

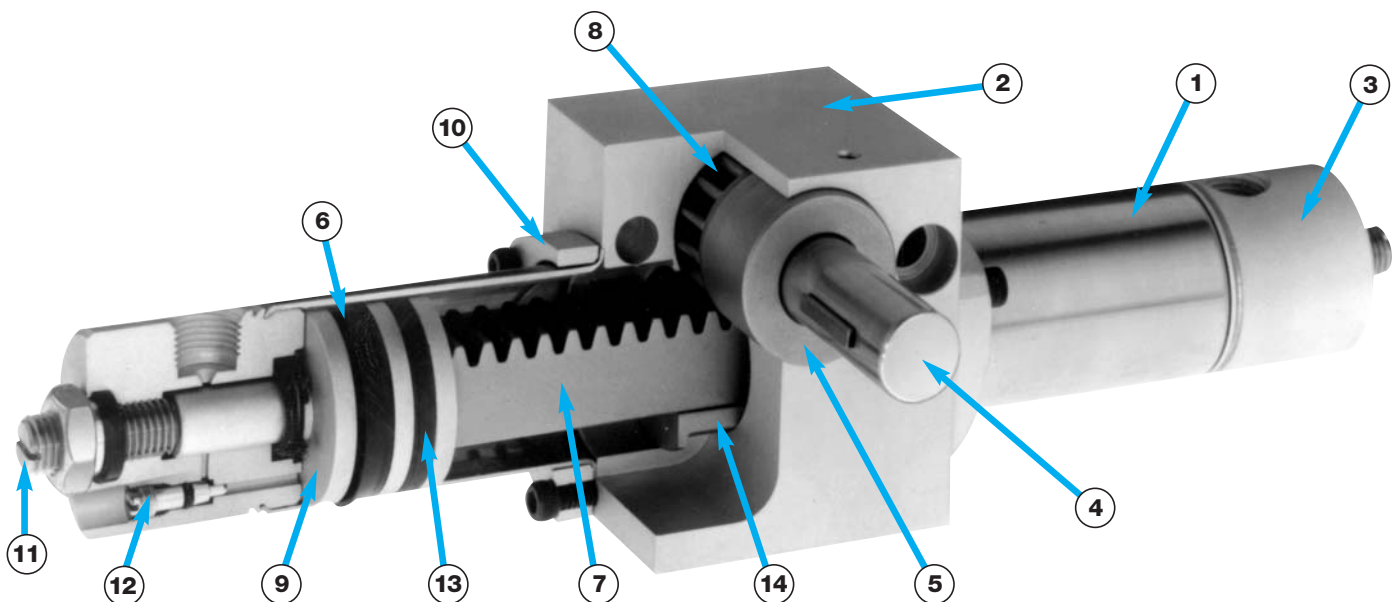
Bimba Metric Pneu-Turn Actuators



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
- Oil Service Seals
- High Temperature Option
- Ball Bearing
- Rear Shaft
- Hardened Shaft



1. **CYLINDER BODIES** – 4301 stainless steel for maximum seal life. (X5 CrNi 18.9)
2. **ACTUATOR BODY** – High strength, anodized aluminum alloy for maximum corrosion protection.
3. **PORTING ENDS** – High strength, anodized aluminum alloy.
4. **SHAFT** – High strength, 4305 stainless steel for maximum wear resistance and long life. (X12 CrNi 18.8)
5. **SHAFT BEARINGS** – Self-lubricating, sintered iron copper material for lower friction.
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.

How to Order

The model number of Pneu-Turn Rotary Actuators consists of three alphanumeric clusters. These designate product type, series, angle of rotation and special options. Please refer to the charts below for an

example of model number PT-060090-A1DV. This is a 27mm bore, single rack, 90° angle of rotation actuator with angle adjustment on both sides, dual shaft and high temperature option.

PT-060090-A1DV

SERIES – TORQUE FACTOR

011 - 14mm Bore, Single Rack
 022 - 14mm Bore, Double Rack
 027 - 19mm Bore, Single Rack
 054 - 19mm Bore, Double Rack
 060 - 27mm Bore, Single Rack
 121 - 27mm Bore, Double Rack
 161 - 38mm Bore, Single Rack
 321 - 38mm Bore, Double Rack
 404 - 50mm Bore, Single Rack
 808 - 50mm Bore, Double Rack

Single Rack see page 4.3.
 Double Rack see page 4.5.

To determine theoretical output torque (N-m), place a decimal point between the first and second digits of the series number. Then multiply that number by the air line pressure (Bars) for the approximate torque produced.

For example, a PT-060090 will produce an output torque of 0.60 times the air line pressure. At 6 Bars this torque will be 3.6 N-m.

ANGLE OF ROTATION

045 - 45°
 090 - 90°
 180 - 180°
 270 - 270°
 360 - 360°

Above angles are standard. Other angles available upon request.

Rotation angles up to 1080° are available. See page 4.10 for rotational tolerance.

OPTIONS

A1 - Angle adjustment (both sides)
 A2 - Angle adjustment (counterclockwise rotation)
 A3 - Angle adjustment (clockwise rotation)
 B1 - Bumpers (both sides)
 B2 - Bumper (counterclockwise rotation)
 B3 - Bumper (clockwise rotation)
 C1 - Cushions (both sides)¹
 C2 - Cushion (counterclockwise rotation)¹
 C3 - Cushion (clockwise rotation)¹
 D - Dual shaft
 E - Rear shaft (front portion of dual shaft removed; to accommodate hanging axial load)
 G - Polymer Grease
 K - Square key²
 M - MRS[®] magnetic position sensing
 R - Ball bearing²
 S - Seals – oil service³
 T - Switch Track
 V - High temperature option (-18°C to +205°C)
 X - Anti-backlash(for 38mm and 50mm bores only)⁵

¹ Not available in Series 011 or 022. See below for option combination availability. See page 4.4 and 4.6 for explanation of clockwise/counterclockwise.
² 011 and 022 have flat shaft.
³ Oil service not recommended for applications at pressures less than 2.8 bar.
⁴ Option T must be ordered in conjunction with Option M. Option M can be ordered with Option-V, but Option V's rating will change to 180°. See Position Sensing Solutions section for additional switch information.
⁵ Option X (Anti-backlash) is available in bore sizes 1-1/16", 1-1/2" and 2", single and double rack-up to 360° rotation. This option eliminates mid-rotational and end of rotation backlash in single rack models. It also eliminates mid-rotational backlash in double rack models. Double rack models do not have end of rotation backlash. All Pneu-Turns with this option include ball bearings Option R. Use this option to provide smooth rotation along with rotational precision.

