Alfa Laval Unique SSV Reverse Acting

Single seat valve

Introduction

The Alfa Laval Unique SSV Reverse Acting is a versatile, reliable pneumatic single seat valve with a single contact surface between the plug and the seat to minimize the risk of contamination.

Its compact, modular and hygienic design meets the highest process demands in terms of hygiene and safety. Built on the well-proven Alfa Laval Unique SSV platform, it provides multiple solutions where the direction of the flow does not allow the use of a standard Alfa Laval Unique SSV to eliminate the risk of pressure shock.

Few moving parts ensure easy dismantling, high reliability and low maintenance costs. A wide range of optional features enables customization to specific process requirements.

Application

The Unique SSV Reverse Acting is designed for use in a broad range of hygienic applications across the dairy, food, beverage, brewery and many other industries.

Benefits

- Exceptional valve hygiene and durability
- Superior cleanability – smooth inner valve body without crevices
- Extended seal life due to the defined seal compression
- Enhanced product safety due to the static seal leak detection
- Protection against full vacuum due to the double lip seal
- Increased flexibility due to reverse-acting function

Standard design

The Unique SSV Reverse Acting is available in a two- or three-body configuration, with easy-to-configure valve bodies, plugs, actuator and clamp rings. The valve can be configured as a shut-off valve with two or four working ports or as a changeover valve with three to six ports.

To ensure flexibility, the valve seat that sits between the two bodies in both the shut-off and changeover version is provided for assembly. The valve seals are optimized for durability and long service life through a defined compression design. The actuator is connected to the valve body using a yoke, and all components are assembled with clamp rings.

The valve can also be fitted with the Alfa Laval ThinkTop V50 and V70 for sensing and control of the valve.

Using the Alfa Laval Anytime configurator, it is easy to customize to meet virtually any process requirement.

Working principle

The Alfa Laval Unique SSV Reverse Acting is operated by means of compressed air from a remote location. The actuator smooths operation and protects process lines against pressure peaks. The valve can be controlled using an Alfa Laval ThinkTop®.

TECHNICAL DATA

Temperature	
Temperature range:	-10 °C to +140 °C (EPDM)
	-10 °C to +105 °C (TR2 - PTFE)
	-10 °C to +160 °C (TR3 - PEEK)

Pressure	
Max. product pressure:	1000 kPa (10 bar)
Min. product pressure:	Full vacuum
Air pressure:	500 to 700 kPa (5 to 7 bar)

Valve body combinations

011 012 021 022 111 112 121 122 211 212 221 222

Actuator function

- Pneumatic downward movement, spring return
- Pneumatic upward movement, spring return
- Pneumatic upward and downward movement (A/A)

PHYSICAL DATA

Materials	
Product wetted steel parts:	1.4404 (316L)
Other steel parts:	1.4301 (304)
External surface finish:	Semi-bright (blasted)
Internal surface finish:	Bright (polished), Ra < 0.8 µm
Product wetted seals:	EPDM, HNBR and FPM
Other seal:	NBR

Options

- Male parts or clamp liners in accordance with required standard
- Control and Indication: ThinkTop
- Plug seals EPDM, HNBR, FPM, TR2 (PTFE) or TR3 (PEEK) floating seals design
- High pressure actuator
- Maintainable actuator
- Two step actuator
- External surface finish bright

Note!
For further details, see instruction ESE00202.

Other valves in the same basic design

The Unique SSV valve range includes several purpose built valves. Below are some of the valve models available, though please use the Alfa Laval Anytime configurator for full access to all models and options.

- Long stroke valve
- Manually operated valve

Semi-Maintainable actuator comes with 5 year warranty.

