Pneumatic-Pneumatic Positioner
(Lever type/Rotary type)

**IP5000/5100 Series**

**JIS F8007 IP55**

1. Avoid impact to positioner while transporting and handling.
2. Operate within specified temperature range to prevent deterioration of seals.
3. Attach a body cover to the positioner after installation on the site.
4. Take measures to avoid dew condensation if the positioner is exposed to high temperature and humidity during transportation or storage or when it is left on the site.
5. The zero point is subject to the mounting position. Adjust zero point after installation on the site.
6. As the positioner contains extra-fine orifices such as restrictor and nozzle, if drain or dust is present in the supply pressure line, malfunction (1) may result. In addition to an air filter (SMC Series AM, AFM) and a micro mist separator (SMC Series AM, AFM) and a micro mist separator (SMC Series AM, AFM), it is recommended to use a mist separator (SMC Series AM, AFM) and a micro mist separator (SMC Series AM, AFM). Also, refer to "SMC Air Preparation System" for air quality.
7. Never use a lubricator, as this can cause a malfunction (1).

*1 If the restrictor is clogged, output from the OUT1 port of the positioner may occur continuously or hunching and overshoot may occur.

### Precautions

- **Type**
  - Lever type
  - Rotary type

- **Input pressure**
  - 0: 0.02 to 0.1 MPa (Standard)
  - 1: 0.02 to 0.06 MPa
  - 2: 0.06 to 0.1 MPa

- **Pressure gauge**
  - (SUP, OUT1)
  - Nil

- **Indication of opening**
  - 0: Not provided
  - 1: Indicated

- **Ambient temperature**
  - T: -5 to 100 °C (High temperature)
  - L: -30 to 80 °C (Low temperature)

- **Pressure gauge/Air port**
  - Nil
  - Rc (Standard)
  - N
  - P
  - G

### Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>IP5000</th>
<th>IP5100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lever type lever feedback</td>
<td>Rotary type cam feedback</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single action</td>
<td>Double action</td>
<td>Single action</td>
</tr>
<tr>
<td>Supply pressure</td>
<td>0.14 to 0.7 MPa</td>
<td>0.14 to 0.7 MPa</td>
<td>0.02 to 0.1 MPa</td>
</tr>
<tr>
<td>Input pressure</td>
<td>10 to 85 mm</td>
<td>60 to 100 mm</td>
<td>10 to 85 mm</td>
</tr>
<tr>
<td>Standard stroke</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Within 0.1% F.S.</td>
<td>Within 0.2% F.S.</td>
<td>Within 0.4% F.S.</td>
</tr>
<tr>
<td>Linearity</td>
<td>Within ±0.5% F.S.</td>
<td>Within ±0.5% F.S.</td>
<td>Within ±0.5% F.S.</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Within ±0.5% F.S.</td>
<td>Within ±0.5% F.S.</td>
<td>Within ±0.5% F.S.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>2% F.S.</td>
<td>2% F.S.</td>
<td>2% F.S.</td>
</tr>
<tr>
<td>Air consumption</td>
<td>5 L/min (ANR) or less (SUP = 0.14 MPa)</td>
<td>11 L/min (ANR) or less (SUP = 0.14 MPa)</td>
<td>5 L/min (ANR) or less (SUP = 0.14 MPa)</td>
</tr>
<tr>
<td>Output flow rate</td>
<td>80 L/min (ANR) or more (SUP = 0.4 MPa)</td>
<td>200 L/min (ANR) or more (SUP = 0.4 MPa)</td>
<td>80 L/min (ANR) or more (SUP = 0.4 MPa)</td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>−20°C to 80°C</td>
<td>−20°C to 80°C</td>
<td>−20°C to 80°C</td>
</tr>
<tr>
<td>Coefficient of temperature</td>
<td>Within ±0.1% F.S./°C</td>
<td>Within ±0.1% F.S./°C</td>
<td>Within ±0.1% F.S./°C</td>
</tr>
<tr>
<td>Air connection port</td>
<td>Rc 1/4 (Standard)</td>
<td>Rc 1/4 (Standard)</td>
<td>Rc 1/4 (Standard)</td>
</tr>
<tr>
<td>Main component parts</td>
<td>Aluminum die-cast, Stainless steel, Brass, Nitrile rubber</td>
<td>Aluminum die-cast, Stainless steel, Brass, Nitrile rubber</td>
<td>Aluminum die-cast, Stainless steel, Brass, Nitrile rubber</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 1.4 kg</td>
<td>Approx. 1.4 kg</td>
<td>Approx. 1.2 kg</td>
</tr>
<tr>
<td>Dimensions</td>
<td>118 x 102 x 86 (Body)</td>
<td>118 x 102 x 86 (Body)</td>
<td>118 x 92 x 77.5 (Body)</td>
</tr>
</tbody>
</table>

### How to Order

**IP5 000 – 0 1 0**

**Accessories**

- Nil: None (Standard)
- A: ±0.7 Output restriction with pilot valve
- B: ±1.0 Output restriction with pilot valve
- C: Fork lever-type fitting M
- D: Fork lever-type fitting S
- E: For stroke 35 to 100 mm with lever unit
- F: For stroke 50 to 140 mm with lever unit

