

VALVE AUTOMATIC MODEL C94&C99

The C94 valve offers a choice of either automatic or single cycling control. It provides for automatic reversal of the ram upon attaining preset pressure on the work or against stroke length control. This valve incorporates differential circuit fast approach speed until the ram contacts the work. It then changes automatically to normal pressing speed.

This is basically a four-way valve with the shuttle acting as the four-way spool. The manual control spool and the movable sleeve between the shuttle and the body are the controls that cause reciprocation of the shuttle. The sleeve is moved by the adjustable stop collars on the shipper rod, and the manual control spool is moved by an eccentric crank. The crank is spring held in idle position, but will lock in continuous cycle position and remain there until released.

To obtain automatic operation the manual control (which is part of the eccentric crank) is moved from the idle position to continuous cycle position. This movement adjusts the control spool so that the tank port is closed, and connects the sequence port thru the automatic control port, to the control port so that pump flow is directed to the bottom of the shuttle.

The pressure build up lifts the shuttle against its spring force, thus allowing pump volume to flow to top cylinder port, which starts the ram down. (See Figure 1).

As the ram moves down, the sleeve which is spring loaded, centers itself closing the sequence port. (See Figure 2). The shuttle is held up due to the back pressure of the exhaust oil from bottom cylinder port. This same exhaust flow passes through a spring loaded check valve being directed back into the pressure line, (which is flowing to top cylinder port) thus giving a differential circuit for fast ram approach. This is shown in Figure 2.

The exhaust flow cannot escape to tank because the spool of the exhaust relief valve is pressure held in position closing the exhaust port. When the ram contacts the work and begins to build up pressure, the pressure is transmitted to the bottom of the speed control spool, lifting it against spring force.

As shown in Figure 3 pressure is relieved from top of exhaust relief valve allowing spool to open exhaust port to tank. Thus exhaust

flow from bottom cylinder port goes to tank. As a result the differential circuit is cut out during the pressing portion of the cycle.

The ram continues to move down at the pressing speed rate until the main relief valve is spilled. This action stops the downward movement of the ram, exhaust flow ceases and the exhaust back pressure dissipates through orifice L to tank, allowing the shuttle to be forced down by its spring. See FIG 4

With the shuttle down, pump volume is directed to the bottom cylinder port, and the top cylinder port is open to tank which causes the ram to go up, until the platen contacts the upper stop collar moving the sleeve upward opening the sequence port and initiating a new cycle. These cycles will continue automatically until the control handle is moved to the idle position. The ram will then finish its cycle and return to its up position and stop, for the pump volume is then directed thru the sequence port to tank. See Fig 5

If distance reversal is desired rather than pressure reversal, the lower stop collar should be set at the required reversal position. When the ram contacts this stop collar, the movable sleeve is pulled down against its spring, thus partially opening the top cylinder port to tank thru the undercut on the sleeve, and partially restricting the flow of oil from the bottom cylinder port. The ram therefore stops and exhaust flow ceases so that the shuttle drops and the ram goes up. This is shown in Figure 6

Single cycle operation is obtained by moving the control handle to the single cycle position to initiate the cycle. The handle may then be released and the ram will go thru one cycle and return up and stop.

Emergency reverse can be obtained at any point in the cycle by moving the control handle to the emergency reverse position. This movement opens the control port to tank so that the shuttle drops due to its spring force, and the ram goes up.

Inching is accomplished by moving the control handle past the emergency reverse position. The control spool then acts as a pump and pumps oil to the bottom of the jack, thus raising shuttle. The shuttle can be raised, lowered, and held at any desired position, thus giving positive control to ram movement.

