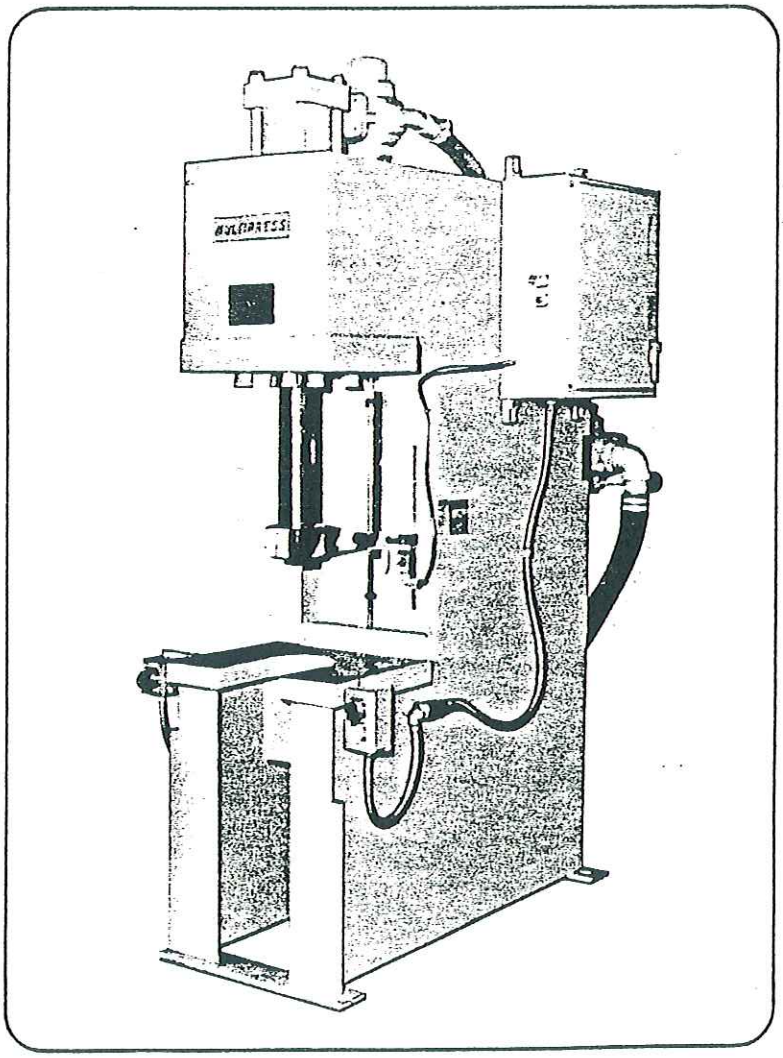
BULLETIN SM-60/61/63

MULTIPRESS®

HYDRAULIC EQUIPMENT

service manual



FW SERIES PRESSES
8, 15, 35 & 50 TON MODELS

MULTIPRESS®
A Division of
QUALITY PRODUCTS, INC.

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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.

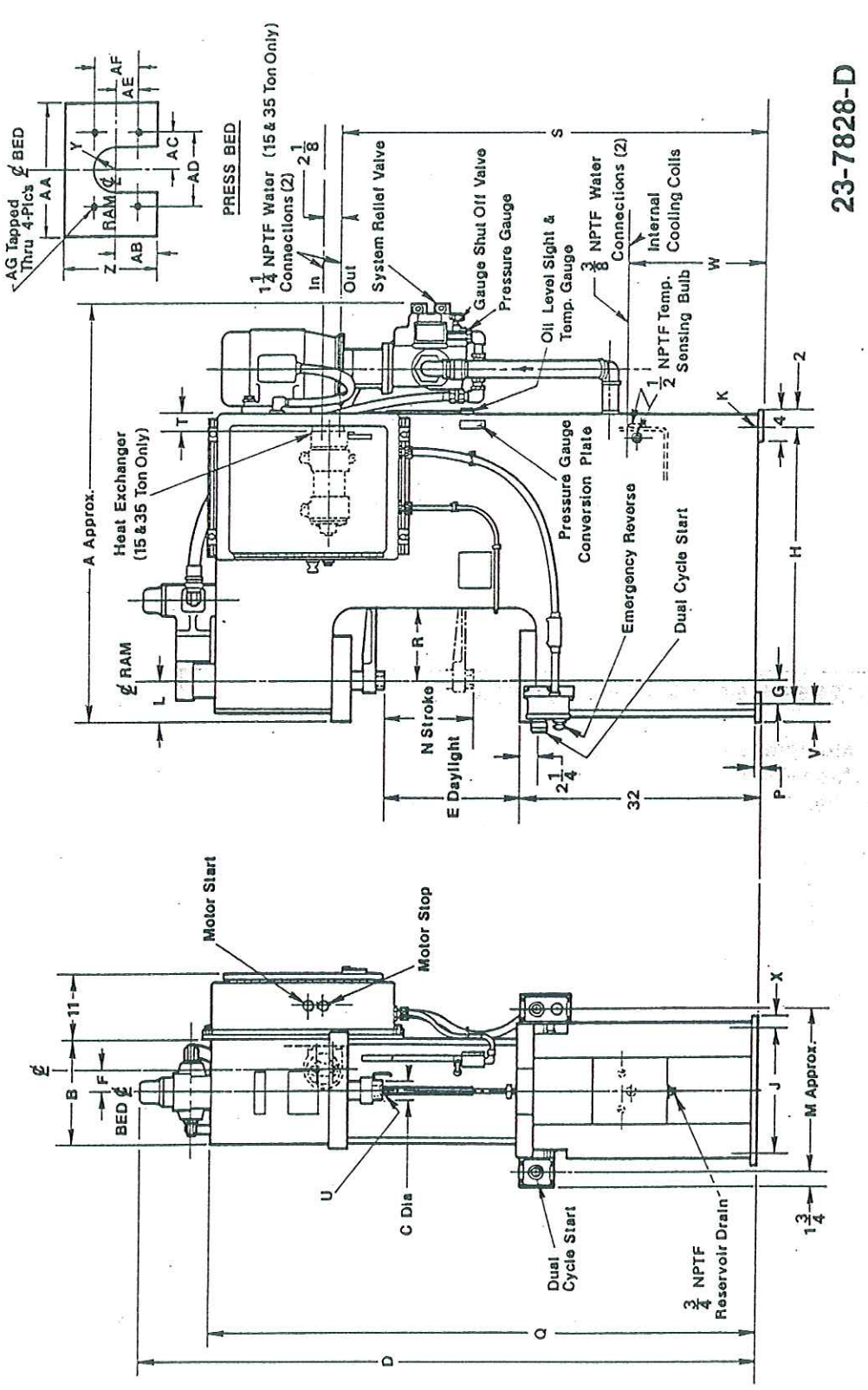
Current characteristics, dictated by the characteristics of the users' current are required at time of order.

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 - MODELS - FW2H, FW2L & FW3N



Press Model	Ton	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X
FW2H	15	58	14	2	82	18	3	3	37½	17	11/16	5½	22½	12	5/8	72	10	56	2½	1-14 UNS x 1.62 DP	2½	—	1½
FW2L	35	69	18	3¾	95	24	5	5	47½	21	13/16	7½	26½	15	¾	83	12	64	7⅝	1-1/2-12UNF x 3.00DP	2½	—	1½
FW3N	50	70	23¼	3¾	95	24	—	7¼	48	25½	13/16	10	28½	15	1	85	12	—	—	1-1/2-12UNF x 3.00DP	2	18½	7/8

Press Model	Press Bed Dimensions							
	Y	Z	AA	AB	AC	AD	AE	AF	AG
FW2H	3	12½	18	5½	5	10	3	6	1/2-13 UNC
FW2L	4	16	22	7½	7	14	5	10	3/4-10 UNC
FW3N	4	19	24	10	8	16	7	14	3/4-10 UNC

Figure 1

DIMENSIONAL DATA - MODEL FW2S087M PRESS

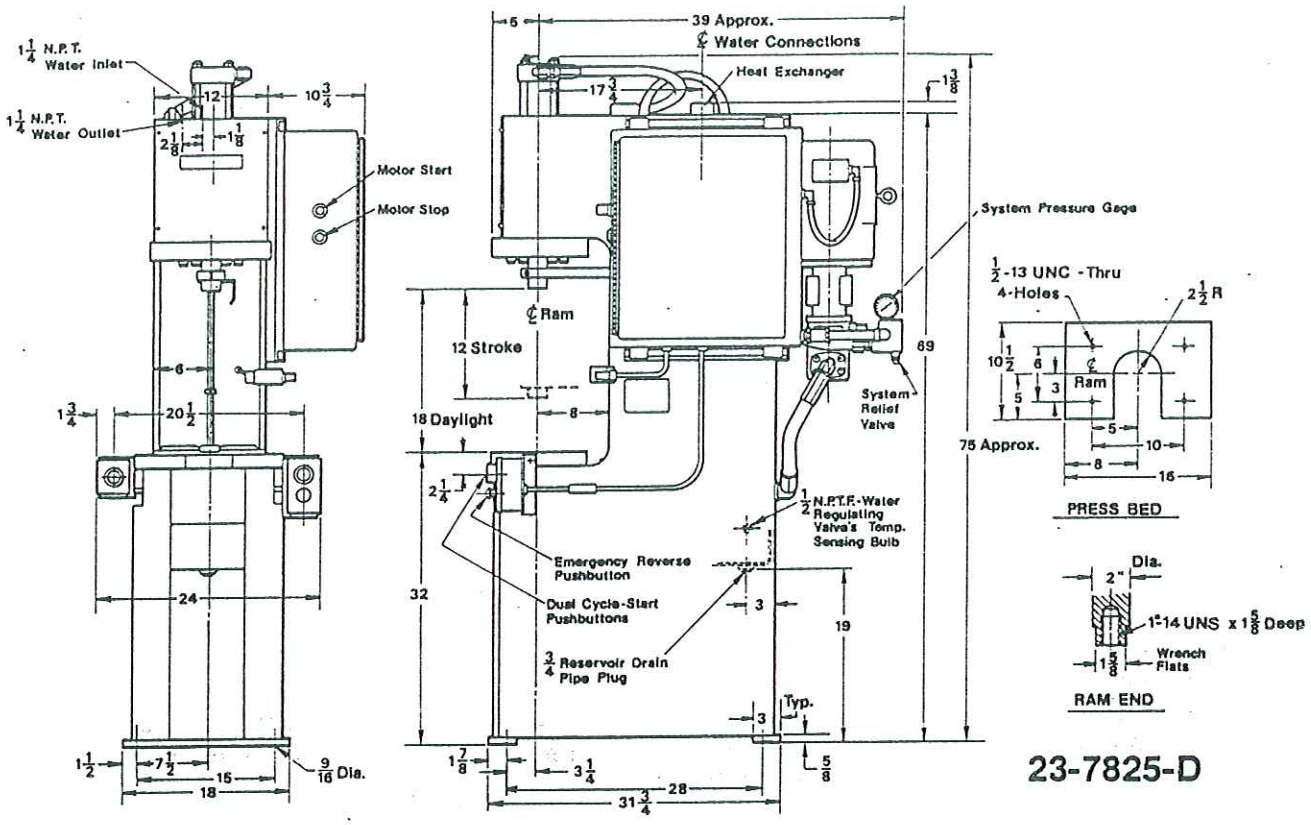


Figure 2

SPECIFICATIONS

FW SERIES PRESSES 8, 15, 35 & 50 TON MODELS

SPECIFICATIONS	FW2S-087M	FW2H-150M	FW2L-3515M	FW3N-5020M
Height (Overall)	75"	82"	95"	95"
Width (Approx.)	28½"	32"	35"	38"
Depth (Approx.)	44"	58"	69"	70"
Weight (lbs.)	1400 lbs.	2400 lbs.	3850 lbs.	5500 lbs.
Daylight	18"	18"	24"	24"
Stroke (Max. Adjustable)	12"	12"	15"	15"
Throat Depth	8"	10"	12"	12"
Cylinder				
Piston-Diameter	3¼"	4"	6"	7"
Rod-Diameter	2"	2½"	4"	5"
Reservoir (Gal.)	20	35	75	85
Rams Speeds (IPM)				
Closing	520	934	644	447
Pressing	148	76	64	62
Return	316	599	516	466
Max. Operating Pressure (PSI)	1930	2390	2475	2600
Pump	Vane Type Series T5C 7.5 GPM @ 1800 RPM	Vane Type Series T5CC 15/7.5 GPM @ 1800 RPM	Vane Type Seriec T5CC 25.5/12 GPM @ 1800 RPM	Vane Type Series T5CC 27/15 GPM @ 1800 RPM
Motor-Electric	7½ HP, 1800 RPM 213 TC, ODP, 230/460/3/60	10 HP, 1800 RPM 215 TC, ODP, 230/460/3/60	15 HP, 1800 RMP 254 TC, ODP 230/460/3/60	20 HP, 1800 RPM 256 TC, ODP, 230/460/3/60
Valve	C-261	C-361	C-361	C-361

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.

FW PRESS MODEL NUMBER KEY

FW2L-3515M

Indicates Frame Size
Indicates Maximum Tonnage
Indicates Motor Horsepower
Indicates Cycle Duty (Medium)

TOOLING INSTRUCTIONS

The "FW" series presses are intended for use with tools designed for automatic and semi-automatic feeding and unloading. Therefore guards, interlocked with press cycle and designed to fit the tools and constructed in accordance with publications of the National Safety Council, the American National Standards Institute, and Government regulations, are required to safeguard the point of operation.

The press is shipped from the factory inoperative until proper tool guards are interlocked, wired, into Terminal Number 15 and 16.

Never wire Terminal 15 to 16 or tool this press in such a way as to allow the press to be cycled without proper tooling guards in place and interlocked with press cycle.

The tool design, guard design, and interlocking of the guards to the press cycle must be done by competent engineers knowledgeable in press operation and safety.

You **must** design the tooling or guards so that it is impossible for the operator to reach into the point of operation.

Guard design should be such that the operators' fingers cannot be jammed into the guards.

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 uneveness 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 2 — 8 Ton Series; Figure 1 — 15, 35 & 50 Ton Series). 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 110°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.

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. Reservoir capacities are as follows:

8 Ton	20 Gallons
15 Ton	35 Gallons
35 Ton	75 Gallons
50 Ton	85 Gallons

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.

SET UP INSTRUCTIONS

Installation of the tooling to the press must be done with the ram in a blocked position. Once the tooling is installed, the guards must be installed before the ram can be cycled.

