

Masoneilan[®]
Type 87/88
Actuators

Specification Data

CR8788

11/01

**Pneumatic
Spring Diaphragm
Actuators**

DRESSER
Flow Control

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Features

Masoneilan Type 87 direct-acting and Type 88 reverse-acting pneumatic spring diaphragm actuators are designed to provide high performance. Product features include:

Field Reversible

Allows air action change in the field without any additional parts.

Multiple Spring Design

Four standard spring ranges achievable by varying spring quantity and placement.

Heavy One-Piece Yoke

Provides maximum strength and support for reliable performance.

Diaphragm Cases

Pressed steel upper and lower cases combine lightness, high mechanical strength, and protection in the event of overpressurization.

Application Flexibility

Five different sizes provide a broad range of stroke and thrust capabilities.

Reliability

Molded elastomer diaphragm with fabric insert provides strength, long life and high sensitivity.

Linearity

The molded rolling diaphragm and deep cases minimize area change, resulting in a linear relationship between travel and air pressure.

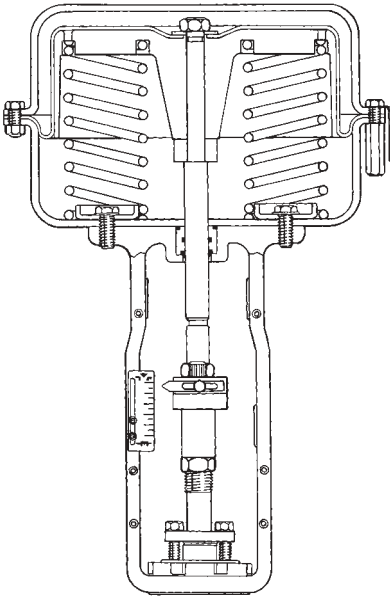
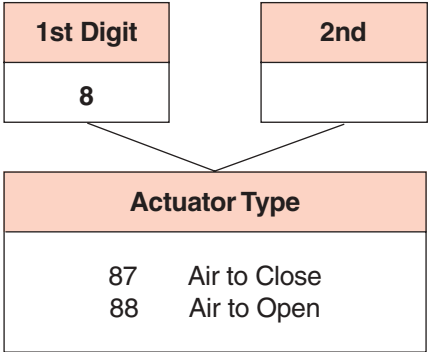
Key Accessories

The 87/88 actuators are also available with a manual override option.

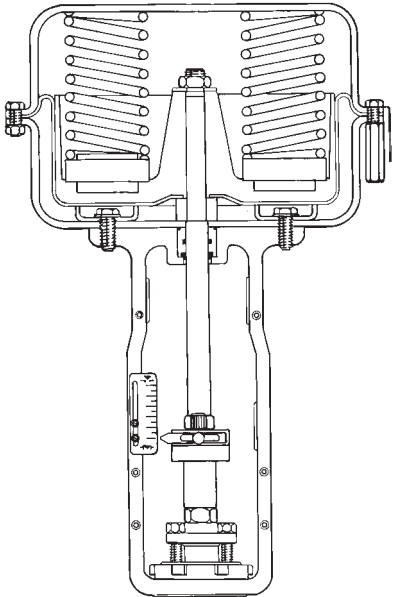
For additional information, consult your local Masoneilan Sales Representative.

Trade names noted throughout are for reference only. Masoneilan reserves the right to supply trade named material or its equivalent.

