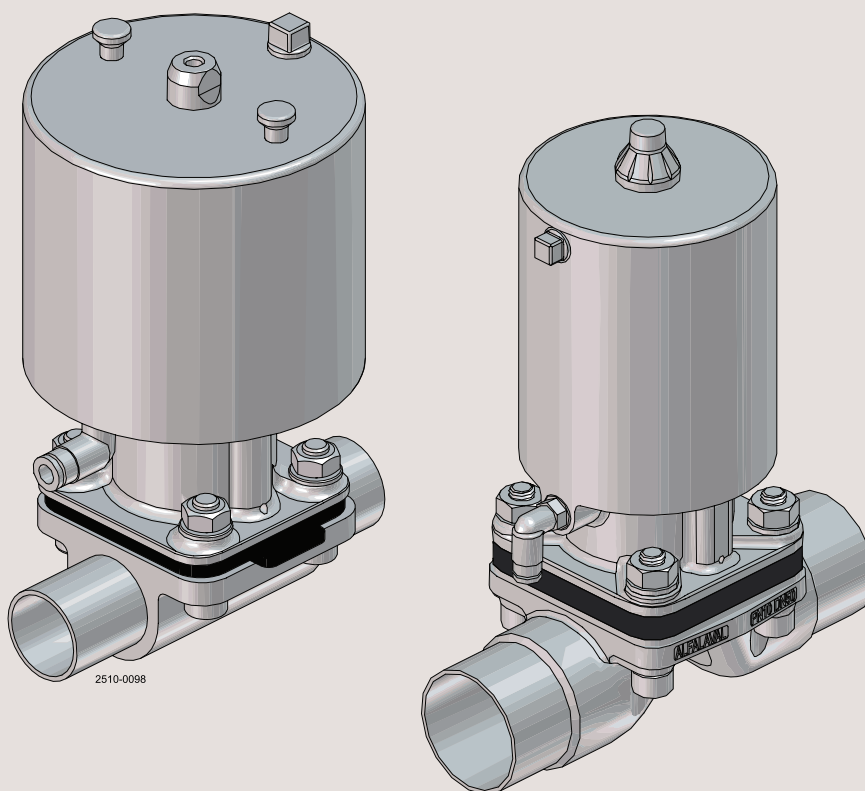




## Instruction Manual

Unique DV-ST UltraPure – pneumatic, valve sizes DN8–DN100 (¼" to 4")



ESE03511-EN10 2022-10

Original manual



*The information herein is correct at the time of issue but may be subject to change without prior notice*

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# 1 Declarations of Conformity

## EU Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Valve

Designation

Unique DV-ST UltraPure

Type

Serial number from Q 000001 to 999999

Serial number from AAX000000001 to AAX999999999

Serial number from E 000001 to 999999

Serial number from AAB000000001 to AAB999999999

Serial number from 100700000001 to 100799999999

is in conformity with the following directives with amendments:

- Machinery Directive 2006/42/EC

- ATEX directive 2014/34/EU



II 2G  
II 3D

Ex h IIB T4 Gb  
Ex h IIIB T100°C Dc

$(-10^{\circ}\text{C} \leq t_{\text{amb}} \leq 80^{\circ}\text{C})$   
 $(-10^{\circ}\text{C} \leq t_{\text{amb}} \leq 80^{\circ}\text{C})$

The valve technical file is stored with: Danish Technological Institute, Kongsvang Allé 29, 8000 Aarhus C, Denmark  
Notified Body no.: 0396 Certificate. no.: DTI 17ATEX0067X

The person authorised to compile the technical file is the signer of this document.

Global Product Quality Manager

Title

Lars Kruse Andersen

Name

Kolding, Denmark

Place

2022-10-01

Date (YYYY-MM-DD)

Signature

This Declaration of Conformity replaces Declaration of Conformity dated 2021-03-03



# 1 Declarations of Conformity

## UK Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Valve

Designation

Unique DV-ST UltraPure

Type

Serial number from Q 000001 to 999999

Serial number from AAX000000001 to AAX999999999

Serial number from E 000001 to 999999

Serial number from AAB000000001 to AAB999999999

Serial number from 100700000001 to 100799999999

is in conformity with the following directives with amendments:

- The Supply of Machinery (Safety) Regulations 2008

- The Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016



II 2G

II 3D

Ex h IIB T4 Gb

Ex h IIIB T100°C Dc

$(-10^{\circ}\text{C} \leq t_{\text{amb}} \leq 80^{\circ}\text{C})$

$(-10^{\circ}\text{C} \leq t_{\text{amb}} \leq 80^{\circ}\text{C})$

The valve technical file is stored with: Danish Technological Institute, Kongsvang Allé 29, 8000 Aarhus C, Denmark

Notified Body no.: 0396

Certificate. no.: DTI 17ATEX0067X

Signed on behalf of: Alfa Laval Kolding A/S

Global Product Quality Manager

Title

Lars Kruse Andersen

Name

Kolding, Denmark

Place

2022-10-01

Date (YYYY-MM-DD)

Signature

DoC Revison\_01\_102022



# 1 Declarations of Conformity

## 1.1 ATEX Directive 2014/34/EU

### ATEX Directive 2014/34/EU

The ATEX Directive 2014/34/EU covers equipment and protective systems that will be used in areas endangered by potentially explosive atmospheres created by the presence of flammable gases, vapours and dusts. Pneumatic diaphragm valves supplied with an ATEX symbol are classified for use in potentially explosive atmospheres under ATEX Directive 2014/34/EU Group II, Categories 2 and 3.

Technical File Ref	Unique DV-ST UltraPure - Document reference no. 9612960801.
Equipment Group and Category	Group II (Zone 1), category 2 G and 3 D
Standards used	EN 80079-36:2016, EN 80079-37:2016

#### WARNING




For utilization in ATEX Environment:

Liquid flow might produce an electrostatic charge. Liquids with high conductivity (< 1000 pS/m) can be used. User should make measures according to IEC TS 60079-32-1.

## 1.2 ATEX Marking

The laser marking is found on the external surface of the actuators.

Example of marking:

		
Manufacturer		
Alfa Laval Kolding A/S, Albuen 31, DK-6000		
Valve type: Unique DV-ST UltraPure		
Serial No. xxxxxxxxxxxx		Year YYYY-MM ②
Cert. No. DTI 17ATEX0067X		
 II 2G EX h IIB T4 Gb		
		II 3D EX h IIB T100°C Dc
Specification: DNXX ①		ZZZZZZ ③ PN10
Recommended air pressure: Min. x.x bar ④		
Service enquiries <a href="http://www.alfalaval.com">www.alfalaval.com</a>		

2510-0099

1. Actuator size stated e.g. DN25.
2. Year and month stated e.g. 2017-05.
3. Actuator type: NC, NO or air/air.
4. See table for recommended air pressure.

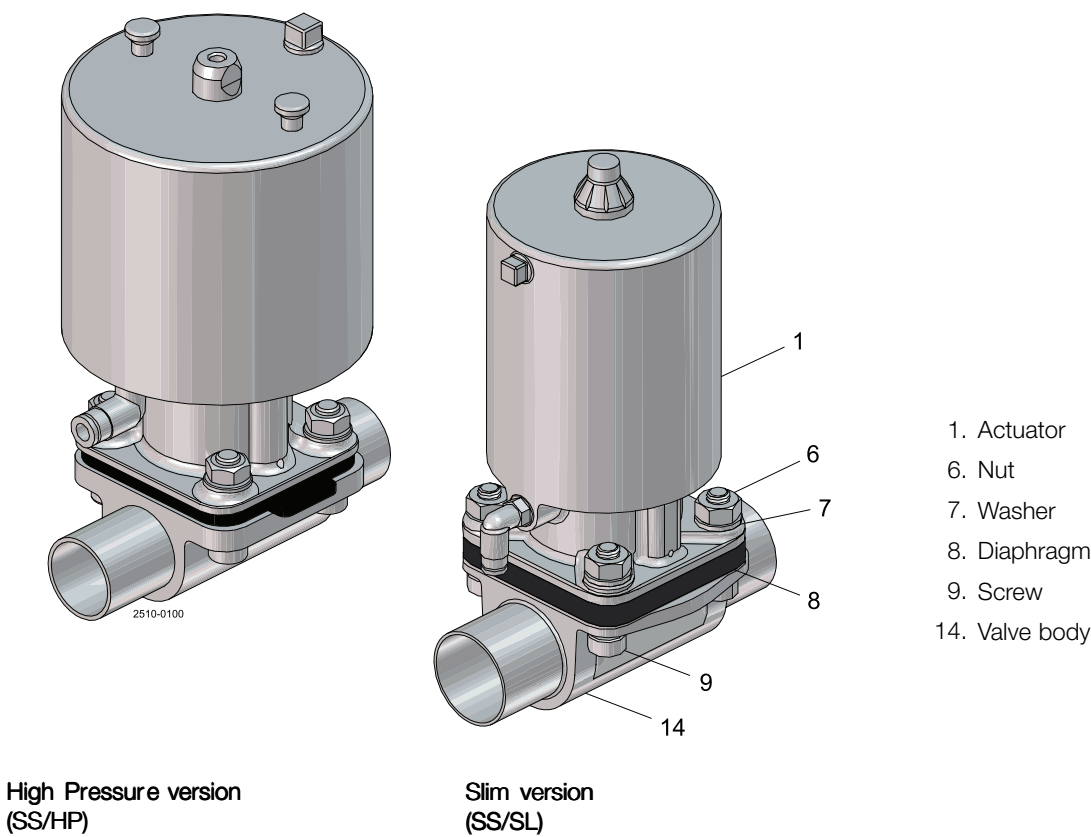
2.1 General information

The compact diaphragm valve requires low maintenance, has a non-maintainable pneumatic actuator and is available in normally closed, normally open and air/air modes of operation.  
The pneumatic actuator is only available in stainless steel. The actuator has been reduced in size, without compromising on strength or endurance, making it especially suited to applications where space is limited.

A wide range of accessories such as an electrical feedback unit, positioner, BUS systems, allow optimal adaption to all types of control tasks.  
Selection of the diaphragm with regard to the medium and temperature is the responsibility of the customer.

We highly recommend additional test(s) for any known special operating conditions. The customer is responsible for carrying out these tests.  
The hazards caused by chemical reactions between parts of the valve and the chemical mediums used must be clarified between the manufacturer and customer.  
These valves are intended to close the medium (on/off or control) after installation into a pipeline.  
Where defects appear on the product during the warranty period, Alfa Laval will take back the product and correct the problem. Should the equipment be modified or not kept in the manner prescribed within this manual, the warranty will become null and void.

2.2 Valve design



## 3 Safety

*Unsafe practices and other important information are indicated in this manual.  
Warnings are emphasised by means of special signs.*

### 3.1 Important information

**Always read this manual before using the valve!**

#### **WARNING**

Indicates that special procedures must be followed to avoid serious personal injury.

#### **CAUTION**

Indicates that special procedures must be followed to avoid damage to the valve.

#### **NOTE**

Indicates important information to simplify or clarify procedures.

### 3.2 Warning signs

General warning:



Caustic agents:



Hot surfaces:



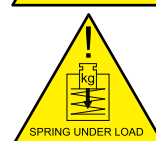
Risk of pinching:



Preloaded spring:



Spring under load





All warnings in the manual are summarised on this page.

Pay special attention to the instructions below so that serious personal injury and/or damage to the valve are avoided.

