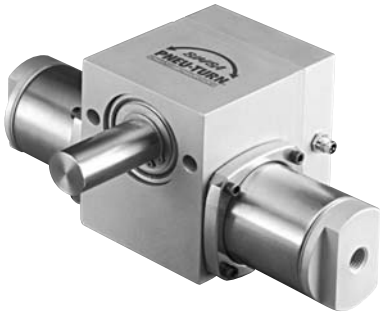


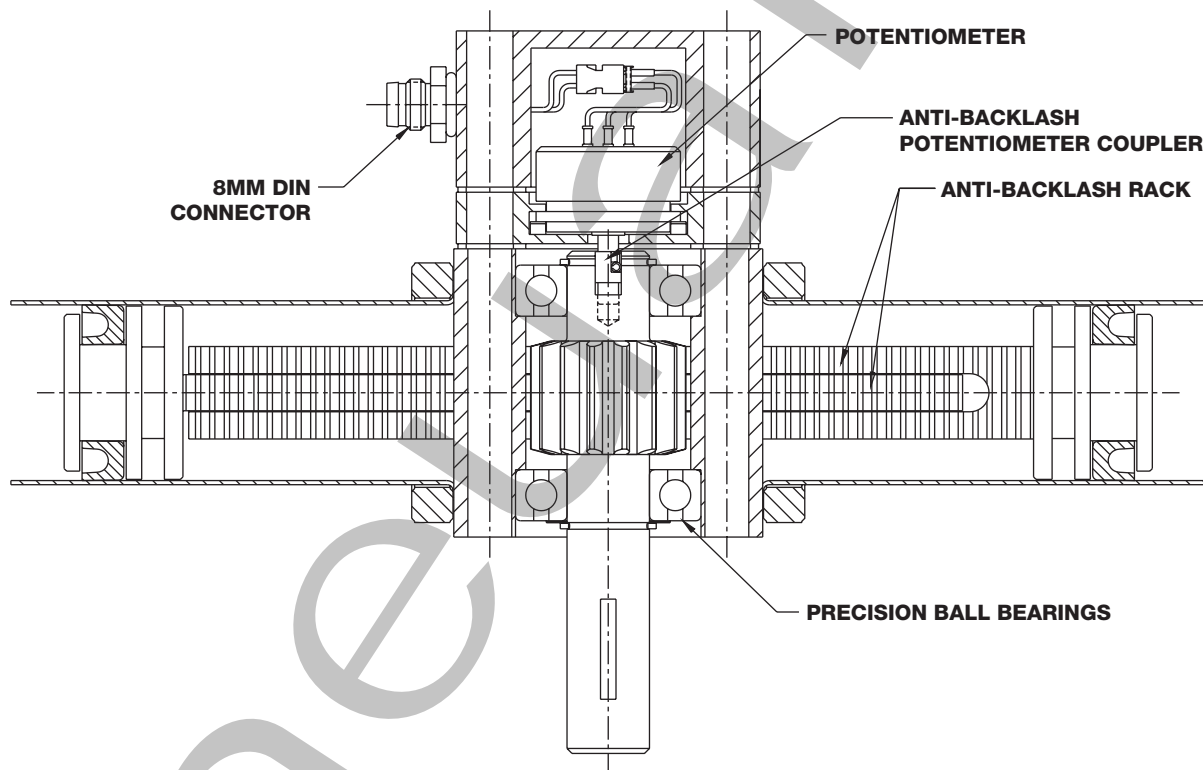
Bimba Position Feedback Pneu-Turn

How it Works

Pneu-Turn® Position Feedback Rotary Actuator - Model PTF



The Bimba Pneu-Turn® position feedback rotary actuator (PTF) provides continuous shaft position sensing. Standard features include shaft ball bearings and the elimination of mid-rotational backlash. Use the Bimba PTF in conjunction with Bimba's Pneumatic Control System (PCS) to achieve rotary shaft positioning accuracy within $\pm 0.5^\circ$.



Bimba Position Feedback Pneu-Turn

How to Order

The model number of the Pneu-Turn rotary actuator with shaft position feedback capabilities consist 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 PTF-098180-A1H1. This is a 1-1/2" bore, single rack, 180° angle of rotation actuator with angle adjustment on both sides and the plug connector located on the clockwise side.

