MB Series Ball Valves

Introduction

Parker MB Series Ball Valves, with their rugged compact design, offer positive shut off or directional control of fluids in process, power and instrumentation applications. The unique one piece seat/packing design insures excellent sealing characteristics while accommodating a superior temperature range and cycle life.

These valves are available in two-way and three-way configurations, brass and stainless steel construction, with a wide variety of port connections. Also, all ports are suitable as inlets to full operating pressure of the valve.

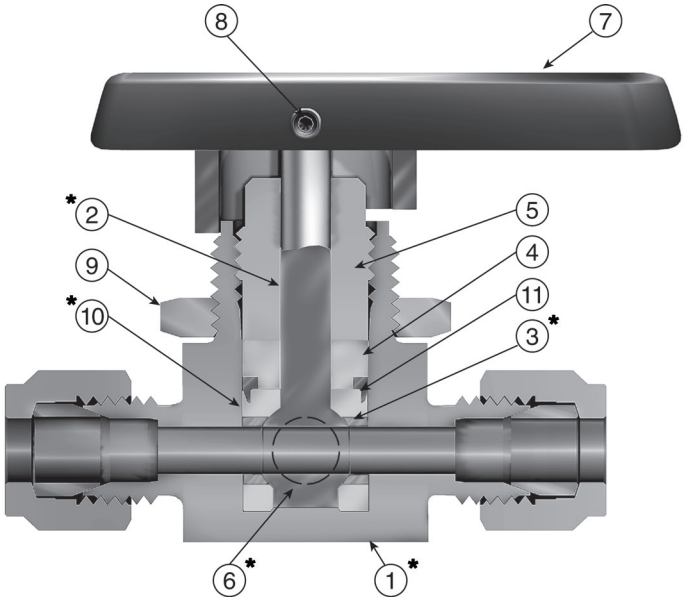
Features

- One piece seat/packing design
- Broad temperature range
- Coated metal inserts
- One piece stem/ball
- Wide variety of US Customary and SI ports
- Panel mountable to 1/4" thickness
- Bi-directional flow
- Handle indicates direction of flow
- Full operating pressure at any port
- Positive handle stops
- Color coded handles
- 100% factory tested
- Vent option
- Manual, electric or pneumatic actuation
- Leak-tight center-off position on three-way valves

Specifications

Pressure Rating	3000 psig* (207 bar) CWP - MB6 2500 psig* (172 bar) CWP - MB2/MB4/MB8
Temperature Rating	-65°F to 300°F (-54°C to 149°C)
Orifice	.052" to .406" (1.3mm to 10.3mm)
C_V	.05 to 6.96
Body Materials	Stainless steel and brass
Body Configurations	two-way (in-line and angle) 3-way, 4-way and 5-way
Port Connections	Tube compression (CPI™ / A-LOK®) NPT (Male / Female) BSP, VacuSeal and UltraSeal
Port Size	1/16" to 3/4" and 3mm to 12mm
Seat/Packing	PFA-Perfluoroalkoxy

* Preset from factory to 1000 psig (69 bar) bubble tight service. To achieve higher pressures packing nut must be tightened with Packing Tool MB6X5. Additional details are in INI-243 Installation Instructions. Packing in vented MB Series Ball Valves is factory adjusted for the maximum valve pressure rating of 500 psig (34 bar).