Never by-pass or wire terminal 15 to 16 so that the press can be operated in any fashion, for any reason, without the proper guards in place.

A. **Starting the Pump and Motor**

Before the pump and motor can be started, proper guarding of tooling must be in place. See "Tooling Instructions".

Lower the setting of the system relief valve (See Service Manual for valve location) by loosening locking nut and then turning adjusting screw counterclockwise until loose but not removed.

Pump and motor must rotate clockwise when looking down on press. Determine rotation by checking motor shaft rotation when momentarily starting and stopping the electric motor.

CAUTION

The press has been shipped with the ram extended and it will retract and stop against the upper stop collar as soon as the motor is started, if the motor is rotating the correct direction.

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, the pump will be damaged after only a few seconds operation 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, 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.

B **Setting Operating Pressure**

Loosen and lower bottom stop collar on shipper rod to a point where it will not be contacted by the banjo when ram is fully extended.

NOTE

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

Simultaneously push and hold Dual Cycle Start pushbuttons until ram exerts full pressure against a piece part or back up anvil.

NOTE

If ram reverses before exerting full pressure, the time on the down Dwell Timer has to be adjusted. See "Setting Down Dwell Timer".

Check the pressure on ram by opening the needle valve, (55 Figure 6 and 43 Figure 11) at rear of press, and reading the pressure gauge.

Adjust system pressure desired by turning the relief valves adjusting screw clockwise to increase ram force.

NOTE

Setting must never be below 200 PSI for the 8 Ton Press and 560 PSI for any of the other "FW" Series Presses. Never exceed maximum operating pressure noted on name plate.

Close needle valve and lock relief valves adjusting screw after ram has retracted to its upper stroke limit.

C. **Setting Ram Stroke (Upper Limit)**

With the ram banjo against the upper stop collar, (See Figures 9 and 19) 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.

Adjust limit switch, in the throat of press, so that the cam on the banjo contacts and holds it near the closing of the die.

The time the ram remains down under system pressure should be no longer than necessary to do the work required. If this is being exceeded, see "Setting Dwell Timer".

D. **Setting Down Dwell Timer (ITR)**

The time the ram stays down is controlled by the down dwell timer located in the electric enclosure, labeled "ITR".

The timer is to be set to allow for the minimum amount of time to do the work thereby conserving energy and avoiding excessive heating of oil.

E. **Final Inspection**

Check the press to make sure it operated in accordance with the "Operational Instructions".

If the press deviates from recommended sequence of operations immediately stop the press motor, disconnect electric source to press, and have the press repaired by a qualified repairman.

SERVICE INSTRUCTIONS

Have qualified personnel interupt the electrical power to the equipment whenever service is to be performed.

CAUTION

Before performing service on the press, lower the ram down against blocks, so that the ram cannot fall as service is being performed on the press. (See Setting the Ram Stroke (upper limit)).

SERVICE ON PUMP

Drain reservoir to a level well below suction port on pump. Utilizing a container to catch oil spillage, disconnect pressure and suction lines at the pump, secure suction lose and above oil level. 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 for service on vane pumps:

Bulletin — "SVP-T5Ca" - FW2S Series Press
Bulletin — "SVP-T5CCa" - FW2L, FW2H, and FW3N Series Presses.

SERVICE ON CYLINDER

Repair kits will be supplied for the cylinder and/or complete cylinder assemblies. To order repair kits, supply the brand name and serial number so the correct repair kit will be supplied for your cylinder.

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.

A. **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.

B. **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.

*Operating Instructions are available in other languages upon request.

ELECTRIC CIRCUIT 08, 15, 35 AND 50 TON SERIES

CR-7038

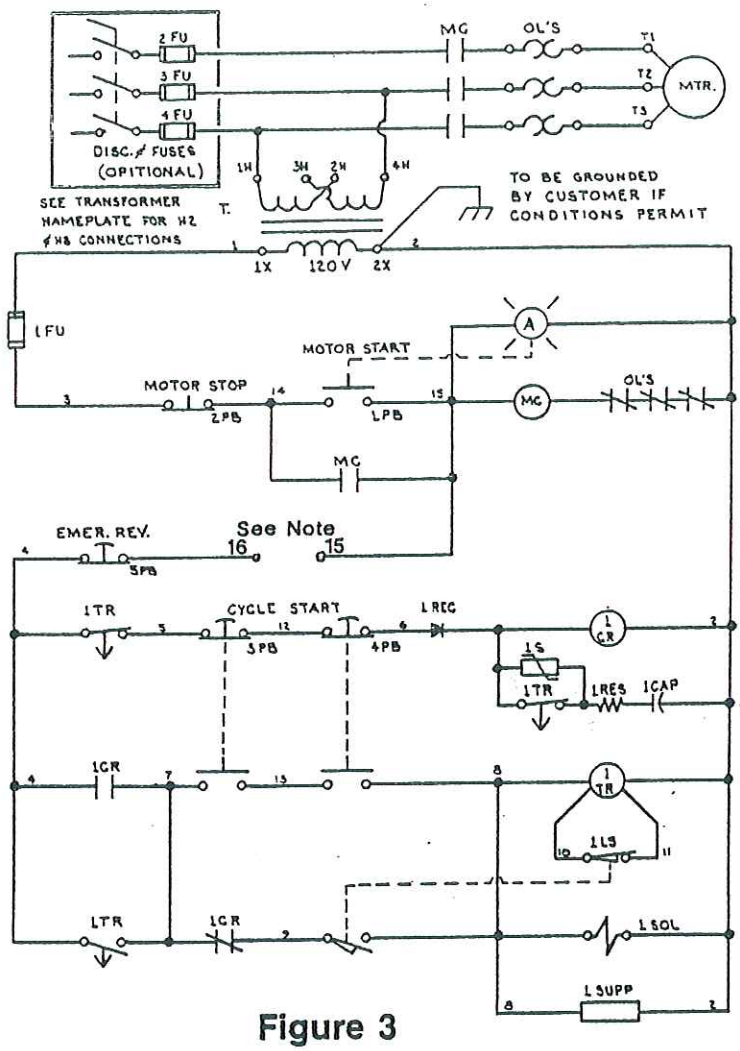


Figure 3

SYMBOL	PART NO.	DESCRIPTION	QTY.
MTR	See Fig. 6 & 13	Motor, Electric	1
MC	See Starter Nameplate	Starter, Motor	1
1FU	764-20006	Fuse, Slow Blow .6 amp	1
T	105-10006	Transformer, 100VA, 230/460V Primary, 115V Secondary	1
1CR	766-40009	Relay, DPDT, 110V., DC, 10 amp	1
1CAP	704-51002	Capacitor, 10 MFD, 250V	1
1SUPP	764-30002	Thyrector, Diode, 120V-RMS Input	1
1REC	772-00019	Rectifier, Diode, 750MA @ 600 Volts	1
1RES	769-21006	Resistor, 100 OHMS, 3W	1
1S	764-30004	Varistor, Metal Oxide	1
1TR	766-60008	Relay, Time Delay, 10 amp, DPDT Cont., 120-60HZ	1
1PB	152-15052	Switch, Illuminated Pushbutton (Motor Start)	1
2PB	152-15003	Switch, Pushbutton, Red Extended Head (Motor Stop)	1
3 & 4PB	152-01600	Switch, Pushbutton, Black Mushroom (Cycle Start)	2
5PB	152-15058	Switch, Pushbutton, Yellow Mushroom (Emergency Reverse))	1
1LS	S11-26300	Switch, Limit	1

NOTE: Guards and switch to be supplied and installed by user so as to be tripped only when guards are in place for operator protection. DO NOT wire Terminal No. 15 to Terminal No. 16.

HYDRAULIC CIRCUIT 8 TON SERIES

CR-7037

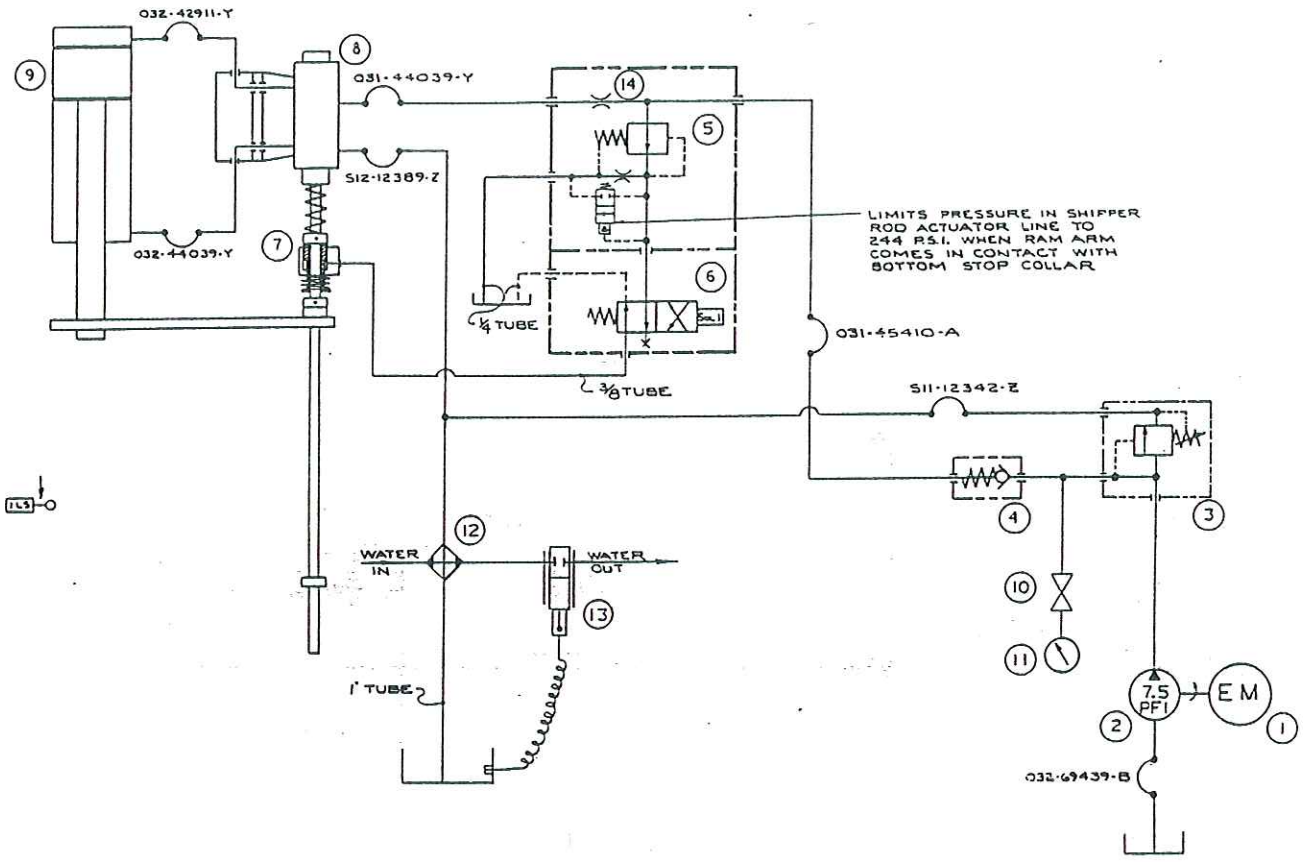


Figure 4

ITEM	PART NO.	DESCRIPTION	QTY.
1	See Figure 6	Motor—Electric	1
2	See Figure 6	Pump—Vane Type	1
3	016-01120	Valve—½" Relief, RV10	1
4	513-25608	Valve—Check, 2 PSI Cracking Pressure	1
5	S12-49014	Valve—Pressure Reducing	1
6	016-44343-5	Valve—4 Way Directional 3D01-	1
7	S12-49012	Actuator—Shipper Rod	1
8	S11-10136	Valve—Press Control C-261	1
9	23-7223	Cylinder—Hydraulic	1
10	514-01104	Valve—¼" Needle	1
11	501-99657	Gauge—Pressure	1
12	505-65011	Heat Exchanger	1
13	515-24606	Water Regulating Valve 75°/135°	1
14	032-90758	Orifice-Pressure Reducing Valve	1

