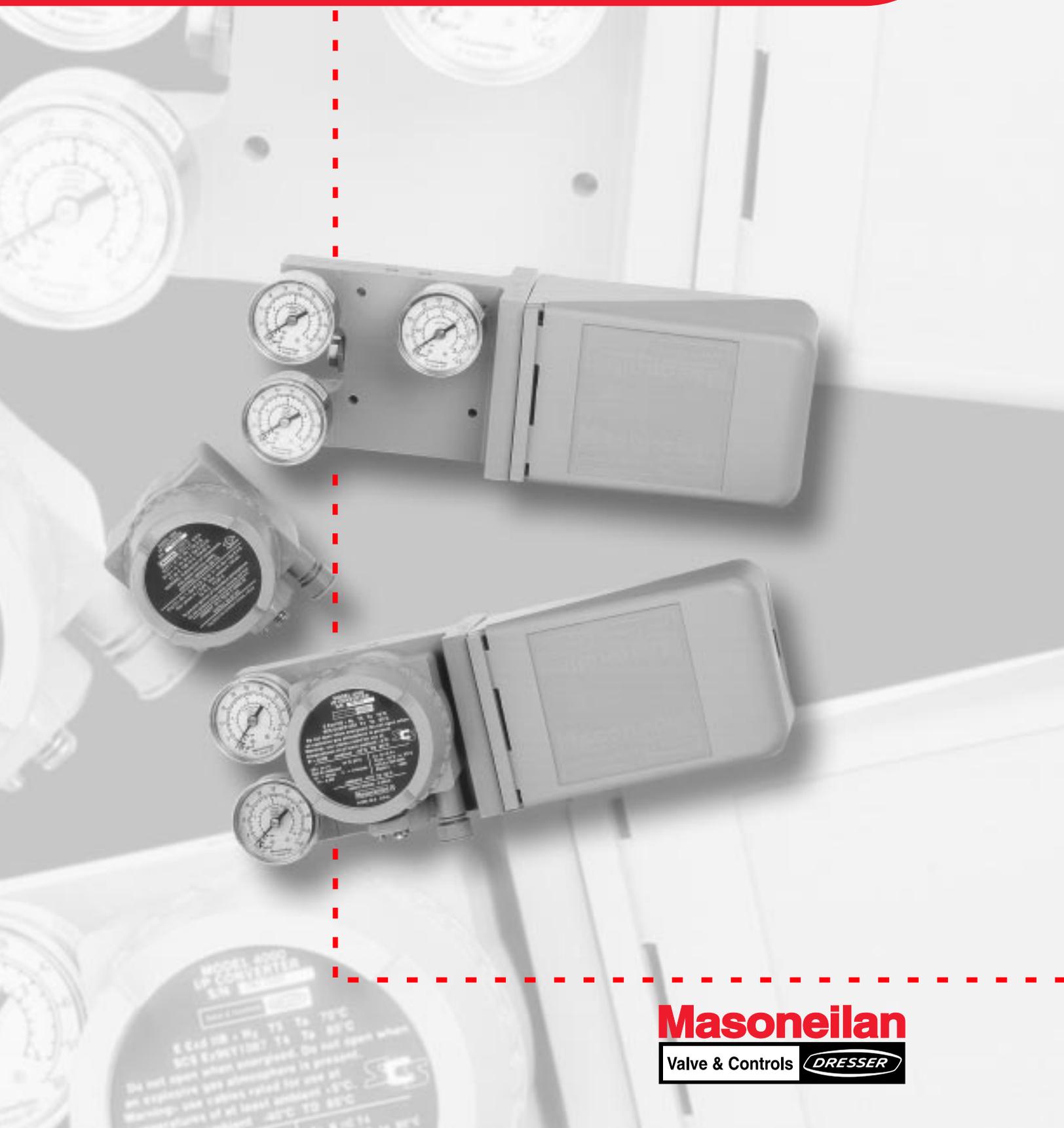


# Corrosion Resistant Pneumatic Positioners Model 4700P and 4700E

Specification Data

CS2007

4/98



**Masoneilan**

Valve & Controls

**DRESSER**

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## Foreword

The Model 4700E (Electric) and 4700P (Pneumatic) are field proven positioners utilizing a precision feedback cam to provide accurate positioning, very fast response, and customized control characteristics for control valves. These positioners can be used with either rotary or reciprocating actuators. When mounted on reciprocating actuators, a simple, rugged turnbuckle and lever assembly couples stem motion to the cam. On rotary acutators, the cam is mounted directly on the shaft.

