Cloriüs Controls A/S

99.66.05-A
GB

Electro-Pneumatic Positioner EPR Series

Instruction Manual

1. Read all safety instructions in this manual carefully before using this EPR positioner. All work should be done by staff with the necessary training and experience.
2. The air filter regulator should be installed before this EPR positioner.
3. The EPR positioned approved for ATEX Eex md IIB T5 must be connected to a fuse with the following ratings:
- Max 125mA, breaking capacity 35A
- Suitable 1/2" PF threaded, certified EEx d cable glands and plugs must be used.

1. Part Number System

EPR –	Protection Class	Feedback Shaft	Pressure Gauge (SUP. OUT)	Pilot Valve Orifice	Position Feedback	Connection Threads	Dome Indicator	High Temp	Mounting Bracket

Description	Code
Protection Class:	F: Flameproof Ex md IIB T6 D: Flameproof Ex md IIC T6 A: Flameproof Eex md IIB T5 ATEX Ⓔx I: Intrinsic safety (Ex ia IIB T6) W: Weatherproof to IP66
Feedback Shaft:	N: NAMUR shaft (direct mounting) A: Fork lever M6x40L B: Fork lever other size on request
Pressure Gauge:	1: 6 bar (90 psi) 2: 10 bar (150 psi)
Pilot Valve Orifice:	S: Standard (actuator volume over 180 ㎤) M: Small orifice (Φ1.0 or Φ0.7) (actuator volume 90~180 ㎤)
Position Feedback: (only for weatherproof type)	N: None (standard) O: Position transmitter (4~20mA output signal) L: 2 x SPDT limit switch M: O+L

Description	Code
Connection Threads: (pneumatic – electrical)	3: PT 1/4 – PT 1/2 (standard) 4: NPT 1/4 – NPT 1/2 5: PT 1/4 – M20 x 1.5
Dome Indicator:	N: Flat indicator (standard) D: Dome indicator
High Temperature: (only for weatherproof type)	T: 70℃ (standard) H: 120℃ (without position feedback option) 85℃ (with position feedback option)
Mounting Bracket:	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

	EPR	
	Rotary Type (Cam Feedback)	
	Single	Double
Input Signal	4 ~ 20mA DC (Note. 1)	
Input Resistance	235 ± 15Ω	
Air Supply	Max. 7.0bar (100psi) free of oil, water, and moisture	
Standard Stroke	60 ~ 100 ° (Note. 2)	
Pneumatic Connections	PT 1/4 or NPT 1/4	
Electrical Connections	PT 1/2 or NPT 1/2	
Protection Class	Ex md IIB T6, Ex md IIC(H2) T6, IP66, Ex ia IIB T6 Eex md IIB T5 ATEX Ⓔx	
Ambient Temperature	-20 ~ +70℃ (standard)	
Pressure Gauge	Stainless Steel	

Output Characteristics	Linear	
Linearity	Within ± 1.0 % F.S	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	5 LPM (Sup. 1.4kgf/㎠)	
Flow Capacity	80 LPM (Sup. 1.4kgf/㎠)	
Material	Aluminum Die-cast	
Weight	2.9 kg (with terminal box)	

Note: 1) It is adjustable to set 1/2 spilt range for 4-12ma input signal or 12-20mA input signal.
2) Stroke can be adjusted to 0~60° or 0~100°

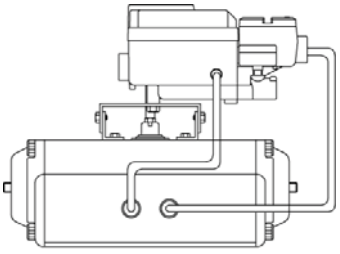
3. Mounting and Selecting RA (reverse acting) or DA (direct acting)

CAUTION: To reduce the risk of ignition of hazardous atmospheres, disconnect the device from the supply circuit before opening. Keep assembly tightly closed during operation.

A. Mounting with NAMUR type

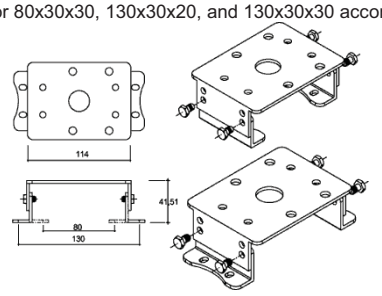
The EPR positioner has the NAMUR shaft as standard which can be directly mounted to the top pinion (VDI/VDE 3845) of the pneumatic rotary actuator..

