



MAINTENANCE AND OPERATING
INSTRUCTION

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Visual Inspection and Neutralizing

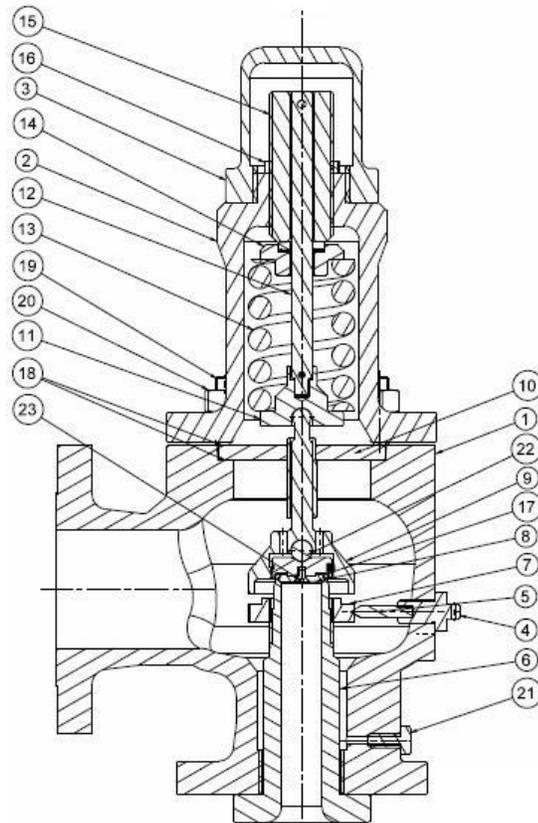
A visual inspection shall be made when valves are first removed from service. The presence of deposits or corrosion products in the valve and in the piping should be recorded and valves should be cleaned to the extent possible prior to disassembly. Check the condition of external surfaces for any indication of corrosive atmospheric attack or evidence of mechanical damage.

Disassembly

KIATORK valves should be disassembled as described below. Parts identification may be found in Figure 1. The parts from each valve should be properly marked and segregated to keep them separate from parts used in other valves.

- a. Remove the cap (40) and cap gasket (41). If the valve has a lifting lever device follow the instructions on pages 15.
- b. Remove the nozzle ring set screw (4) and set screw gasket (27). Record the position of the nozzle ring (3) with respect to the disc holder (5) by counting the number of notches required to raise the ring until it just touches the disc holder. This information will be needed again when reassembling the valve.
- c. Loosen the adjusting bolt nut (25). Before releasing the spring load, make note of the depth of the adjusting bolt in the bonnet and count the number of turns required to remove the spring load. This information will help when reassembling the valve to its approximate original setting.
- d. Release all of the spring load by rotating the adjusting bolt (24) in a counterclockwise direction.
- e. Remove the bonnet stud nuts (22).
- f. Lift the bonnet (20) straight up to clear the spindle (16) and valve spring (18). Exercise care when lifting the bonnet as the spring and spindle will then be free to fall aside.
- g. The spring and spring washers (19) can now be lifted off the spindle (16). The spring and spring washers are fitted together and must be kept together as a subassembly. Spring washers are not interchangeable between ends of the spring.
- h. Remove the spindle, guide (15), disc holder and disc insert (8).
If parts are difficult to remove, due to the presence of corrosive or foreign materials, soaking in a suitable solvent may be required.
- i. Remove the spindle from the disc holder.
- j. Lift the guide off the disc holder.
- k. Disc Insert Removal
- l. Remove the nozzle ring (3) from the nozzle (2).
- m. Remove the nozzle (2) from the valve body (1) if necessary. Unless the valve seat on the nozzle has been mechanically damaged or shows signs of corrosive attack, it will not be necessary to remove the nozzle. In most cases the nozzle can be reconditioned without removal from the valve body. To remove the nozzle, turn the valve body over taking care not to damage the bonnet studs (21). Turn the nozzle counterclockwise by using the wrench flats on the nozzle flange or a nozzle wrench designed to clamp onto the nozzle flange.

