

# Bellows-Sealed Valves

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# Low Pressure Bellows-Sealed Valves

## SM Series

### Introduction

SM Series Low Pressure Bellows-Sealed Valves are suitable for high purity and ultra high purity applications. Replacing packing with bellows as the seal effectively improves valve cleanliness and extends service life. Additionally, parts prone to damage are easy to replace.

### 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
- ⦿ Manual and pneumatic actuator available
- ⦿ Pneumatic actuator to rotate 360° for ease of installation
- ⦿ Panel mounting and bottom mounting available
- ⦿ Position sensors available assembled on normally closed pneumatically actuated valves

### Technical Data

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	Manual	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: -40 ~ 200 °F (-40 ~ 93 °C) PFA: -40 ~ 302 °F (-40 ~ 150 °C) Polyimide: -40 ~ 400 °F (-40 ~ 204 °C)	
Leak Rate (Helium)	Internal	≤ 4×10 <sup>-9</sup> std cm <sup>3</sup> /s	
	External	≤ 4×10 <sup>-9</sup> std cm <sup>3</sup> /s	

### Flow Data

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

Orifice in. (mm)	Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
0.16 (4.1)	10 (0.68)	96	3.6
	50 (3.4)	250	7.9
	100 (6.8)	450	11.0
0.31 (8.0)	10 (0.68)	270	9.6
	50 (3.4)	730	21.6
	100 (6.8)	1280	30.0

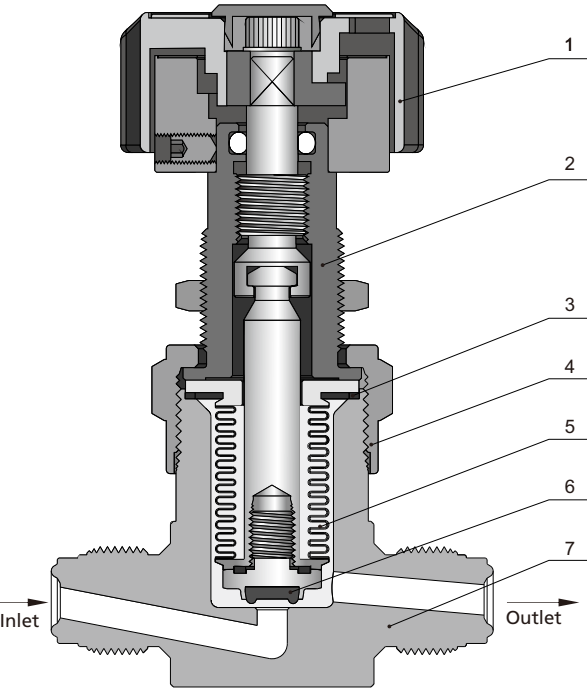


Process Specification

Item	Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material		316 SS, 316L SS	316L SS, 316L SS VAR
Wetted Surface Roughness		Ra 20 μin. (0.50 μm)	Ra 8 μin. (0.20 μm)
Polishing Process		Machine finished	Electropolished

Note: Refer to page P-01 for a detailed description of Process Specification.

Major Materials of Construction



Manual Model

Item	Component	Material/Specification
1	Handle	ABS/Aluminum
2	Bonnet	316 SS/ASTM A479
3	Bonnet Gasket	316L SS/ASTM A269
4	Bonnet Nut	316 SS/ASTM A479
5	Bellows	316L SS/ASTM A269
6	Seat	PCTFE/ASTM D1430 or PFA/ASTM D3307 or Polyimide
7	Body	316 SS or 316L SS or 316L SS VAR

Handles and Actuators

Manual - Round Handle

- One-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 actuator
- Normally closed, "N.C." marked on the top of the actuator



Position Sensors

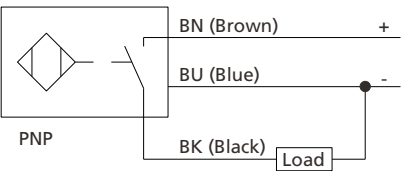
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves.

Technical Information

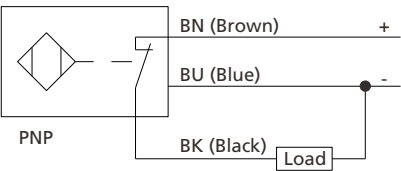
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally Open Position Sensor



Normally Closed Position Sensor



Explosion-proof Position Sensors

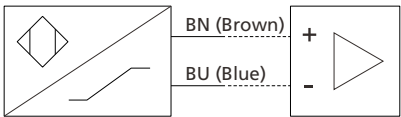
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram



