

BULLETIN SM 51-D

# **MULTIPRESS®**

## **HYDRAULIC EQUIPMENT**

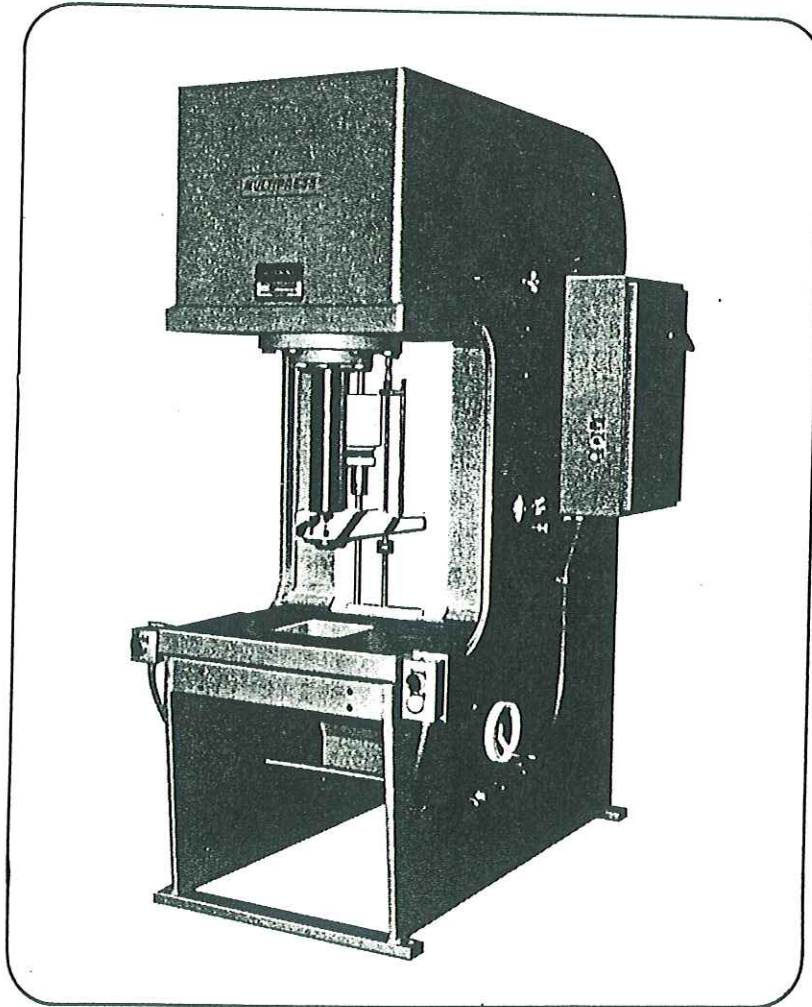
F SERIES PRESS MODELS  
FH 12, FH 20, FL 35, FN 50, FQ 75, FX 100, FY 150, FZ 200

# **service manual**

**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.



**MULTIPRESS®**

560 Dublin Avenue,

Columbus, Ohio 43215

(614) 228-0185

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# INTRODUCTION

## SERVICE POLICY

The simplicity of Multipress® Equipment, the unitized construction of its major components 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 will be rendered only upon receipt of purchase order for such service.

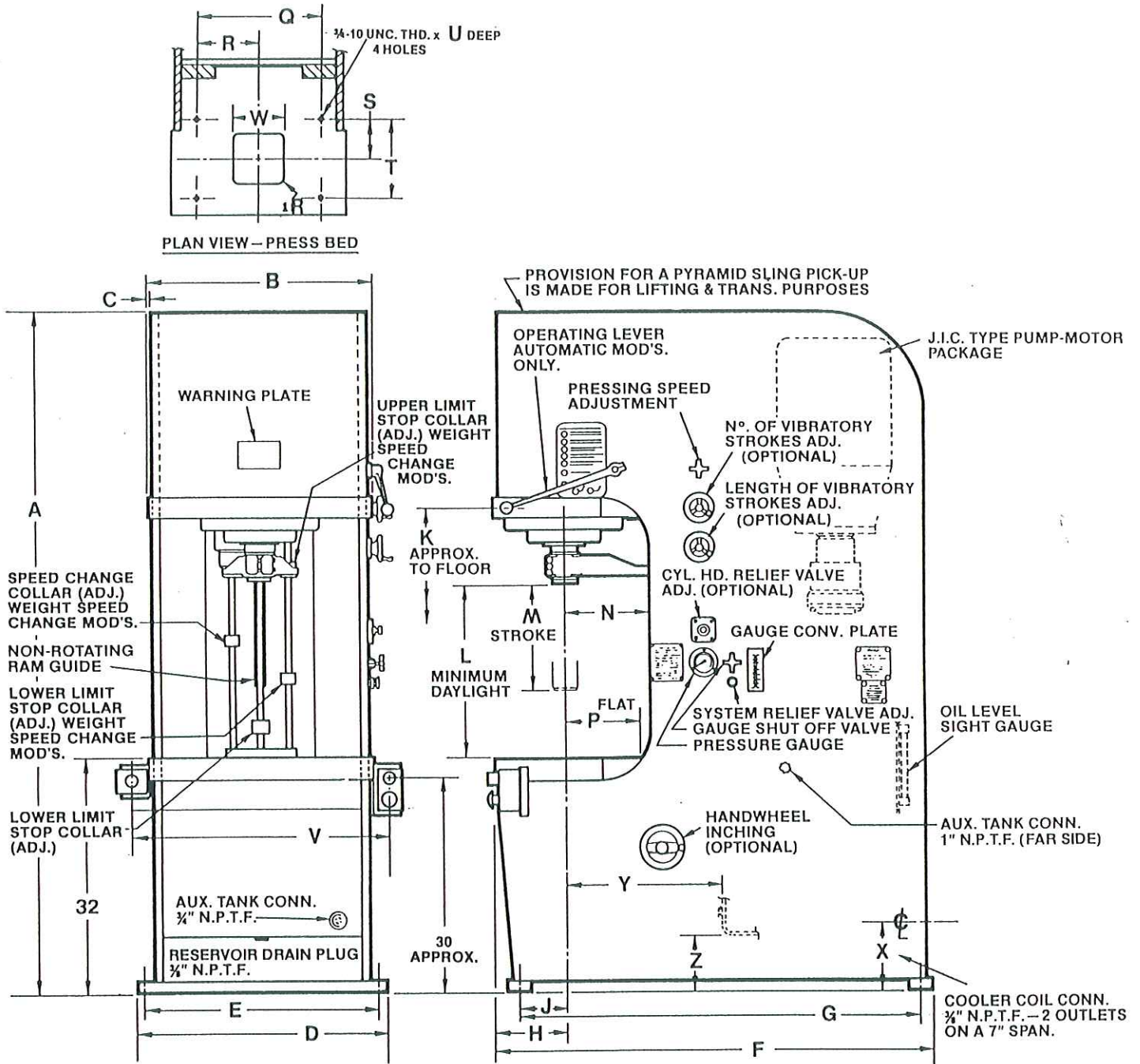
Current characteristics, dictated by the characteristics of the users' current are required at time of order.

## MULTIPRESS® EQUIPMENT WARRANTY

If any Multipress equipment part of our manufacture which, after prepaid shipment to our factory and upon inspection at our factory or by a qualified factory representative, is proven defective in workmanship or material, it will be replaced free of charge providing that, within a period of six months from date of shipment from our factory it is still owned by the original purchaser and being used in recommended service and using an oil meeting our recommended specifications.

Parts other than of our manufacture bear only such warranties as their manufacturers allow. When upon inspection by a qualified representative, it is indicated that these parts are defective, we will endeavor to secure from the manufacturer the benefits of such warranties for our customers.

# DIMENSIONAL DATA



PRESS	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
FH 12 <sup>&amp;</sup> FH 20 <sup>&amp;</sup>	85	25-3/4	3/8	29	27-1/4	46	41	8	4-1/2	62	21	12	10	9-1/8	20	10	6	12	1-5/16	31-1/4	9	9-1/8	16	7
FL 35	92-1/4	30	1/2	33	31-1/4	61	56	10	6-1/2	66	24-3/4	15	12	10	22	11	7	14	1-1/2	35-1/2	9	9-1/8	16	7-1/2
FN 50	94-1/4	31	1/2	34	32-1/4	61	56	10	6-1/2	66	24-1/4	15	12	10	22	11	7	14	1-1/2	36-1/2	9	9-1/8	21-1/2	7-1/2
FQ 75	106	34	1/2	37	35-1/4	64-1/2	59-1/2	10	6-1/2	65	30	15	13	10-1/4	22	11	7	14	1-1/2	38-1/2	9	9-1/8	23-1/2	7-1/2
FX 100	108	36	1/2	40	38	73-1/2	65-1/2	13	8	65	30	15	14	10-1/4	22	11	7	14	1-1/2	41-1/2	9	9-1/8	25-1/2	7-1/2
FY 150	111-3/8	40	1/2	45	43	78	71	18	13-1/2	36	15	16	15	20	10	12	24	1-1/2	44-1/2	10	13-1/8	23	11-1/4	
FX 200	111-3/8	40	1/2	45	43	78	71	18	13-1/2	36	15	16	15	20	10	12	24	1-1/2	44-1/2	10	13-1/8	23	11-1/4	

**Figure 1**  
**BASIC PRESS INSTALLATION DWG.**  
**(Optional Items not shown)**

# SPECIFICATIONS

Press Model	Max Tons	Motor HP	Ram Speeds I.P.M. @ 1800 RPM - 60 Hz			Pump Model	GPM*	Cylinder		Max. Pressure PSI	Reservoir Capacity GAL.	Shipping Weight Approx. LBS.
			Closing	Pressing	Return			Bore IN.	Ram IN.			
FH-12	12	10	150	150	365	T1C-008	12	4	2-3/4	1930	55	3,200
FH-20	20	20	550	250	600	T1C-014	21	4-1/2	3-1/4	2516	55	3,200
FL-35	35	30	525	240	500	P1F07	23	5	3-1/2	3565	80	6,200
FN-50	50	30	365	166	370	P1F07	23	6	4-1/4	3536	80	7,800
FQ-75	75	30	232	114	242	P1F07	20	7	5	3900	90	9,700
FX-100	100	40	250	122	248	P1F07	30.6	8-1/2	6	3525	90	14,600
FY-150	150	60	192	81	180	T5D	46.5	11-1/2	8	2890	105	22,000
FX-200	200	60	139	61	131	P1F07	30.5	11-1/2	8	3850	105	24,000

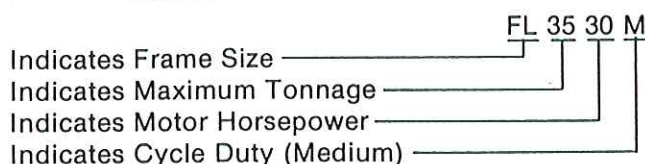
\* Pump delivery (GPM) Theoretical @ 1800 RPM

## INSTALLATION

### GENERAL

This manual is intended for reference when installing and preparing Multipress® equipment for operation and is for use in the normal maintenance, repair and upkeep of the press. Each major component and the parts within that component are shown in the following pages.

#### PRESS MODEL NUMBER KEY



### INSTALLATION INSTRUCTIONS

After removing press from shipping container, move equipment into the area where it will be anchored to the floor.

Care should be taken to avoid twisting or dropping of the equipment during the uncrating and transportation to the area of operation.

Bolt press firmly in place, using shims to compensate for any unevenness between the press and floor.

Carefully wash off all protective coating with a solvent. Then dry completely.

Connect water supply to one of the pipe connections for reservoir cooler (See Figure 1). Connect water regulating valve, which was shipped loose with the press, to the other reservoir cooler pipe connection. Install thermostatic bulb in the 1/2 N.P.T.F. port in reservoir. From outlet of regulating valve connect drain line. The regulating valve should be set to open at 100° F.

Following the wiring schematic furnished with the press and connect proper line voltage to the electric enclosure.

### CAUTION

Do not permit electric motor to operate before press reservoir is filled with oil or to operate in the wrong direction of rotation (See starting pump and motor instructions.).

### RECOMMENDED OIL SPECIFICATIONS

Warranty for Multipress®\*\* equipment applies only when the proper hydraulic fluid has been used and oil contamination level is equal to or better than "NAS...1638...CLASS NUMBER 8 OR BETTER, NO PARTICLES OVER 200 MICRON".

