

Trunnion Ball Valves

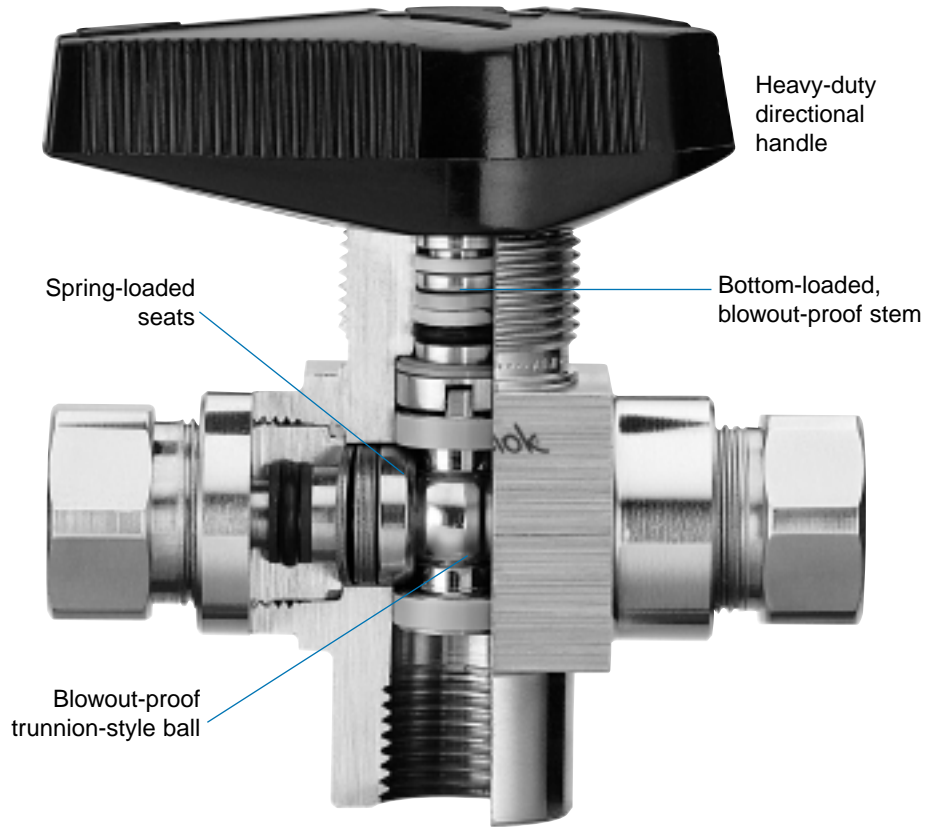


83 Series and H83 Series

- Working pressures up to 10 000 psig (689 bar)
- 1/8 to 1/2 in. and 6 to 12 mm Swagelok tube fitting or NPT end connections
- 316 stainless steel materials

Features

- Compact, maximum flow design
- Low operating torque
- 2- or 3-way flow patterns
- Panel mounting
- Pneumatic and electric actuators available



Technical Data

Seat Material	Temperature Rating °F (°C)	Pressure Rating at 100°F (37°C) psig (bar)		Flow Coefficient (C _v)
		Stainless Steel	Alloy 400	
83 Series				
PCTFE, reinforced nylon	0 to 250 (-17 to 121)	6000 (413)	5000 (344)	2-way valves— 1.0 to 1.6 depending on end connection; 3-way valves— 0.75
PEEK	0 to 450 (-17 to 232)			
PTFE		1500 (103)		
H83 Series				
PEEK	0 to 450 (-17 to 232)	6000 to 10 000 (413 to 689) depending on end connection	—	2-way valves— 1.0 to 1.6 depending on end connection; 3-way valves— 0.75

Important Information About Ball Valves

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

Testing

Every Swagelok trunnion ball valve is factory tested 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.

Cleaning and Packaging

All Swagelok trunnion ball valves are cleaned and packaged in accordance with *Swagelok Standard Cleaning and Packaging (SC-10)*. Cleaning and packaging in accordance with *Special Cleaning and Packaging (SC-11)* to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C are available as an option for 83 series valves with PCTFE, PTFE, or reinforced nylon seats.

Pressure-Temperature Ratings

83 Series

Pressure-temperature ratings for 83 series valves are based on listed seat materials, fluorocarbon FKM O-rings, and reinforced PTFE backup rings.

