

SPRING OPPOSED PISTON ACTUATOR



KOSO KENT INTROL SUPPLIES A DIVERSE RANGE OF PRECISION -MANUFACTURED CONTROL, CHOKE, AND ROTARY VALVES FOR OIL AND GAS, PETROCHEMICAL AND POWER INDUSTRIES – WORLDWIDE



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'S' SERIES

GENERAL

The 'S' Series Spring Opposed Piston Actuator has been developed to complement KOSO Kent Introl's highly successful 'C' & 'D' Series of Double acting and spring opposed Actuators.

The 'S' series offers a compact, modular design that utilises lightweight corrosive composite materials to reduce weight and improve responsiveness and latency on movement or positioning. The unit is designed for a maximum working pressure of 10 Barg.

The 'S' Series features nested spring options to offer a wide selection of spring ranges. The modular design allows the addition of many optional units such as De-clutchable side mounted handwheel units and Maximum and minimum limit stop units.

The modular robust design also allows for retrofitting of many of the optional extras without modification of the basic unit. The 'S' series range offers the following advantages over the conventional piston type:-

- Simple cost effective design.
- Increased life and reliability.
- Composite GRP cylinder ensuring accurate bores and smooth operation.
- Full Stainless steel construction available.
- Robust, Simple, Low cost, simple maintenance.
- High Thrust capability when using maximum air supply of 10 Barg (145 psig).

PERFORMANCE

- Reliability.
- High Power.
- Full response.
- Low Hysteresis.
- Modulating or On/Off Duty.

DESIGN FLEXIBILITY

- Reversible fail action without extra parts.
- Split Coupling for easy attachment to valve plug stem.
- Wide selection of optional accessories available, many without modification of standard unit.
- Variable stroke 0.5" up to 12" as standard.

DESIGN INTEGRITY

- Robust steel and GRP construction.
- Low stressed alloy steel springs.
- Twin seal box with wiper system.
- Operating temperatures, -45 to +85 Deg°C.

QUALITY MANUFACTURING

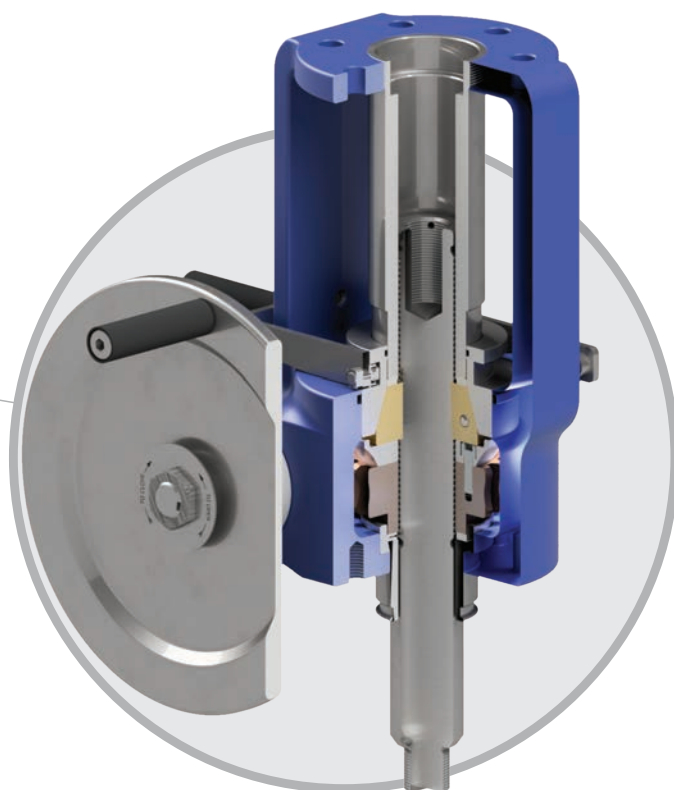
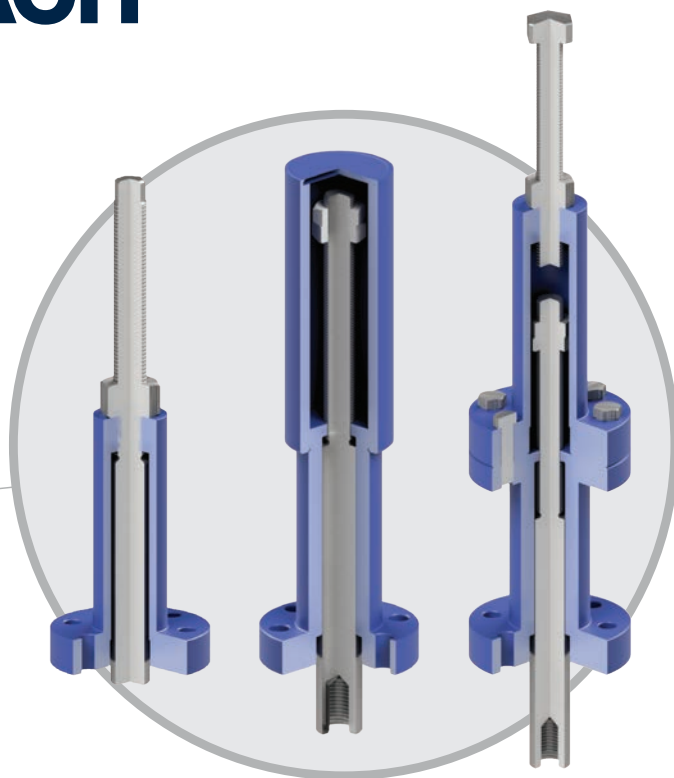
- High quality material with traceability throughout manufacture.
- Quality Assurance systems in accordance with BS/EN ISO 9001.
- Comprehensively tested to ensure specified performance on site.



