

OPERATION AND MAINTENANCE INSTRUCTIONS

334 SERIES THREE-PIECE BALL VALVES – 1/4” to 2-1/2”

Installation and Operation

Always install your valve according to accepted industry standards and practices and operate only within stated pressure, temperature and fluid media limits. Do not open or disassemble valve unless you intend to replace resilient seat and gasket materials. Repair kits are available from your local Inline representative or call 1-800-568-8998 for assistance in locating your local authorized Inline valve distributor.

The 334 series valve comes standard with a lever operator, lockout device and incorporates an integrally cast ISO 5211 mounting pad for direct mounting of electric or pneumatic actuation. Product specification sheets and technical drawings are available for dimensional information required for proper installation and automation.

Regular Inspection

Inline valve products are designed and built to the world’s highest quality standards so we expect our customers to enjoy many years of trouble free service. Since most ball valve seats are made of polymeric materials, these products will wear over time as the valve is actuated. Inline recommends the following general procedure for inspection and maintenance of ball valves.

All assembly torques are checked before shipment from the factory so valves should be ready for immediate operation. If modifications or adjustments are made after leaving our warehouse, it is recommended that body bolt and stem packing torques be rechecked before entering service.

Newly installed ball valves should be inspected after the first 5000 cycles to insure that all seals are performing as designed. After this, valves should be inspected every 20,000 cycles. If leakage is detected, fasteners should be retightened to the recommended torque. If leaking continues, valve should be removed for full replacement of resilient seats and seals.

Maintenance

Polymer seated valve products may wear over time resulting in loosening at component boundaries. If leakage is detected, tighten according to the steps and torque values outlined below. If tightening does not correct the problem, it is time to replace your seats and seals.

Repair

Remove, Disassemble, and Clean Valve

- A. If valve is in line, make sure system is purged and line, ball and cavity pressure are released before unbolting from piping system.

- B. Make sure valve is in the open position prior to removal from the line. This will keep the ball in place while the valve body is pulled from the pipeline. For automated valves, remove all add-on components (actuator, switch, solenoid, etc) from the top of the valve and set aside. Secure stem with an elastic band or other device to keep the Gland Nut Lock Washer (#15) in place for further disassembly in work area.
- C. Loosen Body Nuts (#8) from Body Bolts (#7) and remove three bolts from valve. Set aside. Valve should be loose and free to rotate about the remaining bolt.
- D. While holding the valve body securely, remove the final Body Bolt. The valve body should now come free from the pipeline. Take care to secure the ball while removing this assembly. The ball will remain in place with the valve in the open position.
- E. Move the valve assembly to a clean work area for repair.
- F. Disassemble valve. For lever-operated valves, bend the tab on the Handle Nut Lock Washer (#22) down so that the Handle Nut (#21) can be loosened. Remove old seats and seals and discard them. Clean and dry metal components in preparation for reassembly.

Install Repair Kit and Reassemble Valve

Arrange cleaned and new valve parts on workbench.

A. Stem Assembly

1. Place Thrust Washer (#9) on Stem (#4) sliding over threaded end and seating on shoulder at base. Place Stem O-Ring (#10) on Stem sliding over threaded end and seating into groove notched at mid-point of Stem.
2. If desired and compatible with process conditions, lightly lubricate the Stem O-Ring and Thrust Washer with acceptable lubricant. This will allow Stem O-Ring to turn more easily during actuation and lower the operating torque of the valve.
3. Insert stem into Body (#1) cavity through side, threaded end first, and glide through the hole in the top of the Body until seated.
4. While holding stem in place, slide Stem Packing Set (#11) over threaded end. The Stem Packing Set should be stacked with mating concave/convex sides facing each other. Slide Stem Packing Set over Stem, concave piece first, until seated.
5. Place the Packing Gland (#12) over threaded end of the Stem and lower over Stem Packing Set.
6. Position Belleville (spring) Washers (#13) with concave sides facing each other and lower each set of two over Stem bringing them to rest upon Packing Gland. (Note: Make sure Belleville's are opposing each other so they act as a spring when compressed.)
7. Thread Gland Nut (#14), the thinner of the two Stem nuts, down Stem and hand tighten until Stem and packing assembly are properly seated, aligned and fixed in position. Once properly positioned, tighten the Gland Nut to the minimum torque specified in Table 1. Using the Handle (#20) or wrench, rotate the Stem 90 degrees several times and recheck the torque. Re-tighten the Gland Nut if needed to reach the minimum torque in Table 1 and rotate slightly more until Gland Nut flats are perpendicular to Stem flats. This will allow you to slide the Gland Nut Lock Washer (#15) down the stem and into position over the Gland Nut. (Please note: torque applied to the Gland Nut should not exceed the maximum indicated in Table 1.)