Low-temperature L83 series ball valves are available. See page 8.

Material	316 SS			Alloy 400		
	Seat Material	PCTFE, Nylon	PTFE	PEEK	PCTFE, Nylon	PTFE
Temperature, °F (°C)	Working Pressure, psig (bar)					
0 (-17) to 100 (37)	6000 (413)	1500 (103)	6000 (413)	5000 (344)	1500 (103)	5000 (344)
150 (65)	3000 (206)	1125 (77.5)	5800 (399)	3000 (206)	1125 (77.5)	4690 (323)
200 (93)	2000 (137)	750 (51.6)	5000 (344)	2000 (137)	750 (51.6)	4390 (302)
250 (121)	1000 (68.9)	625 (43.0)	4100 (282)	1000 (68.9)	625 (43.0)	4100 (282)
300 (148)	—	500 (34.4)	3200 (220)	—	500 (34.4)	3200 (220)
350 (176)	—	375 (25.8)	2300 (158)	—	375 (25.8)	2300 (158)
400 (204)	—	250 (17.2)	1400 (96.4)	—	250 (17.2)	1400 (96.4)
450 (232)	—	125 (8.6)	500 (34.4)	—	125 (8.6)	500 (34.4)

H83 Series

Pressure-temperature ratings for H83 series valves are based on PEEK seats, fluorocarbon FKM O-rings, and reinforced PTFE backup rings.

Low-temperature LH83 series ball valves are available. See page 8.

Material	316 SS					
	End Connections	F2, F4, S6MM, S4	S8MM	S12MM	S6	S8
Temperature, °F (°C)	Working Pressure, psig (bar)					
0 (-17) to 100 (37)	10 000 (689)	7500 (516)	6600 (454)	6500 (447)	6700 (461)	6000 (413)
150 (65)	7 500 (516)	7500 (516)	6600 (454)	6500 (447)	6700 (461)	5900 (406)
200 (93)	5 000 (344)	5000 (344)	5000 (344)	5000 (344)	5000 (344)	5000 (344)
250 (121)	4 100 (282)	4100 (282)	4100 (282)	4100 (282)	4100 (282)	4100 (282)
300 (148)	3 200 (220)	3200 (220)	3200 (220)	3200 (220)	3200 (220)	3200 (220)
350 (176)	2 300 (158)	2300 (158)	2300 (158)	2300 (158)	2300 (158)	2300 (158)
400 (204)	1 400 (96.4)	1400 (96.4)	1400 (96.4)	1400 (96.4)	1400 (96.4)	1400 (96.4)
450 (232)	500 (34.4)	500 (34.4)	500 (34.4)	500 (34.4)	500 (34.4)	500 (34.4)

Flow Data at 70°F (20°C)

83 Series 2-Way

0.187 in. (4.75 mm) orifice, 1.2 C_v

Pressure Drop to Atmosphere (Δp) psi (bar)	Air Flow std ft ³ /min (std L/min)	Water Flow U.S. gal/min (L/min)
10 (0.68)	14 (390)	3.8 (14)
50 (3.4)	36 (1000)	8.5 (32)
100 (6.8)	64 (1800)	12 (45)

H83 Series 2-Way

0.187 in. (4.75 mm) orifice, 1.2 C_v

Pressure Drop to Atmosphere (Δp) psi (bar)	Air Flow std ft ³ /min (std L/min)	Water Flow U.S. gal/min (L/min)
150 (10.3)	92 (2600)	15 (56)
600 (41.3)	340 (9600)	29 (100)
1000 (68.9)	570 (16 100)	38 (140)

83 Series 3-Way

0.187 in. (4.75 mm) orifice, 0.75 C_v

Pressure Drop to Atmosphere (Δp) psi (bar)	Air Flow std ft ³ /min (std L/min)	Water Flow U.S. gal/min (L/min)
10 (0.68)	8.0 (220)	2.4 (9.0)
50 (3.4)	23 (650)	5.3 (20)
100 (6.8)	40 (1100)	7.5 (28)

