

Apollo Ball Valves with Secure Vent Option

77-100-SV Series

Installation, Operation, & Maintenance Manual

Storage & Protection

Valve should be stored in its original shipping container until just prior to installation with any protection means in place and protected from the environment or any other potentially damaging effects.

Limitations

- In-line service only, not recommended for end of line service.
- Valves with the secure vent option are intended for air service only. It is the user's responsibility to determine that the valve is appropriate for the intended application.
- The possibility of material deterioration in service and need for periodic inspections is the responsibility of the user.
- Mechanical supports are not to be welded or brazed directly to the valve, however may be fitted to the associated piping.
- It is the piping system designer's responsibility to implement appropriate protection measures to minimize reaction forces and moments, which result from supports, attachments, piping, etc.
- On-off service only (not to be used for throttling).
- Level of training, experience or ability of users should be at least that of trained and skilled maintenance personnel or technicians.

Pre-Installation Inspection

Just prior to installation, remove each valve from its packing. Examine the flow bore for debris. All Apollo ball valves are shipped in the open position to prevent damage to the ball surface. Any grit or foreign matter must be removed. Do not install a damaged valve.

It is also important to check for valve operation clearances. If necessary, valves can be installed at angles other than upright or vertical.

Valves with the secure vent option are directional and must be oriented correctly for proper operation. Each valve is marked with a flow direction arrow.

Drain port leakage is normal and should be considered. Any pressure downstream of the valve will be released

from the drain port when the valve is closed. Threaded drain port connections are a standard feature.

Installation

Apollo ball valves are designed to be used with pipe and fittings threaded to American National Taper Pipe Thread standards, NPT.

1. Check mating threads for cleanliness and defects.
2. An appropriate thread sealant compound or PTFE tape is required for make-up of pressure tight NPT joints. Two to four wraps of pipe tape (or pipe dope, but not both) is recommended for use on pipe joints. Following thread sealant application, hand tighten the joint making certain that the flow direction is correct.
3. To complete the joint, the hex flats nearest the joint must be used for tightening. Never apply torque through the valve's body and retainer joint. Tightening approximately one turn past hand tight engagement should be sufficient.
4. Prior to connecting the remaining joint, check for possible excessive piping loads. Vibrations and movement of connected piping can cause severe damage. Connect the remaining joint using the methods described above if piping supports are found to be acceptable.
5. Connect any vent piping if applicable.

Operation

Ball valves are intended to be on-off devices operating through 90° rotation of the stem. Operation is clockwise to close. Valves with the secure vent, automatic drain option, are designed to relieve any pressure from downstream piping. If downstream pressure is noted, valve maintenance is required.

The most common service failures not related to the installation and start-up processes are:

- * Exceeding the operating temperature or pressure limits of the valve due to a process upset condition.
- * A chemical attack on valve components due to either misapplication or changes in the service. Violating temperature and pressure limits can result in immediate valve failure where chemical attack or corrosion generally occurs gradually.

Maintenance

At some point in the service life of the valve, leakage may occur. This should be noted in the maintenance history log of the valve. The stem packing was adjusted at the factory to provide a leak tight seal, but compaction can occur within these seals that may make re-adjustment necessary. Stem leakage should be stopped as soon as it is detected. Packing adjustment can be accomplished by turning the packing gland screw clockwise to the maximum torque shown in Table 1.

Caution: Never back off the packing gland adjustment screw when the valve is under pressure.

Table 1: Packing Gland Adjustment Screw Torque

Valve Size (inches)	Torque (ft-lbs)
1/4", 3/8", 1/2"	12-13
3/4"	20-22
1", 1-1/4"	61-67
1-1/2", 2", 2-1/2"	61-67

Do not over tighten the packing gland adjustment screw. Over-tightening will result in excessive operating torque and shorten the packing's service life. If stem leakage continues, or operating torque becomes excessive, de-pressurize the valve and replace the stem seals.

Valves with high operating torque not resulting from stem seal over-tightening or valves which have leakage by the seats, may have damaged seats or ball surfaces. These valves should be de-pressurized, disassembled, and inspected for damage.

Valve Overhaul

As part of planned maintenance or as a result of a problem that cannot be adjusted away, a valve may require a complete overhaul. Due to the uncomplicated design of the Apollo ball valves this can easily be accomplished.

The first step is to contact your distributor to acquire an appropriate rebuild kit. These kits typically contain a complete set of seats, seals, and gaskets. If ball or stem damage is suspected, it is wise to order these parts when the seal kit is purchased. Most of these items will be in stock at the factory. To properly order spare parts, you will need the valve model number as shown on the hang tag.

