Type 650
Positive Bias Relay
Increases flow capacity plus adds an adjustable bias pressure

Used extensively for increased flow capacity or remote pressure control applications, the Type 650 positive bias relay is a signal operated regulator that provides an output pressure that is the sum of the input signal pressure plus an adjustable preset bias. The unit allows flow capacities up to 50 SCFM with minimal pressure drop. The Type 650 is most often used for conversion of a low flow control signal to the higher flow requirements of an operating system.

Features

• High Flow Capacity
  Allows flows up to 50 SCFM
• Four Bias Ranges
  From 0-15 psi to 2-150 psi
• High Relief Capacity
  Large relief valve provides 15 SCFM relief capacity
• Balanced Supply Valve
  Rolling diaphragm design makes unit insensitive to supply pressure variation
• Accurate Pressure Conversion
  High sensitivity achieves accurate conversion of signal to output with no lag

Principles of Operation

A pressure introduced through the signal port in combination with the bias spring creates a downward force on the upper diaphragm area. This force is balanced by the output pressure acting against the lower control diaphragm area. If signal pressure and/or bias spring force is increased above the output pressure then there is a net downward force on the diaphragm assembly causing the supply valve to open. Output pressure increases until equilibrium is achieved.
### Type 650 Positive Bias Relay

**Dimensions**

- **Flow Capacity**: 50 SCFM (1,415 Nl/min) at 100 psig (7 BAR) supply with 20 psig (1.4 BAR) output
- **Exhaust Capacity**: 15 SCFM (425 Nl/min) Downstream 5 psig (0.35 BAR) above set pressure
- **Sensitivity**: 1/4\(^\circ\) (3.2 mm) water column
- **Effect of Supply Pressure Change**: 0.1 psi for a 50 psig change
- **Maximum Supply Pressure**: 250 psig (17 BAR)
- **Maximum Signal Pressure**: 150 psig (10 BAR)
- **Maximum Output Pressure**: 150 psig (10 BAR)
- **Ambient Temperature Limits**: -40°F to 160°F (-40°C to 71°C)
- **Weight**: 1.75 lbs. (635 gm)
- **Mounting**: pipe, panel or bracket

**Specifications**

- **Model Number** | **Port Size NPT** | **Bias Range (psi)** | **Bias Range (BAR)**
  - 650-BA | 1/4" | 0-2 | 0-0.14
  - 650-BC | 1/4" | 0-15 | 0-1
  - 650-BD | 1/4" | 0-30 | 0-2
  - 650-BE | 1/4" | 0-60 | 0-4
  - 650-BF | 1/4" | 0-150 | 0-10
  - 650-CC | 3/8" | 0-15 | 0-1
  - 650-CB | 3/8" | 0-30 | 0-2
  - 650-CE | 3/8" | 0-60 | 0-4
  - 650-CF | 3/8" | 0-150 | 0-10
  - 650-DA | 1/2" | 0-2 | 0-0.14
  - 650-DC | 1/2" | 0-15 | 0-1
  - 650-DD | 1/2" | 0-30 | 0-2
  - 650-DE | 1/2" | 0-60 | 0-4
  - 650-DF | 1/2" | 0-150 | 0-10

**Options** (Add proper letter at end of model number)

- **E** Tapped Exhaust - 1/8" NPT port allows captured exhaust
- **T** Tamperproof Cover - prevents casual adjustment of bias setting
- **U** BSP Porting
- **X** ATEX 94/9/EC
- **Z** Negative Bias - built in -4 ±1 psig bias

**Accessories**

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<tr>
<th>Item</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>Mounting Bracket</td>
<td>446 707025</td>
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<tr>
<td>Gauge 0-15 psi</td>
<td>446 725003</td>
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<td>Gauge 0-30 psi</td>
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<td>Gauge 0-60 psi</td>
<td>446 725001</td>
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<tr>
<td>Gauge 0-160 psi</td>
<td>446 725002</td>
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**Warranty**

ControlAir, Inc. products are warranted to be free from defects in materials and workmanship for a period of eighteen months from the date of sale, provided said products are used according to ControlAir, Inc. recommended usages. ControlAir, Inc. reserves the right to discontinue manufacture of any products or change products materials, designs or specifications without notice. Note: ControlAir does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for the proper selection, use, and maintenance of any ControlAir product remains solely with the purchaser and end user. Drawing downloads available at www.controlair.com