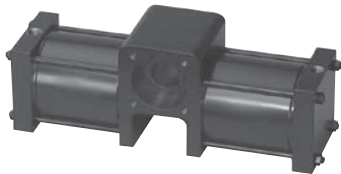
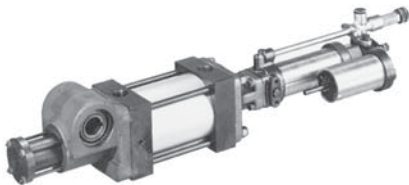
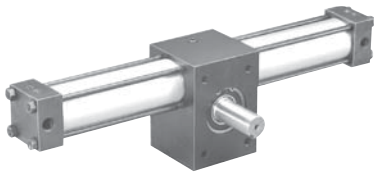
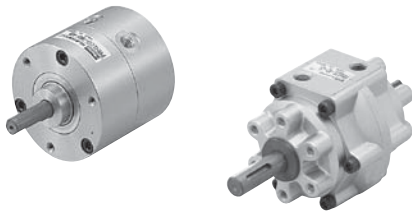


**Rotary Actuators**  
**Vane / Rack & Pinion Series**



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**Overview**

**Selection Guide**

Basic performance features of the rotator product line are shown below. See product sections for greater detail and ordering information.

Type	Vane		Rack & Pinion			
	Series	PV	PRN(A)	PTR	B671	HP
Standard Rotations		95°/100° <sup>1</sup> 275°/280° <sup>2</sup>	90°/100° <sup>1</sup> 180° <sup>2</sup> 270°/280° <sup>2</sup>	90° 180° 270° 360°	90° 180°	90° 180°
Maximum Torque at 100 PSI (lb-in)		1800	2540	2000	2500	10,000
Maximum Air Pressure Rating (PSI)		150	100/140	250	140	100
Shaft Bearing Type		Ball or Composite Bushing	Composite	Radial Ball Bushing	Bronze Bushing	Bronze Bushing
Non-Lube Service		●	●	●	●	●
Metric (M) or Imperial (I)		I	M	M,I	I	I
Switch Options	Hall Effect	●	●	●		
	Reed	●	●	●	C	
	Proximity Sensor			●		●
Shaft Options	Double End	●	●	●		
	Female			●	●	●
	Preload Keyway			●		
	Special	C		C	C	C
Rotation Options	Stroke Adjust	●	●	●		●
	Cushions			●	●	●
	Bumpers	●	●	●		
	Shock Absorbers		●	●		
Port Relocation		●	●	●	C	●
3-Position		C		●		
Air / Oil				●	● <sup>3</sup>	
Zero Backlash		●	●	●		
Fluorocarbon Seals		●	●	●		●
Flange Mount		●	●	●		
Washdown		●	C	C		
Clean Room			C			

● = Available from catalog

C = Consult Factory

<sup>1</sup> Double vane

<sup>2</sup> Single vane

<sup>3</sup> Hydro-check option

**PV Series**

**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 PTFE 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.)

**VANE**

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

**VANE SEAL**

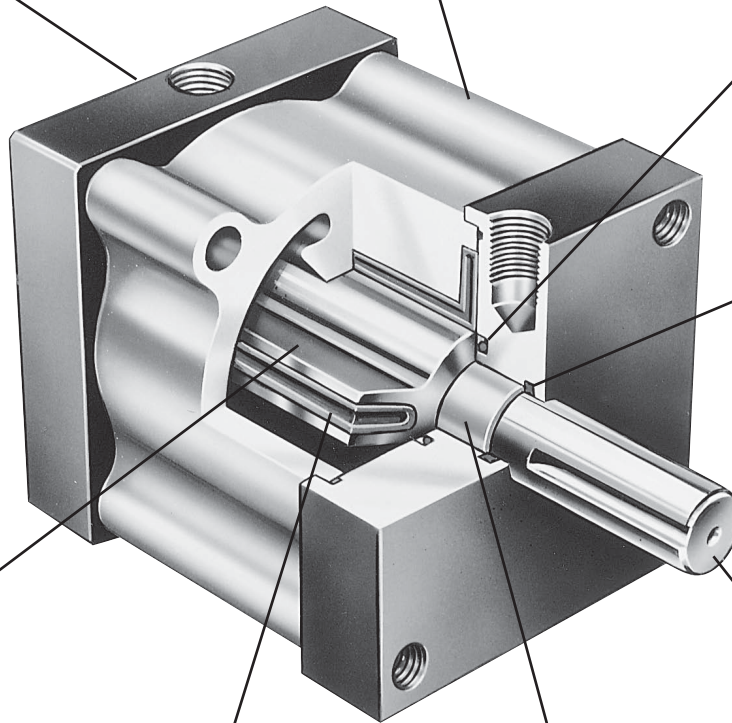
A special self-lubricated, abrasion resistant nitrile compound is molded into a one-piece vane seal, providing low breakaway pressure and long life, even with no lubrication.

**SHAFT BEARING**

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

**SHAFT**

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



PV Series

PRN(A) Series

PTR Series

B671/F672 Series

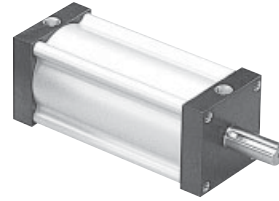
HP Series

Rotary Actuators  
Products

**H**

Features

- Single or double vane rotary actuator
- 8 model sizes
- Output torque @ 100 PSIG: 8 to 1800 lb-in
- Standard rotations:  
 Single vane units:  $280^\circ \pm 1^\circ$   
 (except size 10 & 11:  $275^\circ \pm 2.5^\circ$ )  
 Double vane units:  $100^\circ \pm 1^\circ$   
 (except size 10 & 11:  $95^\circ \pm 2.5^\circ$ )  
 Available with stroke adjusters and internal stops to provide 90° and 180° rotation
- Stainless steel shaft
- Optional radial ball bushing shaft bearing



Operating information

Operating pressure:	150 PSIG (10.3 bar)
Temperature range:	30°F to 180°F (-1°C to 82°C)
Nitrile seals	30°F to 250°F (-1°C to 121°C)
Fluorocarbon seals*	30°F to 250°F (-1°C to 121°C)
* See fluorocarbon seal option for high temperature applications.	
Filtration requirements:	40 micron, dry filtered air

Ordering information



Model			
10	22	33	42
11		36	44
			46

Vanes / maximum rotation	
Omit	Single Vane, 280° Rotation (275° on PV10, PV11)
D	Double Vane, 100° Rotation (95° on PV10, PV11)

Rotation Options (may order more than one)	
Omit	Standard Units (no stroke adjusters, bumpers or switches)
090A	Stroke Adjusters adjustable from 60° to maximum unit rotation (preadjusted to 90°)*
180A	Stroke Adjusters (single vane only) adjustable from 60° to 190° (preadjusted to 180°)*
090B	Internal bumpers, 90° rotation <sup>4</sup>
180B	Internal bumpers, 180° rotation (single vane only)
090S	Magnets <sup>1</sup> added, 90° setting
180S	Magnets <sup>1</sup> added, 180° setting (single vane only)

\* Stroke adjusters cannot be ordered with bumpers

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.

Special options	
Omit	Standard
Two digit code assigned by factory when any "X" appears in the model number or when special options or features are required.	

Design series	
B	Current design series

Options	
Omit	None
L	Radial ball bushings
V	Fluorocarbon seals

Ports	
2	NPTF Top (Std) (10-32 on PV10 & PV11)
7	NPTF Rear <sup>2</sup> (10-32 on PV10 & PV11)

Shaft	
B	Single male keyed (Std)
C	Double end male keyed <sup>2</sup>

Mounting	
B	Base / Front (Std)
R	Rear Flange <sup>2,3</sup>
F	Front Flange
S	Base / Rear Face <sup>2</sup>

**Sensors**  
See section L for sensors.

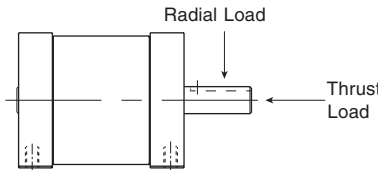
PV Series  
PRN(A) Series  
PTR Series  
B671/F672 Series  
HP Series  
Rotary Actuators Products  
H



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**Quick reference data**

Model number	Maximum rotation (Degrees)	Actual output torque (lb-in) at specified input pressure (PSI)			Displacement (in <sup>3</sup> )	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

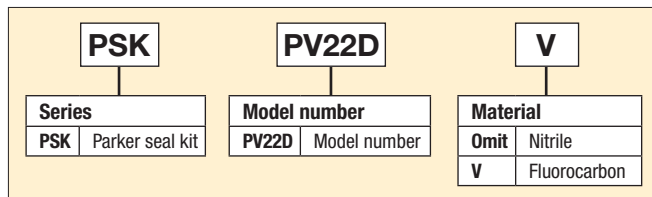


**Kinetic energy ratings and bearing load capacities**

Model number	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.

**Seal kit ordering information**



**Seal kit installation tool**

Model (S)	Items	Seal guide kit number
PV10 & 11 (D)	21, 22	ATS-PV1
PV22 (D)	21, 22	ATS-PV2
PV33 & 36 (D)	21, 22	ATS-PV3



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**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-sec<sup>2</sup>)

(Dependent on physical size of object and weight)

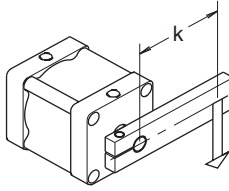
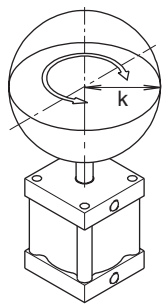
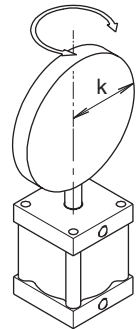
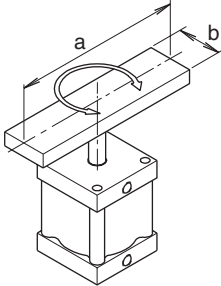
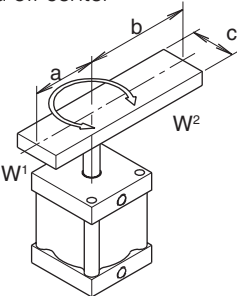
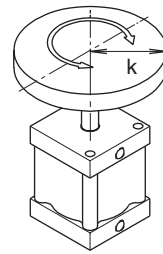
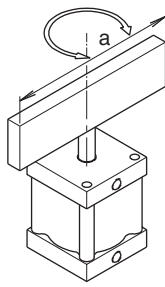
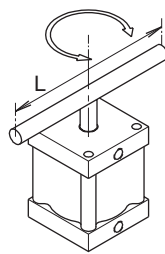
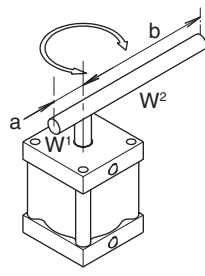
$\omega$  = Peak Velocity (rad/sec) (Assuming twice average velocity)


W = Weight of load (lb)

g = Gravitational constant = 386.4 in/sec<sup>2</sup>

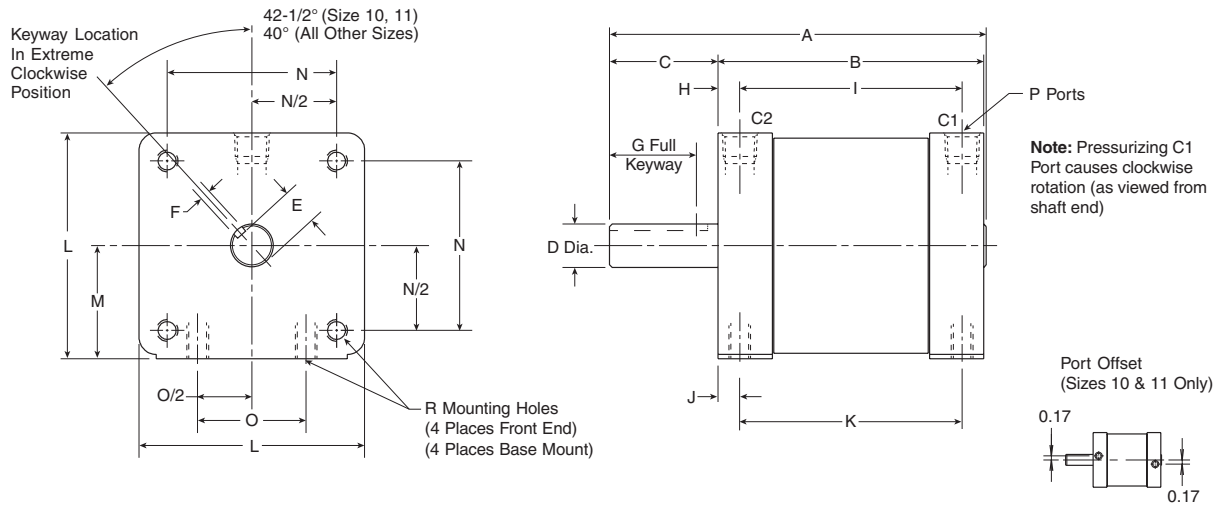
k = Radius of gyration (in)

**Moments of Inertia**

<p><b>POINT LOAD</b></p>  $Jm = \frac{W}{g} \times k^2$	<p><b>SOLID SPHERE -                      Mounted on center</b></p>  $Jm = \frac{2}{5} \times \frac{W}{g} \times k^2$	<p><b>THIN DISK -                      End mounted on center</b></p>  $Jm = \frac{W}{g} \times \frac{k^2}{4}$
<p><b>THIN RECTANGULAR PLATE -                      Mounted on center</b></p>  $Jm = \frac{W}{g} \times \frac{a^2 + b^2}{12}$	<p><b>THIN RECTANGULAR PLATE -                      Mounted off center</b></p>  $Jm = \frac{W^1}{g} \times \frac{4a^2 + c^2}{12} + \frac{W^2}{g} \times \frac{4b^2 + c^2}{12}$	<p><b>THIN DISK -                      Mounted on center</b></p>  $Jm = \frac{W}{g} \times \frac{k^2}{2}$
<p><b>THIN RECTANGULAR PLATE -                      End mounted on center</b></p>  $Jm = \frac{W}{g} \times \frac{a^2}{12}$	<p><b>SLENDER ROD -                      Mounted on center</b></p>  $Jm = \frac{W}{g} \times \frac{L^2}{12}$	<p><b>SLENDER ROD -                      Mounted off center</b></p>  $Jm = \frac{W^1}{g} \times \frac{a^2}{3} + \frac{W^2}{g} \times \frac{b^2}{3}$

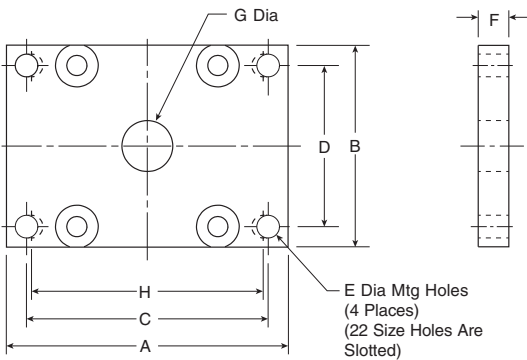
PV Series  
 PRN(A) Series  
 PTR Series  
 B671/F672 Series  
 HP Series  
 Rotary Actuators Products  


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



Model number	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	0.095 0.094	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	0.095 0.094	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	0.126 0.125	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	0.189 0.188	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	0.189 0.188	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	0.251 0.250	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 number	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.

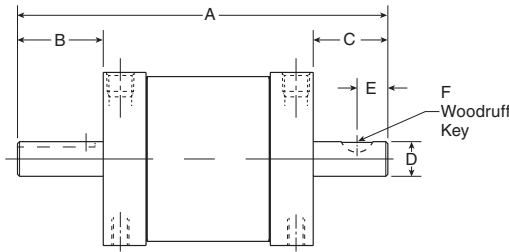


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PV Series  
 PRN(A) Series  
 PTR Series  
 B671/F672 Series  
 HP Series  
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**Double End Male Keyed Shaft (C)**



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

Model number	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

**Adjustable Rotation Stop (090A, 180A)**

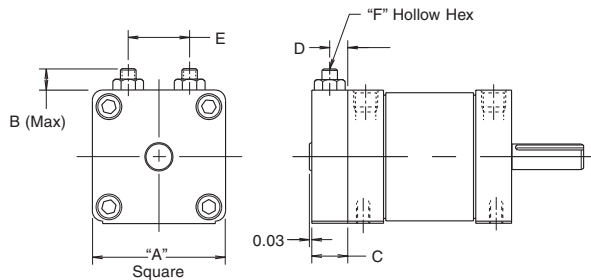
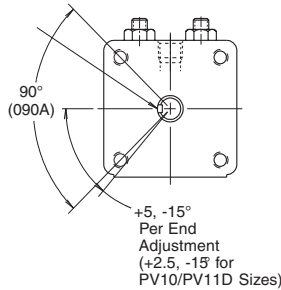
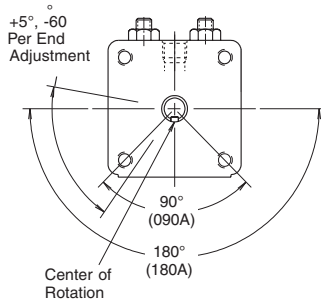
An adjustable positive stop is available to provide end of rotation adjustability in a compact package. Total adjustment range is 60° to 190° on single vane actuators, and 60° to 100° on double vane actuators (95° on PV10/11 sizes). The rotation is factory preset to a nominal 90° or 180° (090A or 180A)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

**NOTE:**

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

**SINGLE VANE UNIT**

**DOUBLE VANE UNIT**



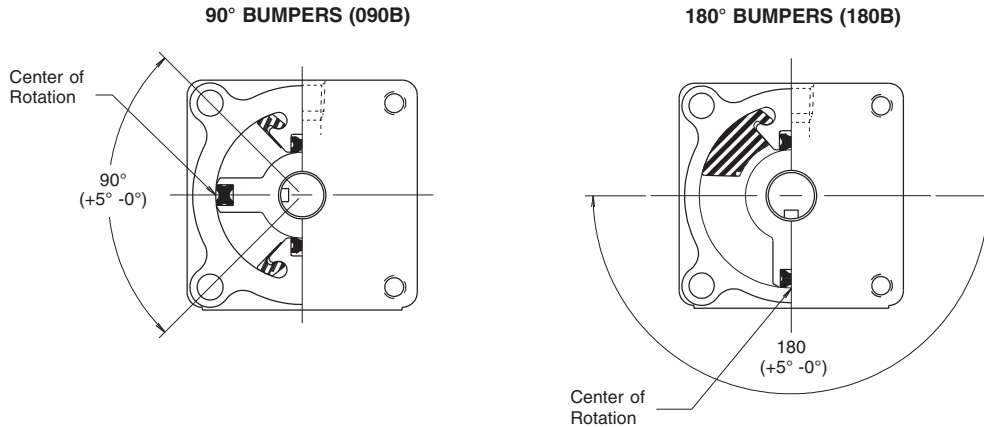
Model number	A	B	C	D	E	F
10	1.62	0.63	0.47	0.24	0.75	3/32
11	1.62	0.63	0.47	0.24	0.75	3/32
22	2.50	1.00	0.72	0.36	1.25	5/32
33	3.00	1.16	0.97	0.425	1.56	3/16
36	3.00	1.16	0.97	0.425	1.56	3/16
42	4.50	1.38	1.25	0.56	2.25	7/32
44	4.50	1.38	1.25	0.56	2.25	7/32
46	4.50	1.38	1.25	0.56	2.25	7/32



Options

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.



