

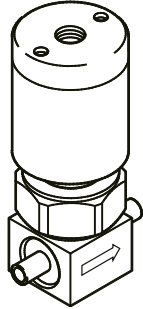
DF Series Diaphragm Valve Service Instructions

⚠ WARNING

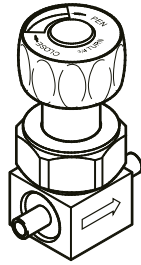
- Before servicing any installed valve, you must
- depressurize the system
 - cycle valve.

⚠ WARNING

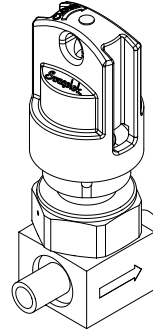
- Residual material may be left in valve and system.



Pneumatically Actuated Valve



Manually Actuated (Round Handle) Valve





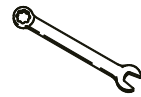
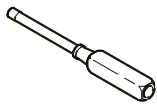

Manually Actuated (Integral Lockout Handle) Valve

The valves are shown with tube butt weld ends. These instructions also apply to valves with any other end connection.

Contents

- Tool Requirements
- Operation
- Installation
 - Panel Mounting (Round Handle Valves)
 - Welding
- Testing
- Maintenance
 - Kit Contents
 - Replacing Diaphragms, Upper Assembly, or Body Assembly
 - Handle Replacement
 - Round Handle
 - Integral Lockout Handle
 - Accessories for Pneumatic Valves
 - Indicator Switch Kit Contents
 - Indicator Switch Installation

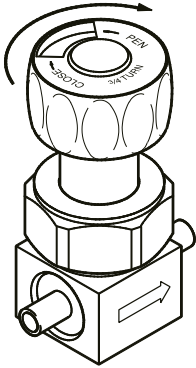
Tool Requirements

Part	Tool	Size
Bonnet nut	Open-end extension 	1 5/16 in.
	Torque wrench 	0 to 600 in.-lb (0 to 67.8 N·m, 0 to 691 cm·kg)
VCR® fittings	Open-end wrench 	Male 15/16 in. Female 1 1/16 in.
"H" Type VCR fittings		Male 5/8 in. Female 3/4 in.
Nut / lock washer (round handle only)	Nut driver 	11/32 in.
Sleeve hex (Integral lockout handle only)	Open-end extension or hex socket (deep well)	18 mm
Set screw (Integral lockout handle only)	Hex wrench 	3/32 in.

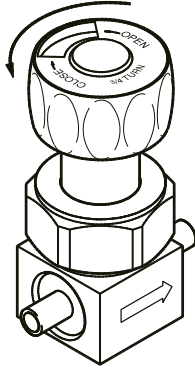
Operation

Manually Actuated (Round Handle) Valve

CAUTION
Do not turn the handle past three-quarters turn or valve could be damaged.

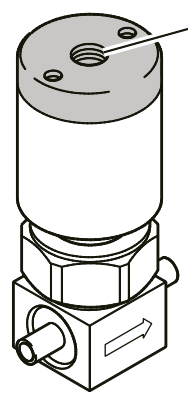


Turn clockwise
three-quarters turn to
close



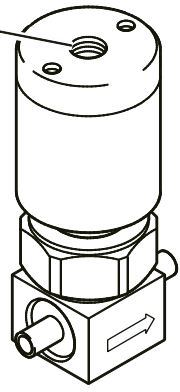
Turn counterclockwise
three-quarters turn to
open

Pneumatically Actuated Valve



Normally Open
Pneumatic Valve

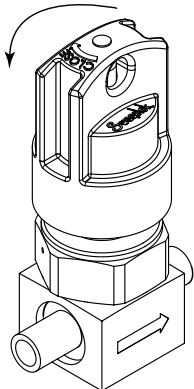
Air Inlet: Apply
70 psig (4.9 bar)
to actuate