Numbering System

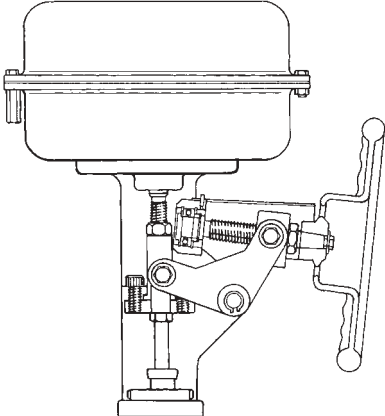


**Direct : Air to Extend Stem
Type 87**



**Reverse : Air to Retract Stem
Type 88**

Handwheels



Actuator Size	Maximum Travel (inches)	Equivalent Air Supply (psi)	Number of Turns	Rim Force (lbs.)
3	0.8	60	4	60
6	0.8	60	5	80
10	1.5	60	9	100
16	2.5	60	17	100
23	2.5	60	25	100

Specifications

Bench ranges available : 3-15, 6-30, 11-23, and 21-45 for all actuator sizes

Actuator Size	Diaphragm Effective Area (sq. in.)	Stem Travel (inches)	Max Supply (psi)
3	30	0.8	60
6	60	0.8	60
10	100	0.8 / 1.5	60
16	160	0.8 / 1.5 / 2.0 / 2.5	60
23	230	0.8 / 1.5 / 2.0 / 2.5	60

Travel Time - Typical Bench Values

Actuator Size	Travel (inches)	Time (seconds)*			
		4700 P		4700 E	
		Loading	Venting	Loading	Venting
3	0.8	1	1	1	1
6	0.8	2	2	2	2
10	0.8	4	4	9	3
	1.5	6	6	14	5
16	0.8	5	8	7	7
	1.5	7	10	11	9
	2.0	9	12	12	11
	2.5	10	13	13	13
23	0.8	11	11	20	8
	1.5	15	17	21	16
	2.0	22	20	35	17
	2.5	20	26	30	25

*Based on 88 reverse acting actuator with 3-15 spring and 20 psi air supply. The 87 direct acting actuator travel time generally exceeds the 88 actuator travel time by 5 % to 15 %. Consult Masoneilan on stroking speeds for specific valve, actuator, and positioner combinations.

Standard Springs

Actuator Size 3

Spring Type	Spring Qty	Spring Spacer
3-15	3	Without
6-30	6	Without
11-23	3	Installed
21-45	6	Installed

