

Multipurpose Ball Valves



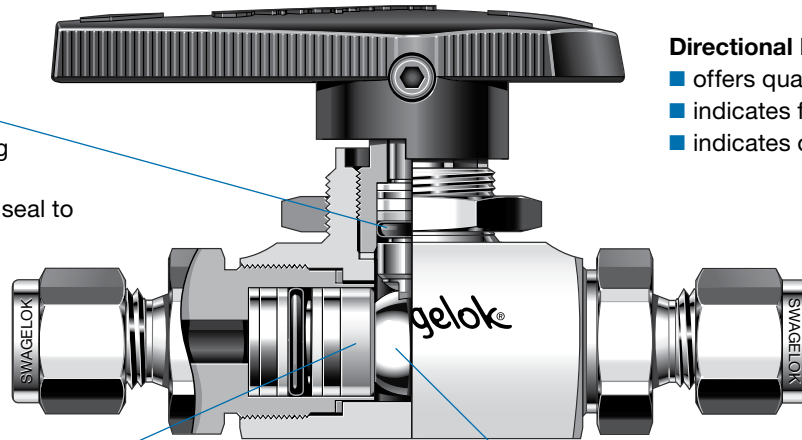
SK Series

- Working pressures up to 6000 psig (413 bar)
- Temperatures from -40 to 302°F (-40 to 150°C)
- High-flow capacity in a compact design
- 1/4 to 3/8 in. and 6 to 8 mm end connections
- 316 stainless steel construction

Features

O-ring stem seal

- requires no packing adjustment
- provides leak-tight seal to atmosphere



Directional handle

- offers quarter-turn operation
- indicates flow direction
- indicates open/closed position

Spring-loaded PEEK seats

- provide chemical compatibility
- provide leak-tight integrity in both low- and high-pressure systems

Stainless steel floating ball

reduces wear and extends cycle life

Swagelok® SK series ball valves offer low-torque, quarter-turn operation in a compact design providing positive shutoff in applications up to 6000 psig (413 bar). Other features include:

- Flow coefficients (C_v) of 0.9 to 1.4
- Swagelok gaugeable tube fitting, NPT and ISO pipe, and Swagelok male VCO® end connections
- Standard panel mounting
- Bidirectional flow
- Field rebuildable with seal kit

Testing

Every Swagelok SK series valve is factory tested in both flow directions with nitrogen at 1000 psig (69 bar). Seats have a maximum allowable leak rate of 0.1 std cm³/min. Shell testing is performed to a requirement of no detectable leakage with a liquid leak detector.

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

Low-temperature SK series valves are available. See page 4.

Temperature °F (°C)	Working Pressure psig (bar)
0 (-17) to 250 (121)	6000 (413)
302 (150)	3000 (206)

For more information about pressure ratings of valves with tube fitting end connections, see Swagelok *Tubing Data*, MS-01-107. Pressure ratings of valves with VCO fitting end connections are based on the ratings of the mating fitting; see the Swagelok *VCO O-Ring Face Seal Fittings* catalog, MS-01-28.

