

# Ball Valves

BF, BFH, BG, BH, BO, BP,  
BR and BV Series

Ball Valves  
Plug Valves



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BF and BFH Series



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## Important Information about Ball Valves

- ⦿ FITOK ball valves are designed to be used in fully open or fully closed position.
- ⦿ Packing adjustment may be required during the valve's life (except for BF and BFH series).
- ⦿ For better quality maintenance, FITOK ball valves should be kept in fully open position in warehouse.
- ⦿ Valves that have not been cycled for a period of time may have a higher initial actuation torque.

# Trunnion Ball Valves

## BF and BFH Series

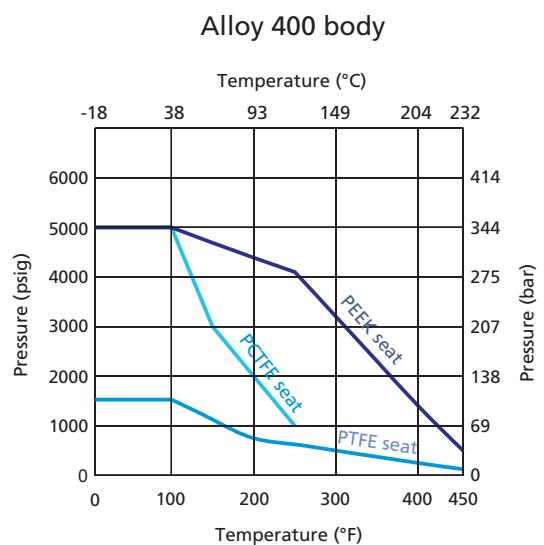
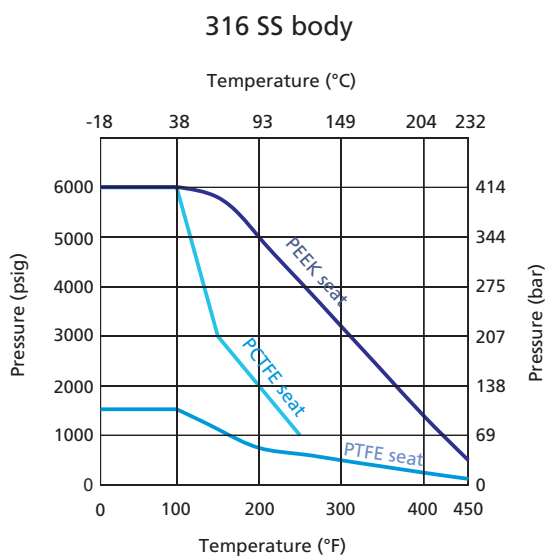
### Features

- ⦿ Working pressure up to: 10,000 psig (690 bar)
- ⦿ Working temperature: 0°F to 450°F (-18°C to 232°C)
- ⦿ Orifice size: 0.19" (4.8 mm)
- ⦿ Fixed ball with double sealing
- ⦿ Trunnion-style ball to prevent ball blowout
- ⦿ Automatic compensation of seat sealing
- ⦿ Low operating torque
- ⦿ Blowout proof stem
- ⦿ Handle as indicator of flow direction
- ⦿ Positive handle stop
- ⦿ Handle color options available
- ⦿ Pneumatic and electric actuator available
- ⦿ Panel mountable
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure (not higher than 6000 psig) to meet the requirement of no visible leak
- ⦿ Compact maximum-flow design
- ⦿ 2- or 3-way flow patterns
- ⦿ Spring-load seats to provide leak tight integrity in both low-and high-pressure systems and reduce seat wear from pressure surges
- ⦿ The inlet of 3-way valve can be any port



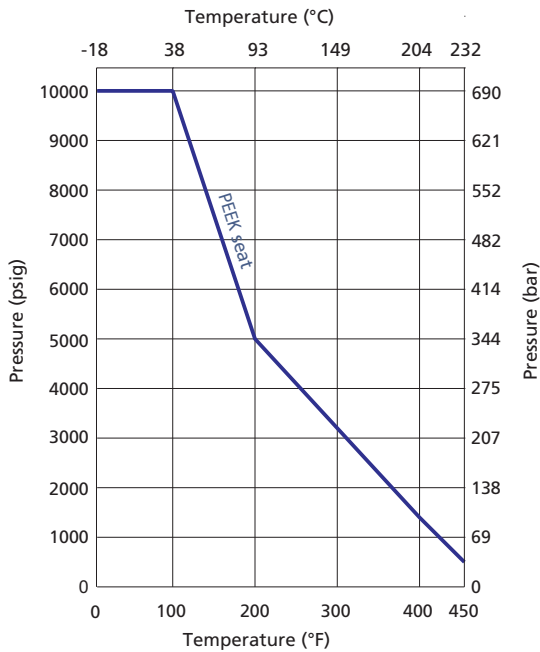
### Pressure vs. Temperature

#### BF Series



### BFH Series

316 SS body



Pressure Rating @ 100°F (38°C)

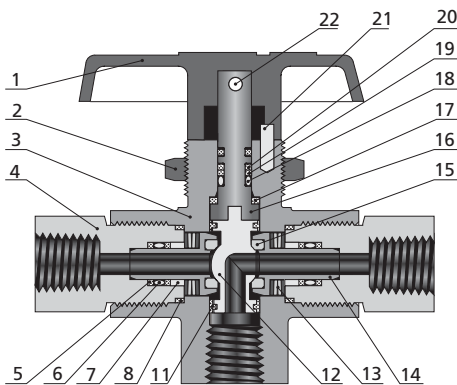
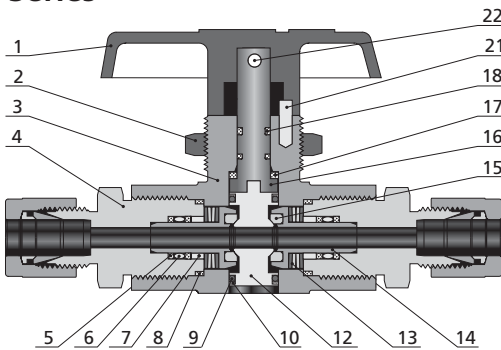
Material	End Connection	Pressure Rating, psig ( bar )
316 SS	FNS2, FNS4 FL4, ML6	10000 (690)
	ML10	8400 (578)
	FL6/ML8	7500 (516)
	FL8	6700 (461)
	ML12	6800 (470)

Note: Maximum working pressure of BFH Series ball valves is 10,000 psig. The specified pressure rating is restricted by end connections.

Ball Valves  
Plug Valves

### Standard Materials of Construction

BF Series

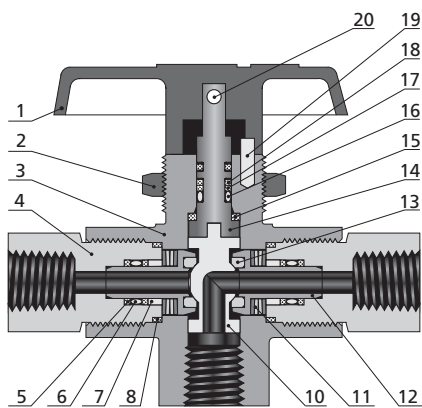
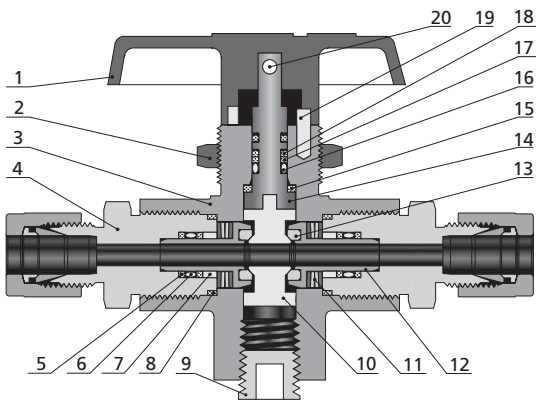


Item	Component	Valve Body Material			
		316 SS		Alloy 400	
		2-way	3-way	2-way	3-way
Material Grade/ASTM Specification					
1	Handle	Nylon with SS insert			
2	Panel Nut	316 SS/A479			
3	Body	316 SS/A182		Alloy 400/B164	
4	End Connection	316 SS/A479		Alloy 400/B164	
5	Seat Retainer Backup Ring	Reinforced PTFE			
6	Seat Retainer O-ring	Fluorocarbon FKM			
7	Seat Retainer Guide	316 SS/A479		Alloy 400/B164	
8	End Connection Seal	PTFE/D1710			
9	Trunnion O-ring	Fluorocarbon FKM	—	Fluorocarbon FKM	—
10	Trunnion Backup Ring	Reinforced PTFE	—	Reinforced PTFE	—
11	Trunnion Bearing	—	PEEK	—	PEEK
12	Ball	316 SS/A479		Alloy 400/B164	
13	Seat Spring	Alloy X-750/AMS 5542			
14	Seat Retainer	316 SS/A479		Alloy 400/B164	
15	Seat	PTFE or PEEK or PCTFE			
16	Stem	316 SS/A479		Alloy 400/B164	
17	Stem Washer	PEEK			
18	Stem O-ring	Fluorocarbon FKM		Fluorocarbon FKM	
19	Secondary Stem Backup Ring	—	PTFE/D1710	—	PTFE/D1710
20	Primary Stem Backup Ring	—	PEEK	—	PEEK
21	Stop Pin	SS			
22	Set Screw	Galvanized carbon steel			
Lubricants		Fluorinated-based			

Note: Wetted components are listed in italics.  
 1. Ball trunnions are PTFE coated for BF series 2-way valves.  
 2. For other materials, please contact FITOK Group or our authorized distributors.

## B-06 Ball Valves

### BFH Series



Item	Component	2-way	3-way
		Material Grade/ASTM Specification	
1	Handle	<i>Nylon with SS insert</i>	
2	Panel Nut	316 SS/A479	
3	Body	316 SS/A182	
4	End Connection	316 SS/A479	
5	Seat Retainer Backup Ring	Reinforced PTFE	
6	Seat Retainer O-ring	Fluorocarbon FKM	
7	Seat Retainer Guide	316 SS/A479	
8	End Connection Seal	PTFE/D1710	
9	Plug	316 SS/A479	
10	Ball	S21800/A479	
11	Seat Spring	<i>Alloy X-750/AMS 5542</i>	
12	Seat Retainer	316 SS/A479	
13	Seat	PEEK	
14	Stem	316 SS/A479	
15	Stem Washer	PEEK	
16	Stem O-ring	Fluorocarbon FKM	
17	Secondary Stem Backup Ring	PTFE/D1710	
18	Primary Stem Backup Ring	PEEK	
19	Stop Pin	SS	
20	Set Screw	Galvanized carbon steel	
Lubricants		<i>Fluorinated-based</i>	

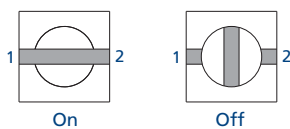
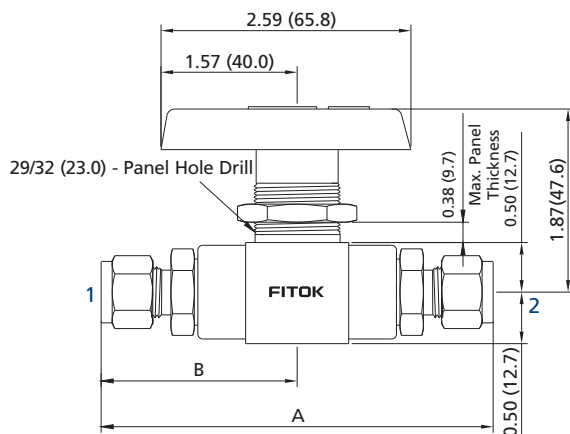
Note: Wetted components are listed in italics.

1. Ball trunnions are PTFE coated for BFH series ball valves.

2. For other materials, please contact FITOK Group or our authorized distributors.

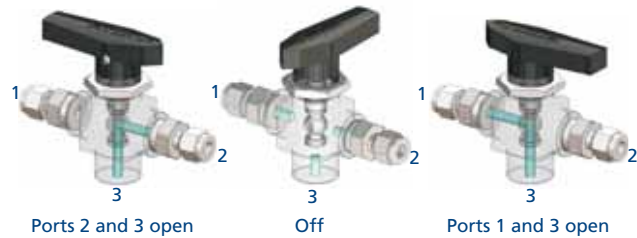
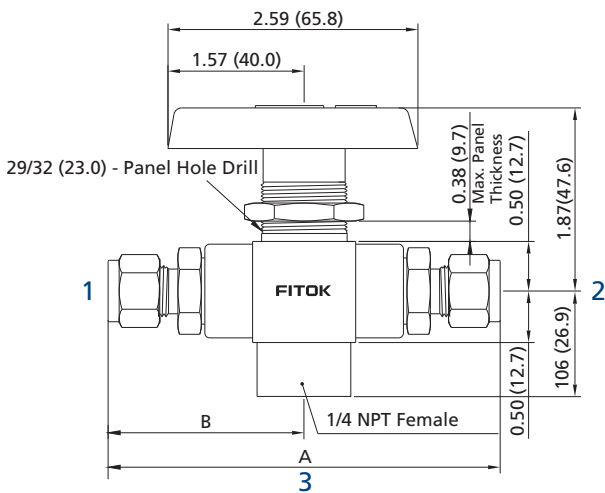
## Dimensions

### 2-way Valves



Basic Ordering Number		Connection Type and Size		Cv	Dimensions, in. (mm)	
BF Series	BFH Series	Connection 1	Connection 2		A	B
BF□□-FNS2	BFH□□-FNS2-P	1/8 Female NPT	1/8 Female NPT	1.2	2.94 (74.7)	1.47 (37.3)
BF□□-FNS4	BFH□□-FNS4-P	1/4 Female NPT	1/4 Female NPT	1.0		
BF□□-FNS8	BFH□□-FNS8-P	1/2 Female NPT	1/2 Female NPT	1.2	4.25 (108.0)	2.13 (54.1)
BF□□-FL4	BFH□□-FL4-P	1/4" FITOK	1/4" FITOK	1.6	4.14 (105.2)	2.07 (52.6)
BF□□-FL6	BFH□□-FL6-P	3/8" FITOK	3/8" FITOK	1.4	4.39 (111.5)	2.19 (55.6)
BF□□-FL8	BFH□□-FL8-P	1/2" FITOK	1/2" FITOK	1.0	4.60 (116.8)	2.30 (58.4)
BF□□-ML6	BFH□□-ML6-P	6 mm FITOK	6 mm FITOK	1.6	4.14 (105.2)	2.07 (52.6)
BF□□-ML8	BFH□□-ML8-P	8 mm FITOK	8 mm FITOK	1.5	4.15 (105.4)	
BF□□-ML10	BFH□□-ML10-P	10 mm FITOK	10 mm FITOK	1.3	4.41 (112.0)	2.20 (55.9)
BF□□-ML12	BFH□□-ML12-P	12 mm FITOK	12 mm FITOK	1.0	4.60 (116.8)	2.30 (58.4)

### 3-way Valves



Basic Ordering Number		Connection Type and Size			Cv	Dimensions, in. (mm)	
BF Series	BFH Series	Connection 1	Connection 2	Connection 3		A	B
BF□□-FNS2-3	BFH□□-FNS2-P-3	1/8 Female NPT	1/8 Female NPT	1/4 Female NPT	0.75	2.94 (74.7)	1.47 (37.3)
BF□□-FNS4-3	BFH□□-FNS4-P-3	1/4 Female NPT	1/4 Female NPT				
BF□□-FL4-3	BFH□□-FL4-P-3	1/4" FITOK	1/4" FITOK			4.14 (105.2)	2.07 (52.6)
BF□□-FL6-3	BFH□□-FL6-P-3	3/8" FITOK	3/8" FITOK			4.39 (111.5)	2.19 (55.6)
BF□□-FL8-3	BFH□□-FL8-P-3	1/2" FITOK	1/2" FITOK			4.60 (116.8)	2.30 (58.4)
BF□□-ML6-3	BFH□□-ML6-P-3	6 mm FITOK	6 mm FITOK			4.14 (105.2)	2.07 (52.6)
BF□□-ML8-3	BFH□□-ML8-P-3	8 mm FITOK	8 mm FITOK			4.15 (105.4)	
BF□□-ML10-3	BFH□□-ML10-P-3	10 mm FITOK	10 mm FITOK			4.41 (112.0)	2.20 (55.9)
BF□□-ML12-3	BFH□□-ML12-P-3	12 mm FITOK	12 mm FITOK			4.60 (116.8)	2.30 (58.4)

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.
4. Bottom port of all 3-way valves is 1/4 in. female NPT.

## Low-Temperature Service Option

Trunnion ball valves for low-temperature service, with a temperature rating of -40 to 200 (-40 to 93), are available.

Low-temperature valves have low-temperature NBR O-rings.

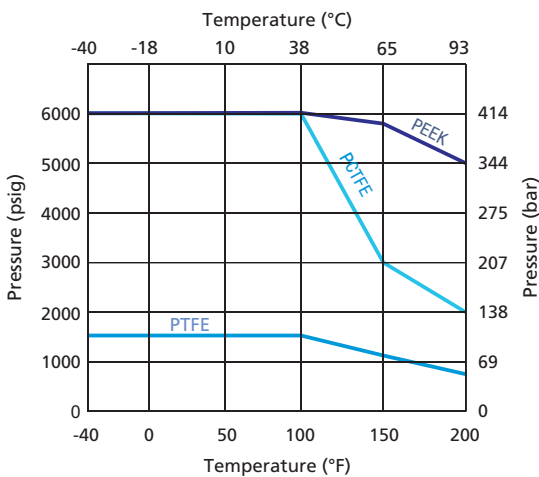
All other materials are the same as those of standard valves.

