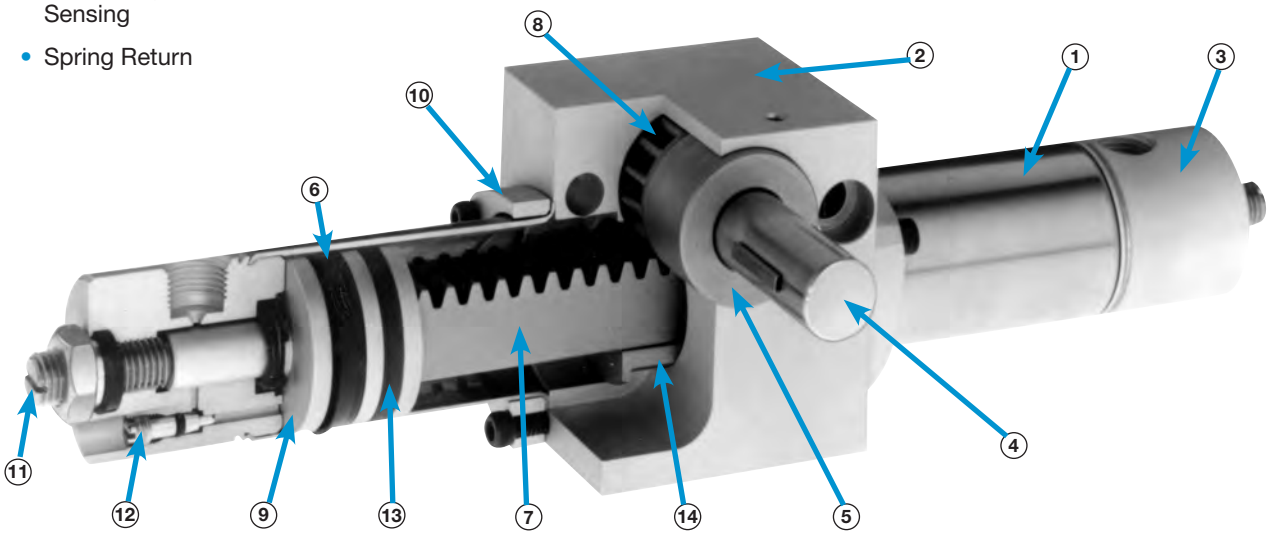
Pneu-Turn Rotary Actuators

Bimba Pneu-Turn Rotary Actuators

TURN TO THE BIMBA PNEU-TURN® ROTARY ACTUATOR FOR THESE QUALITY FEATURES AT A LOWER COST:

The Bimba Pneu-Turn Rotary Actuator is available with these catalog options:

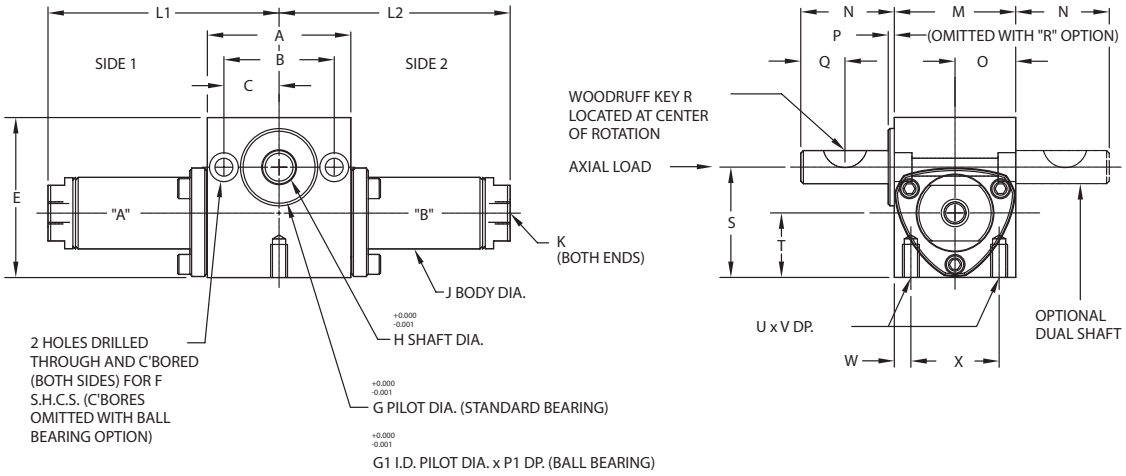
- Angle Adjustment
- Bumpers
- Adjustable Cushions
- Dual Shaft
- Square Key
- MRS® Magnetic Position Sensing
- Spring Return
- Oil Service Seals
- High Temperature Option
- Ball Bearing
- Rear Shaft
- Hardened Shaft
- Anti-backlash Rack



