

Bellows-sealed Valves

SM, SVH Series



Bellows-sealed Valves

SM Series Low Pressure Bellows-sealed Valves

Features

- ⦿ Metal-to-metal gasket seal without external leakage
- ⦿ Precision-formed metal bellows to ensure reliability
- ⦿ Non-rotating stem tip to increase shutoff cycle life
- ⦿ Handle and pneumatic actuator available
- ⦿ Pneumatic actuator to rotate 360° for ease of installation
- ⦿ Panel mounting and bottom mounting available
- ⦿ Indicator switch available assembled on normally closed valves, transmitting a signal to an electrical device to indicated either the open or closed position of the valves

Technical Data

Type		SM4	SM8
Ports Size		1/4" to 3/8" or 6 mm to 8 mm	3/8" to 1/2" or 10 mm to 12 mm
Flow Coefficient (Cv)		0.30	0.80
Orifice Size		0.16 in. (4.1mm)	0.31 in. (8.0 mm)
Max Working Pressure	Handle	500 psig (34.4 bar)	
	Pneumatic	145 psig (10 bar)	
Pneumatic Actuator Operating Pressure		60 to 90 psig (4.2 to 6.2 bar)	
Temperature		PCTFE: 10 ~ 200°F (-23 ~ 93°C) PFA: -10 ~ 302°F (-23 ~ 150°C) Vespal: 10 ~ 400°F (-23 ~ 204°C)	
Leak rate (Helium)	Internal	≤ 4x10 ⁻⁹ mbar l/s	
	External	≤ 4x10 ⁻⁹ mbar l/s	

Flow Data

Air @ 70°F (21°C)

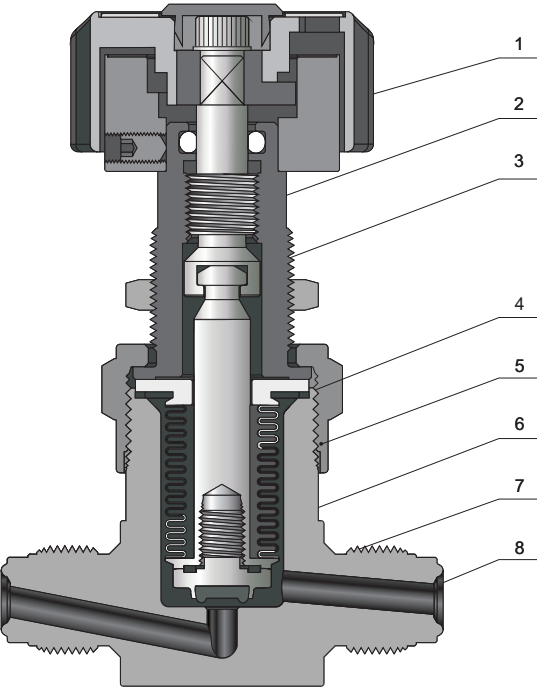
Water @ 60°F (16°C)

Pressure Drop to Atmosphere psi (bar)	Sm4: Cv 0.30		Sm8: Cv 0.80	
	Air (l/min)	Water (l/min)	Air (l/min)	Water (l/min)
10 (0.68)	96	3.6	270	9.6
50 (3.4)	250	7.9	730	21.6
100 (6.8)	450	11.0	1280	30.0

Product Technology Grade

Product Grade Technology	General Purpose	Special Cleaning and Packaging (F2)	Ultra High Purity (F3)
Material/Specification	316 SS/ASTM A479 316L SS/ASTM A479		316L VAR/SEMI F20
Wetted Surface Roughness	Ra 20 µin. (0.51 µm)		Ra 8 µin. (0.20 µm)
Polishing Process	Machine finished		Electropolished
Process Specification	FC-01 Standard Cleaning and Packaging	FC-02 Special Cleaning and Packaging	FC-03 Ultra High Purity Process Specification
Cleaning	Thrice degreasing ultrasonic cleaning	Special cleaning with non-ozone-depleting chemicals	Ultra high purity cleaning in continuously monitored ultrasonic cleaning system with deionized water
Assembly Environment	At atmosphere	In specially cleaned areas	In ISO Class 5/Federal Class 100 cleanroom
Packaging	Individually bagged	Double bagged	Double bagged and vacuum sealed in cleanroom