### 3.3 Safety precautions

#### Installation:

**Always** read the technical data thoroughly (see chapter 7 Technical data)

**Always** release compressed air after use



**Never** touch the moving parts if the actuator is supplied with compressed air



**Never** touch the valve or the pipelines when processing hot liquids or when sterilising

**Never** dismantle the valve with valve and pipelines under pressure

**Never** dismantle the valve when it is hot

Connect air supply hose to push-in fitting. Make sure that air supply hose is fitted properly.

Do **not** pressurise spring side of actuator.



#### Operation:

For utilization in ATEX Environment:

Liquid flow might produce an electrostatic charge. Liquids with high conductivity ( $< 1000 \text{ pS/m}$ ) can be used. User should make measures according to IEC TS 60079-32-1.

**Never** dismantle the valve with valve and pipelines under pressure

**Never** dismantle the valve when it is hot

**Always** read the technical data thoroughly (See chapter 7 Technical data)

**Always** release compressed air after use



**Never** touch the valve or the pipelines when processing hot liquids or when sterilising



**Never** touch the moving parts if the actuator is supplied with compressed air

**Always** rinse well with clean water after the cleaning

Connect air supply hose to push-in fitting. Make sure that air supply hose is fitted properly.

Do **not** pressurise spring side of actuator.



**Always** handle lye and acid with great care



### 3 Safety

---

*All warnings in the manual are summarised on this page.*

*Pay special attention to the instructions below so that serious personal injury and/or damage to the valve are avoided.*

---

#### Maintenance:

**Always** read the technical data thoroughly (See chapter 7 Technical data)

**Always** release compressed air after use

**Never** service the valve when it is hot

**Never** service the valve with valve and pipelines under pressure



**Never** put your fingers through the valve ports if the actuator is supplied with compressed air

**Never** touch moving parts if the actuator is supplied with compressed air



NON-MAINTAINABLE actuator: **Never** disassemble the actuator

Connect air supply hose to push-in fitting. Make sure that air supply hose is fitted properly.

Do **not** pressurise spring side of actuator.



---

#### Transportation:

**Always** secure that compressed air is released

**Always** check that all connections are disconnected before attempting to remove the valve from the installation

**Always** drain liquid from valves before transportation

**Always** ensure that the valve is adequately secured during transportation - if specially designed packaging material is available, it must be used



*The instruction manual is part of the delivery. Study the instructions carefully.  
The items refer to the parts list and service kits section.  
The valve is supplied as separate parts as standard (for welding).  
If it is supplied with fittings, the valve is assembled before delivery.*

### 4.1 Unpacking/delivery – applies to both actuator versions

#### Step 1

##### CAUTION

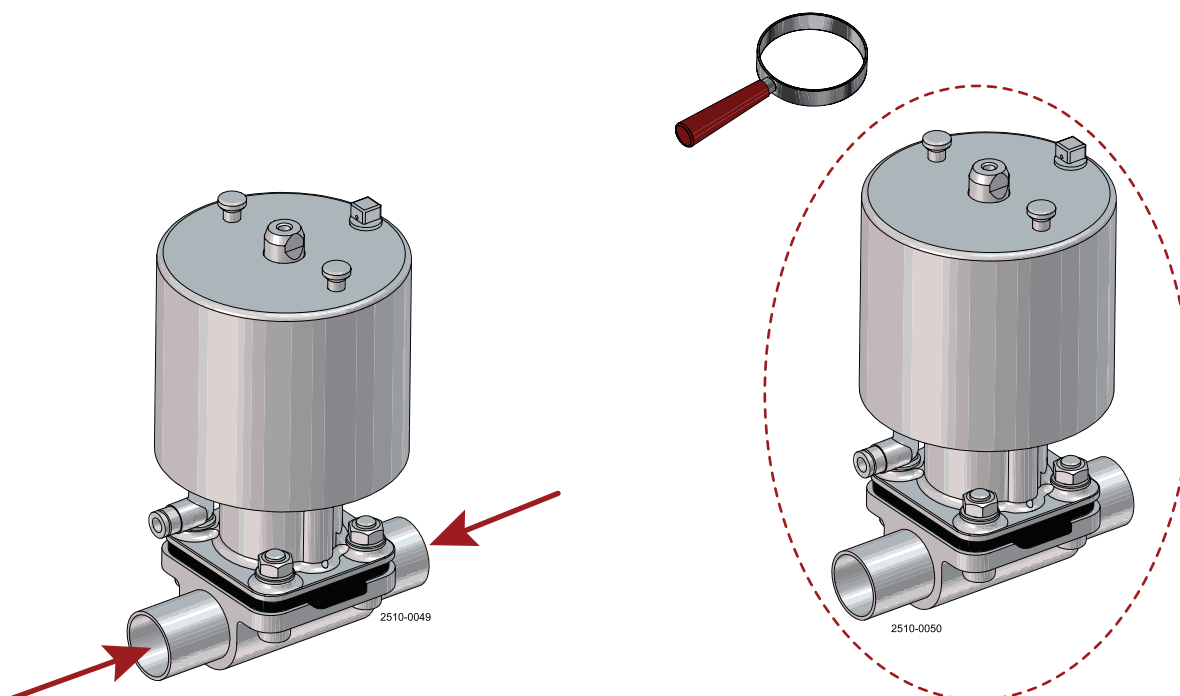
Alfa Laval cannot be held responsible for incorrect unpacking.

##### Check the delivery for:

1. Complete valve.
2. Delivery note.

#### Step 2

1. Remove any packing materials from the valve/valve parts.
2. Inspect the valve/valve parts for visible transportation damage.
3. Avoid damaging the valve/valve parts.



### 4.2 Unpacking/intermediate storage – applies to both actuator versions

#### Step 1

##### CAUTION

Alfa Laval cannot be held responsible for incorrect unpacking.

##### Check the delivery for:

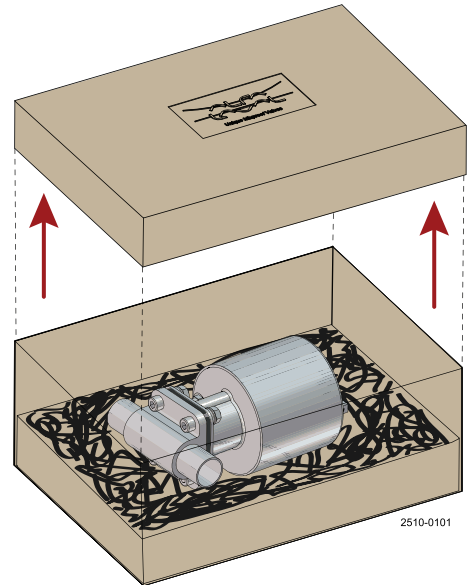
1. Complete valve
2. Delivery note
3. Warning label

## 4 Installation

*The instruction manual is part of the delivery. Study the instructions carefully.  
The items refer to the parts list and service kits section.  
The valve is supplied as separate parts as standard (for welding).  
If it is supplied with fittings, the valve is assembled before delivery.*

### Step 2

Remove upper support.

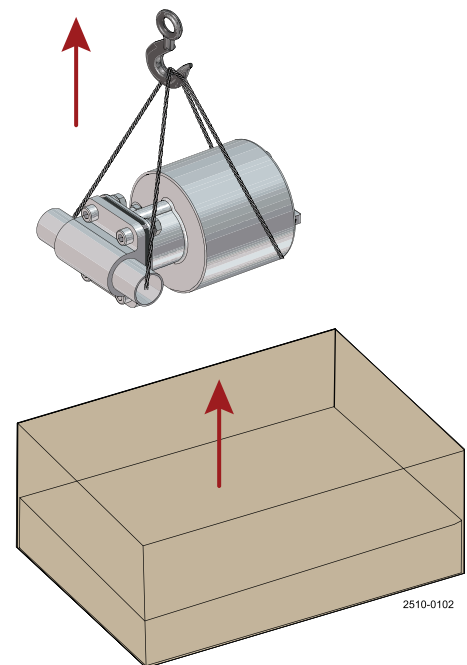


### Step 3

Lift out the valve.

#### NOTE

Please note weight of valve as printed on box.



### Step 4

Remove any packing materials from the valve ports.

## 4 Installation

The instruction manual is part of the delivery. Study the instructions carefully.

The items refer to the parts list and service kits section.

The valve is supplied as separate parts as standard (for welding).

If it is supplied with fittings, the valve is assembled before delivery.

**Weight** - kg (lbs)

	DN8/D-N10 (¼"/¾")	DN15 (½")	DN20 (¾")	DN25 (1")	DN40 (1½")	DN50 (2")	DN65 (2½")	DN80 (3")	DN100 (4")
<b>Actuator type: high pressure (SS/HP)</b>									
2-way forged	0.9 (2.0)	1.0 (2.2)	3.5 (7.5)	3.9 (8.6)	10.3 (22.7)	12.7 (28.0)	31.5 (69.4)	38.7 (85.3)	-
2-way cast	0.9 (2.0)	1.0 (2.2)	3.3 (7.3)	3.8 (8.4)	10.0 (22.0)	11.7 (25.8)	29.9 (65.9)	36.2 (79.8)	-
2-way block	-	-	-	-	-	-	-	-	37 (82.2)
T-block equal port sizes	0.9 (2.0)	1.1 (2.4)	3.5 (7.5)	4.2 (9.3)	11.3 (24.9)	14.4 (31.7)	34.0 (75.0)	45.0 (99.2)	-
Tank outlet block	-	1.2 (2.6)	3.6 (7.9)	4.2 (9.3)	11.3 (24.9)	13.0 (28.7)	32.5 (71.7)	42.1 (92.8)	-
<b>Actuator type: slim (SS/SL)</b>									
2-way forged	0.8 (1.76)	0.9 (1.98)	2.5 (5.5)	3.3 (7.26)	2.6 (5.72)	7.3 (16.06)	9.2 (20.24)	16.1 (35.42)	-
2-way cast	0.8 (1.76)	0.9 (1.98)	2.3 (5.06)	3.2 (5.06)	2.3 (7.04)	6.3 (13.86)	7.6 (16.72)	13.6 (29.92)	-
2-way block	-	-	-	-	-	-	-	-	14.4 (31.68)
T-block equal port sizes	0.8 1.76	1 (2.2)	2.5 (5.5)	3.6 (7.92)	3.6 (7.92)	9 (19.8)	11.7 (25.74)	22.4 (49.28)	-
Tank outlet block	-	1.1 (2.42)	2.6 (5.72)	3.6 (7.92)	3.6 (7.92)	7.6 (16.72)	10.2 (22.44)	19.5 (42.9)	-

## 4 Installation

*Study the instructions carefully and pay special attention to the warnings!*  
*The valve has welding ends as standard but can also be supplied with fittings.*

### 4.3 General installation – applies to both actuator versions

#### Step 1



**Always** read the technical data thoroughly

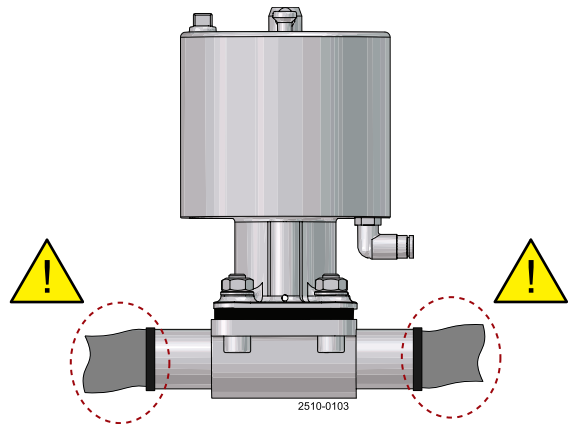
#### CAUTION

Alfa Laval cannot be held responsible for incorrect installation.

Avoid stressing the valve.

