INSTRUCTIONS

OILGEAR TYPE "C" & "CG" CONSTANT DELIVERY PUMPS

Size 100 and LARGER

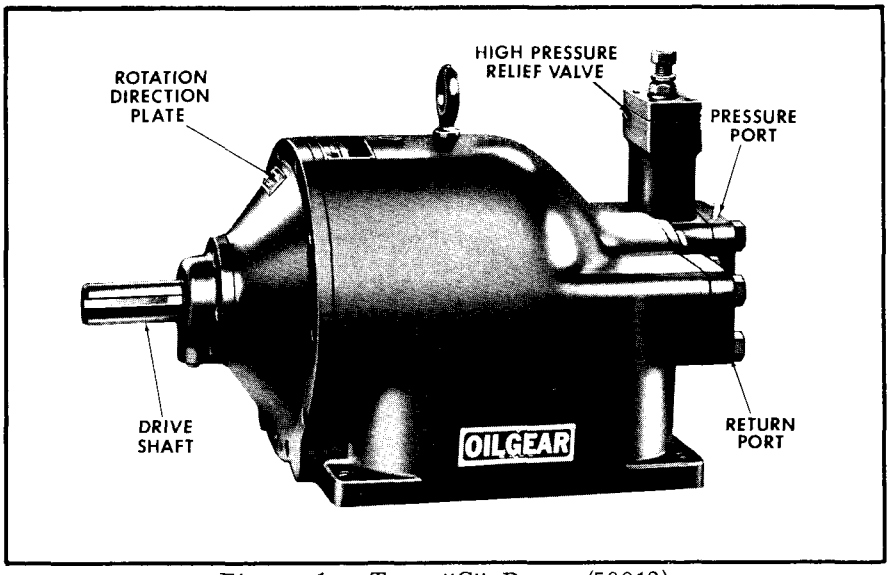


Figure 1. Type "C" Pump (50912)

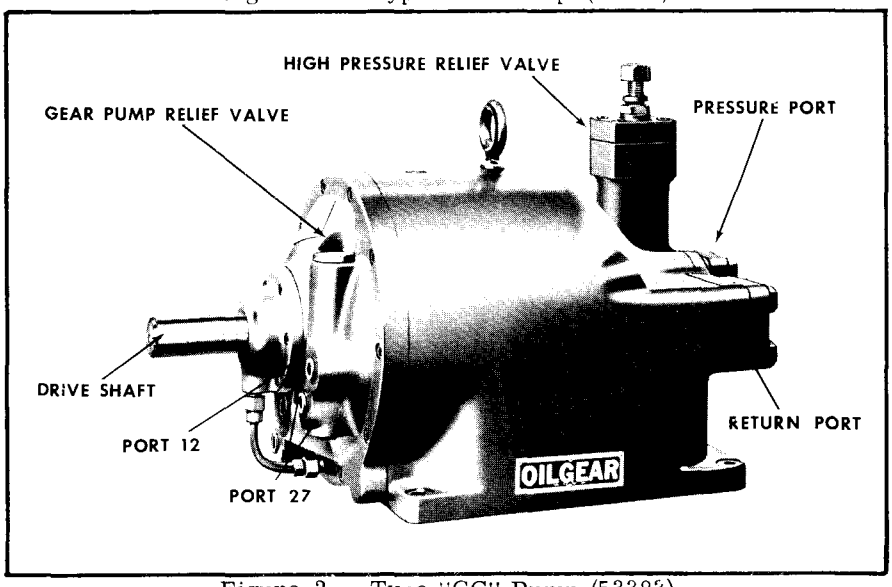


Figure 2. Type "CG" Pump (53383)

REFERENCE BULLETINS

Oil Recommendations	90000
Fire Resistant Fluids	90001
Contamination Evaluation Guide	90004
Piping Information	90011
One-Way Pump Suction and Return Valves	947913
Some "CG" Pumps are fitted with "Two-Way" Pump Suction Valves with plunger blocked on the pressure side	947914

TO THE USER AND OPERATOR OF OILGEAR UNITS

These instructions are prepared to simplify installation, operation and maintenance of Oilgear Type "C" and "CG" Pumps. Acquaintance with their construction, principle of operation and characteristics will help to attain satisfactory performance, reduce shut-downs and increase pump life. We are confident the Oilgear pump will operate to your satisfaction, if these instructions are adhered to. Some Oilgear units have been modified from those described in this bulletin and other changes may be made without notice.

Reissued Sept. 1974

THE OILGEAR COMPANY
MILWAUKEE, WISCONSIN, U.S.A. 53219

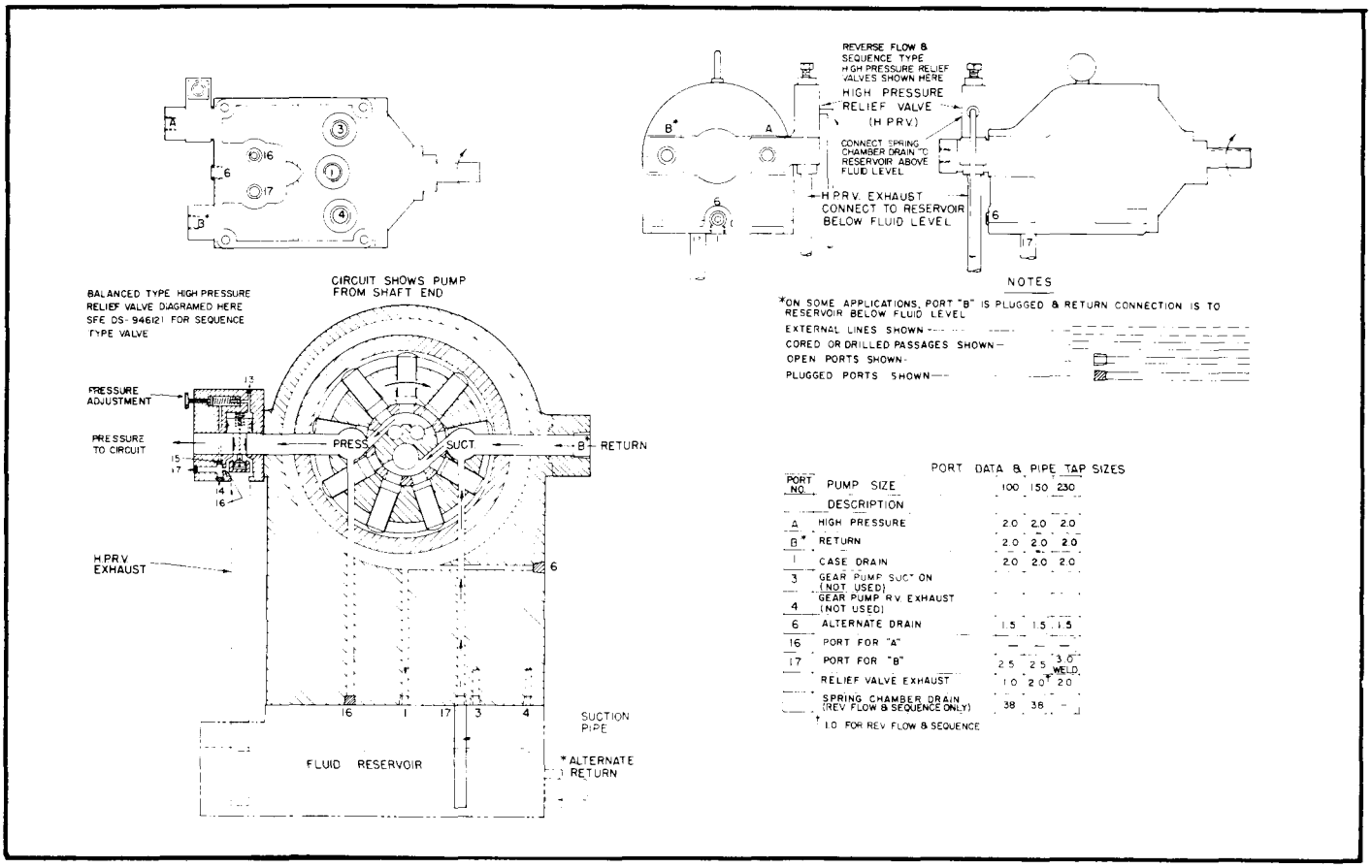


Figure 3. Cutaway Circuit Diagram of "C" Units. DS-946021 (508972).

I. PREPARATION AND INSTALLATION

A. MOUNTING

1. PUMPS WITHOUT RESERVOIRS. When shipped WITH tubes in place, avoid jarring or abuse to protect tubes and pump. Remove all pipe tap protectors from case bottom. IMPORTANT: Port "1" must be open for draining above the reservoir fluid level . . . no tube is required. When shipped WITHOUT tubes in place, remove all pipe tap protectors (not pipe plugs) from case bottom. Corresponding port numbers are stamped on pump case, suction valve and furnished tubes. Screw tubes in securely to prevent air being drawn into system (see "Piping Information" bulletin for sealing joints). Be sure high pressure relief valve spring chamber is connected to port 6 or to reservoir above fluid level (does not apply to units equipped with balanced type relief valves). Suction and discharge tubes should reach within one or two times their diameters from reservoir bottom — do not allow tubes to bottom on reservoir. Clean external surfaces of pump thoroughly and secure pump with gasket to mounting surface.

