

MAINTENANCE INSTRUCTIONS

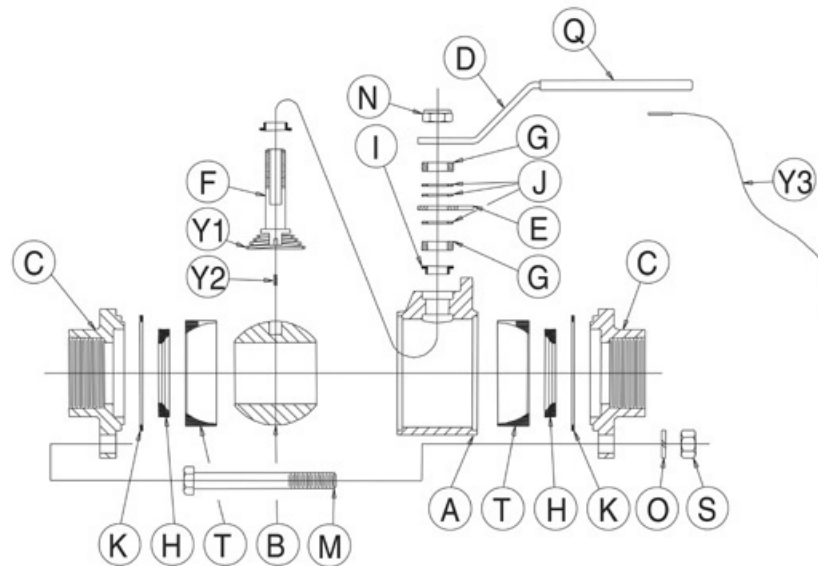
2-Way, Flush Tank & Diverting Port Ball Valves

SP, DP/DI and FT/FI Series 1

Manually-Operated



COMPONENT LIST	
Item	Description
A	Body
B	Ball
C	End Fitting
D	Handle
E	Stop Disc
F	Stem
G	Follower
H	Seat
I	Stem Packing
J	Spring Washers
K	Body Gasket
M	End Fitting Fastener
N	Locking Jam Nut
O	Lock Washer
Q	Handle Cover
S	Hex Nut
T	Cavity Filler (optional)
Y ₁	Outer Ground Spring
Y ₂	Inner Ground Spring
Y ₃	Ground Wire



SK94071A

Follow instructions to ensure optimum performance:

Adjusting for Normal Wear

- 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 end fitting fasteners evenly, in the sequence shown in Table 3, until leakage stops and the valve operates smoothly:
 - Initially, there should be a space between the end fittings and the body. This space is key to the Adjust-O-Seal feature, and allows in-line adjustment of seats and gaskets.
 - End fitting fasteners should be tightened only until the valve stem breakaway torque is reached (Table 1).
- If the valve shows signs of leakage in the stem area due to normal stem packing wear, tighten the locking jam nut on the stem to fully compress spring washers, then back off the nut 1/8 turn. Leakage should stop, and the valve should continue to operate smoothly.
- After adjustments have been made to the seats, or if packing leakage cannot be stopped, a repair kit will be required.

Installing Replacement Parts

- Isolate and depressurize the piping system. Cycle the valve to drain any trapped fluid from the body cavity. Remove valve from piping.
- Loosen and remove the hex nuts and lock washers from fasteners. Remove the fasteners. Pull end fittings free of body. For FT valves, remove the end fitting/body assembly from the flush tank pad. Remove body subassembly.
- Remove the seats, gaskets and O-rings, if any, from end fittings.
- Remove the cavity fillers, if any, from the body.
- Turn the stem to position the ball closed. Slide the ball out of the body, taking care not to scratch or nick the ball. Remove inner and outer ground springs, if any.
- Loosen and remove the jam nut from handle. Remove handle.
- Remove spring washers, stop disc, followers and ground wire, if any, from stem.
- Push stem down and out an open end of body.
- Remove the packing from the body or stem.
- Before reassembling valve, examine parts and repair or replace damaged or worn parts. Clean metal parts, as necessary, using a solvent compatible with process fluid and a non-abrasive cloth.

