

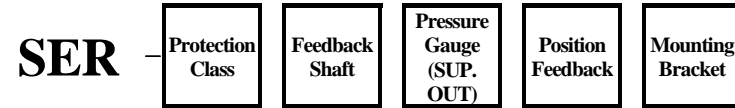
# Instruction Manual



## SER Series Electro-Pneumatic Positioner

- 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



Description	Code	Description	Code
<b>Protection Class:</b>	F: Flameproof (Exd IIB T6) I: Intrinsic safety (Ex ia IIC T6) W: Weatherproof to IP66	<b>Pressure Gauge:</b>	1: 6 bar (90 psi) 2: 10 bar (150 psi)
<b>Feedback Shaft:</b>	F: Fork lever type N: NAMUR shaft (direct mounting)	<b>Position Feedback:</b>	N: None (standard) O: Position transmitter (4 - 20mA output signal) L: 2 x alarm limit M: O + L
<b>Mounting Bracket:</b>	N: None R: Multi-size bracket for DIN VDI/VDE 3845		

### 2. Specifications

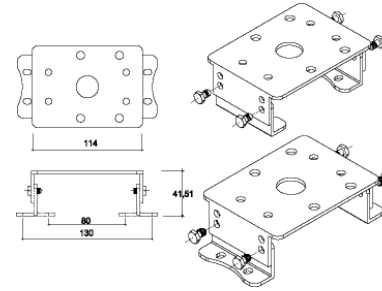
Input signal	4 - 20mA DC
Voltage supply min. /max.	8.5V DC / 30V DC (425 ohm)
Power consumption	30.8mW @ 4mA / 170mW @ 20mA
Characteristic	Linear
Operating Angle	40...90° (max. up to 100°)
Input pressure range	1.5...7.0 bar
Air capacity	6.6 kg/h = 5.4N m <sup>3</sup> /h = 3 scfm @ supply air of 1.4bar (20psi)
Air consumption	< 0.04 kg/h
Output pressure range	0...100% of supply air pressure
Media characteristic	Pressurized air or allowed gas, Free of water, oil, and dust
Linearity	± 0.5%
Hysteresis	± 0.2%
Sensitivity	± 0.1%
Operating temperature	-20 - +80 °C

Air piping connection	Rc 1/4 or 1/4 NPT
Conduit connection	G 1/2 or 1/2 NPT
Body material	Aluminum die-cast
Protection class	IP66, intrinsic safety (Exia) or flameproof (Exd)
Weight	2.5 kg

### 3. Mounting SER Positioner (rotary type)

SER positioner has the NAMUR shaft as standard, so it can be directly mounted to the top pinion (VDI/VDE 3845) of the pneumatic rotary actuator with the following multi-size bracket supplied as option. A user can re-assemble it for 80x30x30, 130x30x20, and 130x30x30 according to requirements as shown below.

Namur Standard	Bracket Height
80 × 30 × 20 (H)	41mm
80 × 30 × 30 (H)	51mm
130 × 30 × 20 (H)	41mm
130 × 30 × 30 (H)	51mm



**80 × 30 × 20 is a standard factory assembly.**

After assembling the bracket according to requirements and confirming the initial rotating direction (0%) of the pneumatic actuator, install the positioner and the bracket as advised below.

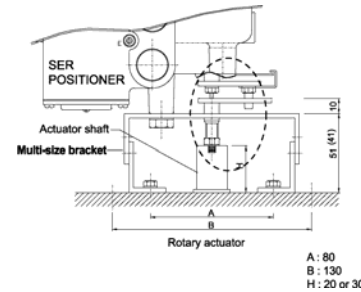
#### 3-1] Mounting with fork lever type

a) Mount the multi-size bracket and insert a fork lever "B" into the actuator output shaft as shown below so that it can be placed about 10mm away from the bracket.

b) Mount the positioner on the multi-size bracket and make a feedback lever shaft "A" placed in the orifice of a fork lever "B" so that they are in alignment with the actuator output shaft.

c) Fix the positioner to the multi-size bracket enclosed M8 bolts.