Pay special attention to:

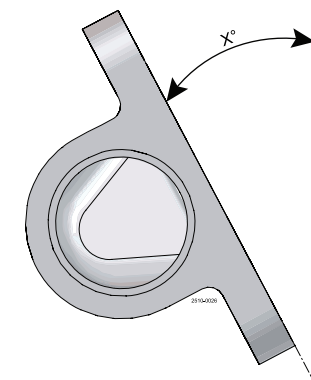
- Vibrations.
  - Thermal expansion of the pipelines.
  - Excessive welding.
  - Overloading of the pipelines.
- 
- When draining the diaphragm valve and pipeline, ensure that there is a suitable installation position.
  - Variable installation position for self-draining, see data on the installation angle.
  - For diaphragm valves with weld ends, remove the actuator and diaphragm from the valve body before welding.
  - For applications in ex-proof areas, the composite actuator should only be wiped with a moist cloth.



**Risk of damage!**

*Study the instructions carefully and pay special attention to the warnings!*  
*The valve has welding ends as standard but can also be supplied with fittings.*

### 4.4 Installation angle on self-draining position – applies to both actuator versions



**Table 1. Forged**

Size	ASME	ISO2037	DIN11850	ISO1127
DN8	41.8	27.2	31.8	26
DN10	32.7	25.4	34.5	27.5
DN15	35.4	25.5	23.7	20.3
DN20	33.9	29.5	27.8	23
DN25	29	29	25.2	21.1
DN32	-	-	18.4	26.3
DN40	29.5	28.8	26.8	21.8
DN50	25.1	24.2	23.8	19.6
DN65	22.9	22.6	19.9	15.7
DN80	26.2	26.7	23.2	21.6
DN100*	14	14	13	8

\* Only block

**Table 2. Forged mini**

Size	ASME
DN8	38
DN10	29,9
DN15	26

**Table 3. Cast ST**

Size	ASME	ISO2037
DN8	37.2	24.2
DN10	29.6	21.7
DN15	35.7	25
DN20	30.8	25.8
DN25	29.3	28.5
DN40	26.4	25.8
DN50	24.4	23.7

**Table 4. Cast OP**

Size	ASME	ISO2037
DN8	-	-
DN10	-	-
DN15	26.5	6.75
DN20	20	14
DN25	22.7	22.4
DN40	13.8	12.9
DN50	16.1	15.4

## 4 Installation

---

*Study the instructions carefully and pay special attention to the warnings!*  
*The valve has welding ends as standard but can also be supplied with fittings.*

---

DN65	21.5	21.5	DN65	14.7	15.3
DN80	25.6	25.7	DN80	14.9	14.9

---



*Study the instructions carefully and pay special attention to the warnings!*  
*The valve has welding ends as standard but can also be supplied with fittings.*

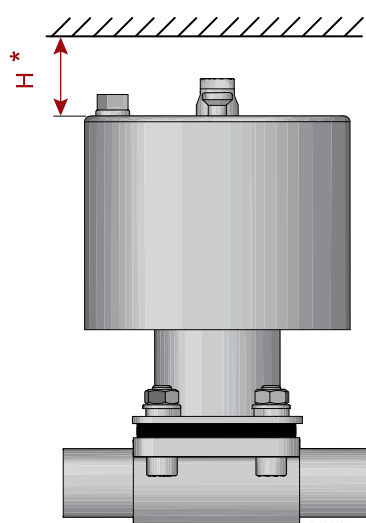
### 4.5 Drainability – applies to both actuator versions

Proper drainability in horizontally installed pipes requires mounting of the valve at the correct angle, see section 4.4 Installation angle on self-draining position - applies to both actuator versions

To ensure proper drainability, the valve must be mounted at the correct angle. Proper installation is the responsibility of the system installer and/or user.

### 4.6 Minimum free space above actuator

When installing an actuator without indication unit (for example a Thinktop unit), a minimum distance above the actuator is required to ensure no pinching of a hand placed on top of the actuator.



Size	H <sup>1)</sup> mm (in)
DN8/DN10 (¼"/⅜")	119 (4.685)
DN15 (½")	122 (4.803)
DN20 (¾")	128 (5.039)
DN25 (1")	131 (5.167)
DN40 (1½")	149 (5.866)
DN50 (2")	149 (5.866)
DN65 (2½")	168 (6.614)
DN80 (3")	174 (6.850)
DN100 (4")	174 (6.850)

<sup>1)</sup> Clearance according to ISO13854

\*) Only applicable for high pressure version

<sup>1)</sup> Clearance according to ISO13854

\*) Only applicable for high pressure version

## 4 Installation

---

*Study the instructions carefully and pay special attention to the warnings!*  
*The valve has welding ends as standard but can also be supplied with fittings.*

---

### 4.7 Welding

---

#### Step 1

**All welding should be done by qualified personnel.**

Disassemble the actuator from the valve body. See Replacing the Diaphragm for details.

---

#### Step 2

Perform the welding procedure on the body according to standard industrial practices.

---

#### Step 3

Reassemble the actuator to the valve body.

---

#### Step 4

Test the valve for correct operation before installing.

---

### 4.8 Mounting of the actuator

---

For T-valves, tandem valves, tank outlet valves and block valves please note that the bonnet is mounted using studs and nuts instead of bolts and nuts.

---

### 4.9 Recycling information

---

#### Unpacking

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps
- Wood and cardboard boxes can be re-used, recycled or used for energy recovery
- Plastics should be recycled or burnt at a licensed waste incineration plant
- Metal straps should be sent for material recycling

#### Maintenance

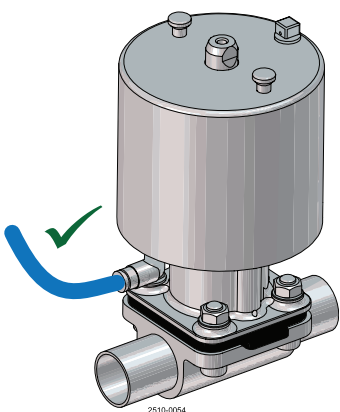
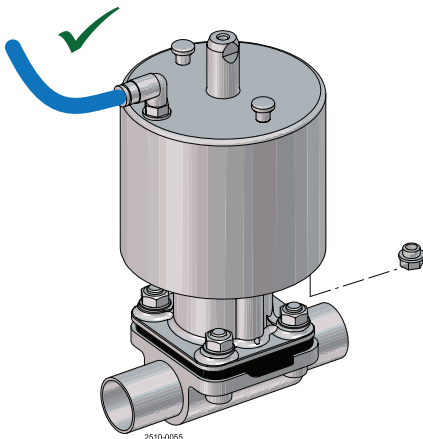
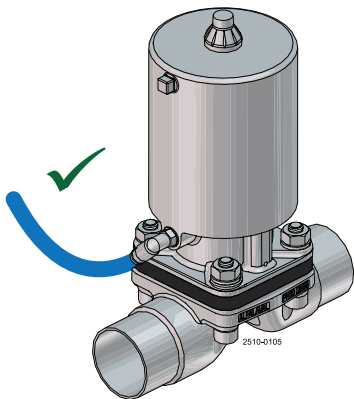
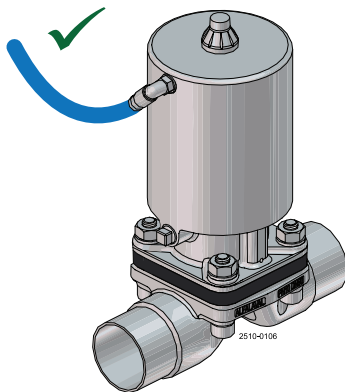
- During maintenance, oil and wear parts in the machine are replaced
- All metal parts should be sent for material recycling
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling
- Oil and all non-metal wear parts must be disposed of in accordance with local regulations

#### Scrapping

- At end of use, the equipment must be recycled according to relevant local regulations. Besides the equipment, any hazardous residues from the process liquid must be taken into consideration and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company
  - Recycling must be undertaken with caution, due to the pre-compressed spring inside the actuator. With disposal, the actuator can be returned to Alfa Laval for scrapping in a safe and secure manner.
-

Study the instructions carefully and pay special attention to the warnings!  
 Ensure that the valve operates smoothly.  
 The items refer to the parts list and service kits section.

## 5.1 Operation

Actuator type	Normally closed (NC)	Normally open (NO)
High pressure (SS/HP)		
Slim (SS/SL)		



**Always** read the technical data carefully  
 See chapter 7 Technical data  
**Always** release compressed air after use.

Connect air supply hose to push-in fitting. Make sure that the air supply hose is fitted properly.  
 Do **NOT** pressurise the spring side of the actuator (applies to high pressure version only)

Alfa Laval cannot be held responsible for incorrect operation.

### WARNING

For utilization in ATEX Environment:

Liquid flow might produce an electrostatic charge. Liquids with high conductivity ( $< 1000 \text{ pS/m}$ ) can be used.  
 User should make measures according to IEC TS 60079-32-1.

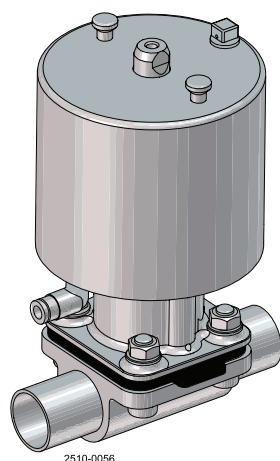
## 5 Operation

*Study the instructions carefully and pay special attention to the warnings!  
Ensure that the valve operates smoothly.  
The items refer to the parts list and service kits section.*

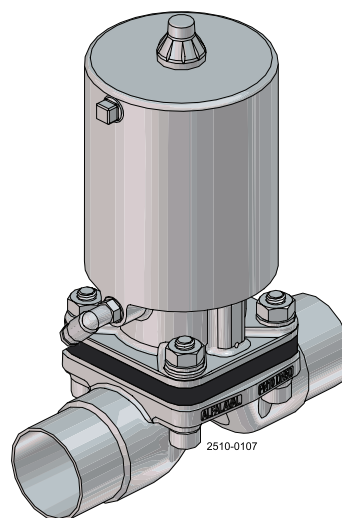
**Fig. 1 - Function NC: Normally Closed**

In de-energised status, the valve is closed by spring force. When the control medium is admitted to the actuator (connection below), the valve opens; when the control medium escapes, the valve is closed via spring force.

**High pressure actuator (SS/HP)**



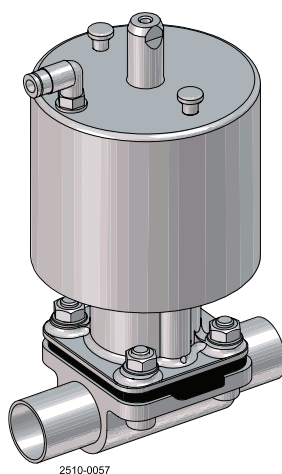
**Slim actuator (SS/SL)**



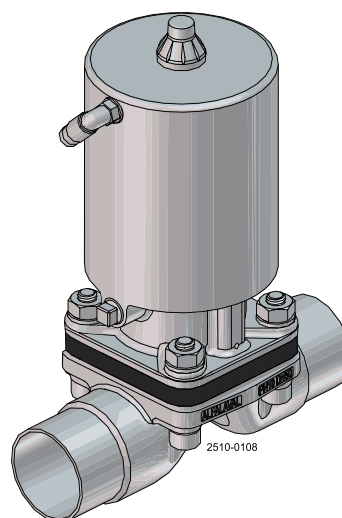
**Fig. 2 - Function NO: Normally open**

In de-energised status, the valve is opened by spring force. When the control medium is admitted to the actuator (connection above), the valve closes; when the control medium escapes, the valve is opened via spring force.

