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I & M Diaphragm Valve Actuators

Installation & Maintenance Instructions for Diaphragm Valve Actuators

Please read these instructions carefully!

Your Steriflow product will provide you with long, trouble free service if it is correctly installed and maintained. Spending a few minutes now reading these instructions can save hours of trouble and downtime later. When making repairs, use only genuine Steriflow Valve parts, available for immediate shipment from the factory.

Technical Data

1. Maximum air supply: 120 PSIG
2. Operating air supply range: 80 – 100 PSIG
3. Air supply connection: ¼ NPT
4. Maximum ambient temperature: 120°F
5. Working Pressure and Temperature:

| Valve Size | Max Working Pressure | | Max Working Temperature |
|------------|----------------------|-------------------|-------------------------|
| | PTFE/EPDM Diaphragm | EPDM Diaphragm | |
| ½" | 150 PSIG at 180°F | 150 PSIG at 180°F | 300°F at 50 PSIG |
| ¾" | 150 PSIG at 180°F | 150 PSIG at 180°F | |
| 1" | 110 PSIG at 225°F | 150 PSIG at 180°F | |
| 1 ½" | 150 PSIG at 160°F | 150 PSIG at 160°F | |
| 2" | 110 PSIG at 190°F | 150 PSIG at 160°F | |

Linear interpolation may be used between the maximum working pressure temperature and maximum working temperature points.

Storage

It is recommended that the actuator be kept in a clean and dry location with supplied plugs in ports.

Installation

Prior to installation, check the body marks to ensure a proper installation, and the pipe work for cleanliness, damage, or debris. Supplied plugs in ports or any other protector should be removed.

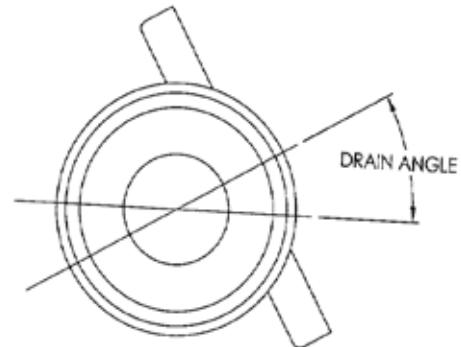
Valves are carefully manufactured, and they should be

handled properly and carefully to avoid damage and particles, dirt, or any unwanted object entering the body. Interior of the body is polished and must be free of damage. Installation must guarantee that the valve can be accessed for cleaning, maintenance and repair and the pipe lines must be supported to avoid extra forces on the valve.

If installation requires welding, disassemble the bonnet with the diaphragm. Before welding the valve body into the pipeline, refer to the "Assembly: Bonnet, Diaphragm & Body" section of the Diaphragm Valve Bonnet I&M. Allow butt weld spigots to cool down before assembling the bonnet.

1. Drain Angle

| Type | Size | Drain Angle |
|----------|--------|-------------|
| Compact | 1/4" | 36° |
| | 3/8" | 30° |
| | 1/2" | 25° |
| Standard | 1/2" | 30° |
| | 3/4" | 22.5° |
| | 1" | 28° |
| | 1 1/2" | 20° |
| | 2" | 20° |
| | 2 1/2" | 25° |
| | 3" | 20° |
| 4" | 15° | |



2. Typical
 - Supplied plugs or any other protector should be removed
 - Mount valve per drain angle
 - Connect air line to the connection on the Cap (18). The arrow indicates the direction in which the piston moves when actuated.
 - Use clean dry filtered air
 - Use the torque values shown below to tight the

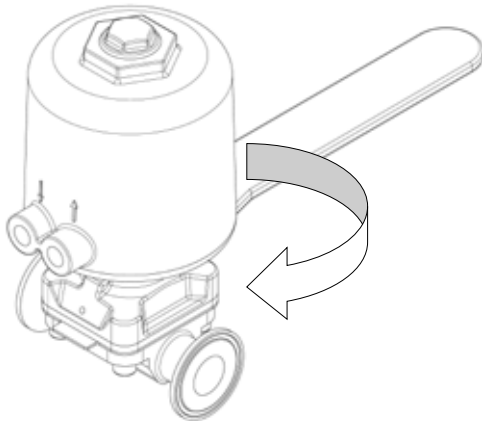
bolts

- Valves are carefully manufactured, and they should be handled properly and carefully to avoid damage and particles/dirt or any unwanted object to enter the body.

