



# Ball and Plug Valves

Catalog 4121-BV

January 2019

aerospace  
 climate control  
 electromechanical  
 filtration  
**fluid & gas handling**  
 hydraulics  
 pneumatics  
**process control**  
 sealing & shielding



ENGINEERING YOUR SUCCESS.



B Series Ball Valve with 61 Series Pneumatic Actuator  
(Part Number: 6Z-B6LJ2-SS-61AD)



SWB Series (Oval Handle option) Ball Valve  
(Part Number: 8F-SWB8L-RT-T-SS-S)

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\* Actual pressure rating will be determined by the valve configuration, such as body material, seat material, etc. Contact the factory for more information.

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B

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B12

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PR

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MB

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SWB

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HB

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Pneu Act

---

Elec Act

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MAB

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End Conn

B

## Introduction

Parker manually, pneumatically, and electrically actuated two-way B Series Ball Valves provide quick 1/4 turn on-off control of fluids utilized in process and instrumentation applications. A broad selection of valve body, seat, and seal materials provide a wide range of pressures and temperatures at which the valve may be used.

## Features

- ▶ Free floating ball design provides seat wear compensation.
- ▶ Available in 316 stainless steel and brass construction. Monel® Alloy 400 and Hastelloy® C-276 construction available upon request.
- ▶ Micro-finished ball provides a positive seal.
- ▶ Straight through flow path for minimum pressure drop.
- ▶ Bi-directional flow.
- ▶ Wide variety of US Customary and SI ports.
- ▶ 90° actuation.
- ▶ Panel mountable.
- ▶ Adjustable PTFE stem seal can be maintained in-line.
- ▶ Handle indicates flow direction.
- ▶ Low operating torques.
- ▶ Positive handle stops.
- ▶ Color coded handles.
- ▶ Optional pneumatic and electric actuation.
- ▶ Optional live-loaded PTFE stem seals.
- ▶ Optional non-adjustable O-ring stem seals.
- ▶ Optional upstream and downstream drain models.
- ▶ Optional stainless steel and extended handles.

## Specifications

### Pressure Ratings:

Material	Pressure Rating	with PTFE Seats
316 Stainless Steel	6000 psig (414 bar)*	1500 psig (103 bar)
Brass	3000 psig (207 bar)	1500 psig (103 bar)
Monel® Alloy 400	3000 psig (207 bar)	1500 psig (103 bar)
Hastelloy® C-276	3000 psig (207 bar)	1500 psig (103 bar)

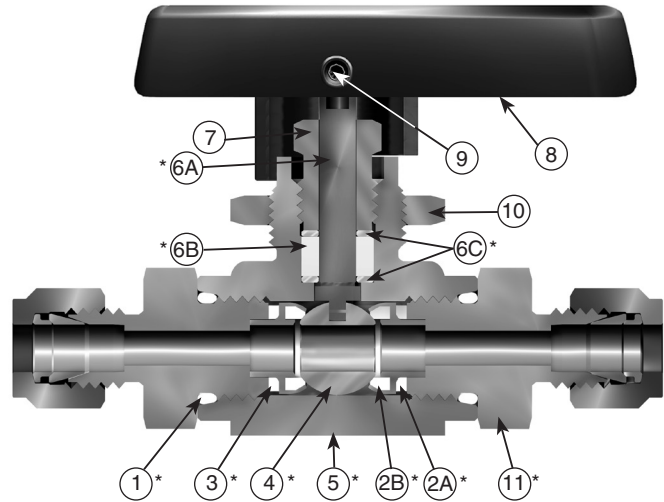
\* B6 Series: 6000 psig rating or 4400 psig (303 bar) CWP  
 B8 Series: 6000 psig rating or 4000 psig (276 bar) CWP

### Pressure Rating and Tubing Selection

For working pressures of A-LOK® and CPI™ tube connections, please see the Instrument Tubing Selection Guide (Bulletin 4200-TS), found in the Technical Section of the Parker Instrumentation Process Control Binder, or the Parker Instrument Fitting Installation Manual (Bulletin 4200-B4).

For working pressures of valves with external or internal pipe threads, please see Catalog 4260, Instrumentation Pipe Fittings.