Major Materials of Construction



Round Handle Model

Item	Component	Material/Specification
1	Handle	ABS
2	Actuator	416 SS/ASTM A582
3	Bonnet	316 SS/ASTM A479
4	Bonnet Gasket	316L SS/ASTM A269
5	Bonnet nut	316 SS/ASTM A479
6	Bellows	316L SS/ASTM A269
7	Seat	PCTFE/ASTM D1430 or PFA/ASTM D3307
8	Body	316 SS/ASTM A479 or 316L SS/ASTM A479

Actuators

Manual - Round Handle

- ⦿ Half turn to operate from fully open to closed
- ⦿ Handle with window to visually indicate open and closed states



Pneumatic

- ⦿ Normally open, "N.O." marked on the top of the cylinder
- ⦿ Normally closed, "N.C." marked on the top of the cylinder



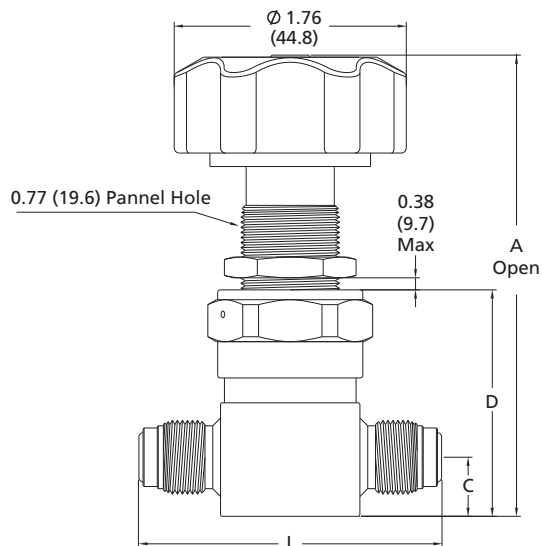
Dimensions and Ordering Information

Straight Type

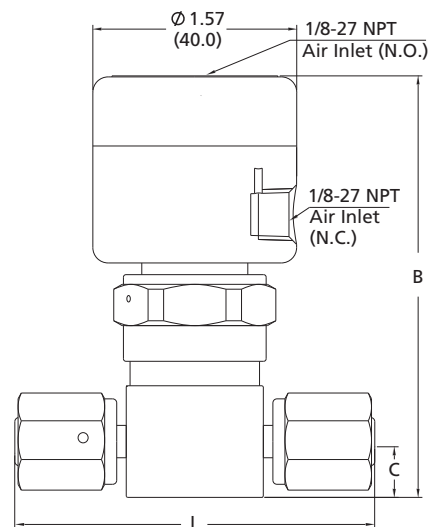
Dimensions

Dimensions, in inches (millimeters), are for reference only.

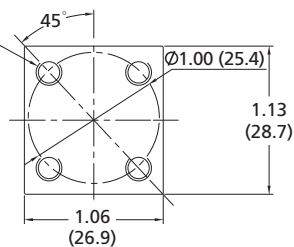
Manual - Handle



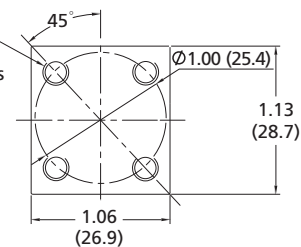
Pneumatic



4 x M5 x 0.8-6H thread
The holes are compatible
with 10-32 mounting screws



4 x M5 x 0.8-6H thread
The holes are compatible
with 10-32 mounting screws



FITOK

Basic Ordering Number	Connection Type and Size	Dimensions, in. (mm)				
		A	B	C	D	L
	SM4 Series					
SM4□□-FL4-	1/4" FITOK Tube Fitting	3.51 (89.4)	3.31 (84.0)	0.45 (11.4)	1.78 (45.2)	2.46(62.5)
SM4□□-FL6-	3/8" FITOK Tube Fitting					2.58(65.5)
SM4□□-ML6-	6 mm FITOK Tube Fitting					2.46(62.5)
SM4□□-ML8-	8 mm FITOK Tube Fitting					2.53(64.3)
SM4□□-TB4-	1/4" Tube Butt Weld					1.74(44.2)
SM4□□-TB6-	3/8" Tube Butt Weld					
SM4□□-MTB6-	6 mm Tube Butt Weld					
SM4□□-TS4-	1/4" Tube Socket Weld					
SM4□□-FR4-	1/4" Integral Male FR					1.75(44.4)
SM4□□-FFR4-	1/4" Female FR					2.30(58.4)
SM4□□-FO4-	1/4" Male FO					2.76(70.1)
		2.00(50.8)				
SM8 Series						
SM8□□-FL6-	3/8"FITOK Tube Fitting	3.77 (95.7)	3.76 (95.5)	0.53 (13.5)	2.02 (51.3)	2.58(65.5)
SM8□□-FL8-	1/2" FITOK Tube Fitting					2.80(71.1)
SM8□□-ML10-	10 mm FITOK Tube Fitting					2.60(66.0)
SM8□□-ML12-	12 mm FITOK Tube Fitting					2.80(71.1)
SM8□□-TB6-	3/8" Tube Butt Weld					1.74(44.2)
SM8□□-TB8-	1/2" Tube Butt Weld					
SM8□□-FR8-	1/2" Integral Male FR	3.87 (98.2)	3.86 (98.0)	0.63 (16.0)	2.12 (53.8)	2.58(65.5)
SM8□□-FFR8-	1/2" Female FR					3.15(80.0)

