



# ***Ball Valves (MB Series)***

*Catalog 4121-MB  
Revised, January 2005*



# 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 2-way and 3-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.

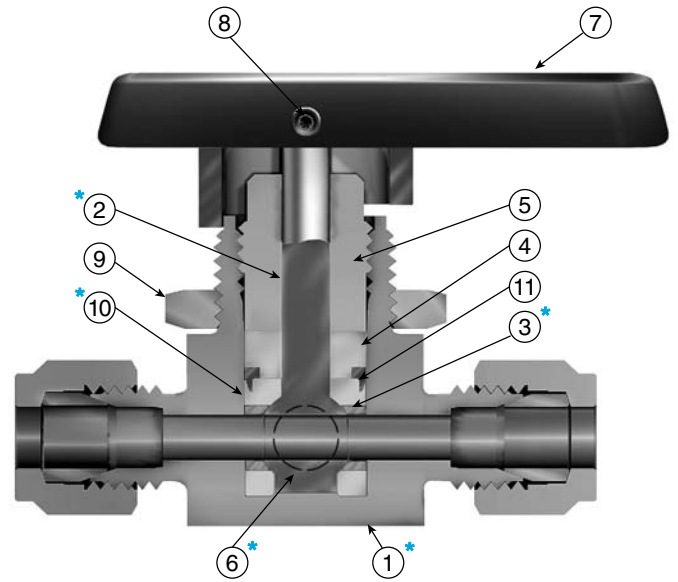
## Features

- 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 3-way valves

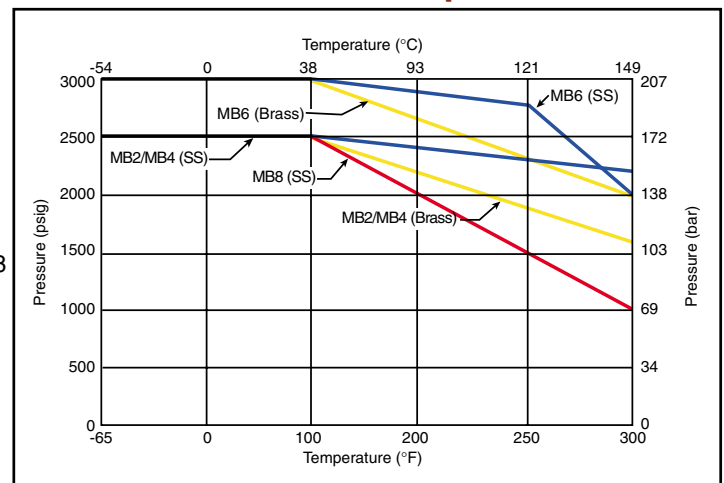
## Specifications

- 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" (1.3 mm to 10.3 mm)
- C<sub>v</sub>: .05 to 6.96
- Body materials: Stainless Steel and Brass
- Body configurations: 2-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. Packing nut must be tightened to achieve higher pressures. Packing in vented MB Series Ball Valves is factory adjusted for the maximum valve pressure rating of 500 psig (34 bar).



