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For installation, maintenance and replacement parts information, go to www.parker.com/actsafety.

Heads

Solid stock heads are precision machined from aluminum, then hard-coat anodized and permanently sealed to ensure long seal life and low breakaway pressure. Solid stock heads eliminate cavities where contaminants may collect and also allow rear porting.

Body

The precision body extrusion is hard-coat anodized and permanently sealed, resulting in a smooth, slick seal surface. This guarantees minimum breakaway and maximum seal life. The unitized body incorporates the stator(s) for superior rigidity.

Shoulder Seal

A nitrile energized, glass-filled Teflon® seal is utilized. It reduces bypass flow and friction, providing superior performance and long life.

Shaft Seal

The high quality, self-lubricated, abrasion resistant nitrile seal is a multiple lobe construction for leak-free operation and greater reliability. (Cleanroom option available on sizes 22, 42, 44 and 46.)

Shaft

Stainless steel provides high strength and corrosion resistance for demanding applications.

Shaft Bearing

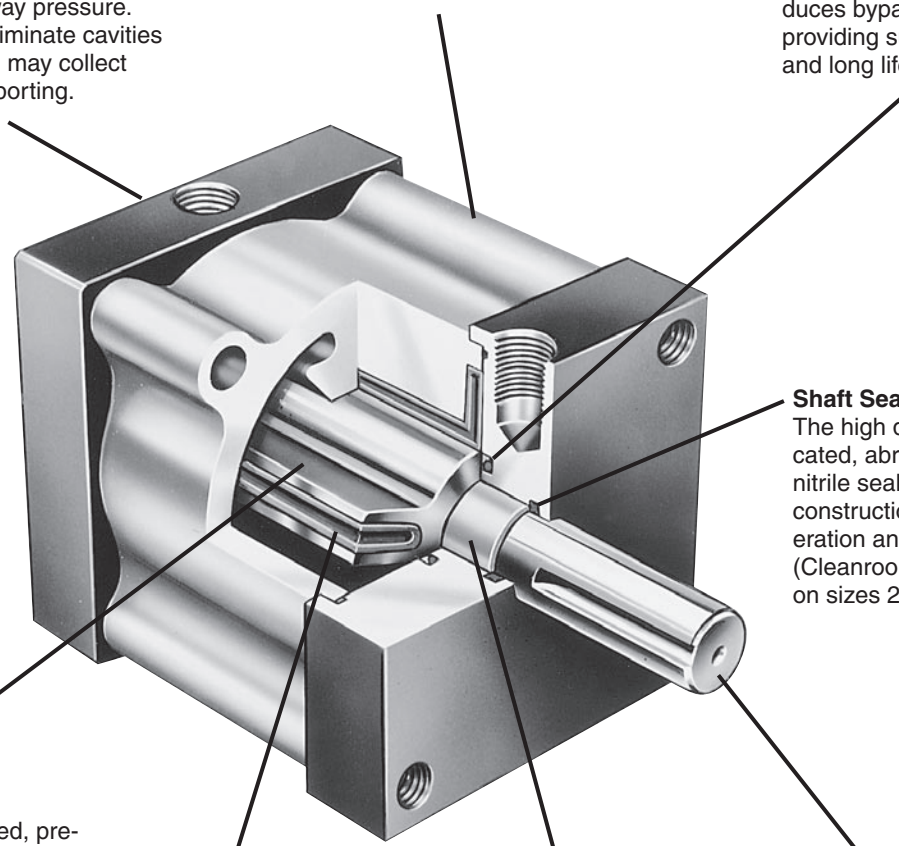
Thermoplastic journal bearing provides washdown capability and low cost. Optional radial ball bushing offers greater precision.

Vane Seal

A special self-lubricated, abrasion resistant nitrile compound is molded into a one-piece vane seal, providing low breakaway pressure and long life, even with no lubrication.

