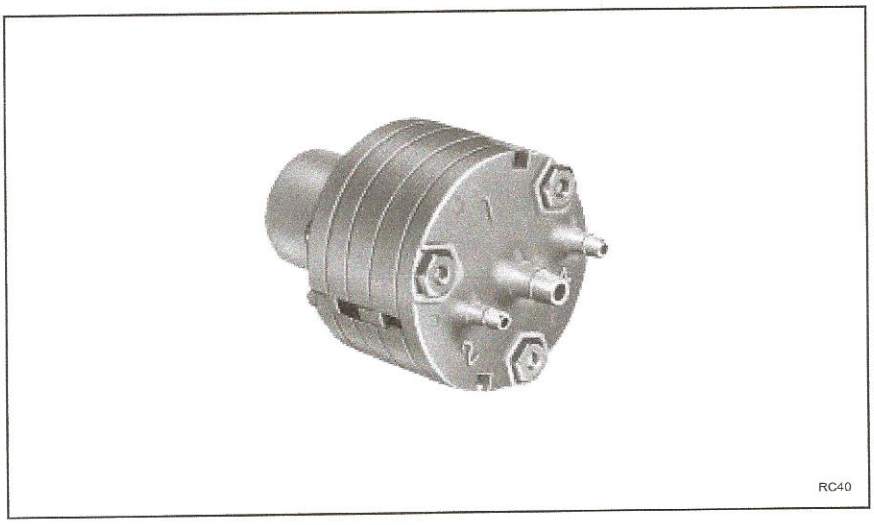
Honeywell

RP972A Pneumatic Reversing Relay

SPECIFICATION DATA



FEATURES

- Reverse acting
- In-line mounting; or can be surface or panel mounted with standard 1-1/2 in. diameter cable clamp
- Neoprene diaphragm
- Stainless steel valve seats

GENERAL

The RP972A Pneumatic Reversing Relay is a modulating relay suitable for all types of heating and air conditioning control systems. It is used as a reversing relay to reverse and increase the capacity of the branchline pressure to the final control element.

EPRI Edgemont Precision Rebuilders, Inc
Matlack Industrial Center
207 Carter Dr Unit C
West Chester, PA 19382
800-356-3774

DESCRIPTION

The RP972A Pneumatic Reversing Relay is a modulating relay suitable for all types of heating and air conditioning control systems. It is used as a reversing relay to reverse and increase the capacity of the branchline pressure to the final control element.

SPECIFICATIONS

Model:
❑ RP972A Reverse Relay

Action:
Reverse acting

Output:
Proportional (branchline pressure decreases with increase in input signal at ratio of 1:1)

Settings:
B: Output (Port 2) = 16 psi (110 kPa) - Input (Port 3) Factory set
C: Output = 18 psi (124 kPa) - Input
A: Output = 13 psi (90 kPa) - Input

Operating Range:
0 to 18 psi (0 to 124 kPa)

Maximum Safe Air Pressure:
30 psi (207 kPa)

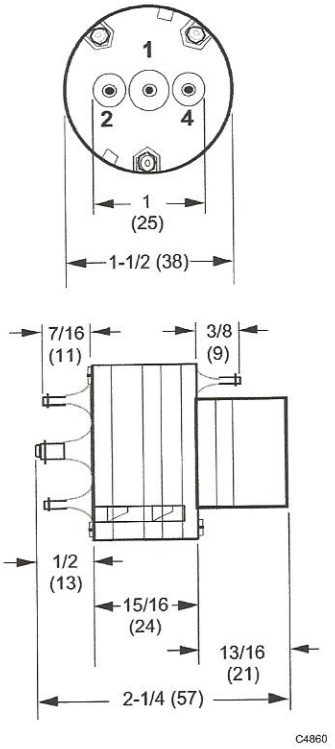
Operating Pressures:
Input: -3 to 15 psi (-21 to 103 kPa)
Main: 18 psi (124 kPa)

Materials of Construction:
Neoprene diaphragm
Stainless steel valve seats

Ambient Temperature Limits:
0 to 140F (-18 to 60C)

Air Connections:
Port 1 (Main, Supply): Sharp barb for 1/4-in. (6-mm) O.D. tubing
Ports 2, 3, and 4 (Branch, Output; Pilot, Input; and Exhaust, respectively): Sharp barb for 5/32-in. (4-mm) O.D. tubing

