



A&N CORPORATION
High Vacuum Products

***Maintenance Instruction
for the
D, E & F Ball Valve***

Please follow these instructions carefully. Failure to do so may result in an improper or poorly functioning valve.

TABLE OF CONTENTS

BEFORE GETTING STARTED

Checking For The Valve Model	1
Important Notes	1
Maintenance Kits	2
<i>Universal Maintenance Kit Components</i>	2
<i>Replacement Balls</i>	2
<i>Stem Kit Components</i>	2

LEGACY DESIGN

Manual	3
<i>Disassembly</i>	3
<i>Reassembly</i>	5
Pneumatic	8
<i>Disassembly</i>	8
<i>Reassembly</i>	10

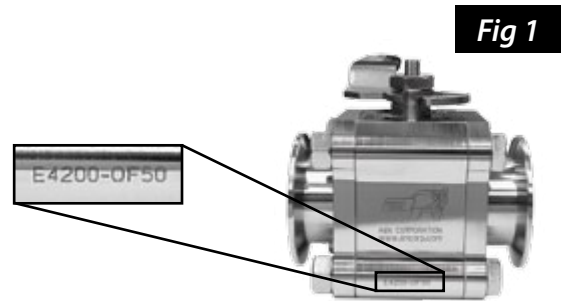
XL DESIGN

Manual	13
<i>Disassembly</i>	13
<i>Reassembly</i>	15
Pneumatic	18
<i>Disassembly</i>	18
<i>Reassembly</i>	20

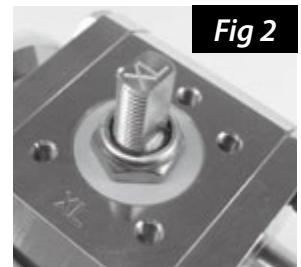
BEFORE GETTING STARTED

Checking For The Valve Model

Important! Check the Reference Number on the side of the valve and determine if the valve is a D, E or F Series valve (Fig 1).



Legacy design or XL design: The Legacy design has a serial number ending with numbers only, e.g. S12345-67890-01. If it is a XL design it will have "XL" engraved at the end of the serial number, e.g. S12345-67890-01XL, as well as on the stem and body (Fig 2).



Important Notes

Detailed maintenance instructions are provided for manually and pneumatically actuated Legacy and XL model valves using the following kits:

- ◆ Universal Maintenance Kit
- ◆ Replacement Balls
- ◆ Stem Kit

The tools needed for disassembly, cleaning and reassembly are provided before each section. Be sure your maintenance kit is the correct one for your valve size. It is the responsibility of the technician performing valve maintenance to ensure the correct parts are used and that the disassembly, cleaning, and assembly instructions are followed accurately.

Valve Size	Ball Port Size	Maintenance Kit	Part Number
D Series	1.25 in	D-RK-S	3010141
E Series	1.50 in	E-RK-S	3010181
F Series	1.87 in	F-RK-S	3010084

Maintenance Kits

Universal Maintenance Kit Components

A universal maintenance kit contains parts for both the Legacy and XL valve designs. Be sure the correct parts are used for the maintenance of the valve. All D, E and F Series maintenance kits contain the following components (Fig 3).

- ◆ #1 Teflon® seats (2)
- ◆ #2 Body o-rings (2)
- ◆ #3 Stem o-ring (1)
- ◆ #4 Nylon lock nut (1)
- ◆ #5A Teflon® spacer (1) (Legacy Only)
- ◆ #5B Lower PEEK bearing (1) (XL Only)
- ◆ #6 Brass bushings (2) (Legacy Only)



Replacement Balls

The universal maintenance kit does not contain a replacement ball, stem, or upper PEEK bearing. Replacement balls can be purchased individually.

Valve Size	Replacement Ball	Part Number
D Series	D-SE	3010144
E Series	E-SE	3010184
F Series	F-SE	3010272

Stem Kit Components

If you require a new stem or upper PEEK bearing you will need to order a stem kit for the valve design that you have. The Legacy stem kit will service D, E, and F Series valves of the Legacy design. The XL stem kit will service D, E, and F Series valves of the XL design.

Valve Design	Stem Bearing Kit Part Number	Part Number
Legacy	D/E/F-SK	3010430
XL	D/E/F-SK-XL	3010432

Legacy Components

- ◆ (1) Legacy design valve stem
- ◆ (1) Legacy design upper PEEK bearing
- ◆ (1) Teflon® stem spacer
- ◆ (2) Brass bushings
- ◆ (1) Stem o-ring
- ◆ (1) Nylon lock nut

XL Components

- ◆ (1) XL design valve stem
- ◆ (1) XL design upper PEEK bearing
- ◆ (1) Lower PEEK bearing
- ◆ (1) Stem o-ring
- ◆ (1) Nylon lock nut

LEGACY DESIGN

Manual

Disassembly

Determine if your valve is manual or pneumatic. Manual valves have a handle attached to the valve stem, while pneumatic valves have an actuator positioned on top of the valve.

Recommendations: Wear latex or lint free gloves when handling the interior components and surfaces of the ball valve. If you are replacing the ball, replace the Teflon® seats and body seal o-rings at this time as well. If replacing the valve stem, replace the stem seal o-ring. Maintenance kits containing these and other wearable components can be purchased by contacting A&N Corporation's sales department.

Required Tools:

- ◆ 3/16" Hex Key
- ◆ 7/8" Wrench
- ◆ 5/16", 8mm, or Adjustable Wrench
- ◆ Vice
- ◆ D and F Series:
 - 5/8" Wrench
 - 11/16" Wrench
- ◆ E Series:
 - (2) 3/4" Wrenches

1. If your valve is equipped with a locking kit, remove any lock or pin that may be in place (Fig 4).
2. Next, remove the valve handle by removing the top stem nut with the 7/8" wrench. Set the nut aside for later use (Fig 5). **Tip: With one hand, hold the valve handle firmly and with the other hand use the wrench to loosen the nut.**
3. Remove the lock washer and handle by lifting the handle off of the valve stem (Fig 6). Set these parts aside for later use (Fig 7). Be careful not to lose the lock washer. **Note: Valves configured with a handle locking kit will have an extra lock washer under the handle. Keep it for later use.**
4. To finish removing the lock plate, use the 3/16" hex key to remove the two socket head screws securing the lock plate to the valve (Fig 8).
5. Remove the lock plate (Fig 9).

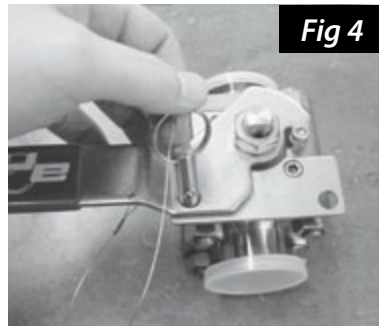


Fig 4

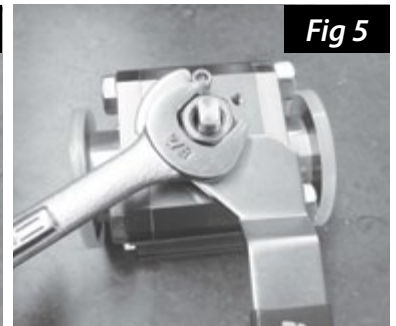


Fig 5

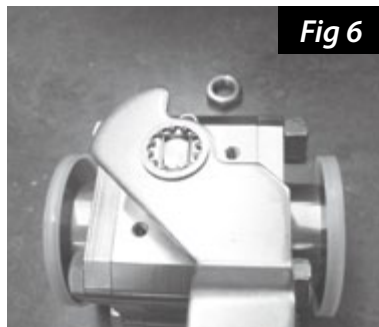


Fig 6

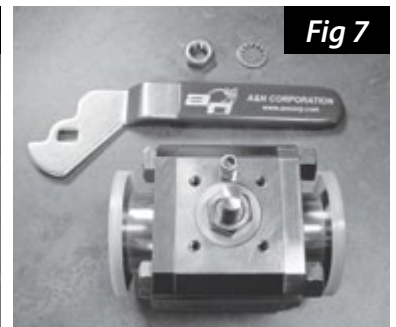


Fig 7

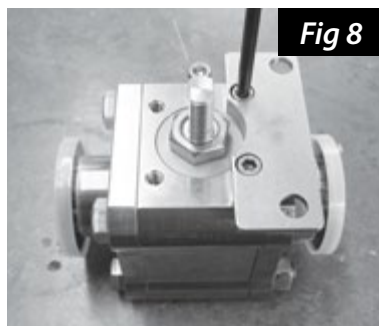


Fig 8

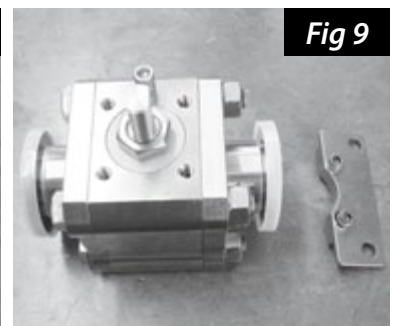


Fig 9

6. Remove the four body bolts using the two wrenches specified below (Fig 10). Remove the end caps and place them in a safe location (Fig 11).

