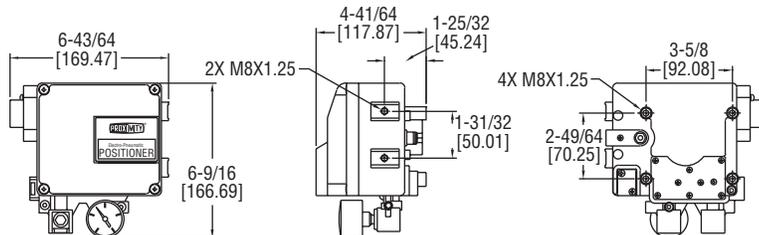


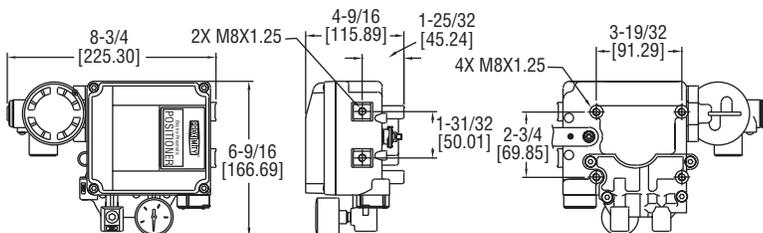


Series 165EL PRECISOR® II Electro-Pneumatic Linear Positioner

Specifications - Installation and Operating Instructions



STANDARD VERSION



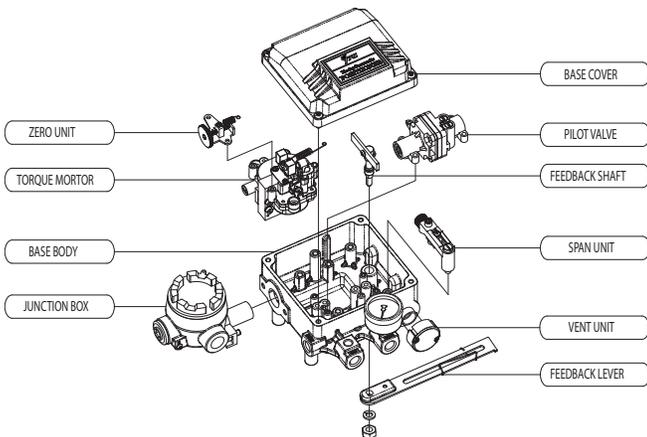
STAINLESS STEEL VERSION

The Series 165EL PRECISOR® II Electro-Pneumatic Positioner is used for linear operation of pneumatic linear valve actuators by means of electrical controller or control systems with an analog output signal of 4 to 20 mA or split ranges.

FEATURES

- There is no resonance in the range of 5 to 200 Hz.
- Perform 1/2 split control without any other substitutes.
- Easy to adjust zero and span.
- Easy to convert from reverse action to direct action or vice versa.
- Easy feedback connection.
- Fast and accurate response.
- Low air consumption.
- Designed as multi-port type for air tubing.
- Easy to install air tubing connection in any direction.
- Designed as block build structure for maintenance and repair.

STRUCTURE



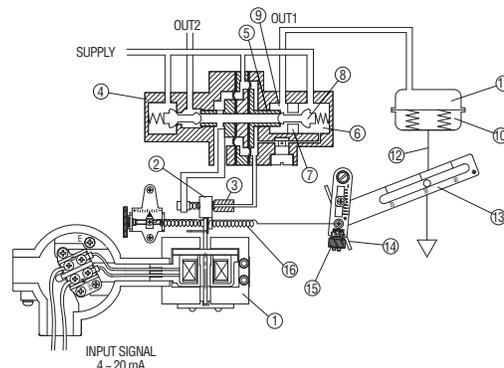
SPECIFICATIONS

- Input Signal:** 4 to 20 mA DC.
- Input Impedance:** 250 ±15 Ω.
- Material:** Aluminum diecasting.
- Air Supply:** 20 to 101 psig (1.4 to 7.0 bar).
- Air Supply Connection:** 1/4" NPT.
- Gage Connection:** 1/8" NPT.
- Electrical Connection:** Screw Terminal.
- Conduit Connection:** 1/2" NPT.
- Linearity:** ±0.2% of FS.
- Hysteresis:** 1% of FS.
- Sensitivity:** ±0.2% of FS.
- Repeatability:** ±0.5% of FS.
- Air Consumption:** 0.10 scfm (3 LPM) at 20 psig (1.4 bar) supply.

