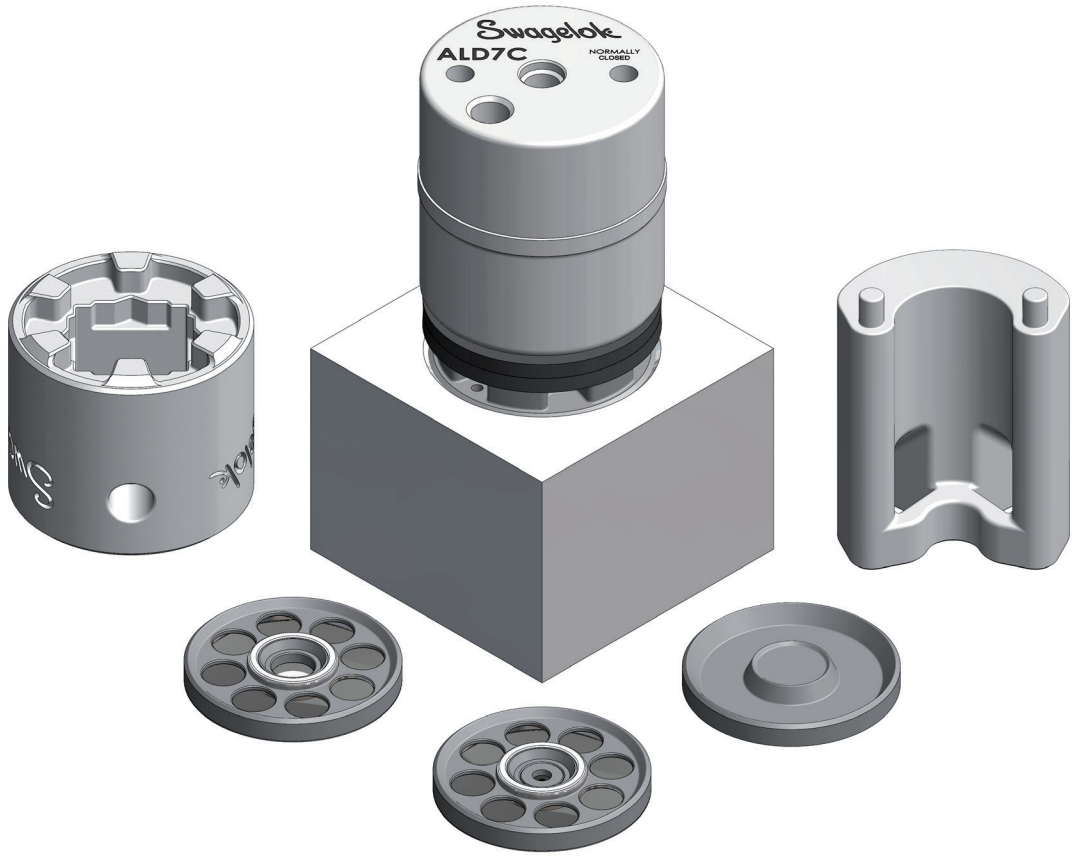
ALD7C Series Diaphragm Valve
Service Instructions



Contents

NOTE
Appropriate testing should be performed after reassembly is complete to ensure proper installation.

⚠ WARNING

Before removing the valve from service, to avoid personal injury, you must:
- **Depressurize the system**
- **Cycle the valve**
- **Purge system to remove any residual system media left in valve**

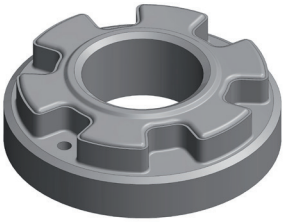
⚠ WARNING

Residual material may be left in the valve and system. Take proper precautions to prevent personal injury from contact.