Disassembly

Once the spare parts are on hand, the first step in the valve disassembly is to isolate the valve from line pressure. **WARNING do not attempt to work on any valve under pressure, and depending on the service, valve surface temperature may be hot, use proper protective gear to protect against burns. Also provide safe means for uncontrolled release of fluid.**

Using an adjustable wrench, valve lever, or properly sized open end wrench, rotate the stem until the valve is in the one half open, one half closed position. Be careful not to damage the stem. This will allow any cavity pressure to be released into the pipeline. Place the valve in the open position after this is done.

Due to the uncomplicated design of Apollo two-piece ball valves, disassembly and repair can easily be accomplished through the following steps.

1. Remove the lever nut, lever, and packing gland screw.
2. Secure the valve body to a heavy work table in preparation for removal of the retainer. It may be beneficial to lightly strike the valve body and retainer joint with a small hammer to help break down the Loctite® retaining compound.
3. Remove the retainer by turning counter-clockwise. A large pipe wrench will be required to remove the retainers from valves larger than 3/4".
4. After removal of the retainer, the ball and remaining seat can easily be removed from the valve. The valve must be placed in the closed position for ball removal.
5. Next, remove the stem by pressing it downward into the body. Remove the stem and stem bearing from the body.
6. Lastly, remove the stem packing. Take care not to scratch the packing gland wall when removing the stem packing. Screw drivers and other sharp tools should be used with caution.

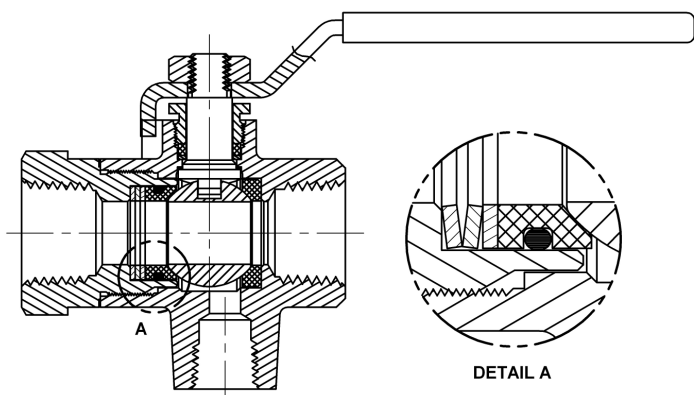
Inspection

1. Thoroughly clean all the components in preparation for inspection.
2. Inspect stem packing contact surfaces for scratches and pits. If either of these is apparent and can be removed with #120 or finer grit emery cloth, body replacement will not be necessary. Deep scratches running down the side of the packing gland or excessive pitting will necessitate the replacement of the valve body.

3. Inspect the ball in the same manner, replace the ball if necessary.
4. Inspect remainder of body interior for pitting or corrosion and replace if excessive.
5. Inspect all parts for wear due to erosion or abrasion and replace if excessive.

Reassembly

1. Begin the re-assembly process by cleaning each of the component parts with a clean towel or cloth.
2. Place the stem bearing on the stem, and insert the stem into the valve body stem bore. Place the flats on top of the stem perpendicular to the centerline of the body.
3. If the application permits, lightly oil the seats with an oil of the consistency of cooking oil. Place the seat not containing the o-ring groove into the valve body seat pocket.
4. Next, insert the ball making certain that the vented side of the ball is adjacent to the body end seat.
5. The remaining seat, o-ring, spacer, and wave springs must be correctly installed into the retainer before the retainer is installed into the body. See Detail A below.



6. After securing the body, apply a suitable Loctite retaining compound to the retainer threads and assemble to the valve body. Torque to the value shown in table 2 below.

Table 2: Body and Retainer Joint Torque

Valve Size (inches)	Torque (ft-lbs)
1/4"	13
3/8"	16
1/2"	42
3/4"	63
1"	130
1-1/4"	199

1-1/2"	282
2"	686
2-1/2"	905

7. Insert the stem packing, followed by the packing gland screw and torque to the value shown in table 1.
8. Install the hang tag, lever, and nut to complete the reassembly process.

Final Adjustments

Cycle the valve from open to close several times to verify free operation. Occasionally, after testing or initial start up, a minor stem packing leak may occur. Re-adjust the stem packing torque as necessary.

Warning

In accordance with the U.S. Safe Drinking Water Act (SDWA), it is illegal to use this product in the United States for potable water services (water intended for human consumption).