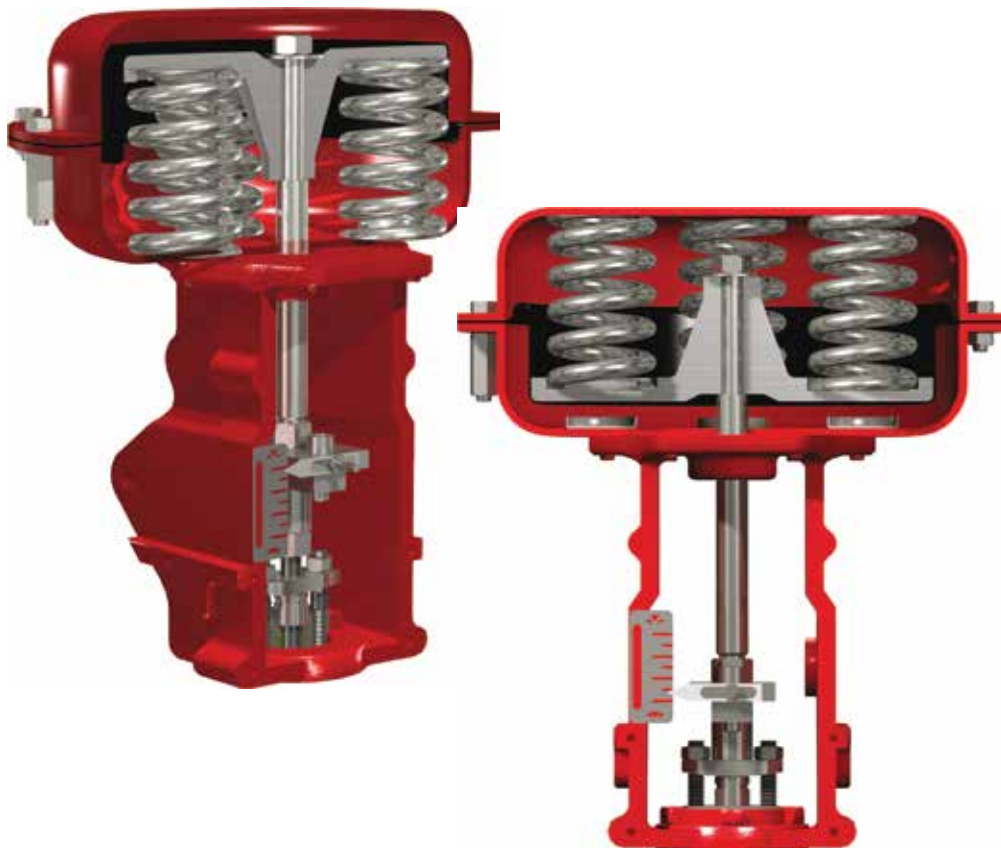


# Masoneilan™ 87/88 Series Actuators

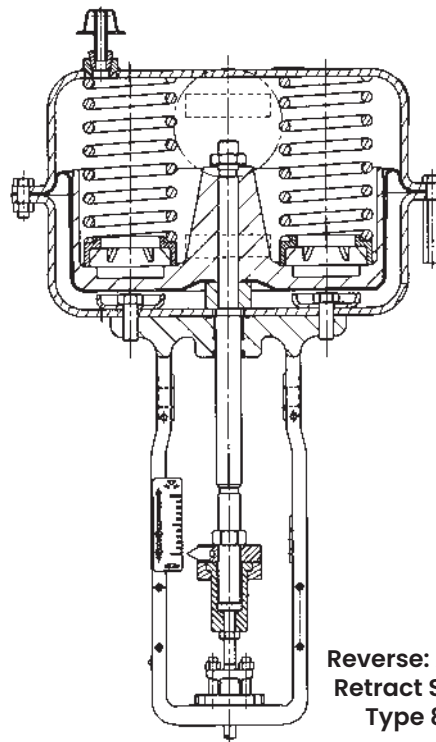
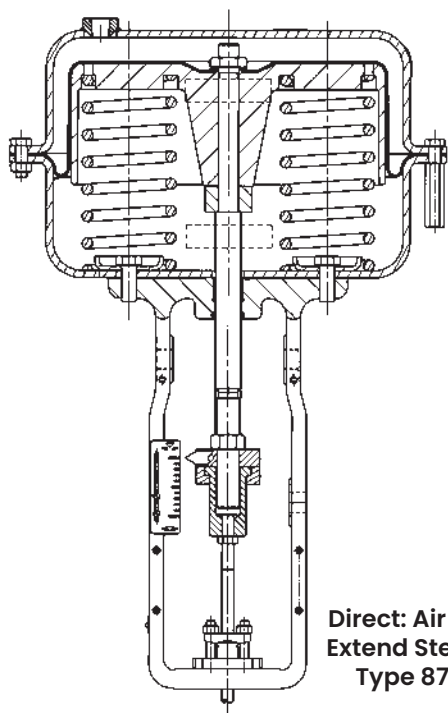
## Pneumatic Multi-Spring Diaphragm Actuators



