

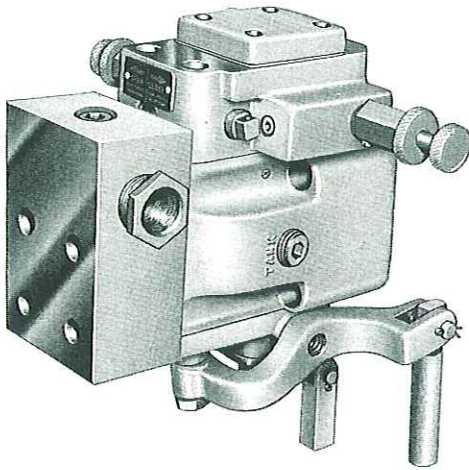
BULLETIN SMV-492-A

Denison Division

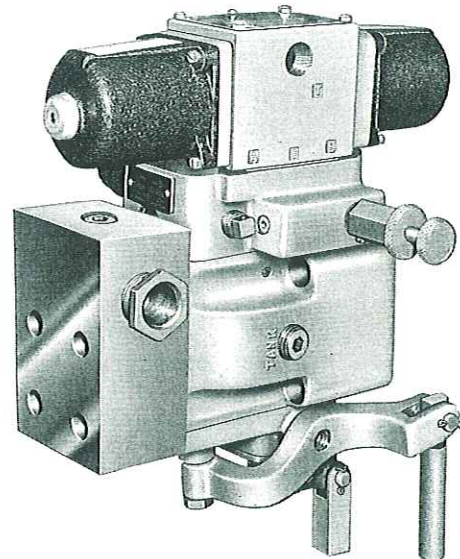
service information

Model C-492

Denison Multipress Control Valve



C-492-M - MANUAL VALVE



C-492-E - ELECTRIC VALVE

Abex

AMERICAN BRAKE SHOE

SEQUENCE OF OPERATION OF PILOT OPERATED C-492-M VALVE

The C-492-M is a special four-way valve, which 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 sequence 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 "A."
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. 1 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 needle valve "D," orifice "C" and check valve "F."
4. When ram contacts the work to be pressed, the exhaust flow stops and "flow control spool" 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 orifices "J," "C," needle valve "D" and orifice "A."
7. "Main spool" being shifted to the extreme up position, ram reverses, goes up and stops against "upper stop collar," thus completing a cycle.
8. Orifice "C" restricts exhaust oil flow, which runs to tank through check valve "F" and "K," holding "main spool" down during controlled pressing speed.
9. Orifice "J" determines 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.
10. 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.
11. "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.
12. In case of emergency, during differential fast approach, just release the manual operating controls, "main spool" shifts to up position. The ram therefore reverses.
13. *NOTE: 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 shift the "main spool" by pushing down the manual operating controls: Ram will start down.
3. Speed of the ram may be controlled by manipulation of the manual operating controls.
4. Ram reverses as soon as the manual operating controls are released.

SEQUENCE OF OPERATION OF PILOT OPERATED C492-E VALVE

The C492-E is a special four-way valve, which 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 stopping 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 sequence 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 depressing "cycle start" pushbutton.
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 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 "A."
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 "cycle start" pushbutton.
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.
14. If "Solenoid A" is de-energized by releasing "cycle start" pushbutton at any point of down stroke, the ram 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." "Solenoid A" must be de-energized by releasing "cycle start" pushbutton in order to reverse the ram.
16. Orifice "L" in "P" port of "pilot control valve" restricts the pilot oil flow to the top of main spool.
17. Check valve "K" prevents high system pressure from building up on top of "main spool."
18. 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. 1 through No. 9.
3. "Cycle start" pushbutton 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 needle valve "D," orifice "C" and check valve "F."

4. When ram contacts the work to be pressed, the exhaust flow stops and "flow control spool" 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 orifices "J," "C," needle valve "D" and orifice "A."
7. "Main spool" being shifted to the extreme up position, ram reverses, goes up and stops against "upper stop collar," thus completing a cycle.
8. Orifice "C" restricts exhaust oil flow, which runs to tank through check valve "F" and "K," holding "main spool" down during controlled pressing speed.
9. Orifice "J" determines 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.
10. 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.
11. "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.
12. 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.

