



The Main Products

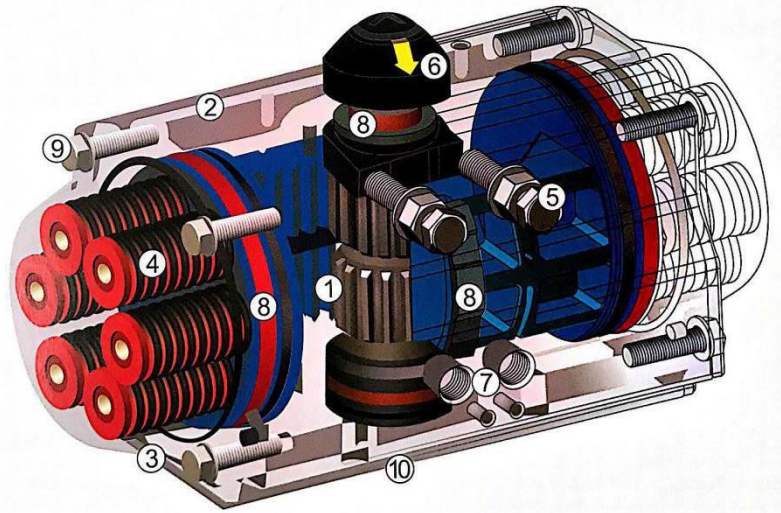
Pneumatic Actuator

Pneumatic Ball Valve

Pneumatic Butterfly Valve

Pneumatic Accessories





⌀ RACK AND PINION

Rack and pinion double piston symmetrical structure design, fast and stable action, high precision, high output power, reverse rotation.

⌀ BODY

The extruded high-quality aluminum alloy cylinder block has a hard anodizing treatment (anodizing + Teflon coating in special cases) on the inner hole and outer surface after precision machining, with longer service life and low friction coefficient.

⌀ INTEGRATED DESIGN

All double acting and single acting actuator models have the same cylinder body and end cover, so it is convenient to change the action mode by adding spring or removing spring.

⌀ SPRING ASSEMBLY

The combined pre loaded safety spring group can be easily and safely installed or increased or decreased in the number of springs, no matter in the assembly process or in the use site.

⌀ ADJUSTING BOLT

Two independent adjusting screws on the external side are more accurate and convenient for the actuator installed on the valve. Adjust the opening and closing positions of the valve. If full stroke adjustment is required, the other two end covers shall be equipped with longer adjusting screws.

⌀ POSITION INDICATOR

Multifunctional position indicator, visual indication on site, conforming to VID/VIE3845, NAMUR standard slot, able to install and output all accessories, such as limit switch box, electric positioner, position sensor.

⌀ AIR CONNECTION

The air supply interface complies with NAMUR standard, and can be directly installed with NAMUR standard solenoid valve.

⌀ BEARING

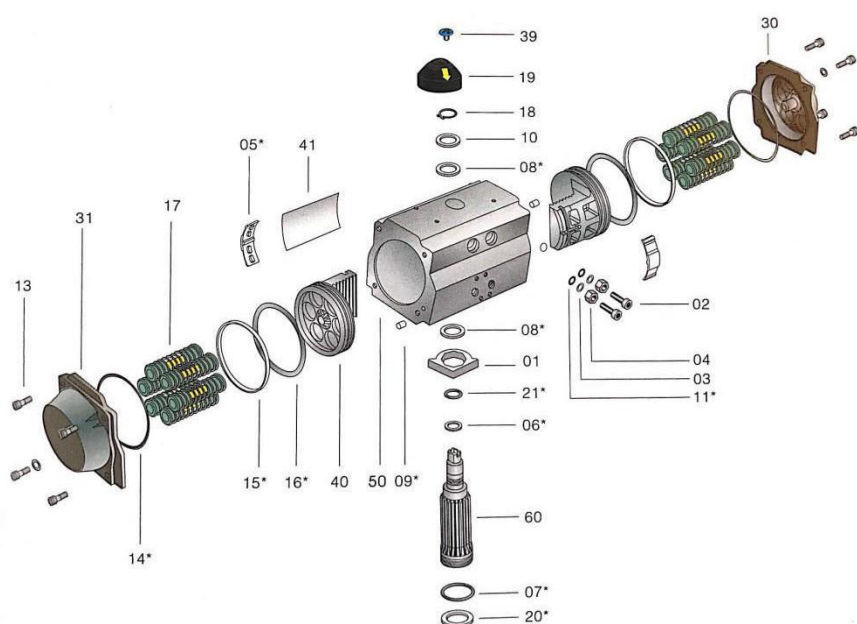
In order to prevent metal to metal friction and increase lubrication, the composite bearing bush and piston guide ring on the back of rack and the bearing of output shaft have low friction and long service life.

⌀ STAINLESS STEEL

All fasteners are made of stainless steel, long-term corrosion resistance.