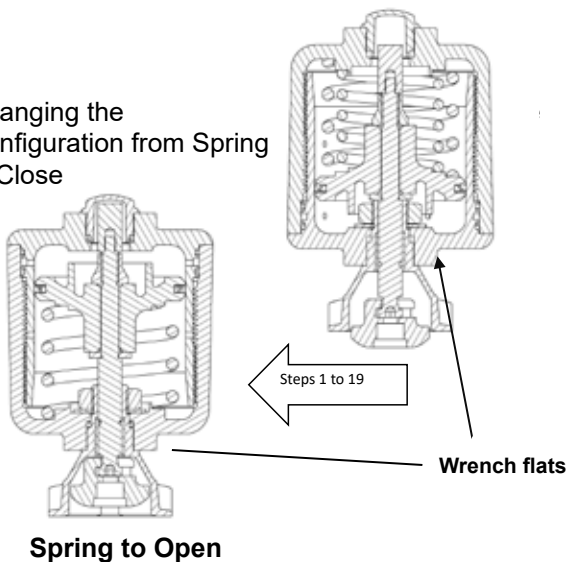
| Body/Bonnet Torque Values | | |
|---------------------------|----------------|--------------------|
| Valve Size | EPDM Diaphragm | TFM/EPDM Diaphragm |
| 1/2" | 30 in/lbs | 55 in/lbs |
| 3/4" | 35 in/lbs | 65 in/lbs |
| 1" | 45 in/lbs | 90 in/lbs |
| 1 1/2" | 60 in/lbs | 130 in/lbs |
| 2" | 150 in/lbs | 190 in/lbs |

3. Adjusting Port Orientation

The actuator is supplied with port as shown below. The port can be adjusted to ease air line installation by rotating the head using either the Cap (18) or Housing (7) hexagon near the bonnet in a clockwise fashion.



4. Changing the Configuration from Spring to Close



The actuator supplied as spring to close configuration can be modified to spring to open using the following procedure.

- Ensure valve is in open position (for spring to close, air will need to be applied to the appropriate port)
- Remove actuator from valve by unfastening the four bolts.
- Remove diaphragm and Compressor Insert (1) if the diaphragm is of the screw type.
- Place Bonnet (5) in a vise and hold Housing (7) with the assembly key on the hexagon.
- Unscrew the Cap (18) completely.
- Take out the Spring Set (17).
- Unscrew Indicator (16) and Locknut (15) by preventing the Stem (3) from turning using an Allen key underneath.
- Pull out the Piston (13), Piston Washer (11) and O-Ring (12).
- Unscrew the Nut (10) and take out Spring Washer (9).
- Remove Housing (7) and ensure the O-Ring (6) remains on the Bonnet (5).
- Place the Cap (18) on the Bonnet (5).
- Place the Spring Washer (9) and Nut (10). Add a drop of Loctite 274 on the internal thread of the Nut and tighten to the value shown at the end of this section.
- Place Piston Washer (11) on the Stem (3) shoulder and place O-Ring (12) on the Piston Washer.
- Install the spring to open from the Spring Set (17) in the Cap (18). See table below for the correct spring to keep.

| Valve Size | Spring to Open |
|------------|-------------------------------------|
| 1/2" | NA (Same spring both configuration) |
| 3/4" | Outer Spring |
| 1" | Outer Spring |
| 1 1/2" | Inner Spring |
| 2" | Inner Spring |

- Install the Piston (13) upside down on the spring and screw the Housing (7) down while holding the Cap (18) hexagon.
- Push the Stem (3) up so its tip is showing thru the Piston (13) center hole and tighten the Locknut (15) with the proper value shown at the end of this section.
- Install Indicator (16).
- Screw back the Sight Glass (20) with the O-Ring (19).
- Adjust port orientation as required. See section 3 under Installation, for details.

| Assembly Torque Values | | |
|------------------------|------------|--------------|
| Valve Size | Nut (10) | Locknut (15) |
| ½" | 225 lbf.in | 110 lbf.in |
| ¾" | 225 lbf.in | 110 lbf.in |
| 1" | 225 lbf.in | 110 lbf.in |
| 1 ½" | 450 lbf.in | 230 lbf.in |
| 2" | 450 lbf.in | 230 lbf.in |