1. **CYLINDER BODIES** – 304 stainless steel for maximum seal life.
2. **ACTUATOR BODY** – High strength, anodized aluminum alloy for maximum corrosion protection.
3. **PORTING ENDS** – High strength, anodized aluminum alloy.
4. **SHAFT** – High strength, 303 stainless steel for maximum wear resistance and long life. (hardened steel optional).
5. **SHAFT BEARINGS** – Self-lubricating, sintered iron copper material for lower friction. (ball bearings optional).
6. **PISTON SEALS** – Buna "N", U-cup type for low breakaway friction and long life.
7. **RACK** – Carbon steel for maximum wear resistance.
8. **PINION** – High strength, alloy steel for greater durability.
9. **PISTON** – High strength, aluminum alloy.
10. **CYLINDER BODY RETAINER RING** – High strength, stainless steel for maximum corrosion protection.
11. **ANGLE ADJUSTMENT** – An option that allows 45˚ of adjustability each end.
12. **ADJUSTABLE CUSHIONS** – An option that controls deceleration at the end of the rotation.
13. **MRS® MAGNETIC POSITION SENSING** – An option that provides a magnet for sensing position.
14. **RACK SUPPORT** – Sintered brass material for increased load carrying capabilities.

For Dowel Pin Hole Locations, see page 10.39

Single Rack Models (in.)



L1/L2 dimensions shown in chart on page 4.6.

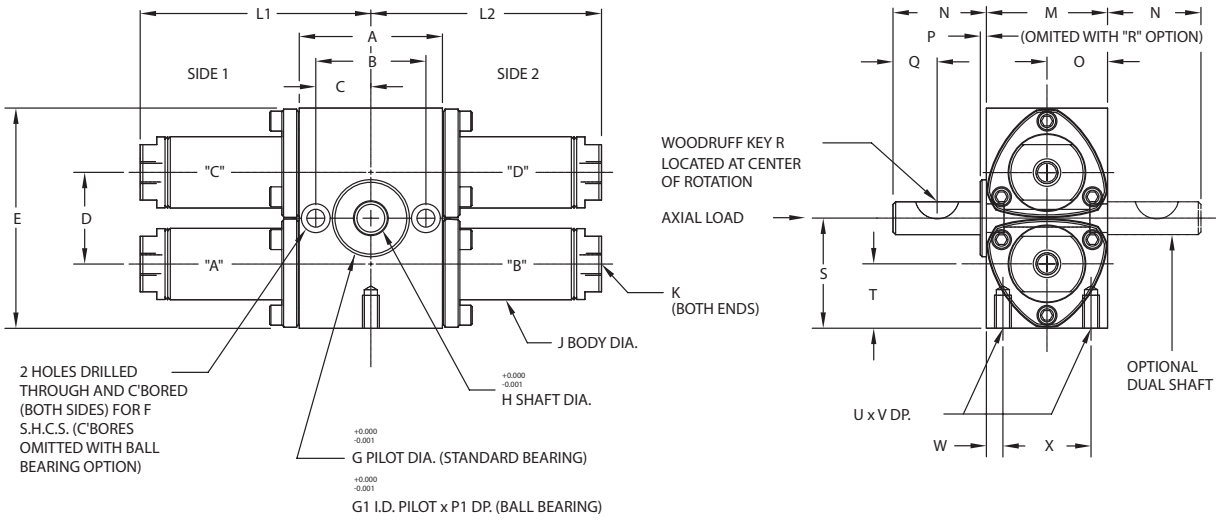
Bore	A	B	C	E	E (With R Option)	F (C' Bores Omitted with Ball Bearing Option)	G (Std Bearing O.D. Pilot Dia.)
9/16" (006)	1.38	1.00	0.50	1.44	1.44	#8 S.H.C.S.	0.675
3/4" (017)	1.62	1.25	0.62	1.81	1.81	#10 S.H.C.S.	0.875
1-1/16" (037)	1.88	1.44	0.72	2.12	2.19	1/4" S.H.C.S.	0.968
1-1/2" (098)	2.38	1.81	0.90	2.81	2.84	5/16" S.H.C.S.	1.249
2" (247)	3.00	2.38	1.19	3.75	3.75	5/16" S.H.C.S.	1.749

Bore	G1 (Ball Bearing I.D. Pilot)	H	J	K	M	N	O	P	P1
9/16" (006)	0.750	0.250	0.61	#10-32 [1]	1.12	0.69	0.56	0.06	0.06
3/4" (017)	0.875	0.375	0.82	#10-32 [1]	1.37	1.06	0.69	0.06	0.06
1-1/16" (037)	1.125	0.500	1.12	1/8 NPT	1.75	1.31	0.88	0.06	0.09
1-1/2" (098)	1.375	0.625	1.56	1/8 NPT	2.25	1.38	1.12	0.09	0.09
2" (247)	1.875	0.875	2.08	1/4 NPT	2.56	2.00	1.28	0.11	0.10

Bore	Q	R[2]	S	T	U	V	W	X
9/16" (006)	0.31	#202.5	1.03	0.61	#8-32	0.44	0.19	0.75
3/4" (017)	0.50	#204	1.25	0.73	#10-24	0.38	0.19	1.00
1-1/16" (037)	0.62	#305	1.56	0.88	1/4-20	0.50	0.25	1.25
1-1/2" (098)	0.62	#405	2.09	1.16	5/16-18	0.62	0.31	1.62
2" (247)	0.75	#606	2.56	1.28	5/16-18	0.62	0.28	2.00

[1]Option-S ports are 1/8 NPT
[2]Key dimensions on page 4.9.