PTF-098180-A1H1

SERIES - TORQUE FACTOR
098 - 1-1/2" Bore, Single Rack
196 - 1-1/2" Bore, Double Rack
247 - 2" Bore, Single Rack
494 - 2" Bore, Double Rack
PTF base units include ball bearing and anti-backlash options.
To determine theoretical output torque (in-lbs.), place a decimal point between the first and second digits of the series number. Then multiply that number by the air line pressure for the approximate torque produced.
For example, a PT-098 will produce an output torque of .98 times the air line pressure.

STANDARD ANGLE OF ROTATION
045 - 45°
090 - 90°
180 - 180°
325 - 325°
Larger rotational angles are available. Contact your Bimba distributor.

OPTIONS
A1 - Angle adjustment, both sides
A2 - Angle adjustment, counterclockwise rotation
A3 - Angle adjustment, clockwise rotation
B1 - Bumpers, both sides
B2 - Bumpers, counterclockwise rotation
B3 - Bumpers, clockwise rotation
C1 - Cushion, both sides ¹
C2 - Cushion, counterclockwise rotation ¹
C3 - Cushion, clockwise rotation ¹
G - Magnalube® G lubrication
H1 - Plug connector, clockwise side
H2 - Plug connector, back of plate
H3 - Plug connector, bottom of plate
K - Square key
M - MRS® magnetic position sensing
S - Seals, oil service ²
V - High temperature option (0°F to 250°F) ³
¹ Cushions will reduce positioning accuracy.
² Oil service not recommended for applications at pressures less than 40 psi.
³ Ball bearing units with high temperature option is 0°F to 250°F.

® Magnalube is a registered trademark of Carleton Stuart Corporation.

Position Feedback
Cylinders

Position Feedback
Cylinder Rod Lock

Position Feedback
Cylinder Accessories

Position Feedback
Pneu-Turn

Position
Control System

Digital Panel Meter

Electronic Controller

PLC/PCS
Application Checklist

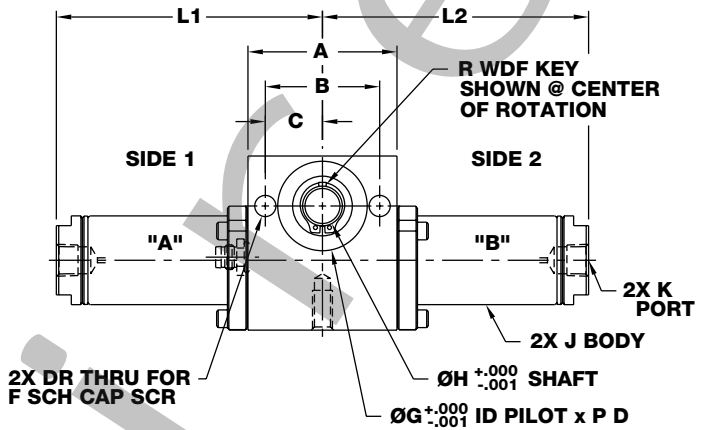
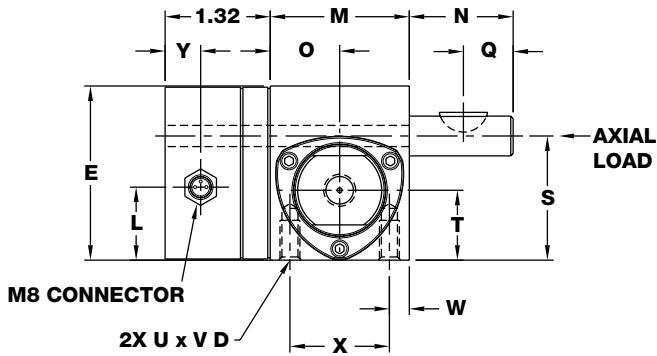
Bimba Position Feedback Pneu-Turn

Due to design or compatibility restrictions, the following options may **not** be ordered in combination. For example, C (Cushions) and B (Bumpers) are not available in combination.

