



**A comprehensive range of pneumatic actuators, providing compact, reliable and economical powered operation for all types of quarter-turn valves.**

**Features**

- Mounting to valve either directly or via bracket, using a detachable mounting plate.
- Double Rack & Pinion design.
- Double Acting or Spring Return models utilize the same compact body design.
- Aluminum body, hard anodized externally and internally, for corrosion and wear resistance.
- Special Nickel Protection (SNP) finish, for areas of extreme corrosion or hygienic conditions (see also page 7).
- Adjustable travel stops.
- Safe end cover bolting requiring no special tools.
- Anti blow-out drive pinion.
- Air connection plate is detachable and replaceable.
- Parallel and diagonal, double square (star) drive and Keystone double-D and bore and key drive.
- Over travel adjustment (at each end)  $\pm 5^\circ$ .
- Under travel adjustment (at each end)  $\pm 10^\circ$ .
- Increased under travel is available on request.
- Easy field conversion between DA and SR models.



**Technical Specifications**

Torque output range	- Double Acting 238 - 18180 lbs in
	- Spring Return 132 - 12515 lbs in
Operating medium	- Air (dry or lubricated)
Travel adjustment	- Over travel (at each end) $\pm 5^\circ$ . Under travel (at each end) $\pm 10^\circ$ .
	Increased under travel is available, on request.
Temperature range	- Minus 20°F to plus 210°F
Air supply pressure	- 120 psi maximum

**Mounting Specifications**

Actuator to valve	- Mounting standard EN ISO 5211 or Keystone standard
Pinion drive	- Parallel or Diagonal Square Head, EN ISO 5211 or Keystone standard
Accessories	- NAMUR VDI/VDE 3845 or Keystone standard

**SNP Technical Data** (see also page 7)

Hardness-Rockwell	- C53
Hardness-Vickers	- 550 HV
Surface finish	- Ra 10
Corrosion resistance	- to salt water spray in accordance with ISO 3768



**Total Flow Control Solutions™**

# Morin MRP Pneumatic Rack and Pinion Actuators

## Double and Single Acting

### Operation

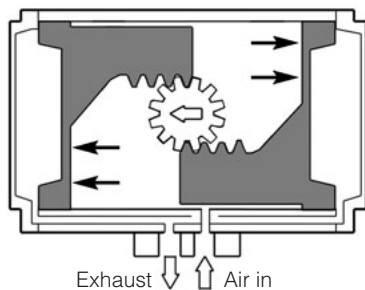
#### Double and Single Acting Actuators

Both the double acting and spring return MRP actuators feature a compact design with the same envelope dimensions. This flexible unit can be converted from double acting to single acting in the field without special charts to decipher color codes on which springs to use. The spring return actuator is available with spring sets from 40 pounds to 80 pounds in 10 pound increments. The springs are manufactured from heavy gauge wire to assure long life and corrosion resistance.

#### Standard Double Acting

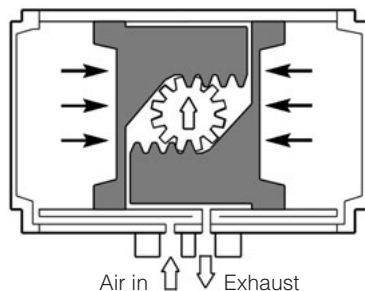
##### To OPEN Valve

In a double acting application, air pressure is introduced to Port 4, pressurizing the space between the pistons and driving the pistons out towards the actuator ends. The volume of air above the piston heads is exhausted to atmosphere. This causes the piston racks to drive the pinion in a counterclockwise direction, resulting in a quarter-turn rotation. This rotation is transferred to the valve shaft, opening the valve.



##### To CLOSE Valve

Air pressure introduced to Port 2, pressurizing the spaces above each piston head and driving the pistons inward. The volume of air between the pistons is exhausted to atmosphere. This causes the piston racks to drive the pinion in a clockwise direction, resulting in a quarter-turn rotation. This rotation is transferred to the valve shaft, closing the valve.

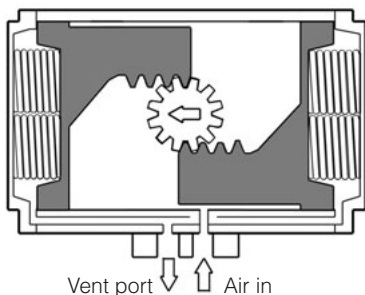


#### Spring Return

##### To OPEN Valve

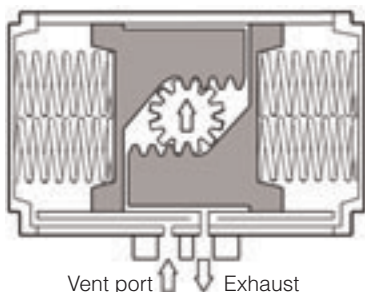
In a single acting application, air pressure is introduced to Port 4, pressurizing the space between the pistons and driving the pistons out towards the actuator ends while at the same time compressing the springs.

This causes the piston racks to drive the pinion in a counterclockwise direction, resulting in a quarter-turn rotation. This rotation is transferred to the valve shaft, opening the valve.