**High pressure actuator (SS/HP)**



**Slim actuator (SS/SL)**

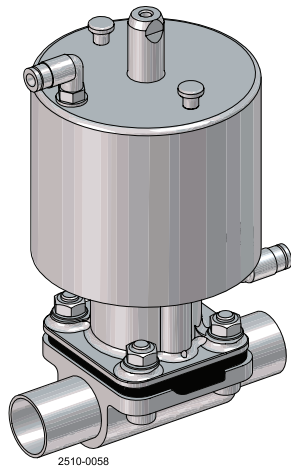


*Study the instructions carefully and pay special attention to the warnings!*  
*Pay attention to possible faults.*  
*The items refer to the parts list and service kits section.*

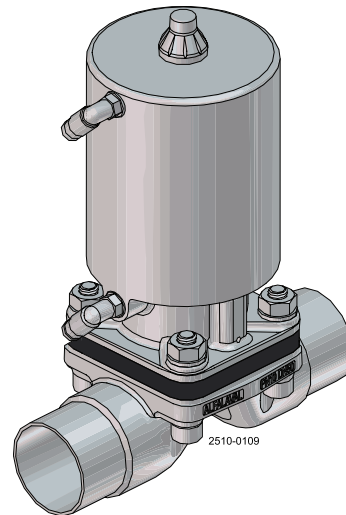
**Fig. 3 - Function AA: Air/Air (double acting)**

The valve has no defined basic position. The valve is opened and closed by applying control pressure to the corresponding control connection. Connection below: open, connection above: close.

**High pressure actuator (SS/HP)**



**Slim actuator (SS/SL)**



### 5.2 Operation – applies to high pressure and slim actuator versions

#### Step 1



- **Always** read the technical data thoroughly (see section ).
- **Always** release compressed air after use.

#### **WARNING**

For utilization in ATEX Environment:

Liquid flow might produce an electrostatic charge. Liquids with high conductivity ( $< 1000 \text{ pS/m}$ ) can be used. User should make measures according to IEC TS 60079-32-1.

#### **CAUTION!**

Alfa Laval cannot be held responsible for incorrect operation.

## 5 Operation

*The valve is designed for cleaning in place (CIP).*

*Study the instructions carefully and pay special attention to the warnings!*

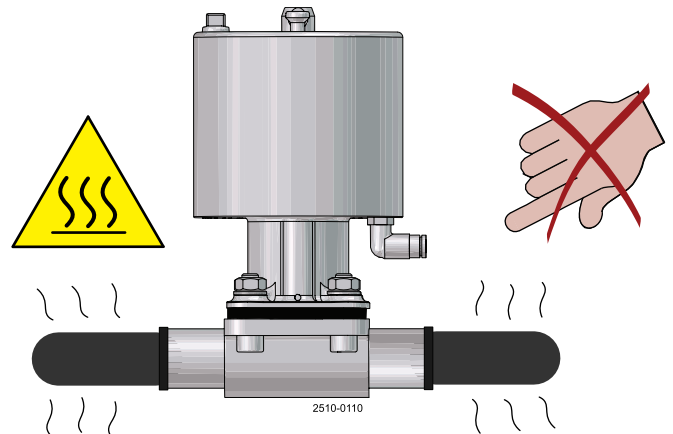
*NaOH = Caustic soda.*

*HNO<sub>3</sub> = Nitric acid.*

### Step 2



**Never** touch the valve or the pipelines when processing hot liquids or when sterilising.



## 5.3 Recommended cleaning

### Step 1



**Always** handle lye and acid with great care

**Caustic danger!**



**Always** use  
rubber gloves!

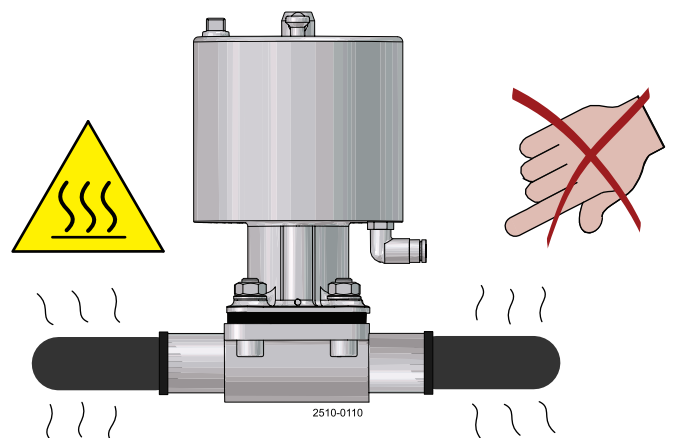


**Always** use  
protective goggles!

### Step 2



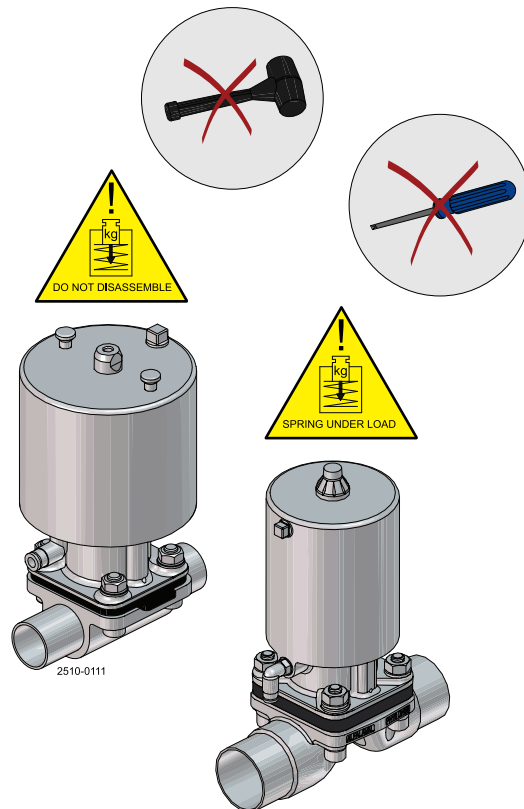
**Never** touch the valve or the pipelines when sterilising.



### 6.1 Replacing the diaphragms and seals

Generally, the only routine maintenance required is the replacement of the diaphragm. The diaphragm replacement routine, depending on the medium, pressure, temperature and cycle (duration and temperature) of steam sterilisation between process runs, determines the optimum change cycle of the diaphragm.

As with all diaphragm valves, the diaphragm itself is the component most exposed to wear. In addition to mechanical stress and temperature range, the diaphragm is subject to wear resulting from the media. Alfa Laval recommend that the diaphragm is replaced once a year or more frequently depending on operating conditions and media. See section 6.2 Replacing the diaphragm.



#### NOTE!

The high pressure and slim actuators are both non-serviceable. In case of malfunction the complete actuator must be replaced.

**DO NOT DISASSEMBLE OR BY ANY MEANS OPEN THE ACTUATOR .  
PRE-COMPRESSED SPRINGS INSIDE!**

## 6 Maintenance

### 6.2 Replacing the diaphragm

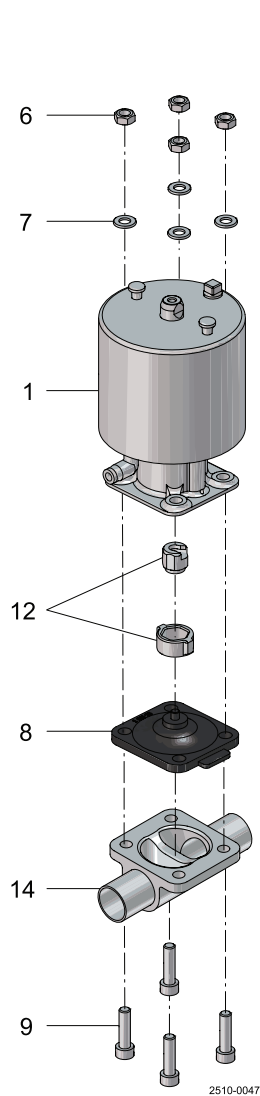
Before servicing any installed valve, you must:

- depressurise the system
- open the valve
- purge the valve

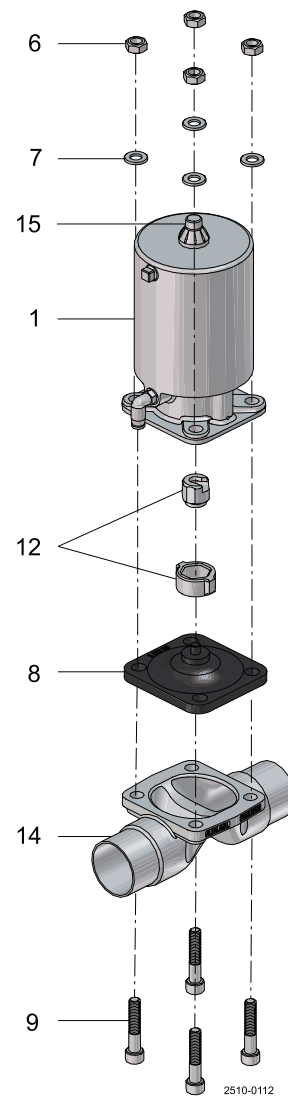
**Note:** The diaphragm can be replaced without removing the valve body.



Risk of pinching fingers during mounting of diaphragm



High pressure actuator (SS/HP)



Slim actuator (SS/SL)



---

### Step 1

Only use Alfa Laval diaphragms

---

### Step 2

Actuate the valve to its "opened" position for:

- Normally closed and air/air actuators, add control air pressure to the lower actuator port
- Normally open actuators, disconnect control air pressure

---

### Step 3

Remove the body fasteners (6, 7 & 9) using a cross-wise pattern.

---

### Step 4

Actuate the valve to its "closed" position for:

- Normally closed actuators, disconnect control air pressure
- Normally open and air/air actuators, apply control air pressure to the upper actuator port

---

### Step 5

Remove the diaphragm from the actuator

#### Button-style compressor:

- Remove the diaphragm (8) by pulling it out (see fig. 1).

#### Threaded-style compressor:

- Rotate the diaphragm (8) counter-clockwise until removal is possible (see fig. 2).

#### Bayonet-style compressor:

- Rotate the diaphragm 90° and remove (see fig. 3).

**NOTE!** see figs. 1-3, reverse action of step 9.

---

### Step 6

Check and clean threads and bayonets (12) of the diaphragm holder.

---

### Step 7

Make sure that the new diaphragm (8) and the contact area on the valve body (14) are clean and dry.

---

### Step 8

Make sure the diaphragm holder (12) matches the connection on the diaphragm (8). Should this not be the case, replace the diaphragm holder.

---

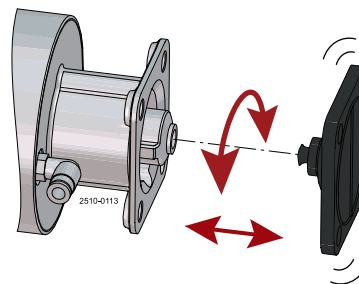
## 6 Maintenance

---

### Step 9

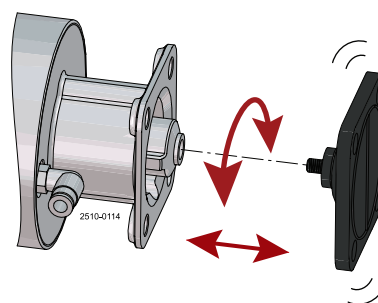
With the actuators in “closed” position, install diaphragm as follows:

For button-style diaphragm holder, insert the diaphragm with a push rotation. Rotate the diaphragm until the flange holes match (fig 1).



For threaded-style compressors, thread the diaphragm into the diaphragm holder in a clockwise direction (fig. 2).