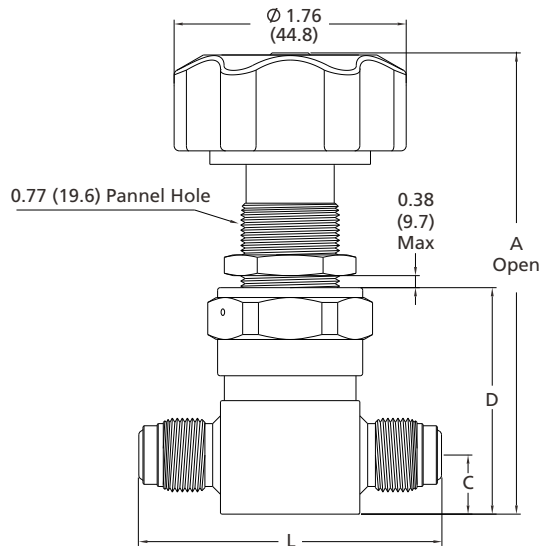
## Dimensions and Ordering Information

### Straight Type

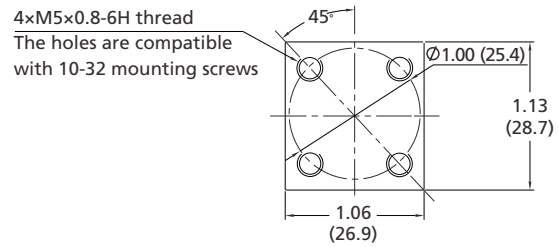
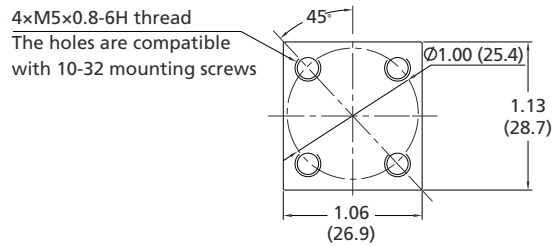
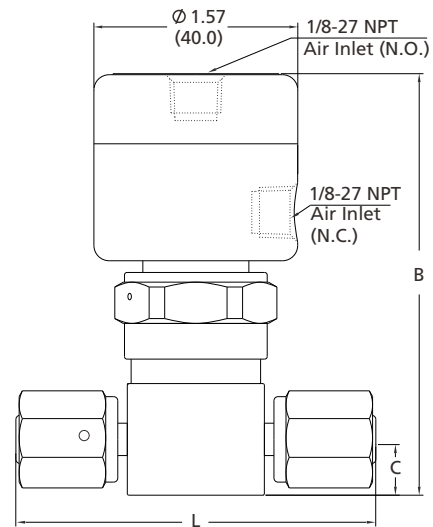
#### Dimensions