Semi - Automatic Operation (C99)

Semi-automatic operation differs from automatic operation in that oil cannot go directly from the sequence port to the control port, but must be directed to it thru valving on an external mechanism. Oil is delivered to the

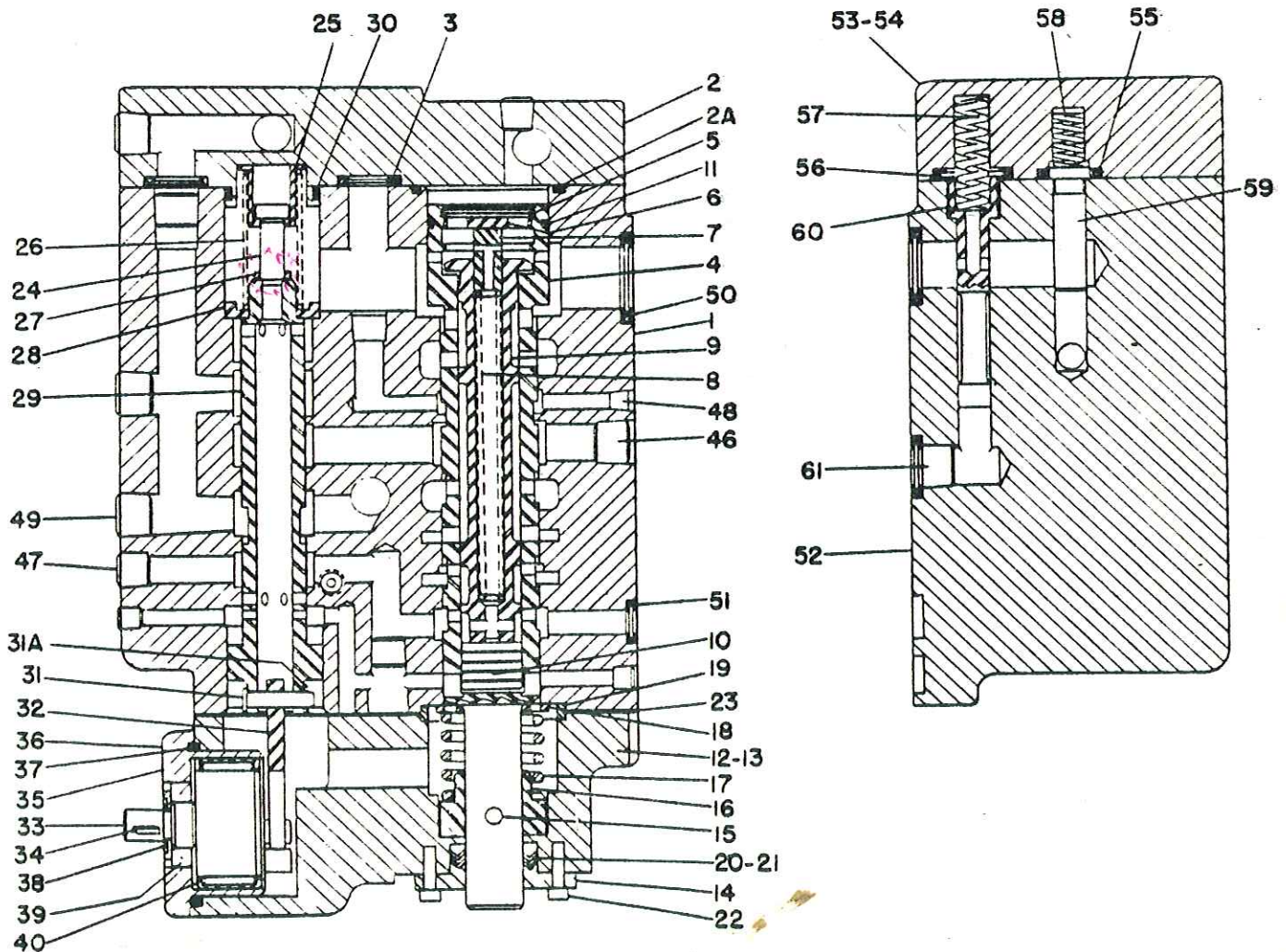
external mechanism only when the ram is in the up position. Semi-automatic operation is accomplished by changing plugs as indicated on the circuit. Oil from any external source can be applied to the control port to initiate a cycle.

PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	35-13127-W	Body - Valve	1
2	35-13115-X	Cap	1
2A	6230-5	Gasket - "0" ring 671-00227	1
3	46146	Vickers seal 630-46146	6
4	25-1861-Y	Sleeve - Shuttle 012-00974	1
5	5000-137	Ring - Retaining 356-30137	2
6	35-13136-Z	Disc-Retainer	1
7	35-13105-Z	Piston	1
8	35-12002-Y-62	Spring - Compression 030-22109	1
9	35-13135-Y	Shuttle	1
10	35-13061-Z	Jack I Dia. x I	1
11	COMM	Ring - Piston - 1-7/8 OD x 1/8 Wide Step Joint 625-21015	1
12	35-13113-X	Cap	1
13	COMM	Screw - Cap, soc hd, 3/8 - 16NC x 1 in. lg.	6
14	35-14371-Z	Gland	1
15	35-13142-Z	Pin	1
16	35-13110-Z	Collar	1
17	35-12008-Y-27	Spring - Compression 030-22398	1
18	35-13104-Z	Washer	1
19	35-13103-Z	Ring - Pilot	1
20	6225-18	Packing "V" type 614-25018	3
21	6229-18	Adapter - Male 614-29018	1
22	COMM	Screw - Cap, soc hd, #10 - 24NC x 5/8 in. lg.	6
23	35-13111-Z	Gasket	1
24	COMM	Screw - Shoulder - 3/8 Dia. Shoulder x 1 in. lg. 5/16 - 18NC Thd.	1
25	35-13107-Z	Stop	1
26	35-12006-Y-28	Spring - Compression 030-22318	1
27	35-13106-Z	Spacer	1
28	35-13109-Z	Seat - Spring	1
29	35-13120-Y	Spool - Selector 030-19808	1
30	6227-23	Packing - "0" ring 671-00218	1
31	AN394-29	Pin - Clevis 321-39429	1
31A	COMM	Pin - Cotter 1/16 Dia. x 3/8 in. lg. 322-02160	1
32	35-13108-Z	Link	1
33	25-1858-Z	Eccentric 011-90972	1
34	#2	Key - Woodruff 211-10002	1
35	35-13102-Z	Cap - Eccentric	1
36	COMM	Screw - Cap, soc hd, 1/4 - 20NC x 1/2 in. lg.	4
37	6230-7	Gasket - "0" ring 671-00229	1
38	5100-50	Ring 356-31050	1
39	141	Seal 620-50141	1
40	GB-2816	Bearing - Needle 230-02816	1
* 41	35-13112-Y	Cap - Accessory	1
* 42	COMM	Screw - Cap, soc hd, 1/2 - 13NC x 2-3/4 in. lg.	4
* 43	COMM	Plug - 3/4 Soc. Pipe	1
* 44	35-13529-Z	Plate - Cover	2
* 45	COMM	Screw - Cap, soc hd, 1/2 - 13NC x 1 in. lg.	4
46	COMM	Plug - 3/8 Soc. Pipe	7
47	COMM	Plug - 1/4 Soc. Pipe	10
48	COMM	Plug - 1/16 Soc. Pipe	3
49	COMM	Plug - 1/2 Soc. Pipe	4

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
50	42305	Vickerseal 630-42305	1
51	49617	Vickerseal 630-49617	2
*	COMM	Screw - Cap, soc hd, 1/2 - 13NC x 2 in. lg.	4
*	COMM	Screw - Cap, soc hd, 1/2 - 13NC x 1-3/4 in. lg.	2
*	#23	Bolt - Eye	1
*	56215	Vickerseal 630-56215	1
*	66945	Vickerseal 630-66945	2
*	42300	Vickerseal 630-42300	2
52	35-13184-W	Body - Control Plate	1
53	35-13189-Y	Cap	1
54	COMM	Screw - Soc, Cap, Hd, 1/2 - 13NC x 2	4
55	46146	Vickerseal 630-46146	4
56	42300	Vickerseal 630-42300	2
57	35-12003-Y-38	Spring - Compression Q30-22174	1
58	35-12003-Y-42	Spring - Compression Q30-22178	1
59	35-13187-Z	Poppet	1
60	35-13188-Z	Spool	1
61	35-13186-Z	Orifice	1
*	35-13185-Z	Orifice	1
*	COMM	Plug 1/4 Soc. Pipe	4
*	40439	Vickerseal 630-40439	1
*	49617	Vickerseal 630-49617	4
*	23	Bolt - Eye	1

