Pneumatic Products

Air Control Valves & Accessories

Catalog 0600P-10/USA

Parker Hannifin Corporation

A global, Fortune 300 company with sales of $8 billion and over 400,000 customers in 46 countries, Parker Hannifin is the world's leading supplier of motion control components and system solutions serving the industrial, mobile, and aerospace markets.

Excellence is imprinted on our corporate DNA. We are the only manufacturer offering customers a choice of hydraulic, pneumatic, electromechanical, or computer motion control.

Total Systems Solutions

Parker's team of highly qualified applications engineers, product development engineers, and system specialists can turn pneumatic, structural extrusion, and electromechanical products into an integrated system solution. And our Selectable Levels of Integration™ program provides the components, subsystems, and controlled motion systems for the level of integration you choose.

Parker consistently raises the bar for its manufacturing plants and distributors, measuring its delivery to customer request date.

1st in Delivery, Field Sales and Distribution

Parker boasts the industry's largest global distribution network, with more than 8,600 distributors worldwide. With factories located strategically on five continents, we can maintain matchless on-time delivery rates.

Expect industry's fastest response and delivery by customer request date when you contact Parker or one of its distributors. Plus, Parker's army of pneumatic engineers works hand-in-hand with you and your local distributors during the design process to ensure the best products, services, and application performance.

Parker Pneumatic Distribution offers the next level in premier customer service. Each location has significant on-hand inventory to keep your down time to a minimum. And many distributors have in-house design capability to support your system and subsystem requirements.

Parker world headquarters in Cleveland

Training

Parker's best-in-class technology training includes hands-on classes, Web-based training, and comprehensive texts for employees, distributors, and customers. Parker also provides computer based training, PowerPoint presentations, exams, drafting and simulation software, and trainer stands.

Five-Year Warranty

Our standard 18-month warranty on pneumatic products is extended to 60 months when used with a properly installed and maintained Parker air preparation system.

www.parker.com/pneumatics

Industry's most comprehensive Web site is your single source for:

- Product information
- Downloadable catalogs
- 3D design files
- Training materials
- Product configuration software
- RFQ capabilities

24/7 Emergency Breakdown Referrals

The Parker product information center is available any time of the day or night at 1-800-C-Parker. Our operators will connect you with on-call representatives who will identify replacement parts or services for all motion technologies. Talk to a real person!

Global Pneumatics, Warning, Offer of Sale

Global Pneumatics

This icon can be found next to products that are widely supported by Parker Pneumatics' worldwide manufacturing and sales network. When you see this icon, you can be confident that this product is manufactured and / or stocked* worldwide for rapid delivery. In addition to local manufacturing or inventory, our sales network has been specifically trained on these products to provide our customers with the best possible service.

Products not showing this icon are still sold and distributed worldwide. However, The Global Pneumatics icon represents products that customers can expect the best level of support.

If you are a multi-national company, seek global sourcing or ship globally, depend on Parker Pneumatic for ***PREMIER CUSTOMER SERVICE***.

* Stocking levels vary by country

⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application including consequences of any failure, and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated on the separate page of this document entitled "Offer of Sale".

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Notes

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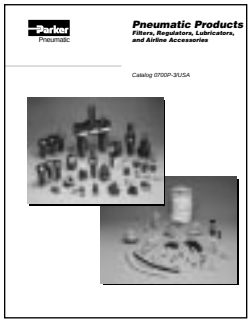
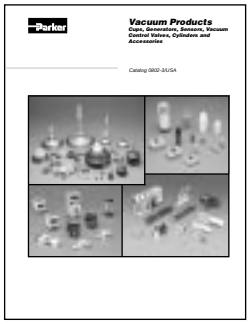
Other Products from Parker Pneumatic...