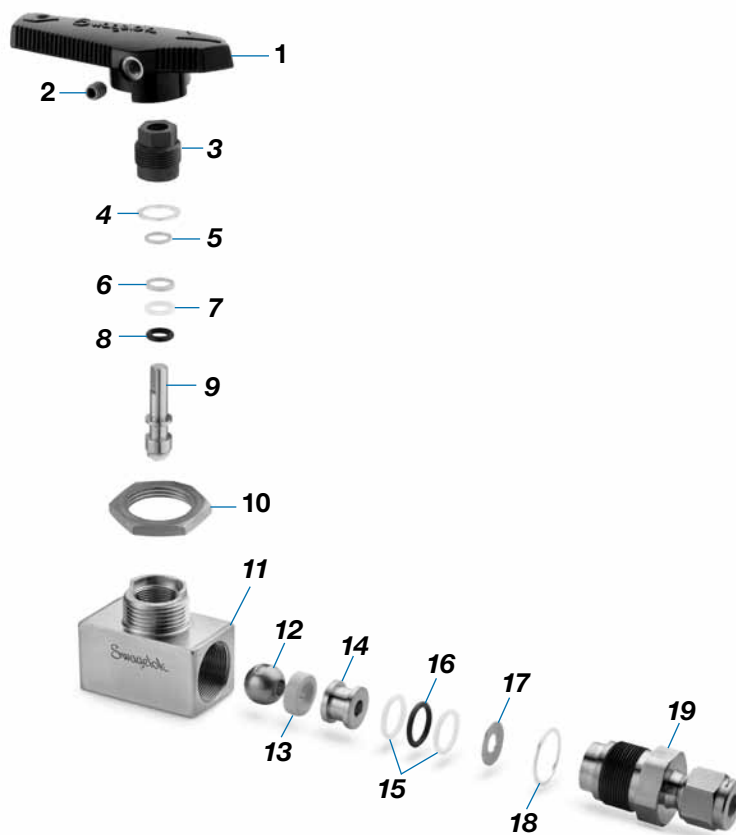
Cleaning and Packaging

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

Special cleaning and packaging 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, is available as an option. See **Process Options**, page 8.

Materials of Construction

Component	Material Grade/ ASTM Specification
1 Handle	Nylon with powdered metal 300 series SS insert
2 Set screw	S17400 SS / A564
3 Packing bolt	316 SS / A479
4 Packing bolt gasket	Silver-plated 316 SS / A240
5 Stem thrust washer	PEEK
6 Chamfered backup ring	PEEK
7 Stem backup ring	PTFE / D1710
8 Stem O-ring	Low-temperature fluorocarbon FKM
9 Stem	316 SS / A479
10 Panel nut	Powdered metal 300 series SS / B783
11 Body	316 SS / A479
12 Ball	316 SS / A276
13 Seats (2)	PEEK
14 Seat glands (2)	316 SS / A479
15 Seat backup rings (4)	PTFE / D1710
16 Seat O-rings (2)	Low-temperature fluorocarbon FKM
17 Seat springs (2)	316 SS / A240
18 End screw gaskets (2)	Silver-plated 316 SS / A240
19 End screws (2)	316 SS / A479
Wetted lubricant	PTFE-based
Nonwetted lubricant	Molybdenum disulfide with hydrocarbon binder coating



Wetted components listed in *italics*.

Ordering Information and Dimensions

Select an ordering number.

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

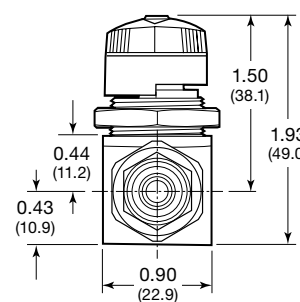
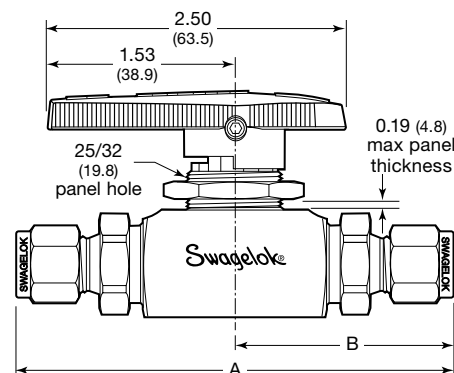
End Connections ^①		Ordering Number	C _v	Dimensions, in. (mm)		
Type	Size			Orifice	A	B
Swagelok tube fitting	1/4 in.	SS-4SKPS4	1.3	0.188 (4.8)	3.60 (91.4)	1.80 (45.7)
	3/8 in.	SS-4SKPS6	1.4		3.73 (94.7)	1.86 (47.2)
	6 mm	SS-4SKPS6MM	1.3		3.60 (91.4)	1.80 (45.7)
	8 mm	SS-4SKPS8MM	1.3		3.68 (93.5)	1.84 (46.7)
Female NPT	1/4 in.	SS-4SKPF4	1.2		2.91 (73.9)	1.46 (37.1)
Female ISO ^②	1/4 in.	SS-4SKPF4RT	1.2		2.91 (73.9)	1.46 (37.1)
Male NPT	1/4 in.	SS-4SKPM4	1.1		3.23 (82.0)	1.62 (41.1)
Male VCO fitting ^③	1/4 in.	SS-4SKPVCO4	0.9		3.15 (80.0)	1.58 (40.1)

Dimensions shown with Swagelok tube fitting nuts finger-tight.

① SK series valves can be ordered with two different end connections. Contact your authorized Swagelok representative for ordering information.

