

UA-H

H Series pneumatic rack & pinion for double acting and spring return actuators are designed for control and on-off duty. Double-opposed piston actuators combine the benefits of high cycle life, rugged construction, and an extremely compact and symmetrical design with a unique range of features. They are specifically designed for fast efficient operation of ball, butterfly, and other rotary type valves.

Features

- Aluminum rack & pinion design.
- Housing hard-anodized extruded aluminum body with honed internal cylinder surface strength and low coefficient of friction to protect against wear and corrosion.
- Hard-anodized, powder polyester painted or PTFE or nickel plated.
- Die-casting aluminum powder polyester painted, PTFE or nickel plated for end cap.
- Preloaded coating springs are made from the high quality material with dip-coating for resistant to corrosion and long cycle life.
- The pre-loaded springs can be demounted safely and conveniently to satisfy different requirements of torque by changing quantity of springs.
- Bearing on all sliding and rotating moving parts from low friction, long-life compound material, to ensure long life.
- Dual piston rack-and-pinion mechanism for simple construction high cycle life and constant torque.
- Modular designs with the same body and end caps for double-acting and spring-return, reduce inventory.
- Springs can be added in the field to convert double-acting to spring-return or for changes in supply pressure.

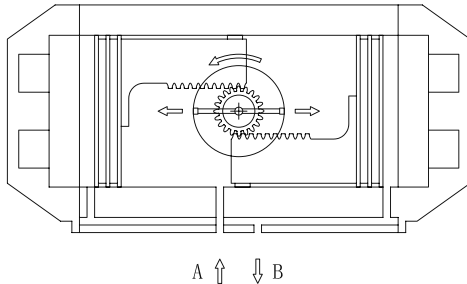
UNIVALS RACK & PINION PNEUMATIC ACTUATOR



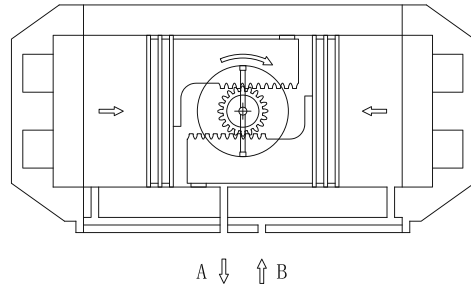
- Failure director can be easily reversed from spring-to -open or spring-to-close orientation simply by inverting the pistons.
- The two independent external travel stop adjustment bolt in both directions assure flexibility and accuracy hex bolt setting the valve in the open and closed position.
- Actuator to valve accessories is comply with ISO 5211 and DIN 3337.
- Solenoid valve and accessory attachment comply with NAMUR VDI/VDE 3845.

Operation Principle

Double Acting

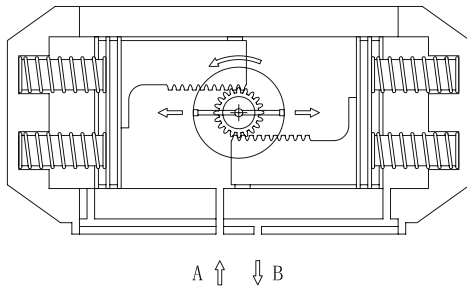


Air to port A force the pistons outwards, causing the pinion to turn counterclockwise while air exhausted from port B.

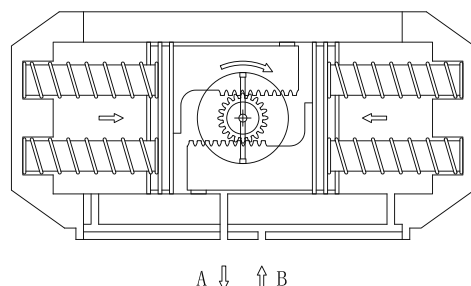


Air to port B force the pistons inwards, causing the pinion to turn clockwise while air exhausted from port A.

Spring Return



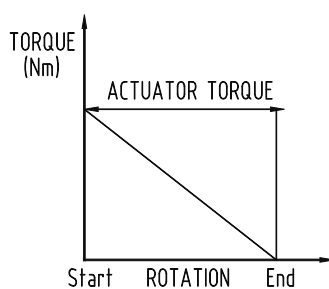
Air to port a force the pistons outwards, causing the springs to compress. The pinion turns counter clockwise while air is exhausted from port B.



