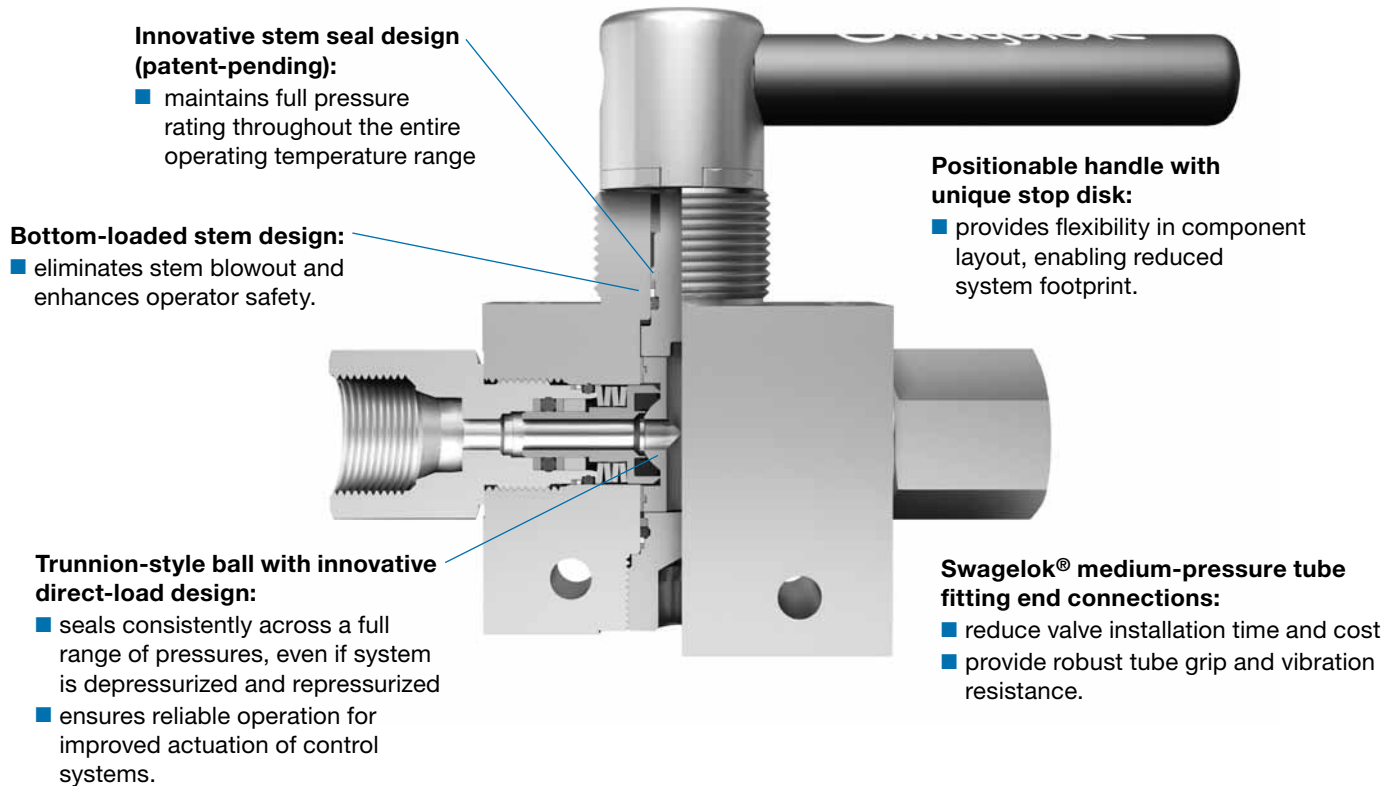


# Medium-Pressure Ball Valves

## FKB Series



Swagelok FKB series trunnion-style ball valves offer low-torque, quarter-turn operation in a compact design providing positive shutoff in applications up to 15 000 psig (1034 bar). Other features include:

- Flow coefficients ( $C_v$ ) from 0.44 to 11.3
- Gaugeable Swagelok medium-pressure tube fitting and female NPT end connections
- 2-way (on-off) and 3-way (switching) flow patterns
- Nitrogen seat tested and shell tested to ensure product integrity
- Positionable bar handle and ISO 5211-compliant pneumatic actuators
- Manual valve panel and shoulder mounting are available as options.

