MULTIPRESS®

HYDRAULIC EQUIPMENT

operation instructions and service manual

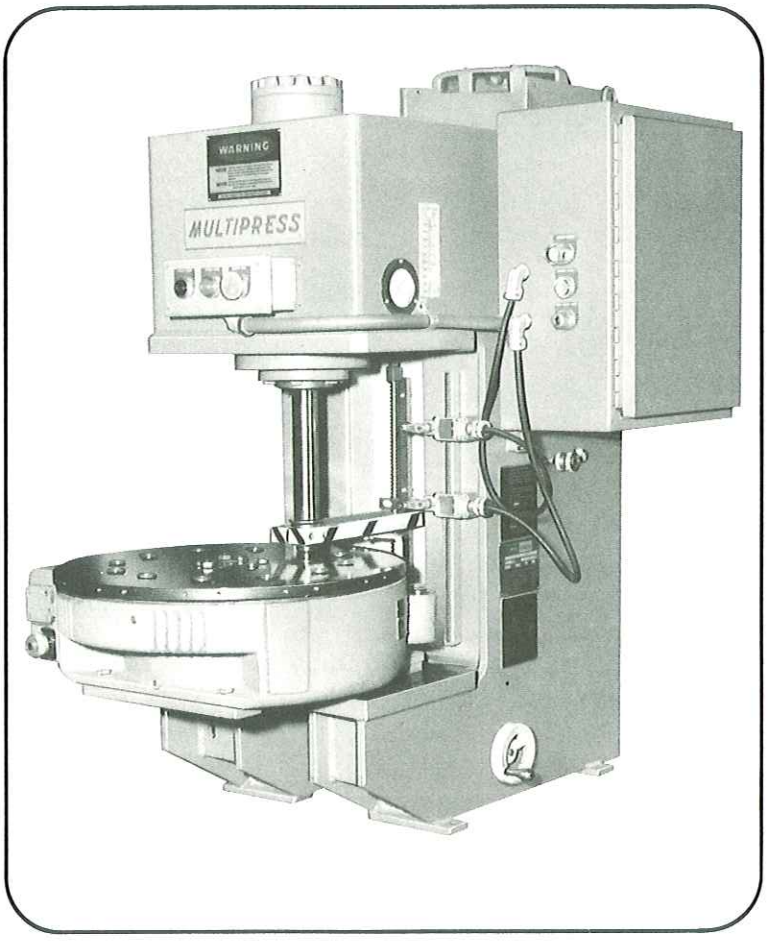
IT100 Series Index Table

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.



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(614) 228-0185

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TABLE OF CONTENTS

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.

MODEL NUMBER KEY

COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4	
CODE	BASIC INDEX TABLE	CODE	NUMBER STATIONS	CODE	ROTATION	CODE	AUXILIARY PACKAGES
IT1	"100" SERIES	06	SIX-C.W. or CCW	R	CLOCKWISE	00	NONE
		12	TWELVE - C.W.	L	C'CLOCKWISE	01	"R" & "WR" SER.
			TWELVE - C.C.W.			02	"S" & "WS" SER.
						03	"T" SERIES
						04	"FH" SERIES
						05	"FL" & "FN"
						06	"FH" W/300 VLV

IT- 106R-01

ONE OR MORE NUMBERS TO DESIGNATE REDESIGNED INDEX TABLE.

FLUID CLASS
PROVIDE NAME OF FLUID TO BE USED.

CODE NUMBER TO BE DETERMINED BY ENGINEERING DEPARTMENT.

NOTE:

MODEL IDENTIFICATION ONLY. NOT FOR ORDERING. CERTAIN COMBINATIONS MAY NOT FUNCTION.

Index Table Service Instructions
Models IT106 and IT112

I. INSTALLATION

The table must be located so that center line of the ram coincides with the center line of the dial station under the ram.

Referring to the Caution Tag attached to the Index Table upon shipment:

1. Do not start press before filling Index Table with oil. (See oil specification data plate on Index Table housing.) Fill table with 4-1/2 quarts of 150 or 200 SSU Hydraulic Oil and 4-1/2 quarts of A.G.M.A. No. 8 compounded oil.

2. LUBRICATION. Every 500 hours remove 1/8" pipe plug located right center underneath dial and install Alemite fitting and lubricate with soft grease. After lubrication remove Alemite fitting and replace 1/8" pipe plug.

II. ADJUSTMENTS

1. To index the table manually, if necessary in tooling set-ups, or to make adjustment, remove housing cap (26) and turn worm with heavy screw driver.

CAUTION

Electric motor must be turned off while making this adjustment. Be certain to have the control handle in neutral. Geneva drive can now be turned manually, causing table to index.

2. To insure the proper synchronization between the index table and press ram, adjust control cam follower. Remove the screws (20) and the cap (12). Rotate worm until dial indexes to mid-point between stations, then turn adjusting screw until contact is made between the adjusting screw and the actuator pad on the valve stem, then back off adjusting screw 3/4 revolution and lock.

CAUTION

Do not make this adjustment unless table repeats index or press ram repeats. Do not adjust with table indexing. If table repeats indexing, then turn the adjusting screw in [clockwise] 1/4 turn at a time. If press ram repeats, then turn the adjusting screw to back out [counter clockwise] 1/4 turn at a time.

3. Regulation of the rate of table travel is provided in a range between 10 and 150 indexes per minute on 6 station, IT106; between 10 and 180 indexes per minute on 12 station, IT112 table. These speeds are computed with table running in continuous skip station. A simple knurled knob adjustment, located on the sequence valve, is easily regulated for speed requirements and can be changed even while table is in motion.

4. Adjust dial height to obtain .003 to .006 inches running clearance. First loosen three socket head cap screws, and the jam nuts of three adjusting screws in the center of the dial. Adjust the dial height to obtain the running clearance by turning the adjusting screws in or out. Check the clearance between the bottom of the dial and the top (rim) of the housing with a feeler gauge all the way around. After the proper clearance is obtained tighten the jam nuts while holding the adjusting screws with a wrench. Then tighten three hold down (cap) screws gently to avoid dishing of the dial.

III. MAINTENANCE

1. Procedure to replace fluid motor and sequence valve: To remove fluid motor; disconnect fluid motor drain line and remove 4 mounting screws. Be sure and not disturb shims between fluid motor and seal retainer for thrust bearings. To remove sequence valve, back off sequence adjusting screw, disconnect 3 hose lines and remove 6 mounting screws. It is not necessary to remove sequence valve to remove sleeve assembly; remove 4 screws (item 20) and sleeve can be removed from valve.

2. To remove push rod assembly remove sequence valve and items 20 and 39 and lift out.

3. To remove worm, remove fluid motor and item 26 and drive worm towards back of table with brass rod.

4. Disassembly of table mechanism.

   (a) Drain oil from table by removing drain plug in front of table.

   (b) To remove dial, remove 3 hold down screws; remove nuts from adjusting screws and then use adjusting screws for jack screws to remove dial from arbor.

   (c) Remove items 37, 12 and 13, and items 10, 11 and 27.

   (d) Remove hold down screws which affix cover to tub, then insert jack screws in 3 tapped holes at 4, 8 and 12 o'clock stations in cover. This will lift cover vertically.

   (e) Remove arbor and driver together by angular lift.

   (f) Remove rest of assembly by removing screws.

   NOTE

   If dial or arbor has to be replaced they must be replaced as complete assembly. If necessary to replace worm or worm gear both must be replaced. Also, Geneva driver must be replaced as an assembly.

   (g) Be sure when replacing driver and arbor, that roller on lock arm is in ram track of driver.

   NOTE

   When rebuilding table follow all noted procedures carefully.

   CAUTION

   Be sure to refill table with oil.

TECHNICAL DATA

1. Space is available for 3/4" maximum knockout cam rise.

2. Dial will withstand a maximum side thrust load of 750 lbs. when not indexing.

3. Dial will withstand a maximum of 400 lbs. knockout force when not indexing.

4. Dial can withstand a maximum tonnage of 15 tons from press ram at 4, 8 and 12 o'clock stations when not indexing. (Providing the entire table is mounted upon a 3/4" thick bolster plate.)

5. Skip station accessory is provided as standard equipment on all "Century" series index tables.

6. Index table can be mounted on an inclined plane of not greater than 90° from horizontal (providing fluid motor is extending down).

7. Indexing repeatability is ± .001 inches.

8. Upon application of this index table to a Denison press, a cylinder head relief valve in conjunction with a sequence line relief valve would be required.

9. This table can be easily adapted for use with coolant or solvents. (For detailed information consult Engineering Department.)

10. Tooling must be assembled within the dial area and not to extend beyond its outside diameter.

The maximum recommended weights of tools to be mounted on the dial are as follows.

IT106 MODEL [6 Station]

50 lbs. @ 150 indexes per minute
110 lbs. @ 125 indexes per minute
225 lbs. @ 100 indexes per minute
400 lbs. @ 80 indexes per minute

IT112 MODEL [12 Station]

100 lbs. @ 180 indexes per minute
200 lbs. @ 145 indexes per minute
400 lbs. @ 110 indexes per minute
600 lbs. @ 95 indexes per minute

The above rates of index speed refer to continuous indexing time, not including press ram action time.

Consult our Engineering Department for other conditions.

Refer to Sales Bulletin M-9-1 for cycle rates.

SEQUENCE OF OPERATION
"100" SERIES INDEX TABLE
6 AND 12 STATION TABLES

The sequence and flow control spools are in "fast traverse" position, due to the relationship of the control cam follower to the control cam, which is affixed to the Geneva driver.

Sequence oil is delivered from the main system control valve to the "pressure" port of the index table sequence valve.

The "flow control" port is blocked by the flow control spool, so that oil is directed from pressure line to the "inlet" of the fluid motor and through orifices H & D to "tank." The fluid motor "exhaust" oil is now open through orifice "D" and the porting of sequence spool to "tank," allowing the fluid motor and Geneva driver to accelerate in "fast traverse." (During the "fast traverse" portion of the cycle, the Geneva drive roller is just engaging in the Geneva arbor as the "lock" disengages, releasing the dial and Geneva arbor for indexing.)

The control cam follower drops off the "fast traverse" rise on the control cam. (This is caused by rotation of control cam.) The sequence and flow control spools are now shifted to "speed control" position. The sequence spool blocks "exhaust" port at orifice "D," consequently the exhaust oil from the fluid motor must now pass through the "flow control" porting of the valve and then through the adjustable orifice to "tank." (During the "speed control" portion of the cycle, the roller on the "lock actuator" moves to such a position in its cam that the "lock" is disengaged before the Geneva drive roller can engage in the Geneva arbor to index the dial and Geneva arbor.) At this time during the "speed control" portion of the cycle, the dial and Geneva arbor complete indexing movement and are waiting to be locked into station. The speed of the dial and Geneva arbor during indexing is dependent upon the regulation of the adjustable orifice. The resistance caused by the exhaust oil of the fluid motor going to "tank through the adjustable orifice is reflected back through the flow control port to the top of the flow control spool (pressure compensating the flow control line) causing the flow control spool to "meter out" the exhaust oil of the fluid motor. This in turn reacts like a hydraulic brake on the fluid motor to decrease its R.P.M., consequently, slowing down the indexing speed of the dial and Geneva arbor.

After the dial and Geneva arbor have completed indexing movement ("speed control" portion of the control cam), the control cam follower is then actuated by the "sequence port" rise on the control cam, shifting the sequence spool to block "tank" port and connect the exhaust oil from the fluid motor to "sequence port." This hydraulic signal to "control port" (main system control valve) in turn shifts the main system control valve, blocking the oil which is available to the "inlet" of the fluid motor.

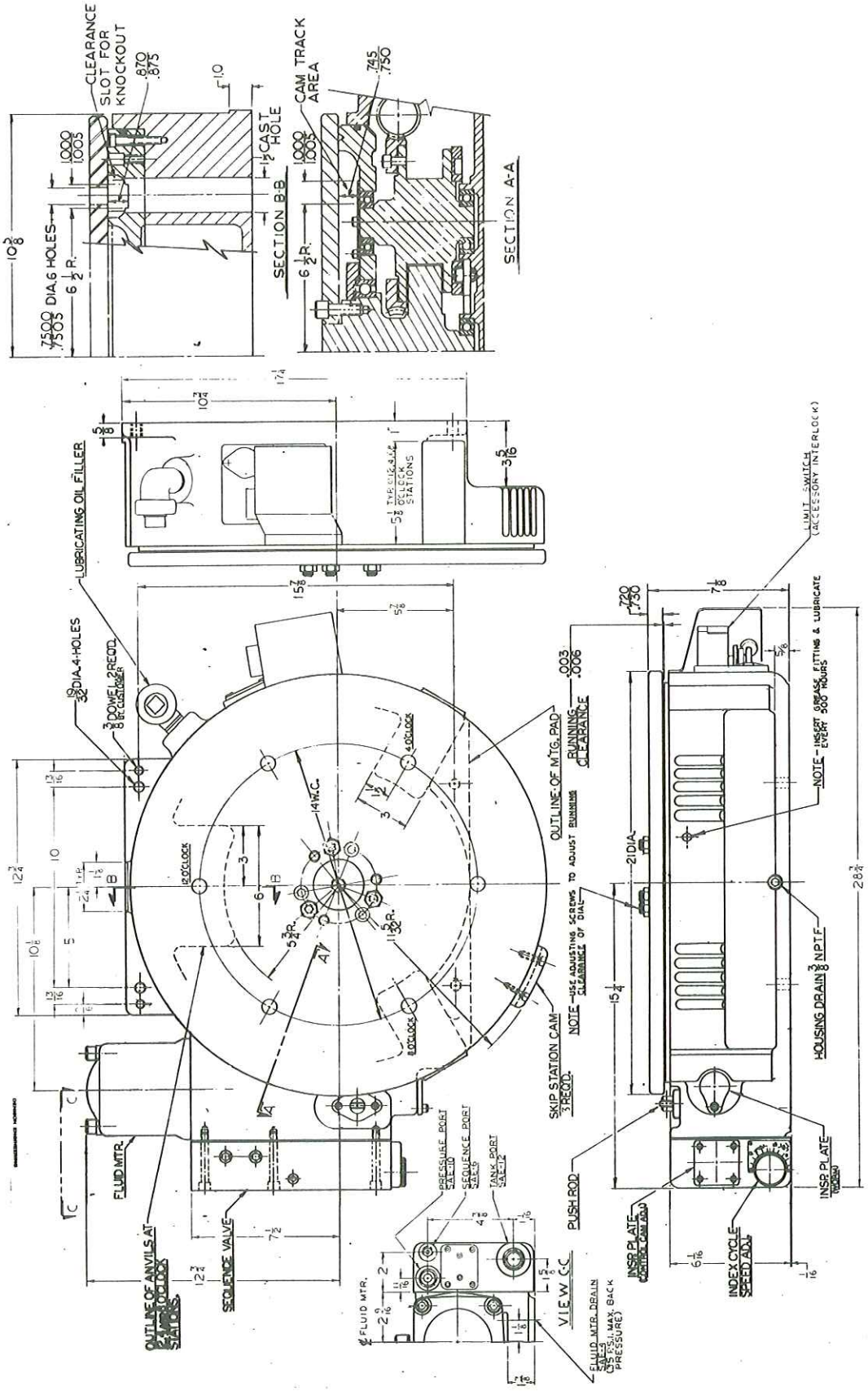
The fluid motor and control cam now coast to "fast traverse" position. During this time, the roller on the Geneva driver disengages from the Geneva arbor, and due to the position of the roller on the "lock actuator" in its cam track, the "lock" engages into the Geneva arbor, locking the dial and Geneva arbor into station. (This completes the full index cycle.) Orifice "D" helps decelerate the fluid motor so that the control cam cannot coast beyond the "fast traverse" contact surface with the control cam follower.