8. For automated valves, secure stem with an elastic band or other device to keep the Gland Nut Lock Washer (#15) in place for further valve assembly and adjustments.
9. For lever operated valves, lower the Stem Spacer (#16) down over the end of the Stem until seated on the Gland Nut Lock Washer. This spacer will hold the Gland Nut Lock Washer in place while providing clearance for manual operation. Lower the Handle (#20) down over the Stem in an orientation parallel to the line marked on the top of the Stem until resting on the Stem Spacer. Lower the Handle Nut Lock Washer (#22) over the Stem, single tab side first, with the single tab parallel to the edge of the Handle. In this orientation, the Handle Nut Lock Washer will rest flat on the Handle with the single tab in line with the edge of the handle and the two square tabs facing up at an angle.
10. Thread the Handle Nut (#21) down over Stem until resting on the Handle Nut Lock Washer. Tighten the Handle Nut securely until one of the Handle Nut flats lines up with one of the tabs on the Handle Nut Lock Washer. Peen the lock washer tab to the Handle Nut flat to keep the nut in place and the Handle secure.
11. Insert the Stop Pin (#17) into the mounting pad and secure with Stop Pin Nut (#19) and Split Washer (#18) provided. This provides a fixed stop for the Handle allowing for 90° rotation of the valve.

B. Body Re-assembly (*valve body assembly without end caps*)

1. The series 334 valve has two Seats (#5) and two Body Seals (#6). If desired and compatible with process conditions, lightly lubricate the bearing surface of the two Seats with acceptable lubricant. Place one Seat into Body cavity, curved side first, until the back or flat side is flush with the end of the Body.
2. Select one of the two Body Seals provided. Gently inset the Body Seal into the step machined into the end of the Body (apply lubricant if desired), also until flush with the end of the Body.
3. Orient the axis of the key at base of Stem with the axis of the valve cylinder in order to facilitate Ball (#3) entry. Carefully insert the Ball into the Body cavity guiding Ball key way (slot) over Stem key until cradled on the Seat. Rotate the Stem 90° so that the key way axis is perpendicular to the cylinder. This will keep ball from sliding out of the body.
4. Gently insert the other Seat (again, curved side first) into the Body cavity coming to rest on the Ball. Insert the other Body Seal into the step machined into the end of the Body until flush with the end (apply lubricant if desired). Secure the seats and seals with an elastomeric strap or similar device to keep the assembled components in position for transport.

C. Return repaired valve body assembly to piping system

1. Position valve Body (#1) assembly for mounting into the pipeline. Carefully insert the Body assembly between the two End Caps (#2) and align it so that the End Cap flange holes align with the through holes on the Body. Once in place, carefully remove the strap securing the Seats and Body Seals in place.

2. Place one of the Body Bolts (#7) through the End Cap flange hole, passing through the corresponding bolt hole on the Body, and then through the flange hole on the other End Cap. Apply a Body Nut (#8) and hand-tighten until the assembly is lightly secure between the End Caps. Repeat with the remaining Body Bolts.
3. The valve assembly should now be loosely secure. Before continuing to tighten the Body Bolts/Nuts, make sure the Body Seals are in position and have not slipped out of place. Continue hand tightening according to the pattern in Figure 1 to insure that each Body Bolt is secured to the same length. Do not over-tighten any one bolt.
4. Once end caps are secure and proper alignment is achieved, tighten each Body Nut with a torque wrench 1/4 turn, again alternating according to Figure 1. Continue repeating this cycle until reaching the torque value specified in Table 2. This should ensure proper seating and ball alignment.