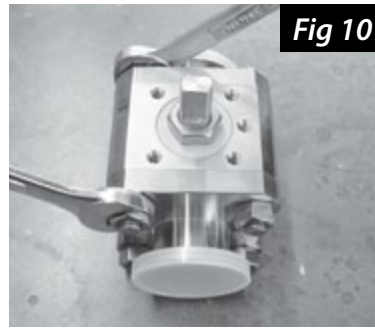


Fig 10

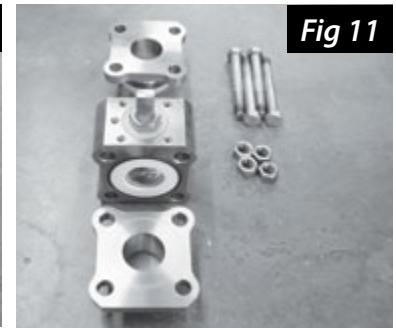


Fig 11

a. For D and F Series use 5/8" and 11/16" wrenches.

b. For the E Series use two 3/4" wrenches.

7. Remove and discard the Teflon® seats and body seal o-rings (Fig 12).

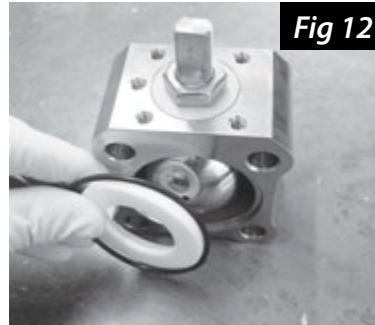


Fig 12

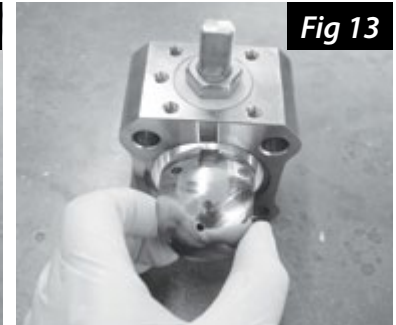


Fig 13

8. If you have not already done so, rotate the valve stem and ball to the "closed" position to remove the ball. Gently push the ball to remove it from the center section of the valve (Fig 13). Place the ball in a safe location for reuse or if replacing the ball it can now be discarded. **Note: If the ball is damaged due to corrosion or some other means, you can purchase a new one by contacting A&N Corporation's sales department.**

9. Remove the stem nut with a 7/8" wrench. Hold the valve stem in place by grasping the base of the stem on the inside of the valve body with a 5/16" or 8mm open-end wrench or an adjustable wrench (Fig 14).

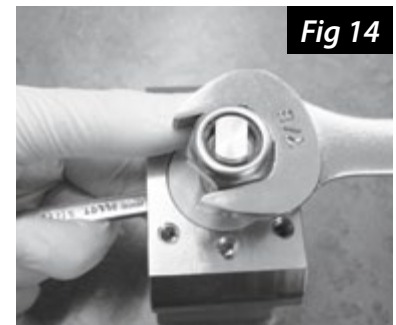


Fig 14

Note: This nut will be replaced with a new nylon lock nut and therefore can be discarded.

10. Push the valve stem inward and then back out. This will expose the PEEK stem bearing, two brass bushings, and the stem seal o-ring (Fig 15). Remove and discard the brass bushings and stem o-ring. Place the upper PEEK bearing in a safe location for reuse. If servicing the valve with a stem kit, discard the upper PEEK bearing.



Fig 15

11. Push the valve stem back in to completely remove it from the valve body. Slide the Teflon® spacer off and discard it (Fig 16).

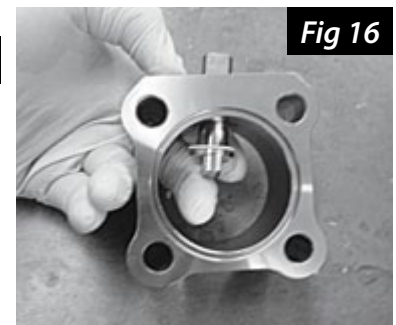


Fig 16

12. Disassembly is complete.

Reassembly

Recommendations: Use latex or lint free gloves when handling the interior components and surfaces of the ball valve. When reusing the ball and/or valve stem, clean all surfaces with isopropyl alcohol and a lint free towel. Remove any debris that may have accumulated on the surfaces. Be sure to distinguish between Legacy and XL instructions.

Required Tools:

- ◆ 3/16" Hex Key
- ◆ Torque Wrench
- ◆ 7/8" Deep-well Socket
- ◆ 7/8" Wrench
- ◆ 5/16", 8mm, or Adjustable Wrench
- ◆ Vice
- ◆ D and F Series:
 - 5/8" Wrench
 - 11/16" Wrench

Optional:

- ◆ Dow Corning® Vacuum Grease (#0600001)
- ◆ Anti-Seize (#0605208)

- ◆ E Series:
 - (2) 3/4" Wrenches
 - 3/4" Socket

1. Place a new Teflon® spacer on the valve stem (Fig 17).

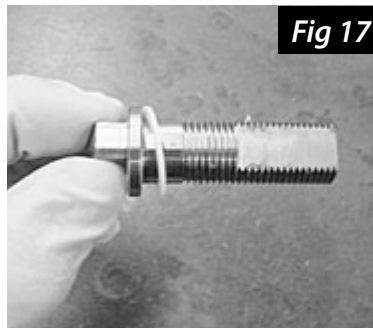


Fig 17

2. Insert the valve stem through the inside of the valve body (Fig 18).

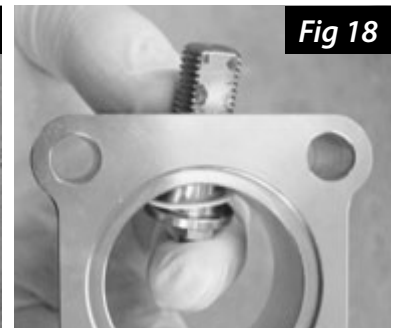


Fig 18

3. Position one of the two new brass bushings over the stem. Apply a liberal amount of vacuum grease around the inside and outside of the new stem seal o-ring. Slide the o-ring onto the stem (Fig 19). Next, slide the second new brass bushing on the stem. **Note: Applying sufficient vacuum grease will reduce stem o-ring wear and extend the life of the stem seal.**

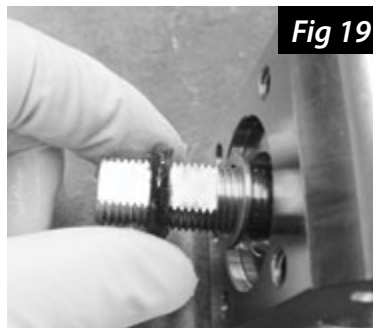


Fig 19

4. While holding the bottom of the stem, place the PEEK stem bearing over the top of the stem. Slide the PEEK stem bearing down until it rests in the groove on top of the body (Fig 20).

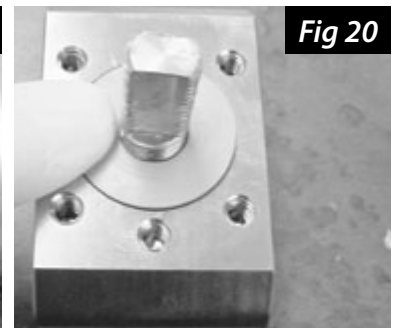


Fig 20

5. Wipe away any excess vacuum grease on the valve stem. Place a new stem lock nut onto the valve stem. Torque nut to 35 in-lbs with a torque wrench and 7/8" socket. Hold the valve stem in place by grasping the base of the stem on the inside of the valve body with a 5/16" or 8mm open-end wrench or an adjustable wrench (Fig 21). **WARNING: Over tightening the stem nut will cause the o-ring to wear prematurely and greatly reduce cycle life. Stem leaks may also result.**

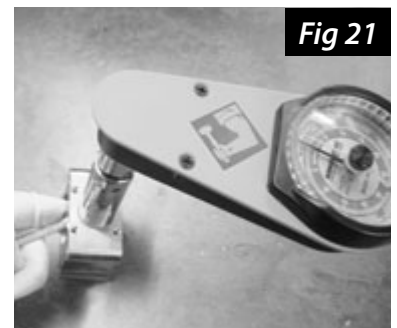


Fig 21

6. Apply a thin coat of vacuum grease around the body seal o-rings and place on the end caps as shown. Apply a thin coat of vacuum grease to the inner radius surface of each Teflon® seat (Fig 22).

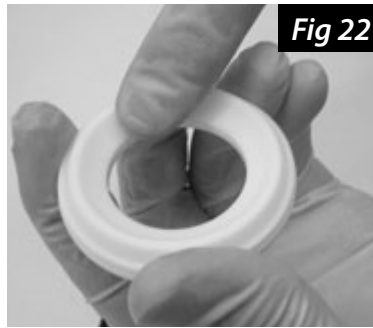


Fig 22

7. Place the Teflon® seat within the o-ring on the end cap as shown. Be sure to place the end cap on a soft surface to avoid damaging the flange (Fig 23). **Note: The new Teflon® seats will be a little thicker than the used ones. This is perfectly normal as the seats are designed to be compressed when the valve is fully assembled.**



Fig 23

8. With one end cap on a flat surface, place the valve's center section over the end cap. Make sure that the contours of the end cap match the contours of the center section. Orient the center section such that the stop pin, or stop pin hole, is on the left while the valve stem points away from you (Fig 24).



Fig 24

9. Align the valve stem with the notch in the ball and carefully drop the ball into the valve center section, being sure the evac hole is facing up (Fig 25).