HYDRAULIC CIRCUIT 15, 35 AND 50 TON SERIES

CR-7049

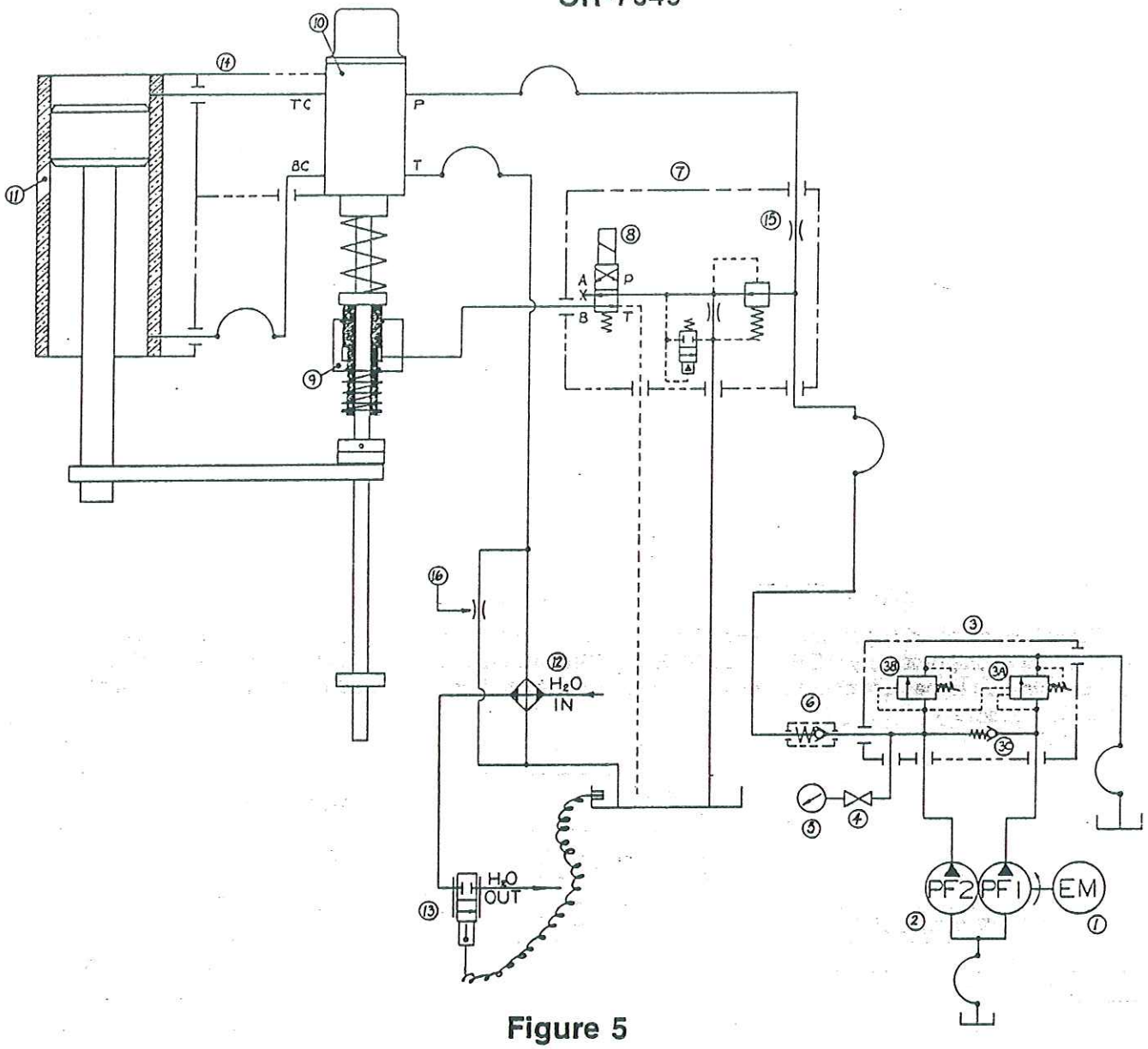


Figure 5

ITEM	PART NO.	DESCRIPTION	FW2H15 QTY.	FW2L35 QTY.	FW3N50 QTY.
1	See Fig. 13	Motor Electic	1	1	1
2	See Fig. 13	Pump, Double Vane	1	1	1
3	012-29197	Valve, Combination	1	1	1
A.	S16-27019	Valve, Unloader	1	1	1
B.	S16-27023	Valve, Relief	1	1	1
C.	513-50088	Valve, Check	1	1	1
4	514-20003	Valve, Needle	1	1	1
5	501-99657	Gauge, Pressure	1	1	1
6	513-50050	Valve, Check 6 PSI Opening	1	1	1
7	S12-49014	Valve, Pressure Reducing	1	1	1
8	S12-44343-5	Valve, 4 Way Directional A3D01	1	1	1
9	S12-49012	Actuator, Shipper Rod	1	1	1
10	012-26018	Valve, Control C-361	1	1	1
11	See Fig. 12	Cylinder, Hydraulic	1	1	1

ITEM	PART NO.	DESCRIPTION	FW2H15 QTY.	FW2L35 QTY.	FW3N50 QTY.
12	505-65011	Heat Exchanger	1	1	
	S12-15394	Cooling Coils			1
13	515-24606	Water Reg. Valve	1	1	
	515-24603	Water Reg. Valve			1
14	032-69712	Subplate, Control Valve	1		
	032-69182	Subplate, Control Valve		1	1
15	032-90839	Orifice, Pressure Reducing Valve	1		
	032-90823	Orifice, Pressure Reducing Valve		1	
	032-72710	Orifice, Pressure Reducing Valve			1
16	032-90824	Orifice, Heat Exchanger By-Pass	1	1	

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.

	SCHED. INSPECT.		MALFUNCTIONS							
						Loose Conn. or Elec. Short				
ITEM TO BE INSPECTED	Routine (Daily)	Periodic	Damaged Kinked or Dented	Worn	Broken or Cracked	Hyd.	Mech.	Elec.	Mis-alignment	Out of Adj.
Frame		✓			✓					
Electric Motor		✓	✓					✓	✓	
Starter		✓						✓		
Pumps		✓				✓	✓		✓	
Valves		✓				✓	✓			✓
Gauges		✓	✓		✓					
Switches		✓	✓	✓	✓		✓	✓		
Operating Controls	✓	✓	✓	✓	✓		✓			✓
Tooling	✓	✓	✓	✓	✓		✓		✓	
Feed and/or Ejection Mech.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil Leaks	✓	✓								
Hydraulic Lines Pipe, Tube Hose		✓	✓		✓		✓			
Hydraulic Fittings		✓			✓		✓			
Electrical Lines Wire, Cable Conduit		✓	✓	✓	✓		✓	✓		
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 12. 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 12 and 13 and record in PERIODIC LOG on page 14.

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

TROUBLE-SHOOTING CHART

TROUBLE	PROBABLE CAUSE	REMEDY
Motor stops or will not start.	1. Thermal overload blown or faulty control fuse. 2. "Stop-Start" Pushbuttons faulty.	1. Disconnect press from power source, reset thermal overload or replace 1-FU Fuse. 2. Replace defective P.B. assembly.
Ram will not start down.	1. "Cycle Start" Pushbuttons not actuated simultaneously. 2. Timer circuit malfunction. 3. Shipper rod actuator not operating. 4. 4-Way Valve malfunction. A. 1-Solenoid burned out. B. Loose connections. C. Spool binding. 5. Relief valve set too low. 6. Guards not in position to protect operator. 7. Guard switch malfunction.	1. Actuate "Cycle Start" Pushbuttons simultaneously. 2. Replace timer or circuit board assembly. 3. Check for binding of shipper rod and or actuator piston. 4. A. Replace solenoid coil. B. Check all connections for looseness. C. Refer to Service Bulletin S6-T110-A. 5. Adjust valve setting. See "Setting Operating Pressure" Page 7. 6. Position guards to protect operator. 7. Replace switch.
Ram extends slowly.	1. Control valve malfunction A. Spool malfunction. B. Spool not shifting to full detent. 2. Shipper rod or actuator binding. 3. Relief valve set too low.	1. A. Check spool for binding. Repair or replace if defective. B. Adjust shipper rod actuator collar. 2. Check for misalignment of actuator, bent shipper rod or foreign objects binding shipper rod. 3. Adjust relief valve per "Setting Operating Pressure" Page 7.
Press will not build tonnage.	1. Low voltage. 2. Fluid viscosity too low. 3. Pressure setting of relief valve too low. 4. Oil temperature excessive. 5. Pump malfunction. 6. Timer duration set too short.	1. Check line voltage. 2. Refer to "Oil Specifications" Page 7. 3. Refer to "Setting Operating Pressure" Page 9. 4. Should be within 125°F to 135°F. (52°C to 57°C) 5. See "Service on Pump" Page 8. 6. Increase timer setting.
Ram Reverses slowly.	1. Relief valve setting too low. 2. Shipper rod or actuator binding.	1. Refer to "Setting Operating Pressure" Page 7. 2. Check for misalignment of actuator, bent shipper rod, or foreign objects binding shipper rod.

TROUBLE-SHOOTING CHART (con't)

TROUBLE	PROBABLE CAUSE	REMEDY
Ram will not reverse.	1. Timer malfunction allowing 4-Way valve to stay energized. 2. Control valve malfunction. A. Control valve staying in full detent. B. Check for broken control valve spring. 3. Check shuttle in 4-Way valve for binding.	1. Replace timer. 2. A. Check control valve spool, actuator piston and shipper rod for binding. B. Replace if required. 3. Refer to Service Bulletin S6-T110-A.
Motor stalls when ram contacts work.	1. Low voltage. 2. Unloader valve malfunction or improper setting. 3. Relief valve set too high.	1. Check line voltage. 2. Unloader should be set at 500 PSI. (This valve is factory set and should never need adjusting). 3. Adjust valve setting, see "Setting Operating Pressure" Page 7.
Press noisy.	1. Upper stop collar set to high, piston bottoming out. 2. Oil level low, pump cavitating. 3. Defective pump. 4. Pump cavitation caused by air leak in suction line.	1. Adjust upper stop collar, see "Setting The Ram Stroke" Page 8. 2. Full reservoir to within 1/2" of top of oil level sight gauge. 3. See "Service on Pump" Page 8. 4. Check line and fittings, replace if necessary.
Ram drifts when press is shutdown.	1. Check valve malfunction. 2. Spillage past control valve. 3. Spillage past piston rings. 4. Shuttle not centered in control valve.	1. Check for foreign material lodge in check valve or replace if defective. 2. Repair or replace valve. 3. Replace piston rings and check cylinder wall finish. 4. Check for binding and or broken spring.
Press overheats.	1. Control valve not centering. 2. Water to heat exchanger not turned on. 3. Water regulating valve malfunction. 4. High pressure pump not unloading to tank. 5. Upper stop collar set too high.	1. Check for binding of spool, shipper rod, and actuator. 2. Turn water on. 3. Valve should be set for 75°/135°F. 4. Unloader valve should be set at 500 PSI. (This valve is factory set and should never need adjusting). 5. Adjust upper stop collar, see "Setting The Ram Stroke" Page 7.

