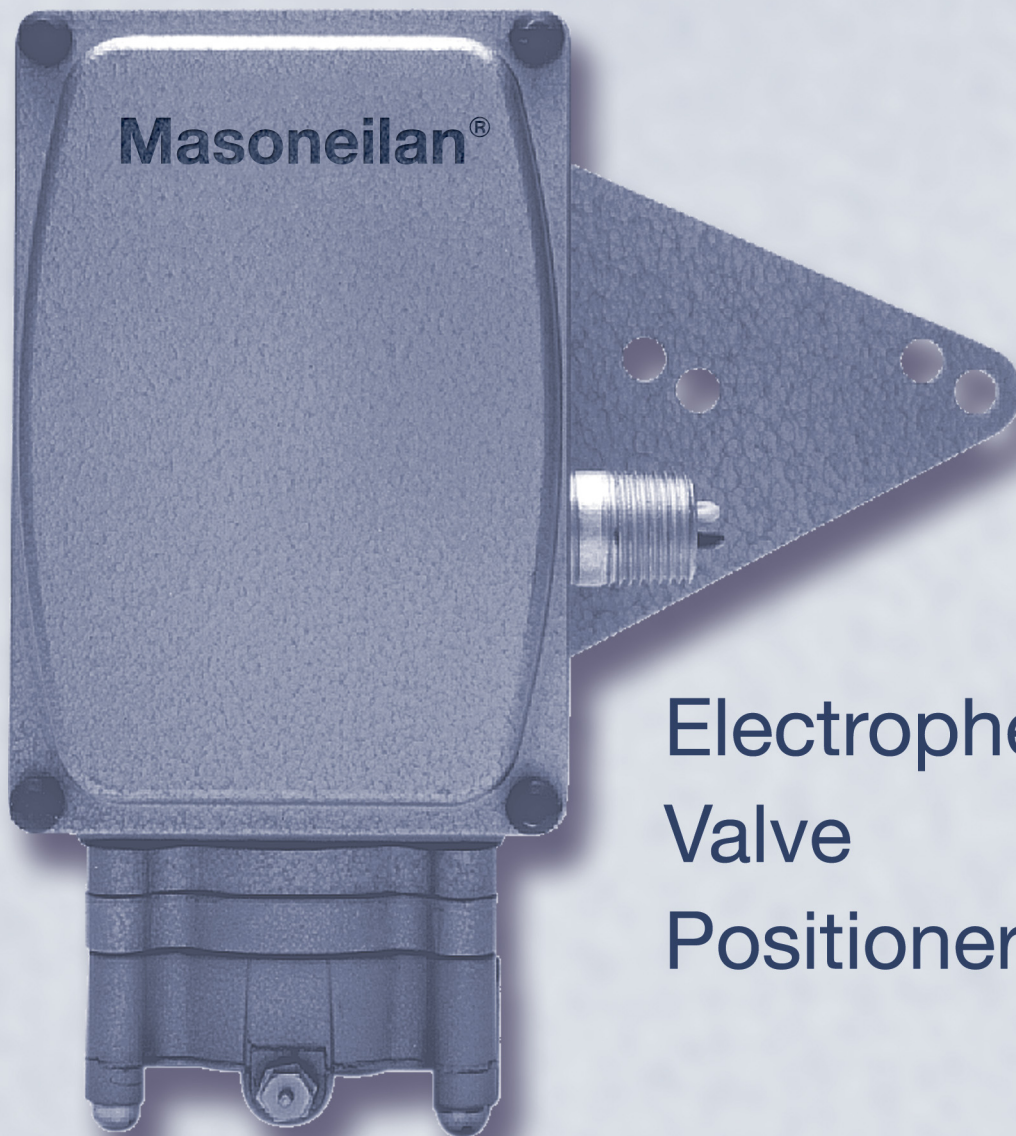


Specification Data

# Masoneilan® 8012 Series

CS5000

05/94



Electropneumatic  
Valve  
Positioners

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## Foreword

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### **Key Design Characteristics of the 8012 Positioner Series are:**

#### **Dynamic Response and Positioning Accuracy**

The Masoneilan Series 8012 Positioners are force-balance, electropneumatic devices which, by directly comparing valve stem position with controller dc output signal, provide dynamic response and positioning accuracy not obtainable with transducer and pneumatic positioner combination.