### Important Information About Swagelok Ball Valves

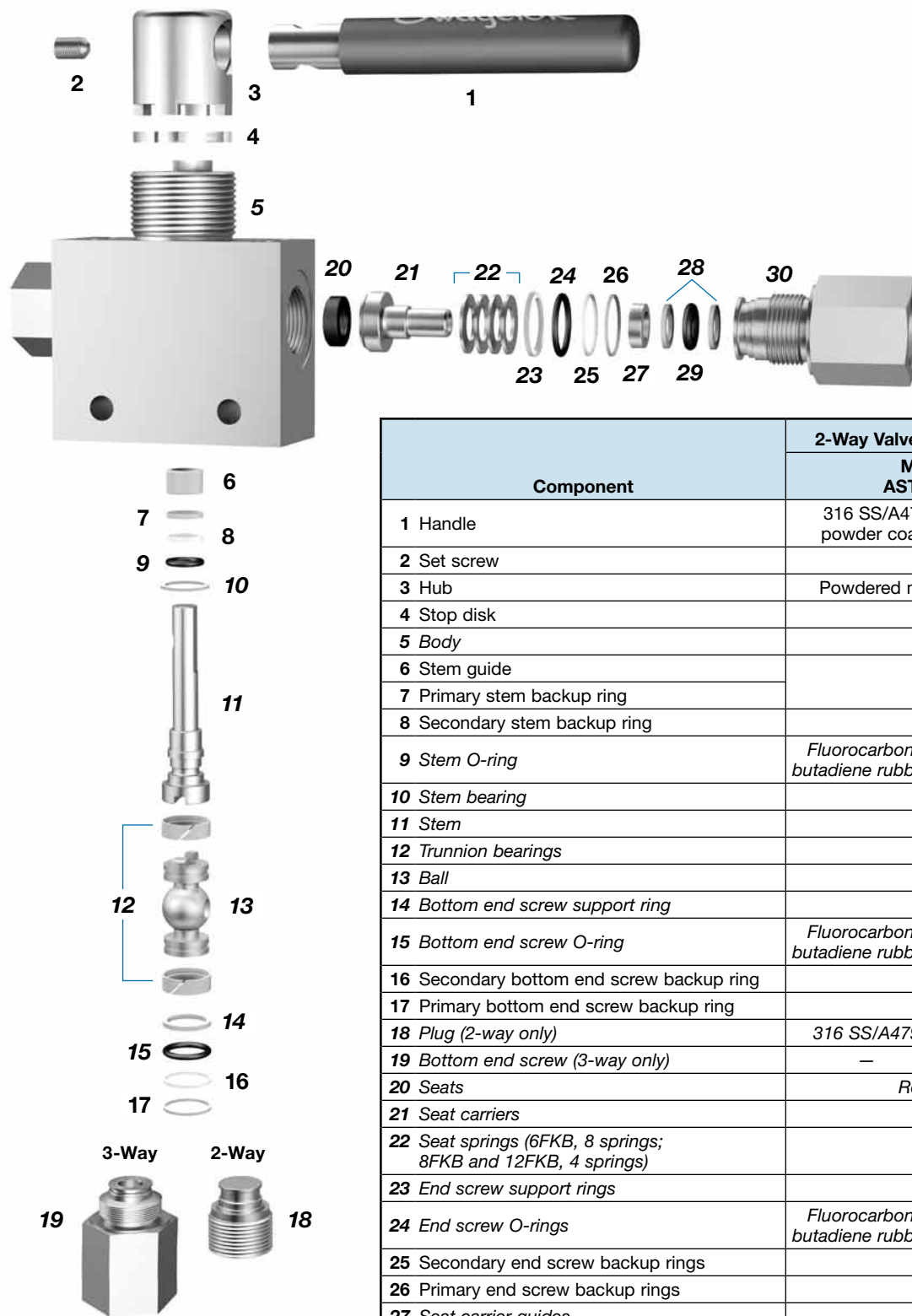
- ⚠ Swagelok ball valves are designed to be used in a fully open or fully closed position.
- ⚠ Valves that have not been cycled for a period of time may have a higher initial actuation torque.

