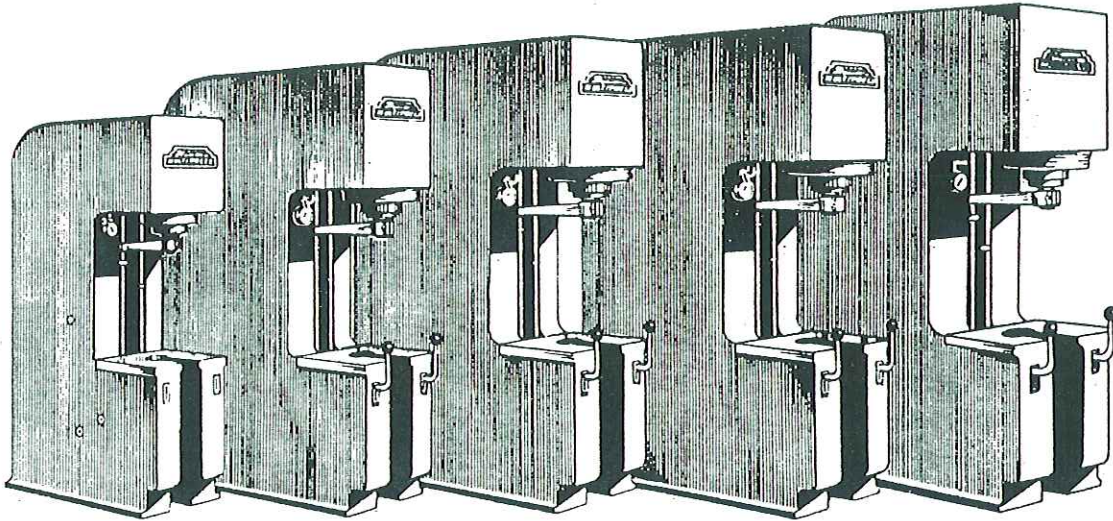


MULTIPRESS SERVICE INSTRUCTIONS For HA15,KA25,LA35,NA50,QA75 Frame Sizes



NOTICE

MULTIPRESS supplies service bulletins, parts lists and parts for presses with serial numbers below 30,000; only as a convenience to our customers. Any press with a serial number below 30,000 was not manufactured by MULTIPRESS.

All guarding and safety considerations are the responsibility of the current owner per ANSI B11.2 1995.

INTRODUCTION

This manual is intended for reference in the normal maintenance, repair and upkeep of your Multipress. Each major component and parts within that component are covered in the following pages and complete parts lists are shown for all models from 15 to 75 ton capacity.

MULTIPRESS MODEL NUMBERS

15 TON	25 TON	35 TON	50 TON	75 TON
HA15	KA25	LA35	NA50	QA75

The model number of your press indicates the components used in its makeup. It includes frame size, cylinder and pump unit combination, type of control valve and operating controls.

For Example:

- H - Frame
- A - Cylinder and Pump Unit
- 15 - Tonnage
- C91 - Type of Control Valve

WARRANTY

Within a period of six months from date of shipment from our factory, and when owned by the original purchaser and being used in recommended service, any Multipress part of our manufacture which, upon inspection at our factory or by qualified factory representative, is proven defective in workmanship or material, will be replaced free of charge. This warranty applies only to Multipress parts manufactured

Parts other than of our manufacture, bear such warranties as their manufacturers allow. When inspection indicates those parts defective, we will endeavor to secure the benefits of such warranties for our customers.

SERVICE POLICY

The extreme simplicity of Multipress, the unit construction of its component parts, and observance of the instructions in this manual, assure ease of servicing by the user.

All Field Service requested by the user and rendered by our factory representatives will be charged for at the established rate per day plus expenses. Multipress equipment sent to our factory for inspection and service after expiration of the six month warranty period must be shipped prepaid. Factory service

will be rendered only upon receipt of purchase order for such service.

Current characteristics are required at time of order dictated by the characteristics of the users' current. In any event, a motor starter corresponding to the voltage of the electric motor in the press should be used. A transformer is recommended for use with the motor start and stop pushbutton switch. Motor starter and transformer are not standard Multipress equipment but are supplied upon receipt of specifications.

INSTALLATION AND PREPARATION FOR USE

CLEANLINESS is the most important requisite in proper maintenance of oil-hydraulic equipment. Of the few maintenance difficulties encountered in the operation of HydroOILics equipment, almost all of them are directly traceable to dirt, or foreign matter in the oil.

EXTREME CARE should be exercised in maintaining a clean supply of oil in the tank and hydraulic system of your equipment at all times. Make certain that no lint, dirt, abrasive, scale or other foreign material enters the pumps, valves or oil lines. **CAREFUL ATTENTION** to these simple precautions will repay owners and operator many times in low maintenance costs and trouble-free operation.

Installation of Thermostatic Water Regulating Valve with Thermostatic Bulb.

All manually controlled series and all automatic series presses are equipped with cooling coils in their oil reservoirs. A thermostatic water regulating valve is also furnished with these models to be used in conjunction with the cooling coils. This regulating valve is packaged separately and is not installed on any press before shipping.

NOTE: *Install Thermostatic Bulb before filling Multipress oil reservoir, or drain reservoir before installing.*

1. Remove 1/4" pipe plugs at lower right and lower left, in rear of Multipress.
2. Remove 1/2" pipe plug in center.
3. Install water inlet line through the thermostatic water regulating valve into Multipress, as shown on page 5.

4. Install thermostatic bulb, as shown on page 5.
5. Connect water outlet to drain

The chart on page 4 lists all the oils which meet Denison Engineering Company's specifications.

The oil level gauge and oil filler pipe are located on the motor mounting plate. In filling the oil reservoir do not add anymore oil after the dial indicator reads full.

Always use **CLEAN** oil of the highest quality as indicated by the lubricant specification tag located at the rear of the press. Run oil through a filter when filling reservoir. Be certain that no foreign matter enters the reservoir. Replace filler cap after oil reservoir has been filled.

