

- CAUTION:**
1. For your safety read this manual before installation or servicing.
  2. Before installing or servicing, please ensure the line pressure has been relieved, and any hazardous fluids have been drained or purged from the system.
  3. Ensure that all Lockout and Tagout procedures for the system have been properly implemented.

**1. USE:**

- 1.1 Maximum results and optimum valve life can be maintained under normal service conditions and in accordance with pressure/temperature ratings and corrosion data chart.

**2. GENERAL INFORMATION FOR INSTALLATION:**

- 2.1 Valves are designed with a preferred flow direction; a flow arrow on the valve body indicates the preferred flow. The valve should be installed with the arrow pointing toward the low-pressure side when the valve is in the closed position.
- 2.2 Before installation of the valves, the pipe must be flushed clean of dirt, burrs and welding residues, or the seats and ball surface may be damaged.
- 2.3 The pipe must be free from tension and in proper alignment.
- 2.4 Before installing, check to ensure that all valves, end connections, and gasket surfaces are free from defects.
- 2.5 Valves should be installed in pipeline completely assembled. Do not disassemble the valves to install.
- 2.6 Install the valve to the pipeline and tighten bolts properly.

**3. MANUAL OPERATION:**

- 3.1 Opening and closing the valve is done by turning the handle a ¼ turn (90 degrees) counter-clockwise to open and clockwise to close.

**CAUTION: If the manual stop is no longer installed on the valve, be careful not to overturn the valve or in the incorrect direction.**

A. Valve in Open Position – The indicator line on the top of the valve should be parallel to the flow of the pipeline. (The lever should also be in line (parallel) with the valve or pipeline.)

B. Valve in Closed Position – The indicator line on the top of the valve should be perpendicular to the flow of the pipeline. (The lever is at a right angle (perpendicular) to the valve or pipeline.)

**4. AUTOMATED OPERATION**

**WARNING: Do not put hands or fingers inside the valve bore at all times. Valve may close unexpectedly.**

- 4.1 Valves with actuators should be checked for proper valve stem alignment. To ensure the couplers are properly aligned on the valve stem, it is recommended to install the actuator with the valve in horizontal position. Angular or linear misalignment may result in high operational torque and unnecessary wear on the valve stem.
- 4.2 When setting the open stop, the stop should be set so that the hole in the ball is visually aligned with the waterway.
- 4.3 When setting the closed stop, the stop should be set so that the center of the ball is in the center of the seats. The center point is the equal distance between both openings of the ball. This is imperative for metal seated valves in order to get the best seal between the ball and the seat. If the valve is tested after setting the stops and leakage is found, it is recommended to adjust the stops slightly in the open or closed direction to get the valve to seal properly.

**5. DISASSEMBLY & CLEANING PROCEDURE:**

**Caution: Ball valve can trap fluids in the ball cavity when closed.**

- 5.1 If the valve has been used to control hazardous media, it must be decontaminated before disassembly. It is recommended that the following steps are taken for safe removal and reassembly.

- A. Relieve the line pressure.
- B. Place valve in half-open position and flush the line to remove any hazardous material.
- C. All persons involved in the removal and disassembly of the valve should wear the proper personal protective equipment, such as face shield, gloves, etc.

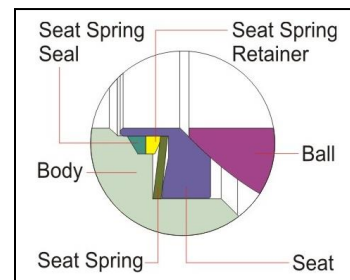
## 5.2 DISASSEMBLY

**CAUTION: On metal seat valves the upstream and downstream seats must be identified as the valve is disassembled. The orientation of the ball is also critical as the downstream side of the ball must be kept next to the downstream seat.**

- 1) Turn the valve to the closed position.
- 2) Remove the snap ring (14), travel stop (15), gland bolts (13), and gland (12).
- 3) Loosen nuts (8) and then remove the cap (2) and gasket (7). Make sure to keep separate and identify as the preferred downstream side of the valve.
- 4) With a permanent marker indicate which side of the ball is the preferred upstream and downstream side.
- 5) For **uni-directional** valves: Remove the ball (3), seats (4), seat gaskets (5), and seat springs (6).  
For **bi-directional** valves: Remove the ball (3), seats (4A), seat spring (6A), seat gasket (5A), seat spring retainer (5C), and seat spring seal (5B).
- 6) Press the stem (11) from the top toward the inside body and then remove it.
- 7) Remove the packing using extreme caution not to damage the packing bore.
- 8) Use an approved solvent to clean the body, cap, ball, studs, nuts, stem and packing gland.
- 9) Thoroughly inspect the valve for defects before reassembly such as scoring of the valve stem in the packing gland area and ball/seat damage.