13. To reverse the ram after pressing speed stated, "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 shift the "main spool" by pushing down the "inching lever," ram will start down.
3. Speed of the ram may be controlled by manipulating the "inching lever." Ram will stop when spool is centered.
4. Ram reverses as soon as "inching lever" is released.

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.

ASSEMBLY PROCEDURE (FIELD CONVERSION) TO CONVERT A C492-M VALVE TO A C492-E VALVE (ORDER KIT NO. S12-11772)

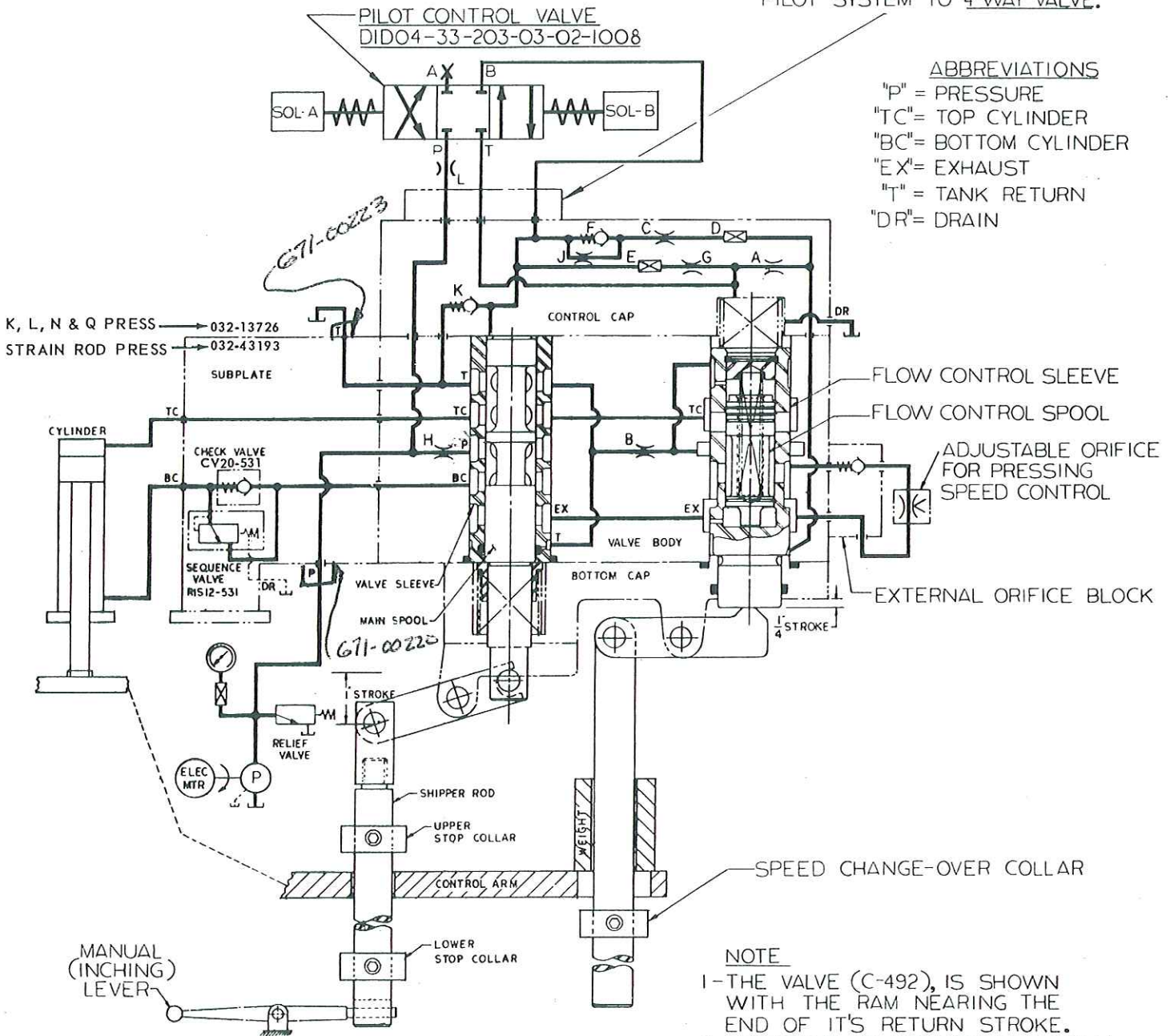
1. Remove mounting screws No. 47, top cover No. 45, seal retainer No. 46, and seals No. 48.
2. Install orifice "L" No. 42 into "P" port of 1/4", 4-way pilot valve No. 44.
3. Install 1/4", 4-way pilot valve, (including orifice "L", seal retainer and seals) to control cap (Ref:

Item No. 37 of page 8 with (4) mounting screws No. 43.

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.

PUMP VOL.	ORIFICE CHART						
G.P.M.	A	B	C	G	H	J	L
10	#60 (.040)	9/64	1/32 (.036)	#64 (.036)	5/32 (.025)	#72 (.025)	#60 (.040)
15	#60 (.040)	3/16	1/32 (.036)	#64 (.036)	3/16 (.025)	#72 (.025)	#60 (.040)
20	#60 (.040)	1/8	1/32 (.036)	#64 (.036)	1/4 (.025)	#72 (.025)	#60 (.040)
25	#55 (.052)	5/64	1/32 (.036)	#64 (.036)	11/64 (.025)	#72 (.025)	#60 (.040)
30	#55 (.052)	1/16	1/32 (.036)	#64 (.036)	19/64 (.025)	#72 (.025)	#60 (.040)
40	#55 (.052)	3/16	1/32 (.036)	#64 (.036)	11/32 (.025)	#72 (.025)	#60 (.040)

NOTE:
FOR C-492-M (MANUAL) VALVES;
INSTALL COVER PLATE, SEAL
RETAINER & SEALS TO BLOCK
PILOT SYSTEM TO 4-WAY VALVE.



ABBREVIATIONS
 "P" = PRESSURE
 "TC" = TOP CYLINDER
 "BC" = BOTTOM CYLINDER
 "EX" = EXHAUST
 "T" = TANK RETURN
 "DR" = DRAIN