## Pressure vs. Temperature



NOTE: To determine MPa, multiply bar by 0.1

## Materials of Construction

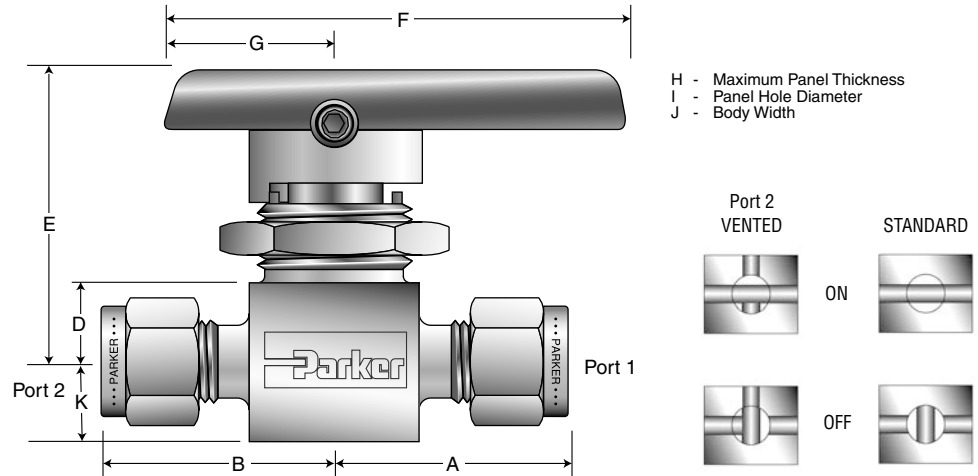
Item #	Part Description	Stainless Steel Valve	Brass Valve
*1	Body	ASTM A 276 TYPE 316	ASTM B 16 Alloy C36000
*2	Stem	ASTM A 276 TYPE 316	
*3	Hollow Insert	316 Stainless Steel	
4	Packing Washer	ASTM B 16 Alloy C36000	
5	Packing Nut	ASTM A 479 Type 316	ASTM B 16 Alloy C36000
*6	Solid Insert	316 Stainless 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