Certain basic physical and chemical properties are necessary for proper operation of the Multipress.

The following basic properties should be presented to the fluid supplier\* for his recommendation of a product for use in this Multipress.

Viscosity @ 100° F.	300 SUS/Plus or Minus 15 SUS
Viscosity Index	90 or Higher
Rust and Oxidation Inhibitors	Yes
Anti-Foam Additive	Yes
Specific Gravity:	0.882 - 0.887 @ 60 F/60 (API Gravity 29-31)

\*It is suggested that the fluid supplier provide the user with certification that his product meets the above requirements.

\*\*See Multipress® Equipment Warranty Page 3.

### FILLING THE PRESS RESERVOIR

Cleanliness is the most important requisite in proper maintenance of oil hydraulic equipment.

Of the few maintenance difficulties encountered in the operation of Multipress® equipment, some of them are directly traceable to foreign matter in the oil.

# INSTALLATION

Extreme care should be exercised in maintaining a clean oil supply in the reservoir and hydraulic system of your equipment at all times. Make certain that no lint, dirt, abrasive scale, or other foreign materials enters the hydraulic system. Trouble free operation over a long period of time may be obtained from the press by taking these precautions with the oil in the press.

The press reservoir is filled through the oil filter breather assembly which is located on top of the reservoir. Remove the filter breather cap and fill the reservoir with any clean oil meeting our "Recommended Oil Specifications". Fill the reservoir to within 1/2" of top of the oil level sight gauge. For reservoir capacity see specifications, page 5.

Never operate the press if the oil level is not within the high-low limits of the oil level-temperature gauge or if the oil temperature is greater than 135° F.

## ELECTRIC

Your standard press came to you wired to be connected to current characteristics as specified when ordered.

Connection of press to users' power source must be accomplished by qualified personnel.

Motor starter with transformer or electric control and disconnecting means in accordance with all applicable electric codes are optional Multipress® equipment but are supplied upon receipt of specifications. If not supplied, a motor starter and disconnecting means corresponding to the electrical requirements of the electric motor and or electric control in accordance with all applicable electric codes should be used. (The electrical requirements for your press are stamped on the nameplate which is attached to the side of your press.) In conjunction with motor start, stop pushbuttons of the motor starter, it is recommended that a transformer be used.

Follow the wiring schematic as shown in the electric control enclosure and connect the proper line voltage to the electric control enclosure mounted on the side of your press.

## CAUTION

Do not permit electric motor to operate before press reservoir is filled with oil or to operate in the wrong direction of rotation (See STARTING PUMP & MOTOR instructions and direction of rotation arrow plate on pump-motor assembly.).

## STARTING THE PUMP & MOTOR

Before starting the pump and motor, lower the setting of the relief valve (4, Fig. 3) by loosening lock nut and then turning knob counterclockwise until loose but not removed (See PRESSURE ADJUSTMENT plate on right side of press.).

## CAUTION

If the press has been shipped to you with the press ram extended, the ram will retract and stop against the upper stop collar as soon as the motor is started, if the motor and pump are operating in the correct direction of rotation.

## NOTE

Ram may not retract if relief valve has been backed off too far.

## CAUTION

If the motor is permitted to operate in the wrong direction of rotation, the pump will be damaged after only a few seconds due to lack of oil to lubricate its precision machined internal parts. When the oil in the reservoir is at the proper level and the pump is operating in the correct direction of rotation, the pump will prime itself and provide adequate lubrication.

When it is determined that the pump and motor are operating in the correct direction, start the motor and allow it to run for a few minutes to remove air from the hydraulic system and to check pipe and hose lines for any oil leakage which may have developed since leaving the factory.

## SETTING OPERATING PRESSURES AND TOOLING

1. If your press is equipped with an electric control circuit, turn the "CYCLE" selector switch to "INCH" position.
2. Loosen and lower bottom stop collar on shipper rod to a point where it will not be contacted by the banjo (16, Fig. 3) when press ram is fully extended.
3. Lower and raise press ram several full strokes by either turning the handwheel inching control or by actuating "Dual Cycle Start Pushbuttons" (See Fig. 1), (according to how your press is equipped), to flush air from the system. (See operating instructions.)

## NOTE

Set and adjust tooling (if required) before setting pressure on the ram. Set lower stop collar on the shipper rod to protect tooling if required.

4. To adjust pressure on ram, first make sure that relief valve (4, FH through FX/89, FY-FZ Fig. 3) is as previously set per "STARTING THE PUMP & MOTOR" instructions.
5. Lower the bottom stop collar far enough to allow ram to exert full pressure against a part or block.
6. Lowering the Ram
  - (a) If your press is equipped with a handwheel type inching control shipper rod assembly,

# INSTALLATION

unlock the upper stop collar on the shipper rod located above the banjo in the throat of the press by loosening the clamping screw. Turn the handwheel of the inching control to lower ram. After ram contacts part or block, turn handwheel approximately 1/2 turn more. Check pressure on ram by opening needle valve on the right side of press and read pressure gauge. After setting operating pressure use handwheel to return press ram to upper position and tighten clamping screw of upper stop collar firmly before cycling press.

- (b) If your press is equipped with a non-inching or vibratory type shipper rod assembly, enlist the aid of another person to operate the dual cycle start pushbutton controls.

## CAUTION

Keep hands off of the ram or the tooling. When the ram has extended and is against the part or block and while maintaining the control mechanism actuated, check the pressure on ram by opening needle valve on the right side of the press and read pressure gauge.

## 7. Setting the Relief Valve and the Remote Control Relief Valve.

To set the relief valve (4, Fig. 3) loosen lock nut and turn adjusting screw clockwise to increase pressure or counterclockwise to decrease pressure.

## NOTE

Relief valve should be set approximately 200 to 300 P.S.I. higher than the required operating pressure.

After adjustment is made, the lock nut must be turned clockwise until firmly contacting the relief valve.

To set the remote control relief valve (67, Fig. 3) use the same procedure as above. The remote control relief valve should be set at the desired operating pressure.

The remote control relief valve should be set near the minimum pressure needed to perform the required service in order to conserve energy and prevent excessive heating of the oil.

## CAUTION

Do not 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 may increase the pressure to a dangerous amount causing failure of some units of the system.

## SETTING THE RAM STROKE (upper limit)

1. If your press is equipped with an electric control circuit, turn the "CYCLE" selector switch to "INCH" position.
2. If your press is equipped with a handwheel type inching control shipper rod assembly, unlock the stop collar on the shipper rod located above the banjo in the throat of the press by loosening the clamping screw. Turn the handwheel of the inching control to inch ram down to desired upper limit of ram stroke and then tighten clamping screw in the upper stop collar firmly before cycling press.
3. If your press is equipped with a non-inching or vibratory type shipper rod assembly with the ram banjo against the upper stop collar (See Fig. 1), stop the motor.

From the underside of the upper stop collar, scribe a mark on the shipper rod the distance that the upper stop collar will have to be lowered to give the required daylight between the upper and lower tools.

Start the motor. Push and hold dual cycle start pushbuttons until the top surface of the banjo, that was against the upper stop collar, passes scribed mark on shipper rod. STOP THE MOTOR.

Lower and lock upper stop collar to scribed mark on shipper rod.

Start the motor. Ram will retract until banjo contacts upper stop collar.

## OPERATING INSTRUCTIONS

To prevent the possibility of injury, never operate this press without guards around the point of operation.

If the press fails to operate as described below or the press operation appears to change in any way stop the press motor by pressing the motor stop button, and notify your supervisor.

### 1. Cycle

Start the motor.

Make sure guards are in place around point of operation.

Press and hold "Dual Cycle Start" pushbuttons at the same time.

The ram will extend, contact work, and exert force.

Ram will retract, after the operation is completed and stop at upper stroke limit. (single cycle models)

### 2. Emergency Reverse

Pushing the "Emergency Reverse" button will retract the ram to its upper stroke limit.

Releasing either one or both cycle start pushbuttons before the limit switch is contacted will retract ram to its upper stroke limit.

# MAINTAINING MULTIPRESS® EQUIPMENT

## MAINTENANCE INSTRUCTIONS

The establishment and implementation of maintenance schedules is essential for the reliable operation of hydraulic press equipment. The elapsed time for periodic maintenance and inspection is based upon environmental and operating conditions (including hours of operation) which are known only to the user of the equipment. Therefore it is the responsibility of the user to insure that the instructions outlined in this manual are carried out on a time table which will insure reliable and efficient operation of the equipment.

It is the responsibility of the user to maintain the Multipress® Equipment at all times in day-to-day operation. The manufacturer

suggests that the following maintenance and service procedures be implemented and regularly practiced by the user.

## WARNING

When malfunction in any Multipress® Equipment is encountered during the operation or inspection of the equipment, operator(s) should immediately stop the equipment, have qualified personnel interrupt the electric power to the equipment and conspicuously tag it, indicating the malfunction, and then report it to the proper authorities. Do not run the equipment until the malfunction has been eliminated.

## MAINTENANCE AND INSPECTION CHECK LIST

The following chart is provided to point out specific check points and the schedule that should be applied for each point. Any ITEM or ROUTINE or PERIODIC inspection points not included in this list, but considered to be pertinent to the maintenance of the equipment should be included. If in doubt, consult the factory.

ITEM TO BE INSPECTED	SCHED. INSPECT.		MALFUNCTIONS							
	Routine (Daily)	Periodic	Damaged Kinked or Dented	Worn	Broken or Cracked	Loose Conn. or Elec. Short			Mis-alignment	Out of Adj.
						Hyd.	Mech.	Elec.		
Frame		✓			✓					
Electric Motor		✓	✓					✓	✓	
Starter		✓						✓		
Pumps		✓				✓	✓		✓	
Valves		✓				✓	✓			✓
Gauges		✓	✓		✓					
Switches		✓	✓	✓	✓		✓	✓		
Operating Controls	✓	✓	✓	✓	✓		✓			✓
Tooling	✓	✓	✓	✓	✓		✓		✓	
Feed and/or Ejection Mech.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil Leaks	✓	✓								
Hydraulic Lines <small>Pipe, Tube Hose</small>		✓	✓		✓		✓			
Hydraulic Fittings		✓			✓		✓			
Electrical Lines <small>Wire, Cable Conduit</small>		✓	✓	✓	✓		✓	✓		
Gaskets, Seals & O-Rings		✓		✓		✓	✓			
Ram Packing		✓	✓	✓		✓	✓			
Oil Level Too Low or Too High	✓	✓								
Oil Contamination Too High		✓								



## ROUTINE (DAILY) MAINTENANCE AND INSPECTION

Before operating Multipress® equipment each operator should make the inspection checks indicated in chart on page 8. These checks should be made after each shift change.

In addition, the following inspection checks should be made by each operator before operating equipment after any break time.

1. Make sure that each equipment component is in the proper condition and position for start up and be aware of any movement which will occur during start up procedure.
2. Check for loose items foreign to the operation

or function of the machine which might cause damage or injury and clear such items from the equipment before start up.

3. Check for oil leaks.
4. Connect electric power to starter box and then actuate MOTOR START push button. With the motor running and driving the hydraulic pump make the following inspection checks:
  - a. Check for oil leaks.
  - b. Make sure that each equipment component is in the proper position to start cycling.
  - c. Make sure that press operates in manner prescribed in sequence of operations.

## SAMPLE ROUTINE LOG

If any check points are found to be malfunctions or could lead to a malfunction, a written report should be made, indicating the problem and what was done to correct it and then made a part of the history of this equipment.

			MALFUNCTION CHECK POINTS						
Date of Inspect.	Oper. Press. (PSI)	Total No. of Cycles	Oil Leaks	Oil Level	Oil Temp.	Hyd. Comp's.	Elec. Comp's.	Mech. Comp's.	Remarks

## PERIODIC MAINTENANCE AND INSPECTION

At regularly scheduled intervals the users' maintenance department should check each piece of the Multipress® Equipment for those items listed on page 8 and 9 and record in PERIODIC LOG on page 10.

In addition, each component of the equipment should be checked for proper performance as follows:

1. When equipped with an electrical circuit, make sure that all devices function in accordance with the schematic diagram, and sequence of operations. Repair or replace any faulty device; see electric circuit service

manual or circuit drawing for identification of parts.

