

One-piece Instrumentation Ball Valves

BO Series

Features

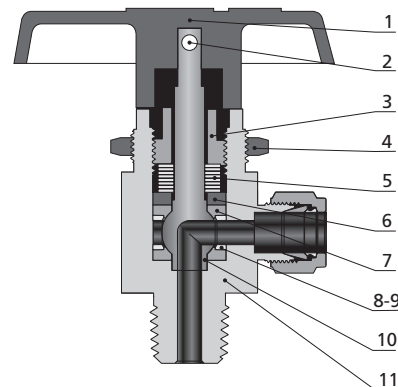
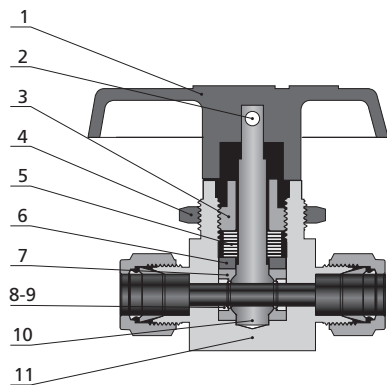
- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -65°F to 300°F (-54°C to 148°C)
- ⦿ End connections:
 - 1/4 to 1/2 thread
 - 1/16" to 3/4" and 3 mm to 18 mm tube fitting
- ⦿ 2-, 3-, 4-, 5-, 6- and 7-way models for on-off, switching and crossover service available
- ⦿ One-piece body and one-piece ball stem
- ⦿ No dead space
- ⦿ Top-loaded design to allow adjustment with the valve in-line
- ⦿ Thermal cycle performance improved and wear compensated by live-loaded design
- ⦿ Any reasonable connections available
- ⦿ Pneumatic and electric actuator available
- ⦿ Handle color options available
- ⦿ Full operating pressure at any port
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure to meet the requirement of no visible leak
- ⦿ The inlet can be any port except for valves with vent ports



Note:

1. To prevent seat leakage, packing adjustment may be required periodically during the service life of the valve.
2. A higher initial actuation torque may happen to the valves that have not been cycled for a period of time.
3. Before installation, instrumentation ball valves exposed to dynamic temperature conditions may lose their initial packing load. Stem packing adjustment should be required.

Standard Materials of Construction



Item	Component	Valve Body Material		
		316 SS	Brass	Alloy 400
		Material Grade/ASTM Specification		
1	Handle	Nylon or Aluminium		
2	Set Screw	Galvanized carbon steel		
3	Packing Bolt	316 SS/A479	Brass C36000/B16	Alloy 400/B164
4	Panel Nut	316 SS/A479	Brass C36000/B16	316 SS/A479
5	Disc Spring	S17700/A693		
6	Gland	316 SS/A479	316 SS/A479	Alloy 400/B164
7	Packing Seat	PTFE/D1710 or UHMWPE/D4020 or PFA/D3307		
8	Support Ring	316 SS/A479	316 SS/A479	Alloy 400/B164
9	Support Disc			
10	Ball Stem	316 SS/A479	Brass C36000/B16	Alloy 400/B164
11	Body	316 SS/A182	Brass C37700/B16	Alloy 400/B164
Wetted Lubricant		Fluorinated-based and silicone-based		
Non-wetted Lubricant		Molybdenum disulfide with hydrocarbon binder coat		

Note: Wetted components are listed in italics.
For other materials, please contact FITOK Group or our authorized distributors.

On-Off (2-way) Valves

Standard Flow Path

Straight Pattern



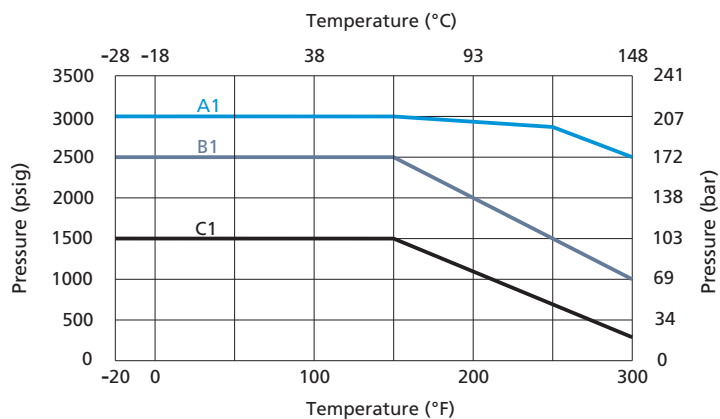
Angle Pattern



Pressure vs. Temperature

Straight Pattern and Angle Pattern

PTFE Packing Seat



A1: Straight Pattern Valves (orifice 0.19")

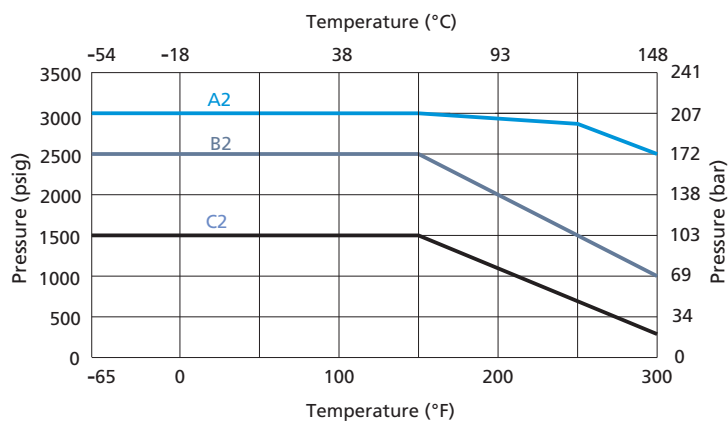
B1: Straight Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.28" & 0.41")

Angle Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.19")

C1: Angle Pattern Valves (orifice 0.28" & 0.41")

PFA, UHMWPE Packing Seat

The working temperature of UHMWPE packing seat should not be higher than 150°F (65°C).



