder head
	1	147005	SEAL, wiper
	3	308501	CAPSCREW, wiper seal retaining
	1	117003	PACKING, chevron ("V" rings)
	1	152003	SPRING, conical
	1	135346	SEAL, static ("O" ring)
	1	113055	SLEEVE, cylinder head
	8	300408	CAPSCREW, head retaining
	8	305004	LOCKWASHER
5 Piston	1	114009	PISTON
	2	116007	CUP, piston
	1	135028	GASKET, piston
	1	115010	SPACER, internal
	1	115009	SPACER, external
	1	304413	NUT, castle
	1	309609	KEY, cotter

NOTE: Piston retaining hardware 304413 nut and 309609 cotter key interchangeable with 304518 self-locking nut if cotter key bore is chamfered to prevent damage to nut insert.

Please show Loader Model and Serial Number and Parts Book form number on all orders.



Note: For cylinders stamped .010 oversize, use:

	Cylinder No.	110041
Item #1	Barrel	111069
Item #4	Sleeve	113042
Item #17	Piston	114021

All other parts are the same.

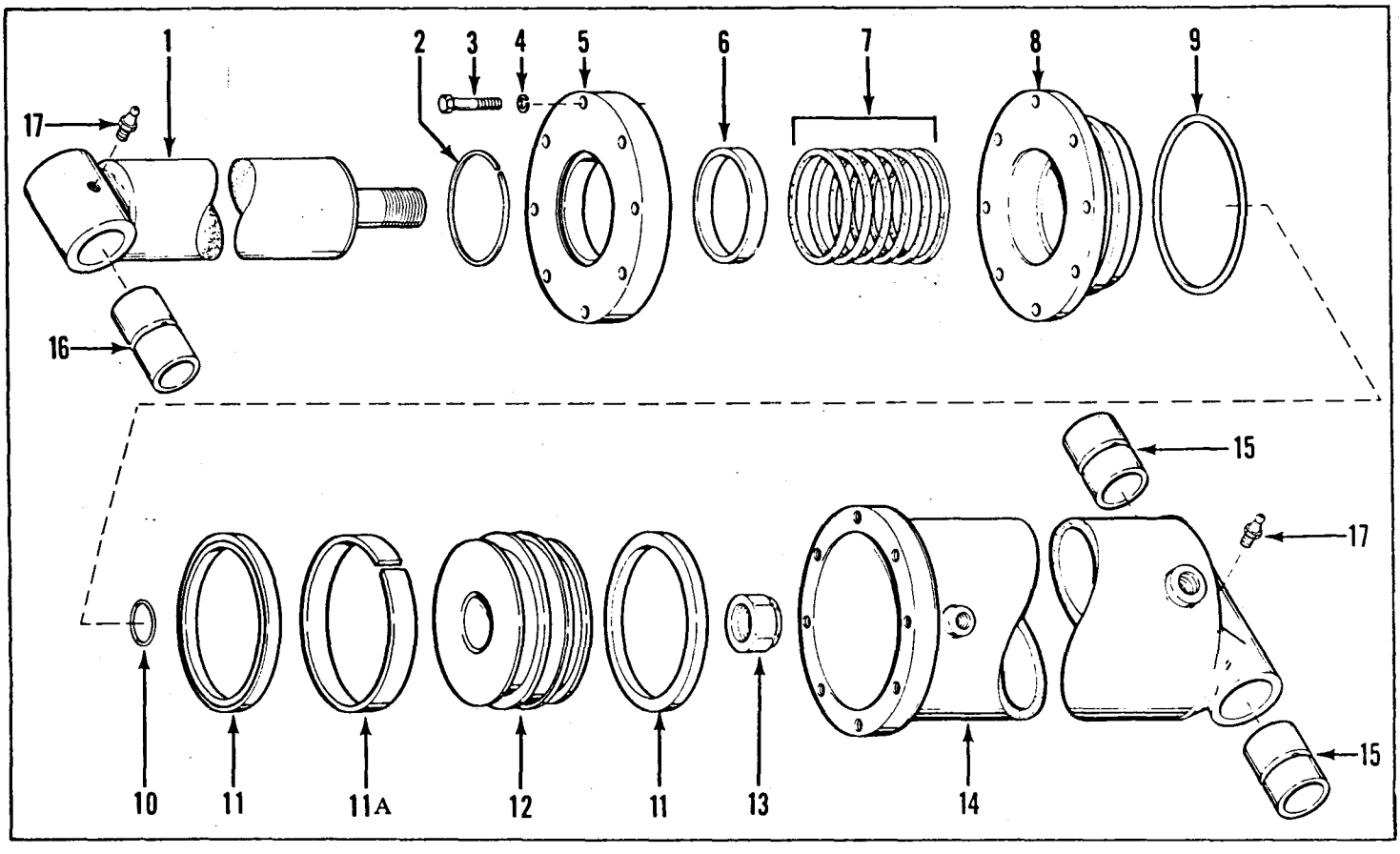
CYLINDER 5" Bore 2" Rod 34" Stroke

HOBC STICK BOOM GOBC & 4B4

Item No.	Name of Part	Part No.	
	Complete Cyl. Assy. (less pins)	110041	
1	Barrel	111028	
2	Hardened Steel Bushing	102505	
3	Grease Fitting (2 required)	121005	
4	Cyl. Head Sleeve	113022	
5	Static Seal	135425	
6	Conical Spring	152003	
7	V Packing	117003	
8	Cyl. Head Cap	113021	
9	Wiper Seal	147005	
10	Brass Cap Screw (3 required)	308501	
11	Cap Screw (8 required)	300410	
12	Lock Washer (8 required)	305004	
13	Cylinder Rod	112019	
14	Piston Gasket	135028	
15	Internal Cup Spacer	115014	
16	Cups - Fabric	116009	
17	Piston	114011	
18	External Cup Spacer	115013	
19	Castle Nut (See Note)	304413	
20	Cotter Pin (See Note)	309609	
21	Boom Pin	[illegible]	136157
22	Nut	[illegible]	304515
[illegible]	[illegible]	[illegible]	
24	Hardened Steel Bushing	102505	

NOTE: Items 19 & 20 interchangeable with 304513 self-lock nut. [illegible] changeable with 304515 self-lock nut. Chamfer cotter key (if present) to prevent damage to nut insert.

When ordering parts please show model and serial number of loader and parts book form number

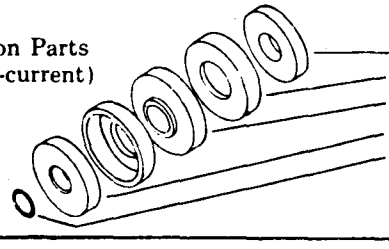


MAIN BOOM CYLINDER
HOBC — HOBPCBL — 3M3
(7" Bore — 4" Rod — 34" Stroke)

Standard 7" Cylinders built as of 8 June 1965 are .010" oversize, and bear the identification stamp "+10". Items 11, 11A and 12 should be installed only in cylinders bearing the "+10" stamp. Older units see NOTE.

Item	Qty.	Part No.	Part Name
	1	110037	Cylinder, complete as illustrated
1	1	112025	Rod
2	1	147011	Seal, wiper
3	8	300511	Capscrew, head retaining (1/2 x 2 - 1/2 NC)
4	8	305005	Lockwasher
5	1	113027	Cap, head
6	1	102015	Wear Ring
7	1	117007	Packing, chevron (6 "V" rings)
8	1	113041	Sleeve, cylinder head (stamped "+10")
9	1	135439	Seal, static ("O" ring)
10	1	135222	Gasket, piston ("O" ring)
11	2	117202	Cup, piston (urethane)
11A	1	117015	Wear Ring used on Piston 114031 (Garlock)
12	1	114031	Piston, grooved for Garlock wear ring (replaces 114025)
13	1	304513	Nut, piston retaining (self-locking)
14	1	111068	Barrel, cylinder (stamped "+10")
15	2	102504	Bushing, base end
16	1	102505	Bushing, rod end
17	2	121005	Fitting, grease

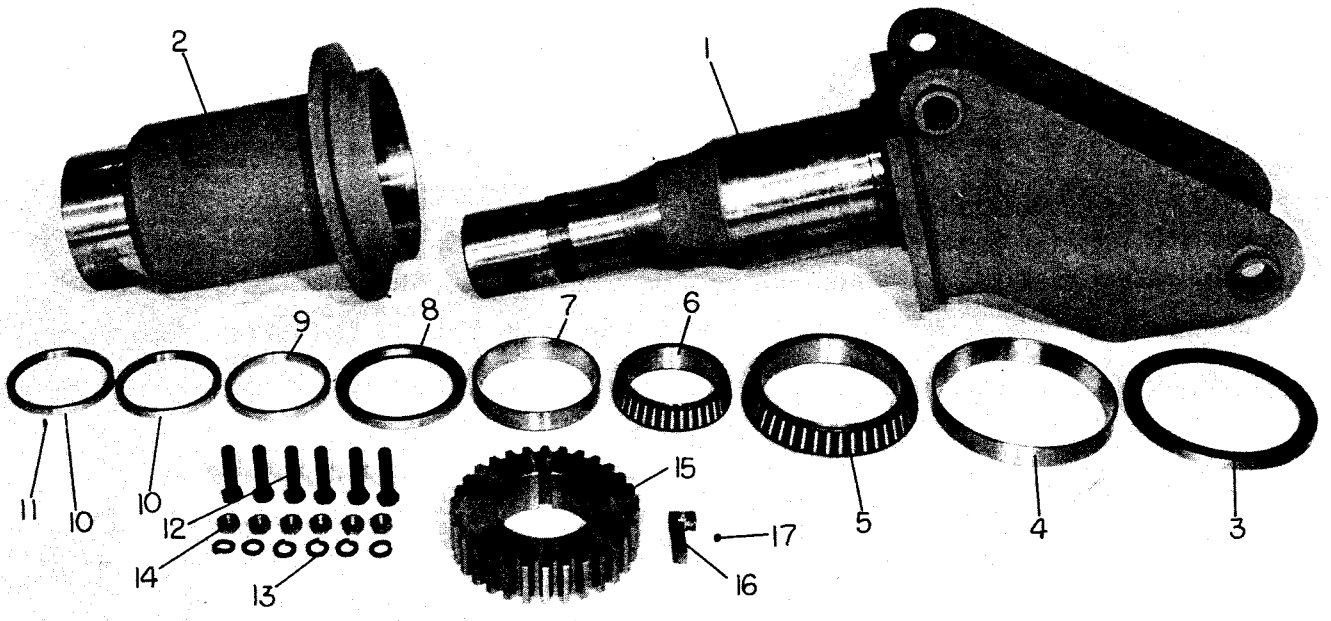
NOTE: 7" Cylinders built before 10 November 1967 (non current) take the following parts.
On Cylinders marked "+10", piston parts can be replaced by items 10, 11, 11A and 12.

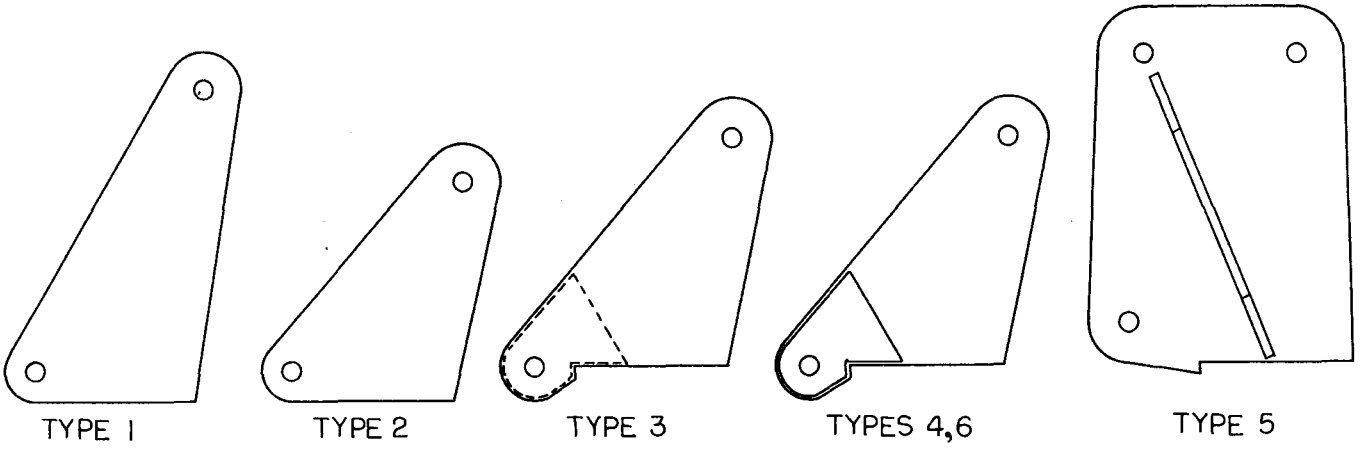


Piston Parts (non-current)

Description	Cyls. Marked "+10"	Unmarked Cyls.
Spacer, external	115019	115019
Cup, piston (2 req'd)	116012	116012
Piston	114020	114014
Spacer, internal	115020	115020
Gasket, piston ("O" ring)	See item 10	See item 10
Sleeve, cylinder head	See item 8	113028
Barrel, cylinder	See item 14	111031

When ordering parts please show model and serial number of loader and parts book form number.



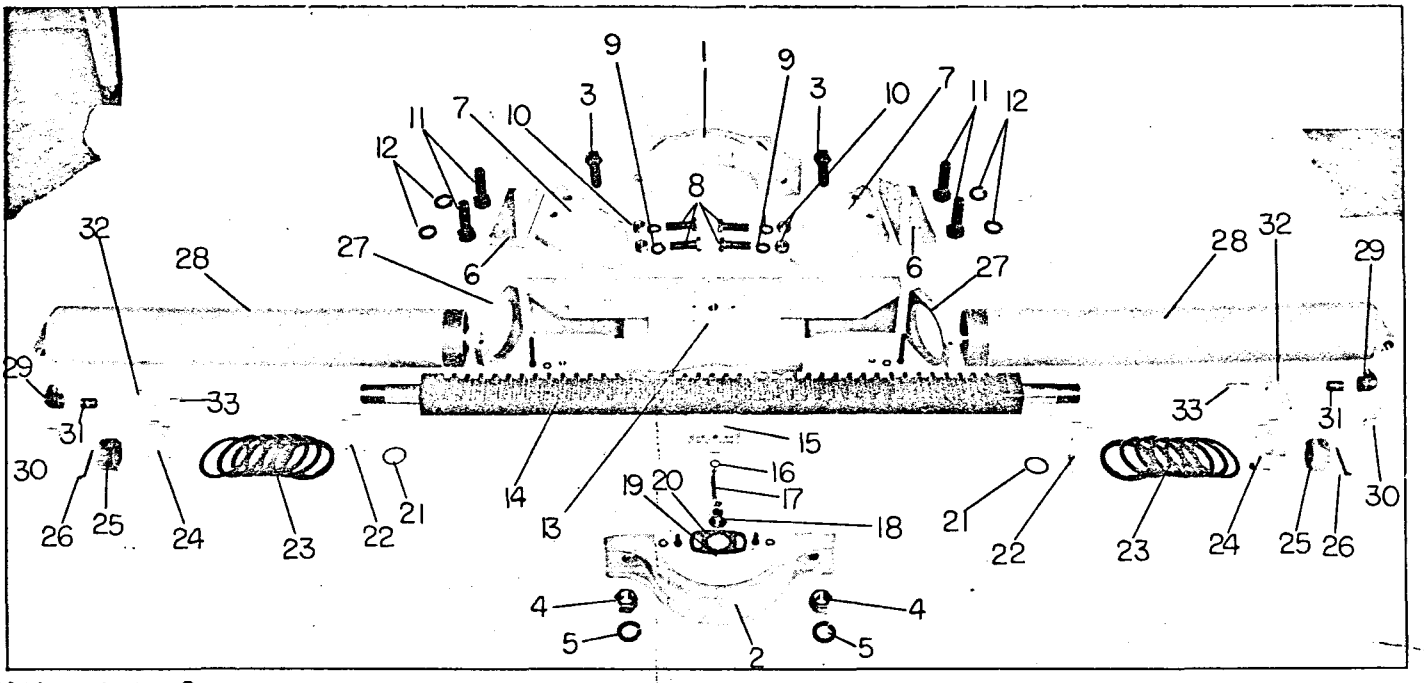


HUB & SPINDLE ASSY.

