



Operators Manual

DR2 & FR10 REVERSING VALVES

DR2-7, DR2-24, DR2-25, DR2-201,
FR10 & HPC3

DL1210 r#2



INTRODUCTION

The function of the Reversing Valve is to direct the flow of lubricant alternately to the two supply lines of a Farval Dual Line Lubrication System. A schematic arrangement of the reversing valve, in the Operation Section, explains the complete operating sequences.

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REVERSING VALVES

OPERATION

1. How the Reversing Valve Operates

The following illustration, with pistons and ports appearing in one plane for clarity, shows one half of a complete DR2 reversing valve operating cycle. The other half cycle is identical except pressure is applied to line L2 with line L1 relieved. At the end of the second half cycle, pistons A and B will have returned to the positions shown in step 1. Black indicates line is under pressure.

STEP 1—TIMER (NOT SHOWN) STARTS PUMP. LUBE FROM PUMP ENTERS AT PORT "S".

PUMP FLOW IN STEP 2: PISTON "A" DIRECTS FLOW FROM PORT "S" TO SUPPLY LINE "L1". LINE PRESSURE HOLDS PISTON "A" IN POSITION.

STEP 2—PRESSURE INCREASES IN SUPPLY LINE "L1" FROM PORT "S". LUBE DISCHARGES TO ALL MEASURING VALVES IN THE SYSTEM.

RELIEF IN STEP 2: SUPPLY LINE "L2" CONNECTS WITH RESERVOIR THRU RELIEF PORT "T".

STEP 3—PRESSURE BUILDS UP IN LINE "L1" CONTINUES UNTIL ENOUGH PRESSURE DEVELOPS AT RETURN END "R1" TO OVERCOME SPRING ATTACHED TO SECTOR ARM "C" AND MOVE PISTON "B" TO NEW POSITION. LUBE FLOW IS RE-DIRECTED IN PREPARATION FOR STEP 4.

RELIEF AT END OF STEP 3: LEFT END OF PISTON "A" CONNECTS WITH RESERVOIR THRU RELIEF PORT "T".

PUMP FLOW AT END OF STEP 3: PISTON "B" DIRECTS FLOW FROM PORT "S" TO RIGHT END OF PISTON "A".

PUMP FLOW AT END OF STEP 4: PISTON "A" DIRECTS FLOW FROM PORT "S" TO LINE "L2".

STEP 4—PISTON "A" MOVES TO NEW POSITION. THIS TRIPS SWITCH "D" WHICH STOPS PUMP. NO PRESSURE IS APPLIED TO EITHER LINE. SYSTEM WAITS FOR TIMER TO START NEXT HALF CYCLE.

RELIEF AT END OF STEP 4: SUPPLY LINE "L1" CONNECTS WITH RESERVOIR THRU RELIEF PORT "T".

STEM MOVEMENT SHOWS WHEN VALVE OPERATES.

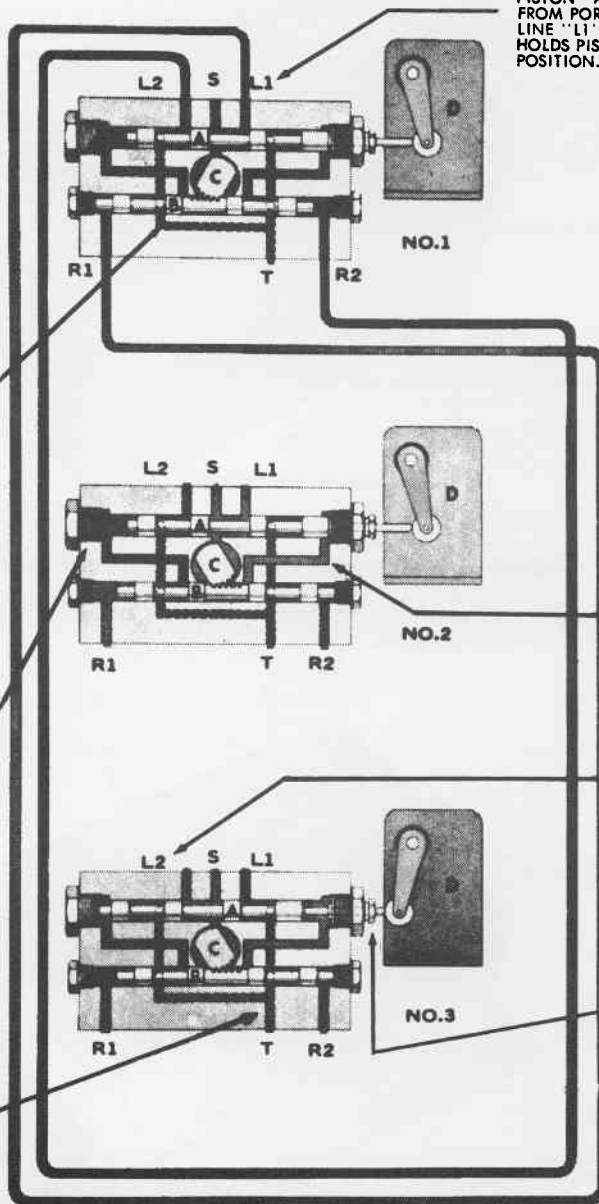


Figure 1 - Reversing Valve Operating Sequence

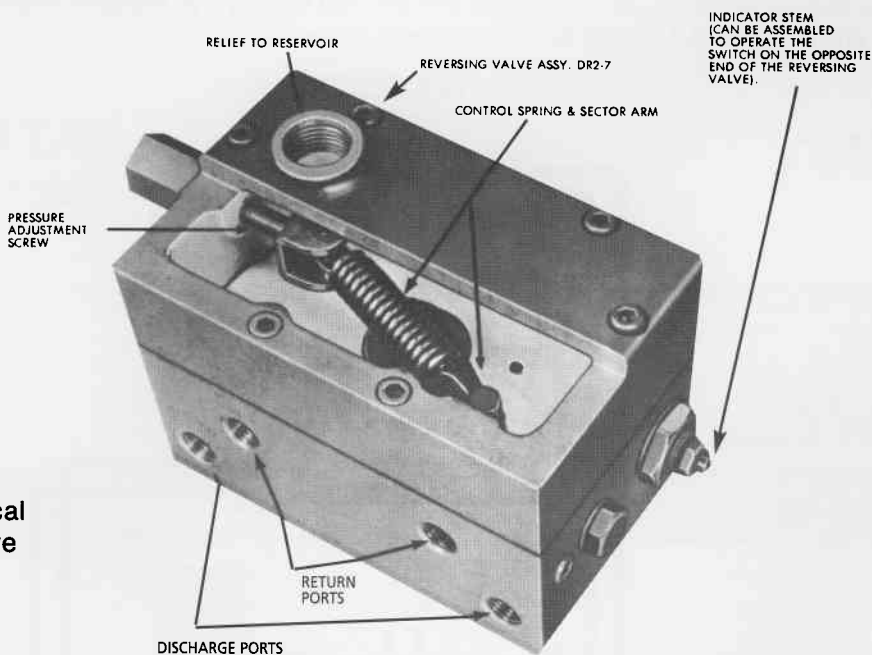
Adjusting Operating Pressure

To increase valve operating pressure turn adjusting screw locknut (fig. 3, item 3) Section CC, outward and to decrease the pressure inward.