A2: Straight Pattern Valves (orifice 0.19")

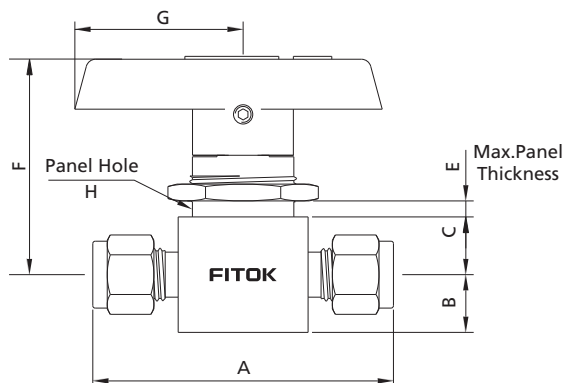
B2: Straight Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.28" & 0.41")

Angle Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.19")

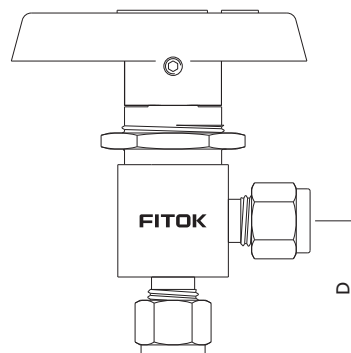
C2: Angle Valves (orifice 0.28" & 0.41")

Dimensions

Straight Pattern



Angle Pattern

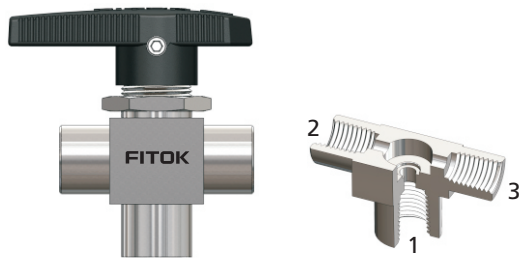


Basic Ordering Number	Connection Type and Size	Orifice in. (mm)	Cv		Dimensions, in. (mm)							
			Straight	Angle	A	B	C	D	E	F	G	H
BO□□-FL1-00	1/16" FITOK	0.05 (1.3)	0.10	—	1.68 (42.7)	0.28 (7.1)	0.34 (8.6)	—	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-FL2-02	1/8" FITOK	0.09 (2.4)	0.20	0.15	2.01 (51.1)			0.97 (24.6)				
BO□□-FL4-03	1/4" FITOK	0.13 (3.2)	0.60	0.35	2.21 (56.1)			1.07 (27.2)				
BO□□-FL4-05		0.19 (4.8)	1.40	0.90	2.39 (60.7)	0.38 (9.7)	0.44 (11.2)	1.17 (29.7)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FL6-05	1.50				2.58 (65.5)			1.29 (32.8)				
BO□□-FL6-07			3/8" FITOK	0.28 (7.1)	6.00	2.00	3.05 (77.5)	0.56 (14.2)	0.56 (14.2)	1.43 (36.3)	0.35 (9)	2.19 (55.5)
BO□□-FL8-10	1/2" FITOK	0.41 (10.3)	6.40	3.80	3.92 (99.6)	0.69 (17.5)	0.69 (17.5)	1.74 (44.2)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
BO□□-FL12-10	3/4" FITOK		12.00	4.60								
BO□□-ML3-02	3 mm FITOK	0.09 (2.4)	0.20	0.15	2.01 (51.1)	0.28 (7.1)	0.34 (8.6)	0.97 (24.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-ML6-03	6 mm FITOK	0.13 (3.2)	0.60	0.35	2.21 (56.1)			1.07 (27.2)				
BO□□-ML6-05		8 mm FITOK	0.19 (4.8)	1.40	0.90	2.39 (60.7)	0.38 (9.7)	0.44 (11.2)	1.17 (29.7)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)
BO□□-ML8-05	1.50			2.46 (62.5)		1.20 (30.5)						
BO□□-ML10-07	10 mm FITOK	0.28 (7.1)	6.00	2.00	3.07 (78.0)	0.56 (14.2)	0.56 (14.2)	1.43 (36.3)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-ML12-10	12 mm FITOK	0.41 (10.3)	12.00	4.60	3.92 (99.6)	0.69 (17.5)	0.69 (17.5)	1.74 (44.2)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
BO□□-FNS2-03	1/8 Female NPT	0.13 (3.2)	0.50	0.30	1.63 (41.4)	0.28 (7.1)	0.34 (8.6)	0.81 (20.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-FNS2-05		0.19 (4.8)	1.20	0.70	2.00 (50.8)	0.38 (9.7)	0.44 (11.2)	1.00 (25.4)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FNS4-05	0.90				0.75			2.06 (52.3)				
BO□□-FNS4-07			0.28 (7.1)	3.00		1.70	2.50 (63.5)	0.56 (14.2)	0.56 (14.2)	1.25 (31.8)	0.35 (9)	2.19 (55.5)
BO□□-FNS6-07	3/8 Female NPT	2.60		1.50								
BO□□-FNS8-10	1/2 Female NPT	0.41 (10.3)	6.30	3.50	3.12 (79.2)	0.69 (17.5)	0.69 (17.5)	1.56 (39.6)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	11/2 (38.1)
BO□□-NS4-05	1/4 Male NPT	0.19 (4.8)	1.20	0.75	2.00 (50.8)	0.38 (9.7)	0.44 (11.2)	1.03 (26.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FRT4-05	1/4 Female BSPT		0.90	—	2.06 (52.3)							
BO□□-FRT6-07	3/8 Female BSPT	0.28 (7.1)	2.60		2.50 (63.5)	0.56 (14.2)	0.56 (14.2)	—	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-FRT8-10	1/2 Female BSPT	0.41 (10.3)	6.30		3.12 (79.2)	0.69 (17.5)	0.69 (17.5)		0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
BO□□-FO4-03	1/4 Male FO	0.13 (3.2)	0.60	0.35	1.75 (44.4)	0.38 (9.7)	0.34 (8.6)	0.94 (23.9)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-FO4-05		0.19 (4.8)	2.40	0.90	1.88 (47.8)		0.44 (11.2)		0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FR4-03	1/4 Male FR	0.13 (3.2)	0.60	0.35	2.13 (54.1)		0.34 (8.6)	1.09 (27.7)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-FR4-05		0.19 (4.8)	2.40	0.90			0.44 (11.2)		0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FR8-07	1/2 Male FR	0.28 (7.1)	6.00	—	2.88 (73.2)	0.56 (14.2)		—	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-FR8-10		0.41 (10.3)	12.00		3.12 (79.2)	0.69 (17.5)		—	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)