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

**Manual - Handle**



**Pneumatic**



Fittings

Valves

Regulators

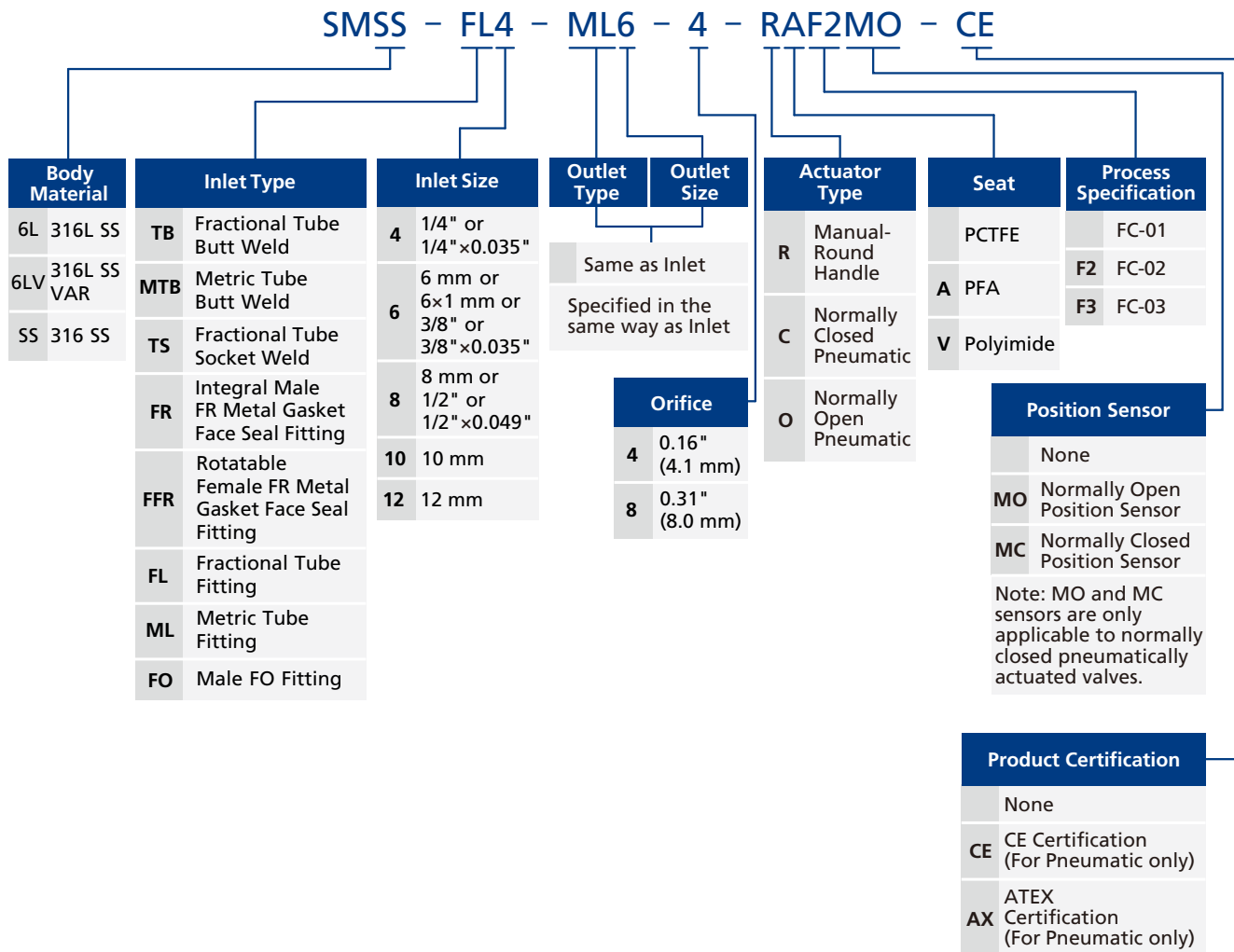
Filters

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Fittings	Orifice in. (mm)	Basic Ordering Number	Connection Type and Size	Dimensions, in. (mm)				
				A	B	C	D	L
Valves	0.16 (4.1)	SM□□-FL4-4-	1/4" FITOK Tube Fitting	3.51 (89.4)	3.31 (84.0)	0.45 (11.4)	1.78 (45.2)	2.44(62.1)
		SM□□-FL6-4-	3/8" FITOK Tube Fitting					2.58(65.5)
		SM□□-ML6-4-	6 mm FITOK Tube Fitting					2.47(62.8)
		SM□□-ML8-4-	8 mm FITOK Tube Fitting					2.53(64.3)
		SM□□-TB4-4-	1/4"×0.035" Tube Butt Weld					1.74(44.2)
		SM□□-TB6-4-	3/8"×0.035" Tube Butt Weld					
		SM□□-MTB6-4-	6x1 mm Tube Butt Weld					1.75(44.4)
		SM□□-TS4-4-	1/4" Tube Socket Weld					
		SM□□-FR4-4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting					2.30(58.4)
		SM□□-FFR4-4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting					2.76(70.1)
		SM□□-FO4-4-	1/4" Male FO					2.00(50.8)
Filters	0.31 (8.0)	SM□□-FL6-8-	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)
		SM□□-FL8-8-	1/2" FITOK Tube Fitting					2.80(71.1)
		SM□□-ML10-8-	10 mm FITOK Tube Fitting					2.60(66.0)
		SM□□-ML12-8-	12 mm FITOK Tube Fitting					2.80(71.1)
		SM□□-TB6-8-	3/8"×0.035" Tube Butt Weld					1.74(44.2)
		SM□□-TB8-8-	1/2"×0.049" Tube Butt Weld					
		SM□□-FR8-8-	1/2" Integral Male FR Metal Gasket Face Seal Fitting	3.87 (98.2)	3.86 (98.0)	0.63 (16.0)	2.12 (53.8)	2.58(65.5)
		SM□□-FFR8-8-	1/2" Rotatable Female FR Metal Gasket Face Seal Fitting					3.15(80.0)
Tubing								
Integrated Systems								
Other Products								
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## Ordering Number Description



## Notes:

- "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.
- For the -CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the -AX option includes a 2-wire explosion-proof position sensor compliant with ATEX certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

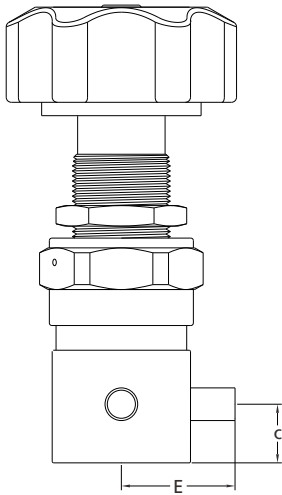
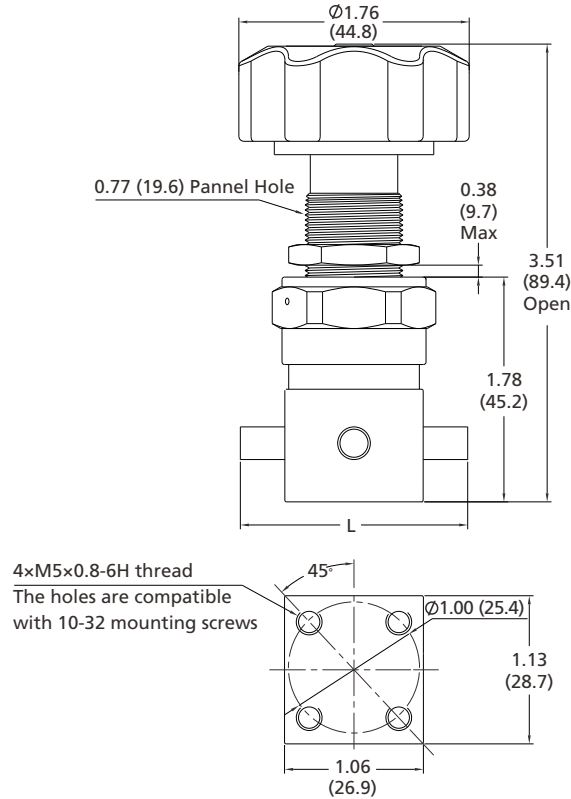


Branch Type

Dimensions

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

Manual - Round Handle



Pneumatic

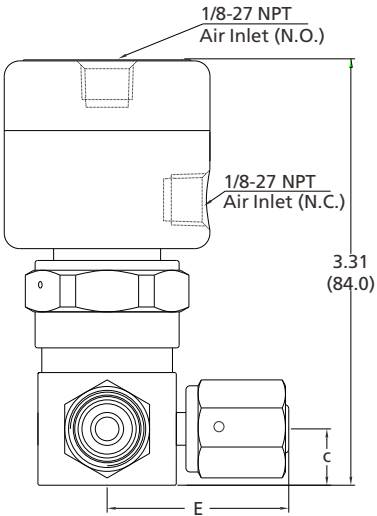
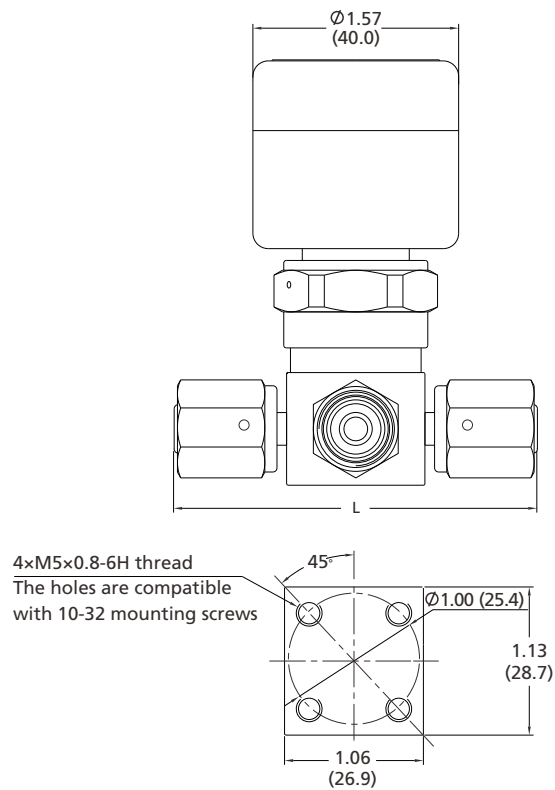
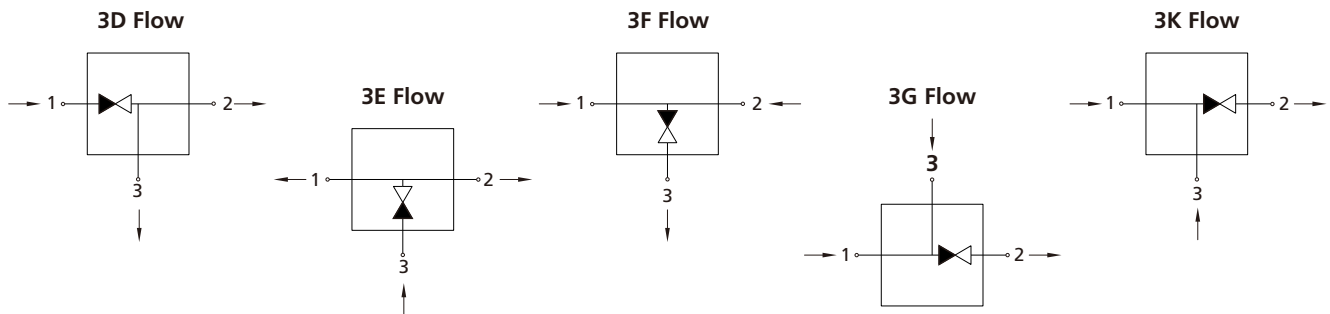