ITEM	PART NAME
1	BODY
2	CASING
3	SCREWED CAP
4	HEX. SET SCREW
5	SET SCREW ROD
6	NOZZLE
7	BLOWDOWN RING
8	DISC
9	DISC HOLDER
10	GUIDE PLATE
11	LOW SPRING PLATE
12	SPINDLE
13	SPRING
14	UP SPRING PLATE
15	ADJUSTING SCREW
16	LOCKING NUT
17	ORING
18	GASKET
19	BOLT
20	HEX. NUT
21	DRAIN
22	BALL
23	HEX. SOCKET COUNTERSUNK SCREW



Cleaning

External parts such as the valve body, bonnet and cap should be cleaned by immersion in a bath such as hot Oakite solution or equivalent. These external parts may be cleaned by wire brushing, provided the brushes used do not damage nor contaminate the base metals. Only clean stainless steel brushes should be used on stainless steel components.

The internal parts such as the guide, disc holder, disc insert, nozzle ring and spindle should be cleaned by immersion in a commercial high alkaline detergent. Guiding surfaces on the disc holder and guide may be polished using a fine emery cloth. The other metal parts may be cleaned using acetone or alcohol, then rinsed with clean tap water and dried.

Inspection

Check all valve parts for wear and corrosion. The valve seats on both the nozzle and disc insert must be examined to determine if they have been damaged. Most often, lapping the valve seats is all that is necessary to restore them to their original condition. If the inspection shows that the valve seats are badly damaged, remachining will be necessary or it may be advisable to replace these parts. When the time element is a factor, it may be advantageous to replace damaged parts from spare parts stock, thereby permitting the replaced part to be checked and reworked at leisure. The valve spring (18) should be inspected for evidence of cracking, pitting or deformation.

The bearing surfaces on the guide and disc holder should be checked for residual product build up and any evidence of scoring. Inspection of valve components is important to ensure proper valve performance. Damaged valve parts must be repaired or replaced.

Reconditioning of Valve Seats

The tightness of a valve and its proper operation depend directly on the condition of the seats. Many pressure relief valve problems are due to eroded or damaged seats. KIATORK valves are constructed with a flat metal-to-metal seat. It is important that seating surfaces be properly refurbished by lapping with a flat cast iron lap coated with the correct lapping compound.

• Lapping Procedures

Unless the seats have been badly damaged by dirt or scale, lapping the seating surfaces should restore them to their original condition. Never lap the disc insert against the nozzle. Lap each part separately against a cast-iron lapping block of the proper size. These blocks hold the lapping compound in their surface pores and must be recharged frequently. Lap the block against the seat. Never rotate the block continuously, but use an oscillating motion. Extreme care should be taken throughout to make certain that the seats are kept perfectly flat. If considerable lapping is required, spread a thin coat of medium coarse lapping compound on the block. After lapping with the medium coarse compound, lap again with a medium-grade compound. Unless much lapping is called for, the first step can be omitted. Next, lap again using a fine grade compound. When all nicks and marks have disappeared remove all the compound from the block and seat. Apply polish compound to another block and lap the seat. As the lapping nears completion only the compound left in the pores of the block should be present. This should give a very smooth finish. If scratches appear the cause is probably dirty lapping compound. These scratches should be removed by using compound free from foreign material. Disc inserts should be lapped in the same way as nozzles. The disc insert must be removed from the holder before lapping. Before the disc insert is placed back in the holder all foreign material should be removed from both parts. The insert must be free when in the holder. If the disc insert is damaged too badly to be reconditioned by lapping, it should be replaced. Remachining the insert will change critical dimensions, affect the action of the valve and is not recommended.

• Lapping Blocks

Lapping blocks are made of a special grade of annealed cast iron. There is a block for each orifice size. Each block has two perfectly flat working sides and it is essential that they retain this high degree of flatness to produce a truly flat seating surface on either the disc insert or the nozzle. Before a lapping block is used, it should be checked for flatness and reconditioned after use on a lapping plate. The block should be lapped in a figure eight motion, applying uniform pressure while rotating the lapping block against the plate as shown in Figure 9.

