



## RP-BA-Series Aluminum Rack and Pinion Actuator

### Application

- Utilized with industrial and sanitary valves for quarter turn actuation in industrial, food, beverage, and pharmaceutical industries

### Features

- Body: extruded hard anodized aluminum alloy provides wear and corrosion resistance
- Heavy duty spring: high tensile steel springs with retainer and guide for safety
- Pistons: die-cast aluminum alloy fitted with nylon bushing guides and nitrile rubber seats
- End caps: epoxy-coated die-cast aluminum alloy for maximum resistance to corrosive environments
- Pinion: electroless nickel plated carbon steel for maximum corrosion and wear resistance
- Rotation adjustment: full  $\pm 5^\circ$  of travel adjustments in the open and closed positions, standard on all sizes
- Solenoid interface: international VDE/VDI 3845 NAMUR solenoid mounting standard on all models
- Indicator: high visibility polyethylene, open/close indication is standard on all models
- Tested to 1 million cycles
- Twin rack and pinion design
- Female double square output shaft
- ISO 5211 bolt patterns

### Specifications

- Size range: 40 in-lb to 16,500 in-lb
- Standard connections: ISO 5211 mounting pad
  - F04, F05, F07, F10, F12, F14
- Operating pressure: **40 to 120 PSI**
- Maximum pressure rating: **150 PSI**
- Temperature range: **-4°F to 200°F (-20°C to 93°C)**
- FKM seal maximum temperature: **350°F (176°C)**
- Operating media: dry or lubricated
- Piston and pinion lubrication: Shell Darina R2
- Range of rotation adjustment: 80° to 100°
- Cycle times
  - Overall cycle time performance will vary greatly for each unit
  - Cycle times are dependent on air supply, valve torque, line pressure, temperature, and media



### RP-BA-Series Spring Return Torque Ratings (in-lb)

Part #	Spring Set	Spring Torque		Air Torque									
				40 PSI		60 PSI		80 PSI		100 PSI		120 PSI	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
RP-BA-025-SR	2	69	45	76	47	138	109	201	172	263	234	326	312
	3	104	67			113	70	176	133	229	195	301	258
	<b>4</b>	<b>140</b>	<b>90</b>			<b>88</b>	<b>31</b>	<b>151</b>	<b>93</b>	<b>213</b>	<b>156</b>	<b>276</b>	<b>218</b>
	5	175	112					126	54	189	116	251	179
	6	209	135							164	77	227	139
RP-BA-045-SR	2	126	81	135	83	248	196	361	309	473	421	586	533
	3	190	121			203	125	316	238	428	350	541	463
	<b>4</b>	<b>254</b>	<b>162</b>			<b>158</b>	<b>54</b>	<b>271</b>	<b>167</b>	<b>383</b>	<b>279</b>	<b>496</b>	<b>392</b>
	5	317	202					226	96	339	209	451	321
	6	381	243							293	137	406	251
RP-BA-101-SR	2	279	179	300	184	549	433	798	682	1048	931	1297	1181
	3	418	270			449	278	698	526	947	775	1196	1025
	<b>4</b>	<b>559</b>	<b>360</b>			<b>350</b>	<b>120</b>	<b>599</b>	<b>371</b>	<b>848</b>	<b>618</b>	<b>1097</b>	<b>867</b>
	5	698	450					500	212	749	464	998	710
	6	839	540							650	304	899	557
RP-BA-225-SR	2	659	394	690	395	1253	958	1816	1521	2379	2084	2939	2647
	3	990	590			1034	591	1596	1154	2159	1717	2722	2280
	<b>4</b>	<b>1320</b>	<b>787</b>			<b>816</b>	<b>226</b>	<b>1379</b>	<b>788</b>	<b>2029</b>	<b>1351</b>	<b>2505</b>	<b>1914</b>
	5	1650	984					1161	424	1724	984	2287	1549
	6	1980	1181							1506	621	2069	1181
RP-BA-365-SR	2	1053	607	1152	659	2063	1570	2975	2482	3886	3393	4797	4305
	3	1573	912			1726	996	2637	1907	3549	2819	4460	3730
	<b>4</b>	<b>2091</b>	<b>1217</b>			<b>1388</b>	<b>423</b>	<b>2300</b>	<b>1335</b>	<b>3211</b>	<b>2246</b>	<b>4123</b>	<b>3157</b>
	5	2625	1519					1967	744	2878	1655	3789	2566
	6	3144	1824							2540	1082	3452	1994
RP-BA-500-SR	2	1560	785	1590	803	2780	1990	3970	3180	5160	4380	6350	5570
	3	2340	1180			2380	1200	3570	2400	4760	3590	5960	4780
	<b>4</b>	<b>3130</b>	<b>1570</b>			<b>1980</b>	<b>414</b>	<b>3180</b>	<b>1600</b>	<b>4370</b>	<b>2800</b>	<b>5560</b>	<b>3990</b>
	5	3910	1960					2780	815	3970	2010	5160	3200
	6	4690	2360							3570	1220	4760	2410
RP-BA-110-SR	2	3400	1720	3460	1760	6060	4360	8660	6960	11300	9560	13900	12200
	3	5100	2570			5200	2650	7790	5240	10400	7840	13000	10400
	<b>4</b>	<b>6790</b>	<b>3430</b>			<b>4330</b>	<b>932</b>	<b>6930</b>	<b>3530</b>	<b>9520</b>	<b>6130</b>	<b>12100</b>	<b>8730</b>
	5	8490	4290					6060	1810	8660	4410	11300	7010
	6	10200	5150							7790	2700	10400	5300

