

MULTIPRESS

HYDRAULIC EQUIPMENT

• operation instructions & service manual •

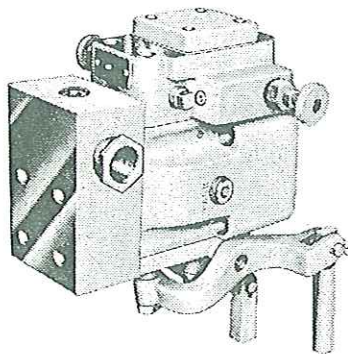
for
MODEL C-592
CONTROL VALVE

NOTICE

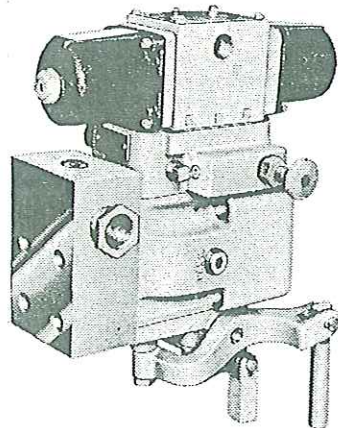
MULTIPRESS supplies service bulletins, parts lists and parts for presses with serial numbers below 30,000; only as a convenience to our customers.

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.



C-592-M • MANUAL VALVE



C-592-E • ELECTRIC VALVE

Your Multipress[®] Equipment Control Valve is a major component of your multipress equipment unit.

This manual is intended for reference when servicing and repairing Multipress[®] Equipment Model "C-592" control valves.

Refer to your Basic Multipress service manual for instructions regarding preparation for operation and maintenance scheduling.

Refer to your Operating Controls service manual for instructions regarding actuation of these valves.

When ordering parts for the C-592 valves it is important to include your press model number, serial number, pump gallonage, and if the valve is manual or electric operated along with the part number(s) of the part(s) being ordered to assure that the correct part(s) are provided for your valve.

sequence of operation

of pilot operated C-592-M valve

The C-592-M valve provides differential circuit for fast approach portion and adjustable speed for pressing portion of down stroke. Pressing speed may be started at any point during the downstroke of the ram. This valve may be operated either for distance reversal or for pressure reversal.

IDLING:

1. While the press is idling, ram is stopped in up position, and control arm is pushing against the upper stop collar, thus pulling main spool down against the bottom spring. At this position "pressure port" of "valve sleeve" is open to "top cylinder," "tank" and "bottom cylinder." Ports through undercuts in "main spool." Back pressure created at "pressure port" opening overcomes weight of the ram and prevents drifting.
2. If the valve is used in a press with heavy platen and tooling, then the relief valve mounted on subplate counterbalances this heavy weight and prevents the ram from drifting at idling, and free falling at down stroke.

DISTANCE REVERSAL OPERATION:

1. Open needle valve "E" and close needle valve "D."
2. To initiate a cycle, starting with the ram in the up position, depress the manual operating controls.
3. The "main spool" is then pulled down against its bottom spring.
4. "Main spool" in down position opens "pressure port" to "top cylinder" port and "bottom cylinder" port to "exhaust" port. The ram therefore starts down.
5. The exhaust flow from the "bottom cylinder" port runs through "exhaust" port to the bottom of the "flow control spool." With no opening available, this oil lifts the "flow control spool" therefore allowing exhaust flow to be fed into the "top cylinder" port, thus providing a differential circuit for fast approach of the ram.

6. Differential speed is maintained until the "weight" sitting on "control arm" contacts "speed change-over collar," pulls it down and through the linkage raises the "flow control sleeve." This cuts out exhaust oil flowing to "top cylinder" port, therefore ends the differential circuit.

7. Exhaust flow now runs to tank through "external orifice block," "adjustable orifice" and orifice "B." The "flow control spool" drops down. A pressure drop occurs at "adjustable orifice" and when pressure differential is great enough to overcome the force of the "flow control spool spring," the "flow control spool" rises again until spring force is equalized. This allows a portion of the oil going to "top cylinder" to flow to tank at a controlled rate. This changes speed of the ram into controlled pressing speed.

8. Pressing speed is controlled by opening or closing the "adjustable orifice." The smaller the orifice, the greater the pressure drop, therefore the greater the rise of the "flow control spool," and the larger the oil flow from "top cylinder" to "tank" and as a result the slower the "pressing speed."

9. When "adjustable orifice" is completely closed, minimum pressing speed is controlled by the size of orifice "M."

10. The ram continues down at controlled speed, contacts the work to be pressed, and pressure increases to the setting of system relief valve.

11. The ram stays down exerting full pressure until the manual operating controls are released.

12. The main spool is shifted to the extreme up position by its spring force, then "pressure" port is connected to "bottom cylinder" port, and "top cylinder" port to "tank port" therefore ram reverses.

13. The ram continues moving up until the upper stop collar is contacted by the control arm. This action pushes shipper rod up, thus pulling the spool down against the bottom spring. Then "pressure port" opens to "tank" and ram stops. Press will idle with the ram at up position until a new cycle is initiated.

14. If at any time, the manual operating controls are released during the "down" stroke of the ram, it will reverse and stop when control arm contacts the "upper stop collar."

15. When the valve is operated with bottom stop collar, to protect the tooling, set the "bottom stop collar" to the point where the ram is required to stop. When the ram comes down and "control arm" contacts the "lower stop collar," shipper rod is pulled down and through the linkage "main spool" is forced to center. The ram therefore stops with no pressure as the pressure port is open to "top cylinder," "tank" and "bottom cylinder ports." The manual operating controls must be released to reverse the ram.

PRESSURE REVERSE OPERATION:

1. Close needle valve "E" and open needle valve "D."
2. Starting a cycle and operation of the valve for differential fast approach and for controlled pressing speed is exactly the same as explained under "Distance Reversal Operation" Sections No. 2 through No. 9.
3. Release the manual operating controls as soon as controlled pressing speed starts. Orifice "B" provides sufficient system pressure during speed control to hold the "main spool" shifted down against bottom spring. This pressure is reflected to the top of "main spool" through orifice "M," needle valve "D" and orifice "C."
4. When ram contacts the work to be pressed, the exhaust flow stops and "flow control speed" is pushed down by its spring at a rate determined by orifice "A."
5. With "flow control spool" down, the partial drain of top cylinder oil to tank is cut off, thus causing the system pressure to raise to the setting of "relief valve," then the ram exerts full force to the work piece.
6. Since the exhaust flow has stopped, no pressure is available to the top of the "main spool," bottom spring force pushes this "main spool" up, oil on top of spool drains to tank through orifice "C," needle valve "D" and orifice "A."
7. "Main spool" being shifted to the extreme up position, ram reverses, retracts and stops against "upper stop collar," thus completing a cycle.

GENERAL NOTES:

1. Orifice "C" restricts exhaust oil flow, which runs to tank through check valve "K," holding "main spool" down during controlled pressing speed.
2. Orifices "C" and "A" in series determine the rate at which "main spool" rises during pressure reversal, so that system pressure builds up to the setting of relief valve before ram reverses.
3. The check valve in "external orifice block" prevents pressure feed-back to the bottom of "flow control spool" during pressure reversal with faster pressing speed.
4. Orifice "M" reduces pressure feed-back to the bottom of "flow control sleeve" and prevents it from shifting up and starting the pressing

speed before the speed change-over collar is pulled down by the weight.

5. "Lower stop collar" may be used to protect special tooling from overtravel of the ram during pressure reversal operation. When the "control arm" pulls the "lower stop collar" down, through the linkage "main spool" is forced to top position. The ram therefore reverses.
6. In case of emergency, during differential fast approach, just release the manual operating controls, "main spool" shifts to up position. The ram therefore reverses.
7. The ram must complete the entire remainder of the cycle after "pressing speed" is started.

INCHING:

1. Open needle valve "E" and close needle valve "D."
2. Slowly turn handwheel clockwise to lower ram.
3. To raise ram turn handwheel counter clockwise.
4. See Basic Service Manual for detail inching instructions.

sequence of operation

of pilot operated C-592-E valve

The C-592-E valve provides a differential circuit for fast approach portion and adjustable speed for pressing portion of down stroke. Pressing speed may be started at any point during the down stroke of the ram.

This valve may be operated either for distance reversal or for pressure reversal.

IDLING:

1. While the press is idling, ram is stopped in up position, and control arm is pushing against the upper stop collar, thus pulling main spool down against the bottom spring. At this position "pressure port" of "valve sleeve" is open to "top cylinder," "tank" and "bottom cylinder." Ports through undercuts in "main spool." Back pressure created at "pressure port" opening overcomes weight of the ram and prevents drifting.
2. If the valve is used in a press with heavy platen and tooling, then the relief valve mounted on subplate counterbalances this heavy weight and prevents the ram from drifting at idling, and free falling at down stroke.

DISTANCE REVERSAL OPERATION:

1. Open needle valve "E" and close needle valve "D".
2. To initiate a cycle, starting with the ram in the up position, energize "Solenoid A" by simultaneously depressing and holding "cycle start" pushbuttons.
3. Pilot valve shifts and connects pilot pressure through "B" port to the top of "main spool," thus forcing it down. Pilot pressure is created by orifice "H" in pressure line in the valve body.
4. "Main spool" in down position opens "pressure port" to "top cylinder" port and "bottom cylinder" port to "exhaust" port. The ram therefore starts down.
5. The exhaust flow from the "bottom cylinder" port runs through "exhaust" port to the bottom of the "flow control spool." With no opening available, this oil lifts the "flow control spool" therefore allowing exhaust flow to be fed into the "top cylinder" port, thus providing a differential circuit for fast approach of the ram.
6. Differential speed is maintained until the "weight" sitting on "control arm" contacts "speed changeover collar," pulls it down and through the linkage raises the "flow control sleeve." This cuts out exhaust oil flowing to "top cylinder" port, therefore ends the differential circuit.
7. Exhaust flow now runs to tank through "external orifice block," adjustable orifice" and orifice "B." The "flow control spool" drops down. A pressure drop occurs at "adjustable orifice" and when pressure differential is great enough to overcome the force of the "flow control spool spring," the "flow control spool" rises again until spring force is equalized. This allows a portion of the oil going to "top cylinder" to flow to tank at a controlled rate. This changes speed of the ram into controlled pressing speed.

8. Pressing speed is controlled by opening or closing the "adjustable orifice." The smaller the orifice, the greater the pressure drop, therefore, the greater the rise of the "flow control spool," and the larger the oil flow from "top cylinder" to "tank" and as a result the slower the "pressing speed."
9. When "adjustable orifice" is completely closed, minimum pressing speed is controlled by the size of orifice "M."
10. The ram continues down at controlled speed, contacts the work to be pressed, and pressure increases to the setting of system relief valve.
11. The ram stays down exerting full pressure until "Solenoid A" is de-energized by releasing either or both "cycle start" pushbuttons.
12. This shuts off pilot pressure, and main spool is shifted to the extreme up position by the spring force, then "pressure" port is connected to "bottom cylinder" port, and "top cylinder" port to "tank port" therefore ram reverses.
13. The ram continues moving up until the upper stop collar is contacted by the control arm. This action pushes shipper rod up, thus pulling the spool down against the bottom spring. Then "pressure port" opens to "tank" and ram stops. Press will idle with the ram at up position until a new cycle is initiated.

GENERAL NOTES (Distance Reversal):

1. If "Solenoid A" is de-energized by releasing either or both "cycle start" pushbuttons at any point of down stroke, the ram will reverse and stop when "control arm" contacts the "upper stop collar."
2. When the valve is operated with bottom stop collar, to protect the tooling, set the "bottom stop collar" to the point where the ram is required to stop. When the ram comes down and "control arm" contacts the "lower stop collar," shipper rod is pulled down and through the linkage "main spool" is forced to center. The ram therefore stops with no pressure as the pressure port is open to "top cylinder," "tank" and "bottom cylinder ports." "Solenoid A" must be de-energized by releasing either or both "cycle start" pushbuttons in order to reverse the ram.
3. Orifice "L" in "P" port of "pilot control valve" restricts the pilot oil flow to the top of the main spool.
4. Check valve "K" prevents high system pressure from building up on top of "main spool."
5. Orifice "G" provides enough back pressure from pilot oil flow to push "main spool" against bottom spring force.

PRESSURE REVERSE OPERATION:

1. Close needle valve "E" and open needle valve "D."
2. Starting a cycle and operation of the valve for differential fast approach and for controlled pressing speed is exactly the same as explained under "Distance Reversal Operations," Sections No. 2 through No. 9.

3. "Cycle start" pushbuttons may be released as soon as controlled pressing speed starts. Orifice "B" provides sufficient system pressure during speed control to hold the "main spool" shifted down against bottom spring. This pressure is reflected to the top of "main spool" through orifice "M," needle valve "D" and orifice "C."
4. When ram contacts the work to be pressed, the exhaust flow stops and "flow control spool" is pushed down by its spring at a rate determined by orifice "A."
5. With "flow control spool" down, the partial drain of top cylinder oil to tank is cut off, thus causing system pressure to raise to the setting of "relief valve," then the ram exerts full force to the work piece.
6. Since the exhaust flow has stopped, no pressure is available to the top of the "main spool," bottom spring force pushes the "main spool" up, oil on top of spool drains to tank through orifice "C," needle valve "D" and orifice "A."
7. "Main spool" being shifted to the extreme up position, ram reverses, retracts and stops against "upper stop collar," thus completing a cycle.

GENERAL NOTES (Pressure Reversal):

1. Orifice "C" restricts exhaust oil flow, which runs to tank through check valve "K," holding "main spool" down during controlled pressing speed.
2. Orifices "C" and "A" in series determine the rate at which "main spool" rises during pressure reversal, so that system pressure builds up to the setting of relief valve before ram reverses.
3. The check valve in "external orifice block" prevents pressure feedback to the bottom of "flow control spool" during pressure reversal with faster pressing speed.
4. Orifice "M" reduces pressure feed-back to the bottom of "flow control sleeve" and prevents it from shifting up and starting the pressing speed before the speed change-over collar is pulled down by the weight.
5. "Lower stop collar" may be used to protect special tooling from over-travel of the ram during pressure reversal operation. When the "control arm" pulls the "lower stop collar" down, through the linkage "main spool" is forced to top position. The ram therefore reverses.
6. In case of emergency, during differential fast approach, just releasing "cycle start" pushbutton shuts off pilot pressure, "main spool" shifts to up position, the ram therefore reverses.
7. To reverse the ram after pressing speed has started, "Solenoid B" must be energized by depressing "emergency reverse" pushbutton. Then the oil holding "main spool" down drains to tank through "pilot control valve," "main spool" immediately shifts to up position by bottom spring force, and ram reverses.

INCHING:

1. Open needle valve "E" and close needle valve "D."

2. Slowly turn handwheel clockwise to lower ram.
3. To raise ram turn handwheel counter clockwise.
4. See Basic Service Manual for detail inching instructions.

TIME DELAY:

1. Valve may be set either for distance or pressure reversal operation.
2. A timer in electric control circuit holds "Solenoid A" energized, thus the ram dwells under full pressure.
3. Ram reverses when timer runs out and de-energizes "Solenoid A."
4. In case of emergency during time delay, depressing "emergency reverse" pushbutton de-energizes "timer" and "Solenoid A" and energizes "Solenoid B" and the ram reverses immediately.

NOTES:

1. Both "cycle start" pushbuttons must be actuated within 1/4 second in order to initiate a press cycle.
2. If Solenoid "A" is not de-energized at bottom of stroke in either distance or pressure reversal, ram will not reverse.
3. When using "limit switch" oper. sp'd control, "sp'd control" valve sol. must be held energized until ram has reversed and is retracting to avoid "flow control" spool chatter and/or "hold down."
4. If "cycle start" pushbuttons are actuated during retracting stroke, ram will reverse and extend again.

