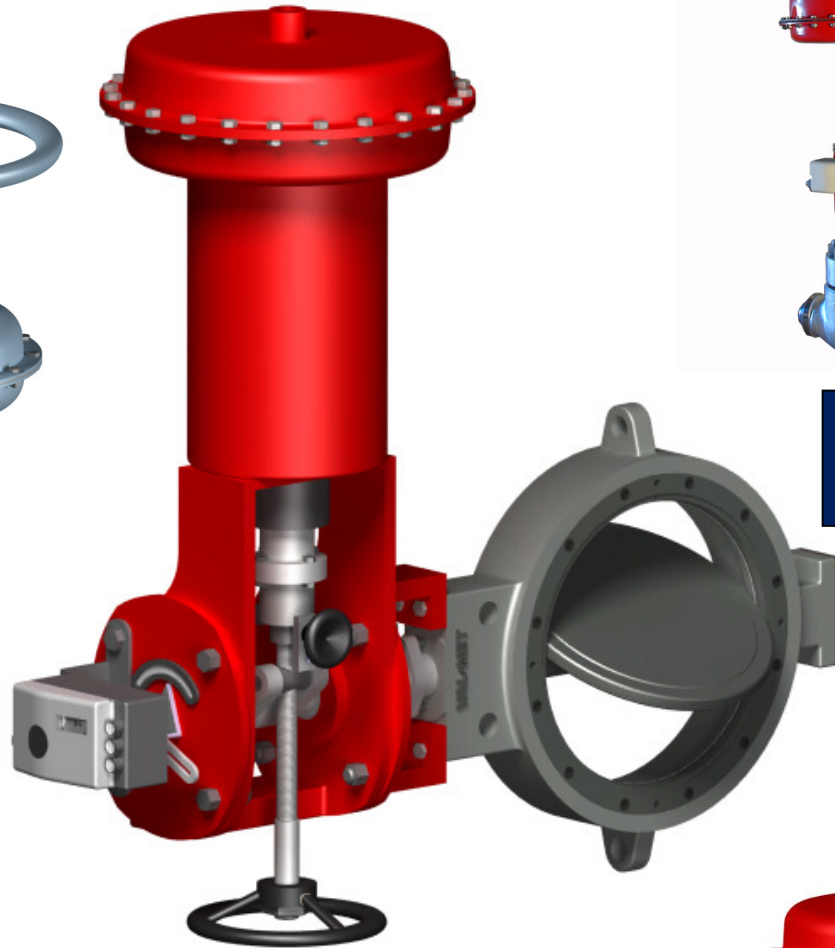
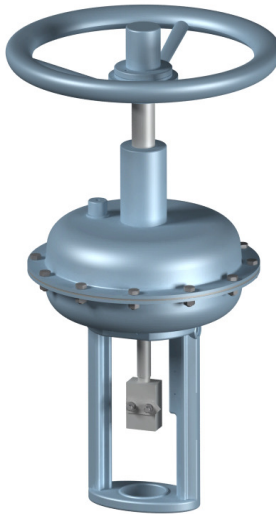
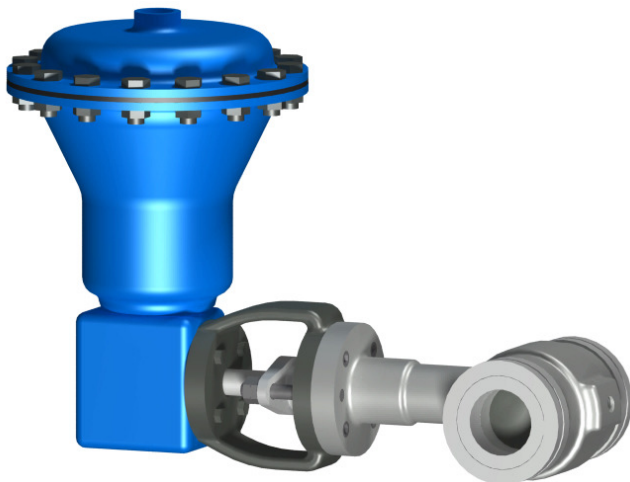


PNEUMATIC DIAPHRAGM ACTUATORS

- ❖ *MULTI SPRING DIAPHRAGM ACTUATOR*
- ❖ *SINGLE SPRING DIAPHRAGM ACTUATOR*
- ❖ *ROTARY DIAPHRAGM ACTUATOR*



*TECHNICAL
BULLETIN*



'M' SERIES MULTI SPRING OPPOSED PNEUMATIC DIAPHRAGM ACTUATOR

Actuator Models: - M-230, M-385, M- 700 & M-1400

'M'-series Multi spring diaphragm actuators are available in 4 sizes, i.e., M-230, M-380, M-700 & M-1400 .If required these actuators can be provided with top mounted handwheel.

