

# Bellows-sealed Valves

SM, SVH Series

Fittings

Valves & Regulators



# 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) Vespel: 10 ~ 400°F (-23 ~ 204°C)	
Leak rate (Helium)	Internal	≤ 4x10 <sup>-9</sup> mbar l/s	
	External	≤ 4x10 <sup>-9</sup> mbar l/s	

### Flow Data

Air @ 70°F (21°C)

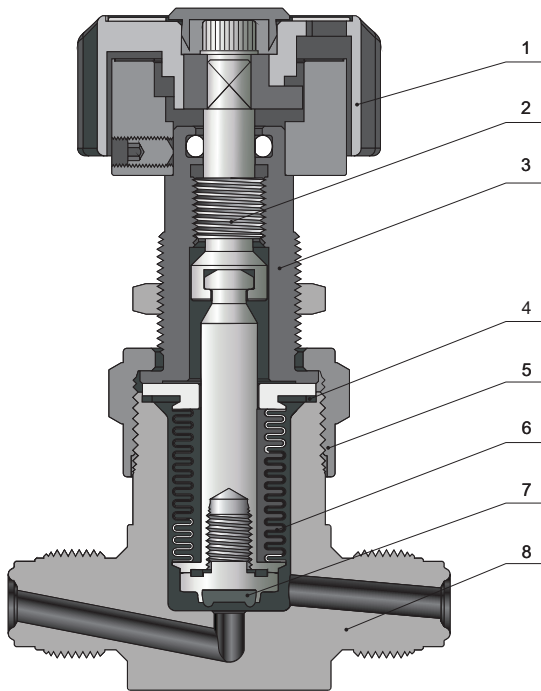
Water @ 60°F (16°C)

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	Standard Cleaning and Packaging	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 $\mu\text{in.}$ (0.51 $\mu\text{m}$ )		Ra 8 $\mu\text{in.}$ (0.20 $\mu\text{m}$ )
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 or Vespel
8	Body	316 SS/ASTM A479 or 316L SS/ASTM A479 or 316L VAR/SEMI F20