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

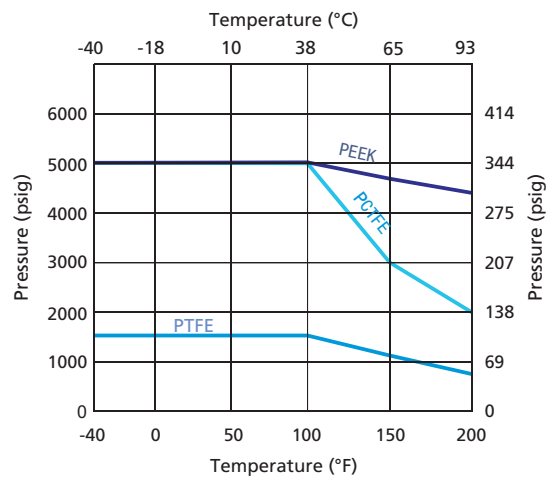
For example: BFSS-FL4-P-LT

## Low-Temperature BF Series Pressure vs. Temperature

316 SS Body



Alloy 400 Body



## Seal Kits

Valve Series	Flow Pattern	Basic Seal Kit Ordering Number	Content
BF series	2-way	BFSS-2-□	Seat retainer backup ring, seat retainer O-ring, seat retainer guide, end connection seal, trunnion O-ring, trunnion backup ring, ball, seat spring, seat retainer, seat, stem, stem washer, stem O-ring, instructions.
Low-temperature BF series		BFSS-2-□-LT	
BF series	3-way	BFSS-3-□	Seat retainer backup ring, seat retainer O-ring, seat retainer guide, end connection seal, trunnion backup ring, ball, seat spring, seat retainer, seat, stem, stem washer, stem O-ring, secondary stem backup ring, primary stem backup ring, instructions.
Low-temperature BF series		BFSS-3-□-LT	
BFH series	2-way	BFHSS-2-P	Seat retainer backup ring, seat retainer O-ring, seat retainer guide, end connection seal, ball, seat spring, seat retainer, seat, stem, stem washer, stem O-ring, secondary stem backup ring, primary stem backup ring, instructions.
Low-temperature BFH series		BFHSS-2-P-LT	
BFH series	3-way	BFHSS-3-P	
Low-temperature BFH series		BFHSS-3-P-LT	

Seat Material	Designator
PTFE	T
PCTFE	K
PEEK	P

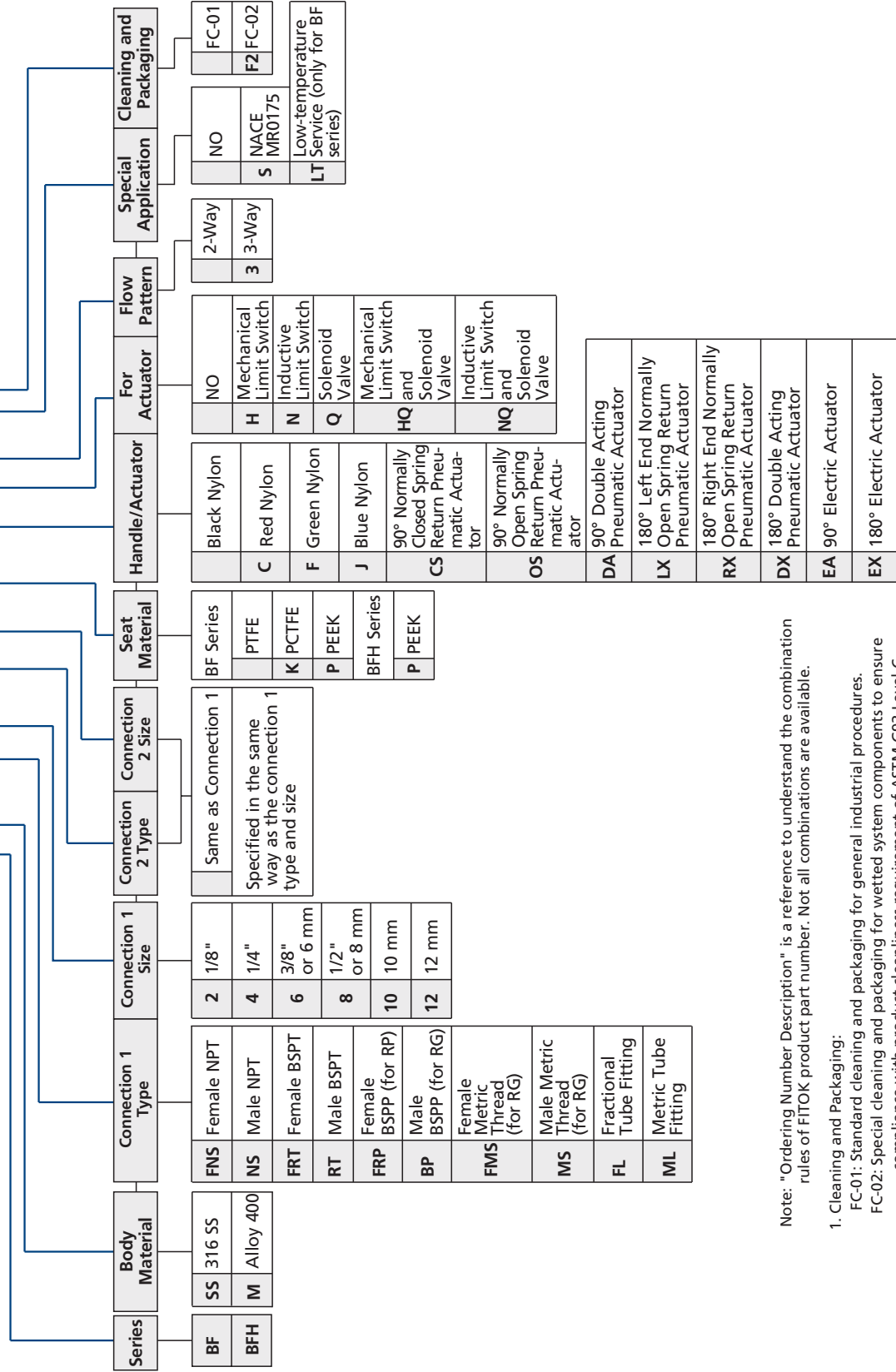
To order seal kits for BF series ball valves, select a seat designator from the table at left and add to the basic ordering number.

Example: BFSS-2-T

Ordering numbers specify 316 stainless steel material. For other materials, replace SS in the ordering number with appropriate material designator. Example: BFM-2-T. M is the designator for Alloy 400.

# Ordering Number Description

BFSS – FNS4 – ML12 – P – RXHQ3 – SF2



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

- 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.  
 2. For more information about pneumatically actuated ball valves, please refer to the catalog **Automatic Control Ball Valves**.



# 3-piece Ball Valves

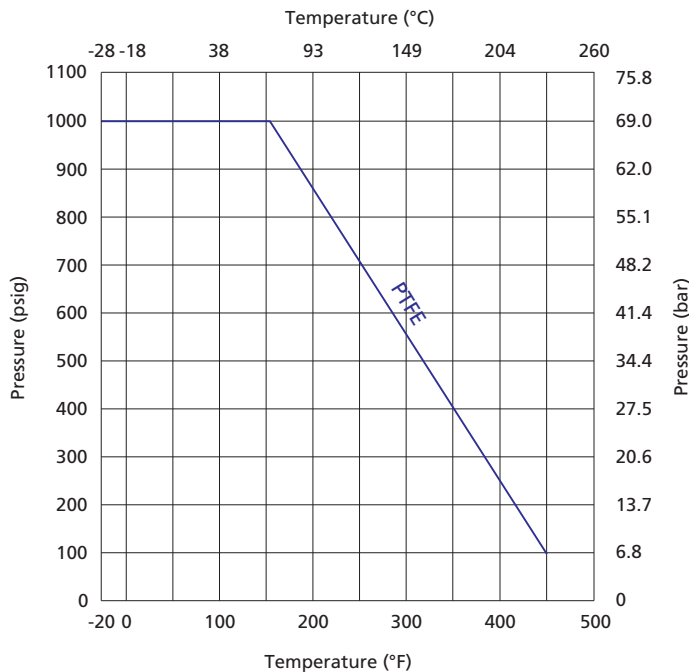
## BG Series

### Features

- ⦿ Working pressure up to: 1000 psig (69.0 bar)
- ⦿ Working temperature: -20°F to 450°F (-28°C to 232°C)
- ⦿ End connections:
  - 1/8 to 1 thread
  - 1/8" to 1" pipe butt or socket weld
  - 1/4" to 1" and 6 mm to 25 mm tube butt or socket weld
  - 1/4" to 1" and 6 mm to 25 mm tube fitting
- ⦿ Orifice sizes: 0.19" (4.8 mm) to 1" (25 mm)
- ⦿ Blowout proof stem
- ⦿ Bidirectional flow
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure to meet the requirement of no visible leak

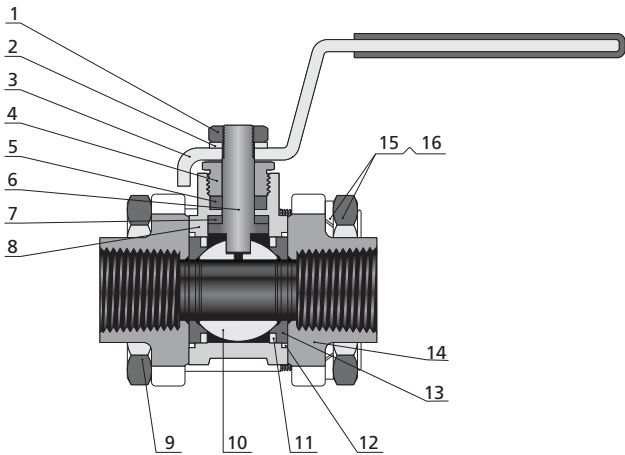


### Pressure vs. Temperature



Note: The temperature and pressure rating are based on valves of standard materials.

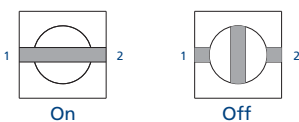
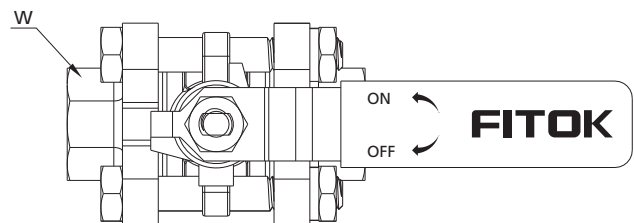
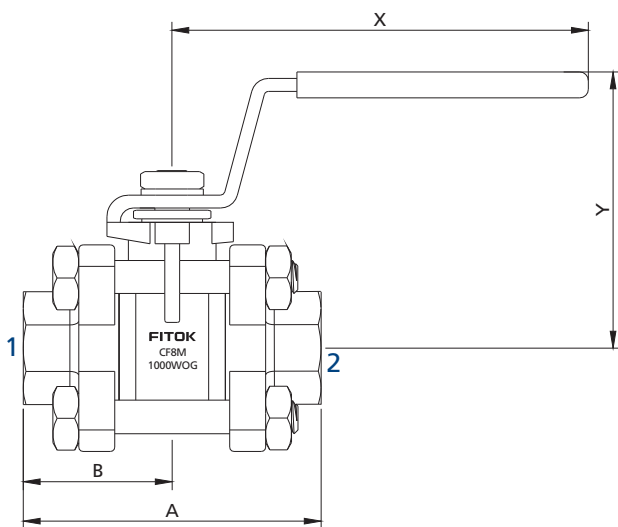
## Standard Materials of Construction



Item	Component	Valve Body Material	
		CF8M/A351	CF8/A351
1	Stem Nut	SS	
2	Gasket	SS	
3	Handle	304 SS/A240 (with vinyl sleeve)	
4	Gland	316 SS/A479 or 304 SS/A479	
5	Stem Packing	PTFE/D1710	
6	Stem	316 SS/A479 or 304 SS/A479	
7	Stem Bearing	PTFE/D1710	
8	Body	CF8M/A351	CF8/A351
9	Body Bolt	SS	
10	Ball	316 SS/A479 or 304 SS/A479	
11	Support Ring	316 SS/A240 or 304 SS/A240	
12	Flange Seal	PTFE/D1710	
13	Seat	PTFE/D1710	
14	End Connection	CF8M/A351	CF8/A351
15	Gasket	SS	
16	Nut	SS	
Lubricants		Silicone-based and PTFE-based	

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

## Dimensions



## B-12 Ball Valves

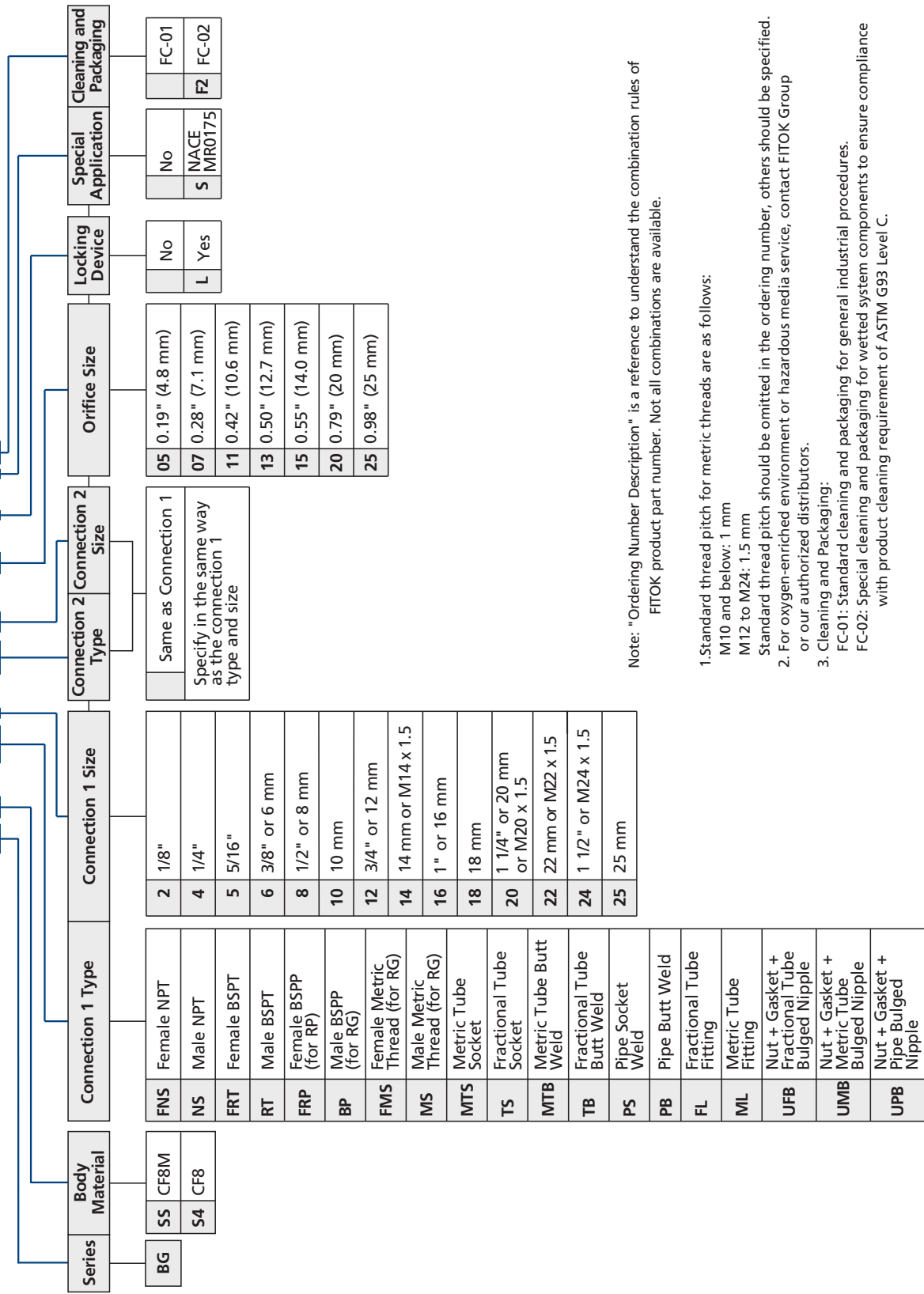
Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)				
	Connection 1	Connection 2			A	B	W	X	Y
BG□□-FNS2-05	1/8 Female NPT	1/8 Female NPT	0.19 (4.8)	1.2	2.05 (52.1)	1.03 (26.0)	0.63 (16.0)	2.69 (68.3)	1.46 (37.0)
BG□□-FRP2-05	1/8 Female BSPP	1/8 Female BSPP							
BG□□-PB4-05	1/4 PB, Schedule Number: 80	1/4 PB, Schedule Number: 80							
BG□□-FL4-05	1/4" FITOK	1/4" FITOK							
BG□□-ML6-05	6 mm FITOK	6 mm FITOK							
BG□□-ML8-05	8 mm FITOK	8 mm FITOK							
BG□□-FNS4-07	1/4 Female NPT	1/4 Female NPT	0.28 (7.1)	3.8	2.05 (52.1)	1.03 (26.0)	0.93 (23.5)	3.94 (100.0)	2.19 (55.7)
BG□□-FRP4-07	1/4 Female BSPP	1/4 Female BSPP							
BG□□-FL6-07	3/8" FITOK	3/8" FITOK							
BG□□-ML10-07	10 mm FITOK	10 mm FITOK							
BG□□-FL8-11	1/2" FITOK	1/2" FITOK	0.42 (10.6)	7.5	4.04 (103.0)	2.02 (51.3)			
BG□□-ML12-11	12 mm FITOK	12 mm FITOK							
BG□□-ML14-11	14 mm FITOK	14 mm FITOK							
BG□□-FNS6-13	3/8 Female NPT	3/8 Female NPT	0.50 (12.7)	11.3	2.57 (65.2)	1.28 (32.6)			
BG□□-FRP6-13	3/8 Female BSPP	3/8 Female BSPP							
BG□□-PS6-13	3/8 PS	3/8 PS							
BG□□-PB8-13	1/2 PB, Schedule Number: 80	1/2 PB, Schedule Number: 80							
BG□□-FL10-13	5/8" FITOK	5/8" FITOK							
BG□□-ML16-13	16 mm FITOK	16 mm FITOK							
BG□□-FNS8-15	1/2 Female NPT	1/2 Female NPT	0.55 (14.0)	13.0	2.74 (69.5)	1.37 (34.8)	1.06 (27.0)	2.26 (57.5)	
BG□□-FRP8-15	1/2 Female BSPP	1/2 Female BSPP							
BG□□-PS8-15	1/2 PS	1/2 PS							
BG□□-MTB22-15	22 mm MTB, tube wall thickness: 3 mm	22 mm MTB, tube wall thickness: 3 mm							
BG□□-TS12-15	3/4" TS	3/4" TS							
BG□□-MTS18-15	18 mm MTS	18 mm MTS							
BG□□-FL12-15	3/4" FITOK	3/4" FITOK							
BG□□-ML18-15	18 mm FITOK	18 mm FITOK							
BG□□-FNS12-20	3/4 Female NPT	3/4 Female NPT	0.79 (20.0)	50.0	3.15 (80.0)	1.57 (40.0)	1.34 (34.0)	5.18 (131.5)	2.66 (67.5)
BG□□-FRP12-20	3/4 Female BSPP	3/4 Female BSPP							

Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)				
	Connection 1	Connection 2			A	B	W	X	Y
BG□□-PB12-20	3/4 PB Schedule Number: 80	3/4 PB Schedule Number: 80	0.79 (20.0)	50.0	3.15 (80.0)	1.57 (40.0)	1.34 (34.0)	5.18 (131.5)	2.66 (67.5)
BG□□-PS12-20	3/4 PS	3/4 PS							
BG□□-TS16-20	1" TS	1" TS							
BG□□-MTB25-20	25 mm MTB, tube wall thickness: 3.5 mm	25 mm MTB, tube wall thickness: 3.5 mm							
BG□□-MTS25-20	25 mm MTS	25 mm MTS			5.12 (130.0)	2.56 (65.0)	1.34 (34.0)	5.18 (131.5)	2.66 (67.5)
BG□□-FL16-20	1" FITOK	1" FITOK							
BG□□-ML22-20	22 mm FITOK	22 mm FITOK							
BG□□-ML25-20	25 mm FITOK	25 mm FITOK							
BG□□-FNS16-25	1 Female NPT	1 Female NPT	0.98 (25.0)	93.0	3.54 (90.0)	1.77 (45.0)	1.57 (40.0)	5.95 (151.2)	3.08 (78.2)
BG□□-FRP16-25	1 Female BSPP	1 Female BSPP							
BG□□-PS16-25	1 PS	1 PS							
BG□□-PB16-25	1 PB Schedule Number: 80	1 PB Schedule Number: 80							

1. FITOK means FITOK double ferrule tube fittings, TS means fractional tube socket weld, MTS means metric tube socket weld, TB means fractional tube butt weld, MTB means metric tube butt weld, PS means pipe socket weld, and PB means pipe butt weld.
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.

# Ordering Number Description

## Ordering Number Example: BGSS - FNS8 - ML18 - 15 - L - SF2



Ball Valves  
Plug Valves

Series		Body Material		Connection 1 Type		Connection 1 Size		Connection 2 Type		Connection 2 Size		Orifice Size		Locking Device		Special Application		Cleaning and Packaging	
BG		SS	CF8M	FNS	Female NPT	2	1/8"					05	0.19" (4.8 mm)	No	No		FC-01		
		S4	CF8	NS	Male NPT	4	1/4"					07	0.28" (7.1 mm)	L	NACE	S	FC-02	F2	
				FRT	Female BSPT	5	5/16"					11	0.42" (10.6 mm)						
				RT	Male BSPT	6	3/8" or 6 mm					13	0.50" (12.7 mm)						
				FRP	Female BSPP (for RP)	8	1/2" or 8 mm					15	0.55" (14.0 mm)						
				BP	Male BSPP (for RG)	10	10 mm					20	0.79" (20 mm)						
				FMS	Female Metric Thread (for RG)	12	3/4" or 12 mm					25	0.98" (25 mm)						
				MS	Male Metric Thread (for RG)	14	14 mm or M14 x 1.5												
				MTS	Metric Tube Socket	16	1" or 16 mm												
				TS	Fractional Tube Socket	18	18 mm												
				MTB	Metric Tube Butt Weld	20	1 1/4" or 20 mm or M20 x 1.5												
				TB	Fractional Tube Butt Weld	22	22 mm or M22 x 1.5												
				PS	Pipe Socket Weld	24	1 1/2" or M24 x 1.5												
				PB	Pipe Butt Weld	25	25 mm												
				FL	Fractional Tube Fitting														
				ML	Metric Tube Fitting														
				UFB	Nut + Gasket + Fractional Tube Bulged Nipple														
				UMB	Nut + Gasket + Metric Tube Bulged Nipple														
				UPB	Nut + Gasket + Pipe Bulged Nipple														

Same as Connection 1  
Specify in the same way as the connection 1 type and size

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

- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.
- 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 cleaning requirement of ASTM G93 Level C.

