

**MIL 37-38  
PNEUMATIC SPRING DIAPHRAGM ACTUATORS  
WITH OPTIONAL HAND WHEELS**



**MIL Controls Limited**

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## Foreword

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MIL 37 direct acting and MIL 38 reverse acting pneumatic spring diaphragm actuators are designed to provide high performance. Their features include:

### **HEAVY ONE-PIECE YOKE**

Provides maximum strength and rigidity.

### **DIAPHRAGM CASES**

Pressed steel upper and lower cases combine lightness, high mechanical strength and adequate protection in the event of severe over pressurization.

### **THRUST CAPABILITY**

Two actuator types and six sizes provide a wide range of application.

### **DIAPHRAGM**

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

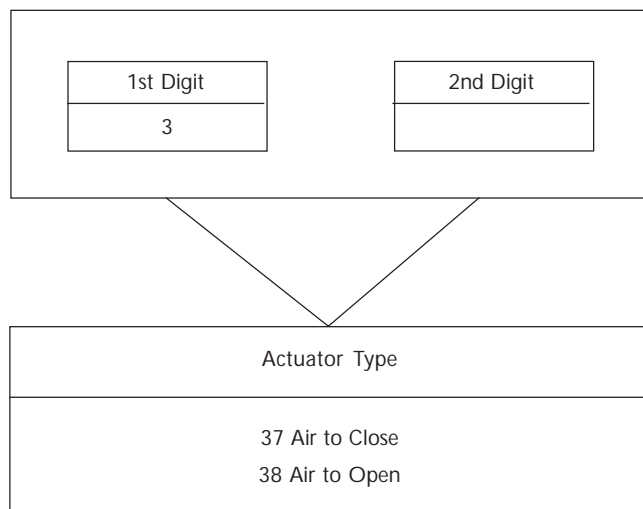
### **LINEARITY**

The molded diaphragm and deep cases minimize area change and produce a linear relationship between travel and air pressure.

The following specifications have been assembled to provide technical information required to specify MIL Type 37 and Type 38 spring diaphragm actuators.

## Numbering System

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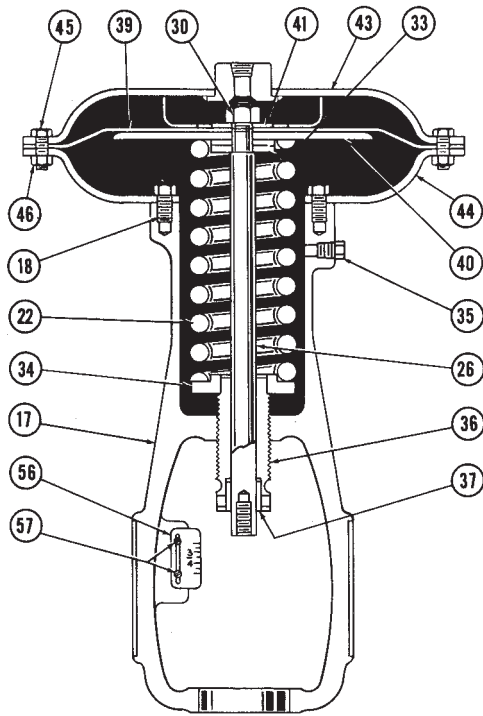
## Specifications