Kit Contents

Standard Cartridge Kit

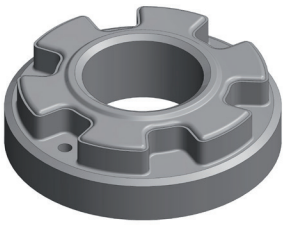
(1) Standard Cartridge



(1) Bonnet Nut

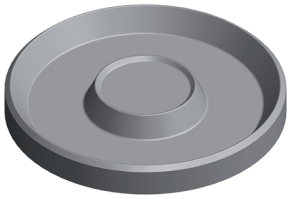
Orifice Cartridge Kit

(1) Orifice Cartridge

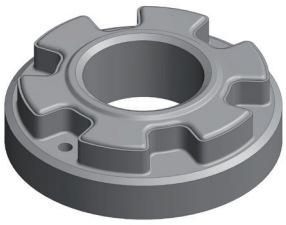


(1) Bonnet Nut

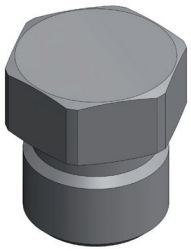
Flow-Through Kit



(1) Flow Through Cap



(1) Bonnet Nut

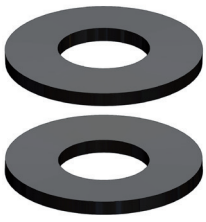


(1) Load Screw

Actuator Kit

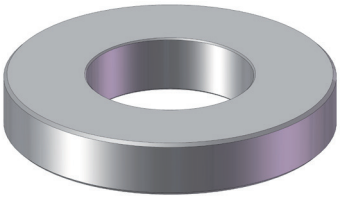
(1) Actuator with Button

Disc Spring Kit



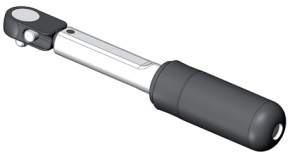
(1) Disc Springs

Spacer Kit



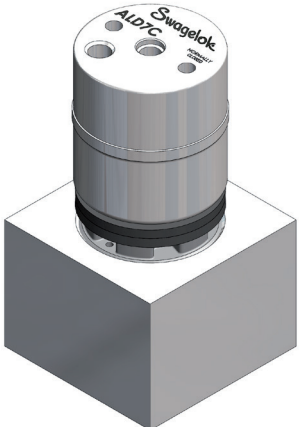
(1) Spacer

Tool Requirements

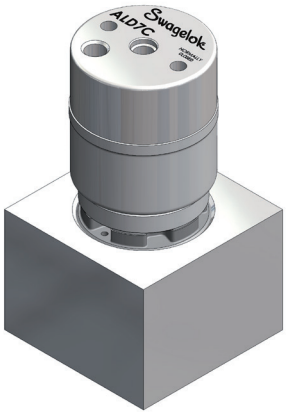
Tool	Size	For Use With	Specifications
Swagelok® Tooling			
Swagelok Spanner Tool MS-TOOL-ALD-FA 	1/4 in. Square Drive	Actuator: Removal and Flow setting/ adjustment	Max Torque: 160 in-lbs. (18.1 N·m)
Swagelok Socket Tool MS-TOOL-ALD-BNST 	1/2 in. Square Drive	Bonnet Nut/Load Screw: Tightening or removal	Max Torque: 650 in-lbs. (73.4 N·m)
Standard Tooling			
Ratchet Wrench 	1/4 in.	Swagelok Spanner Tool	–
	1/2 in.	Swagelok Socket Tool	
Socket Extension (optional) 	1/4 in. 2 in. min length	Swagelok Spanner Tool	–
	1/2 in. 2 in. min length	Swagelok Socket Tool	
Torque Wrench 	1/4 in. Up to 160 in.·lb (up to 18.1 N·m)	Swagelok Spanner Tool	–
	1/2 in. Up to 750 in.·lb (up to 73.5 N·m)	Swagelok Socket Tool	
Vacuum Suction Tool 	–	Cartridge	–

Configurations/Exploded View

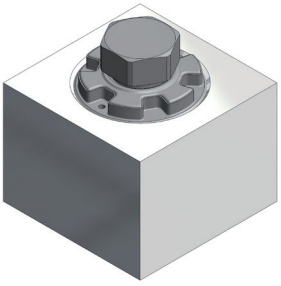
Field Flow Adjustable Configuration

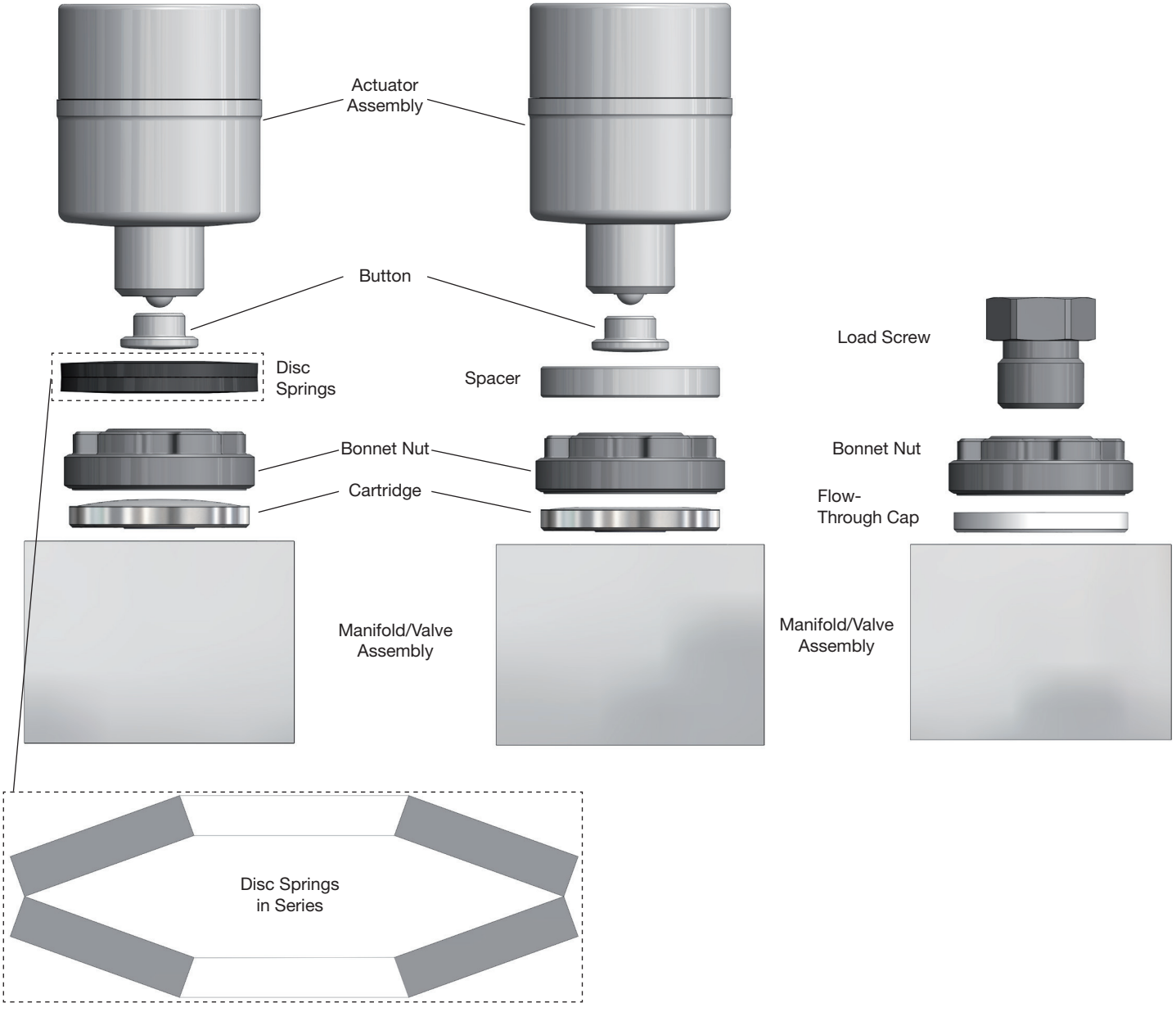


Non-Adjustable Flow Configuration



Flow-Through Configuration





Quick Start Guide

<table>
<tr><th colspan="2" rowspan="2">Quick Start Guide</th><th colspan="4">Installing New</th><th rowspan="2">Flow Adjustments

(Field flow adjustable configurations only)</th></tr>
<tr><th>Standard Cartridge</th><th>Orifice Cartridge</th><th>Flow-Through Cap</th><th>Actuator</th></tr>
<tr><td rowspan="3">Current Configuration</td><td>Field Flow Adjustable Configuration</td><td colspan="4" rowspan="2">Actuator Disassembly, see page 6</td><td>Field Flow Adjustable Instructions, see page 11</td></tr>
<tr><td>Non-Adjustable Flow Configuration</td><td rowspan="2"></td></tr>
<tr><td>Flow-Through Configuration</td><td colspan="4">Flow-Through Cap Disassembly, see page 12</td></tr>
</table>

Actuator Disassembly

Field Flow Adjustable and Non-Adjustable Flow Configurations

NOTICE

Current valve flow setting will be lost. Record any pertinent process parameters for future reference.