##### To CLOSE Valve

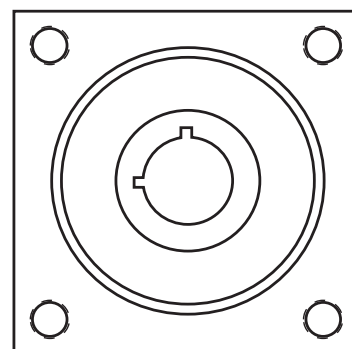
When the air pressure is relieved, the spring tension moves the pistons inward and exhausts the air through Port 4. This causes the piston racks to drive the pinion in a clockwise direction, resulting in a quarter-turn rotation. This rotation is transferred to the valve shaft, closing the valve.



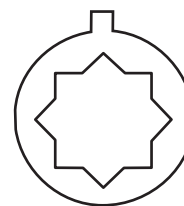
#### ISO/DIN Valves Shaft Adaptation

The Morin MRP Rack and Pinion actuator offers unsurpassed flexibility in mounting options. The design provides a common sense approach to the multiple shaft designs allowed by ISO. The MRP addresses the complexity of this standard with a standard of its own and offers a comprehensive range of adapters to suit many of the ISO "standard" shafts on the market today.

This allows the MRP to be used on differing valve shaft designs in the same plant without having the same size actuator models with different pinions.



Actuator Mounting pad of the Morin MRP: The dual-keyed input shaft allows parallel or perpendicular mounting to the valve flow and is designed to accept the desired ISO adapter sleeve. A comprehensive range of adapter sleeves is available to suit many valve stems.



ISO EN 12116 Square Adapter Sleeve

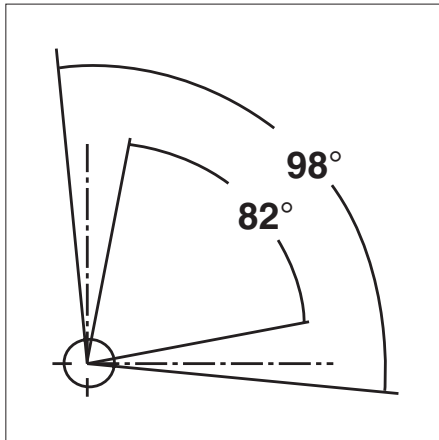


ISO EN 12116 Flat Head Adapter Sleeve

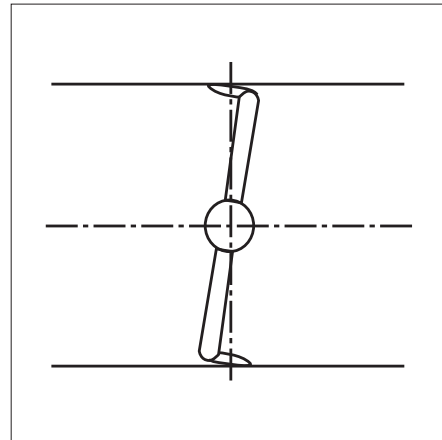
\* 037 and larger ISO models have dedicated Star drives.

## Travel Adjustments

Within the mechanical connections of the drive between the valve and the MRP actuator there are several points of manufacturing tolerance, including valve disc or ball to stem, stem to adapter and adapter to actuator that must be compensated for in the operation of the assembly. Therefore, adjustment is necessary to ensure that valve operation is as precise as required. With the MRP, Dual travel stops allow adjustment at both ends of the stroke. Maximum adjustment range of 82° to 98° rotation, including an over travel of +/-4° and an under travel of +/-4°.

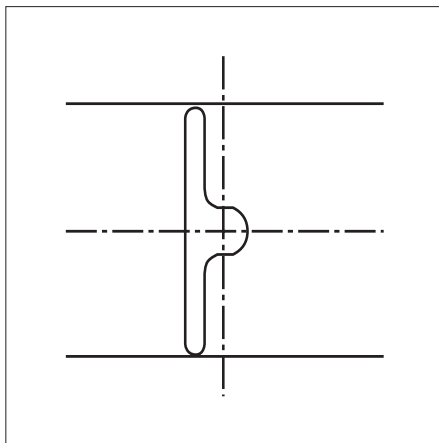


The standard travel stops also provide the desired adjustment necessary for proper operation of various valve types, as detailed.



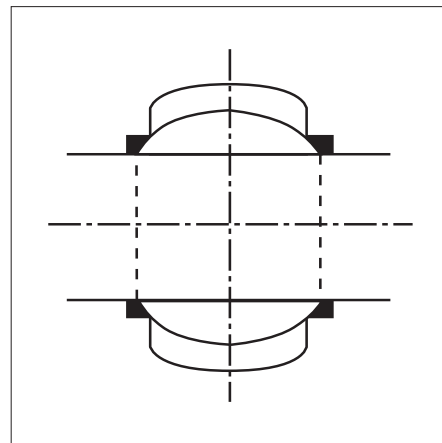
### Resilient seated butterfly valves

Shut-off occurs before the disc has rotated a full 90° from the open position. Travel adjustment is therefore desirable to prevent over travel, which would result in unnecessary operating torque and premature deterioration of seat life. In the open position, adjustment is necessary to ensure maximum flow through the valve and minimum dynamic forces acting on the disc.



### High performance butterfly valves

The double offset design of high performance butterfly valves results in the disc moving into the seat with a camming action. It is important that the disc does not travel beyond the seat position, otherwise damage to the seat will occur.