Dimensions In Inches (Millimeters):



Air Handling Capacity (Feed and Bleed):
0.039 scfm at ±1.02 psi droop (18.3 ml/sec at 7 kPa droop)
Nominal mainline: 18 psi (124 kPa)
Input: 9 psi (62 kPa)

Air Consumption:
0.002 scfm (1.0 ml/sec) maximum

Filters:
100 mesh stainless steel, main and branch ports

Accessories:
For surface or panel mounting order either:
Mounting Clamp—810629S
Mounting Clip—14003030-001

Mounting:
In-line
Surface or panel using standard 1-1/2 in. dia. mounting clamp or clip

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RP972A Pneumatic Reversing Relay

INSTALLATION INSTRUCTIONS

DESCRIPTION

The RP972A Reversing Relay is a four-port, modulating relay suitable for all types of heating and air conditioning control systems. It is used as a reversing relay to reverse and increase the capacity of branchline pressure to the final control element. It has three distinct, detented, field-adjustable and reversing settings.

See Fig. 1 for approximate dimensions.

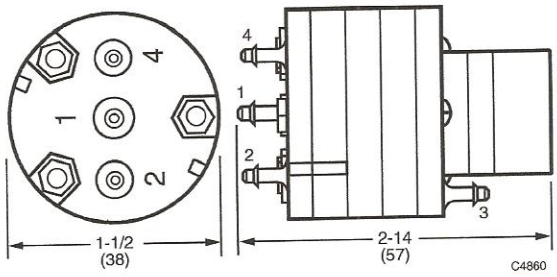

Fig. 1. RP972A dimensions in in. (mm).

INSTALLATION

Mounting

Suspend on tubing or mount on a surface. See Fig. 2. for surface mounting.

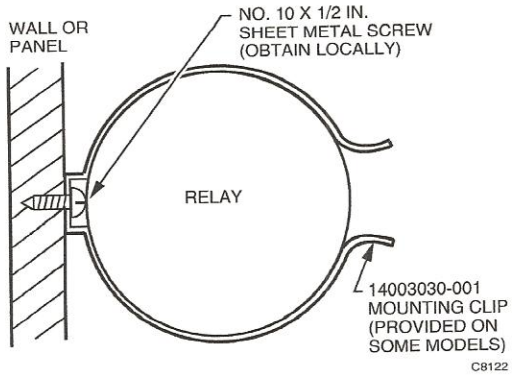

Fig. 2. Typical surface mounting.

Piping

Fig. 3 shows adaptation piping. Port 1 (Main, Supply) sharp barb for 1/4-in. (6 mm) O.D. tubing. Ports 2, 3, and 4 (Branch, Output; Pilot, Input; and Exhaust, respectively), sharp barb for 5/32-in (4 mm) O.D. tubing.

⚠ CAUTION

Equipment Damage Hazard.
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: When the system is other than copper or poly-ethylene tubing, adapt as shown in Fig. 3. Some models provide the parts for adapting.

Port Identification Table

The two right columns in Table 1 identify the ports on older Honeywell pneumatic relays when upgrading the installation.

Table 1. Pneumatic Relay Ports.

	RP972A	RP95B	RP904B
Pilot	3	1	P
Main	1	2	M
Output	2	3	B
Exhaust	4	—	—

Adjustments

The slotted plunger on the narrow end of the RP972A Relay is a screwdriver-adjustable bayonet lock. See Fig. 4. The lock can be set at one of three positions: A, B or C. Each position provides a different value for "K" in the following equation.

