



INSTRUCTIONS

OILGEAR TYPE "DV" VARIABLE DELIVERY PUMPS WITH ELECTROHYDRAULIC STROKER CONTROL

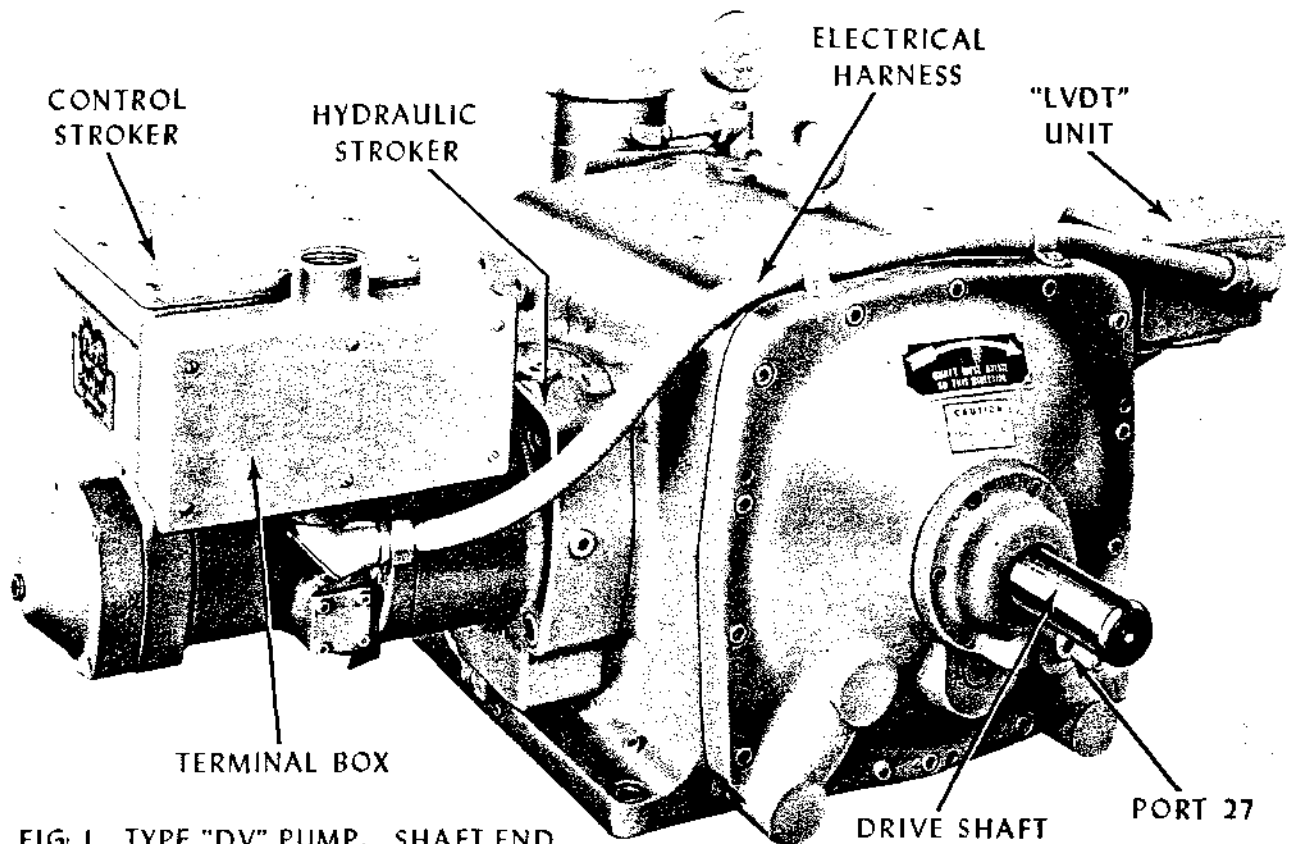


FIG. 1. TYPE "DV" PUMP, SHAFT END.

TO THE USER AND OPERATOR OF OILGEAR TYPE "DV" PUMPS

The purpose of these instructions is to both simplify and minimize your work of installing, operating and maintaining Oilgear Type "DV" Pumps. Your acquaintance with the detail construction, principle of operation, recommended application and inherent characteristics of these units will assure satisfactory performance, reduce shut-downs and increase the life expectancy. For publication convenience, instructions covering the "Case and Radial Piston Units", "Gear Pumps", "Suction Valves", "High Pressure Relief Valves" and "Gear Pump Relief Valves" are issued in separate bulletins (see back cover). We feel confident that, if these instructions are adhered to, the Oilgear Pump will operate to your satisfaction.

THE OILGEAR COMPANY

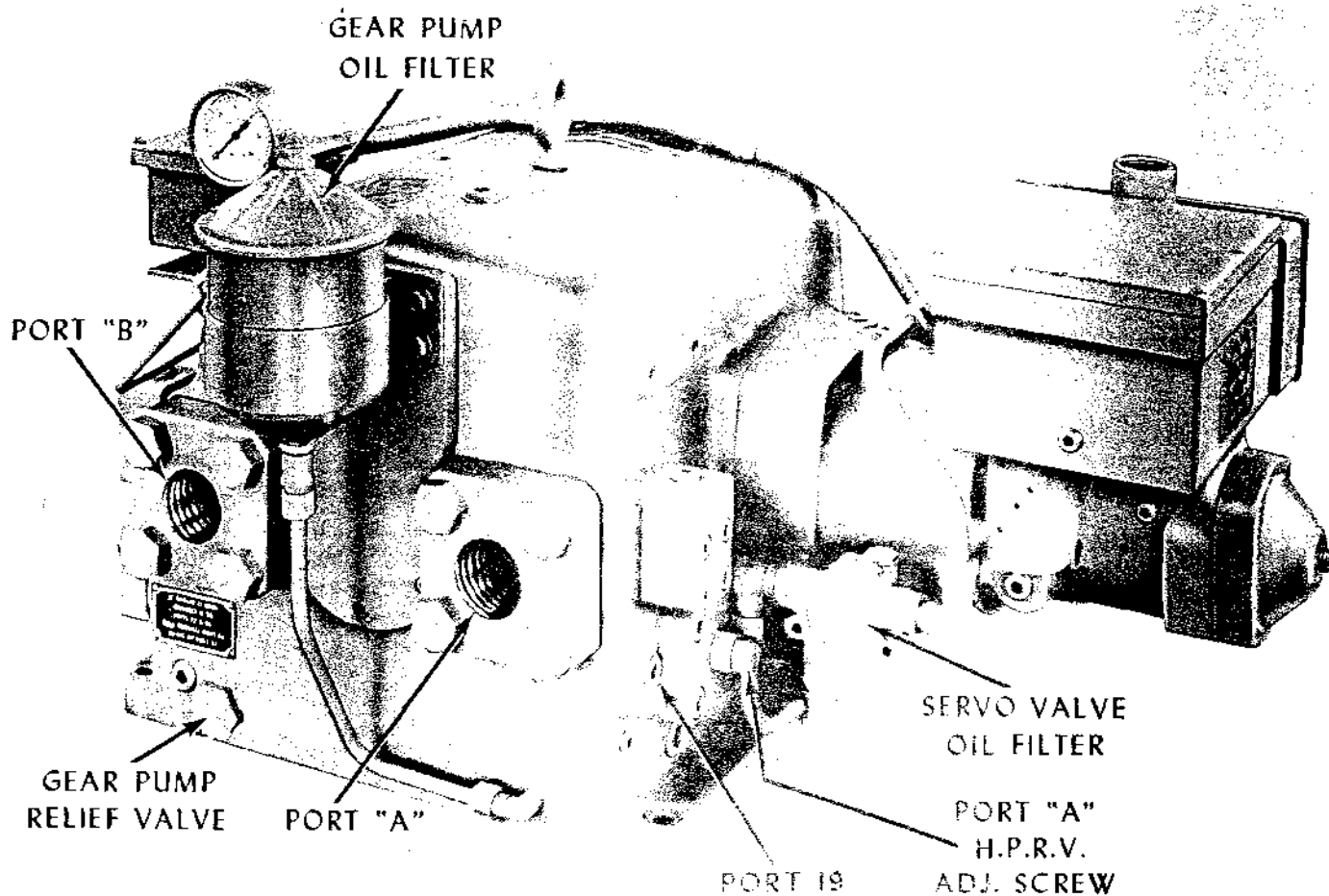


FIG. 2. TYPE "DV" PUMP, FLANGE END.

SOME PUMPS HAVE NO PORTS 50&51. ON THESE UNITS PORT 8, INSTEAD OF PORT 26, IS CONNECTED TO PORT 22.