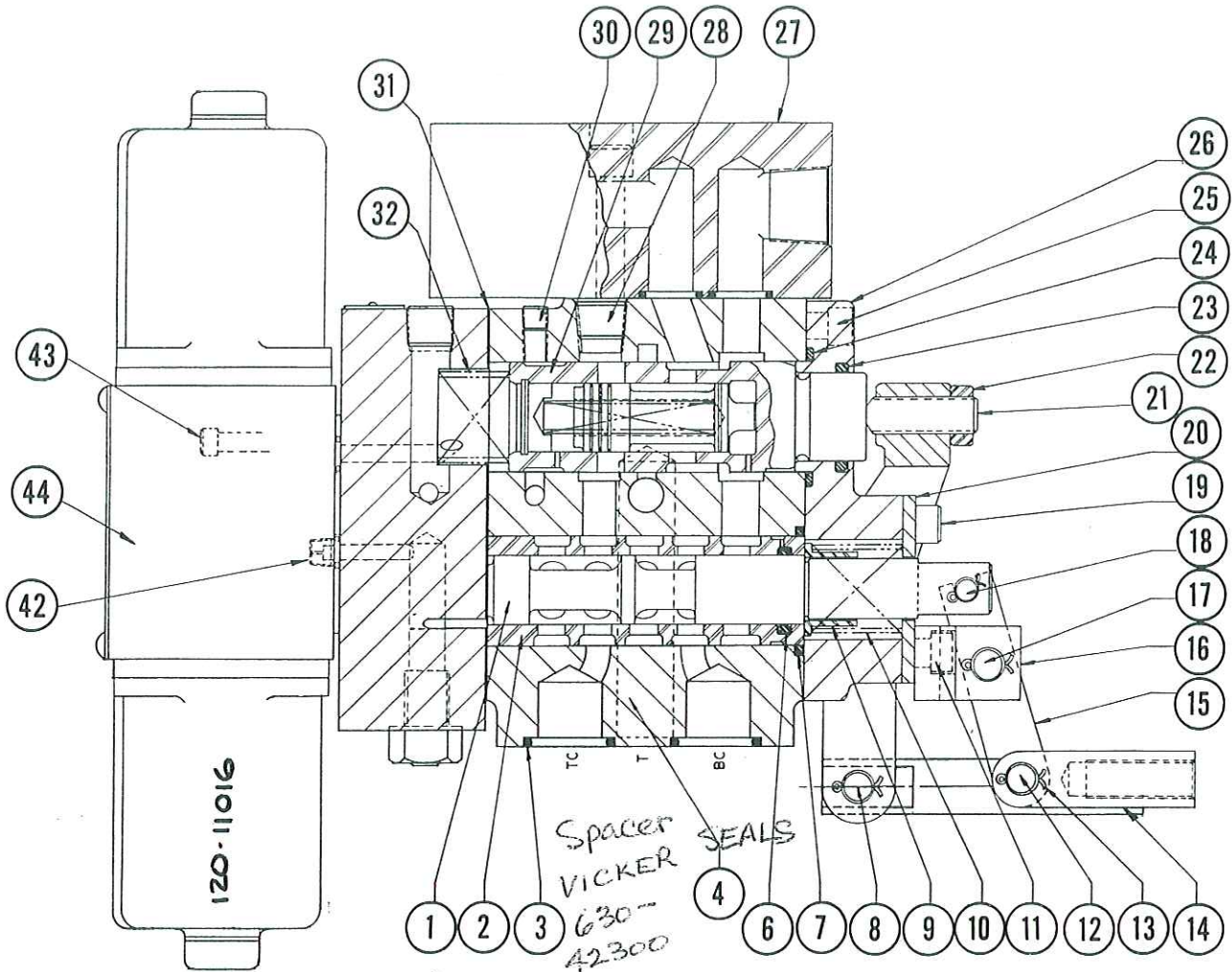
NOTE
 1-THE VALVE (C-492), IS SHOWN
 WITH THE RAM NEARING THE
 END OF IT'S RETURN STROKE.
 2-SEQUENCE OF OPERATION, C-492-M
 (MANUAL) VALVES, PAGE 1
 3-SEQUENCE OF OPERATION, C-492-E
 (ELECTRIC) VALVES, PAGE 2

CR-2201 - HYDRAULIC CIRCUIT, C-492 VALVES
 (Electric & Manual)