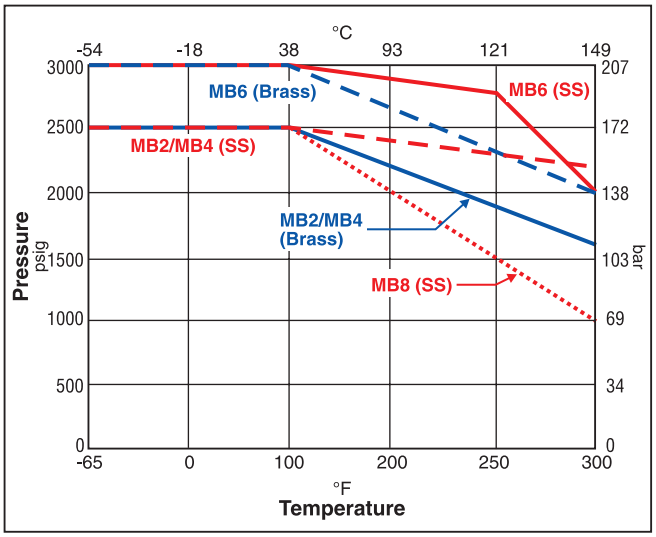


Materials of Construction

Item #	Part Description	Stainless Steel	Brass
1	Body	ASTM A 276 Type 316	ASTM B 16 Alloy C36000
2	Stem	ASTM A 276 Type 316	
3	Hollow Insert	316 Stainless Steel	
4	Packing Washer	ASTM B 16 Alloy C36000	
5	Packing Nut	ASTM A 479 Type 316	ASTM B 16 Alloy C36000
6	Solid Insert	316 Stainless Steel	
7	Handle	Nylon 6/6	
8	Set Screw	Stainless Steel	
9	Panel Nut	316 Stainless Steel**	
*10	Seat/Packing	Perfluoroalkoxy (PFA)	
11	Packing Ring	ASTM A 479 Type 316	

* Wetted Parts **Nickel Plated Brass for MB8
Lubrication: Perfluorinated polyether

Pressure vs. Temperature



Note: To determine MPa, multiply bar by 0.1

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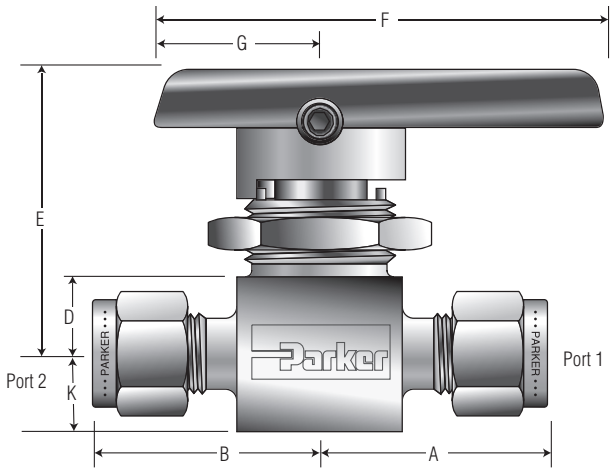
Two-Way In-Line MB Series Ball Valves

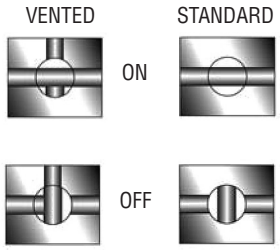
Two-Way In-Line Dimensions, Flow Data

Two-Way In-Line

Vented – In off position the downstream port vents to atmosphere through a hole in the side of the body.



