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BELLOWS VALVES

Microelectronics Product Line

Catalog 4506/USA

October 2003

VERIFLO

ISO 9001 Certified

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BELLOWS VALVES

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Parker Hannifin Corporation 10

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VERIFLO DIVISION

Veriflo Division, Parker Hannifin Corporation is a leading manufacturer of precision valves, regulators and surface mount components for the control and application of liquids and gases used in the fabrication of semiconductors, as well as in the chemical and petrochemical industries.

A Leading Manufacturer Of Precision Valves, Regulators & Surface Mount Components

Veriflo has maintained industry leadership over the past 95 years through innovative engineering, manufacturing and by placing a premium on quality customer care.

The division maintains two state-of-the-art Class 10 Clean Rooms at its Richmond, CA, facility and has adopted a corporate wide "Lean Manufacturing" philosophy, which is delivering greater value to the customer by eliminating wasteful steps through continuous improvement activities.

Veriflo Division's two manufacturing facilities develop and manufacture applications for the Semiconductor/High Purity and Instrument/Analyzer industries.

With the focus of maintaining the highest industry standards,

Maintained Industry Leadership By Placing A Premium On Quality Customer Care

Veriflo Division has achieved an ISO 9001 registration at both its Richmond, CA manufacturing plant and at its Carson City, NV facility. This certification confirms Veriflo's commitment to quality and excellence as recognized by the international community.

The Instrumentation Group of Parker Hannifin specializes in high quality, critical flow components for world-wide process instrumentation, ultra-high-purity, medical, analytical and biopharmaceutical applications.

Parker's Instrumentation Group has ten manufacturing plants and over 300 authorized distributor locations around the world to provide local inventory and technical support. Key markets for the Instrumentation Group include: Chemical Process, Power Generation, Oil and Gas Exploration, Semiconductor Manufacturing, Biomedical, and Analytical Equipment.

Note: For further information on Veriflo Division and or its product line visit the division web site at www.veriflo.com. For more information on Parker Hannifin Corporation visit the corporation's web site at www.parker.com.

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P Series Manual

Manual
Bellows Valve

VERIFLO
ISO 9001 Certified

Parker Hannifin Corporation's Veriflo Division presents the P Series manual bellows valve. These valves are multi-purpose packless externally pressurized bellows valves that may be used in a wide variety of gas or liquid systems.

The P Series manual bellows valve offers clean, reliable operation at full system pressures in either flow direction.

features

- Bottom or Panel mountable.
- Minimal PCTFE to reduce outgassing and moisture absorption.
- Electropolish surface finishes available at 10 Ra; GP finishes at 20 Ra.

materials of construction

Wetted

Body	316L Stainless Steel
Bellows	321 Stainless Steel
Bellows Assembly	316L Stainless Steel
Seat	PCTFE, Vespel®, Stainless Steel
Gasket	Teflon® Coated Stainless Steel, Nickel with Stainless Steel seat

Non-wetted

Handle	Nylon6/6
Bonnet	316L Stainless Steel
Bonnet Nut	316L Stainless Steel

operating conditions

Pressure Rating . . . . . Vacuum to 1250 psig (86.9 barg)

Temperature:

PCTFE	-150°F to 300°F (-101°C to 148.9°C)
Vespel®	-150°F to 400°F (-101°C to 204.4°C)
Stainless Steel	-150°F to 600°F (-101°C to 316°C)

surface finishes

20 Ra	for A, W or Z type connections
10 Ra	Electropolished

functional performance

Flow Capacity . . . . . see chart

Design Leak Rate across the seat . . . . . 4×10^{-9} cc/sec He

internal volume

0.09 in^3 (1.55 cm^3)