## 6. ASSEMBLY

- 1) Place the thrust washer (9) onto the stem (11).
- 2) Insert the stem (11) into the stem hole, from inside the body (1), and then slide the gland packing (10) down the stem (11) and into the valve body (1). Use care not to damage the gland packing (10). A sleeve may be required to guide the gland packing (10) into the bore without damaging the seal.
- 3) Slide the gland (12) onto the stem. Align holes of the gland to the mounting holes of the body, and hand tighten the gland bolt (13). Ensure the stem is pulled up until it bottoms out on the thrust washer (9).
- 4) Put the seat gasket (5), body seat (4), and ball (3) into the body (1).  
**CAUTION: On metal seat valves the upstream and downstream seats must be identified as the valve is disassembled. The orientation of the ball is also critical as the downstream side of the ball must be kept next to the downstream seat.**
- 5) For **uni-directional** valves: Insert the seat spring (6) and cap seat (4) into the cap (2)  
For **bi-directional** valves: Insert the seat spring seal (5B), seat spring retainer (5C), seat spring (6A), and cap seat (4A) in the cap (2).  
**CAUTION: Be sure to install the seat spring retainer (5C) with the beveled side toward the seat spring (6A) and the flat side against the seat spring seal (5B).**
- 6) Put the seat spring (6) and cap seat (4) into the cap (2).
- 7) Insert the gasket (7) into the body (1) and carefully mount cap (2). Hand tighten the nuts (8) onto the studs making sure the studs are fully seated in the valve body.
- 8) Open and close the valve to ensure that all parts are properly aligned. Close the valve.
- 9) Tighten the nuts (8) according to the torque values in Figure 1 in a diagonal pattern.
- 10) Slide the travel stop (15) and insert the snap ring (14) onto the stem.
- 11) Tighten the gland bolts (13) according to the torque values in Figure 1.
- 12) The valve is ready to be pressure tested per ANSI/FCI 70-2 class V standard and returned to service.



**TROUBLESHOOTING**

Area	Description	Solution
Inner	Internal Leakage	<ol style="list-style-type: none"> <li>1. Make sure the ball is accurately positioned.</li> <li>2. Check if there is any damage on the contact surface of ball (3) and seats (4).</li> <li>3. If parts are damaged, replace damaged ball &amp; seats, and seat gasket (5).</li> <li>4. If Ball &amp; Seats are ok replace Seat Gasket (5)</li> <li>5. Body Gasket (7) must be replaced with a new one every time the valve is disassembled.</li> </ol>
Outer	Stem Leakage	<ol style="list-style-type: none"> <li>1. Tighten gland bolts (15) to the torque values in Figure 1.</li> <li>2. If step 1 does not stop leakage, disassemble the valve to replace gland packing (10).</li> <li>3. Gasket (7) must be replaced with a new one every time the valve is disassembled.</li> </ol>
	Body Gasket Leakage.	<ol style="list-style-type: none"> <li>1. Tighten joint studs &amp; nuts (8) to the torque values in Figure 1 per valve rating. Do not over torque studs &amp; nuts</li> <li>2. If step 1 does not stop leakage, disassemble body (1) and cap (2) to replace gasket (7).</li> </ol>

**BOLT TIGHTENING SPECIFICATIONS:**

The body bolts of the valve should be tightened evenly.  
Tighten one-side snugly, then the one diagonally across.  
Repeat for the other bolts, bringing them all down equally to the required torque value.