SKIP STATION OPERATION

When "skip station" is desired, the control cam follower is actuated by the skip station cam and push rod. The control cam follower then moves down to the lower level of the control cam's surface (this level does not have a "sequence port" rise.) Consequently, a continuous source of oil is available to the fluid motor, and the table will continue indexing until the control cam follower is allowed to return to the upper level of the control cam's surface, when the dial is approaching the next station. Then the "sequence port" rise is allowed to actuate the control cam follower, which initiates the completion of an index cycle as previously described.

For "TMC" "TIC" & "PIF07" — To regulate skip station rate of index, adjust set screw in speed control knob to 150 indexes per minute.

For "TMB" Pumps — To regulate skip station rate of index, back set screw in speed control knob all the way out, so that the table cycles at its maximum rate of index. Then adjust the set screw in until the index rate begins to decrease. Then back set screw out 1/4 turn.



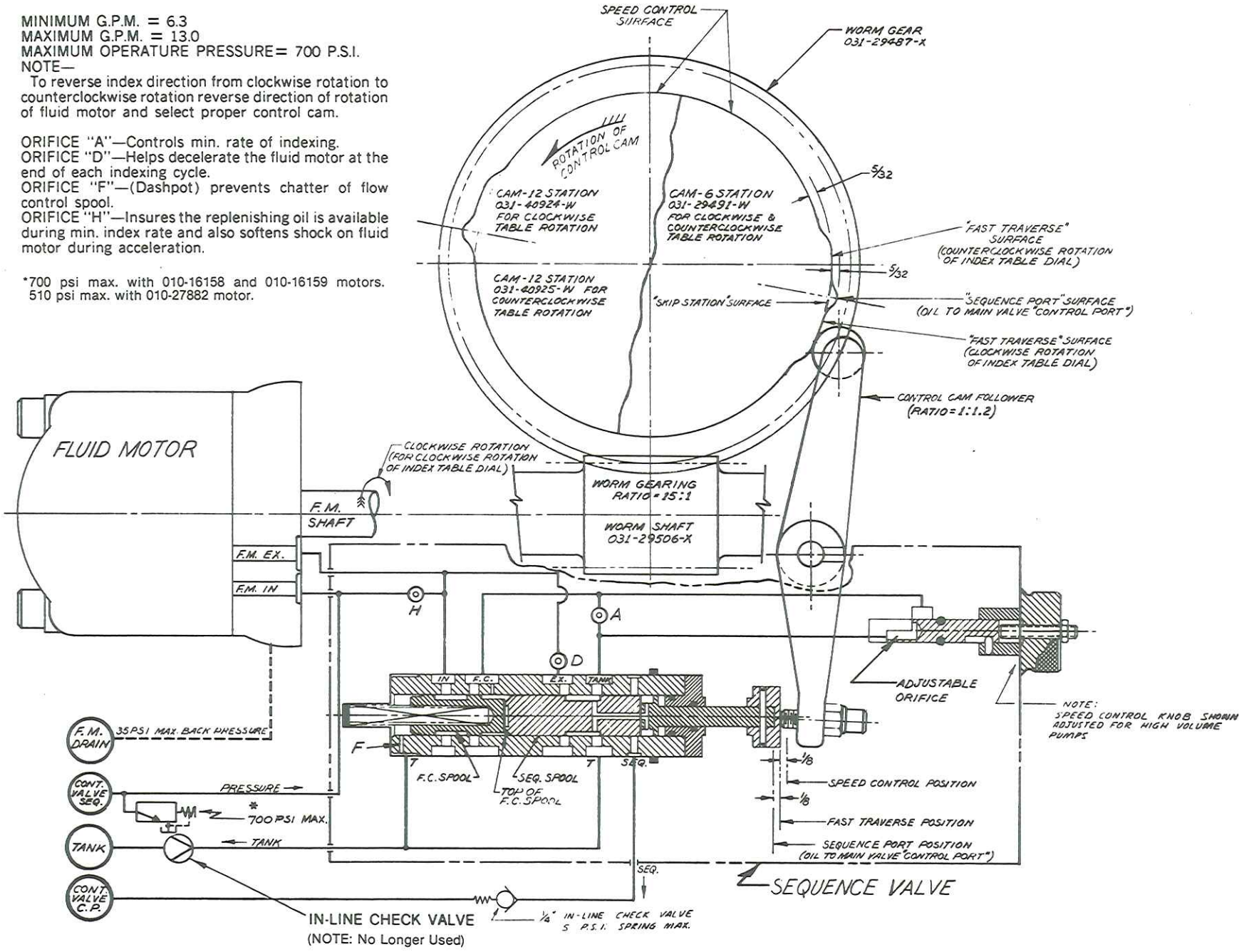
INSTALLATION DRAWING

CURCUIT — HYDRAULIC
(For 6 & 12 Station Index Table)

MINIMUM G.P.M. = 6.3
MAXIMUM G.P.M. = 13.0
MAXIMUM OPERATURE PRESSURE= 700 P.S.I.
NOTE—
To reverse index direction from clockwise rotation to counterclockwise rotation reverse direction of rotation of fluid motor and select proper control cam.

ORIFICE "A"—Controls min. rate of indexing.
ORIFICE "D"—Helps decelerate the fluid motor at the end of each indexing cycle.
ORIFICE "F"—(Dashpot) prevents chatter of flow control spool.
ORIFICE "H"—Insures the replenishing oil is available during min. index rate and also softens shock on fluid motor during acceleration.

*700 psi max. with 010-16158 and 010-16159 motors.
510 psi max. with 010-27882 motor.



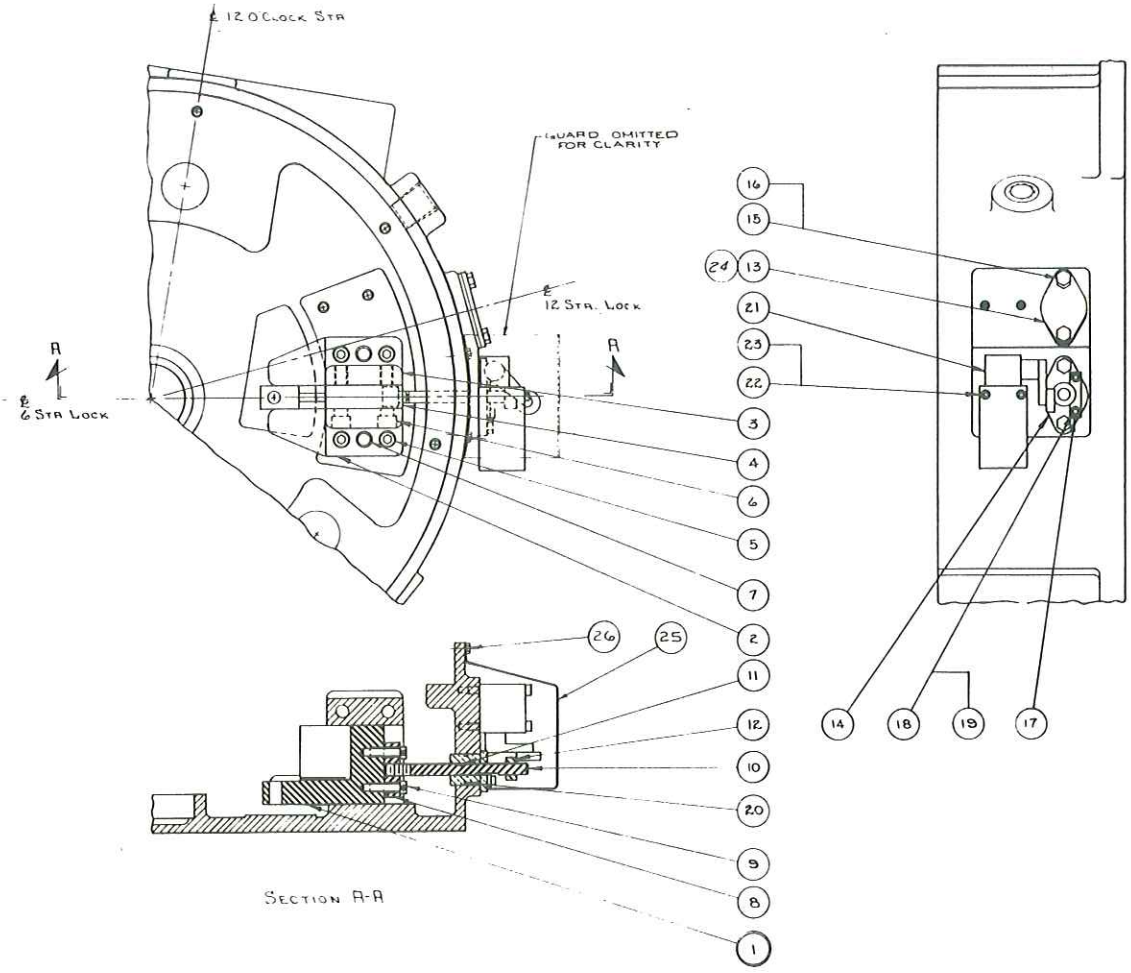


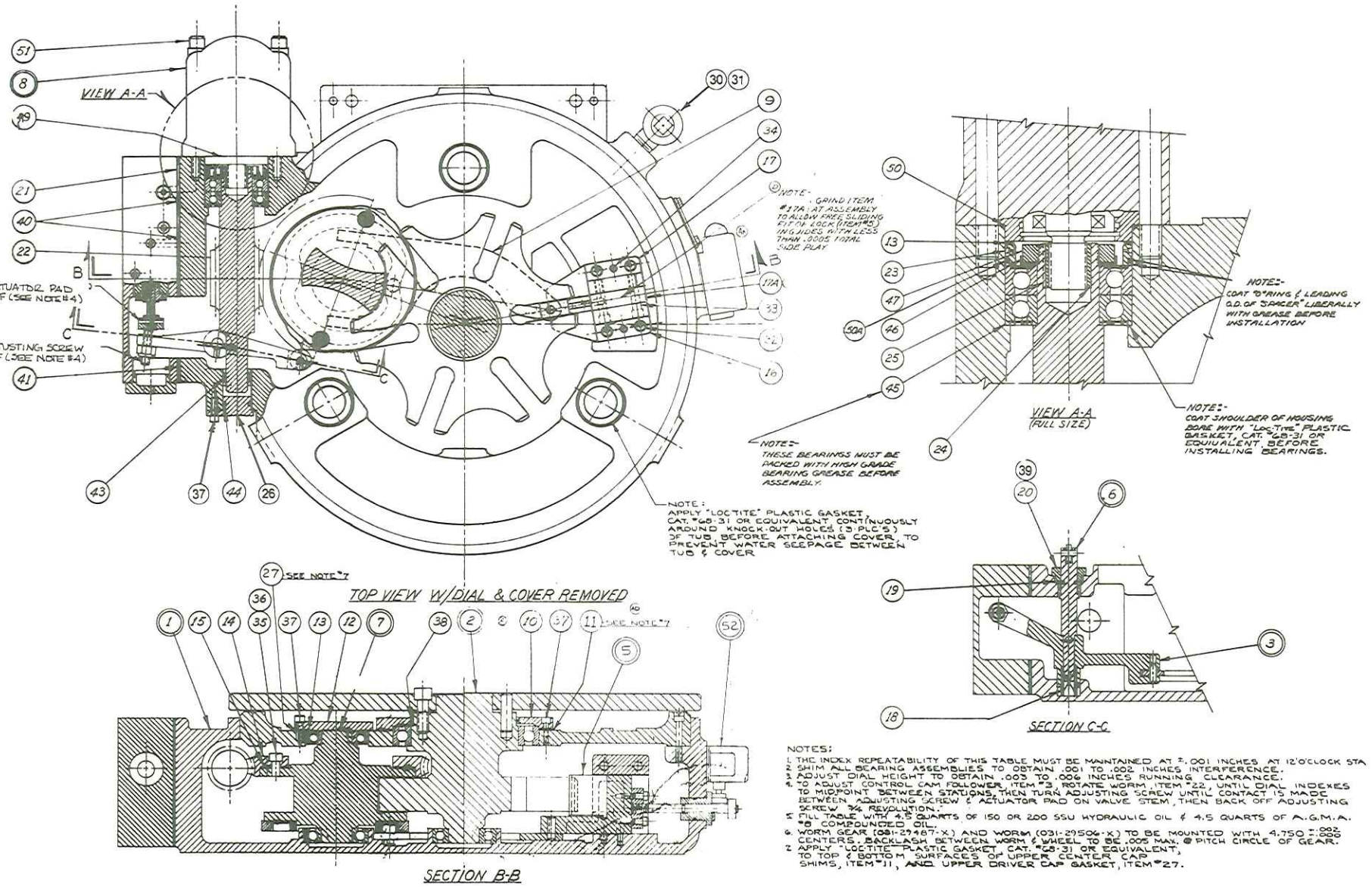
FIGURE 1

SAFETY INTERLOCK MODEL INT-100
S11-29088

ITEM	PART NO.	DESCRIPTION	QTY.
1	Ref. only	Lock - Geneva Arbor	—
2		Guide R.H. Lock	—
3		Guide L.H. Lock	—
4		Spacer - Lock Guide	—
5		Screw SHC 5/16 - 18 UNC x 1-1/4	—
6		Screw SHC 3/8 - 16 UNC x 1-1/2	—
7		Pin Dowel 3/8 dia. x 1-1/4	—
8	031-69429	Bar - Lock Connector	1
9	358-12146	Screw SHC 1/4 - 20 UNC x 7/8 Nylok	2
10	031-69428	Shaft	1
11	671-00010	O-Ring	1
12	210-15006	Collar w/set screw	1
13	031-69431	Cover	1
14	031-69427	Bushing	1
15	306-12100	Screw HHC 1/4 - 20 UNC x 5/8	4
16	346-10016	Lockwasher 1/4 STD	4
17	031-69430	Bar - Shaft Lock	1
18	358-08060	Screw SHC #8-32 UNC x 3/8	2
19	346-10008	Lockwasher #8 STD	2
20	671-00117	O-Ring	2
21	114-13800	Switch Limit	1
22	358-10200	Screw SHC #10 - 24 UNC x 1-1/2	2
23	346-10010	Lockwasher #10 STD	2
24	031-69432	Gasket	1
25	031-69929	Guard - Safety Interlock	1
26	306-10060	Screw HHC #10-24 UNC x 3/8	2

