

ARI2040 Bottom Outlet Ball Valve

INSPECTION & MAINTENANCE BULLETIN



These instructions are
applicable to the following models:
ARI2040, ARI2040A and ARI2040B

Only facilities with AAR activity code C5 are certified to
recondition, repair, retest, and qualify tank car vacuum
relief valves. Personnel performing inspections and tests
must be certified to a minimum of Level II per AAR Manual
of Standards and Recommended Practices, M-1002.

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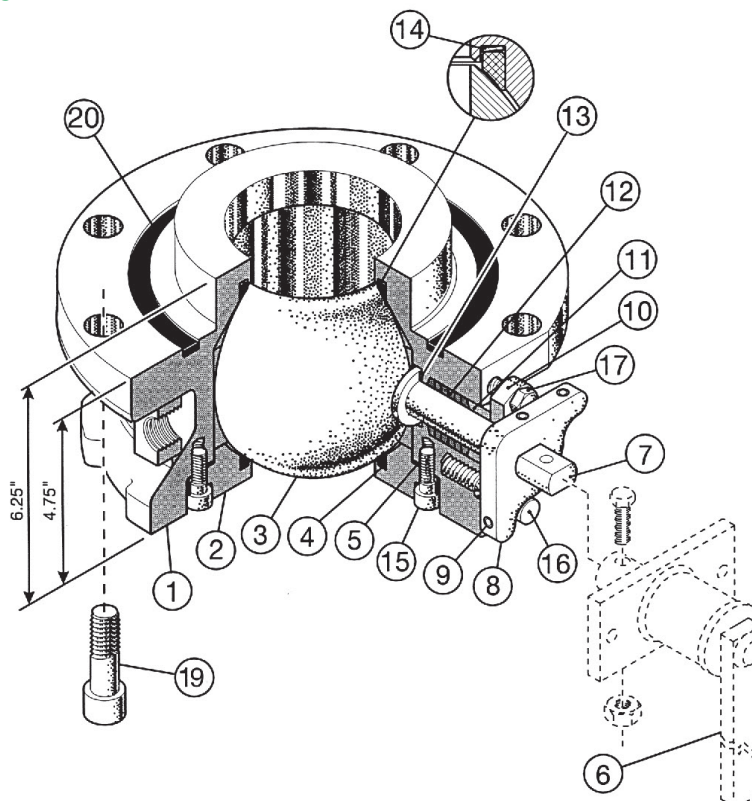
New Valves for Replacement of Existing Equipment

New valves are tested, sealed and packaged at the time of manufacture. A new valve can be applied provided it is still in its original packaging.

Valve Rating

The ARI2040, ARI2040A, and ARIs2040B Bottom Outlet Valves are rated to max operating pressure and 300° F.

Disassembly Procedures



1. Remove the gasket (item #20) by inserting a gasket removal tool along the outer wall and prying underneath the gasket, taking care not to gouge or mar the metal surfaces.
2. The illustration above shows the valve open in the as installed position. Turn the entire valve assembly over to continue disassembly.
3. Loosen the set screw (item #9) and remove the stop (item #8) from the stem (item #7).
4. Remove the eight cap screws (item #15) from the cover (item #2). Then remove the cover.
5. Remove the cover gasket (item #5), taking care not to gouge or mar the metal surfaces.
6. Rotate the ball (item #3) to the closed position.
7. Lift the ball (item #3) out of the valve body (item #1), taking care not to gouge or mar the spherical surface.
8. Remove the two packing retainer bolts (item #17) then remove the retainer packing gland (item #10).
9. Remove the stem (item #7) and the stem gasket (item #13) from the inside of the valve body. Remove the packing rings (item #12) from the outside of the valve body. The stem gasket and packing rings should be discarded and replaced with new components.