**Figure 1**

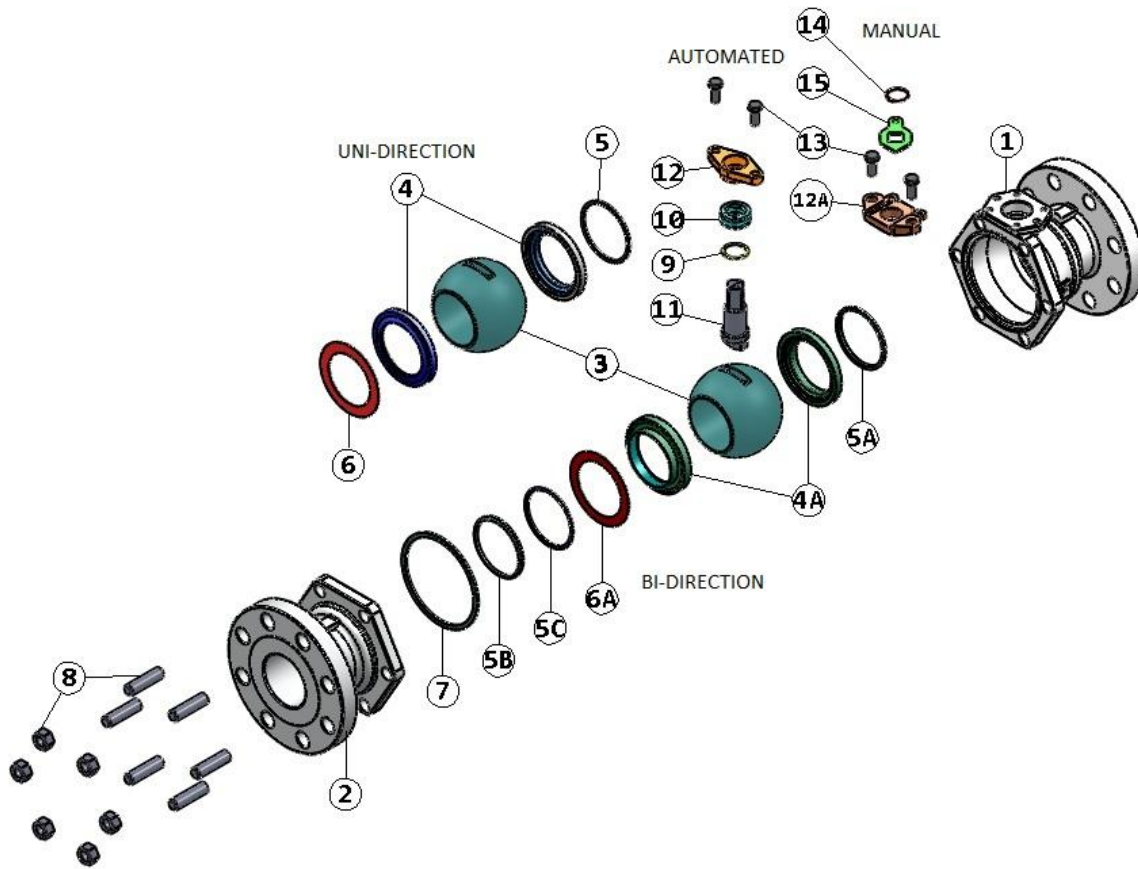
Torque Values				
ANSI-150LB				
Size	Body Bolts		Packing Gland Bolts	
	Nm	In-Lbs	Nm	In-Lbs
1/2"	20	177	7	62
3/4"	20	177	7	62
1"	40	354	8	71
1-1/2"	52	460	16	142
2"	52	460	16	142
2-1/2"	52	460	18	159
3"	52	460	20	177
4"	52	460	20	177
5"	52	460	24	212
6"	120	1062	24	212
8"	120	1062	24	212

**Figure 1 Continued**

<b>ANSI-300LB</b>				
<b>Size</b>	<b>Body Bolts</b>		<b>Packing Gland Bolts</b>	
	<b>Nm</b>	<b>In-Lbs</b>	<b>Nm</b>	<b>In-Lbs</b>
<b>1/2"</b>	20	177	7	62
<b>3/4"</b>	20	177	7	62
<b>1"</b>	40	354	8	71
<b>1-1/2"</b>	70	620	16	142
<b>2"</b>	70	620	16	142
<b>2-1/2"</b>	80	708	18	159
<b>3"</b>	160	1416	20	177
<b>4"</b>	160	1416	20	177
<b>5"</b>	160	1416	24	212
<b>6"</b>	240	2124	24	212
<b>8"</b>	240	2124	24	212
<b>ANSI-600LB</b>				
<b>Size</b>	<b>Body Bolts</b>		<b>Packing Gland Bolts</b>	
	<b>Nm</b>	<b>In-Lbs</b>	<b>Nm</b>	<b>In-Lbs</b>
<b>1/2"</b>	20	177	7	62
<b>3/4"</b>	20	177	7	62
<b>1"</b>	70	620	8	71
<b>1-1/2"</b>	80	708	16	142
<b>2"</b>	80	708	16	142
<b>3"</b>	240	2124	18	159
<b>4"</b>	240	2124	20	177

**Figure 2**

UNI-DIRECTION NO.	BI-DIRECTION NO.	PARTS NAME
1		BODY
2		CAP
3		BALL
4	4A	UPSTREAM AND DOWNSTREAM SEATS
5	5A	SEAT GASKET
N/A	5B	SEAT SPRING SEAL
N/A	5C	SEAT SPRING RETAINER
6	6A	SEAT SPRING
7		GASKET
8		STUD & NUT
9		THRUST WASHER
10		GLAND PACKING
11		STEM
12/12A		AUTOMATED OR MANUAL GLAND
13		PACKING GLAND BOLT
14		SNAP RING
15		TRAVEL STOP





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