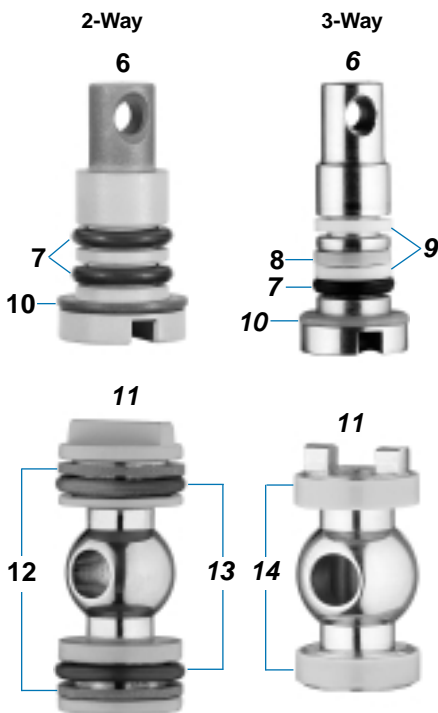
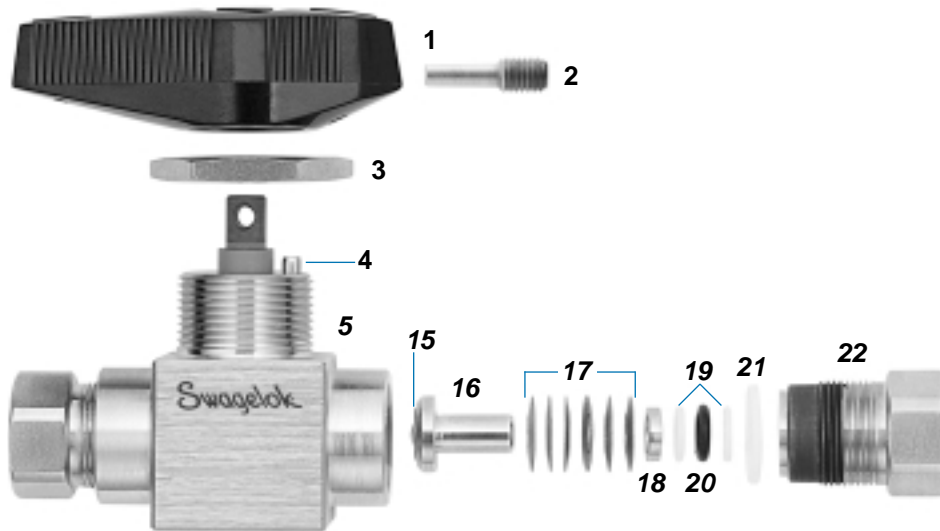
H83 Series 3-Way

0.187 in. (4.75 mm) orifice, 0.75 C_v

Pressure Drop to Atmosphere (Δp) psi (bar)	Air Flow std ft ³ /min (std L/min)	Water Flow U.S. gal/min (L/min)
150 (10.3)	57 (1600)	9.2 (34)
600 (41.3)	210 (5900)	18 (68)
1000 (68.9)	350 (9900)	24 (90)

