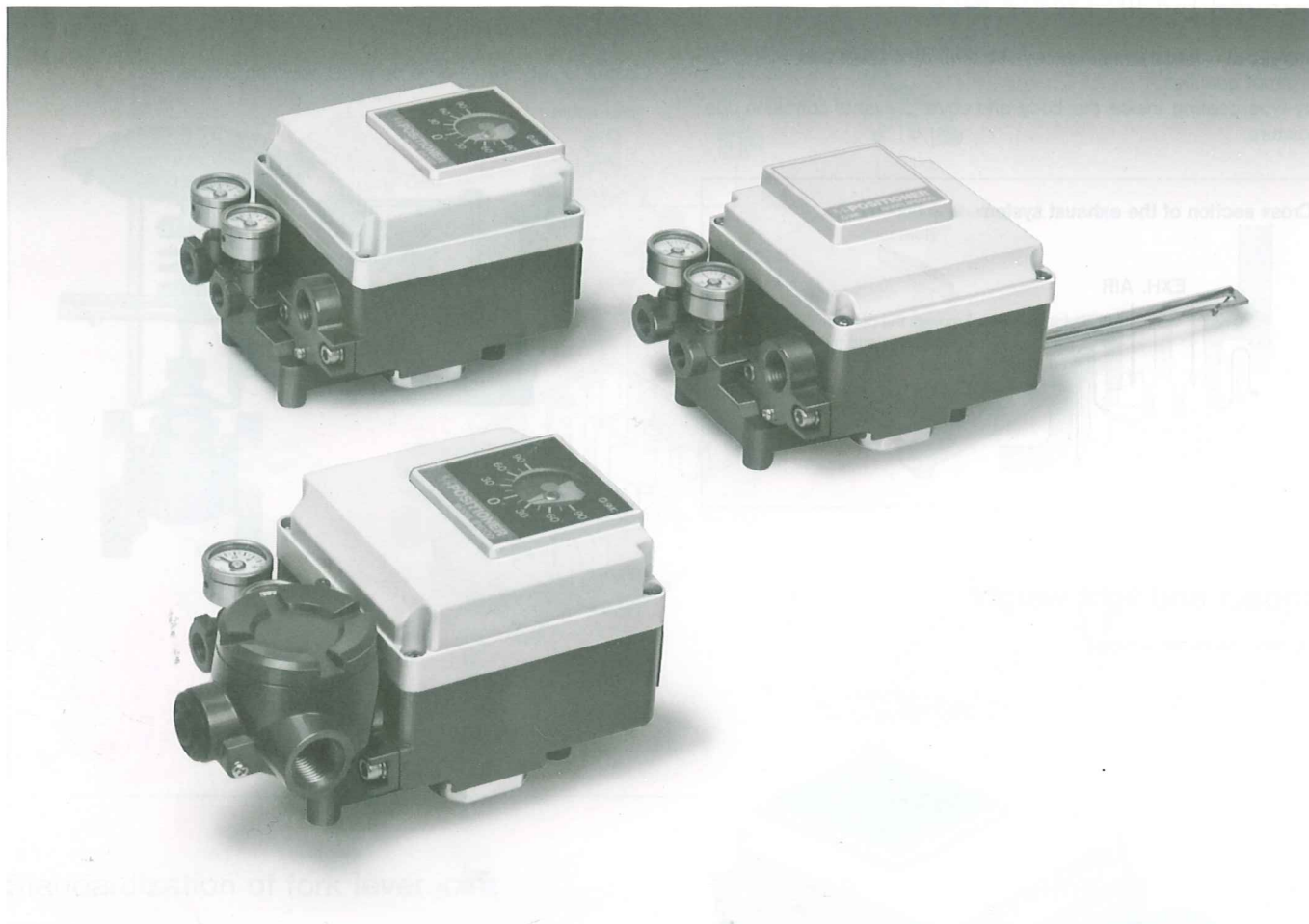


Electro-Pneumatic Positioner

Series IP6000/IP6100



High performance positioner
Resistant to hostile environments.
Exceptional shock and vibration performance.

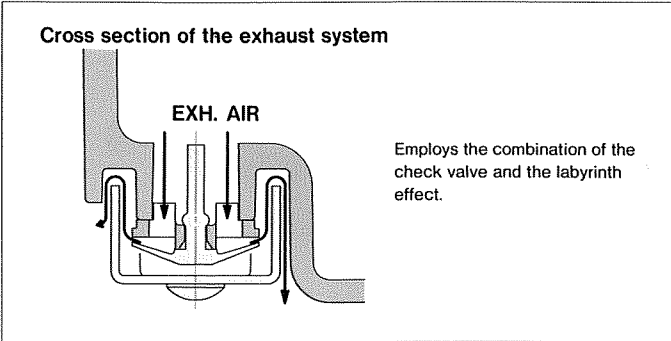
High performance positioner
Resistant to hostile environments, Exceptional shock and vibration performance

Series IP6000/IP6100

No resonances : 5~200Hz

Approved by JIS F8007 IP55

A centralized exhaust system enhances both dust-proof and water-proof qualities.
Epoxy-type coating inside the body and cover prevents corrosion due to moisture.



Compact and light weight

20% Lighter than other types.

