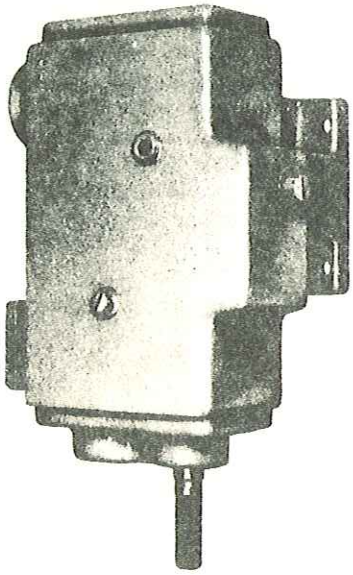
DENISON
Engineering Division

installation and service information

Multipress Control Valves

MODELS C04, C104, C09, C109

American Brake Shoe Company Columbus 16, Ohio



This is basically a four-way valve with the shuttle acting as the four-way spool. The movable sleeve, between the shuttle and the body, and the manual control spool, are the controls that cause reciprocation of the shuttle. The movable sleeve is operated by adjustable stop collars on the shipper rod, and the manual spool is actuated by an eccentric crank. A spring arrangement tends to hold the crank in "neutral", but it will lock in the automatic position and remain there until released.

For automatic operation, starting with the ram in the "up" position, the manual control spool is moved from the "neutral" position (with the control port covered and the top cylinder port open) to the "automatic" position. This opens the control port and blocks the top cylinder port. The movable sleeve is in the "up" position due to contact of the ram arm on the upper stop collar.

The oil now flows from the pump through the sequence port to the control port thus raising the shuttle against a spring. The pump volume now is directed to the top cylinder port and starts the ram down. The bottom cylinder port is open to tank through the exhaust port and orifice (R).

When the ram starts down, the sleeve also starts down as it is spring centered and the sequence port closes. As the ram starts down however, the oil from the bottom cylinder port is restricted by orifice (R). Back pressure is built up which is transmitted to the bottom of the shuttle through orifice (S) and the shuttle is maintained in its "up" position throughout the down stroke of the ram.

Reversal of the ram can be accomplished by pressure reversal or distance reversal. With pressure reversal, the ram contacts the work, which resists with a force (determined by relief valve setting) necessary to spill the relief valve. The ram therefore stops and flow from the bottom of the cylinder ceases. Thus removing the back pressure from the bottom of the shuttle. The shuttle spring returns the shuttle to its "down" position thus directing oil flow to the bottom cylinder port and opening the top cylinder port to tank, and the ram goes up.

Distance reversal is accomplished by the ram arm contacting the lower stop collar. The movable sleeve is lowered, thus partially opening the top cylinder port to tank by means of the undercut on the sleeve. At the same time the flow of oil from the bottom cylinder port is restricted.

Insufficient oil now passes through orifice (R) to maintain the back pressure necessary to hold the shuttle up against its spring, so it is forced down. When the ram arm contacts the upper stop collar, the sleeve is raised, thus opening the sequence port and closing the bottom cylinder port. If the manual control spool is still in "automatic" position, the shuttle will again be raised and the cycle will repeat.

When it is desired to cause the ram to stop at the end of a cycle in its "up" position, the control spool should be moved to the neutral position any time during the stroke. The ram arm contacts the upper stop collar on the "up" stroke, thus lifting the sleeve and opening the pump volume to tank through the sequence port.

The ram can be reversed at any point in the "down" stroke by raising the manual control spool to the "emergency reverse" position. This opens the bottom of the shuttle through the control port to tank, thus allowing the shuttle to drop. This diverts the pump volume to the bottom cylinder port and the ram will return to its "up" position.

