37HS
Pneumatic Warm-Up/Fire Safety Switch

Installation and Operating Instructions

CONTENTS

GENERAL

The pneumatic warm-up switch/fire safety switch is used to provide either of these functions in conjunction with the Moduline® control.

Pneumatic Warm-Up — Pneumatic warm-up offers an opportunity to open all Moduline units in an area to allow immediate hot air distribution prior to the building occupancy. Through the use of a separate pneumatic signal, the pneumatic warm-up switch, placed in-line between the Moduline volume controller and the diffuser or wall system powered thermostat, closes the low pressure bleed in the thermostat line. This raises the low side pressure, opens the volume controller bleed and lowers the bellows pressure, allowing airflow from the Moduline terminal according to the setting of the volume controller.

Fire Safety — Many urban fire codes for multi-story buildings require the air distribution system to respond to a fire control to assist the shutdown of the fire and help the occupants of the building. Multi-story building fires often start on one or two floors, making floor-by-floor action desirable.

System-powered Moduline units are reaction devices and normally have no connecting energy between the terminal and the building system control. Where the fire code so demands, the Moduline fire safety switch enables the system to exert some control in the event of a fire.

The principle exercised is that the fire floor or floors must be starved of oxygen and the non-fire floors require maximum ventilation. With the Moduline fire safety switch, the units on the non-fire floors can be opened to provide airflow. On the fire floor(s), the fire may destroy the effectiveness of the Moduline control and thus, another method is required to stop the flow of air. This is accomplished by a fire damper in the primary air supply to the fire floor(s). Thus, the building fire control must both close the fire floor(s) damper and signal the Moduline fire switch to open the Moduline units on the non-fire floors.

Control Package — The pneumatic warm-up switch/fire safety switch and components are shown in Fig. 1. Note that one device is used in both applications and in both normally open (NO) and normally closed (NC) configurations.

The switch can be used with both wall and diffuser-mounted system-powered thermostats.

Table 1 contains the package number information for the switch package and the thermostat control packages with which it can be used.

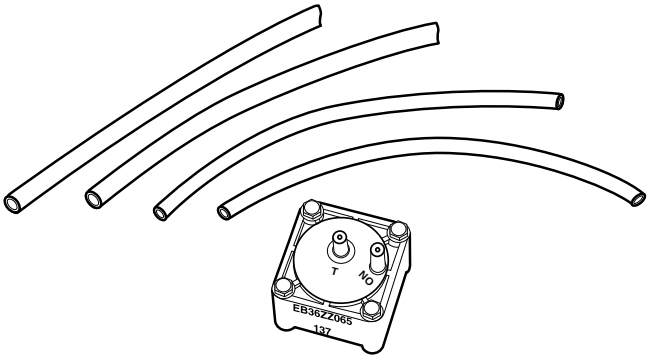


Fig. 1 — Pneumatic Warm-Up/Fire Safety Switch Package Contents

Table 1 — Pneumatic Warm-Up/Fire Safety Switch and Thermostat Control Packages

PNEUMATIC WARM-UP/ FIRE SAFETY SWITCH	WALL THERMOSTAT		DIFFUSER THERMOSTAT	
	Cooling Thermostat	Constant Volume Control	Size	Variable Volume Control
37HS900017	37CM901012	37HS900003	HS1 HS2 HS4	37HS900001 37HS900002 37HS900004
			ALL	37HS90005 (UNIVERSAL CONTROL PACKAGE)

INSTALLATION

Both warm-up switch and fire safety switch are installed using the package shown in Table 1. The tubing used for connections supports the switch, so installation does not require that holes be drilled in the plenum side. The switch is nonadjustable and needs no field adjustment. Figure 2 shows a typical installation at the control end of a Moduline® master control terminal.

Pneumatic Warm-Up — As a pneumatic warm-up switch, the device is piped as shown in Fig. 3 and 4. Note that the same switch is used in both NO and NC configurations by connecting tubing to the specific ports shown.

