

VB04 Series Process Interface Valve Maintenance Instructions

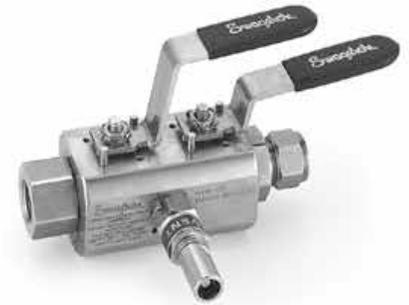
Swagelok®



Flange × Thread



Flange × Flange



Thread × Thread

Carefully read entire instruction before servicing the valve.

Kit Contents (contents may vary by kit)



Lock washer



Disc spring



Seal retainer



Stem seal



Slip ring



Stem



Seat



Ball



Body seal



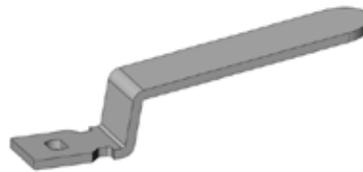
Anti-rotation pin



Nut



Handle sleeve



Handle
(type may vary)



Snap ring
(Probe only)

Symbols



Discard

Tools Required

Tool	Size	Component																	
Vise 	—	Valve body																	
Open-ended wrench/socket 	End connection - determined by assembly ordered <table border="1"> <thead> <tr> <th>Bore Size</th> <th>Nut</th> </tr> </thead> <tbody> <tr> <td>9.5 mm</td> <td>13 mm hex</td> </tr> <tr> <td>14 mm</td> <td>17 mm hex</td> </tr> <tr> <td>20 mm</td> <td>19 mm hex</td> </tr> </tbody> </table>	Bore Size	Nut	9.5 mm	13 mm hex	14 mm	17 mm hex	20 mm	19 mm hex	End connection, lock nuts									
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9.5 mm	13 mm hex																		
14 mm	17 mm hex																		
20 mm	19 mm hex																		
Torque wrench 	Capable of 1060 in-lb (119 N-m)	End connection, lock nuts																	
Plastic pick 	—	Disc spring, seat, stem seal, seal retainer																	
Lubricants/fluids 	P-80® (or equivalent) Molykote® 1000 Permanent thread locking fluid Molykote 111	Seat and handle End piece/end fitting Stem threads Stem, stem bore, OD surface, ID surface, disc spring																	
Stem seal assembly tools 	<table border="1"> <thead> <tr> <th>Bore</th> <th>Kit Number</th> </tr> </thead> <tbody> <tr> <td rowspan="4">9.5 mm</td> <td>K-VB95-STMSL-TOOL-KIT</td> </tr> <tr> <td>K-VB95-ID-GUIDE-TOOL</td> </tr> <tr> <td>K-VB95-OD-GUIDE-TOOL</td> </tr> <tr> <td>K-VB95-PUSHER-TOOL</td> </tr> <tr> <td rowspan="4">14 mm</td> <td>K-VB14-STMSL-TOOL-KIT</td> </tr> <tr> <td>K-VB14-ID-GUIDE-TOOL</td> </tr> <tr> <td>K-VB14-OD-GUIDE-TOOL</td> </tr> <tr> <td>K-VB14-PUSHER-TOOL</td> </tr> <tr> <td rowspan="4">20 mm</td> <td>K-VB20-STMSL-TOOL-KIT</td> </tr> <tr> <td>K-VB20-ID-GUIDE-TOOL</td> </tr> <tr> <td>K-VB20-OD-GUIDE-TOOL</td> </tr> <tr> <td>K-VB20-PUSHER-TOOL</td> </tr> </tbody> </table>	Bore	Kit Number	9.5 mm	K-VB95-STMSL-TOOL-KIT	K-VB95-ID-GUIDE-TOOL	K-VB95-OD-GUIDE-TOOL	K-VB95-PUSHER-TOOL	14 mm	K-VB14-STMSL-TOOL-KIT	K-VB14-ID-GUIDE-TOOL	K-VB14-OD-GUIDE-TOOL	K-VB14-PUSHER-TOOL	20 mm	K-VB20-STMSL-TOOL-KIT	K-VB20-ID-GUIDE-TOOL	K-VB20-OD-GUIDE-TOOL	K-VB20-PUSHER-TOOL	Stem seal and stem
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	K-VB20-PUSHER-TOOL																		
Pliers or grips 	—	Anti-rotation pin																	
Punch, hammer, permanent marker, string	—	If applicable																	
Slip joint pliers 	—	Lock washer																	
Hex for end cap, hex key for end fittings, crow's foot for probe, hex for check valve	—	If applicable																	

