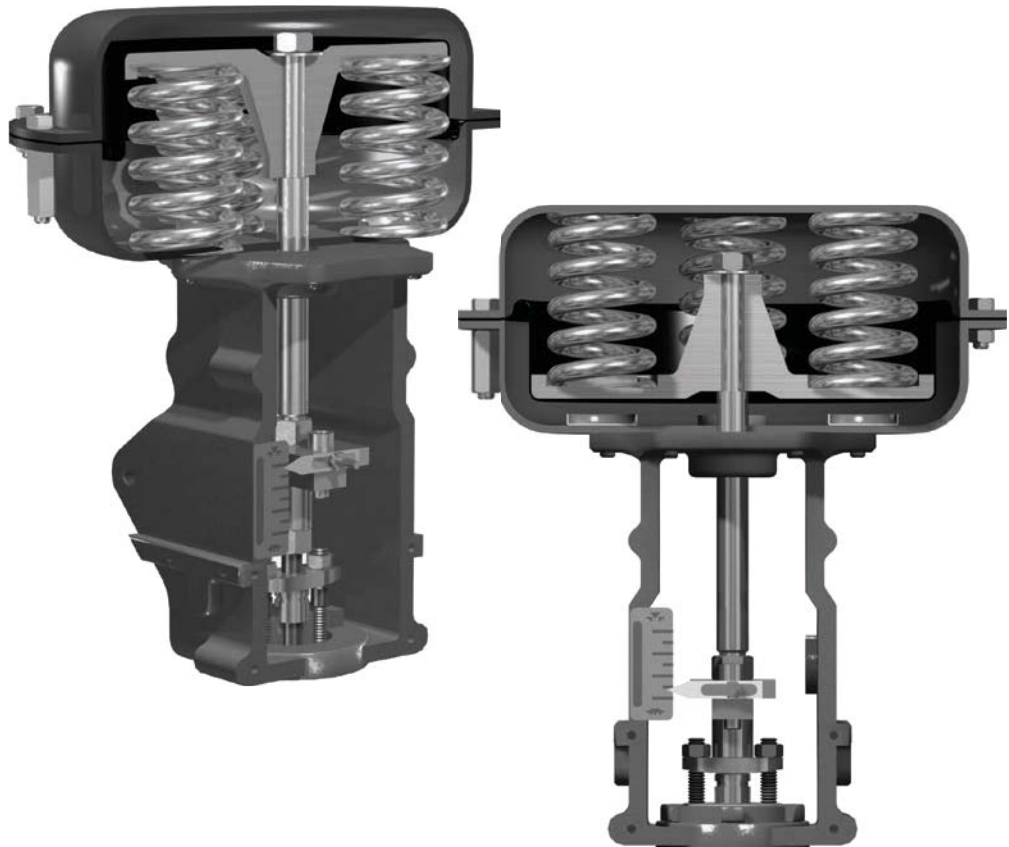


Masoneilan* 87/88 Series

Pneumatic Multi-Spring Diaphragm Actuators

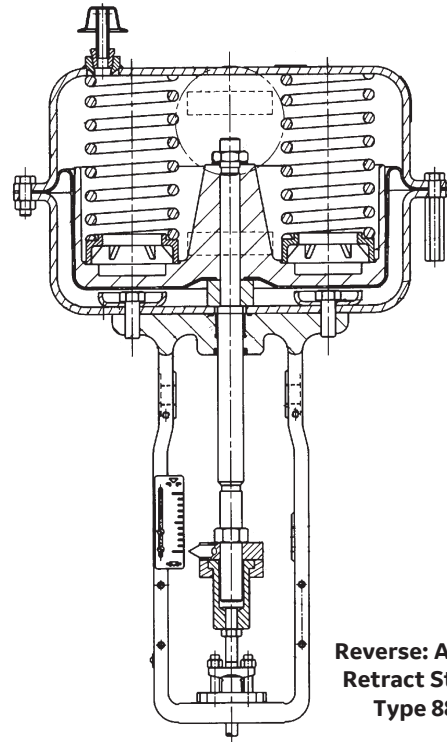
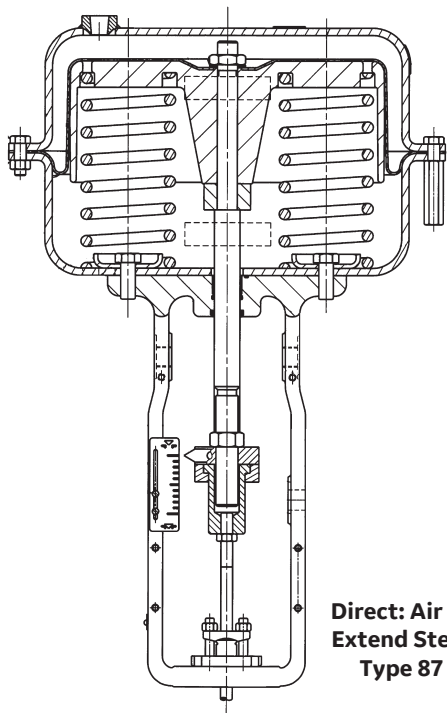
Actuator air action can be changed in the field for increased flexibility and reduced inventory.