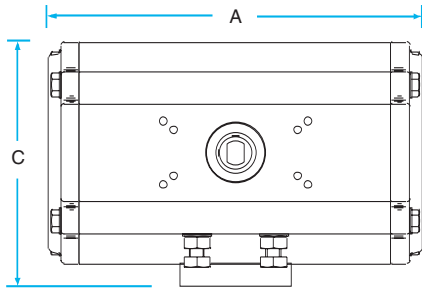
### Ball and Plug valves

The ball or plug must be precisely in line with the valve port to prevent damage to the seat in the open position.

Adjustment at the closed position is necessary to ensure that complete shut-off is achieved. MRP actuators have over travel adjustment of 4° +/- one degree and under travel adjustment of at least 4°, making them ideally suited for all quarter turn valve designs.

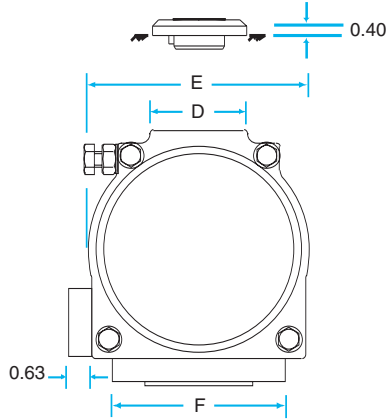
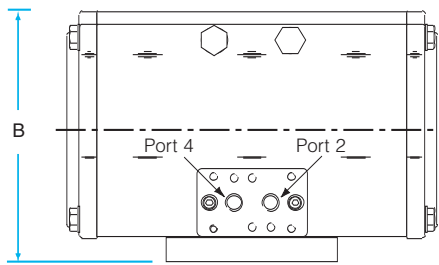
## Dimensions (ins)

### Top view

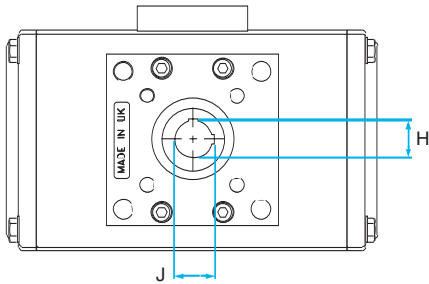


Front View

### Side View



### Bottom view



### Note

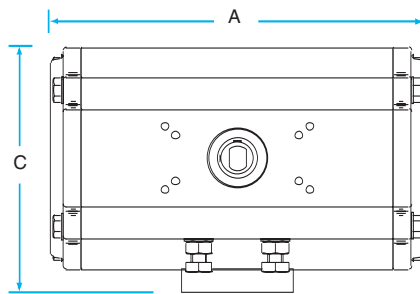
1. For size 180 only, spring return model has an extended body, due to the addition of spring packs. Dimension 'A' is then 27.32 ins.

## Actuator dimensions (ins)

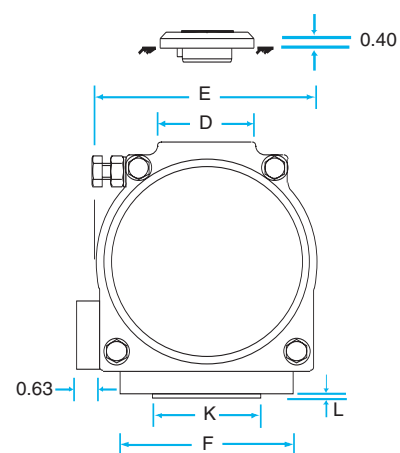
	A	B	C	D	E	F	Bottom of Shaft			Top of Shaft			Mounting Holes	
							H	J	Key	H	J	Key	No x Size	PCD
004	6.77	3.66	3.66	2.5	3.03	2.95	0.81	0.85	0.19	0.81	0.85	0.19	4 x 1/4-20UNC x 0.38 Dp	1.75
													4 x 3/8-16UNC x 0.56 Dp	3.25
009	7.67	4.8	4.8	2.5	4.17	3.15	1	1.06	0.25	1	1.06	0.25	4 x 3/8-16UNC x 0.56 Dp	3.25
014	8.11	5.43	5.22	2.5	4.59	3.15	1	1.06	0.25	1	1.06	0.25	4 x 3/8-16UNC x 0.56 Dp	3.25
025	9.53	6.42	6.1	2.5	5.64	4.4	1.12	1.25	0.25	1.12	1.25	0.25	4 x 3/8-16UNC x 0.56 Dp	3.25
													4 x 1/2-13UNC x 0.63 Dp	5
037	11.22	7.26	6.59	2.85	6.44	4.57	1.12	1.25	0.25	1.12	1.25	0.25	4 x 3/8-16UNC x 0.56 Dp	3.25
													4 x 1/2-13UNC x 0.63 Dp	5
045	13.13	7.87	7.12	2.95	6.87	4.57	1.12	1.25	0.25	1.12	1.25	0.25	4 x 3/8-16UNC x 0.56 Dp	3.25
													4 x 1/2-13UNC x 0.63 Dp	5
069	15.51	9.05	8.35	3.5	8.07	5	1.38	1.51	0.31	1.12	1.25	0.25	4 x 1/2-13UNC x 0.63 Dp	5
070	15.51	9.05	8.35	3.5	8.07	5	1.62	1.81	0.37	1.12	1.25	0.25	4 x 1/2-13UNC x 0.63 Dp	5
087	16.44	10	9.13	3.86	8.72	5.9	1.62	1.81	0.37	1.12	1.25	0.25	4 x 1/2-13UNC x 0.63 Dp	5
													4 x 3/4-10UNC x 0.63 Dp	6.5
088	16.44	10	9.13	3.86	8.72	5.9	1.88	2.06	0.5	1.12	1.25	0.25	4 x 1/2-13UNC x 0.63 Dp	5
													4 x 3/4-10UNC x 0.63 Dp	6.5
180	18.93 (1)	11.10	10.47	5.12	9.84	7.48	1.88	2.06 (SB)	0.5	1.12	1.25	0.25	4 x 3/4-10UNC x 1.0 Dp	6.5
							2.25	2.43 (LB)	0.5					