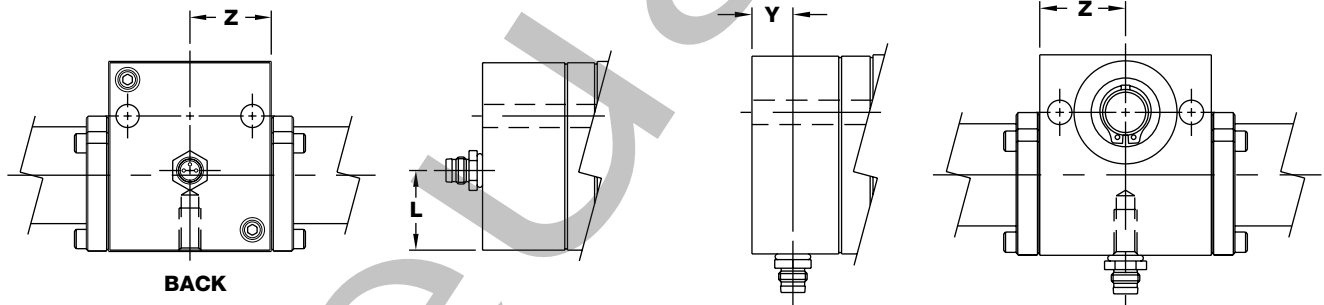
Option Series	A	B	C	K	M	S	V
1-1/2" (098)	N/A	C,S	B,S	N/A	V	B,C	M
1-1/2" (196)	N/A	C,S	B,S	N/A	V	B,C	M
2" (247)	N/A	C,S	B,S	N/A	V	B,C	M
2" (494)	N/A	C,S	B,S	N/A	V	B,C	M

Bimba Position Feedback Pneu-Turn

Single Rack Models (in.)



Plug connector shown in standard position. The H1 option dimensionally positions the connector on the clockwise rotation side.



Bore	A	B	C	E	F	G (Ball Bearing I.D. Pilot)	H	J	K	L	M
1-1/2" (098)	2.38	1.81	0.90	2.84	5/16" S.H.C.S.	1.375	0.625	1.56	1/8 NPT	1.449	2.25
2" (247)	3.00	2.38	1.19	3.75	5/16" S.H.C.S.	1.875	0.875	2.08	1/4 NPT	1.918	2.56

Bore	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1-1/2" (098)	1.38	1.12	0.09	0.62	#405	2.09	1.15	5/16-18	0.62	0.31	1.62	0.45	1.19
2" (247)	2.00	1.28	0.10	0.75	#606	2.56	1.28	5/16-18	0.62	0.28	2.00	0.45	1.50