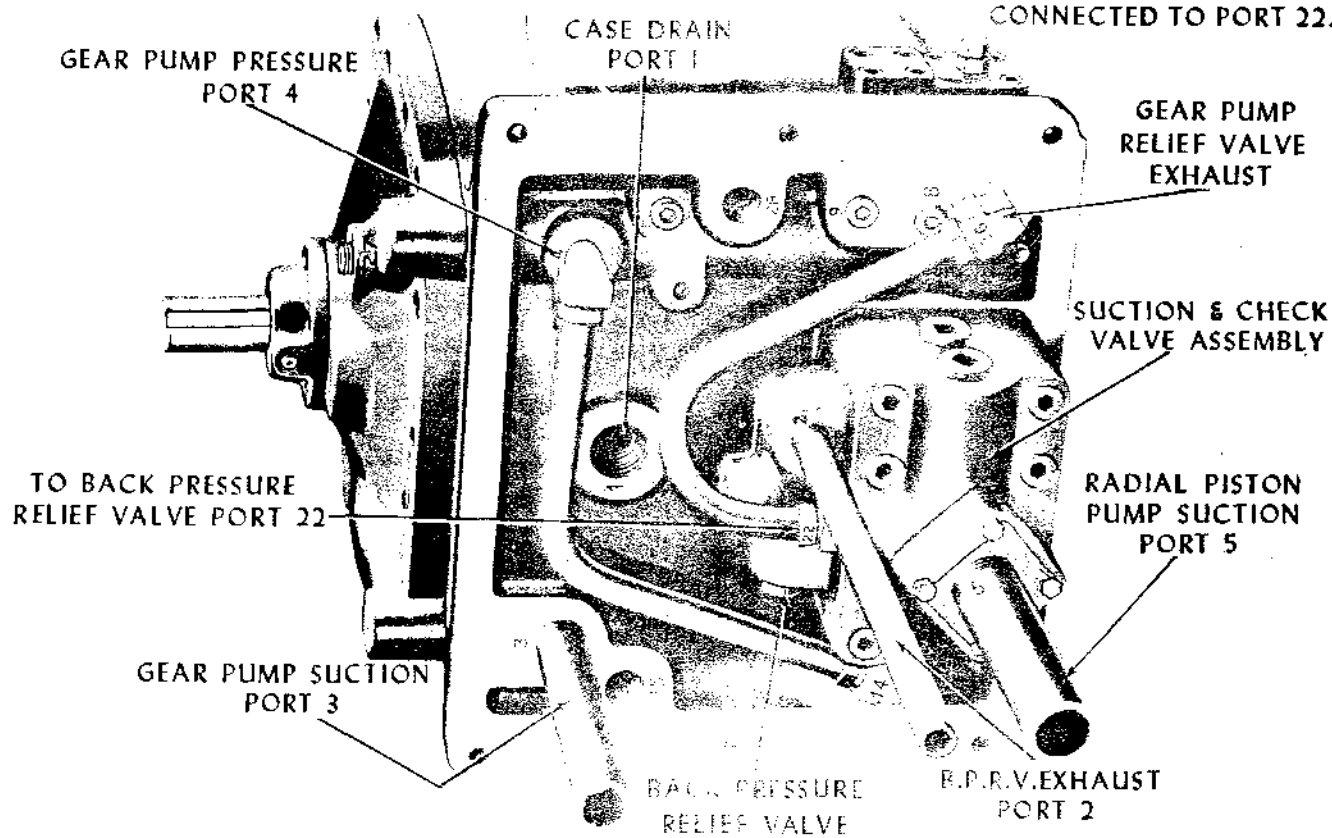


FIG. 3. TYPE "DV" PUMP, BOTTOM VIEW.

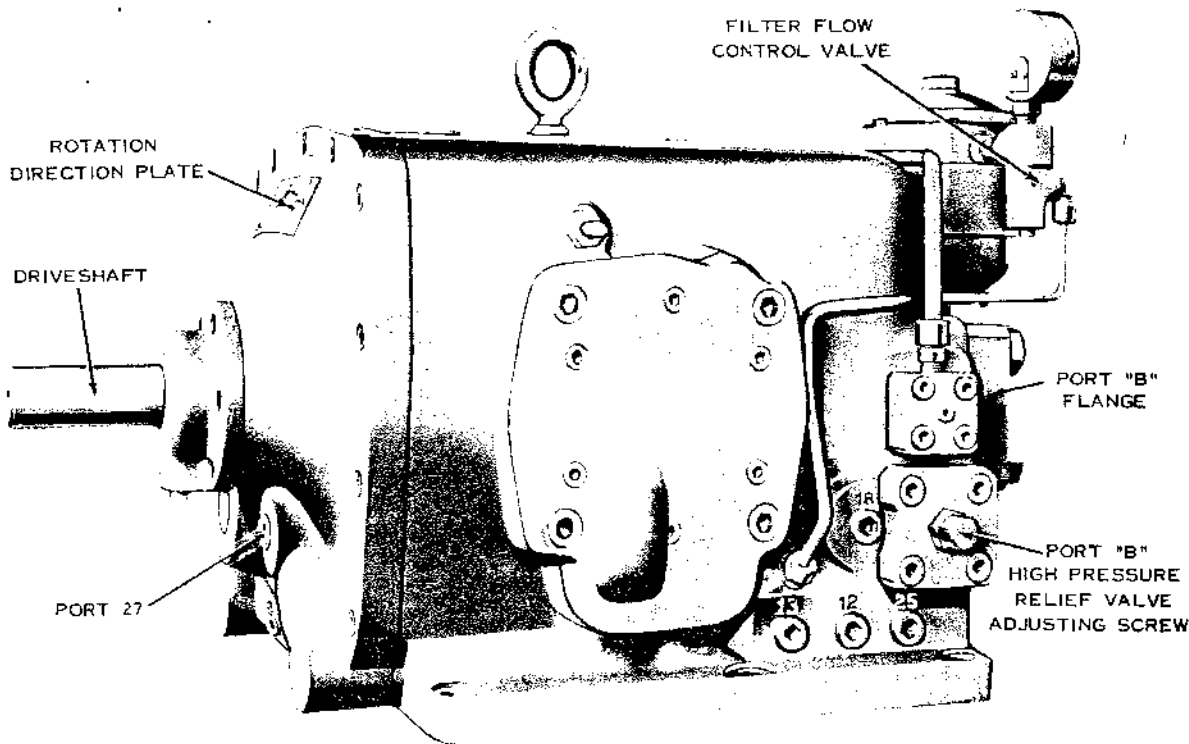


FIG. 4 TYPE "D" PUMP, OPPOSITE CONTROL SIDE.

INSTALLATION AND PREPARATION OF PUMP FOR SERVICE

1. **PUMPS WITH RESERVOIRS.** These units are usually fully equipped and ready for installation.

2. **PUMPS WITHOUT RESERVOIRS.** These units are shipped with or without suction and discharge tubes in place. When shipped WITH tubes in place, clean external surfaces of pump thoroughly . . . especially the bottom surface which mounts on reservoir. **IMPORTANT,** remove pipe tap protector from case drain port 1. This port must be open to reservoir . . . no tube is required. When shipped WITHOUT tubes in place, clean external surfaces of pump thoroughly . . . especially the bottom surface which mounts on reservoir. Remove all pipe tap protectors under pump case. Screw tubes securely into proper ports under pump. Numbers corresponding with proper ports in case are stamped or printed on the tubes furnished by The Oilgear Company. Use pipe compounds sparingly. Screw tubes securely in place to prevent air being drawn into the system. Suction and discharge tubes should reach to within one or two times the diameter of tube from bottom of reservoir. **IMPORTANT,** port 1 must be open to reservoir . . . no tube is required.

3. MOUNTING.

Bolt lower flange of pump and gasket to machine reservoir or bolt standard reservoir to machine or floor. Mount reservoir at least six inches above floor level to facilitate draining of oil. Avoid undue jarring and abuse in handling to protect tubes and pump mechanism.

4. PIPING AND FITTINGS.

See Oilgear bulletin on "Piping Recommendations".

5. POWER REQUIREMENTS.

Power is required in proportion to volume and pressure used. Motor size recommendations for specific applications can be obtained from The Oilgear Company. Standard low starting torque motors are suitable for most applications.

6. DRIVE.

Pump drive shaft always rotates clockwise when facing end of pump shaft. (Special pumps available for counterclockwise rotation). See Rotation Direction plate on gear pump housing. Use either direct, belt, Texrope, silent chain or gear drive. Provide an easy slip fit for coupling, pulley, sheave, sprocket or gear and fasten with set screw. Do not use a drive fit.