MODULAR DESIGN APPROACH

STANDARD ACTUATOR WITH BOLT-ON FEATURES SUCH AS:

- De-clutchable handwheel.
- Minimum limit stop.
- Maximum limit stop.
- Minimum and maximum limit stop.



De-clutchable handwheel unit

ACTUATOR CODING

1	2	3	-	4	5	6	7	8	-	9
S	R	5	-	A	S	1	C	3	-	0

Above example equates to – Piston, Reverse Fail Action (Close), Size 50, 10-20 psi Spring, Side Mounted Handwheel, Offshore Materials, 2 ¼” travel to suit 3 9/16” Bonnet Mount, No Additional Features.

1	2	3	4	5	6	7	8	9
TYPE	FAIL ACTION	SIZE	SPRING	ADDITIONAL	MATERIAL	TRAVEL	BONNET	ADDITIONAL
S Piston	N DBL/Acting	4 25	0 None*	0 None	0 STD	0 None	1 2.1/8”	0 No Further Option
T Low Temp Piston	R Reverse	5 50	A 10-20	S Side	1 Offshore	A 1.1/8” (28.5)	2 2.13/16”	A ST.ST. Yoke
	D Direct	6 100	B 20-40	L SMH Lock	2 316 STST	B 1.1/2” (38)	3 3.9/16”	B ST.ST. Yoke + High Flow
	L Low Volume	7 200	C 30-60	1 Min		C 2.1/4” (57)	4 5.3/4”	C ST.ST. Yoke + Titanium Bonnet
		8 300	Z SPL	2 Max		D 3.1/2” (89)	A 2.1/4”	D ST.ST. Yoke + ST.ST. Shroud
				3 Min & Max		E 4” (102)	B 2.3/8”	H High Flow
				A SMH + Min		F 5” (127)	C 3”	T Titanium Bonnet
				B SMH + Max		G 6” (152)	D 4”	S ST.ST. Shroud
				C SMH + Min + Max		H 7” (178)	E 4.3/8”	
				D SMH Lock + Min		J 8” (203)	G F16	
				E SMH Lock + Max		K 9” (229)	H F12	
				F SMH Lock + Min & Max		L 10” (254)	J F10	
						M 12” (305)	K F14	
						N 3/4” (19)	L F20	
						P 1/2” (13)		
						R 2” (51)		
						S 5mm		
						T 3” (76)		
						Z Special		

