

RP975A Pneumatic Hesitation Relay

INSTALLATION INSTRUCTIONS

DESCRIPTION

The RP975A is a special three-port pneumatic hesitation relay that provides ASHRAE Cycle II control to a damper operator in large-volume unit ventilation applications.

The scaleplate is marked from 0 to 100, and the knob rotates 180 degrees limited by breakaway stops. This represents an output pressure range from 7 to 12 psi (48 to 83 kPa.)

Fig. 1 shows approximate dimensions in inches (millimeters).

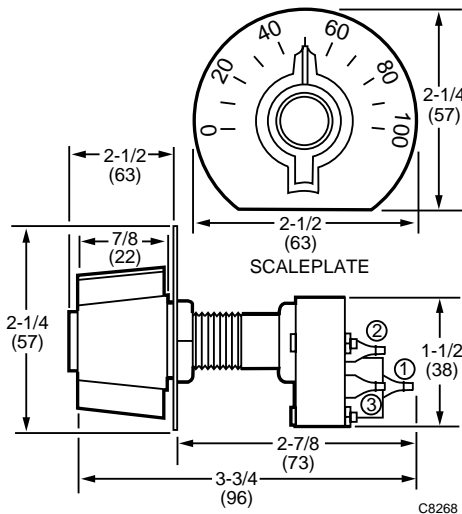


Fig. 1. Dimensions of RP975A with scale plate and knob.

Fig. 2 shows a cutaway of the RP975A.

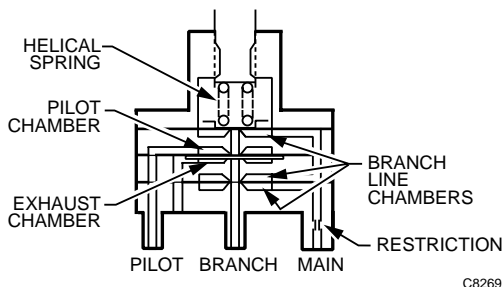


Fig. 2. RP975A Components.

INSTALLATION

Mounting

Suspend on tubing or mount on a surface. See Fig. 3. Use a 1-1/2 in. (38 mm) dia. metal spring clip (supplied) and one No. 10 mounting screw (locally purchased). The RP975A ships with a scaleplate and attached knob.

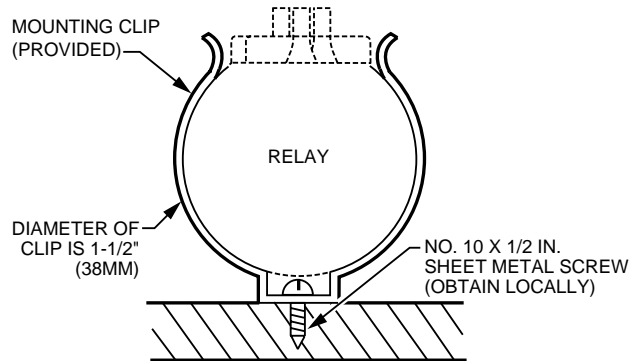


Fig. 3. Surface mounting the RP475A with a spring clip.

Piping

Fig. 4. shows adaptation piping. All connections are sharp barb 5/32 in. (4 mm) O.D. polyethylene tubing.



CAUTION

To prevent damage to the sharp barb connections, do not attempt to cut or pull tubing. To remove the tubing from the barb connections, cut tubing a few inches from the control device. Use a coupling to reconnect tubing.

NOTE: If the system is other than copper or polyethylene tubing, adapt as shown in Fig. 4.



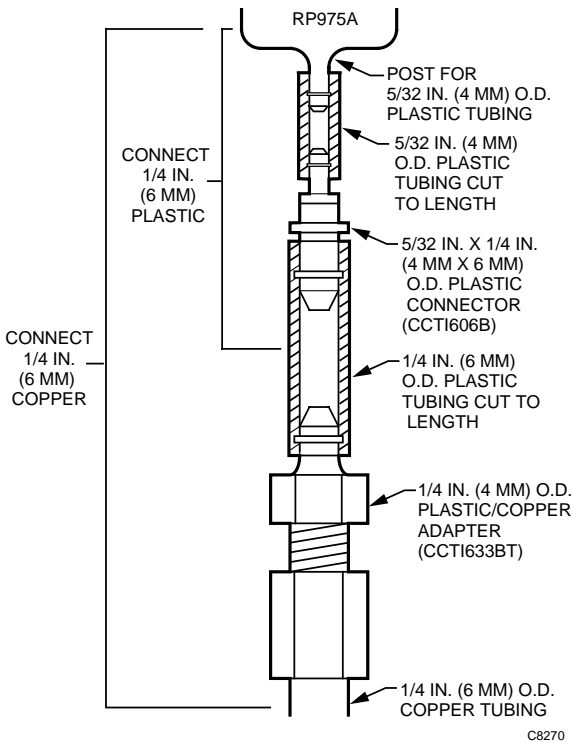


Fig. 4. Adaptation piping.

