

# ELECTRO-PNEUMATIC POSITIONER

## Linear & Rotary Type

### A Solid Workhorse You Can Depend On For Consistent, Reliable Control

Electro-Pneumatic Positioners (4-20mA linear and rotary type) are advanced control devices which provide unparalleled stability in difficult environments

## FEATURES

- ◆ Easy Maintenance
- ◆ Precise Calibration with simple SPAN and ZERO adjustments
- ◆ Simple Conversion to Direct Acting or Reverse Acting
- ◆ 1/2 Spilt Range Available by simple adjustments without changing parts
- ◆ Simple Structure for feedback connection
- ◆ Corrosion-Resistant Aluminium Diecast Body
- ◆ Sensitive and Correct Response for high performance
- ◆ Economical Energy Saving
- ◆ Extremely Vibration Resistant Design
- ◆ Stainless Steel Gauges Standard
- ◆ A Restricted Pilot Valve Orifice Kit for small actuators included
- ◆ Optional Built-in Limit Switches or 4-20mA Position Transmitter for feedback
- ◆ Optional Directly-Mountable Positioner guaranteeing more outstanding stability



EPL (Linear Type)

## SPECIFICATIONS

Item	EPL		EPR	
	Linear Type (lever feedback)		Rotary Type (cam feedback)	
	Single	Double	Single	Double
Input Signal	4...20mA DC (Note.1)			
Input Resistance	235 ± 15 ohms			
Supply Air Pressure	Max. 7.0 kgf/cm <sup>2</sup> (100psi)			
Standard Stroke	10 ~ 80mm(Note.2)		60 ~ 100° (Note.3)	
Air Piping Connection	PT 1/4 (NPT 1/4)			
Conduit Connection	PF 1/2 (NPT 1/2)			
ExplosionProof Classification	Exmd II BT6, Exmd II C(H <sub>2</sub> )T6, IP66, Exia IIBT6			
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 0.1 % F.S.		Within 0.5 % F.S.	
Hysteresis	Within 0.5 % F.S.		Within 1.0 % F.S.	
Repeatability	Within ± 0.5 % F.S.			
Air Consumption	5 LPM (Sup. 1.4 kgf/cm <sup>2</sup> )			
Flow Capacity	80 LPM (Sup. 1.4 kgf/cm <sup>2</sup> )			
Material	Aluminium Diecast Body			
Weight	2.9 kg (with a terminal box)			

- Note** : 1) 1/2 spilt range can be adjusted  
 2) Feedback lever for stroke 80° ~150mm is available (EPL)  
 3) Stroke can be adjusted to 0° ~ 60° or 0° ~ 100° (EPR)



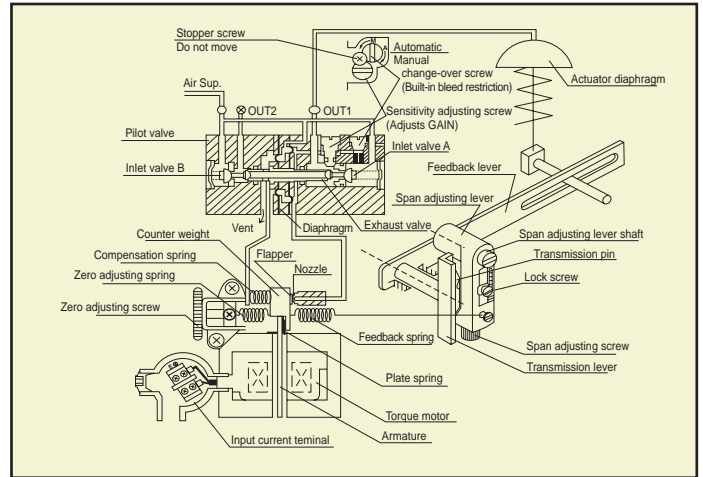
EPR (Rotary Type)

# PRINCIPLES OF OPERATION

## EPL (Linear Operation)

As the signal current from the controller increases, the plate spring of the torque motor works as a pivot. As the armature receives the rotary torque in the counter-clockwise direction, the counter-weight is pushed to the left, the clearance between the nozzle and the flapper will increase, and the nozzle back pressure will decrease. As a result, the exhaust valve of the pilot valve moves to the right, and the output pressure of OUT1 increases to move the actuator diaphragm.

