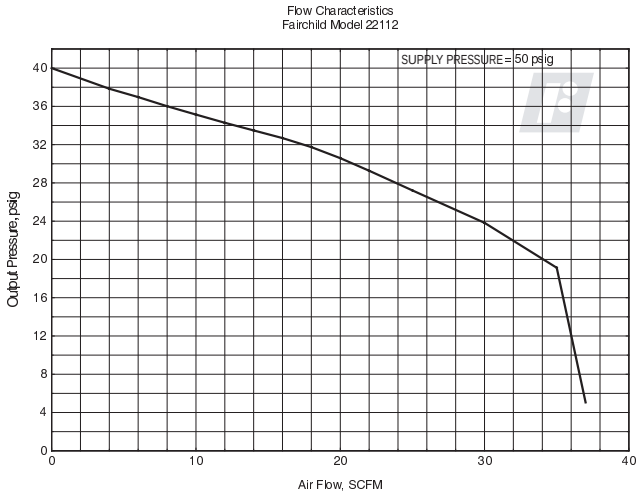
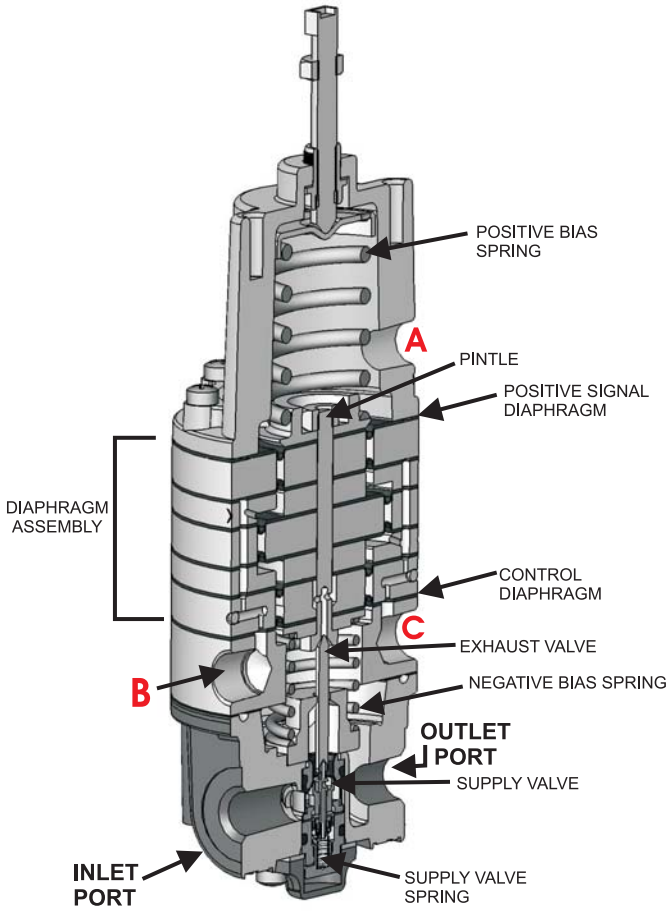
Model 22
Computing Relay

FAIRCHILD
precision pneumatic & motion control



General Information

- Small bleed across relief seat assures fast response to small signals
- Multiple inputs allow versatility in process control
- Adjustable Bias Range from -18 to +15 psig permits variation in output
- Two gauge ports located 90° from supply and outplet ports, allows versatility in installation
- Line or Panel Mounting