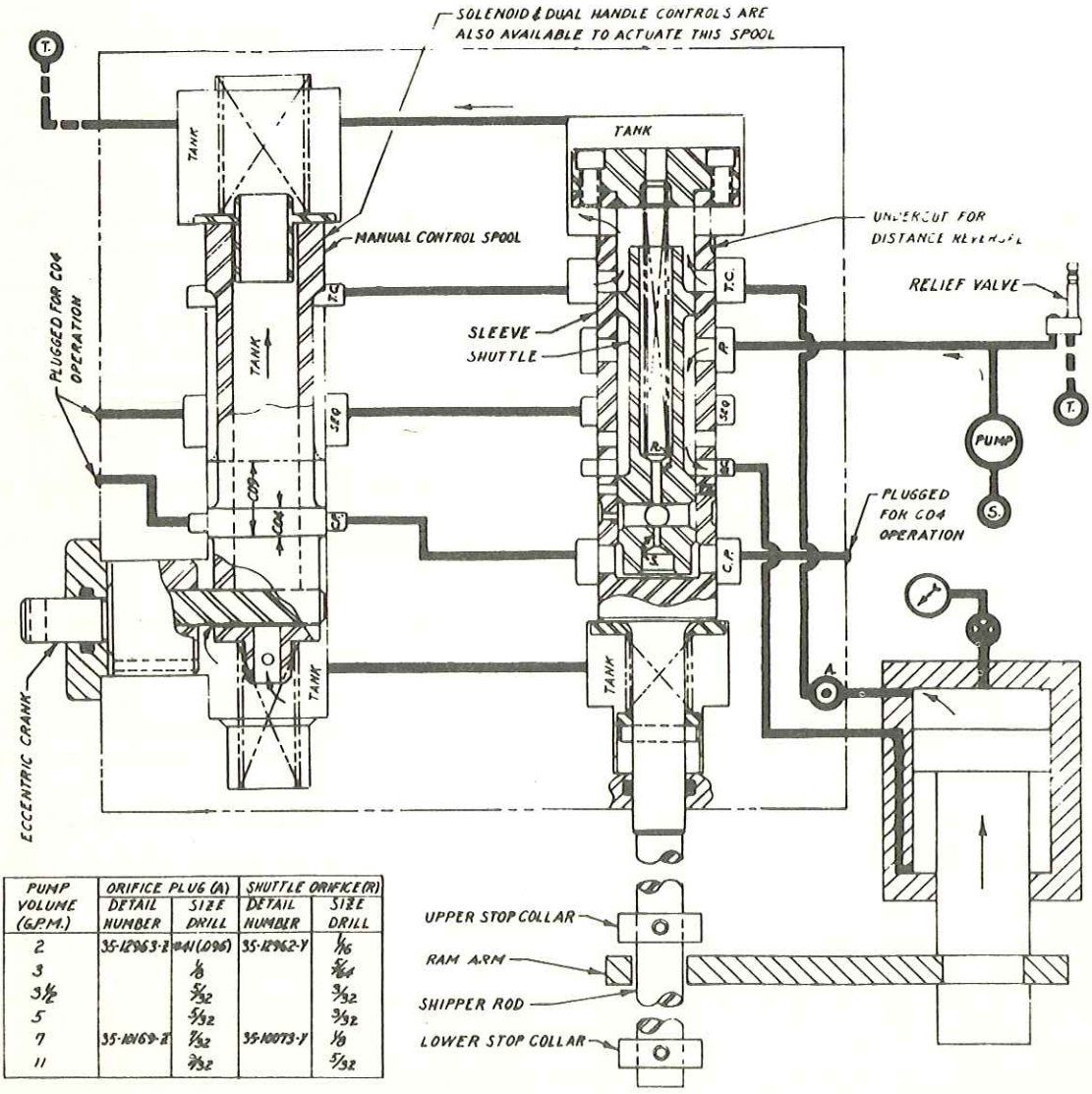
To cause the ram to proceed to the work and hold with full force, it is necessary to first move the control spool to the "automatic" position, thus initiating the cycle. The control spool is then moved to the "hold down" position so that the top cylinder port is connected to the control port. This prevents the shuttle from dropping when the flow from the bottom cylinder is no longer sufficient to create the necessary back pressure to hold the shuttle up.