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P Series Manual

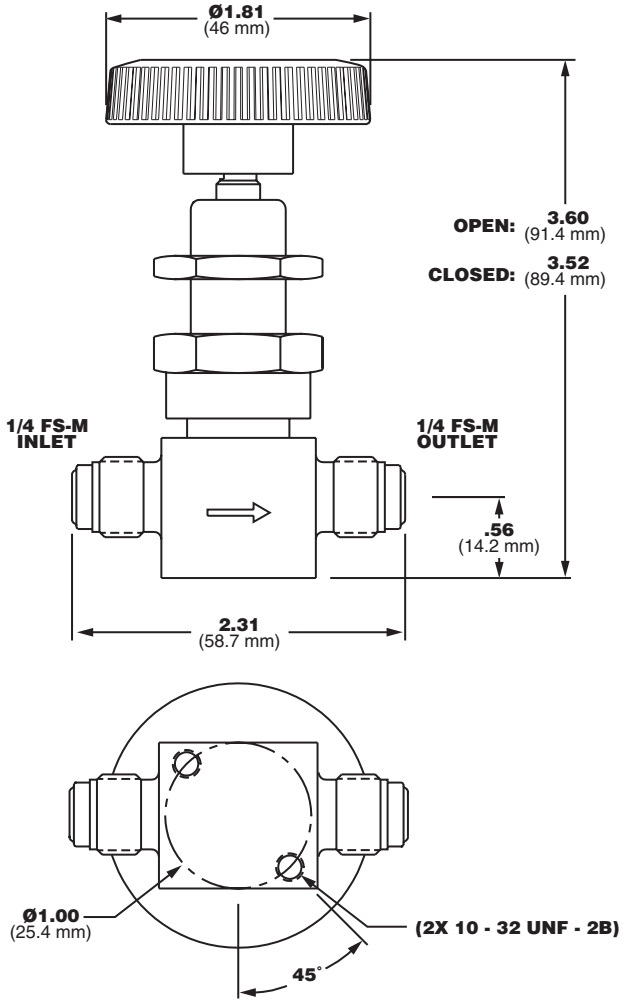
Dimensional Drawings

All Metal Stem Tips (R Stem)

Valve Series	Orifice	Maximum Flow Coefficient, C_V	Pressure Drop To Atmospher (ΔP)	Air SCFM @ 70˚F (21˚C)	Water GPM @ @ 70˚F (21˚C)
P4	.156	C_V = .37	10	5.12	1.17
P4	.156		50	14.15	2.62
P4	.156		100	25.09	3.70
P4A	.156	C_V = .45	10	6.23	1.42
P4A	.156		50	17.21	3.18
P4A	.156		100	20.52	4.50
P6	.281	C_V = .73	10	10.10	2.31
P6	.281		50	27.92	5.16
P6	.281		100	49.50	7.30
P8	.312	C_V = .80	10	11.07	2.53
P8	.312		50	30.60	5.66
P8	.312		100	54.25	8.00

Soft Seat Stem Tips (K & VE)

Valve Series	Orifice	Maximum Flow Coefficient, C_V	Pressure Drop To Atmospher (ΔP)	Air SCFM @ 70˚F (21˚C)	Water GPM @ @ 70˚F (21˚C)
P4	.156	C_V = .38	10	5.26	1.20
P4	.156		50	14.54	2.69
P4	.156		100	25.77	3.80
P4A	.156	C_V = .47	10	6.50	1.49
P4A	.156		50	17.98	3.32
P4A	.156		100	31.87	4.70
P6	.281	C_V = .87	10	12.04	2.75
P6	.281		50	33.28	6.15
P6	.281		100	59.00	8.70
P8	.312	C_V = .93	10	12.87	2.94
P8	.312		50	35.57	6.58
P8	.312		100	63.07	9.30



Ordering Information

4 V - P4 K - SSV - PE

INLET & OUTLET CONNECTION SIZE
4 = 1/4"
6 = 3/8"
8 = 1/2"

INLET & OUTLET CONNECTION TYPE
V1* = Female VacuSeal™
V* = Male VacuSeal™
VH* = Male VacuSeal™ Swivel
BW = Tube Stub
T3 = Tube Stub (3" Long)
W = Socket Weld
A = A-LOK®
Z = CPI™

SURFACE FINISH
= 20 Ra (Only Available for A, W or Z Type Connections)
PE = 10 Ra Electropolish

MATERIAL
SSV = 316L Stainless Steel VeriClean

STEM TIP MATERIAL
K = PCTFE
VE = Vespel®
R = Stainless Steel**

BASIC SERIES
P4, P6, P8 = Inline Pattern
P4A = Angle Pattern
PT4 = Toggle Inline Pattern
PT4A = Toggle Angle Pattern

*** Only available in P4 and P8 versions.**
**** P6R & P8R standard with Tee Handle.**

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CPI™ is a trademark of Parker Hannifin Corporation.