#### **Split-ranging Controller**

In addition, the Positioners provide an accurate means of split-ranging controller output signal for sequential operation of two or more control valves by a single controller.

#### **Corrosion Resistance**

This series of electropneumatic valve positioners is suitable for most corrosive atmospheres due to its internal nozzle bleed. This provides constant purging.

#### **Direct Action and Reverse Action**

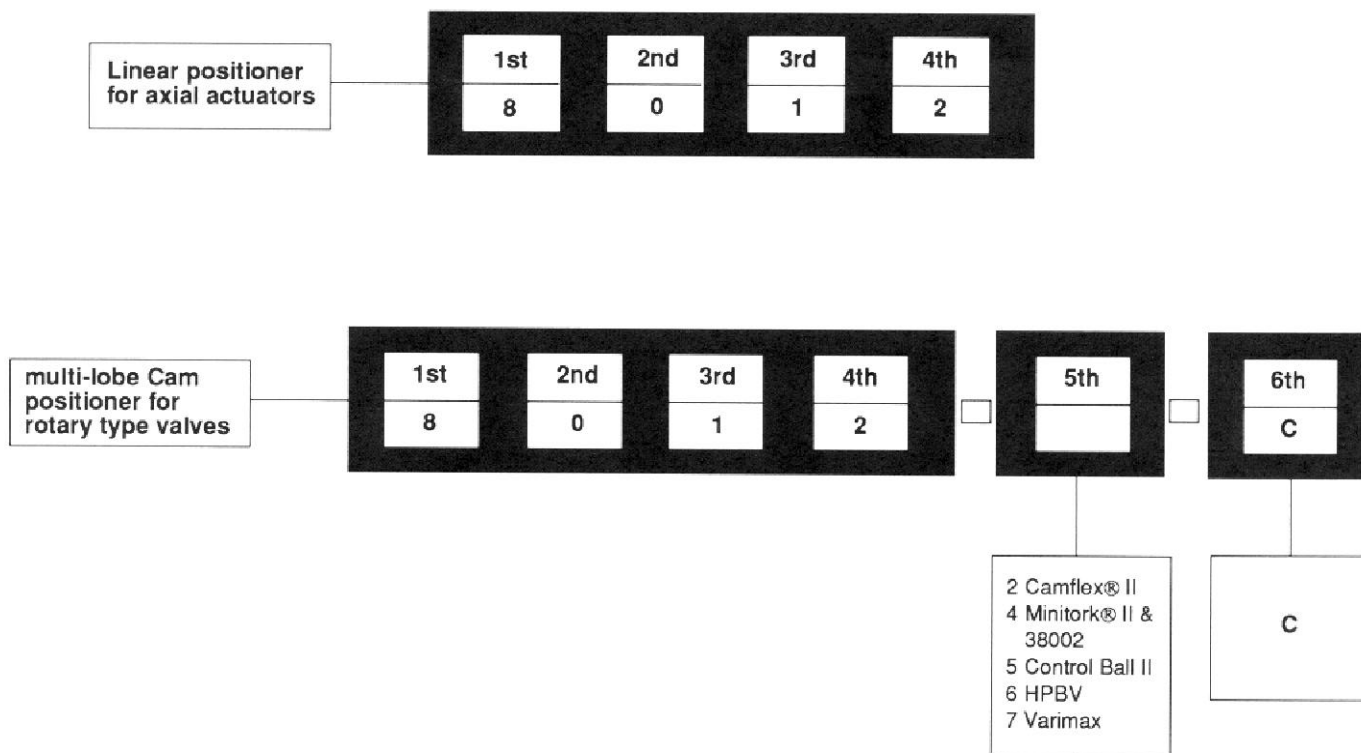
Positioners are available for either direct action (increase in electrical signal increases output pressure) or reverse action (increase in electrical signal decreases output pressure).

