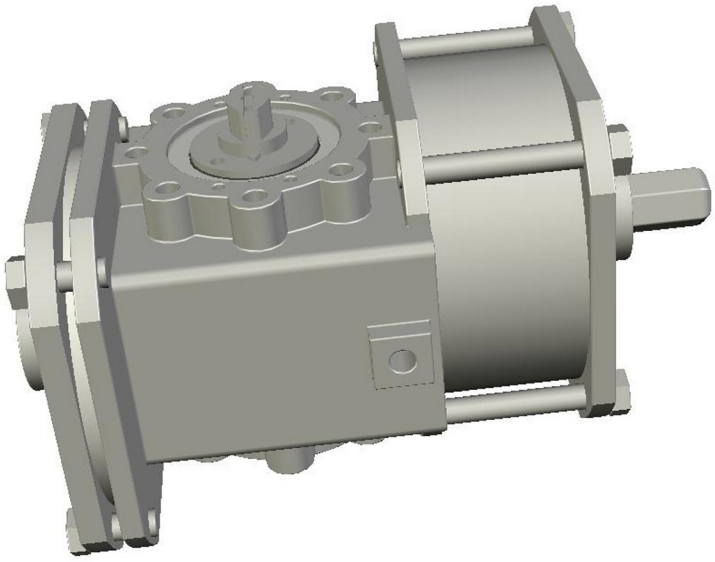
Maintenance Instructions - Seal Replacement Q04DA and Q05DA



Problem - Leakage past the piston
Cause - O-Ring wear
Resolution - Replace O-Ring
General Requirement - Piston o-ring can be replaced with actuator mounted on valve
Procedure: (refer to figures 1 and 2)

1. Remove all air lines to assure there can be no pressure in the actuators and that none can be applied during maintenance.
2. It is not necessary to remove accessories such as switch boxes or positioners or to remove the actuator from the valve unless desired by the user.
3. With all air pressure removed, loosen and remove the cylinder ties rod nuts on the long cylinder end only.
4. Remove the end cap , travel stop cover as an assembly. The cylinder seal may remain in the end cap (normal) or it may become loose as a separate part. Either is acceptable. This seal is compressed in service and seldom is damaged in service or during maintenance.
5. Remove the cylinder by sliding it off of the piston.
6. With the piston yet in place, remove and replace the piston o-ring.
7. Inspect the cylinder bore. If scratched, polishing with a scotch abrasive pad may suffice. If badly damaged by foreign particles, replace the cylinder.

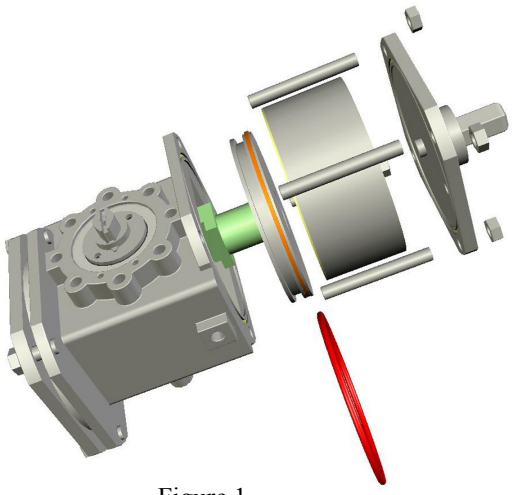


Figure 1

8. Reinstall the cylinder making certain that the cylinder seal is located in the body flange groove.
9. Tighten tie rods.
10. Replace end cap assembly - assuring that the cylinder seal is located in the end cap face groove.
11. Replace tie rod nuts. Tighten the slightly until all are snug. The in a diagonal pattern, tighten each nut to 5