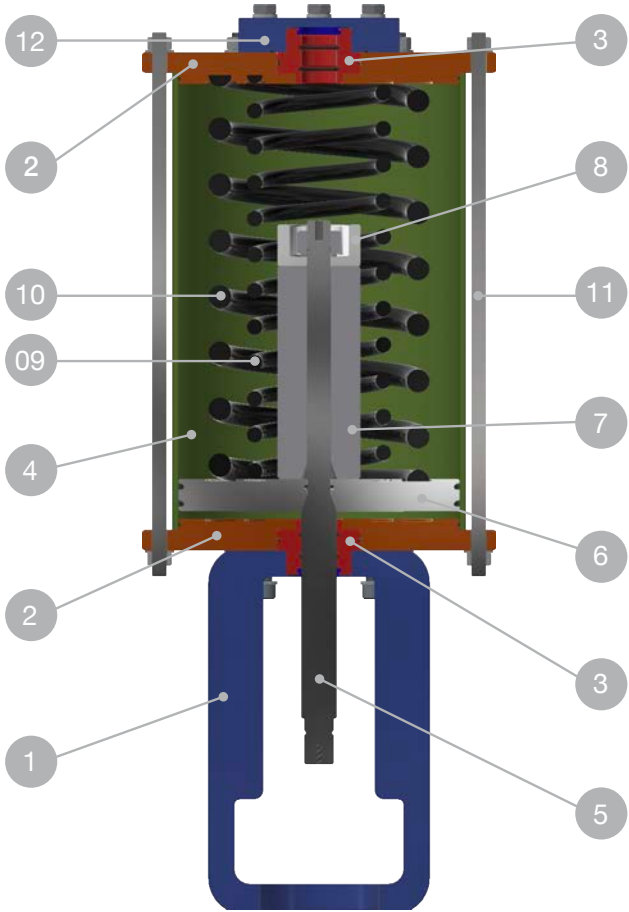
*Yoke Material STD - LCC

MATERIALS OF CONSTRUCTION

SOFT SEALS***

Item	Standard Material
O-Ring	Nitrile
Wiper	Polyurethane

***Other material options considered subject to application



ITEM	QTY	ITEM	STANDARD MATERIAL	OFFSHORE	STAINLESS STEEL OPTIONS
1	1	Yoke	Carbon Steel	Carbon Steel	316 Stainless Steel
2	2	Top/Bottom Plate	Carbon Steel	Carbon Steel	316 Stainless Steel
3	2	Seal Bush	Nylon	Nylon	Nylon
4	1	Cylinder	GRP	GRP	GRP C/W 316 Stainless Steel Shroud
5	1	Stem	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel
6	1	Piston*	Aluminium	Carbon Steel	316 Stainless Steel
7	1	Spring Spacer*	Aluminium	Carbon Steel	316 Stainless Steel
8	1	Travel Stop*	Aluminium	Carbon Steel	316 Stainless Steel
9	1	Inner Spring**	Spring Steel	Spring Steel	Spring Steel
10	1	Outer Spring**	Spring Steel	Spring Steel	Spring Steel
11	6	Tie Rods	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel
12	1	Top cap	Carbon Steel	Carbon Steel	316 Stainless Steel

*Other Material Options Considered Subject To Application

**Subject to actuator requirement

OVERALL DIMENSIONS

S-RANGE ACTUATOR ENVOLOP DIMENSIONS*					
Actuator size	Travel	'A'	'B'	'C'	'D'
050	0-3"	595	265	110	115
050	3-6"	715	265	145	150
100	0-3"	745	385	145	150
100	3-6"	975	385	145	150
100	6-12"	1390	385	145	150
200	0-3"	765	500	145	150
200	3-6"	1000	500	145	150
200	6-12"	1415	500	145	150

“The Company’s policy is one of continual development and the right is reserved to modify the specifications contained herein without notice.”



SPRING + AIR OUTPUT FORCES

TRAVEL (INCHES)		S050 SPRING LOADS							
		REVERSE ACTING				DIRECT ACTING			
		LOWER (CLOSE)		UPPER (OPEN)		LOWER (OPEN)		UPPER (CLOSE)	
		LBF	PSI	LBF	PSI	LBF	PSI	LBF	PSI
0.5-3	Light	435	8.7	1398	27.8	606	12.1	1087	21.6
	Standard	871	17.3	1833	36.5	1212	24.1	2174	43.3
	Heavy	1307	26.0	2750	54.7	1818	36.2	3261	64.9
3-6	Light	440	9	878	17	506	10	954	19
	Standard	839	17	1712	34	973	19	1852	37
	Heavy	1279	25	2590	52	1479	29	2801	56