PRESS ASSEMBLY – 8 TON

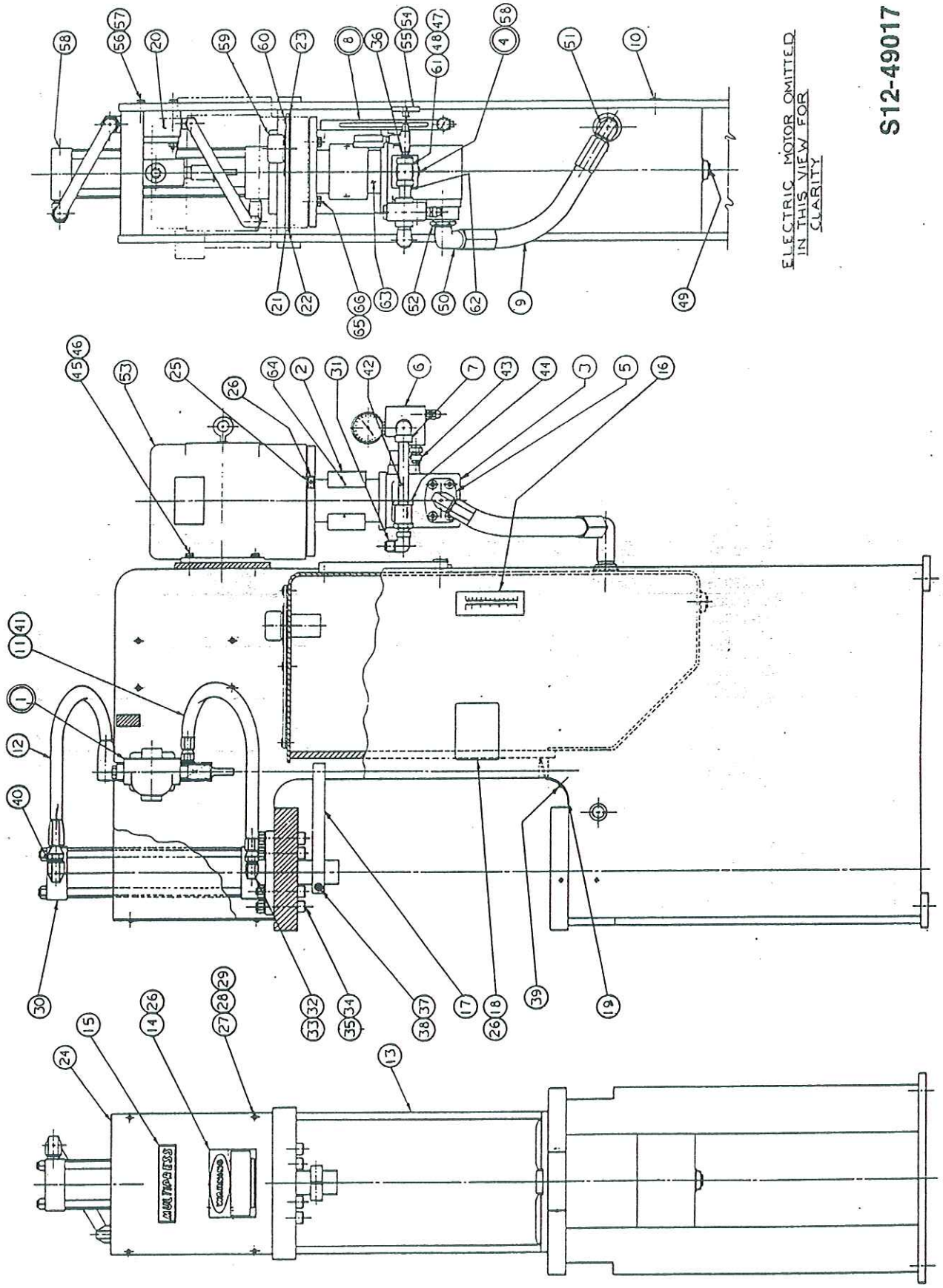


Figure 6

PRESS ASSEMBLY - 8 TON

ITEM	PART NO.	DESCRIPTION	QTY.
1	See Figure 7	Valve—Multipress Control, Mod. #C-261	1
2	212-85071	Coupling—Motor Half	1
	212-85014	Coupling—Pump Half	1
	212-85042	Coupling—Insert	1
	032-49301	Guard—Coupling	1
3	014-24587	Pump—Vane (T5C-005-1R02-A1)	1
4	S12-22217	Connection—Pump Pressure 1" NPTF W/¼" Aux.	1
5	S14-10786	Connection—Pump Suction 1½" NPTF	1
6	016-01120	Valve—½" Relief Mod. #RV10	1
7	426-30800	Elbow—½"	1
8	013-11890	Gauge—Oil Level Sight and Temp.	1
9	032-69439	Hose—Pump Suction	1
10	431-92500	Plug—½" Soc., Flush	1
11	032-44039	Hose—Bottom Cylinder	1
12	032-42911	Hose—Top Cylinder	1
13	032-48493	Frame	1
14	031-48097	Nameplate—Warning	1
15	031-18823	Plate—Insignia	1
16	031-42877	Plate—Pressure Gauge Conversion	1
17	031-10685	Arm—Shipper Rod	1
18	031-10131	Nameplate—Data	1
19	032-49234	Cover	1
20	032-40526	Block—Control Valve Mounting	1
21	032-90864	Cover—Reservoir Top	1
22	032-69589	Gasket—Reservoir Cover	2
23	032-69588	Gasket—Reservoir Cover	2
24	032-48525	Cover—Press Head	1
25	031-15003	Nameplate—"Motor Rotation"	1
26	320-10203	Screw—R.D.H. Drive #2 x 3/16" Lg.	10
27	310-10081	Screw—R.H.M. #10 - 23 UNC x ½" Lg.	4
28	345-11010	Washer, #10 SAE	4
29	606-25035	Grommet	4
30	507-00008	Cylinder, Hydraulic	1
31	474-11008	Fitting—Female Elbow	1
32	433-91208	Bushing—Hex. Pipe Red ¾ x ½	1
33	484-11008	Fitting—90° Long Elbow	1
34	358-24360	Screw—S.H.C. ⅝ - 11 UNC x 4" Lg.	8
35	330-24000	Nut—⅝ - 11 UNC, Flex. Lok	8
36	433-90804	Bushing—Hex. Rd. ½ x ¼	1
37	311-16083	Screw—Soc. Set Cone Pt. ⅜ - 16 UNC x ½" Lg.	2
38	358-16240	Screw—S.H.C. ⅜ - 16 UNC x 2" Lg.	1
39	310-10061	Screw—R.H.M. #10 - 24 UNC x ⅜" Lg.	2
40	473-11612	Fitting—90° Elbow	1
41	473-11008	Fitting—90° Elbow	1
42	442-08240	Nipple—Extra Heavy ½ x 6" Lg.	1
43	470-11208	Fitting—Male Connection	1
44	513-25608	Valve—Check	1
45	306-16160	Screw—H.H.C. ⅜ - 16 UNC x 1" Lg.	4
46	346-10024	Washer—⅜" Std. Lock	4
47	433-91608	Bushing—Hex. Red. 1" x ½"	1
48	442-08010	Nipple—Extra Heavy ½ x 1⅛" Lg.	1
49	488-01503	Plug, Magnetic Pipe ¾"	1
50	473-11616	Fitting—90° Elbow	1
51	473-15004	Fitting—Extra Long Elbow	1
52	433-92416	Bushing—Hex. Red. 1½ x 1"	1
53	158-00004	Motor—Electric 7½ hp., 1800 rpm.	1
54	501-99657	Gauge—Pressure	1
55	514-01104	Valve—¼" Angle Needle	1
56	306-16360	Screw—H.H.C. ⅜ - 16 UNC x 4" Lg.	4
57	330-16000	Nut—Hex, Self Locking ⅜ - 16 UNC	4
58	431-90404	Plug—¼" Pipe	2
59	506-85002	Filler—Breather	1
60	306-12160	Screw—H.H.C. ¼ - 20 UNC x 1" Lg.	8
61	427-20800	Tee-Pipe ½" 2000	1
62	442-08080	Nipple—Extra Heavy ½ x 2" Lg.	1
63	031-47778	Adapter—Motor to Pump	1
64	320-60806	Screw—Self Tapping	4
65	306-20180	Screw—H.H.C. ½ - 13 UNC x 1¼" Lg.	6
66	346-10032	Washer—½ Std. Lock	6
	S12-47692	Seal and Spring Repair Kit: C261 Valve, Shipper Rod Actuator, Pressure Reducing Valve, Reservoir Gasket	1

CONTROL VALVE ASSEMBLY C-261

SD-00495

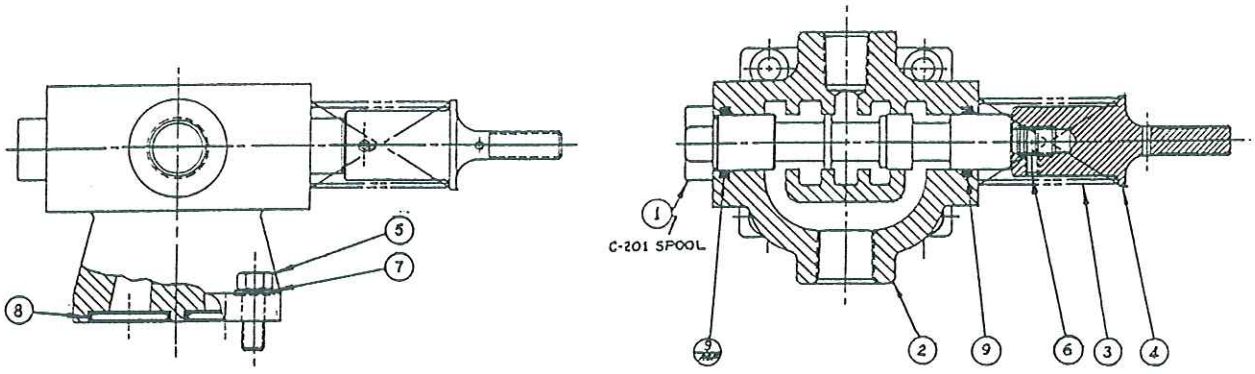


Figure 7

ITEM	PART NO.	DESCRIPTION	QTY.
1	S11-11810	Spool Assembly	1
2	031-10001	Body	1
3	*031-22386	Spring, Compression	1
4	031-25555	Retainer, Spring	1
5	306-16160	Screw, H.H.C. ⅜-16 UNC x 1" Lg.	4
6	311-12065	Screw, S.S. Full Dog Pt., ¼-20 UNC x ⅜ Lg.	1
7	346-10024	Washer, Lock ⅜ Std.	4
8	*630-42305	Vickerseal	2
9	*671-00214	O-Ring	2
	S11-23260	Seal and Spring Repair Kit	

*These items are supplied in repair kit.

SPOOL ASSEMBLY (C-261 VALVE)

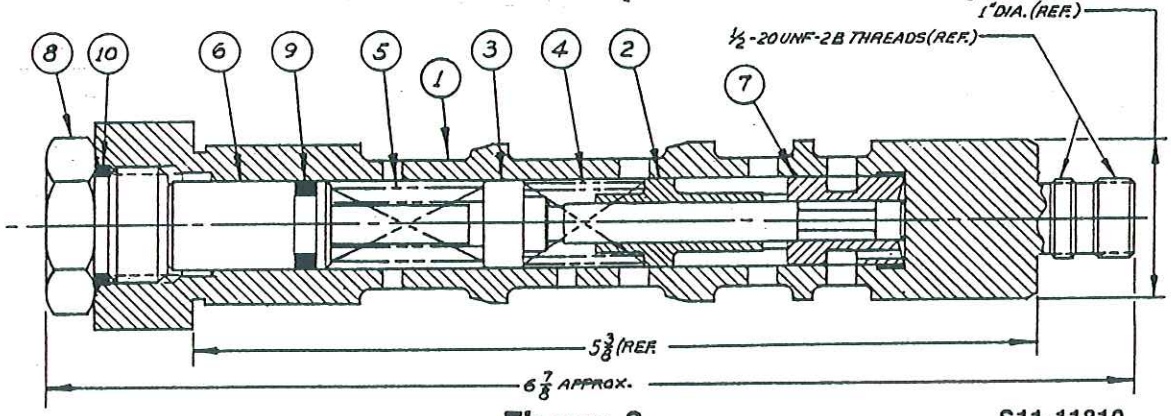


Figure 8

S11-11810

ITEM	PART NO.	DESCRIPTION	QTY.
1	031-13397	Spool	1
2	031-13401	Shuttle, Differential	1
3	031-13398	Poppet, Differential	1
4	*031-22194	Spring, Compression (Differential Shuttle)	1
5	*031-13245	Spring, Compression (Differential Poppet)	1
6	031-13400	Stop, Differential Poppet	1
7	031-13399	Collar, Spool	1
8	488-14080	Plug	1
9	*671-00110	O-Ring	1
10	*671-00114	O-Ring	1

*These items are supplied in repair kit (S11-23260) C-261 Valve

ANTI-TIE DOWN ASSEMBLY - 8 TON

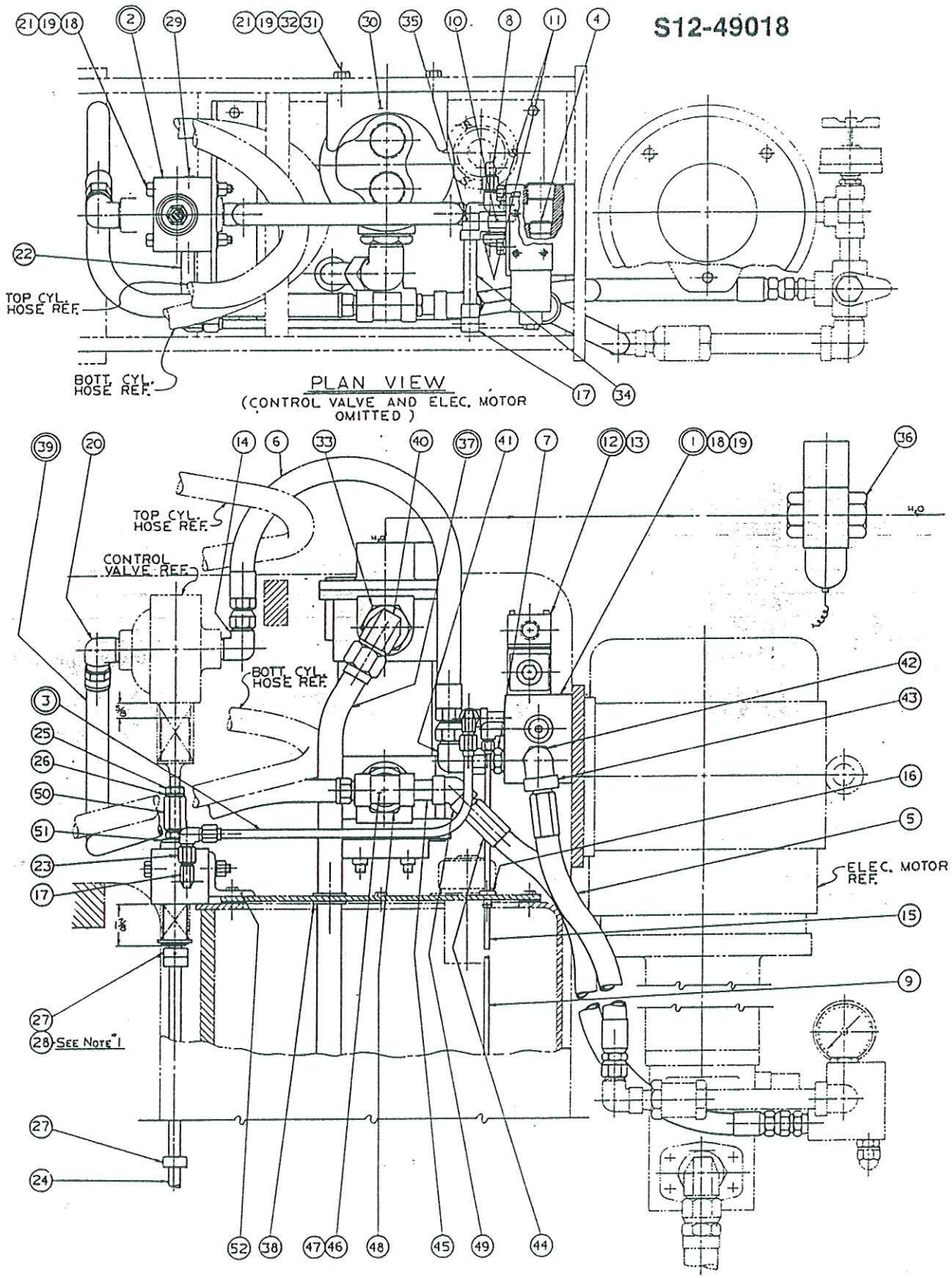


Figure 9

ANTI-TIE DOWN - 8 TON

S12-49018

ITEM	PART NO.	DESCRIPTION	QTY.
1	See Figure 21	Assembly—Pressure Reducing Valve	1
2	See Figure 20	Assembly—Shipper Rod Actuator	1
3	S12-49021	Assembly Pilot Line Tubing	1
4	032-90758	Orifice	1
5	031-45410	Hose—Pressure	1
6	032-44039	Hose—Pressure	1
7	470-35015	Connector—Male	1
8	496-15003	Elbow—Swivel Nut	1
9	803-04035	Tube—Tank Line	2 ft.
10	442-04060	Nipple—Extra Heavy ¼" x 1½" Lg.	1
11	473-10404	Elbow—Male	2
12	016-44343-5	Valve—4 Way Directional Mod. #A3D01-35-111-01-01-00A5-01A28	1
13	359-09240	Screw—S.H.C. #10-32 UNF x 2" Lg.	4
14	492-15001	Elbow—Male	1
15	803-04035	Tube	1 ft.
16	606-20614	Grommet	2
17	474-10604	Elbow—Female	2
18	306-16340	Screw—H.H.C. ⅜ - 16 UNC x 3½" Lg.	4
19	346-10024	Washer—Lock ⅜" Std.	8
20	473-11212	Elbow—Male	1
21	333-16000	Nut—Hex. ⅜ - 16 UNC	6
22	442-04120	Nipple—Extra Heavy ¼ x 3" Lg.	1
23	496-10609	Elbow—Swivel Nut	1
24	032-10684	Rod—Shipper	1
25	335-19100	Nut—Hex. Jam ½ - 20 UNF	2
26	348-10032	Lockwasher ½"	2
27	210-15003	Collar	3
28	325-12180	Rollpin 3/16 x 1⅛" Lg.	1
29	431-90404	Plug ¼" NPTF Flush	1
30	505-65011	Heat Exchanger #HE-20B	1
31	306-16200	Screw—H.H.C. ⅜ - 16 UNC x 1½" Lg.	4
32	344-10024	Washer—Flat ⅜" Std.	4
33	433-92416	Bushing—Reducing 1½" x 1"	1
34	442-04140	Nipple—Extra Heavy ¼ x 3½" Lg.	1
35	424-20400	Elbow—¼"	1
36	515-24606	Valve—Heater Regulating	1
37	S12-49062	Tube—H.E. Tank	1
38	606-25001	Grommet	1
39	S12-12389	Hose	1
40	473-11616	Elbow—Male	1
41	496-15002	Elbow—Swivel Nut	1
42	433-91208	Bushing—Hex. Reducing ¾ x ½"	1
43	426-30800	Elbow—Str. ½"	1
44	S11-12342	Hose	1
45	441-12080	Nipple—Std. ¾" x 2" Lg.	1
46	416-01200	Tee—Mall. Iron ¾"	1
47	441-12100	Nipple—Std. ¾ x 2½"	1
48	433-92412	Bushing—Hex. Reducing 1½ x ¾"	1
49	405-01200	Elbow—45° ¾" Mall. Iron	1
50	032-10075	Connector—Shipper Rod	1
51	344-10028	Washer—Std. ½"	1
52	032-90759	Bracket—Shipper Rod Actuator	1

