

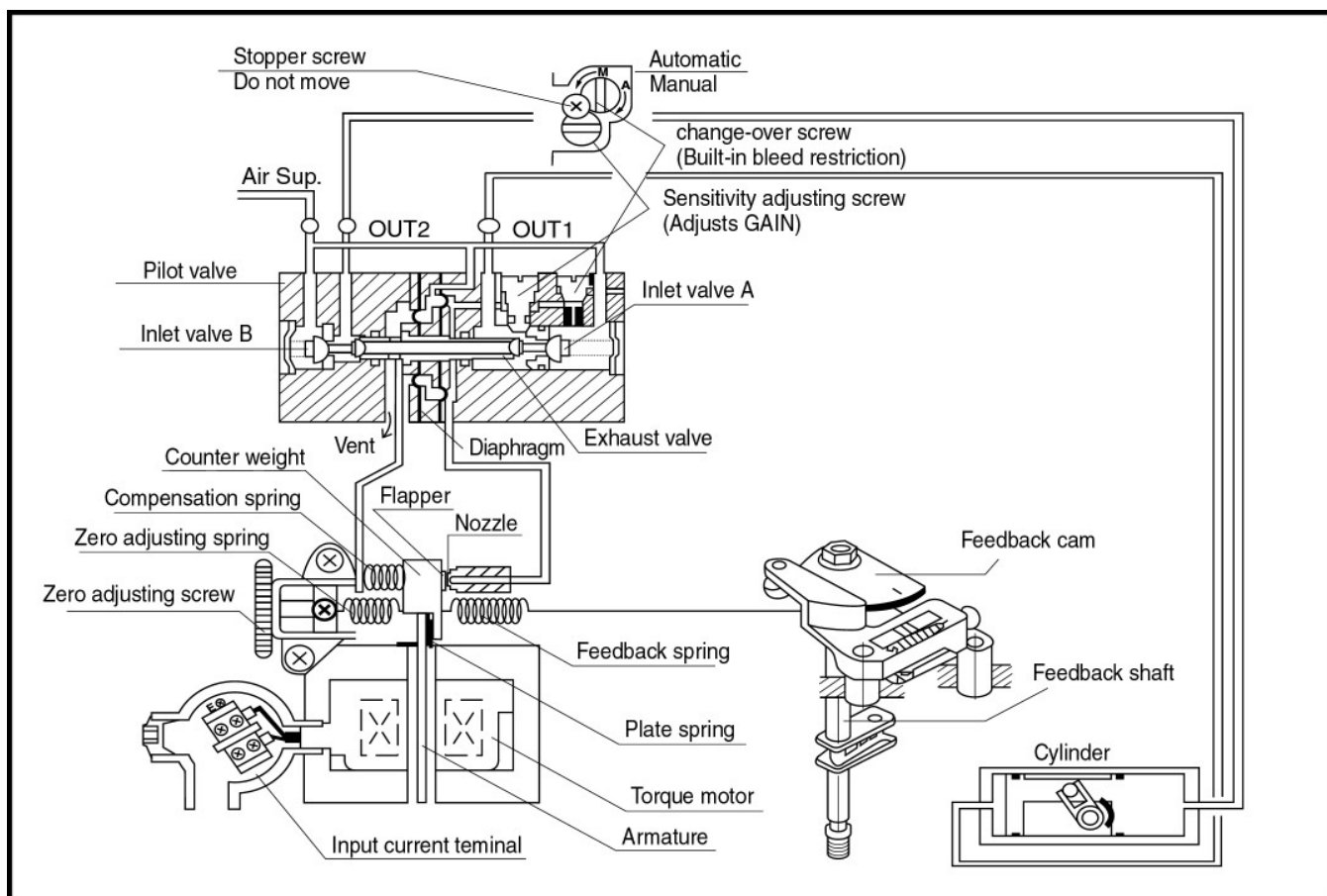
1. Description

The EPR series are electro-pneumatic positioners controlled with a 4-20mA signal for operation of quarter-turn valves.