# 3-piece Ball Valves

## BH Series

### Features

- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -20°F to 450°F (-28°C to 232°C)
- ⦿ End connections:
  - 1/8 to 2 thread
  - 1/8" to 2" pipe butt or socket weld
  - 1/4" to 2" and 6 mm to 50 mm tube butt or socket weld
  - 1/4" to 2" and 6 mm to 38 mm tube fitting
- ⦿ 3-piece precision cast body construction
- ⦿ Orifize sizes: 0.19" (4.8 mm) to 1.5" (38.1 mm)
- ⦿ Pneumatic and electric actuator available
- ⦿ Bidirectional flow for 2-way valves
- ⦿ Bottom port as inlet for 3-way valves
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure to meet the requirement of no visible leak

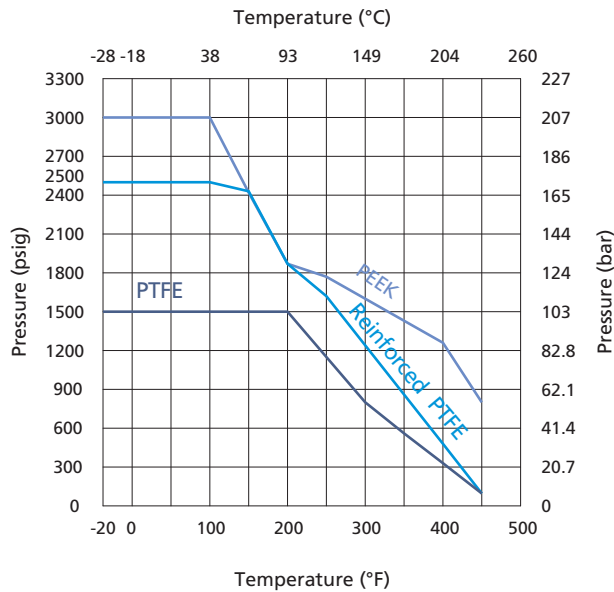


Ball Valves  
Plug Valves

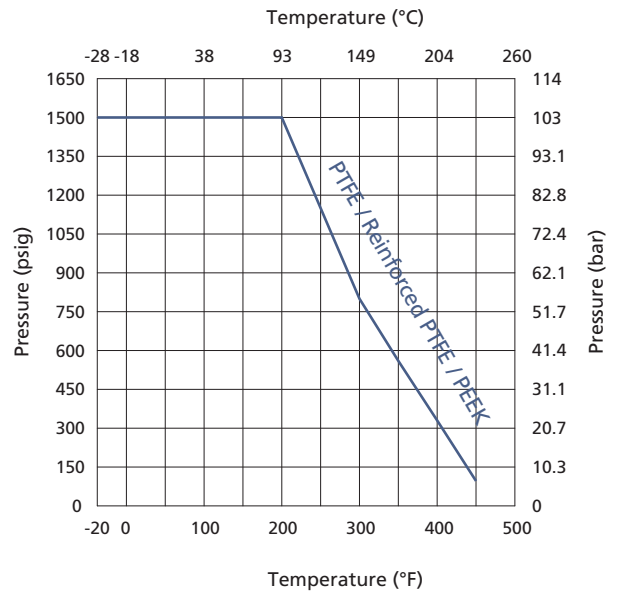
## Pressure vs. Temperature

### 2-way Valves

Orifice Size: 0.19", 0.28", 0.41", 0.52" & 0.88"

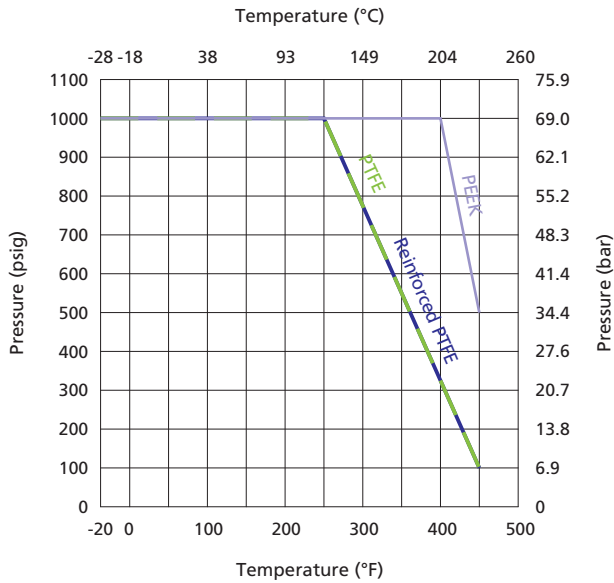


Orifice Size: 1.13", 1.25" & 1.50"



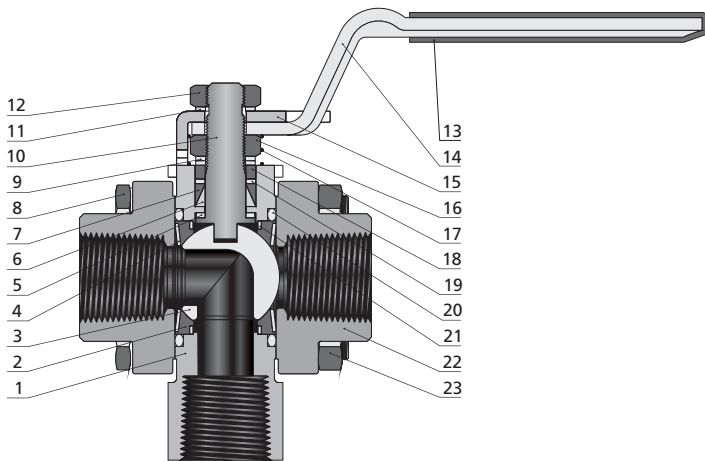
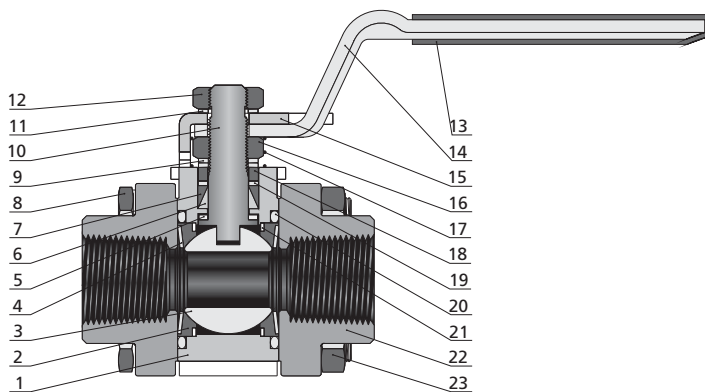
## B-16 Ball Valves

### 3-way Valves



Note: The temperature and pressure rating are based on valves of standard materials.

### Standard Materials of Construction



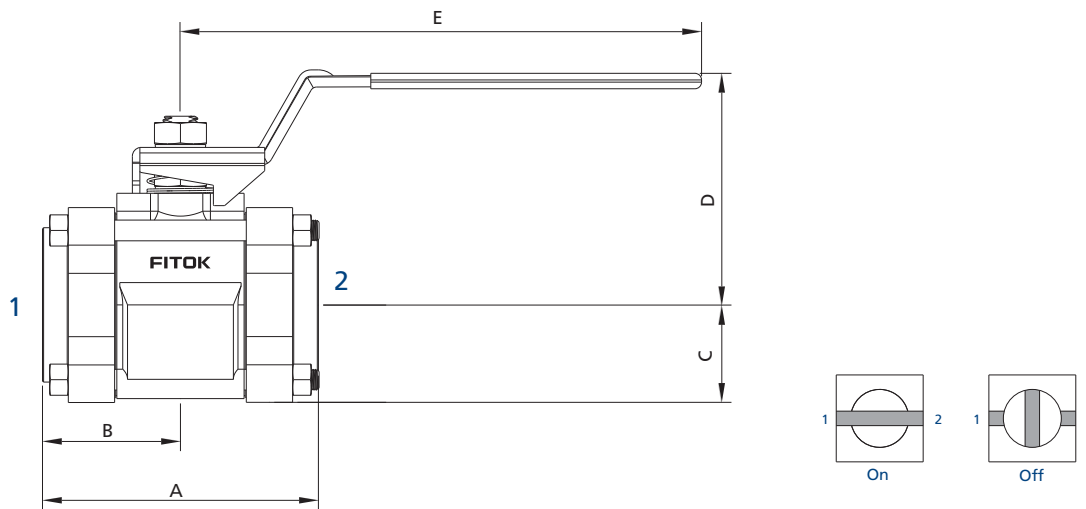
Item	Component	Material Grade/ASME Specification	
1	<i>Body</i>	<i>CF8M/A351</i>	<i>CF8/A351</i>
2	<i>Seat</i>	<i>PTFE or Reinforced PTFE or PEEK</i>	
3	<i>Ball</i>	<i>316 SS/A479</i>	
4	<i>Coned-disc Spring</i>	<i>Strain-hardened 316 SS/A240</i>	
5	<i>Stem Bearing</i>	<i>PEEK</i>	
6	<i>Lower Packing</i>	<i>Reinforced PTFE</i>	
7	<i>Upper Packing</i>	<i>Reinforced PTFE</i>	
8	<i>Body Bolt</i>	<i>Gr. B8M/A193</i>	
9	<i>Stem Spring</i>	<i>Strain-hardened 316 SS/A240</i>	
10	<i>Stem</i>	<i>316 SS/A479</i>	
11	<i>Stem Spring</i>	<i>Strain-hardened 316 SS/A240</i>	
12	<i>Stem Nut</i>	<i>Gr. 8M/A194</i>	
13	<i>Handle Sleeve</i>	<i>Vinyl</i>	
14	<i>Handle</i>	<i>304 SS/A240</i>	
15	<i>Stop Plate</i>	<i>304 SS/A240</i>	
16	<i>Stem Nut</i>	<i>Gr. 8M/A194</i>	
17	<i>Grounding Spring</i>	<i>302 SS/A313</i>	
18	<i>Gland</i>	<i>PTFE-coated 316 SS/A479</i>	
19	<i>Packing Support</i>	<i>PEEK</i>	
20	<i>Flange Seal</i>	<i>PTFE/ID1710</i>	
21	<i>Support Ring</i>	<i>316 SS/A240</i>	
22	<i>End Connection</i>	<i>CF8M/A351</i>	<i>CF8/A351</i>
23	<i>Body Nut</i>	<i>Gr.8M/A194</i>	
	<i>Lubricants</i>	<i>Silicone-based and PTTE-based</i>	

Note: Wetted components are listed in italics.

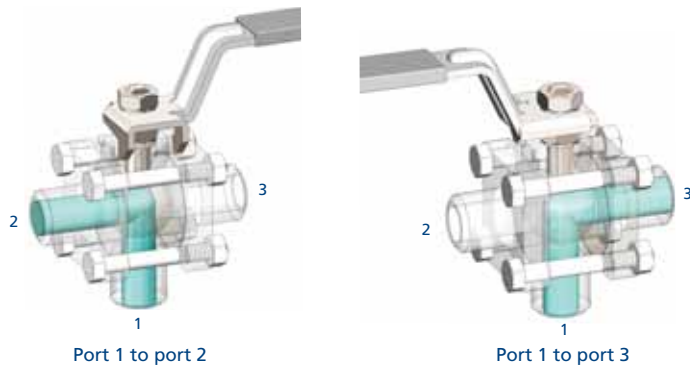
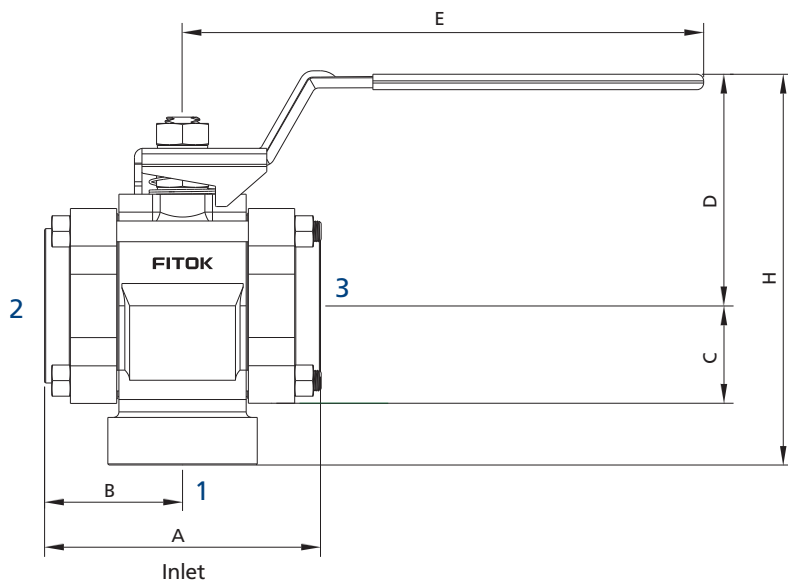
For other materials, please contact FITOK Group or our authorized distributors.

## Dimensions

### 2-way Valves



### 3-way Valves





B-18 Ball Valves

Basic Ordering Number		Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)								
2-way	3-way	Connection 1	Connection 2/3			A	B	C	D	E	H			
BH□□-FL4-05	BH□□-FL4-05-3	1/4" FITOK	1/4" FITOK	0.19 (4.8)	1.2	3.17 (80.5)	1.59 (40.4)	0.68 (17.3)	1.66 (42.2)	2.37 (60.2)	3.35 (85.1)			
BH□□-ML6-05	BH□□-ML6-05-3	6 mm FITOK	6 mm FITOK											
BH□□-ML8-05	BH□□-ML8-05-3	8 mm FITOK	8 mm FITOK		2.5									
BH□□-TS4-05	—	1/4" TS	1/4" TS		1.2	2.16 (54.9)	1.08 (27.4)							
BH□□-MTS6-05	—	6 mm MTS	6 mm MTS			2.08 (52.8)	1.04 (26.4)							
BH□□-PB4-05	—	1/4 PB, Schedule Number: 80	1/4 PB, Schedule Number: 80											
BH□□-FNS2-07	BH□□-FNS2-07-3	1/8 Female NPT	1/8 Female NPT	0.28 (7.1)	3.8	2.16 (54.9)	1.08 (27.4)	0.68 (17.3)	1.66 (42.2)	2.37 (60.2)	3.12 (79.2)			
BH□□-FRT2-07	BH□□-FRT2-07-3	1/8 Female BSPT	1/8 Female BSPT											
BH□□-FRP2-07	BH□□-FRP2-07-3	1/8 Female BSPP	1/8 Female BSPP											
BH□□-FNS4-07	BH□□-FNS4-07-3	1/4 Female NPT	1/4 Female NPT											
BH□□-FRT4-07	BH□□-FRT4-07-3	1/4 Female BSPT	1/4 Female BSPT											
BH□□-FRP4-07	BH□□-FRP4-07-3	1/4 Female BSPP	1/4 Female BSPP											
BH□□-FL6-07	BH□□-FL6-07-3	3/8" FITOK	3/8" FITOK									3.17 (80.5)	1.59 (40.4)	
BH□□-ML10-07	BH□□-ML10-07-3	10 mm FITOK	10 mm FITOK									3.20 (81.3)	1.60 (40.6)	
BH□□-TS6-07	—	3/8" TS	3/8" TS									2.16 (54.9)	1.08 (27.4)	
BH□□-PB6-07	—	3/8 PB, Schedule Number: 80	3/8 PB, Schedule Number: 80									2.08 (52.8)	1.04 (26.4)	
BH□□-FL8-10	BH□□-FL8-10-3	1/2" FITOK	1/2" FITOK	0.41 (10.4)	7.5	4.04 (103)	2.02 (51.3)	0.89 (22.6)	2.35 (59.7)	4.50 (114)	4.48 (114)			
BH□□-ML12-10	BH□□-ML12-10-3	12 mm FITOK	12 mm FITOK	0.41 (10.4)										
BH□□-TS8-10	—	1/2" TS	1/2" TS	0.41 (10.4)								2.70 (68.6)	1.34 (34)	
BH□□-FNS6-13	BH□□-FNS6-13-3	3/8 Female NPT	3/8 Female NPT	0.52 (13.1)	12	2.70 (68.6)	1.35 (34.3)	0.89 (22.6)	2.35 (59.7)	4.50 (114)	4.19 (106)			
BH□□-FRT6-13	BH□□-FRT6-13-3	3/8 Female BSPT	3/8 Female BSPT											
BH□□-FRP6-13	BH□□-FRP6-13-3	3/8 Female BSPP	3/8 Female BSPP											
BH□□-FNS8-13	BH□□-FNS8-13-3	1/2 Female NPT	1/2 Female NPT											
BH□□-FRT8-13	BH□□-FRT8-13-3	1/2 Female BSPT	1/2 Female BSPT											
BH□□-FRP8-13	BH□□-FRP8-13-3	1/2 Female BSPP	1/2 Female BSPP											
BH□□-FL12-13	BH□□-FL12-13-3	3/4" FITOK	3/4" FITOK									13.6	4.04 (103)	2.02 (51.3)
BH□□-ML16-13	BH□□-ML16-13-3	16 mm FITOK	16 mm FITOK											
BH□□-ML18-13	BH□□-ML18-13-3	18 mm FITOK	18 mm FITOK											
BH□□-TS12-13	—	3/4" TS	3/4" TS											
BH□□-PS8-13	—	1/2 PS	1/2 PS	15	6.8	2.69 (68.3)	1.34 (34)							
BH□□-PB8-13	—	1/2 PB, Schedule Number: 80	1/2 PB, Schedule Number: 80											

Ball Valves  
Plug Valves

Basic Ordering Number		Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in. (mm)					
2-way	3-way	Connection 1	Connection 2/3			A	B	C	D	E	H
BH□□-PB12-13	—	3/4 PB, Schedule Number: 80	3/4 PB, Schedule Number: 80	0.52 (13.1)	13.6	2.69 (68.3)	1.34 (34)	0.89 (22.6)	2.35 (59.7)	4.50 (114)	—
BH□□-FNS12-22	BH□□-FNS12-22-3	3/4 Female NPT	3/4 Female NPT	0.88 (22.2)	31	3.59 (91.2)	1.8 (45.7)	1.25 (31.8)	2.94 (74.7)	6.00 (152)	5.45 (138)
BH□□-FRT12-22	BH□□-FRT12-22-3	3/4 Female BSPT	3/4 Female BSPT								
BH□□-FRP12-22	BH□□-FRP12-22-3	3/4 Female BSPP	3/4 Female BSPP								
BH□□-FNS16-22	BH□□-FNS16-22-3	1 Female NPT	1 Female NPT								
BH□□-FRT16-22	BH□□-FRT16-22-3	1 Female BSPT	1 Female BSPT								
BH□□-FRP16-22	BH□□-FRP16-22-3	1 Female BSPP	1 Female BSPP								
BH□□-FL16-22	BH□□-FL16-22-3	1" FITOK	1" FITOK								
BH□□-FL20-22	BH□□-FL20-22-3	1 1/4" FITOK	1 1/4" FITOK								
BH□□-ML25-22	BH□□-ML25-22-3	25 mm FITOK	25 mm FITOK								
BH□□-ML28-22	BH□□-ML28-22-3	28 mm FITOK	28 mm FITOK								
BH□□-TS16-22	—	1" TS	1" TS								
BH□□-MTS25-22	—	25 mm MTS	25 mm MTS								
BH□□-PS12-22	—	3/4 PS	3/4 PS								
BH□□-PS16-22	—	1 PS	1 PS								
BH□□-PB16-22	—	1 PB Schedule Number: 80	1 PB Schedule Number: 80								
BH□□-TS20-29	—	1 1/4" TS	1 1/4" TS		1.13 (28.6)	80	4.39 (112)				2.19 (55.6)
BH□□-PB20-32	—	1 1/4 PB, Schedule Number: 80	1 1/4 PB, Schedule Number: 80	4.57 (116)			2.28 (57.9)				
BH□□-FNS20-32	BH□□-FNS20-32-3	1 1/4 Female NPT	1 1/4 Female NPT	1.25 (31.8)	90	4.39 (112)	2.19 (55.6)	1.53 (38.9)	4.03 (102)	9.14 (232)	6.86 (174)
BH□□-FNS24-32	BH□□-FNS24-32-3	1 1/2 Female NPT	1 1/2 Female NPT								
BH□□-TS24-32	—	1 1/2" TS	1 1/2" TS								
BH□□-PS20-32	—	1 1/4 PS	1 1/4 PS								
BH□□-PS24-32	—	1 1/2 PS	1 1/2 PS								
BH□□-PB24-32	—	1 1/2 PB, Schedule Number: 80	1 1/2 PB, Schedule Number: 80								
BH□□-FNS32-38	BH□□-FNS32-38-3	2 Female NPT	2 Female NPT	1.50 (38.1)	130	4.94 (125)	2.47 (62.5)	1.74 (44.2)	4.16 (106)	9.14 (232)	7.21 (183)
BH□□-FRT32-38	BH□□-FRT32-38-3	2 Female BSPT	2 Female BSPT								
BH□□-TS32-38	—	2" TS	2" TS								
BH□□-PS32-38	—	2 PS	2 PS								
BH□□-PB32-38	—	2 PB, Schedule Number: 80	2 PB, Schedule Number: 80								

1. FITOK means FITOK double ferrule tube fittings, TS means fractional tube socket weld, MTS means metric tube socket weld, TB means fractional tube butt weld, MTB means metric tube butt weld, PS means pipe socket weld, and PB means pipe butt weld.
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.



