

Tork-Mate Pneumatic Actuators

890
SERIES

Heavy Duty
Rack and Pinion
Extended Life . . .



Up to
15 Million Cycles

posi-flate®
butterfly valves

Tork-Mate 890 Series

Design Features

1. Piston

Aluminum alloy, designed for the most demanding applications.

2. Piston bearing

Low friction wear band centers the piston for extended life.

3. Piston Seal

A double acting, PTFE, O-ring energized seal minimizes friction and requires an extremely low breakaway force. Provides a much longer life than conventional O-rings.

4. Pinion

High strength steel, plated for corrosion resistance. Precisely machined gear minimizes wear and backlash.

5. Piston Rack

Precision engineered tooth profile and wide engagement with pinion minimizes wear and maximizes strength. An integral safety bar* prevents any possible pinion blowout.

6. Pinion Bearings

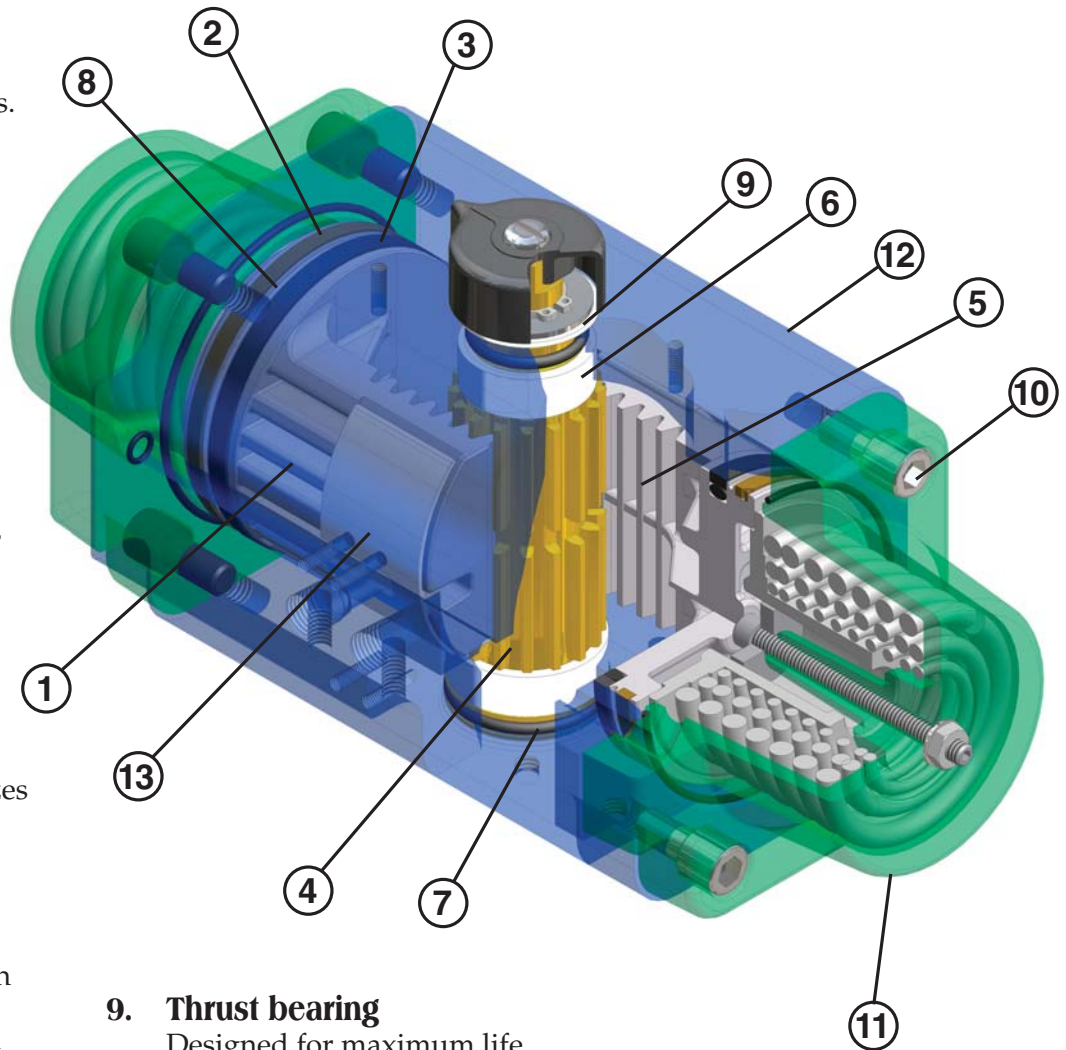
A proprietary high wear, low friction acetal compound extends life.