# MB Series Ball Valves

## 2-Way In-Line

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



Model shown: 4A-MB6LPFA-SSP

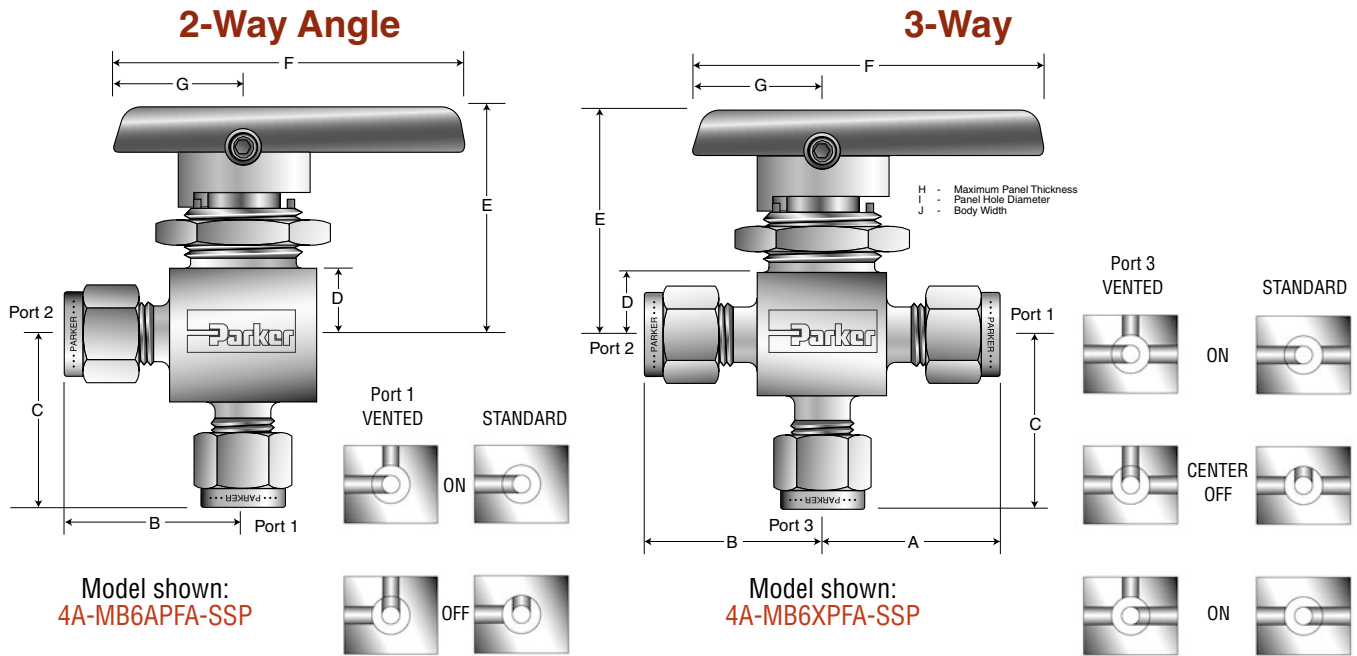
## 2-Way In-Line Dimensions, Flow Data

Port Size	Basic Part #	Flow Data				End Connections		Dimensions inches (mm)									
		Orifice inch	mm	$C_v$	$x_T$ †	Port 1	Port 2	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	0.84	0.34	1.31	1.88	0.75	0.25	0.58	0.58	0.28
1A						1/16" A-LOK®		(21.3)	(21.3)								
2Z		1/8" CPI™		1.00	1.00												
2A		1/8" A-LOK®		(25.4)	(25.4)												
M3Z		3mm CPI™		1.00	1.00												
M3A	3mm A-LOK®		(25.4)	(25.4)													
2F	MB4L	0.125	3.2	0.44	0.34	1/8" Female NPT		0.81	0.81	0.34	1.31	1.88	0.75	0.25	0.58	0.58	0.28
4Z						1/4" CPI™		1.12	1.12								
4A						1/4" A-LOK®		(28.5)	(28.5)								
M6Z						6mm CPI™		1.12	1.12								
M6A						6mm A-LOK®		(28.5)	(28.5)								
2Z	MB6L	0.093	2.4	0.18	0.55	1/8" CPI™		1.09	1.09	0.44	1.56	2.37	0.88	0.25	0.77	0.80	0.38
2A						1/8" A-LOK®		(27.7)	(27.7)								
2F		1/8" Female NPT		1.00	1.00												
4M		1/4" Male NPT		1.00	1.00												
4Z		1/4" CPI™		1.19	1.19												
4A		1/4" A-LOK®		(30.2)	(30.2)												
4F		1/4" Female NPT		1.03	1.03												
4M4Z		1/4" Male NPT	1/4" CPI™	1.00	1.19												
4M4A		1/4" Male NPT	1/4" A-LOK®	(25.4)	(30.2)												
4V		1/4" VacuSeal		1.03	1.03												
6Z		3/8" CPI™		1.31	1.31												
6A		3/8" A-LOK®		(33.3)	(33.3)												
M6Z		6mm CPI™		1.19	1.19												
M6A		6mm A-LOK®		(30.2)	(30.2)												
M8Z		8mm CPI™		1.22	1.22												
M8A	8mm A-LOK®		(31.0)	(31.0)													
8A	MB8L	0.406	10.3	10.7	0.16	1/2" A-LOK®		1.94	1.94	0.69	2.39	4.50	1.50	0.38	1.50	1.50	0.69
8Z						1/2" A-CPI™		(49.3)	(49.3)								
8F		1/2" FNPT		1.56	1.56												
12A		3/4" A-LOK®		(39.6)	(39.6)												
12Z		3/4" CPI™		1.94	1.94												
M12A		12mm A-LOK®		(49.3)	(49.3)												
M12Z		12mm CPI™		1.96	1.96												
		0.375	9.5	10.7	0.16			1.96	1.96								