All oils listed on page 4 meet the Engineering Company's specifications.

Direction of pump rotation is shown by the arrow on the motor frame at the rear of the press. Direction of rotation of motor and pump can be determined by viewing the motor rotor, while in operation, through the opening in the motor housing on the top of the motor. If the pump is permitted to rotate in the wrong direction, it will seize after a few seconds operation, due to lack of oil. The result will be broken or scored parts. To reverse motor rotation, reverse the electrical connections either at motor conduit box or motor starter.

The pump utilizes the hydraulic fluid for in-

ternal lubrication of its closely fitted parts. If the suction line to the oil reservoir is open and the oil supply sufficient, pump rotation in the proper direction will immediately pull oil into the pump and provide adequate lubrication.

Having filled the reservoir and insured proper direction of pump rotation, start the motor and allow it to run for a few minutes. Check the pipe lines and the tubing for any oil leakage which may have been caused by mis-handling in shipment or installation.

Lower and raise the press ram in full strokes two or three times by operating control mechanism to flush air from system. Check pressure obtained by reading pressure gauge.

If the pressure recorded exceeds the rated press capacity, adjust the relief valve to bring the pressure down to the rated capacity. If the pressure produced is less than required and not more than maximum rated capacity of the press, adjust the relief valve to increase the pressure.

On manual models to preset working pressure or tonnage, allow ram to bottom. Then adjust relief valve to required pressure. On automatic models, move selector control lever to inching position and hold there. This will cause ram to remain in down position and pressure will be increased to setting of relief valve.

The pressure gauge reading at this point, indicates the pressure setting of the relief valve. Move selector control up to idle position to return ram to its upstroke limit and release pressure. Gauge shutoff valve should be closed after pressure has been reset or checked. This will greatly prolong the life of the pressure gauge, as this is not a production type gauge.

Adjust the length of ram stroke to fit your particular operation by moving and locking the adjustable stop collars on the ram control shipper rod. These stop collars may be loosened and locked by means of an Allen wrench. Lower stop collars are not furnished on solenoid operated manual valves.

It is very important that the upper shipper rod collar be set on all models, to insure oil being directed to tank, when the ram is in up or idle position. This prevents possible over-heating of the press when the motor is running. Cap screws in the collars must be

securely tightened to prevent slippage.

To make this adjustment on manually operated models (C91, C92, C93) back relief valve off to a low pressure. Loosen upper shipper rod collar, turn on motor allowing ram to go as far up as possible, shut off motor. Depress both handles, then tighten upper shipper rod collar by holding the upper shipper rod collar down against the ram guide.

To make this adjustment on automatic models (C94, C95, C96, C97, C98, C99) back relief valve off to a low pressure, loosen upper shipper rod collar, and turn on motor allowing ram to go as far up as possible, shut off motor. Loosen the lower shipper rod collar and tighten in a position so it is possible to pry the shipper rod up against the spring tension to its maximum limit. When the shipper rod is raised as high as possible, hold the upper shipper rod collar down against the ram guide, and tighten the upper shipper rod collar.

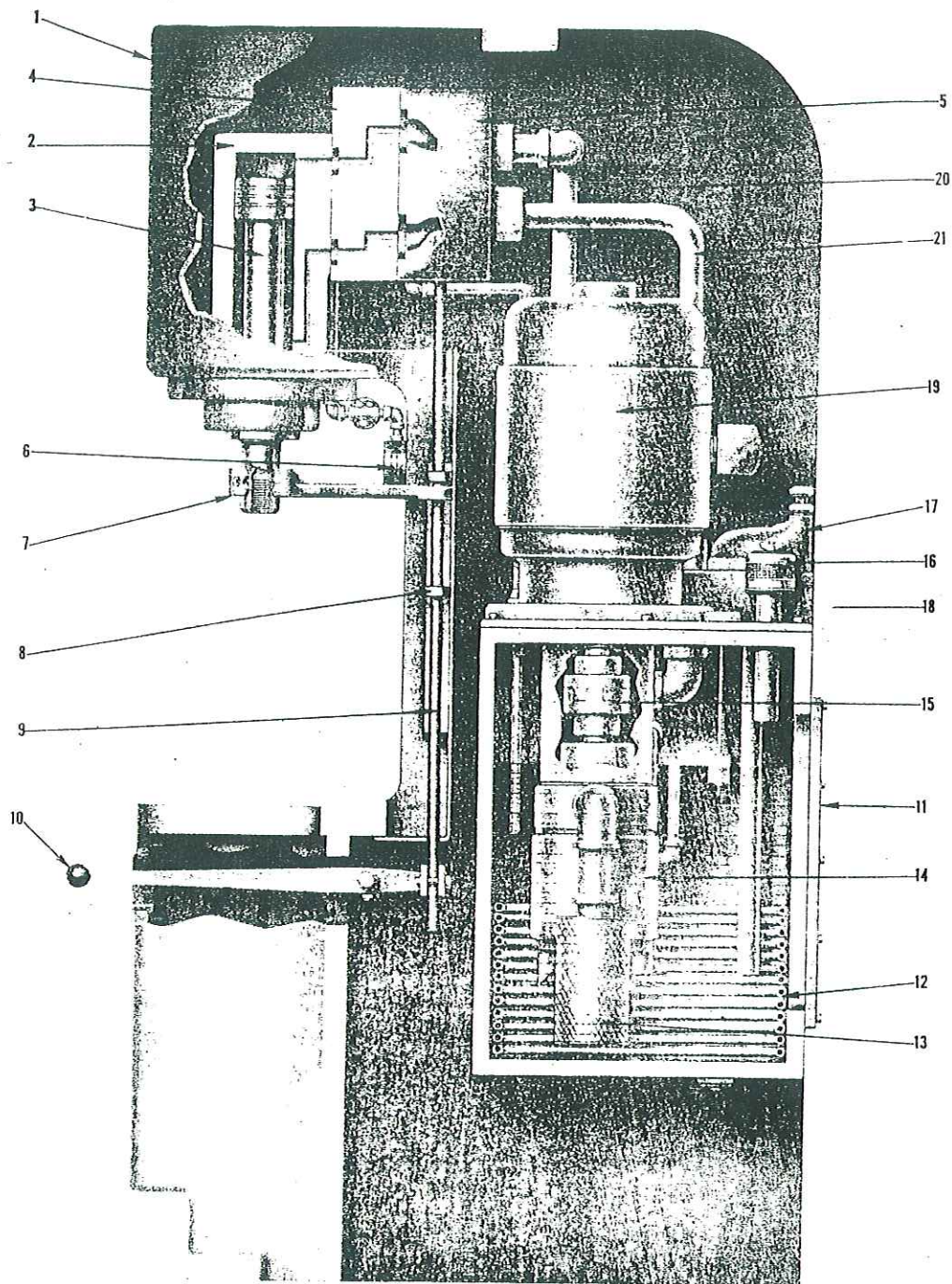
The above explains how to raise the ram to its highest position. The upper shipper rod collar may be lowered to any position desired. To obtain distance reversal of the ram raise the lower shipper rod collar to desired position.

