

# SERVICE INSTRUCTIONS

## OILGEAR TYPE "P" MODULAR PLAIN OPERATOR FOR "VSM" CYLINDER PREFILL VALVES

### PURPOSE OF INSTRUCTIONS

These instructions are written to simplify your work when installing, operating and maintaining Oilgear Type "VSM" cylinder prefill valves and operators. Your acquaintance with the construction, principle of operation and characteristics of these valves will help you attain satisfactory performance, reduce shut-down time and increase the unit's life. Some valves and operators have been modified from those described in this bulletin and other changes may be made without notice.

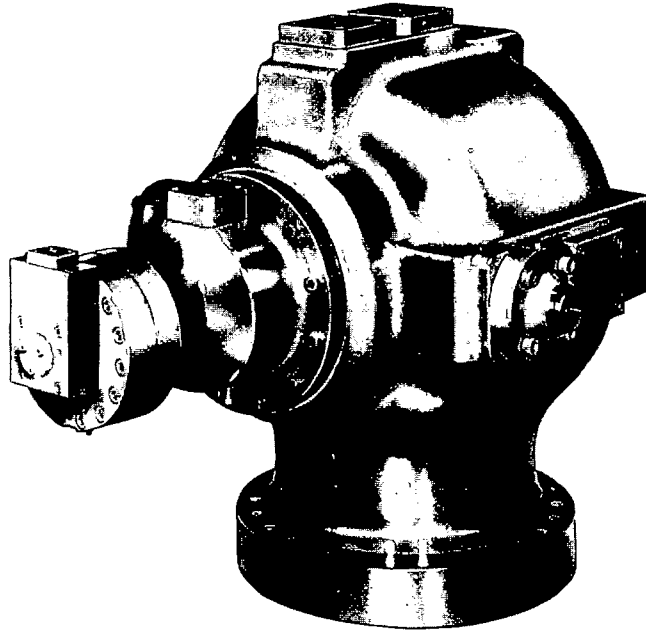


Figure 1. Typical Prefill with Type "P" Modular Operator (93022).

### REFERENCE MATERIAL

Piping Information . . . . .	Bulletin 90011
Prefill and Control Specifications . . . . .	Bulletin 86000
Size 100 (4") thru 200 (8") Cylinder Prefill and Exhaust Valves . . . . .	Bulletin 986304
Size 250 (10") and Larger Cylinder Prefill and Exhaust Valves . . . . .	Bulletin 986308

### I. PREPARATION AND INSTALLATION

See referenced instructions on applicable size cylinder prefill and exhaust valve. See referenced "Piping Information" bulletin and individual circuit diagram before connecting prefill to system.

### II. CONSTRUCTION

Refer to Figure 2. The principle parts of this operator are a dashpot nose (310) on the control piston, a floating dashpot mechanism (302) in the rear head (300), and an adapter block (315). Optional limit switch assembly (340) or visual tell tale assembly (325) may also be mounted on the module adapter block (315).