## Materials of Construction



Model Shown: 6A-B6LJ-SSP

## Materials of Construction

Item #	Part Description	Stainless Steel	Brass
*1	Connector O-Ring	PTFE**	
*2A	Seat Retainer	ASTM A 276 Type 316	ASTM B 16 Alloy C36000
*2B	Seat	PTFE, PCTFE, PEEK	
*3	Retainer Seal	PTFE**	
*4	Ball	316 Stainless Steel	
*5	Body	ASTM A 351 Grade CF3M	ASTM B 283 Alloy C37700
*6A	Stem	ASTM A 276 Type 316	
*6B	Stem Seal	PTFE**	
*6C	Stem Washer	316 Stainless Steel	
7	Packing Nut	ASTM A 479 Type 316	ASTM B 453 Alloy C34000
8	Handle	Nylon 6/6	
9	Handle Set Screw	Stainless Steel	
10	Panel Nut	316 Stainless Steel	
*11	End Connector	ASTM A 479 Type 316	ASTM B 16 Alloy C36000

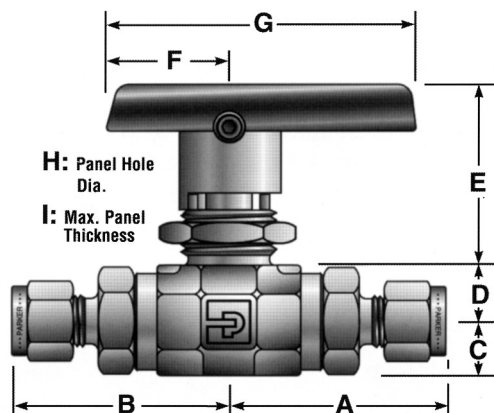
\* Wetted Parts.

\*\* Optional stem seal and body seal materials are described in the How to Order section.

Lubrication: Perfluorinated Polyether.

Hastelloy® is a registered trademark of Haynes International.  
 Monel® Alloy 400 is a registered trademark of Special Metals Corporation.

## Dimensions & Flow Data



**Model Shown:  
4A-B6LJ-SSP**

Port Size	Basic Part #	Flow Data				End Connections		Dimensions Inches (mm)								
		Inch	mm	Cv	X <sub>T</sub> *	Port 1	Port 2	A†	B†	C	D	E	F	G	H	I
1A	B2L	0.052	1.3	0.06	0.45	1/16" A-LOK®		1.30	1.30	0.33 (8.4)	0.33 (8.4)	0.94 (23.9)	0.75 (19.1)	1.88 (47.8)	0.58 (14.7)	0.13 (3.3)
1Z						1/16" CPI™	(33.0)	(33.0)								
2A		0.093	2.4	0.21	0.47	1/8" A-LOK®		1.36	1.36							
2Z						1/8" CPI™	(34.5)	(34.5)								
2F		0.165	4.2	0.93	0.43	1/8" Female NPT		1.07	1.07							
2M		0.165	4.2	0.93	0.43	1/8" Male NPT		1.18	1.18							
4A		0.165	4.2	0.93	0.43	1/4" A-LOK®		1.48	1.48							
4Z						1/4" CPI™	(37.6)	(37.6)								
4M		0.165	4.2	0.93	0.43	1/4" Male NPT		1.35	1.35							
M3A		0.086	2.2	0.18	0.44	3mm A-LOK®		1.37	1.37							
M3Z						3mm CPI™	(34.8)	(34.8)								
4A		0.187	4.7	1.04	0.42	1/4" A-LOK®		1.74	1.74							
4Z	1/4" CPI™					(44.2)	(44.2)									
4F	0.250	6.4	2.34	0.29	1/4" Female NPT		1.51	1.51								
4M	0.250	6.4	2.34	0.29	1/4" Male NPT		1.62	1.62								
4V	0.188	4.8	1.04	0.42	1/4" VacuSeal		1.75	1.75								
6A	0.250	6.4	2.34	0.29	3/8" A-LOK®		1.80	1.80								
6Z					3/8" CPI™	(45.7)	(45.7)									
6M	0.250	6.4	2.34	0.29	3/8" Male NPT		1.62	1.62								
M6A	0.187	4.7	1.04	0.42	6mm A-LOK®		1.75	1.75								
M6Z					6mm CPI™	(44.5)	(44.5)									
M8A	0.250	6.4	2.34	0.42	8mm A-LOK®		1.78	1.78								
M8Z					8mm CPI™	(45.2)	(45.2)									
M10A	0.250	6.4	2.34	0.42	10mm A-LOK®		1.81	1.81								
M10Z					10mm CPI™	(46.0)	(46.0)									
6F	B8L	0.406	10.3	6.42	0.37	3/8" Female NPT		1.95	1.95	0.69 (17.5)	0.70 (17.8)	1.74 (44.2)	1.50 (38.1)	4.00 (101.6)	0.90 (22.9)	0.38 (9.7)
8F						1/2" Female NPT		2.15	2.15							
8A		0.406	10.3	6.42	0.37	1/2" A-LOK®		2.34	2.34							
8Z						1/2" CPI™	(59.4)	(59.4)								
8M		0.406	10.3	6.42	0.37	1/2" Male NPT		2.22	2.22							
8V		0.406	10.3	6.42	0.37	1/2" VacuSeal		2.21	2.21							
12A		0.406	10.3	6.42	0.37	3/4" A-LOK®		2.33	2.33							
12Z						3/4" CPI™	(59.2)	(59.2)								
12F		0.406	10.3	6.42	0.37	3/4" Female NPT		2.25	2.25							
M12A		0.375	9.5	5.57	0.37	12mm A-LOK®		2.33	2.33							
M12Z						12mm CPI™	(59.2)	(59.2)								
M16A		0.406	10.3	6.42	0.37	16mm A-LOK®		2.33	2.33							
M16Z	16mm CPI™					(59.2)	(59.2)									