2. Check all mechanical linkage and adjustments; adjust, repair or replace as necessary to comply with operating and/or adjustment instructions in this manual or manual of the operating control.
3. Check the hydraulic system as follows:
  - a. Check pressure setting of pressure control valve; adjust if necessary.
  - b. Check operational cycle to insure that all valves function in accordance with the schematic diagram and sequence of operations; repair or replace faulty valves.
  - c. Check the entire system for leaks; repair as required to eliminate problem.

## SAMPLE PERIODIC LOG

If any check points are found to be malfunctions or could lead to a malfunction, a written report should be made, indicating the problem and what was done to correct it and then made a part of the history of this equipment.

MALFUNCTION CHECK POINTS										
Date of Inspect.	Oper. Press. (PSI)	Total No. of Cycles	Oil Contam Level	Oil Leaks	Oil Level	Oil Temp.	Hyd. Comp's.	Elec. Comp's.	Mech. Comp's.	Remarks

# SERVICING MULTIPRESS® EQUIPMENT

## SERVICE INSTRUCTIONS

Have qualified personnel interrupt the electric power to the equipment whenever service is to be performed.

### SERVICE ON PUMP

Disconnect pressure line at pump. Remove suction line which extends from pump into reservoir at pump. Remove coupling guards and screws, loosen set screw in pump half of coupling, remove hex head cap screws holding pump to adapter while supporting pump and then withdraw pump from adapter. See service bulletin SVP-T1C or SVP-T5D for service on vane pumps, or bulletin SP4-14 for piston pumps.

### SERVICE ON CYLINDER (Figures 5,6&7)

Remove all tooling which is attached to the ram, remove banjo from the ram. Utilizing a container to catch oil spillage, remove the socket head cap screws from the packing gland and remove the gland. Remove the four packing rings being careful not to damage ram or stuffing box. Packing may be replaced at this time. (See packing installation instructions.) If it should be necessary to replace piston rings, remove the socket head cap screws from the stuffing box and remove the stuffing box. Carefully withdraw ram from cylinder body.

### INSTALLING PISTON RINGS

Extreme care should be exercised when installing piston 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 re-assembly.

### INSTALLING PACKING

The packing for all cylinders used on the "F" series press is furnished as a set. If the packing should develop a leak the entire set must be replaced.

The FQ-75 and FX-100 series press is equipped with "V" type packing and all other "F" series presses are equipped with two neoprene and two fiber "Uneepac" type packing.

Oil both "V" type and "Uneepac" type packing before installation.

When installing "V" type packing slide top adapter, each "V" ring, with open end of "V" up, and bottom adapter separately over ram being careful not to damage rings. Press into place using a wooden tool. Tap lightly if necessary.

When installing "Uneepac" type packing, slide one neoprene ring on ram first followed by one fabric ring. Install the last two rings in the same

order. Press packing rings into place with a wooden tool. Tap lightly if necessary.

Replace packing gland and tighten screws evenly across bolt diameter. Tighten screws firmly.

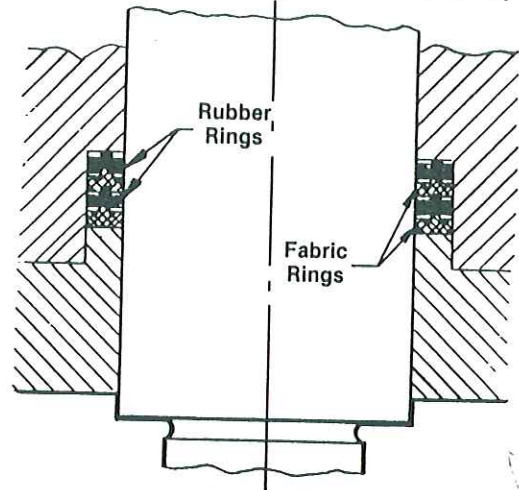


Figure 3  
INSTALLATION-UNEOPAC  
(For Denison Cylinder Rams)

### SERVICE ON RELIEF VALVE (Fig. 10 & 11)

At times, the relief valve is prevented from operating satisfactorily due to the presence of lint, pipe scale, or some other foreign matter between the control seat (11) and cone (12). This may cause fluctuating pressure or pressure failure.

Quite often this condition may be corrected by starting the pump, releasing the lock nut (19) and sufficiently backing off (CCW) adjusting screw (21) to remove all spring pressure from cone (12). Oil circulating through the cap and discharging through spool (24) 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 socket set screw (7) from cap and cone seat.
2. Remove the cap assembly (8) from the body (1) being careful not to lose or damage the "O" rings.
3. Remove the adjusting screw (21) and spring retainer (17).
4. Remove seal piston (15) by threading in a 10-24 screw into the tapped end and pulling out.
5. Remove compression spring (13) and cone (12).
6. Examine control seat (11), 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 pressed or driven out.

7. Thoroughly clean cap (8) giving special attention to drilled passages which communicate with the body. It is recommended that the cap be washed in stoddard solvent and then all holes blown out with clean compressed air. Do not wipe with rags, as they may leave lint.
8. Clean and inspect all parts removed from cap (8). If cone (12) shows a full sealing ring, it is satisfactory and may be reused, otherwise replace with new part. Examine control seat (11). If seat is damaged, use opposite sealing edge. If that too is damaged, replace part.
9. Reassemble:
  - (a) Press control seat (11) into cap (8) through the hole where socket set screw (7) was removed 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. This is done to prevent damage to seat.
  - (b) Assemble spring (13) on cone (12), add seal ring (16) to piston (15) which is inserted into opposite end of spring. Insert this assembly, cone first, into the end of cap (8) from which it was removed and thread adjusting plug (17) into cap and tighten to hold parts in cap. Assemble lock nut (19) and sleeve (18) onto adjusting screw assembly (20, 21, 22) and thread into adjusting plug (17).

#### REMOTE CONTROL VALVE VERSION

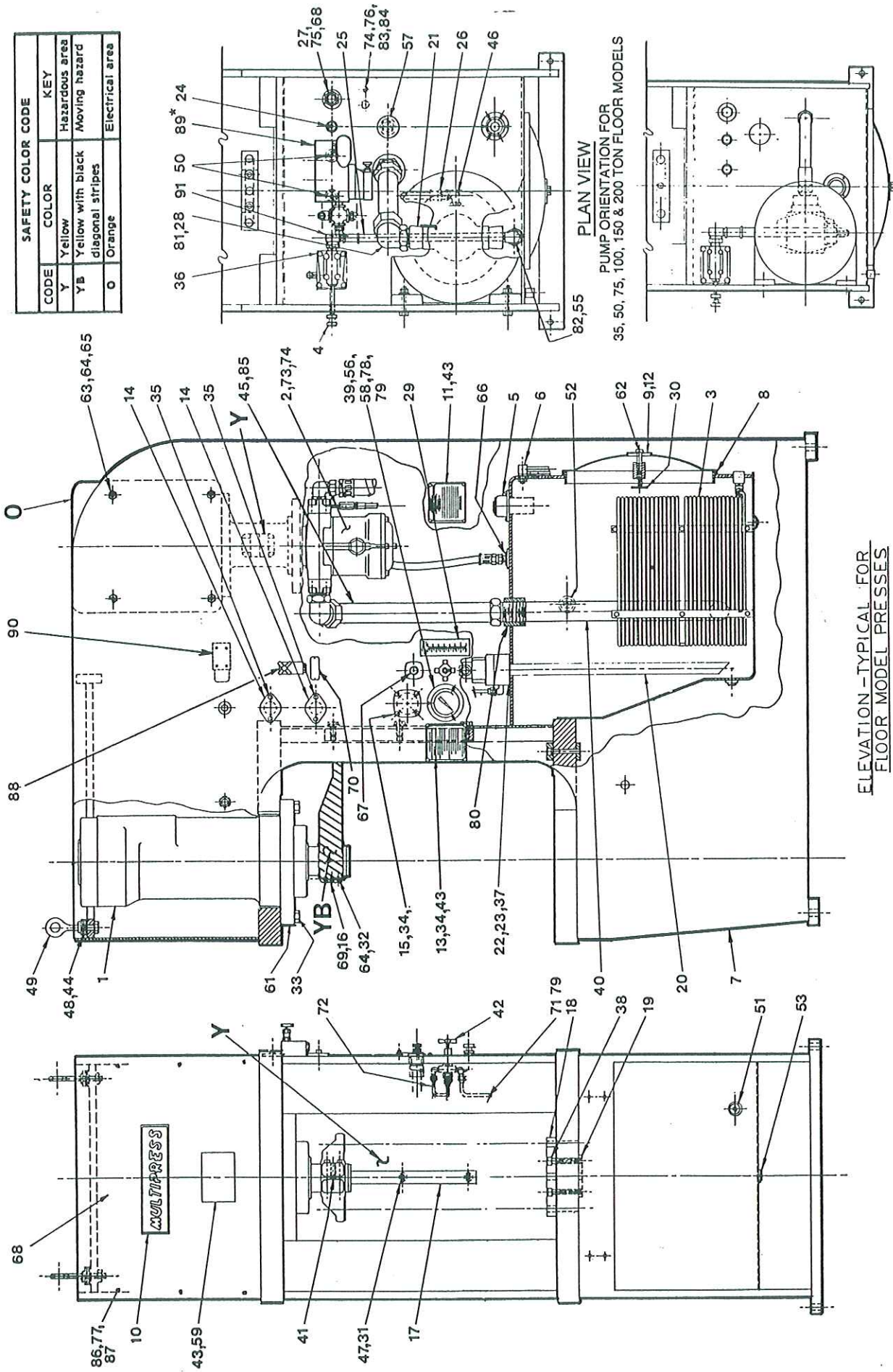
- (b) Insert damping sleeve (26) into cap. Install damping piston (27) and spring (31) into

damping sleeve (26). Install ball (30) and thread screw (7) into cap until ball (30) and damping sleeve (26) are tight against the seat (11).

- (c) Install cone seat spacer (10) and screw socket set screw (7) into cap and tighten until cone seat spacer (10) is tight against the seat (11).
10. Next, remove spring (4) and spool (24) from the body (1).
11. Clean all parts thoroughly in stoddard solvent. Use clean compressed air to blow out all passages.
12. Examine seat in sleeve (5) making sure that it is clean and that the seating edge does not show defects. If seat is defective, replace. Do not re-grind defective part, as such procedure will unbalance characteristics of the valve, resulting in unsatisfactory operation of the valve.
13. Examine tapered seat surface of spool (24). This surface should show a perfect seating ring. If inspection indicates improper seating, replace part. A satin appearance near the sealing ring does not mean a defective part. Spool erosion does, however, necessitate replacement.
14. Reassemble cap assembly to body assembly. It is advisable to replace all "O" rings. Be sure all "O" rings are in place before completing this assembly. Cap screws fastening cap (8) to the body (1) should be drawn down uniformly and tightened securely. Loose cap screws will allow extrusion of the "O" rings.