⚠ WARNING

Before servicing any installed valve, you must:

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

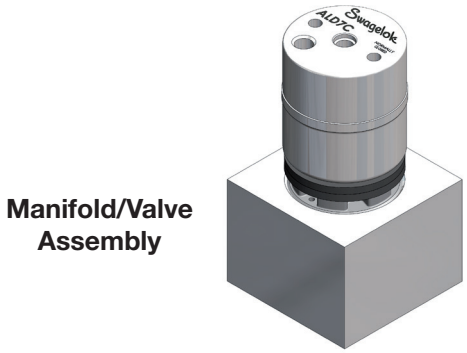
Tool Requirements:

- **Swagelok Spanner Tool**
- **1/4 in. Ratchet Wrench**

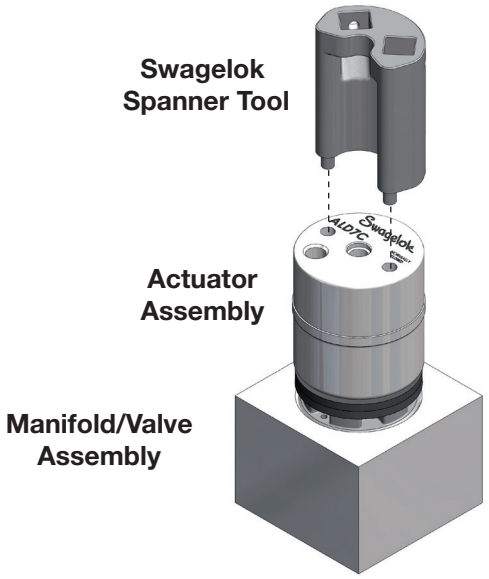
Kit Requirements: N/A

Instructions:

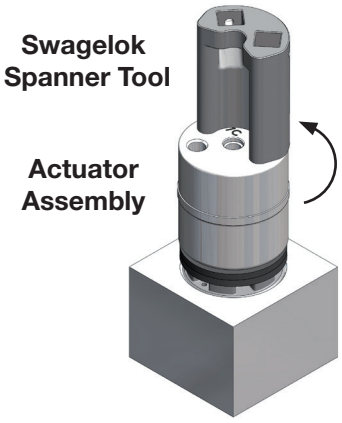
1. After depressurizing the system and purging the valve, remove the **manifold/valve assembly** from the system, if possible.
2. Tightly secure the manifold/valve assembly to prevent any effect from the disassembly torque.



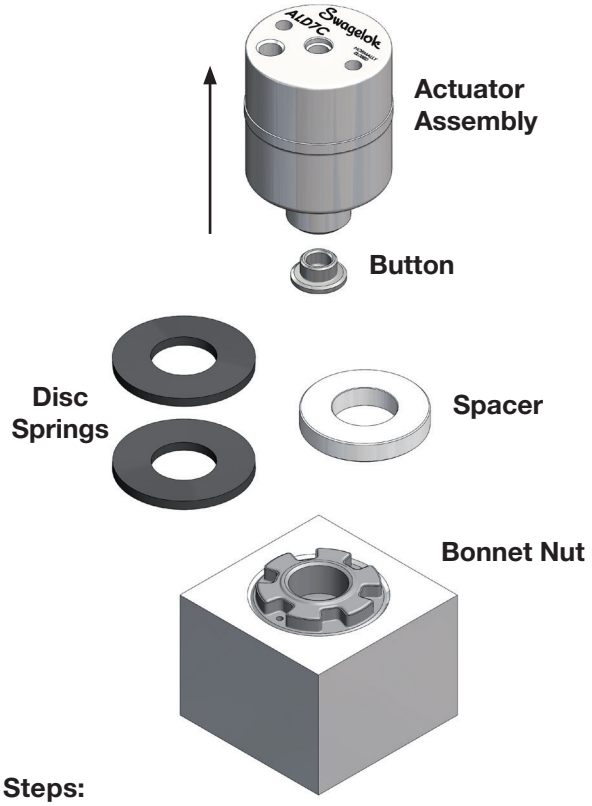
3. Connect a 1/4 in. ratchet wrench to the **Swagelok® spanner tool** (either square drive may be used).
4. Align the Swagelok spanner tool's pins with the two matching cap holes on the **actuator assembly**.



5. Loosen the **actuator assembly** by turning the **Swagelok spanner tool** counterclockwise.



6. Remove the actuator assembly, button, and disc springs/spacer from the **bonnet nut.**
   - If replacing actuator only, discard used actuator assembly and button. Disc springs or spacer can be set aside for re-use.
   - If replacing cartridge, set aside **actuator assembly**, **button**, **disc springs**, and/or **spacer** for re-use.



Next Steps:

- For cartridge replacement or flow-through cap installation, see page 7, Cartridge Disassembly.
- For new actuator assembly:
  - Non-Adjustable Flow Configurations, see page 9, Non-Adjustable Flow Actuator Assembly.
  - Field Flow Adjustable Configurations, see page 10, Field Flow Adjustable Actuator Assembly.

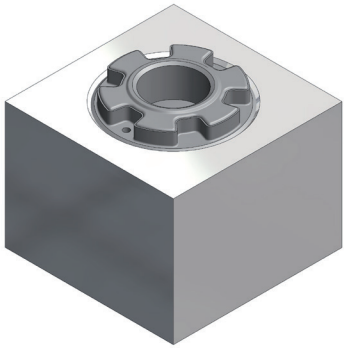
Cartridge Disassembly

Field Flow Adjustable and Non-Adjustable Flow Configurations

Tool Requirements:

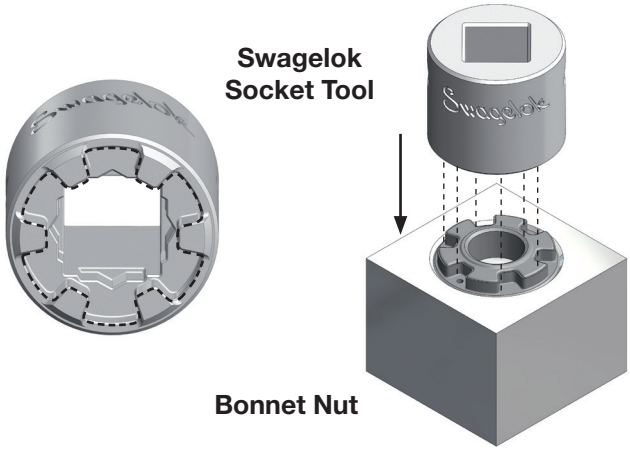
- **Swagelok Socket Tool**
- **1/2 in. Ratchet Wrench**

