

Installation, Operation, and Maintenance Instructions ASME B16.10 Full Port Flanged Ball Valves AN Series 5, 1/2" thru 6", ANSI 150# & 300# Class Non-Adjust-O-Seal®



IMI PBM



WARNING:

For your safety and protection it is important that the following precautions be taken prior to working on the valve.

1. Depressurize and drain the line.
2. Cycle the valve to relieve any pressure trapped in the valve.
3. Disconnect any air and electrical connections to the valve assembly.
4. Know what the media is in the line and wear appropriate protective clothing and equipment. Obtain appropriate MSDS sheets.
5. To ensure safe product selection and operation, it is the responsibility of the process system designer and end user to determine the appropriate compatible materials of construction and adequate product ratings for the process system. Process system designer, installer, and end user are responsible for proper installation, operation, and maintenance.
6. When disposing of Teflon parts, do not incinerate or subject to open flames.

1. General

This Installation, Operation, and Maintenance manual is for the safe use of PBM 2-piece, Non-Adjust-O-Seal®, Bi-Directional, AN Series 5 ball valves. Please read the instructions carefully and save them for future reference.

2. Installation

AN valves may be installed in either direction with the valve in the "open" position. For flanged end valves, it is not necessary to disassemble the valves before installation.

3. Operation

For manual valves, operation consists of turning the handle 1/4 turn to close or open the valve. When handle is parallel with the pipeline, the valve is in the open position. These valves may also be automated with actuators and other valve automation equipment. Mechanical handle stops must be removed if manual valves are converted to automated valves. For automated valves, operation is controlled by the actuator placed on top of the valve. Valve stops are an integral part of the actuators. Good operating procedure requires periodic inspection of the valves and replacement of parts as required. Always use PBM factory authorized replacement parts.

Locking Handle Device, manual valves only – (If Equipped)

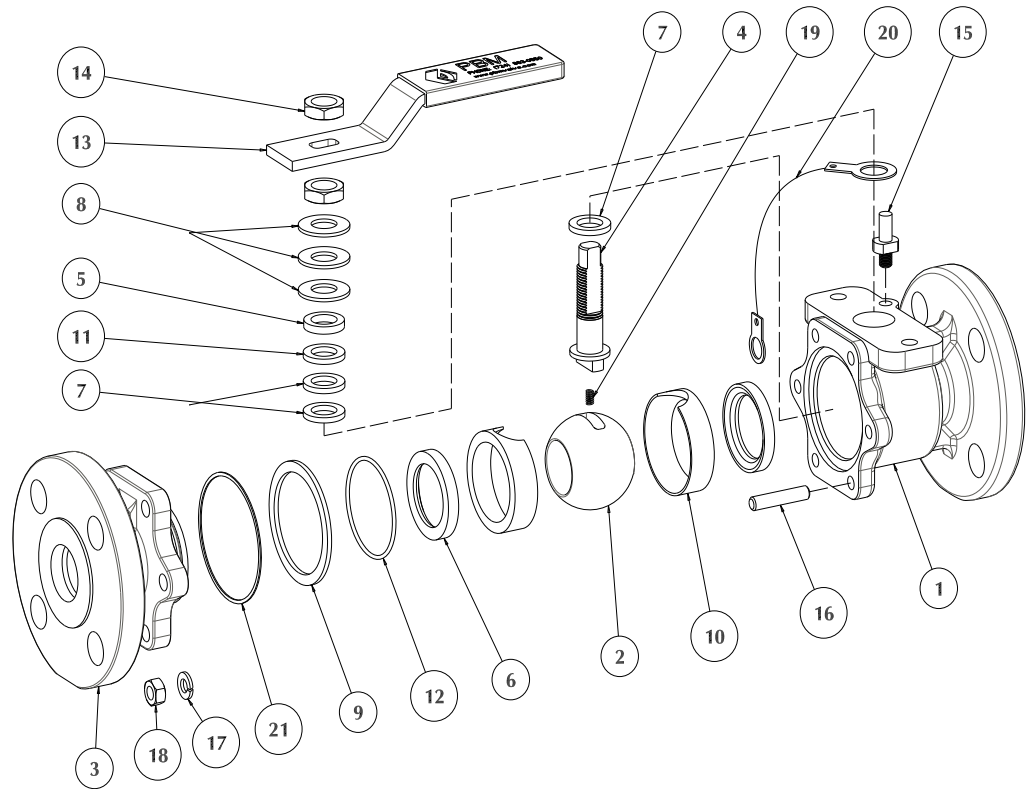
1. Depress handle lock bar inward toward the valve stem until it clears the stop on the valve body.
2. While maintaining the handle lock bar in this position, turn handle to desired position.
3. Release the handle lock bar, ensuring that it returns to the proper position against the handle.