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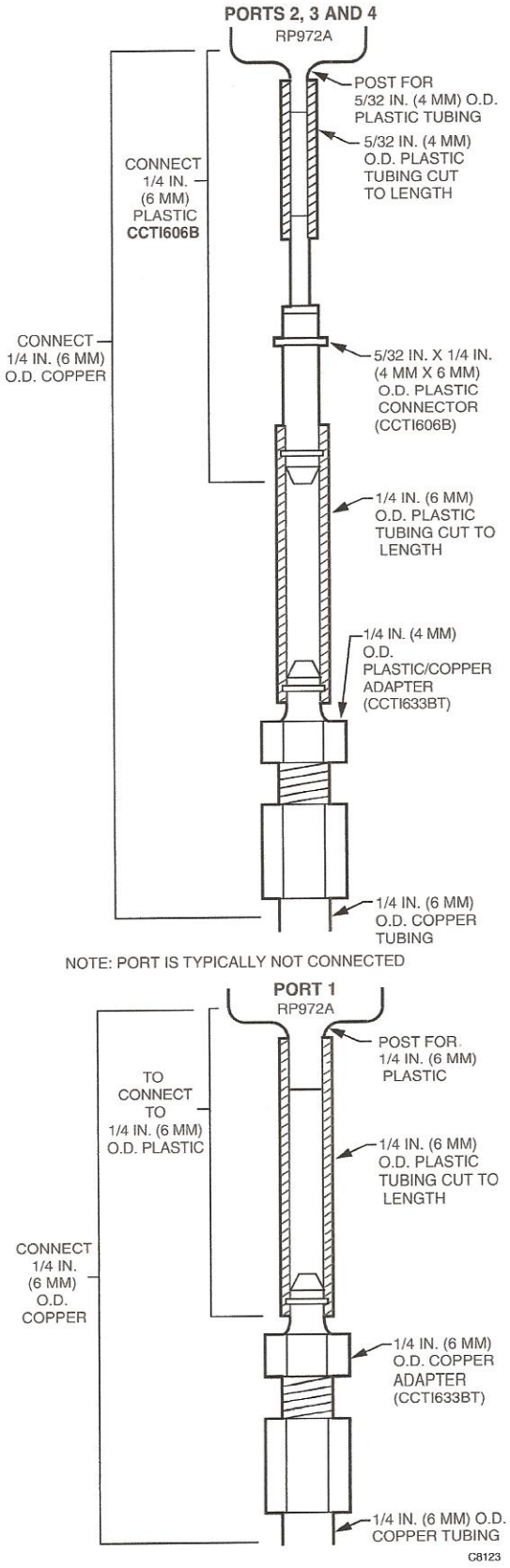

Fig. 3. Adaptation piping.

NOTE: The RP972A is factory set at position B and in most applications, does not need to be changed.

Output = K – Input

For example: if in position B:

K = 16

Input = 7 psi (48 kPa),

then the output is 16 – 7 = 9 psi (62 kPa).

The values of K are:

— position A: 13 psi (90 kPa): used to ensure zero output when input is limited to 13 psi (90 kPa) maximum.

— position B: 16 psi (110 kPa): used for 3-13 psi (21-90 kPa) operating range.

— position C: 18 psi (124 kPa): used for 3-15 psi (21-103 kPa) operating range.

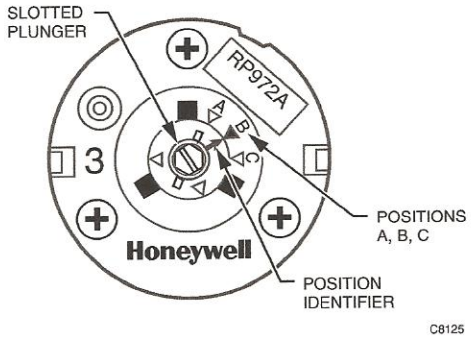

Fig. 4. RP972A showing slotted plunger and three positions.

Calibration

The small Allen hex screw in the middle of the slotted plunger is for factory calibration. When required, the K value can be shifted up to ± 2 psi (± 14 kPa) with this screw.

Checkout and Test

The RP972A Relay should reverse the branch line signal. Check the following items:

1. With zero pilot pressure and main line pressure applied, branch line pressure should equal the K value (in the above equation), or main line pressure if it is lower than K.
2. Each psi (kPa) of pilot pressure increase should result in a psi (kPa) of branch decrease.

NOTE: When there is no reversing or a high reverse signal occurs, recheck the setting of the slotted plunger. It can be lodged between detentes.

Gently insert a screwdriver in the slot and twist it back and forth. If the plunger is between settings, it snaps into position. The plunger should be flush with the top in position A and adjust increasingly deeper in positions B and C.

