

# Pneumatic-Pneumatic Positioner PPR Series Instruction Manual





1. Read all safety instructions in this manual carefully before using this product. All work should be done by staff with the necessary training and experience.
2. An air filter regulator should be installed before the positioner.

### 1. Part Number System



<u>Description</u>	<u>Code</u>	<u>Description</u>	<u>Code</u>
<b>Feedback Shat:</b>	N: NAMUR shaft (direct mounting) A: Fork lever M6x40L B: Fork lever other size on request	<b>Connection Threads: (pneumatic)</b>	3: Rc 1/4 4: NPT 1/4
<b>Pressure Gauge:</b>	1: 6 bar (90 psi) 2: 10 bar (150 psi)	<b>Dome Indicator:</b>	N: Flat indicator (standard) D: Dome indicator
<b>Pilot Valve Orifice:</b>	S: Standard (actuator volume over 180 $\text{cm}^3$ ) M: Small orifice ( $\Phi 1.0$ or $\Phi 0.7$ ) (actuator volume 90~180 $\text{cm}^3$ )	<b>High Temperature:</b>	T: 70 °C (standard) H: 120 °C (without position feedback option) 85 °C (with position feedback option)
<b>Position Feedback:</b>	N: None (standard) O: Position transmitter (4~20mA output signal) L: 2 x SPDT limit switches M: O+L	<b>Mounting Bracket:</b>	N: None R: Multi-size NAMUR bracket for DIN VDI/VDE 3845  F: DHCT bracket 80x30 for fork lever type E: Multi-size NAMUR bracket for fork lever type

### 2. Specifications

	PPR	
	Rotary Type (Cam Feedback)	
	Single	Double
Input Signal	0.2~1.0 $\text{kgf/cm}^2$ (3 ~ 15psi) (Note 1)	
Air Supply	Max. 7.0bar (100psi) free of oil, water, and moisture	
Standard Stroke	60 ~ 100 ° (Note. 2)	
Pneumatic Connections	Rc 1/4 or NPT 1/4	
Ambient Temperature	-20 ~ +70 °C	
Pressure Gauge	Stainless Steel	
Output Characteristics	Linear	
Linearity	Within ± 1.0 % F.S	Within ± 1.5 % F.S
Sensitivity	Within ± 0.2 % F.S	Within ± 0.5 % F.S
Hysteresis	Within ± 1.0 % F.S	
Repeatability	Within ± 0.5 % F.S	
Air Consumption	5 LPM (Sup. 1.4 $\text{kgf/cm}^2$ )	
Flow Capacity	80 LPM (Sup. 1.4 $\text{kgf/cm}^2$ )	
Material	Aluminum Die-cast Body	
Weight	2.5 kg	

Note: 1) It is adjustable to set 1/2 split range for 3-9psi input signal or 9-15psi input signal.  
2) Stroke can be adjusted to 0~60° or 0~100°

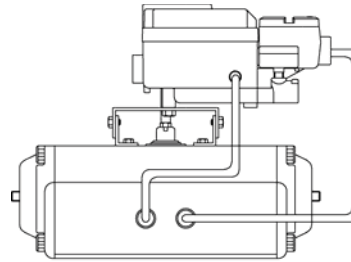
### 3. Mounting and Selecting RA (reverse acting) or DA (direct acting)

**⚠ CAUTION: Keep assembly tightly closed during operation.**

#### A. Mounting with NAMUR type

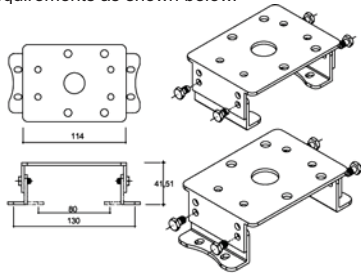
The PPR positioner basically has the NAMUR shaft which can be directly mounted to the top pinion (VDI/DE 3845) of the pneumatic rotary actuator.

- ① Mount the NAMUR multi-size bracket to the pneumatic rotary actuator with the enclosed bolts (4 x M5) as shown to the right.
- ② Mount the positioner to the bracket and insert the positioner feedback shaft into the actuator top pinion (output shaft) as shown to the right.
- ③ Fix the positioner to the bracket with the enclosed bolts (4 x M6).