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.

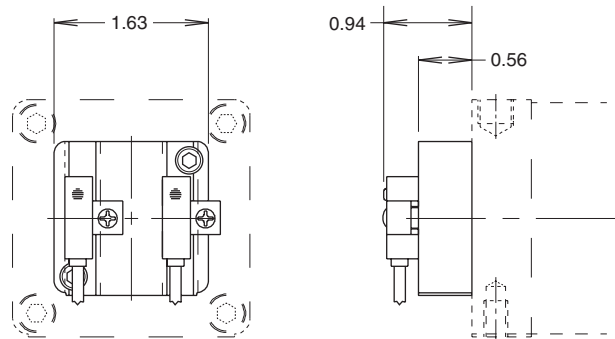
Example Ordering Codes, Keyway Positions and Switch Sensing Locations:

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.



PV Series
PRN(A) Series
PTR Series
B671/F672 Series
HP Series
Rotary Actuators Products

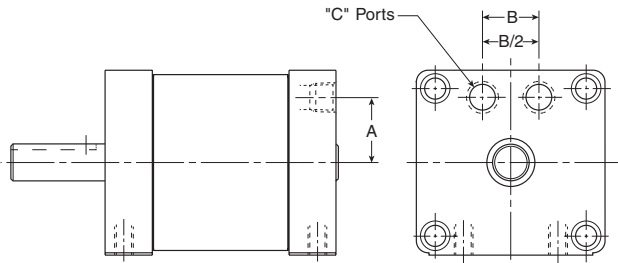


Options

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.

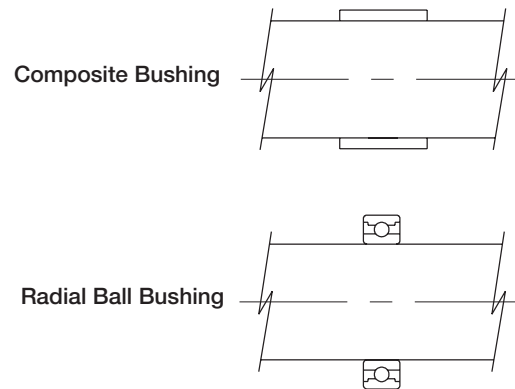


Model number	A	B	C
10	0.54	0.50	10-32
11	0.54	0.50	10-32
22	0.88	0.75	1/8 NPTF
33	1.09	0.90	1/8 NPTF
36	1.09	0.90	1/8 NPTF
42	1.68	1.00	1/4 NPTF
44	1.68	1.00	1/4 NPTF
46	1.68	1.00	1/4 NPTF

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.

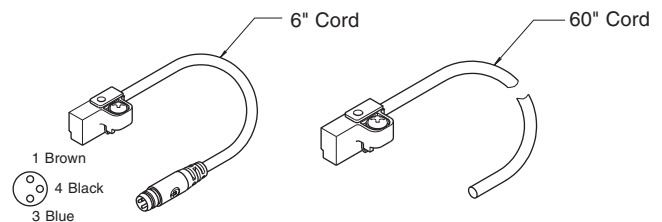
Option	Temperature Range* (°F)
Bumpers	0 - 200
Magnets	0 - 155
Switches	14 - 185

\*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.

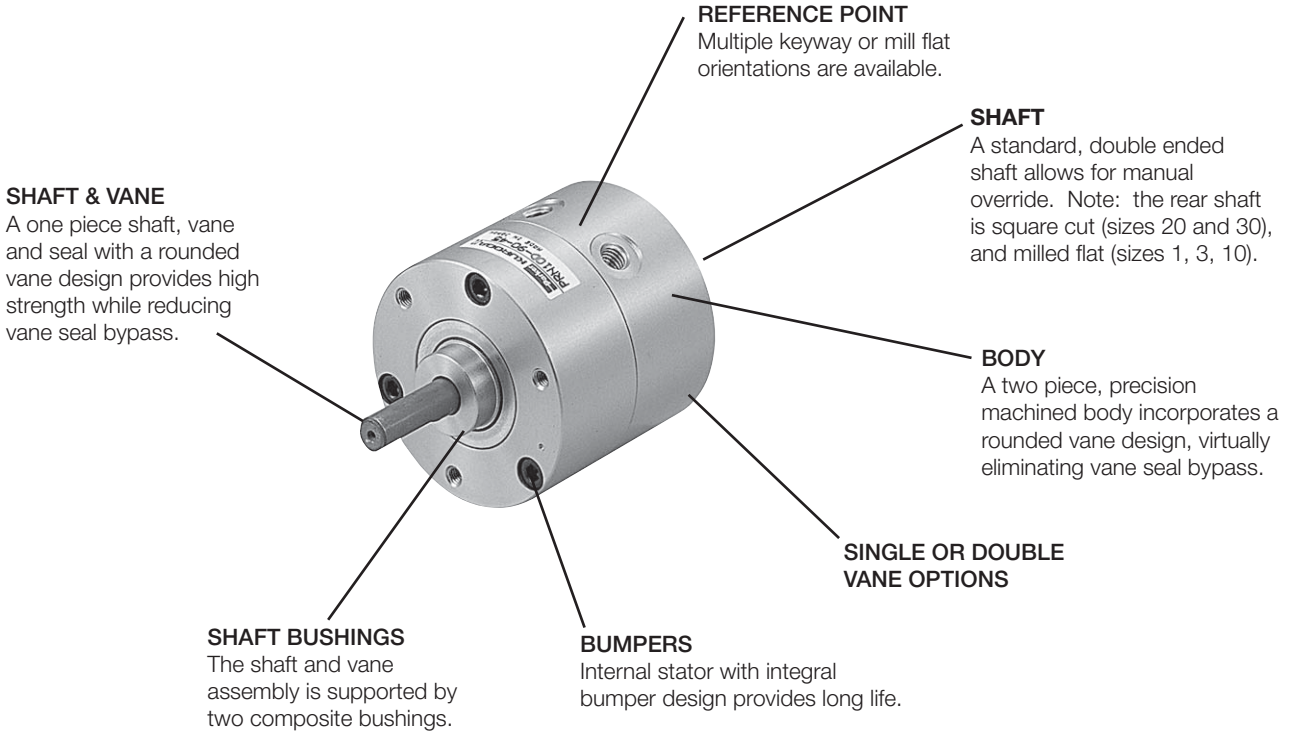
Sensors must be ordered separately from the Electronic Sensors section.



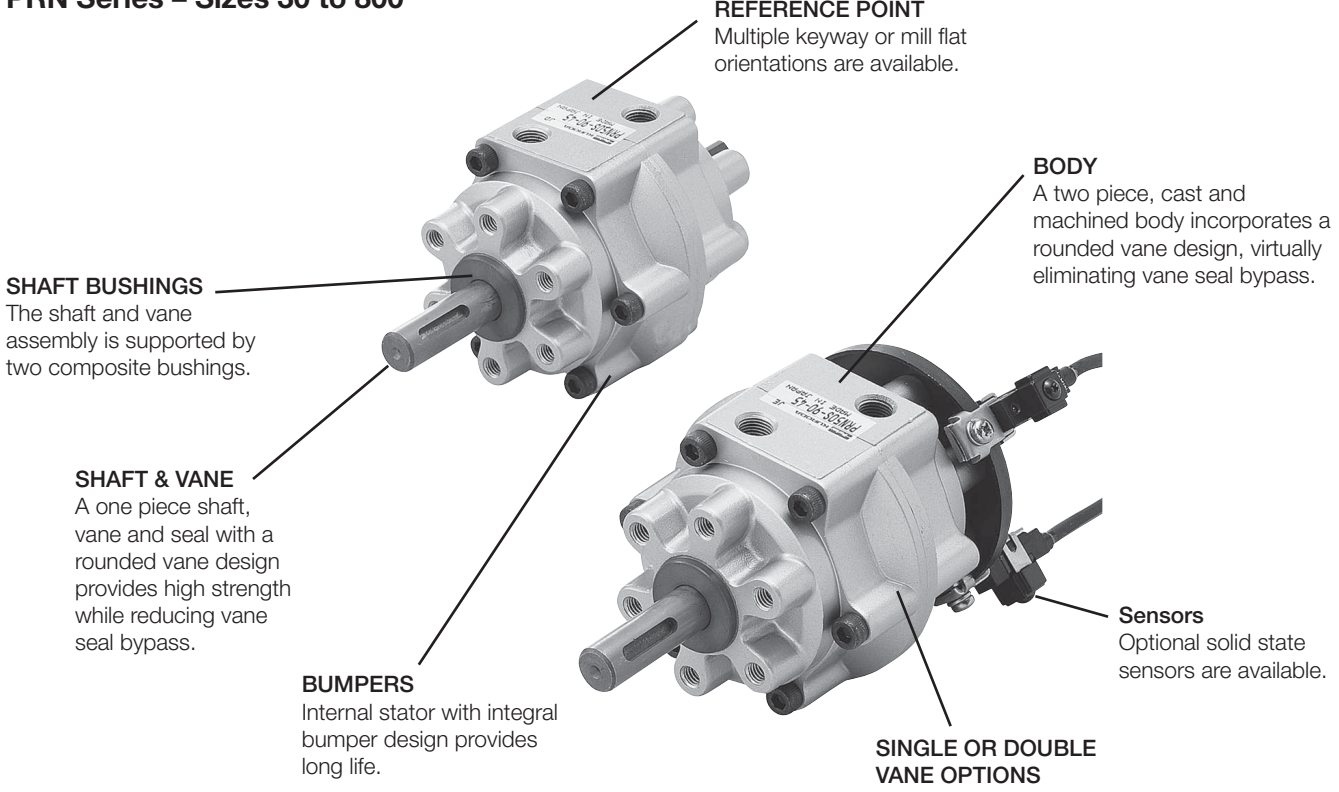
PV Series
PRN(A) Series
PTR Series
B671/F672 Series
HP Series
Rotary Actuators Products
<b>H</b>

**PRN Series**

**PRNA Series – Miniature Sizes 1 to 20**



**PRN Series – Sizes 30 to 800**



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

## Features

- Single or double vane rotary actuator
- 3 standard rotations: 90°, 180°, or 270°
- Output torque @ 0.7 MPa:  
16 to 1120 N•cm (1.4 to 99 in-lb)
- Internal bumpers are standard
- Shock absorbers are available for high inertia loads



### Operating information

Operating pressure:	100 PSIG (6.9 bar)
Temperature range:	-5°C to 80°C (-23°F to 176°F)
Filtration requirements:	40 micron, dry filtered air

### Ordering information

**PRNA**      **20**      **S** - **90** - **90**      **S**

Type	
PRNA	Sizes 1-20
PRN	Sizes 30-800

Size	
1	
3	
10	
20	
30	
50	
150	
300	
800	

Type	
S	Single vane
D	Double vane

Porting	
Omit	Standard porting
S	Rear porting (sizes 3-20 only)

Rotation angle	
90	90° (all sizes, single and double vane)
100	100° (sizes 50 through 800, double vane only)
180	180° (all sizes, single vane only)
270	270° (single vane only, not available on size 1)
280	280° (sizes 50 through 800, single vane only)

Oscillating reference point*	
40	40°
45	45°
90	90°

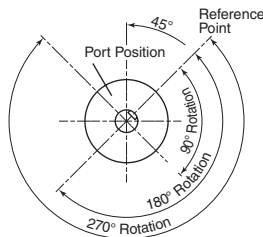
\* See specification tables for availability of rotation angle /reference point combinations for the selected model.

**Sensors**  
See section L for sensors.

### Reference point and rotation orientations

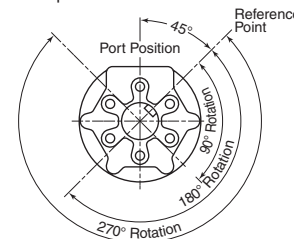
#### PRNA1S/D, PRNA3S/D, PRNA10S/D PRNA20S/D, PRN30S/D

Reference point at 45°



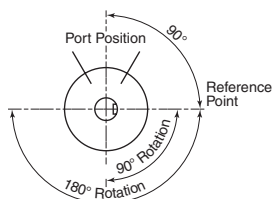
#### PRN50, 150, 300, 800

Reference point at 45°



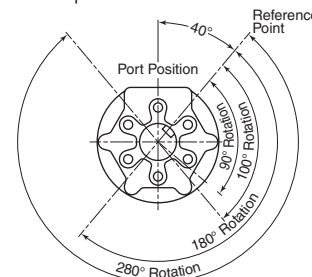
#### PRN1AS, PRNA3S PRNA10S, PRNA20S

Reference point at 90°



#### PRN50, 150, 300, 800

Reference point at 40°



**Quick reference data – PRNA miniature**

Type	Model number	Theoretical output torque								Maximum breakaway pressure		Unit weight	
		0.3 MPa (45 PSI)		0.5 MPa (75 PSI)		0.7 MPa (100 PSI)		1.0 MPa (145 PSI)					
		Ncm	(in-lb)	Ncm	(in-lb)	Ncm	(in-lb)	Ncm	(in-lb)	MPa	PSI	kg	lb
Single vane	<b>PRNA1S</b>	8	(0.7)	13	(1.2)	19	(1.6)	—	—	0.08	(12)	0.04	(0.08)
	<b>PRNA3S</b>	17	(1.5)	31	(3)	45	(4.0)	—	—	0.10	(15)	0.07	(0.15)
	<b>PRNA10S</b>	46	(4.1)	86	(7.6)	127	(11)	—	—	0.10	(15)	0.14	(0.31)
	<b>PRNA20S</b>	80	(7.1)	159	(14)	240	(21)	350	(31)	0.10	(15)	0.25	(0.55)
Double vane	<b>PRNA1D</b>	17	(1.5)	28	(2.5)	41	(3.6)	—	—	0.10	(15)	0.04	(0.09)
	<b>PRNA3D</b>	32	(2.9)	54	(4.8)	76	(6.7)	—	—	0.07	(10)	0.07	(0.16)
	<b>PRNA10D</b>	101	(8.9)	168	(15)	235	(21)	—	—	0.07	(10)	0.15	(0.33)
	<b>PRNA20D</b>	165	(15)	330	(29)	530	(47)	800	(71)	0.06	(9)	0.26	(0.57)

**Kinetic energy ratings and bearing load capacities – sizes 1 to 30**

Model number	Bearing load capacities				Distance between centerline bearings		Maximum kinetic energy rating	
	Thrust load		Radial load		mm	in	mJ	in-lb
	N	lb	N	lb				
<b>PRNA1S</b>	1	0.2	10	2	15	0.6	0.8	0.01
<b>PRNA3S</b>	4	0.9	40	9	20	0.8	4	0.03
<b>PRNA10S</b>	4	0.9	50	11	30	1.2	8	0.07
<b>PRNA20S</b>	25	5.6	300	67	42	1.7	40	0.35
<b>PRN30S</b>	30	6.7	400	90	48	1.9	67	0.60

**Specifications**

Model	Unit	PRNA1S			PRNA3S			PRNA10S			PRNA20S			PRN30S		
Vane		Single Vane														
Rotation	Degree	90	180	270	90	180	270	90	180	270	90	180	270	90	180	270
Rotational Tolerance	Degree	+4, -0														
Reference Point	Degree	90	90	90	45,90	45,90	45	45,90	45,90	45	45,90	45,90	45	45	45	45
Port Size		M5			M5			M5			M5			Rc 1/8		
Operating Pressure Range	MPa	0.3 to 0.7			0.2 to 0.7			0.2 to 0.7			0.2 to 1			0.2 to 1		
	psi	45 to 100			30 to 100			30 to 100			30 to 150			30 to 150		
Temperature Range	°C	-5 to 80			-5 to 80			-5 to 80			-5 to 80			-5 to 60		
	°F	23 to 176			23 to 176			23 to 176			23 to 176			23 to 140		
Maximum Frequency*	cycle/min	300	180	70	260	160	60	240	150	100	210	120	60	180	90	60
Displacement	cm <sup>3</sup>	1.4	1.4	1.5	3.4	3.4	4	9.8	9.8	12	17	17	21	37	37	43
	in <sup>3</sup>	0.09	0.09	0.09	0.2	0.2	0.2	0.6	0.6	0.7	1.0	1.0	1.3	2.3	2.3	2.6

Model	Unit	PRNA1D			PRNA3D			PRNA10D			PRNA20D			PRN30D		
Vane		Double Vane														
Rotation	Degree	90			90			90			90			90		
Rotational Tolerance	Degree	+4, -0			+4, -0			+4, -0			+4, -0			+4, -0		
Reference Point	Degree	45			45			45			45			45		
Port Size		M5			M5			M5			M5			Rc 1/8		
Operating Pressure Range	MPa	0.3 to 0.7			0.2 to 0.7			0.2 to 0.7			0.2 to 1			0.2 to 1		
	psi	45 to 100			30 to 100			30 to 100			30 to 150			30 to 150		
Temperature Range	°C	-5 to 80			-5 to 80			-5 to 80			-5 to 80			-5 to 60		
	°F	23 to 176			23 to 176			23 to 176			23 to 176			23 to 140		
Maximum Frequency*	cycle/min	240			240			240			200			200		
Displacement	cm <sup>3</sup>	2			2.4			5			10			34		
	in <sup>3</sup>	0.12			0.1			0.3			0.6			2.1		

\* Maximum frequency value given at a pressure of 0.5 MPa (73 psi) and under no load.