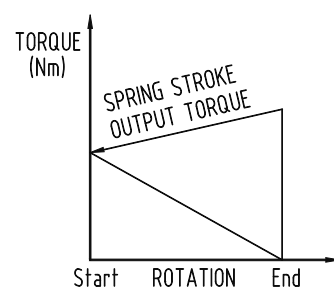
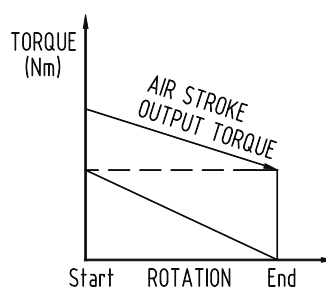
Loss of air pressure through port A, the stored energy in the springs to forces the pistons inwards. The pinion turns clockwise while air is exhausted from A.

Rack and Pinion Actuator Output Torque Features

The diagrams below show typical torque curve of rack & pinion actuators for both double acting and spring return actuators. The output torque is liner for double acting. There are two operations for spring return. Air stroke of torque output is descending and spring stroke of torque output is increasing as below.

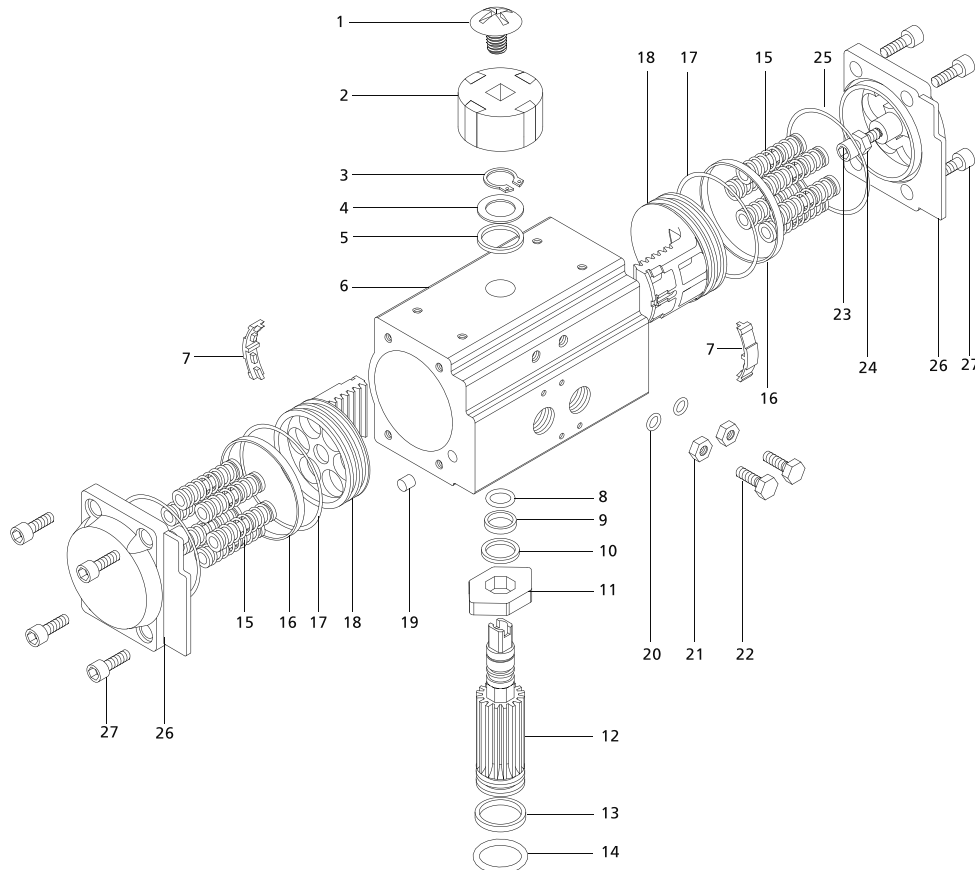


Double Acting Curve



Spring Return Acting Curve

Exploded View



Material Parts List

No.	Part	Material	Qty	No.	Part NAME	Material	Qty
1	Indicator screw	Plastic (ABS)	1	15	Spring	Spring Steel	0-12
2	Indicator	Plastic (ABS)	1	16*	Piston Bearing	Polyoxymethylene	2
3	Circlip	304 Stainless Steel	1	17*	O-Ring (Piston)	NBR	2
4	Thrust Washer	304 Stainless Steel	1	18	Piston	Die Cast Aluminum	2
5*	Outside Washer	Polyoxymethylene	1	19	Plug	NBR	2
6	Housing	Extruded Aluminum Alloy	1	20*	O-Ring (Adjust Screw)	NBR	2
7*	Piston Guide	Polyoxymethylene	2	21	Nut (Adjust Screw)	304 Stainless Steel	2
8*	O-Ring (Pinion Top)	NBR	1	22	Adjust Screw	304 Stainless Steel	2
9*	Bearing (Pinion Top)	Polyoxymethylene	1	23	Stop Bolt	304 Stainless Steel	2
10*	Inside Washer	Polyoxymethylene	1	24	Nut (Stop Bolt)	304 Stainless Steel	2
11	Cam	Stainless Steel	1	25*	O-Ring (End Cap)	NBR	2
12	Pinion Shaft	Stainless Steel	1	26	End Cap	Die Cast Aluminum	2
13*	Bearing (Pinion Bottom)	Polyoxymethylene	1	27	End Cap Screw	304 Stainless Steel	8
14	O-Ring (Low pinion)	NBR	1				

* Note suggested spare parts for maintenance

Pneumatic Actuator Technical Data

Actuator Model		Air consumption		Operation Time in Seconds								Weight Kg
		Volume In Liter		Double Acting		Spring Return Acting with Spring Qty						
		Opening	Closing	Opening	Closing	Opening			Closing			