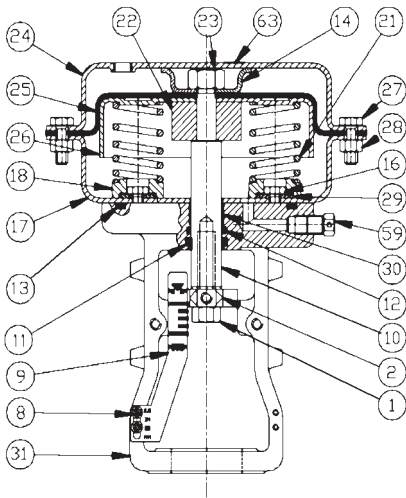
Actuator Sizes 6, 10, 16, and 23

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

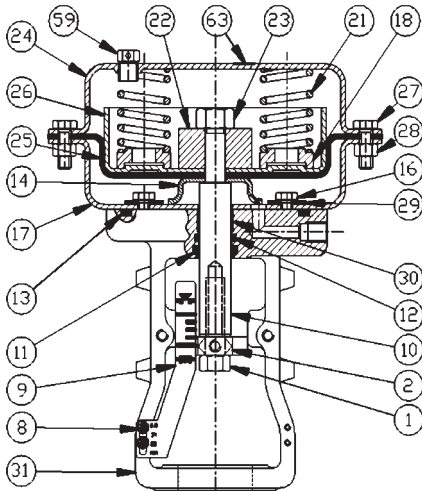
Air Connections

Standard : 1/4" NPT - All Sizes
 Optional : 1/2" NPT - Not Available on No. 3

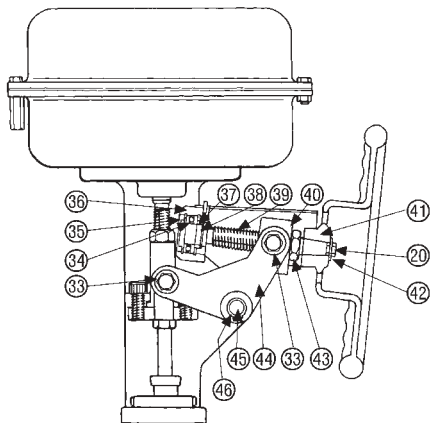
Materials



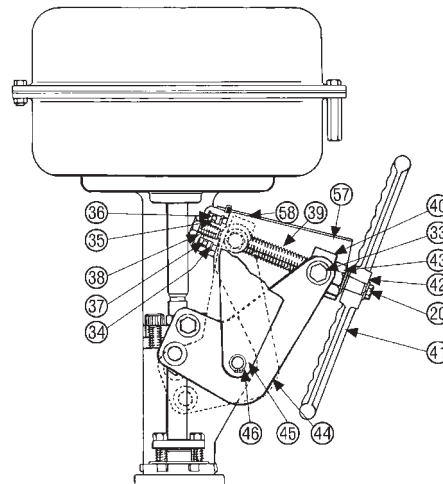
**Size 3 Actuator Air to Close
(Model 87)**



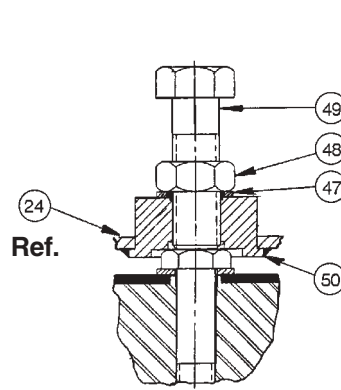
**Size 3 Actuator Air to Open
(Model 88)**



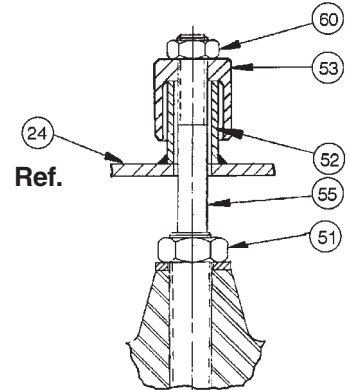
**Size 10 Actuator
with Optional Handwheel**



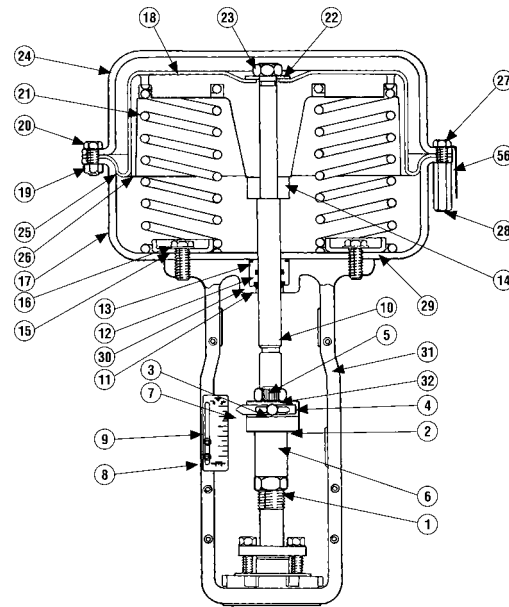
**Size 23 Actuator
with Optional Handwheel**



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



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



Size 16 Actuator

Materials

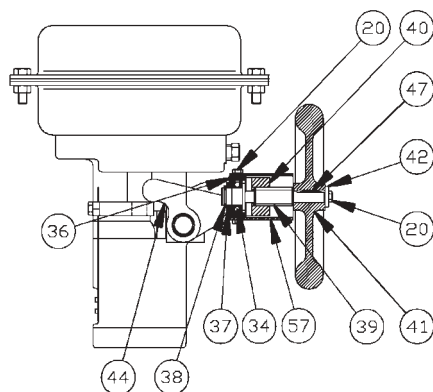
Parts Reference for Actuator Sizes 6,10,16 and 23