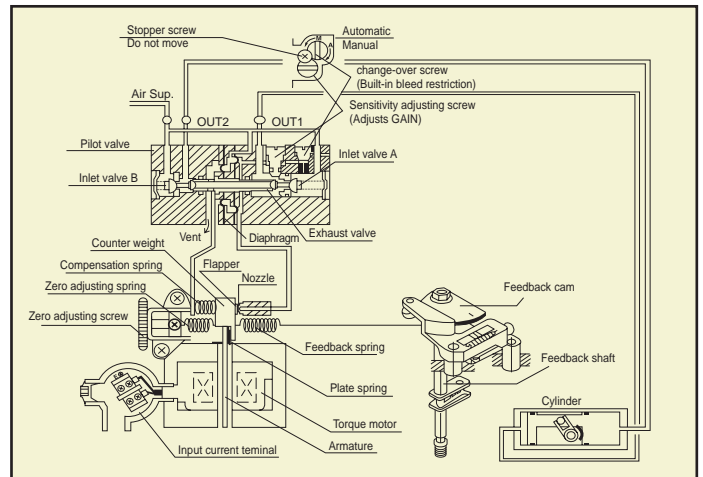
The valve stem goes up or down by the movement of the actuator diaphragm, and the feedback spring lengthens or shortens by the movement of the feedback lever. The valve stem stays in the position where the spring force is balanced with the force generated by the input current in the torque motor. The compensation spring is for direct feedback of the motion of the exhaust valve and is connected to the counter weight to enhance the stability of the loop. The zero point is adjusted by changing the zero adjustment spring tension.



## EPR (Rotary Operation)

As the signal current from the controller increases, the plate spring of the torque motor works as a pivot. As the armature receives the rotary torque in the counter-clockwise direction, the counter-weight is pushed to the left, the clearance between the nozzle and the flapper will increase, and the nozzle back pressure 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.

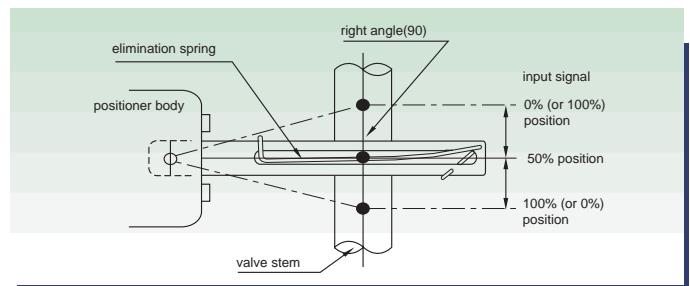
The movement of the actuator in turn rotates the feedback shaft, and the feedback spring lengthens or shortens by the movement of the feedback cam connected to the feedback shaft. The actuator stays in the position where the spring force is balanced with the force generated by the input current in the torque motor. The compensation spring is for direct feedback of the motion of the exhaust valve and is connected to the counter weight to enhance the stability of the loop. The zero point is adjusted by changing the zero adjustment spring tension.



# INSTALLATION

## EPL (Linear Type)

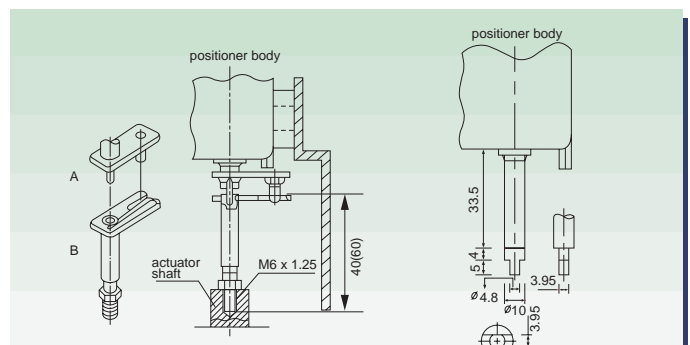
- 1) Connect the feedback lever to the control valve stem at position where the angle between the valve stem and the feedback lever is 90 degrees as shown to the right when the input signal is set to 12mA(50%).
- 2) The stroke range for the best performance should be 10 ~ 80mm and the operation angle of the feedback lever should be between Min. 10 degrees and Max. 30 degrees to carry out accuracy and linearity perfectly.



FEEDBACK LEVER INSTALLATION

## EPR (Rotary Type)

Mount the positioner to the actuator at position where the feedback lever is in perfect alignment with the rotary actuator output shaft. The spring pin of the feedback lever "A" should be placed in the orifice of the feedback lever "B". Be sure that linearity and hysteresis will suffer if these alignment and placement are not correct.