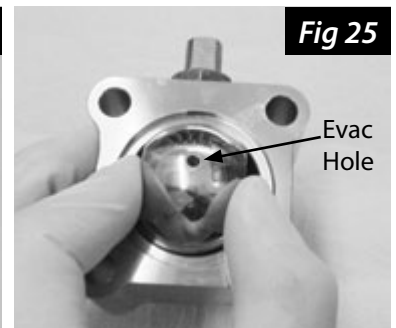


Fig 25

10. Position the second lubricated Teflon® seat and body seal o-ring onto the center section as shown in (Fig 26).

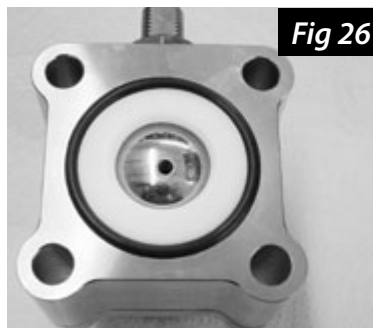


Fig 26

11. Set the second end cap on top of the center section making sure that the contours match (Fig 27). Insert the four body bolts into their holes such that the bolt heads and the evac hole of the ball are on the same side of the valve.



Fig 27

12. Begin to thread the body bolt nuts onto the body bolts by hand (Fig 28). Anti-seize lubricant can be applied inside the nut threads to ease insertion and prevent galling. Starting with one bolt, tighten so there is only a small compression and move to the next bolt located diagonally from the first. Do the same with the other two bolts. Tighten until there is no gap between the end caps and the valve body (approximately 35 ft-lbs). **Note: Failure to tighten all bolts evenly can cause the body o-ring to slip out and/or damage the Teflon® seats. Do not tighten one or more bolts with too much force over the others.**



Fig 28

a. For D and F Series use 5/8" and 11/16" wrenches.

b. For the E Series use two 3/4" wrenches.

13. Let the valve sit for 10 to 15 minutes to allow the Teflon® seats to form to the shape of the ball.

14. Secure the valve in a vice and manually cycle the valve 4 or 5 times to check for proper functioning.

15. If your valve is equipped with a lock kit, skip to step 17. Otherwise, place the handle on the valve stem with a lock washer on top of the handle over the stem (Fig 29).

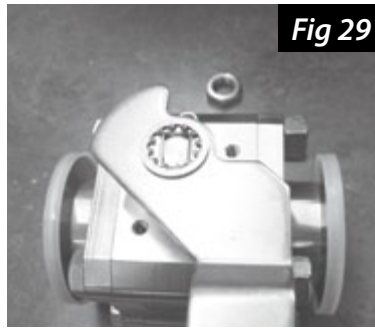


Fig 29

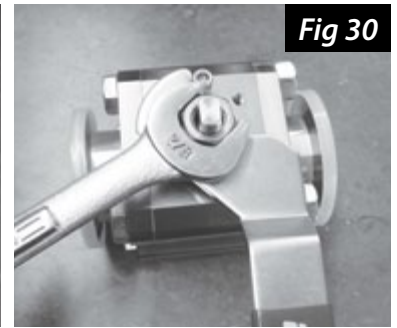


Fig 30

16. Thread the nut onto the valve stem and tighten with the 7/8" wrench until the handle is secure (Fig 30).

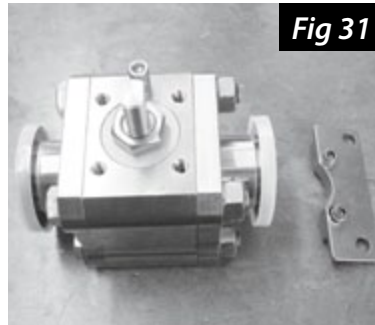


Fig 31

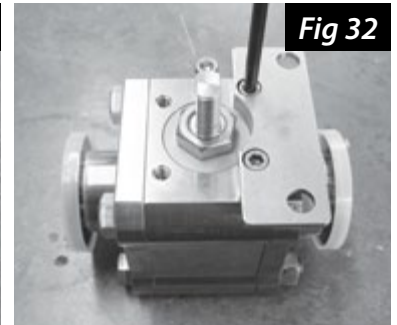


Fig 32

17. If your valve is equipped with a lock kit follow these steps.

a. Position the lock plate on the same side of the valve as the valve body bolt nuts and secure the plate to the valve using the 3/16" hex key and the two socket head screws that were previously removed (Fig 31 & 32).

b. Place a lock washer on the valve stem. Then place the handle onto the valve stem over the washer.

18. Place a lock washer onto the valve stem over the handle (Fig 29).

19. Thread the nut onto the valve stem and tighten with the 7/8" wrench until the handle is secure (Fig 30).

20. Insert pin (or a padlock of your choice) through the valve handle and lock plate (Fig 33).

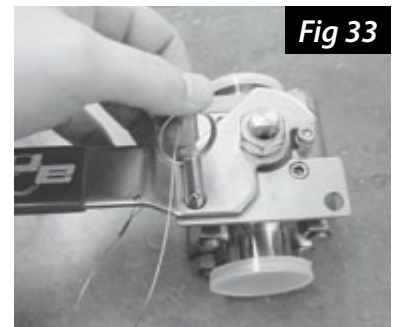


Fig 33

21. Replacement is complete.

Pneumatic

Disassembly

Recommendations: Wear latex or lint free gloves when handling the interior components and surfaces of the ball valve. If you are replacing the ball, replace the Teflon® seats and body seal o-rings at this time as well. If replacing the valve stem, replace the stem seal o-ring. Maintenance kits containing these and other wearable components can be purchased by contacting A&N Corporation's sales department.

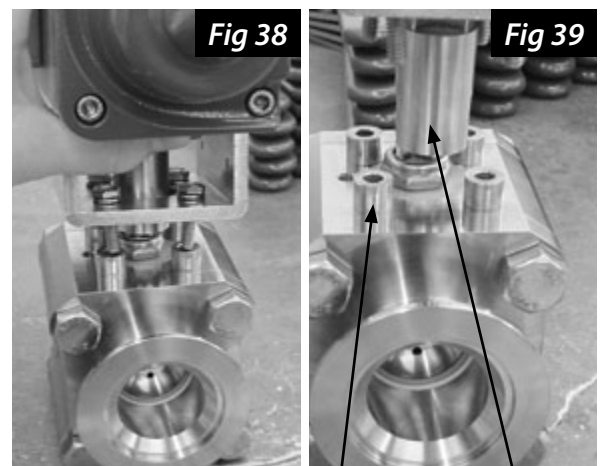
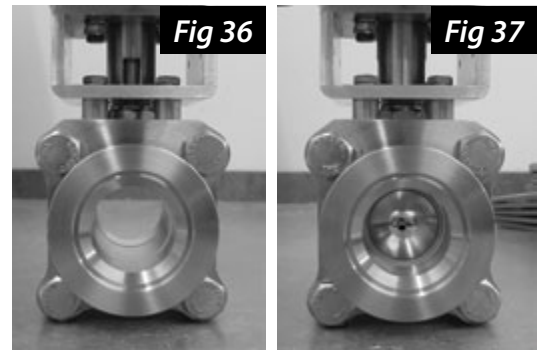
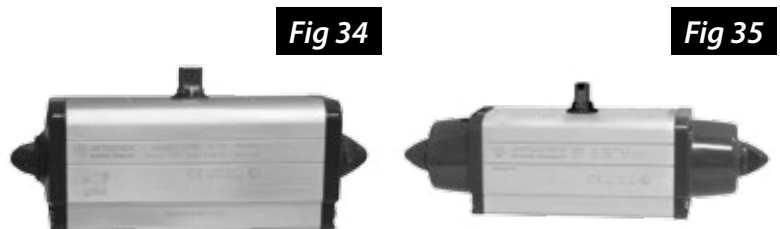
Required Tools:

- ◆ 7/16" Wrench
- ◆ 7/8" Wrench
- ◆ 5/16", 8mm, or Adjustable Wrench
- ◆ Vice
- ◆ D and F Series:
 - 5/8" Wrench
 - 11/16" Wrench
- ◆ E Series:
 - (2) 3/4" Wrenches

1. Determine the type of actuator you have.

- a. For a double-acting actuator (Fig 34), cycle the valve to the closed position and disconnect the air supply from the actuator.
- b. For a fail-safe actuator (Fig 35), disconnect the air supply from the actuator. Make note of whether the valve is in the normally open or normally closed position as shown in (Fig 36 & Fig 37). **Note: This distinction will be very important for the proper reassembly of the valve and the replacement of the actuator assembly.**
- c. Loosen the four bolts connecting the mounting bracket to the valve with the 7/16" wrench. Once the bolts are disengaged from the valve, lift the actuator assembly off of the valve and place it in a safe location (Fig 38). **Tip: It is only necessary to remove the mounting bracket from the valve. Leave the mounting bracket attached to the actuator for convenience.**

2. If the valve has heater jacket standoffs, remove them and place them with the actuator assembly. Remove the actuator adaptor and place it with the actuator assembly (Fig 39).



Standoffs and actuator adaptor

3. Remove the four body bolts using the two wrenches specified below (Fig 40). Remove the end caps and place them in a safe location (Fig 41).

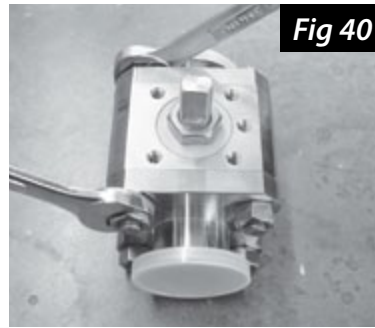


Fig 40

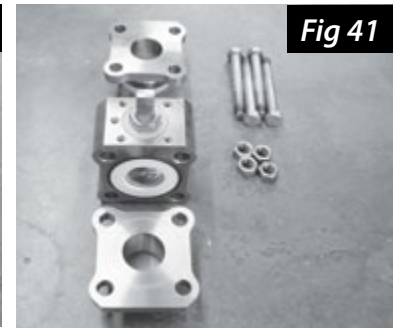


Fig 41

a. For D and F Series use 5/8" and 11/16" wrenches.

b. For the E Series use two 3/4" wrenches.