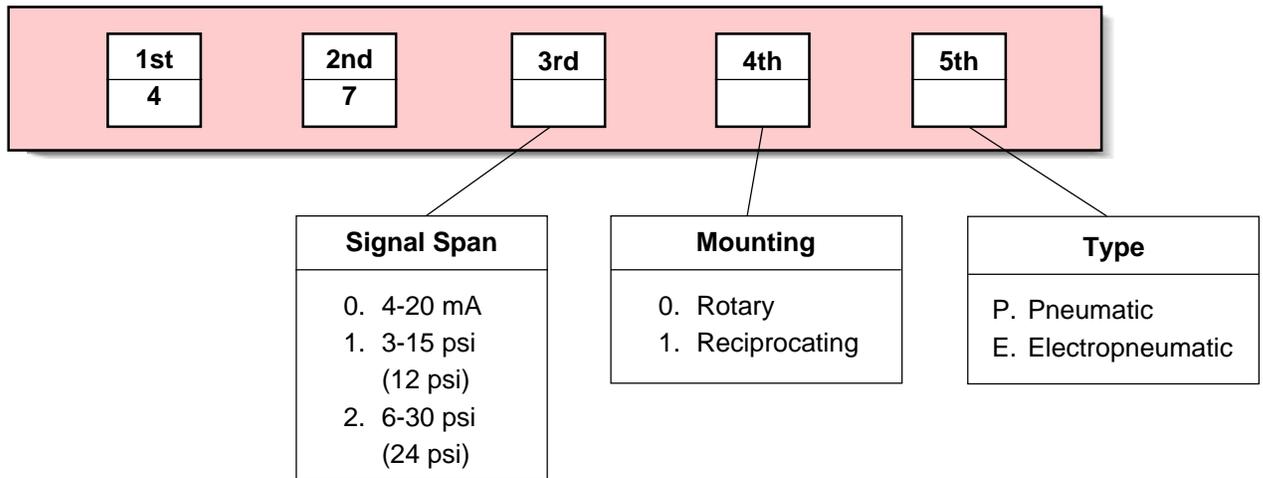
The main features of the Model 4700E and 4700P positioners are:

- **one multi-lobe cam** - The cam provides linear, split linear and equal percentage control characteristics. Custom characteristics are available on special order.
- **zero adjustments** - Adjustment of the positioner zero can easily be accomplished by means of the adjustable spring button. Further zeroing can be performed through the turnbuckle assembly on linear motion actuators.

- **corrosion resistant material** - Protection against harsh environments. Internal componts are manufactured of corrosion resistant materials.
- **fully enclosed** - All adjustments are fully enclosed for protection from the environment
- **simplicity** - Positioner action can be reversed without additional parts. (4700P only) The same mounting orientation is used for both direct and reverse action.
- **easy to maintain** - The pilot valve is the only moving part in the pilot housing. It is easilyremoved without disassembling any other part of the positioner.
- **optional bypass** - A molded nylon bypass valve with an O-ring seal permits continued automatic control during the cleaning of the pilot valve. The bypass valve is concealed in back of the unit to prevent tampering. The bypass is available only on the direct action 4700P pneumatic positioner.
- **damping adjustment** - Actuator travel speed can be adjusted as required for stable operation.

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

# Numbering System



# Specification Data

<b>type</b>	cam feedback, pneumatic, force balanced; electropneumatic positioner uses current to pneumatic converter to generate pneumatic operating signal	<b>output and exhaust capacity</b>	see Figure 1								
<b>action</b>	<u>direct</u> : increasing signal increases output <u>reverse</u> : increasing signal decreases output  Note: Reverse Action is available only on the 4700P Pneumatic Positioner	<b>temperature effects span error (typical)</b>	<table border="1"> <thead> <tr> <th>Temp Range °C</th> <th>Error</th> </tr> </thead> <tbody> <tr> <td>-40 to -20</td> <td>.31% per °C</td> </tr> <tr> <td>-20 to +60</td> <td>.06% per °C</td> </tr> <tr> <td>+60 to +85</td> <td>.11% per °C</td> </tr> </tbody> </table>	Temp Range °C	Error	-40 to -20	.31% per °C	-20 to +60	.06% per °C	+60 to +85	.11% per °C
Temp Range °C	Error										
-40 to -20	.31% per °C										
-20 to +60	.06% per °C										
+60 to +85	.11% per °C										
<b>characteristics</b>	linear equal percentage custom	<b>supply pressure influence</b>	less than 0.25% stroke change per psi supply change								
<b>maximum air consumption</b>	0.3 scfm - 25 psig supply	<b>maximum air supply rating</b>	dictated by actuator, but never greater than 100 psig								
		<b>connections</b>	- pneumatic 1/4" NPT - electrical 1/2" NPT or M20								
		<b>weight</b>	4700P - 3.5 lbs 4700E - 4.7 lbs								