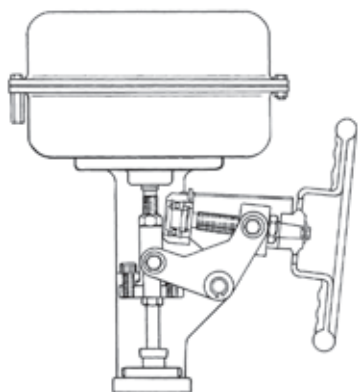
# Numbering System

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

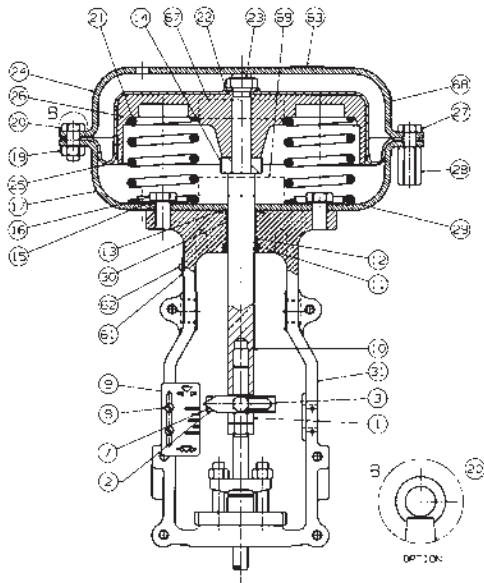
Actuator Model	Stem Travel		Spring Type	Spring Qty	Placement
	Inches	mm			
87	4	102	3-15	3	Lower Level
			6-30	6	Lower Level
			11-23	3	Upper Level
			21-45	6	Upper Level
	3.5	89	6-27	6	Lower Level
	3	76	6-24	6	Lower Level
88	4	102	3-15	3	Lower Level
			6-30	6	Lower Level
			11-23	3	Upper Level
			21-45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

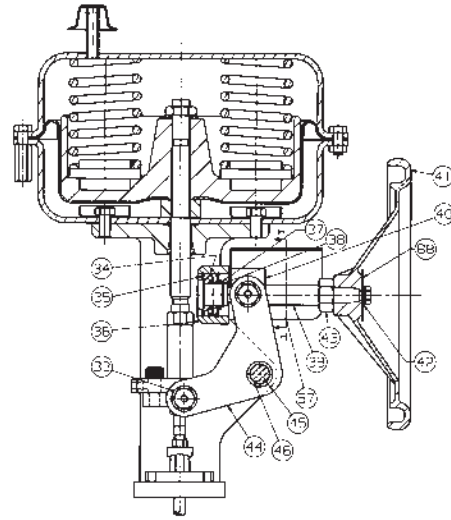
**Standard:** 1/4" NPT - Size 6, 10 1/2" NPT - Size 16, 23

