



The art of power and perfection



PNEUMATIC ACTUATORS





The art of power and perfection

RACK AND PINION
Aluminium housing

TORQUES UP TO
6,500 Nm

ACTUATORS IN
14 different sizes

We are a manufacturer of rack and pinion aluminium housing actuators with torque figures up to 6,500 Nm and scotch yoke actuators for heavy duty service up to 250,000 Nm. Our products offer reliable and dependable service for ¼ turn valves.

Engineered and built to withstand most of the applications and environmental conditions, the precision in design and quality provides a long and safe operational performance in valve control.

ACTREG has invested in quality assurance, state-of-the-art machining and testing facilities in order to assist customers in safely controlling their processes.

ACTREG engineers are happy to help you with your automation demands.



The art of power and



SCOTCH YOKE
Heavy duty service

TORQUES UP TO
250,000 Nm

ACTUATORS IN
25 different sizes

Certificates

ACTREG, S.A. has a quality Management System certified in accordance with the requirements of ISO 9001:2008 for the design, development, manufacturing and distribution of pneumatic actuators and accessories for valves. Certified by BVQI No. ESPMDD005463.

ADA/ASR 10 up to ADA/ASR 300 are classified as category SEP in accordance with the requirements of Pressure Equipment Directive 97/23/EC. ADA/ASR 500 up to ADA/ASR 4000 are classified as Category I, Procedure module A.

All ACTREG pneumatic actuators are classified for use in potentially explosive atmospheres as Group II Category 2, suitable for zones 1, 2, 21 and 22 in accordance with Annex VIII of Directive 94/9/CE (ATEX). Technical file is deposited in LCIE, No. LCIE 05 AR 022.

ACTREG pneumatic actuators have got SIL 3 (Safety integral level 3) certificate. The ACTREG actuators meets manufacturer design process requirements of Safety integral Level (SIL) 3. This is intended to achieve sufficient integrity against systematic errors of design by the manufacturer.



perfection

MAIN FEATURES & CHARACTERISTICS

- 1 BODY**

The aluminium body is inside and outside coated with hard anodizing, with extremely abrasion resistance, low surface roughness and optimal resistance.
 - 2 PINION**

Carbon steel shaft electroless nickel plated against external and internal corrosion. Anti-blowout design.
 - 3 ADJUSTMENT STROKE**

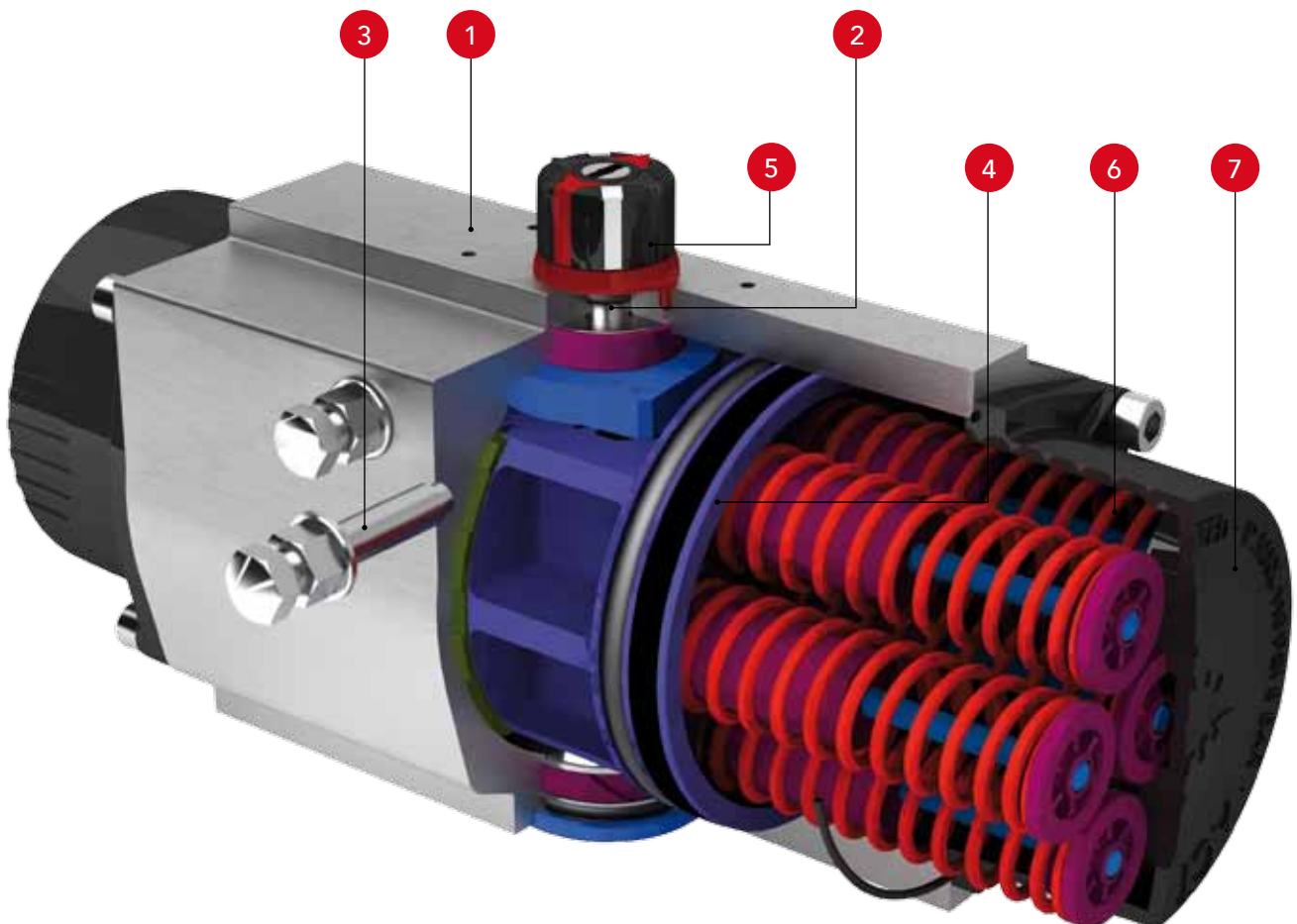
External stroke adjustment for 5 degrees regulation, placed on the opposite side of Namur connection for better manipulation when the solenoid valve is assembled.
 - 4 PISTONS**