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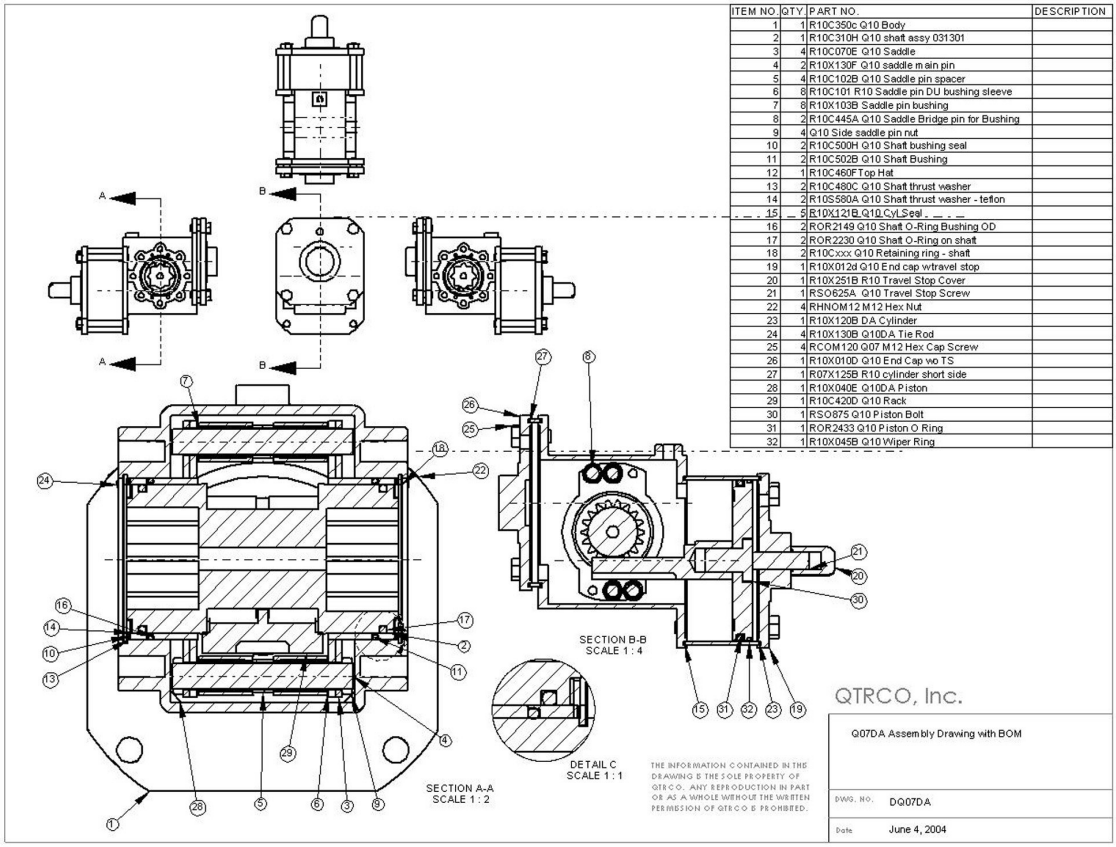
pound feet torque. Then repeat tightening pattern using 15-20 pound feet of torque.

12. At this point the actuator is ready for use. Reinstall air lines and test for piston o-ring and cylinder seal leakage.



ITEM NO.	QTY	PART NO.	DESCRIPTION
1	1	R10C350c Q10 Body	
2	1	R10C310H Q10 shaft assy 031301	
3	4	R10C070E Q10 Saddle	
4	2	R10X130F Q10 saddle main pin	
5	4	R10C102B Q10 Saddle pin spacer	
6	8	R10C101 R10 Saddle pin DU bushing sleeve	
7	8	R10X103B Saddle pin bushing	
8	2	R10C445A Q10 Saddle Bridge pin for Bushing	
9	4	Q10 Side saddle pin nut	
10	2	R10C500H Q10 Shaft bushing seal	
11	2	R10C502B Q10 Shaft Bushing	
12	1	R10C460FTop Hat	
13	2	R10C480C Q10 Shaft thrust washer	
14	2	R10S580A Q10 Shaft thrust washer - teflon	
15	5	R10X121B Q10 CyL Seal	
16	2	ROR2149 Q10 Shaft O-Ring Bushing OD	
17	2	ROR2230 Q10 Shaft O-Ring on shaft	
18	2	R10Cxxx Q10 Retaining ring - shaft	
19	1	R10X012d Q10 End cap wtravel stop	
20	1	R10X251B R10 Travel Stop Cover	
21	1	RSO625A Q10 Travel Stop Screw	
22	4	RHNOM12 M12 Hex Nut	
23	1	R10X120B DA Cylinder	
24	4	R10X130B Q10DA Tie Rod	
25	4	RCOM120 Q07 M12 Hex Cap Screw	
26	1	R10X010D Q10 End Cap wo TS	
27	1	R07X125B R10 cylinder short side	
28	1	R10X040E Q10DA Piston	
29	1	R10C420D Q10 Rack	
30	1	RSO875 Q10 Piston Bolt	
31	1	ROR2433 Q10 Piston O Ring	
32	1	R10X045B Q10 Wiper Ring	

Figure 2

Problem - Leakage past the shaft seals

Cause - O-Ring wear or media attack on the elastomer seal

Resolution - Replace shaft O-Rings

The are two o-rings on each end of the shaft.

One is positioned in a groove in the shaft.

The other is captured between an inner and an outer shaft bushing.