• Lapping Compounds

Experience has proven that medium coarse, medium fine, and polish lapping compounds will properly condition any damaged pressure relief valve seat except where the damage requires remachining. The following lapping compounds or their commercial equivalents are suggested:

• Machining of Nozzle Seats

If machining of the nozzle seat or other major repairs is necessary it is recommended that the valve be returned to a Tyco Valves & Controls facility for repair. All parts must be accurately machined per KIATORK specifications. No pressure relief valve will be tight, nor will it operate properly unless all parts are correctly machined. The most satisfactory way to machine a nozzle is to remove it from the valve body. However, it may also be machined while assembled within the valve body.

In any event it is vitally important that the seating surfaces run absolutely true before machining. Machining dimensions for KIATORK valves with metal-to-metal nozzle seats are shown in Figure 10 and

Table 8. Remove only enough metal to restore the surface to its original condition. Turning to the smoothest possible finish will facilitate lapping. The nozzle must be replaced when minimum face to seat dimension is reached. This critical dimension is shown in Table 8.

• Machining of Disc Insert Seats

When the damage to the disc insert seat is too severe to be removed by lapping, the disc insert may be machined and lapped provided that minimum seat height is maintained (Figure 11 and table 9).

Assembly

All components should be clean. Before assembling the following parts, lubricate with pure nickel “Never-Seez”.

- Nozzle and body threads
- Nozzle and body sealing surface
- All studs and nut threads
- Spindle and threads
- Set screw threads
- Spring washer bevels
- Adjusting bolt and bonnet threads
- Bonnet pipe plug
- Cap threads
- Dog shaft bearing threads
- Disc holder threads (bellows valves only)

Lubricate the spindle point thrust bearing and disc insert bearing with pure nickel “Never-Seez”. Special attention should be given to the guiding surfaces, bearing surfaces and gasket surfaces to ensure that they are clean, undamaged and ready for assembly. (Figure 12) For parts identification, refer to Figure 1.

a. Before installing the nozzle (2) apply lubricant to the flange surface in contact with the valve body (1) and on the body to nozzle threads. Screw the nozzle (2) into the valve body (1) and tighten with a nozzle wrench.

b. Screw the nozzle ring (3) onto the nozzle (2).

Note: The top of the nozzle ring should be above the nozzle seating surface. For P, Q, R and T Orifice Style JLT, position the nozzle ring per table 2.

c. For bellows valves only, place the disc holder in a vise (larger sizes may require a 3 jaw vise) as shown in Figure 8. Install the tailpiece gasket (29). Screw the bellows assembly onto the disc holder. Tighten with a suitable wrench.

d. Assemble the disc insert (8) and the disc holder (5). (See page 15 for O-ring soft seat assembly) Install the disc insert retention clip (9) onto the disc insert. Install the disc insert into the disc holder. The disc insert should snap into place using hand force only.

Safety precautions should be followed whenever heavy parts are being lifted or transported.

Dropping disc holder assembly may dislodge the insert.



e. Assemble the disc holder (5) and guide (15) by sliding the guide over the disc holder.

Note: The guide for D and E orifice valves protrudes up into the valve bonnet.

f. Install the two guide gaskets (28), one above and one below the guide.

Note: When assembling bellows valves, the bellows flange eliminates the need for a bottom guide gasket.

g. While holding the top of the disc holder, install the guide into the body. Align the hole of the guide with the body outlet. Once the guide is seated, the disc holder and disc insert can be lowered onto the nozzle.

Note: Lower the nozzle ring below the seats so that it moves freely.

h. Place the spring (18) and washers (19) onto the spindle (16) and assemble the spindle to the disc holder (5) with the spindle cotter pins.