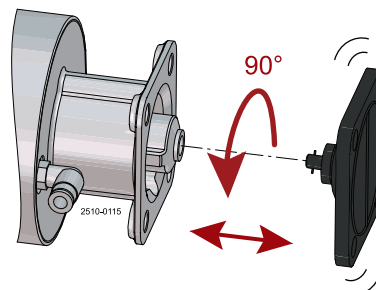
Do **not** overtighten! If necessary, turn the diaphragm in a counter-clockwise direction until the flange holes match.



For bayonet-style diaphragm holder insert the diaphragm with bayonet into the cavity of the diaphragm holder. Rotate the diaphragm 90° (fig. 3). Flange holes must match.

### Important!

Make sure the cavity groove is directioned towards the two protrusions on the diaphragm holder before mounting the diaphragm.



### WARNING

Do **not** overtighten!



Risk of pinching fingers during mounting of diaphragm.

**Step 10**

Actuate the valve to the "open" position - see step 2

**Step 11**

Align the actuator yoke to the valve body (14) using fasteners (9). Assemble the nuts and washers (6 & 7). To secure the actuator and body, tighten the four fasteners (6) by hand loosely.

Ensure all four bolts (9) are used. Lubricating the threads with an anti-seizing grease is required prior to mounting!

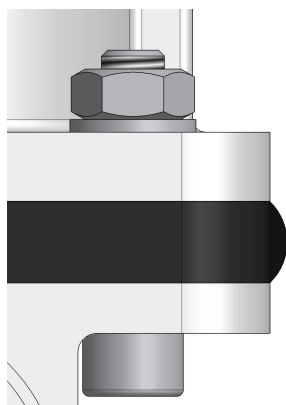
**Step 12**

Actuate the valve to the "closed" and "open" position several times, so that the diaphragm can properly fit to the weir prior tightening - see step 2 and 4. In valve closed position initiate tightening of the four fasteners (6) in a cross-wise pattern using a torque wrench and to the listed torque values

**Step 13**

Actuate the valve to the "open" and "closed" position several times and verify none of the nuts are loose. Otherwise step 12 must be followed again.

Fig 4



#### Recommended torque values for assembly

Size	
DN8/DN10 (1/4"/3/8")	2.5 Nm
DN15(1/2")	2.5 Nm
DN20 (3/4")	2.5 Nm
DN25 (1")	5 Nm
DN40 (1 1/2")	14 Nm
DN50 (2")	14 Nm
DN65 (2 1/2")	16 Nm
DN80/DN100 (3"/4")	36 Nm

Torque values should be followed in order to achieve a prolonged lifetime of the diaphragms. Make sure to tighten with an even distribution and in a cross-wise pattern until the listed torque values are obtained on each fastener. Fig. 4 primarily refers to assembly of EPDM diaphragms

**Step 14**

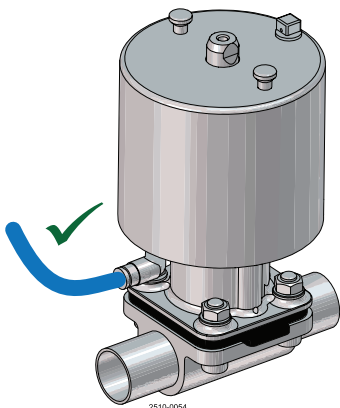
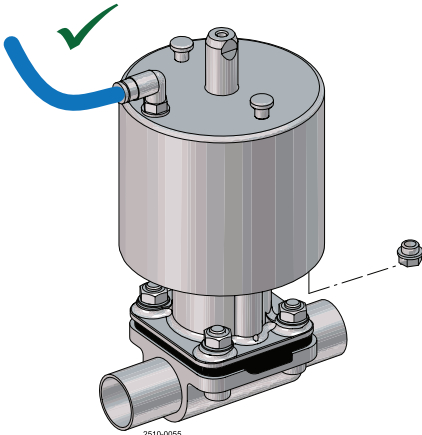
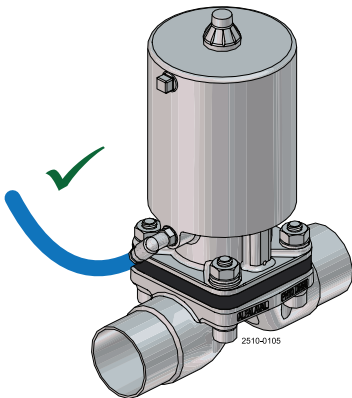
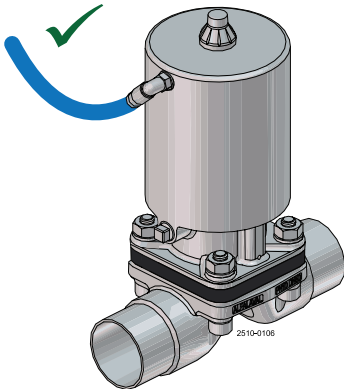
Test the valve for proper function

**NOTE:** For diaphragms based on a combination of polymer and elastomer a lower holding pressure performance prior the first heat cycle can be experienced. This is due to settling of temperature dependent factors (such as compression-set, rebound etc.). If seat leakage is persistent after the first heat cycle and re-tightening to specified torque values is with no effect. Loosen the fasteners and re-tighten to the specified torque again. Otherwise replace diaphragm.

# 6 Maintenance

## Step 15

Connect air supply hose to push-in fitting. Make sure that the air supply hose is fitted properly. Do not pressurise the spring side of the actuator.

Actuator version	Normally closed (NC)	Normally open (NO)
High pressure (SS/HP)		
Slim (SS/SL)		

## 7.1 Technical data

Actuator	
Temperature range	-10°C (14°F) to 80°C (176°F).
Air quality	ISO 8573-1, Class 0.2.4
Control air pressure	Max. 7 bar (102 psi) <sup>1)</sup>

<sup>1)</sup> Maximum control air pressure for actuator. For maximum control air pressure in regards to diaphragm endurance, please refer to tables 2 to 4

### Product wetted area

Table 3. Diaphragm properties

Description	Temperature recommendations		
	Liquid		Steam
	Min.	Max.	Max.
EPDM	-40°C/-40°F	130°C/266°F	150°C/302°F <sup>1)</sup>
PTFE/EPDM	-5°C/23°F	175°C/347°F	150°C/302°F <sup>2)</sup>
TFM/EPDM	-5°C/23°F	175°C/347°F	150°C/302°F <sup>2)</sup>

<sup>1)</sup> Continuous temperature

<sup>2)</sup> 40 min. steam sterilisation

Chemical compatibility:  
Please contact Alfa Laval for information.

### Diaphragm service lifetime

Diaphragm material	Code (marked on diaphragm)	Max. recommended service lifetime in years (stock and operation)
EPDM	S2, S3, S4	8
PTFE/EPDM	93	8
TFM/EPDM	LC	8

**Note!** Correct storage (e.g. in accordance with ISO 2230) is a prerequisite for achieving the specified storage time.

## 7 Technical data

Maximum working pressure for actuator type: high pressure (SS/HP)

**Table 4. High pressure actuator NC (Normally closed):**  
Product pressures and recommended control air pressures

Size		Control air pressure <sup>1)</sup>	EPDM		PTFE/EPDM		TFM/EPDM	
			$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$	$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$	$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$
DN	Inch	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)
8-10	1/4"-3/8"	Min. 3.1 (45)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
15	1/2"	Min. 5.5 (80)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
20	3/4"	Min. 3.2 (47)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
25	1"	Min. 5.7 (83)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
40	1 1/2"	Min. 3.1 (45)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
50	2"	Min. 5.1 (74)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
65	2 1/2"	Min. 4.1 (59)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
80	3"	Min. 5.1 (60)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
100	4"	Min. 5.1 (60)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)

<sup>1)</sup> Minimum air pressure at product pressure 0 bar. See chapter 7.6 for further information.

<sup>2)</sup> See diagram below for further information.

**Table 5. High pressure actuator NO (Normally open):**  
Product pressures and recommended control air pressures

Size		Control air pressure <sup>1)</sup>	EPDM		PTFE/EPDM		TFM/EPDM	
			$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$	$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$	$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$
DN	Inch	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)
8-10	1/4"-3/8"	Max. 5.7 (83)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
15	1/2"	Max. 5.5 (80)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
20	3/4"	Max. 5.5 (80)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
25	1"	Max. 5.2 (76)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
40	1 1/2"	Max. 5.2 (76)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
50	2"	Max. 5.2 (76)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
65	2 1/2"	Max. 4.5 (65)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
80	3"	Max. 4.4 (64)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
100	4"	Max. 4.4 (64)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)

<sup>1)</sup> Maximum air pressure at product pressure 10 bar. See chapter 7.6 for further information.

<sup>2)</sup> See diagram below for further information.

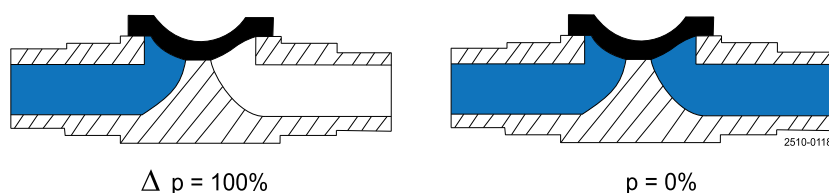
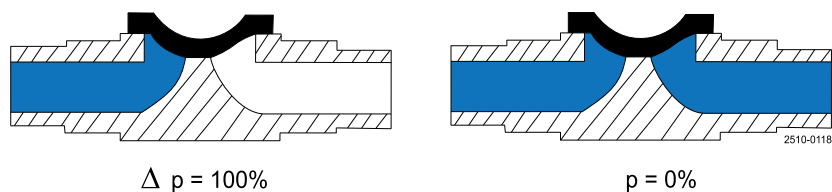


Table 6. High pressure actuator AA (Air/Air):  
Product pressures and recommended control air pressures

Size		Control air pressure <sup>1)</sup>	EPDM		PTFE/EPDM		TFM/EPDM	
			$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$	$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$	$\Delta p = 100\%^{2)}$	$\Delta p = 0\%^{2)}$
DN	Inch	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)
8-10	1/4"-3/8"	Max. 3.2 (46)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
15	1/2"	Max. 4.0 (59)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
20	3/4"	Max. 2.1 (31)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
25	1"	Max. 2.9 (42)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
40	1 1/2"	Max. 2.1 (31)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
50	2"	Max. 3.1 (45)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
65	2 1/2"	Max. 2.1 (31)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
80	3"	Max. 3.3 (48)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)
100	4"	Max. 3.3 (48)	10 (145)	10 (145)	10 (145)	10 (145)	6 (87)	6 (87)

<sup>1)</sup> Maximum air pressure at product pressure 10 bar. See chapter 7.6 for further information.

<sup>2)</sup> See diagram below for further information.



## 7 Technical data

Maximum working pressure for actuator type: slim (SS/SL)

**Table 7. Slim actuator NC (Normally closed):**  
Product pressures and recommended control air pressures

Size		Control air pressure <sup>1)</sup>	EPDM	PTFE/EPDM	TFM/EPDM
			Δ p =100% <sup>2)</sup>	Δ p = 100% <sup>2)</sup>	Δ p = 100% <sup>2)</sup>
DN	Inch	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)
8-10	1/4"-3/8"	Min. 4.5 (65.3)	10 (145)	6 (87)	6 (87)
15	½"	Min. 4.6 (66.7)	10 (145)	6 (87)	6 (87)
20	¾"	Min. 3.9 (56.6)	10 (145)	6 (87)	6 (87)
25	1"	Min. 4.2 (61)	10 (145)	6 (87)	6 (87)
40	1½"	Min. 4.3 (62.4)	10 (145)	6 (87)	6 (87)
50	2"	Min. 4.5 (65.3)	8 (116)	5 (72.5)	5 (72.5)
65	2½"	Min. 5.3 (76.9)	8 (116)	5 (72.5)	5 (72.5)
80	3"	Min. 5.5 (79.8)	8 (116)	5 (72.5)	5 (72.5)
100	4"	Min. 5.5 (79.8)	8 (116)	5 (72.5)	5 (72.5)

<sup>1)</sup> Minimum air pressure at product pressure 0 bar. See chapter 7.6 for further information.