7. Pinion Seals

Nitrile, specially lubricated for life.

8. Lubrication Groove

Unique lubrication groove between the piston seal and piston bearing holds the proper amount of grease where it is needed for maximum life.



9. Thrust bearing

Designed for maximum life.

10. Fasteners

304 stainless steel are high strength and corrosion resistant.

11. End Caps

Special aluminum alloy for durability. Powder coated for corrosion resistance and durability. Optional spring return end caps have restrained springs for easy installation.

12. Housing

Extruded aluminum alloy, precision machined with a proprietary hard coat finish internally and externally to guard against wear and corrosion.

13. Piston Heel Bearing

Large acetal bearing controls gear backlash and eliminates rack fatigue.

* Models 5000 and 11000 feature interlocked tooth geometry to prevent pinion blowout.

Tork-Mate 890 Series Advantages

The Tork-Mate® 890 series extended life actuators are ideal for the operation of 90° turn devices such as butterfly valves, ball valves, plug valves, damper valves and other devices. Tork-Mate pneumatic actuators have features that are unique, providing many benefits to the user looking for worry-free service.

■ TMHC 2324

A proprietary two-step hardcoat process that offers superior protection on interior and exterior housing surfaces. TMHC 2324 also ensures maximum life from the piston seals, piston bearings and heel bearings.

■ NAMUR Mounting

Tork-Mate 890 series actuators meet the latest NAMUR standards, allowing direct or close coupling of NAMUR designed accessories. The pinion interface features a positive, international standard drive for positioners, switches and other accessories. The solenoid interface allows direct acceptance of any NAMUR designed control valves.

■ Modular

Easily removable end caps and modular spring packs simplify the conversion from double-acting to spring-return configurations.

■ Travel Adjustment

The Tork-Mate 890 series actuators feature pinion travel stops that allow a full +/-10° of valve travel adjustment. As an option, extended stroke adjustment screws can be added for inexpensive throttling applications.

■ Extended Cycle Life

Special piston seals provide greatly extended life compared to standard O-ring actuators. All other bearings, seals and components have been engineered to provide superior and extended service lives.

■ Blow-out Proof Pinion Gear

In addition to the stainless steel pinion retaining ring, the Tork-Mate 890 series actuators feature a unique internal safety bar.

■ Operating Ranges

Tork-Mate 890 series double-acting actuators produce guaranteed minimum torque outputs up to 17,466 inch pounds (1973 Nm).

■ Custom Options

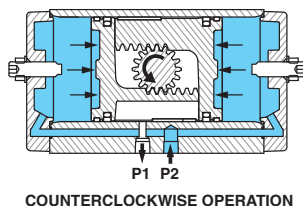
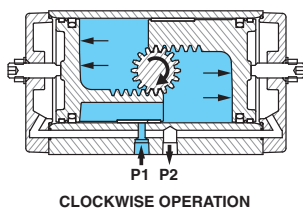
These include Viton seals, high temperature trim up to 250° F (121° C), special finishes, stainless steel pinions, special mounting configurations and special coupling configurations.