NOTE: Spring set 4 is standard on all sizes

**RP-BA-Series Double Acting Torque Ratings (in-lb)**

Part #	40 PSI	60 PSI	80 PSI	100 PSI	120 PSI
RP-BA-012-DA	63	94	125	156	188
RP-BA-025-DA	125	187	250	312	375
RP-BA-045-DA	225	337	450	562	675
RP-BA-101-DA	500	750	1000	1250	1500
RP-BA-225-DA	1125	1687	2250	2812	3375
RP-BA-365-DA	1825	2738	3650	4563	5475
RP-DA-500-DA	2500	3750	5000	6250	7500
RP-BA-110-DA	5500	8250	11000	13750	16500

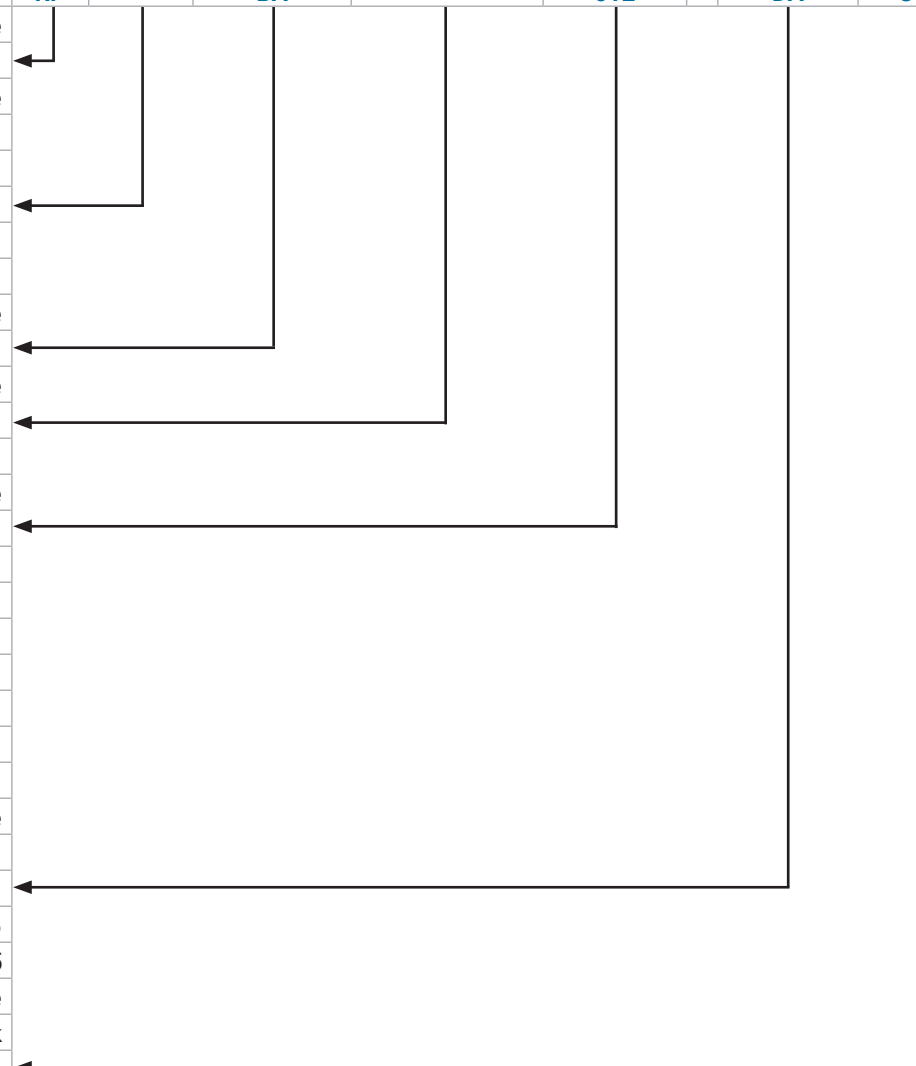
**Weight, Volume, Mounting, and Cycle Times - Spring Return**