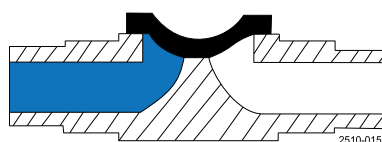
<sup>2)</sup> See diagram below for further information.

**Table 8. Slim actuator NO (Normally open):**  
Product pressures and recommended control air pressures

Size		Control air pressure <sup>1)</sup>	EPDM	PTFE/EPDM	TFM/EPDM
			Δ p = 100% <sup>2)</sup>	Δ p = 100% <sup>2)</sup>	Δ p = 100% <sup>2)</sup>
DN	Inch	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)
8-10	1/4"-3/8"	Min.4.2 (60.9)	10 (145)	6 (87)	6 (87)
15	½"	Min. 5.6 (81.2)	10 (145)	6 (87)	6 (87)
20	¾"	Min. 4.6 (66.7)	10 (145)	6 (87)	6 (87)
25	1"	Min. 4.9 (71.1)	10 (145)	6 (87)	6 (87)
40	1½"	Min. 4.5 (65.3)	10 (145)	6 (87)	6 (87)
50	2"	Min. 5 (72.5)	8 (116)	5 (72.5)	5 (72.5)
65	2½"	Min. 5 (72.5)	8 (116)	5 (72.5)	5 (72.5)
80	3"	Min. 5.8 (84.1)	8 (116)	5 (72.5)	5 (72.5)
100	4"	Min. 5.8 (84.1)	8 (116)	5 (72.5)	5 (72.5)

<sup>1)</sup> Maximum air pressure at product pressure 10 bar. See chapter 7.6 for further information.

<sup>2)</sup> See diagram below for further information.



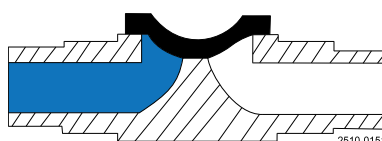
$\Delta p = 100\%$



Table 9. Slim actuator AA (Air/Air):

Product pressures and recommended control air pressures

Size		Control Air pressure <sup>1)</sup>	EPDM	PTFE/EPDM	TFM/EPDM
			Δ p = 100% <sup>2)</sup>	Δ p = 100% <sup>2)</sup>	Δ p = 100% <sup>2)</sup>
DN	Inch	Bar (psi)	Bar (psi)	Bar (psi)	Bar (psi)
8-10	1/4"-3/8"	Max. 1.7 (24.7)	10 (145)	6 (87)	6 (87)
15	½"	Max. 3.1 (45)	10 (145)	6 (87)	6 (87)
20	¾"	Max. 3.0 (43.5)	10 (145)	6 (87)	6 (87)
25	1"	Max. 3.1 (45)	10 (145)	6 (87)	6 (87)
40	1½"	Max. 3.3 (47.9)	10 (145)	6 (87)	6 (87)
50	2"	Max. 3.4 (49.3)	8 (116)	5 (72.5)	5 (72.5)
65	2½"	Max. 3.5 (50.8)	8 (116)	5 (72.5)	5 (72.5)
80	3"	Max. 4.1 (59.5)	8 (116)	5 (72.5)	5 (72.5)
100	4"	Max. 4.1 (59.5)	8 (116)	5 (72.5)	5 (72.5)

<sup>1)</sup> Maximum air pressure at product pressure 10 bar. See chapter 7.6 for further information.<sup>2)</sup> See diagram below for further information. $\Delta p = 100\%$

## 7 Technical data

**Weight** - kg (lbs)

	DN8/D- N10 (¼"/⅜")	DN15 (½")	DN20 (¾")	DN25 (1")	DN40 (1½")	DN50 (2")	DN65 (2½")	DN80 (3")	DN100 (4")
<b>Actuator type: high pressure (SS/HP)</b>									
2-way forged	0.9 (2.0)	1.0 (2.2)	3.5 (7.5)	3.9 (8.6)	10.3 (22.7)	12.7 (28.0)	31.5 (69.4)	38.7 (85.3)	-
2-way cast	0.9 (2.0)	1.0 (2.2)	3.3 (7.3)	3.8 (8.4)	10.0 (22.0)	11.7 (25.8)	29.9 (65.9)	36.2 (79.8)	-
2-way block	-	-	-	-	-	-	-	-	37 (82.2)
T-block equal port sizes	0.9 (2.0)	1.1 (2.4)	3.5 (7.5)	4.2 (9.3)	11.3 (24.9)	14.4 (31.7)	34.0 (75.0)	45.0 (99.2)	-
Tank outlet block	-	1.2 (2.6)	3.6 (7.9)	4.2 (9.3)	11.3 (24.9)	13.0 (28.7)	32.5 (71.7)	42.1 (92.8)	-
<b>Actuator type: slim(SS/SL)</b>									
2-way forged	0.8 (1.76)	0.9 (1.98)	2.5 (5.5)	3.3 (7.26)	2.6 (5.72)	7.3 (16.06)	9.2 (20.24)	16.1 (35.42)	-
2-way cast	0.8 (1.76)	0.9 (1.98)	2.3 (5.06)	3.2 (5.06)	2.3 (7.04)	6.3 (13.86)	7.6 (16.72)	13.6 (29.92)	-
2-way block	-	-	-	-	-	-	-	-	14.4 (31.68)
T-block equal port sizes	0.8 1.76	1 (2.2)	2.5 (5.5)	3.6 (7.92)	3.6 (7.92)	9 (19.8)	11.7 (25.74)	22.4 (49.28)	-
Tank outlet block	-	1.1 (2.42)	2.6 (5.72)	3.6 (7.92)	3.6 (7.92)	7.6 (16.72)	10.2 (22.44)	19.5 (42.9)	-

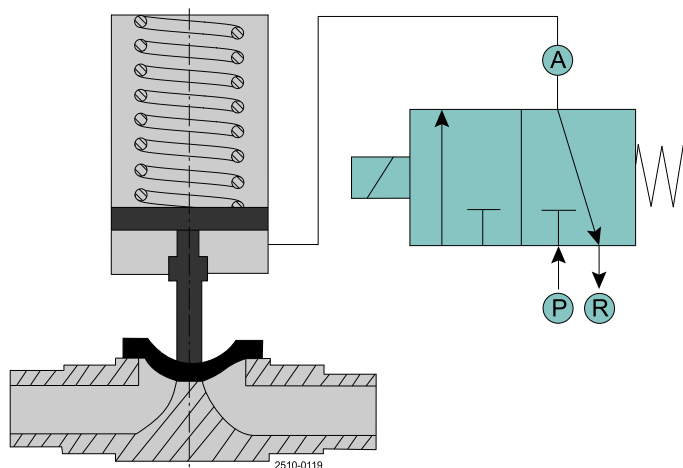
### 7.2 Automatic operation

The actuator controls the axial movement of a piston, thereby opening or closing the valve depending on the actuator function. Closing the valve will push the compressor downwards on the diaphragm, pressing the diaphragm against the weir of the valve body thereby closing the valve.

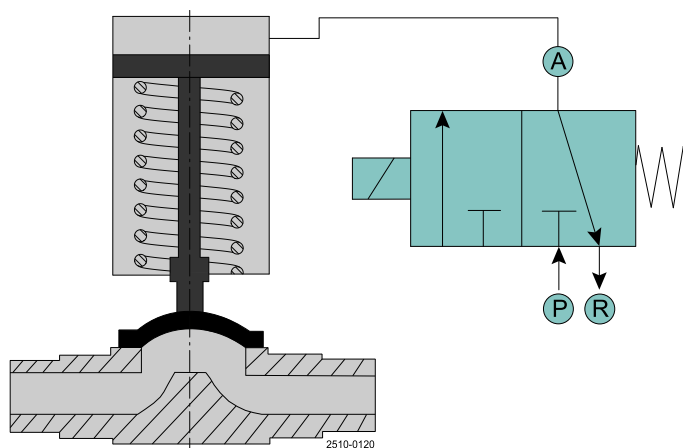
*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

### 7.3 Control diagram/modes

- a) **Function NC: normally closed** with a solenoid valve 3/2 way for connection below



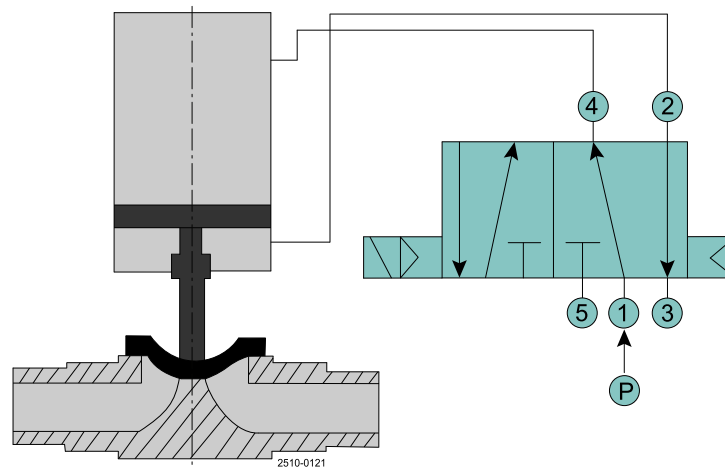
- b) **Function NO: normally open** with a solenoid valve 3/2 way for connection above



## 7 Technical data

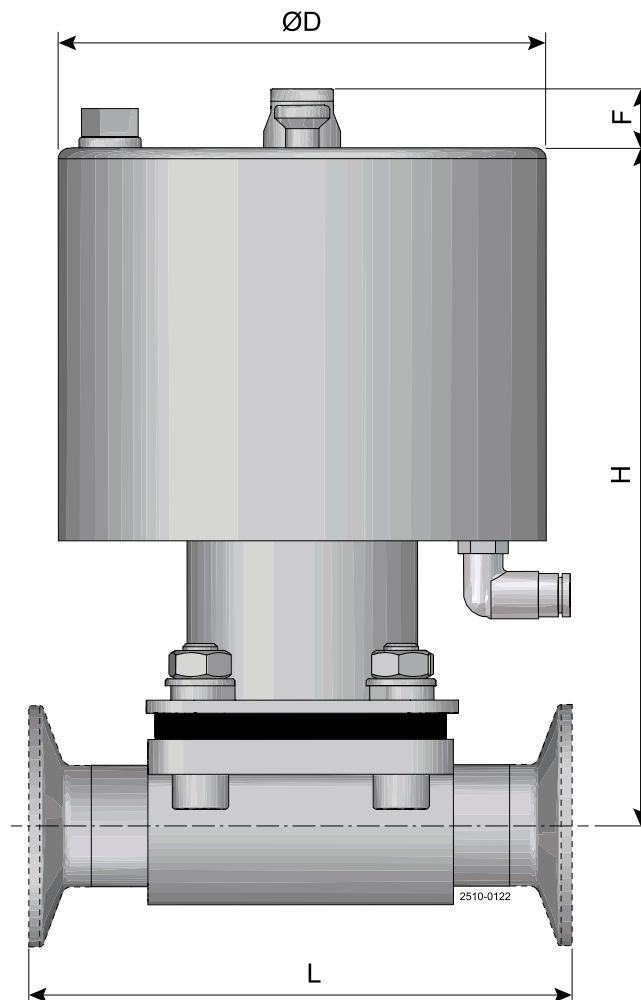
*It is important to observe the technical data during installation, operation and maintenance.  
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c) **Function AA: air/air** with a solenoid valve 4/2 and 5/2 way for connection below and above