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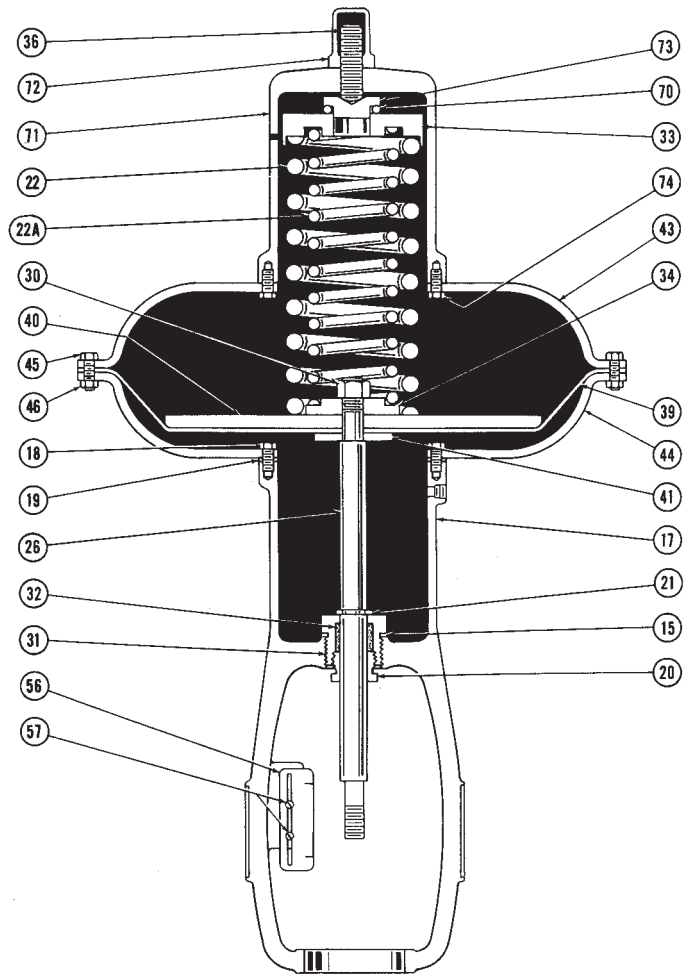
Actuator Size	Initial Diaphragm Effective Area (sq.in.)	Stem Travel (in.)	Bench Range (psi)	Max. Supply (psi)
11	81.5	$\frac{1}{2}$ , $\frac{3}{4}$ , 1	3-15	60
			6-30	
13	115.2	$\frac{1}{2}$ , $\frac{3}{4}$ , 1, $1\frac{1}{2}$	3-15	60
			6-30	
15	176	$\frac{3}{4}$ , $1\frac{1}{2}$ , 2	3-15	60
			6-30	
18	272	$\frac{7}{8}$ , $1\frac{1}{2}$ , 2, $2\frac{1}{2}$	3-15	60
			6-30	
18L	272	3, $3\frac{1}{2}$ , 4	3-15	60
			6-30	
24	368	$2\frac{1}{2}$ , $3\frac{1}{2}$ , 4	3-15	55
			6-30	

*Other stem travels and spring ranges available.*

# 37 / 38 ACTUATORS



**Type 37 Actuator**  
**Direct : Air to extend stem**  
*(11" size shown)*



**Type 38 Actuator**  
**Reverse : Air to retract stem**  
*(18" size shown)*

## MATERIALS - TYPE 37 / 38

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Ref. No.	Description	Material
*15	Gasket (Packing Box)	Copper
17	Yoke	Cast Iron/Steel
18	Cap Screw	Carbon Steel
*19	Gasket (Lower case to yoke)	**Asbestos
*20	Packing Nut	Brass
*21	Snap Ring	Carbon Steel
22	Actuator Spring	Spring Steel
*22A	Actuator Spring	Spring Steel
26	Actuator Stem	Stainless Steel
30	Nut (Actuator Stem)	Carbon Steel
*31	Packing Box	Brass or Iron
*32	Yoke Packing	** Graphited Asbestos
33	Spring Guide (Upper Spring Seat)	Carbon Steel
34	Spring Button (Lower Spring Seat)	Nickel Copper Alloy
#35	Pipe Plug	Plastic or C.S.
*36	Spring Adjuster	Steel
#37	Bushing (Spring Adjuster)	Steel
39	Diaphragm	Elastomer w/Fabric Insert
40	Diaphragm Plate	Carbon Steel
41	Diaphragm Washer	Carbon Steel
43	Diaphragm Case (Upper)	Carbon Steel
44	Diaphragm Case (Lower)	Carbon Steel
45	Cap Screw (Diaph. Case)	Carbon Steel
46	Nut (Diaph. Case)	Carbon Steel
56	Travel Indicator Scale	Aluminium
57	Machine Screw	Stainless Steel
*70	Ball & Retainer	Stainless Steel
*71	Spring Barrel	Cast Iron
*72	Spring Barrel Cap	Cast Iron
*73	Ball Bearing Race	Steel
*74	Cap Screw	Carbon Steel

