

TWO POSITION AIR ACTUATOR O-RING REPLACEMENT

Technical Note 409

You will need:

1. 7/64" and 9/64" hex driver
2. 3/8" open end wrench
3. 3/16" screwdriver
4. An awl or small jeweler's screwdriver
5. Silicone lubricant (such as Dow Corning DC-112) 6. Lint-free tissues and a clean shop rag

You will also need one of the following:

DESCRIPTION	PART NUMBER
Standard O-Ring Kit	OR
High Temperature O-Ring Kit	ORT

DISASSEMBLY

1. Apply air pressure to the actuator inlet nearest the valve. Then use the open end wrench to remove the air supply lines from the actuator.
2. Remove the valve and valve-mounting hardware from the actuator.

Closemount valve (Figure 1)

Use the 7/64" hex driver to loosen the HWSC-SC6-10B socket-head screw in the stainless CR4/clamp ring. Pull off the valve and its attached black-anodized CR41 closemount standoff. With a 9/64" hex driver, remove the two HWSC-SC8-6TDH modified socket-head screws which hold the clamp ring to the actuator.

Valve on a standoff (Figure 2)

Use the 9/64" hex driver to loosen the HWSC-SC8-10B socket-head screw in the black anodized CR3 clamp ring on the actuator. Pull off the standoff with the valve attached. The same hex driver will remove the two HWSC-SC8-6 socket-head screws which hold the clamp ring to the actuator.

FIGURE 1: Closemount valve removal

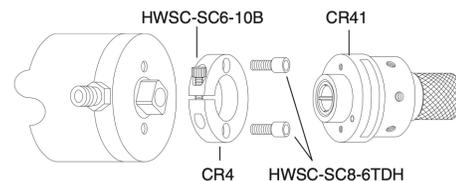
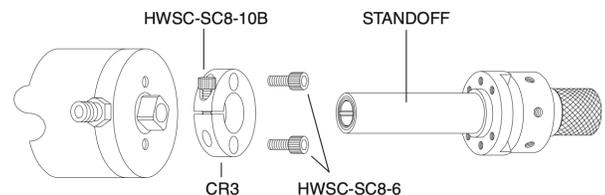


FIGURE 2: Removal of a valve on standoff



- Use the 9/64" hex driver to remove the three end cap screws with PEEK washers (**Figure 3**). Some models have slotted head screws instead of hex head.
- Place the actuator on a hard work surface with the end cap screw holes up. Push down on the cylinder, and the female end cap will pop up.
- While holding the cylinder and the rest of the assembly together, pull the female end cap all the way off. If the bearing and thrust race washers fall out, just set them aside.
- Repeat the procedure with the actuator inverted, so that the cylinder slides loose from the male end cap. Remove the cylinder.
- Pull the subassembly off the male end cap as indicated in **Figure 4**. (NOTE: Recently purchased actuators may have a sub-assembly made primarily of molded plastic, differing in appearance from the one shown in **Figures 3, 4, and 5**. The procedures are the same for either type.)
- Loosen but do not remove the three slotted head screws which hold the subassembly together.
- Take care to hold the rest of the subassembly together, and slide the O-ring plate off the drive shaft. (**Figure 5**) (If the subassembly comes apart despite your caution, reassembly instructions are provided at the end of this procedure.)

FIGURE 3: Steps 3-6

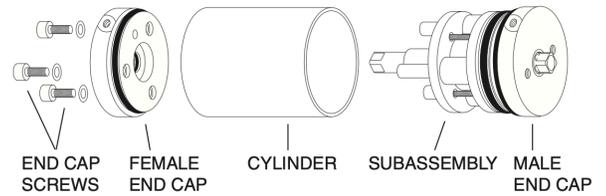


FIGURE 4: Removing the subassembly from the male end cap

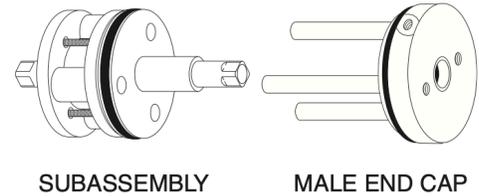
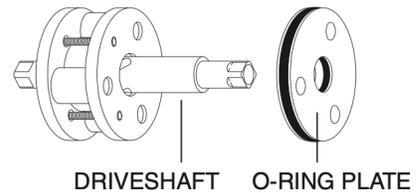