Table 1. Port Identification

	RP975A
MAIN (Supply Port)	1
BRANCH (Output Port)	2
PILOT (Input Port)	3

Checkout and Test

Rotate the knob clockwise to increase start-point pressure output. A steady increase of pilot pressure above minimum position pressure brings about a directly proportional increase in output pressure.

ENGINEERING DATA

Specifications

Model:
RP695A Pneumatic Hesitation Relay

Operating Pressure (Switch and Pilot) Range:
Normal Main: 18 psi (90 kPa)
Maximum Safe Main: 30 psi (207 kPa)
Branch Output (Port 2): 0 to 18 psi (0 to 124 kPa)
Pilot Input (Port 3): 0 to 18 psi (0 to 124 kPa)

Ambient Operating Limits:
Temperature: 0 to 140°F (-18 to 60°C)
Relative Humidity: 5 to 95%

Output:
Factory calibrated for 7 to 12 psi (48 to 83 kPa), manually adjustable; may be field recalibrated for any 5 psi (34 kPa) span in the 0 to 18 psi (0 to 124 kPa) range.

Air Consumption:
0.022 scfm max. (10 ml/s)

Construction:
Molded plastic, neoprene diaphragms, steel spring and shaft

Operation

Main air flows through a 0.007 in. (0.18 mm) restriction in Port 1 into the two branch chambers (Fig. 5A.) When pilot pressure force is less than the spring force, the air that enters the lower branch chamber flows out of the exhaust port. When pilot pressure exceeds approximately 1.5 psi (10 kPa), internal Port A between the lower branch chamber and the exhaust chamber closes and Port B in the pilot chamber opens at one end only (Fig. 5B). Branchline pressure then begins to increase up to the spring setting.

At the pressure dictated by the knob setting (7 to 12 psi [48 to 83 kPa]), the branchline pressure in the upper branch chamber overcomes the spring and opens Port C (Fig. 5C). Excess air from the branch line flows out the pilot port because the pilot pressure is less than the branchline pressure. (Note the similarity to the SP970A and B with exhaust air flowing out the pilot line. You cannot use a restricted pilot line.) If pilot pressure increases above the knob setting, pilot air flows into the branch chamber until the branch line pressure equals the pilot line pressure. Then the excess bleed air again exhausts through the pilot (Fig. 5D.)

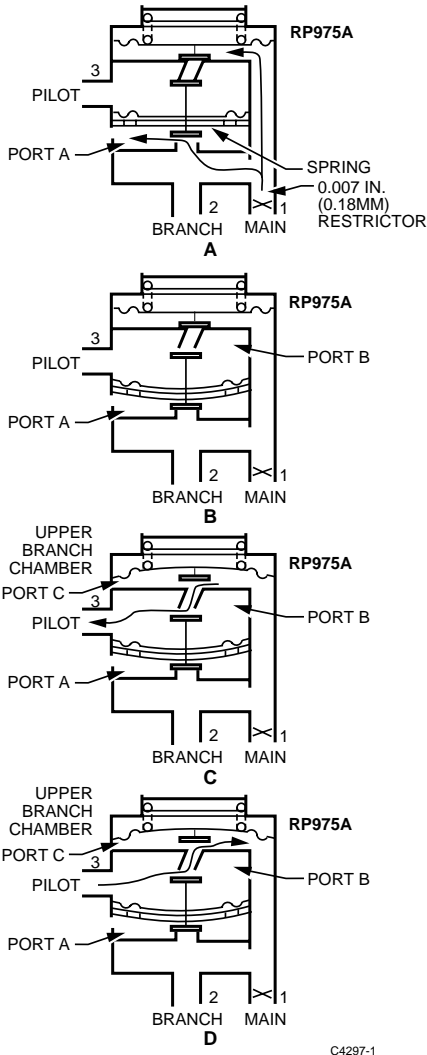


Fig. 5. RP975A Operation.

The scaleplate is marked from 0 to 100 for a knob rotation of 188 degrees. This represents minimum position output pressures from 7 to 12 psi (48 to 83 kPa.). See Fig. 6.