Option Combination Availability

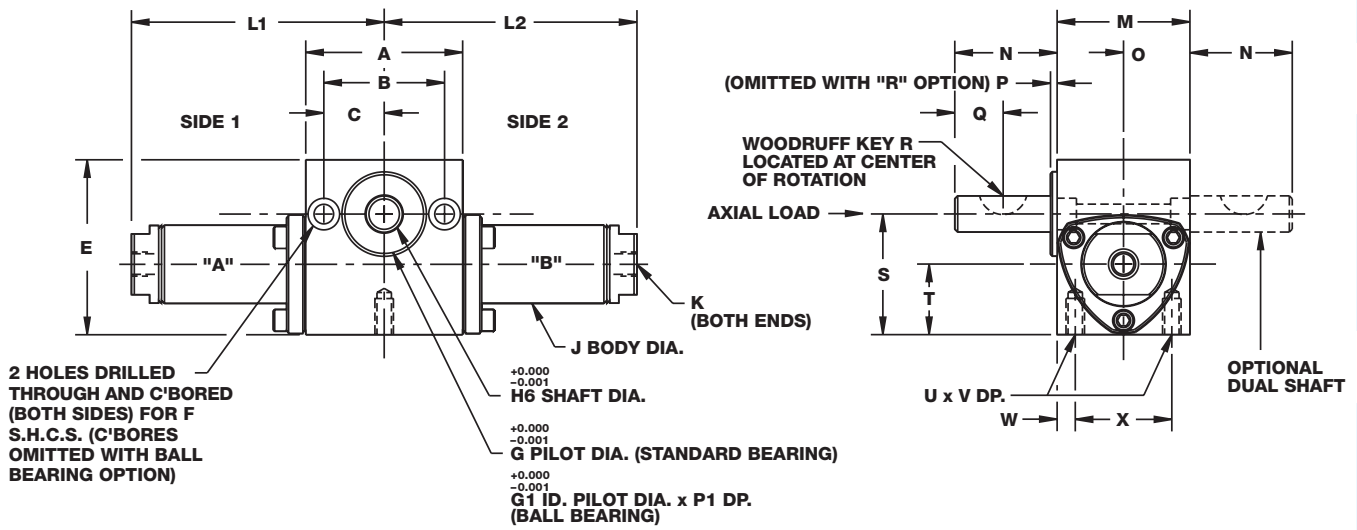
Due to design or compatibility restrictions, the following options may **not** be ordered in combination. For example, M (magnetic position sensing) and V (high temperature option) are not available in combination.

SERIES \ OPTIONS	A	B	C	D	E**	K	M	R*	S	V	X
14mm (011)	S	S	N/A	E	D,R	N/A	V	E	A,B	M	N/A
14mm (022)	N/A	S	N/A	E	D,R	N/A	V	E	B	M	N/A
19mm (027)	S	C,S	B,S	E	D,R	N/A	V	E	A,B,C	M	N/A
19mm (054)	N/A	C,S	B,S	E	D,R	N/A	V	E	B,C	M	N/A
27mm (060)	N/A	C,S	B,S	E	D,R	N/A	V	E	B,C	M	E
27mm (121)	N/A	C,S	B,S	E	D,R	N/A	V	E	B,C	M	E
38mm (161)	N/A	C,S	B,S	E	D,R	N/A	V	E	B,C	M	E
38mm (321)	N/A	C,S	B,S	E	D,R	N/A	V	E	B,C	M	E
50mm (404)	N/A	C,S	B,S	E	D,R	N/A	V	E	B,C	M	E
50mm (808)	N/A	C,S	B,S	E	D,R	N/A	V	E	B,C	M	E

*Temperature range of ball bearing option with high temperature option is -18°C to +120°C.

**Option E with standard bearing – front part of dual shaft removed to accommodate hanging axial load. Not required for option R.

Single Rack Models(mm)



L1/L2 dimensions shown in chart on page 4.4.

Bore	A	B	C	E	E (With R Option)	F (C' Bores Omitted with Ball Bearing Option)	G (Std Bearing O.D. Pilot Dia.)
14mm (011)	40.0	31.0	15.5	39.0	39.0	4mm S.H.C.S.	22.00 / 21.97
19mm (027)	49.0	37.0	18.5	47.0	47.0	5mm S.H.C.S.	24.99 / 24.97
27mm (060)	59.0	47.0	23.5	60.0	60.0	6mm S.H.C.S.	29.01 / 28.98
38mm (161)	65.0	50.0	25.0	74.0	74.0	8mm S.H.C.S.	31.72 / 31.70
50mm (404)	80.0	63.0	31.5	96.0	96.0	8mm S.H.C.S.	44.42 / 44.40

Bore	G1 Ball Bearing I.D. Pilot	H	J	K	M	N	O	P	P1
14mm (011)	22.00 / 21.98	8mm	15.5	M5 x 0.8	29.0	20.0	14.5	1.6	2.0
19mm (027)	26.00 / 25.98	10mm	20.8	M5 x 0.8	35.0	23.0	17.5	1.6	2.43
27mm (060)	35.00 / 34.98	14mm	28.4	G 1/8	49.0	30.0	24.5	1.6	2.17
38mm (161)	35.00 / 34.98	16mm	39.6	G 1/8	60.0	28.0	30.0	2.3	3.37
50mm (404)	47.00 / 46.97	25mm	52.8	G 1/4	66.0	50.0	33.0	2.1	3.99

Bore	Q	R*	S	T	U	V	W	X
14mm (011)	8.0	2 x 3.7	26.0	15.5	M4 x 0.7	11.5	5.0	19.0
19mm (027)	10.0	3 x 5	32.0	18.8	M5 x 0.8	10.0	4.5	26.0
27mm (060)	16.0	5 x 7.5	40.0	22.7	M6 x 1	13.0	8.5	32.0
38mm (161)	16.0	5 x 7.5	54.0	30.2	M8 x 1.25	16.0	9.0	42.0
50mm (404)	20.0	8 x 13	65.0	32.5	M8 x 1.25	16.0	7.1	52.0

*Key dimensions on page 4.7.