Maintenance

General

1. Relieve system pressure ensuring that all line media has drained and make sure that any valve that has come in contact with hazardous media has been decontaminated prior to any maintenance work.
2. Correct use of tools and equipment is imperative, and personnel should take proper precautions.
3. External parts must be inspected periodically and any part that shows damage or excessive wear must be replaced.
4. Media leaking from the body/diaphragm joint indicates that the bolts need to be re-tightened
5. Diaphragm should be inspected periodically and if it shows damage or excessive wear, it must be replaced. Life of the diaphragm depends on the type of media, operating temperature and pressure, frequency of operation and SIP process.

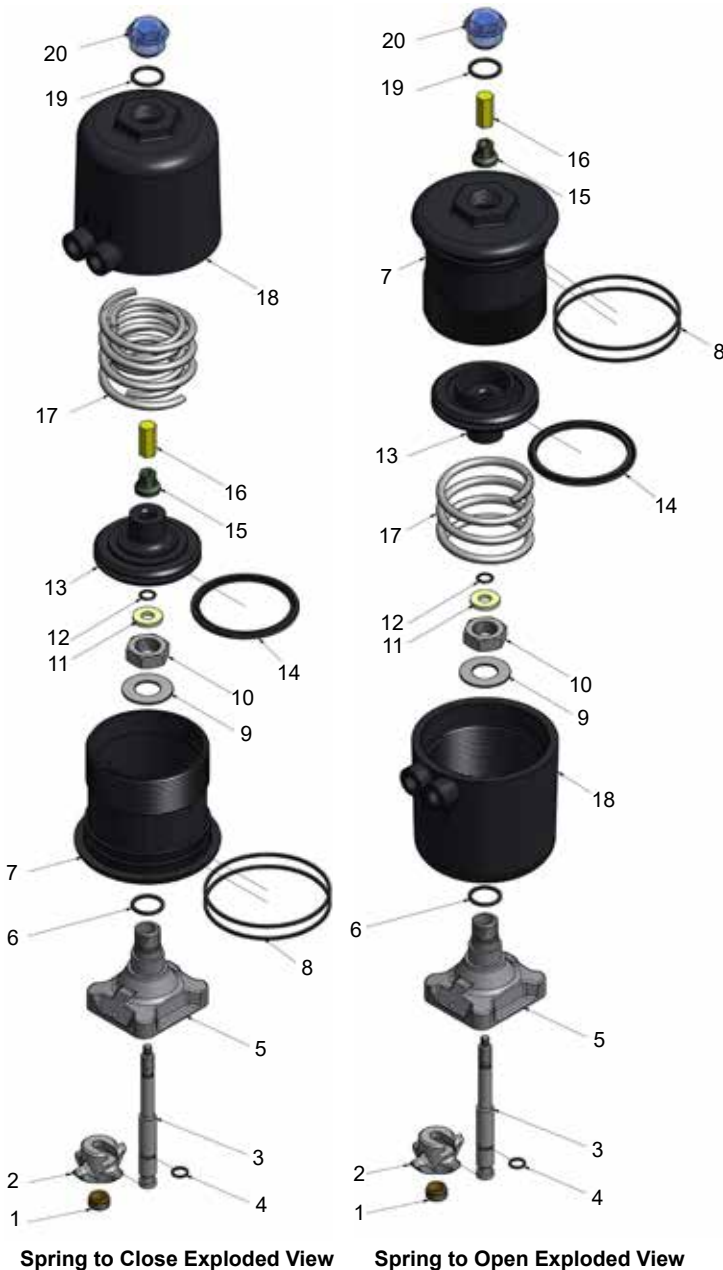
Replacing the Diaphragm

1. Relieve system pressure ensuring that all line media has drained.
2. In the open position, remove actuator from valve by unfastening the four bolts.
3. Remove used diaphragm.
4. Assure that the diaphragm and valve body are dry and clean.
5. In the closed position, attach new diaphragm to the compressor.
 - a. For bayonet connection, PTFE/EPDM diaphragm: Insert bayonet and rotate ¼ turn clockwise.
 - b. For screw connection, EPDM diaphragm: engage threads fully then slack to align bolt holes.
6. In the open position, install the top works on the valve body and hand-tighten bolts
7. Actuate the actuator twice to properly position the diaphragm.
8. In the closed position, finish tightening bolts to the value shown in section 1 of *Installation*, in a diagonal pattern.