**Part no.**

<table>
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<tr>
<th>Description</th>
<th>Note</th>
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<tr>
<td>P378010-10</td>
<td>Pilot valve unit For IP5000</td>
</tr>
<tr>
<td>P378020-11</td>
<td>Pilot valve unit For IP5100</td>
</tr>
<tr>
<td>P368010-24</td>
<td>Fork lever assembly M For IP5100 (Accessory: C)</td>
</tr>
<tr>
<td>P368010-25</td>
<td>Fork lever assembly S For IP5000 (Accessory: D)</td>
</tr>
<tr>
<td>P378011-11</td>
<td>Feedback lever For IP5000/10 to 85 mm (Accessory: Nil)</td>
</tr>
<tr>
<td>P378012-10</td>
<td>Feedback lever For IP5000/35 to 100 mm (Accessory: E)</td>
</tr>
<tr>
<td>P378013-13</td>
<td>Feedback lever For IP5000/50 to 140 mm (Accessory: F)</td>
</tr>
</tbody>
</table>

Note 1) If two or more accessories are required, the part numbers should be given in alphabetical order. Ex.) IP5000-010-AD

Note 2) For “E” and “F”, standard lever is not provided.
Principle of Operation

IP5000 type

When the input pressure applied to the SIG port of the positioner increases, bellows \( q \) press balance lever \( w \) to the left. As this movement moves flapper \( r \) to the left through connecting spring \( e \), the gap between nozzle \( t \) and flapper \( r \) widens, and the nozzle back pressure of pilot valve \( y \) drops. As a result, the pressure balance in the constant pressure chamber is broken, and exhaust valve \( !3 \) presses inlet valve B \( !4 \) to the right, thus opening inlet port B. Then, output pressure OUT1 rises, and driven diaphragm \( u \) moves downward.

The movement of diaphragm valve \( v \) deflects feedback arm \( !2 \) to the right through feedback lever \( i \), transmission lever \( o \), and roller \( !0 \). Such deflection increases the tension of feedback spring \( !3 \) and acts on balance lever \( w \).

Since driven diaphragm \( v \) moves until the tensile force of feedback spring \( !2 \) and the force generated by bellows \( q \) balance, it is always set in the position proportional to the input pressure. When the signal air pressure decreases, the operation is reversed.

IP5100 type

When the input pressure applied to the SIG port of the positioner increases, bellows \( q \) press balance lever \( w \) to the left. As this movement moves flapper \( r \) to the left through connecting spring \( e \), the gap between nozzle \( t \) and flapper \( r \) widens, and the nozzle back pressure of pilot valve \( y \) drops. As a result, the pressure balance in the constant pressure chamber is broken, and exhaust valve \( !4 \) presses inlet valve B \( !5 \) to the right. Then, inlet port B opens, and output pressure OUT1 increases. In the meantime, the movement of exhaust valve \( !4 \) to the right opens exhaust port A, and output pressure OUT2 decreases. Therefore, pressure difference is generated between pressure chamber 1 and pressure chamber 2 of oscillating actuator \( u \), and actuator shaft \( !1 \) turns in the direction of the arrow. The movement of actuator shaft \( !1 \) deflects feedback arm \( !1 \) to the right through feedback shaft \( o \), cam \( !0 \), and bearing \( !1 \). Such deflection increases the tension of feedback spring \( !3 \) and acts on balance lever \( w \).

Since oscillating actuator \( u \) moves until the tensile force of feedback spring \( !2 \) and the force generated by bellows \( q \) balance, it is always set in the position proportional to the input pressure. When the signal air pressure decreases, the operation is reversed.
Pneumatic-Pneumatic Positioner **IP5000/5100 Series**

**Dimensions**

**IP5000 type (Lever type lever feedback)**

![View A of IP5000 type](image1)

**IP5100 type (Rotary type cam feedback)**

![View B of IP5100 type](image2)

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**Table of Specifications**

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<th>Specification</th>
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<tbody>
<tr>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>IP5000 type (Lever)</td>
<td></td>
</tr>
<tr>
<td>IP5100 type (Rotary)</td>
<td></td>
</tr>
</tbody>
</table>

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**Legend**

- **IP**
- **IW**
- **1301**
- **AW**
- **IL**
- **IT**
- **IS**
- **VFN**

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**Notes**

- The IP5000/5100 Series is designed for industrial applications requiring precise and reliable position control.
- The lever feedback IP5000 type offers lever-based feedback for increased accuracy and easier mechanical adjustment.
- The cam feedback IP5100 type utilizes a cam action for feedback, providing a compact and high-performance solution.

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**Technical Details**

- The IP5000/5100 series offers a wide range of customization options, including various mounting configurations and thread specifications.
- Each model includes standard connections such as Rc, NPT, and G threads, ensuring compatibility with a broad range of industrial systems.

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**Visual Aids**

- The diagrams illustrate the physical dimensions and connection points for each type, aiding in the understanding of assembly and integration into existing systems.
- View A and View B provide side-by-side comparisons of the lever and cam feedback models, highlighting key differences in design and functionality.

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**References**

- [SMC Technical Manual](https://www.smc.com)
- [Industrial Automation Standards](https://www.iso.org)

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**Contact**

For more information or support, please contact SMC at [support@smc.com](mailto:support@smc.com) or visit their website at [www.smc.com](http://www.smc.com).