7. OIL RECOMMENDATIONS.

Refer to red oil instruction plate on pump case or reservoir or Oilgear bulletin on "Oil Recommendations". Turn drive shaft a few revolutions by hand to be sure all working parts are free. **AVOID STARTING OR STOPPING OF PUMP UNDER LOAD.** Switch electric control off and on several times before allowing pump to reach full speed. Energize control to fill system with oil. Pump passages, piping and cylinder or hydraulic motor are filled by running pump. When cylinders are used, operate machine idle and at full stroke of cylinders to enable all air to be forced out of the system and replaced by a solid column of oil. Add oil to the pump reservoir as system is being filled. Be sure the oil level in reservoir never drops below the low oil level marker.

INSTALLATION AND PREPARATION OF PUMP FOR SERVICE (CONT'D)

8. OIL FILTER.

Approximately 30 gph of the gear pump oil flows through the filter flow control valve and filter. Replace element when filter pressure gage pointer reaches "Change Filter Element" area at normal oil temperature. Remove top cover of filter case, lift out element and open drain plug to drain out oil. Wipe filter case clean, close drain plug, insert a new element and fasten cover in place. If filter gage pointer remains at "0", remove plug in bottom of flow control valve and clean out passage and plunger groove.

9. AIR BREATHER.

On most installations, an air breather is screwed into top of oil reservoir. Keep breather case filled to the oil level mark with oil. About once every six months, remove wing nut and cover from breather and clean screen with solvent. Install screen and fill to mark with clean oil.

STANDARD TYPE "DV" PUMP INSTRUCTION BULLETINS

Gear Pump Relief Valves	947910-A
High Pressure Relief Valves	947911-C
Gear Pumps	947912
Two-Way Pump Suction Valves (Check valve type)	947915
Case and Radial Piston Units (Sizes 2 to 60)	947916
Case and Radial Piston Units (Sizes 100 and 150)	947917-A

SPECIAL TYPE "DV" PUMP INSTRUCTION BULLETINS

Type "DV" Pumps may be equipped with Two-Way Pump Suction and Return Valves (3-Way) covered by instruction bulletin 947914.

GENERAL INSTRUCTION BULLETINS

Oil Recommendations	90000-H
Oil Selection and Maintenance Recommendations	90002-A
Piping Recommendations	90011-A

TYPE "V" ELECTROHYDRAULIC STROKERS

1. Construction.

The electrohydraulic stroker assembly consists of an integral hydraulic stroker, torque motor, servo valve, control stroking cylinder, spring centering cylinder, neutral bypass valve and "fail-safe" valve. The hydraulic stroker consists of a pilot plunger and bushing assembly and control piston. Sizes 4 thru 35 pumps have a thrust bearing in control piston and a thrust cup in the slideblock. Sizes 60 thru 150 pumps have a guided control piston contacting the slideblock. Standard Action controls have single ring control pistons. Sizes 60 thru 150 pumps are available with Fast Action controls using a smaller dual ring control piston. The torque motor is bolted to the servo valve body, a rod connects the armature to "swing-plate" and the servo valve body is gasket mounted to the servo control housing. Built into this housing are the pilot plunger stroking cylinder and piston; the dual, spring operated, centering pistons and cylinder; the solenoid operated "fail-safe" valve; and the hydraulically operated neutral by-pass valve. Dual terminal strips are bolted inside housing and an electrical

terminal box is mounted to outside of the housing. A filter is mounted and piped between the gear pump discharge and the inlet to the servo valve.

2. Principle of Operation.

Gear pump pressure applied to the small control piston, mounted in the opposite side of the case, maintains a constant force tending to move the slideblock toward the hydraulic stroker (large control piston). Gear pump pressure is also applied through the filter to servo valve port 1, to an area in the pilot plunger bushing and to the normally closed port of solenoid operated valve. Gear pump pressure also actuates centering pistons to release stroker piston and shifts neutral by-pass valve plunger when solenoid operated "fail-safe" valve is energized. An electric signal to torque motor positions the "swing-plate" to permit gear pump oil to flow through port 3 or 4 to either side of pilot plunger stroking piston, and move the pilot plunger, large control piston and slide block to position selected for delivery out port A or B. Oil from stroker piston flows through servo valve to reser-

Principle of Operation (Cont'd.)

voir. When power fails or solenoid operated "fail-safe" valve is de-energized, the flow of gear pump oil to the neutral by-pass valve and centering cylinder is stopped; the neutral bypass plunger returns to the by-pass position to connect ports 3 and 4 of the servo valve through the stoker piston; spring actuates both centering pistons to move stoker piston to neutral position which in turn moves the pilot plunger, large control piston and slide block to neutral position.

3. Malfunctions and Causes.

A. Erratic or unresponsive control.

1. Defective torque motor, servo valve, solenoid or loose electrical connection.
2. Foreign material in hydraulic fluid and in servo valve.
3. Binding plungers; pilot, "fail-safe" or neutral by-pass.
4. Damaged control piston rings.
5. Defective electrical system.
6. Defective L.V.D.T.
7. Binding centering pistons.
8. Broken valve springs; "fail-safe", neutral by-pass or centering.
9. Binding or worn stoker piston.

B. Sticking Control.

1. Binding slideblock, control, stoker or centering pistons.
2. Low gear pump pressure.
3. Foreign material in servo valve.

4. Trouble Shooting.

Malfunctioning could be either hydraulic or electrical. Isolate the electrical power supply to the control and isolate the pump from the machine by providing by-pass lines for the high pressure ports "A" and "B" directly to the reservoir or to each other. Remove the centering cylinder cover, the "LVDT" housing cover, and the control housing cover. Operate the control manually by actuating the stoker piston stem. The tension of the centering cylinder spring must be overcome, this requires approximately ten (10) pounds of force. Linear movement of this stem will, in turn, position the slideblock of the pump. Slideblock movement is indicated by the slideblock indicator. This can be observed inside the "LVDT" housing. If no movement is indicated, stop the pump and insert 0-500 psi pressure gages in pump port 2, and in the port in the control housing. Start pump and observe gear pump pressure. Normal pressure is 150 psi. If gear pump

pressure is erratic, see bulletin on "Gear Pump Relief Valves". If pressure decreases more than 10% and does not return to normal setting when shifting piston from full to full, check for pressure leak. If slideblock indicator shows movement and gear pump pressure is normal, replace cover on centering cylinder. Depress the "fail-safe" solenoid and manually operate the servo valve by moving the armature on the torque motor. Maximum movement of the servo valve "swing-plate" is 0.015 inches to each side of neutral. Check connecting rod from torque motor to servo valve. Make certain lock nuts are tight. Do not attempt to re-adjust stroke of servo valve "swing-plate". Care must be exercised when manually operating the torque motor armature. Do Not Use Any Magnetic Object. Observe slideblock indicator. If slideblock movement is normal, the hydraulic portion of the control is functioning properly. Proceed with the electrical trouble shooting as follows. Check the "fail-safe" solenoid coil. Make certain all leads are tight and coils are not damaged. Check for blown fuses in amplifier. Check all terminal strip connections. Make certain no two leads touch and all leads are good. Broken wires create many problems. Make the following checks at the "Amplifier"; Input voltage of 110 Volts A.C., points 9 & 10; Output voltage of 110 volts A.C., points 11 & 12; "Command" signal input, points 3 & 4 (see table for value); "Amplified" signal output of 12 Volts D.C., points 20 & 21. Vary the "Command" signal and check for voltage variation at 3 & 4, & 20 & 21. "LVDT" checks; Excitation voltage of 110 Volts at points 1 & 2; Voltage increase at points 3 & 6 from zero (0) volts at neutral position of slideblock to voltage at full stroke position. Voltage value listed in table. (Table on page 6.)

If the "LVDT" does not exhibit the proper voltage at points 3 & 6 after "excitation voltage" has been assured at points 1 & 2, replace "LVDT". If no "Command" signal is apparent at Amplifier points 3 & 4, check or replace Command unit. If no output signal is apparent at Amplifier points 20 & 21, after "Command" input signal was confirmed at Amplifier points 3 & 4, replace Amplifier.

If, after checking the Amplifier, Command Unit and the "LVDT", the torque motor is still inoperative, replace the torque motor. Torque motors and servo valves are furnished only as a complete assembly.

Trouble Shooting (Cont'd.)