	4700P	4700E
<b>deadband</b>	<0.2% of span	<0.5% of span
<b>hysteresis</b>	<0.2% of span	<0.5% of span
<b>repeatability</b>	within 0.2% of span	within 0.5% of span
<b>sensitivity</b>	better than 0.2% of span	better than 0.3% of span
<b>conformity</b>	±1% of span	±1% of span
<b>input resistance</b> 4-20 mA signal	N/A	170 ohms nominal

# Hazardous Area Installations

The positioner is available in versions suitable for use in hazardous areas. The labeling on the positioner indicates correct areas of use.

## Factory Mutual approved version

**Explosionproof:** Class I, Division 1, Groups B, C, and D. Temperature classification T6 @ 75°C ambient, T5 @ 85°C ambient, indoor and outdoor (NEMA Type 4X) hazardous (classified) locations.

**Dust-Ignitionproof:** Class II / III, Division 1, Groups E, F, and G.

**Non-Incendive:** Class I / II / III, Division 2 Groups A, B, C, D, F, and G.

**Intrinsically Safe:** Class I / II / III, Division 1, Groups A, B, C, D, E, F, and G hazardous indoor/outdoor NEMA 4X locations. Temperature Classification T4 @ 40°C ambient, T3B @ 70°C ambient, T3A @ 85°C ambient.

## CSA (Canadian Standards Association) approved version

**Explosionproof:** Class I, Groups B, C, and D Class II, Groups E, F, and G and Class III rated at 30 mA maximum, 28 Vdc maximum, with a temperature code T6 @ 75°C, T5 @ 85°C, Type 4X enclosure.

**Division 2:** Class 1, Division 2, Groups A, B, C, and D rated 30 mA maximum and 28Vdc maximum.

**Intrinsically Safe:** Class I, Groups A, B, C, and D, Class II, Groups E, F, and G, Class III rated at 30 mA maximum 28 Vdc maximum. Temperature code T6 @ 55°C, T4A @ 85°C, Type 4X enclosure.

## CENELEC Approved Version

**Flameproof:** Coded as EEx d IIB + H<sub>2</sub>  
 T5 @ Tamb = 70°C  
 T4 @ Tamb = 85°C

**Type N:** Coded as Ex N IIC  
 T4 @ Tamb = -40°C to 80°C

**Intrinsically Safe:** Coded as EEx ia IIC T4 @ 80°C  
**Housing Protection Rating:** IP66

### OUTPUT AND EXHAUST CAPACITY 4700P/4700E

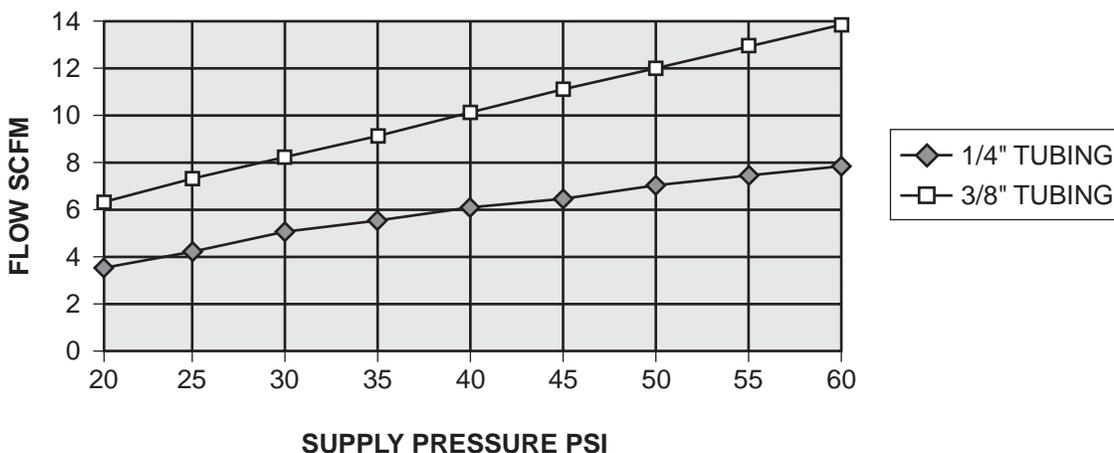


Figure 1

The Model 4700P and 4700E cam positioners provide precise positioning, fast response, and customized control characteristics.