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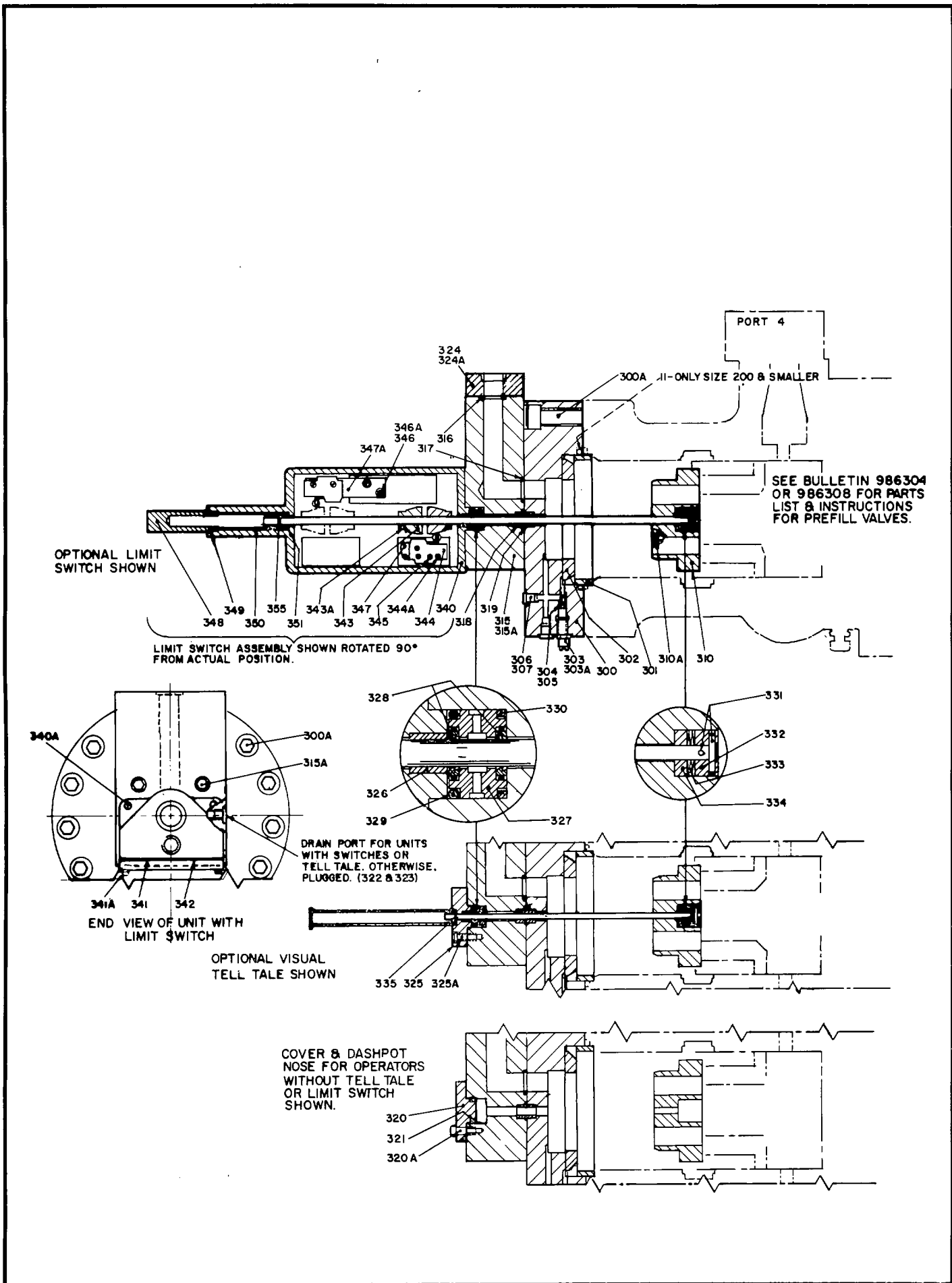


Figure 2. Parts Drawing, Modular Plain Type Operator. DS 986321 (516665).