Vane

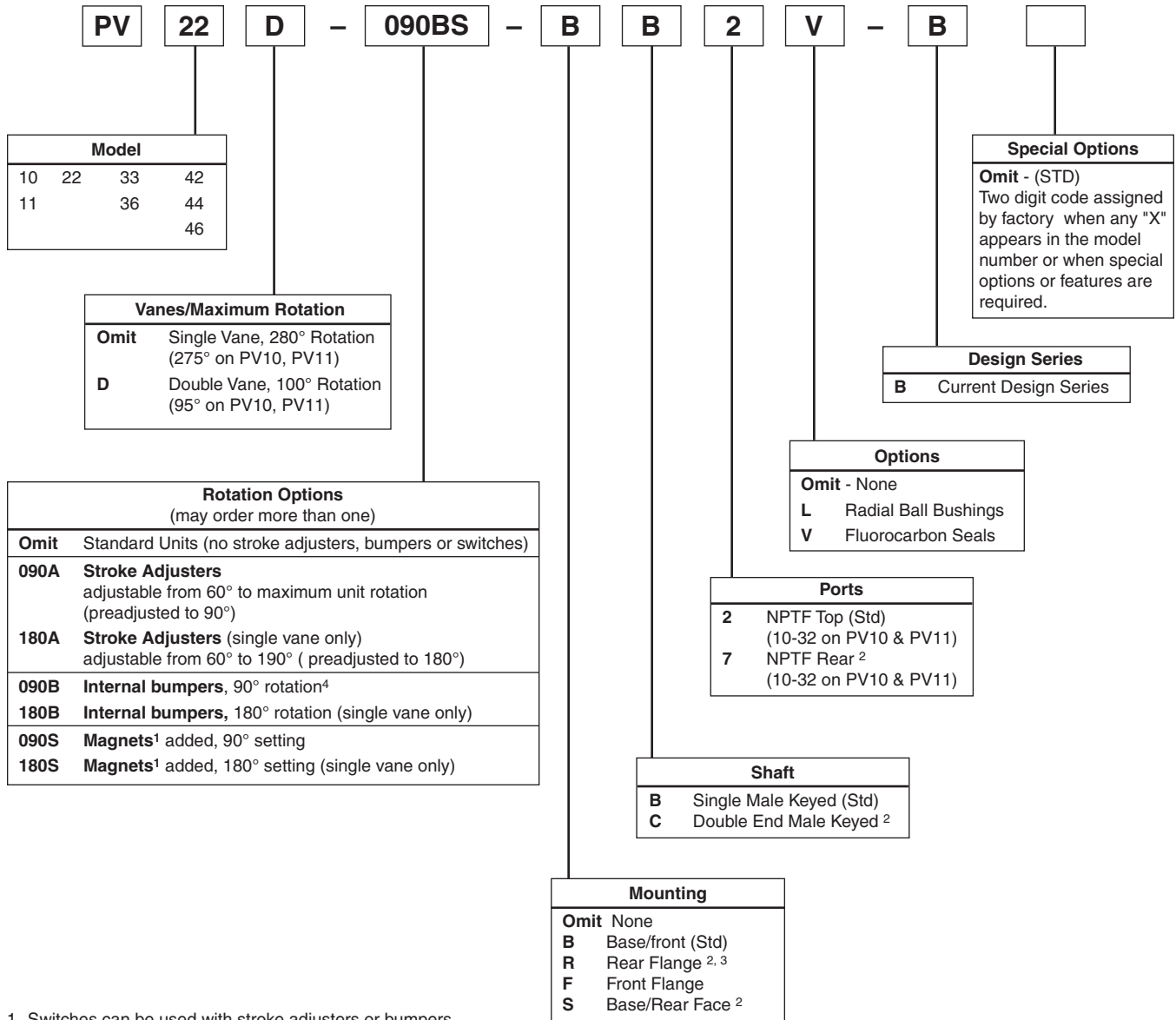
A hard-coat anodized, precision aluminum extrusion is permanently affixed to shaft. The lightweight vane reduces inertia allowing very fast rotational speeds.



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available for download at
parker.com/pneumatics

Model Code and Ordering Information

Example: PV22D - 090BS - BB2V - B



1. Switches can be used with stroke adjusters or bumpers (example: PV22D-090BS-BB2-B).
2. Not available with switches or stroke adjusters.
3. No tapped mounting holes in face opposite the flange.
4. 90° bumpers (090B) not available on PV10/11 sizes.