FIGURE 5: Sliding the O-ring plate off of the shaft

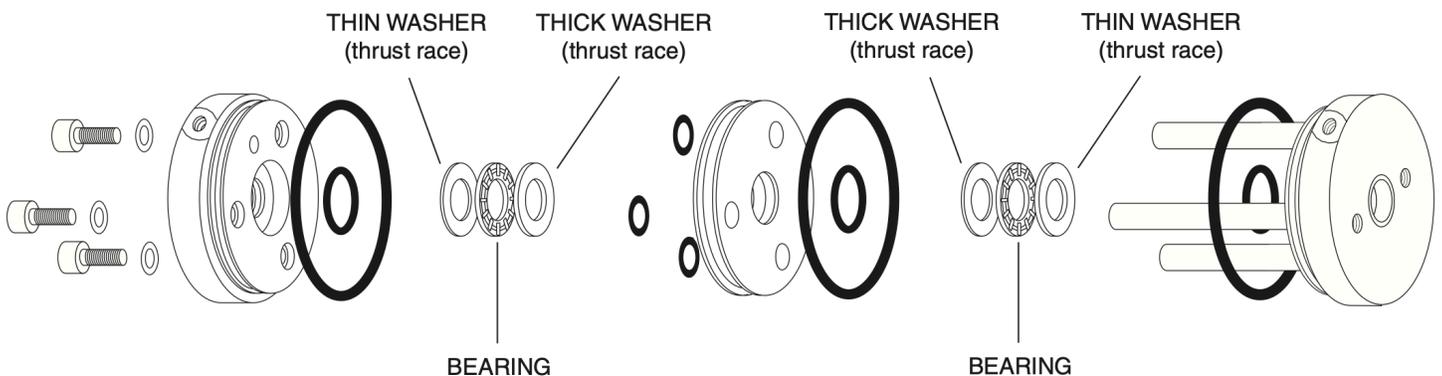


O-RING REPLACEMENT

The O-rings to be replaced are in the two end caps and the O-ring plate. The internal end cap O-rings are easier to get to if the washers and bearing are removed.

- Use the small screwdriver or awl to remove the old O-rings, being careful not to scratch the metal.
- Use a lint-free tissue to clean the O-ring grooves as completely as possible.
- As each new O-ring is installed, coat it with a thin layer of silicone lubricant. We recommend Dow Corning DC-112.

FIGURE 6: O-ring locations



ASSEMBLY

Where it's possible to do so, apply a slight rotating action to the parts as they go over or through the O-rings to help prevent any nicking or tearing of the new parts.

1. While being careful that the subassembly doesn't come apart, gently push the O-ring plate onto the drive shaft. Make sure that the threaded holes in the plate are facing the subassembly.
2. Screw the slotted-head screws into the O-ring plate, and push the drive shaft into the O-ring plate as far as it will go (**Figure 7**).
3. Place the thrust race washers and bearing in the male end cap. (The thin washer goes in first, as in **Figure 6**.) One of the flats on the drive shaft will line up with a line drawn between two of the holes in the O-ring plate, as shown in **Figure 8**. Slide the subassembly onto the pins of the male end cap with this flat lined up with the air inlet on the end cap.
4. Install the cylinder, sliding it over the subassembly and pressing the male end cap into it.
5. Place the thrust race washers and bearing in the female end cap (the thin washer goes in first, as in **Figure 6**). Press the end cap into the cylinder, making sure that the air inlet hole is in the same orientation as the one in the male end cap.
6. Install the three end cap screws with the new PEEK washers provided.
7. Replace the valve mounting hardware and air supply lines.
8. Apply air pressure to the actuator inlet nearest the valve so that the actuator will be in the same position as it was when the valve was removed.
9. Slide the valve with its standoff or CR41 closemount standoff into the clamp ring, making sure that the square hole in the valve coupling or in the end of the standoff driveshaft is fully engaged by the square of the actuator drive shaft. Tighten the clamp ring screw.