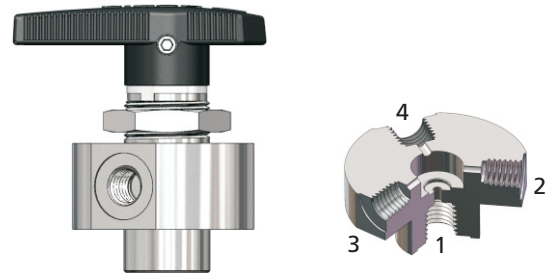
Switching (3-, 4-, 5-, 6- and 7-way) Valves

Standard Flow Path

3-way Valves

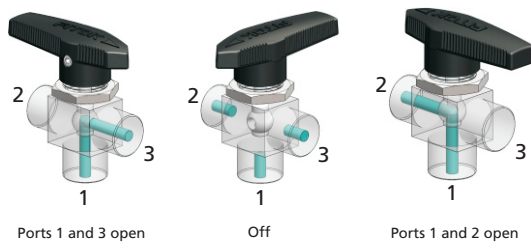


4-way Valves



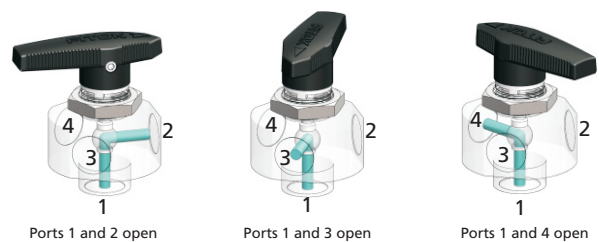
3L Flow Path

This type of valve can connect one side port to the bottom port or shut off 3 ports. Switch between 0°, 90° and 180° positions with 180° rotation handle.

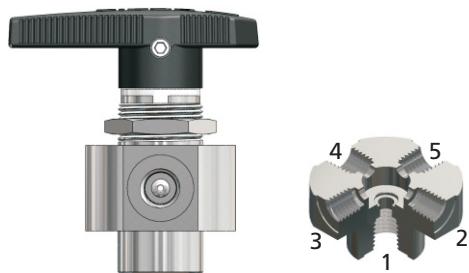


4L Flow Path

This type of valve can connect one side port to the bottom port, and shut off other 2 side ports at the same time. Switching can be done in 120° increments with 360° rotation handle.

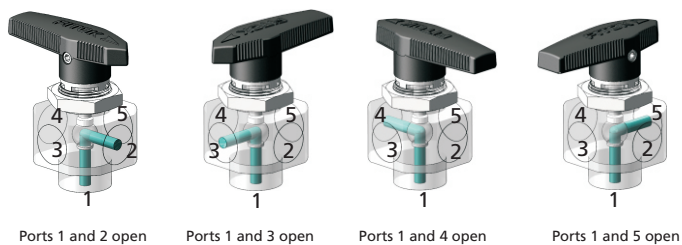


5-way Valves

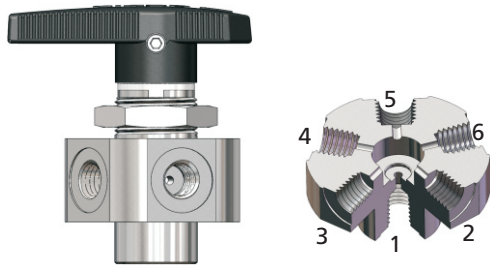


5L Flow Path

This type of valve can connect one side port to the bottom port, and shut off other 3 side ports at the same time. Switching can be done in 90° increments with 360° rotation handle.

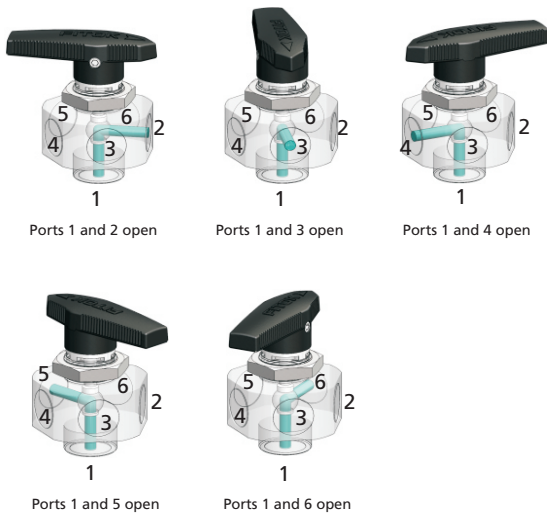


6-way Valves

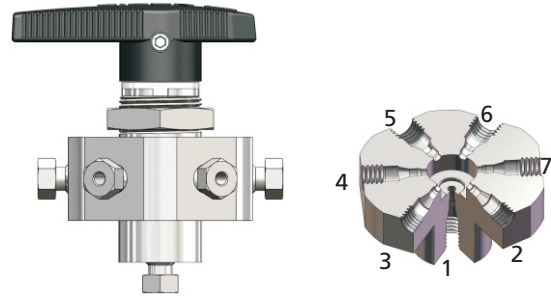


6L Flow Path

This type of valve can connect one side port to the bottom port, and shut off other 4 side ports at the same time. Switching can be done in 72° increments with 360° rotation handle.