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

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

# MB Series Ball Valves



## 2-Way Angle and 3-Way Dimensions, Flow Data

Port Size	Basic Part #	Flow Data				End Connections			Dimensions inches (mm)									
		Orifice inch	Orifice mm	$C_v$	$x_T \ddagger$	Port 1	Port 2	Port 3*	A†	B†	C†	D	E	F	G	H	I	J
1Z	MB2A MB2X	0.052	1.3	0.02	0.58	1/16" CPI™			0.84	0.84	0.81	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®			(21.3)	(21.3)	(20.6)							
2Z		1/8" CPI™			1.00	1.00	0.97											
2A		1/8" A-LOK®			(25.4)	(25.4)	(24.6)											
M3Z		3mm CPI™			1.00	1.00	0.97											
M3A	3mm A-LOK®			(25.4)	(25.4)	(24.6)												
2F	MB4A MB4X	0.125	3.2	0.34	0.45	1/8" Female NPT			0.81	0.81	0.81	0.34	1.31	1.88	0.75	0.25	0.58	0.58
4Z						1/4" CPI™			1.12	1.12	1.12							
4A						1/4" A-LOK®			(28.4)	(28.4)	(28.4)							
M6Z						6mm CPI™			1.12	1.12	1.12							
M6A						6mm A-LOK®			(28.4)	(28.4)	(28.4)							
4Z	MB6A MB6X	0.187	4.7	0.70	0.58	1/4" CPI™			1.19	1.19	1.15	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®			(30.2)	(30.2)	(29.2)							
4F						1/4" Female NPT			1.03	1.03	1.03							
4V						1/4" VacuSeal			1.03	1.03	1.03							
4Z4Z4M						1/4" CPI™			1.19	1.19	1.03							
4A4A4M						1/4" A-LOK®			(30.2)	(30.2)	(26.2)							
6Z						3/8" CPI™			1.31	1.31	1.23							
6A						3/8" A-LOK®			(33.3)	(33.3)	(31.2)							
M6Z						6mm CPI™			1.19	1.19	1.15							
M6A						6mm A-LOK®			(30.2)	(30.2)	(29.2)							
M8Z	8mm CPI™			1.22	1.22	1.18												
M8A	8mm A-LOK®			(31.0)	(31.0)	(30.0)												
8A	MB8A MB8X	0.406	10.3	5.4	0.36	1/2" A-LOK®			1.75	1.75	1.75	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™			(44.5)	(44.5)	(44.5)							
8F		1/2" FNPT			1.56	1.56	1.56											
12A		3/4" A-LOK®			1.75	1.75	1.75											
12Z		3/4" CPI™			(44.5)	(44.5)	(44.5)											
M12A		12mm A-LOK®			1.75	1.75	1.75											
M12Z		12mm CPI™			(44.5)	(44.5)	(44.5)											

\* Not applicable for the 2-Way Angle pattern.

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

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

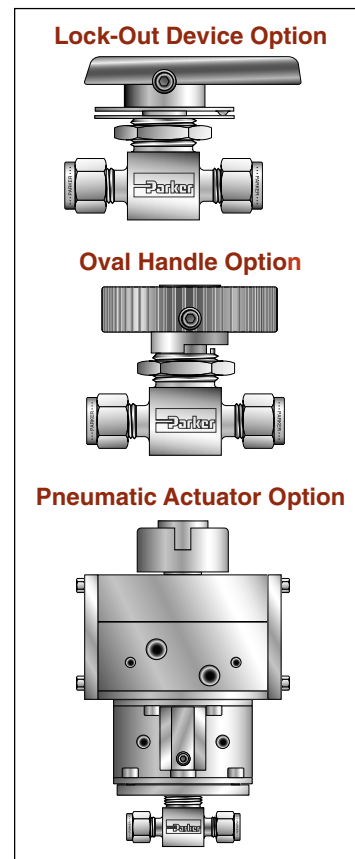
## How to Order 2-Way In-Line, 2-Way Angle and 3-Way Patterns

The correct part number is easily derived by following the circled number sequence.



Describes a MB Series, 2-way, in-line pattern ball valve with 1/8" CPI™ compression end connections for ports 1 and 2 Inline Body Styler, PFA seat and packing, stainless steel body construction, and a panel mounting nut.

① Port 1	② Port 2	③ Port 3	④ Valve Series	⑤ Seat Material	⑥ Body Material
1Z - 1/16" CPI™			MB2L MB2A MB2X	PFA - Perfluoroalkoxy	SSP - Stainless Steel (Stainless Steel with BP - Brass (Brass with Panel Nut)  (Only Available in MB 2,4,6)
1A - 1/16" A-LOK®					
2Z - 1/8" CPI™					
2A - 1/8" A-LOK®			MB4L MB4A MB4X		
M3Z - 3mm CPI™					
M3A - 3mm A-LOK®					
2F - 1/8" Female NPT			MB6L MB6A MB6X		
4Z - 1/4" CPI™					
4A - 1/4" A-LOK®					
M6Z - 6mm CPI™					
M6A - 6mm A-LOK®					
2Z - 1/8" CPI™					
2A - 1/8" A-LOK®					
2F - 1/8" Female NPT					
4Z - 1/4" CPI™					
4A - 1/4" A-LOK®					
4F - 1/4" Female NPT					
4M - 1/4" Male NPT					
4V - 1/4" VacuSeal					
6Z - 3/8" CPI™					
6A - 3/8" A-LOK®					
M6Z - 6mm CPI™					
M6A - 6mm A-LOK®					
M8Z - 8mm CPI™					
M8A - 8mm A-LOK®					
8Z - 1/2" CPI™			MB8A MB8L MB8X		
8A - 1/2" A-LOK®					
8F - 1/2" Female NPT					
12Z - 3/4" CPI™					
12A - 3/4" A-LOK®					
M12Z - 12mm CPI™					
M12A - 12mm A-LOK®					