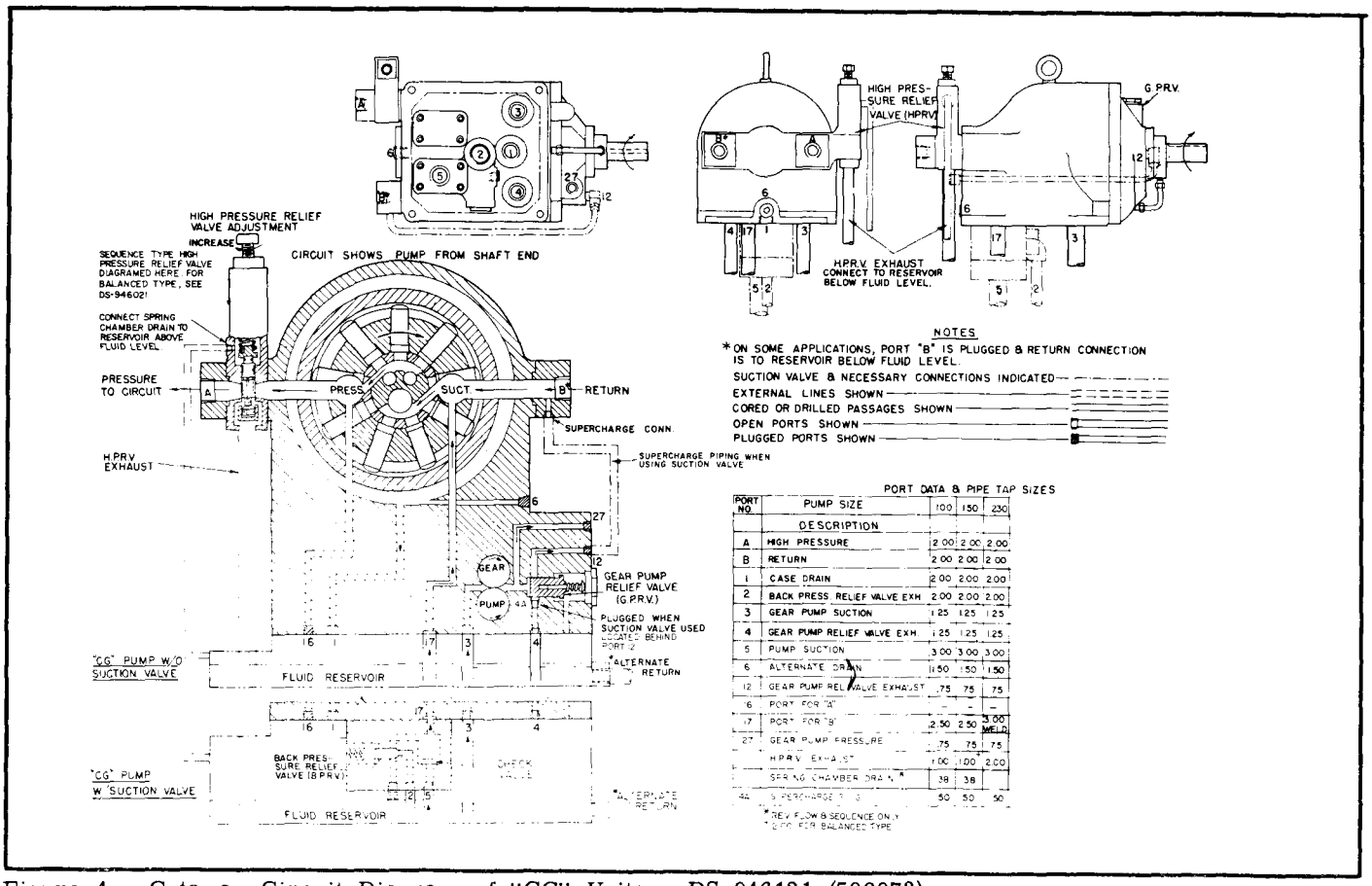
2. PUMPS WITH RESERVOIRS are usually fully equipped. Mount reservoir on a level foundation — with bottom about six inches above floor level to facilitate draining of fluid.

B. PIPING AND FITTINGS. See "Piping Information" bulletin and/or application circuit drawings.

C. POWER AND STARTING. Power required is proportional to volume and operating pressure Motor size recommendations for specific applications can be obtained from The Oilgear Company. Standard low starting torque motors are suitable for most applications. Never start or stop unit under load unless system is approved by Oilgear. Circuits require a delivery bypass for starting.

D. DRIVE. Pump driveshaft must rotate clockwise when facing shaft. (Special pumps are available for counter-clockwise rotation). See rotation direction plate on front housing, or check circuit. Use direct, belt, silent chain or gear drive. Provide an easy slip fit for coupling, pulley sheave, sprocket or gear and fasten with set screw over key. Do not use a drive fit.

E. FLUID FILLING RECOMMENDATIONS. Refer to instruction plate on reservoir or machine, and/or Oilgear bulletins on "Oil Recommendations" or "Fire Resistant Fluids". Pump all fluid thru a clean 10 micron filter. Fill reservoir to, but not above, high level on gage. Turn driveshaft by hand a few times to be sure parts are "free". Make certain control valve is in a position to bypass delivery. Turn drive unit on and off several times before allowing pump to attain full speed. System is filled by running pump and operating control valves. Stop pump if reservoir level becomes low. Add fluid and re-start. On differential systems, be sure level is not above "high" when ram is retracted, or below "low" when extended. Bleed air from system by loosening connections or opening petcocks at highest points in system. Tighten connections or close petcocks when solid fluid stream appears. To assure long service keep hydraulic fluid clean.



PORT NO.	PUMP SIZE	100	150	230
	DESCRIPTION			
A	HIGH PRESSURE	2.00	2.00	2.00
B	RETURN	2.00	2.00	2.00
1	CASE DRAIN	2.00	2.00	2.00
2	BACK PRESS. RELIEF VALVE EXH.	2.00	2.00	2.00
3	GEAR PUMP SUCTION	1.25	1.25	1.25
4	GEAR PUMP RELIEF VALVE EXH.	1.25	1.25	1.25
5	PUMP SUCTION	3.00	3.00	3.00
6	ALTERNATE DRAIN	1.50	1.50	1.50
12	GEAR PUMP REL. VALVE EXHAUST	.75	.75	.75
16	PORT FOR "A"	-	-	-
17	PORT FOR "B"	2.50	2.50	3.00 WELD
27	GEAR PUMP PRESSURE	.75	.75	.75
	H.P.R.V. EXHAUST	1.00	1.00	2.00
	SER. NO. CHAMBER DRAIN *	.38	.38	
4A	SUPERCHARGE *	.50	.50	.50

*REV. FLOW & SEQUENCE ONLY
*2.00 FOR BALANCED TYPE

Figure 4. Cutaway Circuit Diagram of "CG" Units. DS-946121 (508973).

F. AIR BREATHER. On most installations, an air breather is mounted on top of reservoir. Keep breather case filled to fluid level mark. About every six months, remove cover from breather and clean screen. Fill container to mark with clean fluid and install dry screen. The breather must be of adequate size and kept clean to allow air flow in and out of reservoir as level changes.

II. CONSTRUCTION (See Fig. 6)

"C" and "CG" constant delivery radial piston pumps consist basically of a case (56), a tapered pintle (5), a cylinder (6) and bushing (7) with closely fitted pistons (8), a rotor (16), rotor cover (65), a drive coupling (19), anti-friction bearings and a flanged high pressure relief valve assembly (33). In addition, the "CG" pump has a gear pump (22 and 23) and gear pump relief valve (GPRV) (51) built into gear pump housing (72) and, in some cases, a suction valve flanged to bottom of pump. The pintle serves as a bearing for the cylinder assembly and as a valve to direct fluid to and from the radial pistons. Automatic control of tapered cylinder bushing and pintle running clearance is provided by coupling flange (19) with piston ring (19A), orifice (95) and relief valve (103). The pintle covers (80) contains a compartment (plugs 7, 8 & 9) for installing thermo-bulb protective devices such as thermometers and thermo limit switches. The rotor (16) and rotor cover (65) assembly, enclosing thrust rings (18), is free to rotate on anti-friction bearings (9 and 10).

III. PRINCIPLE OF OPERATION (See Fig. 3 and 4).

Torque applied to driveshaft is transmitted through the drive coupling to the cylinder assembly, rotating it about the pintle. Centrifugal force (plus return and gear pump pressure, when used) keeps the beveled piston heads against the beveled surfaces of thrust rings. Through contact of the pistons, the rotor and thrust ring assembly rotates with the cylinder on anti-friction bearings mounted in counterbores of the case and front housing. These counterbores are eccentric with respect to the pintle centerline. Consequently, with the cylinder rotating about the pintle and the pistons following the thrust rings, reciprocating motion is imparted to the pistons. The bores of those moving outward are filled with fluid from the lower pintle port, while those moving inward are delivering fluid to the upper pintle port. (The functions of pintle ports are reversed on counterclockwise driven units).

