INSTRUCTIONS

BULLETIN 947577

OILGEAR TYPE "P" PRESSURE UNLOADING CONTROL FOR "PVL" UNITS

Type "PVL" Pumps w/o Controls	947077
Fluid Recommendations	90000
Filtration Recommendations	90007
Piping Recommendations	90011

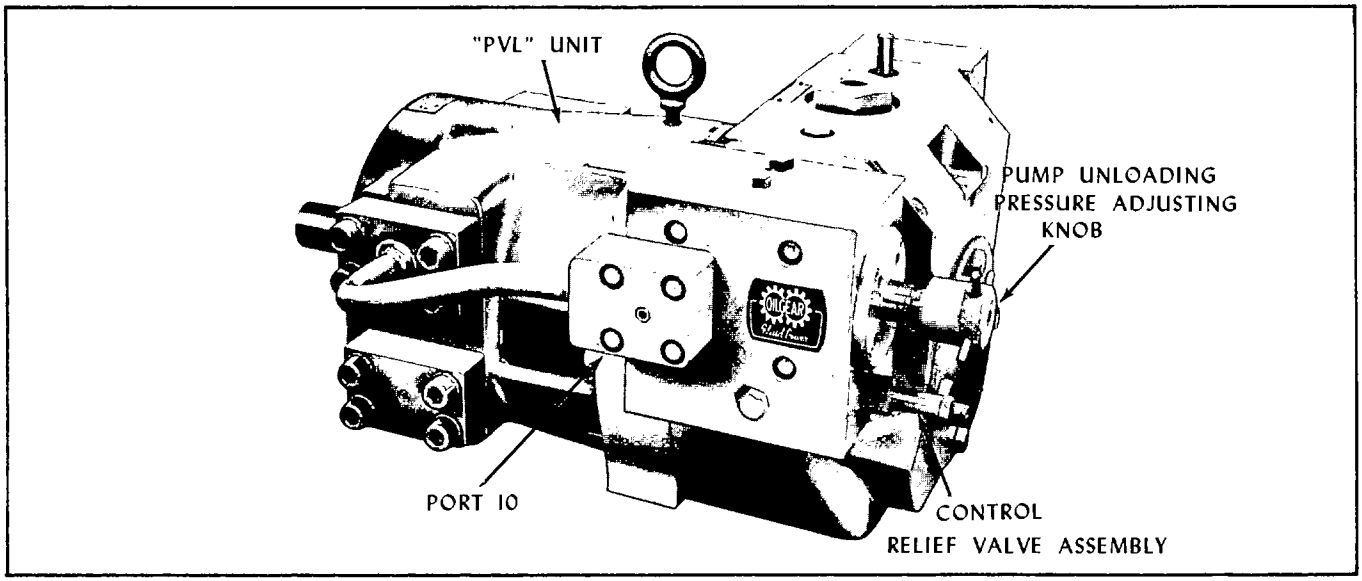

Figure 1. Oilgear Type "PVLPKR-170-NNA-NN Pump showing integral type "P" pressure unloading control (55137)

To the User and Operator of Oilgear "P" Controlled Units:

These instructions are printed to simplify and minimize your work of operating Oilgear "P" controlled units. They will acquaint you with the construction, principle of operation and characteristics of these units. Some controls may be modified for specific applications from those described in this bulletin and other changes may be made without notice.

I. CONSTRUCTION

The principle components of the type "P" pressure unloading control are a sequence valve assembly (309 and 310) and a control relief valve (325), contained in control housing (300) flanged to the side of the pump. Units equipped with a "P" control usually have a type "K" opposing operator flanged to the opposite side of the pump. Some units equipped with "P" control may have another control opposite it for additional functions.

II. PRINCIPLE OF OPERATION (see page 2)

III. SPECIFICATIONS

Working Pressure Range

Size 075 - 1400 psi (96,6 bar) to 5000 psi (345 bar) Max.*

Size 170 - 1400 psi (96,6 bar) to 5000 psi (345 bar) Max.*

Size 250 - 1400 psi (96,6 bar) to 5000 psi (345 bar) Max.*

*other ratings available for specific applications.

Control relief valve setting:
600 psi to 1000 psi max.
(41,4 bar) to (69,0 bar max.)