Ref No.	Description	Material
1	Hex Nut	Carbon Steel
2	Bottom Stem Connector	Carbon Steel, Zinc Plate
3	Hex Head Cap Screw	Carbon Steel
4	Top Stem Connector	Carbon Steel, Zinc Plate
5	Socket Head Cap Screw	Alloy Steel
6	Connector Insert	Carbon Steel, Zinc Plate
7	Pointer	Stainless Steel
8	Pan Head Screw	Carbon Steel
9	Scale - Travel	Stainless Steel
10	Actuator Stem	Stainless Steel
11	Stem Wiper	Polyurethane
12	O-ring	Buna-N
13	O-ring	Buna-N
14	Spacer	Carbon Steel
15	Seal Washer	Steel & Rubber
16	Hex Head Cap Screw	Carbon Steel
17	Lower Diaphragm Case	Carbon Steel
18	Spring Spacer	Cast Iron
19	Hex Nut	Carbon Steel
20	Hex Head Cap Screw	Carbon Steel
21	Spring	Carbon/Alloy Spring Steel
22	Washer	Carbon Steel
23	Jam Nut	Carbon Steel
24	Upper Diaphragm Case	Carbon Steel
25	Diaphragm	Buna-N w/Polyester
26	Diaphragm Plate	Aluminum ① Cast Iron ②
27	Hex Head Cap Screw	Carbon Steel
28	Compression Nut	Carbon Steel
29	Spring Guide	Carbon Steel
30	Stem Bushing	Tin/Lead Bronze
31	Machining Yoke	Gray Cast Iron
32	Lock Nut	Carbon Steel

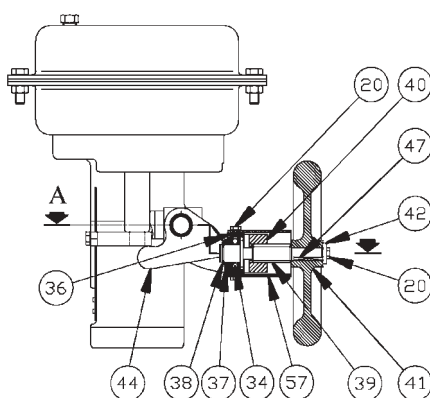
Ref No.	Description	Material
33	Pivot Pin	Carbon Steel, Zinc Plate
34	Thrust Bearing	Alloy Steel
35	Retaining Ring	Carbon Steel
36	Handwheel Pivot	Carbon Steel
37	End Flange ①	Carbon Steel, Zinc Plate
	Bearing Ring ②	Carbon Steel
38	Hex Head Cap Screw ①	Carbon Steel
	Retaining Ring ②	Carbon Steel
39	Handwheel Stem	Carbon Steel, Zinc Plate
40	Traveling Nut	Leaded Steel
41	Handwheel	Gray Cast Iron
42	Washer, Flat	Carbon Steel
43	Lock Nut	Carbon Steel
44	Handwheel Lever Assy	Carbon Steel
45	Lever Pin	Carbon Steel
46	Retaining Ring	Carbon Steel
47	Seal Washer	Steel & Rubber
48	Jam Nut	Carbon Steel
49	Hex Head Cap Screw	Carbon Steel
50	Upper Case Assembly	Carbon Steel
51	Jam Nut or Stop	Carbon Steel
52	Upper Case Assembly	Carbon Steel
53	Limit Stop	Carbon Steel
55	Stem Extension	Stainless Steel
56	Warning Plate	Stainless Steel
57	Handwheel Cover	Carbon Steel
58	Groove Pin	Carbon Steel
60	Jam Nut	Carbon Steel