Ordering Number Description

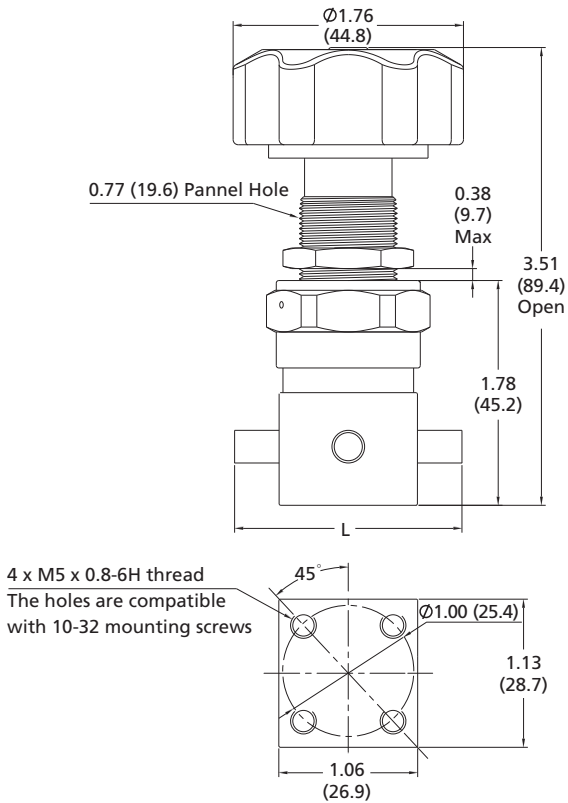
SM4SS – FL4 – ML6 – RAF2M																				
Body Material		Inlet Type		Inlet Size		Outlet Type	Outlet Size	Actuator Type		Seat		Technology Grade								
6L	316L SS	TB	Fractional Tube Butt Weld	4	1/4"	Same as Inlet	Specified in the same way as Inlet type and size	R	Handle		PCTFE	General Purpose								
6LV	316L VAR	MTB	Metric Tube Butt Weld	6	6 mm or 3/8"			C	Pneumatic Normally Closed	A	PFA	F2	Special Cleaning and Packaging							
SS	316 SS	TS	Fractional Tube Socket Weld	8	8 mm or 1/2"	Specified in the same way as Inlet type and size	Specified in the same way as Inlet type and size	O	Pneumatic Normally Open	V	Vespel	F3	Ultra High Purity							
Type		FR	Integral Male FR Fitting	10	10 mm			Indicator Switch (only for normally closed valves)						None						
		FFR	Female FR Fitting	12	12 mm									M	Normally Open					
		FL	Fractional Tube Fitting																	
		ML	Metric Tube Fitting																	
		FO	Male FO Fitting										M2	Normally Closed						

