

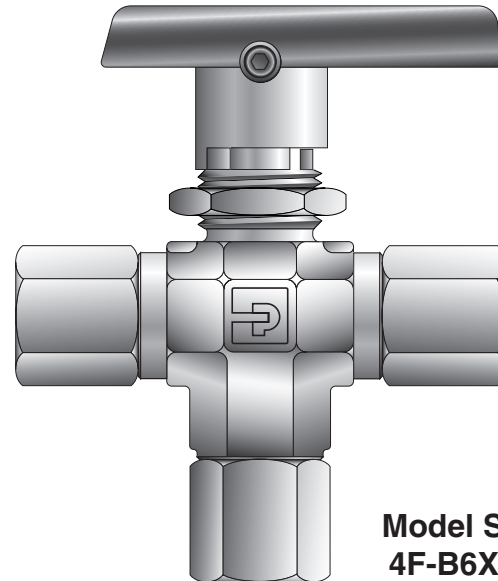
B

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*
Brass3000 psig (207 bar) CWP

Pressure Rating with side ports as inlet:

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

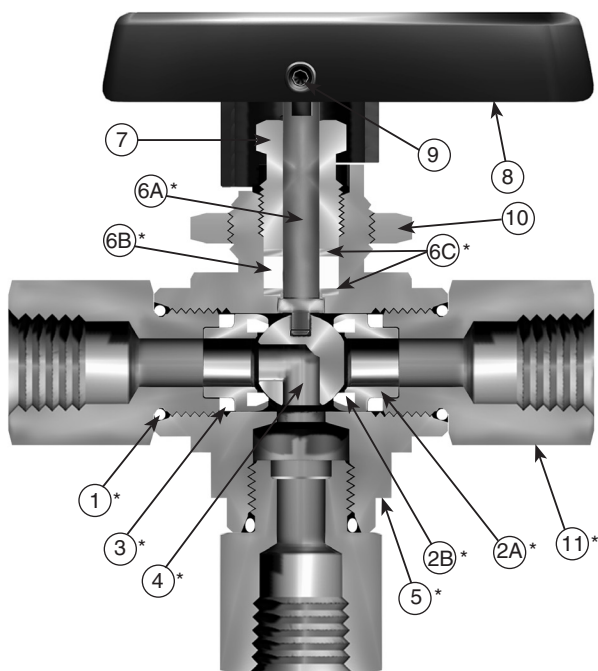
Pressure Rating and Tubing Selection

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.

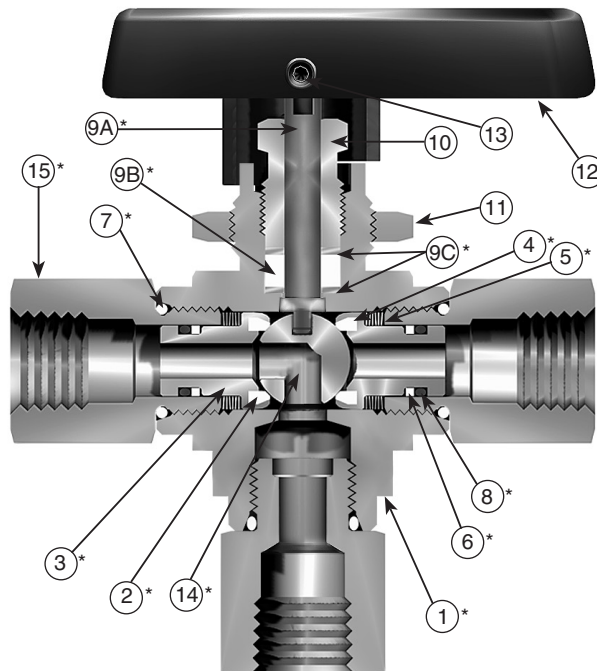


Diverter Valve



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.

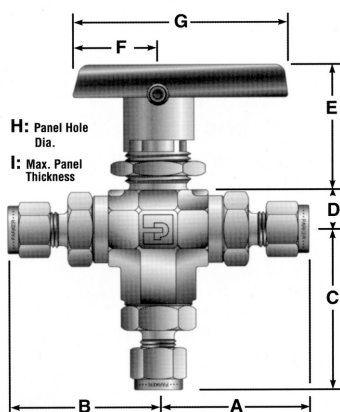
** Optional stem seal and body seal materials are described in the How to Order section.

