



Installation and Maintenance Manual
Electro Pneumatic Positioner - Lever type
with 4-20mA output
Series IP8000-0#1-#-X84-#



1 Safety Instructions

- This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "DANGER", "WARNING" or "CAUTION", followed by important safety information which must be carefully followed.
- To ensure safety ISO4414: Pneumatic Fluid power and JIS B 8370: Pneumatic System principles must be observed, along with other relevant safety practices.

⚠ DANGER	In extreme conditions, there is a possibility of serious injury or loss of life.
⚠ WARNING	If instructions are not followed there is a possibility of serious injury or loss of life.
⚠ CAUTION	If instructions are not followed there is a possibility of injury or equipment damage.

2 Specifications

Protect the unit from impact and dropping during transfer and when mounted. This may cause failure of the unit.

- Do not use the unit in places with high humidity and temperature. This may cause malfunction.
- Do not use this product outside of the range of it's specifications, as this can cause failure.

Type	IP8000-0#1-#-X84-#	
	Lever type	
Item	Single action	Double action
Input current	4 ~ 20mADC (Standard)*1	
Input resistance	235±15Ω (4 ~ 20mADC)	
Supply Air Pressure	0.14 ~ 0.7MPa	
Standard stroke	10 ~ 85mm (External lever allowable runout angle 10° ~ 30°)	
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.	
Thermal coefficient	Within 0.1% F.S./°C	
Output flow rate	80 l/min (ANR) or more (SUP=0.14 MPa)*2	
Air consumption	Within 5 l/min (ANR) (SUP=0.14MPa)	
Ambient / Fluid temperature	-20°C to +80°C	

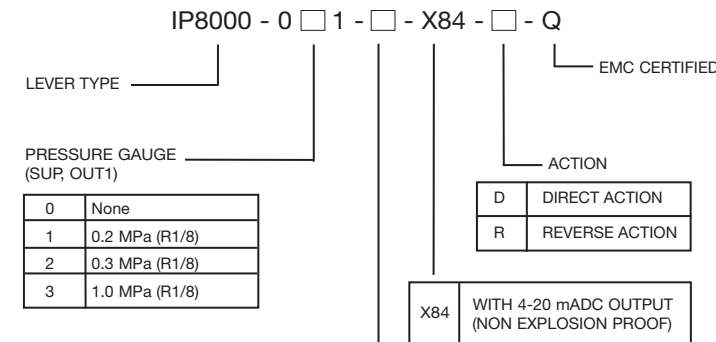
Air connection Port	Rc1/4 (Female)
Electrical wiring connection Port	G1/2 (Female)
Output Signal	4-20 mADC
Power Supply	12-35 V (for output current detection)
Resistance Load	Power Supply-12 V 20 mADC
Output characteristic	±2% F.S.
Hysteresis	2% F.S.
Material	Body - Aluminium diecast
Weight	Approx 2.6 kg
Protection Classification	JISF8007, IP65 (IEC 60529)

* 1 : 1/2 split range is possible using the standard type (by adjusting the span).

* 2 : Standard air (JIS B0120): temp.20 °C, absolute press.760 mm Hg, ratio humidity 65%.

2 Specifications (continued)

2.1 How to Order



ACCESSORIES

NIL	NO ACCESSORIES (STANDARD LEVER)
A	WITH PILOT VALVE 0.7mm DIA ORIFICE FOR RESTRICTING OUTPUT
B	WITH PILOT VALVE 1.0mm DIA ORIFICE FOR RESTRICTING OUTPUT
E	WITH FEEDBACK LEVER UNIT FOR STROKE 35-100mm (WITHOUT STANDARD LEVER)
F	WITH FEEDBACK LEVER UNIT FOR STROKE 50-140mm (WITHOUT STANDARD LEVER)
G	WITH GAIN SUPPRESSION SPRING (A). (WITHOUT STANDARD SPRING)

NOTE: WHEN MORE THAN 2 ACCESSORIES ARE REQUIRED, SPECIFY IN ALPHABETICAL ORDER.

3 Installation

3.1 Installation



- Do not install the product unless the safety instructions have been read and understood.
- Since the zero point varies depending on the mounting position, the zero point should be adjusted after installation.
- Avoid hitting the product with metal objects!
- Avoid using the product in non-explosive environments which can become explosive due to air leakage!

3.2 Environment



- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- The product should not be exposed to prolonged sunlight. Use a protective cover.
- Do not mount the product in a location where it is subject to strong vibrations and/or shock.
- Do not mount the product in a location exposed to radiant heat.
- Allow sufficient space for maintenance and adjustment around the product when mounted.

3.3 Piping



- Before piping make sure to clean away chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port.
- When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings according to appropriate tightening torque.