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P Series Toggle

Toggle Lever Bellows Valve

VERIFLO
ISO 9001 Certified

Parker Hannifin Corporation's Veriflo Division presents the P Series toggle bellows valve. These valves provide a quick open and close operation with positive stem retraction in valve sizes 1/4" thru 1/2" tube.

These externally pressurized bellows valves will operate in vacuum to 150 psig at 70°F to handle shut-off control for toxic, ultra-pure, pyrophoric and corrosive media in vacuum or pressurized systems.

features

- Bottom or Panel mountable.
- Minimal PCTFE to reduce outgassing and moisture absorption.
- Electropolish surface finishes available at 10 Ra; GP finishes at 20 Ra.

materials of construction

Wetted

Body . . . . . 316L Stainless Steel
Bellows . . . . . 321 Stainless Steel
Bellows Assembly . . . . . 316L Stainless Steel
Seat . . . . . PCTFE
Gasket . . . . . Teflon® Coated Stainless Steel

Non-wetted

Handle Nylon6/6
Pin . . . . . 316L Stainless Steel
Bonnet . . . . . 316L Stainless Steel
Bonnet Nut . . . . . 316L Stainless Steel

operating conditions

Pressure Rating . . . . . Vacuum to 150 psig (10.3 barg)

Temperature:
PCTFE . . . . . -150°F to 300°F (-101°C to 148.9°C)

surface finishes

20 Ra . . . . . for A, W or Z type connections
10 Ra . . . . . Electropolished

functional performance

Flow Capacity . . . . . see chart

Design Leak Rate
across the seat . . . . . 4×10^{-9} cc/sec He

internal volume

0.09 in^3 (1.55 cm^3)

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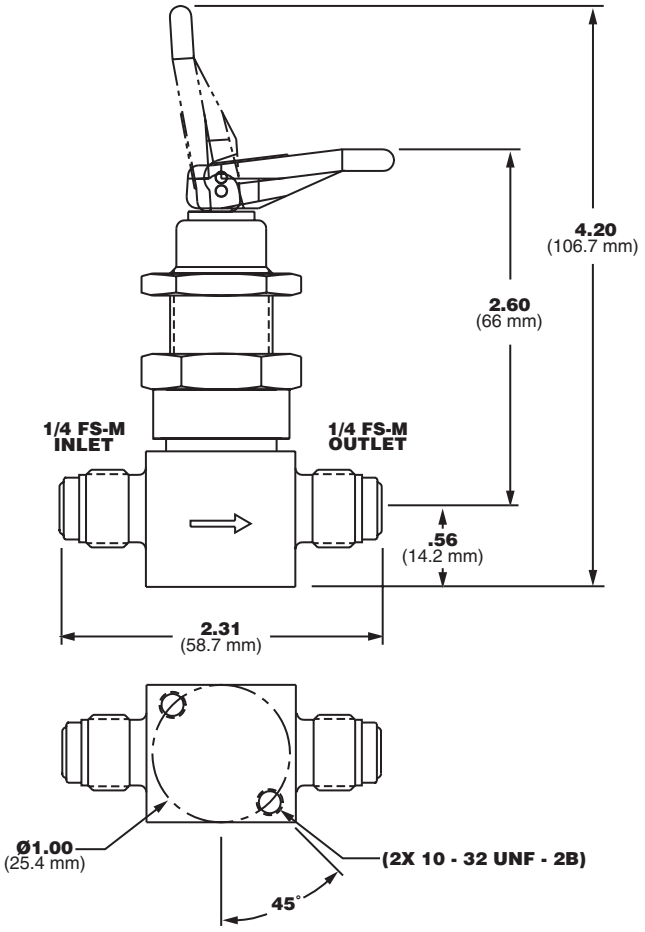
P Series Toggle