H - Maximum Panel Thickness
I - Panel Hole Diameter
J - Body Width



Model shown: 4A-MB6LPFA-SSP

MB

Port Size	Basic Part #	Flow Data: Orifice Inch	Orifice mm	Cv	X_T*	End Connections Port 1	Port 2	Dimensions Inches (mm) A†	B†	D	E	F	G	H	I	J	K
1Z	MB2L	0.052	1.3	0.03	0.46	1/16" CPI™		0.84 (21.3)	0.84 (21.3)	0.34 (8.6)	1.31 (33.3)	1.88 (47.8)	0.75 (19.1)	0.25 (6.4)	0.58 (14.7)	0.58 (14.7)	0.28 (7.1)
1A						1/16" A-LOK®											
2Z		0.093	2.4	0.20	0.42	1/8" CPI™		1.00 (25.4)	1.00 (25.4)								
2A						1/8" A-LOK®											
M3Z		0.086	2.2	0.17	0.43	3mm CPI™		1.00 (25.4)	1.00 (25.4)								
M3A						3mm A-LOK®											
2F	MB4L	0.125	3.2	0.44	0.34	1/8" Female NPT		0.81 (20.6)	0.81 (20.6)								
4Z						1/4" CPI™		1.12 (28.5)	1.12 (28.5)								
4A						1/4" A-LOK®											
M6Z						6mm CPI™		1.12 (28.5)	1.12 (28.5)								
M6A						6mm A-LOK®											
2Z	MB6L	0.093	2.4	0.18	0.55	1/8" CPI™		1.09 (27.7)	1.09 (27.7)	0.44 (11.2)	1.56 (39.6)	2.37 (60.2)	0.88 (22.4)	0.25 (6.4)	0.77 (19.6)	0.80 (20.3)	0.38 (9.7)
2A						1/8" A-LOK®											
2F		0.187	4.7	1.02	0.53	1/8" Female NPT		1.00 (25.4)	1.00 (25.4)								
4M						1/4" Male NPT		1.00 (25.4)	1.00 (25.4)								
4Z						1/4" CPI™		1.19 (30.2)	1.19 (30.2)								
4A						1/4" A-LOK®											
4F						1/4" Female NPT		1.03 (26.2)	1.03 (26.2)								
4M4Z						1/4" Male NPT	1/4" CPI™	1.00 (25.4)	1.19 (30.2)								
4M4A						1/4" Male NPT	1/4" A-LOK®										
4V						1/4" VacuSeal		1.03 (26.2)	1.03 (26.2)								
6Z						3/8" CPI™		1.31 (33.3)	1.31 (33.3)								
6A						3/8" A-LOK®											
M6Z						6mm CPI™		1.19 (30.2)	1.19 (30.2)								
M6A						6mm A-LOK®											
M8Z						8mm CPI™		1.22 (31.0)	1.22 (31.0)								
M8A						8mm A-LOK®											
8A	MB8L	0.406	10.3	10.7	0.16	1/2" A-LOK®		1.94 (49.3)	1.94 (49.3)	0.69 (17.5)	2.39 (60.7)	4.50 (114.3)	1.50 (38.1)	0.38 (9.7)	1.50 (38.1)	1.50 (38.1)	0.69 (17.5)
8Z						1/2" A-CPI™											
8F		0.406	10.3	6.1	0.20	1/2" FNPT		1.56 (39.6)	1.56 (39.6)								
12A		0.406	10.3	6.4	0.19	3/4" A-LOK®		1.94 (49.3)	1.94 (49.3)								
12Z						3/4" CPI™											
M12A		0.375	9.5	10.7	0.16	12mm A-LOK®		1.96 (49.8)	1.96 (49.8)								
M12Z						12mm CPI™											

* 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.

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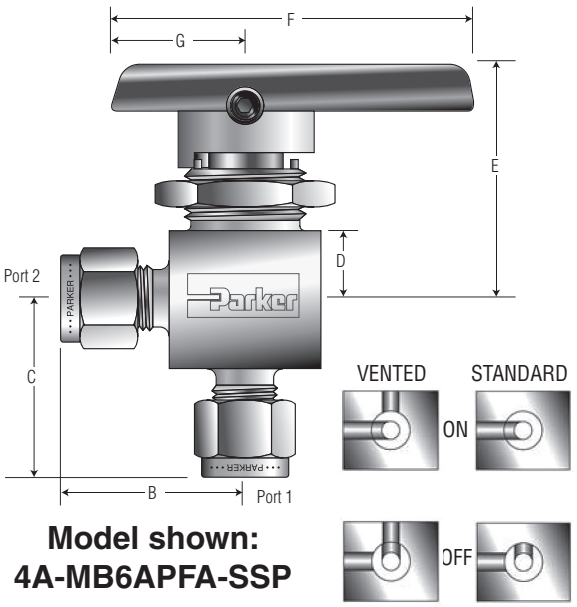
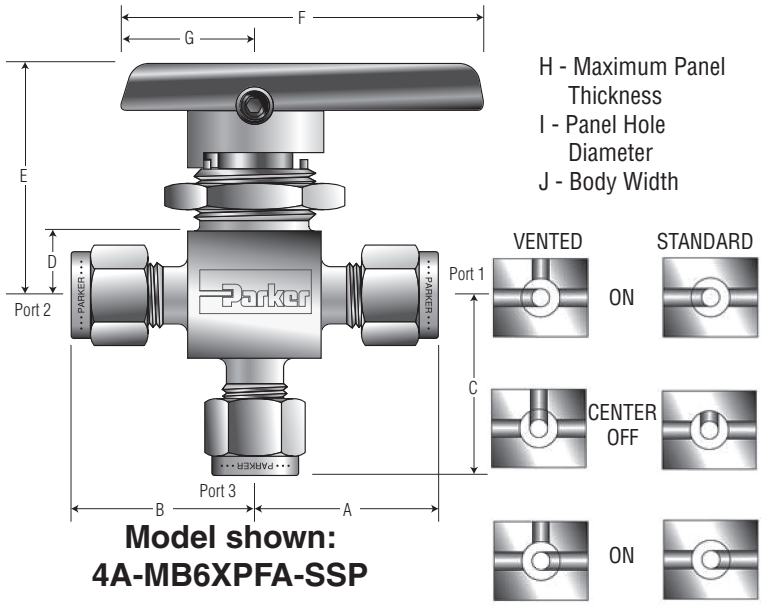
Two-Way Angle and Three-Way Dimensions, Flow Data