ASSEMBLY PROCEDURE (FIELD CONVERSION)

TO CONVERT A C-592-M VALVE TO A C-592-E VALVE

(ORDER KIT NO. S12-11772)

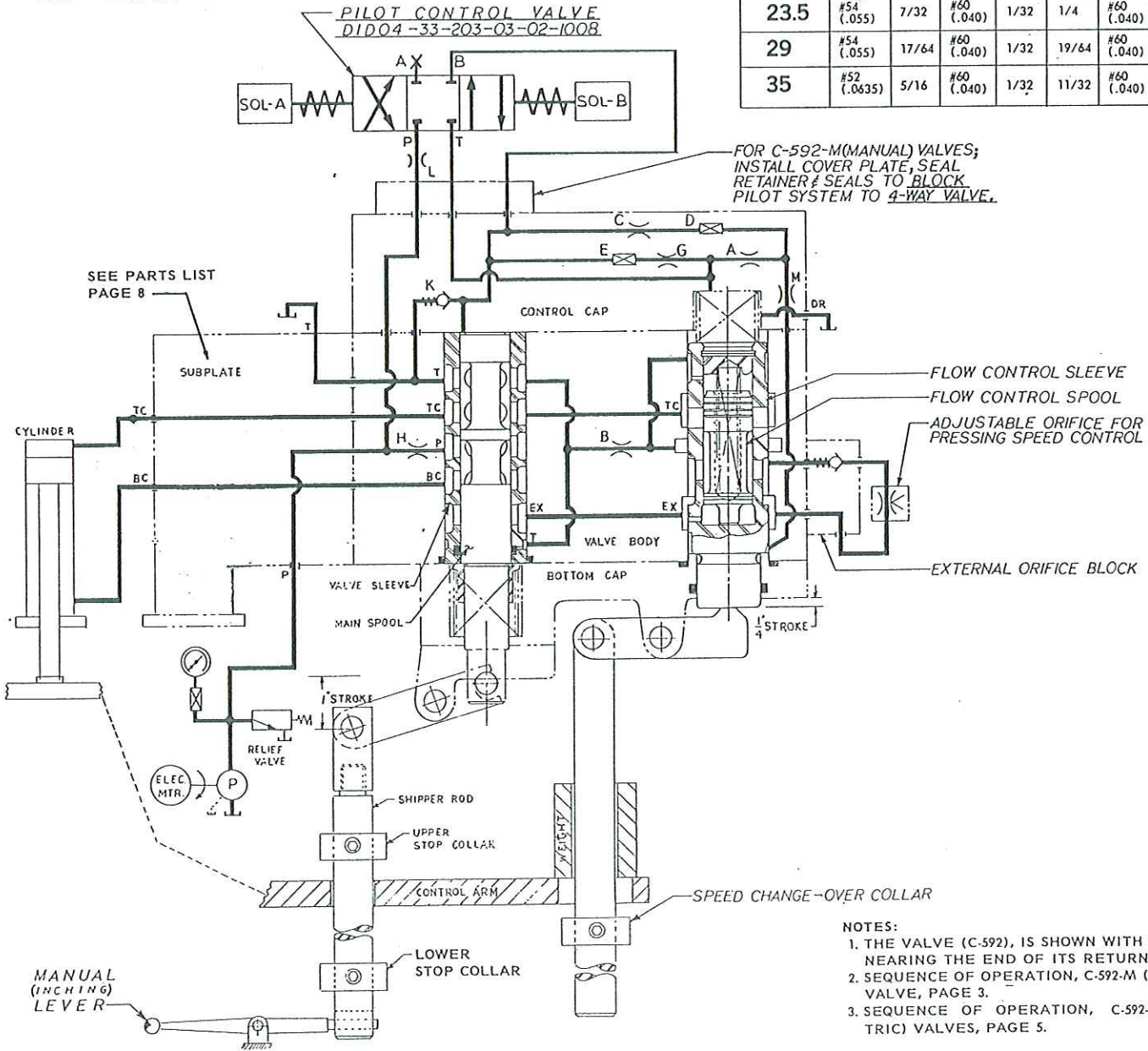
1. Remove mounting screws No. 43, top cover No. 46, seal retainer No. 44 and seals No. 45.
2. Install orifice "L" No. 40 into "P" port of 1/4", 4-way pilot valve No. 41.
3. Install 1/4", 4-way pilot valve, (including orifice "L", seal retainer and seals) to control cap (Ref: Item No. 39 of page 10 with (4) mounting screws No. 42.

NOTE: To obtain proper orientation of pilot valve to the control cap, match the port definitions of the valve ("A" and "B") to the port definitions ("A" and "B") stamped on the face of the control cap.

ABBREVIATIONS

- P — PRESSURE
- TC — TOP CYLINDER
- BC — BOTTOM CYLINDER
- EX — EXHAUST
- T — TANK RETURN
- DR — DRAIN

PUMP VOL.	ORIFICE CHART							
	G.P.M.	A	B	C	G	H	L	M
10	#56 (.0465)	1/8	1/32	1/32	5/32	#60 (.040)	#53 (.0595)	
14	#54 (.055)	5/32	#65 (.035)	1/32	3/16	#60 (.040)	#53 (.0595)	
21	#54 (.055)	7/32	#60 (.040)	1/32	1/4	#60 (.040)	#53 (.0595)	
23.5	#54 (.055)	7/32	#60 (.040)	1/32	1/4	#60 (.040)	#53 (.0595)	
29	#54 (.055)	17/64	#60 (.040)	1/32	19/64	#60 (.040)	#52 / (.0635)	
35	#52 (.0635)	5/16	#60 (.040)	1/32	11/32	#60 (.040)	#51 (.067)	



- NOTES:**
1. THE VALVE (C-592), IS SHOWN WITH THE RAM NEARING THE END OF ITS RETURN STROKE.
 2. SEQUENCE OF OPERATION, C-592-M (MANUAL) VALVE, PAGE 3.
 3. SEQUENCE OF OPERATION, C-592-E (ELECTRIC) VALVES, PAGE 5.

WHEN THE C-592 VALVES ARE USED ON "C"-FRAME PRESSES REQUIRING COUNTER-BALANCE CIRCUITRY, IT IS NECESSARY TO EXTERNALLY PIPE THE "CHECK" & "RELIEF" VALVES INTO THE BOTTOM CYLINDER CIRCUIT OF THE PRESS.

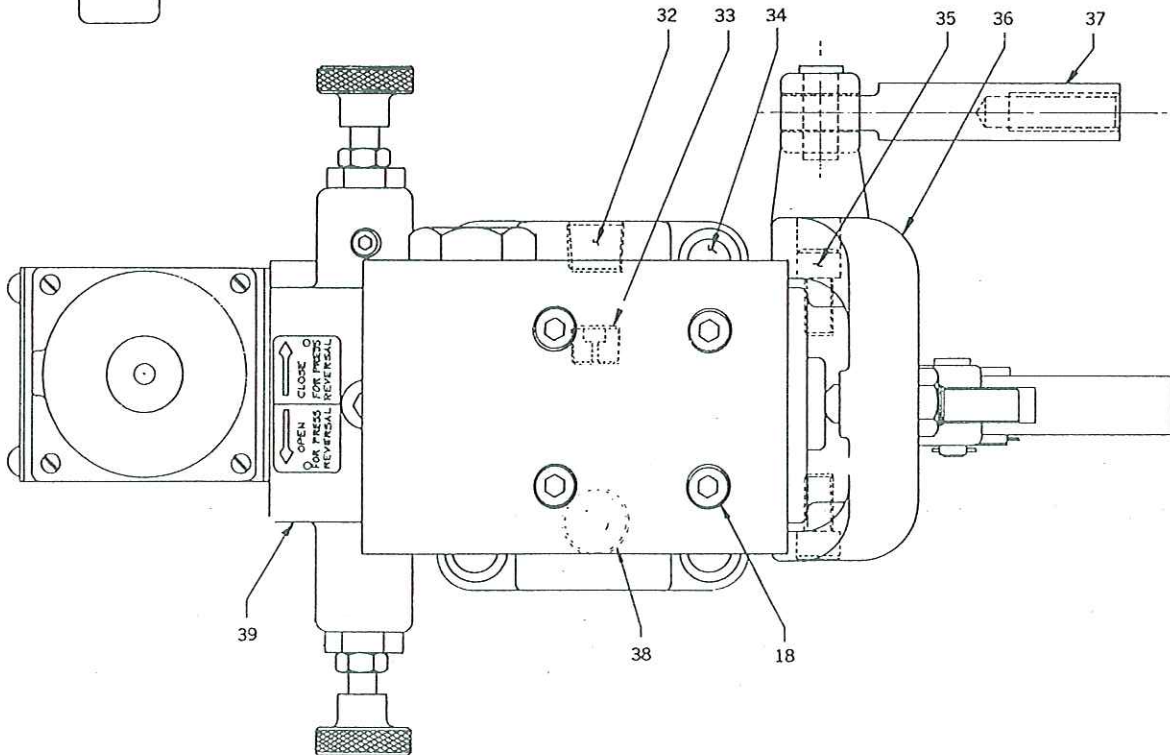
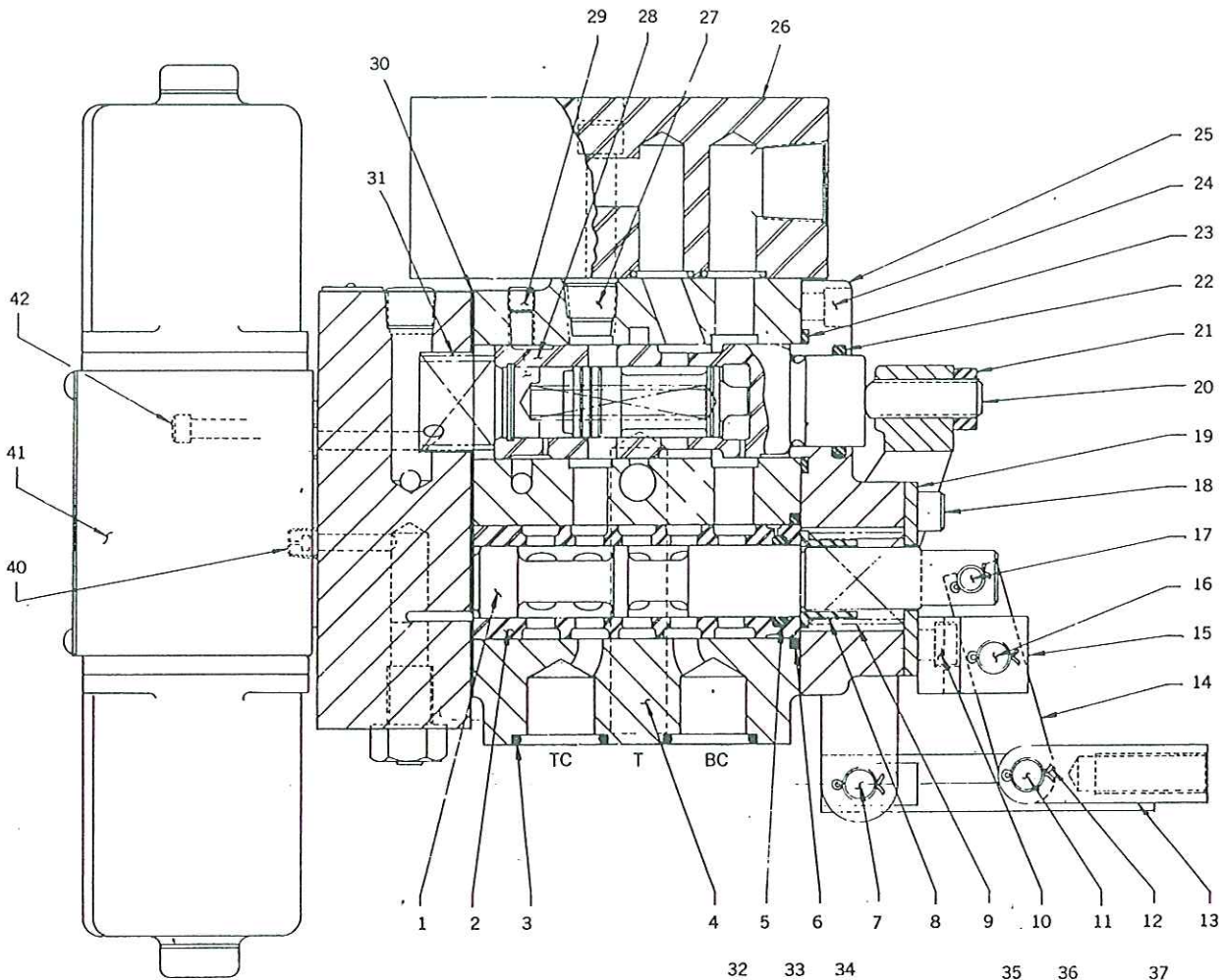
CR-5700—HYDRAULIC CIRCUIT, C-592 VALVES
(Electric & Manual)

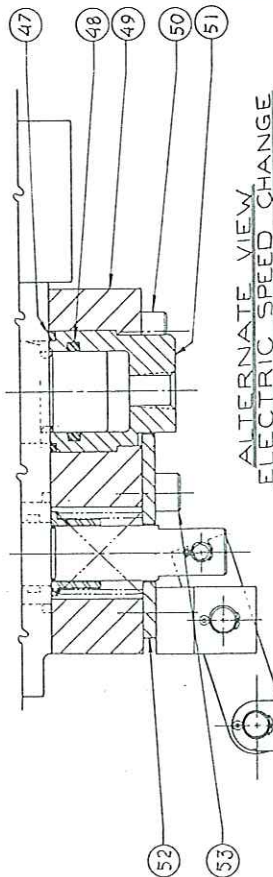
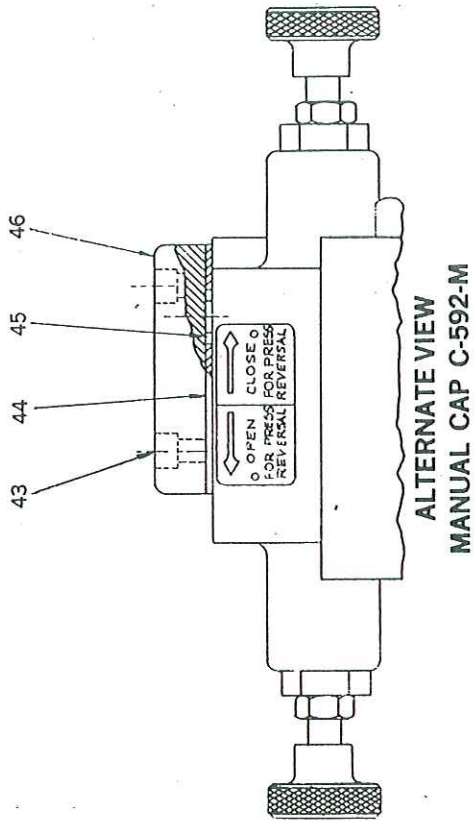
parts list

for subplated adaption assembly to C-592 valve

ITEM	PART NO.	DESCRIPTION	AMT. REQ.		
			"C" Frame Presses with Threaded Pipe Conn	"C" Frame Presses with Socket Weld Pipe Conn.	Strain Rod Presses
1	032-13726	Subplate	1	1	
	032-43193	Subplate			1
2	032-42194	Flange 1 1/4"	1		
	032-42948	Flange 1"	1		
	032-13172	Flange 1 1/4"		1	
	032-13730	Flange 1"		1	
3	464-00001	Connection 1 1/4" (complete with o-ring, mt'g screws and lock washers)			2
	464-00002	Connection 1 1/2" (complete with o-ring, mt'g screws and lock washers)			2
4	358-16240	Socket Hd. Cap Screw 3/8"—16 x 2 Lg.	4	4	
	358-24300	Socket Hd. Cap Screw 5/8"—11 x 2 3/4 Lg.	4	4	
	306-26280	Hex Hd. Cap Screw 3/4"—10 x 2 1/2 Lg.	6	6	
5	630-42300	Vicker Seal	2	2	
6	671-00220	O-ring	1	1	
7	671-00223	O-ring	1	1	