Dimensional Drawings

Soft Seat Stem Tips (K)

Valve Series	Orifice	Maximum Flow Coefficient, C_V	Pressure Drop To Atmospher (ΔP)	Air SCFM @ 70˚F (21˚C)	Water GPM @ @ 70˚F (21˚C)
PT4	.156	C_V = .38	10	5.26	1.20
PT4	.156		50	14.54	2.69
PT4	.156		100	25.77	3.80
PT4A	.156	C_V = .47	10	6.50	1.49
PT4A	.156		50	17.98	3.32
PT4A	.156		100	31.87	4.70
PT6	.281	C_V = .87	10	12.04	2.75
PT6	.281		50	33.28	6.15
PT6	.281		100	59.00	8.70
PT8	.312	C_V = .93	10	12.87	2.94
PT8	.312		50	35.57	6.58
PT8	.312		100	63.07	9.30



Ordering Information

4 V - PT4 K - SSV - PE

INLET & OUTLET CONNECTION SIZE
4 = 1/4"
6 = 3/8"
8 = 1/2"

INLET & OUTLET CONNECTION TYPE
V1* = Female VacuSeal™
V* = Male VacuSeal™
VH* = Male VacuSeal™ Swivel
BW = Tube Stub
T3 = Tube Stub (3" Long)
W = Socket Weld
A = A-LOK®
Z = CPI™

SURFACE FINISH
= 20 Ra (Only Available for A, W or Z Type Connections)
PE = 10 Ra Electropolish

MATERIAL
SSV = 316L Stainless Steel VeriClean

STEM TIP MATERIAL
K = PCTFE

BASIC SERIES
PT4 = Toggle Pattern
PT4A = Toggle Angle Pattern
PT6 = Toggle Pattern
PT8 = Toggle Pattern

*** Only available in PT4 and PT8 versions.**

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P Series Pneumatic

Pneumatic Actuated Bellows Valve

VERIFLO
ISO 9001 Certified

Parker Hannifin Corporation's Veriflo Division presents the P Series Pneumatic Actuated bellows valve.

The P Series bellows valve offers a 360° rotation of the air inlet port for postion purposes and ease of use. The P Series bellows valve provides clean, reliable operation at full system pressures.

features

- Bottom mountable.
- Minimal PCTFE to reduce outgassing and moisture absorption.
- Electropolish surface finishes available at 10 Ra; GP finishes at 20 Ra.
- 12AC has compact design - 1-1/4" diameter.
- 360° rotation of actuator for easy installation.
- Stem guide out of flow path.

materials of construction

Wetted

Body . . . . . 316L Stainless Steel
Bellows . . . . . 321 Stainless Steel
Bellows Assembly . . . . . 316L Stainless Steel
Seat . . . . . PCTFE, Vespel®
Gasket . . . . . Teflon® Coated Stainless Steel

Non-wetted

Actuator Body . . . . . Aluminum 6061
Bonnet . . . . . 316L Stainless Steel
Bonnet Nut . . . . . 316L Stainless Steel

operating conditions

Pressure ratings:
Normally Closed (11AC, 12AC)
. . . . . Vacuum to 200 psig(14 barg)

Normally Open (11AO, 12AO)
. . . . . Vacuum to 600 psig(41 barg)

Double Acting (11AD, 12AD)
. . . . . Vacuum to 700 psig(48 barg)

Temperature:
PCTFE . . . . . -150°F to 300°F (-101°C to 148.9°C)
Vespel® . . . . . -150°F to 400°F (-101°C to 204.4°C)

surface finishes

20 Ra . . . . . for A, W or Z type connections
10 Ra . . . . . Electropolished

functional performance

Flow Capacity . . . . . see chart

Design Leak Rate
across the seat . . . . . 4 x 10^{-9} cc/sec He

internal volume

0.09 in^3 (1.55 cm^3)