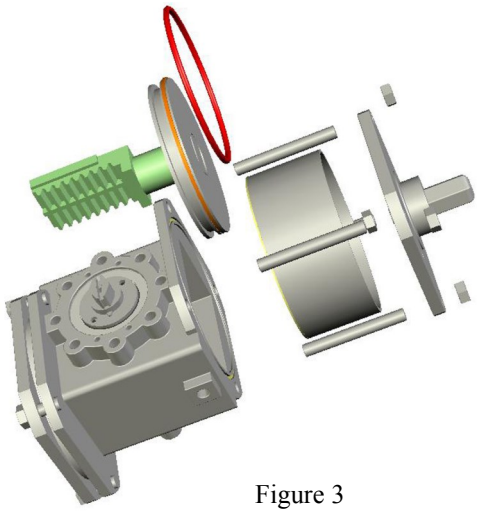


Figure 3

General Requirement - The actuator must be removed from the valve

Procedure: (refer to figures 2 through 7)

1. Remove all air lines to assure there can be no pressure in the actuators and that none can be applied during maintenance.
2. It is necessary to remove accessories such as switch boxes or positioners and to remove the actuator from the valve.
3. With all air pressure removed, loosen and remove the cylinder ties rod nuts on the long cylinder end only.
4. Remove the end cap, travel stop cover as an assembly. The cylinder seal may remain in the end cap (normal) or it may become loose as a separate part. Either is acceptable. This seal is compressed in service and seldom is damaged in service or during maintenance.

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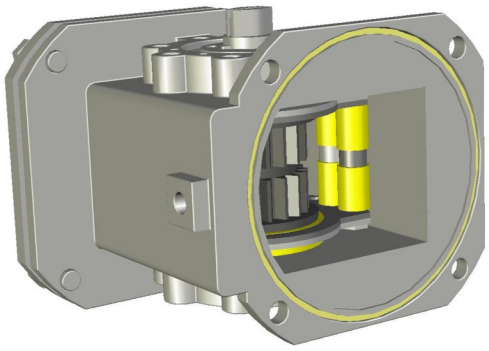
5. Remove the cylinder by sliding it off of the piston.
6. Remove the piston / rack assembly from the actuator body
7. Remove the end cap and cylinder from the short end of the body assembly.
8. Remove the NAMUR Top Hat from the actuator shaft.
9. Remove the retaining rings which secure the shaft - both ends.
10. Remove the metal and PFTE washers from each end of the shaft.
11. Drive the shaft out of the actuator using a rod applied to the bottom of the double square drive.
12. When the shaft is removed, the 'Saddle Assembly" will be loose within the body. Remove this assembly - taking care to note the installed orientation - for proper reinstallation.
13. Remove the bushings and o-rings from the shaft.
14. Clean the shaft [2] and bushings [10, 11] to remove all debris.
15. Place the body on a flat surface with the axis of the shaft bore being vertical.

Figure 4



16. Position the saddle assembly within the body cavity and in the same orientation as when removed. (The side with two bushing sets should be positioned so that they will be against the back side of the rack when it is installed)
17. Install one shaft bushing [11] in the upward shaft bore until it aligns within the saddle assembly on this end. Use a plastic hammer to lightly drive the bushing into the body and then fully inward using light tapping via a mallet and wooden or plastic rod.
18. Install a metal thrust washer [13] and a retaining ring [18] in the shaft bore groove on the upper end
19. Turn the body over so that the thrust washer and retaining ring are downward and the axis of the shaft bore again vertical.
20. Install the shaft sliding it carefully through the upper bore hole, the saddle assembly and the lower bushing. It will come to rest against the installed thrust washer.
21. Install the shaft bushing [11] in the upper end, driving it inward until it aligns in the saddle assembly.
22. Lubricate the shaft o-ring [17] and position it at the opening between the shaft and body shaft hole bore.
23. Using a thin screw driver, push the o-ring inward until it snaps into the o-ring groove of the shaft.
24. Lubricate the shaft o-ring OD [16] and position it at the same opening.
25. Using a thin screw driver, push it inward until it rests on the installed bushing [11].
26. Install the shaft seal bushing [10] with the stepped end first. Push this bushing inward until it comes to rest against the first bushing [11]. The step on this bushing will cause the OD o-ring [16] to slide over the step, effecting a seal between the seal bushing [10] and the body shaft bore.
27. Install the PTFE thrust washer [14] followed by the metal thrust washer [13].
28. Install the retaining ring [18]
29. Turn the body over once again.
30. Removed the previously installed