Item No.	Description	No. Req.	Part No.
1	Spindle w/FOBC ears	1	203021
	Spindle w/Type 1 ears for 7" cyl.	1	203012
	Spindle w/Type 2 ears for 7" cyl.	1	203001
	Spindle w/Type 3 ears for 6" cyl.	1	203013
	Spindle w/Type 4 ears for 7" cyl.	1	203029
	Spindle w/Type 5 ears (dual)	1	203023
	Spindle w/Type 6 ears (3M3 boom)	1	203036
2	Hub	1	202001
3	Grease Seal (upper)	1	147013
4	Upper Cup	1	100019
5	Upper Cone	1	100020
6	Lower Cone	1	100018
7	Lower Cup	1	100017
8	Grease Seal (lower)	1	147009
9	Bearing Spacer & Seal Seat	1	203004
10	Adjusting Nut (2 required)	1	203055
11	[illegible] Screw -308001	1	[illegible]
12	Cap Screw	6	302813
13	Lock Washer	6	305008
14	Nut	6	304208
15	Gear FOBC & GOBC (30 teeth)	1	203031
	Gear HOBC (30 teeth)	1	203030
16	Key, gear (GOBC)	1	203007
17	Allen Head Set Screw	1	306005
15	Key, gear (HOBC)	1	203060

*Units made before Jan.'66 take fine tooth gear (40 teeth) HOBC 203020; GOBC 203006

When ordering parts, please show model and serial number of loader and parts book form number



(204507) 400° Complete Swing Ass'y (Block Loader)
(204511) 300° Complete Swing Ass'y (34" Anchor Bracket)

SWING ASSEMBLY

(5" Bore)

(204508) 400° Complete Swing Ass'y (34" Anchor Bracket)

Item No.	Description		Part No.
	300° Complete Swing Assembly (29" Anchor Bkt)		204504
	360° Complete Swing Assembly (29" Anchor Bkt)		204505
	400° Complete Swing Assembly (29" Anchor Bkt)		204506
1	Hub Pad	1	~~204019~~
2	Hub Clamp	1	~~204020~~
3	Cap Screw	2	~~303122~~
4	Nut	2	304211
5	Lock Washer	2	305011
6	Anchor Mtg. Angle 204024(Right)	2	~~204003~~
7	Side Thrust Brace 204025(Left)	2	~~204017~~
8	Cap Screw	4	302810
9	Lock Washer (See Note 1)	4	305008
10	Nut (See Note 1)	4	304208
11	Cap Screw	4	303113
12	Lock Washer	4	305011
13	Anchor Bracket & Center Housing (29")	1	204011
	Anchor Bracket & Center Housing (34")	1	204012
	Anchor Bracket & Center Housing (38")	1	204016
14	Rack Gear 300°	1	144024
	Rack Gear 360°	1	144025
	Rack Gear 400°	1	144026
15	Rack Shoe	1	144029
16	O ring	1	135113
17	Rack Shoe Lubricator	1	~~144006~~ 144007
18	Nut	1	304209
19	Grease Fitting	1	121005
20	Locking Plate	1	144010
	Cap Screw	2	300305
	Lock Washer	2	305003
21	Piston Gasket	2	135222
22	Internal Piston	2	114015
23	V packing	2	117011
24	External Piston	2	114016
25	Nut (See Note 2)	2	304414
26	Cotter pin (See Note2)	2	309709
27	Swing Cylinder Clamp	2	204015
	Cap Screw	2	300311
	Lock Washer	2	305003
	Nut	2	304003
28	Cylinder Barrel 300°	2	111046
	Cylinder Barrel 360°	2	111044
*	Cylinder Barrel 400°	2	111047
29	Elbow	2	138403
30	Hose fittings 1/2"	2	125021
	Hose fittings 3/8"	2	125109
31	Nipple	2	139401
32	Colorflow Valve *	2	129018
33	Hose Fitting	2	125112

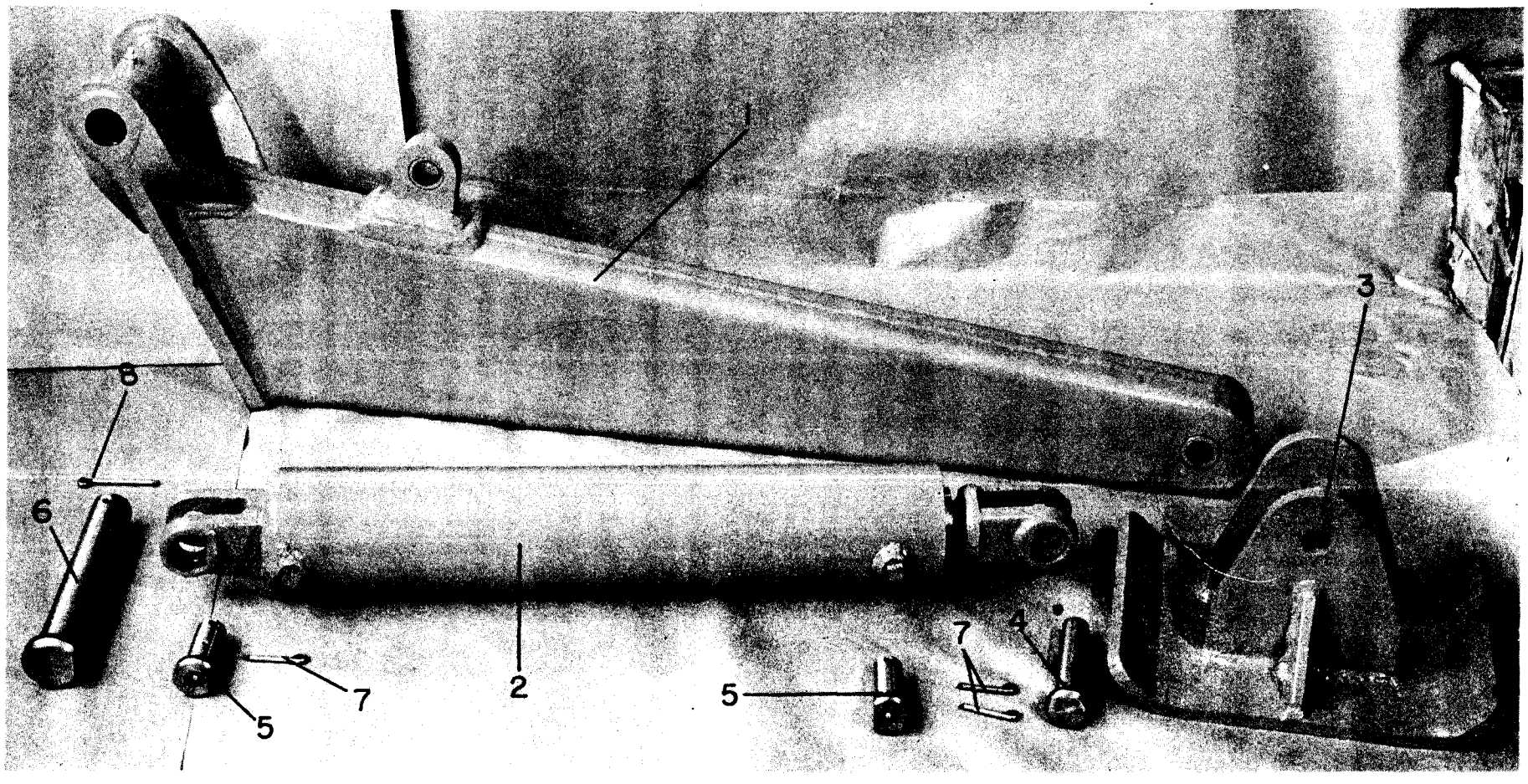
*Note: Colorflow Valves on 300° swings are mounted on valve bank. Use Item No. (30) fittings.

* Cylinder Barrels stamped + .010 use
300° - 111079
360° - 111080
400° - 111081

NOTE: (1) Items 9 and 10 replaced in current production by 304517 self-locking nut.

NOTE: (2) Items 25 and 26 replaced in current production by 304513 self-locking nut.

When ordering parts please show model and serial number of loader and parts book form number



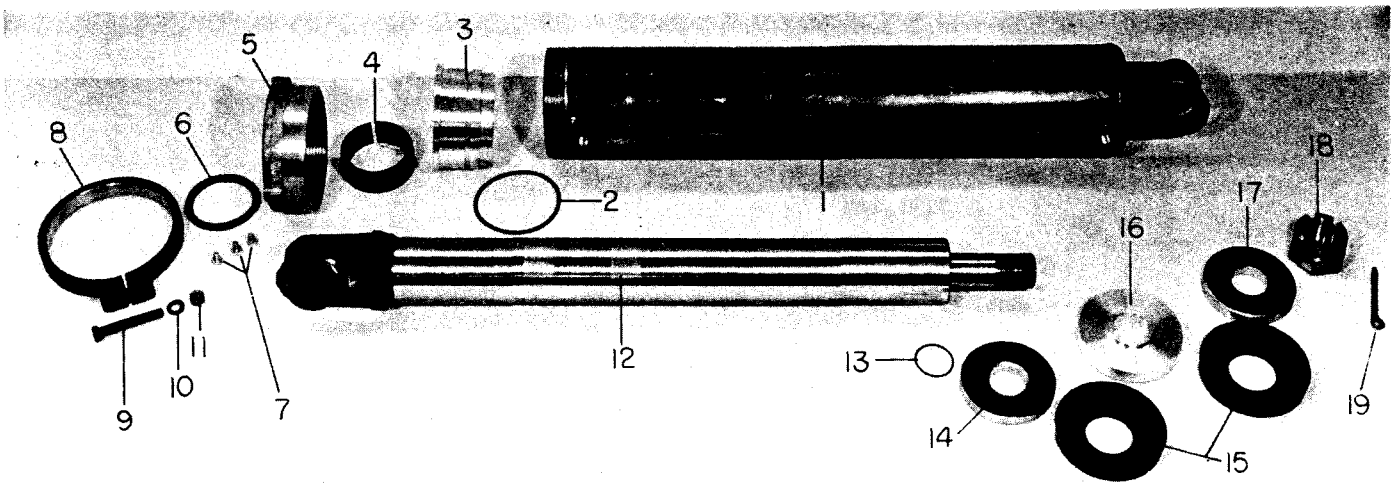
HYDRAULIC STABILIZERS - STIFF ARM
Quantities listed for complete unit

Item	Qty.	Part No.	Description
1	2	167017	Arm, stabilizer (left & right interchangeable)
2	2	110013	Cylinder — snap ring head (For breakdown See PHI 71)
2	2	110102	Cylinder — bolt-on head (For breakdown See PHI 190)
3	2	167018	Pad, stabilizer
4	2	136013	Pin, pad
5	4	136001	Pin, cylinder — base end & rod end w/121002 ftg.
	4	102501	Bushing, cylinder mtg. ear — base end & rod end
6	2	136015	Pin, arm anchor
7	6	309605	Key, cotter — pin retaining
8	2	309609	Key, cotter — arm anchor pin retaining

Stabilizer arm anchor pin tube takes 1 ea. grease fitting 121005.

When ordering parts please show model and serial number of loader and parts book form number.

PRENTICE HYDRAULICS
a division of OMARK Industries, Inc.
Prentice, Wisconsin



HOBC STIFF ARM STABILIZER

CYLINDER

4" Bore 2½" Rod 18" Stroke

Screw Cap Type

Item No.	Name of Part	Part No.
	Complete Cylinder Assy. (less pins)	110067
1	Barrel	111075
2	Static Seal	135240
3	Cylinder Head Sleeve	113047
4	V Packing	117004
5	Screw-on Cap	113046
6	Wiper Seal	147003
7	Brass Cap Screws (3 req.)	308501
8	Clamping Ring	113051
9	Cap Screw	302311
10	Lock Washer	305003
11	Nut	304003
12	Cylinder Rod	112051
13	Piston Gasket	135028
14	Internal Cup Spacer	115006
15	Cup (2 req.)	116005
16	Piston	114005
17	External Cup Spacer	115005
18	Castle Nut	304413
19	Cotter Pin 309609	XXXXX

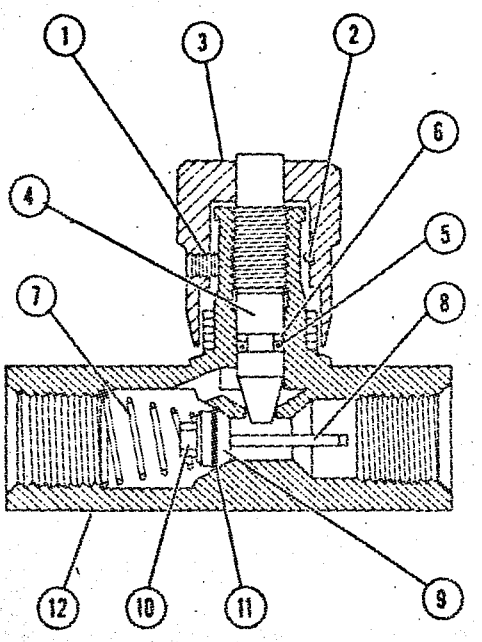
NOTE: Items 18 & 19 interchangeable with 304518 self-lock nut. Chamfer cotter Key bore (if present) to prevent damage to nut insert.

When ordering parts please show model and serial number of loader and parts book form number

OPERATING INSTRUCTIONS

COLORFLOW Control Valves simplify your flow (speed) control problems. Setting, adjusting, checking and *recording* can be done quickly and easily by the color coding system. Unskilled personnel can be quickly trained to obtain precise flow control. The valves meet J. I. C. standards.

The Valves should be installed between the operating valve and one or both ends of the cylinder. For exhaust speed control, install the COLORFLOW Flow Control Valve with the arrow pointed away from the cylinder. This allows speed control through meter flow in one direction and rapid return through free flow in the other direction. For best results, it is recommended that exhaust method of speed control be used. Little maintenance is required to keep COLORFLOW Valves operating accurately. The single O-Ring (5) is the only part subject to wear and may be easily replaced. To order replacement parts, give valve model, size, and material, together with name and number of part required.



DISASSEMBLY

Remove locking set screw (1). Rotate knob until the locking balls (2) drop out of the set screw hole. Knob (3) and needle (4) can now be unscrewed from the body (12). O-ring (5) and Teflon back-up ring (6) can be removed from groove in needle. Spring (7) is removed from body by pulling it out with needle-nose pliers. The poppet assembly can then be easily removed.

The poppet blade (8) can be unscrewed from the poppet retainer (9) and poppet (10) to inspect the seat and poppet seal ring (11).

To reassemble the valve, assemble the parts in reverse of the disassembly procedure outlined above.

ADJUSTMENT

The COLORFLOW Valve allows a controlled flow from zero to full valve capacity. A range of five or more complete revolutions of the micrometer type adjustment knob allows an infinite number of flow settings. Any setting can be *easily recorded* for future reference, such as: Red 6, Orange 3, etc. Adjustment is obtained by rotating the adjustment knob (3). To increase flow, rotate it in the direction of the arrow marked "FAST." The set screw (1) locks the valve position and prevents field tampering. A locking ball (2) prevents the needle from being backed completely out.

COLORFLOW CONTROL VALVE

Item No.	Description	¼" - F400-S Part No.	½" - F800-S Part No.
1	Set Screw	129033	129019
2	Locking Balls	129034	129020
3	Knob	129035	129030
4	Needle	129036	129031
5	O Ring	129037	129022
6	Back Up Ring	129038	129023
7	Spring	129039	129024
8	Poppet Blade	129040	129025
9	Poppet Retainer	129041	129026
10	Poppet	129042	129027
11	Poppet Seal Ring	129043	129028
12	Body	129044	129029
13	Marking Washer	129045	129046
No Number	Complete Valve	129032	129018

When ordering parts please show model and serial number of loader and parts book form number

HOSE CATEGORY

First three numbers signify type of hose
Three dash numbers signify length of hose in inches

900- 1/4" double wire braid hose

902- 3/8" double wire braid hose

904- 1/2" double wire braid hose

906- 3/4" double wire braid hose

908- 1" double wire braid hose

920- 1/4" single wire braid hose

922- 3/8" single wire braid hose

924- 1/2" single wire braid hose

926- 3/4" single wire braid hose

928- 1" single wire braid hose

940- 3/4" fabric braid hose

950- 1/4" double wire braid no skive hose

952- 3/8" double wire braid no skive hose

954- 1/2" double wire braid no skive hose

956- 3/4" double wire braid no skive hose

958- 1" double wire braid no skive hose

MF- signifies male fitting on one end, female fitting on one end

MM- signifies male fitting on both ends

FF- signifies female fittings on both ends

INSTRUCTIONS FOR REPLACING SPOOL SEALS IN GRESEN 25P CONTROL VALVE

REQUIREMENT: One Special T-273 Tool.

