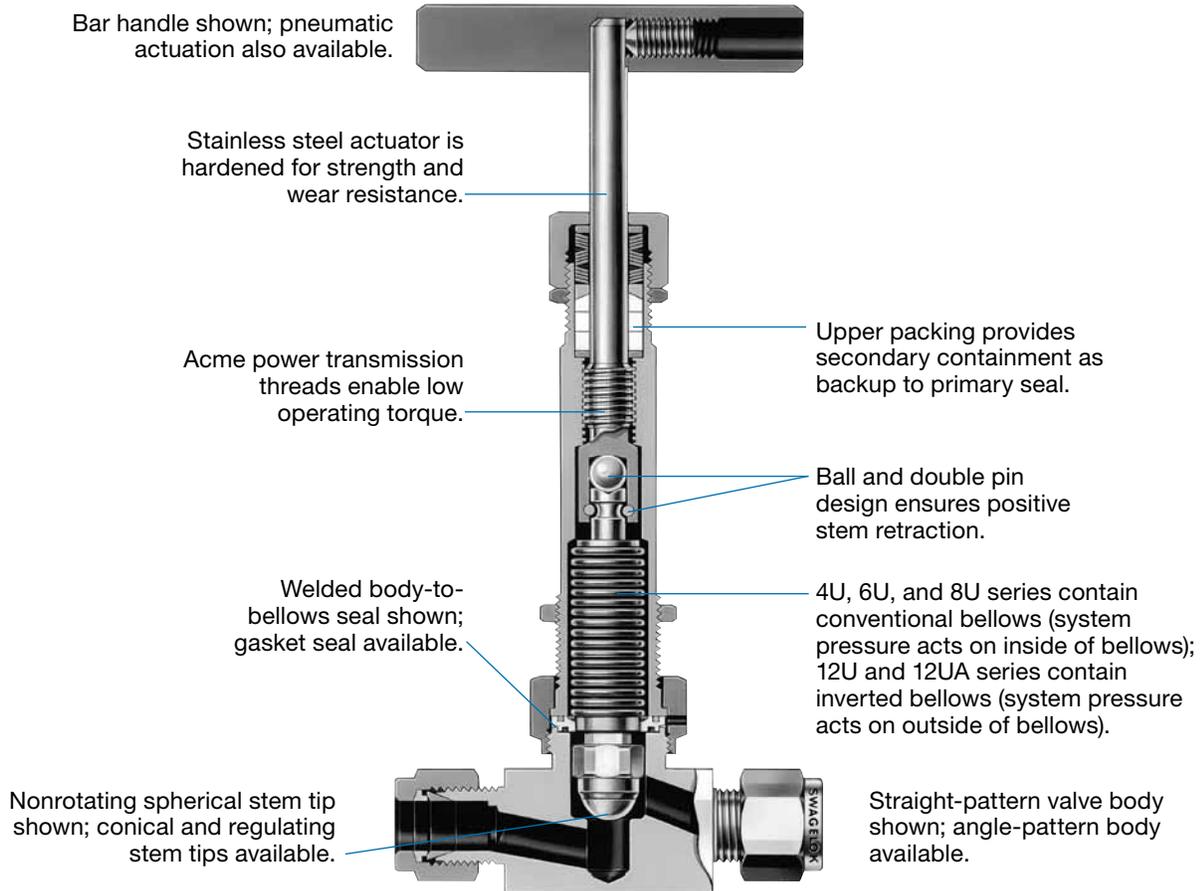


# Bellows-Sealed Valves



## U Series

- Secondary containment system above the bellows
- Working pressures up to 2500 psig (172 bar)
- Temperatures up to 1200°F (648°C)
- 1/4, 3/8, 1/2, 3/4, and 1 in.; 6, 10, and 12 mm end connections
- Stainless steel material



## Features

Swagelok® U series bellows-sealed valves enhance reliability, versatility, and safety—with a secondary containment system that prevents leaks to atmosphere even if the primary seal fails.

- Gasketed or welded body-to-bellows seals
- Stem tips for shutoff or regulating service
- Flow coefficients ( $C_v$ ) from 0.36 to 5.3
- Variety of end connections:
  - Swagelok tube fittings—1/4 to 1/2 in. and 6 to 12 mm
  - Tube socket weld ends—1/4 to 3/4 in.
  - Tube butt weld ends—3/8 to 1 in.
  - Female VCR® face seal fittings—1/4 and 1/2 in.
- Panel, bottom, and side mounting available