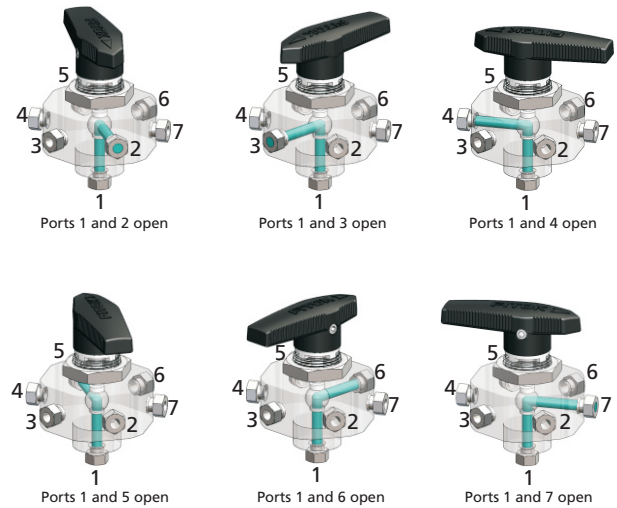


7-way Valves



7L Flow Path

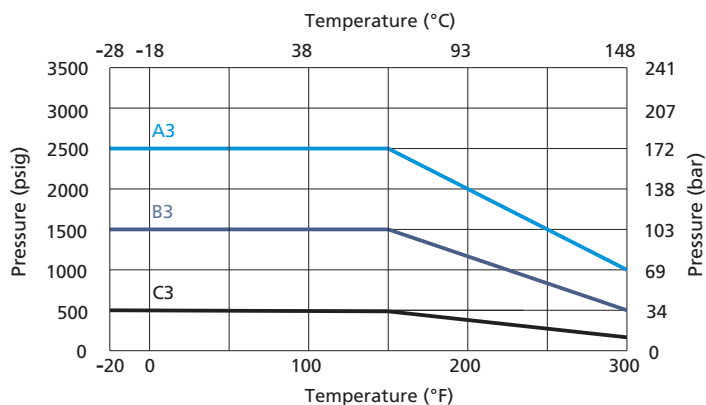
This type of valve can connect one side port to the bottom port, and shut off other 5 side ports at the same time. Switching can be done in 60° increments with 360° rotation handle.



Pressure vs. Temperature

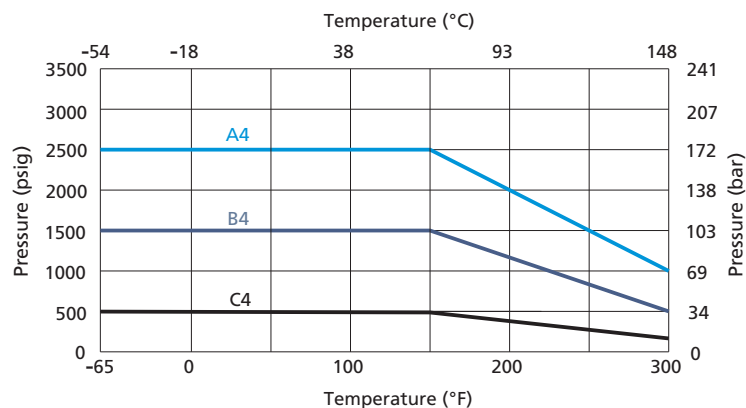
Switching Valves

PTFE Packing Seat



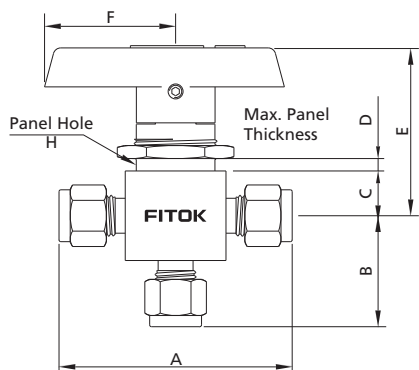
PFA, UHMWPE Packing Seat

The working temperature of UHMWPE packing seat should not be higher than 150°F (65°C).

