



TVS 4000 Series Trap Valve Station Installation, Operation and Maintenance Instructions

This bulletin should be used by experienced personnel as a guide to the installation and maintenance of the TVS-4000 Trap Valve Station Series. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Armstrong or its local representative if further information is required.

Operation

In a piston valve, the control of stem and seat leakage is obtained by tightness of valve sealing rings to the body and valve plug. The bonnet compresses the valve sealing rings against the body and the valve plug.

Flexible disc springs automatically assure a tight seal by exerting pressure on the valve sealing rings, keeping them compressed.

Opening and Closing the TVS Isolation Valve

The isolation valve begins to stop flow when the valve plug enters the lower valve sealing ring.

When the isolation valve is completely closed, the valve plug is in full contact with the valve sealing rings, ensuring the best possible seal. Since there is no metal to metal seating, torquing the isolation valve closed is not required.

Armstrong recommends that after closing the isolation valve completely, the handwheel should be turned back one half turn. This makes it easy to re-open the valve after prolonged periods of no use.

Testing TVS-4000 Trap for Operation

- Open test valve – Condensate may discharge from the test port on the bottom of the connector.

Note: Test valve is on the inlet side of the casting marked "Test".

Caution: Hot condensate and flash steam will be discharged from the test port. Use caution as burns could occur to personnel.

- Close TVS outlet isolation valve.
- Observe trap operation at test port.
- To place trap back in operation open TVS outlet isolation valve and close test valve.
- Close test valve with 40-50 ft. lbs. torque.

Replacing and Depressurization of TVS-4000 Trap

- Close TVS-4000 inlet and outlet isolation valves.
- Open TVS-4000 strainer blowdown valve to relieve pressure inside trap.

Caution: Hot condensate and flash steam will be discharged from the trap at the strainer blowdown valve discharge port. Use caution as burns could occur to personnel.

- After pressure has been relieved, remove bolts and the trap.
- Clean trap connector sealing surfaces.
- Apply "never seize" to the new trap bolts, insert bolts through connector block making sure, if the trap is an inverted bucket type it is in the vertical position. Tighten bolts evenly.
- Close TVS-4000 strainer blowdown valve.
- Open TVS-4000 inlet and outlet isolation valves.
- Check for leaks around trap connector.

Troubleshooting – TVS-4000 Isolation Valves

A piston valve will retain its leak tightness for several years without maintenance. In severe service, such as rapid heating and cooling, some field maintenance may be required. Depending on the problem, these simple steps may help:

- Isolation valve leaks when the valve is closed. First, Check to make sure the valve is actually closed. Check to see if bonnet is seated on the body, if not, tighten the bonnet bolts until the bonnet seats. This compresses the valve sealing rings against the body and the valve plug. If valve continues to leak, replace the isolation valve assembly.
- Valve stem leaks. Same as above.
- Maintain the isolation valves as soon as leakage starts. Internal leakage can wear the valve plug or valve sealing rings and they will have to be replaced if leakage continues.

Caution: Before tightening the bonnet bolts, make sure the valve is in the **closed position**.

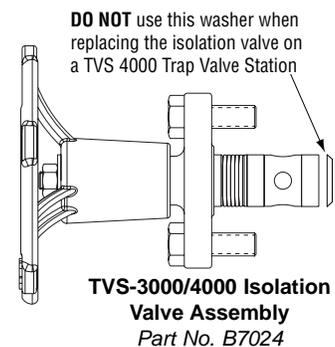
- Test valve leaks. Reseat with 40-50 ft. lbs. torque.

Removing the bonnet assembly, valve sealing rings, lantern bushing and valve washers.

- This can be done with the TVS-4000 Trap Valve Station remaining in the steam line. Be sure to isolate the TVS-4000 Trap Valve Station both up and down stream by using separate shut-off valves before performing any maintenance.
- Open TVS-4000 Isolation Valves
- Using the handwheel or wrench, open the bleed valve all the way slowly to depressurize trap and then open the test valve all the way until it stops.
- Loosen and remove the bonnet bolts.
- Pull bonnet assembly out of valve body.
- Remove valve sealing rings, valve washers and lantern bushing using a Packing Hook. Check to see if all components, including valve washer at bottom of valve body have been removed. Inspect and clean any debris that might have remained in the valve body.

Installing New Isolation Valve Assembly

- Place Armstrong Part No. B7024 isolation valve assembly in valve body.
- Lightly tap the isolation valve assembly to the bottom of the valve body.
- Coat the treads of the bonnet bolts with “never seize”, insert bolts through bonnet and tighten evenly until the bonnet seats on the valve body.
- Check the TVS-4000 isolation valve for proper operation by opening and closing the valve one or two times leaving them in the open position.
- Open isolation valves up and down stream from the Trap Valve Station and check for leaks.



TVS-4000 Handwheel and Manifold Replacement

Armstrong recommends that the entire bonnet sub-assembly be replaced with valve repair kit B7024.

Caution:

1. Do not rotate the valve piston shaft. The stainless sheets in the grafoil valve rings will score the piston and cause leakage and/or shorten the valve's life.

2. LEFT-HANDED NUT holds the valve piston to the hand wheel and it is locked on using Loctite.
 - A. Remove the Bonnet and valve piston without disturbing the valve sealing rings.
 1. Open the valve. Counter clockwise.
 2. Remove the two bolts holding the bonnet (13mm open end wrench).
 3. Rotate the bonnet up into the hand wheel.
 4. Place open end of wrench around piston. Continue to open valve until piston pulls up through the top valve sealing rings.
 5. Remove the bonnet sub-assembly and note how the Bellville washers are installed.
 - B. Removing the hand wheel.
 1. Lock the inside end of the piston in a SOFT vise. If you mar the piston you have to replace it. Purchase bonnet sub-assembly repair kit B7024.
 2. Remove the LEFT HANDED nut (10 mm combination wrench), which is secured with Loctite, from the top of the hand wheel.
 3. Unscrew the hand wheel from the bonnet.
 - C. Replacing the hand wheel.
 1. With the piston still in the soft vise, and bonnet in place, be sure the washer is on the stem.
 2. Apply anti-seize compound to all the threads inside the hand wheel (be sure to cover all threads to bottom).
 3. Screw the hand wheel on to the bonnet.
 4. Place washer over the stem.
 5. Loctite the nut and replace.
 - D. Replacing the Bonnet.
 1. Verify that the Bellville washers and flat washer are properly placed in the body.
 2. Turn the hand wheel on the bonnet to position the valve piston/stem joint even with the end of the bonnet.
 3. Carefully place the piston into the top valve ring and push the bonnet down into the body. Be sure the piston is correctly aligned with the valve ring.
 4. Replace the bonnet bolts and tighten until the bonnet bottoms out on the body. Be sure that there is adequate never-seize compound on the bolt threads.

Leak test to be sure the valve does not leak past the stem. Also check to see if the valve shuts off.

If the valve leaks, purchase the bonnet sub-assembly repair kit B7024.