The package contains 2 spring and EPDM assemblies.

1. Connect FR (fire retardant) tubing, supplied with package, to one of the spring and EPDM assemblies. (See Fig. 5.)
2. Connect the EPDM tube of this assembly to the thermostat port of the volume controller and connect the FR tube to the required port on the warm-up switch. (See Fig. 3 and 4.)
3. Connect a short length of FR tubing to the other spring and EPDM assembly.
4. Connect the EPDM tube to the diffuser thermostat port and connect the FR tube to the warm-up switch. (See Fig. 3 and 4.)

The system piping can be arranged with direct pneumatic air supply to each Moduline master unit or with zone 3-way valves for each group of Moduline units requiring warm-up at a given time. Figure 6 shows a zone system piping diagram in which each Moduline master unit is equipped with a pneumatic warm-up switch and in turn connected to a 3-way valve.

The pneumatic warm-up switch is a nonbleed device. The pneumatic valve should therefore be a 3-way device, arranged to bleed out the pneumatic circuit downstream of the valve when the valve is closed.

Fire Safety — The fire safety switch, like the pneumatic warm-up, can be piped either as a NO or NC device. Figures 7 and 8 provide the schematic piping for each arrangement.

The package contains 2 spring and EPDM assemblies.

1. Connect a FR tubing, supplied with package, to one of the spring and EPDM assemblies. (See Fig. 5.)
2. Connect the EPDM tube of this assembly to the thermostat port of the volume controller and connect the FR tube to the required port on the fire safety switch. (See Fig. 7 and 8.)
3. Connect a short length of FR tubing to the other spring and EPDM assembly.
4. Connect the EPDM tube to the diffuser thermostat port and connect the FR tube to the fire safety switch. (See Fig. 7 and 8.)

The pneumatic fire safety system layout is similar to the warm-up switch design, except the fire control signal must be divided by floors. A bleed 3-way valve or valves is necessary for each floor; each master terminal requires a fire safety switch.

Figure 9 provides a typical system schematic.