# BASIC PRESS ASSEMBLY

SAFETY COLOR CODE		KEY
CODE	COLOR	
Y	Yellow	Hazardous area
YB	Yellow with black diagonal stripes	Moving hazard
O	Orange	Electrical area



PLAN VIEW

PUMP ORIENTATION FOR  
35, 50, 75, 100, 150 & 200 TON FLOOR MODELS

PLAN VIEW

PUMP ORIENTATION FOR  
12 & 20 TON FLOOR MODELS

\*150 & 200 TON MODELS ONLY

ELEVATION - TYPICAL FOR  
FLOOR MODEL PRESSES

Figure 3

# BASIC PRESS ASSEMBLY

ITEM	PART NO.	DESCRIPTION	S12-41673 FZ200		
			QUANTITY		
1	See page 18 & 19	Assembly-Cylinder	1	1	1
2	See page 16	Assembly-Pump Motor	1	1	1
3	S12-15394	Assembly-Cooler	1	1	1
4	See page 22	Assembly-Relief Valve	1	1	1
5	506-85002	Assembly-Filler Cap	1	1	1
6	013-11890	Gauge-Sight, Oil Level	1	1	1
7	032-46884	Frame	1		
	032-46992	Frame	1		
	032-90268	Frame	1		
	032-72522	Frame	1		
8	032-13162	Gasket-Reservoir Cover Plate (Square Door)	1	1	1
	032-69729	Gasket-Reservoir Cover (Round Door)	1	1	1
9	032-49740	Cover-Cleanout	1	1	1
10	032-23448	Nameplate-Insignia	1	1	1
11	032-10131	Nameplate-Data	1	1	1
12	636-80006	Seal-Washer	1	1	1
13	032-42902	Nameplate-Pressure Adjust	1	1	1
14	032-42903	Plate-Cover	2	2	
15	032-42904	Plate-Cover	1	1	
16	032-16659	Arm-Non Rotating Shipper Rod	1		
	032-18710	Arm-Non Rotating Shipper Rod	1		
	032-72523	Arm-Non Rotating Shipper Rod	1	1	
17	032-42907	Guide-Ram	1	1	1
18	032-13161	Guide-Shipper Rod	1	1	
19	032-13163	Retainer-Shipper Rod Guide	1	1	
20	032-44028	Pipe-1" Std.	1	1	
	032-47612	Pipe-1-1/2" Std.	1	1	
21	442-32010	Nipple-X-Hvy Pipe	1		
	442-32120	Nipple-X Hvy Pipe	1		
22	032-44026	Subplate-Relief Valve	1	1	
23	032-44027	Gasket-Relief Valve Subplate	1	1	
24	032-42910	Pipe-3/4"	1	1	
25	032-44030	Hose-Pressure	1		
	486-15127	Hose-Pressure	1		
	032-72810	Hose-Pressure	1		
	032-72815	Hose-Pressure	1		
26	032-29473	Hose-Drain	1	1	
	032-43866	Hose-Drain 3/8" ID	1		
27	032-42912	Pipe-1-1/4" (in reservoir)	1	1	1
28	424-03200	Elbow-90° Pipe	1	1	
29	032-43871	Plate-Pressure Gauge Conversion	1		
	032-46993	Plate-Pressure Gauge Conversion	1		
	032-72506	Plate-Pressure Gauge Conversion	1	1	
30	032-90129	Anchor-Cleanout Cover	1	1	1
31	306-16160	Screw-H.H.C. 3/8 UNC x 1"	3	3	
	306-16180	Screw-H.H.C. 3/8 UNC x 1-1/4"	3	3	
32	358-24320	Screw-S.H.C. 5/8 UNC x 3"	2		
	358-20360	Screw-S.H.C. 1/2 UNC x 4"	2		
	306-24220	Screw-H.H.C. 5/8 UNC x 1-3/4"	4	4	
33	358-26280	Screw-S.H.C. 3/4 UNC x 2-1/2"	8		
	358-28280	Screw-S.H.C. 7/8 UNC x 2-1/2"	8		
	358-34360	Screw-S.H.C. 1 1/4 UNC x 4"	8	8	
34	358-12100	Screw-S.H.C. 1/4 UNC x 5/8"	4	4	4
35	358-16120	Screw-S.H.C. 3/8 UNC x 3/4"	4	4	
36	358-20220	Screw-S.H.C. 1/2 UNC x 1-3/4"	4	4	
37	358-14240	Screw-S.H.C. 5/16 UNC x 2"	4	4	
38	358-20360	Screw-S.H.C. 1/2 UNC x 4"	2	2	

ITEM	PART NO.	DESCRIPTION	S12-41673 FZ200		
			QUANTITY		
39	310-10061	Screw-R.H.M. #10 UNC x 3/8"	14	9	6
40	032-46885	Pipe-Suction Line 2" Dia.	1	1	1
	032-72510	Pipe-Suction Line 2" Dia.			1
41	311-20222	Screw-S.S. Flat Pt. 1/2-13 x 1-3/4"	1	1	
42	514-01504	Valve-Needle 1/4"	1		
	514-20026	Valve-Needle 3/8"	1		
	514-01435	Valve-Needle 1/4"	1	1	
43	320-10203	Screw-Drive Type 'U' #2 x 3/16"	12	12	12
44	333-24000	Nut-Hex 5/8-11 UNC	2	4	4
	333-26000	Nut-Hex 3/4-10 UNC	2		
45	486-15110	Hose-2"	1	1	
46	492-15199	Adapter-Reducer	1	1	
47	345-10024	Washer-3/8" Std.	3	3	3
48	345-10040	Washer-5/8" Std.	4	8	
49	354-70117	Eyebolt-5/8-11 UNC	2		
	354-15003	Eyebolt-3/4-10 UNC	2		
50	431-90604	Plug-Socket Pipe 3/8" N.P.T.F.	2	2	
51	431-92501	Plug-Socket Pipe 3/4" N.P.T.F.	2	2	
52	431-92502	Plug-Socket Pipe 1" N.P.T.F.	1	1	1
53	488-01401	Plug-Magnetic 3/8" N.P.T.F.	1	1	1
54	032-41055	Hose-(Air bleed to reservoir)	1	1	
	032-69416	Hose	1		
55	473-11616	Fitting-Tube 90° Elbow	1	1	2
56	501-99683	Gauge-Pressure	1	1	1
57	506-77615	Breather	1	1	1
58	533-00001	Snubber-Pressure Gauge	1	1	1
59	032-48097	Plate-Warning	1	1	1
60	515-24603	Valve-Water Reg. (Not shown)	1	1	1
		Included in Item 3			
61		Not Applicable			
62	306-24280	Screw-H.H.C. 5/8 UNC x 2-1/2"	1	1	1
63	306-20320	Screw-H.H.C. 1/2 UNC x 3"	4		
	306-24350	Screw-H.H.C. 5/8 UNC x 3-3/4"	4		
	306-24400	Screw-H.H.C. 5/8 UNC x 5"	4	4	
64	348-10032	Washer-1/2 Internal Shakeproof	4		
	348-10040	Washer-5/8 Internal Shakeproof	4	8	8
65	345-10032	Washer-17/32 Plain	8		
	345-10040	Washer-21/32 Plain	8		
66	431-92500	Plug-Socket Pipe 1/2" N.P.T.F.	1		
67	See page 22	Valve-Remote Pressure (RIE02-)	1	1	
68	032-72516	Plate-Press Head	1	1	
69	032-72517	Retainer-Ram To Banjo	1	1	
70	035-13155	Plate-Pressing Speed Control	1	1	
71	032-42936	Hose-1/4 I.D. x 23-1/2"	1	1	
72	031-48974	Hose-1/4 I.D. x 26"	1	1	
73	442-04140	Nipple-1/4" x 3-1/2"	1		
74	473-10604	Elbow-Male	1	1	
75	470-35002	Connector-Male	1	1	
76	442-04010	Nipple-1/4" x 7/8"	1	1	
77	606-25035	Grommet	6	6	
78	803-04035	Tubing-1/4" O.D.	2ft.	2ft.	
79	474-10404	Elbow-Female	1	1	
80	518-00003	Flange	1	1	
81	426-33200	Elbow-Street 2"	1	1	
82	433-92016	Bushing-Hex. Reducing 1-1/4" x 1"	1		
83	416-00400	Tee-1/4 Mall. Iron	1	1	
84	479-10604	Tee-Male	1	1	
85	470-10604	Connector-Male	1		
86	310-10081	Screw-R.H.M. #10-24 UNC x 1/2"	6	6	
87	345-11010	Washer-7/32" I.D.	6	6	
88	S12-47518	Assembly-Adj. Pressing Speed Valve	1	1	
89	See page 21	Manifold Assembly	1	1	
90	See page 24 & page 25	Valve-4 Way (DID04 or A-3D01)	1	1	
91	473-10404	Fitting-Elbow	2	3	

# BASIC PRESS ASSEMBLY

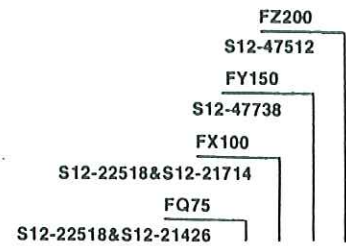
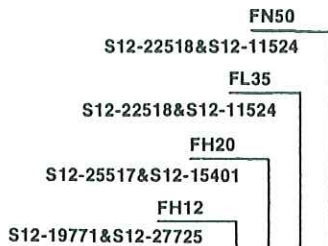
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				S12-11522 FL35					
				S12-15380 FH20					
				S12-27726 FH12					
ITEM	PART NO.	DESCRIPTION	QUANTITY						
1	See pages 18 & 19	Assembly-Cylinder	1 1 1 1						
2	See page 16	Assembly-Pump Motor	1 1 1 1						
3	S12-15394	Assembly-Cooler	1 1 1 1						
4	See page 22	Assembly-Relief Valve (R4V)	1 1 1 1						
5	506-85002	Assembly-Filler Cap	1 1 1 1						
6	013-11890	Gauge-Sight, Oil Level	1 1 1 1						
7	032-42900	Frame	1 1						
	032-44020	Frame	1						
	032-44056	Frame	1						
8	032-13162	Gasket-Reservoir Cover Plate (Square Door)	1 1 1 1						
	032-69729	Gasket-Reservoir Cover (Round Door)	1 1 1 1						
9	032-49740	Cover-Cleanout	1 1 1 1						
10	032-23448	Nameplate-Insignia	1 1 1 1						
11	032-10131	Nameplate-Data	1 1 1 1						
12	636-80006	Seal-Washer	1 1 1 1						
13	032-42902	Nameplate-Pressure Adjust	1 1 1 1						
14	032-42903	Plate-Cover	2 2 2 2						
15	032-42904	Plate-Cover	1 1 1 1						
16	032-69268	Arm-Non Rotating Shipper Rod	1						
	032-42905	Arm-Non Rotating Shipper Rod	1						
	032-44049	Arm-Non Rotating Shipper Rod	1 1						
17	032-69273	Guide-Ram	1						
	032-42907	Guide-Ram	1 1 1 1						
18	032-13161	Guide-Shipper Rod	1 1 1 1						
19	032-13163	Retainer-Shipper Rod Guide	1 1 1 1						
20	032-44028	Pipe-1" Std.	1 1 1 1						
21	442-32010	Nipple X-Hvy Pipe	1 1						
22	032-44026	Subplate-Relief Valve	1 1 1 1						
23	032-44027	Gasket-Relief Valve Subplate	1 1 1 1						
24	032-42910	Pipe 3/4"	1 1 1 1						
25	032-42911	Hose-Pressure	1 1						
	032-44030	Hose-Pressure	1 1						
26	032-29473	Hose-Drain	1 1						
27	032-42912	Pipe 1-1/4" (in reservoir)	1 1 1 1						
28	424-03200	Elbow 90° Pipe	1 1						
29	032-42879	Plate-Pressure Gauge Conversion	1						
	032-42913	Plate-Pressure Gauge Conversion	1						
	032-44050	Plate-Pressure Gauge Conversion	1						
	032-43167	Plate-Pressure Gauge Conversion	1						
30	032-90129	Anchor-Cleanout Cover	1 1 1 1						
31	306-16160	Screw-H.H.C. 3/8-16 UNC x 1" LG.	3 3 3 3						
32	358-16280	Screw-S.H.C. 3/8-16 UNC x 2-1/2" LG.	1						
	306-20320	Screw-H.H.C. 1/2-13 UNC x 3" LG.	2 2						
	306-20330	Screw-H.H.C. 1/2-13 UNC x 3-1/4" LG.	2						
33	306-40014	Screw-H.H.C. 7/8-9 UNC x 2-1/2" LG.	4 6						
	306-40062	Screw-H.H.C. 1-8 UNC x 3" LG.	6						