The main features of the Model 4700P and 4700E are:

- **cam characterization** - This cam provides field changeable, linear, split range linear, and equal percentage control characteristics. Custom characteristics are available on special order.
- **zero and span adjustments** - For ease of installation and maintenance, two simple procedures provide easy adjustment of zero and span. An adjustment nut allows zeroing while span is accomplished by changing the effective length of the feedback spring. All adjustments are fully enclosed for protection from the environment.

***NOTE: The electropneumatic (4700E) positioner has no adjustments in the I/P module.***

- **simple and easy to maintain** - The pilot valve is the only moving part in the pilot housing. It is easily removed without disassembling any other part of the positioner. An optional bypass valve module is available for use on the Model 4700P pneumatic direct acting positioner. Where operating parameters allow, it permits the positioner to be isolated for maintenance while operating the valve directly with the instrument signal. The bypass module is mounted on the back of the positioner to discourage tampering.
- **corrosion resistance** - Premium performance is the standard on the Model 4700P and 4700E positioner. Internal components are manufactured of corrosion resistant materials for protection against the harshest environments.

### **ROTARY VALVES**

On rotary valves, the cam assembly is attached directly to the end of the shaft, and only one positioner assembly is required. This proven performer eliminates linkage and associated backlash problems.

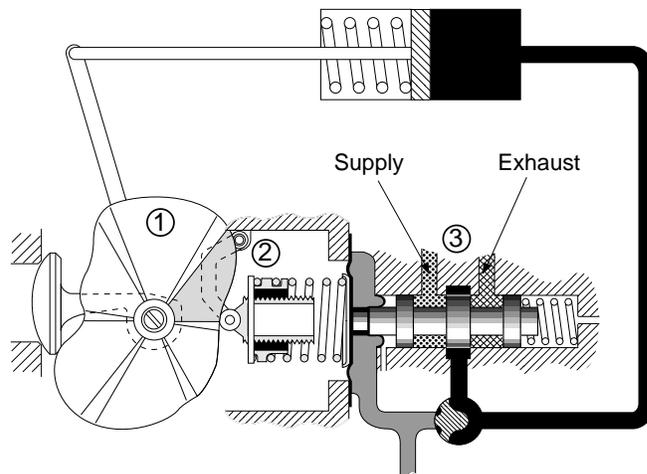
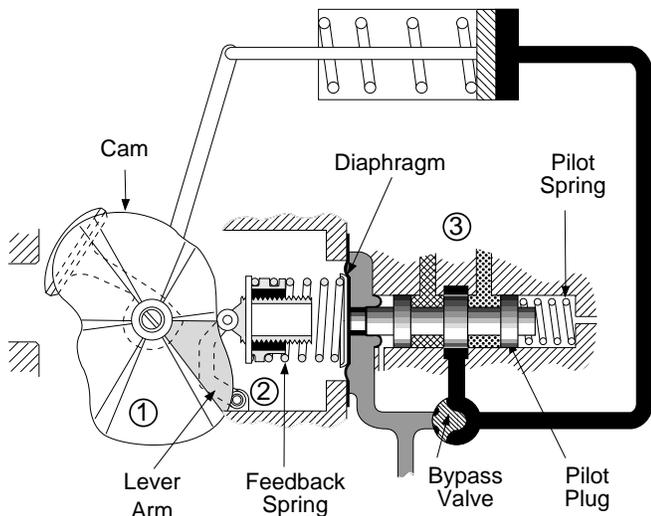
### **RECIPROCATING VALVES**

For use with reciprocating valve spring diaphragm actuators, the positioner is fitted with a post hub and shaft on which the cam is mounted. Actuation is transmitted to the cam via a rugged and simple turnbuckle and lever assembly.