Three types of relief valves are used to protect pump, work and machine against overload. With reverse flow type, pressure transmitted through slots in small circumference of plunger acts on the larger circumference annular area of plunger forcing it up against spring (opening plunger against seat) and relieves the system. With the sequence type, pressure is transmitted through slots in plunger to recessed area and through drilled passages in plunger to its bottom area forcing it against spring (opening plunger against seat) and relieves the system. With balanced type, pressure is transmitted through slots in large circumference of plunger to the pilot valve. When it forces the pilot valve plunger off its seat against the spring -- the large area

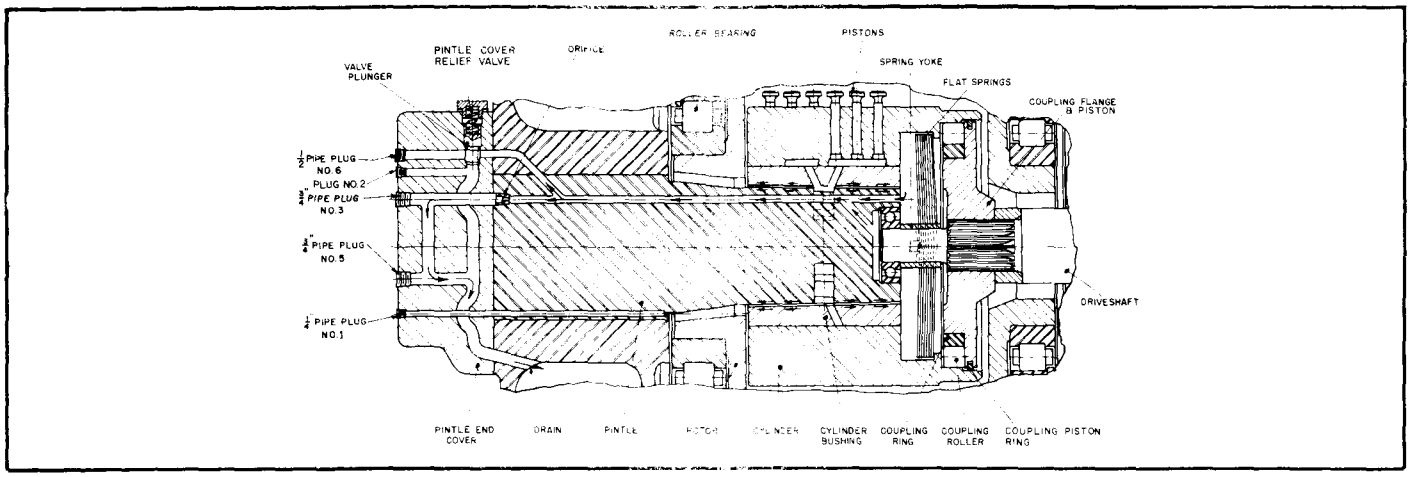


Figure 5. Cylinder Clearance Control DS- 947026-B (49215-B).

above the main plunger is opened to drain — a state of unbalance is reached and pressure on bottom large area of main plunger opens main valve to relieve system pressure. When system pressure is reduced (or relieved) all valves reseat (close). Slot and drillings in plunger provide dashpot closing.

The gear pump on "CG" pumps, without suction valves, is used for auxiliary purposes only. On "CG" pumps with suction valve, the gear pump is used to supercharge the radial piston pump and for auxiliary purposes.

Automatic Cylinder Clearance Control

See figure 5. Flat springs hold cylinder toward small end of tapered pintle for maximum running clearance at idle or low pressure. Fluid escaping through running clearance on small end of pintle flows into flat spring chamber. Escape from the chamber is blocked by coupling flange with piston ring and restricted by an orifice in the pintle. As pump pressure increases, the amount of fluid escaping through the running clearance increases and builds up pressure in the chamber, forcing the cylinder farther onto the tapered pintle, thus reducing the running clearance. A relief valve limits pressure in chamber should the orifice become clogged or pintle unit become worn beyond the limits of the automatic control.

IV. MALFUNCTIONS AND CAUSES

A. IRREGULAR OR UNSTEADY OPERATION
1. Fluid level in reservoir too low.
2. Air in fluid power system.
3. Sticking pistons or worn radial piston unit.
4. Faulty hydraulic cylinder or motor.

B. LOSS OF PRESSURE OR VOLUME
1. Foreign material in high pressure relief valve, sticking HPRV plunger or defective HPRV spring.
2. Worn radial piston pump.
3. In-operative cylinder and pintle clearance control.
4. Obstructed suction passages in case or pintle.
5. Bushing turned in cylinder.

C. OVERHEATING
1. Worn radial piston unit.
2. Leakage past high pressure relief valve.
3. Fluid level in reservoir too low.
4. Continuous operation at excessive pressure.
5. Excessive gear pump pressure or worn gear pump.

D. EXCESSIVE NOISE
1. Worn bearings or radial piston unit.
2. Air in fluid power system.

V. SPECIFICATIONS

A. RADIAL PISTON UNIT.
a. Rotor eccentricity in inches.
d. Rotor end play in inches ± .005.
e. Cylinder should begin to get tight when pintle projects amount shown ± .031.
f. Approximate force in tons to press out pintle.
g. Approximate force in tons to press in pintle.
h. Cylinder off-of-tight position.
k. Maximum normal rated speeds in rpm.

Size	a	d	e	f	g	h	k
10011	.406	.035	.12	250	100	.05	900
10017	.406	.035	.12	250	100	.05	900
10025	.406	.035	.12	250	100	.05	900
15025	.531	.035	.12	250	100	.05	900
15030	.531	.035	.12	250	100	.05	900
15035	.531	.035	.12	250	100	.05	900
23030	.675	.035	.12	250	100	.05	900

B. GEAR PUMP AND RELIEF VALVE ("CG" only)
1. Gear pump volume for new units in cubic inches per minute at 100 psi and rpm given in column "k".
2. Gear pump relief valve (GPRV) setting in psi.
3. Maximum gear pump pressure in psi using standard spring. Consult The Oilgear Company for special settings of gear pump pressure.

Size	1	2	3
100	5430	150	160
150 & 230	7160	150	160

C. HIGH PRESSURE RELIEF VALVES (HPRV)
1. For general straight-line applications, continuous service ratings are 1100, 1700, 2500, 3000 and 3500 psi as indicated by 11, 17, 25,

30 and 35 in body of the unit type designation. Relief valve setting is 1475, 2100, 3000, 3250 and 4000 psi respectively when blowing pump volume.

2. For rotary drive applications, continuous service ratings are 1100, 1700, 2500 psi as indicated by 11, 17 and 25 in body of the unit type designation (3000 and 3500 psi not normally used for rotary drives). Relief valve setting of these pumps are 1700, 2500 and 3000 psi respectively when blowing pump volume.
3. Relief valves are often set for lower pressures to limit overload peaks.

D. PINTLE COVER RELIEF VALVE. The pintle cover relief valve is normally set to crack when pump high pressure relief valve is blowing.

VI. TESTING AND ADJUSTING

A. HIGH PRESSURE RELIEF VALVE, (HPRV). Install a high pressure gage in pump pressure port and operate machine. Block pressure port momentarily with valve or by stalling cylinder or hydraulic motor and read gage. Keep periods of relief valve discharge short or excessive heating and damage may result. To increase pressure turn adjusting screw (40) or knob (146) clockwise; opposite to reduce.

B. GEAR PUMP RELIEF VALVE, (GPRV) ("CG" only). Connect pressure gage (500 psi) to port 27 and run pump. Compare reading with "Specifications, V-B". Note: Gear pump pressure may be higher than specified when fluid is cold, do not take reading or make adjustments until fluid is warm. Stop unit. Insert additional shims (53) to increase pressure or remove to decrease. Each 1/32" shim will change pressure about 5 psi. CAUTION: do not shim for pressure higher than those in "Specifications, V-B" or spring will be compressed solid. If additional shims fail to increase pressure; disassemble, clean and inspect. Reassemble and recheck.

C. GEAR PUMP, ("CG" only). If gear pump pressure is still insuficient, remove pipe plug from port 27 and install one leg of a tee fitting into port, globe valve in another and a 500 psi gage in the remaining. Place a suitable container near the valve outlet to catch fluid. Start pump (with delivery bypassed). Open valve until gage reads 100 psi and measure volume. See V-B. Limit discharge to prevent dropping reservoir below low level. Check all components supplied by gear pump to assure fluid is not bypassed or leaking somewhere in the circuit.

D. RADIAL PISTON UNIT. Remove eyebolt (90) from pump top. Start the pump and run at rated pressure for several minutes while looking in eyebolt hole. If fluid begins to rise in the case or flow out of hole, the radial piston unit is worn excessively.