### Pressure-Temperature Ratings

Temperature °F (°C)	O-Ring Material		
	Fluorocarbon FKM	HNBR	Per- fluorocarbon FFKM
	Working Pressure, psig (bar)		
0 (-17) to 250 (121)	15 000 (1034)	15 000 (1034)	—
20 (-6) to 185 (85)	—	—	15 000 (1034)

For more information about pressure ratings of valves with medium-pressure tube fitting end connections, see the Swagelok *Medium-Pressure Gaugeable Tube Fittings and Adapter Fittings* catalog, MS-02-335.

## Materials of Construction



Component	2-Way Valve	3-Way Valve
	Material Grade/ ASTM Specification	
1 Handle	316 SS/A479 with blue electrostatic powder coating and white epoxy ink	
2 Set screw	316 SS/A276	
3 Hub	Powdered metal 300 series SS/B783	
4 Stop disk	316 SS/A276	
5 Body	316 SS/A479	
6 Stem guide	PEEK	
7 Primary stem backup ring	PTFE	
8 Secondary stem backup ring	PTFE	
9 Stem O-ring	<i>Fluorocarbon FKM, hydrogenated nitrile butadiene rubber, or perfluorocarbon FFKM</i>	
10 Stem bearing	PEEK	
11 Stem	316 SS/A479	
12 Trunnion bearings	PEEK	
13 Ball	316 SS/A276	
14 Bottom end screw support ring	PEEK	
15 Bottom end screw O-ring	<i>Fluorocarbon FKM, hydrogenated nitrile butadiene rubber, or perfluorocarbon FFKM</i>	
16 Secondary bottom end screw backup ring	PTFE	
17 Primary bottom end screw backup ring	PEEK	
18 Plug (2-way only)	316 SS/A479	—
19 Bottom end screw (3-way only)	—	316 SS/A479
20 Seats	Reinforced PEEK	
21 Seat carriers	316 SS/A276	
22 Seat springs (6FKB, 8 springs; 8FKB and 12FKB, 4 springs)	17-7PH/A673	
23 End screw support rings	PEEK	
24 End screw O-rings	<i>Fluorocarbon FKM, hydrogenated nitrile butadiene rubber, or perfluorocarbon FFKM</i>	
25 Secondary end screw backup rings	PTFE	
26 Primary end screw backup rings	PEEK	
27 Seat carrier guides	316 SS	
28 Seat carrier backup rings	PEEK	
29 Seat carrier O-rings	<i>Fluorocarbon FKM, hydrogenated nitrile butadiene rubber, or perfluorocarbon FFKM</i>	
30 End screws	316 SS/A479	
Wetted lubricants	<i>Silicone-based, tungsten disulfide and fluorinated-based</i>	
Nonwetted lubricants	Hydrocarbon-based	

Wetted components listed in *italics*.

## Testing

Every Swagelok medium-pressure ball valve is factory tested with nitrogen at 1000 psig (68.9 bar). Seats have a maximum allowable leak rate of 0.1 std cm<sup>3</sup>/min. Shell testing is performed to a requirement of no detectable leakage with a liquid leak detector.

## Cleaning and Packaging

All Swagelok medium-pressure ball valves are cleaned and packaged in accordance with Swagelok *Standard Cleaning and Packaging (SC-10)*, MS-06-62.