These actuators are suitable for regulating and on/off control applications. Full stainless steel version is also optionally available.

General Features:

- Compact yoke mounted Actuator.
- Easy Coupling to valve plug stem.
- Fast response.
- Wide range of travel & spring range.
- Low weight
- Long life.
- Surface protection suitable for corrosive Atmosphere

Actuator Range:

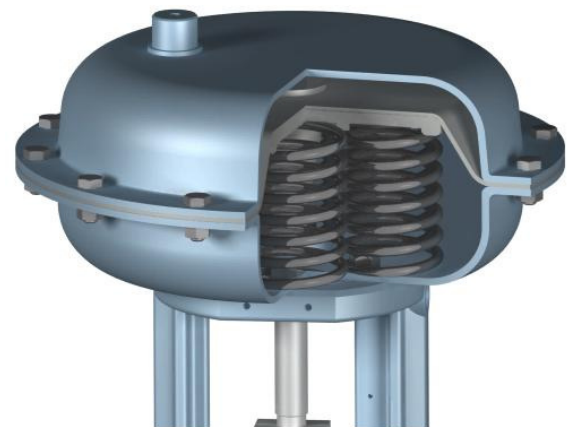
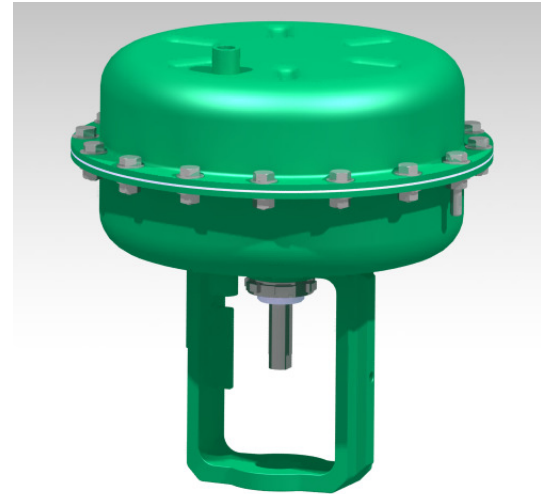
Size: - 230cm², 385cm², 700cm² & 1400cm².

Travel: - 16mm to 60mm

Spring Range: - 0.2-1 bar, 0.4-2 bar & 0.8-2.4 bar etc .

Technical Data:-

Component	Material
Diaphragm housing	Carbon Steel
Yoke	S.G.Iron
Diaphragm	Reinforced Nitrile
Seals	NBR
Springs	Steel (Grade-3)
Bolts/nuts	Stainless Steel