Materials of Construction

83 Series

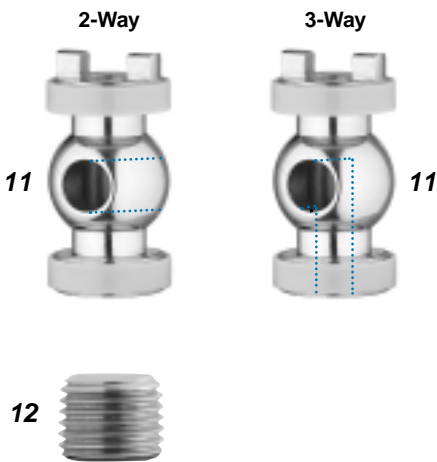
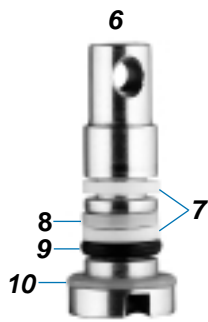
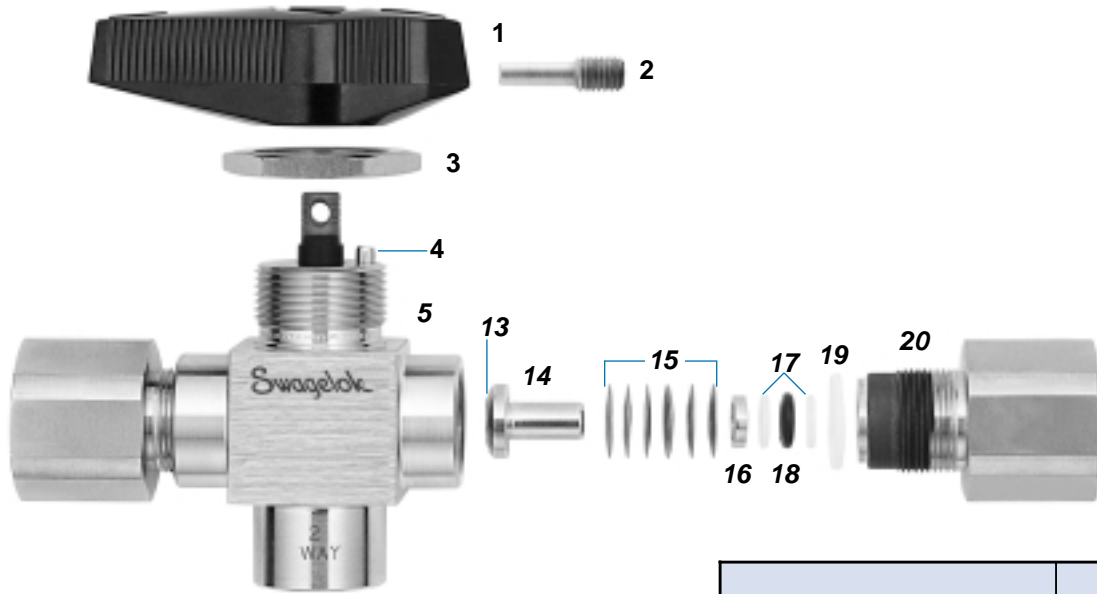


Component	Valve Body Material			
	Stainless Steel		Alloy 400	
	2-Way	3-Way	2-Way	3-Way
	Material Grade/ASTM Specification			
1 Handle	Phenolic with brass insert			
2 Set screw	S17400 SS			
3 Panel nut	316 SS/B783			
4 Stop pin (2-way—2; 3-way—1)	Stainless steel			
5 Body	316 SS/A479		Alloy 400/B164	
6 Stem	316 SS/A276		Alloy R-405/B164	
7 Stem O-rings (2-way—2; 3-way—1)	Fluorocarbon FKM			
8 Primary stem backup ring	—	PEEK	—	PEEK
9 Secondary stem backup ring	—	PTFE/D1710	—	PTFE/D1710
10 Stem bearing	Reinforced PTFE	PEEK	Reinforced PTFE	PEEK
11 Ball ^①	316 SS/A276	S21800/A276	Alloy R-405/B164	
12 Trunnion backup rings (2)	Reinforced PTFE	—	Reinforced PTFE	—
13 Trunnion O-rings (2)	Fluorocarbon FKM	—	Fluorocarbon FKM	—
14 Trunnion bearings	—	PEEK	—	PEEK
15 Seats (2)	PCTFE/AMS 3650, PTFE/D1710, reinforced nylon, or PEEK			
16 Seat carriers (2)	316 SS/A276		Alloy R-405/B164	
17 Seat springs (6 with PTFE; 12 with all others)	Alloy X-750/AMS 5542			
18 Seat carrier guides (2)	316 SS/A276		Alloy R-405/B164	
19 Seat carrier backup rings (4)	Reinforced PTFE			
20 Seat carrier O-rings (2)	Fluorocarbon FKM			
21 End screw seals (2)	PTFE/D1710			
22 End screws (2)	316 SS/A479		Alloy R-405/B164	
Lubricants	Molybdenum disulfide (PEEK seats) and fluorinated-based			

Wetted components listed in *italics*.

① Ball trunnions are PTFE coated in 83 series 2-way valve.