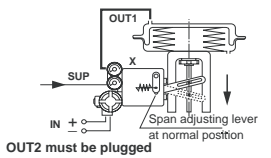
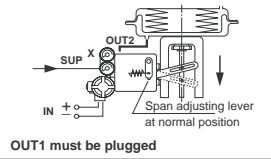
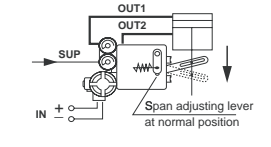
Standard Mounting (Fork Lever Type)

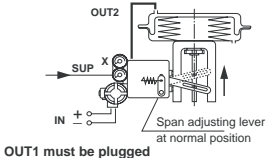
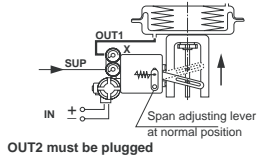
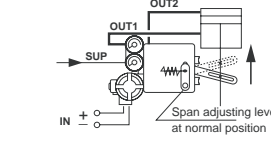
Direct Mounting (NAMUR Type)

MOUNTING

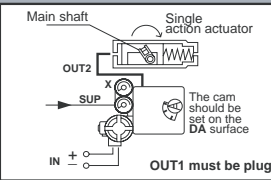
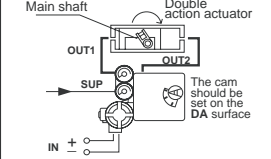
# AIR PIPING

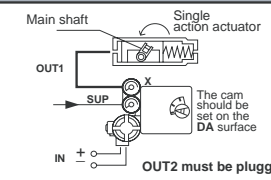
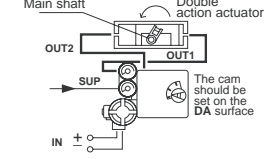
## ◆ EPL - LINEAR TYPE

Direct Acting (DA)	
As the input signal increases, Valve stem moves downwards. Actuator : DA Connection : Out 1	
As the input signal increases, Valve stem moves downwards. Actuator : DA Connection : Out 2	
As the input signal increases, Valve stem moves downwards	

Reverse Acting (RA)	
As the input signal increases, Valve stem moves upwards Actuator : RA Connection : Out 2	
As the input signal increases, Valve stem moves upwards Actuator : RA Connection : Out 1	
As the input signal increases, Valve stem moves upwards	

## ◆ EPR - ROTARY TYPE

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

Reverse Acting (RA)	
As the input signal increases, Actuator stem rotates counter - clockwise.	
As the input signal increases, Actuator stem rotates counter - clockwise.	

# HOW TO ORDER

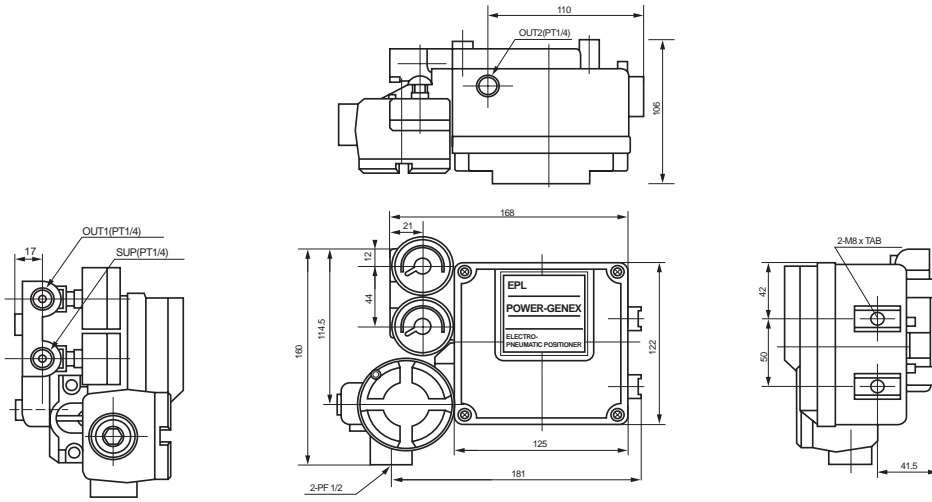
EP	Actuator Operation	Explosion Protection	Feedback Lever	Pressure Gauge (SUP.OUT)	Pilot Valve Orifice	Position Feedback	Mounting Bracket
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Description	Code
<b>Actuator Operation:</b>	L : Linear Type R : Rotary Type
<b>Explosion Protection:</b>	F : Flameproof (Exd IIB T6) I : Intrinsic Safety (Exia IIB T6) W : Weatherproof to IP66
<b>Feedback Lever :</b> - Linear Type  - Rotary Type	A : Stroke (10~80mm) B : Stroke (80~150mm)  A : Fork Lever M6 x 40L B : Fork Lever M8 x 40L C : Fork Lever M6 x 60L D : Fork Lever M8 x 60L N : Namur Shaft (direct mounting)
<b>Pressure Gauge:</b>	1 : 6 Bar (90psi) 2 : 10 Bar (150psi)