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 _T *	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 (27.2)	1.07 (27.2)	1.15 (29.2)						
2M		0.165	4.2	0.63	0.59	1/8" Male NPT	1.18 (30.0)	1.18 (30.0)	1.26 (32.0)						
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 (34.3)	1.35 (34.3)	1.43 (36.3)						
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		B6X	0.187	4.7	0.70	0.69	1/4" A-LOK®	1.74	1.74						
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 (38.4)	1.51 (38.4)	1.65 (41.9)						
4M	0.196		5.0	0.87	0.74	1/4" Male NPT	1.62 (41.1)	1.62 (41.1)	1.76 (44.7)						
4V	0.188		4.8	0.70	0.69	1/4" VacuSeal	1.75 (35.1)	1.75 (35.1)	1.89 (37.1)						
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 (41.1)	1.62 (41.1)	1.76 (44.7)						
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 (49.5)	1.95 (49.5)	2.29 (58.2)							
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 (54.6)	2.15 (54.6)	2.49 (63.2)							
8M	0.406	10.3	3.62	0.64	1/2" Male NPT	2.22 (56.4)	2.22 (56.4)	2.59 (65.8)							
8V	0.406	10.3	3.62	0.64	1/2" VacuSeal	2.21 (56.1)	2.21 (56.1)	2.55 (65.0)							
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 (57.1)	2.25 (57.1)	2.59 (65.8)							
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 $P_1 - P_2 / P_1 = x_T$.

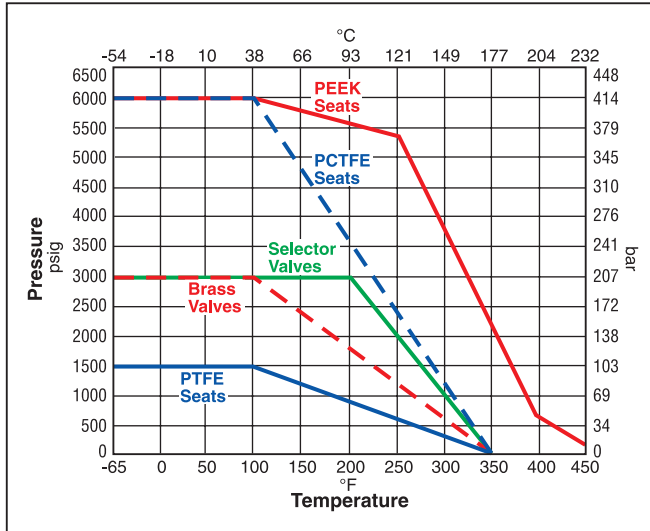
† For CPI™ and A-LOK®, dimensions are measured with nuts in the finger tight position

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 ³ /hr	scfm	m ³ /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

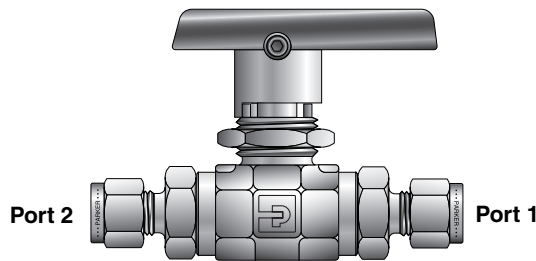
Three-Way

Valve Series	Max. Cv	Pressure Drop ΔP		Water @ 60°F (16°C)		Air @ 60°F (16°C)	
		psig	bar	gpm	m ³ /hr	scfm	m ³ /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