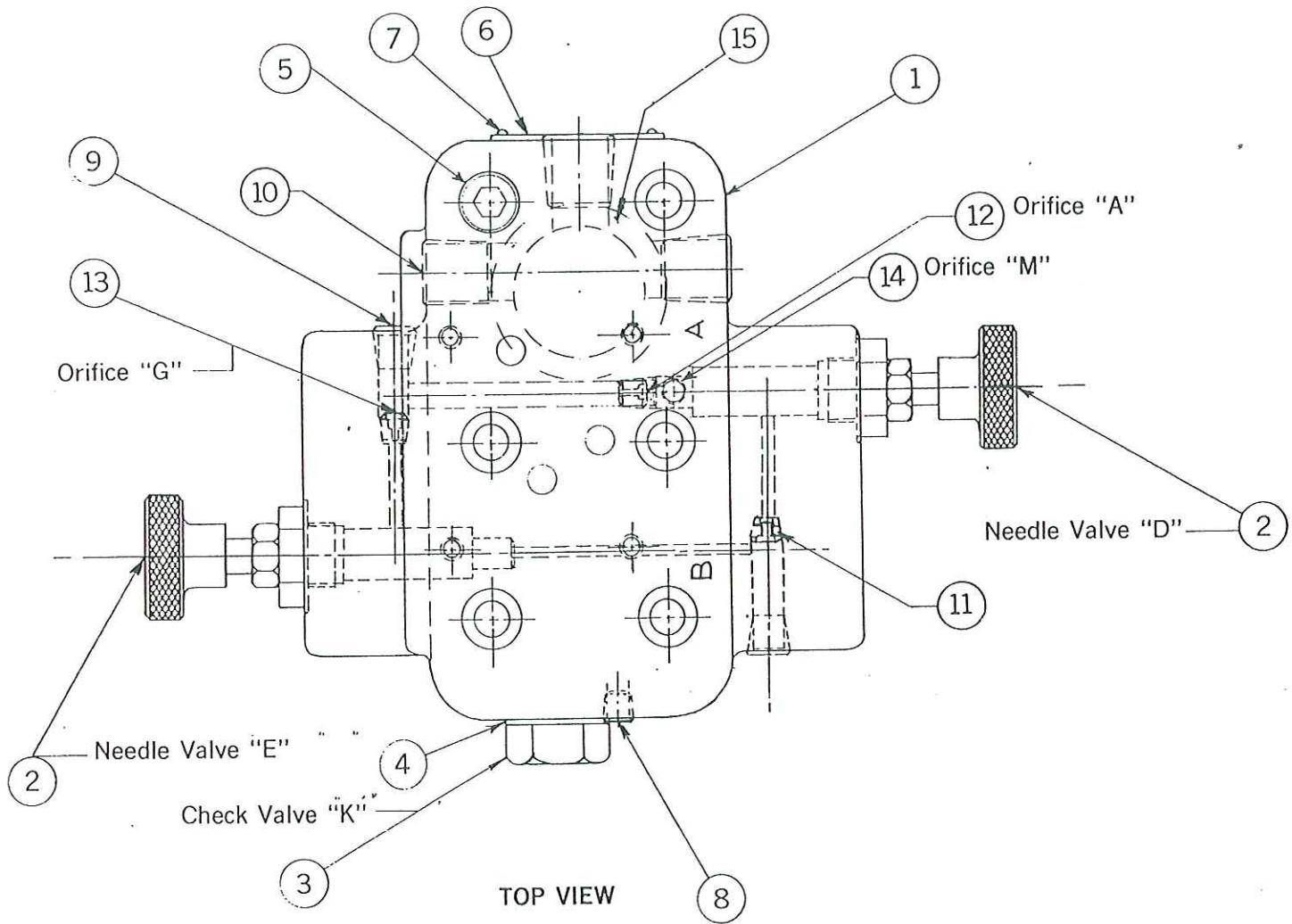
DIFFICULTIES	CAUSE	REMEDY
RAM STAYS DOWN	<ol style="list-style-type: none"> 1. Spring at bottom of main spool may be broken. 2. Dirt around shipper rod. 3. Pilot control valve spool not centered or stuck. 	<ol style="list-style-type: none"> 1. Remove and replace with new spring. 2. Clean dirt and chips away from shipper rod. 3. Replace Solenoid or clean dirt and chips to free sticking spool.
NO SPEED CONTROL	<ol style="list-style-type: none"> 1. Weight not shifting collar on shipper rod. 2. Flow control spool may be stuck. 	<ol style="list-style-type: none"> 1. Adjust left shipper rod collar upwards to pick up weight. 2. Disassemble and clean thoroughly. Check for dirt, if still tight polish with crocus cloth and oil.
UNABLE TO OBTAIN PRESSURE	<ol style="list-style-type: none"> 1. Weight not shifting collar on shipper rod. 2. On manual valve, handles may be contacting frame before spool is completely shifted. 3. Dirt may be holding relief valve open. 4. Pressure line from pump to relief valve may be cracked or broken. 5. Defective pump. 	<ol style="list-style-type: none"> 1. Adjust left shipper rod collar upwards to pick up weight. 2. Adjust shipper rod so that it is raised further when handles are depressed. 3. Back off relief valve, then re-adjust for pressure. 4. Check pump and pressure lines. 5. Repair or replace.
RAM IS SLOW AND/OR PUMP IS NOISY	<ol style="list-style-type: none"> 1. Dirty filter. 	<ol style="list-style-type: none"> 1. Remove filter from suction line of pump and clean thoroughly or replace.
PRESS OVERHEATS	<ol style="list-style-type: none"> 1. Top collar on shipper rod set too high. 2. Water not circulating. 	<ol style="list-style-type: none"> 1. Lower top stop collar so that valve centers before piston of ram contacts top of cylinder. 2. Check and make sure water is turned on and circulating in cooler coils.





ITEM	PART NO.	DESCRIPTION	QTY.
1	032-49168	Spool	1
2	032-43184	Sleeve—Valve	1
3	691-00215	"O" Ring	4
4	032-43185	Body—Valve	1
5	671-00213	"O" Ring	1
6	671-00222	"O" Ring	1
7	321-39735	Pin—Clevis 7/16" Dia.	1
8	032-43186	Stop	1
9	35-22359	Spring—Compression	2
10	358-16260	Screw—Soc. Hd. Cap 3/8" — 16 x 2-1/4"	2
11	321-39725	Pin—Clevis 7/16" Dia.	1
12	322-03240	Pin—Cotter, 3/32" Dia. x 3/4"	4
13	35-13728	Link—Adjusting	1
14	35-13727	Link—Shifter	1
15	35-17480	Bracket—Support	1
16	321-39735	Pin—Clevis, 7/16" Dia.	2
17	321-39527	Pin—Clevis, 5/16" Dia.	1
18	358-16240	Screw—Soc. Hd. Cap. 3/8" — 16 x 2"	6
19	35-20148	Stop—Spool	1
20	311-20201	Screw—Soc. Set, Oval Pt., 1/2" — 13 x 1-1/2"	1
21	335-20100	Nut—Hex Jam, 1/2" — 13	1
22	671-00217	"O" Ring	1
23	671-00223	"O" Ring	1
24	358-16120	Screw—Soc. Hd. Cap, 3/8" — 16 x 3/4"	2
25	032-43187	Cap—Bottom	1
26	S12-15910	Assembly—External Orifice Block	1
27	431-90604	Plug—3/8" Soc. Pipe	1
28	S12-15911	Assembly—Sleeve, Flow Control	1
29	431-90104	Plug—1/16" Soc. Pipe	4
30	032-43191	Gasket—Vellumoid	1
31	032-22359	Spring—Compression	1
32	431-90800	Plug—1/2 Soc. Pipe	1
33	35-20681	Orifice "B"	1
34	358-20260	Screw—Soc. Hd. Cap. 1/2" — 13 x 2-1/4"	4
35	353-16122	Screw—Soc. Hd. Cap. 3/18" — 16 x 3/4"	2
36	35-13790	Link—Valve Shifter	1
37	032-42939	Adapter—Shipper Rod	1
38	032-49172	Orifice "H"	1
39	S12-23671	Cap—Control See page 12 ALTERNATES FOR C-592-E VALVE	1
40	032-17035	Orifice "L"—No. 60 Drill, Located in "P" Port of Item No. 41	1
41	016-01489	Valve—1/4" DID04-33-203-03-02-1008	1
42	358-12240	Screw—Soc. Hd. Cap. 1/4" — 20 x 2" ALTERNATES FOR C-592-M VALVES	4
43	358-12120	Screw—Soc. Hd. Cap. 1/4" — 20 x 3/4"	4
44	032-17184	Plate—Seal Retainer	1
45	671-00110	"O" Ring	3
46	032-17200	Cover—Top ALTERNATES FOR C-592-E VALVE	1
47	671-00223	"O" Ring ARP-223	1
48	671-00217	"O" Ring ARP-217	1
49	032-43187	Cap—Bottom (For Mech. Speed Chg.)	1
50	358-16120	Screw—S.H.C. 3/8— 16 Unc. x 3/4 Long (For Mech. Speed Chg.)	2
51	032-69069	Body—Cylinder (For Elec. Speed Chg.)	1
52	35-20148	Stop—Spool (For Mech. Speed Chg.)	1
53	358-16240	Screw—S.H.C. 3/8— 16 Unc. x 2" Long	12

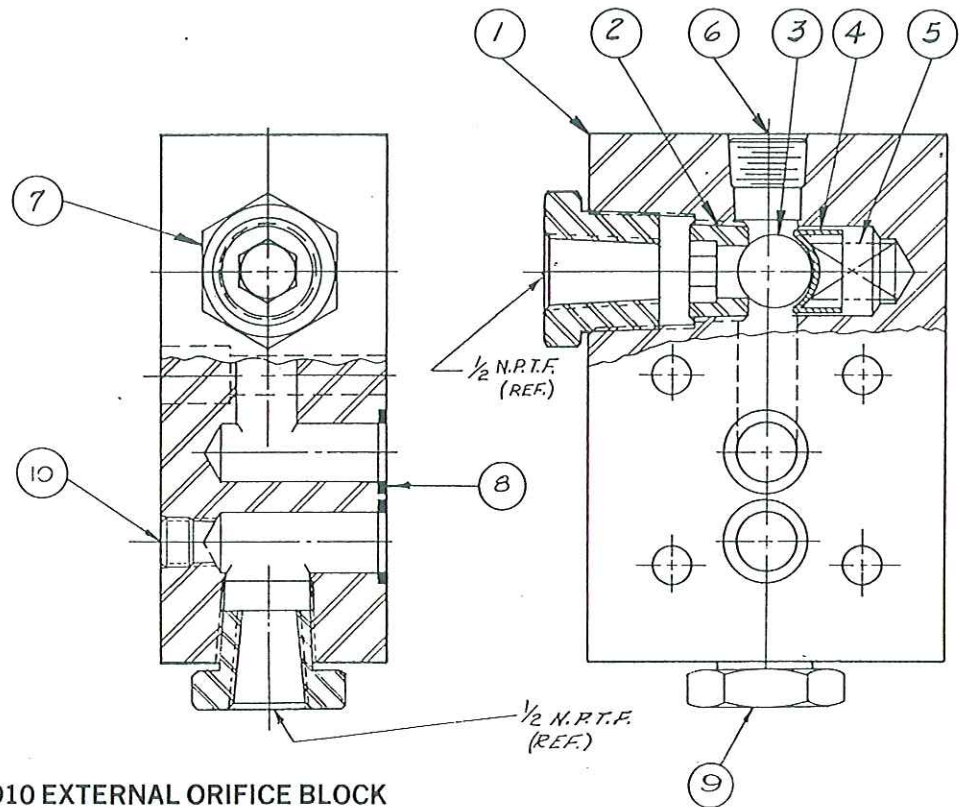
*See chart on hydraulic circuit for size of orifice



S12-23671 CAP CONTROL

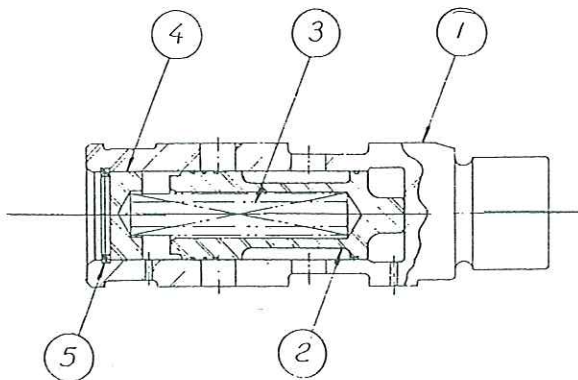
ITEM	PART NO.	DESCRIPTION	QTY.
1	032-49170	Cap—Control	1
2	S12-23672	Assembly—Valve, Needle	2
3	S12-15914	Assembly—Valve, Check "K"	1
4	032-10167	Washer	1
5	358-16240	Screw—Soc. Hd. Cap. 3/8—16 NC x 2" Lg.	6
6	032-27691	Plate—Name	1
7	320-10203	Screw—Drive, Type "U" No. 2 x 3/16"	2
8	431-90104	Plug—1/16" Soc. Pipe	1
9	431-90204	Plug—1/8" Soc. Pipe	2
10	431-90604	Plug 3/8" Soc. Pipe	2
11	35-12819	*Orifice—"C"	1
12	35-25528	*Orifice—"A"	1
13	35-12819	*Orifice—"G"	1
14	032-49171	*Orifice—"M"	1
15	032-49173	Stop—Sleeve	1

*See chart on Hydraulic Circuit for size of orifice



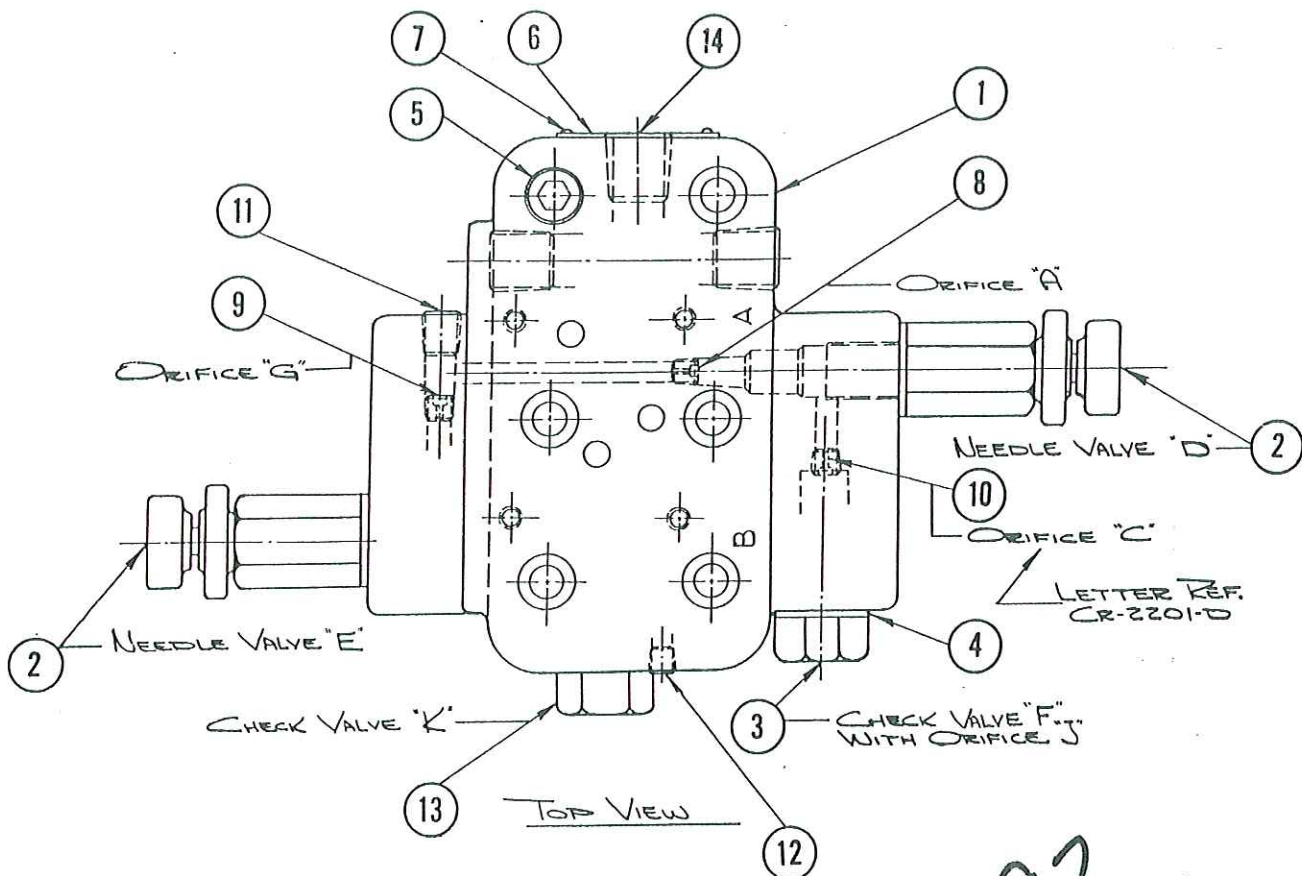
S12-15910 EXTERNAL ORIFICE BLOCK

ITEM	PART NO.	DESCRIPTION	QTY.
1	032-43188	Block	1
2	036-16441	Seat	1
3	201-24001	Ball—3/4" Dia.	1
4	036-16335	Guide—Ball	1
5	035-22280	Spring	1
6	431-90800	Plug—1/2" Pipe, Hex. Soc.	1
7	433-91608	Bushing—Pipe, Hex. Reducing 1" to 1/2"	1
8	671-00115	"O" Ring	2
9	433-91208	Bushing—Pipe, Hex. Reducing 3/4" to 1/2"	1
10	431-90400	Plug—1/4" Pipe, Hex. Soc.	1



