

# Electro-Pneumatic Linear Positioner

## Installation and Operation Instructions



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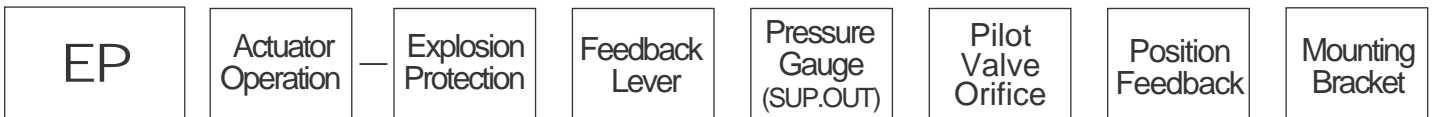
## Electro-Pneumatic Linear Positioner

### Description of Device

Electro-Pneumatic Linear Positioner (4~20mA) is the advanced control device for a linear control valve that provides unparalleled stability in difficult environments

- Easy maintenance
- Precise Calibration with simple SPAN and ZERO adjustments
- Simple Conversion to Direct Acting or Reverse Acting
- 1/2 Split Range Available by simple adjustments without changing parts
- Simple Structure for feedback connection
- Corrosion-Resistant Aluminum Diecast Body
- Sensitive and Correct Response for high performance
- Economical Energy Saving
- Extremely Vibration Resistant Design
- Stainless Steel Gauges Standard
- Optional Built-in 4-20mA Position Transmitter for feedback

### Part Number System



Description	Code
<b>Actuator Operation:</b>	L : Linear Type R : Rotary Type
<b>Explosion Protection:</b>	F : Flameproof (Exd IIB T6) I : Intrinsic Safety (Exia IIB T6) W : Weatherproof to IP66
<b>Feedback Lever :</b> - Linear Type  - Rotary Type	A : Stroke (10~80mm) B : Stroke (80~150mm)  A : Fork Lever M6 x 40L B : Fork Lever M8 x 40L C : Fork Lever M6 x 60L D : Fork Lever M8 x 60L N : Namur Shaft (direct mounting)
<b>Pressure Gauge:</b>	1 : 6 Bar (90psi) 2 : 10 Bar (150psi)

Description	Code
<b>Position Feedback:</b>	S : Standard (actuator volume over 180cm <sup>3</sup> ) M : Small Orifice (Ø1.0 or Ø0.7) (actuator volume 90~180cm <sup>3</sup> )
<b>Position Feedback:</b>	N : None O : Position Transmitter (4~20mA Output Signal) L : Two SPDT Limit Switches (only for EPR)
<b>Mounting Bracket:</b>  1~3 : for Namur shaft type 4~5 : for Fork lever type	N: None  1 : 80 x 30 x 20 (H) 2 : 80 x 30 x 30 (H) 3 : 130 x 30 x 30 (H) 4 : DHCT Bracket 80 x 30 5 : Box Bracket 130 x 30 6 : DIN / IEC 534 (for EPL)