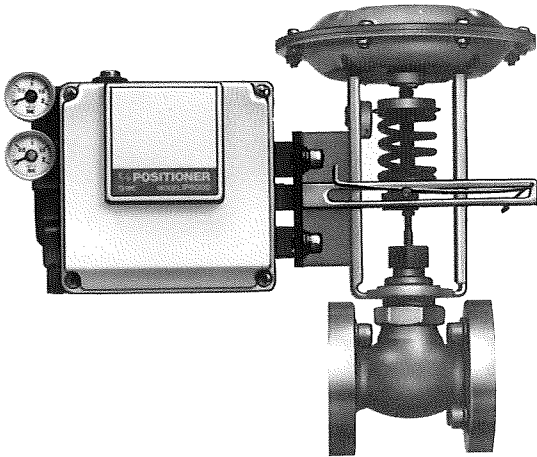


Easy to attach small diaphragm actuators

The pneumatic and electrical ports are on the side of the body and do not interfere with the feedback lever on the other side.

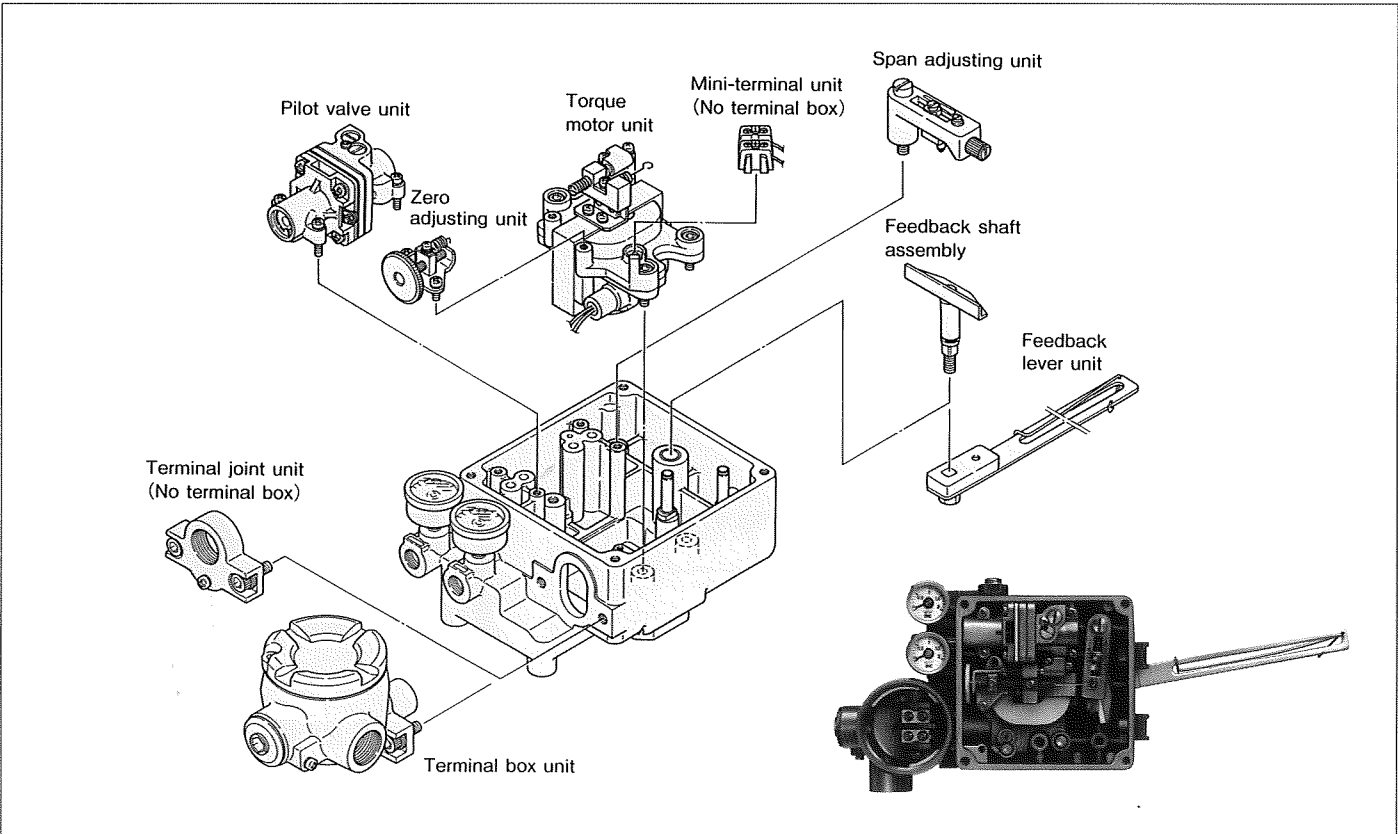
Stable operation

Control is very stable even on small sized actuators.



Easy maintenance

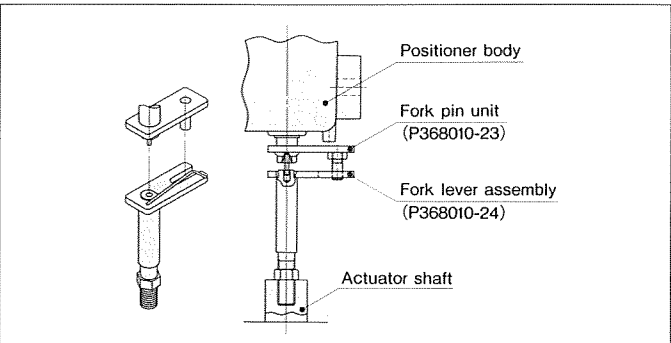
Maintenance and parts replacement made easy by modular construction.