Dimensions (mm)

Nominal size	Inch tubes DN/OD						DIN tubes DN					
	25	38	51	63.5	76.1	101.6	25	40	50	65	80	100
A_1	338	355	411	436	483	532	346	361	416	448	500	538
A_2	350	376	437	462	514	563	358	382	442	474	531	569
A_3	386	420	489	526	586	660	398	429	496	544	611	668
A_4	397	436	515	548	613	687	409	445	518	566	638	695
C	47.8	60.8	73.8	86.3	98.9	123.6	52	64	76	92	107	126
OD	25	38	51	63.5	76.1	101.6	29	41	53	70	85	104
ID	21.8	34.8	47.8	60.3	72.9	97.6	26	38	50	66	81	100
t	1.6	1.6	1.6	1.6	1.6	2	1.5	1.5	1.5	2	2	2
E	50	49.5	61	81	86	119	50	49.5	62	78	87	120
F_1	12	21	26	26	31	31	12	21	26	26	31	31

Nominal size	Inch tubes DN/OD						DIN tubes DN					
	25	38	51	63.5	76.1	101.6	25	40	50	65	80	100
F_2	11	16	22	22	27	27	11	16	22	22	27	27
G	23.9	30.4	40.5	43.15	49.45	62	26	32	38	46	53.5	63
H	ø85	ø85	ø115	ø115	ø157	ø157	ø85	ø85	ø115	ø115	ø157	ø157
H (high pressure)	ø85	ø115	ø157	ø157	ø157	ø157	ø85	ø115	ø157	ø157	ø157	ø157
M (ISO clamp)	21	21	21	21	21	21	-	-	-	-	-	-
M (DIN clamp)	-	-	-	-	-	-	21	21	21	28	28	28
M (DIN male)	-	-	-	-	-	-	22	22	23	25	25	30
M (SMS male)	20	20	20	24	24	35	-	-	-	-	-	-
Weight (kg)												
Shut-off valve	4.3	4.4	7.3	8.9	14.4	18.3	4.4	4.6	7.3	9.2	15.3	18.2
Change-over valve	5.2	5.4	8.7	11.0	17.1	22.6	5.4	5.7	8.7	11.4	18.5	22.5

For exact high pressure actuator dimension (A and F) - please refer to information in Anytime configurator.

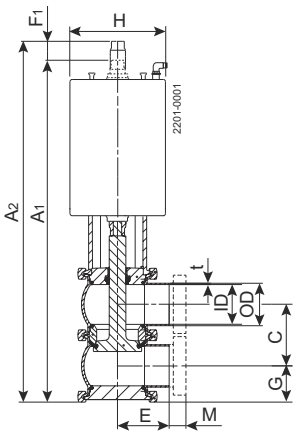


Figure 1. Shut-off valve

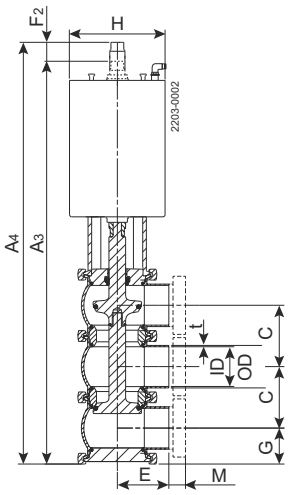


Figure 2. Change-over valve

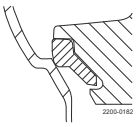


Figure 3. TR2-PTFE and TR3-PEEK Floating plug seal

Please note!

Opening/closing time will be effected by the following:

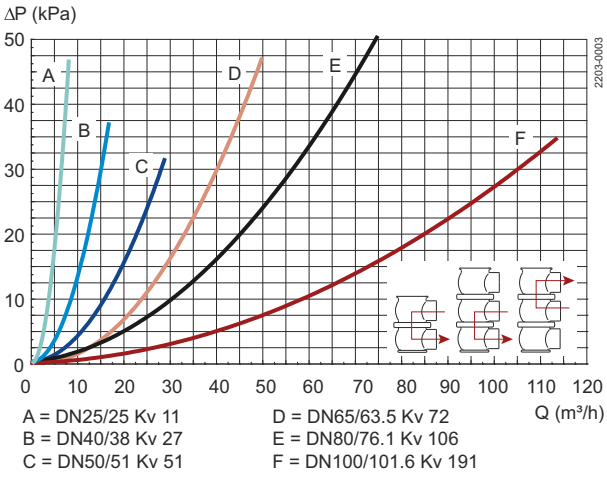
- The air supply (air pressure).
- The length and dimensions of the air hoses.
- Number of valves connected to the same air hose.
- Use of single solenoid valve for serial connected air actuator functions.
- Product pressure.