## 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



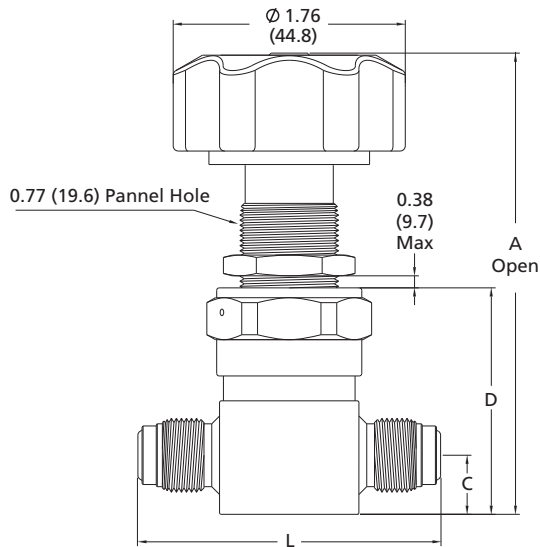
## Dimensions and Ordering Information

### Straight Type

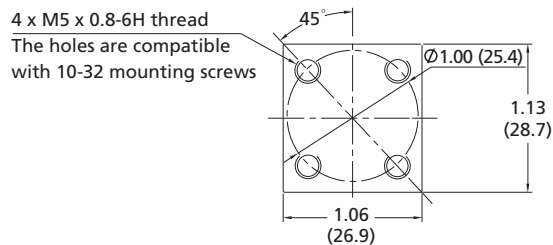
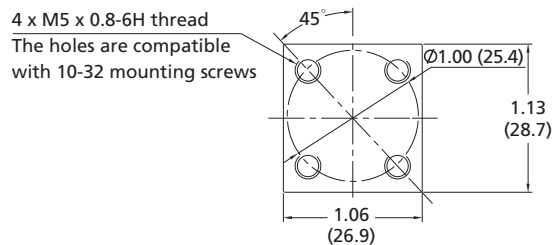
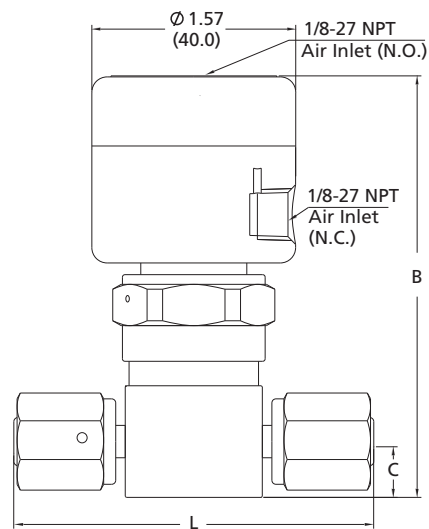
#### Dimensions

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

Manual - Handle



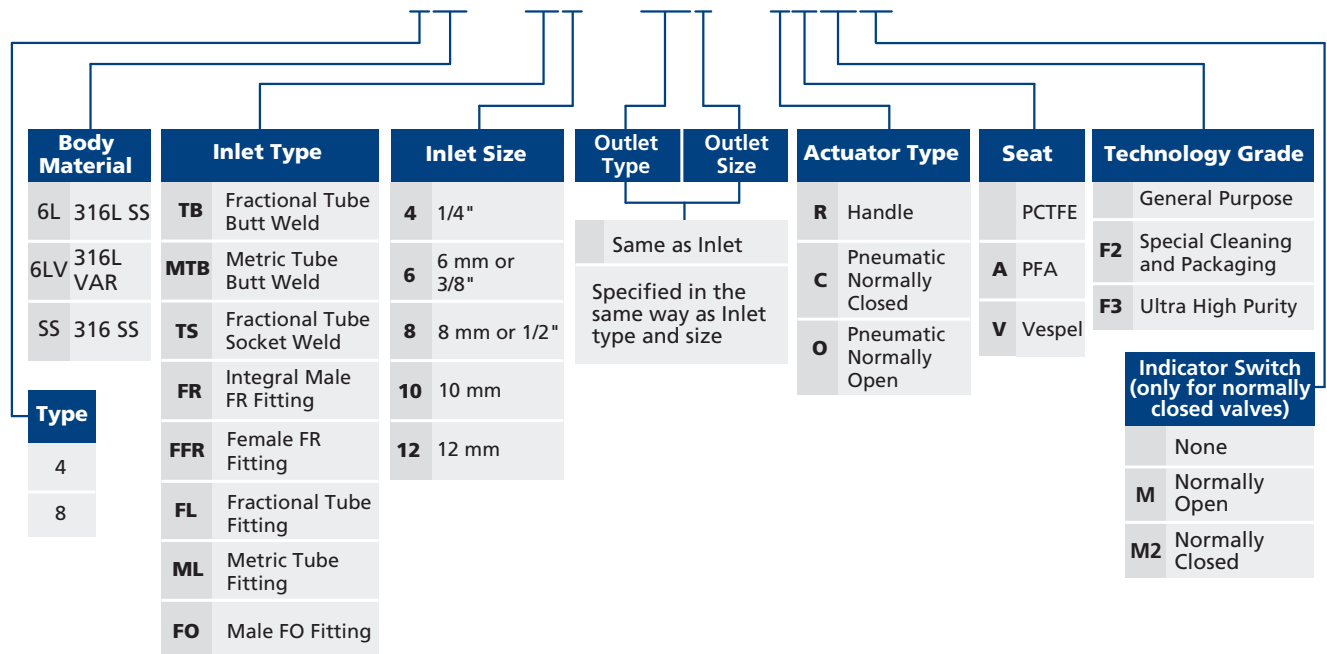
Pneumatic



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					
SM4□□-FFR4-	1/4" Female FR					
SM4□□-FO4-	1/4" Male FO					
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