Pistons are coated with special treatment for corrosion resistance. Backlash is avoided by a special tooth machining. The pistons have a 3 way guide for low friction between body and pistons. The pistons are also provided with an integral guide machined between pistons and pinion.
 - 5 POSITION INDICATOR**

Multi-function indicator suitable for mechanical or inductive switches is a standard feature. Many different combinations without the need to buy external indicators.
 - 6 SPRINGS**

Pre-stressed springs offers more torque and different options for their positioning. This system allows us to easily fit the necessary torque to close or open the valve, offering a total safety replacement and manipulation.
 - 7 END CAPS**

Different end caps for double or single acting for fast and safety identification without the need to read the label. End caps are epoxy coated as standard protecting them against environment corrosion.
- + Every single actuator is tested and provided with a unique serial number for traceability. This heat number is stamped on the body.
 - + The assembly of switch boxes, proximity switches or positioners, takes place by means of the Namur connection VDI/VDE 3845, which is a standard feature in all our models. The height of the axis to fulfil this Norm is of 30 mm, for all our products, with which it entails that with a single model of Box or positioner, we can cover all our manufacturing range.



Types of Actuators

Double Acting & Spring Return



ADA
DOUBLE
ACTING
ACTUATOR



ASR
SPRING
RETURN
ACTUATOR

Rack and pinion design | Linear torque | Rotation angle $90^\circ \pm 5^\circ$ | Antifriction sliding bearings | Long life without maintenance | Total safety for springs replacement | Mounting of solenoid valves acc. NAMUR Std. | Mounting of devices acc. NAMUR VDI/VDE 3845 Std. | Coupling according to ISO 5211 and DIN 3337 (Octagonal drive) | Multi-function position indicator suitable for mechanical and inductives direct switches.

Working temperature:

- 30 °C to 100 °C in Standard Construction.
- 15 °C to 150 °C with FKM O-rings (high temperature execution).
- 40 °C to 80 °C with Silicone O-rings (low temperature execution).
- 55° C to 80° C with Silicone O-rings and 316 pinion (extreme low temperature).

Maximum working pressure:

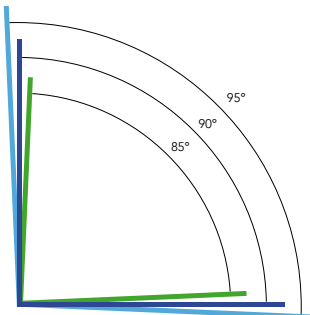
8 bar (116 psig). (Except ADA10 at 10 bar)

Bi-Directional Travel Stops

ACTREG pneumatic actuators are provided with bi-directional pinion travel stops.

Side located stops allow a full $\pm 5^\circ$ travel adjustment between 85° and 95° . These travel stops are designed to absorb the maximum rated torque of the actuator and the maximum impact loads associated with recommended travel speed.

Adjustment of the counterclockwise and clockwise rotation limits is accomplished by unscrewing the locking nuts, turning the respective left and right stop studs to reduce or increase the travel angle and screwing the locking nuts.



Options On Request

- Stainless steel pinion (grade 304 and 316).
- Fast acting actuators.
- Actuators with 100% travel adjustment stroke.
- Actuators fire proof (K-mass, blanket, other executions,...).

Coatings for special applications

Actreg Pneumatic actuators shall be protected against external corrosion resistant by proper material selection or surface treatment. Actreg coatings are according to EN 15714-3 and are indicated to:

Standard execution

Anticorrosive C3 according EN-ISO 12944-2

PARTS & PROTECTION	DESCRIPTION	COATING
BODY	Hard anodized	25 - 30 μm
END CAPS	Epoxy painted	80 - 90 μm
STEM	Carbon steel + ENP	25 - 30 μm

Execution A1

Anticorrosive C5-I according to EN-ISO 12944-2

PARTS & PROTECTION	DESCRIPTION	COATING
BODY	Epoxy painted	80 - 90 μm
END CAPS	Epoxy painted	80 - 90 μm
STEM	SS 304	

Execution A2

Anticorrosive C5-M according to EN-ISO 12944-2

PARTS & PROTECTION	DESCRIPTION	COATING
BODY	Epoxy painted	80 - 90 μm
END CAPS	Epoxy painted	80 - 90 μm
STEM	SS 316	

Execution B

Anticorrosive C4 according to EN-ISO 12944-2

PARTS & PROTECTION	DESCRIPTION	COATING
BODY	Epoxy painted	80 - 90 μm
END CAPS	Epoxy painted	80 - 90 μm
STEM	Carbon steel + ENP	25 - 30 μm

Execution C

Anticorrosive C5-I according to EN-ISO 12944-2

PARTS & PROTECTION	DESCRIPTION	COATING
BODY	Hard anodized + ENP	25 - 30 μm
END CAPS	ENP	80 - 90 μm
STEM	Carbon steel + ENP	25 - 30 μm

Multi-function position indicator



Inductive switch indicating open or closed position



Mechanical switches indicating open and close



Inductive switches indicating open and closed position



Namur connection for direct mounting switch box



Inductive switches indicating open and closed position (45° detecting switches...)