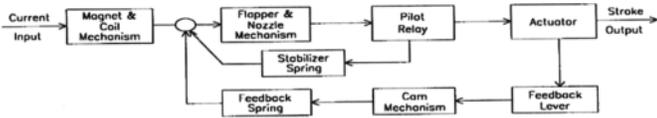
- Flow Capacity:** 28 scfm (80 LPM) at 20 psig (1.4 bar) supply.
- Stroke:** 0.5 to 6" (10 to 150 mm).
- Enclosure Rating:** IP66.
- Operating Temperature:**
 - 165EL: -4 to 158°F (-20 to 70°C);
 - 165EL-SS: -40 to 158°F (-40 to 70°C);
 - 165EL-FM: -4 to 140°F (-20 to 60°C).
- Weight:** 165EL: 6.1 lb (2.7 kg); 165EL-SS: 12.6 lb (5.7 kg).
- Agency Approvals:** CE (165EL only), FM (165EL only).

PRINCIPLE OF OPERATION

Increase the input current signal to change lift position of valve. Force exerted by (1) Torque Motor reduces Nozzle Back Pressure with increase in gap between (2) Flapper and (3) Nozzle. Then (5) Spool moves upward and the (7) Seat opens simultaneously. Air pressure of OUT1 pipe is discharged to (10) Actuator. As pressure in the actuator chamber goes up, (12) Actuator Stem starts to move. The movement of (12) Actuator Stem exerts force to the (a) Feedback Spring through Feedback Shaft connections. Then (10) Actuator will stop at the point of force balance exerted by the input current signal and the feedback spring.

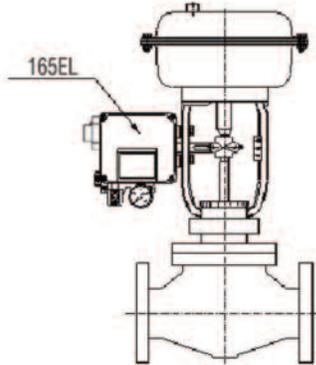


BLOCK DIAGRAM OF 165EL



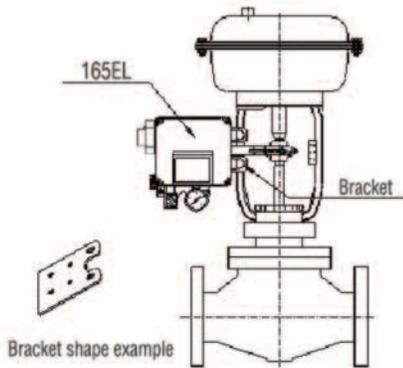
INSTALLATION

Example of attaching to actuator



Example 1.

Case of directly attaching to diaphragm valve.

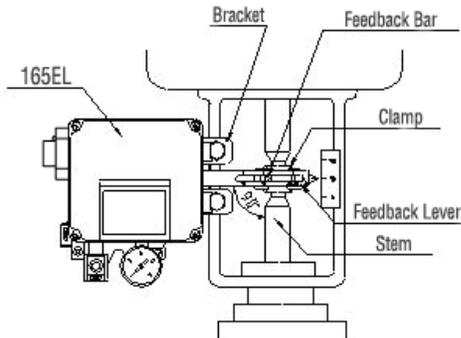


Example 2.

Case of using a bracket.

Connection with Feedback Lever

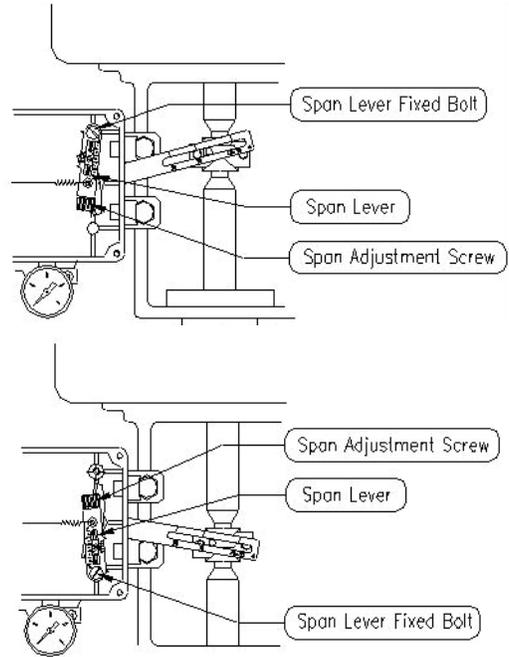
Attach in the position that the valve stem and lever form a right angle when the input signal is 50%. Attach to the position that the runout angle is within the range of 10 to 30°.