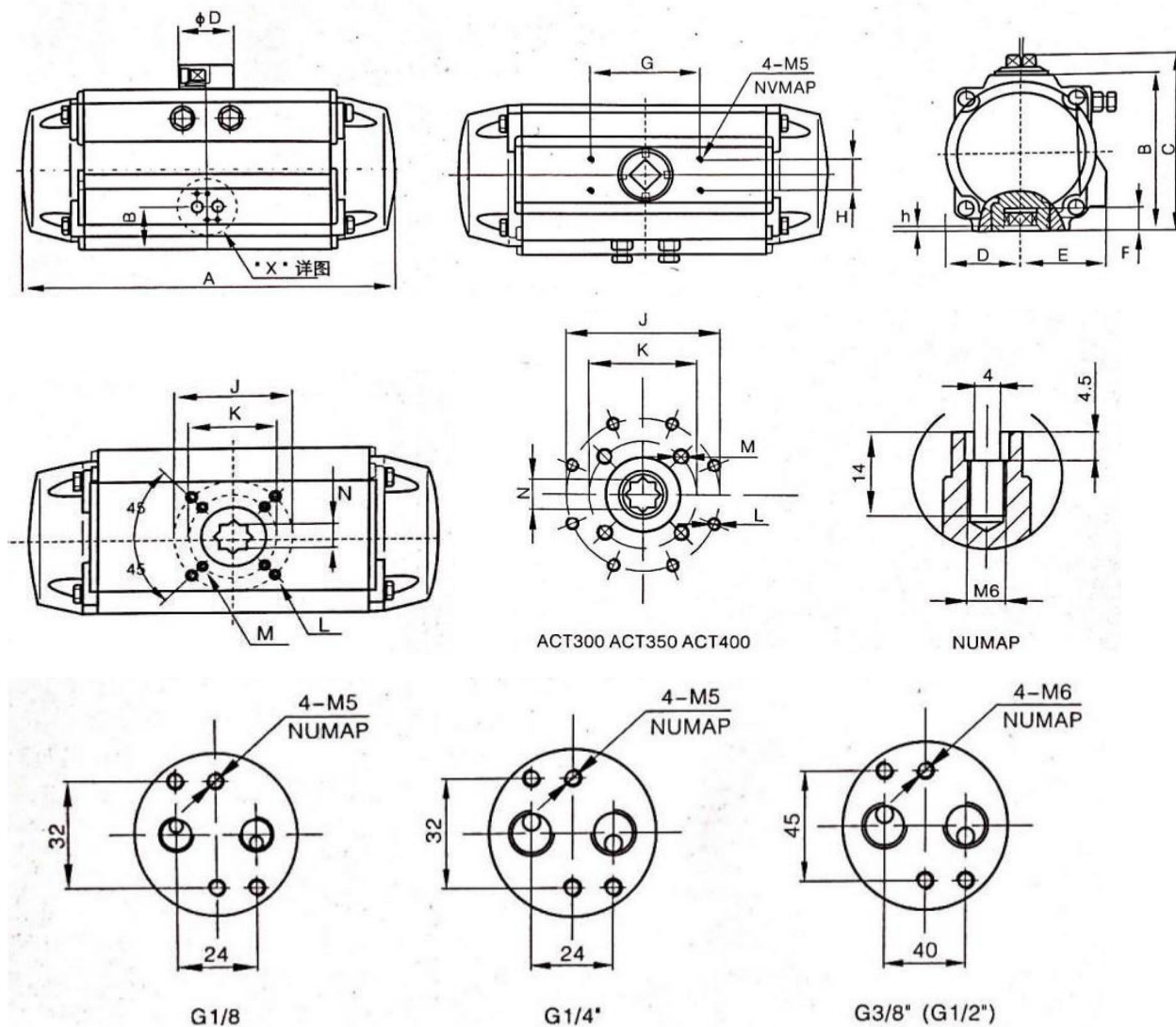
⌀ CONNECTION STANDARD

The connection part conforms to the new international standard ISO5211, and DN3337 (F03-F25) is installed with interchangeability and universal type.



COMPONENTS AND MATERIAL

Part No.	Quantity	Part Name	Standard Material
1	1	Adjusting cam	Stainless steel
2	2	Adjusting bolt	Stainless steel
3	2	Gasket	Stainless steel
4	2	Nut	Stainless steel
5	2	Guide bearing(at the back of the piston)	Nylon46
6	1	Bearing(at the top of the output shaft)	Nylon46
7	1	O-ring(at the bottom of the output shaft)	NBR
8	1	Thrust bearing(output shaft)	Nylon46
9	1	Bearing(at the top of the output shaft)	Nylon46
10	10	Gasket(output shaft)	Stainless steel
11	2	O-ring(adjusting bolt)	NBR
13	8	End cap bolt	Stainless steel
14	2	O-ring(end cap)	NBR
15	2	Guide ring(piston)	Fluorine-carbon
16	2	O-ring(piston)	NBR
17	5-12	Spring assembly	Alloy spring steel
18	1	Elastic damping ring	Stainless steel
19	1	Position indicator	PPPP+30%GF
20	1	Bearing(at the bottom of the output shaft)	Nylon46
21	1	O-ring(at the top of the output shaft)	NBR
30	1(1)	Right end cap	Casting aluminum alloy
31	1(1)	Left end cap	Casting aluminum alloy
39	1	Screw	PPPP+30%GF
40	2	Piston	Casting aluminum alloy
41	1	Name Plate	Stainless steel
50	1	Cylinder	Extruded aluminum alloy
60	1	Output shaft	Carbon steel



METRIC DIMENSIONS AND TECHNICAL DATA(mm)

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	O	AIR CONNECTION
ACT042	115	55	75	24	33	12	50	30	F05/50	F03/36	M6	M5	11	30	G1/8"
ACT050	155	69	89	29	41	12	80	30	F05/50	F03/36	M6	M5	11	40	G1/4"
ACT063	168	85	105	36.5	46.5	14	80	30	F05/50	F03/36	M6	M5	14	40	G1/4"
ACT075	219	102.5	122.5	43	52.5	18	80	30	F07/70	F05/50	M8	M6	17	40	G1/4"
ACT090	249	115	135	49	56.5	18	80	30	F07/70	F05/50	M8	M6	17	40	G1/4"
ACT100	274	127.5	147.5	55.5	66.5	20	80	30	F10/102	F07/70	M10	M8	22	40	G1/4"
ACT115	315	140	170	61.5	71	26	130	30	F10/102	F07/70	M10	M8	22	56	G1/4"
ACT125	355	156.5	186.5	69.5	80.5	32	130	30	F10/102	F07/70	M10	M8	27	56	G1/4"
ACT145	417	176	206	78.5	91	36	130	30	F12/125	F10/102	M12	M10	27	56	G1/4"
ACT160	452	196	226	88	97	36	130	30	F12/125	F10/102	M12	M10	27	65	G1/4"
ACT190	540	231	261	105	110	40	130	30	F14/140		M16		36	65	G1/4"
ACT210	585	253.5	283.5	116	119.5	40	130	30	F14/140		M16		36	80	G1/4"
ACT240	685	291	331	130.5	130.5	50	130	30	F16/165		M20		46	95	G3/8"
ACT270	743	331.5	371.5	147	147	50	130	30	F16/165		M20		46	95	G3/8" G1/2"
ACT300	857	354	394	162	173	60	130	30		F16/165		M20	46	95	G3/8" G1/2"
ACT350	935	410	450	190	195	60	130	30	F25/254	F16/165	M16	M20	46	95	G3/8" G1/2"
ACT400	1035	466	506	260	260	60	130	30	F25/254	F16/165	M16	M20	55	95	G3/8" G1/2"

ACTUATOR DATA



Model		ACT050		ACT063		ACT075		ACT090		ACT100		ACT115		ACT125		ACT145		ACT160		ACT190		ACT210		ACT240		ACT270		ACT300		ACT350		ACT400	
		D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S
Cylinder diameter（mm）		50		63		75		90		100		115		125		145		160		190		210		240		270		300		350		400	
Adjust 1 degree, revolve		1/6		1/6		1/5		1/5		1/5		1/5		1/5		1/4		1/4		1/4		1/4		1/4		1/4		1/4					
Cylinder volume（L）	Open	0.08		0.16		0.3		0.5		0.7		1.05		1.42		2.2		3.1		4.6		6.5		10.2		15.5		20.7		31		46	
	Close	0.12		0.24		0.43		0.68		0.98		1.33		2		3.1		4.2		7		9.8		14.6		22.5		29		45		68.5	
Open time（S）		0.2	0.3	0.3	0.3	0.3	0.35	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.1	1.2	1.4	1.5	1.7	2	2.2	2.7	3.2	3.5	4	4	4.5	6	7.5				
Close time（S）		0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.9	0.9	1.1	1.2	1.4	1.5	1.8	1.8	2.1	2.4	2.8	3.5	4	4.1	4.6	4.5	5	7	8.5				
Weight（Kg）		1.1	1.2	1.6	1.8	2.8	3.3	4	4.7	5.4	6.5	8.4	9.8	11	13.4	15.5	19.1	20.2	24.4	33	39.6	35.5	45.1	61.5	72.5	86	135						

Max. Air supply pressure - Dry or lubricating clean compressed air 8 bar

Rotation angle - 90'±5' or the whole trip 0'-90'

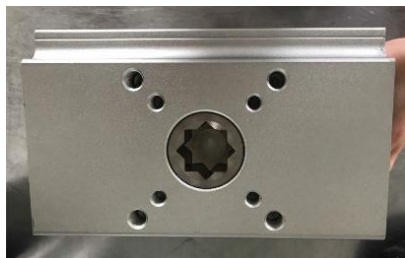
Operating temperature('c) - -20±80 ST(standard) NBR O-ring , -15±150 HT fluorine rubber O-ring , -40±80 LT solocone rubber O-ring

The reaction time of the actuator is based on tests on the following conditions: (1) atmospheric temperature; (2) 90'Stroke; (3) pipe inner diameter:8mm; (4) solenoid valve,with 4mm bore and flow of Qn400L/min; (5) neutral clean air; (6) air supply pressure of 5bar (79.75psi); (7) no-load actuator.