2. Principle of Operation

As the input signal current (4-20mA) from the controller increases, the plate spring of the torque motor works as a pivot. As the armature receives the rotary torque in the counterclockwise direction, the counterweight is pushed to the left, the clearance between the nozzle and the flapper will increase, and the back pressure of the nozzle will decrease. As a result, the exhaust valve of the pilot valve moves to the right, and the output pressure of OUT1 increases (as OUT 2 decreases) to move the cylinder actuator.

The movement of the actuator in turn rotates the feedback shaft, and the feedback spring lengthens or shortens by the movement of the feedback cam connected to the feedback shaft. The actuator 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 counterweight to enhance the stability of the loop. The zero point is adjusted by changing the zero-adjustment spring tension.



3. Specifications

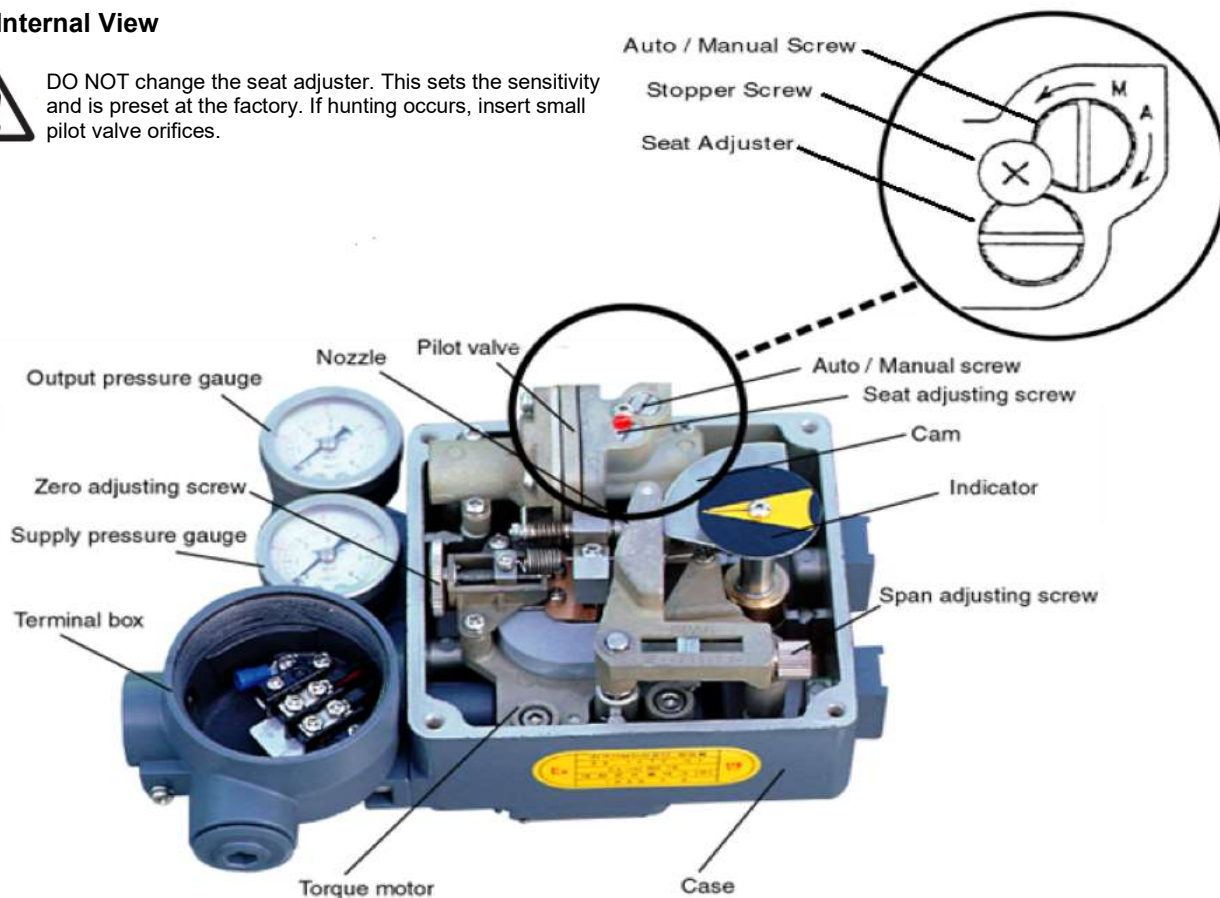
	EPR
Type	Rotary Type (Cam Feedback)
Action	Single Acting Double Acting
Input Signal	4 - 20mA 24VDC (Note. 1)
Input Resistance	235±15Ω
Air Supply Pressure	Max. 100 PSI (free of oil, water and moisture)
Standard Stroke	60 ° - 100° (Note. 2)
Air Piping Connection	¼" NPT
Conduit Connection	½" NPT
Protection	IP66; ATEX/IECEX Ex dmb IIC T6/T5 Gb (Note. 3)
Ambient Temperature	-4°F to 158°F
Pressure Gauge	Stainless Steel
Output Characteristics	Linear
Linearity	Within ± 1.5 % F.S
Sensitivity	Within 0.5 % F.S
Hysteresis	Within 1.0% F.S
Repeatability	Within ± 0.5 % F.S
Air Consumption	0.18 CFM (Sup. 20PSI)
Flow Capacity	2.83 CFM (Sup. 20PSI)
Material	Aluminum Die Casting Body
Weight	6.40 Lbs (with terminal box)