Branch Type

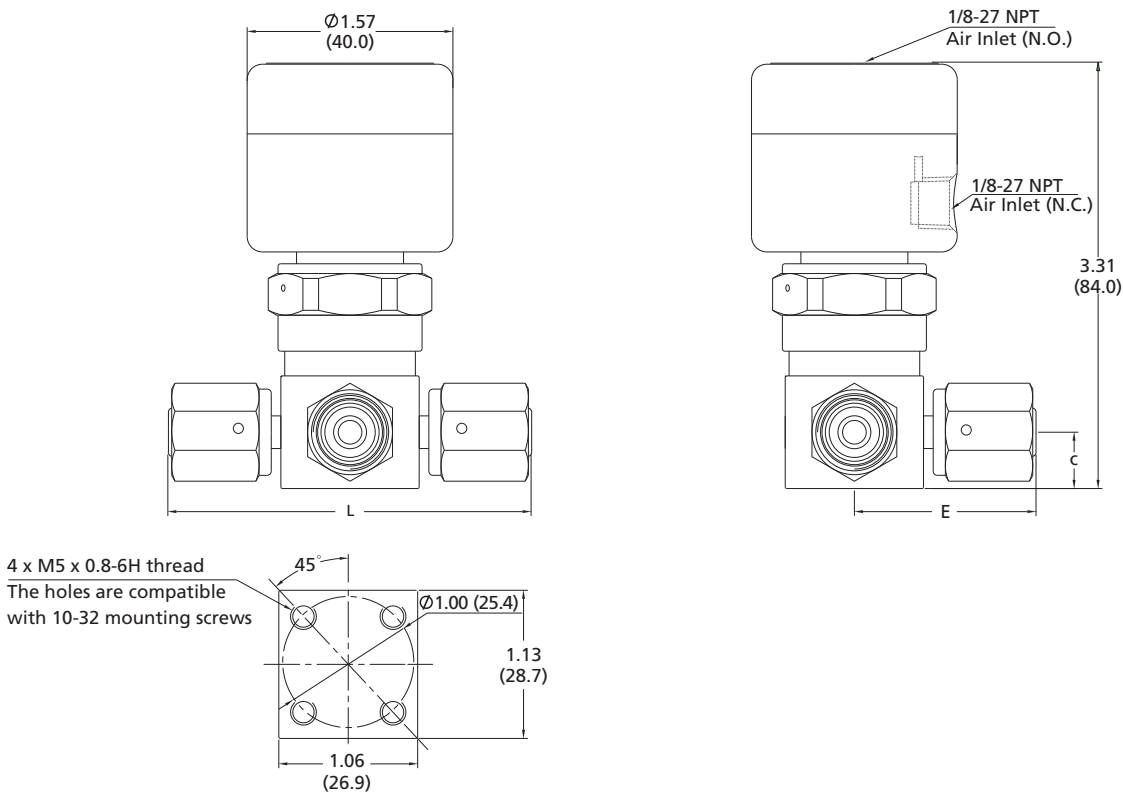
Dimensions

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Manual - Handle



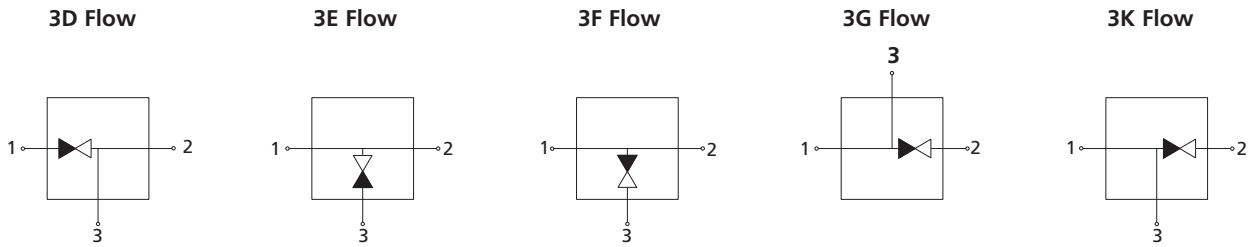
Pneumatic



Basic Ordering Number	Connection Type and Size	Dimensions, in. (mm)		
		C	E	L
SM4□□-TB4-	1/4" Tube Butt Weld	0.45 (11.4)	0.87 (22.1)	1.74 (44.2)
SM4□□-MTB6-	6 mm Tube Butt Weld			
SM4□□-FFR4-	1/4" Female FR		1.38 (35.1)	2.76 (70.1)
SM4□□-RFR4-	1/4" Rotatable Male FR		1.74 (44.2)	3.48 (88.4)

Flow Paths

⦿ Flow paths as viewed from the top



Ordering Number Description

SM4SS - TB4 - FR4 - FFR4 - 3G - RAF2M									
Type	Body Material		Port 1 Type	Port 1 Size	Port 2/3 Type	Port 2/3 Size	Actuator Type	Seat	Indicator Switch (only for normally closed valves)
4	6L	316L SS	TB	Fractional Tube Butt Weld	4	1/4"	R	Handle	PCTFE
	6LV	316L VAR	MTB	Metric Tube Butt Weld	6	6 mm or 3/8"	C	Pneumatic Normally Closed	A
	SS	316 SS	TS	Fractional Tube Socket Weld	8	8 mm	O	Pneumatic Normally Open	V
			FR	Integral Male FR Fitting	Same as Port 1 Specified in the same way as Port 1 type and size		Flow Path		
			FFR	Female FR Fitting					
			FL	Fractional Tube Fitting					
			ML	Metric Tube Fitting					
			FO	Male FO Fitting					
							Technology Grade		
							3D	General Purpose	
							3E	F2 Special Cleaning and Packaging	
							3F	F3 Ultra High Purity	
							3G		
							3K		