Catalog 0700P/USA

Filters, Regulators, Lubricators and Airline Accessories

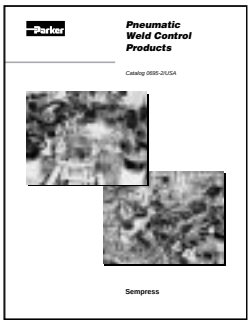
- Air Preparation Units – FRL's
- Safety Blow Guns
- Ball Valves, Plug Valves
- Lockout Valves
- Flow Controls and Accessories
- Control Panels
- Sensing
- Fittings, Hose and Tubing
- Quick Couplings



Catalog 0802/USA

Vacuum Cups, Vacuum Generators Pressure Sensors

- Versatile Bellows Cup Designs
- Vacuum Generators that Create High Vacuum with Fast Response
- Semi-Conductor Based Pressure Sensors with an Integrated Digital Display, Includes Interfacing User-Programming Capabilities



Catalog 0695/USA

Weld Control Products

- Cylinders for Manual and Robotic Spot Welding
- Valve Blocks with Rapid Approach for Pre-Stroke and Low-Inpact with Electrical feedback for Weld Stroke
- Air and Water Service Units

Catalog FRL-PAI-3/USA

Prep-Air® I

- Air Preparation Units – FRL's
- Heavy Duty Construction
- 1/8 to 1 Inch Ports Available

Bulletin 0600-B75

Pneumatic Solutions for Transportation

- Mobile Pneumatic Cylinders
- Mobile Pneumatic Valves
- Mobile *LOAD-TAMER*™
- Parker Kneeling Module
- Auxiliary Products
- Viking Xtreme

Catalog VAL-CYC-3/USA

Cyclone Series

- General Purpose, Stainless Steel or Brass Solenoid Valves
- Used with Air and Inert Liquids and Gasses
- Available in a Variety of Pressure and Flow Ranges
- 1/8 & 1/4 Inch Ports Available

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Electronic Only. See www.parker.com/pneumatics

C/CW/CC Series

- Manual, Cam, Hand and Foot Operated
- 1/4 and 3/8 Inch Ports Available
- Suitable for Vacuum Service
- Can Be Used as a Diverter
- C/CW – 3-Way, Single Solenoid & Air Pilot, Inline Mounting
- CC – 4-Way, Single & Double Solenoid & Air Pilot, Side Ported Base

Catalog 0640-E/USA

Directional Control Valves

- Schrader Bellows Pilot, Mini-King, Electroaire, Multi-Purpose, Sliding Seals and Brass Poppet Valves

Catalog VAL-MISC-E/USA

Directair Series

- Direct Pipe Ported & Base Mounted
- 3 & 4-Way Directional Control Valves
- Solenoid & Air Pilot Operated
- 1/8 to 3/8 Inch Ports Available

Catalog VAL-DA-E/USA

HHB Series

- Heavy Duty, 4-Way Directional Control Valves
- Shur-shift chamber "Accumulator" Assures Positive Shifting Even at Low Pressure
- Suitable for Non-Lube Service
- Subbase or Manifold Mounted
- 3/8, 1/2 or 1 Inch Ports Available

Catalog 0665-E/USA

Load-Tamer™

- Pressure Control Panels Designed Specifically for Vehicular Air Suspension Applications
- Various Control Options including Electrical Switch, Toggle Switch, Push-Pull or External Remote Pilot
- 1/8 and 1/4 Inch Ports Available

Catalog 0675/USA

Valvair Sprint Series

- Heavy Duty, 4-Way Directional Control Valves
- 1/4 & 3/8 Inch Ports Available
- Dual O-Ring Design for Non-Lube, Dirty Environments
- Sandwich Regulators and Flow Controls Available

Catalog VAL-VS-E/USA

Speed King SK200 Series

- Heavy Duty, 4-Way Directional Control Valves
- Base Mounted and Direct Pipe Ported
- 1/4 thru 1-1/4 Inch Ports Available
- Ideal for Non-Lube & Harsh Environments

Catalog VAL-SK-E/USA

T, GG & SS Series

- Compact Inline, for Easy Mounting
- 3 & 4-Way Directional Control Valves

Catalog 0620-E/USA

Valvair Manual Spool Valves

- Air Pilot, Manual & Mechanically Operated
- 1/4" to 1" NPTF Ports (to 1-1/2" in lock-out)
- Interchangeable Operators
- Interchangeable End Sections
- Service without Disturbing Plumbing
- Dual Mounting Brackets on Most Models