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = X_T$ .  
 † For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position

Dimensions in inches/millimeters are for reference only, subject to change.

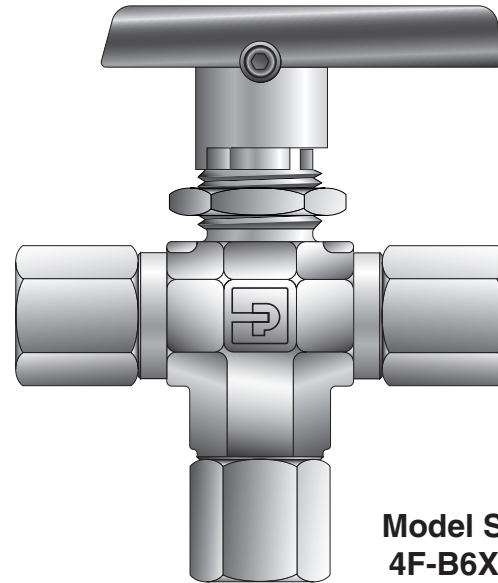
B

## Introduction

Parker manually, pneumatically, and electrically actuated three-way B Series Ball Valves may be used as diverting or selecting valves for fluids utilized in process and instrumentation applications. The standard three-way diverter valve is designed to accept media through the bottom port and direct it out of two outlet ports. When equipped with spring-loaded seats, the three-way valve may be used as a selector valve, alternately accepting media from either of two inlet sources (side ports) and directing it through a single outlet (bottom port).

## Features

- ▶ Available in 316 stainless steel and brass construction. Monel® Alloy 400 and Hastelloy® C-276 construction available for Diverter Valves upon request.
- ▶ Micro-finished ball provides a positive seal.
- ▶ Wide variety of US Customary and SI ports.
- ▶ 180 degree actuation.
- ▶ Panel mountable.
- ▶ Adjustable PTFE stem seal can be maintained in-line.
- ▶ Handle indicates flow direction.
- ▶ Low operating torques.
- ▶ Positive handle stops.
- ▶ Color coded handles.
- ▶ Optional pneumatic and electric actuation.
- ▶ Optional live-loaded PTFE stem seals.
- ▶ Optional non-adjustable O-ring stem seals.
- ▶ Optional stainless steel and extended handles.