* Not Shown



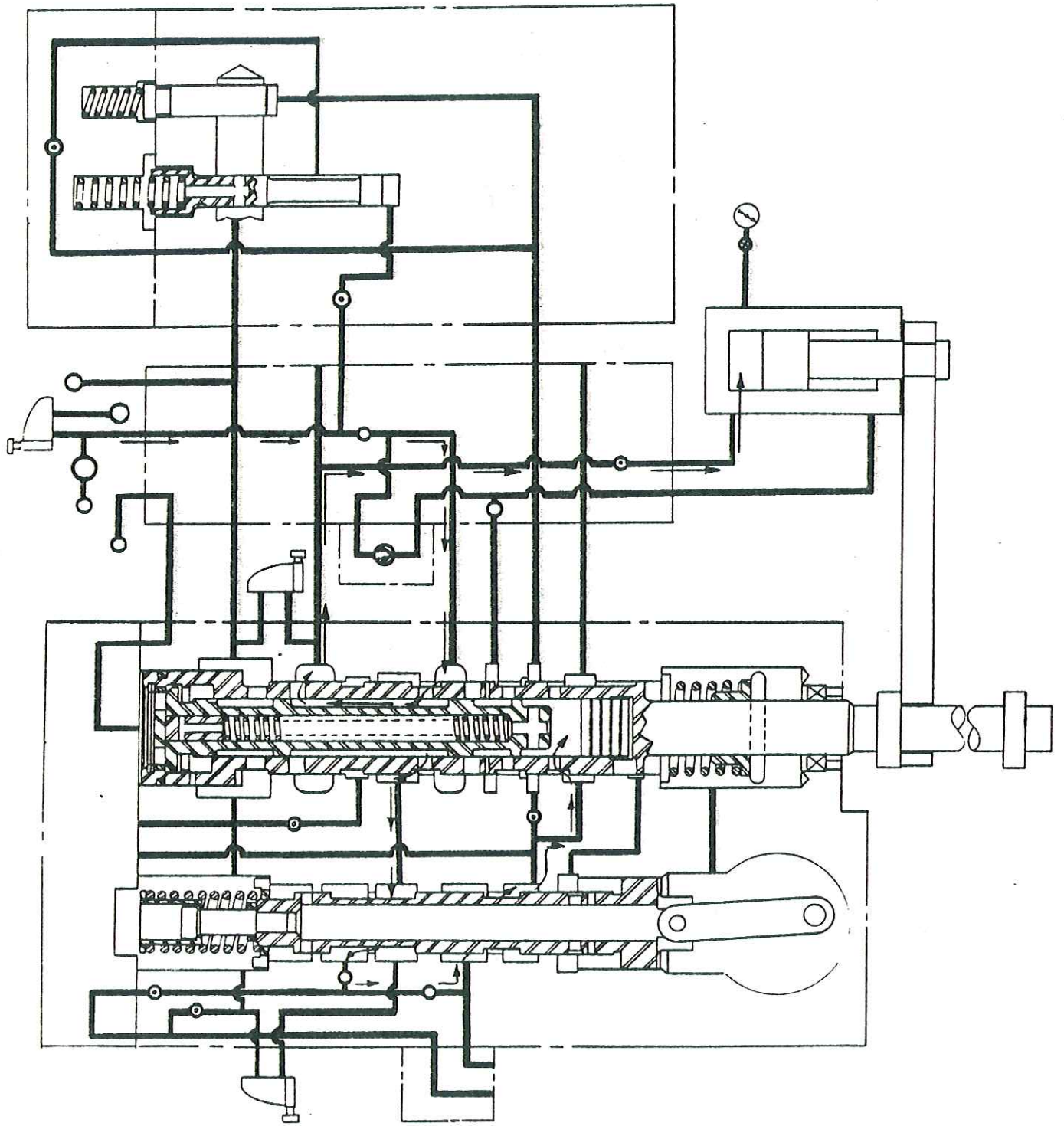


FIG. 1