						8 pc springs	10 pc springs	12 pc springs	8 pc springs	10 pc springs	12 pc springs	
UA-52	DA	0.12	0.16	0.6	0.53	2.5	2.5	2.6	0.44	0.4	0.36	1.3
	SR		-									1.45
UA-63	DA	0.21	0.23	0.66	0.58	2.6	2.6	2.7	0.52	0.46	0.44	2.03
	SR		-									2.05
UA-75	DA	0.3	0.34	0.72	0.64	2.7	2.7	2.7	0.6	0.54	0.52	2.7
	SR		-									2.9
UA-83	DA	0.43	0.47	0.83	0.73	2.8	2.8	2.8	0.7	0.63	0.61	3.13
	SR		-									3.6
UA-92	DA	0.64	0.73	1	0.86	2.9	3	3	0.8	0.76	0.74	4.6
	SR		-									5.2
UA-105	DA	0.95	0.88	1.35	1.3	3.2	3.2	3.3	0.9	0.81	0.8	6.8
	SR		-									6.9
UA-125	DA	1.6	1.4	2.4	1.8	4.3	4.3	4.4	1.2	1.1	1.1	8.9
	SR		-									10.1
UA-140	DA	2.5	2.2	2.5	2.1	4.6	4.7	4.7	1.3	1.3	1.2	13.3
	SR		-									15.6
UA-160	DA	3.7	3.2	3.9	2.6	4.8	4.8	4.8	1.7	1.7	1.7	20.1
	SR		-									24
UA-190	DA	5.9	5.4	4.6	3.5	5.8	5.8	5.8	3.5	3.4	3.4	31
	SR		-									35.3
UA-210	DA	7.5	7.5	5.5	4.4	8.4	8.5	17	4.6	4.5	4.5	47
	SR		-									55
UA-240	DA	11	9	8.4	8.3	16	17	18	5.1	4	4.9	67.3
	SR		-									80.2
UA-270	DA	17	14	11	8.5	18	18	18.4	6.3	6.2	6.2	97
	SR		-									118

The above integrated table which be combined by air consumption volumes, operation time on opening & closing time, which are as per different quantity of springs and weights of Pneumatic Actuators.

Specifications

Supply Pressure Range:
2 bar to 8 bar Double Acting
2.5 bat to 8 bar Spring Return

Temperature Range:
Standard: -20°C to +80°C
Low Temp.: -35°C to +80°C
High Temp.: -15°C to +150°C

Travel Adjustment:
±5° for the rotation 0° and 90°
Supply Media: Dry, non-corrosive gas.

Actuator Selection

To select a proper actuator for a particular valve and service, first determine the maximum operating torque that will be required from applicable valve torque table of valve bulletin. Then refer to the appropriate torque output tables and select an actuator that will, at the available supply pressure, provide a torque output on not less than the required operating torque for the valves. For Spring-return units, both the spring torque and the air torque must be sufficient.