FIGURE 7: Subassembly ready to go on

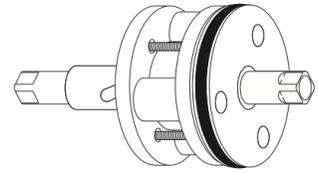
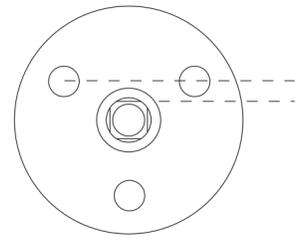


FIGURE 8: O-ring plate orientation



VALVE ALIGNMENT

Valves which have been installed using two 3-way solenoids or a Valco Digital Valve Interface will not maintain actuation force after they have been actuated. For accurate valve alignment, a temporary method of supplying continuous air pressure to the selected actuator inlet must be contrived.

1. Switch the actuator from one position to the other several times to make sure that the play in the coupling mechanism has been absorbed.
2. Visually inspect the valve body cutout to determine if the rotor pin is against the stop. If it is, proceed to Step 3. If it is not, proceed to Step 4.
3. Switch the actuator to its other position and repeat the visual inspection. If the rotor pin is touching the stop in this position also, the valve and actuator are properly aligned. If the pin does not touch the stop, proceed with Step 4.
4. Switch the actuator to the other position.
5. Slowly loosen the clamp ring screw until the valve body moves, indicating that the actuator has travelled to the end of its stroke. Immediately re-tighten the clamp ring screw.
6. Repeat the visual inspection. If the steps have been executed correctly, the rotor pin should contact the stops in both positions. If it does not, repeat the entire procedure.

REBUILDING THE SUBASSEMBLY

Hopefully this section will be unnecessary, but just in case the subassembly fell apart somewhere along the line, here's how to get it back together. See **Figure 9** on the following page for parts identification.

1. Put a liberal coating of DC-112 on the slots in the driveshaft.
2. Place the ball retainer over the shaft so that the holes in the retainer line up with the slots in the shaft.
3. Put the balls in the holes of the retainer so that they rest in the slots. They should be held in place by the thick lubricant.
4. Notice that the slots in the female race extend all the way to one end but not the other. Observe also that one end of the driveshaft has a 1/4" hole. Put that end of the driveshaft into the end of the female race which has the slot openings, sliding the balls into the slots.
5. Place the male end cap on a flat work surface. Set the O-ring plate on the end cap with the pins lined up to go through the three small O-rings. Don't press it on yet: that will only dislodge the O-rings.
6. The two bearing plates are identical except that one of them has three countersunk holes to accept the heads of the subassembly screws. Locate the one which is not countersunk and line it up on top of the O-ring plate (in the rare cases where both bearing plates are countersunk, they are interchangeable). Press down to force the pins through the O-rings and bearing plate, continuing until the two parts are riding about half-way down the pins.
7. Slide the three bushings over the pins.
8. Install the driveshaft/ball assembly with the 1/4" hole end down. The female race will rest between the bushings.
9. Place the remaining bearing plate in position with the countersunk holes up, and screw the entire assembly together. Tighten the screws in rotation to insure optimum alignment.
10. Now pull the subassembly off of the male end cap so that its orientation can be checked, and proceed with Step 2 of the Assembly.

FIGURE 9

