

# Saunders HC4 Diaphragm Valves Installation and Maintenance Instructions Actuated Valves

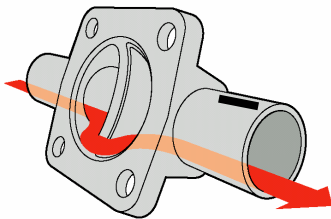
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## Installation

Saunders diaphragm valves can be installed in any orientation and are fully bi-directional. Hash marks on the tube or clamp ends indicate self drain position. Two way valves should be installed with these hash marks in the 12 o'clock position, if the valve is to fully drain. Refer to drawings for orientation of tandem valve assemblies and block valves.



**Important:** System drainability is a function of many factors in addition to proper valve selection and installation and is the responsibility of the system designer and fabricator or installer.

Saunders butt weld valves may be welded in line while assembled without damage to diaphragm or top works providing standard orbital welding procedures are used and heat source is localized.

## Automated Valve Disassembly

**Important:** The diaphragm can be changed without removing the valve from the pipeline. Before servicing the valve, ensure that any pressure in the adjacent pipework is released. **Disassembling a valve under pressure can result in serious injury. Be aware of all adjacent pipeline conditions, hot pipework, for example, can cause serious injury. Be careful, prevent accidents and protect valuable equipment**



Only when confident that the valve is not under pressure and the process lines have been flushed and drained, is it safe to disassemble valve and replace diaphragm

**Important:** Before removing the valve/actuator fastenings, please note the following:

⇒ For **NORMALLY CLOSED (NC) Actuated Valves and DOUBLE ACTING (DA) Actuated Valves**, apply air to activate the actuator into the open position. **Failure to use air to open the valve can result in damage to the actuator.**

⇒ For **Normally OPEN (NO) Actuated Valves**, it is not necessary to activate the valve.

**Remove fasteners:** Start to to loosen fasteners in an opposing diagonal manner.

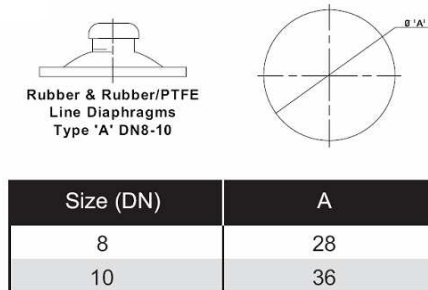
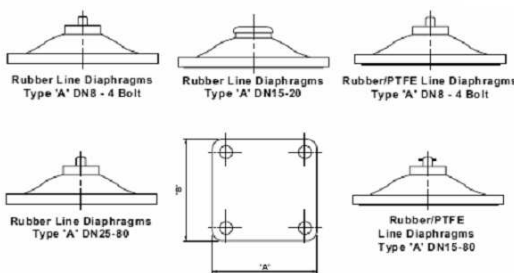
**Important:** Do not completely remove fasteners as there may be pressure remaining in the system. Wait for any pressure to finish venting.



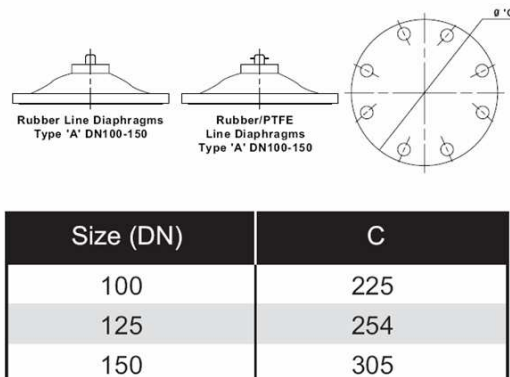
**Use only genuine Saunders replacement diaphragms.** The use of unauthorized replacement diaphragms or other replacement parts can void the manufacturers warranty and all responsibility for liability and performance. Saunders diaphragms are developed, engineered and manufactured specifically to fit Saunders Diaphragm Valves and to provide optimum performance and service life. The use of unauthorized diaphragms may result in reduced performance and or premature valve failure.

**Replacing a Diaphragm - Important:** Procedure to remove and replace Saunders Diaphragms will vary depending on the size, grade of diaphragm and the method of attachment to the compressor. Please refer to figure 1.