#### **Vibration Resistant**

Masoneilan's nozzle design provides a detection system which is not affected or damaged by valve vibration. Zero and span changes are essentially independent of vibration.

The following specifications have been assembled to provide technical information required to specify 8012 Series Electropneumatic valve positioners for use with reciprocating control valves, Camflex® II valves, Varimax valves, Control Ball II valves, Minitork® II, 38002 and 39002 butterfly valves.

## Numbering System



## Model Descriptions

### Basic Model 8012

The basic Model 8012 Positioner is used with reciprocating control valves. Its linkage is designed for actuators with a straight axial motion. Feedback linkage is connected directly to the actuator stem. The Model 8012 has a stroke and zero adjustment assembly and may be split-ranged with various controller signals.

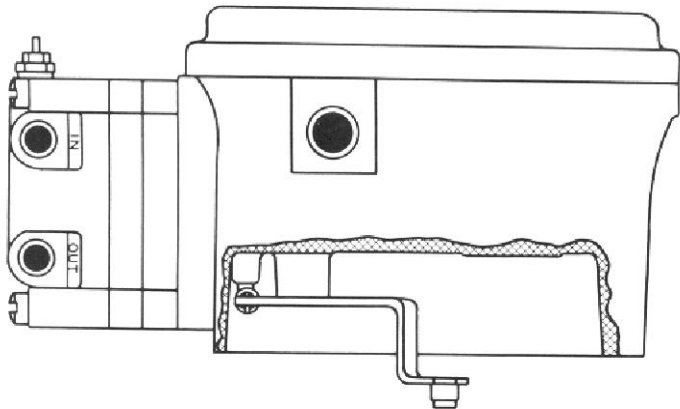
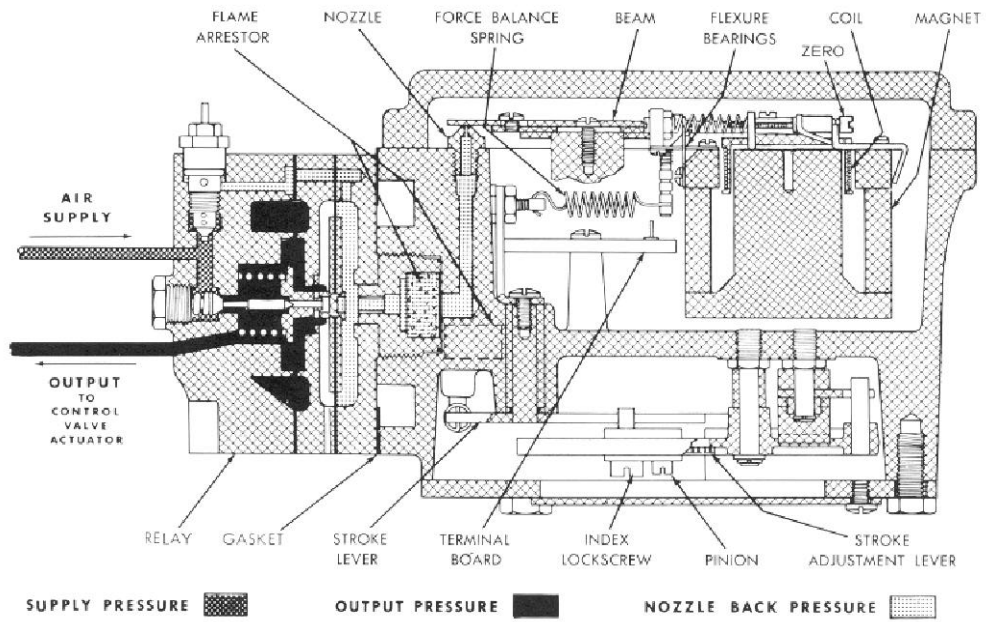
### Cam Model 8012 (2-C, 4-C, 5-C, 6-C, 7-C)

The multi-lobe Cam model positioners are used with most Masoneilan rotary type valves.