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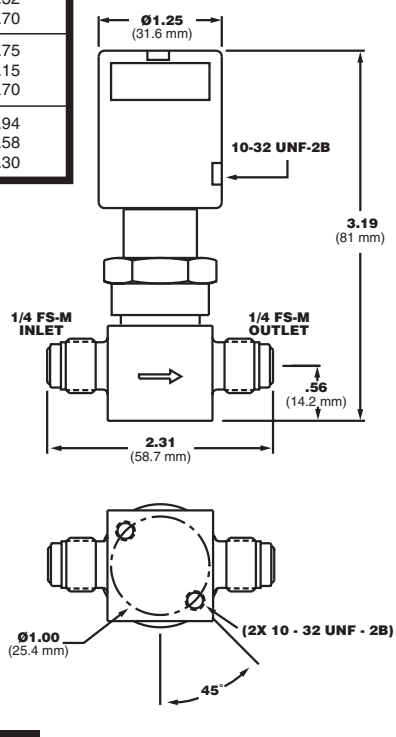
P Series Pneumatic

Dimensional Drawings

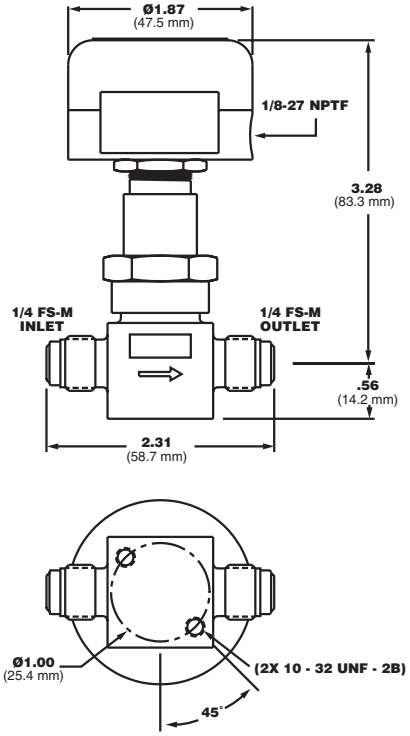
Soft Seat Stem Tips (K)

Valve Series	Orifice	Maximum Flow Coefficient, C_V	Pressure Drop To Atmospher (ΔP)	Air SCFM @ 70˚F (21˚C)	Water GPM @ @ 70˚F (21˚C)
PT4	.156	C_V = .38	10	5.26	1.20
PT4	.156		50	14.54	2.69
PT4	.156		100	25.77	3.80
PT4A	.156	C_V = .47	10	6.50	1.49
PT4A	.156		50	17.98	3.32
PT4A	.156		100	31.87	4.70
PT6	.281	C_V = .87	10	12.04	2.75
PT6	.281		50	33.28	6.15
PT6	.281		100	59.00	8.70
PT8	.312	C_V = .93	10	12.87	2.94
PT8	.312		50	35.57	6.58
PT8	.312		100	63.07	9.30

12 AC



11 AC



Ordering Information

4 V - P4 K - 12AC - SSV - PE

INLET & OUTLET CONNECTION SIZE
4 = 1/4"
6 = 3/8"
8 = 1/2"

INLET & OUTLET CONNECTION TYPE
V1* = Female VacuSeal™
V* = Male VacuSeal™
VH* = Male VacuSeal™ Swivel
BW = Tube Stub
T3 = Tube Stub (3" Long)
W = Socket Weld
A = A-LOK®
Z = CPI™

*** Only available in P4 and P8 versions.**

SURFACE FINISH
= 20 Ra (Only Available for A, W or Z Type Connections)
PE = 10 Ra Electropolish

MATERIAL
SSV = 316L Stainless Steel VeriClean

ACTUATOR
11AC, 12AC = Air Operated, Normally Closed
11AO, 12AO = Air Operated, Normally Open
11AD, 12AD = Air Operated, Double Acting
Note: Series 12 Actuator is a compact design at 1-1/4" diameter.