S12-15911 FLOW CONTROL SLEEVE ASSEMBLY

ITEM	PART NO.	DESCRIPTION	QTY.
1	032-43189	Sleeve—Flow Control	1
2	032-43190	Spool—Flow Control	1
3	35-22151	Spring—Compression	1
4	35-13784	Button	1
5	356-30093	Ring—Retaining, Internal Type	2

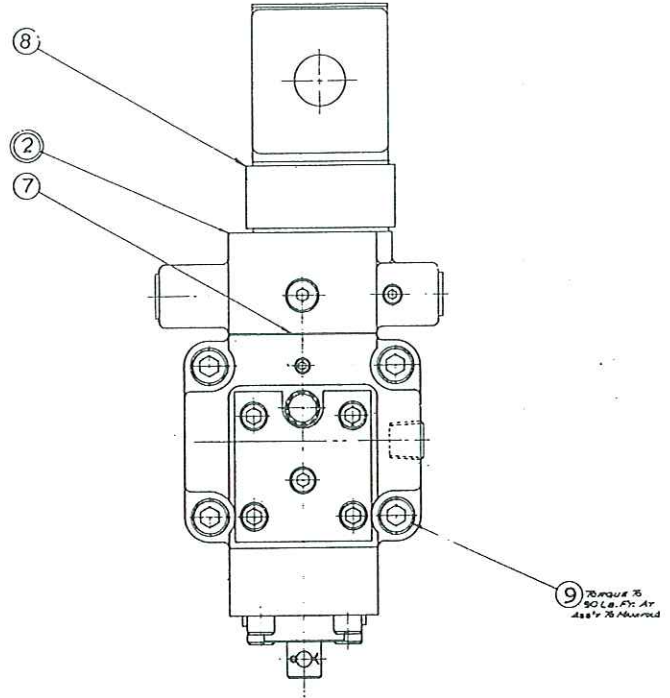
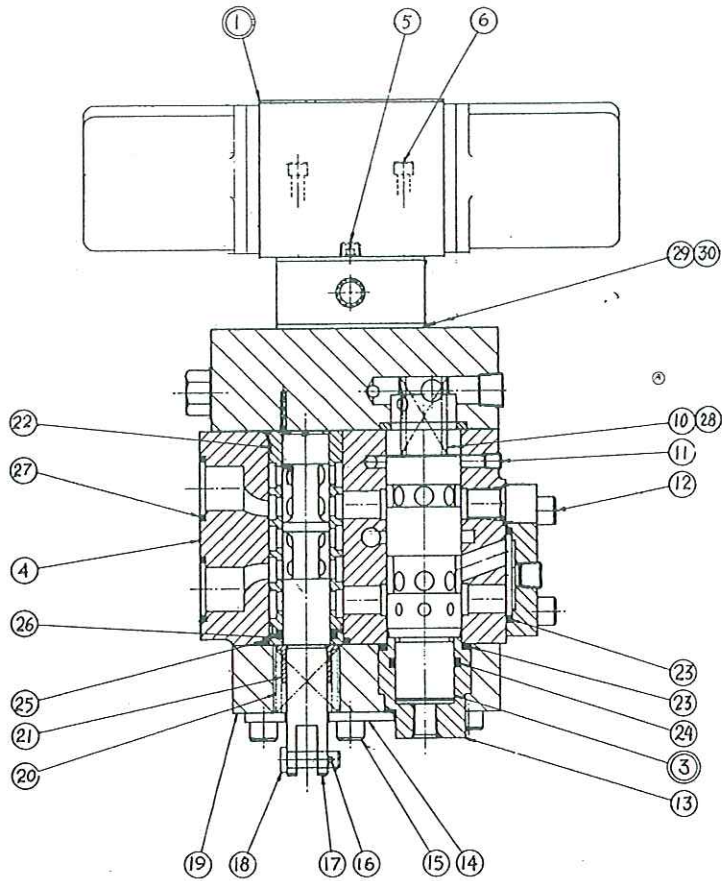


C492

S12-15912 CAP CONTROL

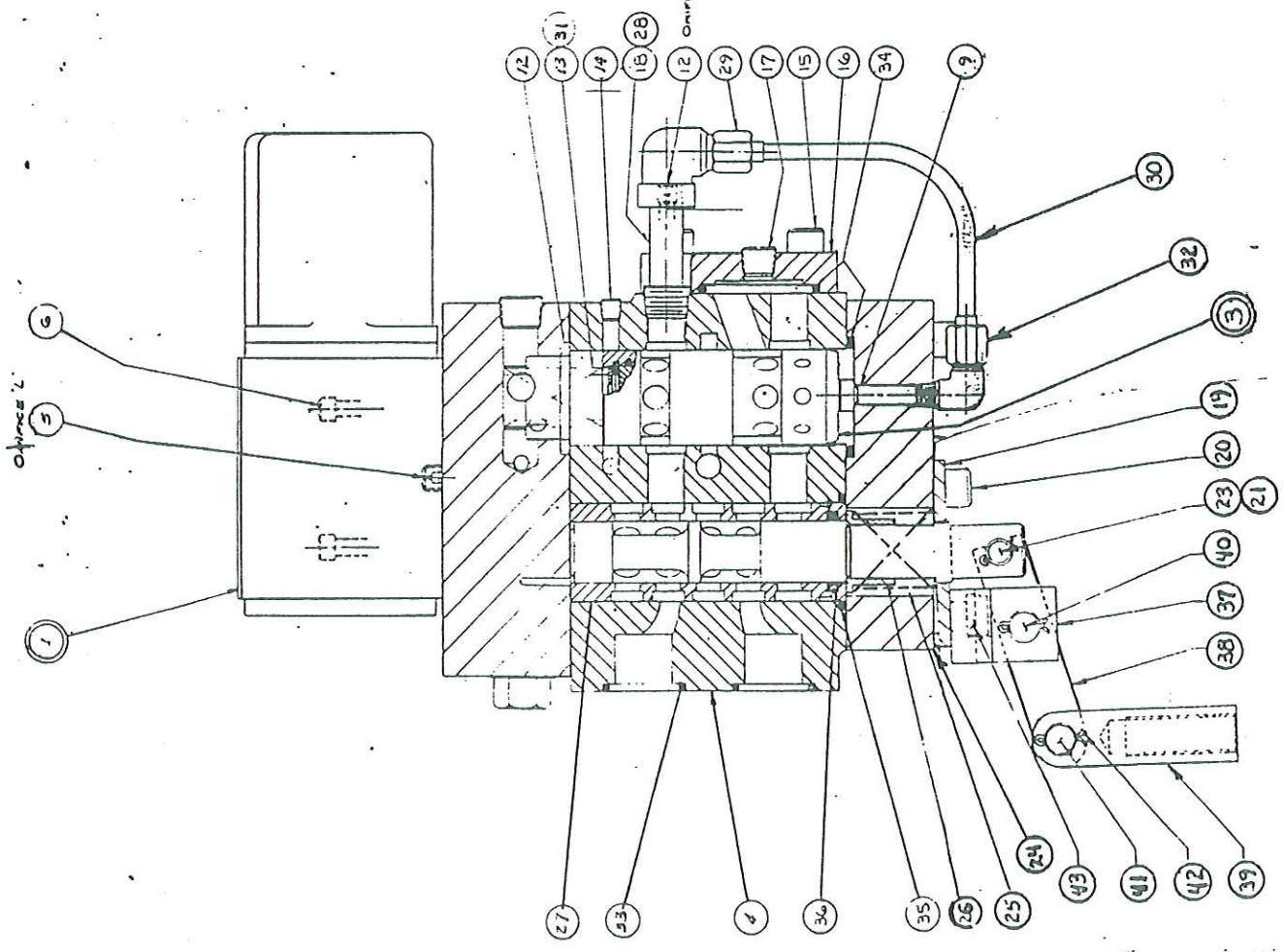
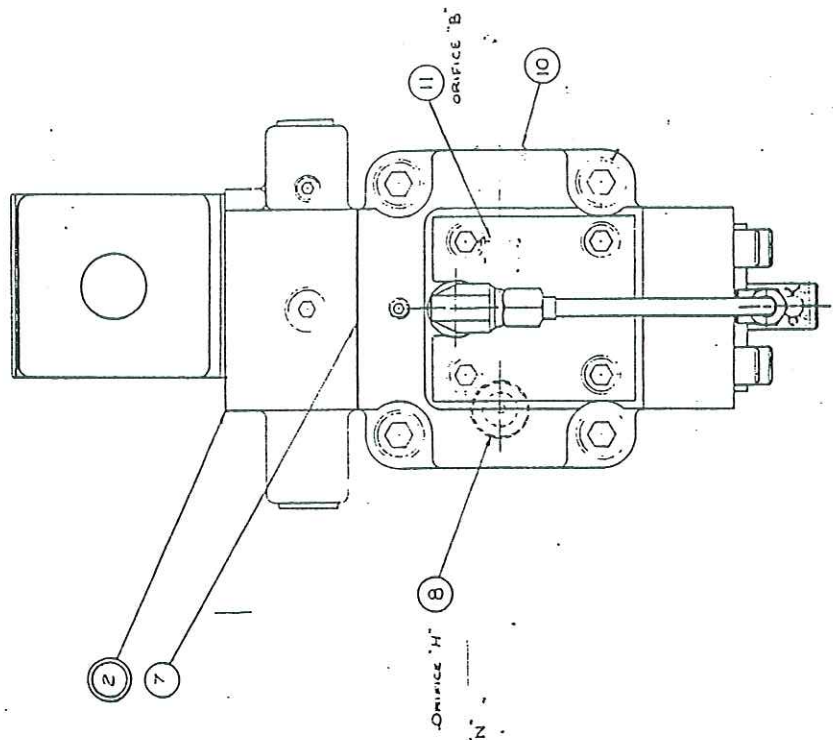
ITEM	PART NO.	DESCRIPTION	QTY
1	032-43192	Cap -- Control	1
2	S11-00472	Assembly -- Valve, Needle	2
3	S12-15913	Assembly -- Valve, Check "F" with Orifice "J"	1
4	032-10167	Washer	4
5	358-16240	Screw -- Soc. Hd. Cap, 3/8-16 NC x 2" Lg.	6
6	032-27691	Plate -- Name	1
7	320-10203	Screw -- Drive, Type "U" No. 2 x 3/16"	2
8	431-90104	Plug -- Pipe, Hex. Soc., Flush 1/16" NPTF -- Orifice "A" (See Chart on Hydraulic Circuit for Size of Orifice "A")	1
9	032-13786	Orifice -- "G" No. 64 (.036), 1/16" Flush Pipe Plug	1
10	032-12819	Orifice -- "C" -- (1/32"), 1/16" Flush Pipe Plug	1
11	431-90200	Plug -- 1/8" Soc. Pipe	1
12	431-90100	Plug -- 1/16" Soc. Pipe	1
13	S12-15914	Assembly -- Valve, Check "K"	1
14	431-90600	Plug -- 3/8" Soc. Pipe	2

THE FOLLOWING
IS INFORMATION ON
MODELS CS90E &
CS90EPR & CS92EPR
VALVES



VALVE C590EPR-S5 PILOT OPERATED
012-29064

ITEM	PART NO.	DESCRIPTION	QTY.
1	016-26902	Valve 1/4-4 way (DID04-33-203-03-02-1008-S5)	1
2	512-29064	Ass'y - control cap	1
3	See Fig. 21	Ass'y - differential spool	1
4	032-43185	Body	1
5	035-17035	Orifice	1
6	358-12330	Screw S.H.C. 1/4-20 unc x 3/4	4
7	032-43191	Gasket	1
8	032-69280	Spacer - pilot pressure	1
9	358-20260	Screw S.H.C. 1/2-13 unc x 2 1/4	4
10	032-22477	Spring	1
11	358-16160	Screw S.H.C. 3/8-16 unc x 1	4
12	032-69070	Cap	1
13	032-69069	Body - cylinder	1
14	032-69279	Stop - spool	1
15	358-16240	Screw S.H.C. 3/8-16 unc x 2	6
16	322-03240	Pin - cotter	1
17	032-49168	Spool	1
18	321-39527	Pin- clevis	1
19	032-69071	Cap	1
20	035-22359	Spring	1
21	032-43186	Stop	1
22	032-43184	Sleeve	1
23	675-00223	O-ring	1
24	675-00217	O-ring	1
25	675-00222	O-ring	1
26	675-00213	O-ring	1
27	675-00215	O-ring	4
28	345-10028	Washer	1
29	036-17184	Plate - retainer	1
30	675-00110	O-ring	4



AMT.	PART NO.	DESCRIPTION	ITEM
1	010-09230	VALVE, 1/4 4-WAY (DID04-33-108-06-01-1006)	1
1	010-29063	ASSEMBLY, CONTROL CAP	2
* 1	010-48673	ASSEMBLY, DIFFERENTIAL SPOOL	3
1	030-43185	BODY	4
1	030-17035	ORIFICE "L" (60.040 DIA.)	5
4	358-12240	SCREW, S.H.C. 1/4-20 UNC X 2 LG.	6
1	030-43191	GASKET, VELLUMOID	7
1	030-49172	ORIFICE "H" (5/32)	8
* 1	030-53445	PISTON, SPOOL ACTUATING	9
1	431-90800	PLUG, 1/2 SOC PIPE	10
1	030-20681	ORIFICE "B" (1/8)	11
1	030-12819	ORIFICE "N" (1/32)	12
1	030-2247	SPRING	13
4	431-90104	PLUG 1/16 SOC PIPE	14
4	358-16160	SCREW, S.H.C. 3/8-16 UNC X 1 LG.	15
1	030-69070	CAP, VALVE SIDE	16
1	431-90400	PLUG, 1/4 SOC PIPE	17
1	432-90604	BUSHING, FLUSH 3/8 X 1/4	18
1	030-69279	STOP, SPOOL	19
4	358-16240	SCREW, S.H.C. 3/8-16 UNC X 2 LG.	20
1	322-03240	PIN, COTTER 3/32 X 3/4	21
1	030-49168	SPOOL	22
1	321-39527	PIN, CLEVIS (AN-395-27) 5/16 X 27/32	23
* 1	030-53146	CAP, BOTTOM VALVE	24
1	030-22359	SPRING, COMPRESSION	25
1	030-43186	STOP	26
1	030-43184	SLEEVE, VALVE	27
1	442-04080	NIPPLE, 1/4 X 'HVY X 2' LG	28
1	474-10404	ELBOW, FEM, "PARKER" 404 DBTX-S	29
1 FT.	803-04035	TUBING, 1/4 O.D. X .034 WALL (CUT LENGTH TO SUIT @ ASSY)	30
1	345-10028	WASHER, 7/16 SAE FLAT	31
1	473-10402	ELBOW - MALE "PARKER" 4CBTX-S	32
4	675-00215	O-RING, ARP 215, VITON "A"	33
2	675-00223	O-RING, ARP 223, VITON "A"	34
1	675-00222	O-RING, ARP 222, VITON "A"	35
1	675-00213	O-RING, ARP 213, VITON "A"	36
1	030-17480	BRACKET, SUPPORT	37
1	030-13727	LINK, SHIFTER	38
1	030-13728	LINK, ADJUSTING	39
1	321-39735	PIN, CLEVIS (AN-397-35)	40
1	321-39725	PIN, CLEVIS (AN-397-25)	41
3	322-03240	PIN, COTTER 3/32 X 3/4" LG.	42
2	358-16260	SCREW, S.H.C. 3/8-16 UNC X 2-1/4" LG.	43