Acc. EN ISO 5211 - Dimensions (ins)

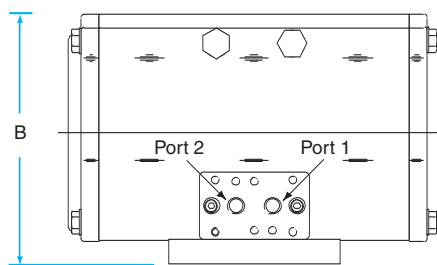
Top view



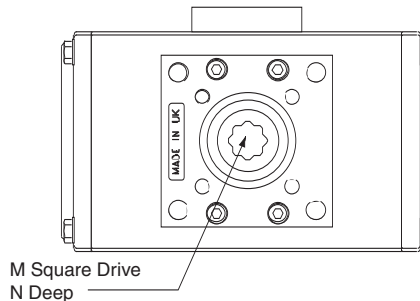
Front View



Side View



Bottom view



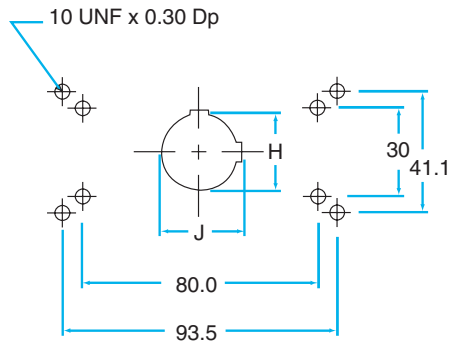
Actuator dimensions (ins) Acc EN ISO 5211

	A	B	C	D	E	F	M (2)	N	Flange	Mounting Holes	
										No x Size	PCD
002	6.5	3.35	3.5	2.24	2.87	2.56	14	16	F05	4 x 1/4-20UNC x 0.38 Dp	1.96
004	6.77	3.68	3.66	2.5	3.03	2.95	14	16	F05	4 x 1/4-20UNC x 0.38 Dp	1.96
009	7.67	4.8	4.8	2.5	4.17	3.15	17	20	F07	4 x 5/16-18UNC x 0.56 Dp	2.76
014	8.11	5.43	5.22	2.5	4.59	3.15	17	20	F07	4 x 5/16-18UNC x 0.56 Dp	2.76
025	9.53	6.42	6.1	2.5	5.64	4.4	19	24	F10	4 x 3/8-16UNC x 0.56 Dp	4.02
037	11.22	7.26	6.59	2.85	6.44	4.57	22	28	F10	4 x 3/8-16UNC x 0.56 Dp	4.02
045	13.13	7.87	7.12	2.95	6.87	4.57	22	28	F10	4 x 3/8-16UNC x 0.56 Dp	4.02
070	15.51	9.05	8.35	3.5	8.07	5	27	30	F12	4 x 1/2-13UNC x 0.63 Dp	4.92
088	16.44	10	9.13	3.86	8.72	5.9	27	38	F12	4 x 1/2-13UNC x 0.63 Dp	4.92
180	18.93 (1)	11.10	10.47	5.12	9.84	7.48	1.81	1.89	F16	4 x 3/4-10UNC x 1.0 Dp	6.5

Notes

1. For size 180 only, spring return model has an extended body, due to the addition of spring packs. Dimension 'A' is the 27.32 ins.
2. Size 180 incorporates a (single) square drive at 45 degrees.

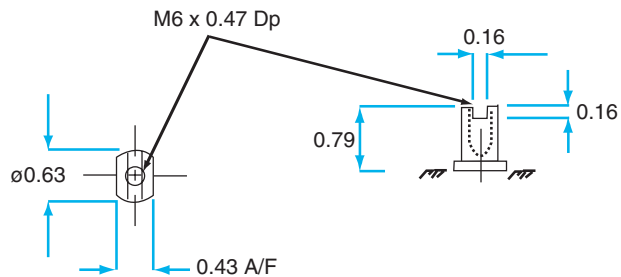
## Top Mount Drilling (Note 1) ins



## Notes

1. 8 x 10 UNF x 0.30 Dp  
Size 002 provides mounting holes at 3 x 1/4" [80 x 30 mm] only.