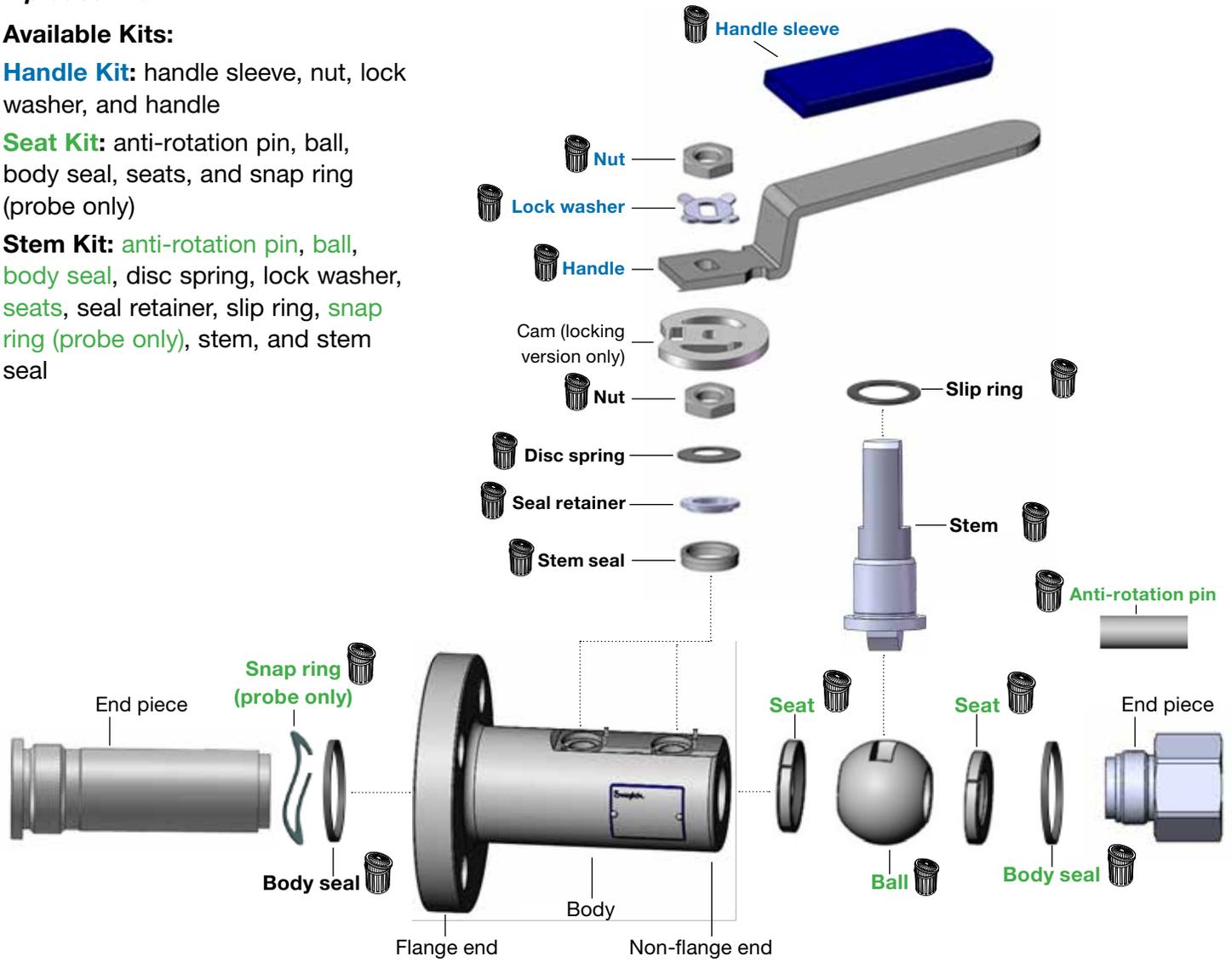
Exploded View

Available Kits:

Handle Kit: handle sleeve, nut, lock washer, and handle

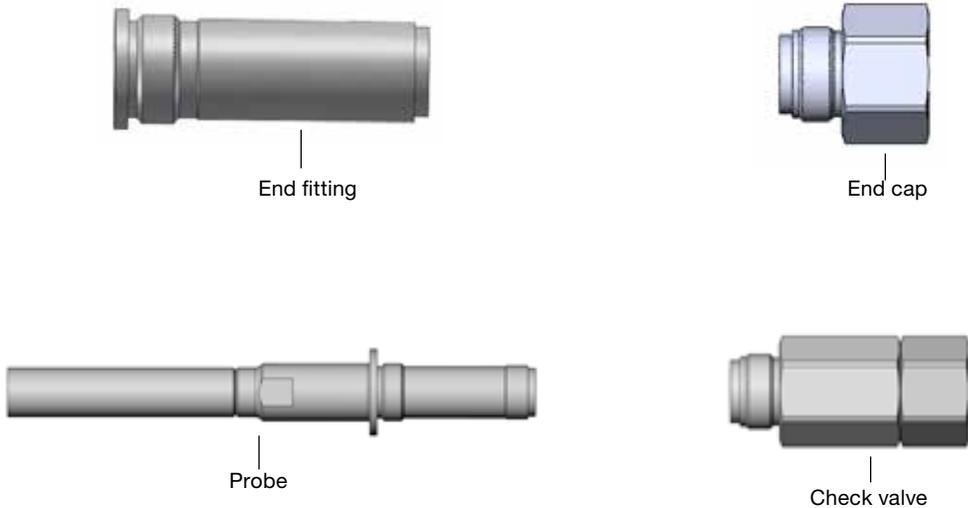
Seat Kit: anti-rotation pin, ball, body seal, seats, and snap ring (probe only)

Stem Kit: anti-rotation pin, ball, body seal, disc spring, lock washer, seats, seal retainer, slip ring, snap ring (probe only), stem, and stem seal