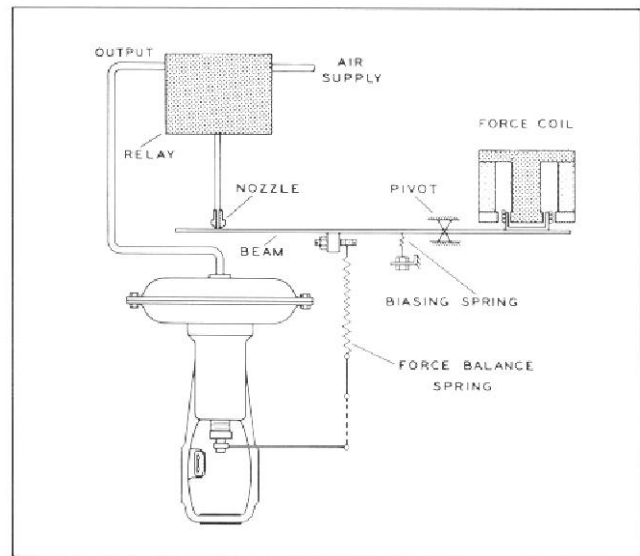
The positioner connects directly to the rotary shaft, thus eliminating all intermediate linkages.

The multi-lobe cams are characterized to provide inherent, equal percentage, and linear characteristics. These cams also provide for split-ranging.

Operation



8012-2-C



## Construction

The die cast aluminum housing provides outdoor weather resistance and a sealed conduit connection. Electrical circuit is easily adapted to a variety of input signals. It utilizes a powerful, Hyflux Alnico V Magnet with high quality force coil with a high dielectric bobbin and mechanically protected windings.

Terminal board has a jack type terminal post to receive coil leads, and also serves as a mounting unit for components necessary to adapt the positioner to various electrical signals.

The case has a 1/2" NPT conduit nipple with 18" long epoxy-sealed external leads to prevent the entrance of moisture prior to start-up and to eliminate the need to open the case for wiring.

Relay is high capacity type for fast stroking speeds. It may be mounted in any one of four positions to facilitate piping. A plunger provides for cleaning sapphire orifice in the removable metering tube.

Balanced beam design permits installation in any position without shift in calibration. Beryllium copper flexure bearings provide friction-free fulcrum points for the beam. An adjustable beam stop prevents damage to coil.

Provision is made for the adjustment of valve travel.

Zero adjustment is easily accomplished and provides 100% zero suppression or elevation for split ranging or reverse action.

## Electrical Safety and Enclosures

The 8012 Series positioners have the following Factory Mutual approvals:

Explosionproof for Class I, Division 1, Groups B, C and D hazardous locations, dust-ignitionproof for Class II, Division 1, Groups E, F and G and suitable for Class III, Division 1 hazardous locations.

Housing NEMA 4X rated.

Intrinsically safe for Class I, II, III, Division 1, applicable Groups A, B, C, D, E, F and G hazardous locations in accordance with entity requirements and Masoneilan Drawing No. CP-12-18-93. Applies only to 4-20 mA input range.

The following Canadian Standards Association (C.S.A.) approvals have been obtained:

Explosionproof for Class I, Division 1 and 2, Groups C and D; Class I, Division 2, Groups A and B.

Intrinsically safe for Class I, Groups A, B, C and D when connected to C.S.A. certified energy limiting device per Masoneilan Drawing No. CP-12-15-116. Applies only to 4-20 mA input range.