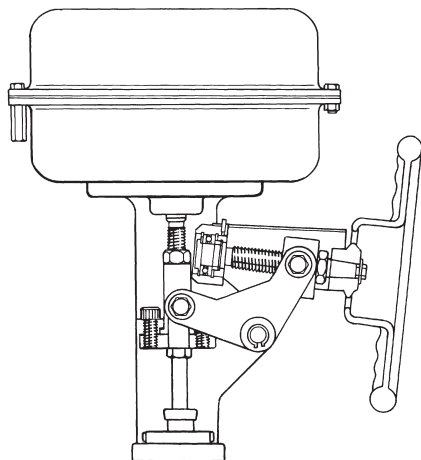
Numbering System

1st	2nd
8	

Actuator Type
87 Air to Close
88 Air to Open



Handwheel



Actuator Size	Maximum Travel		Equivalent Air Supply		Number of Turns
	Inches	(mm)	psi	(bar)	
6	0.8	20	60	4.1	5
10	1.5	38	60	4.1	9
16	2.5	63	60	4.1	17
23	2.5	63	60	4.1	25
23L	4.0	102	60	4.1	440

Specifications

Actuator Size	Diaphragm Effective Area		Stem Travel		Max Supply	
	sq. in.	sq. cm.	(inches)	mm	(psi)	(bar)
6	60	387	0.8	20	60	4.1
10	100	645	0.8 / 1.5	20 / 38	60	4.1
16	160	1032	0.8 / 1.5 / 2.0 / 2.5	20 / 38 / 50 / 63	60	4.1
23	230	1484	0.8 / 1.5 / 2.0 / 2.5	20 / 38 / 50 / 63	60	4.1
23L	230	1484	3.0 / 3.5 / 4.0	76 / 89 / 102	60	4.1

Standard Springs

Actuator Size 6, 10, 16, and 23

Spring Type	Spring Qty	Placement
3-15	3	Lower Level
6-30	6	Lower Level
11-23	3	Upper Level
21-45	6	Upper Level

Actuator Size 23L

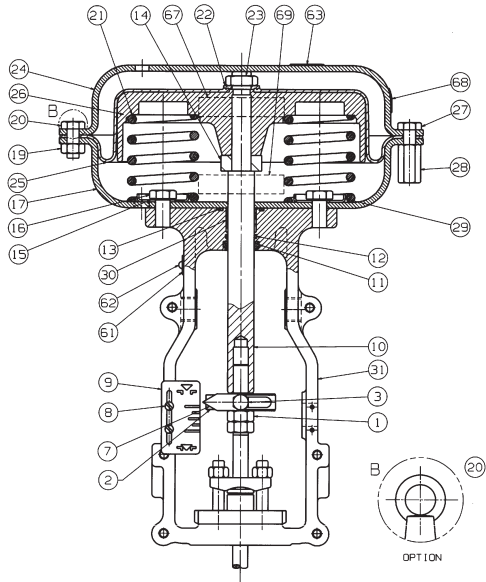
Actuator Model	Stem Travel		Spring Type	Spring Qty	Placement
	Inches	mm			
87	4	102	3-15	3	Lower Level
			6-30	6	Lower Level
			11-23	3	Upper Level
			21-45	6	Upper Level
	3.5	89	6-27	6	Lower Level
	3	76	6-24	6	Lower Level
88	4	102	3-15	3	Lower Level
			6-30	6	Lower Level
			11-23	3	Upper Level
			21-45	6	Upper Level
	3.5	89	9-30	6	Lower Level
			24-45	6	Upper Level
	3	76	12-30	6	Lower Level
			27-45	6	Upper Level

Air Connections

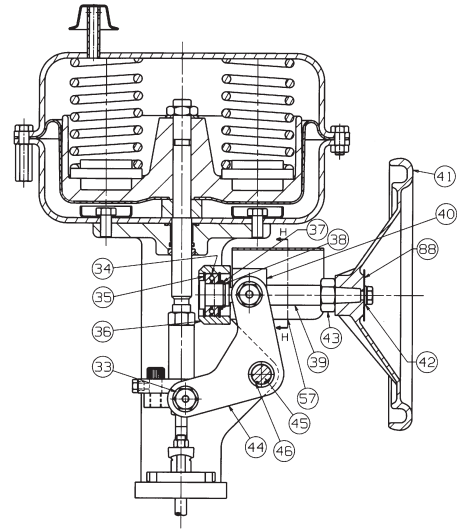
Standard: 1/4" NPT - Size 6, 10 1/2" NPT - Size 16, 23