Position Feedback
Cylinders

Position Feedback
Cylinder Rod Lock

Position Feedback
Cylinder Accessories

Position Feedback
Pneu-Turn

Position
Control System

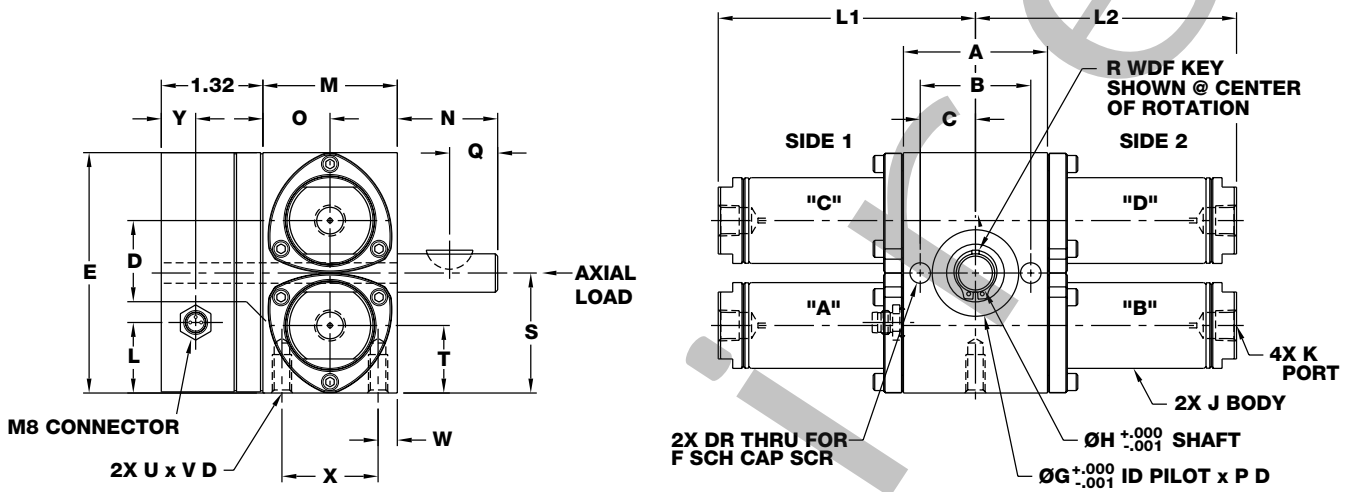
Digital Panel Meter

Electronic Controller

PFC/PGS
Application Checklist

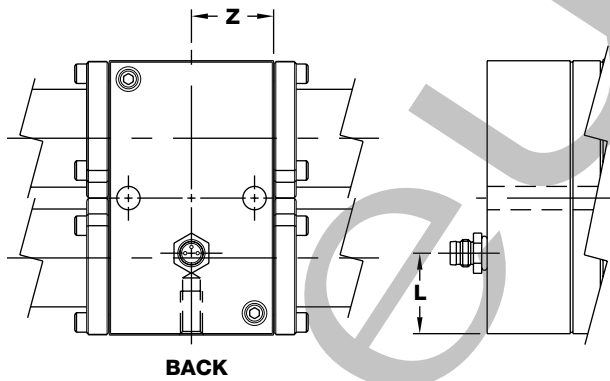
Bimba Position Feedback Pneu-Turn

Double Rack Models (in.)

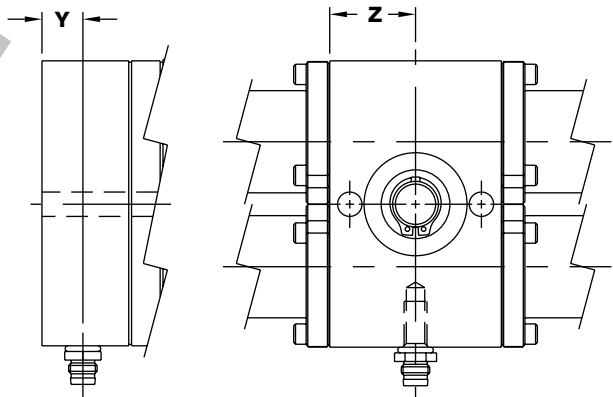


Plug connector shown in standard position. The H1 option dimensionally positions the connector on the clockwise rotation side.

H2 Option



H3 Option



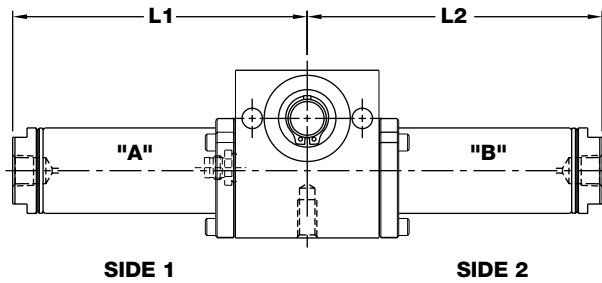
Bore	A	B	C	D	E	F	G (Ball Bearing I.D. Pilot)	H	J	K	L	M
1-1/2" (196)	2.38	1.81	0.90	1.88	4.19	5/16" S.H.C.S.	1.375	0.625	1.56	1/8 NPT	1.449	2.25
2" (494)	3.00	2.38	1.19	2.56	5.13	5/16" S.H.C.S.	1.875	0.875	2.08	1/4 NPT	1.918	2.56

Bore	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1-1/2" (196)	1.38	1.12	0.09	0.62	#405	2.09	1.15	5/16-18	0.62	0.31	1.62	0.45	1.19
2" (494)	2.00	1.28	0.10	0.75	#606	2.56	1.28	5/16-18	0.62	0.28	2.00	0.45	1.50

Bimba Position Feedback Pneu-Turn

Single Rack Options (in.)

