

# SERVICE INSTRUCTIONS

## OILGEAR TYPE "VSM" FOUR-WAY CYLINDER PREFILL AND EXHAUST VALVES, SIZE 100 (4"), 150 (6") AND 200 (8")

### PURPOSE OF INSTRUCTIONS

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

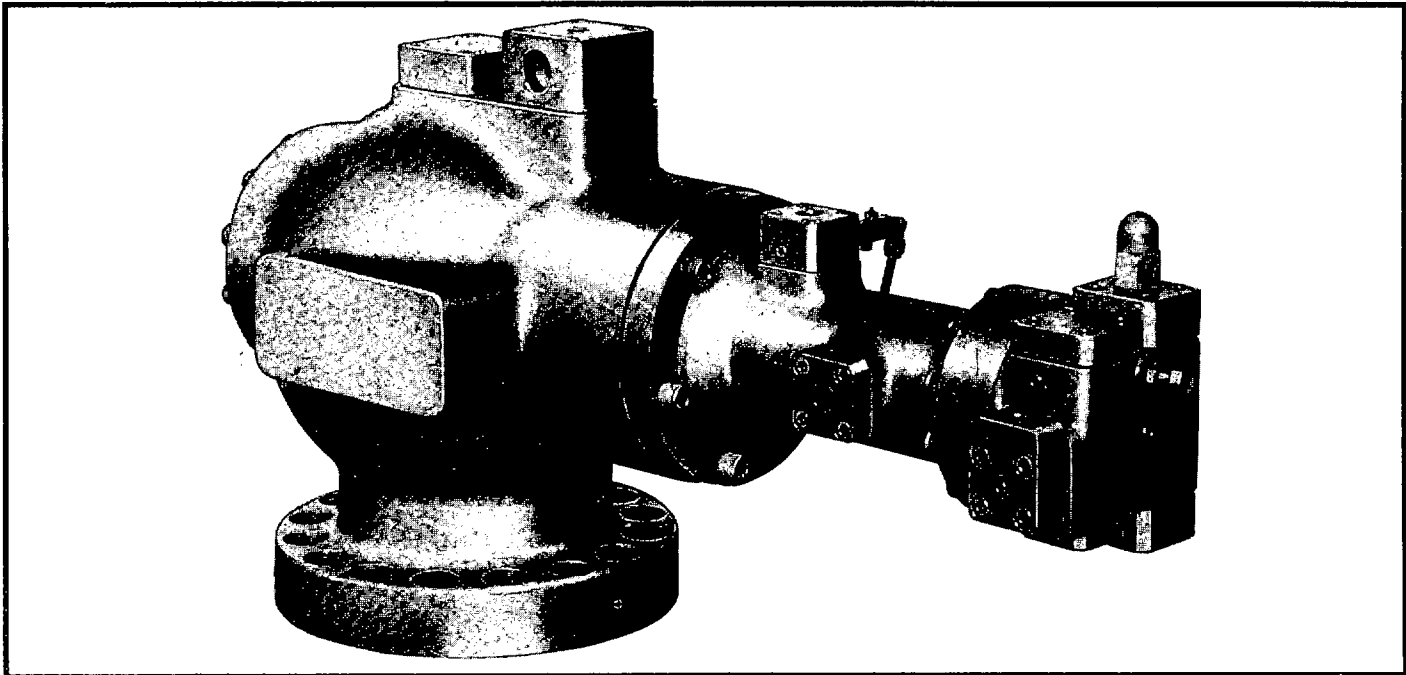


Figure 1. Typical Small Size "VSM" Prefill and Exhaust Valve (54505-R).

### REFERENCE MATERIAL

Piping Information . . . . . Bulletin 90011  
 Prefill and Control Specifications . . . . . Bulletin 86000

#### Early Operator Instructions

Plain Type . . . . . Bulletin 986320  
 Resistance Type . . . . . Bulletin 986330  
 Solenoid Pilot Valve Type . . . . . Bulletin 986340  
 Solenoid Operated 4-Way Valve Type . . . . . Bulletin 986350

#### Modular "VSM" Operator Instructions

Plain Type . . . . . Bulletin 986321  
 Resistance Type . . . . . Bulletin 986331  
 4-Way Valve Type . . . . . Bulletin 986352

## I. PREPARATION AND INSTALLATION

### A. MOUNTING

Thoroughly clean all external valve surfaces and remove all thread protectors. Mount the unit on a flat 63 RMS min. finish surface being sure o'ring (2) or (2A) is in .counterbore at Port 1.