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Flat

Pneu-Turn

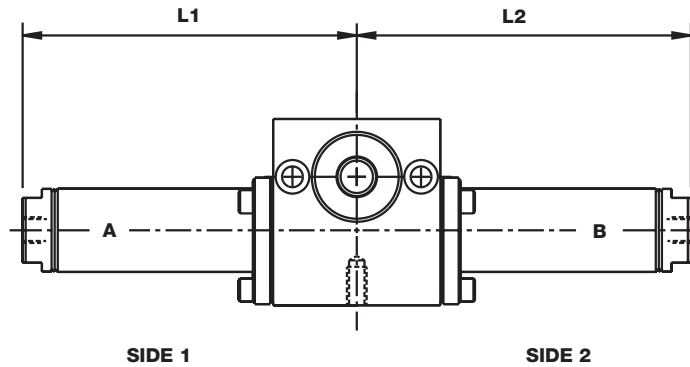
Ultram

Flow Control

Position Sensing Solutions

Single Rack Options(mm)

(Dimensional variations from standard as shown.)



	14mm (011)		19mm (027)		27mm (060)		38mm (161)		50mm (404)	
	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2
Adder Per Degree of Rotation	0.121	0.121	0.166	0.166	0.185	0.185	0.246	0.246	0.348	0.348
Plus One Length Adder Below Per Side										
Base Unit (No Options)	41.2	41.2	44.3	44.3	57.3	57.3	61.7	61.7	74.1	74.1
Bumper Both Sides (B1)	44.2	44.2	47.8	47.8	61.1	61.1	65.5	65.5	79.2	79.2
Bumper CCW Side (B2)	41.2	41.2	44.3	47.8	57.3	61.1	61.7	65.5	74.1	79.2
Bumper CW Side (B3)	44.2	44.2	47.8	44.3	61.1	57.3	65.5	61.7	79.2	74.1
Cushion Both Sides (C1)	N/A	N/A	57.7	57.7	75.1	75.1	77.9	77.9	94.7	94.7
Cushion CCW Side (C2)	N/A	N/A	44.3	57.7	57.3	75.1	61.7	77.9	74.1	94.7
Cushion CW Side (C3)	N/A	N/A	57.7	44.3	75.1	57.3	77.9	61.7	94.7	74.1
Oil Service Seals (S)	N/A	N/A	58.1	58.1	65.1	65.1	72.7	72.7	87.7	87.7
Oil Service with Angle Adjustment (AS)	51.5	51.5	N/A	N/A	83.0	83.0	89.0	89.0	108.3	108.3

“CCW Side” –

refers to the extreme rotation of the shaft in the counter-clockwise direction as viewed from the mounting pilot side of the actuator.

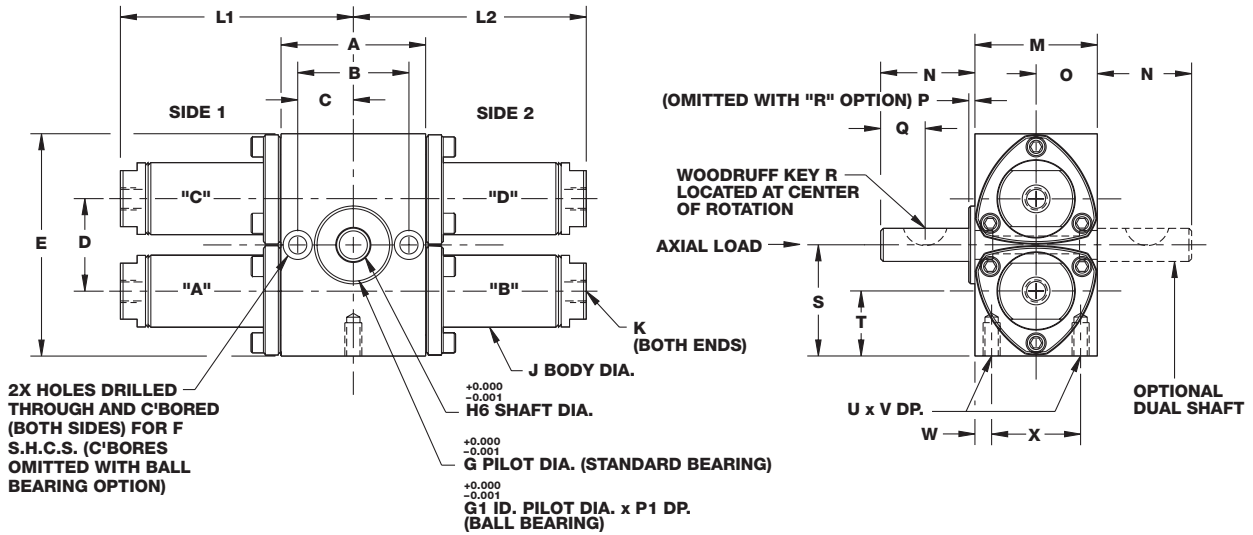
The location of the optional feature chosen will be on tube B for single rack actuators.

“CW Side” –

refers to the extreme rotation of the shaft in the clockwise direction as viewed from the mounting pilot side of the actuator.

The location of the optional feature chosen will be on tube A for single rack actuators.

Double Rack Models(mm)



Note: Body retainer on 50mm bore has 4 corners.
L1/L2 dimensions shown in chart on page 4.6.