NOTE: 1) 1/2 split range can be adjusted for 4-12mA or 12-20mA input signal
2) Stroke can be adjusted to 0° - 60° or 0° - 100°
3) ATEX/IECEX ratings on model EPX-1000 only

4. Internal View



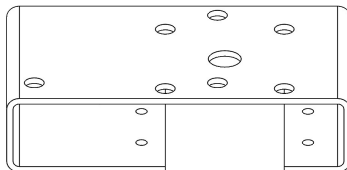
DO NOT change the seat adjuster. This sets the sensitivity and is preset at the factory. If hunting occurs, insert small pilot valve orifices.



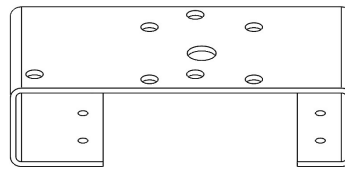
5. Installation

5.1. Mounting

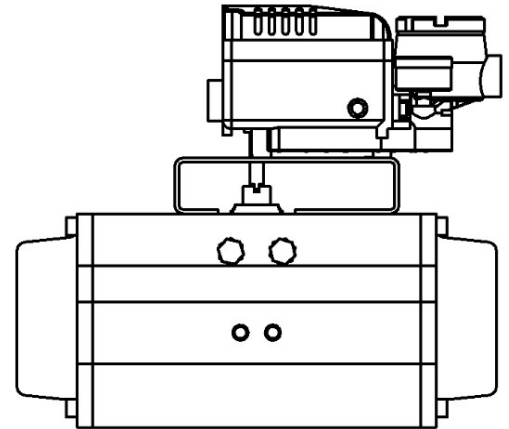
The EPR positioner has the NAMUR shaft as standard which can be directly mounted to the top pinion (VDI/VDE 3845) of the pneumatic rotary actuator.



NAMUR Bracket
(80 x 30 x 20)



NAMUR Bracket
(130 x 30 x 30)