E. SUCTION VALVE, ("CG" only). See reference bulletin for instructions on suction valve.

F. PINTLE COVER RELIEF VALVE. The pintle cover relief valve is set as shown in V-D "Specifications" at the factory. The relief valve does not blow in normal service. If the pintle unit should become worn beyond the limits of the automatic clearance control mechanism, the pintle cover relief valve then blows and prevents excessive end thrust on the rotor assembly. If it should become necessary to test the setting of this relief valve, remove plug 2, stall ram or output shaft of driven component. The pintle cover relief valve should start discharging past opening behind plug 2 at the same time the maximum high pressure relief valve setting is reached. Blow HPRV only long enough to check setting or excessive heat and damage may result. Stop pump and add shims (101) if pintle cover relief valve discharged too soon, or remove shims if too late. Be sure orifice plug (95) is not plugged, but do not change its size.

VII. DISASSEMBLY, (See figure 6)

Depending on what parts are to be inspected or replaced, complete disassembly may not be necessary. Refer to applicable sub-section. Disconnect unit from circuit and drive motor. Remove flange (79), relief valve assembly (33 or 120 and 142), pintle cover (80) and pump mounting bolts. Lift pump from reservoir and set on flange end. Block pump to hold it securely in this position. Observe position of, and tag all gaskets, O'rings and shims during disassembly so they can be returned to their original position on assembly.

A. SUCTION VALVE - See reference instructions.

B. GEAR PUMP ASSEMBLY, ("CG" only). Remove gear pump housing screws (72A), fasten a clamp to driveshaft (1A) or screw hook bolts into taps in outer rim of gear pump housing (72) and carefully lift gear pump assembly with crane. Remove gear pump cover screws (69), gaskets (70), cover (73), gears (22 and 23) and key (26).

C. PISTON UNIT. Remove housing (57 or 72) and driveshaft (1 or 1A) assembly. Remove lock wire and rotor cover screws (66). Jack cover (65) from rotor (16) with square head set screws. Lift cover and outer bearing race (10) out. Lift out coupling flange (19) with ring (19A), coupling ring (21), coupling rollers (20), flat springs (97), steel balls (96) and spring yoke (98). Push pistons (8) all the way into their bores. Screw hook bolts into tapped holes in cylinder end and very carefully lift the cylinder-bushing (6 & 7) and piston (8) assembly off the pintle (5). Be careful pistons do not fall from their bores. Do not cock or scratch inside of bushing when removing the assembly. If cylinder is frozen to pintle, press pintle out of case before attempting to separate the cylinder and pintle. Screw hook bolts into end of rotor (16) and lift rotor assembly out. Remove rotor bearing shims (14). If pintle is to be replaced or reground, set pump case, with open end down, in a press (see "Specifications, V-A-f" for capacity). Insert a piece of wood or other soft material under inside end of pintle so when it drops from case it will not be damaged. Apply pressure to case end of pintle. Pintle has .005" taper on diameter per inch of length. After it's

pressed down a short distance, it will drop. If it is necessary to remove thrust rings (18) from rotor, break the inner spacer ring (17A) by striking with a rod inserted in one or more of the radial holes in the rotor directly behind the spacer ring. Note position and sequence of thrust and spacer rings before removing. Then, drive out the thrust rings and spacer rings (17) by striking a brass bar inserted in the axial holes in bearing end of rotor.

D. SHAFT REMOVAL. Drive shaft (1 or 1A) need not be removed unless inspection of shaft seal (27) and front shaft bearing (11) is necessary. File burrs on keyway. Place shim stock or scotch tape over keyway to prevent cutting of shaft seal. Remove screws (71A) and carefully slide gland (71) with seal off shaft. Lift shaft and bearing assembly out. Remove lock nut (3) and washers (4). Pull bearing (11) off shaft.

E. GEAR PUMP RELIEF VALVE ("CG" only). Unscrew cap (55) and remove gasket (54), shims (53), spacer (49), dashpot plunger (50), spring (52) and valve plunger (51). Avoid marring highly finished surfaces of dashpot and valve plungers.

F. HIGH PRESSURE RELIEF VALVE

1. Reverse Flow and Sequence Type. Mark setting of screw so it can be returned to original setting. Turn out adjusting screw (40) until spring tension is relieved, remove cap (38) with adjusting screw. Withdraw spring guides and spring (42). If plunger (34) and bushing (35) are to be removed, remove flange (32) and push bushing out from top (spring side).
2. Balanced Type. Remove pilot head (135) from body (142) and spring (115) and main HPRV (116) can be withdrawn. If necessary, seat (117) can be withdrawn off guide pin (150) after removing flange (118) and spacer (149). If pilot valve disassembly is necessary, mark setting of screw (137) so it can be returned to original position. Turn adjusting knob (146) to relieve spring tension and turn cap (136) out of body. Dowel pin (139), spring guide (133), spring (132) and pilot valve plunger (131) can now be removed. Remove pilot valve seat cap (128) and push out seat (129).

VIII. INSPECTION

A. GEAR PUMP ASSEMBLY ("CG" only). Inspect gears (22 and 23) teeth for wear. Check stub shaft (25) and roller bearing (24). Inspect wear surfaces in housing (72) and cover (73). Check depth of each gear pocket with depth gage and add amount of wear in cover. Measure diameter of gear bores. Measure width and outside diameter of gears. Normal running clearances are 0.003 to 0.005".

B. SHAFT SEAL Inspect shaft seal (27) for cracks, cuts, hardening or deterioration. If replaced, press new seal in carefully to prevent distortion.

C. RADIAL PISTON PUMP. Make certain all chips, grit and foreign matter are removed. Inspect all bearings for pitting, galling and binding. Inspect all pistons and bores for cracks, scratches or other signs of wear. Inspect working surfaces on pintle, bushing, and thrust rings. Check scratch mark or number stamp on upper face of cylinder and bushing, across joint line, to make certain bushing has not turned in cylinder. Replace any parts which appear worn or damaged.

D. GEAR PUMP RELIEF VALVE ("CG" only). Clean dirt from grooves in dashpot plunger and small hole in end of valve plunger. Check valve plunger seat for scoring, wear, or foreign matter. Polish or lap sticking plungers.

E. HIGH PRESSURE RELIEF VALVE

1. Reverse Flow Type. Be sure plunger moves in bushing freely. Clean foreign matter from grooves in plunger. Check seat in bushing for scoring, wear or foreign matter. Relap plunger on seat if necessary. When lapping seat, retain close fit between small diameter of plunger and bushing.
2. Sequence Type. Be sure plunger moves freely in bushing. Clean foreign matter from **axial** grooves and passageway (in center) and connecting drilling of valve. Relap plunger on seat if necessary.
3. Balanced Type. Be sure main plunger moves freely in body. Clean foreign matter from axial and radial grooves as well as passageway thru center of plunger. Do not remove plug (121) (port 5) if used. Relap plunger on seat if necessary. Be sure all passageways and orifices in pilot head are open and clean. Relap pilot plunger on seat if necessary.

IX. ASSEMBLY

Be sure reservoir, system components and hydraulic fluid are clean. Clean and lubricate all parts with a film of system fluid prior to assembly. If bearing races are heated in oil to ease assembly, exercise extreme care to prevent heating over 300°F.

A. HPRV. Reassemble in reverse order of disassembly. Be sure plunger is free in bore. Turn screw in to previously marked position and lock with nut. Check pressure when unit is assembled and mounted.

B. GPRV ("CG" only). Reassemble in reverse order of disassembly. Anneal gasket (54) and be sure it is in place before tightening cap.

C. GEAR PUMP ("CG" only). Replace parts in reverse order of disassembly. Check driveshaft key (26) fit in driveshaft and driving gear (22). Gear must be sliding fit over shaft and key. Lock gear pump cover screws (69) with soft iron or brass wire. If only the gear pump was dismantled, refer to paragraph on "Driveshaft (IX-D-4) for insertion and shimming of front shaft bearing and correct shimming for cylinder end-play.

D. RADIAL PISTON UNIT.

1. PINTLE. If pintle (5) was removed, set pump case with open end facing up in a press (see V-A-g for force needed). Apply a thin coat of white lead on the large tapering surface of pintle and insert pintle into case locating it with key (77). Slip a sleeve over small pintle end so it rests against

large diameter shoulder, not pintles small end. Press on sleeve until pintle end is flush with back of case. Cylinder bushing (7) and pintle (5) have 0.032" taper on diameter per inch of length. Suspend cylinder-bushing assembly in a crane with large end of bore downward. Clean pintle and bushing surfaces thoroughly. Slowly lower cylinder over pintle, do not scrape bushing against edges or pintle ports. Stop when cylinder begins to become tight on pintle. Do not let entire weight of cylinder rest on pintle or it will become too tight and damage the bushing. At this point, the pintle should project past cylinder bushing face the amount shown in V-A-e (see figure 7). Record actual dimension and identify it as "e". Remove cylinder from pintle.

2. ROTOR. If spacers (17 & 17A) and thrust rings (18) were removed, press new ones evenly into rotor (16). Install a minimum of eight 0.010" thick shims (14) in case's rotor bearing counter bore. If measurement "e" from step 1 was less than shown in V-A-e, add one additional shim for each .010" less. Press rotor bearing (9) outer race, with thrust flange down, into case. Install inner race assembly of rotor bearing (9) on rotor and inner race of bearing (10) on rotor cover (65). Be sure bearing races are tight against hub shoulders. Lubricate bearings, place rotor assembly in case and make sure bearing (9) turns freely.