## Ordering Information and Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change. Dimensions shown with Swagelok medium-pressure tube fitting nuts finger-tight.

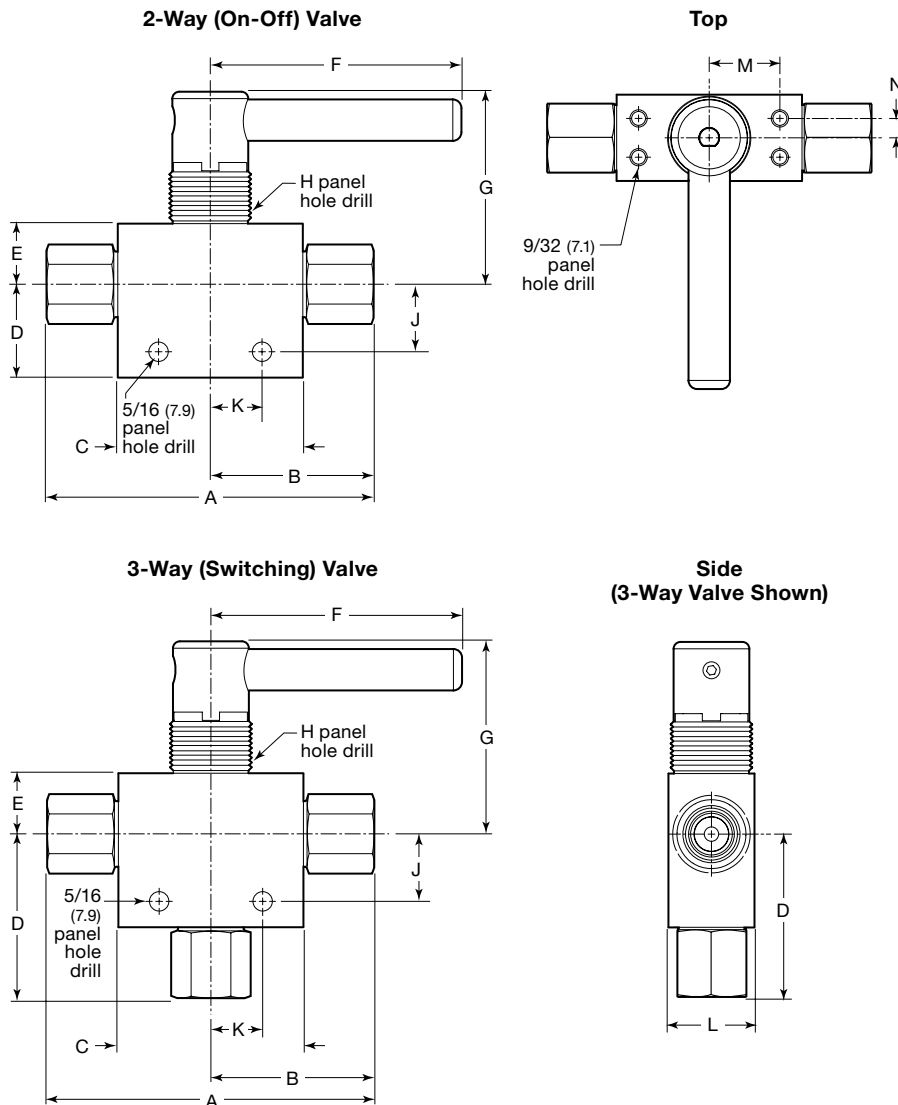
Select an ordering number from the table, next page.

Valve ordering numbers specify fluorocarbon FKM O-rings. To order valves with optional O-ring materials, add **-H** for HNBR (hydrogenated nitrile butadiene rubber) or **-C** for perfluorocarbon FFKM to the valve ordering number.

Example: SS-6FKBFK4-**H**

Valve ordering numbers specify the standard positionable handle. To order valves with locking handles, add **-LH** to the valve ordering number.