PRESS MODEL	NO. OF INDEXING STATIONS	ROTATION	PARTS LIST
R, S, T, WR & WS	6	C. W.	S11-13160
	6	C. C. W.	S11-13161
FH, FL & FN	6	C. W.	S11-29216
	6	C. C. W.	S11-13161
R, S, T, WR & WS FH, FL & FN	12	C. W.	S11-13162
R, S, T, WR & WS FH, FL & FN	12	C. C. W.	S11-13163

ITEM	PART NO.	DESCRIPTION	QTY.
1	See Fig. 5	Housing & Cover Ass'y.	1
2	See Fig. 8	Dial & Arbor	1
3	See Fig. 6	Control Cam Follower Ass'y	1
4	See Fig. 3	Sequence Valve	1
5	S11-13171	Lock Ass'y	1
6	See Fig. 7	Push Rod Ass'y	1
7	See Fig. 10	Geneva Driver 6 Station	1
	See Fig. 11	Geneva Driver 12 Station	1
8	See Fig. 4	Fluid Motor	1
9	S11-23434	Lock and Roller Actuator	1
10	031-29480	Cap - Upper Center	1
11	031-29482	Shim Set - Upper Center Cap	1
12	031-294^3	Cap - Upper Driver	1
13	031-29484	Shim Set - Upper Driver Bearing	2
14	031-29487	Gear - Worm	1
15	031-29488	Shim Set - Worm Gear	1
16	031-29492	Guide R.H. Lock	1
17	031-29494	Guide L.H. Lock	1
17A	031-42519	Spacer - Lock Guide	1
18	031-29500	Spring - Skip Station	1
19	031-40694	Gasket - Skip Station Rod Bushing	1
20	031-29503	Bushing - Skip Station Rod	1
21	031-29505	Plate - O - Ring Valve Body	1
22	031-29506	Worm	1
23	031-42476	Spacer - Fluid Motor	1
24	031-29508	Bushing - Fluid Motor Shaft to Worm	1
25	031-29509	Key - Shaft	1
26	031-29510	Cap - Housing	1
27	031-69440	Gasket	1
29	031-40697	Cam - Skip Station (6 Station)	3
	031-40697	Cam - Skip Station (12 Station)	6
30	406-01200	Elbow - 3/4 street	1
31	409-91200	Plug - 3/4	1
32	358-14180	Screw SHC 5/16 - 18 UNC x 1-1/4	4
33	358-16200	Screw SHC 3/8-16 UNC x 1-1/2	2
34	324-22420	Pin-Dowel 3/8 x 1-1/4	2
35	358-14126	Screw SHC 5/16-18 UNC x 3/4 Nylok	6
36	325-20160	Rollpin 5/16 x 1	2
37	358-12120	Screw SHC 1/4-20 UNC x 3/4	9
38	671-00158	O-Ring	1
39	358-12080	Screw SHC 1/4 - 20 UNC x 1/2	6
40	671-00114	O-Ring	3
41	671-00155	O-Ring	1
42	358-14300	Screw SHC 5/16-18 UNC x 2-3/4	6
43	230-82035	Bearing - Needle	1
44	671-00214	O-Ring	1
45	230-82042	Bearing	1
46	350-01007	Washer - Lock	1
47	341-10007	Nut - Lock	1
48	431-90600	Plug - Drain Plug	1
49	671-00113	O-Ring	2
50	671-00232	O-Ring	1
50A	671-00230	O-Ring	1
51	358-20420	Screw SHC 1/2-13 UNC x 5-1/2	4
52	See Fig. 1	Safety Interlock	1
54	358-12140	Screw SHC 1/4-20 UNC x 7/8 (6 station)	6
	358-12140	Screw SHC 1/4-20 UNC x 7/8 (12 station)	12



NOTES:

1. THE INDEX REPEATABILITY OF THIS TABLE MUST BE MAINTAINED AT ±.001 INCHES AT 12 O'CLOCK STA
2. SHIM ALL BEARING ASSEMBLIES TO OBTAIN .001 TO .002 INCHES INTERFERENCE.
3. ADJUST DIAL HEIGHT TO OBTAIN .003 TO .006 INCHES RUNNING CLEARANCE.
4. TO ADJUST CONTROL CAM FOLLOWER, ITEM "3, ROTATE WORM, ITEM "22, UNTIL DIAL INDEXES TO MIDPOINT BETWEEN STATIONS, THEN TURN ADJUSTING SCREW UNTIL CONTACT IS MADE BETWEEN ADJUSTING SCREW & ACTUATOR PAD ON VALVE STEM, THEN BACK OFF ADJUSTING SCREW ¾ REVOLUTION.
5. FILL TABLE WITH 4.5 QUARTS OF 150 OR 200 SSU HYDRAULIC OIL & 4.5 QUARTS OF A.G.M.A. "8 COMPOUNDED OIL.
6. WORM GEAR (031-29487-X) AND WORM (031-29506-X) TO BE MOUNTED WITH 4.750 ±.002 CENTERS, BACKLASH BETWEEN WORM & WHEEL TO BE .005 MAX. @ PITCH CIRCLE OF GEAR.
7. APPLY "LOCTITE" PLASTIC GASKET, CAT. "68-31 OR EQUIVALENT, TO TOP & BOTTOM SURFACES OF UPPER CENTER CAP SHIMS, ITEM "11, AND UPPER DRIVER CAP GASKET, ITEM "27.

FIGURE 2

SEQUENCE VALVE S11-13167

ITEM	PART NO.	DESCRIPTION	QTY.
1	See Fig. 9	Knob - speed control	1
2	031-29523	Body-valve	1
3	031-29525	Sleeve	1
4	031-29526	Spool - sequence	1
5	031-29527	Spool - flow control	1
6	031-29528	Spring - flow control spool	1
7	031-29536	Cap - body	1
8	031-40837	Gasket	2
9	031-29530	Cap - sleeve	1
10	031-29529	Stem - control	1
11	031-29531	Pad - actuator	1
12	031-29532	Cap - body	1
13	031-29534	Plate - dial	1
14	350-10072	Washer - spring wave	1
16	035-20675	Orifice - 1/4 pipe plug ("A" 1/32 ida.)	1
17	035-13185	Orifice - 1/4 pipe plug (Not shown)("D" 1/8 dia. under item 30)	1
18	031-69702	Gasket	1
19	358-12200	Screw SHC 1/4 - 20 UNC x 1-1/2	2
20	358-12120	Screw SHC 1/4 - 20 UNC x 3/4	4
21	671-00222	O-ring	2
22	671-00113	O-ring	1
23	358-10060	Screw SHC #10 - 24 UNC x 3/8	4
24	671-00012	O-ring	1
25	325-08160	Roll pin - 1/8 dia. x 1	1
26	306-12080	Screw HHC 1/4 - 20 UNC x 1/2	4
28	040-00867	Locking Screw	1
30	431-90604	Plug - SOC pipe 3/8 flush	4
31	431-90404	Plug - SOC pipe 1/4	4
32	431-90204	Plug - SOC pipe 1/8	3
33	325-20160	Roll pin 5/16 dia. x 1	2

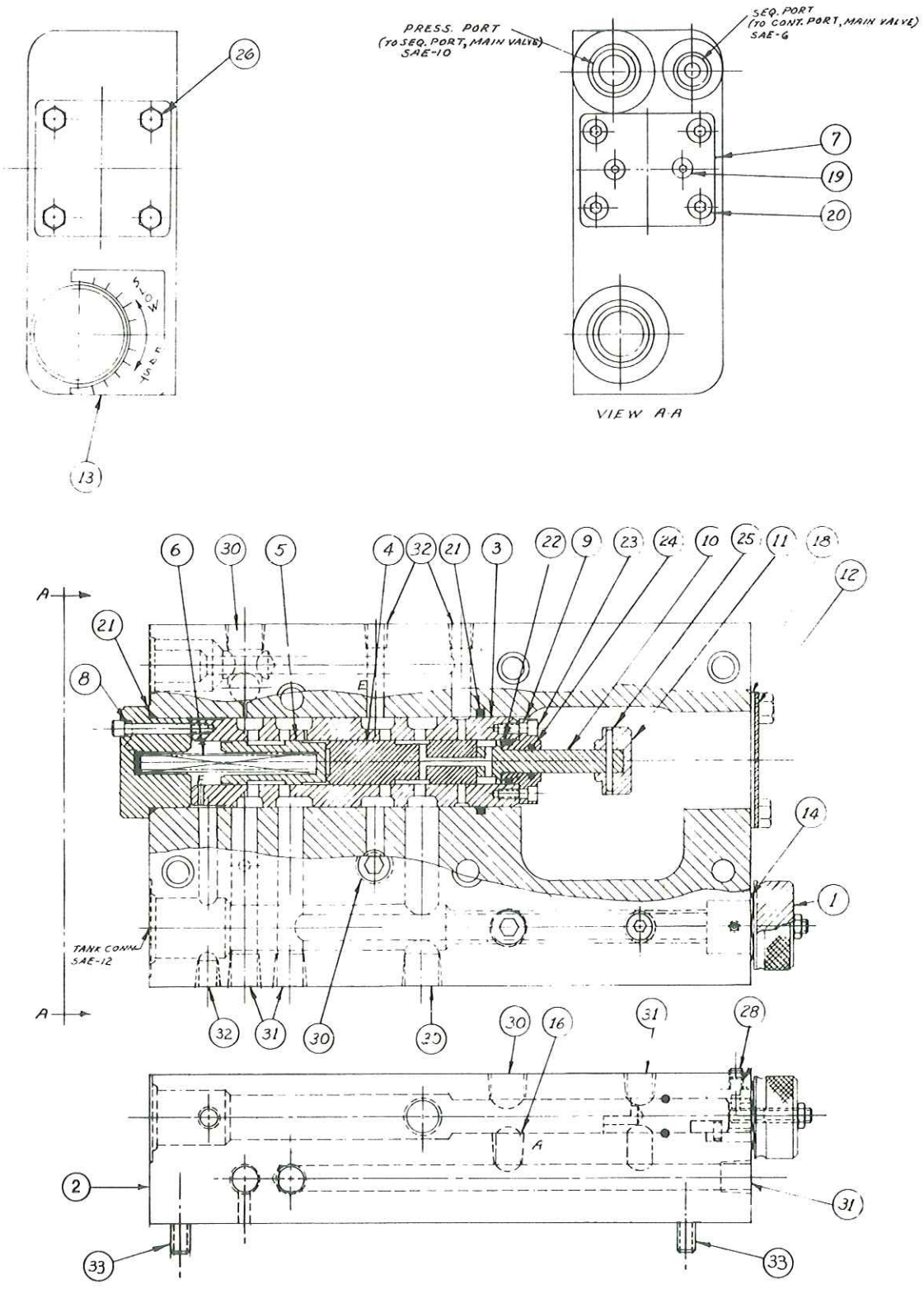
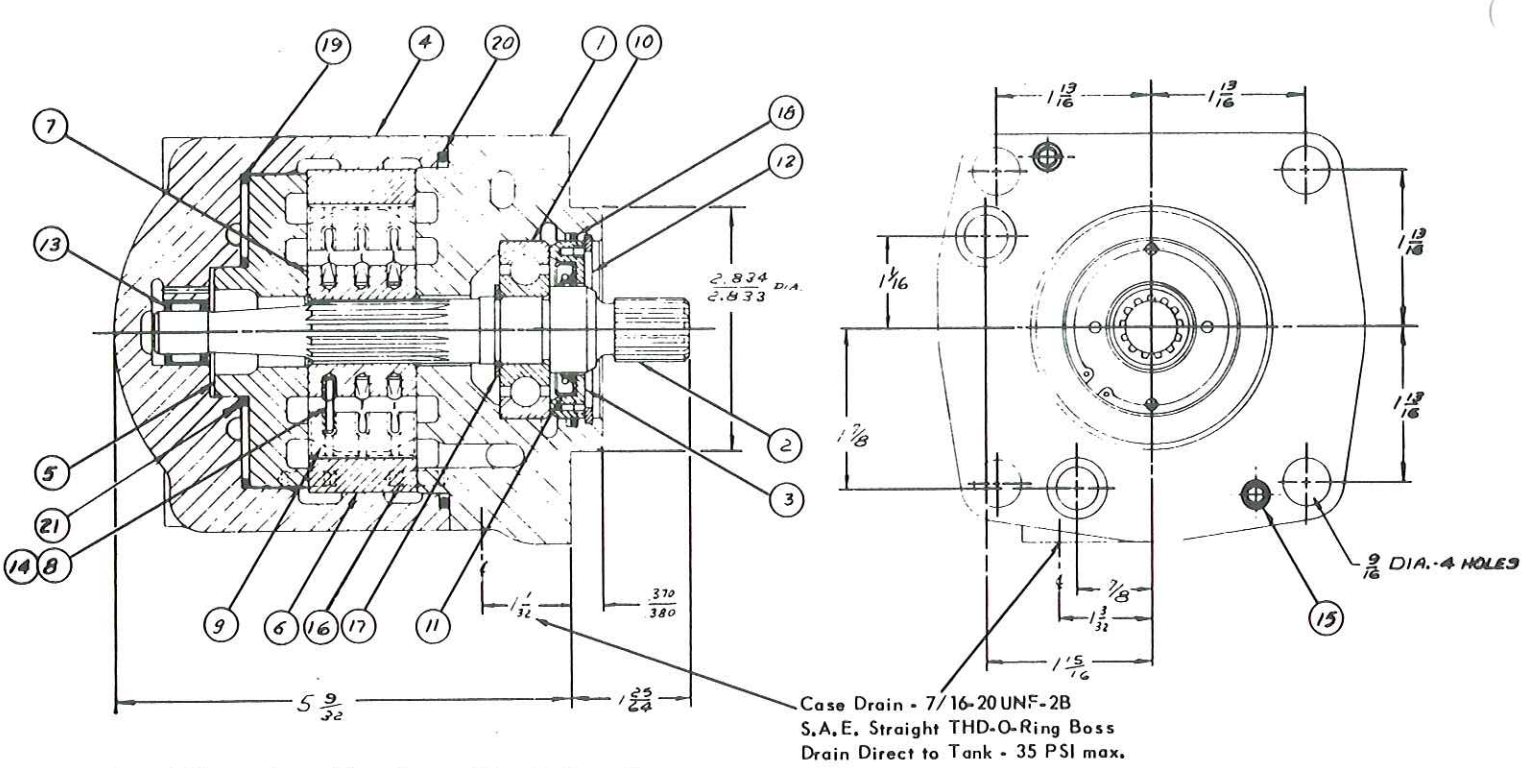


FIGURE 3

SUB-ASSEMBLY — VALVE, SEQUENCE
INDEX TABLE



Dowel Pins - item 16 - shown 45° out of position.