■ Imperial or Metric Mounting

Operation Principles

Double-Acting

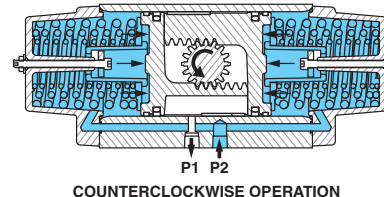
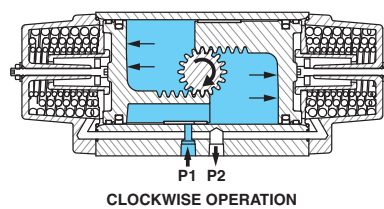
For clockwise operation, Port 2 (P2) is open to atmosphere and air pressure is directed to Port 1 (P1). As the pistons move apart, the pinion rotates clockwise. The linear movement of the pistons is converted to rotary motion by the piston racks and the output pinion gear.



For counterclockwise operation, Port 1 is open to atmosphere and air pressure is directed to Port 2. The pressure differential moves the pistons together, rotating the pinion counterclockwise.

Spring Return

For clockwise operation, Port 2 is open to atmosphere and air pressure is directed to Port 1. The air pressure compresses the springs and moves the pistons outward. As the pistons move apart, the pinion rotates clockwise. The linear movement of the pistons is converted to rotary motion by the piston racks and the output pinion gear.



For counterclockwise operation, Port 1 is open to atmosphere and air pressure is directed to Port 2. High pressure and/or spring force moves the pistons inward, rotating the pinion counterclockwise.

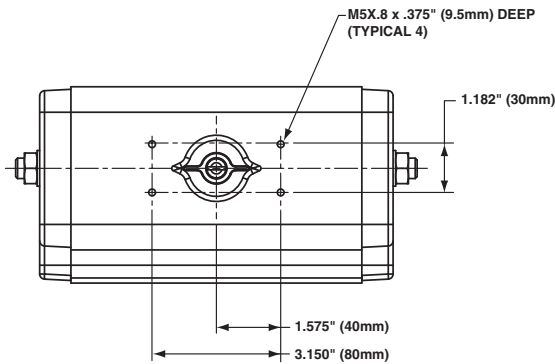
Tork-Mate 890 Series General Dimensions

Imperial

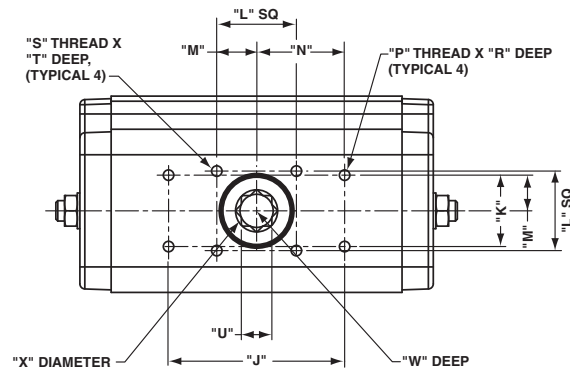
Model	Dimensions (inches)								
	AD	AS	B	C	D	E	F	G	H
250	7.630	9.688	3.815	1.029	2.600	3.250	1.625	3.313	2.063
450	7.630	10.000	3.815	1.185	2.980	4.000	2.000	4.063	2.438
1000	9.834	12.812	4.917	1.489	3.480	5.000	2.500	4.813	2.813
2250	11.875	15.688	5.938	1.907	4.100	6.250	3.125	5.813	3.313
5000	15.188	20.625	7.594	2.719	5.100	8.250	4.125	7.844	4.344
11000	19.695	28.188	9.848	4.247	5.700	9.438	4.719	9.094	4.969