Optional: 1/2" NPT - Size 6, 10

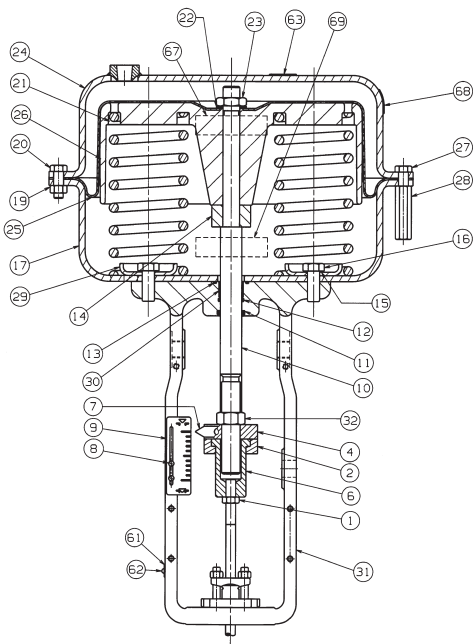
Materials



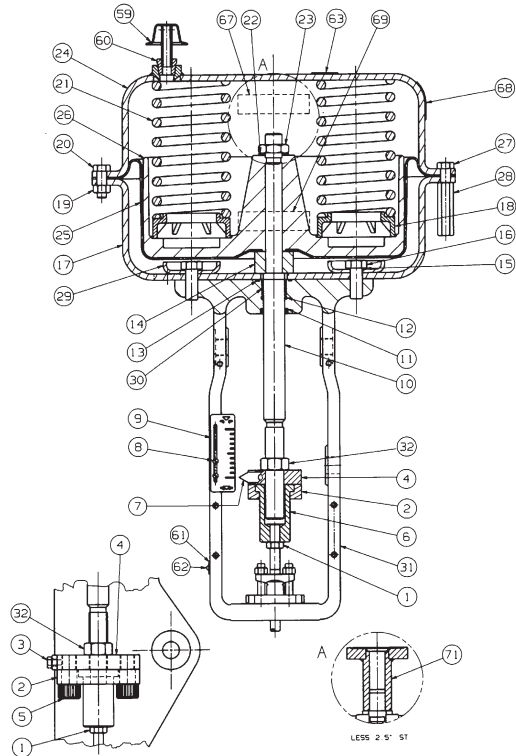
Size 6 Actuator



**Size 10 Actuator
with Optional Handwheel**

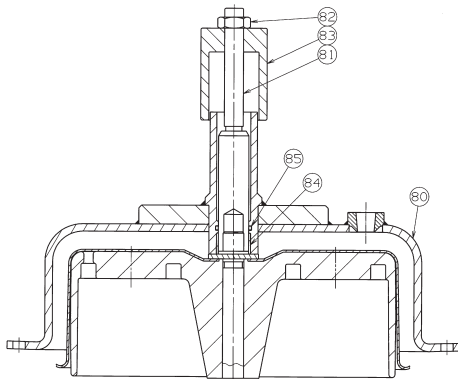


**Size 16 Actuator Air to Close
(Model 87)**

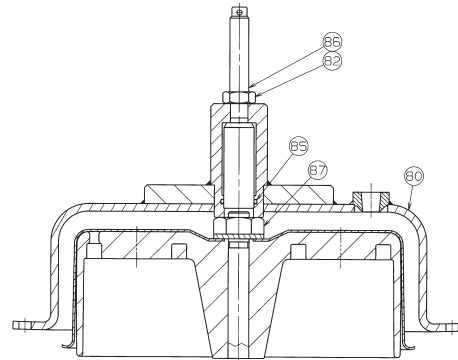


**Size 16 Actuator Air to Open
(Model 88)**

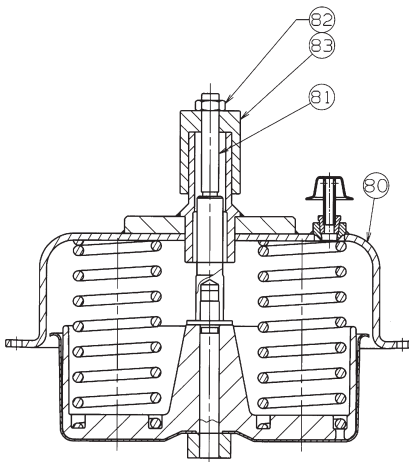
Materials