3 Installation (continued)

3.4 Lubrication



- The Positioner has a fixed orifice and nozzle, which contain fine paths. Use filtered, dehydrated air and avoid the use of lubricators as this may cause malfunction of the Positioner.
- Ensure that the air supply system is filtered to 5 microns.

3.5 Handling



- Avoid impact to the body and torque motor of the positioner, and applying excessive force to the armature, because this may lead to failure. Handle with care during transportation and operation.
- If the Positioner is left at the operation site for a long time before installation, cover it to prevent rain water from entering the positioner. If the atmosphere is of high temperature or humidity, take measures to avoid condensation inside the positioner. Condensation control measures must be taken thoroughly during export shipment,
- Avoid setting the positioner near magnetic fields because the characteristics will be affected.

4 Mounting

4.1 Mounting IP8000 to Actuator

The IP8000 positioner is compatible with IP6000 and IP600 mounting pitch. If you are using the IP6000 or IP600 already, the bracket for these positioners can be used to mount the IP8000 to the actuator.

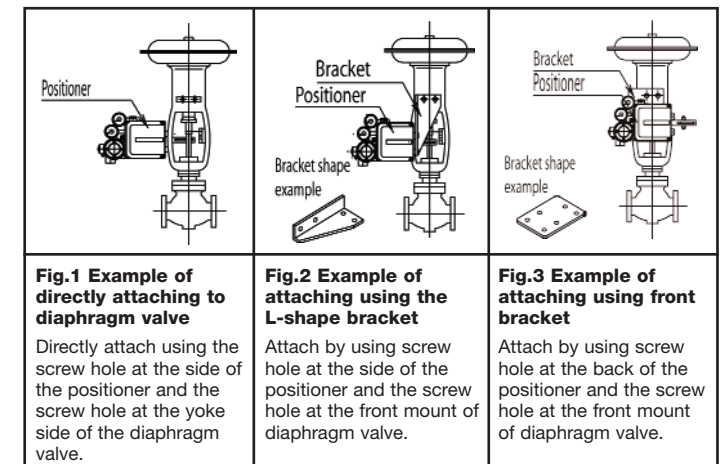


Fig.1 Example of directly attaching to diaphragm valve
Directly attach using the screw hole at the side of the positioner and the screw hole at the yoke side of the diaphragm valve.

Fig.2 Example of attaching using the L-shape bracket
Attach by using screw hole at the side of the positioner and the screw hole at the front mount of diaphragm valve.

Fig.3 Example of attaching using front bracket
Attach by using screw hole at the back of the positioner and the screw hole at the front mount of diaphragm valve.

4.2 Connection with external feedback lever

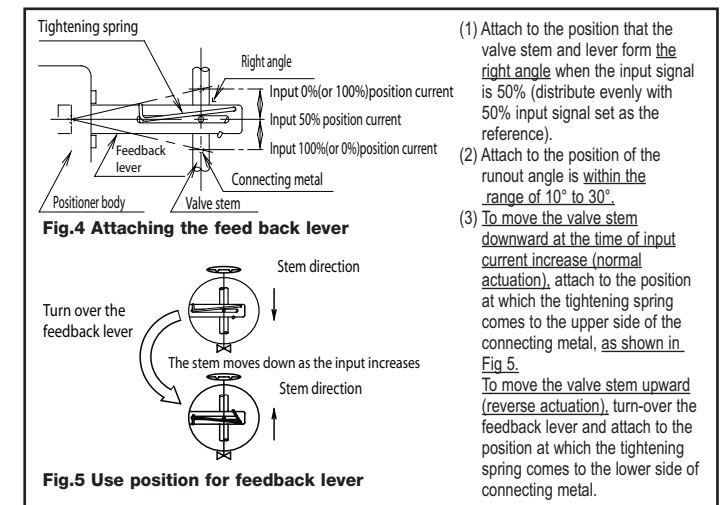


Fig.4 Attaching the feed back lever

Fig.5 Use position for feedback lever

- Attach to the position that the valve stem and lever form the right angle when the input signal is 50% (distribute evenly with 50% input signal set as the reference).
- Attach to the position of the runout angle is within the range of 10° to 30°.
- To move the valve stem downward at the time of input current increase (normal actuation), attach to the position at which the tightening spring comes to the upper side of the connecting metal, as shown in Fig 5. To move the valve stem upward (reverse actuation), turn-over the feedback lever and attach to the position at which the tightening spring comes to the lower side of connecting metal.



- Ensure that the air supply system is filtered to 5 microns.

