

Series 228

Pneumatic Rack & Pinion, and Scotch Yoke Actuator Datasheet



Pneumatic Rack & Pinion, and Scotch Yoke Actuator Series 228



Specifications

Pressure Range

40 to 150 psi

Temperature Range*

-5° F to 175° F

Stroke

90 degrees +/- 5 degrees

Media

Clean, dry air, non-corrosive gas or light hydraulic oil

Lubrication

Factory lubricated, no additional lubrication required under normal conditions

Construction

Suitable for indoor and outdoor installation

Mounting Dimensions

Model 3K: ABZ standard mounting dimensions on valve side to direct mount actuator to many ABZ butterfly valves

Model 3R: F-pattern, metric, mounting dimensions on valve side

* Low temperature option -45° F to 175° F
High temperature option 0° F to 300° F

Features

- Rack and Pinion
- Scotch Yoke
- Eighteen (18) double acting sizes
- Seventeen (17) spring return sizes
- Five unique start and end torque outputs for each rack and pinion model, and two start and end torque outputs per each scotch yoke model
- Dual travel stops
- NAMUR interface for direct accessory mounting
- Mid body interface minimizes interference with mounted accessories and valves
- Anodized cylinders and epoxy coated end-caps secured with stainless steel fasteners for corrosion resistance
- Large piston guide plates and piston back-up ring provide for minimum cylinder wear and optimum contact between the rack and pinion

Double Acting, Rack & Pinion Torque Chart

Actuator Model	Torque Output (lbf-inch) at Supply Pressure					Volume Cu. In.		Cycle Time Seconds per 90°	Weight	
	40 PSI	60 PSI	80 PSI	100 PSI	120 PSI	CW	CCW		Lbs	Kg
228-3R-10DA	30	45	60	75	90	3.0	3.0	0.3	2.2	1.0
228-3R-20DA	93	140	187	233	280	10.4	7.9	0.5	3.0	1.4
228-3K-40DA	167	250	334	417	501	17.1	14.0	0.6	4.8	2.2
228-3K-80DA	361	541	722	902	1083	40.3	28.7	1.0	8.0	3.6
228-3K-130DA	526	789	1051	1314	1577	60.4	42.1	1.2	10.5	4.8
228-3K-200DA	761	1141	1522	1902	2283	79.9	61.6	1.5	13.5	6.1
228-3K-300DA	1186	1779	2372	2966	3559	130.0	98.2	2.0	21.9	9.9
228-3K-500DA	2029	3044	4058	5073	6087	200.8	162.3	2.5	29.6	13.4
228-3K-700DA	2562	3843	5124	6406	7687	256.9	206.9	2.9	35.3	16.0
228-3K-850DA	3092	4638	6184	7730	9276	341.1	228.8	3.3	44.6	20.2
228-3K-1000DA	3699	5548	7398	9247	11097	392.4	283.1	3.5	54.1	24.5
228-3K-1200DA	4983	7474	9966	12457	14949	554.1	400.9	4.2	72.4	32.8
228-3R-1750DA	6087	9131	12174	15218	18262	721.3	487.6	5.0	88.4	40.1
228-3R-2400DA	8945	13417	17889	22361	26834	984.3	717.0	7.0	120.6	54.7
228-3R-2700DA	13584	20377	27169	33961	40753	1468.2	1064.9	10.0	160.9	73.0
228-3R-3300DA	18634	27952	37269	46586	55903	1938.7	1479.8	14.0	211.9	96.1

Air Consumption (scf per 90 Deg) = (Volume/1728) x (Supply Pressure +14.7)/14.7.

Note: Accessory mounting holes are not intended for manual gear overrides or stop blocks. Cycle times are under no load conditions. Air line size, air capacity and valve torque characteristics affect the cycle times. Faster or slower cycle times can be accomplished using special control components.

Pneumatic Rack & Pinion Actuator Series 228



Spring Return, Rack & Pinion Torque Output (inch pounds) at Supply Pressure Chart

Actuator Model	Springs per Side	Spring Torque		40 PSI		60 PSI		80 PSI		100 PSI		Volume		Cycle Time	Weight	
		(compressed) Start	(extended) End	Start	End	Start	End	Start	End	Start	End	Spring	Air	Seconds per 90°	Lbs	Kg
228-3R-20SR	2	41	28	65	52	112	99	158	145	205	192	10.4	7.9	0.5	3.2	1.5
	3	62	43	51	31	97	78	144	124	191	171					
	4	83	57	37	10	83	57	130	104	177	150					
	5	104	71			69	36	116	83	162	130					
	6	124	85			55	16	102	62	148	109					
228-3K-40SR	2	70	46	121	97	205	181	288	264	372	348	17.1	14.0	0.6	5.1	2.3
	3	105	69	98	62	182	146	265	229	349	313					
	4	139	91	75	27	159	111	242	194	326	278					
	5	174	114			136	76	220	160	303	243					
	6	209	137			113	41	197	125	280	208					
228-3K-80SR	2	155	106	255	206	435	387	616	567	796	748	40.3	28.7	1.0	8.8	4.0
	3	232	159	202	129	382	309	563	490	743	670					
	4	309	212	149	52	329	232	510	412	690	593					
	5	387	265			277	155	457	335	637	516					
	6	464	318			224	77	404	258	584	438					
228-3K-130SR	2	231	156	369	295	632	558	895	821	1158	1084	60.4	42.1	1.2	11.8	5.4
	3	346	235	291	180	554	443	817	706	1080	968					
	4	461	313	213	65	476	327	739	590	1002	853					
	5	576	391			398	212	661	475	923	738					
	6	692	469			320	97	582	360	845	623					
228-3K-200SR	2	330	212	548	431	929	811	1309	1192	1690	1572	79.9	61.6	1.5	15.0	6.8
	3	495	319	442	266	823	646	1203	1027	1584	1407					
	4	660	425	336	101	716	481	1097	862	1477	1242					
	5	825	531			610	316	991	697	1371	1077					
	6	990	637			504	151	884	532	1265	912					
228-3K-300SR	2	526	351	835	660	1428	1253	2021	1847	2614	2440	130.0	98.2	2.0	24.5	11.1
	3	789	527	659	397	1252	991	1846	1584	2439	2177					
	4	1052	703	484	134	1077	728	1670	1321	2263	1914					
	5	1315	878			901	465	1494	1058	2087	1651					
	6	1578	1054			726	202	1319	795	1912	1388					
228-3K-500SR	2	865	576	1454	1164	2468	2178	3483	3193	4497	4207	200.8	162.3	2.5	33.8	15.3
	3	1298	863	1166	731	2180	1746	3195	2760	4209	3775					
	4	1730	1151	878	299	1892	1313	2907	2328	3922	3342					
	5	2163	1439			1605	881	2619	1895	3634	2910					
	6	2596	1727			1317	448	2331	1463	3346	2477					
228-3K-700SR	2	1108	738	1824	1454	3105	2735	4386	4016	5667	5297	256.9	206.9	2.9	39.7	18.0
	3	1663	1107	1455	900	2736	2181	4017	3462	5298	4743					
	4	2217	1477	1086	345	2367	1626	3648	2908	4929	4189					
	5	2771	1846			1998	1072	3279	2353	4560	3634					
	6	3325	2215			1628	518	2910	1799	4191	3080					
228-3K-850SR	2	1398	937	2155	1694	3701	3240	5247	4786	6793	6332	341.1	228.8	3.3	51.5	23.4
	3	2096	1406	1686	995	3232	2541	4778	4087	6324	5633					
	4	2795	1874	1217	297	2763	1843	4309	3389	5855	4934					
	5	3494	2343			2295	1144	3841	2690	5387	4236					
	6	4193	2812			1826	445	3372	1991	4918	3537					
228-3K-1000SR	2	1597	1064	2635	2102	4484	3952	6334	5801	8183	7650	392.4	283.1	3.5	61.6	27.9
	3	2395	1596	2103	1304	3952	3153	5802	5003	7651	6852					
	4	3193	2128	1571	505	3420	2355	5269	4204	7119	6054					
	5	3992	2660			2888	1557	4737	3406	6587	5255					
	6	4790	3192			2356	758	4205	2608	6055	4457					