① Size 16 and 23 Actuators only

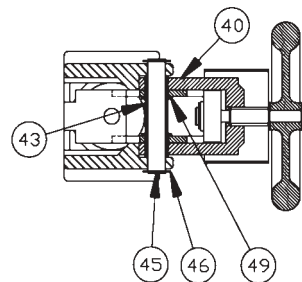
② Size 6 and 10 Actuators only



**Size 3 Actuator, Type 87
with Optional Handwheel**



**Size 3 Actuator, Type 88
with Optional Handwheel**



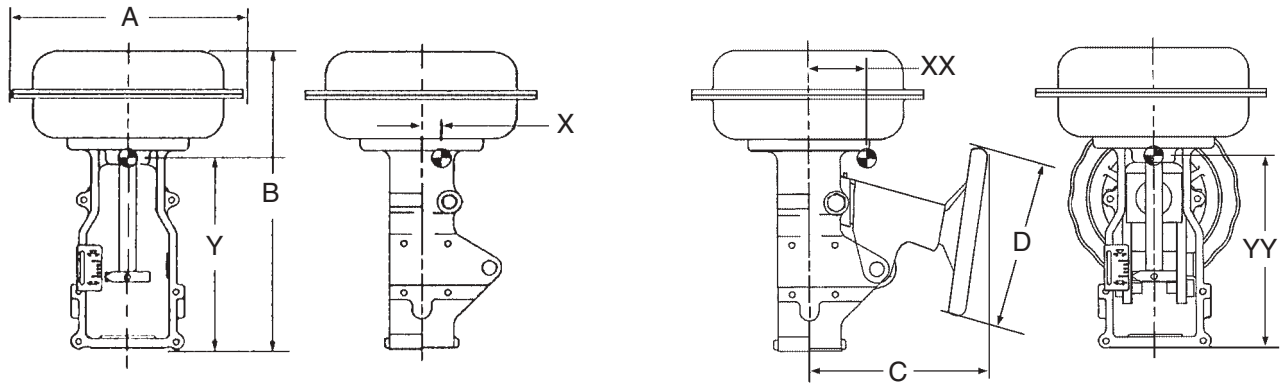
**Size 3 Actuator
Handwheel Sectional View**

Parts Reference for Actuator Size 3

Ref No.	Description	Material
1	Hex Nut	Carbon Steel
2	Stem Flange	Carbon Steel, Zinc Plate
8	Screw, Pan head	Carbon Steel
9	Scale - Travel	Stainless Steel
10	Actuator Stem	Stainless Steel
11	Stem Wiper	Polyurethane
12	O-Ring	Buna-N
13	O-Ring	Buna-N
14	Spacer	Carbon Steel, Zinc Plate
16	Cap Screw, Hex head	Carbon Steel
17	Lower Diaphragm Case	Carbon Steel
18	Spring Spacer	Carbon Steel, Zinc Plate
20	Cap Screw, Hex head	Carbon Steel
21	Spring	Alloy Spring Steel
22	Spacer	Carbon Steel, Zinc Plate
23	Hex Nut	Carbon Steel
24	Upper Diaphragm Case	Carbon Steel
25	Diaphragm	Buna-N w/Polyester
26	Diaphragm Plate	Carbon Steel
27	Cap Screw, Hex head	Carbon Steel
28	Hex Nut	Carbon Steel

Ref No.	Description	Material
29	Spring Guide	Carbon Steel, Zinc Plate
30	D.U. Bushing	Steel/Bronze/PTFE
31	Yoke, machining	Gray Cast Iron
34	Thrust Bearing	Alloy Steel
36	Handwheel Pivot	Carbon Steel
37	Bushing	Tin/Lead Bronze
38	Retaining Ring	Carbon Steel
39	Handwheel Stem	Carbon Steel, Zinc Plate
40	Handwheel Holder	Carbon Steel
41	Handwheel	Gray Cast Iron
42	Washer	Carbon Steel
43	Lever Assembly	Carbon Steel
44	Handwheel Lever	Carbon Steel, Zinc Plate
45	Lever Pin	Carbon Steel
46	Retaining Ring	Carbon Steel
47	Key	Carbon Steel
49	Retaining Ring	Carbon Steel
57	Handwheel Cover	Carbon Steel, Zinc Plate
59	Vent Plug	Carbon Steel, Zinc Plate
63	Caution Tag	Vinyl

Dimensions and Weights (U.S.)