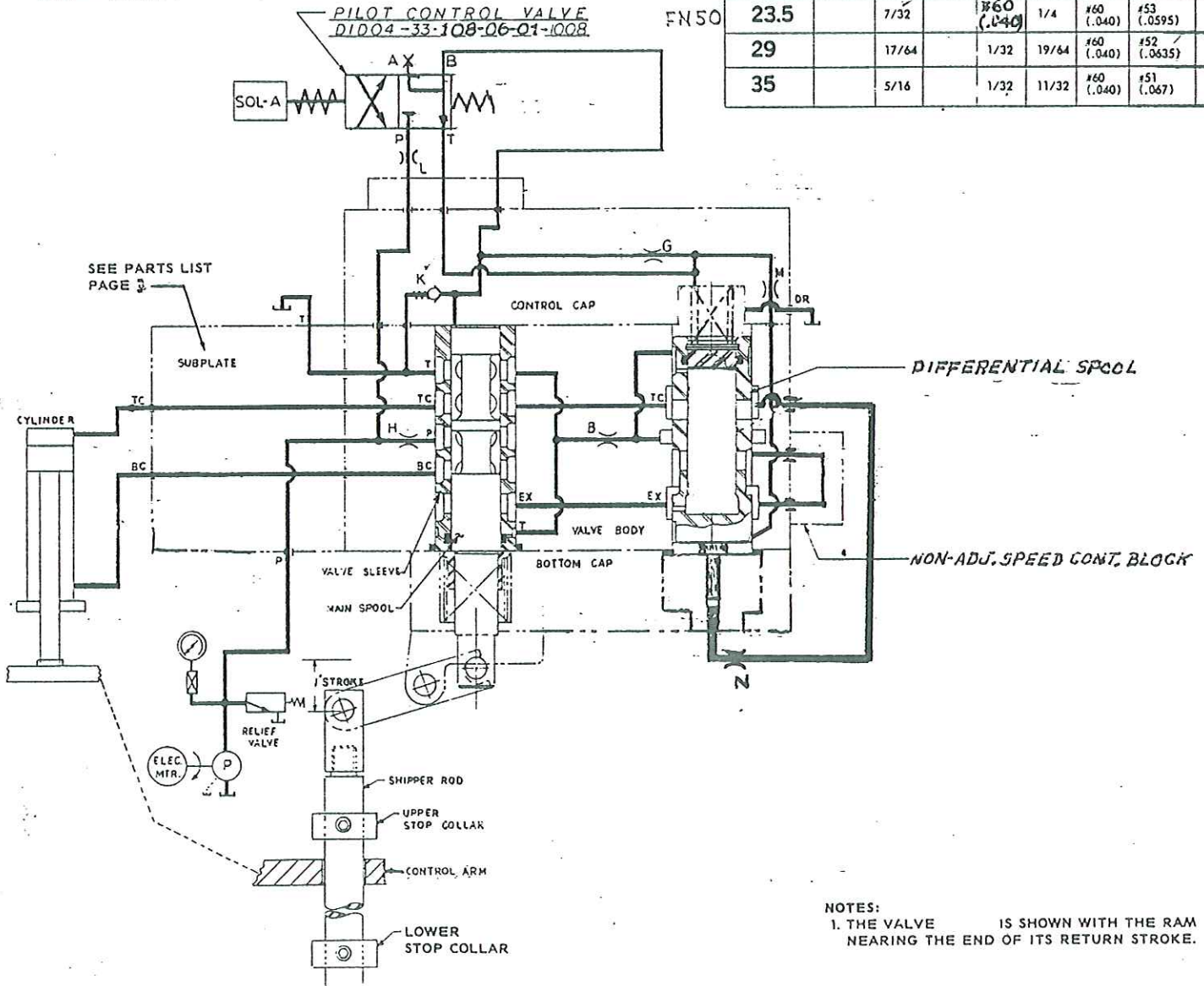
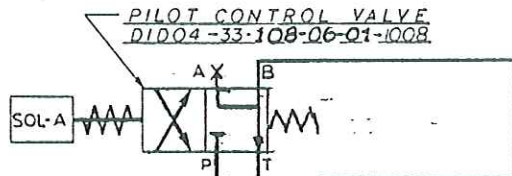
- NOTE:
1. ORIFICES SHOWN ON THIS B.M. FOR 10 GPM VALVE ONLY.
 2. FOR OTHER GPM VALVES, REWORK ORIFICES PER CR-7093-D.
 3. STAMP VALVE BODY TO INDICATE MODEL NO. (EXAMPLE: FOR 21 GPM C0590-21)
 4. IF ITEMS MARKED (*) ARE TO BE REPLACED OR DEPT AS SPARES, THIS WILL NECESSITATE THE ORDERING ALL ITEMS MARKED (*), PER VALVE ASSY, BECAUSE OF IMPROVED DESIGN. ALL SUBSEQUENT ORDERS REQUIRE ONLY THE ORDERING OF ITEM DESIRED.

ABBREVIATIONS

- P — PRESSURE
- TC — TOP CYLINDER
- BC — BOTTOM CYLINDER
- EX — EXHAUST
- T — TANK RETURN
- DR — DRAIN

PUMP VOL.	ORIFICE CHART						
	G.P.M.	B	G	H	L	M	N
10	1/8		1/32	5/32	#60 (.040)	#53 (.0595)	1/32
14	5/32		1/32	3/16	#60 (.040)	#53 (.0595)	1/32
21	7/32		#60 (.040)	1/4	#60 (.040)	#53 (.0595)	1/32
23.5	7/32		#60 (.040)	1/4	#60 (.040)	#53 (.0595)	1/32
29	17/64		1/32	19/64	#60 (.040)	#52 (.0635)	1/32
35	5/16		1/32	11/32	#60 (.040)	#51 (.067)	1/32

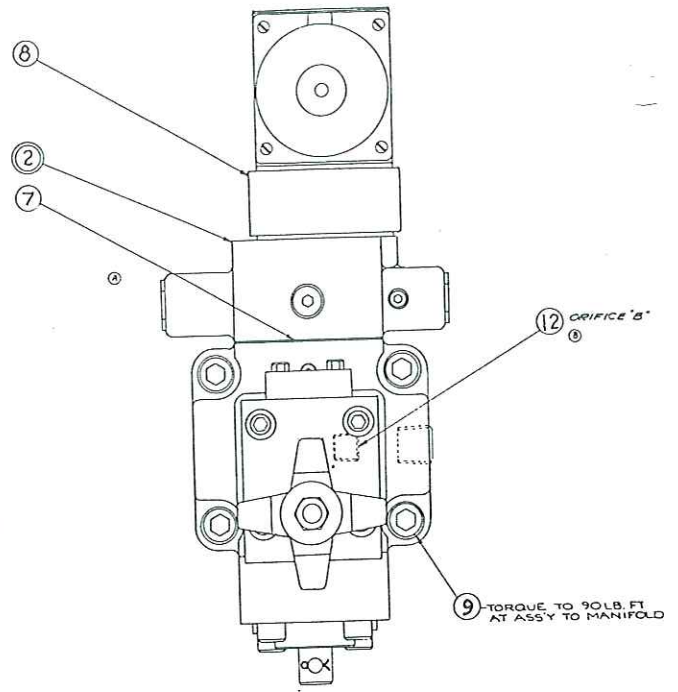
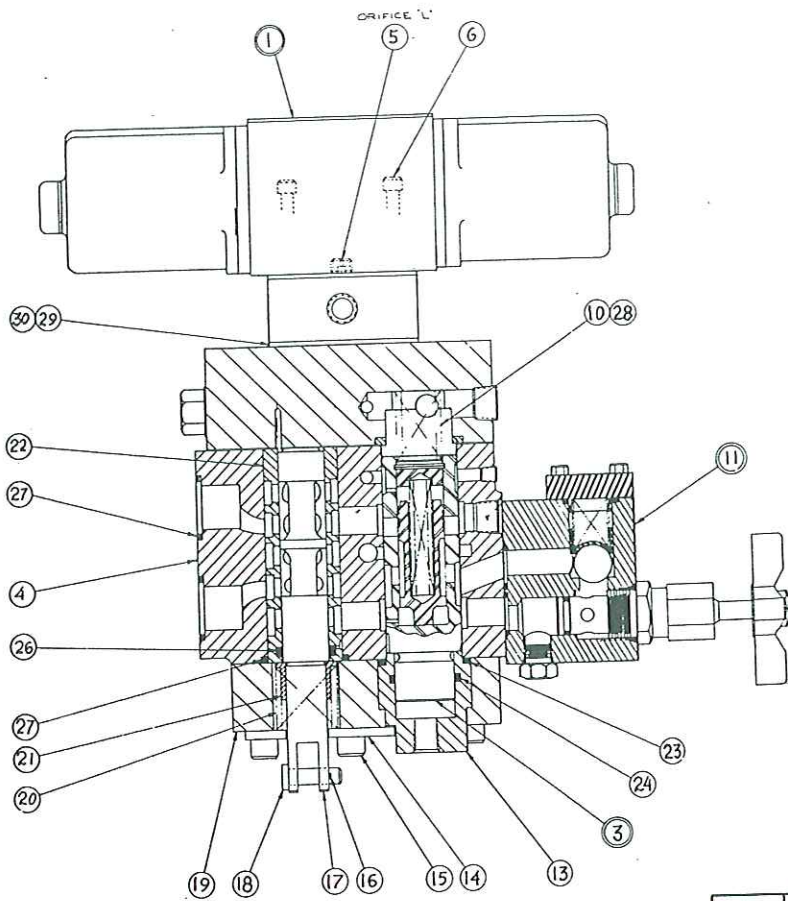
FH20
FN50



NOTES:
1. THE VALVE IS SHOWN WITH THE RAM NEARING THE END OF ITS RETURN STROKE.

WHEN USED ON "C" FRAME PRESSES REQUIRING COUNTER-BALANCE CIRCUITRY, IT IS NECESSARY TO EXTERNALLY PIPE THE "CHECK" & "RELIEF" VALVES INTO THE BOTTOM CYLINDER CIRCUIT OF THE PRESS.

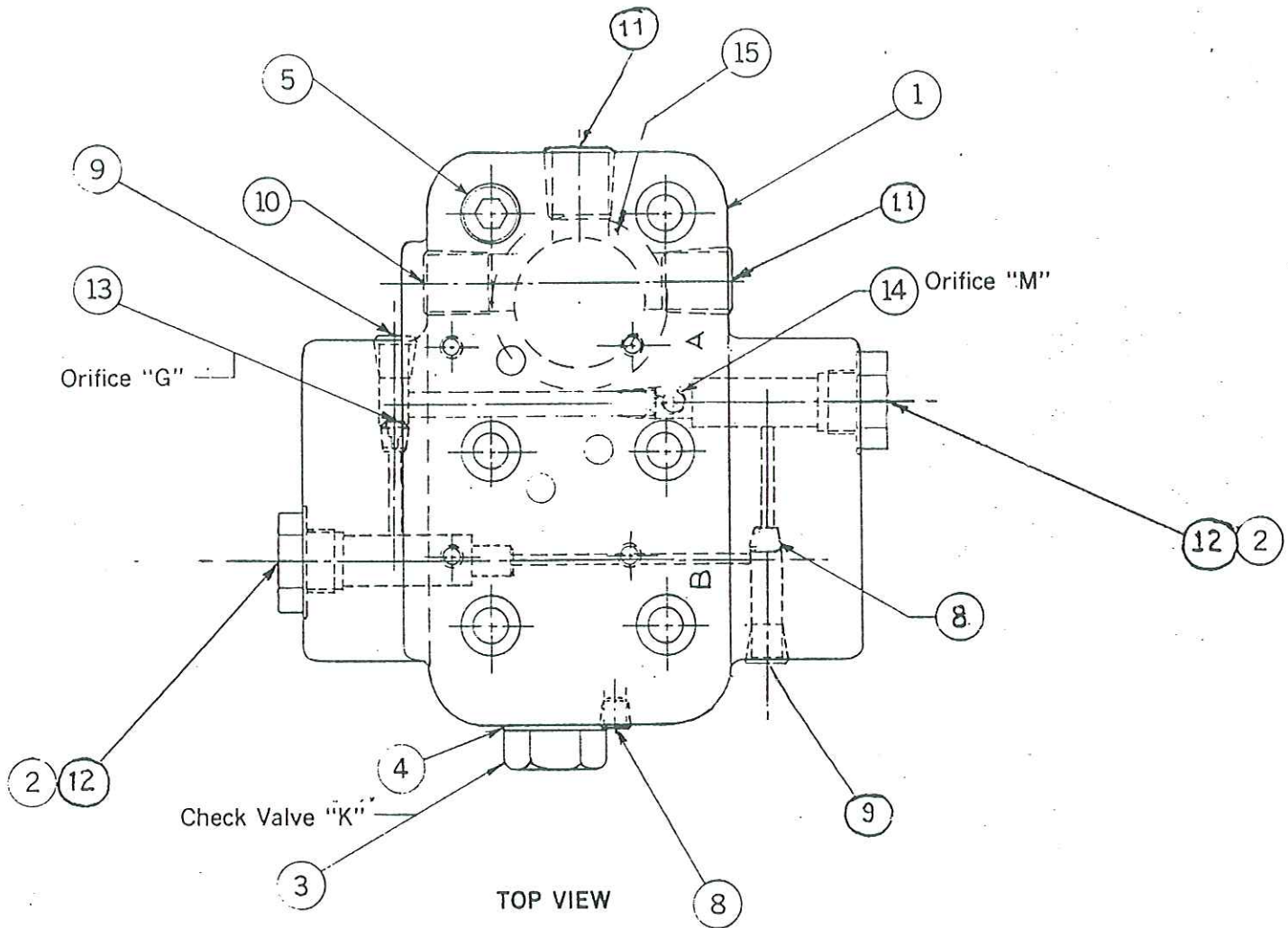
CR-7093-D-HYDRAULIC CIRCUIT, C-590 VALVES
(Electric)



**VALVE C590EPR-S5 PILOT OPERATED WITH
ADJUSTABLE SPEED CONTROL**

012-29134

ITEM	PART NO.	DESCRIPTION	QTY.
1	016-26902	Valve 1/4-4 way (DID04-33-203-03-02-1008-55)	1
2	See Fig. 23	Assy-control cap	1
3	See Fig. 20	Assy-flow control sleeve	1
4	032-43185	Body	1
5	035-17035	Orifice	1
6	358-12330	Screw S.H.C. 1/4-20 unc x 3/4	4
7	032-43191	Gasket	1
8	032-69280	Spacer - pilot pressure	1
9	358-20260	Screw S.H.C. 1/2-13 unc x 2 1/4	4
10	032-22477	Spring	1
11	See Fig. 16	Valve - speed control	1
12	032-20681	Orifice	1
13	032-69069	Body - cylinder	1
14	032-69279	Stop - spool	1
15	358-16240	Screw S.H.C. 3/8-16 unc x 2	6
16	322-03240	Pin - cotter	1
17	032-49168	Spool	1
18	321-39527	Pin - clevis	1
19	032-69071	Cap	1
20	035-22359	Spring	1
21	032-43186	Stop	1
22	032-43184	Sleeve - valve	1
23	675-00222	O-ring	1
24	675-00217	O-ring	1
25	675-00222	O-ring	1
26	675-00213	O-ring	1
27	675-00215	O-ring	4
28	345-10028	Washer	1
29	036-17184	Plate - retainer	1
30	675-00110	O-ring	4