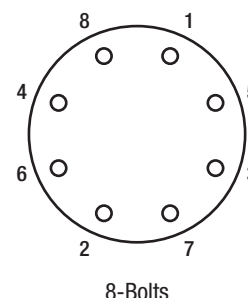
Inspection of Valve Components

1. Remove the seal rings (item #4) and the spring washer (item #14) by using either a gasket removal tool or other sharp instrument taking care not to gouge or mar the metal surfaces.
2. If necessary, clean the internal and external valve body (item #1) and the cover seal pockets with a light gauge wire brush or light media blast.
3. Inspect the sealing surfaces on the body (item #1), cover (item #2), and stem (item #7) for signs of corrosion, voids, cracks, and scratches. These surfaces include the internal and external seal pockets of the body and cover, and the seal areas that the stem gasket (item #13) and packing rings (item #12) seal onto in the stem bore area.
4. Outside the sealing areas the defects must not exceed 1/16" in depth and 3/32" in width. Additionally, a maximum of one void per square inch is allowable, and the void area must not exceed 10% of total surface.
5. Clean the ball (item #3) with a commercial cleaning solution, rubbing alcohol, or in an ultrasonic bath to remove any residue.
6. Inspect the ball spherical surface for irregularities in the form of scratches or gouges. Scratches or gouges can be evaluated by sliding a soft metal i.e.: brass pick tool over the affected area. If the pick tool "catches," the depth of the discontinuity could damage the ball seals (item #4) resulting in improper sealing of the valve. Replace the ball (item #3) as it cannot be repaired.
7. Clean the valve body, cover, stem, and packing gland (item #11) with a commercial cleaning solution, rubbing alcohol, or in an ultrasonic bath.
8. Bolts should be cleaned using a wire brush.

Reassembly

1. Slide the new stem gasket (item #13) over the stem (item #7) and insert the stem into the body (item #1). Orient the stem (item #7) so that the slot in the ball (item #3) will engage the stem when inserted.
2. Slide the packing rings (item #12) over the stem followed by the retainer packing gland (item #10). Apply a light coating of anti-seize lubricant to the retainer bolts (item #17). Install the bolts hand-tight. Tighten bolts alternating 1/4 turn each until torque is 50 +/- 5 in-lbs.
3. Lightly tap the stem from the inside of the valve body to allow clearance to install the ball.
4. Insert a new spring washer (item #14) in the body (item #1) with the inside diameter edge facing upward toward the ball (item #3). Apply a thin coat of Molykote 111 to the bevel side of seal (item #4) and insert the seal bevel side upwards on top of the spring washer.
5. Carefully lower the ball (item #3) into the body cavity.
6. Inspect the seal (item #4) to ensure it remained seated in the seal groove.
7. Apply a thin coating of Nordstrom 555 sealant to the bottom surface of the second ball seal (item #4). Apply a thin coat of Molykote 111 to the bevel side then insert the seal (item #4) into the cover (item #2) seat pocket. Do not apply excessive sealant as it could adversely affect the operation of the valve.
8. Install a new cover gasket (item #5).
9. Align the bolt holes in the cover (item #2) and valve body (item #1) then lower the cover into place taking care to ensure that the seal (item #4) does not slip out of position.
10. Apply a light coating of anti-seize lubricant to the eight cap screws (item #15) and place them in the cover (item #2). Torque using a diametrically opposite (criss-cross) tightening sequence to 30 +/- 2 ft/lbs in at least 3 stages.
11. Avoiding quick or jerky movements, partially cycle the valve open and closed 6 to 8 times, then cycle fully open and closed 3 times to seat the seals. Some resistance to rotation is normal.
12. If the valve will be stored for a prolonged period of time, leave valve in the open position and install protective caps into both ports.
13. If valve can be leak tested soon after assembly, proceed to leak test.

8 bolt torque sequence



Test Procedure

1. Per the following procedure, leak test the valve in the valve closed, half-open and fully open positions using an approved bubble leak test procedure.
2. Valve should be tested in closed, half-open, and open position.

After Testing

1. Remove the plug or flange used to seal the discharge opening in the valve cover.
2. Blow the valve dry with compressed air.
3. Slip the stem stop (item #8) over the stem (item #7) and tighten the set screw (item #9) to hand tight.
4. The opening in the ball should be concentric with the opening in the valve cover (item #2). If not, adjust the set screw (item #9) against the stop bolt (item #16) until the ball is concentric.
5. Fully open the valve and install a protective cap in both ends.
6. Remove the valve from the test fixture.
7. Turn the valve over and install a protective cap.
8. Store the valve in a cardboard box or protective enclosure.
9. Record the results of the test on the approved leak test form.
10. Mark and place the tested valve in appropriate storage.

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