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

## How to Order Options (2-way, Angle, and 3-way)

**Lock-Out Devices** – Add the suffix **-LD** to the end of the part number to order directly on the valve. **Example:** 2F-MB4LPFA-SSP-LD. For field installation, simply substitute the correct valve series number in the following nomenclature: **LD**-valve series. **Example:** LD-MB6L

**Colored Handles** – Add the designator corresponding to the correct handle as a suffix to the part number: **W** - white, **B** - blue, **G** - green, **R** - red, **Y** - yellow. **Example:** 4Z-MB6LPFA-SSP-G

**Stainless Steel Handles** – Add the suffix **-ST** to the part number. **Example:** 4F-MB6LPFA-SSP-ST

**Oval Handles** – Add the suffix **-S** to the part number. **Example:** 6Z-MB6APFA-SSP-S. If requesting a colored oval handle, add the suffix **-S-color designator**. **Example:** 6Z-MB6APFA-SSP-S-W (\* MB6 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

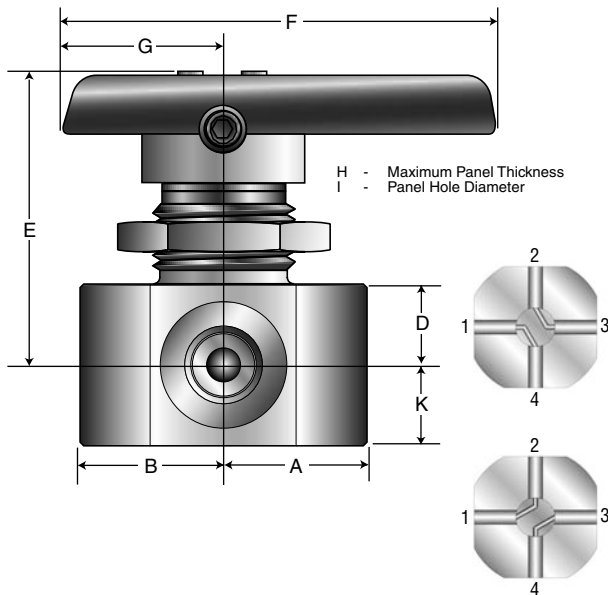
**Special Cleaning** – All face seal ended valves are cleaned in accordance with Parker Specification ES8001. This is an available option for all valves by adding the suffix **-C1** to the end of the part number. **Example:** 4V-MB4XPFA-SSP-C1

**Pneumatic Actuators** – For detailed actuator information, refer to Catalog 4123. 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

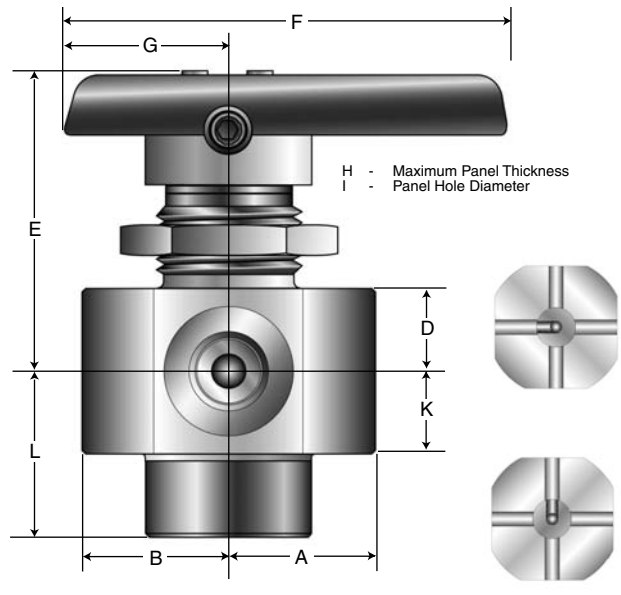
**Electric Actuators** – For detailed actuator information, refer to Catalog 4123. For factory assembly, add the actuator part number as the suffix to the valve part number. **Example:** M6A-MB6XPFA-SSP-71C. For field installation, specify the actuator desired. **Example:** 71C. The appropriate mounting hardware may be obtained by adding the valve series and actuator series to the prefix **MK-**. **Example:** MK-MB6X-70