PUMP SIZE	A - C VOLTAGE*	
	COMMAND INPUT* Amp. Pts, 3 & 4	"LVDT" VOLTAGE INCREASE "LVDT" Pts. 3 & 6
4	8	8
8	7	7
12	10	10
20	10	10
35	16	16
60	16	16
100	10	10
150	14	14

*Min. Voltage Listed For Normal Operation, In Some Cases Higher Voltage Will Be Encountered.

5. Testing

Observe action of slideblock indicator. Movement should be smooth and uninterrupted. If movement is uneven, check gear pump pressure and filter. Check for neutral setting by blocking both ports "A" & "B" at pump and insert a high pressure gage in each or in ports 18 & 19. Neutral position is where both gages indicate identical pressures. If necessary to re-adjust control for neutral position of pump, remove centering cylinder cover and loosen outer clamping collar, turn the piston stem clockwise to decrease the "A" side setting and counterclockwise to increase the "A" setting. The stroke of the stroker piston from neutral to the piston gland must be identical on each side in relation to the stroke of the pump. If the stroker piston short strokes on either "A" or "B", loosen the three cap screws securing centering cylinder and turn the three set screws counterclockwise to decrease the "A" setting and clockwise to increase the "A" setting. Both the stroker piston and the pilot plunger must be centered for neutral position to obtain maximum delivery from radial piston pump. When neutral settings are obtained, secure centering cylinder with cap screws and piston stem with clamping collar. Lock clamping collar with set screw. If it is necessary to replace the centering cylinder piston liners or spacer ring, new liners and spacer ring are furnished unground. Components should be ground so that centering cylinder spring is compressed by liners and not by spacer ring. If defective, the servo valve and torque motor should be returned to the factory for testing, adjusting and repairs.

6. Disassembly.

Disconnect filter, tubing and fittings. Remove 1/4 inch pipe plug from control housing opposite electrical terminal box and drain oil level of stroker assembly. Remove the cover of terminal box and stroker assembly. Identify and disconnect all electrical leads. Some oil will drain from the control when further disassembly is accomplished. Remove solenoid from "fail-safe" valve. Remove retaining ring and retaining plug below "fail-safe" valve. Remove retaining ring and spacer from "fail-safe" valve plunger and withdraw solenoid plunger, spring cage, springs and plunger from housing being careful to avoid damage to plunger. Retaining ring and bushing may be removed if necessary. Remove cap screws, retaining cap, O'Ring, and spring from neutral by-pass valve and withdraw plunger, being careful to avoid damage to plunger. In removing control assembly from hydraulic stroker housing, do not allow adapter ring to damage pilot plunger. Support assembly and pull out horizontally to avoid damage to pilot plunger. If necessary, separate pilot plunger from stem by removing roll pin. Remove cap screws and spring centering cylinder cover. Note position of the clamping collars. Remove outer clamping collar and turn piston stem clockwise to separate piston stem and stroker piston. Remove inner piston gland, inner clamping collar and remove stroker piston. Remove centering cylinder assembly. Do not move the three set screws in the centering cylinder assembly. The centering cylinder assembly should not be disassembled unless necessary. If necessary, remove the retaining ring, exercising care since the centering spring free length is as follows: size 4 thru 60---2-5/16 inches; size 100 & 150---2-7/8 inches. Remove retaining ring, piston liner, outer piston and centering spring. CAUTION! Remove screws from hydraulic stroker housing and pull assembly out horizontally. Withdraw pilot plunger bushing and control piston from pump case. Remove cap screws and retainer plate from control piston. For sizes 4 thru 35, withdraw thrust bearing assembly and pilot plunger bushing from control piston. For sizes 60 thru 150, withdraw pilot plunger bushing and spacer plate, being careful to avoid damaging the O'Rings. Piston ring (s) need not be removed unless damaged. Do not attempt to disassemble torque motor and servo valve. If defective, return assembly to the factory for repairs.

7. Inspection.

Clean all parts thoroughly. Inspect all O'Rings for hardening and signs of deterioration. Inspect piston rings, pistons and bores for signs of wear. Replace any piston ring or O'Ring which appears unduly worn. Check sliding fit of pilot plunger in pilot plunger bushing and bushing in stroker housing. Check the sliding fits of large control piston in piston bore, stroker piston and centering pistons in cylinder. All sliding fits should be smooth, with no indication of any binding condition. Lap if necessary.

8. Assembly.

Insert pilot plunger bushing and thrust bearing assembly in large control piston and secure with retaining ring and retaining screws. [Insert spacer plate with O'Rings and pilot plunger bushing in control piston. Slide retainer plate over pilot plunger bushing and secure with cap screws.] Install large control piston assembly in pump case, make certain piston ring is properly located and ring slot up. Insert gasket in proper location and secure hydraulic stroker housing to pump case with cap screws, being careful to avoid damaging the pilot plunger bushing. The pilot plunger bushing must have a smooth slip fit in the hydraulic stroker housing. Secure outer stroker piston gland to control housing with cap screws. Insert stroker piston in control housing, make certain a smooth, slip fit exists. Secure inner stroker piston gland to housing with cap screws. Insert centering cylinder assembly into control housing and secure with cap screws. Do not move the three set screws. If pilot plunger and piston stem were separated, make certain retaining ring and spacer are properly located before securing pilot plunger to piston stem with roll pin. Slide piston stem and pilot plunger into stroker

piston and thread piston stem in stroker piston until secure. Position control adapter and O'Ring and secure control housing to hydraulic stroker housing with cap screws, being careful to avoid damaging the pilot plunger when inserting plunger in bushing. Secure inner clamping collar on stroker piston and lock in position with set screw. Collar should butt against centering cylinder bushing. Position outer clamping collar and lock with set screw. Insert O'Ring and centering cylinder cover and secure cover with cap screws. Make certain O'Rings are in position and mount servo valve with torque motor to housing. Insert neutral by-pass plunger, spring, O'Ring and retaining cap and secure with cap screws. Insert "fail-safe" plunger with plunger spring, plunger cage, and cage spring into bushing. Position spacer on end of plunger and secure with retaining ring. Insert solenoid plunger into plunger cage and secure with retaining ring. Replace solenoid assembly and secure with cap screws. Make certain all gaskets have been placed in their original positions. Insert core plug and O'Ring in "fail-safe" bushing bore and secure with retaining ring. Install filter, tubing and fittings. Replace the 1/4 inch pipe plugs. Connect all electrical leads to control components. Make certain electrical leads are not damaged. Replace gasket and cover on both terminal box and control housing and secure with cap screws. Install high pressure gages in ports "A" & "B", start pump and note pressure indicated. A minimum amount of adjustment can be made by loosening the three cap screws securing centering cylinder to control housing and turning the three set screws until both pressures are equal. If neutral setting needs further adjustment, refer to paragraph 5.

RADIAL PISTON UNIT MALFUNCTIONS AND CAUSES

A. Irregular or unsteady operation.

1. Oil level in reservoir is low (see paragraph 7).
2. Air in the fluid power system (see paragraph 7, and instruction bulletin on "Suction Valves").
3. Insufficient back pressure (see instruction bulletin on "Suction Valves").
4. Insufficient gear pump pressure (see instruction bulletin on "Gear Pumps").
5. Sticking pistons or worn radial piston unit (see instruction bulletin on "Case and Radial Piston Units").
6. Faulty hydraulic motor or cylinder.

B. Loss of pressure or volume.

1. Foreign sediment under high pressure relief valve, sticking H.P.R.V. plunger or defective H.P.R.V. spring (see instruction bulletin on "High Pressure Relief Valves").
2. Worn radial piston unit (see instruction bulletin on "Case and Radial Piston Units").
3. Faulty suction check valve (see instruction bulletin on "Suction Valves").
4. Obstructed suction passages in case or pintle (see instruction bulletin on "Case and Radial Piston Units").

(Cont'd on page 14).