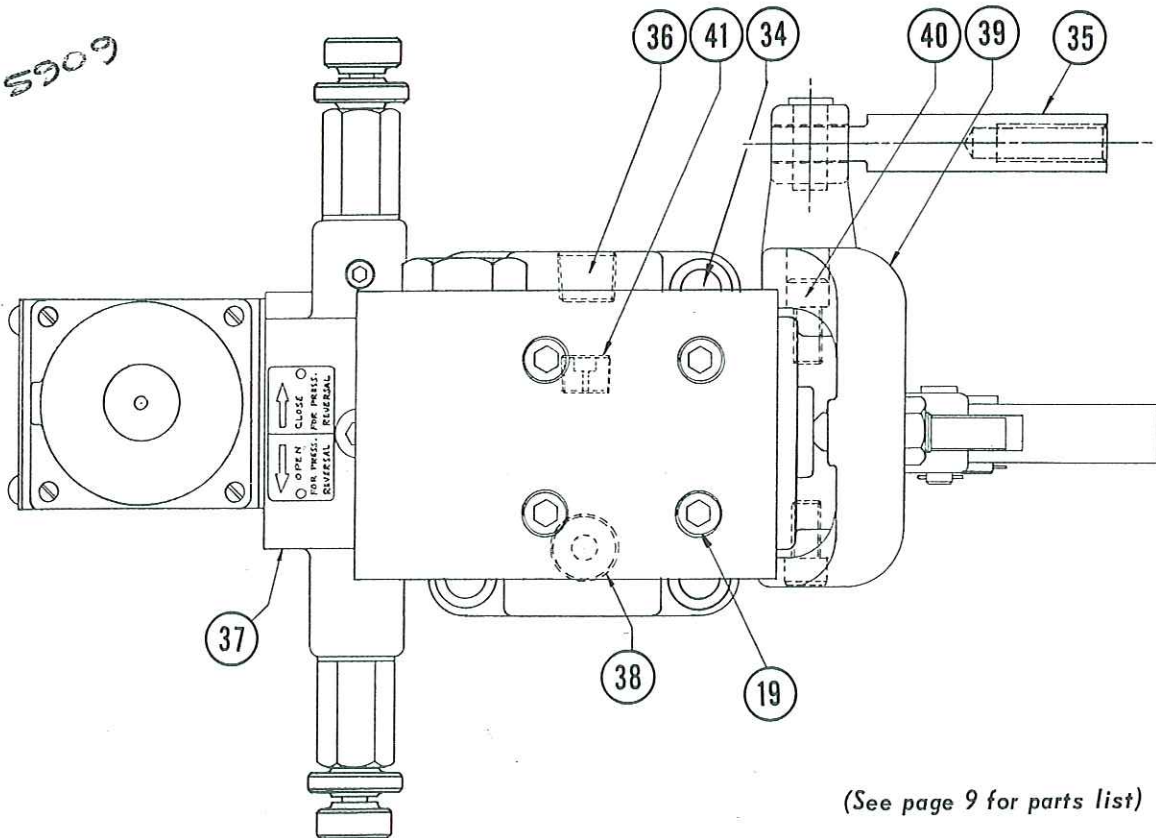
SERVICE TIPS

*IF PUMP NOT
HOLDING VOLUME
AT PSI RAM
WILL STAY DOWN*

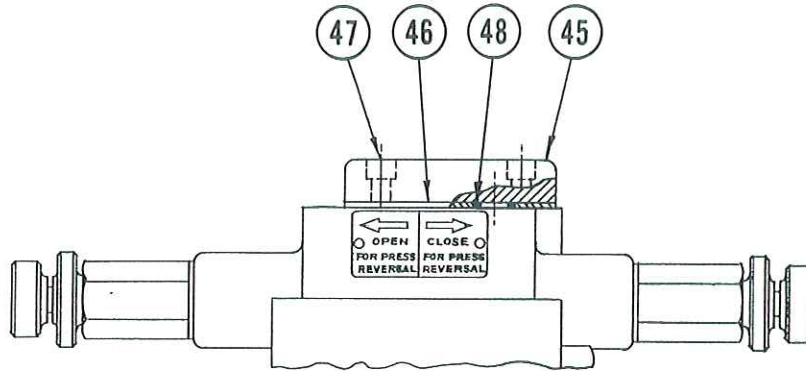
DIFFICULTIES	CAUSE	REMEDY
RAM STAYS DOWN	<ol style="list-style-type: none"> 1. Spring at bottom of main spool may be broken. 2. Dirt around shipper rod. 	<ol style="list-style-type: none"> 1. Remove and replace with new spring. 2. Clean dirt and chips away from shipper rod.
NO SPEED CONTROL	<ol style="list-style-type: 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.