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

PV Series

PRNA Series

PTR Series

B671/F672 Series

HP Series

Rotary Actuators Products



Specifications – Sizes 30 to 800

Quick reference data – PRN

Type	Model number	Theoretical output torque								Maximum breakaway pressure		Unit weight	
		0.3 Mpa (45 PSI)		0.5 MPa (75 PSI)		0.7 MPa (100 PSI)		1.0 MPa (145 PSI)		MPa	PSI	kg	(lb)
Single vane	PRN30S	180	(16)	319	(28)	480	(42)	720	(64)	0.10	(15)	0.47	(1.04)
	PRN50S	259	(23)	479	(42)	700	(62.0)	1060	(94)	0.10	(15)	0.8	(1.8)
	PRN150S	850	(75)	1500	(133)	2100	(186)	3050	(270)	0.08	(12)	2.0	(4.4)
	PRN300S	1650	(146)	2850	(252)	4050	(358)	5750	(509)	0.08	(12)	3.7	(8.2)
Double vane	PRN800S	5910	(523)	10200	(903)	14400	(1274)	20500	(1814)	0.05	(7)	13	(28)
	PRN30D	440	(39)	770	(68)	1120	(99)	1660	(147)	0.08	(12)	0.48	(1.06)
	PRN50D	579	(51)	1040	(92.0)	1510	(134)	2250	(199)	0.08	(12)	0.8	(1.8)
	PRN150D	1900	(168)	3500	(310)	4800	(425)	6900	(611)	0.06	(9)	2.0	(4.4)
	PRN300D	3900	(345)	6800	(602)	9700	(858)	1370	(121)	0.06	(9)	4.3	(9.5)
	PRN800D	12000	(1062)	20600	(1823)	28800	(2549)	41100	(3637)	0.05	(7)	13	(28)

Kinetic energy ratings and bearing load capacities – sizes 50 to 800

Model	Bearing load capacities						Maximum kinetic energy rating					
	Thrust load		Radial load		Distance between centerline bearings		Standard unit		Shock absorber (per cycle)		Shock absorber (per cycle)	
	N	lb	N	lb	mm	in	J	in-lb	J	in-lb	J/hr	in-lb/hr
PRN50S/D	44.1	9.9	588	132	66	2.6	0.13	1.2	7.8	69	3100	27000
PRN150S/D	88.2	19.8	1176	264	79.5	3.1	0.6	5.3	10	231	11300	100000
PRN300S/D	147	33.0	1960	441	97.5	3.8	8.0	70	20	462	22000	194000
PRN800S/D	490	110.2	4900	1102	138.5	5.5	10.5	92	156	1387	56500	500000

Specifications

Model	Unit	PRN50S				PRN150S				PRN300S			
Vane		Double Vane											
Rotation	Degree	90	180	270	280	90	180	270	280	90	180	270	280
Rotational Tolerance	Degree	+3 -0											
Reference Point	Degree	45	40, 45	45	40	45	40, 45	45	40	45	40, 45	45	40
Port Size		Rc 1/8	Rc 1/8	Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8	Rc 3/8	Rc 3/8
Operating Pressure Range	MPa	0.2 to 1.0											
	psi	30 to 150											
Temperature Range	°C	5 to 60											
	°F	41 to 140											
Maximum Frequency*	cycle/min	180	90	60	60	120	80	50	50	90	60	40	40
Displacement	cm³	51	51	61	62	146	146	179	185	244	283	352	365
	in³	3.1	3.1	3.7	3.8	8.9	8.9	10.9	11.3	14.9	17	21	22

Model	Unit	PRN800S				PRN50D		PRN150D		PRN300D		PRN800D	
Vane		Double Vane											
Rotation	Degree	90	180	270	280	90	100	90	100	90	100	90	100
Rotational Tolerance	Degree	+3, -0											
Reference Point	Degree	45	40, 45	45	40	40, 45	40	45	40	45	40, 45	45	40
Port Size		Rc 1/2	Rc 1/2	Rc 1/2	Rc 1/2	Rc 1/8	Rc 1/8	Rc 1/4	Rc 1/4	Rc 3/8	Rc 3/8	Rc 1/2	Rc 1/2
Operating Pressure Range	MPa	0.2 to 1.0											
	psi	30 to 150											
Temperature Range	°C	5 to 60											
	°F	41 to 140											
Maximum Frequency*	cycle/min	65	45	30	30	180	-	120	-	90	-	65	-
Displacement	cm³	754	869	1036	1046	42	43	127	123	244	271	754	774
	in³	46	53	63	64	2.6	2.6	7.7	7.5	14.9	16.5	46	47

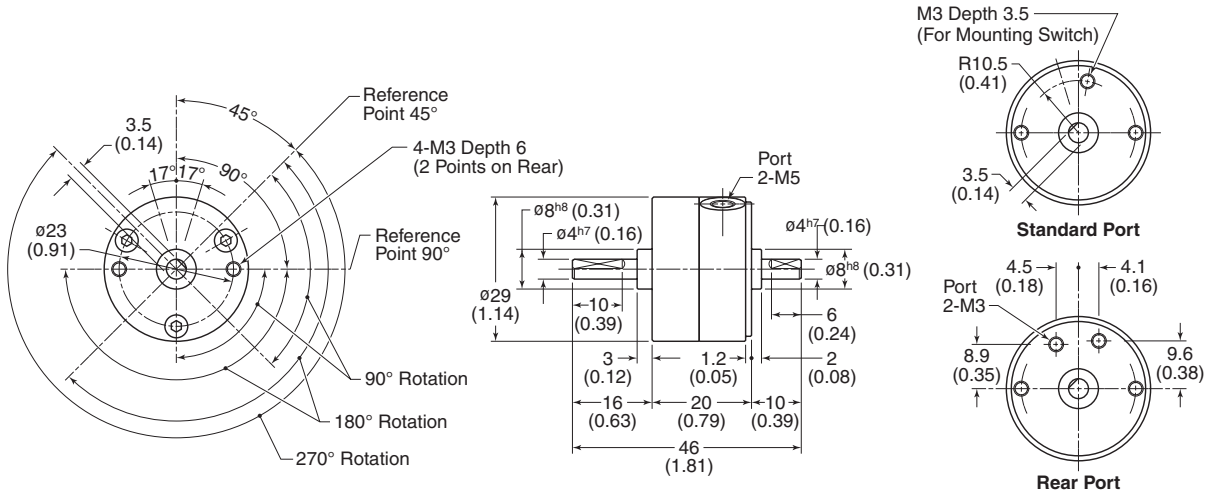
\* Maximum frequency value given at a pressure of 0.5 MPa (73 psi) and under no load.



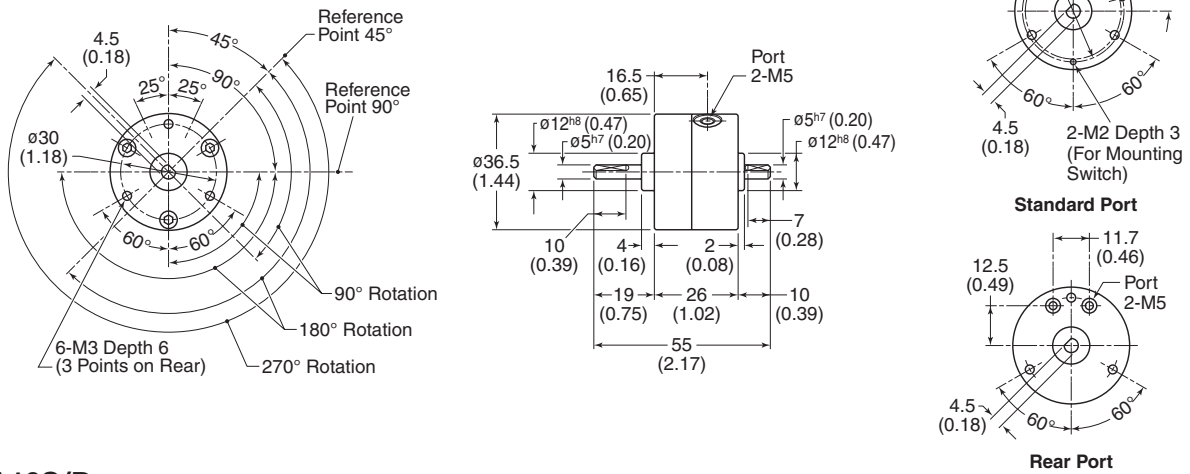
For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)



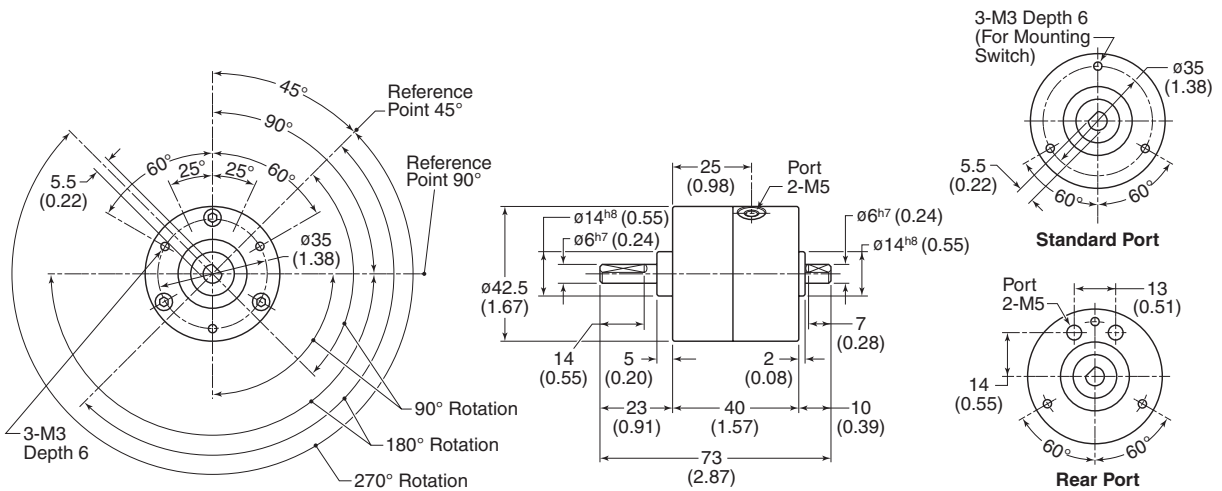
PRNA1S



PRNA3S/D



PRNA10S/D



Dimensions in mm (inch)



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

H15

Parker Hannifin Corporation  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

PV Series

PRNA(A) Series

PTR Series

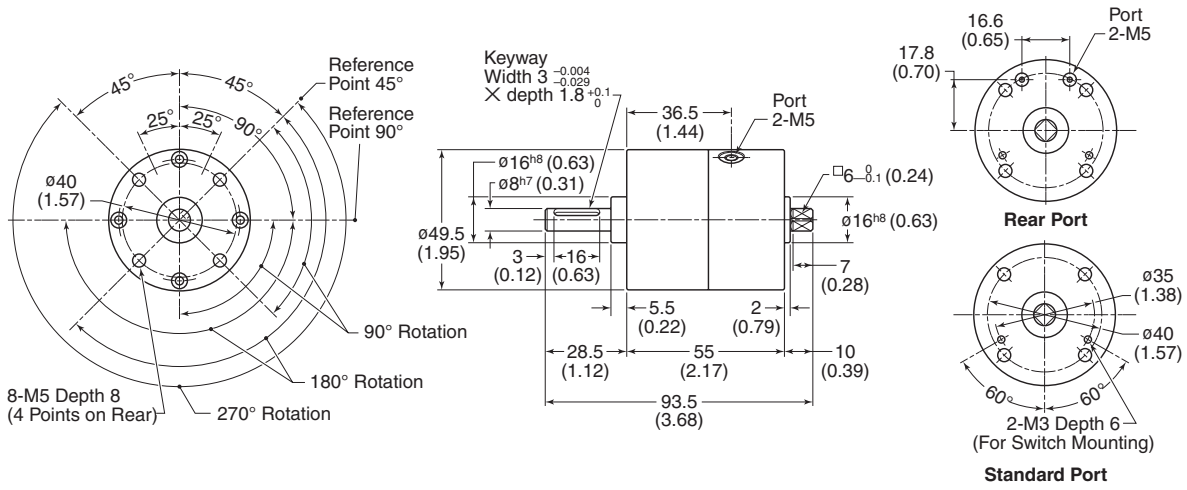
B671/F672 Series

HP Series

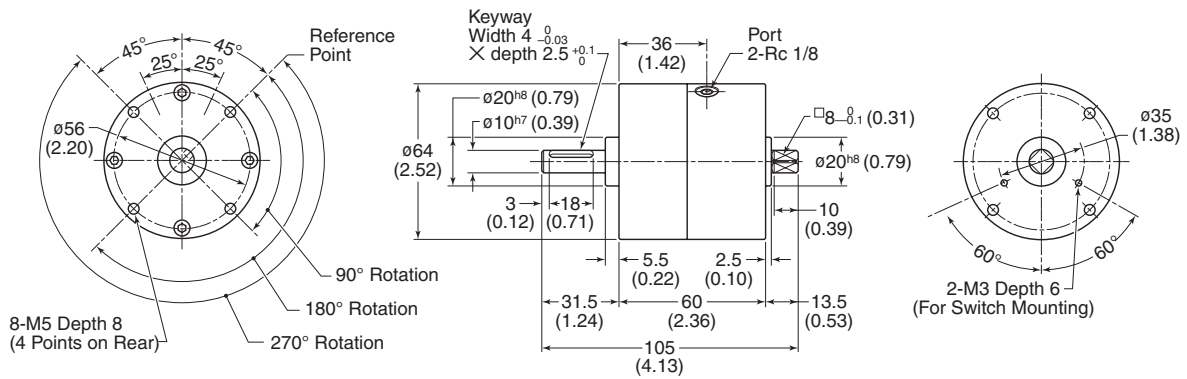
Rotary Actuators  
Products

H

PRNA20S/D



PRN30S/D



Dimensions in mm (inch)



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

H16

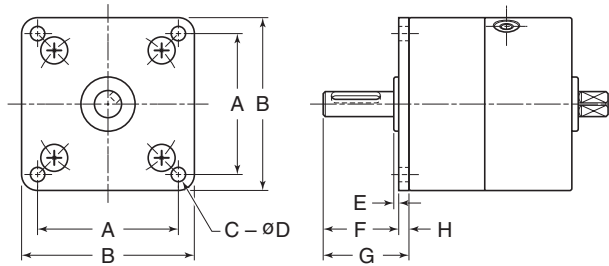
**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)





**Flange Mount – Sizes 1 to 30**

**Note:** Should not be used on rear face when rear ports (S) or switches are specified.

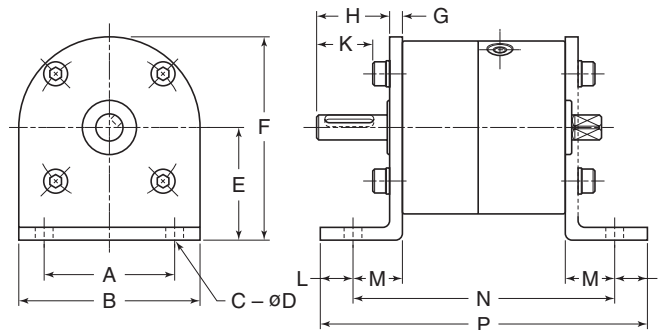


Part number	A	B	C	D	E	F	G	H
PRNA1-P	24 (0.94)	30 (1.18)	4 (0.16)	3.4 (0.13)	1 (0.04)	14 (0.55)	16 (0.63)	2 (0.08)
PRNA3-P	30 (1.18)	37 (1.46)	4 (0.16)	3.4 (0.13)	1.5 (0.06)	16.5 (0.65)	19 (0.75)	2.5 (0.10)
PRNA10-P	34 (1.34)	42 (1.65)	4 (0.16)	3.5 (0.14)	1.8 (0.07)	19.8 (0.78)	23 (0.91)	3.2 (0.13)
PRNA20-P	41 (1.61)	50 (1.97)	4 (0.16)	5.5 (0.22)	1.9 (0.07)	24.9 (0.98)	28.5 (1.12)	3.6 (0.14)
PRN30-P	52 (2.05)	64 (2.52)	4 (0.16)	5.5 (0.22)	1.9 (0.07)	27.9 (1.10)	31.5 (1.24)	3.6 (0.14)

mm (Inches)

**Foot Mount – Sizes 1 to 30**

- Note:**
- A foot plate can be rotated in intervals of 90°.
  - Only one plate included. Two plates must be purchased to mount from both sides (as shown).
  - Should not be used on rear face when rear ports (S) or switches are specified.



Part number	A	B	C	D	E	F	G	H	K	L	M	N	P
PRNA1-L	20 (0.79)	30 (1.18)	2 (0.08)	4.8 (0.19)	22 (0.87)	37 (1.46)	2 (0.08)	14 (0.55)	10.3 (0.41)	5 (0.20)	10 (0.39)	40 (1.57)	50 (1.97)
PRNA3-L	26 (1.02)	36 (1.41)	2 (0.08)	4.8 (0.19)	25 (0.98)	43 (1.69)	2.6 (0.10)	16.4 (0.65)	12.7 (0.50)	7 (0.28)	11 (0.43)	48 (1.89)	62 (2.44)
PRNA10-L	30 (1.18)	42 (1.65)	2 (0.08)	5.8 (0.23)	30 (1.18)	51 (2.01)	3.2 (0.13)	19.8 (0.78)	16.1 (0.63)	8 (0.31)	12 (0.47)	64 (2.52)	80 (3.15)
PRNA20-L	36 (1.42)	49 (1.93)	2 (0.08)	7 (0.28)	34 (1.34)	58.5 (2.30)	3.6 (0.14)	24.9 (0.98)	18.6 (0.73)	10 (0.39)	15 (0.59)	85 (3.35)	105 (4.13)
PRN30-L	48 (1.89)	66 (2.60)	2 (0.08)	6.5 (0.26)	42 (1.65)	75 (2.95)	4.5 (0.18)	27 (1.06)	20.7 (0.81)	12 (0.47)	18 (0.71)	96 (3.78)	120 (4.72)

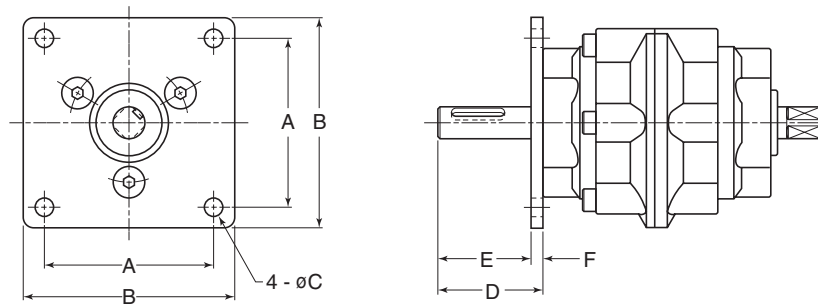
mm (Inches)



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**Flange Mount – Sizes 50 and 150**

**Note:** A flange plate can be rotated in intervals of 60°

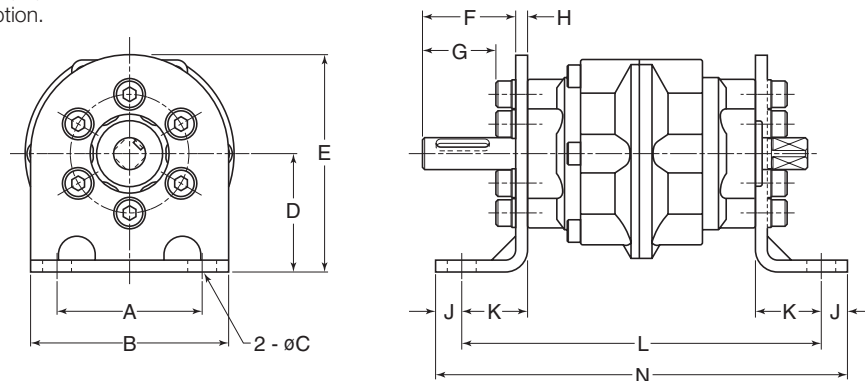


Part number	A	B	C	D	E	F
PRN50-P	64 (2.52)	80 (3.15)	7 (0.28)	39.5 (1.56)	35 (1.38)	4.5 (0.18)
PRN150-P	88 (3.46)	110 (4.33)	9 (0.35)	53.5 (2.11)	47.5 (1.87)	6 (0.24)

mm (Inches)

**Foot Mount – Sizes 50 to 800**

- Note:**
- A foot plate can be rotated in intervals of 60°.
  - Two foot plates (L2) are not available with the CR, FM, FC option.