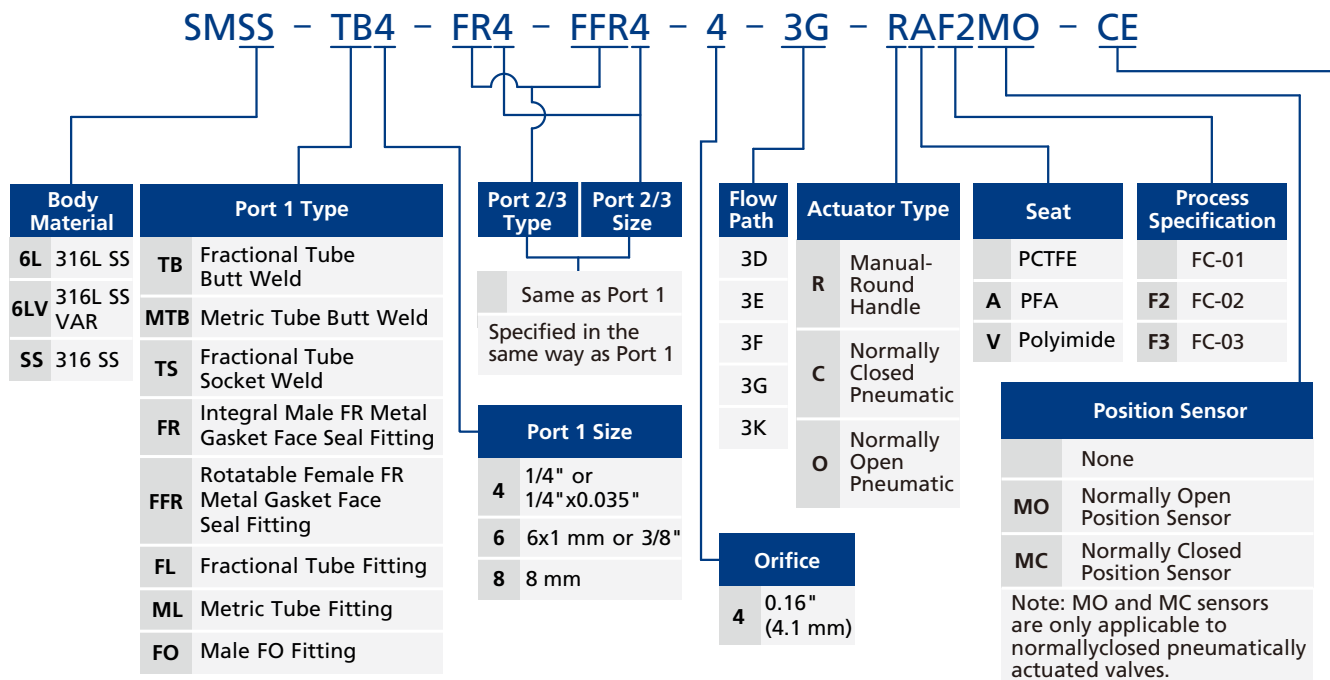
Table 1. Dimensions of Standard Fittings				
Basic Ordering Number	Connection Type and Size	Dimensions, in. (mm)		
		C	E	L
SM□□-TB4-4-	1/4"×0.035" Tube Butt Weld	0.45 (11.4)	0.87 (22.1)	1.74 (44.2)
SM□□-MTB6-4-	6×1 mm Tube Butt Weld			
SM□□-FFR4-4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting		1.38 (35.1)	2.76 (70.1)
SM□□-RFR4-4-	1/4" Rotatable Male FR Metal Gasket Face Seal Fitting		1.74 (44.2)	3.48 (88.4)

## Flow Paths

© Flow paths as viewed from the top



## Ordering Number Description



Notes:

1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.
2. For the -CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the -AX option includes a 2-wire explosion-proof position sensor compliant with ATEX certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

Product Certification	
	None
CE	CE Certification (For Pneumatic only)
AX	ATEX Certification (For Pneumatic only)

# High Pressure Pneumatic Bellows-Sealed Valves

## SVH Series

### Introduction

SVH Series High Pressure Pneumatic Bellows-Sealed Valves are suitable for high purity and ultra high purity applications. Replacing packing with bellows as the seal effectively improves valve cleanliness and extends service life. Additionally, parts prone to damage are easy to replace.

