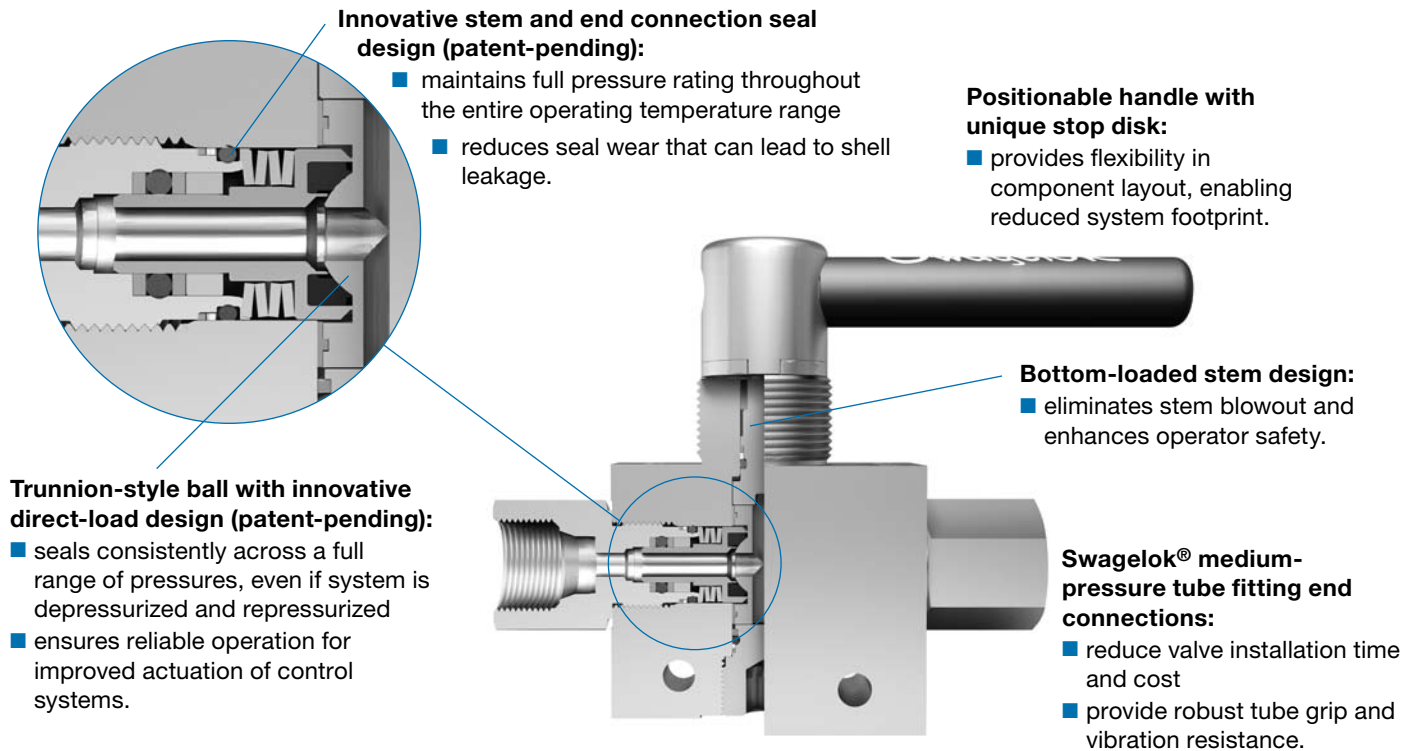


# Medium-Pressure Ball Valves

## 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

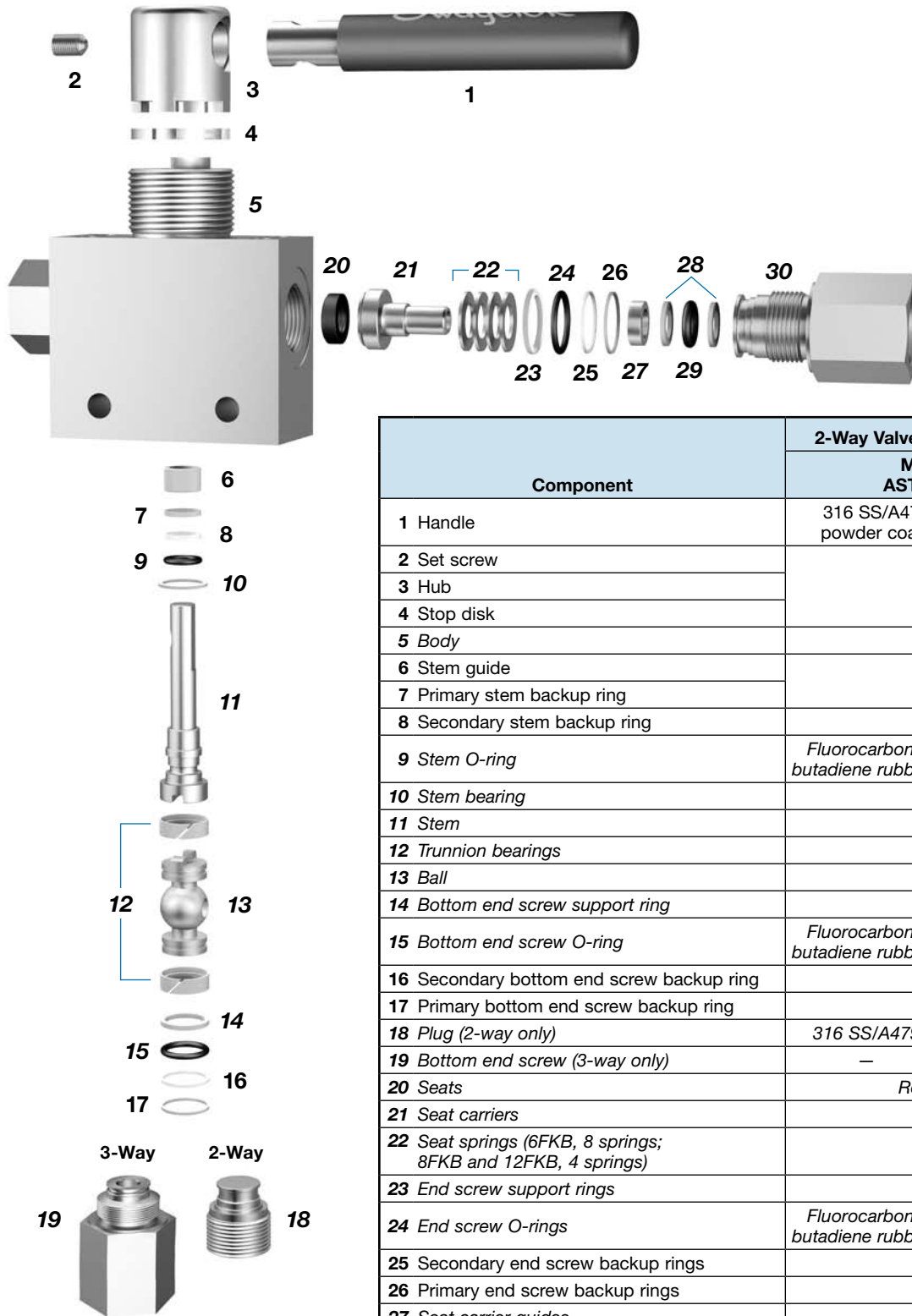
- ⚠ Swagelok ball valves are designed to be used in a fully open or fully closed position.
- ⚠ Valves that have not been cycled for a period of time may have a higher initial actuation torque.

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

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.