**Figure 1**



Size (DN)	A	B
8	35	33
15	48	44
20	62	57
25	71	67
32	87	81
40	100	90
50	125	106
65	144	132
80	189	175



## Removing the Diaphragm

Before removing body diaphragm, it is necessary to set the actuator to its **CLOSED** position

- ⇒ Release air pressure for normally closed actuators
- ⇒ Apply air pressure for normally open actuators

**A) Valve with Actuator and elastomer diaphragm with threaded attachment sizes DN8-DN200 (BioSeal - 8.00")** Disconnect the actuator assembly from the body by unscrewing the body/actuator nuts or capscrews. Unscrew the diaphragm from the compressor.

**B) Valve with Actuator and PTFE diaphragm with bayonet attachment sizes DN15-DN200 (0.50" - 8.00")** Disconnect the actuator assembly from the body by unscrewing the body/actuator nuts or capscrews. Rotate the diaphragm 1/4 turn to disengage from the compressor.

**C) Valve with Actuator and elastomer diaphragm with button attachment sizes DN8-DN20 (BioSeal - 0.75")** Disconnect the actuator assembly from the body by unscrewing the body/actuator nuts or capscrews. Twist and pull the diaphragm from the compressor.

**D) Valve with Actuator and PTFE diaphragm with button attachment size DN8 (BioSeal)** Disconnect the actuator assembly from the body by unscrewing the body/actuator nuts or capscrews. Twist and pull the diaphragm from the compressor

**Important - After disassembly:** Check the condition of the valve body sealing surfaces for contamination or damage. It is recommended that the sealing area of polished stainless steel valves fitted with elastomer diaphragms be cleaned with ethyl alcohol prior to diaphragm replacement to remove any residual elastomer that may have become attached to the valve. Allow the valve body to fully dry prior to reassembly.

**Before installing a new diaphragm:** Check that the replacement diaphragm is the correct size and grade (refer to Figure 1) and that the female thread or recess in the compressor is clean and in good condition for re-use. **Using the incorrect grade of diaphragm could result in immediate or premature valve failure, reduced diaphragm life or could be a violation of your company's change control procedures.**

**Important:** Retain the original fasteners for reassembly of the valve after diaphragm changeout. Using fasteners of different sizes or thread type can result in reduced valve performance by changing the clamping forces required to effect proper diaphragm seal.

## Installing the Diaphragm in the Actuator



**A) Valve with Actuator and elastomer diaphragm with threaded attachment sizes DN8-DN200 (0.25\"- 8.00\")** Screw new diaphragm clockwise into the compressor as far as it will go, but do not use excessive force. Turn back, counter-clockwise, until the bolt holes in the diaphragm are aligned with the bolt holes in the actuator.

**B) Valve with Actuator and PTFE diaphragm with bayonet attachment sizes DN15-DN200 (0.50\"- 8.00\")** Insert the bayonet into the compressor and apply slight pressure to the center of the diaphragm to ensure the cross pin is fully engaged in the compressor. Continue to apply pressure to the center of the diaphragm and turn 90° to align bolt holes in the diaphragm with the bolt holes in the actuator. **Care must be taken not to rotate the diaphragm until the cross pin is completely within the compressor recess.**



**C) Valve with Actuator and PTFE diaphragm with threaded attachment size DN8 (Bioseal)** Separate the diaphragm into rubber backing and PTFE facing by pulling apart. Hold the rubber backing against actuator with bolt holes in the backing in alignment with the bolt holes in the bonnet. Thread PTFE facing clockwise into the compressor until thread bottoms out, **do not force**. Turn back PTFE facing, counter clockwise, until all bolt holes in PTFE facing, rubber backing and bonnet are all in alignment.

**D) Valve with Actuator and button attachment sizes DN8-DN20 (0.25\"- 0.75\")** Carefully push the button into the compressor recess while rotating the diaphragm until the button locates into the recess. Diaphragm engagement is achieved by pressing and twisting motion. When fully engaged, the diaphragm will turn easily. Rotate the diaphragm to ensure the bolt holes in the diaphragm are aligned with the bolt holes in the actuator.