STEM TIP MATERIAL
K = PCTFE
VE = Vespel®

BASIC SERIES
P4, P6, P8 = Incline Pattern
P4A = Angle Pattern

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A-LOK® is a registered trademark of Parker Hannifin Corporation.
CPI™ is a trademark of Parker Hannifin Corporation.

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P Series HP

High Pressure Bellows Valve

VERIFLO
ISO 9001 Certified

Parker Hannifin Corporation's Veriflo Division presents the P Series HP Pneumatic bellows valve. These valves are multi-purpose packless externally pressurized bellows valves that may be used in a wide variety of high pressure gas or liquid systems.

The P Series HP Pneumatic bellows valve provides clean, reliable operation at full system pressures in either flow direction.

features

- Bottom mountable.
- Minimal PCTFE to reduce outgassing and moisture absorption.
- Electropolish surface finishes available at 10 Ra; GP finishes at 20 Ra.
- Remote actuation.

materials of construction

Wetted

Body . . . . . 316L Stainless Steel
Bellows . . . . . 321 Stainless Steel
Bellows Assembly . . . . . 316L Stainless Steel
Seat . . . . . PCTFE, Vespel®
Gasket . . . . . Teflon® Coated Stainless Steel

Non-wetted

Actuator Body . . . . . Aluminum 6061
Bonnet. . . . . 316L Stainless Steel
Bonnet Nut . . . . . 316L Stainless Steel

operating conditions

Pressure rating. . . . . Vacuum to 3500 psig (241 barg)

Temperature:

PCTFE . . . . . -150°F to 150°F (-101°C to 66°C)
Vespel® . . . . . -150°F to 400°F (-101°C to 204.4°C)

surface finishes

20 Ra . . . . . for A, W or Z type connections
10 Ra. . . . . Electropolished

functional performance

Flow Capacity . . . . . C_V = .33

Design Leak Rate across the seat. . . . . 4 x 10^{-9} cc/sec He

internal volume

.22 in^3 (.56 cm^3)

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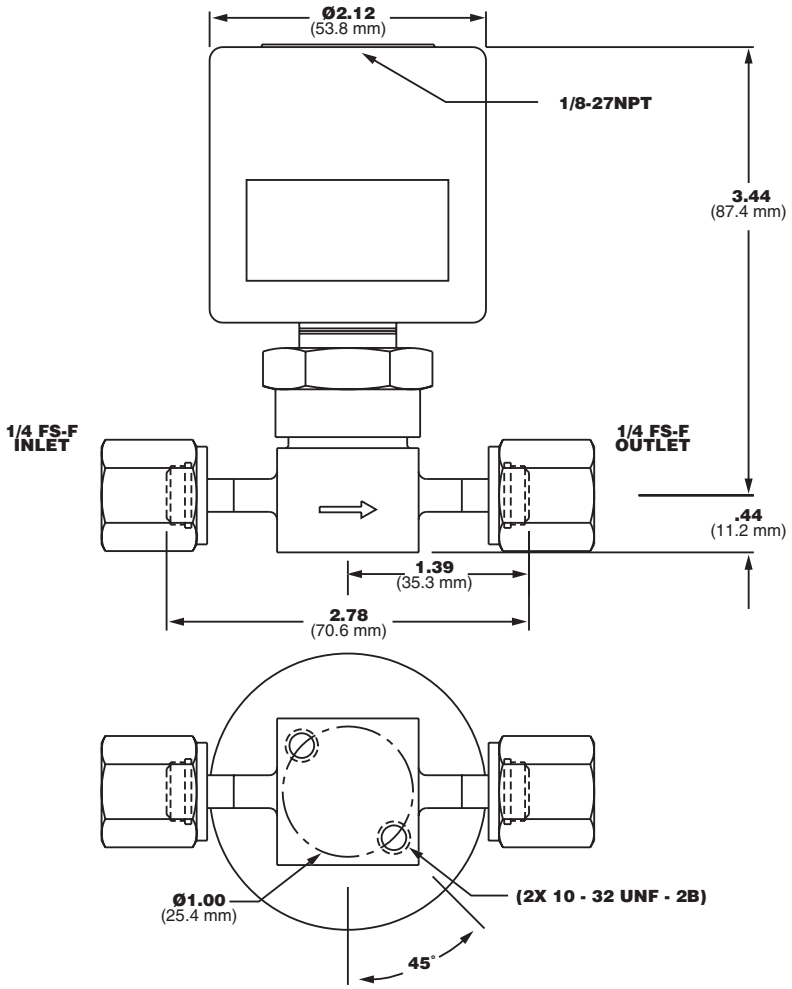
P Series HP