Standardization of fork lever joint

(IP6100 type)

Linkage design tolerates a slight misalignment of shafts

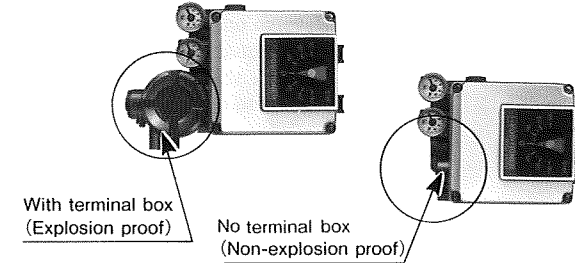


Position indicator : Standard equipment

(IP6100 type)

Two electric wiring configurations

With terminal box (Explosion proof) • No terminal box (Non-explosion proof)



Span adjuster accommodates 1/2 split range.

Excellent explosion proof specification

Explosion proof standard—— sd2G4/Exsd IIBT5

Interchangeable

Compatible with IP600 series mounting bracket.

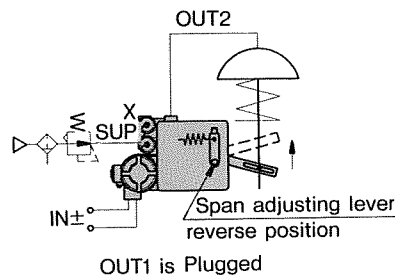
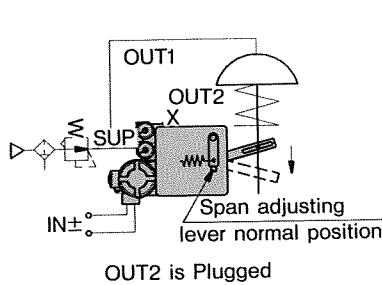
Piping method

IP6000 Lever type

Single action

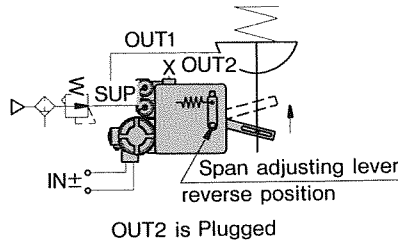
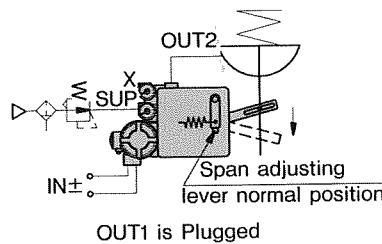
Positive operation: When the input signal is increased, the stem extends.

Reverse operation: When the input signal is increased, the stem retracts. (Reverse valve operation by its positive operation mode)



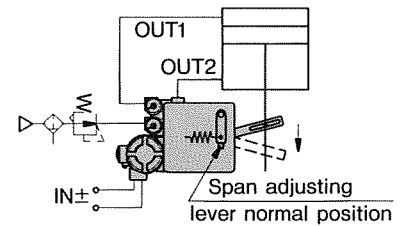
When the input signal is increased, the stem extends. (Positive valve operation by its reverse operation mode)

When the input signal is increased, the stem retracts.

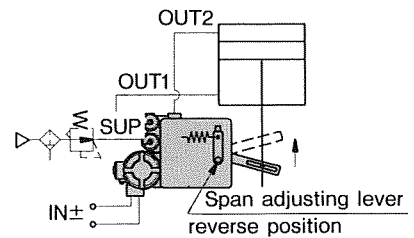


Double action

Positive operation: When the input signal is increased, the cylinder rod extends.



Reverse operation: When the input signal is increased, the cylinder rod retracts.

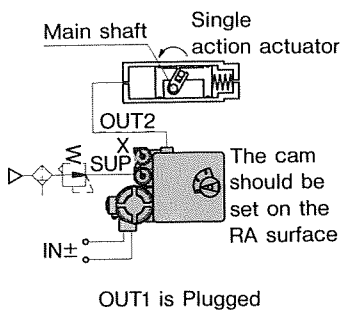
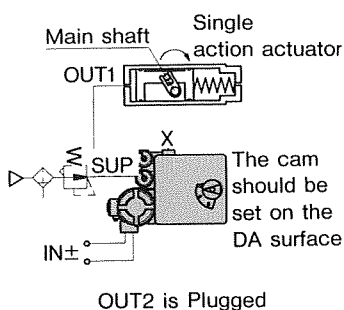


IP6100 Rotary type

Single action

Positive operation: When the input signal is increased, the actuator shaft rotates in a counter clockwise direction.

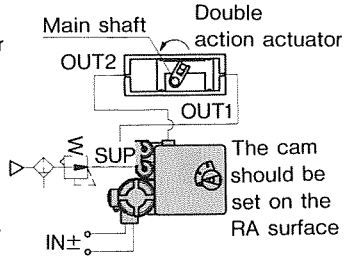
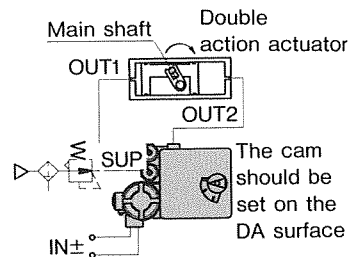
Reverse operation: When the input signal is increased, the actuator shaft rotates in a counter clockwise direction.