4. Remove and discard the Teflon® seats and body seal o-rings (Fig 42).

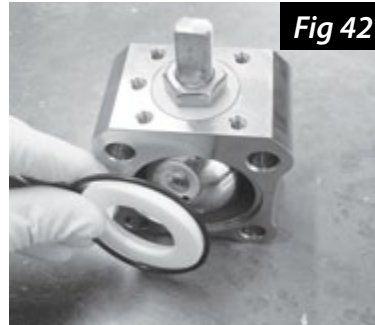


Fig 42

5. If you have not already done so, rotate the valve stem and ball to the "closed" position to remove the ball. Gently push the ball to remove it from the center section of the valve (Fig 43). Place the ball in a safe location for reuse or if replacing the ball it can now be discarded. **Note: If the ball is damaged due to corrosion or some other means, you can purchase a new one by contacting A&N Corporation's sales department.**

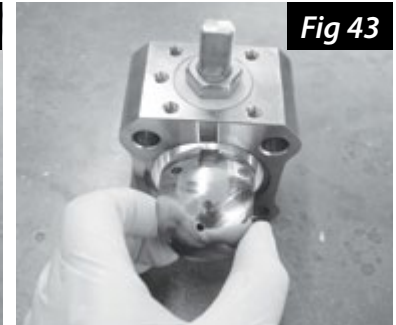


Fig 43

6. Remove the stem nut with a 7/8" wrench. Hold the valve stem in place by grasping the base of the stem on the inside of the valve body with a 5/16" or 8mm open-end wrench or an adjustable wrench (Fig 44).

Note: This nut will be replaced with a new nylon lock nut and therefore can be discarded.

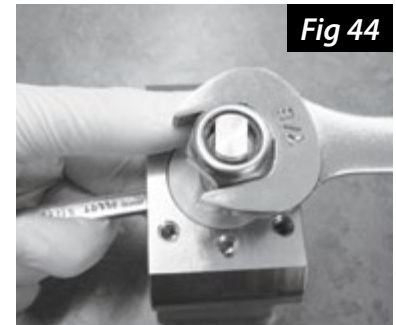


Fig 44

7. Push the valve stem inward and then back out. This will expose the PEEK stem bearing, two brass bushings, and the stem seal o-ring (Fig 45). Remove and discard the brass bushings and stem o-ring. Place the upper PEEK bearing in a safe location for reuse. If servicing the valve with a stem kit, discard the upper PEEK bearing.



Fig 45

8. Push the valve stem back in to completely remove it from the valve body. Slide the Teflon® spacer off and discard it (Fig 46).

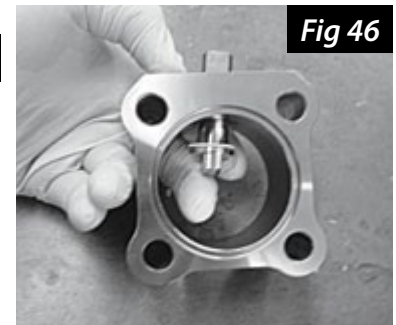


Fig 46

9. Disassembly is complete.

Reassembly

Recommendations: Use latex or lint free gloves when handling the interior components and surfaces of the ball valve. When reusing the ball and/or valve stem, clean all surfaces with isopropyl alcohol and a lint free towel. Remove any debris that may have accumulated on the surfaces. Be sure to distinguish between Legacy and XL instructions.

Required Tools:

- ◆ 7/16" Wrench
- ◆ Torque Wrench
- ◆ 7/8" Deep-well Socket
- ◆ 7/8" Wrench
- ◆ 5/16", 8mm, or Adjustable Wrench
- ◆ Vice
- ◆ D and F Series:
 - 5/8" Wrench
 - 11/16" Wrench
 - 11/16" Socket
- ◆ E Series:
 - (2) 3/4" Wrenches
 - 3/4" Socket

Optional:

- ◆ Dow Corning® Vacuum Grease (#0600001)
- ◆ Anti-Seize (#0605208)

1. Place a new Teflon® spacer on the valve stem (Fig 47).

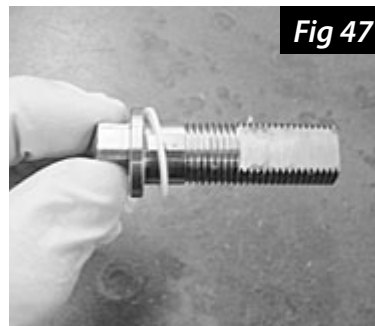


Fig 47

2. Insert the valve stem through the inside of the valve body (Fig 48).

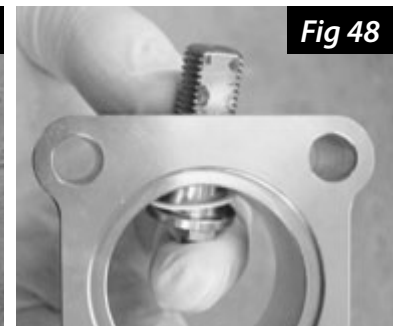


Fig 48

3. Position one of the two new brass bushings over the stem. Apply a liberal amount of vacuum grease around the inside and outside of the new stem seal o-ring. Slide the o-ring onto the stem (Fig 49). Next, slide the second new brass bushing on the stem. **Note: Applying sufficient vacuum grease will reduce stem o-ring wear and extend the life of the stem seal.**

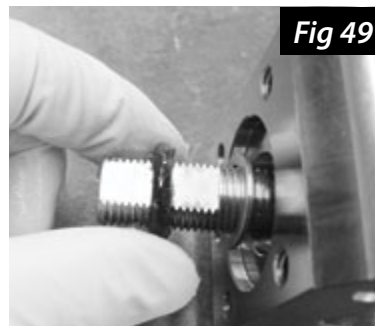


Fig 49

4. While holding the bottom of the stem, place the PEEK stem bearing over the top of the stem. Slide the PEEK stem bearing down until it rests in the groove on top of the body (Fig 50).

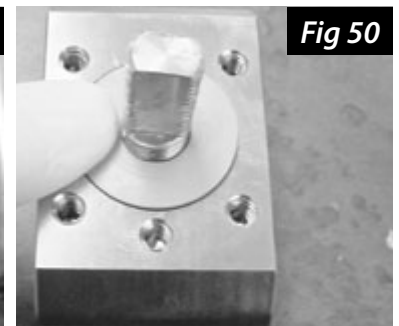


Fig 50

5. Wipe away any excess vacuum grease on the valve stem. Place a new stem lock nut onto the valve stem. Torque nut to 35 in-lbs with a torque wrench and 7/8" socket. Hold the valve stem in place by grasping the base of the stem on the inside of the valve body with a 5/16" or 8mm open-end wrench or an adjustable wrench (Fig 51). **WARNING: Over tightening the stem nut will cause the o-ring to wear prematurely and greatly reduce cycle life. Stem leaks may also result.**

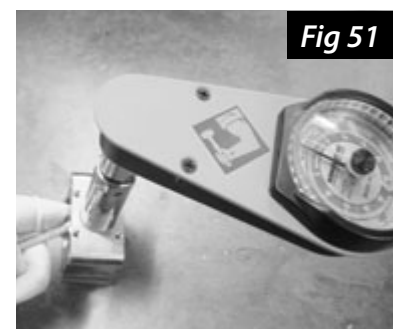


Fig 51

6. Apply a thin coat of vacuum grease around the body seal o-rings and place on the end caps as shown. Apply a thin coat of vacuum grease to the inner radius surface of each Teflon® seat (Fig 52).

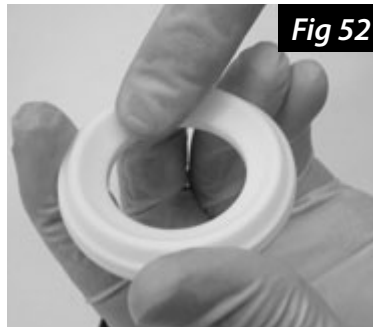


Fig 52

7. Place the Teflon® seat within the o-ring on the end cap as shown. Be sure to place the end cap on a soft surface to avoid damaging the flange (Fig 53). **Note: The new Teflon® seats will be a little thicker than the used ones. This is perfectly normal as the seats are designed to be compressed when the valve is fully assembled.**



Fig 53

8. With one end cap on a flat surface, place the valve's center section over the end cap. Make sure that the contours of the end cap match the contours of the center section. Orient the center section such that the stop pin, or stop pin hole, is on the left while the valve stem points away from you (Fig 54).



Fig 54

9. Align the valve stem with the notch in the ball and carefully drop the ball into the valve center section, being sure the evac hole is facing up (Fig 55).

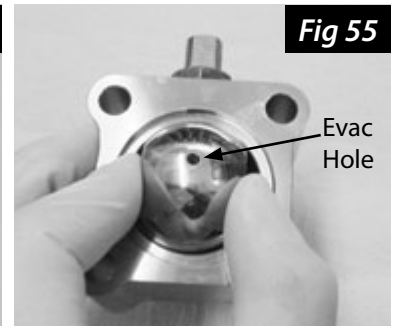


Fig 55

10. Position the second lubricated Teflon® seat and body seal o-ring onto the center section as shown in (Fig 56).

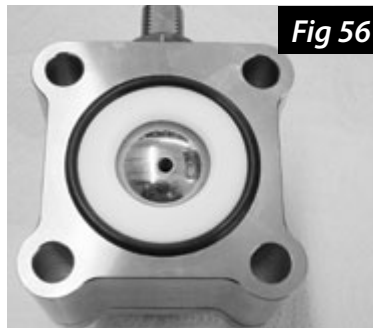


Fig 56

11. Set the second end cap on top of the center section making sure that the contours match (Fig 57). Insert the four body bolts into their holes such that the bolt heads and the evac hole of the ball are on the same side of the valve.