It is economical and good operating policy, to adjust the relief valve for the minimum pressure needed to perform the required service. If it is set for excessive pressure, more power will be used than is necessary.

The following valves (C92, C95, C96, C97, C98) have pressing speed control. This control is actuated by a weight located on the left hand shipper rod.

Upon contact with an adjustable collar, located on the shipper rod it shifts the flow control spool in the control valve. The downward speed of the ram is slowed up to the amount which has been preset by the handwheel adjustment on the right hand side of the press, labeled pressing speed control.

DO NOT MAKE CHANGES IN TOOLING SET-UPS WHILE MOTOR IS RUNNING. IN RESETTING SHIPPER ROD COLLARS. SHIPPER ROD MAY BE SHIFTED SLIGHTLY CAUSING RAM TO MOVE, DAMAGING TOOLS OR INJURING OPERATOR.



CUTAWAY VIEW SHOWING COMPONENT PARTS OF THE HA15, KA25, LA35, NA50 AND QA75 SERIES PRESSES. ALL PRESSES IN THIS SERIES ARE OF THE SAME BASIC DESIGN.

- | | | |
|-------------------|----------------------|-----------------------|
| 1. Press Frame | 8. Stop Collar | 15. Flexible Coupling |
| 2. Cylinder | 9. Shipper Rod | 16. Air Filter |
| 3. Piston | 10. Hand Lever Arm | 17. Relief Valve |
| 4. Subplate | 11. Tank Access Door | 18. Subplate |
| 5. Control Valve | 12. Cooling Coil | 19. Electric Motor |
| 6. Pressure Gauge | 13. Oil Filter | 20. Pressure Line |
| 7. Ram Guide | 14. Hydraulic Pump | 21. Return Line |

MULTIPRESS CONTROL VALVES

C91

Basic manual control valve with action similar to the small series CO1 valve. Dual safety control levers permit throttling control of ram descent. Provides shockless reversal and adaptability to electric control.

C92

Offers combined differential circuit fast ram approach followed by controlled pressing speed which may be regulated. Return speed is rapid. The ram will descend at full speed, change automatically upon reaching a preset distance to controlled pressing speed, apply preset pressure and return at full return speed when the controls are released. Use of dual shipper rods make it possible to control the distance the ram will descend before starting the slow pressing speed. As an optional feature, the valve may be set up to give single cycle pressure reversal. Choice of controls.

C93

Features manual control of ram with adjustable length vibratory strokes—short, repeat strokes that are applied upon the work as long as control handles are depressed. These repeat strokes are of full preset tonnage and are used where consecutive applications of pressure are necessary. Vibratory strokes may be adjusted "out" for straight ram cycling, if desired. When using straight ram cycling, the action is the same as with the C91 valve. Choice of controls.

C51

The servo control is used where complete control over ram motion and pressure is desired. Depressing hand lever causes the ram to descend. Ram movement, either up or down is directly proportional to hand lever movement. Moving it rapidly causes the ram to move rapidly. A differential circuit is incorporated to give a fast approach speed. Releasing the lever at any time causes the ram to return to its "up" position and stop. Slow displacement of hand lever when ram is on work will cause a gradual change in the force exerted.

C94

Basic automatic valve featuring a choice of either automatic or single cycling control of press ram.

The ram will reverse automatically upon attaining preset pressure on the work or against stroke length control. This feature provides automatic reversal of ram for either distance or pressure requirements and has differential circuit fast approach speed until the ram contacts the work. It then changes automatically to normal pressing speed.

C95

Automatic cycling identical to C98 control (including vibratory and repeat strokes) except provision is made for the interlocking of hydraulic accessories through control system of press.

C98

Automatic cycling, plus vibratory repeat strokes which may be regulated both for length and number. For example, the ram may be preset to descent at a differential circuit fast approach speed automatically change to a slower controlled speed when a predetermined distance has been reached, exert preset pressure and then make short, repeat strokes of any number between 1 and 10 upon work. The ram then returns to its "up" position automatically. Speed control with adjustable pressing speed on the down-stroke is also a feature for the full length of stroke. This valve also features automatic reversal of ram of either distance or pressure requirements.