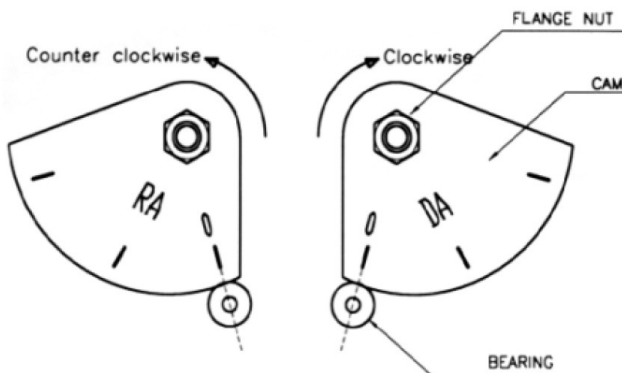


5.2. Cam and Indicator Adjustment

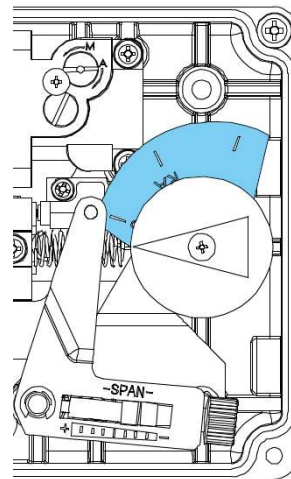


WARNING: When adjusting or replacing cams, ensure the air supply to the EPR positioner is shut off to avoid the EPR positioner suddenly reacting and causing possible damage or injury.

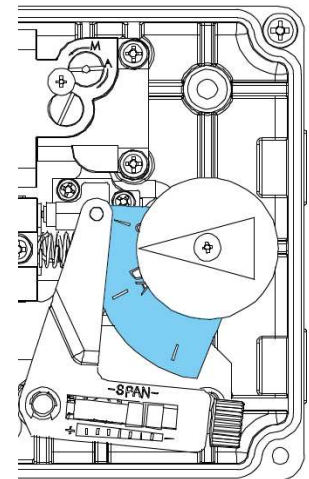
- 1) Loosen the flange nut on the cam. Match the part of the cam with "0" marked on it with the center of bearing as shown. The span adjusting arm unit should now be aligned.



NOTE: Direct Acting (RA up) is the standard factory setting.



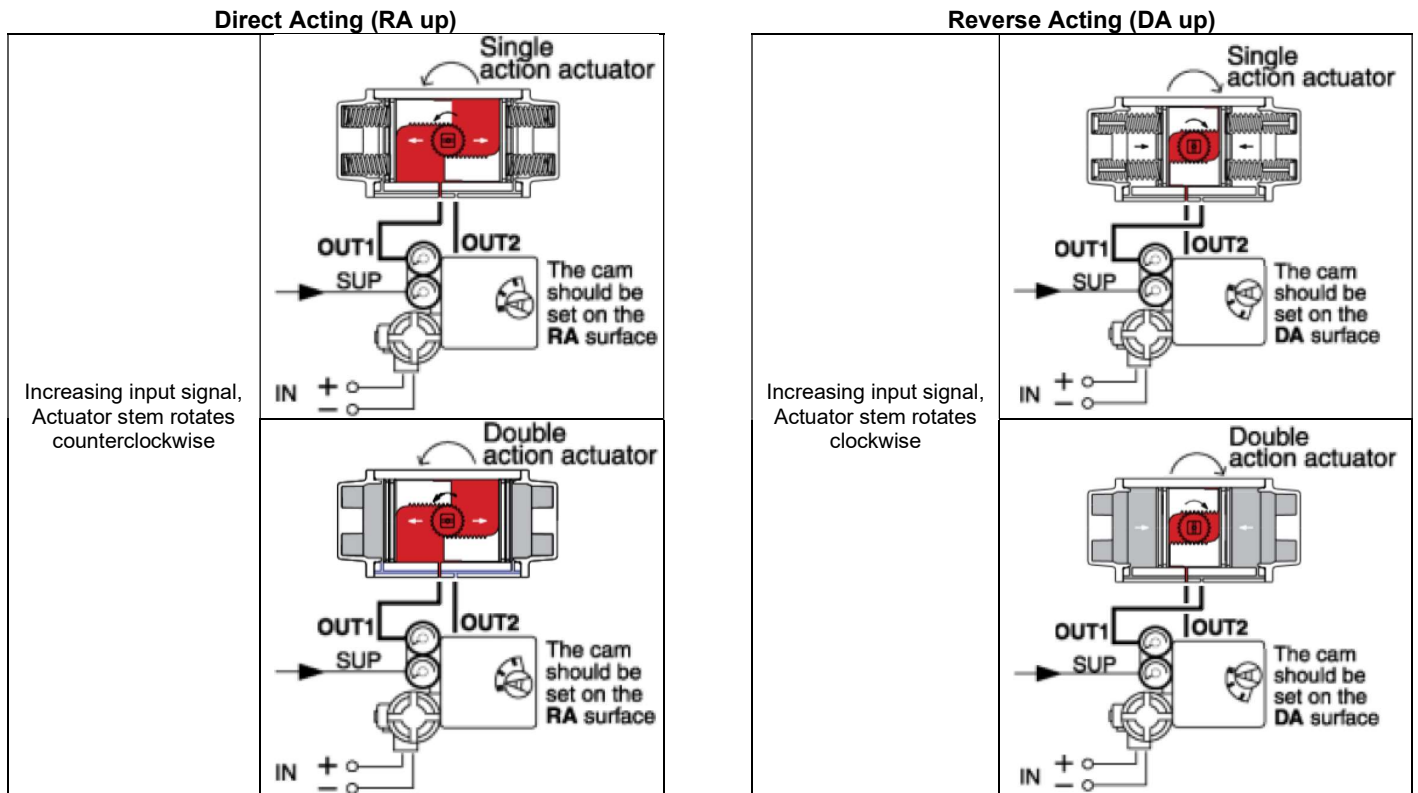
Direct Acting (RA up)