Cross Section

Model 22 Detail Drawing

Operating Principles

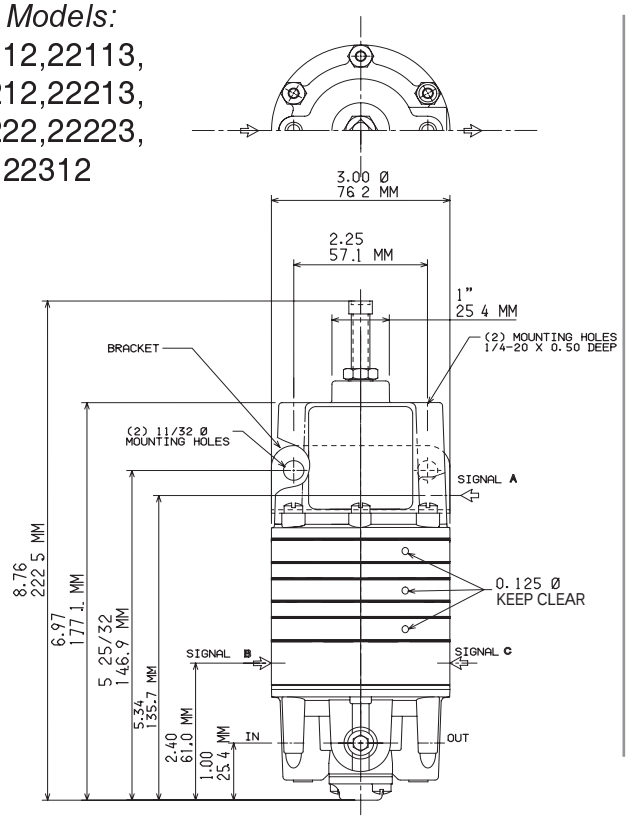
The Model 22 Pneumatic Computing Relay is a highly versatile control valve designed to perform a number of specialized functions, including averaging, differential, inverting, and totalizing. This high quality unit, which offers up to four inputs as well as positive and negative biasing over a broad range, is available in several configurations to meet most application requirements.

The combination of multiple configuration options and accurate response characteristics make the Model 22 the ideal choice in a variety of applications with specific input/output requirements such as override or multi-element control, or as an ON-OFF valve.

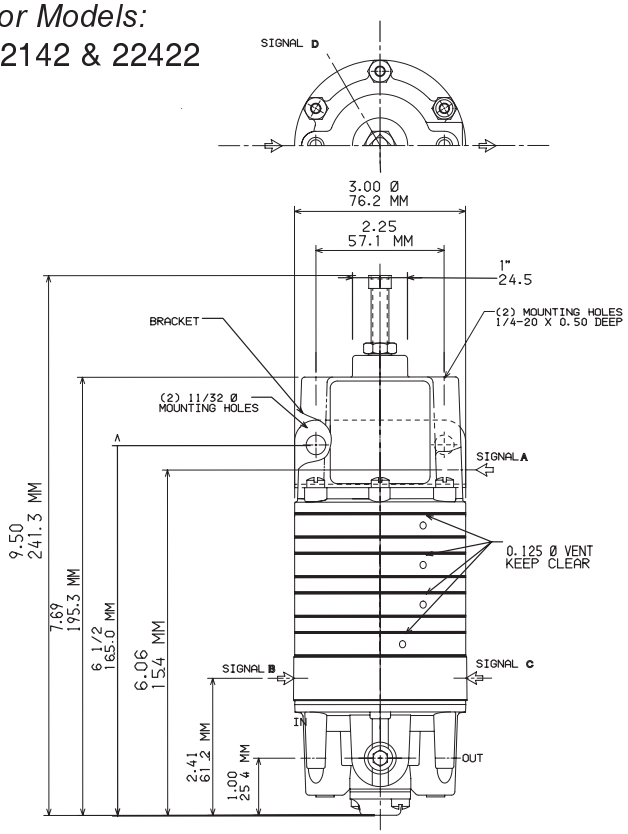
For more information, see cross sectional diagrams.