Double Rack Models (in.)



Note: Body retainer on 2" bore has 4 corners.
L1/L2 dimensions shown in chart on page 4.8.

Bore	A	B	C	D	E	F (C' Bores Omitted with Ball Bearing Option)	G (Std Bearing O.D. Pilot Dia.)
9/16" (014)	1.38	1.00	0.50	0.83	2.06	#8 S.H.C.S.	0.675
3/4" (033)	1.62	1.25	0.62	1.04	2.50	#10 S.H.C.S.	0.875
1-1/16" (074)	1.88	1.44	0.72	1.36	3.12	1/4" S.H.C.S.	0.968
1-1/2" (196)	2.38	1.81	0.90	1.88	4.19	5/16" S.H.C.S.	1.249
2" (494)	3.00	2.38	1.19	2.56	5.13	5/16" S.H.C.S.	1.749

Bore	G1 (Ball Bearing I.D. Pilot)	H	J	K	M	N	O	P	P1
9/16" (014)	0.750	0.250	0.61	#10-32 [1]	1.12	0.69	0.56	0.06	0.06
3/4" (033)	0.875	0.375	0.82	#10-32 [1]	1.37	1.06	0.69	0.06	0.06
1-1/16" (074)	1.125	0.500	1.12	1/8 NPT	1.75	1.31	0.88	0.06	0.09
1-1/2" (196)	1.375	0.625	1.56	1/8 NPT	2.25	1.38	1.12	0.09	0.09
2" (494)	1.875	0.875	2.08	1/4 NPT	2.56	2.00	1.28	0.11	0.10

Bore	Q	R[2]	S	T	U	V	W	X
9/16" (014)	0.31	#202.5	1.03	0.61	#8-32	0.44	0.19	0.75
3/4" (033)	0.50	#204	1.25	0.73	#10-24	0.38	0.19	1.00
1-1/16" (074)	0.62	#305	1.56	0.88	1/4-20	0.50	0.25	1.25
1-1/2" (196)	0.62	#405	2.09	1.16	5/16-18	0.62	0.31	1.62
2" (494)	0.75	#606	2.56	1.28	5/16-18	0.62	0.28	2.00

[1]Option-S ports are 1/8 NPT (bodies "A" and "C" only).
[2]Key dimensions on page 4.9.

Three-Position Pneu-Turn

The Three-Position Pneu-Turn rotary actuators, in all bore sizes; both single and double rack can now be ordered as a standard catalog option.

How to Order

The model number for the Three-Position Pneu-Turn consists of alphanumeric characters. They designate the product; bore size, total rotation, degrees to mid-position, position of the shaft key at the mid-rotational position and options. The example below is for a 1-1/2" bore, single rack model with 225 degrees of total rotation, 45 degrees of rotation to the middle position, the key located at mid-position 8 and angle adjustment on both sides.

PT - 098225/045-8A1

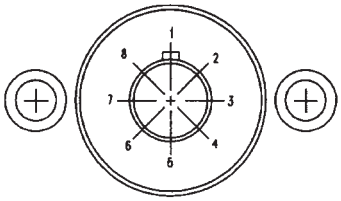
PRODUCT DESIGNATOR

BORE SIZE
SAME AS STANDARD OFFERING

ANGLE OF TOTAL ROTATION

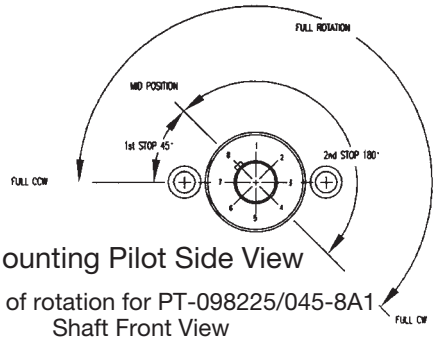
DEGREES TO MID-POSITION

KEY LOCATION
From the graphic below, select the position of shaft key when the shaft is at the middle position



Mounting Pilot Side
*All other key positions are available. Contact your Bimba distributor.

OPTIONS
SAME AS STANDARD OFFERING except T (track) not available



Mounting Pilot Side View

Example of rotation for PT-098225/045-8A1
Shaft Front View

Option Combination Availability

This chart provides the options that ***cannot*** be combined due to design or compatibility restrictions. For example, F and E options ***are not*** available in combination.

