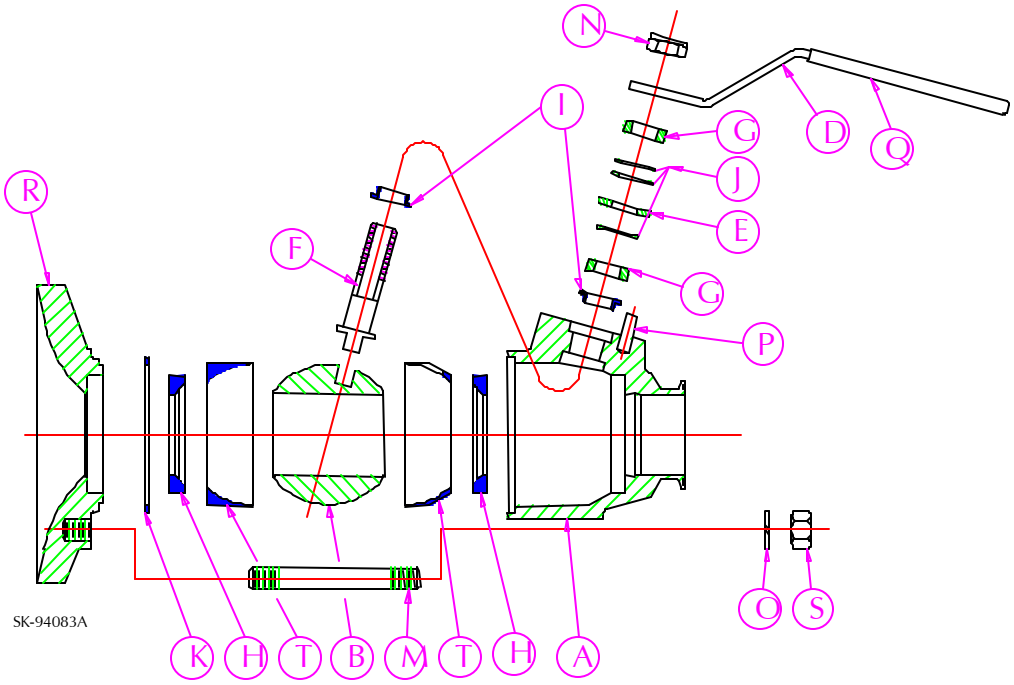
MAINTENANCE INSTRUCTIONS

Angle Stem Flush Tank Ball Valves

AF Series 1

Manually Operated

COMPONENT LIST	
Item	Description
A	Body
B	Ball
D	Handle
E	Stop Disc
F	Stem
G	Follower
H	Seat
I	Stem Packing
J	Spring Washers
K	Body Gasket
M	Body Fastener
N	Locking Hex Nut
O	Lock Washer
P	Stop Pin
Q	Handle Cover
R	Tank Pad
S	Hex Nut
T	Cavity Filler (optional)



Follow instructions to ensure optimum performance:

Adjusting for Normal Wear

1. PBM ball valves are designed with the Adjust-O-Seal® feature. If the valve shows signs of leakage due to normal seat wear, tighten the body fasteners evenly, in the sequence shown in Table 3, until leakage stops and the valve operates smoothly:

a. Initially, there should be a space between the flush tank pad and the body. This space is key to the Adjust-O-Seal feature, and allows in-line adjustment of seats and gaskets.

b. Body fasteners should be tightened only until the ball valve breakaway torque is reached (Table 1).

2. 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 4" and 6" 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.
3. After adjustments have been made to the seats, or if packing leakage cannot be stopped, a repair kit will be required.