TRAVEL (INCHES)		S100 SPRING LOADS							
		REVERSE ACTING				DIRECT ACTING			
		LOWER (CLOSE)		UPPER (OPEN)		LOWER (OPEN)		UPPER (CLOSE)	
		LBF	PSI	LBF	PSI	LBF	PSI	LBF	PSI
0.5-3	Light	815	7	1696	15	1310	12	2305	20
	Standard	1623	14	3211	28	2522	22	4280	38
	Heavy	2438	22	4907	43	3832	34	6585	58
3-6	Light	855	8	1699	15	1071	9	1950	17
	Standard	1791	16	3457	31	2230	20	3936	35
	Heavy	2646	23	5155	46	3301	29	5886	52
6-12	Light	750	7	1514	13	874	8	1607	14
	Standard	1718	15	3527	31	1976	17	3800	34
	Heavy	2468	22	5044	45	2858	25	5414	48

TRAVEL (INCHES)		S200 SPRING LOADS							
		REVERSE ACTING				DIRECT ACTING			
		LOWER (CLOSE)		UPPER (OPEN)		LOWER (OPEN)		UPPER (CLOSE)	
		LBF	PSI	LBF	PSI	LBF	PSI	LBF	PSI
0.5-3	Light	1742	8.7	3667	18.2	2803	13.9	4727	23.5
	Standard	3485	17.3	7333	36.5	5606	27.9	9455	47.0
	Heavy	5227	26.0	11000	54.7	8409	41.8	14182	70.5
3-6	Light	1903	9	3607	18	2356	12	4095	20
	Standard	3269	16	6943	35	4218	21	8027	40
	Heavy	5173	26	10550	52	6574	33	12122	60
6-12	Light	1799	9	3723	19	2064	10	3989	20
	Standard	3598	18	7447	37	4129	21	7977	40
	Heavy	5398	27	11170	56	6193	31	11966	60

ACTUATOR OUTPUT FORCE NO INTERNAL SPRINGS

		ACTUATOR SIZE		
		50	100	200
PRESSURE (PSI)	10	503	1131	2011
	20	1005	2262	4021
	30	1508	3393	6032
	40	2011	4524	8042
	60	3016	6786	12064
	80	4021	9048	16085
	100	5027	11310	20106

ACTUATOR VOLUMES

TRAVEL (INCHES)		S050 DEAD VOLUME								DISPLACED VOLUME	
		REVERSE ACTING				DIRECT ACTING					
		BELOW		ABOVE		BELOW		ABOVE			
		CM³	IN³	CM³	IN³	CM³	IN³	CM³	IN³	CM³	IN³
≤ 3	0.5	263	16.0	6924	422.5	4219	257.5	2967	181.1	412	25.1
	0.75	263	16.0	6718	409.9	4219	257.5	2761	168.5	618	37.7
	1.125	263	16.0	6409	391.1	4219	257.5	2452	149.7	927	56.5
	1.5	263	16.0	6100	372.2	4219	257.5	2144	130.8	1236	75.4
	2	263	16.0	5688	347.1	4219	257.5	1732	105.7	1647	100.5
	2.25	263	16.0	5482	334.5	4219	257.5	1526	93.1	1853	113.1
	3	263	16.0	4864	296.8	4219	257.5	908	55.4	2471	150.8
≤ 6	3.5	263	16.0	9680	590.7	6976	425.7	2967	181.1	2883	175.9
	4	263	16.0	9268	565.6	6976	425.7	2555	155.9	3295	201.1
	5	263	16.0	8445	515.3	6976	425.7	1732	105.7	4119	251.3
	6	263	16.0	7621	465.1	6976	425.7	908	55.4	4942	301.6