Example: SS-6FKBFK4-H-**LH**



## Ordering Information and Dimensions

End Connections		Flow Coefficient (C <sub>v</sub> )	Valve Ordering Number	Dimensions, in. (mm)													
Type	Size			A	B	C	D	E	F	G	H	J	K	L	M	N	
<b>6FKB Series On-Off (2-Way) Valves, 0.209 in. (5.31 mm) Orifice</b>																	
Swagelok medium-pressure tube fitting	1/4 in.	0.5	SS-6FKBFK4	5.03 (128)	2.52 (64.0)	2.68 (68.1)	1.35 (34.3)	0.88 (22.4)	3.65 (92.7)	2.79 (70.9)	1.38 (35.1)	0.98 (24.9)	0.75 (19.0)	1.25 (31.8)	1.02 (26.0)	0.28 (7.1)	
	3/8 in.	1.5	SS-6FKBFK6	5.87 (149)	2.94 (74.7)												
	1/2 in.	1.4	SS-6FKBFK8	5.87 (149)	2.94 (74.7)												
Female NPT	1/4 in.	1.3	SS-6FKBF4	4.22 (107)	2.11 (53.6)	2.68 (68.1)	1.35 (34.3)	0.88 (22.4)	3.65 (92.7)	2.79 (70.9)	1.38 (35.1)	0.98 (24.9)	0.75 (19.0)	1.25 (31.8)	1.02 (26.0)	0.28 (7.1)	
	3/8 in.	1.1	SS-6FKBF6	4.34 (110)	2.17 (55.1)												
	1/2 in.	1.0	SS-6FKBF8	4.78 (121)	2.39 (60.7)												
<b>6FKB Series Switching (3-Way) Valves, 0.209 in. (5.31 mm) Orifice</b>																	
Swagelok medium-pressure tube fitting	1/4 in.	0.44	SS-6FKBFXK4	5.03 (128)	2.52 (64.0)	2.68 (68.1)	1.35 (34.3)	0.88 (22.4)	3.65 (92.7)	2.79 (70.9)	1.38 (35.1)	0.98 (24.9)	0.75 (19.0)	1.25 (31.8)	1.02 (26.0)	0.28 (7.1)	
	3/8 in.	0.98	SS-6FKBFXK6	5.87 (149)	2.94 (74.7)												2.05 (52.1)
	1/2 in.	0.83	SS-6FKBFXK8	5.87 (149)	2.94 (74.7)												2.37 (60.2)
Female NPT	1/4 in.	0.81	SS-6FKBFXF4	4.22 (107)	2.11 (53.6)	2.68 (68.1)	1.35 (34.3)	0.88 (22.4)	3.65 (92.7)	2.79 (70.9)	1.38 (35.1)	0.98 (24.9)	0.75 (19.0)	1.25 (31.8)	1.02 (26.0)	0.28 (7.1)	
	3/8 in.	0.76	SS-6FKBFXF6	4.34 (110)	2.17 (55.1)												2.12 (53.8)
	1/2 in.	0.73	SS-6FKBFXF8	4.78 (121)	2.39 (60.7)												2.18 (55.4)
<b>8FKB Series On-Off (2-Way) Valves, 0.375 in. (9.52 mm) Orifice</b>																	
Swagelok medium-pressure tube fitting	1/2 in.	3.2	SS-8FKBFK8	7.20 (183)	3.60 (91.4)	3.75 (95.2)	1.95 (49.5)	1.18 (30.0)	4.49 (114)	3.10 (78.7)	1.69 (42.9)	1.57 (39.9)	1.00 (25.4)	1.63 (41.4)	1.55 (39.4)	0.38 (9.7)	
Female NPT	1/2 in.	4.5	SS-8FKBF8	5.81 (148)	2.90 (73.7)												
<b>12FKB Series On-Off (2-Way) Valves, 0.560 in. (14.2 mm) Orifice</b>																	
Swagelok medium-pressure tube fitting	3/4 in.	7.3	SS-12FKBFK12	9.25 (235)	4.93 (118)	4.58 (116)	2.30 (58.4)	1.33 (33.8)	4.46 (113)	3.48 (88.4)	1.69 (42.9)	1.85 (47.0)	1.44 (36.6)	2.00 (50.8)	1.55 (39.4)	0.38 (9.7)	
Female NPT	3/4 in.	11.3	SS-12FKBF12	7.38 (187)	3.69 (93.7)												