\* Only for Type 38, Reverse Actuators

# Only for Type 37, Direct Actuators

\*\* Non-Asbestos Material Available, Consult MIL

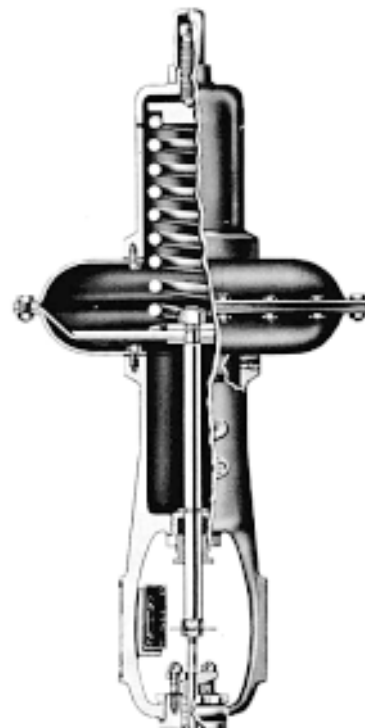
## Travel Time — Typical Bench Values

Actuator Size	Travel (inches)	Approx. closing or opening time (seconds)	
		8013 Electro pneumatic Positioner	7400 Pneumatic Positioner
11	$\frac{3}{4}$	3	6
	1	4	7
13	1	5	11
	$1\frac{1}{2}$	7	13
15	$1\frac{1}{2}$	10	17
	2	12	20
18	2	19	30
	$2\frac{1}{2}$	21	34
18L	$3\frac{1}{2}$	29	44
	4	32	48

*Basis : 3-15 psi spring range, 20 psi supply, Stroking time varies with other spring ranges, accessories, packing material and supply pressure, Stroking time can be further improved by adding suitable accessories, Consult MIL*

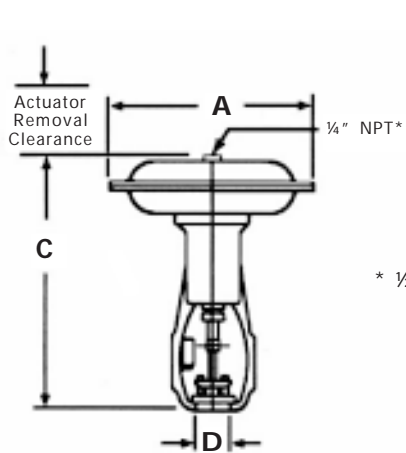


**Type 37 Actuator**  
**Direct : Air to extend stem**

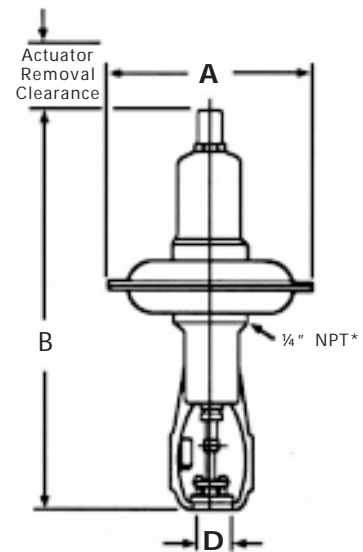


**Type 38 Actuator**  
**Reverse : Air to retract stem**

## Actuator Dimensions (Inches) & Weight (Kgs.)



\* 1/2" NPT for 24" Actuators



**Type 37 Actuator**  
Direct : Air to extend stem

**Type 38 Actuator**  
Reverse : Air to retract stem

Actuator Size	A (Inch)	B (Inch)	C (Inch)	Spud Dia D (Inch)	ARC (Inch)	Weight 37 (kg)	Weight 38 (kg)
11	13	24.10	16.4	2.25	5.6	20	25
13	15	29.6	20.1	2.25	5.6	32	39
15	17.50	35.3	25.4	3.13	5.6	54	64
18	20.75	36.8	26.8	3.13	5.6	82	113
*18L	20.75	42.1/52	33.2	3.75	5.6/6.2	86	168
24	27.50	45.5	34.7	3.75	5.6	109	136

\* 24 case-1/2"NPT

ARC : Actuator Removal Clearance

\* 18L 2 Types are available

# Handwheels - Side Mounted Types

## General

Handwheels provide a means for normally operating control valves in emergency, during start-up and in event of air failure. Side mounted continuously connected handwheels are operated without the use of clutches of any kind. Handwheel position indicators, and latches to retain wheels when not in use, are provided. Five sizes are available, combining compactness with adequate power to operate the valve sizes for which each is designed (see table).

## 6A Series

These bell crank lever types are externally mounted on the yoke. They provide adjustable stops to limit the extent of valve travel in either direction, but not both. A pad cast on the side of the handwheel bracket provides for the attachment of an air supply valve. On valve with 6-30 psi spring range these handwheels are recommended for setting limit stops or for occasional emergency manual operation.