Torque Table of Double Acting

Torque Output of Pneumatic Actuator with Double Acting in Nm								
Actuator Model	Air Supplier Pressure in Bar							
	3 bar	4 bar	4.5 bar	5 bar	5.5 bar	6 bar	7 bar	8 bar
UA-52DA	12	16	18	20	22	23	28	32
UA-63DA	21	29	33	37	40	44	51	58
UA-75DA	30	40	45	50	55	60	70	80
UA-83DA	47	63	71	78	86	94	110	125
UA-92DA	67	90	102	113	124	135	158	181
UA-105DA	99	132	149	165	182	198	231	265
UA-125DA	151	201	226	251	276	301	351	401
UA-140DA	256	342	385	428	470	513	598	684
UA-160DA	399	532	598	665	732	798	931	1064
UA-190DA	638	851	958	1064	1170	1277	1489	1702
UA-210DA	789	1064	1197	1330	1463	1596	1862	2128
UA-240DA	1154	1539	1731	1924	2116	2308	2693	3078
UA-270DA	1754	2339	2632	2924	3216	3508	4094	4678

Torque Table of Spring Return Acting (52 – 75)

Torque Output of Pneumatic Actuator with Spring Return Acting Actuator in Nm															
Actuator Model	Spring Set	Air Supplier Pressure in bar												Springs in Nm	
		3 bar		4 bar		5 bar		6 bar		7 bar		8 bar			
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
UA-52SR	5	8	6											6	4
	6	7	5	11	9									7	5
	7	6	3	10	7	14	10							8	6
	8	5	2	9	6	13	9	17	14					10	7
	9	4	1	8	5	12	8	16	12	20	16			11	8
	10			7	4	12	7	15	11	19	15			12	8.5
	11			7	2	11	5	14	10	18	14	22	18	13	9
	12					10	4	13	9	17	12	21	17	14	10
UA-63SR	5	15	11	22	15									10	7
	6	14	9	21	16	28	24							12	8
	7	13	7	20	15	27	22							15	10
	8	11	5	18	12	26	20	33	27	40	34			17	11
	9			17	11	24	18	31	25	39	32			19	12
	10			15	8	23	16	30	23	37	30	45	37	21	14
	11					22	14	29	21	36	28	43	35	23	15
	12					20	11	27	19	35	26	42	33	25	16
UA-75SR	5	19	16	30	26									15	11
	6	17	13	27	23	38	33							17	13
	7	15	10	25	20	35	30							20	15
	8	13	7	23	17	33	27	43	37	53	47			23	17
	9			21	14	31	24	41	34	51	44			26	19
	10			19	11	29	21	39	31	49	41	59	51	29	21
	11					27	18	37	28	47	38	57	48	32	23
	12					25	15	35	25	45	35	55	45	35	25

Torque Table of Spring Return Acting (83 – 160)

