



# Ball and Plug Valves

Catalog 4121-BV

January 2019

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



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## Introduction

Parker High Pressure HB4 Series Ball Valves provide reliable shut-off or switching functions. The upper and lower trunnion bearings enhance the resistance of the trunnions against seizure, and increase the valve life in extreme applications. The compact and rugged design employs spring-loaded seats for high cycle life and low operating torques at pressures up to 10,000 psig (689 bar).

## Features

- ▶ PEEK trunnion bearings for longer cycle life
- ▶ Two-way and three-way designs
- ▶ Compact FNPT version for tight work areas
- ▶ Blow-out resistant two-piece ball/stem
- ▶ Full operating pressure at any port
- ▶ Low operating torque
- ▶ Manual, electric or pneumatic actuation
- ▶ Panel mountable to 3/8" (9.6mm) thickness
- ▶ No packing to adjust
- ▶ Color coded fracture resistant handles
- ▶ Handle indicates direction of flow
- ▶ Positive handle stops
- ▶ Wide variety of US customary and SI ports
- ▶ Top of stem marked to indicate flow direction
- ▶ 100% factory tested
- ▶ Compact package
- ▶ Heat code traceability

## Specifications

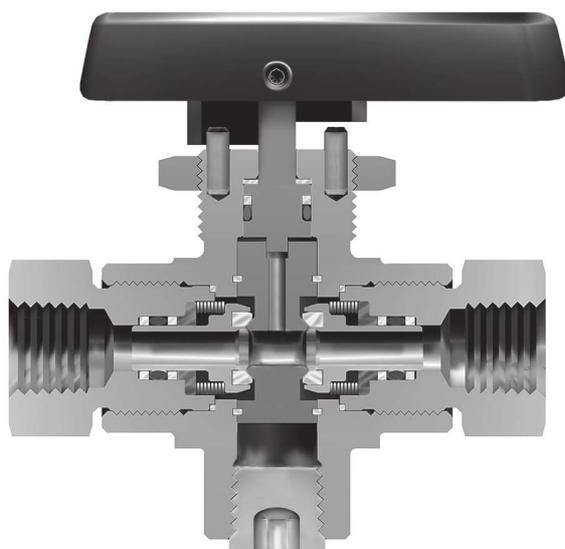
<b>Pressure Rating</b>	10,000 psig (689 bar) CWP with PEEK (PKR) Seats 6,000 psig (414 bar) CWP with PCTFE (K) Seats
<b>Temp. Rating</b>	-65°F to 400°F (-54°C to 204°C)
<b>Body Materials</b>	Stainless steel
<b>Body Config.</b>	Two-way and three-way
<b>Port Connections</b>	Tube compression (CPI™/A-LOK®) Short and long female NPT
<b>Port Size</b>	1/8" – 1/2" (6 mm to 12 mm)

## Flow Data

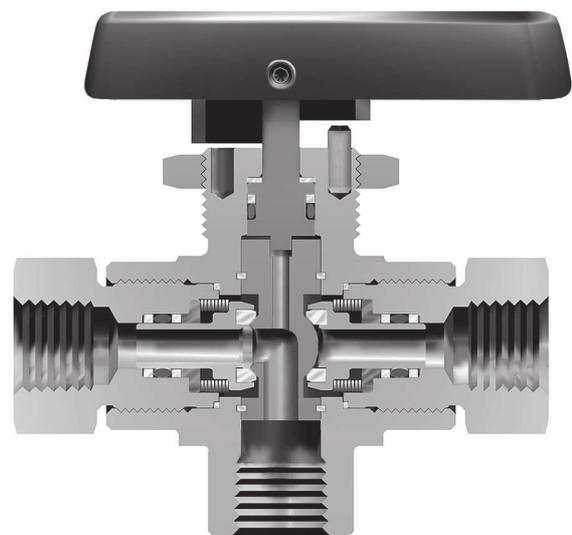
	Two-Way HB4L	Three-Way HB4X
<b>C<sub>v</sub></b>	1.02	0.62
<b>X<sub>T</sub></b>	0.42	0.71
<b>Orifice</b>	0.188" (4.8mm)	0.188" (4.8mm)