Air Consumption (scf per 90 Deg) = (Volume/1728) x (Supply Pressure +14.7)/14.7.

Pneumatic Rack & Pinion Actuator Series 228



Spring Return, Rack & Pinion Torque Output (inch pounds) at Supply Pressure Chart (Cont.)

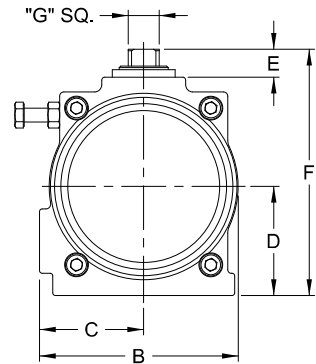
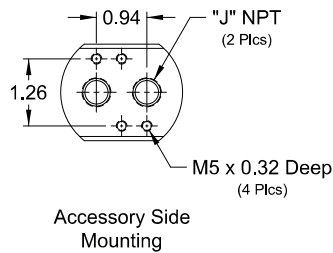
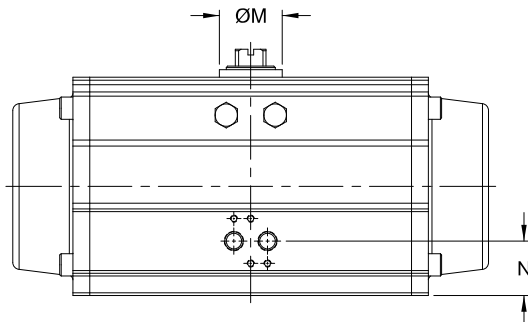
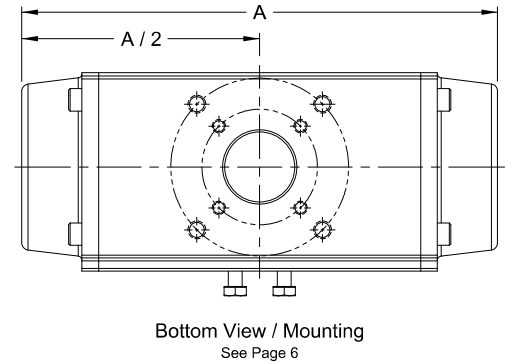
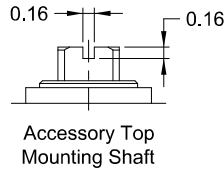
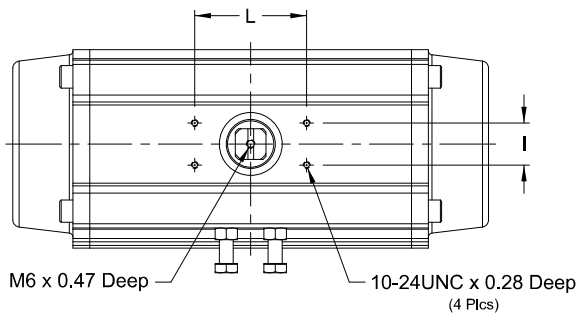
Actuator Model	Springs per Side	Spring Torque		40 PSI		60 PSI		80 PSI		100 PSI		Volume		Cycle Time Seconds per 90°	Weight	
		(compressed) Start	(extended) End	Start	End	Start	End	Start	End	Start	End	Spring	Air		Lbs	Kg
228-3K-1200SR	2	2076	1342	3641	2907	6132	5398	8624	7890	11115	10381	554.1	400.9	4.2	82.7	37.5
	3	3114	2014	2969	1869	5461	4360	7952	6852	10444	9343					
	4	4152	2685	2298	831	4790	3322	7281	5814	9773	8305					
	5	5190	3356			4119	2284	6610	4776	9102	7267					
	6	6228	4027			3447	1246	5939	3738	8430	6229					
228-3R-1750SR	2	2548	1846	4241	3539	7285	6582	10328	9626	13372	12670	721.3	487.6	5.0	105.6	47.9
	3	3823	2769	3318	2265	6362	5308	9405	8352	12449	11395					
	4	5097	3692	2395	990	5439	4034	8482	7078	11526	10121					
	5	6371	4615			4516	2760	7559	5803	10603	8847					
	6	7645	5538			3593	1485	6636	4529	9680	7573					
228-3R-2400SR	2	3719	2755	6190	5225	10662	9698	15134	14170	19607	18642	984.3	717.0	7.0	133.5	60.6
	3	5579	4132	4813	3366	9285	7838	13757	12310	18229	16783					
	4	7438	5509	3435	1506	7908	5979	12380	10451	16852	14923					
	5	9298	6886			6530	4119	11003	8591	15475	13063					
	6	11157	8264			5153	2259	9625	6732	14098	11204					
228-3R-2700SR	2	5278	3756	9829	8307	16621	15099	23413	21891	30205	28683	1468.2	1064.9	10.0	201.7	91.5
	3	7917	5634	7951	5668	14743	12460	21535	19252	28327	26044					
	4	10556	7512	6073	3029	12865	9821	19657	16613	26449	23405					
	5	13195	9390			10987	7182	17779	13974	24571	20766					
	6	15834	11268			9109	4543	15901	11335	22693	18127					
228-3R-3300SR	2	7516	5173	13462	11118	22779	20436	32096	29753	41413	39070	1938.7	1479.8	14.0	262.7	119.2
	3	11274	7759	10876	7360	20193	16677	29510	25995	38827	35312					
	4	15032	10345	8289	3602	17606	12919	26924	22237	36241	31554					
	5	18790	12931			15020	9161	24337	18479	33655	27796					
	6	22548	15518			12434	5403	21751	14721	31068	24038					

Air Consumption (scf per 90 Deg) = (Volume/1728) x (Supply Pressure +14.7)/14.7.