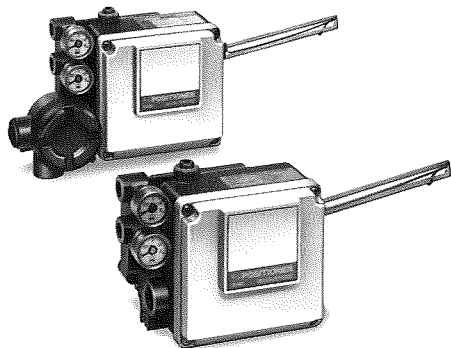


Double action

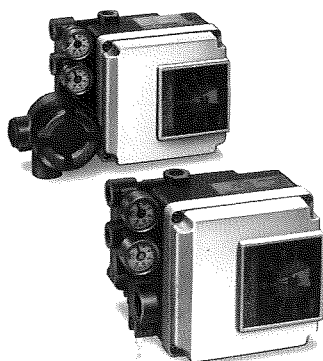
Positive operation: When the input signal is increased, the actuator shaft rotates in a clockwise direction.

Reverse operation: When the input signal is increased, the actuator shaft rotates in a counter-clockwise direction.





IP6000



IP6100

How To Order

IP6

Type ●

000	Lever type lever feedback
100	Rotary type cam feedback

Input current ●

0	4~20mA DC (Standard)
1	10~50mA DC

Pressure gauge (SUP, OUT 1) ●

1	0.2MPa{2kgf/cm ² }
2	0.3MPa{3kgf/cm ² }
3	1.0MPa{10kgf/cm ² }

Construction ●

0	No terminal box (Terminal on the body non-explosion proof)
1	With terminal box (sd2G4, Exsd IIBT5) Note 1)

● Accessories Note 2)

Nil	None (Standard)	IP6000 has standard lever for stroke (10~85mm)
A	φ0.7 Output restriction with pilot valve	Accessory for IP6000, 6100 small capacity actuator Note 3)
B	φ1.0 Output restriction with pilot valve	
C	Fork lever joint M	Accessory for IP6100
D	Fork lever joint S	
E	For stroke 35~100mm with lever unit	Accessory for IP6000 Note 4)
F	For stroke 50~140mm with lever unit	
G	Compensation spring (A)	For IP6000, 6100 Note 5)

Note 1) For construction No. 1 (with terminal box), the ambient and fluid temperatures are as follows:

- sd2G4 ——— —20~70°C
- Exsd IIBT5 ——— —20~60°C
- Non-explosion proof (non hazardous locations only) ——— —20~80°C

Two labels (sd2G4, Exsd IIBT5) are on the body.

Note 2) If two or more accessories are required, the part numbers should be made according to alphabetical order. (ex. IP6000-011-AG)

Note 3) "A" is applied to approx 90cm³-capacity actuator.

"B" is applied to approx 180cm³-capacity actuator.

Note 4) Standard lever is not attached.

Note 5) The following combinations are available: A + G or B + G

Specifications

Item	Type	IP6000		IP6100	
		Lever type lever feedback		Rotary type cam feedback	
		Single action	Double action	Single action	Double action
Input current		4~20mADC (Standard) Note 1)			
Coil resistance		235 ± 15 Ω (4~20mADC)			
Supply air pressure		0.14~0.7MPa{1.4~7.1kgf/cm ² }			
Stroke		10~85mm (Deflection angle 10°~30°)		60°~100° Note 2)	
Sensitivity		Within 0.1%F.S.	Within 0.5%F.S.		
Linearity		Within ±1%F.S.	Within ±2%F.S.		
Hysteresis		Within 0.75%F.S.	Within 1%F.S.		
Repeatability		Within ±0.5%F.S.			
Coefficient of temperature		Within 0.1%F.S./°C			
Output flow		Note 3) 80 ℓ/min (ANR) or more (SUP = 0.14MPa)			
Air consumption (Bleed)		Note 3) 5 ℓ/min (ANR) or less (SUP = 0.14MPa)			
Ambient and fluid temperature		- 20°C~80°C (Non-explosion proof)			
		- 20°C~70°C (Pressure tight explosion proof sd2G4)			
		- 20°C~60°C (Pressure tight explosion proof Exsd IIBT5)			
Explosion proof construction	Pressure tight explosion proof construction	sd2G4 (Type certification approval number. No.43907)			
		Exsd IIBT5 (Type certification approval number. No.C10474)			
Air port		Rc (PT) ¼ female			
Electrical connection		G (PF) ½ female			
Wiring method		Conduit system・Pressure tight packing system			
		Resin G (PF) ½ connector (Non-Explosion proof, option)			
Material		Aluminum diecast body			
Weight		With terminal box 2.6kg (None 2.4kg)			

Note 1) ½ Sprit range (Standard) Note 2) Stroke adjustment : 0~60, 0~100°
Note 3) Standard air temperature : 20° (298k), Absolute pressure : 760mmHg, Relative humidity : 65%

Fork lever joints (IP6100 type)

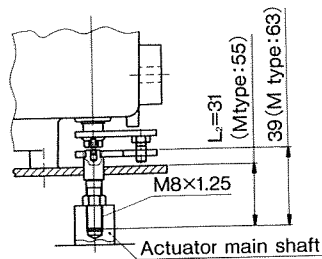
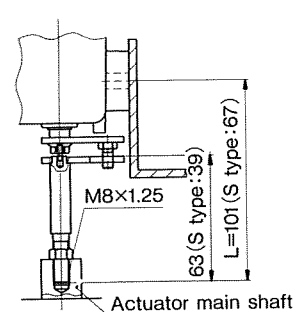
Fork-lever rotary joints are available that tolerate small misalignments between positioner and actuator shaft.
These are available in two standard sizes.