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

HB

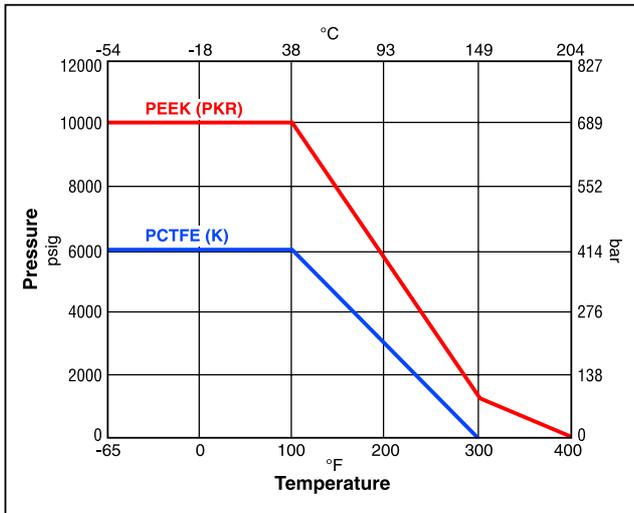


Two-Way HB4L Design



Three-Way HB4X Design

## Pressure vs. Temperature



**Note:** To determine MPa, multiply bar by 0.1

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.

### Temperature Ratings:

Nitrile (Nitrile) Rubber	40°F to 250°F (-40°C to 121°C)
Ethylene Propylene Rubber	-65°F to 300°F (-54°C to 149°C)
Fluorocarbon Rubber	-15°F to 400°F (-26°C to 204°C)

## Flow Calculations, Two-Way HB4L

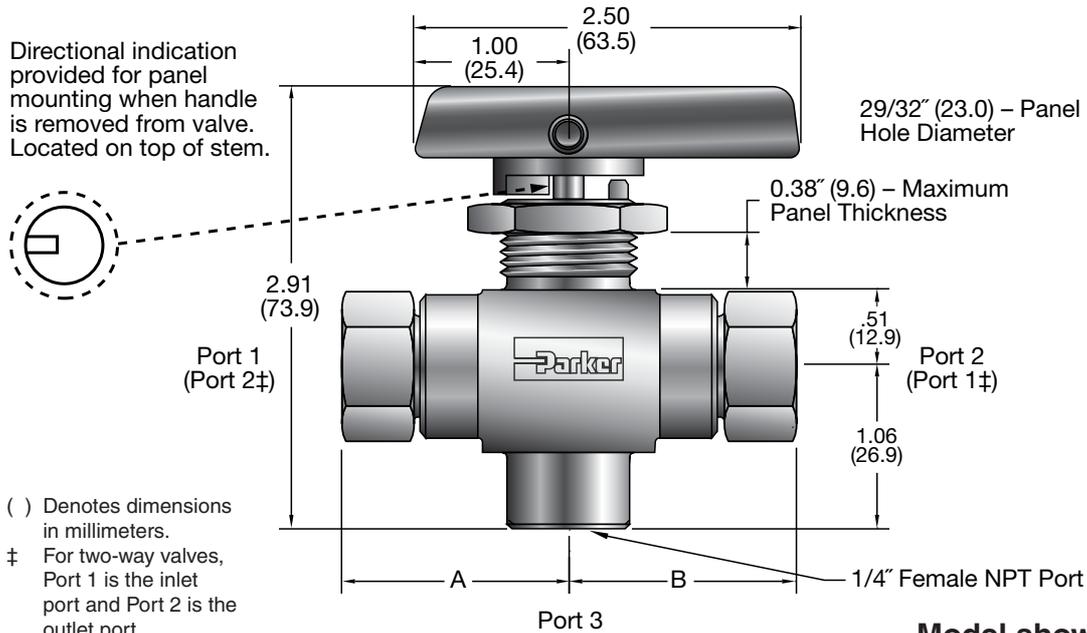
Inlet Pressure		Pressure Drop ΔP		Water @ 60°F (16°C)		Air @ 60°F (16°C)	
psig	bar	psig	bar	gpm	m3/hr	scfm	m3/hr
100	7	1	0.1	1.0	0.2	10.8	17.4
		10	0.7	3.2	0.7	32.0	50.7
		50	3.5	7.2	1.6	50.5	76.0
1000	69	10	0.7	3.2	0.7	101.3	171.3
		100	6.9	10.2	2.3	297.7	502.3
		500	34.5	22.8	5.2	446.7	749.6
3000	207	100	6.9	10.2	2.3	542.0	919.9
		1000	69.0	32.3	7.3	1297.0	2198.9
		1500	103.4	39.5	9.0	1327.2	2248.8
6000	414	1000	69.0	32.3	7.3	2158.5	3662.7
		2000	137.9	45.6	10.4	2188.5	4388.6
		3000	206.8	55.9	12.7	2647.9	4486.8
10000	689	1000	69.0	32.3	7.3	2954.3	5020.2
		2000	137.9	45.6	10.4	3818.4	6487.0
		3000	206.8	55.9	12.7	4236.2	7194.9