## ISO 5211-Compliant Pneumatic Actuators

Swagelok ISO 5211-compliant rack and pinion pneumatic actuators are available in spring-return and double-acting modes. On-off (2-way) valves require 90° actuation; switching (3-way) valves require 180° actuation.

Swagelok can provide complete actuated ball valve assemblies—including valves, actuators, sensors, bracket kits, and solenoids—with interfaces that meet ISO 5211, NAMUR, and VDI/VDE 3845.

For technical data, including actuator materials of construction and weight, see the *ISO 5211-Compliant Actuators for Swagelok Ball Valves*, MS-02-337.

**⚠ Caution: Actuated assemblies must be properly aligned and supported. Improper alignment or inadequate support of the actuated assembly may result in leakage or premature valve failure.**

## Pressure-Temperature Ratings

Maximum actuator pressure is 116 psig (8.0 bar). See **Minimum Actuator Pressure** table below for minimum actuator pressures.

Actuator Service	Actuator Service Designator	Temperature Range °F (°C)
Standard	—	-40 to 176 (-40 to 80)
High temperature	HT	5 to 302 (-15 to 150)

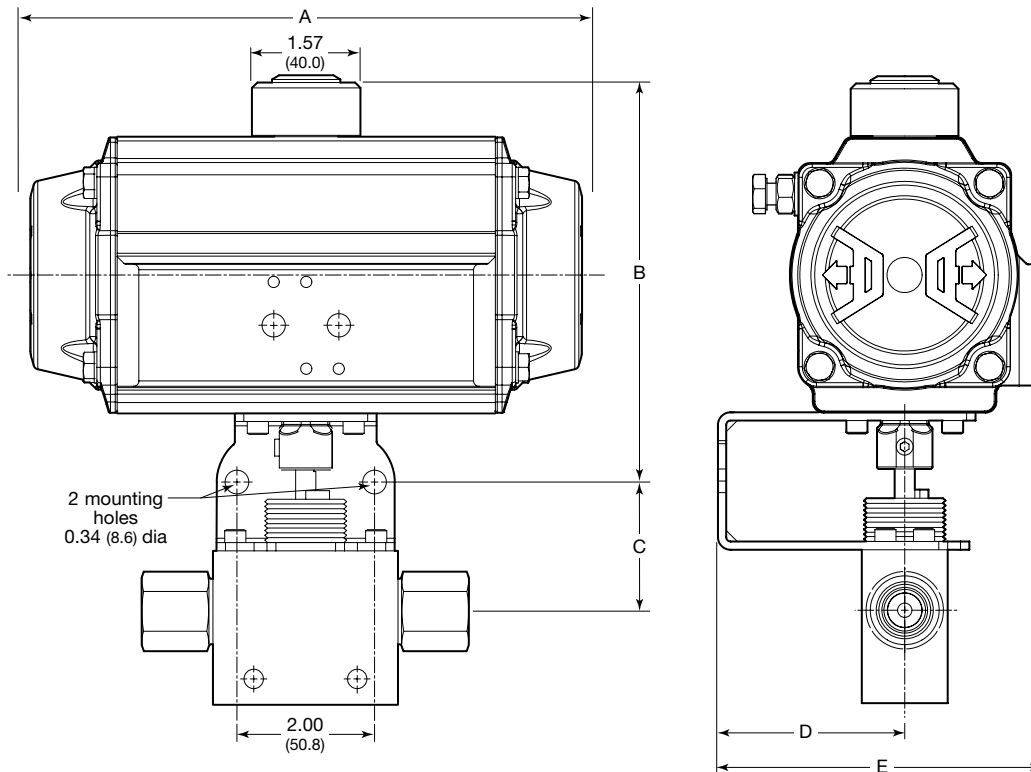
## Minimum Actuator Pressure

Actuator Model	Spring Return Model Designators		Double Acting Model Designator	Actuation Mode	
	Normally Closed	Normally Open		Spring Return	Double Acting
				Minimum Actuator Pressure, psig (bar)	
<b>6FKB Series On-Off (2-Way) Valves</b>					
A30 (90°)	—	—	-A30D	—	43 (3.0)
A60 (90°)	-A60C5	-A60O5	-A60D	72 (5.0)	36 (2.5)
<b>6FKB Series Switching (3-Way) Valves</b>					
A30 (180°)	—	—	-A30XD	—	43 (3.0)
A60 (180°)	—	—	-A60XD	—	36 (2.5)
<b>8FKB Series On-Off (2-Way) Valves</b>					
AF60 (90°)	—	—	-AF60D	—	84 (5.7)
A100 (90°)	-A100C6	-A100O6	-A100D	88 (6.0)	55 (3.8)
<b>12FKB Series On-Off (2-Way) Valves</b>					