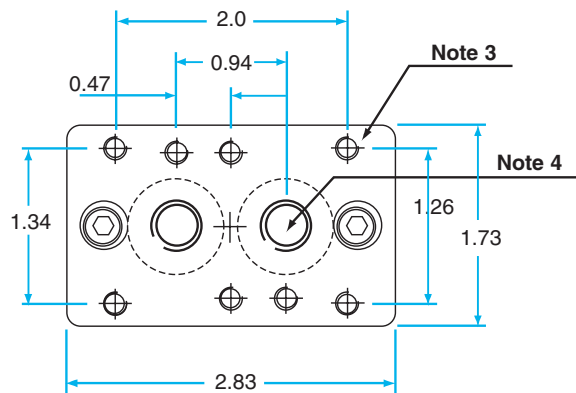
## VDI/VDE 3845 Mounting (Note 2) ins



## Notes

2. Full compliance to this specification is achieved with the addition of a male insert fitted to the top drive.

## Air Connection (Solenoid) Plate ins



## Notes

3. 8 x 10 UNF x 0.30 Dp
4. 2 x 1/4" NPT x 0.45 Dp

## Air Consumption Volumes (at specified pressure)

Actuator Size	On opening		On closing (Double Acting models)	
	cu. in.	litres	cu. in.	litres
002	8.2	0.13	5.2	0.09
004	15.1	0.25	9.4	0.15
009	31.9	0.52	21.2	0.35
014	45.5	0.75	31	0.51
025	78.5	1.29	55	0.9
037	115.6	1.9	79.9	1.31
045	156.1	2.56	105.8	1.74
069/070	245.2	4.02	165.9	2.72
087/088	292.5	4.8	196.7	3.23
180	590.7	9.7	408	6.7

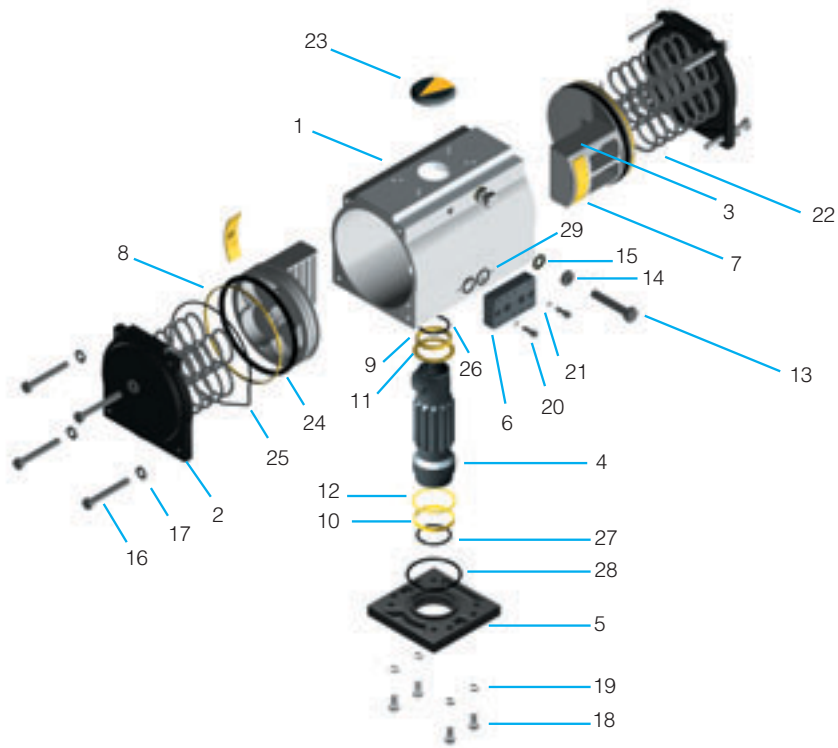
## Weight lbs

Actuator Size	Double Acting	Spring Return
002	3.3	3.5
004	4.2	4.4
009	7.5	8.4
014	9.7	10.8
025	16.0	18.0
037	23.3	25.3
045	33.0	35.2
069/070	42.0	48.0
087/088	77.0	88.0
180	99.0	158.4

Materials of Construction

Optional Special Nickel Protection (SNP)

For those harsh environments where even our tough, standard electrostatic powder coating can be overcome, MRP offers the option of Special Nickel Protection. Used in difficult services including caustic wash downs in food and beverage operations, salt air environments in coastal regions, high humidity zones such as cooling towers, and many others, this option provides some of the highest levels of protection obtainable in pneumatic rack and pinion actuators. The MRP with SNP is protected by the nickel process both inside and out, including the pinion, using a proprietary chemical process.