Fig 57

12. Begin to thread the body bolt nuts onto the body bolts by hand (Fig 58). Anti-seize lubricant can be applied inside the nut threads to ease insertion and prevent galling. Starting with one bolt, tighten so there is only a small compression and move to the next bolt located diagonally from the first. Do the same with the other two bolts. Tighten until there is no gap between the end caps and the valve body (approximately 35 ft-lbs). **Note: Failure to tighten all bolts evenly can cause the body o-ring to slip out and/or damage the Teflon® seats. Do not tighten one or more bolts with too much force over the others.**



Fig 58

a. For D and F Series use 5/8" and 11/16" wrenches.

b. For the E Series use two 3/4" wrenches.

13. Let the valve sit for 10 to 15 minutes to allow the Teflon® seats to form to the shape of the ball.

14. Secure the valve in a vice and manually cycle the valve 4 or 5 times to check for proper functioning. **Note: If your valve is pneumatically actuated with a fail-safe actuator and is configured to be normally open, leave the valve in the open position. Otherwise, leave the valve in the closed position.**

15. If your valve is configured to be normally open, make sure that the valve is in the open position (Fig 59). If your valve is configured to be normally closed, or if your valve uses a double-acting actuator, make sure that the valve is in the closed position (Fig 60). Failure to do so may result in improper actuation and/or false signals if your valve has position indication.

16. Place the actuator adaptor onto the valve stem.

17. If your valve has heater jacket standoffs, position them as shown (Fig 61).

18. Gently place the actuator assembly onto the valve such that when the valve body bolt heads are facing you, the control ports for the actuator are on the left hand side of the assembly (Fig 62).

19. Start tightening the four bolts by hand. Once you have all four bolts started, use the 7/16" wrench to tighten the bolts until the actuator assembly is firmly secured to the valve.

20. Check that the valve actuates properly, and in the case of a valve with position indication, check that you have an "open" signal when the valve is open and a "closed" signal when the valve is closed.

21. Replacement is complete.



Fig 59



Fig 60

Heater Jacket Standoffs

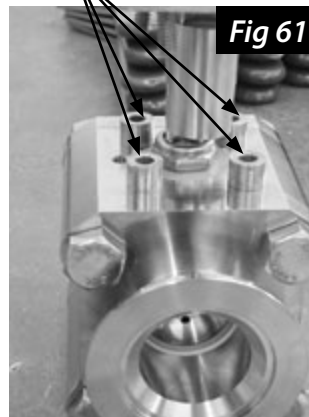


Fig 61



Fig 62

XL DESIGN

Manual

Disassembly

Determine if your valve is manual or pneumatic. Manual valves have a handle attached to the valve stem, while pneumatic valves have an actuator positioned on top of the valve.

Recommendations: Wear latex or lint free gloves when handling the interior components and surfaces of the ball valve. If you are replacing the ball, replace the Teflon® seats and body seal o-rings at this time as well. If replacing the valve stem, replace the stem seal o-ring. Maintenance kits containing these and other wearable components can be purchased by contacting A&N Corporation's sales department.

Required Tools:

- ◆ 3/16" Hex Key
- ◆ 7/8" Wrench
- ◆ 5/16", 8mm, or Adjustable Wrench
- ◆ Vice
- ◆ D and F Series:
 - 5/8" Wrench
 - 11/16" Wrench
- ◆ E Series:
 - (2) 3/4" Wrenches

1. If your valve is equipped with a locking kit, remove any lock or pin that may be in place (Fig 63).
2. Next, remove the valve handle by removing the top stem nut with the 7/8" wrench. Set the nut aside for later use (Fig 64). **Tip: With one hand, hold the valve handle firmly and with the other hand use the wrench to loosen the nut.**
3. Remove the lock washer and handle by lifting the handle off of the valve stem (Fig 65). Set these parts aside for later use (Fig 66). Be careful not to lose the lock washer. **Note: Valves configured with a handle locking kit will have an extra lock washer under the handle. Keep it for later use.**
4. To finish removing the lock plate, use the 3/16" hex key to remove the two socket head screws securing the lock plate to the valve (Fig 67).
5. Remove the lock plate (Fig 68).

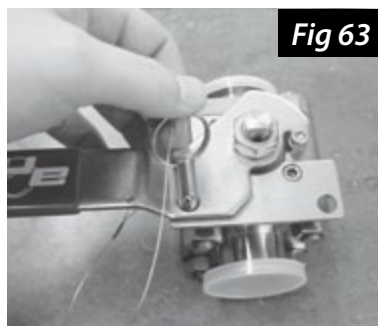


Fig 63

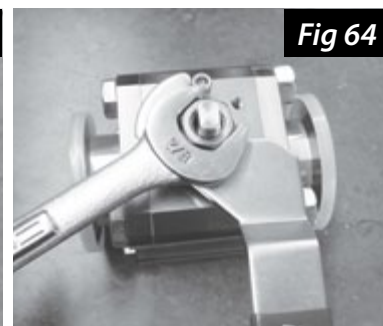


Fig 64

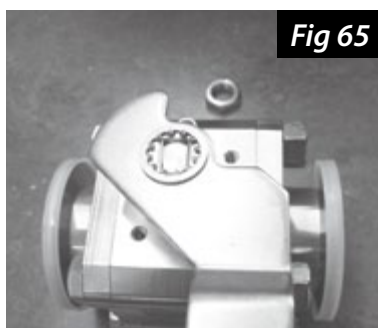


Fig 65



Fig 66

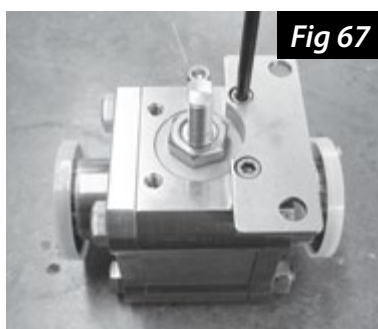


Fig 67

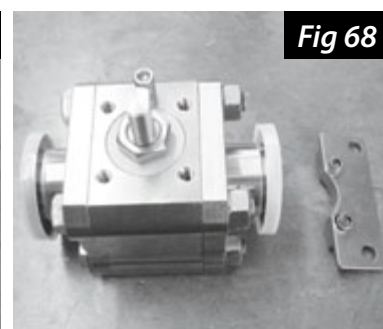


Fig 68

6. Remove the four body bolts using the two wrenches specified below (Fig 69). Remove the end caps and place them in a safe location (Fig 70).

a. For D and F Series use 5/8" and 11/16" wrenches.

b. For the E Series use two 3/4" wrenches.

7. Remove and discard the Teflon® seats and body seal o-rings (Fig 71).

8. If you have not already done so, rotate the valve stem and ball to the "closed" position to remove the ball. Gently push the ball to remove it from the center section of the valve (Fig 72). Place the ball in a safe location for reuse or if replacing the ball it can now be discarded. **Note: If the ball is damaged due to corrosion or some other means, you can purchase a new one by contacting A&N Corporation's sales department.**

9. Remove the stem nut with a 7/8" wrench. Hold the valve stem in place by grasping the base of the stem on the inside of the valve body with a 5/16" or 8mm open-end wrench or an adjustable wrench (Fig 73). **Note: This nut will be replaced with a new nylon lock nut and therefore can be discarded.**

10. Push the valve stem inward and then back out. This will expose the upper PEEK stem bearing and the stem seal o-ring (Fig 74). Place the upper PEEK bearing in a safe location for reuse. If servicing the valve with a stem kit, discard the upper PEEK bearing.

11. Remove and discard the stem o-ring. Push the valve stem back in to completely remove it from the valve body (Fig 75). Remove the lower PEEK stem bearing from the stem and discard it. If you are replacing the valve stem, you may now discard it. **Note: If the valve stem is damaged due to corrosion or some other means, you can purchase a new one by ordering a stem kit.**