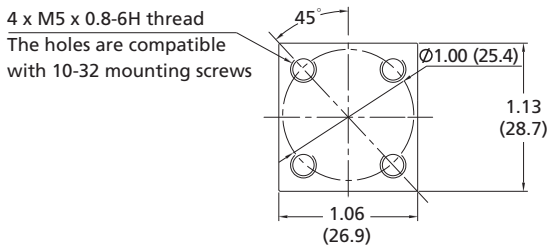
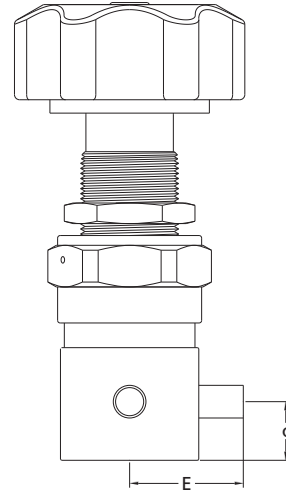
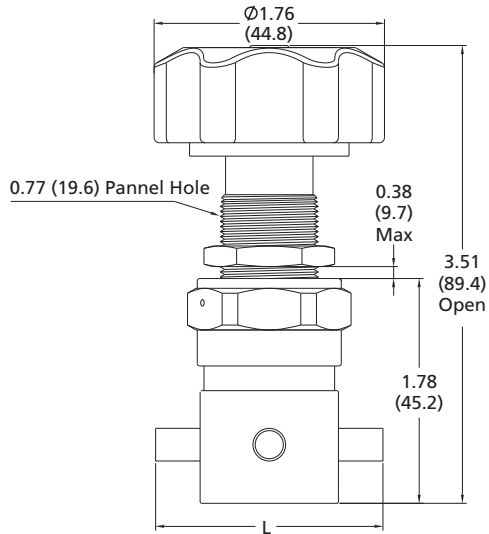


## Branch Type

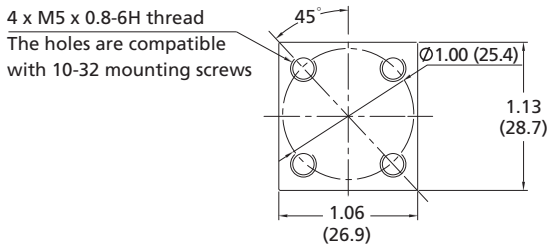
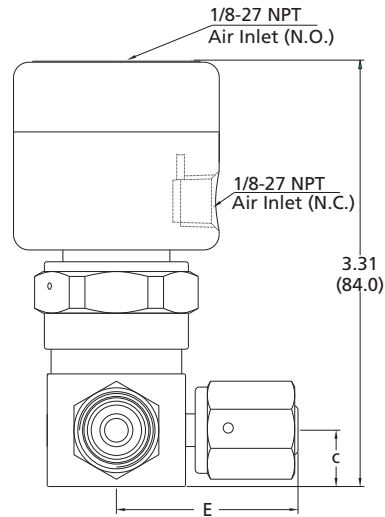
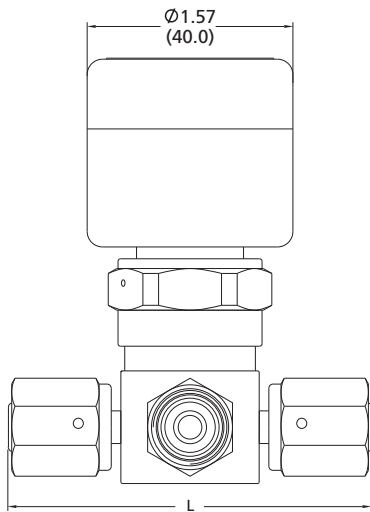
### Dimensions