Materials of Construction

No	Item		Material		Finish
			US Material Std.	DIN/BS Material Std.	
1	Body	Extruded aluminum	ASTM B221	BS 1474 6000 T5/6	Hard Anodize + ESPC* or SNP**
2	End Cap	Die cast aluminum	ASTM B85	DIN 1725-231	Chromate + ESPC* or SNP**
3	Piston	Die cast aluminum	ASTM B85	DIN 1725-231	Anodize or SNP**
4	Pinion shaft	Carbon steel	ASTM A108	BS 970: 1983 212A42	Nitrotech™*** or SNP**
5	Base plate	Die cast aluminum	ASTM B85	DIN 1725-231	Chromate + ESPC* or SNP**
6	Air connection plate	Die cast aluminum	ASTM B85	DIN 1725-231	Chromate + ESPC* or SNP**
7	Piston backing pad	Devlon-V™			Natural
8	Piston support ring	Devlon-V™			Natural
9	Top bearing	Devlon-V™			Natural
10	Bottom bearing	Devlon-V™			Natural
11	Top spacer	Devlon-V™			Natural
12	Bottom spacer	Devlon-V™			Natural
13	Stop bolt	304 Stainless steel	ASTM A193	BS 3692-A2-304	Natural
14	Lock nut	304 Stainless steel	ASTM A193	BS 3692-A2-304	Natural
15	Sealing washer	304 Stainless steel	ASTM A193	BS 4320-A2-304	Natural
16	End cap bolt	304 Stainless steel	ASTM A193	BS 3692-A2-304	Natural
17	End cap washer	304 Stainless steel	ASTM A193	BS 4320-A2-304	Natural
18	Base plate bolt	304 Stainless steel	ASTM A193	BS 3692-A2-304	Natural
19	Base plate washer	304 Stainless steel	ASTM A193	BS 4320-A2-304	Natural
20	Air connection plate bolt	304 Stainless steel	ASTM A193	BS 3692-A2-304	Natural
21	Air connection plate washer	304 Stainless steel	ASTM A193	BS 4320-A2-304	Natural
22	Spring	Spring steel	ASTM A877	BS 2806 685 A55 HDR3	Oil Dip
23	Indicator	ABS			Natural
24	Piston O-ring	Rubber-NBR or FPM			Natural
25	End cap O-ring	Rubber-NBR or FPM			Natural
26	Shaft top O-ring	Rubber-NBR or FPM			Natural
27	Shaft bottom O-ring	Rubber-NBR or FPM			Natural
28	Base plate O-ring	Rubber-NBR or FPM			Natural
29	Air connection plate O-ring	Rubber-NBR or FPM			Natural

Notes

- \* ESPC = Electrostatic Powder Coating
- \*\* SNP = Special Nickel Protection finish
- \*\*\* Nitrotech™ = Proprietary corrosion resistant finish
- 1. Devlon-V™ is a trademark of Devol Engineering
- 2. Nitrotech™ is a trademark of Nitrotech Inc.

## Torque Output (lbf. Ins) - Double Acting Models

Actuator Size	Air Pressure (psi)						
	40	50	60	70	80	90	100
002	114	145	175	206	237	268	299
004	204	260	315	370	425	481	536
009	460	584	709	833	957	1082	1206
014	674	856	1038	1221	1403	1585	1767
025	1196	1519	1842	2166	2489	2812	3135
037	1737	2206	2676	3145	3615	4084	4554
045	2301	2922	3544	4166	4788	5409	6031
070	3606	4581	5556	6531	7505	8480	9055
088	4277	5432	6588	7744	8900	10056	11211
180	8736	11097	13458	15818	18180	22902	27624