Two-Way Angle



Model shown:
4A-MB6APFA-SSP

Three-Way



H - Maximum Panel Thickness
I - Panel Hole Diameter
J - Body Width

Model shown:
4A-MB6XPFA-SSP

MB

Port Size	Basic Part #	Flow Data: Orifice Inch	Orifice mm	Cv	X_T*	End Connections: Port 1	Port 2	Port 3 ‡	Dimensions Inches (mm): A†	B†	C	C	E	F	G	H	I	J
1Z	MB2A MB2X	0.052	1.3	0.02	0.58	1/16" CPI™			0.84 (21.3)	0.84 (21.3)	0.81 (20.6)	0.34 (8.6)	1.31 (33.3)	1.88 (47.8)	0.75 (19.1)	0.25 (6.4)	0.58 (14.7)	0.58 (14.7)
1A						1/16" A-LOK®												
2Z		0.093	2.4	0.18	0.48	1/8" CPI™			1.00 (25.4)	1.00 (25.4)	0.97 (24.6)							
2A						1/8" A-LOK®												
M3Z		0.086	2.2	0.15	0.47	3mm CPI™			1.00 (25.4)	1.00 (25.4)	0.97 (24.6)							
M3A						3mm A-LOK®												
2F	MB4A MB4X	0.125	3.2	0.34	0.45	1/8" Female NPT			0.81 (20.6)	0.81 (20.6)	0.81 (20.6)	0.34	1.31	1.88	0.75	0.25	0.58	0.58
4Z						1/4" CPI™			1.12 (28.4)	1.12 (28.4)	1.12 (28.4)							
4A						1/4" A-LOK®												
M6Z						6mm CPI™			1.12 (28.4)	1.12 (28.4)	1.12 (28.4)							
M6A						6mm A-LOK®												
4Z	MB6A MB6X	0.187	4.7	0.70	0.58	1/4" CPI™			1.19 (30.2)	1.19 (30.2)	1.15 (29.2)	0.44 (11.2)	1.56 (39.6)	2.37 (60.2)	0.88 (22.4)	0.25 (6.4)	0.77 (19.6)	0.80 (20.3)
4A						1/4" A-LOK®												
4F						1/4" Female NPT			1.03 (26.2)	1.03 (26.2)	1.03 (26.2)							
4V						1/4" VacuSeal			1.03 (26.2)	1.03 (26.2)	1.03 (26.2)							
4Z4Z4M						1/4" CPI™	1/4" CPI™	1/4" Male NPT	1.19 (30.2)	1.19 (30.2)	1.03 (26.2)							
4A4A4M						1/4" A-LOK®	1/4" A-LOK®	1/4" Male NPT										
6Z						3/8" CPI™			1.31 (33.3)	1.31 (33.3)	1.23 (31.2)							
6A						3/8" A-LOK®												
M6Z						6mm CPI™			1.19 (30.2)	1.19 (30.2)	1.15 (29.2)							
M6A						6mm A-LOK®												
M8Z						8mm CPI™			1.22 (31.0)	1.22 (31.0)	1.18 (30.0)							
M8A						8mm A-LOK®												
8A	MB8A MB8X	0.406	10.3	5.4	0.36	1/2" A-LOK®			1.75 (44.5)	1.75 (44.5)	1.75 (44.5)	0.69 (17.5)	2.39 (60.7)	4.50 (114.3)	1.50 (38.1)	0.38 (9.7)	1.50 (38.1)	1.50 (38.1)
8Z						1/2" A-CPI™												
8F		0.406	10.3	5.0	0.33	1/2 " Female NPT			1.56 (39.6)	1.56 (39.6)	1.56 (39.6)							
12A		0.406	10.3	4.9	0.39	3/4" A-LOK®			1.75 (44.5)	1.75 (44.5)	1.75 (44.5)							
12Z						3/4" CPI™												
M12A		0.375	9.5	5.6	0.37	12mm A-LOK®			1.75 (44.5)	1.75 (44.5)	1.75 (44.5)							
M12Z						12mm CPI™												