NOTE:

Order Hall effect sensors and reed switches separately from the [Electronic Sensors section](#).

Specifications

- Maximum operating pressure: 150 psi air
- Output torque @ 100 psi: 8 to 1800 lb-in
- Standard rotations: Single vane units: 280° ± 1° (except size 10 & 11: 275° ± 2.5°)
 Double vane units: 100° ± 1° (except size 10 & 11: 95° ± 2.5°)
 Also available with stroke adjusters and internal stops to provide 90° and 180° rotation
- Maximum breakaway pressure and bypass leakage: see table
- Mounting orientation: unrestricted
- Operating temperature range: Nitrile seals 0 to 180°F
 Fluorocarbon seals* 0 to 250°F
- Filtration requirement: 40 micron filtered, dry air

*See Fluorocarbon seal option for high temperature applications.

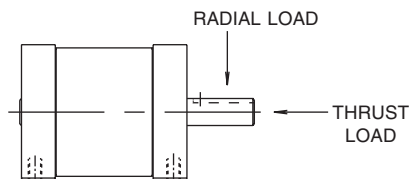
Quick Reference Data

Model	Maximum Rotation (Deg)	Actual Output Torque (lb-in) at Specified Input Pressure (PSI)			Displacement (in³)	Maximum Breakaway Pressure (PSI)	Maximum Bypass Leakage @100 PSI (cfm)	Unit Weight (lb)
		50	75	100				
10	275	4	6	8	0.52	25	0.15	0.38
10D	95	8	12	16	0.37	20	0.20	0.38
11	275	8	12	16	1.04	20	0.15	0.50
11D	95	17	25	33	0.74	15	0.20	0.50
22	280	32	48	64	3.67	15	0.20	0.50
22D	100	68	101	135	2.62	10	0.25	1.75
33	280	75	112	150	8.70	15	0.20	3.44
33D	100	155	235	315	6.20	10	0.25	3.56
36	280	150	220	300	17.40	15	0.20	5.19
36D	100	315	470	630	12.40	10	0.25	5.50
42	280	140	210	285	17.80	15	0.20	7.13
42D	100	300	450	600	14.58	10	0.25	7.50
44	280	285	425	570	35.61	15	0.20	8.81
44D	100	600	900	1200	29.17	10	0.25	9.38
46	280	425	640	850	53.41	15	0.20	10.50
46D	100	900	1350	1800	43.75	10	0.25	10.75

Kinetic Energy Ratings and Bearing Load Capacities

Model	Composite Bushing Load Capacities (lb)*		Radial Ball Bushing Load Capacities (lb)*		Distance Between Centerline Bearings	Maximum Kinetic Energy Rating for Models Based on Configuration (in-lb)		
	Radial	Thrust	Radial	Thrust		Standard	Stroke Adjusters	Bumpers
10	15	7	50	15	0.88	0.03	0.12	0.05
11	15	7	50	15	1.50	0.06	0.12	0.09
22	50	25	Consult Factory		2.38	0.25	0.50	0.38
33	100	50	Consult Factory		3.50	0.75	1.50	1.13
36	100	50	Consult Factory		6.50	1.00	1.50	1.50
42	200	75	Consult Factory		2.75	2.00	4.00	3.00
44	200	75	Consult Factory		4.75	2.50	4.00	3.75
46	200	75	Consult Factory		6.75	3.00	4.00	4.75

* Bearing capacities only. Check Kinetic Energy ratings to determine if actuator will stop load.