### B. PIPING AND FITTINGS

See referenced "Piping Information" Bulletin and individual circuit diagram before connecting prefill valve to system.

Remove flanges if pipes are being welded or brazed to them. Use piping compounds or Teflon tape sparingly on tubes being threaded into flanges. Secure tubes and bolts tightly to prevent air being drawn into the system.

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SHOWN FOR REFERENCE ONLY. DASHPOT NOSE USED ON MODULAR OPERATED UNITS ONLY. SEE MODULAR OPERATOR INSTRUCTIONS.

SEE OPERATOR INSTRUCTIONS

PLAIN CYLINDER AND PLAIN PISTON

IF SO EQUIPPED, SEE MODULAR OPERATOR INSTRUCTION FOR O'RING LOCATION AND SIZE.

PIPE PLUG, PART \*\*\* 8A

NOT USED ON ALL UNITS

PORT 1&2 CONFIGURATION FOR 4" AND SOME 6" UNITS (NO SEAL RETAINING LIP) USE PARTS 2A & 24A

TOP VIEW

INTERLOCKING CYLINDER AND INTERLOCKING PISTON

OPTIONAL CLOSING DASHPOT

4" PREFILL UNIT PISTON AND PLUNGER

NOTE: WHEN ORDERING REPLACEMENT PARTS; BE SURE TO INCLUDE UNIT SERIAL NUMBER, BULLETIN NUMBER & PART NUMBER; SPECIFY TYPE OF HYDRAULIC FLUID FOR O'RINGS.

\*\*\*PART 8A USED ONLY WHEN UNIT IS SUPPLIED FOR DASHPOT OPERATION.

†PARTS 6,7,10,20,21,22 NOT USED ON 4" UNIT.

Figure 2. Parts Drawing, Size 100, 150 and 200 Basic Prefill Valves Without Operators DS-986304D (504058D).

## II. CONSTRUCTION

Refer to Figure 2. The principle parts of these prefill valves are an operator (see separate bulletin); a control cylinder (3 or 4) and a control piston (8 or 9) of either the standard or interlocking type; the prefill valve body (1) and the prefill valve plunger (18).

## III. PRINCIPLE OF OPERATION

See diagram in applicable reference operator bulletin.

### A. PREFILL VALVE WITH STANDARD CONTROL PISTON AND PORT 7 PLUGGED.

Pilot fluid at Port 4 acts on the annular area of the control piston and shifts control piston and prefill valve plunger from "closed" to "open" position at a constant speed determined by pilot volume or the prefill valve operator. So, Port 1 (ported to cylinder) and Port 2 (ported to the reservoir) are connected; Port 3 (ported to high pressure supply) is blocked. Some units are equipped with operators (see referenced bulletin) that include an adjustable dashpot to "cushion" stop the control piston.

Pilot fluid flowing through the operator and acting on the full area of the control piston shifts the prefill valve plunger from "open" to "closed" at a constant speed to block Port 2 and connect Ports 1 and 3. As the prefill valve plunger blocks Port 2, grooves in the plunger open Port 1 to Port 3. Some units are equipped with an adjustable dashpot to "slow down" movement of control piston (and prefill valve plunger) as it closes.

### B. PREFILL VALVE WITH INTERLOCK CONTROL PISTON AND CYLINDER

The prefill valve plunger movement is the same as described in III-A except Ports 4 and 7 are connected when prefill valve is in "open" position. When valve is in "closed" position, Port 7 and operator are connected.

### C. MORE "PRINCIPLE OF OPERATION"

See separate referenced bulletin on operator instructions for additional principle of operation description.

## IV. SPECIFICATIONS

See referenced material and prefill valve operator material for "Pressure Drop vs. Flow" curves and other specifications. See individual application circuit and/or installation drawings for exceptions.

## V. MALFUNCTIONS AND CAUSES

### A. PLUNGER DOES NOT SHIFT PROPERLY

1. Dirt or foreign material causing plunger or control piston to stick.
2. Insufficient pilot fluid pressure.
3. Worn or broken control piston rings.
4. Operator not functioning properly (see reference bulletin).