				S12-11540 FN50					
				S12-11522 FL35					
				S12-15380 FH20					
				S12-27726 FH12					
ITEM	PART NO.	DESCRIPTION	QUANTITY						
34	358-12100	Screw-S.H.C. 1/4-20 UNC x 5/8" LG.	4 4 4 4						
35	358-16120	Screw-S.H.C. 3/8-16 UNC x 3/4" LG.	4 4 4 4						
36	358-20220	Screw-S.H.C. 1/2-13 UNC x 1-3/4" LG.	4 4 4 4						
37	358-14240	Screw-S.H.C. 5/16-18 UNC x 2" LG.	4 4 4 4						
38	358-20320	Screw-S.H.C. 1/2-13 UNC x 3" LG.	2 2						
	358-20360	Screw-S.H.C. 1/2-13 UNC x 4" LG.	2 2						
39	310-10061	Screw-R.H.M. #10-24 UNC x 3/8" LG.	9 9 14 14						
40	032-47612	Pipe-Suction Line 1-1/2" Dia.	1 1						
	032-47624	Pipe-Suction Line 2" Dia.	1 1						
41	311-20222	Screw-S.S. Flat Point 1/2-13 UNC x 1-3/4" LG.	1 1 1 1						
42	514-01504	Valve-Needle 1/4"	1 1 1 1						
43	320-10203	Screw-Drive, Type "U" #2 x 3/16" LG.	12 12 12 12						
44	333-24000	Nut-Hex 5/8-11 UNC	4 4 2						
	335-24100	Nut-Hex 5/8-11 UNC	2						
45	486-15109	Hose-1-1/2"	1 1						
	486-15110	Hose-2"	1 1						
46	492-15199	Adapter-Reducer	1 1						
47	345-10024	Washer-3/8" Std.	11 3 3 3						
48	345-10040	Washer-5/8" Std.	2 2 4 4						
49	354-70117	Eyebolt-5/8-11 UNC	2 2 2 2						
50	431-90604	Plug-Socket Pipe 3/8" N.P.T.F.	1 1 2 2						
51	431-92501	Plug-Socket Pipe 3/4" N.P.T.F.	2 2 2 2						
52	431-92502	Plug-Socket Pipe 1" N.P.T.F.	1 1 1 1						
53	488-01401	Plug-Magnetic 3/8" N.P.T.F.	1 1 1 1						
54	032-41055	Hose-(Air bleed to reservoir) Not Shown	1 1						
55	473-11616	Fitting-Tube 90° Elbow	1 1 1 1						
56	501-99683	Gauge-Pressure	1 1 1 1						
57	506-77615	Breather	1 1 1 1						
58	533-00001	Snubber-Pressure Gauge	1 1 1 1						
59	032-48097	Plate-Warning	1 1 1 1						
60	515-24603	Valve-Water Reg. (not shown) Included in Item 3	1 1 1 1						
61	032-49009	Adapter-Cylinder	1						
62	306-24280	Screw-H.H.C. 5/8 UNC x 2-1/2" LG.	1 1 1 1						
63	306-16220	Screw-H.H.C. 3/8-16 UNC x 1-3/4" LG.	4						
	306-20260	Screw-H.H.C. 1/2-13 UNC x 2-1/4" LG.	4						
	306-20280	Screw-H.H.C. 1/2-13 UNC x 2-1/2" LG.	4						
	306-20300	Screw-H.H.C. 1/2-13 UNC x 2-3/4" LG.	4						
64	348-10024	Washer-3/8 Internal Shake-proof	4						
	348-10032	Washer-1/2 Internal Shake-proof	4 4 4						
65	345-10032	Washer-17/32 Plain	8 8 8						
91	473-10404	Fitting-Elbow	3 3 3 2						





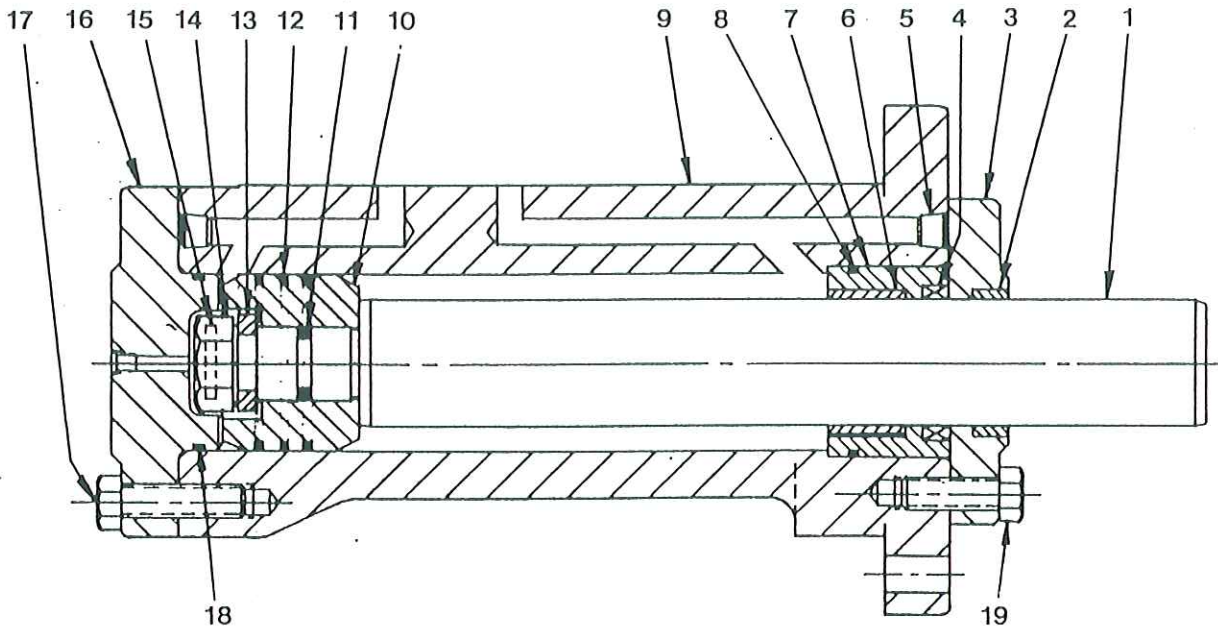
# PUMP-MOTOR ASSEMBLY



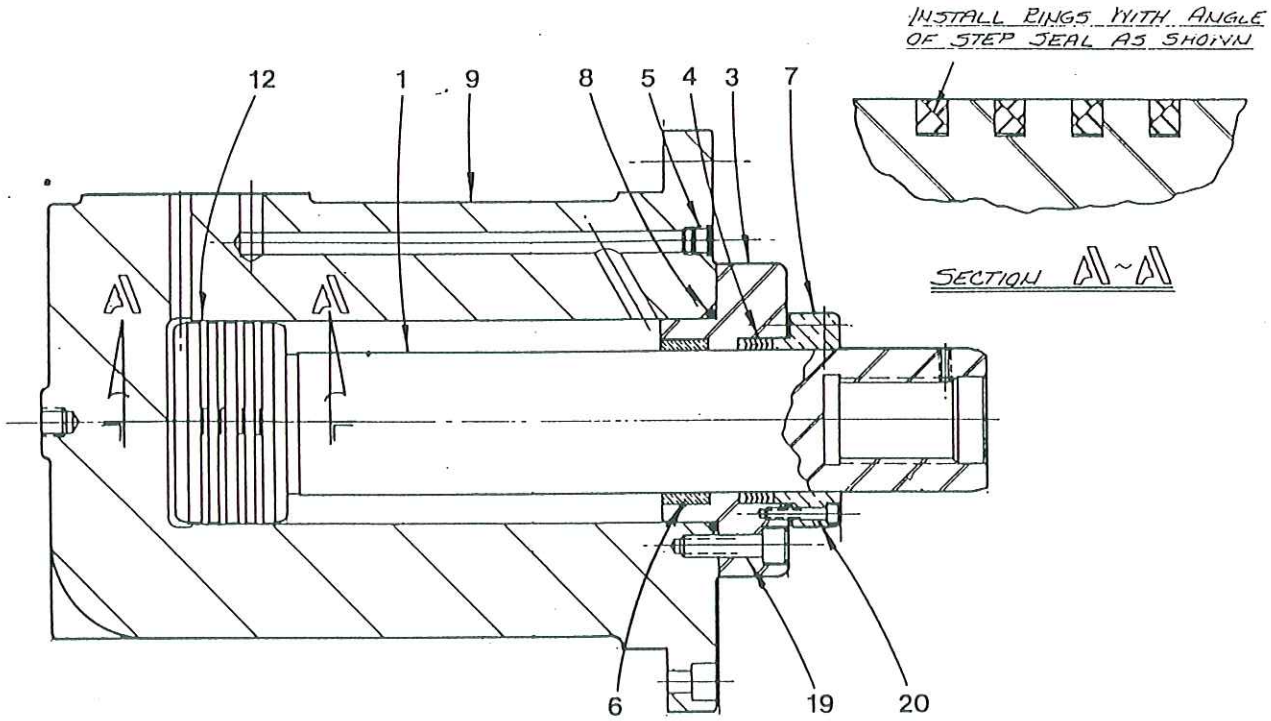
ITEM	PART NO.	DESCRIPTION	QUANTITY
1	Ref. only	Motor-Electric 10 H.P., 1800 RPM "C" Face H.F.M.	1
		Motor-Electric 20 H.P., 1800 RPM "C" Face H.F.M.	1
		Motor-Electric 30 H.P., 1800 RPM "C" Face H.F.M.	1 1
2	014-06701	Pump-Vane Model TIC-008-21R-02	1
	014-06750	Pump-Vane Model TIC-014-21R-02	1
	015-13514	Pump-Piston Model PIF07-015-51R	1 1
3	032-47778	Adapter	1 1
	032-47798	Adapter	1 1
4	212-85010	Coupling-Half (Pump)	1 1
	212-85014	Coupling-Half (Motor)	1
	212-85015	Coupling-Half (Motor)	1
	212-85042	Insert-Coupling	1 1
	212-85021	Coupling-Half (Pump & Motor)	2 2
	212-85043	Insert-Coupling	1 1
5	306-20180	Screw-H.H.C. 1/2-13 UNC x 1-1/4" LG.	6 6
	306-20200	Screw-H.H.C. 1/2-13 UNC x 1-1/2" LG.	8 8
6	346-10032	Washer-Lock 1/2" Std.	6 6 8 8
7	032-49301	Guard-Coupling	2 2
	032-49303	Guard-Coupling	2 2
8	320-60806	Screw-Self Tapping #8-32 UNC x 3/8" LG.	4 4 8 8
9	S12-22217	Connection-Pressure	1 1
	S15-99795	Connection-Pressure	1 1
10	S14-10786	Connection-Suction	1 1
	S15-13112	Connection-Suction	1 1
11	S15-01238	Valve-Case Drain Check	1 1
12	016-09020	Valve-Air BLeed Model AB04-15	1 1 1 1

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	Ref. only	Motor-Electric 30 H.P., 1800 RPM "C" Face H.F.M.	1
		Motor-Electric 40 H.P., 1800 RPM "C" Face H.F.M.	1
		Motor-Electric 60 H.P., 1800 RPM "C" Face H.F.M.	1 1
2	015-13516	Pump-Piston Model PIF07-012-51R	1
	015-13510	Pump-Piston Model PIF07-020-51R	1
	014-53844	Pump-Vane Model T5D-031-1R03-C1	1
	015-13510	Pump-Piston Model PIF07-020-51R	1
3	032-47798	Adapter	1 1 1
	031-48621	Adapter	1
4	212-85021	Coupling-Half (Pump & Motor)	2 2 1
	212-85043	Insert-Coupling	1 1 1 1
	212-85068	Coupling-Half (Pump)	1
	212-85023	Coupling-Half (Motor)	1 1
5	306-20200	Screw-H.H.C. 1/2-13 UNC x 1-1/2" LG.	8 8 8
	306-20220	Screw-H.H.C. 1/2-13 UNC x 1-3/4" LG.	4
6	346-10032	Washer-Lock 1/2 Std.	8 8 4 8
7	032-49303	Guard-Coupling	2 2 2
	032-49302	Guard-Coupling	2
8	320-60806	Screw-Self Tapping #8-32 UNC x 3/8" LG.	8 8 4 8
9	S15-99795	Connection-Pressure	1 1 1
	S14-19747	Connection-Pressure	1
10	S15-13112	Connection-Suction	1 1 1
	S14-09335	Connection-Suction	1
11	S15-01238	Valve-Case Drain Check	1 1
12	016-09020	Valve-Air Bleed Model AB04-15	1 1
	431-90400	Plug-Pipe	1
13	031-48624	Spacer-Motor End	1 1 1
14	358-24160	Screw-S.H.C. 5/8-11 UNC x 1" LG.	8 8
15	306-24220	Screw-H.H.C. 5/8-11 UNC x 1-3/4" LG.	2
16	346-10040	Washer-Lock 5/3" Std.	2
17	492-15199	Adapter-Pipe	1