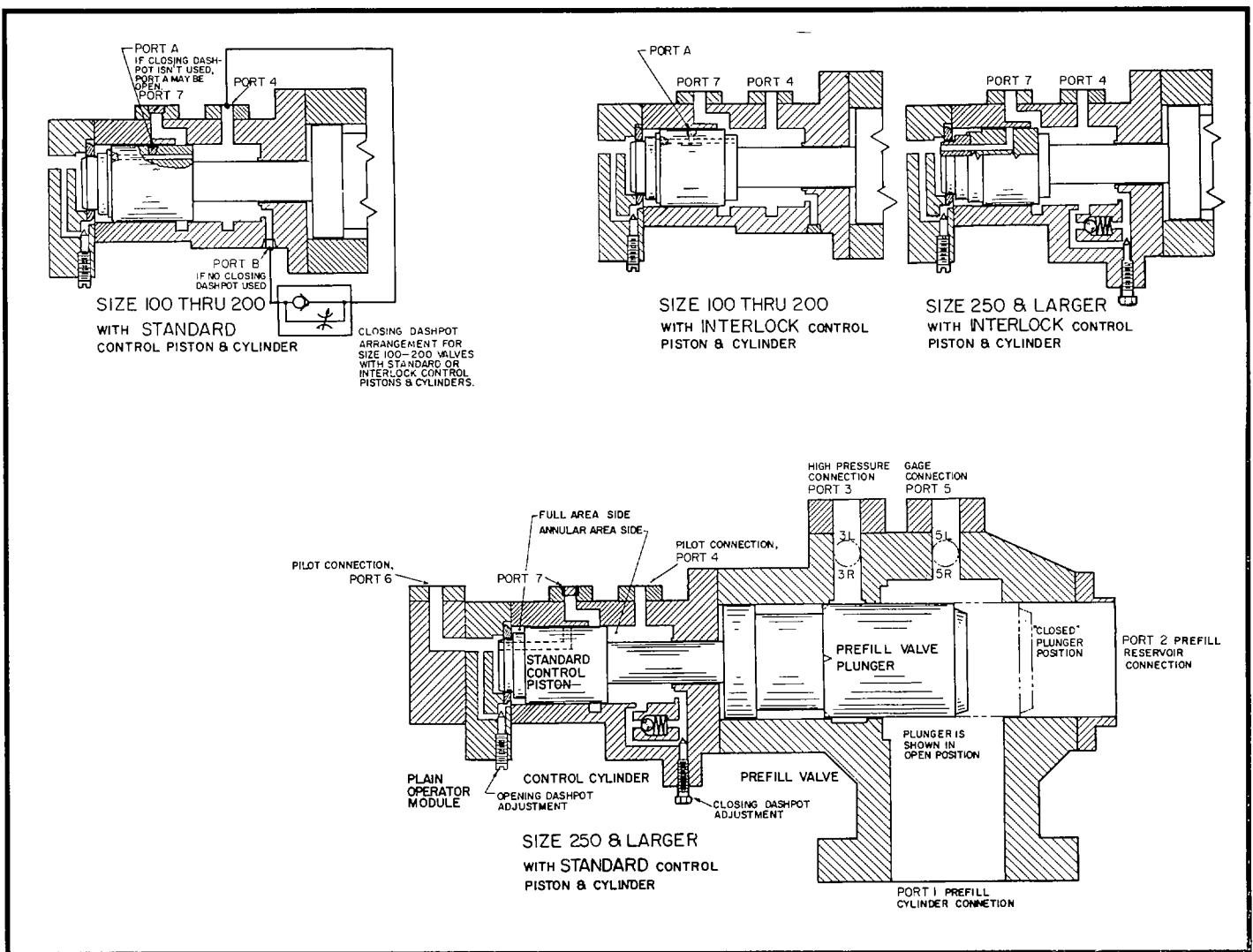


Figure 3. Schematic Cut-a-way Diagram, Prefill Valve with Plain Operator (5V-12038-L).

### III. PRINCIPLE OF OPERATION

See Figure 3. Applying pilot pressure thru Port 6 allows it to act on the full area side of the control piston and closes the prefill valve plunger. Pilot flow in Port 6 and exhaust flow out (from annular area side) Port 4 is unrestricted (so control piston movement is at a constant speed) until closing dashpot restricts flow from the annular area.

Applying pilot pressure thru Port 4 and connecting Port 6 to drain opens the prefill valve plunger. Pilot flow in Port 4 and exhaust flow out (from full area side) Port 6 is unrestricted (so control piston movement is at a constant speed) until opening dashpot in the operator restricts flow from the full area side of piston.

For operation with interlock piston or adjustable closing dashpot, see referenced bulletin on Cylinder Prefill and Exhaust Valves.

### IV. SPECIFICATIONS

See referenced bulletin on "Prefill and Control Specifications".

### V. MALFUNCTIONS AND CAUSES

#### A. UNIT DOES NOT SHIFT PROPERLY

1. Insufficient pilot (or operator) pressure.
2. Plugged dashpot check or choke valves
3. See referenced bulletin on Cylinder Prefill and Exhaust Valves.

### VI. TESTING AND ADJUSTING

- To measure prefill valve plunger stroke or observe movement, use the tell tale rod if unit is so equipped. If limit switch is used, remove enclosure cover (341) to observe rod movement. If not equipped, the optional visual tell tale assembly can be ordered from The Oilgear Company.

### VII. DISASSEMBLY

#### A. GENERAL

Refer to Figure 2. It will be advantageous to tag similar parts (particularly screws, plugs and o-rings) during disassembly to be certain they don't become confused with similar parts and to ensure they will be returned to original location.