Installing Replacement Parts

1. Isolate and depressurize the associated piping system. Cycle the valve to drain any trapped fluid from the body cavity.
2. Loosen and remove the hex nuts and lock washers. Remove the body assembly from the flush tank pad.
3. Remove the seat, gasket and O-ring, if any, from the flush tank pad.
4. Remove the outer cavity filler, if any, from the valve body.
5. Turn the stem to close the valve. Slide the ball out of the body, taking care not to scratch or nick the ball. Remove the inner seat and inner cavity filler, if any.
6. Loosen and remove the locking hex nut from the stem. Remove the handle, follower, spring washers, stop disc, and follower.
7. Push the stem down and out an open end of the body.
8. Remove the lower packing from the body or stem, and remove the upper packing from the body.
9. Before reassembling the valve, examine parts and repair or replace damaged or worn parts. Clean metal parts using a solvent compatible with the process fluid and a non-abrasive cloth.
10. Insert inner seat into the body. Insert inner cavity filler, if any.
11. Place a packing over the stem with the flanged surface seated against the flange on the stem.
12. Insert the stem into the body bore. Install a packing on the stem with the flanged surface facing upward. Push the packing into the body counterbore.
13. Install a follower over the stem. Lubricate stem threads with an anti-galling lubricant.
14. Insert the ball in the closed position, into the body. Slide stem tang into the ball slot, taking care not to scratch or nick ball. The stem tang and ball slot are indexed such that they fit together in one position only.
15. Install a spring washer over the stem with its concave side facing upward. For 1-1/2" and larger valves, install the stop disc such that clockwise rotation of the stem closes the valve with the ports aligned, and counterclockwise rotation opens the valve. Ensure the stop disk will contact the stop pin. If the ports do not align, rotate the stem 180 degrees to achieve proper alignment.
16. Install a spring washer over the stem with the concave side facing upward (away from the body). For 1½" and larger valves, install the stop disc such that counter-clockwise rotation of the stem opens the valve, then observe whether the ports of the ball align with the seats in the open position. If the ports do not align, rotate the stem 180 degrees to achieve proper alignment.
17. Install the remaining spring washers, alternating convex and concave curves, with the convex side of the lowest additional spring washer facing upward. Spring washers should not be "nested" (curving in the same direction). Install second follower.

18. Install the handle over the stem such that the handle is over the stop pin when the valve is in the open position. For 1″ valves, open the valve and observe whether the ports of the ball align with the seats in the open position. If the ports do not align, remove the handle and rotate the stem 180 degrees, then reinstall the handle to achieve alignment.
19. Install the locking hex nut with the nylon lock facing away from the valve body. Tighten the nut to fully compress the spring washers, then back off the nut 1/8 turn. For 4″ and 6″ valves, tighten this nut until the gap between adjacent spring washers is approximately 0.1″. Open and close the valve, and recheck open ball port alignment.
20. Insert the outer cavity filler, if any, into the valve body.
21. Install seat, gasket and O-ring, if any, into the flush tank pad. In vertical installations, it may be necessary to apply a lubricant to the back of the seat and gasket to hold these parts in place.
22. Lubricate the body fastener threads with an anti-galling lubricant. Then, install the fasteners into the tapped holes in the flush tank pad until they reach the bottom. For a 6″ valve, lubricate the first 1-1/2″ of the body bore with a lubricant compatible with the process fluid to prevent cutting of the O-rings during installation.
23. To assemble the body to the flush tank pad, push the body against the pad, allowing fasteners to enter holes in the body.
24. Install hex nuts and lock washers and hand-tighten.
25. With the valve in the closed position, wrench-tighten the body fasteners in accordance with the procedure shown in Table 3, leaving a gap between the body and the flush tank pads, until the valve stem breakaway torque (Table 1) is achieved. Then, remeasure stem breakaway torque for several cycles to verify repeatability.
26. If practical, leak test the seats, gaskets and packings. Open the valve and recheck open ball port alignment.

Notes:
1. 1″ valves have the stop disc integrated with the handle.
2. 6″ valves have one O-ring. Smaller sizes have none.
3. PBM recommends using new seats and seals at each assembly.