REVERSING VALVES

DR2-7

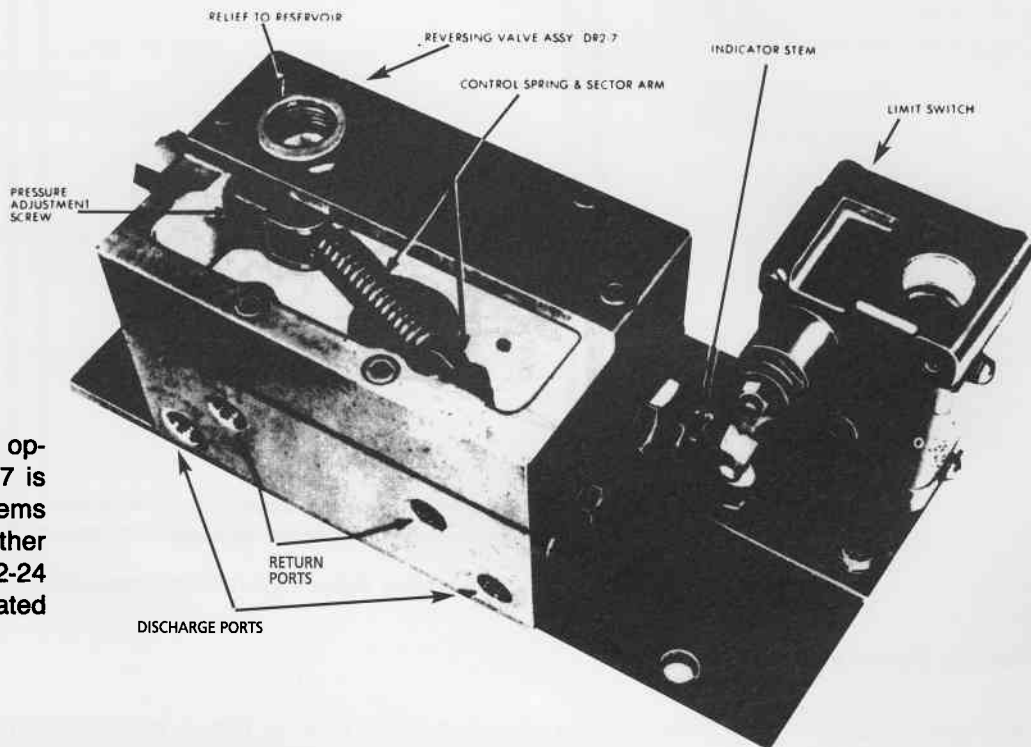
The reversing action is automatic, controlled hydraulically by the action of a pressure sensing (pilot) piston within the valve. The figures describe the valve and tell how it operates.



A cut-away view of a typical DR2-7 type reversing valve

Figure 2 - Cut-away DR2 Type Reversing Valve

DR2-24



DR2-7 type reversing valve operating a switch. The DR2-7 is used in most dual line systems but usually as part of another assembly such as the DR2-24 shown here or DR2-25 illustrated on page 10.

Figure 3 - Cut-away DR2 Type Valve with Limit Switch (DR2-24 Reversing Valve Assembly)

REVERSING VALVES

REVERSING VALVE DR2-7 (FOR OIL AND GREASE)

Reversing valves DR2-7 (there are actually two models DR2-7A and DR2-7B) serve as basic components of a number of reversing valve assemblies such as DR2-24 or DR2-25.

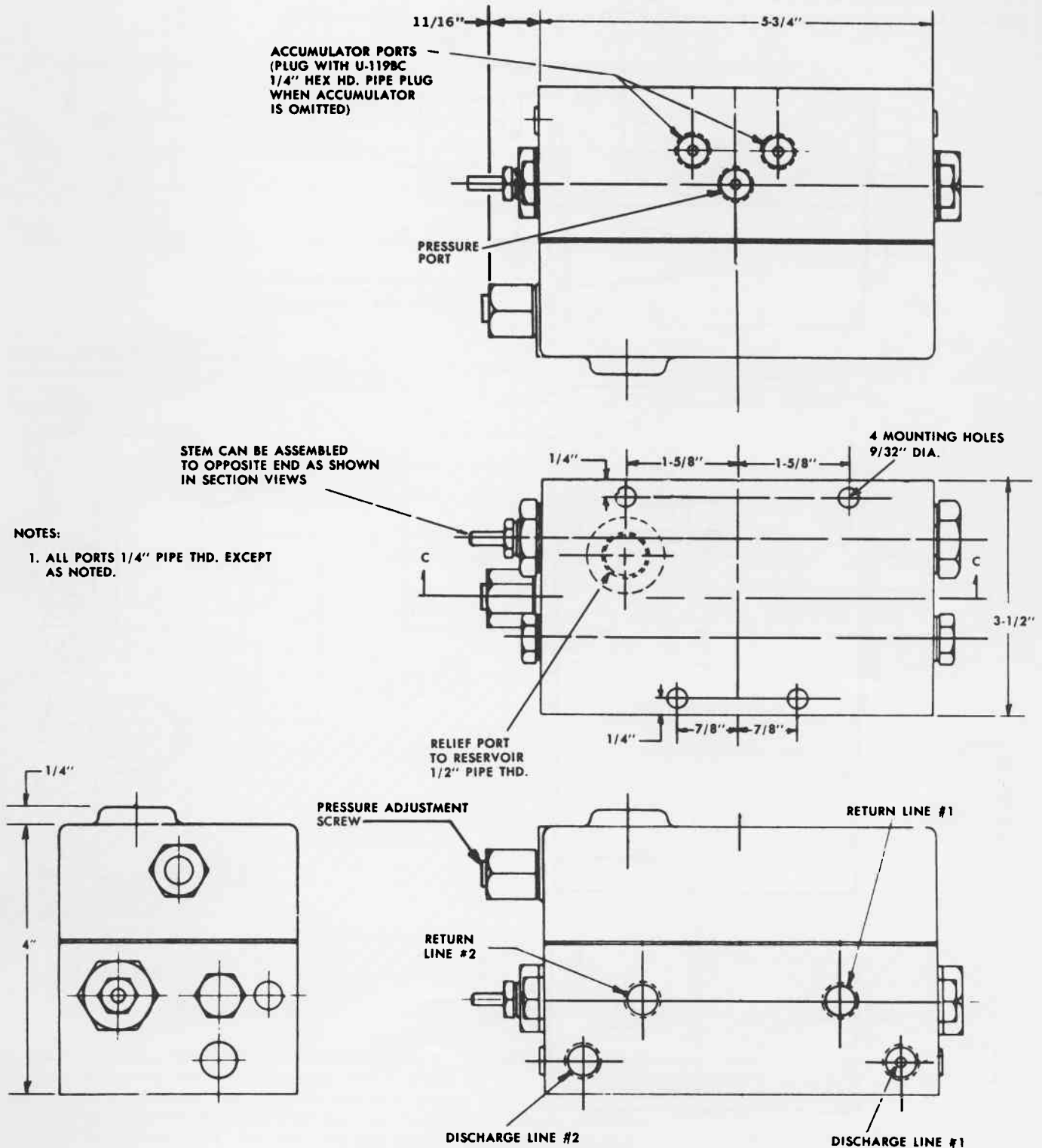


Figure 4 - DR2-7 Reversing Valve

REVERSING VALVES

MODELS DR2-201A and DR2-201B

DR2-201

DR2-201 reversing valves operate in the same manner as the DR2-7 reversing valves. A drawing of the valve is illustrated below and on page 5 and a photograph in Bulletin DL-1025. In both cases the valve is shown mounted in its working position on the DJ25 pump. DR2-201 valves are almost identical to the widely used model DR2-7A and DR2-7B. The chief difference is that the control spring, sector arm, and related parts are actually inside the pump (see section CC) and therefore no cover is needed.