Kit Requirements: N/A

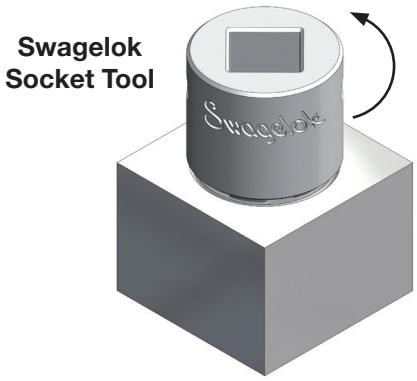


Instructions:

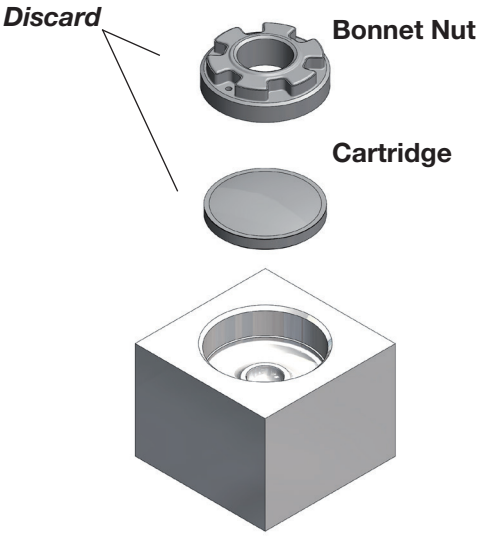
1. Tightly secure the manifold/valve assembly to prevent any effect from the disassembly torque.
2. Connect a 1/2 in. ratchet wrench to the **Swagelok socket tool**.



3. Align the **Swagelok socket tool's** spline with the spline on the bonnet nut.
4. Loosen the bonnet nut by turning the Swagelok socket tool counterclockwise.



5. Remove the **bonnet nut** and discard. Using a vacuum suction tool, remove the **cartridge** and **discard**.



Next Steps:

- For new cartridge installation, see page 8, Cartridge Assembly.
- For flow-through cap installation, see page 13, Flow-Through Cap Assembly.

Cartridge Assembly

Field Flow Adjustable and Non-Adjustable Flow Configurations

Tool Requirements:

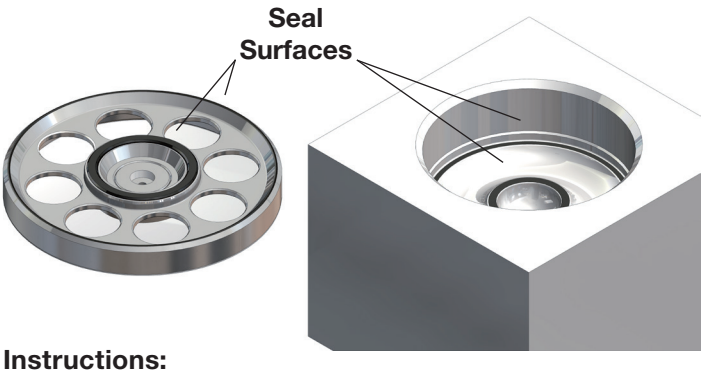
- **Swagelok Socket Tool**
- **1/2 in. Torque Wrench**

Kit Requirements:

- **Standard or Orifice Cartridge Kit** (New Cartridge and Bonnet Nut)

NOTICE

The seal surfaces on the body must be clean before reassembly. Particles/Handling can damage the seat and seal surfaces and cause leakage.

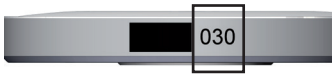


Instructions:

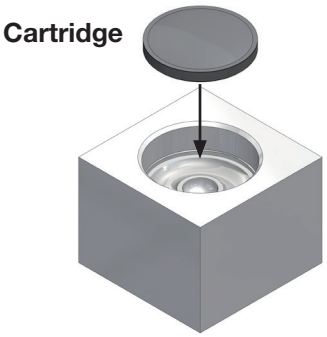
1. Tightly secure the manifold/valve assembly to prevent any effect from the assembly torque.

2. Using a vacuum suction tool, place a clean, new **cartridge** into the **manifold/valve assembly**, diaphragm side up.
   - Verify correct cartridge size is being installed by referencing laser marking as shown.

Standard Cartridge

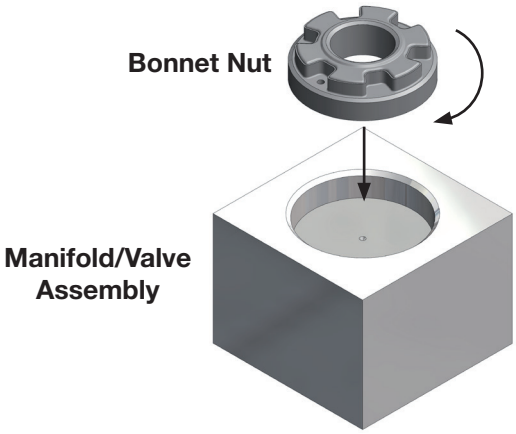


Orifice Cartridge
Ex: 030 = .030 in.

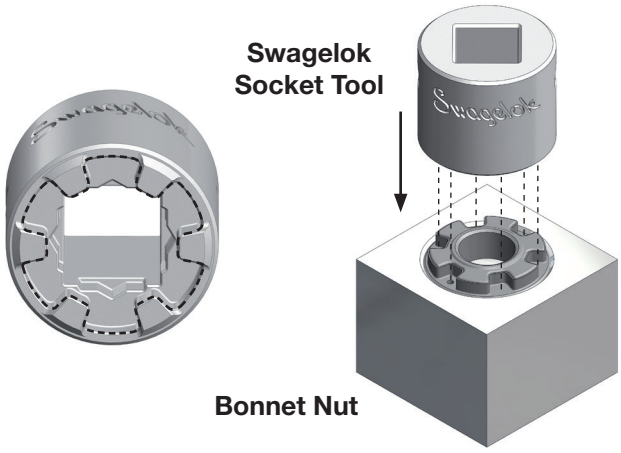


Manifold/Valve Assembly

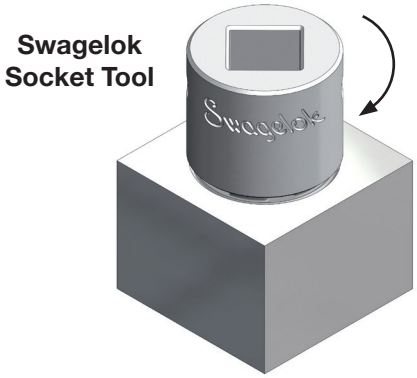
3. Thread the new **bonnet nut** into the **manifold/valve assembly** and hand tighten.