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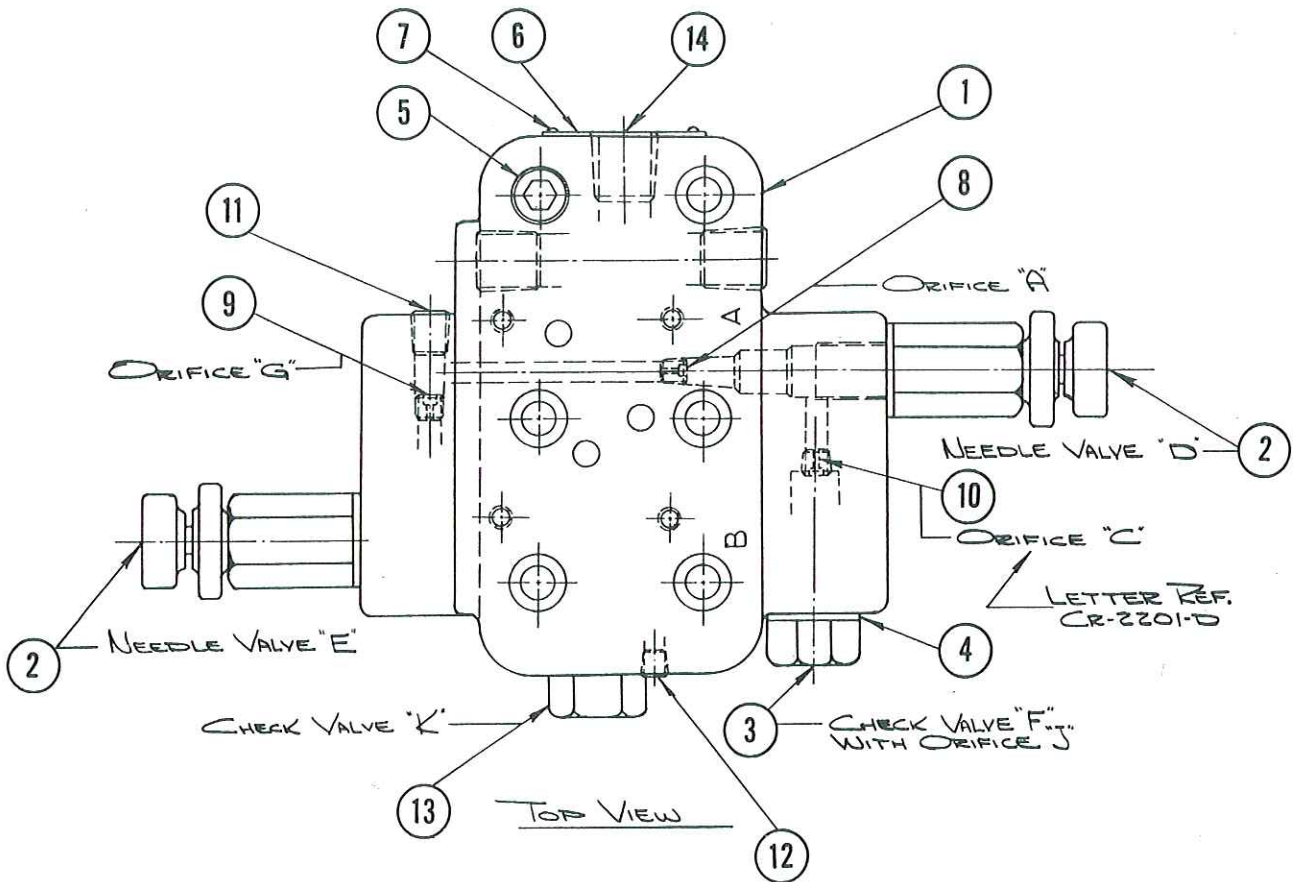


(See page 9 for parts list)