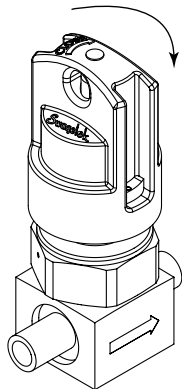
Normally Closed
Pneumatic Valve

Manually Actuated (Integral Lockout Handle) Valve

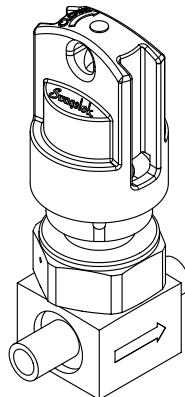
CAUTION
Do not turn the handle past three-quarters turn or valve could be damaged.



Turn counterclockwise
three-quarters turn to
open



Turn clockwise
three-quarters turn to
close



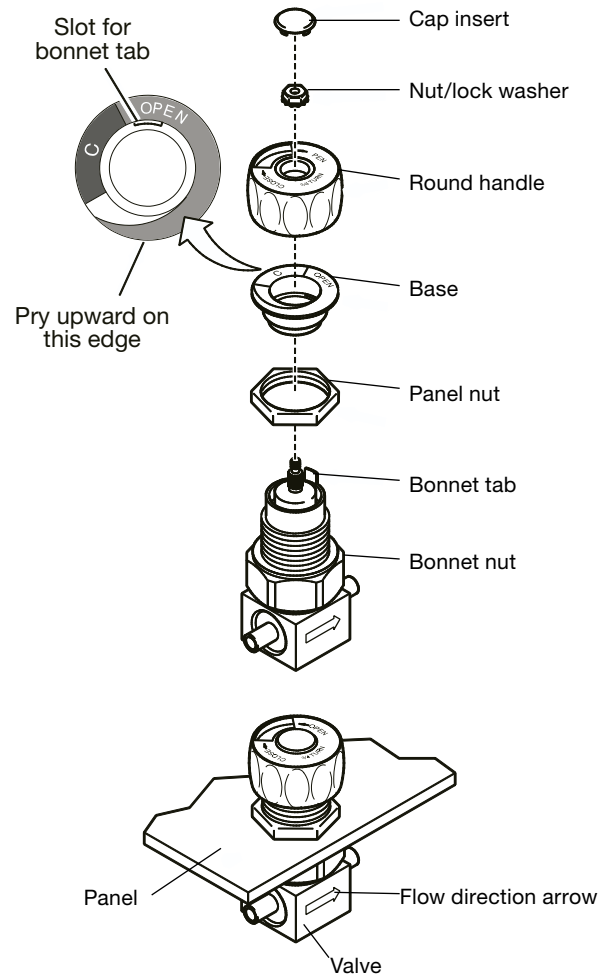
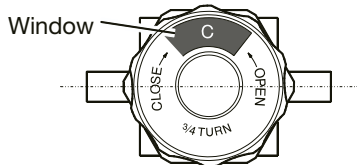
To lock in the closed
position, pull up on
handle. Insert padlock
(0.18 in. minimum
shank diameter)
through the hole.
Note: Hole diameter is
0.33 in. (8.3 mm).

Installation

To maintain original cleanliness, all valves are packaged in double bags. Remove outer bag prior to entering cleanroom. Remove inner bag in cleanroom.

Panel Mounting (Round Handle Valve)

1. Close the valve.
2. Pry upward on the **cap insert** to remove it.
3. Remove the **nut/lock washer**.
4. Lift upward on the **round handle** to remove it.
5. Pry upward on the outside edge of the **base**, opposite the **bonnet tab**, and remove.
6. Remove the **panel nut**.
7. Insert the valve through the **panel**.
8. Using the **flow direction arrow** on the **valve**, orient the valve to the proper flow direction.
9. Install the **panel nut**.
10. Position the **slot** in the **base** over the **bonnet tab**, then press the base onto the **bonnet**.
11. Slide the **round handle** onto the valve. Position the handle to center the **C** on the **base** in the window.
Note: If the **C** cannot be centered in the window, offset the **C** slightly to the right (toward the word **Open**).