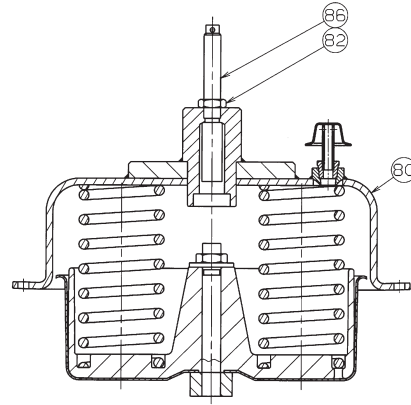
Model 87 - Down Stop
Optional Adjustable Limit Stop



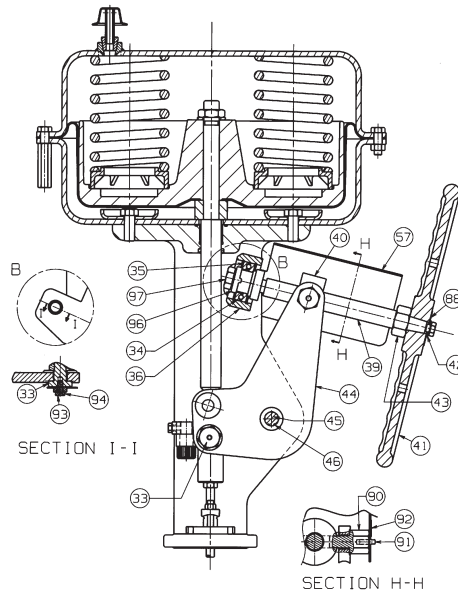
Model 87 - Up Stop
Optional Adjustable Limit Stop



Model 88 - Down Stop
Optional Adjustable Limit Stop



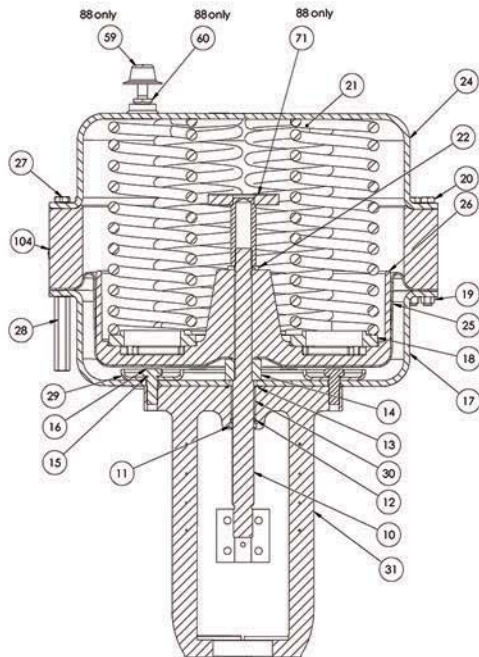
Model 88 - Up Stop
Optional Adjustable Limit Stop



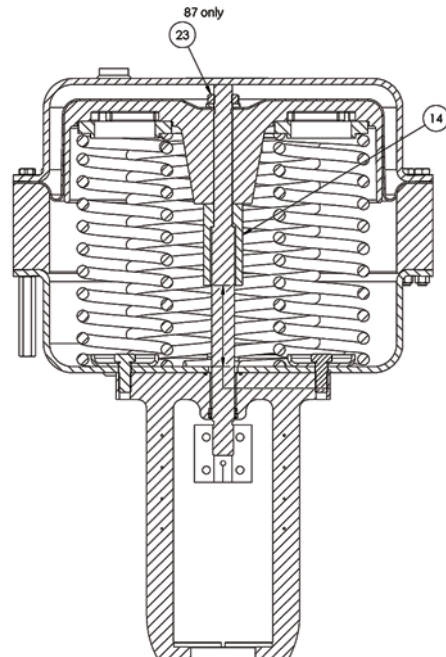
Size 23 Actuator with Optional Handwheel