### Important

The following data must be furnished to the factory with all inquiries for intrinsically safe positioners: specify interface module, barrier, manufacturer, and model number and classification of the hazardous atmosphere. Refer to factory for current approval listing.

## Input Signals

The Series 8012 Electropneumatic Positioners can be supplied or easily adapted to accommodate the dc output signals of nearly all electronic controllers presently on the market.

input current dc signal	nominal input resistance
1-5 mA	2140 ohms
10-50 mA	104 ohms
4-20 mA	173 ohm
4-20 mA	273 ohms
	Intrinsically Safe

## Performance Characteristics

<b>conformity:</b>	± 2% of span	<b>① maximum supply pressure:</b>	75 psi
<b>ambient temperature range:</b>	-40°F to +180°F	<b>speed vs orientation:</b>	see actuator data
<b>air consumption steady state:</b>	0.21 scfm @ 20 psig 0.29 scfm @ 35 psig	<b>output:</b>	determined by supply pressure
<b>exhaust capacity:</b>	3.3 scfm @ 20 psig approximately 5.4 scfm @ 35 psig	<b>load sensitivity:</b>	output pressure change of 1.2 psi
<b>orientation effect:</b>	insignificant		

① Limited by actuator rating.  
Special metering orifice available for supply pressures 55 psig to 75 psig.

## Electrical Characteristics

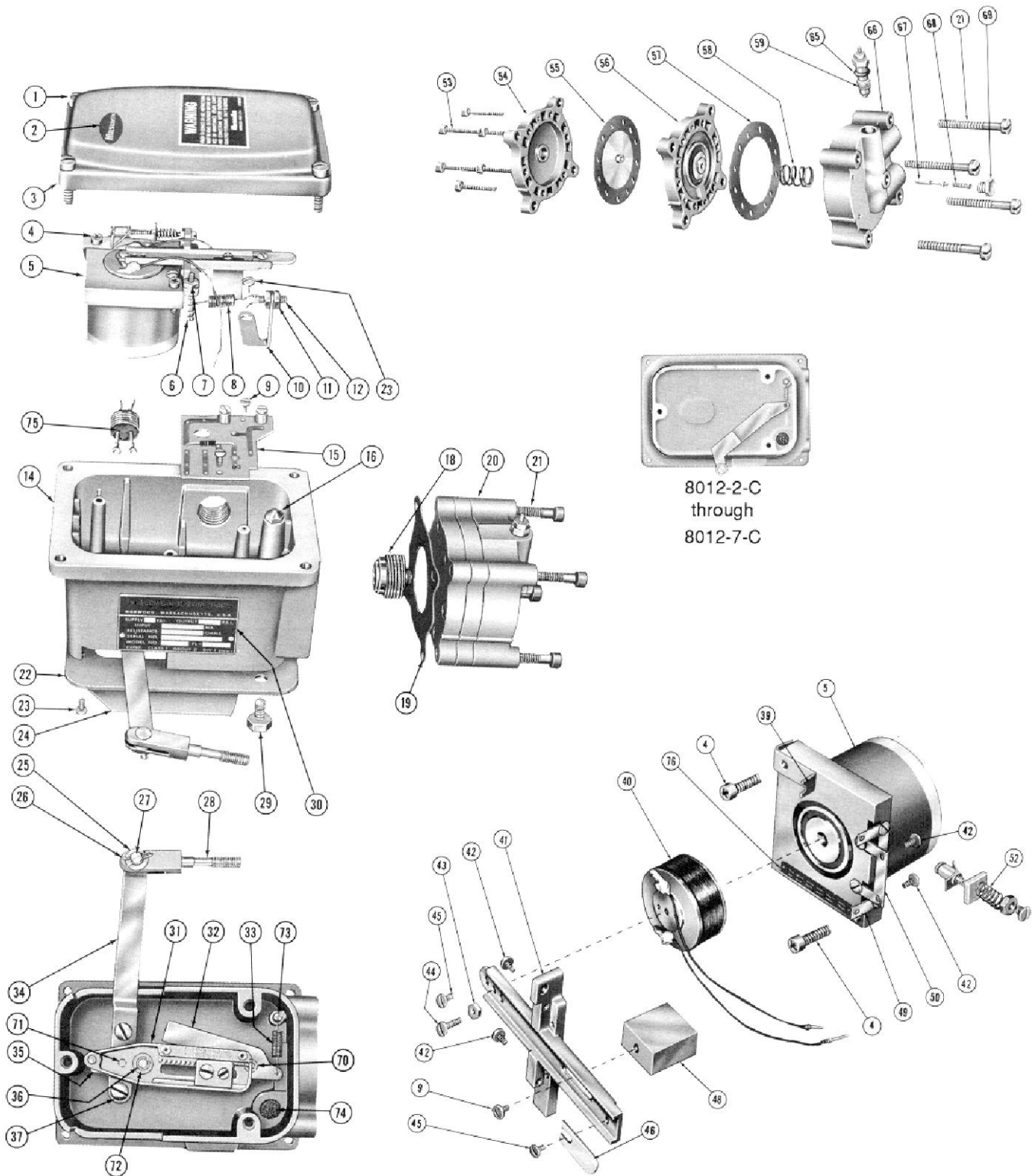
<b>electrical safety:</b>	weatherproof, explosion-proof, intrinsically safe (see page 5, electrical safety and enclosures)	<b>zero adjustment:</b>	vernier screw
<b>input:</b>	1-5 mA; 2140 ohms 4-20 mA; 173 ohms 4-20 mA; 273 ohms 10-50 mA; 104 ohms	<b>span adjustment:</b>	tension adjustment on force balance spring
<b>① open loop gain:</b>	approximately 100	<b>range selection:</b>	index and calibrated stroke scale, Model 8012 electro-pneumatic valve positioner  multi-function cam, Models 8012-2-C through 8012-7-C electropneumatic valve positioner