# One-piece Instrumentation Ball Valves

## BO Series

### Features

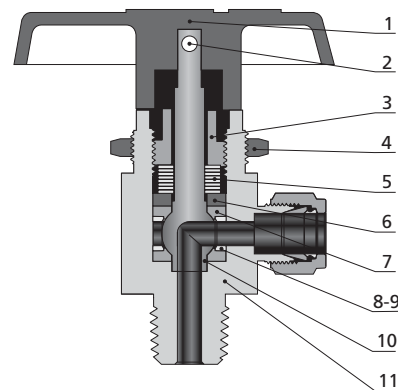
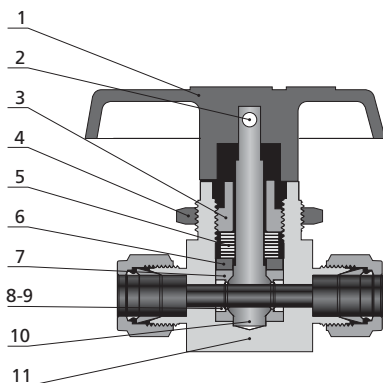
- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -65°F to 300°F (-54°C to 148°C)
- ⦿ End connections:
  - 1/4 to 1/2 thread
  - 1/16" to 3/4" and 3 mm to 18 mm tube fitting
- ⦿ 2-, 3-, 4-, 5-, 6- and 7-way models for on-off, switching and crossover service available
- ⦿ One-piece 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



## B-22 Ball Valves

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	<i>Packing Seat</i>	<i>PTFE/D1710 or UHMWPE/D4020 or PFA/D3307</i>		
8	<i>Support Ring</i>	316 SS/A479	316 SS/A479	Alloy 400/B164
9	<i>Support Disc</i>			
10	<i>Ball Stem</i>	316 SS/A479	Brass C36000/B16	Alloy 400/B164
11	<i>Body</i>	316 SS/A182	Brass C37700/B16	Alloy 400/B164
<i>Wetted Lubricant</i>		<i>Fluorinated-based and silicone-based</i>		
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



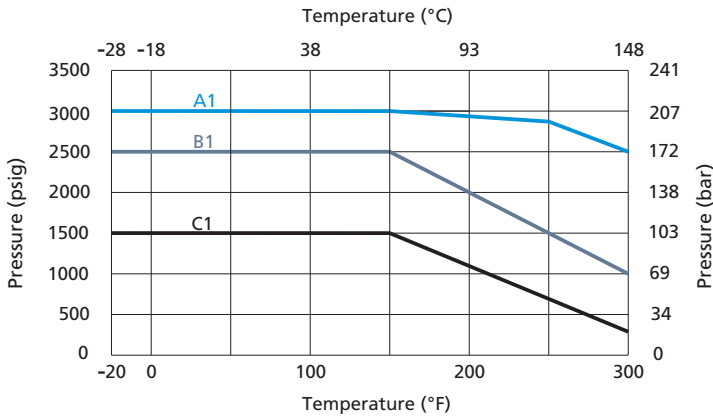
#### Angle Pattern



## Pressure vs. Temperature

Straight Pattern and Angle Pattern

### PTFE Packing Seat



A1: Straight Pattern Valves (orifice 0.19")

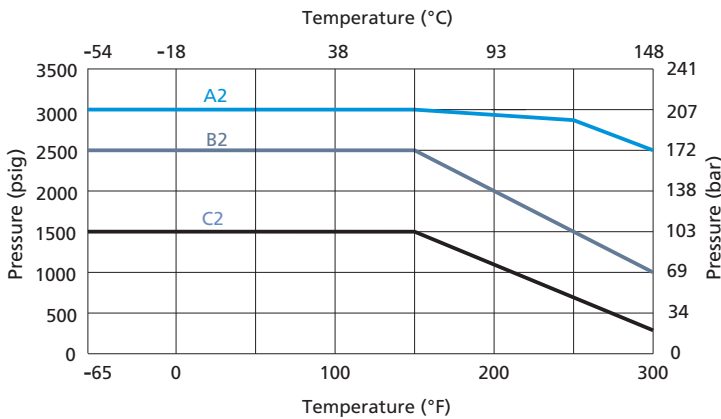
B1: Straight Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.28" & 0.41")

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")

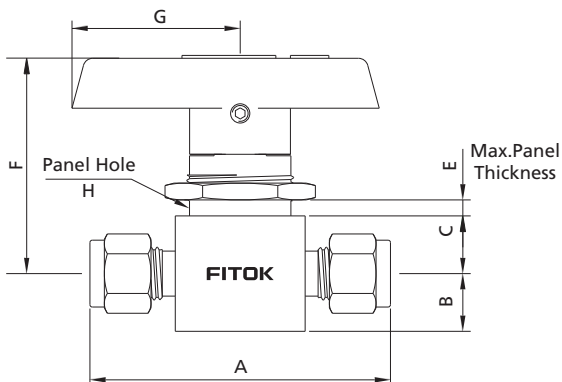
B2: Straight Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.28" & 0.41")

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

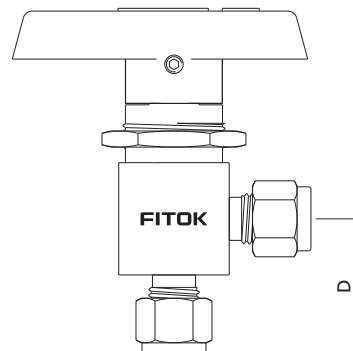
C2: Angle Valves (orifice 0.28" & 0.41")

## Dimensions

### Straight Pattern



### Angle Pattern



## B-24 Ball Valves

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)			—					
BO□□-FL2-02	1/8" 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□□-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	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)	2.05 (52)	1 1/8 (28.6)
BO□□-FL6-07													
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		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□□-ML8-05	8 mm FITOK		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	1/4 Female NPT		0.90	0.75	2.06 (52.3)			1.03 (26.2)					
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)	2.05 (52)	1 1/8 (28.6)	
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)	1 1/2 (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)		0.34 (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)	0.38 (9.7)	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

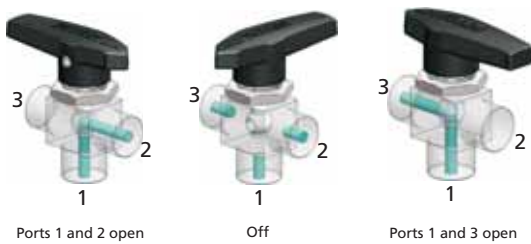


#### 4-way Valves



#### 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.

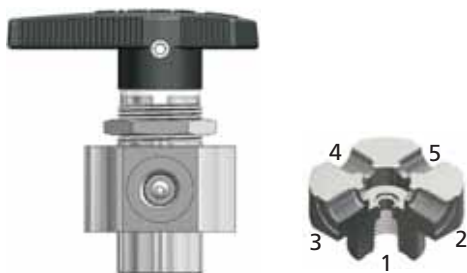


#### 4L Flow Path

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.





## B-26 Ball Valves

### 6-way Valves

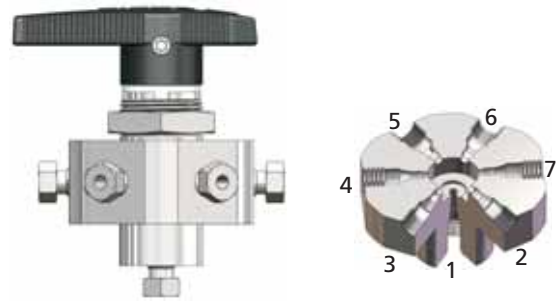


### 6L Flow Path

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.

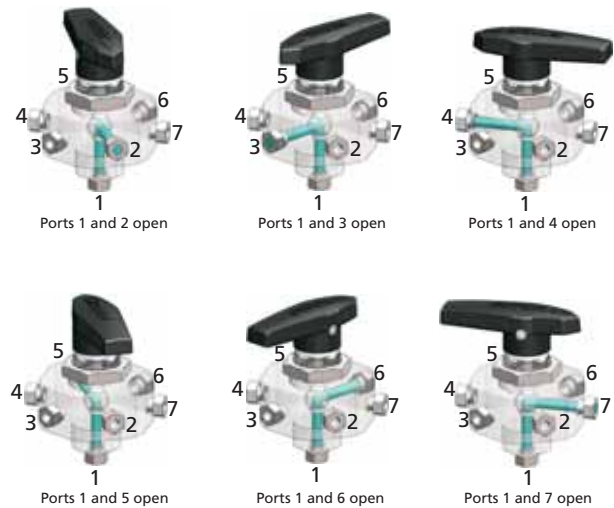


### 7-way Valves



### 7L Flow Path

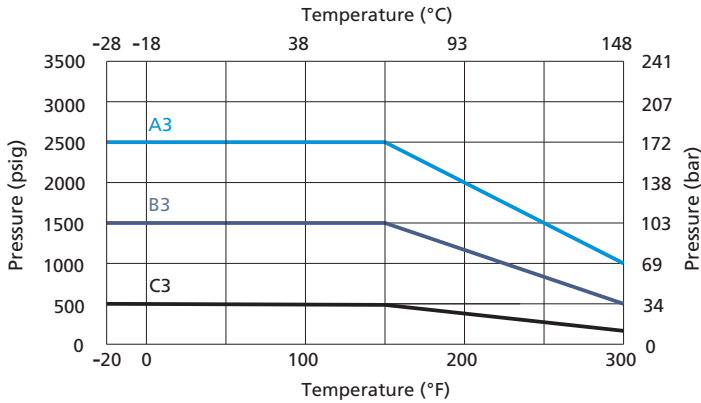
This type of valve can connect one side port to the bottom port, and shut off other 5 side ports at the same time. Switching can be done in 60° increments with 360° rotation handle.



## Pressure vs. Temperature

Switching Valves

### PTFE Packing Seat



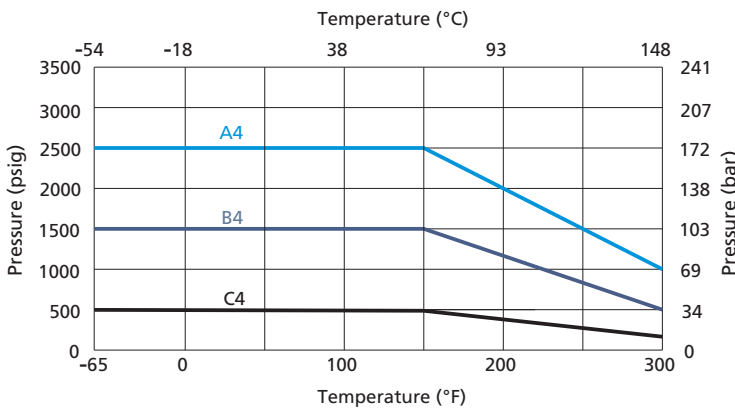
A3: 3-way (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.19")  
4-way / 5-way (orifice 0.06")

B3: 3-way (orifice 0.28" & 0.41")  
4-way / 5-way (orifice 0.41")

C3: 6-way / 7-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).



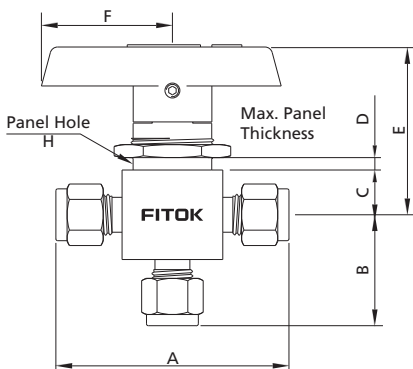
A4: 3-way (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.19")  
4-way / 5-way (orifice 0.06")

B4: 3-way (orifice 0.28" & 0.41")  
4-way / 5-way (orifice 0.41")

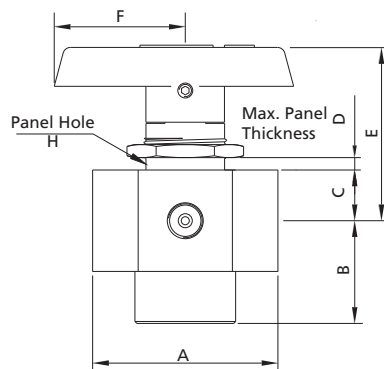
C4: 6-way / 7-way (orifice 0.05" & 0.06")

## Dimensions

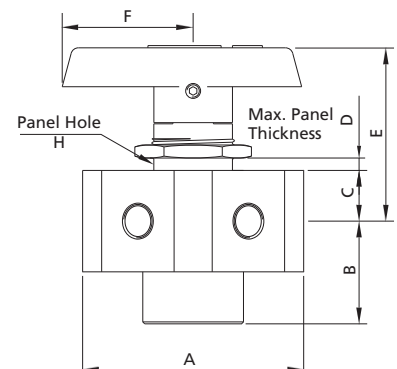
### 3-way Valves



### 4-and 5-way Valves



### 6-and 7-way Valves



B-28 Ball Valves

Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Orifice in. (mm)	Cv	Dimensions, in. (mm)						
				A	B	C	D	E	F	H
<b>3-way Valves</b>										
BO□□-FL1-00-3L	1/16" FITOK	0.05 (1.3)	0.08	1.68 (42.7)	0.81 (20.6)					
BO□□-FL2-02-3L	1/8" 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□□-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)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-ML8-05-3L	8 mm FITOK		0.80	2.46 (62.5)	1.20 (30.5)					
BO□□-ML10-07-3L	10 mm 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)	1 1/8 (28.6)
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)
<b>4 - &amp; 5-way Valves</b>										
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				1.85 (47)	0.88 (22.4)					
BO□□-FNS2-01-4L	1/8 Female NPT	0.06 (1.6)	0.07	1.55 (39.4)						
BO□□-FNS2-01-5L										
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										
<b>6 - &amp; 7-way Valves</b>										
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

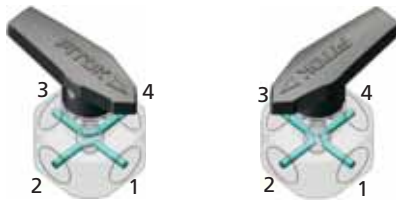


#### 6-way Valves



#### 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.

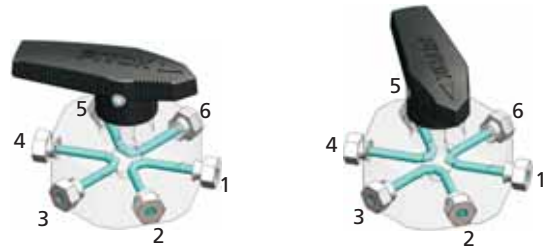


Ports 1 and 2 open  
Ports 3 and 4 open

Ports 1 and 4 open  
Ports 2 and 3 open

#### 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.



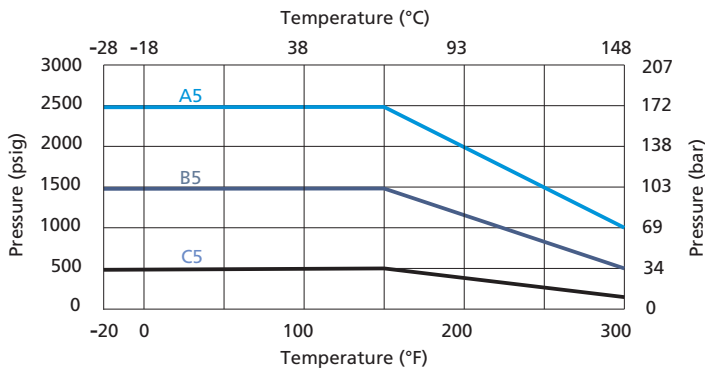
Ports 1 and 2 open  
Ports 3 and 4 open  
Ports 5 and 6 open

Ports 1 and 6 open  
Ports 2 and 3 open  
Ports 4 and 5 open

## Pressure vs. Temperature

### Crossover Valves

#### PTFE Packing Seat



A5: 4-way (orifice 0.06")

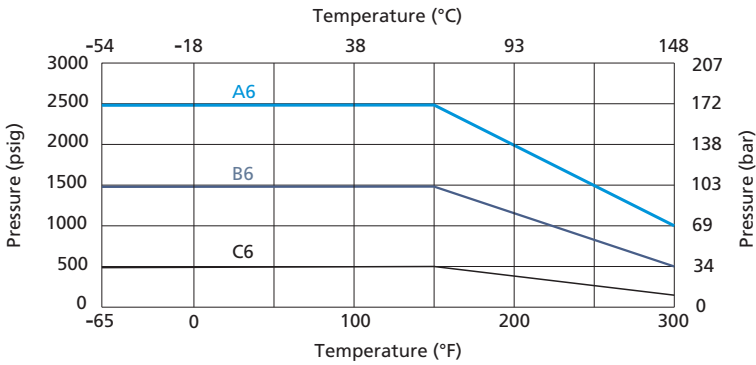
B5: 4-way (orifice 0.41")

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

## B-30 Ball Valves

### PFA, UHMWPE Packing Seat

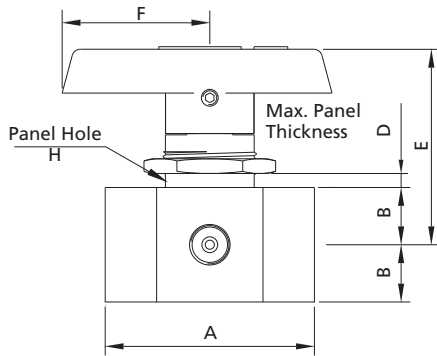
The working temperature of UHMWPE packing seat should not be higher than 150°F (65°C).



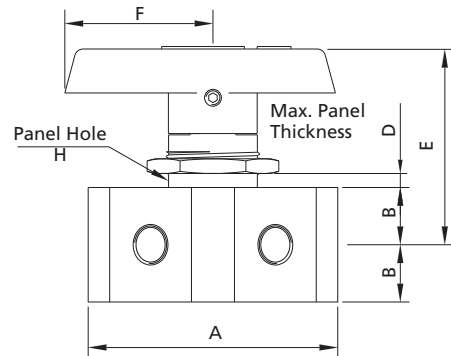
- A6: 4-way (orifice 0.06")
- B6: 6-way (orifice 0.41")
- C6: 6-way (orifice 0.05" & 0.06")

## 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
<b>4-way Valve</b>									
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)
<b>6-way Valve</b>									
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.

- FITOK means FITOK double ferrule tube fittings.
- Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.
- 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.

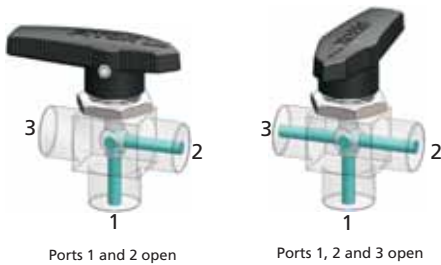
## Special Flow Path

### 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



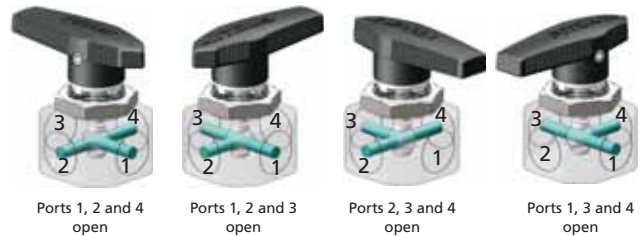
#### 4H Flow Path

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.



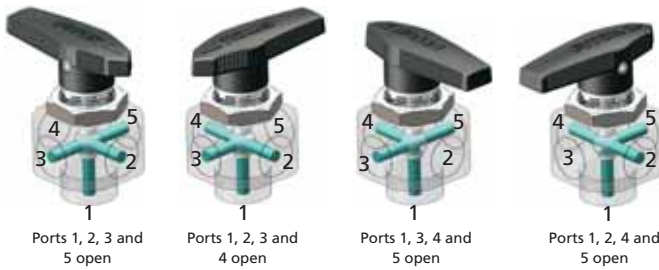
## B-32 Ball Valves

### 5-way Valves



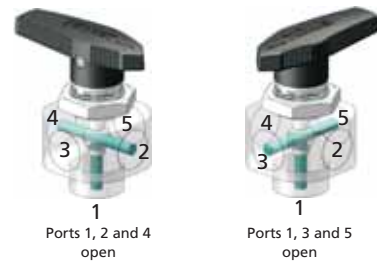
#### 5HL Flow Path

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.



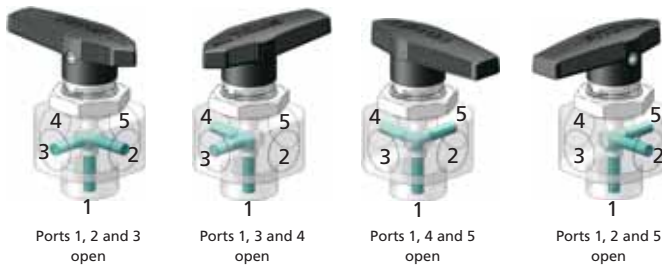
#### 5H Flow Path

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

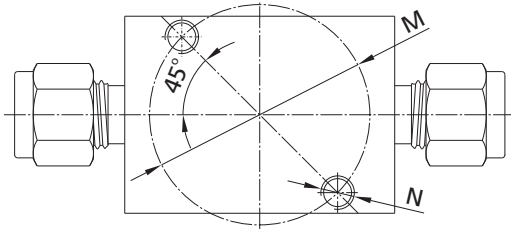
A FITOK tube fitting or a tube stub welded to the vent port is available for stainless steel vented valves.