4. Connect a 1/2 in. torque wrench to the Swagelok socket tool.
5. Align the **Swagelok socket tool's** spline with the spline on the **bonnet nut**.



6. Tighten the bonnet nut by rotating the **Swagelok socket tool** clockwise. Torque to 600 to 650 in.·lb (67.8 to 73.4 N·m).



Next Steps:

- For non-adjustable configurations, see page 9, Non-adjustable Flow Actuator Assembly.
- For field flow adjustable configurations, see page 10, Field Flow Adjustable Actuator Assembly.

Non-Adjustable Flow Actuator Assembly

Non-Adjustable Flow Configurations Only

Tool Requirements:

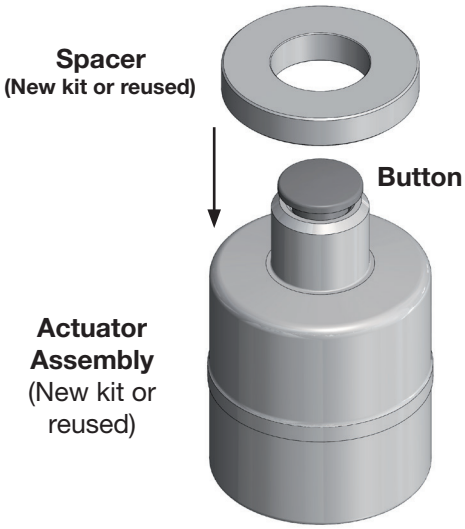
- **Swagelok Spanner Tool**
- **1/4 in. Torque Wrench**

Kit Requirements:

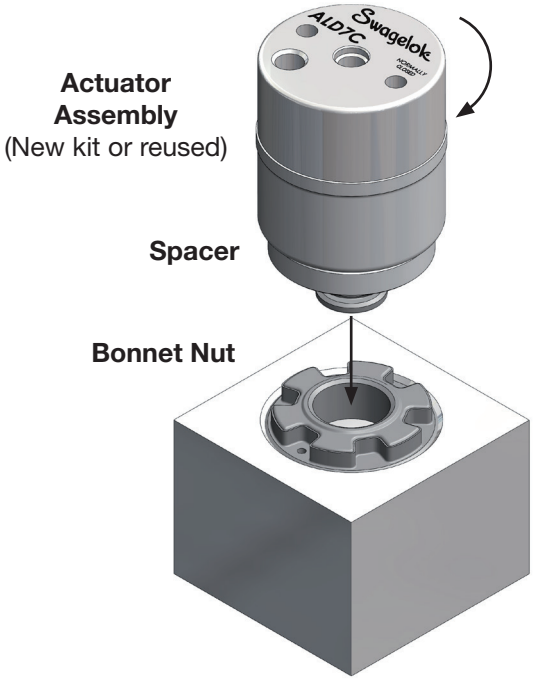
- **Spacer Kit (Optional)**
- **Actuator Kit (*Optional*)**

Instructions:

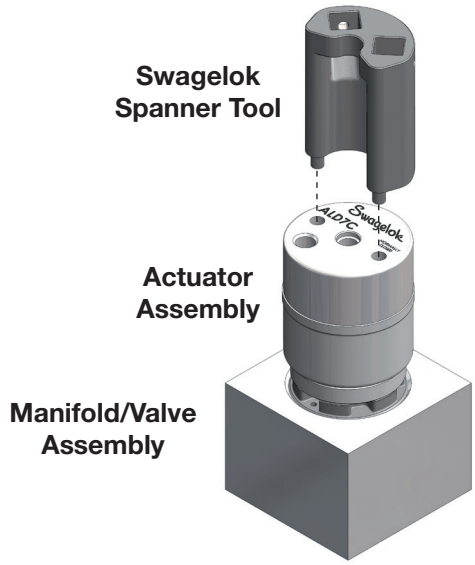
1. Place new **spacer** on the bottom of the **actuator assembly** (new kits or reused).
   - Ensure **button** is attached to piston of actuator assembly.
   - The spacer does not have a specific orientation.



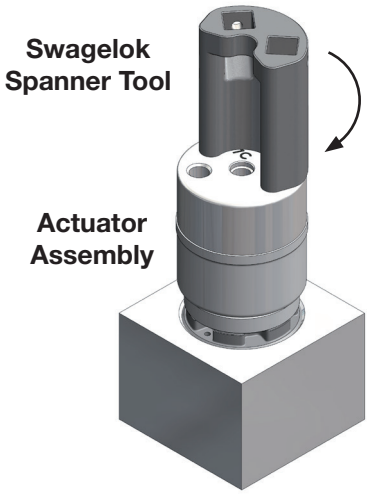
2. Holding the **spacer** up against the **actuator assembly**, flip the actuator assembly over, insert into the **bonnet nut**, and thread clockwise hand tight to ensure button doesn't fall off actuator assembly.



3. Tightly secure the **manifold/valve assembly** to prevent any effect from the assembly torque.
4. Connect a 1/4 in. torque wrench to the **Swagelok spanner tool** (either square drive may be used).
5. Align the Swagelok spanner tool's pins with the two matching cap holes on the **actuator assembly**.

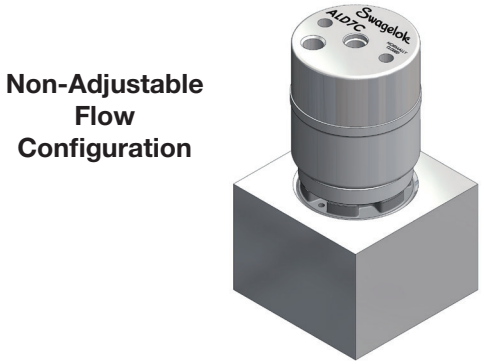


6. Tighten the **actuator assembly** by rotating the **Swagelok spanner tool** clockwise. Torque to 110 to 130 in.·lb (12.4 to 14.7 N·m).



NOTE

- Non-adjustable flow configuration assembly is complete.
  - Appropriate testing should be performed after reassembly is complete to ensure proper operation. See page 14, Testing.