4 Mounting (continued)

4.3 Direct / Reverse actuation

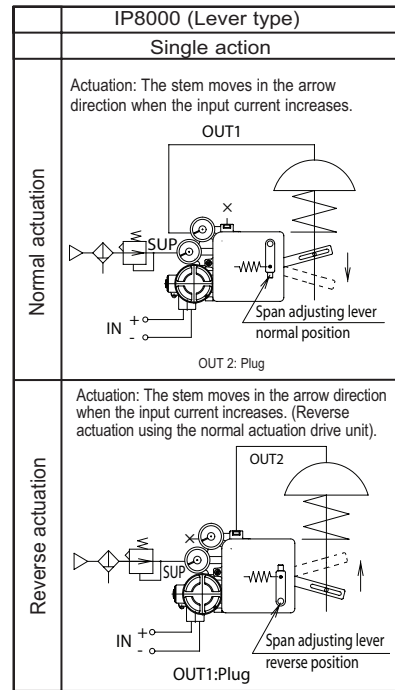


Fig.6 Direct / Reverse actuation

5 Adjustment

CAUTION

Check the following prior to starting the adjustment:

- (1) Check that the pipeline is correctly connected with the pressure supply port and OUT1 and OUT2 ports.
- (2) Check that the actuator and positioner are sturdily connected.
- (3) Check that the span adjustment lever for internal feedback is attached to the correct (normal or reverse) position (refer to Fig.6).
- (4) Check for locking of the auto / manual changeover screw of the pilot valve (fully tightened in the clockwise direction).
- (5) Check that the wires are connected correctly to the (+), (-) and Ground terminals.

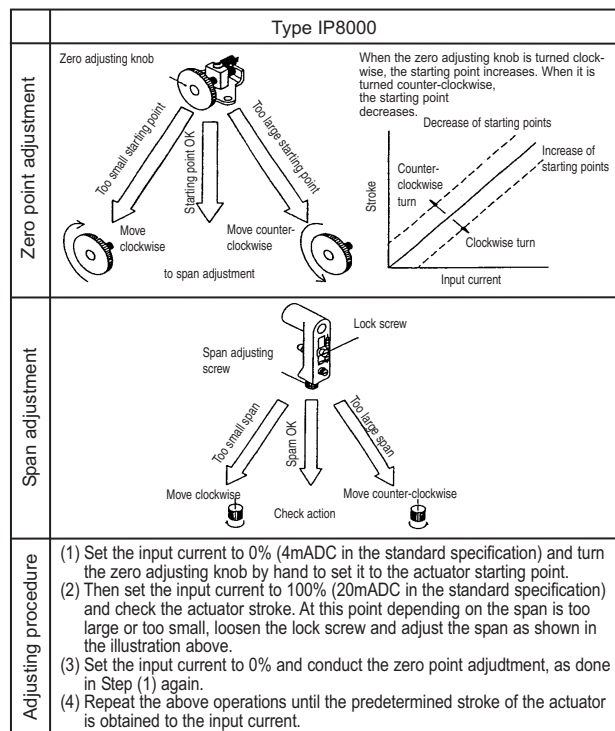


Fig.7 Zero / Span adjustment

*1 When the span adjusting screw is turned clockwise with a screwdriver, the span increases. When it is turned counter-clockwise, the span decreases.

5 Adjustment (continued)

CAUTION

- (1) For this positioner, span and zero point adjustment of each actuator is necessary. Adjustment should be carried out based on each actuator size.
- (2) Keep in mind that the span and zero point adjustment interfere with each other.
- (3) Characteristics change due to change of mounting position, ambient temperature and supply pressure.
- (4) If the positioner takes a long time to operate after initial adjustment, check and adjust the product again.
- (5) Sensitive adjustment is effective for only double acting actuators.
- (6) Manual change function is effective for single acting actuators which are controlled by using OUT1.

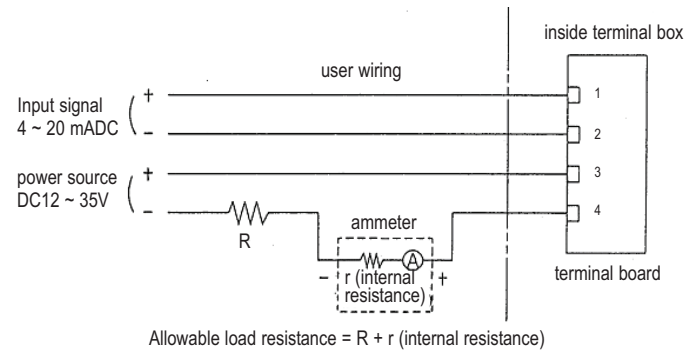
5.1 Electrical wiring

This product has a potentiometer and p.c.board built into it. This is for confirming the actuator's opening by a 4-20 mADC output signal produced by supplying initial power to the pcb. This supply power can be set freely between 12-35 VDC.

According to the operating direction of the actuator or feed back lever, the clockwise potentiometer direction gives regular operation, and the counter-clockwise direction gives opposite operation.