Note: No cotter pins are required in D through K orifice sizes all other orifice sizes use two cotter pins.

i. Lower the bonnet (20) over the spindle and spring assembly onto the bonnet studs (21) in the body. Position the bonnet counter bore on the O.D. of the guide and lower the bonnet onto the guide.

j. Screw the bonnet nuts (22) onto the bonnet studs and tighten down evenly to prevent unnecessary strain and possible misalignment.

k. Screw the adjusting bolt (24) and nut (25) into the top of the bonnet to apply force on the spring. (The original set pressure can be approximated by screwing the adjusting bolt down to the predetermined measurement.)

l. Move the nozzle ring up until it touches the disc holder, then lower it two notches. This is a test stand setting only.

m. Place the set screw gasket (27) onto the set screw (4) and screw the set screw into the body engaging the nozzle ring. The nozzle ring should move back and forth slightly after the set screw is tightened.

n. The valve is now ready for testing. After testing, the following measures should be taken:

- Be sure that adjusting bolt nut (25) is locked.
- Return the nozzle ring to either the original recorded position or to the recommended position shown in Table 1.
- Install the cap or lifting device. See Figure 13 for lifting lever assembly.
- Seal the cap or lifting lever device and nozzle ring set screw to prevent tampering.

Reassembly

General Information

The 1900™ Series SRV can be easily reassembled after the required internal parts maintenance has been performed. All parts should be clean before reassembly.

Preparation

Before beginning reassembly take these steps as follows:

1-Inspect guiding surfaces, bearing surfaces, flange faces, retainer recesses, and grooves for cleanliness (See Replacement Parts Planning for recommended compounds and tools).

2-Check all gaskets used during reassembly. Reuse undamaged, solid metal gaskets (not pitted or creased) and replace all soft gaskets.

3-Before installing the (flat) gaskets, apply a light uniform coating of lubricant to the surface to be sealed. Then coat the top of the gasket with lubricant.

4-If lapping of bearing points was necessary, ensure all lapping compound is removed. Then, thoroughly clean both surfaces and rinse with alcohol or another suitable cleaner.

5-Apply a light, uniform layer of lubricant to each bearing surface.

6-If the valve has an O-ring seat seal, the O-ring should be replaced. Please refer to its tag plate (see Figure 32) to determine O-ring material and “as-built” part number.

Lubrication

Use a nickel-based, anti-seize lubricant on all threads and bearing surfaces.

Reassembly Procedure

1-If the nozzle (2) was removed; apply thread lubricant to the nozzle threads before reinstalling it in the valve base (1).

2-Insert the nozzle (2) into the inlet flange of the base (1) and torque to the correct value (see Table 9).

3-Install the adjusting ring (3) on the nozzle (2) below the seat level so that the disc (6) will seat on the nozzle and not on the adjusting ring.

4-For restricted lift valves:

- If the nozzle (2) did not require machining, the same limit washer (tagged during disassembly) may possibly be reused. However, lift should be checked and verified as described in Checking Lift on Lift-Restricted Valves.

- If the nozzle was remachined, measure the required lift as described in Checking Lift on Lift-Restricted Valves and replace limit washer if necessary.

5-Assemble the disc/disc holder as follows:

- Before assembly of the disc (6) into the disc holder (8), remove the disc retainer (7) from the back of the disc.

- Use 1000-grit lapping compound on the bearing surface to lap the disc (6) into the disc holder (8) and to properly establish the bearing surface.

- For D through U orifice valves with metal to- metal discs (see Figure 2), place the disc retainer (7) into the groove in the disc (6). The retainer should “snap” into the disc holder (8) with moderate finger or hand force. Check that the disc “rocks” after set in place.

ATTENTION: Do not use excessive force to insert the disc (6) into the disc holder (8).

- For V and W orifice discs (see Figure 3), place the disc into the disc holder and secure it with disc retaining bolts.

- For O-ring disc sizes D through J (see Figure 5), reassemble the disc holder using a new O-ring Seat Seal, O-ring retainer, and retainer lock screw(s).

- For O-ring disc sizes K through U (see Figure 5), reassemble the disc using a new O-ring Seat Seal, O-ring retainer, and retainer lock screws. Assemble the disc into the disc holder.

6. On restricted lift valves, install the limit washer with the chamfered side down.

7. For D through U valves:

Place the guide (9) over the disc holder (8).