Field Flow Adjustable Actuator Assembly

Field Flow Adjustable Configurations Only

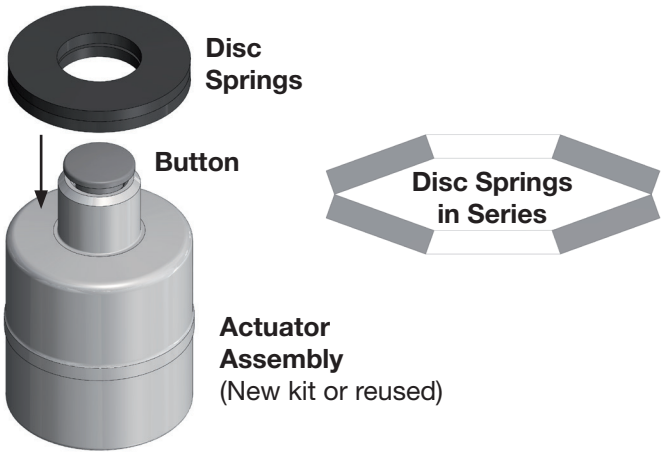
Tool Requirements: N/A

Kit Requirements:

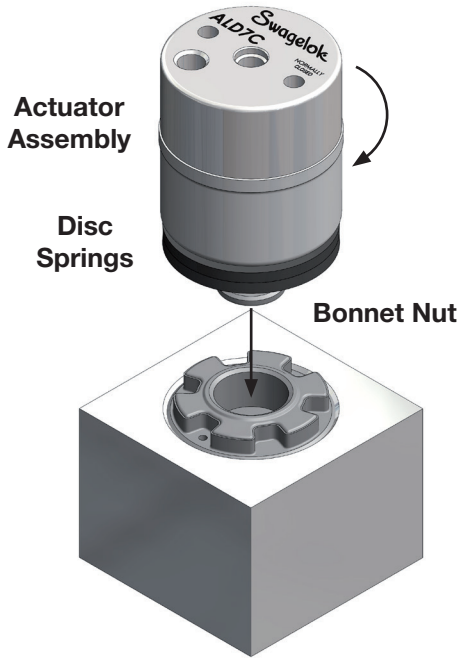
- **Disc Spring Kit (Optional)**
- **Actuator Kit (*Optional*)**

Instructions:

1. Place the **disc springs** on the bottom of the **actuator assembly** (new kit or reused).
   - Ensure **button** is attached to piston of actuator assembly.
   - Ensure disc springs are stacked in series as shown.



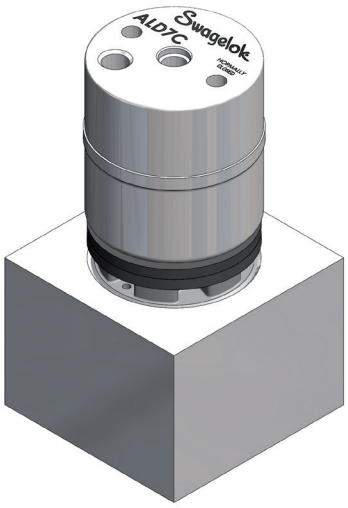
2. Holding the **disc springs** up against the actuator assembly, flip the **actuator assembly** over, insert into the **bonnet nut**, and thread clockwise hand tight to ensure button doesn't fall off actuator assembly.



3. See page 11, Field Flow Adjustment Instructions.

NOTE

- Field flow adjustable configuration is not ready for use at this time.
  - Flow adjustment is required to achieve desired process parameters. See page 11, Field Flow Adjustment Instructions.



Field Flow Adjustable Configuration
(Flow Adjustment Required)

Field Flow Adjustable Instructions

Field Flow Adjustable Configurations Only

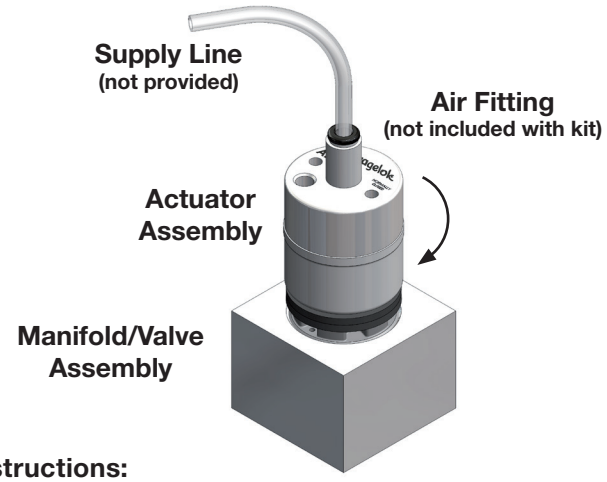
Tool Requirements:

- **Swagelok Spanner Tool**
- **1/4 in. Torque Wrench**

Kit Requirements: N/A

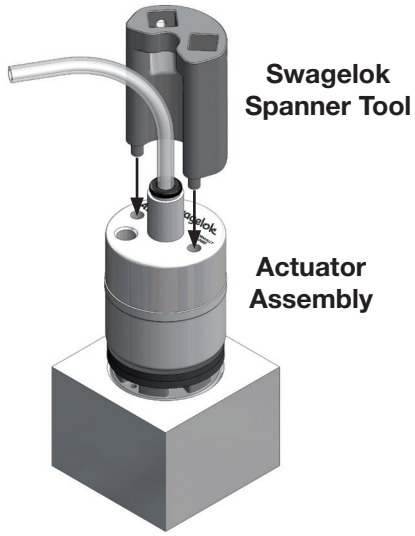
NOTICE

- Ensure **manifold/valve assembly** is properly installed into system or test bench and at process temperature and pressure. Have target process parameters available, either from previous measurements or a desired new target.
- Ensure manifold/valve assembly is tightly secured in system to withstand a torque up to 160 in-lbs (18.1 N·m).
- Selected air fitting should be installed on **actuator assembly** and **supply line** attached.
- Ensure supply line allows for rotation of the actuator assembly during flow adjustment.
- When installing **air fittings**, effort must be made to not turn actuator. Rotation will affect the factory setting.
- Be careful not to damage sensor (if installed).