IV. MALFUNCTIONS AND CAUSES

A. ERRATIC CONTROL ACTION
1. Binding or leaking sequence valve plunger and bushing (309 and 310).
2. Wrong size control orifice (333) used.
3. Broken pressure control spring (317).
4. Bushing (311) not locked in place by shims (308).
5. Binding or leaking control piston.
6. Leaking control relief valve (325).
7. Faulty opposing operator.
8. Faulty pump unit. (See reference bulletin)

B. DOES NOT UNLOAD
1. Frozen or damaged sequence valve.
2. Leaking control relief valve.
3. Faulty opposing operator.
4. Pump high pressure relief valves set below unloading control setting.

D. INSUFFICIENT VOLUME OR PRESSURE
1. Unit or system high pressure relief valve set below unloading control valve setting.
2. Binding control or cradle.
3. Faulty pump unit. (See reference bulletin)

E. EXCESSIVE HEATING
1. Unit or system high pressure relief valve set below unloading control.
2. Faulty pump unit. (See reference bulletin)

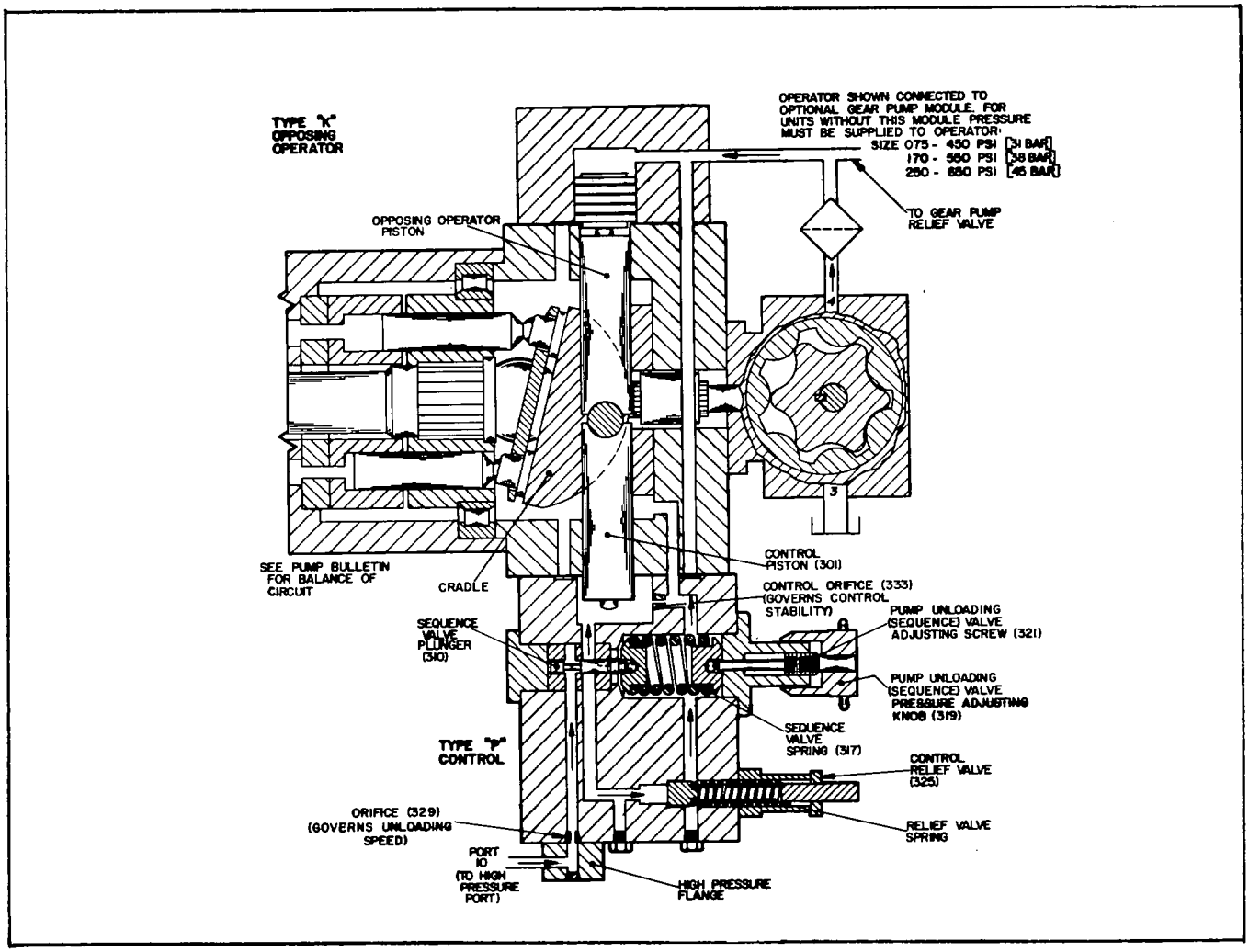

Figure 2. Cutaway Circuit Diagram (509757, sh. 2)

F. SLOW RESPONSE

1. Damaged control valve.
2. Binding control or cradle.
3. Orifice (329) too small (unloading or reducing stroke).
4. Orifice (333) too small (loading or increasing stroke).

V. TESTING AND ADJUSTING

A. PRESSURE ADJUSTMENT

Pressure can be tested by observing pressure gage in pump high pressure port or system during hold cycle. To adjust pressure, loosen locking screw (322). Unloading pressure is increased by turning adjusting knob clockwise and decreased by turning counter-clockwise. Maximum holding pressure is limited by screw (318) set at factory. NOTE: — pump high pressure relief valves must be set for pressure 300 psi (20,6 bar) higher than control's setting. (Cont'd on last page)

II. PRINCIPLE OF OPERATION (see fig. 2)