INSTALLATION cont.

Direct Action & Reverse Action

Attach the cam in the procedure of loosening the hexagonal nut with flange first, setting the actuator to the starting position and then setting the cam reference line and the bearing contact point of span adjusting arm unit to the same position. Do not apply the supply pressure when attaching the cam as otherwise it is very dangerous. When the positioner is shipped out, the cam is tentatively tightened to the shaft. Be sure to firmly lock the cam to the lock nut [tightening torque 17.7 to 22.1 in-lbs (2.0 to 2.5 NM)].



AIR PIPING CONNECTION

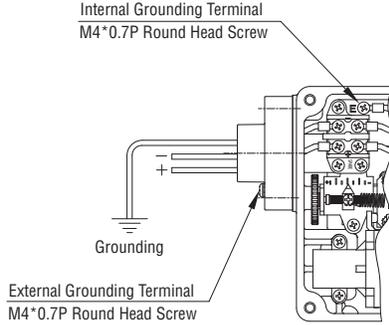
Fully purge the pipe to remove foreign matter. Use a clean supply air fully removed of humidity and dust. Use a Series AFR filter regulator to keep supply air pressure constant.

Direct Action	Reverse Action
<p>As the input current increases, Stem goes down.</p> <p>Actuator : DA Span : DA Connection : OUT 1</p>	<p>As the input current increases, Stem goes up.</p> <p>Actuator : DA Span : RA Connection : OUT 2</p>
<p>As the input current increases, Stem goes down.</p> <p>Actuator : RA Span : DA Connection : OUT 2</p>	<p>As the input current increases, Stem goes up.</p> <p>Actuator : RA Span : RA Connection : OUT 1</p>
<p>As the input current increases, Stem goes down.</p> <p>Actuator : Cylinder Span : DA</p>	<p>As the input current increases, Stem goes up.</p> <p>Actuator : Cylinder Span : RA</p>

ELECTRICAL WIRING

Connect the (+) and (-) output terminals from the regulator with the (+) and (-) input terminals, respectively, of the positioner.

- Use Cable Gland in pressure tight packing type. (Cable O.D.= 0.375").
- Use 1/2" NPT standard for conduit thread connection type. There is a Spare Bolt in the terminal board.

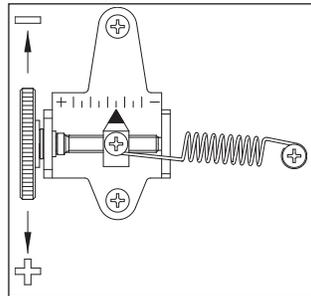


ADJUSTMENT

- Check the following prior to starting the adjustment:
- The pipeline is correctly connected with the pressure supply port and OUT1 and OUT2 port.
 - The wires are correctly connected with the (+), (-) and grounding terminals.
 - The actuator and positioner are sturdily connected.
 - For locking of the auto/manual changeover screw of pilot valve (fully tightened in the clockwise direction).
 - The span adjusting lever of internal feedback lever is attached to the correct (Direct or Reverse) position. Flange nut is firmly locked.

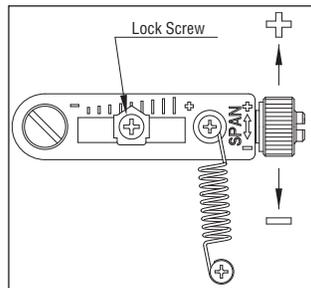
Zero Adjustment

Set input signal to the Stroke starting signal (4 mA) then turn the Zero Adjuster clockwise or counterclockwise. In case of Spring Actuator, check if it is set to standard pressure in Zero Point. If not, repeat Zero adjustment.



Span Adjustment

Adjust Range Adjustment so that an Actuator stops at 0% position of the Stroke by the 0% applied input signal and 100% position for 100% input signal respectively. Check Zero Point and repeat Zero Span Adjustment. 1/2 Split Range can be used by Zero and Span Adjustment. After Setting, tighten up Lock Screw of Span adjustment.