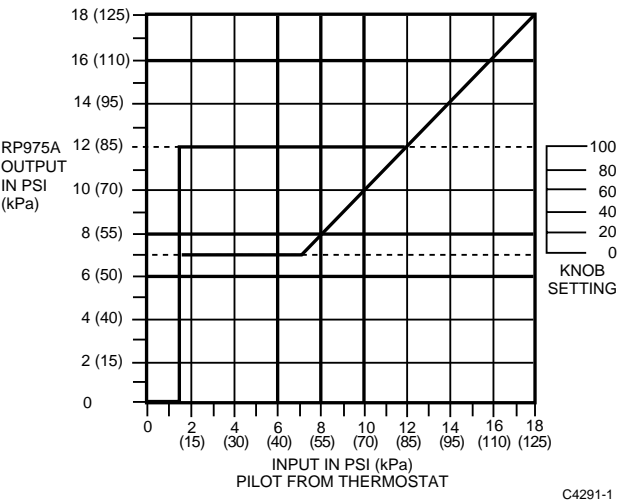


Fig. 6. RP975A output pressure according to knob setting.

Application(s)

Fig. 7 shows a typical hookup for the RP975A and a pneumatic damper actuator. When thermostat branchline pressure exceeds 1.5 psi (10 kPa), the damper actuator goes to a preset minimum position determined by knob setting. When thermostat branchline pressure reaches the setting of the RP975A, the thermostat controls the damper actuator. When the thermostat branchline pressure drops below the RP975A setting, the damper drops to the minimum position and stays there until the thermostat branchline pressure drops below 1.5 psi (10 kPa); then the output of the hesitation relay drops to zero.

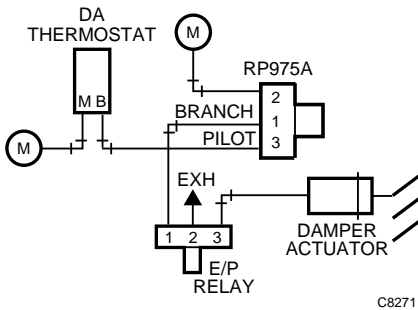


Fig. 7. RP975A application in a restricted branch line circuit.

When a restricted branch line is involved in an existing application (Fig. 8), it is possible to modernize and update the system using an RP975A Hesitation Relay in conjunction with an RP470B relay piped as a repeater to achieve the same control.

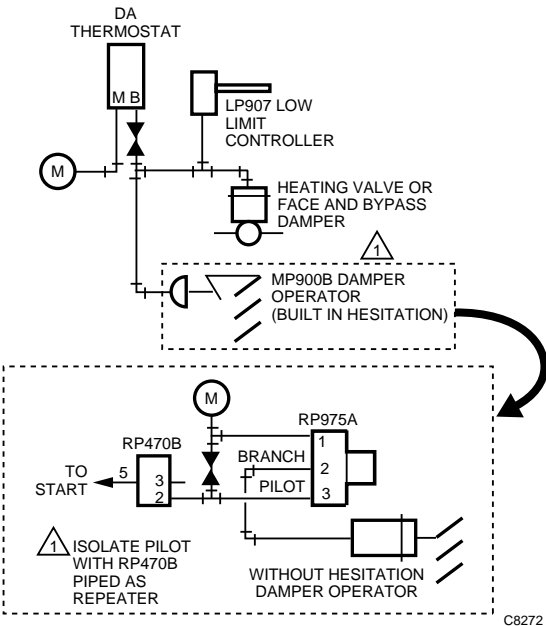


Fig. 8. RP975A application in a restricted branch line circuit.

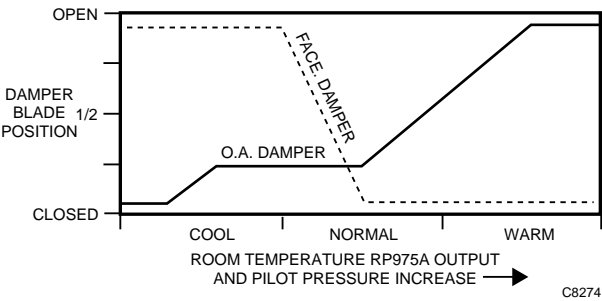


Fig. 9. Damper blade position with respect to the RP975A output pressure and room temperature for typical ASHRAE Cycle II control sequence.

Fig. 9 shows a graph that plots the position of the damper blade, with respect to RP975A output pressure and room temperature, for a typical ASHRAE Cycle II control sequence.

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