3. CYLINDER. Lubricate mating surfaces of pintle and cylinder bushing, and lower cylinder without pistons (8) on pintle; do not scratch bushing on pintle. With cylinder resting on rotor, be sure cylinder turns freely and measure pintle projection (see figure 8). It should project by an amount equal to "e" (from step 1) less dimension given in V-A-h ("e" minus "h"). Add or remove rotor bearing shims (14) to obtain correct position of cylinder. Record actual final measurement as "u".

4. DRIVESHAFT. Lift cylinder off pintle and place a .187" thick spacer ring inside rotor. Position cylinder on pintle so it rests on this spacer. Fit coupling ring (21) and coupling flange (19), without rollers, in cylinder end. Remove driveshaft (1 or 1A) from housing (57 or 72) (see VII-D on "Shaft Removal"). Place housing assembly in position with gasket (29) (use pieces if available) and tighten housing screws (57A or 72A). If removed, fit front driveshaft bearings (11) on shaft with both outer race thrust sides facing seal (27) end, install lockwasher (4), tighten nut (3) to hold bearing tight against shaft shoulder and bend one prong of washer to lock nut. Remove any shims (15) from counterbore in housing. Slide shaft with coupling spacer (2) and key (26) (if used) in place, through housing firmly. Be sure outer race of bearing (11) is all the way down and measure from top of outer race to face of housing. Add shims under bearing until this measurement increases .005" to .010". Add .010" shims (15) between outer front driveshaft bearing (11) and gland (71) until gap between gland and housing (without gasket in place) is .005". Install seal (27), match gasket (28) holes to gland and secure gland with gasket to housing. Remove housing and driveshaft assembly from case; coupling flange and ring from cylinder; cylinder from pintle and .187" spacer ring from rotor.

5. CYLINDER. Insert pistons (8) all the way in cylinder (6) and carefully lower assembly part way on pintle. Hold it high enough to set spring yoke (98) on rear shaft bearing (12), balls (96) in yoke and flat springs (97) on balls in each side of yoke. Size 100 units use six springs, size 150 use seven. Lower cylinder until it hangs on springs (see figure 9). Measure from bushing face to end of pintle to determine spring deflection. Shim (15A) under bearing (12) to obtain measurement of 0.34" minus "u" for size 100; or 0.38" minus "u" for size 150. The "u" dimension was recorded in step 3. Be sure outer race thrust face of bearing (12) faces down. Install coupling ring (21) and rollers (20). Check for free fit of coupling piston ring (19A) in cylinder bore, install ring in coupling flange (19) and assembly in cylinder.

6. ROTOR COVER. Position rotor cover (65), with balance mark "0" matching "0" mark on rotor (16) and force cover down uniformly with cover screws (66) holding spacers (17 & 17A) and thrust rings (18) securely. There should be approximately 0.062" clearance between rotor and cover when cover is tight. Secure screws with new soft iron or brass lock wire (106). With outer race of rotor cover bearing (10) resting on roller faces, measure height difference between outer and inner race faces (see figure 10). If rotor cover bearing is not replaced, check projection in a similar manner; but with rotor cover and housing (57 or 72) separated from pump assembly. Record this difference as "+t" if inner race projects, or as "-t" if outer projects. To check for correct rotor end play, (see figure 11) lay a straight edge across the open end of case (56) and measure from the bottom edge to top face of inner race of bearing (10). Write down this measurement "X". Measure distance from front housing (57 or 72) where it mates against gasket (29) to bottom surface of front housing (57) or assembled gear pump cover (73). Subtract 0.008 from this dimension (compressed gasket thickness) and label remainder "Y". Measure distance from bottom surface of front housing (57) or cover (73) to bottom of bearing counter bore (without shims (13) in place) and label measurement as "Z". Calculate number of 0.010" bearing shims (13) to be used as follows:

$$\frac{X-(Y-Z)-.035+t}{.010} = \text{number of shims}$$

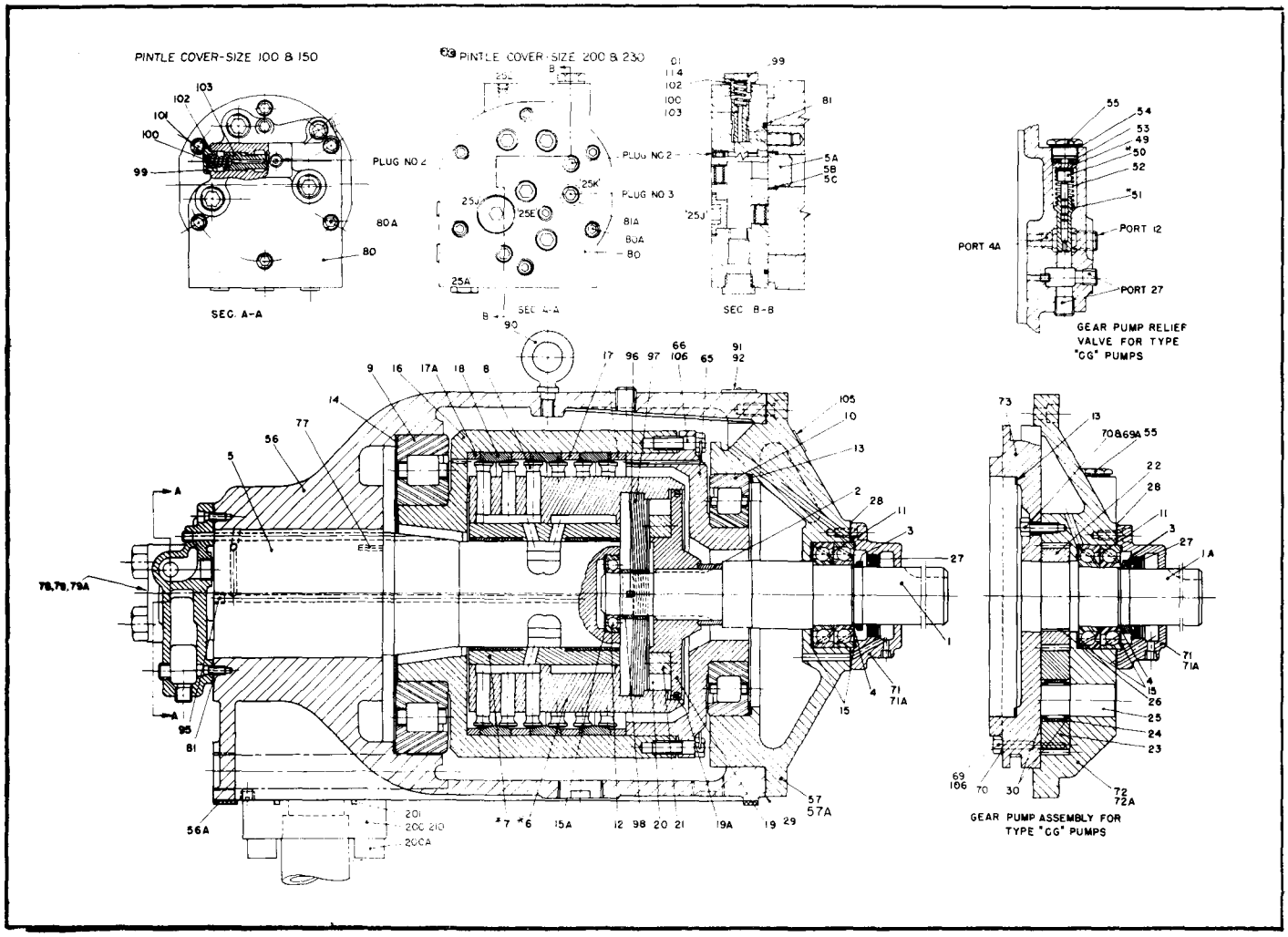
Install shims and press in outer race of rotor cover bearing.

F. FRONT HOUSING. Match gasket (29) to case and secure front housing (57) or assembled gear pump housing (72) with driveshaft to case.

G. SUCTION VALVE. See reference material.

H. RELIEF VALVES. Reassemble pintle relief valve in reverse order of disassembly. Be sure pintle orifice plug (95) is not plugged and fasten assembly with gasket (81) to rear of case. Mount assembled high pressure relief valve with gasket (39 or 122) and spacer (44 or 126) on case.

I. MOUNTING. Bolt pump with gasket (56A) to reservoir. Turn pump over by hand several times to make certain no parts are binding. Couple pump to drive motor; re-install piping; test and adjust pump and relief valves if necessary.