PARTS LIST GILGEAR TYPE "DV" PUMPS

PART	DESCRIPTION	PART	DESCRIPTION	PART	DESCRIPTION
1.	Shaft, Drive	47.	Cap, Aux. Port	†95.	Plug, Orifice
2.	Spacer, Coupling	48.	Plug, Pipe	†96.	Ball, Steel
3.	Nut, Lock	49.	Spacer, G.P.R.V.	†97.	Spring, Flat
4.	Washer, Lock	*50.	Plunger, Dashpot	†98.	Yoke, Flat Spring
5.	Pintle	*51.	Plunger, G.P.R.V.	†99.	Cap, Pintle Cover R.V.
*6.	Cylinder	52.	Spring, G.P.R.V.	†100.	Spring, Pintle Cover R.V.
*7.	Bushing, Cylinder	53.	Shims, G.P.R.V.	†101.	Shims, Pintle Cover R.V.
8.	Piston, Radial	54.	Gasket, G.P.R.V. Cap	†102.	Gasket, Cap
9.	Bearing, Rear Rotor	55.	Cap, G.P.R.V.	†103.	Plunger, Ptle. Cover R.V.
10.	Bearing, Front Rotor	56.	Case, Pump	104.	Tubing, W/Fittings
11.	Bearing, Frt. Dr. Shaft	56A.	Gasket, Pump Mtg.	200.	Body, Suction Valve
12.	Bearing, Rear Dr. Shaft	57.	Assembly, Oil Filter	201.	Disc, Check Valve
13.	Shims, Front Rotor Brg.	57A.	Element, Filter	202.	Gasket, H.P. Exhaust
14.	Shims, Rear Rotor Brg.	58.	Valve, Flow Control	203.	Gasket, Upper Cage
15.	Shims, Frt. Dr. Shaft Brg.	59.	Gage, Filter	203A.	Gasket, Lower Cage
†15A.	Shims, Rear Dr. Shaft Brg.	60.	Adapter, Control Piston	204.	Seat, Check Valve
16.	Rotor	61.	Screw, Ctrl. Piston Adptr.	205.	Cage, Check Valve
17.	Ring, Spacer	62.	Piston, Control	206.	Spring, Check Valve
17A.	Ring, Spacer	62A.	Shims, Control Piston	207.	Cage, Check Valve
18.	Ring, Thrust	63.	Ring, Piston	208.	Gasket, Flange
19.	Flange, Coupling	64.	Screw, Ctrl. Piston	209.	Disc, Check Valve
†19A.	Ring, Coupling Piston	65.	Head, Rotor	210.	Seat, Check Valve
20.	Roller, Coupling	66.	Screw, Rotor Head	211.	Flange, Suction
21.	Ring, Coupling	67.	Shims, Slideblock Cover	212.	Screw, Flange
22.	Gear, G.P.Driving	68.	Ring, Slideblock Spacer	214.	Plunger, B.P.R.V.
23.	Gear, G.P.Driven	69.	Screw, G.P. Cover	215.	Spring, B.P.R.V.
24.	Bearing, Roller	70.	Gasket, G.P. Cover Screw	216.	Shims, B.P.R.V.
25.	Shaft, Stub	71.	Housing, Oil Seal	217.	Gasket, Flange
26.	Key, Drive Shaft	72.	Housing, Gear Pump	218.	Cap, B.P.R.V.
27.	Seal, Oil	73.	Cover, Gear Pump	380.	Bracket, Mounting
28.	Gasket, Frt. Cover	74.	Screw, Slideblock Cover	380A.	Screw, Sock. Hd. Cap
29.	Gasket, G.P. Housing	75.	Cover, Slideblock End	381.	Housing, L.V.D.T.
30.	Spacer, Bearing	76.	Tubing, W/Fittings	382.	Assembly, L.V.D.T.
31.	Gasket, Control Mtg.	77.	Key, Pintle	382A.	Screw, Sock. Hd. Cap
32.	Gasket, Control Adapter	78.	Gasket, Flange	383.	Cover, Housing
33.	Gasket, Piston Screw	79.	Flange, Pipe	383A.	Screw, Sock. Hd. Cap
*34.	Plunger, H.P.R.V.	80.	Cover, Pintle End	384.	Assembly, Wiring Harness
*35.	Bushing, H.P.R.V.	81.	Gasket, Pintle Cover	385.	Plate, Mounting
36.	Packing, O'Ring	82.	Slideblock	385A.	Screw, Sock. Hd. Cap
37.	Packing, O'Ring	83.	Pin, Dowel	386.	Ring, Retaining
38.	Cap, H.P.R.V.	84.	Liner, Slideblock	387.	Adapter, Indicator Stem
39.	Gasket, H.P.R.V. Cap	84A.	Shims, Liner	388.	Stem, Indicator
40.	Screw, H.P.R.V. Adj.	85.	Liner, Case	389.	Spring, Indicator Stem
40A.	Nut, Adj. Screw Lock	86.	Pin, Dowel	390.	Guide, Spring
41.	Guide, Spring	90.	Eye Bolt	391.	Retainer, Spring
42.	Spring, H.P.R.V.	91.	Plate, Name	392.	Hub, Housing
43.	Guide, Spring	92.	Screw, Drive	393.	Head, Control
44.	Retainer, Bushing	93.	Plate, Name	393A.	Screw, Sock. Hd. Cap
45.	Shims, Retainer				
46.	Gasket, Aux. Port				

Part numbers preceded by symbol (†) applicable to size 100 and 150 units only.
 *Part numbers 6 and 7, 34 and 35, 50 and 51 furnished only as an assembly.
 When ordering replacement parts, be sure to include pump serial number, part number and Data Sheet number. Specify type of hydraulic fluid for O'Rings and seals.

O R I N G S I Z E
 (Cross Section x I.D. x O.D. x Duro ± 5)

PART	P U M P S I Z E		
	NC.	4 - 8 - 1 2	2 0 - 3 5
T A P E R E D B U S H I N G S			
36	3/32 x 11/16 x 7/8 - 70	1/8 x 1-1/4 x 1-1/2 - 70	1/8 x 1-1/2 x 1-3/4 - 70
37	3/32 x 3/4 x 15/16 - 70	1/8 x 1-7/16 x 1-11/16 - 70	1/8 x 1-5/8 x 1-7/8 - 70
S T R A I G H T B U S H I N G S			
37	3/32 x 11/16 x 1-1/16 - 70	1/8 x 1-1/2 x 1-3/4 - 70	1/8 x 1-5/8 x 1-7/8 - 70

PUMP INSTALLATION DRAWING : DS-47740
 COOLER INSTALLATION DRAWING : DS-47903
 COOLER CIRCUIT DRAWING : DS-947906

NOTE: WHEN ORDERING PARTS, BE SURE TO
 INCLUDE SERIAL NUMBER, PART NUMBER
 AND DATA SHEET NUMBER, SPECIFY TYPE
 HYDRAULIC FLUID FOR O-RINGS AND SEALS.

PARTS *6, 6*, *7, *34, 6*, *55,
 *50, B, *51, B, *384 ARE
 FURNISHED AS A COMPLETE
 ASSEMBLY ONLY.