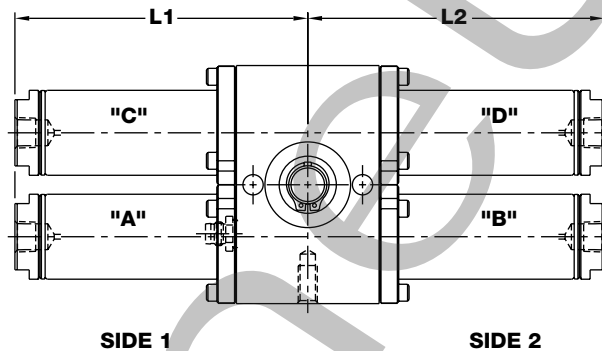
(Dimensional variations from standard as shown)



	1-1/2" (098)		2" (247)	
	L1	L2	L1	L2
Adder per Degree of Rotation	0.0097	0.0097	0.0137	0.0137
Base Unit (No Options)	2.34	2.34	2.84	2.84
Bumper Both Sides (B1)	2.49	2.49	3.04	3.04
Bumper CCW Side (B2)	2.34	2.49	2.84	3.04
Bumper CW Side (B3)	2.49	2.34	3.04	2.84
Cushion Both Sides (C1)	2.98	2.98	3.65	3.65
Cushion CCW Side (C2)	2.34	2.98	2.84	3.65
Cushion CW Side (C3)	2.98	2.34	3.65	2.84
Oil Service Seals (S)	2.77	2.77	3.38	3.38
Oil Service with Angle Adjustment (AS)	3.41	3.41	4.19	4.19

Double Rack Options (in.)

(Dimensional variations from standard as shown)



	1-1/2" (098)		2" (247)	
	L1	L2	L1	L2
Adder per Degree of Rotation	0.0097	0.0097	0.0137	0.0137
Base Unit (No Options)	2.34	2.39	2.84	2.89
Bumper Both Sides (B1)	2.49	2.39	3.04	2.89
Bumper CCW Side (B2)	2.49	2.39	3.04	2.89
Bumper CW Side (B3)	2.49	2.39	3.04	2.89
Cushion Both Sides (C1)	2.98	2.39	3.65	2.89
Cushion CCW Side (C2)	2.98	2.39	3.65	2.89
Cushion CW Side (C3)	2.98	2.39	3.65	2.89
Oil Service Seals (S)	2.77	2.39	3.38	2.89
Oil Service with Angle Adjustment (AS)	3.41	2.39	4.19	2.89

"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 models and tube C for double rack models.

"CW Side" –

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

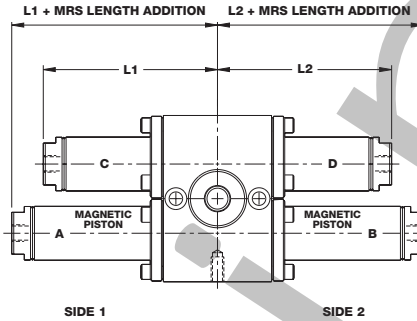
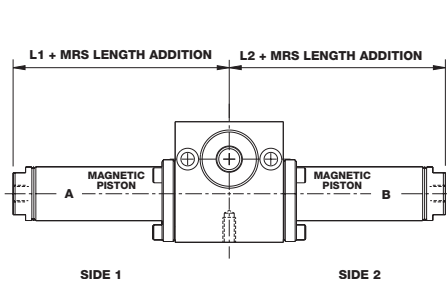
The location of the optional feature chosen will be on tube A for both single and double rack models.

Bimba Position Feedback Pneu-Turn

Options

MRS® Magnetic Position Sensing

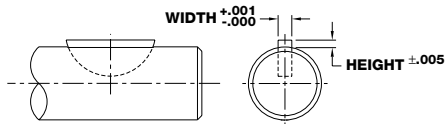
Magnetic pistons are located on the A and B tubes of both the single and double rack rotary actuators, guaranteeing switch operation at any point in the rotation.



MRS® Length Adder (in.)