FIGURE 4

FLUID MOTOR

	ITEM	PART NO.	DESCRIPTION	MICQ-00Y-1YR 011-16158	MICQ-00Y-1YL 011-16159	MICQ-00K-1YR 011-27882
				QUANTITY		
	1	031-29537	Cap-Mounting	1	1	1
	2	031-29538	Shaft	1	1	1
	3	031-29539	Seal-Retainer	1	1	1
	4	031-43410	Housing	1	1	1
	5	031-43411	Plate-Port	1	1	1
●	6	031-27262	Ring-Cam	1	1	
■		034-27277				1
●■	7	031-27256	Rotor	1	1	1
●■	8	031-41676	Spring-Vane	30	30	30
●■	9	031-27257	Vane	10	10	10
	10	230-03304	Bearing-Ball	1	1	1
*	11	620-82012	Seal-Shaft	1	1	1
	12	356-30206	Ring Snap-Internal	1	1	1
	13	230-82036	Bearing-Needle	1	1	1
●■	14	031-40687	Guide-Spring	30	30	30
	15	358-14220	Screw SHC 5/16-18 x 1-3/4	2	2	2
	16	324-21208	Pin-Dowel 3/16 x 1/2	2	2	2
	17	356-31078	Ring Snap External	1	1	1
*	18	691-10137	Seal Sq. Section	1	1	1
*	19	691-10153	Seal Sq. Section	1	1	1
*	20	691-10240	Seal Sq. Section	1	1	1
*	21	691-10128	Seal Sq. Section	1	1	1
●		S14-06691	Pumping Cartridge	1	1	
■		S14-06992	Pumping Cartridge			1
*		S11-25579	Seal Kit RK-084	1	1	1

ASSEMBLY PROCEDURE FOR MICQ-OOY-1YR, M1CQ-00Y-1YL AND MICQ-00K-1YR VANE MOTOR

Cleanliness

The proper functioning and performance of these units requires that a close tolerance and minimum running clearance exist in the pumping cartridge components. It is mandatory that all parts be cleaned thoroughly with solvent and compressed air and then assembled on an absolutely clean bench, free from any grit, chips, or foreign material. This bench should not be used as a work bench for any other purpose.

Handling Parts

It is imperative that the vanes (9), cam ring (6), rotor (7), and wear faces of the port plate (5) and the mouting cap (1) be properly protected until such time as they are assembled in the motors. It is recommended that partitioned boxes be used for transporting and storing these parts.

ASSEMBLY

1. Press bearing (13) into housing (4) with stamped end of bearing against the shoulder of the pressing tool so that it is 1/32" below face.
2. Press ballbearing (10) on shaft (2) to shoulder and then install retaining ring (17) to hold bearing in place. Install bearing and shaft assembly into mounting cap (1) from pilot end of motor and bottom in bearing bore.
3. Press shaft seal (11) into seal retainer (3).

NOTE

"Open" face of seal must be toward installation tool.

CAUTION

Special care must be taken to keep foreign matter from sealing lips of seal to prevent cuts or abrasion of these edges.

4. Install "O" Ring (18) in mounting cap (1). (Place heavy grease on "O" Ring seal.)
5. Completely fill space between seal lips with high temperature grease. Install seal retaining assembly in mounting cap (1) against bearing (10).
6. Insert retaining ring (12) in groove against seal retainer assembly.

CAUTION

Retaining Ring [12] must be fully seated in groove.

7. Install "O" Rings (19) in housing (4). (Place heavy grease on "O" Ring.)
8. Install "O" Ring (21) over port plate (5). (Place heavy grease on "O" Ring.) Insert port plate (5) into housing (4), using care not to damage the "O" Rings. Align arrow in port between dowel pin slots with mark on outside of housing (4).
9. Lay rotor (7) face down on a clean flat surface. Install springs (8) and Spring Guides (14) in the openings provided in the base of the rotor slots and place the vanes (9) carefully over these springs and partially in rotor slots.
10. Place ring compressor or hose clamps around rotor (7) and vanes (9). Draw up to compress vanes in slots. Carefully insert this assembly in cam ring (6) using a backup plate to prevent the vanes from sliding endwise in the slots and damaging the springs. If the vanes slide endwise, inspect and replace any damaged springs.

CAUTION

Be certain that the assembly is inserted far enough in cam ring so that when the compressor is removed, the vanes do not fly out of position.

11. Place dowel pin (16) in port plate (5), engaging dowel pin hole nearest arrow indicating desired shaft rotation.
12. Insert cartridge assembly into housing (4) and against port plate (5) with model number and arrow facing out — indicating shaft rotation corresponding to direction of arrow selected in port plate (5).

NOTE

To reverse rotation, this cartridge has to be inverted 180° and rotated to match with arrows as outlined above.

13. Insert dowel pin (16) in hole provided in cam ring. Install "O" Ring (20) against shoulder on mounting cap (1). (Place heavy grease on "O" Ring seal.)
14. Assemble mounting cap (1) to housing aligning mark on mounting cap (1) with arrow on outside of housing (4). Be sure to engage dowel pin in cartridge with dowel pin hole in mounting cap (1). It may be necessary to rotate the cartridge to engage dowel pin and align mark on mounting cap (1) with mark on housing (4) located near drain port. Care should be taken to avoid cutting "O" Ring (20).
15. Attach mounting cap (1) to housing (4) with screws (15). Tighten securely and evenly 12 to 15 lbs. torque, being careful not to cock any internal parts.

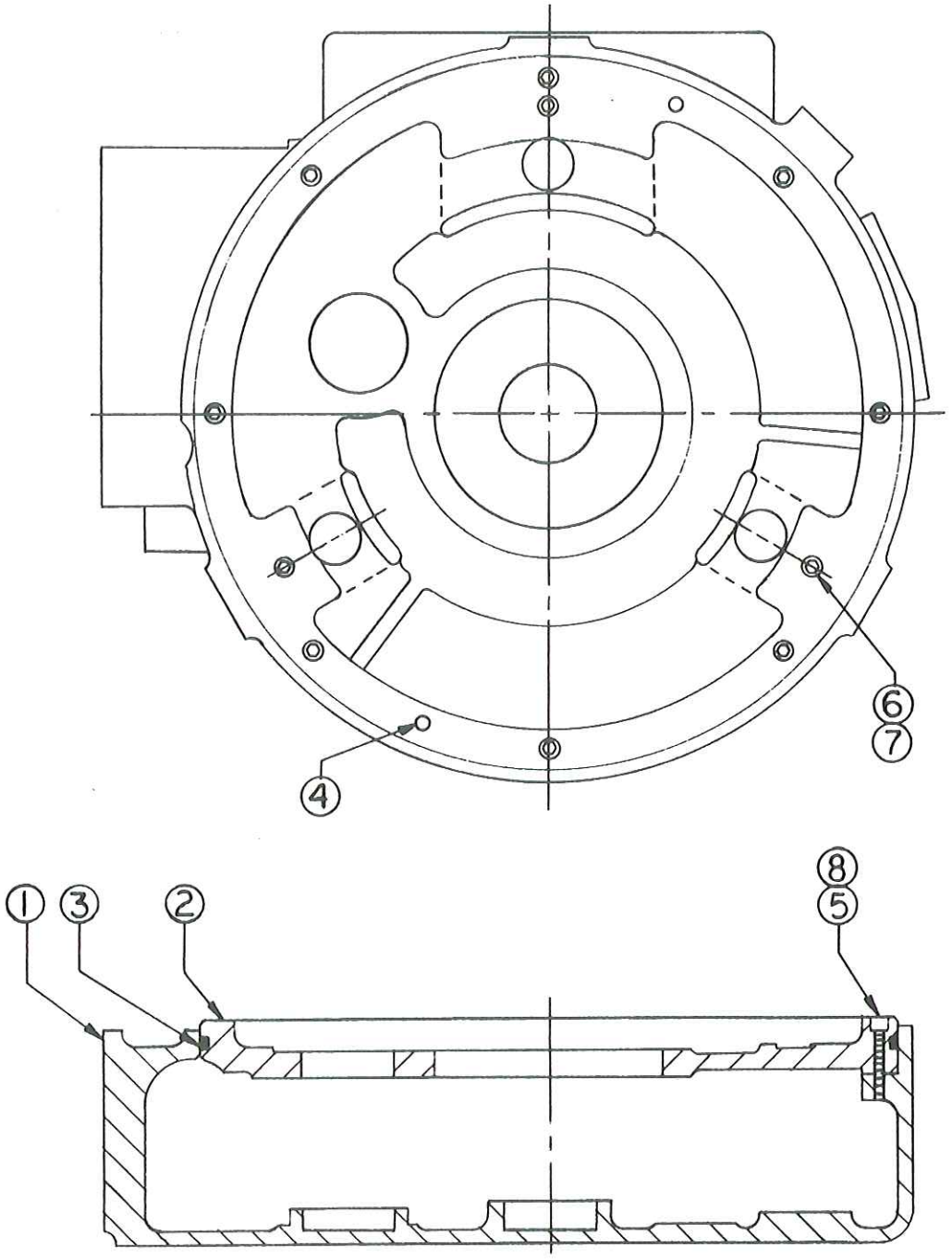


FIGURE 5

HOUSING & COVER ASS'Y
S11-13164

ITEM	PART NO.	DESCRIPTION	QTY.
1	031-29512	Housing	1
2	031-29514	Cover	1
3	031-29478	O-RIng	1
4	324-22420	PIn-Dowell 3/8 dia. x 1-1/4	2
5	358-14220	Screw - SHC 5/16-18 UNC x 1-3/4	8
6	358-16120	Screw - SHC 3/8-16 UNC x 3/4	3
7	035-22731	Gasket - Copper	3
8	031-22728	Washer - Copper	8

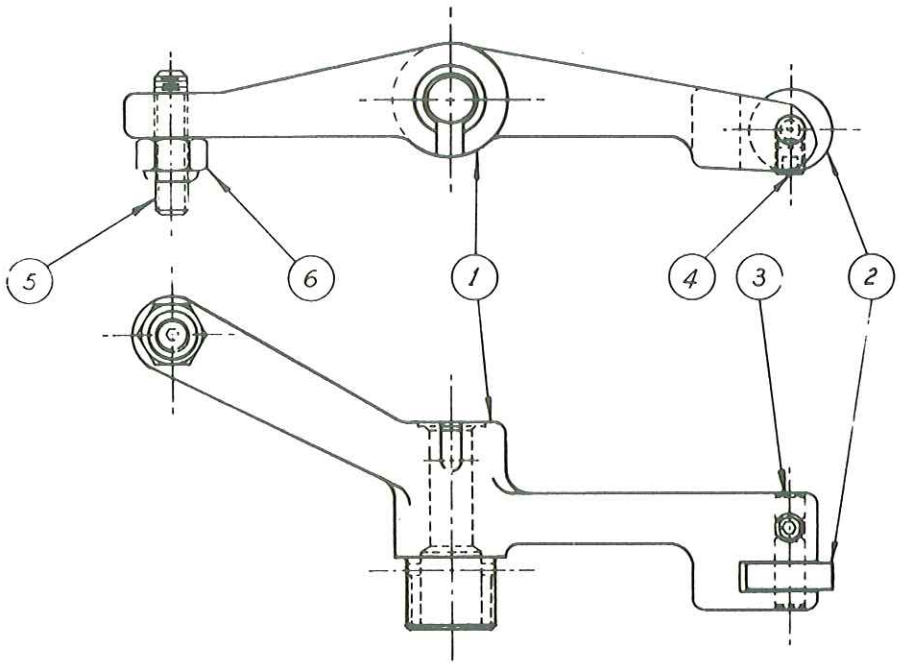


FIGURE 6

CONTROL CAM FOLLOWER ARM SUB-ASSEMBLY S11-13166

Item	Part No.	Description	Qty
1	031-29497	ARM—Control Cam Follower	1
2	031-29499	ROLLER—Control Cam Follower	1
3	031-40695	PIN—Control Cam Follower Roller	1
4	311-10060	SCREW—Soc. Set, Cup Pt. #10—24 x 3/8"	1
5	312-15222	SCREW—Soc. Set, Flat Pt. 3/8"—24 x 1-3/4"	1
6	331-15000	NUT—Elastic Stop 3/8"—24	1

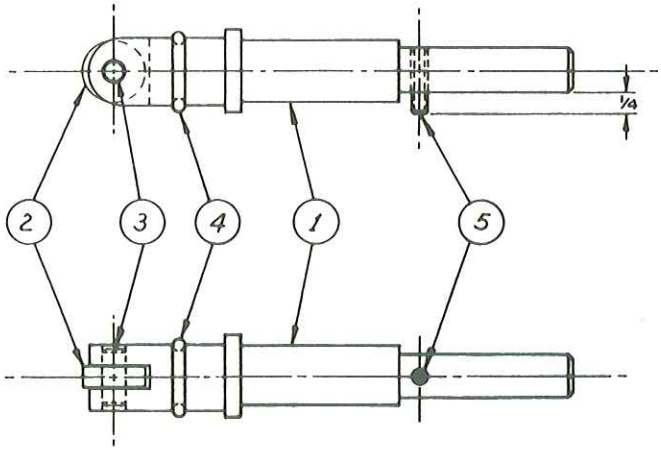


FIGURE 7

PUSH ROD SUB-ASSEMBLY S11-13491

Item	Part No.	Description	Qty
1	031-29501	ROD—Skip Station Push	1
2	031-29502	ROLLER—Skip Station Cam	1
3	324-21610	PIN—Dowel 1/4" dia. x 5/8"	1
4	671-00113	"O"RING	1
5	325-12120	PIN—Roll 3/16" dia. x 3/4"	1