See reference instruction bulletin for basic "PVL" Pump principle of operation.

The pressure unloading control hydraulically reduces cradle angle (therefore volume) when the preset system pressure is reached. It moves the cradle to an angle just sufficient to maintain this pressure. Power input and heating is reduced; power is not wasted past a relief valve. Output pressure is piped from the pressure port to the high pressure flange on the control. Flow from the optional pressure gear pump is blocked from the "P" control. Gear pump pressure is necessary for the opposing operator and can be used for auxiliary functions. When pressure reaches maximum, set by adjusting screw (321), high pressure directed through a slot to the end of the sequence valve plunger (310) moves plunger against spring (317). Fluid is then ported behind control piston (301). The force behind the control piston overcomes the opposing operator and moves the cradle to a decreased angle just sufficient to maintain the preset pressure in the system. "PVL" unit delivery is proportional to cradle angle. Some of the volume behind control piston is continuously "bled" to drain through control orifice (333) and is replenished by continuous operation of the sequence valve plunger. When pressure in the system drops below the preset value, plunger (310) is repositioned by spring (317). The fluid behind control piston (301) is then ported through a "U" shaped groove in sequence plunger to drain. The opposing operator force overcomes that of "P" control and increases cradle angle (and pump volume) until preset system pressure is attained and unloading control functions again. A control relief valve (325), which opens to drain when operating, protects the control against momentary peaks or excessive pressures.