Bore	A	B	C	D	E	F (C' Bores Omitted with Ball Bearing Option)	G (Std Bearing O.D. Pilot Dia.)
14mm (022)	40.0	31.0	15.5	21.1	52	4mm S.H.C.S.	22.00 / 21.97
19mm (054)	49.0	37.0	18.5	26.4	64	5mm S.H.C.S.	24.99 / 24.97
27mm (121)	59.0	47.0	23.5	34.5	80	6mm S.H.C.S.	29.01 / 28.98
38mm (321)	65.0	50.0	25.0	47.6	108	8mm S.H.C.S.	31.72 / 31.70
50mm (808)	80.0	63.0	31.5	65.0	130	8mm S.H.C.S.	44.42 / 44.40

Bore	G1 (Ball Bearing I.D. Pilot)	H	J	K	M	N	O	P	P1
14mm (022)	22.00 / 21.98	8.0	15.5	M5 x 0.8	29.0	20	14.5	1.6	2.00
19mm (054)	26.00 / 25.98	10.0	20.8	M5 x 0.8	35.0	23	17.5	1.6	2.43
27mm (121)	35.00 / 34.98	14.0	28.4	G 1/8	49.0	30	24.5	1.6	2.17
38mm (321)	35.00 / 34.98	16.0	39.6	G 1/8	60.0	28	30.0	2.3	3.37
50mm (808)	47.00 / 46.97	25.0	52.8	G 1/4	66.0	50	33.0	2.1	3.99

Bore	Q	R*	S	T	U	V	W	X
14mm (022)	8.0	2 x 3.7	26.0	15.5	M4 x 0.7	11.5	5.0	19.0
19mm (054)	10.0	3 x 5	32.0	18.8	M5 x 0.8	10.0	4.5	26.0
27mm (121)	16.0	5 x 7.5	40.0	22.7	M6 x 1	13.0	8.5	32.0
38mm (321)	16.0	5 x 7.5	54.0	30.2	M8 x 1.25	16.0	9.0	42.0
50mm (808)	20.0	8 x 13	65.0	32.5	M8 x 1.25	16.0	7.1	52.0

*Key dimensions on page 4.7.

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Flat

Pneu-Turn

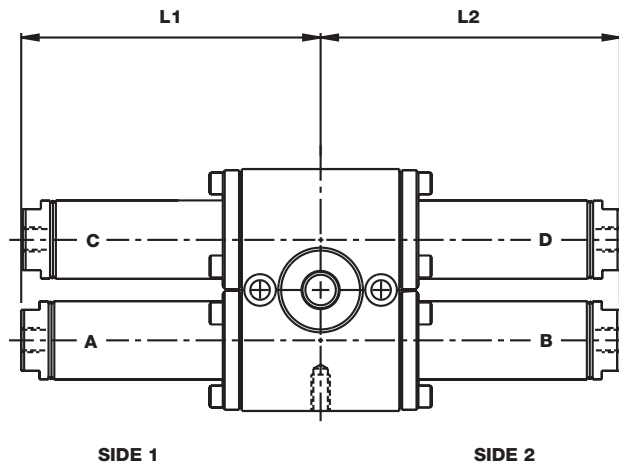
Ultram

Flow Control

Position Sensing Solutions

Double Rack Options(mm)

(Dimensional variations from standard as shown.)



	14mm (022)		19mm (054)		27mm (121)		38mm (321)		50mm (808)	
	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2
Adder Per Degree of Rotation	0.121	0.121	0.166	0.166	0.185	0.185	0.246	0.246	0.348	0.348
Plus One Length Adder Below Per Side										
Base Unit (No Options)	41.2	42.5	44.3	45.5	57.3	58.5	61.7	62.9	74.1	75.3
Bumper Both Sides (B1)	44.2	42.5	47.8	45.5	61.1	58.5	65.5	62.9	79.2	75.3
Bumper CCW Side (B2)	44.2	42.5	47.8	45.5	61.1	58.5	65.5	62.9	79.2	75.3
Bumper CW Side (B3)	44.2	42.5	47.8	45.5	61.1	58.5	65.5	62.9	79.2	75.3
Cushion Both Sides (C1)	N/A	N/A	57.7	45.5	75.1	58.5	77.9	62.9	94.7	75.3
Cushion CCW Side (C2)	N/A	N/A	57.7	45.5	75.1	58.5	77.9	62.9	94.7	75.3
Cushion CW Side (C3)	N/A	N/A	57.7	45.5	75.1	58.5	77.9	62.9	94.7	75.3
Oil Service Seals (S)	N/A	N/A	58.1	45.5	65.1	58.5	72.7	62.9	87.7	75.3
Oil Service with Angle Adjustment (AS)	51.5	42.5	N/A	N/A	83.0	58.5	89.0	62.9	108.3	75.3

“CCW Side” –

refers to the extreme rotation of the shaft in the counter-clockwise direction as viewed from the mounting pilot side of the actuator.

The location of the optional feature chosen will be on tube C for double rack actuators.

“CW Side” –

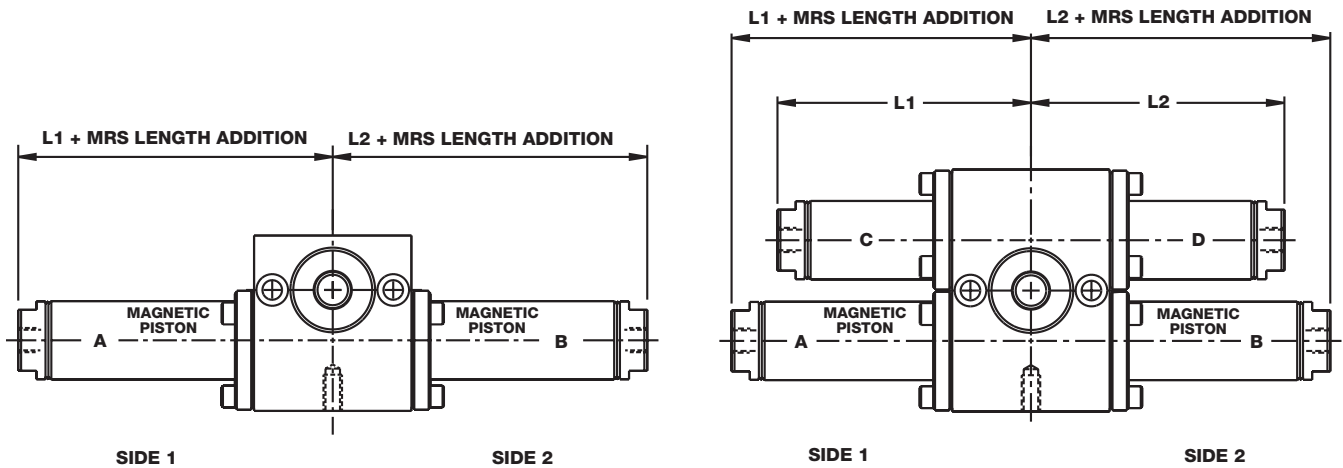
refers to the extreme rotation of the shaft in the clockwise direction as viewed from the mounting pilot side of the actuator.

The location of the optional feature chosen will be on tube A for double rack actuators.