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

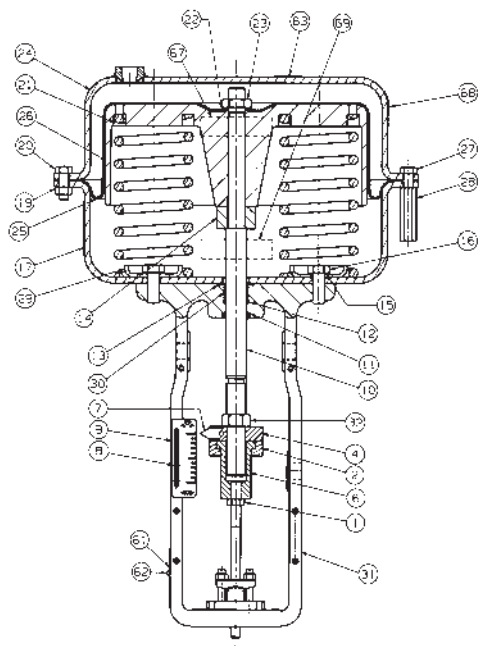
# Materials



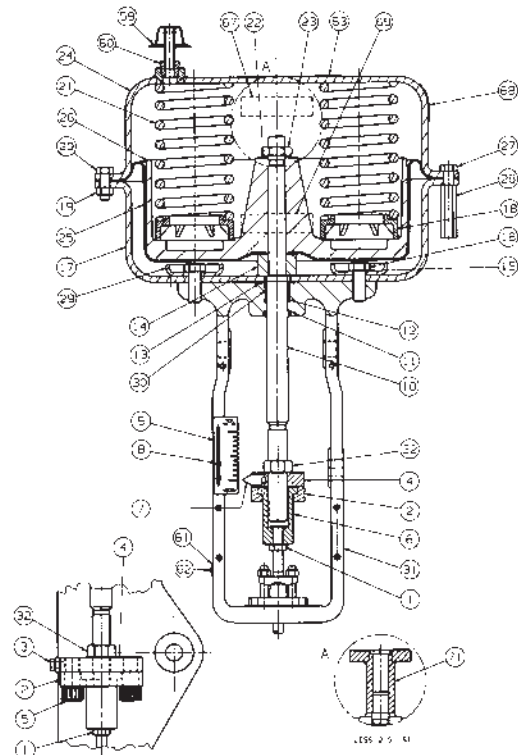
**Size 6 Actuator**



**Size 10 Actuator  
with Optional Handwheel**

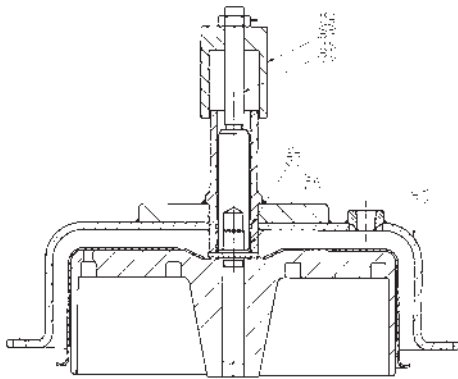


**Size 16 Actuator Air to Close  
(Model 87)**

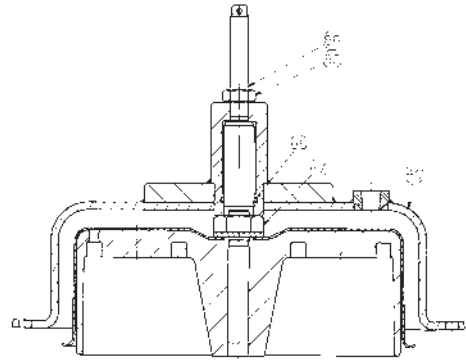


**Size 16 Actuator Air to Open  
(Model 88)**

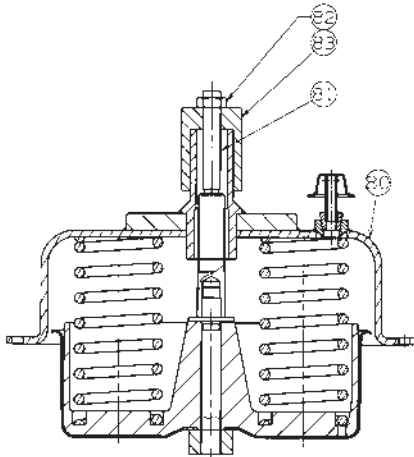
