1. Safety Instructions

- **This manual contains essential information for the protection of users and operators from possible personal injury.**
- **Read this manual before using the product, to ensure correct handling, installation, and operation.**
- **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 of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.**

**WARNING**

- **In extreme conditions, there is a possibility of serious injury or loss of life.**

**CAUTION**

- **If instructions are not followed 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 serious injury or loss of life.**

2. Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Type IP8100</th>
<th>Rotary type cam</th>
<th>Single action</th>
<th>Double action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input current</td>
<td>0.014 ± 0.003</td>
<td>0.020 ± 0.005</td>
<td>0.014 ± 0.003</td>
<td>0.020 ± 0.005</td>
</tr>
</tbody>
</table>

3. Installation

- **Avoid giving impact to the body and torque motor of the positioner, and giving excessive force to the armature because this leads to failure. Handle with care during transport and operation.**

4. Mounting

4.1.2 Connection with feedback shaft

(1) **Attach the position to which the actuator is mounted.**
(2) **If the actuator is mounted on the flange, the actuator must be adjusted at the actuator back side.**
(3) **Check the clearing of the actuator and the positioner.**

4.1.3 Cam attaching procedure

(1) **Use the DA face of the cam to turn the actuator main shaft clockwise (viewed from the positioner front cover side) at the time of input signal increase. Use the RA face to turn it counter-clockwise (reverse actuation).**
(2) **Check the actuator and positioner are firmly locked.**

4.4 Handling

- **Avoid giving impact to the body and torque motor of the positioner, and giving excessive force to the armature because this leads to failure. Handle with care during transport and operation.**

5. Adjustment

- **Check the following prior to start the adjustment.**
- **Check the clearing of the actuator and the positioner.**
- **Check for locking of the actuator.**
- **Check for correct use of the flange and the actuator.**

---

**WARNING**

- **Avoid giving impact to the body and torque motor of the positioner, and giving excessive force to the armature because this leads to failure. Handle with care during transport and operation.**

---

**DANGER**

- **Always use the specified tool and proper operation according to the instruction manual.**

---

**NOTICE**

- **Read this manual before using the product, to ensure correct handling, installation, and operation.**

---

**CAUTION**

- **Check the following prior to start the adjustment.**
- **Check the clearing of the actuator and the positioner.**
- **Check for locking of the actuator.**
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**NOTICE**

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---

**CAUTION**

- **Check the following prior to start the adjustment.**
- **Check the clearing of the actuator and the positioner.**
- **Check for locking of the actuator.**
- **Check for correct use of the flange and the actuator.**
5 Adjustment (continued)

(5) Check that the wires are connected correctly with the (+), (−) and
grounding terminals.

Fig.6 Zero / Span adjustment
*1 When the span adjusting screw is turned clockwise with a slotted/4-
screwdriver, the span decreases. When it is turned counter-clockwise,
the span increases.

NOTE! Allowable load resistance depends on supply voltage
(4) The allowable load resistance is obtained by the formula below. 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.

Allowable load resistance E (Supply voltage-12V) / 20mA DC(1)

5.2 Zero / Span adjustment (output)

Zero point / Span adjustment of the output of the positioner (with potentiometer) should be carried out after initial zero / span adjustments in Fig.6.

This product requires zero / span adjustment of the output current according to the actuator’s rotating angle (Rotary type).

Please follow the procedure below.

(1) Set actuator’s output opening or stroke to 0% after adjusting the zero / span.
(2) Adjust zero / span with the variable resistor on the p.c.board.
(3) Adjust 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 broken. Adjust while monitoring output signal.

5.3 Change of Operating direction (IP8100 Rotary)

(1) The Output signal is configured to increase in normal operation (clockwise) when shipped.
(2) To apply the positioner in reverse operation (counter-clockwise), specify the accessory classification ‘JR’ when ordering. Alternatively, to change the operation of the delivered product, reverse the direction of the output signal.

Move clockwise
Move counter-clockwise
Too large span
Too small span

Span OK

Too large starting point
Too small starting point

Starting point OK

Spam OK

Adjusting procedure

(1) After installation, repair and disassembly, connect compressed air and perform a function test and leak test. If bleeding noise is lower than the initial state, or operation is abnormal, stop operation and check if installation is correct or not.

(1) Check if supply air is clean or not. Inspect compressed air cleaning system periodically so that dust, oil and humidity, which can cause malfunction and failure of the unit, do not enter the equipment.
(2) 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.
(3) Check the positioner once a year. When an excessively worn diaphragm, O-ring or other packing 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.
(4) 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.
(5) 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 inserting a 0.3mm diameter wire into the aperture.
(6) When you disassemble the pilot valve, coat the O-ring of the sliding section with grease. (Use the TORAY SILICONE SH45 grease.)
(7) Check for air leaks from the compressed air piping. Air leaks could lower the performance characteristics of the positioner. Air is normally discharged form a bleed port, but this is necessary air consumption based on the construction of the positioner, and is not an abnomality if the air consumption is within the specified range.

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 4-20mA DC output signal produced by supplying initial power to the p.c.board. This supply power can be set freely between DC12-25V.

According to the operating direction of the actuator or feedback 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 (for Positioner control) to 1(+)-2(-) of the terminal board in the terminal box.
(2) Connect power source (for detecting output current) to 3(+)-4(-) of the terminal board.
(3) Connect an ammeter in series between (+) side and 3(+) of terminal board or (-) side and 4(-).

6 Maintenance

WARNING

(1) After installation, repair and disassembly, connect compressed air and perform a function test and leak test. If bleeding noise is lower than the initial state, or operation is abnormal, stop operation and check if installation is correct or not.

CAUTION

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5.4 Zero Adjusting Procedure

(1) For this positioner, span and zero point adjustment of each actuator is necessary. Adjustment shall be done based on each actuator size.
(2) Keep in mind that span and zero point adjustment interfere in each other.
(3) Characteristics changes due to change of mounting position, ambient temperature and supply pressure.
(4) If it takes along time until the operation after initial adjustment, check and adjust this product.
(5) Sensitive adjustment is effective for only double acting actuator.
(6) Manual change function is effective for single acting actuator which is controlled by using OUT1.

5.2.1 Start point and Zero point

(1) Connect the input signal (for Positioner control) to 1(+)-2(-) of the terminal board in the terminal box.
(2) Connect power source (for detecting output current) to 3(+)-4(-) of the terminal board.
(3) Connect an ammeter in series between (+) side and 3(+) of terminal board or (-) side and 4(-).

WARNING ! Allowable load resistance depends on supply voltage

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This product requires zero / span adjustment of the output current according to the actuator’s rotating angle (Rotary type).

Please follow the procedure below.

(1) Set actuator’s output opening or stroke to 0% after adjusting the zero / span.
(2) Adjust zero / span with the variable resistor on the p.c.board.
(3) Loosen potentiometer screw set while applying power and ensuring output current, then rotate the potentiometer 10-20’ away from the dead band (see Fig.8) to decide the start point. Set the potentiometer with the screws again.

6 Maintenance

WARNING

(1) After installation, repair and disassembly, connect compressed air and perform a function test and leak test. If bleeding noise is lower than the initial state, or operation is abnormal, stop operation and check if installation is correct or not.

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(1) Check if supply air is clean or not. Inspect compressed air cleaning system periodically so that dust, oil and humidity, which can cause malfunction and failure of the unit, do not enter the equipment.
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