## 7A Series

Series 7A handwheels are designed with a worm gear drive to provide the extra power required by large size valves. The gears are contained in a permanently lubricated gear box which is integral with the special long yoke. The high quality material and precise construction used in the manufacture of the gears,

Actuator	Handwheel
11	6A1
13	6A2
15	6A3
18	6A3 / 8A
24	7A

power screw and thrust bearings, assure trouble-free operation and minimum effort to operate. Clockwise rotation of the handwheel normally moves the stem downward. However, handwheel may be located so that clockwise rotation moves the stem upward. This change can be readily made in the field. Stops may be set in either or both directions.

## 8A Series

The 8A series handwheel units feature a transformation of motion by worm gears and worm, like the 7A Series Handwheel Units. They deliver the necessary power for operating large size valves. The permanently lubricated gears are located in a housing placed at top of the actuator. High grade materials, precise machining of gears, worm and power screw and use of ball bearings, makes it a sturdy and easy to operate unit. The actuator stem extends when the handwheel is rotated clockwise.

**6A Series  
Side Mounted Handwheel**



# Handwheels (Optional)

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**7A Series**  
**Side Mounted Handwheel**



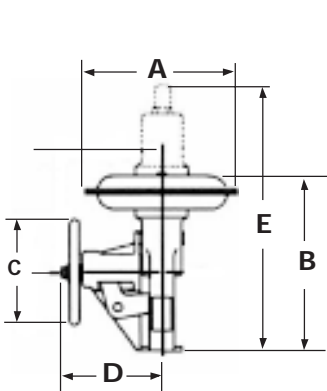
**8A Series**  
**Side Mounted Handwheel**

# Handwheel Specifications

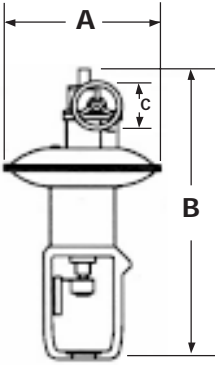
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H/W Type	Act. Size	Max. Travel (Inches)	Max. Air Supply (Psig)	Weight (Kgs)
6A1	11	1.0	60	10
6A2	13	1.5	60	20
6A3	15	2.0	60	34
	18	2.5	35	
8A	18	4.0	60	18
7A	24	4.0	55	32

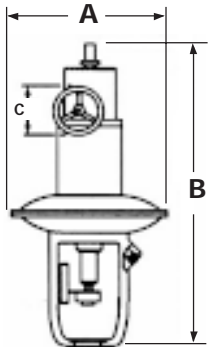
# Handwheels Dimensions (Inches)



**6A Series**  
**Side Mounted Handwheel**



**8A Series**  
**Side Mounted Handwheel**  
*(Mounted on 37 Direct Actuators)*



**8A Series**  
**Side Mounted Handwheel**  
*(Mounted on 38 Reverse Actuators)*

Type	Actuator Size	A	B	C	D	E
6A1	11	13	16 <sup>3</sup> / <sub>8</sub>	9	8 <sup>3</sup> / <sub>4</sub>	24 <sup>1</sup> / <sub>8</sub>
6A2	13	15	20 <sup>1</sup> / <sub>8</sub>	12	10 <sup>7</sup> / <sub>8</sub>	29 <sup>5</sup> / <sub>8</sub>
6A3	15	17 <sup>1</sup> / <sub>2</sub>	25 <sup>5</sup> / <sub>8</sub>	18	15	35 <sup>1</sup> / <sub>2</sub>
	18	20 <sup>3</sup> / <sub>4</sub>	26 <sup>7</sup> / <sub>8</sub>	18	15	36 <sup>3</sup> / <sub>4</sub>
8A	18	20 <sup>3</sup> / <sub>4</sub>	53	8	-	-
	24	27 <sup>1</sup> / <sub>2</sub>	58	12	-	-

## 37 / 38 Actuator Diaphragm Areas

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Actuator Stroke (inch)	Effective Diaphragm Area (Sq.inch)				
	11"	13"	15"	18"	24"
0	81.5	115.2	176	272	368
0.125	78.0	-	-	-	-
0.25	75.7	107.0	-	-	-
0.375	73.7	-	-	-	-
0.500	72.2	102.5	149	243	-
0.625	70.7	-	-	-	-
0.750	69.7	100.0	143	237	-
1.000	68.0	98.0	140	230	335
1.250	-	96.2	137	226	-
1.500	-	94.5	136	224	324
1.750	-	-	-	-	-
2.000	-	-	134	223	314
2.500	-	-	-	221	303
3.000	-	-	-	217	-
3.500	-	-	-	212	260
4.000	-	-	-	200	234



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