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 EPR positioner to the bracket and insert the EPR positioner feedback shaft into the actuator top pinion (output shaft) as shown to the right.
③ Fix the EPR 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.

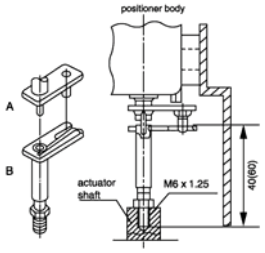


Multi-size bracket (NAMUR mounting)

B. Mounting with fork lever type

Mount the EPR 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)



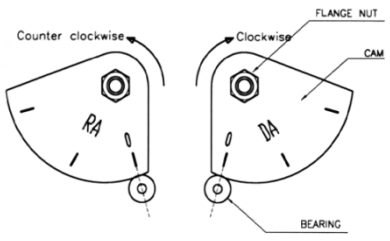
Fork lever type mounting

C. Cam and Indicator Adjustment

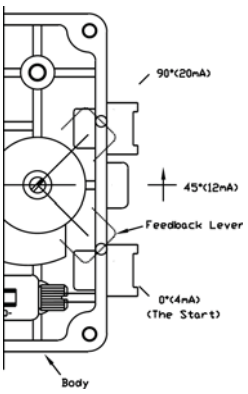
WARNING: When adjusting or replacing cams, be sure to shut off air supply to the EPR positioner. Otherwise, the EPR positioner might react suddenly and cause damage or injury.

RA (reverse acting) is a standard factory setting.

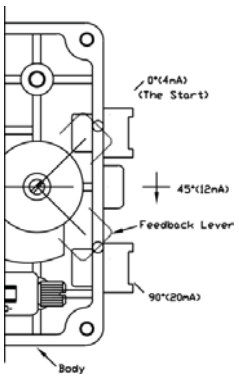
① Loosen a flange nut on a cam and reverse a cam for DA setting. Match the part of the cam with "0" marked on it with the center of bearing as shown below. The span adjusting arm unit should now be aligned.



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.

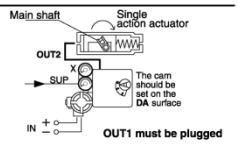
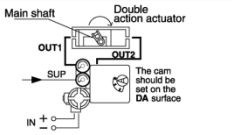


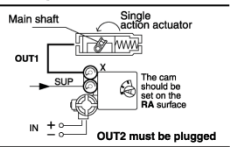
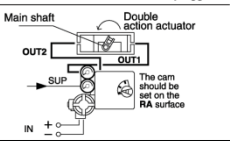
[RA]



[DA]