## Flow Calculations, Three-way HB4X

Inlet Pressure		Pressure Drop ΔP		Water @ 60°F (16°C)		Air @ 60°F (16°C)	
psig	bar	psig	bar	gpm	m3/hr	scfm	m3/hr
100	7	1	0.1	0.6	0.1	6.6	10.6
		10	0.7	2.0	0.4	20.0	31.9
		50	3.5	4.4	1.0	37.1	57.4
1000	69	10	0.7	2.0	0.4	61.8	104.4
		100	6.9	6.2	1.4	187.2	316.1
		500	34.5	13.9	3.1	337.4	567.7
3000	207	100	6.9	6.2	1.4	333.1	565.4
		1000	69.0	19.6	4.5	903.4	1532.8
		1500	103.4	24.0	5.5	1004.4	1703.2
6000	414	1000	69.0	19.6	4.5	1393.5	2365.2
		2000	137.9	27.7	6.3	1803.8	3060.4
		3000	206.8	34.0	7.7	2004.9	3399.8
10000	689	1000	69.0	19.6	4.5	1858.9	3159.0
		2000	137.9	27.7	6.3	2499.6	4247.2
		3000	206.8	34.0	7.7	2903.0	4932.1

HB

## Dimensions, Pressure Data



**Model shown:  
4F-HB4XPKR-SSP**

HB

Basic Part Number*	Pressure Rating @100°F (38°C)		End Connection		Dimensions			
	psig	bar	Port 1	Port 2	A†		B‡	
					inch	mm	inch	mm
2F-HB4	10,000	689	1/8" Female NPT		1.47	37.3	1.47	37.3
4F-HB4**			1/4" Female NPT		1.47	37.3	1.47	37.3
4FL-HB4			1/4" Female NPT (Long)		1.97	50.0	1.97	50.0
4A-HB4			1/4" A-LOK® Compression		2.07	52.6	2.07	52.6
4Z-HB4			1/4" CPI™ Compression		2.07	52.6	2.07	52.6
M6A-HB4			6 mm A-LOK® Compression		2.07	52.6	2.07	52.6
M6Z-HB4			6 mm CPI™ Compression		2.07	52.6	2.07	52.6
6A-HB4	6,600†	455	3/8" A-LOK® Compression		2.19	55.6	2.19	55.6
6Z-HB4			3/8" CPI™ Compression		2.19	55.6	2.19	55.6
8A-HB4	6,300†	434	1/2" A-LOK® Compression		2.30	58.4	2.30	58.4
8Z-HB4			1/2" CPI™ Compression		2.30	58.4	2.30	58.4
M8A-HB4	7,975†	550	8 mm A-LOK® Compression		2.07	52.6	2.07	52.6
M8Z-HB4			8 mm CPI™ Compression		2.07	52.6	2.07	52.6
M10A-HB4	6,525†	450	10 mm A-LOK® Compression		2.19	55.6	2.19	55.6
M10Z-HB4			10 mm CPI™ Compression		2.19	55.6	2.19	55.6
M12A-HB4	6,162†	425	12 mm A-LOK® Compression		2.30	58.4	2.30	58.4
M12Z-HB4			12 mm CPI™ Compression		2.30	58.4	2.30	58.4

\* Flow configurations are two-way (HB4L) and three-way (HB4X); Seat materials are PEEK (Polyetheretherketone) and PCTFE (Polychlorotrifluoroethylene).