* Tested in accordance with ISA S75.02. Gas flow will be choked when $P_1 - P_2 / P_1 = x_T$.
‡ Not applicable for the two-way Angle pattern.
† 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.

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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

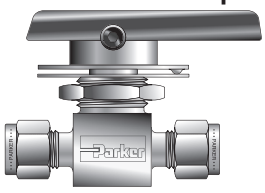
Example:

2Z	–	MB2LPFA	–	SSP
Port 1* / Port 2* / Port 3*	–	Valve Series / Seat Material	–	Body Material

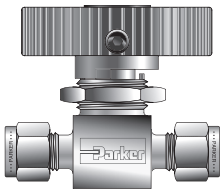
Ports 1, 2 and 3*				Valve Series	Seat Material	Body Material	
1Z	1/16" CPI™	**M3Z**	3mm CPI™	**MB2L**	**PFA** Perfluoro alkoxy	**SSP**	Stainless Steel (Stainless Steel with Stainless Steel Panel Nut)
1A	1/16" A-LOK®	**M3A**	3mm A-LOK®	**MB2A**		**BP**	Brass (Brass with Stainless Steel Panel Nut) (Only available in MB 2, 4, 6)
2Z	1/8" CPI™			**MB2X**			
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.

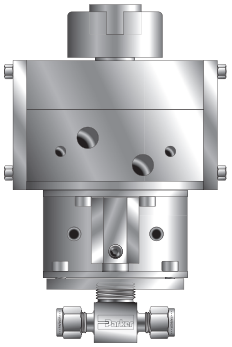
Lock-Out Device Option



Oval Handle Option



Pneumatic Actuator Option



MB

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-MB**V**2XPFA-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

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Introduction

Parker 60 Series spring return (AC/AO) or double acting (AD) rack and pinion actuators are compact, simply designed devices that are quality engineered to provide high torque outputs and a high cycle, trouble-free life.

A compact, dual opposed rack and pinion design and guide band suspension combine to produce a symmetrically balanced, center mount actuator. In addition, the actuator has a short powerful stroke, rapid response, and fully concentric operating load capability which ensures optimum performance.

Features

- Three point suspension system uses carbon filled PTFE guide bands for piston alignment and rack support
- Dual opposed piston design uses air pressure on two pistons to deliver a balanced force to the pinion gear
- Patented balanced piston design results in even distribution of bearing loads and eliminates piston tilting
- Multiple spring concept permits actuator use at 40 to 120 psig (2.8 to 8.3 bar) air supply requirements
- Suitable for use with dry or lubricated air, non-corrosive gas, or light hydraulic oil
- Aluminum alloy body construction with two component polyurethane coating
- Manual override

Specifications

Operating Pressure

90° Models: 40 to 120 psig (2.8 to 8.3 bar) maximum
AC – Normally Closed Spring Return
AD – Double Acting
AO – Normally Open Spring Return

180° Models: 80 psig (5.5 bar) maximum
ACX – Spring Return
ADX – Double Acting

Temperature Range

-4°F to 175°F (-20°C to 79°C)