Note:if one or more data is different during the on-site test,the reaction time is different.

The loaded weight for Model SR is calculated based on 10 springs:when increase or reduce springs,the weight of each is increased or reduced according the weight correspondent for each spring.

CONNECTION DETAILS



Limit switch box and positioner connection standard: VDI/VDE 3845 Namur standard.

Actuator and valve connection is applicable for ISO5211 and DIN3337; mounted easily to valve.

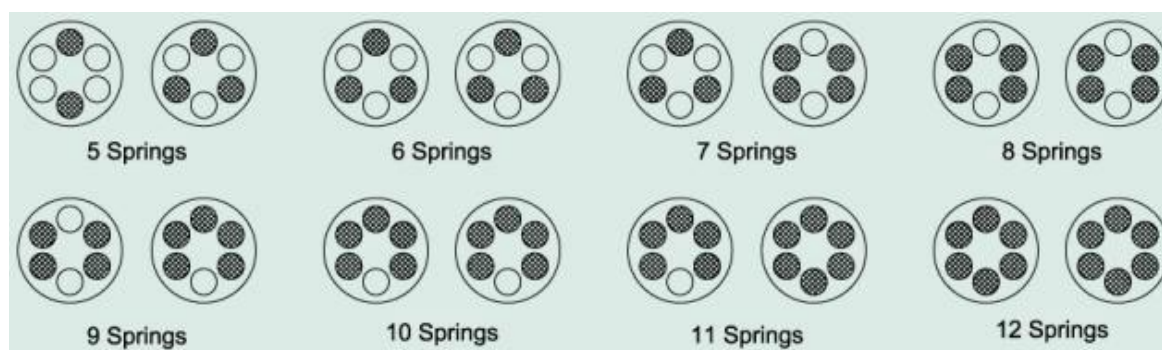
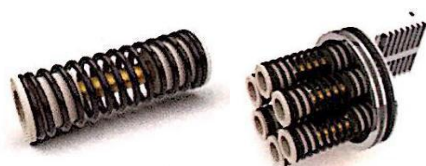
Actuator front side valve connection is suitable for 3845 Namur standard. Direction solenoid valve can be mounted.

OPERATING PRINCIPLE AND DIRECTION OF ROTATION

DOUBLE ACTING		
	Air supplied to "2" drives the piston outward,turning the pinion counterclockwise. Exhaust air exits at "4".	Air supplied to "4" drives the piston inward,turning the pinion clockwise. Exhaust air exits at "2".
SINGLE ACTING		
	Air supplied to "2" drives the pistons outward and compresses the springs,turning the pinion counterclockwise. Exhaust air exits at "4".	Loss of air pressure allows the springs to drive the pistons inward,turning the pinion clockwise. Exhaust air exits at "2"

SPRING OPTIONS FOR SINGLE ACTING ACTUATORS

Pneumatic actuators come standard with 12 springs. Air supply pressure will determine the actual number of springs needed in operation. The following spring configurations are available:



OUTPUT TORQUE (lb*in) and (NM)

DOUBLE ACTING - OUTPUT TORQUE (lb*in)

DOUBLE ACTING - OUTPUT TORQUE (lb*in)								
Air Pressure	40psi	50psi	60psi	70psi	80psi	90psi	100psi	120psi
ACT042D	50.46	58.42	67.28	83.21	92.06	100.91	116.85	134.55
ACT050D	78.78	91.18	104.45	130.12	143.4	156.68	183.24	208.91
ACT063D	138.09	161.11	185.01	230.15	253.17	277.07	323.1	369.13
ACT075D	274.41	320.44	366.47	458.53	504.56	549.71	640.88	732.95
ACT090D	432.86	504.56	576.27	720.55	795.79	866.61	1008.24	1150.76
ACT100D	628.49	732.95	834.74	1048.08	1150.76	1260.52	1465.01	1678.34
ACT115D	1017.98	1181.74	1354.36	1690.73	1858.92	2035.96	2372.34	2708.71
ACT125D	1310.1	1527.86	1749.16	2182.02	2403.32	2615.77	3056.6	3490.34
ACT145D	2053.66	2390.04	2744.12	3425.72	3762.1	4107.33	4797.78	5479.39
ACT160D	2673.3	3124.76	3576.21	4461.41	4912.86	5364.31	6249.51	7152.42
ACT190D	5019.08	5860.02	6692.11	8373.99	9206.08	10038.17	11720.05	13384.22
ACT210D	6249.51	7294.05	8338.58	10409.95	11463.34	12499.02	14588.1	16677.17
ACT240D	9799.16	11427.93	13065.55	16323.09	17960.71	19598.33	22855.86	26131.1
ACT270D	13950.75	16278.83	18598.05	23245.35	25573.43	27901.5	32557.66	37196.1
ACT300D	19138.02	22324.74	25511.46	31884.9	35080.48	38276.05	44649.49	51031.78
ACT350D	28653.92	33425.15	38205.23	47747.69	52527.77	57307.85	66850.3	76410.46
ACT400D	40825.42	47623.76	54430.95	68036.47	74843.66	81650.85	95247.52	108861.9

SINGLE ACTING - OUTPUT TORQUE (lb*in)



