



QSM, Inc.
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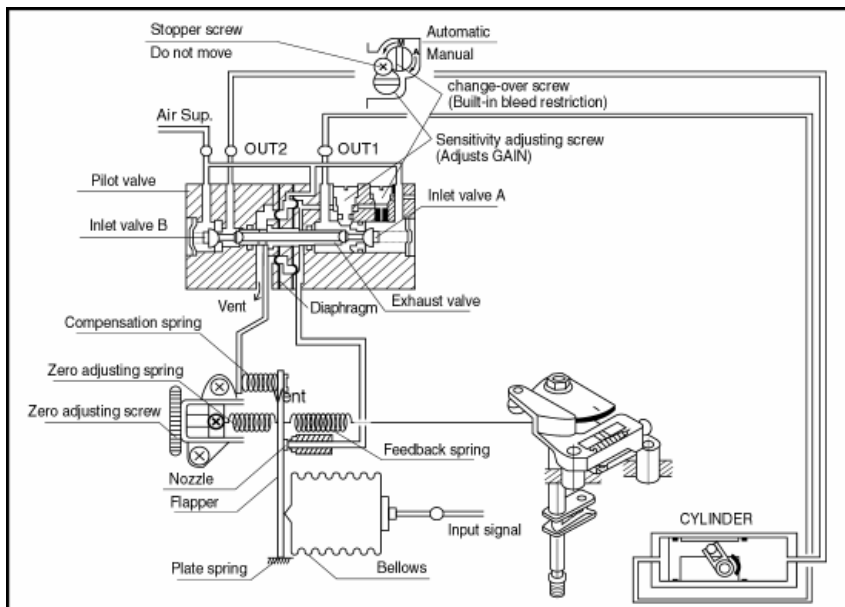
INSTALLATION & MAINTENANCE MANUAL

PPR SERIES PNEUMATIC POSITIONER

- Principle of Operation

As the input signal (3~15psi) from the controller increases, the plate spring of the bellows works as a pivot. As the flapper receives the rotary torque in the counter-clockwise direction, 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 signal in the bellows. The compensation spring is for direct feedback of the motion of the exhaust valve and is connected to the flapper to enhance the stability of the loop. The zero point is adjusted by changing the zero adjustment spring tension.



- Specification

	PPR	
	Rotary Type (Cam Feedback)	
	Single	Double
Input Signal	3~15psi (Note. 1)	
Air Supply Pressure	Max. 100PSIA	
Standard Stroke	60 ° ~ 100° (Note. 2)	
Air Piping Connection	1/4" NPT	
Ambient Temperature	-4 ~ 158 Deg 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	4.6 Lbs	

Note: 1) 1/2 spilt range can be adjusted

2) Stroke can be adjusted to 0 ° ~ 60° or 0 ° ~ 100°



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- Standard Mounting (Fork Lever Type)

- Mount the bracket to the actuator. The brackets have been designed for actuators with the 80 X 30mm NAMUR accessory pattern. For the 130 X 30mm pattern, the block type bracket is available.

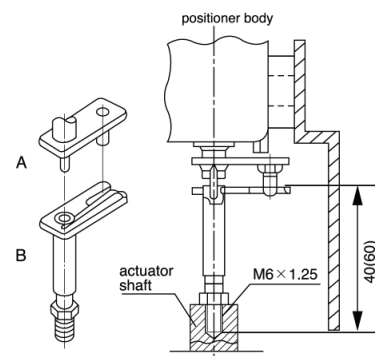


Bracket (80 X 30)



Block Type Bracket (130 X 30)

- Mount the fork lever "B" to the actuator and thread it into the actuator first before mounting the positioner and the bracket to the actuator.
- Once the bracket has been mounted to the actuator, mount the positioner to the bracket with the bolts (2-M8 or 3-M8). Be sure that the feedback lever (feedback lever shaft "A" + fork lever "B") is in perfect alignment with a rotary actuator output shaft. The spring pin of the feedback lever shaft "A" acts as a guide and should be placed in the orifice of the fork lever "B". Please note that linearity and hysteresis will suffer if these alignment and placement are not correct.