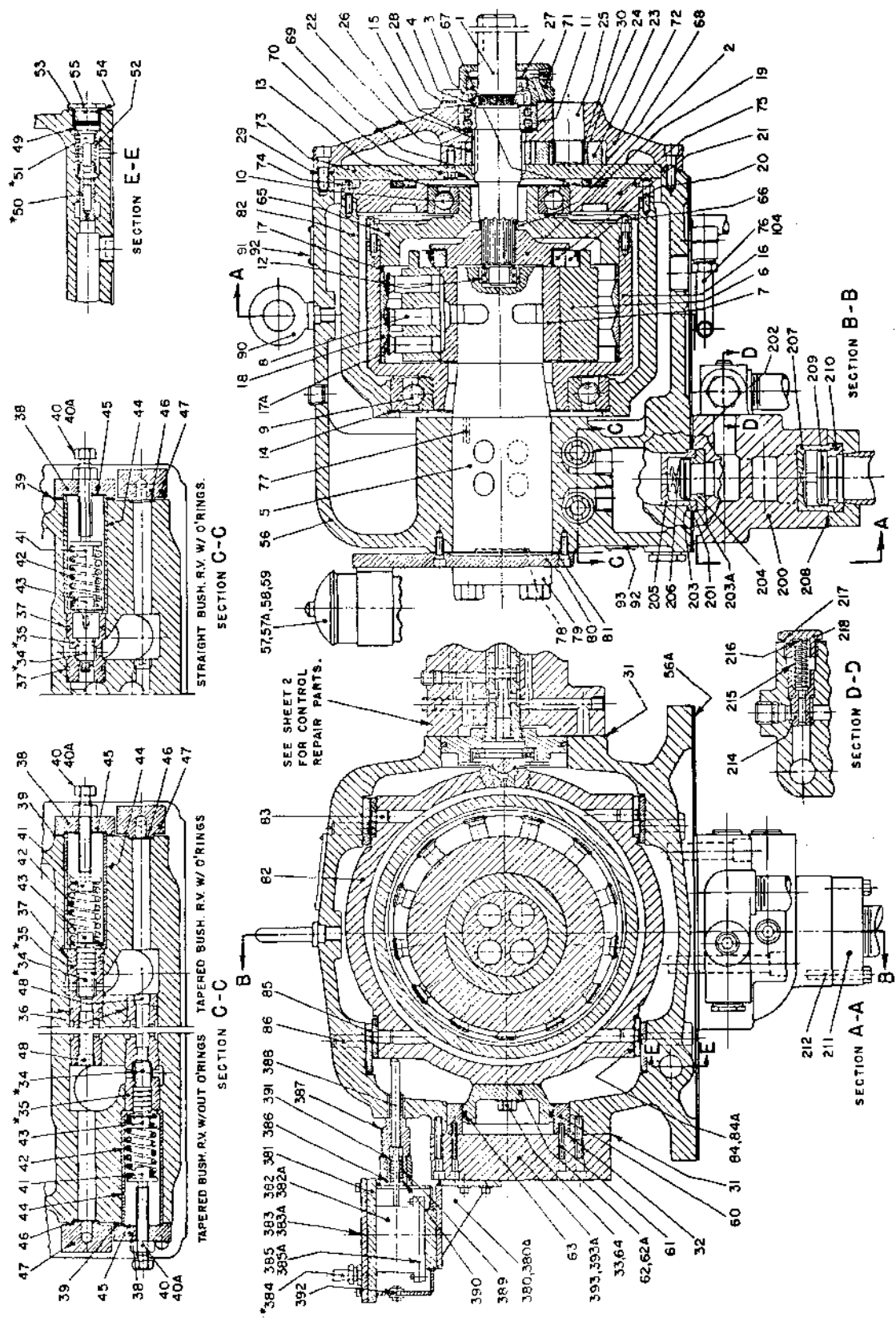
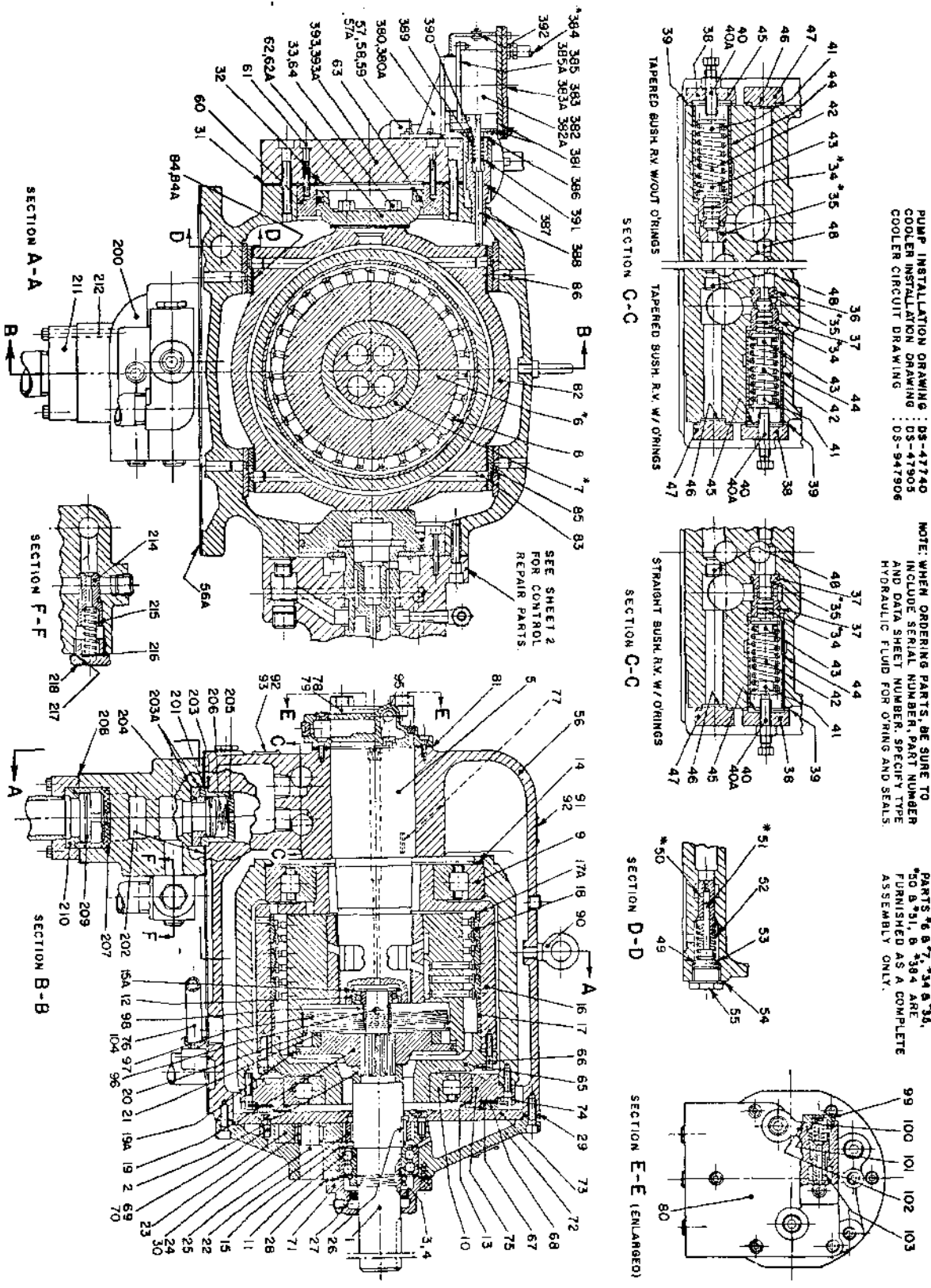


Fig. 5. Type "DV" Pumps (Sizes 4-60) parts Drawing (500847-A) (DS-947740-A, sh. #1)



PUMP INSTALLATION DRAWING : DS-47740
 COOLER INSTALLATION DRAWING : DS-47905
 COOLER CIRCUIT DRAWING : DS-947906

NOTE: WHEN ORDERING PARTS, BE SURE TO
 INCLUDE SERIAL NUMBER, PART NUMBER
 AND DATA SHEET NUMBER. SPECIFY TYPE
 HYDRAULIC FLUID FOR O-RINGS AND SEALS.

PARTS *6 & *7, *34 & *35,
 *50 & *51, & *584 ARE
 FURNISHED AS A COMPLETE
 ASSEMBLY ONLY.

Fig. 6. Type "DV" Pumps (Sizes 100-150) Parts Drawing (501070) (DS-947741 sh. #1)

