Reversing Relay
CR-102

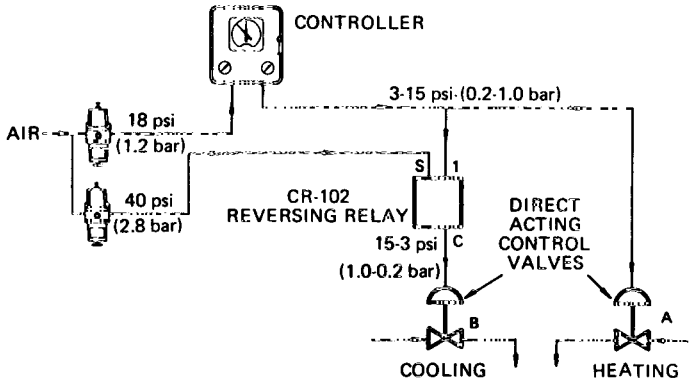
DESCRIPTION

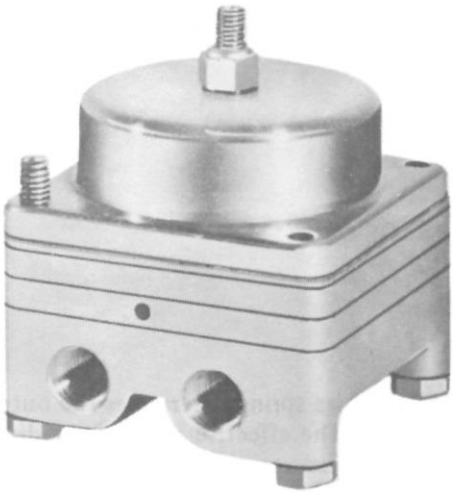
The CR-102 Reversing Relay is a proportioning unit designed for use in industrial pneumatic control systems where the application requires delivery of an output pressure which decreases in direct proportion to an increase in input pressure. In the region where "P_1" (input) varies between zero and "K" (bias), operation is described by the equation:

$P_0 = K - P_1$ where K = Bias

TYPICAL APPLICATION

Valve A closes and Valve B opens on rising signal from controller.





SPECIFICATIONS

DESIGN DATA

Input Pressure-Range:
0-20 psig (0-1.4 bar) nominal
0-50 psig (0-3.5 bar) maximum

Supply Pressure:
40 psig (2.8 bar) nominal
60 psig (4.1 bar) maximum

Output Pressure Range: .....0-30 psig (0-2.1 bar)
Ambient Temperature Limits: .-40 to 180 F. (-40 to 82° C)
Biasing Adjustment: ..... ±18 psig (1.2 bar)
Connections: .....1/4" female NPT.
Weight: .....1.3 lbs. (0.59 Kg.)

PERFORMANCE DATA

Ultimate Sensitivity:..... .01 in. H_2O.
Ambient Temperature Effect: Change in output for a 75 F. (24° C) change in ambient temperature - 0.5% of full range.
Supply Pressure Effect: .....Change in output pressure for a 5 psig (0.35 bar) supply pressure change - less than 1% of full range.
Maximum Air Consumption: ..... 6.0 SCFH
For Maximum Flow:
Supply output capacity .....3.0 SCFM nominal
Exhaust output capacity .....3.0 SCFM nominal