SEMI-AUTOMATIC OPERATION - C09 CONTROL VALVE

Semi-automatic operation differs from automatic operation in that a different manual control spool is used. With this spool, oil entering the sequence port cannot go directly to the control port, but must be connected to it through valving on an external mechanism. This oil is delivered only when the ram is in the "up" position, and may be used to operate the external mechanism. This creates a tie-up in sequence between the external mechanism and the main ram. Oil from any external source applied to the control port on the semi-automatic valve can be used to initiate a cycle of the main ram.

TIME DELAY CONTROL - MODEL C42

To add time delay at the bottom of the stroke of the C04 or C09 valves, use Service Bulletin I-24. With time delay added, a limit switch operated solenoid valve connects the top cylinder port to the control port to maintain pressure against the bottom of the shuttle to prevent ram reversal. The time delay period is governed by an adjustable electronic type timer.



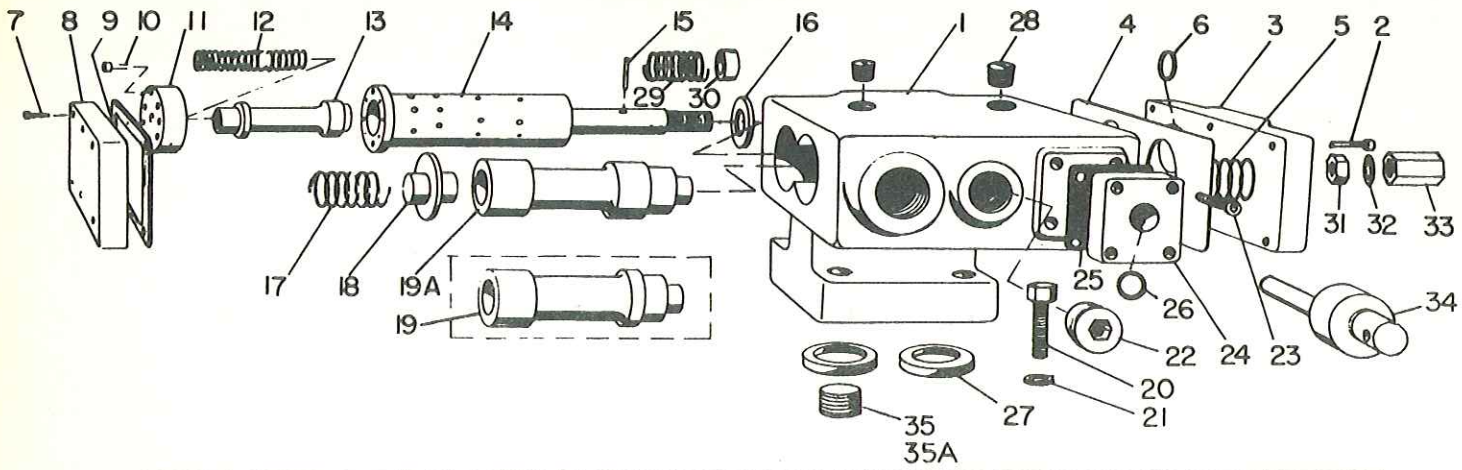
PUMP VOLUME (G.P.M.)	ORIFICE PLUG (A) DETAIL NUMBER	ORIFICE PLUG (A) SIZE DRILL	SHUTTLE ORIFICE (R) DETAIL NUMBER	SHUTTLE ORIFICE (R) SIZE DRILL
2	35-12963-2	#41 (.096)	35-12962-Y	1/16
3		1/8		5/64
3 1/2		5/32		3/32
5		5/32		3/32
7	35-12169-2	7/32	35-10073-Y	1/8
11		7/32		5/32