# CYLINDER ASSEMBLY

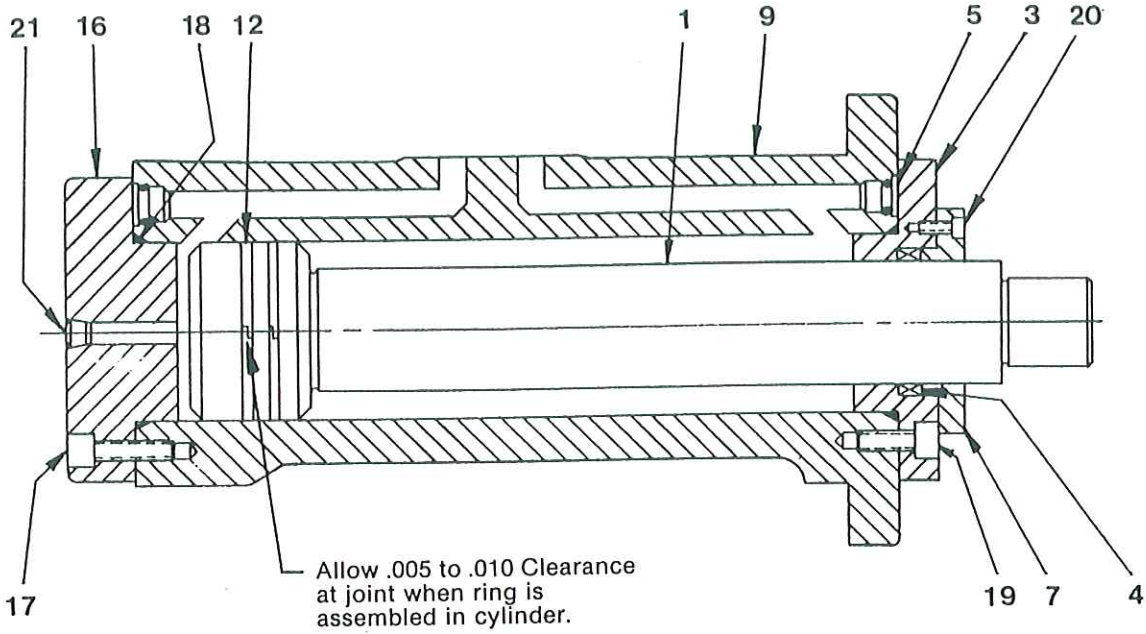


**Figure 5**  
**FH20, FL35, FN50, FY150, & FZ200 Cylinder Ass'y.**

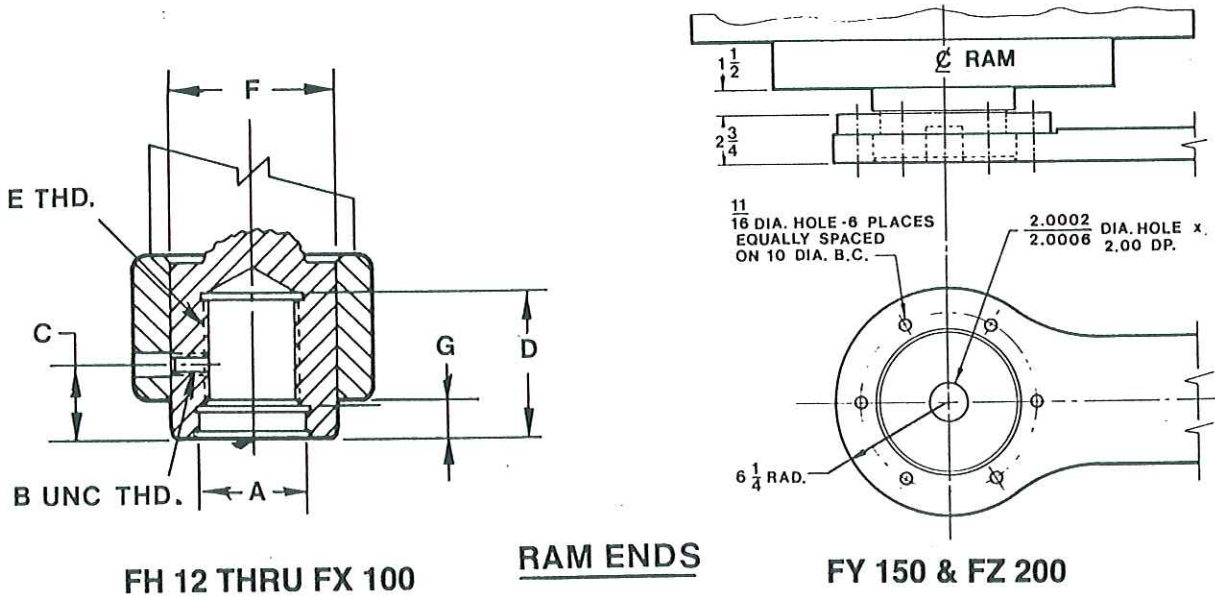


**Figure 6**  
**FQ75 & FX100 Cylinder Ass'y.**

# CYLINDER ASSEMBLY



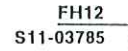
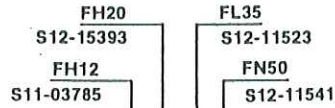
**Figure 7**  
**FH12 Cylinder Ass'y**



CYLINDER	A Dia.	B Thd.	C	D	E Thd.	F Dia.	G
FH12		1/4-20	1-1/4	2	7/8-9 UNC	2.000/1.999	1/2
FH20	1.250/1.252	3/8-16	1-1/2	2-1/2	1-14 UNF	3.250/3.249	3/4
FL 35	1.750/1.752	3/8-16	1-1/2	2-1/2	1-1/2-12 UNF	3.500/3.499	3/4
FN50	2.250/2.254	3/8-16	1-1/2	3	2-8 UNF	3.500/3.499	3/4
FQ75	3.000/3.002	1/2-13	2-1/2	4-1/4	2-1/2-12 UNC	5.000/4.999	1-1/4
FX100	3.750/3.754	1/2-13	1-3/4	6-3/4	3-1/2-12 UNC	5.997/5.995	1/2

**Figure 8**

# CYLINDER ASSEMBLY



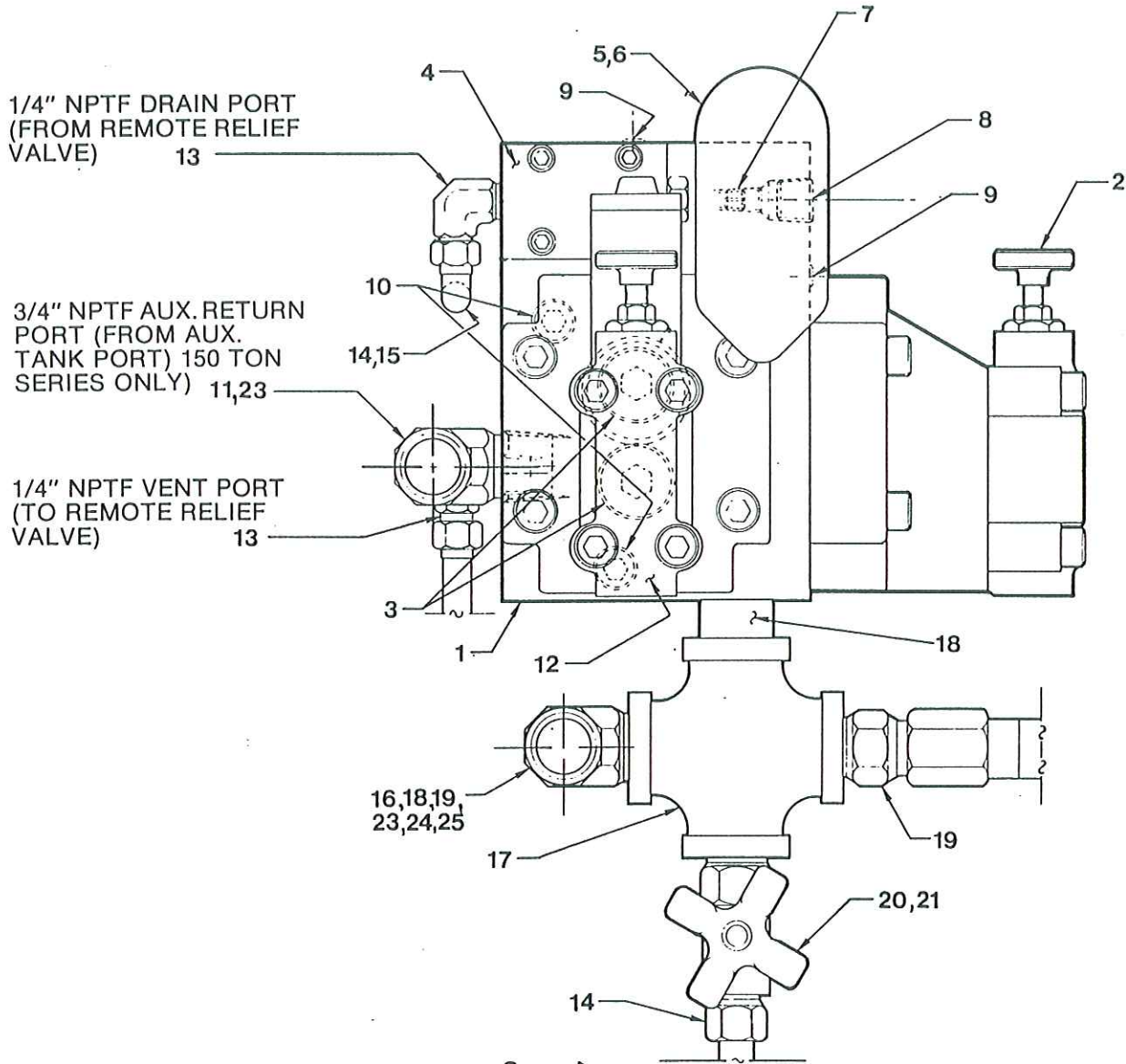
ITEM	PART NO.	DESCRIPTION	QUANTITY
1	031-23659	Ram	1
	032-42914	Ram	1
	032-44040	Ram	1
	032-44066	Ram	1
2	032-42918	Bushing	1
	032-44045	Bushing	1
	032-44063	Bushing	1
3	031-23654	Box-Stuffing	1
	032-42917	Retainer	1
	032-44044	Retainer	1
	032-44062	Retainer	1
4	633-00006	Packing-Cylinder "UNEEPAC"	1
	633-00026	Packing-Cylinder "UNEEPAC"	1
	633-00020	Packing-Cylinder "UNEEPAC"	1
	633-00021	Packing-Cylinder "UNEEPAC"	1
5	488-35044	Plug	2
	431-92500	Plug	2 2 2
6	032-42920	Bushing	1
	032-44047	Bushing	1
	032-44065	Bushing	1
7	031-23650	Gland-Packing	1
	032-42919	Gland-Packing	1
	032-44046	Gland-Packing	1
	032-44064	Gland-Packing	1
8	671-00349	O-Ring	1
	691-00428	O-Ring	1
	691-00437	O-Ring	1
9	031-23656	Body-Cylinder	1
	032-42921	Body-Cylinder	1
	032-44021	Body-Cylinder	1
	032-44057	Body-Cylinder	1
10	032-42915	Piston	1
	032-44041	Piston	1
	032-44067	Piston	1
11	671-00326	O-Ring	1
	671-00328	O-Ring	1
	671-00332	O-Ring	1
12	625-33032	Ring-Piston	2
	625-33036	Ring-Piston	3
	625-33040	Ring-Piston	3
	625-34048	Ring-Piston	3
13	032-42916	Washer-Thrust	1
	032-44042	Washer-Thrust	1
	032-44068	Washer-Thrust	1
14	032-90305	Nut-Hex	1
	032-90306	Nut-Hex	1
	032-90307	Nut-Hex	1
15	325-16360	Pin-Roll	1
16	031-23658	Head-Cylinder	1
	032-42923	Head-Cylinder	1
	032-44023	Head-Cylinder	1
	032-44059	Head-Cylinder	1
17	358-20220	Screw-S.H.C. 1/2-13 UNC x 1-3/4" 8	8
	306-40013	Screw-H.H.C. 7/8-9 UNC x 3-1/4" 8	8
	306-40037	Screw-H.H.C. 1-1/4-7 UNC x 4-1/2" 8	6 8
18	691-00242	O-Ring	2
	671-00346	O-Ring	1
	691-00248	O-Ring	1
	691-00256	O-Ring	1
19	358-20186	Screw-S.H.C. 1/2-13 UNC x 1-1/4" 8	8
	306-40014	Screw-H.H.C. 7/8-9 UNC x 2-1/2" 8	8
	306-40013	Screw-H.H.C. 7/8-9 UNC x 4-1/4" 8	8
	306-40039	Screw-H.H.C. 1"-8 UNC x 4" 8	8