### 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
- ⦿ Normally open and normally closed position sensors 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) Polyimide: -40 ~ 400 °F (-40 ~ 204 °C)
Leak Rate (Helium)	Internal	$\leq 4 \times 10^{-9}$ std cm <sup>3</sup> /s	
	External	$\leq 4 \times 10^{-9}$ std cm <sup>3</sup> /s	

### Flow Data

Air @ 70 °F (21 °C)

Water @ 60 °F (16 °C)

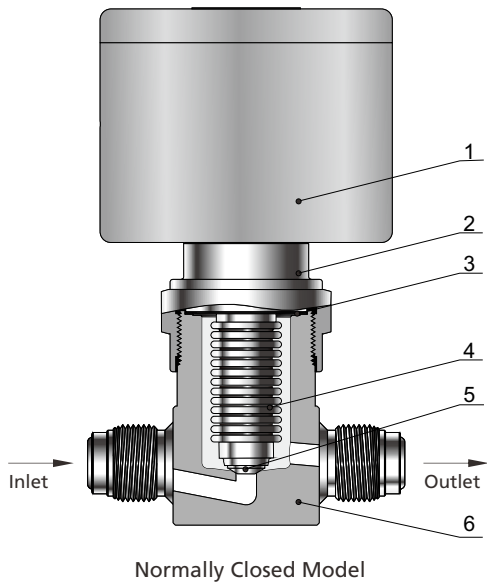
Pressure Drop to Atmosphere psig (bar)	Air (l/min)	Water (l/min)
10 (0.68)	96	3.6
50 (3.4)	250	7.9
100 (6.8)	450	11.0

### Process Specification

Item	Process Specification	Standard Cleaning and Packaging Process (FC-01) Special Cleaning and Packaging Process (FC-02)	Ultra High Purity Process (FC-03)
Material		316 SS, 316L SS	316L SS
Wetted Surface Roughness		Ra 20 μin. (0.5 μm)	Ra 10 μin. (0.25 μm)
Polishing Process		Machine finished	Electropolished

Note: Refer to page P-01 for a detailed description of Process Specification.

## Major Materials of Construction



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 Polyimide
6	Body	316 SS or 316L SS

## Pneumatic Actuators

- ☉ Normally open, "N.O." marked on the top of the actuator
- ☉ Normally closed, "N.C." marked on the top of the actuator



## Position Sensors

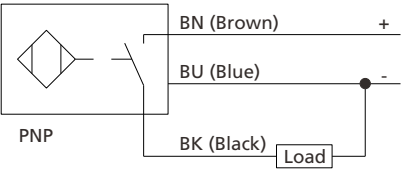
Transmit a signal to an electrical device indicating the open and closed position of pneumatically actuated valves

## Technical Information

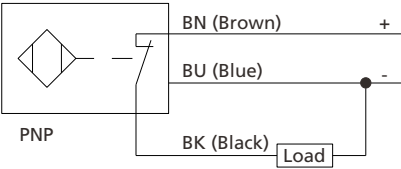
Output	3-wire V (dc), PNP
Output Function	Normally open or normally closed
Voltage	10 ~ 30 V (dc)
Working Temperature	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

Normally Open Position Sensor



Normally Closed Position Sensor



Notes:

1. For normally closed pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are open. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are closed.
2. For normally open pneumatically actuated valves, when fitted with normally open sensors, the sensors transmit signals with indicators illuminated when the valves are closed. Conversely, when fitted with normally closed sensors, the sensors transmit signals with indicators illuminated when the valves are open.

Explosion-proof Position Sensors

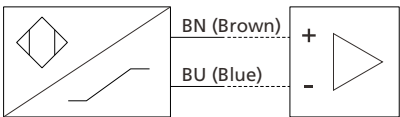
Transmit a signal to an electrical device, indicating the open and closed positions of pneumatically actuated valves.

Equipment Group II under ATEX Certification. The output complies with DIN EN 6094 7-5-6 (NAMUR) and the sensor should be used with an isolation amplifier.

Technical Information

Output	2 Wires DC
Voltage	8.2 V (dc)
Working Temperatre	-13 ~ 158 °F (-25 ~ 70 °C)