12. Disassembly is complete.

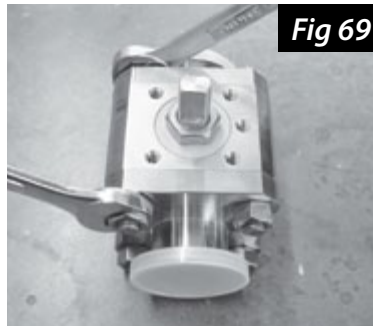


Fig 69

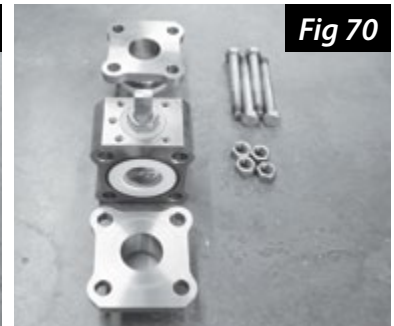


Fig 70

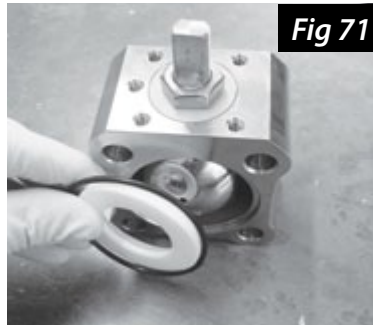


Fig 71

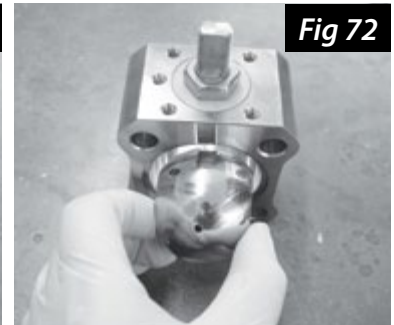


Fig 72

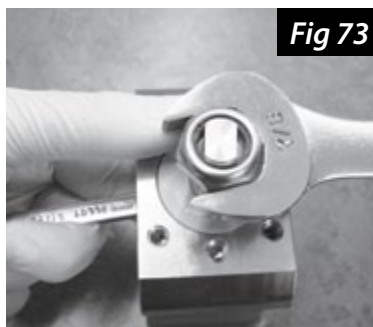


Fig 73

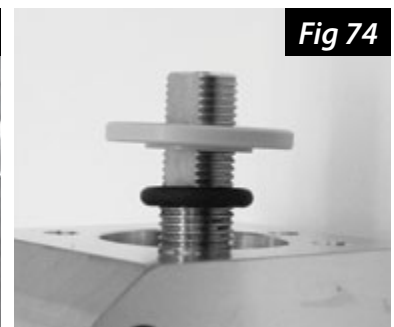


Fig 74



Fig 75

Reassembly

Recommendations: Use latex or lint free gloves when handling the interior components and surfaces of the ball valve. When reusing the ball and/or valve stem, clean all surfaces with isopropyl alcohol and a lint free towel. Remove any debris that may have accumulated on the surfaces. Be sure to distinguish between Legacy and XL instructions.

Required Tools:

- ◆ Torque Wrench
- ◆ 7/8" Deep-well Socket
- ◆ 7/8" Wrench
- ◆ 5/16", 8mm, or Adjustable Wrench
- ◆ Vice
- ◆ D and F Series:
 - 5/8" Wrench
 - 11/16" Wrench
- ◆ E Series:
 - (2) 3/4" Wrenches

Optional:

- ◆ Dow Corning® Vacuum Grease (#0600001)
- ◆ Anti-Seize (#0605208)

1. Place a new lower PEEK bearing on the valve stem (Fig 76).



Fig 76

2. Insert the valve stem through the inside of the valve body (Fig 77).

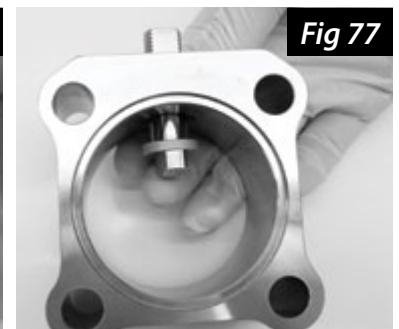


Fig 77

3. Apply a liberal amount of vacuum grease around the inside and outside of the new stem seal o-ring. Slide the o-ring onto the stem (Fig 78). **Note: Applying sufficient vacuum grease will reduce stem o-ring wear and extend the life of the stem seal.**



Fig 78

4. Place the upper PEEK stem bearing over the top of the stem. While holding the bottom of the stem, firmly press down on the upper PEEK bearing until it is fully seated (Fig 79).

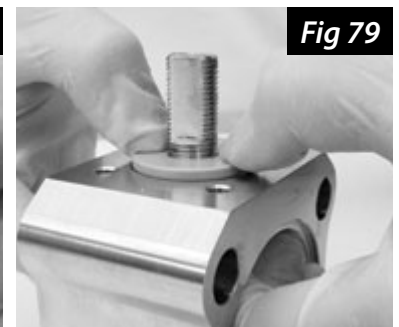


Fig 79

5. Place a new stem lock nut onto the valve stem. Torque nut to 35 in-lbs with a torque wrench and 7/8" socket. Hold the valve stem in place by grasping the base of the stem on the inside of the valve body with a 5/16" or 8mm open-end wrench or an adjustable wrench (Fig 80). **WARNING: Over tightening the stem nut will cause the o-ring to wear prematurely and greatly reduce cycle life. Stem leaks may also result.**

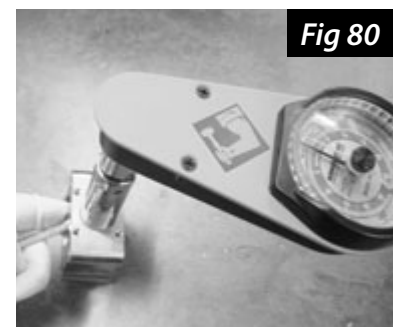


Fig 80

6. Apply a thin coat of vacuum grease around the body seal o-rings and place on the end caps as shown. Apply a thin coat of vacuum grease to the inner radius surface of each Teflon® seat (Fig 81).

7. Place the Teflon® seat within the o-ring on the end cap as shown. Be sure to place the end cap on a soft surface to avoid damaging the flange (Fig 82). **Note: The new Teflon® seats will be a little thicker than the used ones. This is perfectly normal as the seats are designed to be compressed when the valve is fully assembled.**

8. With one end cap on a flat surface, place the valve's center section over the end cap. Make sure that the contours of the end cap match the contours of the center section. Orient the center section such that the stop pin, or stop pin hole, is on the left while the valve stem points away from you (Fig 83).

9. Align the valve stem with the notch in the ball and carefully drop the ball into the valve center section, being sure the evac hole is facing up (Fig 84).

10. Position the second lubricated Teflon® seat and body seal o-ring onto the center section as shown in (Fig 85).

11. Set the second end cap on top of the center section making sure that the contours match (Fig 86). Insert the four body bolts into their holes such that the bolt heads and the evac hole of the ball are on the same side of the valve.

12. Begin to thread the body bolt nuts onto the body bolts by hand (Fig 87). Anti-seize lubricant can be applied inside the nut threads to ease insertion and prevent galling. Starting with one bolt, tighten so there is only a small compression and move to the next bolt located diagonally from the first. Do the same with the other two bolts. Tighten until there is no gap between the end caps and the valve body (approximately 35 ft-lbs). **Note: Failure to tighten all bolts evenly can cause the body o-ring to slip out and/or damage the Teflon® seats. Do not tighten one or more bolts with too much force over the others.**

a. For D and F Series use 5/8" and 11/16" wrenches.

b. For the E Series use two 3/4" wrenches.

13. Let the valve sit for 10 to 15 minutes to allow the Teflon® seats to form to the shape of the ball.

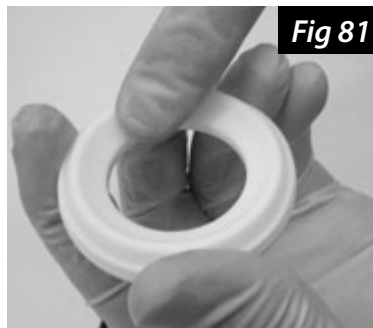


Fig 81

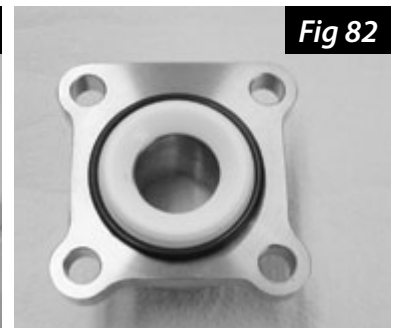


Fig 82



Fig 83

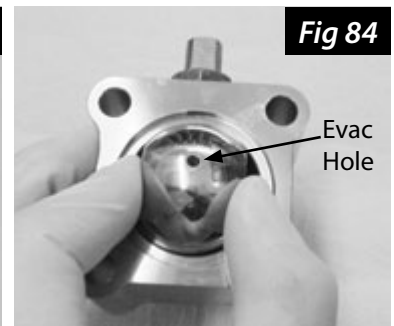


Fig 84

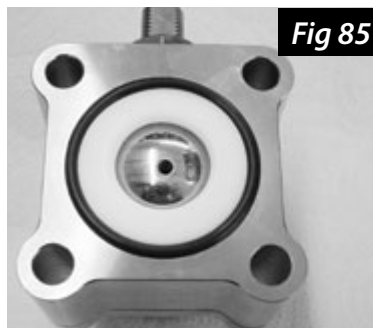


Fig 85



Fig 86



Fig 87

14. Secure the valve in a vice and manually cycle the valve 4 or 5 times to check for proper functioning.

15. If your valve is equipped with a lock kit, skip to step 17. Otherwise, place the handle on the valve stem with a lock washer on top of the handle over the stem (Fig 88).

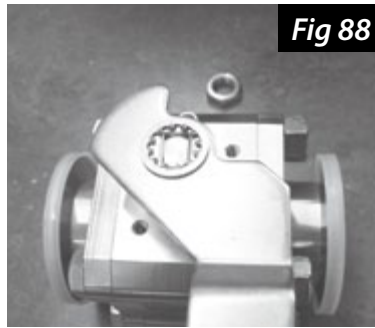


Fig 88

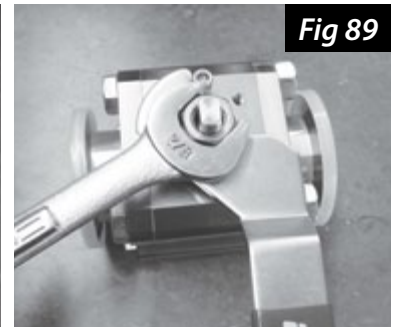


Fig 89

16. Thread the nut onto the valve stem and tighten with the 7/8" wrench until the handle is secure (Fig 89).

17. If your valve is equipped with a lock kit follow these steps.

a. Position the lock plate on the same side of the valve as the valve body bolt nuts and secure the plate to the valve using the 3/16" hex key and the two socket head screws that were previously removed (Fig 90 & 91).