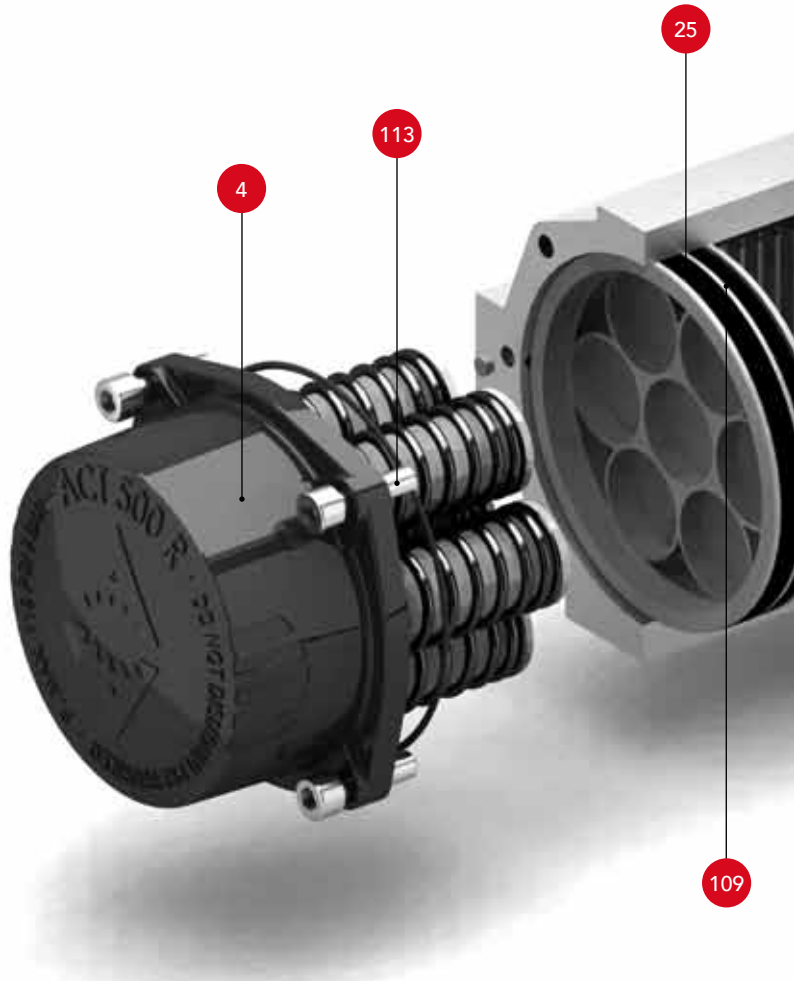


Inductive switches indicating open and closed position (up/down detecting switches...)

PARTS & MATERIALS

- 1 Body
Aluminium Hard Anodized
- 2 Piston
Aluminium
- 3 Pinion
Nickel Plated Carbon Steel
- 4 End Caps
Aluminium Epoxy Coated
- 5 Soft Pinion Washer *
Polyamide PA 6,6
- 6 Slide Piston *
Polyamide PA 6,6 + 30% G.F.
- 7 Lug **
Nickel Plated Carbon Steel
- 8 Pinion Washer
Stainless Steel
- 10 Upper Pinion Bearing
Polyamide PA 6,6 Size 500 & greater in Reinforced Br.
- 12 Stop
ASTM A 105
- 14 Spring's Long Support
Polyamide PA 6,6
- 15 Spring's Short Support
Polyamide PA 6,6
- 16 Leveling Screw
Stainless Steel
- 18 Bolt
Stainless Steel
- 19 Spring
DIN 2076 · D-5.6
- 20 Position Indicator
Polypropylene
- 21 Cam
Polypropylene
- 23 Centering Ring
Nickel Plated Carbon Steel
- 25 Slide Guide *
Polyamide PA 6,6 + 30% G.F.
- 26 Lower Pinion Bearing *
Polyamide PA 6,6
- 41 Stop Washer Pinion **
Stainless Steel
- 109 O-Ring *
NBR
- 110 O-Ring *
NBR

SPRING RETURN ACTUATOR (ASR)



- 111 O-Ring *
NBR
- 113 Bolt
Stainless Steel
- 118 O-Ring *
NBR
- 119 O-Ring *
NBR
- 125 Washer
Stainless Steel
- 471 Slip Washer *
Stainless Steel
- 934 Nut
Stainless Steel
- 985 Nut
Stainless Steel