## Bottom Screw Panel Mounting Options

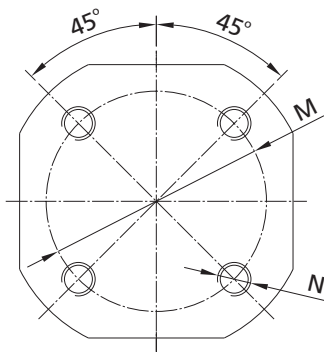
### Mounting Dimensions

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

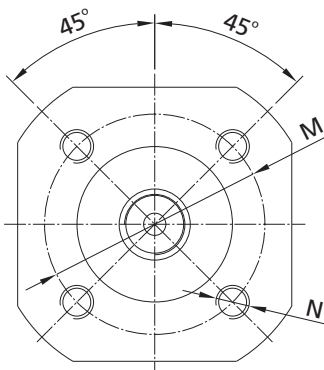
#### 2-way



#### 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)
4-way	0.41 (10.3)	1.63 (41.28)	M5 x 0.8 deep 0.24" (6)
	0.05~0.06 (1.3~1.6)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)
5-way	0.28 (7.1)	2.00 (50.8)	M5 x 0.8 deep 0.24" (6)
	0.05~0.06 (1.3~1.6)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)
5-way	0.41 (10.3)	2.00 (50.8)	M5 x 0.8 deep 0.24" (6)
	0.05~0.06 (1.3~1.6)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)



# Ordering Number Description

BOSS - ML6 - FL4 - ML8 - H05 - OSHQ3L - B - FL4 - SF2

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 Specified in the same way as the connection 1 type and size	2 to 7 Size	00 0.05" (1.3 mm)	C Black Nylon	NO	A Straight	No vent port	FC-01	NO	FC-01		
	S4 304 SS	NS Male NPT	2 1/8"			01 0.06" (1.6 mm)	F Red Nylon	H Mechanical Limit Switch	3L Angle	FL2 1/8" tube fitting	NACE S MR0175			F2 FC-02	
	S1 321 SS	FRT Female BSPT	3 3 mm			02 0.09" (2.4 mm)	J Blue Nylon	N Inductive Limit Switch	3HL 3-way	FL4 1/4" tube fitting					
	6L 316L SS	RT Male BSPT	4 1/4"			03 0.13" (3.2 mm)	U Black Aluminium	Q Solenoid Valve	4L 4-way	FL6 3/8" tube fitting					
	B Brass	FMS Female Metric Thread (for RG)	6 3/8" or 6 mm			05 0.19" (4.8 mm)	CS 90° Normally Closed Spring Return Pneumatic Actuator	HQ Mechanical Limit Switch and Solenoid Valve	4C 4-way	ML3 3 mm tube fitting					
	M Alloy 400	MS Male Metric Thread (for RG)	8 1/2" or 8 mm			07 0.28" (7.1 mm)	OS 90° Normally Open Spring Return Pneumatic Actuator	NQ Inductive Limit Switch and Solenoid Valve	4H 4-way	ML6 6 mm tube fitting					
		FRP Female BSPP (for RP)	10 10 mm			10 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						5L 5-way						Bottom screw
		ML Metric Tube Fitting	14 14 mm						5H 5-way						B
		FO Male FO Fitting	16 16 mm						5HL 5-way						
	FR Male FR Fitting	18 18 mm				5LV 5-way									
						6L 6-way									
						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*.

# Bar Stock Ball Valves

## BP Series

### Features

- ⦿ Working pressure up to: 10000 psig (690 bar)
- ⦿ Working temperature: -40°F to 450°F (-40°C to 232°C)
- ⦿ Bidirectional flow for 2-way valves
- ⦿ Seat wear compensation by free floating ball
- ⦿ Variety of end connections
- ⦿ Blowout proof stem with self-sealing function
- ⦿ Handle color options available
- ⦿ Optional pneumatic and electric actuator
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure (not higher than 6000 psig) to meet the requirement of no visible leak
- ⦿ Restricted flow path for BP series: only port 1 as inlet, port 2 and port 3 as outlet

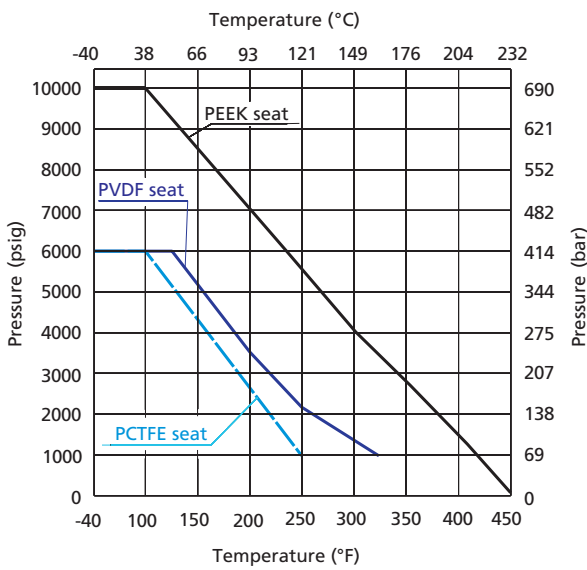


Ball Valves  
Plug Valves

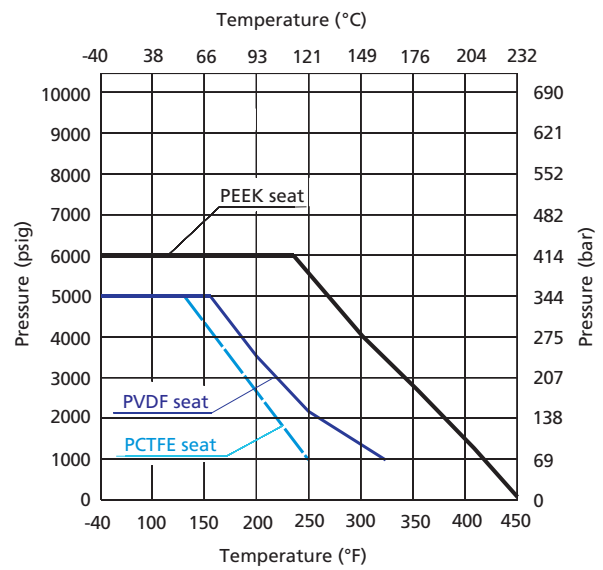
## Pressure vs. Temperature

### 2-way Valves

Orifice code: 10



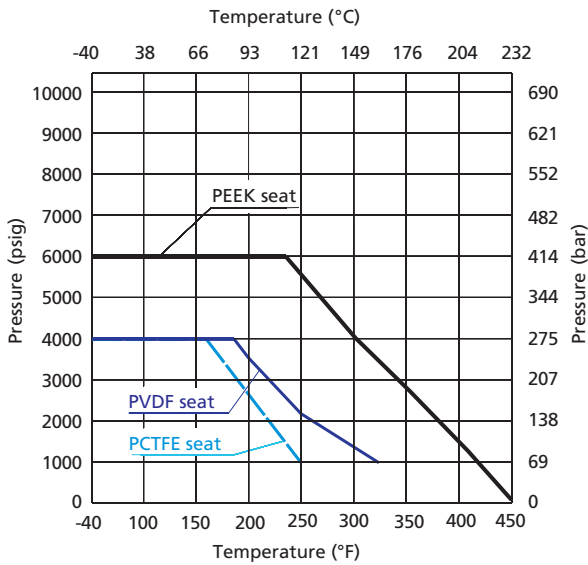
Orifice code: 13 and 19



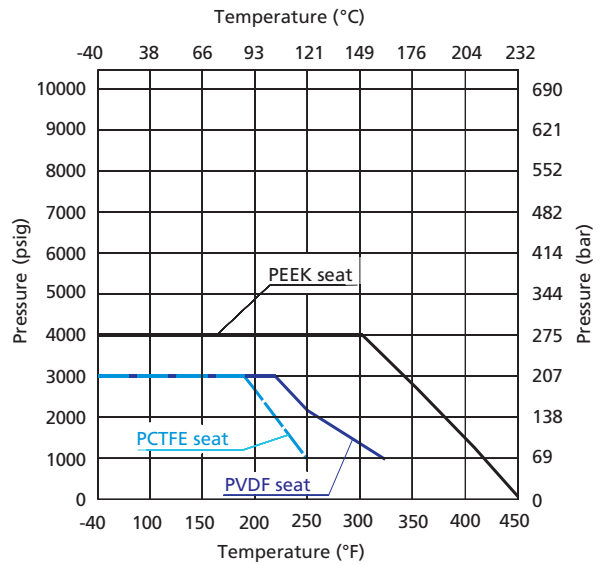
## B-36 Ball Valves

### 3-way Valves

Orifice code: 10



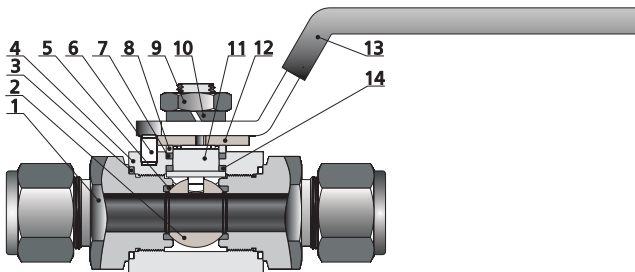
Orifice code: 13 and 19



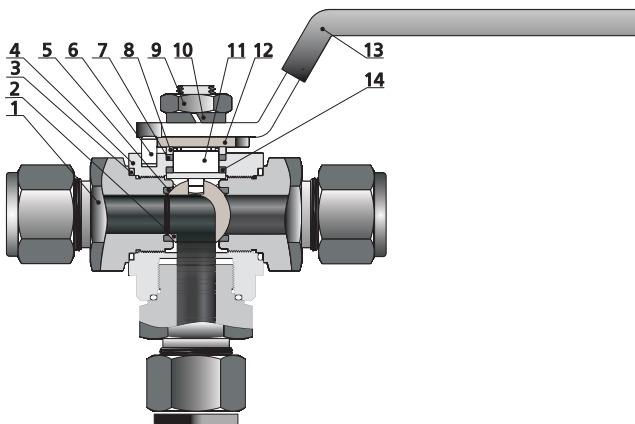
- Note: 1. Graphs are with 316SS body. For information of body in other materials, please contact FITOK Group or our authorized distributors.  
 2. The working pressure of valves is restricted by materials of the valve body and seat, as well as end connections. When choosing a valve for your applications, please refer to the above Temperature vs. Pressure Curves and the pressure rating in the dimension table. The minimum value shall be the pressure rating of the valve.

## Standard Materials of Construction

### 2-way Valves



### 3-way Valves



Item	Component	Body Material
		316 SS
1	<i>End Connection</i>	<i>316 SS/A479</i>
2	<i>Ball</i>	<i>316 SS/A479</i>
3	<i>O-ring</i>	<i>Fluorocarbon FKM</i>
4	<i>Body</i>	<i>316 SS/A479</i>
5	<i>Seat</i>	<i>PVDF or PCTFE or PEEK</i>
6	Stop Pin	SS
7	<i>Stem Packing</i>	<i>PTFE/D1710</i>
8	Stem Washer	316 SS/A479
9	Stem Nut <sup>①</sup>	SS
10	Spring Washer	SS
11	<i>Stem</i>	<i>316 SS/A479</i>
12	Stop Block	304 SS/A240
13	Handle	SS with vinyl cover
14	Lower Packing <sup>②</sup>	PEEK

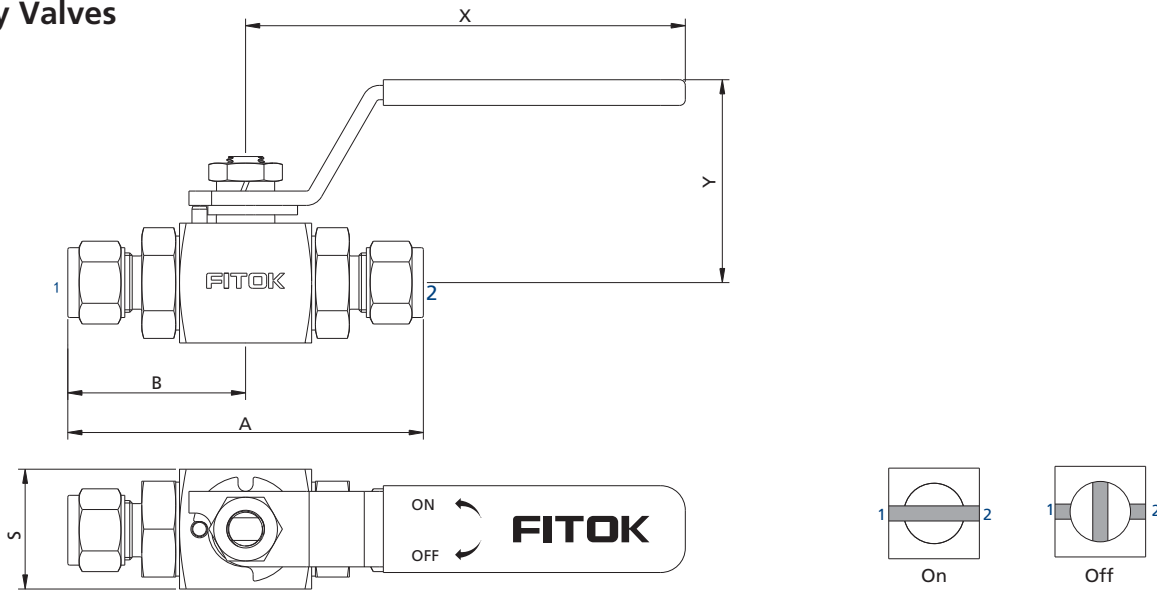
Note: Wetted components are listed in italics.  
 For other materials, please contact FITOK Group or our authorized distributors.

① Ball valves with orifice code 13 or 19 have 2 stem nuts.

② Lower packing material of ball valves with orifice code 19 is PTFE.

## Dimensions

### 2-way Valves

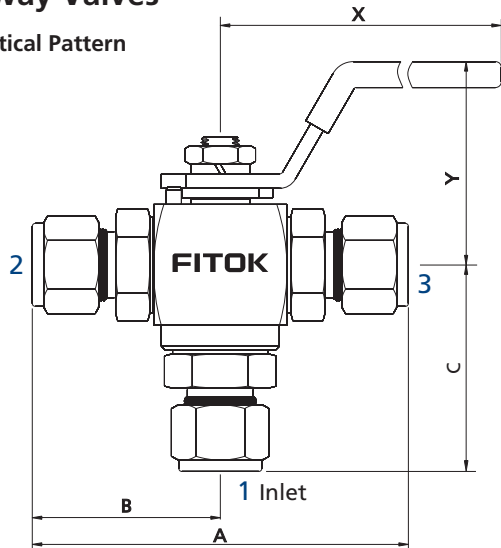


Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)	Orifice in. (mm)	Cv	Dimensions, in. (mm)							
					A	B	X	Y	S			
BP□□-ML6-10	6 mm FITOK	10000 (690)	0.19(4.8)	1.2	3.54 (90.0)	1.77 (45.0)	4.57 (116.0)	2.10 (53.4)	1.30 (32.0)			
BP□□-ML8-10	8 mm FITOK	7500 (517)	0.25(6.4)	2.3	3.60 (91.6)	1.80 (45.8)						
BP□□-ML10-10	10 mm FITOK	8400 (579)	0.28(7.1)	3.7	3.70 (94.0)	1.85 (47.0)						
BP□□-ML12-10	12 mm FITOK	6800 (469)	0.39 (10.0)	7.5	3.94 (100.0)	1.97 (50.0)						
BP□□-ML14-10	14 mm FITOK	6200 (427)			3.92 (99.6)	1.96 (49.8)						
BP□□-FL4-10	1/4" FITOK	10000 (690)	0.19(4.8)	1.2	3.56 (90.4)	1.78 (45.2)				4.57 (116.0)	2.10 (53.4)	1.30 (32.0)
BP□□-FL6-10	3/8" FITOK	6500 (448)	0.28(7.1)	3.7	3.72 (94.6)	1.86 (47.3)						
BP□□-FL8-10	1/2" FITOK	6700 (462)	0.39 (10.0)	7.5	3.03 (77.0)	1.52 (38.5)						
BP□□-FNS4-10	1/4 Female NPT	10000 (690)			2.80 (71.0)	1.40 (35.5)						
BP□□-FNS6-10	3/8 Female NPT	10000 (690)			3.27 (83.0)	1.63 (41.5)						
BP□□-FNS8-10	1/2 Female NPT	10000 (690)			3.36 (85.4)	1.68 (42.7)						
BP□□-NS4-10	1/4 Male NPT	10000 (690)	0.28(7.1)	3.7	3.75 (95.2)	1.88 (47.6)	5.59 (142.0)	2.54 (64.4)	1.50 (38.0)			
BP□□-NS6-10	3/8 Male NPT	10000 (690)	0.39 (10.0)	7.5								
BP□□-NS8-10	1/2 Male NPT	10000 (690)										
BP□□-ML16-13	16 mm FITOK	5800 (400)	0.50 (12.7)	10.0								
BP□□-ML18-13	18 mm FITOK	5400 (372)			4.12 (104.6)	2.06 (52.3)						
BP□□-ML20-13	20 mm FITOK	5500 (379)			4.43 (112.6)	2.22 (56.3)						
BP□□-ML22-13	22 mm FITOK	4900 (338)			4.29 (109.0)	2.15 (54.5)						
BP□□-FL10-13	5/8" FITOK	6000 (414)			4.36 (110.6)	2.18 (55.3)						
BP□□-FL12-13	3/4" FITOK	5800 (400)			3.54 (90.0)	1.77 (45.0)						
BP□□-FNS8-13	1/2 Female NPT	6000 (414)			4.09 (104.0)	2.05 (52.0)						
BP□□-FNS12-13	3/4 Female NPT	6000 (414)			4.14 (105.2)	2.07 (52.6)						
BP□□-NS12-13	3/4 Male NPT	6000 (414)			0.71 (18.0)	30.0	4.87 (123.8)	2.43 (61.9)	6.46 (164.0)	2.72 (69.0)	1.96 (50.0)	
BP□□-ML20-19	20 mm FITOK	5500 (379)					5.11 (129.8)	2.66 (64.9)				
BP□□-ML22-19	22 mm FITOK	4900 (338)	4.59 (116.6)	2.29 (58.3)								
BP□□-ML25-19	25 mm FITOK	4600 (317)	5.11 (129.8)	2.66 (64.9)								
BP□□-FL12-19	3/4" FITOK	5800 (400)	3.81 (96.8)	1.91 (48.4)								
BP□□-FL16-19	1" FITOK	4700 (324)	4.26 (108.2)	2.13 (54.1)								
BP□□-FNS12-19	3/4 Female NPT	6000 (414)	4.91 (124.8)	2.45 (62.4)								
BP□□-FNS16-19	1 Female NPT	6000 (414)										
BP□□-NS16-19	1 Male NPT	6000 (414)										