NOTE: For the purpose of these instructions, we shall consider the control handle side of the valve as the front end, and the opposite end as the back end.

* * * * * * *

1. At the back of the valve, remove the #1611 die cast Bonnet Assy. This assembly is fastened to the valve housing by four (4) #2673 Bonnet Screws with four (4) #563 Lockwashers.

2. Remove #1618 Spool Assembly Screw, #1610 Spool Collar, #1291 Spool Assembly Lockwasher, #1609 Stop Collar, and #1625 Centering Spring. Be sure to observe the order in which these parts are removed to insure proper reinstallation.

3. Disconnect handle from spool by removing #085 Handle Pin. Let handle swing free of spool.

4. Pull spool towards front end of valve just far enough to expose the back seal in housing.

5. Remove back seal (#1616).

6. Push spool in opposite direction (towards back end) until front seal is fully exposed.

7. Remove front seal (#1616) from housing.

8. BE SURE THAT BODY SEAL GROOVES ARE THOROUGHLY AND CAREFULLY CLEANED.

9. Insert new #1616 Seal in front groove, being very careful that the open end (end with wiping edges) of the seal is placed towards the center of the valve body. It will be very helpful to pinch one side of the seal, causing the seal to bend into a shape slightly smaller than the seal groove in the valve. When the seal has been properly placed in seal groove, straighten the seal by running a smooth rod around the exposed surface of the seal until you have it well seated. To check this, run your finger around the exposed edge of the seal. You should have a smooth perfect ridge with no kinks.

10. Apply a small amount of grease or heavy oil on the #1616 Seal to prevent it from tearing during assembly.

(Continued on Reverse Side)

GRESEN MANUFACTURING COMPANY

405 - 35TH AVENUE N. E. MINNEAPOLIS 18, MINNESOTA

MANUFACTURERS OF
• HYDRAULIC COMPONENTS •
MOBILE - INDUSTRIAL
AGRICULTURAL

Form #43 3/6/61 PRINTED IN U. S. A.

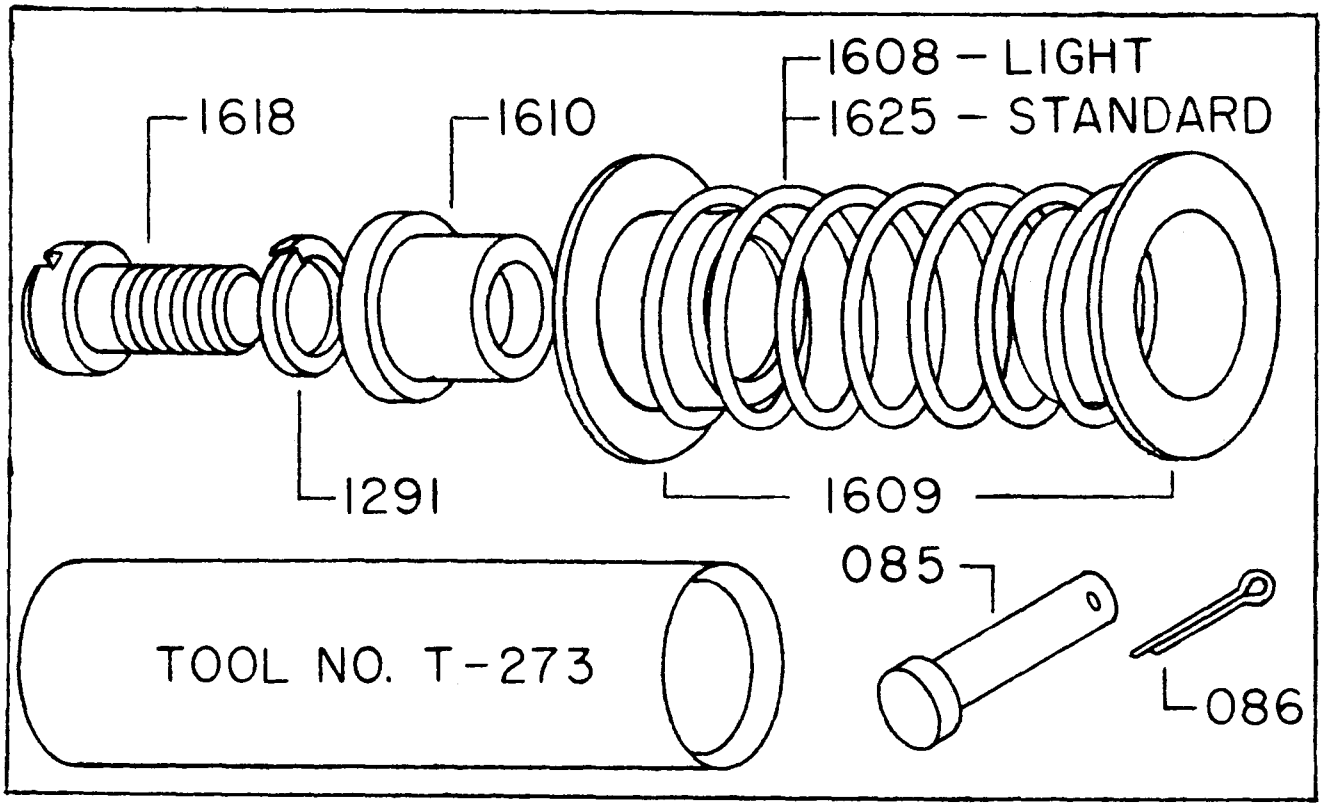
11. Insert the internal-chamfered end of the T-273 Special Tool into the spool bore of the valve housing from the front side of the valve and through the new seal. Push spool forward until the spool and tool make contact. Push spool further forward against tool until rear seal groove is completely exposed, but no further.

12. Install new #1616 Seal in back groove and apply grease or heavy oil. Insert T-273 Special Tool (internal-chamfered end first) carefully into back bore through seal until it makes contact with spool. From front side, push spool back approximately 3/4".

13. Reinstall complete handle assembly, installing the #085 Handle Pin and #086 Cotter Pin.

14. Reinstall the complete spring assembly on back of spool. Be sure the #1618 Spool Assembly Screw is securely tightened. (20 Ft. Lbs. Torque)

15. Reinstall #1611 Bonnet Assembly.



25P DIRECTIONAL CONTROL VALVE

4-WAY 3-POSITION SECTION

SPOOL SPRING–CENTERED
OPEN CENTER IN NEUTRAL WITH WORK PORTS BLOCKED
PARALLEL CIRCUIT
Max. Pressure – 2500 PSI

FOR CONTROL OF DOUBLE-ACTING CYLINDERS: OR START, STOP AND REVERSE OF HYDRAULIC MOTORS WHERE "FREE-WHEELING" OF MOTOR IS NOT REQUIRED.

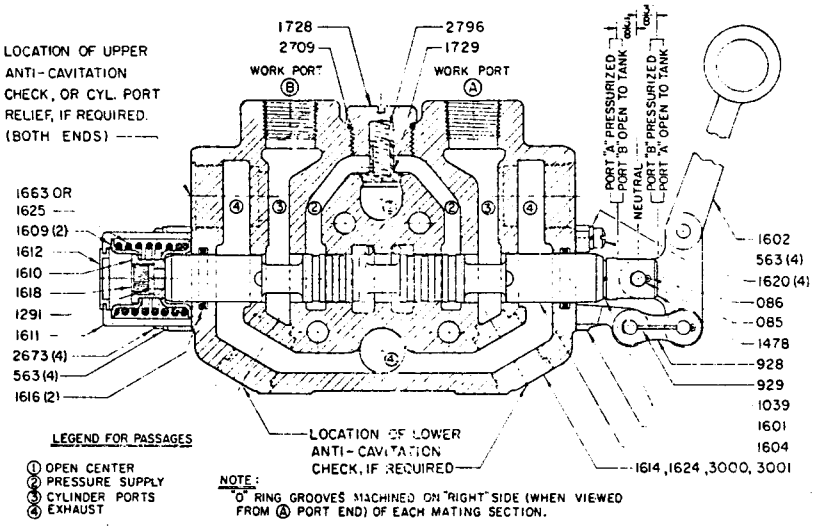
- Handle Provisions Available on Either "A" or "B" Port End. ("A" Port End is Standard.)
- Individual Load-Check. (Spring-Loaded)
- Spring-Centered Spool.
- Two Work Ports.
- Cylinder Port Relief (Pilot or Poppet) and/or Anti-Cavitation Checks Available in Either Work Port. (Refer to Forms #435 and 436.)
- 3-Position Detent (Optional) (See Form #433.)
- Free Flow (F) Spool (Optional) for Free-Wheeling of Motor.

NOTE

For Available Port Sizes, see page 4 of Form #428.

APPROXIMATE WEIGHTS (LESS HANDLES)

Center Section #1614 – 13¾ lbs.
Right End Section #1624 – 16½ lbs.
Left End Section #3001 – 22½ lbs.
Left End Section #3000 – 21¼ lbs.



Dwg. 301 Misc.

PARTS LIST

(Effective on all valves manufactured after July 1, 1965)

PART NO.	DESCRIPTION	QTY. PER SECTION
085	Handle Pin	1
086	Handle Pin Cotter	1
563	Lockwasher (Bonnet Screw & Handle Bracket Screw)	8
928	Handle Link	1
929	Handle Link Cotter	1
1039	Handle Adapter Lockwasher	1
1291	Spool Assembly Lockwasher	1
1478	Handle Adapter	1
1601	Handle Bracket	1
1602	Handle	1
*1604	4-Way Spool	1
*1606	4-Way Free Flow Spool (Opt.)	(1)
1609	Stop Collar	2
1610	Spool Collar	1
1611	Bonnet	1
1612	Bonnet Diaphram	1
*1614	Center Section Valve Hsg.	(1)
1616	Spool Seal	2
1618	Spool Assembly Screw	1
1620	Handle Bracket Screw	4
*1624	Integral Turn-Around Sec. (Right Hand End)	(1)
1625	Standard Centering Spring	1
1663	Heavy Centering Spring (Opt.)	(1)
*3000	Left Hand End W/End "In" & "Out" Section Valve Hsg.	(1)
*3001	Left Hand End W/Top "In" & "Out" Section Valve Hsg.	(1)
1728	Check Plug	1
1729	Check Popper	1
2673	Bonnet Screw	4
2709	Check Plug O-Ring Seal	1
2796	Check Spring	1

ASSEMBLY PARTS

934	Assy. Bolt (3 Section)	4
1039	Lockwasher (Used Only With Assy. Bolts #934, #1670, & #1676)	4
1621	Section Seal (Small) (Not Used On #1624 Sec.)	2
1622	Section Seal (Large) (Not Used on #1624 Sec.)	1
1665	Assy. Stud Nut (Used Only With Studs.)	4
1676	Assy. Bolt (1 Section)	4
1670	Assy. Bolt (2 Section)	4
1672	Assy. Stud (4 Section)	4
1673	Assy. Stud (5 Section)	4
1674	Assy. Stud (6 Section)	4
1675	Assy. Stud (7 Section)	4
1755	Assy. Stud (8 Section)	4
1756	Assy. Stud (9 Section)	4
1754	Rubber Grommet for Bottom Outlet (Opt.)	(1)

Housings and Spools Cannot be Ordered as Separate Items. All Spools are Fitted to Individual Housings by Select Hone Process at Factory.

MODEL 25P & 25PK DIRECTIONAL CONTROL VALVE

ANTI-CAVITATION CHECKS

(For use in any Working Cylinder Port)

Purpose

For use with double-acting cylinders. Allows oil from the "exhaust or tank" passage of valve to supplement pump flow to "powered" end of cylinder when it is being moved by an external force. Installation of anti-cavitation checks reduces operating time, lag, and sponginess caused by cylinder cavitation.

Function

The anti-cavitation check is unseated only when "pump" pressure falls below "exhaust or tank" pressure, and allows the "exhaust or tank" flow to supplement "pump" flow until such time that "pump" flow pressure exceeds "exhaust or tank" pressure at which time the check ball reseats.

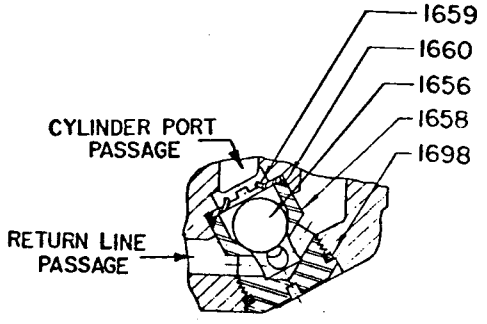
LOWER ANTI-CAVITATION CHECK

(Weight – 2½ oz.)

Used when cylinder port relief valve also required in same cylinder port. If no cylinder port relief is required, then upper anti-cavitation check is used.

PERFORMANCE

Will Pass 6.3 GPM at 10 PSI Pressure Differential.
Will Pass 9 GPM at 20 PSI Pressure Differential.
Will Pass 14.6 GPM at 40 PSI Pressure Differential.



PARTS LIST

Part No.	Description	No. Req'd. Per Assembly
1656	Lower Anti-Cav. Ball (9/16" Dia.)	1
1658	Lower Anti-Cav. Body	1
1659	Lower Anti-Cav. Ball Retainer	1
1660	Lower Anti-Cav. Body Seal (Inner)	1
1667	Lower Anti-Cav. Plug	(Opt.)
1698	Lower Anti-Cav. Body Seal (Outer)	1

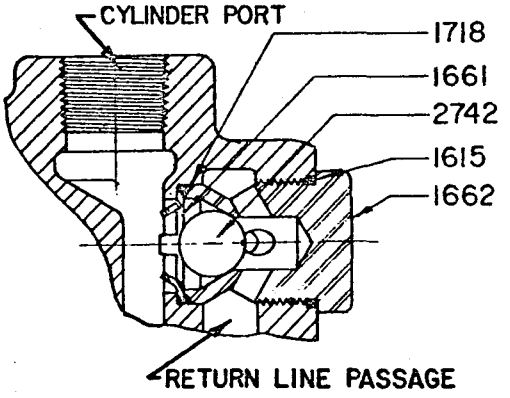
UPPER ANTI-CAVITATION CHECK

(Weight – 5½ oz.)

Used when cylinder port relief valve is not used. If cylinder port relief is required, then lower anti-cavitation check is used.

PERFORMANCE

Will Pass 8.7 GPM at 10 PSI Pressure Differential.
Will Pass 14 GPM at 20 PSI Pressure Differential.
Will Pass 25 GPM at 40 PSI Pressure Differential.



PARTS LIST

Part No.	Description	No. Req'd. Per Assembly
1615	Seal O-Ring (Outer)	1
1661	Upper Anti-Cav. Ball Retainer	1
1662	Upper Anti-Cav. Body	1
1668	Upper Anti-Cav. Plug	(Opt.)
1718	Seal O-Ring (Outer)	1
2742	Upper Anti-Cav. Ball (5/8" Dia.)	1

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AGRICULTURAL

Form #435 (Rev. 12/14/62)

PRINTED IN U. S. A.

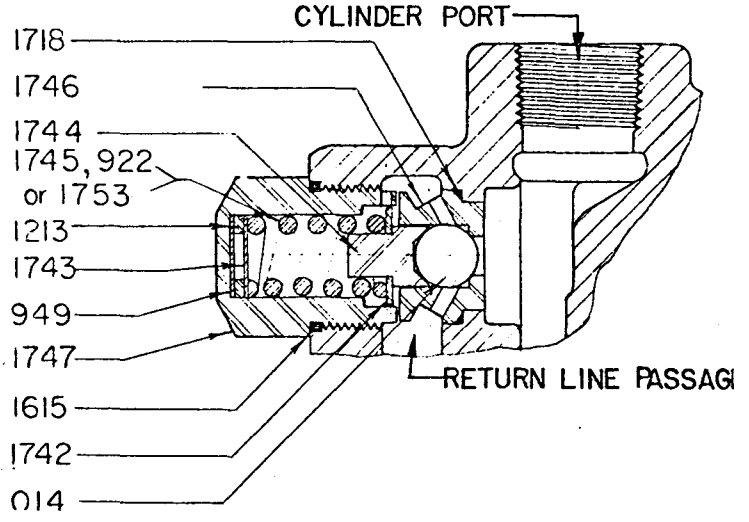
25P & 25PK DIRECTIONAL CONTROL VALVE

CYLINDER PORT "POPPET" RELIEF

For Use in any Working Cylinder Port

(Pressure Range – (300 To 3000 PSI Crack)

IDEAL FOR "LIMITING" CYLINDERS WITH RIGID LINKAGE OR VANE TYPE CYLINDERS HAVING INERTIA LOADS.