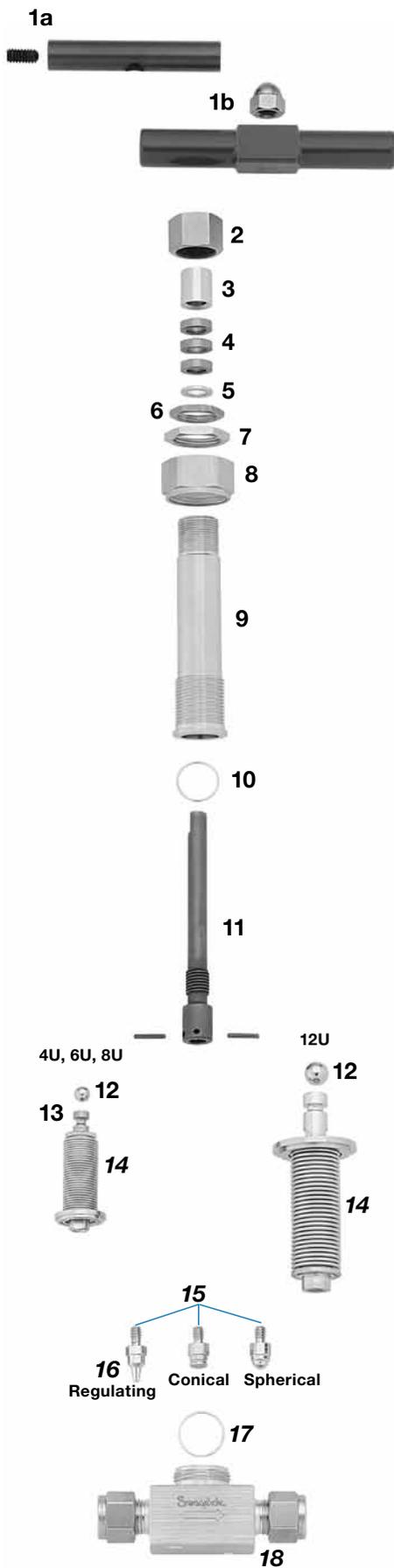
## Technical Data

Body-to-Bellows Seal	Stem Tip	Flow Pattern	$C_v$ <sup>①</sup>	Internal Volume <sup>①</sup> in. <sup>3</sup> (cm <sup>3</sup> )	Series <sup>②</sup>	
Gasket	Metal (regulating)	Straight	0.36	0.11 (1.8)	4URG	
			0.36	0.11 (1.8)	4UG	
			1.0	0.25 (4.1)	6UG	
			1.2	0.27 (4.4)	8UG	
	3.1		1.46 (23.9)	12UG		
	Metal (spherical)		5.3	1.22 (20.0)	12UAG	
			Polyimide (conical)	Angle	0.36	0.11 (1.8)
	1.0				0.25 (4.1)	6UK
	1.2	0.27 (4.4)			8UK	
	3.1	1.46 (23.9)			12UK	
	PCTFE (cylindrical)	Angle	5.3	1.22 (20.0)	12UAK	
			2.9	1.22 (20.0)	12UAK	
Weld	Metal (regulating)	Straight	0.36	0.11 (1.8)	4URW	
			0.36	0.11 (1.8)	4UW	
			1.0	0.25 (4.1)	6UW	
			1.2	0.27 (4.4)	8UW	
	Metal (spherical)		3.1	1.46 (23.9)	12UW	
			Angle	5.3	1.22 (20.0)	12UAW

① Determined using valves with Swagelok tube fitting end connections.

② **R** designates regulating stem tip; **G** designates gasket body-to-bellows seal; **A** designates angle pattern; **K** designates PCTFE or Polyimide stem tip; **W** designates welded body-to-bellows seal.

