



TRIAD MAINTENANCE & INSTALLATION MANUAL

MODEL 50D THREE-PIECE PYRAMIDAL STEM BALL VALVE

Brief Introduction

The Triad 50D ball valve allows easy replacement of body gaskets, stem seal, stem packing, and seats without special tools. The valve is of a “floating ball” design. Induced by the line pressure, the ball is free to move horizontally inside the valve body. The valve is capable of tight shutoff with flow in either direction or in “dead-end” service, regardless of the position of the valve in the line. The downstream seat, opposite the pressurized side of a closed valve, carries the load exerted by the line pressure on the ball, while the upstream seat is subject to little load or wear. For this reason, it is sometimes possible to increase seat life by turning the valve end-for-end in the pipeline.

1. USE:

- 1.1 The life of the valve can be maximized if the valve is used within the rated range, and in accordance with pressure, temperature, and corrosion data.

2. MANUAL OPERATION:

- 2.1 To open or close the valve, turn the handle $\frac{1}{4}$ turn (90 degrees).
 - A. Valve in Open Position – the handle is in parallel (in-line) with the valve or pipeline.
 - B. Valve in Closed Position – the handle is perpendicular (crossed) with the valve or pipeline.

3. AUTOMATED OPERATION:

- 3.1 A valve with an actuator should be checked for valve stem alignment. Angular or linear misalignment will result in high operational torque and unnecessary wear on the stem seal.

4. DISASSEMBLING & CLEANING THE VALVE:

- 4.1 Ball valve can trap fluids in ball cavity when it is in the closed position.
- 4.2 If the valve has been used in hazardous media, it must be decontaminated before disassembly.
 - A. Relieve the line pressure.
 - B. Place valve in half-open position and flush the line to remove any hazardous material from valve.
 - C. All persons involved in the removal and disassembly of the valve should wear proper protective clothing, such as face shield, glove, apron, etc.

5. REPLACING SEATS, JOINT GASKETS, STEM SEAL, AND STEM PACKING,

The Model 50D is designed with Belleville washers for automatic seal wear compensation. If there is sign of leakage from the stem, it is time to replace the stem packing and the stem seal. If there is sign of internal leakage, it is time to replace the ball seats.

- 5.1 Replacing seats and joint gaskets (refer to the assembly diagram when in doubt)
 - A. Follow the above Disassembling & Cleaning Instruction on item 4. Make sure the pipeline is depressurized.
 - B. With the valve in open position (lever to be parallel to the axis of the pipe), loosen all the nuts on the body bolting. Remove all the bolts except one. Swing the body outside the pipe.
 - C. Turn the handle to the half open position to assist in the removal of the seats.
 - D. Replace with a new set of seats and body gaskets.
 - E. Swing the body back into position. Replace the removed bolts, and tighten the bolts according the Bolt Tightening Specification Table on the next page.
- 5.2 Replacing pyramidal stem seal and v-ring stem packing (refer to the assembly diagram when in doubt)
 - A. Follow the direction for replacing the seats and joint gaskets from 5.1.A to 5.1.C.
 - B. To assist in loosening of the disc plate, place a rod of diameter smaller than the ball orifice into the ball orifice. Loosen and remove the disc plate with two-prong tool. Remove the set of Belleville washers and the gland. Place all removed parts in a clean and secure place.



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- C. Remove the rod. Turn the valve to the closed position (handle crossed with the pipeline). Remove the seats and body gaskets. The ball should slide out with a gentle push. Place all removed parts in a clean and secure place.
- D. Push the stem downward. It should come out through the center body. Remove the stem then remove the pyramidal stem seal. Thoroughly clean the stem. Replace with a new pyramidal stem seal.
- E. Remove the v-ring stem packing from the center body cavity. Thoroughly clean the center body. Replace with a new v-ring stem packing.
- F. Replace the stem, the Belleville washers and the gland. Replace the disc plate. To tighten the disc plate, hold the stem in place and tighten the disc plate with two-prong tool. When tightening the disc plate, make sure it is snug and the Belleville washer is compressed to the maximum extent.
- G. Turn the valve to the closed position (handle crossed with the pipeline). Replace the ball. Turn the valve to the open position (handle in-line with the pipeline). Replace the seats and joint gaskets.
- H. Swing the center body back into position. Replace the removed bolts and nuts. Tighten the nuts according to the Bolt Tightening Specification Table.

