

ACHEM SERIES Pneumatic Actuators



ACHEM[®]
Valve Control Experts

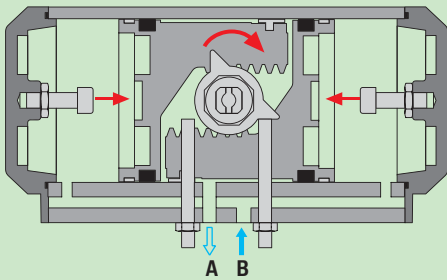
ACHEM Controls
Add: 1155 North Service Road #. 11, Oakville, Ontario Canada
Phone: 289-291-3984 Cell: 905-616-0014
E-mail: Kevin.armstrong@achemgroup.com
www.achemgroup.com Skype: achemkevin

www.achemgroup.com

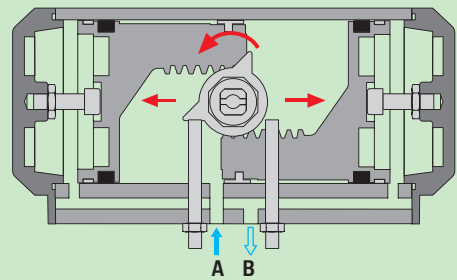
ACM SERIES PNEUMATIC ACTUATORS

Operating Principle

Double Acting (R-closed)

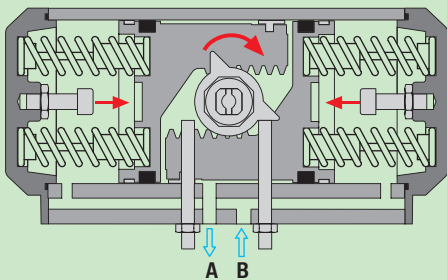


By supplying air to Port B, pressure is applied to the outside chamber and drives the dual pistons inward. The action causes the pinion to turn clockwise while the air is being exhausted from Port A.

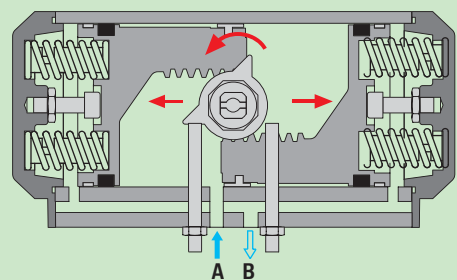


By supplying air to Port A, pressure is applied to the center chamber and forces the dual pistons outward. Linear piston force is transferred via gear racks to the pinion gear, causing the pinion to turn counterclockwise while the air is being exhausted from Port B.

Spring Return (R-closed, fail closed)



Upon loss of air pressure, the stored energy in the compressed springs forces the pistons inwards producing rotary motion with exhaust air exiting at Port A. This "fail safe" position is held by spring force until air pressure reapplied to Port A.

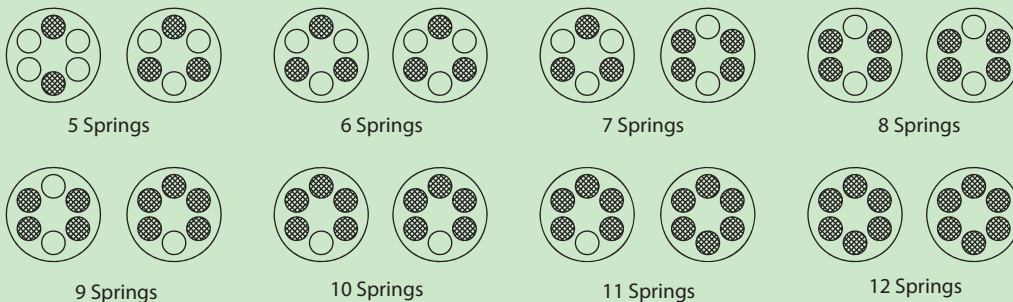


By supplying air to Port A, pressure is applied to the center chamber, forcing the dual pistons outward, compressing the springs in the outside chambers to produce a counterclockwise rotation. Exhaust air exits at Port B.

Stroke Adjustment:

Stroke Adjustment: Pinion stops allow $\pm 5^\circ$ adjustment at 0° and 90° .

Installation of Springs for Spring Return Actuator



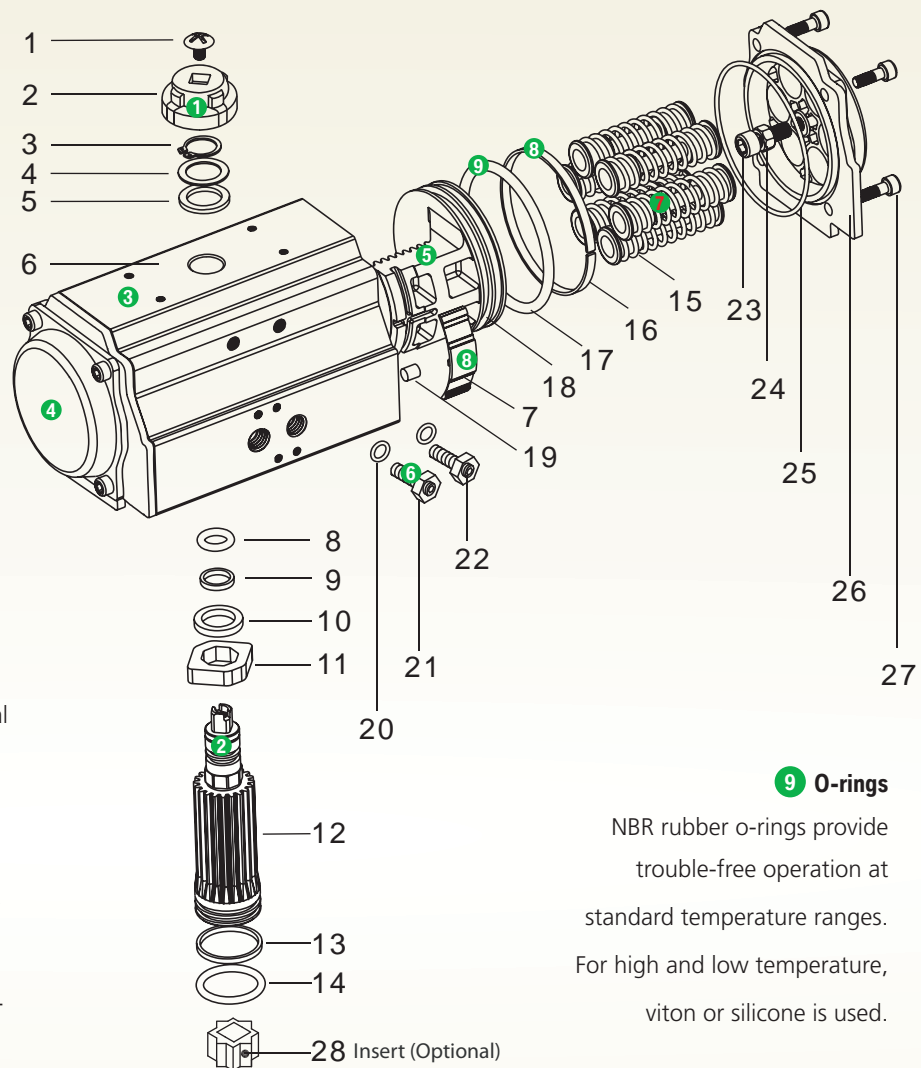
Even spring set is recommended for high cycle application.