Reverse Acting (DA up)

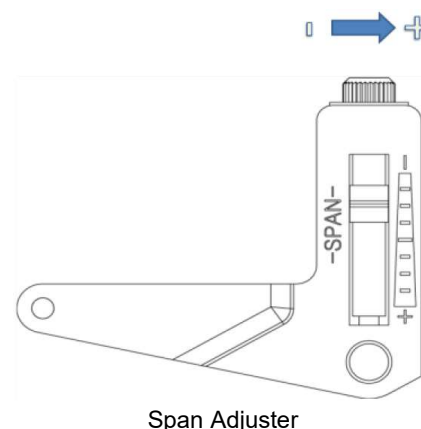
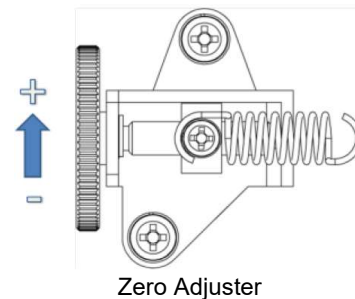
- 2) Tighten the flange nut of the cam after setting the cam.
- 3) After cam installation, proceed to adjust zero and span. Once this is complete, secure the indicator with the bolt (M6) to the feedback shaft according to the actuator type (RA or DA) as shown below. The position for the indicator should be arranged in the scale (0-90 degrees) shown on the cover.

5.3. Air Connections



5.4. Zero and Span Setting

- 1) Check all air connections.
 - 2) Set input signal to 4mA (24VDC) while positioner is at the 0% position, or stroke starting point. Turn the zero-adjustment knob clockwise or counter-clockwise to set the 0% position.
 - 3) Check the stroke of the actuator by setting the signal to 20mA (24VDC). If the stroke does not meet the 100% position, turn the span adjustment screw clockwise or counterclockwise to set the 100% position.
 - 4) Set input signal back to 4mA (24VDC) and adjust the zero-adjustment screw until 0% position is reached.
 - 5) Repeat the process until the desired set points are reached.
- Adjust into the 0% and 100% position to avoid stopping by the actuator's mechanical stops.
 - Due to variations in circuitry and environmental effects, often 0% is set at 4.5mA and 100% is set at 19.5mA to ensure the valve will fully open or fully close.