C99

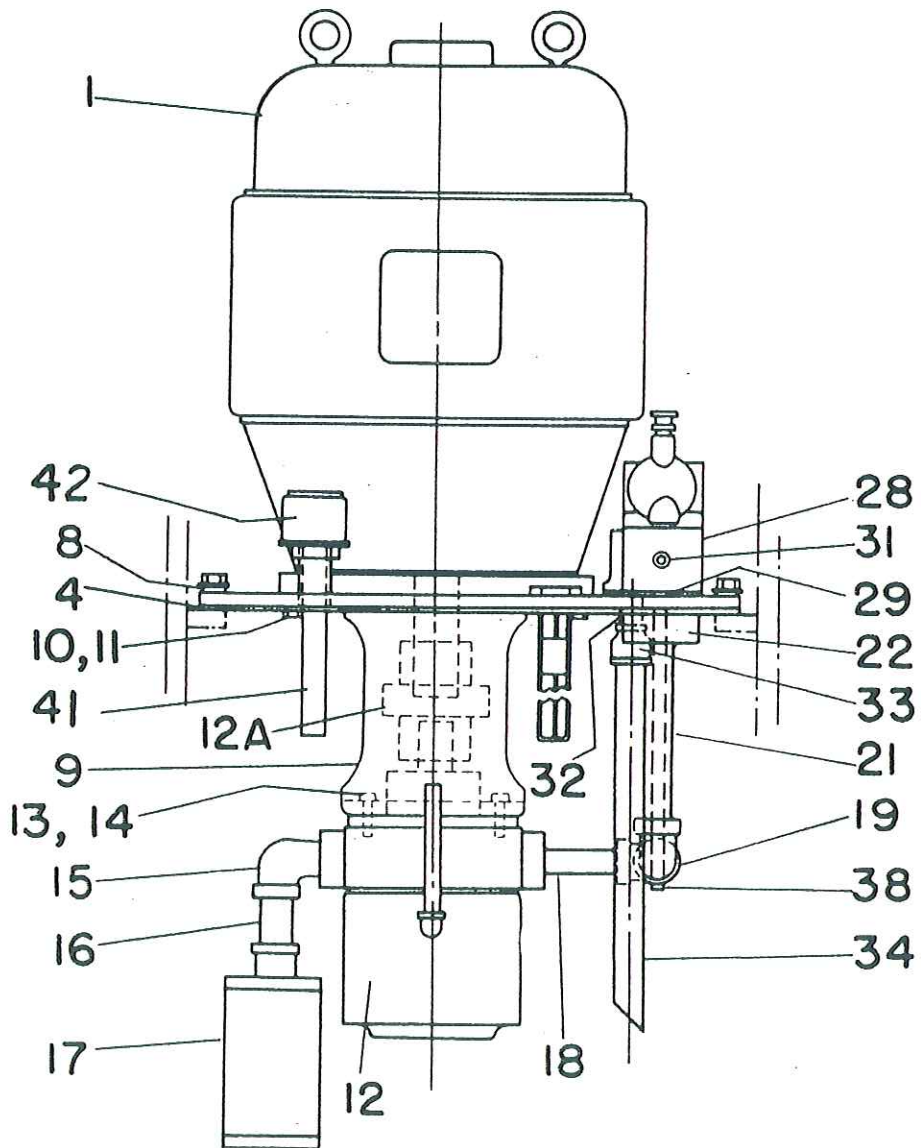
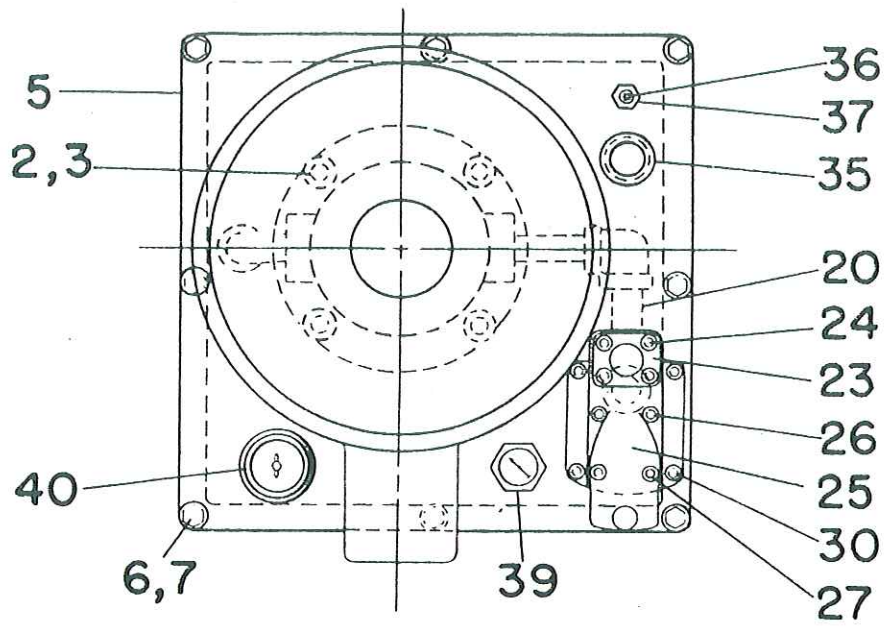
Automatic cycling identical to C94 except provision is made for the interlocking of hydraulic accessories through the control.

C96

Automatic cycling same as C98 without vibratory repeat strokes.

C97

Automatic cycling identical to C96 control except provision is made for interlock of hydraulic accessories through control system of the press.