② See specifications ISO 7/1, BS EN 10226-1, DIN-2999, and JIS B0203.

③ VCO fittings on standard valves include low-temperature fluorocarbon FKM O-rings.



Handle Options

Factory-Assembled Handles

Nylon Directional

Black is standard. For other colors, add a handle color designator to the valve ordering number.

Example: SS-4SKPS4-**BL**

Handle Color	Designator
Blue	-BL
Green	-GR
Orange	-OG
Red	-RD
Yellow	-YW

Nylon Oval

Add **-K** to the valve ordering number.

Example: SS-4SKPS4-**K**

Stainless Steel Directional

- Ideal for continuous elevated ambient temperatures

Add **-SHD** to the valve ordering number.

Example: SS-4SKPS4-**SHD**

No Handle

Add **-NH** to the valve ordering number.

Example: SS-4SKPS4-**NH**



Handle Kits for Field Assembly

Kits include handle and set screw.

Nylon Directional ^①	Nylon Oval	Stainless Steel Directional
NY-5K-43G-BK	NY-5K-43GK-BK	SS-5K-43GPM

① Ordering number specifies a black handle. For a handle of another color, replace **-BK** with a handle color designator from the table at left.
Example: NY-5K-43G-**BL**

Locking Bracket

- Designed to lock valve in the open and closed position
- Fits padlocks with 3/16 to 9/32 in. (4.8 to 7.1 mm) shackle diameters
- For nylon and stainless steel directional handles only—not panel mountable
- To order the locking bracket factory-assembled on a valve, add **-LH** to the valve ordering number.
Example: SS-4SKPS4-**LH**
- To order the locking bracket for field assembly, use kit ordering number: **SS-51K-4SK-LH**



Material and Service Options

Valves With ECE R110-Type Approval

SK series valves are available with ECE R110-type approval for use in alternative fuel service. Valves with this approval have ultralow-temperature fluorocarbon/D2000 stem and seat O-rings.

- ECE R110 Manual Service Valve Type Approval
Classification: Class 0
Pressure: 3770 psig (260 bar)
Temperature: -40 to 248°F (-40 to 120°C)

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

Example: SS-4SKPS4-**DE**

Low-Temperature Service

SK series valves are available for low-temperature service, with a temperature rating of -40 to 200°F (-40 to 93°C) at listed pressures. Low-temperature valves have Buna C O-rings. All other materials and ratings are the same as those of standard valves.

To order, insert **L** into the valve ordering number.

Example: SS-**L**4SKPS4

Sour Gas Service

SK series valves for sour gas service are available. Materials are selected in accordance with NACE MR0175/ISO 15156. See the NACE specification for information on stainless steel tube fitting requirements.

To order, replace **SS** with **MX** and add **-SG** to the valve ordering number.

Example: **MX**-4SKPF4-**SG**

PTFE-Coated Stainless Steel Ball

SK series valves are available with a PTFE-coated stainless steel ball to promote service life in applications subject to lubricant washout.

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

Example: SS-4SKPS4-**TC**

Ethylene Propylene O-Rings

SK series valves are available with ethylene propylene O-rings, with ratings shown at right.

Temperature °F (°C)	Working Pressure psig (bar)
-20 (-28) to 150 (65) 250 (121)	6000 (413) 1700 (117)

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

Example: SS-4SKPS4-**E**

Component	Material
<i>End screw, packing bolt, stem, and ball</i>	<i>Alloy 400/B164</i>
<i>Stem O-ring and seat O-ring</i>	<i>Ethylene propylene</i>
<i>Seat springs</i>	<i>Alloy 718/AMS 5596</i>

Wetted components listed in *italics*.

Pneumatic Actuators



Swagelok rack and pinion pneumatic actuators are compact, lightweight, easily mountable, and can be operated with standard shop air.