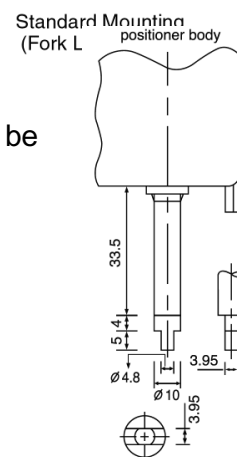
- Direct Mounting (NAMUR Type, see the right picture)



NAMUR Type Bracket (80 X 30 X 20)



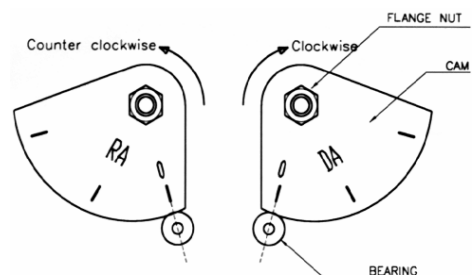
NAMUR Type Bracket (130 X 30 X 30)



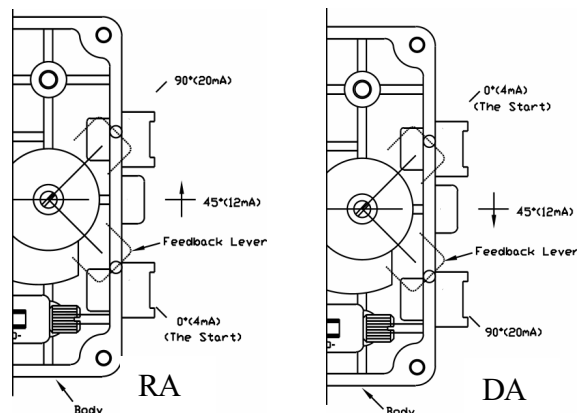
Direct Mounting (NAMUR Type)

- Cam and Indicator Adjustment

- 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 to the right. The span adjusting arm unit should now be aligned.
- Tighten the flange nut of the cam after setting the cam.
- 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.



Be sure that RA (reverse acting) is the standard factory setting.





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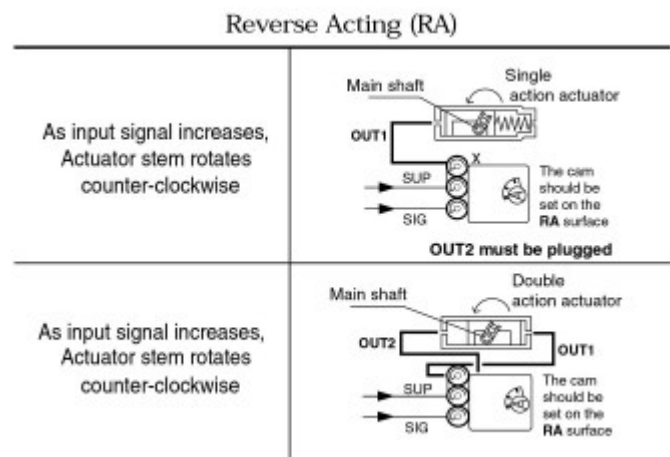
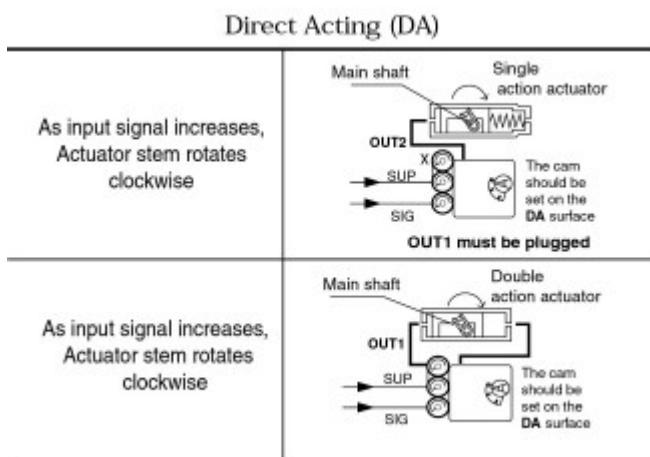
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- Span and Zero Adjustment

- Check all air connections. See the picture below on this page.
- Set input signal to 3psi while positioner is at the 0% or stroke starting point. Turn the zero adjustment knob clockwise or counter clockwise to set the zero position.
- Check the stroke of actuator by setting the signal to 15psi. If the stroke does not meet 100%, turn the span adjustment screw clockwise or counter clockwise until 100% is reached.
- Set input signal back to 3psi and adjust the zero adjustment screw until starting point is reached.
- Repeat the process until the desired set point is reached.