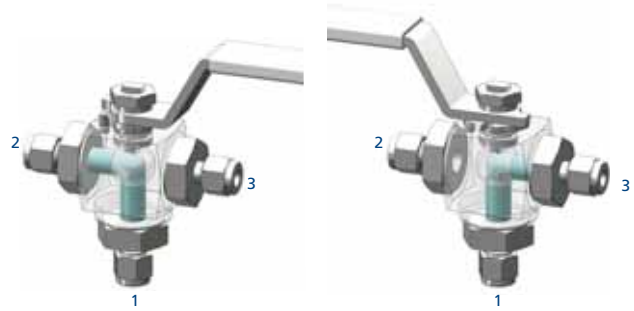
## B-38 Ball Valves

### 3-way Valves

#### Vertical Pattern



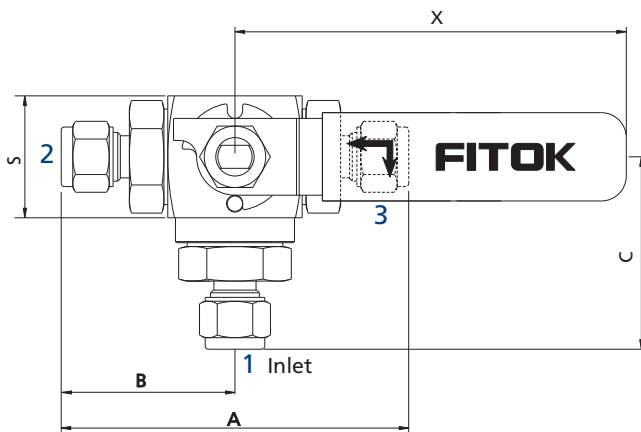
Port 1 as inlet  
180° rotation handle



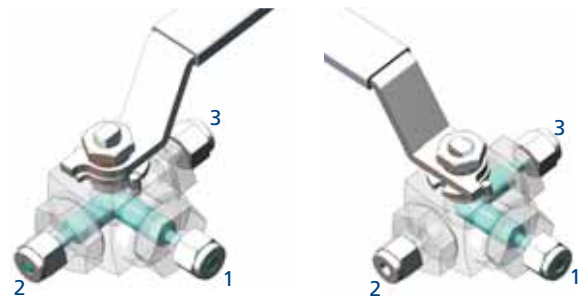
Port 1 to port 2

Port 1 to port 3

#### Horizontal Pattern



Port 1 as inlet  
90° rotation handle



Port 1 to port 2

Port 1 to port 3

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100 °F (38 °C), psig (bar)	Orifice in. (mm)	Dimensions, in. (mm)					
				A	B	C	X	Y	S
BP□□-ML6-10-3□	6 mm FITOK	10000 (690)	0.19 (4.8)	3.54 (90.0)	1.77 (45.0)	2.00 (51.0)	4.57 (116.0)	2.10 (53.4)	1.30 (32.0)
BP□□-ML8-10-3□	8 mm FITOK	7500 (517)	0.25 (6.4)	3.60 (91.6)	1.80 (45.8)	2.02 (51.3)			
BP□□-ML10-10-3□	10 mm FITOK	8400 (579)	0.28 (7.1)	3.70 (94.0)	1.85 (47.0)	2.07 (52.5)			
BP□□-ML12-10-3□	12 mm FITOK	6800 (469)	0.39 (10.0)	3.94 (100.0)	1.97 (50.0)	2.18 (55.5)			
BP□□-ML14-10-3□	14 mm FITOK	6200 (427)		3.94 (100.0)	1.97 (50.0)	2.18 (55.5)			
BP□□-FL4-10-3□	1/4" FITOK	10000 (690)	0.19 (4.8)	3.56 (90.4)	1.78 (45.2)	1.95 (49.5)			
BP□□-FL6-10-3□	3/8" FITOK	6500 (448)	0.28 (7.1)	3.72 (94.6)	1.86 (47.3)	2.16 (54.8)			
BP□□-FL8-10-3□	1/2" FITOK	6700 (462)	0.39 (10.0)	3.92 (99.6)	1.96 (49.8)	2.13 (54.0)			
BP□□-FNS4-10-3□	1/4 Female NPT	10000 (690)		3.03 (77.0)	1.52 (38.5)	1.44 (36.5)			
BP□□-FNS6-10-3□	3/8 Female NPT	10000 (690)		2.80 (71.0)	1.40 (35.5)	1.57 (40.0)			
BP□□-FNS8-10-3□	1/2 Female NPT	10000 (690)		3.27 (83.0)	1.63 (41.5)	1.83 (46.4)			
BP□□-NS4-10-3□	1/4 Male NPT	10000 (690)	0.28 (7.1)	3.36 (85.4)	1.68 (42.7)	1.90 (48.2)			
BP□□-NS6-10-3□	3/8 Male NPT	10000 (690)	0.39 (10.0)	3.75 (95.2)	1.88 (47.6)	2.09 (53.1)			
BP□□-NS8-10-3□	1/2 Male NPT	10000 (690)							

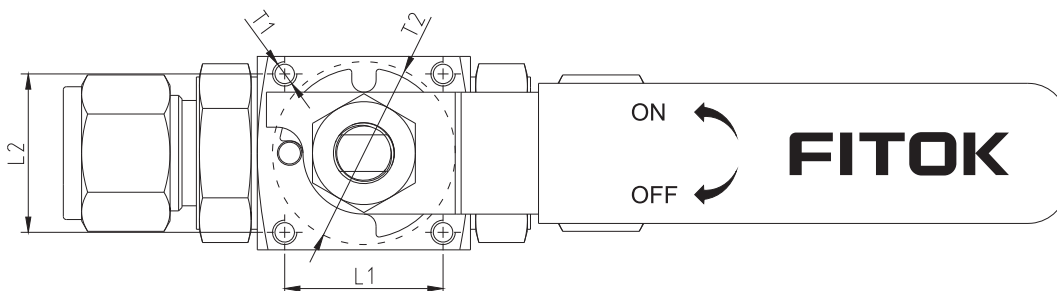
Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)	Orifice in. (mm)	Dimensions, in. (mm)									
				A	B	C	X	Y	S				
		316 SS											
BP□□-ML16-13-3□	16 mm FITOK	5800 (400)	0.50 (12.7)	4.42 (112.2)	2.21 (56.1)	2.60 (66.1)	5.59 (142.0)	2.54 (64.4)	1.50 (38.0)				
BP□□-ML18-13-3□	18 mm FITOK	5400 (372)		4.12 (104.6)	2.06 (52.3)	2.45 (62.3)							
BP□□-ML20-13-3□	20 mm FITOK	5500 (379)		4.43 (112.6)	2.22 (56.3)	2.61 (66.3)							
BP□□-ML22-13-3□	22 mm FITOK	4900 (338)		4.29 (109.0)	2.15 (54.5)	2.54 (64.5)							
BP□□-FL10-13-3□	5/8" FITOK	6000 (414)		4.36 (110.6)	2.18 (55.3)	2.57 (65.3)							
BP□□-FL12-13-3□	3/4" FITOK	5800 (400)		3.54 (90.0)	1.77 (45.0)	2.02 (51.2)							
BP□□-FNS8-13-3□	1/2 Female NPT	6000 (414)		4.09 (104.0)	2.05 (52.0)	2.44 (62.0)							
BP□□-FNS12-13-3□	3/4 Female NPT	6000 (414)		4.14 (105.2)	2.07 (52.6)	2.46 (62.6)							
BP□□-NS12-13-3□	3/4 Male NPT	6000 (414)		4.87 (123.8)	2.43 (61.9)	2.89 (73.4)							
BP□□-ML20-19-3□	20 mm FITOK	5500 (379)		0.71 (18.0)	5.11 (129.8)	2.66 (64.9)				3.00 (76.2)	6.46 (164.0)	2.72 (69.0)	1.96 (50.0)
BP□□-ML22-19-3□	22 mm FITOK	4900 (338)	5.11 (129.8)		2.66 (64.9)	3.00 (76.2)							
BP□□-ML25-19-3□	25 mm FITOK	4600 (317)	4.86 (123.4)		2.43 (61.7)	3.02 (76.7)							
BP□□-FL12-19-3□	3/4" FITOK	5800 (400)	5.11 (129.8)		2.66 (64.9)	2.85 (72.4)							
BP□□-FL16-19-3□	1" FITOK	4700 (324)	3.82 (97.0)		1.91 (48.5)	2.22 (56.5)							
BP□□-FNS12-19-3□	3/4 Female NPT	6000 (414)	4.26 (108.2)		2.13 (54.1)	2.72 (69.1)							
BP□□-FNS16-19-3□	1 Female NPT	6000 (414)	4.54 (115.2)		2.27 (57.6)	2.72 (69.1)							
BP□□-NS12-19-3□	3/4 Male NPT	6000 (414)	4.91 (124.8)		2.45 (62.4)	2.90 (73.9)							
BP□□-NS16-19-3□	1 Male NPT	6000 (414)											

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.

## Panel Mounting Options

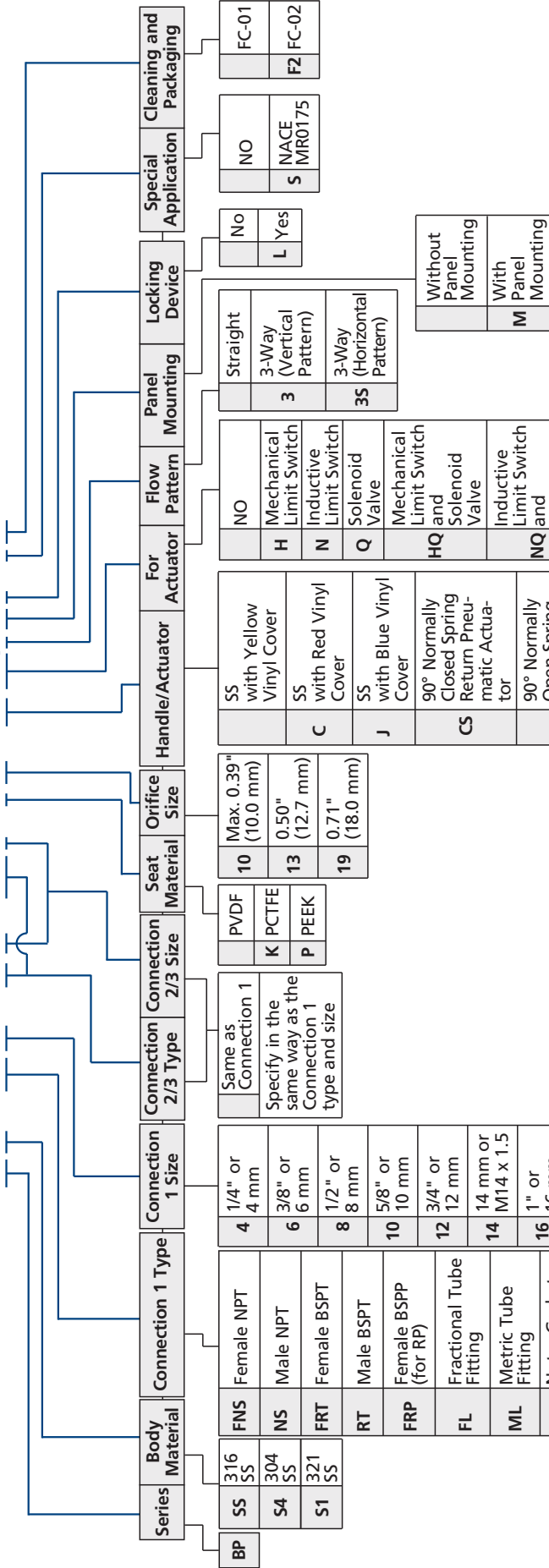
### Dimension for Panel Mounting

Orifice in. (mm)	in. (mm)			
	L1	L2	T1	T2
0.39 (10.0)	1.02 (26.0)	1.02 (26.0)	M4 × 0.7P deep 0.19 (5.0)	1.18 (30.0)
0.50 (12.7)	1.18 (30.0)	1.18 (30.0)	M5 × 0.8P deep 0.19 (5.0)	1.18 (30.0)
0.71 (18.0)	1.37 (35.0)	1.57 (40.0)	M5 × 0.8P deep 0.19 (5.0)	1.50 (38.0)



# Ordering Number Description

## BPSS - ML20 - FL12 - FNS8 - P13 - OSHQ3ML - SF2



Series	Body Material	Connection 1 Type	Connection 1 Size	Connection 2/3 Type	Connection 2/3 Size	Seat Material	Seat Orifice Size	Handle/Actuator	For Actuator	Flow Pattern	Panel Mounting	Locking Device	Special Application	Cleaning and Packaging
BP	316 SS	FNS Female NPT	4 1/4" or 4 mm	Same as Connection 1	10 Max. 0.39" (10.0 mm)	PVDF	SS with Yellow Vinyl Cover	SS	NO	NO	Straight	No	NO	FC-01
S4	304 SS	NS Male NPT	6 3/8" or 6 mm	Specify in the same way as the Connection 1 type and size	13 0.50" (12.7 mm)	K PCTFE	SS with Red Vinyl Cover	C	H Mechanical Limit Switch	Mechanical Limit Switch	3 3-Way (Vertical Pattern)	L Yes	NACE MR0175	F2 FC-02
S1	321 SS	FRT Female BSPT	8 1/2" or 8 mm		19 0.71" (18.0 mm)	P PEEK	SS with Blue Vinyl Cover	J	Q Solenoid Valve	Solenoid Valve	3S 3-Way (Horizontal Pattern)			
	RT Male BSPT		10 5/8" or 10 mm				90° Normally Closed Spring Return Pneumatic Actuator	CS	HQ Mechanical Limit Switch and Solenoid Valve	Mechanical Limit Switch and Solenoid Valve				
	FRP Female BSPP (for RP)		12 3/4" or 12 mm				90° Normally Open Spring Return Pneumatic Actuator	OS	NQ Inductive Limit Switch and Solenoid Valve	Inductive Limit Switch and Solenoid Valve				
	FL Fractional Tube Fitting		14 14 mm or M14 x 1.5											
	ML Metric Tube Fitting		16 1" or 16 mm											
	UFB Nut + Gasket + Fractional Tube Bulged Nipple		18 18 mm											
	UMB Nut + Gasket + Metric Tube Bulged Nipple		20 20 mm or M20 x 1.5											
	UPB Nut + Gasket + Pipe Bulged Nipple		22 22 mm or M22 x 1.5											
			25 25 mm											
			28 28 mm											
			30 30 mm											
			32 32 mm											
								DA 90° Double Acting Pneumatic Actuator						
								LX 180° Left End Normally Open Spring Return Pneumatic Actuator						
								RX 180° Right End Normally Open Spring Return Pneumatic Actuator						
								DX 180° Double Acting Pneumatic Actuator						
								EA 90° Electric Actuator						
								EX 180° Electric Actuator						

- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
M27 and above: 2 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.
- 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 requirements of ASTM G93 Level C.
- For more information about pneumatic actuator ball valves, please refer to the catalog **Automatic Control Ball Valves**.

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

# Hex Bar Stock Ball Valves

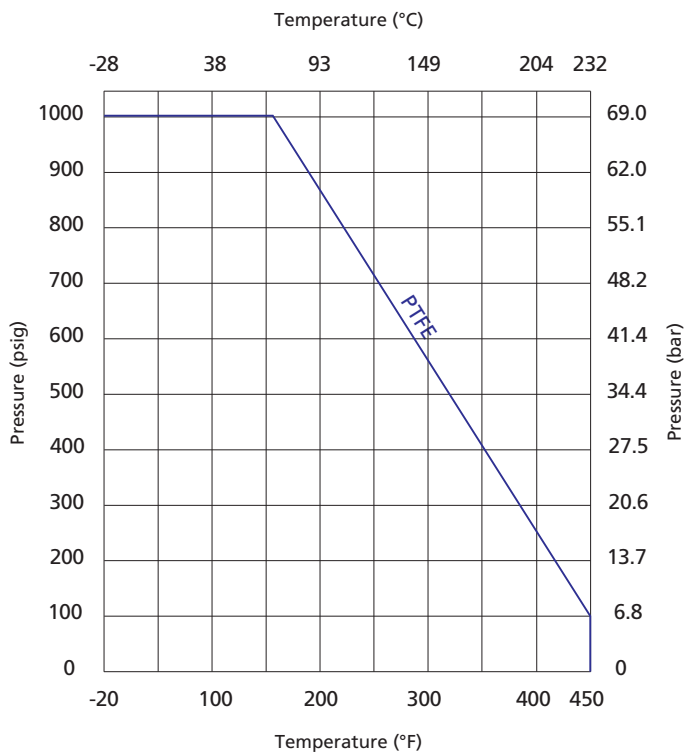
## BR Series

### Features

- ⦿ Working pressure up to: 1000 psig (69.0 bar)
- ⦿ Working temperature: -20°F to 450°F (-28°C to 232°C)
- ⦿ Compact and economical design
- ⦿ Free floating ball design for seat wear compensation
- ⦿ Bi-directional flow
- ⦿ Low operating torque
- ⦿ Any reasonable connections available
- ⦿ Blowout proof stem
- ⦿ Handle color options available
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure to meet the requirement of no visible leak

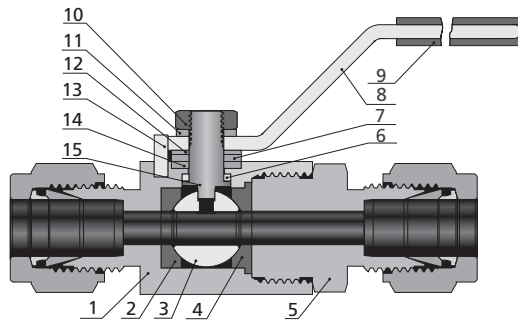


### Pressure vs. Temperature





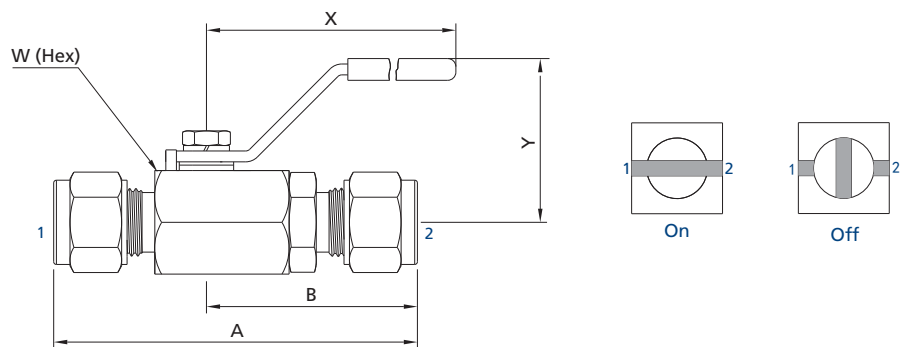
## Standard Materials of Construction



Item	Component	Valve Body Material			
		316 SS	304 SS	316L SS	Brass
1	<i>Body</i>	<i>316 SS/A479</i>	<i>304 SS/A479</i>	<i>316L SS/A479</i>	<i>Brass C36000/B16</i>
2	<i>Front Seat</i>	<i>PTFE/D1710</i>			
3	<i>Ball</i>	<i>316 SS/A479</i>	<i>304 SS/A479</i>	<i>316L SS/A479</i>	<i>316 SS/A479</i>
4	<i>Back Seat</i>	<i>PTFE/D1710</i>			
5	<i>End Connection</i>	<i>316 SS/A479</i>	<i>304 SS/A479</i>	<i>316L SS/A479</i>	<i>Brass C36000/B16</i>
6	<i>Lower Packing</i>	<i>PTFE/D1710</i>			
7	Washer	316 SS/A479			
8	Handle	304 SS/A240 or Aluminium			
9	Sleeve	Vinyl			
10	Stem Nut	SS			
11	Gasket	SS			
12	Coned-disk Spring	S17700/A693			
13	Stop Pin	SS			
14	<i>Upper Packing</i>	<i>PTFE/D1710</i>			
15	<i>Stem</i>	<i>316 SS/A479</i>	<i>304 SS/A479</i>	<i>316L SS/A479</i>	<i>316 SS/A479</i>