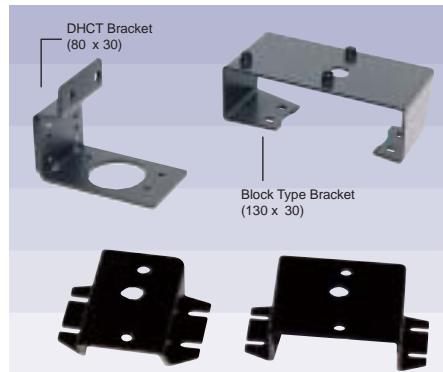
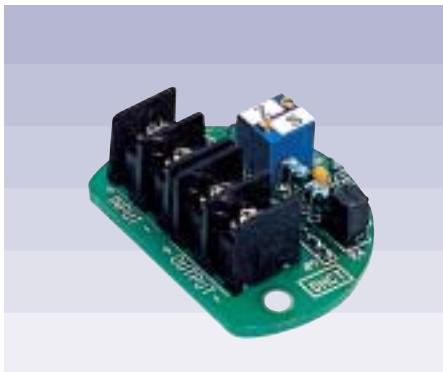
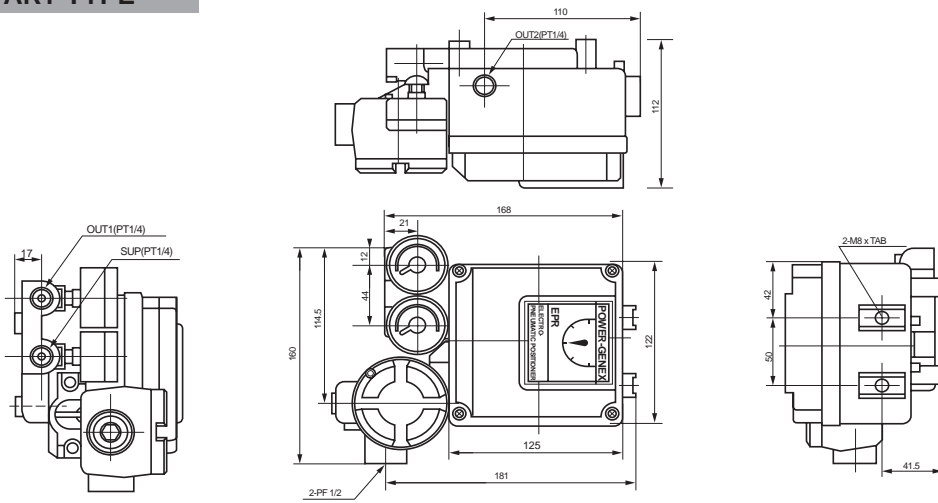
Description	Code
<b>Position Feedback:</b>	S : Standard (actuator volume over 180cm <sup>3</sup> ) M : Small Orifice (∅1.0 or ∅0.7) (actuator volume 90~180cm <sup>3</sup> )
<b>Position Feedback:</b>	N : None O : Position Transmitter (4~20mA Output Signal) L : Two SPDT Limit Switches (only for EPR)
<b>Mounting Bracket:</b>  1~3 : for Namur shaft type 4~5 : for Fork lever type	N: None  1 : 80 x 30 x 20 (H) 2 : 80 x 30 x 30 (H) 3 : 130 x 30 x 30 (H) 4 : DHCT Bracket 80 x 30 5 : Box Bracket 130 x 30 6 : DIN / IEC 534 (for EPL)

# DIMENSIONS

## ◆ EPL - LINEAR TYPE

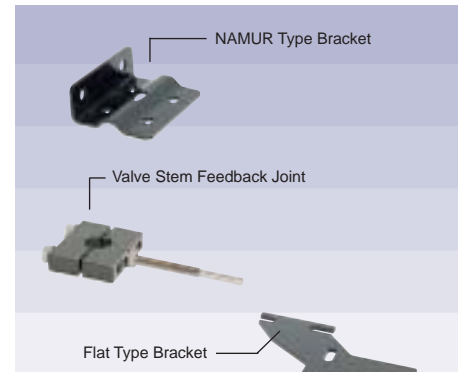


## ◆ EPR - ROTARY TYPE



NAMUR Type Bracket (80 x 30 x 20, for direct mounting) NAMUR Type Bracket (130 x 30 x 30, for direct mounting)