Part number	A	B	C	D	E	F	G	H	J	K	L	N
PRN50-L	55 (2.17)	75 (2.95)	11 (0.43)	45 (1.77)	82.5 (3.25)	35 (1.38)	27.5 (1.08)	4.5 (0.18)	10 (0.39)	25 (0.98)	136 (5.35)	156 (6.14)
PRN150-L	80 (3.15)	110 (4.33)	13 (0.51)	65 (2.56)	115 (4.53)	43.5 (1.71)	33.5 (1.32)	10 (0.39)	12 (0.47)	28 (1.10)	159 (6.26)	183 (7.20)
PRN300-L	100 (3.94)	140 (5.51)	15 (0.59)	80 (3.15)	135 (5.31)	53 (2.09)	40.5 (1.59)	12 (0.47)	13 (0.51)	32 (1.26)	189 (7.44)	215 (8.46)
PRN800-L	140 (5.51)	200 (7.87)	15 (0.59)	110 (4.33)	200 (7.87)	54.5 (2.15)	39.5 (1.56)	15 (0.59)	15 (0.59)	35 (1.38)	241 (9.49)	271 (10.67)

mm (Inches)



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**Shock Absorber**

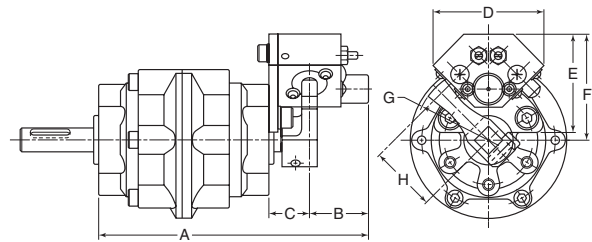
The CRN Series Shock Absorber should be used in applications involving high inertial loads. Inertial loads are a result of any or all of the following:

- High cycle speeds
- Heavy loads
- Physically / dimensionally large loads

When any of these characteristics are present, it is important that some means of deceleration, such as the CRN, is used.

**Notes:**

- It is critical not to exceed the maximum kinetic energy values of the CRN. See chart below for kinetic energy calculations.
- When ordering a CRN, the shock absorber and the shock arm must be ordered separately.
- When a CRN is specified, maintain a minimum working pressure of 0.3 MPa.



Part number	A	B	C	D	E	F	G	H
<b>CRN50</b>	136.5 (5.37)	30 (1.18)	20.5 (0.81)	56 (2.20)	50 (1.97)	54 (2.13)	R38 (1.50)	34 (1.34)
<b>CRN150</b>	159.5 (6.28)	34 (1.34)	22.5 (0.89)	80 (3.15)	62 (2.44)	71.5 (2.81)	R51 (2.01)	46 (1.81)
<b>CRN300</b>	187.5 (7.38)	37 (1.46)	25.5 (1.00)	95 (3.74)	87 (3.43)	96 (3.78)	R68 (2.68)	62 (2.44)
<b>CRN800</b>	244 (9.61)	42 (1.65)	31 (1.22)	130 (5.12)	118 (4.65)	135 (5.31)	R78 (3.07)	90 (3.54)

mm (Inches)

**Shock Absorber Only**

CRN50	
Model	
CRN50	for PRN50
CRN150	for PRN150
CRN300	for PRN300
CRN800	for PRN800

**Shock Arm**

CRN50	
Model	
CRN50	for PRN50
CRN150	for PRN150
CRN300	for PRN300
CRN800	for PRN800

90	
Rotation	
90	90°
100	180°
180	180°
270	270°
280	280°

45 - T	
Reference Point	
40	40°
45	45°

**Relationship Between Rotation and Reference Point**

Options	Rotation			
	90°	180°	270°	280°
40°	X	X	N/A	X
45°	X	N/A	X	N/A

**Note:** Select a shock arm based on the reference point and rotation of the PRN to be used.

Model No.	Unit	CRN50	CRN150	CRN300	CRN800
Kinetic Energy (per cycle)	J	7.8	10	20	156
	in-lb	68	85	170	1356
Maximum Angular Velocity	Degree/s	850	750	650	550
Kinetic Energy (per hour)	J/hr	3100	11300	22000	56500
	in-lb/hr	26939	98197	191180	490985
Temperature Range	°C	5 to 50	5 to 50	5 to 50	5 to 50
	°F	41 to 122	41 to 122	41 to 122	41 to 122
Deceleration Angle	Degree	11	12	14	15
Weight	g	240	420	780	1620
	lb	0.528	0.924	1.716	3.564



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

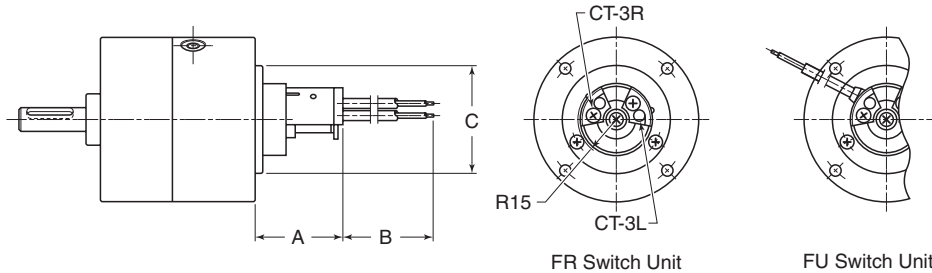
**Variable Position Solid State (FR Series) Sensor**

The FR Series variable position sensor provides the ability to adjust the sensor to sense along the full travel of the actuator. All switches and sensors must be ordered separately.

See the Electronic Sensors section for part numbers and

sensor specifications.

**Note:** Not to be used in conjunction with rear ports (S).



Model	A	B	C
PRNA1	31.9 (1.26)	1000 (39.37)	29 (1.14)
PRNA3	30.7 (1.21)	1000 (39.37)	35 (1.38)
PRNA10	34 (1.34)	1000 (39.37)	42 (1.65)
PRNA20	34 (1.34)	1000 (39.37)	42 (1.65)
PRN30	34 (1.34)	1000 (39.37)	42 (1.65)

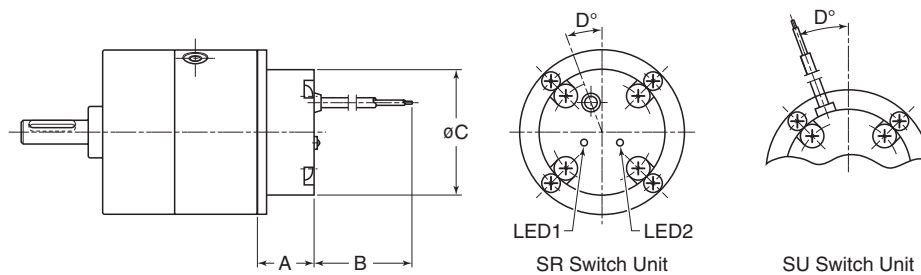
mm (Inches)

**Fixed Position Solid State (SR / SU Series) Sensor**

The SR or SU Series fixed position sensor senses the end of stroke only. All switches and sensors must be ordered separately.

See the Electronic Sensors section for part numbers and sensor specifications.

**Note:** Not to be used in conjunction with rear ports (S).



Model	A	B	C	D
PRNA1	N/A	N/A	N/A	N/A
PRNA3	18 (0.71)	1000 (39.37)	36 (1.42)	30 (1.18)
PRNA10	18.3 (0.72)	1000 (39.37)	42 (1.65)	25 (0.98)
PRNA20	18.3 (0.72)	1000 (39.37)	49 (1.93)	20 (0.79)
PRN30	21.8 (0.86)	1000 (39.37)	49 (1.93)	20 (0.79)

mm (Inches)

PV Series  
PRN(A) Series  
PTR Series  
B671/F672 Series  
HP Series  
Rotary Actuators Products

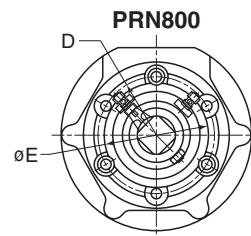
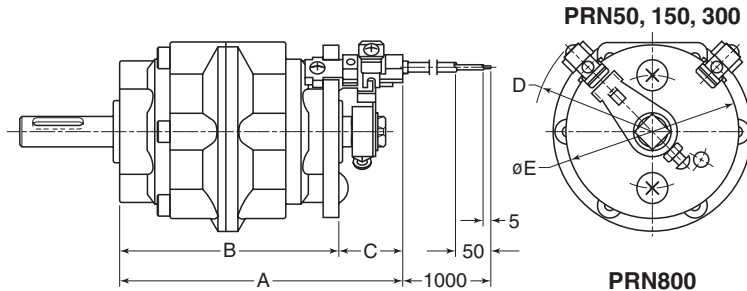


For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**Variable Position Solid State (FR / FC Series) Sensor**

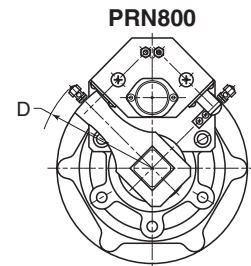
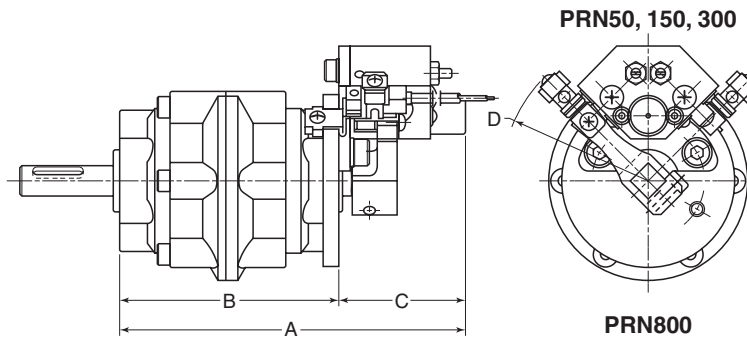
The FR and FC Series variable position sensor provides the ability to adjust the sensor to sense along the full travel of the actuator. The FR Series sensor is to be used with the standard PRN sizes 50–800, and the FC Series sensor is to be used when a CRN Series shock absorber is specified.

See the Electronic Sensors section for part numbers and sensor specifications.



Model No.	A	B	C	D	E
PRN50	115 (4.53)	87.2 (3.43)	27.5 (1.08)	R47 (1.85)	69 (2.72)
PRN150	131.7 (5.19)	104.2 (4.10)	27.5 (1.08)	R61 (2.40)	97 (3.82)
PRN300	161.2 (6.35)	126.2 (4.97)	35 (1.38)	R69 (2.72)	113 (4.45)
PRN800	215.5 (8.48)	174.2 (6.86)	41.3 (1.63)	R60 (2.36)	108 (4.25)

mm (Inches)



Model No.	A	B	C	D
PRN50	137.7 (5.42)	87.2 (3.43)	50.5 (1.99)	R58.2 (2.29)
PRN150	160.7 (6.33)	104.2 (4.10)	56.5 (2.22)	R72.2 (2.84)
PRN300	188.7 (7.43)	126.2 (4.97)	62.5 (2.46)	R88.2 (3.47)
PRN800	244 (9.61)	174.2 (6.86)	69.8 (2.75)	R118.5 (4.67)

mm (Inches)



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

PV Series
PRN(A) Series
<b>PTR Series</b>
B671/F672 Series
HP Series
Rotary Actuators Products
<b>H</b>

**PTR Series**

**TUBING & BODY**

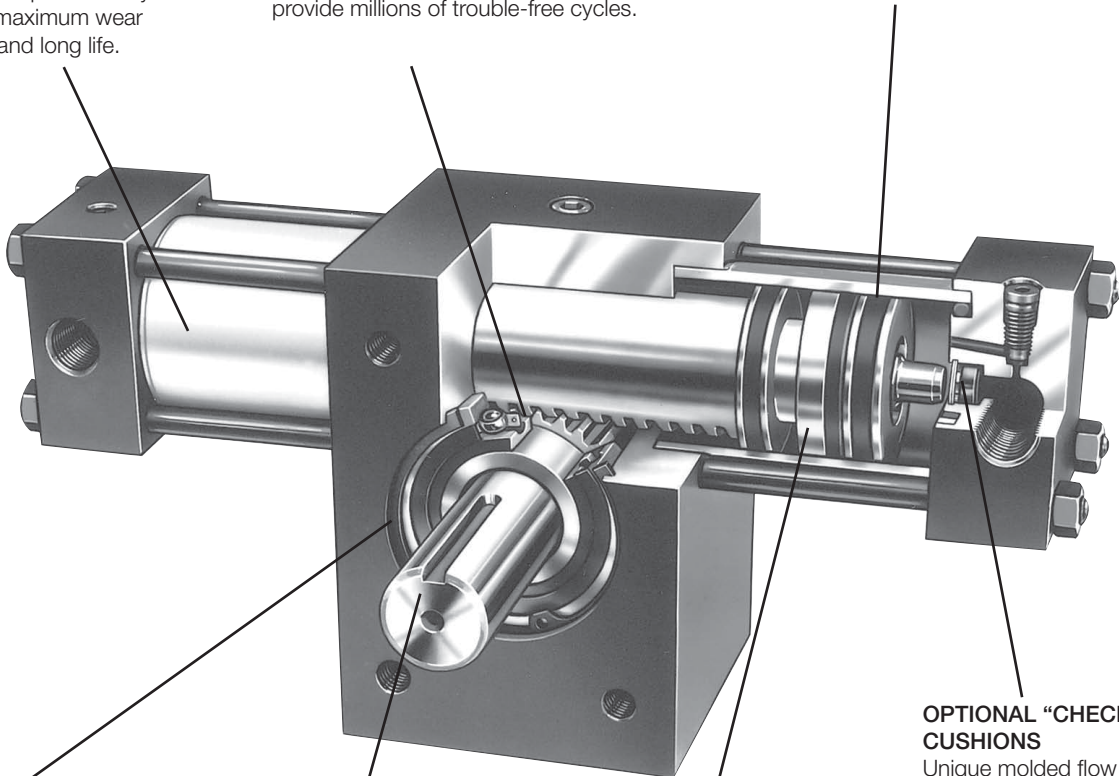
Aluminum is hard-coat anodized and permanently sealed for maximum wear resistance and long life.

**RACK & PINION**

Heavy duty gear design is made from through hardened chrome alloy steel for maximum strength and shock resistance. The gear chamber is prelubricated to provide millions of trouble-free cycles.

**PISTON SEALS**

Unique geometry of lipseal provides low breakaway pressure and long life. The specially formulated Nitroxile ELF compound incorporates a unique internal lubricant to provide the lowest breakaway and running friction, while maintaining the best wear resistance available. Can be operated with no added lubrication.



**SEALED BALL BEARINGS**

Reduce friction and breakaway pressure while providing substantial pinion and shaft support. This ensures a rigid and long lasting assembly, even for high cycle applications.

**STANDARD MALE KEYED SHAFT**

Is as large as possible to ensure superior strength; pinion and output shaft are one-piece to provide long life. A female shaft is available.

**PISTONS**

Floating Wear-Tech® aluminum pistons are supported at both ends by rugged filled PTFE wear bands which prevent cylinder scoring, galling, and binding. A magnet groove is standard on all pistons, allowing field conversion to position sensors.

**OPTIONAL "CHECK SEAL" CUSHIONS**

Unique molded flow passages combine the benefits of floating cushions with check valve action, providing effective cushioning and quick stroke reversal for higher cycle and production rates. This proven design eliminates failure-prone springs and ensures minimum wear. An adjustable needle valve and springless check valve allow exact "tailoring" of the cushion to match the application.

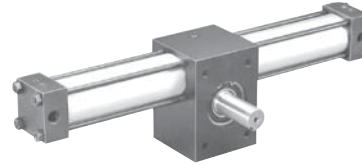


For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)



## Features

- Rack and pinion rotary actuator
- 5 bore sizes from 1" to 3-1/4"
- Output torque @ 100 PSIG: 39 lb-in to 2281 lb-in
- Standard rotations: 90°, 180°, 270°, 360°
- Available as single or double rack, 3 position, air/oil, antibacklash
- Optional bumpers, cushions, stroke adjusters, shock absorbers



### Operating information

Operating pressure:	250 PSIG (17 bar)
Temperature range:	
Nitrile seals	0°F to 180°F (-18° to 82°C)
Fluorocarbon seals	0°F to 250°F (-18° to 121°C)
Filtration requirements:	40 micron, dry filtered air

### Sensors

See section L for sensors.



## Ordering information

**PTR 25 1 - 090 3 F P - A B 2 1 M V - C**

Model <sup>1</sup>	
10	1" Bore
15	1-1/2" Bore
20	2" Bore
25	2-1/2" Bore
32	3-1/4" Bore

Rotation <sup>2</sup>	
090	90°
180	180°
270	270°
360	360°

Or specify any other rotation.

Mounting	
A	Face/base (standard)
F	Front flange
G	Foot flange
P	Pilot ring
R	Rear flange
X	Special

Design Series	
C	Current

Configuration	
1	Single Rack
2	Double Rack
3	Three Position Actuator
6	Air/Oil Operation
7	Antibacklash

Special Options	
Omit	Standard

(Two-digit code assigned by factory and applies when any "X" or "9" appears in the model number or when special options or features are required.)