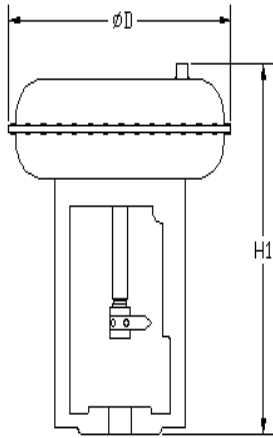
Actuator Power:-

Max.continuous working pressure: 4 bar

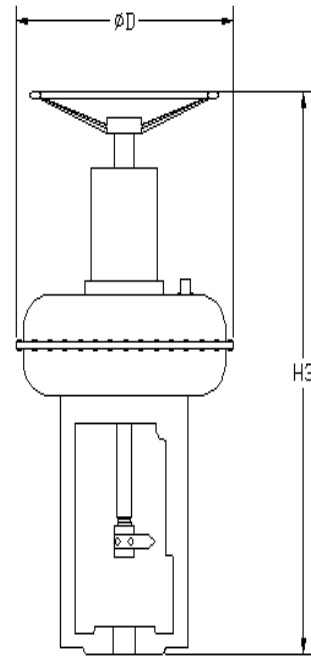
MULTI SPRING PNEUMATIC DIAPHRAGM ACTUATOR

Actuator Size	Spring					Thrust gross kgf (lbf)	Power					
	Travel		Range				Thrust Nett		Spring Extended			
Cm ²	Inch	mm	bar	psi	kpa	kgf	lbf	kgf	lbf			
230	5/8	16	0.2-1.0	3-15	20-100	940	(2070)	704	1549	47	104	
			0.4-2.0	6-30	40-200			469	1032	94	207	
			0.6-3.0	9-44	60-300			235	517	142	313	
			1.4-2.3	21-34	140-230			399	878	330	726	
	3/4	19	0.2-1.0	3-15	20-100			704	1549	47	104	
			0.2-0.6	3-9	20-60			800	1760	47	104	
			0.6-10	9-15	60-100			704	1549	142	313	
	1 1/8	29	0.4-2.0	6-30	40-200			469	1032	94	207	
385	5/8	16	0.2-1.0	3-15	20-100	1571	(3456)	1178	2592	79	174	
			0.4-2.0	6-30	40-200			785	1727	158	348	
			0.6-3.0	9-44	60-300			393	865	236	520	
			1.4-2.3	21-34	140-230			668	1470	550	1210	
	3/4	19	0.2-1.0	3-15	20-100			1178	2592	79	174	
			0.2-0.6	3-9	20-60			1335	2937	79	174	
			0.6-10	9-15	60-100			1178	2592	236	520	
	1 1/8	29	0.4-2.0	6-30	40-200			786	1729	156	348	
	1 1/4	32	0.2-1.0	3-15	20-100			1178	2592	79	174	
			0.4-2.0	6-30	40-200			785	1727	158	348	
			1.4-2.3	21-34	140-230			668	1470	550	1210	
		1 1/2	38	0.4-2.0	6-30			40-200	785	1729	158	348
		1.57	40	0.8-2.0	12-30			80-200	630	1386	315	693
	2 1/4	57	0.4-2.0	6-30	40-200			786	1729	158	348	
700	3/4	19	0.2-1.0	3-15	20-100	2856	(6283)	2142	4712	143	315	
			0.2-0.6	3-9	20-60			2428	5342	143	315	
			0.6-10	9-15	60-100			2250	4960	430	946	
			0.4-2.0	6-30	40-200			1428	3141	286	629	
	1 1/8	29	0.2-1.0	3-15	20-100			2142	4712	143	315	
			0.4-2.0	6-30	40-200			1428	3142	286	629	
	1.96	50	0.2-1.0	3-15	20-100			2142	4712	143	315	
			0.4-2.0	6-30	40-200			1428	3142	286	629	
1400	1 1/8	29	0.2-1.0	3-15	20-100	5712	(12566)	4500	9240	300	660	
			0.4-2.0	6-30	40-200			3000	6600	600	1320	
	1.57	40	0.2-1.0	3-15	20-100			4284	9425	286	628	
			0.4-2.0	6-30	40-200			2856	6283	572	1258	
	2.36	60	0.2-1.0	3-15	20-100			4284	9425	286	660	
			0.4-2.0	6-30	40-200			2856	6283	572	1320	

ACTUATOR DIMENSIONS:-



STANDARD ACTUATOR
DIRECT/REVERSE



TOP MOUNTED DIR/REV
ACTUATOR

SR.NO.	ACTUATOR Model	EFFECTIVE cm ²	MAX TRAVEL mm	BONNET MOUNT DIA mm	DIA D mm	H1 mm	H3 mm
1	M230	230	29	32-71	235	267	435
2	M385	385	57	32-71	285	351	625
3	M700	700	50	32-71	392	400	725
5	M1400	1400	60	71-90	545	468	800

'S' SERIES SINGLE SPRING OPPOSED PNEUMATIC DIAPHRAGM ACTUATOR

(With or without Side mounted handwheel)

Actuator Model: S-225, S-320, S-550, S-700, S-960, S-1400 & S-1920

If required these actuators can be provided with side mounted hand wheel.

These actuators are suitable for regulating and on/off control applications and can be used against aggressive environments with appropriate surface protection.

General Features:

- Wide range of travel and Spring range.
- Quick response.
- Smooth functioning, constant linearity with negligible hysteresis.
- Easy to change fail action on site without any extra parts.
- Easy to assemble and disassemble from valve.
- Various accessories to work during failure of power

Actuator Range: –

Size: - 225 cm², 320 cm², 550 cm², 700 cm², 960 cm², 1400 cm², 1920 cm²

Travel: - 20mm, to 150 mm

Range: - 0.2-1 bar, 0.4-2bar, 1.4-3bar, 0.9-3.0bar etc.