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
19	COMM	Elbow - 1 in. - 90° - 3000 PSI	2
20	COMM	Nipple - 1 in. XX Hvy. x 5 in. lg.	1
21	COMM	Nipple - 1 in. XX Hvy. x 11 in. lg.	1
22	35-13141Z	Flange	1
23	35-16188-Z	Flange	1
24	COMM	Screw - Cap, soc hd., - 5/8-11NC x 2-1/2	1
25	25-1609-X	Valve - Relief Model RY063333A	8
26	COMM	Screw - Cap, soc hd., 1/2-13 NC x 1 in. lg.	1
27	COMM	Screw - Cap, soc hd., 1/2-13 NC x 3-1/4 in. lg.	2
28	35-13143-X	Plate	2
29	35-13137-Y	Gasket	1
30	COMM	Screw - Cap, soc hd., - 3/8-16NC x 3/4 in. lg.	1
31	COMM	Plug - 1/2 Soc. Pipe	4
32	COMM	Nipple - 3/4 Std. Pipe x 2-1/2	1
33	COMM	Coupling - 3/4 to 1-1/4 Pipe	1
34	COMM	Pipe - 1-1/4 Std. x 20 lg.	1
35	35-13116-Z	Grommet	1
36	COMM	Plug - 3/8 Std. Pipe	1
37	35-13117-Z	Bushing	1
38	COMM	Pipe - 3/8 Std. x 14 in. lg.	1
39	MS-47	Gauge - Liquid Level	1
40	FKOH	Breather - Air Maze	1
41	COMM	Nipple - 1-1/2 Pipe Std. x 3 in. lg.	1
42	35-13138-Z	Filler - Filter	1

**MOTOR AND PUMP ASSEMBLY FOR
MODELS LA35, NA50, AND QA75**

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	COMM	Motor - 30HP - 1200 RPM Frame 405 "C" Flange	1
2	COMM	Screw - Cap, hex hd., - 5/8 - 11NC x 1-3/4 in. lg.	4
3	COMM	Washer - 5/8 Std. Lock	4
4	35-13869-Y	Gasket - Motor Mounting	1
5	35-13868-W	Plate - Motor - Mounting	1
6	COMM	Screw - Cap, hex hd., - 1/2 x 13 NC x 2 in. lg.	8
7	COMM	Washer 1 in Std.	8
8	35-13139-Z	Grommet	8
9	35-13140-X	Bracket	1
10	COMM	Screw - Cap, hex hd., - 1/2 x 13 NC x 1-1/2	4
11	COMM	Washer - 1/2 Std. Lock	4
12	25-2481-Z	Pump - Model PA-202-570-X82	1
12A	W-226	Coupling	1
13	COMM	Screw - Cap, soc hd., - 1/2 - 13NC x 1-3/4	4
14	COMM	Washer - 1/2 Std. Lock	4
15	COMM	Elbow - 1-1/2 in. street std. pipe	1
16	COMM	Nipple - 1-1/2 Std. Pipe 5-3/4 in. lg.	1
17	A-1-1/2-30	Filter	1
18	COMM	Nipple - 1 in. XX Hvy. x 5-1/4 in. lg.	1
19	COMM	Elbow - 1 in.	2
20	COMM	Nipple - 1 in. XX Hvy. x 5 in. lg.	1
21	COMM	Nipple - 1 in. XX Hvy x 11 in. lg.	1
22	35-13141-Z	Flange	1
23	35-16188-Z	Flange	1
24	COMM	Screw - Cap, soc hd., - 5/8 - 11NC x 2-1/2	8
25	25-1609-X	Valve - Relief Model RYO 63533A	1
26	COMM	Screw - Cap, soc hd., - 1/2 - 13NC x 1 in. lg.	2
27	COMM	Screw - Cap, soc hd., - 1/2 - 13NC x 3-1/4 in. lg.	2
28	35-13143-X	Plate	1
29	35-13137-Y	Gasket - Subplate	1
30	COMM	Screw - Cap, soc hd., - 3/8 - 16NC x 3/4 in. lg.	4
31	COMM	Plug - 1/2 Soc. Pipe	1
32	COMM	Nipple - 3/4 Std. Pipe x 2-1/2	1
33	COMM	Couplings - 1-1/4 to 3/4 Pipe	1
34	COMM	Pipe - 1-1/4 Std. x 20 lg.	1
35	35-13116-Z	Grommet	1
36	COMM	Plug - 3/8 in Std. Pipe	1

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
37	35-13117-Z	Bushing - Pipe	1
38	COMM	Pipe - 3/8 Std. x 14 lg.	1
39	MS-47	Gauge	1
40	COMM	Breather - Model FKOH	1
41		Nipple - 1-1/2 Pipe	1
42	35-13138-Z	Filler - Filter	1

CYLINDERS

The cylinders for all K, L, N and Q frame Multipresses are of the double action type, and are basically like, differing only in size as shown in the cylinder and pump unit chart. The cylinders are cast with internal coring to provide oil passage to both ends of the cylinder. A banjo collar fits over the end of the ram and rides up and down with it, being guided by the shipper rod in the throat of the Multipress, preventing the ram from turning in the cylinder.

The piston has been fitted at the factory with four piston rings, extreme care should be exercised in their installation. When installing the rings on the piston, as well as inserting piston with rings in the cylinder, inspect piston ring grooves for small nicks or burrs. When present, they should be removed with a hard sharp stone or tool. The parts should then be thoroughly washed and cleaned to remove all foreign matter before putting into operation.