Catalog VAL-MO-E/USA

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VALVE SERIES	PORT SIZE											NO. of PORTS	FLOW (Cv)	OPERATORS						
														Solenoid				Manual/ Mechanical	Air	
														Direct		Pilot Operated				
	4mm (5/32) Tube	M3 M5 10-32	1/8	1/4	1/4 Tube	3/8	3/8 Tube	1/2	3/4	1	1-1/4 to 1-1/2			Single	Double	Single	Double		Single	Double
A00		X										3	.01	X						
15mm		X										3	.033	X						
XM			X									3/4	.15	X						
A05	X	X										5	.18			X	X			
Interface 2000	X				X							3/4	.19			X	X			
DA2			X									3/5	.20					X		
Moduflex	X				X		X					3/4	0.32-0.80			X	X			
Sliding Seal			X	X								3/4	.5 - 1.25					X		
A12			X		X							5	.47			X	X			
DX02			X									3/5	.55			X	X		X	X
HB			X									3/5	.55			X	X		X	X
PVLB			X		X							5	.6			X	X		X	X
PVLB10			X		X							5	.6			X	X			
P2LAX			X									5	.7			X	X	X	X	X
DX01			X									3/5	.75			X	X		X	X
B3			X	X								3/5	.75			X	X		X	X
DA4				X								3/5	.84					X		
Brass Poppet				X								2/3	.94					X		
HA				X								3/5	1.1			X	X		X	X
DX1				X		X						3/5	1.15			X	X		X	X
PVLC				X			X					5	1.2			X	X		X	X
PVLC10				X			X					5	1.2			X	X			
P2LBX				X								5	1.3			X	X		X	X
42 Man.				X		X						5	1.3 - 2.8					X		
B5				X		X						3/5	1.4			X	X		X	X
H1				X		X						3/5	1.5			X	X		X	X
PL / VL				X		X		X				4	2.2 - 5.3					X		
DX2						X		X				3/5	2.5			X	X		X	X
P2LCX						X						5	2.5			X	X		X	X
P2LDX								X				5	2.7			X	X		X	X
B6						X						3/5	2.7			X	X		X	X
H2						X		X				3/5	3.0			X	X		X	X
LV / EX				X		X		X	X	X		3	3.0 - 13.7					X		
N				X		X		X	X	X	X	3	3.6 - 26.9			X			X	
DX3								X	X			3/5	4.15			X	X		X	X
B7								X				3/8	5.8			X	X		X	X
H3								X	X			3/5	6.0			X	X		X	X
B8									X			3/5	6.8			X	X		X	X
Valvair II						X		X		X	X	3/4	1.9 - 13.1							

Notes:
1) Some Valve Series can operate below 35 PSIG with the use of an external pilot supply. Consult the individual Technical Data page for any valve in question.
2) ***WCS*** – Wear Compensation System – Unique seals installed on the spool expand radially under pressure and compensate for wear during extended operation.