A150 (90°)	—	—	-A150D	—	84 (5.7)
A220 (90°)	-A220C5	-A220O5	-A220D	80 (5.5)	51 (3.5)

## ISO 5211-Compliant Pneumatic Actuators

### Dimensions

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



Actuator Model	Dimensions, in. (mm)				
	A	B	C	D	E
<b>6FKB Series On-Off (2-Way) Valves</b>					
A30 (90°)	6.04 (153)	5.24 (133)	1.88 (47.8)	2.72 (69.1)	4.63 (118)
A60 (90°)	8.01 (203)	5.91 (150)	1.88 (47.8)	2.72 (69.1)	4.71 (120)
<b>6FKB Series Switching (3-Way) Valves</b>					
A30 (180°)	8.50 (216)	5.24 (133)	1.88 (47.8)	2.72 (69.1)	4.63 (118)
A60 (180°)	11.4 (290)	5.91 (150)	1.88 (47.8)	2.72 (69.1)	4.71 (120)
<b>8FKB Series On-Off (2-Way) Valves</b>					
AF60 (90°)	8.01 (203)	6.06 (154)	2.16 (54.9)	2.87 (72.9)	4.86 (123)
A100 (90°)	9.41 (239)	6.57 (167)	2.16 (54.9)	2.87 (72.9)	5.09 (129)
<b>12FKB Series On-Off (2-Way) Valves</b>					
A150 (90°)	10.2 (259)	7.04 (179)	2.31 (58.7)	2.87 (72.9)	5.35 (136)
A220 (90°)	12.0 (305)	8.15 (207)	2.31 (58.7)	2.87 (72.9)	5.71 (145)

## ISO 5211-Compliant Pneumatic Actuators

### Ordering Information

#### Factory-Assembled Valves with Actuators

#### Typical Ordering Number

A
B
C  
**SS-6FKBFBK8 -A60C5 HT**

#### **A** Valve Ordering Number

#### **B** Actuator Model

Based on actuation mode and flow pattern, select actuator designator. See **Minimum Actuator Pressure** table, page 5.

#### **C** Actuator Service

**HT** = High temperature  
**None** = Standard

#### Kits for Field Assembly

Order one actuator kit and one mounting bracket kit for each valve.

#### Actuator Kit Typical Ordering Number

A
B
C  
**MS - A60-DA - DIN -HT**

#### **A** Actuator Model

Based on actuation mode and flow pattern, select actuator designator. See **Minimum Actuator Pressure** table, page 5, and **Actuator Model Designators** table below.