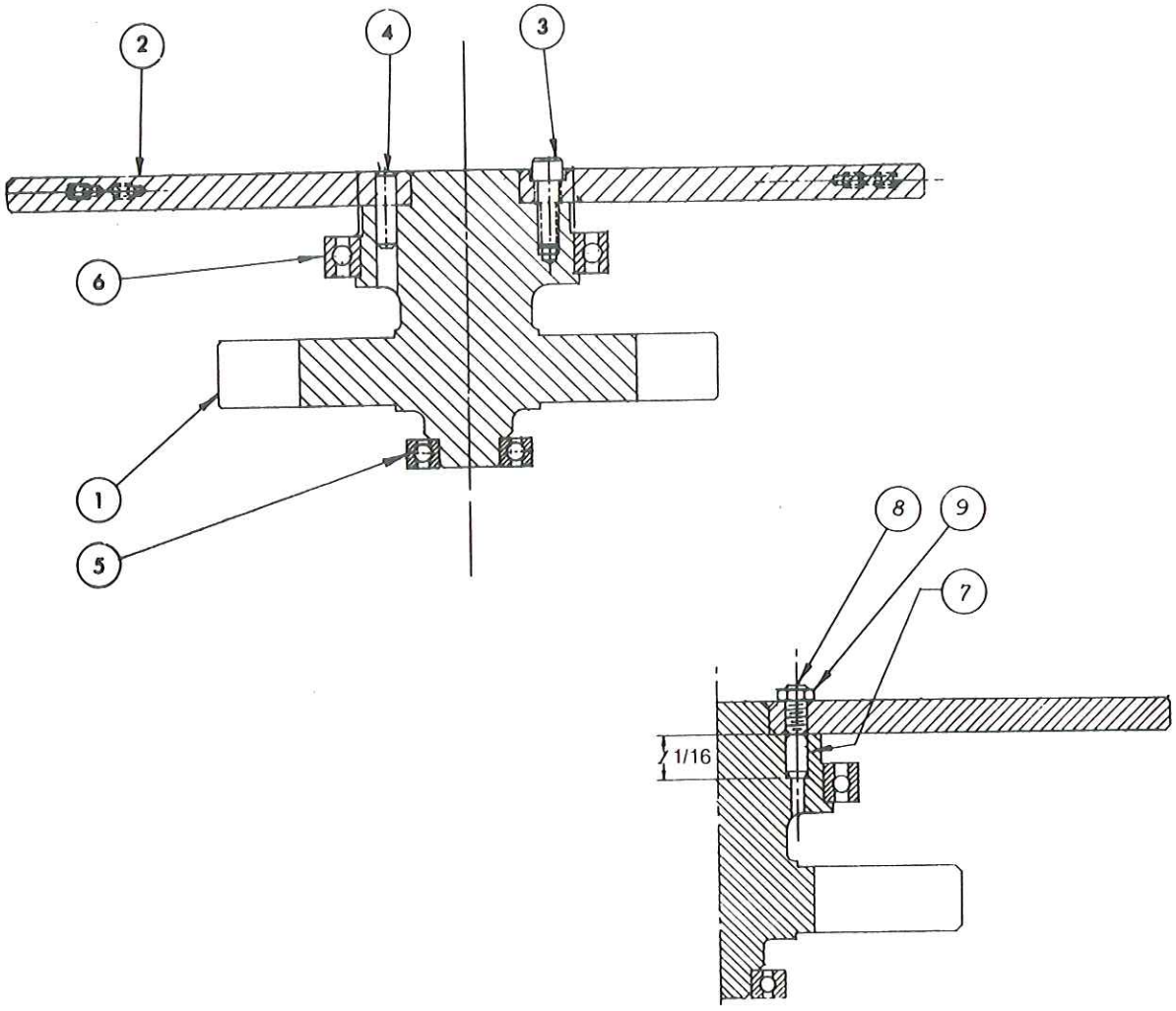


FIGURE 8

Item	Part No.	Description	Qty
1	031-29516	ARBOR—6 Station	1
	031-40926	ARBOR—12 Station	1
2	031-29518	DIAL	1
3	358-20180	SCREW—Socket head Cap 1/2"—13 UNC x 1-1/4"	3
4	324-23228	PIN—Dowel	3
5	230-00207	BEARING—Ball	1
6	230-82033	BEARING—Ball	1
7	324-23216	PIN—Dowel	3
8	311-20184	SCREW—Socket Set Half Dog Point 1/2"—13 UNC x 1-1/4"	3
9	335-20100	NUT—Hex 1/2"—13 UNC	3

DIAL & ARBOR ASSEMBLY
S11-13165 6 Station
S11-13556 12 Station

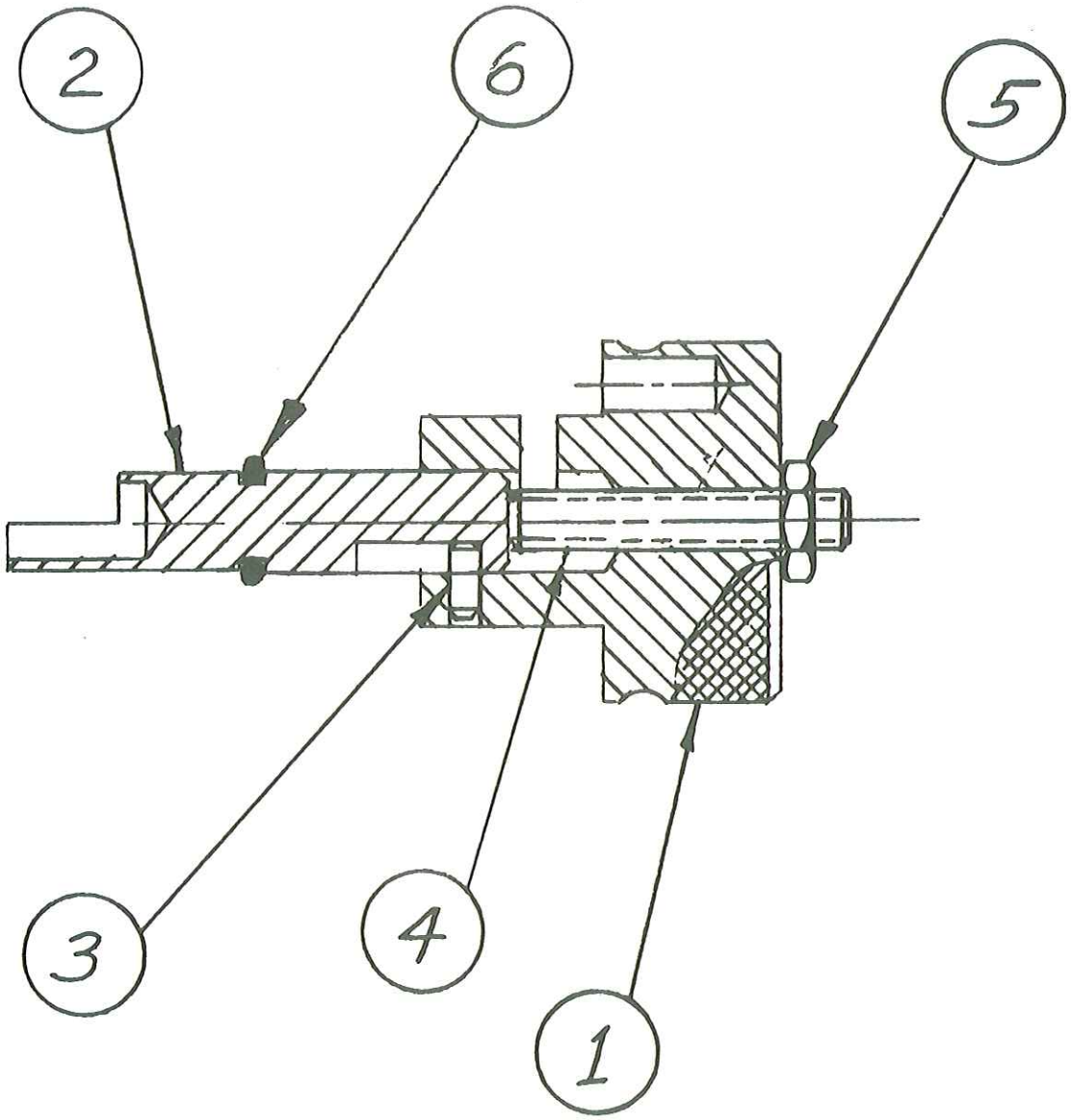


FIGURE 9

Item	Part No.	Description	Qty.
1	031-40838	KNOB	1
2	031-40839	STEM	1
3	325-08060	ROLL PIN	1
4	311-12182	SCREW—Soc. Set Flat Pt. 1/4"—20 UNC x 1-1/4"	1
5	335-12100	NUT—Hex 1/4"—20 UNC	1
6	671-00011	"O" RING	1

KNOB — SPEED CONTROL
S11-13538

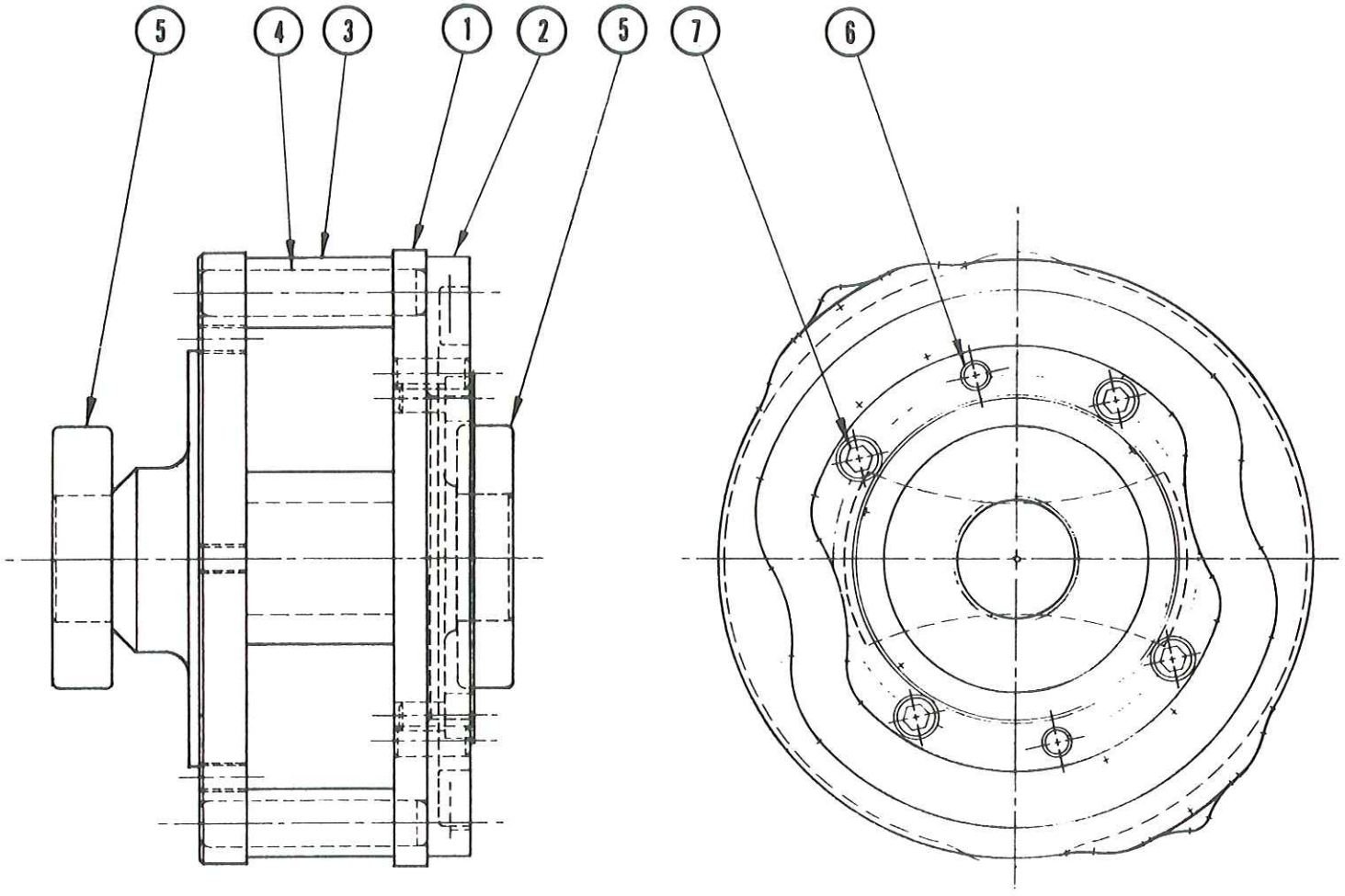


FIGURE 10

GENEVA DRIVER 6 STATION

ITEM	PART NO.	DESCRIPTION	QTY. S11-13492 R,S,T,WR,WS	QTY. S11-29215 FH,FL,FN
1	031-29485	Driver - Geneva	1	1
2	031-29491	Cam - Control	1	
	031-69559			1
3	031-29489	Roller - Geneva Drive	2	2
4	031-29490	Pin - Geneva Drive	2	2
5	230-00207	Bearing - Ball	2	2
6	325-20120	Roll Pin	2	2
7	358-14086	Screw SHC 5/16-18 UNC x 1/2	4	4

