INSTRUCTIONS

BULLETIN 947915B

TWO-WAY PUMP SUCTION & RETURN VALVES (CHECK VALVE TYPES) FOR OILGEAR TYPE "D" UNITS

REFERENCE BULLETINS
Type "D" Variable Delivery Pumps--------947000

I. CONSTRUCTION.

Check type suction valves are built in two similar styles. The plain type built for size 4 thru 150 units incorporates a single suction check valve (209) and two return check valves (201). The dual type incorporates dual suction check valves (209) and two smaller return check valves (201). Plain type suction valves have a single suction pipe connected to port 5, dual suction valves use pipes connected to ports 16 and 17. Both valves contain a back pressure relief valve (214) (BPRV) enclosed in body (200) and flange (212).

II. PRINCIPLE OF OPERATION.

A. PLAIN. (Circuit shown in bulletin 947000). Supercharge pressure is generally ported from the gear pump to port 22 of the suction valve. The suction check valve (209) retains supercharge and high pressure relief valve exhaust in the suction valve and pump, yet the pump is allowed to draw fluid from the reservoir thru pipe in port 5 if the supercharge volume is insufficient. The back pressure relief valve (214) limits supercharge or exhaust pressure. Return check valves (201) direct all return fluid thru the pump or to the pumps high pressure relief valves, providing a closed non-differential system. If return volume is insufficient, the return checks open on suction side allowing direct suction or supercharging of that side of the pump.

B. TWIN. Supercharge pressure is generally ported from the gear pump to port 22 of the suction valve. The suction check valves (209) retain supercharge, high pressure relief valve exhaust and return fluid in the suction valve and pump, yet allow the pump to draw fluid from the reservoir if supercharge of return volume is insufficient. The back pressure relief valve (214) limits supercharge or exhaust pressure. Return check valves (201) direct all return flow thru the pump or high pressure relief valves, providing a closed non-differential system. If return volume is insufficient, the return checks allow supercharge fluid to to enter suction side of pump.

C. SPECIAL. Some pumps are equipped with modified suction valves for specific applications. Some one-way pumps are equipped with a two-way check type suction valve from which one of the return check valves (201) have been removed to eliminate hydrodynamic braking at the high pressure relief valve setting.

III. SPECIFICATIONS.

Back pressure relief valves are normally set at 60 psi.

A. Approximate pressure variation for each 1/16" shim.

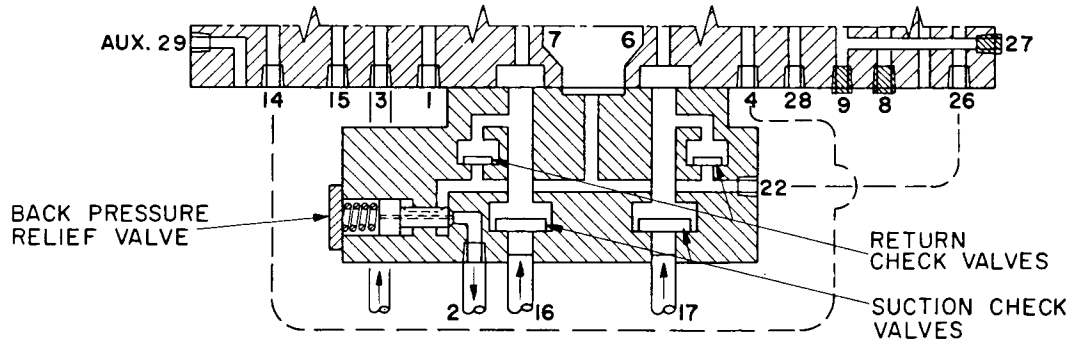
B. Maximum total thickness of all shims permitted.

Pump Size	A	B
2 & 4	8	5/8
8 & 12	8	9/16
20	4	1/4
35	4	7/16
60, 100 & 150	4	1/8

IV. MALFUNCTIONS AND CAUSES.

Excessive noise in pump is usually caused by air entering system at suction valve gaskets or pipes. Be sure bolts and pipe are tight. It may also be

(Continued on page 4)



TWO-WAY PUMP SUCTION VALVE
(TWIN SUCTION CHECK TYPE)

Figure 1. Schematic, Twin Suction Check Valve. (3V-10066-L).