**Model Shown:  
4F-B6XJ2-BP**

## Diverter Valve Specifications

Pressure Ratings with bottom port as inlet:

Material	Pressure Rating	with PTFE Seats
316 Stainless Steel	6000 psig (414 bar)*	1500 psig (103 bar)
Brass	3000 psig (207 bar)	1500 psig (103 bar)
Monel® Alloy 400	3000 psig (207 bar)	1500 psig (103 bar)
Hastelloy® C-276	4000 psig (276 bar)	1500 psig (103 bar)

\* B6 Series: 6000 psig rating or 4400 psig (303 bar) CWP  
B8 Series: 6000 psig rating or 4000 psig (276 bar) CWP

### Pressure Rating and Tubing Selection

For working pressures of A-LOK® and CPI™ tube connections,

**Pressure Rating with side ports as inlet:**

150 psig (10 bar)

## Selector Valve Specifications

(Spring Loaded – B6 and B8 models only)

**Pressure Rating with bottom port as inlet:**

316 Stainless Steel..... 6000 psig (414 bar) CWP\*  
Brass .....3000 psig (207 bar) CWP

**Pressure Rating with side ports as inlet:**

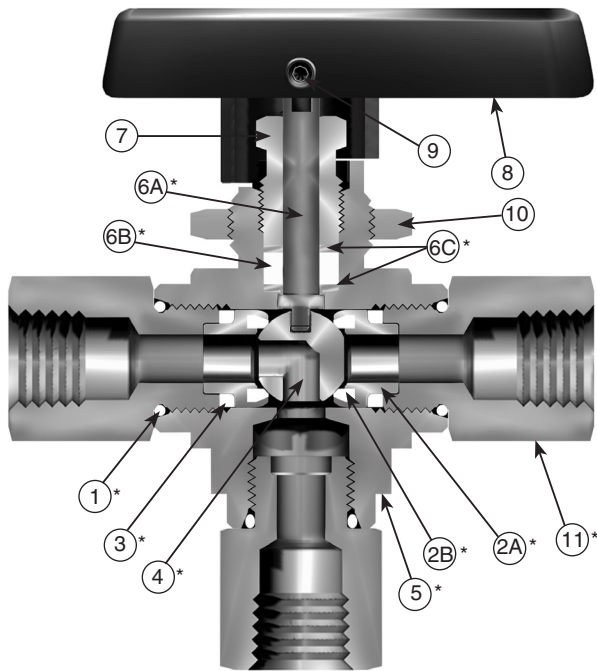
316 Stainless Steel and Brass.....3000 psig (207 bar) CWP

### Pressure Rating and Tubing Selection

For working pressures of A-LOK® and CPI™ tube connections, please see the Instrument Tubing Selection Guide (Bulletin 4200-TS), found in the Technical Section of the Parker Instrumentation Process Control Binder, or the Parker Instrument Fitting Installation Manual (Bulletin 4200-B4).

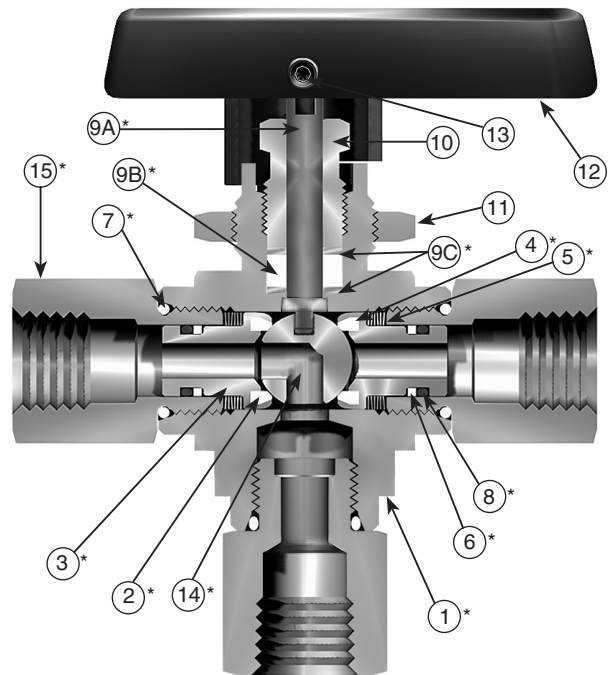
For working pressures of valves with external or internal pipe threads, please see Catalog 4260, Instrumentation Pipe Fittings.