### Materials of Construction

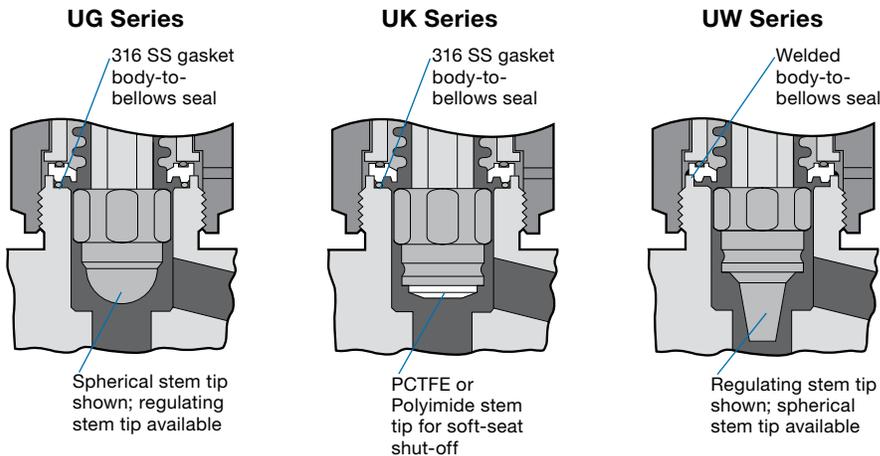


Component	Series	Material Grade/ ASTM Specification
1a Handle Set screw	All 4U, 6U, 8U	Green-anodized aluminum/B211
		Alloy steel/ANSI 18.3
1b Handle Cap nut	All 12U, 12UA	Green-painted aluminum/B211
		18-8 SS
2 Gland nut	All	316 SS/A479
3 Gland		
4 Packing (3)	All UK, UAK	PTFE/D1710
	All UG, UAG, UW, UAW	Grafoil®
5 Spacer	All	316 SS/A240
6 Jam nut	All	316 SS/A479
7 Panel mount nut	All	
8 Bonnet nut	All	Silver-plated 316 SS/A479
9 Bonnet	All	316 SS/A479
10 Lower seal O-ring	All	316 SS/A580
11 Actuator Actuator pin (2)	All	440C SS/A276
		416 SS
12 Ball bearing	All	440C SS
13 Stem extension	All 4U, 6U, 8U	440C SS/A276
14 Stem Bellows Weld ring	All	316 SS/A479
	All 4U, 6U, 8U	347 SS/A269
	All 12U, 12UA	316 SS/A240
15 Stem adapter	All	316 SS/A479
16 Stem tip	4URG, 4URW	316 SS/A479 (regulating)
	All UK, UAK	PCTFE/D1430 (cylindrical) Polyimide (conical)
	All UG, UAG, UW, UAW	Cobalt-based alloy (spherical)
17 Gasket	All UK, UAK	PTFE-coated 316 SS/A580
	All UG, UAG	Silver-plated 316 SS/A580
18 Body	All	316 SS/A479
Wetted lubricant	All UG, UAG, UW, UAW	Fluorinated-based (spherical stem tip, pneumatically actuated valves)
Nonwetted lubricant	All	Molybdenum disulfide based; silicone based;

Wetted components listed in *italics*.

#### Gasket Seal

#### Welded Seal



## Pressure-Temperature Ratings

### UW, URW, UG, and URG Series

**W** designates welded body-to-bellows seal; **R** designates regulating stem tip; **G** designates gasket body-to-bellows seal.

Ratings limited to 1000°F (537°C) for valves with VCR fitting end connections.

Ratings apply to manual valves and to valves with 6 series or 8 series pneumatic actuators. For actuator ratings, see page 6.

Material	316 SS	
Series	UW, URW	UG, URG
Temperature, °F (°C)	Working Pressure, psig (bar)	
<b>Standard Model</b>		
-20 (-28) to 650 (343)	2500 (172)	2500 (172)
700 (371)	2120 (146)	—
750 (398)	1740 (119)	—
800 (426)	1360 (93.7)	—
850 (454)	980 (67.5)	—
900 (482)	600 (41.3)	—
<b>UW High-Temperature Model</b>		
950 (510)	540 (37.2)	—
1000 (537)	480 (33.0)	—
1050 (565)	425 (29.2)	—
1100 (593)	360 (24.8)	—
1150 (621)	300 (20.6)	—
1200 (648)	250 (17.2)	—

For more information about pressure ratings of valves with tube fitting end connections, see Swagelok *Tubing Data*, MS-01-107.

### Handle Temperature Gradient

When Valve Seat Is	Valve Handle Is
600°F (315°C)	135°F (57°C)
900°F (482°C)	140°F (60°C)
1200°F (648°C)	150°F (65°C)

### UK Series

**K** designates PCTFE or polyimide stem tip. See page 8.  
2500 psig (172 bar) at -20 to 200°F (-28 to 93°C) for PCTFE.

### Testing

Every U series valve is factory vacuum tested with helium at room temperature for 5 s to a maximum leak rate of  $4 \times 10^{-9}$  std cm<sup>3</sup>/s at the seat, envelope, and all seals.

### Cleaning and Packaging

Swagelok U series valves with VCR end connections are processed in accordance with Swagelok *Special Cleaning and Packaging (SC-11)*, MS-06-63, to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C.

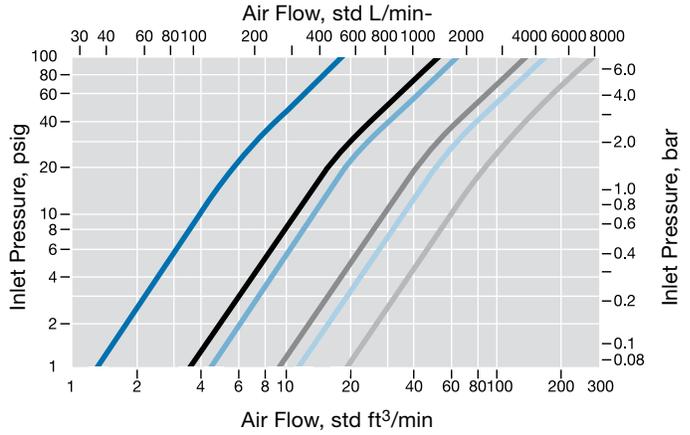
Swagelok U series valves with other end connections are processed in accordance with Swagelok *Standard Cleaning and Packaging (SC-10)*, MS-06-62; special cleaning and packaging are available as an option.