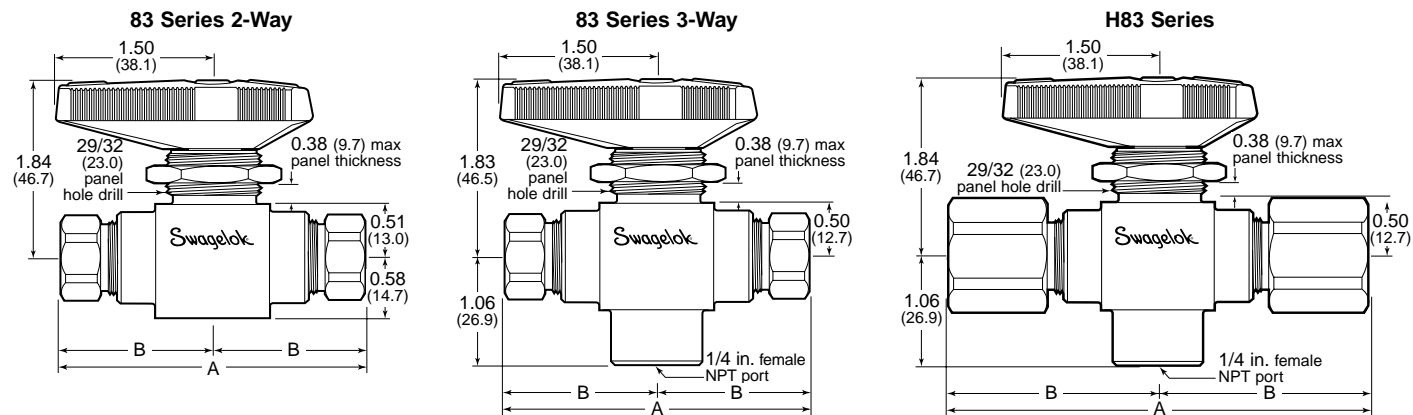
H83 Series



Component	2-Way	3-Way
	Material Grade/ ASTM Specification	
1 Handle	Phenolic with brass insert	
2 Set screw	S17400 SS	
3 Panel nut	316 SS/B783	
4 Stop pin (2-way—2; 3-way—1)	Stainless steel	
5 Body	316 SS/A479	
6 Stem	316 SS/A276	
7 Secondary stem backup rings	PTFE/D1710	
8 Primary stem backup ring	PEEK	
9 Stem O-ring	Fluorocarbon FKM	
10 Stem bearing	PEEK	
11 Ball ^①	S21800/A276	
12 Plug (2-way only)	316 SS/A276	—
13 Seats (2)	PEEK	
14 Seat carriers (2)	316 SS/A276	
15 Seat springs (12)	Alloy X-750/AMS 5542	
16 Seat carrier guides (2)	316 SS/A276	
17 Seat carrier backup rings (4)	Reinforced PTFE	
18 Seat carrier O-rings (2)	Fluorocarbon FKM	
19 End screw seals (2)	PTFE/D1710	
20 End screws (2)	316 SS/A479	
Lubricants	Molybdenum and tungsten disulfide and fluorinated-based	

Wetted components listed in *italics*.
 ① Ball trunnions are Xylan[®] coated.

Dimensions



End Connections		Flow Coefficient (C _v)	83 Series Valve Ordering Number	H83 Series Valve Ordering Number	Dimensions, in. (mm)	
Type	Size				A	B
2-Way Valves, 0.187 in. (4.75 mm) Orifice						
Female NPT	1/8 in.	1.2	SS-83KF2	SS-H83PF2	2.94 (74.7)	1.47 (37.3)
	1/4 in.	1.0	SS-83KF4	—		
Swagelok tube fitting	1/4 in.	1.6	SS-83KS4	SS-H83PS4	3.93 (99.8)	1.97 (50.0)
	3/8 in.	1.4	SS-83KS6	SS-H83PS6	4.14 (105)	2.07 (52.6)
	1/2 in. ^①	1.0	SS-83KS8	SS-H83PS8	4.39 (112)	2.19 (55.6)
	6 mm	1.6	SS-83KS6MM	SS-H83PS6MM	4.60 (117)	2.30 (58.4)
	8 mm	1.5	SS-83KS8MM	SS-H83PS8MM	4.14 (105)	2.07 (52.6)
	10 mm	1.3	SS-83KS10MM	SS-H83PS10MM	4.15 (105)	2.20 (55.9)
	12 mm ^①	1.0	SS-83KS12MM	SS-H83PS12MM	4.41 (112)	2.20 (55.9)
3-Way Valves, 0.187 in. (4.75 mm) Orifice						
Female NPT	1/8 in.	0.75	SS-83XKF2	SS-H83XPF2	2.94 (74.7)	1.47 (37.3)
	1/4 in.		SS-83XKF4	—		
Swagelok tube fitting	1/4 in.		SS-83XKS4	SS-H83XPS4	3.93 (99.8)	1.97 (50.0)
	3/8 in.		SS-83XKS6	SS-H83XPS6	4.14 (105)	2.07 (52.6)
	1/2 in. ^①		SS-83XKS8	SS-H83XPS8	4.39 (112)	2.19 (55.6)
	6 mm		SS-83XKS6MM	SS-H83XPS6MM	4.60 (117)	2.30 (58.4)
	8 mm		SS-83XKS8MM	SS-H83XPS8MM	4.14 (105)	2.07 (52.6)
	10 mm		SS-83XKS10MM	SS-H83XPS10MM	4.15 (105)	2.20 (55.9)
	12 mm ^①		SS-83XKS12MM	SS-H83XPS12MM	4.41 (112)	2.20 (55.9)