POSITION INDICATOR

FROM SIZE 20 TO 850



Inserts
Stainless Steel

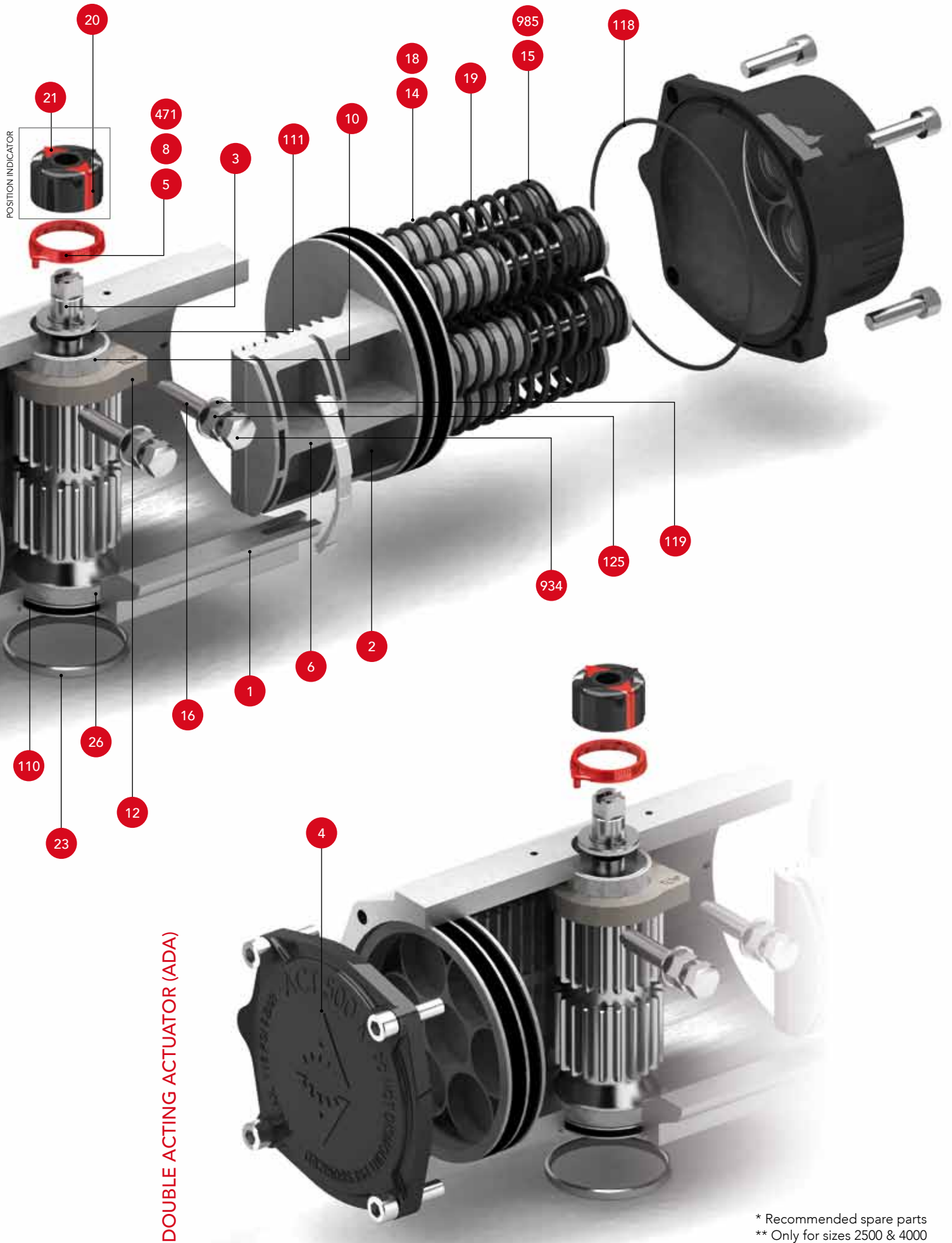
FROM SIZE 1200 TO 4000



Position indicator & Cams
Polypropylene

25

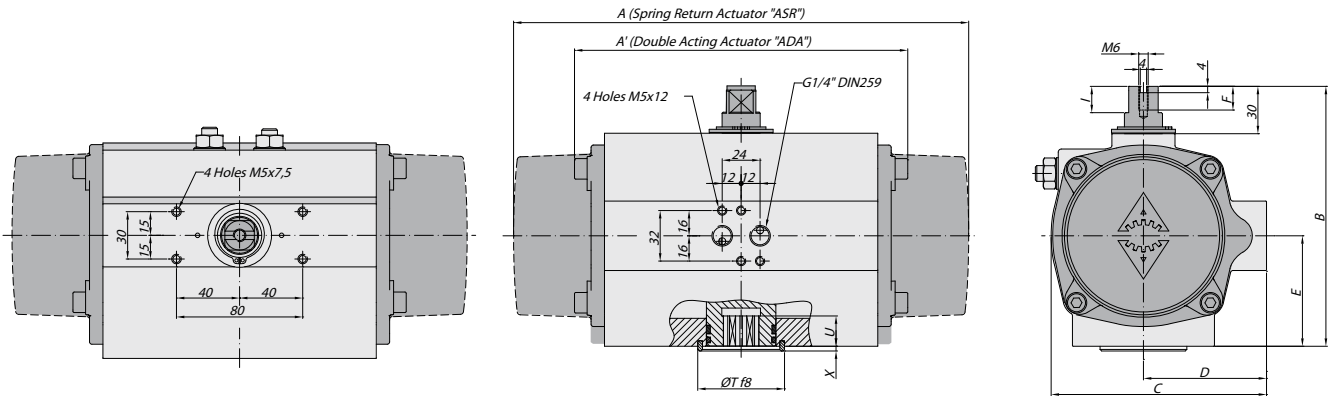
109



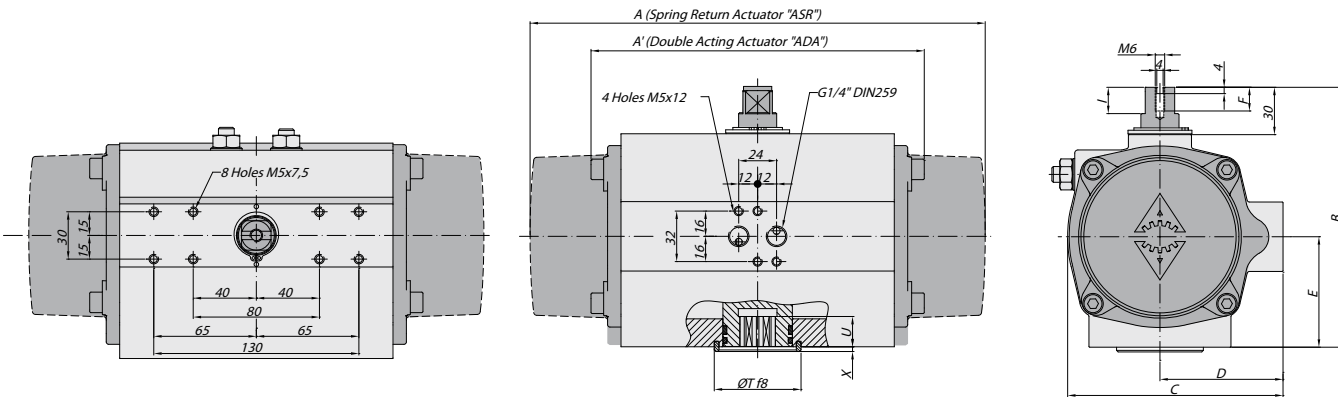
* Recommended spare parts
 ** Only for sizes 2500 & 4000

GENERAL DIMENSIONS

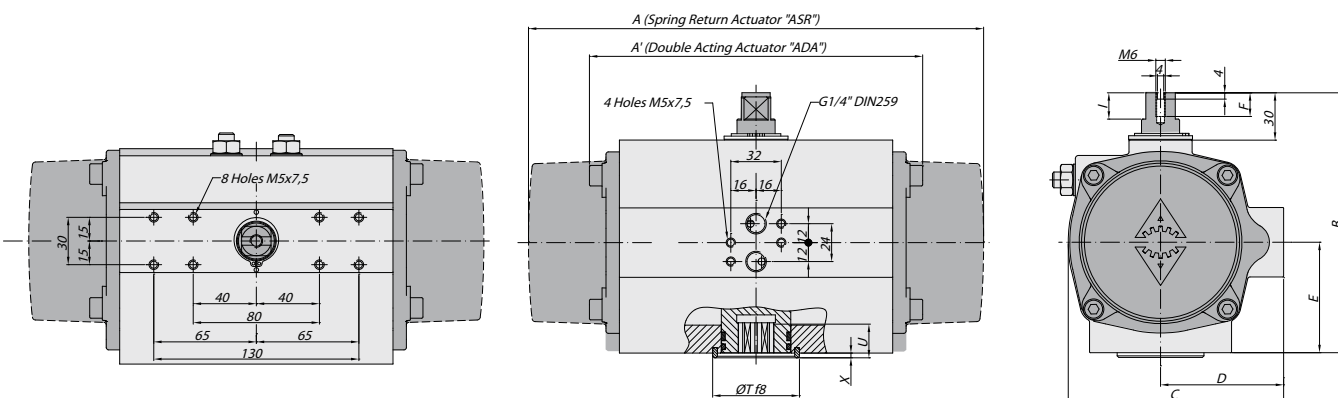
SIZES 10 | 20 | 40 | 80 | 130 | 200 | 300 | 500 | 850