Options(mm)

MRS® Magnetic Position Sensing

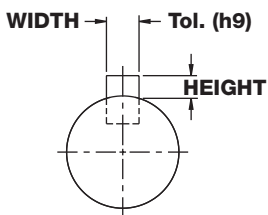
Magnetic pistons are located on the A and B tubes of both the single and double rack rotary actuators, guaranteeing switch operation at any point in the rotation.



MRS® Length Adder

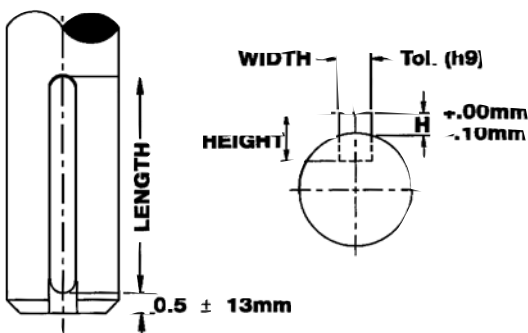
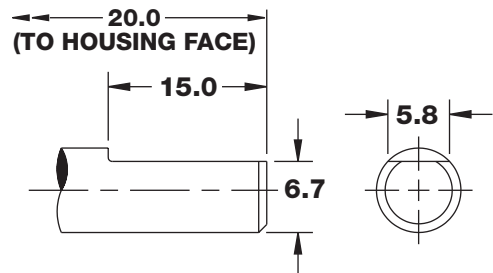
Degrees	14mm		19mm		27mm		38mm		50mm	
	(011)	(022)	(027)	(054)	(060)	(121)	(161)	(321)	(404)	(808)
45°	16.7		16.8		19.2		18.9		19.0	
90°	14.0		13.1		15.0		13.4		11.0	
180°	8.6		5.6		6.7		2.3		0.0	
270°	3.1		0.0		0.0		0.0		0.0	
360°	0.0		0.0		0.0		0.0		0.0	

Woodruff Key



Key No.	Width	Height
2 x 3.7	2mm	0.8mm +.00 -.10
3 x 5	3mm	1.2mm +.00 -.10
5 x 7.5	5mm	2.0mm +.00 -.10
8 x 13	8mm	2.8mm +.00 -.20

Flat Key (011 and 014)



Square Key Option

Bore Size	Length	Width	Height	H
19mm (027 / 054)	18mm	3mm	3mm	1.2
27mm (060 / 121)	20mm	5mm	5mm	2.0
38mm (161 / 321)	20mm	5mm	5mm	2.0
50mm (404 / 808)	45mm	8mm	7mm	4.0

ISO 6431

ISO 6432

Flat

Pneu-Turn

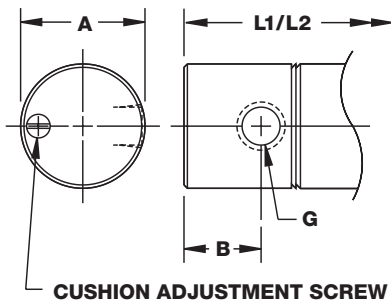
Ultran

Flow Control

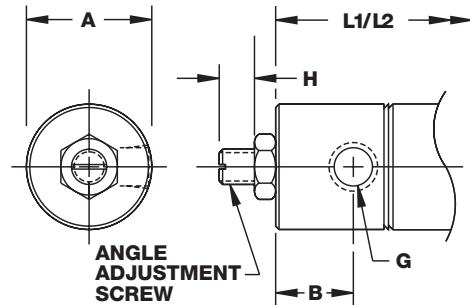
Position Sensing Solutions

Options(mm)

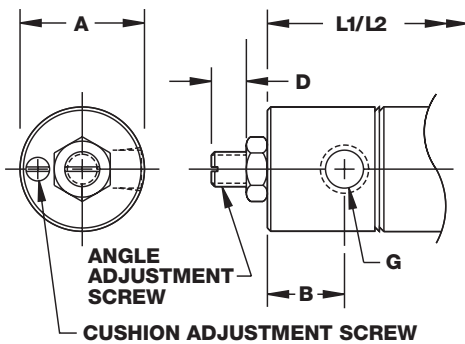
**Cushion
(C Option)**



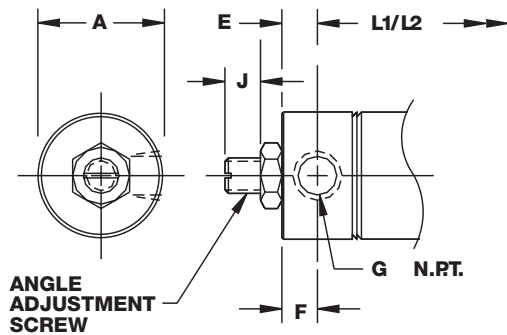
**Angle Adjustment with
Oil Service Seals (AS Option)**



**Angle Adjustment with
Cushion (AC Option)**



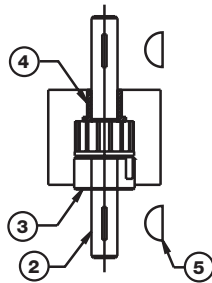
**Angle Adjustment
(A Option)**



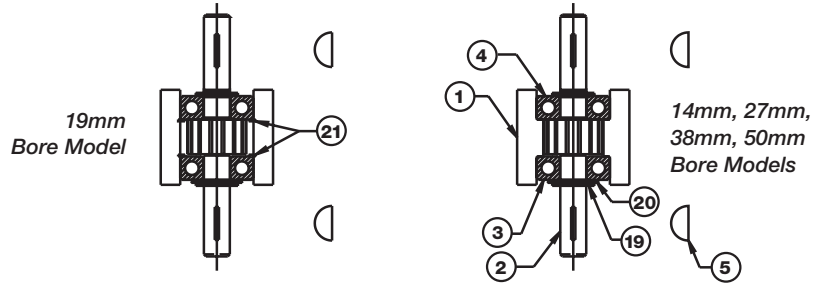
Bore	A	B	D	E	F	G	H	J
14mm (011)	20.6	N/A	N/A	5.8	6.1	M5 x 0.8	N/A	13.4
14mm (022)	20.6	N/A	N/A	5.8	6.1	M5 x 0.8	N/A	13.4
19mm (027)	22.1	10.4	12.2	5.6	6.4	M5 x 0.8	N/A	18.0
19mm (054)	22.1	10.4	12.2	5.6	6.4	M5 x 0.8	N/A	18.0
27mm (060)	33.1	15.9	12.8	14.2	8.4	G-1/8	19.2	19.2
27mm (121)	33.1	15.9	12.8	14.2	8.4	G-1/8	19.2	19.2
38mm (161)	39.6	17.4	15.1	12.5	9.1	G-1/8	23.7	23.7
38mm (321)	39.6	17.4	15.1	12.5	9.1	G-1/8	23.7	23.7
50mm (404)	52.8	22.1	20.2	13.5	10.4	G-1/4	32.4	32.4
50mm (808)	52.8	22.1	20.2	13.5	10.4	G-1/4	32.4	32.4