ACM SERIES PNEUMATIC ACTUATORS

Materials and Structure

- 1 Indicator** - Position indicator with NAMUR is convenient for mounting accessories such as limit switch box, positioner and so on.
- 2 Pinion** - Fully conform to the latest standards of ISO5211, DIN3337, NAMUR. The dimensions can be customized and the stainless steel is available.
- 3 Actuator body** - The extruded aluminum alloy ASTM6005 body can be treated with hard anodized, powder polyester painted (different colors is available such as blue, orange, yellow etc).
- 4 End caps** - Die-casting aluminum powder polyester painted in different colors.
- 5 Pistons** - The twin rack pistons are made from die-casting aluminum treated with hard anodized.
- 6 Travel adjustment** - The two independent external travel stop bolts allow $\pm 5^\circ$ adjustment at the positions of 0° and 90° .
- 7 High performance springs** - Preloaded coating springs are made from the high quality material for longer cycle life and resistant to corrosion.
- 8 Bearings & guides** - Made from low friction, long-life compound material, to avoid the direct contact between metals. The maintenance and replacement are easy and convenient.



9 O-rings

NBR rubber o-rings provide trouble-free operation at standard temperature ranges. For high and low temperature, viton or silicone is used.

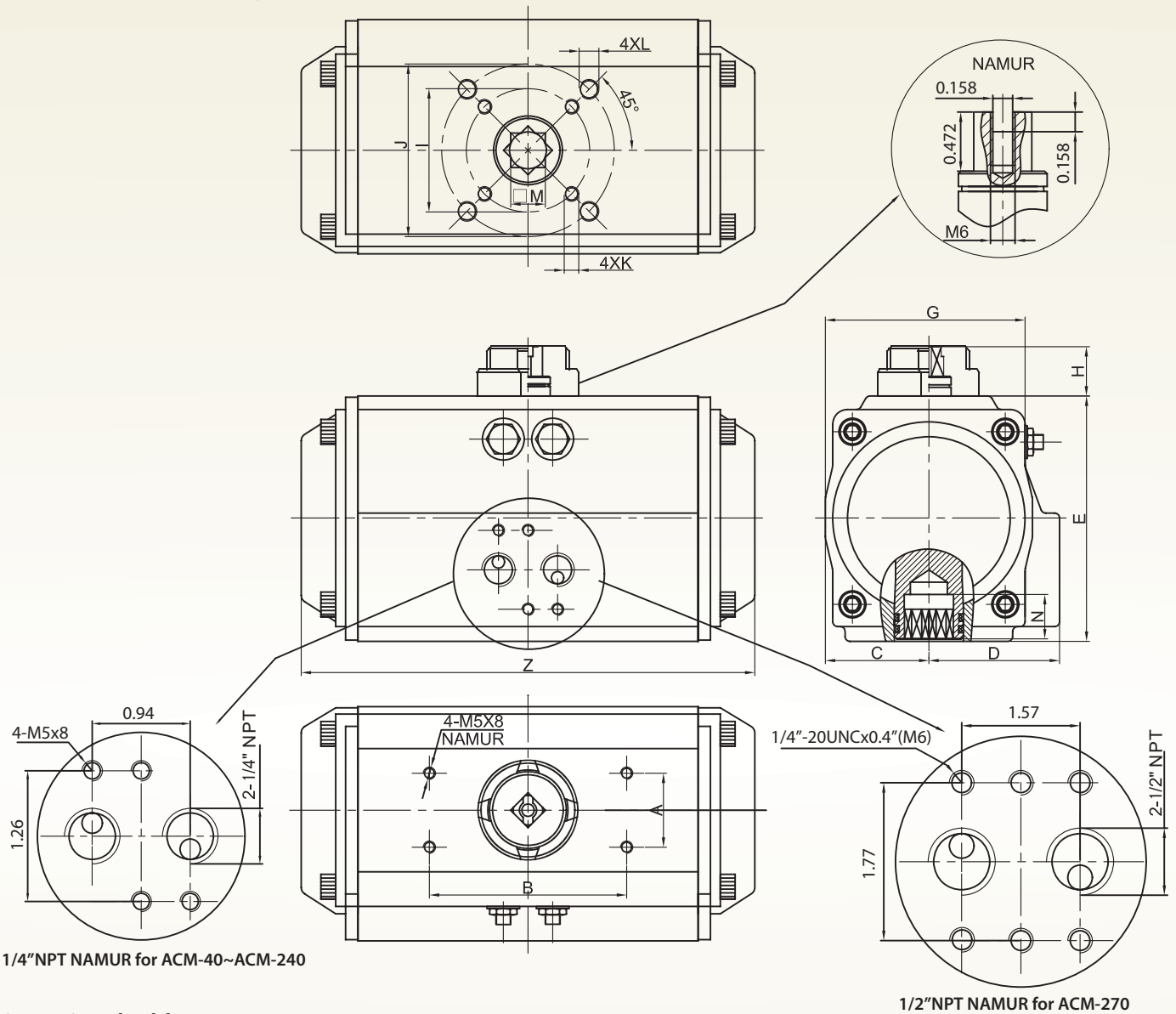
No.	Part Description	Qty.	Material
1	Indicator Cap Screw	1	Plastic / Stainless Steel
2	Position Indicator	1	Plastic (ABS)
3	Pinion Snap Ring	1	Stainless Steel 300 Series
4	Thrust Washer	1	Stainless Steel 300 Series
5	Thrust Bwaring	1	Polyoxymethylene (Delrin)
6	Body	1	Hard Anodized Aluminum
7	Piston Guide	2	Polyoxymethylene (Delrin)
8	O-ring (Pinion Top)	1	NBR
9	Bearing (Pinion Top)	1	Polyoxymethylene (Delrin)
10	Inside Washer	1	Polyoxymethylene (Delrin)
11	Cam	1	Alloy Steel / ASTM 1045
12	Pinion (Drive Shaft)	1	Nickel Plated Alloy / ASTM 1045
13	Bearing (Pinion Bottom)	1	Polyoxymethylene (Delrin)
14	O-ring (Pinion Bottom)	1	NBR