Kinetic Energy Basic Formula

$$KE = 1/2 Jm\omega^2$$

$$\omega = 0.035 \times \frac{\text{Angle Traveled (Deg.)}}{\text{Rotation Time (Sec.)}}$$

where:

KE = Kinetic Energy (in-lb)

Jm = Rotational mass moment of inertia (in-lb-sec²)
 (Dependent on physical size of object and weight)

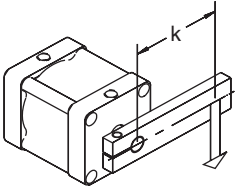
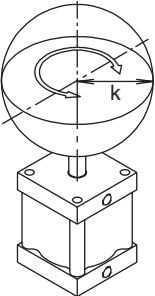
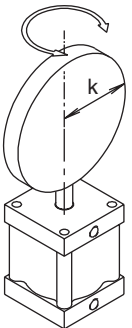
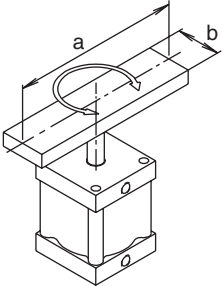
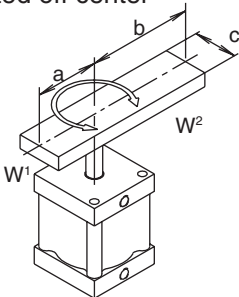
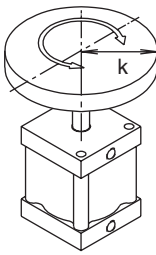
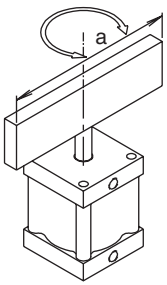
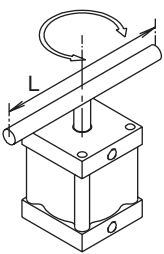
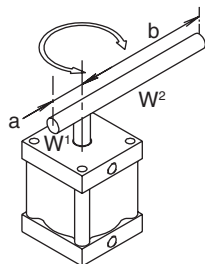
ω = Peak Velocity (rad/sec) (Assuming twice average velocity)

W = Weight of load (lb)

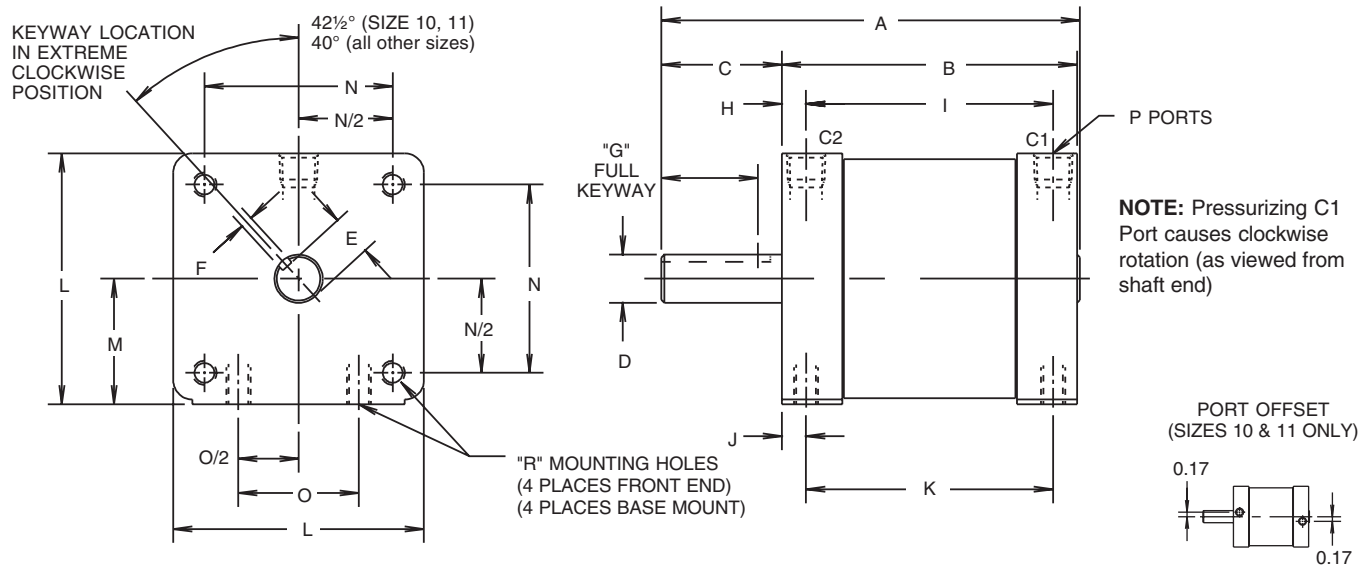
g = Gravitational constant = 386.4 in/sec²

k = Radius of gyration (in)