RELIEF VALVE ASSEMBLY

016-01120

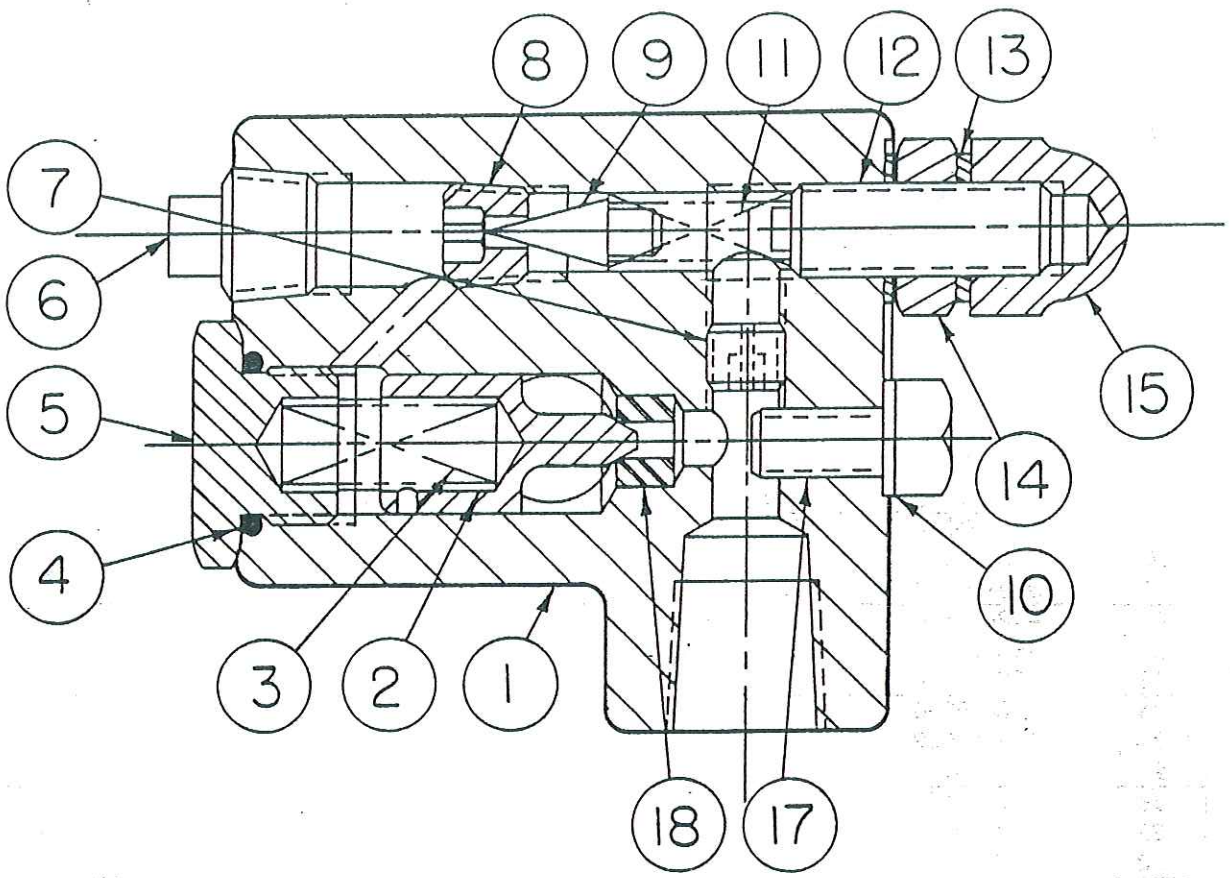


Figure 10

ITEM	PART NO.	DESCRIPTION	QTY.
1	036-17048	Body-Threaded	1
2	036-17049	Spool	1
3	036-22142	Spring—Compression	1
4	671-00910	O-Ring	1
5	036-24236	Plug—Screw Thread ⅞-14 UNF	1
6	429-90600	Plug—⅜" Sq. Hd. Pipe	1
7	036-43653	Plug—Orifice	1
8	036-17034	Seat—Control	1
9	036-12288	Cone—⅜" Diameter x 1⅛"	1
10	036-17861	Gasket	1
11	036-13244	Spring—Compression	1
12	036-21001	Screw—Soc. Set ½" Dog Pt. — ½-20 UNF x 1½"	1
13	036-22745	Gasket—Washer	2
14	335-19101	Nut—Jam ½-20 UNF Light	1
15	327-25000	Nut—Acorn ½-20 SAE Regular	1
16		Not Used	
17	307-17121	Screw—H.H.C. 7/16-20 UNG x ¾"	1
18	036-17133	Seat—9/16 Diameter x ½	1

PRESS ASSEMBLY, 15-35 & 50 TON

SD-01091

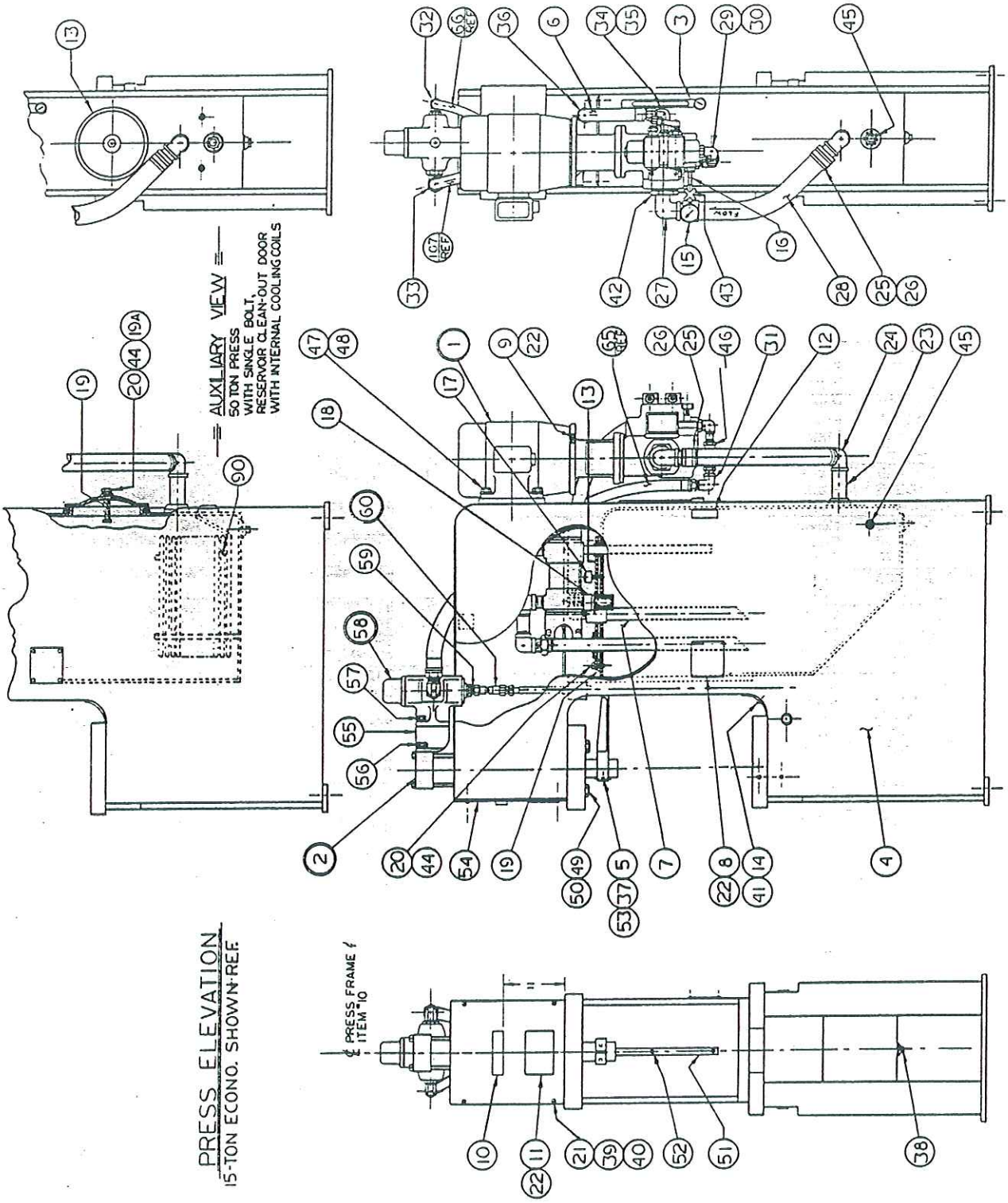


Figure 11

PRESS ASSEMBLY, 15-35 & 50 TON

SD-01091

ITEM	PART NO.	DESCRIPTION	FW2H15 QTY.	FW2L35 QTY.	FW3N50 QTY.
1	See Fig. 13	Motor, Electric	1	1	1
2	See Fig. 12	Cylinder Assembly	1	1	1
3	013-11890	Gauge, Oil Level Sight and Temperature	1	1	1
4	032-49402	Frame, Press	1		
	032-69166	Frame, Press		1	
	032-72708	Frame, Press			1
5	032-49413	Arm, Control	1		
	032-69184	Arm, Control		1	
	032-72709	Arm, Control			1
6	032-69197	Hose	1	1	1
7	032-69204	Pipe, 1¼" Diameter	1	1	1
8	032-10131	Plate, Data	1	1	1
9	032-15003	Plate, Motor Rotation	1	1	1
10	032-18823	Plate, Insignia	1		
	032-23448	Plate, Insignia		1	1
11	032-48097	Plate, Warning	1	1	1
12	032-43850	Plate, Pressure Conversion	1		
	032-69205	Plate, Pressure Conversion		1	
	032-43871	Plate, Pressure Conversion			1
13	032-69705	Cover, Reservoir	1		
	032-90818	Cover, Reservoir		1	
	032-49740	Cover, Reservoir			1
14	032-49435	Cover, Throat Plate	1		
	032-69191	Cover, Throat Plate		1	
15	501-99657	Gauge	1	1	1
16	442-04120	Nipple	1	1	1
17	506-77615	Breather, 40 Micron	1	1	1
18	506-85002	Filler, Reservoir	1	1	1
19	859-20924	Gasket, Reservoir Cover	5 ft.	7 ft.	
	032-69729	Gasket, Reservoir Cover			1
	032-90129	Anchor, Cleanout Door			1
A.	636-80006	Washer, Seal			1
20	306-12120	Screw, H.H.C. ¼ - 20 UNC x ¾" Lg.	12	12	
	306-24280	Screw, H.H.C. ⅝ - 11 UNC x 2½" Lg.			1
21	310-10081	Screw, R.H.M. #10-24 UNC x ½" Lg.	4	4	4
22	320-10203	Screw, Self Tapping #2 x 3/16" Lg.	10	10	10
23	441-24190	Nipple, Std. 1½ x 4¾" Lg.	1		
	441-40240	Nipple, Std. 2½ x 6" Lg.		1	
	441-32240	Nipple, Std. 2 x 6" Lg.			1
24	404-02400	Elbow 1½"	1		
	404-04000	Elbow 2½"		1	
	404-03200	Elbow 2"			1
25	486-15113	nipple 1½"	1		
	486-15131	Nipple 2½"		1	
26	486-15138	Clamp, Hose	4		
	486-15141	Clamp, Hose		4	
27	406-02400	Elbow 1½"	1		
	406-04000	Elbow 2½"		1	
	406-03200	Elbow 2"			1
28	486-15134	Hose	1		
	486-15140	Hose		1	
	032-72674	Hose			1

ITEM	PART NO.	DESCRIPTION	FW2H15 QTY.	FW2L35 QTY.	FW3N50 QTY.
29	492-15238	Adapter, Female Elbow	1	1	1
30	442-16100	Nipple	1		
	442-16180	Nipple		1	1
31	473-11616	Elbow, Male	1	1	1
32	494-15002	Elbow, Straight Thread	1	1	1
33	494-12430	Elbow, Straight Thread	1	1	1
34	493-12026	Connector, Straight Thread	1	1	1
35	496-15005	Elbow, Swivel Nut	1	1	1
36	473-15005	Elbow, Male	1	1	1
37	358-16280	Screw, S.H.C. ⅜ - 16 UNC x 2½" Lg.	1		
	358-16320	Screw, S.H.C. ⅜ - 16 UNC x 3" Lg.		2	
	358-20340	Screw, S.H.C. ½ - 13 UNC x 3½" Lg.			1
38	488-01503	Plug, ¾" Magnetic	1	1	1
39	606-25035	Grommet	4	4	4
40	345-11010	Washer, #10 Flat SAE	4	4	4
41	310-10061	Screw, R.H.M. #10 - 24 UNC x ⅜" Lg.	2	2	
42	413-94824	Bushing, Hex. Reducing 3 x 1½" Lg.	1		
	413-94840	Bushing, Hex. Reducing 3 x 2½"		1	
	413-94832	Bushing, Hex. Reducing 3 x 2"			1
43	514-20003	Valve, ¼" Needle	1	1	1
44	345-10016	Washer, ¼" Flat SAE	12	12	
	345-10040	Washer, ⅝" Flat SAE			1
45	431-92500	Plug, ½" Flush Pipe	1	1	1
46	513-50050	Valve, Check	1	1	1
47	306-16200	Screw, H.H.C. ⅜ - 16 UNC x 1½" Lg.	4		
	306-20180	Screw, H.H.C. ½ - 13 UNC x 1½" Lg.		4	4
48	346-10024	Washer, ⅜" Std. Lock	4		
	346-10032	Washer, ½" Std. Lock		4	4
49	306-40147	Screw, H.H.C. ⅝ - 11 UNC x 5" Lg.	8		
	306-40141	Screw, H.H.C. 1" - 8 UNC x 6" Lg.		8	
	306-40196	Screw, H.H.C. 1⅛" - 7 UNC x 7" Lg.			8
50	330-24000	Nut, ⅝" - 11 UNC	8		
	342-30000	Nut, 1" - 8 UNC		8	
	333-32000	Nut, 1⅛" - 7 UNC			8
51	032-69202	Guide, Ram		1	1
52	358-14140	Screw, S.H.C. 5/16 — 18 UNC x ⅞" Lg.		3	3
53	311-16202	Screw, S.S., ⅜ - 16 UNC x 1½" Lg.	1		
54	032-49404	Cover, Press Head	1		
		Cover, Press Head		1	
	032-72713	Cover, Press Head			1
55-60	See Fig. 12	Cylinder, Assembly	1	1	1
90	S12-15394	Cooling Coils			1
	S12-47693	Seal and Spring Repair Kit	1	1	
	S12-47694	Seal and Spring Repair Kit			1