Note: Cycle times are under no load conditions. Air line size, air capacity and valve torque characteristics affect the cycle times. Faster or slower cycle times can be accomplished using special control components.



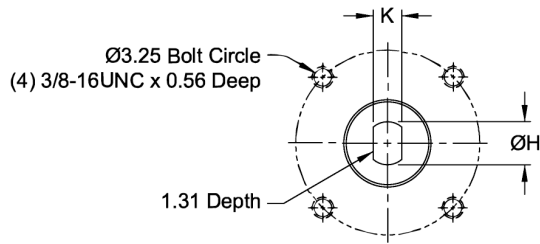
Pneumatic Rack & Pinion Actuator Series 228



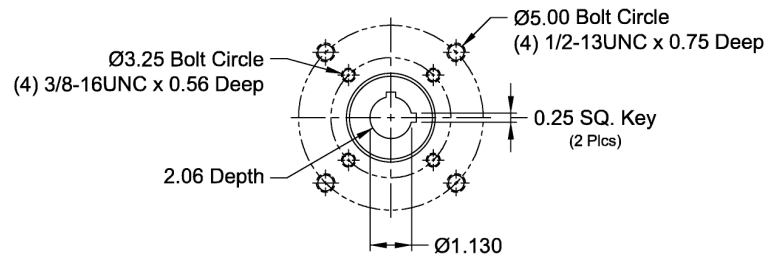
Dimensions – Rack & Pinion

Actuator Model	Dimensions											
	A (length)	B (width)	C	D	E	F (height)	G (square)	L	I	J (NPT)	ØM	N
228-3R-10	4.57	1.93	1.10	1.00	0.787	2.697	0.354	1.969	0.984	1/8"	0.79	0.94
228-3R-20	6.50	2.66	1.63	1.42	0.787	3.617	0.394	3.150	1.181	1/8"	0.87	0.94
228-3K-40	7.60	3.35	1.85	1.73	0.787	4.247	0.394	3.150	1.181	1/8"	1.06	1.07
228-3K-80	9.29	4.18	2.24	2.15	0.787	5.087	0.394	3.150	1.181	1/4"	1.06	1.32
228-3K-130	11.02	4.27	2.30	2.30	0.787	5.397	0.551	3.150	1.181	1/4"	1.34	1.14
228-3K-200	11.50	4.78	2.52	2.64	0.787	6.067	0.551	3.150	1.181	1/4"	1.34	1.34
228-3K-300	13.39	5.59	2.93	3.07	0.787	6.927	0.866	3.150	1.181	1/4"	1.77	1.34
228-3K-500	15.35	5.98	3.03	3.41	1.181	7.991	0.866	5.118	1.181	1/4"	1.97	1.59
228-3K-700	16.89	6.38	3.19	3.68	1.181	8.541	0.866	5.118	1.181	1/4"	1.97	1.71
228-3K-850	19.37	6.85	3.43	3.91	1.181	8.991	0.866	5.118	1.181	1/4"	1.97	1.80
228-3K-1000	19.31	7.48	3.74	4.23	1.181	9.641	0.866	5.118	1.181	1/4"	1.97	2.07
228-3K-1200	22.36	8.11	4.06	4.53	1.181	10.241	1.260	5.118	1.181	1/4"	1.97	2.05
228-3R-1750	23.54	8.90	4.45	5.04	1.181	11.261	1.260	5.118	1.181	1/4"	2.84	2.24
228-3R-2400	24.80	10.24	5.12	5.73	1.181	12.641	1.260	5.118	1.181	1/4"	2.84	2.62
228-3R-2700	28.27	11.57	5.79	6.50	1.181	14.171	1.260	5.118	1.181	1/4"	2.84	3.19
228-3R-3300	30.47	12.76	6.38	6.92	1.181	15.021	1.260	5.118	1.181	1/4"	2.84	3.34

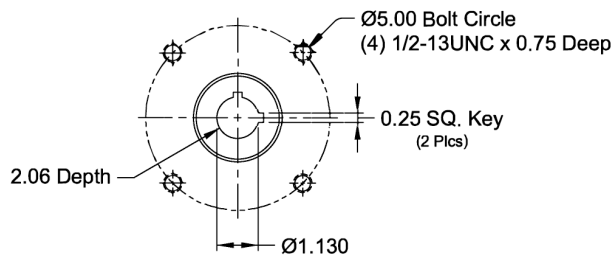
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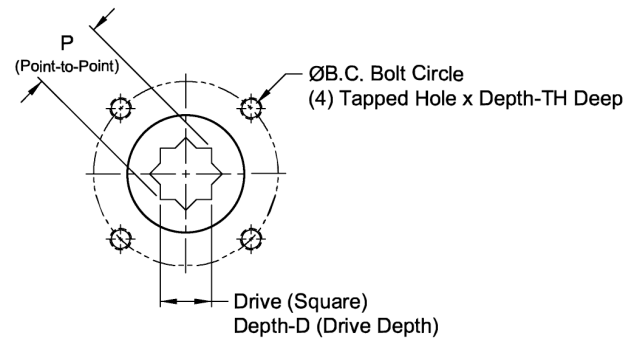
Actuator Mounting
228-3K-(Sizes 40, 80, 130, 200)



Actuator Mounting
228-3K-(Sizes 300, 500)



Actuator Mounting
228-3K-(Sizes 700, 850, 1000, 1200)



Actuator Mounting
228-3R-(Sizes 10, 20, 1750, 2400, 2700, 3300)