S12-2903 CAP CONTROL

ITEM	PART NO.	DESCRIPTION	QTY.
1	032-69354	Cap—Control	1
2	488-35018	Plug #8 NIPSON Straight Thread	2
3	S12-26307	Assembly—Valve, Check "K"	1
4	032-10167	Washer	1
5	358-16240	Screw—Soc. Hd. Cap. 3/8—16 NC x 2" Lg.	6
6			
7			
8	431-90104	Plug—1/16" Soc. Pipe	2
9	431-90204	Plug—1/8" Soc. Pipe	2
10	499-00514	Plug 3/8 dust	2
11	431-90604	Plug 3/8" Soc. Pipe	2
12	675-00908	O-Ring- ARP-908	2
13	032-17035	*Orifice—"G"	1
14	032-49171	*Orifice—"M"	1
15	032-49173	Stop—Sleeve	1

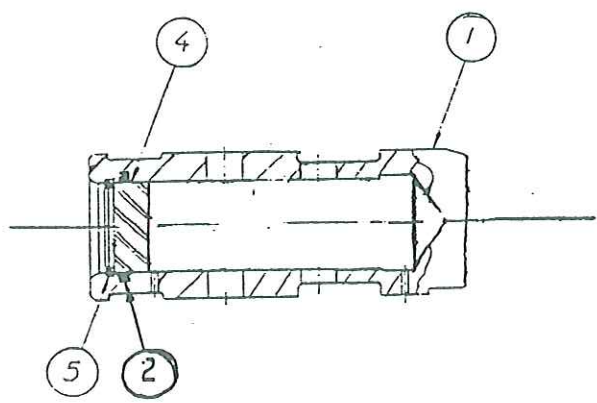
*See chart on Hydraulic Circuit for size of orifice

FOR C590 EPR & C592 EPR

parts list

or subplated adaption assembly to C-592 valve

ITEM	PART NO.	DESCRIPTION	AMT. REQ.		
			"C" Frame Presses with Threaded Pipe Conn	"C" Frame Presses with Socket Weld Pipe Conn.	Strain Rod Presses
1	032-13726	Subplate	1	1	
	032-43193	Subplate			1
2	032-42194	Flange 1 1/4"	1		
	032-42948	Flange 1"	1		
	032-13172	Flange 1 1/4"		1	
	032-13730	Flange 1"		1	
3	464-00001	Connection 1 1/4" (complete with o-ring, mt'g screws and lock washers)			2
	464-00002	Connection 1 1/2" (complete with o-ring, mt'g screws and lock washers)			2
4	358-16240	Socket Hd. Cap Screw 3/8"—16 x 2 Lg.	4	4	
	358-24300	Socket Hd. Cap Screw 5/8"—11 x 2 3/4 Lg.	4	4	
	306-26280	Hex Hd. Cap Screw 3/4"—10 x 2 1/2 Lg.	6	6	
5	630-42300	Vicker Seal	2	2	
6	671-00220	O-ring	1	1	
7	671-00223	O-ring	1	1	

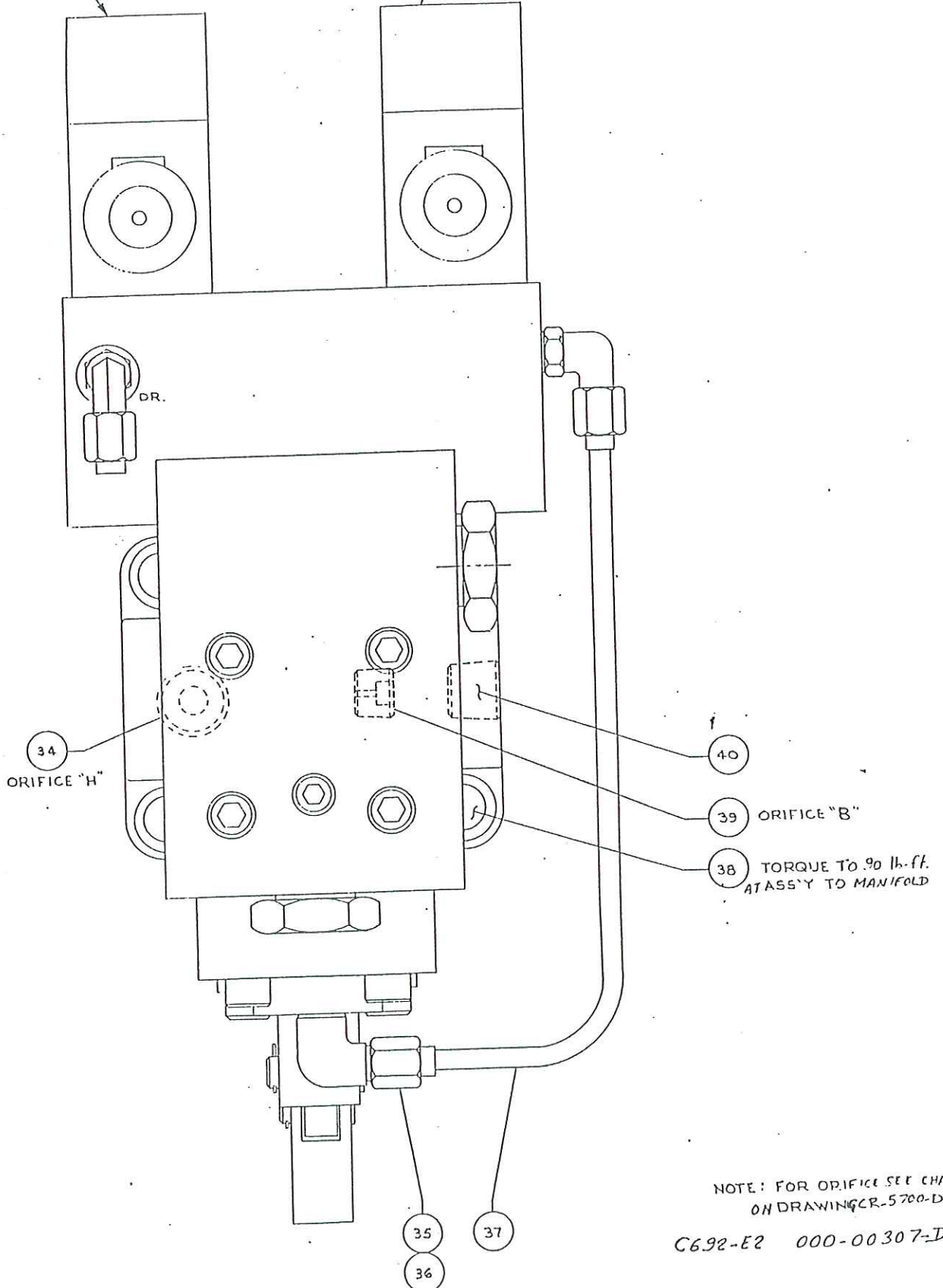


S12-48673 DIFFERENTIAL SLEEVE ASSEMBLY

ITEM	PART NO.	DESCRIPTION	QTY.
1	032-53447	Sleeve—Flow Control	1
2	675-00119	"O" Ring - ARP-119	1
4	032-69067	Button	1
5	356-30093	Ring—Retaining, Internal Type	2

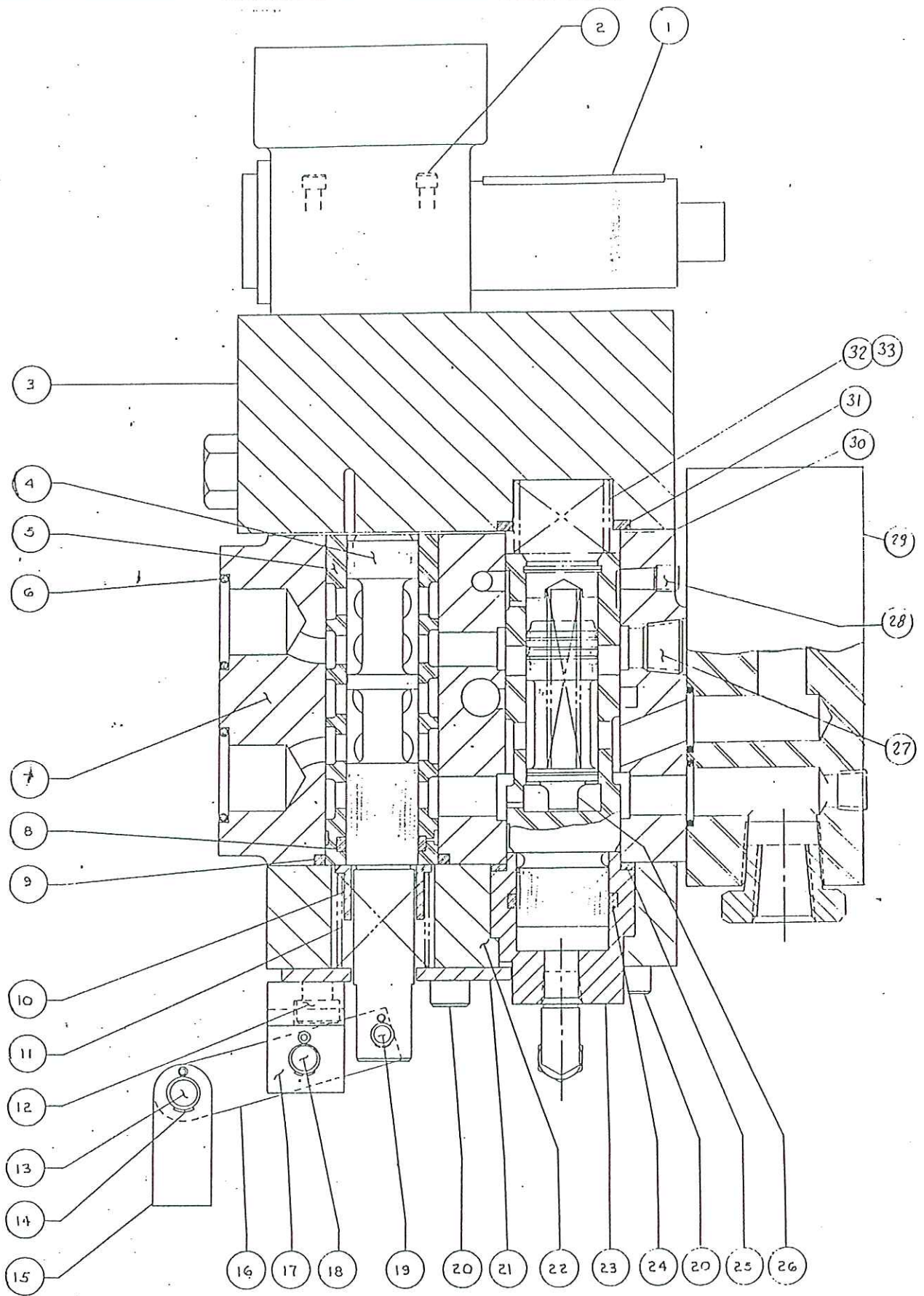
PILOT VALVE

SPEED CONTROL VALVE



NOTE: FOR ORIFICE SEE CHART
ON DRAWING CR-5700-D

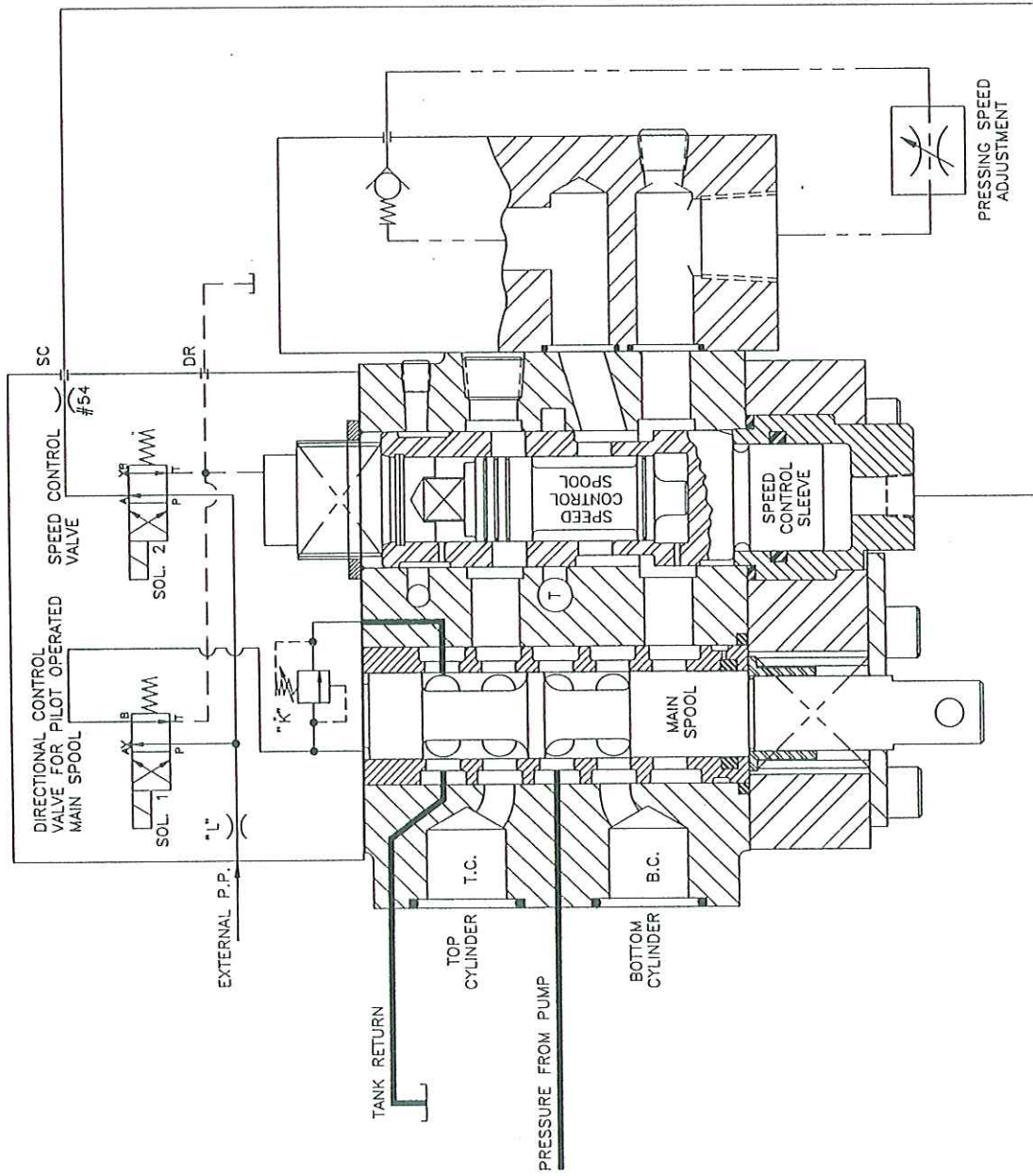
C692-E2 000-00307-D



C692-E2 000-00307-D

BILL OF MATERIAL		CHECKER	MULTIPRESS®	000-00307-D		
ISSUED 4-22-87		DRAFTSMAN		SHEET NO. 2 OF 2		
REVISED				KRK	COLUMBUS, OHIO 43215	
AMT.	PART NO.	DESCRIPTION			ITEM	
1	S12-15910-Y	ASSEMBLY-EXTERNAL ORIFICE BLOCK			29	
1	032-43191-Z	GASKET-VELLUMOID			30	
1	032-49173-A	STOP-SLEEVE			31	
1	032-22359-Z	SPRING			32	
1	345-10028	WASHER 7/16 SAE FLAT			33	
1	032-49172-Z	ORIFICE "H"			34	
1	473-10604	FITTING MALE ELBOW #6 CBTX-S			35	
1	035-12758-A	ORIFICE # 54			36	
2FT	803-06035	TUBE 3/8 O.D. X .035W			37	
4	358-20260	SCREW SHC 1/2-13 UNC X 2 1/4 LG			38	
1	032-20681-Z	ORIFICE "B"			39	
1	431-90800	PLUG 1/2			40	