Repair Parts

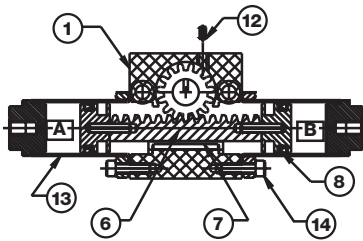
Standard Shaft



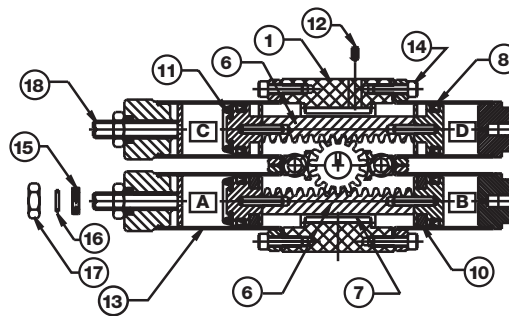
Ball Bearing (R) Option



Single Rack Model



Double Rack Model



Repair Parts

No.	Part Description	Quantity Required	
		Single	Double
PT-1	Actuator Body	1	1
PT-2	Shaft/Pinion Assembly	1	1
PT-3	Front Shaft Bearing	1	1
PT-4	Rear Shaft Bearing	1	1
PT-5	Shaft Key	1	1
PT-6	Piston/Rack Assembly (Includes Rack, Roll Pins and 2 Pistons)	1	2
PT-7	Rack Support	1	2
PT-8	Piston Seal*	2	4
PT-9	Piston Wear Ring (Required for Oil Service only)	2	2
PT-10	Magnet	2	2
PT-11	Bumper	2	2
PT-12	Bearing Retainer Set Screw	1	1
PT-13	Cylinder Body Assembly (Includes Body, End Cap, and Retainer Ring)	2	4
PT-14	Cylinder Body Retainer Cap Screw ****	6	12
PT-15	Cylinder Body Thread Seal	2	2
PT-16	Cylinder Body Thread Seal Ring	2	2
PT-17	Cylinder Body Jam Nut	2	2
PT-18	Angle Adjustment Screw	2	2
	Retaining Ring	2	2
PT-19	Shim Package	1	1
	Shaft Spacers**	1	1

Repair Kits

Bearing Kit (K-A-PT)***		
PT-3	Front Shaft Bearing	1
PT-4	Rear Shaft Bearing	1

Shaft Kit (K-S-PT)		
PT-2	Shaft/Pinion Assembly	1
PT-5	Shaft Key	1

Seal Kit (K-L-PT)*		
PT-8	Piston Seals	2

* Double Rack Models require two repair kits per rotary actuator.

Oil Service Option: Single Rack models require four oil service seals or two oil service seal kits. Double Rack models require four oil service seals and two standard seals or two oil service seal kits and one standard seal kit.

** Used on 19mm bore single and double rack units with Ball Bearing option.

*** Bearing Kit for Ball Bearings includes retaining rings and shim package.

**** 50mm bore requires 8 or 16.

ISO 6431

ISO 6432

Flat

Pneu-Turn

Ultran

Flow Control

Position Sensing Solutions

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 pre-lube are available upon request.

The rack and pinion gear and ball bearings are pre-lubricated 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.

RATINGS:

Pressure Rating: All Bimba Pneu-Turn Rotary Actuators are rated for 10.34 bar air.

Rotation Tolerance: Standard rotation tolerance for 14mm-27mm is -0°+15° and for 38mm-50mm bore is 0° to 10°.

Temperature Range: Buna N: (Standard) -25°C to +95°C; Option (V) High temperature seals: -18°C to +205°C.

Temperature range of high temperature seals with Ball Bearing option is -18°C to +120°C. 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.

Standard Line

Series	14mm		19mm		27mm		38mm		50mm	
	(011)	(022)	(027)	(054)	(060)	(121)	(161)	(321)	(404)	(808)
Theoretical Torque Capacity (N-m/bar)	0.111	0.221	0.272	0.542	0.604	1.210	1.608	3.214	4.040	8.081
Bearing Load (Axial) (N)	110	110	110	110	175	175	175	175	350	350
Bearing Load (Radial) (N)	890	890	1110	1110	1335	1335	1550	1550	2220	2220
Distance Between Bearing Midpoints (mm)	19.8	19.8	24.3	24.3	33.8	33.8	44.4	44.4	50.3	50.3
Maximum Rate of Rotation (@6.9 bars 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) (grams)	200	380	360	670	790	1430	1470	2730	2970	4310
Body Retainer Cap Screw Recommended Tightening Torque (N-m)	1.13	1.13	1.13	1.13	2.26	2.26	2.26	2.26	2.26	2.26

For Ball Bearing Option, the Following Specifications Apply

Series	14mm		19mm		27mm		38mm		50mm	
	(011)	(022)	(027)	(054)	(060)	(121)	(161)	(321)	(404)	(808)
Bearing Load (Axial) (N)	250	250	350	350	450	450	500	500	600	600
Bearing Load (Radial) (N)	900	900	1200	1200	1700	1700	1900	1900	3300	3300
Distance Between Bearing Midpoints (mm)	16.9	16.9	21.2	21.2	30.5	30.5	40.4	40.4	46.3	46.3
Weight (Approximate) (grams)	190	370	350	650	740	1340	1360	2530	2885	4225

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 (Nm)

Size	Without Cushions	With Cushions
14mm (011 / 022)	.002	N/A
19mm (027 / 054)	.004	.009
27mm (060 / 121)	.008	.100
38mm (161 / 321)	.046	.880
50mm (404 / 808)	.181	1.47