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TYPE			POSITIONS				MOUNTING					PRESSURE RANGE PSIG (Note 1)	TEMPERATURE RANGE	CONSTRUCTION	VALVE SERIES	SECTION
2 Way	3 Way	4 Way	2	3			Single Subbase	Manifold		Inline	Stacking					
				APB	CE	PC		Individual	Bar							
	X			X			X		X			VAC-100	32 – 122°F	Poppet	**A00**	**F**
	X			X			X		X			VAC-145	5 – 140°F	Poppet	**15mm**	**A**
	X	X					X		X	X	X	-14.7-125	32 – 125°F	Poppet	**XM**	**B**
		X	X	X	X	X	X		X	X		VAC-100	32 – 122°F	***WCS (Note 2)***	**A05**	**F**
	X	X	X								X	45-120	5 – 140°F	Poppet	**Interface 2000**	**C**
	X	X	X							X		VAC-150	32 – 175°F	Poppet/Spool	**DA2**	**Q**
	X		X	X	X	X				X	X	VAC-120	5 – 140°F	Spool	**Moduflex**	**D**
	X	X	X	X						X		VAC-200	-40 – 212°F	Lapped Disc	**Sliding Seal**	**V**
		X	X	X	X	X	X		X			VAC-100	32 – 122°F	***WCS (Note 2)***	**A12**	**F**
		X	X	X	X	X	X	X				VAC-145	14-140°F	Ceramic Spool	**DX02**	**J**
		X	X	X	X	X	X	X				VAC-145	5 – 120°F	***WCS (Note 2)***	**HB**	**K**
		X	X	X	X					X	X	30-150	5 – 140°F	Lip Seal	**PVLB**	**E**
		X	X	X	X						X	30-150	5 – 140°F	Lip Seal	**PVLB10**	**E**
		X	X	X	X	X			X	X		VAC-232	-40 – 158°F	Molded Rubber	**P2LAX**	**H**
		X	X	X	X	X	X	X				VAC-145	14-140°F	Ceramic Spool	**DX01**	**J**
	X	X	X	X	X	X	X	X	X	X		VAC-145	5 – 120°F	***WCS (Note 2)***	**B3**	**G**
	X	X	X	X	X	X				X		VAC-150	32 – 175°F	Packed Bore	**DA4**	**R**
X	X		X							X		0-150	-20 – 180°F	Poppet	**Brass Poppet**	**V**
		X	X	X	X	X	X	X				VAC-145	5 – 120°F	***WCS (Note 2)***	**HA**	**K**
		X	X	X	X	X	X	X				VAC-145	14-140°F	Ceramic Spool	**DX1**	**J**
		X	X	X	X					X	X	30-150	5 – 140°F	Lip Seal	**PVLC**	**E**
		X	X	X	X						X	30-150	5 – 140°F	Lip Seal	**PVLC10**	**E**
		X	X	X	X	X			X	X		VAC-232	-40 – 158°F	Molded Rubber	**P2LBX**	**H**
		X	X	X	X					X	X	VAC-150	0 – 160°F	Overmold Seal	**42 Man.**	**S**
	X	X	X	X	X	X		X	X	X		VAC-145	5 – 120°F	***WCS (Note 2)***	**B5**	**G**
		X	X	X	X	X	X	X				VAC-145	5 – 120°F	***WCS (Note 2)***	**H1**	**K**
		X		X	X		X			X		0-150	0 – 160°F	Lapped Disc	**PL / VL**	**V**
		X	X	X	X	X	X	X				VAC-145	14-140°F	Ceramic Spool	**DX2**	**J**
		X	X	X	X	X			X	X		VAC-232	-40 – 158°F	Molded Rubber	**P2LCX**	**H**
		X	X	X	X	X			X	X		VAC-232	-40 – 158°F	Molded Rubber	**P2LDX**	**H**
	X	X	X	X	X	X			X	X		VAC-145	5 – 120°F	***WCS (Note 2)***	**B6**	**G**
		X	X	X	X	X	X	X				VAC-145	5 – 120°F	***WCS (Note 2)***	**H2**	**K**
	X		X							X		0-250	32 – 175°F	Poppet	**LV / EX**	**U**
X	X		X							X		VAC-250	0 – 150°F	Poppet	**N**	**N**
		X	X	X	X	X	X	X				VAC-145	14-140°F	Ceramic Spool	**DX3**	**J**
		X	X	X	X	X						VAC-145	5 – 120°F	***WCS (Note 2)***	**B7**	**G**
		X	X	X	X	X	X	X				VAC-145	5 – 120°F	***WCS (Note 2)***	**H3**	**K**
	X	X	X	X	X	X						VAC-145	5 – 120°F	***WCS (Note 2)***	**B8**	**G**
X	X		X							X		VAC-225	-15 – 212°F	Packed Bore	**Valvair II**	**P**

Notes:
1) Some Valve Series can operate below 35 PSIG with the use of an external pilot supply. Consult the individual Technical Data page for any valve in question.
2) ***WCS*** – Wear Compensation System – Unique seals installed on the spool expand radially under pressure and compensate for wear during extended operation.

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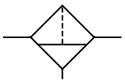
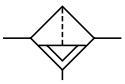
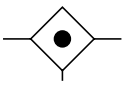
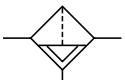
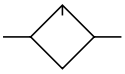
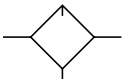
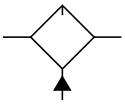
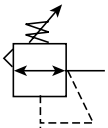
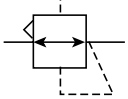
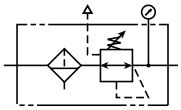
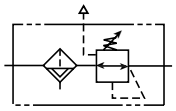
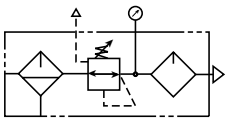
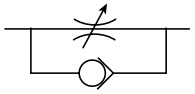
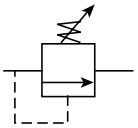
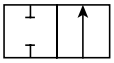
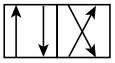
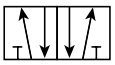
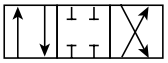
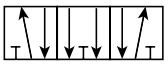
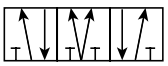
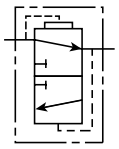
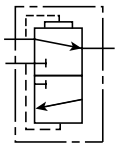
AIR PREPARATION UNITS