# Installation and Operating Instructions

## Electro-Pneumatic Linear Positioner

### Specification

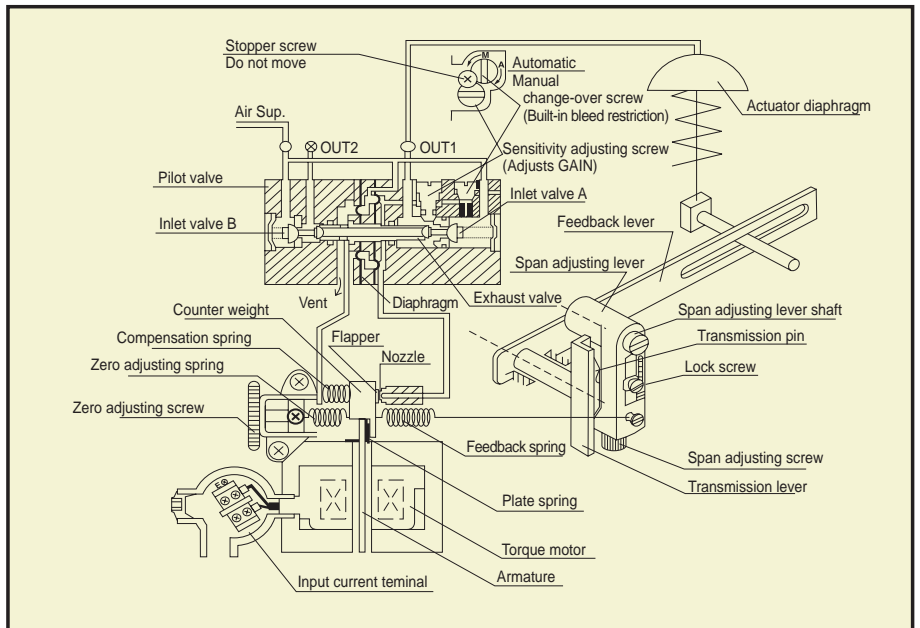
	<b>EPL</b>	
	Linear Type (Lever Feedback)	
	Single	Double
Input Signal	4~20mA DC (Note. 1)	
Input Resistance	235±15 ohms	
Air Supply Pressure	Max. 7.0kgf/cm <sup>2</sup> (100psi)	
Standard Stroke	10~80mm (Note. 2)	
Air Piping Connection	PT 1/4 (NPT 1/4)	
Conduit Connection	PF 1/2 (NPT 1/2)	
Classification	IP66	
Ambient Temperature	-20~70°C	
Pressure Gauge	Stainless Steel	
Output Characteristics	Linear	
Linearity	Within ± 1.0 % F.S	
Sensitivity	Within 0.1% F.S	
Hysteresis	Within 0.5% F.S	
Repeatability	Within ± 0.5% F.S	
Air Consumption	5 LPM (Sup. 1.4kgf/cm <sup>2</sup> )	
Flow Capacity	80 LPM (Sup. 1.4kgf/cm <sup>2</sup> )	
Material	Aluminum Die Casting Body	
Weight	2.9 kg (with a terminal box)	

Note: 1) 1/2 split range can be adjusted  
 2) Feedback lever for stroke 80 ~150mm is available

### Principle of Operation

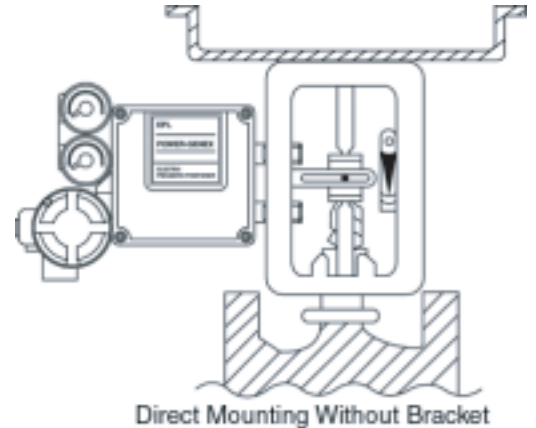
As the signal current from the controller increases, the plate spring of the torque motor works as a pivot. As the armature receives the rotary torque in the counter-clock direction, the counter-weight is pushed to the left, the clearance between the nozzle and the flapper will increase, and the nozzle back pressure will decrease. As a result, the exhaust valve of the pilot valve moves to the right, and the output pressure of OUT1 increases to move the actuator diaphragm.

The valve stem goes up or down by the movement of the actuator diaphragm, and the feedback spring lengthens or shortens by the movement of the feedback lever. The valve stem stays in the position where the spring force is balanced with the force generated by the input current in the torque motor. The compensation spring is for direct feedback of the motion of the exhaust valve and is connected to the counter weight to enhance the stability of the loop. The zero point is adjusted by changing the zero adjustment spring tension.