Materials

Size 23L
Without Optional Handwheel

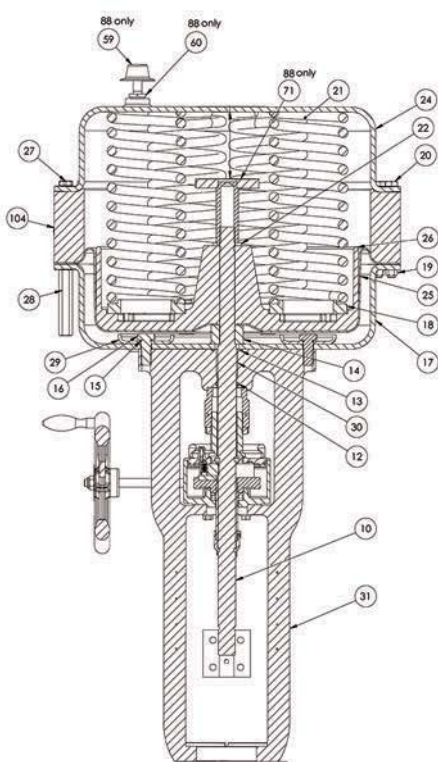


Model 88

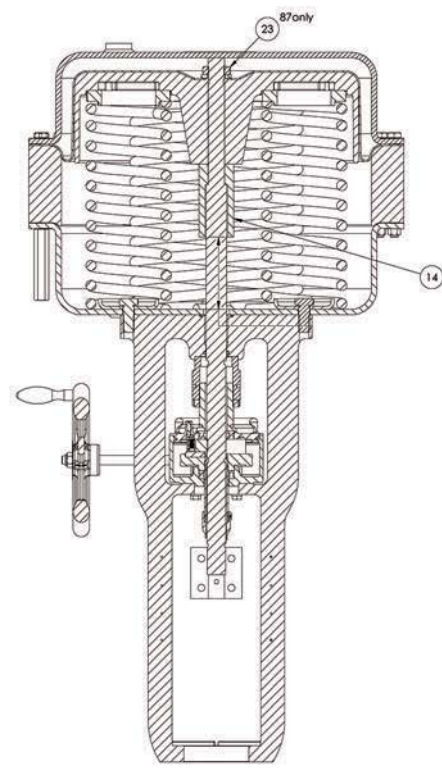


Model 87

With Optional Handwheel



Model 88



Model 87

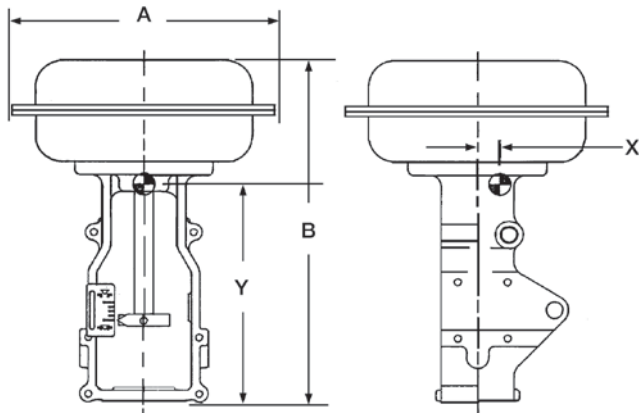
Materials

Parts Reference for Actuator Sizes 6,10,16, 23 and 23L

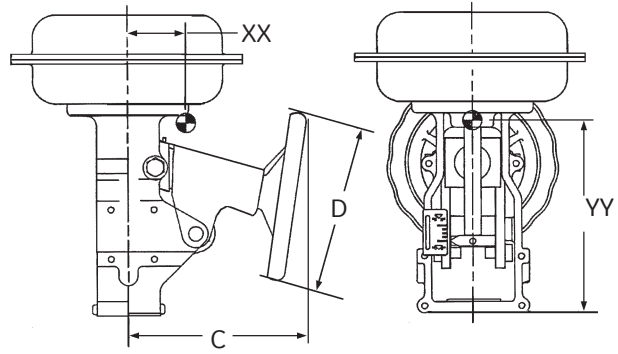
Ref No.	Description	Material
1	Lock Nut	Carbon Steel
2	Stem Connector-Bottom	Carbon Steel, Zinc Plate
3	Cap Screw-Pointer	Carbon Steel
4	Stem Connector-Top	Carbon Steel, Zinc Plate
5	Cap Screw-Connector	Carbon Steel
6	Connector Insert	Carbon Steel, Zinc Plate
7	Pointer	Stainless Steel
8	Screw-Pan Head	Carbon Steel
9	Scale-Travel	Stainless Steel
10	Actuator Stem	Stainless Steel
10a	Actuator Stem	Stainless Steel
11	Stem Wiper	Polyurethane
11a	Rod Scraper	Buna-N
12	O-ring	Buna-N
13	O-ring	Buna-N
14	Spacer	Carbon Steel, Zinc Plate
15	Seal Washer	Steel & Rubber
16	Cap Screw-Yoke	Carbon Steel
17	Lower Diaphragm Case	Carbon Steel
18	Spring Spacer	Carbon Steel
19	Hex Nut	Carbon Steel
20	Cap Screw-Hex Head	Carbon Steel
21	Spring	Carbon Steel
22	Washer Flat	Carbon Steel
23	Nut-Jam	Carbon Steel
24	Upper Diaphragm Case	Carbon Steel
25	Diaphragm	Buna-N/Polyester
26	Diaphragm Plate	Aluminum Alloys
27	Cap Screw-Comp	Carbon Steel
28	Compression Nut	Carbon Steel
29	Spring Guide	Carbon Steel
30	Bushing	PTFE/Steel
31	Yoke	Cast Iron
32	Lock Nut	Carbon Steel
33	Pivot Pin	Carbon Steel, Zinc Plate
34	Thrust Bearing	Carbon Steel
36	HW Pivot	Carbon Steel
37	Bearing Ring	Carbon Steel
38	Retaining Ring	Carbon Steel