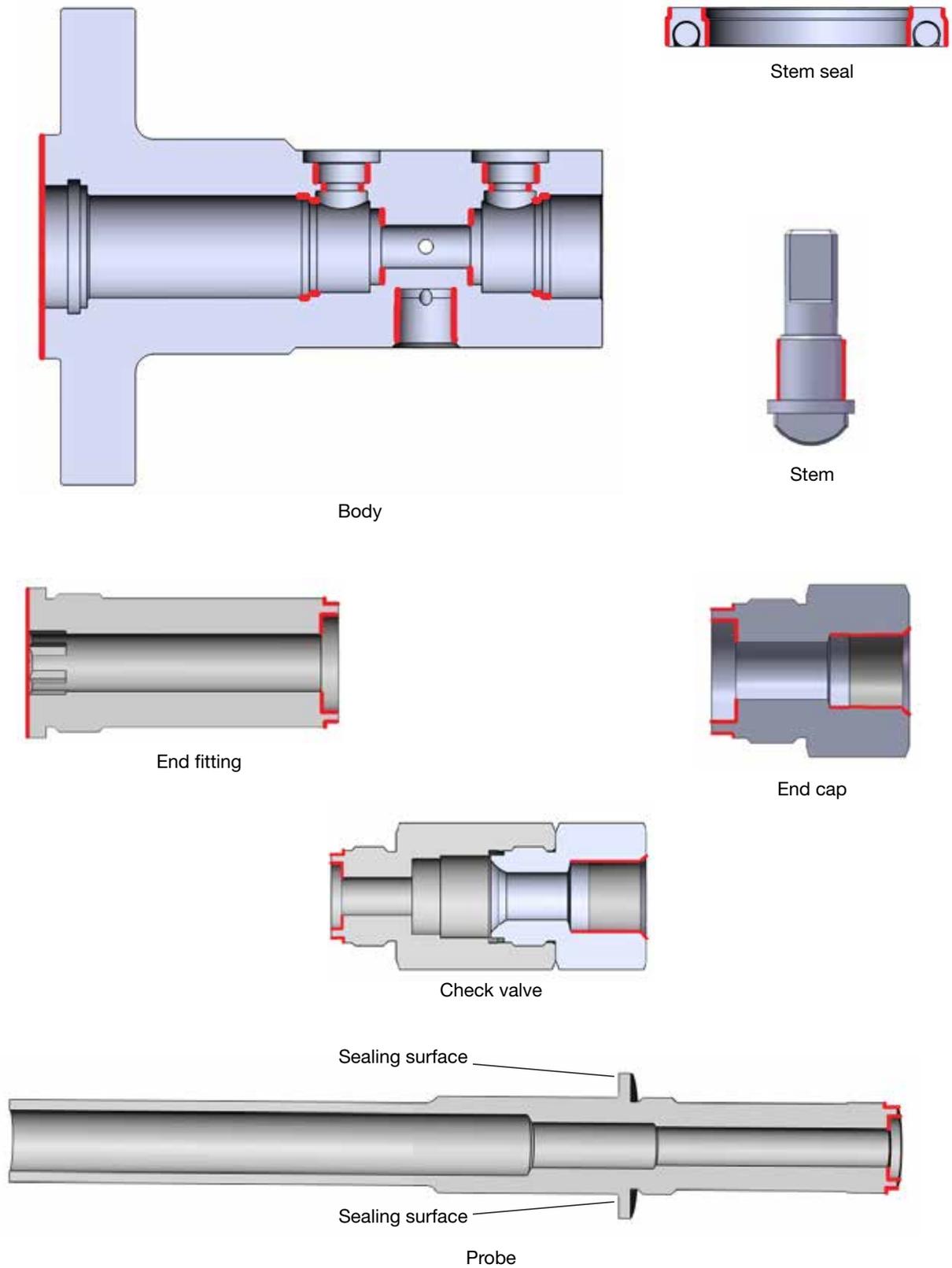
***Bold indicates kit component.**

Available End Pieces



Critical Sealing Surfaces

The surfaces highlighted in red are the critical sealing surfaces. These surfaces must be free of scratches, dents, disfigurement, and debris to ensure successful maintenance and leak free performance.



⚠ WARNING

Before removing valve from system, to avoid personal injury, you must

- **Depressurize the valve**
- **Cycle the valve**
- **Purge the valve to remove any residual system media left in the valve**

Disassembly

1. Clamp the valve body in a vise.

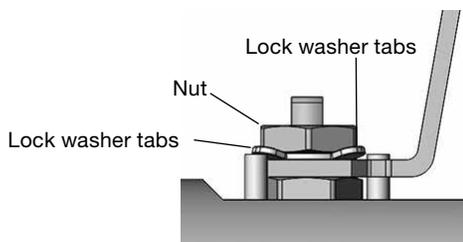
NOTICE

Be careful not to scratch the critical sealing surfaces. Leakage could result.

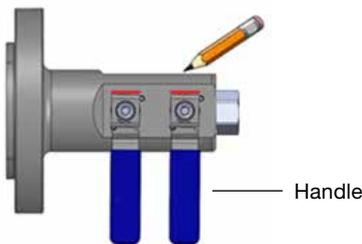
2. Carefully bend the **lock washer tabs** away from the top **nut** using a punch and hammer.

NOTICE

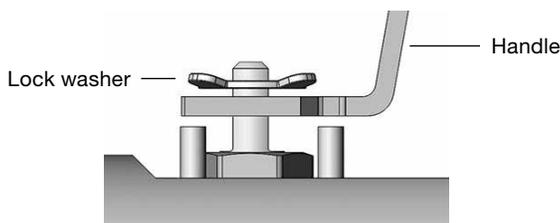
Excessive force may damage the valve. Leakage could result.



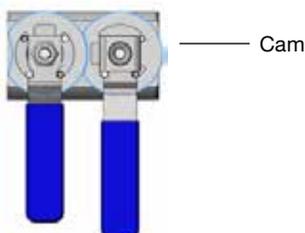
3. Close the valve against the handle stop. Document on the body the **handle** orientation relative to the body, using a marker, for proper reassembly.