### Rotary Type Mounting Brackets



### Linear Type Mounting Brackets

# PNEUMATIC - PNEUMATIC POSITIONER

## Linear & Rotary Type

### A Solid Workhorse You Can Depend On For Consistent, Reliable Control

Power-Genex Pneumatic-Pneumatic Positioners (3-15psi linear & rotary type) are advanced control devices which provide unparalleled stability in difficult environments

## FEATURES

- ◆ Easy Maintenance
- ◆ Precise Calibration with simple SPAN and ZERO adjustments
- ◆ Simple Conversion to Direct Acting or Reverse Acting
- ◆ 1/2 Spilt Range Available by simple adjustments without changing parts
- ◆ Simple Structure for feedback connection
- ◆ Corrosion-Resistant Aluminium Diecast Body
- ◆ Sensitive and Correct Response for high performance
- ◆ Extremely Vibration Resistant Design
- ◆ Stainless Steel Gauges Standard
- ◆ A Restricted Pilot Valve Orifice Kit for small actuators included
- ◆ NAMUR mounting version available (direct mounting)



PPL (Linear Type)

## SPECIFICATIONS

Item	PPL		PPR	
	Linear Type (lever feedback)		Rotary Type (cam feedback)	
	Single	Double	Single	Double
Input Signal	0.2 ~ 1.0 kgf/cm <sup>2</sup> (3 ~ 15psi) (Note.1)			
Supply Air Pressure	Max. 7.0 kgf/cm <sup>2</sup> (100psi)			
Standard Stroke	10 ~ 80mm (Note.2)		60 ~ 100° (Note.3)	
Air Piping Connection	PT 1/4 (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 0.1 % F.S.		Within 0.5 % F.S.	
Hysteresis	Within 0.5 % F.S.		Within 1.0 % F.S.	
Repeatability	Within ± 0.5 % F.S.			
Air Consumption	5 LPM (Sup. 1.4 kgf/cm <sup>2</sup> )			
Flow Capacity	80 LPM (Sup. 1.4 kgf/cm <sup>2</sup> )			
Material	Aluminium Diecast Body			
Weight	2.1 kg			



PPR (Rotary Type)

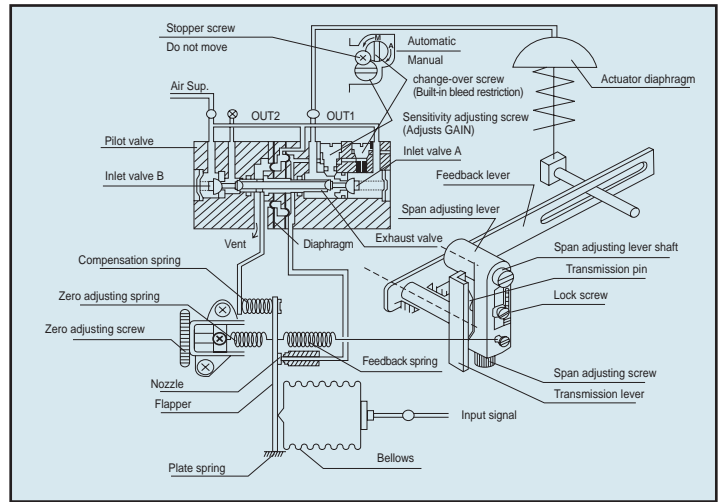
Note : 1) 1/2 spilt range is available  
 2) Feedback lever for stroke 80 ~ 150mm is available (PPL)  
 3) Stroke can be adjusted to 0° ~ 60° or 0° ~ 100° (PPR)

# PRINCIPLES OF OPERATION

## PPL (Linear Operation)

As the input signal (3~15psi) from the controller increases, pressure inside of the bellows increases and the plate spring 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 nozzle back pressure will decrease. As a result, the exhaust valve of the pilot valve moves to the right, and the output pressure of OUT1 increases to move the actuator diaphragm.