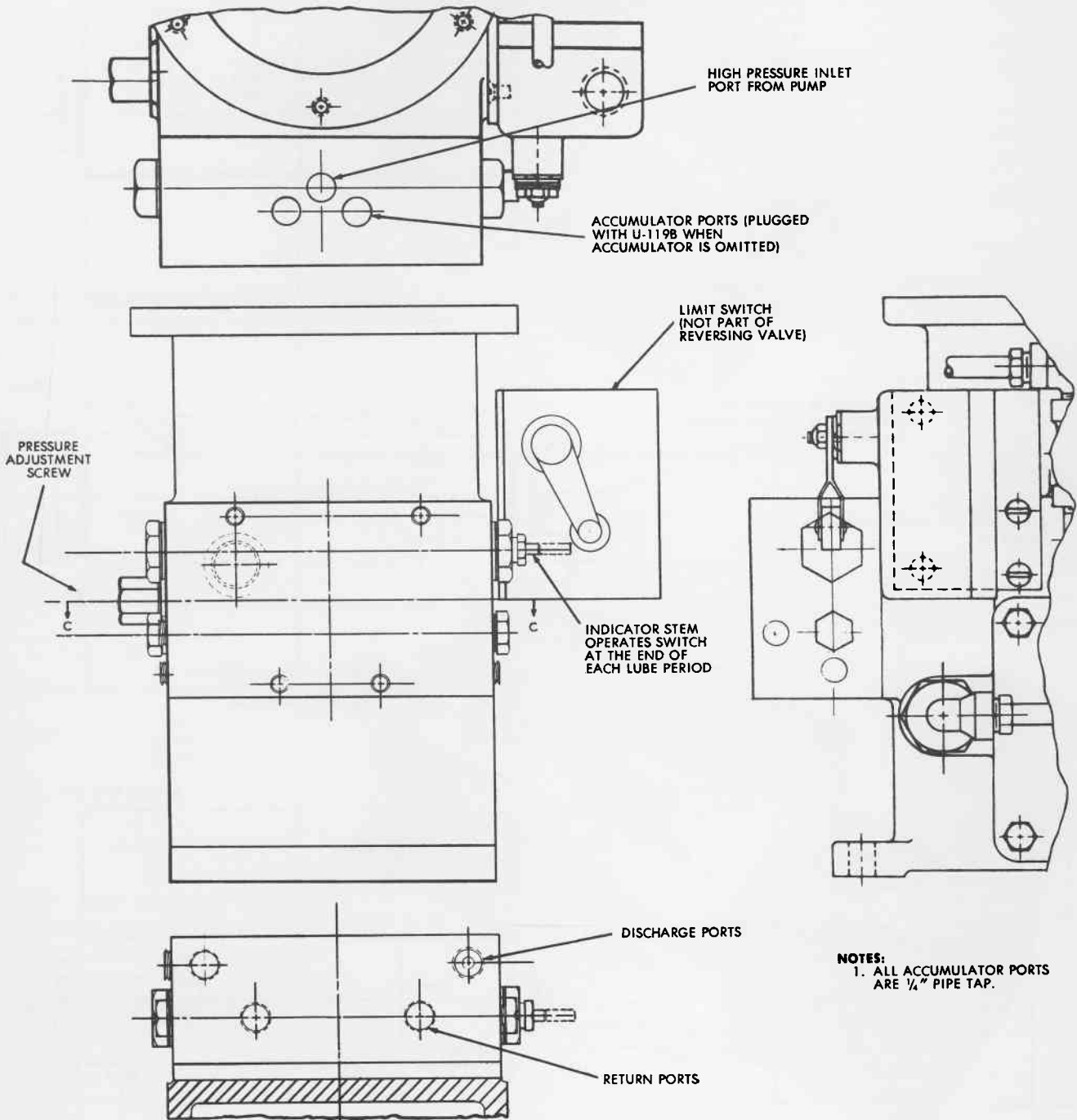
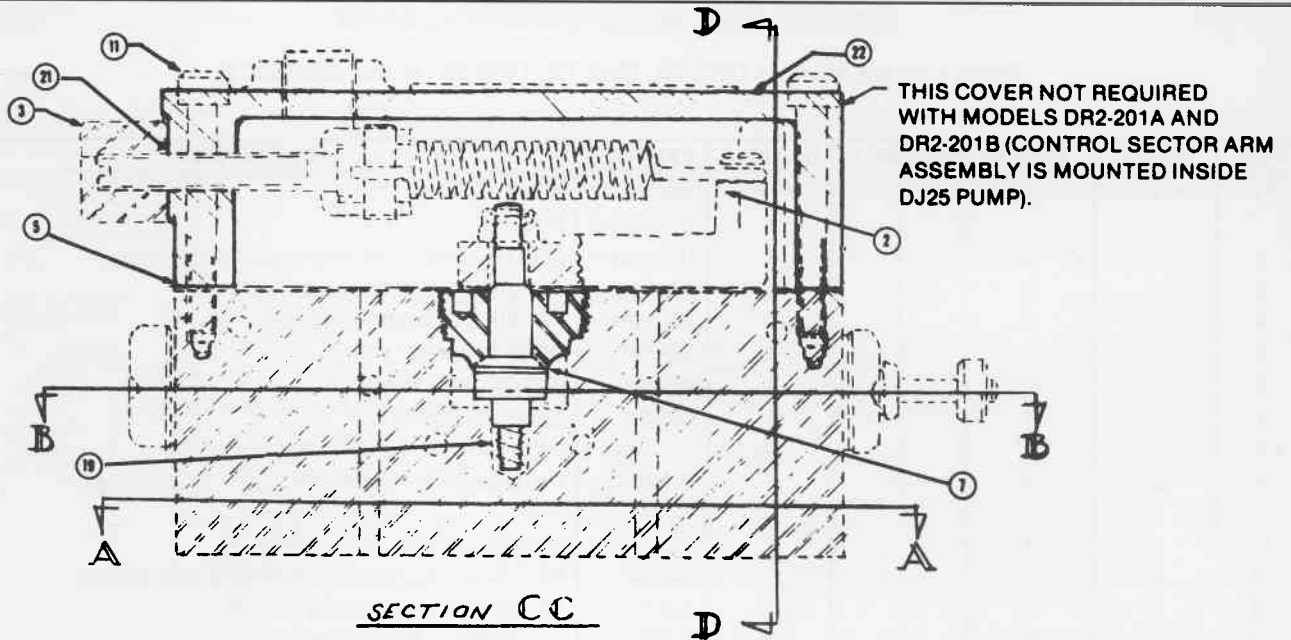