① Defined as  $\frac{\% \text{ of full stroke}}{\% \text{ of full input range}}$

## Construction and Materials

<b>housing:</b>	die cast aluminum, Anodized or chromated surface finish	<b>seat ring:</b>	aluminum
<b>relay:</b>	die cast aluminum	<b>relief seat:</b>	brass
<b>beam:</b>	balanced die-cast anodized aluminum	<b>force coil:</b>	high dielectric bobbin with winding protection
<b>beam bearings:</b>	beryllium copper flexures	<b>weight:</b>	6.5 lbs. (approximately)
<b>nozzle:</b>	brass	<b>magnet:</b>	Hyflux Alnico V with soldered plated low carbon steel pole pieces
<b>plug:</b>	303 stainless steel		





## Parts Reference

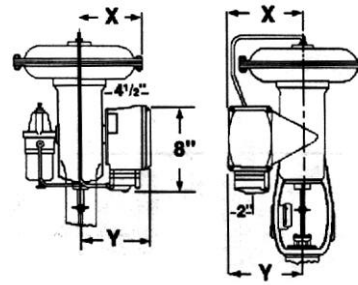
Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
1	Cover Screw	25	Washer	48	Weight
2	Emblem	26	Retaining Clip	49	Flexure Bearing
3	Cover	27	Clevis Pin	50	Flexure Bearing
4	Mounting Screw	28	Clevis	52	Biasing Spring
5	Magnet S/A	29	Cap Screw	53	Machine Screw
6	Adjusting Screw	30	Serial Plate	54	Cap
7	Nut	31	Lever (Stroke Adj.)	55	Diaphragm S/A
8	Spring (Force Balance)	32	Stroke Lever	56	Bellofram Plate S/A
9	Screw	33	Spring (Stroke Lever)	57	Gasket
10	Spring Lever	34	Back Lever	58	Spring
11	Locking Nut	35	Back Lever Adapter	59	Metering Tube S/A
12	Adjusting Screw	36	Snap Ring	65	O-Ring
14	Case	37	Screw	66	Relay Body
15	Terminal Board S/A	39	Spring Bracket	67	Relay Plug
16	Nozzle	40	Coil S/A	68	Spring
18	Adapter (Flame Arrestor)	41	Beam	69	Holding Screw
19	Gasket	42	Screw	70	Sleeve Bearing
20	Relay	43	Locknut	71	Bearing Post
21	Mounting Screw (Relay)	44	Machine Screw	72	Bearing Post
22	Mounting Bracket	45	Machine Screw	73	Groove Pin
23	Screw	46	Flapper	74	Flame Arrestor
24	Cover Plate (Stroke Adj.)			75	Nipple