# Operation/Features

**Direct Positioner Action**

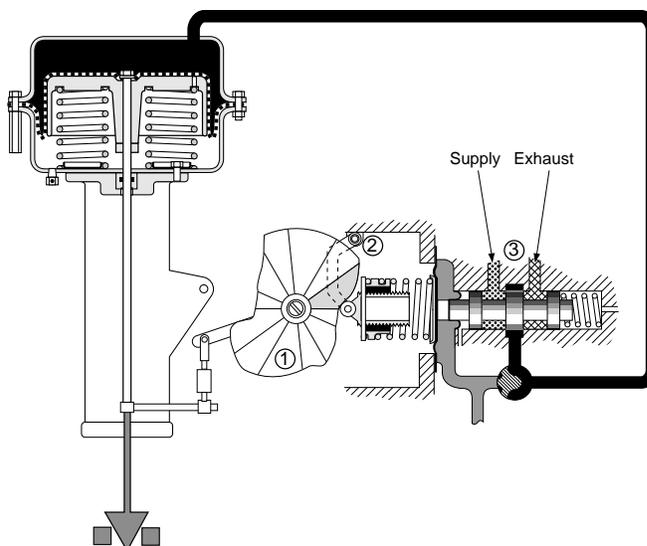
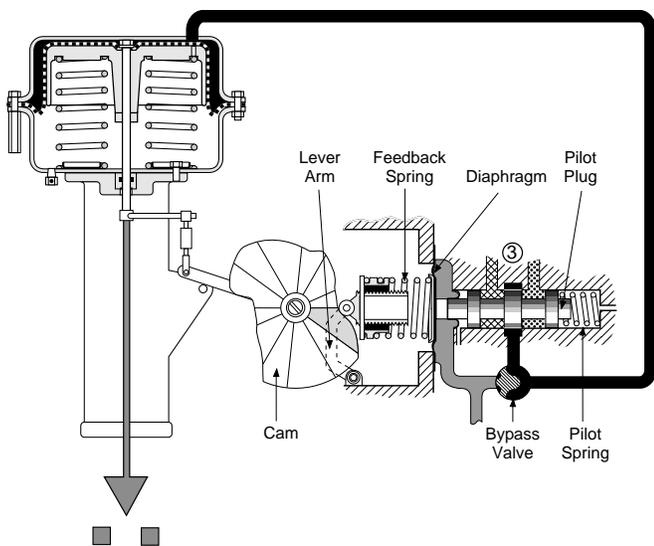
**Reverse Positioner Action  
(4700P Only)**



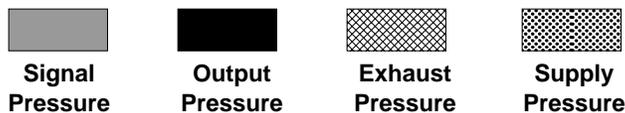
**Figure 2 - Rotary**

**Direct Positioner Action**

**Reverse Positioner Action  
(4700P Only)**



**Figure 3 - Reciprocating**



For 4700P model only, positioner action can be reversed by simply engaging the proper lobe on the cam and reversing the follower arm (numbers 1 and 2 above), and the supply and exhaust ports (number 3 above).

Characteristics shown represent final valve characteristic

**Model 4700P and 4700E (Camflex® II)**

Characteristics			
Linear		Equal Percentage	
3-9	6-30		
3-15	9-15		3-15
3-27	15-27		3-27
6-18	18-30		6-30

**Model 4700P and 4700E  
(MiniTork® II & 38002 TFE-Lined)**

Characteristics	
Equal Percentage	
3-9	6-30
3-15	9-15
3-27	15-27
6-18	18-30

**Model 4700P and 4700E  
(Control Ball II)**

Characteristics	
Equal Percentage	
3-9	6-30
3-15	9-15
3-27	15-27
6-18	18-30

**Model 4700P and 4700E  
(39002 HPBV)**

Characteristics	
Equal Percentage	
3-9	6-30
3-15	9-15
3-27	15-27
6-18	18-30

**Model 4700P and 4700E (87/88 Actuator)**

Characteristics			
Linear		Equal Percentage	
3-9	6-30		6-30
3-15	9-15	3-15	
3-27	15-27	3-27	
6-18	18-30		

**Model 4700P and 4700E (Varimax)**

Characteristics			
Linear		Equal Percentage	
3-9	6-30		
3-15	9-15		3-15
3-27	15-27		3-27
6-18	18-30		6-30