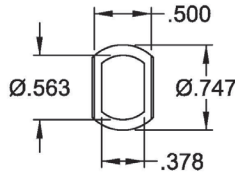
Dimensions: 228 Rack & Pinion Actuators

Model & Size	ISO 5211	B.C.	Tapped Hole	Depth-TH	K	ØH	Drive (sq)	Depth-D	P Point-to-Point
228-3R-10	F03	1.417	10-24	0.24	N/A	N/A	0.354	0.39	0.460
228-3R-20	F04	1.654	10-24	0.32	N/A	N/A	0.433	0.63	0.612
228-3K-40	ABZ STD	3.250	3/8-16	0.56	0.378	0.568	N/A	1.31	N/A
228-3K-80	ABZ STD	3.250	3/8-16	0.56	0.503	0.755	N/A	1.31	N/A
228-3K-130	ABZ STD	3.250	3/8-16	0.56	0.503	0.755	N/A	1.31	N/A
228-3K-200	ABZ STD	3.250	3/8-16	0.56	0.503	0.755	N/A	1.31	N/A
See Sketch	ABZ STD	See Sketch: 3K-300, 3K-500, 3K-700, 3K-850, 3K-1000, 3K-1200							
228-3R-1750	F14	5.512	5/8-11	0.87	N/A	N/A	1.417	1.90	2.004
228-3R-2400	F16	6.496	3/4-10	0.98	N/A	N/A	1.811	2.00	2.561
228-3R-2700	F16	6.496	3/4-10	0.98	N/A	N/A	1.811	2.36	2.561
228-3R-3300	F16	6.496	3/4-10	0.98	N/A	N/A	1.811	2.36	2.561

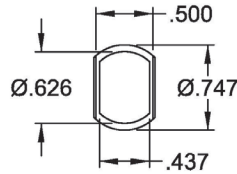
Pneumatic Rack & Pinion Actuator Series 228



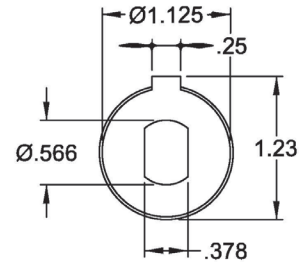
Actuator Drive Inserts Available



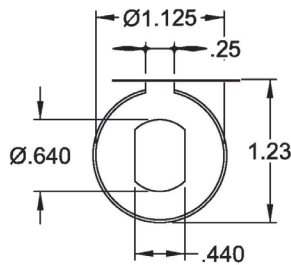
Fits Double D Stem Size
Ø9/16 by 3/8
Part Number: 5322021280



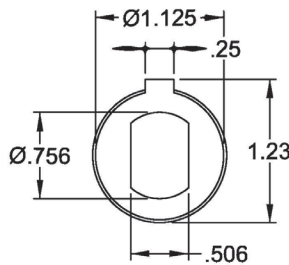
Fits Double D Stem Size
Ø5/8 by 7/16
Part Number: 5322021320



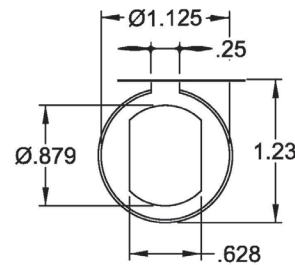
Fits Double D Stem Size
Ø9/16 by 3/8
Part Number: 5322021260



Fits Double D Stem Size
Ø5/8 by 7/16
Part Number: 5322021300



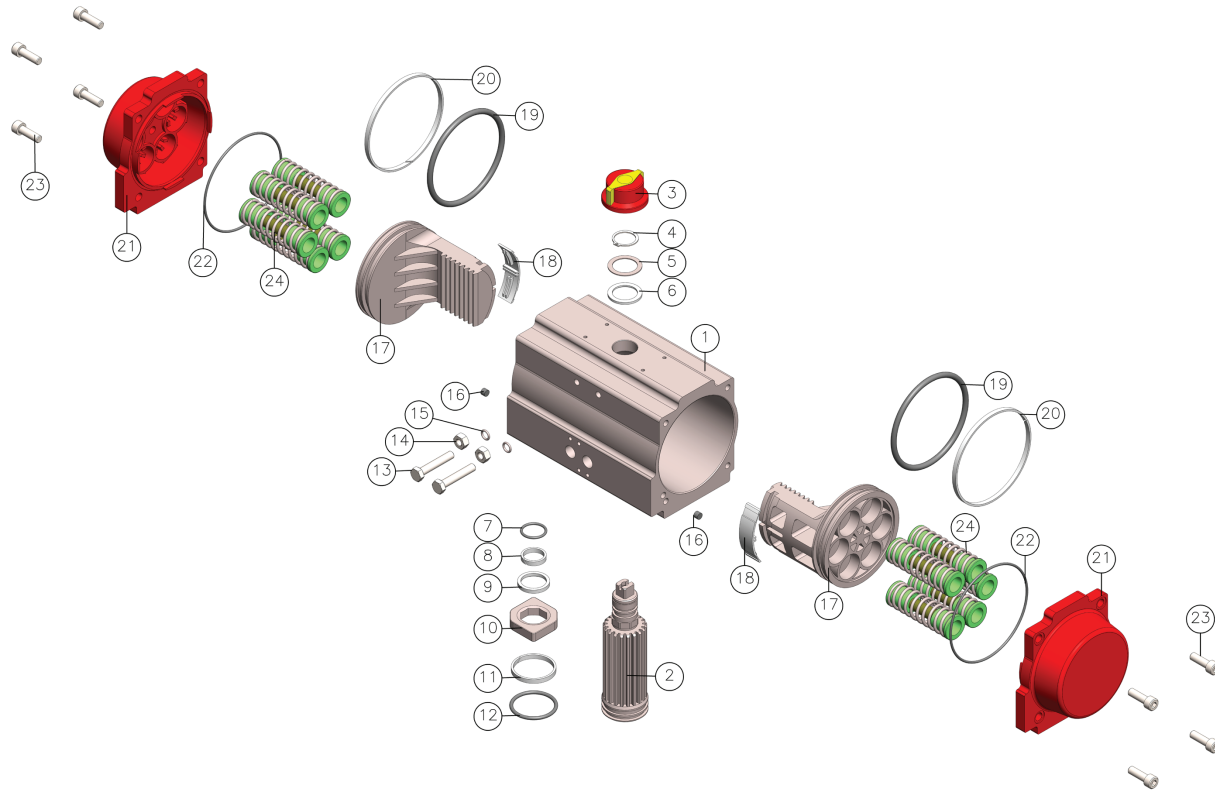
Fits Double D Stem Size
Ø3/4 by 1/2
Part Number: 5322021340