Ref No.	Description	Material
39	H/W Stem	Carbon Steel, Zinc Plate
40	Traveling Nut	Leaded Steel
41	Handwheel	Cast Iron
42	Washer-Flat	Carbon Steel
43	HW Limitation Nut	Carbon Steel, Zinc Plate
44	HW Lever	Carbon Steel
45	Lever Pin	Carbon Steel, Zinc Plate
46	Retaining Ring-Lever Pin	Carbon Steel
57	HW Cover	Carbon Steel
59	Vent Plug	Carbon Steel
60	Pipe Fitting	Carbon Steel, Zinc Plate
63	Information Label	Vinyl
67	Warning Label	Vinyl
68	Warning Label	Vinyl
69	Warning Label	Vinyl
71	Travel Stop	Carbon Steel, Zinc Plate
80	Upper Diaphragm Case	Carbon Steel
81	Stem Extension	Stainless Steel
82	Lock Nut	Stainless Steel
83	Limit Stop	Stainless Steel
84	Bushing	Steel/PTFE Lined
85	O-ring	Buna-N
86	Stop	Stainless Steel
87	Stop	Carbon Steel
88	Plate-Rotation Arrow	Stainless Steel
90	Pivot Pin-HW Lock	Carbon Steel, Zinc Plate
91	Handwheel Lock Pin	Stainless Steel
92	Information Plate-HW	Vinyl
93	Cap Screw-Hex Head	Carbon Steel
94	Washer-Flat	Carbon Steel
96	End Flange	Carbon Steel, Zinc Plate
97	Cap Screw-HW Stem	Carbon Steel
105	Recessed Head Screw	Carbon Steel
106	Indicator Plate	Carbon Steel
107	Indicator Arm	Carbon Steel
108	Spring Lockwasher	Carbon Steel, Zinc Plate
109	Split Clamp	Carbon Steel
110	Hexagon Bolt	Carbon Steel, Zinc Plate

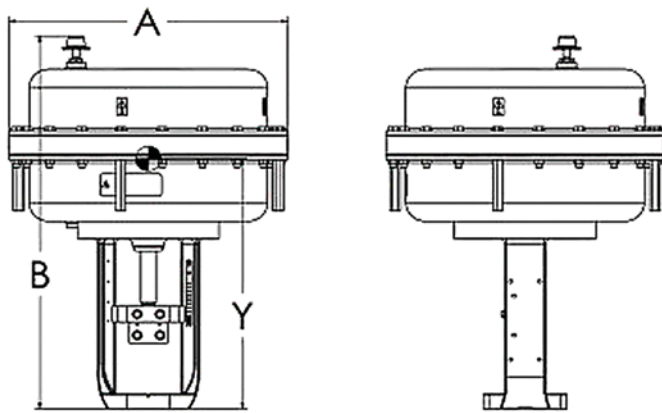
Dimensions and Weights (U.S.)