Air Pressure		40psi		50psi		60psi		70psi		80psi		90psi		100psi		120psi		Spring Stroke	
Model	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
	QTY	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER
ACT042S	S05	30.98	15.93	38.95	23.9	47.8	32.75	63.73	48.69									34.52	19.47
	S06	26.56	9.74	34.52	17.7	43.37	26.56	59.31	42.49	68.16	51.34							40.72	23.9
	S07	22.13	3.54	30.1	11.51	38.95	20.36	54.88	36.29	63.73	45.15	72.59	54					46.92	28.33
	S08			25.67	5.31	34.52	14.16	50.46	30.1	59.31	38.95	68.16	47.8	84.09	63.73			53.11	32.75
	S09					30.1	7.97	46.03	23.9	54.88	32.75	63.73	41.6	79.67	57.54	97.37	75.24	59.31	37.18
	S10							41.6	17.7	50.46	26.56	59.31	35.41	75.24	51.34	92.95	69.05	65.5	41.6
	S11							37.18	11.51	46.03	20.36	54.88	29.21	70.82	45.15	88.52	62.85	71.7	46.03
	S12									41.6	14.16	50.46	23.02	66.39	38.95	84.09	56.65	77.9	50.46
ACT050S	S05	52.23	40.72	64.62	53.11	77.9	66.39	103.57	92.06									38.06	26.56
	S06	47.8	33.64	60.19	46.03	73.47	59.31	99.14	84.98	112.42	98.26							45.15	30.98
	S07	42.49	25.67	54.88	38.06	68.16	51.34	93.83	77.01	107.11	90.29	120.39	103.57					53.11	36.29
	S08			48.69	30.1	61.96	43.37	87.63	69.05	100.91	82.32	114.19	95.6	140.75	122.16			61.08	42.49
	S09					56.65	35.41	82.32	61.08	95.6	74.36	108.88	87.63	135.44	114.19	161.11	139.86	69.05	47.8
	S10							77.9	54	91.18	67.28	104.45	80.55	131.01	107.11	156.68	132.78	76.13	52.23
	S11							72.59	46.03	85.86	59.31	99.14	72.59	125.7	99.14	151.37	124.81	84.09	57.54
	S12									79.67	51.34	92.95	64.62	119.5	91.18	145.17	116.85	92.06	63.73
ACT063S	S05	94.72	71.7	117.73	94.72	141.63	118.62	186.78	163.76									66.39	43.37
	S06	85.86	58.42	108.88	81.44	132.78	105.34	177.93	150.48	200.94	173.5							79.67	52.23
	S07	77.01	45.15	100.03	68.16	123.93	92.06	169.07	137.21	192.09	160.22	215.99	184.12					92.95	61.08
	S08			91.18	54.88	115.08	78.78	160.22	123.93	183.24	146.94	207.14	170.84	253.17	216.87			106.22	69.93
	S09					106.22	65.5	151.37	110.65	174.38	133.67	198.28	157.57	244.32	203.6	290.35	249.63	119.5	78.78
	S10							142.52	97.37	165.53	120.39	189.43	144.29	235.46	190.32	281.49	236.35	132.78	87.63
	S11							134.55	81.44	157.57	104.45	181.47	128.35	227.5	174.38	273.53	220.41	148.71	95.6
	S12									148.71	94.72	172.61	118.62	218.64	164.65	264.67	210.68	158.45	104.45
ACT075S	S05	186.78	138.09	232.81	184.12	278.84	230.15	370.9	322.21									136.32	87.63
	S06	169.96	110.65	215.99	156.68	262.02	202.71	354.08	294.77	400.11	340.8							163.76	104.45
	S07	152.25	84.09	198.28	130.12	244.32	176.15	336.38	268.22	382.41	314.25	427.55	359.39					190.32	122.16
	S08			181.47	102.68	227.5	148.71	319.56	240.77	365.59	286.8	410.73	331.95	501.91	423.13			217.76	138.98
	S09					209.79	121.27	301.85	213.33	347.88	259.36	393.03	304.51	484.2	395.68	576.27	487.75	245.2	156.68
	S10							284.15	185.89	330.18	231.92	375.32	277.07	466.5	368.24	558.56	460.3	272.64	174.38
	S11							267.33	158.45	313.36	204.48	358.51	249.63	449.68	340.8	541.74	432.86	300.08	191.2
	S12									295.66	177.93	340.8	223.07	431.98	314.25	524.04	406.31	326.64	208.91

SINGLE ACTING - OUTPUT TORQUE (lb*in)



Air Pressure		40psi		50psi		60psi		70psi		80psi		90psi		100psi		120psi		Spring Stroke	
Model	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
	QTY	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER
ACT090S	S05	288.58	205.37	360.28	277.07	431.98	348.77	576.27	493.06									227.5	144.29
	S06	259.36	159.34	331.06	231.04	402.77	302.74	547.05	447.03	622.3	522.27							273.53	173.5
	S07	230.15	114.19	301.85	185.89	373.55	257.59	517.84	401.88	593.08	477.12	663.9	547.94					318.67	202.71
	S08			274.41	140.75	346.11	212.45	490.4	356.74	565.64	431.98	636.46	502.79	778.09	644.43			363.82	230.15
	S09					316.02	166.42	460.30	310.71	535.55	385.95	606.36	456.76	747.99	598.4	890.51	740.91	409.85	260.25
	S10							431.09	264.67	506.33	339.92	577.15	410.73	718.78	552.36	861.3	694.88	455.88	289.46
	S11							402.77	220.41	478.01	295.66	548.82	366.47	690.46	508.1	832.97	650.62	500.14	317.79
	S12									449.68	249.63	520.5	320.44	662.13	462.07	804.65	604.59	546.17	346.11
ACT100S	S05	429.32	318.67	533.78	423.13	635.57	524.92	848.91	738.26									309.82	199.17
	S06	389.49	255.82	493.94	360.28	595.74	462.07	809.07	675.41	911.76	778.09							372.67	239
	S07	348.77	194.74	453.22	299.2	555.02	401	768.35	614.33	871.04	717.01	980.8	826.78					433.75	279.72
	S08			414.27	237.23	516.07	339.03	729.4	552.36	832.09	655.05	941.85	764.81	1146.33	969.29			495.71	318.67
	S09					475.35	276.18	688.69	489.52	791.37	592.2	901.13	701.96	1105.61	906.44	1318.95	1119.78	558.56	359.39
	S10							648.85	427.55	751.53	530.23	861.3	640	1065.78	844.48	1279.11	1057.81	620.53	399.23
	S11							609.02	365.59	711.7	468.27	821.47	578.04	1025.95	782.52	1239.28	995.85	682.49	439.06
	S12									671.87	406.31	781.63	516.07	986.11	720.55	1199.45	933.89	744.45	478.89
ACT115S	S05	694.88	501.91	858.64	665.67	1031.26	838.28	1367.63	1174.66									516.07	323.1
	S06	630.26	398.34	794.02	562.1	966.64	734.72	1303.01	1071.09	1471.2	1239.28							619.64	387.72
	S07	565.64	295.66	729.4	459.42	902.02	632.03	1238.39	968.41	1406.58	1136.6	1583.62	1313.64					722.32	452.34
	S08			664.79	354.08	837.4	526.69	1173.78	863.07	1341.96	1031.26	1519	1208.3	1855.38	1544.67			827.66	516.96
	S09					772.78	424.9	1109.16	761.27	1277.34	929.46	1454.38	1106.5	1790.76	1442.88	2127.14	1779.25	929.46	581.58
	S10							1044.54	658.59	1212.72	826.78	1389.76	1003.82	1726.14	1340.19	2062.52	1676.57	1032.14	646.2
	S11							979.92	557.68	1148.1	725.86	1325.14	902.9	1661.52	1239.28	1997.9	1575.66	1133.06	710.82
	S12									1082.6	622.3	1259.64	799.34	1596.02	1135.71	1932.39	1472.09	1236.62	776.32
ACT125S	S05	896.71	663.9	114.47	881.66	1335.77	1102.96	1768.63	1535.82									646.2	413.39
	S06	814.38	531.12	1032.14	748.88	1253.44	970.18	1686.31	1403.04	1907.61	1624.34							778.98	495.71
	S07	731.18	404.54	948.93	622.3	1170.23	843.6	1603.1	1276.46	1824.4	1497.76	2036.85	1710.21					905.56	578.92
	S08			865.73	487.75	1087.03	709.05	1519.89	1141.91	1741.19	1363.21	1953.64	1575.66	2394.47	2016.49			1040.11	662.13
	S09					1005.59	583.35	1438.45	1016.21	1659.75	1237.51	1872.2	1449.96	2313.03	1890.79	2746.78	2324.54	1165.81	743.57
	S10							1354.36	880.77	1575.66	1102.07	1788.1	1314.52	2228.93	1755.35	2662.68	2189.1	1301.24	827.66
	S11							1270.26	756.85	1491.56	978.15	1704.01	1190.59	2144.84	1631.42	2578.59	2065.17	1425.17	911.76
	S12									1411.89	845.37	1624.34	1057.81	2065.17	1498.64	2498.92	1932.39	1557.95	991.42

SINGLE ACTING - OUTPUT TORQUE (lb*in)