Bellows-sealed Valves

SVH Series High Pressure Bellows-sealed Valves

Features

- ⦿ Packless valves with all-metal seal to atmosphere
- ⦿ Compact designed body with minimal dead space
- ⦿ 316L SS precision-formed bellows for long cycle life
- ⦿ PCTFE stem tip material with remarkable chemical and thermal resistance
- ⦿ Normally closed and normally open pneumatic actuator optional
- ⦿ Bottom mounting
- ⦿ Indicator switch available assembled on pneumatic valves, transmitting a signal to an electrical device to indicated either the open or closed position of the valves
- ⦿ Normally open and normally closed indicator switches optional

Technical Data

Ports Size	1/4" to 3/8" or 6 mm to 8 mm	
Flow Coefficient (Cv)	0.30	
Orifice Size	0.15 in. (3.8 mm)	
Max. Working Pressure	3500 psig (241 bar)	
Pneumatic Actuator Operating Pressure	60 to 90 psig (4.2 to 6.2 bar)	
Temperature	PCTFE: -40~150°F (-40~65°C) Vespel: -40~400°F (-40~204°C)	
Leak Rate (Helium)	Internal	≤4x10 ⁻⁹ mbar l/s
	External	≤4x10 ⁻⁹ mbar l/s

Flow Data

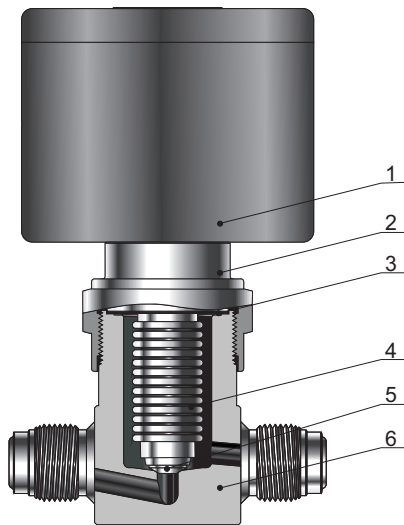
Air @ 70°F (21°C)
Water @ 60°F (16°C)

Pressure Drop to Atmosphere psi (bar)	Air (l/min)	Water (l/min)
10 (0.68)	96	3.6
50 (3.4)	250	7.9
100 (6.8)	450	11.0

Product Technology Grade

Product Grade Technology	General Purpose	Special Cleaning and Packaging (F2)	Ultra High Purity (F3)
Material/Specification	316 SS/ASTM A479 316L SS/ASTM A479		316L SS/ASTM A479
Wetted Surface Roughness	Ra 20 μin. (0.51 μm)		Ra 10 μin. (0.25 μm)
Polishing Process	Machine finished		Electropolished
Process Specification	FC-01 Standard Cleaning and Packaging	FC-02 Special Cleaning and Packaging	FC-03 Ultra High Purity Process Specification
Cleaning	Thrice degreasing ultrasonic cleaning	Special cleaning with non-ozone-depleting chemicals	Ultra high purity cleaning in continuously monitored ultrasonic cleaning system with deionized water
Assembly Environment	At atmosphere	In specially cleaned areas	In ISO Class 5/Federal Class 100 cleanroom
Packaging	Individually bagged	Double bagged	Double bagged and vacuum sealed in cleanroom

Major Materials of Construction



Normally Closed Model

Item	Component	Material/Specification
1	Pneumatic Actuator	Aluminum
2	Bonnet Nut	304 SS/ASTM A479
3	Gasket	PTFE-coated 316L SS/A240
4	Bellows	316L SS/ASTM A269
5	Seat	PCTFE/ASTM D1430 or Vsepel
6	Body	316 SS/ASTM A479 or 316L SS/ASTM A479

Pneumatic Actuators

- ⦿ Normally open, "N.O." marked on the top of the cylinder
- ⦿ Normally closed, "N.C." marked on the top of the cylinder