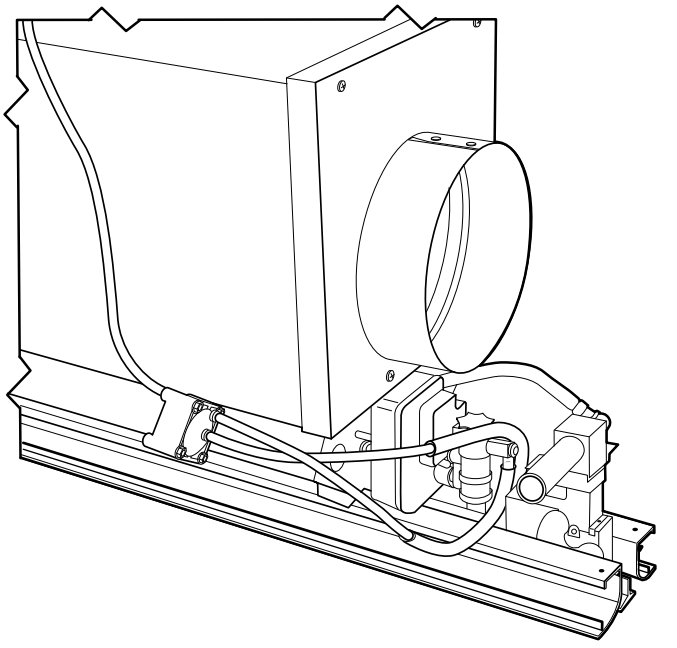


Fig. 2 — Typical Installation of Pneumatic Warm-Up/Fire Safety Switch

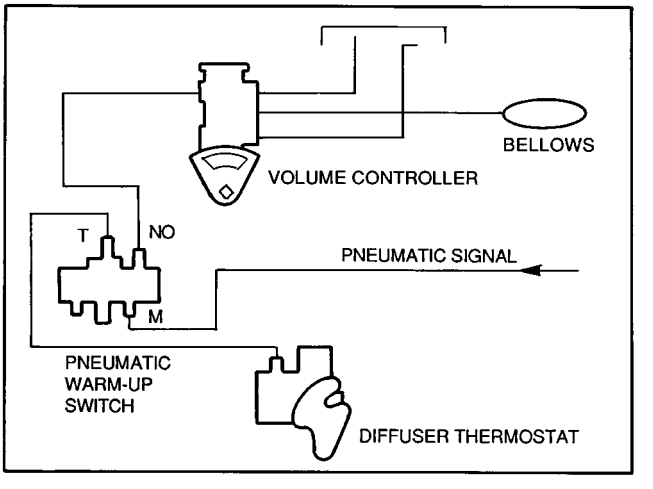


Fig. 3 — Piping Diagram, NO Configuration, Pneumatic Warm-Up

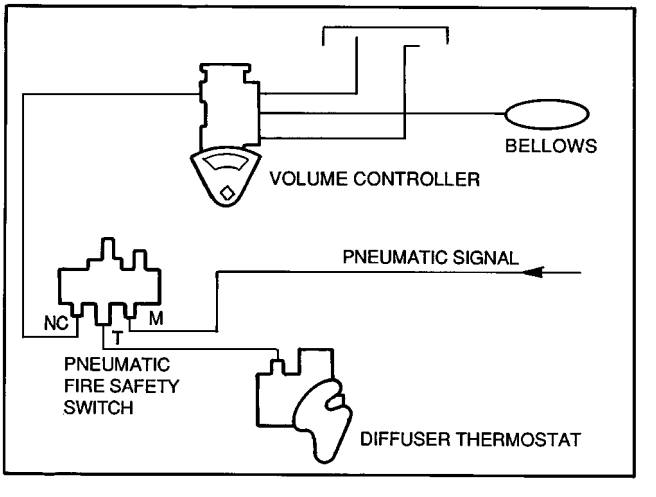
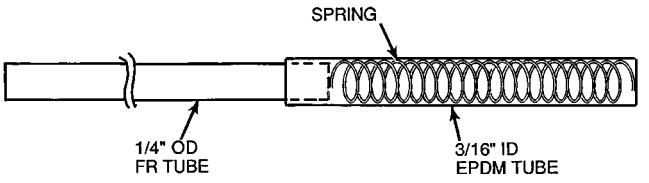