## Flow Data at 70°F (20°C)

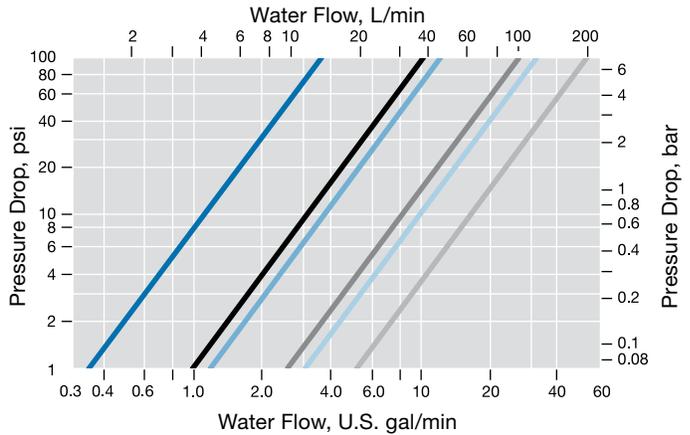
A designates angle pattern.

— 4U — 6U — 8U — 12UAK<sup>Ⓢ</sup> — 12U — 12UA

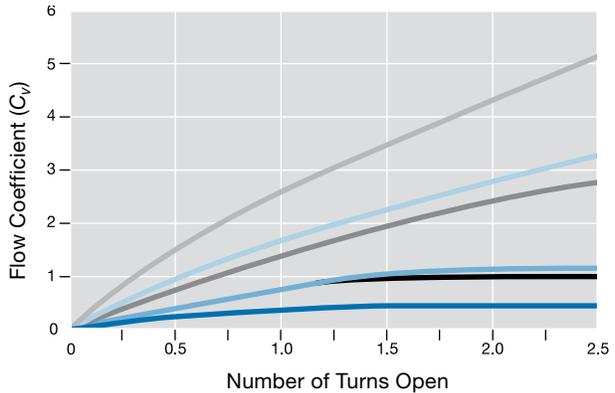
### Air



### Water



### Flow Coefficient at Turns Open



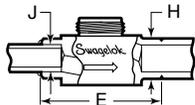
Ⓢ 12U Series pneumatically actuated angle valves with the PCTFE stem tip have a C<sub>v</sub> of 2.9.

**⚠ To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.**

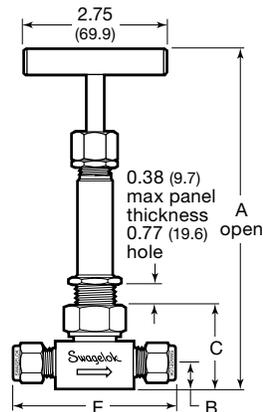
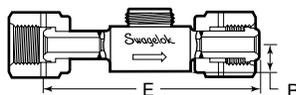
## Ordering Information and Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

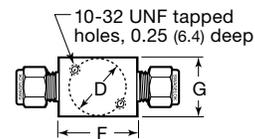
### Tube Socket Weld and Tube Butt Weld Ends



### Butt Welded Female VCR Fitting Ends



### Bottom



## UW Series Valves

Select an ordering number.

## UG and UK Series Valves

Replace **W** with **G** or **K**.

Example: SS-4UG

For UK, add -VP for a polyimide stem tip. See page 8.