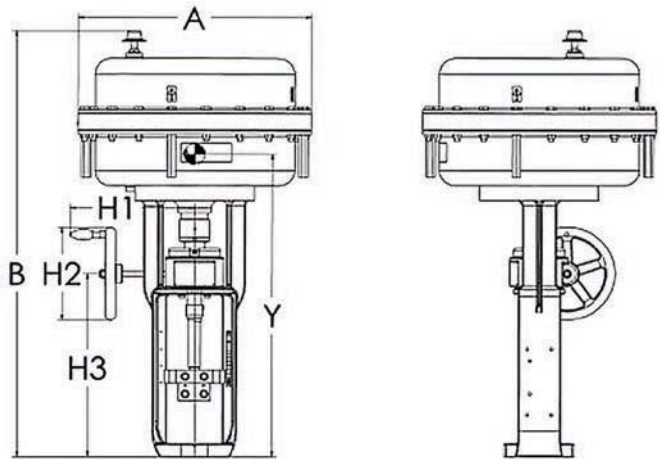
Shown without optional Handwheel



Shown with optional Handwheel



23L Shown without optional Handwheel



23L Shown with optional Handwheel

Dimensions and Weights

Actuator Size	Spring Range	Actuator Dimensions (inches)				H1	H2	Weights (lbs.)	
		A	B (Model 88)	C	D			Standard	w/Handwheel
6	All	11.5	15.54 (17.52)	10	9			45	60
10	All	14.5	19.58 (21.54)	10.9	12			85	105
16	All	18.75	28.22 (30.79)	14	18			210	245
23	All	21.63	30.71 (33.27)	16	18			265	320
23L	3-15, 6-30	21.63	27.8 (30.00)			11.5	8.9	375	417
23L	11-23, 21-45	21.63	38.55 (40.75)			11.5	8.9	507	549

Actuator Removal Clearance = 6 inches

Center of Gravity (inches)

Without Handwheel

Size	XX	YY
6	0.2	9.8
10	0.0	12.9
16	0.1	18.5
23	0.1	21.1
23L ¹	0.0	20.1
23L ²	0.0	21.9

- Nominal spring ranges 3-15 & 6-30
- Nominal spring ranges 11-23 & 21-45

With Handwheel

Size	XX	YY
6	1.3	9.1
10	0.9	12.0
16	1.4	16.7
23	1.4	19.0
23L ¹	0.0	28.9
23L ²	0.0	30.7

- Nominal spring ranges 3-15 & 6-30
- Nominal spring ranges 11-23 & 21-45

Dimensions and Weights (U.S.)

Limit Stops (inches)

Up Stop

Size	Spring Range	Model	Overall Height B
6	All	87	19.5
10	All		25.4
16	All		36.4
23	All		38.8
23L ¹	3-15, 6-30		38.4
23L ¹	11-23, 21-45		41.3
23L ²	3-15, 6-30		49.1
23L ²	11-23, 21-45		52.1
6	All	88	19.2
10	All		25.1
16	All		35.5
23	All		35.5
23L ¹	3-15, 6-30		38.4
23L ¹	11-23, 21-45		41.3
23L ²	3-15, 6-30		49.1
23L ²	11-23, 21-45		52.1

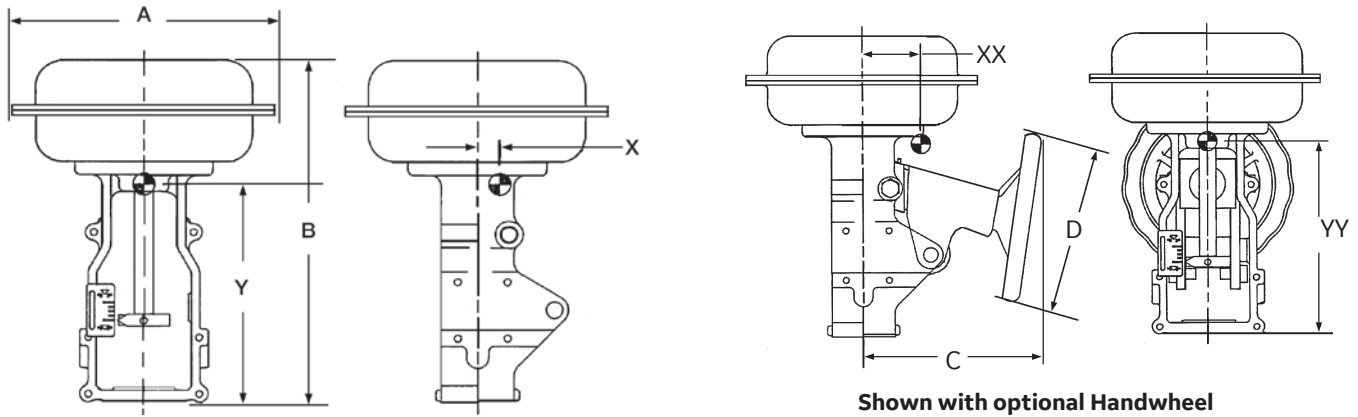
1. Without Handwheel
2. With Handwheel

Down Stop

Size	Spring Range	Model	Overall Height B
6	All	87	19.8
10	All		26.0
16	All		37.2
23	All		39.9
23L ¹	3-15, 6-30		39.9
23L ¹	11-23, 21-45		42.8
23L ²	3-15, 6-30		50.6
23L ²	11-23, 21-45		53.6
6	All	88	19.7
10	All		25.9
16	All		37.5
23	All		40.3
23L ¹	3-15, 6-30		39.9
23L ¹	11-23, 21-45		42.8
23L ²	3-15, 6-30		50.6
23L ²	11-23, 21-45		53.6