SIZES 1200 | 1750



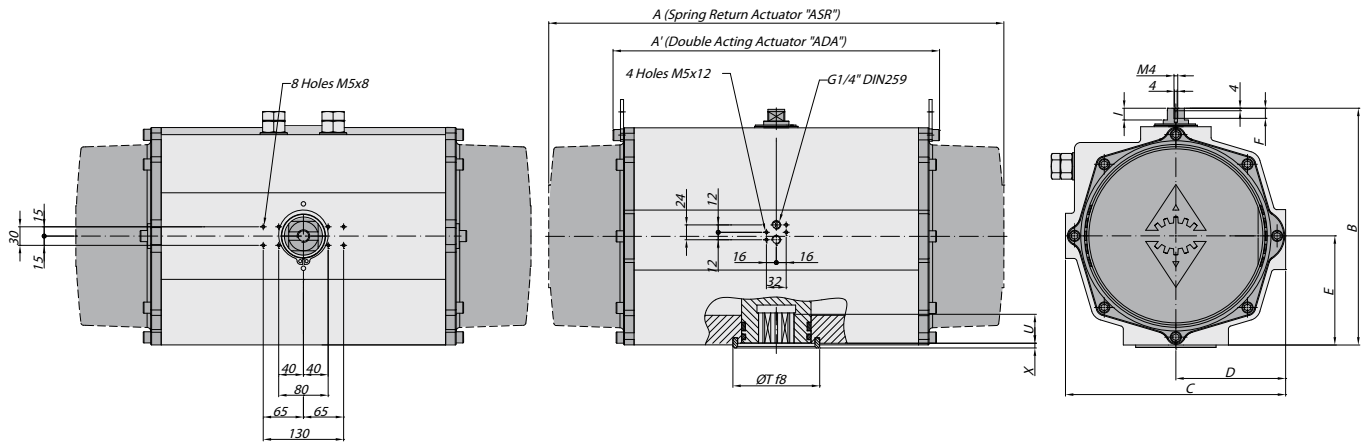
SIZES 2100



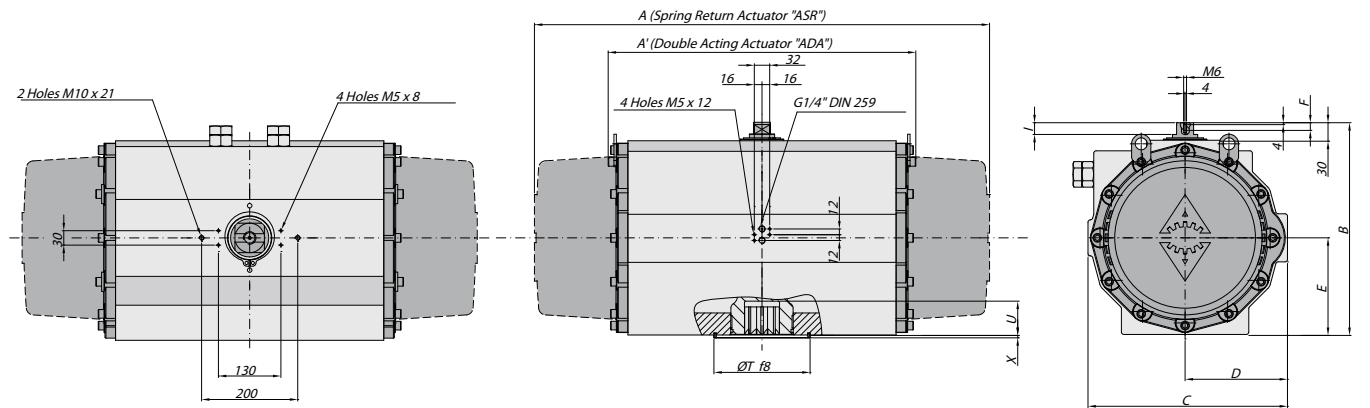
DOUBLE ACTING & SPRING RETURN ACTUATORS GENERAL DIMENSIONS in mm

SIZE	A	A'	B	C	D	E	F	I	R	øS	ISO 5211	øL	MxV	ISO 5211	øL1	M1xV1	øT	X	U
10	-	100	76	56	33	23	9	6	9	12.5	F03	36	M5x8	-	-	-	11	2	12
20	163	145	96	76	48	34	9	12.5	9	12.5	F03	36	M5x8	F05	50	M6x10	25	2	10
20	163	145	96	76	48	34	9	12.5	14	18.1	F05	50	M6x10	-	-	-	35	3	12
20	163	145	96	76	48	34	9	12.5	14	18.1	F04	42	M5x10	-	-	-	35	3	12
40	195	158	115	91	56	45	9	12.5	14	18.1	F04	42	M5x10	-	-	-	35	3	12
40	195	158	115	91	56	45	9	12.5	14	18.1	F05	50	M6x10	-	-	-	35	3	12
80	217	177	137	111	66	55	12	12.5	17	22.5	F05	50	M6x10	F07	70	M8x16	55	3	19
130	258	196	147	122	71	60	12	12.5	17	22.5	F05	50	M6x10	F07	70	M8x16	55	3	22
200	299	225	165	135.5	78	70	12	12.5	17	22.5	F07	70	M8x16	F10	102	M10x16	55	3	23