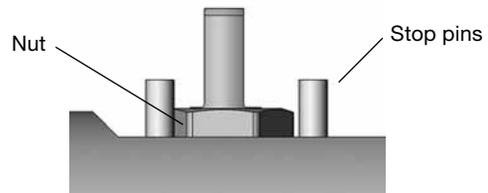
4. Remove the top nut while holding the valve in a closed position.
5. Remove the **lock washer** and **handle**.



6. Remove the **cam** (locking cam version). Note the location and orientation of each cam for proper reassembly.



7. Remove the bottom **nut**. Do not remove the **stop pins**.

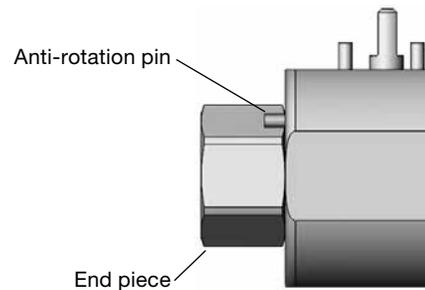


8. Carefully remove the disc spring and seal retainer with a plastic pic.

NOTICE

Be careful not to scratch the critical sealing surfaces. Leakage could result.

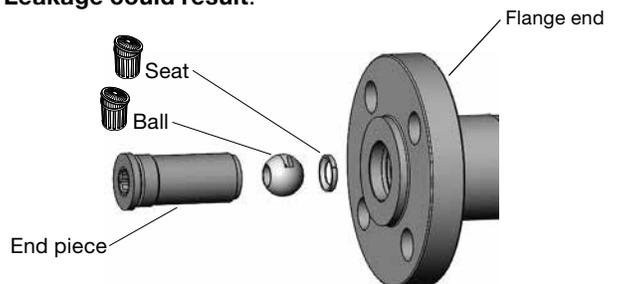
9. If disassembling a non-flange side end piece, remove the **anti-rotation pin** next to the **end piece** using pliers.



10. If disassembling a probe end piece, remove the snap ring.
11. Remove the **end piece, seat, ball,** and second **seat** with a plastic pic.

NOTICE

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12. Push the stem down through the stem bore and remove through the body bore.
13. Remove the stem seal from the stem bore with a plastic pic.
14. Remove the slip ring from the stem.

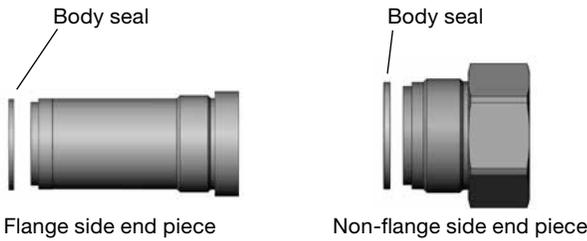
NOTICE

Be careful not to scratch the critical sealing surfaces. Leakage could result.

15. Remove the **body seal** from the **end piece**.

NOTICE

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Reassembly

1. Clean the valve, components, and all the critical sealing surfaces.

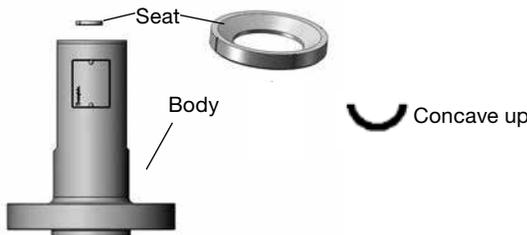
NOTICE

Do not use abrasive cleaners on critical sealing surfaces. Leakage could result.

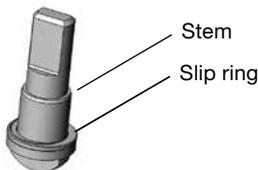
- 2. Secure the valve body vertically in a vise.
- 3. Apply a light coat of P-80 to the back of the **seat** and place concave face up in the **body**.

NOTICE

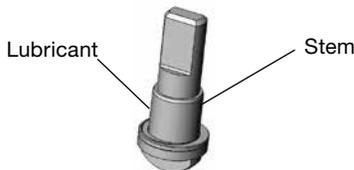
Be careful not to scratch the critical sealing surfaces. Leakage could result.



4. Place the **slip ring** onto the **stem**.



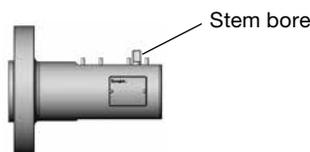
5. Apply a light coat of Molykote 111 on the lower **stem** neck above slip ring.