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

## Dimensions

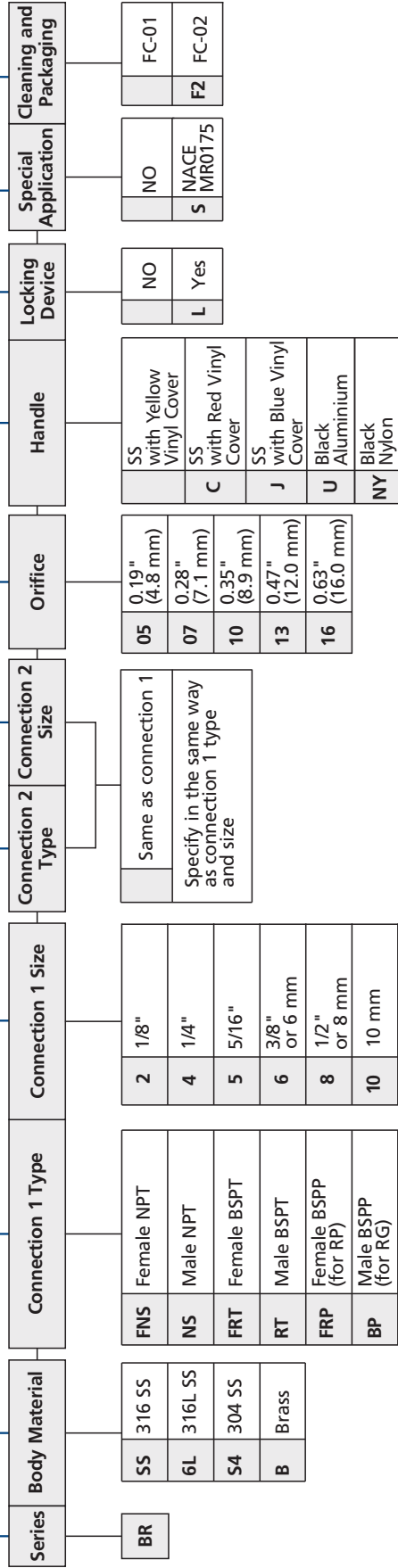


Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)					
	Connection 1	Connection 2			A	B	W	X	Y	
BR□□-ML6-05	6 mm FITOK	6 mm FITOK	0.19 (4.8)	1.25	2.57 (65.2)	1.50 (38.1)	3/4 (19.05)	2.36 (60)	1.18 (30)	
BR□□-ML8-05	8 mm FITOK	8 mm FITOK			2.63 (66.8)	1.53 (38.8)				
BR□□-FL4-05	1/4" FITOK	1/4" FITOK			2.57 (65.2)	1.50 (38.1)				
BR□□-FL5-05	5/16" FITOK	5/16" FITOK			2.63 (66.8)	1.53 (38.8)				
BR□□-FNS2-05	1/8 Female NPT	1/8 Female NPT			1.85 (47.0)	1.08 (27.4)				
BR□□-FRP2-05	1/8 Female BSPP	1/8 Female BSPP			2.00 (50.0)	1.14 (29.0)				
BR□□-FRP4-05	1/4 Female BSPP	1/4 Female BSPP			2.00 (50.0)	1.14 (29.0)				
BR□□-FNS4-05	1/4 Female NPT	1/4 Female NPT			1.85 (47.0)	1.08 (27.4)				
BR□□-ML10-07	10 mm FITOK	10 mm FITOK	0.28 (7.1)	2.50	2.87 (72.9)	1.68 (42.7)	7/8 (22.23)	1.26 (32)		
BR□□-FL6-07	3/8" FITOK	3/8" FITOK			2.03 (51.6)	1.18 (30.0)				
BR□□-FRP6-07	3/8 Female BSPP	3/8 Female BSPP								
BR□□-FNS6-07	3/8 Female NPT	3/8 Female NPT								
BR□□-ML12-10	12 mm FITOK	12 mm FITOK	0.35 (8.9)	9.25	3.15 (80.0)	1.83 (46.5)	1 1/16 (27.0)	3.15 (80)	1.54 (39)	
BR□□-ML14-10	14 mm FITOK	14 mm FITOK			3.24 (82.2)	1.87 (47.5)				
BR□□-FL8-10	1/2" FITOK	1/2" FITOK			3.15 (80.0)	1.83 (46.5)				
BR□□-FL10-10	5/8" FITOK	5/8" FITOK			3.24 (82.2)	1.87 (47.5)				
BR□□-FRP8-10	1/2 Female BSPP	1/2 Female BSPP			2.08 (53.0)	1.12 (28.5)				15/16 (24.0)
BR□□-FNS8-10	1/2 Female NPT	1/2 Female NPT			2.08 (53.0)	1.12 (28.5)				
BR□□-ML16-13	16 mm FITOK	16 mm FITOK	0.47 (12.0)	12.65	3.50 (88.9)	2.00 (50.8)	1 1/4 (31.75)	3.94 (100)	2.03 (51.7)	
BR□□-ML18-13	18 mm FITOK	18 mm FITOK			2.48 (63.0)	1.30 (33.0)				
BR□□-FL12-13	3/4" FITOK	3/4" FITOK								
BR□□-FRP12-13	3/4 Female BSPP	3/4 Female BSPP								
BR□□-FNS12-13	3/4 Female NPT	3/4 Female NPT								2.39 (60.7)
BR□□-ML22-16	22 mm FITOK	22 mm FITOK	0.63 (16.0)	17.35	3.96 (100.6)	2.24 (57.1)	1 1/2 (38.1)	2.15 (54.8)		
BR□□-ML25-16	25 mm FITOK	25 mm FITOK			4.31 (109.5)	2.42 (61.5)				
BR□□-FL16-16	1" FITOK	1" FITOK								
BR□□-FRP16-16	1 Female BSPP	1 Female BSPP							3.25 (82.6)	1.63 (41.3)
BR□□-FNS16-16	1 Female NPT	1 Female NPT							3.00 (76.5)	1.50 (38.1)

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.

# Ordering Number Description

BRSS - ML8 - FL4 - 05 - UL - SF2



Series	Body Material	Connection 1 Type	Connection 1 Size	Connection 2 Type	Connection 2 Size	Orifice	Handle	Locking Device	Special Application	Cleaning and Packaging
BR	SS	FNS	2			05	SS with Yellow Vinyl Cover	NO	NO	FC-01
	6L	NS	4			07	SS with Red Vinyl Cover	L	NACE	FC-02
	S4	FRT	5			10	SS	Yes	S	F2
	B	RT	6			13	SS with Blue Vinyl Cover		MR0175	
		FRP	8			16	Black Aluminium			
		BP	10				Black Nylon			

Same as connection 1  
Specify in the same way as connection 1 type and size

Connection 1 Type	Connection 1 Size
FNS	Female NPT
NS	Male NPT
FRT	Female BSPT
RT	Male BSPT
FRP	Female BSPP (for RP)
BP	Male BSPP (for RG)
FL	Fractional Tube Fitting
MIL	Metric Tube Fitting
UFB	Nut + Gasket + Fractional Tube Bulged Nipple
UMB	Nut + Gasket + Metric Tube Bulged Nipple
UPB	Nut + Gasket + Pipe Bulged Nipple

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

- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
M27 and above: 2 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.
- 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 cleaning requirement of ASTM G93 Level C.

# High Performance Ball Valves

## BV Series

### Features

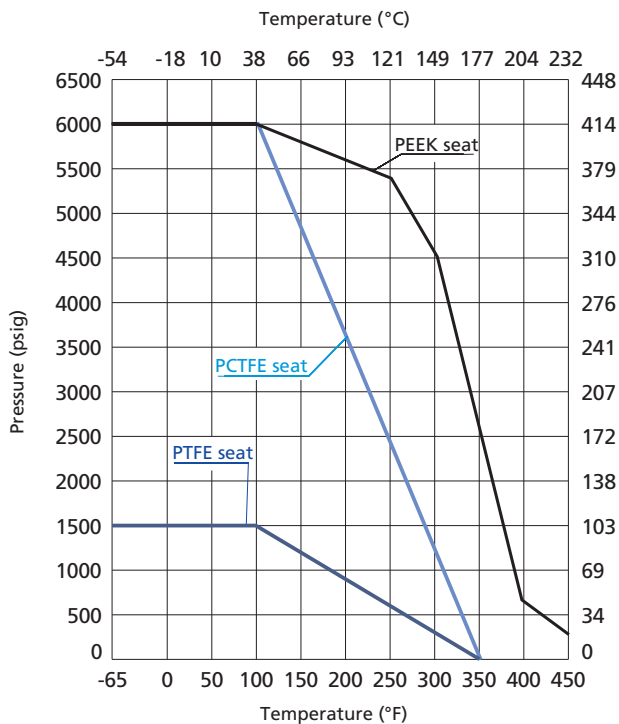
- ⦿ Working pressure up to: 6000 psig (414 bar)
- ⦿ Working temperature: -65°F to 450°F (-54°C to 232°C)
- ⦿ Low operating torque
- ⦿ Handle as indicator of flow direction
- ⦿ Positive handle stop
- ⦿ Electric and pneumatic actuator available
- ⦿ Handle color options available
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve to meet the requirement of no visible leakage at the rated pressure
- ⦿ Bi-directional flow for straight valves
- ⦿ The inlet of 3-way valves and angle pattern valves can only be the bottom port



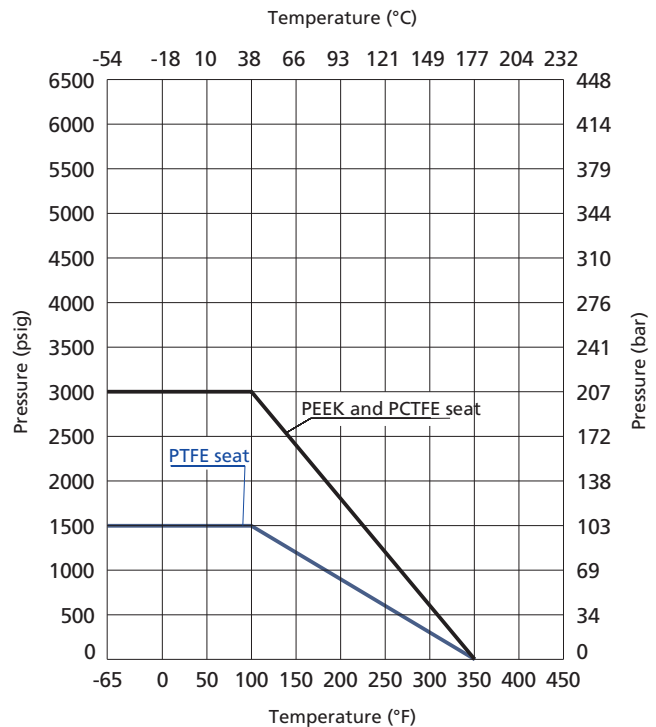
Ball Valves  
Plug Valves

### Pressure vs. Temperature

#### 316 SS Body



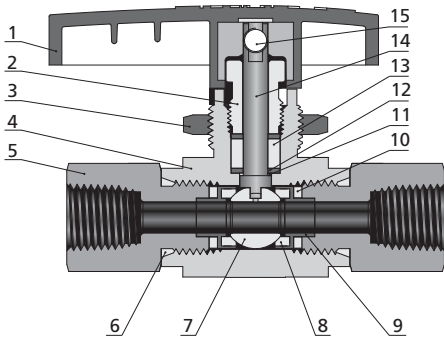
#### Brass Body



Note: The working pressure of valves is restricted by materials of the valve body and seat, as well as end connections. When choosing a valve for your applications, please refer to the above Temperature vs. Pressure Curves and the pressure rating in the dimension table. The minimum value shall be the pressure rating of the valve.

## Standard Materials of Construction

### Straight Valves

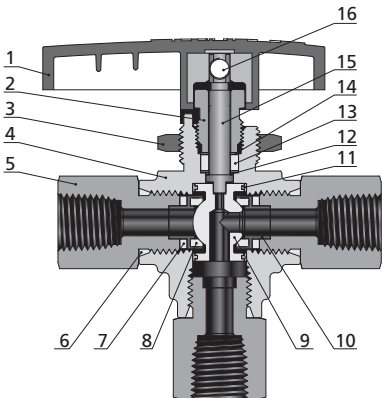


Item	Component	Valve Body Material	
		SS	Brass
1	Handle	Nylon or Aluminium	
2	Packing Nut	316 SS/A479	C36000/B16
3	Panel Nut	316 SS/A479	
4	<i>Body</i>	<i>CF8M/A351</i>	<i>C37700/B283</i>
5	<i>End Connection</i>	<i>316 SS/A479</i>	<i>C36000/B16</i>
6	<i>Connection O-ring</i>	PTFE	
7	<i>Ball</i>	316 SS/A479	
8	<i>Seat</i>	PTFE or PCTFE or PEEK	
9	<i>Seat Retainer</i>	316 SS/A479	
10	<i>Seat Packing</i>	PTFE	
11	<i>Stem Back-up Ring</i>	PEEK	
12	<i>Stem Washer</i>	316/A479	
13	<i>Stem Packing</i>	PTFE	
14	<i>Stem</i>	316 SS/A479	
15	<i>Set Screw</i>	Galvanized carbon steel	
	<i>Lubricants</i>	Fluorinated-based	

Note: Wetted components are listed in italics.

For other materials, please contact FITOK Group or our authorized distributors.

### 3-way Valves

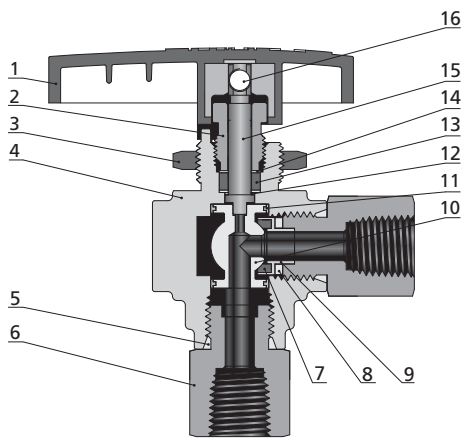


Item	Component	Valve Body Material	
		SS	Brass
1	Handle	Nylon or Aluminium	
2	Packing Nut	316 SS/A479	C36000/B16
3	Panel Nut	316 SS/A479	
4	<i>Body</i>	<i>CF8M/A351</i>	<i>C37700/B283</i>
5	<i>End Connection</i>	<i>316 SS/A479</i>	<i>C36000/B16</i>
6	<i>Connection O-ring</i>	PTFE	
7	<i>Seat Packing</i>	PTFE	
8	<i>Seat</i>	PTFE or PCTFE or PEEK	
9	<i>Ball</i>	316 SS/A479	
10	<i>Seat Retainer</i>	316 SS/A479	
11	<i>Trunnion Bearing</i>	PEEK	
12	<i>Stem Back-up Ring</i>	PEEK	
13	<i>Stem Packing</i>	PTFE	
14	<i>Stem Washer</i>	316 SS/A479	
15	<i>Stem</i>	316 SS/A479	
16	<i>Set Screw</i>	Galvanized carbon steel	
	<i>Lubricants</i>	Fluorinated-based	

Note: Wetted components are listed in italics.

For other materials, please contact FITOK Group or our authorized distributors.

### Angle Pattern Valves



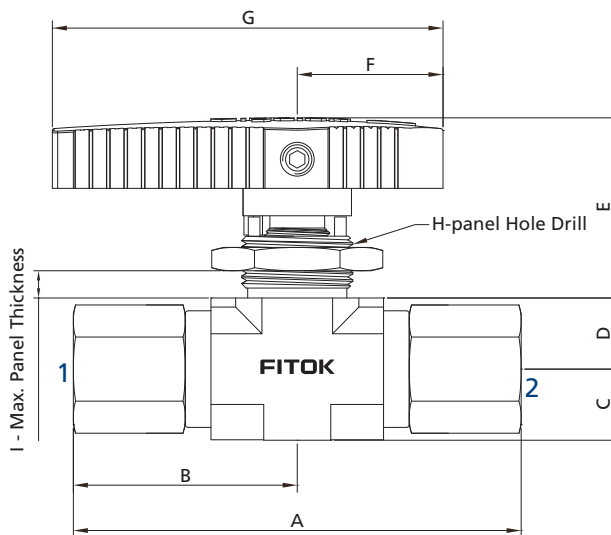
Item	Component	Valve Body Material	
		SS	Brass
1	Handle	Nylon or Aluminium	
2	Packing Nut	316 SS/A479	C36000/B16
3	Panel Nut	316 SS/A479	
4	Body	CF8M/A351	C37700/B283
5	Connection O-ring	PTFE	
6	End Connection	316 SS/A479	C36000/B16
7	Seat	PTFE or PCTFE or PEEK	
8	Seat Packing	PTFE	
9	Seat Retainer	316 SS/A479	
10	Ball	316 SS/A479	
11	Trunnion Bearing	PEEK	
12	Stem Back-up Ring	PEEK	
13	Stem Packing	PTFE	
14	Stem Washer	316 SS/A479	
15	Stem	316 SS/A479	
16	Set Screw	Galvanized carbon Steel	
	Lubricants	Fluorinated-based	

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

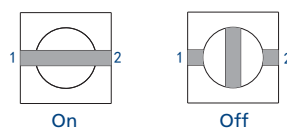
Ball Valves  
 Plug Valves

### Dimensions

#### Straight Valves



I - Max. Panel Thickness

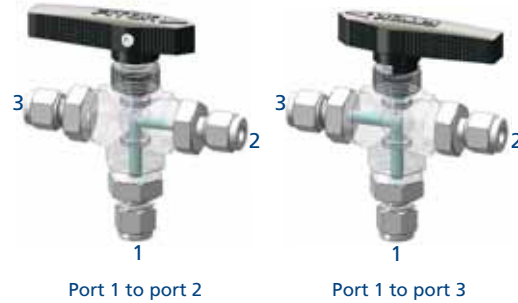
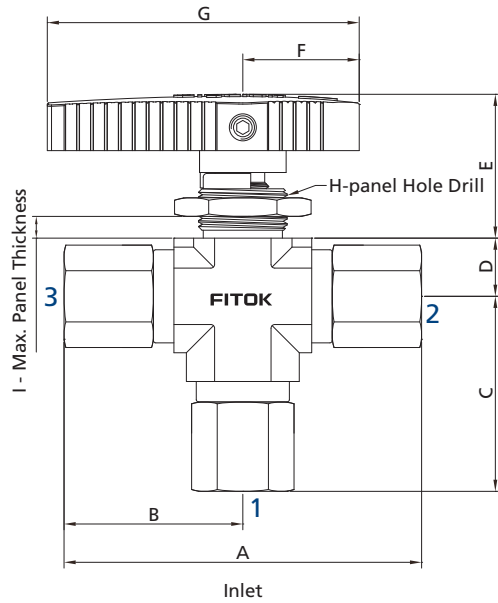


B-48 Ball Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C)		Orifice in. (mm)	Cv	Dimensions, in. (mm)																							
		316 SS	Brass			A	B	C	D	E	F	G	H	I															
															Connection 1/2														
BV□□-FL1-01	1/16" FITOK	6000 (414)	3000 (207)	0.05 (1.3)	0.06	2.60 (66.0)	1.30 (33.0)																						
BV□□-FL2-02	1/8" FITOK	6000 (414)	3000 (207)	0.09 (2.4)	0.21	2.72 (69.0)	1.36 (34.5)																						
BV□□-ML3-02	3 mm FITOK	6000 (414)	3000 (207)			2.74 (69.6)	1.37 (34.8)																						
BV□□-FRT2-04	1/8 Female BSPT	6000 (414)	3000 (207)			2.14 (54.4)	1.07 (27.2)																						
BV□□-FRP2-04	1/8 Female BSPP	6000 (414)	3000 (207)	0.17 (4.2)	0.93	2.36 (60.0)	1.18 (30.0)	0.36 (9.2)	0.33 (8.5)	0.94 (23.9)	0.79 (20.0)	1.97 (50.0)	0.58 (14.7)	0.18 (4.6)															
BV□□-FNS2-04	1/8 Female NPT	6000 (414)	3000 (207)																										
BV□□-RT2-04	1/8 Male BSPT	6000 (414)	3000 (207)																										
BV□□-BP2-04	1/8 Male BSPP	6000 (414)	3000 (207)																										
BV□□-NS2-04	1/8 Male NPT	6000 (414)	3000 (207)																										
BV□□-RT4-04	1/4 Male BSPT	6000 (414)	3000 (207)																										
BV□□-BP4-04	1/4 Male BSPP	6000 (414)	3000 (207)																										
BV□□-NS4-04	1/4 Male NPT	6000 (414)	3000 (207)																										
BV□□-FL4-05	1/4" FITOK	6000 (414)	3000 (207)												0.19 (4.7)	1.04	3.48 (88.4)	1.74 (44.2)											
BV□□-ML6-05	6 mm FITOK	6000 (414)	3000 (207)														3.50 (89.0)	1.75 (44.5)											
BV□□-FL6-06	3/8" FITOK	6000 (414)	2200 (152)	0.25 (6.4)	2.34	3.60 (91.4)	1.80 (45.7)	0.48 (12.2)	0.48 (12.2)	1.24 (31.5)	0.59 (25.0)	2.64 (67.0)	0.77 (19.6)	0.25 (6.4)															
BV□□-ML8-06	8 mm FITOK	6000 (414)	2300 (159)			3.56 (90.4)	1.78 (45.2)																						
BV□□-ML10-06	10 mm FITOK	6000 (414)	1900 (131)			3.62 (92.0)	1.81 (46.0)																						
BV□□-FRT4-06	1/4 Female BSPT	6000 (414)	3000 (207)			3.02 (76.8)	1.51 (38.4)																						
BV□□-FRP4-06	1/4 Female BSPP	6000 (414)	3000 (207)																										
BV□□-FNS4-06	1/4 Female NPT	6000 (414)	3000 (207)																										
BV□□-RT4-06	1/4 Male BSPT	6000 (414)	3000 (207)																										
BV□□-BP4-06	1/4 Male BSPP	6000 (414)	3000 (207)																										
BV□□-NS4-06	1/4 Male NPT	6000 (414)	3000 (207)																										
BV□□-RT6-06	3/8 Male BSPT	6000 (414)	3000 (207)																										
BV□□-BP6-06	3/8 Male BSPP	6000 (414)	3000 (207)																										
BV□□-NS6-06	3/8 Male NPT	6000 (414)	3000 (207)																										
BV□□-FL8-10	1/2" FITOK	6000 (414)	2100 (145)	0.41 (10.3)	6.42			4.68 (118.8)	2.34 (59.4)																				
BV□□-FL12-10	3/4" FITOK	5800 (400)	1800 (124)																										
BV□□-ML12-10	12 mm FITOK	6000 (414)	2000 (138)	0.37 (9.5)	5.57	4.66 (118.4)	2.33 (59.2)																						
BV□□-ML14-10	14 mm FITOK	6000 (414)	1900 (131)																										
BV□□-ML16-10	16 mm FITOK	5800 (400)	1700 (117)																										
BV□□-ML18-10	18 mm FITOK	5400 (372)	1600 (110)																										
BV□□-ML20-10	20 mm FITOK	5500 (379)	1600 (110)																										
BV□□-ML22-10	22 mm FITOK	4900 (338)	1450 (100)																										
BV□□-FRT6-10	3/8 Female BSPT	6000 (414)	3000 (207)	3.90 (99.0)	1.95 (49.5)																								
BV□□-FRP6-10	3/8 Female BSPP	6000 (414)	3000 (207)																										
BV□□-FNS6-10	3/8 Female NPT	6000 (414)	3000 (207)																										
BV□□-FRT8-10	1/2 Female BSPT	6000 (414)	3000 (207)																										
BV□□-FRP8-10	1/2 Female BSPP	6000 (414)	3000 (207)																										
BV□□-FNS8-10	1/2 Female NPT	6000 (414)	3000 (207)																										
BV□□-FRT12-10	3/4 Female BSPT	6000 (414)	3000 (207)			4.30 (109.2)	2.15 (54.6)																						
BV□□-FRP12-10	3/4 Female BSPP	6000 (414)	3000 (207)																										
BV□□-FNS12-10	3/4 Female NPT	6000 (414)	3000 (207)																										
BV□□-RT8-10	1/2 Male BSPT	6000 (414)	3000 (207)																										
BV□□-BP8-10	1/2 Male BSPP	6000 (414)	3000 (207)																										
BV□□-NS8-10	1/2 Male NPT	6000 (414)	3000 (207)																										
BV□□-RT12-10	3/4 Male BSPT	6000 (414)	3000 (207)																										
BV□□-BP12-10	3/4 Male BSPP	6000 (414)	3000 (207)																										
BV□□-NS12-10	3/4 Male NPT	6000 (414)	3000 (207)																										
				0.41 (10.3)	6.42			4.44 (112.8)	2.22 (56.4)																				