NAMUR Mounting

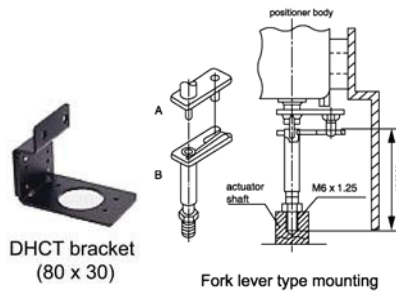
A multi-size bracket is assembled for 80x30x20 as a standard factory setting. But the user can re-assemble it for 80x30x30, 130x30x20, and 130x30x30 according to requirements as shown below.



Multi-size bracket (NAMUR mounting)

#### B. Mounting with fork lever type

Mount the PPR positioner to the actuator with DHCT bracket (80x30) as shown to the right. Be sure that the feedback lever shaft "A" is placed in the orifice for the fork lever "B" and they are in alignment with a rotary actuator output shaft.



DHCT bracket (80 x 30)

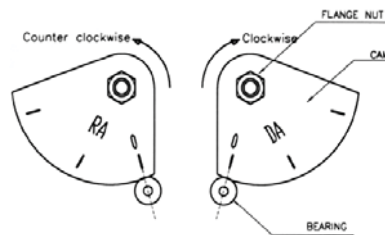
Fork lever type mounting

#### C. Cam and Indicator Adjustment

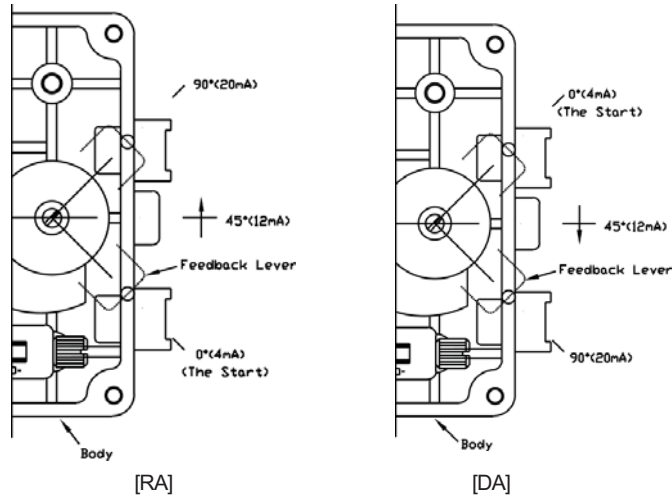
**⚠ WARNING: When adjusting or replacing cams, be sure to shut off air supply to the PPR positioner. Otherwise, the PPR positioner might react suddenly and cause damage or injury.**

**⚠ RA (reverse acting) is a standard factory setting.**

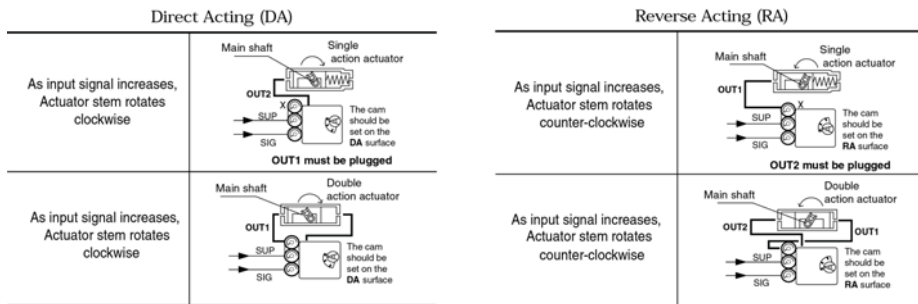
- ① Loosen a flange nut on a cam and reverse a cam for DA setting. Match the part of the cam with "0" marked on it with the center of bearing as shown below. The span adjusting arm unit should now be aligned.