Fork lever joint

Part name	Part number
Fork lever assembly M	P368010-24
Fork lever assembly S	P368010-25

Side mounting with the fork lever assembly M

Rear mounting with the fork lever assembly S

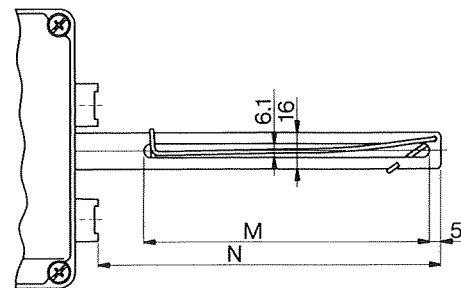


External feedback lever (IP6000 type)

The feedback lever is selected according to valve stroke.
Consult factory for strokes less than 10mm.

External feedback lever

Stroke	Order code	Unit number	Size M	Size N
10~85mm	(Nil)	P368010-20	125	150
35~100mm	(E)	P368010-21	110	195
50~140mm	(F)	P368010-22	110	275



Pilot valve with output restriction (IP6000, 6100 type)

In general, mounting on a small-size actuator may cause hunting. For prevention, a pilot valve with a built-in output restriction is available. The restriction is removable.

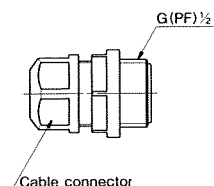
Restrictions

Actuator Capacity	Orifice size	Part number	Pilot unit part number
90cm ³	φ 0.7	P36801080	P368010-28
120cm ³	φ 1.0	P36801081	P368010-29

Resin connector (Non-explosion proof specification)

Optional cable connectors are available for two different cable sizes. These are not for explosion proof applications.

Cable connector (Option)			
Part name	Part number	Suited cable outer diameter	
Resin-made cable clamp unit (A)	P368010-26	φ 7 ~ φ 9	
Resin-made cable clamp unit (B)	P368010-27	φ 9 ~ φ 11	



Installation

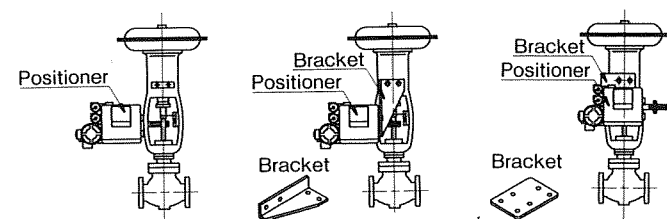
IP6000 type (Lever type lever feedback)

- ① The unit should be mounted using bolts firmly fixed through mounting holes on the side or back of the positioner.

No bracket

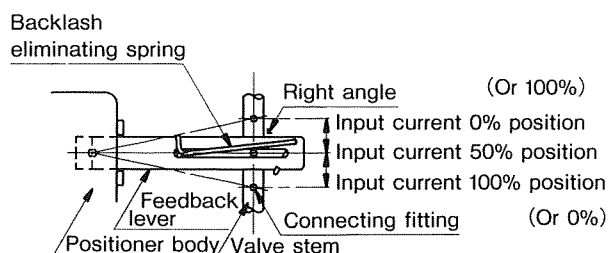
L-type bracket

Front bracket



- ② A connecting fitting or pin to transfer the displacement of valve stem should be mounted at a position so that the feedback lever is at right angles to the valve stem for an input current of 50%. The following figure is the configuration viewed from the front.

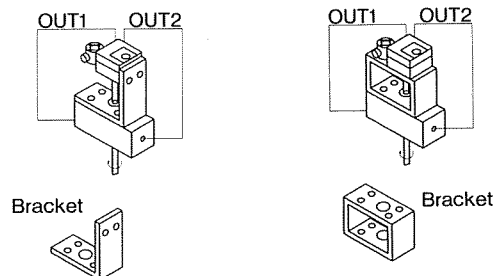
Installing feedback lever



- ③ A fullscale deflection of 20° is optimum. It should be at least 10° and at most 30° to achieve specified accuracy and linearity.

IP6100 type (Rotary type cam feedback)

- The positioner should be mounted so that the feedback shaft is aligned with the shaft of the rotary actuator.



Explosion Proof

This product has the following approvals.

※sd2G4: Explosion-protected construction standard of electrical equipment (Notification No.16 of the ministry of labor, Japan in 1969.)

※Exsd IIBT5: Newly established standard based on international specifications (IEC No.79).

Use as sd2G4

(A) Pressure-proof packing. As shown below in the chart, use "cable gland" (option).