### B. EXCESSIVE SLIP

1. Worn prefill valve plunger or broken piston rings.

## VI. TESTING AND ADJUSTING

See referenced prefill valve operator bulletin.

## 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. Do not remove (locator) roll pins unless they are deformed or otherwise in need of replacement.

**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 the valve 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 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 these units and new CLEAN threadless rags used to handle and dry parts.

Isolate the prefill valve from reservoir and press cylinder, or drain hydraulic fluid before disassembly.

#### CAUTION:

**Avoid allowing cylinder prefill plunger (18) movement beyond normal closed position or piston rings (19) 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

IF THE PREFILL CAN BE REMOVED FROM THE PRESS, disconnect all external piping, remove flanges (12, 14, 23, 25 and 27) and withdraw o'rings (13, 15, 24, 26 and 28). Remove valve body mounting bolts, lift and withdraw o'ring (2 or 2A).

IF THE VALVE CAN NOT BE REMOVED FROM THE PRESS, disconnect piping from ports 3, 4, 5 and 7 (if used), remove flanges (12, 14, 25 and 27) and withdraw o'rings (13, 15, 26 and 28).

### D. OPERATOR GROUP

Refer to applicable operator instruction bulletin and remove the prefill valve operator assembly from the control cylinder (3) and withdraw o'ring (11).

### E. PREFILL VALVE

Remove screws (3A). Use a hoist for support and carefully separate control cylinder (3 or 4) from valve body (1). As control cylinder is separated laterally from the body, the control piston assembly (8 or 9) will bring along the prefill valve plunger (18). The prefill plunger should be supported as it is removed. Remove o'ring (17).

To separate control piston and ram (8 or 9) from prefill valve plunger (18), remove lockwire (5B) and screws (5A). On size 100 units, remove connector plate (5). On size 150 and 200 units,

## XI. AFTER SALES SERVICES

Oilgear builds products that last. However, it is the nature of this type of machinery to require proper maintenance regardless of the care that goes into its manufacture. Oilgear has several service programs to help you.

### “STAY-ON-STREAM” SERVICE:

By signing up for Oilgear’s “Stay-On-Stream” program you can prepare for problems before they happen. Certain field tests such as fluid testing, slip testing and electronic profile recording comparisons can be performed by our field service people or your own trained personnel. These tests can indicate problems before they become “down-time” difficulties.

### SERVICE SCHOOLS:

Oilgear holds schools to train your maintenance personal. A “general” hydraulic or electronic school is conducted in our Milwaukee plant on a regular basis. “Custom” schools, specifically addressing your particular hydraulic and electrohydraulic equipment can be conducted in your plant.

### SPARE PARTS AVAILABILITY:

Prepare for future needs by stocking Oilgear original factory parts. Having the correct parts and necessary skills “in-plant” enables you to minimize down-time. Oilgear has developed parts kits to cover likely future needs. Oilgear field service technicians also stand ready to assist your maintenance people in troubleshooting and repairing equipment.

### OILGEAR EXCHANGE SERVICE

Standard replacement pumps and motors are available to users of Oilgear equipment where comparable units will be returned in exchange. When standard replacements must be modified to replace units which are special, shipment will depend on availability of parts, assembly and test time necessary.

To obtain this service, place an order for an exchange unit and provide the serial number and type designation. The replacement unit 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.



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out roll pin (6), remove locknut (7) and connector plate (5). Withdraw control piston from control cylinder (3). Remove piston rings (10 and 19) if used. **Do not** remove plug (30).

NOTES:

**Do not** remove retaining rings (20), prefill plunger tube (21) and o'ring (22) unless necessary. Remove optional dashpot assembly (40, 41, 42 and 43) if necessary.

## 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. PREFILL VALVE

#### CAUTION

**If valve is equipped with a modular operator, see appropriate referenced bulletin for assembly of dashpot nose (and tell tale if used) to control piston.**

SIZE 100 UNIT ASSEMBLY - Insert control piston (3 or 4) [being sure plug (30) is installed] into control cylinder (3 or 4). Insert o'ring (17) in its bore. Position connector plate (5) and secure it to main unit plunger (18) with screws (5A).