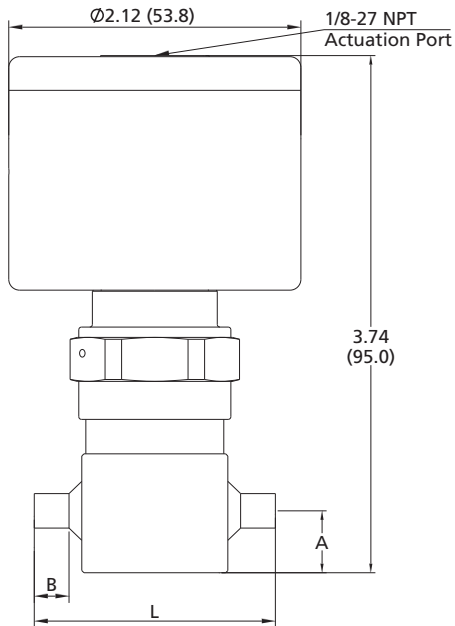
Dimensions and Ordering Information

Straight Type

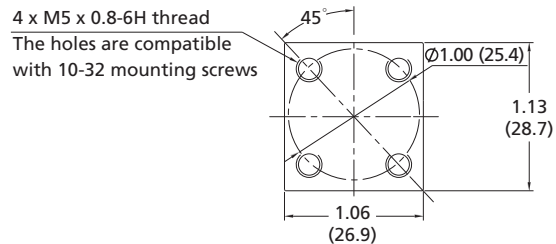
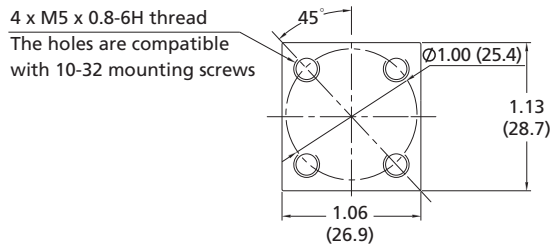
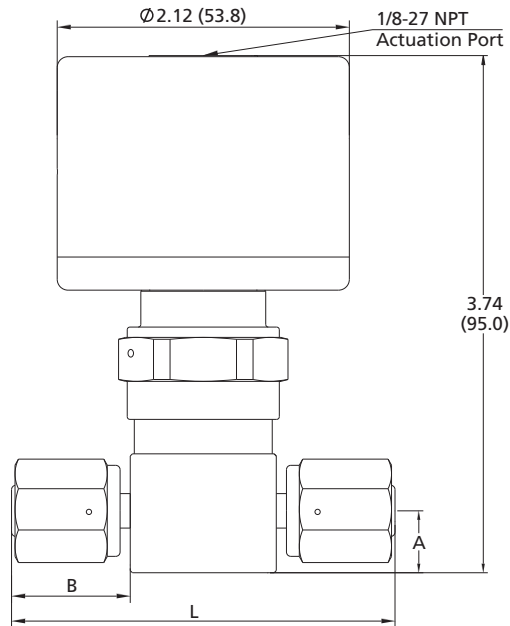
Dimensions