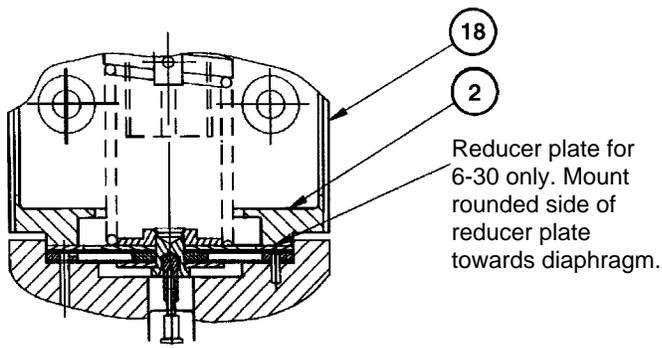
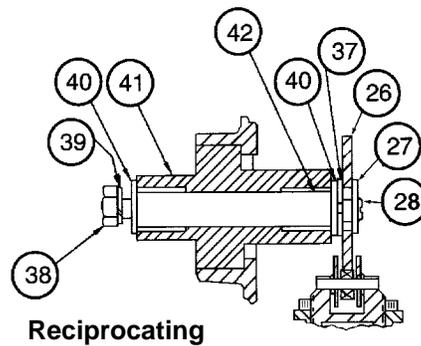
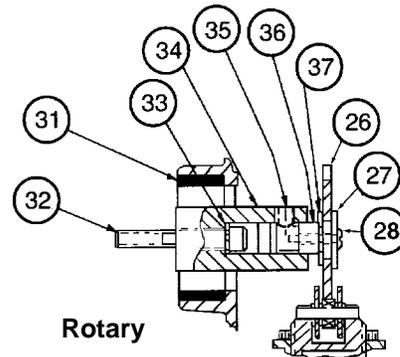
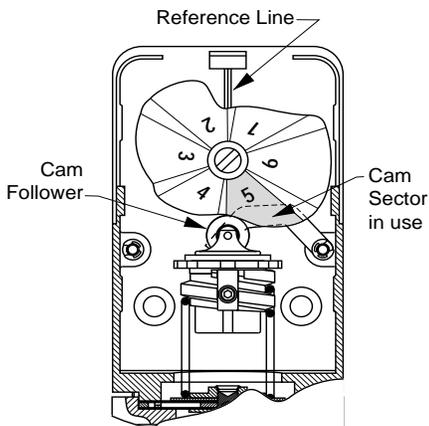
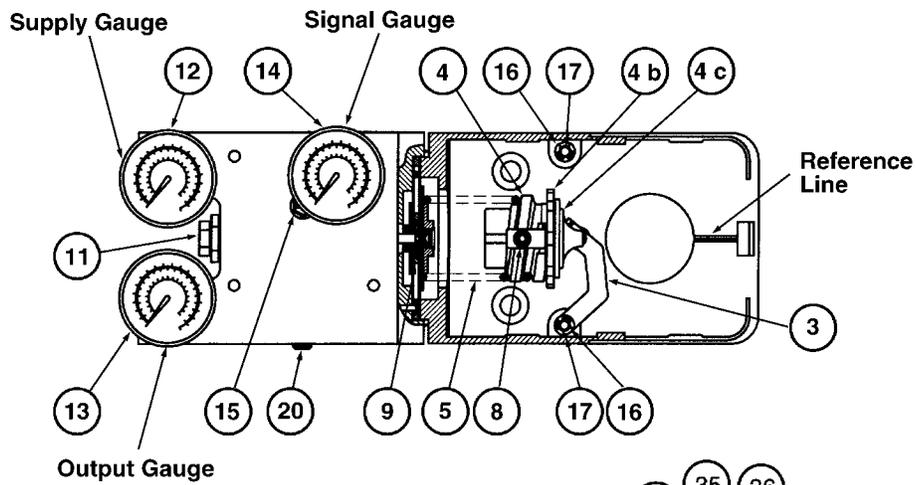
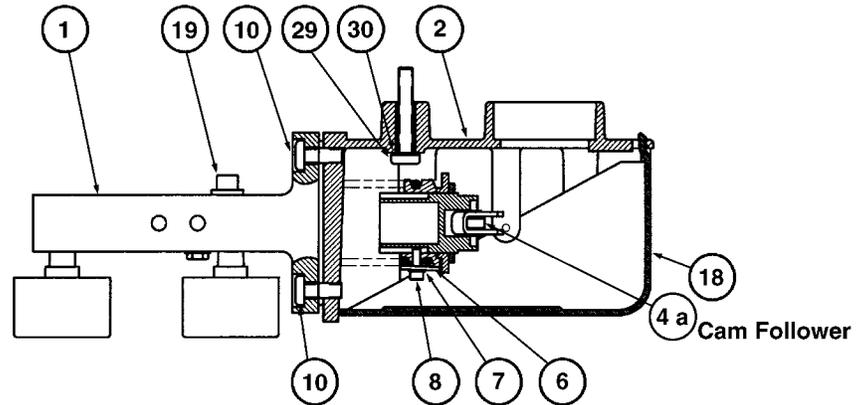
**Note:** Equal percentage cams must not be used with percentage characterized trim.