Outline Dimensions

For Models:
22112,22113,
22212,22213,
22222,22223,
22312



For Models:
22142 & 22422

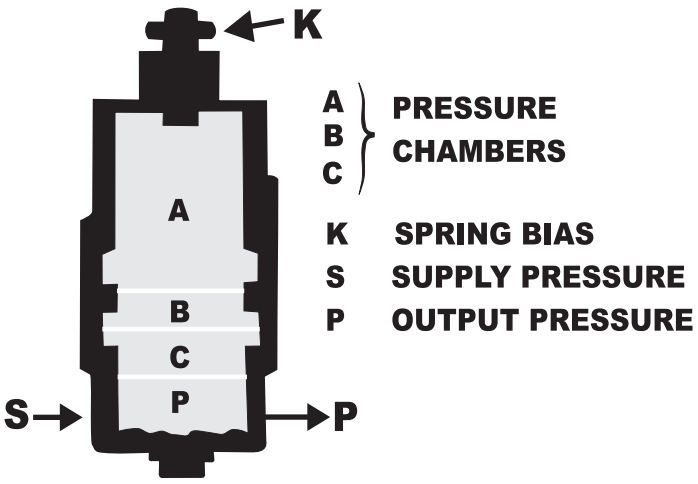


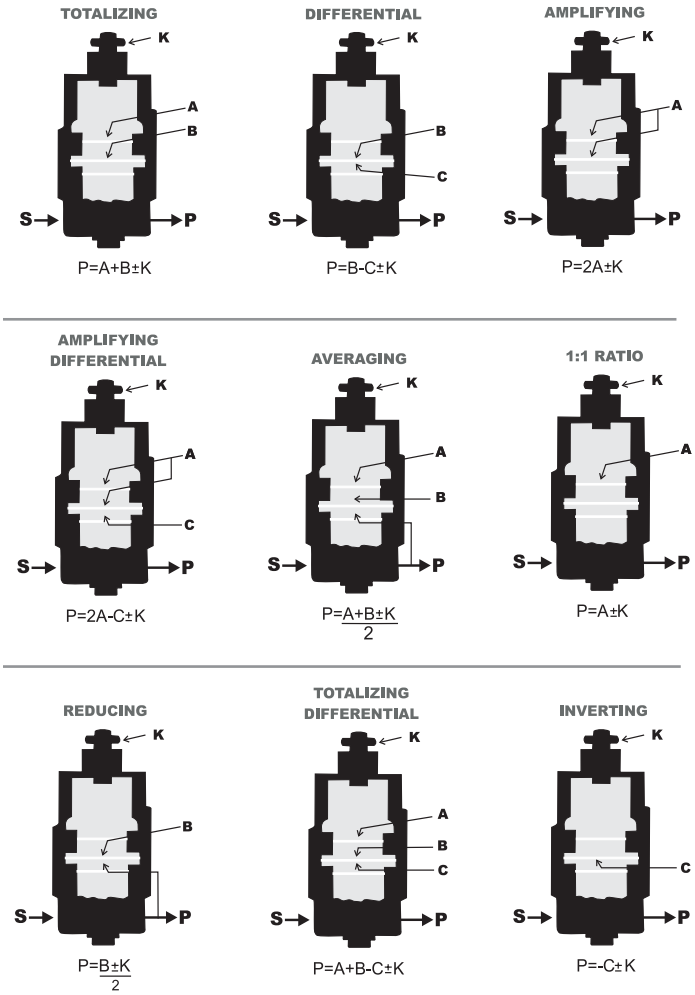
Specifications

Input and Output Pressure	3-15 psig, [.2-1.0 BAR], (20-100kPa)
Normal Supply	20 psig, [1.5Bar], (150kPa)
Maximum Operating Pressure	
Signal and Ouput	50 psig, [3.5BAR], (350kPa)
Supply	150 psig, [10.0 BAR], (1000kPa)
Maximum Over Pressure	
Any Connection	100 psig, [7.0BAR], (700kPa)
Supply Connection Only	250 psig, [17.0 BAR], (1700kPa)
Minimum Output Pressure	0 psig at any supply pressure
Linearity of Output Pressure	within 0.4% of full range
Air Consumption *(in balance of dead end service)*	0.06 SCFM (.102m³/HR) maximum at 15 psig, [1.0 BAR], (100kPa) output
Repeatability	For unbalances within the normal pressure range, output pressure will repeat its previous value within 0.5% of full range
Ambient Temperature Limit	-40°F to 200°F (-40°C to 93.3°C)
Output Flow Capacity (Midscale Output)	20 psig, [1.5BAR], (150kPa) supply. A foward flow of 2 SCFM (3.4m³/HR will not cause a drop in output of more than 3% of full range
Supply Pressure Effect	A supply pressure change of 5 psig [.35 BAR], (35kPa) will not change output pressure by more than 0.1% of full range
Materials of Construction	Valve & Bonnet . . . . . Die Cast Aluminum Diaphragm . . . . . Buna A Range Screws & Fastners . . . . . Zinc Plated Steel

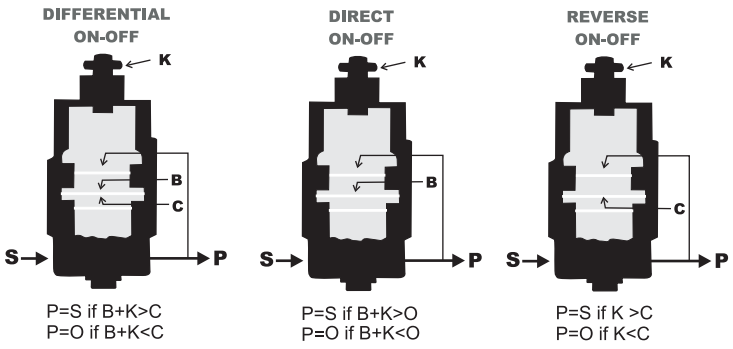
Cross Section

The diagrams show some typical functions and modes of operation for the Model 22. In the equation associated with the diaphragms, **P**=Output Pressure and **A, B,** and **C**=Signal Pressures. **K**, the constant, is provided by the biasing springs, and is adjustable over a range of -18 psig to +30 psig. **S**=Supply Pressure