Port flow controls	
Omit	None
P	Flow control both rotations
R	Flow control CW rotation <sup>3</sup>
S	Flow control CCW rotation <sup>3</sup>

Seals	
Omit	Nitrile
V	Fluorocarbon
X	Special

Standard options	
Omit	None
M	Magnetic piston ring
S	Shaft seal cover
Q	Prepped for external air/oil tank
L	Air/oil cushion & flow control adj. at location 1 (opposite standard)

Shaft	
A	Female keyed
B	Single male keyed (standard)
C	Double male keyed
D	Double male keyed, single end - metric
E	Female keyed - metric
F	Male keyed, double end - metric
R	Preload keyway
X	Special

Port location	
1	Position 1 (standard)
2	Position 2
3	Position 3
4	Position 4 <sup>8</sup>
5	Position 5 <sup>6</sup>
9	Special

Port type	
1	SAE straight thread
2	NPTF
4	BSPP (ISO 1179-1 with ISO 228-1 threads)
9	Special

Other options	
Detail in clear text:	
• Proximity Sensors	
• Feedback Potentiometer	

### Notes:

- <sup>1</sup> Cylinder bore size. See appropriate tables for torque output.
- <sup>2</sup> For 3-position units, specify middle and total rotation separated by a "/", ie 090/180. To obtain equal rotation both sides of midstroke (theoretical 12:00), order unit with 5° longer rotation than standard with stroke adjusters.
- <sup>3</sup> Viewed from shaft end.
- <sup>4</sup> Double rack models only.
- <sup>5</sup> Reduces to 10° with cushions.
- <sup>6</sup> Not available with cushions or stroke adjusters.
- <sup>7</sup> Stroke adjusters for option configuration compatibility.
- <sup>8</sup> Not available on double rack models
- <sup>9</sup> Not available with flow controls

Cushion / Bumpers	
Omit	None
1	Cushioned CW rotation <sup>3</sup>
2	Cushioned CCW rotation <sup>3</sup>
3	Cushioned both rotations
4	Four cushions <sup>4</sup>
5	Bumper CW rotation <sup>3</sup>
6	Bumper CCW rotation <sup>3</sup>
7	Bumper both rotations
9	Special

Stroke adjusters	
Omit	None
D	0-30° CW rotation <sup>3,5</sup>
E	0-30° CCW rotation <sup>3,5</sup>
F	0-30° both rotations <sup>5</sup>
H	Shock/stroke adj. CW rotation <sup>3,7,9</sup>
K	Shock/stroke adj. CCW rotation <sup>3,7,9</sup>
L	Shock/stroke adj. both rotations <sup>7,9</sup>
X	Special



**Quick reference data**

Model		Typ. actual output torque @ 100 PSI (lb-in)	Theoretical output torque* (lb-in) versus input pressure (PSI)				Displacement per degree rotation (in <sup>3</sup> /°)	Maximum angular backlash (minutes)	Tolerance (degrees)
Single rack	Double rack		50	75	100	250			
101		35	19	29	39	98	0.007	60	-0, +5
	102	70	39	59	79	197	0.014	60	-0, +5
151		100	59	88	118	294	0.021	45	-0, +4
	152	200	118	177	236	590	0.042	45	-0, +4
201		250	141	212	282	705	0.049	35	-0, +3
251		375	215	322	430	1074	0.075	35	-0, +3
	202	500	282	423	565	1410	0.099	35	-0, +3
	252	750	430	644	859	2148	0.150	35	-0, +3
321		1000	570	856	1141	2852	0.199	25	-0, +2
	322	2000	1141	1711	2281	5703	0.398	25	-0, +2

\* Allow 10% for friction loss. Allow 20% on air/oil units. Use the single rack torque values for all air/oil, three position, and anti-backlash actuators.

**Bearing load capacities and kinetic energy ratings**

Model	Bearing load capacities* (lb)		Distance between bearings	Maximum kinetic energy absorption rating for models based on configuration (lb-in)			
	Radial	Thrust		Standard or stroke adjusters	Bumper	Cushion**	Shock absorbers (per cycle / per hour)
10	100	50	1.40	0.5	0.75	5.00	15/150,000
15	250	125	2.15	1.50	2.25	15.00	35/200,000
20	500	250	2.15	3.00	4.50	35.00	140/350,000
25	750	375	2.50	5.50	8.25	55.00	140/300,000
32	1000	500	3.75	12.00	18.00	155.00	N/A

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

\*\* Assuming positive back pressure provided by meter-out flow control.

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

HP Series

Rotary Actuators Products



**Kinetic Energy Calculations**

In many cases, the size and life of a rotary actuator is determined not by its torque output, but rather by its energy dissipation capability. This is based on the assumption that if the actuator is capable of stopping the load, it is certainly capable of starting the load.

Both torque output and kinetic energy absorption must be considered if the actuator physically stops the load.

To calculate Kinetic Energy, the following variables are required:

1. Rotational Mass Moment of Inertia ( $J_m$ ) - See next page.
2. Total Rotation (Degrees)
3. Rotation Time (Seconds)

**KINETIC ENERGY BASIC FORMULA**

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

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

where

KE = Kinetic Energy (in-lb)

$J_m$  = Rotational Mass Moment of Inertia (in-lb-sec<sup>2</sup>)

See next page for formulas.

$\omega$  = Peak Velocity (rad/sec)

(Assuming twice average velocity)

**Unit Weights (lb)**

Model	Rotation			
	90°	180°	270°	360°
PTR101	2-1/4	2-1/2	2-3/4	3
PTR102	3-1/2	3-7/8	4-1/4	4-5/8
PTR151	8-1/4	8-3/4	9-1/4	9-3/4
PTR152	11-3/8	12-3/8	13-3/8	14-3/8
PTR201	13-5/8	14-5/8	15-5/8	16-3/4
PTR202	19-3/4	21-7/8	24	26-1/8
PTR251	21-1/8	22-3/4	24-3/8	26
PTR252	30-3/4	34	37-1/4	40-1/2
PTR321	44-1/4	46-5/8	49	51-3/8
PTR322	61-7/8	66-5/8	71-3/8	76-1/8

**Seal kit ordering information**

- Standard units are equipped with Nitrile seals.
- Optional seal compounds are available.
- Seal kit part numbers as shown:

<b>PSK</b> Parker seal kit	—	<b>PTR322</b> Base model	<b>V</b>
			<b>Omit</b> Standard
			<b>V</b> Fluorocarbon
			<b>Q</b> Quad ring piston seals
			<b>W</b> Carboxilated nitrile piston seals

**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-sec<sup>2</sup>)  
 (Dependent on physical size of object and weight)

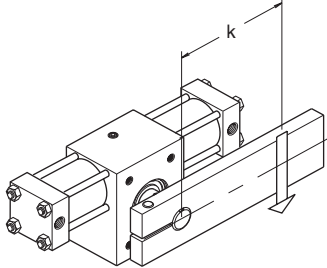
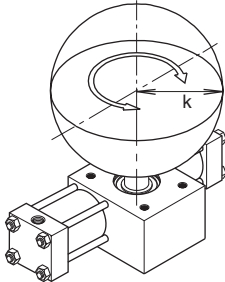
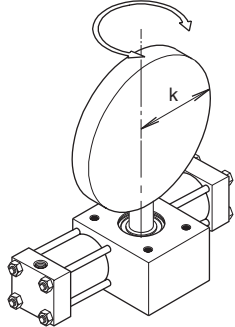
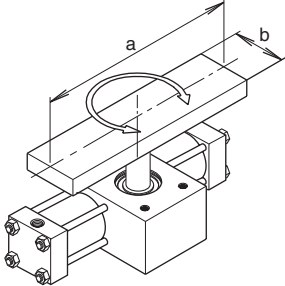
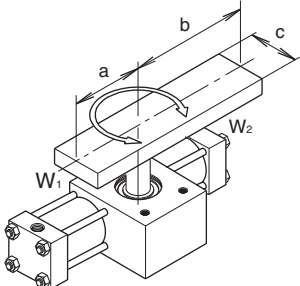
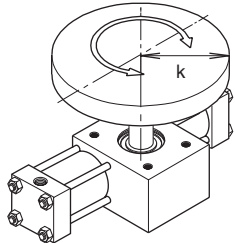
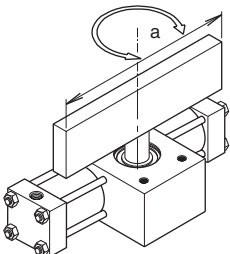
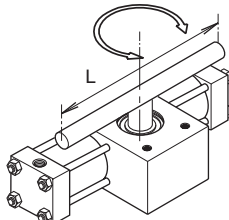
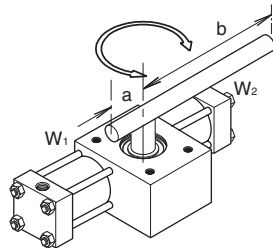
$\omega$  = Peak Velocity (rad/sec) (Assuming twice average velocity)

W = Weight of load (lb)

g = Gravitational constant = 386.4 in/sec<sup>2</sup>

k = Radius of gyration (in)

**Moments of Inertia**

<p><b>POINT LOAD</b></p>  $Jm = \frac{W}{g} \times k^2$	<p><b>SOLID SPHERE -</b>                      Mounted on center</p>  $Jm = \frac{2}{5} \times \frac{W}{g} \times k^2$	<p><b>THIN DISK -</b>                      End mounted on center</p>  $Jm = \frac{W}{g} \times \frac{k^2}{4}$
<p><b>THIN RECTANGULAR PLATE -</b>                      Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{a^2 + b^2}{12}$	<p><b>THIN RECTANGULAR PLATE -</b>                      Mounted off center</p>  $Jm = \frac{W_1}{g} \times \frac{4a^2 + c^2}{12} + \frac{W_2}{g} \times \frac{4b^2 + c^2}{12}$	<p><b>THIN DISK -</b>                      Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{k^2}{2}$
<p><b>THIN RECTANGULAR PLATE -</b>                      End mounted on center</p>  $Jm = \frac{W}{g} \times \frac{a^2}{12}$	<p><b>SLENDER ROD -</b>                      Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{L^2}{12}$	<p><b>SLENDER ROD -</b>                      Mounted off center</p>  $Jm = \frac{W_1}{g} \times \frac{a^2}{3} + \frac{W_2}{g} \times \frac{b^2}{3}$

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

HP Series

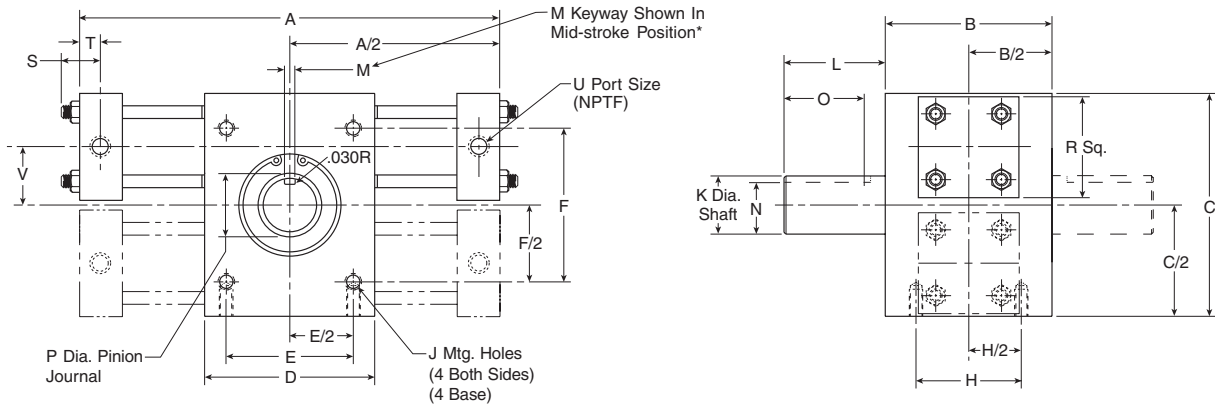
Rotary Actuators Products



Dimensional Data

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

Double Male Keyed Shaft (C) shown in phantom



Model number	Rotation (Degrees)	A	B	C	D	E	F	H	J	K	L	M	N
10	90°	6-11/16											
	180°	8-1/4	2	3	2	1.500	2.000	1.500	1/4-20 x 3/8 DP	0.500 0.499	7/8	0.125 0.127	0.430 0.425
	360°	11-7/16											
15	90°	9-1/8											
	180°	11-3/16	3	4-1/4	3	2.000	3.000	2.000	5/16-18 x 1/2 DP	0.875 0.874	1-7/8	0.188 0.190	0.771 0.761
	360°	15-3/8											
20	90°	11-3/16											
	180°	14-1/16	3	5	4	2.500	3.500	2.000	3/8-16 x 1/2 DP	1.125 1.124	1-7/8	0.250 0.252	0.986
	360°	19-11/16											
25	90°	12-9/16											
	180°	15-1/2	3-1/2	6	4	2.500	4.500	2.000	1/2-13 x 3/4 DP	1.375 1.374	2-1/4	0.313 0.315	1.201 1.191
	360°	20-5/8											
32	90°	16-5/8											
	180°	21-1/8	5	8	5	3.000	5.000	2.500	3/4-10 x 1 DP	1.750 1.749	3-1/2	0.375 0.377	1.542 1.532
	360°	29-3/8											

Model number	O	P	R	S	T	U	V
10	5/8	0.59	1-1/2	1/4	0.31	1/8	3/4
15	1-1/2	0.98	2	5/16	0.41	1/4	1-1/16
20	1-1/2	1.18	2-1/2	3/8	0.41	1/4	1-1/4
25	1-3/4	1.38	3	3/8	0.41	1/4	1-1/2
32	3	1.77	3-3/4	7/16	0.56	3/8	1-15/16

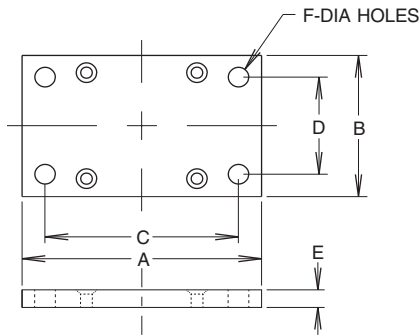
\* To obtain equal rotation both sides of midstroke (theoretical 12:00), order 5° longer rotation than standard with stroke adjusters.



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**Mounting Options (F, G, P, R)**

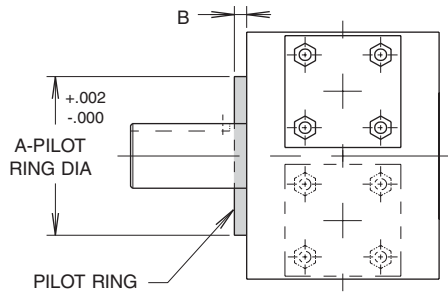
**Foot Flange (G)**



**Note:** Actuators are shipped with mounting flange installed unless otherwise noted.

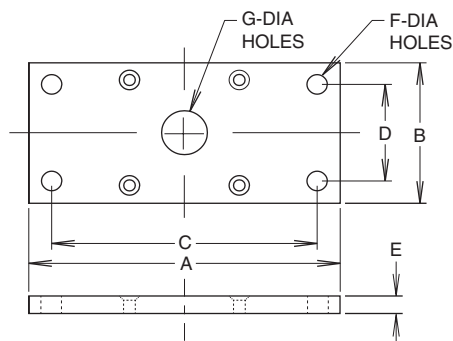
Model	A	B	C	D	E	F
10	3.25	2.00	2.625	1.375	0.250	0.281
15	4.50	3.00	3.875	2.125	0.438	0.406
20	4.50	4.00	3.875	3.375	0.438	0.406
25	5.50	4.00	4.500	3.000	0.438	0.531
32	8.00	5.00	6.500	3.500	0.750	0.781

**Pilot Ring (P)**



Model	A	B
10	1.124	0.125
15	2.000	0.25
20	2.167	0.25
25	2.679	0.25
32	3.348	0.25

**Front Flange (F)**  
**Rear Flange (R)**



Model	A	B	C	D	E	F	G
10	4.25	2.00	3.625	1.375	0.250	0.281	0.625
15	5.75	3.00	5.125	2.125	0.438	0.406	1.000
20	6.50	4.00	5.875	3.375	0.438	0.406	1.250
25	8.25	4.00	7.250	3.000	0.438	0.531	1.625
32	12.00	5.00	10.000	3.000	0.750	0.781	2.000

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

HP Series

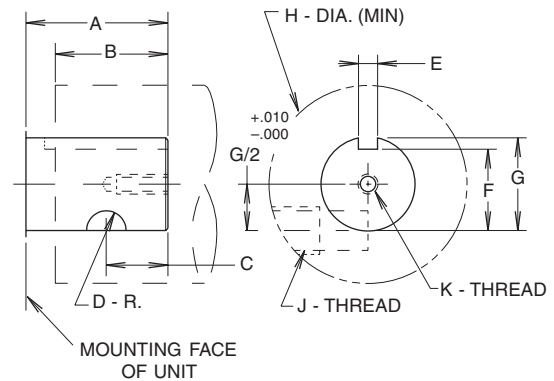
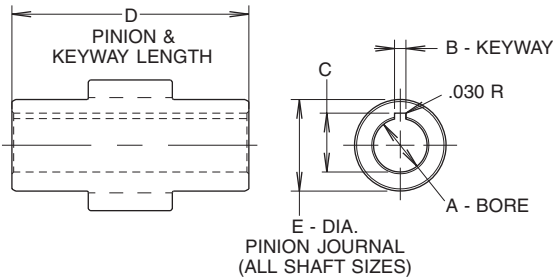
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**H**

Options – Shafts

Shaft Options (C, A, R)

Units are equipped standard with single male keyed shaft (B). Double male keyed (C) also available as shown on page H24. Also available in female keyed and preload keyway options.



**Note:** Female keyed pinion designed primarily for pneumatic service. Review shaft stresses before applying on hydraulic service.