#### **B** Coupling Drive Type

DIN

#### **C** Actuator Service

**-HT** = High temperature  
**None** = Standard

#### Actuator Model Designators

Actuator Model	Spring Return Model Designator	Double Acting Model Designator
<b>6FKB Series On-Off (2-Way) Valves</b>		
A30 (90°)	—	A30-DA
A60 (90°)	A60S5	A60-DA
<b>6FKB Series Switching (3-Way) Valves</b>		
A30 (180°)	—	A30-XDA
A60 (180°)	—	A60-XDA
<b>8FKB Series On-Off (2-Way) Valves</b>		
AF60 (90°)	—	AF60-DA
A100 (90°)	A100S6	A100-DA
<b>12FKB Series On-Off (2-Way) Valves</b>		
A150 (90°)	—	A150-DA
A220 (90°)	A220S5	A220-DA

#### Mounting Bracket Kits

Swagelok ISO 5211 mounting bracket kits contain:

- 316 stainless steel mounting bracket
- Eight 316 stainless steel socket head cap screws
- Powdered metal 300 series stainless steel coupling
- 316 stainless steel set screw
- Instructions.

Valve Series	Kit Ordering Number
6FKB	SS-MB-6FKB-F05-14DIN-M
8FKB	SS-MB-8FKB-F07-17DIN-M
12FKB	SS-MB-12FKB-F07-17DIN-M

## Options

### Handle Colors

Stainless steel bar handles with blue electrostatic powder coating are standard. Other colors are available.

To order, add a handle color designator to the valve ordering number.

Example:

SS-6FKBFBK4-BK

Handle Color	Designator
Black	-BK
Green	-GR
Orange	-OR
Red	-RD
Yellow	-YW

## Options for Pneumatic Actuators

### For Field Assembly or Factory Assembly

#### ■ Solenoid Valves

attach to the actuator to create an electropneumatically actuated ball valve assembly.

#### ■ Position Indicators

provide visual status of a valve.

#### ■ Limit Switches

indicate actuator position by means of an electrical signal. They meet a variety of NEMA ratings such as NEMA 4 (weatherproof) and NEMA 7 (explosion proof).

All electrical components listed above meet North American NEMA and European CE/CENELEC requirements. Contact your authorized Swagelok representative for ordering information.

## Accessories

### Locking Handle Kits

Locking handle kits are available. Each kit contains a 316 stainless steel locking bracket, bracket screws, locking stop disk, and instructions.

### Panel Nut Kits

Panel nut kits are available for manual valves. Panel thickness minimum is 0.12 in. (3.0 mm); maximum is 0.50 in. (12.7 mm). Each kit contains a 316 stainless steel panel nut and instructions.

### Cap Screw Kits

Cap screw kits are available for panel mounting manual valve body shoulders to a panel 0.125 in. (3.2 mm) thick. Each kit contains four 1/4-20, 3/8 in. (9.7 mm) long 316 stainless steel cap screws and instructions.

Valve Series	Valve Flow Path	Ordering Numbers			
		Locking Handle Kits	Panel Nut Kits	Cap Screw Kits	Stop Disk Kits
6FKB	2-way	SS-5DK-6FKB-LH	SS-7K-6FKB	SS-6SCK-0882	SS-5DK-6FKB
	3-way	SS-5DK-6FKBX-LH			SS-5DK-6FKBX
8FKB	2-way	SS-5DK-8FKB-LH	SS-7K-8FKB	SS-6SCK-0882	SS-5DK-8FKB
12FKB	2-way	SS-5DK-12FKB-LH	SS-7K-8FKB	SS-6SCK-0882	SS-5DK-12FKB

### Stop Disk Kits

Replacement stop disk kits are available. Each kit contains a replacement stop disk and instructions.

## Related Products

### Fittings

See the Swagelok *Medium-Pressure Gaugeable Tube Fittings and Adapter Fittings* catalog, MS-02-335, for more information.



### Tubing

See the Swagelok *Medium-Pressure Tubing—Heavy-Wall Annealed and Cold-Drawn 1/8-Hard* catalog, MS-02-334, for more information



#### 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.