No.	Description	Qty.	Material
15	Spring (Cartridge)	0~12	High Alloy Spring Steel
16	Bearing (Piston)	2	Polyoxymethylene (Delrin)
17	O-ring (Piston)	2	NBR
18	Piston	2	Die-Cast Aluminum
19	Plug	2	NBR
20	O-ring (Adjust Screw)	2	NBR
21	Stop Nut (Adjust Screw)	2	Stainless Steel 300 Series
22	Adjust Screw	2	Stainless Steel 300 Series
23	End Adjust Screw	2	Stainless Steel 300 Series
24	End Adjust Screw Nut	2	Stainless Steel 300 Series
25	O-ring (End Cap)	2	NBR
26	End Cap	2	Die-Casting Aluminum
27	End Cap Screw	8	Stainless Steel 300 Series
28	Adaptor	1	Powder metal

ACM SERIES PNEUMATIC ACTUATORS

Dimensions

Dimensional drawings



1/4" NPT NAMUR for ACM-40~ACM-240

1/2" NPT NAMUR for ACM-270

Dimensional tables

Unit: inch

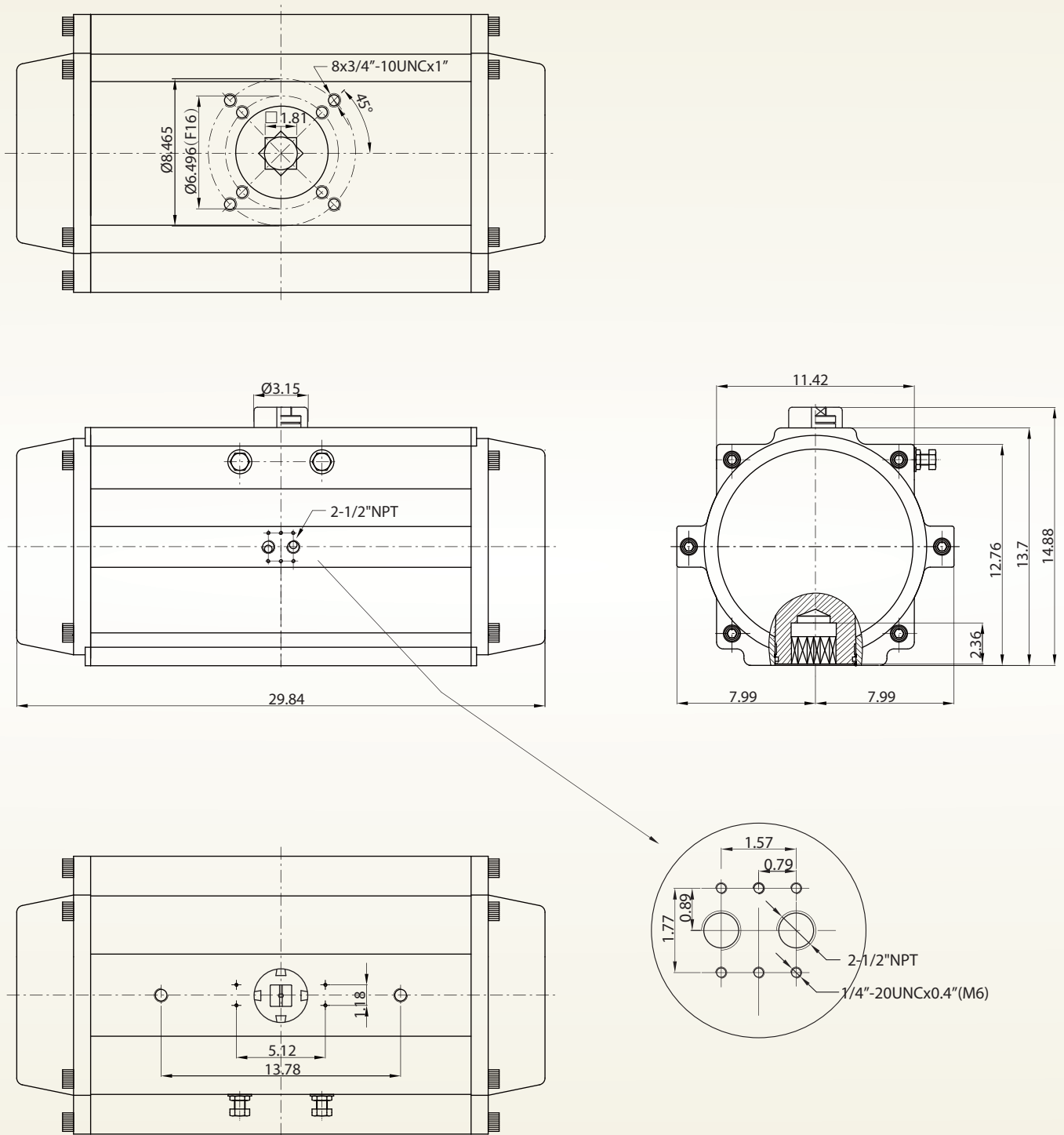
Model	A	B	C	D	E	G	H	I*	J*	K*	L*	M	N	Z
ACM-40	1.18	3.15	1.12	1.44	2.36	2.05	0.79	1.417 (F03)	1.969 (F05)	M5x8	1/4"-20UNCx0.4"(M6)	0.43	0.55	4.72
ACM-52	1.18	3.15	1.18	1.63	2.83	2.56	0.79	1.417 (F03)	1.969 (F05)	M5x8	1/4"-20UNCx0.4"(M6)	0.43	0.55	5.79
ACM-63	1.18	3.15	1.42	1.85	3.44	2.83	0.79	1.969 (F05)	2.756 (F07)	1/4"-20UNCx0.4"(M6)	5/16"-18UNCx0.51"(M8)	0.55	0.71	6.61
ACM-75	1.18	3.15	1.65	2.09	3.92	3.19	0.79	1.969 (F05)	2.756 (F07)	1/4"-20UNCx0.4"(M6)	5/16"-18UNCx0.51"(M8)	0.55	0.71	7.24