Flexibility of construction:-

- The actuator may be reversed on site without removing the valve from the flow line.
- Easy for maintenance.
 - Various options for functioning during power failure.
 - Top mounted hand wheel.
 - Side mounted hand wheel.
 - Can achieve max and min travel by attaching additional limit stop unit.

Material Construction:-

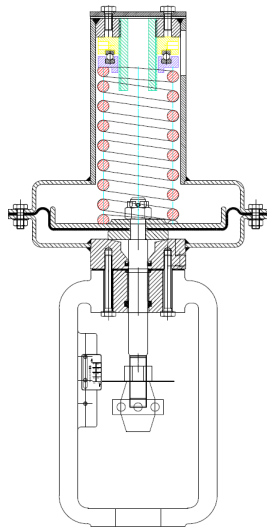
- Heavy duty S.G.Iron yoke to provide high strength.
- High quality molded Nitrile rubber diaphragm with Nylon fabrics membrane between two layers to work at infinite pressure cycles.
- Alloy steel spring to sustain maximum working cycles.
- Fabricated spring tube with pressed steel upper and lower diaphragm casing.
- Sealing components of high quality nitrile rubber and Teflon.
- All fasteners are of stainless steel or High tensile steel.
- All MS parts with Zinc plated or epoxy painted.



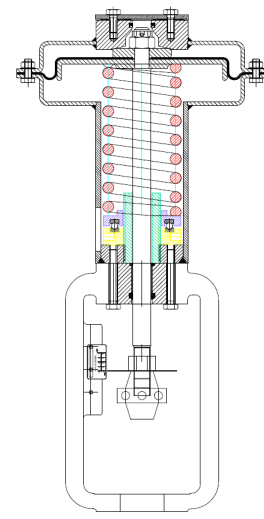
**DIRECT ACTING
STANDARD ACTUATOR**



**REVERSE ACTING STANDARD
ACTUATOR**



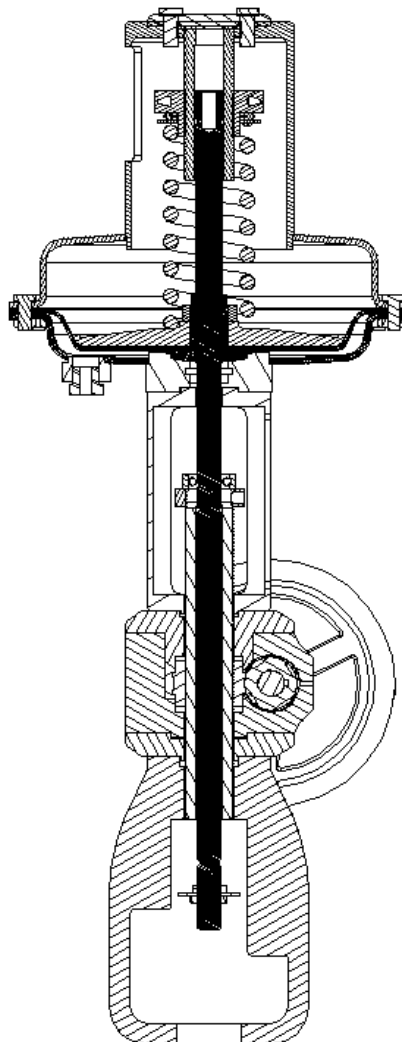
REVERSE ACTING STANDARD ACTUATOR



DIRECT ACTING STANDARD ACTUATOR

Hand wheels (Actuator sizes S0480, S0960 & S1920):-

The Side mounted hand wheels may be fitted as original equipment or by retrospective action in field and can be used to operate a valve manually throughout its full stroke or as a travel stop, limiting the amount of closing or opening of the valve.



Side mounted hand wheel:-

Side mounted hand wheel is of the continuously connected type operating through a permanently lubricated worm gear box, and is available on all actuator sizes. It is conveniently located on the side of the actuator, immediately above the yoke. The mechanical advantage of the gears and lead screw operating in thrust bearing reduces the effort required to operate even the largest valves by fingers well within the capabilities of the operator.