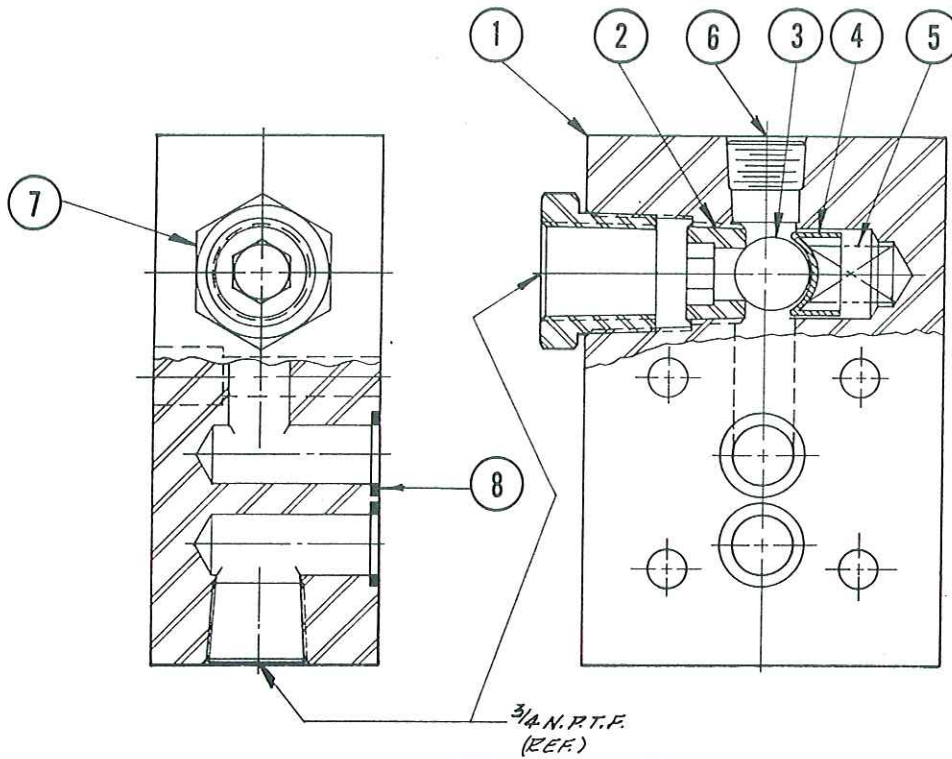
ALTERNATE VIEW
MANUAL CAP C-492-M

ITEM	PART NO.	DESCRIPTION	QTY
1	032-43183	Spool REPLACE W/ 032-49168	1
2	032-43184	Sleeve - Valve	1
3	691-00215	"O" Ring 90-6227-20	4
4	032-43185	Body - Valve	1
6	671-00213	"O" Ring 70-6227-18	1
7	671-00222	"O" Ring 70-6227-27	1
8	321-39735	Pin-Clevis 7/16" Dia. AN397-35	1
9	032-43186	Stop	1
10	032-22359	Spring - Compression, (35-12007-Y-25)	1
11	358-16260	Screw - Soc. Hd. Cap, 3/8" - 16 X 2 1/4"	2
12	321-39725	Pin - Clevis 7/16" Dia. AN397-25	1
13	322-03240	Pin - Cotter, 3/32" Dia. x 3/4"	4
14	032-13728	Link - Adjusting	1
15	032-13727	Link - Shifter	1
16	032-17480	Bracket - Support	1
17	321-39735	Pin - Clevis, 7/16" Dia. AN397-35	1
18	321-39527	Pin - Clevis, 5/16" Dia. AN395-27	1
19	358-16240	Screw - Soc. Hd. Cap, 3/8" - 16 X 2"	6
20	032-20148	Stop - Spool	1
21	311-20201	Screw - Soc. Set, Oval Pt., 1/2" - 13 X 1 1/2"	1
22	335-20100	Nut - Hex Jam, 1/2" - 13	1
23	671-00217	"O" Ring 70-6227-22	1
24	671-00223	"O" Ring 70-6230-1	1
25	358-16120	Screw - Soc. Hd. Cap, 3/8" - 16 X 3/4"	2
26	032-43187	Cap - Bottom	1
27	S12-15910	Assembly - External Orifice Block see page 11	1
28	431-90600	Plug - 3/8" Soc. Pipe	1
29	S12-15911	Assembly - Sleeve, Flow Control see page 11	1
30	431-90104	Plug - 1/16" Soc. Pipe	4
31	032-43191	Gasket - Vellumoid	1
32	032-22359	Spring - Compression, (35-12007-Y-25)	1
34	358-20320	Screw - Soc. Hd. Cap, 1/2" - 13 X 3"	4
35	032-42939	Adapter - Shipper Rod	1
36	431-90800	Plug - Pipe, 1/2" N.P.T.F.	1
37	S12-15912	Assembly - Cap, Control see page 10	1
38	311-28140	Screw - Soc. Set 7/8" - 9 x 7/8" Orifice "H" See Chart on Hydraulic Circuit for Size of Orifice "H"	1
39	032-13790	Link - Valve Shifter	1
40	353-16122	Screw - Soc. Hd. Cap, 3/8" - 16 X 3/4"	2
41	431-90604	Plug - Pipe, Hex. Soc., 3/8" NPT, Orifice "B" See Chart on Hydraulic Circuit for Size of Orifice "B"	1
ALTERNATES FOR C-492-E ELECTRIC VALVE			
42	032-17035	Orifice "L" - No. 60 Drill, Locate in "P" Port of Item No. 44	1
43	358-12240	Screw - S.H.C. 1/4 - 20 X 2" Lg.	4
44	016-01489	Valve - 1/4" - "DECO" D1D04-33-203-03-02-1008	1
ALTERNATES FOR C-492-M MANUAL VALVE			
45	032-17200	Cover - Top	1
46	032-17184	Plate - Retainer	1
47	358-12120	Screw - S.H.C. 1/4" - 20 X 3/4"	4
48	671-00110	"O" Ring - 70-6227-8	3