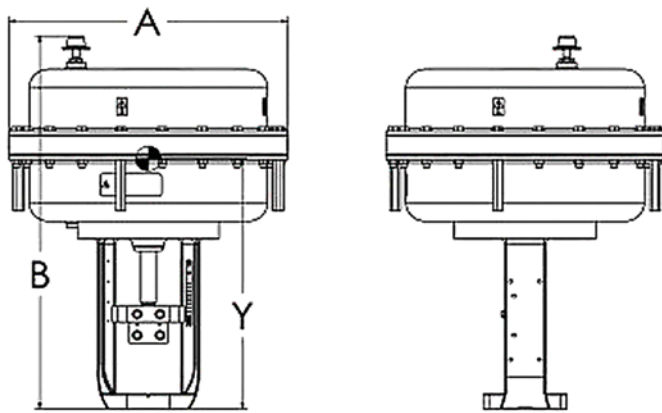
1. Without Handwheel
2. With Handwheel

Dimensions and Weights (Metric)

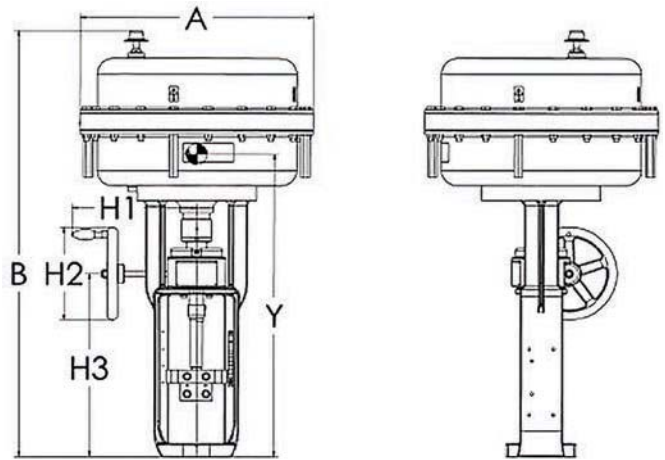


Shown without optional Handwheel

Shown with optional Handwheel



23L Shown without optional Handwheel



23L Shown with optional Handwheel

Dimensions and Weights

Actuator Size	Spring Range	Actuator Dimensions (mm)				H1	H2	Weights (kg)	
		A	B (Model 88)	C	D			Standard	w/Handwheel
6	All	302	395 (445)	254	229			20	27
10	All	373	497 (547)	277	305			39	48
16	All	476	717 (782)	356	457			95	111
23	All	549	780 (845)	406	457			120	145
23L	3-15, 6-30	549	706 (762)			292	225	170	189
23L	11-23, 21-45	549	781 (837)			292	225	230	249

Actuator Removal Clearance = 152 mm

Center of Gravity (mm)

Without Handwheel

Size	XX	YY
6	5	248
10	0	327
16	3	470
23	2	537
23L ¹	0	511
23L ²	0	557

- Nominal spring ranges 3-15 & 6-30
- Nominal spring ranges 11-23 & 21-45

With Handwheel

Size	XX	YY
6	32	232
10	22	305
16	35	425
23	35	483
23L ¹	0	734
23L ²	0	780

- Nominal spring ranges 3-15 & 6-30
- Nominal spring ranges 11-23 & 21-45

Dimensions and Weights (Metric)

Limit Stops (mm)

Up Stop

Size	Spring Range	Model	Overall Height B
6	All	87	494
10	All		646
16	All		925
23	All		987
23L ¹	3-15, 6-30		975
23L ¹	11-23, 21-45		1050
23L ²	3-15, 6-30		1248
23L ²	11-23, 21-45		1323
6	All	88	487
10	All		636
16	All		901
23	All		982
23L ¹	3-15, 6-30		975
23L ¹	11-23, 21-45		1050
23L ²	3-15, 6-30		1248
23L ²	11-23, 21-45		1323

1. Without Handwheel
2. With Handwheel

Down Stop

Size	Spring Range	Model	Overall Height B
6	All	87	503
10	All		660
16	All		945
23	All		1014
23L ¹	3-15, 6-30		1013
23L ¹	11-23, 21-45		1088
23L ²	3-15, 6-30		1286
23L ²	11-23, 21-45		1361
6	All	88	501
10	All		657
16	All		952
23	All		1024
23L ¹	3-15, 6-30		1013
23L ¹	11-23, 21-45		1088
23L ²	3-15, 6-30		1286
23L ²	11-23, 21-45		1361

1. Without Handwheel
2. With Handwheel



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