Air Connections Compressed air:

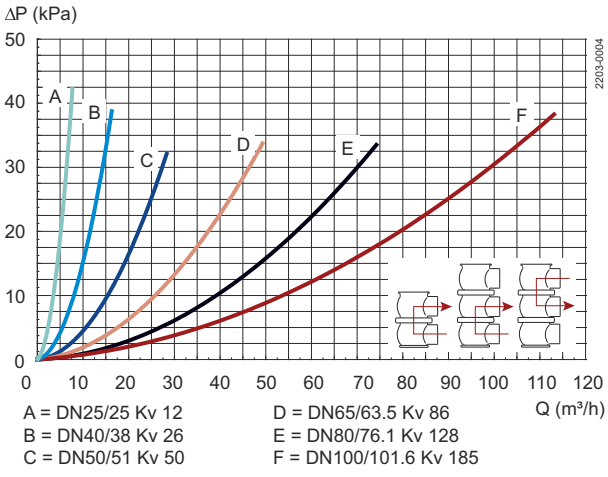
R 1/8" (BSP), internal thread.

Air consumption (litres free air) for one stroke			
Size	DN25-40 DN/OD 25-38 mm	DN50-65 DN/OD 51-63.5 mm	DN80100 DN/OD 76.1101.6 mm
NO and NC	0.2 x air pressure [bar]	0.5 x air pressure [bar]	1.3 x air pressure [bar]
A/A	0.5 x air pressure [bar]	1.1 x air pressure [bar]	2.7 x air pressure [bar]

Pressure drop/capacity diagrams



A = DN25/25 Kv 11
B = DN40/38 Kv 27
C = DN50/51 Kv 51
D = DN65/63.5 Kv 72
E = DN80/76.1 Kv 106
F = DN100/101.6 Kv 191



A = DN25/25 Kv 12
B = DN40/38 Kv 26
C = DN50/51 Kv 50
D = DN65/63.5 Kv 86
E = DN80/76.1 Kv 128
F = DN100/101.6 Kv 185

Note!
For the diagrams the following applies:
Medium: Water (20 °C)
Measurement: In accordance with VDI2173
Pressure drop can also be calculated in Anytime configurator.

Pressure drop can also be calculated with the following formula:

$Q = Kv \times \sqrt{\Delta p}$

Where

Q = Flow in m^3/h.

Kv = m^3/h at a pressure drop of 1 bar (see table above).

Δ p = Pressure drop in bar over the valve.

How to calculate the pressure drop for an ISO 2.5" shut-off valve if the flow is 40 m^3/h

2.5" shut-off valve, where Kv = 111 (See table above).

$Q = Kv \times \sqrt{\Delta p}$

$40 = 111 \times \sqrt{\Delta p}$

$\Delta p = \left(\frac{40}{111}\right)^2 = 0.13$ bar

(This is approx. the same pressure drop by reading the y-axis above)

