**Masoneilan™ 8012/8013 Series**

**Electro-pneumatic Valve Positioners**

**Excellent Dynamic Response and Positioning Accuracy**

**Accurate, Simple, Rugged**

The primary function of a valve positioner is to ensure that the control valve plug position is always proportional to the value of the controller output signal, regardless of packing box friction, diaphragm actuator hysteresis, or out-of-balance forces on the valve plug. The controller output signal may be pneumatic or electric, depending on the type of positioner.

Baker Hughes Masoneilan 8012 and 8013 Series cam positioner is a force-balance electro-pneumatic device which, by directly comparing valve position with a controlled DC output signal, provides excellent dynamic response and positioning accuracy. One multi-lobe cam provides field-changeable linear- or percentage-control characteristics without additional parts.
**Operation**

The 8013 Series electro-pneumatic cam positioner is able:

- To change the valve action (increase in electrical signal opens or closes the valve)
- To change control characteristics (linear or equal-percentage)
- To operate each of two control valves (split-range)

The 8013 Series positioner is available for either direct action (increase in electrical signal increases output pressure) or reverse action (increase in electrical signal decreases output pressure). In addition, the positioner provides an accurate means of split-ranging controller output signal for sequential operation of two control valves by a single controller.
**Description**

**Sectional View of Positioner**

The installation in hazardous area locations must be in accordance with applicable safety standards.

**Housing:** The cast aluminum case is mounted at the front of the device by means of a mounting plate and a molded support.

**Beam and flexure bearings:** Beryllium copper flexure bearings provide friction-free fulcrum points for the beam.

**Pilot:** High-capacity type for fast stroking speeds. The metering tube for the nozzle air supply is equipped with a clean-out plunger.

**Cam:** Only one cam can be provided, depending on the selected lobe, equal-percentage or linear (and linear split-range) control characteristics. Linkage and associated backlash problems are essentially eliminated by mounting the cam directly to the end of the plug shaft (rotary valves) or the actuator stem (reciprocating valves).

**Electrical circuit:** The 8013 Series electro-pneumatic positioner can be supplied or easily adapted to accommodate the DC current output signals of nearly all the electric controllers presently available. The coil is impregnated with an insulating material.
**Operation**

Any variation in the output signal of an electro-pneumatic controller causes the coil to produce a force on the beam, moving the flapper to cover or uncover the nozzle.

The modification in nozzle back pressure causes, through the pilot, a variation of output pressure to the control valve actuator. An increase in electrical signal increases output pressure in direct action and decreases output pressure in reverse action.

The resultant plug motion is transmitted through the positioner lever to the force-balance spring, extending or compressing the spring until the force exerted by it on the beam balances the opposing force of the coil.

The system is then in equilibrium, and positioner output is stabilized at the necessary level to maintain the desired valve plug position. When the forces on the beam are in equilibrium, there is theoretically no flow of air into or out from the pilot.

Actually, a small bleed is provided between supply and output to increase pilot responsiveness when at equilibrium.

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**Hazardous Environment Approvals**

For all details dealing with Explosion-proof and Intrinsic safety, please refer to 8000 ATEX Manual (ref. 33467).
**General Data**

**Performance Characteristics**

**Air supply:**
1.4 to 5.2 bar (20 to 75 psi) depending on the valve size and actuator action.

**Air consumption and output:**

<table>
<thead>
<tr>
<th>Supply pressure influence:</th>
<th>0.3 to 0.7 percent of output pressure for 100 mbar supply pressure change (0.2 to 0.5 percent per psi) depending on supply pressure.</th>
</tr>
</thead>
<tbody>
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<td>0.3 to 0.7 percent of output pressure for 100 mbar supply pressure change (0.2 to 0.5 percent per psi) depending on supply pressure.</td>
</tr>
<tr>
<td>Air connections:</td>
<td>1/4&quot; NPT</td>
</tr>
<tr>
<td>Ambient temperature operating range:</td>
<td>• Standard instrument: down to -20°C (-4°F) • Low temperature instrument: down to -55°C (-67°F)</td>
</tr>
<tr>
<td>Performance data:</td>
<td>The performance of a complete valve (i.e. the valve and its packing, actuator, positioner, and accessories) depends upon the specific performance of each component. The performance data given below, in average value in percentage of the input span, concerns Camflex™ II, MiniTork™ II, and 87/88 multi-spring actuators equipped with a standard 8013 positioner.</td>
</tr>
<tr>
<td>Hysteresis at mid stroke:</td>
<td>0.8 percent max</td>
</tr>
<tr>
<td>Sensitivity:</td>
<td>0.3 percent max</td>
</tr>
<tr>
<td>Electromagnetic compatibility:</td>
<td>Model 8013 fall under the scope of the Article 2.2.(d) of the EMC 2014/30/EU Directive. Consequently, this Directive does not apply.</td>
</tr>
<tr>
<td>Weight:</td>
<td>3.5 kg (7.5 lbs)</td>
</tr>
</tbody>
</table>

**Electrical Characteristics**

Typical circuit resistance is 216 ohm for an input D.C. signal of 4 to 20 mA.

The circuit is available for most current signals such as:

<table>
<thead>
<tr>
<th>Input d.c. signal</th>
<th>Positioner input resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>mA</td>
<td>ohms</td>
</tr>
<tr>
<td>1-5</td>
<td>2763</td>
</tr>
<tr>
<td>4-20</td>
<td>216</td>
</tr>
<tr>
<td>10-50</td>
<td>105</td>
</tr>
<tr>
<td>Other signals</td>
<td>On request</td>
</tr>
</tbody>
</table>

Note: for intrinsically safe device, 4-20 mA & 216/173 ohms only.

**Zero adjustment:**
Vernier screw.

**Span adjustment:**
Tension adjustment on force balance spring.

**Dimensions in mm (inches)**

![Dimensions Diagram](image-url)
**Numbering System**

**US design with FM approvals**

Linear positioner for axial actuators: Series Identification 8012

Multi-lobe cam positioner for rotary type valves: Series Identification 8012-b-c

- **Mounting on**
  2. Camflex II, multi-lobe cam
  4. Minitork II & 38002, multi-lobe cam
  5. 36000 Control Ball Valves, multi-lobe cam
  6. HPBV, multi-lobe cam

**European design with ATEX, CCOE and IA approvals**

Series Identification 8013-bd

- **Mounting on**
  0. 37/38 and 87/88 actuators, without cam
  1. 37/38 and 87/88 actuators, basic cam
  2. Camflex II, multi-lobe cam
  3. Sigma F, multi-lobe cam
  4. Minitork II & 38002, multi-lobe cam

- **Approvals**
  55. Weather-proof
  57. Explosion-proof and Weather-proof (ATEX, CCOE, IA)
  58. Intrinsically safe and Weather-proof (ATEX, CCOE, IA)
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