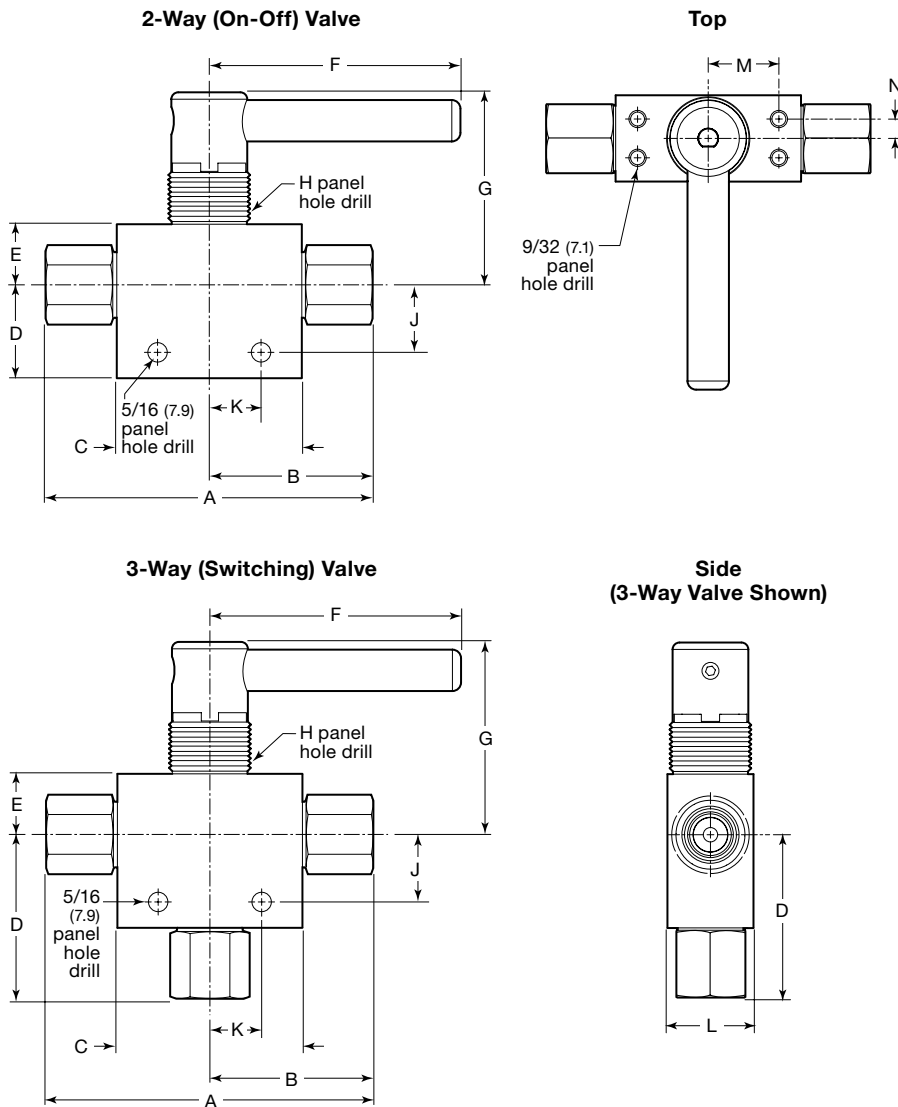
Select an ordering number from the table, next page.

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	4.08 (104)	2.04 (51.8)	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	4.74 (120)	2.37 (60.2)												
	1/2 in.	1.4	SS-6FKBFK8	4.74 (120)	2.37 (60.2)												
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-6FKBXFK4	4.08 (104)	2.04 (51.8)	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-6FKBXFK6	4.74 (120)	2.37 (60.2)												
	1/2 in.	0.83	SS-6FKBXFK8	4.74 (120)	2.37 (60.2)												
Female NPT	1/4 in.	0.81	SS-6FKBXF4	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-6FKBXF6	4.34 (110)	2.17 (55.1)												
	1/2 in.	0.73	SS-6FKBXF8	4.78 (121)	2.39 (60.7)												
<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	5.81 (148)	2.90 (73.7)	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														
<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	7.38 (187)	3.69 (93.7)	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														

## 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	—	-4 to 176 (-20 to 80)
High temperature	HT	5 to 302 (-15 to 150)
Low temperature	LT	-40 to 176 (-40 to 80)