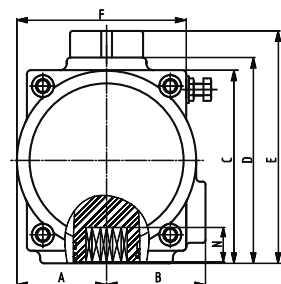
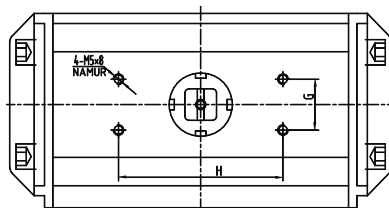
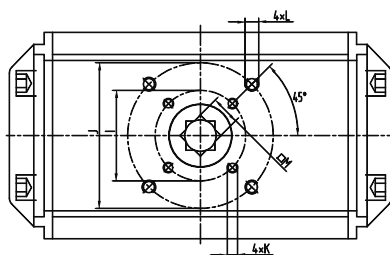
Torque Output of Pneumatic Actuator with Spring Return Acting Actuator in Nm															
Actuator Model	Spring Set	Air Supplier Pressure in bar												Springs in Nm	
		3 bar		4 bar		5 bar		6 bar		7 bar		8 bar			
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
UA-83SR	5	31	24	47	40									23	16
	6	28	19	44	35	59	51							28	19
	7	25	15	41	31	56	46							32	22
	8	22	10	37	26	53	42							37	25
	9			34	21	50	37	66	53	81	68			41	29
	10			31	17	47	32	62	48	78	64	94	79	46	32
	11					44	28	59	43	75	59	91	75	51	35
	12					40	23	56	39	72	55	87	70	55	38
UA-92SR	5	44	33	67	56									34	23
	6	40	26	62	49	85	71							41	28
	7	35	19	58	42	80	65							48	33
	8	31	13	53	35	76	58	98	81	121	103			55	37
	9			48	28	71	51	94	74	116	96			62	42
	10			44	22	66	44	89	67	111	89	134	112	69	47
	11					62	37	84	60	107	82	129	105	76	51
	12					57	30	79	53	102	76	125	98	83	56
UA-105SR	5	68	50	101	83									49	31
	6	61	40	94	73	127	106							59	38
	7	55	30	88	63	121	96							69	44
	8	49	20	82	54	115	87	148	120	181	153			79	51
	9			75	44	108	77	142	110	175	143			89	57
	10			69	33	102	67	135	100	168	133	201	166	98	63
	11					96	57	129	90	162	123	195	156	108	70
	12					89	48	123	81	156	114	189	147	118	76
UA-125SR	5	98	72	148	122									79	52
	6	88	56	138	107	188	157							94	63
	7	77	40	127	90	178	141							110	73
	8	67	25	117	75	167	125	217	176	268	226			125	84
	9			107	59	157	109	207	159	257	210			141	94
	10			96	44	146	94	196	144	247	194	297	245	157	105
	11					136	78	186	128	236	178	286	228	173	115
	12					125	63	176	113	226	163	276	213	188	125
UA-140SR	5	171	127	256	213									129	86
	6	154	102	239	187	325	273							155	103
	7	137	76	222	162	308	247							181	120
	8	120	50	205	136	291	221	376	307	462	392			206	137
	9			187	110	273	196	358	281	444	367			232	155
	10			170	84	256	169	341	255	427	340	512	426	258	172
	11					238	143	324	229	409	314	495	400	284	189
	12					221	118	307	203	392	289	478	374	310	206
UA-160SR	5	259	191	392	324									208	140
	6	232	149	365	282	498	415							250	168
	7	203	107	336	240	469	373							292	196
	8	176	66	309	199	442	237	575	465	708	598			333	223
	9			280	157	413	290	546	423	679	556			375	251
	10			253	115	386	248	519	381	652	514	785	647	417	279
	11					358	207	491	340	624	473	757	606	458	307
	12					330	165	463	298	596	431	729	564	500	335

Torque Table of Spring Return Acting (190-270)

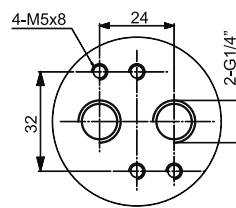
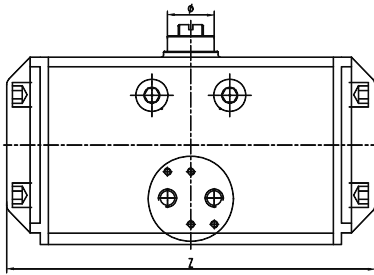
Torque Output of Pneumatic Actuator with Spring Return Acting Actuator in Nm															
Actuator Model	Spring Set	Air Supplier Pressure in bar												Springs in Nm	
		3 bar		4 bar		5 bar		6 bar		7 bar		8 bar			
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
UA-190SR	5	438	329	651	542									309	200
	6	398	267	611	480	824	693							731	240
	7	358	205	571	418	784	631							433	280
	8	318	143	531	356	744	569	957	782	1169	995			495	320
	9			491	295	704	507	917	720	1130	993			557	360
	10			451	233	664	446	877	658	1090	871	1302	1084	618	400
	11					624	384	837	597	1050	809	1263	1022	680	440
	12					584	322	797	535	1010	748	1223	960	742	480
UA-210SR	5	523	418	789	684									380	275
	6	468	342	734	608	1000	874							456	330
	7	413	266	679	532	945	798							532	385
	8	358	190	624	456	890	722	1156	988	1422	1254			608	440
	9			569	380	835	646	1101	912	1367	1178			684	495
	10			514	304	780	570	1046	836	1312	1102	1578	1368	760	550
	11					725	494	991	760	1257	1026	1523	1292	836	605
	12					670	418	936	684	1202	950	1468	1216	912	660
UA-240SR	5	744	600	1129	985									554	410
	6	662	489	1047	874	1432	1259							665	402
	7	580	379	964	764	1349	1149							775	575
	8	498	268	883	653	1267	1037	1652	1422	2037	1807			886	656
	9			800	542	1185	926	1569	1311	1954	1696			998	739
	10			718	431	1103	816	1488	1201	1872	1586	2257	1970	1108	821
	11					1021	705	1406	1090	1791	1474	2176	1859	1219	903
	12					939	594	1323	979	1708	1363	2093	1748	1330	985
UA-270SR	5	1195	968	1779	1552									787	560
	6	1083	811	1667	1396	2252	1981							943	672
	7	972	654	1556	1238	2141	1832							1101	783
	8	860	497	1444	1081	2029	1666	2614	2252	3199	2836			1258	895
	9			1332	923	1917	1509	2502	2094	3087	2678			1416	1007
	10			1220	767	1805	1352	2390	1937	2974	2521	3560	3107	1572	1119
	11					1693	1194	2278	1779	2862	2364	3448	2949	1730	1231
	12					1582	1037	2167	1623	2751	2207	3336	2792	1887	1342