When used as an ON-OFF valve, the Model 22 may open or close a pneumatic circuit, moving rapidly to a full open or a full closed position when signal pressures deviate from set point. In the full open position, the valve passes full supply pressure without modulation or regulation. The function is achieved by connecting output pressure to signal chamber **A**. This connection forms a feedback loop so that, once flow is started, the valve is driven wide open. The relay always goes full open or full closed when conditions are as shown in the diagrams.

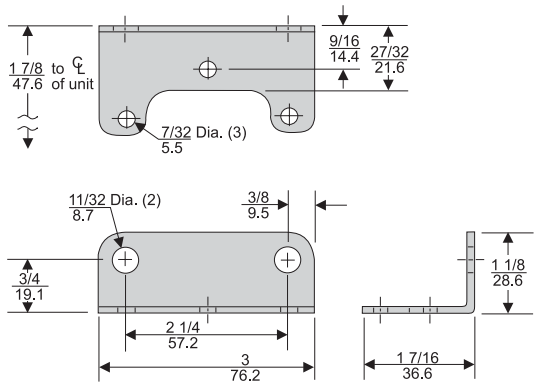


NOTE:
Relays reflecting functions identified with prefix numbers 223, 224, 225 and 226 are not shown in this catalog sheet. These units are equipped with additional diaphragms to enable the handling of added signal inputs.

P=A+B+C+D ± K (not shown)
P=A+B−C+D ± K (not shown)

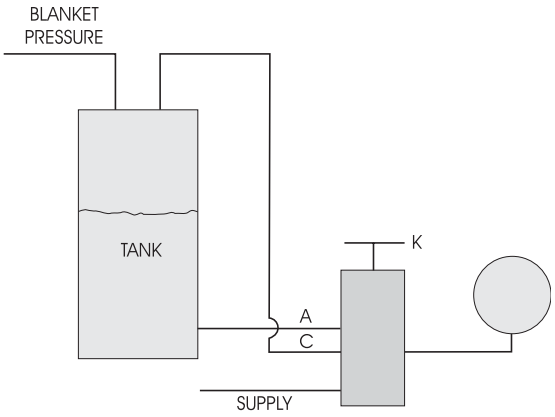
Mounting Bracket

EB-09921(sold separately)



Typical Application

In the configuration shown below, the Model 22 is used to determine true head pressure in a tank.



$P_o = A - C \pm K$

A=Tank Pressure
C=Blanket Pressure
K=O

Service Information

Repair parts are available for servicing the Model 22. Please refer to the *Fairchild Model 22 Installation, Operation and Maintenance Instructions*, IS-30000022.

ISO 9001:2000
FM NO. 25571

ISO 9001:2000 Certified

Catalog Information

Catalog Number 2 2 ☐ ☐

Function		
Totalizing	(P = A+B±K)	11
Differential	(P = B−C±K)	
Amplifying	(P = 2A±K)	
Inverting	(P = −C±K)	
Totalizing Differential	(P = A+B−C±K)	
Amplifying Differential	(P = 2A−C±K)	
1:1 Ratio	(P = A±K)	
Differential On-Off	(P = S if B±K>C) or (P = O if B±K<C)	21
Reverse On-Off	(P = S if K>C) or (P = O if K<C)	
Direct On-Off	(P = S if B+K>O) or (P = O if B+K<O)	
Reducing	$(P = \frac{B \pm K}{2})$	22
Averaging	$(P = \frac{A+B \pm K}{2})$	
Totalizing	(P = A+B+C±K)	31[1]
Totalizing	(P = A+B+C+D±K)	41[1]
Totalizing Differential	(P = A+B−C+D±K)	

Pipe Size

1/4" NPT	2
3/8" NPT	3

[1] *1/4" NPT Pipe Size Only*

SYMBOL KEY

A, B, C, D	Signal Pressure
K	± Spring Bias
P	Output Pressure
S	Supply Pressure

FAIRCHILD

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