# Materials



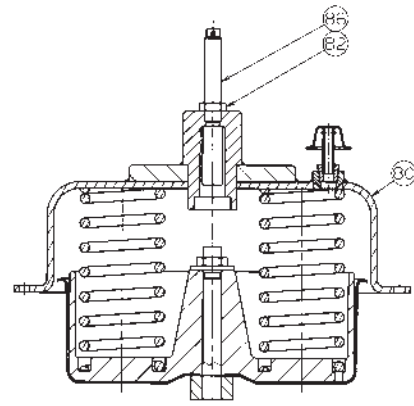
**Model 87 - Down Stop  
Optional Adjustable Limit Stop**



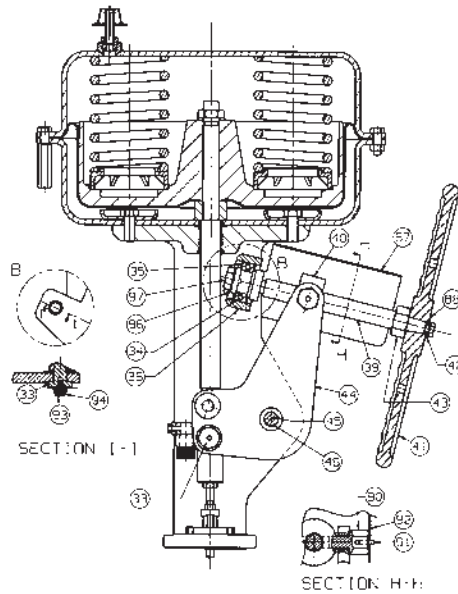
**Model 87 - Up Stop  
Optional Adjustable Limit Stop**



**Model 88 - Down Stop  
Optional Adjustable Limit Stop**



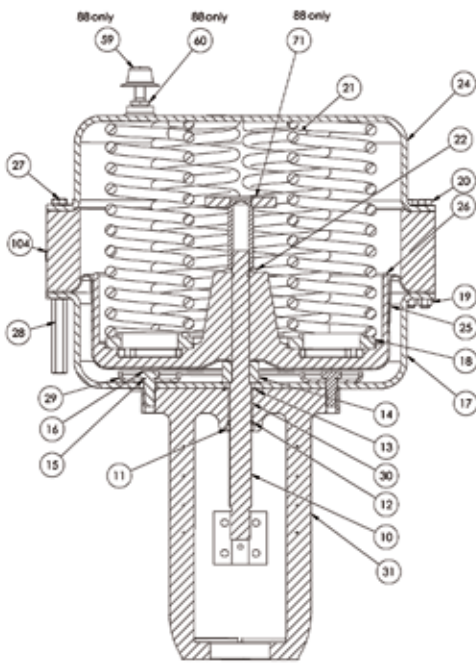
**Model 88 - Up Stop  
Optional Adjustable Limit Stop**



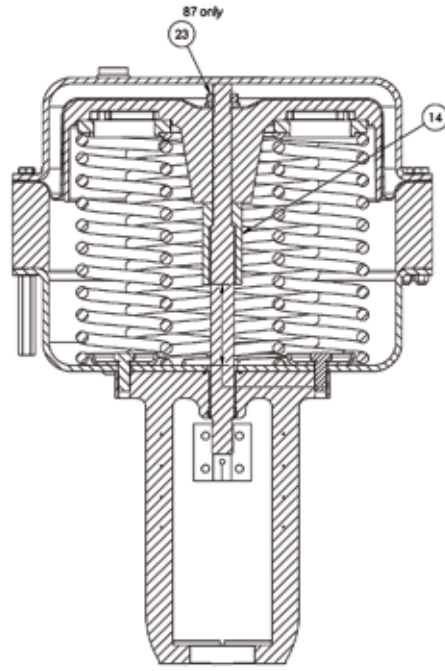
**Size 23 Actuator with Optional Handwheel**