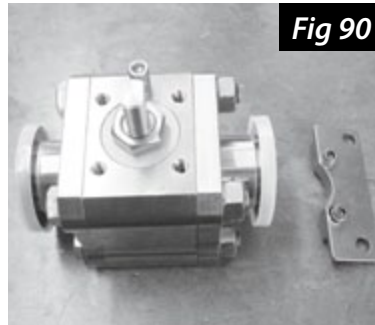


Fig 90

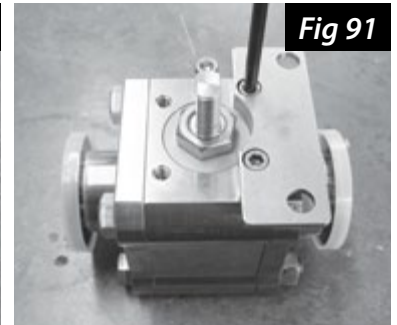


Fig 91

b. Place a lock washer on the valve stem. Then place the handle onto the valve stem over the washer.

18. Place a lock washer onto the valve stem over the handle (Fig 88).

19. Thread the nut onto the valve stem and tighten with the 7/8" wrench until the handle is secure (Fig 89).

20. Insert pin (or a padlock of your choice) through the valve handle and lock plate (Fig 92).

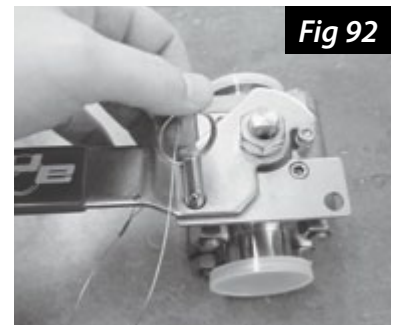


Fig 92

21. Replacement is complete.

Pneumatic

Disassembly

Recommendations: Wear latex or lint free gloves when handling the interior components and surfaces of the ball valve. If you are replacing the ball, replace the Teflon® seats and body seal o-rings at this time as well. If replacing the valve stem, replace the stem seal o-ring. Maintenance kits containing these and other wearable components can be purchased by contacting A&N Corporation's sales department.

Required Tools:

- ◆ 7/16" Wrench
- ◆ 7/8" Wrench
- ◆ 5/16", 8mm, or Adjustable Wrench
- ◆ Vice
- ◆ D and F Series:
 - 5/8" Wrench
 - 11/16" Wrench
- ◆ E Series:
 - (2) 3/4" Wrenches

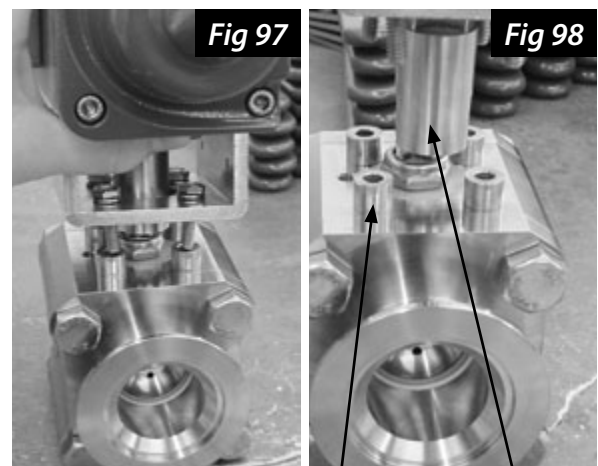
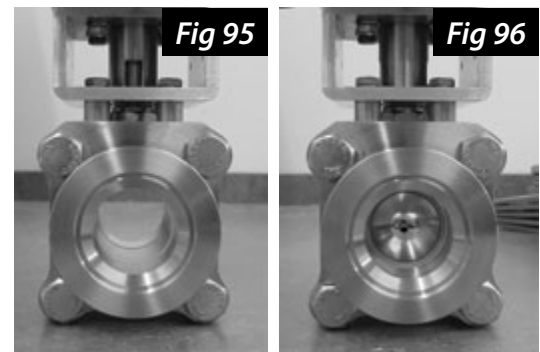
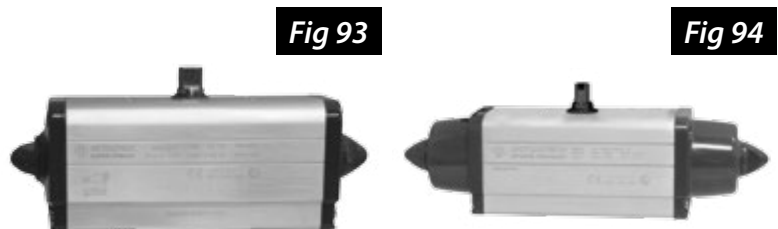
1. Determine the type of actuator you have.

a. For a double-acting actuator (Fig 93), cycle the valve to the closed position and disconnect the air supply from the actuator.

b. For a fail-safe actuator (Fig 94), disconnect the air supply from the actuator. Make note of whether the valve is in the normally open or normally closed position as shown in (Fig 95 & Fig 96). **Note: This distinction will be very important for the proper reassembly of the valve and the replacement of the actuator assembly.**

c. Loosen the four bolts connecting the mounting bracket to the valve with the 7/16" wrench. Once the bolts are disengaged from the valve, lift the actuator assembly off of the valve and place it in a safe location (Fig 97). **Tip: It is only necessary to remove the mounting bracket from the valve. Leave the mounting bracket attached to the actuator for convenience.**

2. If the valve has heater jacket standoffs, remove them and place them with the actuator assembly. Remove the actuator adaptor and place it with the actuator assembly (Fig 98).



Standoffs and actuator adaptor

3. Remove the four body bolts using the two wrenches specified below (Fig 99). Remove the end caps and place them in a safe location (Fig 100).

a. For D and F Series use 5/8" and 11/16" wrenches.

b. For the E Series use two 3/4" wrenches.

4. Remove and discard the Teflon® seats and body seal o-rings (Fig 101).

5. If you have not already done so, rotate the valve stem and ball to the "closed" position to remove the ball. Gently push the ball to remove it from the center section of the valve (Fig 102). Place the ball in a safe location for reuse or if replacing the ball it can now be discarded. **Note: If the ball is damaged due to corrosion or some other means, you can purchase a new one by contacting A&N Corporation's sales department.**

6. Remove the stem nut with a 7/8" wrench. Hold the valve stem in place by grasping the base of the stem on the inside of the valve body with a 5/16" or 8mm open-end wrench or an adjustable wrench (Fig 103). **Note: This nut will be replaced with a new nylon lock nut and therefore can be discarded.**

7. Push the valve stem inward and then back out. This will expose the upper PEEK stem bearing and the stem seal o-ring (Fig 104). Place the upper PEEK bearing in a safe location for reuse. If servicing the valve with a stem kit, discard the upper PEEK bearing.

8. Remove and discard the stem o-ring. Push the valve stem back in to completely remove it from the valve body (Fig 105). Remove the lower PEEK stem bearing from the stem and discard it. If you are replacing the valve stem, you may now discard it. **Note: If the valve stem is damaged due to corrosion or some other means, you can purchase a new one by ordering a stem kit.**

9. Disassembly is complete.

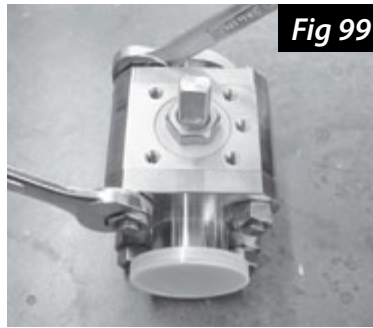


Fig 99

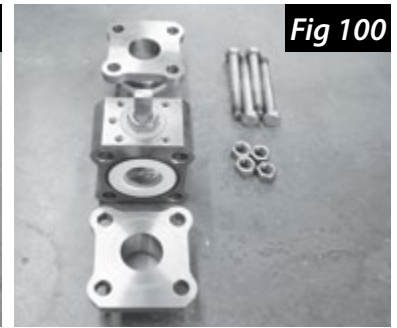


Fig 100

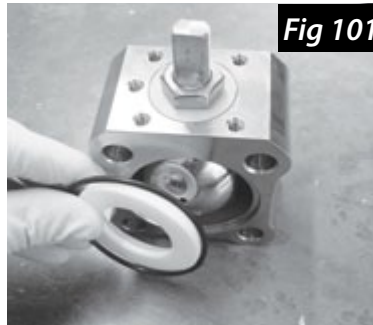


Fig 101

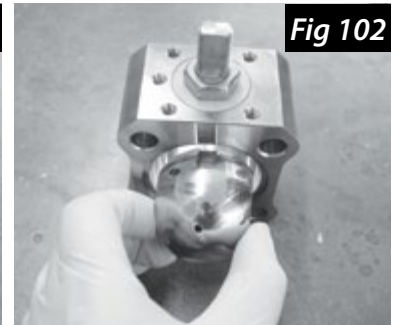


Fig 102

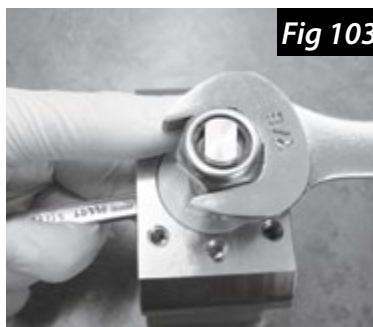


Fig 103

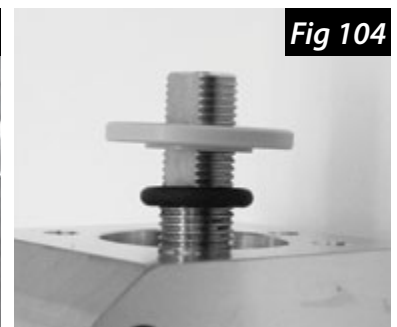


Fig 104



Fig 105

Reassembly

Recommendations: Use latex or lint free gloves when handling the interior components and surfaces of the ball valve. When reusing the ball and/or valve stem, clean all surfaces with isopropyl alcohol and a lint free towel. Remove any debris that may have accumulated on the surfaces. Be sure to distinguish between Legacy and XL instructions.