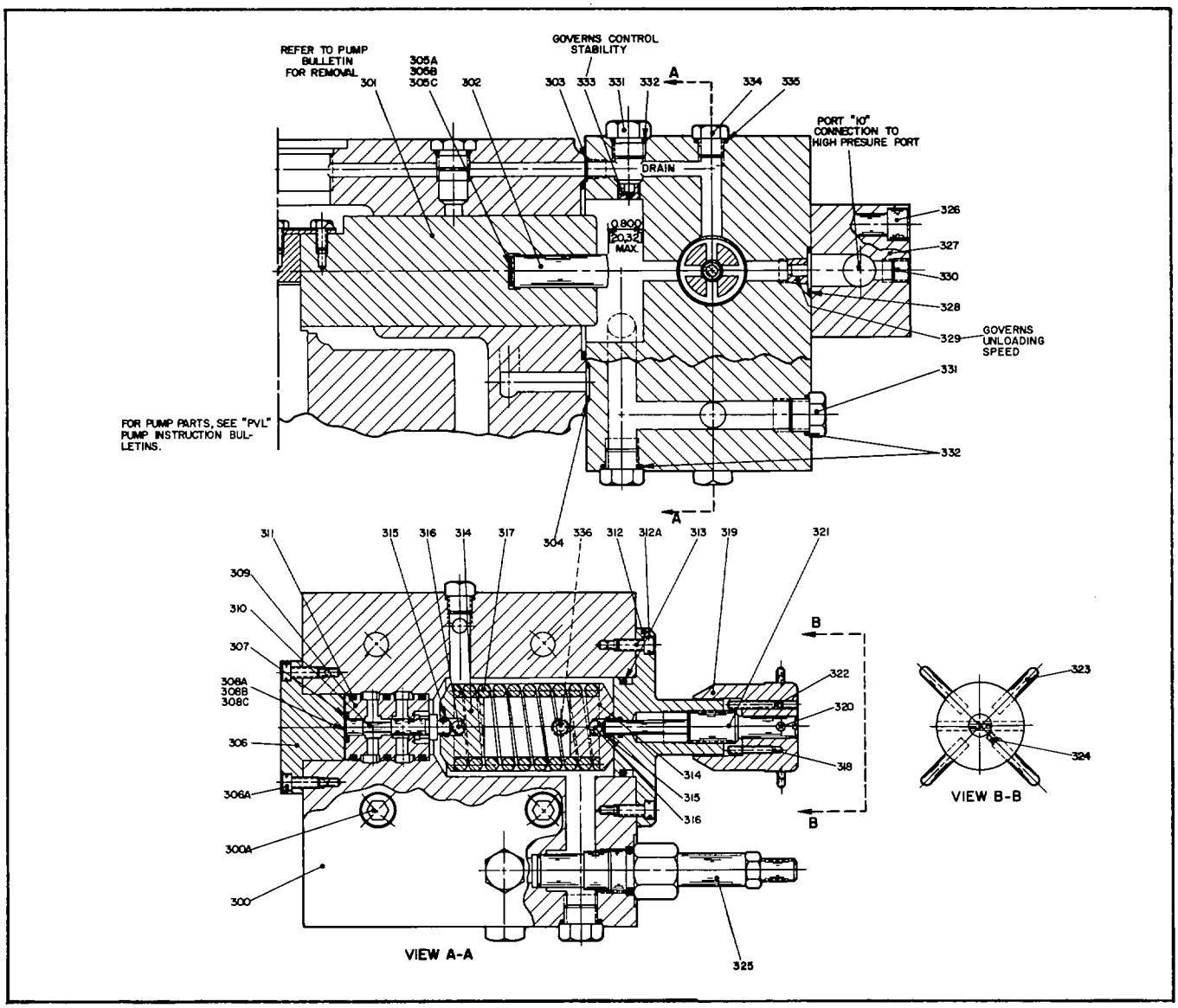

Figure 3. Parts Drawing, "P" Control (509757, sh. 1)

IX. PARTS LIST

Item No.	Description	Item No.	Description
300	Body, Control	316	Bearing, Ball
300A	Screw, Cap	317	Spring, Sequence Valve
301	Piston, Control	318	Screw, Maximum Pressure Limiting
302	Pin, Control Stop	319	Knob, Unloading (Seq.) Valve Press. Adj.
303	Seal, O'ring	320	Pin, Roll
304	Seal, O'ring	321	Screw, Unloading (Seq.) Valve Adj.
305A	Shim, Control Stop	322	Screw, Adjusting Locking
305B	Shim, Control Stop	323	Pin, Control Knob
305C	Shim, Control Stop	324	Screw, Set
306	Flange, Sequence Valve End Cover	325	Relief Valve Assembly
306A	Screw, Cap	326	Screw, Cap
307	Seal, O'ring	327	Flange, High Pressure
308A	Shim, Bushing	328	Seal, O'ring
308B	Shim, Bushing	329	Plug, High Pressure Orifice
308C	Shim, Bushing	330	Plug, Pipe
309	Bushing, Sequence Valve	331	Plug, Str. Thrd.
310	Plunger, Sequence Valve	332	Seal, O'ring
311	Seal, O'ring	333	Plug, Orifice Drain
312	Head, Sequence Valve	334	Plug, Str. Thrd
313	Seal, O'ring	335	Seal, O'ring
314	Guide, Sequence Valve Spring	336	Plug, Pipe
315	Seal, O'ring		

Parts used in this assembly are per Oilgear specifications. Use Oilgear parts to assure compatibility with assembly requirements. When ordering parts, be sure to specify type designation, serial number stamped on nameplate, bulletin number and item number. Specify type of hydraulic fluid for packings and seals.