Follow instructions to ensure optimum performance:

Adjusting for Normal Wear

1. If valve shows signs of leakage in stem area due to normal stem packing wear, loosen the upper jam nut on the stem, then tighten the lower jam nut as follows:
 - a. For valves 2" and smaller, tighten the nut to completely compress the spring washers, then loosen nut 1/2 turn.
 - b. For valves 3", tighten the nut until a gap of about 0.05" (1.3 mm) exists between the adjacent spring washers.
 - c. For valves 4" and larger, tighten the nut until a gap of about 0.10" (2.5 mm) exists between the adjacent spring washers.Leakage should stop, and the valve should continue to operate smoothly.
2. After adjustments have been made and the packing leakage cannot be stopped or if there is leakage past the non-adjusting ring, a repair kit will be required.

| PARTS LIST | |
|------------|--------------------------------|
| ITEM | DESCRIPTION |
| 1 | Body |
| 2 | Ball |
| 3 | End Fitting |
| 4 | Stem |
| 5 | Follower |
| 6 | Seat |
| 7 | Stem Packing |
| 8 | Spring Washers |
| 9 | End Body Gasket |
| 10 | Cavity Filler (If equipped) |
| 11 | Stem Packing |
| 12 | O-Ring |
| 13 | Handle (Manual Only) |
| 14 | Stem Hex Nut(s) |
| 15 | Stop Pin (Manual Only) |
| 16 | End Fitting Fastener |
| 17 | Lock Washer |
| 18 | End Fitting Hex Nut |
| 19 | Ground Spring (If equipped) |
| 20 | Ground Wire (If equipped) |
| 21 | Non-Adjusting Ring |



Disassembly of valve:

1. Isolate and depressurize the associated piping system. Cycle the valve to ensure there is no trapped pressure or fluid in the valve cavity. The valve should be left fully open or fully closed.
2. **For Automated Valves Only:** Remove all air and electrical power from the actuator, solenoid valve, and switchbox, if equipped. Then remove the automation assembly from the valve. Retain coupling and mounting bracket.
3. **For Manual Valves Only:** Loosen and remove the upper jam nut from the stem and then remove the handle.
4. Loosen and remove the flange bolting and remove the valve from the piping.
5. Remove the end fitting hex nuts or fasteners, lock washers, and tag, if equipped.
6. Pull the end fitting free from the body. It may require force to remove.
7. Remove the seat, o-ring, end body gasket, non-adjusting ring, and cavity filler, if equipped.
8. Rotate the stem to orient the ball to the closed position. Remove the ball out, taking care not to nick or scratch the ball.
9. Remove the internal ground spring, if equipped, from the bottom of the stem.
10. Remove the jam nut, spring washers, and follower. For valves with gear operators, remove the gear operator, bracket, and coupling.
11. Push the stem into the body and out through the open end of the body. The bottom packing may come off with the stem. If not, reach into the body counterbore and remove the packing.

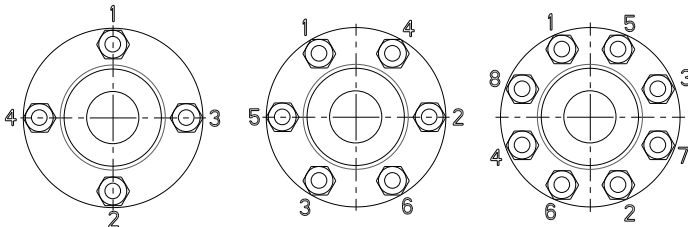
- Remove the top packings from the body, the inner cavity filler, if equipped, and the seat from the body recess.

Reassembly of valve:

- Before reassembling the valve, examine the 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. PBM recommends using new seats, body gaskets, and seals at each assembly.
- Insert a new seat and cavity filler, if equipped, into the body recess with the seating surface facing towards the ball cavity.
- Install a new packing onto the threaded end of the stem and slide it down until it contacts the shoulder.
- Insert the stem into body bore and through the stem bore in the body. Install the remaining packings onto the stem with the S-TEF® (gray) packing installed last. Push the packings into the body counterbore. Install the follower onto the stem.
- Install a spring washer onto the stem with the concave side facing upward. Install the external ground wire terminal onto the stem, if applicable, such that the ground wire extends towards the end fitting side of the body
- Install a second spring washer onto the stem with the concave side facing downward. Install the remaining spring washers onto the stem in an alternating or *series* arrangement. No two adjacent spring washers should be facing the same direction or in a *parallel* arrangement
- Lubricate the stem threads with an anti-galling lubricant.
- Thread a stem hex nut onto the stem. For valves 2" and smaller, tighten the nut to completely compress the spring washers, then back off 1/2 turn. For 3" valves, tighten the nut until a gap of about 0.05" (1.3 mm) exists between the adjacent spring washers. For valves 4" and larger, tighten the nut until a gap of about 0.10" (2.5 mm) exists between the adjacent spring washers.
- For Manual Valves Only:** Install the handle on the stem such that stop pin will contact the right side of the handle. Install and tighten the remaining hex nut to secure the handle to the stem.
- Rotate the stem to the closed position of the valve. Insert the ground spring, if equipped, into the hole in the bottom of the stem. Rotate the stem to the closed position of the valve. Then, while holding the ball directly over the entrance to the valve body, orient the ball to the closed position, rotate the slotted end of the ball toward the stem tang located inside the valve, and insert the ball into the body. Take care not to scratch or nick the ball.
- Rotate the stem until the ball is in the open position. Install the remaining cavity filler into the body, if equipped. Install the non-adjusting ring and end body gasket onto the end fitting. Lubricate the o-ring and approximately the first 1-1/2" of the body bore with a lubricant compatible with the process fluid. Install the o-ring into the groove in the end fitting.
- Lubricate the threads of body bolting with anti-galling lubricant.
- Install the end fitting onto the body. Install the external ground wire, if equipped, onto one of the adjacent end fitting fasteners. Install tagging, lock washers, and hex nuts. Hand-tighten the hex nuts.
- Torque the body / end fitting fasteners in a staggered and incremental sequence as per the instructions on the following page. Cycle the valve to verify freedom of operation. If practical, check the valve seats and seals for leaks.
- Reinstall the valve into the piping using appropriate gaskets and fasteners.
- For valves with gear operators, reinstall the bracket, coupling, and gear operator.
- For Automated Valves Only:** Reinstall the automation assembly with the bracket and coupling. Then reconnect air and electrical power.
- Insulate the valve, if applicable.