For V and W orifice valves:

Install guide rings into the grooves located inside the guide ID. Make sure the space where the upper and lower guide ring ends meet is positioned 180° apart. Mark both the guide and disc holder at the point where the bottom guide ring ends meet. This mark must be faced 180° away from the outlet when the assembly is placed into the valve. Gently lower the guide down onto the disc holder ensuring that guide rings remain in their respective groove.

8. Set the disc holder (8), disc side down, on the work surface. Place a small amount of 1000- grit lapping compound onto the ball end of the spindle (15) and place it in the spindle socket of the disc holder. Turn the spindle clockwise and then counterclockwise to seat the spindle/disc holder bearing point. When finished, clean lapping compound from all parts.

9. Spread a small amount of 320-grit lapping compound on the spring washer bearing surface.

10. Place the spring washer (17) over the spindle/spring washer bearing surface and turn it clockwise and then counterclockwise to seat it on the bearing surface. In the same manner, lap the adjusting screw (19) into the bearing surface of the upper spring washer to establish a smooth bearing surface. When finished, clean lapping compound from all parts.

11. Place the spindle retainer (16) over the end of the spindle head or disc holder (8), as applicable.

12. Apply lubricant sparingly to the ball tip of the spindle (15).

13. Place a new guide gasket (10) in the base (1).

14. Install the spindle/disc guide assembly as follows:

For D through L size valves:

- Place the spindle (15) in the disc holder (8) and align the spindle retainer (16) so that the gap is midway between the two slots.
- Use a screwdriver to compress the spindle retainer and guide it into the retaining groove. Ensure the spindle turns freely.
- Lift complete assembly and carefully lower it into the valve base (1).
- Ensure proper fit for a conventional valve by aligning the hole in the guide (9) over the extended end of the educator tube (40).

For M through U size valves:

- Install lifting tool (see Figure 10a) onto disc holder and carefully lower the disc holder assembly into the valve base.
- Ensure proper fit for a conventional valve by aligning the hole(s) in the guide over the extended end of the educator tube(s).
- Then, install the spindle in the disc holder and align the spindle retainer so that the gap is midway between the two slots.
- Use a screwdriver to compress the spindle retainer and guide it into the retaining groove. Ensure the spindle turns freely.

For V and W size valves:

- Using the same lifting lugs used during disassembly (see Figure 10b); carefully lower the disc holder assembly into the valve base.
- Install the spindle in the disc holder and align the spindle retainer so that the gap is midway between the two slots.
- Use a screwdriver to compress the spindle retainer and guide it into the retaining groove. Ensure the spindle turns freely.

15. Apply a small quantity of lubricant to the spring washer bearing surface of the spindle (15).

16. Place the spring assembly on the spindle (15).

17. Place a new bonnet gasket (12) in the base (1) before installing the bonnet (11). Uniformly tighten the stud nuts (14) using the appropriate bolt tightening pattern (see Figure 33).

Determine the required torque for the subject valve (see Tables 10a or 10b). Determine the torque values for each round of the pattern (see Table 11). The last round ensures that all stud nuts are at the required torque.

18. With the adjusting screw locknut (20) assembled near the top of the adjusting screw (19), apply a small quantity of lubricant to the spherical end and threads of the adjusting screw.

19. Thread the adjusting screw (19) into the bonnet (11) until it contacts the spring washer (17).

For V and W orifice, use the setting device to assemble the spring plunger and adjusting screw. Contact the factory for procedure on how to use the setting device.

20. Use pliers to hold the spindle (15) and prevent it from turning in the disc holder (8). Turn the adjusting screw (19) clockwise until the original distance between the end of the spindle and the top of the adjusting screw is obtained. This method of compressing the spring (18) will approximately reestablish the original set pressure. The valve must still be reset for the required pressure.

21. Restore the adjusting ring (3) to its original position, with reference to the disc holder (8), as recorded.

22. Fit the adjusting ring pin (4) with a new adjusting ring pin gasket (5).

23. Install the adjusting ring pin (4) in the valve assembly in the original position. If the original position is not known, verify the number of notches on the adjusting ring (3) and refer to Tables 12, 13 or 14, depending on the valve serial number or trim.

Set the ring position according to the applicable set pressure and orifice size.

The valve is no