**Model 4700P and 4700E (87U/88U Actuator)**

Characteristics			
Linear		Equal Percentage	
3-9	6-30		6-30
3-15	9-15	3-15	
3-27	15-27	3-27	
6-18	18-30		

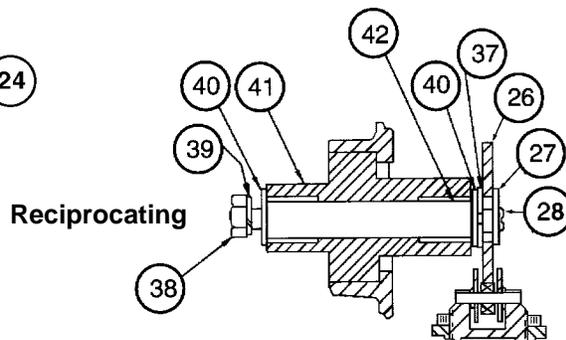
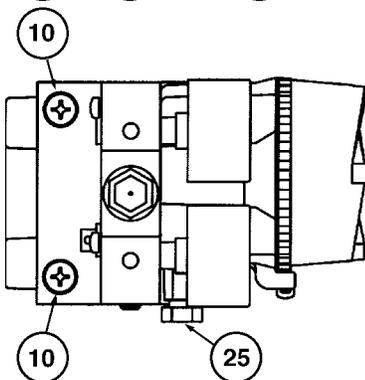
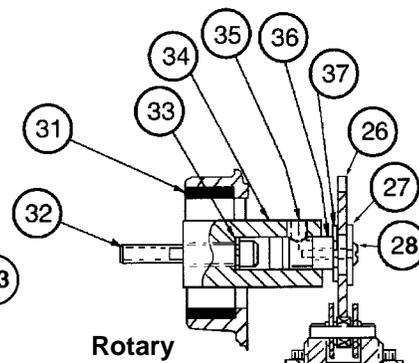
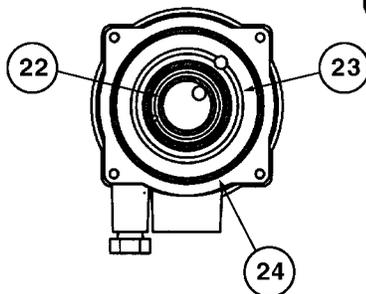
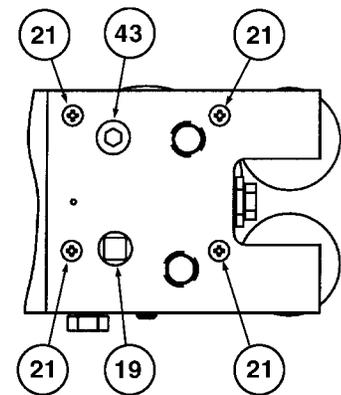
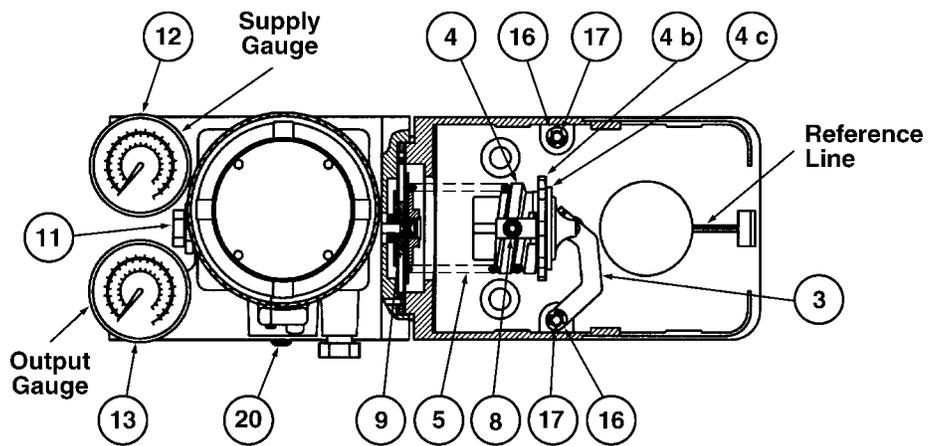
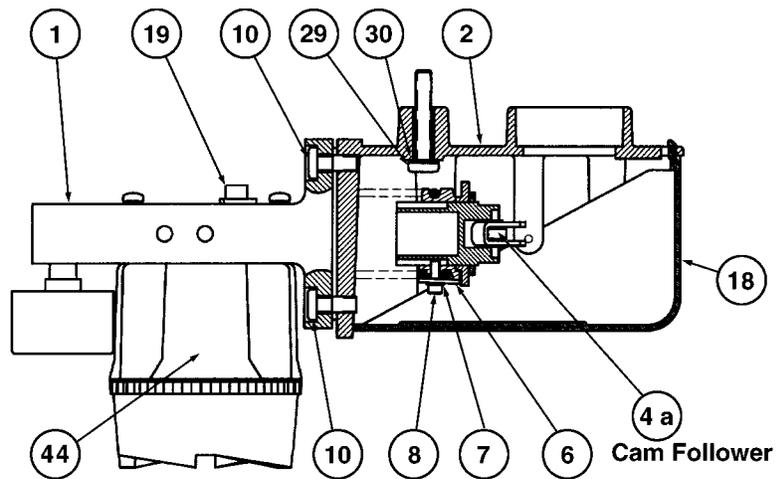
**Note:** Equal percentage cams must not be used with percentage characterized trim.