(B) Flameproof threaded joint steel conduit type lead in method.

Use as Exsd IIBT5

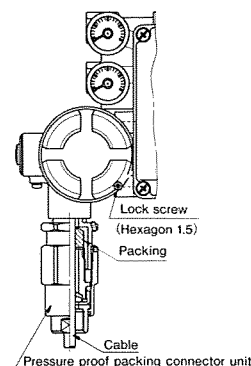
(A) Pressure-proof packing.

As shown below in the chart, use "Cable gland"(option).

(B) Metal Piping.

Attach the sealant fitting near the cable port.

For details, refer to "Factory electric equipment explosion proof guide line" published by the industry safety association.



Cable gland armour with pressure proof packing (Option)

Part name	Part number	Suited cable outer diameter
Pressure proof packing connector unit	P368010-32	φ 7.0 ~ φ 10.0
	P368010-33	φ 10.0 ~ φ 12.0

Precautions

- ① Avoid impact to positioner while transporting and handing.
- ② Operate within specified temperature range to prevent deterioration of seals.
- ③ Do not remove terminal cover in a hazardous location.
- ④ Covers for the terminal and body should be in place while operating in the presence of moisture and gases.
- ⑤ To extend the life of the positioner when used outdoors, extra protection is recommended against rain and dust. Units should also be protected against moisture in high heat and humidity conditions during transport, packaging should protect against moisture.

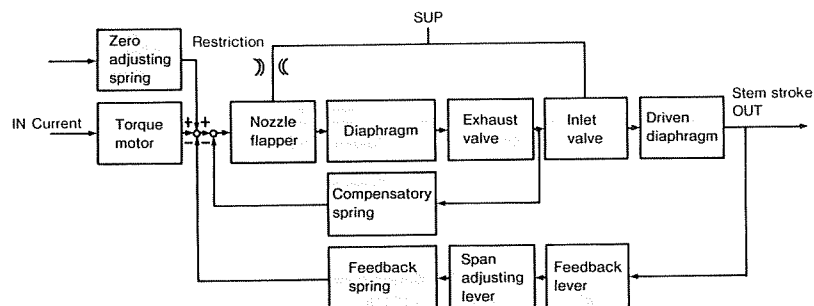
Principle of Operation

IP6000 type

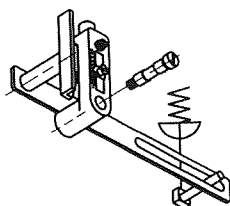
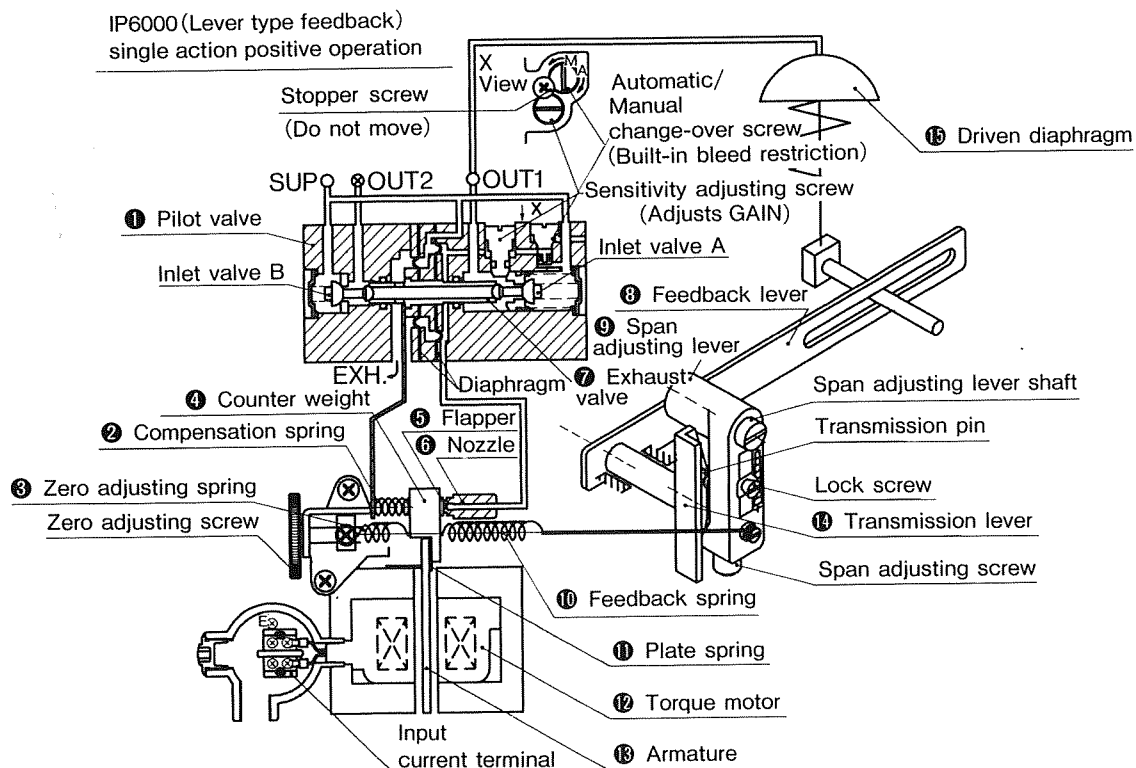
When the input current increases, ① the plate spring of ② the torque motor will work as a pivot, ⑩ armature will receive a counter clockwise torque, ④ the counter weight will be pushed to the left, the clearance between ⑥ the nozzle and ⑤ the flapper will increase, and the nozzle back pressure will decrease. Consequently, ⑦ the exhaust valve of ① the pilot valve moves to the right, the output pressure of OUT 1 increases and ⑮ the diaphragm moves downwards. The motion of ⑮ the diaphragm acts on ⑪ the feedback spring through ⑧ the feedback lever, ⑬ the transmission lever and ⑨ the span adjustment lever to rest at the balance position generated by the input current.