ORDERING INFORMATION

Specify: Model CR-102

DIMENSIONS

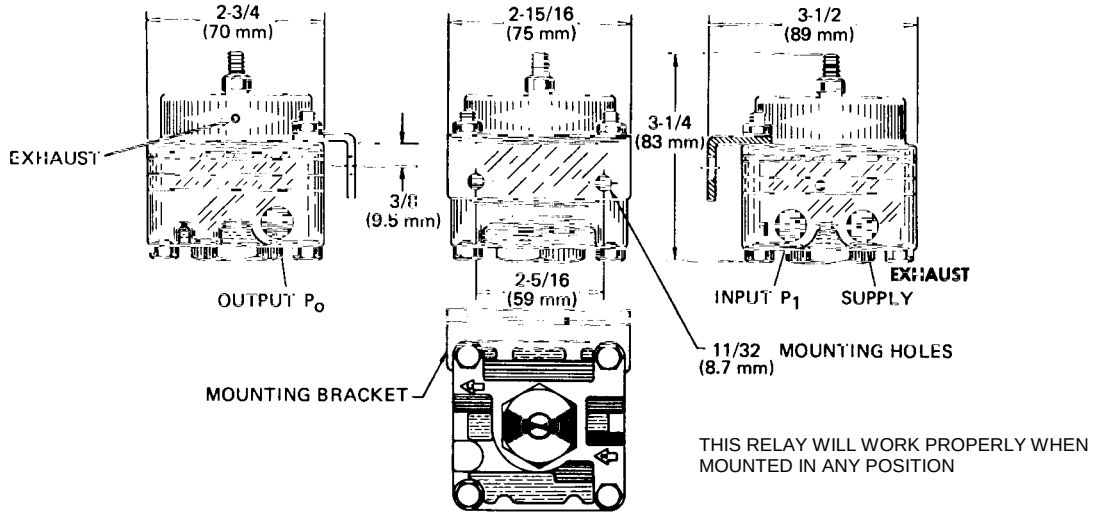


Figure 1

OPERATION

Adjustment of the bias spring determines the output with zero input pressure. The effective areas of the diaphragms are such that the pressures against the lower two cancel each other, and the effective area of the upper diaphragm is such as to give an upward force of one unit per unit of input pressure.

For example, with supply pressure of 40 psig (2.8 bar) and zero input pressure, if the bias adjusting screw is turned clockwise, it compresses the spring, creating a downward force on the center assembly and thereby on the poppet. This downward force pushes the poppet off the supply seat, admitting supply air supply air into the output chamber. Assume that the spring is compressed until the output pressure is 30 psig (2.1 bar). At this point, the upward force of the output pressure against the bottom diaphragm balances the spring force. This balancing force will return the center assembly to its original position, permitting the valve to close. The unit is now delivering 30 psig (2.1 bar) output pressure with zero input pressure.

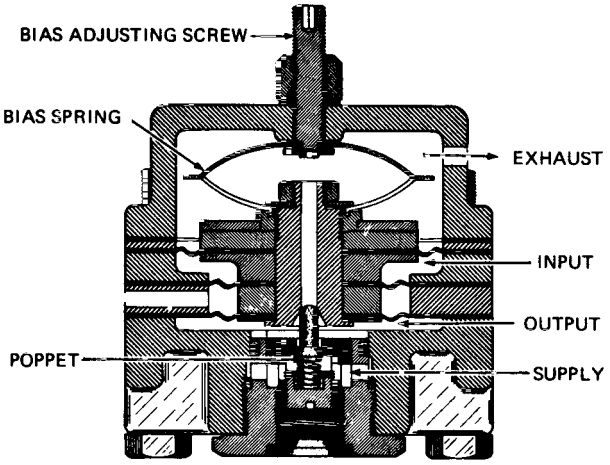


Figure 2

An increase of input pressure to 10 psig (0.7 bar) acting on the effective areas of the diaphragms, will create an upward force. As a result, the center assembly will move upward, with the result that the exhaust seat moves away from the poppet and the output pressure exhausts until the upward force of the input pressure [10 psig (0.7 bar)] plus the upward force of the new output pressure [20 psig (1.38 bar)] equals the downward force of the spring [30 psig (2.1 bar)] . The decrease in the output pressure will return the unit to balance, closing the exhaust seat of the valve. Further increase in the input pressure will cause further decrease in the output pressure until, when the input pressure is 30 psig (2.1 bar), the output pressure will be zero.

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