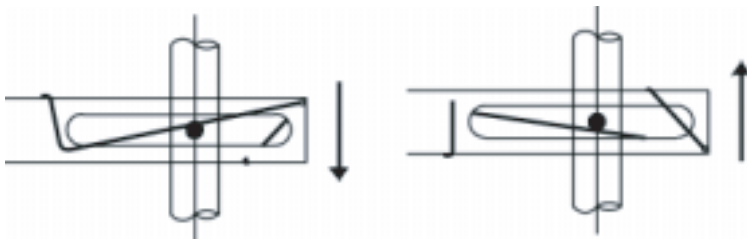


### Mounting the Positioner and Attaching the Feedback Lever

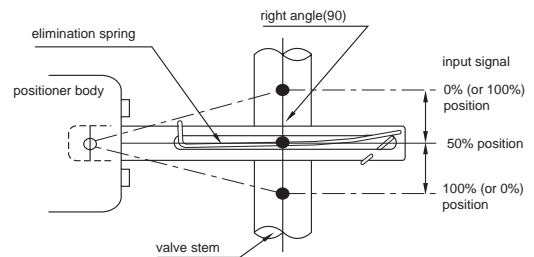
- (1) Mount the positioner to the control valve with bolts (2-M8) and the bracket as shown to the right.
- (2) Connect the feedback lever to the control valve stem at position where the angle between the valve stem and the feedback lever is 90 degrees as shown to the right below when the input signal is set to 12mA(50%). Be sure that the elimination spring should be installed as shown to the left below according to the actuator type (direct acting or reverse acting).
- (3) The stroke range for the best performance should be 10~80mm and the operation angle of the feedback lever should be between Min. 10 degrees and Max. 30 degrees to carry out accuracy and linearity perfectly.



**⚠** Connect the feedback lever with the enclosed additional feedback lever if the stroke range of the control valve is over 80mm.

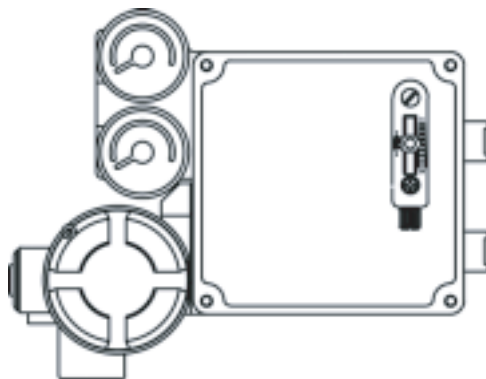


valve stem moves downwards (DA)    valve stem moves upwards (RA)  
**Elimination Spring Installation**

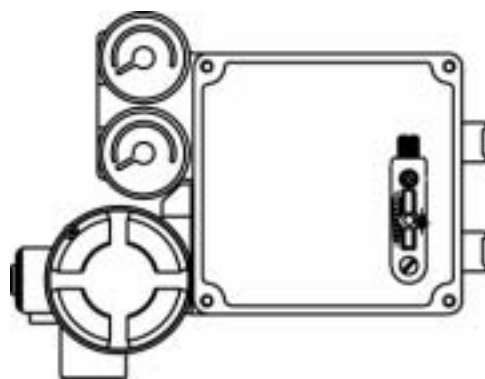


FEEDBACK LEVER INSTALLATION

### Position of the Span Adjuster According to the Actuator Type



Direct Acting (DA)



Reverse Acting (RA)

**⚠** Be sure that Reverse Acting (RA) is the standard factory setting.

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### Span and Zero Adjustment

- (1) Check the proper installation of the positioner and the feedback lever.
- (2) Check the proper position of the span adjuster according to the actuator type (direct acting or reverse acting).
- (3) Connect all air connections.
- (4) Supply air and set the input signal to 4mA. Turn the zero adjusting screw clockwise or counter clockwise to set the zero position.
- (5) Check the stroke of the control valve by setting the input signal to 20mA. If the stroke does not meet 100%, turn the span adjusting screw clockwise or counter clockwise until 100% is reached.
- (6) Set the input signal back to 4mA and adjust the zero adjusting screw until the zero point is reached.
- (7) Repeat the process of (4) to (6) until the desired set points are reached.
- (8) If the strokes of the control valve perfectly meet 0% and 100%, each setting point of 8, 12, and 16mA is automatically reached.