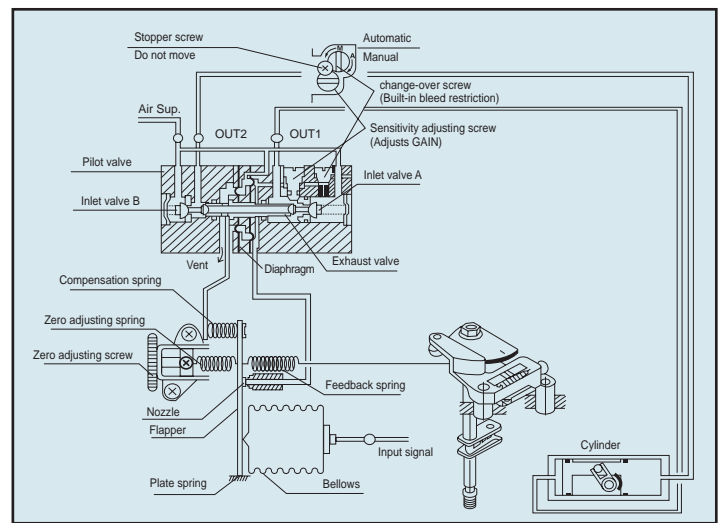
The valve stem goes up or down by the movement of the actuator diaphragm, and the feedback spring lengthens or shortens by the movement of the feedback lever. The valve stem stays in the position where the spring force is balanced with the force generated by the input signal supplied into the bellows. 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.



## PPR (Rotary 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 OUT2 decreases) to move the cylinder actuator.

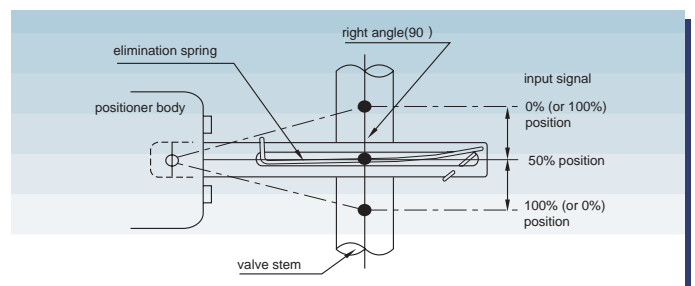
The movement of the actuator in turn rotates the feedback shaft, and the feedback spring lengthens or shortens by the movement of the feedback cam connected to the feedback shaft. The actuator stays in the position where the spring force is balanced with the force generated by the input signal in the 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.



# INSTALLATION

## PPL (Linear Type)

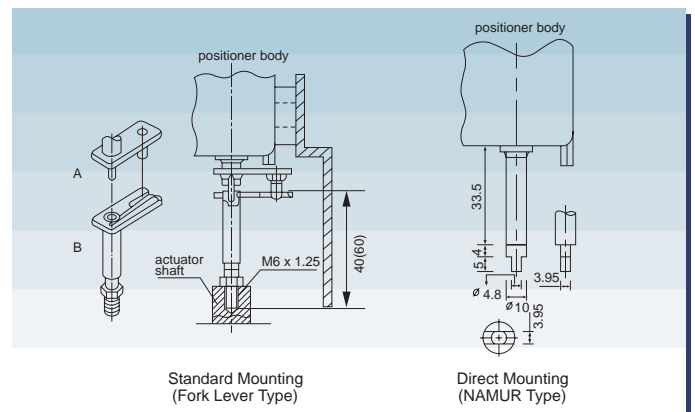
- 1) Connect the feedback lever to the control valve stem at position where the angle between the valve stem and the feedback lever is 90° as shown in the right when the input signal is set to 9psi(50%).
- 2) The stroke range for the best performance should be 10~80mm and the operation angle of the feedback lever should be between Min. 10° and Max. 30° to carry out accuracy and linearity perfectly.



FEEDBACK LEVER INSTALLATION

## PPR (Rotary Type)

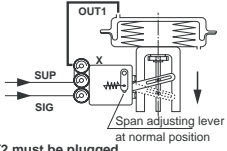
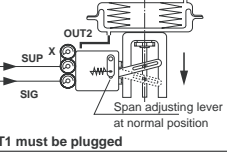
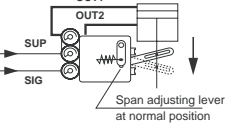
Mount the positioner to the actuator at position where the feedback lever is in perfect alignment with the rotary actuator output shaft. The spring pin of the feedback lever "A" should be placed in the orifice of the feedback lever "B". Be sure that linearity and hysteresis will suffer if these alignment and placement are not correct.