Option Series	A	B	C	D	E	F	G	K	M	N	Q	R	S	V	X
9/16" Single	S	N,Q,S	N/A	E,F	D,F,R	D,E,K	N,S	F	N	B,G,M,V	N/A	E	A,B,G	N	N/A
9/16" Double	S	N,Q,S	N/A	E,F	D,F,R	D,E,K	N,S	F	N	B,G,M,V	N/A	E	A,B,G	N	N/A
3/4" Single	Q,S	C,N,S	B,Q,S	E,F	D,F,R	D,E,K	N,S	F	N	B,G,M,Q,V	A,C,N,S	E	A,B,C,G,Q	N	N/A
3/4" Double	Q,S	C,N,S	B,Q,S	E,F	D,F,R	D,E,K	N,S	F	N	B,G,M,Q,V	A,C,N,S	E	A,B,C,G,Q	N	N/A
1-1/16" Single	Q	C,N,S	B,Q,S	E,F	D,F,R,X	D,E,K,X	N,S	F	N	B,G,M,Q,V	A,C,N,S	E	B,C,G,Q	N	E,F
1-1/16" Double	Q	C,N,S	B,Q,S	E,F	D,F,R,X	D,E,K,X	N,S	F	N	B,G,M,Q,V	A,C,N,S	E	B,C,G,Q	N	E,F
1-1/2" Single	Q	C,N,S	B,Q,S	E,F	D,F,R,X	D,E,K,X	N,S	F	N	B,G,M,Q,V	A,C,N,S	E	B,C,G,Q	N	E,F
1-1/2" Double	Q	C,N,S	B,Q,S	E,F	D,F,R,X	D,E,K,X	N,S	F	N	B,G,M,Q,V	A,C,N,S	E	B,C,G,Q	N	E,F
2" Single	Q	C,N,S	B,Q,S	E,F	D,F,R,X	D,E,K,X	N,S	F	N	B,G,M,Q,V	A,C,N,S	E	B,C,G,Q	N	E,F
2" Double	Q	C,N,S	B,Q,S	E,F	D,F,R,X	D,E,K,X	N,S	F	N	B,G,M,Q,V	A,C,N,S	E	B,C,G,Q	N	E,F

Three-Position List Price Adders

Bore Size	9/16"		3/4"		1-1/16"		1-1/2"		2"	
Type	Single (006)	Double (014)	Single (017)	Double (033)	Single (037)	Double (074)	Single (098)	Double (196)	Single (247)	Double (494)
Three Position Base Adder	$90.55	$115.10	$90.55	$115.10	$100.20	$136.20	$112.95	$164.35	$138.75	$207.30
**Adder per 45 degree Rotation	2.55	4.90	2.55	4.90	3.35	6.55	3.80	7.15	4.15	7.80

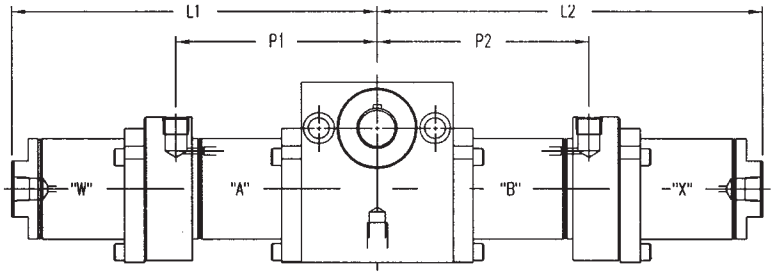
**The 45-degree rotational adder shown above includes the base and three-position requirement. No additional rotational adder is required.

Option list prices are the same as the standard offering.

Three-Position Pneu-Turn

Port A provides Full CCW position

Port B provides Full CW position



Ports W and X provide mid-position

Single Rack Model Dimensions

	9/16" (006)				3/4" (017)				1-1/16" (037)			
	P1	P2	L1	L2	P1	P2	L1	L2	P1	P2	L1	LR
Degrees of Full Rotation Adder per degree of rotation	**full rot. 0.0048**	**full rot. 0.0048**	**full rot. 0.0048**	**full rot. 0.0048**	**full rot. 0.0066**	**full rot. 0.0066**	**full rot. 0.0066**	**full rot. 0.0066**	**full rot. 0.0073**	**full rot. 0.0073**	**full rot. 0.0073**	**full rot. 0.0073**
Degree of Stop Rotation Adder per degree of rotation	2nd stop N/A	1st stop N/A	2nd stop 0.0048	1st stop 0.0048	2nd stop N/A	1st stop N/A	2nd stop 0.0066	1st stop 0.0066	2nd stop N/A	1st stop N/A	2nd stop 0.0073	1st stop 0.0073
Base Unit (No Option)	1.41	1.41	2.82	2.82	1.63	1.63	3.05	3.05	2.03	2.03	3.89	3.89
Bumpers Both Sides (B1)	1.53	1.53	3.06	3.06	1.77	1.77	3.33	3.33	2.18	2.18	4.19	4.19
Bumper CCW Side (B2)	1.41	1.53	2.82	3.06	1.63	1.77	3.05	3.33	2.03	2.18	3.89	4.19
Bumper CW Side (B3)	1.53	1.41	3.06	2.82	1.77	1.63	3.33	3.05	2.18	2.03	4.19	3.89
Cushion/Flow Both Sides (C1) (Q1)	N/A	N/A	N/A	N/A	1.63	1.63	3.58	3.58	2.03	2.03	4.51	4.51
Cushion/Flow CCW Side (C2) (Q2)	N/A	N/A	N/A	N/A	1.63	1.63	3.05	3.58	2.03	2.03	3.89	4.51
Cushion/Flow CW Side (C3) (Q3)	N/A	N/A	N/A	N/A	1.63	1.63	3.58	3.05	2.03	2.03	4.51	3.89
Angle Adjustment Both Sides (A1)	1.41	1.41	3.05	3.05	1.63	1.63	3.27	3.27	2.03	2.30	4.28	4.28
Angle Adjustment CCW Side (A2)	1.41	1.41	2.82	3.05	1.63	1.63	3.05	3.27	2.03	2.03	3.89	4.28
Angle Adjustment CW Side (A3)	1.41	1.41	3.05	2.82	1.63	1.63	3.27	3.05	2.03	2.03	4.28	3.89