O'RING SIZES
(Cross Section x O.D. - Duro ± 5)

Item No.				
303	3/32	x	9/16	70
304	3/32	x	7/8	70
307	3/32	x	11/16	90
311	1/8	x	1-1/2	90
313	3/16	x	2-1/4	70
315	1/16	x	7/16	70
328	1/8	x	1-1/16	90
332	908 ARP			70
335	906 ARP			70

(Cont'd from page 2)

B. VOLUME ADJUSTMENT

Maximum (full) stroke can be adjusted by use of shims (305) behind control piston stop (302). Care must be taken to limit control stroke to 0.800 inches (20,32 mm) maximum to prevent overstroking pump which may cause damage to pump.

VI. DISASSEMBLY

Note the locations of all O'rings and shims during disassembly. They must be returned to these locations. Disconnect any connections to the control. Remove control housing (300) from pump. Pull control stop pin (302) and shims (305 A, B, C) from control piston (301). Refer to pump bulletin for removal of control piston. Remove O'rings (303) and (304). Turn relief valve (325) out of control housing.

Remove screws (306A) and flange (306). Lift out O'ring (307) and shims (308 A, B, C). Slide bushing from housing and remove O'rings (311). Slide sequence valve piston (310) from bushing (309).

Remove screws (312A) and sequence valve head (312). Lift off O'ring (313). Remove sequence valve spring guides (314), O'rings (315), ball bearings (316) and sequence valve spring (317).

If necessary, back out screw (322), turn sequence valve knob (319) from sequence valve head (312). Take out control knob pins (323) and set screw (324). Press out roll pin (320) and remove sequence valve adjusting screw (321).

Remove screws (326) and high pressure flange (327). Lift out O'ring (328) and unscrew high pressure orifice plug (329). Take out plug (331), O'ring (332) and orifice drain plug (333).

VII. INSPECTION

Check for hardening or deterioration of seals, gaskets or packings and replace if necessary. Inspect plunger and bushing for scratches or signs of wear. Plunger and bushing can only be replaced as a matched assembly. Test all plungers in their bores, bushings, or on their seats. Plunger movement should be smooth. If not, it may be necessary to lap. Be sure slots in plunger are clean. Check control relief valve for dirt or leaking. Make sure all orifices, passages, bores and bushings are clean. Inspect all parts thoroughly and replace any part which appears unduly worn. Wash all parts thoroughly before reassembly.

VIII. ASSEMBLY

Install orifice drain plug (333) and install plug (331) with O'ring (332). Install high pressure orifice plug (329) and O'ring (328). Secure high pressure flange (327) to control housing (300) with screws (326). Turn relief valve assembly (325) into control housing.

Replace sequence valve spring guide (314), O'ring (315), ball bearing (316) and sequence valve spring (317). Insert sequence valve adjusting screw (321) into sequence valve knob (319). Replace set screw (324) and secure with "Loctite". Press in roll pin (320) and replace control knob pins (323) and adjustment locking screw (322). Maximum pressure limiting screw (318) is installed with "Loctite" to limit maximum control unloading setting. Turn sequence valve knob assembly into sequence valve head (312) with O'ring (315) in place. Secure sequence valve head with O'ring (313) in place to control housing (300) with screws (312A). Replace O'rings (311) and insert bushing (309) into control housing. Slide sequence valve plunger (310) into bushing and insert O'ring (307). Shims (308) are necessary to "lock" bushing in place. Measure distance from face to bushing and measure distance from flange (306) face to shoulder. Add shims accordingly. Replace flange (306) to housing with screws (306A). Refer to pump bulletin for assembly of control housing (301). Add shims (305 A, B, C) and control stop pin (302). Replace O'rings (303) and (304).

Be sure all O'rings and pipe plugs are in their proper places as indicated on parts drawing. Fasten control assembly to pump case with screws (300A). Make any external connections necessary. Test and adjust per section V.

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