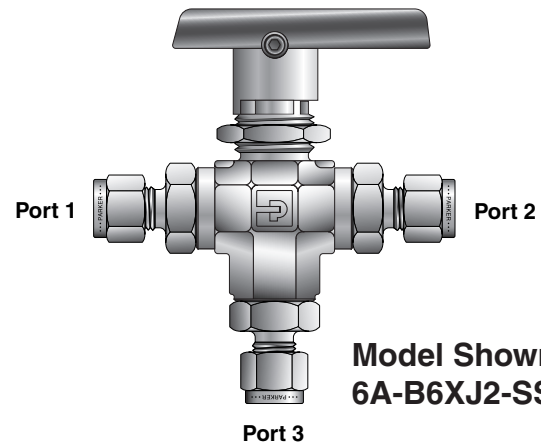


How to Order

B



Model Shown: 6A-B6LJ2-SSP



Model Shown: 6A-B6XJ2-SSP

Ports 1, 2, and 3			Valve Series	Seat Material	Seal Material	Body Material				
1A	1/16" A-LOK®	B6L B6X	B2L B2X	J PTFE J2 PCTFE	(Blank) PTFE V Fluorocarbon Rubber EPR Ethylene Propylene Rubber BN Nitrile Rubber KZ Highly Fluorinated Fluorocarbon Rubber LT Live-Loaded PTFE Packing with PTFE Seals VLT Live-Loaded PTFE Packing with Fluorocarbon Rubber Seals EPRLT Live-Loaded PTFE Packing with Ethylene Propylene Rubber Seals BNLT Live-Loaded PTFE Packing with Nitrile Rubber Seals KZLT Live-Loaded PTFE Packing with Highly Fluorinated Fluorocarbon Rubber Seals	SSP 316 Stainless Steel BP Brass MP Monel® Alloy 400 HCP Hastelloy® C-276				
1Z	1/16" CPI™									
2A	1/8" A-LOK®									
2Z	1/8" CPI™									
2F	1/8" Female NPT									
2M	1/8" Male NPT									
4A	1/4" A-LOK®									
4Z	1/4" CPI™									
4M	1/4" Male NPT									
M3A	3mm A-LOK									
M3Z	3mm CPI™									
4A	1/4" A-LOK®						B8L B8X	J PTFE J2 PCTFE S2 Spring-Loaded PCTFE PKR PTFE Lubricated PEEK SPKR Spring-Loaded PTFE Lubricated PEEK	(Blank) PTFE V Fluorocarbon Rubber EPR Ethylene Propylene Rubber BN Nitrile Rubber KZ Highly Fluorinated Fluorocarbon Rubber LT Live-Loaded PTFE Packing with PTFE Seals VLT Live-Loaded PTFE Packing with Fluorocarbon Rubber Seals EPRLT Live-Loaded PTFE Packing with Ethylene Propylene Rubber Seals BNLT Live-Loaded PTFE Packing with Nitrile Rubber Seals KZLT Live-Loaded PTFE Packing with Highly Fluorinated Fluorocarbon Rubber Seals	SSP 316 Stainless Steel BP Brass MP Monel® Alloy 400 HCP Hastelloy® C-276
4Z	1/4" CPI™									
4F	1/4" Female NPT									
4M	1/4" Male NPT									
4V	1/4" VacuSeal									
6A	3/8" A-LOK®									
6Z	3/8" CPI™									
6M	3/8" Male NPT									
M6A	6mm A-LOK®									
M6Z	6mm CPI™									
M8A	8mm A-LOK®									
M8Z	8mm CPI™									
M10A	10mm A-LOK®									
M10Z	10mm CPI™									
6F	3/8" Female NPT	B8L B8X	J PTFE J2 PCTFE S2 Spring-Loaded PCTFE PKR PTFE Lubricated PEEK SPKR Spring-Loaded PTFE Lubricated PEEK	(Blank) PTFE V Fluorocarbon Rubber EPR Ethylene Propylene Rubber BN Nitrile Rubber KZ Highly Fluorinated Fluorocarbon Rubber LT Live-Loaded PTFE Packing with PTFE Seals VLT Live-Loaded PTFE Packing with Fluorocarbon Rubber Seals EPRLT Live-Loaded PTFE Packing with Ethylene Propylene Rubber Seals BNLT Live-Loaded PTFE Packing with Nitrile Rubber Seals KZLT Live-Loaded PTFE Packing with Highly Fluorinated Fluorocarbon Rubber Seals	SSP 316 Stainless Steel BP Brass MP Monel® Alloy 400 HCP Hastelloy® C-276					
8A	1/2" A-LOK®									
8Z	1/2" CPI™									
8F	1/2" Female NPT									
8M	1/2" Male NPT									
8V	1/2" VacuSeal									
12Z	3/4" CPI™									
12F	3/4" Female NPT									
M12A	12mm A-LOK®									
M12Z	12mm CPI™									
M16A	16mm A-LOK®									
M16Z	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.

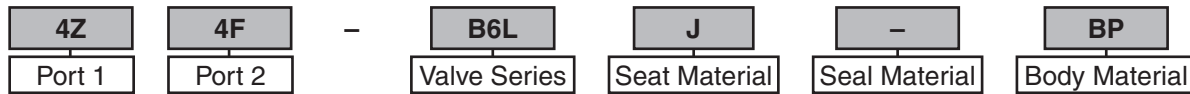
See examples on page 9. See pages 10 and 11 for information about How to Order Options and Maintenance Kits.