Air Pressure		40psi		50psi		60psi		70psi		80psi		90psi		100psi		120psi		Spring Stroke	
Model	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
	QTY	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER
ACT145S	S05	1407.47	1035.68	1743.84	1372.06	2097.92	1726.14	2779.53	2407.74									1017.98	646.2
	S06	1274.69	832.09	1611.06	1168.46	1965.14	1522.54	2646.75	2204.15	2983.12	2540.52							1221.58	778.98
	S07	1150.76	637.34	1487.14	973.72	1841.22	1327.8	2522.82	2009.4	2859.2	2345.78	3204.42	2691.01					1416.32	902.9
	S08			1354.36	770.12	1708.44	1124.2	2390.04	1805.81	2726.42	2142.18	3071.64	2487.41	3762.1	3177.87			1619.92	1035.68
	S09					1575.66	920.61	2257.26	1602.21	2593.64	1938.59	2938.86	2283.82	3629.32	2974.27	4310.92	3655.88	1823.51	1168.46
	S10							2124.48	1389.76	2460.86	1726.14	2806.08	2071.37	3496.54	2761.82	4178.14	3443.43	2035.96	1301.24
	S11							2000.55	1195.02	2336.93	1531.4	2682.16	1876.62	3372.61	2567.08	4054.22	3248.68	2230.7	1425.17
	S12									2204.15	1327.8	2549.38	1673.03	3239.83	2363.48	3921.44	3045.09	2434.3	1557.95
ACT160S	S05	1788.1	1363.21	2239.56	1814.66	2691.01	2266.11	3576.21	3151.31									1310.1	885.2
	S06	1611.06	1106.5	2062.52	1557.95	2513.97	2009.4	3399.17	2717.56	3850.62	3169.02							1566.8	1062.24
	S07	1434.02	840.94	1885.48	1292.39	2336.93	1743.84	3222.13	2629.04	3673.58	3080.5	4125.03	3531.95					1832.36	1239.28
	S08			1708.44	1026.83	2159.89	1478.28	3045.09	2363.48	3496.54	2814.94	3947.99	3266.39	4833.19	4151.59			2097.92	1416.32
	S09					1982.85	1221.58	2868.05	2106.78	3319.5	2558.23	3770.95	3009.68	4656.15	3894.88	5559.06	4797.78	2354.63	1593.36
	S10							2691.01	1850.07	3142.46	2301.52	3593.91	2752.97	4479.11	3638.17	5382.02	4541.08	2611.34	1770.4
	S11							2513.97	1584.51	2965.42	2035.96	3416.87	2487.41	4302.07	3372.61	5204.98	4275.52	2876.9	1947.44
	S12									2788.38	1770.4	3239.83	2221.85	4125.03	3107.05	5027.94	4009.96	3142.46	2124.48
ACT190S	S06	3248.68	2274.96	4089.62	3115.9													2744.12	1770.4
	S07	2956.57	1823.51	3797.51	2664.45	4629.6	3496.54											3195.57	2062.52
	S08	2655.6	1363.21	3496.54	2204.15	4328.63	3036.24	6010.51	4718.12	6842.6	5550.2							3655.88	2363.48
	S09					4036.51	2584.78	5718.39	4266.66	6550.48	5098.75	7382.57	5930.84					4107.33	2655.6
	S10					3735.54	2124.48	5417.42	3806.36	6249.51	4638.45	7081.6	5470.54	7966.8	7152.42	10427.66	8816.59	4567.63	2956.57
	S11							5125.31	3354.91	5957.4	4187	6789.48	5019.08	8471.36	6700.96	10135.54	8365.14	5019.08	3248.68
	S12							4833.19	2894.6	5665.28	3726.69	6497.37	4558.78	8179.25	6240.66	9843.42	7904.84	5479.39	3540.8
ACT210S	S06	3815.21	2885.75	4859.75	3930.29													3363.76	2434.3
	S07	30167.79	20608.13	39414.03	29854.36	5497.09	4417.15											3921.44	2841.49
	S08	3000.83	1770.4	4045.36	2814.94	5089.9	3859.47	7161.27	5930.84	8214.66	6984.23							4479.11	3248.68
	S09					4682.71	3478.84	6754.08	5373.16	7807.46	6426.55	8843.15	7462.24					5036.79	3655.88
	S10					4284.37	2735.27	6355.74	4806.64	7409.12	5860.02	8444.81	6895.71	10533.88	8984.78	12622.95	11073.85	5603.32	4054.22
	S11							5948.54	4248.96	7001.93	5302.35	8037.62	6338.03	10126.69	8427.1	12215.76	10516.18	6160.99	4461.41
	S12							15541.35	3691.28	6594.74	4744.67	7630.42	5780.36	9719.5	7869.43	11808.57	9958.5	6718.67	4868.6
ACT240S	S06	6160.99	4541.08	7789.76	6169.84	9427.38	7807.46	12684.92	11065	14322.54	12702.62							5258.09	3638.17
	S07	5550.2	3655.88	7178.97	5284.64	8816.59	6922.26	12074.13	10179.8	13711.75	11817.42	15349.37	13455.04					6143.29	4248.96
	S08			6577.04	4417.15	8214.66	6054.77	11472.19	9312.3	13109.81	10949.92	14747.43	12587.54	18004.97	15845.08			7010.78	4850.9
	S09					7603.87	5178.42	10861.4	8435.96	12499.02	10073.58	14136.64	11711.2	17394.18	14968.73			7887.13	5461.68
	S10							10259.47	7559.61	11897.09	9197.23	13534.71	10834.85	16792.24	14092.38	20669.42	18243.97	8763.48	6063.62
	S11							9657.53	6683.26	11472.19	8320.88	12932.77	9958.5	16190.31	13216.04	20067.48	17367.62	9639.83	6665.56
	S12									10684.36	7444.53	12321.98	9082.15	15579.52	12339.69	19465.55	16491.28	10516.18	7276.34

SINGLE ACTING - OUTPUT TORQUE (lb*in)