Tightening Procedure for Body / End Fitting Fasteners:

- Hand-tighten fasteners.
- Wrench-tighten each fastener in a staggered and incremental sequence as illustrated below until the recommended torque value in Table 2 on Page 4 is achieved.



| Table 1 - Replacement Kits and Parts | | | | | | |
|--------------------------------------|---------------------|--------------------------|-----------------|-----------------|----------------|----------|
| Valve Size | Repair Kit (V-TEF™) | Cavity Filler Kit (VTFE) | Ball (316L S/S) | Stem (316L S/S) | Spring Washers | Follower |
| 1/2" | ANTFC5 -- G -- 1 | ANTFC5 -- J -- 3 | SPHLC502 | SPHLD505 | SPK-E110 | SPK-D506 |
| 3/4" | ANTFD5 -- G -- 1 | ANTFD5 -- J -- 3 | SPHLD502 | SPHLD505 | SPK-E110 | SPK-D506 |
| 1" | ANTFE5 -- G -- 1 | ANTFE5 -- J -- 3 | SPHLE102 | SPHLE505 | SPK-E510 | ANK-E506 |
| 1-1/2" | ANTFG5 -- G -- 1 | ANTFG5 -- J -- 3 | SPHLG102 | ANHLH505 | SPK-H510 | SPK-H506 |
| 2" | ANTFH5 -- G -- 1 | ANTFH5 -- J -- 3 | SPHLH102 | ANHLH505 | SPK-H510 | SPK-H506 |
| 3" | ANTFK5 -- G -- 1 | ANTFK5 -- J -- 3 | SPHLK402 | SPHLK505 | SPK-K510 | ANK-K506 |
| 4" | ANTFL5 -- G -- 1 | ANTFL5 -- J -- 3 | ANHLL102 | SPHLL505 | MPK-L110 | ANK-L506 |
| 6" | ANTFM5 -- G -- 1 | ANTFM5 -- J -- 3 | SPHLM502 | SPHLM505 | SPK-M510 | SPK-M506 |

Notes for Table above:

- Standard repair kits include 2 V-TEF™ seats, 1 V-TEF™ body gasket, 3 V-TEF™ stem packings, 1 O-ring, and 1 S-TEF® (gray) stem packing. Cavity filler kits include 2 VTFE fillers only.
- Standard repair kits and replacement parts are V-TEF™.
- Replacement parts are one each per part number.
- For materials other than V-TEF™, substitute the correct material ID and code.
- For valves with grounding, add "G" to the end of the stem part number.

| Table 2 - Fastener Torque | | |
|---------------------------|------------------------------------|-------|
| Valve Size | Fastener Torque Body / End Fitting | |
| | in – lbs. | N - m |
| Class 150 Valves | | |
| 1/2" | 50 | 5.6 |
| 3/4" | 50 | 5.6 |
| 1" | 50 | 5.6 |
| 1-1/2" | 100 | 11.2 |
| 2" | 250 | 28.2 |
| 3" | 250 | 28.2 |
| 4" | 750 | 84.7 |
| 6" | 1000 | 112 |
| Class 300 Valves | | |
| 1/2" | 50 | 5.6 |
| 3/4" | 50 | 5.6 |
| 1" | 100 | 11.2 |
| 1-1/2" | 175 | 19.7 |
| 2" | 250 | 28.2 |
| 3" | 750 | 84.7 |
| 4" | 1000 | 112 |
| 6" | 2400 | 271 |

Material Definitions:

| | | |
|----|--------|--|
| TF | V-TEF™ | Chemically modified polytetrafluoroethylene |
| VT | VTFE | Virgin Polytetrafluoroethylene |
| HT | S-TEF® | Stainless steel reinforced polytetrafluoroethylene |
| CT | C-TEF™ | Carbon reinforced polytetrafluoroethylene |
| PK | PEEK™ | Polyetheretherketone |
| UT | UHMWPE | Ultra High Molecular Weight Polyethylene |
| KY | KYNAR | Polyvinylidene Fluoride |



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