**Select Magnetic Position Sensing adder from MRS table

	1-1/2" (098)				2" (247)			
	P1	P2	L1	L2	P1	P2	L1	L2
Degrees of Full Rotation Adder per degree of rotation	**full rot. 0.0097**	**full rot. 0.0097**	**full rot. 0.0097**	**full rot. 0.0097**	**full rot. 0.0137**	**full rot. 0.0137**	**full rot. 0.0137**	**full rot. 0.0137**
Degree of Stop Rotation Adder per degree of rotation	2nd stop N/A	1st stop N/A	2nd stop 0.0048	1st stop 0.0048	2nd stop N/A	1st stop N/A	2nd stop 0.0066	1st stop 0.0066
Base Unit (No Option)	2.28	2.28	4.39	4.39	2.81	2.81	5.13	5.13
Bumpers Both Sides (B1)	2.43	2.43	4.69	4.69	3.01	3.01	5.53	5.53
Bumper CCW Side (B2)	2.28	2.43	4.39	4.69	2.81	3.01	5.13	5.53
Bumper CW Side (B3)	2.43	2.28	4.69	4.39	3.01	2.81	5.53	5.13
Cushion/Flow Both Sides (C1) (Q1)	2.28	2.28	5.03	5.03	2.81	2.81	5.95	5.95
Cushion/Flow CCW Side (C2) (Q2)	2.28	2.28	4.39	5.03	2.81	2.81	5.13	5.95
Cushion/Flow CW Side (C3) (Q3)	2.28	2.28	5.03	4.39	2.81	2.81	5.95	5.13
Angle Adjustment Both Sides (A1)	2.28	2.28	4.80	4.80	2.81	2.81	5.66	5.66
Angle Adjustment CCW Side (A2)	2.28	2.28	4.39	4.80	2.81	2.81	5.13	5.66
Angle Adjustment CW Side (A3)	2.28	2.28	4.80	4.39	2.81	2.81	5.66	5.13

**Select Magnetic Position Sensing adder from MRS table

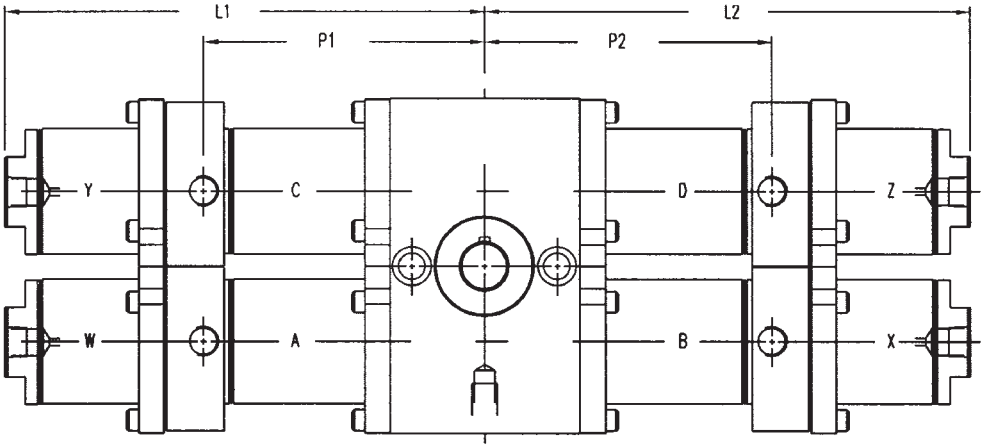
Note:
Overall length calculator spreadsheet available. Contact the Technical Assistance Center for details.

	MRS Length Adder (in.)				
Total Rotation Degrees	**006/014**	**017/033**	**037/074**	**098/196**	**247/494**
45˚	0.66	0.66	0.75	0.75	0.75
90˚	0.55	0.52	0.59	0.53	0.44
180˚	0.34	0.22	0.26	0.09	0.00
270˚	0.12	0.00	0.00	0.00	0.00
360˚	0.00	0.00	0.00	0.00	0.00

Single rack overall width calculation: PT-098180/045-8C1--Using the chart above, calculate L1 and L2 dimensions as follows:
L1 = Total rotation (180) * (.0097) Full rotation adder + Degrees to 2nd stop (135) * (.0097) 2nd stop rotation adder + Cushion adder (5.03")
L2 = Total rotation (180) * (.0097) Full rotation adder + Degrees to 1st stop (45) * (.0097) 1st stop rotation adder + Cushion adder (5.03")
[L1 = (1.746" + 1.310" + 5.03") = 8.086"] + [L2 = (1.746" + .437 + 5.03") = 7.213"]; Total width = 8.086" + 7.213" = 15.30"