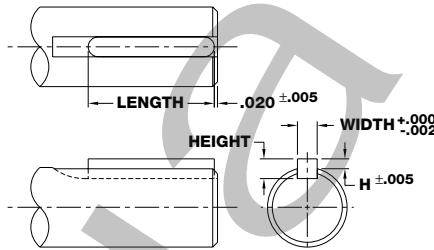
Degrees	098/196	247/494
45°	0.75	0.75
90°	0.53	0.44
180°	0.09	0.00
325°	0.00	0.00

Woodruff Key (in.)



Key No.	Width	Height
405	0.1250	0.063
606	0.1875	0.094

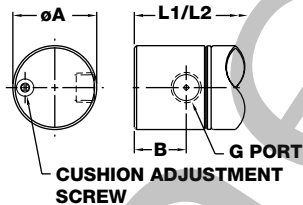
Square Key (in.)



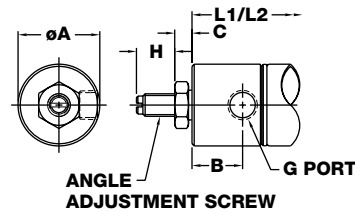
Bore Size	Length	Width	Height	H
1-1/2" (098/196)	0.797	0.188	0.188	0.094
2" (247/494)	1.781	0.250	0.250	0.125

Option Dimensions

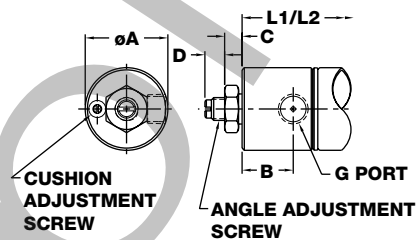
Cushion (C Option) (in.)



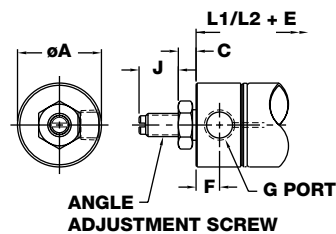
Angle Adjustment with Oil Service Seals (AS Option) (in.)



Angle Adjustment with Cushion (AC Option) (in.)



Angle Adjustment (A Option) (in.)

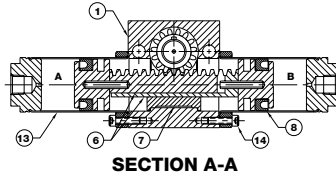
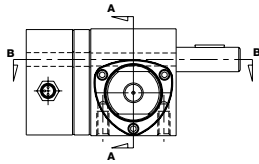


Bore	A	B	C	D	E	F	G	H	J
1-1/2" 098 and 196	1.56	0.77	0.27	0.33	0.42	0.34	1/8 NPT	0.67	0.67
2" 247 and 494	2.08	0.87	0.31	0.49	0.53	0.41	1/4 NPT	0.97	0.97

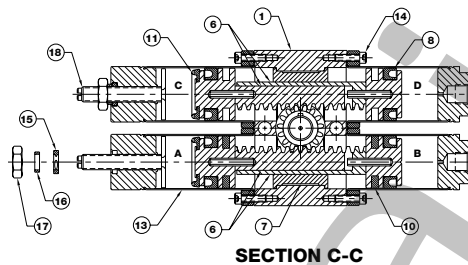
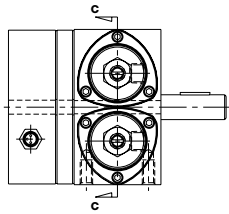
Bimba Position Feedback Pneu-Turn