**E) Valve with Actuator and PTFE diaphragm with button attachment size DN8 (0.25\")** Separate the diaphragm into backing and facing by pulling apart. Engage into compressor backing by pushing and rotating the button of the backing. Ensure full engagement. Align diaphragm bolt holes with actuator flange. Secure PTFE facing through the backing by pushing and rotating the button of the PTFE. Check to confirm full engagement.

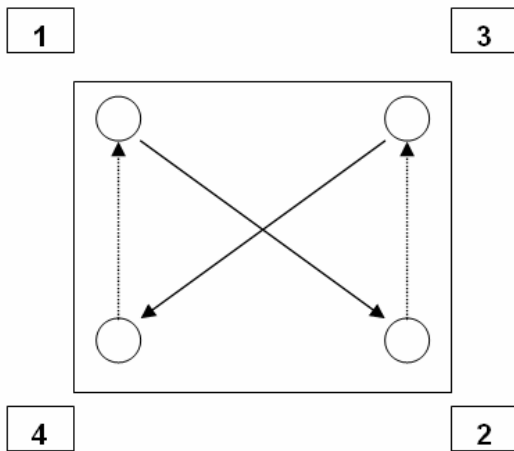
## Assembly of Actuated Valve

**First** – Set actuator to **OPEN** position

- ⇒ For **NORMALLY CLOSED (NC) Actuated Valves** and **DOUBLE ACTING (DA) Actuated Valves**, apply air to activate the actuator into the open position. **Failure to use air to open the valve can result in damage to the actuator.**
- ⇒ For **Normally OPEN (NO) Actuated Valves**, release any air pressure.

**Assembly:** Attach the opened actuator and diaphragm assembly to the body. Insert the retaining fasteners and hand tighten. **Important: Use diagonally opposing technique to tighten fastenings at all times as shown in Figure 2.**

**Figure 2**



Set the actuator to the closed position

- ⇒ Release air pressure for **NORMALLY CLOSED (NC) Actuators**
- ⇒ Apply air pressure for **NORMALLY OPEN (NO) Actuators**

This will ensure that the diaphragm seats correctly before further tightening. Continue to fastenings to  $\frac{3}{4}$  of full torque, as per torque specifications.

Before final tightening, set actuator to open position

- ⇒ Apply air pressure for **NORMALLY CLOSED (NC) Actuators**
- ⇒ Release air pressure for **NORMALLY OPEN (NO) Actuators**

**Final Assembly:** Tighten all fasteners to the correct torque settings (see torque tables).

### Torque Table

Valve Size	Maximum Torque (Nm)	Maximum Torque lb.ft
<b>DN 8 (0.25" Bioseal)</b>	<b>3</b>	<b>2.2</b>
<b>DN10 (0.375" Bioseal)</b>	<b>3</b>	<b>2.2</b>
<b>(0.50" Bioseal)</b>	<b>3</b>	<b>2.2</b>
<b>DN 15 (0.50")</b>	<b>6.6</b>	<b>5</b>
<b>DN20 (0.75")</b>	<b>6.6</b>	<b>5</b>
<b>DN25 (1.00")</b>	<b>8</b>	<b>6</b>
<b>DN40 (1.50")</b>	<b>17</b>	<b>13</b>
<b>DN50 (2.00")</b>	<b>33</b>	<b>24</b>
<b>DN65 (2.50")</b>	<b>47</b>	<b>35</b>
<b>DN80 (3.00")</b>	<b>67</b>	<b>49</b>
<b>DN100 (4.00")</b>	<b>53</b>	<b>39</b>
<b>DN150 (6.00")</b>	<b>107</b>	<b>79</b>
<b>DN200 (8.00")</b>	<b>130</b>	<b>96</b>

### Diaphragm and Valve Storage

To achieve a long shelf life, we recommend spare diaphragms (PTFE faced, natural, and synthetic rubber), be stored in bags on wooden shelves, away from direct sunlight and ozone (which can be formed by electrical equipment). Leave spare diaphragms in Saunders packaging until required. Do not place other articles on diaphragm, to avoid possibility of deformation.

All Sanitary valves are supplied with protective end caps and unassembled bodies should have weir covers. Keep these protective caps and covers in position until valve/body is installed.