Air Pressure		40psi		50psi		60psi		70psi		80psi		90psi		100psi		120psi		Spring Stroke	
Model	Spring	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
	QTY	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER
ACT270S	S06	8913.96	6878	11242.04	9206.08													7072.75	5036.79
	S07	8081.88	5700.69	10409.95	8028.76	12729.18	10347.99											8250.06	5868.88
	S08	7240.94	4514.52	9569.01	6842.6	11888.24	9161.82	16535.54	13809.12	18863.61	16137.2							9436.23	6709.82
	S09			8728.07	5665.28	11047.3	7984.5	15694.6	12631.8	18022.67	14959.88	20350.75	17287.96					110613.55	7550.76
	S10					10206.36	6807.19	14853.66	11454.49	17181.73	13782.56	19509.81	16110.64	24165.96	20766.79	28804.41	25405.24	11790.86	8391.7
	S11							14021.57	10277.17	16349.64	12605.25	18677.72	14933.32	23333.87	19589.48	27972.32	24227.92	12968.18	9223.78
	S12							13180.63	9099.86	15508.7	11427.93	17836.78	13756.01	22492.93	18412.16	27131.38	23050.61	14145.5	10064.72
ACT300S	S06	11852.83	8542.18	15039.55	11728.9													10595.84	7285.2
	S07	10631.25	6780.63	13817.97	9967.35	15234.29	13154.07											12357.39	8506.77
	S08			12605.25	8205.8	15791.97	11392.52	22165.41	17765.96									14118.94	9719.5
	S09					14579.24	9630.98	20952.68	16004.42	24148.26	19199.99	27343.83	22395.56					15880.49	10932.22
	S10					13366.52	7851.72	19739.96	14225.16	22935.53	17420.74	26131.1	20616.31	32504.54	26989.75	38886.84	33372.04	17659.74	12144.94
	S11							18500.68	12463.62	21713.96	15659.19	24909.53	18854.76	31282.97	25228.2	37665.26	31610.49	19421.29	13366.52
	S12							17305.66	10702.07	20501.23	13897.64	23696.8	17093.21	30070.24	23466.65	36452.54	29848.94	21182.84	14579.24
ACT350S	S06	16942.73	11658.08	21713.96	16429.31													16995.84	11711.2
	S07	14995.29	8825.44	19766.52	13596.67	24546.6	18376.75											19828.48	13658.64
	S08	13039	5992.8	17810.22	10764.03	22590.3	15544.11	32132.76	25086.57									22661.12	15614.93
	S09					20634.01	12711.47	30176.47	22253.93	34956.55	27034.01	39736.63	31814.09					25493.76	17571.22
	S10					18686.57	9878.83	28229.03	19421.29	33009.11	24201.37	37789.19	28981.45	47331.64	38523.9	56891.8	48084.06	28326.4	19518.66
	S11							26272.74	16588.65	31052.82	21368.73	35832.9	26148.81	45375.35	35691.26	54935.51	45251.42	31159.04	21474.95
	S12							24316.44	13747.16	29096.52	18527.24	33876.6	23307.32	43419.06	32849.77	52979.22	42409.93	34000.53	23431.24
ACT400S	S08	23351.58	13437.34	30149.91	20235.67													27388.09	17473.85
	S09	21173.98	10011.61	27972.32	16809.95	34779.51	23617.14											30813.81	19651.44
	S10	18987.54	6585.89	25785.88	13384.22	32593.06	20191.41	46198.59	33796.94									34239.54	21837.88
	S11					30406.62	16774.54	44012.14	30380.06	50819.33	37187.25	57626.52	43994.44					37656.41	24024.33
	S12					28229.03	13339.96	41834.55	26945.49	48641.74	33752.68	55448.93	40559.86	69045.6	54156.54	82659.98	67770.91	41090.98	26201.92
	S13							39648.11	23528.62	46455.3	30335.8	53262.48	37142.99	66859.16	50739.66	80473.53	64354.04	44507.86	28388.36
	S14							37452.81	20102.89	44268.85	26910.08	51076.04	33717.27	64672.71	47313.94	78287.09	60928.32	47933.58	30574.81
	S15							35284.07	16677.17	42091.26	23484.36	48898.45	30291.54	62495.12	43888.22	76109.5	57502.59	51359.3	32752.4
	S16									39904.82	20058.63	46712	26865.82	60308.68	40462.49	73923.05	54076.87	54785.03	34938.84

DOUBLE ACTING - OUTPUT TORQUE (NM)

DOUBLE ACTING - OUTPUT TORQUE (NM)										
AIR PRESSURE	2.5bar	3bar	3.5bar	4bar	4.5bar	5bar	5.5bar	6bar	7bar	8bar
ACT042D	4.7	5.7	6.6	7.6	8.5	9.4	10.4	11.4	13.2	15.2
ACT050D	7.3	8.9	10.3	11.8	13.3	14.7	16.2	17.7	20.7	23.6
ACT063D	13	15.6	18.2	20.9	23.5	26	28.6	31.3	36.5	41.7
ACT075D	25.9	31	36.2	41.4	46.6	51.8	57	62.1	72.4	82.8
ACT090D	40.7	48.9	57	65.1	73.3	81.4	89.9	97.9	113.9	130
ACT100D	59.2	71	82.8	94.3	106.8	118.4	130	142.4	165.5	189.6
ACT115D	95.2	115	133.5	153	172	191	210	230	268	306
ACT125D	148	123	172.6	197.6	221.6	246.5	271.5	295.5	345.3	394.3
ACT145D	193	232	270	310	348	387	425	464	542	619
ACT160D	253	302	353	404	454	504	555	606	706	808
ACT190D	473	567	662	756	851	946	1040	1134	1324	1512
ACT210D	588	706	824	942	1059	1176	1295	1412	1648	1884
ACT240D	922	1107	1291	1476	1660	1844	2029	2214	2582	2952
ACT270D	1313	1576	1839	2101	2364	2626	2889	3152	3678	4202
ACT300D	1801	2162	2522	2882	3243	3602	3963	4324	5044	5765
ACT350D	2856	3427	3998	4570	5141	5712	6283	6854	7997	9139
ACT400D	3843	4612	5380	6149	6918	7686	8455	9224	10760	12298

SINGLE ACTING - OUTPUT TORQUE (NM)

AIR PRESSURE		2.5bar		3bar		3.5bar		4bar		4.5bar		5bar		5.5bar		6bar		7bar		8bar		SPRING TORQUE	
MODEL	SPRING	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
	QTY	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER
ACT042S	S05	2.5	0.8	3.5	1.8	4.4	2.7	5.4	3.7	6.3	4.6	7.2	5.5									3.9	2.2
	S06	2.0	0.1	3.0	1.1	3.9	2.0	4.9	3.0	5.8	3.9	6.7	4.8	7.7	5.8							4.6	2.7
	S07			2.5	0.4	3.4	1.3	4.4	2.3	5.3	3.2	6.2	4.1	7.2	5.1	8.2	6.1					5.3	3.2
	S08					2.9	0.6	3.9	1.6	4.8	2.5	5.7	3.4	6.7	4.4	7.7	5.4	9.5	7.2			6.0	3.7
	S09							3.4	0.9	4.3	1.8	5.2	2.7	6.2	3.7	7.2	4.7	9.0	6.5	11.0	8.5	6.7	4.2
	S10									3.8	1.1	4.7	2.0	5.7	3.0	6.7	4.0	8.5	5.8	10.5	7.8	7.4	4.7
	S11											4.2	1.3	5.2	2.3	6.2	3.3	8.0	5.1	10.0	7.1	8.1	5.2
	S12													4.7	1.6	5.7	2.6	7.5	4.4	9.5	6.4	8.8	5.7
ACT050S	S05	4.3	3.0	5.9	4.6	7.3	6.0	8.8	7.5	10.3	9.0	11.7	10.4									4.3	3.0
	S06	3.8	2.2	5.4	3.8	6.8	5.2	8.3	6.7	9.8	8.2	11.2	9.6	12.7	11.1							5.1	3.5
	S07			4.8	2.9	6.2	4.3	7.7	5.8	9.2	7.3	10.6	8.7	12.1	10.2	13.6	11.7					6.0	4.1
	S08					5.5	3.4	7.0	4.9	8.5	6.4	9.9	7.8	11.4	9.3	12.9	10.8	15.9	13.8			6.9	4.8
	S09							6.4	4.0	7.9	5.5	9.3	6.9	10.8	8.4	12.3	9.9	15.3	12.9	18.2	15.8	7.8	5.4
	S10									7.4	4.7	8.8	6.1	10.3	7.6	11.8	9.1	14.8	12.1	17.7	15.0	8.6	5.9
	S11											8.2	5.2	9.7	6.7	11.2	8.2	14.2	11.2	17.1	14.1	9.5	6.5
	S12													9.0	5.8	10.5	7.3	13.5	10.3	16.4	13.2	10.4	7.2