ACM-83	1.18	3.15	1.81	2.24	4.28	3.62	0.79	1.969 (F05)	2.756 (F07)	1/4"-20UNCx0.4"(M6)	5/16"-18UNCx0.51"(M8)	0.67	0.83	8.03
ACM-92	1.18	3.15	1.97	2.40	4.59	3.86	0.79	1.969 (F05)	2.756 (F07)	1/4"-20UNCx0.4"(M6)	5/16"-18UNCx0.51"(M8)	0.67	0.83	10.31
ACM-105	1.18	3.15	2.26	2.52	5.24	4.31	0.79	2.756 (F07)	4.016 (F10)	5/16"-18UNCx0.51"(M8)	3/8"-16UNCx0.63"(M10)	0.87	1.02	10.55
ACM-125	1.18	3.15	2.66	2.93	6.10	5.02	0.79	2.756 (F07)	4.016 (F10)	5/16"-18UNCx0.51"(M8)	3/8"-16UNCx0.63"(M10)	0.87	1.02	11.85
ACM-140	1.18	3.15	2.95	3.03	6.77	5.41	0.79	4.016 (F10)	4.921 (F12)	3/8"-16UNCx0.63"(M10)	1/2"-13UNCx0.78"(M12)	1.06	1.22	15.35
ACM-160	1.18	3.15	3.43	3.43	7.76	6.22	0.79	4.016 (F10)	4.921 (F12)	3/8"-16UNCx0.63"(M10)	1/2"-13UNCx0.78"(M12)	1.06	1.22	18.03
ACM-190	1.18	5.12	4.06	4.06	9.06	7.44	1.18		5.512 (F14)		5/8"-11UNCx1"(M16)	1.42	1.57	20.79
ACM-210	1.18	5.12	4.49	4.49	10.04	8.31	1.18		5.512 (F14)		5/8"-11UNCx1"(M16)	1.42	1.57	20.94
ACM-240	1.18	5.12	5.12	5.12	11.38	9.65	1.18		6.496 (F16)		3/4"-10UNCx1"(M20)	1.81	1.97	23.70
ACM-270	1.18	5.12	5.79	5.79	12.83	10.75	1.18		6.496 (F16)		3/4"-10UNCx1"(M20)	1.81	1.97	28.43

* Dimension may be an ISO or rectangular metric pattern (in mm) as shown.