CYLINDER AND VALVE ASSEMBLY
FW2H (S12-40319) FW2L (S12-27647)
FW3N (S12-47690)

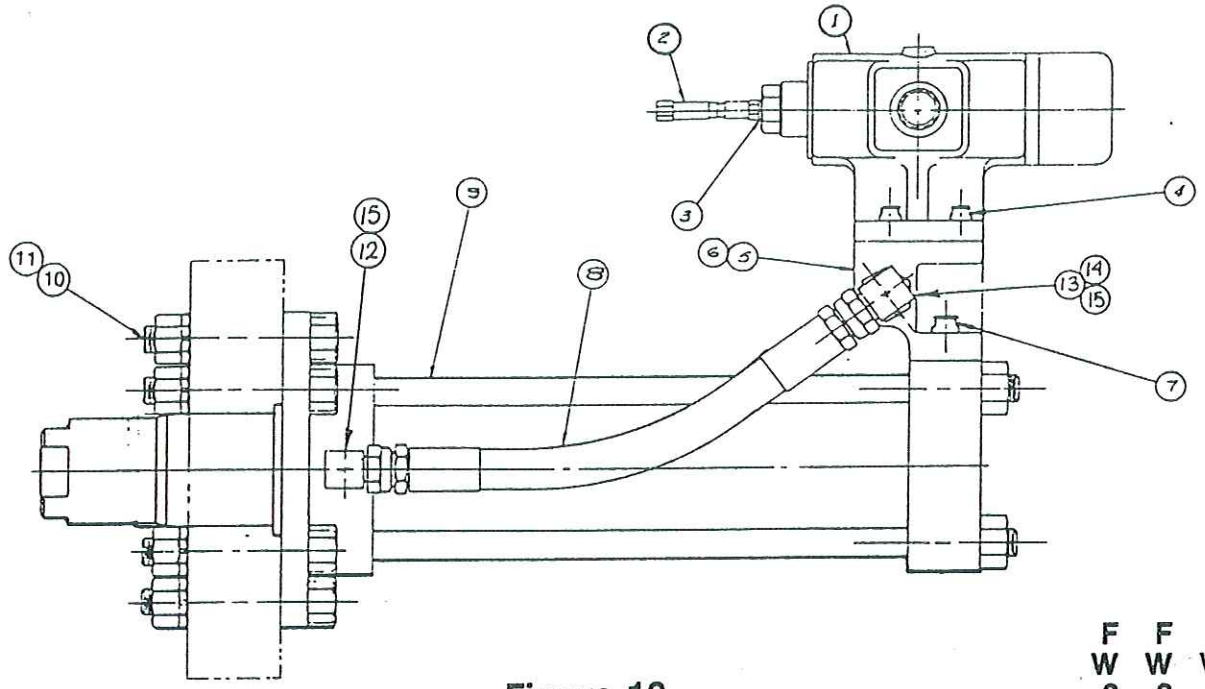


Figure 12

ITEM	PART NO.	DESCRIPTION	FW2H15 QTY.	FW2L35 QTY.	FW3N50 QTY.
1	See Figure 15	Valve, Control Model C-361	1	1	1
2	S11-03790	Joint, Swivel	1	1	1
3	348-10028	Washer, 7/16 Std. Lock	1	1	1
4	306-40005	Screw, H.H.C. ½ - 13 UNC x 1½" Lg.	4	4	4
5	032-69712	Subplate	1		
	032-69182	Subplate		1	
	032-90388	Subplate			1
6	691-00219	O-Ring	1	1	1
7	358-20340	Screw, S.H.C. ½ - 13 UNC x 3½" Lg.	2		
	306-40003	Screw, H.H.C. ⅝ - 11 UNC x 1¾" Lg.		2	
	358-26300	Screw, S.H.C. ¾ - 10 UNC x 2¾" Lg.			4
8	032-69711	Hose	1		
	032-69193	Hose		1	
	032-72712	Hose			1
9	507-00031	Cylinder, Hydraulic	1		
	507-00023	Cylinder, Hydraulic		1	
	507-00033	Cylinder, Hydraulic			1
10	306-40147	Scres, H.H.C. ⅝ - 11 UNC x 5" Lg.	8		
	306-40141	Screw, H.H.C. 1" - UNC x 6" Lg.		8	
	306-40196	Screw, H.H.C. 1⅛ - 7 UNC			8
11	342-30000	Nut, 1 - 8 Unc		8	
	333-32000	Nut, 1⅛ - 7 UNC			8
12	493-15009	Fitting, Std. Thd. Con.	1		
	493-11621	Fitting, Std. Thd. Con.		1	1
13	492-15088	Fitting, Adapter, 1 5/16 - 12 Std x 1" NPTF	1		1
	494-15003	Fitting, Adapter		1	
14	470-11616	Fitting, Male 1" P x 1" T		1	1
15	494-15003	Fitting, Elbow 1" T x 1" 5/16 - 12 Swivel Nut		2	1

PUMP-MOTOR ASSEMBLY
FW2H (S12-40322) FW2L (S12-27643)
FW3N (S12-47689)

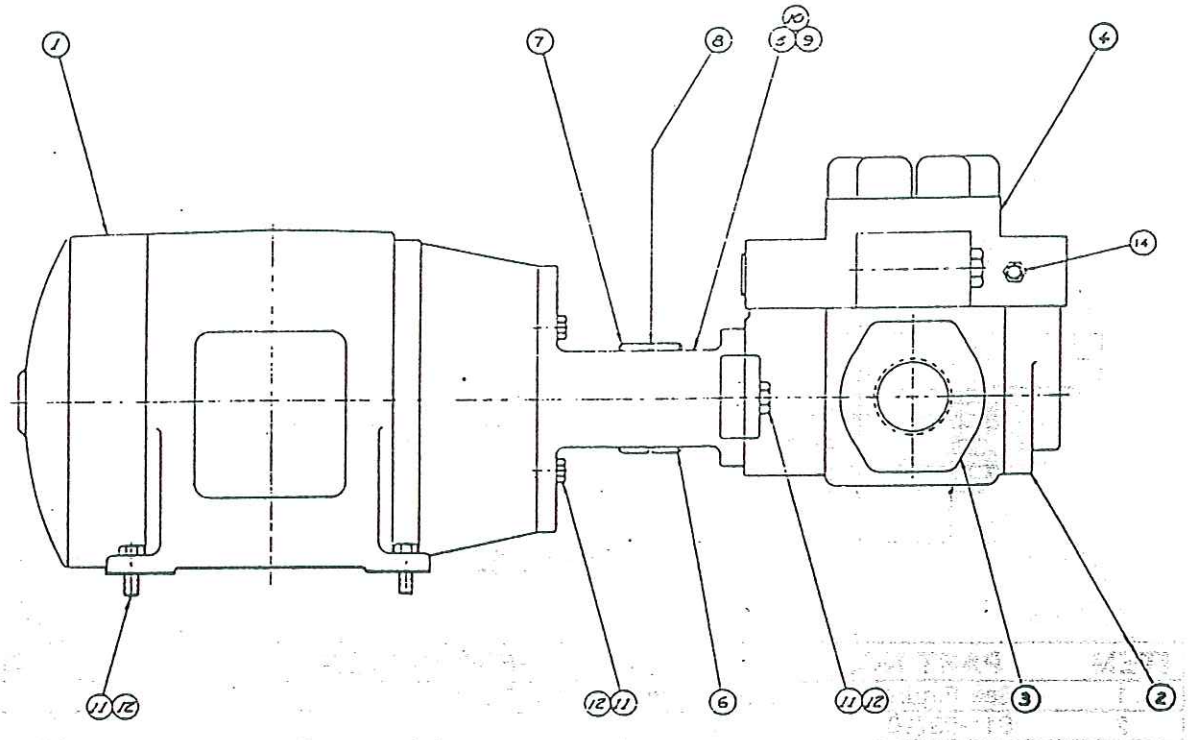


Figure 13

ITEM	PART NO.	DESCRIPTION	QTY. FW2H 15	FW2L 35	FW3N 50
1	158-0005	Motor, Electric, 10 hp, 1800 rpm	1		
	158-0006	Motor, Electric, 15 hp, 1800 rpm		1	
	158-0007	Motor, Electric, 20 hp, 1800 rpm			1
2	014-45957	Pump, Vane T5CC-010-005-1R-01-A1	1		
	014-42117	Pump, Vane T5CC-017-008-1R-01-A1		1	
	014-29932	Pump, Vane T5CC-017-010-1R-01-A1			1
3	S14-07428	Connection, Suction 3" NPTF	1	1	1
4	See Figure 14	Valve, Combination Pressure Control	1	1	1
5	031-47778	Adapter, Motor to Pump	1	1	1
6	212-85010	Coupling, Pump Half	1	1	1
7	212-85014	Coupling, Motor Half	1		
	212-85015	Coupling, Motor Half		1	1
8	212-85042	Coupling, Insert	1	1	1
9	032-49301	Guard, Coupling	1	1	1
10	320-60806	Screw, Self Tapping	4	4	4
11	306-20180	Screw, H.H.C. ½ - 13 UNC x 1¼" Lg.	6	6	6
12	346-10032	Washer, ½ Std. Lock	6	6	6
13		Not Used			
14	492-15087	Adapter, Female Pipe	1	1	1

COMBINATION PRESSURE CONTROL VALVE

012-29197

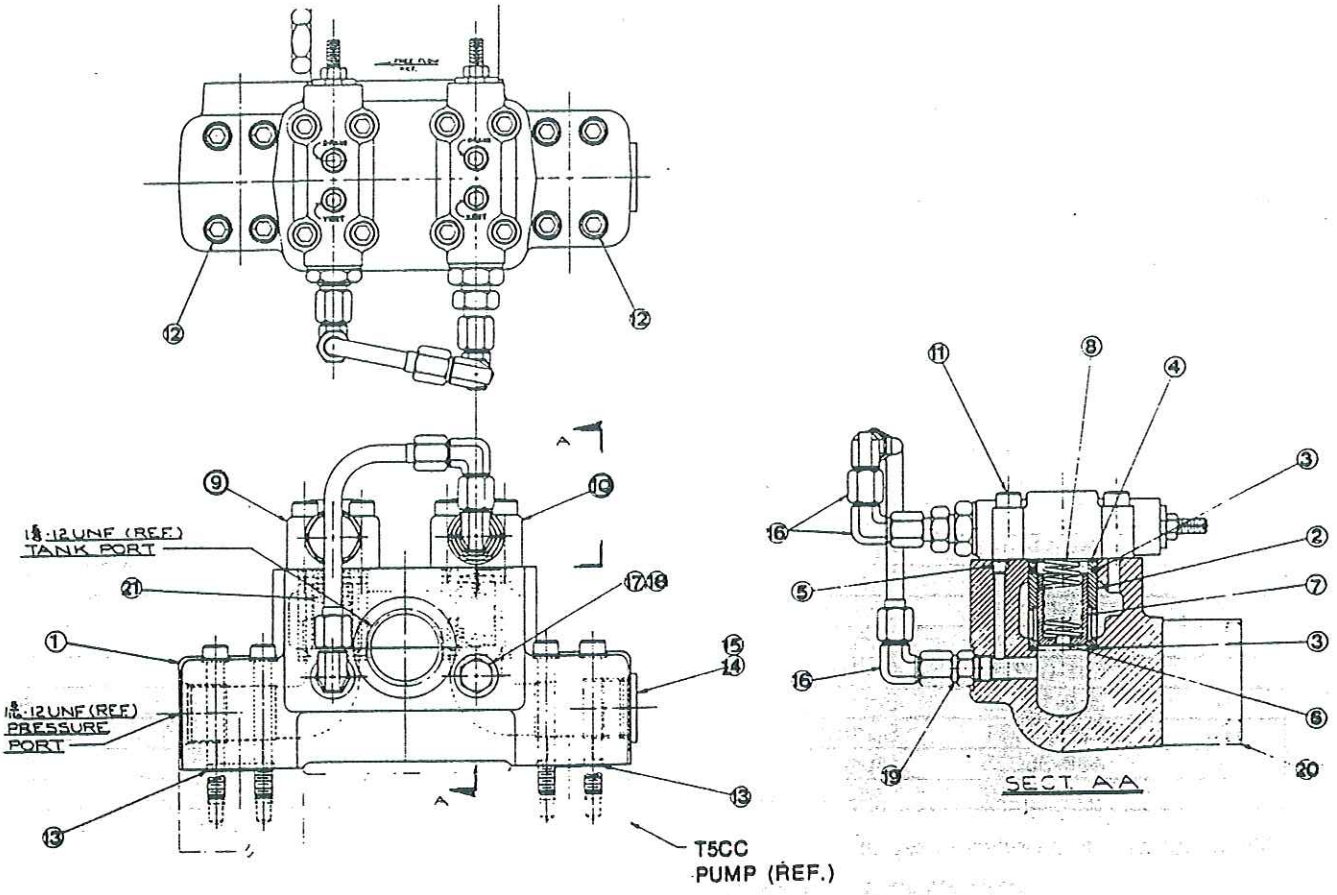


Figure 14

ITEM	PART NO.	DESCRIPTION	QTY.
1	032-69555	Body	1
2	036-27549	Sleeve	2
3	*671-00125	O-Ring	4
4	*671-00026	O-Ring	2
5	036-25528	Plug—Orifice	2
6	431-90104	Plug	2
7	036-27550	Spool	2
8	*036-42772	Spring (unloader valve)	1
9	See Figure 18	Assembly Relief Valve	1
10	See Figure 17	Assembly Unloader Valve	1
11	359-15220	Screws S.H.C. ⅜-24 UNF x 1¾	8
12	358-16320	Screws S.H.C. ⅜-16 UNC x 3	8
13	*671-00218	O-Ring	2
14	488-35037	Plug	1
15	*671-00916	O-Ring	1
16	496-10609	Elbow—Swivel	3
17	488-35003	Plug	1
18	*671-00906	O-Ring	1
19	493-15002	Connector—Straight	1
20	513-50088	Valve ¾ Check	1
21	*036-27547	Spring (relief valve)	1
	S12-47696	Seal and Spring Repair Kit	1

*These items are supplied in repair kit.