Part #	Weight (lbs)	Volume		ISO 5211	Cycle Time (@ 80 PSI, No Load)	
		cm <sup>3</sup>	in <sup>3</sup>		Spring Side (seconds)	Air Side (seconds)
RP-BA-025-SR	4.21	170	10.37	F05	0.05	0.25
RP-BA-045-SR	5.20	324	19.77	F05/F07	0.08	0.39
RP-BA-101-SR	11.45	708	43.20	F05/F07	0.17	0.81
RP-BA-225-SR	22.50	1573	95.99	F07/F10	0.3	1.77
RP-BA-365-SR	40.55	2673	163.12	F10/F12	0.44	2.52
RP-BA-500-SR	57.80	3018	184.17	F10/F12	0.6	3.44
RP-BA-110-SR	116.40	6381	389.39	F14	1.31	7.10

**Weight, Volume, Mounting, and Cycle Times - Double Acting**

Part #	Weight (lbs)	Volume				ISO 5211	Cycle Time (@ 80 PSI, No Load, seconds)
		Outboard		Inboard			
		cm <sup>3</sup>	in <sup>3</sup>	cm <sup>3</sup>	in <sup>3</sup>		
RP-BA-012-DA	2.24	77	4.70	80	4.88	F04	0.04
RP-BA-025-DA05	2.36	139	8.48	170	10.37	F04	0.08
RP-BA-025-DA	2.36	139	8.48	170	10.37	F05	0.08
RP-BA-045-DA	5.00	252	15.38	324	19.77	F05/F07	0.10
RP-BA-101-DA	8.70	495	30.21	708	43.20	F05/F07	0.21
RP-BA-225-DA	17.25	1163	70.97	1573	95.99	F07/F10	0.50
RP-BA-365-DA	14.80	2415	147.37	2673	163.12	F10/F12	0.62
RP-BA-500-DA	45.00	2863	174.71	3018	184.17	F10/F12	1.80
RP-BA-110-DA	95.01	5591	341.18	6381	389.39	F14	3.80