When set in neutral position the actuator operates automatically under the influence of the air pressure and actuator spring. An indicator is provided showing the position of the handwheel mechanism, and the usual valve travel indicator is also supplied. A locknut is provided to lock the top mounted hand wheel in any position. Locking devices for side mounted hand wheels are available on request

Technical Data:-

Actuator selection criteria are depending on number of design factors with respect to application of control valve.

The variable factors in order to application are,

Table 1:- Actuator Yoke/Valve Bonnet Connection:-

Actuator Model cm ²	Travel in mm	Yoke boss Size in mm
S-225	20	49 & 54
S-320	20	49 & 56
	30	
S-550	20	49 & 72
	38	
	54	
S-700	30	56 & 72
	60	
S-960	60	72 & 100
	100	
S-1400	60	72 & 100
	100	
S-1920	90	90 & 146
	150	

SINGLE SPRING PNEUMATIC DIAPHRAGM ACTUATOR

Actuator Power:-

Max Continuous Working Pressure (bar) = 4 bar.

Actuator Model	Spring					Power					
	Travel		Range			Thrust gross		Thrust Nett		Spring Extended	
	Cm ²	Inch	mm	bar	psi	kpa	kgf	(lbf)	kgf	lbf	kgf
'S'-225	3/4	20	0.2-1.0	3-15	20-100	918	(2020)	688.5	1515	46	101
			0.4-2.0	6-30	40-200			459	1010	92	202
'S'-320	3/4	20	0.2-1.0	3-15	20-100	1306	(2873)	980	2156	65	144
			0.4-2.0	6-30	40-200			653	1437	130	286
			1.0-1.8	15-27	100-180			730	1606	326	717
			1.9-3.0	28-45	190-300			714	1571	620	1364
	1-1/8	30	0.2-1.0	3-15	20-100	1306	(2873)	980	2156	65	143
			0.4-2.0	6-30	40-200			653	1437	130	286
			1.0-1.8	15-27	100-180			719	1582	326	717
			1.4-3.0	21-45	140-300			327	719	457	1005
'S'-550	3/4	20	0.2-1.0	3-15	20-100	2244	(4936)	1683	3702	112	246
			0.4-2.0	6-30	40-200			1122	2468	224	492
	1-1/2	38	0.2-1.0	3-15	20-100			1683	3702	112	246
			0.4-2.0	6-30	40-200			1122	2468	224	492
	2-1/8	54	0.2-1.0	3-15	20-100			1683	3702	112	246
			0.4-2.0	6-30	40-200			1122	2468	224	492
'S'-700	1-1/8	30	0.2-1.0	3-15	20-100	2856	(6283)	2142	4712	143	315
			1.1-1.9	17-29	110-190			1500	3300	785	1727
	2-1/2	60	0.2-1.0	3-15	20-100			2142	4712	143	315
			0.8-1.5	12-23	80-150			1785	3927	570	1254
			1.4-3.0	21-45	140-300			714	1571	1000	2200
'S'-960	2-1/2	60	0.2-1.0	3-15	20-100	3917	(8617)	2938	6464	196	431
			0.4-2.0	6-30	40-200			1959	4310	392	862
	4	100	0.2-1.0	3-15	20-100			2938	6464	196	431
			1.4-3.0	21-45	140-300			979	2154	1371	3016
'S'-1400	2-1/2	60	0.2-1.0	3-15	20-100	5712	(12566)	4284	9425	286	629
			1.0-1.8	15-27	110-180			3142	6912	1428	3142
	4	100	0.2-1.0	3-15	20-100			4284	9425	286	629
			0.6-1.4	9-21	60-140			3713	8169	857	1885
			0.9-3.0	14-45	90-300			1428	3142	1285	2827

'R' SERIES ROTARY SPRING DIAPHRAGM ACTUATOR

Actuator Model: - R-260, R-350 & R-550

'R'-series spring diaphragm actuators are available in 3 sizes, i.e., R-225, R-350, R-550 & R-870 .If required these actuators can be provided with handwheel.

These actuators are suitable for regulating and on/off control applications and can be used against aggressive environments with appropriate surface protection

General Features:

- Wide range of travel and spring range.
- Quick response.
- Smooth functioning, constant linearity with negligible hysteresis.
- Robust design
- Top mounted hand wheel option
- Easy to change fail action on site without any extra parts.
- Easy to assemble and disassemble from valve.
- Various accessories to work during failure of power

Actuator Range: –

Size: - 260cm², 350cm² & 550 cm².

