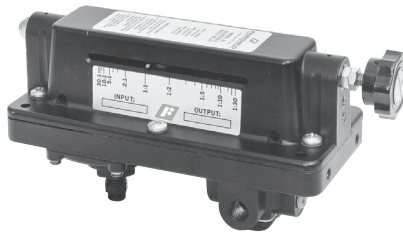


# Model 21 Relay



**Model 21**

## Features

- An aspirator tube compensates downstream pressure drop under flow conditions
- 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:

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

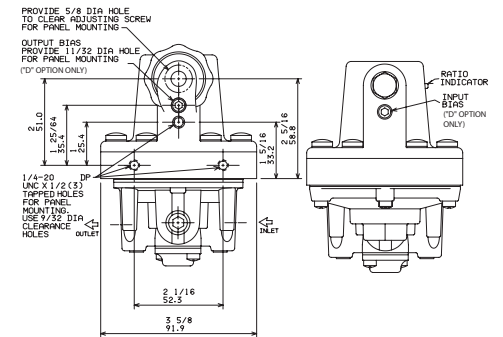
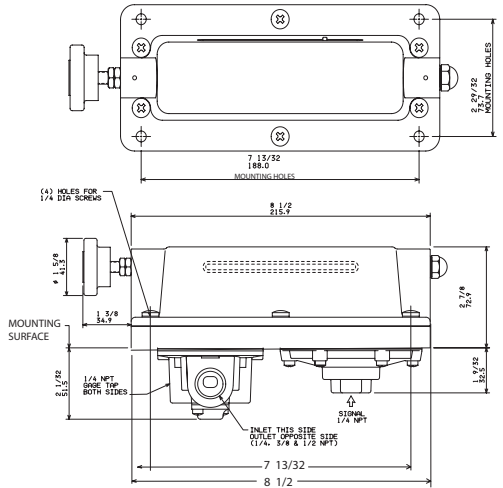
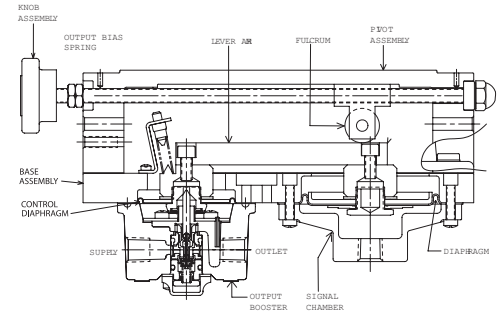
$P_o$  = Output pressure

$P_s$  = Input signal

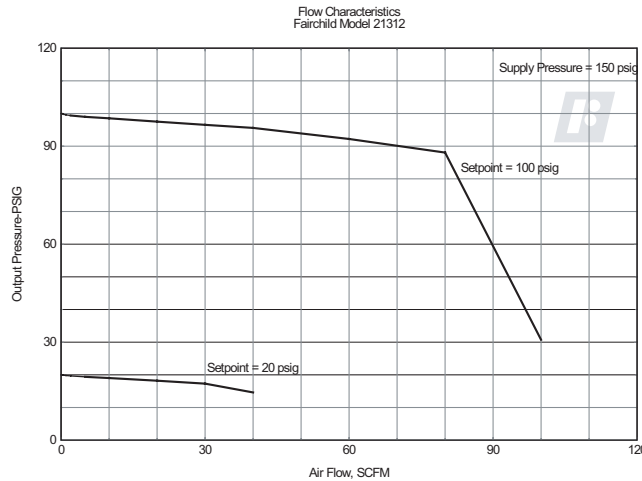
$R$  = Ratio of setting

$K_1$  = Input bias, (-) only

$K_2$  = Output bias, (+) only



**Technical Information**



**Specifications**

**Flow Capacity**

40 SCFM (68 m<sup>3</sup>/HR) 100 psig, [7.0 BAR], (700 kPa)

supply, 20 psig, [1.5 BAR], (150 kPa)

**Exhaust Capacity**

5.5 SCFM (9.4 m<sup>3</sup>/HR) (downstream pressure 5 psig, [.35 BAR], (35 kPa) above set pressure)

**Supply Pressure**

250 psig, [17 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, [10 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°F to +200°F, (-40°C 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

**Catalog Information**

**Catalog Number**

**2 1 3 1**

**Pipe Size**

1/4" NPT.....  2

3/8" NPT.....  3

**Options**

Bias<sup>1</sup>.....  D

BSPT (Tapered) .....  U

<sup>1</sup> Maximum Input Bias: -3 psig, [-0.2 BAR], (-20 kPa),  
 Maximum Output Bias: 9.0 psig, [0.6 BAR], (60 kPa)

**Installation**

A service kit is available for the Model 21. Refer to the *Fairchild Model 21 Relay Installation, Operation and Maintenance Instructions*, IS-10000021.