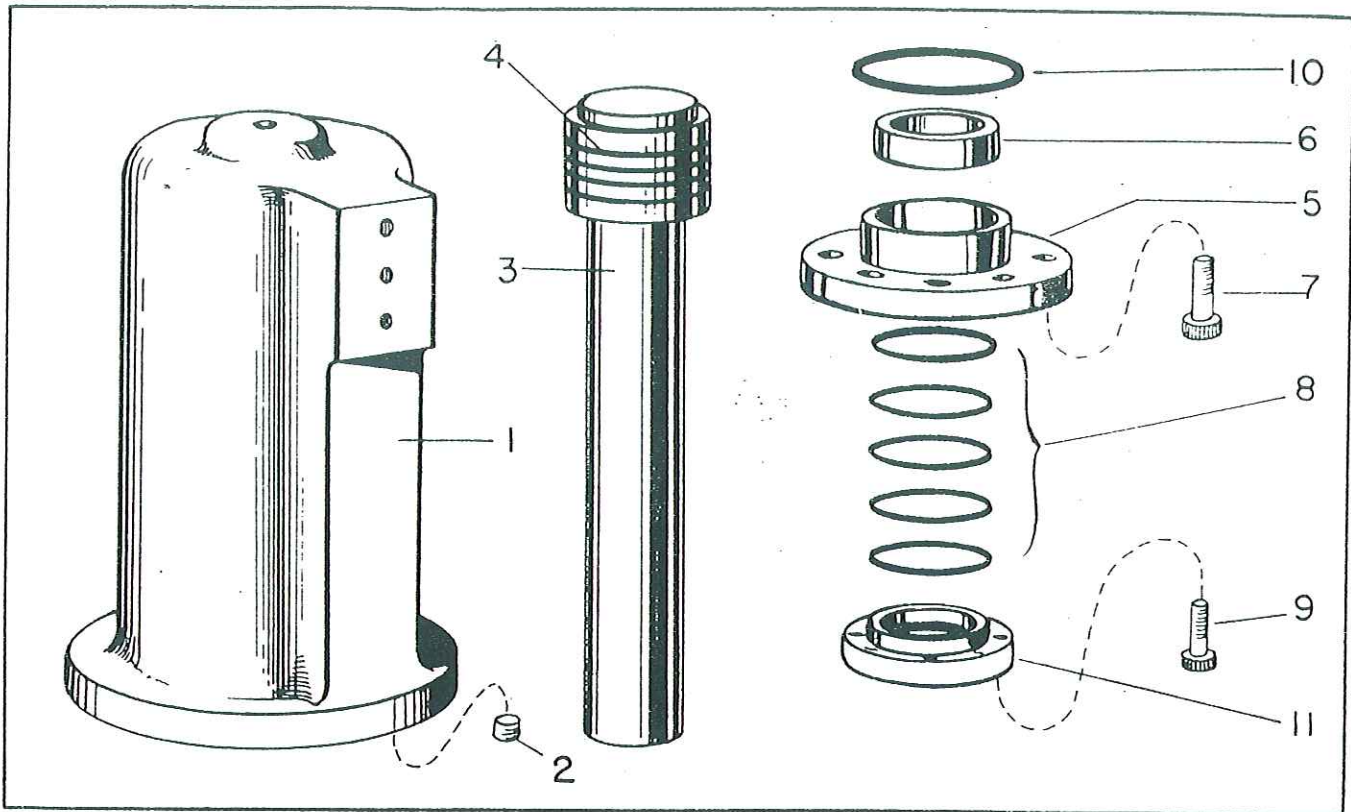
MAINTENANCE

If oil leakage develops after press has been in operation for some time, the packing gland should be tightened slightly. This may be accomplished by drawing down the cap screws, which hold the

packing gland in place. It is necessary that the cap screws be tightened evenly and across the diameter of the bolt circle.

To install new ram packing in the press cylinder, first remove ram tooling attached to the ram. The banjo collar must also be dropped down off the ram by removing set screws. Remove the socket head cap screws which hold the packing gland in place and remove the gland. The four rings of "V" type packing should then be removed very carefully, being careful not to damage surface of ram or stuffing box. The new packings should be wiped with oil. During the installation of new packing, care should be exercised when sliding lips of packing over banjo relief on ram, then lips should be carefully inserted in stuffing box. A wooden tool should be used to press new packing into the stuffing box. (Do not force; tap lightly.) First, install follower ring then four "V" packing rings with open end of the "V" facing upward. These should be inserted singly and carefully pushed to the top of the stuffing box. It is important to tighten the cap screws down evenly across the bolt diameter. Do not tighten the packing gland too tight; just tight enough to stop leakage. (Allow slight leakage at first for lubrication.) The packing gland can be tightened more at a later time if necessary to compensate for slight wear.

PRESS		CYLINDER				MOTOR-PUMP ASSEMBLY			
MODEL	CAP	PISTON	RAM	STROKE	RAM END	GPM	TYPE	PSI	HP
HA15	15	3-3/4	2-1/2	12	1-14 NF	15	Piston	2700	15
KA25	25	4-3/4	3-1/4	15	1-1/2-12NF	20	Piston	2820	25
LA35	35	4-3/4	3-1/4	15	1-1/2-12NF	20	Piston	3950	30
NA50	50	6	4-1/4	15	2-8 NC	20	Piston	3540	30
QA75	75	7	5	15	2-1/2-12N	20	Piston	3900	30



PARTS LIST

CYLINDER ASSEMBLY FOR HA15 (15 TON) 3-3/4 IN. BORE X 2-1/2 IN. RAM X 12 IN. STROKE

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	35-13750-W	Body - Cylinder	1
2	COMM	Plug - 1/2 Soc. Pipe	1
3	35-13754-X	Ram	1
4	COMM	Ring - Piston - 3-3/4 OD x 3/16 Wide	4
5	35-13751-Y	Box Stuffing	1
6	35-13753-Z	Bushing - Stuffing Box	1
7	COMM	Screw - Cap, soc hd., 7/8-9-NC x 2-1/4 in. lg.	6
8	COMM	Packing - "V" Type - 2-1/2ID x 3-1/4OD (Set of five)	1
9	COMM	Screw - Cap, soc hd., 1/2-13NC x 1-1/4 in. lg	6
10	6230-18	Gasket - "O" Ring	1
11	35-13752-Z	Gland Packing	1

CYLINDER ASSEMBLY FOR KA25 (25 TON) AND LA35 (35 TON) 4-3/4 IN. BORE X 3-1/4 IN. RAM X 15 IN. STROKE

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	35-13900-W	Body	1
2	COMM	Plug - 1/2 Socket Pipe	1
3	35-13087-X	Ram	1
4	COMM	Rings - 4-3/4 Dia. x 3/16 Wide	4
5	25-1856-Z	Box Stuffing	1
6	35-13092-Z	Bushing	1
7	COMM	Screw - 1/8NC - Socket Head Cap - 2 in. long	6
8	COMM	Packing - 3-1/4ID x 40D - 1-1/4 (Set of five)	1
9	COMM	Screw - Cap, soc hd., 1/2-13NC x 1-1/4 in. lg.	6
10	6230-26	Gasket - "O" Ring	1
11	35-13090-Z	Gland Packing	1

