Model 661 Amplifying Relays with Bias

Introduction

Features & Benefits

- Fixed-gain force and bias adjustment mechanisms amplify pneumatic instrument signals to provide control circuit design flexibility

Description

Series 661 Amplifying Relays are fixed-gain force-balance instruments, which incorporate bias adjustment that amplify pneumatic instrument signals. For example, a 3-15 psi signal can be amplified to operate a 3-27 psi control valve, or with a reverse-action instrument, a 3-15 psi signal can be converted to a 27-3 psi signal.

The input pressure signal, acting upon the effective area of the upper diaphragm, produces a force opposed by the force produced by the output pressure applied over the effective area of the lower diaphragm and by a manually-set (constant) spring force. Any inbalance in the opposing forces will operate the pilot valve to throttle supply air to change the output until rebalance is achieved.

Plus or minus biasing of the input signal is accomplished by changing the setting of the upper biasing spring, which alters the net spring force on the diaphragm assembly.

Reverse Action: The force of the input pressure signal is exerted under the top diaphragm and that force opposes the positive biasing spring. The negative (lower) biasing spring is not used in the reverse-acting relay.

When the input pressure increases, causing an unbalance in opposing forces, the diaphragm-stack assembly will lift off the pilot valve. The pilot valve will then shut off air supply and open the exhaust port to decrease the output pressure until rebalance is achieved. Conversely, a decrease in input will cause an increase in output.

Positive biasing is accomplished by adjusting a slotted screw at the top of the instrument.

Specifications

Supply Pressure

Normal: 20 psig (140 kPa)
Maximum: 80 psig (550 kPa)
Minimum: 1 psi (7 kPa) above maximum required output

Range Limits

80 psig max. for input or output (whichever limits)

Overrange Limits

100 psig (690 kPa) at any connection

Minimum Output Pressure

Less than 0.1 psi (0.7 kPa)

Ratio Accuracy

Within 1% of normal ratio

Linearity

±1% of output span

Reproducibility

Within 0.1% of output span

Response Level

0.2" H_2O (5 mm H_2O)

Bias Range

Direct Acting: +30 psi to -15 psi (210 to -100 kPa)
Reverse Acting: +22.5 psi to 0.25 psi (155 to 2 kPa)

Flow Capacity

2.2 scfm minimum (62.3 SDM^3/M)

Air Consumption

0.15 scfm maximum (4.25 SDM^3/M)

Ambient Teperature Limits

-40 to 180° F (-40 to 82° C)

Materials of Construction

Brass, aluminum, stainless steel, and Neoprene

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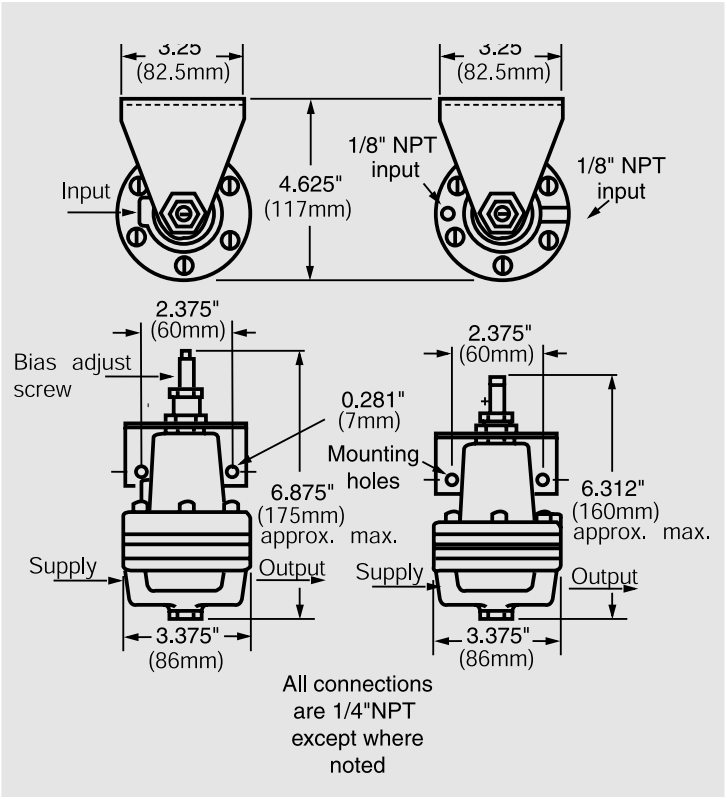
Technical data

Model Selection

Direct Action		Reverse Action	
Model No.	**Gain**	**Model No.**	**Gain**
661A2	2	661A2R	2
661A3	3	661A3R	3
661A4	4	661A4R	4
661A6	6	661A5R	6
Function Equation: $P_{out} = G (P_{in} \pm K)$		Function Equation: $P_{out} = G (K-P_{in})$	

Where P_{in} = input pressure
p_{out} = output pressure
G = gain
K = adjustable bias
(see Specifications)

Mounting Dimensions



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