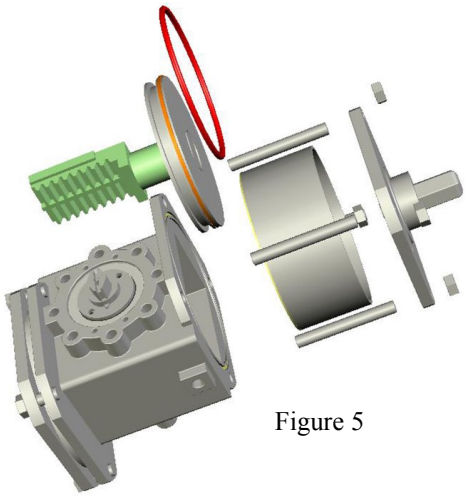
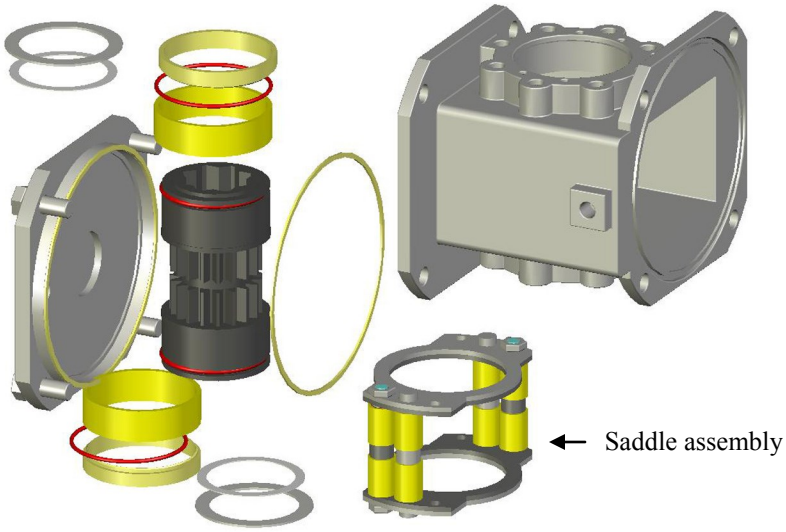


Figure 5

Figure 6



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retaining ring and metal thrust washer.

31. Install the o-rings, shaft seal bushing, thrust washers and retaining ring as on the other side.
32. Body assembly is now complete
33. Place the body on a flat surface with the shaft axis vertical and with right side body flange being further away from you than the left end flange as per figure 7. The flange facing to the right should be the one into which the rack will be inserted and the saddle should be oriented such that there are two bushing sets on the side that will support the rack.
34. Locate the two indented 'dots' on the end of the shaft and rotate the shaft so that the dots are pointed at the two o'clock position. NOTE—not to the 12 o'clock position as shown in the figure. This will permit the shaft to engage with the leading rack tooth so that when the rack is at the start position, the dots will locate to the 12:00 position.
35. Install the rack / piston assembly (You should have replaced the o-ring with a new, lubricated o-ring).
36. Push the rack and piston fully inward. This should result in the shaft dots being at the 9:00 position. If they are not, you have engaged the wrong gear teeth. Repeat the above step, locating the dots either at more or less than the 2:00 position depending upon if the shaft rotated too far (more than 2:00) or too little (less than the 2:00 position)
37. With the piston inward replace the cylinder (did you check the bore?)
38. Then replace the end cap etc as describer in the 'piston o-ring leaks' section of these instructions.
39. Also replace the short end cylinder and end cap.
40. The actuator should now be tested for leakage of the shaft seals and the piston seals.
41. Assure that each shaft retaining ring is properly installed and secure. Then apply up to 80 psig pressure to the end cap on the long cylinder end.
42. Check for cylinder seal at the end cap / cylinder juncture. If a leak does occur, tighten the end cap nuts again. Did you install the end cap seal? Use a soap solution to expose leaks.
43. Check for leakage passing out of the body air port (would indicate that the piston o-ring is not sealing).
44. When satisfied, remove the end cap pressure and apply the air pressure to the body port. Check for shaft seal leakage and also for air passing out of the end cap port (piston o-ring seal in the reverse direction)
45. Actuator is now ready to be installed on the valve and placed back in service.

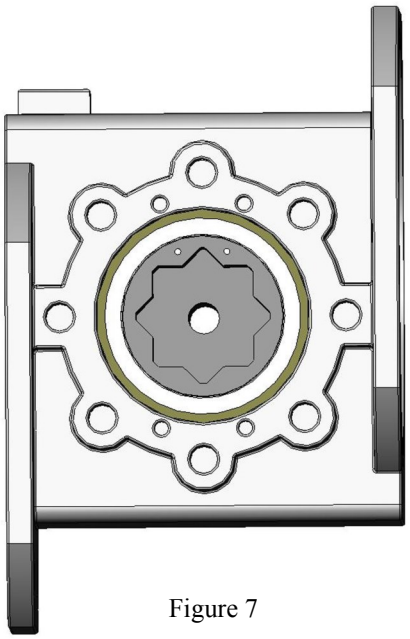

Figure 7

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