ACM SERIES PNEUMATIC ACTUATORS

Dimensions

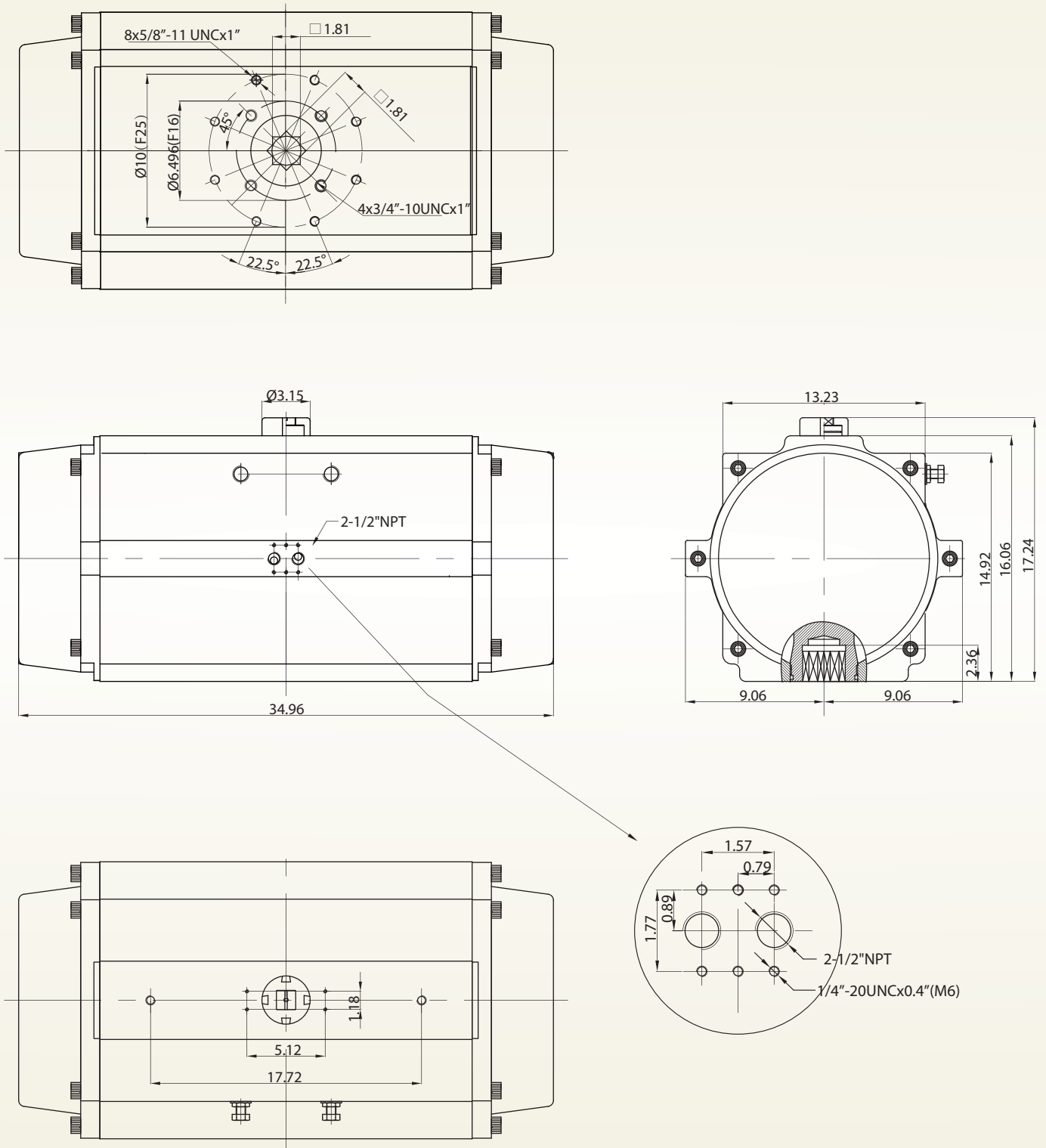
Dimensional drawings for ACM-300



ACM SERIES PNEUMATIC ACTUATORS

Dimensions

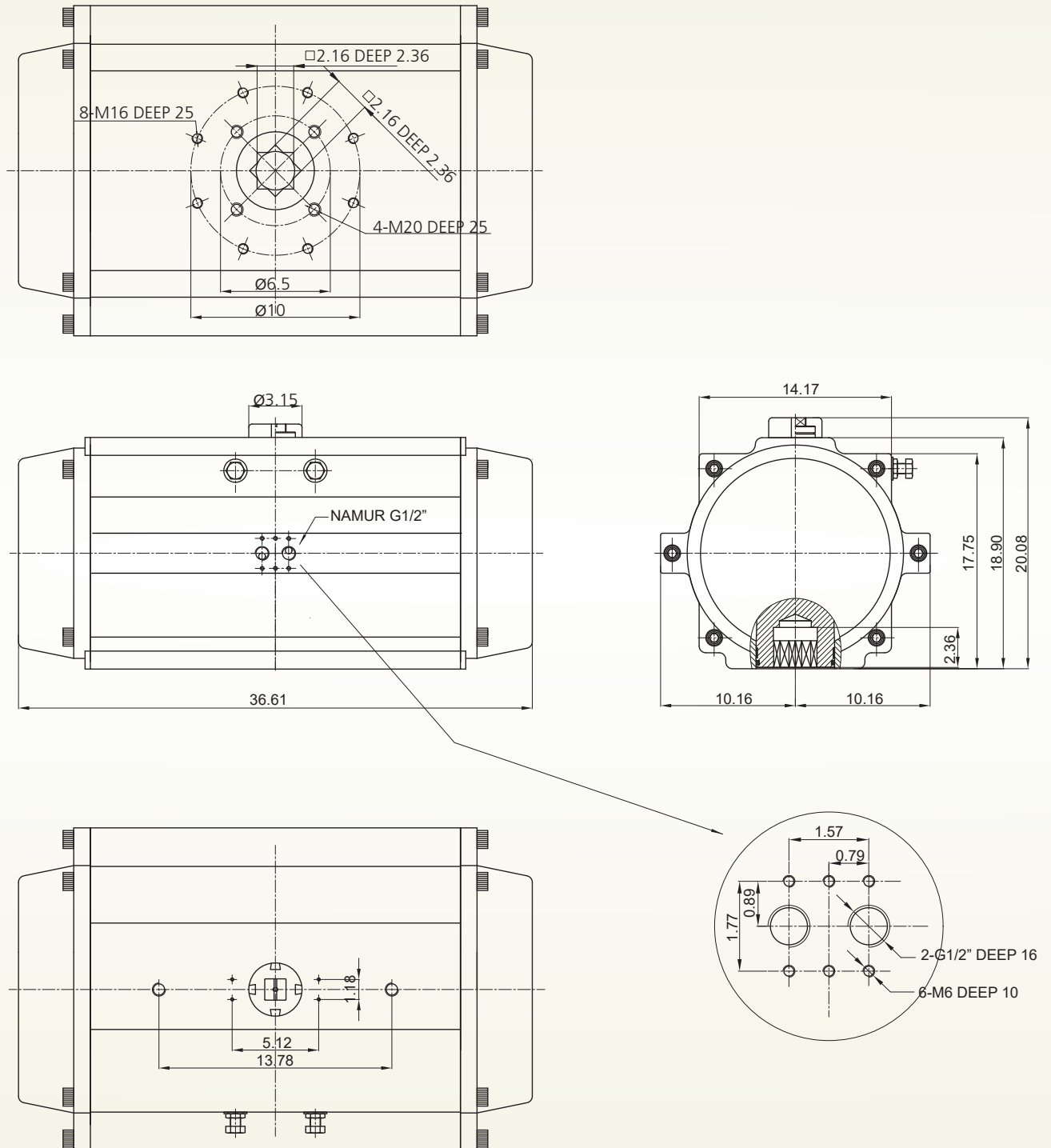
Dimensional drawings for ACM-350



ACM SERIES PNEUMATIC ACTUATORS

Dimensions

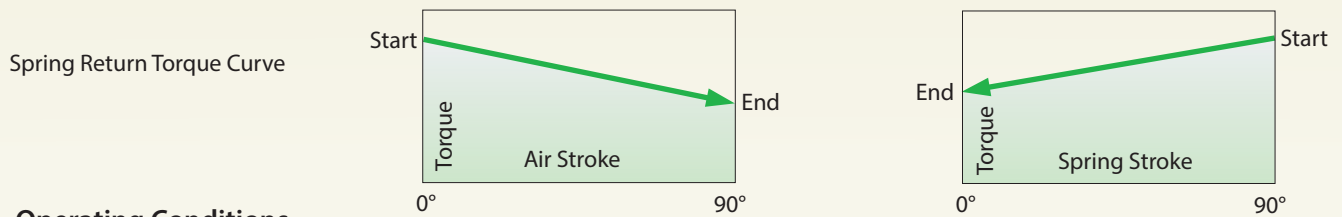
Dimensional drawings for ACM-400



ACM SERIES PNEUMATIC ACTUATORS

Technical Data

Spring Return Actuators Output Torque (lbf-in)



Operating Conditions

Operating Media: Dry and lubricated air, or non-corrosive gas. The maximum particle diameter must be less than 30 μ m.
 Air Supply Pressure: The minimum supply pressure is 35 psig. The maximum supply pressure is 150 psig.
 Operating Temperature: Standard (NBR O-ring): -4 °F to 175 °F. Low Temperature (Silicone O-ring): -30 °F to 175 °F.
 High Temperature (Viton O-ring): 5 °F to 300 °F. Cold Temperature (LNBR + Silica O-ring): -58 °F to 175 °F.

Output Air to Spring																Spring Return Output	
Air Pressure (PSI)		36		44		58		73		87		102		116		90°	0°
Actuator Type	Spring No.	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	Start	End
ACM-52SR	5	50	34	67	50											55	38
	6	43	22	61	40	96	75									65	44
	7	35	12	53	29	87	65	124	92							76	52
	8			46	18	81	53	117	81	152	125					88	59
	9			38	7	73	42	109	70	144	113	180	149			98	67
	10					65	32	102	59	137	103	173	138			110	75
	11					58	20	94	48	129	92	165	127	200	162	120	82
	12							86	37	122	81	158	108	193	151	131	90
ACM-63SR	5	101	68	133	101	197	132									92	60
	6	89	50	120	82	185	147	250	212							111	73