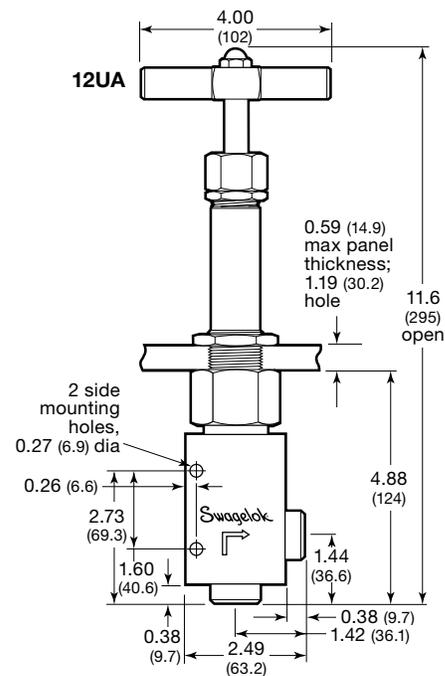
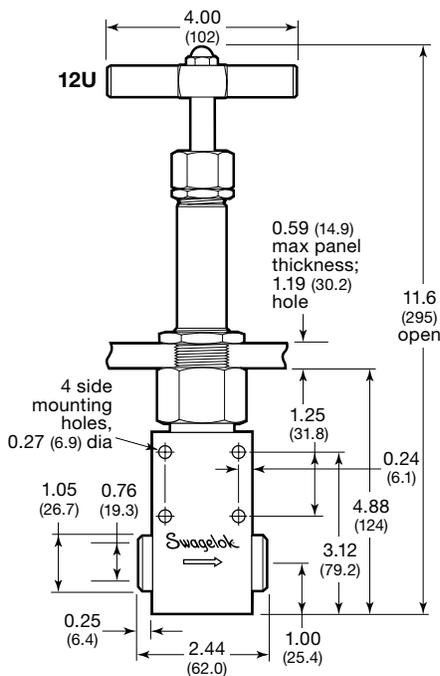
## 4U, 6U, and 8U Series

End Connections		Ordering Number	Series	Dimensions, in. (mm)									
Type	Size			Orifice	A	B	C	D	E	F	G	H	J
Fractional Swagelok tube fitting	1/4 in.	SS-4UW	4U	0.172 (4.37)	6.48 (165)	0.56 (14.2)	1.49 (37.8)	1.00 (25.4)	2.46 (62.5)	1.06 (26.9)	1.00 (25.4)	-	-
	3/8 in.	SS-6UW	6U	0.265 (6.73)	6.59 (167)	0.50 (12.7)	1.61 (40.9)	1.13 (28.7)	3.09 (78.5)	1.57 (39.9)	1.13 (28.7)		
	1/2 in.	SS-8UW	8U	0.312 (7.92)					3.30 (83.8)				
Metric Swagelok tube fitting	6 mm	SS-6UW-MM	4U	0.172 (4.37)	6.48 (165)	0.56 (14.2)	1.49 (37.8)	1.00 (25.4)	2.46 (62.5)	1.06 (26.9)	1.00 (25.4)	-	-
	10 mm	SS-10UW-MM	6U	0.281 (7.14)	6.59 (167)	0.50 (12.7)	1.61 (40.9)	1.13 (28.7)	3.11 (79.0)	1.57 (39.9)	1.13 (28.7)		
	12 mm	SS-12UW-MM	8U	0.281 (7.14)					3.30 (83.8)				
Tube socket and tube butt weld	1/4 and 3/8 in.	SS-4UW-TW	4U	0.156 (3.96)	6.48 (165)	0.56 (14.2)	1.49 (37.8)	1.00 (25.4)	1.68 (42.7)	1.00 (25.4)	1.00 (25.4)	0.38 (9.7)	0.25 (6.4)
	3/8 and 1/2 in.	SS-6UW-TW	6U	0.281 (7.14)	6.59 (167)	0.50 (12.7)	1.61 (40.9)	1.13 (28.7)	2.27 (57.7)	1.52 (38.6)	1.13 (28.7)	0.50 (12.7)	0.38 (9.7)
	1/2 and 3/4 in.	SS-8UW-TW	8U	0.312 (7.92)								0.75 (19.1)	0.50 (12.7)
Butt welded female VCR fitting	1/4 in.	SS-4UW-V51	4U	0.156 (3.96)	6.48 (165)	0.56 (14.2)	1.49 (37.8)	1.00 (25.4)	2.76 (70.1)	1.00 (25.4)	1.00 (25.4)	-	-
	1/2 in.	SS-6UW-V19	6U	0.281 (7.14)	6.59 (167)	0.50 (12.7)	1.61 (40.9)	1.13 (28.7)	5.19 (132)	1.52 (38.6)	1.13 (28.7)		
		SS-8UW-V47	8U	0.297 (7.54)					0.57 (14.5)	3.12 (79.2)			

Dimensions shown with Swagelok nuts finger-tight.  
**H** = butt weld diameter; **J** = socket weld diameter.