### Pilot Valve Seat Adjuster

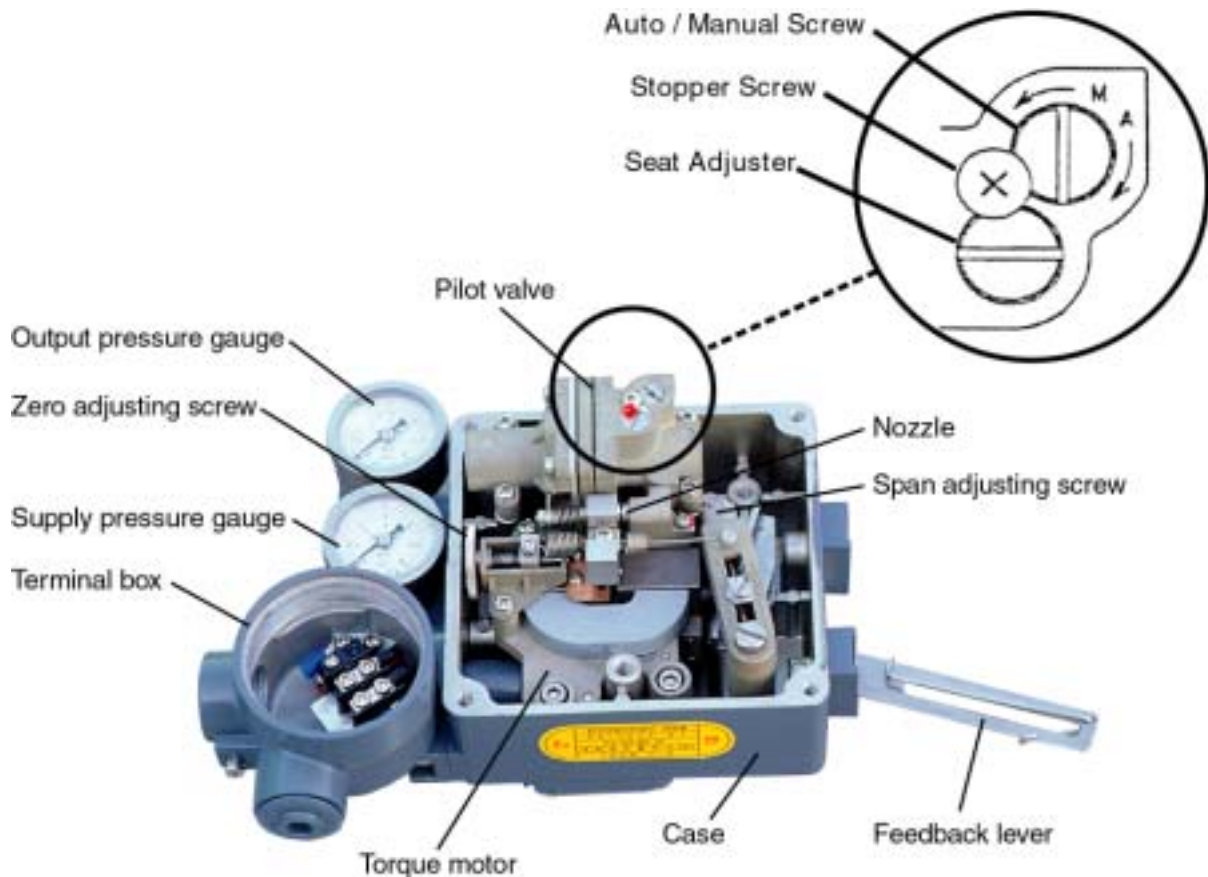
The seat adjuster (sensitivity adjusting screw) located on the pilot valve is used to adjust the positioner for double-acting actuators. Normally, no adjustment is required.

When the sensitivity is not optimal, rotate this screw clockwise. If there is hunting, rotate the screw counterclockwise. For smaller actuators, it might be necessary to insert the small pilot valve orifice inserts if adjusting the seat does not improve performance.