## Diverter Valve



Model Shown: 4F-B6XJ-SSP

## Selector Valve



Model Shown: 4F-B6XS2-SSP

### Materials of Construction

Item #	Part Description	Stainless Steel	Brass
*1	Connector O-Ring	PTFE**	
*2A	Seat Retainer	ASTM A 276 Type 316	ASTM B 16 Alloy C36000
*2B	Seat	PTFE, PCTFE, PEEK	
*3	Retainer Seal	PTFE**	
*4	Ball	316 Stainless Steel	
*5	Body	ASTM A 351 Grade CF3M	ASTM B 283 Alloy C37700
*6A	Stem	ASTM A 276 Type 316	
*6B	Stem Seal	PTFE**	
*6C	Stem Washer	316 Stainless Steel	
7	Packing Nut	ASTM A 479 Type 316	ASTM B 453 Alloy C34000
8	Handle	Nylon 6/6	
9	Handle Set Screw	Stainless Steel	
10	Panel Nut	316 Stainless Steel	
*11	End Connector	ASTM A 479 Type 316	ASTM B 16 Alloy C36000

\* Wetted Parts.

\*\* Optional stem seal and body seal materials are described in the How to Order section.

Lubrication: Perfluorinated Polyether.

### Materials of Construction

Item #	Part Description	Stainless Steel	Brass
1	Body	ASTM A 351 Grade CF3M	ASTM B 283 Alloy C37700
*2	Seat	PTFE, PEEK	
*3	Seat Retainer	ASTM A 276 Type 316	
4	Spring	Stainless Steel	
*5	Seat Retainer Washer	316 Stainless Steel	
*6	Back-up Ring	PTFE	
*7	Connector O-Ring	PTFE**	
*8	Seat Retainer O-Ring	Fluorocarbon Rubber**	
*9A	Stem	ASTM A 276 Type 316	
*9B	Stem Seal	PTFE*	
*9C	Stem Washer	316 Stainless Steel***	
10	Packing Nut	ASTM A 479 Type 316	ASTM B 453 Alloy C34000
11	Panel Nut	316 Stainless Steel	
12	Handle	Nylon 6/6	
13	Handle Set Screw	Stainless Steel	
*14	Ball	316 Stainless Steel	
*15	End Connector	ASTM A 479 Type 316	ASTM B 16 Alloy C36000

\* Wetted Parts.

\*\* Optional stem seal and body seal materials are described in the How to Order section.

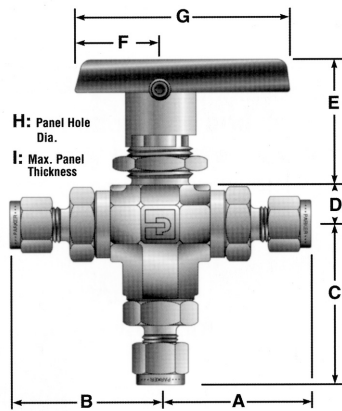
Lubrication: Perfluorinated Polyether.

\*\*\*The lower stem washer material is PEEK for B8 Selector Valves.

Lubrication: Perfluorinated polyether.