Metric

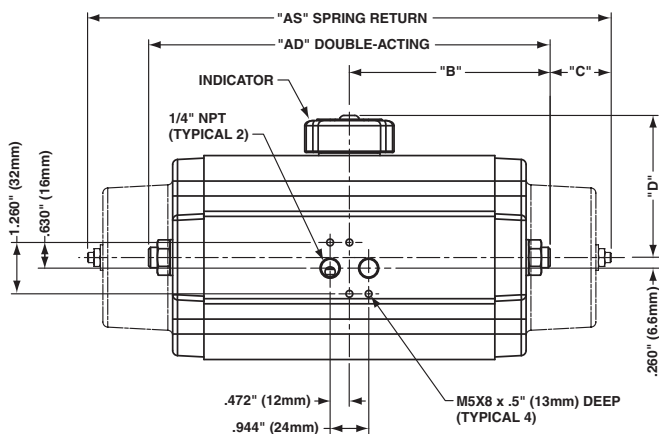
Model	Dimensions (mm)								
	AD	AS	B	C	D	E	F	G	H
253	193.8	246.1	96.9	26.1	66.0	82.6	41.3	84.2	52.4
453	193.8	254.0	96.9	30.1	75.7	101.6	50.8	103.2	61.9
1003	249.8	325.4	124.9	37.8	88.4	127.0	63.5	122.3	71.5
2253	301.6	398.5	150.8	48.4	104.1	158.8	79.4	147.7	84.2
5003	385.8	523.9	192.9	69.0	129.5	209.6	104.8	199.2	110.3
11003	500.3	716.0	250.1	107.9	144.8	239.7	119.9	231.0	126.2



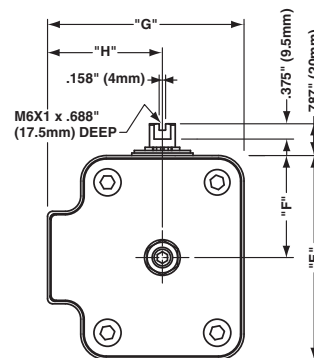
**TOP VIEW
(WITH INDICATOR SHOWN)**



BOTTOM VIEW



**FRONT VIEW
(WITH INDICATOR SHOWN)**



**SIDE VIEW
(WITH INDICATOR REMOVED)**

Tork-Mate 890 Series

General Dimensions

Imperial

Model	Dimensions (inches)											
	J	K	L	M	N	P	R	S	T	U	W	X
250	3.250	1.172	1.392	0.696	1.625	1/4"-20	0.375	1/4"-20	0.375	0.433	1.090	0.562
450	3.250	1.172	1.392	0.696	1.625	1/4"-20	0.375	1/4"-20	0.375	0.551	1.090	0.721
1000	4.313	1.750	1.950	0.975	2.157	5/16"-18	0.438	5/16"-18	0.500	0.748	1.100	1.014
2250	4.313	1.750	2.840	1.420	2.157	5/16"-18	0.438	3/8"-16	0.625	0.866	1.700	1.156
5000	10.000	3.480	3.480	1.740	5.000	1/2"-13	0.750	1/2"-13	0.750	1.063	1.400	1.318
11000	10.000	3.896	3.896	1.948	5.000	5/8"-11	0.938	5/8"-11	0.938	1.418	1.800	1.788

Metric

Model	Dimensions (mm)											
	J	K	L	M	N	P	R	S	T	U	W	X
253	82.6	29.8	35.4	17.7	41.3	M6 X 1	9.5	M6 X 1	9.5	11.0	27.7	14.3
453	82.6	29.8	35.4	17.7	41.3	M6 X 1	9.5	M6 X 1	9.5	14.0	27.7	18.3
1003	109.6	44.5	49.5	24.8	54.8	M8 X 1.25	11.1	M8 X 1.25	12.7	19.0	27.9	25.8
2253	109.6	44.5	72.1	36.1	54.8	M8 X 1.25	11.1	M10 X 1.5	15.9	22.0	43.2	29.4
5003	254.0	88.4	88.4	44.2	127.0	M12 X 1.75	19.1	M12 X 1.75	19.1	27.0	35.6	33.5
11003	254.0	99.0	99.0	49.5	127.0	M16 X 2	23.8	M16 X 2	23.8	36.0	45.7	45.4