Fits Double D Stem Size
Ø7/8 by 5/8
Part Number: 5322021360



Pneumatic Rack & Pinion Actuator Series 228



Parts & Materials – Rack & Pinion sizes 10 to 2400, plus 2700 & 3300

No.	Description	Qty.	Standard Material	Options	Repair Kit
1	Cylinder Body	1	Hard Anodized Aluminum (AL6005-T5)		
2	Pinion	1	Zinc/Chromate Plated Carbon Steel		
3	Position Indicator	1	Acrylonitrile Butadiene Styrene (ABS)		
4	Snap Ring	1	Electroless Nickel Plated Steel		
5	Pinion SST Washer	1	304 Stainless Steel		✓
6	Pinion Washer	1	Polyoxymethylene (POM)		✓
7	Top Pinion O-Ring	1	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
8	Top Pinion Bushing - A	1	Nylon (A66)		✓
9	Top Pinion Bushing - B	1	Nylon (A66)		✓
10	Travel Stop Cam	1	Nickel Phosphorus Coated 45# Alloy Steel		
11	Bottom Pinion Bushing	1	Nylon (A66)		✓
12	Bottom Pinion O-Ring	1	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
13	Travel Stop Bolt	2	304 Stainless Steel		
14	Travel Stop Nut	2	304 Stainless Steel		
15	Travel Stop O-Ring	2	Nitrile Buna (NBR)		✓
16	Hole Sealant	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
17	Piston	2	Anodic Oxidation Film Die Cast Aluminum		
18	Guide Plate	2	Nylon (A66)		✓
19	Piston O-Ring	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
20	Piston Guide Band	2	Nylon (A66)		✓
21	End Cap	2	Epoxy Coated Die Cast Aluminum		
22	End Cap O-Ring	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
23	End Cap Bolt	2	304 Stainless Steel		
24	Spring Cartridge	10*	Epoxy Coated Spring Steel		

* Spring Qty can range from 1-12.

Pneumatic Scotch Yoke Actuator Series 228



Scotch Yoke Double Acting Torque Chart (inch pounds)

228-3R-2500DA			
Supply Air	0 degree	Min	90-degree
60 PSI	13334	6667	11610
80 PSI	17778	8890	15483
100 PSI	22223	11110	19350

228-3R-3500DA			
Supply Air	0 degree	Min	90-degree
60 PSI	26650	13330	23200
80 PSI	35550	17750	30960
100 PSI	44440	22200	38700

Scotch Yoke Spring Return Clockwise (inch pounds)

228-3R-2500SC						
Supply Air	Spring Start	Run	Spring End	Air Start	Run	Air End
60 PSI	6000	2500	3480	9854	4000	5612
80 PSI	9080	3950	5520	12258	4750	6403
100 PSI	11349	5133	7495	14728	5978	8005

228-3R-3500SC						
Supply Air	Spring Start	Run	Spring End	Air Start	Run	Air End
60 PSI	12000	5000	6900	19700	8000	11200
80 PSI	18100	7900	11000	24500	9500	12800
100 PSI	22698	10266	14990	29450	11956	16010

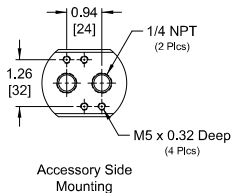
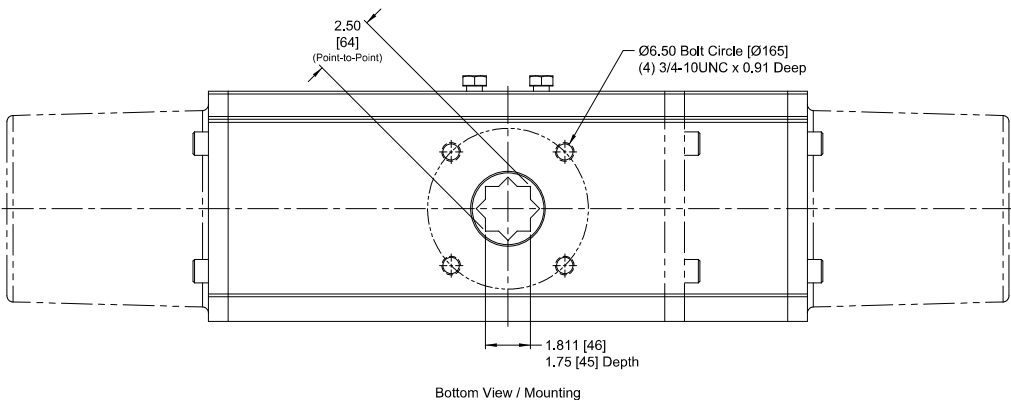
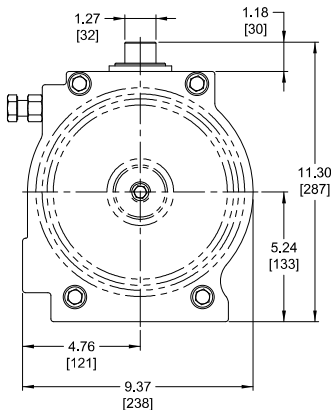
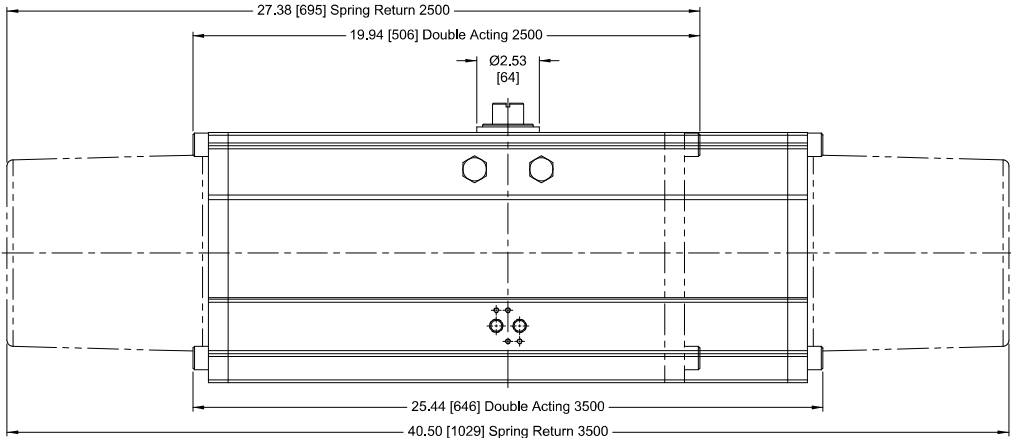
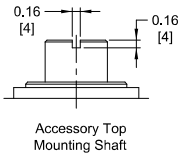
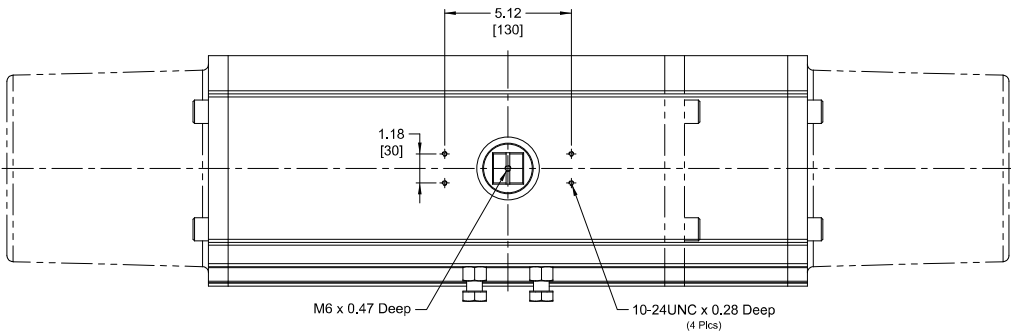
Scotch Yoke Spring Return Counter-Clockwise (inch pounds)