ITEM	PART NO.	DESCRIPTION	QUANTITY
20	358-14120	Screw-S.H.C. 5/16-18 UNC x 3/4" 4	4
21	431-90800	Plug-1/2" Soc. Pipe	1



ITEM	PART NO.	DESCRIPTION	QUANTITY
1	032-16680	Ram	1
	032-18711	Ram	1
	032-72518	Ram	1
2	032-72508	Bushing	1
3	032-14364	Box-Stuffing	1
	032-18707	Box-Stuffing	1
	032-72514	Retainer-Packing Gland	1
4	613-10345	"V" Packing-Set	1
	613-10365	"V" Packing-Set	1
	633-00040	Packing-Cylinder "UNEEPAC"	1
5	431-90800	Plug-Soc. Pipe-1/2" N.P.T.F.	1
	431-91200	Plug-Soc. Pipe-3/4" N.P.T.F.	1
6	032-19757	Bushing	1
	032-18709	Bushing	1
	032-72513	Bushing	1
7	032-14365	Gland-Packing	1
	032-18708	Gland-Packing	1
	032-72512	Gland-Packing	1
8	691-00261	O-Ring	1
	691-00268	O-Ring	1
	671-00452	O-Ring	1
9	032-16681	Body-Cylinder	1
	032-18706	Body-Cylinder	1
	032-90256	Body-Cylinder	1
10	032-72515	Piston	1
11	671-00425	O-Ring	1
12	625-34056	Ring-Piston	4
	625-35068	Ring-Piston	4
	625-40001	Ring-Piston	4
13	032-72507	Washer-Thrust	1
14	032-72504	Nut-Hex 3-3/4"-8 UNC-SPECIAL	1
15	325-24480	Pin-Roll 3/8 Dia. x 3" LG.	1
16	032-72511	Head-Cylinder	1
17	358-34360	Screw-S.H.C. 1-1/4"-7 UNC x 4" LG.	15
18	671-00451	O-Ring	1
19	358-30320	Screw-S.H.C. 1"-8 UNC x 3" LG.	8
	358-32340	Screw-S.H.C. 1-1/8"-7 UNC x 3-1/2" LG.	10
	306-40037	Screw-H.H.C. 1-1/4"-7 UNC x 4-1/2" LG.	10
20	358-24246	Screw-S.H.C. 5/8-11 UNC x 2" LG.	8
	358-24286	Screw-S.H.C. 5/8-11 UNC x 2-1/2" LG.	10

# MANIFOLD ASSEMBLY



ITEM	PART NO.	DESCRIPTION	S12-47739		S12-47517		ITEM	PART NO.	DESCRIPTION	S12-47739		S12-47517	
			FY150	FZ200	QUANTITY	QUANTITY				FY150	FZ200	QUANTITY	QUANTITY
1	032-72521	Manifold-Valve Mounting	1	1	13	473-15026	Elbow-Male	2	2				
2	016-84142	Valve-3/4" Relief R4V06-535-10-A1	1	1	14	470-10404	Connector-Male	3	3				
3	431-90800	Plug-1/2" Hex. Soc. Pipe		2	15	031-48974	Hose-1/4" I.D. x 26 L.G.		1				
4	513-50110	Valve-1/4" Subplate Mounted check	1	1	16	473-11616	Elbow-Male	1	2				
5	115-15004	Switch-Pressure	1	1	17	428-31600	Cross-1"	1					
6	441-04010	Nipple-1/4" Std. Pipe x 7/8	1	1		428-61600	Cross-1"		1				
7	031-69575	Plug-Orifice	1	1	18	442-16080	Nipple-1" x 2"	2					
8	431-90400	Plug-1/4" Hex. Soc. Pipe	1	1		444-16010	Nipple-1" x 1-1/2"		1				
9	431-90104	Plug-1/16" Flush Hex. Soc. Pipe	7	7	19	470-11616	Connector-Male		1				
10	358-16340	Screw-Soc. Hd. Cap. 3/8-16 x 3-1/2	3	3	20	433-91604	Bushing-Hex. Reducing 1" x 1/4"	1	1				
11	473-15003	Elbow-Male	1		21	514-01435	Valve-Needle 1/4"	1	1				
	431-91200	Plug-3/4" Hex. Soc. Pipe		1	22	442-16080	Nipple-1" x 2"	1					
12	016-86981	Valve-3/4" Relief R4V06-535-10-09-115-60-A1	1		23	032-90585	Hose	2	1				
					24	513-50050	Valve-Check	1					
					25	426-31600	Elbow-Street	1					

Figure 9

# RELIEF VALVE ASSEMBLY

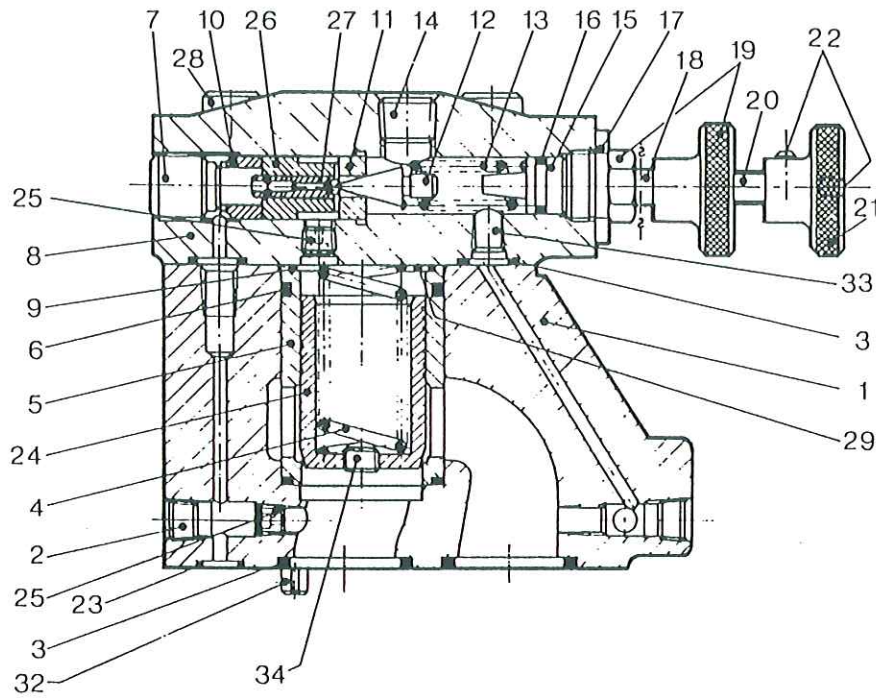


Figure 10

# REMOTE CONTROL VALVE ASSEMBLY

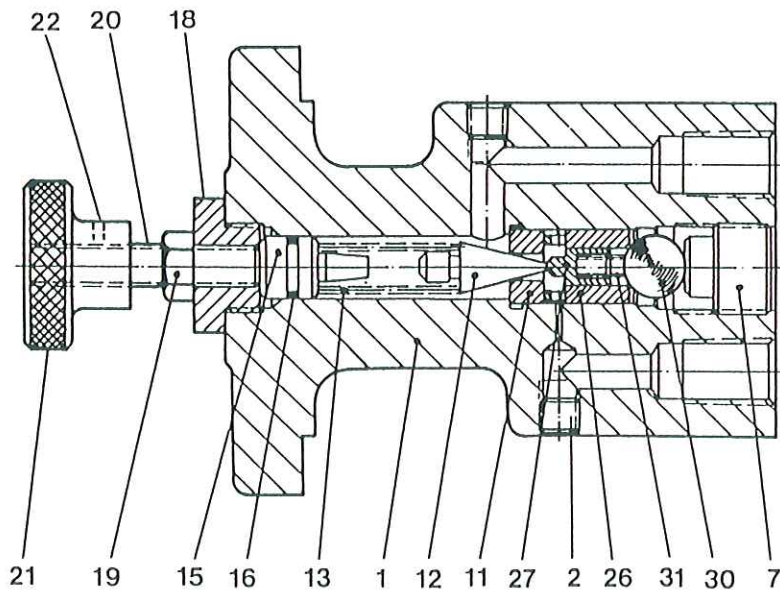
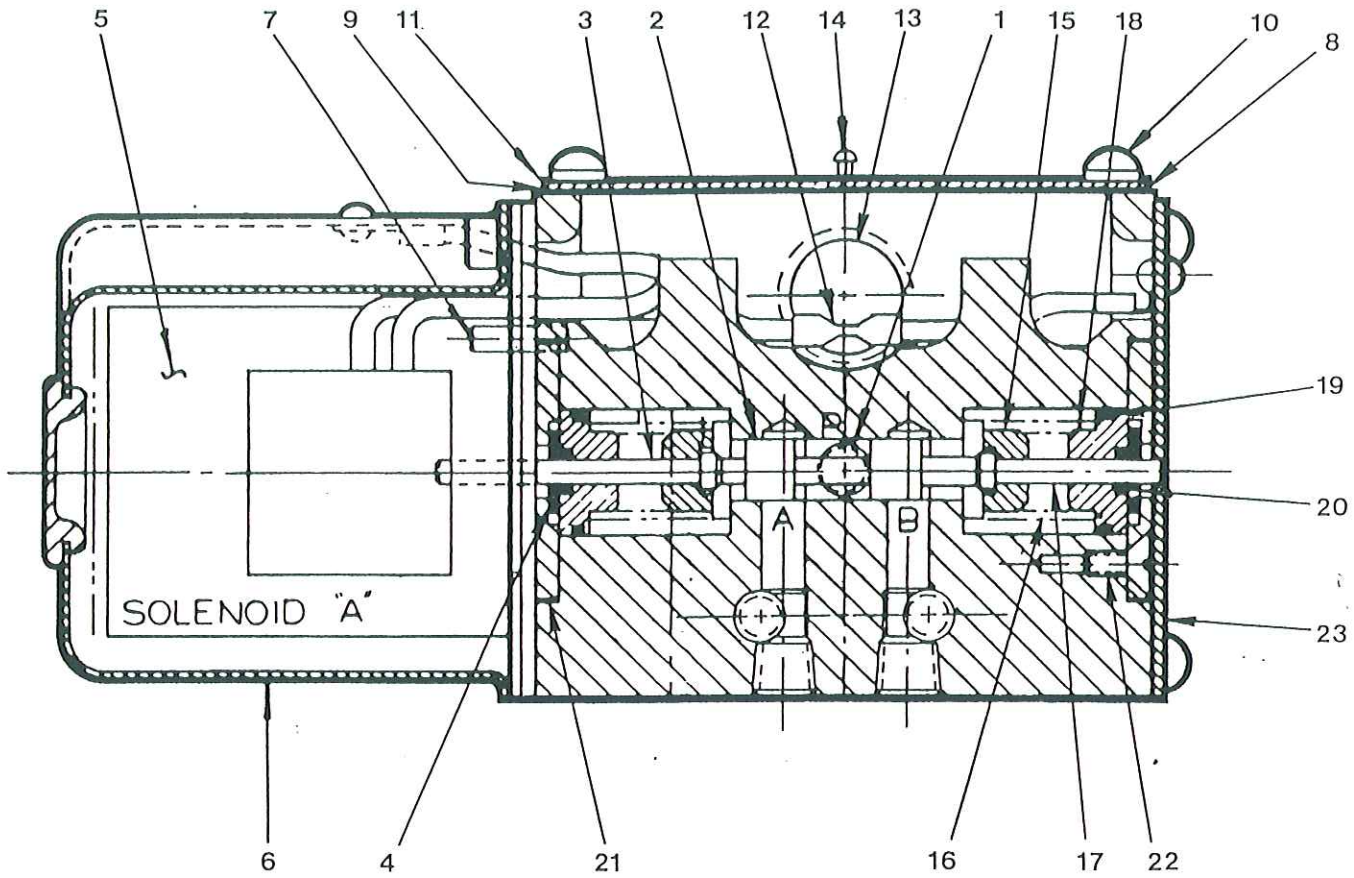


