

# FINE CONTROLS (UK) LTD



Fine Controls have been supplying process controls & instrumentation equipment since 1994, & now serves an ever expanding customer base, both in the UK & globally.

We offer a full range of valve & instrumentation products & services, with our product range representing leading technologies & brands:

**Flow:** Flow Meters & Transmitters, Flow Switches, Flow Control Valves & Batch Control Systems

**Temperature:** Temperature Probes & Thermowells, Temperature transmitters, Temperature Regulators & Temperature Displays

**Level:** Level Transmitters & Switches

**Pressure:** Pressure Gauges & Transmitters, Precision & High Pressure Regulators & I-P Converters, Volume boosters.

**Precision Pneumatics:** Pressure Regulators, I-P Converters, Volume Boosters, Vacuum Regulators

**Valves:** Solenoid & Pneumatic Valves, Control Valves & Positioners, Actuated Ball, Globe or Diaphragm Valves & Isolation Valves

**Services:** Repair, Calibration, Panel Build, System Design & Commissioning

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## Features

- 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:

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

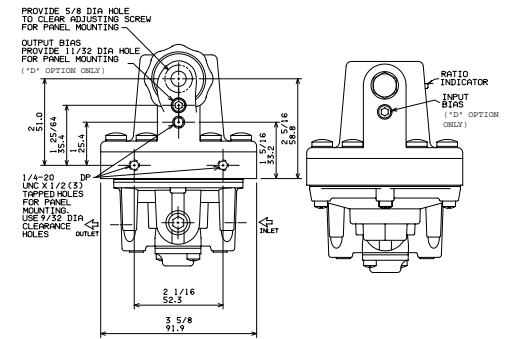
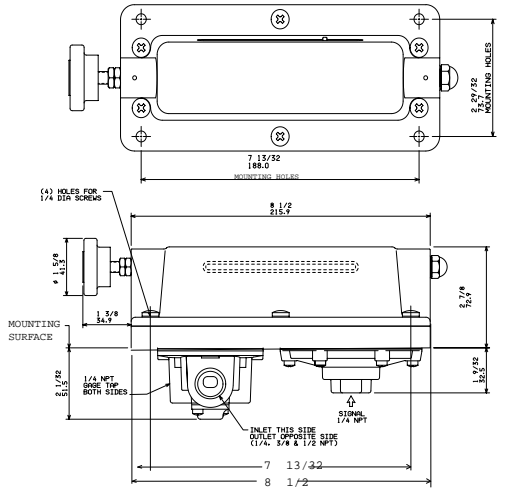
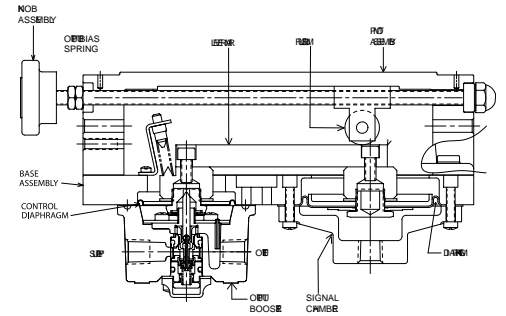
$P_o$  = Output pressure

$P_s$  = Input signal

$R$  = Ratio of setting

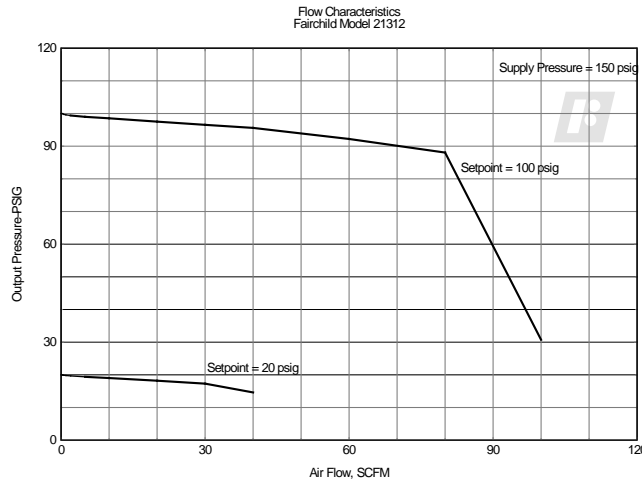
$K_1$  = Input bias, (-) only

$K_2$  = Output bias, (+) only



**D**  
Model  
21

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, [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°F to +200°F, (-40°C to +93.3°C)

**Materials of Construction**

Body and Housing.....Aluminum  
Trim.....Stainless Steel, Brass, and Zine 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  
Fluorcarbon Elastomers ..... J  
Tamper Proof ..... T  
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.



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