



Keeping the World Flowing
for Future Generations



Model 21 Relay

Features and Benefits

- Venturi aspiration compensates for downstream pressure losses
- Optional input and output biasing allows versatility in applications
- Adjustable from 30:1 dividing ratio to 1:30 multiplying ratio assures infinite pressure adjustments
- Floating seal ring isolates control chamber which increases stability by reducing effect of high flows
- Panel or line mounting

Operating Principles

The Model 21 consists of a signal chamber lever arm, a Model 20 output valve body, and pivot assembly for lever arm adjustment. The ratio of output pressure to signal pressure is infinitely adjustable. The adjustment range permits signal amplification of 1:30 or signal reduction of 30:1 by rotation of the ratio adjustment knob.

The signal pressure acting on the signal chamber diaphragm transmits a force through a lever to the control diaphragm, thus setting output pressure. The lever fulcrum is adjustable.

Output pressure is a function of signal pressure times the ratio of lever arm lengths on either side of the fulcrum. A bias may be introduced by means of the set screws.

The Model 21D is available with both input and output adjustable bias. Maximum input bias is 3 psig, with a maximum output bias of 9 psig. The basic mathematical expression for the bias in this relay is:

$$P_o = (P_s - K_1) R + K_2, \text{ where}$$

P_o = Output pressure

P_s = Input signal

R = Ratio of setting

K_1 = Input bias, (-) only

K_2 = Output bias, (+) only

Specifications

Flow Capacity

- 40 SCFM (68 m³/HR) 100 psig, [7.0 BAR], (700 kPa) supply, 20 psig, [1.5 BAR], (150 kPa)

Exhaust Capacity

- 5.5 SCFM (9.4 m³/HR) (downstream pressure 5 psig, [.35 BAR], (35 kPa) above set pressure)

Supply Pressure

- 250 psig, [1.7 BAR], (1700 kPa) maximum

Supply Pressure Effect

- Less than .1 psig, [.007 BAR], (.7 kPa) for 100 psig, [7.0 BAR], (700 kPa) change

Signal or Output Pressure

- 150 psig, [1.0 BAR], (1000 kPa) maximum

Ratio Range

- 30:1 through 1:30 (signal pressure: output pressure)

Operating Pressure (minimum)

- 0.5 psig, [0.03 BAR], (3.5 kPa)

Sensitivity

- 0.5" (1.27 cm) water column

Ambient Temperature Limits

- -40 to +200 °F (-40 to +93.3 °C)

Materials of Construction

- Body and Housing: Aluminum
Trim: Stainless Steel, Brass, and Zinc Plated Steel
Diaphragms: Buna N and Dacron
Lever and Fulcrum: Hardened Steel

