

# MAINTENANCE INSTRUCTIONS



## Cavity Free Valves

### SF Series

Factory-Actuated (Code 02) or

Prepared for Actuation with Handle (Code 03)

COMPONENT LIST	
Item	Description
A	Body
B	Rotor
C	Top Cap
D	Bottom Cap
E	Cap O-Ring
F	Top Spacer
G	Bottom Spacer
J	Stem
K	Follower
L	Blank Seat
M	Seat O-Ring
N	Stem Packing
O	Spring Washers
P	Cap Screws
Q	Jam Nut
R	Lock Washer

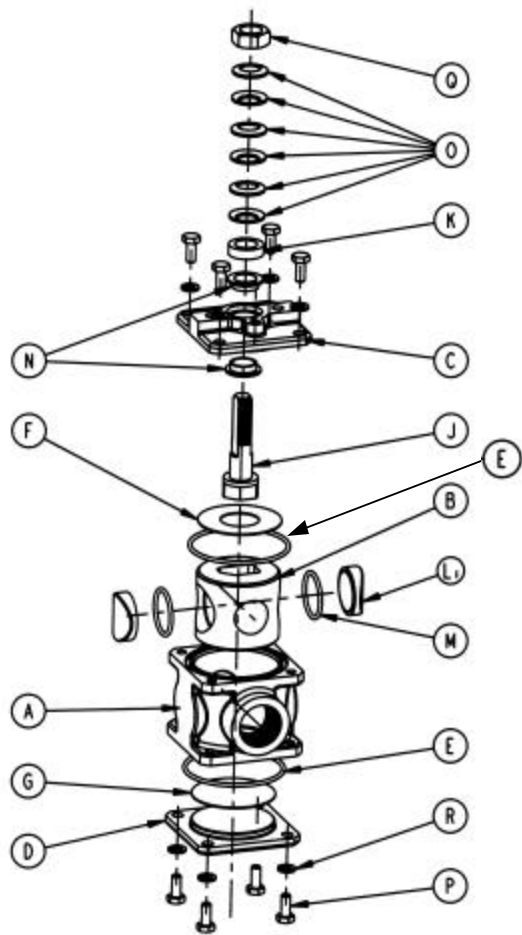
Follow instructions to ensure optimum performance:

#### Adjusting for Packing Wear

1. If the valve shows signs of leakage in the stem area due to normal stem packing wear, tighten the jam nut on the stem to fully compress the spring washers, then back off the nut 1/8 turn. For 3" and 4" valves, tighten this nut until the gap between adjacent spring washers is approximately 0.1". Leakage should stop, and the valve should continue to operate smoothly.
2. If packing leakage cannot be stopped, a repair kit will be required.

#### Installing Replacement Parts

1. Isolate and depressurize associated piping system. Cycle the valve to depressurize any fluid trapped in the valve cavity. Remove the valve from the piping. (NOTE: Removing the valve from the piping is optional. Maintenance can be performed in-line if desired.)
2. If actuated, remove all air and electrical power from the actuator, solenoid valve, and switch box, if any.
3. Remove the actuator, solenoid valve, and switch box, if any.
4. Loosen and remove the top cap screws and lock washers. Pull the top cap and stem upward and out of the valve body.
5. Remove the O-ring and top spacer from the top of the valve body.
6. Loosen and remove the jam nut from the stem. Remove the handle (if applicable), spring washers, stop disc (if applicable), and follower.
7. Push the stem down and out of the top cap and remove the two packings from the cap or stem.



SF\_H6\_EX

8. Loosen and remove the bottom cap screws and lock washers. Pull the bottom cap downward and out of the valve body.
9. Remove the O-ring and bottom spacer from the bottom of the valve body.
10. Tap the rotor with a soft hammer to push the rotor out of the valve body, taking care not to damage the rotor.
11. Remove the seats and O-rings from the rotor.
12. Before reassembling the valve, examine parts and repair or replace damaged or worn parts. Clean metal parts, as necessary, using a solvent compatible with the process fluid and a non-abrasive cloth.
13. Install each seat, with O-ring, into the rotor, ensuring that the seat O-ring is positioned on the outer perimeter of the rotor and the seat. Rotate the seats so the convex curvature of the seats matches the cylindrical surface of the rotor.
14. Set the body on a horizontal surface. Note that there is no top or bottom to the body, both ends are identical. Hold the seats in the rotor and set the rotor on the top of the body bore, such that the open ports of the rotor align with the ports of the body.
15. Realign the seats and ensure the bottoms of the seats are inside the chamfer on the body. Then, push the rotor

and seats into the body. A soft hammer or, for 3- and 4-inch valves, a press may be needed for this installation.