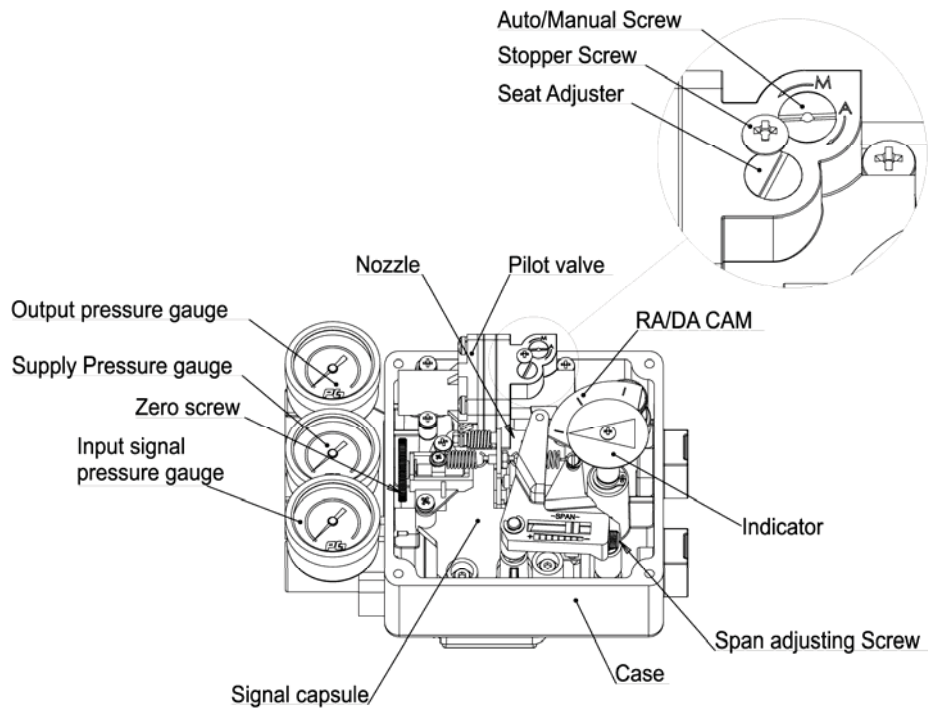
- ② Tighten the flange nut of the cam after setting the cam.
- ③ After cam installation, proceed to adjust zero and span. Once this is complete, secure the indicator with the bolt (M6) to the feedback shaft according to the actuator type (RA or DA) as shown below. The position for the indicator should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



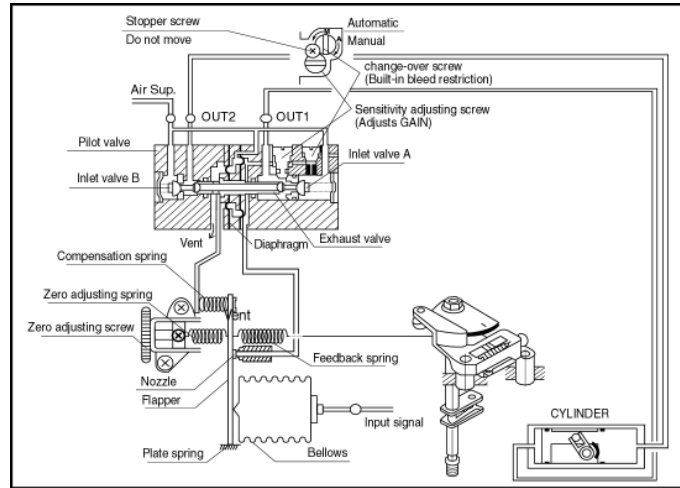
### 4. Air Connections



### 5. Internal View



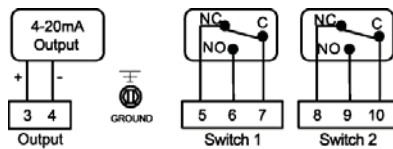
**⚠** Never move the seat adjuster. It was already set at the factory precisely.



### 6. Span and Zero Adjustment

- ① Check the proper installation of the PPR positioner and the feedback shaft.
- ② Check the proper position of a cam according to the actuator type (direct acting or reverse acting).
- ③ Connect all air connections.
- ④ Supply air and set the input signal to 3psi. 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 15psi. 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 3psi 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 6, 9, and 12psi is automatically reached.