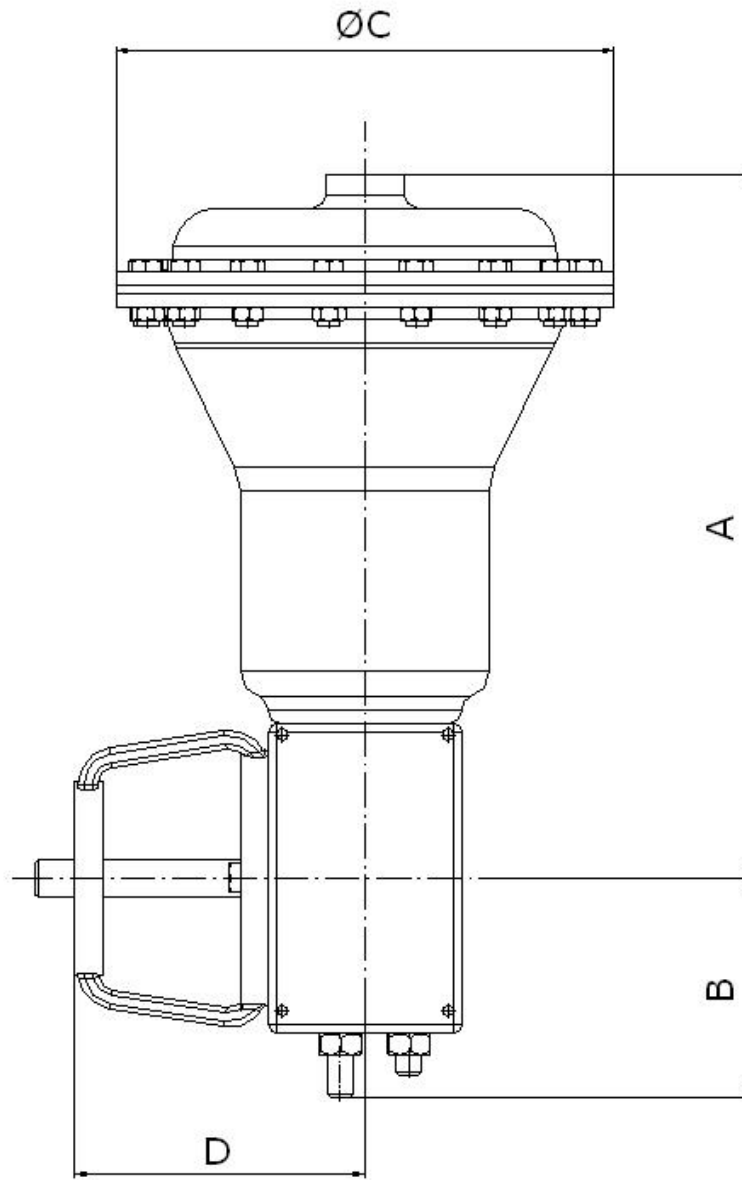


Actuator Output Torques:

Actuator Model	Actuator Action	Supply Pressure	Output Torque
cm ²	1-Open 2-Close	Bar g (psi g)	Nm (lbs-inch)
R-260	R260-1 R260-2	1.4 (20) 1.4 (20)	42 (372) 26 (228)
	R260-3 R260-4	2.4 (35) 2.4 (35)	79 (696) 79 (696)
	R260-5 R260-6	4.2 (60) 4.2 (60)	129 (1180) 138 (1224)
R-350	R350-1 R350-2	1.4 (20) 1.4 (20)	119 (1056) 103 (912)
	R350-3 R350-4	2.4 (35) 2.4 (35)	206 (1824) 168 (1488)
	R350-5 R350-6	4.2 (60) 4.2 (60)	356 (3156) 303 (2688)
R-550	R550-1 R550-2	1.4 (20) 1.4 (20)	176 (1560) 176 (1560)
	R550-3 R550-4	2.4 (35) 2.4 (35)	298 (2640) 300 (2652)
	R550-5 R550-6	4.2 (60) 4.2 (60)	527 (4668) 527 (4668)

ROTARY SPRING DIAPHRAGM ACTUATOR

Actuator Dimensions:



Actuator Model	Dimensions				Weights (kgs)	
	cm ²	A (mm)	B (mm)	C (mm)		D (mm)
R-260		287	89	258	167	29
R-350		472	135	307	170	80
R-550		510	135	380	190	110