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

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

① Valves with 1/2 in. and 12 mm tube fitting end connections are not recommended for panel mounting.

Ordering Information

83 Series

Select a valve ordering number.

Valve ordering numbers specify stainless steel material. To order valves of alloy 400 material, replace **SS** in the ordering number with **M**.

Example: **M-83KF2**

Valve ordering numbers specify a PCTFE seat. To order valves with other seat materials, replace **K** in the ordering number with a seat material designator.

Example: **SS-83TF2**

Seat Material	Designator
PTFE	T
Reinforced nylon	N
PEEK	P

H83 Series

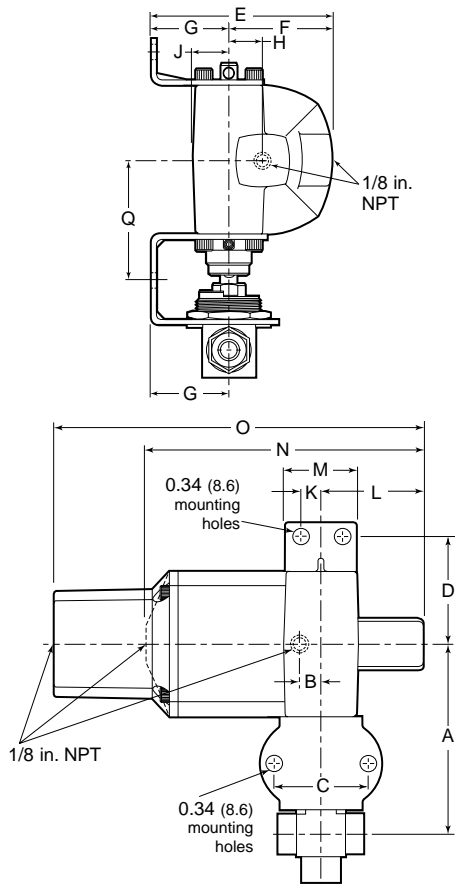
Select a valve ordering number.

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 *Rack and Pinion Pneumatic Actuators for Swagelok Ball Valves* catalog.

Dimensions

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



83 Series Actuator Pressure at Maximum System Pressure

Required pressures based on valve performance using pressurized air or nitrogen.

Valve Series	Actuator Model	Pressure in Valve psig (bar)	Actuation Modes			
			Double Acting		Spring Return	
			Single	Dual	Single	Dual
Minimum Actuator Pressure, psig (bar)						
90° Actuation						
83 2-way	131	1500 (103)	30 (2.0)	50 (3.4)	70 (4.8)	80 (5.5)
		6000 (413)	35 (2.4)	60 (4.1)	75 (5.1)	—
	133	1500 (103)	15 (1.0)	20 (1.3)	65 (4.4)	70 (4.8)
		6000 (413)	20 (1.3)	25 (1.7)	75 (5.1)	75 (5.1)
180° Actuation						
83 3-way	151	1500 (103)	35 (2.4)	60 (4.1)	75 (5.1)	—
		6000 (413)	45 (3.1)	85 (5.8)	—	—
	153	1500 (103)	15 (1.0)	25 (1.7)	70 (4.8)	75 (5.1)
		6000 (413)	20 (1.3)	35 (2.4)	75 (5.1)	—

H83 Series Actuator Pressure at Maximum System Pressure

Required pressures based on valve performance using pressurized air or nitrogen.