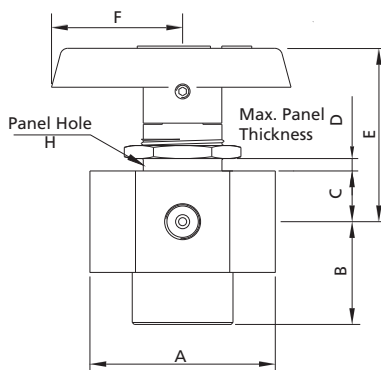


Dimensions

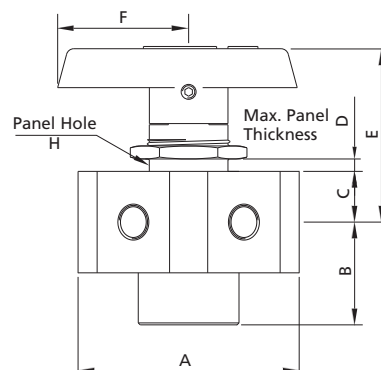
3-way Valves



4-and 5-way Valves



6-and 7-way Valves

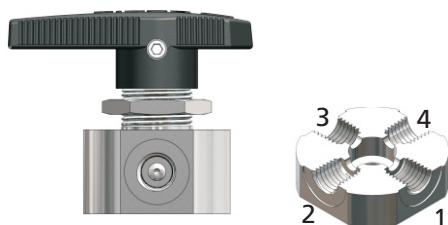


Basic Ordering Number	Connection Type and Size	Orifice in. (mm)	Cv	Dimensions, in. (mm)						
				A	B	C	D	E	F	H
	3-way Valves									
BO□□-FL1-00-3L	1/16" FITOK	0.05 (1.3)	0.08	1.68 (42.7)	0.81 (20.6)	0.34 (8.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-FL2-02-3L	1/8" FITOK	0.09 (2.4)	0.15	2.01 (51.1)	0.97 (24.6)					
BO□□-FL4-03-3L	1/4" FITOK	0.13 (3.2)	0.35	2.21 (56.1)	1.07 (27.2)					
BO□□-FL4-05-3L		0.19 (4.8)	0.90	2.39 (60.7)	1.17 (29.7)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FL6-07-3L	3/8" FITOK	0.28 (7.1)	2.00	2.89 (73.4)	1.43 (36.3)	0.56 (14.2)	0.35 (9)	2.19 (55.5)	2.05 (52)	11/8 (28.6)
BO□□-FL8-10-3L	1/2" FITOK	0.41 (10.3)	4.60	3.48 (88.4)	1.74 (44.2)	0.69 (17.5)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	11/2 (38.1)
BO□□-FL12-10-3L	3/4" FITOK		4.90							
BO□□-ML3-02-3L	3 mm FITOK	0.09 (2.4)	0.15	2.01 (51.1)	0.97 (24.6)	0.34 (8.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-ML6-03-3L	6 mm FITOK	0.13 (3.2)	0.35	2.21 (56.1)	1.07 (27.2)					
BO□□-ML6-05-3L		0.19 (4.8)	0.90	2.39 (60.7)	1.17 (29.7)					
BO□□-ML8-05-3L	8 mm FITOK		0.80	2.46 (62.5)	1.20 (30.5)	0.56 (14.2)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-ML10-07-3L	10 mm FITOK									
BO□□-ML12-10-3L	12 mm FITOK	0.41 (10.3)	4.60	3.48 (88.4)	1.74 (44.2)	0.69 (17.5)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
BO□□-FNS2-03-3L	1/8 Female NPT	0.13 (3.2)	0.30	1.63 (41.4)	0.81 (20.6)	0.34 (8.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-FNS4-05-3L	1/4 Female NPT	0.19 (4.8)	0.75	2.06 (52.3)	1.03 (26.2)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FNS4-07-3L		0.28 (7.1)	1.70	2.5 (63.5)	1.18 (30)	0.56 (14.2)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-FNS6-07-3L	3/8 Female NPT		1.50							
BO□□-FNS8-10-3L	1/2 Female NPT	0.41 (10.3)	3.50	3.13 (79.5)	1.56 (39.6)	0.69 (17.5)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
BO□□-FRT4-05-3L	1/4 Female BSPT	0.19 (4.8)	0.75	2.06 (52.3)	1.03 (26.2)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FRT6-07-3L	3/8 Female BSPT	0.28 (7.1)	1.50	2.5 (63.5)	1.18 (30)	0.56 (14.2)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-FRT8-10-3L	1/2 Female BSPT	0.41 (10.3)	3.50	3.13 (79.5)	1.56 (39.6)	0.69 (17.5)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
4 - & 5-way Valves										
BO□□-FL2-01-4L	1/8" Female FITOK Tube Fitting	0.06 (1.6)	0.07	2.36 (60)	1.32 (33.5)	0.44 (11.2)	0.20 (5.2)	1.76 (44.6)	1.57 (39.9)	29/32 (23.1)
BO□□-FL2-01-5L										
BO□□-FNS2-01-4L	1/8 Female NPT	0.06 (1.6)	0.07	1.85 (47)	0.88 (22.4)					
BO□□-FNS2-01-5L				1.55 (39.4)						
BO□□-FNS8-10-4L	1/2 Female NPT	0.41 (10.3)	3.50	3.13 (79.5)	1.56 (39.6)	0.69 (17.5)	0.41 (10.5)	2.67 (70.2)	2.63 (66.7)	1 1/2 (38.1)
BO□□-FNS8-10-5L										
6 - & 7-way Valves										
BO□□-FL1-00-6L	1/16" Female FITOK Tube Fitting	0.05 (1.3)	0.05	2.64 (67)	1.32 (33.5)	0.44 (11.2)	0.28 (7)	1.76 (44.6)	1.57 (39.9)	29/32 (23.1)
BO□□-FL1-00-7L										
BO□□-FL2-01-6L	1/8" Female FITOK Tube Fitting	0.06 (1.6)	0.07	2.26 (57.6)	0.97 (24.7)					
BO□□-FL2-01-7L										

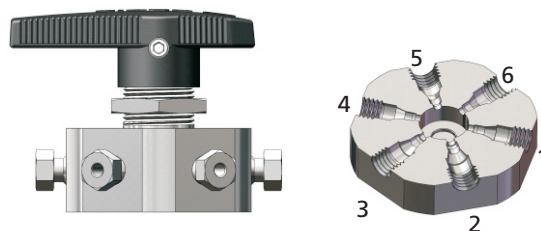
Crossover (4-, 6-way) Valves

Standard Flow Path

4-way Valves

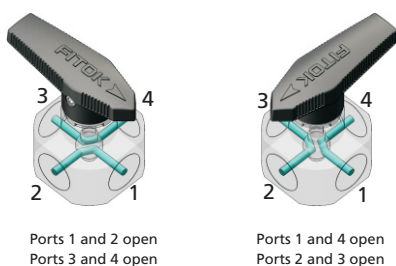


6-way Valves



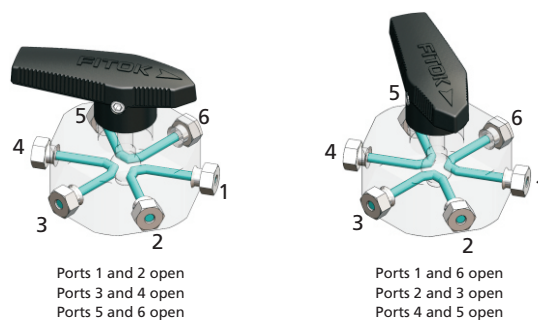
4C Flow Path

This type of valve can connect two groups of adjacent ports at the same time. Switch between 0° and 90° positions with 90° rotation handle.