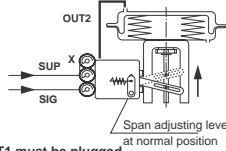
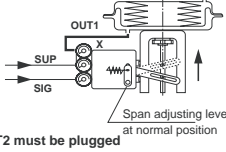
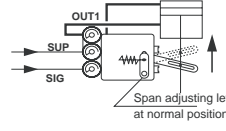


MOUNTING

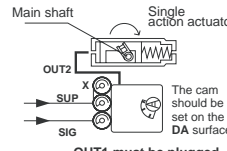
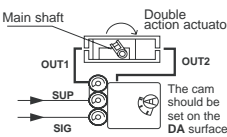
# AIR PIPING

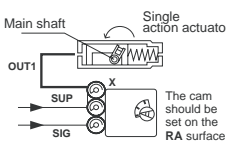
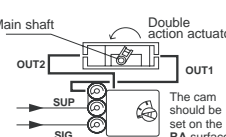
## ◆ PPL - LINEAR TYPE

Direct Acting (DA)	
As the input signal increases, Valve stem moves downwards. Actuator : DA Connection : Out 1	
As the input signal increases, Valve stem moves downwards. Actuator : DA Connection : Out 2	
As the input signal increases, Valve stem moves downwards	

Reverse Acting (RA)	
As the input signal increases, Valve stem moves upwards Actuator : RA Connection : Out 2	
As the input signal increases, Valve stem moves upwards Actuator : RA Connection : Out 1	
As the input signal increases, Valve stem moves upwards	

## ◆ PPR - ROTARY TYPE

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

Reverse Acting (RA)	
As the input signal increases, Actuator stem rotates counter - clockwise.	
As the input signal increases, Actuator stem rotates counter - clockwise.	

# HOW TO ORDER

PP

Actuator Operation

Feedback Lever

Pressure Gauge (SUP.OUT)

Pilot Valve Orifice

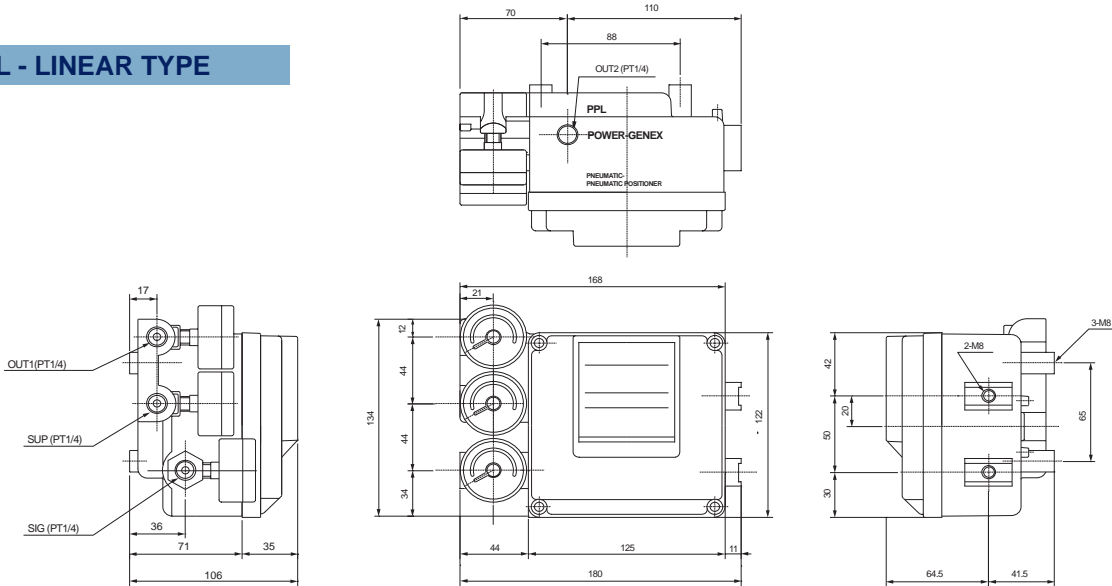
Mounting Bracket

Description	Code
<b>Actuator Operation:</b>	L : Linear Type R : Rotary Type
<b>Feedback Lever :</b> - Linear Type  - Rotary Type	A : Stroke (10~80mm) B : Stroke (80~150mm)  A : Fork Lever M6 x 40L B : Fork Lever M8 x 40L C : Fork Lever M6 x 60L D : Fork Lever M8 x 60L N : Namur Shaft (direct mounting)
<b>Pressure Gauge:</b>	0 : 2 Bar (30psi) 1 : 6 Bar (90psi) 2 : 10 Bar (150psi)