Valve Series	Actuator Model	Pressure in Valve psig (bar)	Actuation Modes			
			Double Acting		Spring Return	
			Single	Dual	Single	Dual
Minimum Actuator Pressure, psig (bar)						
90° Actuation						
H83 2-way	131	1 500 (103)	35 (2.4)	60 (4.1)	75 (5.1)	—
		6 000 (413)	45 (3.1)	85 (5.8)	—	—
		10 000 (689)	55 (3.7)	100 (6.8)	—	—
	133	1 500 (103)	15 (1.0)	25 (1.7)	70 (4.8)	75 (5.1)
		6 000 (413)	20 (1.3)	35 (2.4)	75 (5.1)	85 (5.8)
		10 000 (689)	25 (1.7)	45 (3.1)	80 (5.5)	90 (6.2)
180° Actuation						
H83 3-way	151	1 500 (103)	35 (2.4)	60 (4.1)	75 (5.1)	—
		6 000 (413)	45 (3.1)	85 (5.8)	—	—
		10 000 (689)	55 (3.7)	100 (6.8)	—	—
	153	1 500 (103)	15 (1.0)	25 (1.7)	70 (4.8)	75 (5.1)
		6 000 (413)	20 (1.3)	35 (2.4)	75 (5.1)	—
		10 000 (689)	25 (1.7)	45 (3.1)	80 (5.5)	—

90° actuation required for 2-way valves; 180° actuation required for 3-way valves.

Actuator Model	Dimensions, in. (mm)														
	A	B	C	D	E	F	G	H	J	K	L	M	N (D)	O (S)	Q
131, 151	3.17 (80.5)	0.34 (8.6)	2.00 (50.8)	1.75 (44.4)	3.04 (77.2)	1.73 (43.9)	1.31 (33.3)	0.60 (15.2)	0.52 (13.2)	0.31 (7.9)	1.46 (37.1)	1.25 (31.8)	4.09 (104)	4.91 (125)	1.89 (48.0)
133, 153	4.08 (104)	0.48 (12.2)		2.31 (58.7)	4.07 (103)	2.32 (58.9)	1.75 (44.4)	0.75 (19.1)	0.81 (20.6)	0.44 (11.2)	2.16 (54.9)	1.56 (39.6)	5.89 (150)	7.86 (200)	2.56 (65.0)

(D) = double acting; (S) = spring return.

Electric Actuators

Electric actuators are available. See the *Electric Actuators—141 and 142 Series* catalog.

Ordering Information

Factory-Assembled Actuators

1. Add an actuator model designator to the valve ordering number.
Example: SS-83KF2-31
2. Add an actuation mode designator.
Example: SS-83KF2-31D
3. For dual-mounted assemblies (two valves mounted to one pneumatic actuator), add **DM** to the ordering number.
Example: SS-83KF2-31DDM

Valve Series	Actuator Model	Designator	Mounting Kit Ordering Number
83, H83 2-way	131	-31	MS-MB-83-131
	133	-33	MS-MB-83-133
83, H83 3-way	151	-51	MS-MB-83-131
	153	-53	MS-MB-83-133

Actuator Kits for Field Assembly

1. Identify the required actuator model designator.
Example: **-31**
2. Replace the dash in the actuator designator with **MS-1**.
Example: **MS-131**
3. Add **-DA** for double acting or **-SR** for spring return.
Example: **MS-131-DA**

The mounting kit must be ordered separately; select the appropriate mounting kit ordering number. Dual assemblies require two mounting kits.

Actuation Mode	Designator
Double acting	D
Normally closed spring return	C
Normally open spring return	O
3-way valve spring return	S

Options

83 Series Vent Options

A downstream or upstream ball vent is available in 83 series 2-way valves. The vent port in the ball does not intersect the main flow passage, ensuring no leakage of system media from the vent port. When the valve is open, flow is straight through. The pressure rating with a ball vent is reduced to 500 psig (34.4 bar).

Downstream (DV) Vent

When a downstream-vented valve is closed, full shutoff occurs at the upstream seat. Downstream system media passes through the vent hole in the ball trunnion and vents to atmosphere through the bottom of the trunnion.

Upstream (UV) Vent

When an upstream-vented valve is closed, full shutoff occurs at the downstream seat. Upstream system media passes through the vent hole in the ball trunnion and vents to atmosphere through the bottom of the trunnion. To order, insert **DV** (downstream) or **UV** (upstream) into the valve ordering number.

Example: SS-83KDV2

83 Series and H83 Series Oxygen Service

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

83 Series and H83 Series Low-Temperature Service

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

To order a valve for low-temperature service, insert **L** into the valve ordering number.