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Normally Closed

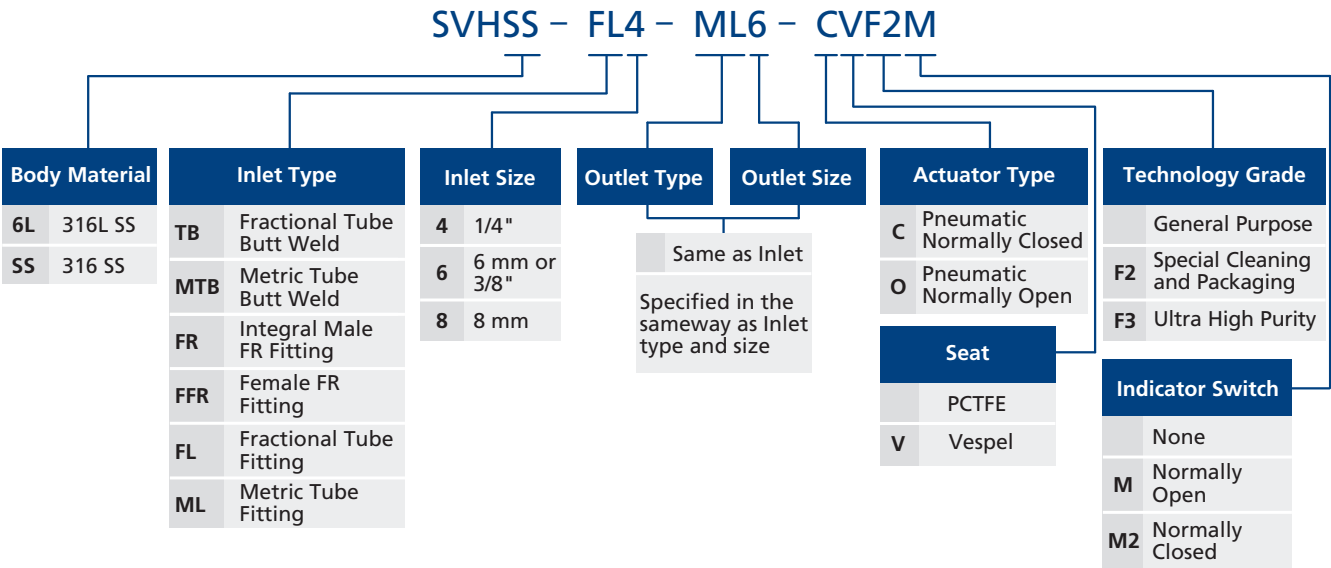


Normally Open



Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)		
		A	B	L
SVH□□-TB4-	1/4" Tube Butt Weld	0.44 (11.2)	0.25 (6.4)	1.75 (44.4)
SVH□□-FFR4-	1/4" Female FR	0.44 (11.2)	0.85 (21.6)	2.76 (70.1)
SVH□□-FR4-	1/4" Integral Male FR	0.44 (11.2)	0.62 (15.7)	2.30 (58.4)
SVH□□-FL4-	1/4" FITOK Tube Fitting	0.44 (11.2)	0.70 (17.8)	2.46 (62.5)
SVH□□-FL6-	3/8" FITOK Tube Fitting	0.44 (11.2)	0.76 (19.3)	2.58 (65.5)
SVH□□-ML6-	6 mm FITOK Tube Fitting	0.44 (11.2)	0.70 (17.8)	2.46 (62.5)

Ordering Number Description

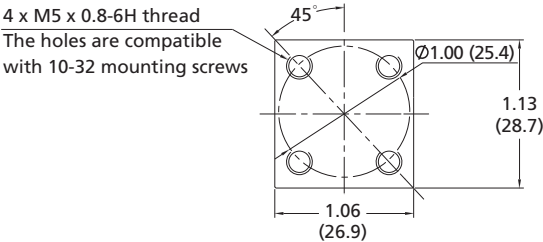
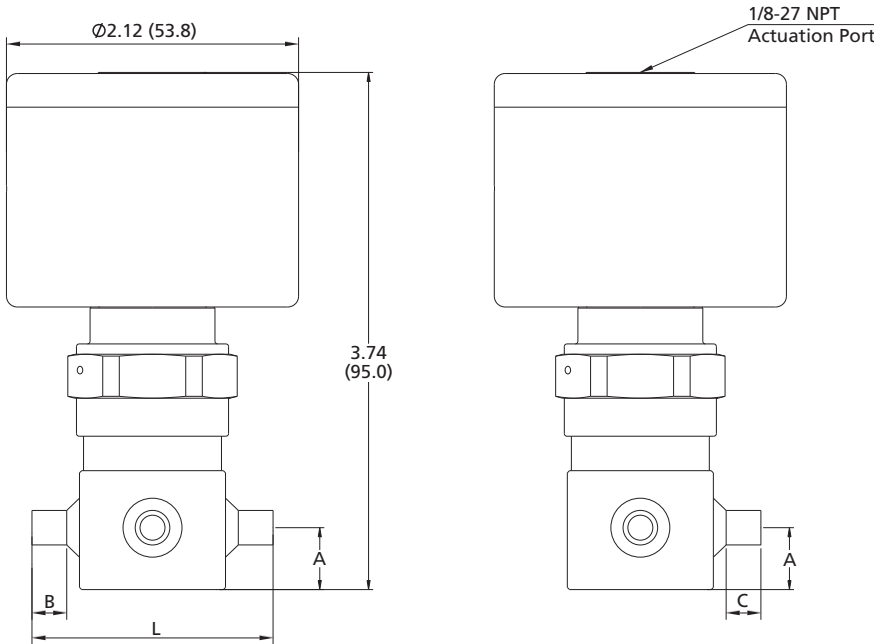