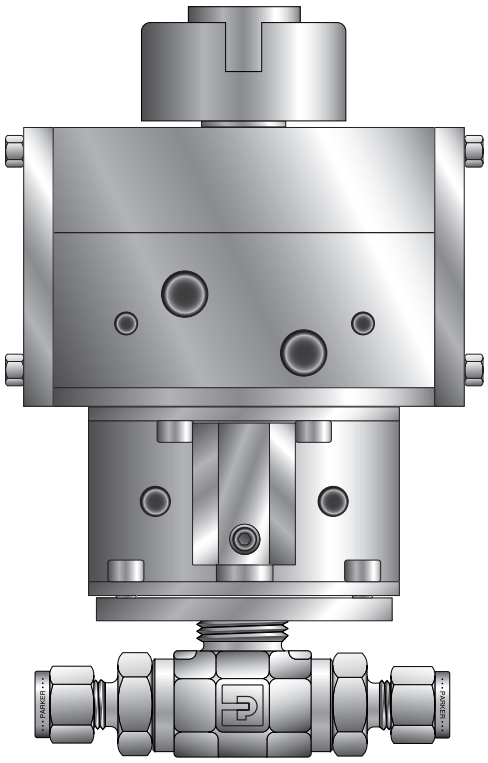
Optional high and low temperature ranges available

Options

- Solenoid valve
- Rotary limit switch with valve position indicator
- Breather block
- Dual mount actuator

Operation

Actuators are manufactured with an integral air manifold and internal porting. The air manifold is designed for direct mounting of solenoid valves. This eliminates the need for external tubing and simplifies installation. For applications not requiring a solenoid valve, the air manifold inlet ports are marked “A” and “B”. Air inlet port “A” will rotate the actuator counter-clockwise. Spring return actuators fail clockwise.



Model Shown: 4Z-B6LJ-V-SS-61AD

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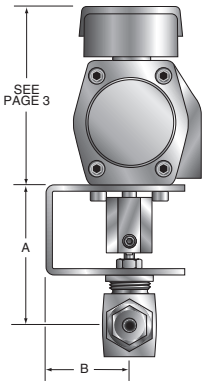
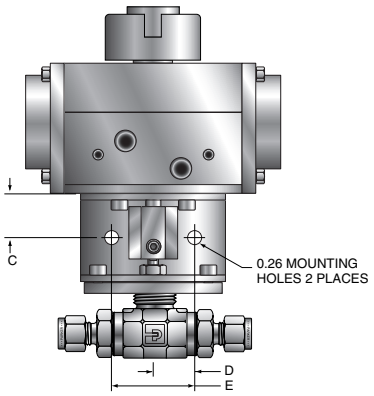
Valve Dimensional Data

Valve Series	A		B		C		D		E	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
B2	2.23	56.6	1.61	40.9	0.80	20.3	0.75	19.1	1.50	38.1
B6	2.49	63.2								
B8	2.91	73.9								
MB2	2.33	59.2								
MB4	2.33	59.2								
MB6	2.48	63.0								
HB4	2.70	68.6								
SWB4	2.57	65.2	1.25	31.7	0.82	20.08				
SWB8	2.79	70.9								
SWB12	2.95	74.9								
SWB16	3.14	79.7								

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





Model Shown:
4Z-B6LJ-V-SS-61AC-2

Recommended Actuators*

Valve Series	Double Acting AD	Spring Return AO	Spring Return AC
B2LJ	61AD	61AO-2	61AC-2
B2LJ2	61AD	61AO-2	61AC-2
B2XJ	61ADX	61ACX-2	61ACX-2
B2XJ2	61ADX	61ACX-2	61ACX-2
B6LJ	61AD	61AO-2	61AC-2
B6LJ2	61AD	61AO-2	61AC-2
B6LS2	61AD	61AO-2	61AC-2
B6LPKR	61AD	61AO-2	61AC-2
B6LSPKR	61AD	61AO-2	61AC-2
B6XJ	61ADX	61ACX-2	61ACX-2
B6XJ2	61ADX	61ACX-2	61ACX-2
B6XS2	61ADX	61ACX-2	61ACX-2
B6XPKR	61ADX	61ACX-2	61ACX-2
B6XSPKR	61ADX	61ACX-2	61ACX-2
B8LJ	61AD	61AO-2	61AC-2
B8LJ2	61AD	62AO-3	62AC-3
B8LS2	61AD	62AO-3	62AC-3
B8LPKR	61AD	62AO-3	62AC-3
B8LSPKR	61AD	62AO-3	62AC-3
B8XJ	61ADX	61ACX-2	61ACX-2
B8XJ2	61ADX	ACX64-3	ACX64-3
B8XS2	61ADX	ACX64-3	ACX64-3
B8XPKR	61ADX	ACX64-3	ACX64-3
B8XSPKR	61ADX	ACX64-3	ACX64-3
HB4LPKR	61AD	62AO-3	62AC-3
HB4LK	61AD	61AO-2	61AC-2
HB4XPKR	61ADX	ACX62-3	ACX62-3
HB4XK	61ADX	61ACX-2	61ACX-2
MB2A	61AD	61AO-2	61AC-2
MB2L	61AD	61AO-2	61AC-2
MB2X	61ADX	61ACX-2	61ACX-2
MB4A	61AD	61AO-2	61AC-2
MB4L	61AD	61AO-2	61AC-2
MB4X	61ADX	61ACX-2	61ACX-2
MB6A	61AD	61AO-2	61AC-2
MB6L	61AD	61AO-2	61AC-2
MB6X	61ADX	61ACX-2	61ACX-2
SWB4	61AD	61AO-2	61AC-2
SWB8	61AD	62AO-3	62AC-3
SWB12	61AD	62AO-3	62AC-3
SWB16	62AD	63AO-3	63AC-3