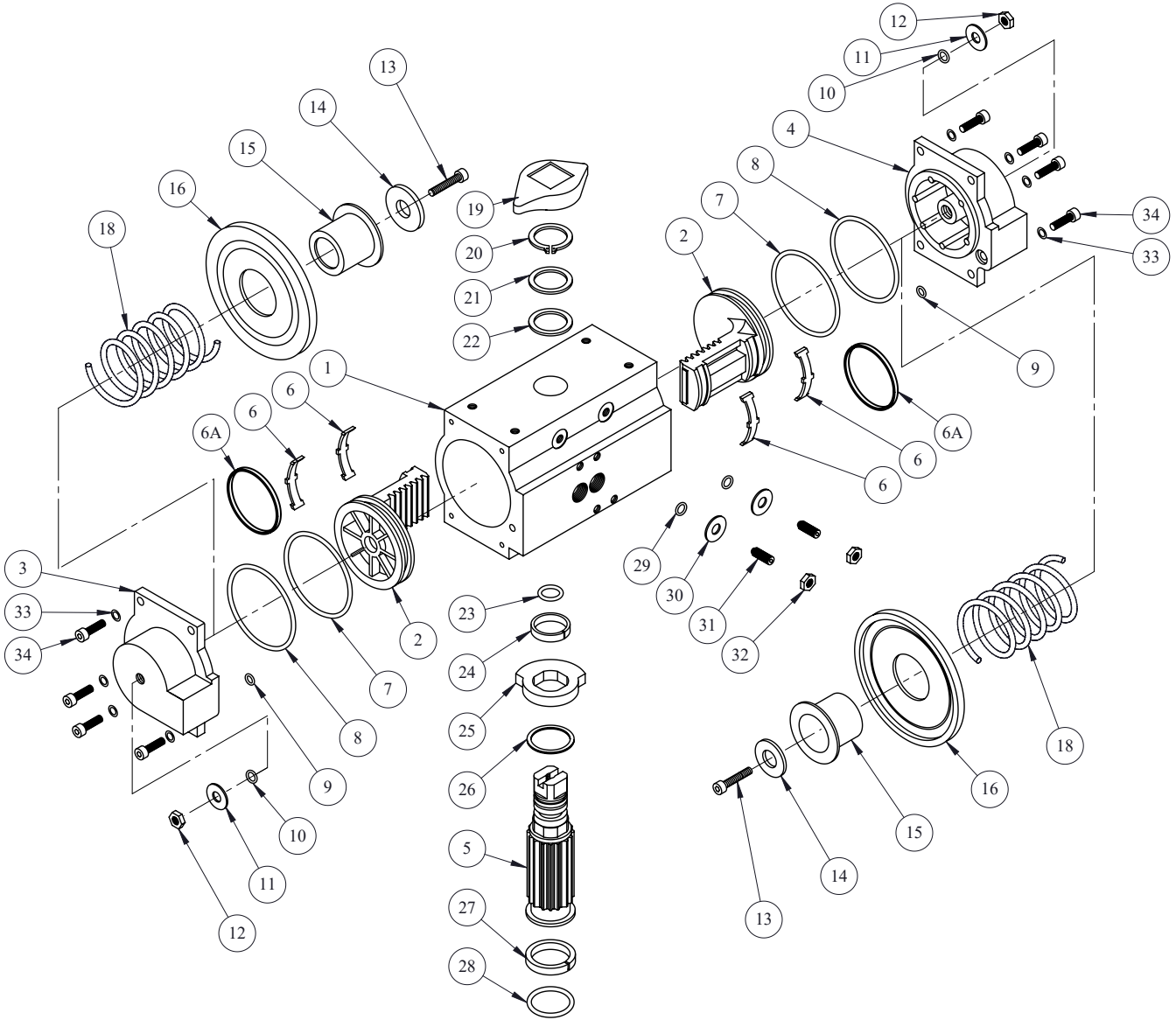
## RP-BA-Series Aluminum Rack and Pinion Actuator - Part Number Key

RP-BA-Series Aluminum Rack and Pinion Actuator Example: RP-BA-012-DACW		Type	Spring Set	Series	Elastomer	Size	Function	Rotation	
		RP	-	BA	-	012	-	DA	CW
<b>Type</b>	<b>Code</b>								
RP (rack and pinion)	RP								
<b>Spring Set</b>	<b>Code</b>								
2 spring set	2								
3 springs	3								
4 springs (standard)	-								
5 springs	4								
6 springs	5								
<b>Series</b>	<b>Code</b>								
BA	BA								
<b>Elastomer</b>	<b>Code</b>								
Nitrile Rubber (standard)	-								
FKM	V								
<b>Size</b>	<b>Code</b>								
012 (double acting only)	012								
025 (F04)	025								
045	045								
101	101								
225	225								
365	365								
500	500								
1000	110								
<b>Function</b>	<b>Code</b>								
Spring return	SR								
Double acting	DA								
Spring return F05 (025 only)	SR05								
Double acting F05 (025 only)	DA05								
<b>Rotation (air to P1)*</b>	<b>Code</b>								
Counter clockwise (standard)	blank								
Clockwise	CW								