IX. PARTS LIST

Part No.	Description
200.	Body, Valve
200A.	Screw, Sock. Hd. Cap
201.	Disc, Return Check
202.	Seal, Gasket or O'ring
203.	Gasket, Spacer
204.	Spacer, Seal
205.	Seat, Return Check
206.	Cage, Return Check
208.	Cage, Suct. Check
209.	Disc, Suct. Check
210.	Seat, Suct. Check
211.	Gasket, Suction Flange
212.	Flange, Suct. Check
212A.	Screw, Sock. Hd. Cap
212B.	Wire, Lock
214.	Plunger, BPRV
215.	Spring, BPRV
216.	Shims, BPRV

Part No.	Description
217.	Seal, BPRV
218.	Cap, BPRV
218A.	Screw, Sock. Hd. Cap
219.	Spring, Ret. Check
220.	Spring, Suct. Check
221.	Retainer, Seal
222.	Seal, O'ring
223.	Gasket, Body
227.	Plug, Pipe
228.	Plug, Pipe
229.	Assembly, Seal w/retainer
230.	Seal, O'ring
231.	Shims, Retainer
232.	Seal, O'ring
233.	Cover, Core
233A.	Screw, Sock. Hd. Cap
234.	Flange, Pipe
234A.	Screw, Sock. Hd. Cap

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

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

Part No.	Size Unit				
	4-8-12	20	35	60-100-150 Plain	60-100-150 Twin
202.	-	3/16 x 2-5/8 90	3/16 x 2-7/8 90	3/16 x 3-5/8 90	3/16 x 4 90
211.	-	-	1/8 x 3-1/8 90	-	3/16 x 4-3/8 90
217.	-	1/8 x 1-7/16 90	1/8 x 1-7/16 90	-	1/8 x 1-1/2 90
222.	-	1/8 x 3 90	3/16 x 3-7/8 70	1/8 x 4-5/8 70	1/8 x 4-5/8 70
—	-	-	-	-	—
230.	-	-	-	-	3/16 x 2-1/2 90
232.	-	-	-	-	3/16 x 3-3/8 -70