Your 334 series ball valve is now repaired and ready for service.

A. Alternate Body Re-assembly (*for valves with end caps or new valves*)

1. The series 334 valve has two Seats (#5) and two Body Seals (#6). If desired and compatible with process conditions, lightly lubricate the bearing surface of the two Seats with acceptable lubricant. Place one Seat into Body cavity, curved side first, until the back or flat side is flush with the end of the Body.
2. Select one of the two Body Seals provided. Gently inset the Body Seal into the step machined into the end of the Body (apply lubricant if desired), also until flush with the end of the Body.
3. Select one End Cap (#2). Gently place the end cap against the body where the Seat and Body Seal have just been positioned.
4. Insert Body Bolts (#7) threaded end first into each of four guide holes around outside of End Cap.
5. Turn Body over carefully onto End Cap so that the threaded ends of the Body Bolts are pointed upward. Make sure Seat and Body Seal are properly positioned in end cap.
6. Orient the axis of the key at base of Stem vertically so as to facilitate Ball (#3) entry. Carefully lower the Ball into the Body cavity gliding the Ball key way (slot) over the Stem key until cradled on Seat. Rotate the Stem 90° to keep Ball from sliding out of the Body.
7. Gently insert the other Seat (again, curved side first) into the Body cavity coming to rest on the Ball. Insert the other Body Seal into the step machined into the end of the Body (side now facing upward) until flush with the end (apply lubricant if desired).
8. Select the other End Cap and carefully lower it onto the Seat and Body Seal making sure the Body Bolts pass through the End Cap guide holes. Before tightening the Body Bolts with the Body Nuts (#8), make sure the Body Seals are in position and have not slipped out of place.
9. Thread the Body Nuts onto each Body Bolt and loosely hand-tighten. Continue hand tightening the Body Nuts according to pattern in Figure 1 to insure that each Body Bolt is secured to the same length. Do not over-tighten any one nut.

10. Ball should now be loosely secure. Turn valve upright and inspect to see that the Stem is straight and Ball orifice is aligned with the End Cap bore holes. Use of a cylindrical dowel to properly align the axis of the Ball between opposing End Caps is highly recommended. Continue hand tightening the Body Nuts according to sequence in Figure 1 until proper alignment is secured.
11. Once End Caps are on and proper alignment is achieved, tighten each Body Nut with a torque wrench 1/4 turn, alternating according to Figure 1. Continue repeating this cycle until reaching the torque value specified in Table 2. This should ensure proper seating and Ball alignment.

B. Seat Test (valve with end caps)

1. Place valve on the seat/seal test stand. Fill valve with air to 80 psi.
2. Close the valve half way and immerse in water to determine if there is any leakage between the body and the end caps. If bubbles form, check fasteners to see that the proper torque has been applied and test the valve again. If bubbles continue, repeat the repair steps with new body seals and re-test the valve until leak free.
3. While under pressure, close the valve completely and immerse in water for 15 seconds (30 Seconds for valves 2-1/2" to 8").
4. If no bubbles form, the valve is bubble tight. There should be a 'pop' heard after opening the valve indicating that the valve has no leakage and is ready for use.

Your 334 series ball valve is now ready for installation and service.

Gland Nut Size	Ball Valve Size	Torques (in.-lbs.)
M12	1/2" – 3/4"	70 – 80
M14	1" – 1 1/4"	85 – 95
M18	1 1/2" – 2"	105 – 115

Table 1. 334 Suggested torque values of gland nut

Bolt Size	Ball Valve Size	Torque (in.-lbs.)
M6*P1.0	1/2"	80
M8*P1.25	3/4", 1"	160
M10*P1.5	1 1/4" – 2"	320

Table 2. 334 Suggested maximum torque values of ball valve bolts

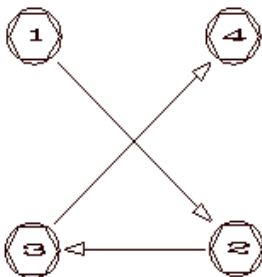


Figure 1. 334 Suggested body bolting sequence

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