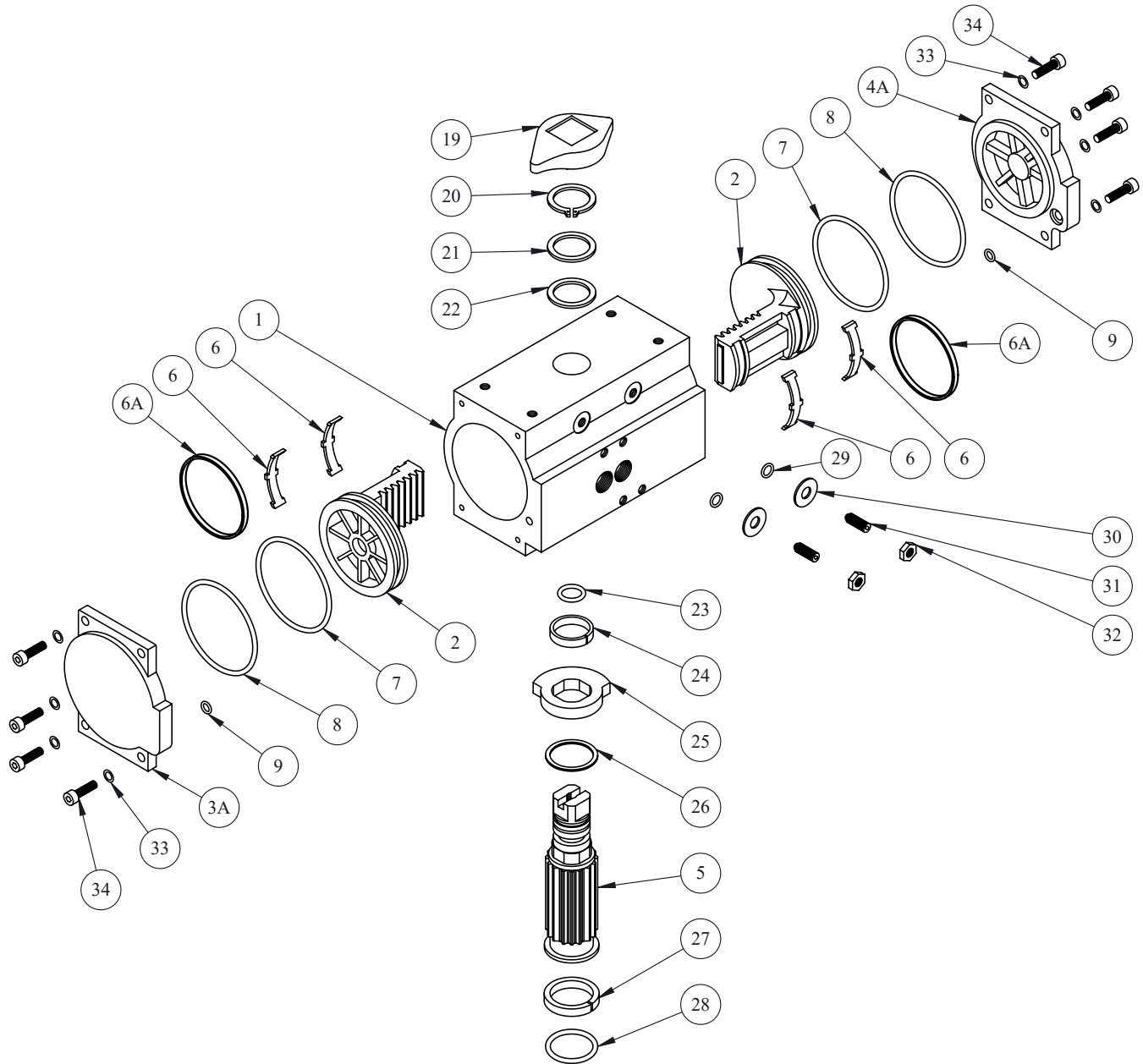
\*See drawing on page 10 for air to P1



RP-BA-Series Spring Return Actuator - Bill of Materials