USED TO LIMIT PRESSURE (OR FORCE) IN BOTH ENDS OF A DOUBLE-ACTING CYLINDER OR HYDRAULIC MOTOR, OR ONE END OF A SINGLE-ACTING CYLINDER.

FACTORY SET TO CUSTOMERS SPECIFICATIONS
(ADJUSTABLE WITH SHIMS.)
PRESSURE SETTING STAMPED ON CAP.

WGT. – 8 OZ.

Function

This relief valve may be installed as an option, in any cylinder port of the 25P or 25 PK control valve. It is a high quality, inexpensive device for limiting pressure, or cushioning in the work port, line, cylinder, or motor supplied by this particular work port.

Performance

THIS RELIEF WILL PASS 35 GPM.

Parts List

Part No.	Description	No. Req'd. Per Assembly
014	POPPET RELIEF BALL (½" DIA. STEEL)	1
922	RELIEF SPRING (1501–3000 PSI*)	(1)
949	POPPET RELIEF SHIM (.010")	As Req'd.
1213	POPPET RELIEF SHIM (.105")	As Req'd.
1615	SEAL O-RING (OUTER)	1
1668	RELIEF CAVITY PLUG	(Opt.)
1718	SEAL O-RING (INNER)	1
1742	POPPET RELIEF SPRING SPACER	1
1743	POPPET RELIEF SHIM (.006")	As Req'd.
1744	RELIEF BALL FOLLOWER	1
1745	RELIEF SPRING (1001–1500 PSI*)	(1)
1746	RELIEF SEAT	(1)
1747	POPPET RELIEF BODY	1
1753	LOW PRESSURE SPRING (500–1000 PSI*)	(1)

* PRESSURES FULL FLOW @ 35 GPM.

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Form #436

PRINTED IN U. S. A.

INSTRUCTIONS FOR REPLACING, ADDING OR REMOVING #1614 OR #1664 CENTER SECTION ASSEMBLIES IN THE 25P AND 25PK STACK VALVE

NOTE: For the purpose of these instructions, we shall consider the section containing the main relief valve as the left side of the valve.

1. If the valve is to be reassembled in the same order, it is suggested that before disassembling, each section be marked numerically so that they may be returned to the same sequence when reassembled.

2. If valve has been removed from equipment, it is advisable to mount valve vertically in a vise to facilitate disassembly and assembly.

3. On the right end of the valve there may be a power beyond sleeve, conversion plug or closed center plug installed. These must be removed before the valve can be disassembled.

4. Remove the four assembly stud nuts or bolts from right end section.

5. Next, valve sections may be disassembled by sliding the sections along the Assembly studs.

6. If sections are to be removed or added to a valve, remove the four (4) assembly studs from the left end section of the valve. Install four proper length studs for the valve size desired. (See list below for correct studs to be used).

1670 Assembly Bolt - Two Section 934 Assembly Bolt - Three Section	Use #1039 Lockwasher with Assembly Bolts.
1672 Assembly Stud - Four Section 1673 Assembly Stud - Five Section 1674 Assembly Stud - Six Section 1675 Assembly Stud - Seven Section 1755 Assembly Stud - Eight Section 1756 Assembly Stud - Nine Section	Use #1665 Assembly Stud Nuts with all Studs. (No Lockwasher)

NOTE: For Valve Assemblies using more than Nine Sections, contact Gresen Engineering Department.

7. Thoroughly clean the O-ring counterbores and the ground surface of each section. Place new O-ring seals, two Part #1621 and one Part #1622, in proper counterbores. For better sealing, it is suggested that all O-rings used in the counterbores be replaced with new parts.

8. Replace the sections on assembly studs with the O-ring counterbores facing right end of valve. Use care in replacing sections so the section O-rings are not dislodged from the counterbores.

9. When all sections are assembled on assembly studs, tighten the assembly stud nuts or bolts evenly to 20 ft. lbs. torque, NO MORE, NO LESS, otherwise spools may bind or stick.

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25P & 25PK DIRECTIONAL CONTROL VALVE
MAIN SYSTEM RELIEF VALVES

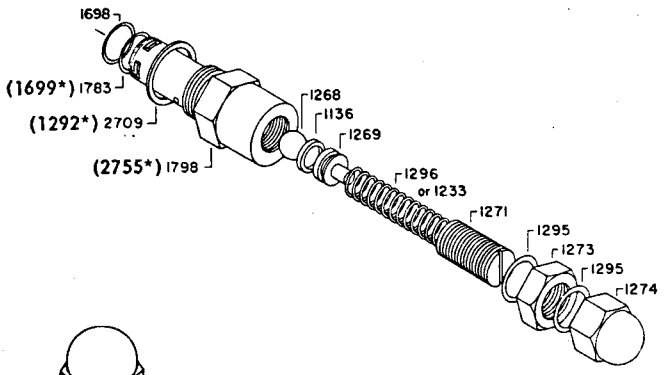
(USED TO CONTROL SYSTEM HYDRAULIC PRESSURE)

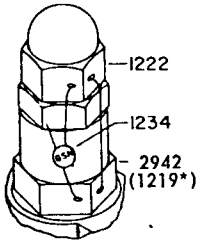
(NOTE: These Main System Relief Valves also used on Model WP & WPK Control Valves.)

MODEL "KC"

(High-Lift Ball-Spring Type) (Adjustable)

Shipping Weight . . . . . 1 lb. 12 oz. (Cartridge Only)
Pressure Range . . . . . 400-2000 PSI
Capacity. . . . . Up to 38 GPM
(See Form #407 for Performance Characteristics.)



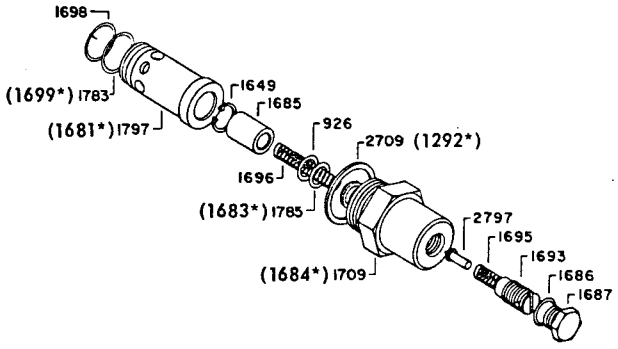


MODEL "KC" (NJ) NON-ADJUSTABLE MODEL

MODEL "PKC"

(Pilot-Operated Type) (Adjustable)

Shipping Weight . . . . . 1 lb. 4 oz. (Cartridge Only)
Pressure Range . . . . . 200-2500 PSI
Capacity. . . . . Up to 40 GPM
(See Form #407 for Performance Characteristics.)



Note: Due to the close tolerances held on the working parts of a pilot-operated relief valve, it is important that the system be kept free of all foreign matter. We strongly recommend that a filter be installed in any system incorporating pilot-operated reliefs. (Refer to Form #450 covering Gresen F-200 Series Filters, and Form #470 for the F-100 Series Filters.

PARTS PRICE LIST

*NOTE: Numbers not shown in parenthesis apply only to Inlet Sections #3000, 3001, 3002 and 1704; and Mid-Inlet Sections #3003 and 3004. Numbers in parenthesis apply to Sections #1714, 1724, 1734, 1740 and 1748.

MODEL "KC"

Part No.	No. Req'd.	Description	List Price
1136	1	Ball Guide Seal	$ .25
1233	(1)	H.P. Relief Spring (Opt.)	.70
1268	1	Ball	.25
1269	1	Ball Guide	.80
1271	1	Adjusting Screw	1.00
1273	1	Jam Nut	.20
1274	1	Acorn Nut	1.00
2709 (1292*)	1	Body Gasket	.30 (.15*)
1295	2	Screw Seal Washer	.20
1296	1	Relief Spring (Std.)	.70
1698	1	O-Ring Seal	.25
1783 (1699*)	1	Back-Up Ring	.40 (.15*)
1798 (2755*)	1	Relief Body	7.00
SPECIAL PARTS FOR NON-ADJUSTABLE (NJ) OPTION			
2942 (1219*)	1	NJ Relief Body	$7.50
1222	1	NJ Acorn Nut	1.50
1234	1	NJ Lead Seal	.10

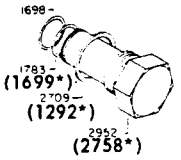
MODEL "PKC"

Part No.	No. Req'd.	Description	List Price
926	1	O-Ring Seal	$ .20
2709 (1292*)	1	Gasket	.30 (.15*)
1649	1	Retaining Ring	.05
•1797 (1681*)	1	Pilot Rel. Cylinder	6.00
1785 (1683*)	1	Back-Up Washer	.30 (.10*)
1709 (1684*)	1	Pilot Rel. Body	6.00 (5.00*)
•1685	1	Pilot Rel. Piston	2.50
1686	1	Gasket	.10
1687	1	Relief Cap	.60
1693	1	Adjusting Screw	1.25
1695	1	Pilot Spring	.25
1696	1	Piston Spring	.35
1698	1	O-Ring	.25
1783 (1699*)	1	Seal	.40 (.15*)
2797	1	Poppet	.75

•NOTE: Sold Only in Matched Sets

NO RELIEF OPTION (N.R.)

Part No.	No. Req'd.	Description	List Price Ea.
2952 (2758*)	1	No Relief Cap.	$2.50
2709 (1292*)	1	Body Gasket	.30 (.15*)
1698	1	O-Ring Seal	.25
1783 (1699*)	1	Back-Up Ring	.40 (.15*)



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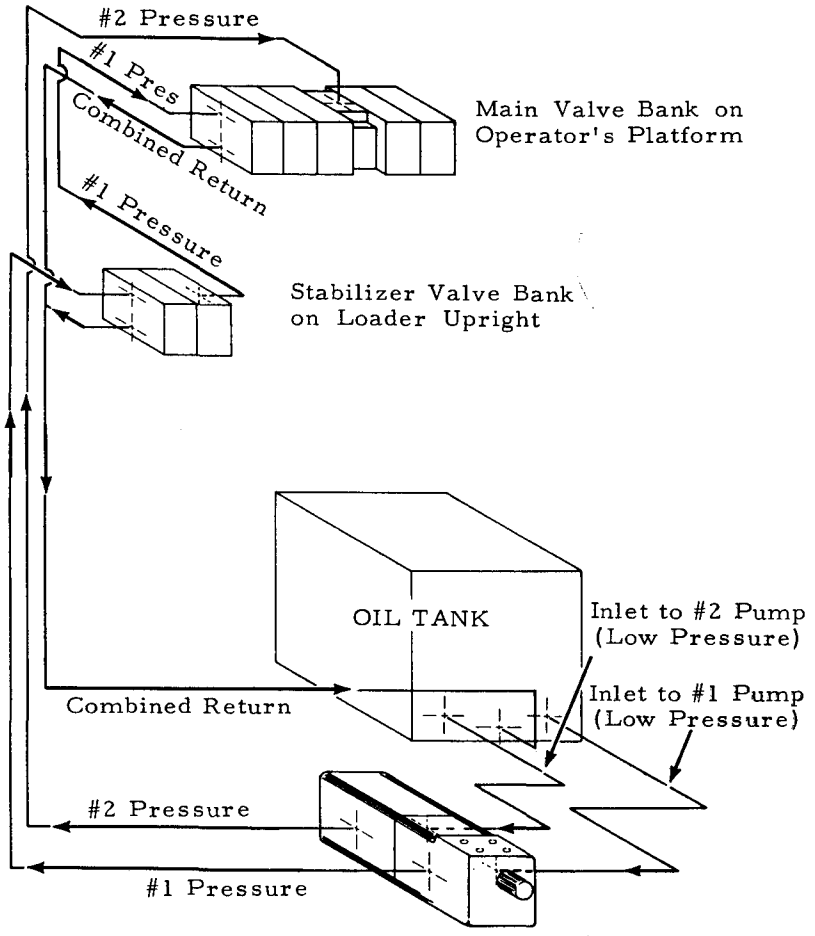
INSTALLATION OF BASIC HYDRAULIC CIRCUIT

SECTION F

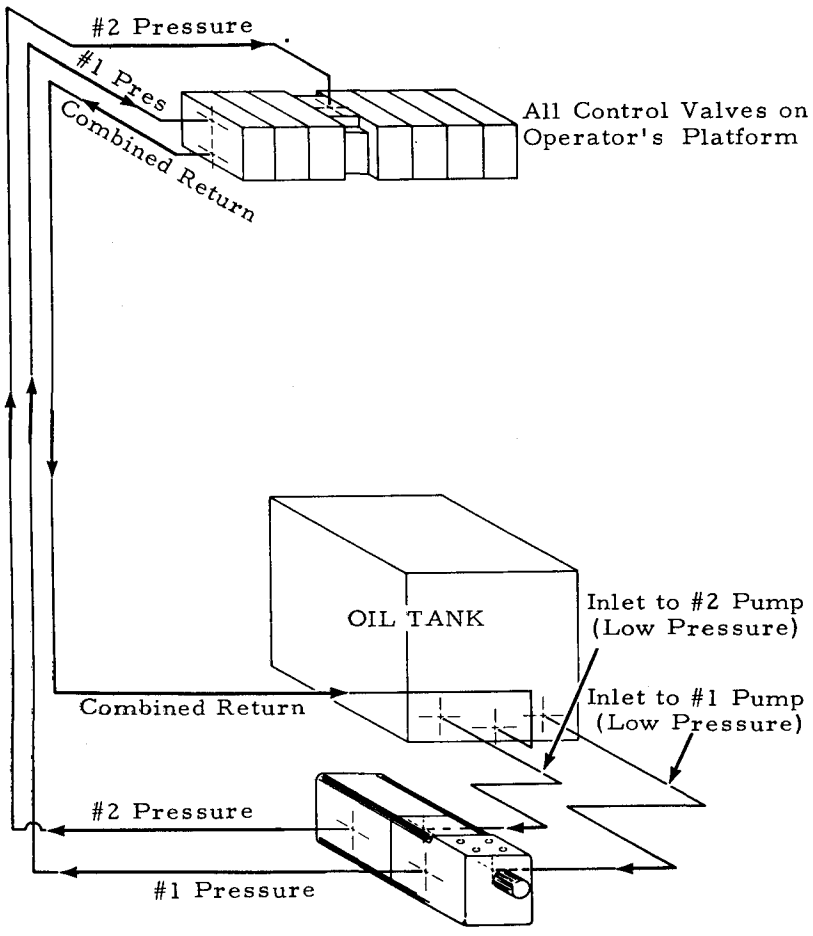
TANDEM CIRCUIT DRAWINGS
(DIAGRAM F1-A)

ROTATING OPERATOR'S PLATFORM



Pump Shaft Rotation
Counter-clockwise

STATIONARY OPERATOR'S PLATFORM



Pump Shaft Rotation
Counter-clockwise

Hydraulic Hosing, Main Frame & Chassis

Tandem Circuit Description

The installation procedure, as described on the following pages, is the same for both tandem and single circuit hydraulic systems.

On tandem circuit units, you will have two 1" pump inlet (low pressure) hoses and two 3/4" pump outlet (high pressure) hoses to install. The combined return hose (to tank) is 1" in diameter on tandem circuit units. DO NOT confuse this high pressure hose with the low pressure pump inlet hoses. Check tags on hoses.

Route the hoses as shown in the circuit diagram on the facing page.

Pump Inlet Lines:

Install the low pressure hoses between the tank and the pump by following single circuit instructions.

Pump Outlet Lines:

The #1 pump (closest to shaft) outlet hose is connected to the line leading to the end inlet of the valve bank (see circuit diagram). On rotating platform units, connect this line to stabilizer valve inlet pipe (see circuit diagram). Units without stabilizers: connect this hose to end inlet of main valve bank.

The #2 pump (farthest from shaft) outlet hose is connected to main valve bank mid-inlet line; see circuit diagram.