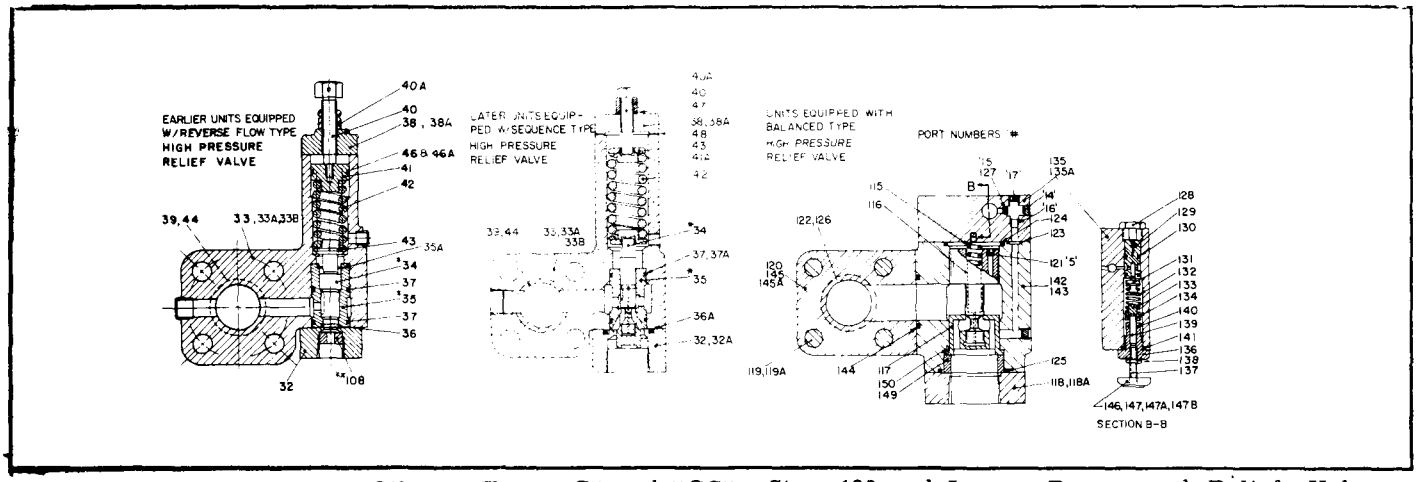


Figure 6. Parts drawing, Oilgear Type "C" and "CG". Size 100 and Larger Pumps and Relief Valves. DS-946205E (500709E).

X PARTS LIST

Part No.	Description
1.	Driveshaft
1A.	Driveshaft (CG)
2.	Spacer, Coupling
3.	Nut, Lock
4.	Washer, Lock
5.	Pintle
5A.	Plug, Pintle
5B.	Seal, O'ring
5C.	Ring, Back-up
*6.	Cylinder
*7.	Bushing, Cylinder
8.	Piston, Radial
9.	Bearing, Rotor
10.	Bearing, Rotor Cover
11.	Bearing, Driveshaft Front
12.	Bearing, Driveshaft Rear
13.	Shim, Rotor Cover Bearing
14.	Shim, Rotor Bearing
15.	Shims, Front Driveshaft Bearing
15A.	Shims, Rear Driveshaft Bearing
16.	Rotor
17.	Ring, Spacer
17A.	Ring, Spacer
18.	Ring, Thrust
19.	Flange, Coupling
19A.	Ring, Coupling Piston
20.	Roller, Coupling
21.	Ring, Coupling
22.	Gear, G. P. Driving
23.	Gear G. P. Driven
24.	Bearing, Needle
25.	Shaft, Stub
26.	Key, Driveshaft
27.	Seal, Shaft
28.	Gasket, Seal Gland
29.	Gasket, Front Housing
30.	Spacer, Bearing
32.	Flange, HPRV
32A.	Screw, Sock. Hd. Cap
33.	Body, HPRV
33A.	Screw, Sock. Hd. Cap
33B.	Nut, Hex
*34.	Plunger, HPRV
*35.	Bushing, HPRV
35A.	Ring, Retaining
36.	Seal, O'ring
36A.	Seal, O'ring
37.	Seal, O'ring
37A.	Ring, Back-up
38.	Cap, HPRV
38A.	Screw, Sock. Hd. Cap
39.	Gasket, HPRV Flange
40.	Screw, HPRV Adjust.
40A.	Nut, Lock
41.	Guide, Spring
41A.	Seal, O'ring
42.	Spring HPRV
43.	Guide, Spring
44.	Spacer
46.	Assembly, Block Vee
46A.	Seal, O'ring
47.	Seal, Thread
48.	Gasket, HPRV Cap
49.	Spacer, G. P. R. V.
*50.	Plunger, Dashpot
*51.	Plunger, G. P. R. V.
52.	Spring, G. P. R. V.
53.	Shims, G. P. R. V.
54.	Gasket, G. P. R. V. Cap
55.	Cap, G. P. R. V.
56.	Case, Pump
56A.	Gasket, Pump Mounting
57.	Housing, Front
57A.	Screw, Sock. Hd. Cap
65.	Cover, Rotor
66.	Screw, Rotor Cover
69.	Screw, G. P. Cover
69A.	Screw, G. P. Cover
70.	Gasket, G. P. Cover Screw
71.	Gland, Shaft Seal
71A.	Screw, Sock. Hd. Cap
72.	Housing, Gear Pump
72A.	Screw, Sock. Hd. Cap
73.	Cover, Gear Pump
77.	Key, Pintle
78.	Gasket, Flange
79.	Flange, Pipe
79A.	Screw, Sock. Hd. Cap
80.	Cover, Pintle End
80A.	Screw, Sock. Hd. Cap
81.	Gasket, Pintle Cover
81.	Seal, O'ring
81A.	Seal, O'ring
90.	Eyebolt
91.	Plate, Name
92.	Screw, Drive
95.	Plug, Orifice
96.	Ball, Steel
97.	Spring, Flat
98.	Yoke, Flat Spring
99.	Cap, Pintle Cover R. V.
100.	Spring, Pintle Cover R. V.
101.	Shims, Pintle Cover R. V.
102.	Gasket, Cap
103.	Plunger, Pintle Cover R. V.
105.	Plate, Rotation
106.	Wire, Lock
**108.	Plug, Orifice
115.	Spring, Main HPRV
116.	Plunger, Main HPRV
117.	Seal, Main HPRV
118.	Flange, HPRV Exhaust
119.	Stud, HPRV
119A.	Nut, Hex
119B.	Washer, Flat
120.	Manifold, HPRV Block
121.	Plug, Pipe
122.	Gasket, HPRV Flange
123.	Seal, O'ring
124.	Seal, O'ring
125.	Seal, O'ring
126.	Spacer
127.	Plug, Orifice
128.	Cap, Pilot Valve Seat
129.	Seat, Pilot Valve
130.	Seal, O'ring
131.	Plunger, Pilot Valve
132.	Spring, Pilot Valve
133.	Guide, Spring
134.	Seal, O'ring
135.	Head, Pilot Valve
135A.	Screw, Sock. Hd. Cap
136.	Cap, Adjust. Screw
137.	Screw, Adjusting
138.	Nut, Hex
139.	Pin, Dowel
140.	Seal, O'ring
141.	Seal, O'ring
142.	Body, HPRV
143.	Screw, Sock. Hd. Cap
144.	Seal, O'ring
145.	Plate, HPRV Name
145A.	Screw, Drive
146.	Knob, Adjust.
147.	Plate, Direction
147A.	Screw
147B.	Washer, Lock
149.	Spacer, Seat
150.	Pin, Roll
**200.	Flange, Suction
**200A.	Screw, Sock. Hd. Cap
**201.	Seal, O'ring
**210.	Flange, Blank
211.	Seal, O'ring

O'ring Sizes on Page 11

*Parts numbered 6 and 7; 34 and 35; 50 and 51 furnished only as assemblies.

**Not used on all units.

Parts used in this assembly are per Oilgear specifications. Use Oilgear parts to insure compatibility with assembly requirements. When ordering replacement parts, be sure to include pump type and serial number, bulletin number and part number. Specify type of hydraulic fluid for packings and seals.

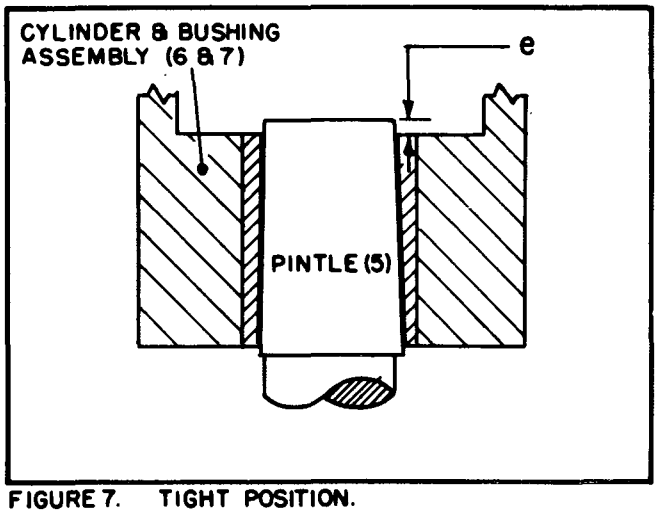


FIGURE 7. TIGHT POSITION.

