

MAINTENANCE INSTRUCTIONS

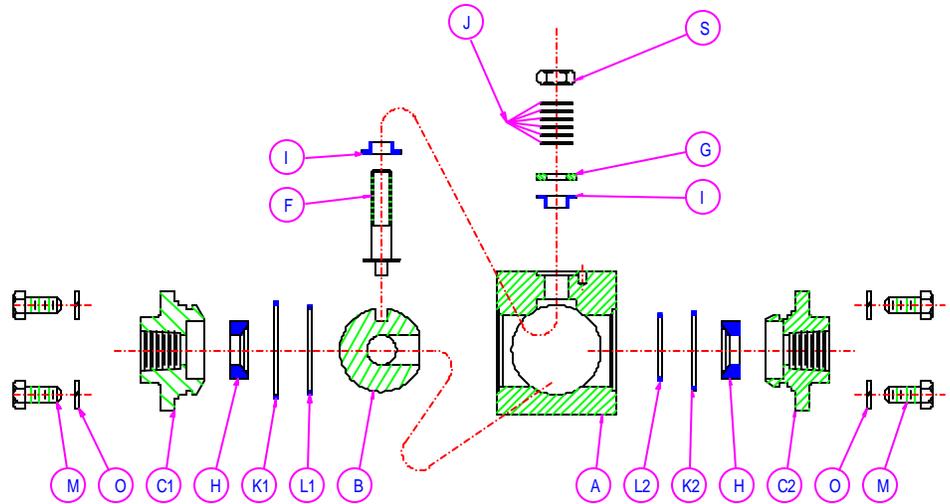
Multi-Port Ball Valves

MP Series 1, 1/2" – 3/4"

Factory-Actuated or Prepared for Actuation (Codes 02 or 03)



COMPONENT LIST	
Item	Description
A	Body
B	Ball
C ₁	End Fitting
C ₂	Side Fitting
F	Stem
G	Follower
H	Seat
I	Stem Packing
J	Spring Washers
K ₁	End Body Gasket
K ₂	Side Body Gasket
L ₁	End Fitting O-Ring
L ₂	Side Fitting O-Ring
M	End Fitting Fasteners
O	Lock Washer
S	Jam Nut



SK-94075B

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 jam nut on the stem 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.
- 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.
- If actuated, remove all air and electrical power from the actuator, solenoid valve, and switch box, if any.
- Remove the actuator, solenoid valve, and switch box, if any.
- Loosen and remove the end and side fitting fasteners and lock washers. Remove the end and side fittings.
- Remove the seats, gaskets and O-rings from the end and side fittings.
- Position the stem such that the flats on the top of the stem are parallel to 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.

- Loosen and remove the jam nut from the stem. Remove the handle (if applicable), spring washers, stop disc (if applicable) and follower.
- Push the stem into the body and out one of the open body ends.
- Remove the two packings 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 the follower on the stem until it seats on the packing. Lubricate the stem threads with an anti-galling lubricant.
- For 02 valves, install a spring washer, concave side facing upward, on top of the follower.
- For 03 valves, install the stop disc on top of the follower. Ensure the 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 handle (if applicable).
- Install the jam nut, and tighten the nut to fully compress the spring washers, then back off the nut 1/8 turn.
- 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.
- Lubricate O-rings and 1/4" body bore with a lubricant compatible with the process fluid. Place O-rings onto the end and side fittings.
- 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.

22. Insert the end and side fittings into the body bores, making sure the seats, gaskets, and O-rings remain in position, taking care not to cut the O-rings.
23. Install the end and side fitting fasteners and lock washers and hand-tighten.
24. Fully position the ball in one of the standard flow positions. Do not mid-position the ball.
25. 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.

26. Reinstall the valve into the piping.
27. If practical, leak test seats, gaskets, and packings.
28. If actuated, 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.

Notes:

1. If the valve is not a bottom entry stem design, contact PBM for instructions.
2. 03 valves include a handle, stop disc, and stop pin. 02 valves do not.

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

Valve Size	Size Code	Valve Stem Breakaway Torque by Seat & Seal Material		
		RT, PL, UT	HT	VT, TF
1/2"	C1	96	120	77
3/4"	D1	96	120	77

TABLE 2: REPLACEMENT PARTS

Valve Size	Repair Kit	O-Rings	Replacement Parts			
			Seat	End Body Gasket	Side Body Gasket	Packing
1/2"	MPRTC1--xyz	OREP--12---2131 OREP--12---2125	MPRTC108	MPRTC113	MPRTC114	ANRTE109
3/4"	MPRTC1--xyz	OREP--12---2131 OREP--12---2125	MPRTD108	MPRTC113	MPRTC114	ANRTE109

Notes for Table 1:

1. Stem torque values shown 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.

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 1/2" 4-way, double T-port bottom entry ball valve with a 28 flow pattern and RTFE seats and seals would be MPRTC1--A281.
1. Standard repair kits and replacement parts are RTFE:
 - a. For VTFE, replace 'RT' with 'VT'. Example: a 1/2" kit would be MPVTC1--xyz.
 - b. For S/STFE, replace 'RT' with 'HT'. Example: a 1/2" kit would be MPHTC1--xyz.
 - c. For UHMWPE, replace 'RT' with 'UT'. Example: a 1/2" kit would be MPUTC1--xyz.
 - d. For PEEK, replace 'RT' with 'PK'. Example: a 1/2" kit would be MPPKC1--xyz.
 - e. For PLUS, replace 'RT' with 'PL'. Example: a 1/2" kit would be MPPLC1--xyz.
 - f. For KYNAR, replace 'RT' with 'KY'. Example: a 1/2" kit would be MPKYC1--xyz.
 - g. For TFM, replace 'RT' with 'TF'. Example: a 1/2" kit would be MPKYC1--xyz.
 2. Repair Kits include 4 seats, 2 end body gaskets, 2 side body gaskets, 4 O-rings (2 of each O-ring from Table 2) and 2 packings.

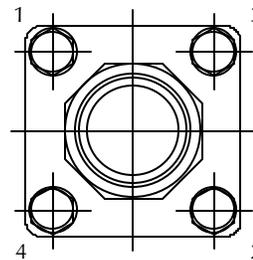
Material Definitions:

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
TF	TFM	Modified Polytetrafluoroethylene

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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.



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