*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

## 7.4 Size

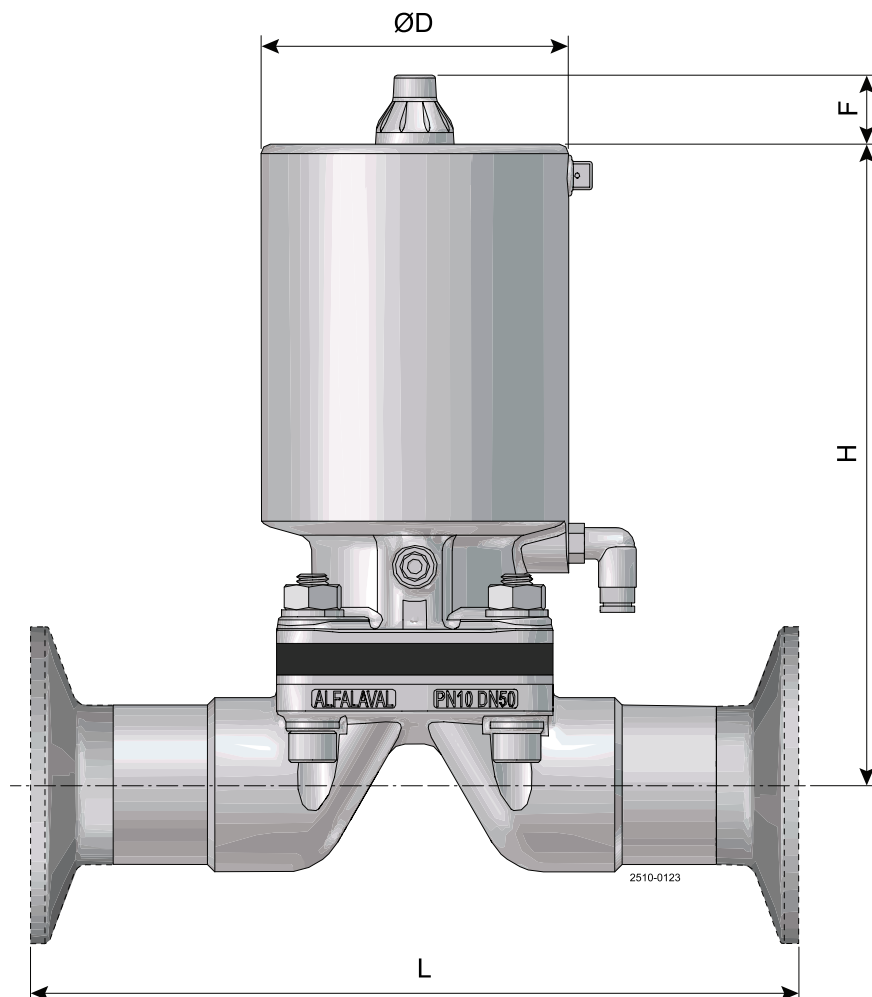


Actuator type: high pressure (SS/HP)

Size		$\varnothing D$	H	Max. F	L (weld end)	L (clamp end)
DN	Inch	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
8-10	1/4"-3/8"	54 (2.125)	105 (4.134)	19 (0.748)	89 (3.504)	89 (3.504)
15	1/2"	54 (2.125)	118 (4.646)	22 (0.866)	110 (4.331)	108 (4.252)
20	3/4"	102 (4.000)	151 (5.937)	28 (1.102)	119 (4.685)	118 (4.646)
25	1"	102 (4.000)	159 (6.260)	31 (1.220)	129 (5.079)	127 (5.000)
40	1 1/2"	156 (6.142)	231 (9.091)	49 (1.929)	161 (6.339)	159 (6.260)
50	2"	156 (6.142)	236 (9.291)	49 (1.929)	192 (7.559)	191 (7.520)
65	2 1/2"	222 (8.740)	360 (14.173)	68 (2.677)	218 (8.583)	216 (8.504)
80	3"	222 (8.740)	368 (14.488)	74 (2.913)	256 (10.079)	254 (10.000)
100	4"	222 (8.740)	374 (14.724)	74 (2.913)	218 (8.583)	305 (11.961)

## 7 Technical data

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Actuator type: slim (SS/SL)

Size		ØD	H	Max. F	L (weld end)	L (clamp end)
DN	Inch	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
8-10	1/4"-3/8"	49 (1.929)	90.8 (3.575)	22 (0.866)	89 (3.504)	89 (3.504)
15	1/2"	49 (1.929)	95 (3.740)	22 (0.866)	110 (4.331)	108 (4.252)
20	3/4"	69 (2.717)	127.2 (5.008)	22 (0.866)	119 (4.685)	118 (4.646)
25	1"	79 (3.110)	152.3 (5.996)	22 (0.866)	129 (5.079)	127 (5.000)
40	1 1/2"	98 (3.858)	194 (7.638)	22 (0.866)	161 (6.339)	159 (6.260)
50	2"	121 (4.764)	233 (9.173)	22 (0.866)	192 (7.559)	191 (7.520)
65	2 1/2"	138 (5.433)	267 (10.512)	22 (0.866)	218 (8.583)	216 (8.504)
80	3"	158 (6.220)	300.8 (11.842)	22 (0.866)	256 (10.079)	254 (10.000)
100	4"	158 (6.220)	306.8 (12.079)	22 (0.866)	218 (8.583)	305 (11.961)

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## 7.5 Product pressure versus control pressure

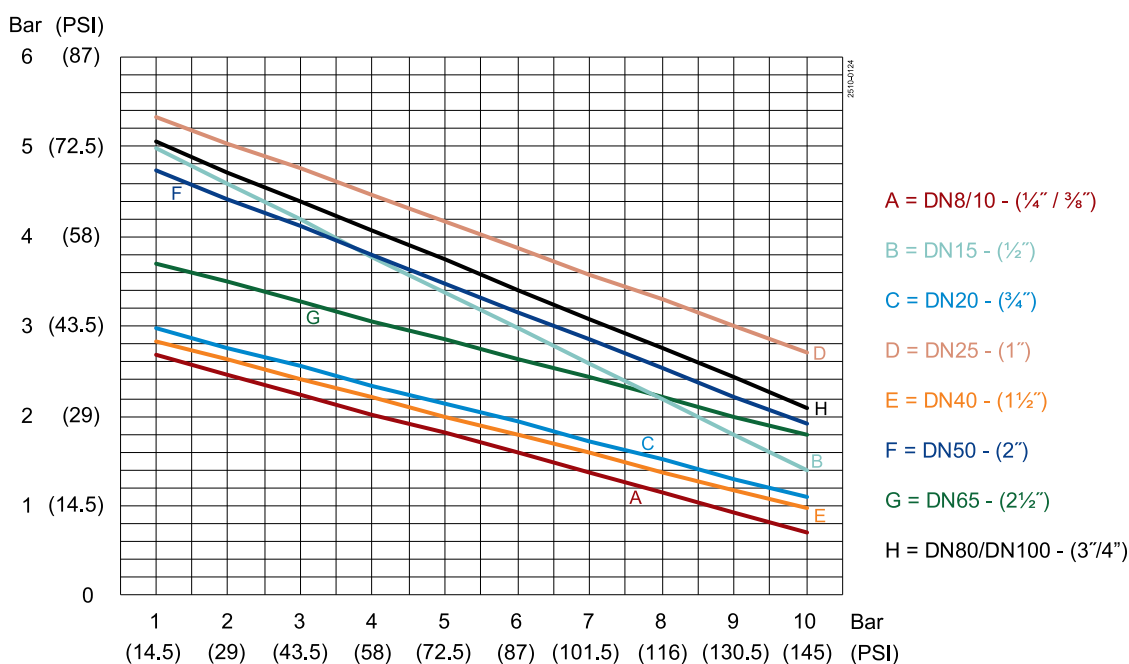
### Description:

The diagrams state the required control pressure on the actuator at a given product pressure in the system.

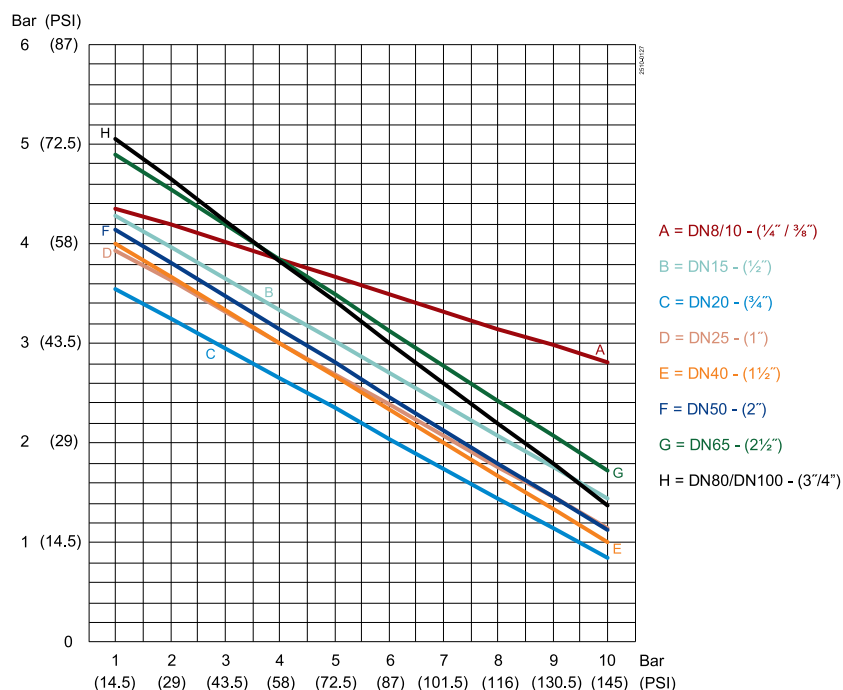
### NC (Normally Closed):

Control pressure is used for opening the valve. Here the required control pressure is reduced when the product pressure is increased. At interruption of air supply the actuator will close the valve.