**CYLINDER ASSEMBLY FOR NA50 (50 TON)
6 IN. BORE X 4-1/4 IN. RAM X 15 IN. STROKE**

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	35-14692-W	Body	1
2	COMM	Plug - 1/2 Socket Pipe	1
3	35-14709-X	Ram	1
4	COMM	Ring - Hydraulic Step seal - 60D x 1/4 wide	4
5	35-14708-Y	Box - Stuffing	1
6	35-14706-Z	Bushing	1
7	COMM	Screw - Cap, soc hd., 1 in. - 8NC x 3 in. lg.	8
8	COMM	Packing - "Y" Type (Set of five)	1
9	COMM	Screw - Cap, soc. hd., 5/8-11NC x 2 in. lg.	8
10	6230-36	Gasket - "O" Ring	1
11	35-14707-Y	Gland - Packing	1

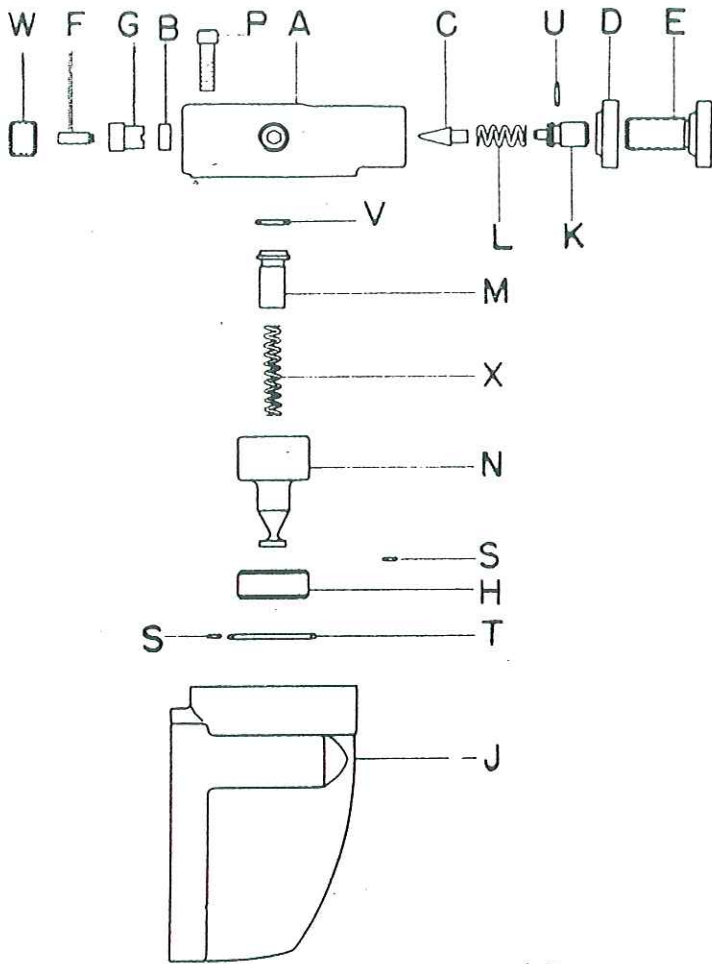
**CYLINDER ASSEMBLY FOR QA75 (75 TON)
7 IN. BORE X 5 IN. RAM X 15-1/2 IN. STROKE**

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	35-16681-W	Body - Cylinder	1
2	COMM	Plug - 1/2 Socket Pipe	1
3	35-16680-X	Ram	1
4	COMM	Ring - 70D x 1/4 Wide	4
5	35-14364-Y	Box - Stuffing	1
6	A-5700-1	Bushing	1
7	COMM	Screw - Cap, soc hd., 1/8NC x 3 in. lg.	8
8	COMM	Packing - 51D x 5-7/8 OD (Set of five)	1
9	COMM	Screw - Cap, soc hd., 5/8-11NC x 2	8
10	6230-40	Gasket - "O" Ring	1
11	35-14365-Y	Gland - Packing	1

RELIEF VALVE

PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
J	35-12170-X	Body	1
A	35-15489-Y	Cap	1
P	COMM	Screw - Cap, soc hd., 7/16 - 14NC x 1-1/2 in. lg.	4
W	35-15398-Z	Plug	1
F	35-11694-Z	Piston, Control	1
G	35-11710-Z	Block, Control	1
B	35-11692-Z	Seat - Control	1
R	COMM	Plug - 1/4 soc, pipe	2
C	35-12288-Z	Cone	1
L	35-13245-Z	Spring (used on HA15, KA25)	1
L	35-12289-Z	Spring (used on LA35, NA50, QA75)	1
K	35-11712-Z	Piston, Seal	1
U	6227-7	Packing - "O" Ring	1
D	35-11870-Z	Lock Nut	1
E	35-11869-Z	Adjusting - Screw	1
V	6227-10	Packing - "O" Ring	1
M	35-11866-Z	Piston - Differential	1
X	35-12002-Y-46	Spring	1
N	35-12078-Z	Spool	1
S	6227-3	Packing - "O" Ring	2
H	35-12077-Z	Seat	1
T	6227-26	Packing - "O" Ring	1



TO SERVICE AND MAINTAIN RELIEF VALVES

At times, the relief valve is prevented from operating satisfactorily due to the presence of lint, pipe scale, or some other foreign matter between control seat "B" and cone "C". This may cause fluctuating pressure or pressure failure.

Quite often this condition may be corrected by starting the pump, releasing the lock nut "D", and sufficiently backing off (counterclockwise) adjusting screw "E" to remove all spring pressure from cone "C". Oil circulating through the cap and discharging through spool "N" to the reservoir quite frequently will eliminate the foreign matter. The adjusting screw should then be turned clockwise until the desired pressure is reached.