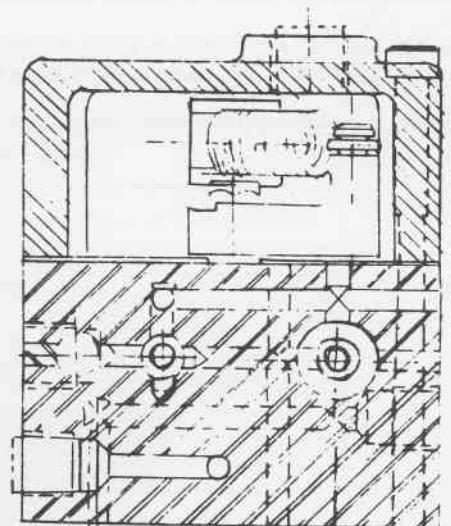
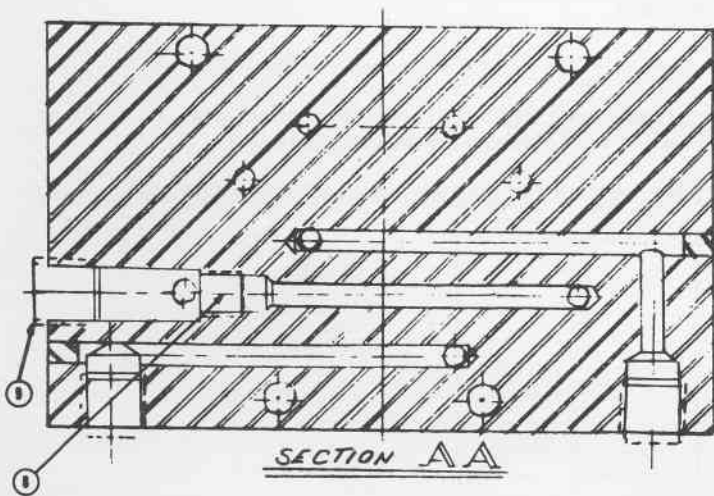
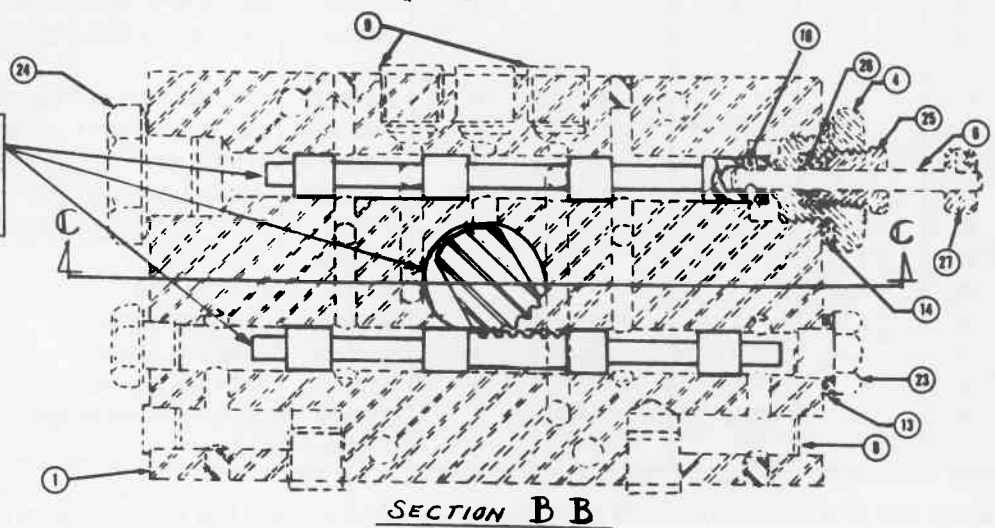
Figure 5 - DR2-201 Reversing Valve

REVERSING VALVES



THIS COVER NOT REQUIRED WITH MODELS DR2-201A AND DR2-201B (CONTROL SECTOR ARM ASSEMBLY IS MOUNTED INSIDE DJ25 PUMP).

THESE ARE MATCHED PARTS - RETURN COMPLETE VALVE TO FACTORY IF THEY NEED REPLACING.



- NOTE: THE FOLLOWING COMPONENTS SHIPPED WITH REVERSING VALVE:**
- (4) U-213-E - 1/4" LOCKWASHER - DR2-7A or DR2-7B
 - (4) U-219-A - 1/4" - 20 HEX. NUT - DR2-7A or DR2-7B
 - (4) U-225-A18 - 1/4" - 20 x 4-1/4" SOC. HD. CAP SCREW - DR2-7A or DR2-7B
 - (4) U-225-A-12 - 1/4" - 20 x SOC. HD. CAP SCREW - DR2-201A or DR2-201B

SECTION DD

Figure 6 - DR2 Type Reversing Valve - Sectional Assemblies.

REVERSING VALVES

Parts List for Models DR2-7A, DR2-7B, DR2-201A and DR2-201B

ITEM	DR2-7A	DR2-7B	DR2-201A	DR2-201B	PART NO.	DESCRIPTION
1	1	1			DR-2401-7	BODY
			1	1	DR-2401-8	BODY
2	1	1	1	1	DR-2951-7	CONTROL SECTOR ARM ASSEMBLY
3	1	1	1	1	DR-2405-4	ADJUSTING SCREW LOCKNUT
4	1	1	1	1	DR-2601	PACKING GLAND BUSHING
5	1	1	1	1	DR-2901-3	BODY GASKET
6	1	1	1	1	A-9262	INDICATOR STEM
7	1	1	1	1	A-9784	BEARING INSERT
†8	2	3	2	3	U-119AC	1/8" HEX. SKT. PIPE PLUG
9	3	3	3	3	U-119BC	1/4" HEX. SKT. PIPE PLUG
11	2	2			U-212A9	1/4" - 18 x 2" SKT. HD. SCREW
12	4	4			U-213E	1/4" LOCKWASHER (NOT SHOWN - SEE NOTE)
13	2	2	2	2	U-217D	1/2" COPPER WASHER
14	2	2	2	2	U-217H	3/4" COPPER WASHER
15	4	4			U-219A	1/4" - 20 HEX NUT (NOT SHOWN - SEE NOTE)
17			6	6	U-225A12	1/4" - 20 x 2-3/4 SKT. HD. SCREW (NOT SHOWN - SEE NOTE)
	4	4			U-225A18	1/4" - 20 x 4-1/4 SKT. HD. SCREW (NOT SHOWN - SEE NOTE)
18	1	1	1	1	U-1220C4	SPIROL PIN
19	1	1	1	1	U-1303DD	HELICAL SPRING
20			6	6	U-1305D	17/16" COPPER WASHER (NOT SHOWN)
21	1	1	1	1	U-1720-011	"O" RING
22	1	1	1	1	U-1312C	NAMEPLATE
23	2	2	2	2	U-1501F	CLOSURE PLUG
24	1	1	1	1	U-1501M	CLOSURE PLUG
25	1	1	1	1	U-1510F	PACKING GLAND
26	3	3	3	3	U-1709C	SOFT PACKING RINGS
27	1	1	1	1	U-1224B	COLLAR

†Model DR2-7A is identical to DR2-7B except for the number of U-119AC pipe plugs. The extra plug in Model DR2-7B is placed as shown in Section A-A. The same applies to Models DR2-201A and DR2-201B.