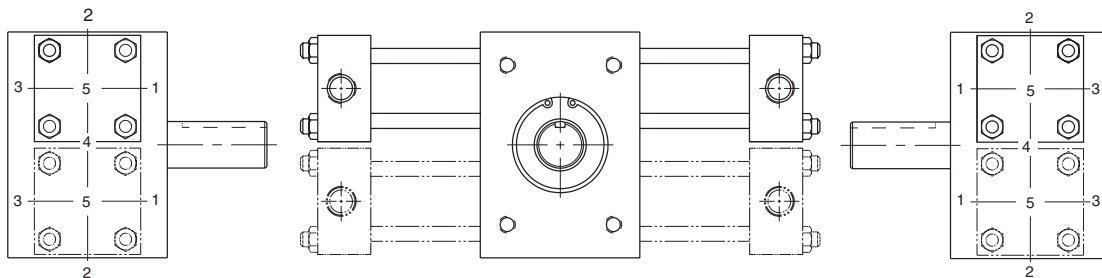
Female Keyed (A)

Model	A	B	C	D	E
10	0.375	0.093	0.417	1-13/32	0.59
	0.377	0.095	0.422		
15	0.500	0.125	0.560	2-11/16	0.98
	0.502	0.127	0.565		
20	0.750	0.187	0.837	2-23/32	1.18
	0.752	0.189	0.847		
25	1.000	0.250	1.083	3-1/8	1.38
	1.002	0.252	1.093		
32	1.250	0.250	1.367	4-9/16	1.77
	1.252	0.252	1.377		

Preload Key (R)

Model	A	B	C	D	E	F	G	H	J	K
10	7/8	5/8	0.375	0.156	0.125	0.430	0.500	1-1/2	3/8-24	10-32 x 3/8 DP
					0.127	0.425	0.499			
15	1-7/8	1-1/2	0.812	0.219	0.188	0.771	0.875	2	1/2-20	5/16-24 x 1/2 DP
					0.190	0.761	0.874			
20	1-7/8	1-1/2	0.812	0.250	0.250	0.986	1.125	3	5/8-11	3/8-24 x 9/16 DP
					0.252	0.976	1.124			
25	2-1/4	1-3/4	1.000	0.250	0.313	1.201	1.375	3-1/2	3/4-10	3/8-24 x 9/16 DP
					0.315	1.191	1.374			
32	3-1/2	3	1.500	0.437	0.375	1.542	1.750	4	1-8	1/2-20 x 3/4 DP
					0.377	1.532	1.749			

Port Size and Location (1, 2, 3, 4)



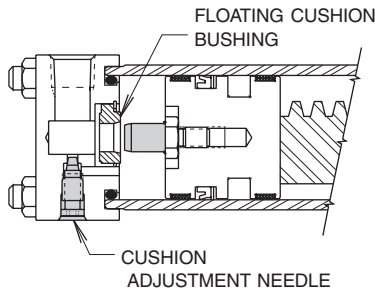
Notes:

- Port position 1 is standard.
- Port positions 2, 3 and 4 are standard options available at no additional cost.
- Port position 4 is for single rack only.
- Port position 5 is not available with cushions or stroke adjusters.

Model	Optional SAE straight thread (1)	Standard NPT (2)
10	7/16 - 20 (SAE 4)	1/8
15	7/16 - 20 (SAE 4)	1/4
20	9/16 - 18 (SAE 6)	1/4
25	9/16 - 18 (SAE 6)	1/4
32	3/4 - 16 (SAE 8)	3/8

**Cushions (1, 2, 3, 4)**

The standard cushions operate over the last 30° of rotation in either or both directions. A floating bushing ensures no binding of the cushion spear. For severe operating conditions, four cushions can be fitted on double rack units. All cushions are fully adjustable. On double rack units, cushions will be located on the upper cylinder.



**Standard Cushion Needle Locations**

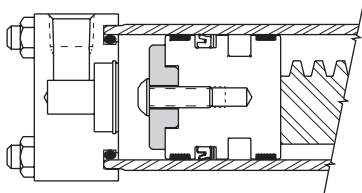
(Reference diagram on previous page)

Port position	Cushion position
1	2
2	3
3	2
4*	3
5	N/A

\*Single Rack only

**Bumpers (5, 6, 7)**

Built-in polyurethane bumper pads absorb shock and noise, thus permitting faster cycle times and increased production rates. Bumpers are available for pneumatic service only.



**Bumper Thickness**

Add the bumper thickness to overall unit length "A" for each bumper specified.

Model	Bumper only	Bumper with stroke adjuster
10	0.13	0.44
15	0.19	0.63
20	0.25	0.75
25	0.25	0.75
32	0.25	1.00

**Notes:**

1. Available with or without stroke adjusters
2. Not available with cushions

PV Series

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PTR Series

B671/F672 Series

HP Series

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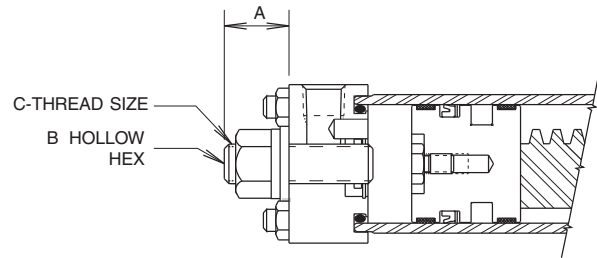
Options – Stroke Adjusters

Stroke Adjusters (D, E, F) 30°

Stroke adjusters will reduce angle of rotation by 30° in either or both directions. Typical applications are for initial set-up purposes where exact rotation cannot be pre-determined or when rotation requirements may change between various operations. Not available with port position 5.

Notes:

- Standard cushions operate over the last 30° of rotation. Stroke adjusters will decrease the effective cushion length by the same amount. For example, reducing the rotation by 5° yields a 25° cushion length. For effective cushions it is recommended that stroke adjustment not exceed 10° when used in conjunction with cushions.
- Maximum unit rotation is equal to rotation specified in model code. Adjusters allow rotational positioning equal to or less than the maximum rotation.
- 30° Stroke Adjusters are available with or without cushions. Double rack units will have cushions on upper rack and adjusters on lower rack. Single rack units with cushions (and double rack units with four cushions) and stroke adjusters will require additional "A" length.
- Antibacklash can be achieved on double rack units with stroke adjusters as long as extra rotation is ordered.
- When ordering cushions and stroke adjusters, the maximum adjustment is 10° per side.



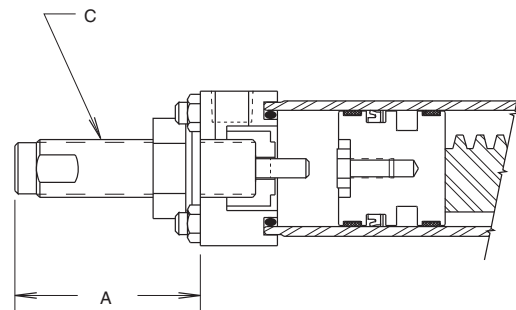
Model	(1) Turn Adj.	30° Adjustment w/o cushioned end cap, A (max)	10° Adjustment w/ cushioned end cap, A (max)	B	C
10	4.0°	0.63	0.38	1/8	1/4-28 UNF
15	4.6°	0.88	1.13	1/4	1/2-20 UNF
20	3.2°	1.13	1.13	1/4	1/2-20 UNF
25	3.2°	1.13	1.18	1/4	1/2-20 UNF
32	2.4°	1.50	2.13	3/8	3/4-16 UNF

Shock / Stroke Adjusters (H, K, L)

Hydraulic shock absorbers reduce noise and allow increased operating speeds and loads while also providing adjustability for end of rotation position. Shocks are fixed orifice self-compensating type and will provide constant deceleration despite changing energy conditions.

Notes:

- Not available on Model 32 or with port position 5.
- This option is not available in combination with the following options:
  - Air/Oil (6)
  - External Air/Oil (Q)
  - Bumpers (5, 6, 7)
  - Cushions (1, 2, 3, 4)
  - Port Flow Controls (P, R, S)
  - End Cap Mounted Proximity Sensors
 (Tie rod mounted reed and Hall effect sensors can be specified.)

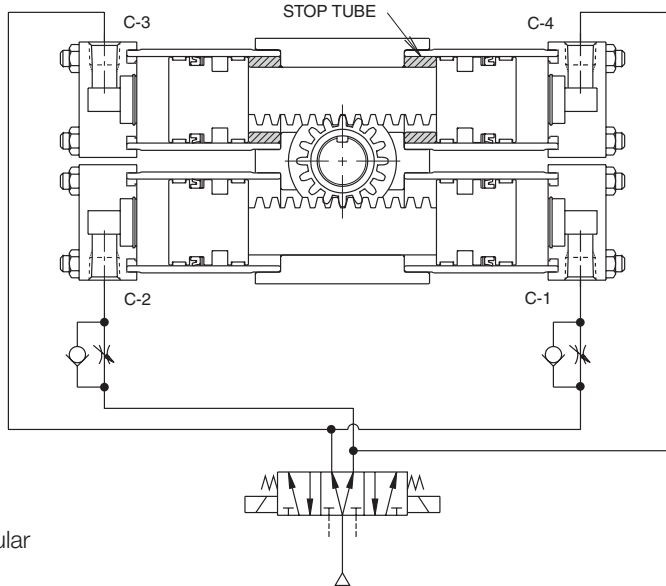
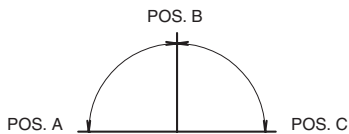


Model	(1) Turn adjustment	A (max)	Max. adjustment	C thread size
10	6°	2.20	110°	9/16 - 18 UNF
15	5°	2.40	80°	3/4 - 16 UNF
20	5°	3.66	130°	1 - 12 UNF
25	5°	3.66	130°	1 - 12 UNF



**Three Position Actuator (3)**

In addition to the standard two position actuators, three position units are also available. All standard options are also available.



**Operation:**

A standard double rack unit is fitted with stop tubes on the upper rack. Pressurizing port C-2 (with ports C-1, C-3 exhausted) causes counter-clockwise pinion rotation to angular position A. Alternately applying pressure to C-1 (with C-2, and C-4 exhausted) will cause clockwise rotation to angular position C. Both positions A and C are at end of stroke, thus typical end cap options such as cushions, bumpers, and stroke adjusters will operate at these positions only.

Position B is obtained by pressurizing all ports. Pressure applied to the upper floating pistons centers the rack between the stop tubes, rotating the pinion to position B. The lower rack is free floating as the forces are equal on both ends.

**Dimensional Data:**

Three position actuator dimensions are identical to the standard double rack units. If stroke adjusters are specified they will be fitted to the upper rack, flow controls and cushions will be on the lower rack. Rotational tolerances are given in the chart at the right.

**Output Torque:**

Output torque of the multiple position actuator is equivalent to the torque output of the same size single rack unit. The chart to the right gives selected torque values for specified pressures.

**Ordering Information:**

Three position actuators can be ordered by inserting a 3 into the “configuration” space in the model code. The desired middle and total rotation should be stated in the model code separated by a “/”. The beginning position, 0°, need not be specified.

For example: **PTR153-045/180F-AB21-C** is a standard pneumatic actuator, three position, with an output torque of 118 lb-in at 100 psi. Position A is 0°, position B is 45°, and position C is 180°. Both positions A and C are adjustable by 30°, as the stroke adjuster option “F” was ordered.

**Rotational Tolerances**

Model	Total rotation, degrees	Between positions, degrees <sup>1</sup>	Backlash, minutes <sup>2</sup>
103	-0, +5	±1	50
153	-0, +4	±1/2	40
203	-0, +3	±1/2	30
253	-0, +2	±1/2	30
323	-0, +2	±1/4	15

1. Measured from centers of backlash.
2. Zero backlash can be achieved at positions A and C by using optional stroke adjusters.

**Theoretical Output Torque (lb-in) at Specified Pressure**

Model	50 psi	100 psi	250 psi
103	19	39	98
153	59	118	294
203	141	282	705
253	215	430	1074
323	570	1141	2852

**Note:** When magnetic piston ring option “M” is ordered, all pistons will be so equipped.

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**Antibacklash Actuator (7)**

An antibacklash actuator is used to obtain precision positioning at the end of rotation. The backlash normally associated with rack and pinion actuators is eliminated by this unique configuration.

**Operation:**

A double rack unit is modified for actuation on one end only. Alternately pressurizing C-1 or C-2 causes clockwise and counter-clockwise rotation, respectively. Backlash in the rack & pinion is eliminated as the pinion is tightly “trapped” between both racks at the end of stroke, preventing any further motion.

**Dimensional Data:**

Antibacklash actuators are similar in size and configuration to standard double rack units with one set of shorter cylinders. The table to the right shows dimensions for this shorter side. If cushions, stroke adjusters or port flow controls are ordered, they will be fitted to the powered rack side.

**Output Torque:**

Output torque of the antibacklash actuator is equivalent to the torque output of the same size single rack unit. The chart to the right gives selected torque valves for specified pressures.

**Ordering Information:**

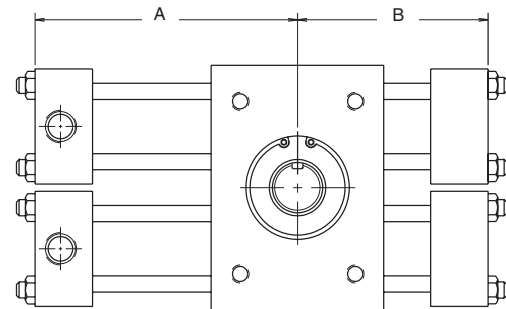
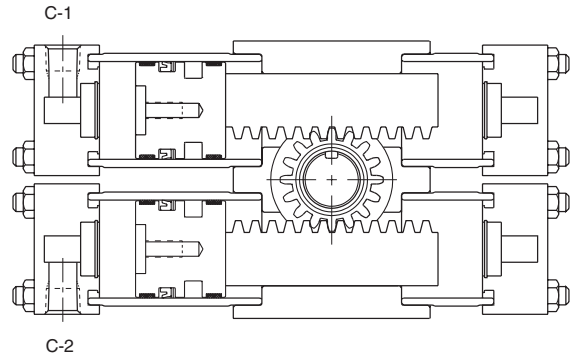
**Theoretical Output Torque, lb-in, at Specified Pressure**

Model	50 psi	100 psi	250 psi
107	19	39	98
157	59	118	294
207	141	282	705
257	215	430	1074
327	570	1141	2852

Antibacklash actuators can be ordered by inserting a “7” into the “configuration” space in the model code. For example: **PTR157-180F-AR21-C** is a pneumatic antibacklash actuator with a theoretical output torque of 118 lb-in at 100 psi.

The optional stroke adjusters make the rotation variable between 120° and 180°. The preload key option on the shaft is also specified to eliminate any backlash in the key and coupling interface.

**Note:** Antibacklash can also be obtained on double rack actuators by implementing stroke adjusters at end of stroke. This will enable you to maintain double rack output torque.

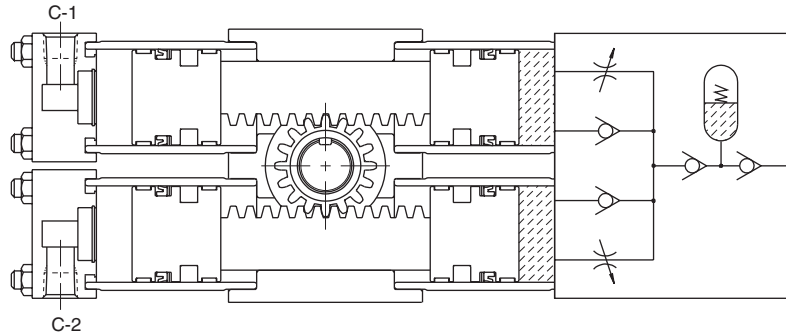


**Dimensions**

Model	Rotation	A	B
107	90°	3-3/4	2-3/4
	180°	4-1/8	3-3/4
	360°	5-3/4	5
157	90°	4-9/16	3-5/16
	180°	5-5/8	4-9/16
	360°	7-11/16	6-5/8
207	90°	5-5/8	4-1/8
	180°	7-1/16	5-5/8
	360°	9-7/8	8-1/2
257	90°	6-5/16	4-3/8
	180°	7-3/4	6-5/16
	360°	10-5/16	8-13/16
327	90°	8-5/16	5-13/16
	180°	10-9/16	8-5/16
	360°	14-11/16	12-7/16

**Self-Contained Tandem Air / Oil Operation (6)**

The Air-Oil Tandem actuator allows precise speed and motion control using standard pneumatic controls. This is possible through the use of a completely sealed oil system which effectively meters and controls actuator movement with no slipping, jerking, or bouncing.



**Operation:**

A standard double rack unit is equipped with a built in hydraulic reservoir and flow controls. Air pressure is alternately applied to ports C-2 and C-1 to cause rotation in either direction. As oil is displaced from the opposite end of the drive rack it is metered precisely by the needle valve. A check valve allows free flow in the opposite direction so that independent speeds for rotation can be set.

The reservoir is directly attached to the actuator, eliminating plumbing and leakage paths. It is spring loaded to compensate for oil volume changes due to temperature variations and has built in fill port.

**Dimensional Data:**

Air / Oil Actuators are identical in size and configuration to standard double rack units, with the addition of the integral reservoir as shown.

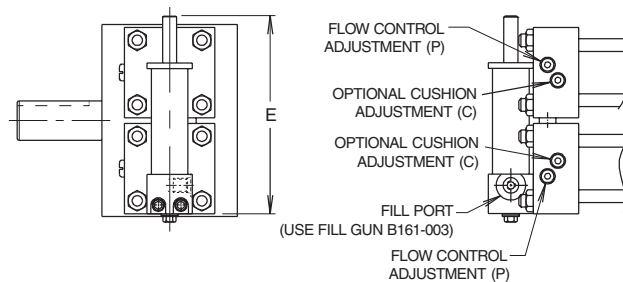
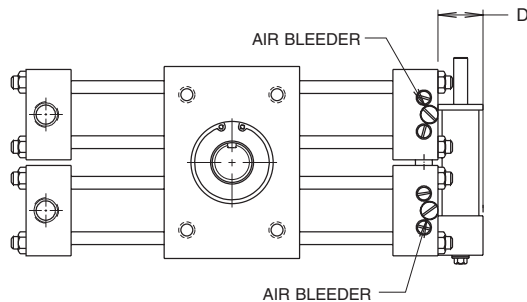
**Output Torque:**

Theoretical output torques are shown in the table below. For design and sizing purposes an actuator should be selected with 20%-50% reserve capacity.

For maximum speed of the Air/Oil actuators please consult the factory or local representative.

**Ordering Information:**

Air / Oil Tandem actuators can be ordered by placing a “6” into the “configuration” space in the model code. All Air / Oil Tandem actuators include as standard port flow controls and Quad-ring piston seals (oil side only), thus it is not necessary to include a “P” and/or “Q” in the model code. Other options, such as cushions, stroke adjusters and magnetic piston ring are also available. For example: **PTR206-180F-AB21-C** is a standard Air/Oil actuator, with a theoretical output torque of 282 lb-in at 100 psi. Rotation of the unit is 180°, with optional cushions and stroke adjusters.



**Dimensions**

Model	D	E
106	1.00	3.63
156	1.00	4.38
206	1.25	4.91
256	1.25	4.91
326	1.25	6.29

**Note:** When magnetic piston ring option “M” is ordered, only the pneumatic pistons will be so equipped.

**Theoretical Output Torque, lb-in, at Specified Pressure**

Model	50 psi	100 psi	250 psi
106	19	39	98
156	59	118	294
206	141	282	705
256	215	430	1074
326	570	1141	2852



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

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**Options**

**Rotary Actuators  
PTR Series**

**External Air / Oil Operation (Q)**

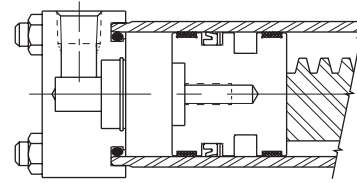
The External Air/Oil actuator allows for connection to a separate air over oil control system. It can also be used for low pressure (less than 150 psi) non-shock hydraulic systems.

**Operation:**

A standard pneumatic rotary actuator is equipped with special piston seals for all pistons to ensure low breakaway pressure and no leakage. This allows smooth, jerk-free operation, even at very low pressures.