BILL OF MATERIAL		CHECKER	MULTIPRESS®	000-00307-D
ISSUED 4-22-87		DRAFTSMAN		SHEET 1 OF 2
REVISED		KRK	COLUMBUS, OHIO 43215	
TITLE		DATE PRINTED		SHOP ORDER NO.
ASSEMBLY-VALVE EXTERNAL OR INTERNAL PILOT OPERATED WITH EXTERNAL ORIFICE BLOCK				
MODEL NO.		REFERENCE INFORMATION		QUANTITY
C-692-E2		INST.		
		ASSY.		
		HYD.	MSK-00093	
		ELEC.	CR-5700-D	
AMT	PART NO.	DESCRIPTION		ITEM
2	536-00001	VALVE 4-WAY (A-3D01-35-111-01-01-00A5-01A28)		1
8	359-09240	SCREW SHC #10-32 UNFX 2LG		2
1	000-00301-C	ASSEMBLY-CONTROL CAP		3
1	032-49168-B	SPOOL		4
1	032-43184-Y	SLEEVE-VALVE		5
4	675-00215	O RING		6
1	032-43185-D	BODY		7
1	675-00213	O RING		8
1	675-00222	O RING		9
1	032-43186-Z	STOP		10
1	35-22359-Z	SPRING		11
2	358-16260	SCREW SHC 3/8-16 UNC X 2 1/4 LG		12
1	321-39725	PIN-CLEVIS		13
3	322-03240	PIN-COTTER 3/32 X 3/4		14
1	35-13728-Z	LINK-ADJUSTING		15
1	35-13727-Z	LINK-SHIFTER		16
1	35-17480-Z	BRACKET-SUPPORT		17
1	321-39735	PIN-CLEVIS		18
1	321-39527	PIN-CLEVIS		19
4	358-16240	SCREW SHC 3/8-16 UNC X 2 LG		20
1	032-69279-A	STOP-SPOOL		21
1	032-69071-C	CAP-BOTTOM VALVE		22
1	032-69069-B	BODY-CYLINDER		23
1	675-00217	O RING		24
1	675-00222	O RING		25
1	S12-15911-Z	ASSEMBLY-FLOW CONTROL SLEEVE		26
1	431-90604	PLUG-FLUSH 3/8		27
4	431-90104	PLUG-1/16 PIPE		28



① AT SHUT-DOWN

MOTOR OFF

PUMP STOPPED

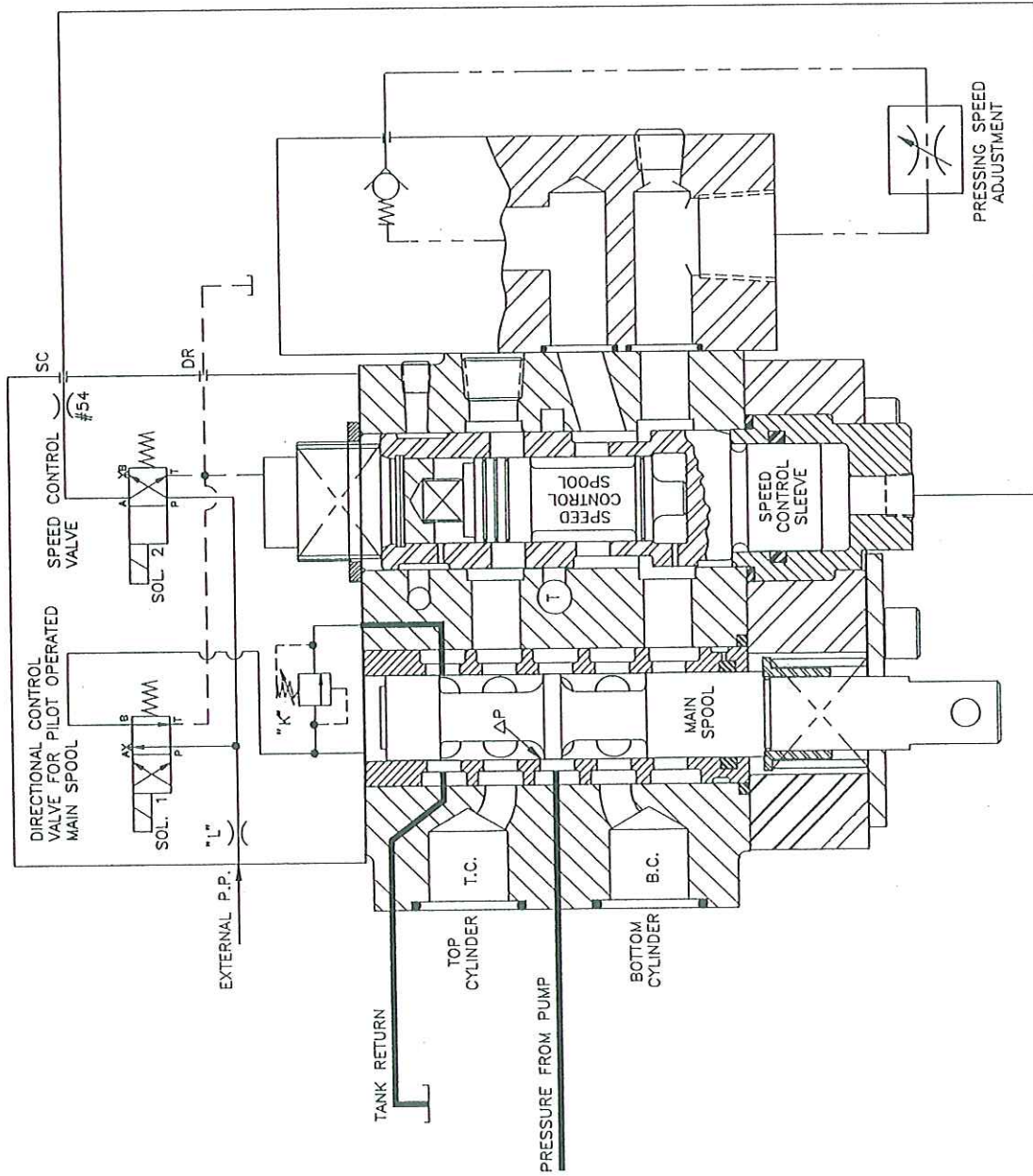
SOL. 1 - NOT ENERGIZED

SOL. 2 - NOT ENERGIZED

MULTIPRESS.
Columbus, Ohio 43215

C-692-E2 CONTROL VALVE
ASSEMBLY

DES. DPH	DR.	DPH	CK.	DATE	09/19/95
SCALE	SH	1			
FULL	OF	1			



② IDLE
AT COUNTERBALANCE
POSITION

PUMP RUNNING

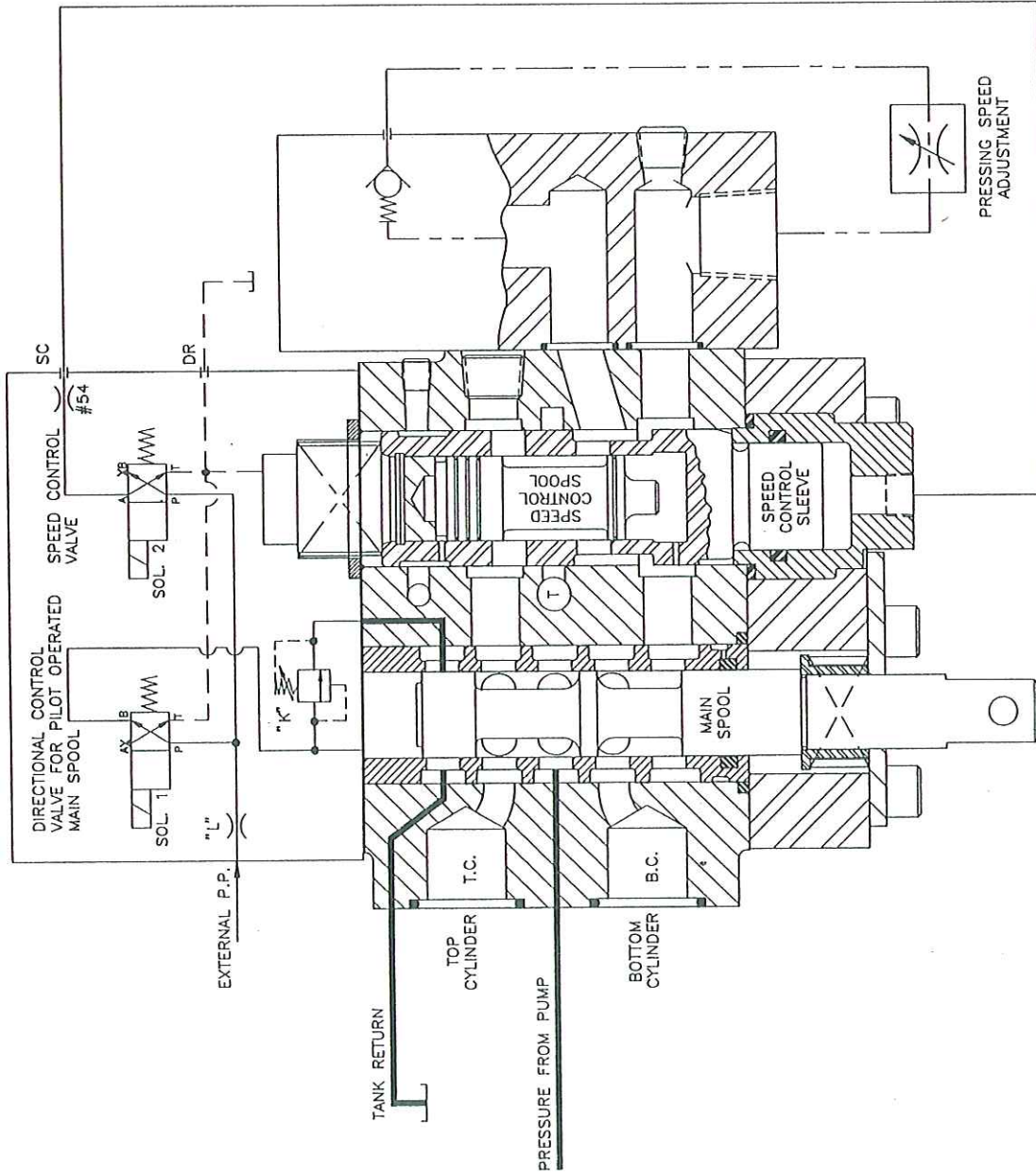
SOL. 1 - NOT ENERGIZED
SOL. 2 - ENERGIZED

MULTIPRESS.

Calmbus, Ohio 43215

C-692-E2 CONTROL VALVE
ASSEMBLY

DES. DPH	DR.	DPH	CK.	DATE	08/06/95
SCALE	SH	1			
FULL	DF	1			2



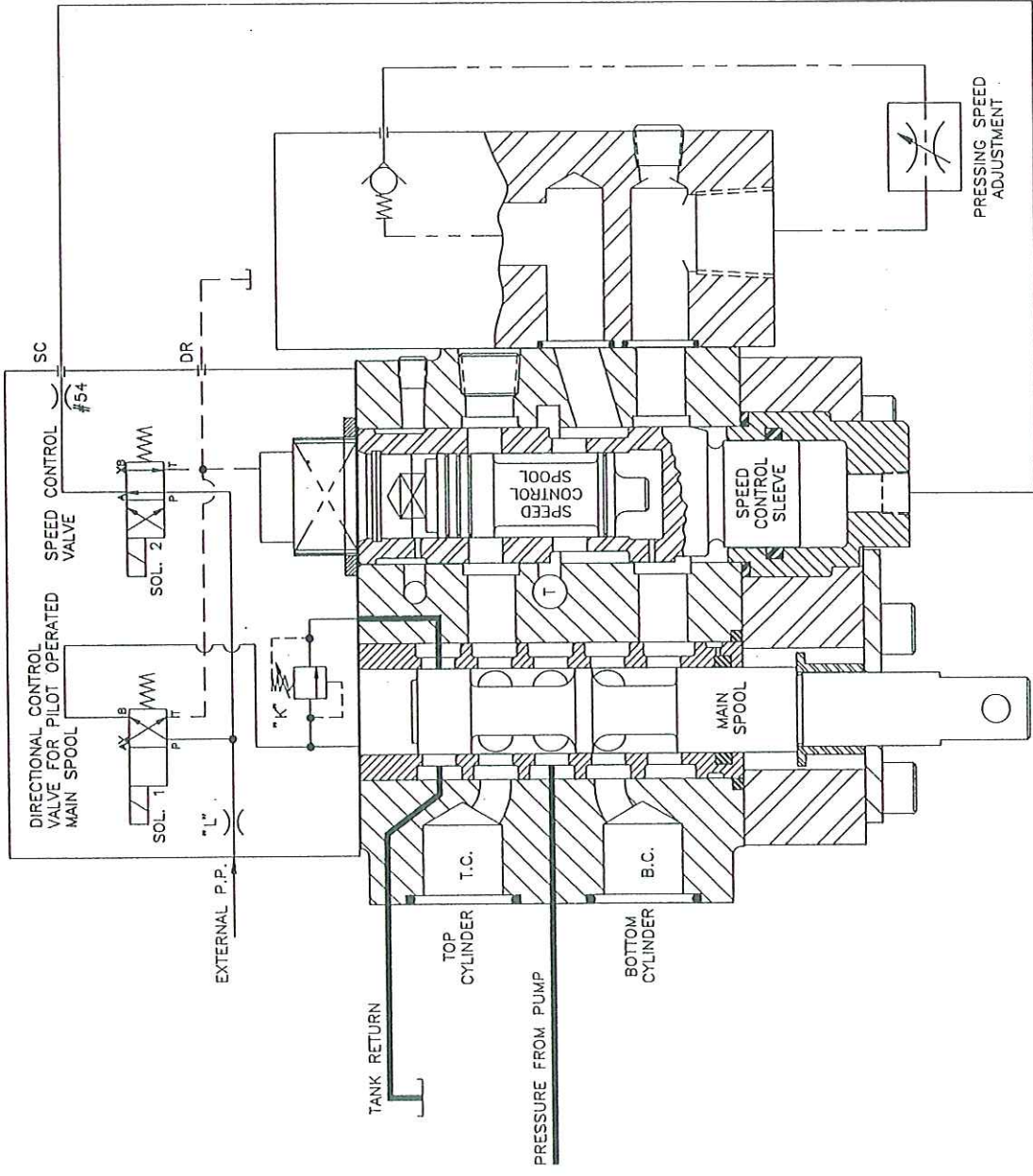
③ DIFFERENTIAL DOWN
(REGENERATIVE)