Wiring Diagram

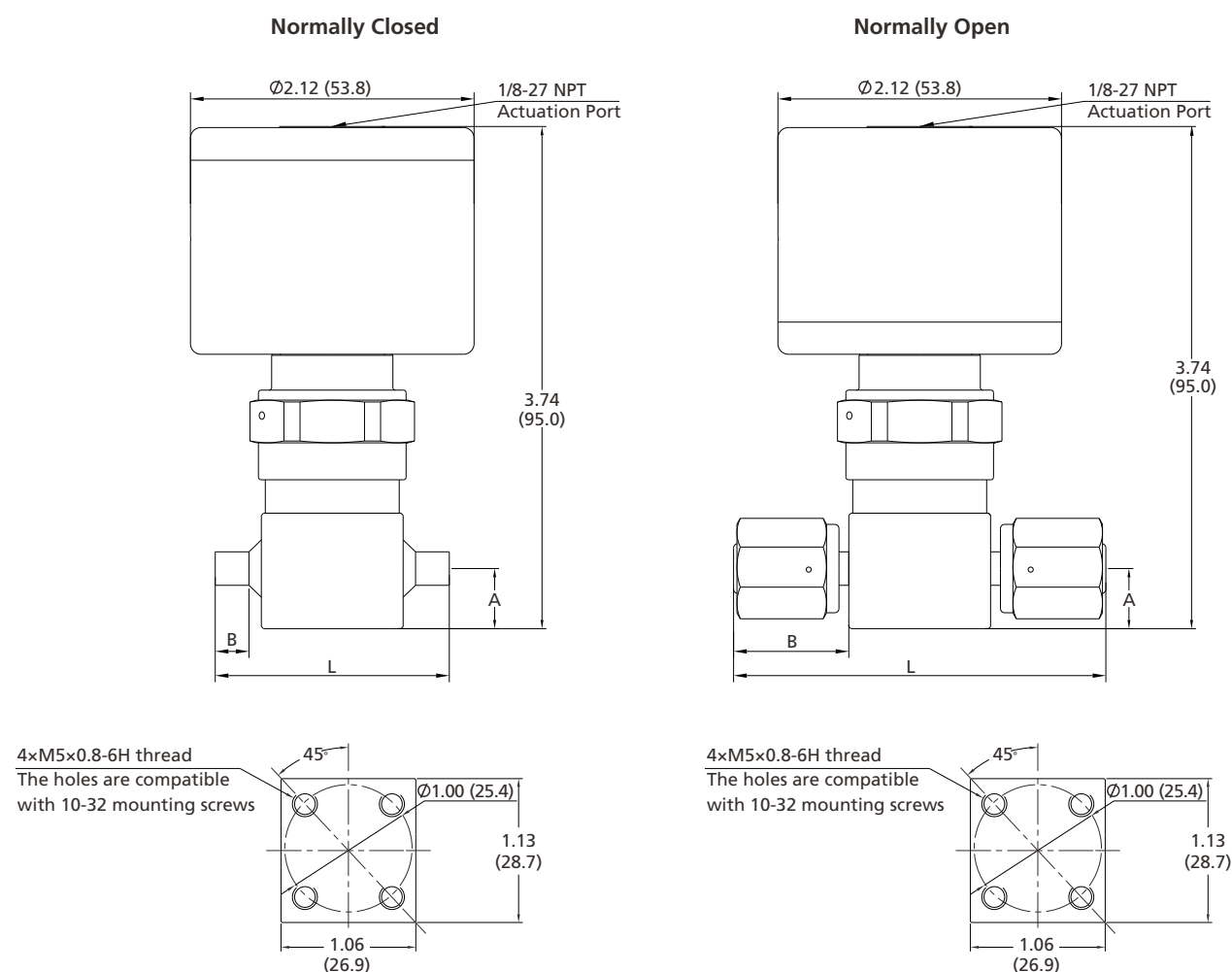


## Dimensions and Ordering Information

## Straight Type

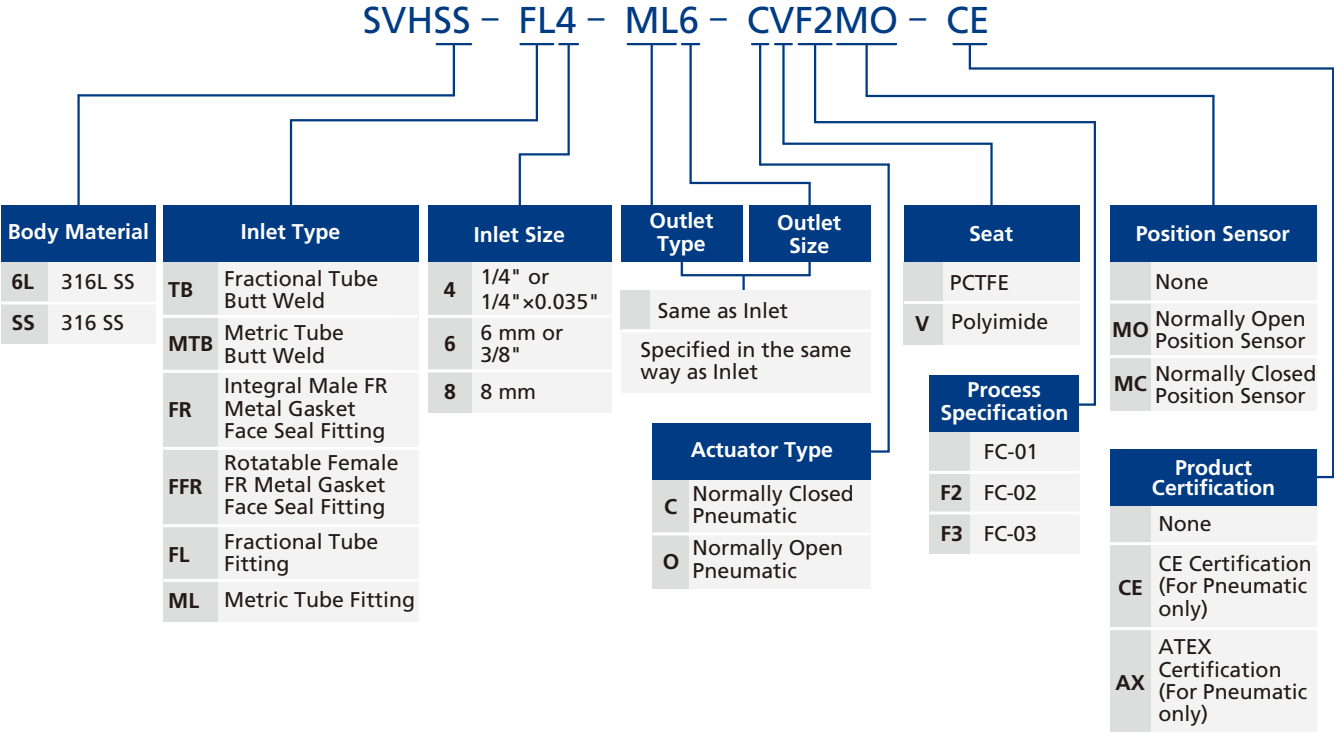
## Dimensions

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" x 0.035" Tube Butt Weld	0.45 (11.4)	0.25 (6.4)	1.75 (44.4)
SVH□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.45 (11.4)	0.85 (21.6)	2.76 (70.1)
SVH□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	0.45 (11.4)	0.62 (15.7)	2.30 (58.4)
SVH□□-FL4-	1/4" FITOK Tube Fitting	0.45 (11.4)	0.70 (17.8)	2.46 (62.5)
SVH□□-FL6-	3/8" FITOK Tube Fitting	0.45 (11.4)	0.76 (19.3)	2.58 (65.5)
SVH□□-ML6-	6 mm FITOK Tube Fitting	0.45 (11.4)	0.70 (17.9)	2.47 (62.8)