TRAVEL (INCHES)		S100 DEAD VOLUME								DISPLACED VOLUME	
		REVERSE ACTING				DIRECT ACTING					
		BELOW		ABOVE		BELOW		ABOVE			
		CM³	IN³	CM³	IN³	CM³	IN³	CM³	IN³	CM³	IN³
≤ 3	0.5	591	36.1	18497	1128.7	11171	681.7	7917	483.1	927	56.5
	0.75	591	36.1	18034	1100.5	11171	681.7	7453	454.8	1390	84.8
	1.125	591	36.1	17339	1058.1	11171	681.7	6758	412.4	2085	127.2
	1.5	591	36.1	16644	1015.6	11171	681.7	6063	370.0	2780	169.6
	2	591	36.1	15717	959.1	11171	681.7	5137	313.5	3707	226.2
	2.25	591	36.1	15254	930.8	11171	681.7	4673	285.2	4170	254.5
	3	591	36.1	13864	846.0	11171	681.7	3283	200.4	5560	339.3
≤ 6	3.5	591	36.1	24699	1507.2	17373	1060.2	7917	483.1	6487	395.8
	4	591	36.1	23772	1450.7	17373	1060.2	6990	426.6	7413	452.4
	5	591	36.1	21919	1337.6	17373	1060.2	5137	313.5	9267	565.5
	6	591	36.1	20066	1224.5	17373	1060.2	3283	200.4	11120	678.6
≤ 12	7	591	36.1	37359	2279.8	25399	1550.0	12550	765.9	12981	792.1
	8	591	36.1	35505	2166.7	25399	1550.0	10697	652.8	14834	905.2
	9	591	36.1	33652	2053.6	25399	1550.0	8843	539.7	16687	1018.3
	10	591	36.1	31799	1940.5	25399	1550.0	6990	426.6	18541	1131.4
	12	591	36.1	28092	1714.3	25399	1550.0	3283	200.4	22247	1357.6

TRAVEL (INCHES)		S200 DEAD VOLUME								DISPLACED VOLUME	
		REVERSE ACTING				DIRECT ACTING					
		BELOW		ABOVE		BELOW		ABOVE			
		CM³	IN³	CM³	IN³	CM³	IN³	CM³	IN³	CM³	IN³
≤ 3	0.5	1051	64.1	32364	1975.0	19600	1196.1	13815	843.0	1647	100.5
	0.75	1051	64.1	31541	1924.7	19600	1196.1	12991	792.8	2471	150.8
	1.125	1051	64.1	30305	1849.3	19600	1196.1	11756	717.4	3707	226.2
	1.5	1051	64.1	29070	1773.9	19600	1196.1	10520	642.0	4942	301.6
	2	1051	64.1	27422	1673.4	19600	1196.1	8873	541.4	6590	402.1
	2.25	1051	64.1	26598	1623.1	19600	1196.1	8049	491.2	7413	452.4
	3	1051	64.1	24127	1472.3	19600	1196.1	5578	340.4	9884	603.2
≤ 6	3.5	1051	64.1	43390	2647.8	30626	1868.9	13815	843.0	11532	703.7
	4	1051	64.1	41743	2547.3	30626	1868.9	12167	742.5	13179	804.2
	5	1051	64.1	38448	2346.3	30626	1868.9	8873	541.4	16474	1005.3
	6	1051	64.1	35153	2145.2	30626	1868.9	5578	340.4	19769	1206.4
≤ 12	7	1051	64.1	65896	4021.2	44895	2738.7	22052	1345.7	23077	1408.2
	8	1051	64.1	62601	3820.2	44895	2738.7	18757	1144.6	26371	1609.3
	9	1051	64.1	59307	3619.1	44895	2738.7	15462	943.6	29666	1810.3
	10	1051	64.1	56012	3418.1	44895	2738.7	12167	742.5	32961	2011.4
	12	1051	64.1	49422	3015.9	44895	2738.7	5578	340.4	39551	2413.5

COMPACT INSTRUMENTATION

The 'S' Series size, stroke and thrust combinations offer an improved and simplified solution when compared to a spring opposed diaphragm yoke design which allows for simplification of instrument solutions and flexibility for instrumentation kits.

The 'S' Series uses double-acting positioners which allows air to be fed to both sides of the piston. Double acting – spring return actuator eliminates the complexity associated with closed-loop systems. Smaller actuator volumes and double-acting positioners allow for faster response and precise movement and minimise the need for additional instruments such as volume booster or exhausts valves and associated pressure regulators. No requirement for vent tubes.

Piston design has lower air consumption than comparable diaphragm actuator. All fasteners and actuator stem/s are 316 stainless steel as standard.



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