### Dimensions (inches)

#### 37/38 Actuator

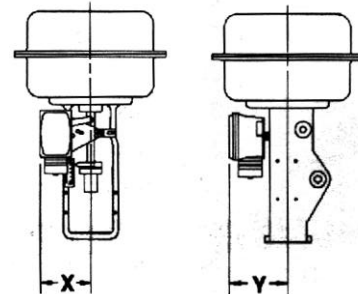
Actuator Size	X	Y
9	5.5	6.25
11	6.5	6.25
13	7.5	7.75
15	8.75	7.75
18	10.38	7.75
24	13.5	9.13



Model 8012 used with Axial Spring Diaphragm Actuator

#### 87/88 Actuator

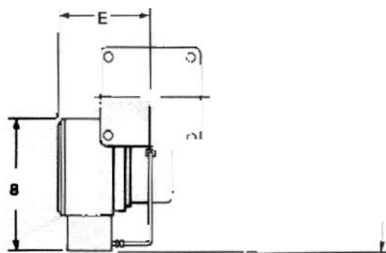
Actuator Size	X	Y
6	6.3	6.6
10	6.3	6.8
16	6.3	7.3
23	6.3	7.3



Model 8012 used with Multi-Spring Diaphragm Actuator

#### Camflex® II Actuator

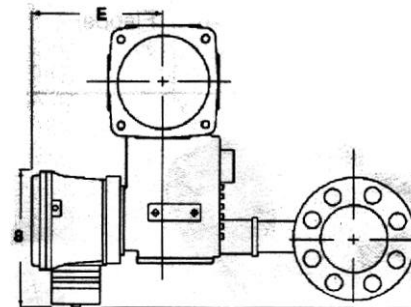
Actuator Size	E	F (max.)
4 1/2	6.1	5.5
6	6.8	5.8
7	7.4	6.2



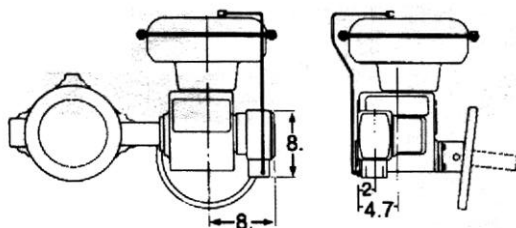
Model 8012-2-C Cam Feedback used with the Camflex® II Actuator

#### Varimax Actuator

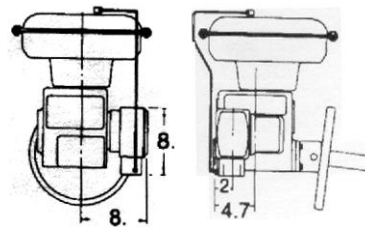
Actuator Size	E	F (max.)
3	7.1	6.9
5	7.7	8.9
7	8.3	9.5
9	9.3	10.8



Model 8012-7-C Cam Feedback used with Varimax



Model 8012-4-C Cam Feedback used with the Minitork® & Model 8012-6-C Cam Feedback used with HPBV (Not shown)



Model 8012-5-C Cam Feedback used with the Control Ball II