② The compensation spring is for direct feedback of the motion of ⑦ the exhaust valve to ④ the counter weight to increase the stability of the loop. The zero point should be adjusted by change of ③ the zero adjustment spring tension.

IP6000 type Block diagram of operating principle



IP6000 Principle of operation



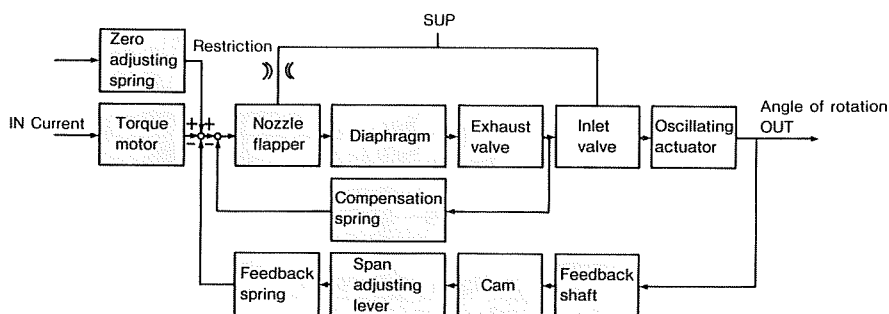
For reverse position, exchange the shaft of the span adjusting lever to the opposite side. The span adjusting screw faces upward in this condition. (See "Piping method")

Principle of Operation

IP6100 type

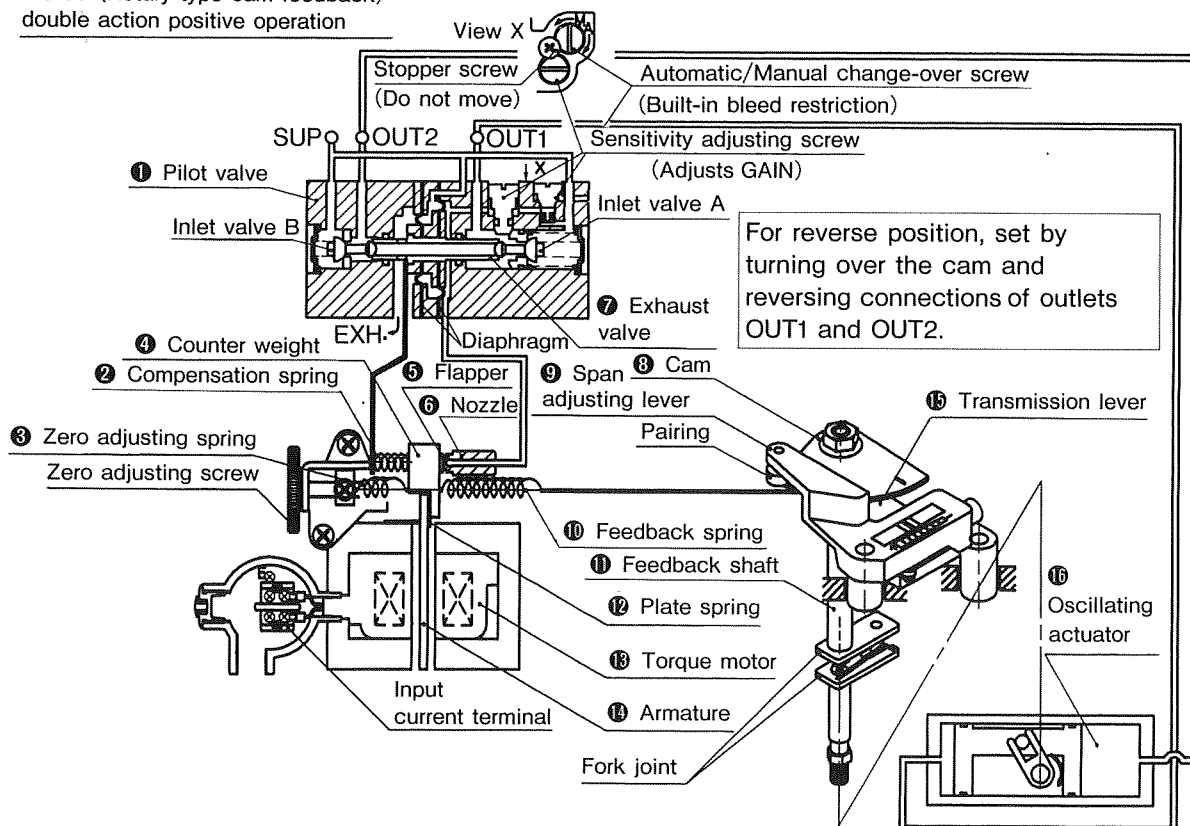
When the input current increases, ⑫ the plate spring of ⑬ the torque motor will work as a pivot, ⑭ armature will receive a counter-clockwise torque, ④ the counter weight will be pushed to the left and the clearance between ⑥ the nozzle and ⑤ the flapper will increase, and the nozzle back pressure will decrease. Consequently, ⑦ the exhaust valve of ① the pilot valve moves to the right, the output pressure of OUT 1 increases, that of OUT 2 decreases and ⑩ the rotary actuator moves. The motion of ⑩ the actuator acts on ⑪ the feedback spring through ⑪ the feedback shaft, ⑧ the cam, ⑨ the span adjustment lever and ⑬ the transmission lever to rest at the balance position generated by the input current. ② The compensation spring is for direct feedback of the motion of ⑦ the exhaust valve to ④ the counter weight to increase the stability of the loop. The zero point should be adjusted by change of ③ the zero adjustment spring tension.