## 12U Series

End Connections	Ordering Number	Orifice in. (mm)
3/4 in. tube socket weld, 3/4 in. pipe butt weld, and 1 in. tube butt weld	SS-12UW-TW	0.500 (12.7)
	SS-12UAW-TW	0.610 (15.5)



## Pneumatic Actuators

### Features

- Reliable piston design for enhanced cycle life
- Low actuation pressures
- Cast construction
- Aluminum and stainless steel components

### Actuator Series

- 6 series actuator for 4U, 6U, and 8U series valves
- 8 series actuator for 12U series valves

### Actuation Modes

**Normally closed**—air opens, spring closes

**Normally open**—air closes, spring opens

**Double acting**—air opens and closes

### Materials of Construction

Component	Material
Housing	Cast aluminum
External hardware	Stainless steel
O-rings	Fluorocarbon FKM

### Technical Data

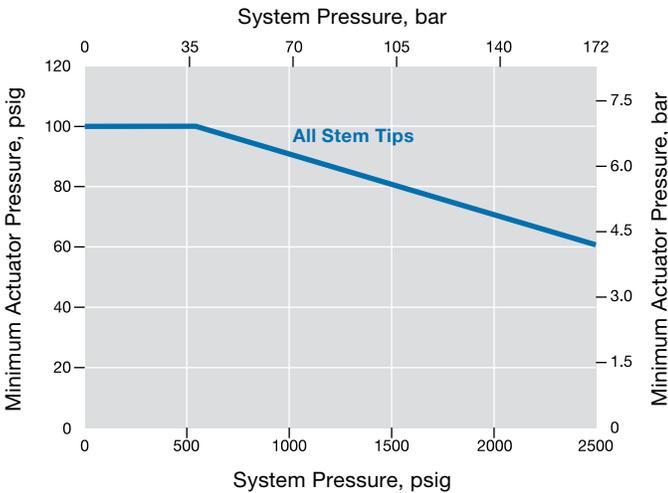
Valve Series	Actuator Series	Pressure Rating psig (bar)	Temperature Rating °F (°C)	Air Displacement in. <sup>3</sup> (cm <sup>3</sup> )	Weight lb (kg)
4U, 6U, 8U	6	65 to 150 (4.4 to 10.3)	-10 to 300 (-23 to 148)	0.88 (14.4)	C—7.3 (3.3) O—4.9 (2.2) D—4.8 (2.1)
12U, 12UA	8	40 to 150 (2.7 to 10.3)		C—2.9 (47.5) O—3.0 (49.2) D—2.4 (39.3)	C—24 (10.9) O—13 (5.9) D—11.5 (5.2)

### Pneumatic Actuator Performance

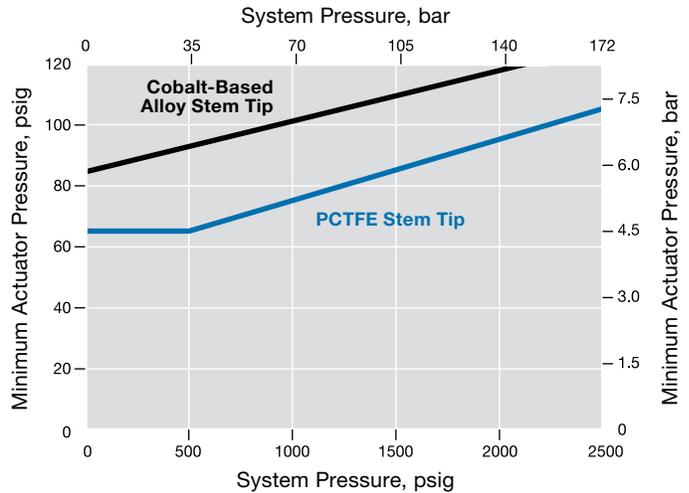
#### 6 Series

The minimum actuation pressure for normally closed, normally open, and double-acting actuators is 65 psig (4.5 bar).