# MB Series Ball Valves

## 4-Way



## 5-Way



## Dimensions

Port Size	Basic Part #	Flow Data				End Connections		Dimensions inches (mm)									
		Orifice inch	mm	$C_V$	$x_T^*$	Port 1	Port 2	A	B	D	E	F	G	H	I	K	L
2A7	MB6X4	0.063	1.6	0.17	0.16	1/8" Female A-LOK®		0.97	0.97	0.44	1.57	2.37	0.88	0.25	0.77	0.44	
2Z7						1/8" Female CPI™	(24.6)	(24.6)									
2F						1/8" Female NPT	(19.8)	(19.8)									
2A7	MB6X5	0.063	1.6	0.17	0.16	1/8" Inverted A-LOK®		0.97	0.97	0.44	1.57	2.37	0.88	0.25	0.77	0.44	0.97
2Z7						1/8" Inverted CPI™	(24.6)	(24.6)	(24.6)								
2F						1/8" Female NPT	(19.8)	(19.8)	(19.8)								

## How to Order

The correct part number is easily derived by following the circled number sequence.

**Example:** 2Z7 - MB6X4PFA - SSP

①            ②    ③            ④

This example describes a MB-Series 4-way pattern ball valve with 1/8" female CPI™ compression end connections for all ports, PFA seat and packing, stainless steel body construction, and a panel mounting nut.

①	②	③	④
End Connection	Valve Series	Seat Material	Body Material
2F - 1/8" Female NPT 2Z7 - 1/8" CPI™ 2A7 - 1/8" A-LOK®	MB6X4 MB6X5	PFA - Perfluoroalkoxy	SSP - Stainless Steel (Stainless Steel with Stainless Steel Panel Nut)

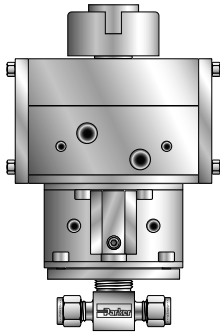
## How to Order Options

**Colored Handles** – Add the designator corresponding to the correct handle as a suffix to the part number: **W** - white, **B** - blue, **G** - green, **R** - red, **Y** - yellow. **Example:** 2F-MB6X4PFA-SSP-R

**Stainless Steel Handles** – Add the suffix -ST to the part number. **Example:** 2A7-MB6XPFA-SSP-ST

## Recommended Pneumatic Actuators

Valve Series	Double Acting AD	Spring Return AO	Spring Return AC
MB2A, MB2L, MB4A, MB4L, MB6A, MB6L, MB6X4	61AD or 61SAD	61AO-2 or 61SAO	61AC-2 or 61SAC
MB8L	62AD	63AO-3	63AC-3
MB2X, MB4X, MB6X	61ADX or 61SADX	61ACX-2 or 61SACX	61ACX-2 or 61SACX
MB8X	ADX62	ACX64-3	ACX64-3



## How to Order Actuators

### Factory Assembled

Valve Part Number — Actuator — Options

**4Z-MB6LPFA-SS - 61AD - 1B**

### For Field Assembly (Without Brackets)

Actuator Number

**61AD**

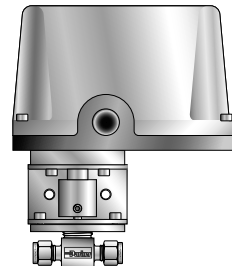
### For Field Assembly (Including Bracket & Coupling)