ENGINEERING DATA

Specifications

Model: RP972A Pneumatic Reversing Relay

Operating Pressure Range:
Normal Main: 18 psi (124 kPa)
Maximum Safe Main: 30 psi (207 kPa)
Pilot: 3 to 15 psi (21 to 103 kPa)

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

Action: Proportional (branchline pressure decreases with increase of pilot signal at 1:1 ratio)

Settings:
A: Output = 13 psi (90 kPa) - Pilot
B: Output (Port 2) = 16 psi (110 kPa) - Pilot (Port 3). Factory set.
C: Output = 18 psi (124 kPa) - Pilot

Air Handling Capacity (Feed and Bleed): 0.039 scfm at ± 1.02 psi droop (18.3 ml/sec at 7 kPa droop). Conditions: 18 psi (124 kPa) Main and 9 psi (62 kPa) Pilot

Air Consumption: 0.002 scfm (1.0 ml/sec) maximum

Construction: Neoprene diaphragm, valox valve seats, steel spring, 100 mesh stainless steel, screen main and branch ports

Operation

When the relay is balanced, the main valve port and exhaust valve port are closed. At balance point, the Output force equals the algebraic sum of the spring force plus pilot pressure force. As pilot pressure increases, the spring compresses and the valve's exhaust port opens. The Output flows out of the exhaust valve until a new balance point is found and the exhaust port closes. As pilot pressure decreases, the spring extends the exhaust tube until a new balance point is found and the main valve port closes.

The indicator is set on Position B for reversing 3 to 13 psi (21 to 90 kPa) signals. In the absence of a pilot pressure, the spring pushes the exhaust tube against the diaphragm and allows main air into the branch line. See Fig. 5A.

When the branchline pressure equals 16 psi (110 kPa), the pressure on the feedback diaphragm equals the adjustment spring pressure and the exhaust tube drops, closing off the feed to the branch chamber and Port 2. The relay is now in a balanced condition. See Fig. 5B.

Any air entering the pilot chamber compresses the spring, opening the exhaust chamber port and lowering the branchline pressure accordingly. See Fig. 5C.

As pilot pressure decreases, the spring pushes the exhaust tube up, allowing main air to enter the branch line and raise the branchline pressure. When branchline pressure equals the spring pressure minus the pilot pressure, the exhaust tube retracts and the relay is balanced with the new, higher branchline pressure.

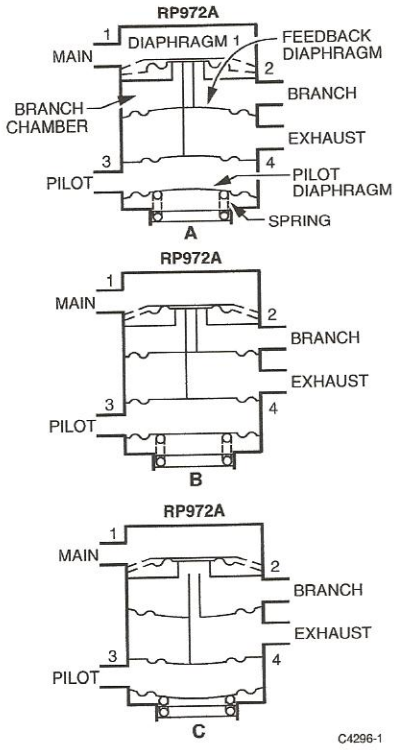

Fig. 5. RP972A operation.

Application

The RP972A is used to reverse a pneumatic signal in direct proportion to the input. Fig. 6 shows how the RP972A controls a chilled water (CW) valve. When the temperature increases, the Direct Acting (D.A.) thermostat outputs an increasing branch line. This closes the Normally Open (N.O.) hot water (HW) valve and, through the reversing action of the RP972A, opens the N.O. CW valve.

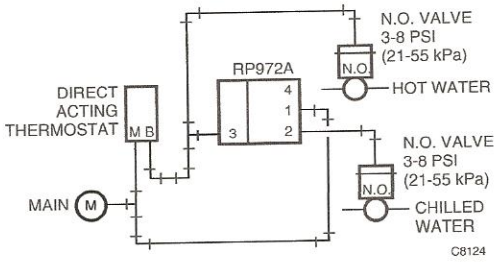

Fig. 6. Use of RP972A to control a cold water valve.