SINGLE CIRCUIT Loader w/Governor:

Two Governor connections may be provided: a 1/4" NPT fitting at base of "A" frame on Loader Pressure Line, or a 1/4" tapped hole in Pump Outlet Fitting. If fitting at base of "A" frame is used (Behind Cab Units), insert street elbow. Be sure to block opening not used with 1/4" pipe plug.
PT Units have governor-hose fitting on pump outlet line only.

Tank Return Lines:

Use high pressure bulk hose tagged "RETURN". Install the hose between the loader return line and the tank by following single circuit instructions. On tandem circuit units, the return line on the loader frame is easily recognized because of its larger size.

Hydraulic Hosing, Main Frame & Chassis

General Instructions

NOTE: Except for the routing, which is described above, the following instructions apply to both tandem and single circuit installations.

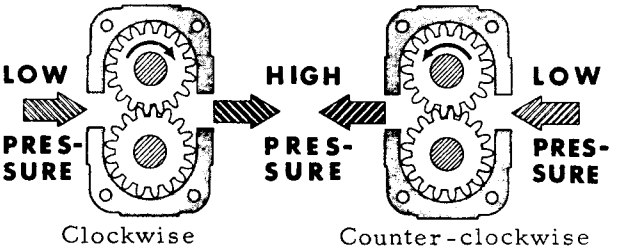
NOTE: To Prevent Leakage

Teflon Tape is furnished with the kit. Every Male pipe-thread (NPT) fitting (male fitting not to be inserted in swivel nut) must be wrapped in a clockwise direction with one and one-half turns of this tape. Start one thread from the end of the threaded pipe or pipe-thread fitting, as shown in illustration F-4.

Direction of Pump Rotation

The hydraulic pump is bi-rotational: it will pump oil in either direction, depending upon which way the drive shaft is turned.

When the pump drive shaft is turned clockwise (looking at the shaft-side of the pump) and the pump is mounted under the mounting bracket, oil will flow in the left side and be pushed out the right side (see diagram F-2). When the pump drive shaft is turned counter-clockwise, the oil will go the opposite way.



F2 -- Pump Rotation/Oil Flow Diagram

After you have determined which is the inlet port of the pump and which is the outlet port, prepare to hose it up. Remove the plugs from the pump ports. All pump ports are 1-1/4" in diameter, but the outlet (pressure) port must be smaller than the inlet port, so bushings are provided. Put the 1" ID bushing in the inlet port, and the 3/4" ID bushing in the outlet port. Install elbows and swivels in pump ports to make hose installation easier. See illustration F-3.

TANDEM CIRCUIT Loader w/Governor:

See Section G of this Manual.

Hydraulic Hosing, Main Frame and Chassis

General Instructions

The kit contains enough bulk hose for most installations. Each section of hose is labeled, and re-usable fittings are supplied.

USE OF PIPE

NOTE: If your loader is too far from the pump and tank for the high pressure hoses to reach, sections of pipe the same inside diameter as the hose may be used. The pipe should be installed on the pump outlet port(s) and the tank inlet port. Use hose between the pipe and the lines on the loader.
Install a swivel fitting where the pipe and hose meet. To make service easier later on, install a union in the pipe near the pump and tank.

PT-MOUNT MODELS

If your loader is to be mounted at the extreme rear of your payload vehicle, more high pressure bulk hose and extra re-usable fittings will be included in the kit.

Obtain a length of 3/4" pipe for each pressure line, and a length of 1" pipe for the return line. These pipes should reach from the loader mounting area to within 36"of the pump and tank, and should be clamped down at both ends and in the middle. Swivel fittings are supplied for coupling hoses to pump and tank.

Connect the "bridge" pipes to the pump, to the loader pressure and return lines, and to the tank, using the bulk hose provided. Refer to the tags on the bulk hose.

INSTALLING BULK HOSE

Refer to tags on bulk hose, and on tube lines on the loader frame.
Before cutting the bulk hose to length, try it in place or take measurements to see how much of it you will need. Remember that a hose will last longer if it is kept away from any sharp corners or edges on the frame. Cut it long enough so that it will not be pulled taut when installed.

If you find you will need to use pipe, install it at this time. Refer to "USE OF PIPE", above.

After cutting bulk hose to length, install reusable fittings on the hose. Refer to page F-6 before installing re-usable fittings.

Find out how much hose you will need between the tank filter outlet and the pump inlet port, and cut the 1" low pressure hose to fit.
Install a swivel fitting in the elbow on the pump inlet port.
Tandem Circuit: Same procedure for both hoses.

Locate the pressure line on the loader frame and find out how much hose you will need between the pump outlet port and the loader pressure line, and cut bulk high pressure hose (tagged "PRESSURE") to fit. Install 90° elbow swivel fitting in reducer bushing in pump outlet port.Tandem Circuit: Refer to page F-2. PT-mount: Refer to "USE OF PIPE", above.

Locate the return line on the loader frame and find out how much hose you will need between the return line and the tank inlet port, and cut bulk high pressure hose (tagged "RETURN") to fit. If there is no swivel on the return line on the loader frame, install swivel fitting at tank inlet port.
Tandem Circuit: Same procedure; refer to tag on bulk hose. PT-mount: Refer to "USE OF PIPE", above.

NOTE: If you are not sure which line on the main frame is the pressure line and which is the return, trace them to a valve bank. "IN" and "OUT" ports of valve bank are marked. The line leading to the "IN" port of the valve bank is the pressure line. The remaining one is the return line. Tandem circuit valve bank has two inlets, the second one being between the MAIN BOOM and STICK BOOM valve sections. Refer to Circuit Drawings.

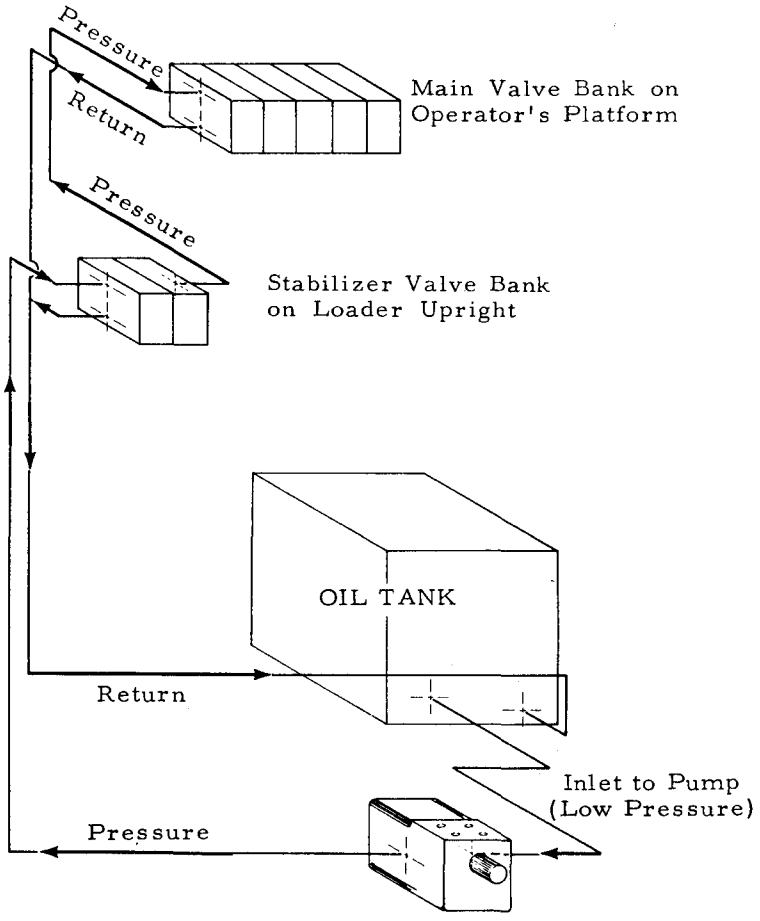
When single circuit hosing is completed, a 1" low pressure line will run from tank to pump; pressure line will run from pump to loader, and a return line from loader to tank will complete the circuit. See Circuit Diagrams in this section. Tandem Circuit: Refer to pages F-1 and F-2.

Install re-usable fittings as described in "Re-usable Fitting Installation" on page F-6 of this manual.

SINGLE CIRCUIT DRAWINGS

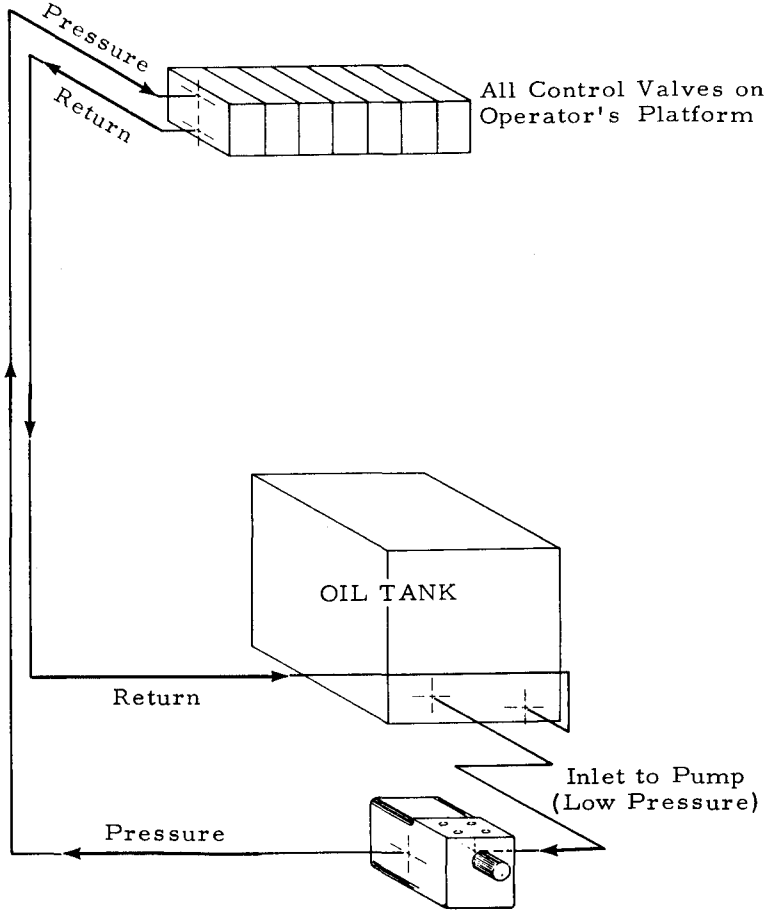
(DIAGRAM F1-B)

ROTATING
OPERATOR'S PLATFORM



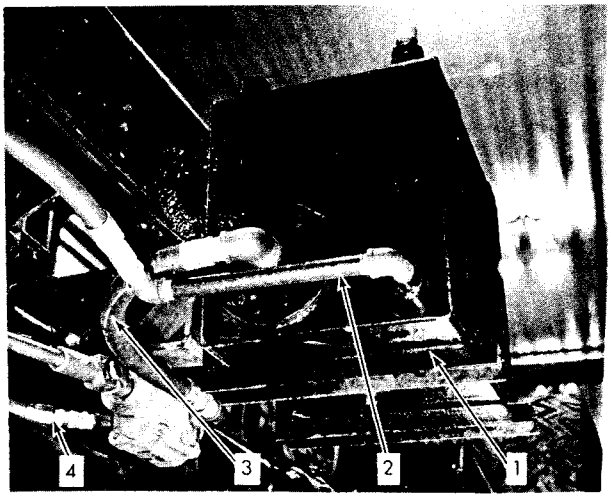
Pump Shaft Rotation
Counter-clockwise

STATIONARY
OPERATOR'S PLATFORM

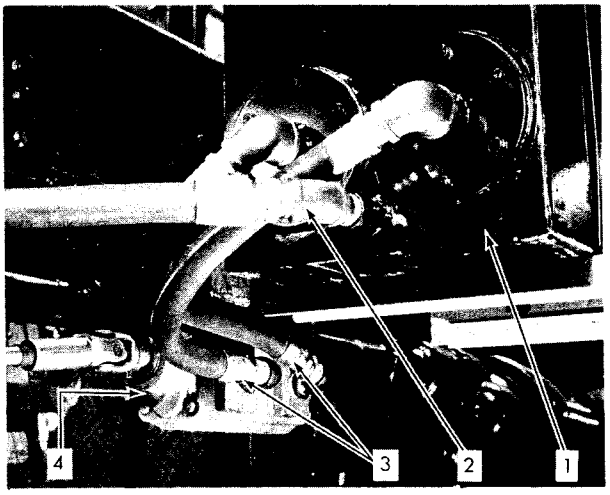


Pump Shaft Rotation
Counter-clockwise

CONTINUED



SINGLE CIRCUIT

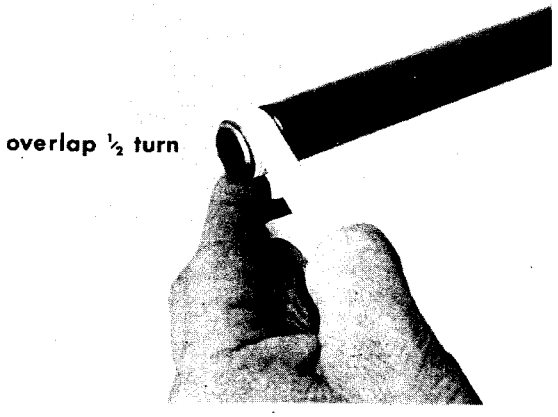


TANDEM CIRCUIT

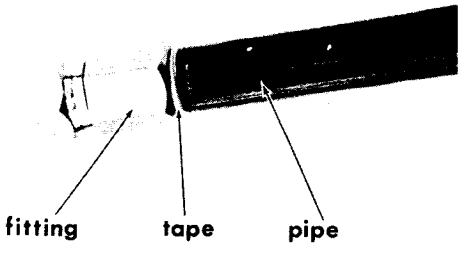
F3 -- Hose Connections at Hydraulic Tank showing hydraulic system Return Line and Pump Inlet (low pressure) Line. Use pipe, as shown, if necessary. Note Teflon tape on pipe-thread fittings. Pumps shown are hosed for counter-clockwise shaft rotation.

ITEM LIST

1. TANK
2. RETURN LINE (high pressure hose)
3. PUMP INLET (low pressure hose)
4. PUMP OUTLET (high pressure hose)



WINDING TAPE



COMPLETED FITTING

F4 -- Correct Use of Teflon Tape On NPT Fitting

Re-usable Fitting Installation

Low Pressure Hose (pump inlet line)

1. Cut hose square to proper length with fine tooth hacksaw or cut-off wheel.
2. Put female fitting in vise and turn hose counterclockwise into it until it bottoms. Be sure to grip hose close to fitting while turning it, to avoid twisting the metal coil inside the hose.
3. Lubricate the inside of the hose and the outside of the male fitting with hydraulic oil or grease.
4. Push the male fitting into the open end of the female fitting. Turn male fitting clockwise until it bottoms on female fitting.

Re-usable Fitting Installation

HIGH PRESSURE NO-SKIVE HOSING

1. Cut hose square to length with fine-tooth hacksaw or cut off wheel.
2. Put hose in vise and turn female fitting counter clockwise until it bottoms.
3. Lubricate inside of hose and outside of male fitting with plenty of hydraulic oil.
4. Push the male fitting into the female fitting until threads make contact. Turn the male fitting clockwise until it bottoms.

NOTE: Be sure the hose is straight. If it is bent or kinked while male fitting is being inserted, the inside of the hose may be damaged by fitting. See illustration F-8

Re-usable Fitting Installation

High Pressure Hose that Requires Sciving (Hose NOT marked "NO-SKIVE").

1. Cut hose square to length required with fine-tooth hacksaw or cut-off wheel.
2. Rubber cover must be stripped from hose before it can be inserted into female fitting. Locate stripping point by lining up end of hose with notch on female fitting. Cut should line up with end of fitting (see illustration F-6)

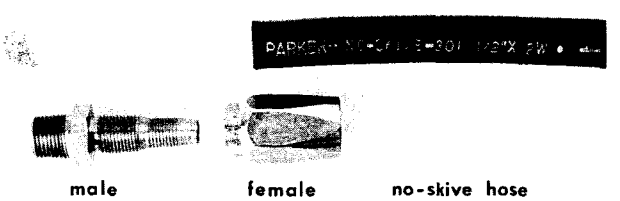
A. Cut down to metal reinforcement all around the hose. Slit hose down to metal reinforcement from cut to end.