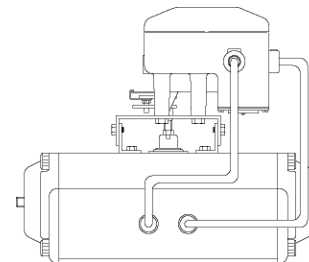
d) Turn and set the indicator so that it can be placed at the starting rotation direction (0%). And fix "B" of the fork lever by turning a nut so that it cannot be loosened.



#### 3-2] Mounting with NAMUR shaft type

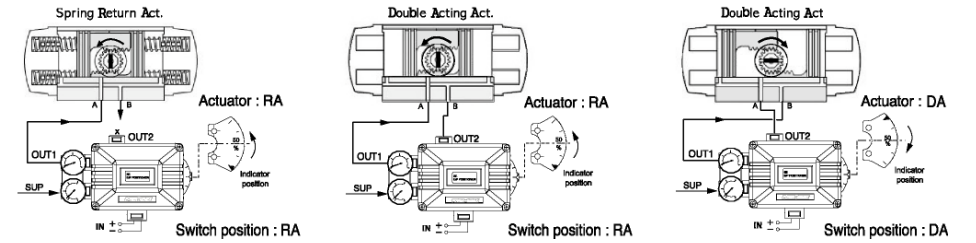
Mount the positioner shaft to the actuator output shaft directly as shown to the right.

**Be sure that the initial rotating direction of the actuator accords with the rotating direction of the positioner.**



### 4. Air Connections

Confirm the rotating direction of the actuator and connect the air lines as below.

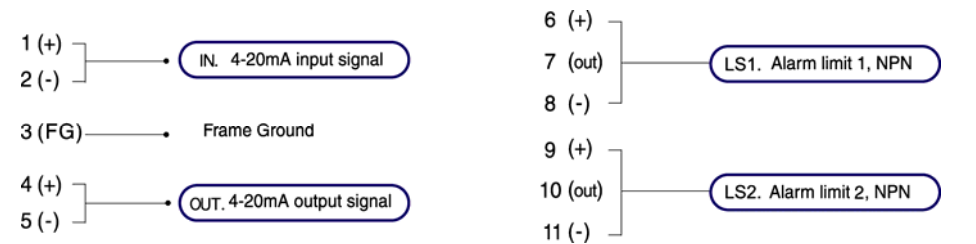


	Spring Return	Double Acting
Reverse Acting	Out 1 : piped, Out 2 : plugged	Out 1 : piped to Actuator port A, Out 2 : piped to Actuator port B
Direct Acting	Out 1 : plugged, Out 2 : piped	Out 1 : piped to Actuator port B, Out 2 : piped to Actuator port A

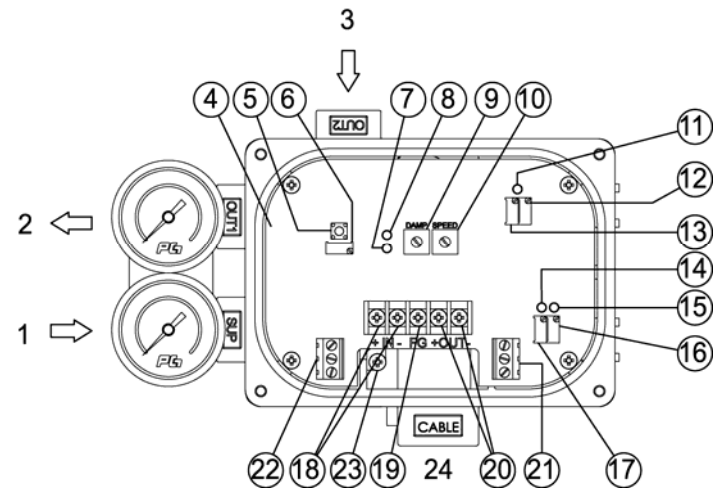
### 5. Electrical Connections

- CAUTION:** 1. 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.  
 2. Always confirm if + and - of input and output signals are connected properly.