## Dimensions & Flow Data

B



**Model Shown:  
4Z-B6XSPKR-V-SSP**

Port Size	Basic Part #	Flow Data				End Connections			Dimensions Inches (mm)						
		Orifice		Cv	X <sub>T</sub> *	Port 1	Port 2	Port 3	A†	B†	C	D	E	F	G
Inch	mm														
1A	B2X	0.052	1.3	0.06	0.56	1/16" A-LOK®	1.30	1.30	1.39	0.33 (8.4)	0.94 (23.9)	0.75 (19.1)	1.88 (47.8)	0.58 (14.7)	0.13 (3.3)
1Z						1/16" CPI™	(33.0)	(33.0)	(35.3)						
2A		0.093	2.4	0.21	0.64	1/8" A-LOK®	1.36	1.36	1.45						
2Z						1/8" CPI™	(34.5)	(34.5)	(36.8)						
2F		0.165	4.2	0.63	0.59	1/8" Female NPT	1.07	1.07	1.15						
2M		0.165	4.2	0.63	0.59	1/8" Male NPT	1.18	1.18	1.26						
4A		0.165	4.2	0.63	0.59	1/4" A-LOK®	1.48	1.48	1.56						
4Z						1/4" CPI™	(37.6)	(37.6)	(39.6)						
4M		0.165	4.2	0.63	0.59	1/4" Male NPT	1.35	1.35	1.43						
M3A		0.086	2.2	0.18	0.63	3mm A-LOK®	1.37	1.37	1.45						
M3Z						3mm CPI™	(34.8)	(34.8)	(36.8)						
4A		0.187	4.7	0.70	0.69	1/4" A-LOK®	1.74	1.74	1.88						
4Z	1/4" CPI™					(44.2)	(44.2)	(47.8)							
4F	0.196	5.0	0.87	0.74	1/4" Female NPT	1.51	1.51	1.65							
4M	0.196	5.0	0.87	0.74	1/4" Male NPT	1.62	1.62	1.76							
4V	0.188	4.8	0.70	0.69	1/4" VacuSeal	1.75	1.75	1.89							
6A	0.196	5.0	0.87	0.74	3/8" A-LOK®	1.80	1.80	1.94							
6Z					3/8" CPI™	(45.7)	(45.7)	(49.3)							
6M	0.196	5.0	0.87	0.74	3/8" Male NPT	1.62	1.62	1.76							
M6A	0.187	4.7	0.70	0.69	6mm A-LOK®	1.75	1.75	1.88							
M6Z					6mm CPI™	(44.5)	(44.5)	(47.8)							
M8A	0.196	5.0	0.87	0.74	8mm A-LOK®	1.78	1.78	1.91							
M8Z					8mm CPI™	(45.2)	(45.2)	(48.5)							
M10A	0.196	5.0	0.87	0.74	10mm A-LOK®	1.81	1.81	1.95							
M10Z					10mm CPI™	(46.0)	(46.0)	(49.5)							
6F	0.406	10.3	3.62	0.64	3/8" Female NPT	1.95	1.95	2.29							
8A	0.406	10.3	3.62	0.64	1/2" A-LOK®	2.34	2.34	2.68							
8Z					1/2" CPI™	(59.4)	(59.4)	(68.1)							
8F	0.406	10.3	3.62	0.64	1/2" Female NPT	2.15	2.15	2.49							
8M	0.406	10.3	3.62	0.64	1/2" Male NPT	2.22	2.22	2.59							
8V	0.406	10.3	3.62	0.64	1/2" VacuSeal	2.21	2.21	2.55							
12A	0.406	10.3	3.62	0.64	3/4" A-LOK®	2.33	2.33	2.68							
12Z					3/4" CPI™	(59.2)	(59.2)	(68.1)							
12F	0.406	10.3	6.42	0.37	3/4" Female NPT	2.25	2.25	2.59							
M12A	0.375	9.5	3.46	0.62	12mm A-LOK®	2.33	2.33	2.67							
M12Z					12mm CPI™	(59.2)	(59.2)	(67.8)							
M16A	0.406	10.3	3.62	0.64	16mm A-LOK®	2.33	2.33	2.67							
M16Z					16mm CPI™	(56.9)	(56.9)	(65.5)							

\* Tested in accordance with ISA S75.02. Gas flow will be choked when  $P_1 - P_2 / P_1 = x_T$ .

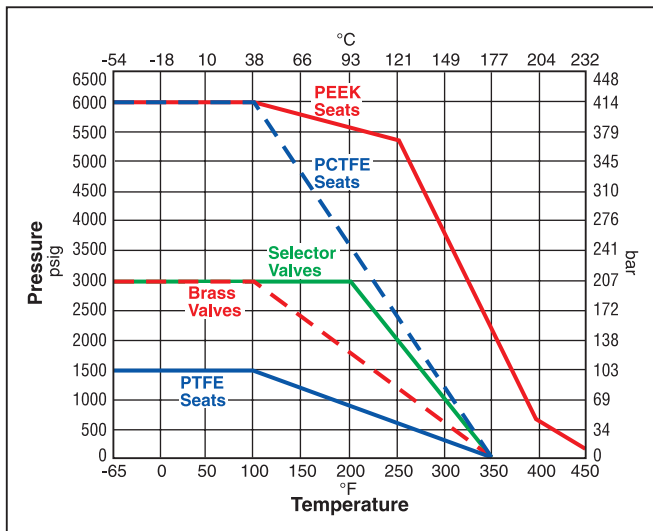
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position

Dimensions in inches/millimeters are for reference only, subject to change.