SIZE 150 AND 200 UNIT ASSEMBLY - Insert piston rings (10), if used, on control piston and insert control piston (8 or 9), [being sure plug (30) is installed] into control cylinder (3 or 4). Position connector plate (5) and secure with locknut (7) allowing 0.003" clearance between connector plate and locknut. Secure locknut with roll pin (6). Secure the prefill valve plunger (18) to connector plate (5) with screws (5A) and lockwire (5B). Insert o'ring (17) in its counterbore.

SIZE 100 thru 200 - If removed, replace o'ring (22), prefill plunger tube (21) and lock in place with retaining rings (20). Insert prefill valve plunger in body (1). **Be careful not to insert too far, or piston rings will expand in Port 3 relief and lock plunger in the body.** Secure the control cylinder (3 or 4) to prefill body with screws (3A).

### B. PREFILL OPERATOR

See reference material for applicable information on operator. See applicable operator reference for operator mounting.

### C. MOUNTING AND CONNECTING

If the unit was removed from the press, insert o'ring (2) and secure unit to its mounting. Install o'rings (13, 15, 24, 26 and 28), flanges (12, 14, 23, 25 and 27) and connect piping to all ports.

**SEE SECTION "I. PREPARATION and INSTALLATION".**

## 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.

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	Body, Prefill Valve	17**	Seal, O'ring
2**	Seal, O'ring	18	Plunger, Prefill Valve
2A**	Seal, O'ring	19	Ring, Piston
3	Cylinder, Standard Control	20*	Ring, Piston
3A	Screw, S.H.C.	21	Tube, Prefill Plunger
4	Cylinder, Interlock Control	22**	Seal, O'ring
5	Plate, Connector	23	Flange, Port 2 Welding
5A	Screw, S.H.C.	23A	Screw, S.H.C.
5B	Wire, Lock	24**	Seal, O'ring
6*	Pin, Roll	24A	Seal, O'ring
7*	Nut, Lock	25	Flange, Port 5
8	Piston & Ram, Standard Control	25A	Screw, S.H.C.
8A***	Plug, Pipe	25B	Plug, Pipe
9	Piston & Ram, Interlock Control	26**	Seal, O'ring
10*	Ring, Control Piston	27	Flange, Port 3
11**	Seal, O'ring	27A	Screw, S.H.C.
12	Screw, S.H.C.	27B	Plug, Pipe
12A	Screw, S.H.C.	28**	Seal, O'ring
12B	Plug, Pipe	29	Plate, Name
13**	Seal, O'ring	29A	Screw, Drive
14	Flange, Port 7	30	Plug, Pipe
14A	Screw, S.H.C.	40	Nipple, Pipe
15**	Seal, O'ring	41	Valve, Flow Control
16	Plug, Pipe	42	Elbow, 90°
		43	Tubing, Steel

\* Parts numbered 6, 7, 10, 20 and 21 are not used on size 100 (4") units.

\*\* Parts are included in Oilgear "Type A" Seal Kit.

\*\*\* Part 8A used only when unit is supplied with dashpot.

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

ITEM NO.	PREFILL VALVE SIZE					
	100 (4")		150 (6")		200 (8")	
2	_____		1/4 x 7	90	1/4 x 9	90
2A	3/16 x 4-1/2	90	1/4 x 6-1/2	90	_____	
11	3/16 x 4-1/4	90	3/16 x 4-1/4	90	3/16 x 4-1/4	90
13	1/8 x 1-1/4	90	1/8 x 1-3/4	90 *	1/8 x 1-3/4	90 *
15	1/8 x 1-1/4	90	1/8 x 1-3/4	90	1/8 x 1-3/4	90
17	3/16 x 4-1/2	90	1/4 x 6-1/2	90	1/4 x 8-1/2	90
22	_____		3/16 x 2-3/8	90	3/16 x 2-3/8	90
24	_____		1/4 x 7	90	1/4 x 9	90
24A	3/16 x 4-1/2	90	1/4 x 6-1/2	90	_____	
26	1/8 x 1-5/8	90	3/16 x 2-1/4	90	3/16 x 2-3/4	90
28	1/8 x 1-5/8	90	3/16 x 2-1/4	90	3/16 x 2-3/4	90

\* Size indicated apply to units with interlock control cylinder.

150 and 200 with standard cylinders have o'ring (13) size 1/8 x 1-1/4 90.