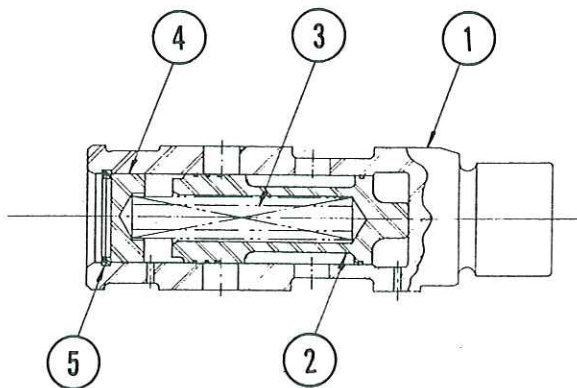
S12-15912 CAP CONTROL

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



S12-15910 EXTERNAL ORIFICE BLOCK

ITEM	PART NO.	DESCRIPTION	QTY
1	032-43188	Block	1
2	032-16441	Seat	1
3	201-24001	Ball - 3/4" Dia. Steel, H & G	1
4	032-16335	Guide - Ball	1
5	032-22280	Spring	1
6	431-90800	Plug - 1/2" Pipe, Hex. Soc.	1
7	433-91612	Bushing - Pipe, Hex. Reducing 1" to 3/4"	1
8	671-00115	"O" Ring - 70-6227-13	2



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	032-22151	Spring - Compression, Ref. 35-12003-Y-15	1
4	032-13784	Button	1
5	356-30093	Ring - Retaining, Internal Type, Walde Truarc No. 5000-93	2

DENISON

SERVICE FACILITIES

*Service is available
from the following offices:*

DECATUR, GEORGIA 30033
1845 Lawrenceville Highway
Phone: (404) 636-7579

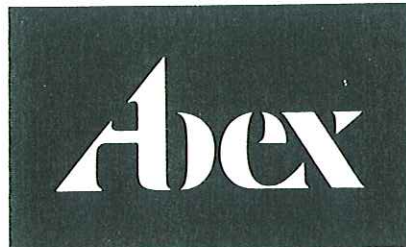
CHICAGO, ILLINOIS 60638
7000 West 63rd Street
Phone: (312) 586-3737

MAHWAH, NEW JERSEY 07430
Ramapo Valley Road
Phone: (201) 529-4550

COLUMBUS, OHIO 43216
1160 Dublin Road
Phone: (614) 488-1191

HAWTHORNE, CALIFORNIA 90250
2323 West El Segundo Blvd.
Phone: (213) 757-2246

HOUSTON, TEXAS 77008
P.O. Box 7353
3315 West 12th Street
Phone: (713) 869-3776



CORPORATION

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