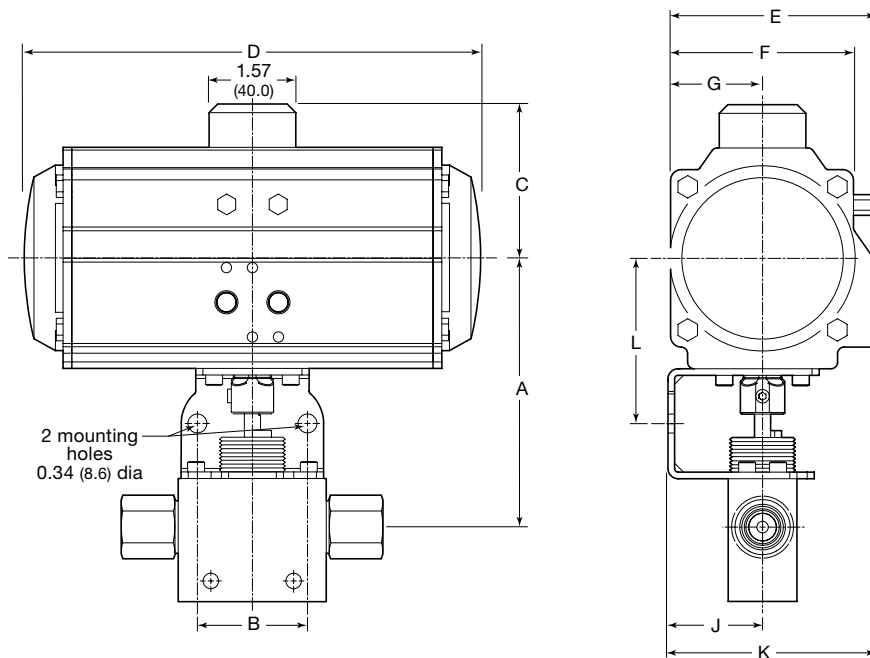
### Minimum Actuator Pressure

Actuator Model	Spring Return Model Designators		Double Acting Model Designator	Actuation Mode	
				Spring Return	Double Acting
	Normally Closed	Normally Open		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)

## 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	F	G	J	K	L
<b>6FKB Series On-Off (2-Way) Valves</b>										
A30 (90°)	4.55 (116)	2.00 (50.8)	2.46 (62.5)	6.22 (158)	3.27 (83.0)	2.83 (72.0)	1.42 (36.0)	1.72 (43.7)	3.57 (90.7)	2.67 (67.8)
A60 (90°)	4.89 (124)		2.80 (71.1)	8.27 (210)	3.72 (94.5)	3.33 (84.5)	1.67 (42.5)		5.93 (151)	3.70 (94.0)
<b>6FKB Series Switching (3-Way) Valves</b>										
A30 (180°)	4.55 (116)	2.00 (50.8)	2.46 (62.5)	8.70 (221)	3.27 (83.0)	2.83 (72.0)	1.42 (36.0)	1.72 (43.7)	3.57 (90.7)	2.67 (67.8)
A60 (180°)	4.89 (124)		2.80 (71.1)	11.7 (298)	3.72 (94.5)	3.33 (84.5)	1.67 (42.5)		3.77 (95.8)	3.00 (76.2)
<b>8FKB Series On-Off (2-Way) Valves</b>										
AF60 (90°)	5.31 (135)	2.00 (50.8)	2.80 (71.1)	8.27 (210)	3.72 (94.5)	3.33 (84.6)	1.67 (42.5)	1.87 (47.5)	3.92 (99.6)	3.16 (80.3)
A100 (90°)	5.57 (141)		3.05 (77.5)	9.76 (248)	4.17 (106)	3.84 (97.5)	1.95 (49.5)		4.11 (104)	3.41 (86.6)

## ISO 5211-Compliant Pneumatic Actuators

### Ordering Information

#### Factory-Assembled Valves with Actuators

#### Typical Ordering Number

A
B
C  
**SS-6FKBFK8 -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  
**LT** = Low 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  
**-LT** = Low 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

### 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

## 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 locking bracket, bracket screw, lock 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 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 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.