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

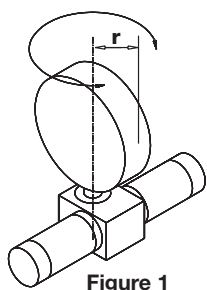
$$KE = 0.5 * I * w^2$$

$$w = 1.20 * (\theta / t)$$

LEGEND:

- KE = Kinetic energy (Nm)
- I = Moment of inertia (kg-m²)
- w = Rotational speed (radians/sec.)
- θ = Angle of rotation (radians)
- t = Time of rotation (sec.)
- W = Weight of load (N)
- g = Acceleration of gravity (9.80m/sec.²)

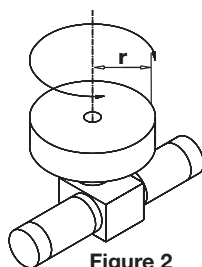
Below are examples of attachments, their geometry, and the equation to use to determine the Moment of Inertia.



Thin Disc
(mounted on side
through center)

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

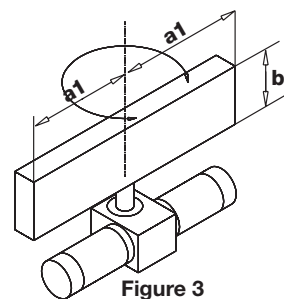
Figure 1



Thin Disc
(centered)

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

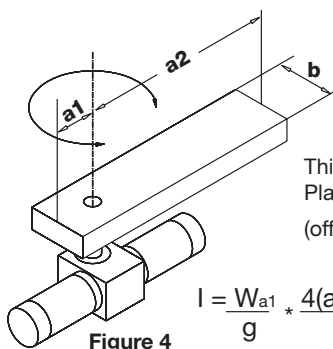
Figure 2



Thin Rectangular
Plate
(centered and
mounted on side)

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

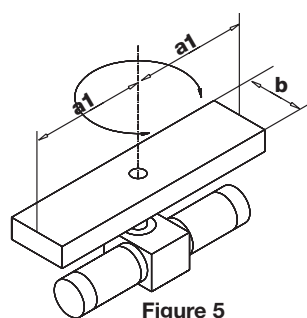
Figure 3



Thin Rectangular
Plate
(off-centered)

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

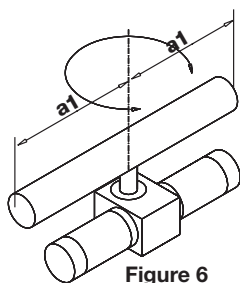
Figure 4



Thin Rectangular
Plate
(centered)

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

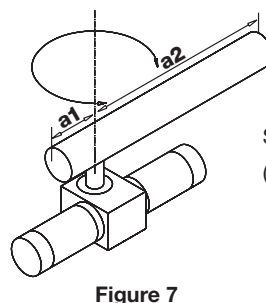
Figure 5



Slender Rod
(centered)

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

Figure 6



Slender Rod
(off-centered)

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

Figure 7

ISO 6431

ISO 6432

Flat

Pneu-Turn

Ultran

Flow Control

Position Sensing Solutions

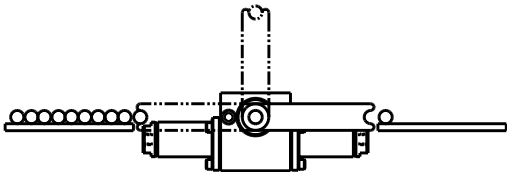
Applications

Picture the possibilities. Consider the many benefits of using the Bimba Pneu-Turn Rotary Actuator:

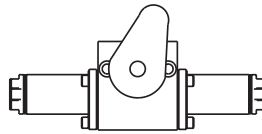
- Compact, Space-Saving Design
- Lightweight
- Corrosion Resistant Components
- Low Cost

Now, using the pictures on this page as a springboard, you can understand that the applications are limitless. All you need is your imagination and a Bimba Pneu-Turn Rotary Actuator.

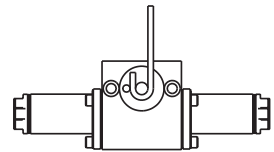
Transferring



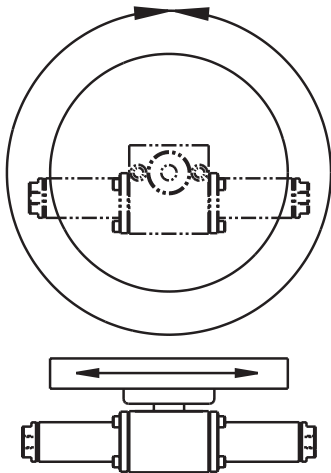
Camming



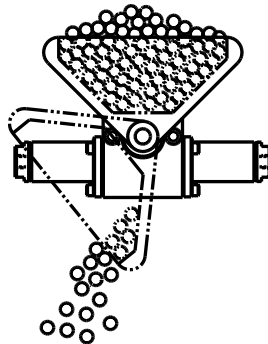
Bending (Tube or Wire)