**Output Torque:**

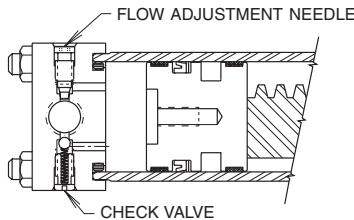
Theoretical output torques are identical to the ones given at the beginning of the PTR section. For design and sizing purposes, an actuator should be selected with 20% - 50% reserve capacity.



**NOTE:** When cushions are specified, the actuator will be equipped with bronze cushion bushings in place of the standard nitrile cushion bushings.

**Port Flow Controls (P, R, S)**

Built in meter-out flow controls provide precise adjustment of actuator speed and eliminate the cost and space of externally plumbed components. A separate ball check is used to provide free flow in the opposite direction. Flow controls may be ordered in conjunction with cushions, bumpers, or stroke adjusters.



**Standard Adjustment Needle Locations**

Port Position	Needle Position
1	2
2	3
3	2
4*	3

\* Single rack only

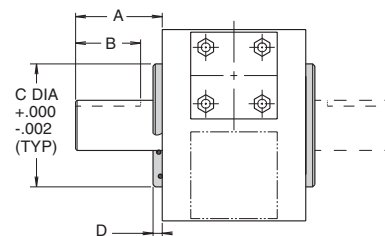
**Note:** When both cushions and port flow controls are specified they will be stamped "C" and "P" respectively.

**Shaft Seal Covers (S)**

Shaft seal covers are designed to prolong bearing life by isolating them from external contamination and pressure. They are designed for use with standard male shafts only (not hollow shafts).

**Specifications**

- Max. Pressure Differential: 500 psi
- Material: Anodized Aluminum
- Shaft Seal: Double Lip Wiper
- Body Seal: O-Ring



Model	A	B	C	D
10	7/8	1/2	1.875	0.25
15	1-7/8	1-5/16	3.000	0.38
20	1-7/8	1-5/16	3.250	0.38
25	2-1/4	1-5/8	3.625	0.38
32	3-1/2	2-7/8	4.480	0.38

**Fluorocarbon Seals (V)**

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

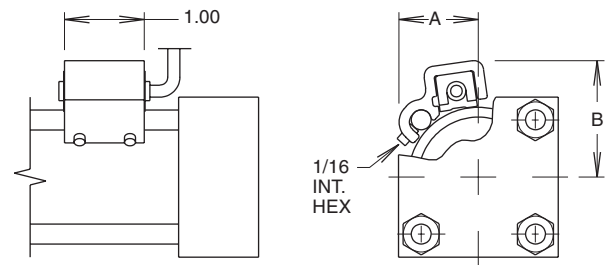
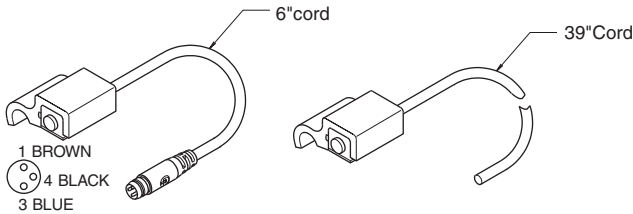
Option	Temperature range (°F)
Shock Absorbers	32 - 150
Bumpers	0 - 200
Piston Magnets	0 - 165
Proximity Sensors	-4 - 150
Reed/Hall Effect Sensors	14 - 140



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**Magnetic Piston (M)**

This option prepares the actuator for use with reed and Hall effect sensors. The “M” option should be provided to provide a magnet on the cylinder piston. Order sensors separately from the Electronic Sensors section.



Model	A	B
10	0.84	1.22
15	0.99	1.46
20	1.27	1.68
25	1.45	1.89
32	1.71	2.20

**Proximity Sensors**

**(Namco Cylinders or Balluff Cylinder Indicator Sensor)**

The inductive type proximity sensor provides end of rotation indication. The non-contact probe senses the presence of the ferrous cushion spear and has no springs, plungers, cams or dynamic seals that can wear out or go out of adjustment. The sensor is solid state and meets NEMA 1, 12 & 13 specifications. For ease of wiring the connector housing is rotatable through 360°. To rotate, lift the cover latch, position and release.

The sensor make/break activation point may occur at 0.125" to ±0.125" from the end of stroke. Depending on the actuator size, this distance may cause activation at 2° to 15° from end of stroke.

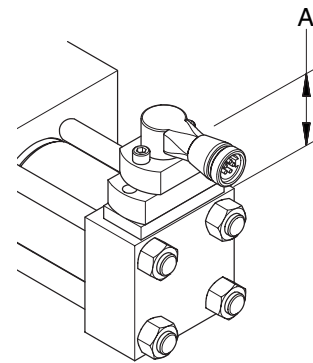
The standard proximity sensor controls 50-230 VAC/DC loads from 5 to 500 mA. The low 1.7 mA off-state leakage current can allow use for direct PLC input. The standard short circuit protection (SCP) protects the sensor from a short in the load or line upon sensing such a condition (5 amp or greater current) by assuming a non-conductive mode. The fault condition must be corrected and the power removed to reset the sensor preventing automatic restarts.

The low voltage DC sensor is also available for use with 10-30 VDC. The sensor is in a non-rotatable housing, but does incorporate the short circuit protection.

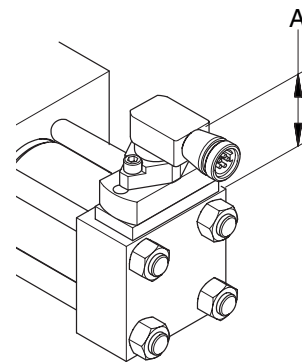
Both sensors are equipped with two LEDs, “Ready” and “Target”. The “Ready” LED is lit when power is applied and the cushion spear is not present. The “Target” LED will light and the “Ready” LED will go out when the sensor is closed, indicating the presence of the cushion spear. Both LEDs flashing indicates a short circuit condition.

**NOTES:**

1. Available with or without cushions.
2. Not available with stroke adjusters.
3. Pressure rating: 3000 psi
4. Operating temperature: -4°F to 158°F
5. Specify sensor type, orientation and voltage when ordering.
6. The low voltage DC sensor is available in non-rotatable style only; consult factory for further information.



EPS-6



EPS-7

Model	A
	EPS-6 & 7
15	2.17
20	2.75
25	2.48
32	2.25

Order proximity sensors separately. See Electronic Sensors section for specifications and ordering information.



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

Features

B671 / F672 Series

PV Series
PRN(A) Series
PTR Series
B671/F672 Series
HP Series
Rotary Actuators Products
<b>H</b>

**BEARINGS**

High quality bronze bearings reduce friction and Break-away pressure while providing substantial pinion support.

**KEYWAY**

At 12:00 position of mid-stroke of actuator.

**PISTON SEALS**

Low friction lipseals are fully dynamic and self-compensating for no-leak service and long life at all operating pressures.

**END CAPS**

Precision machined from cold rolled steel to exacting NFPA specifications, then black oxide coated for greater reliability and durability.

**PORTS**

Full area ports provide unrestricted flow for maximum operating speeds.

**OPTIONAL CUSHIONS**

Provide maximum performance and reduced shock in all applications. The floating polyurethane cushion seal provides maximum sealing effectiveness as the spear enters the cushion, yet allows fast "out-stroke" action by functioning as a springless check valve. Full adjustment of the cushion is obtained by the flush mounted adjustment needle.

**RACK & PINION**

Chromium alloy steel with flame hardening ensures maximum shock resistance and strength of the rack & pinion.

**HOUSING**

A high strength aluminum housing is hard anodized for superior wear and corrosion resistance.

**CYLINDER**

Precision finished aluminum alloy tubing is hard anodized for maximum wear resistance and long seal life.

**SIDE TAPPED**

Mounting Holes  
Front and rear heads

**FEMALE SHAFT**

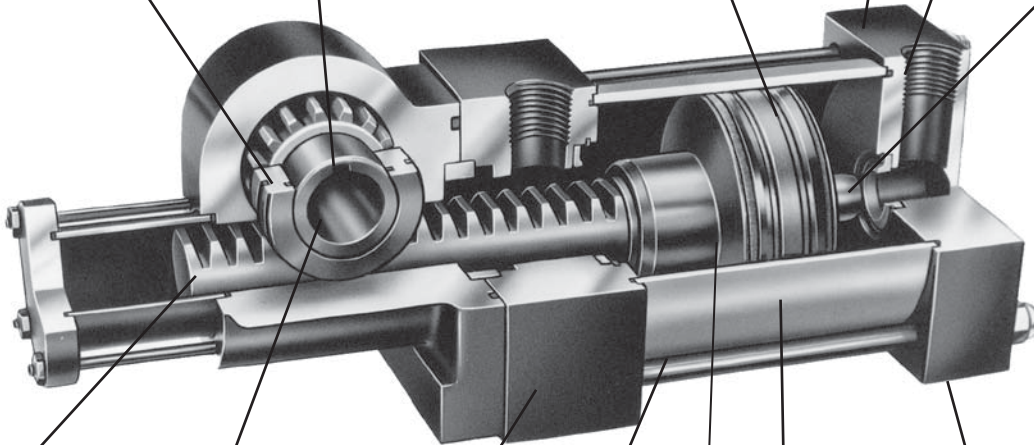
Designed for direct, on-shaft installation, eliminating the need or couplings and other connections.

**TIE RODS**

High tensile steel has precision rolled threads and black oxide coating for greater strength and fatigue resistance.

**PISTONS**

Are one piece steel for high strength and piloted to the rack assembly to ensure concentricity. A nonmetallic wear strip is employed to provide a non-scoring bearing surface. This high quality assembly eliminates friction, wear and galling while providing smooth operation.





**Features**

- Standard Rotations: 90°, 180°, 360°
- Output Torque @ 100 psi: 100 lb-in to 2500 lb-in
- Maximum Break-away Pressure: 10 psi
- Mounting Orientation: Unrestricted
- Leakage: External: 0 cfm  
Internal: 0 cfm
- Theoretical Timing: Keyway located at 12:00 position at mid-stroke position of actuator

**B671 Series**

The B671 Pneumatic Rotary Actuator is designed to provide force in a reciprocating, rotational motion. It is ideal for any application requiring constant torque through a rotational distance: rotating or lifting heavy objects, positioning or bending operations.

**F672 Series**

The F672 utilizes the same high quality construction found on the B671 Series with the addition of a coupling arrangement for a Hydro-Check. An F672 / Hydro-Check assembly will provide controlled feed rates and excellent rotational control with pneumatic power through adjustable hydraulic resistance.

**B671 / F672 Series**

Pneumatic Rotary Actuator can be powered by shop air or inert gas. The actuators are pre-lubricated at assembly with NLG1 grade 2 grease with outstanding oxidation stability and corrosion resistant additives. This pre-lubrication is intended for use in pneumatic systems where airline lubrication is not used. However, to assure maximum service life of the cylinder, the air supply should be properly filtered and moisture free.

The pneumatic rotary actuator can be controlled by any conventional 4-way valve - hand, foot, mechanically or electrically controlled. All four sizes of rotary actuators are designed for direct on-shaft installation - no flexible couplings, cam and roller or chain and sprocket combinations are required.

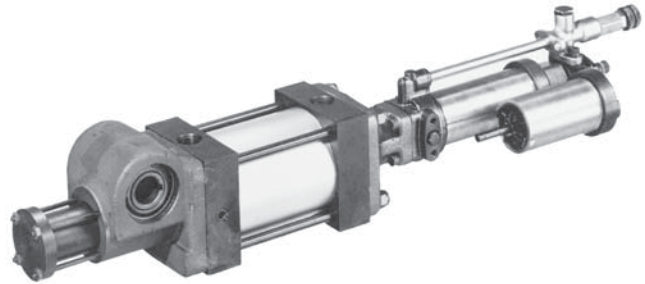
**B671 / F672 Series Cushion Option**

The standard cushions operate at the end of rotation to decelerate the actuator. A floating polyurethane cushion seal provides maximum sealing effectiveness going into the cushion. This durable material ensures millions of trouble free cycles with no wear. The cushion seal also acts as a check valve, allowing full air flow around the seal during outstroke, providing excellent break-away. Cushions, when so ordered, are installed both directions. They are available on both the B671 and F672 Series.

**Operating information**

Operating pressure (max):	140 PSIG (9.65 bar)
Temperature range:	0°F to 180°F (-17°C to 82°C)

**Hydro-Check Combination**



The Rotary Actuator/Hydro-Check combination consists of the F672 Series Actuator axially linked to an F172-2 or F172-3 Series Hydro-Check. The Hydro-Check is a precision built adjustable hydraulic resistance unit designed to provide controlled feed rates. When coupled to an actuator, excellent rotational control is attained.

The Rotary Actuator / Hydro-Check combination provides consistent torque with adjustable hydraulic resistance for a smooth controlled rotational feed rate. Axial coupling of these units eliminates eccentric loading of component parts.

These actuators are available in three torque ranges to comply with varying load requirements. The Hydro-Check is capable of checking axial loads to 3,000 lbs. and is available with many controlling options (see Ordering Information). For information on Hydro-Checks not shown in this catalog, consult factory.

**Quick Reference Data**

Model	Cylinder bore (in)	Actual output torque (lb-in) versus specified pressure (PSI)				Displacement per degree rotation (in3/°)	Maximum angular backlash (minutes)	Maximum rotational tolerance (°)
		50	75	100	125			
1	1-1/2	50	75	100	125	0.021	40	-0, +5
2	3-1/4	250	375	500	625	0.116	40	-0, +4
3	4	500	750	1000	1250	0.219	40	-0, +3
4	5	1250	1875	2500	3125	0.514	30	-0, +2

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

HP Series

Rotary Actuators Products



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

Ordering Information

PV Series  
PRN(A) Series  
PTR Series  
B671/F672 Series  
HP Series  
Rotary Actuators Products

B671 / F672 Series Ordering Information

B671
2
20
D

Series		Cushions	
<b>B671</b>	Pneumatic rotary actuator	<b>5</b>	No cushions
<b>F672</b>	Pneumatic rotary actuator with hydro-check mounting interface	<b>8</b>	Cushions both rotations

Torque Output in in-lb @ 100 PSI		Degrees Rotation	
<b>1</b>	100 *	<b>10</b>	90°
<b>2</b>	500	<b>20</b>	180°
<b>3</b>	1000	<b>30</b>	360°
<b>4</b>	2500		

\* 100 lb-in size unit not available for F672 series

F172 Inline Hydro-Check Ordering Information  
For Use with F672 Rotary Actuator

F172
-
20
10
3

Hydro-Check Inline Assembly

Checking Action	
<b>20</b>	Single Acting
<b>30</b>	Double Acting

Stroke  
(see stroke table)

<b>1</b>	2 in.
<b>2</b>	4 in.
<b>3</b>	6 in.
<b>4</b>	9 in.
<b>5</b>	12 in.

Hydro-Check Valve Options Single Acting		Hydro-Check Valve Options Double Acting	
<b>01</b>	Standard	<b>01</b>	Standard
<b>02</b>	Standard reverse acting	<b>36</b>	Stop & Skip
<b>11</b>	Stop & skip forward acting	<b>37</b>	Precision
<b>12</b>	Stop & skip reverse acting	<b>52</b>	Precision with stop & skip
<b>13</b>	Precision		
<b>14</b>	Precision reverse acting		

**Hydro-Check Stroke Table**

Model	Nominal Torque Output (lb-in)	Rotation Range (°)	Hydro-Check Stroke Required (in)
2	500	30-140	2
		141-284	4
		285-360	6
3	1000	30-112	2
		113-227	4
		228-341	6
		342-360	9
4	2500	30-74	2
		75-151	4
		152-227	6
		228-342	9
		343-360	12

- Notes:**
- Hydro-Check must be ordered separately.
  - When both Actuator and Hydro-Check are ordered from Actuator Division, they will be assembled together.
  - Specify voltage with stop and skip function - 12, 115, 220 or 440 VAC.
  - For availability of other Hydro-Check options not listed here, please consult factory.

Service Kits – B671 / F672 \*

Actuator size (cushioned or non-cushioned)	Seal kit number
100 lb-in	<b>B732904</b>
500 lb-in	<b>B732905</b>
1,000 lb-in	<b>B732906</b>
2,500 lb-in	<b>B732907</b>

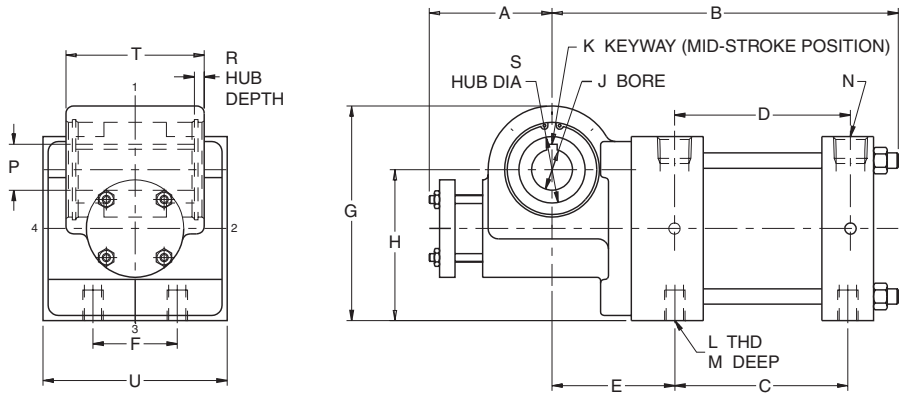
\* Does not include Hydro-Check seal kit.