CONTROL VALVE C361-50

012-26018

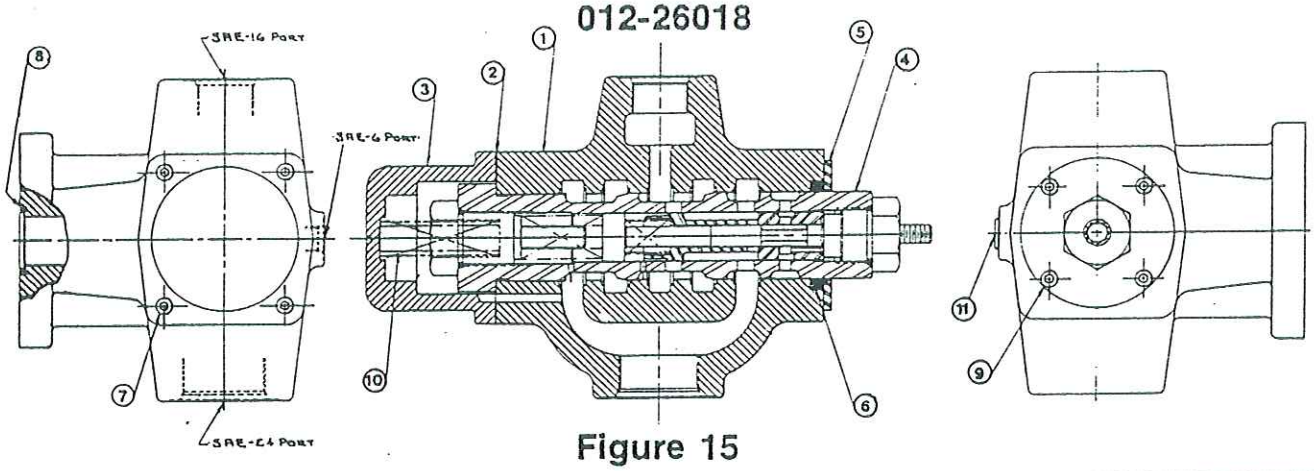


Figure 15

ITEM	PART NO.	DESCRIPTION	QTY.
1	032-69176	Body	1
2	*032-69177	Gasket	1
3	032-69179	Cap	1
4	See Figure 16	Assembly Spool	1
5	032-69180	Retainer—Seal	1
6	*633-00039	Uneepac	2
7	358-12140	Screw S.H.C. ¼ - 20 UNC x ⅞	4
8	*691-00219	O-Ring	2
9	358-12080	Screw S.H.C. ¼ - 20 UNC x ½	4
10	*225-92031	Spring	1
11	488-35025	Plug	1
	S12-47697	Seal and Spring Repair Kit	1

*These items are supplied in repair kit.

SPOOL ASSEMBLY (C-361 VALVE)

S12-25580

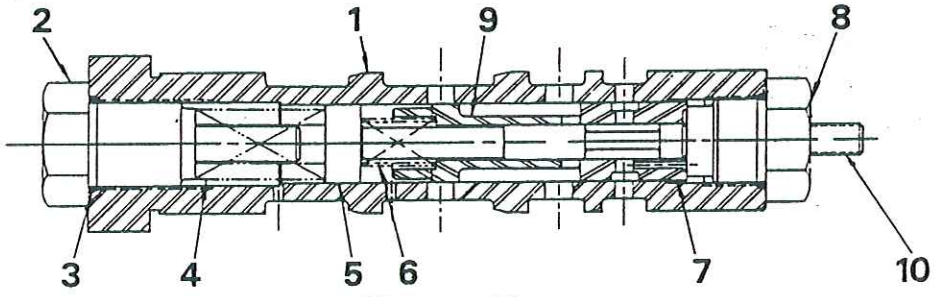


Figure 16

ITEM	PART NO.	DESCRIPTION	QTY.
1	032-69169	Spool	1
2	032-69170	Plug—Upper Spool Stop	1
3	*691-00916	O-Ring	2
4	*225-92041	Spring	1
5	032-69171	Spool—Shuttle	1
6	*225-92025	Spring	1
7	032-69172	Sleeve	1
8	032-69173	Plug—Spool	1
9	032-69174	Shuttle	1
10	311-18200	Screw Soc. Set 7/16 - 14 Cup Point	1

*These items are supplied in repair kit. (S12-47696)

UNLOADER VALVE CAP

S16-27019-5

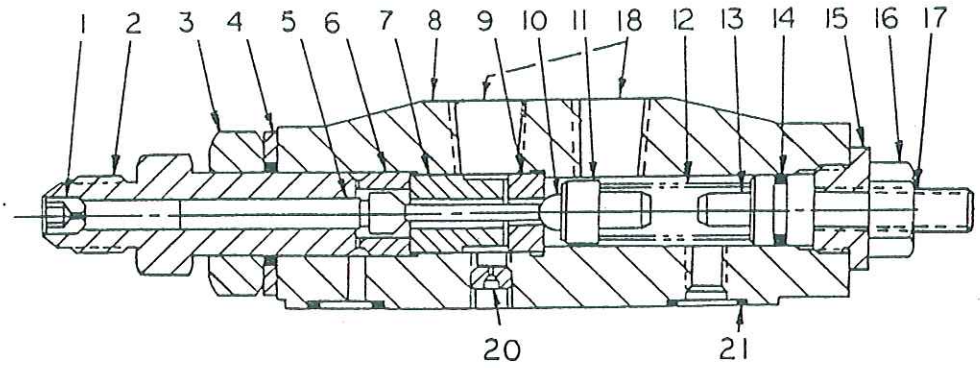


Figure 17

ITEM	PART NO.	DESCRIPTION	QTY.
1	036-45029	Plug—Orifice	1
2	036-45027	Adapter	1
3	335-23100	Nut—Jam ⅝ - 18 UNF	1
4	*635-00006	Seal	1
5	036-45028	Piston	1
6	036-27548	Spacer	1
7	036-11710	Block—Control	1
8	036-42372	Cap	1
9	036-11692	Seat	1
10	201-08001	Ball	1
11	036-11697	Support—Ball	1

ITEM	PART NO.	DESCRIPTION	QTY.
12	*036-13244	Spring	1
13	036-21767	Piston—Seal	1
14	*675-00012	O-Ring	1
15	036-21765	Plug—Adjusting	1
16	333-13001	Nut—Hex	1
17	312-13200	Screw—Adjust	1
18	431-90400	Plug—¼" Pipe	2
19		Not Used	
20	036-25528	Plug—Orifice	1
21	675-00013	O-Ring	2

*These items are supplied in Repair Kit (S12-47697) combination block.

RELIEF VALVE CAP

S16-27023-5

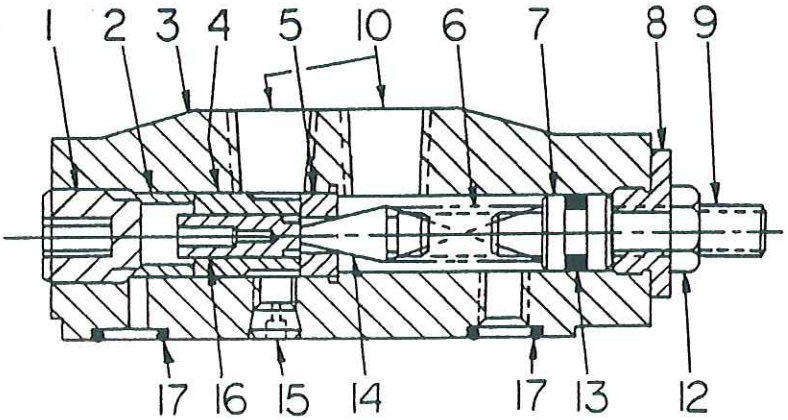


Figure 18

ITEM	PART NO.	DESCRIPTION	QTY.
1	312-35018	Screw S.H.S.	1
2	036-27548	Spacer	1
3	036-42372	Cap	1
4	036-11710	Block—Control	1
5	036-11692	Seat	1
6	*036-13245	Spring	1
7	036-21767	Piston—Seal	1
8	036-21765	Plug—Adjusting	1
9	312-13200	Screw-Adjusting	1

ITEM	PART NO.	DESCRIPTION	QTY.
10	431-90400	Plug—¼" Pipe	2
11		Not Used	
12	333-13001	Nut—Hex	1
13	*675-00012	O-Ring	1
14	036-12268	Cone	1
15	036-25528	Plug—Orifice	1
16	036-11694	Piston—Control	1
17	*675-00013	O-Ring	2

*These items are supplied in Repair Kit (S12-47697) combination block.

ANTI-TIE DOWN ASSEMBLY

SD-01091

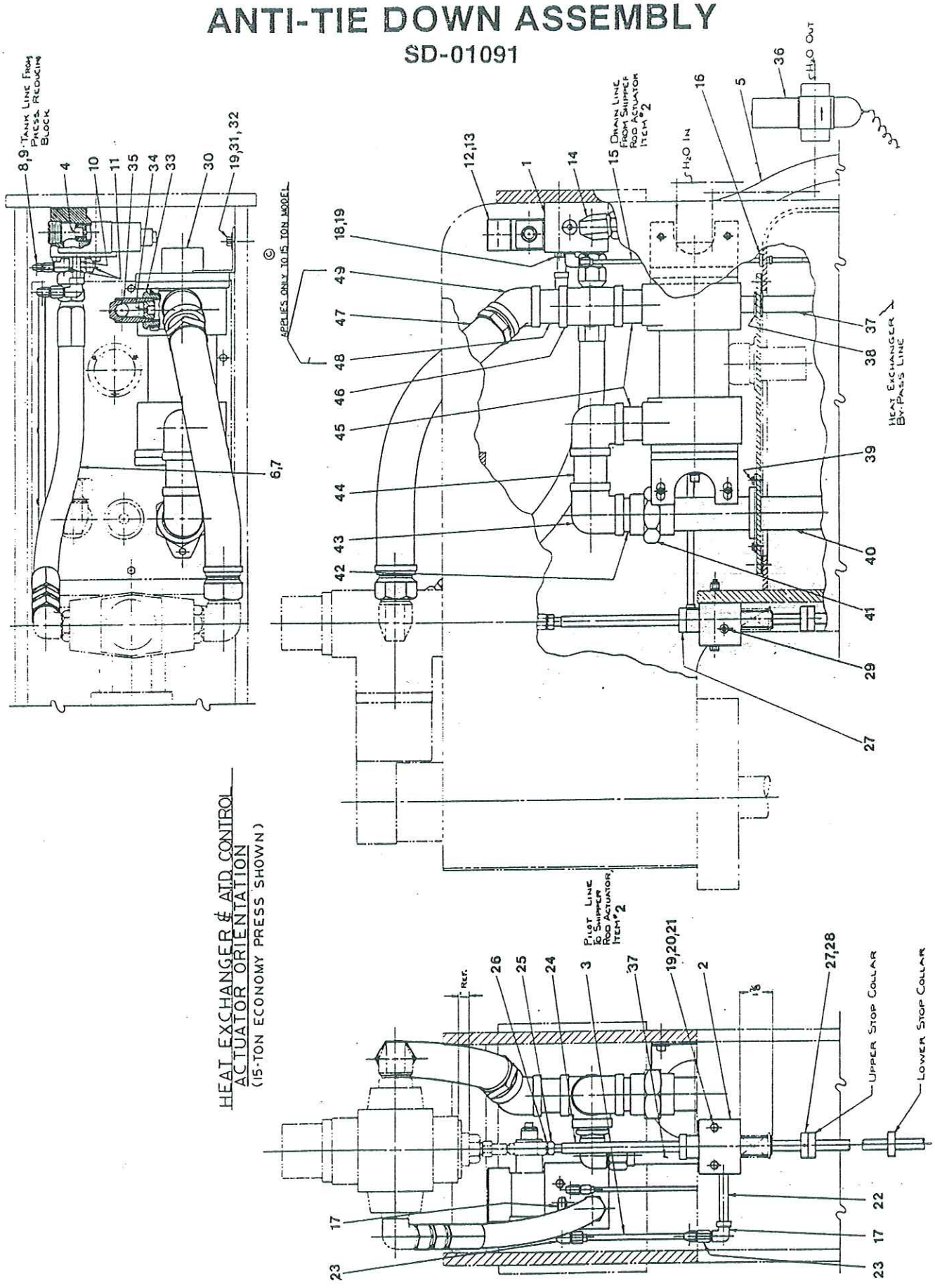


Figure 19

ANTI-TIE DOWN

SD-01091

ITEM	PART NO.	DESCRIPTION	FW 2 H 15 QTY.	FW 2 L 35 QTY.	FW 3 N 50 QTY.
1	S12-49014	Pressure Reducing Valve Assembly	1	1	1
2	S12-49012	Shipper Rod Actuator	1	1	1
3	S12-49052	Pilot Line Tubing Assembly	1		
	S12-49037	Pilot Line Tubing Assembly		1	
	S12-72711	Pilot Line Tubing Assembly			1
4	032-90839	Orifice	1		
	032-90823	Orifice		1	
	032-72710	Orifice			1
5	032-90548	Hose, Pressure	1	1	1
6	032-90548	Hose, Pressure	1		
	032-69979	Hose, Pressure		1	
	032-69248	Hose, Pressure			1
7	470-35001	Connector, Male	1	1	2
8	496-15003	Elbow, Swivel Nut	1	1	1
9	803-04035	Tube	2 ft.	2 ft.	2 ft.
10	442-04080	Nipple	1	1	1
11	473-10404	Elbow, Male	2	2	2
12	016-44343-5	Valve, 4 Way Directional, Mod. #3D01-35-111-01-01-00A5-01A28	1	1	1
13	359-09240	Screw, S.H.C. #10-32 UNF x 2" Lg.	4	4	4
14	473-15003	Elbow, Male	1	1	1
15	803-04035	Tube	1 ft.	1 ft.	1 ft.
16	606-20614	Grommet	2	2	2
17	474-10604	Elbow, Female	2	2	2
18	306-16340	Screw, H.H.C. ⅜ - 16 UNC x 3½" Lg.	2	2	2
19	346-10024	Washer, Lock ⅜" Std.	8	8	8
20	306-16360	Screw, H.H.C. ⅜ - 16 UNC x 4" Lg.	2	2	
	306-16380	Screw, H.H.C. ⅜ - 16 UNC x 4½" Lg.			2
21	333-16000	Nut, Hex. ⅜ - 16 UNC	2	2	2
22	442-04140	Nipple, Extra Heavy	1		
	442-04200	Nipple, Extra Heavy		1	1
23	496-10609	Elbow, Swivel Nut	2	2	2
24	032-69706	Rod, Shipper	1		
	032-69190	Rod, Shipper		1	
	032-40637	Rod, Shipper			1
25	335-19100	Nut, Hex, Jam ½ - 20 UNF	1	1	1
26	348-10032	Lockwasher ½"	1	1	1
27	210-15003	Collar	4		4
	210-15001	Collar		4	
28	325-12180	Rollpin, 3/16 x 1⅛" Lg.	1	1	1
29	431-90404	Plug	1	1	1
30	505-65011	Heat Exchanger #HE-20B	1	1	
	S12-15394	Cooling Coils			1
31	306-16160	Screw, H.H.C. ⅜ - 16 UNC x 1" Lg.	4	4	
32	344-10024	Washer, Flat	4	4	
33	433-92416	Bushing, Reducing	1	1	
34	032-90824	Orifice	1	1	
35	032-90826	Tube	1	1	
36	515-24606	Valve, Water Regulating	1	1	
	515-24603	Valve, Water Regulating			1
37	803-16065	Tube	1 ft.	1 ft.	
38	606-25001	Grommet	1	1	
39	518-00022	Flange	1	1	
40	032-47612	Pipe	1	1	1
41	415-02400	Union	1	1	
42	441-24010	Nipple, Std.	1	1	
43	404-02400	Elbow	2	2	
44	441-24120	Nipple, Std.	1	1	
45	441-24100	Nipple, Std.	2	2	
46	416-02400	Tee	1	1	
47	032-90173	Hose	1	1	
	032-90825	Hose			1
48	441-24100	Nipple, Std.	1		
49	405-02400	Elbow	1		