### 7. Wire Diagrams for Position Transmitter and Limit Switches

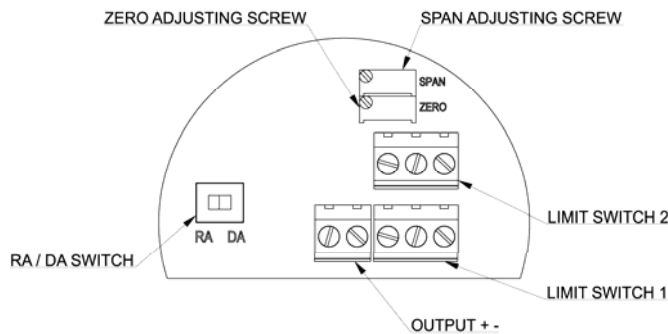


Output / SPDT Limit Switches

**⚠ 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.

### 8. Position Transmitter (4...20mA output signal)

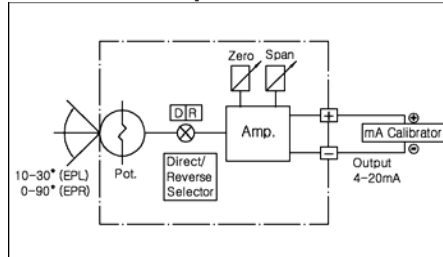
#### A. Board View



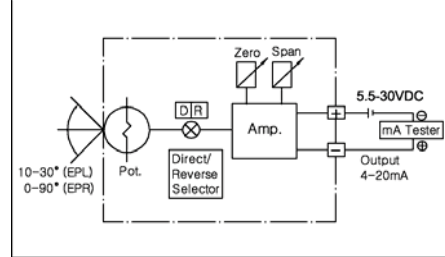
**B. Specifications**

Power Supply Rating	5.5 ~ 30V DC loop-powered
Recommended Power Supply	24V DC
Output Signal	4~20mA
Operating Temperature	-20° to 70°C
Load Impedance	0~600 ohms
Max. Output	30mA DC
Linearity	± 1.0 %
Hysteresis	1.0 % of full scale
Repeatability	± 0.5 % of full scale
Adjustment	Zero and Span in terminal box

**C. With mA Loop calibrator**



**D. With multimeter tester**



**E. Span and Zero Adjustment**

- ① Select RA or DA on a board in the terminal box. For reference, RA (reverse acting) is a standard factory setting.
- ② Supply 4mA input signal and turn the zero adjusting screw on a board clockwise or counter clockwise until output signal becomes 4mA.
- ③ Supply 20mA input signal and turn the span adjusting screw on a board clockwise or counter clockwise until output signal becomes 20mA.
- ④ Repeat the process of ② to ③ until output signal approaches input signal.

- ⚠**
1. Be sure that Span and Zero of the EPR positioner should be exactly set before setting Span and Zero of the position transmitter.
  2. Be sure that 5.5 - 30V DC should be supplied in case of using the mA tester (multimeter tester).
  3. Check a loop power if the output power indicating lamp ⑥ is not on.

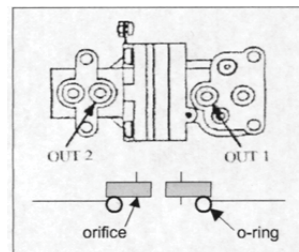
**9. Limit Switches (open and close)**

Contacts	SPDT Form C
AC Rating	16A 1/2HP 125/250VAC
DC Rating	0.6A 125VDC / 0.3A 250VDC
Adjustment	Cams with set screws (L-wrench included for setting)

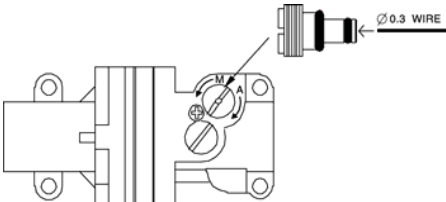
**10. Optional Restricted Pilot Valve Orifice**