**CAUTION:** When opening the positioner cover at humid places, more attention is required. This may cause the serious malfunction of the control board.



## 6. Board Details



- |                           |                           |                       |                      |
|---------------------------|---------------------------|-----------------------|----------------------|
| ① Supply air              | ② OUT 1                   | ③ OUT 2               | ④ Board cover        |
| ⑤ Auto-setting button     | ⑥ Span adjusting screw    | ⑦ DA lamp             | ⑧ RA lamp            |
| ⑨ Damping screw           | ⑩ Speed adjusting screw   | ⑪ Feedback lamp       | ⑫ Feedback span      |
| ⑬ Feedback zero           | ⑭ Limit switch lamp 1     | ⑮ Limit switch lamp 2 | ⑯ Limit switch 2     |
| ⑰ Limit switch 1          | ⑱ Input signal +, -       | ⑲ Frame ground        | ⑳ Output signal +, - |
| ㉑ Limit switch 2 terminal | ㉒ Limit switch 1 terminal | ㉓ Earth               | ㉔ Cable entry        |

### 6-1] Auto-Setting ⑤

Push this button for auto-setting. The SER positioner will automatically set Zero and Span and also decide RA or DA. Lamps ⑦ and ⑧ will be blinking during auto-calibration process.

### 6-2] Span Adjusting Screw ⑥

Span is automatically set after auto-calibration process. But please turn this screw when it is necessary to set Span.

### 6-4] Damping Screw ⑧

If hunting happens, turn this screw counter clockwise a little.

### 6-5] Speed Adjusting Screw ⑩

Turn this screw clockwise and the response speed of the actuator will be increased. Turn counter clockwise and it will be decreased.

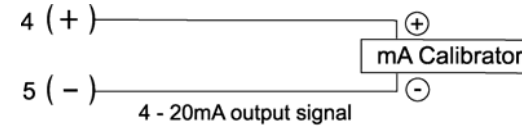
▲ The maximum speed is a standard factory setting.

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

▲ Note that Zero and Span of feedback are automatically set after auto-calibration process.

Specifications of Position Transmitter	
Output signal	4 - 20mA
Power supply rating	15 - 30V DC
Recommended power supply	24VDC
Operating temperature	-20 - +70°C
Input impedance	0 - 430Ω
Characteristic	Linear
Linearity	±0.5% F.S.
Hysteresis	±0.5% F.S.
Repeatability	±0.5% F.S.
Adjustment	Zero and span
Rotary angle	50...90° (max. 100°)

### 7-1] With mA calibrator



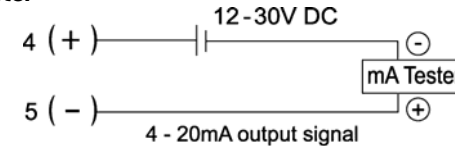
Supply 4mA input signal and set the output signal to 4mA by turning the feedback zero screw ⑬. Turn the feedback zero screw ⑬ clockwise, and the output signal will be increased. Turn counter clockwise and the output signal will be decreased.

Supply 20mA input signal (100%). Set the output signal to 20mA by turning the feedback span screw ⑫. Turn the feedback span screw ⑫ clockwise, and the output signal will be increased. Turn counter clockwise and the output signal will be decreased.

Confirm if the output signal accords with the input signal by supplying 4, 8, 12, 16, and 20mA input signal by step.

- ▲ a) The feedback signal lamp ⑪ is the dimmest at 4mA and the brightest at 20mA.  
b) If the feedback signal lamp ⑪ isn't on, please check if + and - are connected properly.

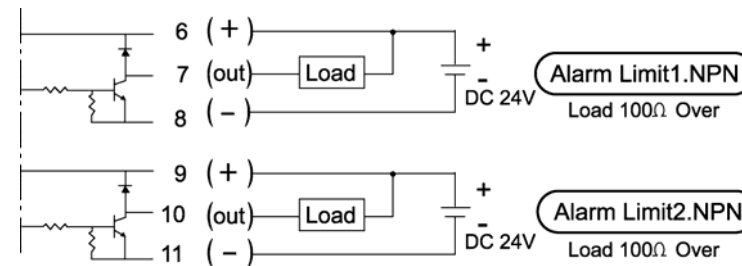
### 7-2] With multi-meter



▲ Supply the input signal with the mA calibrator and measure the position feedback with the multi-meter by supplying DC Power 12...30V DC. The setting method is the same with the mA calibrator.