6C Flow Path

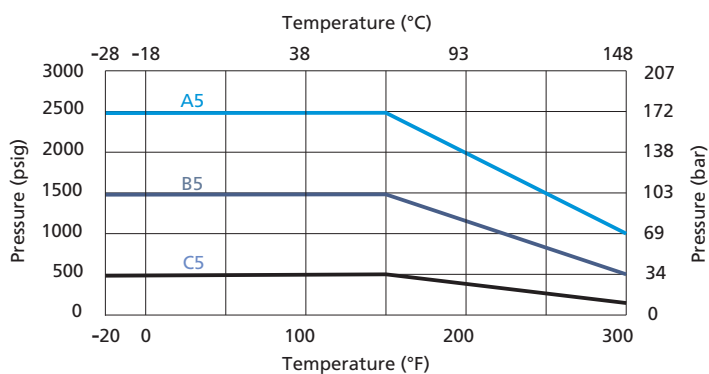
This type of valve can connect three groups of adjacent ports at the same time. Switch between 0° and 60° positions with 60° rotation handle.



Pressure vs. Temperature

Crossover Valves

PTFE Packing Seat



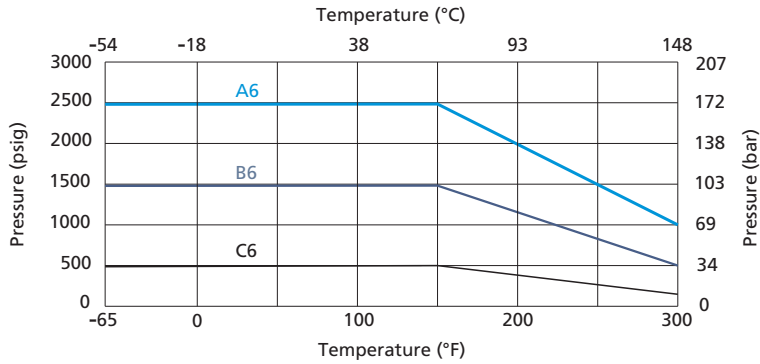
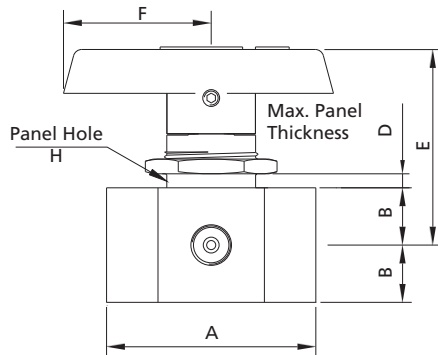
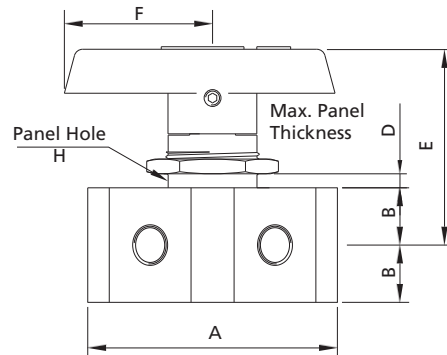
A5: 4-way (orifice 0.06")

B5: 4-way (orifice 0.41")

C5: 6-way (orifice 0.05" & 0.06")

PFA, UHMWPE Packing Seat

The working temperature of UHMWPE packing seat should not be higher than 150°F (65°C).

**Dimensions****4-way Valves****6-way Valves**

Basic Ordering Number	Connection Type and Size	Orifice in. (mm)	Cv	Dimensions, in. (mm)					
				A	B	D	E	F	H

4-way Valve

BO□□-FL1-00-4C	1/16" Female FITOK Tube Fitting	0.05 (1.3)	0.06	1.95 (49.6)					
BO□□-FL2-01-4C	1/8" Female FITOK Tube Fitting	0.06 (1.6)	0.08	2.61 (66.3)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FNS2-01-4C	1/8 Female NPT			1.55 (39.4)					
BO□□-FNS8-07-4C	1/2 Female NPT	0.28 (7.1)	1.60	3.13 (79.5)	0.69 (17.5)	0.48 (12.2)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)

6-way Valve

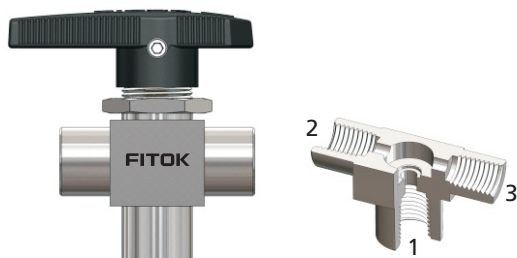
BO□□-FL1-00-6C	1/16" Female FITOK Tube Fitting	0.05 (1.3)	0.06	1.95 (49.5)	0.44 (11.2)	0.19 (4.8)	1.68 (42.7)	1.53 (38.9)	29/32 (23.1)
BO□□-FL2-01-6C	1/8" Female FITOK Tube Fitting	0.06 (1.6)	0.08	2.59 (65.8)					

Note: Connection type for ball valves in 4L, 5L, 6L, 7L, 4C, 6C, 4H, 4HL, 4V, 5HL, 5H and 5LV flow path is female FITOK tube fitting, which can not be used directly with standard FT and MT connections. Please contact FITOK Group or authorized distributors for use with standard FT and MT connections.

1. FITOK means FITOK double ferrule tube fittings.
 2. Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.
 3. Dimensions are shown with tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change.
- For dimensions not shown above, please contact FITOK Group or our authorized distributors.