### RP-BA-Series Double Acting Actuator - Bill of Materials



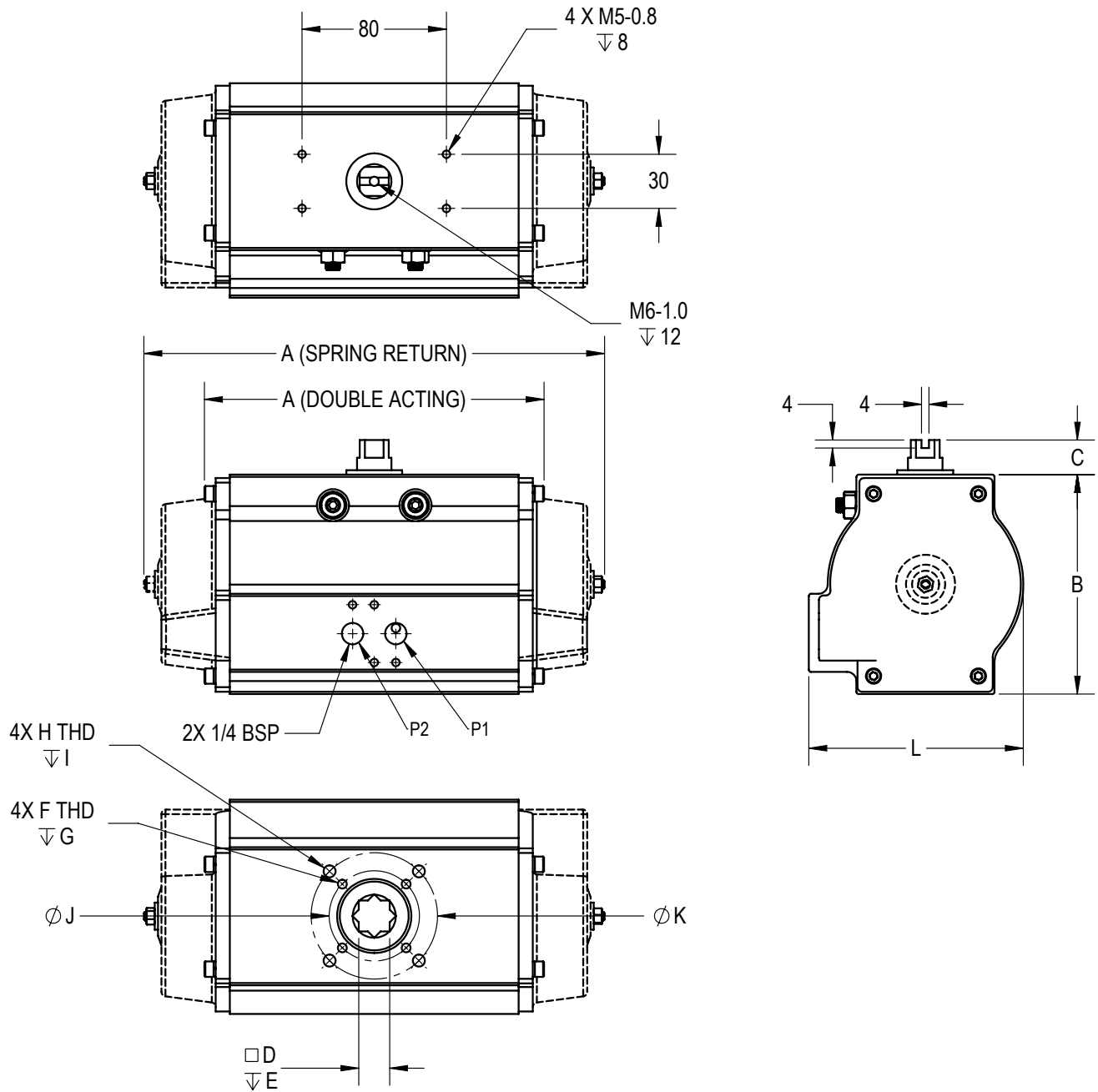
**RP-BA-Series Rack and Pinion Actuator - Bill of Materials**