SIZES 2500



SIZES 4000



ISO 5211 DETAIL

SIZES

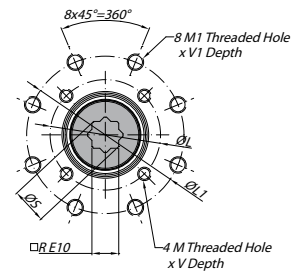
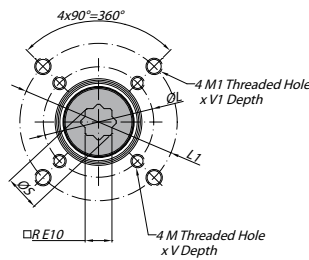
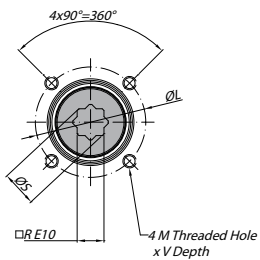
10 | 20 | 40 | 500 | 1750 | 2100 | 2500

SIZES

20 | 80 | 130 | 200 | 300 | 850 | 1200

SIZES

4000



DOUBLE ACTING & SPRING RETURN ACTUATORS GENERAL DIMENSIONS in mm

SIZE	A	A'	B	C	D	E	F	I	R	øS	ISO 5211	øL	MxV	ISO 5211	øL1	M1xV1	øT	X	U
300	348.5	273	182	152.5	86	80	12	12.5	22	28.5	F07	70	M8x16	F10	102	M10x16	70	3	24
500	397	304	199	173	96	85	12	12.5	22	28.5	F10	102	M10x16	-	-	-	70	3	32
850	473	372	221	191.5	106	98	12	12.5	27	36.5	F10	102	M10x17	F12	125	M12x20	85	3	39
1200	560	439	249	212.5	116	114	16	18.6	36	48.5	F10	102	M10x17	F14	140	M16x26	100	4	48
1750	601	461	280	242.5	131	130	16	18.6	36	48.5	F14	140	M16x26	-	-	-	100	4	50
2100	702	510	313	276.5	148	147	16	18.6	46	60.1	F16	165	M20x29	-	-	-	130	4	50
2500	738	518	383	356	177.5	176.5	16	18.6	46	60.2	F16	165	M20x29	-	-	-	130	4	58
4000	940	630	434	415	213	201	16	18.6	55	72.5	F16	165	M20x30	F25	254	M16x30	200	4	60

DOUBLE ACTING ACTUATOR TORQUE OUTPUT in Nm

Size	Output torque for double acting in Nm														Weight (kg)								
	3 bar		3,5 bar		4 bar		4,5 bar		5 bar		5,5 bar		6 bar			6,5 bar		7 bar		8 bar		10 bar	
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°		0°	90°	0°	90°	0°	90°	0°	90°
10	6		8		9		10		11		11.5		12		12		13		14		15		0.64
20	9.7		11.4		13		14.6		16.2		17.8		19.5		21.1		23		26		-		1.4
40	20.3		23.7		27.1		30.5		33.9		37.3		41		44		47		54		-		2.1
80	38.5		44.9		51.3		57.7		64.1		70.5		77		83		90		103		-		3
130	59.1		68.9		78.7		88.6		98.4		108.3		118		128		138		157		-		3.8
200	88		102		117		131		146		161		175		190		205		234		-		5.6
300	145		170		194		218		242		267		291		315		339		388		-		8.5
500	217		253		289		325		361		397		433		469		505		577		-		11.2
850	359		419		479		538		598		658		718		778		837		957		-		16.9
1200	519		606		692		779		865		952		1038		1125		1211		1384		-		25.8
1750	707		824		942		1060		1178		1295		1413		1531		1649		1884		-		32.5
2100	1086		1267		1448		1629		1810		1991		2172		2353		2534		2896		-		49.7
2500	1730		2019		2307		2596		2884		3172		3461		3749		4038		4614		-		69.6
4000	2408		2809		3210		3612		4013		4414		4816		5217		5618		6421		-		129.4