Valve Series & Seat Material - Actuator

**MB6LPFA - 61AD**

For more details see Catalog 4123

Suffix	Accessory
<b>Single Option</b>	
-1A	Breather Block
-1B	Solenoid Valve, (NEMA 4, 120 VAC)
-1C	Solenoid Valve, (NEMA 7, 120 VAC)
-1D	Solenoid Valve, (NEMA 4, 24 VDC)
-1E	Solenoid Valve, (NEMA 7, 24 VDC)
-1F	Solenoid Valve, (NEMA 4, 240 VAC)
-1G	Solenoid Valve, (NEMA 7, 240 VAC)
-1H	Limit Switch – Two SPDT switches with mounting kit
<b>Double Option</b>	
-2A	Breather Block, Solenoid Valve, (NEMA 4, 120 VAC)
-2B	Breather Block, Solenoid Valve, (NEMA 7, 120 VAC)
-2C	Breather Block, Solenoid Valve, (NEMA 4, 24 VDC)
-2D	Breather Block, Solenoid Valve, (NEMA 7, 24 VDC)
-2E	Breather Block, Solenoid Valve, (NEMA 4, 240 VAC)
-2F	Breather Block, Solenoid Valve, (NEMA 7, 240 VAC)
-2G	Limit Switch, Solenoid Valve, (NEMA 4, 120 VAC)
-2H	Limit Switch, Solenoid Valve, (NEMA 7, 120 VAC)
-2J	Limit Switch, Solenoid Valve, (NEMA 4, 24 VDC)
-2K	Limit Switch, Solenoid Valve, (NEMA 7, 24 VDC)
-2L	Limit Switch, Solenoid Valve, (NEMA 4, 240 VAC)
-2M	Limit Switch, Solenoid Valve, (NEMA 7, 240 VAC)
<b>Triple Option</b>	
-3A	Breather Block, Limit Switch, Solenoid Valve, (NEMA 4, 120 VAC)
-3B	Breather Block, Limit Switch, Solenoid Valve, (NEMA 7, 120 VAC)
-3C	Breather Block, Limit Switch, Solenoid Valve, (NEMA 4, 24 VDC)
-3D	Breather Block, Limit Switch, Solenoid Valve, (NEMA 7, 24 VDC)
-3E	Breather Block, Limit Switch, Solenoid Valve, (NEMA 4, 240 VAC)
-3F	Breather Block, Limit Switch, Solenoid Valve, (NEMA 7, 240 VAC)



## Electric Actuators Factory Assembled

The correct part number is easily derived by following the circled number sequence.

**Example:** 4Z-MB6XPFA-SS - 81 X A -       
① ② ③ ④ ⑤

Describes a Model 81, 3-Way electric actuator unit with a NEMA 4, 4X, 7 and 9 rating, a 230 VAC motor and no options, mounted on a MB Series ball valve.

① Valve Part Number	② Actuator Model	③ Flow Pattern	④ Voltage	⑤ Options
See the "How to Order" section in the applicable catalog for the desired valve series	71 72 81 73 82 71R 83 72R 84 73R	Blank - 2-Way X - 3-Way	Blank - 115 VAC A - 230 VAC B - 24 VAC C - 12 VDC D - 24 VDC	T - Heater and Thermostat S# - Additional Limit Switch; # = number of limit switches required C - Modulating Control Package with position re-transmit (4-20mA, 0-10 VDC includes potentiometer) <sup>‡</sup> F - Position Indicator (70R Series only) CE - European Conformity Marking

<sup>‡</sup>For 80 Series electric actuators only.



Catalog 4121-MB, 10M, 1/05

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**Parker Hannifin plc**  
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Barnstaple, Devon EX31 1NP  
England  
Phone: +44 (0) 1271 313131  
Fax: +44 (0) 1271 373636  
Email: [ipd@parker.com](mailto:ipd@parker.com)  
[www.parker.com/ipd](http://www.parker.com/ipd)