# Materials

Size 23L  
Without Optional Handwheel

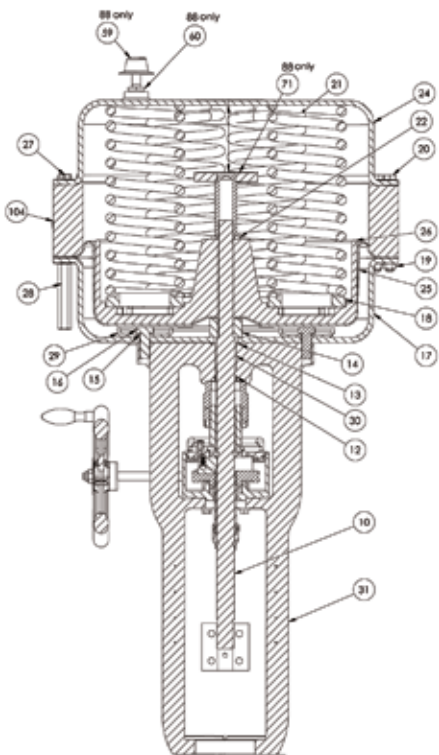


Model 88

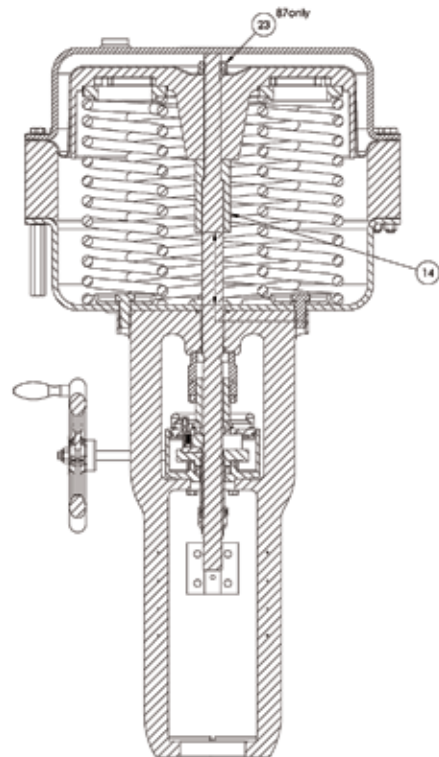


Model 87

With Optional Handwheel



Model 88



Model 87

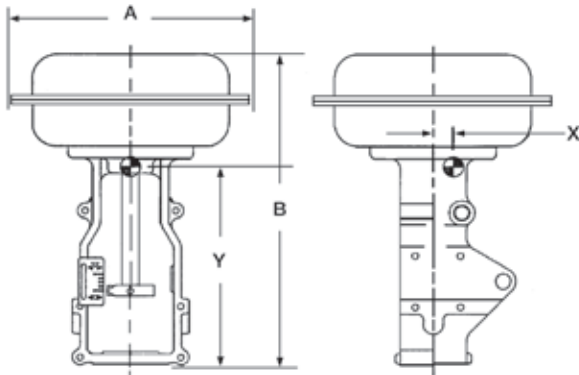
# Materials

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

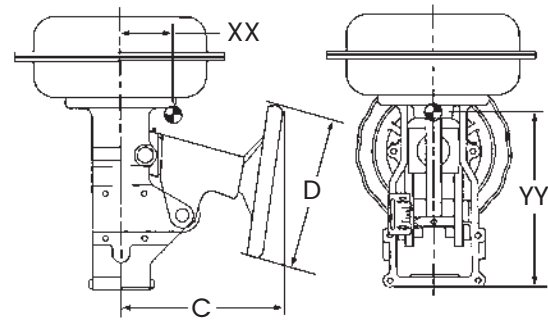
Ref No.	Description	Material
1	Lock Nut	Carbon Steel
2	Stem Connector-Bottom	Carbon Steel, Zinc Plate
3	Cap Screw-Pointer	Carbon Steel
4	Stem Connector-Top	Carbon Steel, Zinc Plate
5	Cap Screw-Connector	Carbon Steel
6	Connector Insert	Carbon Steel, Zinc Plate
7	Pointer	Stainless Steel
8	Screw-Pan Head	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