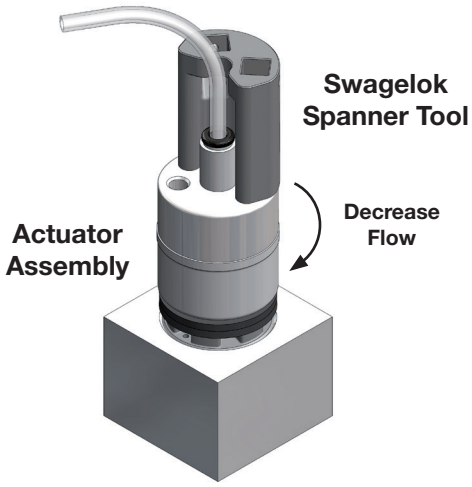


Instructions:

1. Actuate valve to open position (air supplied to **actuator assembly**, 60 to 100 psig [4.2 to 6.9 bar]).
2. Connect a 1/4 in. torque wrench to the **Swagelok spanner tool** (either square drive may be used).
3. Align the Swagelok spanner tool's pins with the two matching cap holes on the actuator assembly.



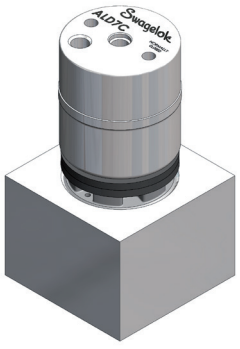
4. Rotate **actuator assembly** clockwise using **Swagelok spanner tool** to decrease flow until desired process parameter(s) are achieved.
   - Flow adjustment sensitivity and range will depend on manifold/valve configuration and process parameters. Typically, the Cv will adjust approximately 3% for every 10 degrees of actuator rotation.
   - Use of a separate flow measurement device is required for actual flow adjustment.
   - The minimum set torque should be 40 in.·lb (4.5 N·m or greater after adjustment.
   - To avoid damage to the valve, do not exceed 160 in.·lb (18.1 N·m) during adjustment.



NOTE

The actuator can be rotated counterclockwise for fine flow tuning; however, ensure torque stays above 40 in-lb.

- Removal of the actuator does not impact the envelope seal integrity of the valve.
- Flow may not change during initial rotation until actuator button contact to diaphragm is achieved.
- Once desired process parameter is achieved, flow adjustment is complete.
- Appropriate testing should be performed after reassembly is complete to ensure proper operation. See page 14 Testing.



Field Flow Adjustable Configuration

Flow-Through Cap Disassembly

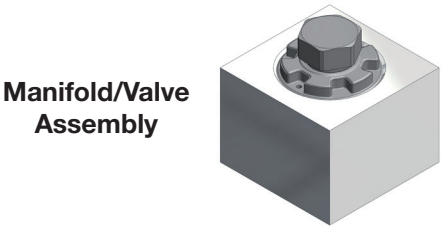
Tool Requirements:

- **Swagelok Socket Tool**
- **1/2 in. Ratchet Wrench**

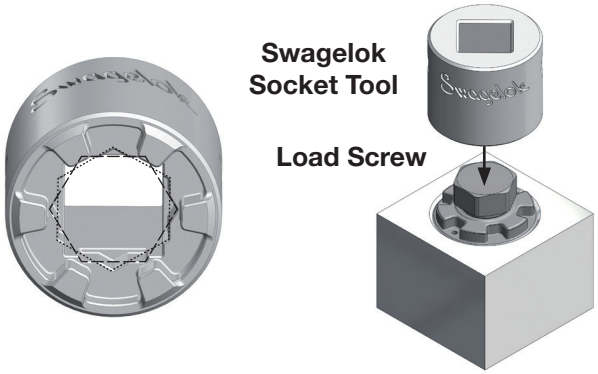
Kit Requirements: N/A

Instructions:

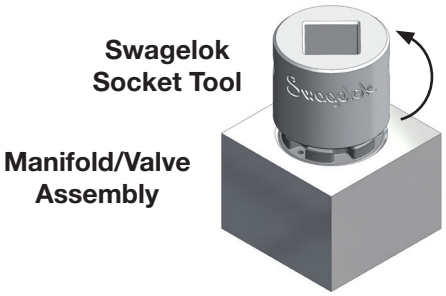
1. After depressurizing the system and purging the valve, remove the **manifold/valve assembly** from the system, if possible.
2. Tightly secure the manifold/valve assembly to prevent any effect from the disassembly torque.



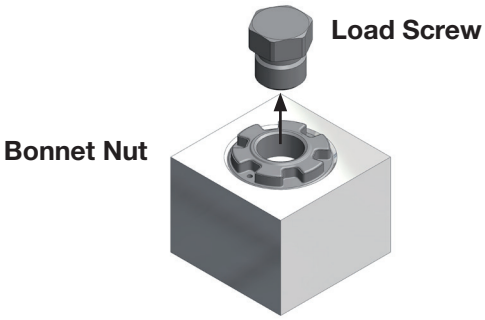
3. Connect a 1/2 in. ratchet wrench to **Swagelok socket tool**.
4. Align the Swagelok socket tool hex with hex of the **load screw**.



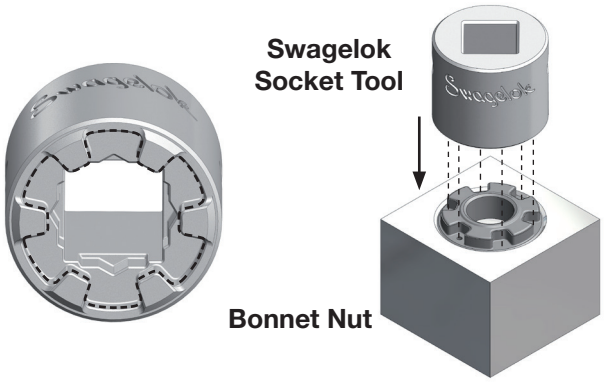
5. Loosen the load screw by turning the **Swagelok socket tool** counterclockwise.



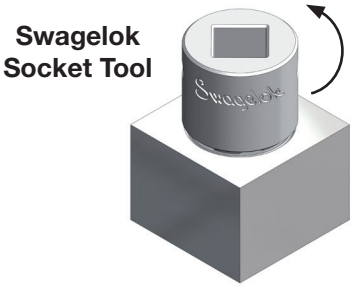
6. Remove **load screw** from **bonnet nut**. Set aside for potential re-use.