## Torque output (lbf.Ins) - Spring Return Models

Actuator Size	Air Pressure (psi)								
	40 Start - End Air	50 Start - End Air	60 Start - End Air	70 Start - End Air	80 Start - End Air	90 Start - End Air	100 Start - End Air	Spring Start - End Spring	Spring Rating
002	61 - 43	92 - 73	123 - 104	154 - 135	186 - 166	215 - 197	246 - 227	62 - 43	40
	48 - 25	79 - 56	110 - 86	141 - 117	171 - 148	202 - 179	233 - 210	80 - 56	50
	35 - 7	66 - 38	97 - 69	128 - 99	158 - 130	189 - 161	220 - 192	97 - 69	60
		53 - 20	84 - 51	114 - 82	145 - 112	176 - 143	207 - 174	115 - 82	70
004		71 - 33	101 - 64	132 - 95	163 - 125	194 - 156	225 - 187	133 - 96	80
		58 - 15	88 - 46	119 - 77	150 - 108	181 - 138	212 - 170	151 - 109	90
			75 - 28	106 - 59	137 - 90	167 - 121	198 - 152	168 - 122	100
	119 - 71	174 - 126	229 - 182	285 - 237	340 - 292	395 - 347	450 - 403	117 - 69	40
009	98 - 38	153 - 93	208 - 148	263 - 203	319 - 259	374 - 314	429 - 369	150 - 90	50
		131 - 60	187 - 115	242 - 170	297 - 225	352 - 281	408 - 336	183 - 112	60
		110 - 26	165 - 82	221 - 137	276 - 192	331 - 247	386 - 303	217 - 133	70
			144 - 48	199 - 103	254 - 159	310 - 214	365 - 269	250 - 154	80
014			123 - 15	178 - 70	233 - 125	288 - 181	344 - 236	283 - 176	90
				156 - 37	212 - 92	267 - 147	322 - 203	317 - 197	100
	267 - 154	391 - 278	515 - 402	640 - 527	764 - 651	888 - 775	1013 - 900	269 - 156	40
	218 - 77	343 - 201	467 - 326	591 - 450	716 - 574	840 - 699	964 - 823	346 - 204	50
025		294 - 125	419 - 249	543 - 373	667 - 498	792 - 622	916 - 746	422 - 253	60
		246 - 48	370 - 172	495 - 297	619 - 421	743 - 545	868 - 670	499 - 301	70
			322 - 96	446 - 220	571 - 344	695 - 469	819 - 593	576 - 349	80
			274 - 19	398 - 143	522 - 268	647 - 392	771 - 516	652 - 398	90
037			350 - 67	474 - 191	598 - 315	723 - 440	848 - 565	729 - 446	100
	386 - 237	568 - 419	750 - 601	933 - 783	1115 - 965	1297 - 1148	1479 - 1330	383 - 233	40
	314 - 127	496 - 309	678 - 492	861 - 674	1043 - 856	1225 - 1038	1407 - 1220	492 - 305	50
		424 - 200	606 - 382	789 - 564	971 - 747	1153 - 929	1335 - 1111	602 - 377	60
045		352 - 91	534 - 273	717 - 455	899 - 637	1081 - 819	1263 - 1002	711 - 449	70
			463 - 163	645 - 346	827 - 528	1009 - 710	1191 - 892	820 - 521	80
			391 - 54	573 - 236	755 - 418	937 - 601	1119 - 783	930 - 593	90
			501 - 127	683 - 309	865 - 491	1047 - 673	1230 - 860	1039 - 665	100
070	712 - 386	1035 - 709	1358 - 1032	1681 - 1356	2005 - 1679	2328 - 2002	2651 - 2325	713 - 387	40
	591 - 183	914 - 507	1237 - 830	1560 - 1153	1884 - 1476	2207 - 1799	2530 - 2123	916 - 508	50
		793 - 304	1116 - 627	1439 - 951	1763 - 1274	2086 - 1597	2409 - 1920	1118 - 629	60
		672 - 102	995 - 425	1318 - 748	1642 - 1071	1965 - 1394	2288 - 1718	1321 - 750	70
088			1842 - 874	1197 - 546	1521 - 869	1844 - 1192	2167 - 1515	1523 - 871	80
			753 - 20	1076 - 343	1400 - 666	1723 - 989	2046 - 1313	1726 - 992	90
				955 - 141	1278 - 464	1602 - 787	1925 - 1110	1928 - 1113	100
	1030 - 577	1500 - 1046	1969 - 1516	2430 - 1985	2908 - 2455	3378 - 2924	3847 - 3394	1019 - 566	40
037	854 - 287	1323 - 756	1793 - 1226	2262 - 1695	2731 - 2165	3201 - 2634	3670 - 3104	1309 - 742	50
		1146 - 466	1616 - 936	2085 - 1405	2555 - 1875	3024 - 2344	3494 - 2814	1599 - 919	60
		970 - 176	1439 - 646	1909 - 1115	2378 - 1585	2848 - 2054	3317 - 2524	1889 - 1096	70
			1263 - 356	1732 - 825	2201 - 1295	2671 - 1764	3140 - 2234	2179 - 1272	80
045			1086 - 66	1555 - 535	2025 - 1005	2494 - 1474	2964 - 1944	2469 - 1449	90
			1379 - 245	1848 - 715	2318 - 1184	2787 - 1654	3257 - 2137	2759 - 1626	100
	1338 - 815	1960 - 1437	2582 - 2059	3204 - 2680	3825 - 3302	4447 - 3924	5069 - 4546	1299 - 776	40
	1098 - 444	1720 - 1066	2341 - 1687	2963 - 2309	3585 - 2931	4207 - 3553	4828 - 4174	1670 - 1016	50
070	857 - 72	1479 - 694	2101 - 1316	2723 - 1938	3344 - 2559	3966 - 3181	4588 - 3803	2042 - 1257	60
		1239 - 323	1860 - 945	2482 - 1566	3104 - 2188	3726 - 2810	4347 - 3422	2413 - 1497	70
			1620 - 573	2242 - 1195	2863 - 1817	3485 - 2439	4107 - 3060	2784 - 1738	80
			1379 - 202	2001 - 824	2623 - 1445	3245 - 2067	3866 - 2689	3156 - 1978	90
088			1760 - 452	2382 - 1074	3004 - 1696	3626 - 2318	4248 - 3040	3527 - 2219	100
	2078 - 1293	3052 - 2268	4027 - 3242	5002 - 4217	5977 - 5192	6951 - 6167	7926 - 7141	2021 - 1236	40
	1696 - 715	2670 - 1689	3645 - 2664	4620 - 3639	5594 - 4613	6569 - 5588	7544 - 6563	2599 - 1618	50
	1313 - 136	2288 - 1111	3263 - 2086	4238 - 3060	5212 - 4035	6187 - 5010	7162 - 5985	3178 - 2001	60
180		1906 - 533	2881 - 1507	3855 - 2482	4830 - 3457	5805 - 4431	6780 - 5406	3756 - 2383	70
			2499 - 929	3473 - 1904	4448 - 2878	5423 - 3853	6397 - 4828	4334 - 2765	80
			2116 - 351	3091 - 1325	4066 - 2300	5040 - 3275	6015 - 4247	4913 - 3147	90
				2709 - 747	3684 - 1722	4658 - 2696	5633 - 3671	5491 - 3529	100
002	2473 - 1460	3629 - 2616	4784 - 3772	5940 - 4928	7096 - 6083	8252 - 7239	9408 - 8395	2470 - 1457	40
	2022 - 756	3178 - 1912	4334 - 3068	5489 - 4224	6645 - 5379	7801 - 6535	8957 - 7691	3174 - 1908	50
	1571 - 52	2727 - 1208	3883 - 2364	5038 - 3519	6194 - 4675	7350 - 5831	8506 - 6987	3878 - 2359	60
		2276 - 504	3432 - 1660	4587 - 2815	5743 - 3971	6899 - 5127	8055 - 6283	4582 - 2810	70
004			2981 - 956	4137 - 2111	5292 - 3267	6448 - 4423	7604 - 5579	5286 - 3261	80
			2530 - 251	3686 - 1407	4841 - 2563	5997 - 3719	7153 - 4875	5990 - 3712	90
				3235 - 703	4391 - 1859	5546 - 3015	6702 - 4171	6694 - 4163	100
	4389 - 2122	6750 - 4482	9111 - 6843	11472 - 9204	13833 - 11565	16193 - 13926	18554 - 16286	5905 - 3637	40
009		5664 - 2829	8025 - 5190	10385 - 7551	12746 - 9911	15107 - 12272	17468 - 14633	7558 - 4724	50
			6938 - 3537	9299 - 5897	11660 - 8258	14021 - 10619	16381 - 12980	9212 - 5810	60
				8213 - 4244	10573 - 6605	12934 - 8966	15295 - 11326	10865 - 6896	70
					9487 - 4952	11848 - 7312	14209 - 9673	12518 - 7983	80
014						10762 - 5659	13122 - 8020	14171 - 9069	90
							12036 - 6367	15825 - 10155	100