Fig. 4 — Piping Diagram, NC Configuration, Pneumatic Warm-Up



FR — Fire Retardant

Fig. 5 — Connecting FR Tubing to Spring and EPDM Assembly

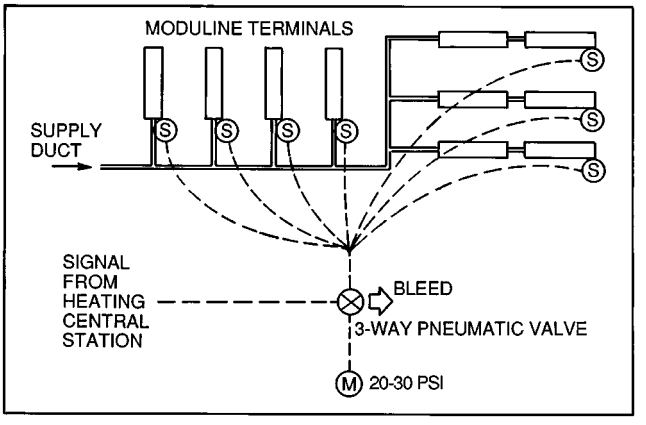


Fig. 6 — Zone Piping for Pneumatic Warm-Up Switch

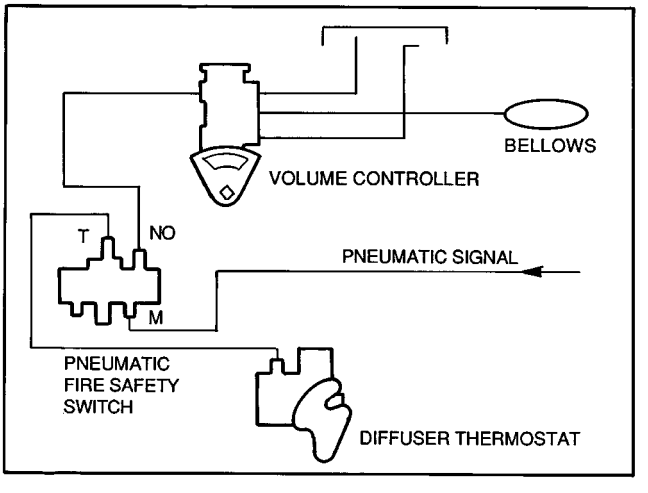


Fig. 7 — NO Configuration for Fire Safety

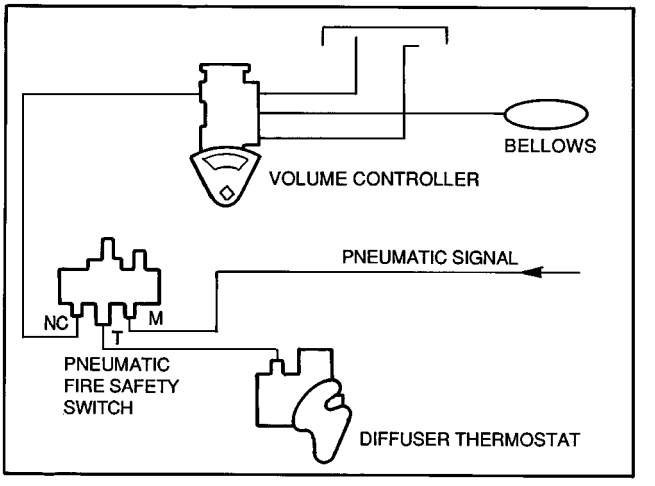


Fig. 8 — NC Configuration for Fire Safety

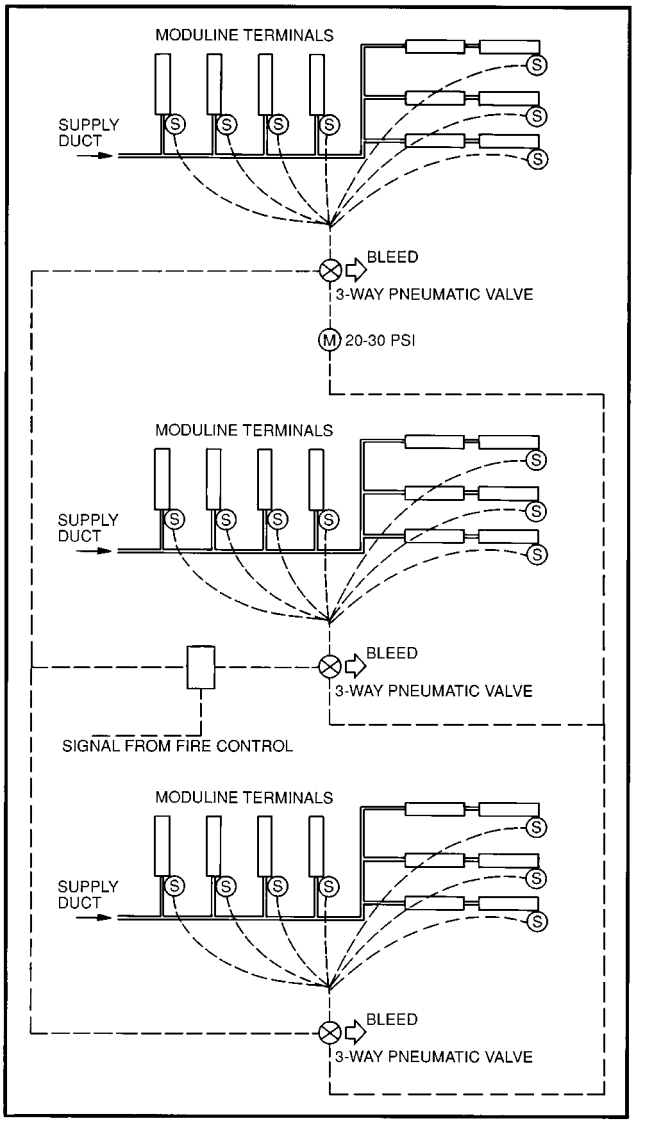


Fig. 9 — Typical System for Pneumatic Fire Control For One Floor

OPERATION

Pneumatic Warm-Up — Operation with a NO device, a pneumatic signal (proportional to the specific characteristics of the 3-way valve) is sent by time clock to the zone valve, opening the valve and permitting pneumatic pressure to reach the NO warm-up switches. Under normal cooling operation, the pressure to the warm-up switch is below 6.0 psig or at zero. The switch closes with main pressure in excess of 10.0 psig, raising the volume controller low side pressure, bleeding the bellows pressure, and opening the Moduline® unit(s) to allow warm air to flow to the space. When the space temperature has risen to the normal room set point, the 3-way valve is closed, bleeding pneumatic pressure downstream of the 3-way valve and returning the Moduline (units) to system powered cooling control.