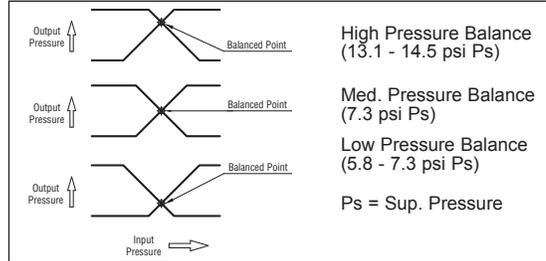
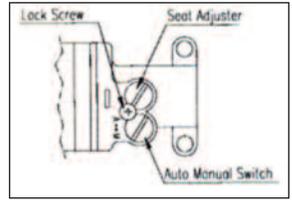


Auto/Manual Switch

This is a Switch for changing Auto and Manual. Shipped products are set for Auto. To use Manual operation, turn A/M Switch counterclockwise. In manual operation, the pressure of AFR regulator connects to Actuator. After using, return switch to "A". Not available for OUT2.

Seat Adjuster

No need to adjust in the field because Seat Adjuster is to be adjusted before shipment for balanced pressure point of output pressure. If the sensitivity is poor because of the actuator type of load condition, turn the seat adjuster screw clockwise. If hunting occurs, turn the seat adjuster screw counterclockwise. (The amount of turning varies by actuators. Do not loosen the stopper screw at this time since it is set to avoid the screw coming off.)



MAINTENANCE

If the supply air is fouled, the positioner may not operate normally. Periodically check the compressed air cleaning system and make sure that clean air is always supplied. When disassembling the pilot valve, coat grease to the O-ring of the sliding section. When the fixed orifice is clogged with carbon particles or others, remove the pilot valve Auto/Manual changeover screw (built-in fixed aperture) and clean it by inserting a 32 AWG wire into the aperture. If it must be replaced with new one, stop the supply pressure and remove the stopper screw of the pilot valve. Check the positioner once a year. Treatment at an early stage is especially important if the positioner is used in severe environments, like coastal area. In the unlikely event the 165EL Series Positioner should fail, the unit can be returned to the factory for warranty repair if the warranty period has not expired. Contact our customer service department for a RGA number and to setup the return.

WARNING

Do not apply large vibration or impact to the positioner. The positioner must be handled very carefully during transportation and operation. If the positioner is used at temperatures outside of the specification, the sealing materials deteriorate quickly and also the positioner may not operate normally. Use clean supply air fully removed of humidity and dust. Do not remove the terminal cover at a dangerous position during power conduction. Be sure that the terminal cover and body cover are installed during the operation. If you leave the positioner at the operation site for a long time without using it, put the cover on it so that rain water does not enter the positioner. If the atmosphere is of high temperature or high humidity, take measures to avoid condensation inside. The condensation control measures must be taken thoroughly for export shipment.

TROUBLESHOOTING

Condition	Cause	What To Do
Not operating with Input Signal applied	Too low or no supply air	Input or increase supply air
	Loose connection	Tighten set screw of terminal
	Wrong wiring for (+) and (-)	Connect wiring (+) and (-)
	Short or open circuit of terminal motor	Replace Motor Unit
	Clogged nozzle	Replace Motor Unit
OUT1 pressure raised, does not come down	Loose or wrong setting of feedback lever	Correct setting and tighten
	Leakage of A/M switch	Tighten or replace A/M switch
	Wrong contact or search of Flapper	Replace Motor Unit
Output pressure is operated by A/M switch only	Clogged fixed orifice	Clean or replace fixed orifice
	Clogged nozzle	Clean nozzle or replace Motor Unit
Hunting occurs	Off-positioned stabilizer spring	Insert stabilizer spring
	Too low of actuator volume	Insert orifice
	Clogged fixed orifice	Clean or replace fixed orifice
Actuator is operated by On/Off only	Wrong connection of OUT1 and OUT2 tube	Correct position of tube
Linearity is not good	Wrong setting of feedback lever	Readjust setting of feedback lever
	Wrong Zero, Span Adjustment	Readjustment of Zero, Span Adjustment
	Supply pressure is unstable	Replace regulator
Hysteresis is not good	Wrong setting of Seat Adjuster	Readjust Seat Adjuster
	Loose connection of actuator and positioner	Tighten connection
	Cam Shaft is worn out	Replace Cam Shaft