228-3R-2500SO						
Supply Air	Spring Start	Run	Spring End	Air Start	Run	Air End
60 PSI	6240	2330	2760	7522	4160	6000
80 PSI	7800	3600	4200	9500	5110	6432

228-3R-3500SO						
Supply Air	Spring Start	Run	Spring End	Air Start	Run	Air End
60 PSI	12400	4600	5410	15000	8200	12000
80 PSI	15600	7200	8400	19000	10200	12800



Pneumatic Scotch Yoke Actuator Series 228



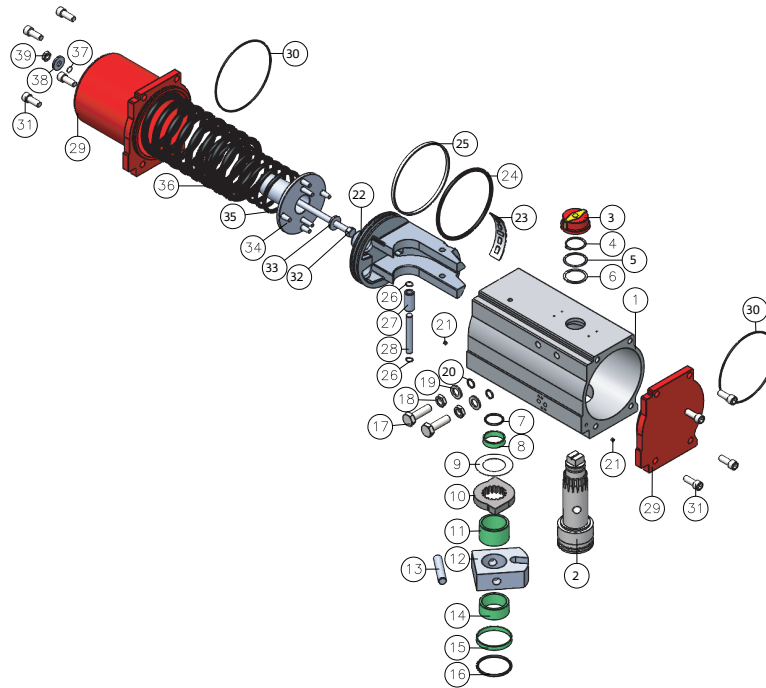
Scotch Yoke Volume & Cycle Time by Weight

Model	Weight (pounds)		Volume (cu.in per 90-deg.)		Cycle Time (sec. per 90-deg.)	
	DA	SR	CW	CCW	CW	CCW
228-3R-2500	98	137	525	310	5	5
228-3R-3500	125	195	650	585	9	9

Note:
Responsibility for proper selection, use and maintenance of any product remains solely with the purchaser and end user.
We reserve the right to modify or improve the designs or specifications of any product at any time without notice.



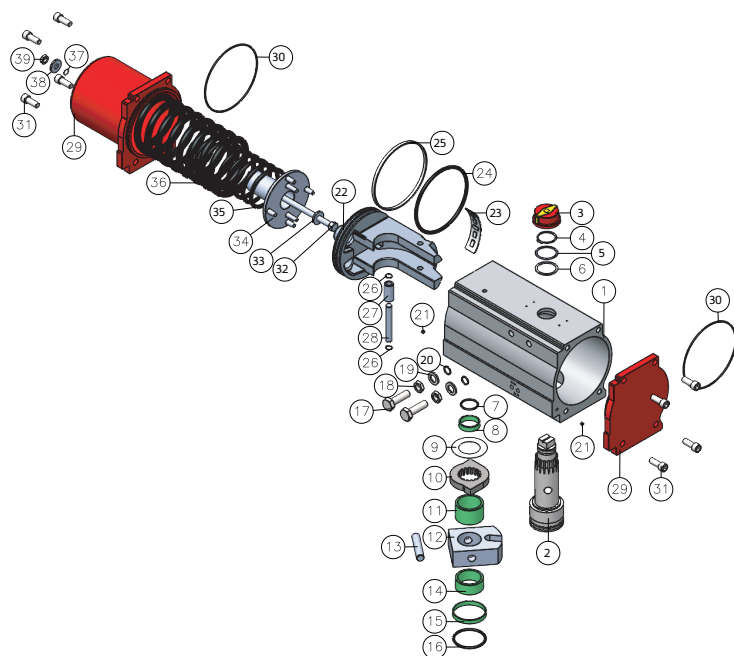
Pneumatic Scotch Yoke Actuator Series 228



Parts & Materials – Scotch Yoke (228-3R-2500)