**WARNING: NEVER attempt to remove or install any component or assembly while system is running. Always shut-off power and release pressure from system before servicing or testing.**

#### B. PREPARATION

While disassembling or assembling unit, we recommend choosing an area where no traces of dust, sand or other abrasive particles, which can damage operator and system, are in the air. We also recommend not working near welding, sand blasting, grinding benches and the likes. Place all parts on a CLEAN

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surface. To clean parts which have been disassembled, it is important to use CLEAN solvents. All tools and gages should be CLEAN prior to working with this unit and new CLEAN threadless rags used to handle and dry parts.

#### CAUTION:

**Before disassembly, isolate prefill valve from reservoir and press cylinder, or drain hydraulic fluid.**

**Avoid allowing cylinder prefill plunger (18) movement beyond normal closed position or piston rings will expand in Port 3 relief and lock plunger in body. Refer to Figure 2. Depending upon what part or parts are to be inspected, it may not be necessary to completely take apart all assemblies or disconnect piping.**

#### C. DISCONNECTING & DISMOUNTING

Disconnect all electrical and hydraulic connections from ports (remove flange 324 and o'ring 316).

#### D. TELL TALES (if used)

IF VISUAL TELL TALE is used, remove screws (325A) and pull guard (325) and bushing (326) from adapter (315).

IF LIMIT SWITCH is used, remove screws (341A), lift cover (341) from enclosure (340) and remove enclosure gasket (342). Mark location of cam (343) on tell tale rod (355) and loosen set screw (343A). Remove screws (340A) and slide limit switch enclosure body (340) with bushing (326) [along tell tale rod (355)] from adapter (315).

#### E. ADAPTER BLOCK

Remove screws (315A) and slide adapter block (315) out [along tell tale rod (335 or 355)] from rear head (301). If necessary, seal retainer assembly parts (327, 328, 329 and 330) can be removed as well as bearing sleeve (318) and o'ring (319).

#### F. REAR HEAD

Remove screws (300A) and the rear head (300) can be slid out along tell tale rod (335 or 355). The dashpot sleeve (302) and rear head locating ring (301) can be removed. If necessary, loosen jam nut (303A) and turn choke screw (303) out from rear head.

#### J. TALE ROD

Working inside the control cylinder, remove screws (310A). Tugging on the rod (335 or 355) should bring out dashpot nose (310) and rod retaining assembly. If necessary, pins (331) can be pressed out and outer rod retainer (332), washer springs (333) and inner rod retainer (334) can be removed.

### VIII. INSPECTION

Clean all parts thoroughly, inspect and replace any part showing signs of undue wear. Be sure o'rings are free from nicks, cuts, hardening, cracking or deterioration. Wash all parts thoroughly prior to assembly.

**WARNING - Always wear safety goggles when using solvents or compressed air. Failure to wear goggles, could result in serious personal injury.**

### IX. ASSEMBLY

#### A. TALE ROD

Slide inner retainer (334) on rod (335 or 355), follow with washer springs (333) and, using roll pins (331), lock outer retainer (332) onto the rod. Slip the assembly into the counterbore of dashpot nose (310). Using screws (310A), secure the nose/rod assembly to the control piston inside the control cylinder.

#### B. REAR HEAD

Place o'ring (304) and back-up ring (305) on choke screw (303). Insert assembly into rear head (300) and lock in place with jam nut (303A). Insert dashpot sleeve (302) and rear head locating ring (301) in counterbore of rear head. Be sure o'ring (11) is in place, slip rear head (300) along rod and fasten to control cylinder with screws (300A).

#### C. ADAPTER BLOCK AND SEAL ASSEMBLY

With sleeve bearing (318) and o'rings (319 and 317) in place, use screws (315A) to secure adapter head to rear head (300). Inner rod shaft seal (328) is composed of a square (cross section) rubber ring that fits around the outside of a plastic ring. **It is recommended that both parts of seal be installed simultaneously.** Note the orientation of the rod seal retainer (327). The narrow O.D. groove of the retainer must face towards the control cylinder when assembled into the adapter block - the "sharp" edges of the inner rod seal (328) must point towards the control cylinder when assembled. To force the seals into the retainer (327), place assembled inner rod seal on a flat surface and **evenly** press the retainer down on each of the inner rod seals (328). Press the square (cross section) joint ring seal (330) into the narrow groove of the retainer and the o'ring (329) into the remaining groove. Slide the seal assembly over the tell tale rod and into the counterbore of adapter block (315). Put o'ring (316) in place and secure Port 6 flange (324) with screws (324A).