Symbol	Description
	FILTER / SEPARATOR with manual drain
	FILTER / SEPARATOR with automatic drain
	OIL REMOVAL FILTER
	AUTOMATIC DRAIN
	LUBRICATOR less drain
	LUBRICATOR with manual drain
	LUBRICATOR with automatic filling
	AIR LINE PRESSURE REGULATOR adjustable, relieving
	AIR LINE PRESSURE REGULATOR pilot controlled, relieving
	FILTER / REGULATOR (piggyback) Manual Drain Relieving (With Gauge)
	FILTER / REGULATOR (piggyback) Auto Drain Relieving
	AIR LINE COMBO F-R-L simplified

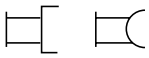
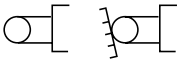
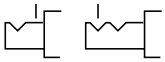
PNEUMATIC VALVES

Symbol	Description
	CHECK
	FLOW CONTROL
	RELIEF VALVE

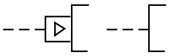
PNEUMATIC VALVES (Cont'd)

Symbol	Description
	2-POSITION 2-WAY
	2-POSITION 3-WAY
	2-POSITION 4-WAY
	2-POSITION, 4-WAY 5-PORTED
	3-POSITION, 4-WAY, APB ports closed, center pos.
	3-POSITION, 4-WAY, CE 5-PORTED cylinder ports open to exhaust in center position
	3-POSITION, 4-WAY, PC 5-PORTED pressure ports open to exhaust in center position
	QUICK EXHAUST
	SHUTTLE

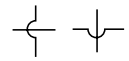
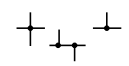
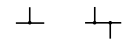
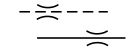
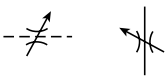
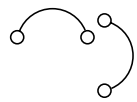
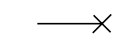
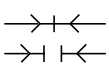
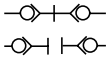
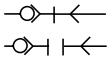
VALVE ACTUATORS

Symbol	Description
	MANUAL general symbol
	PUSH BUTTON
	LEVER
	PEDAL OR TREADLE
	MECHANICAL cam, toggle, etc.
	SPRING
	DETENT line indicates which detent is in use

VALVE ACTUATORS (Cont'd)

Symbol	Description
	SOLENOID
	INTERNAL PILOT SUPPLY
 complete simplified	REMOTE PILOT SUPPLY
	AND / OR COMPOSITE solenoid and pilot or manual override
	AND / OR COMPOSITE solenoid and pilot or manual override and pilot

LINES AND FUNCTIONS

Symbol	Description
	solid line – MAIN LINE
	dashed line – PILOT LINE
	dotted line – EXHAUST OR DRAIN LINE
	center line – ENCLOSURE OUTLINE
	LINES CROSSING (90° intersection not necessary)
	LINES JOINING (90° intersection not necessary)
	LINES JOINING
	FLOW DIRECTION hydraulic medium
	FLOW DIRECTION gaseous medium
	ENERGY SOURCE
	LINE WITH FIXED RESTRICTION
	LINE WITH ADJUSTABLE RESTRICTION
	FLEXIBLE LINE
	PLUGGED PORT, TEST STATION, POWER TAKE-OFF
 connected disconnected	QUICK DISCONNECT WITHOUT CHECKS
 connected disconnected	QUICK DISCONNECT WITH CHECKS
 connected disconnected	QUICK DISCONNECT WITH ONE CHECK

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Saving Money and Space by Sizing Your Valves Properly

This catalog gives you a flow rating (Cv) for each valve in the Parker Hannifin line. You can "plug" *your* requirements into the following simple formula, and determine the Cv needed to do the job. By not oversizing, you'll save space and money, and you'll ensure the valve you select will do the job.