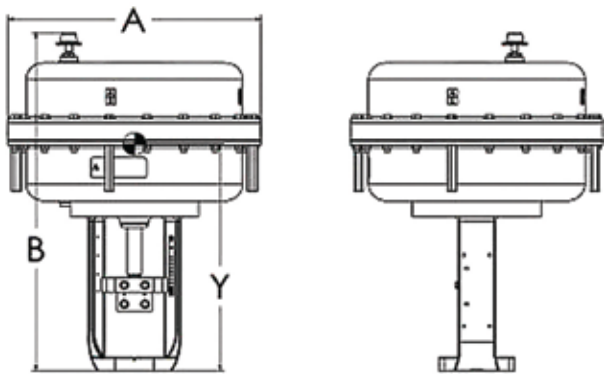
# Dimensions and Weights (U.S.)



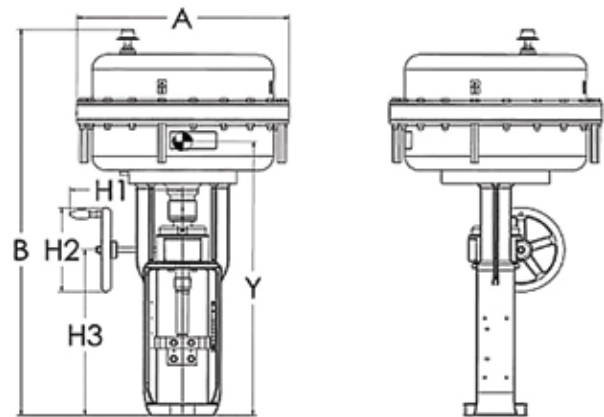
Shown without optional Handwheel



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	X	Y
6	0.2	9.8
10	0.0	12.9
16	0.1	18.5
23	0.1	21.1
23L <sup>1</sup>	0.0	20.1
23L <sup>2</sup>	0.0	21.9

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 <sup>1</sup>	0.0	28.9
23L <sup>2</sup>	0.0	30.7

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



# Dimensions and Weights (U.S.)

## Limit Stops (inches)

### Up Stop

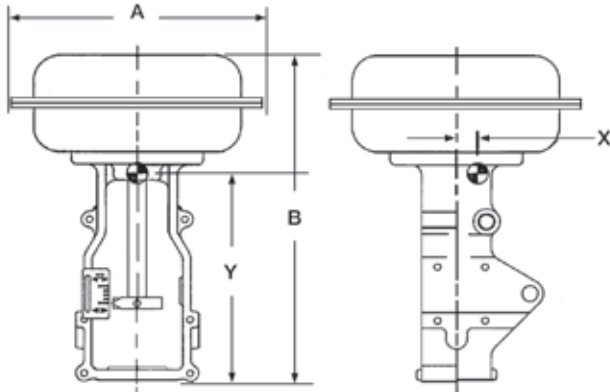
Size	Spring Range	Model	Overall Height B
6	All	87	19.5
10	All		25.4
16	All		36.4
23	All		38.8
23L <sup>1</sup>	3-15, 6-30		38.4
23L <sup>1</sup>	11-23, 21-45		41.3
23L <sup>2</sup>	3-15, 6-30		49.1
23L <sup>2</sup>	11-23, 21-45		52.1
6	All	88	19.2
10	All		25.1
16	All		35.5
23	All		35.5
23L <sup>1</sup>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