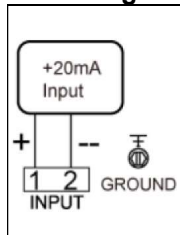
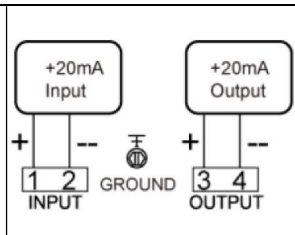
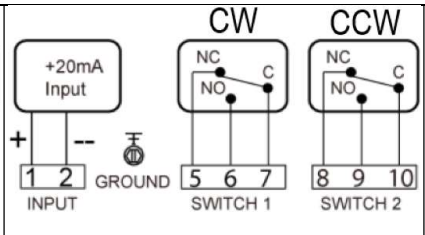
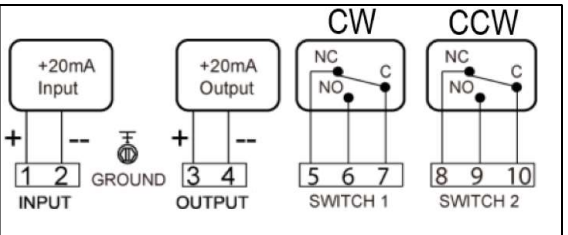


6. Electrical Connections



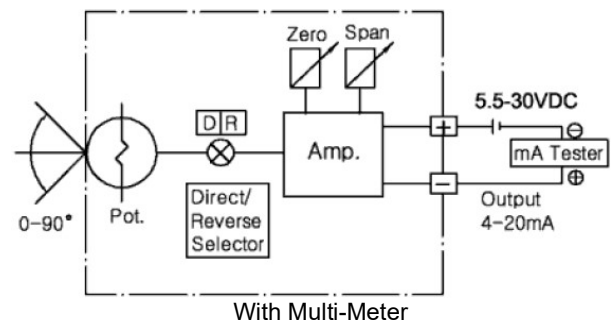
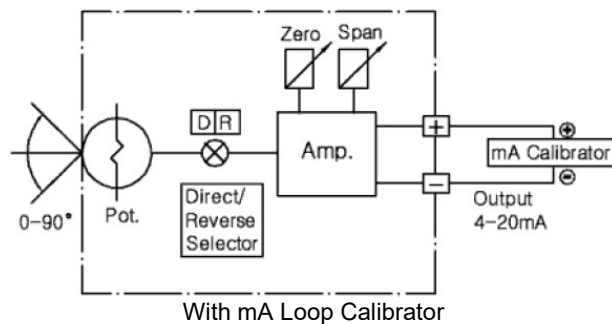
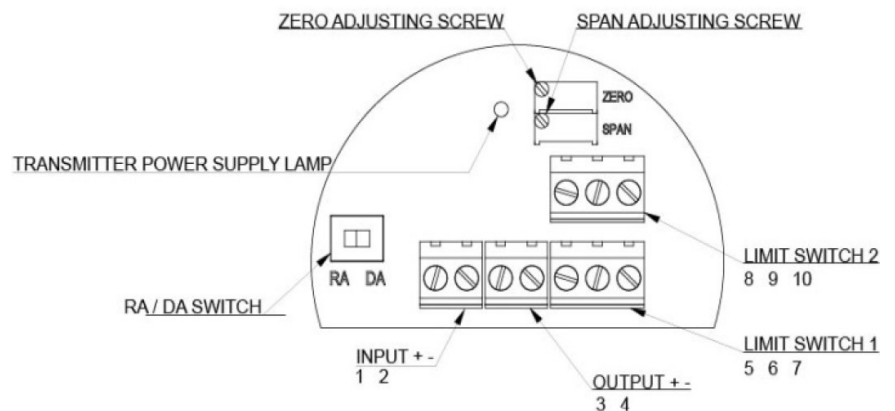
- 1) Always check that the electrical load is within the range stated on the nameplate. Failure to remain within the electrical ratings may result in damage to, or premature failure of the electrical switches, sensors or transmitter electronics.
- 2) Ensure correct polarity of + and – connections.

Wiring

			
STANDARD 4-20mA INPUT	POSITION TRANSMITTER 4-20mA INPUT and OUTPUT	(2) SPDT LIMIT SWITCHES 4-20mA INPUT	POSITION TRANSMITTER + (2) SPDT LIMIT SWITCHES 4-20mA INPUT and OUTPUT

Position Transmitter

Power Supply Rating:	5.5 – 30 VDC
Recommended Power Supply:	24 VDC
Output Signal:	4-20 mA
Operating Temperature:	-4° to 158°F
Load Impedance:	0-600 Ohms
Max. Output:	30 mA DC
Linearity:	± 1.0 %
Hysteresis:	1.0 % of full scale
Repeatability:	± 0.5 % of full scale
Adjustment:	Zero and Span in Terminal Box