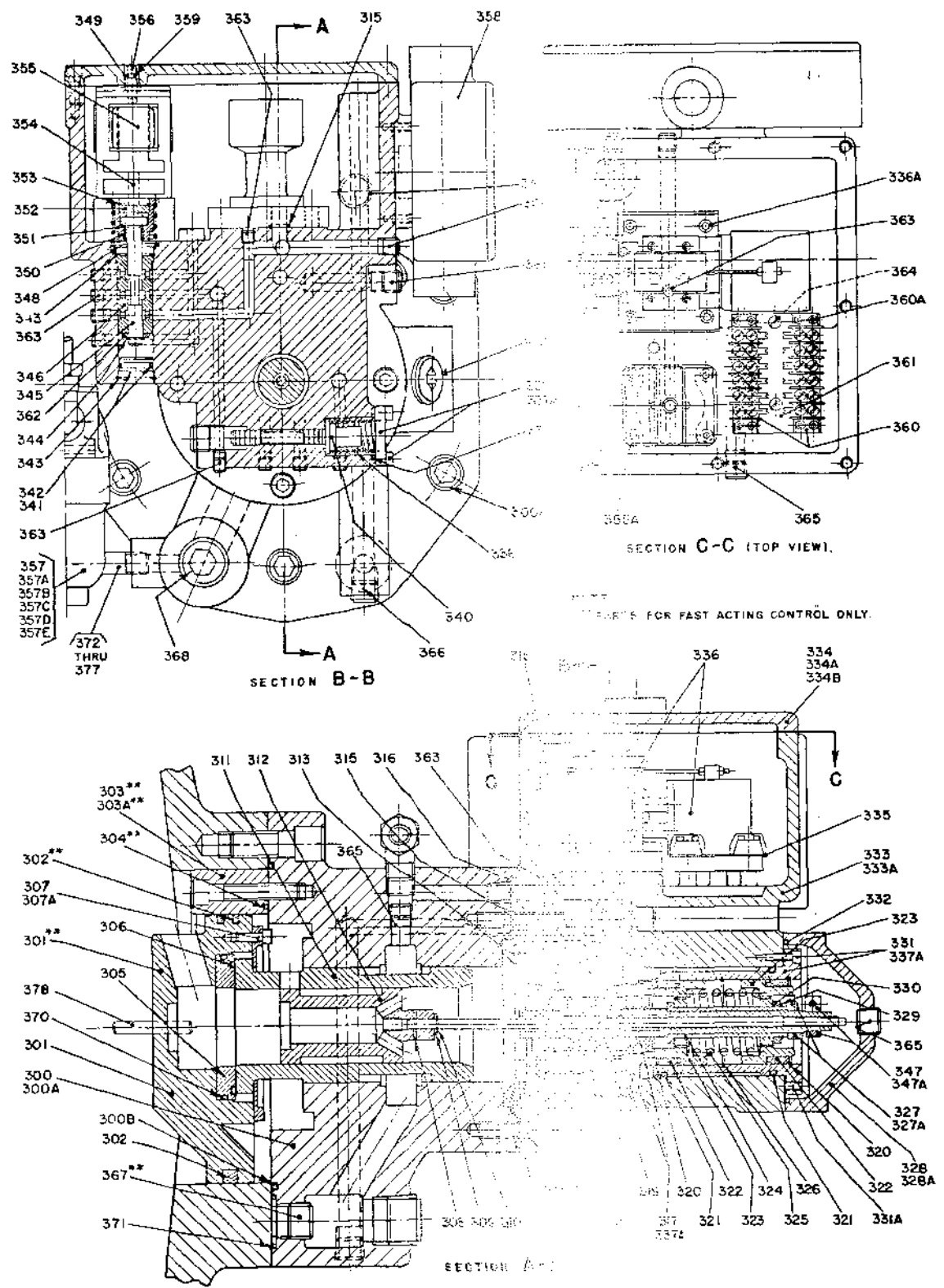


Fig.7. Type "DV" Pumps (Sizes 60-100-150)Control Ports (Drawing No. 947741-A, sh.#2)

CONTROL PARTS LIST OILGEAR TYPE "DV" PUMP

PART	DESCRIPTION	PART	DESCRIPTION	PART	DESCRIPTION
300.	Hsg., Hydraulic Stroker	325.	Spring, Centering Cyl.	351.	Spring, Plunger
300A.	Screw, Sock. Hd. Cap	326.	Ring, Retaining	352.	Disc, Push-Rod
* 300B.	Packing, O'Ring	327.	Collar, Inner Clamping	353.	Ring, Retaining
301.	Piston, Control	327A.	Screw, Sock. Hd. Set	354.	Pin, Solenoid
* 301.	Piston, Control **	328.	Cover, End	355.	Solenoid
302.	Ring, Piston	328A.	Screw, Sock. Hd. Cap	355A.	Screw, Sock. Hd. Cap
* 302.	Ring, Piston **	329.	Ring, Retaining	356.	Rod, Solenoid Push
303.	Cup, Thrust	330.	Ring, Spacer	357.	Assembly, Oil Filter
* 303.	Adapter, Ctrl. Piston **	331.	Cylinder, Centering	357A.	Nut, Ermeto
* 303A.	Screw, Sock. Hd. Cap **	331A.	Screw, Sock. Hd. Set.	357B.	Gasket, Ermeto
304.	Plate, Thrust	332.	Packing, O'Ring	357C.	Ring, Ermeto
* 304.	Packing, O'Ring	333.	Housing, Control	357D.	Elbow, Ermeto
305.	Bearing, Thrust	333A.	Screw, Sock. Hd. Cap	357E.	Element, Filter
* 305.	Plate, Spacer	333B.	Cover, Housing	358.	Assembly, Outlet Box
306.	Ring Retaining	334A.	Screw, Sock. Hd. Cap	359.	Packing, O'Ring
* 306.	Packing, O'Ring	334B.	Gasket, Housing Cover	360.	Board, Terminal
307.	Plate, Retaining	335.	Strip, Back-up	360A.	Screw, Sock. Hd. Cap
307A.	Screw, Flat Hd. Mach.	336.	Assembly, Servo Valve	361.	Plate, Backing
308.	Pin, Roll	336A.	Screw, Sock. Hd. Cap	362.	Spacer, Plunger
309.	Spacer, Plunger	337.	Cover, Plunger	363.	Plug, Pipe 1/16"
310.	Ring, Retaining	337A.	Screw, Sock. Hd. Cap	364.	Plug, Pipe 1/8"
311.	Bushing, Plunger	338.	Spring, By-Pass Plngr.	365.	Plug, Pipe 1/4"
312.	Plunger, Amplifier	339.	Packing, O'Ring	366.	Plug, Pipe 3/8"
313.	Adapter, Control	340.	Plunger, By-Pass	* 367.	Plug, Pipe 3/4"
314.	Packing, O'Ring	341.	Plug, Sealing	* 368.	Plug, Pipe 1"
315.	Packing, O'Ring	342.	Packing, O'Ring	* 369.	Packing, O' Ring
316.	Packing, O'Ring	342.	Ring, Retaining	* 370.	Packing, O'Ring
317.	Gland, Stroker Piston	344.	Ring, Retaining	* 371.	Packing, O'Ring
318.	Piston, Stroker	345.	Plunger, Fail-Safe	372.	Elbow, Ermeto
319.	Stem, Piston	346.	Bushing, Plunger	373.	Elbow, Ermeto
320.	Ring, Retaining	347.	Collar, Outer Clamping	374.	Nut, Ermeto
321.	Packing, O'Ring	347A.	Screw, Sock. Hd. Set	375.	Sleeve, Ermeto
322.	Liner, Centering Cyl.	348.	Spring, Cage	376.	Nipple, 3/8" Steel
323.	Piston, Centering Cyl.	349.	Bushing, Rod	377.	Tubing, Seamless Steel
324.	Spacer, Centering Cyl.	350.	Cage, Spring	378.	Pin, Dowel

* (Prefix) Indicates part applicable to sizes 60-100-150 units only.

** (Suffix) Indicates part applicable to Fast Action Control available only in sizes 60-100-150 units.

When ordering replacement parts, be sure to include pump serial number, part number and Data Sheet number. Specify type of Hydraulic fluid for O'Rings and seals.

O R I N G S I Z E S
(Cross Section x I.D. x O.D. - Duro ± 5)

PART NO.	P U M P S I Z E S					
	4	8	12	20	35	60 - 100 - 150
314	1/8	x	4-1/4	x	4-1/2	-90
315	1/16	x	3/8	x	1/2	-70
316	3/32	x	9/16	x	3/4	-70
321	1/8	x	2-1/2	x	2-3/4	-90
332	1/8	x	3-7/8	x	4-1/8	-90
339	1/8	x	15/16	x	1-3/16	-90
342	3/32	x	11/16	x	7/8	-70
359	1/16	x	1/8	x	1/4	-70
	60		100		150	
*300B	1/8	x	8-3/4	x	9	-90
	1/4	x	11	x	11-1/2	-90
*304**	1/8	x	6	x	6-1/4	-90
	1/8	x	8-1/4	x	8-1/2	-90
*306	1/8	x	3	x	3-1/4	-90
	1/8	x	3	x	3-1/4	-90
*369	3/32	x	5/8	x	13/16	-70
	3/32	x	5/8	x	13/16	-70
*370	1/8	x	3-3/8	x	3-5/8	-90
	1/8	x	3-3/8	x	3-5/8	-90
*371	1/8	x	1-1/4	x	1-1/2	-90
	1/8	x	1-1/4	x	1-1/2	-90