Item	Description	Material	Quantity		Part Number
			SR	DA	
1	body	anodized aluminum alloy	1		RP-BA-###-1
2	piston	die-cast aluminum allow	2		RP-BA-###-2
3	left end cover SR	die-cast aluminum allow	1	-	RP-BA-###-3
3A	left end cover DA	die-cast aluminum allow	-	1	RP-BA-###-3A
4	right end cover SR	die-cast aluminum allow	1	-	RP-BA-###-4
4A	right end cover DA	die-cast aluminum allow	-	1	RP-BA-###-4A
5	pinion	carbon steel	1		RP-BA-###-5
6	bearing	nylon	*		RP-BA-###-6
6A	breaing	nylon	**		RP-BA-###-6A
7	O-ring	nitrile or FKM	2		RP-BA-###-7
8	O-ring	nitrile or FKM	2		RP-BA-###-8
9	O-ring	nitrile or FKM	2		RP-BA-###-9
10	O-ring	nitrile or FKM	2	-	RP-BA-###-10
11	washer	304 ss	2	-	RP-BA-###-11
12	nut	304 ss	2	-	RP-BA-###-12
13	screw	304 ss	2	-	RP-BA-###-13
14	washer	304 ss	2	-	RP-BA-###-14
15	spring guide	304 ss	2	-	RP-BA-###-15
16	retainer	304 ss	2	-	RP-BA-###-16
18	spring	high tensile steel	***	-	RP-BA-###-18
19	piston indicator	polyethylene	1		RP-BA-###-19
20	retaining ring	304 ss	1		RP-BA-###-20
21	washer	304 ss	1		RP-BA-###-21
22	bearing	nylon	1		RP-BA-###-22
23	O-ring	nitrile or FKM	1		RP-BA-###-23
24	bearing	nylon	1		RP-BA-###-24
25	stop cam	iron-based powdered metal	1		RP-BA-###-25
26	retaining ring	304 ss	1		RP-BA-###-26
27	bearing	nylon	1		RP-BA-###-27
28	O-ring	nitrile or FKM	1		RP-BA-###-28
29	O-ring	nitrile or FKM	2		RP-BA-###-29
30	washer	304 ss	2		RP-BA-###-30
31	stop screw	304 ss	2		RP-BA-###-31
32	nut	304 ss	2		RP-BA-###-32
33	washer	304 ss	8		RP-BA-###-33
34	cap screw	304 ss	8		RP-BA-###-34

\*Quantity 4 for size 012 to 101, quantity 2 for sizes 225 to 1000  
 \*\*Quantity 0 for sizes 012 to 101, quantity 2 for sizes 225 to 1000  
 \*\*\*Actual number of physical springs will depend on spring set being used  
 ###Refer to size below  
 - 012, 025, 045, 101, 225, 365, 500, 1000



### RP-BA-Series Aluminum Rack and Pinion Actuator - Dimensions



Size	A (in)		B (in)	C (in)	D (mm)	E (in)	F	G (mm)	H	I (mm)	J	K	L (in)
	Spring Return	Double Acting											
012	-	4.7	2.6	0.5	9	0.4	M5	8	-	-	F04	-	2.9
025 (F04)	7.7	5.7	3.1	0.5	11	0.7	M5	8	-	-	F04	-	3.2
025 (F05)	7.7	5.7	3.1	0.5	11	0.7	M6	10	-	-	F05	-	3.2
045	8.1	5.9	4.8	0.5	14	0.8	M6	10	M8	12	F05	F07	3.7
101	9.8	7.2	5.6	0.5	17	1.0	M6	10	M8	12	F05	F07	4.7
225	14.0	10.2	6.9	0.5	22	1.2	M8	12	M10	15	F07	F10	5.5
365	16.6	12.0	7.7	0.5	27	1.4	M10	15	M12	19	F10	F12	7.3
500	19.2	14.3	9.6	0.5	27	1.4	M10	15	M12	19	F10	F12	8.1
1000	25.3	19.3	25.3	0.5	36	1.8	M16	24	-	-	F14	-	9.4