Three-Position Pneu-Turn

Ports A and D provide Full CCW position Ports B and C provide Full CW position



Ports W, X, Y, and Z provide mid-position

Double Rack Model Dimensions

	9/16" (014)				3/4" (033)				1-1/16" (074)			
	P1	P2	L1	L2	P1	P2	L1	L2	P1	P2	L1	LR
Degrees of Full Rtation Adder per degree of rotation	**full rot. 0.0048**	**full rot. 0.0048**	**full rot. 0.0048**	**full rot. 0.0048**	**full rot. 0.0066**	**full rot. 0.0066**	**full rot. 0.0066**	**full rot. 0.0066**	**full rot. 0.0073**	**full rot. 0.0073**	**full rot. 0.0073**	**full rot. 0.0073**
*Degrees to longest stop Adder per degree of rotation	stop rot. N/A	stop rot. N/A	stop rot. 0.0048	stop rot. 0.0048	stop rot. N/A	stop rot. N/A	stop rot. 0.0066	stop rot. 0.0066	stop rot. N/A	stop rot. N/A	stop rot. 0.0073	stop rot. 0.0073
Base Unit (No Option)	1.41	1.46	2.82	2.87	1.63	1.68	3.05	3.10	2.03	2.08	3.89	3.94
Bumpers Both Sides (B1)	1.53	1.46	3.06	2.87	1.77	1.68	3.33	3.10	2.18	2.08	4.19	3.94
Bumper CCW Side (B2)	1.53	1.46	3.06	2.87	1.77	1.68	3.33	3.10	2.18	2.08	4.19	3.94
Bumper CW Side (B3)	1.53	1.46	3.06	2.87	1.77	1.68	3.33	3.10	2.18	2.08	4.19	3.94
Cushion/Flow Both Sides (C1) (Q1)	N/A	N/A	N/A	N/A	1.63	1.68	3.58	3.10	2.03	2.08	4.51	3.94
Cushion/Flow CCW Side (C2) (Q2)	N/A	N/A	N/A	N/A	1.63	1.68	3.58	3.10	2.03	2.08	4.51	3.94
Cushion/Flow CW Side (C3) (Q3)	N/A	N/A	N/A	N/A	1.63	1.68	3.58	3.10	2.03	2.08	4.51	3.94
Angle Adjustment Both Sides (A1)	1.41	1.46	3.05	2.87	1.63	1.68	3.27	3.10	2.03	2.08	4.28	3.94
Angle Adjustment CCW Side (A2)	1.41	1.46	3.05	2.87	1.63	1.68	3.27	3.10	2.03	2.08	4.28	3.94
Angle Adjustment CW Side (A3)	1.41	1.46	3.05	2.87	1.63	1.68	3.27	3.10	2.03	2.08	4.28	3.94

**Select Magnetic Position Sensing adder from MRS table

	1-1/2" (196)				2" (494)			
	P1	P2	L1	L2	P1	P2	L1	L2
Degrees of Full Rtation Adder per degree of rotation	**full rot. 0.0097**	**full rot. 0.0097**	**full rot. 0.0097**	**full rot. 0.0097**	**full rot. 0.0137**	**full rot. 0.0137**	**full rot. 0.0137**	**full rot. 0.0137**
Degree of Stop Rotation Adder per degree of rotation	stop rot. N/A	stop rot. N/A	stop rot. 0.0097	stop rot. 0.0097	stop rot. N/A	stop rot. N/A	stop rot. 0.0137	stop rot. 0.0137
Base Unit (No Option)	2.28	2.33	4.39	4.44	2.81	2.86	5.13	5.18
Bumpers Both Sides (B1)	2.43	2.33	4.69	4.44	3.01	2.86	5.53	5.18
Bumper CCW Side (B2)	2.43	2.33	4.69	4.44	3.01	2.86	5.53	5.18
Bumper CW Side (B3)	2.43	2.33	4.69	4.44	3.01	2.86	5.53	5.18
Cushion/Flow Both Sides (C1) (Q1)	2.28	2.33	5.03	4.44	2.81	2.86	5.95	5.18
Cushion/Flow CCW Side (C2) (Q2)	2.28	2.33	5.03	4.44	2.81	2.86	5.95	5.18
Cushion/Flow CW Side (C3) (Q3)	2.28	2.33	5.03	4.44	2.81	2.86	5.95	5.18
Angle Adjustment Both Sides (A1)	2.28	2.33	4.80	4.44	2.81	2.86	5.66	5.18
Angle Adjustment CCW Side (A2)	2.28	2.33	4.80	4.44	2.81	2.86	5.66	5.18
Angle Adjustment CW Side (A3)	2.28	2.33	4.80	4.44	2.81	2.86	5.66	5.18

Note:
Overall length calculator spreadsheet available. Contact the Technical Assistance Center for details.

**Select Magnetic Position Sensing adder from MRS table

Double rack overall width calculation: PT-196180/045-8C1--Using the chart above, calculate L1 and L2 dimensions as follows:
L1 = Total rotation (180) * (.0097) Full rotation adder + Largest Degrees stop (135) * (.0097) stop rotation adder + Cushion adder (5.03")
L2 = Total rotation (180) * (.0097) Full rotation adder + Largest Degrees stop (135) * (.0097) stop rotation adder + Cushion adder (4.44")
[L1 = (1.746" + 1.310" + 5.03") = 8.086"] + [L2 = (1.746" + 1.310 + 4.44") = 7.496"]; Total width = 8.086" + 7.496" = 15.58"
**Notes - Largest stop rotation is used for double rack models to calculate overall L1 and L2 length. Double rack models - one body on each side will be shorter if the shaft mid-position is not 1/2 of the total rotation, the above calculation still provides the units overall width.