Performance Data

Double-Acting – Imperial

Actuator Model	Volume (cu. inch)		Max. Operating Pressure (PSIG)	Approx. Weight (Lbs.)
	Outboard	Inboard		
250	8.0	10.2	125	6.2
450	16.3	19.2	125	8.3
1000	32.9	42.4	125	14.4
2250	77.2	95.1	125	27.5
5000	171.3	182.4	125	48.8
11000	354.9	381.8	125	85.8

Double-Acting – Metric

Actuator Model	Volume (cu. cm)		Max. Operating Pressure (Barg)	Approx. Weight (Kg)
	Outboard	Inboard		
253	131	167	8.6	2.8
453	267	315	8.6	3.8
1003	539	695	8.6	6.5
2253	1265	1558	8.6	12.5
5003	2807	2989	8.6	22.1
11003	5816	6257	8.6	38.9

Spring Return – Imperial

Actuator Model	Volume (cu. inch)	Max. Operating Pressure (PSIG)	Approx. Weight (Lbs.)
	Inboard		
250-SR	10.2	125	7.7
450-SR	19.2	125	11.3
1000-SR	42.4	125	18.9
2250-SR	95.1	125	35.5
5000-SR	182.4	125	60.8
11000-SR	381.8	125	105.8

Spring Return – Metric

Actuator Model	Volume (cu. cm)	Max. Operating Pressure (Barg)	Approx. Weight (Kg)
	Inboard		
253-SR	167	8.6	3.5
453-SR	315	8.6	5.1
1003-SR	695	8.6	8.6
2253-SR	1558	8.6	16.1
5003-SR	2989	8.6	27.6
11003-SR	6257	8.6	48.0

Tork-Mate 890 Series Torque Ratings

Double-Acting – Imperial

Model	Operating Pressure (PSIG)				
	40	60	80	100	120
	Torque Output (in. lbs.)				
250	112	168	224	280	337
450	213	319	426	532	639
1000	509	764	1019	1273	1527
2250	1128	1692	2257	2820	3385
5000	2608	3912	5216	6520	7824
11000	5822	8733	11644	14555	17466

Spring Return – Imperial

Model	Spring Set	Spring Torque Output (in. lbs.)		Operating Pressure (PSIG)									
				40		60		80		100		120	
				Air Pressure Torque Output (in. lbs.)									
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
250-SR	2	61	40	68	42	124	98	180	154	236	210	293	280
	3	92	59			102	63	158	119	206	175	270	232
	4	124	80			79	28	135	83	191	140	248	196
	5	155	99					113	48	170	104	226	161
	6	185	120							147	69	204	125
450-SR	2	118	76	128	79	235	186	342	293	448	399	555	505
	3	179	114			192	118	299	225	405	331	512	438
	4	239	152			150	51	257	158	363	264	470	371
	5	298	190					214	91	321	198	427	304
	6	358	229							277	130	384	238
1000-SR	2	285	183	305	187	559	441	813	695	1067	948	1320	1202
	3	427	276			457	283	711	536	964	789	1218	1043
	4	571	368			357	122	610	378	864	629	1117	883
	5	712	459					510	216	763	473	1016	723
	6	856	551							662	310	915	567
2250-SR	2	661	395	692	396	1257	961	1822	1526	2386	2090	2948	2655
	3	993	592			1037	593	1601	1158	2165	1722	2730	2287
	4	1325	790			818	227	1383	790	2035	1355	2512	1920
	5	1655	987					1165	425	1729	987	2294	1554
	6	1987	1185							1510	623	2075	1184
5000-SR	2	1633	824	1659	838	2900	2076	4142	3317	5383	4569	6624	5811
	3	2450	1239			2483	1252	3724	2504	4966	3745	6217	4986
	4	3277	1649			2066	432	3317	1669	4559	2921	5800	4162
	5	4093	2058					2900	850	4142	2097	5383	3338
	6	4910	2478							3724	1273	4966	2514
1100-SR	2	3619	1839	3663	1863	6415	4615	9167	7367	11962	10120	14714	12914
	3	5428	2749			5504	2805	8246	5547	11009	8299	13761	11009
	4	7227	3668			4584	987	7336	3737	10077	6489	12808	9241
	5	9037	4588					6415	1916	9167	4668	11962	7420
	6	10856	5507							8246	2858	11009	5610