Required Tools:

- ◆ Torque Wrench
- ◆ 7/8" Deep-well Socket
- ◆ 7/8" Wrench
- ◆ 5/16", 8mm, or Adjustable Wrench
- ◆ Vice
- ◆ D and F Series:
 - 5/8" Wrench
 - 11/16" Wrench
- ◆ E Series:
 - (2) 3/4" Wrenches

Optional:

- ◆ Dow Corning® Vacuum Grease (#0600001)
- ◆ Anti-Seize (#0605208)

1. Place a new lower PEEK bearing on the valve stem (Fig 106).



Fig 106

2. Insert the valve stem through the inside of the valve body (Fig 107).

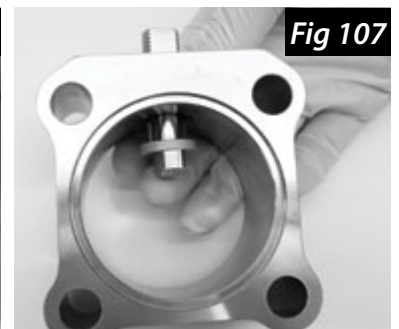


Fig 107

3. Apply a liberal amount of vacuum grease around the inside and outside of the new stem seal o-ring. Slide the o-ring onto the stem (Fig 108). **Note: Applying sufficient vacuum grease will reduce stem o-ring wear and extend the life of the stem seal.**



Fig 108

4. Place the upper PEEK stem bearing over the top of the stem. While holding the bottom of the stem, firmly press down on the upper PEEK bearing until it is fully seated (Fig 109).

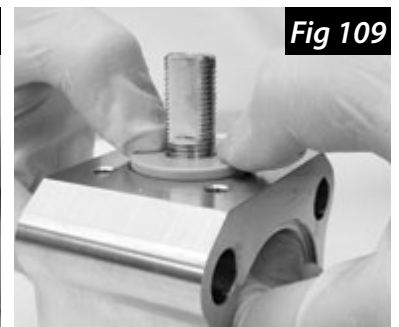


Fig 109

5. Place a new stem lock nut onto the valve stem. Torque nut to 35 in-lbs with a torque wrench and 7/8" socket. Hold the valve stem in place by grasping the base of the stem on the inside of the valve body with a 5/16" or 8mm open-end wrench or an adjustable wrench (Fig 110). **WARNING: Over tightening the stem nut will cause the o-ring to wear prematurely and greatly reduce cycle life. Stem leaks may also result.**

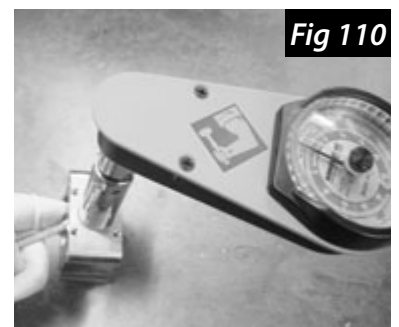


Fig 110

6. Apply a thin coat of vacuum grease around the body seal o-rings and place on the end caps as shown. Apply a thin coat of vacuum grease to the inner radius surface of each Teflon® seat (Fig 11).

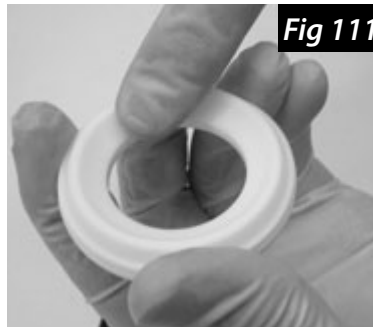


Fig 111

7. Place the Teflon® seat within the o-ring on the end cap as shown. Be sure to place the end cap on a soft surface to avoid damaging the flange (Fig 112). **Note: The new Teflon® seats will be a little thicker than the used ones. This is perfectly normal as the seats are designed to be compressed when the valve is fully assembled.**

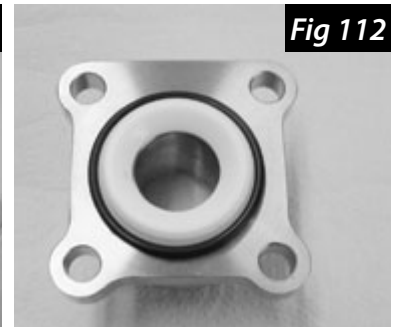


Fig 112

8. With one end cap on a flat surface, place the valve's center section over the end cap. Make sure that the contours of the end cap match the contours of the center section. Orient the center section such that the stop pin, or stop pin hole, is on the left while the valve stem points away from you (Fig 113).



Fig 113

9. Align the valve stem with the notch in the ball and carefully drop the ball into the valve center section, being sure the evac hole is facing up (Fig 114).

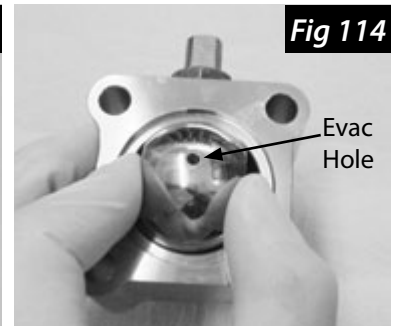


Fig 114

10. Position the second lubricated Teflon® seat and body seal o-ring onto the center section as shown in (Fig 115).

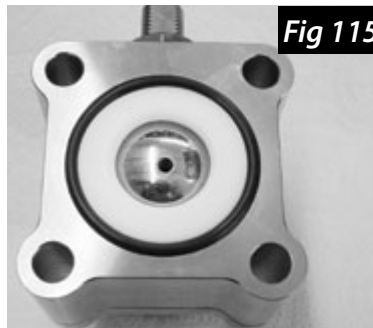


Fig 115

11. Set the second end cap on top of the center section making sure that the contours match (Fig 116). Insert the four body bolts into their holes such that the bolt heads and the evac hole of the ball are on the same side of the valve.



Fig 116

12. Begin to thread the body bolt nuts onto the body bolts by hand (Fig 117). Anti-seize lubricant can be applied inside the nut threads to ease insertion and prevent galling. Starting with one bolt, tighten so there is only a small compression and move to the next bolt located diagonally from the first. Do the same with the other two bolts. Tighten until there is no gap between the end caps and the valve body (approximately 35 ft-lbs). **Note: Failure to tighten all bolts evenly can cause the body o-ring to slip out and/or damage the Teflon® seats. Do not tighten one or more bolts with too much force over the others.**



Fig 117

a. For D and F Series use 5/8" and 11/16" wrenches.

b. For the E Series use two 3/4" wrenches.

13. Let the valve sit for 10 to 15 minutes to allow the Teflon® seats to form to the shape of the ball.

14. If your valve is configured to be normally open, make sure that the valve is in the open position (Fig 118). If your valve is configured to be normally closed, or if your valve uses a double-acting actuator, make sure that the valve is in the closed position (Fig 119). Failure to do so may result in improper actuation and/or false signals if your valve has position indication.

15. Place the actuator adaptor onto the valve stem.

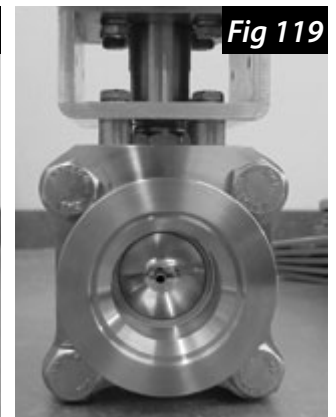
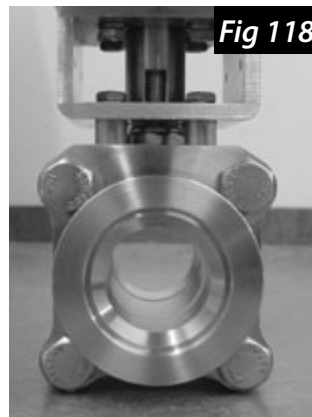
16. If your valve has heater jacket standoffs, position them as shown (Fig 120).

17. Gently place the actuator assembly onto the valve such that when the valve body bolt heads are facing you, the control ports for the actuator are on the left hand side of the assembly (Fig 121).

18. Start tightening the four bolts by hand. Once you have all four bolts started, use the 7/16" wrench to tighten the bolts until the actuator assembly is firmly secured to the valve.

19. Check that the valve actuates properly, and in the case of a valve with position indication, check that you have an "open" signal when the valve is open and a "closed" signal when the valve is closed.

20. Replacement is complete.



Heater Jacket Standoffs