6. Assemble the stem into the **stem bore** through the body bore.

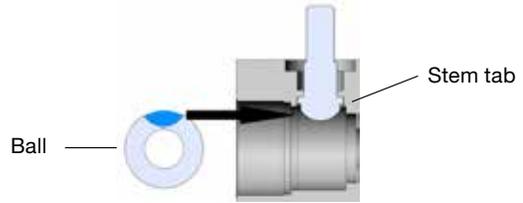
NOTICE

Be careful not to scratch the critical sealing surfaces. Leakage could result.



7. Thread the string through the bore of ball.

8. Orient the **ball slot** with the **stem tab**.



9. Lower the ball into the body using the string and engage the ball slot with the stem.

NOTICE

Ensure the ball does not fall into the body or the ball could be scratched. Leakage could result.

10. Remove the string.

11. Apply a light coat of P-80 on the back of the second seat and assemble the **seat** into the **end piece**, concave face up.

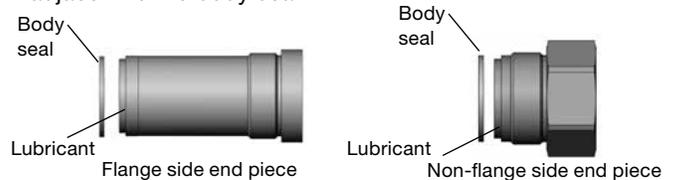


12. Apply a heavy coat of Molykote 1000 to the **threads** of the **end piece**.



13. Assemble the body seal onto the end piece.

14. Apply a light coat of Molykote 111 to the OD surface adjacent to the body seal.



15. Assemble the end piece into the valve body and finger-tighten.

16. Secure the valve body horizontally in a vise.

NOTICE

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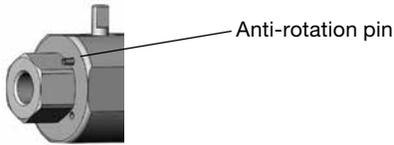
17. Torque the end piece per the following table:

Bore Size	Torque, in.-lbs (N·m)
9.5 mm	430 to 530 (48.5 to 59.8)
14 mm	650 to 790 (73.4 to 89.2)
20 mm	860 to 1060 (97.2 to 119)

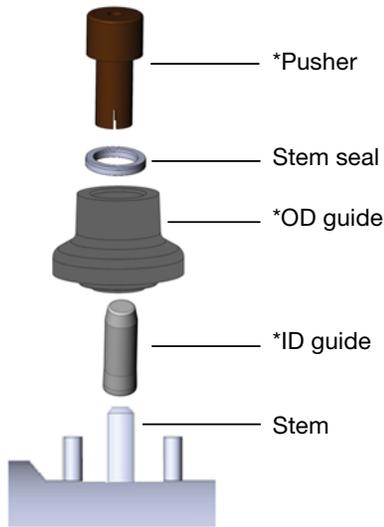
NOTICE

Ensure the seat remains in place before torquing and the valve remains in open or closed position. Leakage could result.

18. If assembling a probe end piece, assemble the snap ring.
19. If assembling a non-flange end, assemble the **anti-rotation pin** into body.

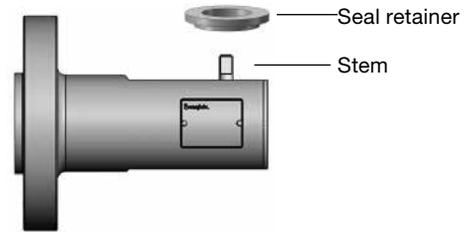


20. Apply a heavy coat of Molykote 111 to the stem bore.
21. Assemble the **stem seals** using the stem seal assembly tools.
 - a. Thread the **ID guide** onto the stem and finger-tighten.
 - b. Insert the **OD guide** over the ID guide into the stem pocket.
 - c. Apply a light coat of Molykote 111 to the OD and ID of the **stem seal**.
 - d. Assemble the **stem seal** onto the ID guide spring side (metal side) down.
 - e. While pressing the OD guide down, press the stem seal completely into place with the **pusher**.
 - f. Remove the stem insertion tools.