B. After cutting and slitting rubber cover, peel it off with pliers. Clean excess rubber off reinforcement with wire brush or wire wheel.
DO NOT FRAY OR FLARE REINFORCEMENT WHEN BRUSHING.

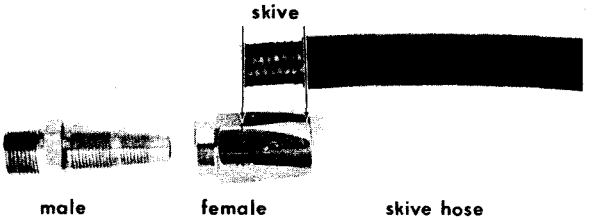
3. Put female fitting in vise and turn hose counter-clockwise into it until it bottoms.
4. Lubricate the inside of the hose and the outside of the male fitting with hydraulic oil.
5. Push the male fitting into the open end of the female fitting. Turn the male fitting clockwise until it is snug against the female fitting.

WARNING:
DO NOT SKIVE any hose that is marked "NO SKIVE". Refer to illustration F-5

ILLUSTRATIONS OF INSTALLATION PROCEDURE ARE ON PAGE F7.



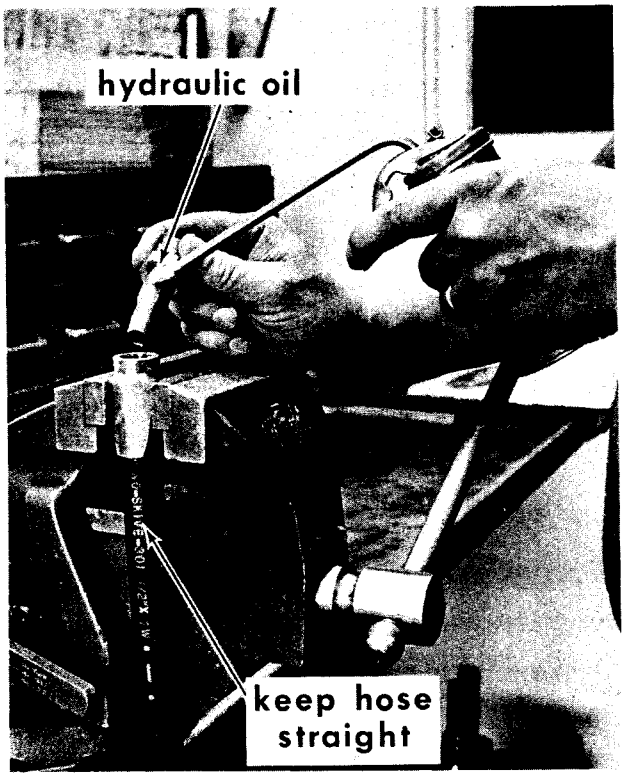
F5 --Re-usable Fitting Components with Hose. High pressure hose that does not require skiving is marked "NO SKIVE".



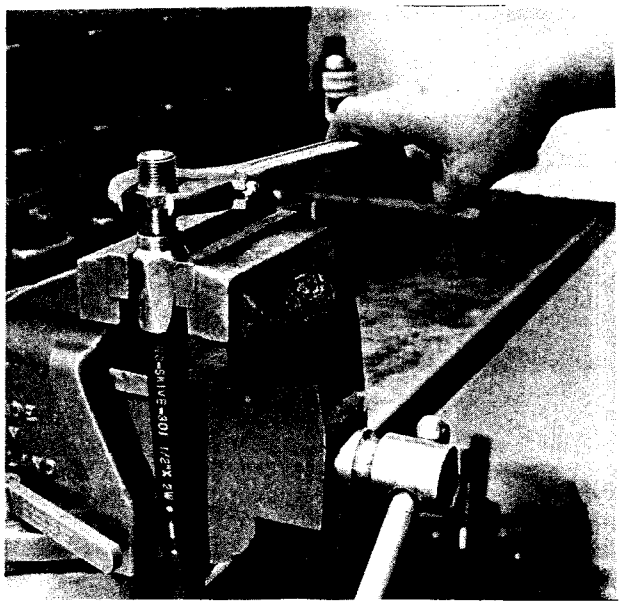
F6 --Re-usable Fitting Components with Skived Hose. Note that fitting is notched for measurement of skive.

CONTINUED

F7 --Turning female fitting onto end of hose. Note LEFT HAND thread.



F8 --Lubricate male fitting with Hydraulic Fluid before inserting into female fitting.



F9 --Turning male fitting into open end of Female Fitting and into Hose. Note RIGHT HAND thread.

NOTE: Except for the skiving, all Re-uasable Fittings are installed the same way.
DO NOT SKIVE low pressure hose.
DO NOT SKIVE "NO-SKIVE" hose.
Install fittings as shown on this page.

DO NOT PUT LOW PRESSURE HOSE IN VISE.

F10 --Completed Re-usable Fitting. Installed on High Pressure Hose.

Prentice

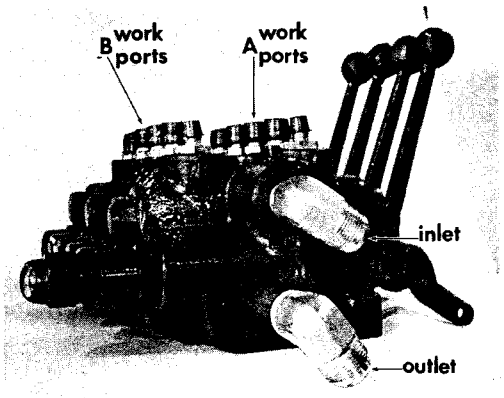
INSTALLATION OF

HOSES

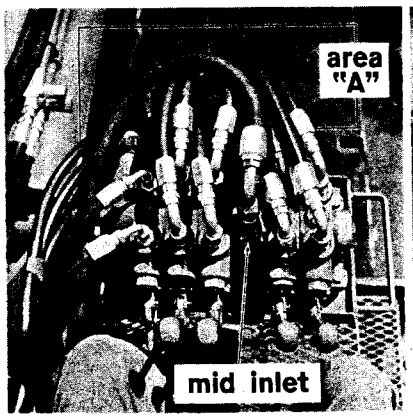
VALVE BANK TO BOOM

ROTATING PLATFORM

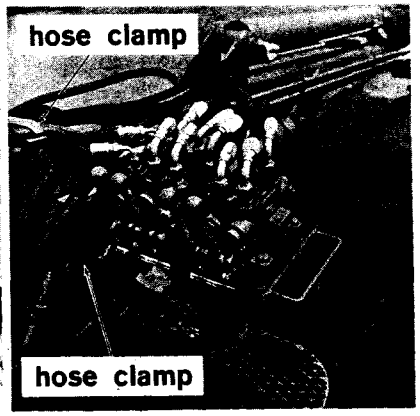
SECTION K



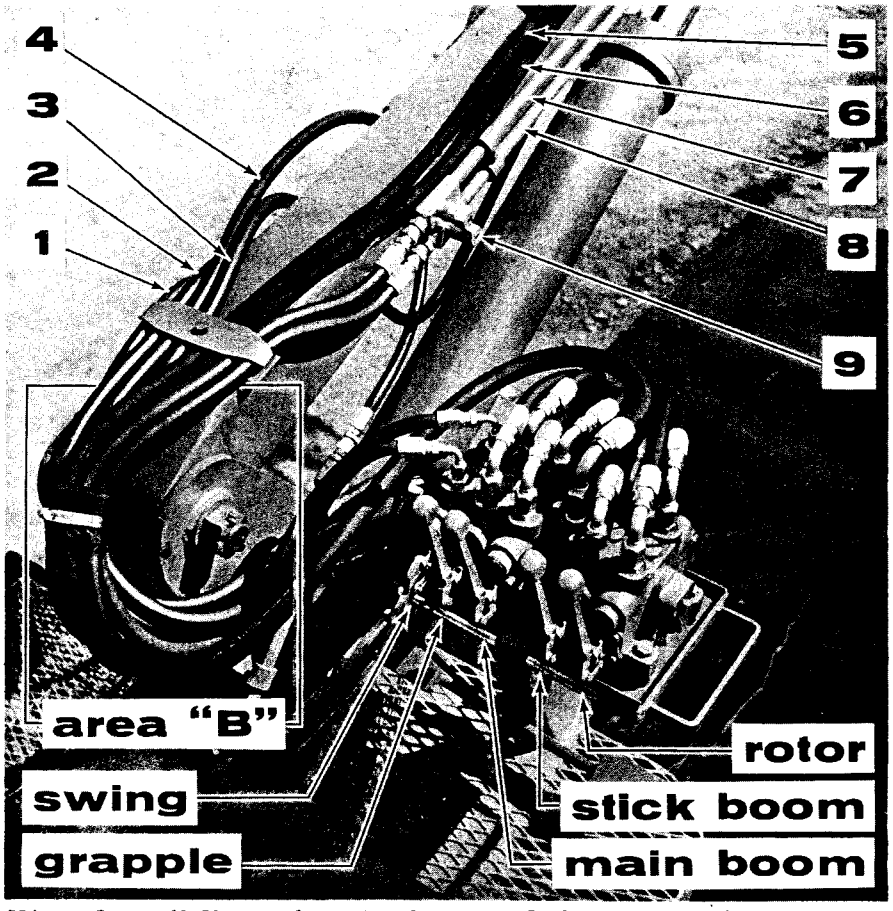
K1 - - End of Valve Bank, showing "A" and "B" work ports, end inlet and outlet.



K2 - - Hoses connected to Valve Bank Work Ports. Mid Inlet Line shown here Used on tandem circuit only.



K3 - - View of Valve Bank and Boom, showing locations of wing-type hose clamps, and hoses leading to stick boom cylinder.



K4 -- Overall View of Hosing between Valve Bank and Boom, with hoses numbered in order of installation.

ILLUSTRATION K4 ITEM LIST

1. "GRAPPLE OPEN" HOSE
2. "GRAPPLE CLOSE" HOSE
3. "MAIN BOOM DOWN" HOSE
4. "MAIN BOOM UP" HOSE
5. "STICK BOOM DOWN" HOSE
6. "STICK BOOM UP" HOSE
7. "ROTOR RIGHT" HOSE
8. "ROTOR LEFT" HOSE
9. FLOW REGULATORS (Used on Units with Orbit Motor Rotator only).

Installation of Valve Bank Hoses

General Information

Hoses from the valve bank to the boom must be installed so that they will not be damaged by the movement of the boom, and they must be connected to the proper ports if the machine is to work properly.

Hoses are cut, fitted, and tagged at the factory. Carefully read the following instructions, and check the tags on the hoses.

Installation of Valve Bank Hoses
Hose Routing Pattern

Sort out the hoses labeled "--Cylinder to Valve," and "--Boom to Valve," these are the Valve Bank Hoses.

Working from left to right, connect the 90° elbows of these hoses to their proper ports on the valve bank, as indicated on tags. Use the following chart and the decal on the valve bank as references. Illustration K-2 shows proper alignment of hose elbows at valve bank.

NOTE: Both rows of valve bank work ports are labeled. The back row of ports (nearest the controls) is labeled "A". The front row of ports is labeled "B". Refer to illustration K-2

Valve Section	Port Pressurized and Function
Boom Swing	This circuit is completely assembled at the factory.

NOTE: If your Loader is equipped with a cab, connect as indicated on tags.

Grapple Cylinder:	B port, grapple CLOSE A port, grapple OPEN
Main Boom	B port, boom UP A port, boom DOWN
Stick Boom	B port, boom UP A port, boom DOWN
Grapple Rotor	B port, rotor RIGHT A port, rotor LEFT
Stabilizers	These circuits hosed as indicated in Section L of this manual.

After connecting the hoses to their proper valve ports, thread hoses between the valve bank and the boom in the following manner:

NOTE: Under "Location" on each hose tag, you will find instructions on where to connect the hose after you have routed it as described below. Do not tighten the fittings until the hose clamps are in place and the hoses have been adjusted for good "fit".

Start at the left of the valve bank and work to the right. Loop the hoses down alongside the boom mounting ear and then up behind the base end of the boom. Refer to illustration K-4.

NOTE: Both rows of valve bank work ports are labeled. The back row (nearest the controls) is labeled "A". The front row is labeled "B". Refer to illustration K-2.

"GRAPPLE OPEN" HOSE

First, loop the A-port hose from the GRAPPLE valve section down alongside the boom mounting ear, and up over the base of the boom at the far left. Connect it to the lower tube line on the left side of the boom.

"GRAPPLE CLOSE" HOSE

Second, loop the B port hose from the GRAPPLE valve section down alongside the boom mounting ear, just outside the loop of the "GRAPPLE OPEN" hose, and up over the base end of the boom, just to the right of the "GRAPPLE OPEN" hose. Connect it to the upper tube line on the left side of the boom.

"MAIN BOOM DOWN" HOSE

Third, loop the A-port hose from the MAIN BOOM valve section down alongside the boom mounting ear just outside the loop of the "GRAPPLE CLOSE" Hose, and up over the base end of the boom just to left of center (refer to illustration K-4). Connect hose to rod end port of main boom cylinder.

"MAIN BOOM UP" HOSE

Fourth, loop the B-port hose from the MAIN BOOM valve section just outside the loop of the "MAIN BOOM DOWN" Hose, and up over the base end of the boom, to the left of the "MAIN BOOM DOWN" Hose (refer to illustration K-4). Connect hose to base end port of main boom cylinder.

- - CONTINUED

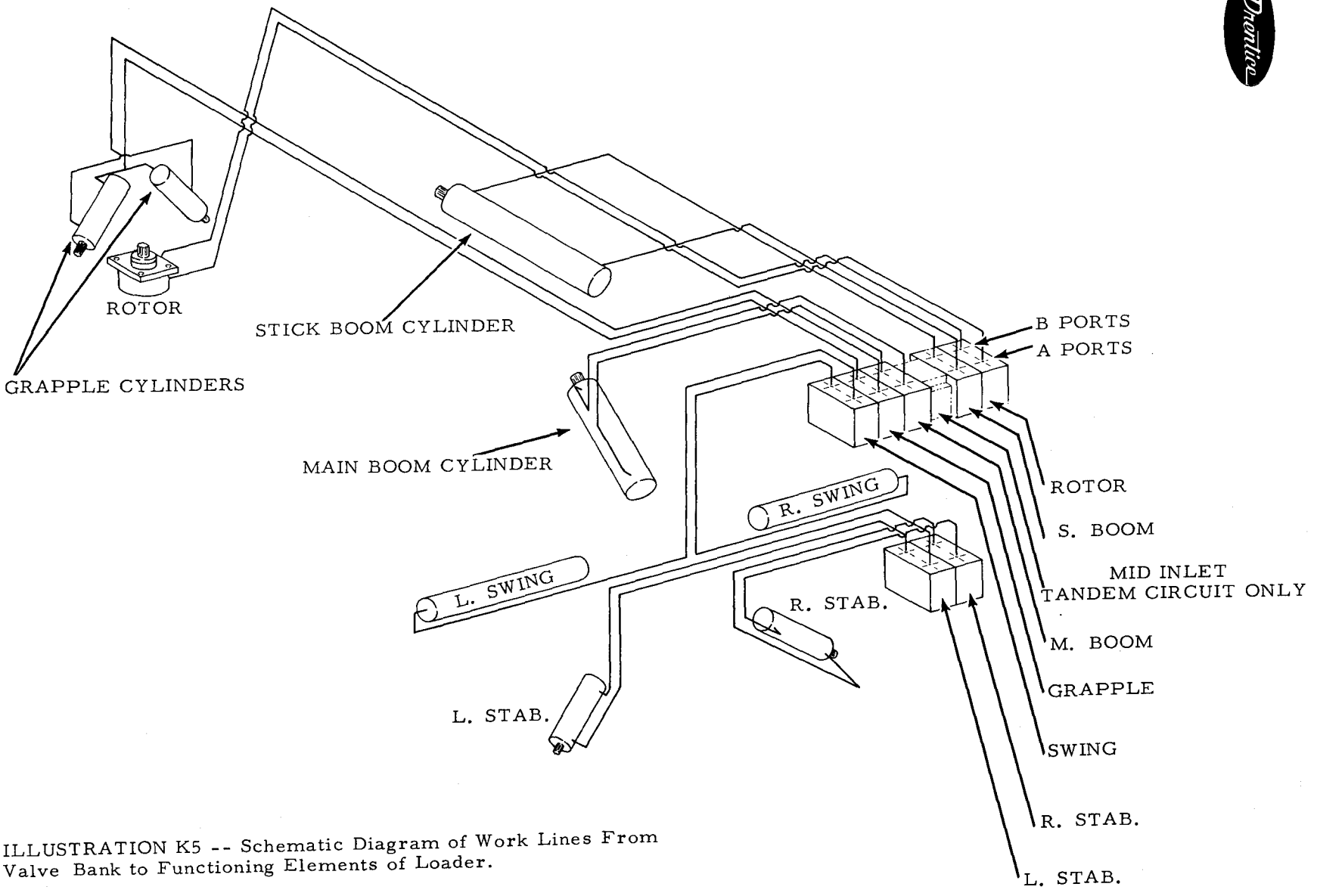


ILLUSTRATION K5 -- Schematic Diagram of Work Lines From Valve Bank to Functioning Elements of Loader.