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

#### Manual - Handle



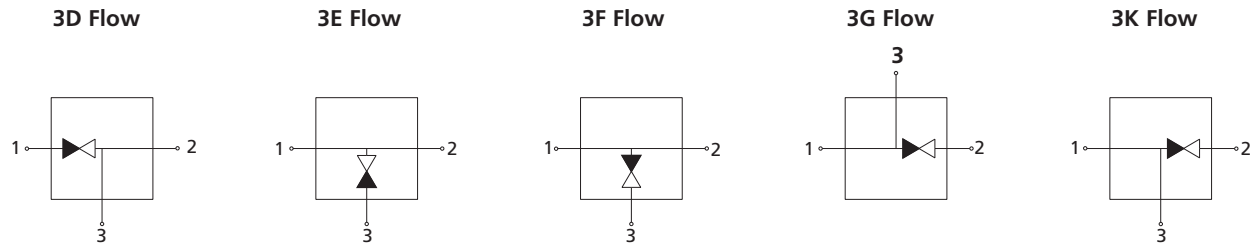
#### Pneumatic



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	<b>TB</b> Fractional Tube Butt Weld	4 1/4"	Same as Port 1	Specified in the same way as Port 1 type and size	<b>R</b> Handle	PCTFE	None
6LV	316L VAR	<b>MTB</b> Metric Tube Butt Weld	6 6 mm or 3/8"			<b>C</b> Pneumatic Normally Closed	<b>A</b> PFA	<b>M</b> Normally Open
SS	316 SS	<b>TS</b> Fractional Tube Socket Weld	8 8 mm	<b>O</b> Pneumatic Normally Open	<b>V</b> Vespel	<b>M2</b> Normally Closed		
		<b>FR</b> Integral Male FR Fitting						
		<b>FFR</b> Female FR Fitting						
		<b>FL</b> Fractional Tube Fitting						
		<b>ML</b> Metric Tube Fitting						
		<b>FO</b> Male FO Fitting						
						<b>Flow Path</b>	<b>Technology Grade</b>	
						3D	General Purpose	
						3E	<b>F2</b> Special Cleaning and Packaging	
						3F	<b>F3</b> 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

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

### Flow Data

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

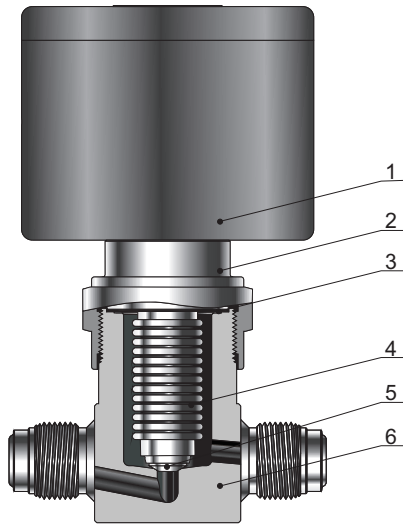
Pressure Drop to Atmosphere psi (bar)	Air (l/min)	Water (l/min)
10 (0.68)	96	3.6
50 (3.4)	250	7.9
100 (6.8)	450	11.0