Limit Switches

Contacts:	SPDT Form C
AC Rating:	16A 1/2HP 125/250 VAC
DC Rating:	0.6A 125VDC / 0.3A 250VDC
Adjustment:	Cams with set screw

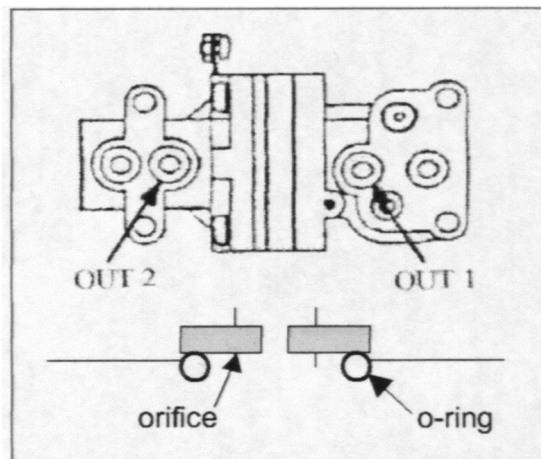
7. Optional Restricted Pilot Valve Orifice



WARNING: Before removing the pilot valve, disconnect the positioner from the signal and compressed air source.

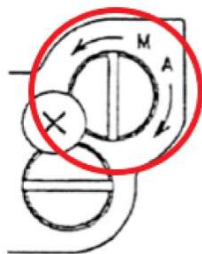
For improved control using smaller actuators, a restricted pilot valve orifice kit is included with the positioner. To install, the pilot valve must be removed from the positioner.

- 1) Remove the four screws holding the pilot in the positioner body.
- 2) Hold the compensation spring in place while the pilot valve is removed.
- 3) Flip the valve to view the bottom side.
- 4) Remove the o-rings from OUT 1 and OUT 2 ports.
- 5) Place the orifice plates in the OUT 1 and OUT 2 ports and replace with new o-rings.
- 6) Reinstall the pilot valve ensuring the compensation spring is in place.