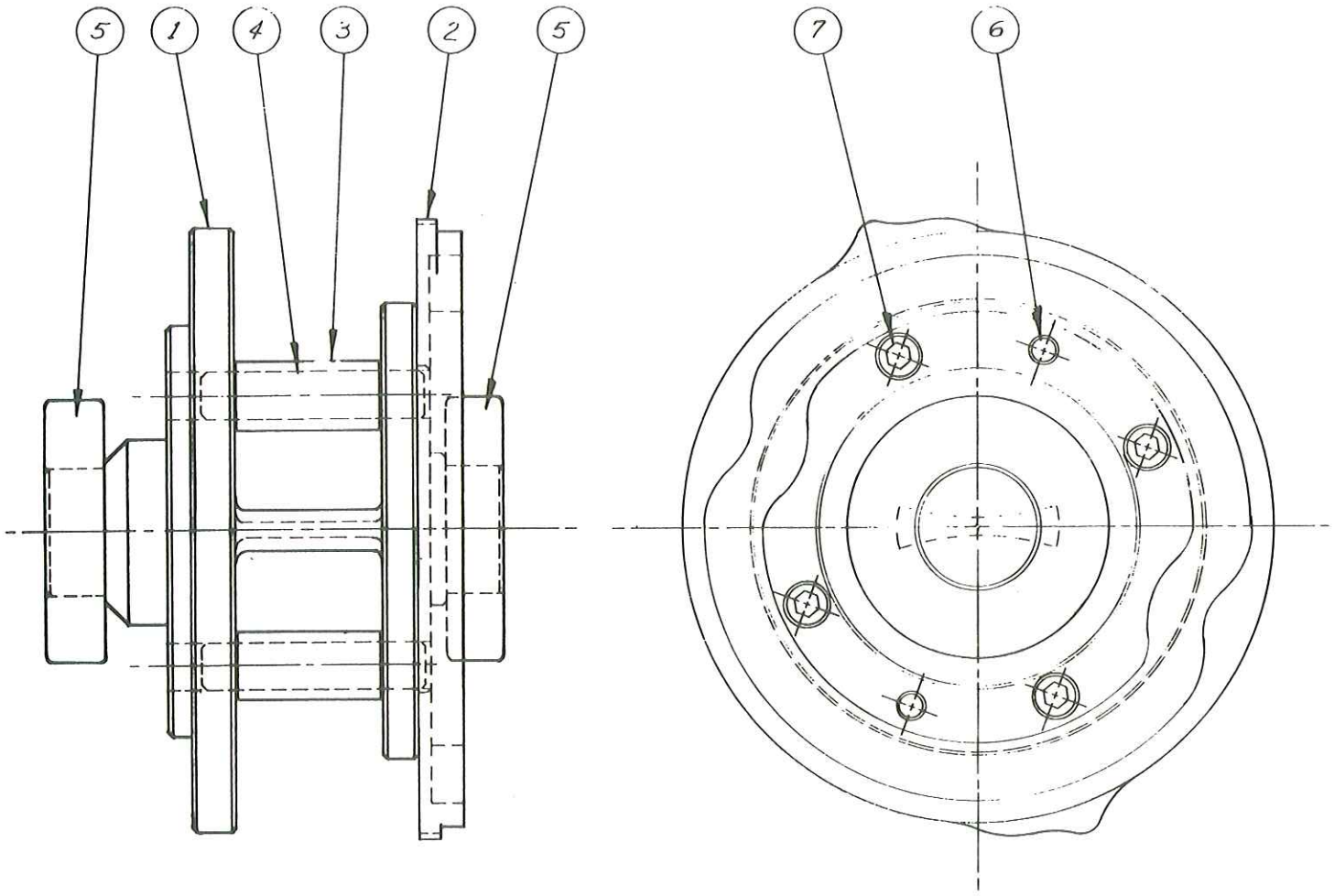
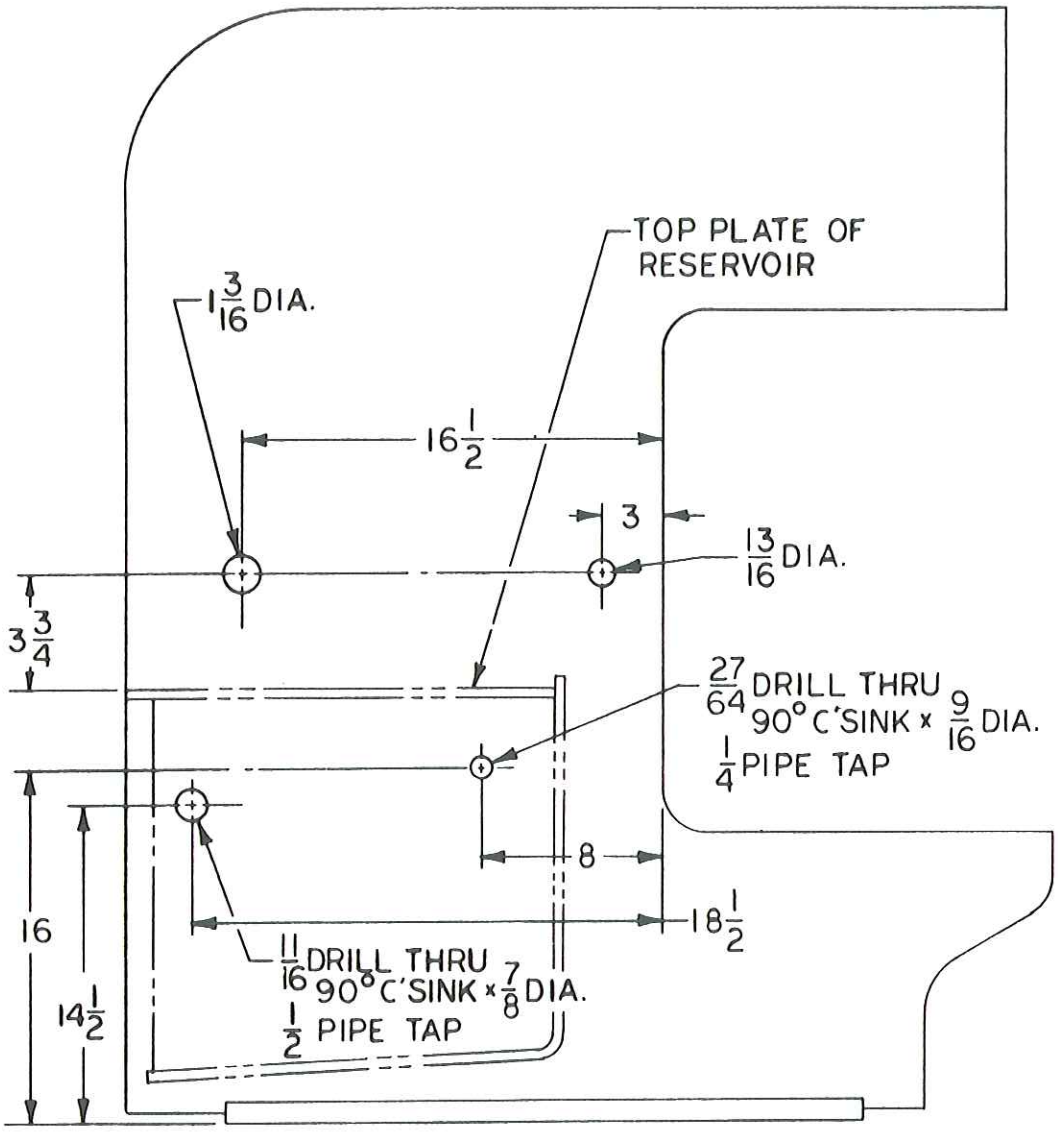


FIGURE 11

Item	Part No.	Description	Qty.
1	031-40923	DRIVER—Geneva	1
2	031-40924	CAM—Control C.W. Rotation	1
	031-40925	CAM—Control C.C.W.Rotation	1
3	031-29489	ROLLER—Geneva Drive	2
4	031-29490	PIN—Geneva Drive	2
5	230-00207	BEARING—Ball	2
6	325-20120	ROLL PIN	2
7	358-14086	SCREW-Socket Head Cap 5/16"—18 UNC x 1/2"	4

GENEVA DRIVER 12 STATION
S11-13554 C.W. ROTATION
S11-13555 C.C.W.ROTATION



Rework of "R," "S," or "T," Series Presses for adaption to 100 Series Index Table

(If holes are already in Frame, Rework is not necessary)

FIGURE 12

NOTES

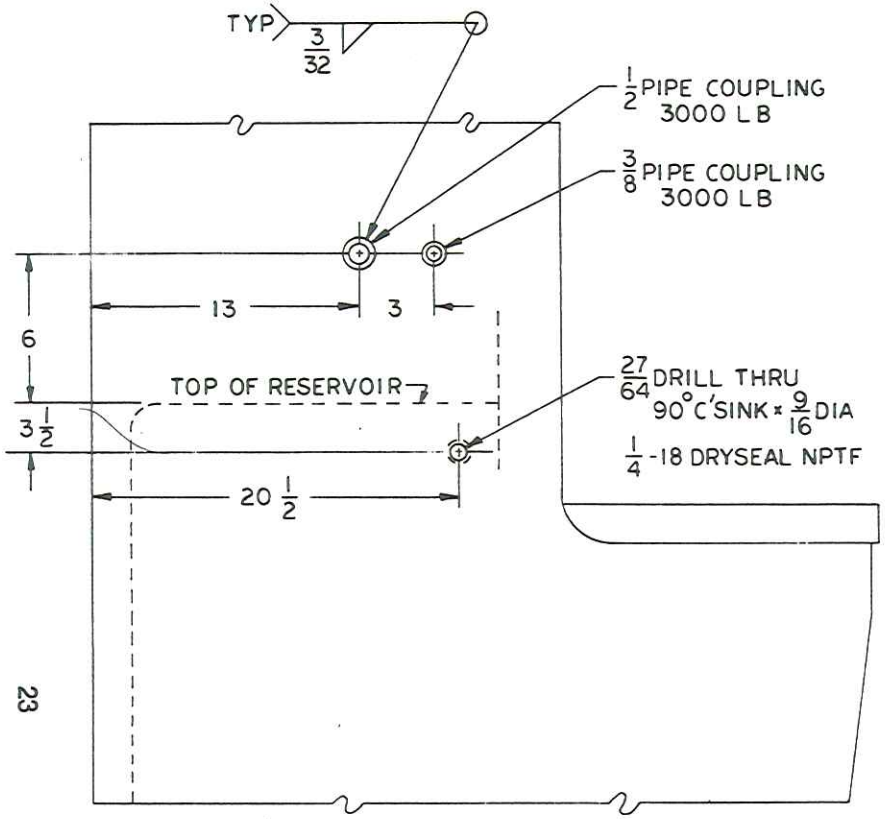
1. Drain Reservoir before drilling any holes in frame. (Note that the two (2) tapped holes are below the top plate of reservoir)

2. After drilling and tapping holes in side of frame, clean the inside of Reservoir.

CAUTION

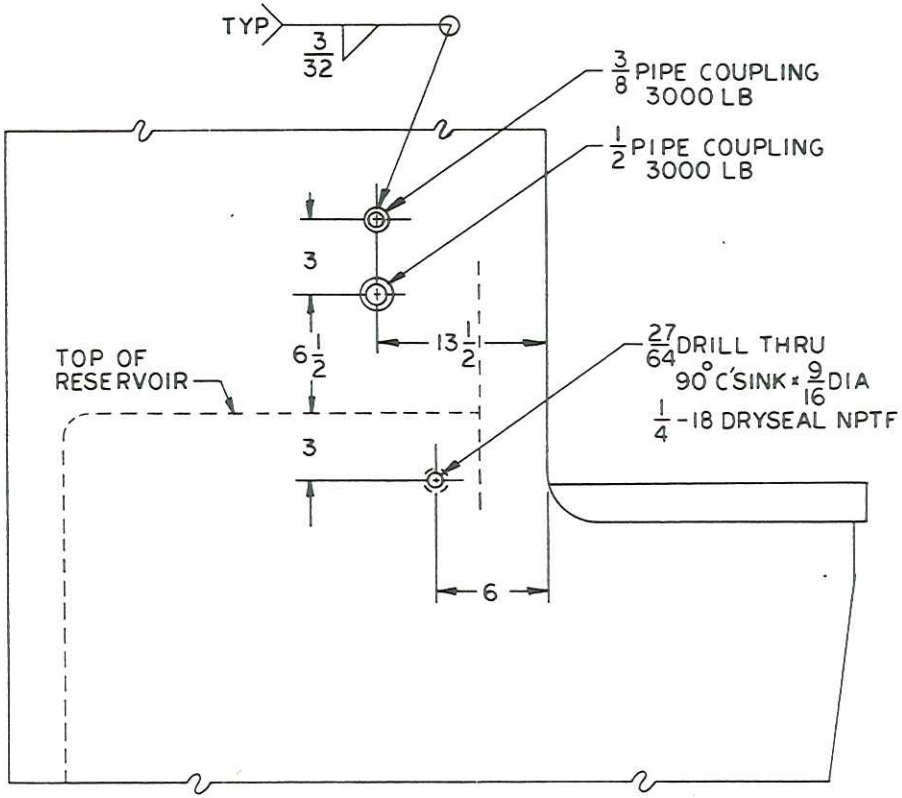
Clean Reservoir carefully to remove all metal chips and foreign material. If Reservoir is not cleaned carefully, damage may occur to the pump and relief valve.

3. **Be sure** to Refill Reservoir.



FH20 PRESS

FIGURE 13



FL35 & FN50 PRESS

FIGURE 14

REWORK PRESS FOR ADAPTION TO 100 SERIES INDEX TABLE

NOTES

1. Drain Reservoir before drilling any holes in frame. (Note that the one (1) tapped hole is below the top plate of reservoir).

2. After drilling and tapping holes in side of frame, clean the inside of Reservoir.

   CAUTION

   Clean Reservoir carefully to remove all metal chips and foreign material. If Reservoir is not cleaned carefully, damage may occur to the pump and relief valve.

3. **Be sure** to Refill Reservoir.