### Product Technology Grade

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

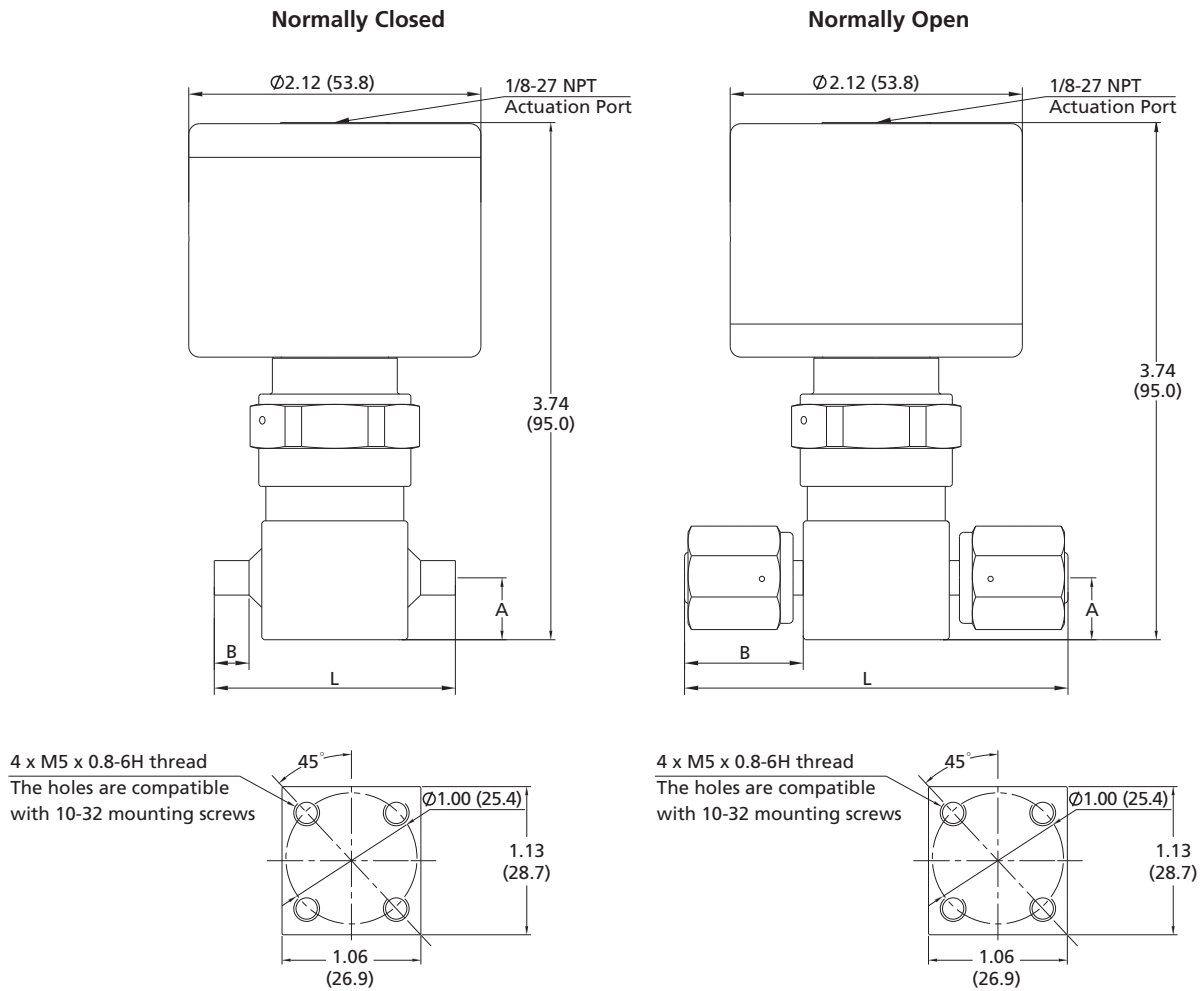


## Dimensions and Ordering Information

### Straight Type

#### Dimensions

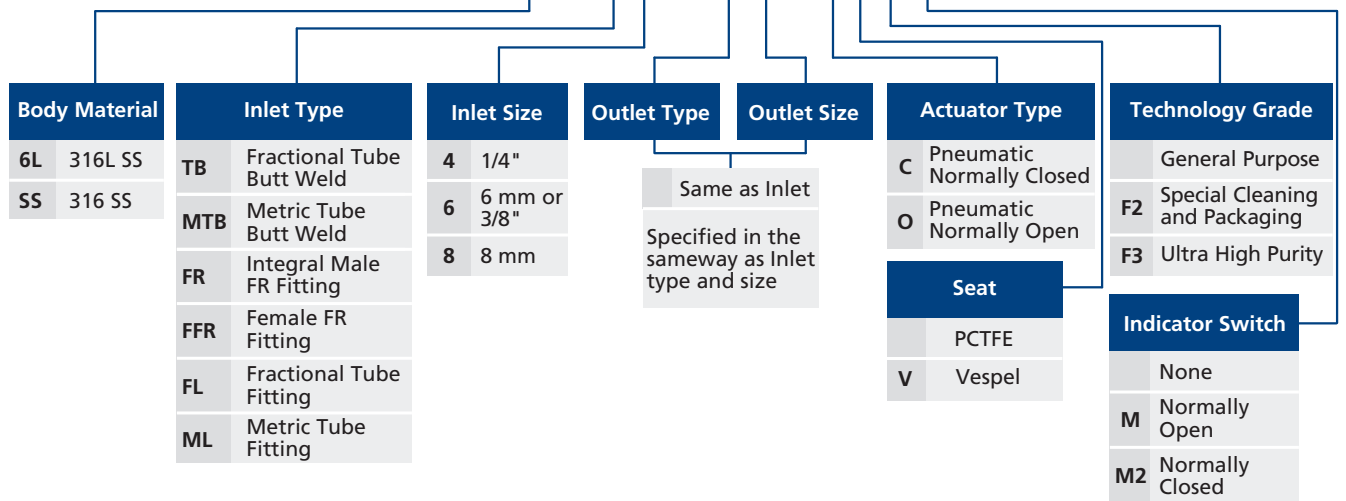