SPRING RETURN ACTUATOR TORQUE OUTPUT in Nm

Size	Type Pressure	Output torque for spring return in Nm														Spring Stroke		Weight (kg)							
		3 bar		3,5 bar		4 bar		4,5 bar		5 bar		5,5 bar		6 bar		6,5 bar			7 bar		8 bar		END	START	
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°		0°	90°	0°	90°	0°	90°	
20	S04			8	5	9	7	11	8	13	10	14	12	16	13	17	15	19	17	22	20	4	7	1.51	
	S06 A									11	7	12	9	14	10	15	12	17	13	20	17	7	11	1.54	
	S08											10	5	12	7	14	9	15	10	18	14	9	15	1.56	
40	S04	16	14	20	17	23	20	26	24	30	27	33	30	37	34	40	37	43	41	50	47	5	8	2.17	
	S06	14	10	18	14	21	17	24	20	28	24	31	27	34	30	38	34	41	37	48	44	7	12	2.20	
	S08			15	10	19	14	22	17	26	20	29	24	32	27	36	30	39	34	46	41	10	16	2.23	
	S10							20	14	24	17	27	20	30	24	34	27	37	30	44	37	12	20	2.26	
	S12									21	13	25	17	28	20	32	24	35	27	42	34	15	24	2.29	
	S14 A												23	13	26	17	30	20	33	24	40	30	17	28	2.32
80	S04	31	27	38	34	44	40	50	46	57	53	63	59	70	66	76	72	82	78	95	91	9	13	3.28	
	S06	27	21	34	28	40	34	47	41	53	47	59	53	66	60	72	66	79	73	92	86	13	20	3.36	
	S08					37	29	43	35	49	41	56	48	62	54	69	61	75	67	88	80	17	27	3.43	
	S10							39	29	46	36	52	42	59	49	65	55	71	61	84	74	22	33	3.51	
	S12									42	30	48	36	55	43	61	49	68	56	81	69	26	40	3.58	
	S14 A												45	31	51	37	58	44	64	50	77	63	30	47	3.65
130	S06	43	36	52	46	62	56	72	65	82	75	92	85	102	95	111	105	121	115	141	134	19	27	4.40	
	S08			47	38	57	48	67	58	76	68	86	77	96	87	106	97	116	107	135	127	26	36	4.50	
	S10					51	40	61	50	71	60	81	70	91	80	100	89	110	99	130	119	32	45	4.60	
	S12							56	42	65	52	75	62	85	72	95	82	105	92	124	111	39	54	4.70	
	S14 A											70	54	80	64	89	74	99	84	119	103	45	64	4.80	
200	S06	61	49	76	63	90	78	105	92	119	107	134	122	149	136	163	151	178	166	207	195	31	46	6.50	
	S08			67	50	81	65	96	79	111	94	125	109	140	123	154	138	169	152	198	182	42	61	6.70	
	S10					72	52	87	66	102	81	116	96	131	110	146	125	160	139	189	169	52	77	6.90	
	S12							78	53	93	68	107	83	122	97	137	112	151	126	180	156	63	92	7.00	
	S14 A											99	70	113	84	128	99	142	113	172	143	73	107	7.30	
300	S06	102	75	126	99	151	123	175	148	199	172	222	196	247	220	272	245	296	269	344	317	51	83	9.65	
	S08			112	76	136	100	160	124	185	148	209	173	233	197	257	221	281	245	330	294	68	111	9.92	
	S10					122	76	146	101	170	125	194	149	219	173	243	198	267	222	315	270	85	138	10.20	
	S12							131	77	156	101	180	126	204	150	228	174	253	198	301	247	102	166	10.50	
	S14 A											165	102	190	126	214	151	238	175	287	223	119	193	10.80	
500	S06	152	119	188	155	224	191	260	227	296	263	333	299	369	335	405	371	441	407	513	480	76	115	13.33	
	S08	131	86	167	122	203	158	239	194	275	231	311	267	347	303	383	339	419	375	492	447	101	153	13.84	
	S10					181	126	217	162	254	198	290	234	326	270	362	306	398	342	470	414	126	192	14.35	
	S12							196	129	232	165	268	201	304	238	340	274	376	310	449	382	152	230	14.85	
	S14 A											247	169	283	205	319	241	355	277	427	349	177	268	15.36	
850	S06	260	209	320	269	380	328	440	388	500	448	559	508	619	568	679	627	739	687	858	807	116	177	19.7	
	S08	227	159	287	218	347	278	407	338	467	398	526	458	586	518	646	577	706	637	826	757	155	236	20.3	
	S10			254	168	314	228	374	288	434	348	494	408	553	467	613	527	673	587	793	707	193	295	20.9	
	S12							341	238	401	298	461	358	521	417	580	477	640	537	760	657	232	353	21.6	
	S14 A											428	307	488	367	547	427	607	487	727	607	271	412	22.2	
1200	S06	373	289	460	376	546	462	633	549	720	635	806	722	893	808	979	895	1066	981	1239	1154	171	271	30.1	
	S08	325	213	411	299	498	386	584	472	671	559	758	645	844	732	931	818	1017	905	1190	1078	229	361	31.1	
	S10	276	136	363	222	449	309	536	395	622	482	709	569	795	655	882	742	969	828	1142	1001	286	451	32.2	
	S12					401	232	487	319	574	405	660	492	747	578	833	665	920	751	1093	924	343	541	33.2	
	S14 A											525	329	612	415	698	502	785	588	871	675	1044	848	400	631
1750	S06	477	349	595	466	712	584	830	702	948	820	1066	937	1183	1055	1301	1173	1419	1291	1654	1526	270	421	39.3	
	S08	400	229	518	347	636	465	754	582	811	700	989	818	1107	936	1225	1053	1342	1171	1578	1407	360	562	41.0	
	S10			441	228	559	345	677	463	795	581	912	699	1030	816	1148	934	1266	1052	1501	1287	451	702	42.7	
	S12							600	344	718	461	836	579	954	697	1071	815	1189	933	1425	1168	541	843	44.4	
	S14 A											642	342	759	460	877	578	995	695	1113	813	1348	1049	631	983
2100	S06	702	509	883	690	1064	871	1245	1052	1426	1233	1607	1414	1788	1595	1969	1776	2150	1957	2512	2319	384	577	60.3	
	S08	574	316	755	497	936	678	1117	859	1298	1040	1479	1221	1660	1402	1841	1583	2022	1764	2384	2126	512	770		

DOUBLE ACTING ACTUATOR TORQUE OUTPUT in ft lb

Size	Output torque for double acting in ft lb																Weight (lb)						
	43.5 psi		50.8 psi		58 psi		65.3 psi		72.5 psi		80 psi		87 psi		94.3 psi			102 psi		116 psi		145 psi	
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°		0°	90°	0°	90°	0°	90°
10	4.4		6		6.5		7.4		8		8.5		9		9		9.5		10.3		12		1.4
20	7.2		8.4		9.6		10.8		11.9		13.1		14.4		15.6		17		19.2		-		3.1
40	15.0		17.5		20.0		22.5		25.0		27.5		30.2		32.4		34.6		39.8		-		4.6
80	28.4		33.1		37.8		42.5		47.2		52.0		56.7		61.2		66		76		-		6.6
130	43.6		50.8		58.0		65.3		72.5		79.8		87		94		102		116		-		8.4
200	64.9		75.2		86.2		96.5		108		119		129		140		151		172		-		12.3
300	107		125.3		143		161		178		197		214		232		250		286		-		18.7
500	160		186		213		240		266		293		319		346		372		425		-		24.7
850	265		309		353		397		441		485		529		573		617		705		-		37.3
1200	383		447		510		574		638		702		765		829		893		1020		-		56.9
1750	521		607		694		781		868		954		1041		1128		1215		1389		-		71.6
2100	801		934		1068		1201		1335		1468		1602		1735		1869		2136		-		109.5
2500	1275		1488		1700		1913		2126		2338		2551		2763		2976		3401		-		153.4
4000	1775		2070		2366		2662		2958		3253		3549		3845		4140		4732		-		285.3