**⚠ WARNING:** Before removing the pilot valve, be sure to disconnect the positioner from the signal and compressed air source

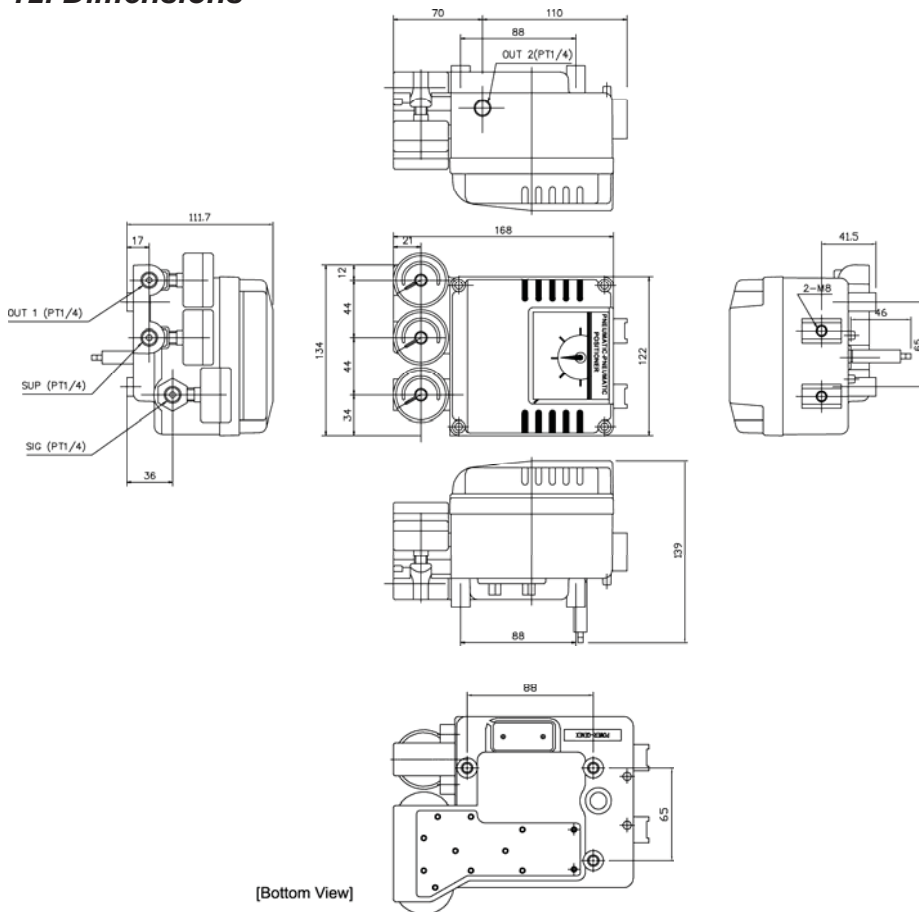
For improved control using smaller actuators, a restricted pilot valve orifice kit is included with the positioner. To install, the pilot valve must be removed from the positioner. Remove four screws holding the pilot valve to the positioner body. As you remove the pilot valve, be sure to hold the compensation spring 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.



### 11. Troubleshooting Tips

Troubles	Solutions
There happens a hunting with a small pneumatic actuator	The actuator is very small. Install two orifices at the bottom of the pilot valve as instructed in 10. Optional Restricted Pilot Valve Orifice.
	If the actuator is not small, check if a position shaft is inserted into the output shaft of the actuator exactly. If there is a gap between these shafts, make it tight.
The valve always opens regardless of input signal.	<p>The orifice of the Auto/Manual screw on the pilot valve is clogged. Disconnect supply air and clean the orifice with a wire attached inside of the EPR positioner cover as shown below.</p>  <p><b>⚠ Never move the seat adjuster. It was already set at the factory precisely.</b></p>
The valve always opens or closes with input signal	The air connections are not made properly. Check again if the pneumatic actuator type is RA (reverse acting) or DA (direct acting) and make the proper air connections. See 7. Air Connections.
Linearity is very poor	Re-set Zero and Span.
Hysteresis is very poor	Tighten a mounting bracket.

### 12. Dimensions





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