12. Install the **nut/lock washer** and tighten to 25 in.-lb (2.8 N·m, 28.8 cm·kg).
13. Press the **cap insert** into place on the **round handle**.

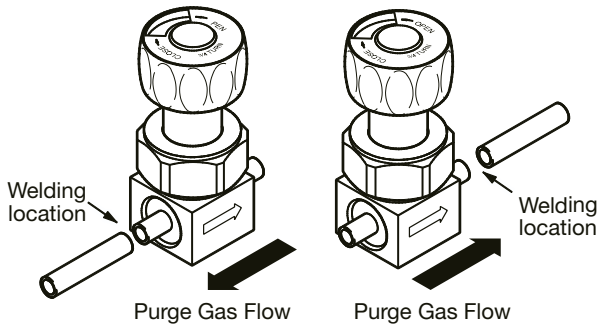
Welding (All Valve Types)

⚠ WARNING

Welding should be done by qualified personnel as outlined in Section IX of the ASME Boiler Code.

⚠ CAUTION

Disassembly of the valve is not required for inline welding if proper precautions are taken. If the valve is disassembled, cover the sealing surfaces to protect them from nicks and weld spatter.



1. If necessary, use a heat sink to prevent excessive heating of internal components.
2. Actuate the valve to the OPEN position.
3. Connect the purge gas supply so that the gas exits out of the valve port being welded.

⚠ CAUTION

Use a high quality purge gas to maintain cleanliness and reduce welding discoloration.

4. Perform the weld.
5. With the valve in the open position, purge the valve and system of contamination.
6. Test the valve for proper operation and leak-tight integrity. See **Testing**.

Testing

All Valves

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 diaphragm seal and the seat seal for leakage by performing an inboard helium leak test to a rate of 1×10^{-9} std cm³/s.
4. Test the seat seal for leakage at the application pressure.

Manually Actuated (Round Handle) Valves

1. Turn the handle to the open position, then the closed position to test for proper three-quarters turn operation.

Manually Actuated (Integral Lockout Handle) Valves

1. Turn the handle to the open, then the closed position to test for proper three-quarters turn operation.
2. With the valve in the closed position, pull up on the handle to test for proper locking function.

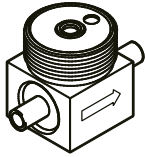
Maintenance

Kit Contents Diaphragm Kit



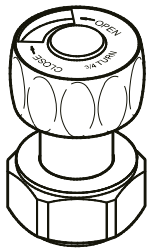
Diaphragms

Body Kit

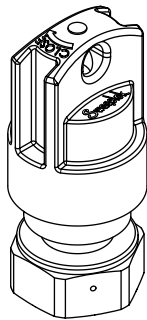


Body Assembly

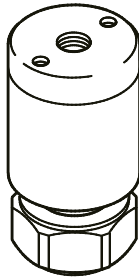
Upper Assembly Kit



Manually Actuated
(Round Handle) Assembly



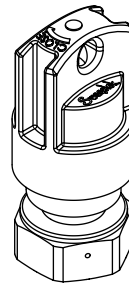
Manually Actuated
(Integral Lockout Handle)
Assembly



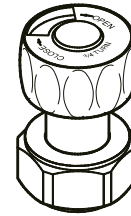
Pneumatically Actuated
Assembly

Replacing Diaphragms, Upper Assembly or Body (All Valve Types)

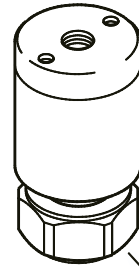
Manually
Actuated
Integral Lockout
Handle



Manually
Actuated
Round Handle

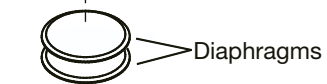


Pneumatically
Actuated

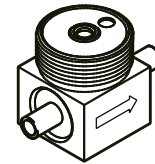


Upper
assembly

Bonnet nut



Diaphragms



Body

Disassembly

⚠ CAUTION

Whenever the valve is disassembled, new diaphragms must be installed.