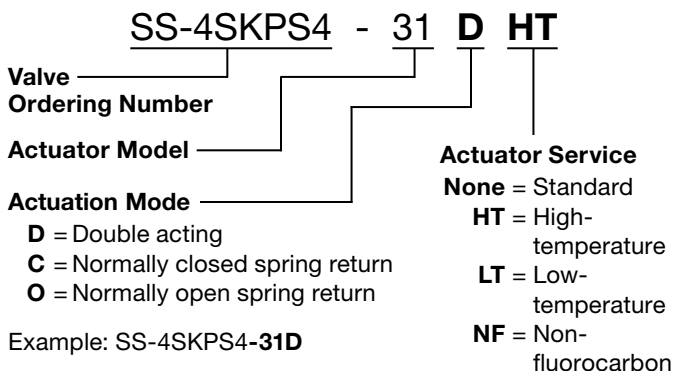
For technical data, including pressure-temperature ratings and materials of construction, see the *Swagelok Rack and Pinion Pneumatic Actuators for Swagelok Ball Valves* catalog, MS-06-87.

⚠ 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.

Ordering Information

Factory-Assembly

Typical Ordering Number



For dual-mounted assemblies (two valves mounted to one actuator), insert **DM** into the ordering number. Example: SS-4SKPS4-31DDMHT

Actuator Service Ratings

Actuator Service	Actuator Service Designator	Temperature Range °F (°C)	Maximum Actuator Pressure psig (bar)	
			At 100°F (37°C)	At Maximum Temperature
Standard	—	-20 to 200 (-28 to 93)	200 (13.7)	165 (11.3)
High-temperature	HT	0 to 400 (-17 to 204)		100 (6.8)
Low-temperature	LT	-40 to 200 (-40 to 93)		165 (11.3)
Nonfluorocarbon	NF	-20 to 200 (-28 to 93)		165 (11.3)

Actuator Pressure at Maximum System Pressure

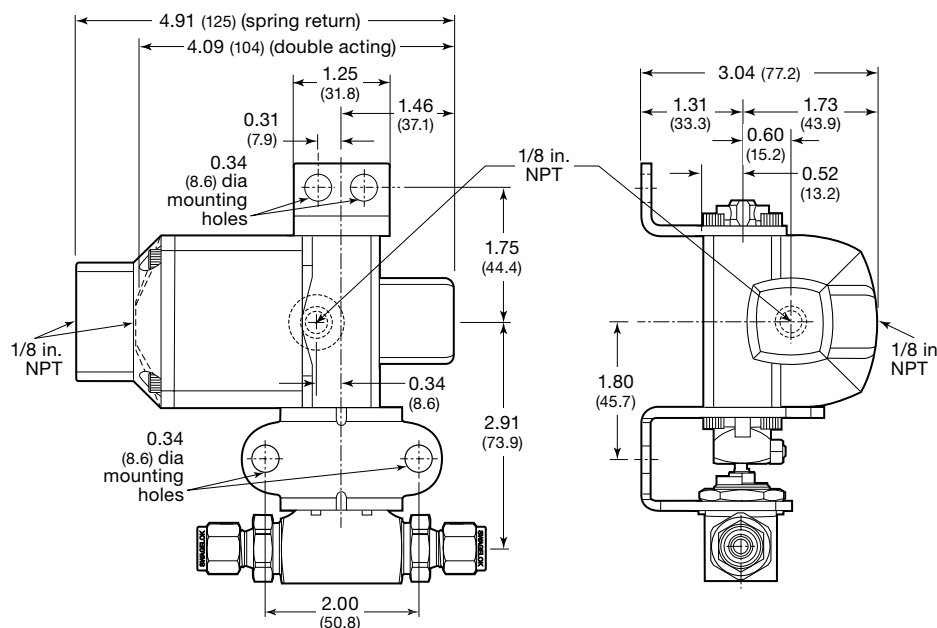
Based on valve performance using pressurized air or nitrogen.

Actuation Mode	Minimum Actuator Pressure psig (bar)	
	Single	Dual ^①
Double acting	45 (3.2)	80 (5.6)
Normally closed, normally open	70 (4.9)	—

① Two valves mounted to one actuator.

Dimensions

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



Field Assembly

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

Actuator Mode	Actuator Service	Kit Ordering Numbers	
		Actuator	Mounting Bracket
Spring return	Standard	MS-131-SR	SS-MB-4SK
	High-temperature	MS-131-SR-HT	
	Low-temperature	MS-131-SR-LT	
	Nonfluorocarbon	MS-131-SR-NF	
Double acting	Standard	MS-131-DA	
	High-temperature	MS-131-DA-HT	
	Low-temperature	MS-131-DA-LT	
	Nonfluorocarbon	MS-131-DA-NF	