## Pressure vs. Temperature



Note: To determine MPa, multiply bar by 0.1

**Note:** This Pressure versus Temperature chart reflects the maximum temperature range of indicated materials.

When combining seat and seal materials, the most restrictive temperature rating of the seats or seals becomes the limiting factor on valve temperature range.

Elastomeric stem packing and seals are recommended if the application subjects the valve to thermal cycling.

Please see pages 2 and 4 for maximum pressure ratings.

### Temperature Ratings:

- PTFE ..... -65°F to 350°F (-54°C to 177°C)
- PCTFE..... -65°F to 350°F (-54°C to 177°C)
- PEEK..... -65°F to 450°F (-54°C to 232°C)
- Nitrile Rubber..... -40°F to 250°F (-40°C to 121°C)
- Fluorocarbon Rubber..... -15°F to 450°F (-26°C to 232°C)
- Ethylene Propylene Rubber.... -65°F to 300°F (-54°C to 149°C)
- Highly Fluorinated Fluorocarbon Rubber ..... -15°F to 200°F (-26°C to 93°C)

## Flow Calculations with 1000 psig (69 bar) Inlet Pressure

### Two-Way

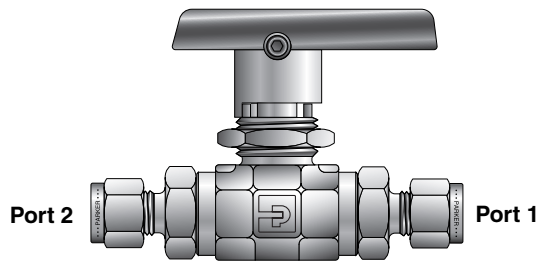
Valve Series	Max. Cv	Pressure Drop ΔP		Water @ 60°F (16°C)		Air @ 60°F (16°C)	
		psig	bar	gpm	m <sup>3</sup> /hr	scfm	m <sup>3</sup> /hr
B2L	0.93	10	0.7	2.9	0.7	92.4	156.2
		50	3.5	6.6	1.5	200.3	338.3
		100	6.9	9.3	2.1	272.0	458.9
B6L	2.34	10	0.7	7.4	1.7	231.7	391.5
		50	3.5	16.5	3.8	494.2	834.7
		100	6.9	23.4	5.3	657.0	1107.9
B8L	6.42	10	0.7	20.3	4.6	637.1	1076.8
		50	3.5	45.4	10.3	1373.6	2320.3
		100	6.9	64.2	14.6	1852.3	3124.8

### Three-Way

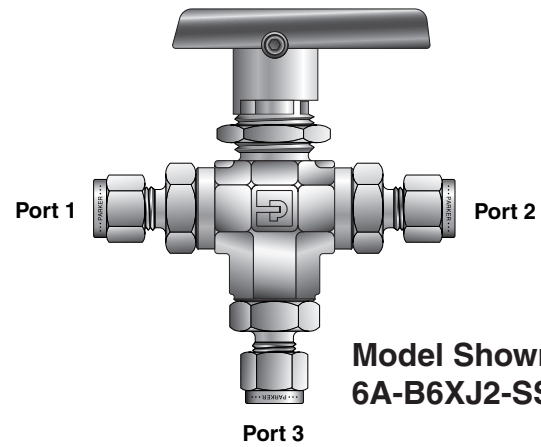
Valve Series	Max. Cv	Pressure Drop ΔP		Water @ 60°F (16°C)		Air @ 60°F (16°C)	
		psig	bar	gpm	m <sup>3</sup> /hr	scfm	m <sup>3</sup> /hr
B2X	0.63	10	0.7	2.0	0.5	62.7	106.0
		50	3.5	4.5	1.0	137.1	231.7
		100	6.9	6.3	1.4	188.4	317.9
B6X	0.87	10	0.7	2.8	0.6	86.7	146.6
		50	3.5	6.2	1.4	190.5	321.8
		100	6.9	8.7	2.0	263.2	444.4
B8X	3.62	10	0.7	11.5	2.6	360.6	609.5
		50	3.5	25.6	5.9	789.7	1343.5
		100	6.9	36.2	8.2	1087.4	1836.6