## 8. Alarm Limits (open and close)

▲ Note that 24VDC power supply should be provided and a load (over 100Ω) should be connected.



For example, if you want contact points to be detected at 5mA for close and 19mA for open,

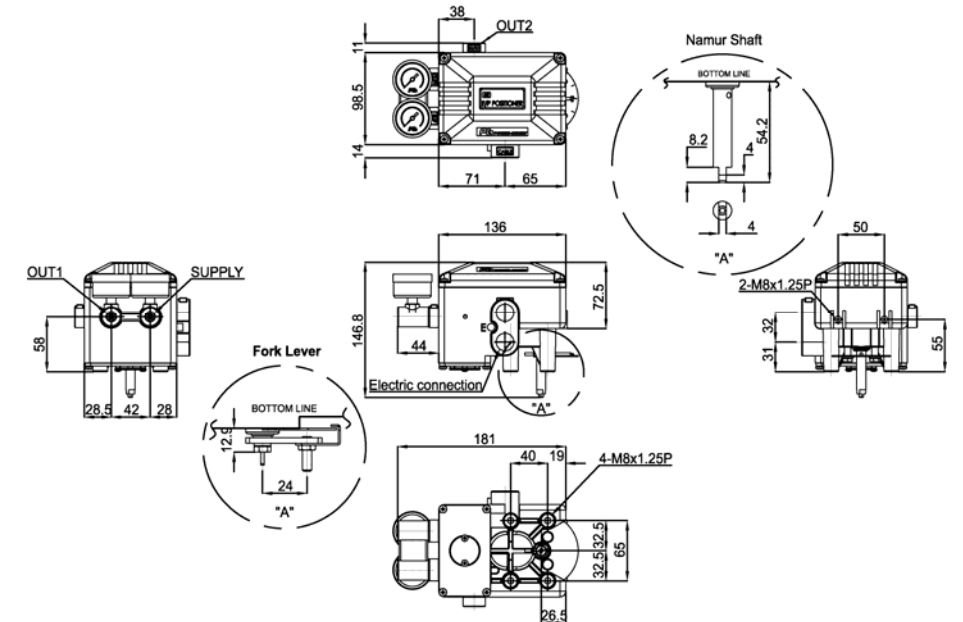
- Connect wires to terminals 6, 8 and 9, 10 and supply 24VDC, And also connect a load (over 100Ω) to terminals 7 and 10.
- Supply 5mA input signal and turn the limit switch screw (LS1) clockwise or counter clockwise until the limit switch lamp LS1 is on.
- Supply 19mA input signal and turn the limit switch screw (LS2) clockwise or counter clockwise until the limit switch lamp LS2 is on.
- Now the lamps are on from 4mA to 5mA for LS 1 and from 19mA to 20mA for LS2.

## 9. Troubleshooting Tips

Trouble	Solution
Input signal is supplied but a lamp is not on.	+ and - of input signal are not connected properly. Change each other and re-connect them.

Hunting happens Target	In case that input signal is supplied and the valve moves up and down drastically from Target and returns to Target in a very short time, turn a damping screw counter clockwise.
Oscillation is happening Target	In case that input signal is supplied, the valve moves up and down like a wave from Target and returns to Target, turn a damping screw clockwise.
Actuator does not respond to the input signal.	- Check if the airlines are properly connected. - If the speed control is set to the minimum, turn it clockwise.
Positioner is exposed to strong electromagnetic waves.	As these SEL & SER series are the electronic positioners, they may not work properly due to strong electromagnetic waves.
Output signal doesn't accord with input signal	As the positioner is not exactly set in accordance with input signal, re-set Zero and Span.

## 10. Dimensions



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