Engineering Specifications

ACTUATOR OPERATION
Rotary action of the Pneu-Turn Rotary Actuator is achieved through the use of a rack and pinion assembly. Just as with a pneumatic or hydraulic cylinder, the speed of rotation may be controlled through the use of flow controls. The action at the end of the rotation can be controlled by the use of adjustable cushions, which are available as an option.

Care should be taken to insure that the inertial force does not exceed the published torque capacity. An external stop may be necessary to avoid exceeding the torque capacity due to inertial loads.

When mounting the Pneu-Turn against the shaft side of the housing, be sure to provide clearance for the pilot diameter to avoid excessive bearing pressure.

For standard models, axial loads must only be applied in the direction indicated on the dimensional drawings. The Dual Shaft or Rear Shaft options can be used to correctly orient tension induced axial loads. With the Ball Bearing option, axial loads can be applied in either direction.

The Angle Adjustment Option will allow 45˚ of adjustability. If cushions are ordered in conjunction with the angle adjustment option, adjustability will be 10˚.

PORT POSITIONING
Ports on the Pneu-Turn may be repositioned to accommodate any air line configuration by loosening the three body retainer screws. Once desired port positions are obtained, tighten screws to specified torque values.

LUBRICATION
The Pneu-Turn Rotary Actuator is pre-lubricated at the factory for extensive, maintenance-free operation. The life of the rotary actuator can be lengthened by providing additional lubrication with an air line mist lubricator or direct introduction of oil to the actuator every 500 hours of operation. Recommended oils for Buna N seals are medium to heavy inhibited hydraulic and general purpose oil. If High Temperature seals, use Dow Corning #710. Other types of prelube are available upon request.

The rack and pinion gear and ball bearings are prelubricated at the factory for extensive, maintenance-free operation. If additional lubrication should be required, use a high grade bearing grease.

WOODRUFF KEY LOCATION
The standard position of the woodruff key is 12 o'clock at the center of rotation. For Three-Position PneuTurn, the center position is 12 o'clock, ± 2°.

RATINGS:
Pressure Rating: All Bimba Pneu-Turn Rotary Actuators are rated for 150 PSI air.

Rotation Tolerance: Standard rotation tolerance for 9/16" – 3/4" bore is -0˚ to 15˚ and for 1-1/16" – 2" bore is -0˚ to +10˚. Bumper option allows compression under pressure which may exceed tolerance. If higher accuracy desired, please specify angle adjustment.

Temperature Range: Buna N: (Standard) - 20˚F to +200˚F; Option (V) High Temperature seals: 0˚F to +400˚F. Temperature range of high temperature seals with Ball Bearing option is 0˚F to +250˚F. If cylinders are operated at temperatures below 0˚ for extended time periods, special modifications may be required. Special seal materials are available on request.

Backlash:

- Without “X” option, 1-1/2˚ of Arc Maximum. Double rack actuators have zero backlash at end of rotational stroke
- With “X” option, single rack models have zero mid rotational and end of rotation backlash. Double rack models have zero mid-rotational backlash.

Breakaway: Less than 5 PSI.

Standard Line

Series	9/16"		3/4"		1-1/16"		1-1/2"		2"	
	(006)	(014)	(017)	(033)	(037)	(074)	(098)	(196)	(247)	(494)
Theoretical Torque Capacity (in.-lbs./PSI)	0.068	0.135	0.166	0.331	0.369	0.739	0.982	1.963	2.468	4.935
Bearing Load (Axial) (lbs.)	25	25	25	25	40	40	40	40	80	80
Bearing Load (Radial) (lbs.)	200	200	250	250	300	300	350	350	500	500
Distance Between Bearing Midpoints (in.)	0.77	0.77	0.96	0.96	1.24	1.24	1.70	1.70	1.98	1.98
Maximum Rate of Rotation (@ 100 PSI With No Load)	3000 deg./sec.	3000 deg./sec.	3500 deg./sec.	3500 deg./sec.	2000 deg./sec.	2000 deg./sec.	1500 deg./sec.	1500 deg./sec.	1000 deg./sec.	1000 deg./sec.
Weight (Approximate) (oz.)	6	11.5	11	20.5	21	38	48	89	105	152
Body Retainer Cap Screw Recommended Tightening Torque (in.-lbs.)	10	10	12	12	12	12	20	20	20	20

For Ball Bearing Option, the Following Specifications Apply

Series	9/16"		3/4"		1-1/16"		1-1/2"		2"	
	(006)	(014)	(017)	(033)	(037)	(074)	(098)	(196)	(247)	(494)
Bearing Load (Axial) (lbs.)	55	55	75	75	100	100	110	110	130	130
Bearing Load (Radial) (lbs.)	205	205	270	270	380	380	425	425	740	740
Distance Between Bearing Midpoints (in.)	.72	.72	.96	.96	1.26	1.26	1.71	1.71	1.82	1.82
Weight (Approximate) (oz.)	6	11.5	10.5	20	20.5	37.5	47	88	103	150

Engineering Specifications

Kinetic Energy Capacity

A load connected to the shaft of a Pneu-Turn will produce kinetic energy as it is rotated. This kinetic energy must be absorbed by the Pneu-Turn or other stopping device. If the Pneu-Turn is to stop the load without external devices, then the application kinetic energy must not exceed the maximums noted in the table below.