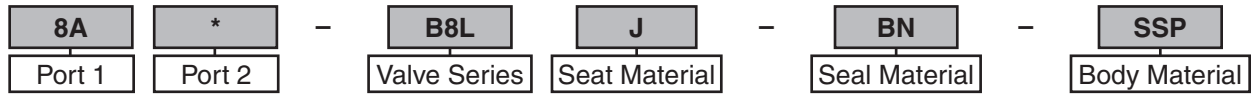


How to Order (Continued)

Examples: Two-Way Valves

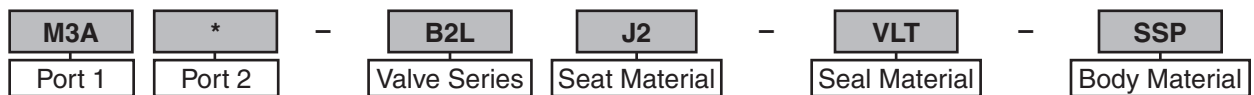


Describes a B6L ball valve with a 1/4" CPI™ end connection for port 1 and a 1/4" female NPT end connection for port 2, PTFE seats, PTFE stem and body seals, brass construction, with a panel mounting nut.



Describes a B8L ball valve with a 1/2" A-LOK® end connections for ports 1 and 2, PTFE seats, Nitrile rubber stem and body seals, stainless steel construction, with a panel mounting nut.

* **Note:** If ports 1 and 2 are the same, eliminate the port 2 designator.



Describes a B2L ball valve with 3mm A-LOK® end connections for ports 1 and 2, PCTFE seats, fluorocarbon rubber body seals, PCTFE packing, stainless steel construction, with a panel mounting nut.

* **Note:** If ports 1 and 2 are the same, eliminate the port 2 designator.

Examples: Three-Way Diverter Valves



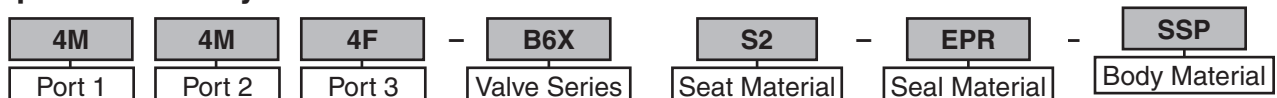
Describes a B6X ball valve with 1/4" CPI™ end connections for side ports 1 and 2, 1/4" female NPT end connection for bottom port 3, PCTFE seats, fluorocarbon rubber stem and body seals, brass construction, and a panel mounting nut.



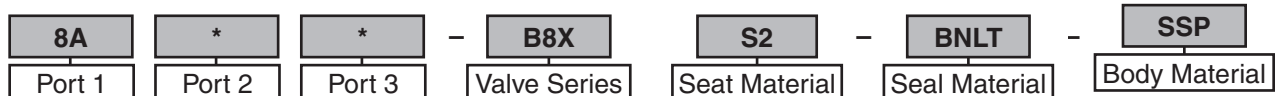
Describes a B2X ball valve with 1/8" CPI™ end connections for ports 1, 2, and 3, PTFE seats, PTFE stem and body seals, stainless steel construction, and a panel mounting nut.

* **Note:** If ports 1, 2, and 3 are the same, eliminate the port 2 and port 3 designators.

Examples: Three-Way Selector Valves



Describes a B6X ball valve with 1/4" male NPT end connections for side ports 1 and 2, 1/4" female NPT end connection for bottom port 3, spring-loaded PCTFE seats, ethylene propylene rubber stem and body seals, stainless steel construction, and a panel mounting nut.



Describes a B8X ball valve with 1/2" A-LOK® end connections for ports 1, 2, and 3, spring-loaded PCTFE seats, Nitrile rubber body seals, live loaded PTFE packing, stainless steel construction, and a panel mounting nut.

* **Note:** If ports 1, 2, and 3 are the same, eliminate the port 2 and port 3 designators.



