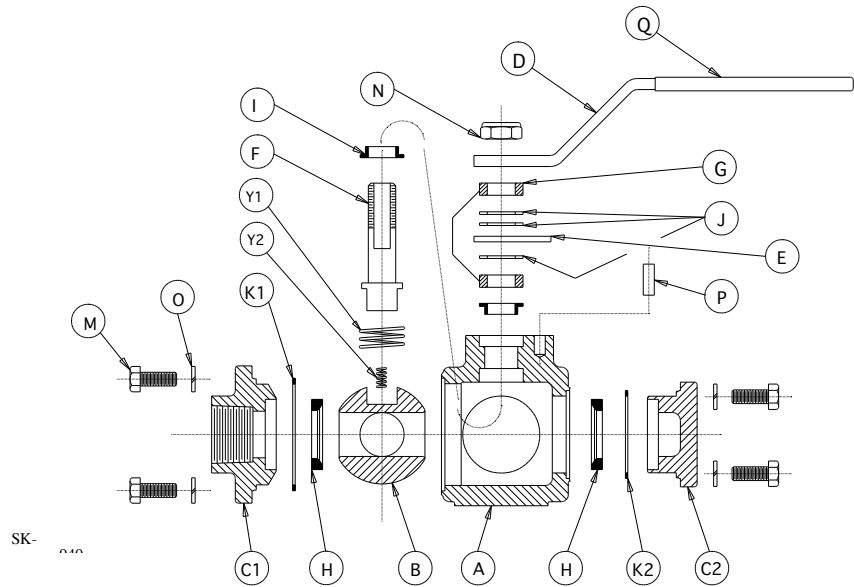


MAINTENANCE INSTRUCTIONS



Multi-Port Ball Valves MP Series 1, 1" - 6" Manually Operated

COMPONENT LIST	
Item	Description
A	Body
B	Ball
C ₁	End Fitting
C ₂	Blank Fitting
D	Handle
E	Stop Disc
F	Stem
G	Follower
H	Seat
I	Stem Packing
J	Spring Washers
K ₁	End Body Gasket
K ₂	Side Body Gasket
M	End Fitting Fasteners
N	Locking Jam Nut
O	Lock Washer
P	Stop Pin
Q	Handle Cover
Y ₁	Outer Ground Spring
Y ₂	Inner Ground Spring



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 and side 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, and the side fittings and the body. This space is key to the Adjust-O-Seal feature, and allows in-line adjustment of the seats and gaskets.
 - End and side 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. For 3" and smaller valves, tighten the nut to fully compress the spring washers, then back off the nut 1/8 turn. Leakage should stop, and the valve should continue to operate smoothly. For 4" and 6" valves, tighten the locking jam nut until the gap between adjacent spring washers is about 0.1".
- 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 associated piping system. Cycle the valve to drain any trapped fluid from the body cavity, and remove the valve from the piping.
- Loosen and remove the end and side fitting fasteners and lock washers. Remove the end and side fittings.
- Remove the seats and gaskets from the end and side fittings.
- Position the stem such that the flats on the top of the stem are parallel with the axis of the side fittings. Then, slide the ball through the end fitting bore and out of the body, taking care not to nick or scratch the ball. Remove ground springs, if any.

- Loosen and remove the locking jam nut from the stem. Remove the handle, upper follower, spring washers, stop disc, spring washer and lower follower.
- Push the stem into the body and out one of the open body ends.
- Remove the packing from the body or stem.
- Before reassembling the 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 one new packing over the stem with the flanged surface seated against the flange on the stem.
- Insert the stem into the end fitting bore and through the stem bore of the body. While supporting the stem, install a second new packing over the stem with the flanged surface facing upward. Push the packing into the body.
- Install a follower on the stem until it seats on the packing. Lubricate the stem threads with an anti-galling lubricant.
- For sizes 1" - 6", install a spring washer, concave side facing upward, on top of the follower. Install the stop disc. Ensure correct flow pattern is obtained.
- For sizes 1" - 1", install the stop disc on top of the follower. Ensure correct flow pattern is obtained. Then, install a spring washer, concave side facing upward.
- Install the remaining spring washers, alternating convex with 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 the second follower, the handle, and the locking jam nut with the nylon lock facing away from the valve body. For 3" and smaller valves, tighten the locking jam nut to fully compress the spring washers, then back off the nut 1/8 turn. For 4" and 6" valves, tighten the locking jam nut until the gap between the adjacent spring washers is about 0.1".
- Place new seats into the end and side fittings with the flat end of the seat against the flat recess in each fitting. Place gaskets onto the end and side fittings.

17. Insert ground springs (if any) into and around the stem, then insert the ball into the body through the end fitting bore. Slide the stem tang into the ball slot, taking care not to scratch or nick the ball. The stem tang and ball will fit in only one orientation. The port identification markings on the top surface of the stem should match the port orientation of the ball.
18. Insert the end and side fittings into the body bores, making sure the seats and gaskets remain in position.
19. Install the end and side fitting fasteners and lock washers and hand-tighten.