No.	Description	Qty.	Standard Materials	Options	Repair Kit
1	Actuator Body	1	Hard Anodized Aluminum A6N01 ST5		
2	Drive Shaft	1	Zinc/Chromate Plating S45C-D		
3	Position Indicator	1	Polyethylene		
4	Drive Shaft Snap Ring	1	Zinc Plated SK5		✓
5	Support Washer	1	304 Stainless Steel		✓
6	Support Bushing	1	Polyoxymethylene (POM)		✓
7	Drive Shaft Upper Ring	1	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
8	Drive Shaft Upper Bushing	1	Nylon 4/6 (TP-601)		✓
9	Stop Cam Spacer	1	PTFE		✓
10	Travel Stop Cam	1	SCM21 Nickel Phosphorus Coated		
11	Travel Stop Cam Support Bushing	1	Nylon 4/6 (TP-601)		✓
12	Yoke	1	Nitriding S45C-D		
13	Yoke Pin	1	S45C-D		
14	Yoke Support Bushing	1	Nylon 4/6 (TP-601)		
15	Drive Shaft Lower Bushing	1	Nylon 4/6 (TP-601)		✓
16	Drive Shaft Lower O-Ring	1	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
17	Travel Stop Bolt	2	304 Stainless Steel		
18	Travel Stop Nut	2	304 Stainless Steel		
19	Travel Stop Washer	2	304 Stainless Steel		✓
20	Travel Stop O-Ring	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
21	Hole Seal	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	
22	Piston	1	AC2B-F		
23	Piston Guide Plate	1	Nylon 4/6 (TP-601)		✓
24	Piston O-Ring	1	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
25	Piston Guide Ring	1	PTFE		✓
26	Piston Pin Snap Ring	2	Zinc Plated Steel		
27	Piston Pin	1	Nitriding S45C-D		
28	Piston Roller	1	Nitriding Bearing Steel		

Pneumatic Scotch Yoke Actuator
Series 228



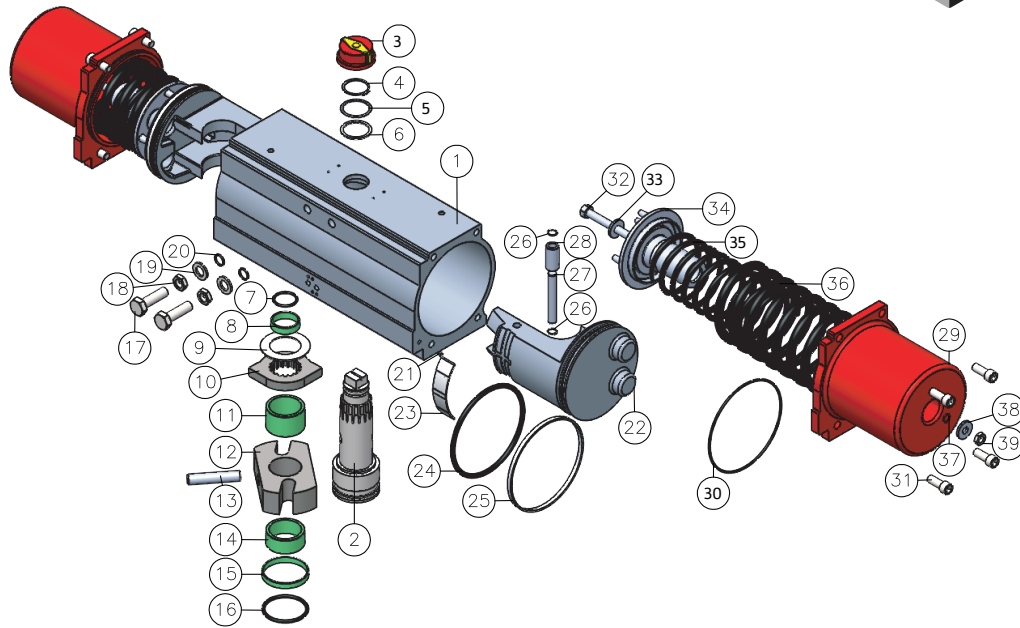
Parts & Materials (Cont.) – Scotch Yoke (228–3R–2500)

No.	Description	Qty.	Standard Materials	Options	Repair Kit
29	End Cap	2	Epoxy Coated AC2B-F		
30	End Cap O-Ring	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	
31	End Cap Bolt	8	304 Stainless Steel		
32	Pre-Tensioning Bolt	1	Electroless Nickel Plated SCM 435		
33	Spring Guide Washer	1	Electroless Nickel Plated SPCC		
34	Spring Guide	1	AC2B-F		
35	Inner Spring	*	SUP 10		
36	Outer Spring	*	SUP 10		
37	Pre-Tensioning O-Ring	1	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
38	Pre-Tensioning Washer	1	Electroless Nickel Plated SPCC		
39	Pre-Tensioning Nut	1	304 Stainless Steel		

*Varies by size and pressure rating.



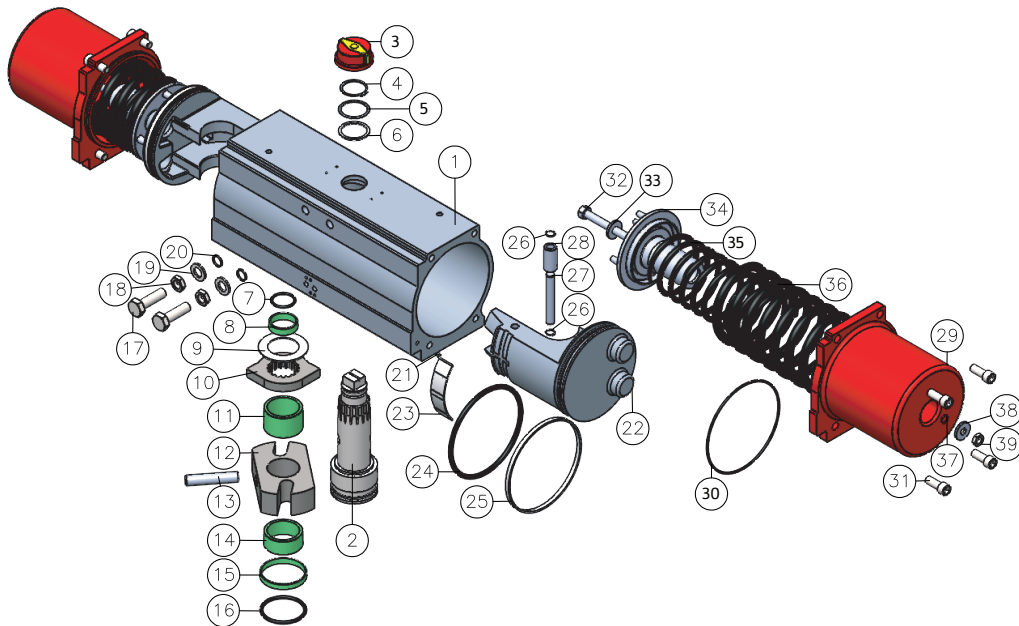
Pneumatic Scotch Yoke Actuator Series 228