Branch Type

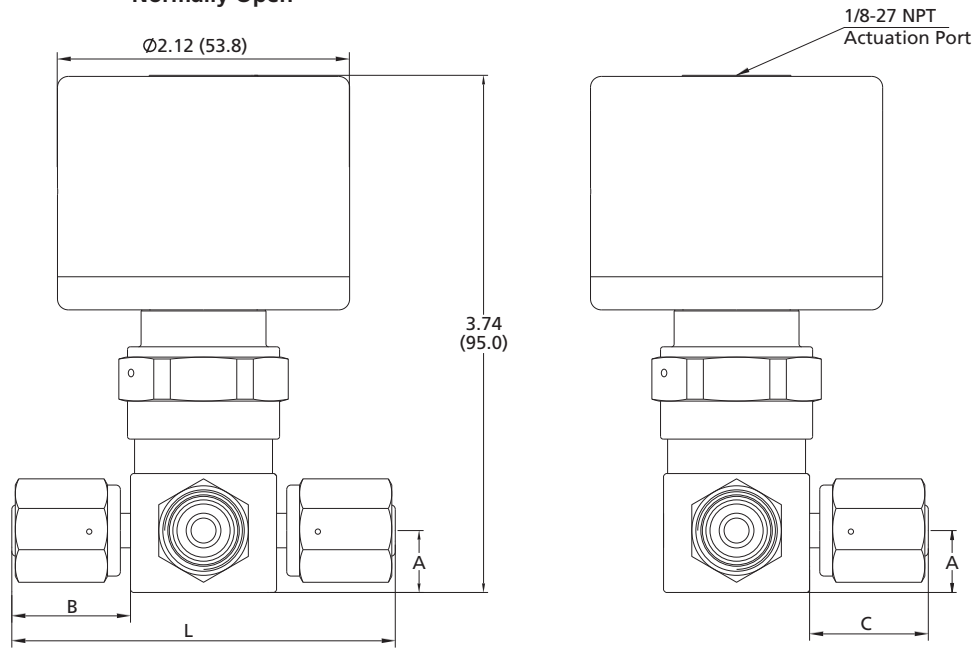
Dimensions

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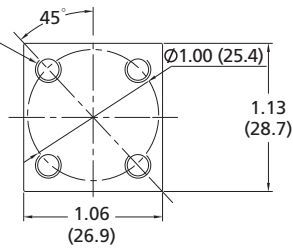
Normally Closed



Normally Open



4 x M5 x 0.8-6H thread
The holes are compatible
with 10-32 mounting screws

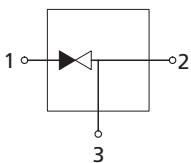


Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
SVH□□-TB4-	1/4" Tube Butt Weld	0.44 (11.2)	0.25 (6.4)	0.25 (6.4)	1.75 (44.4)
SVH□□-FFR4-	1/4" Female FR	0.44 (11.2)	0.85 (21.6)	0.85 (21.6)	2.76 (70.1)
SVH□□-FR4-	1/4" Integral Male FR	0.44 (11.2)	0.62 (15.7)	0.62 (15.7)	2.30 (58.4)
SVH□□-FL4-	1/4" FITOK Tube Fitting	0.44 (11.2)	0.70 (17.8)	0.70 (17.8)	2.46 (62.5)
SVH□□-FL6-	3/8" FITOK Tube Fitting	0.44 (11.2)	0.76 (19.3)	0.76 (19.3)	2.58 (65.5)
SVH□□-ML6-	6 mm FITOK Tube Fitting	0.44 (11.2)	0.70 (17.8)	0.70 (17.8)	2.46 (62.5)

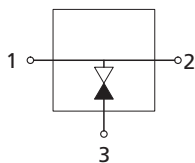
Flow Paths

⦿ Flow paths as viewed from the top

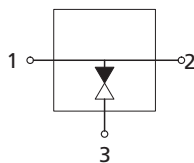
3D Flow



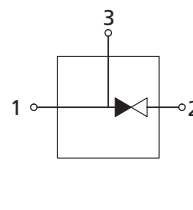
3E Flow



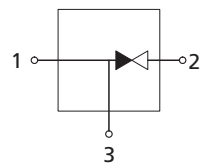
3F Flow



3G Flow



3K Flow



Ordering Number Description

SVHSS – TB4 – FR4 – FFR4 – 3G – CVF2M

Body Material		Port 1 Type		Port 1 Size	Port 2/3 Type	Port 2/3 Size	Flow Path	Actuator Type		Technology Grade	
6L	316L SS	TB	Fractional Tube Butt Weld	4	1/4"	Same as Port 1 Specified in the same way as port 2/3 type and size	3D	C	Pneumatic Normally Closed		General Purpose
SS	316 SS	MTB	Metric Tube Butt Weld	6	6 mm or 3/8"		3E	O	Pneumatic Normally Open	F2	Special Cleaning and Packaging
		FR	Integral Male FR Fitting	8	8 mm		3F			F3	Ultra High Purity
		FFR	Female FR Fitting				3G				
		FL	Fractional Tube Fitting				3K	Seat		Indicator Switch	
		ML	Metric Tube Fitting						PCTFE		None
								V	Vespel	M	Normally Open
										M2	Normally Closed