### Actuator type: high pressure (SS/HP)



### Actuator type: slim (SS/SL)



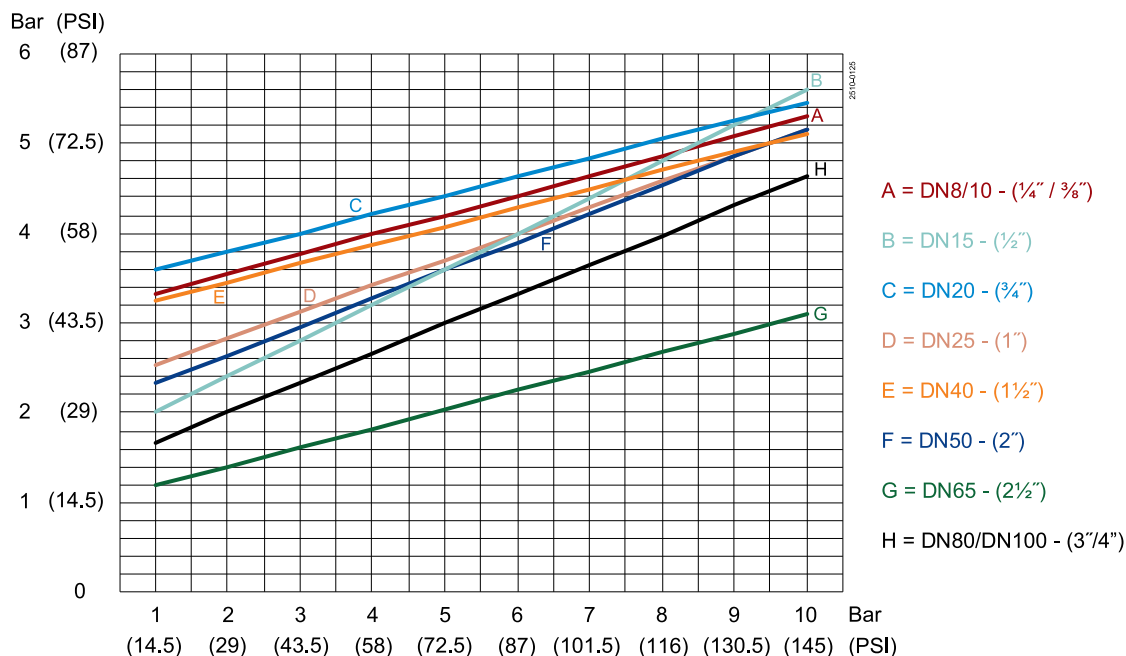
## 7 Technical data

*It is important to observe the technical data during installation, operation and maintenance.  
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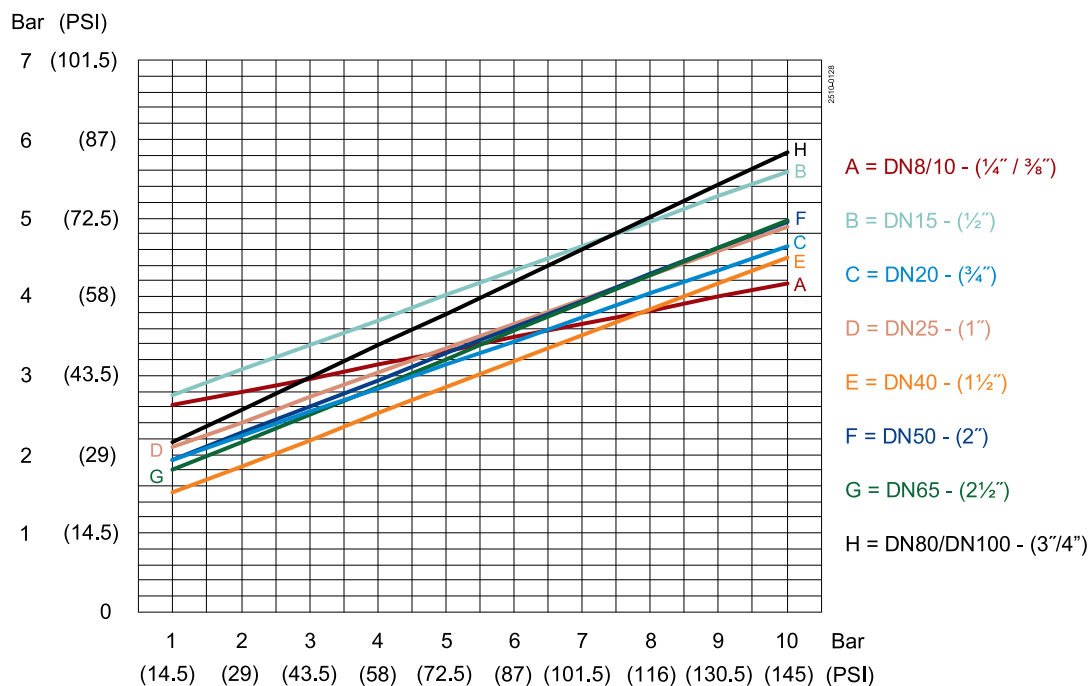
### NO (Normally Open):

Control pressure is used for closing the valve. Here the required control pressure is increased when the product pressure is increased. With interruption of air supply, the actuator will open the valve.

#### Actuator type: high pressure (SS/HP)



#### Actuator type: slim (SS/SL)





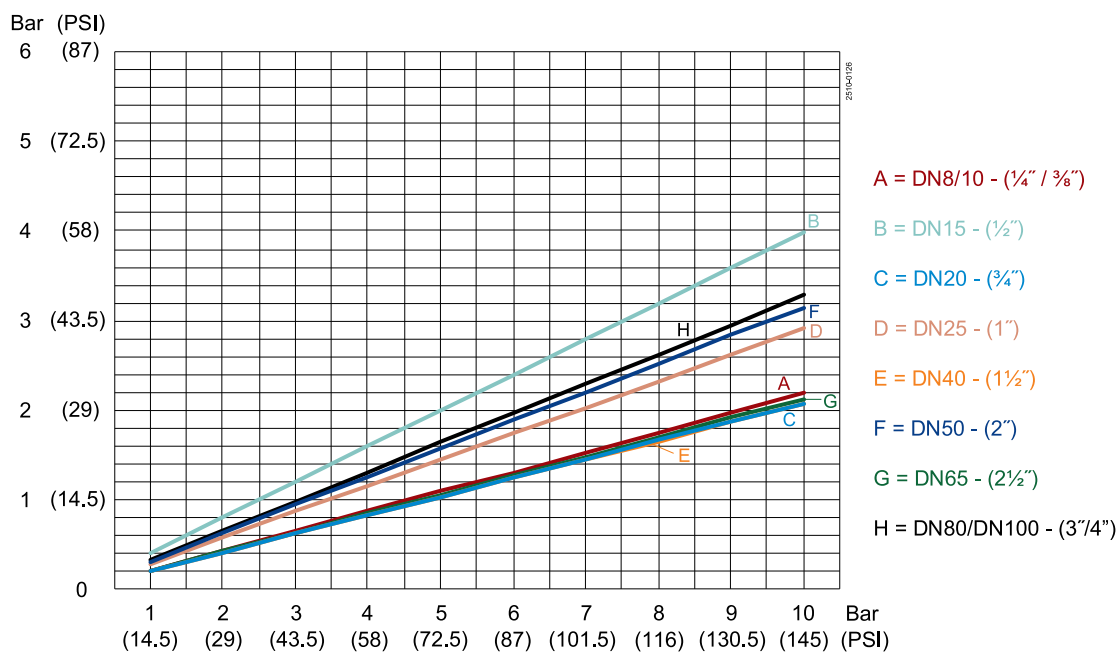
It is important to observe the technical data during installation, operation and maintenance.  
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### A/A (Air/Air) :

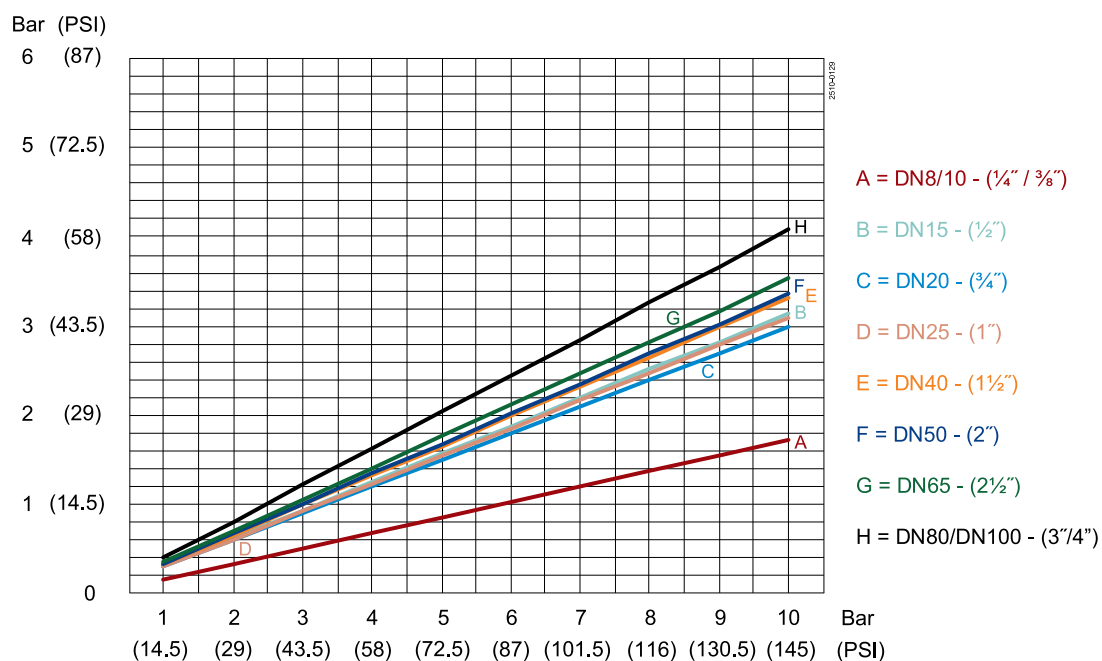
Control pressure is used for both opening and closing of the valve. Here the required control pressure is Increased when the product pressure is increased.

With interruption of air supply, the valve will open at positive product pressure and close at negative product pressure.

### Actuator type: high pressure



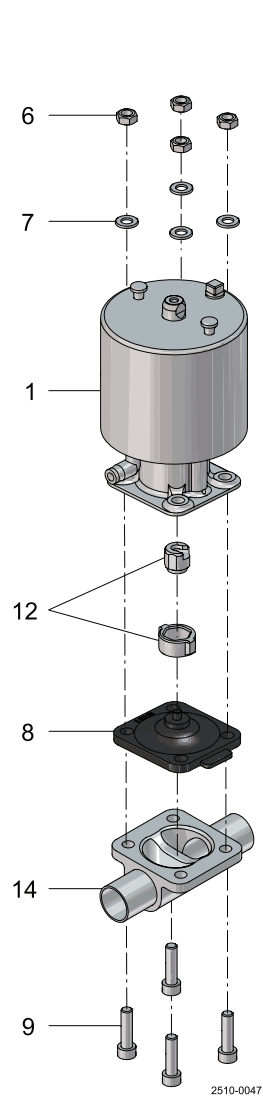
### Actuator type: slim



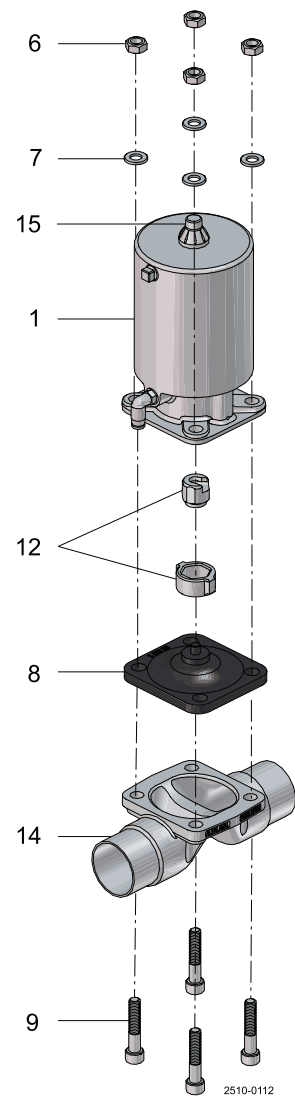
## 8 Parts list and service kits

*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

### 8.1 Actuator DN8–DN100 (¼"–4")



High pressure actuator  
(SS/HP)



Slim actuator  
(SS/SL)

## 8 Parts list and service kits

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*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

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### Parts list

Pos.	Qty	Denomination
1	1	Actuator
8	1	Diaphragm
9+6+7	1	Nut, washer, screw set
14	1	Valve body
15	1	Indication cap kit for SS/SL

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**How to contact Alfa Laval**

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