Install DR2-7A or DR2-201A in most grease systems.

Install DR2-7B or DR2-201B in all oil systems and in those grease systems having HPC3 high pressure control valves. A DR2-7B or DR2-201B might also be required in those systems supplying an extremely light grease which behaves like an oil.

NOTE: For matched parts, or for replacement of parts at the factory - See notes with the schematic drawings of reversing valve sections.

REVERSING VALVES

MODEL DR2-24A (FOR OIL AND GREASE)

DR2-24

Model DR2-24 valves are installed in loop type systems operating at pressures ranging from 300 to 700 psi.

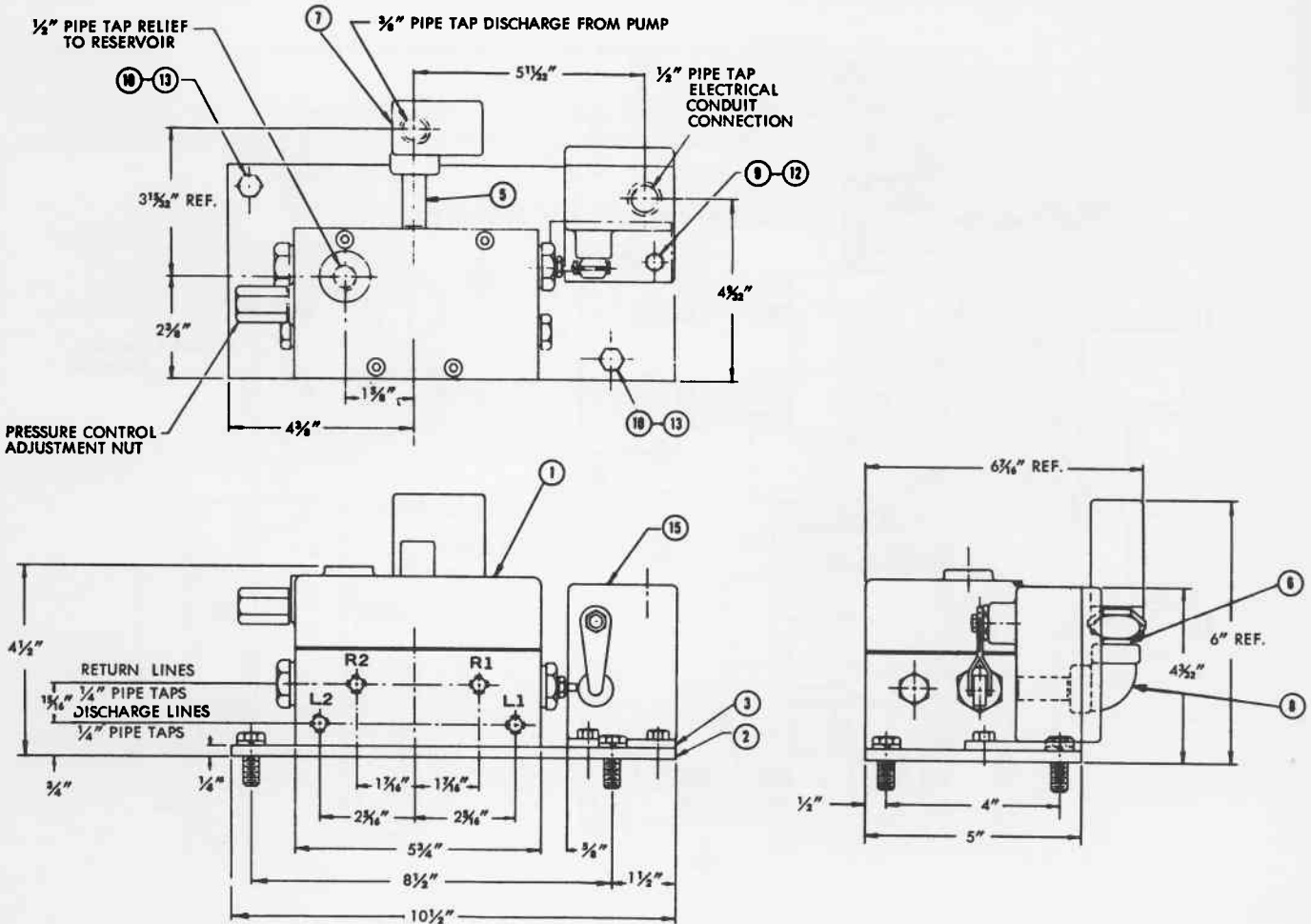


Figure 7 - DR2-24A Reversing Valve

ITEM No.	PART No.	QUANTITY REQUIRED	DESCRIPTION
		DR2-24A	
1	DR2-7A	1	Reversing Valve
2	DC42-1017-1	1	Base Plate
3	LA-5759	1	Switch Adapter Plate
4			
5	U-101B5	1	1/4" x 2" Pipe Nipple
6	U-101C1	1	3/8" x 1" Pipe Nipple
7	LS-03-120	1	3/8" Line Strainer
8	U-113CB	1	3/8" x 1/4" Reducing Elbow
9	U-204A1	2	1/4"-20 x 1/2" Hex Head Cap Screw
10	U-204C2	2	3/8"-16 x 1" Hex Head Cap Screw
11			
12	U-213E	2	1/4" Lockwasher
13	U-213G	2	3/8" Lockwasher
14			
15	U-625	1	EX-AR Explosion Proof Micro-Switch