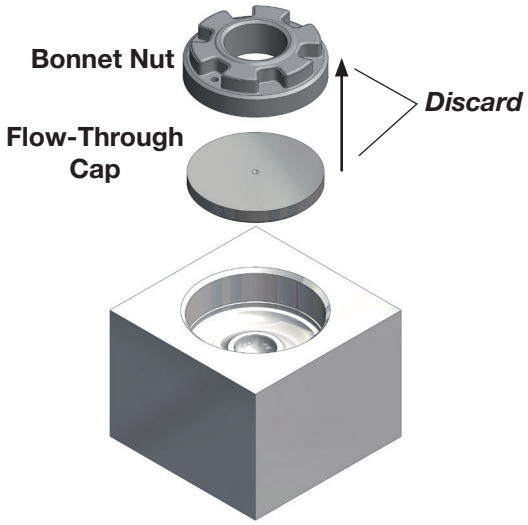
7. Align the **Swagelok socket tool's** spline with the spline on the **bonnet nut**.



8. Loosen the bonnet nut by turning the **Swagelok socket tool** counterclockwise.



9. Remove the **bonnet nut** and discard. Using a vacuum suction tool, remove the **flow-through cap** and discard.



Next Steps:

- For new cartridge installation, see page 8, Cartridge Assembly.
- For flow-through cap installation, see page 13, Flow-Through Cap Assembly.

Flow-Through Cap Assembly

Tool Requirements:

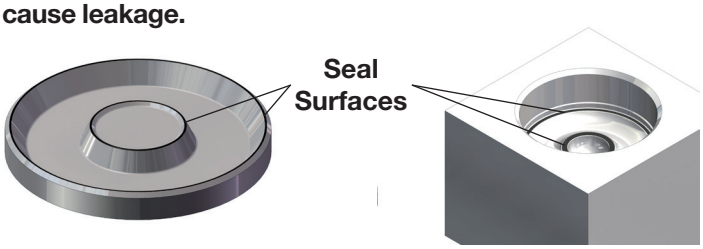
- **Swagelok Socket Tool**
- **1/2 in. Torque Wrench**

Kit Requirements:

- **Flow-Through Kit (Cap, Load Screw and Bonnet)**

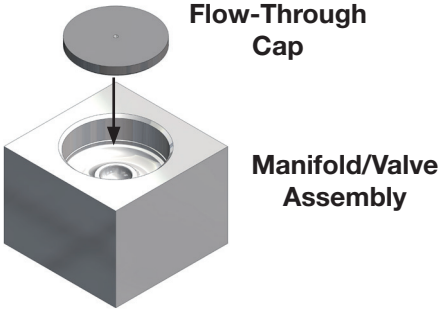
NOTICE

Particles/Handling can damage the seal surfaces and cause leakage.

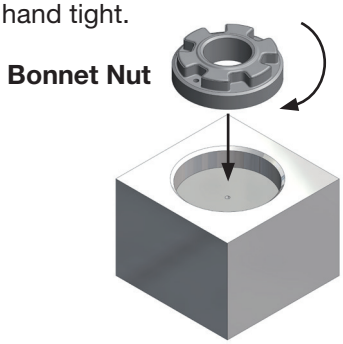


Instructions:

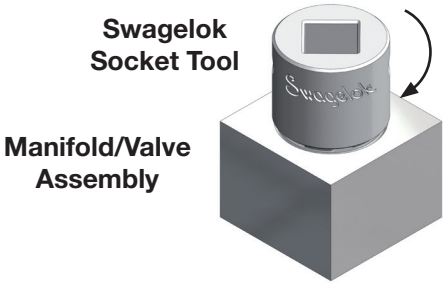
1. Tightly secure the manifold/valve assembly to prevent any effect from the assembly torque.
2. Using a vacuum suction tool, place a clean, new **flow-through cap** into the **manifold/valve assembly**, flat side up.



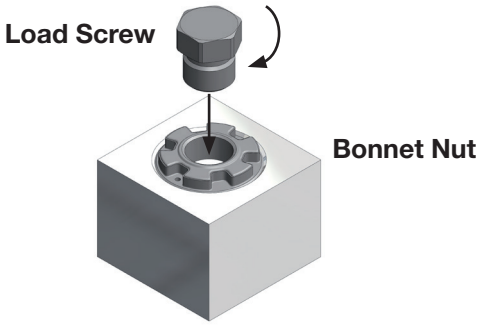
3. Thread the new **bonnet nut** into the manifold clockwise hand tight.



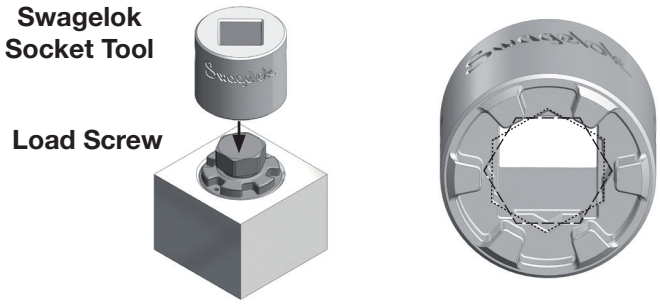
4. Connect a 1/2 in. torque wrench to **Swagelok socket tool**.
5. Tighten the bonnet nut by rotating the Swagelok socket tool clockwise. Torque to 600 to 650 in.·lb (67.8 to 73.4 N·m).



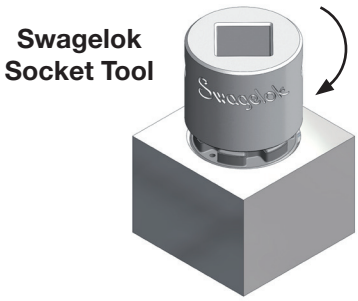
6. Thread the **load screw** into the **bonnet nut** clockwise hand tight.



7. Align the **Swagelok socket tool** hex with hex of **load screw**.

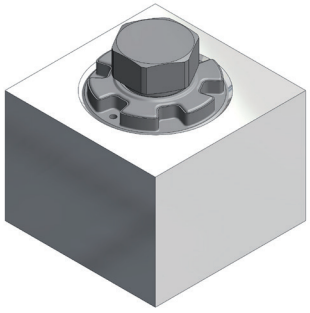


8. Tighten the load screw by rotating the **Swagelok socket tool** clockwise. Torque to 135 to 165 in.·lb (15.3 to 18.6 N·m).



NOTE

- Flow-Through configuration assembly is complete.
  - Appropriate testing should be performed after reassembly is complete to ensure proper operation. See page 14, Testing.



Flow-Through Configuration

Testing

Non-Adjustable Flow and Field Flow Adjustable Configurations:

1. With the valve in the OPEN position, verify that flow passes through the valve.
2. With the valve in the CLOSED position, verify that no flow passes through the valve.
3. Test the cartridge seal and seat seal for leakage.

Flow-Through Configurations:

1. Test the seals for leakage.

*For additional information, see **swagelok.com**.*

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