SINGLE ACTING - OUTPUT TORQUE (NM)



AIR PRESSURE		2.5bar		3bar		3.5bar		4bar		4.5bar		5bar		5.5bar		6bar		7bar		8bar		SPRING TORQUE	
MODEL	SPRING	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
	QTY	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER
ACT063S	S05	8.1	5.5	10.7	8.1	13.3	10.7	16.0	13.4	18.6	16.0	21.1	18.5									7.5	4.9
	S06	7.1	4.0	9.7	6.6	12.3	9.2	15.0	11.9	17.6	14.5	20.1	17.0	22.7	19.6							9.0	5.9
	S07			8.7	5.1	11.3	7.7	14.0	10.4	16.6	13.0	19.1	15.5	21.7	18.1	24.4	20.8					10.5	6.9
	S08					10.3	6.2	13.0	8.9	15.6	11.5	18.1	14.0	20.7	16.6	23.4	19.3	28.6	24.5			12.0	7.9
	S09							12.0	7.4	14.6	10.0	17.1	12.5	19.7	15.1	22.4	17.8	27.6	23.0	32.8	28.2	13.5	8.9
	S10									13.6	8.5	16.1	11.0	18.7	13.6	21.4	16.3	26.6	21.5	31.8	26.7	15.0	9.9
	S11											15.2	9.2	17.8	11.8	20.5	14.5	25.7	19.7	30.9	24.9	16.8	10.8
	S12													16.8	10.7	19.5	13.4	24.7	18.6	29.9	23.8	17.9	11.8
ACT075S	S05	16.0	10.5	21.1	15.6	26.3	20.8	31.5	26.0	36.7	31.2	41.9	36.4									15.4	9.9
	S06	14.1	7.4	19.2	12.5	24.4	17.7	29.6	22.9	34.8	28.1	40.0	33.3	45.2	38.5							18.5	11.8
	S07			17.2	9.5	22.4	14.7	27.6	19.9	32.8	25.1	38.0	30.3	43.2	35.5	48.3	40.6					21.5	13.8
	S08					20.5	11.6	25.7	16.8	30.9	22.0	36.1	27.2	41.3	32.4	46.4	37.5	56.7	47.8			24.6	15.7
	S09							23.7	13.7	28.9	18.9	34.1	24.1	39.3	29.3	44.4	34.4	54.7	44.7	65.1	55.1	27.7	17.7
	S10									26.9	15.8	32.1	21.0	37.3	26.2	42.4	31.3	52.7	41.6	63.1	52.0	30.8	19.7
	S11											30.2	17.9	35.4	23.1	40.5	28.2	50.8	38.5	61.2	48.9	33.9	21.6
	S12													33.4	20.1	38.5	25.2	48.8	35.5	59.2	45.9	36.9	23.6
ACT090S	S05	24.4	15.0	32.6	23.2	40.7	31.3	48.8	39.4	57.0	47.6	65.1	55.7									25.7	16.3
	S06	21.1	9.8	29.3	18.0	37.4	26.1	45.5	34.2	53.7	42.4	61.8	50.5	70.3	59.0							30.9	19.6
	S07			26.0	17.9	34.1	21.0	42.2	29.1	50.4	37.3	58.5	45.4	67.0	53.9	75.0	61.9					36.0	22.9
	S08					31.0	15.9	39.1	24.0	47.3	32.2	55.4	40.3	63.9	48.8	71.9	56.8	87.9	72.8			41.1	26.0
	S09							35.7	18.8	43.9	27.0	52.0	35.1	60.5	43.6	68.5	51.6	84.5	67.6	100.6	83.7	46.3	29.4
	S10									40.6	21.8	48.7	29.9	57.2	38.4	65.2	46.4	81.2	62.4	97.3	78.5	51.5	32.7
	S11											45.5	24.9	54.0	33.4	62.0	41.4	78.0	57.4	94.1	73.5	56.5	35.9
	S12													50.8	28.2	58.8	36.2	74.8	52.2	90.9	68.3	61.7	39.1
ACT100S	S05	36.7	24.2	48.5	36.0	60.3	47.8	71.8	59.3	84.3	71.8	95.9	83.4									35.0	22.5
	S06	32.2	17.1	44.0	28.9	55.8	40.7	67.3	52.2	79.8	64.7	91.4	76.3	103.0	87.9							42.1	27.0
	S07			39.4	22.0	51.2	33.8	62.7	45.3	75.2	57.8	86.8	69.4	98.4	81.0	110.8	93.4					49.0	31.6
	S08					46.8	26.8	58.3	38.3	70.8	50.8	82.4	62.4	94.0	74.0	106.4	86.4	129.5	109.5			56.0	36.0
	S09							53.7	31.2	66.2	43.7	77.8	55.3	89.4	66.9	101.8	79.3	124.9	102.4	149.0	126.5	63.1	406.0
	S10									617.0	36.7	73.3	48.3	84.9	59.9	97.3	72.3	120.4	95.4	144.5	119.5	70.1	45.1
	S11											68.8	41.3	80.4	52.9	92.8	65.3	115.9	88.4	140.0	112.5	77.1	49.6
	S12													75.9	45.9	88.3	58.3	111.4	81.4	135.5	105.5	84.1	54.1
ACT115S	S05	58.7	36.9	78.5	56.7	97.0	75.2	116.5	94.7	135.5	113.7	154.5	132.7									58.3	36.5
	S06	51.4	25.2	71.2	45.0	89.7	63.5	109.2	83.0	128.2	102.0	147.2	121.0	166.2	140.0							70.0	43.8
	S07			63.9	33.4	82.4	51.9	101.9	71.4	120.9	90.4	139.9	109.4	158.9	128.4	178.9	148.4					81.6	51.1
	S08					75.1	40.0	94.6	59.5	113.6	78.5	132.6	97.5	151.6	116.5	171.6	136.5	209.6	174.5			93.5	58.4
	S09							87.3	48.0	99.0	67.0	125.3	86.0	144.3	105.0	164.3	125.0	202.3	163.0	240.3	201.0	105.0	65.7
	S10										55.4	118.0	74.4	137.0	93.4	157.0	113.4	195.0	151.4	233.0	189.4	116.6	73.0
	S11											110.7	63.0	129.7	82.0	149.7	102.0	187.7	140.0	225.7	178.0	128.0	80.3
	S12													122.3	70.3	142.3	90.3	180.3	128.3	218.3	166.3	139.7	87.7

SINGLE ACTING - OUTPUT TORQUE (NM)