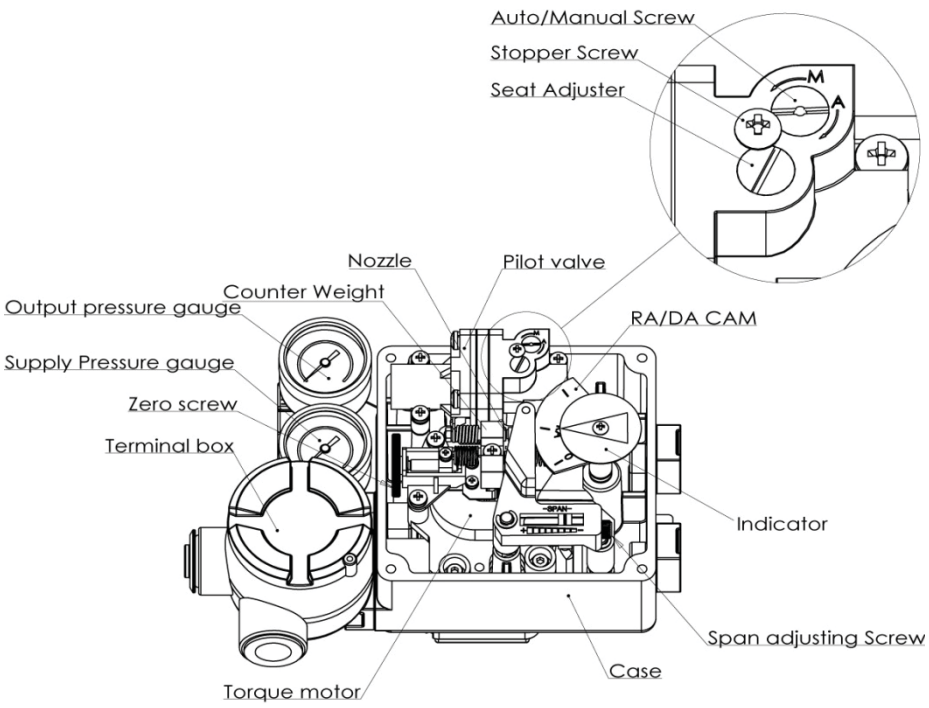
4. Air Connections

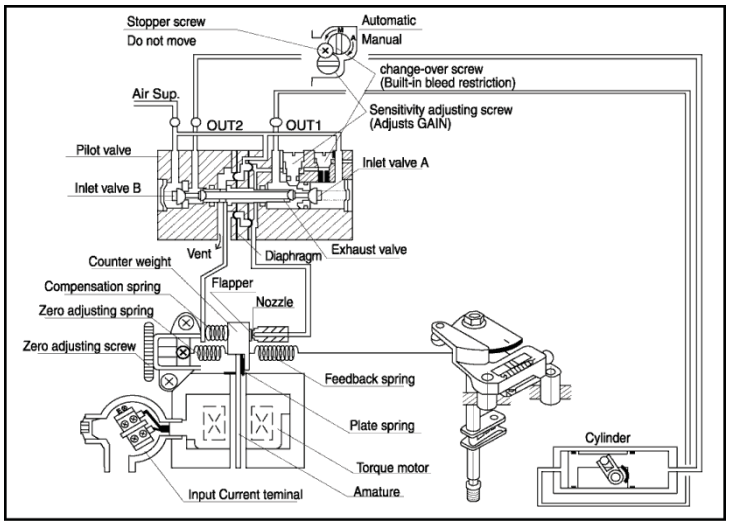
Direct Acting (DA)	
Increasing the input signal, Actuator stem rotates clockwise.	
Increasing the input signal, Actuator stem rotates clockwise.	

Reverse Acting (RA)	
Increasing the input signal, Actuator stem rotates counter clockwise.	
Increasing the input signal, Actuator stem rotates counter clockwise.	

5. Internal View

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





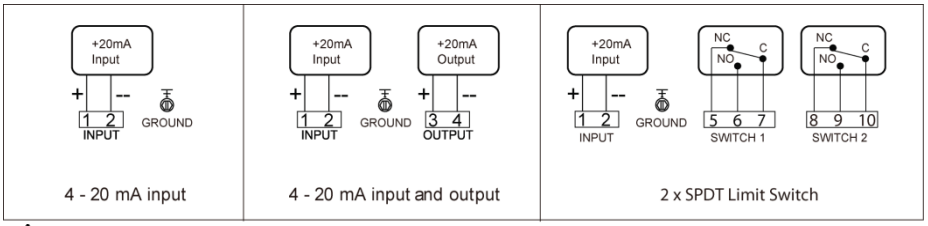
6. Span and Zero Adjustment

① Check the proper installation of the EPR 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 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.

NOTE: Due to variations in circuitry and environmental effects, often 0% is set at 4.5mA and 100% at 19.5mA to make sure that at the end points the valve will be fully open or fully closed.

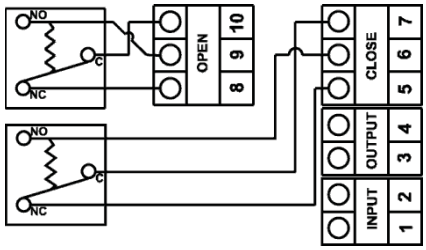
7. Wire Diagrams

A. Standard and With Position Transmitter or Limit Switches



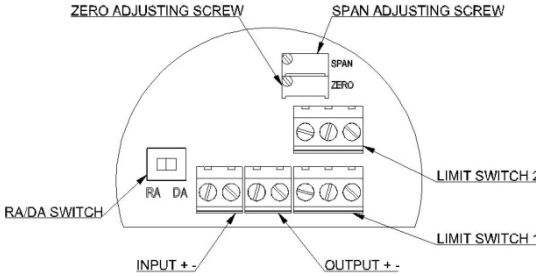
CAUTION: Always check that the electrical load is within the range stated on the nameplate. Failure to remain within electrical ratings may result in damage to or premature failure of the electrical switches, sensors or transmitter electronics.