4. Couplings to extend 1/4" on outside of press frame.

5. Do not distort couplings.

ADAPTION ASSEMBLY
INDEX TABLE TO PRESS

Item	Part No.	Description	R & WR PRESSES S11-16796 Qty.	S & WS PRESSES S11-16795 Qty.	T PRESSES S11-16794 Qty.
1	S11-16739	CYLINDER HEAD RELIEF VALVE	1	—	—
	S11-18455		—	1	—
	S11-18456		—	—	1
2	031-29466	PLATE MOUNTING	1	1	—
	031-29467		—	—	1
3	031-29469	HOSE ASSEMBLY (Tank Line)	1	1	—
	031-29470		—	—	1
4	031-29471	HOSE ASSEMBLY (Fluid Motor Drain Line)	1	1	—
	031-29472		—	—	1
5	031-44416	HOSE ASSEMBLY (Sequence Line)	1	—	—
	031-44417		—	1	1
6	031-29475	HOSE ASSEMBLY (Sequence Line)	1	1	—
	031-29476		—	—	1
7	470-10604	MALE CONNECTOR	1	1	1
8	031-41054	HOSE ASSEMBLY (Control Port Line)	2	2	2
9	493-15000	CONNECTOR—Straight Thread	1	1	1
10	513-25608	VALVE—Check (No Longer Used)	1	1	1
11	406-00800	90° STREET ELBOW	1	1	1
12	494-15001	ELBOW—Straight Thread	1	1	1
13	473-10404	ELBOW—Male	1	1	1
14	426-30800	90° STREET ELBOW	1	1	1
15	473-10808	ELBOW—Male	1	1	1
16	492-15001	ELBOW—Male	2	2	2
17	493-15001	CONNECTOR—Straight Thread	1	1	1
18	486-15067	ADAPTOR—Bulkhead	1	1	1
* 19	016-01120	VALVE—Relief Model RV10	1	1	1
20	442-08070	NIPPLE 1/2" x 1-3/4"	1	1	1
21	473-10604	ELBOW—Male	2	2	2
22	493-15002	CONNECTOR—Straight Thread	1	1	1
23	486-15066	ADAPTOR—Bulkhead	1	1	1
24	306-20180	SCREW—Hex Head Cap 1/2"—13 UNC x 1-1/2"	2	2	4
25	316-20200	SCREW—Flat Head 1/2"—13 UNC x 1-1/2"	2	2	4
26	306-20240	SCREW—Hex Head Cap 1/2"—13 UNC x 2" Lg.	1	1	—
27	513-25004	VALVE—Check	1	1	1
28	426-30400	90° STREET ELBOW	1	1	1
29	442-04060	NIPPLE 1/4" x 1-1/2"	1	1	1
30	473-11208	ELBOW—Male	1	1	1
31	803-12049	TUBING	20"	23"	23"
32	606-25004	GROMMET	1	1	1

* SEE SERVICE BULLETIN SVR-3

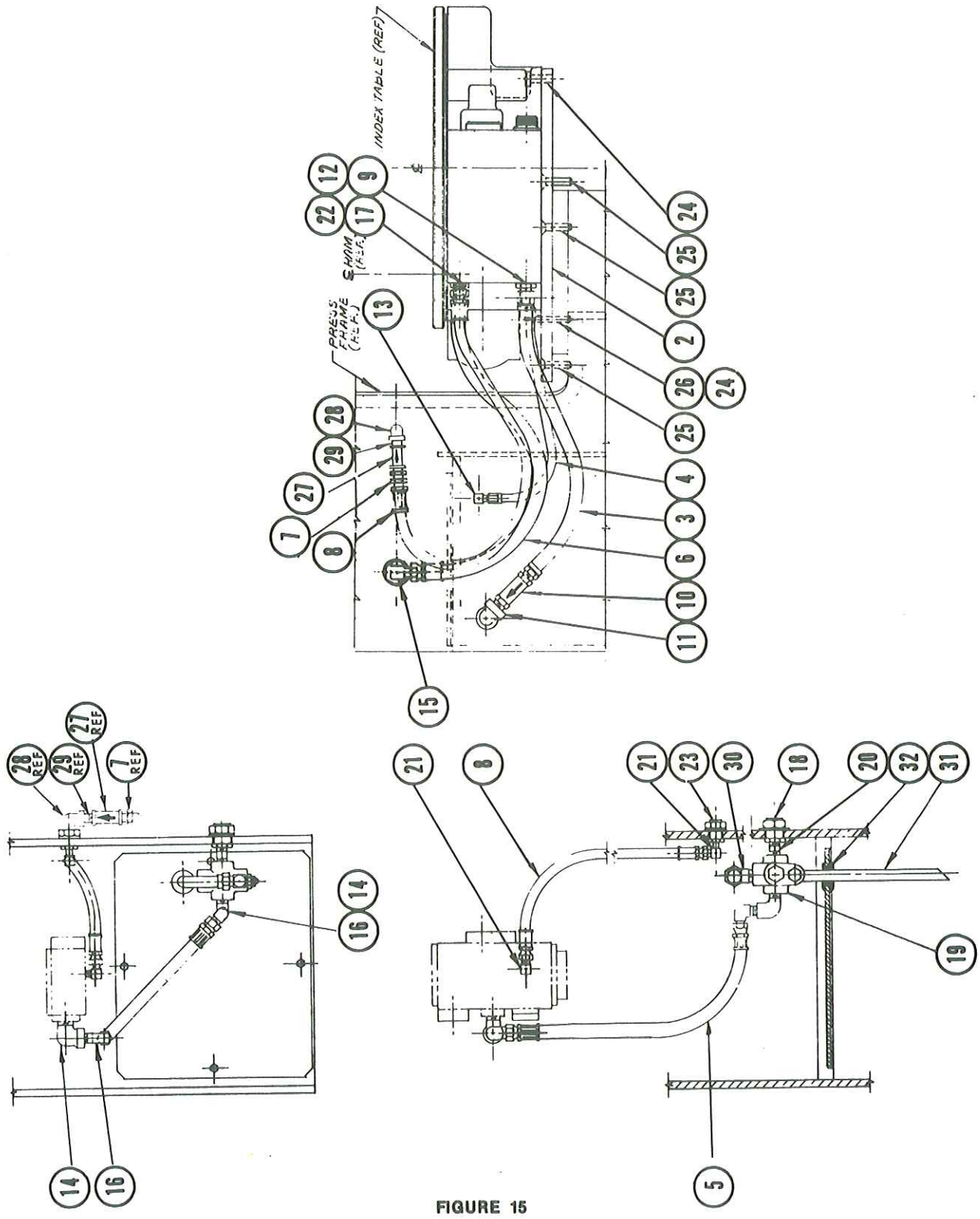


FIGURE 15

ADAPTION ASSEMBLY
INDEX TABLE TO PRESS
R, S, T, WR & WS PRESSES

MODEL C-235A FOR R & WR PRESSES
C-237A FOR S & WS PRESSES
C-255A FOR T PRESSES

PARTS LIST
ADAPTION ASSEMBLY CYLINDER HEAD RELIEF VALVE

	Item	Part No.	Description	ASSEMBLY S11-16735 MODEL NO. C-235A Qty.	S11-18455 C-237A Qty.	S11-18456 C-255A Qty.
*	1	016-09025	VALVE—Relief (R2V12-333)	1	1	1
	2	031-45486	HOSE	1	1	1
	3	424-20800	ELBOW—Pipe 1/2" x 90°	1	1	1
	4	426-30800	ELBOW—Pipe St. 1/2" x 90°	1	1	1
	5	486-15017	ADAPTOR—tube 90° Ell	1	1	1
	6	220-10001	CLAMP—Hose	1	1	—
	7	358-16200	SCREW—S.H.C. 3/8"—16 UNC x 1-1/2" Lg.	4	4	4
	8	306-16120	SCREW—Hex Head 3/8"—16 UNC x 3/4" Lg.	1	1	—
	9	442-08180	NIPPLE—Pipe 1/2" x 4-1/2" Lg.	1	—	—
		442-08220	NIPPLE—Pipe 1/2" x 5-1/2" Lg.	—	1	1
	10	442-08320	NIPPLE—Pipe 1/2" x 8 Lg.	1	—	—
		442-08460	NIPPLE—Pipe 1/2" x 11-1/2" Lg.	—	1	1

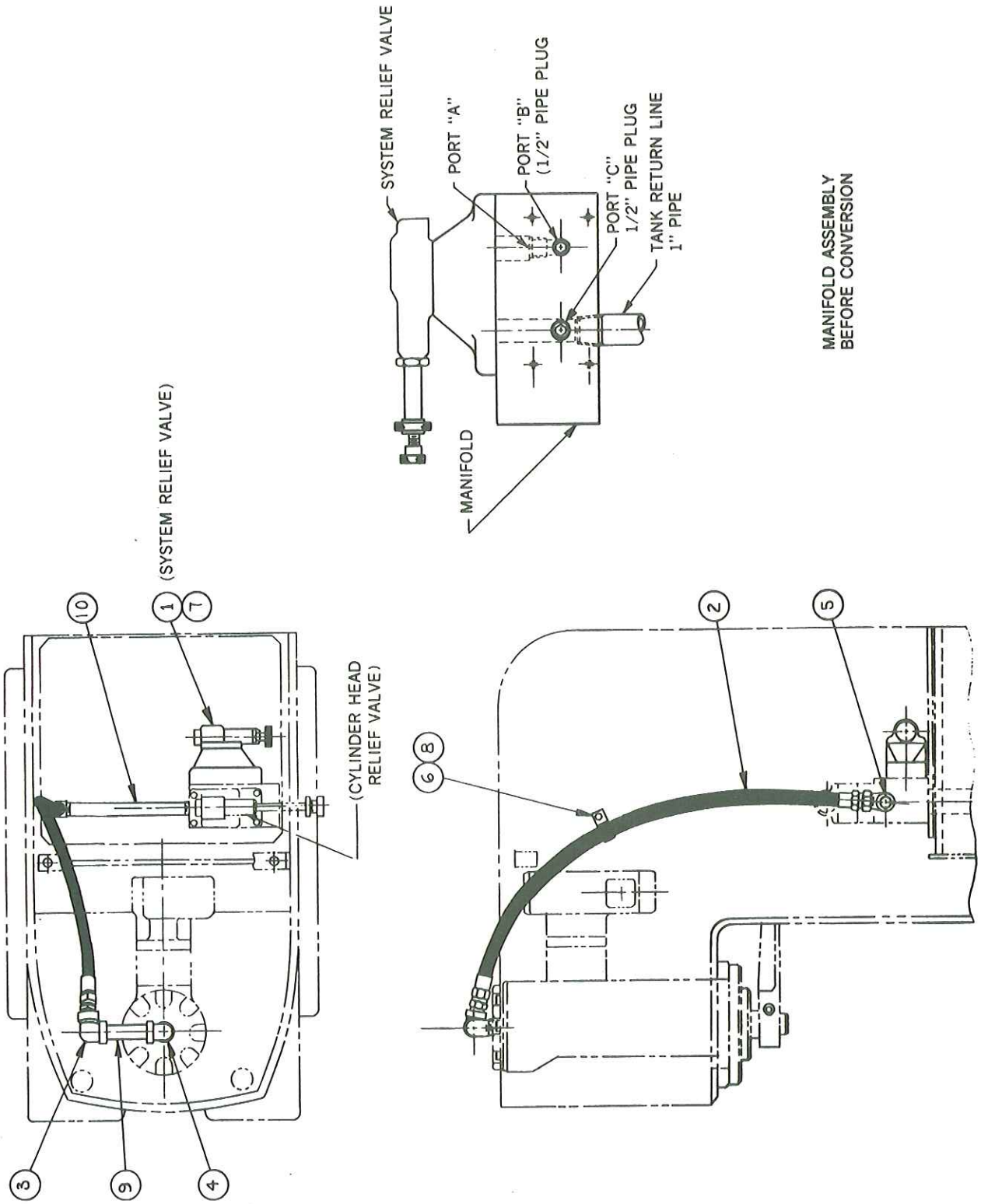
* SEE SERVICE BULLETIN SVR-4

MANIFOLD CONVERSION PROCEDURE FOR CYLINDER HEAD RELIEF VALVE ADAPTATION

1. Remove 1/2" pipe plugs from ports "B" and "C" of manifold. Remove system relief valve from manifold and plug port "A" with 1/2" pipe plug. Reinstall relief valve to original mounting position. (This valve will now be used for cylinder head relief valve.)

2. Clean the side mounting surface of the manifold to accept valve mounting. Install relief valve item 1 to side of the manifold with screws item 7.

3. Install items 2, 3, 4, 5, 6, 8, 9 and 10. Press is now adapted for cylinder head relief valve.



ADAPTION ASSEMBLY
CYLINDER HEAD RELIEF VALVE

FIGURE 16

ADAPTION ASSEMBLY INDEX TABLE TO PRESS FH-20 WITH C309SSI OR C409SSI CONTROL VALVE S12-25967

ITEM	PART NO.	DESCRIPTION	QTY.
1	473-10808	Elbow - male	1
2	426-30600	Elbow - street 3/8	1
3	473-10404	Elbow - male	1
4	406-00800	Elbow - street 1/2	1
5	306-20180	Screw HHC 1/2 - 13 x 1-1/4	4
6	316-26200	Screw - flat head allen 3/4-10 x 1-1/2	4
7	413-91608	Bushing 1 to 1/2	1
8	513-25608	Valve - check (No Longer Used)	1
9	031-29470	Hose - tank	1
10	031-29472	Hose - drain	1
11	031-41054	Hose - control port	1
12	031-29476	Hose - sequence	1
13	031-29468	Plate - mounting	1
14	493-15001	Fitting	1
15	493-15002	Fitting	1
16	494-15001	Fitting	1
17	493-15000	Fitting	1
18	513-25004	Valve - 1/4 in-line check	1
19	442-04060	Nipple - 1/4 x 1-1/2	1
20	470-10604	Fitting	1
21	433-90604	Bushing 3/8 to 1/4	1
22	031-43641	Rework - frame (Fig. 13)	1
* 23	016-01119	Valve model RV-20	1
24	441-12013	Nipple 3/4 x close	1
25	470-35015	Connector - male	1
26	032-69046	Hose - sequence	2
27	473-11008	Elbow - male	1
28	473-10804	Elbow - male	1
29	032-69047	Hose - control port	1
30	473-10806	Elbow - male	1
31	416-01200	Tee - 3/4	1
32	S12-25989	Cylinder head relief valve assy. (see Fig. 18)	1
33	473-15019	Elbow - male	1

