

# Saunders

## INSTALLATION GUIDELINES



### Introduction

This installation sheet provides general guidelines for basic installation of a Saunders Diaphragm Valve and/or diaphragm replacement. For detailed instructions, refer to the *Saunders Diaphragm Valve Service and Installation Manual (SVSM)*.

### Safety Precautions

Safety is very important! Follow the safety precautions below when storing, installing or operating the diaphragm valve.

### Transport and Storage

- Unpack the valve and inspect upon receipt. Report any damage to carrier.
- Valves are packaged to protect them from damage during transport. If transport is necessary, place the valve in its original packaging.
- Store the valve in its original packaging with end protectors in place on the valve body.
- Store replacement diaphragms in the "relaxed" position. Store assembled valves in the "open" position, whenever possible.
- Store the valves indoors, if possible, in a clean and dry environment. Valves should not be stored in areas where ambient temperatures are extremely harsh.

### Valve Maintenance

- **DO NOT attempt to modify any Saunders product.** Do not use replacement parts other than those specifically manufactured by Saunders. To do so could create unsafe conditions and void all warranties.
- **DO NOT place any Saunders product in an application where general product service ratings are exceeded.**
- Relieve all pressure from the system prior to valve maintenance.
- Ensure all hot, cold or toxic substances are removed prior to valve maintenance.

### System Installation

There are many factors involved in obtaining maximum performance from a valve in a system. Several guidelines should be considered during installation and design. Poor system design and installation can lead to inadequate flow, drainability, and system life.

- Piping upstream and downstream of the valve should be unobstructed and straight.
- For a close-control over the design flow, there should be no bends for a distance of at least 5 times the pipe diameter and no sharp bends for 10 times the pipe diameter. (In either direction)
- Good matching of tube bores and ferrules is essential.
- Where the valve size differs from system line size, a gradual reduction should be used.
- Adjacent piping should be designed for easy removal of valve assembly or its top works.
- Pipe work should be designed to reduce the stress on the valve body. Pipe work should be adequately supported but accessible
- Piping should be done progressively with valves installed during assembly of the system.

### Valve Installation

- Standard Two-Way Valve Bodies come with two sets of hash marks indicating the self-drain angle of the valve for a left or right hand installation. One set of hash marks should be aligned and installed facing up to allow the valve to drain properly. A standard slope is also recommended to assist in drainability.
- Installation of Tri-Clamp® bodies requires the correct gasket and clamp to assure proper fit. Be sure to align the hash marks. Generally, disassembly of the valve is not necessary on Tri-Clamp bodies.

Installing Weld-end Two-Way Bodies for Schedule 5 pipe and lighter, along with tubing using an orbital welder does not require the valve to be disassembled during welding. Schedule 10 pipe and heavier require bonnet and diaphragm removal. Manual welding of the valves of any kind requires removal of the bonnet and diaphragm due to heat induced on the valve body.

Note: Standard Two-Way Valve Bodies with weld-ends come with 1 1/16" cutback suitable for most orbital welding heads, and automatic welders to assist in installation.

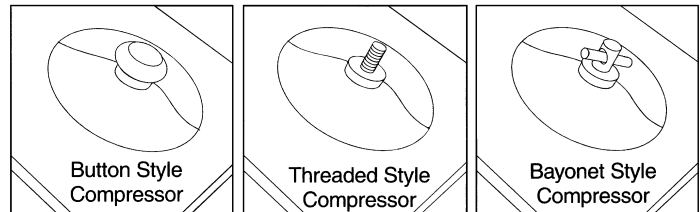
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### Replacing the Diaphragm

	<b>WARNING</b>
	<p>Before servicing ANY valve, make sure pressure from the system is released.</p>



Note: Generally, the diaphragm can be replaced without removing the valve body from the system.

1. USING ONLY GENUINE SAUNDERS DIAPHRAGMS. Establish the size of the diaphragm needed, connection style, and match material grade of the diaphragm to application.