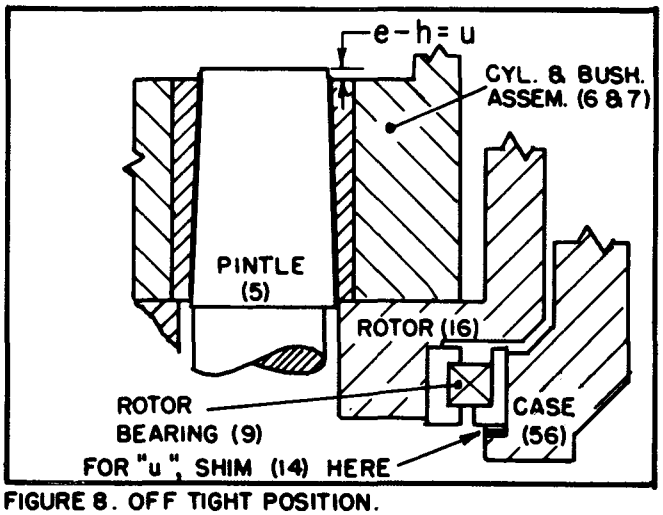


FIGURE 8. OFF TIGHT POSITION.

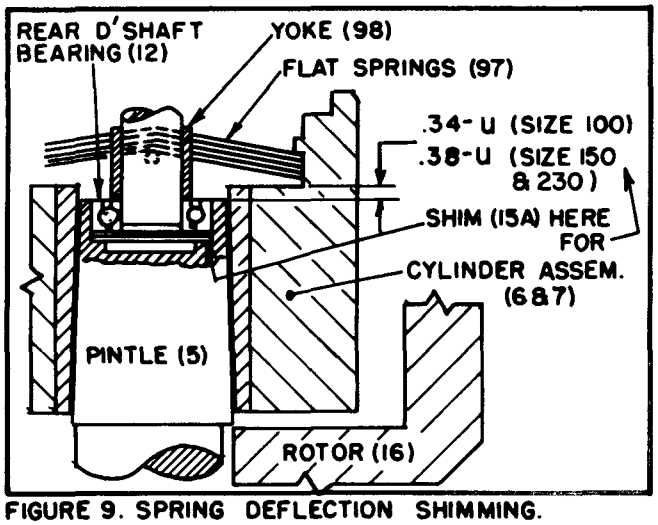


FIGURE 9. SPRING DEFLECTION SHIMMING.

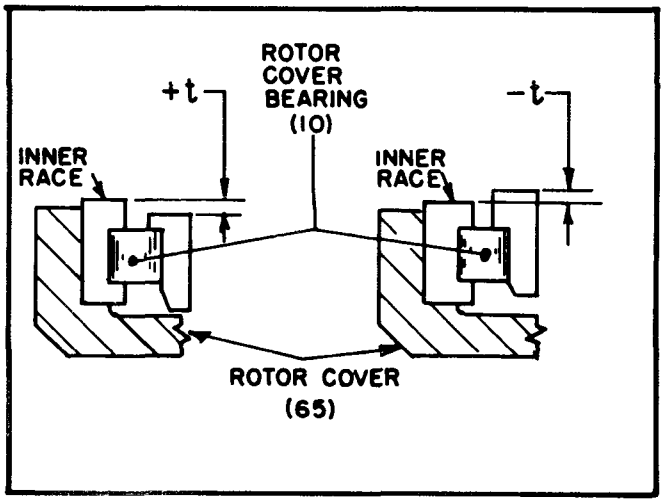


FIGURE 10. INITIAL ROLLER BRG. RACE PROJECTION.

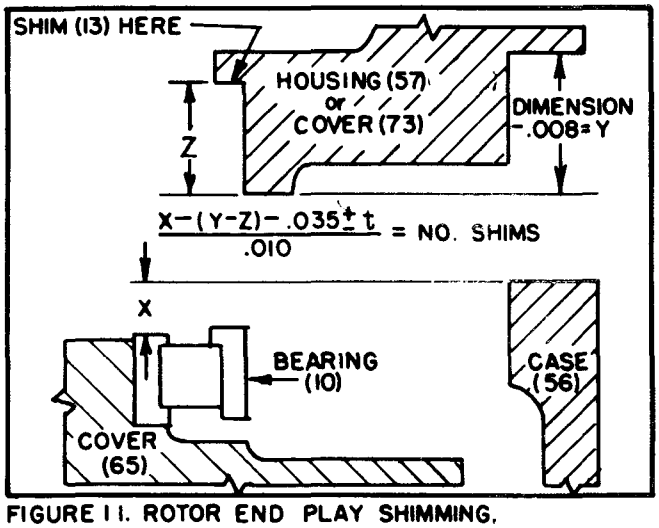


FIGURE 11. ROTOR END PLAY SHIMMING.

O'ring Sizes
Cross Section x O.D. Duro ± 5

Part No.	Size Unit							
	100 & 150				230			
5B	———				3/32	x	2	70
36	1/8	x	2-5/8	70	———			
36A	3/16	x	2-5/8	70	———			
41A	1/16	x	3/4	70	———			
46A	3/32	z	1-11/16	70	———			
81	———				1/8	x	8-1/2	70
81A	———				1/8	x	1-1/4	70
123	3/32	x	3/4	90	3/32	x	3/4	90
124	3/16	x	2-7/8	90	3/16	x	2-7/8	90
125	3/16	x	3-3/8	90	3/16	x	3-3/8	90
130	3/32	x	3/4	90	3/32	x	3/4	90
134	1/16	x	7/16	70	1/16	x	7/16	70
140	1/16	x	7/16	70	1/16	x	7/16	70
141	1/8	x	1-1/8	70	1/8	x	1-1/8	70
144	3/16	x	2-1/2	90	3/16	x	2-1/2	90
201	———				3/16	x	4-1/4	70
211	———				3/16	x	4-1/4	90

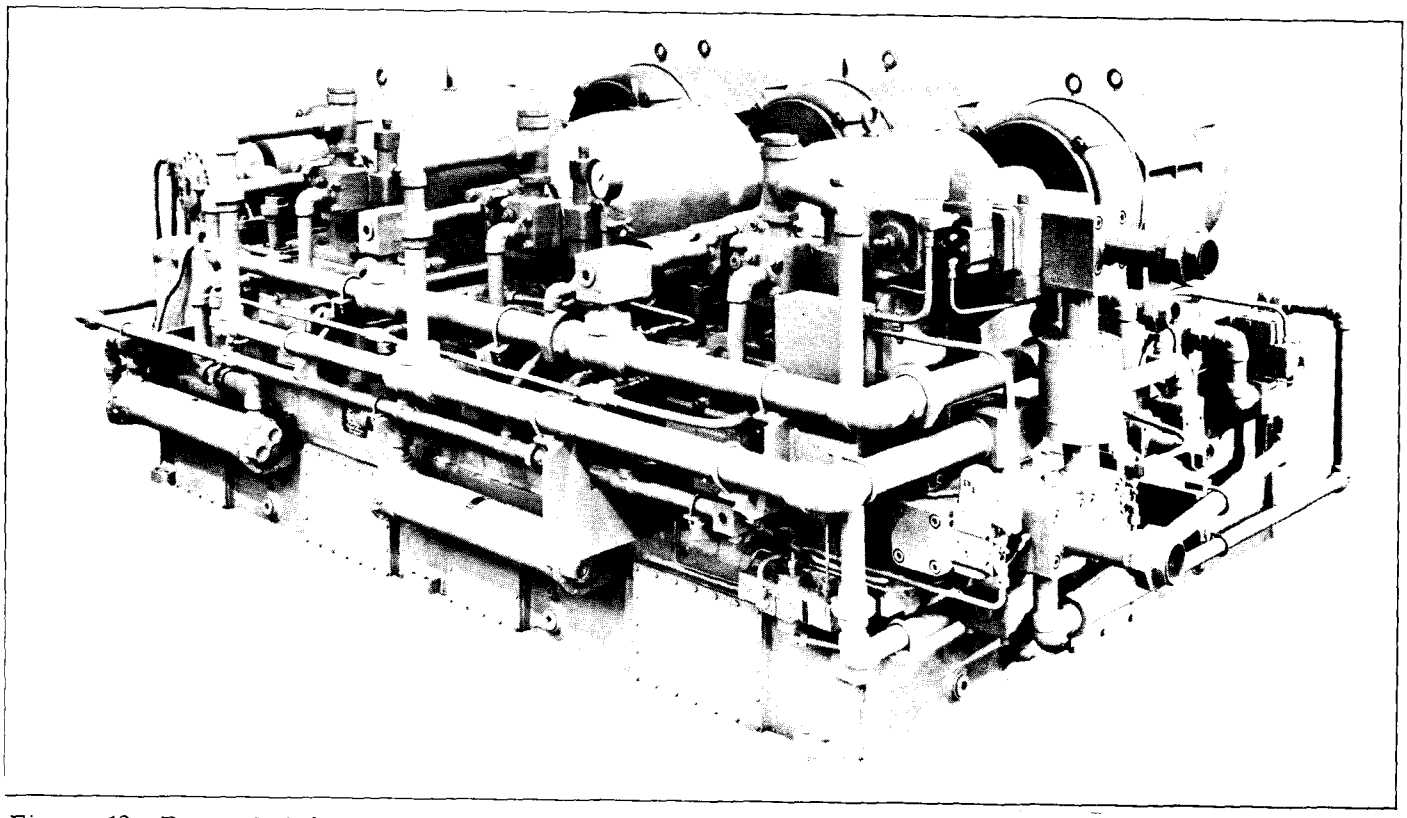


Figure 12. Power-Pak for a 1500 ton capacity forging press includes three "CG-15025" Pumps. Base capacity is 1100 gallon differential and 1750 gallons total. (54598)

OILGEAR EXCHANGE SERVICE

Standard replacement pumps and motors are available to users of Oilgear equipment where comparable units will be returned in exchange. 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, shipment will depend on availability of parts and assembly and test time necessary.