Ordering Number Description



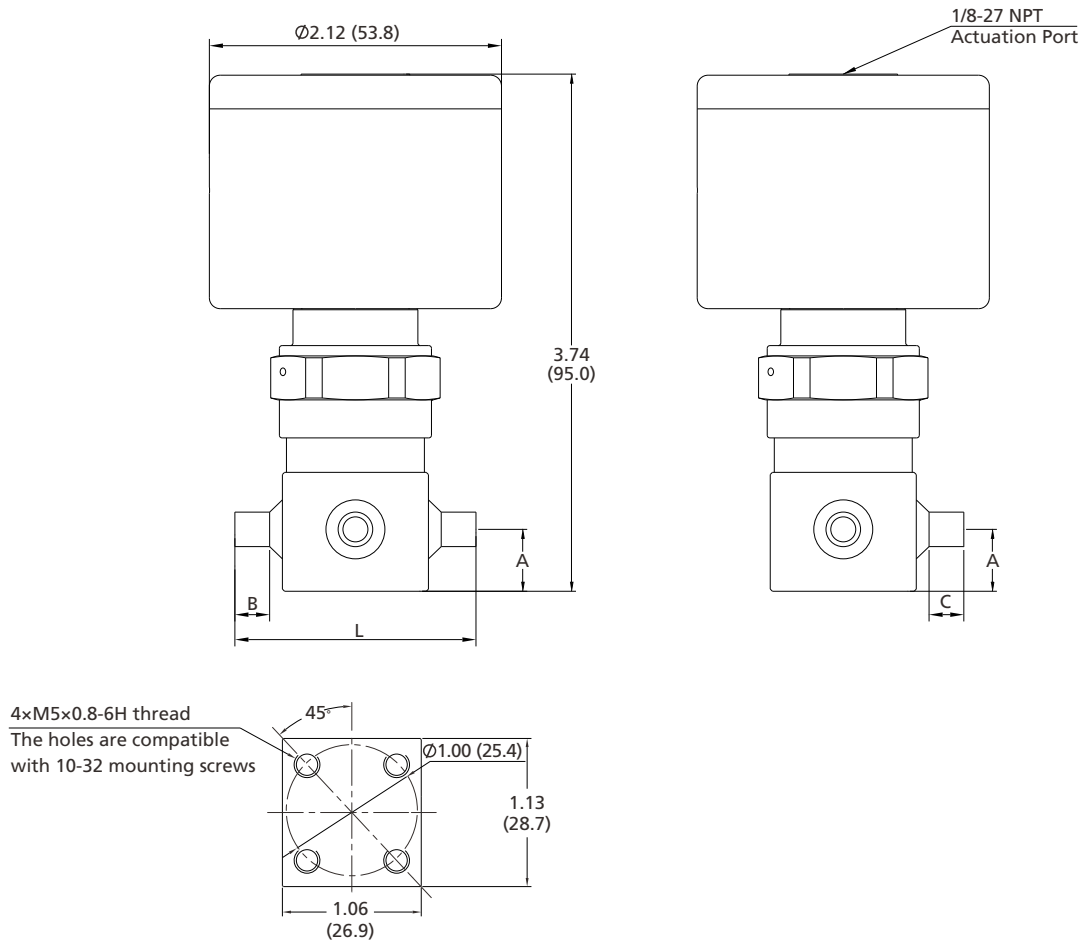
- Notes:
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  - For the -CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the -AX option includes a 2-wire explosion-proof position sensor compliant with ATEX certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.

## Branch Type

### Dimensions

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

#### Normally Closed



Fittings

Valves

Regulators

Filters

Tubing

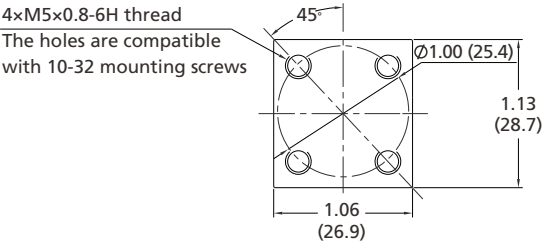
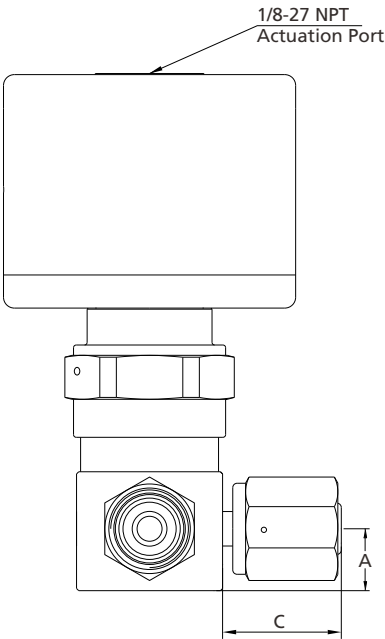
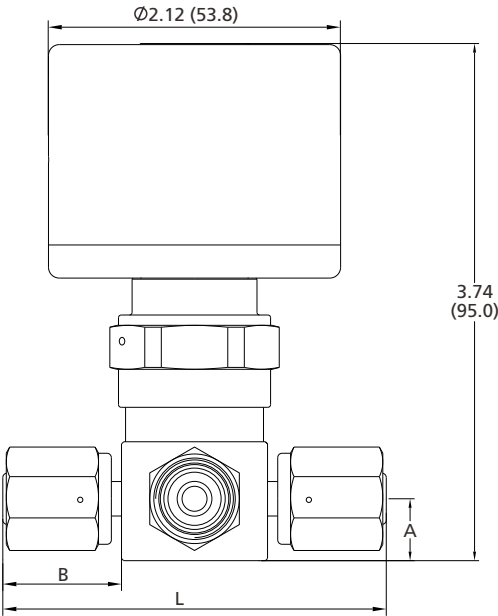
Integrated Systems

