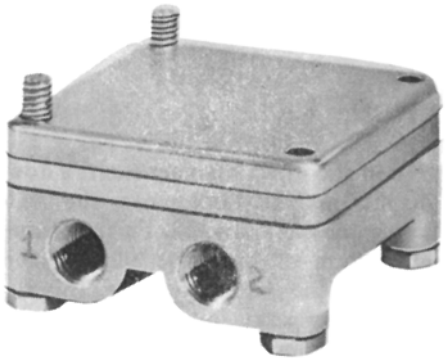
Robertshaw
INDUSTRIAL PRODUCTS DIVISION

Ratio Relay
CR-100-Series A/B

GENERAL DESCRIPTION

The Model CR100 Series A and B Ratio Relays comprise a group of proportioning units designed for use in industrial pneumatic control systems where the application requires amplifying or reducing the volume of control air in a pre-determined ratio. They are available in input to output ratios of 1:1.5 through 1:6 and 1.5:1 through 6:1. The relay components are made of steel and aluminum, and the diaphragms are Buna-N on nylon.



SPECIFICATIONS

DESIGN DATA

Input-Output Ratios:

Amplifying	Reducing
1:1.5	1.5:1
1:2	2:1
1:3	3:1
1:4	4:1
1:5	5:1
1:6	6:1

Input Pressure Range:
25 psig (1.8 bar) maximum for amplifying
90 psig (6.3 bar) maximum for reducing

Supply Pressure:
60 psig (4.2 bar) maximum (should always be at least 10 psig [0.7 bar] greater than output pressure.)

Output Pressure:.....50 psig (3.5 bar) maximum

Action:..... Proportional

Ambient Temperature Limits:
-40° F. to 180° F. (-40° C. to 82° C.)

Connections: ..... 1/4" female NPT
(Exhaust connection is 1 / 16" female NPT)

Weight: .....1.0 lb. (0.45 Kg.)

PERFORMANCE DATA

Ultimate Sensitivity: ..... 0.1% of full range

Supply Pressure Effect: .....Change in output pressure for 5 psig (0.35 bar) supply pressure change, less than 1% of full range.

Ambient Temperature Effect: ..... Change in output for a 75 F. (24° C.) ambient temperature change - 0.5% of full range.

Air Consumption: Maximum ..... 7.0 SCFH

For Maximum Flow:

Supply output capacity .....3.0 SCFM nominal

Exhaust output capacity .....5.0 SCFM nominal

ORDERING INFORMATION

Specify Ratio of Input to Output.

Amplifying Relays		*Reducing Relays*	
Model No.	Ratio	Model No.	Ratio
99936-F6	1:1.5	99936-J1	1.5:1
CR100-A2	1:2	CR100-B2	2:1
CR100-A3	1:3	CR100-B3	3:1
CR100-A4	1:4	VR100-B4	4:1
CR100-A5	1:5	CR100-B5	5:1
CR100-A6	1:6	CR100-B6	6:1

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DIMENSIONS

1. This relay will operate properly when mounted in any position.

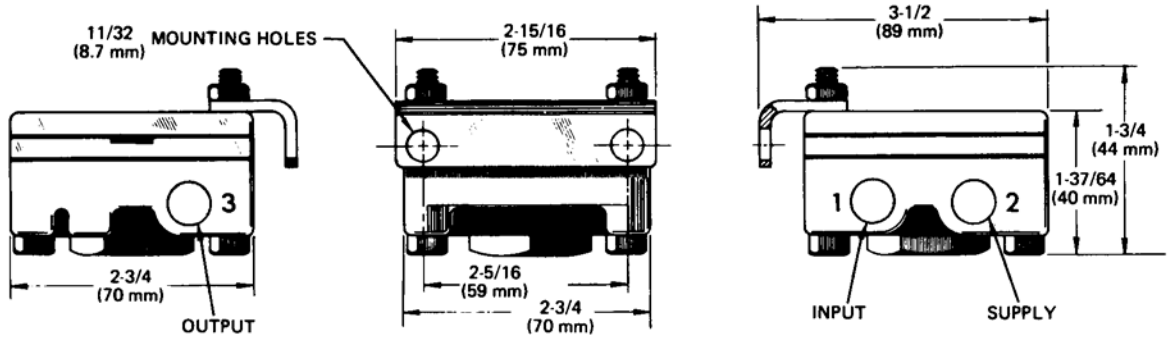


Figure 1

OPERATION

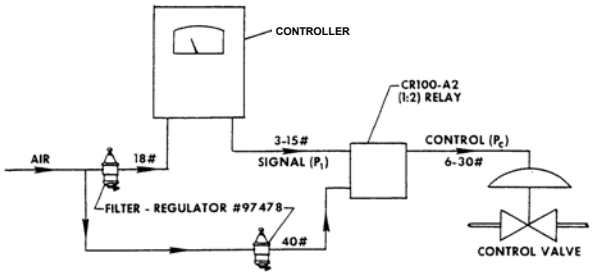
The output pressure is proportional to the input pressure as the effective area of the input diaphragm is to the effective area of the output diaphragm. The illustration (Figure 2) shows a 1:6 amplifying relay.

Air pressure in the input chamber exerts a downward force on the diaphragm. This force moves the center assembly down, closing the exhaust valve. Further movement opens the lower portion of the valve allowing the supply air pressure to enter the output chamber. This air acts on the diaphragm and also passes out through the output port. Since the effective area of the input diaphragm, in this case, is six times as large as the effective area of the output diaphragm, it will take six times as much output pressure to balance the unit. As the increasing output pressure approaches the balance point, the center assembly will begin to rise, permitting the valve to close, throttling the flow of supply air. When the output pressure balances the input pressure, both surfaces of the valve will be closed and the relay will be in balance.

A further increase in the input pressure will cause the lower portion of the valve to open until the output pressure again equals the input pressure. A decrease in input pressure will allow the output pressure to force the center assembly upward, opening the exhaust valve until the output pressure is equal to the input pressure.

TYPICAL APPLICATION

Increase signal range from controller to control valve which requires higher pressure at valve.



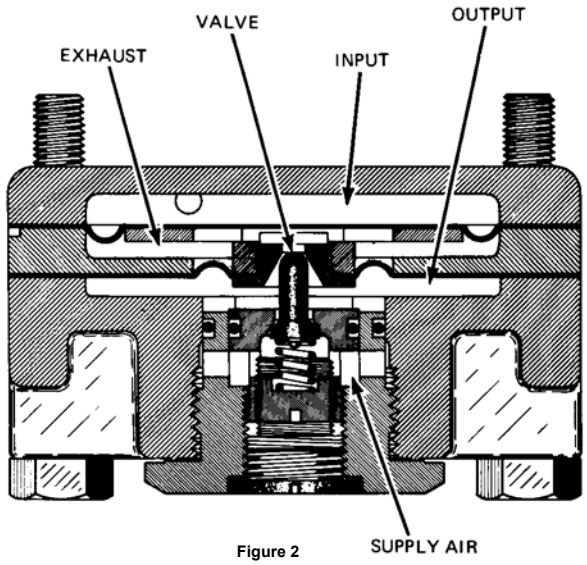


Figure 2

Robertshaw

U.S.A. and CANADA

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