Pressure data for Unique Single Seat Valve Reverse Acting

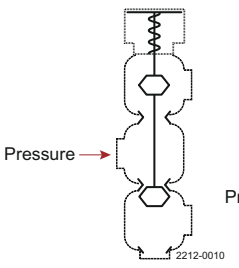


Figure 4. 1

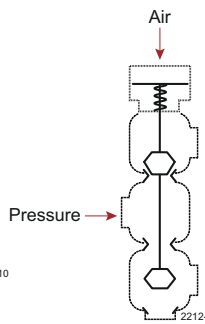


Figure 5. 2

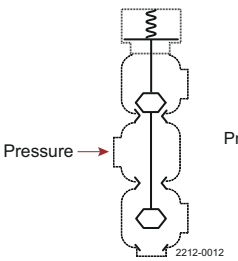


Figure 6. 3

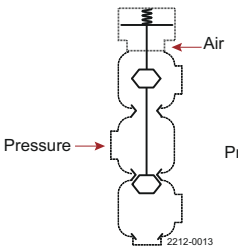


Figure 7. 4

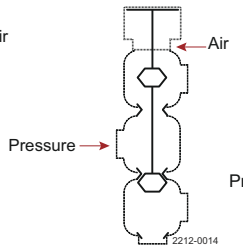


Figure 8. 5

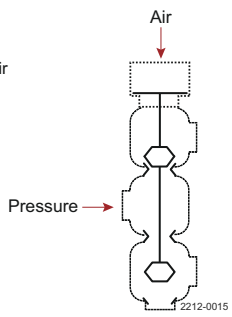


Figure 9. 6

Shut-off and Change-over valves

Actuator/valve body combination and direction of pressure Change-over valve	Air pressure (bar)	Plug position	Max. pressure in bar without leakage at the valve seat					
			Valve size					
			DN25 DN/OD 25 mm	DN40 DN/OD 38 mm	DN50 DN/OD 51 mm	DN65 DN/OD 63.5 mm	DN80 DN/OD 76.1 mm	DN100 DN/OD 101.6 mm
Figure 4. 1		NC	10.0	8.2	8.4	4.5	6.8	4.4
Figure 5. 2	6	NC	10.0	7.6	9.6	5.6	7.2	4.8
Figure 6. 3		NO	10.0	6.3	7.2	4.2	6.4	4.2
Figure 7. 4	6	NO	10.0	10.0	10.0	6.1	7.7	5.0
Figure 8. 5	6	A/A	10.0	10.0	10.0	10.0	9.0	5.8
Figure 9. 6	6	A/A	10.0	10.0	10.0	10.0	8.5	5.6

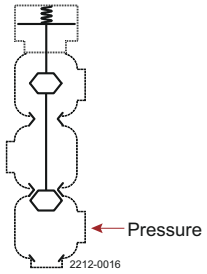


Figure 10. 7

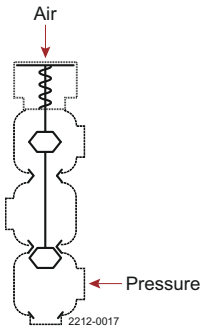


Figure 11. 8

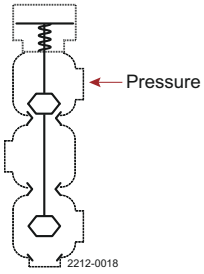


Figure 12. 9

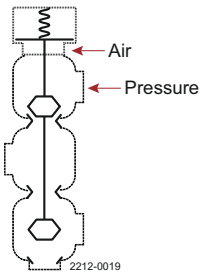


Figure 13. 10

Shut-off and Change-over valves

Actuator/valve body combination and direction of pressure Change-over valve	Air pressure (bar)	Plug position	Max. pressure in bar against which the valve can open					
			Valve size					
			DN25 DN/OD 25 mm	DN40 DN/OD 38 mm	DN50 DN/OD 51 mm	DN65 DN/OD 63.5 mm	DN80 DN/OD 76.1 mm	DN100 DN/OD 101.6 mm
Figure 10. 7		NO	10.0	9.7	10.0	6.8	4.6	3.1
Figure 11. 8	6	NC	10.0	10.0	10.0	8.3	9.9	6.6
Figure 12. 9		NC	10.0	10.0	10.0	7.4	4.9	3.2
Figure 13. 10	6	NO	10.0	10.0	10.0	9.0	10.0	6.9

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com