**RP-BA-Series Aluminum Rack and Pinion Actuator - Repair Kits**

Kit Type	Part Number	Contains
Seal/Bearing Kit (Nitrile)	RP-012-RKB	Items 3, 4, 5, 9, 10, 16, 18, 19, 20
	RP-025-RKB	
	RP-045-RKB	
	RP-101-RKB	
	RP-225-RKB	
	RP-365-RKB	
	RP-500-RKB	
	RP-110-RKB	
Seal/Bearing Kit (FKM)	RP-012-RKV	Items 3, 4, 5, 9, 10, 16, 18, 19, 20
	RP-025-RKV	
	RP-045-RKV	
	RP-101-RKV	
	RP-225-RKV	
	RP-365-RKV	
	RP-500-RKV	
	RP-110-RKV	
End Cap/Spring Set Assembly	RP-025-SS	Items 6, 25, 26, 27, 28, 29, 30, 31, 32, 33
	RP-045-SS	
	RP-101-SS	
	RP-225-SS	
	RP-365-SS	
	RP-500-SS	
	RP-110-SS	

NOTE: All kits are qt. 1 kit/actuator  
 \* This part number is for spring set #4?

## Limited Warranty

DIXON VALVE & COUPLING COMPANY, LLC (herein called "Dixon") warrants the products described herein and manufactured by Dixon to be free from defects in material and workmanship for a period of one (1) year from date of shipment by Dixon under normal use and service. Its sole obligation under this warranty being limited to repairing or replacing, as hereinafter provided, at its option any product found to Dixon's satisfaction to be defective upon examination by it, provided that such product shall be returned for inspection to Dixon's factory within three (3) months after discovery of the defect. The repair or replacement of defective products will be made without charge for parts or labor. This warranty shall not apply to: (a) parts or products not manufactured by Dixon, the warranty of such items being limited to the actual warranty extended to Dixon by its supplier; (b) any product that has been subject to abuse, negligence, accident, or misapplication; (c) any product altered or repaired by others than Dixon; and (d) normal maintenance services and the replacement of service items (such as washers, gaskets, and lubricants) made in connection with such services. To the extent permitted by law, this limited warranty shall extend only to the buyer and any other person reasonably expected to use or consume the goods who is injured in person by any breach of the warranty. No action may be brought against Dixon for an alleged breach of warranty unless such action is instituted within one (1) year from the date the cause of action accrues. This limited warranty shall be construed and enforced to the fullest extent allowable by applicable law.

Other than the obligation of Dixon set forth herein, Dixon disclaims all warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose, and any other obligation or liability. The foregoing constitutes Dixon's sole obligation with respect to damages, whether direct, incidental, or consequential, resulting from the use or performance of the product.

Some products and sizes may be discontinued when stock is depleted or may require a minimum quantity for ordering.

## Limits of Liability

This brochure is intended as a product offering. It is not intended to be a user or technical manual. Information in this brochure is subject to change without notice. All users and distributors of products sold through this brochure should contact Dixon with questions of use, compatibilities, coupling procedures, and life of product. Our full-time engineering and test staff are always available to recommend uses and to assist distributors and users with any questions.



### Safety



Safety logos, which appear throughout our catalog, are used as a reminder that the user should carefully review for the appropriateness of the product for the media, application, and environment in which it will be used.

NOTE: Because of the health hazards associated with contamination and lead content in drinking water systems, Dixon couplings, unless otherwise specifically approved, are not recommended for potable water service and should not be used in applications where drinking water will contact the wetted surfaces of the coupling.

All Dixon products are shipped in cartons with the following warning:

**"WARNING:** This product contains lead, a chemical known to the State of California to cause cancer and birth defects or other reproductive harm."

## Trademark

Delrin® and Zytel® are registered trademarks of E.I. duPont Nemours and Company.

Kalrez® is a registered trademark of DuPont Dow Elastomers.

All other trademarks appearing in the Dixon illustrated product list are the property of their respective owners.

## Copyright

Copyright © 2023 by Dixon Valve & Coupling Company, LLC

All rights reserved. This book is copyrighted material. Use, reproduction or copying of it by anyone other than Dixon® is strictly forbidden without its express written consent.

NOTE: Reasonable care has been taken in preparing this catalog. Dixon Valve & Coupling Company, LLC reserves the right to make corrections.