Figures 10-12 show the control operating sequence for a NO warm-up switch application.

In operation with an NC device, pneumatic pressure in excess of 9.0 psig must be maintained during all cooling periods in order to keep the valve open and the Moduline unit open to supply cooling to the space. Pneumatic pressure below 5.0 psig will cause the switch to close.

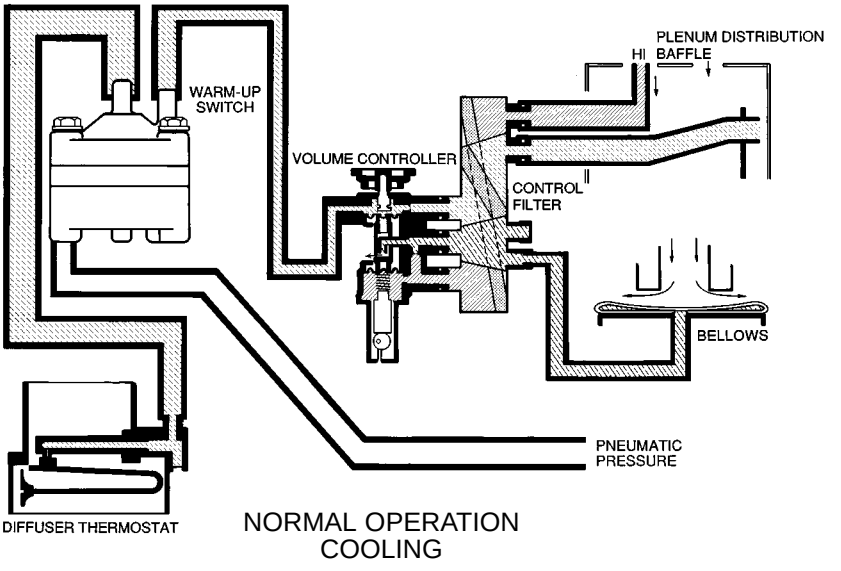
Figures 13-15 detail the sequence of operation for an NC switch.

Fire Safety — The fire safety switch application allows Moduline units on non-fire floors in multi-story buildings to be opened to permit full ventilation air in the event of a fire, while at the same time closing the fire damper on the fire floor(s). Use of the pneumatic fire safety switch enables the building system control to override the fire safety system-powered controls and open the Moduline terminal to full flow.

With a NO fire switch, the fire control must supply pneumatic pressure in excess of 10.0 psig in order to close the fire safety switch, bleed the volume controller, and open the Moduline unit to ventilate the non-fire floors. At the same time, the fire control must close the fire damper in the primary air distribution to the fire floor(s). Figures 16-18 provide the sequence of operation.