- Place new bottom packing over the stem with flanged surface seated against the flange on the stem. Insert the stem into the body bore.
- While supporting the stem, install packing over the stem with the flanged surface facing upward. Push the packing into body counterbore.
- Install new top follower over stem until resting on the upper packing. Lubricate stem threads with an anti-galling lubricant.
- For 1" and smaller valves:
 - Install a spring washer, concave side facing upward, on follower.
 - Install second spring washer, concave side facing downward. Install third spring washer, concave side facing upward. Install external ground wire, if any, between any two spring washers.
 - Install a second follower on top of spring washers. Install integral handle/stop disc on top of the follower such that the handle is over stop pin when the valve is in open position.
 - Thread jam nut onto stem and tighten to fully compress spring washers, then back off the nut 1/8 turn.
- For 1 1/4" and larger valves:
 - Install a spring washer, concave side facing upward on top of the follower. Install the stop disc such that the valve rotates 90° clockwise to open the valve.
 - Install two (three for 6" and 8" valves) more spring washers, alternating direction, starting concave side facing downward. If external ground wire is used, install between any two spring washers. Install a second follower.
 - Install the handle such that the handle is over the stop pin when the valve is open.
 - Thread jam nut onto stem and tighten nut to fully compress spring washers, then back off the nut 1/8 turn.
- Place new seats in end fittings with the flat end of seat against flat recess in the end fittings. Place gaskets onto the end fittings.
- Lubricate O-rings, if any, and 1/4" of body bore with lubricant compatible with the process fluid. Place the O-rings in the groove on end fittings.
- Position stem to close valve. Install the two internal ground springs, if any, on the bottom of the stem. Insert ball into body. Slide stem tang into ball slot, taking care not to scratch or nick ball.

19. Position ball in open position. Install cavity fillers, if any.
20. Lubricate external threads of fasteners with anti-galling lubricant.
21. Insert end fittings into body, taking care not to cut O-rings, if any.
22. Turn the stem and close the valve.
23. Install fasteners with lock washers. Install and hand-tighten hex nuts. Install the external ground wire, if any, to any fastener.
24. Wrench-tighten hex nuts in sequence shown in Table 3, leaving a gap between body and end fittings even and until valve stem breakaway torque (Table 1) is achieved. First, measure the stem

- breakaway torque with the valve in the closed position. Then, measure stem breakaway torque for several cycles to verify repeatability.
25. Reinstall the valve into the piping.
26. If practical, leak test the seats, gaskets and packings.

Notes:

1. 6" and 8" valves have O-rings. 1/4" - 4" valves do not.

Valve Size	Size Code	Valve Stem Breakaway Torque <i>by Seat & Seal Material</i>		
		RT UT	HT	VT
1/4"	A1	48	60	38
3/8"	B1	48	60	38
1/2"	C1	48	60	38
3/4"	D1	60	75	48
1"	E1	72	90	58
1 1/4"	F1	132	165	106
1 1/2"	G1	168	210	134
2"	H1	192	240	154
2 1/2"	J1	300	375	240
3"	K1	420	525	336
4"	L1	540	675	432
6"	M1	1200-1920	1500-2400	960-1536
8"	N1	1440-2400	1800-3000	1152-1920