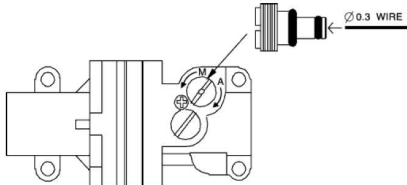
8. Auto / Manual Operation

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



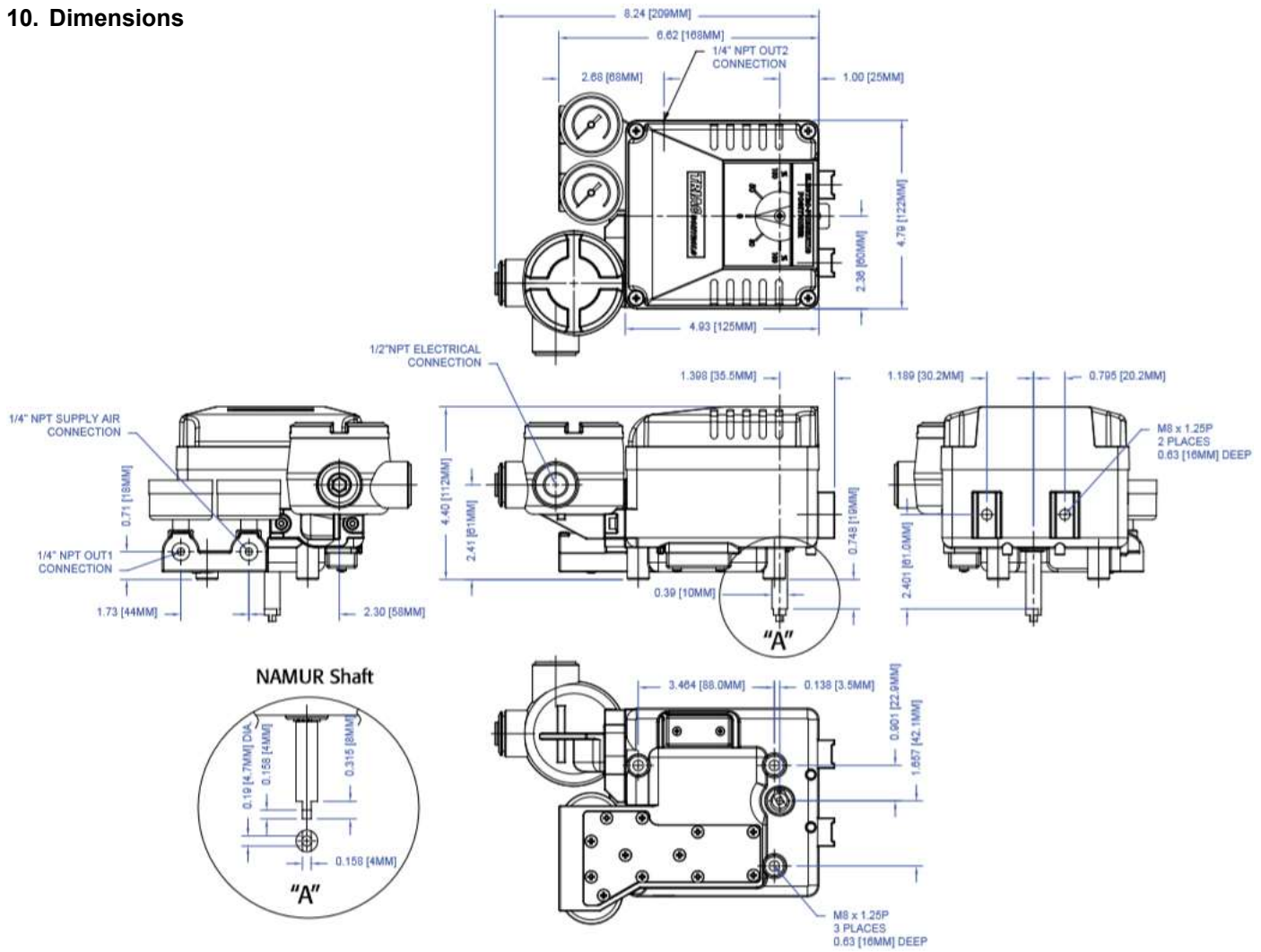
9. Troubleshooting

Trouble	Solution
Valve is hunting.	The actuator is small. Install the small orifice kit in the pilot valve.
	Ensure the position shaft is tightly inserted into the actuator output shaft.
Valve is always open regardless of input signal.	The pilot valve Auto/Manual screw orifice is clogged. Disconnect supply air and clean orifice with a wire (one is provided attached inside the positioner cover).
	DC loop supply voltage connected directly across input instead of through current loop.



Trouble	Solution
Valve is always open or closed with input signal.	Air connections or cam are not correct. Verify air connections and cam orientation.
Linearity is poor.	- Check if positioner and mounting bracket are installed properly and tightly. - Check if zero and span are set properly.
Hysteresis is poor.	Check if mounting bracket is installed tightly.
Valve moves too slowly.	Actuator is too large. Use an air volume booster

10. Dimensions



A-T Controls product, when properly selected, is designed to perform its intended function safely during its useful life. However, the purchaser or user of A-T Controls products should be aware that A-T Controls products might be used in numerous applications under a wide variety of industrial service conditions. Although A-T Controls can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser / user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of A-T Controls products. The user should read and understand the installation operation maintenance (IOM) instructions included with the product and train its employees and contractors in the safe use of A-T Controls products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only. Because A-T Controls is continually improving and upgrading its product design, the specifications, dimensions and information contained in this literature are subject to change without notice. Should any question arise concerning these specifications, the purchaser/user should contact A-T Controls.

For product specifications go to <http://download.a-tcontrols.com/>

A-T Controls, Inc. • 9955 International Boulevard, Cincinnati, OH 45246 • Phone: (513) 530-5175 • Fax: (513) 247-5462 • www.atcontrols.com