1. Remove the valve from system if possible.
2. Place the valve in the open position. Normally closed valves, apply 70 psig (4.8 bar) minimum actuator pressure.
3. Loosen the **bonnet nut**.
4. Remove the **upper assembly** and both **diaphragms**.

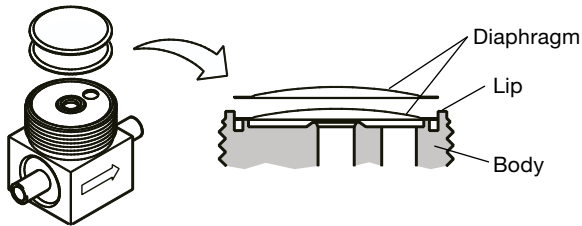
Maintenance (contd)

Reassembly

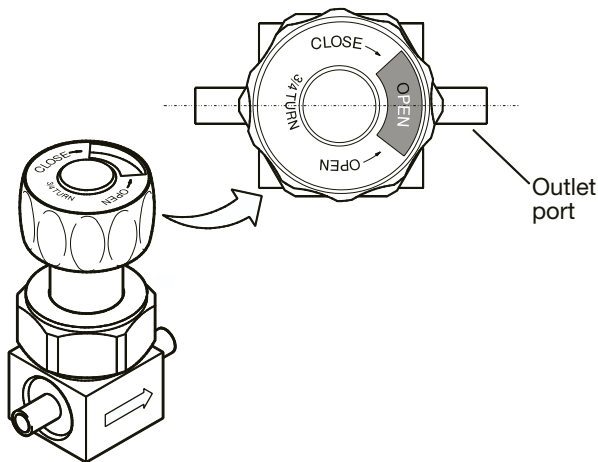
⚠ Caution

Seal surfaces on the body, seat assembly, and diaphragms must be clean before reassembly. Particles can damage the seat and seal surfaces.

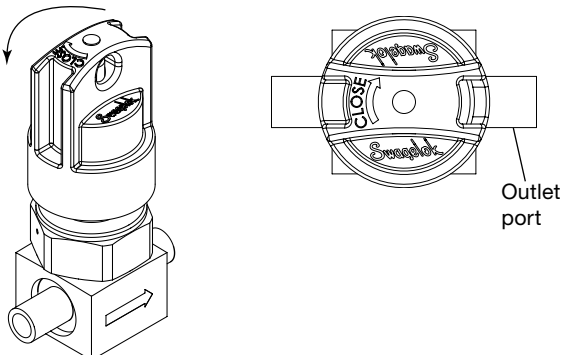
- Place the two new **diaphragms** inside the **lip** on the **body** with the convex side of the diaphragms facing up.



- Place the upper assembly on the body.
 - **Pneumatically actuated assemblies:** No alignment is required.
 - **Manually actuated (round handle) assemblies:** Align the word open in the handle window over the outlet port on the body.



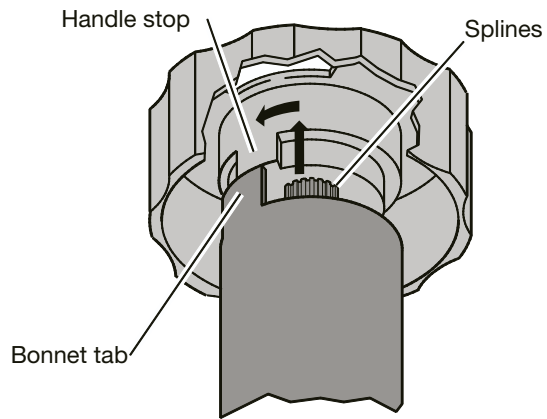
- **Manually actuated (integral lockout handle) assemblies:** Align the word open in the handle window over the outlet port on the body.