TABLE 1: STEM TORQUE VALUES (IN.-LB.)

Valve Size	Size Code	Ball Valve Breakaway Torque by Seat & Seal Material		
		RTFE, PLUS, UHMWPE	S/STFE	VTFE
1″	E	72	90	58
1½″	G	168	210	134
2″	H	192	240	153
3″	K	420	525	336
4″	L	540	675	432
6″	M	1200-1920	1500-2400	960-1536

TABLE 2: REPLACEMENT PARTS

Repair Kit	Replacement Parts				
	Seat	Gasket	Packing	Cavity Filler Kit	Body O-Ring
AFRTE1--A--1	SPRTE008	SPRTE013	SPRTE109	AFRTE1--B--3	N/A
AFRTG1--A--1	SPRTG008	SPRTG013	SPRTG109	AFRTG1--B--3	N/A
AFRTH1--A--1	SPRTH008	SPRTH013	SPRTH109	AFRTH1--B--3	N/A
AFRTK1--A--1	SPRTK008	SPRTK013	SPRTK109	AFRTK1--B--3	N/A
AFRTL1--A--1	SPRTL008	SPRTL013	SPRTK109	AFRTL1--B--3	N/A
AFRTM1--A--1	SPRTM008	SPRTM013	SPRTM109	AFRTM1--B--3	ORVI--12---2372

Notes for Table 1:
1. Stem torque values shown are minimum values and represent ideal conditions (100 psig or less, ambient temperature, with fluid free of suspended solids and comparable in viscosity to water).
2. Torque values are measured at the stem, NOT at the body bolts .
3. For PEEK and KYNAR® seat and seal material torque values, consult PBM.

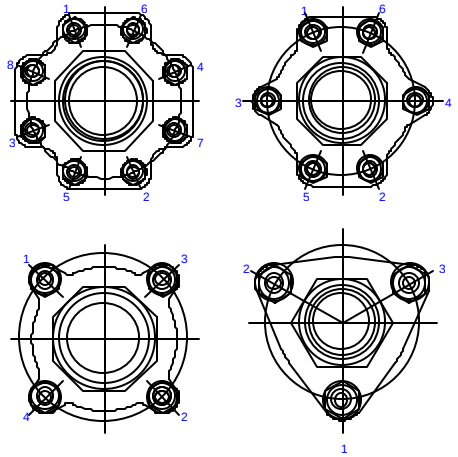
Material Definitions:

HT	S/STFE	Stainless Steel Reinforced Polytetrafluoroethylene
KY	KYNAR®	Polyvinylidene Fluoride
PK	PEEK	Polyetheretherketone
PL	PLUS	Glass & Carbon Reinforced Polytetrafluoroethylene
RT	RTFE	Glass Reinforced Polytetrafluoroethylene
UT	UHMWPE	Ultra High Molecular Weight Polyethylene
VT	VTFE	Virgin Polytetrafluoroethylene

Notes for Table 2:
1. Standard Repair Kits are RTFE. To order a Repair Kit with a different material, replace "RT" with the appropriate 2-letter material definition. Be sure to also replace the "A" with the appropriate seat and seal designator from the Seat/Seal column in the PBM Part Number manual (LT-PN98).
   a. For VTFE, replace "RT" with "VT" and add "C" to the code. Example: a 1" kit would become AFVTE1--C--1.
2. Repair kits include 2 seats, 1 gasket, 2 packings and, if applicable, 1 Viton O-ring. (EPR O-rings and other materials are also available.)
3. Cavity filler kits include 2 cavity fillers and 1 gasket.

TABLE 3: TIGHTENING PROCEDURE FOR BODY FASTENERS

1. Hand-tighten in the sequence illustrated.
2. Wrench-tighten in the sequence illustrated until the lock washer begins to compress.
3. Continue tightening each bolt 1/8 turn until the recommended torque value (Table 1) is achieved when measuring the torque at the valve stem.



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