* With 60 psig (4.1 bar) actuation pressure.

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How to Order 2-Way and 3-Way MAB Series Ball Valves

When ordering Parker MPI™ Ball valves, consider first the bore size to verify that it is large enough for the flow rate needed, then choose the end connection. We have flow and pressure options not found anywhere else. The correct part number is easily derived from the following example and ordering chart. The ten product characteristics required are coded as shown in the chart.

The following example describes an MAB Series, three-way diverter ball valve with a .375" orifice, fluorocarbon rubber seals, 1/4" MPI™ medium pressure inverted connections on all ports, stainless steel body and the optional lock out device.

Typical part number example: **4MP7-MAB6XPKD-V-SSP-LD** (part number is created based on customer selection of product parameters, see below for example)

4	MP7	-	MAB	6	X	PK	D	-	V	-	SSP	-	LD
Inlet/Outlet Connection Size	Connection Type		Valve Series	Orifice Size	Valve Type	Seat Material	3 Way Valve Type		Seat Gland Seal Material		Body Material		Options
4 = 1/4" **6** = 3/8**"** **8** = 1/2" **9** = 9/16" **12** = 3/4**"** **16** = 1"	**MP7=** Parker MPI™		**MAB**	**3** = 3/16"[2] **4** = 1/4"[1] **6** = 3/8" **8** = 1/2" **12** = 3/4"[1]	**L=** 2 Way **X=** 3 Way	**PK=** PEEK	**Blank=** Selector **D=** Diverter		**V***=** Fluorocarbon Rubber **KZ**=** FFKM Highly Fluorinated Fluorocarbon Rubber **BN=** Nitrile Rubber **EPR=** Ethylene Propylene Rubber **C**=** PTFE U-Cup		**SSP=** Stainless Steel **2507=** Super Duplex		**LD=** Lock Out Device **XF=** High Strength Ferrules for 2507 SD sizes 12 & 16 only **Actuator Options** (see pages 61-69)
									** Limited size availability - see O-ring options below *** Standard o-ring material				

[1] Only Available with 2-Way Valves

[2] Only Available with 3-Way Valves

Note: Critical gas applications such as hydrogen or helium are not recommended. Consult factory with application details for assistance.

MAB

Options

Standard valve has Fluorocarbon Rubber o-rings [0 ºF (-18 ºC) to 400 ºF (204 ºC) maximum].

KZ - Standard valve with FFKM Highly Fluorinated Fluorocarbon Rubber o-rings [30°F to 500°F (0° to 260°C).
NOTE: Not available with 3/4" orifice 2-way valves

C - Standard valve with PTFE U-Cup Seal [0° to 500°F (-18° to 260°C)].
NOTE: Only available with 3/4" orifice 2-way valves

BN - Standard valve with Buna-N (Nitrile) Rubber o-rings [-20° to 250°F (-29° to 121°C)].

EPR - Standard valve with Ethylene Propylene Rubber o-rings [-20° to 250°F (-29° to 121°C).

LD - Standard valve with factory-installed lock out device.

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