20. Fully position the ball in one of the standard flow positions. Do not mid-position the ball.
21. Wrench-tighten the end and side fitting fasteners in the sequence shown in Table 3, leaving a gap between the body and the end and side fittings, until the valve stem breakaway torque (Table 1) is achieved. Then, remeasure stem breakaway torque for several cycles to verify repeatability.
22. Reinstall the valve into the piping.
23. If practical, leak test the seats, gaskets, and packings.

Notes:

1. If the valve is not a bottom entry stem design, contact PBM for instructions.
2. 1" - 3" valves have three spring washers. 4" - 6" have four spring washers.

TABLE 1: STEM TORQUE VALUES (IN.-LB.)				
Valve Size	Size Code	Valve Stem Breakaway Torque <i>by Seat & Seal Material</i>		
		RT, PL, UT	HT	VT
1"	E1	240	300	192
1 1/2"	F1	240	300	192
1 1/2"	G1	480	600	384
2"	H1	540	675	432
3"	K1	720	900	576
4"	L1	1020	1275	816
6"	M1	Consult PBM		

TABLE 2: REPLACEMENT PARTS					
Valve Size	Repair Kit**	Replacement Parts			
		Seat	End Body Gasket	Side Body Gasket	Packing
1"	MPRTE1--xyz	MPRTE008	MPRTE013	MPRTE014	SPRTH109
1 1/2"	MPRTF1--xyz	MPRTE008	MPRTE013	MPRTE014	SPRTH109
1 1/2"	MPRTG1--xyz	MPRTG008	MPRTG013	MPRTG014	SPRTH109
2"	MPRTH1--xyz	MPRTH008	MPRTH013	MPRTH014	SPRTH109
3"	MPRTK1--xyz	MPRTK008	MPRTK013	MPRTK014	SPRTH109
4"	MPRTL1--xyz	MPRTL008	MPRTL013	MPRTL014	MPRTL109
6"	MPRTM1--xyz	MPRTM008	MPRTM013	MPRTM014	SPRTH109

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:

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
PK	PEEK	Polyetheretherketone
KY	KYNAR	Polyvinylidene Fluoride

Notes for Table 2:

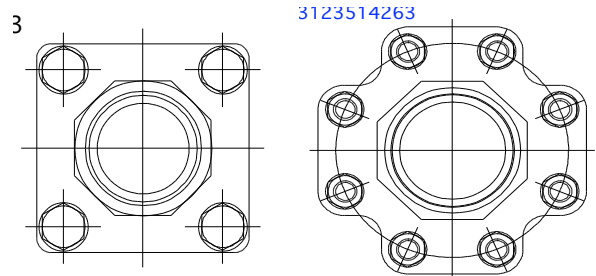
- ** When ordering a repair kit, substitute the following for xyz above:
- x = Enter appropriate character from Seat/Seal column in PBM Part Number Manual (LT-PN98). "A" (RTFE) is standard for MP Series 1 valves.
 - yy = Enter flow pattern number from PBM Part Number Manual (LT-PN98).
 - z = Enter "1" for Each or "2" for a Box.

For example, the part number for a single repair kit for a 1" 4-way, double T-port bottom entry ball valve with a 28 flow pattern and RTFE seats and seals would be MPRTE1--A281.

1. Standard repair kits and replacement parts are RTFE:
 - a. For VTFE, replace 'RT' with 'VT'. Example: a 1" kit would be MPVTE1--xyz.
 - b. For S/STFE, replace 'RT' with 'HT'. Example: a 1" kit would be MPHTE1--xyz.
 - c. For UHMWPE, replace 'RT' with 'UT'. Example: a 1" kit would be MPUTE1--xyz.
 - d. For PEEK, replace 'RT' with 'PK'. Example: a 1" kit would be MPPKE1--xyz.
 - e. For PLUS, replace 'RT' with 'PL'. Example: a 1" kit would be MPPLE1--xyz.
 - f. For KYNAR, replace 'RT' with 'KY'. Example: a 1" kit would be MPKYE1--xyz.
2. Repair Kits for 1" - 2" valves include 4 seats, 1 end gasket, 3 side gaskets and 2 packings. Repair Kits for 3" - 4" valves include 5 seats, 1 end gasket, 4 side gaskets, and 2 packings. Repair Kits for 6" valves include 5 seats, 2 end gaskets, 3 side gaskets, and 2 stem packings.
3. Replacement parts are one each per part number. Order two for repair/replacement.
4. For 1" - 2" valves, 4-Way Side Entry Kits are standard. For 3" - 6" valves, 5-Way Side Entry Kits are standard.

TABLE 3: TIGHTENING PROCEDURE FOR END & SIDE FITTING FASTENERS

1. Hand-tighten in the sequence illustrated at right, alternating fittings from end, side, and, if appropriate, bottom.
2. Wrench-tighten each fastener 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.



PBM, Inc.
 1070 Sandy Hill Road, Irwin, PA 15642
 Phone: (724) 863-0550 or (800) 967-4PBM
 Fax: (724) 864-9255
 E-mail: info@pbmvalve.com
 Web: www.pbmvalve.com

Adjust-O-Seal is a trademark of PBM, Inc.
 Kynar[®] is a registered trademark of Elf Atochem North America, Inc.