Dimensional Drawings



Ordering Information

4 V1 - HP4 K - 14AC - SSV - PE

INLET & OUTLET CONNECTION SIZE
4 = 1/4"

INLET & OUTLET CONNECTION TYPE
V1 = Female VacuSeal™
V = Male VacuSeal™
VH = Male VacuSeal™ Swivel
BW = Tube Stub
W = Socket Weld
A = A-LOK®
Z = CPI™

SURFACE FINISH
= 20 Ra (Only Available for A, W or Z Type Connections)
PE = 10 Ra Electropolish

MATERIAL
SSV = 316L Stainless Steel VeriClean

ACTUATOR
14AC = Air Operated, Normally Closed
14AO = Air Operated, Normally Open

STEM TIP MATERIAL
K = PCTFE
VE = Vespel®

BASIC SERIES
HP4 = Inline Pattern

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Parker Hannifin Corporation

About Parker Hannifin Corporation

Parker Hannifin is a leading global motion-control company dedicated to delivering premier customer service. A Fortune 500 corporation listed on the New York Stock Exchange (PH), our components and systems comprise over 1,400 product lines that control motion in some 1,000 industrial and aerospace markets. Parker is the only manufacturer to offer its customers a choice of hydraulic, pneumatic, and electromechanical motion-control solutions. Our Company has the largest distribution network in its field, with over 7,500 distributors serving nearly 400,000 customers worldwide.

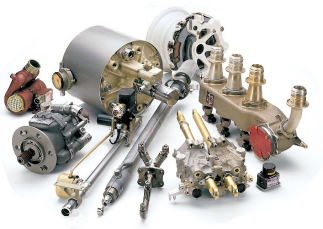
Parker's Charter

To be a leading worldwide manufacturer of components and systems for the builders and users of durable goods. More specifically, we will design, market and manufacture products controlling motion, flow and pressure. We will achieve profitable growth through premier customer service.

Product Information

North American customers seeking product information, the location of a nearby distributor, or repair services will receive prompt attention by calling the Parker Product Information Center at our toll-free number: 1-800-C-PARKER (1-800-272-7537). In Europe, call 00800-C-PARKER-H (00800-2727-5374).

The Aerospace Group is a leader in the development, design, manufacture and servicing of control systems and components for aerospace and related high-technology markets, while achieving growth through premier customer service.



The Climate & Industrial Controls Group designs, manufactures and markets system-control and fluid-handling components and systems to refrigeration, air-conditioning and industrial customers worldwide.

The Fluid Connectors Group designs, manufactures and markets rigid and flexible connectors, and associated products used in pneumatic and fluid systems.

The Seal Group designs, manufactures and distributes industrial and commercial sealing devices and related products by providing superior quality and total customer satisfaction.

The Hydraulics Group designs, produces and markets a full spectrum of hydraulic components and systems to builders and users of industrial and mobile machinery and equipment.

The Filtration Group designs, manufactures and markets quality filtration and clarification products, providing customers with the best value, quality, technical support, and global availability.

The Automation Group is a leading supplier of pneumatic and electromechanical components and systems to automation customers worldwide.

The Instrumentation Group is a global leader in the design, manufacture and distribution of high-quality critical flow components for worldwide process instrumentation, ultra-high-purity, medical and analytical applications.

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Revision: A • 10/03

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