### Auto / Manual Operation

For manual operation using an external air regulator, set the Auto / Manual switch located on the pilot valve to M. This will bypass the 4~20mA input signal.

### Internal View of E/P Linear Positioner



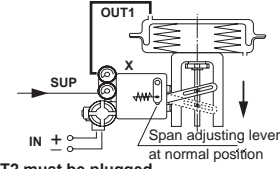
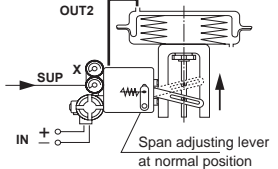
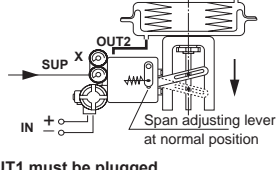
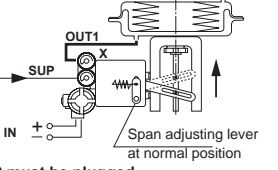
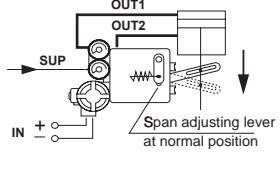
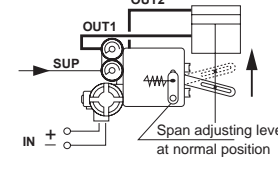
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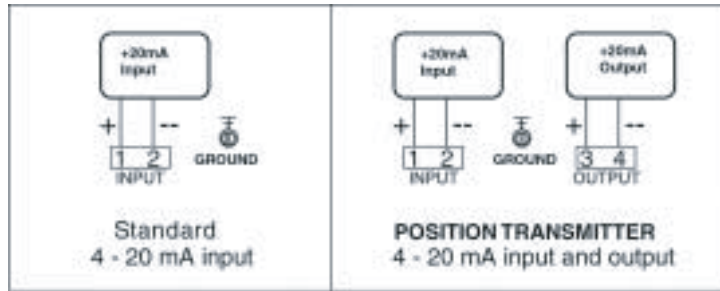
### Air Connections

#### Direct Acting (DA)

#### Reverse Acting (RA)

<p>As the input signal increases, Valve stem moves downwards. Actuator : <b>DA</b> Connection : Out 1</p>	 <p><b>OUT2 must be plugged</b></p>	<p>As the input signal increases, Valve stem moves upwards. Actuator : <b>RA</b> Connection : Out 2</p>	 <p><b>OUT1 must be plugged</b></p>
<p>As the input signal increases, Valve stem moves downwards. Actuator : <b>DA</b> Connection : Out 2</p>	 <p><b>OUT1 must be plugged</b></p>	<p>As the input signal increases, Valve stem moves upwards. Actuator : <b>RA</b> Connection : Out 1</p>	 <p><b>OUT2 must be plugged</b></p>
<p>As the input signal increases, Valve stem moves downwards</p>		<p>As the input signal increases, Valve stem moves upwards</p>	

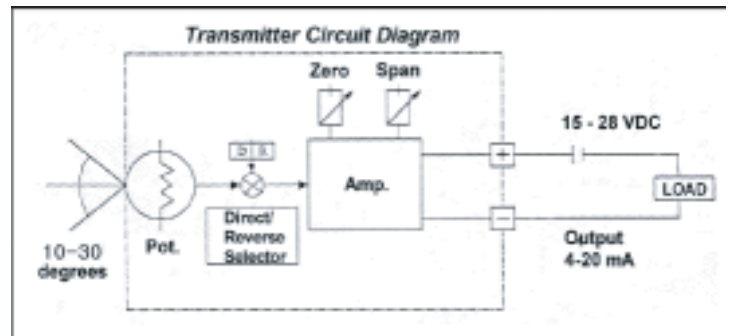
### Wire Diagrams



**CAUTION:** Always check that the electrical load is within the range stated on the nameplate. Failure to remain within electrical ratings may result in damage to or premature failure of the electrical switches, sensors or transmitter electronics.