Converting the Job Requirements Into Cv (Capacity Co-efficient).

$$\mathbf{C}v = \frac{\text{Cylinder Area (Sq. In.) (See Table 1)} \times \text{Cylinder Stroke (In.)} \times \text{Compression Factor (Table 2)} \times \text{"A" (Table 2)}}{\text{Stroke Time (sec.)} \times 28.8}$$

Let's work through an example:

We want to extend a $3^1/_4$" bore cylinder which has a 12" stroke in one second, and we have a supply pressure of 80 PSI to do the work. Here's what we know:

Cylinder Area for a 3-1/4" Bore, from Table 1 ..... 8.30 sq. in.

Cylinder Stroke ..... 12 in.

Stroke Time Required in Seconds ..... 1 sec.

Compression Factor at 80 PSI, from Table 2 ..... 6.4

"A" Constant for 80 PSI, from Table 2 ..... .048

Substituting in the formula, we have:

$$\mathbf{C}_V = \frac{8.30 \times 12 \times 6.4 \times .048}{1 \times 28.8} = 1.06$$

Any valve, therefore, which has a Cv of *at least* 1.06, will extend our cylinder the specified distance in the required time.

Choosing the Valve "Series"

Your next step is to choose a basic valve design to do the job. For a quick guide to valve designs, see Table 3.

Having selected the basic valve design, consult the Capacity Co-efficient (Cv) tables which describe the individual valve capacities.

Selecting the Valve Model, Options and Accessories

Having determined Cv, series, port size, flow-path configuration (pre-determined by circuit design), and actuation method, you're ready to choose the *exact* valve model number.

Read the pertinent catalog pages; note the exact model numbers, options and accessories you want. Then phone or write your Parker Hannifin air valve distributor. They will give you prompt, accurate service.

Note: Need circuit design help? Contact your local Parker Hannifin distributor. They are backed up by our regional Sales Engineers and offices. Between them, you'll find answers to all of your questions.

Table 1

Effective Square-Inch Areas for Standard-Bore-Size Cylinders

Bore Size	Cylinder Area (Sq. In.)	Bore Size	Cylinder Area (Sq. In.)
3/4"	.44	4"	12.57
1"	.79	4-1/2"	15.90
1-1/8"	.99	5"	19.64
1-1/4"	1.23	6"	28.27
1-1/2"	1.77	7"	38.48
1-3/4"	2.41	8"	50.27
2"	3.14	10"	78.54
2-1/2"	4.91	12"	113.10
3-1/4"	8.30	14"	153.94
3-5/8"	10.32		

Table 2

Compression Factors and "A" Constants

Inlet Pressure (PSIG)	Compression Factor	"A" Constants for Various Pressure Drop*		
		2 PSI △P	5 PSI △P	10 PSI △P
10	1.6	.152	.103	
20	2.3	.126	.084	.065
30	3.0	.111	.073	.055
40	3.7	.100	.065	.048
50	4.4	.091	.059	.044
60	5.1	.085	.055	.040
70	5.7	.079	.051	.037
80	6.4	.075	.048	.035
90	7.1	.071	.046	.033
100	7.8	.068	.044	.032
110	8.5	.065	.042	.030
120	9.2	.063	.040	.029
130	9.9	.061	.039	.028
140	10.6	.058	.037	.027
150	11.2	.057	.036	.026
160	11.9	.055	.035	.025
170	12.6	.053	.034	.024
180	13.3	.052	.033	.024
190	14.0	.051	.032	.023
200	14.7	.050	.032	.023

Note: Use "A" constant at 5 PSI △P for most applications. On very critical applications, use "A" at 2 PSI △P. You will find in many cases, a 10 PSI △P is not detrimental, and can save money and mounting space.

* Tabulated values are the solution of $\frac{1}{22.48}\sqrt{\frac{GT}{(P_1 - P_2)\,P_2}}$ where T is for 68°F and G =1 for Air.

Table 3

Characteristics of the Major Valve Designs

A. Poppet 3-Way and 4-Way	1. High flow capacities 2. Minimum lubrication requirements 3. Fast response 4. Self-cleaning poppet seats 5. Pressures of 15 to 150 PSIG (modifications for vacuum to 250 PSIG)
B. Spool Valves (WCS) 3-Way and 4-Way	1. Low friction 2. Lower operating pressures 3. Fast response 4. Less wear 5. Long Cycle Life - Under pressure, radial expansion of the seal occurs to maintain sealing contact with the valve bore 6. Non-Lube Service - No lubrication required for continuous valve shifting 7. Bi-Directional Spool Seals - Common spool used for any pressure, including vacuum
C. Packed Bore 4-Way	1. Wide range of flow capacities 2. Wide range of flow-path configurations 3. Pilot-operated models available 4. Pressures of vacuum to 150 PSIG
D. Rotary Or Reciprocating Disc 4-Way, manually operated	1. Inexpensive 2. Versatility in manual actuation