#### NOTE:

**Use a guide bushing behind seal to keep inner rod seal (328) from popping out of retainer (327).**

#### D. TELL TALES (if used)

Be sure bushing (326) is installed in visual tell tale assembly (325) or in limit switch enclosure body (340).

IF VISUAL TELL TALE is used, slide assembly (325) over the rod (355) and fasten with screws (325A).

IF LIMIT SWITCH is used, slide the enclosure body (340) over rod (355) being certain that cams (343) also slide along rod and fasten with screws (340A). Move cams (343) to locations, marked on disassembly, and tighten set screws (343A) to lock in place. Put gaskets (342) in place and fasten cover (341) with screws (341A). Be sure to connect "Limit Switch Drain Port" in module adapter block (315).

#### E. CONNECTION

After entire prefill is assembled and mounted, re-connect electrical and hydraulic connections to Ports 4 and 6.

## X. PARTS LIST

Parts used in this assembly are per Oilgear specifications. Use Oilgear parts to ensure compatibility with assembly requirements. When ordering replacement parts, be sure to include prefill type designation, serial number, bulletin number and item number. To assure seal and packing compatibility, specify type of hydraulic fluid used.

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
300	Head, Rear	327	Retainer, Rod Seal
300A	Screw, Sock. Hd. Cap	328	Seal, Inner Rod
301	Ring, Rear Head Locating	329	Seal, O'ring
302	Sleeve, Dashpot	330	Seal, Joint Ring
303	Screw, Flow Choke	331	Pin, Roll
303A	Nut, Jam	332	Retainer, Outer Rod
304	Seal, O'ring	333	Washer, Spring
305	Ring, Back-up	334	Retainer, Inner Rod
306	Plug, Hex.	335	Rod, Visual Tell Tale
307	Seal, O'ring		
310	Nose, Dashpot	340	Body, Limit Switch Enclosure
310A	Screw, Nylock S.H.C.	340A	Screw, Sock. Hd. Cap
315	Block, Module Adapter	341	Cover, Enclosure
315A	Screw, Sock. Hd. Cap	341A	Screw, Rd. Hd.
316	Seal, O'ring	342	Gasket, Enclosure
317	Seal, O'ring	343	Cam, Limit Switch
318	Bearing, Rod Sleeve	343A	Screw, Set
319	Seal, O'ring	344	Switch, Micro
320	Cap, End	344A	Screw, Rd. Hd.
320A	Screw, Sock. Hd. Cap.	345	Screw, Rd. Hd.
321	Seal, O'ring	346	Screw, Rd. Hd.
322	Plug, Hollow	346A	Washer
323	Seal, O'ring	347	Plate, Sub
324	Flange, Port 6	347A	Plate, Adapter
324A	Screw, Sock. Hd. Cap	348	Cap, Limit Switch End
325	Guard, Visual Tell Tale	349	Seal, O'ring
325A	Screw, Sock. Hd. Cap.	350	Bushing, Back-up
326	Bushing, Rod	351	Bushing, Limit Switch Rod
		355	Rod, Limit Switch Tell Tale

### O'RING SIZES

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ITEM NO.	PREFILL VALVE SIZE	
	200	250 thru 400
304	1/16 x 3/8 90	1/16 x 3/8 90
307	ARP 904	ARP 904
316	1/8 x 1-3/8 90	1/8 x 1-3/8 90
317	1/8 x 1-1/4 90	1/8 x 1-3/8 90
319	3/32 x 7/8 90	3/32 x 7/8 90
321	1/8 x 1-1/8 90	1/8 x 1-1/8 90
323	_____	ARP 904
329	1/8 x 1-1/8 90	1/8 x 1-1/8 90
349	ARP 910	ARP 910