- Air Connections





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- Pilot Valve Seat Adjuster

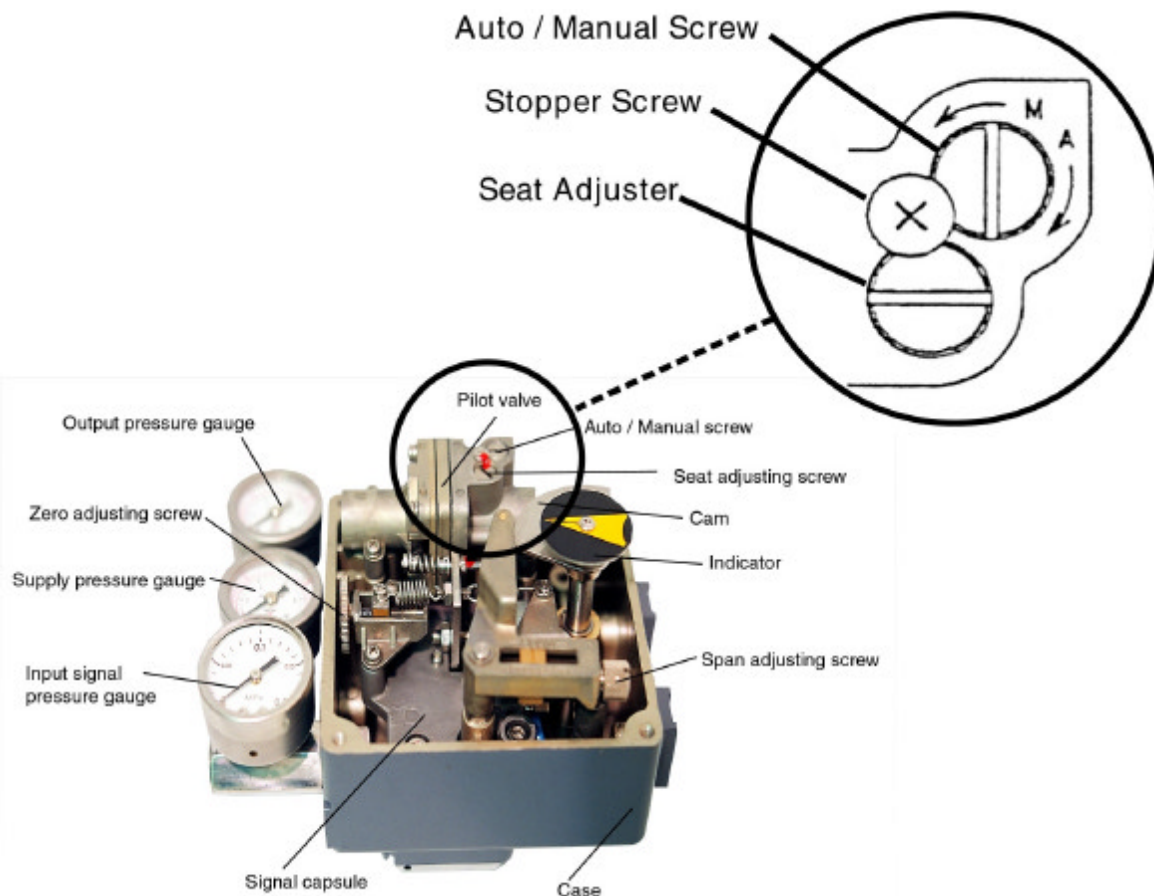
The seat adjuster (sensitivity adjusting screw) located on the pilot valve is used to adjust the positioner for double-acting actuators. Normally, no adjustment is required.

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 3-15psi input signal.

Internal View of PPR Rotary Positioner





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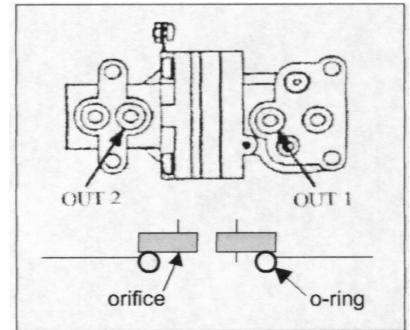
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- Optional Restricted Pilot Valve Orifice

WARNING: Before removing pilot valve, be sure to 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. Remove the four screws holding the pilot to the positioner body. As you remove the valve, be sure to hold the compensation spring (see page 2) in place. Flip the valve so the bottom faces you. Remove the o-rings from the *out 1* and *out 2* ports (as shown in the diagram at right). Place the orifice plates in their place with new o-rings above them, and re-install the pilot valve, making sure the compensation spring is back in place. The positioner is now set up for smaller actuators.



- 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 slow.
- The nozzle might be clogged. Take the metal wire located in the positioner cover and clean the nozzle.

- 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)

Poor Linearity

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

- Dimensions