SPRING RETURN ACTUATOR TORQUE OUTPUT in lb

Size	Type Pressure	Output torque for spring acting in ft lb																Spring Stroke		Weight (lb)					
		43.5 psi		50.8 psi		58 psi		65.3 psi		72.5 psi		80 psi		87 psi		94.3 psi		102 psi			116 psi		END	START	
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°		0°	90°	0°	90°	
20	S04			6	4	7	5	8	6	9	7	10	9	12	10	13	11	14	12	16	15	3	5	3.33	
	S06 A											8	5	9	6	10	8	11	9	13	10	5	8	3.40	
	S08											8	4	9	5	10	6	11	8	14	10	7	11	3.44	
40	S04	12	10	14	12	17	15	19	17	22	20	24	22	27	25	29	27	32	30	37	35	4	6	4.78	
	S06	10	7	13	10	15	12	18	15	21	18	23	20	25	22	28	25	30	27	35	32	5	9	4.85	
	S08			11	7	14	10	16	12	19	15	21	18	24	20	27	22	29	25	34	30	7	12	4.92	
	S10							15	10	18	13	20	15	22	18	25	20	27	22	32	27	9	15	4.98	
	S12									15	10	18	13	20	15	24	18	26	20	31	25	11	18	5.05	
	S14 A											17	10	19	13	22	15	24	18	29	22	13	21	5.11	
80	S04	23	20	28	25	32	29	37	34	42	39	46	43	52	49	56	53	60	57	70	67	6	10	7.23	
	S06	20	16	25	21	30	25	35	30	39	35	43	39	49	44	53	49	58	54	68	63	10	15	7.41	
	S08					27	21	32	26	36	30	41	35	46	40	51	45	55	49	65	59	13	20	7.56	
	S10							29	21	34	27	38	31	43	36	48	41	52	45	62	55	16	25	7.74	
	S12									31	22	35	27	41	32	45	36	50	41	60	51	19	29	7.89	
	S14 A											33	23	38	27	43	32	47	37	57	46	22	34	8.05	
130	S06	31	26	39	34	46	41	53	48	60	55	68	63	75	70	82	77	89	85	104	99	14	20	9.70	
	S08			35	28	42	35	49	43	56	50	63	57	71	64	78	71	85	79	99	94	19	27	9.92	
	S10					38	29	45	37	52	44	60	52	67	59	74	66	81	73	96	88	24	33	10.14	
	S12							41	31	48	38	55	46	63	53	70	60	77	68	91	82	29	40	10.36	
	S14 A											52	40	59	47	66	55	73	62	88	76	33	47	10.58	
200	S06	45	36	56	46	66	57	77	68	88	79	99	90	110	100	120	111	131	122	153	144	23	34	14.33	
	S08			49	37	60	48	71	58	82	69	92	80	103	91	113	102	125	112	146	134	31	45	14.77	
	S10					53	38	64	49	75	60	85	71	97	81	108	92	118	102	139	125	38	56	15.21	
	S12							57	39	69	50	79	61	90	71	101	83	111	93	133	115	46	68	15.43	
	S14 A											73	52	83	62	94	73	105	83	127	105	54	79	16.09	
300	S06	75	55	93	73	111	91	129	109	147	127	164	144	182	162	200	181	218	198	254	234	38	61	21.27	
	S08			83	56	100	74	118	91	136	109	154	128	172	145	189	163	207	181	243	217	50	81	21.87	
	S10					90	56	108	74	125	92	143	110	161	128	179	146	197	164	232	199	63	102	22.49	
	S12							97	57	115	74	133	93	150	111	168	128	186	146	222	182	75	122	23.15	
	S14 A											122	75	140	93	158	111	175	129	212	164	88	143	23.81	
500	S06	112	88	139	114	165	141	192	167	218	194	245	220	272	247	298	273	325	300	378	354	56	85	29.39	
	S08	97	63	123	90	150	116	176	143	203	170	229	197	256	223	282	250	309	276	363	329	74	113	30.51	
	S10					133	93	160	119	187	146	214	172	240	199	267	226	293	252	346	305	93	141	31.64	
	S12							144	95	171	122	198	148	224	175	251	202	277	228	331	282	112	170	32.74	
	S14 A											182	125	209	151	235	178	262	204	315	257	130	198	33.86	
850	S06	192	154	236	198	280	242	324	286	369	330	412	374	456	419	500	462	545	506	632	595	85	130	43.43	
	S08	167	117	212	161	256	205	300	249	344	293	388	338	432	382	476	425	520	469	609	558	114	174	44.75	
	S10			187	124	231	168	276	212	320	256	364	301	408	344	452	388	496	433	584	521	143	217	46.08	
	S12							251	175	296	220	340	264	384	307	427	352	472	396	560	484	171	260	47.62	
	S14 A											315	226	360	270	403	315	447	359	536	447	200	304	48.94	
1200	S06	275	213	339	277	402	340	467	405	531	468	594	532	658	595	722	660	786	723	913	850	126	199	66.36	
	S08	240	157	303	220	367	284	430	348	495	412	559	475	622	539	686	603	750	667	877	794	168	266	68.56	
	S10	203	100	268	164	331	228	395	291	458	355	523	419	586	483	650	547	714	610	842	738	210	332	70.99	
	S12					296	171	359	235	423	298	486	363	551	426	614	490	678	553	806	681	253	399	73.19	
	S14 A											387	242	451	306	514	370	579	433	642	497	769	625	295	465
1750	S06	352	257	439	343	525	430	612	517	699	604	786	691	872	778	959	865	1046	951	1219	1125	199	310	86.64	
	S08	295	169	382	256	469	343	556	429	642	516	729	603	816	690	903	776	989	863	1163	1037	265	414	90.39	
	S10			325	168	412	254	499	341	586	428	672	515	759	601	846	688	933	775	1106	949	332	517	94.14	
	S12							442	254	529	340	616	427	703	514	789	601	876	688	1050	861	399	621	97.88	
	S14 A											473	252	559	339	646	426	733	512	820	599	993	773	465	724
2100	S06	518	375	651	509	785	642	918	776	1052	909	1185	1043	1319	1176	1452	1310	1586	1443	1853	1710	283	426	132.28	
	S08	423	233	557	367	690	500	824	634	957	767	1091	901	1224	1034	1358	1168	1491	1301	1758	1568	378	568	136.69	
	S10			462	225	596	358	729	492	863</															