	7	76	32	111	64	173	128	237	194							129	85
	8			96	45	161	110	226	175	290	239	355	304			148	96
	9					149	92	213	157	278	220	343	285			166	109
	10					12	73	202	138	266	202	330	266	396	331	185	121
	11							190	119	254	183	319	248	383	312	203	133
	12							177	101	242	165	306	229	371	295	221	145
ACM-75SR	5	128	94	172	137	261	227									128	93
	6	110	67	153	112	243	201	332	290							154	112
	7	92	42	135	86	224	176	313	265							180	131
	8			116	60	204	150	295	239	382	327	472	416			205	150
	9					186	125	276	213	364	302	453	391			231	168
	10					168	98	255	188	345	276	435	365	523	453	257	187
	11							239	162	327	250	416	340	504	428	282	205
	12							220	136	309	225	397	313	486	402	307	224
ACM-83SR	5	206	142	275	212	414	351									204	140
	6	178	102	248	171	387	311	526	449							244	168
	7	150	61	219	131	358	270	497	409							285	196
	8			192	89	331	228	470	367	609	506	748	645			326	224
	9					303	189	442	327	581	466	719	605			366	252
	10					274	147	413	286	552	425	691	564	830	702	407	280
	11							386	245	525	384	664	523	802	662	448	308
	12							358	205	497	344	635	482	774	621	489	336
ACM-92SR	5	293	195	391	294	591	495									304	206
	6	251	135	350	234	551	434	751	634							365	248
	7	211	73	309	172	509	373	710	573							426	289
	8			277	112	468	312	668	512	868	712	1068	912			487	330
	9					427	251	628	451	828	651	1027	851			548	372
	10					386	190	586	390	786	590	985	789	1186	990	608	413
	11							544	329	744	530	943	729	1144	929	669	455
	12							503	269	703	469	902	668	1102	868	730	496

ACM SERIES PNEUMATIC ACTUATORS

Technical Data

Spring Return Actuators Output Torque (lbf-in)