*SEE SERVICE BULLETIN SVR-3

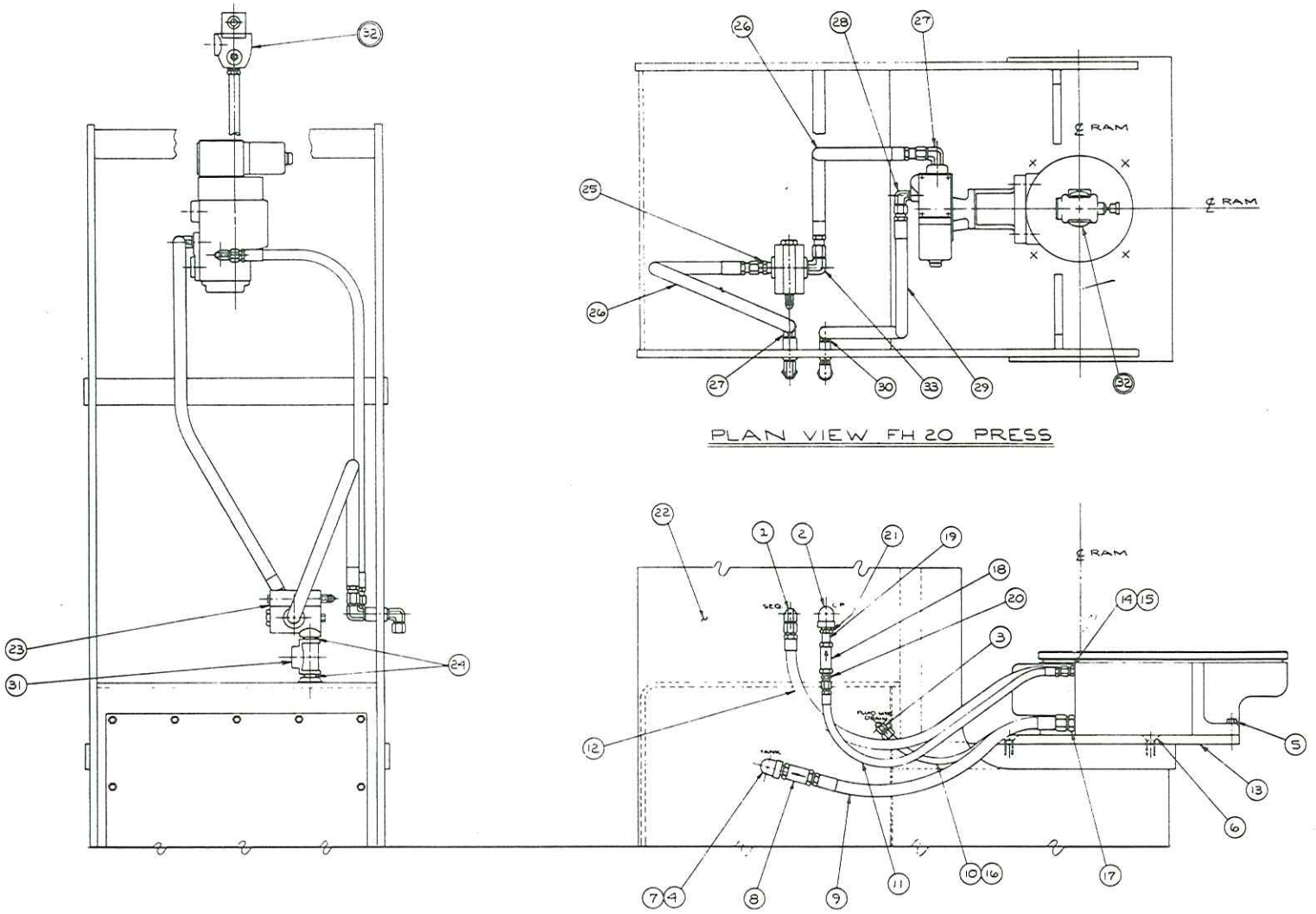


FIGURE 17

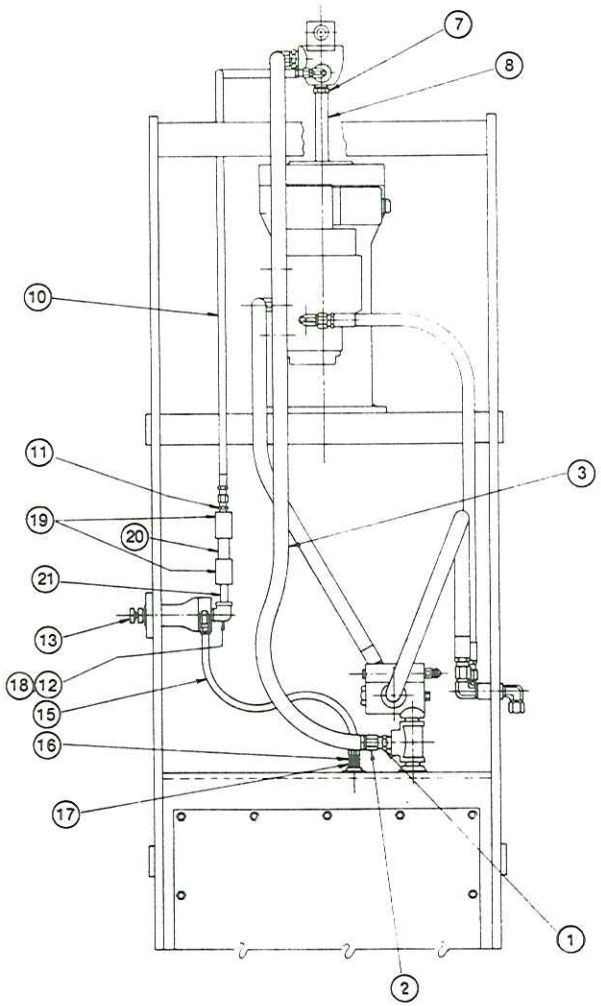
ADAPTION ASSEMBLY
INDEX TABLE TO PRESS
FH20 W/C309SSI OR C369SSI
CONTROL VALVE

CYLINDER HEAD RELIEF VALVE ASSEMBLY
FOR FH-20 WITH C300 OR C400 SERIES CONTROL VALVES
S12-25989

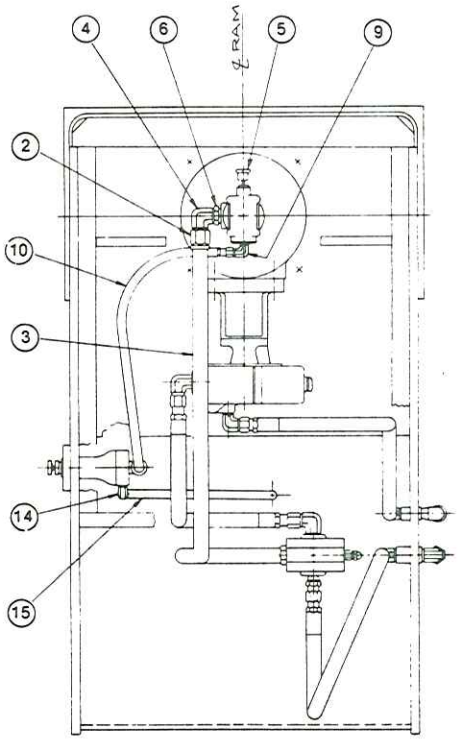
	ITEM	PART NO.	DESCRIPTION	QTY.
	1	470-11212	Connector - male	1
	2	486-15013	Fitting - hose	2
	3	486-15014	Hose - tank	1
	4	473-11212	Elbow - male	1
*	5	016-09030	Valve - 3/4 relief model RIV12-513	1
	6	413-91612	Bushing 1 to 3/4	1
	7	433-91208	Bushing 3/4 to 1/2	1
	8	442-08240	Nipple - 1/2 x 6	1
	9	473-10604	Elbow - male	1
	10	032-69048	Hose - vent	1
	11	470-10604	Connector - male	1
	12	426-30400	Elbow - street 1/4	1
**	13	016-01218	Valve - remote model RE04-1313	1
	14	473-10404	Elbow - male	1
	15	032-29472	Hose - drain	1
	16	470-10404	Connector - male	1
	17	413-90604	Bushing 3/8 to 1/4	1
	18	032-25528	Plug - orifice	1
	19	422-30804	Coupling - reducing 1/2 to 1/4	2
	20	442-08100	Nipple 1/2 x 2-1/2	1
	21	442-04080	Nipple 1/4 x 2	1

*SEE SERVICE BULLETIN SVR-5-1

**SEE SERVICE BULLETIN SD-1613



BACK



TOP

FIGURE 18

CYLINDER HEAD RELIEF VALVE
ASSEMBLY FOR FH-20 WITH
C300 OR C400 SERIES CONTROL VALVES

ADAPTION ASSEMBLY INDEX TABLE TO PRESS WITH C95, C97 & C99 CONTROL VALVES

	ITEM	PART NO.	DESCRIPTION	FH120 S12-21600 QTY.	FL35 & FN50 S12-21601 QTY.
	1	473-10808	Elbow 90° male adapter	1	1
	2	426-30600	Elbow 90° street	1	1
	3	473-10404	Elbow 90° male adapter	1	1
	4	406-00800	Elbow 90° street	1	1
	5	306-20180	Screw HHC 1/2-13 x 1-1/4	4	4
	6	316-26200	Screw flat hd. 3/4-10 x 1-1/2	4	4
	7	413-91608	Bushing 1 to 1/2	1	1
	8	513-25608	Valve - check	1	1
	9	031-29470	Hose - tank	1	1
	10	031-29472	Hose - drain	1	1
	11	031-41054	Hose - control port	1	1
	12	031-29476	Hose - sequence	1	1
	13	031-29468	Plate - mounting	1	
		031-47078			1
	14	493-15001	Fitting	1	1
	15	493-15002	Fitting	1	1
	16	494-15001	Fitting	1	1
	17	493-15000	Fitting	1	1
	18	513-25004	Valve - 1/4 in-line check	1	1
	19	442-04060	Nipple - 1/4 x 1-1/2	1	1
	20	470-10604	Fitting	1	1
	21	433-90604	Bushing - 3/8 to 1/4	1	1
	22	031-43641	Rework frame (Fig. 13)	1	
		032-47079	Rework frame (Fig. 14)		1
	23	474-11008	Fitting	1	1
	24	442-08260	Nipple - 1/2 x 6-1/2	1	1
	25	031-69455	Hose - sequence	1	
		031-25914			1
	26	474-10607	Fitting	1	
		474-10806			1
	27	442-06180	Nipple - 3/8 x 4-1/2	1	1
	28	032-69305	Hose - control port	1	
		031-25917			1
	29	473-10606	Fitting	1	
		473-10806			1
	30	433-91208	Bushing - 3/4 to 1/2	1	1
	31	473-11008	Fitting	1	1
*	32	016-00842	Valve - relief model RV12-533	1	
*		016-00844	Valve - relief model RV12-535		1
*	33	016-00840	Valve - relief model RV12-531	1	1
	34	032-42936	Hose - pressure	1	
		032-47479			1
**	35	016-01218	Valve - remote control model RE04-1313	1	
**		016-00870	Valve - remote control model RE04-1513		1
	36	031-29472	Hose - drain	1	1

*SEE SERVICE BULLETIN SVR 2-1

**SEE SERVICE BULLETIN SD-1613

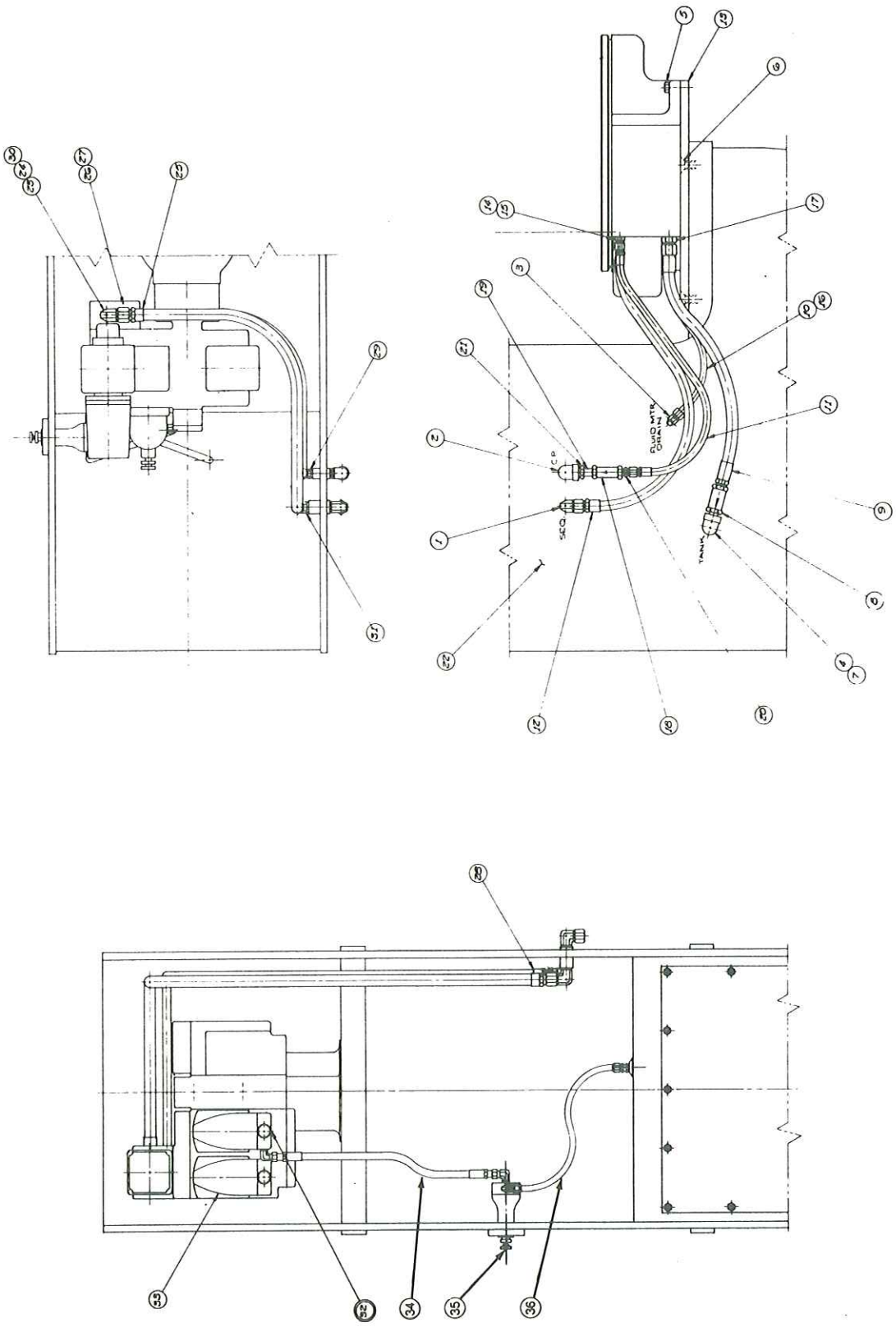


FIGURE 19

ADAPTION ASSEMBLY
INDEX TABLE TO PRESS
FH20, FL35 & FN50 PRESSES
W/C95, C97 & C99 CONTROL VALVES

Notes

MULTIPRESS®

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