The double acting actuator has constant torque over the whole travel. Its output torque is linear. Hence, all that needs to be known for sizing is the maximum static torque required by the valve, which is multiplied by a safety coefficient between 20%-30% depending on the valve application conditions. The spring return acting actuator has two working conditions which can be achieved by air failure to close (spring to close) and air failure to open (spring to open). The suggested safety factor under working conditions is between 30%-50% depending on the valve application service.

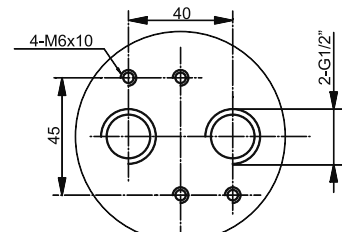
Dimensions



Dimensions



G1/4"NUMAR



G1/2"NUMAR

Model Size	Actuator Dimensions in mm																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Z	Ø	G*/ NPT	
UA-52	30	42	66	72	92	65	30	80	Ø35	Ø50	M5X8	M6X10	11	14	147	Ø40	1/4	
UA-63	36	47	81	88	108	72	30	80	Ø50	Ø70	M6X10	M8X13	14	18	168	Ø40	1/4	
UA-75	42	53	94	100	119	81	30	80	Ø50	Ø70	M6X10	M8X13	14	18	184	Ø40	1/4	
UA-83	46	57	99	109	129	92	30	80	Ø50	Ø70	M6X10	M8X13	17	21	204	Ø40	1/4	
UA-92	50	59	111	117	136	98	30	80	Ø50	Ø70	M6X10	M8X13	17	21	262	Ø40	1/4	
UA-105	58	64	123	133	153	109	30	80	Ø70	Ø102	M8X13	M10X16	22	26	268	Ø40	1/4	
UA-125	68	75	146	155	175	127	30	80	Ø70	Ø102	M8X13	M10X16	22	26	301	Ø55	1/4	
UA-140	75	77	161	172	192	137	30	80	Ø102	Ø125	M10X16	M12X20	27	31	390	Ø55	1/4	
UA-160	87	87	184	197	217	158	30	80	Ø102	Ø125	M10X16	M12X20	27	31	458	Ø55	1/4	
UA-190	103	103	213	230	260	189	30	130		Ø140		M16X25	36	40	525	Ø80	1/4	
UA-210	113	113	236	255	285	210	30	130		Ø140		M16X25	36	40	532	Ø80	1/4	
UA-240	130	130	265	289	319	245	30	130		Ø165		M20X25	46	50	602	Ø80	1/4	
UA-270	147	147	299	326	356	273	30	130		Ø165		M20X25	46	50	722	Ø80	1/2	

* Standard air entry connection is G 1/4". If NPT connection is required please specify when selecting.

How to Order

To specify a complete UA pneumatic actuator, simply make a selection from the code boxes below:

Example: UA-160SR8LT

1.	Univals Actuators			
UA-	Standard Body			
UA-SS-	Stainless Steel Body			
2.	Size			
Total 13 sizes	52	92	160	270
	63	105	190	
	75	125	210	
	83	140	240	

3.	Operating Function	
DA	Double Acting	
SR	Spring Return	
4.	Spring Pieces	
4 types spring	6	10
	8	12
5.	Temperature Options	
-	Standard Temperature -20°C ~ +80°C	
LT	Low Temperature -35°C ~ +80°C	
HT	High Temperature -15°C ~ +150°C	

SINGAPORE

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