### Down Stop

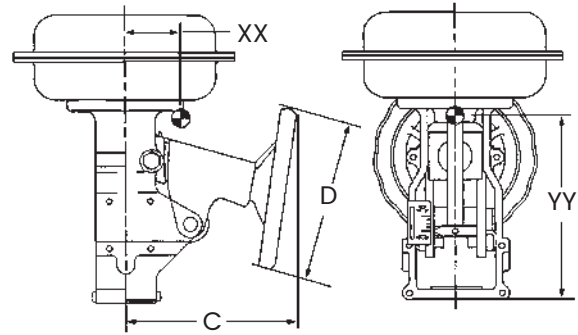
Size	Spring Range	Model	Overall Height B
6	All	87	19.8
10	All		26.0
16	All		37.2
23	All		39.9
23L <sup>1</sup>	3-15, 6-30		39.9
23L <sup>1</sup>	11-23, 21-45		42.8
23L <sup>2</sup>	3-15, 6-30		50.6
23L <sup>2</sup>	11-23, 21-45		53.6
6	All	88	19.7
10	All		25.9
16	All		37.5
23	All		40.3
23L <sup>1</sup>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

1. Without Handwheel
2. With Handwheel

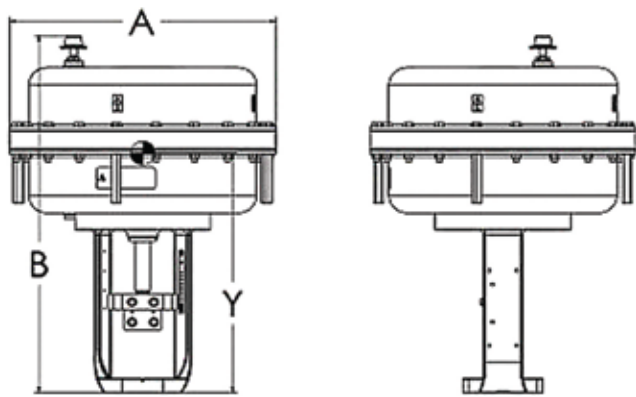
# Dimensions and Weights (Metric)



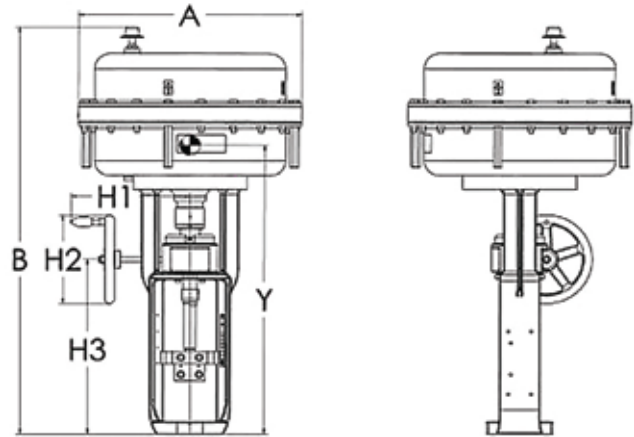
Shown without optional Handwheel



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 = 150 mm

## Center of Gravity (mm)

Without Handwheel

Size	X	Y
6	5	248
10	0	327
16	3	470
23	2	537
23L <sup>1</sup>	0	511
23L <sup>2</sup>	0	557

With Handwheel

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

1. Nominal spring ranges 3-15 & 6-30  
2. 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 <sup>1</sup>	3-15, 6-30		975	
23L <sup>1</sup>	11-23, 21-45		1050	
23L <sup>2</sup>	3-15, 6-30		1248	
23L <sup>2</sup>	11-23, 21-45		1323	
6	All		88	487
10	All			636
16	All	901		
23	All	982		
23L <sup>1</sup>	3-15, 6-30	975		
23L <sup>1</sup>	11-23, 21-45	1050		
23L <sup>2</sup>	3-15, 6-30	1248		
23L <sup>2</sup>	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 <sup>1</sup>	3-15, 6-30		1013	
23L <sup>1</sup>	11-23, 21-45		1088	
23L <sup>2</sup>	3-15, 6-30		1286	
23L <sup>2</sup>	11-23, 21-45		1361	
6	All		88	501
10	All			657
16	All	952		
23	All	1024		
23L <sup>1</sup>	3-15, 6-30	1013		
23L <sup>1</sup>	11-23, 21-45	1088		
23L <sup>2</sup>	3-15, 6-30	1286		
23L <sup>2</sup>	11-23, 21-45	1361		



CONTROLS SUPPLY CHAIN

VALVES ACTUATORS INSTRUMENTATIONS