Replacing the Seal Kit

Spring to Close

1. Remove actuator from valve by unfastening the four bolts (put actuator in open position for spring to close configuration).
2. Remove diaphragm and Compressor insert (1) if the diaphragm is of the screw type.
3. Place Bonnet (5) in a vise and hold Housing (7) with the assembly key on the hexagon.
4. Unscrew the Cap (18) completely and remove Housing O-Ring (8). Prior to install the new Housing O-Ring, apply a coat of solid lubricant (graphite dispersed in isopropanol works well) to ease later Cap installation and removal.
5. Unscrew Sight Glass (20) and replace O-Ring (19) with a new one.



6. Take out the Spring Set (17), unscrew Indicator (16) and Locknut (15) by preventing the Stem (3) from turning, using an Allen key.
7. Take out the Piston (13), remove Piston Seal (14) and replace it with a new one.
8. Remove Stem (3) from Bonnet (5), remove Stem O-Ring (4) and replace it with the new one. The Piston Washer (11) and Piston Washer O-Ring (12) should be lying on the bonnet, take them out and replace the o-ring with a new one.
9. Unscrew the Nut (10) and take out Spring Washer (9).
10. Remove Housing (7), remove the O-Ring (6) and replace with a new one.
11. Reinstall Housing (7), Spring Washer (9) and Nut (10). Add a drop of Loctite 274 on the internal thread of the Nut and tighten to the value shown at the end of section 3.
12. Grease Bonnet (5) bore, Housing (7) bore and Stem (3) with Orapi CT-609 or an equivalent grease.
13. Insert Stem (3) in the bonnet with the Compressor (2) installed.
14. Place Piston Washer (11) on the Stem (3) shoulder and place O-Ring (12) on the Piston Washer.
15. Place the Piston (13) inside the Housing (7) and on the Stem (3).
16. Tighten the Locknut (15) with the proper value shown at section 3. Reinstall the Compressor Insert (1) if required, add a drop of Loctite 274 on the Compressor thread prior to do so.
17. Install Indicator (16) and put back the Spring Set (17).
18. Screw back the Sight Glass (20) with the O-Ring (19).
19. Adjust port orientation as required. See section 3 under Installation for details.
20. See General section under Maintenance to reinstall the actuator on the valve.
9. Remove Stem (3) from Bonnet (5), remove Stem O-Ring (4) and replace it with the new one. The Piston Washer (11) and Piston Washer O-Ring (12) should be lying on the bonnet, take them out and replace the O-Ring with a new one.
10. Unscrew the Nut (10) and take out Spring Washer (9).
11. Remove Cap (18), remove the O-Ring (6) and replace with a new one.
12. Reinstall Cap (18), Spring Washer (9) and Nut (10). Add a drop of Loctite 274 on the internal thread of the Nut and tighten to the value shown at the end of the Installation section.
13. Grease Bonnet (5) bore, Housing (7) bore and Stem (3) with Orapi CT-609 or an equivalent grease.
14. Insert Stem (3) in the Bonnet (5) with the Compressor (2) installed.
15. Install the Spring Set (17) in the Cap (18).
16. Install the Piston (13) on the spring and screw the Housing (7) down while holding the Cap (18) hexagon.
17. Push the Stem (3) up so its tip is showing thru the Piston (13) center hole and tight the Locknut (15) with the proper value shown at the end of the Installation section.
18. Install Indicator (16).
19. Screw back the Sight Glass (20) with the O-Ring (19).
20. Adjust port orientation as required. See section 3 under *Installation* for details.
21. See General section under *Maintenance* to reinstall the actuator on the valve.