Tork-Mate 890 Series Torque Ratings

Double-Acting – Metric

Model	Operating Pressure (Barg)				
	2.8	4.1	5.5	6.9	8.3
	Torque Output (Nm)				
253	13	19	25	32	38
453	24	36	48	60	72
1003	57	86	115	144	172
2253	127	191	255	318	382
5003	295	442	589	736	884
11003	658	986	1315	1644	1973

Spring Return – Metric

Model	Spring Set	Spring Torque Output (Nm)		Operating Pressure (Barg)									
				2.8		4.1		5.5		6.9		8.3	
		Air Pressure Torque Output (Nm)											
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
253-SR	2	7	5	8	5	14	11	20	17	27	24	33	32
	3	10	7			11	7	18	13	23	20	31	26
	4	14	9			9	3	15	9	22	16	28	22
	5	17	11					13	5	19	12	25	18
	6	21	14							17	8	23	14
453-SR	2	13	9	14	9	27	21	39	33	51	45	63	57
	3	20	13			22	13	34	25	46	37	58	50
	4	27	17			17	6	29	18	41	30	53	42
	5	34	21					24	10	36	22	48	34
	6	40	26							31	15	43	27
1003-SR	2	32	21	34	21	63	50	92	78	121	107	149	136
	3	48	31			52	32	80	61	109	89	138	118
	4	64	42			40	14	69	43	98	71	126	100
	5	80	52					58	24	86	53	115	82
	6	97	62							75	35	103	64
2253-SR	2	75	45	78	45	142	109	206	172	269	236	333	300
	3	112	67			117	67	181	131	245	194	308	258
	4	150	89			92	26	156	89	230	153	284	217
	5	187	111					132	48	195	111	259	175
	6	224	134							171	70	234	134
5003-SR	2	184	93	187	95	328	234	468	375	608	516	748	656
	3	277	140			280	141	421	283	561	423	702	563
	4	370	186			233	49	375	189	515	330	655	470
	5	462	232					328	96	468	237	608	377
	6	555	280							421	144	561	284
1103-SR	2	409	208	414	210	724	521	1035	832	1351	524	1662	1459
	3	613	310			622	317	931	626	1243	429	1554	1243
	4	816	414			518	111	828	422	1138	335	1447	1044
	5	1308	518					724	216	1035	240	1351	838
	6	1226	622							931	146	1243	634

Tork-Mate 890 Series Accessories

Numerous accessories are available as optional components to interface with the Tork-Mate 890 series actuators. Mounting kits are also available.



Position Indicators

- Nema 4, 4X, 7, 9, 12
- IP 65, 66, 67
- All hazardous classifications
- UL, CSA, CE marked
- Intrinsically safe
- Sensors - Mechanical, inductive, proximity, intrinsically safe, SPDT and DPDT



Solenoids for every application

- Nema 4, 4X, 7, 9, 12
- IP 65, 66, 67
- All hazardous classifications
- UL, CSA, CE marked
- Intrinsically safe



Valve Positioners

- 3-15 PSI
- 4-20 mA
- Nema 4, 4X, 7, 9, 12
- IP 65, 66, 67
- All hazardous classifications
- UL, CSA, CE marked
- Intrinsically safe



Open Position Adjustment Stop

- Easy setting of the open position on double acting and spring return actuators
- Infinite settings from 15 to 90 degrees open
- Easily mounts between valve and actuator



Integrated Position Sensor and Valve Controller for Bus applications

- AS-I
- Foundation Fieldbus
- DeviceNet
- Profibus
- Modbus



Declutchable Gear Overrides

All specifications subject to change without notice.

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