SOL. 1 - ENERGIZED
SOL. 2 - ENERGIZED

MULTIPRESS.
Columbus, Ohio 43215

C-692-E2 CONTROL VALVE
ASSEMBLY

DES.	DPH	DR.	DPH	CK.	DATE	09/07/95
SCALE	SH	1	OF	1		
FULL						3



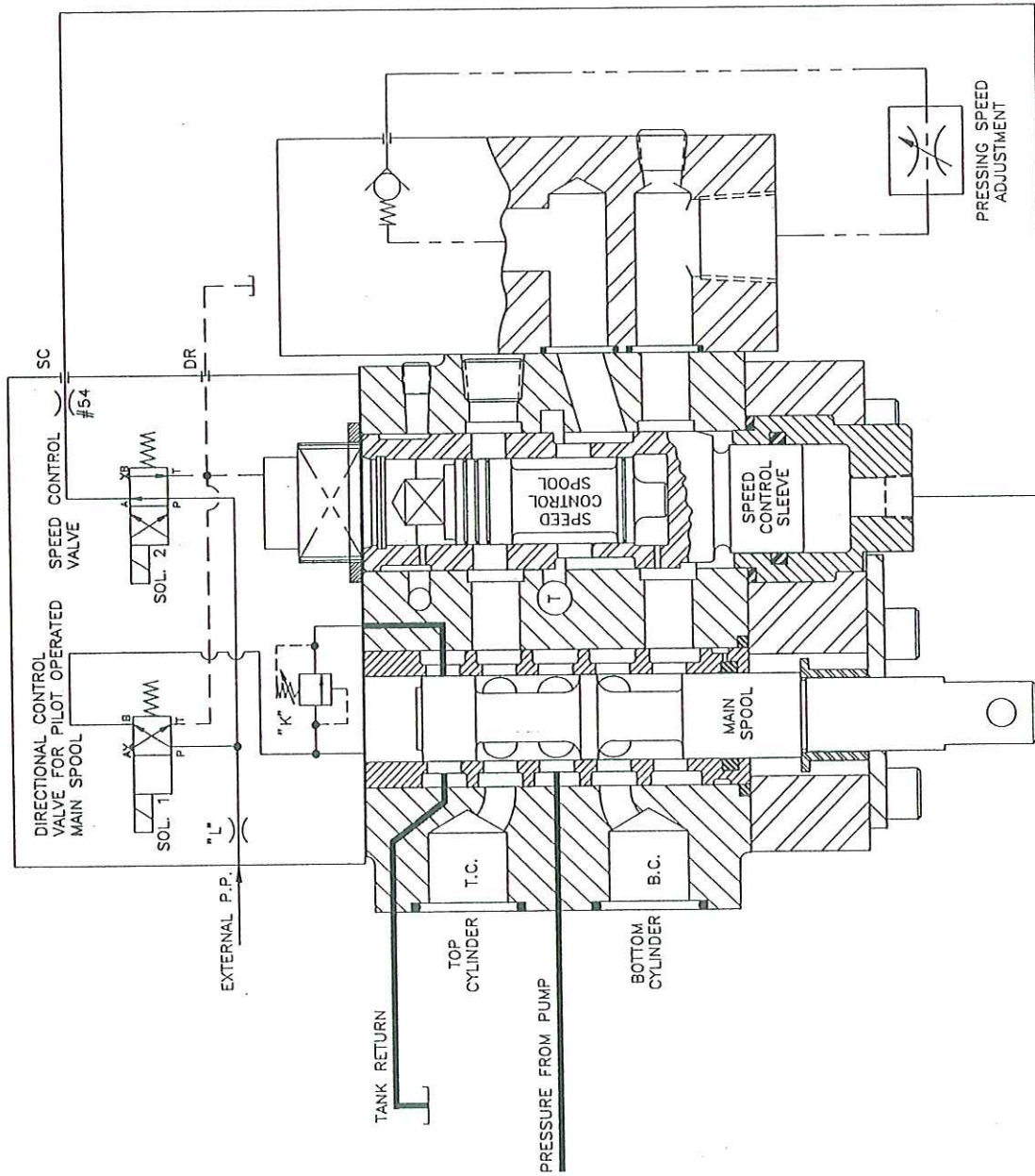
④ SPEED CONTROL
DOWN

SOL. 1 - ENERGIZED
SOL. 2 - NOT ENERGIZED

MULTIPRESS
Columbus, Ohio 43215

C-692-E2 CONTROL VALVE
ASSEMBLY

DES.	DPH	DR.	DPH	CK.	DATE	09/13/95
SCALE	SH	1	OF	1	4	



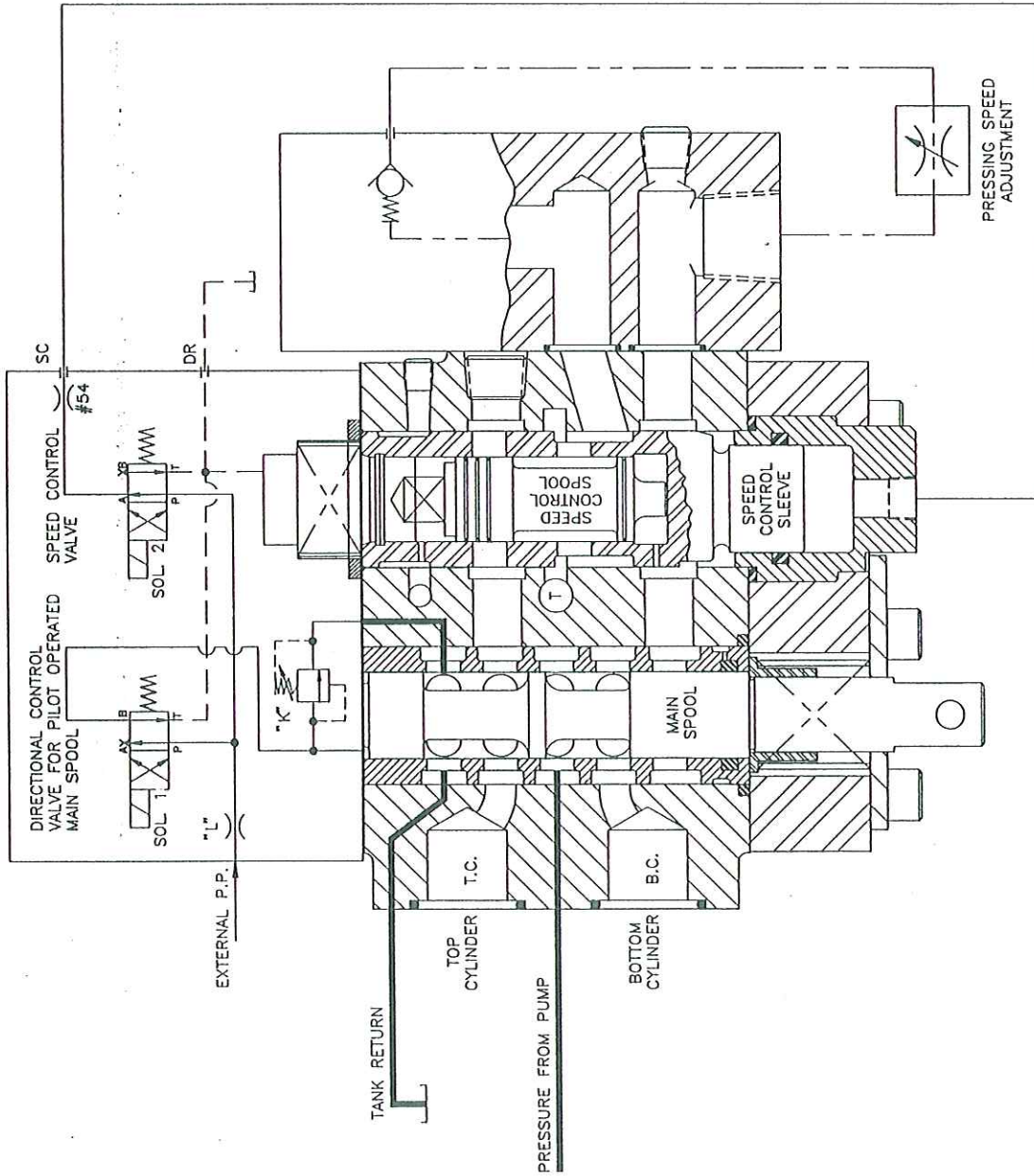
④ PRESSING AND/OR TIME DELAY

SOL. 1 - ENERGIZED
SOL. 2 - NOT ENERGIZED

MULTIPRESS.
Columbus, Ohio 43215

C-692-E2 CONTROL VALVE ASSEMBLY

DES. DPH	DR	DPH	CK.	DATE	09/20/95
SCALE	1	1			
FULL	OF	1			4A



⑤ RETURN STROKE

SOL. 1 - NOT ENERGIZED
 SOL. 2 - NOT ENERGIZED

MULTIPRESS.
 Columbus, Ohio 43215

C-692-E2 CONTROL VALVE
 ASSEMBLY

DES. DPH	DR.	DPH	CK.	DATE	09/14/95
SCALE	SH	OF			
FULL	1	1			

**SEQUENCE OF OPERATION OF "MULTIPRESS" MODEL C-692E2
(PILOT OPERATED, SOLENOID CONTROLLED) VALVE**

MULTIPRESS C-692E-2 press control valve provides a regenerative (differential) circuit for fast approach and an adjustable pressing speed during the down stroke of the press ram (slide).

This valve may be operated either for distance reversal or pressure reversal. It is provided with a handwheel inching control for ease of tool set up, adjustment of the working stroke length and setting of the operating pressure.

Two single solenoid 4-way valves control the pilot pressure for various ram actions. The valve with SOL.1 causes ram down stroke when maintained energized - and makes the ram retract when de-energized. The valve with SOL.2 provides ram down speed control when kept de-energized.

1. AT SHUT DOWN, PUMP-MOTOR OFF, SOLENOIDS DE-ENERGIZED

The ram in extended position. It was either drifted down since there was no pressure, or was left at down position before the press was shut down.

The main spool is up, the speed control sleeve and the speed control spool are in down positions, forced by their respective springs.

The pressure port is open to the bottom cylinder port, and the top cylinder port is open to the tank return port.

**2. IDLING, PUMP-MOTOR RUNNING, SOL.1 DE-ENERGIZED, SOL.2
EITHER DE-ENERGIZED OR ENERGIZED**

As soon as the pump starts running, pressure to the bottom cylinder port causes the ram to retract to the point where the control arm (banjo) attached to the ram contracts the upper stop collar on the shipper rod, pushing the shipper rod up, thus pulling the main spool down against the bottom spring. At this position, the pressure, bottom cylinder, and the top cylinder ports are open to the tank return port. Hydraulic fluid delivered by the pump returns to the reservoir through the tank return port. Back pressure created at pressure port acting on the bottom cylinder area automatically provides the counter balancing force and prevents the ram drifting as long as the pump is running.

If the valve is used in a press with heavy tooling and platen, then a counter balance valve must be provided at the bottom cylinder port of the cylinder to prevent drifting at idling, and free falling at down stroke.

3. DIFFERENTIAL (REGENERATIVE) APPROACH. BOTH SOL.1 AND SOL.2 ENERGIZED

The pilot pressure through the directional control valve (SOL.1) shifts the main spool down against the spring. Pump output through the top cylinder port causes the ram to extend. Exhaust flow from the bottom cylinder goes through the speed control sleeve assembly, holding the speed control spool shifted up, and joins to pump flow which was going to the top cylinder, thus provides a differential (regenerative) fast approach of the ram.

There is no return flow to the reservoir during the differential approach of the ram.

4. SPEED CONTROL DOWN, SOL.1 ENERGIZED, SOL.2 DE-ENERGIZED

Speed control of the fast approaching ram may be started at any point of the down stroke, by de-energizing SOL.2 with a limit switch. However, SOL.1 must be kept energized in order to continue down stroke of the ram. As soon as SOL.2 is de-energized, pilot pressure shifts the speed control sleeve thus diverting the exhaust flow to the adjustable orifice.

Pressure drop at the adjustable orifice (a needle valve) causes the speed control spool within the sleeve assembly to shift against the spring. This allows some of hydraulic fluid that was going to top cylinder to bleed-off and return to the reservoir with the exhaust flow coming out of the adjustable orifice.

The rate of bleed-off from top cylinder is proportional to pressure drop at the adjustable orifice (pressing speed adjustment valve). The more the needle valve is closed, the higher is the pressure drop, and therefore, the higher is the rate of bleed-off. The higher rate of bleed-off causes the slower speed control (pressing speed) down.

4A. PRESSING AND/OR TIME DELAY SOL.1 ENERGIZED, SOL.2 DE-ENERGIZED

The ram extends at pressing speed and contacts the work piece, the pressure at the top cylinder increases to the relief valve setting. The relief valve dumps the pump flow to the reservoir, the ram stops but the pre-set pressure is maintained at top cylinder. Since there is no flow through the adjustable orifice, the speed control spool is pushed down by the spring, thus opening the bottom cylinder to tank return at no pressure. Then the ram

exerts a force, determined by the relief valve, to the work piece, as long as SOL.1 is kept energized.

A pressure switch provided to sense when the relief valve reaches to the pre-set pressure. The signal from the pressure switch either de-energizes SOL.1 or starts a pre-set timer to de-energize SOL.1 at a later time.

5. RETURN STROKE SOL.1 AND SOL.2 DE-ENERGIZED

As soon as SOL.1 is de-energized, pilot pressure to the main spool is stopped. The spring shifts the main spool up, the pump flow is diverted to the bottom cylinder, and the top cylinder connected to tank return. The ram starts the return stroke, and stops at idle position when the control arm (banjo) contacts and pushes the upper stop collar on the shipper rod, thus pulling the main spool down far enough to return the pump flow to the reservoir, yet to maintain the counter balance pressure at bottom cylinder port.

DISTANCE REVERSAL OPERATION

When the press is operated at Distance Reversal mode, a limit switch at the point of reversal may de-energize SOL.1, and causes the ram to return to idle position.

Or the press operator may release cycle start button(s) at the point of reversal to de-energize SOL.1 to return the ram to idle position.

In either way of distance reversal, the pressure may not reach to the pre-set value of the relief valve, when the ram is reversed.

If the pressure reaches to the pre-set value of the relief valve before the point of reversal, the signal from the pressure switch must be ignored in order to maintain the down stroke.

PRESSURE REVERSAL OPERATION

If the press is operated at Pressure Reversal mode, when the pressure reaches to the pre-set value of the relief valve, then the signal received from the pressure switch is used to de-energize SOL.1 which causes the ram to return to idle position.

TIME REVERSAL OPERATION

In this mode, the signal received from the pressure switch starts a timer, the ram holds down under pre-set pressure, and returns to idle position after the pre-set time runs out.

INCHING

At inch mode SOL.1 and SOL.2 maintained de-energized. The main spool is pulled down far enough by turning the handwheel so that flow path to the tank return port is restricted and the pressure drop created at that point is reflected to the top cylinder thus causing the ram to start moving down. As the ram moves down, the control arm (banjo) gets away from the upper stop collar and the shipper rod drops off until upper stop collar rests on the control arm. This movement raises the main spool to relieve pressure at top cylinder and to increase counter balancing pressure at top cylinder and to increase counter balancing pressure, thus the ram stops. The ram continues to move down as long as the handwheel is kept turning.

If the handwheel is turned in the opposite direction, then the main spool is pushed up far enough to increase the counter balancing pressure thus causing the ram to move up. The control arm pushes upper stop collar, and the shipper rod pulls the main spool until counter balancing pressure becomes low enough so the ram stops. The ram continues to move up as long as the handwheel is kept turning.

SETTING THE OPERATING STROKE LENGTH

By inching up or down, the upper stop collar on the shipper rod may be set at a point to provide the required operating stroke length.

ADJUSTING THE RELIEF VALVE SETTING

The ram may be inched down until the attached tooling contacts the work piece. Turning the handwheel further pulls the main spool down until the passage from top cylinder to tank return is completely closed. Then the pressure at top cylinder rises to the present setting of the relief valve. The relief valve setting may now be adjusted to required value while the ram is held against the work piece. Then the ram may be raised up to the idle position again by turning the handwheel in the opposite direction.

PILOT PRESSURE

C-692E-2 valve may be assembled for either external or internal pilot pressure. "L" orifice limits the flow rate of the pilot flow.

An orifice in the pressure port of the valve creates the pilot pressure.

External pilot may be provided from another pressure source within the hydraulic system.

“K” check valve is factory set to open at about 300 PSI and limits the pilot pressure which shifts the main spool.

CYCLE START AND EMERGENCY REVERSE

The electric control circuit to be designed such that cycle may only be started with anti-tie-down dual pushbuttons for the safety of the press operator.

Momentary actuation of the Emergency Reverse button should de-energize SOL.1 and cause immediate reversal of the ram to return to idle position.

C-692E-2 valve may be electrically coupled with an index table, a shuttle feed, or a feeder device for automatic cycling. In this case necessary safety devices such as guards, interlock switches, light curtains etc. must be provided for safety of the press operator.

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