Cv – Capacity Co-efficients (sometimes called Flow Factors). Each flow path through the valve has its own Cv value. All Cv ratings for each valve cataloged on this page are listed on the front side of this sheet.

$$\mathbf{Cv} = \frac{Q}{22.48}\sqrt{\frac{GT}{(P_1 - P_2)\,P_2}}$$

Q = Flow in Standard Cubic Feet per minute (14.7 PSIA at 60°F)
P_1 = Inlet Absolute Pressure (gauge pressure + 14.7)
P_2 = Outlet Absolute Pressure (gauge pressure + 14.7)
Note: P_2 must be greater than .53 x P_1
G = Specific Gravity of flowing medium (Air, G =1)
T = Absolute Temperature of Air (460 + °F.)

Cv = Q x "A" (Table 2)

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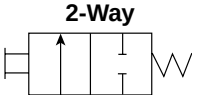
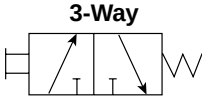
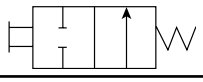
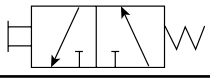
Electrical Enclosure IP Ratings

1st Numeral: Degree of Protection with respect to persons and solid objects		**2nd Numeral:** Degree of protection with respect to harmful ingress of water								
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
		Non Protected	Protected against dripping water	Protected against dripping water of ±15° angle	Protected against spraying water of ±60° angle	Protected against splashing water	Protected against water jets	Protected against heavy seas	Protected against immersion	Protected against submersion
Non-Protected	**0**	**IP00**	**IP01**	**IP02**						
Protected against solid objects greater than Ø50mm	**1**	**IP10**	**IP11**	**IP12**	**IP13**					
Protected against solid objects greater than Ø12mm	**2**	**IP20**	**IP21**	**IP22**	**IP23**					
Protected against solid objects greater than Ø2.5mm	**3**	**IP30**	**IP31**	**IP32**	**IP33**	**IP34**				
Protected against solid objects greater than Ø1.0mm	**4**	**IP40**	**IP41**	**IP42**	**IP43**	**IP44**	**IP45**	**IP46**		
Dust protected Depression 200mm water column, air flow 80 x volume of enclosure	**5**					**IP54**	**IP55**	**IP56**		
Dust-tight Same test procedure	**6**						**IP65**	**IP66**	**IP67**	**IP68**

Functionality Explanation

Fluid Power			**Universal Description**	**Electrical**	
Function	**Symbol**			**Function**	**Symbol**
Normally Closed (N.C.)	**2-Way** 	**3-Way** 	**Normally Non-Passing (NNP)**	**Normally Open (N.O.)**	
Normally Open (N.O.)	**2-Way** 	**3-Way** 	**Normally Passing (NP)**	**Normally Closed (N.C.)**	

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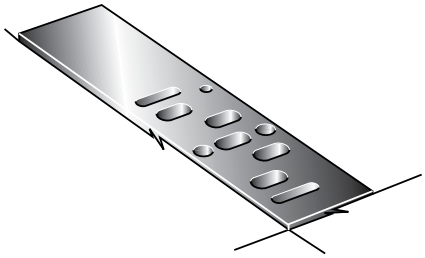
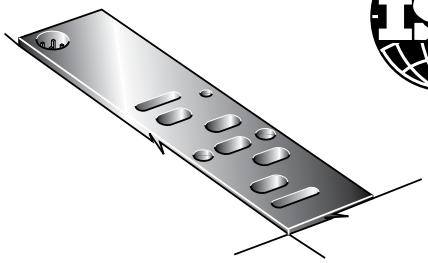


15407-1

External Electrical Connection Subbase Valves

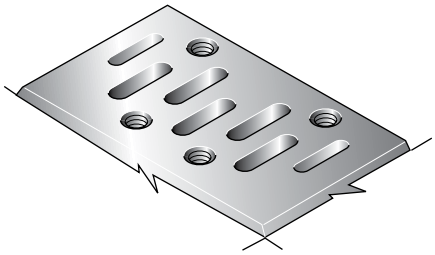
The ISO Standard 15407-1 specifies an interface pattern for a common subbase valve consisting of pressure passages 1, 3, 5, 2, & 4, pilot passages 12 & 14. The width of the pattern and location of the 2-bolt holes are also specified. This ISO standard specifies 2 different sizes – 18mm as the smallest and 26mm as the largest.