"STICK BOOM DOWN" HOSE
Fifth, loop the A-port hose from the STICK BOOM valve section just outside the loops of the other hoses, alongside boom mounting ear, and up over the base end of the boom, just right of center. Connect it to the base-end port of the Stick Boom Cylinder.

"STICK BOOM UP" HOSE
Sixth, loop the B-port hose from the STICK BOOM valve section, just outside the loops of the other hoses alongside boom mounting ear, and up over the base end of the boom, to the right of the "STICK BOOM DOWN" Hose. Connect it to the rod-end -port tube line on the Stick Boom Cylinder.

"ROTOR RIGHT" HOSE
Seventh, loop the B- port hose from the ROTOR valve section just outside the loops of the other hoses alongside boom mounting ear, and up over the base end of the boom, to the right of the other hoses. Connect it to the upper tube line on the right side of the boom.

"ROTOR LEFT" HOSE
Eighth, loop the A- port hose from the ROTOR valve section just outside the loops of the other hoses alongside boom mounting ear, and up over the base end of the boom, to the right of the other hoses. Connect it to the lower tube line on the right side of the boom.

There is a tapped hole on the right boom mounting ear, and one on the base of the boom. These are for hose-clamp mounting capscrews. Arrange the hoses four on either side of each hole, put the wing-type hose clamps in place, and insert the capscrews (see illustration K-3). Do not tighten the hose connections or the capscrews.

After making sure the hoses are connected properly, and that the wing-type clamps are in place (but not tightened), adjust the hoses to accumulate slack as follows:

The main part of the slack in these hoses should be between the two wing clamps.

Do not leave too much slack in the hoses between the valve bank and the wing clamp on the boom mounting ear (Area "A" in illustration); leave just enough slack so that hoses are not kinked, or bent too sharply, at valve bank fittings. Tighten the wing clamp on the boom mounting ear.

Before tightening the wing clamp screw on the base end of the main boom, pull hard on the hoses behind this clamp to accumulate the remaining slack in Area "B" (shown in illustration). Tighten the wing-type hose clamp on the base end of the main boom.

Hose Connection Checklist
(Refer to illustration K5)

VALVE SECTION	HOSE
Grapple Cylinder:	"GRAPPLE OPEN" to lower tube line on left side of boom. "GRAPPLE CLOSE" to upper tube line on left side of boom.
Main Boom:	"BOOM DOWN" to rod-end port of main boom cylinder. "BOOM UP" to base-end port of main boom cylinder.
Stick Boom	"BOOM DOWN" to base-end port of stick boom cylinder. "BOOM UP" to line that leads to rod-end port of stick boom cylinder.
Grapple Rotor	"ROTOR LEFT" to lower line on right side of boom. "ROTOR RIGHT" to upper line on right side of boom.

Place a large size collar-type hose clamp around the hoses about two feet from the wing-type hose clamp on the boom. Tighten it slightly to hold hoses in place while you wrap a few turns of friction tape around them next to the clamp.

Loosen the clamp, move it over the friction tape, and tighten it securely. After all clamps have been secured, tighten all hydraulic fittings. Illustrations K-3 and K-4 show clamp locations.

Apply the other large size collar-type hose clamp in the above manner to hoses between valve bank and boom mounting ear. This clamp should be placed about midway between the valve bank and the clamp on the boom mounting ear.

Tighten all hose fittings.

ILLUSTRATED INSTRUCTIONS FOR VALVE BANK TO BOOM HOSING ON UNIT WITH CAB ARE ON PAGE K-5.

ILLUSTRATION K-6 -- Installation of Valve Bank-to-Boom Hosing on Units Equipped with Cab.

We recommend that Stabilizer Valve Bank be hosed (see Section L) before hoses are installed between Main Valve Bank and Boom.

INSTRUCTIONS

Valve Bank-to-Boom Hoses are much longer on units equipped with operator's cab, than on units without cab.

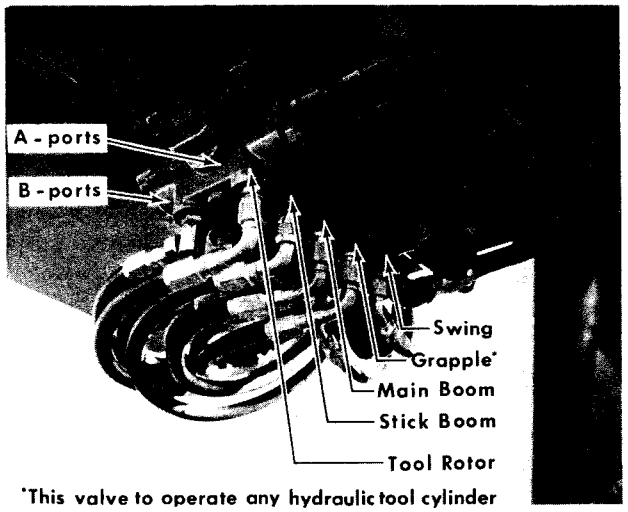
Main Valve bank is mounted under cab floor.

Connect hoses to work ports, following instructions on page K-4, and instructions on tags.

When threading hoses up to boom, follow pattern shown in these illustrations, refering to numbers, which are repeated in the following paragraph:

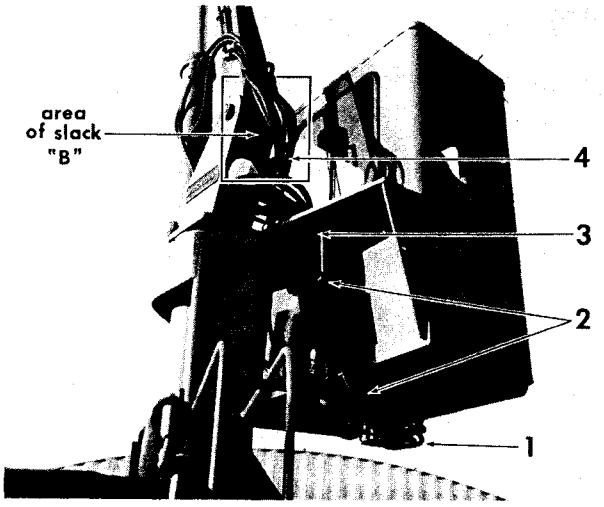
Hoses are routed;

1. to rear of valve bank
2. looped around to the left and up left side of cab
3. through hole in cab mounting bracket
4. looped forward over top of stabilizer valve bank, and back alongside boom and up over main boom base-end as shown in illustrations K-6B, K-6C, and K-4.

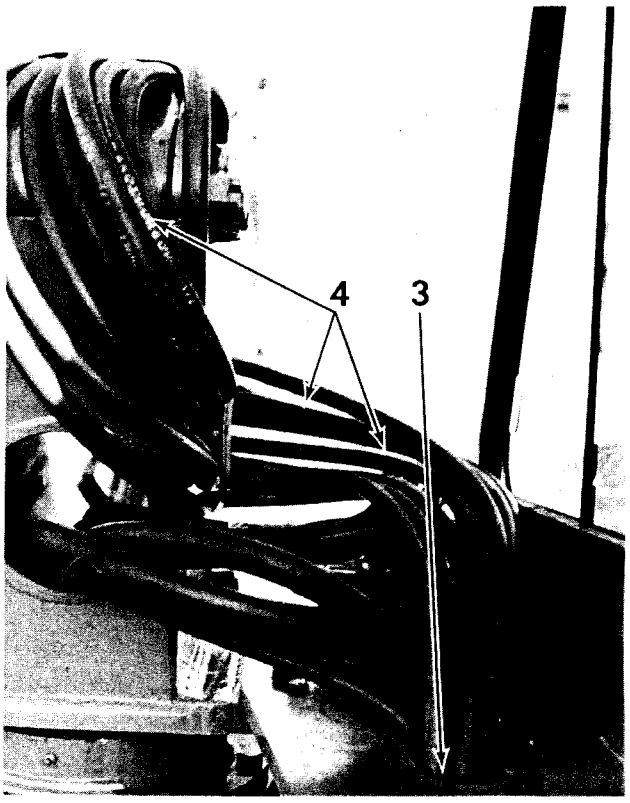


*This valve to operate any hydraulic tool cylinder

K-6A -- Valve Bank properly hosed



K-6B -- View of properly hosed Cab Mount (complete) from below. No collar-type hose clamp necessary in area of slack "B" on these units.

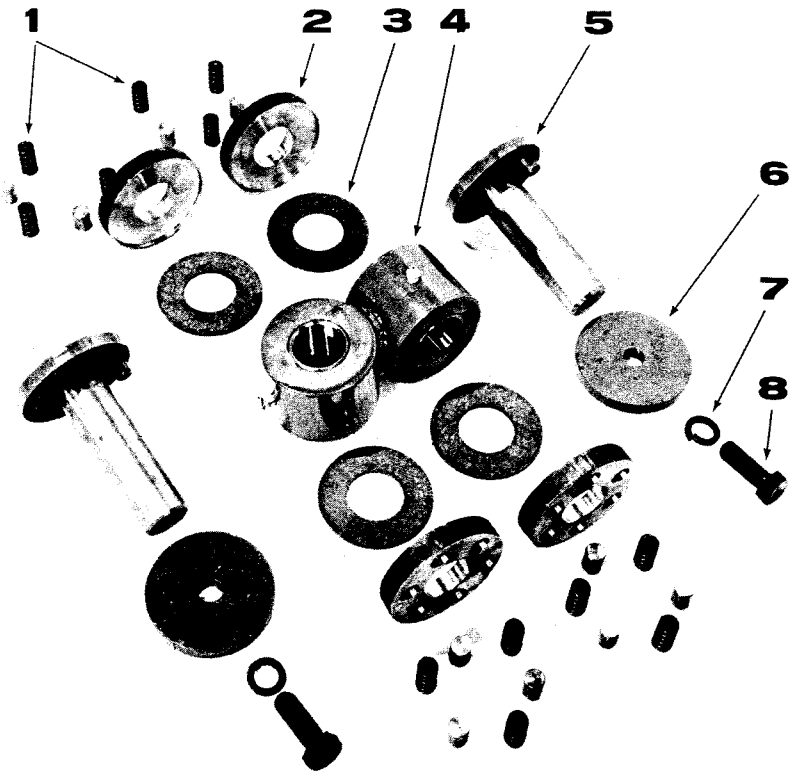


K-6C -- Hoses above Cab Mounting Bracket, leading to base-end of boom.

Prentice

INSTALLATION OF TOOL

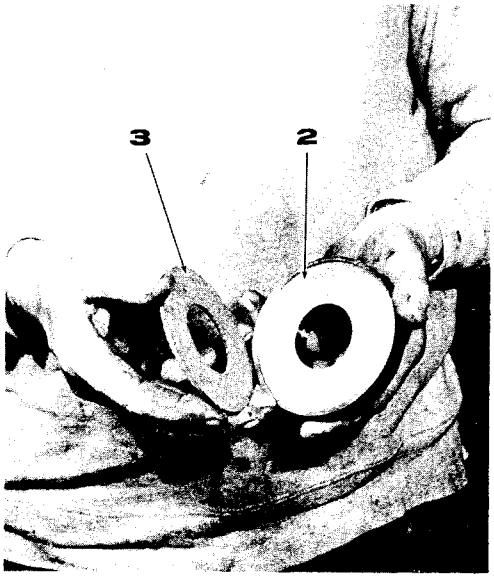
SECTION N



LIST OF ITEMS CALLED OUT IN ILLUSTRATIONS N1, N2, N3, N4, and N5

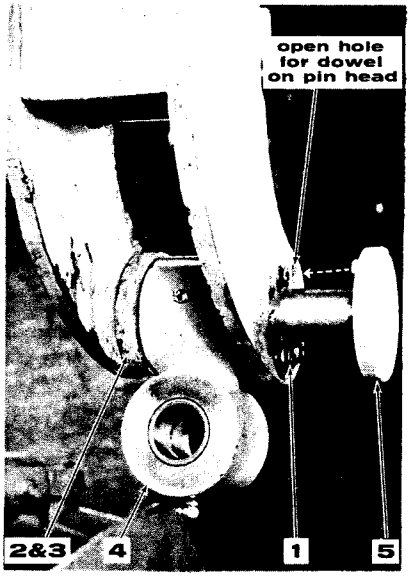
1. Dowels and Springs for mounting friction discs.
2. Brake Disc.
3. Brake Facing
4. U-Joint Knuckle ass'y w/grease fittings.
5. Mounting Pin (Note dowel on pinhead)
6. Washer
7. Lockwasher
8. Capscrew

N1 - - Separate Parts of Working Tool Mounting U-Joint Assembly.



N2 - - Install Brake Facings in Brake Dics.

N3 - - Install Dowels, Discs and Springs in Mounting Ears.



N4 - - Install U-Joint between Discs with Mounting Pin.

MOUNTING FRICTION KNUCKLE ON BOOM

Mounting Friction Discs on Boom

The Tool is mounted to the boom by a Universal Joint, which must be assembled before the Tool is installed. The knuckles of the Universal Joint are equipped with self-adjusting brake discs; the assembly is referred to as a Friction Knuckle (See illustration N-1 for parts).

Four discs, each with one side dead-end bored for mounting dowels, and the other side milled out for brake-facings, will be found in the kit. Install facings in the discs (see illustration N-2).

Mounting dowels and springs will be found in the box with the discs. There are ten (10) dowels and twelve (12) springs in the assembly.

Insert three dowels in one of the mounting ears on the boom, putting them in every other hole. Place two in the opposite mounting ear, as shown in illustration N-3. The remaining hole is for the dowel on the head of the mounting pin. Tap the dowels until they are flush with the outsides of the ears. Install discs and springs as shown in illustration N-3.

Mounting Tool U-Joint on Boom
See illustration N-1 for parts.

Retap the grease-fitting holes in the U-joint to remove paint. Fit the U-joint between the discs on the stick boom mounting ears. The tapped hole (for grease fitting) in the side of the sleeve should face away from the boom, as shown in illustration N-3.

The hole that remains after the springs and dowels have been inserted is for the dowel on the head of the mounting pin. Line up the holes, and insert the boom to U-joint mounting pin; secure it at the other end with the washer, lockwasher and capscrew shown in illustration N-1.

Insert a straight grease fitting in the hole in the front of the upper U-joint sleeve, and insert a 90° elbow grease fitting in the hole in the bottom of the lower U-joint sleeve.

MOUNTING THE GRAPPLE

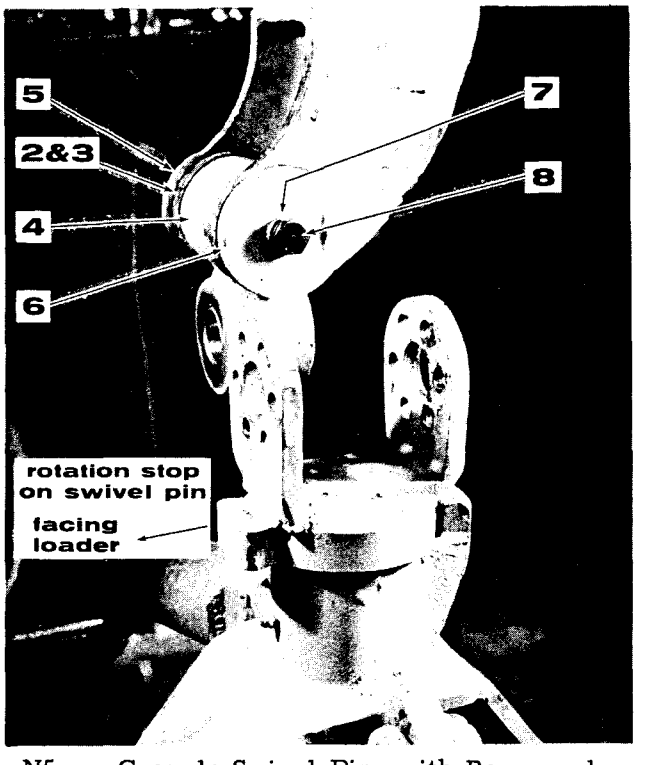
Friction discs may be installed on tool mounting ears at this point, or they may be installed just before tool is fastened to U-joint.