## How to Order

B



Model Shown: 6A-B6LJ2-SSP



Model Shown: 6A-B6XJ2-SSP

Ports 1, 2, and 3			Valve Series	Seat Material	Seal Material	Body Material			
<b>1A</b>	1/16" A-LOK®	<b>SSP</b> 316 Stainless Steel <b>BP</b> Brass <b>MP</b> Monel® Alloy 400 <b>HCP</b> Hastelloy® C-276	<b>B2L</b> <b>B2X</b>	<b>J</b> PTFE <b>J2</b> PCTFE	<b>(Blank)</b> PTFE <b>V</b> Fluorocarbon Rubber <b>EPR</b> Ethylene Propylene Rubber <b>BN</b> Nitrile Rubber <b>KZ</b> Highly Fluorinated Fluorocarbon Rubber <b>LT</b> Live-Loaded PTFE Packing with PTFE Seals <b>VLT</b> Live-Loaded PTFE Packing with Fluorocarbon Rubber Seals <b>EPRLT</b> Live-Loaded PTFE Packing with Ethylene Propylene Rubber Seals <b>BNLT</b> Live-Loaded PTFE Packing with Nitrile Rubber Seals <b>KZLT</b> Live-Loaded PTFE Packing with Highly Fluorinated Fluorocarbon Rubber Seals				
<b>1Z</b>	1/16" CPI™								
<b>2A</b>	1/8" A-LOK®								
<b>2Z</b>	1/8" CPI™								
<b>2F</b>	1/8" Female NPT								
<b>2M</b>	1/8" Male NPT								
<b>4A</b>	1/4" A-LOK®								
<b>4Z</b>	1/4" CPI™								
<b>4M</b>	1/4" Male NPT								
<b>M3A</b>	3mm A-LOK								
<b>M3Z</b>	3mm CPI™								
<b>4A</b>	1/4" A-LOK®						<b>B6L</b> <b>B6X</b>	<b>J</b> PTFE <b>J2</b> PCTFE <b>S2</b> Spring-Loaded PCTFE <b>PKR</b> PTFE Lubricated PEEK <b>SPKR</b> Spring-Loaded PTFE Lubricated PEEK	
<b>4Z</b>	1/4" CPI™								
<b>4F</b>	1/4" Female NPT								
<b>4M</b>	1/4" Male NPT								
<b>4V</b>	1/4" VacuSeal								
<b>6A</b>	3/8" A-LOK®								
<b>6Z</b>	3/8" CPI™								
<b>6M</b>	3/8" Male NPT								
<b>M6A</b>	6mm A-LOK®								
<b>M6Z</b>	6mm CPI™								
<b>8A</b>	1/2" A-LOK®	<b>B8L</b> <b>B8X</b>	<b>J</b> PTFE <b>J2</b> PCTFE <b>S2</b> Spring-Loaded PCTFE <b>PKR</b> PTFE Lubricated PEEK <b>SPKR</b> Spring-Loaded PTFE Lubricated PEEK						
<b>8Z</b>	1/2" CPI™								
<b>8F</b>	1/2" Female NPT								
<b>8M</b>	1/2" Male NPT								
<b>8V</b>	1/2" VacuSeal								
<b>12Z</b>	3/4" CPI™								
<b>12F</b>	3/4" Female NPT								
<b>M12A</b>	12mm A-LOK®								
<b>M12Z</b>	12mm CPI™								
<b>M16A</b>	16mm A-LOK®								
<b>M16Z</b>	16mm CPI™								

**Notes:**  
 1. Panel Mounting Nut supplied with each valve. Various port combinations are available.  
 2. See How to order.  
 3. VacuSeal is not available in Brass.  
 4. 12F (3/4" Female NPT) not panel mountable.

See examples on page 9. See pages 10 and 11 for information about How to Order Options and Maintenance Kits.