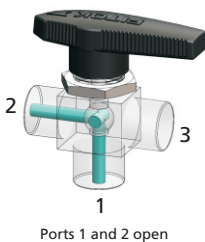
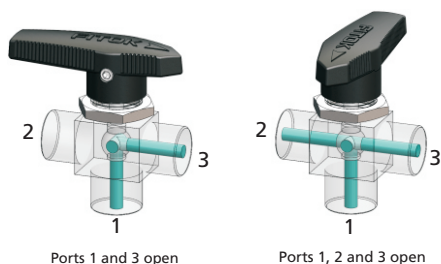
Special Flow Path

3-way Valves



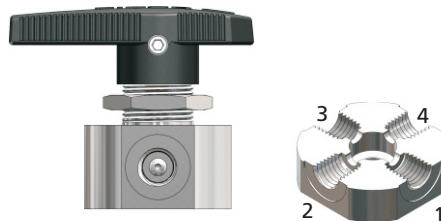
3HL Flow Path

This type of valve can connect one side port to the bottom port, or connect two side ports to the bottom port. Switching can be done in 90° increments with 180° rotation handle.



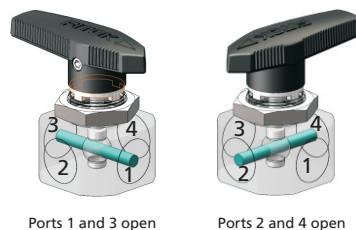
Note: For Temperature VS. Pressure curves and dimensions of 3-way valves, see Switching (3-way) Valves above. For Temperature VS. Pressure curves and dimensions of 4-way valves, see Crossover (4-way) Valves above.

4-way Valves



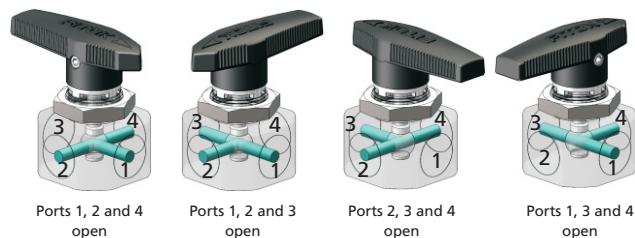
4H Flow Path

This type of valve can connect two opposite ports. Switch between 0° and 90° positions with 90° rotation handle.



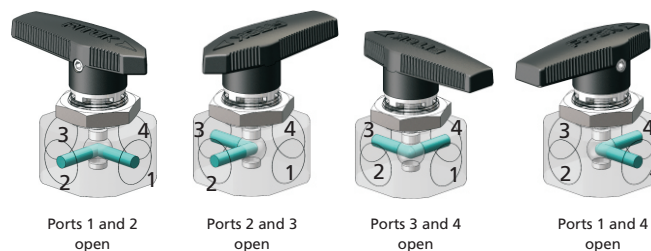
4HL Flow Path

This type of valve can connect three adjacent ports and shut off other ports. Switching can be done in 90° increments with 360° rotation handle.

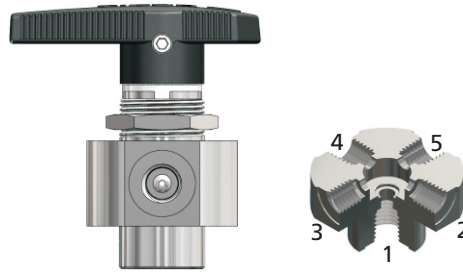


4V Flow Path

This type of valve can connect two adjacent ports and shut off other ports. Switching can be done in 90° increments with 360° rotation handle.



5-way Valves

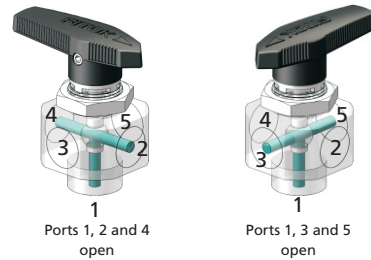
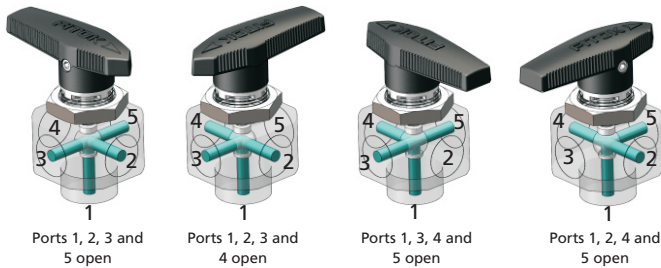


5HL Flow Path

This type of valve can connect three side ports to the bottom port, and shut off the fourth side port at the same time. Switching can be done in 90° increments with 360° rotation handle.

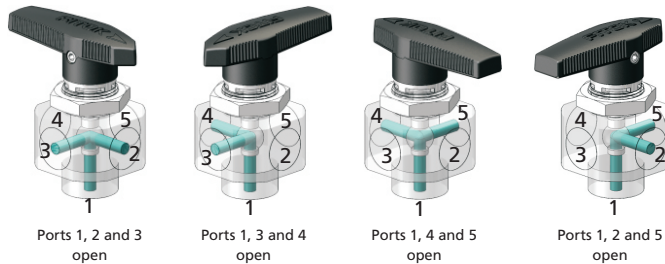
5H Flow Path

This type of valve can connect the bottom port to port 2 and port 4, or connect the bottom port to port 3 and port 5. Switch between 0° and 90° positions with 90° rotation handle.



5LV Flow Path

This type of valve can connect two adjacent ports to the bottom port, and shut off other two side ports at the same time. Switching can be done in 90° increments with 360° rotation handle.



Note: For Temperature vs. Pressure curve and dimensions of 5-way valves, see Switching (5-way) Valves above.

Vent Port Options

Vented Valves

The maximum working pressure for vented valves is 500 psig (34.4 bar).