Note: Size and grade can be determined from the old diaphragm. The existing diaphragm will have this information molded on the top surface and tab.

2. Disconnect the bonnet assembly from the body by removing the four cap screws, (also washers and nuts, if applicable) using a diagonal sequence.
3. Remove the diaphragm from the bonnet assembly, by turning the bonnet handwheel to the full closed position, so the compressor protrudes from the bonnet shell.

If you are using an EC 6 Spring-to-Open or an EC 4 Air-to-Air actuator, apply air to the top of the port to place the valve in the closed position.

4. Elastomer Diaphragms:
  - 4a. (1" and up, threaded style compressor) Unscrew the old diaphragm in a counterclockwise direction.
  - 4b. (1/4", 3/8", 1/2" and 3/4", button style compressor) Remove the old diaphragm by using a pull and twist motion.

TFE Diaphragms:

- 4c. (Bayonet style compressor, P style). Turn the old diaphragm 90°, and pull outward.
- 4d. (Bio-Seal TFE 1/4", 3/8", 1/2") Remove the old diaphragm by using a pull and twist motion.

5. Check and clean threads or recess in compressor.
6. Make sure the new diaphragm and the contact area on the valve body is clean and dry. (Use an IPA solution and a lint free cloth when cleaning.)
7. With the bonnet or actuator in the Closed position, install the diaphragm:
  - 7a. (1" and up, threaded style compressor) Screw the diaphragm clockwise into the compressor until its snug against the compressor. Turn counterclockwise just enough to align fastener holes.
  - 7b. (1/4", 3/8", 1/2" and 3/4", button style compressor) Engage one edge of the diaphragm button with the recess in the compressor. Press firmly in the center while turning the diaphragm to fully engage it with the compressor, and align with fastening holes.

- 7c. TFE Faced Diaphragms (1/2" - 6" bayonet style compressor, P Style). Align the bayonet with the compressor groove, turn the diaphragm 90° (until fastening holes are aligned).

- 7d. TFE Faced Diaphragms (Bio-Seal 1/4", 3/8", 1/2") Disassemble diaphragm by separating the TFE face from the elastomer backing cushion. Engage one edge of the backing cushions button with the recess in the compressor. Press firmly in the center while turning the diaphragm to fully engage it with the compressor and align with the fastening holes. Install TFE diaphragm face by snapping stud into already installed backing cushion.

8. Turn the bonnet handwheel to the fully open position.  
If you are using an EC 5 Spring-to-Close or an EC 4 Air-to-Air actuator, apply air to the bottom port to place the valve in the open position.
9. Align the bonnet/diaphragm assembly to the valve body, and install the cap screws, washers, and nuts. Hand tighten the nuts to secure the bonnet to the valve.
10. Actuate the bonnet to the closed position to set diaphragm to weir, and tighten the nuts to torque specifications shown in Table 1 using a diagonal sequence.
11. Fully open bonnet assembly, and tighten nuts to torque specifications shown in Table 1 using a diagonal sequence.

Note: Minimum tightening extends the life of the diaphragm. Proper tightening achieves a crescent shaped bulge in the diaphragm edge when observed from the side.

Retightening of TFE diaphragms is recommended 24 hours after system has reached operating pressure and temperature.

Table 1: Maximum Torque Specifications

Valve Size		Torque	
in	CN	in-lb	Nm
Bio-Seal (1/4, 3/8, 1/2)		27	3.0
1/4	8	35	4.0
3/8	10	35	4.0
1/2	15	44	5.0
3/4	20	44	5.0
1	25	53	6.0
1 1/4	32	71	8.0
1 1/2	40	115	13.0
2	50	221	25.0
2 1/2	65	310	35.0
3	80	443	50.0
4	100	354	40.0

\* For all body materials and diaphragm materials.

\*\* Consult factory for torque on EC actuators with brass inserts.



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