Other Products

Technical Information



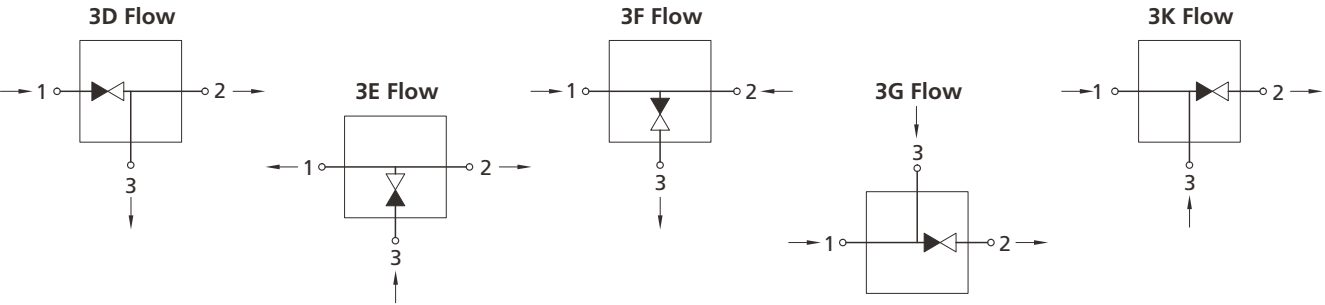
Normally Open



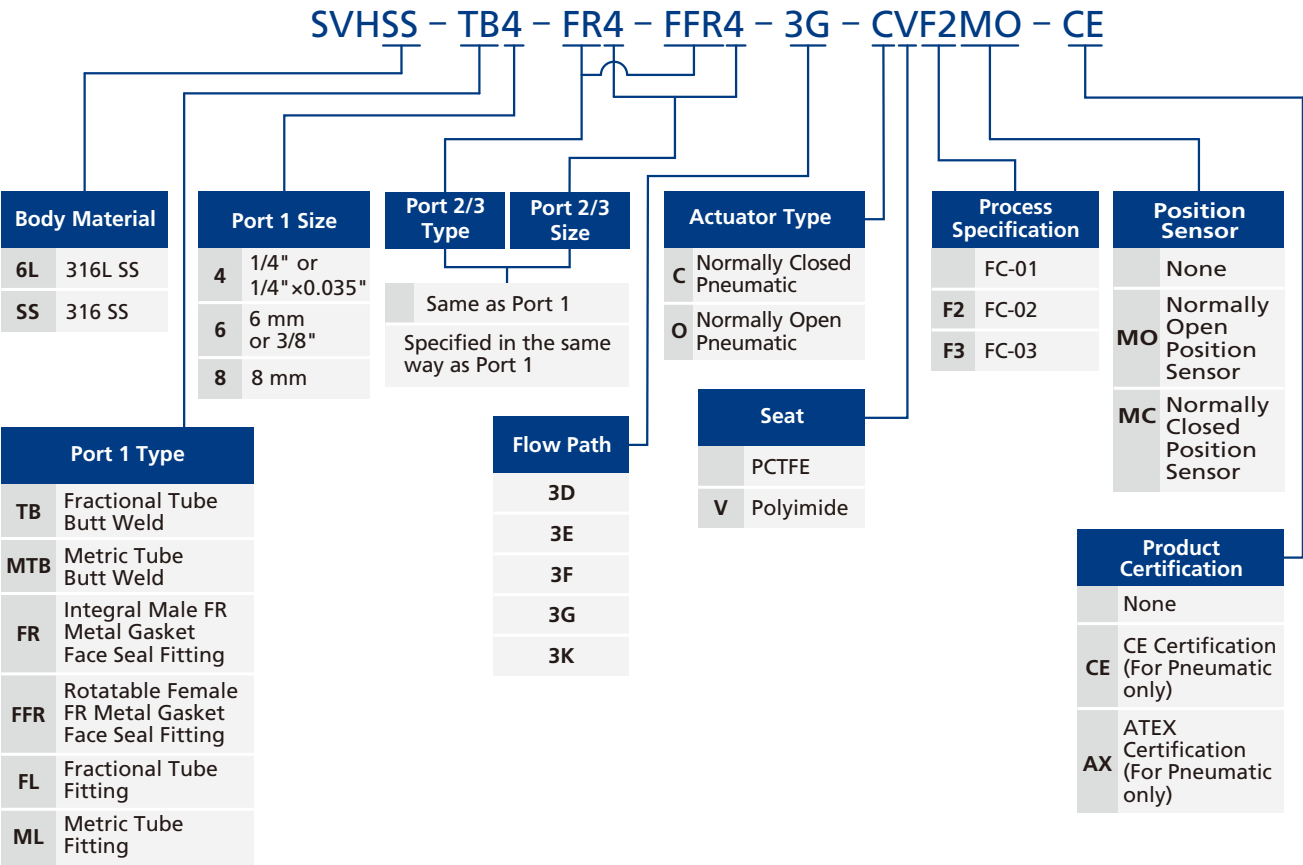
Basic Ordering Number	Connection Type and Size	Dimensions in. (mm)			
		A	B	C	L
SVH□□-TB4-	1/4" x 0.035" Tube Butt Weld	0.44 (11.2)	0.25 (6.4)	0.25 (6.4)	1.75 (44.4)
SVH□□-FFR4-	1/4" Rotatable Female FR Metal Gasket Face Seal Fitting	0.44 (11.2)	0.85 (21.6)	0.85 (21.6)	2.76 (70.1)
SVH□□-FR4-	1/4" Integral Male FR Metal Gasket Face Seal Fitting	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 (17.9)	2.47 (62.8)

Flow Paths

⦿ Flow paths as viewed from the top



Ordering Number Description



- Notes:
- "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available, Should you have any questions, please contact FITOK Group or our authorized distributors.
  - For the –CE or AX options, the valve conforms to ATEX certification, with "CE" marking and explosion protection "EX" marking. For position sensor selections, the -CE option includes a 3-wire position sensor compliant with CE certification, while the –AX option includes a 2-wire explosion-proof position sensor compliant with ATEX certification. The 2-wire explosion-proof position sensor requires use with an isolating switch amplifier.