NOTE: The following instructions apply to grapples, and other tools that will stand upright when at rest. Some special attachments, such as the Multi-Use Fork, cannot be mounted in this manner; refer to page N-5 for Fork mounting instructions.

Mounting Tool on U-Joint
(See illustration N-1 for parts)

Mounting ears on tool swivel pin should be fitted with dowels, discs and springs as described at the beginning of this section.

NOTE: Some installers prefer to mount one friction disc, time the rotor (see instructions below) and install the second disc after the knuckle has been slipped between the mounting ears on the tool swivel pin.



N5 - - Grapple Swivel Pin, with Boom and Friction Knuckle in position to prepare Grapple for Mounting.

- - CONTINUED

TIMING AND HOSING THE GRAPPLE

Place the tool near the Loader, where it can be reached with the boom.
Turn the tool swivel pin by hand (remove plugs from rotor ports) until the stop on the swivel pin faces the Loader, then carefully lower the boom until the lower knuckle is between the mounting ears on the tool.
Check springs to be sure they are in place before inserting pin.

Making sure that the mounting pin is inserted in the side with the missing dowel, align the pinholes and insert the mounting pin. Be sure the dowel on the pinhead aligns with its hole in the mounting ear before tapping it home and securing it with the large washer, lockwasher and capscrew shown in illustration N-1.

Grease bushings in U-joint knuckles.

Timing the Grapple

NOTE: These instructions do not apply to Multi-Use Fork and other Tools with Orbit Motor Rotator. See page N-5.

Raise the boom to lift the grapple off the ground, and turn it (remove plugs from rotor ports) until the rotation stop on the grapple head faces away from the Loader. Now the two rotation stops should be facing in opposite directions, as shown in illustration N-8.
The stop on the grapple swivel pin faces toward the Loader, and the stop on the grapple head faces away from the Loader.

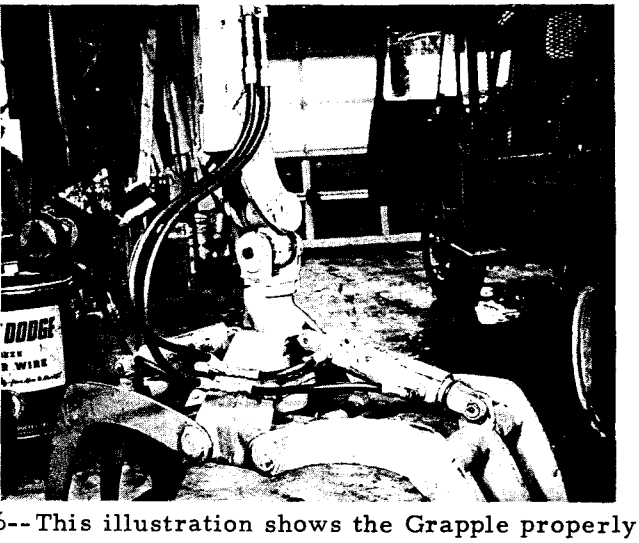
Hosing the Grapple Cylinders
(Refer to Illustration N-6)

NOTE: These instructions do not apply to Multi-Use Fork and other tools without dual cylinders. See page N-5.

The small-diameter hoses that remain in the kit are the Tool Hoses. Sort them out according to the information on the tags, and connect them in the following manner:

1. Insert 45° pipe elbows in grapple cylinder rod end ports. Use Teflon tape on pipe thread.
2. Connect "GRAPPLE OPEN" Bridge Lines to the 45° pipe elbows. Swivels on these lines should face one another.
3. Connect the free ends of the two Bridge Lines (with swivels), using T-fitting.
4. Insert "GRAPPLE CLOSE" Bridge Lines in the grapple cylinder base end ports. Connect free (swivel) ends of these lines, using T-fitting.
5. Install the "GRAPPLE OPEN" (Grapple Cyl. to Boom) hose between rod-end Bridge Line T-fitting and lower line on left side of boom.
6. Install the "GRAPPLE CLOSE" (Grapple Cyl. to Boom) hose between base-end Bridge Line T-fitting and upper line on left side of boom.

Refer to illustration N-6 for complete installation.



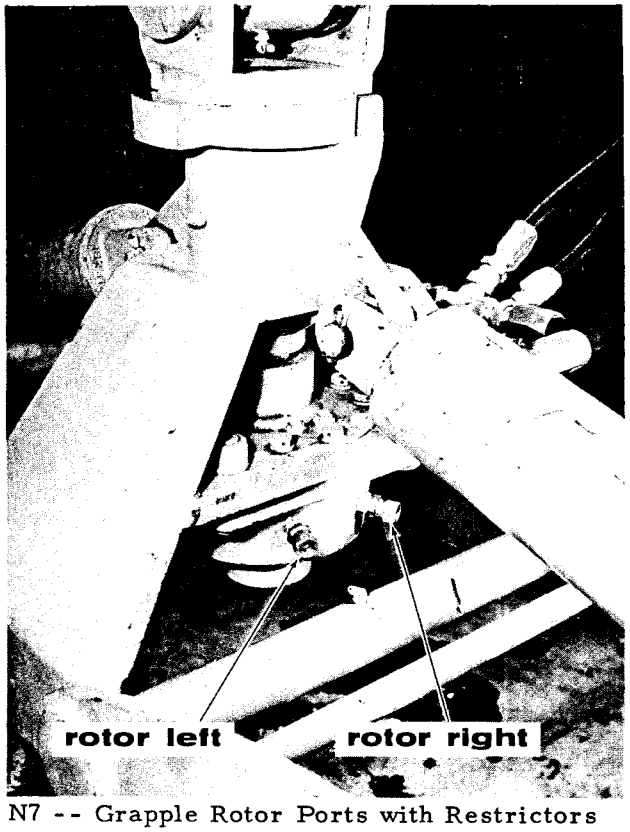
N6--This illustration shows the Grapple properly timed and mounted, with cylinder Hoses installed. Hose from upper left line on boom leads to base end of cylinders, hose from lower left line on boom leads to rod end of cylinders. Note 45° pipe elbows on grapple cylinder rod end ports.

Installation of Rotator Hoses
General Information

Grapple with Prentice Rotor:

If the tool is properly installed, the rotor ports will be found on the right.

1. There are two restrictor bushings, with swivels, in the kit. Install these in rotor ports, as shown in illustration N-7. Use Teflon tape on pipe thread.

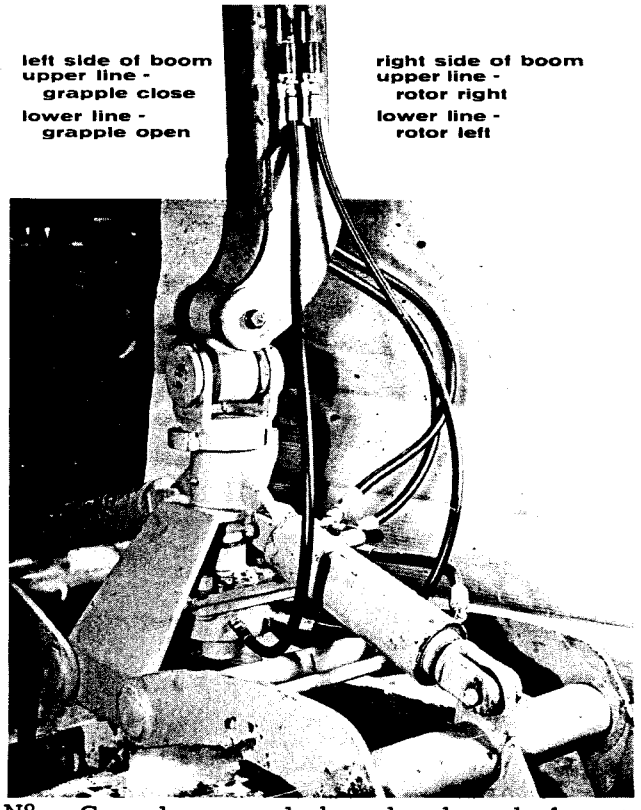


N7 -- Grapple Rotor Ports with Restrictors installed, ready for installation of Rotor Hoses.

2. Connect one end of the "ROTOR LEFT" hose to the lower line on the right side of the boom. There should be an adapter at the end of the line for this hose. Connect the other end of the "ROTOR LEFT" line to the swivel fitting in the rear rotor port.

3. Connect one end of the "ROTOR RIGHT" hose to the upper line on the right side of the boom. Thread the other end of this hose between the two Grapple Cylinder Bridge hoses, around the right grapple cylinder and connect it to the swivel fitting in the front rotor port.

Refer to Illustration N-8 for complete installation.



N8 – Grapple properly hosed and ready for use. Note position of Rotation Stops.

Installation Test

After connecting and tightening all hoses, start the loader and carefully test the tool controls. Tool should rotate all the way to both rotation stops without pulling hoses tight. Tool cylinders should extend and retract fully without twisting or tangling hoses.

MOUNTING MULTI-USE FORK

Mounting Fork on Boom - - Hosing the Cylinder
(Refer to Illustration N-1 for parts)

Set the Fork near the machine, with the tines pointed toward the Loader (refer to illustration N-9).

The best way to get the swivel pin into mounting position is to hose the fork cylinder. Hoses will be found in the kit, labeled "FORK CYLINDER TO BOOM LINE". Be sure that 90° elbows are in place on Fork cylinder, then connect the male end of the "TILT FORK DOWN" hose to the female coupling on the lower left boom line and the swivel end to the cylinder rod end port, as indicated on the tag. Connect the "TILT FORK UP" hose as indicated on the tag. Refer to illustration N-9.

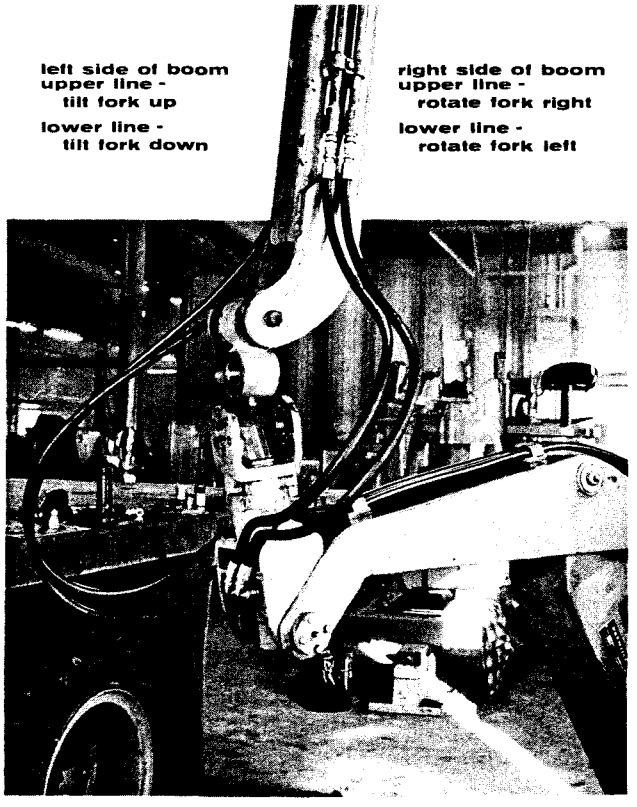
Always connect hoses to boom lines first, because cylinder-end of each hose is equipped with swivel.
Clamp hoses in place but do not tighten clamps until you are sure the Orbit Motor is timed correctly.

Tighten hose connections firmly.

Start the engine and push the GRAPPLE control to "Open" position, just long enough to make the head of the fork stand up, as in illustration N-10.

CAUTION: DO NOT attempt to raise head of fork much farther than shown in illustration N-10, as it may fall over on its back.

N9 - - Materials Positioning (Multi-Use) Fork with cylinder hoses connected; head not yet raised to mounting position.



N10 - - Materials Positioning (Multi-Use) Fork hosed-up and in position for mounting.

Mounting Fork on Boom - - Timing Orbit Motor
(Refer to illustration N-10)

Install Restrictors in Orbit Motor ports; Orbit Motor Restrictors will be found in the kit (refer to illustration N-10).

Hoses will be found in the kit, labeled "ORBIT MOTOR TO BOOM LINE". Connect the male end of the "ROTATE TOOL LEFT" to the female reducer in the lower right boom line, and the elbow end to the left orbit motor port, as indicated on tag. Connect the "ROTATE TOOL RIGHT" hose as indicated on the tag. Refer to illustration N-10.

Both rotation stops, the one on the Fork Swivel Pin and the one on the Fork Head, should be faced toward the Loader. The third stop, which turns free on a spacer, should face away from the machine. Work ROTOR control to get Fork swivel pin into proper position.

Mounting Fork on Boom - - Assembling U-Joint
(Refer to illustrations N-2, N-3, N-4, N-10 and N-11)

Assemble Upper Friction Knuckle (on end of boom) and mount U-joint as described on page N-2 and shown in illustrations N-1 thru N-4.

Be sure rotation stop on swivel pin faces the Loader. Mount one of the friction discs as described on page N-2, then slip the lower knuckle between the mounting ears on the Fork. Install the other friction disc between knuckle and mounting ear, align pinholes, and insert the mounting pin, being sure to insert pin on side with open hole (for dowel on pinhead) as described on page N-2 (refer to illustration N-4).

Secure mounting pin with large washer, lockwasher and capscrew. Regulate "stiffness" of friction knuckles by tightening or loosening capscrews on mounting pins.

NOTE: BE SURE HOSES LAY AS SHOWN IN ILLUSTRATIONS N-10 AND N-11 BEFORE TIGHTENING HOSE CLAMPS AND FITTINGS.

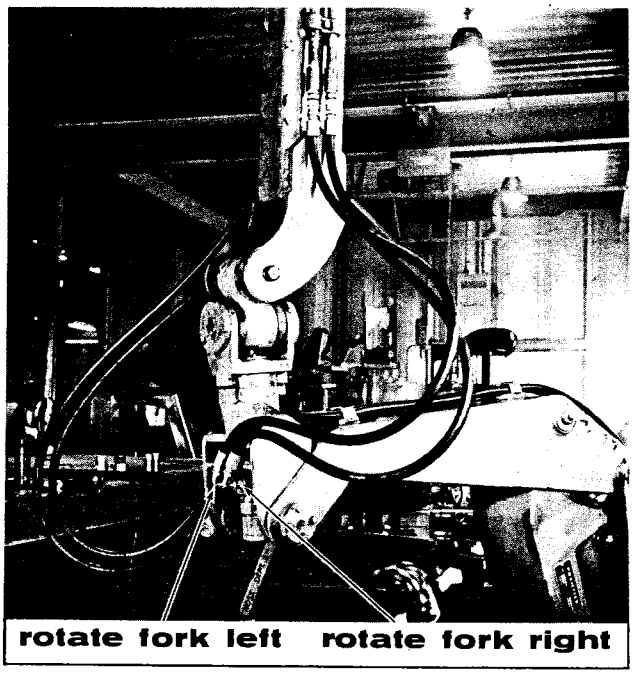
Mounting Fork or Boom - - Installation Test

Pull fork cylinder hoses to accumulate most slack between fork and boom.

Start the engine and work the tool rotor and cylinder controls slowly and carefully through full travel both ways.
If the fork has been installed and hosed correctly, it should be possible to work the orbit motor to both extremes of rotation without twisting the hoses.
It should also be possible to tilt the fork all the way up and all the way down without pulling or stretching the hoses to the cylinder.

Try the fork in all positions before making adjustments. After adjustments have been made, tighten the hose clamps.

NOTE ON COLOR-FLOW VALVES:
If Orbit Motor does not work, see Section P of this Manual for instructions on adjustment of Color Flow Valves on Orbit Motor lines; the valves will be found at the base end of the boom, on the right side.



N11 - - Materials Positioning (Multi-Use) Fork properly hosed and mounted on boom.