AIR PRESSURE		2.5bar		3bar		3.5bar		4bar		4.5bar		5bar		5.5bar		6bar		7bar		8bar		SPRING TORQUE	
MODEL	SPRING	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
	QTY	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER
ACT125S	S05	76.3	50.0	101.3	75.0	125.9	99.6	150.9	124.6	174.9	148.6	199.8	173.5									73.0	46.7
	S06	67.0	35.0	92.0	60.0	116.6	84.6	141.6	109.6	165.6	133.6	190.5	158.5	215.5	183.5							88.0	56.0
	S07			82.6	45.7	107.2	70.3	132.2	95.3	156.2	119.3	181.1	144.2	206.1	169.2	230.1	193.2					102.3	65.4
	S08					97.8	55.1	122.8	80.1	146.8	104.1	171.7	129.0	196.7	154.0	220.7	178.0	270.5	277.8			117.5	74.8
	S09							113.6	65.9	137.6	89.9	162.5	114.8	187.5	139.8	211.5	163.8	261.3	213.6	310.3	262.6	131.7	84.0
	S10									128.1	74.6	153.0	99.5	178.0	124.5	202.0	148.5	251.8	198.3	300.8	247.3	147.0	93.5
	S11											143.5	85.5	168.5	110.5	192.5	134.5	242.3	184.3	291.3	233.3	161.0	103.0
	S12													159.5	95.5	183.5	119.5	233.3	169.3	282.3	218.3	176.0	112.0
ACT145S	S05	120	78	159	117	197	155	237	195	275	233	314	272									115	73
	S06	105	55	144	94	182	132	222	172	260	210	299	249	337	287							138	88
	S07			130	72	168	110	208	150	246	188	285	227	323	265	362	304					160	102
	S08					153	87	193	127	231	165	270	204	308	242	347	281	425	359			183	117
	S09							178	104	216	142	255	181	293	219	332	258	410	336	487	413	206	132
	S10									201	118	240	157	278	195	317	234	395	312	472	389	230	147
	S11											226	135	264	173	303	212	381	290	458	367	252	161
	S12													249	150	288	189	366	267	443	344	275	176
ACT160S	S05	153	105	202	154	253	205	304	256	354	306	404	356									148	100
	S06	133	76	182	125	233	176	284	227	334	257	384	307	435	358							177	120
	S07			162	95	213	146	264	297	314	247	364	297	415	348	466	399					207	140
	S08					193	116	244	267	294	217	344	267	395	318	446	369	546	469			237	160
	S09							224	138	274	188	324	238	375	289	426	340	526	440	628	542	266	180
	S10									254	159	304	209	355	260	406	311	506	411	608	513	295	200
	S11											284	179	335	230	386	281	486	381	588	483	325	220
	S12													315	200	366	251	466	351	568	453	355	240
ACT190S	S05	306	215																			258	167
	S06	273	163	367	257	462	352															310	200
	S07	240	112	334	206	429	301	523	395	618	490											361	233
	S08			300	154	395	249	489	343	584	438	679	533	773	627							413	267
	S09							456	292	551	387	646	482	740	576	834	670					464	300
	S10							422	240	517	335	612	430	706	524	800	618	990	808	1178	996	516	334
	S11											579	379	673	473	767	567	957	757	1145	945	567	367
	S12											546	327	640	421	734	515	924	705	1112	893	619	400
ACT210S	S05	359	271																			317	229
	S06	313	208	431	326	549	444															380	275
	S07	267	145	385	263	503	381	621	499	738	616											443	321
	S08			339	200	457	318	575	436	692	553	809	670	928	789							506	367
	S09							529	393	646	490	763	607	882	726	999	843					569	413
	S10							484	309	601	426	718	543	837	662	954	779	1190	1015	1426	1251	633	458
	S11											672	480	791	599	908	716	1144	952	1380	118	8696	504
	S12											626	417	745	536	862	653	1098	889	1334	112	5759	550

SINGLE ACTING - OUTPUT TORQUE (NM)

AIR PRESSURE		2.5bar		3bar		3.5bar		4bar		4.5bar		5bar		5.5bar		6bar		7bar		8bar		SPRING TORQUE	
MODEL	SPRING	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
	QTY	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER	START	OVER
ACT240S	S05	580	427	765	612	949	796	1134	981	1318	165	1502	1349									495	342
	S06	511	328	696	513	880	697	1065	882	1249	1066	1433	1250	1618	1435							594	411
	S07			627	413	811	597	996	782	1180	966	1364	1150	1549	1335	1734	1520					694	480
	S08					743	499	928	684	1112	868	1296	1052	1481	1237	1666	1422	2034	1790			792	548
	S09							859	585	1043	769	1227	953	1412	1138	1597	1323	1965	1691			891	617
	S10									975	670	1159	854	1344	1039	1529	1224	1897	1592	2335	2061	990	685
	S11											1091	755	1296	940	1461	1125	1829	1493	2267	1962	1089	753
	S12													1207	841	1392	1026	1760	1394	2199	1863	1188	822
ACT270S	S05	879	640																			745	530
	S06	781	475	1054	768	1353	1059															894	636
	S07	644	309	937	602	1236	983	1525	1190	1823	1480											1043	742
	S08			819	437	1119	727	1407	1025	1706	1314	1612	2293	2293	1901							1192	848
	S09					1002	561	1289	859	1589	1148	1446	2176	2176	1735	2463	2033					1341	954
	S10							1171	694	1472	982	1281	2069	2069	1569	2345	1868	2932	2455	3519	3042	1490	1060
	S11									1355	816	1115	1942	1942	1403	2227	1702	3814	2289	3401	2876	1639	1166
	S12											950	1825	1825	1237	2110	1537	1697	2124	3284	2711	1788	1272
ACT300S	S05	1115	804	1476	1165																	997	686
	S06	978	604	1339	965	1699	1325															1197	823
	S07	840	405	1201	766	1561	1126	1721	1486													1396	961
	S08					1424	927	1784	1287	2145	1648	2504	2007									1595	1098
	S09							1647	1088	2008	1449	2367	1808	2728	2169	3089	2530					1794	1235
	S10							1510	887	1871	1248	2230	1607	2591	1968	2952	2329	3672	3049	4393	3770	1995	1372
	S11									1733	1049	2090	1408	2453	1769	2814	2130	3534	2850	4255	3571	2194	1510
	S12											1955	1209	2316	1570	2677	1931	3397	2651	4118	3372	2393	1647
ACT350S	S05	1553	964																			1445	987
	S06	1292	586	1863	1157	2432	1738															1735	1196
	S07	1031	208	1602	779	2171	1630	2745	1922													2315	1395
	S08			1341	401	1910	980	2484	1544	3053	2117	3626	2686									2025	1595
	S09							2224	1165	2792	1739	3366	2307	3934	2881	4508	3449					2604	1795
	S10							1963	787	2531	1361	3105	1929	3673	2503	4247	3071	5390	4212	6532	5356	2894	1994
	S11									2270	983	2844	1551	3412	2125	3986	2693	5129	3836	6271	4978	3183	2193
	S12											2584	1172	3151	1747	3726	2314	4869	3457	6011	4599	3473	2393
ACT400S	S07	2117	1136																			2707	1726
	S08	1869	749	2639	1518	3406	2286															3094	1974
	S09			2392	1131	3160	1899	3929	2668													3481	2220
	S10			2145	744	2913	1512	3682	2281	4451	3050	5219	3818									1386	82467
	S11							3435	1895	4204	2664	4972	3432	5741	4201	6510	4970					4254	2714
	S12									3958	2276	4726	3044	5495	3813	6264	4582	7800	6118	9338	7656	4642	2960
	S13											4479	2658	5248	3427	6017	4196	7553	5732	9091	7270	5028	3207

	S14												4232	2271	5001	3040	5770	3809	7306	5345	8844	6883	5415	3454
	S15												3986	1884	4755	2653	5524	3422	7060	4958	8598	4690	5802	3700
	S16														4508	2266	5277	3035	6813	4571	8351	6109	6189	3947