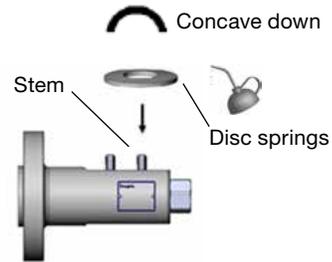


*Stem seal insertion tools

22. Assemble the **seal retainer** into the **stem**, shoulder facing down.

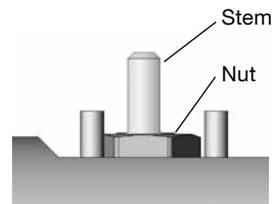


23. Apply a light coat of Molykote 111 to both sides of the disc spring.
24. Assemble the **disc spring** onto the **stem**, concave side down.

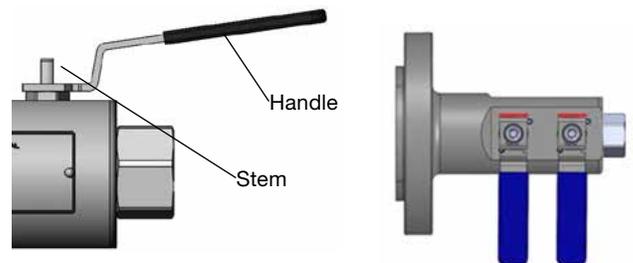


25. Orient the stem to a closed position using the unassembled handle. Remove the unassembled handle.
26. Apply a light coat of permanent thread-locking fluid to the stem threads (20 mm bore only).
27. Assemble the bottom **nut** onto the **stem** and torque per the following table:

Bore Size	Torque, in.·lbs (N·m)
9.5 mm	5 to 6 (0.56 to 0.67)
14 mm	5 to 6 (0.56 to 0.67)
20 mm	20 to 30 (2.2 to 3.4)



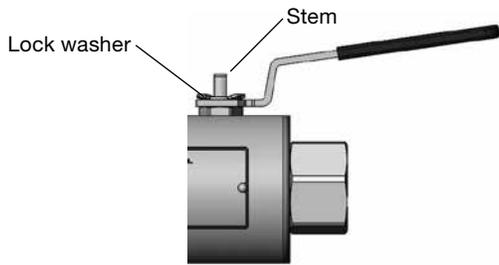
28. Assemble the proper cam (from **Disassembly** step #6) over the stem (locking cam version only).
29. Assemble the handle sleeve on the handle. Apply P-80 if difficult to assemble.
30. Place the **handle** on the **stem** and orient with the mark from **Disassembly** step #3.



31. Assemble the **lock washer** onto the **stem**.

NOTICE

Ensure the valve is in the closed position. Unexpected flow could result.



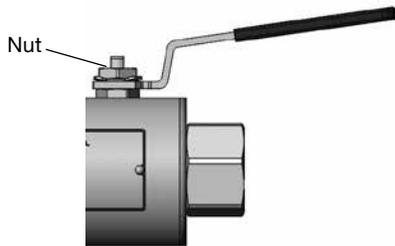
32. Apply a light coat of permanent thread-locking fluid on the stem threads.

33. Assemble the top **nut** onto the stem and torque per the following table:

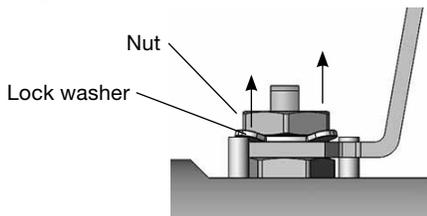
Bore Size	Torque, in.·lbs (N·m)
9.5 mm	70 to 90 (7.9 to 10.1)
14 mm	90 to 110 (10.1 to 12.4)
20 mm	110 to 130 (12.4 to 14.6)

NOTICE

Ensure the stem does not rotate until the top lock nut has been secured by the lock tab washer. Leakage could result.



34. Pinch the **lock washer** tabs against the flats of the top **nut** using slip joint pliers.



33. Open and close the valve several times to inspect for smooth actuation.
 34. Test each valve for proper operation and leak-tight integrity.

NOTICE

Allow thread locking fluid to cure for 24 hours before installing the valve. Failure to do so could result in leakage.

For additional information, see www.swagelok.com.