How to Order Two-Way In-Line, Two-Way Angle and Three-Way Patterns

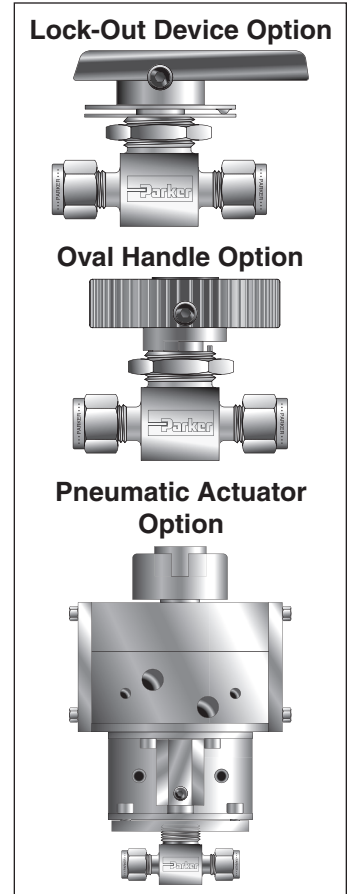
The correct part number is easily derived from the following example and ordering chart. The six product characteristics required are coded as shown in the chart.

The following example describes a MB Series, two-way, in-line pattern ball valve with 1/8" CPI™ compression end connections for ports 1 and 2 Inline

Example:

2Z				MB2LPFA		SSP	
Port 1*	Port 2*	Port 3*	Valve Series	Seat Material	Body Material		
Ports 1, 2 and 3*			Valve Series	Seat Material	Body Material		
1Z	1/16" CPI™	M3Z	3mm CPI™	MB2L	PFA Perfluoro alkoxy	SSP Stainless Steel	
1A	1/16" A-LOK®	M3A	3mm A-LOK®	MB2A		(Stainless Steel with Stainless Steel Panel Nut)	
2Z	1/8" CPI™			MB2X		BP Brass (Brass with Stainless Steel Panel Nut) (Only available in MB 2, 4, 6)	
2A	1/8" A-LOK®						
2F	1/8" Female NPT	M6Z	6mm CPI™	MB4L			
4Z	1/4" CPI™	M6A	6mm A-LOK®	MB4A			
4A	1/4" A-LOK®			MB4X			
2Z	1/8" CPI™	6Z	3/8" CPI™	MB6L			
2A	1/8" A-LOK®	6A	3/8" A-LOK®	MB6A			
2F	1/8" Female NPT	M6Z	6mm CPI™	MB6X			
4Z	1/4" CPI™	M6A	6mm A-LOK®				
4A	1/4" A-LOK®	M8Z	8mm CPI™				
4F	1/4" Female NPT	M8A	8mm A-LOK®				
4M	1/4" Male NPT						
4V	1/4" VacuSeal						
8Z	1/2" CPI™	12Z	3/4" CPI™	MB8A			
8A	1/2" A-LOK®	12A	3/4" A-LOK®	MB8L			
8F	1/2" Female NPT	M12Z	12mm CPI™	MB8X			
		M12A	12mm A-LOK®				

* Valves with identical port connections for port 1 and port 2 require only one designator.



How to Order Options (Two-Way, Angle, and Three-Way)

Lock-Out Devices – For field installation, simply substitute the correct valve series number in the following nomenclature: **LD**-valve series. **Example:** LD-MB6L

Colored Handles – **Example:** MB6-HANDLE-BLUE
NOTE: Not offered in MB8 series.

Stainless Steel Handles – **Example:** MB6-HANDLE-SS (MB6 series only)

Oval Handles – **Example:** MB6-OV-HANDLE-BLACK. If requesting a colored oval handle. **Example:** MB6-OV-HANDLE-RED
NOTE: MB6 series only.

Vented Valves – Add the designator **V** after the **MB** in the part number for the vent option. **Example:** 2Z-MBV2XPFA-SSP.

Oxygen Cleaning – Add the suffix **-C3** to the end of the part number to receive valves cleaned and assembled for oxygen service in accordance with Parker Specification ES8003. **Example:** 4A-MB4LPFA-SSP-C3

Pneumatic Actuators – For detailed actuator information, refer to the Pneumatic Actuators section of this catalog. For factory assembly, add the actuator part number as the suffix to the valve part number. **Example:** 4A-MB4LPFA-SSP-61AC-2. For field installation, specify the actuator desired. **Example:** 61AC-2. The appropriate mounting hardware may be obtained by adding the valve series and actuator size to the prefix **MK-**. **Example:** MK-MB4L-61

Electric Actuators – For detailed actuator information, refer to the Electric Actuators section of this catalog. For factory assembly, add the actuator part number as the suffix to the valve part number. **Example:** M6A-MB6XPFA-SSP-71C. For field installation, specify the actuator desired. **Example:** 71C. The appropriate mounting hardware may be obtained by adding the valve series and actuator series to the prefix **MK-**. **Example:** MK-MB6X-70