ISO 5211-Compliant Pneumatic Actuators



Actuator Service Ratings

Actuator Service	Temperature Range °F (°C)	Maximum Actuator Pressure psig (bar)
Standard	-40 to 176 (-40 to 80)	116 (7.9)
High-temperature	5 to 302 (-15 to 150)	

Minimum Actuator Pressure

Actuator Model	Actuation Modes	
	Double Acting	Spring Return
	Minimum Actuator Pressure, psig (bar)	
A10	36 (2.5)	—
A15	20 (1.4)	36 (2.5)

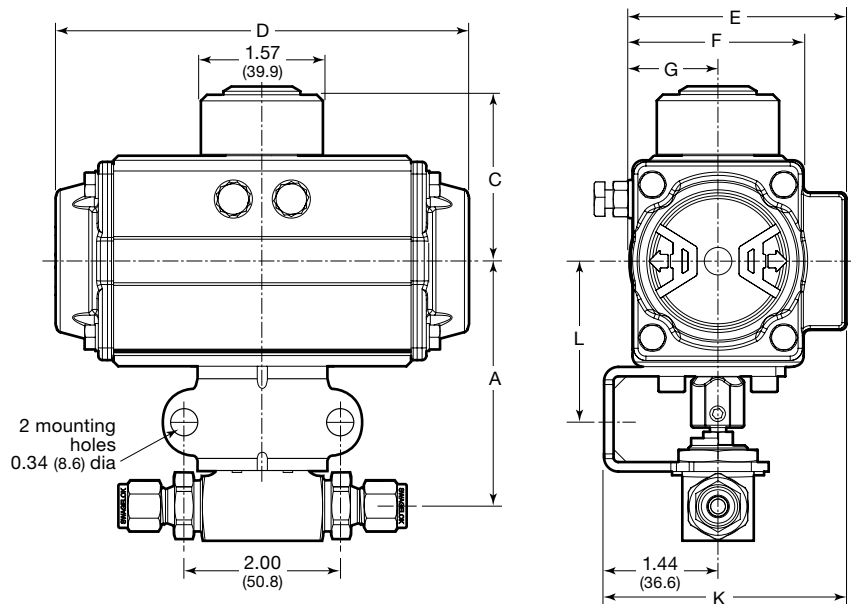
Swagelok ISO 5211-compliant rack and pinion pneumatic actuators are available in spring-return and double-acting modes.

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.

⚠ 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.

Dimensions

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

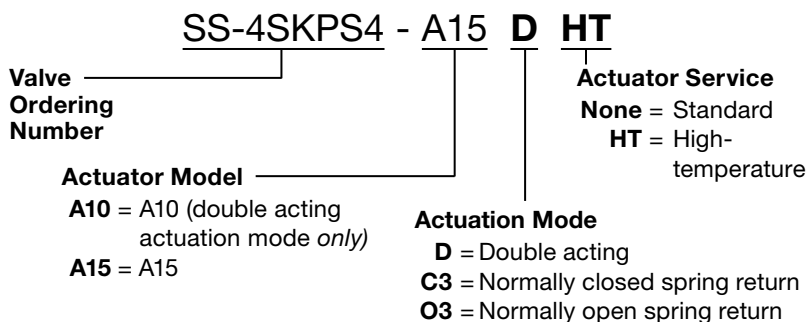


Actuator Model	Dimensions, in. (mm)							
	A	C	D	E	F	G	K	L
A10	3.06 (77.7)	2.09 (53.1)	4.65 (118)	2.44 (62.0)	2.09 (53.1)	1.04 (26.4)	2.84 (72.1)	1.96 (49.8)
A15	3.12 (79.2)	2.15 (54.6)	5.33 (135)	2.80 (71.1)	2.24 (56.9)	1.14 (29.0)	3.09 (78.5)	2.02 (51.3)

Ordering Information

Factory Assembly

Typical Ordering Number



Field Assembly

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

Mounting bracket kit ordering number:
SS-MB-4SK-F04-11DIN-M

Actuator Mode	Actuator Service	Actuator Kit Ordering Number
Spring return	Standard	MS-A15-3-DIN
	High-temperature	MS-A15-3-DIN-HT
Double acting	Standard	MS-A10-DA-DIN
		MS-A15-DA-DIN
	High-temperature	MS-A10-DA-DIN-HT
		MS-A15-DA-DIN-HT

ISO 5211-Compliant Actuator Mounting Bracket Kits

Mounting Bracket Kits

Swagelok ISO 5211 mounting bracket kits contain:

- 316 stainless steel mounting bracket
- Four A4 stainless steel, socket head cap screws (A4 is similar to 316 SS)
- Powdered metal 300 series stainless steel coupling
- A4 stainless steel set screw
- Instructions

Ordering Information

1. Choose an actuator based on the valve start and end torque. See the actuator manufacturer's literature to specify ISO 5211 mounting dimensions, including flange and coupling sizes.
2. Select a mounting bracket kit ordering number.