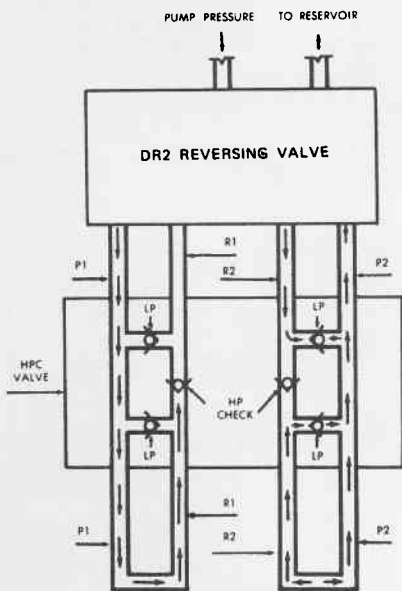
REVERSING VALVES

HIGH PRESSURE CONTROL VALVE MODEL HPC3

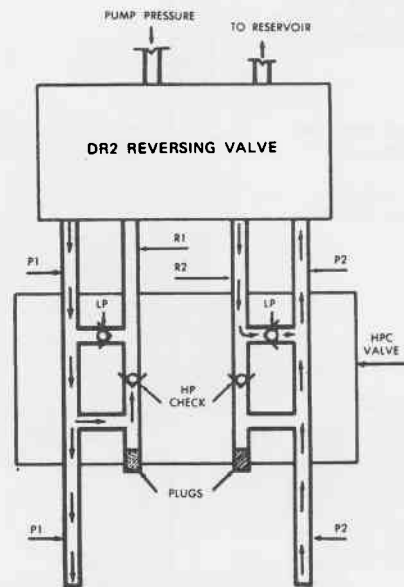
Model HPC-3 valves, which are connected in series with the DR2 reversing valves on the central station, increase the system operating pressure to inject lubricant into bearings having unusually high back pressures. System operating pressures are increased from a 300-700 psi range to a 500-3000 psi range.

- Use HPC3-1 valves where loop type main line systems are desired.
- Use HPC3-2 valves where loop type main line systems must be modified to eliminate the return supply line. In this case the valve, thru internal porting, substitutes for the return supply line.

HOW MODEL HPC VALVES OPERATE



HPC-3 SERIES 1 CONTROL VALVE



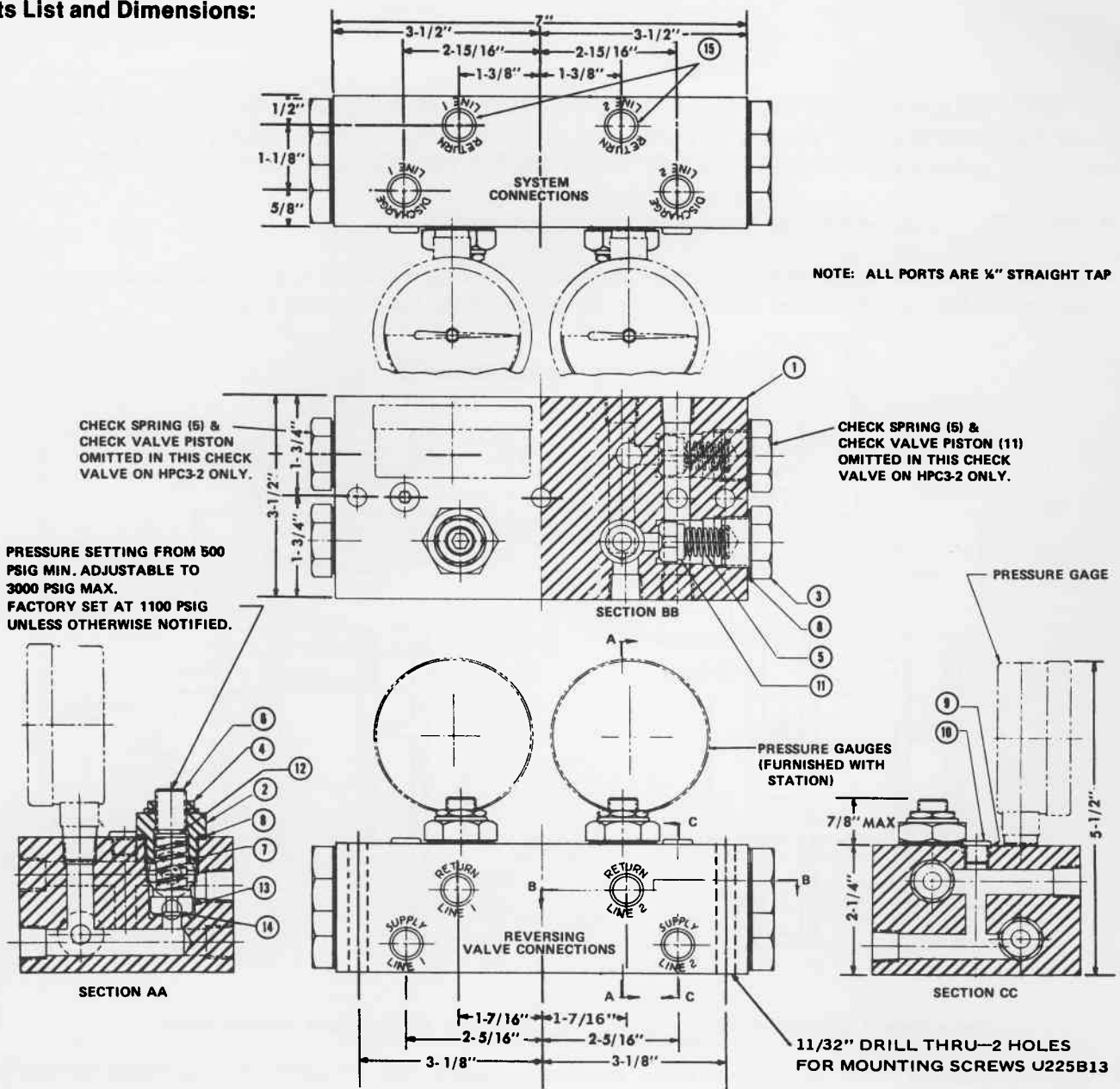
HPC-3 SERIES 2 CONTROL VALVE

1. With the reversing valve set to direct pump pressure to supply line P1 lubricant is pumped through the passage in the high pressure control block to system supply line P1. Pressure is also applied to the spring side of relief checks LP holding them closed. Pressure from system supply line P1 after operating the Dualine Measuring Valves, returns through return line R1 and must build up high enough to open pressure control valve HP before passing on to overcome the adjustable reversal setting of the DR2 reversing valve, thus stopping the pump.
2. While pressure is being applied to line P1 of the system as outlined above, line P2 is in relief through relief checks LP in the right side of the control.
3. At the next operation of the pump, pressure will be applied to line P2 of the system while line P1 will be in relief.

REVERSING VALVES

HIGH PRESSURE CONTROL VALVE MODEL HPC3

Parts List and Dimensions:



ITEM No.	QUANTITY		PART NAME	PART No.
	HPC3-1	HPC3-2		
1	1	1	BODY	HPC-3004-1
2	2	2	BONNET BODY	HPC-3005-1
3	4	4	CHECK PLUG	A-9194
4	2	2	TRU-SEAL FITTINGS	U-255E
5	4	2	CHECK SPRING	A-9197
6	2	2	1/2"-20 x 3/4" SOCKET SET SCREW	U-249K9
7	2	2	SQUARE SECTION SPRING	200870
8	6	6	COPPER WASHER	U-1305T
9	2	2	COPPER WASHER	U-1305U
10	2	2	CLOSURE PLUG	U-1523A
11	4	2	CHECK VALVE PISTON	U-1914H
12	2	2	INTERMEDIATE DISC	LA-8531
13	2	2	CHECK BALL RETAINER	LA-8530
14	2	2	3/8" DIA. CHECK BALL	U-230E
15		2	1/4" SOCKET HEAD PIPE PLUG	U-1198C
16	2	2	5/16-18 x 3" SOC. HD. CAP SCREW	U-225B13

Figure 9 - High Pressure Control Valves (HPC3-1 & HPC3-2)

REVERSING VALVES

MODEL FR10 (FOR OIL OR GREASE) Solenoid Operated

**"FR10 SERIES IS OBSOLETE
REPLACED BY FR20 SERIES"**

FR10

FR10 reversing valves, operating in conjunction with pressure control devices alternate lube flow thru DC41 end-of-line systems so that lube is directed first to one set of measuring valve inlet ports and then the other, on succeeding system cycles.