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

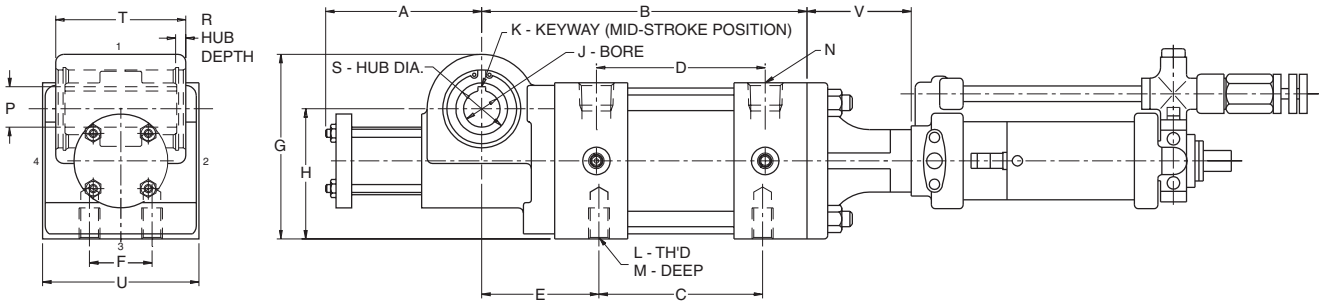


**B671 Series**



Model	Rotation	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	
1	90°	2.16	6.45	3.36	3.42															
	180°	3.35	7.53	4.44	4.50	2.19	0.62	2.94	1.92	0.500	0.12 x	1/4-20	0.38	3/8	0.560	0.16	1.00	1.69	2.00	
	360°	5.35	9.68	6.60	6.66					0.502	1.31				0.570					
2	90°	2.50	7.95	3.92	3.99															
	180°	3.75	9.21	5.17	5.25	2.81	1.50	4.44	3.12	0.875	0.19 x	1/2-13	0.75	1/2	0.964	0.22	1.25	3.12	3.75	
	360°	6.25	11.72	7.69	7.76					0.877	2.62				0.974					
3	90°	3.00	8.46	4.23	4.30															
	180°	4.56	10.03	5.80	5.87	3.00	2.06	5.25	3.69	1.000	0.25 x	1/2-13	0.75	1/2	1.117	0.24	1.62	3.38	4.50	
	360°	7.96	13.17	8.94	9.01					1.002	2.88				1.127					
4	90°	3.56	10.51	5.28	5.35															
	180°	5.75	12.87	7.63	7.71	3.88	2.69	6.88	4.75	1.500	0.38 x	5/8-11	0.94	1/2	1.668	0.31	2.50	4.12	5.50	
	360°	10.75	17.58	12.34	12.42					1.502	3.50				1.678					

**F672 Series**



**F672 Actuator with Hydro-check**

Model	Rotation	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
2	90°	2.50	7.80	3.92	4.05															
	180°	3.75	9.06	5.17	5.31	2.81	1.50	4.44	3.12	0.875	0.19 x	1/2-13	0.75	1/2	0.964	0.22	1.25	3.12	3.75	2.50
	360°	6.25	11.57	7.69	7.82						0.877	2.62			0.974					
3	90°	3.00	8.30	4.23	4.36															
	180°	4.56	9.87	5.80	5.93	3.00	2.06	5.25	3.69	1.000	0.25 x	1/2-13	0.75	1/2	1.117	0.24	1.62	3.38	4.50	2.50
	360°	7.96	13.01	8.94	9.07						1.002	2.88			1.127					
4	90°	3.56	10.22	5.28	5.41															
	180°	5.75	12.58	7.63	7.77	3.88	2.69	6.88	4.75	1.500	0.38 x	5/8-11	0.94	1/2	1.668	0.31	2.50	4.12	5.50	2.50
	360°	10.75	17.29	12.34	12.48						1.502	3.50			1.678					



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

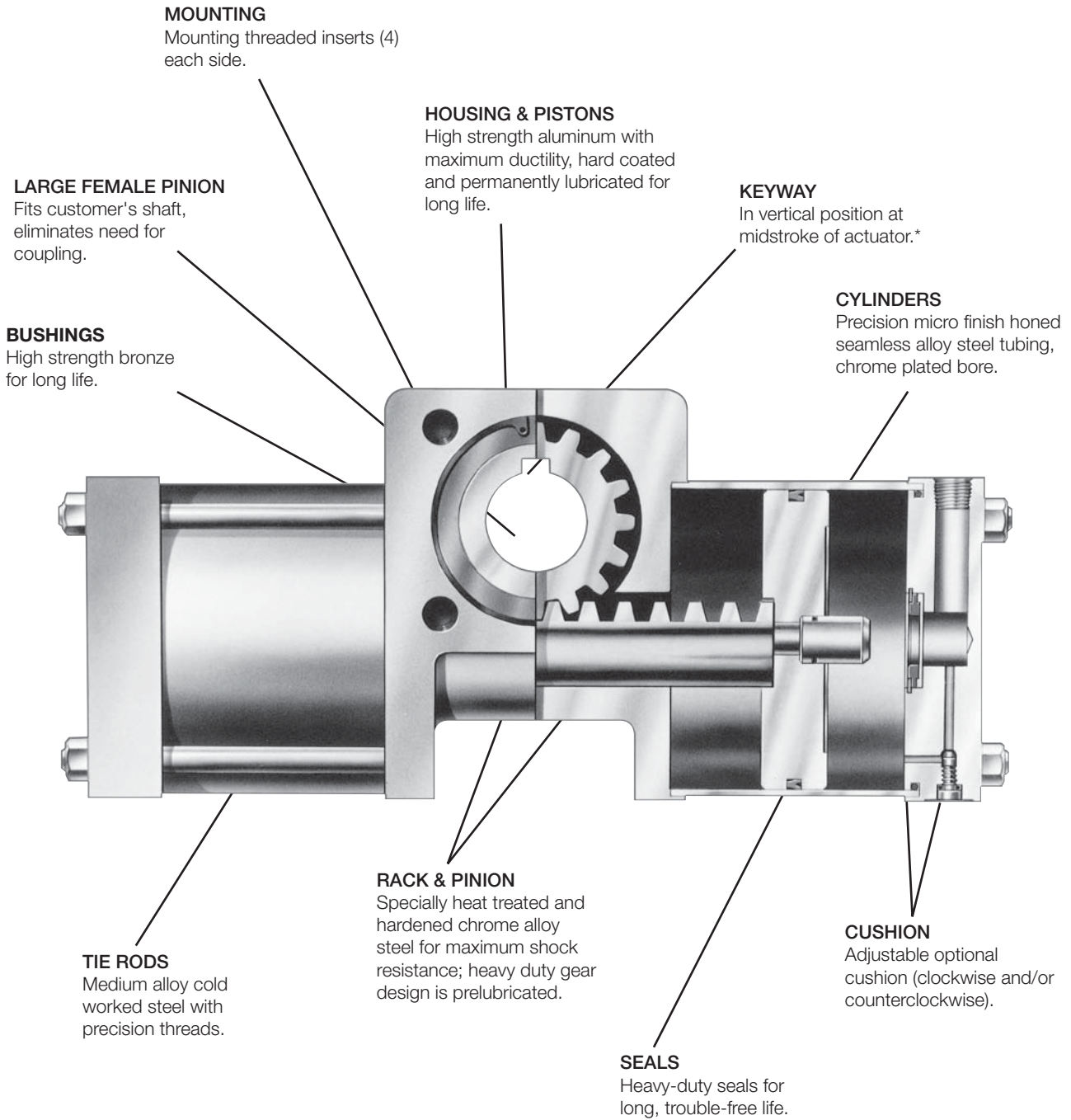
PV Series  
 PRN(A) Series  
 PTR Series  
 B671/F672 Series  
 HP Series  
 Rotary Actuators Products



Features

HP Series

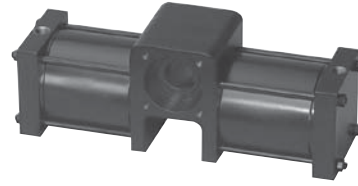
PV Series
PRN(A) Series
PTR Series
B671/F672 Series
HP Series
Rotary Actuators Products
<b>H</b>



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**Features**

- Rack and pinion rotary actuator
- 2 large bore models
- 3 standard rotations: 90°, 180°, 360°
- Standard output torque at 100 PSIG: 4,500 and 10,000 lb-in
- Large female pinion
- Available with adjustable cushions and stroke adjusters



**Operating information**

Operating pressure:	100 PSIG (6.9 bar)
Temperature range:	
Nitrile seals	0°F to 180°F (-18° to 82°C)
Fluorocarbon seals	0°F to 250°F (-18° to 121°C)
Filtration requirements:	40 micron, dry filtered air

**Ordering information**

**HP 10 - 090 3 C - A A 2 V -**

Model	
4.5	4,500 lb-in output torque
10	10,000 lb-in output torque

Rotation <sup>1</sup>	
090	90°
180	180°
360	360°

Specify other rotations.

Cushions	
Omit	None
1	CW rotation <sup>2</sup>
2	CCW rotation <sup>2</sup>
3	Both rotation
9	Special

Stroke adjusters	
Omit	None
A	0-5° CW rotation <sup>2</sup>
B	0-5° CCW rotation <sup>2</sup>
C	0-5° both rotation
D	0-30° CW rotation <sup>2,3</sup>
E	0-30° CCW rotation <sup>2,3</sup>
F	0-30° both rotation <sup>3</sup>
X	Special

Special options	
Omit	Standard
Two digit code assigned by factory when any "X" or "9" appears in the model number or when special options or features are required.	

Seals	
Omit	Nitrile (standard)
V	Fluorocarbon
X	Special

Port type	
2	NPTF (standard)
9	Special

Shaft configuration	
A	Female keyed shaft
B	Male keyed shaft
D	Female SAE 10B spline
E	Male SAE 10B spline
X	Special

Mounting style	
A	Face (standard)
X	Special

**Notes:**

<sup>1</sup> To obtain equal rotation both sides of midstroke (theoretical 12:00), order 5° longer rotation than standard with stroke adjusters.

<sup>2</sup> Viewed from shaft end.

<sup>3</sup> Cannot combine with cushions.

Sensors	
See section L for sensors.	

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

HP Series

Rotary Actuators Products



Specifications

PV Series  
PRN(A) Series  
PTR Series  
B671/F672 Series  
HP Series  
Rotary Actuators Products

Quick reference data

Model	Rotation* (Degrees)	Displacement (Cubic inches)	Weight (lb)	Bore size	Actual torque output at 100 psi (lb-in)	Maximum rotational tolerance (degrees)	Maximum angular backlash (minutes)
4.5	90°	79.93	63	6"	4,500	-0, +2	15
	180°	159.86	75				
	360°	319.72	95				
10	90°	177.64	125	8"	10,000	-0, +2	15
	180°	355.28	147				
	360°	710.56	190				

\* To obtain equal rotation both sides of midstroke (theoretical 12:00), order 5° longer rotation than standard with stroke adjusters.

Bearing load capacities and kinetic energy ratings

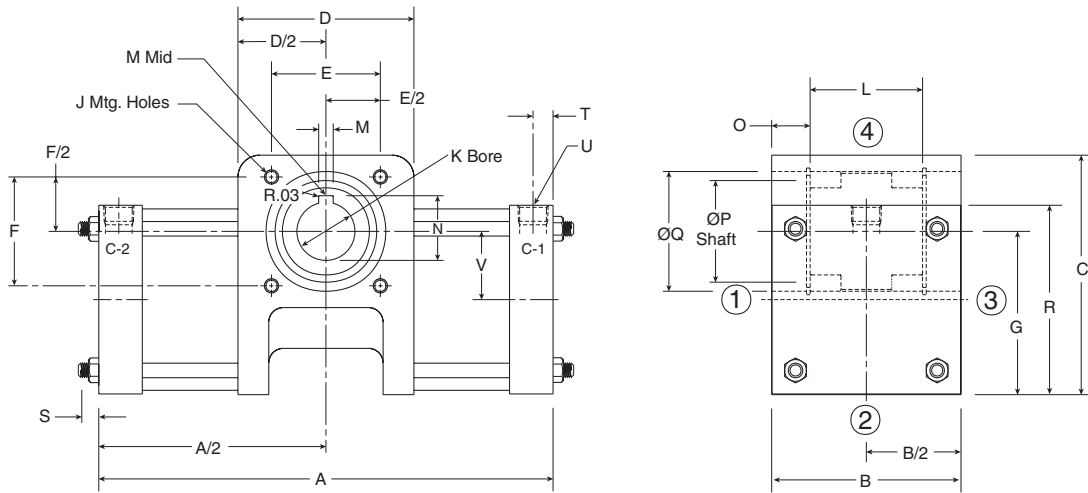
Model	Radial load (lb) per bearing		Thrust load (lb)		Distance between bearings (in.)	Maximum kinetic energy rating for models based on configuration (in-lb)		
	Dynamic	Static	Dynamic	Static		Standard	Stroke adjusters	Cushion
4.5	2,000	3,000	300	450	2.77	45	45	650
10	2,000	3,000	500	750	3.63	100	100	1,450

Seal kit ordering information

- Standard units are equipped with Nitrile seals.
- Optional seal compounds are available.
- Seal kit part numbers as shown:

<b>PSK</b>	—	<b>HP4.5</b>	<b>V</b>	
Parker seal kit		Base model	Omit	Standard
			V	Fluorocarbon
			N	Non-Lube

**Standard face mount (A) and female keyed shaft (A) shown**



**Notes:** Pressure on C-1 port gives clockwise rotation.  
 Pressure on C-2 port gives counterclockwise rotation.

Numbers above represent possible mounting and port positions.

Model	Rotation (Degrees)	A	B	C	D	E	F	G	J	K
4.5	90°	15-5/8								
	180°	22-1/4	6.525	8-1/4	6.063	3.750	3.750	5.615	7/16-14 x 21/32 DP	2.000
	360°	33								2.003
10	90°	18								
	180°	26-3/4	8.525	10-1/2	7.813	5.000	5.000	7.265	5/8-11 x 15/16 DP	2.250
	360°	39-5/8								2.253

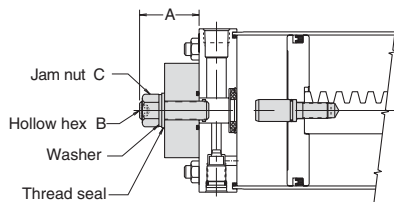
Mode	L	M	N	O	P	Q	R	S	T	U	V
4.5	3-7/8	0.500	2.223	1-5/16	3-1/2	4-1/8	6-1/2	5/8	0.69	3/4 NPTF	2.35
		0.502	2.233								
10	5	0.625	2.525	1-3/4	4-1/2	5-1/4	8-1/2	3/4	0.69	3/4 NPTF	3.00
		0.628	2.535								

PV Series  
 PRN(A) Series  
 PTR Series  
 B671/F672 Series  
 HP Series  
 Rotary Actuators Products

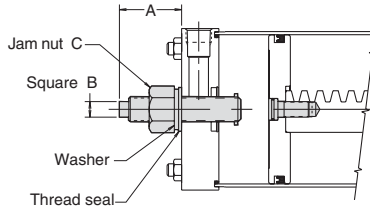


**Stroke Adjusters (A - F)**

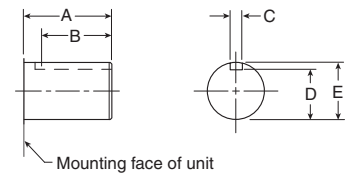
5° stroke adjust option with cushion option



5° or 30° stroke adjust option without cushion option



**Male Shaft (B)**



Model	A	B
4.5	2.61	2.38
10	4.38	3.38

Model	C	D	E
4.5	0.561	1.928	2.249
	0.562	1.933	2.250
10	0.625	1.888	2.249
	0.627	1.893	2.250

**Cushioned end cap**

Model	(1) Turn Adjust	A			B				
		A	B	C	(1) Turn Adjust	5°	30°	C	
4.5	2.5°	2.50	5/8	1.00-14	2.0°	2.00	2.81	3/8	3/4-16
10	2.0°	2.50	15/16	1.50-12	1.5°	2.56	3.50	15/16	1-1/2-12

**Non-cushioned end cap**

Model	(1) Turn Adjust	A			B				
		A	B	C	(1) Turn Adjust	5°	30°	C	
4.5	2.5°	2.50	5/8	1.00-14	2.0°	2.00	2.81	3/8	3/4-16
10	2.0°	2.50	15/16	1.50-12	1.5°	2.56	3.50	15/16	1-1/2-12



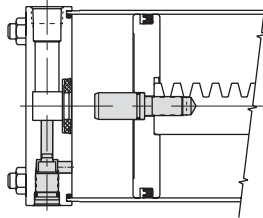
For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**Options**

PV Series  
 PRN(A) Series  
 PTR Series  
 B671/F672 Series  
 HP Series  
 Rotary Actuators Products

**Cushions (1, 2, 3)**

The standard cushions operate over the last 20° of rotation in either direction. A floating bushing ensures no binding of cushion spear. All cushions are fully adjustable and are located on the side opposite the port. For other cushion locations specify "9" and describe.



**Proximity Sensors**

**(Namco Cylinders or Balluff Cylinder Indicator Sensor)**

The inductive type proximity sensor provides end of rotation indication. The non-contact probe senses the presence of the ferrous cushion spear and has no springs, plungers, cams or dynamic seals that can wear out or go out of adjustment. The sensor is solid state and meets NEMA 1, 12 & 13 specifications. For ease of wiring the connector housing is rotatable through 360°. To rotate, lift the cover latch, position and release.

The sensor make/break activation point may occur at 0.125" to ±0.125" from the end of stroke. Depending on the actuator size, this distance may cause activation at 2° to 15° from end of stroke.

The standard proximity sensor controls 50-230 VAC/DC loads from 5 to 500 mA. The low 1.7 mA off-state leakage current can allow use for direct PLC input. The standard short circuit protection (SCP) protects the sensor from a short in the load or line upon sensing such a condition (5 amp or greater current) by assuming a non-conductive mode. The fault condition must be corrected and the power removed to reset the sensor preventing automatic restarts.

The low voltage DC sensor is also available for use with 10-30 VDC. The sensor is in a non-rotatable housing, but does incorporate the short circuit protection.

Both sensors are equipped with two LEDs, "Ready" and "Target". The "Ready" LED is lit when power is applied and the cushion spear is not present. The "Target" LED will light and the "Ready" LED will go out when the sensor is closed, indicating the presence of the cushion spear. Both LEDs flashing indicates a short circuit condition.

**NOTES:**

1. Available with or without cushions.
2. Not available with stroke adjusters.
3. Pressure rating: 3000 psi
4. Operating temperature: -4°F to 158°F
5. Specify sensor type, orientation and voltage when ordering.
6. The low voltage DC sensor is available in non-rotatable style only; consult factory for further information.

**Rotary Actuators  
 HP Series**

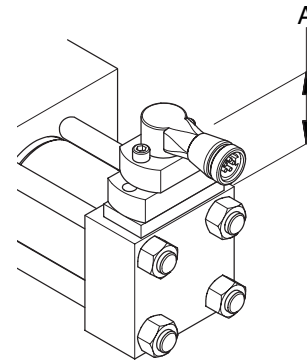
**Additional Shaft Options (D, E)**

Hollowed key shaft is standard. Additional shaft options available are available as a special. Consult factory for information.

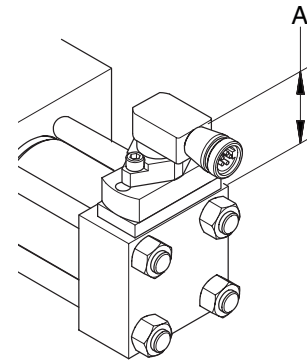
- Male splined (E)
- Female splined (D)

**Fluorocarbon Seals (V)**

Standard 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.



**EPS-6**



**EPS-7**

Model	A (max)
	EPS-6 & 7
4.5	1.59
10	2.28

**Order proximity sensors separately. See Electronic Sensors section for specifications and ordering information.**



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)