5.1.1 Wiring of Input signal & Power source

- (1) Connect the input signal wires (for positioner control) to 1 (+) and 2 (-) of the terminal board in the terminal box.
- (2) Connect the power source wires (for powering the output current detection circuit) to 3 (+) and 4 (-) of the terminal board.
- (3) Connect an ammeter in series between (+) side and 3 (+) of terminal board, or (-) side and 4 (-) terminals.



$$\text{Allowable load resistance} = R + r \text{ (internal resistance)}$$

NOTE ! Allowable load resistance depends on supply voltage

Fig.8 Electrical Wiring

- (4) The allowable load resistance is determined using the formula below.
Allowable load resistance = (Supply voltage-12V) / 20 mADC-(1)

Normal output current is not obtained if the load resistance value exceeds the results of the formula. Please confirm internal resistance when selecting an ammeter.

5.2 Zero / Span adjustment (Output)

Zero point / Span adjustment of the output current of the positioner (with potentiometer) should be carried out after initial zero / span adjustments in Fig.7.

This product requires zero / span adjustment zero / span adjustment of the output current according to the stroke of the actuator (Lever type) i.e. oscillating angle of the feedback lever.

Please follow the procedure below:

- (1) Set the actuator's output opening or stroke to 0% after adjusting the zero / span.
- (2) Adjust the zero / span with the variable resistors on the p.c.board (refer to Fig.9).
- (3) Adjust the zero point and span alternately and repeatedly as they interact with each other. Since this variable resistor can be wound endlessly, do not overwind, otherwise internal equipment might be damaged. Adjust while monitoring the output signal.

5 Adjustment (continued)

CAUTION

To mount the IP8000 (Lever type) positioner to the actuator, the valve stem and lever should be set at right angles, when the input signal is 50% (Fig.5). If this angularity is out by more than +/-5°, there are some cases where zero adjustment cannot be achieved. Do not change the fixed position of the potentiometer, but instead change the zero adjustment setting (Refer to Fig.7).

5.3 Change of Operating Direction (IP8000 Lever type)

The IP8000 lever type positioner needs accurate mounting & adjustment to satisfy its performance. The following are 2 points to note:-

- (1) The potentiometer is difficult to adjust, therefore the operating direction should not be changed by the end user. This is factory set for Direct /Reverse operation.

IP8000-0#1-#-X84-D-Q	Direct Action : Valve stem moves down when the input current is increased.
IP8000-0#1-#-X84-R-Q	Reverse Action : Valve stem moves up when the input current is decreased.

- (2) Do not loosen the potentiometer set screw (refer to Fig.10), because this may cause operation failure or result in the decline of the positioner accuracy.

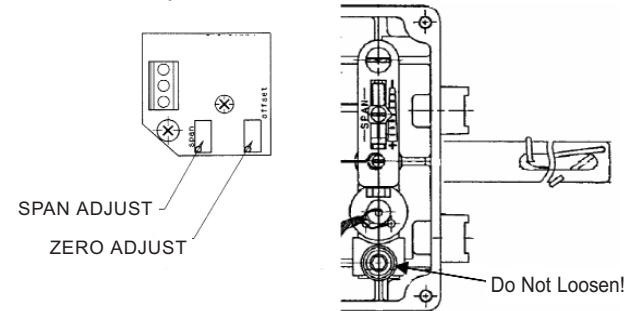


Fig.9 Zero / Span P.C.Board

Fig.10 Mounting of Potentiometer

6 Maintenance

WARNING

- After installation, repair and disassembly, connect compressed air and perform a proper function test and leak test. If bleed noise is louder than the initial state, or operation is abnormal, stop operation and check if the installation is correct.

CAUTION

- Check if supply air is clean or not. Inspect compressed air cleaning system periodically so that dust, oil and humidity do not enter the unit. This can cause malfunction or failure of the unit.
- If handled improperly, compressed air can be dangerous. Maintenance and replacement of unit parts should only be performed by trained and experienced personnel for instrumentation equipment, as well as following the product specifications.
- Check the positioner once a year. When an excessively worn diaphragm, O-ring or other seals of any unit that has been damaged is found, replace with new ones. Treatment at an early stage is especially important if the positioner is used in a place of severe environment, such as coastal areas.
- Before removing the positioner for maintenance, or replacing unit parts after installation, ensure the supply pressure is shut off and all residual air pressure is released from the piping.
- When the fixed orifice is clogged with carbon particles or other material, remove the pilot valve Auto/Manual change over screw (built in fixed aperture) and clean it by carefully inserting a 0.3mm diameter wire into the aperture.
- When disassembling the pilot valve, coat the O-ring of the sliding section with grease. (Use TORAY SILICONE SH45 grease).
- Check for air leaks from the compressed air piping. Air leaks could reduce the performance characteristics of the positioner. Air is normally discharged from a bleed port, but this is necessary air consumption based on the construction of the positioner, and is not abnormal if the air consumption is within the specified range.

7 Contact

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