Valve Size	Repair Kit	Replacement Parts			
		Seat	Body Gasket	Packing	(Note 6) Cavity Filler Kit*
1/4"	SPRTC1--x--z	SPRTC008	SPRTC013	SPRTC109	SPRTC0--3
3/8"	SPRTC1--x--z	SPRTC008	SPRTC013	SPRTC109	SPRTC0--3
1/2"	SPRTC1--x--z	SPRTC008	SPRTC013	SPRTC109	SPRTC0--3
3/4"	SPRTD1--x--z	SPRTD008	SPRTD013	SPRTC109	SPRTD0--3
1"	SPRTE1--x--z	SPRTE008	SPRTE013	SPRTE109	SPRTE0--3
1 1/4"	SPRTE1--x--z	SPRTE008	SPRTE013	SPRTE109	SPRTE0--3
1 1/2"	SPRTG1--x--z	SPRTG008	SPRTG013	SPRTH109	SPRTG0--3
2"	SPRTH1--x--z	SPRTH008	SPRTH013	SPRTH109	SPRTH0--3
2 1/2"	SPRTJ1--x--z	SPRTJ008	SPRTJ013	SPRTJ109	SPRTJ0--3
3"	SPRTK1--x--z	SPRTK008	SPRTK013	SPRTK109	SPRTK0--3
4"	SPRTL1--x--z	SPRTL008	SPRTL013	SPRTK109	SPRTL0--3
6"	SPRTM1--x--z	SPRTM008	SPRTM013	SPRTM109	SPRTM0--3
8"	SPRTN1--x--z	SPRTN008	SPRTN013	SPRTM109	SPRTN0--3

Notes for Table 1:

1. Stem torque values shown are nominal 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 body bolts.**
3. For PEEK or KYNAR seat and seal material torque values, consult PBM.

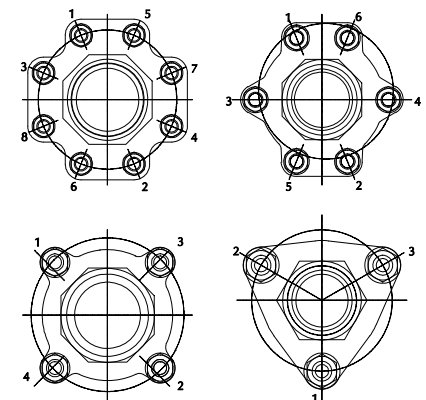
Material Definitions:

RT	RTFE	Glass Reinforced Polytetrafluoroethylene
UT	UHMWPE	Ultra High Molecular Weight Polyethylene
HT	S-TEF™	Stainless Steel Reinforced Polytetrafluoroethylene
VT	VTFE	Virgin Polytetrafluoroethylene
PK	PEEK	Polyetheretherketone
KY	KYNAR®	Polyvinylidene Fluoride

Notes for Table 2:

1. Standard repair kits and replacement parts are RTFE:
 - a. For VTFE, replace 'RT' with 'VT'. Example: a 1" kit would be SPVTE1--x--z.
 - b. For S-TEF™, replace 'RT' with 'HT'. Example: a 1" kit would be SPHTE1--x--z.
 - c. For UHMWPE, replace 'RT' with 'UT'. Example: a 1" kit would be SPUTE1---x--z.
 - d. For PEEK, replace 'RT' with 'PK'. Example: a 1" kit would be SPPKE1--x--z.
 - e. For KYNAR, replace 'RT' with 'KY'. Example: a 1" kit would be SPKYE1--x--z.
2. Repair kits include 2 seats, 2 body gaskets and 2 packings.
3. Replacement parts are one each per part number. Order two for repair/replacement.
4. Cavity filler kits include 2 fillers and 2 end gaskets. Kits for 6" and 8" do not include gaskets.
5. 6" & 8" repair kits include 2 Viton O-rings. (Other materials available.)
6. SP and FT valves use the cavity filler kits listed. For DP cavity filler kits, replace 'SP' with 'DP'. Example: a 1" DP cavity filler kit would be DPRTE0--3.

* In RT Filler kits, cavity fillers are Virgin Teflon with RTFE gaskets.



<ol style="list-style-type: none"> 1. Hand-tighten fasteners. 2. Wrench-tighten each fastener in the sequence illustrated until lock washers begin to compress. 3. Continue tightening bolts 1/8 turn until recommended torque value (Table 1) is achieved when measuring at valve stem.

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