Output Air to Spring																	Spring Return output	
Air Pressure (PSI)		36		44		58		73		87		102		116		90°	0°	
Actuator Type	Spring No.	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	Start	End	
ACM-105SR	5	451	296	597	442	890	735									435	280	
	6	396	208	541	354	834	648	1127	940							523	336	
	7	340	121	486	268	778	561	1071	853							610	392	
	8			429	181	722	474	1015	766	1307	1059	1600	1352			697	448	
	9					666	387	959	680	1252	972	1544	1265			784	504	
	10					610	296	903	589	1196	882	1489	1174	1781	1467	871	560	
	11							847	504	1139	797	1432	1090	1724	1382	959	616	
12							791	420	1084	713	1376	1005	1669	1298	1045	672		
ACM-125SR	5	646	416	867	637	1310	1080									699	460	
	6	558	274	779	496	1221	947	1664	1390							832	558	
	7	460	133	682	354	1124	797	1575	1248							974	646	
	8			593	221	1036	664	1478	1106	1921	1558	2372	2000			1106	743	
	9					947	522	1390	965	1832	1407	2275	1859			1248	832	
	10					850	389	1292	832	1735	1275	2186	1717	2629	2168	1390	929	
	11							1204	690	1646	1133	2089	1575	2531	2018	1531	1018	
12							1106	558	1558	1000	2000	1443	2443	1885	1664	1106		
ACM-140SR	5	1133	752	1513	1124	2266	1885									1142	761	
	6	982	522	1363	903	2115	1655	2876	2416							1372	912	
	7	832	292	1213	673	1965	1434	2726	2186							1602	1062	
	8			1062	443	1814	1204	2576	1956	3328	2717	4089	3469			1823	1213	
	9					1655	974	2416	1735	3169	2487	3930	3248			2053	1372	
	10					1505	743	2266	1496	3018	2257	3779	3009	4532	3770	2283	1522	
	11							2106	1266	2868	2027	3620	2779	4381	3540	2514	1673	
12							1956	1044	2717	1797	3469	2558	4231	3310	2744	1823		
ACM-160SR	5	1708	1097	2292	1690	3469	2868									1841	1239	
	6	1460	735	2053	1319	3231	2496	4408	3673							2213	1487	
	7	1213	363	1797	947	2974	2124	4151	3301							2584	1735	
	8			1558	584	2735	1761	3912	2098	5089	4116	6266	5293			2947	1974	
	9					2478	1390	3655	2567	4832	3744	6010	4921			3319	2222	
	10					2239	1018	3416	2195	4594	3372	5771	4549	6948	5726	3691	2469	
	11							3169	1832	4346	3009	5523	4186	6700	5364	4054	2717	
12							2921	1460	4098	2638	5275	3815	6452	4992	4425	2965		
ACM-190SR	5	2938	1965	3877	2912	5762	4797									2735	1770	
	6	2584	1425	3523	2363	5408	4248	7293	6134							3284	2124	
	7	2230	876	3169	1814	5054	3700	6939	5585							3832	2478	
	8			2815	1266	4700	3151	6585	5036	8470	6921	10347	8806			4381	2832	
	9					4346	2611	6231	4487	8116	6373	10001	8258			4930	3186	
	10					3992	2062	5877	3947	7762	5824	9647	7709	11524	9594	5470	3540	
	11							5523	3399	7408	5284	9293	7160	11178	9045	6018	3894	
12							5169	2850	7054	4735	8939	6620	10824	8497	6567	4248		
ACM-210SR	5	3452	2522	4629	3700	6983	6054									3363	2434	
	6	2965	1850	4142	3027	6496	5381	8851	7736							4036	2921	
	7	2478	1177	3655	2354	6010	4709	8364	7063							4709	3408	
	8			3169	1682	5523	4036	7877	6390	10231	8745	12586	11099			5381	3894	
	9					5036	3363	7390	5718	9745	8072	12099	10426			6054	4381	
	10					4549	2691	6904	5045	9258	7399	11612	9754	13966	12108	6727	4868	
	11							6417	4372	8771	6727	11125	9081	13480	11435	7399	5355	
12							5930	3700	8284	6054	10639	8408	12993	10762	8072	5841		
ACM-240SR	5	4886	3620	6585	5310	9992	8718									4903	3629	
	6	4160	2629	5859	4328	9267	7736	12674	11143							5886	4355	
	7	3434	1655	5133	3354	8532	6762	11940	10169							6859	5089	
	8			4408	2372	7815	5780	11214	9178	14621	12586	18029	15993			7842	5806	
	9					7081	4797	10488	8196	13887	11603	17294	15011			8833	6541	
	10					6355	3815	9762	7222	13170	10630	16569	14037	19976	17436	9807	7266	
	11							9037	6240	12444	9647	15852	13046	19259	16454	10789	7992	
12							8311	5257	11710	8665	15117	12064	18525	15471	11771	8718		

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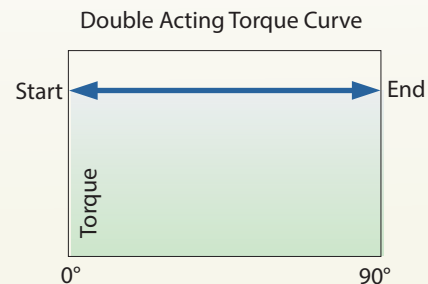
Technical Data

Spring Return Actuators Output Torque (lbf-in)

Air Pressure (PSI)		Output Air to Spring														Spring Return output		
		36		44		58		73		87		102		116				
Actuator Type	Spring No.	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	
ACM-270SR	5	7992	5974	10577	8568	15745	13736									6966	4956	
	6	6992	4594	9585	7178	14754	12356	19932	17533							8346	5948	
	7	6010	3195	8603	5788	13772	10957	18949	16135							9745	6930	
	8			7612	4399	12780	9568	17958	14745	23136	19932	28313	25101			11134	7921	
	9					11789	8169	16967	13356	22145	18533	27322	23702			12533	8913	
	10					10798	6789	15976	11966	21153	17144	26322	22313	31509	27499	13913	9904	
	11							14984	10568	20162	15745	25331	20923	30517	26101	15312	10895	
	12							14002	9178	19180	14365	24348	19534	29526	24711	16701	11878	
	ACM-300SR	5	9709	6452													9391	6461
		6	8275	4372	11648	7744											11267	7753
		7	6833	2283	10205	5656	16958	12409									13143	9045
		8			8771	3567	15524	10320	22277	17073							15020	10338
9						14090	8231	20843	14984	27597	21737					16896	11630	
10						12657	6151	19410	12904	26163	19657	32916	26411	39669	33164	18781	12922	
11								17967	10816	24720	17569	31473	24322	38226	31075	20658	14214	
12								16533	8727	23286	15480	30039	22233	36792	28986	22534	15506	
ACM-350SR		5	13745	8532													15064	10382
		6	11435	5187	16489	10240											18082	12462
		7	9125	1841	14179	6895	24295	17011									21091	14515
		8			11869	3549	21985	13666	32093	23773							24109	16613
	9					19684	10311	29792	20419	39899	30526					27119	18693	
	10					17374	6966	27482	17073	37589	27181	47705	37297	57813	47405	30137	20764	
	11							25171	13727	35279	23835	45395	33951	55503	44059	33146	22844	
	12							22870	10373	32978	20481	43094	30597	53202	40705	36164	24924	
	ACM-400SR	7	17948	7691													25488	16257
		8	15364	3637	22568	10841											29134	18585
		9			19992	6797	34400	21205									32772	20904
		10			17408	2752	31550	17160	46224	31568							36418	23222
11						29232	13116	43639	27524	58047	41931					40055	25550	
12						26656	9071	41064	23479	55472	37887	69871	52286	84279	66694	43701	27869	
13								38480	19426	52888	33834	67287	48233	81694	62640	47339	30196	
14								35904	15381	50312	29789	64711	44188	79119	58596	50985	32515	
15								33320	11337	47728	25745	62127	40144	76535	54551	54622	34842	
16										45144	21700	59543	36099	73951	50507	58268	37161	