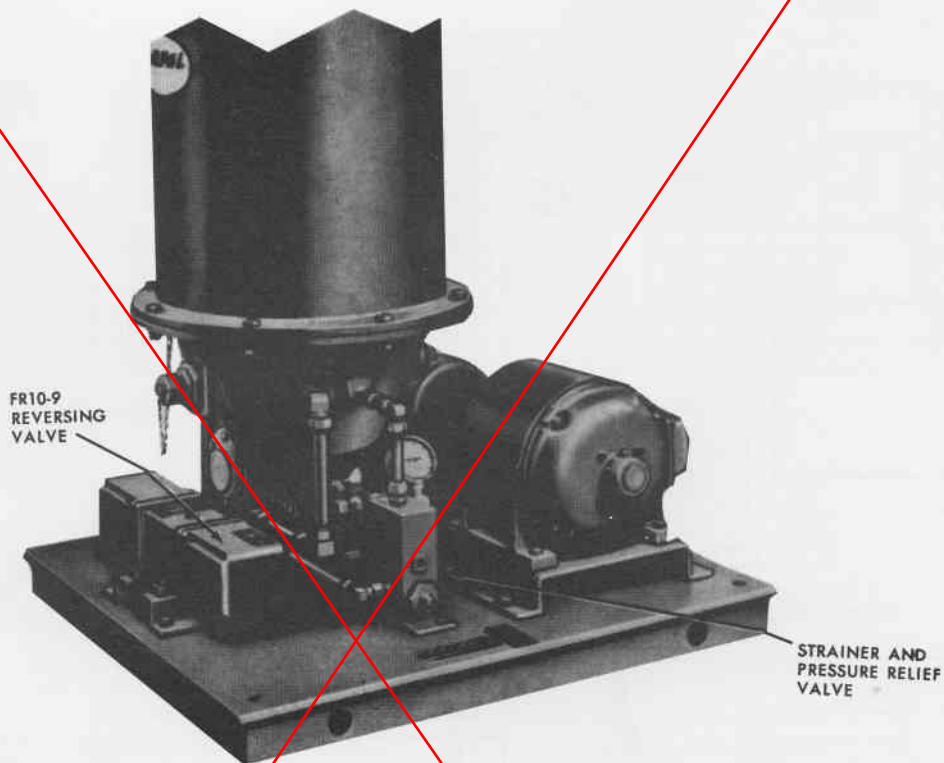


Figure 10 - Model FR10-9 Reversing Valve on Central Station.

SPECIFICATIONS

Max. Flow Rate: 10 GPM (Oil)
Max. Allowable Pressure — Non Shock: 5000 PSI
(3000 PSI at Relief Port)
Buna "N" Rubber Seals: -60 to +250°F.

Spool Configuration: 2 Position — Closed Center
Solenoid: Push Type Epoxy Covered Coil
Inrush Current: 11.0 Amps.
Holding Current: 1.65 Amps.

ORDERING CODES

FR10 VALVE

MODEL	SIZE	SERIES	VOLTAGE	CYCLES
FR	10	5	120	60
		9	220	50
			460	

FR - 10 - 5 - 120 - 60

U-685D REPLACEMENT SOLENOID

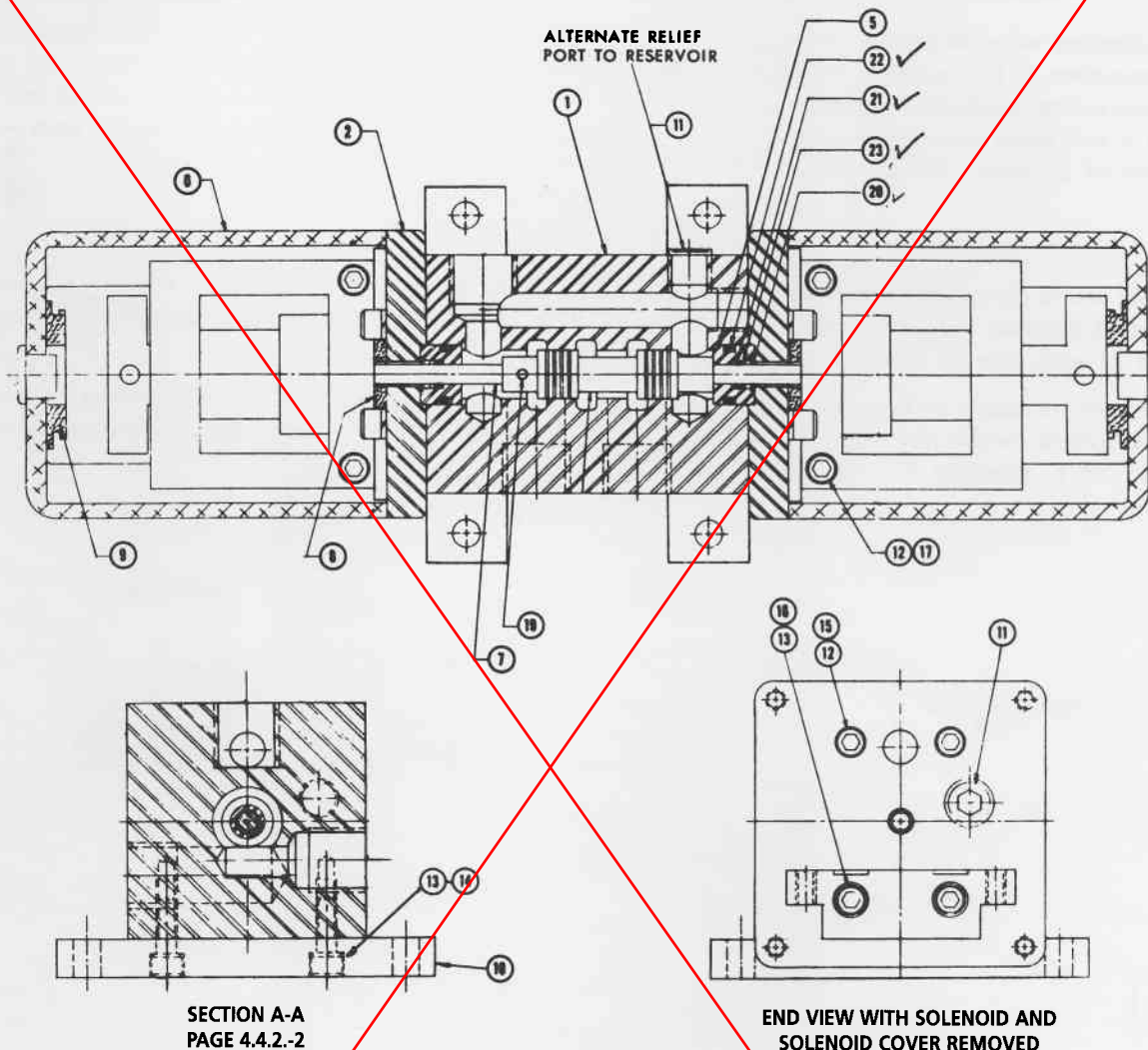
MODEL	VOLTAGE	CYCLES
U-685D	120	60
	220	50
	460	