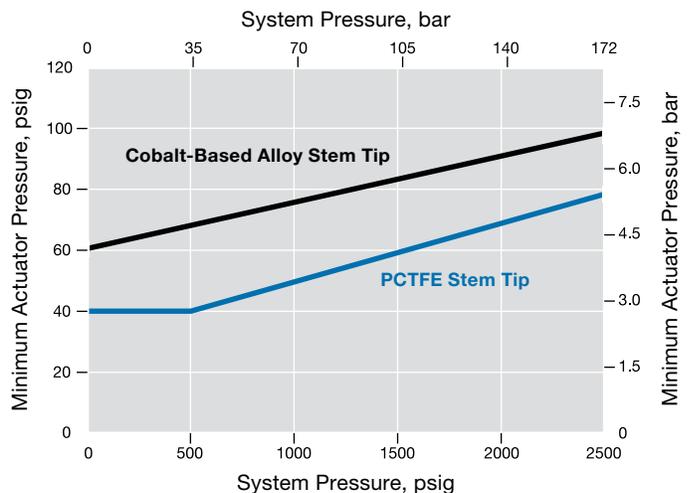
#### 8 Series Normally Closed



#### 8 Series Normally Open



#### 8 Series Double-Acting



## Pneumatic Actuators

### Dimensions and Ordering Information

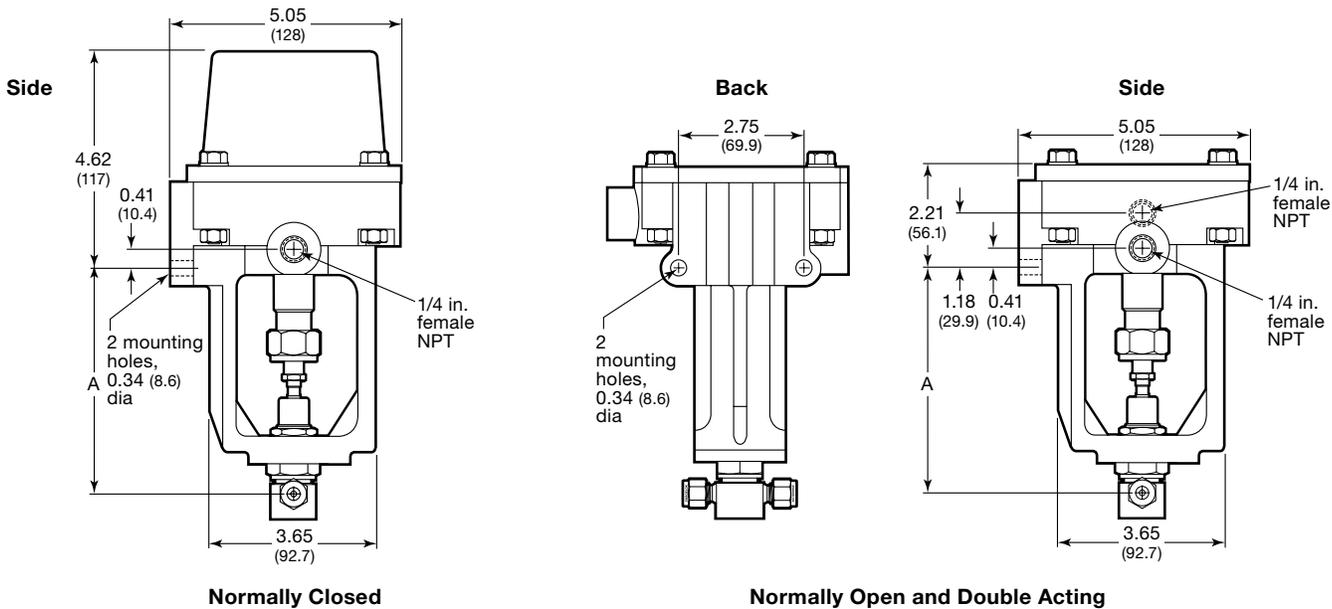
Dimensions, in inches (millimeters), are for reference only and are subject to change.

Add an actuator series designator, then an actuation mode designator to the valve ordering number.

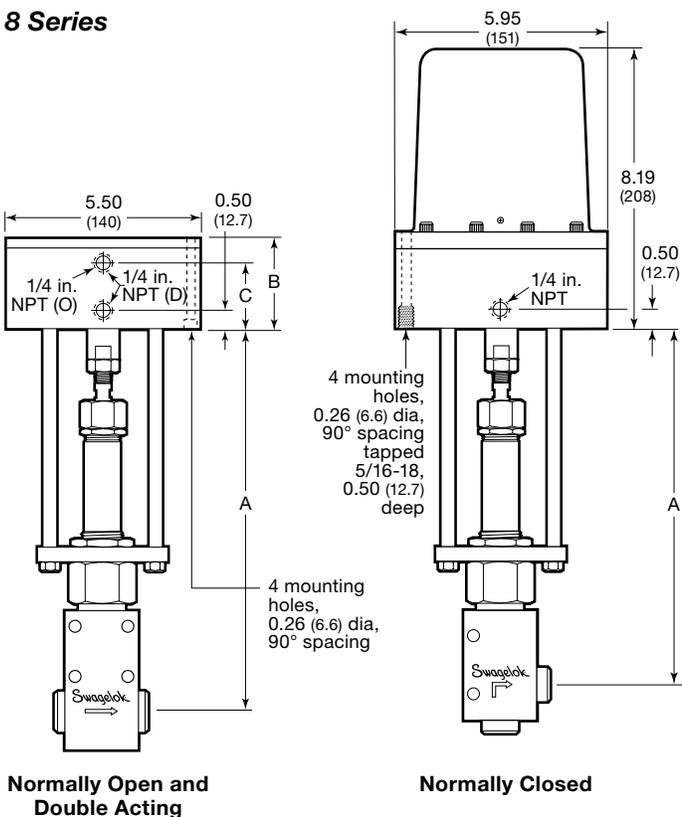
Example: SS-4UW-6C

Actuator Series	Designator	Actuation Mode	Designator
6	-6	Normally closed	C
		Normally open	O
8	-8	Double acting	D

### 6 Series



### 8 Series



Valve Series	Actuator Series	Dimensions, in. (mm)		
		A	B	C
4U	6	6.60 (168)	—	—
6U, 8U		6.76 (172)	—	—
12U	8	10.5 (267)	O—2.75 (69.9)	D—1.88 (47.8)
12UA		10.0 (254)	D—2.56 (65.0)	O—1.75 (44.5)

### Actuator Conversion Kits

The actuator conversion kit converts a U series valve with a Swagelok 4 series pneumatic actuator to a valve with a 6 series pneumatic actuator.