- Hold the upper assembly down firmly against the body assembly and thread the bonnet nut onto the body hand-tight.
- Torque the bonnet nut to 550 in.-lb (62.1 N·m, 633 cm·kg).
- Test the valve for proper operation and leak-tight integrity. See **Testing**.
If a manual valve leaks across the seat, reset handle. See **Resetting the Round Handle** or **Resetting the Integral Lockout Handle**.

Resetting the Round Handle

- With the handle in the open position, pry off the cap insert and remove the nut/lock washer.
- Keep the **handle splines** engaged with the **upper assembly splines** and lift the handle up approximately 1/8 in. to allow the **handle stop** to clear the **bonnet tab**.
- Turn the handle clockwise until the valve is fully closed.
- Test the valve for proper operation and leak-



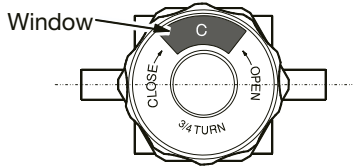
Note: Base removed for clarity

tight integrity. See **Testing**. Repeat steps 1 through 3 until valve passes testing.

Resetting the Round Handle (contd)

5. Reposition the handle on the valve body, making sure the C on the base is centered in the window.

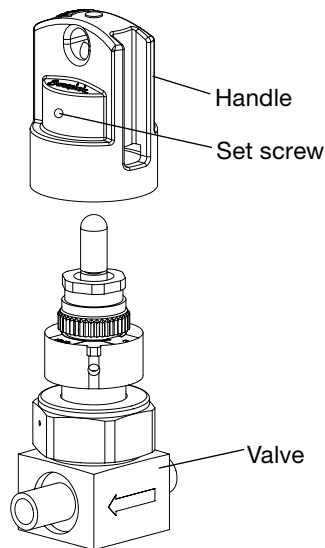
Note: If the C cannot be centered in the window, offset the C slightly to the right (toward the word OPEN)



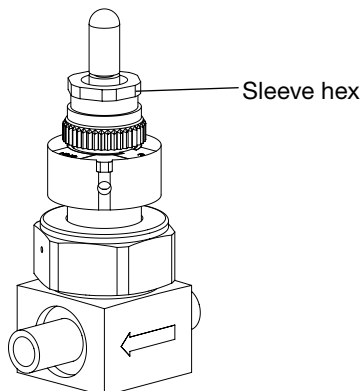
6. Reinstall the nut/lock washer and torque to 25 in.-lb (2.8 N·m, 28.8 cm·kg).
7. Press the cap insert into place on the handle.
8. Reinstall valve in system.

Resetting the Integral Lockout Handle

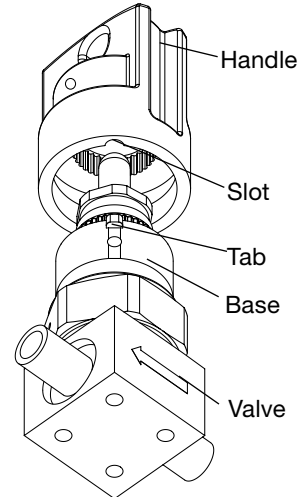
1. With the handle in the closed position, loosen the **set screw** using a hex wrench.
2. Lift up on **handle** and remove from **valve**.



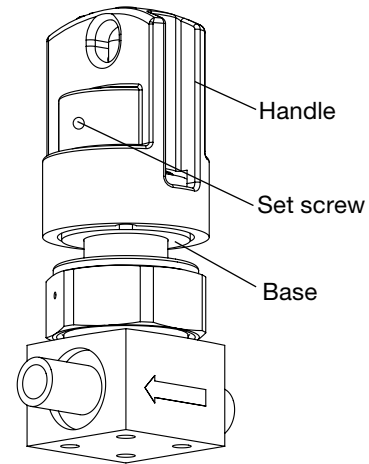
3. Turn the **sleeve hex** counterclockwise one-half turn.