Dimensions, in inches (millimeters), are for reference only.



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

SVHSS – FL4 – ML6 – CVF2M

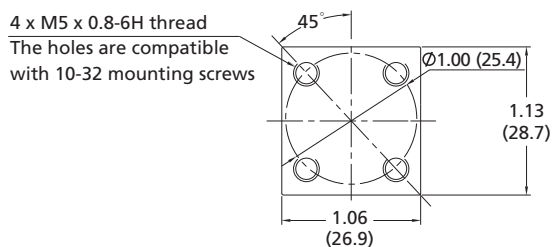
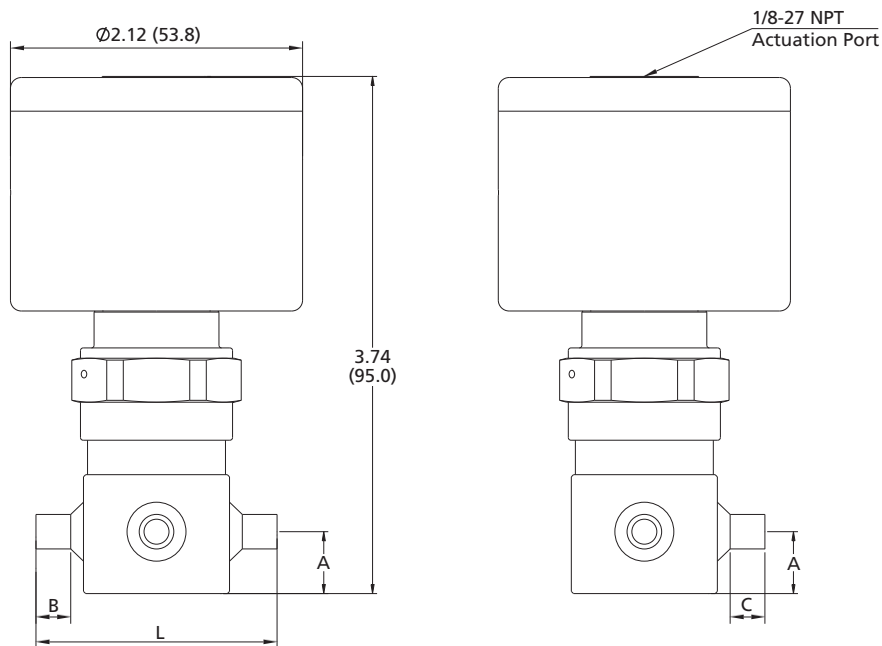