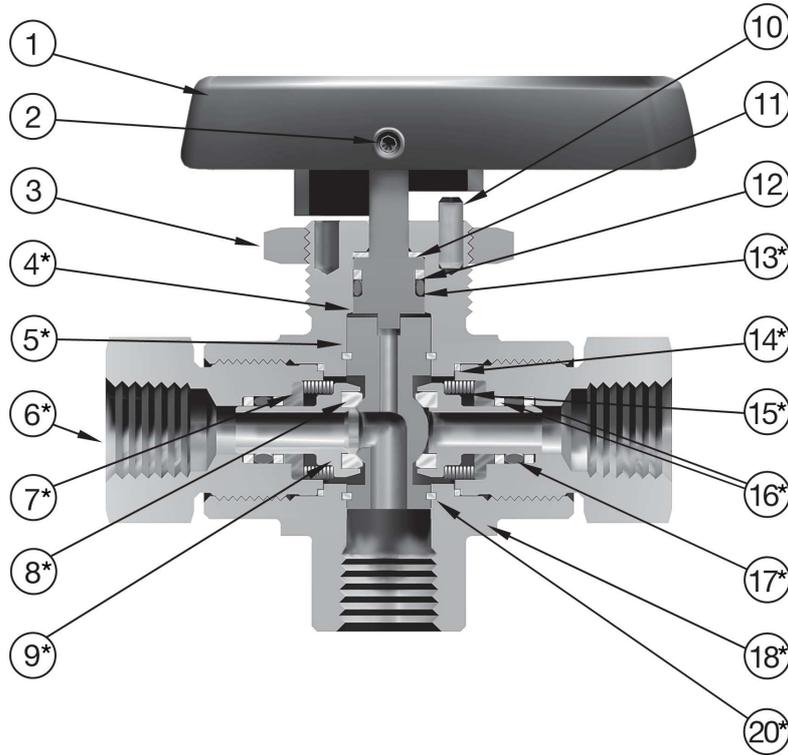
Dimensions in inches/millimeters are for reference only, subject to change.

\*\* Designed with shorter end-to-end dimensions than the 4FL model to save space.

† Reduced pressure rating is determined by the maximum rated pressure of the tubing as stated in the Parker Instrument Tubing Selection Guide Bulletin 4200-TS. The working pressure ratings are limited by the seat material (PCTFE – 6,000 psig (414 bar) maximum and PEEK – 10,000 psig (689 bar) maximum) and the temperature of the application.

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

## Materials of Construction



HB

No.	Part Description	6,000 psi (414 bar)	10,000 psi (689 bar)
1	Handle/insert	Nylon 6/6/316 SS	Nylon 6/6/316 SS
2	Handle screw	Stainless steel	Stainless steel
3	Panel nut	316 Stainless steel	316 Stainless steel
4*	Stem	ASTM A 479 Type 316	ASTM A 479 Type 316
5*	Ball trunnion	ASTM A 479 Type 316	ASTM A 479 Type 316
6*	Port end connector	ASTM A 479 Type 316	ASTM A 479 Type 316
7*	Spring washer	ASTM A 479 Type 316	ASTM A 479 Type 316
8*	Seat	PCTFE	PEEK
9*	Seat retainer	ASTM A 276 Type 316	ASTM A 276 Type 316
10	Handle stop pins	302 Stainless steel	302 Stainless steel
11	Stem washer	PEEK	PEEK
12	Stem O-ring back-up	PTFE	PTFE
13*	Stem O-ring	Fluorocarbon rubber**	Fluorocarbon rubber**
14*	Connector end seal	PEEK	PEEK
15*	Spring	ASTM A 313 Type 631	ASTM A 313 Type 631
16*	Seat retainer O-ring back-up	PTFE	PTFE
17*	Seat retainer O-ring	Fluorocarbon rubber**	Fluorocarbon rubber**
18*	Valve body	ASTM A 276 Type 316	ASTM A 276 Type 316
19*	Pipe plug (Not shown/HB4L only)	316 Stainless steel	316 Stainless steel
20*	Trunnion bearing	PEEK	PEEK

\* Wetted parts

\*\* Optional elastomer seals available

Lubrication: Perfluorinated polyether