4. Turn the **sleeve hex** clockwise to the closed position and torque to 25 in.-lb (2.8 N·m, 28.8 cm·kg).
5. Align the **slot** on the inside diameter of the **handle** with the **tab** on the **base** and place the handle on the **valve**.



5. Slide the **handle** down until the bottom of the handle is level with the bottom of the **base**.



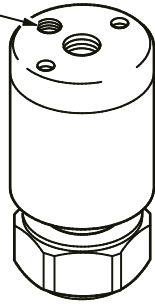
6. Tighten the **set screw** to 10 in.-lb (1.1 N·m, 11 cm·kg).
7. Test the valve for proper operation and leak-tight integrity. See **Testing**.

If valve fails any of the testing, repeat steps 1 through 7.

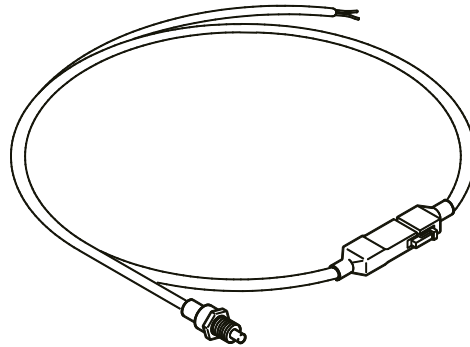
Accessories for Pneumatic Valves (Normally Closed Only)

Indicator Switch Kit Contents

Threaded hole for
indicator switch



Pneumatically Actuated Assembly
with Modified Cap



Indicator Switch

Indicator Switch Installation

⚠ CAUTION

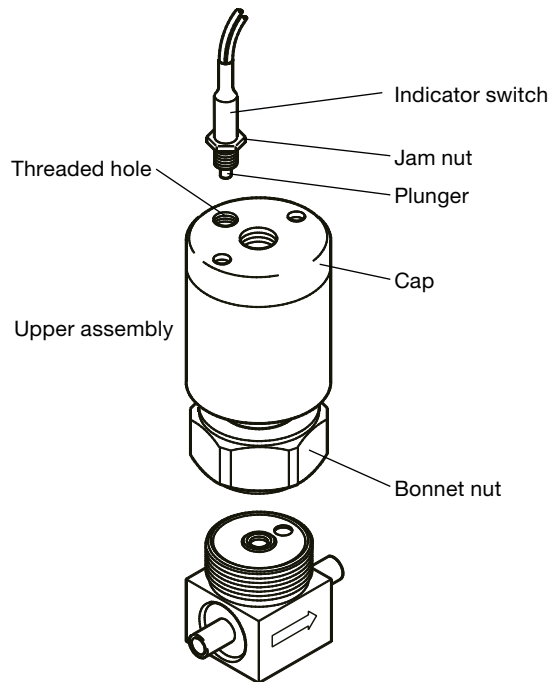
Whenever the valve is disassembled, new diaphragms must be installed.

Disassembly

1. If possible, remove the valve from the system.
2. Actuate the valve to the open position. Apply 70 psig (4.8 bar) minimum actuator pressure.
3. Loosen the **bonnet nut**.
4. Remove the **upper assembly** and both diaphragms.

Reassembly

1. Using the modified actuator assembly, reassemble the valve. See steps 1 through 4 of **Maintenance Reassembly**).
2. Thread the **indicator switch** into the **threaded hole** on the cap until the **plunger** rests on top of the internal piston.
3. Connect switch leads to a continuity tester.
4. Thread the **indicator switch** into **cap** until the continuity tester indicates that the switch is actuated.
5. Thread the **jam nut** against the **cap** and tighten.
6. Test the valve for proper operation and leak-tight integrity. Test the indicator switch by actuating the valve open and closed.
7. Install the valve into the system and connect the switch wire leads.



⚠ WARNING

Do not mix/interchange Swagelok products or components not governed by industrial design standards, including Swagelok tube fitting end connections, with those of other manufacturers.