To obtain this service, place an order for an exchange unit and for repair of the worn pump or motor (give serial number and type designation). The replacement will be shipped F.O.B., our factory, 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, or a flat rate exchange price, if one has been applied to that particular type of unit.

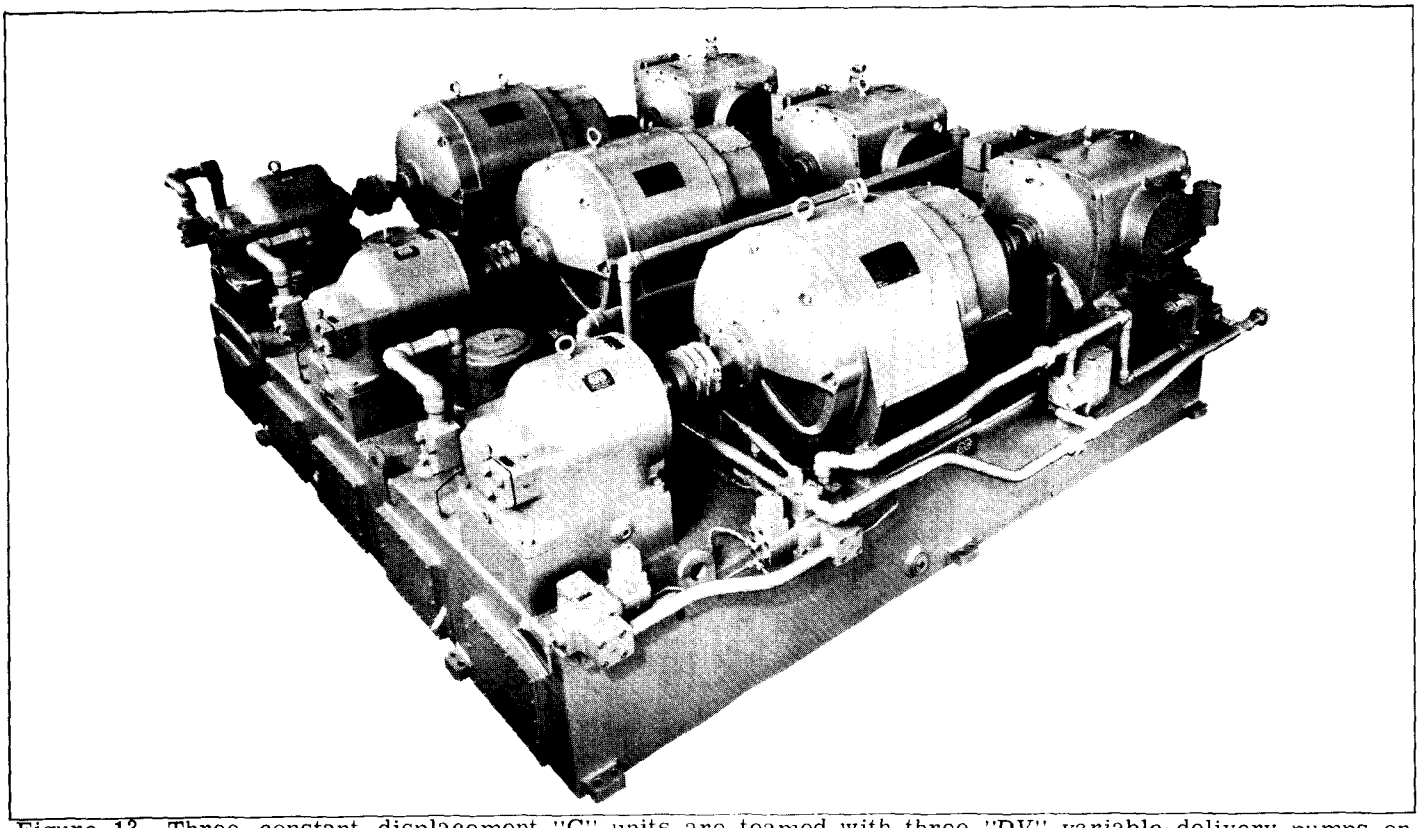


Figure 13. Three constant displacement "C" units are teamed with three "DV" variable delivery pumps on a Power-Pak for operation of a 350,000 pound capacity drawbench. (54501)

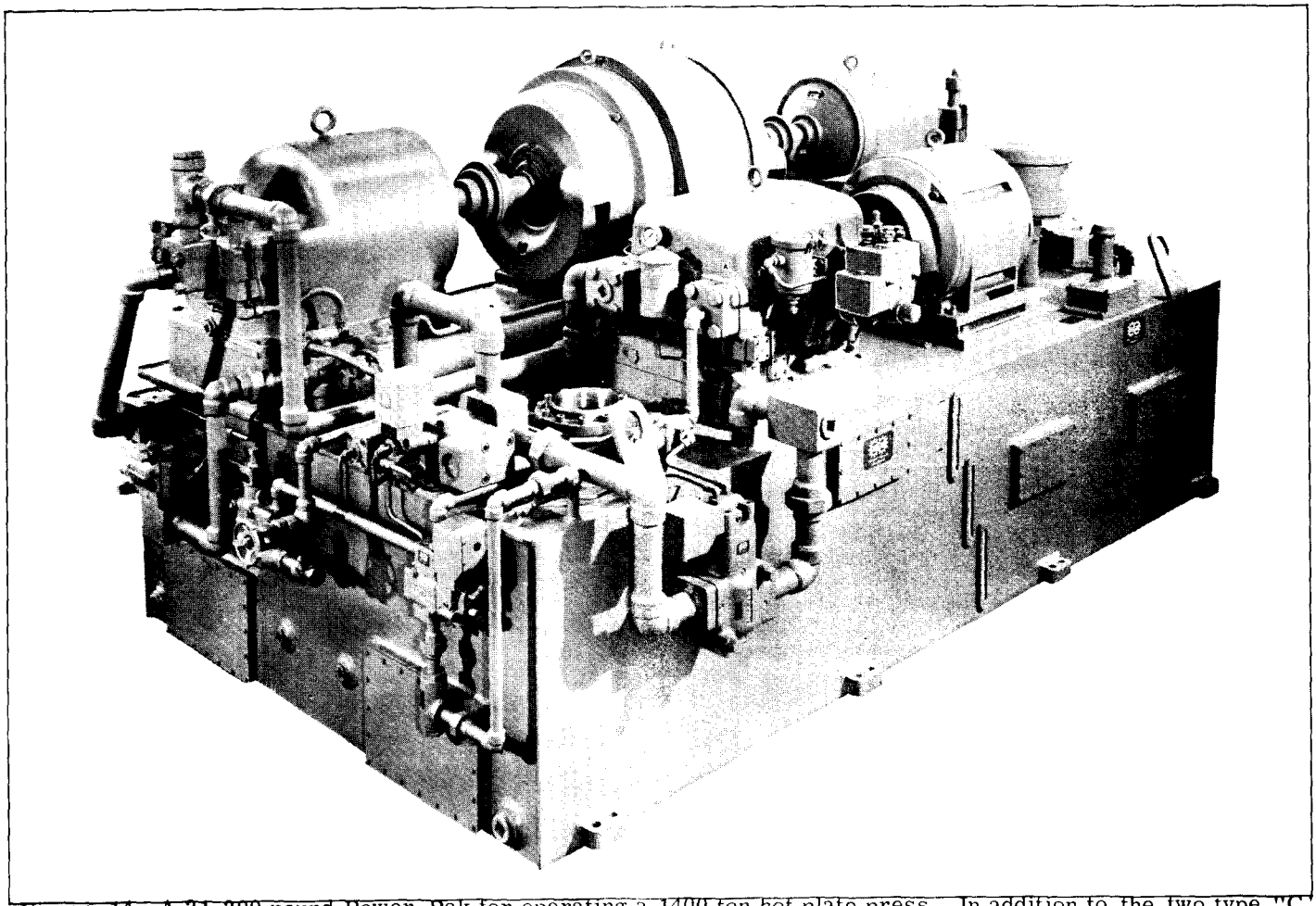


Figure 14. A 21,200 pound Power-Pak for operating a 1400 ton hot plate press. In addition to the two type "C" pumps and the "DMP" pump, the base contains all the valving and circuitry necessary for press operation (54164)