Circuit Diagram for C04, C104, C09 and C109

SERVICE TIPS

A. Ram descends but will not return.	1. Check shuttle. Should move freely in sleeve. 2. Check spring in shuttle for breakage. 3. Check orifices to be sure they are open. 4. Check relief valve for failure to open.
B. Ram will not descend.	1. Check relief valve setting. This valve's minimum operating pressure is 300 psi. 2. Check relief valve for dirt, lint, etc. 3. Also check system for dirt in valves. 4. Check shuttle as above. 5. Check pump and pressure line. Line may be broken. 6. Install smaller orifice in top cylinder port of valve at cylinder.
C. Shipper rod arm breaks on "up" stroke.	1. Check screws in top cap of sleeve. Be sure that all screws are in place and tight.
D. Pressure will not build up before ram reverses.	1. Check lower stop collar. Arm should not contact it unless distance reversal is required. 2. Check relief valve setting. Should be at least 300 psi. 3. Check pressure lines for cracks and other leaks. 4. Possibly slightly smaller orifice in bottom of shuttle will help. 5. Smaller orifice in pipe plug in top cylinder port of valve at cylinder. 6. Possibly use a smaller top orifice in shuttle. This is especially true on a blanking operation when pressure pads force the ram downward faster than normal speeds obtainable.
E. Press overheats.	1. Be sure cooler coils within the press tank are attached to water lines and water is flowing through them.

PARTS LIST



ITEM	PART NUMBER	DESCRIPTION	QUANTITY
		CONTROL VALVES MODELS C04, C104, C09 and C109	
1	35-10071-X	Body — Valve	1
2	308-12100	Screw — Cap, soc hd, 1/4-20 NC x 5/8 in. lg.	6
3	35-10076-Z	Cap — Valve end	1
4	35-10083-Z	Gasket — End cap	1
5	736-05001	Spring — Compression (35-12005Y-32)	1
6	601-02711	"0" ring 70 DUR. (6227-11)	1
7	308-12100	Screw — Cap, soc hd, 1/4-20 NC x 5/8 in. lg.	6
8	35-10085-Z	Cap — Valve end	1
9	35-10084-Z	Gasket — End cap	1
10	308-10060	Screw — 10-24 NC x 3/8 in. lg.	6
11	35-10086-Z	Cap — Spool end	1
12	736-02002	Spring — Compression (35-12002Y-10)	1
13	35-10073-Y	Shuttle — Valve (for use with 5 gpm pumps or more)	1
13A	35-12962-Y	Shuttle — Valve (for use with pumps less than 5 gpm)	1
14	35-10074-Y	Spool — Valve	1
15	35-10080-Z	Pin — Plain	1
16	35-10079-Z	Washer — Countersunk	1
17	736-06001	Spring — Compression (35-12006Y-17)	1
18	35-10092-Z	Follower — Spring	1
19	35-10072-Y	Spool (C04 and C104 only)	1
19A	35-10095-Y	Spool (C09 and C109 only)	1
20	307-15160	Screw — Cap, hex hd, 3/8-16 NC x 1 in. lg.	4
21	346-10024	Washer — Lock, 3/8 in.	4
22	431-90800	Plug — Pipe, 1/2 in. soc	1
23	308-12100	Screw — Cap, soc hd, 1/4-20 NC x 5/8 in. lg.	4
24	35-10090-Z	Cap — End	1
25	35-10081-Z	Gasket	1
26	601-02710	"0" ring 70 DUR. (6227-10)	1
27	630-42305	Seal — Oil (42305)	2
28	431-90400	Plug — Pipe, 1/4 in. flush	2
29	736-05001	Spring — Compression (35-12005Y-18)	1
30	35-10078-Z	Collar — Slotted	1
31	333-19007	Nut — Hex, standard, 1/2-20 NF	1
32	348-10032	Washer — Lock (1224)	1
33	35-10075-Z	Coupling — Shipper	1
34	25-1212-Y	Eccentric Assembly	1
35	35-10169-Z	Plug (Use with pumps of 5 gpm or over)	1
35A	35-12963-Z	Plug (Use with pumps of less than 5 gpm)	1

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