Ball Valves  
Plug Valves

### 3-way Valves



Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)											
		316 SS	Brass			A	B	C	D	E	F	G	H	I			
BV□□-FL1-01-3	1/16" FITOK	6000 (414)	3000 (207)	0.05 (1.3)	0.06	2.60 (66.0)	1.30 (33.0)	1.35 (34.3)									
BV□□-FL2-02-3	1/8" FITOK	6000 (414)	3000 (207)	0.09 (2.4)	0.21	2.72 (69.0)	1.36 (34.5)	1.41 (35.8)									
BV□□-ML3-02-3	3 mm FITOK	6000 (414)	3000 (207)			2.74 (69.6)	1.37 (34.8)	1.42 (36.1)									
BV□□-FRT2-04-3	1/8 Female BSPT	6000 (414)	3000 (207)			2.14 (54.4)	1.07 (27.2)	1.12 (28.5)									
BV□□-FRP2-04-3	1/8 Female BSPP	6000 (414)	3000 (207)														
BV□□-FNS2-04-3	1/8 Female NPT	6000 (414)	3000 (207)						0.33 (8.5)	0.94 (23.9)	0.79 (20.0)	1.97 (50.0)	0.58 (14.7)	0.18 (4.6)			
BV□□-RT2-04-3	1/8 Male BSPT	6000 (414)	3000 (207)														
BV□□-BP2-04-3	1/8 Male BSPP	6000 (414)	3000 (207)	0.12 (3.0)	0.28	2.36 (60.0)	1.18 (30.0)	1.23 (31.3)									
BV□□-NS2-04-3	1/8 Male NPT	6000 (414)	3000 (207)														
BV□□-RT4-04-3	1/4 Male BSPT	6000 (414)	3000 (207)														
BV□□-BP4-04-3	1/4 Male BSPP	6000 (414)	3000 (207)			2.70 (68.6)	1.35 (34.3)	1.40 (35.6)									
BV□□-NS4-04-3	1/4 Male NPT	6000 (414)	3000 (207)														
BV□□-FL4-05-3	1/4" FITOK	6000 (414)	3000 (207)			3.48 (88.4)	1.74 (44.2)	1.88 (47.7)									
BV□□-ML6-05-3	6 mm FITOK	6000 (414)	3000 (207)			3.50 (89.0)	1.75 (44.5)	1.89 (48.0)									
BV□□-FL6-06-3	3/8" FITOK	6000 (414)	3000 (207)			3.60 (91.4)	1.80 (45.7)	1.94 (49.2)									
BV□□-ML8-06-3	8 mm FITOK	6000 (414)	3000 (207)			3.56 (90.4)	1.78 (45.2)	1.92 (48.7)									
BV□□-ML10-06-3	10 mm FITOK	6000 (414)	3000 (207)			3.62 (92.0)	1.81 (46.0)	1.95 (49.5)									
BV□□-FRT4-06-3	1/4 Female BSPT	6000 (414)	3000 (207)														
BV□□-FRP4-06-3	1/4 Female BSPP	6000 (414)	3000 (207)														
BV□□-FNS4-06-3	1/4 Female NPT	6000 (414)	3000 (207)	0.19 (4.7)	0.70	3.02 (76.8)	1.51 (38.4)	1.65 (41.9)	0.48 (12.2)	1.24 (31.5)	0.59 (25.0)	2.64 (67.0)	0.77 (19.6)	0.25 (6.4)			
BV□□-RT4-06-3	1/4 Male BSPT	6000 (414)	3000 (207)														
BV□□-BP4-06-3	1/4 Male BSPP	6000 (414)	3000 (207)														
BV□□-NS4-06-3	1/4 Male NPT	6000 (414)	3000 (207)														
BV□□-RT6-06-3	3/8 Male BSPT	6000 (414)	3000 (207)														
BV□□-BP6-06-3	3/8 Male BSPP	6000 (414)	3000 (207)														
BV□□-NS6-06-3	3/8 Male NPT	6000 (414)	3000 (207)			3.24 (82.2)	1.62 (41.1)	1.76 (44.6)									

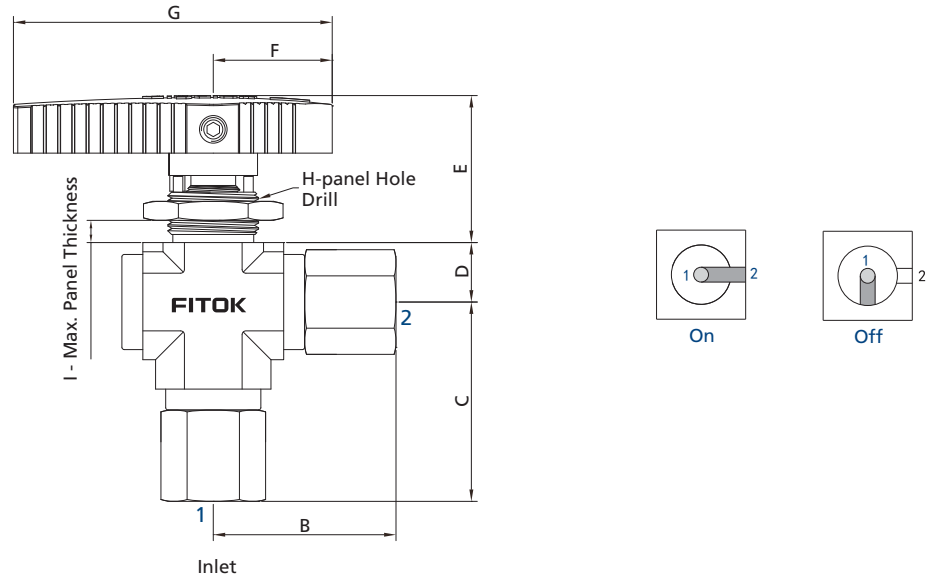


B-50 Ball Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)								
		316 SS	Brass			A	B	C	D	E	F	G	H	I
BV□□-FL8-10-3	1/2" FITOK	6000 (414)	2100 (145)	0.37 (9.5)	3.48	4.68 (118.8)	2.34 (59.4)	2.68 (68.1)	0.71 (18.0)	1.54 (39.0)	1.42 (36.0)	3.78 (96.0)	0.90 (22.9)	0.38 (9.7)
BV□□-FL12-10-3	3/4" FITOK	5800 (400)	1800 (124)			4.66(118.4)	2.33 (59.2)	2.67 (67.9)						
BV□□-ML12-10-3	12 mm FITOK	6000 (414)	2000 (138)			4.84 (123.0)	2.42 (61.5)	2.76 (70.2)						
BV□□-ML14-10-3	14 mm FITOK	6000 (414)	1900 (131)											
BV□□-ML16-10-3	16 mm FITOK	5800 (400)	1700 (117)			3.90 (99.0)	1.95 (49.5)	2.29 (58.2)						
BV□□-ML18-10-3	18 mm FITOK	5400 (372)	1600 (110)											
BV□□-ML20-10-3	20 mm FITOK	5500 (379)	1600 (110)			4.30 (109.2)	2.15 (54.6)	2.49 (63.3)						
BV□□-ML22-10-3	22 mm FITOK	4900 (338)	1450 (100)											
BV□□-FRT6-10-3	3/8 Female BSPT	6000 (414)	3000 (207)			3.97 (101.0)	1.99 (50.5)	2.33 (59.1)						
BV□□-FRP6-10-3	3/8 Female BSPP	6000 (414)	3000 (207)											
BV□□-FNS6-10-3	3/8 Female NPT	6000 (414)	3000 (207)			4.30 (109.2)	2.15 (54.6)	2.49 (63.3)						
BV□□-FRT8-10-3	1/2 Female BSPT	6000 (414)	3000 (207)											
BV□□-FRP8-10-3	1/2 Female BSPP	6000 (414)	3000 (207)			4.50 (114.2)	2.25 (57.1)	2.59 (65.8)						
BV□□-FNS8-10-3	1/2 Female NPT	6000 (414)	3000 (207)											
BV□□-FRT12-10-3	3/4 Female BSPT	6000 (414)	3000 (207)			4.44 (112.8)	2.22 (56.4)	2.56 (65.1)						
BV□□-FRP12-10-3	3/4 Female BSPP	6000 (414)	3000 (207)											
BV□□-FNS12-10-3	3/4 Female NPT	6000 (414)	3000 (207)			4.44 (112.8)	2.22 (56.4)	2.56 (65.1)						
BV□□-RT8-10-3	1/2 Male BSPT	6000 (414)	3000 (207)											
BV□□-BP8-10-3	1/2 Male BSPP	6000 (414)	3000 (207)			4.44 (112.8)	2.22 (56.4)	2.56 (65.1)						
BV□□-NS8-10-3	1/2 Male NPT	6000 (414)	3000 (207)											
BV□□-RT12-10-3	3/4 Male BSPT	6000 (414)	3000 (207)			4.44 (112.8)	2.22 (56.4)	2.56 (65.1)						
BV□□-BP12-10-3	3/4 Male BSPP	6000 (414)	3000 (207)											
BV□□-NS12-10-3	3/4 Male NPT	6000 (414)	3000 (207)			4.44 (112.8)	2.22 (56.4)	2.56 (65.1)						
BV□□-NS12-10-3	3/4 Male NPT	6000 (414)	3000 (207)											

Ball Valves  
Plug Valves

Angle Pattern Valves



Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)								
		316 SS	Brass			B	C	D	E	F	G	H	I	
BV□□-FL1-01-A	1/16" FITOK	6000 (414)	3000 (207)	0.05 (1.3)	0.06	1.30 (33.0)	1.35 (34.3)							
BV□□-FL2-02-A	1/8" FITOK	6000 (414)	3000 (207)	0.09 (2.4)	0.21	1.36 (34.5)	1.41 (35.8)							
BV□□-ML3-02-A	3 mm FITOK	6000 (414)	3000 (207)			1.37 (34.8)	1.42 (36.1)							
BV□□-FRT2-04-A	1/8 Female BSPT	6000 (414)	3000 (207)	0.12 (3.0)	0.28	1.07 (27.2)	1.12 (28.5)							
BV□□-FRP2-04-A	1/8 Female BSPP	6000 (414)	3000 (207)											
BV□□-FNS2-04-A	1/8 Female NPT	6000 (414)	3000 (207)					0.33 (8.5)	0.94 (23.9)	0.79 (20.0)	1.97 (50.0)	0.58 (14.7)	0.18 (4.6)	
BV□□-RT2-04-A	1/8 Male BSPT	6000 (414)	3000 (207)			1.18 (30.0)	1.23 (31.3)							
BV□□-BP2-04-A	1/8 Male BSPP	6000 (414)	3000 (207)											
BV□□-NS2-04-A	1/8 Male NPT	6000 (414)	3000 (207)											
BV□□-RT4-04-A	1/4 Male BSPT	6000 (414)	3000 (207)											
BV□□-BP4-04-A	1/4 Male BSPP	6000 (414)	3000 (207)			1.35 (34.3)	1.40 (35.6)							
BV□□-NS4-04-A	1/4 Male NPT	6000 (414)	3000 (207)											
BV□□-FL4-05-A	1/4" FITOK	6000 (414)	3000 (207)					1.74 (44.2)	1.88 (47.7)					
BV□□-ML6-05-A	6 mm FITOK	6000 (414)	3000 (207)					1.75 (44.5)	1.89 (48.0)					
BV□□-FL6-06-A	3/8" FITOK	6000 (414)	2200 (152)					1.80 (45.7)	1.94 (49.2)					
BV□□-ML8-06-A	8 mm FITOK	6000 (414)	2300 (159)			1.78 (45.2)	1.92 (48.7)							
BV□□-ML10-06-A	10 mm FITOK	6000 (414)	1900 (131)			1.81 (46.0)	1.95 (49.5)							
BV□□-FRT4-06-A	1/4 Female BSPT	6000 (414)	3000 (207)	0.19 (4.7)	0.70	1.51 (38.4)	1.65 (41.9)							
BV□□-FRP4-06-A	1/4 Female BSPP	6000 (414)	3000 (207)					0.48 (12.2)	1.24 (31.5)	0.59 (25.0)	2.64 (67.0)	0.77 (19.6)	0.25 (6.4)	
BV□□-FNS4-06-A	1/4 Female NPT	6000 (414)	3000 (207)											
BV□□-RT4-06-A	1/4 Male BSPT	6000 (414)	3000 (207)											
BV□□-BP4-06-A	1/4 Male BSPP	6000 (414)	3000 (207)											
BV□□-NS4-06-A	1/4 Male NPT	6000 (414)	3000 (207)											
BV□□-RT6-06-A	3/8 Male BSPT	6000 (414)	3000 (207)											
BV□□-BP6-06-A	3/8 Male BSPP	6000 (414)	3000 (207)											
BV□□-NS6-06-A	3/8 Male NPT	6000 (414)	3000 (207)											
								1.62 (41.1)	1.76 (44.6)					

Ball Valves  
Plug Valves

B-52 Ball Valves

Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)							
		316 SS	Brass			B	C	D	E	F	G	H	I
BV□□-FL8-10-A	1/2" FITOK	6000 (414)	2100 (145)	0.37 (9.5)	3.48	2.34(59.4)	2.68(68.1)	0.71 (18.0)	1.54 (39.0)	1.42 (36.0)	3.78 (96.0)	0.90 (22.9)	0.38 (9.7)
BV□□-FL12-10-A	3/4" FITOK	5800 (400)	1800 (124)										
BV□□-ML12-10-A	12 mm FITOK	6000 (414)	2000 (138)										
BV□□-ML14-10-A	14 mm FITOK	6000 (414)	1900 (131)										
BV□□-ML16-10-A	16 mm FITOK	5800 (400)	1700 (117)										
BV□□-ML18-10-A	18 mm FITOK	5400 (372)	1600 (110)										
BV□□-ML20-10-A	20 mm FITOK	5500 (379)	1600 (110)										
BV□□-ML22-10-A	22 mm FITOK	4900 (338)	1450 (100)										
BV□□-FRT6-10-A	3/8 Female BSPT	6000 (414)	3000 (207)										
BV□□-FRP6-10-A	3/8 Female BSPP	6000 (414)	3000 (207)										
BV□□-FNS6-10-A	3/8 Female NPT	6000 (414)	3000 (207)										
BV□□-FRT8-10-A	1/2 Female BSPT	6000 (414)	3000 (207)										
BV□□-FRP8-10-A	1/2 Female BSPP	6000 (414)	3000 (207)										
BV□□-FNS8-10-A	1/2 Female NPT	6000 (414)	3000 (207)										
BV□□-FRT12-10-A	3/4 Female BSPT	6000 (414)	3000 (207)										
BV□□-FRP12-10-A	3/4 Female BSPP	6000 (414)	3000 (207)										
BV□□-FNS12-10-A	3/4 Female NPT	6000 (414)	3000 (207)										
BV□□-RT8-10-A	1/2 Male BSPT	6000 (414)	3000 (207)										
BV□□-BP8-10-A	1/2 Male BSPP	6000 (414)	3000 (207)										
BV□□-NS8-10-A	1/2 Male NPT	6000 (414)	3000 (207)										
BV□□-RT12-10-A	3/4 Male BSPT	6000 (414)	3000 (207)										
BV□□-BP12-10-A	3/4 Male BSPP	6000 (414)	3000 (207)										
BV□□-NS12-10-A	3/4 Male NPT	6000 (414)	3000 (207)										

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.

# Ordering Number Description

## BVSS - FL8 - ML12 - ML10 - P06 - RXHQ3 - SF2

Series	Body Material	Connection 1 Type	Connection 1 Size	Connection 2/3 Type	Connection 2/3 Size	Seat Material	Orifice Size	Handle/ Actuator	For Actuator	Flow Pattern	Special Application	Cleaning and Packaging
BV	SS CF8M	FNS Female NPT	2 1/8"	2 1/8"	Same as Connection 1	PTFE	02 0.09" (2.4 mm)	Black Nylon	NO	NO	Straight	No
	6L CF3M	NS Male NPT	3 3 mm	3 3 mm	Specify in the same way as the Connection 1 type and size	K PCTFE	03 0.13" (3.2 mm)	Red Nylon	H Mechanical Limit Switch	Mechanical Limit Switch	Angle (Bottom Port Inlet)	NACE MR0175 S
	S4 CF8	FRT Female BSPT	4 1/4"	4 1/4"		P PEEK	04 0.17" (4.2 mm)	Green Nylon	N Inductive Limit Switch	Inductive Limit Switch	3-Way (Diverter Valve)	FC-01
	B Brass	RT Male BSPT	5 5/16"	5 5/16"			05 0.19" (4.7 mm)	Blue Nylon	Q Solenoid Valve	Solenoid Valve		F2 FC-02
		FMS Female Metric Thread (for RG)	6 3/8" or 6 mm or M6 x 1	6 3/8" or 6 mm or M6 x 1			06 0.25" (6.4 mm)	Yellow Nylon	HQ and Solenoid Valve	Mechanical Limit Switch Solenoid Valve		
		MS Male Metric Thread (for RG)	8 1/2" or 8 mm	8 1/2" or 8 mm			10 0.41" (10.3 mm)	Black Aluminium	Inductive Limit Switch	Inductive Limit Switch		
		FRP Female BSPP (For RP)	10 10 mm or M10 x 1	10 10 mm or M10 x 1				90° Normally Closed Spring Return Pneumatic Actuator	CS	90° Normally Closed Spring Return Pneumatic Actuator		
		BP Male BSPP (For RG)	12 3/4" or 12 mm	12 3/4" or 12 mm					OS	90° Normally Open Spring Return Pneumatic Actuator		
		FL Fractional Tube Fitting	14 14 mm or M14 x 1.5	14 14 mm or M14 x 1.5					DA	90° Double Acting Pneumatic Actuator		
		ML Metric Tube Fitting	16 16 mm	16 16 mm					LX	180° Left End Normally Open Spring Return Pneumatic Actuator		
		UFB Nut + Gasket + Fractional Tube Bulged Nipple	18 18 mm	18 18 mm					RX	180° Right End Normally Open Spring Return Pneumatic Actuator		
		UMB Nut + Gasket + Metric Tube Bulged Nipple	20 20 mm or M20 x 1.5	20 20 mm or M20 x 1.5					DX	180° Double Acting Pneumatic Actuator		
		UPB Nut + Gasket + Pipe Bulged Nipple	22 22 mm or M22 x 1.5	22 22 mm or M22 x 1.5					EA	90° Electric Actuator		
			24 M24 x 1.5	24 M24 x 1.5					EX	180° Electric Actuator		

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

- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.
- 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 cleaning requirement of ASTM G93 Level C.
- For more information about pneumatic actuator ball valves, please refer to the catalog **Automatic Control Ball Valves**.

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