6. GENERAL INFORMATION FOR ON-SITE INSTALLATION:

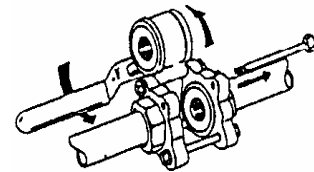
- 6.1 The valve may be fitted in any position on the pipeline.
- 6.2 To prevent damage to the seats and ball surface, the pipeline must be flushed, free of dirt, burrs, and welding residues before installing the valve.

7. INSTALLATION OF THREADED VALVES

- 7.1 Use conventional sealant, such as hemp core, Teflon, etc.
- 7.2 Apply wrench on the hexagon end of the valve only. Tightening by using the valve body or handle can seriously damage the valve.
- 7.3 For applications where weld end valves are back-welded on site, these valves must be dismantled according to instructions for weld end valves.

8. INSTALLATION OF WELD END VALVES

- 8.1 Tack-weld the valve on the pipe in four points on both end caps.
- 8.2 With the valve in open position (lever to be parallel to the axis of the pipe), loosen all the nuts on the body bolts. Remove all the bolts except one. Swing the body outside the pipe.
- 8.3 Turn the handle to the half open position to assist in the removal of the seats and body gaskets.
- 8.4 Turn the handle to the closed position and remove the ball.
- 8.5 Place all removed parts in a clean and secure place.
- 8.6 Replace the body and the removed bolt. Tighten all nuts slightly. To prevent any leakage to the body joints after welding, make sure that the body and the end caps remain perfectly parallel.
- 8.7 Finish welding both end caps onto the pipe.
- 8.8 After the pipeline and valve cool, clean end caps then remove the previous replace bolt. Swing out the body. Turn the valve to the closed position, and then replace the ball. Turn valve in open position and replace seats and body gaskets.
- 8.9 After seats, body gaskets and ball are replaced, swing the body into position, replace the removed bolts and nuts, and tighten the nuts according to the Bolt tightening Specification Table.





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BOLT TIGHTENING SPECIFICATIONS TABLE:

The body bolts of the valve should be tightened evenly. Tighten one-side snugly, and then tighten the one diagonal across. Repeat for the other bolts, bringing them all down tightly in sequence to the torque shown below:

Valve Size	Torque (IN•LB)	Torque (N•m)
1/4" to 1/2"	70	8
3/4" & 1"	155	17.5
1 1/4" & 1 1/2"	300	34
2"	520	59
2 1/2" to 4"	1000	113



This exploded view diagram illustrates the assembly of a 1/2" x 1/2" ball valve. The components are numbered as follows:

- 1**: Valve body
- 2**: Flange nut
- 3**: Ball
- 4**: O-ring
- 5**: Flange nut
- 6**: Stem seal
- 7**: Stem seal
- 8**: Stem seal
- 9**: Stem
- 10**: Stem seal
- 11**: Stem seal
- 12**: Stem seal
- 13**: Flange nut
- 14**: Flange nut
- 15**: Flange nut
- 20**: Stem seal
- 21**: Stem seal

NO.	PART NAME	MATERIAL	Q'TY
1	Body	ASTM A351 Gr. CF8M	1
2	End Cap	ASTM A351 Gr. CF8M	2
3	Ball	SUS316	1
4	Seat	PTFE	2
5	Body Gasket	PTFE	2
6	Stem	SUS316	1
7	Pyramidal Stem Seal	PTFE	1
8	O-Ring	Viton	1
9	V-Ring Stem Packing	PTFE	†
10	Gland	SUS304	1
11	Belleville Washer	SUS301	2
12	Disc Plate	SUS304	1
13	Body Bolt	SUS304	‡
14	Body Nut	SS304	§
15	Body Washer	SS304	§

± 1/4" to 2" = 4pcs; 2 1/2" = 4pcs studs; 3" & 4" = 6pcs studs
§ 1/4" to 2" = 4pcs; 2 1/2" = 8pcs; 3" & 4" = 12pcs