Figure 11

# VALVE ASSEMBLY

ITEM	PART NO.	DESCRIPTION	VALVE MODEL		
			R1E	R1V	R4V
			S16-14660	S12-11525	S16-65198
			VALVE MODEL		
			R1E	R1V	R4V
			QUANTITY		
1	036-39860	Body-Valve	1		
	036-24393	Body-Valve		1	
	036-38907	Body-Valve			1
2	431-90104	Plug-Pipe	2		
	431-90200	Plug-Pipe		1	
	431-90204	Plug-Pipe			2
3	691-00215	"O"-Ring		2	
	691-00216	"O"-Ring			2
4	036-27547	Spring-Compression	1	1	
5	036-27549	Sleeve	1	1	
6	691-00125	"O"-Ring		2	2
7	312-23104	Screw-Soc. Set.	1		
	312-35018	Screw-Soc. Set.		1	
	312-35051	Screw-Soc. Set.			1
8	036-42372	Cap	1		
	036-27545	Cap			1
9	691-00026	"O"-Ring		1	1
10	036-27548	Spacer		1	1
11	036-11692	Seat	1	1	1
12	036-12288	Cone	1	1	1
13	036-12289	Spring-Compression, 5000 PSI	1	1	1
14	431-90400	Plug-Pipe		2	
	431-90404	Plug-Pipe			1
15	036-21767	Piston-Seal	1	1	1
16	691-00012	"O"-Ring	1	1	1
17	036-21765	Retainer-Spring	1	1	1
18	032-42926	Sleeve-Adjusting		1	
19	333-13001	Nut-Control Locking	1		1
	032-42927	Knob-Control Locking		1	
20	312-13200	Screw-Adjusting	1	1	
	312-42928	Screw-Adjusting			1
21	036-24504	Knob-Control	1	1	1
22	312-09041	Screw-Soc. Set		1	1
	312-13080	Screw-Soc. Set	1		
23	691-00013	"O"-Ring		3	4
24	036-27550	Spool		1	1
25	036-25528	Plug-Orifice		2	2
26	036-33347	Sleeve-Damping	1		
	036-11710	Block-Control		1	1
27	036-33348	Piston-Damping	1		
	036-11694	Piston-Control		1	1
28	359-15220	Screw-S.H.C.		4	4
29	036-45247	Retainer-Spring		1	
30	700-70589	Ball	1		
31	036-33350	Spring	1		
32	325-16100	Pin-Roll 1/4 x 4/8" LG.			1
33	431-90104	Plug-1/16" NPTF (on models with external pilot oil dis- charge only)			1
34	431-90100	Plug-Pipe		1	
	431-90104	Plug-Pipe			1

# 4-WAY VALVE (D1D04)



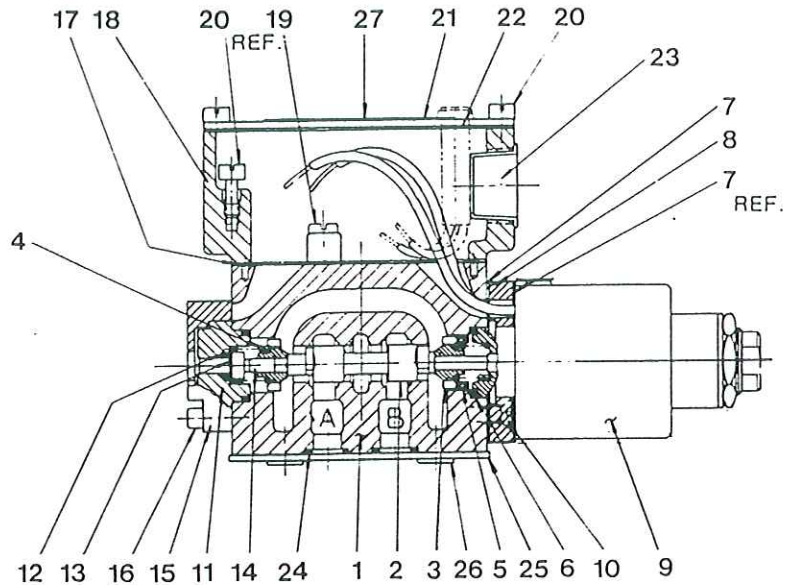
016-01609

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	431-90104	1/16" Soc. Pipe Plug	1
2	036-20411	No. 11 Spool	.1
3	036-20181	Standard Solenoid Pin	1
4	036-24543	Washer	2
5	120-04016	110V 60 cy (9-32 coil only 121-10016)	1
6	S16-01580	Solenoid Cover Assembly (25-3943)	1
7	325-12100	Roll Pin 3/16 x 5/8	2
8	036-20202	Valve Body (AC & DC Solenoids)	1
9	036-20186	Cover Gasket	1
10	036-20184	Special Screw	8
11	036-20180	Name Plate	1
12	124-20200	Wire Connector	1
13	449-00004	Shipping Plug	1
14	320-10405	No. 4 x 5/16 type U Drive Screw	1
15	036-20412	Solenoid Pin Guide	2
16	036-20911	Spring	2
17	036-20188	Pin	1
18	036-20189	Seal Retainer	2
19	671-00016	"O" Ring 70-914-4	2
20	671-00007	"O" Ring 70-6227-2	2
21	036-24544	Retainer Plate	2
22	315-09060	10-32 x 5/8 F.H.M. Screw	8
23	016-01635	End Cap Assembly (25-4166)	1

Figure 12



# 4-WAY VALVE (3D01)



016-44343-5

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	036-72192	Body	1
2	036-39808	Spool (Type 11)	1
3	036-39826	Spring Washer	2
4	036-39811	Spring	2
5	036-39833	Spacer	1
6	675-00016	O-Ring	2
7	036-71536	Gasket	2
8	036-71539	Adapter Plate	1
9	120-11053	Solenoid	1
10	358-08080	Screw, Soc. Hd. Cap	1
11	036-39818	Seat Retainer	1
12	675-00007	O-Ring	1
13	036-39834	Washer	1
14	036-39816	Override Pin	1
15	036-81001	End Cap	1
16	358-08100	Screw, Soc. Hd. Cap	4
17	036-71652	Gasket	1
18	036-72197	Wiring Box	1
19	353-25030	Screw, Slotted Hd.	2
20	036-72184	Screw	5
21	036-71283	Name Plate	1
22	036-71534	Gasket	1
23	449-00517	Plug	1
24	695-00012	O-Ring	4
25	036-39820	Dust Cover	1
26	449-00501	Plug	4
27	036-71676	Plate, Spool Symbol	1
28	516-39264	Subplate	1
	121-98292	Coil Replacement	1

Figure 13

# TROUBLE-SHOOTING CHART

TROUBLE	PROBABLE CAUSE	REMEDY
Motor stops or will not start.	<ol style="list-style-type: none"> <li>1. Thermal overload blown or faulty control fuse.</li> <li>2. "Stop-Start" Pushbuttons faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Disconnect press from power source, reset thermal overload or replace control fuse.</li> <li>2. Replace defective P.B. assembly.</li> </ol>
Ram will not start down.	<ol style="list-style-type: none"> <li>1. "Cycle Start" Pushbuttons not actuated simultaneously.</li> <li>2. 4-Way Valve malfunction.               <ol style="list-style-type: none"> <li>A. 1-Solenoid burned out.</li> <li>B. Loose connections.</li> <li>C. Spool binding.</li> </ol> </li> <li>3. Relief valve set too low.</li> <li>4. Guards not in position to protect operator.</li> <li>5. Guard switch malfunction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Actuate "Cycle Start" Pushbuttons simultaneously.</li> <li>2.               <ol style="list-style-type: none"> <li>A. Replace solenoid coil.</li> <li>B. Check all connections for looseness.</li> <li>C. See Page 24.</li> </ol> </li> <li>3. Adjust valve setting. See "Setting Operating Pressure" Page 6.</li> <li>4. Position guards to protect operator.</li> <li>5. Replace switch.</li> </ol>
Ram extends slowly.	<ol style="list-style-type: none"> <li>1. Control valve malfunction.               <ol style="list-style-type: none"> <li>A. Spool malfunction.</li> <li>B. Spool not shifting to full detent.</li> </ol> </li> <li>2. Shipper rod binding.</li> <li>3. Relief valve set too low.</li> </ol>	<ol style="list-style-type: none"> <li>1.               <ol style="list-style-type: none"> <li>A. Check spool for binding. Repair or replace if defective.</li> <li>B. Adjust shipper rod actuator collar.</li> </ol> </li> <li>2. Check for misalignment or bent shipper rod or foreign objects binding shipper rod.</li> <li>3. Adjust relief valve per "Setting Operating Pressure" Page 6.</li> </ol>
Press will not build tonnage.	<ol style="list-style-type: none"> <li>1. Low voltage.</li> <li>2. Fluid viscosity too low.</li> <li>3. Pressure setting of relief valve too low.</li> <li>4. Oil temperature excessive.</li> <li>5. Pump malfunction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check line voltage.</li> <li>2. Refer to "Oil Specifications" Page 5.</li> <li>3. Refer to "Setting Operating Pressure" Page 6.</li> <li>4. Should be within 125°F to 135°F. (52°C to 57°C)</li> <li>5. See "Service on Pump" Page 11.</li> </ol>
Ram reverses slowly.	<ol style="list-style-type: none"> <li>1. Relief valve setting too low.</li> <li>2. Shipper rod binding.</li> </ol>	<ol style="list-style-type: none"> <li>1. Refer to "Setting Operating Pressure" Page 6.</li> <li>2. Check for misalignment or bent shipper rod, or foreign objects binding shipper rod.</li> </ol>

# TROUBLE-SHOOTING CHART (contd)

TROUBLE	PROBABLE CAUSE	REMEDY
Ram will not reverse.	<ol style="list-style-type: none"> <li>1. Control valve malfunction.               <ol style="list-style-type: none"> <li>A. Control valve staying in full detent.</li> <li>B. Check for broken control valve spring.</li> </ol> </li> <li>2. Check shuttle in 4-Way valve for binding.</li> </ol>	<ol style="list-style-type: none"> <li>1. A. Check control valve spool, and shipper rod for binding. B. Replace if required.</li> <li>2. See Page 24.</li> </ol>
Motor stalls when ram contacts work.	<ol style="list-style-type: none"> <li>1. Low voltage.</li> <li>2. Relief valve set too high.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check line voltage.</li> <li>2. Adjust valve setting, see "Setting Operating Pressure" Page 6.</li> </ol>
Press noisy.	<ol style="list-style-type: none"> <li>1. Upper stop collar set to high, piston bottoming out.</li> <li>2. Oil level low, pump cavitating.</li> <li>3. Defective pump.</li> <li>4. Pump cavitation caused by air leak in suction line.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust upper stop collar, see "Setting The Ram Stroke" Page 7.</li> <li>2. Full reservoir to within 1/2" of top of oil level sight gauge.</li> <li>3. See "Service on Pump" Page 11.</li> <li>4. Check line and fittings, replace if necessary.</li> </ol>
Ram drifts when press is shutdown.	<ol style="list-style-type: none"> <li>1. Check valve malfunction.</li> <li>2. Spillage past control valve.</li> <li>3. Spillage past piston rings.</li> <li>4. Shuttle not centered in control valve.</li> <li>5. Excessive tooling weight.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for foreign material lodge in check valve or replace if defective.</li> <li>2. Repair or replace valve.</li> <li>3. Replace piston rings and check cylinder wall finish.</li> <li>4. Check for binding and or broken spring.</li> <li>5. Reduce tooling weight.</li> </ol>
Press overheats.	<ol style="list-style-type: none"> <li>1. Control valve not centering.</li> <li>2. Water to heat exchanger not turned on.</li> <li>3. Water regulating valve malfunction.</li> <li>4. Upper stop collar set too high.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for binding of spool or shipper rod.</li> <li>2. Turn water on.</li> <li>3. Valve should be set for 75°/135°F.</li> <li>4. Adjust upper stop collar, see "Setting The Ram Stroke" Page 6.</li> </ol>

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