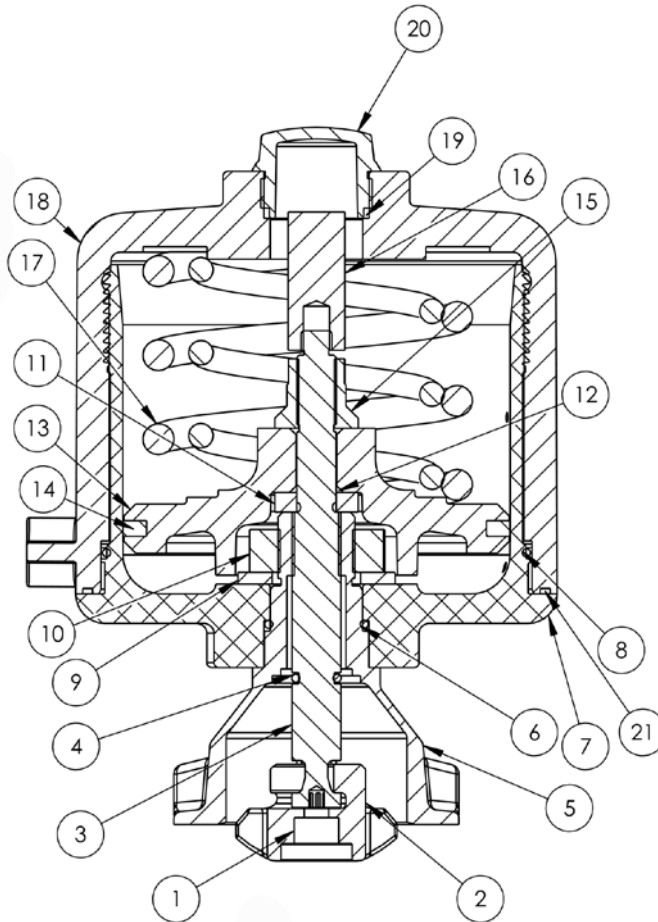
Lubrication

Valves are lubricated in the factory and they do not need to get additional lubrication under normal operating conditions. The use of Krytox 206 grease is recommended.

Spring to Open

1. Remove actuator from valve by unfastening the four bolts.
2. Remove diaphragm and Compressor Insert (1) if the diaphragm is of the screw type.
3. Unscrew Sight Glass (20) and replace O-Ring (19) with a new one.
4. Unscrew Indicator (16) and Locknut (15) by preventing the Stem (3) from turning using an Allen key.
5. Place Bonnet (5) in a vise and hold Cap (18) with the assembly key on the hexagon.
6. Unscrew the Housing (7) completely and remove Housing O-Ring (8). Prior to install the new Housing O-Ring, apply a coat of solid lubricant (graphite dispersed in isopropanol works well) to ease later Cap (18) installation and removal.
7. Take out the Piston (13), remove Piston Seal (14) and replace it with a new one.
8. Take out the Spring Set (17).

Illustration and Parts List



Section B-B
Scale 1:2

| Item | Qty | Description | Material | Item | Qty | Description | Material |
|------|-----|-------------------|-----------------------|------|-----|-------------------------|----------------------|
| 1 | 1 | COMPRESSOR INSERT | BRASS | 12 | 1 | PISTON WASHER O-RING | NITRILE |
| 2 | 1 | COMPRESSOR | STAINLESS STEEL | 13 | 1 | PISTON | GLASS REINFORCED PA |
| 3 | 1 | STEM | STAINLESS STEEL | 14 | 1 | PISTON SEAL | NITRILE |
| 4 | 1 | STEM O-RING | NITRILE | 15 | 1 | LOCKNUT | STAINLESS STEEL |
| 5 | 1 | BONNET | STAINLESS STEEL | 16 | 1 | INDICATOR | PE |
| 6 | 1 | BONNET O-RING | NITRILE | 17 | 1 | SPRING SET | CHROME-SILICON STEEL |
| 7 | 1 | HOUSING | GLASS REINFORCED PA | 18 | 1 | CAP | GLASS REINFORCED PA |
| 8 | 2 | HOUSING O-RING | NITRILE | 19 | 1 | SIGHT GLASS O-RING | NITRILE |
| 9 | 1 | SPRING WASHER | CHROME-VANADIUM STEEL | 20 | 1 | SIGHT GLASS | POLYCARBONATE |
| 10 | 1 | NUT | ZINC PLATED STEEL | 21 | 1 | HOUSING O-RING (BOTTOM) | NITRILE |
| 11 | 1 | PISTON WASHER | STAINLESS STEEL | | | | |