Moments of Inertia

<p>POINT LOAD</p>  $Jm = \frac{W}{g} \times k^2$	<p>SOLID SPHERE - Mounted on center</p>  $Jm = \frac{2}{5} \times \frac{W}{g} \times k^2$	<p>THIN DISK- End mounted on center</p>  $Jm = \frac{W}{g} \times \frac{k^2}{4}$
<p>THIN RECTANGULAR PLATE - Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{a^2 + b^2}{12}$	<p>THIN RECTANGULAR PLATE - Mounted off center</p>  $Jm = \frac{W1}{g} \times \frac{4a^2 + c^2}{12} + \frac{W2}{g} \times \frac{4b^2 + c^2}{12}$	<p>THIN DISK- Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{k^2}{2}$
<p>THIN RECTANGULAR PLATE- End mounted on center</p>  $Jm = \frac{W}{g} \times \frac{a^2}{12}$	<p>SLENDER ROD- Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{L^2}{12}$	<p>SLENDER ROD - Mounted off center</p>  $Jm = \frac{W1}{g} \times \frac{a^2}{3} + \frac{W2}{g} \times \frac{b^2}{3}$

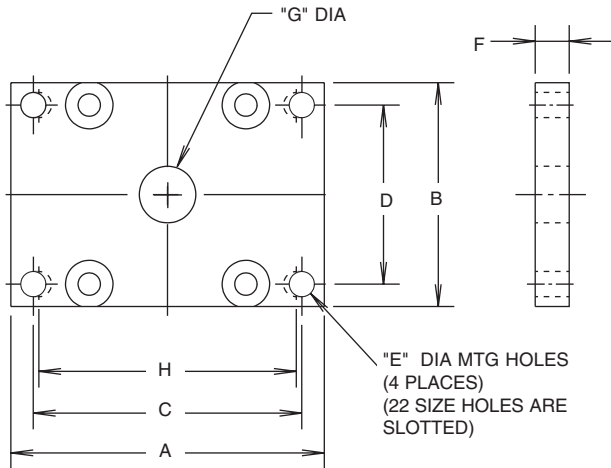
Standard Face/Base Mount (B) and Male Keyed Shaft (B)



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 or ThomasRegister.com

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R
10	2.280	1.38	0.88	0.312 0.311	0.258 0.253	0.094 0.095	0.63	0.19	1.00	0.19	1.000	1.62	0.810	1.220	0.750	10-32	8-32 x 0.25 DP
11	2.905	2.00	0.88	0.312 0.311	0.258 0.253	0.094 0.095	0.63	0.19	1.63	0.19	1.625	1.62	0.810	1.220	0.750	10-32	8-32 x 0.25 DP
22	4.340	3.06	1.25	0.500 0.499	0.423 0.418	0.125 0.126	0.94	0.25	2.56	0.25	2.560	2.50	1.250	2.000	1.250	1/8 NPTF	1/4-20NC x 0.38 DP
33	6.180	4.40	1.75	0.749 0.748	0.644 0.639	0.188 0.189	1.38	0.35	3.70	0.26	3.875	3.00	1.500	2.436	1.500	1/4 NPTF	5/16-18NC x 0.47 DP
36	9.180	7.40	1.75	0.749 0.748	0.644 0.639	0.188 0.189	1.38	0.35	6.70	0.26	6.875	3.00	1.500	2.436	1.500	1/4 NPTF	5/16-18NC x 0.47 DP
42	6.280	4.00	2.25	0.999 0.998	0.859 0.854	0.250 0.251	2.00	0.50	3.00	0.50	3.000	4.50	2.250	3.500	2.375	1/4 NPTF	3/8-16NC x 0.75 DP
44	8.280	6.00	2.25	0.999 0.998	0.859 0.854	0.250 0.251	2.00	0.50	5.00	0.50	5.000	4.50	2.250	3.500	2.375	1/4 NPTF	3/8-16NC x 0.75 DP
46	10.280	8.00	2.25	0.999 0.998	0.859 0.854	0.250 0.251	2.00	0.50	7.00	0.50	7.000	4.50	2.250	3.500	2.375	1/4 NPTF	3/8-16NC x 0.75 DP