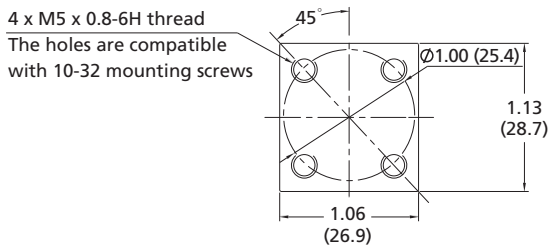
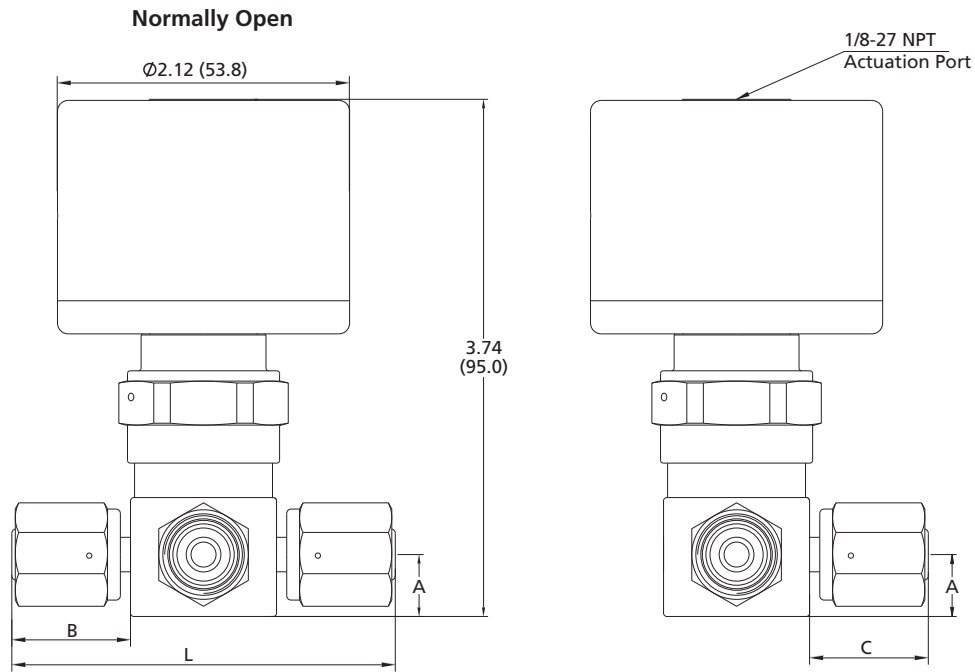
Branch Type

Dimensions

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

Normally Closed

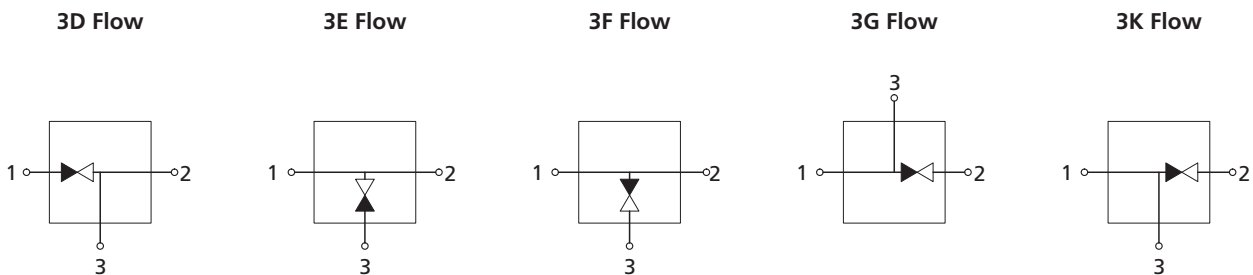




Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
SVH□□-TB4-	1/4" Tube Butt Weld	0.44 (11.2)	0.25 (6.4)	0.25 (6.4)	1.75 (44.4)
SVH□□-FFR4-	1/4" Female FR	0.44 (11.2)	0.85 (21.6)	0.85 (21.6)	2.76 (70.1)
SVH□□-FR4-	1/4" Integral Male FR	0.44 (11.2)	0.62 (15.7)	0.62 (15.7)	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



Ordering Number Description

SVHSS – TB4 – FR4 – FFR4 – 3G – CVF2M