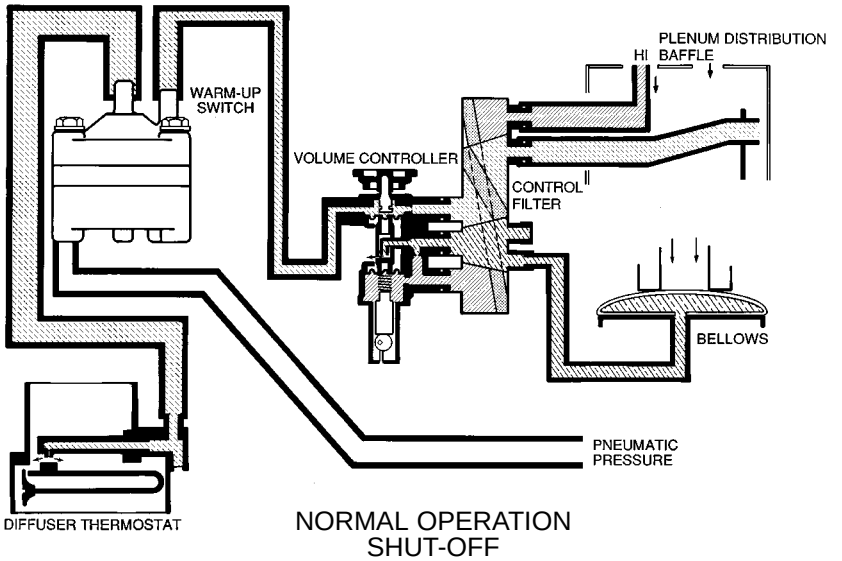
Under normal cooling operation the pressure to the fire safety switch is below 6.0 psig or at zero.

With a NC fire switch application, pneumatic pressure in excess of 9.0 psig is maintained on the switch whenever the primary air system is in operation. A fire causes the dropping of the pressure below 5.0 psig and the closing of the switch, the bleeding of the controller and the delivery of ventilation air. Figures 19-21 provide the sequence of operation.



NO Warm-Up Switch;
Pneumatic Pressure Below 6.0 psig or OFF;
Warm-Up Switch Open;
With System Powered Thermostat Closed, Calling for Cooling Volume Controller Open and Bleeding, Bellows Deflated, Air Flowing

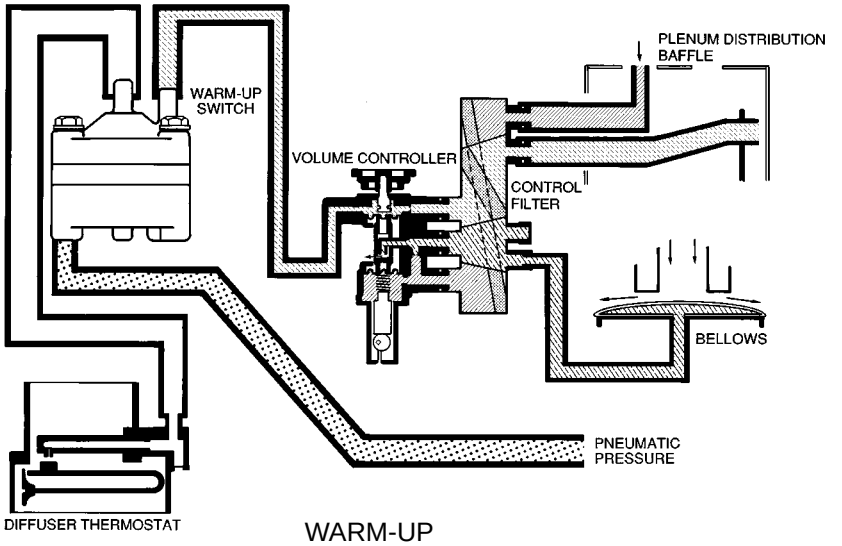
Fig. 10 — NO Warm-Up in Cooling



NORMAL OPERATION
SHUT-OFF

NO Warm-Up Switch;
Pneumatic Pressure below 6.0 psig or OFF;
Warm-Up Switch Open;
With System Powered Thermostat Open, Not Calling for Cooling, Thermostat Bleeds, Volume Controller Closed, Bellows Inflated, Unit Shutoff.