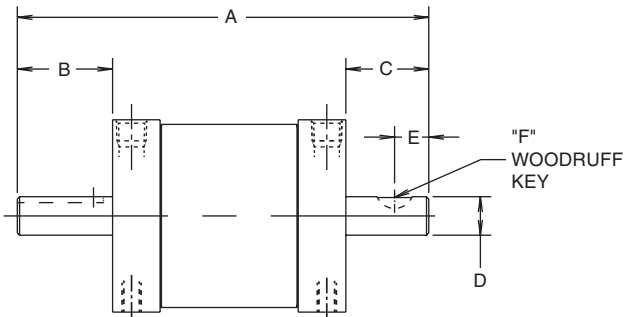
Flange Mount (F, R)*



Model	A	B	C	D	E	F	G	H
10	2.50	1.62	2.000	1.250	0.203	0.19	0.41	N/A
11	2.50	1.62	2.000	1.250	0.203	0.19	0.41	N/A
22	3.50	2.50	3.000	2.000	0.281	0.25	0.66	2.875
33	4.50	3.00	3.750	2.000	0.344	0.38	0.84	N/A
36	4.50	3.00	3.750	2.000	0.344	0.38	0.84	N/A
42	7.32	4.51	5.905	2.953	0.551	0.63	1.61	N/A
44	7.32	4.51	5.905	2.953	0.551	0.63	1.61	N/A
46	7.32	4.51	5.905	2.953	0.551	0.63	1.61	N/A

Note: The face opposite the flange mount does not contain tapped mounting holes. Consult factory if needed.

Double End Male Keyed Shaft (C)



Model	A	B	C	D	E	F
10	2.75	0.88	0.50	0.312 0.311	0.28	#302.5
11	3.38	0.88	0.50	0.312 0.311	0.28	#302.5
22	5.06	1.25	0.75	0.500 0.499	0.44	#404
33	7.15	1.75	1.00	0.749 0.748	0.56	#606
36	10.15	1.75	1.00	0.749 0.748	0.56	#606
42	7.53	2.25	1.28	0.999 0.998	0.72	#808
44	9.53	2.25	1.28	0.999 0.998	0.72	#808
46	11.53	2.25	1.28	0.999 0.998	0.72	#808

Note: Not available with switches or stroke adjustment. Consult factory for rear port option.

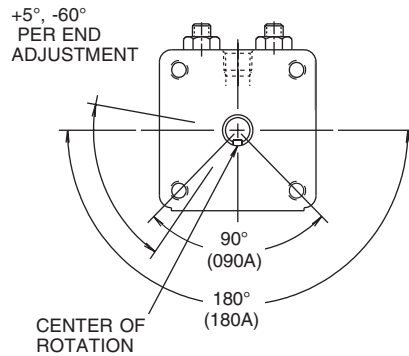
Adjustable Rotation Stop (090A, 180A)

An adjustable positive stop is available to provide end of rotation adjustability in a compact package. Total adjustment range is 60° to 190° on single vane actuators, and 60° to 100° on double vane actuators (95° on PV10/11 sizes). The rotation is factory preset to a nominal 90° or 180° (090A or 180A) for convenient installation.

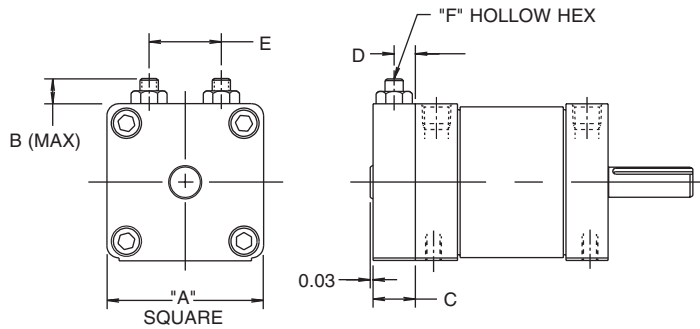
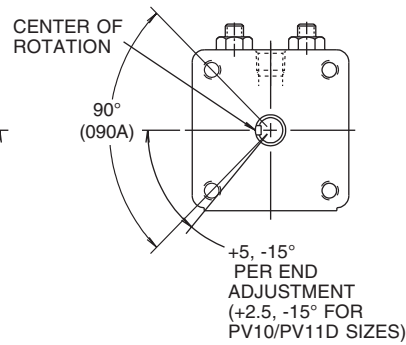
NOTE:

1. Not available with double end shaft.
2. Not available with rear ports.

SINGLE VANE UNIT



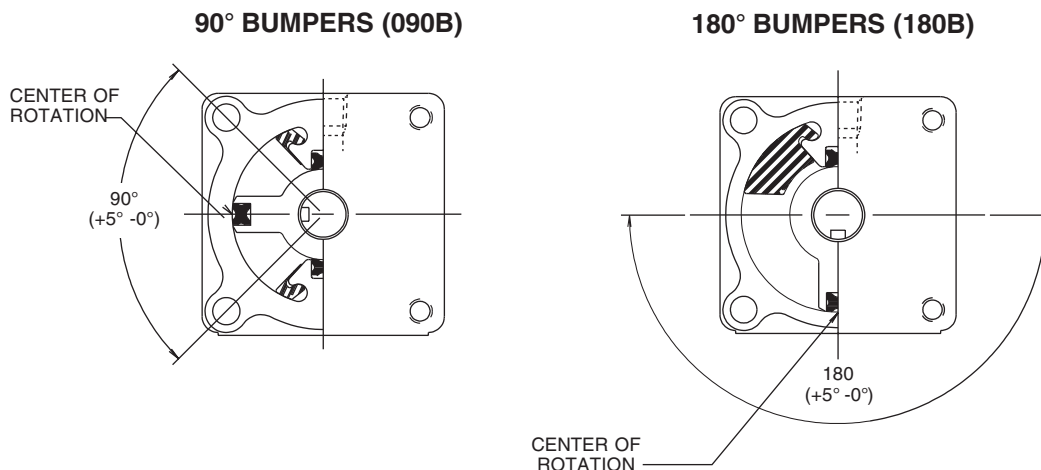
DOUBLE VANE UNIT



Model	A	B	C	D	E	F
10	1.62	0.63	0.47	0.24	0.75	3/32
11	1.62	0.63	0.47	0.24	0.75	3/32
22	2.50	1.00	0.72	0.36	1.25	5/32
33	3.00	1.16	0.97	0.48	1.56	3/16
36	3.00	1.16	0.97	0.48	1.56	3/16
42	4.50	1.38	1.25	0.56	2.25	7/32
44	4.50	1.38	1.25	0.56	2.25	7/32
46	4.50	1.38	1.25	0.56	2.25	7/32

90° or 180° Bumpers (090B, 180B)

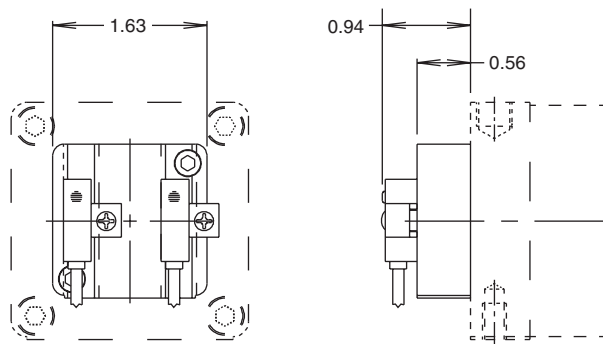
Bumpers are available to reduce noise and dissipate energy. This permits faster cycle times and increased production rates. Single vane units are available with 90° or 180° bumpers and double vane units are available with 90° bumpers.

**NOTE:**

1. Not available with stroke adjusters.
2. Rotation tolerance of $+5^\circ/-0^\circ$.
3. 90° bumpers (090B) not available on PV 10/11 sizes.