If the above operation does not eliminate the trouble, the following procedure should be followed:

1. Remove the 3/8" pipe plug from the cap.
2. Remove the cap assembly from the body "J", being careful not to lose or damage the "O" rings.
3. Remove control piston "F" through the 3/8" pipe tap hole in the cap "A". This is accomplished by inserting a wood match stick in the 1/8" dia. drilling and pulling out.
4. Remove the adjusting screw "E".
5. Next remove seal piston "K" by threading in a 10-24 screw into the tapped end and pulling out.
6. Remove compression spring "L" and cone "C".
7. Examine control seat "B" if the seat appears to be deformed or otherwise damaged it may be removed by inserting a 7/16" dia. brass rod from the adjusting screw end and then be pressed or driven out. The control block "G" will be ejected with control seat "B".
8. Thoroughly clean cap "A", giving special attention to drilled passages which communicate with the body. Clean the passage furthest from the center of the cap with a (54) (.055 dia.) drill. Push the drill through. Do not rotate. It is recommended that the cap be washed in kerosene and then all holes blown out with clean compressed air. Do not wipe with rags, as they may leave lint.
9. Clean and inspect all parts removed from cap "A". Clean control piston "F" axial orifice with a (54) (.055 dia.) drill and the cross holes with a 1/16" dia. drill. Push drills, do not rotate. Make sure the orifices are open and free from burrs. Check operation of control piston "F" in bore of control block "G". Piston should move freely in control block, but not be excessively loose. Replace either or both parts if the latter is the case. If cone

PRESSURE ADJUSTMENT

The adjusting screw provides a convenient means of regulating the system pressure within a 5000 P.S.I. range. Whenever a pressure adjustment is made, lock nut "D" must be turned counterclockwise, adjusting screw "E" may then be turned. Clockwise rotation of the adjusting screw increases pressure, while counterclockwise rotation reduces pressure. After adjustment is made, the locknut must be turned clockwise until firmly contacting cap "C".

Caution must be taken not to turn the adjusting screw too rapidly, since the lag in pressure change may cause an eventual magnified change in pressure. This is especially important when pressures are increased. Rapid turning of the screw may increase the pressure to a dangerous amount, causing the failure of some units of the system.

In all instances, it is important to adjust the pressure to a minimum for proper operation of the system. Excessive relief pressures are also reflected as waste horsepower.

"C" shows a full sealing ring, it is satisfactory and may be re-used, otherwise replace with new part. Examine control seat "B". If seat is damaged, use opposite sealing edge. If that too is damaged, replace part.

10. Reassemble.

a—Press control seat "B" into cap "A", through the 3/8" pipe tap end until it reaches the shoulder. Tool required for this operation is a 9/16" dia. brass rod having a 3/8" dia. drilled hole in the end contacting the seat. This is done to prevent damage to the seat.

b—Assemble control block "G", slotted end first, adjacent to control seat "B". Assembly done in same manner as step "A" above.

c—Assemble control piston "F" into control block "G". Insert through the 3/8" pipe tap opening in the cap, being careful to insert the shouldered end with 1/16" cross drillings first. Piston should slide freely.

d—Assemble spring "L" on cone "C", add seal ring "U" to piston "K" which is inserted in opposite end of spring "L". Insert this assembly, cone first, into the end of cap "A", from which it was removed. Next assemble lock nut "D" on adjusting screw "E". Thread adjusting screw "E" clockwise into cap as far as the lock nut "D" will permit. Back off counterclockwise. Inspect control block "G" and control seat "B" for movement.

Full spring pressure on these parts should not force them out.

e—Screw 3/8" pipe plug "W" into cap. Tighten the same after cap is reassembled on body "J".

The cap assembly is now complete. If the valve is a straight relief type, the 1/16" pipe tap in the center of the machined surface should be open. Do not plug.

11. Next remove differential piston "M", spring "X", and spool "N" from the body "J"
12. Clean all parts thoroughly in kerosene. Use clean compressed air to blow out all passages.
13. Examine seat "H", making sure it is clean and that the seating edge does not show defects. If seat "H" is defective, replace. Do not re-grind defective part, as such procedure

will unbalance the characteristics of the valve, resulting in unsatisfactory operation of the valve.

14. Examine tapered seat surface of spool "N". This surface should show a perfect seating ring. If inspection indicates improper seating, replace part. A satin appearance near the seating ring does not mean a defective part. Spool erosion does, however, necessitate replacement. Examine differential piston "M". The end grooved for "O" ring "V" should be flat and free from burrs and marks. Now insert differential piston "M" into the bore spool "N". The piston should slide freely in spool "N", the latter should slide freely in body "J". Measure spring "X" for free length. It should measure 1-7/8" long.

15. Reassemble.

a—If seat "H" was defective, press new seat into body, using brass pressing tool which does not contact the 1/2" dia. hole edge. Seat must be assembled into body "J" with the surface with the 1/2" dia. hole up.

b—Insert spool "N", large end up.

c—Insert spring "X" into its seat in spool "N".

d—Insert differential piston "M" into spool "N" over spring "X".

16. Reassemble cap assembly to body assembly. It is advisable to replace all "O" rings but not absolutely necessary unless they are defective. Be sure all four "O" rings are in place before completing this assembly. Cap screws fastening the cap "A" to the body "J" should be drawn down uniformly and tightened securely. Loose cap screws will allow the extrusion of the "O" rings. When assembling the cap "A" to the body "J", make sure the (54) (.055 dia.) drilled hole in the cap, aligns with one of the pressure passages in the body sealed with gaskets "S".

If the above service and maintenance procedure is followed, any trouble that may occur in these valves should be corrected. Do not remove control seat "B" and control block "G" unless seat is damaged. Numerous removals of these parts cause wear, resulting in loss of press fit holding force. All other inspection and replacement may be done without their removal.