SHIPPER ROD ACTUATOR

S12-49012

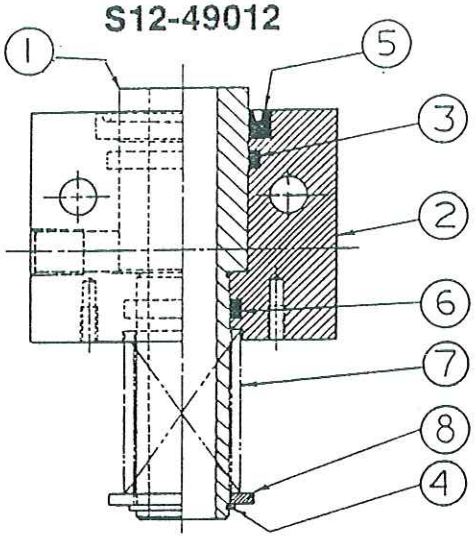


Figure 20

ITEM	PART NO.	DESCRIPTION	QTY.
1	032-90756	Piston	1
2	032-90755	Body	1
3	*671-00220	O-Ring	1
4	*356-31100	Retaining Ring	1
5	*631-45008	Wiper	1
6	*671-00214	O-Ring	1
7	*036-22359	Spring	1
8	350-10065	Washer-Thrust	1

*These items are supplied in Seal and Spring Repair Kit (S12-47695).

PRESSURE REDUCING VALVE ASSEMBLY

S12-49014

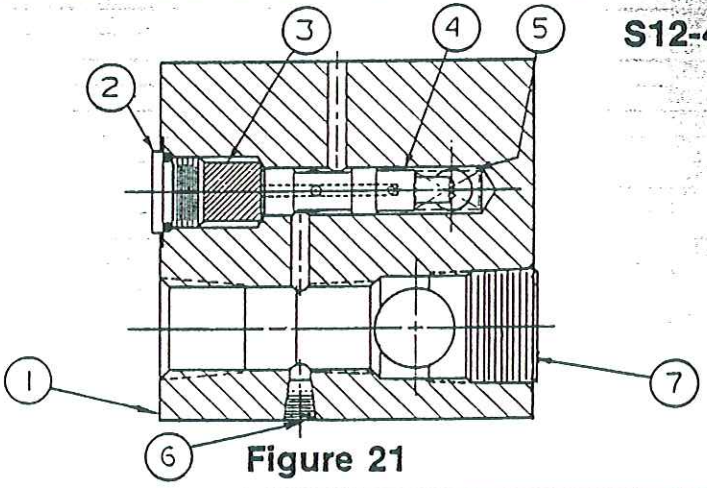
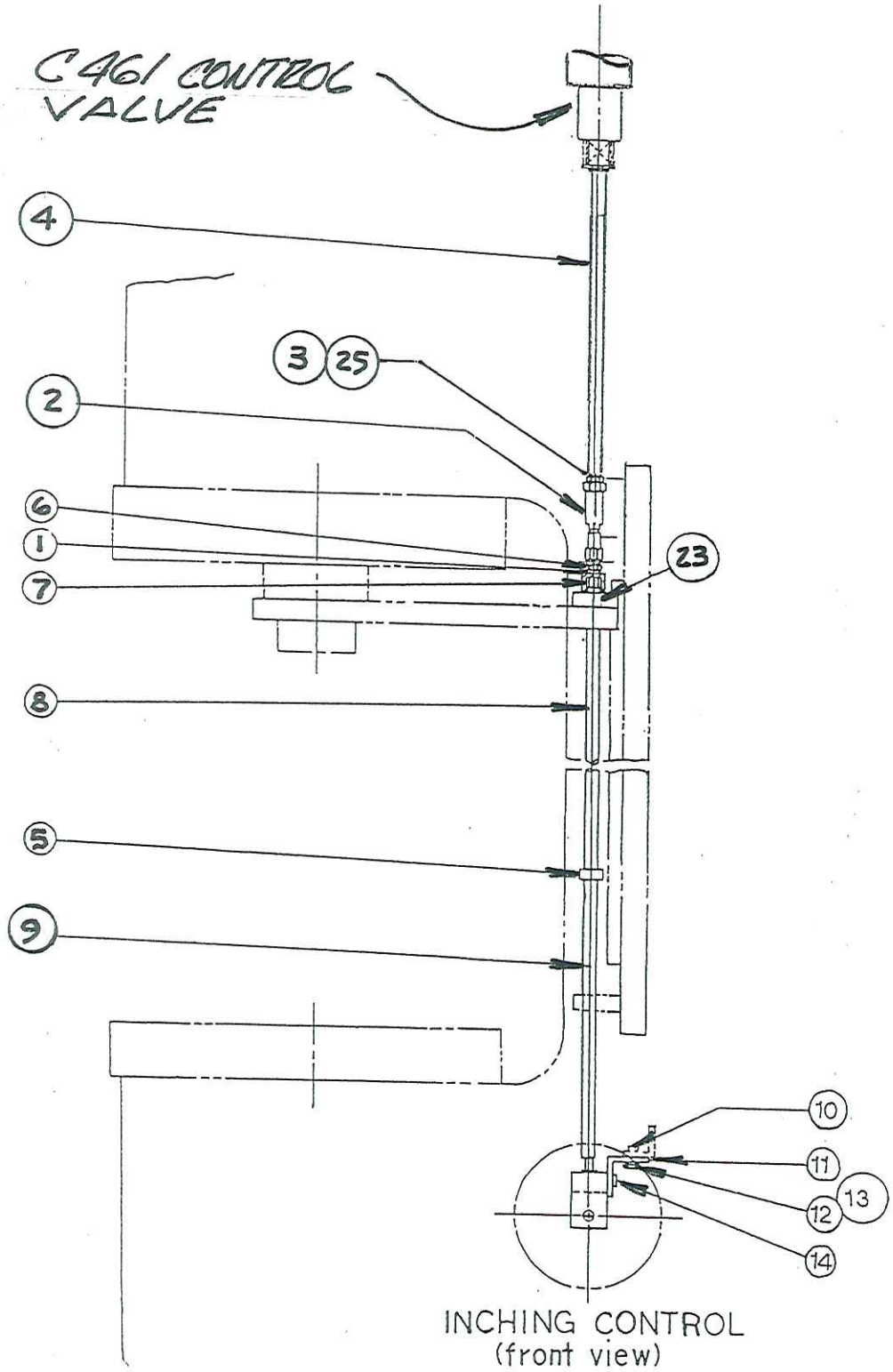


Figure 21

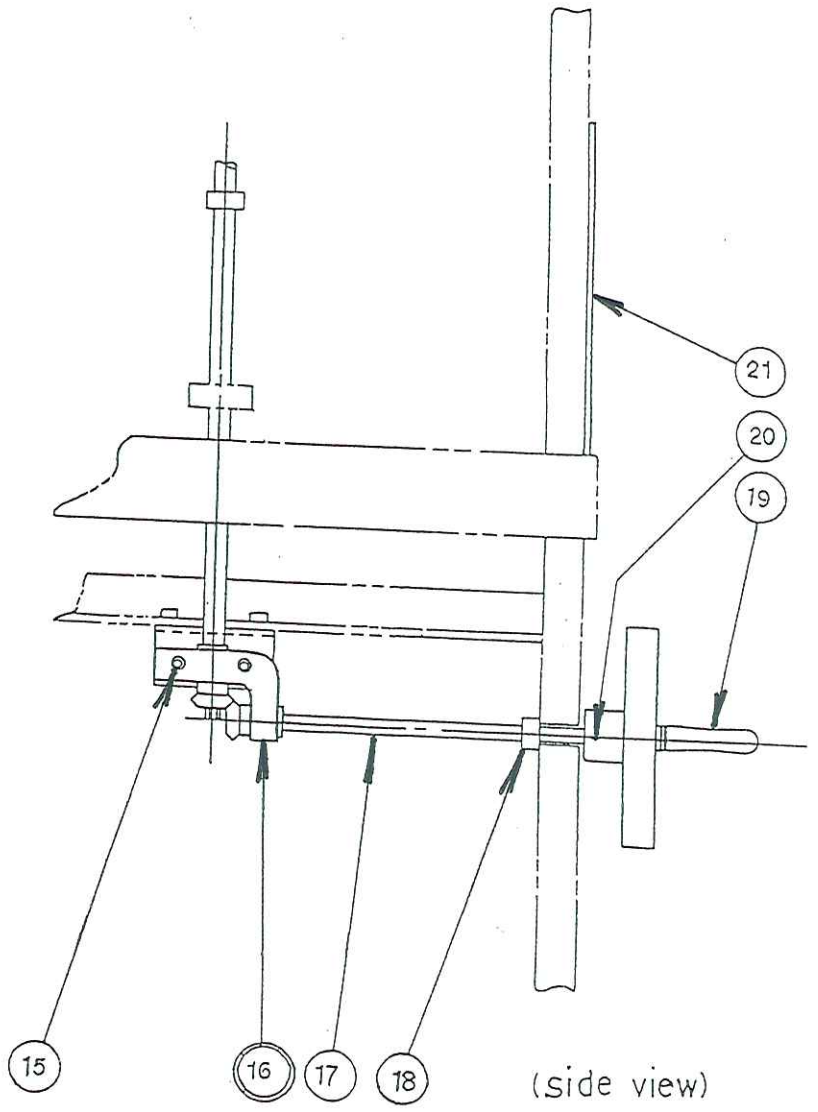
ITEM	PART NO.	DESCRIPTION	QTY.
1	032-90752	Body—Pressure Reducing Valve	1
2	488-35044	Plug—Hex. Socket O-Ring Boss	1
3	032-90754	Spacer	1
4	032-90753	Spool—Pressure Reducing	1
5	*225-92053	Spring	1
6	431-90104	Plug—Flush 1/16"	3
7	431-91600	Plug—Pipe 1" Hex. Soc. Pipe	1

*Item supplied with Seal and Spring Repair Kit (S12-47695).

Inching Control & Handwheel



INCHING CONTROL
(front view)



(side view)

HANDWHEEL INCHING

(For FW Economy Presses)

Item	Part #	Description	FW4H-15 S12-48997	FW4L-35 S22-10032	FW4N-50 S22-10172
1	348-10028	Washer, 7/16''	1	2	1
2	010-03790	Swivel Joint	1	1	1
3	335-19100	Nut—1/2-200NF Jam	—	1	1
4	030-59154	Adapter—Inching	—	—	1
	030-53470	Adapter—Inching	—	1	—
	030-53621	Adapter—Inching	1	—	—
5	210-15001	Collar-Stop, 5/8'' I.D.	1	3	2
6	335-18100	Nut-Jam, 7/16-14	—	—	1
7	030-25430	Stop-Positive	1	1	1
8	030-47200	Shipper Rod—Upper	—	—	1
	030-53468	Shipper Rod—Upper	—	1	—
	030-53484	Shipper Rod—Upper	1	—	—
9	030-47352	Shipper Rod—Lower	—	—	1
	030-48039	Shipper Rod—Lower	—	1	—
	030-53485	Shipper Rod—Lower	1	—	—
10	358-14180	Screw—5/16-18 x 1¼	1	2	2
11	030-47202	Bracket	1	1	1
12	346-10020	Washer-Lock, 5/16	—	2	2
13	333-14000	Nut—5/16-18	—	2	2
14	030-25851	Plate-Bolt Anchor	1	1	1
15	358-14240	Screw—5/16-18 x 2	—	2	2
	358-14280	Screw—5/16-18 x 2½	1	—	—
16	010-23924	Control Gear Assembly	1	1	1
17	030-53554	Shaft—Gear Control	—	—	1
	030-53469	Shaft—Gear Control	—	1	—
	030-53457	Shaft—Gear Control	1	—	—
18	210-05000	Collar—1/2'' I.D.	1	1	1
19	030-49001	Handwheel	1	1	1
20	325-12160	Rollpin—3/16 x 1	1	1	1
21	030-25519	Inching Control Plate	1	1	1
22	325-12100	Rollpin—3/16 x 5/8	1	1	1
23	030-23571	Collar—Upper Stop	1	1	—
24	358-14160	Screw—5/16-18 x 1	(Item 10)	1	—
25	348-10028	Lockwasher—7/16''	1	2	—
26	348-10032	Lockwasher—1/2''	2	1	—
27	030-48681	Bar—Upper Shipper Rod Guide	1	—	—
28	030-53622	Angle—Upper Guide Mounting	1	—	—
29	358-14100	Screw—5/16-18 x 5/8	4	—	—
30	335-20100	Nut-Jam, 1/2-13	1	—	—
31	358-14200	Screw—5/16-18 x 1½	2	—	—
32	345-11020	Washer—5/16'' Flat	7	—	—
33	335-14100	Nut—5/16''-18 Jam	2	—	—

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