U-685D - 120 - 60

REVERSING VALVES

REVERSING VALVE FR10 (FOR OIL AND GREASE) — continued

Parts List and Dimensions



ITEM	QUANTITY		PART NO.	DESCRIPTION	ITEM	QUANTITY		PART NO.	DESCRIPTION
	-5	-9				-5	-9		
1	1	1	201365	Valve Body and Piston	17	4	4	U-225A8	1/4-20 x 1-3/4 Sock. Hd. Cap Sc.
2	2	2	FR10-1006-4	End Plate	18	2	2	U685D	Solenoid (See page 13)
3	2	2	FR10-1007-4	Support Bar	19	1	1	U-1220D6	Spirol Pin
5	2	2	FR10-1009-4	Seal Cartridge	20	2	2	U-1305D	17/64 Copper Washer
6	2	2	FR10-1010-4	Solenoid Cover	21	2	2	U-1720-0105	"O" Ring
7	1	1	FR10-1011-4	Shaft	22	2	2	U-1720-1135	"O" Ring
8	2	2	FR10-1012-4	Shim	23	2	2	U-1731-010	Teflon Back Up Ring
9	2	2	FR10-1013-4	Stop	24		2	LB-9259	Mounting Bracket
10	2	2	FR10-1014-5	Mounting Plate	25	4	4	U-204B3	5/16-18 x 1-1/4 Hex. Hd. C. Sc.
11	2	2	U-119BC	1/4" Socket Hd. Pipe Plug	26	4	4	U-204C3	3/8-16x1-1/4 Hex. Hd. Cap. Sc.
12					27	4	4	U-213F	5/16 Lockwasher
13	24	24	U-213ES	1/4" Lockwasher	28	4	4	U-241D	3/8 Std. Wrought Washer
14	12	12	U-225A3	1/4-20 x 3/4 Sock. Hd. Cap Sc.	29	4	4	U-219B	5/16-18 Hex. Nut
15	4	4	U-225A5	1/4-20 x 1 sock. Hd. Cap Sc.					
16	4	4	U-225A6	1/4-20 x 1-1/4 Sock. Hd. Cap Sc.					

Figure 12 - FR10 Reversing Valve Parts List

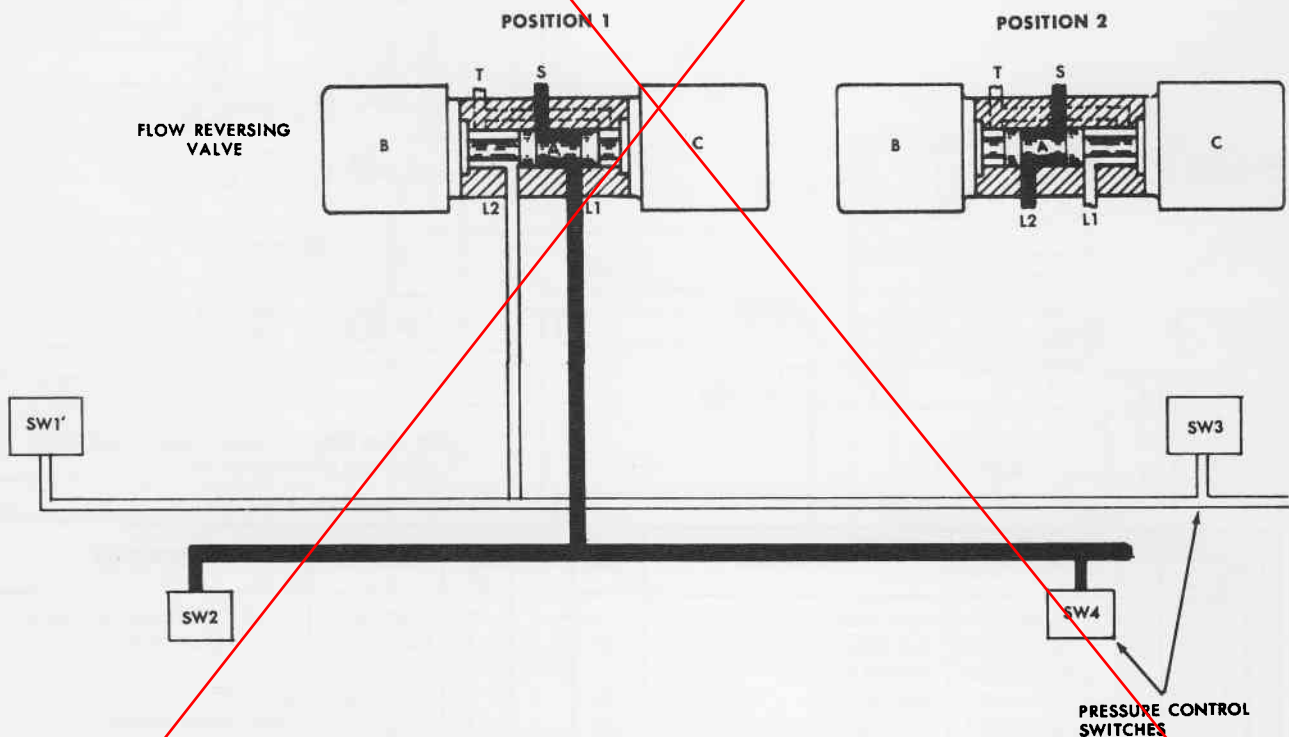
REVERSING VALVE FR10 (FOR OIL AND GREASE) — continued

How the Reversing Valve Operates

The following schematic view, with pistons and ports appearing in one plane for clarity, shows one half of a complete FR10 reversing valve and pressure control switch operating cycle. The other half cycle is identical except pressure is applied to line L2 with line L1 relieved. At the end of the second half cycle, piston A will have returned to position 1. The example shown has two sets of main supply lines — hence two sets of switches. Switches SW1 and SW3 are wired in series as are SW2 and SW4.

↳ FIRST HALF OF LUBE CYCLE -

- Timer starts pump and lube under pressure (shown in black) enters at port "S". Piston "A", which is held in position shown by solenoid "B", directs lube flow so that pressurized lube flows thru supply line L1 with line L2 relieved to the reservoir thru line "T".
- Pressure increases in line L1 until all measuring valves have discharged and the setting of the pressure control switch has been reached. The switch closes a circuit which transfers the current from solenoid "B" to solenoid "C". Solenoid "C" moves piston "A" to position 2.



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