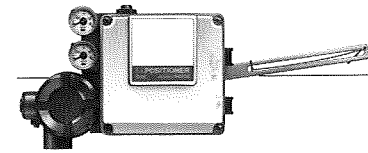
IP6100 type Block diagram of operating principle

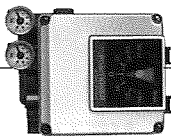


IP6100 Principle of operation

IP6100 (Rotary type cam feedback)
double action positive operation

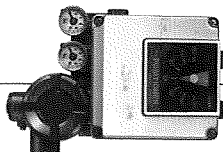
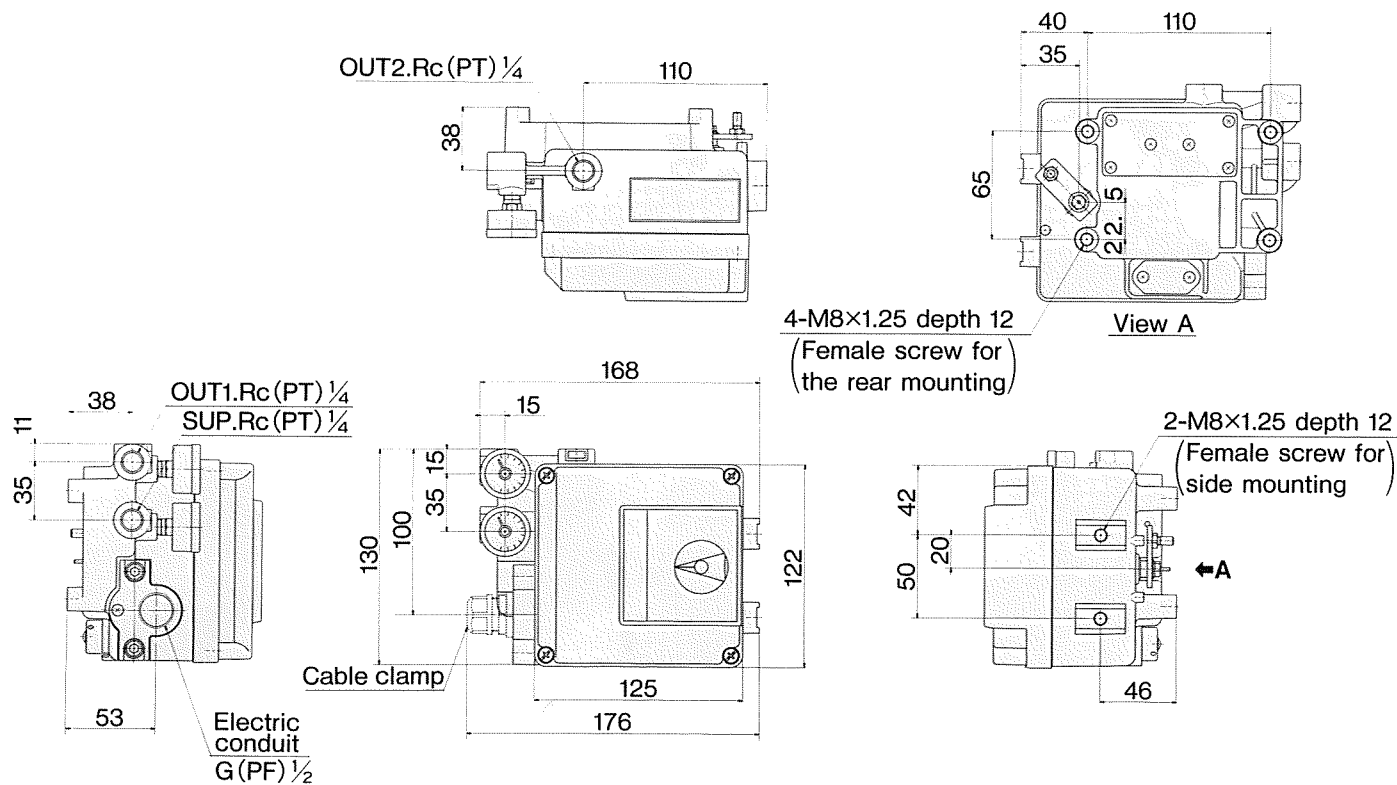






IP6100 type(Rotary type cam feedback(No terminal box))

Scale: 1/5



IP6100 type(Rotary type cam feedback(With terminal box))

Scale: 1/5