## Notes

### Double Acting Models

Using the chart opposite, select the actuator, which will provide the nearest torque output above the anticipated torque of the valve (+ safety factor).

### Spring Return Models

Determine the desired 'failure mode' (fail open or fail closed), then determine the critical torque points for the subject valve using the table below. Using the chart opposite, select the appropriate Spring Rating (far right column), according to the air supply pressure. Select the actuator which will provide the nearest torque output (both 'start' and 'end of spring') above the anticipated valve torque (+ safety factor).

## Critical torque points

### Butterfly Valves

#### 'Fail Closed'

Start of Air Torque  
End of Spring Torque

### Butterfly Valves

#### 'Fail Open'

Start of Spring Torque  
End of Air Torque

### Ball Valves

#### 'Fail Closed'

Start of Air (unseating) Torque  
End of Air (full open) Torque  
Start of Spring (breakout from open) Torque  
End of Spring (re-seating) Torque

### Ball Valves

#### 'Fail Open'

Start of Spring (unseating) Torque  
End of Spring (full open) Torque  
Start of Air (breakout from open) Torque  
End of Air (re-seating) Torque



## Control Accessories

### Solenoid Valves

A comprehensive range of solenoid valves is available for controlling the pneumatic supply to the actuator cylinder by means of an electrical signal. Alternative specifications of solenoid valves include:

- Weatherproof to NEMA 4, 4X
- Explosionproof to NEMA 4, 4X, 7, 9
- Intrinsically safe to Class 1, A, -D, Class 2 E-G, Div.1&2



### AVID Position Monitors

The AVID range of position monitoring equipment incorporates HiVue Local Visual Display, EasiFix Switch adjustment and ModMount Assembly facilities, enabling direct, low profile mounting.

#### K-Switch

Quarter Turn position indicator, UL & CUL approved to NEMA 4, 4X, 7 and 9 for use in Class1, Div 1, Group C&D and Class II, Div 1, Groups E, F & G Hazardous Locations.



**K-Switch**



**XA**

#### XR

FM & CSA approved to NEMA 4, 4X, 7, 9 position monitor for use in Class1, Div 1, Group C&D and Class II, Div 1, Groups E, F & G Hazardous Locations.



**ZR**

#### ZR PLUS



#### ZR

NEMA/FM approved position monitor for General Purpose and Intrinsically Safe applications

#### ZR Plus

Integrated monitoring and control of automated valves in a single, NEMA/FM approved package for General Purpose and Intrinsically Safe applications.

### AVID Positioners

The AVID range of Analogue and Smart Positioners offers solutions to the precise positioning of pneumatic actuators are mounted to the actuator housing using NAMUR (VDI/VDE 3845) standards.

#### EaziCal IR®

Analogue Positioner with AutoCal calibration certified General Purpose. Weatherproof NEMA 4, 4X



**EaziCal IR®**

#### SmartCal®

A NEMA/FM approved Intelligent Positioner, Weatherproof NEMA 4, 4X, allowing for AutoCal keypad calibration, HART® communications capability and on-site diagnostic information.



**SmartCal®**

### Network Solutions

The AVID range of PlantNet Monitors facilitates communication with AS-interface™, DeviceNet, Fieldbus Foundation™ and Profibus™ Network Protocols to enable complete system integration of all valve units.

**DeviceNet™**



### Notes

1. DeviceNet™ is a trademark of Open DeviceNet Vendor Association, Inc.
2. HART® is a registered trademark of the HART Communication Foundation.

***Tyco Valves & Controls***

[www.tycovalves.com](http://www.tycovalves.com)

---

The data presented in this bulletin is for general information only. Manufacturer is not responsible for acceptability of these products in relation to system requirements. Patents and Patents Pending in U.S. and foreign countries. All rights reserved. Printed in U.S.A. Tyco reserves the right to change product design and specifications without notice. © Copyright 2003.