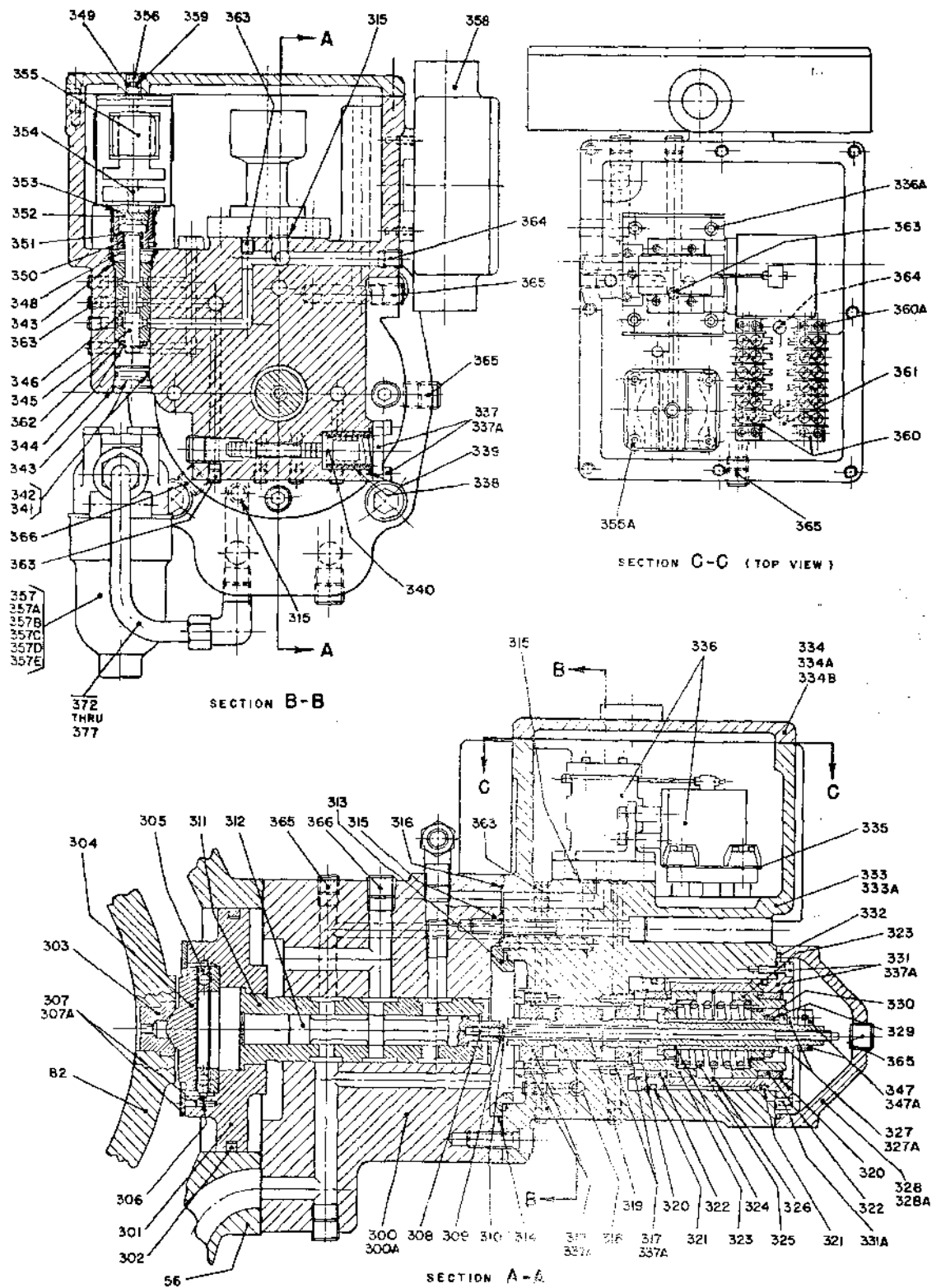


Fig. 8. Type "DV" Pumps (Sizes 4-35) Control Parts Drawing (50064-A, (6S-947740-A, sh.#2)

Cont'd from page 7.

5. Bushing turned in cylinder (see instruction bulletin on "Case and Radial Piston Units").

C. Overheating.

1. Worn radial piston unit (see instruction bulletin on "Case and Radial Piston Units").
2. Leakage past high pressure relief valve (see instruction bulletin on "High Pressure Relief Valves").
3. Insufficient cylinder running clearance (see instruction bulletin on "Case and Radial Piston Units").
4. Low oil level in reservoir (see paragraph 7).

5. Excessive gear pump pressure or worn gear pump (see instruction bulletin on "Gear Pumps").

6. Continuous operation at excessive pressure.

D. Excessive noise.

1. Worn bearings or radial piston unit (see instruction bulletin on "Case and Radial Piston Units").
2. Air in the Fluid Power System (see paragraph 7, or instruction bulletin on "Suction Valves").
3. Incorrect clearances in radial piston unit (see instruction bulletin on "Case and Radial Piston Units").

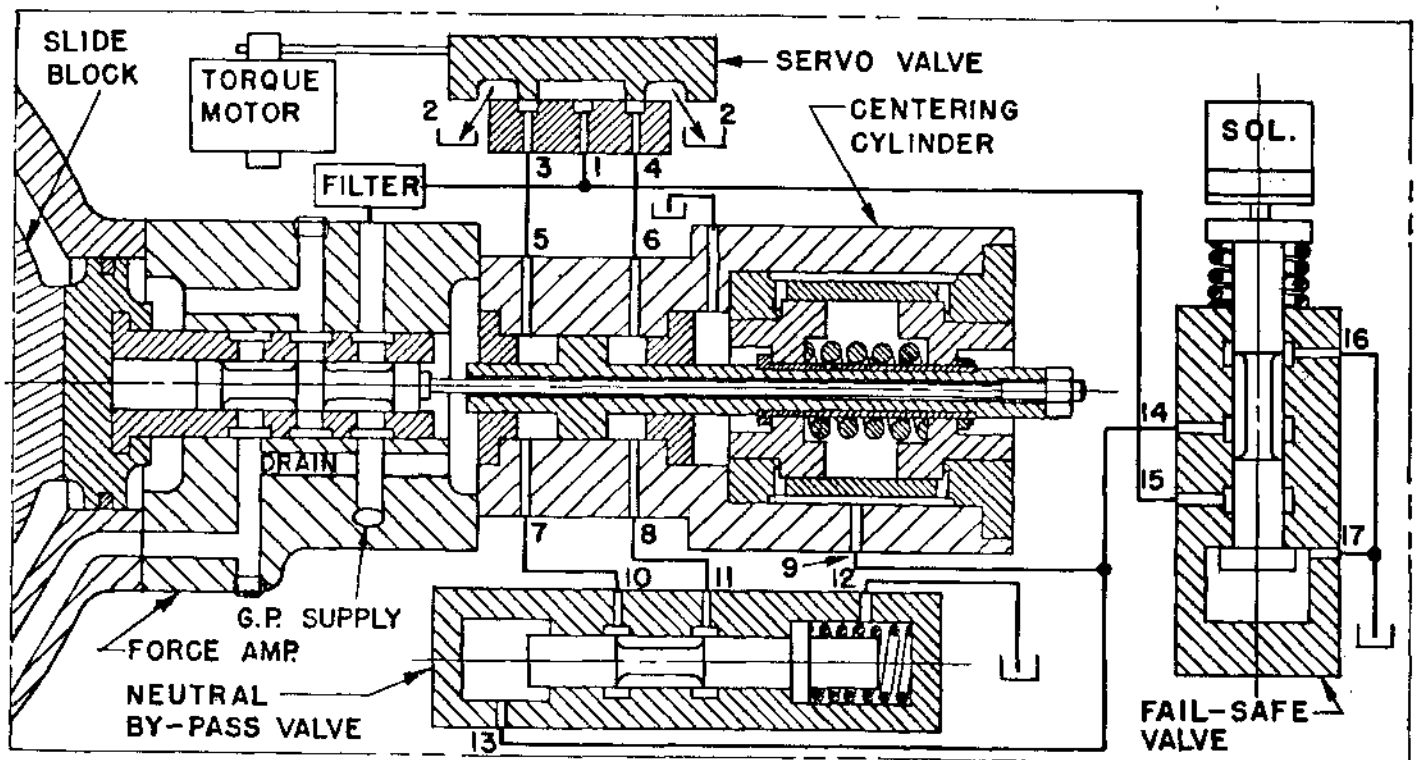


Fig. 7. Schematic Oil Circuit "DV" Control. (1V-9388-L)

OILGEAR REPLACEMENT SERVICE

STANDARD REPLACEMENT PUMPS ARE AVAILABLE TO USERS OF OILGEAR EQUIPMENT WHERE COMPARABLE UNITS WILL BE RETURNED FOR REBUILD. THESE REBUILT AND TESTED REPLACEMENTS ARE USUALLY CARRIED IN STOCK FOR QUICK DELIVERY, SUBJECT TO PRIOR REQUESTS. WHEN STANDARD REPLACEMENTS MUST BE MODIFIED TO REPLACE UNITS WHICH ARE SPECIAL, DELIVERY WILL DEPEND ON AVAILABILITY OF PARTS AND ASSEMBLY AND TEST TIME NECESSARY.

TO OBTAIN THIS SERVICE, PLACE AN ORDER FOR A REPLACEMENT AND FOR REPAIR OF THE WORN UNIT (GIVE SERIAL NUMBER AND TYPE DESIGNATION). THE REPLACEMENT WILL BE SHIPPED F. O. B. MILWAUKEE, WISCONSIN. USER RETAINS THE REPLACEMENT AND RETURNS THE WORN UNIT PREPAID TO THE OILGEAR COMPANY FOR RECONDITIONING AND TEST. WHEN THE UNIT IS RECONDITIONED AND STOCKED, THE USER IS BILLED THE COST OF RECONDITIONING.