90° or 180° Magnet (S)

Option "S" provides a magnet(s) attached to the actuator shaft. Hall effect or reed switches sense the position of these magnets. The switches are available in two nominal rotations, 90° or 180°, and the adjustment is $\pm 20^\circ$ for each switch to provide a total adjustment of $\pm 40^\circ$. Adjustable stops, "A", or bumpers, "B", can be supplied in addition to magnets. Order switches separately.

**Example Ordering Codes, Keyway Positions and Switch Sensing Locations:**

Please note the following keyway position and switch sensing locations, with respect to ordering codes and options, with porting at the 12:00 position as viewed from the output shaft end (as shipped from the factory).

180S, 180AS, 180BS - Single vane actuator with magnet or with magnet and stroke adjusters and/or bumpers: Keyway midstroke position at 6:00, magnet positioned to sense at 3:00 and 9:00.

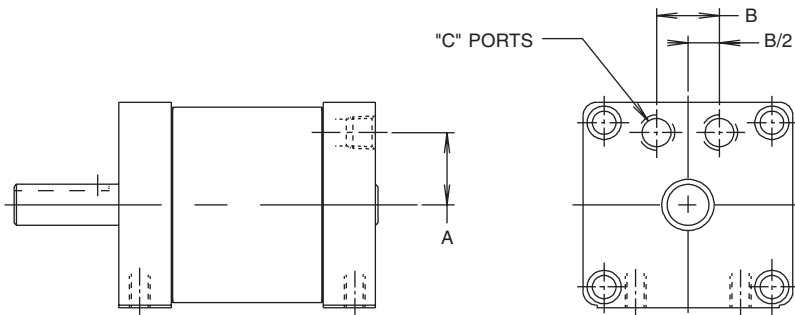
090S, 090AS - Single vane actuator with magnet or with magnet and stroke adjusters: Keyway midstroke position at 6:00, magnet positioned to sense at 4:30 and 7:30.

090S, 090AS, 090BS - Double vane actuator with magnet or with magnet and stroke adjusters or bumpers; or single vane actuator with magnet and bumpers: Keyway midstroke position at 9:00, magnet positioned to sense at 7:30 and 10:30.

Rear Port (7)

Rear porting provides convenience for confined mounting on very small units being face mounted.

This option is not available with switches or stroke adjustment. Consult factory for double end shaft option.

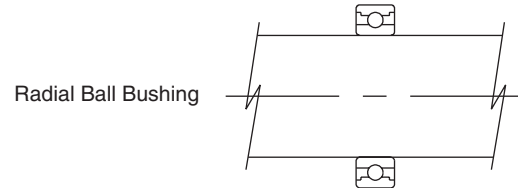
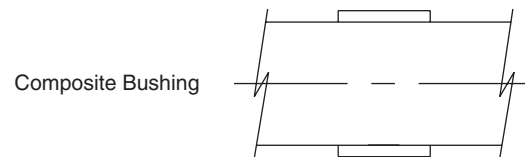


Model	A	B	C
10	0.54	0.50	10-32
11	0.54	0.50	10-32
22	0.88	0.75	1/8 NPTF
33	1.09	0.90	1/8 NPTF
36	1.09	0.90	1/8 NPTF
42	1.68	1.00	1/4 NPTF
44	1.68	1.00	1/4 NPTF
46	1.68	1.00	1/4 NPTF

Bearings - Radial Ball Bushings (L)

Composite bushings should be used for washdown, highly contaminated, and low priced applications. Radial ball bushings provide greater precision. For bearing load capacities, reference the Engineering Data section of the catalog.

Consult factory for pricing and availability.



Fluorocarbon Seals (V)

Standard self-lubricating, abrasion resistant nitrile seals should be used for general purpose applications with temperatures of 0 to 180°F. Fluorocarbon seals are recommended for high temperature applications up to 250°F.

Option	Temperature Range* (°F)
Bumpers	0 - 200
Magnets	0 - 155
Switches	14 - 185

*Consult factory for higher temperature operation.

Solid State (Hall Effect) and Reed Sensors

Sensors are available in a normally open or normally closed configuration. The low amp reed sensor is suitable for connection to PLCs or other low current devices. The high amp sensor can be used to drive sequencers, relays, coils or other devices directly.

Sensors must be ordered separately from the [Electronic Sensors section](#).