Repair Parts

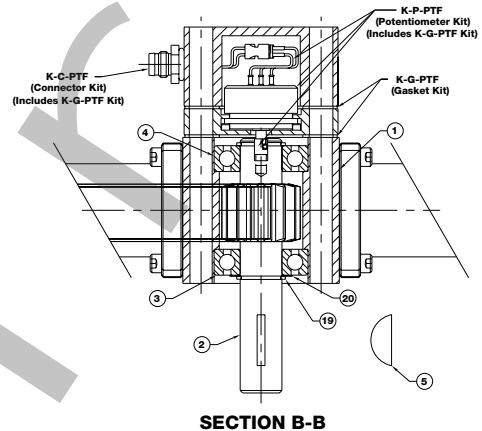
Single Rack Model



Double Rack Model



Ball Bearing® Option



Repair Parts

No.	Part Description	Quantity Required	
		Single	Double
PT-1-R	Actuator Body	1	1
PTF-2	Shaft/Pinion Assembly	1	1
PT-3-R	Front Shaft Ball Bearing	1	1
PT-4-R	Rear Shaft Ball Bearing	1	1
PT-5	Shaft Key	1	1
PT-7-X	Rack Support	1	2
PTF-8	Piston Seal ¹	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-13	Cylinder Body Assembly (Includes Body, End Cap, and Retainer Ring)	2	4
PT-14	Cylinder Body Retainer Cap Screw ²	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
PT-19	Retaining Ring	2	2
PT-20	Shim Package	1	1

¹ 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.

² 2" bore requires 8 or 16.

Repair Kits

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

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

Seal Kit (K-L-PTF)		
PTF-8	Piston Seals	2

Gasket Kit (K-G-PTF)		
Gasket		1

Connector Kit (K-C-PTF)		
Connector Assy.		1
Gasket		2

Potentiometer Kit (K-P-PTF)		
Pin Header		1
Potentiometer Assy.		1
Potentiometer Coupler		1
Gasket		2

Position Feedback
Cylinders

Position Feedback
Cylinder Rod Lock

Position Feedback
Cylinder Accessories

Position Feedback
Pneu-Turn

Position
Control System

Digital Panel Meter

Electronic Controller

PLC/PCS
Application Checklist

Bimba Position Feedback Pneu-Turn

Engineering Specifications

Repeatability:	$\pm 0.01^\circ$ (of potentiometer itself)
Nonlinearity:	$\pm .88^\circ$ ($\pm 0.25\%$ of $340 \pm 4^\circ$)
Resolution:	Infinite
Signal Input:	10 VDC typical
Input Impedance Required:	100 Kohm
Signal Output:	0 to 10 VDC FS (depends on FS mechanical rotation)
Rated Life of Potentiometer:	10 million cycles
Temperature Coefficient:	± 600 ppm/ $^\circ\text{C}$
Electrical Rotation:	$340^\circ \pm 4^\circ$

General Specifications

Rotary action of the Pneu-Turn rotary actuator is achieved through the use of a rack and pinion assembly. Just as with any hydraulic or pneumatic cylinder, the speed of rotation may be controlled through the use of flow controls. The PTF may also be controlled with Bimba's Pneumatic Control System, Model PCS.

Care should be taken to insure that the inertial force does not exceed the published torque capacity.

Port Positioning

Ports on the PTF may be repositioned to accommodate any air line configuration by loosening the three body retainer screws. Once desired port positions are obtained, screws must be tightened to specified torque values in the table below.

Lubrication

The PTF is prelubricated 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 the oil to the actuator every 500 hours of operation. Recommended oils for Buna N seals are medium to heavy inhibited hydraulic or general purpose oil.

The rack and pinion gear and ball bearings are prelubricated at the factory for extensive maintenance free operation. If additional lubrication is 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: 150 psi air or oil with S Option

Rotation Tolerance:

1-1/16" - 2" bore is -0° to $+10^\circ$. The Angle Adjustment Option allows 45° of adjustability. If cushions are ordered in conjunction with the angle adjustment option, adjustability will be 10° .

Temperature Range: Standard Seals: -20° to 200°F ; V Option High Temp seals: 0° to 250° .

Note: If used for positioning applications, it is recommended to use low temperature lubricant for temperatures less than 35°F .

Backlash: Both single and double rack models have zero mid-rotational and end of rotation backlash.

Breakaway: Less than 3 psi.

Series	1-1/2"		2"	
	(098)	(196)	(247)	(494)
Theoretical Torque Capacity (in-lbs/PSI)	0.982	1.963	2.468	4.935
Bearing Load (Axial lbs)	110	110	130	130
Bearing Load (Radial lbs)	425	425	740	740
Distance between bearing midpoints (in)	1.71	1.71	1.82	1.82
Maximum rate of rotation (@ 100 PSI with no load)	1500 deg/sec	1500 deg/sec	1000 deg/sec	1000 deg/sec
Weight (approximate oz)	47	88	103	150
Body Retainer cap screw recommended tightening torque (in-lbs)	20	20	20	20