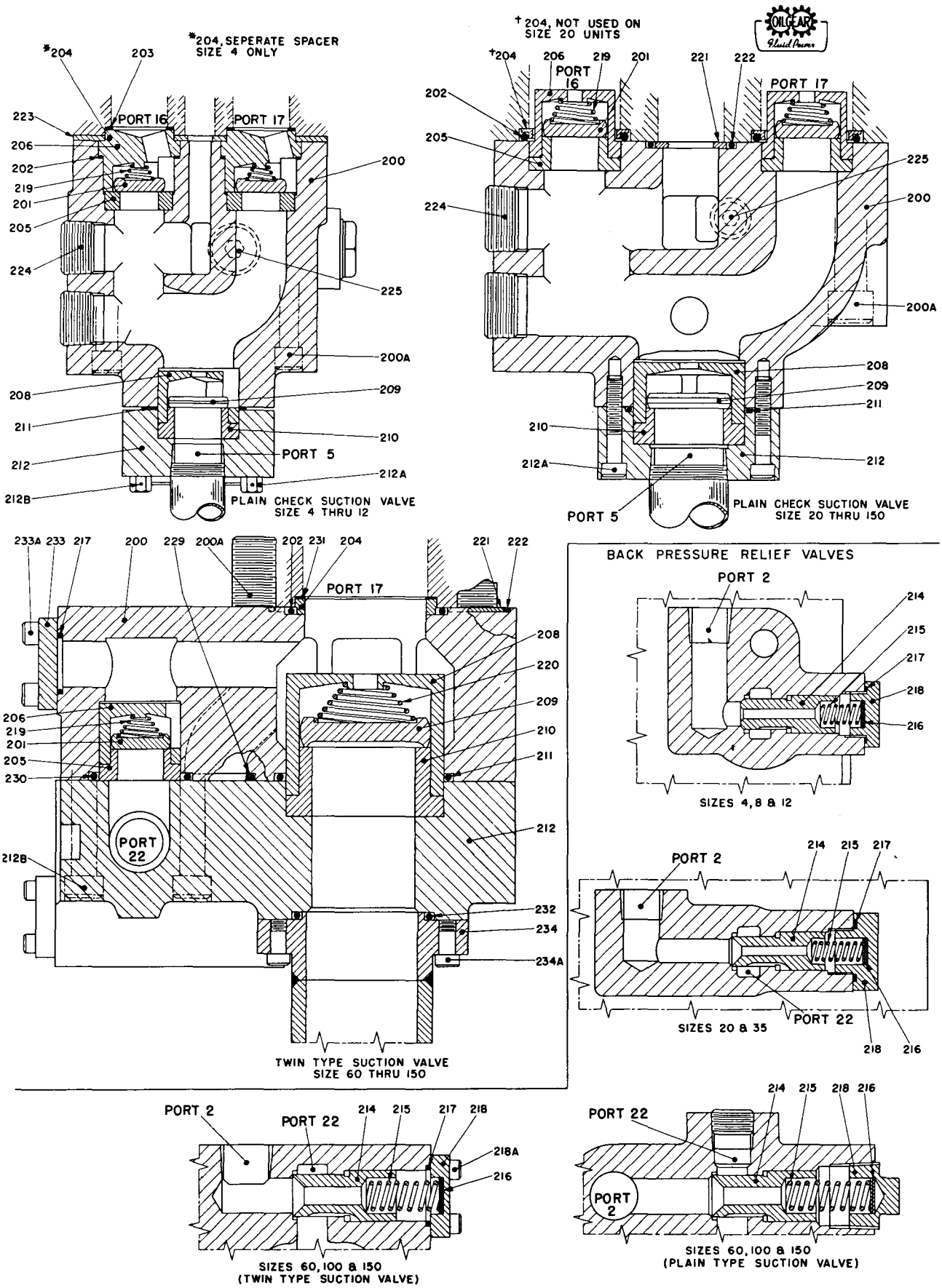


Figure 2. Parts Drawing, Two-Way Suction and Return Valves. DS-947915A (504364-A)

caused by cavitation due to restricted passages or low back pressure. Low back pressure is usually caused by a sticky BPRV plunger (214) or faulty suction check valve (209). Insufficient pump volume or pressure may be caused by excessive leakage past the return check valves (201) or two suction check valves (209) on twin type.

V. TESTING AND ADJUSTING.

To check the back pressure relief valve setting, insert a low pressure gage in port 12 and run the pump at neutral. If port 12 is being used, disconnect piping and insert a tee fitting. Connect piping to two legs of the tee and gage to the other. Gage will read the back pressure.

To adjust back pressure, remove inspection cover on side of reservoir (it may be necessary to drain some fluid first). If reservoir base does not have an inspection cover, it will be necessary to disconnect the pump from the circuit and drive motor to raise it so the BPRV can be shimmed. Remove cover (218) over BPRV and add shims (216) to increase pressure, remove shims to decrease pressure. See III. A and B. CAUTION: Do not install solid shims (216) between plunger (214) and spring (215). *

VI. DISASSEMBLY.

Tag all O'rings, gaskets, seals and shims so they will be returned to their original positions. Remove all piping from valve and valve from pump.

Suction Check Valve. Remove suction flange (212). The check valve cage (208) has a 0.002" press fit in suction flange. Complete disassembly of flange and cage is usually not necessary for inspection and cleaning.

Return Check Valves. When suction valve body (200) is removed from pump case (or flange (212) from body (200), for twin type) the return check valve assemblies are exposed. The cages (206), springs (219) and disks (201) are free to be removed. Check valve seat (205) has a 0.002" press fit into body and should not be removed unless cracked or scored.

Back Pressure Relief Valve (BPRV). Remove cover (plug or cap) (218). The shims (216), spring (215) and plunger (214) are free to be removed. Plunger is tapped so a threaded rod can be inserted to withdraw it.

VII. INSPECTION.

Check Valves. Check for dirt on the check valve seats (205 & 210) or disks (201 & 209) and examine surfaces for scratches or grooves. Check for cracked seat.

Back Pressure Relief Valve. Inspect valve plunger seat for scoring or foreign matter. Clean V-slot in plunger. Polish or lap sticky plunger. Clearance between plunger and valve body should be 0.001" at both diameters. Be sure hole thru plunger is not blocked.

VIII. ASSEMBLY.

Anneal all copper gaskets. Clean all parts thoroughly. If BPRV plunger was lapped, make certain all compound has been removed. Insert BPRV plunger (214), spring (215), shims (216) and secure cover (218). * Insert suction check valve seat (210) and disk (209), and press cage (208) into suction flange (212). If return check valve assemblies in twin type valves were removed, reassemble in body (200). Mount suction flange assembly with seal (211) on valve body (200). Draw bolts up evenly and very tightly. Insert return check valves assemblies (plain type) valve body (200) and bolt entire suction valve assembly with seals or gaskets, spacers; spacer seals in place on bottom of pump. Draw suction valve mounting bolts up evenly and very tightly as all seals must be air tight. Install suction and exhaust pipes. Use pipe compounds sparingly or Teflon tape and only on male threads, connections must be tight. Connect piping to port 22 and remount pump on reservoir.

*If a flange type BPRV cover is used, insert hollow shims or washers between plunger and spring and secure cover screws with soft iron locking wire.