15407-2

Body-to-Base Plug-In Subbase Valves

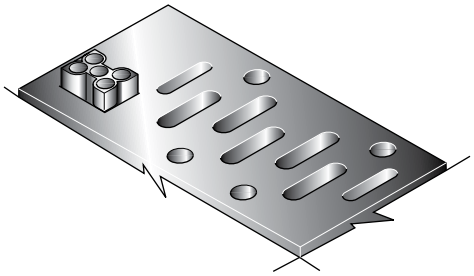
The ISO Standard 15407-2 specifies an interface pattern for a common subbase valve consisting of pressure passages 1, 3, 5, 2, & 4, pilot passages 12 & 14, and a plug-in electrical connector. The width of the pattern and location of the 2-bolt holes are also specified. This ISO standard specifies 2 different sizes – 18mm as the smallest and 26mm as the largest.



5599-1

External Electrical Connection Subbase Valves

The ISO Standard 5599-1 specifies an interface pattern for a common subbase valve consisting of pressure passages 1, 3, 5, 2, & 4, and pilot passages 12 & 14. The width of the pattern and location of the 4 bolt holes are also specified. There are no specifications for the type of external electrical connection used to control the valve.



5599-2

Body-to-Base Plug-In Subbase Valves

The ISO Standard 5599-2 specifies an interface pattern for a common subbase valve consisting of pressure passages 1, 3, 5, 2, & 4, pilot passages 12 & 14, and a plug-in electrical connector. The width of the pattern and location of the 4-bolt holes are also specified. This ISO standard specifies 6 different sizes – 1 as the smallest up to 6 as the largest. Manufacturers who produce ISO 5599-2 valves typically offer sizes 1, 2 & 3.

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The Parker 5-Year Extended Warranty

Parker Hannifin Corporation will extend its warranty on all pneumatic components to sixty (60) months providing they are correctly installed and protected by Parker pneumatic filters which are properly maintained. Components covered by this warranty include all cylinders, valves and pneumatic automation components manufactured by Parker in any of our global facilities. This warranty covers our components anywhere in the world you may ship your equipment.

Parker's obligation under this warranty is limited to the replacement or repair of any failed components. The buyer understands that the seller will not be liable for any other costs or damages.

The buyers of quality Parker components and filters benefit by having ONE source for all pneumatic needs - Parker.

R. Sherrard

Roger Sherrard
President
Automation Group

Parker
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Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

⚠ WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

1.1. Scope: This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.

1.2. Fail-Safe: Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.

1.3 Relevant International Standards: For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.

1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.

1.5. User Responsibility: Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
- Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
- Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
- Assuring compliance with all applicable government and industry standards.

1.6. Safety Devices: Safety devices should not be removed, or defeated.

1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.

1.8. Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

2.1. Flow Rate: The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.

2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.

2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.

2.4. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.

2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.

2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:

- Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
- Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, keytones, esters or certain alcohols.
- Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

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2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5

2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
- Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
- Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1. Component Inspection: Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.

3.2. Installation Instructions: Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.

3.3. Air Supply: The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1. Maintenance: Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.

4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.

4.3. Lockout / Tagout Procedures: Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)

4.4. Visual Inspection: Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
- Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
- Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
- Any observed improper system or component function: Immediately shut down the system and correct malfunction.
- Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:
- Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.

4.6. Functional Test: Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.

4.7. Service or Replacement Intervals: It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
- Government and / or industrial standards.
- When failures could result in unacceptable down time, equipment damage or personal injury risk.

4.8. Servicing or Replacing of any Worn or Damaged Parts: To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
- Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
- Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.

4.9. Putting Serviced System Back into Operation: Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

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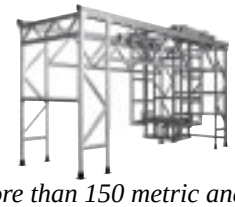

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Catalog 0600P-10/USA 05/07 12.5M IGS Printed in U.S.A.