Shown with optional handwheel

Dimensions and Weights

Actuator Size	Actuator Dimensions (inches)				Weights (lbs.)	
	A	B	C	D	Standard	w/Handwheel
3	9.06	10.99	6.74	6.30	27	34
6	11.50	15.54	10.00	9.00	45	60
10	14.50	19.58	10.90	12.00	85	105
16	18.75	28.22	14.00	18.00	210	245
23	21.63	30.71	16.00	18.00	265	320

Actuator Removal Clearance = 6 inches

Center of Gravity (inches)

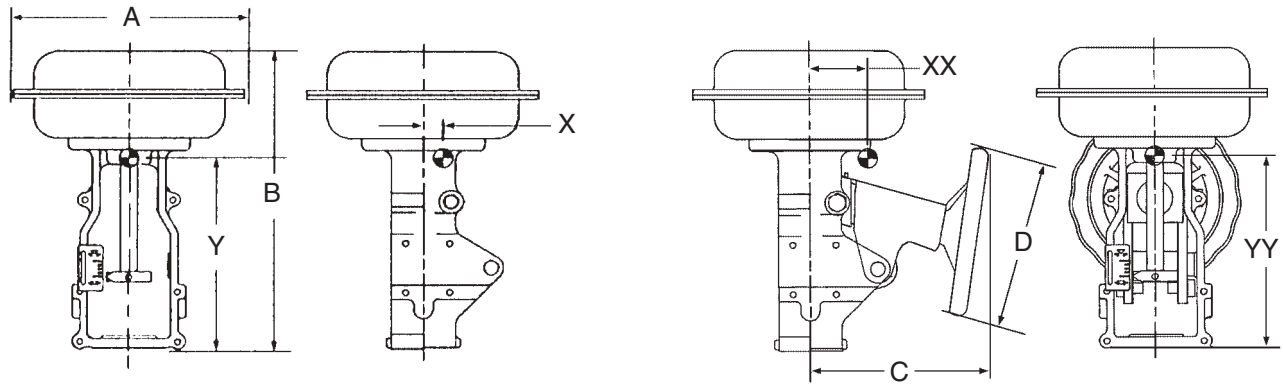
Size	X	Y
3	.11	6.89
6	.19	9.75
10	0	12.88
16	.13	18.50
23	.06	21.13
With Handwheel		
Size	XX	YY
3	1	6.30
6	1.25	9.13
10	0.88	12.00
16	1.38	16.75
23	1.38	19.00

Limit Stops (inches)

Size	Model	Overall Height
6	87	19.1
10		24.5
16		32.3
23		35.2
6	88	18.8
10		24.6
16		35.6
23		37.8

Not Available for Size 3

Dimensions and Weights (Metric)



Shown with optional handwheel

Dimensions and Weights

Actuator Size	Actuator Dimensions (mm)				Weights (kg)	
	A	B	C	D	Standard	w/Handwheel
3	230	279	171	160	12	15
6	292	395	254	229	20	27
10	368	497	277	305	39	48
16	476	717	356	457	95	111
23	549	780	406	457	120	145

Actuator Removal Clearance = 150 mm

Center of Gravity (mm)

Size	X	Y
3	3	175
6	5	248
10	0	327
16	3	470
23	2	537
With Handwheel		
Size	XX	YY
3	25	160
6	32	232
10	22	305
16	35	425
23	35	483

Limit Stops (mm)

Size	Model	Overall Height
6	87	485
10		622
16		820
23		894
6	88	478
10		625
16		904
23		960

Not Available for Size 3

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