# 4700P 3-15 and 6-30 Ranges



## 4700P 3-15 and 6-30 Range

Ref. No.	Description	Ref. No.	Description
1	Body S/A	26	Cam
2	Case S/A	27	Washer
3	Lever S/A	28	Pan Head Screw
4	Spring End	29	Socket Head Screw
4A	Cam Follower	30	Lockwasher
4B	Zero Nut	31	Gasket
4C	Zero Locknut	32	Socket Head Screw
5	Spring, Feedback	33	Lockwasher
6	Clamp	34	Coupling
7	Lockwasher	35	Socket Head Set Screw
8	Socket Head Screw	36	Cam Holder
9	Diaphragm S/A	37	Truarc Ring
10	Screw	38	Cap Screw
11	Pilot S/A	39	Lockwasher
12	Supply Gauge	40	Washer
13	Output Gauge	41	Post Hub S/A
14	Instrument Gauge	42	Input Shaft
15	Screw, Washer Head	43	
16	Washer	44	
17	Retaining Clip	45	
18	Cover, Case	46	
19	Vent Plug	47	
20	Screw, Sealing, Set 5/16-24 x .5	48	
21		49	
22		50	
23		51	
24		52	
25		53	



## 4700E

Ref. No.	Description	Ref. No.	Description
1	Body S/A	26	Cam
2	Case S/A	27	Washer
3	Lever S/A	28	Pan Head Screw
4	Spring End	29	Socket Head Screw
4A	Cam Follower	30	Lockwasher
4B	Zero Nut	31	Gasket
4C	Zero Locknut	32	Socket Head Screw
5	Spring, Feedback	33	Lockwasher
6	Clamp	34	Coupling
7	Lock Washer	35	Socket Head Set Screw
8	Socket Head Screw	36	Cam Holder
9	3-15 Diaphragm S/A	37	Truarc Ring
10	Screw	38	Cap Screw
11	Pilot S/A	39	Lockwasher
12	Supply Gauge	40	Washer
13	Output Gauge	41	Post Hub S/A
14		42	Input Shaft
15		43	Plug, Pipe 1/4" NPT
16	Washer	44	I/P Module Assembly
17	Retaining Clip	45	
18	Cover, Case	46	
19	Vent Plug	47	
20	Screw, Sealing, Set 5/16-24 x .5	48	
21	Screw 8-32 x 1.25	49	
22	O-ring .81" ID	50	
23	O-ring 1.31" ID	51	
24	O-ring 2.38" ID	52	
25	Breather	53	