Parts & Materials – Scotch Yoke (228-3R-3500)

No.	Description	Qty.	Standard Materials	Options	Repair Kit
1	Actuator Body	1	Hard Anodized Aluminum A6N01 ST5		
2	Drive Shaft	1	Zinc/Chromate Plating S45C-D		
3	Position Indicator	1	Polyethelene		
4	Drive Shaft Snap Ring	1	Zinc Plated SK5		✓
5	Support Washer	1	304 Stainless Steel		✓
6	Support Bushing	1	Polyoxymethylene (POM)		✓
7	Drive Shaft Upper Ring	1	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
8	Drive Shaft Upper Bushing	1	Nylon 4/6 (TP-601)		✓
9	Stop Cam Spacer	1	PTFE		✓
10	Travel Stop Cam	1	SCM21 Nickel Phosphorus Coated		
11	Travel Stop Cam Support Bushing	1	Nylon 4/6 (TP-601)		✓
12	Yoke	1	Nitriding S45C-D		
13	Yoke Pin	1	S45C-D		
14	Yoke Support Bushing	1	Nylon 4/6 (TP-601)		
15	Drive Shaft Lower Bushing	1	Nylon 4/6 (TP-601)		✓
16	Drive Shaft Lower O-Ring	1	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
17	Travel Stop Bolt	2	304 Stainless Steel		
18	Travel Stop Nut	2	304 Stainless Steel		
19	Travel Stop Washer	2	304 Stainless Steel		✓
20	Travel Stop O-Ring	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
21	Hole Seal	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	
22	Piston	2	AC2B-F		
23	Piston Guide Plate	2	NYLON6		✓
24	Piston O-Ring	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	✓
25	Piston Guide Ring	2	PTFE		
26	Piston Pin Snap Ring	4	Zinc Plated Steel		
27	Piston Pin	2	Nitriding S45C-D		

Pneumatic Scotch Yoke Actuator
Series 228



Parts & Materials (Cont.) – Scotch Yoke (228–3R–3500)

No.	Description	Qty.	Standard Materials	Options	Repair Kit
28	Piston Roller	2	Nitriding Bearing Steel		
29	End Cap	2	Epoxy Coated AC2B-F		
30	End Cap O-Ring	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	
31	End Cap Bolt	8	304 Stainless Steel		
32	Pre-Tensioning Bolt	2	Electroless Nickel Plated SCM 435		
33	Spring Guide Washer	2	Electroless Nickel Plated SPCC		
34	Spring Guide	2	AC2B-F		
35	Inner Spring	*	SUP 10		
36	Outer Spring	*	SUP 10		
37	Pre-Tensioning O-Ring	2	Nitrile Buna (NBR)	Viton® (FKM) or Silicone	
38	Pre-Tensioning Washer	2	Electroless Nickel Plated SPCC		✓
39	Pre-Tensioning Nut	2	304 Stainless Steel		

*Varies by size and pressure rating.



Pneumatic Rack & Pinion, and Scotch Yoke Actuator Series 228



Example: 228-3K-80SC4B

The designation for an ASC Series 228, fail clockwise, model 80, spring return, rack & pinion actuator with buna seals, 4 springs and travel stops in both directions, is: 227-3K-80SC4B.

How to order Series 228

228	-	3K	-	80	SC	4	B	
Series		Model & Mounting		Size	Action	Springs per Side	Seals	Options & Suffixes
Series		Size		Action		Springs per Side		Seals
228	Pneumatic Actuator with Dual Travel Stops	Rack & Pinion	SC	Spring Return, Fail Clockwise (CW)	No Code <blank>	DA & DR	B	Buna [standard] -5°F to 175°F
Model & Mounting		10 **	DA	Double Acting (CW to close)	Rack & Pinion SC, SO		Non-Standard	
3K	Direct mount to many ABZ-BFV	20 **	Non-Standard		1	1 spring	V	Viton® 0°F to 300°F
3R	ISO-5211 mounting	40 *	SO	Fail CCW (Counter Clockwise)	2	2 springs	L	Low temperature Silicone (-45°F to 175°F)
		80 *	DR	Double Acting (Reverse acting)	3	3 springs	Options & Suffixes	
		130 *			4	4 springs	No Code <blank>	Standard 1/8" NPT 10 thru 40 1/4" NPT 80 thru 3500
		200 *			5 <Std>	5 springs	E	Extra long travel stops (1)
		300 *			6	6 springs	1	1/4" NPT Port (2)
		500 *			Scotch Yoke SC, SO		2	3/8" NPT Port (size 3K/R 80 and larger)
		700 *			60	60 psi spring	3	1/2" NPT Port (size 3K/R 300 and larger)
		850 *			80 <Std>	80 psi spring	4	3/4" NPT Port (size 3K/R 1000 and larger)
		1000 *			100	100 psi spring	5	1" NPT Port (size 3K/R 2400 and larger)
		1200 *					N	Electroless Nickel Plating
		1750 **					P	PTFE Coating
		2400 **					Y	Epoxy Coating
		2700 **					S	Addition to one spring on one side (1)
		3300 **						
		Scotch Yoke						
		2500 **						
		3500 **						
		* = 3K						
		** = 3R						

Notes:

(1) Not available for size 3R-10, 3R-2500 or 3R-3500

(2) 1/4" NPT Port Option (size 3K-40)

Note: Responsibility for proper selection, use and maintenance of any product remains solely with the purchaser and end user. We reserve the right to modify or improve the designs or specifications of any product at any time without notice.



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ASC Engineered Solutions is defined by quality—in its products, services and support. With more than 1,400 employees, the company's portfolio of precision-engineered piping support, valves and connections provides products to more than 4,000 customers across industries, such as mechanical, industrial, fire protection, oil and gas, and commercial and residential construction. Its portfolio of leading brands includes ABZ Valve®, AFCON®, Anvil®, Anvil EPS, Anvil Services, Basic-PSA, Beck®, Catawissa, Cooplet®, FlexHead®, FPPI®, Gruvlok®, J.B. Smith, Merit®, North Alabama Pipe, Quadrant®, SCI®, Sharpe®, SlideLOK®, SPF® and SprinkFLEX®. With headquarters in Commerce, CA, and Exeter, NH, ASC also has ISO 9001:2015 certified production facilities in PA, TN, IL, TX, AL, LA, KS, and RI.



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