Straight-pattern Valves

A vent hole in the side of the valve body makes the downstream port vent to atmosphere when the valve is closed.

Angle-pattern and 3-way Valves

A vent hole in the side of the valve body makes the bottom port vent to atmosphere when the valve is closed.

Welded Vent Port Connections

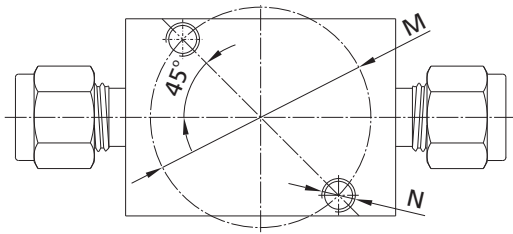
A FITOK tube fitting or a tube stub welded to the vent port is available for stainless steel vented valves.

Bottom Screw Panel Mounting Options

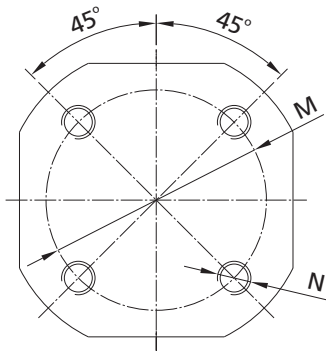
Mounting Dimensions

The bottom screw panel mounting options are not available on angle-pattern valves, 3-way valves, 6-way valves and 7-way valves.

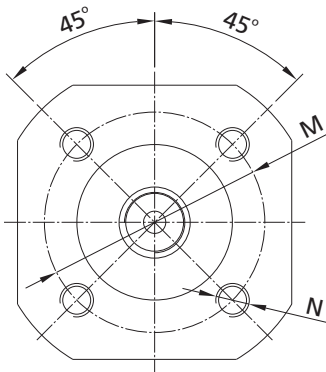
2-way



4-way



5-way



	Orifice in. (mm)	Dimensions, in. (mm)	
		M	N
2-way	0.05~0.13 (1.3~3.2)	0.63 (15.88)	M2.5 x 0.45 deep 0.24" (6)
	0.19 (4.8)	0.88 (22.23)	M3 x 0.5 deep 0.24" (6)
	0.28 (7.1)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)
	0.41 (10.3)	1.63 (41.28)	M5 x 0.8 deep 0.24" (6)
4-way	0.05~0.06 (1.3~1.6)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)
	0.28 (7.1)	2.00 (50.8)	M5 x 0.8 deep 0.24" (6)
5-way	0.05~0.06 (1.3~1.6)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)
	0.41 (10.3)	2.00 (50.8)	M5 x 0.8 deep 0.24" (6)

Ordering Number Description

BOSS - ML6 - FL4 - ML8 - H05 - OSHQ3L - B - FL4 - SCEF2

Series	Body Material	Connection 1 Type	Connection 1 Size	Connection 2 to 7 Type	Connection 2 to 7 Size	Seat Material	Orifice Size	Handle/Actuator	For Actuator	Flow Pattern	Panel Installation	Vent Port	Special Application	Cleaning and Packaging
BO	SS 316 SS	FNS Female NPT	1 1/16"	Same as connection 1	0.05" (1.3 mm)	C Black Nylon	NO	NO	NO	A Straight	No vent port	FC-01		
	S4 304 SS	NS Male NPT	2 1/8"	Specified in the same way as the connection 1 type and size	0.06" (1.6 mm)	F Red Nylon	H Mechanical Limit Switch	H	Mechanical Limit Switch	3L Angle	FL2 1/8" tube fitting	NO	NACE	FC-02
	S1 321 SS	FRT Female BSPT	3 3 mm		0.09" (2.4 mm)	J Green Nylon	N Inductive Limit Switch	N	Inductive Limit Switch	3HL 3-way	FL4 1/4" tube fitting	S MR0175	CE	
	6L 316L SS	RT Male BSPT	4 1/4"		0.13" (3.2 mm)	U Black Aluminium	Q Solenoid Valve	Q	Solenoid Valve	4L 4-way	FL6 3/8" tube fitting	CE	CE	
	B Brass	FMS Female Metric Thread (for RG)	6 3/8" or 6 mm		0.19" (4.8 mm)	CS 90° Normally Closed Spring Return Pneumatic Actuator	HQ and Solenoid Valve	HQ	Mechanical Limit Switch and Solenoid Valve	4H 4-way	ML3 3 mm tube fitting			
	M Alloy 400	MS Male Metric Thread (for RG)	8 1/2" or 8 mm		0.28" (7.1 mm)	OS 90° Normally Open Spring Return Pneumatic Actuator	Inductive Limit Switch and Solenoid Valve	NQ	Inductive Limit Switch and Solenoid Valve	4HL 4-way	ML6 6 mm tube fitting			
		FRP Female BSPP (for RP)	10 10 mm		0.41" (10.3 mm)	DA 90° Double Acting Pneumatic Actuator				4V 5-way	ML8 8 mm tube fitting	Panel nut		
		FL Fractional Tube Fitting	12 3/4" or 12 mm			LX 180° Left End Normally Open Spring Return Pneumatic Actuator				5L 5-way		Bottom screw		
		ML Metric Tube Fitting	14 14 mm			RX 180° Right End Normally Open Spring Return Pneumatic Actuator				5HL 5-way				
		FO Male FO Fitting	16 16 mm			DX 180° Double Acting Pneumatic Actuator				5LV 5-way				
		FR Male FR Fitting	18 18 mm			EA 90° Electric Actuator				6L 6-way				
						EX 180° Electric Actuator				6C 6-way				
										7L 7-way				

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

1. For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.

2. Cleaning and Packaging:

FC-01: Standard cleaning and packaging for general industrial procedures.

FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

3. For more information about pneumatic actuator ball valves, please refer to the catalog **Automatic Control Ball Valves**.

4. CE certification is available. For more information, please contact FITOK group or our authorized distributors