16. Install the bottom spacer on the end of the rotor without the stem slot. Then, place the cap O-ring into the groove on the valve body, and install the bottom cap. Align the bolt holes of the cap with the tapped holes in the body.
17. Lubricate the threads of four cap screws with an anti-galling lubricant, and install the cap screws and lock washers. Tighten the cap screws to secure the bottom cap to the body.
18. Set the assembly on the bottom cap and install the top spacer and cap O-ring into the open end of the body.
19. Lubricate the threads of four cap screws with an anti-galling lubricant.
20. Place a new bottom packing over the stem with the flanged surface seated against the flange on the stem. Insert the stem into the top cap.
21. Place the top cap and stem into the body and allow the stem tang to engage the slot in the rotor. The stem tang and the rotor will engage in only one orientation.
22. Rotate the top cap to align the bolt holes with the tapped holes in the body. The stop pin on the top cap (03 valves) or the hole for the stop pin (02 valves) should be located on the flow axis of the valve. Then, install the cap screws and lock washers and tighten.

23. Install a new top packing over the stem with the flanged surface facing upward. Push the packing into the top cap.
24. Install a follower over the stem until it seats on the packing. For 03 valves, install the stop disc such that 90° clockwise stem rotation closes the valve. Lubricate the stem threads with an anti-galling lubricant.
25. Install a spring washer, concave side facing upward, on top of the follower.
26. Install the remaining spring washers in series, alternating convex with concave curves, with the convex side of the lowest spring washer facing upward. Spring washers should not be “nested” (curving in the same direction).
27. Install the jam nut, and tighten the nut to fully compress the spring washers, then back off the nut 1/8 turn. For 3” and 4” valves, tighten this nut until the gap between adjacent spring washers is approximately 0.1”.
28. For 03 valves, install the handle and second jam nut.
29. Cycle the valve to verify freedom of operation and proper port positions. Then, leak check the assembly and reinstall the valve into the piping system, if appropriate.
30. If actuated, position the valve in the “Fail” position, then install the actuator, solenoid valve, and switch box, if any. Reconnect air and electrical power. If practical, cycle the valve using the actuator to verify proper assembly.

**TABLE 1: REPLACEMENT PARTS**

Valve Size	Size Code	Repair Kit	Replacement Parts				
			Seat	Top Spacer Bottom Spacer	Body O-Ring	Seat O-Ring	Packing
1"	E4	SFRTE1--A--1	SFRTE108	SFVTE113 SVFTE114	ORVI--12---2147	ORVI--12--2123	SPRTH109
1½"	G4	SFRTG1--A--1	SFRTG108	SPVTG113 SPVTG114	ORVI--12---2238	ORVI--12--2225	SPRTH109
2"	H4	SFRTH1--A--1	SFRTH108	SFVTH113 SFVTH114	ORVI--12---2243	ORVI--12--2229	SPRTH109
3"	K4	SFRTK1--A--1	SFRTK108	SFVTK113 SFVTK114	ORVI--12---2259	ORVI--12--2238	SPRTL109
4"	L4	SFRTL1--A--1	SFRTL108	SFVTL113 SFVTL114	ORVI--12---2267	ORVI--12--2349	SPRTL109

**Notes:**

1. Standard repair kits and replacement parts are RTFE:
  - a. For VTFE, replace ‘RT’ with ‘VT’. Example: a 1" kit would be SFVTE1--A--1.
2. The quantities of seats, O-rings, and packings per repair kits varies per flow pattern. Consult PBM.
3. In repair kits with TFE-based seats and packings, the top and bottom spacers are always VTFE.
4. In repair kits with UHMWPE seats and packings, the top and bottom spacers are UHMWPE.

**Material Definitions:**

RT	RTFE	Glass Reinforced Polytetrafluoroethylene
PL	PLUS	Glass & Carbon Reinforced Polytetrafluoroethylene
UT	UHMWPE	Ultra High Molecular Weight Polyethylene
HT	S/STFE	Stainless Steel Reinforced Polytetrafluoroethylene
VT	VTFE	Virgin Polytetrafluoroethylene



PBM, Inc.  
 1070 Sandy Hill Road, Irwin, PA 15642  
 Phone: 724.863.0550 or 800.967.4PBM Fax: 724.864.9255  
 Web: www.pbmvalve.com E-mail: info@pbmvalve.com  
 © Copyright 1997-2000 PBM, Inc. LT-109B 11/00 Printed in USA