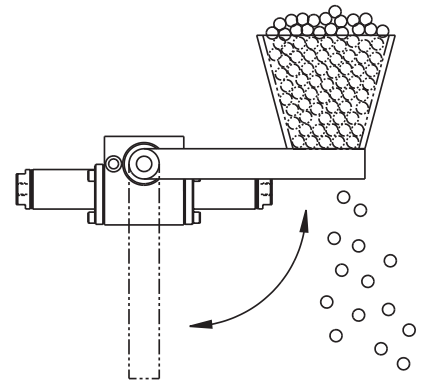
Indexing



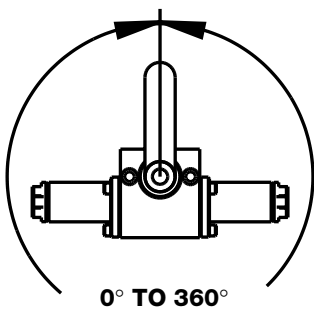
Unloading



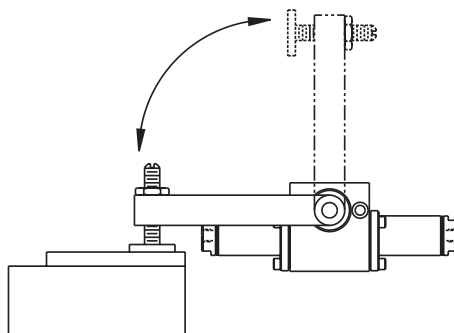
Opening/Closing



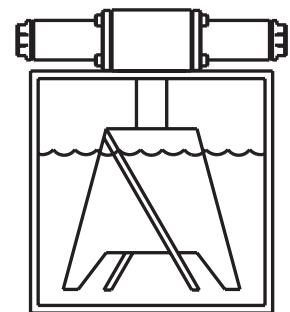
Turning



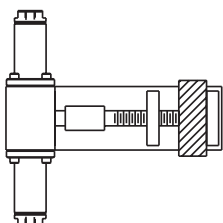
Clamping



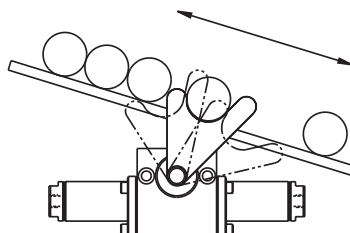
Mix/Agitate



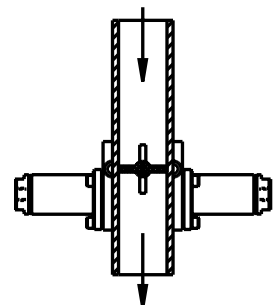
Screw/Clamping



Feeding



Valve Actuator



Pneu-Turn Application Checklist

This checklist makes sizing and selecting Bimba actuators easier. Bimba's Engineering Department will assist you by providing a detailed analysis of your application and, based on the information in the application checklist, will help you choose the actuators best suited to your needs.

Step 1. Photocopy the sketch and checklist sheets.

Step 2. Complete the sketch and checklist.

Step 3. Mail or fax the sketch and checklist to your local stocking distributor.

Date: _____

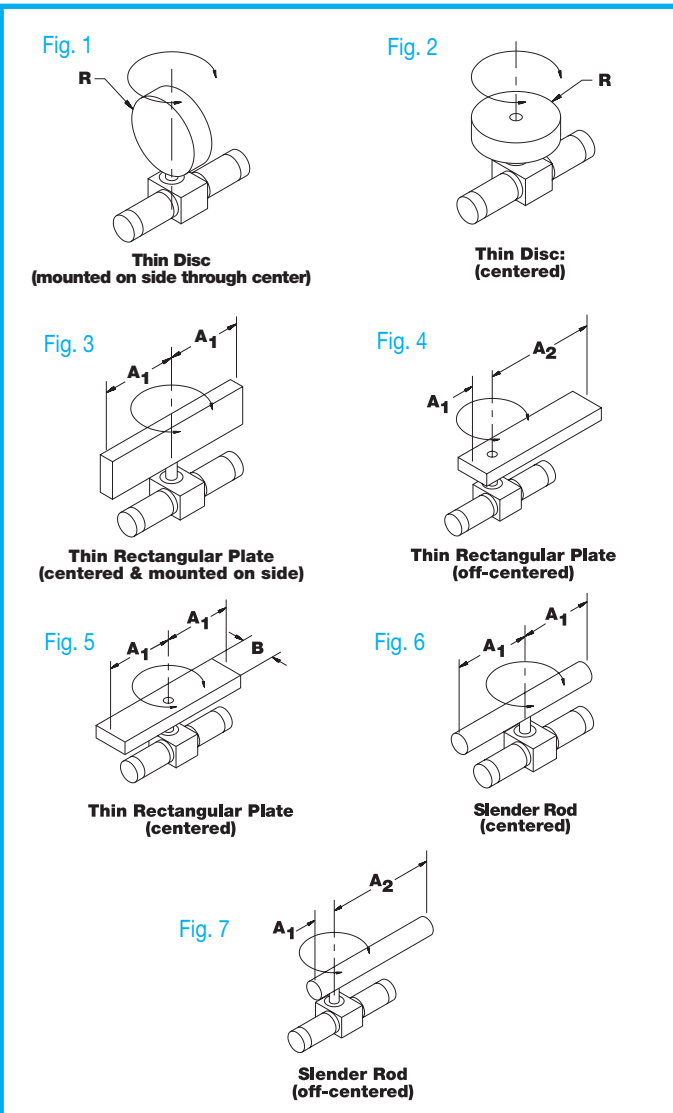
Your Name: _____

Company: _____

Address: _____

Phone: _____

Fax: _____



Request Pneu-Turn model number recommended by Engineering? Yes _____ No _____

If no, Pneu-Turn model number to be used in your application: _____

Air _____ Bar Hydraulic _____ Bar

Torque Required:

0 – 15 Nm 75 – 100 Nm
 15 – 35 Nm 200 – 500 Nm
 35 – 75 Nm other: _____

Application closest to (circle one):

Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6 Fig. 7

Dimensions applicable to your lever arm:

Radius _____ mm A1 _____ mm
 A2 _____ mm B _____ mm

Weight and material of lever arm and attachments:

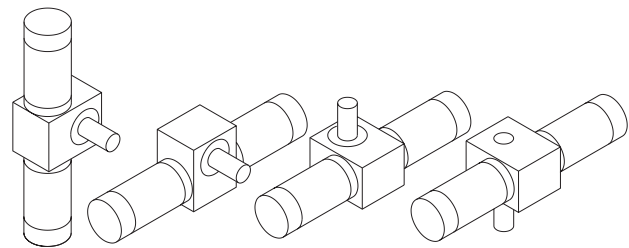
_____ N _____ N material: _____

Load to be moved by the lever arm:

_____ N _____ N

Distance from the center of the load to the center of the shaft: _____ mm

Shaft Mounted: (shaft, cylinders)



(horiz., vert.) (horiz., horiz.) (vert. (up), horiz.) (vert. (down) horiz.)

Axial loading? Yes _____ No _____

If yes, direction with reference to pushing or pulling the standard shaft: _____

Rotation of lever arm: _____ degrees

Time needed to move load in one direction:

_____ secs. Opposite direction _____ secs.

May cushions be used to slow the load at the end of stroke?

Yes _____ No _____

May external stops be used if deemed necessary?

Yes _____ No _____

ISO 6431

ISO 6432

Flat

Pneu-Turn

Ultram

Flow Control

Position Sensing Solutions