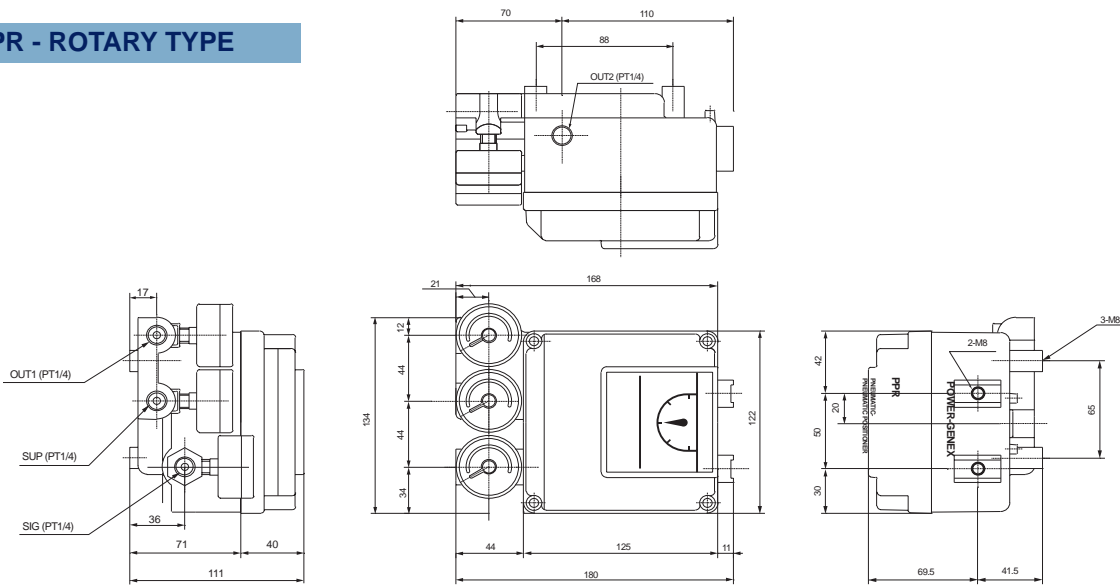
Description	Code
<b>Pilot Valve Orifice:</b>	S : Standard (actuator volume over 180cm <sup>3</sup> ) M : Small Orifice (Ø1.0 or Ø0.7) (actuator volume 90~180cm <sup>3</sup> )
<b>Mounting Bracket:</b>	N: None  1~3 : for Namur shaft type 4~5 : for Fork lever type  1 : 80 x 30 x 20 (H) 2 : 80 x 30 x 30 (H) 3 : 130 x 30 x 30 (H) 4 : DHCT Bracket 80 x 30 5 : Box Bracket 130 x 30 6 : DIN / IEC 534 (for PPL)

# DIMENSIONS

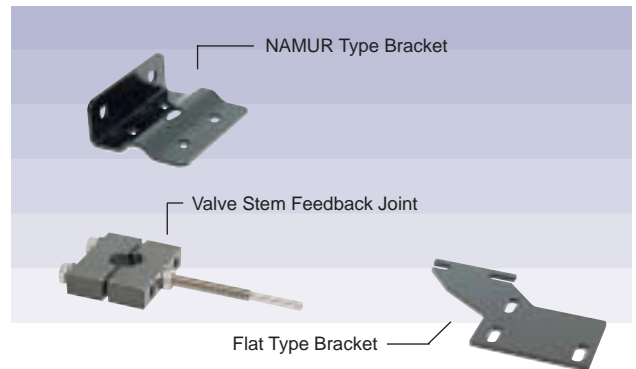
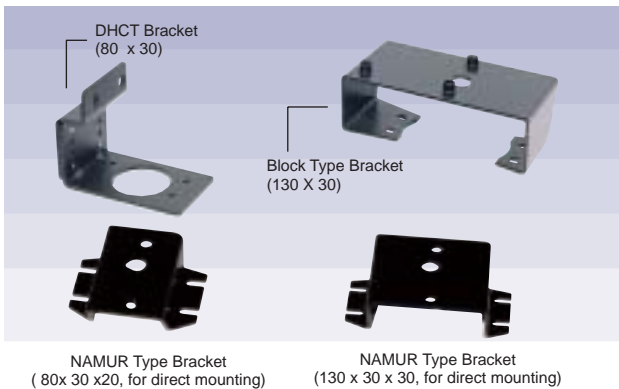
## ► PPL - LINEAR TYPE



## ► PPR - ROTARY TYPE



# ACCESSORIES



KS A 9001 : 2001 **Rotary Type Mounting Brackets**

**Linear Type Mounting Brackets**