Example: SS-L83KF2

Contact your independent Swagelok sales and service representative for information about valves for service down to -65°F (-53°C).

L83 Series Pressure-Temperature Ratings

Material	316 SS		Alloy 400	
	PCTFE, Nylon, PEEK	PTFE	PCTFE, Nylon, PEEK	PTFE
Temperature, °F (°C)	Working Pressure, psig (bar)			
-40 (-40) to 100 (37)	6000 (413)	1500 (103)	5000 (344)	1500 (103)
150 (65) 200 (93)	See Pressure-Temperature Ratings, page 3			

LH83 Series Pressure-Temperature Ratings

Material	316 SS					
	F2, F4, S6MM, S4	S8MM	S12MM	S6	S8	S10MM
Temperature, °F (°C)	Working Pressure, psig (bar)					
-40 (-40) to 100 (37)	10 000 (689)	7500 (516)	6600 (454)	6500 (447)	6700 (461)	6000 (413)
150 (65) 200 (93)	See Pressure-Temperature Ratings, page 3					

Options

83 Series Special Cleaning and Packaging (SC-11)

To order optional cleaning and packaging in accordance with *Special Cleaning and Packaging (SC-11)* to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C for 83 series valves with PCTFE, PTFE, or reinforced nylon seats, add **-SC11** to the valve ordering number.

Example: SS-83KF2-**SC11**

Accessories

83 Series Seal Kits

Seal kits contain components of the same materials as new components. See **Materials of Construction**, page 4, or **Low-Temperature Service**, page 8.

For a complete ordering number, add a seat material designator to the basic seal kit ordering number.

Example: SS-9K-83K

Seat Material	Designator
PEEK	P
PCTFE	K
PTFE	T
Reinforced nylon	N

Valve Series	Basic Seal Kit Ordering Number	Kit Contents
83 2-way	SS-9K-83	Instructions, O-rings, stem bearing, ball, seat subassemblies (seats and seat carriers), seat springs, end screw seals, lubricant, and lubricant Material Safety Data Sheet (MSDS)
Low-temperature 83 2-way	SS-9K-L83	Instructions, stem, O-rings, backup rings, bearings, ball, seat subassemblies (seats and seat carriers), seat springs, end screw seals, lubricant, and lubricant MSDS
83 3-way	SS-9K-83X	Instructions, stem, O-rings, backup rings, bearings, ball, seat subassemblies (seats and seat carriers), seat springs, end screw seals, lubricant, and lubricant MSDS
Low-temperature 83 3-way	SS-9K-L83X	Instructions, stem, O-rings, backup rings, bearings, ball, seat subassemblies (seats and seat carriers), seat springs, end screw seals, lubricant, and lubricant MSDS

Seal kit ordering numbers specify stainless steel material. For alloy 400 material, replace **SS** with **M** for in the basic ordering number.

Example: **M**-9K-83K

H83 Series Seal Kits

Seal kits contain components of the same materials as new components. See **Materials of Construction**, page 5, or **Low-Temperature Service**, page 8.

- instructions
- stem
- O-rings
- backup rings
- stem bearing
- ball
- seat subassemblies (seats and seat carriers)
- seat springs
- end screw seals
- lubricant
- lubricant MSDS.

Valve Series	Seal Kit Ordering Number
H83 2-way	SS-9K-H83P
Low-temperature H83 2-way	SS-9K-LH83P
H83 3-way	SS-9K-H83XP
Low-temperature H83 3-way	SS-9K-LH83XP

83 Series and H83 Series Handles

Black phenolic handles are standard. Colored phenolic, oval, and 316 stainless steel bar handles are available. To order, add a handle designator to the valve ordering number.

Example: SS-83KF2-**RD**

Handle Kits

Handle kits contain a handle and set screw.

Standard black phenolic handle kit ordering number: **PH-5K-83-BK**

To order handles in other colors, replace **-BK** in the kit ordering number with a handle designator.

Example: PH-5K-83-**RD**

Stainless steel bar handle kit ordering number: **SS-5K-83**

Handle	Designator
Black phenolic	-BK
Blue phenolic	-BL
Green phenolic	-GR
Orange phenolic	-OG
Red phenolic	-RD
Yellow phenolic	-YW
Stainless steel bar	-SH
Oval	-K

Safe Product Selection

When selecting products, 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.