Double Acting Actuators Output Torque (lbf-in)

MODEL	Air Pressure (Psig)								
	36	44	58	65	73	80	87	102	116
ACM-40DA	53	64	84	95	105	116	127	148	169
ACM-52DA	89	106	142	159	177	194	212	247	282
ACM-63DA	161	194	258	290	323	355	388	452	517
ACM-75DA	222	266	355	399	444	489	533	621	711
ACM-83DA	347	416	555	624	694	763	833	971	1110
ACM-92DA	499	599	799	899	999	1098	1198	1398	1598
ACM-105DA	732	878	1170	1317	1463	1609	1756	2048	2341
ACM-125DA	1110	1332	1775	1998	2220	2442	2664	3107	3552
ACM-140DA	1892	2270	3027	3406	3784	4162	4540	5297	6054
ACM-160DA	2943	3531	4709	5297	5886	6474	7063	8240	9417
ACM-190DA	4709	5650	7534	8475	9417	10359	11301	13184	15067
ACM-210DA	5886	7063	9417	10594	11771	12949	14126	16480	18834
ACM-240DA	8514	10216	13621	15324	17027	18729	20432	23838	27243
ACM-270DA	12941	15529	20705	23292	25880	28468	31056	36232	41409
ACM-300DA	16887	23640	27012	30393	33766	37147	40519	47272	54025
ACM-350DA	25278	35394	40448	45502	50555	55609	60663	70779	80887
ACM-400DA	36020	43223	57631	64835	72039	79243	86447	100855	115262



ACM SERIES PNEUMATIC ACTUATORS

Technical Data

Weight (lbs)

MODEL	40	52	63	75	83	92	105	125	140	160	190	210	240	270	300	350	400
ACM-DA	2	3	4	6	7	10	13	20	29	44	72	87	122	185	283	463	636
ACM-SR		3	5	7	8	12	15	23	35	52	87	108	153	235	344	572	792

Maximum Air Consumption (L) Per Stroke

Model Action	52	63	75	83	92	105	125	140	160	190	210	240	270	300	350	400
OPEN	0.12	0.21	0.3	0.43	0.64	0.86	1.5	2.68	3.45	5.54	6.75	9.87	15.12	23.8	35.1	52.6
CLOSED	0.16	0.23	0.34	0.47	0.73	1.18	1.73	3.16	4.89	7.59	9.5	13.94	22	29.7	46.3	56

Actuator Cycle Speed (sec.)

Action	Model	52	63	75	83	92	105	125	140	160	190	210	240	270	300	350	400
OPEN	DA	0.53	0.58	0.64	0.73	0.86	1.3	1.79	2.1	2.6	3.45	4.35	8.33	8.53	14.9	18.6	29
	SR	2.58	2.66	2.74	2.83	3.01	3.26	4.36	4.68	4.84	5.83	8.5	17	18.4	24.9	31.6	52.1
CLOSED	DA	0.6	0.66	0.72	0.83	1	1.35	2.4	2.5	3.93	4.55	5.5	8.4	10.9	15	23.7	31
	SR	0.36	0.44	0.52	0.61	0.74	0.79	1.08	1.22	1.65	3.4	4.5	4.84	6.14	12.54	12.54	26.2



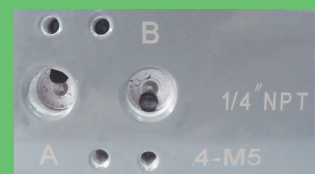
Interface Specification



Drive and Flange to ISO 5211 configuration for easy direct mount onto a valve or connection with standardized mounting hardware.



The NAMUR Drive Pinion and NAMUR top mounting connection for direct installation of accessories such as Limit Switch and Positioner.



Air supply connection is designed in accordance with NAMUR Standard to install solenoid valve.

ACM SERIES PNEUMATIC ACTUATORS

Operating Conditions

Remove any manual opening device from the valve, leaving the valve stem clear. Make sure that the shape of the stem fit the actuator output and that the rotation is not hindered in any way. Mount the actuator onto the valve, certaining it well on the stem. Make sure that the rotation direction is correct, in any case do not insert your hands inside the valve. We strongly suggest checking the cleanness of the air-supply pipes, especially when the plant is not provided with filters. A spacer between actuator and valve will be necessary with fluids at high temperature.

Maintenance

- 1.It is recommended that periodic checks be performed to make sure that all fasteners remain tight.
- 2.The actuator is supplied ready-lubricated no further lubrication is required. If lubrication is deemed necessary , use EP-1 grease.
- 3.Under certain working conditions (heavy duty, non-compatible operating media or abnormal operating conditions)internal seals should be checked periodically and replaced when necessary.
- 4.On spring return actuators, spring fatigue may set in requiring the replacement of springs. Spring should always be replaced in full sets.

NOTE

If an actuator is properly assembled and used , it will be maintenance free, as it has been lubricated enough to last a normal working life under normal working conditions. Should it get necessary to replace its seals, we suggest turning to our company where the product will be overhauled first, and then tested. On request, our company will be willing to provide its customers with kits and instructions.