Maximum Allowable Kinetic Energy (in.-lbs.)

Size	Without Cushions	With Cushions
9/16" (006 / 014)	0.02	N/A
3/4" (017 / 033)	0.04	0.08
1-1/16" (037 / 074)	0.07	0.88
1-1/2" (098 / 196)	0.41	7.80
2" (247 / 494)	1.60	13.00

The kinetic energy developed by your application can be determined by using the equations noted below:

$$KE = 0.5 * I * w^2$$

$$w = 1.20 * (ø / t)$$

LEGEND:

KE = Kinetic energy (in.-lbs.)
I = Moment of inertia (in.-lb.-sec.^{2})
w = Rotational speed (radians/sec.)
ø = Angle of rotation (radians)
t = Time of rotation (sec.)
W = Weight of load (lb.)
g = Acceleration of gravity (386 in./sec.^{2})

Below are examples of attachments, their geometry, and the equation to use to determine the Moment of Inertia.

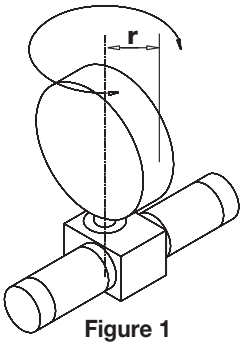


Figure 1

Thin Disc
(mounted on side through center)

$$I = \frac{W}{g} * \frac{r^2}{4}$$

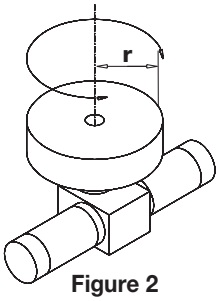


Figure 2

Thin Disc
(centered)

$$I = \frac{W}{g} * \frac{r^2}{2}$$

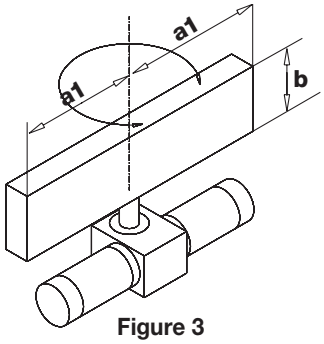


Figure 3

Thin Rectangular Plate
(centered and mounted on side)

$$I = \frac{W}{g} * \frac{(2(a1))^2}{12}$$

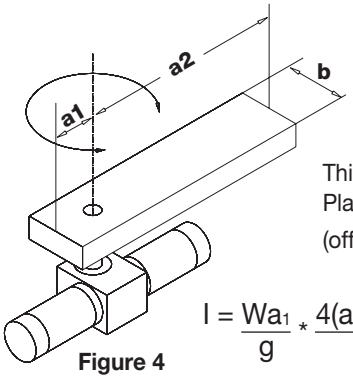


Figure 4

Thin Rectangular Plate
(off-centered)

$$I = \frac{Wa_1}{g} * \frac{4(a1)^2 + b^2}{12} + \frac{Wa_2}{g} * \frac{4(a2)^2 + b^2}{12}$$

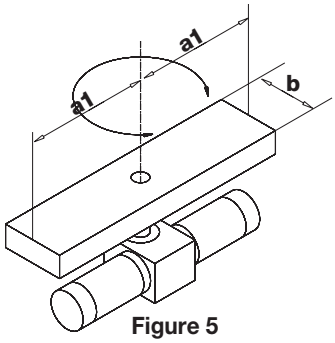


Figure 5

Thin Rectangular Plate
(centered)

$$I = \frac{W}{g} * \frac{(2(a1))^2 + b}{12}$$

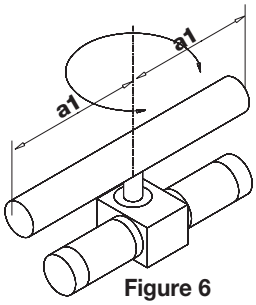


Figure 6

Slender Rod
(centered)

$$I = \frac{W}{g} * \frac{(2(a1))^2}{12}$$

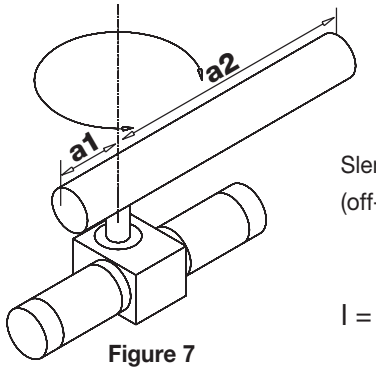


Figure 7

Slender Rod
(off-centered)

$$I = \frac{Wa_1}{g} * \frac{a1^2}{3} + \frac{Wa_2}{g} * \frac{a2^2}{3}$$