Valve Series	Actuation Mode	Actuator Conversion Kit Ordering Number
4U, 6U, 8U	Normally closed	MS-6CK
	Normally open	MS-6OK
	Double acting	MS-6DK

## Options and Accessories

### Special Cleaning and Packaging (SC-11)

Swagelok U series valves with VCR end connections are processed in accordance with Swagelok *Special Cleaning and Packaging (SC-11)*, MS-06-63, to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C.

To order special cleaning and packaging for U series valves with other end connections, add **-SC11** to the valve ordering number.

Example: SS-4UW-**SC11**

### UW High-Temperature Model

- Nickel-based lubricant prevents seizing of actuator threads.
- Valve rating extends to:
  - 1000°F (537°C) for valves with VCR fittings.
  - 1200°F (648°C) for valves with Swagelok tube fittings.

To order, add **-HT** to the valve ordering number.

Examples: SS-4UW-**HT**  
SS-4UW-**HT-6C**

### UG, UW Series Low-Temperature Model

- For temperatures from -325 to 400°F (-200 to 204°C).

To order a UG or UW series valve with PTFE secondary packing, add **-TF** to the valve ordering number.

Examples: SS-4UW-**TF**  
SS-4UW-**TF-6C**

### UG and UK Series Polyimide Stem Tips

- Provide soft-seat shutoff for temperatures up to 400°F (204°C) or where PCTFE is not compatible with the system fluid.
- Are available in manually or pneumatically actuated UG and UK series valves.
- Are rated to the same pressure as the standard valve.

To order, add **-VP** to the valve ordering number.

Example: SS-4UG-**VP**

- Not available with the UW welded option.

### 4U, 6U, and 8U Alloy 600 Bellows

To order, add **-IN** to the valve ordering number.

Examples: SS-4UW-**IN**  
SS-4UW-**IN-6C**

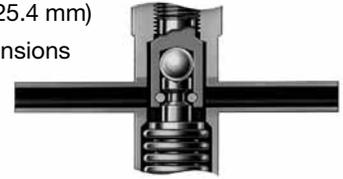
### Bonnet Sniffer Tubes

Bonnet sniffer tubes are 1 in. (25.4 mm) long, 1/4 in. (6.4 mm) tube extensions that enable monitoring of bellows integrity.

- 4U, 6U, and 8U series tubes are welded to the bonnet.
- 12U series tubes are attached to the bonnet with 1/8 in. female NPT threads.

To order, add **-T1** for one bonnet sniffer tube or **-T2** for two bonnet sniffer tubes to the valve ordering number.

Examples: SS-4UW-**T1**  
SS-12UW-**TW-T2**



### Bellows-Sealed 3-Valve Manifolds

The Swagelok 3-valve manifold uses B or U series bellows-sealed valves for systems with difficult fluid containment requirements.

For more information, see the Swagelok *Bellows-Sealed 3-Valve Manifolds—V3 Series* catalog, MS-02-07.



### 6 Series Pneumatic Actuator Microswitches

- Signal OPEN or CLOSED position of valve to panel or process controller
- Feature single-pole, double-throw switch
- Meet NEMA standard for type 1 and type 3 enclosures
- Include stainless steel mounting bracket
- Are available factory assembled on 4U, 6U, and 8U series valves with 6 series pneumatic actuator or in kits for field assembly.



#### Factory-Assembled Microswitches

To order a valve with a microswitch, add **M** to the valve ordering number.

Example: SS-4UW-**6CM**

#### Microswitch Kits for Field Assembly

To order a kit for an existing valve, use ordering number **MS-6CMK-U**.

### Maintenance Kits

Stem tip/adaptor kits, bellows kits, and gasket kits are available for UG, URG, and UK series valves. See the Swagelok *Bellows-Sealed Valve Maintenance Kits* catalog, MS-02-66.

### Oxygen Service Hazards

For more information about hazards and risks of oxygen-enriched systems, see the Swagelok *Oxygen System Safety* technical report, MS-06-13.







**Safe Product Selection**

**When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

**Caution: Do not mix or interchange parts with those of other manufacturers.**

**Warranty Information**

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit [swagelok.com](http://swagelok.com) or contact your authorized Swagelok representative.

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