B. With Position Transmitter and Limit Switches



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

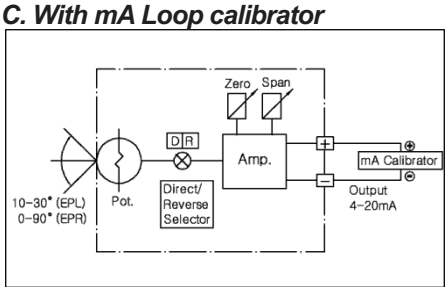
A. Board View



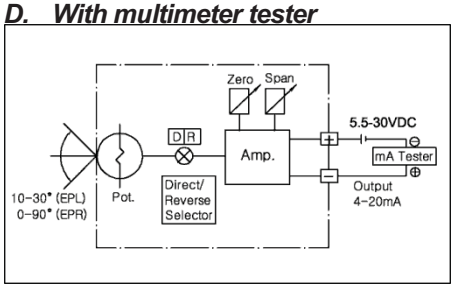
B. Specifications

Power Supply Rating	5.5 ~ 30V DC loop-powered
Recommended Power Supply	24V DC
Output Signal	4~20mA
Operating Temperature	-20º to 70℃
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.

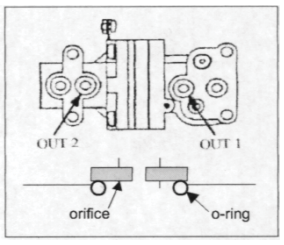
1. Be sure that Span and Zero of the EPR positioner should be exactly set before setting Span and Zero of the position transmitter.
2. Be sure that 5.5 - 30V DC should be supplied in case of using the mA tester (multimeter tester).
3. Check a loop power if the output power indicating lamp ⑥ is not on.

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

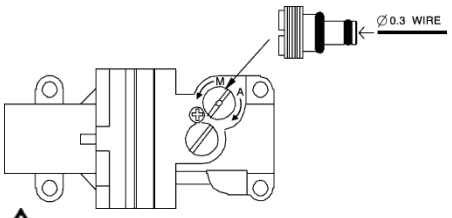
WARNING: Before removing the pilot valve, be sure to disconnect the EPR positioner from the signal and compressed air source



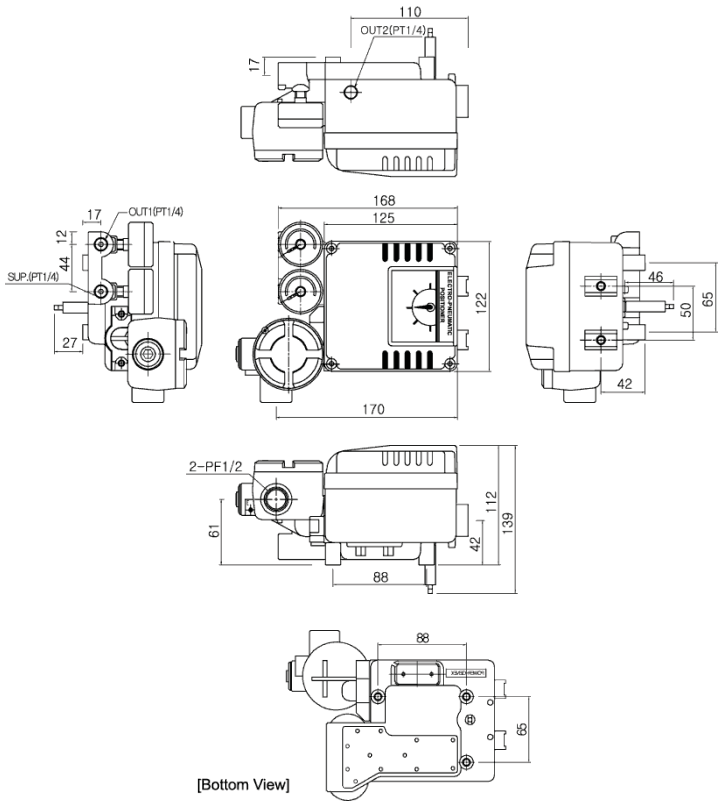
For improved control using smaller actuators, a restricted pilot valve orifice kit is included with the EPR positioner. To install, the pilot valve must be removed from the EPR positioner. Remove four screws holding the pilot valve to the EPR positioner body. As you remove the pilot valve, be sure to 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 EPR 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 12. 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.	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.  ⚠ **Never move the seat adjuster. It was already set at the factory precisely.**
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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