Mounting Bracket Kit Ordering Numbers

ISO 5211 Flange Size	Coupling Size	Cap Screw Type	Bracket Kit Ordering Number
F04	11 mm ISO 11 mm ISO 11 mm DIN 11 mm DIN	Metric Fractional Metric Fractional	SS-MB-4SK-F04-11ISO-M SS-MB-4SK-F04-11ISO-F SS-MB-4SK-F04-11DIN-M SS-MB-4SK-F04-11DIN-F

Calculating Operating Torque

1. Determine the base start and base end torque at system pressure from Table 1, below.
2. Determine the temperature factor from Table 2, below.
3. Calculate the start and end operating torque:
Base torque × temperature factor

Example: SK series valve is operated with nitrogen at 3000 psig and 70°F (20°C).

1. According to Table 1, the base start torque is 21 in.·lb and the base end torque is 10 in.·lb.
2. According to Table 2, the temperature factor is 1.0.
3. Start torque = 21 in.·lb × 1.0 = 21 in.·lb
End torque = 10 in.·lb × 1.0 = 10 in.·lb.

Table 1—Base Start and End Torque

Use linear interpolation to obtain torque values for system pressures not listed.

System Pressure, psig (bar)					
0 (0)		3000 (206)		6000 (413)	
Base Torque, in.·lb (N·m)					
Start	End	Start	End	Start	End
14 (1.6)	10 (1.1)	21 (2.4)	10 (1.1)	26 (2.9)	10 (1.1)

Table 2—Temperature Factors

Use linear interpolation to obtain factors for system temperatures not listed.

Temperature, °F (°C)				
-40 (-40)	0 (-17)	70 (20)	250 (121)	302 (150)
2.0	2.0	1.0	1.0	1.0

Options for ISO 5211-Compliant and Swagelok Pneumatic Actuators

For Field Assembly or Factory Assembly

Solenoid Valves

attach to the actuator to create an electropneumatically actuated ball valve assembly. For more information on

- ISO 5211-compliant actuators, contact your authorized Swagelok representative.
- Swagelok actuators, see the Swagelok *Solenoid Valves for Electropneumatically Actuated Ball Valves* catalog, MS-02-41.

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). For more information on

- ISO 5211-compliant actuators, contact your authorized Swagelok representative.
- Swagelok actuators, see the Swagelok *Limit Switches* catalog, MS-06-39.

Process Options

Hydrostatic Testing

SK series valves are available with optional hydrostatic shell testing. Valves are hydrostatically tested with deionized water at 1.5 times the rated pressure of the valve. No visible leakage is permitted.

To order, add **-W20** to the valve ordering number.

Example: SS-4SKPS4-**W20**

Special Cleaning and Packaging (SC-11)

SK series valves are available with optional cleaning and packaging 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, add **-SC11** to the valve ordering number.

Example: SS-4SKPS4-**SC11**

Oxygen Service Hazards

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

Maintenance Kits

Seat Seal Kits

The seat seal kit contains two seats, low-temperature fluorocarbon FKM seat O-rings, seat backup rings, seat springs, end screw gaskets, gland assembly tool, lubricant with Material Safety Data Sheet (MSDS), and instructions.

Kit ordering number: **SS-9K-4SK**

Stem and Seal Kits

The stem and seal kit contains a packing bolt gasket, stem thrust washer, chamfered backup ring, stem backup ring, low-temperature fluorocarbon FKM stem O-ring, two seats, low-temperature fluorocarbon FKM seat O-rings, seat backup rings, seat springs, end screw gaskets, gland assembly tool, lubricant with Material Safety Data Sheet (MSDS), and instructions.

Kit ordering number: **SS-91K-4SK**

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 or contact your authorized Swagelok representative.