### Specifications – Current Output

Power Supply Rating:	15~28 VDC loop power
Recommended Power Supply:	24VDC
Output Signal:	4~20mA
Operating Temperature:	-20° to 70°C
Load Impedance:	0~600 ohms
Max. Output:	35mA DC
Linearity:	± 1.0 %
Hysteresis:	1.0 % of full scale
Repeatability:	± 0.5 % of full scale
Adjustment:	Zero and Span in a Terminal Box



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### Troubleshooting Tips

#### Hunting

- \* If your actuator is small, install orifice restrictions in ports 1 and 2 of the pilot valve. Then the control valve moves slowly.
- \* The nozzle might be clogged. Take the metal wire located in the positioner cover and clean the nozzle.

#### Poor Linearity

- \* Air supply might be unstable- check or install a pressure regulator.

- \* Check Zero and Span adjustments

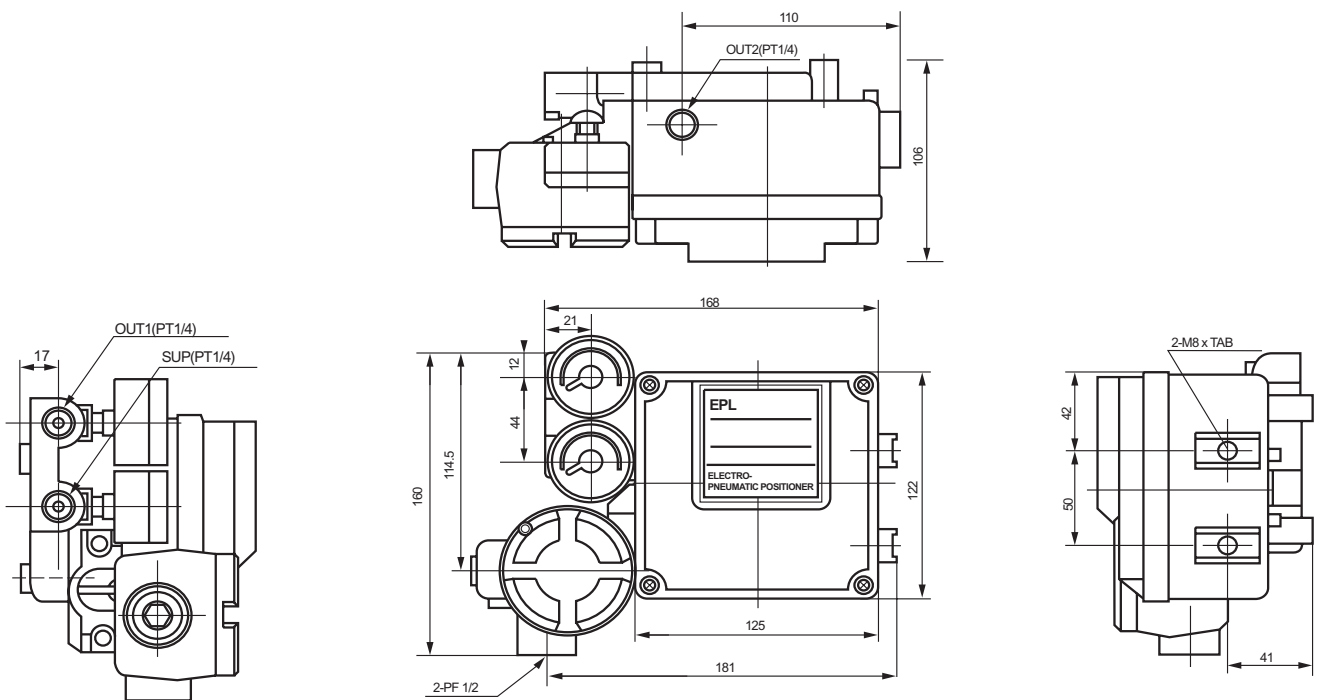
- \* Loose feedback lever – tighten feedback lever

#### Poor Hysteresis

- \* Loose mounting of the actuator to the positioner – tighten the mounting bracket.

- \* Adjust the seat, using the seat adjuster (double acting actuators only)

### Dimensions





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