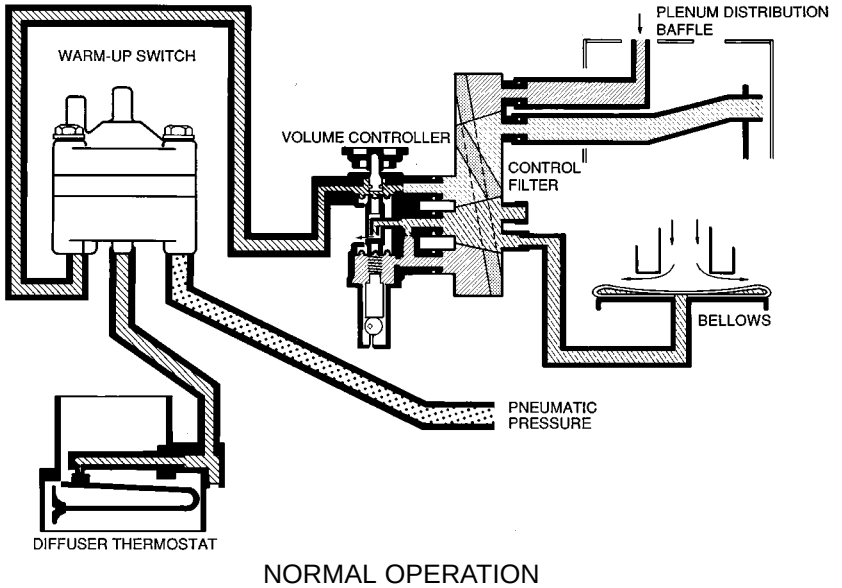
Fig. 11 — NO Warm-Up in Shutoff



WARM-UP
WARM AIR FLOWING

NO Warm-Up Switch;
Pneumatic Pressure in excess of 10.0 psig or ON;
Warm-Up Switch is Closed;
Volume Controller Bleeding; Unit Open, Air Flowing

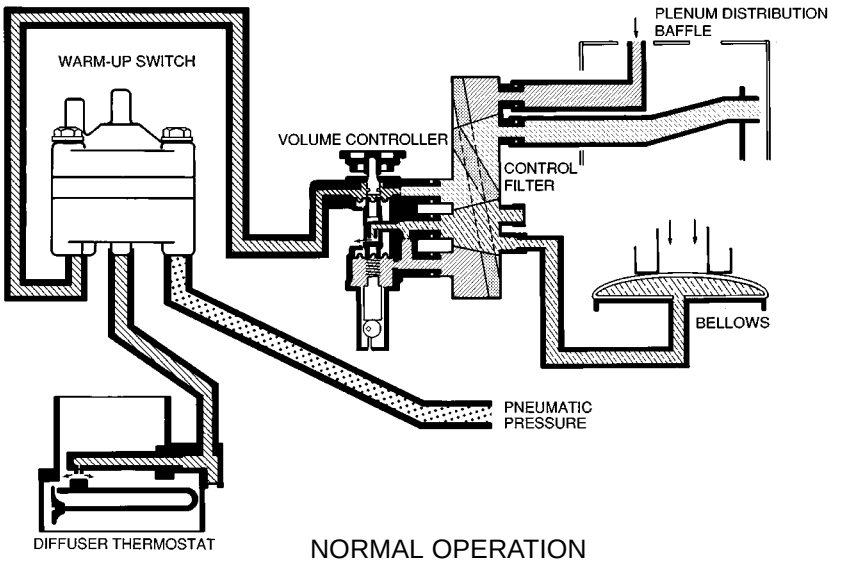
Fig. 12 — NO Warm-Up in Warm Air Flowing



NORMAL OPERATION
COOLING

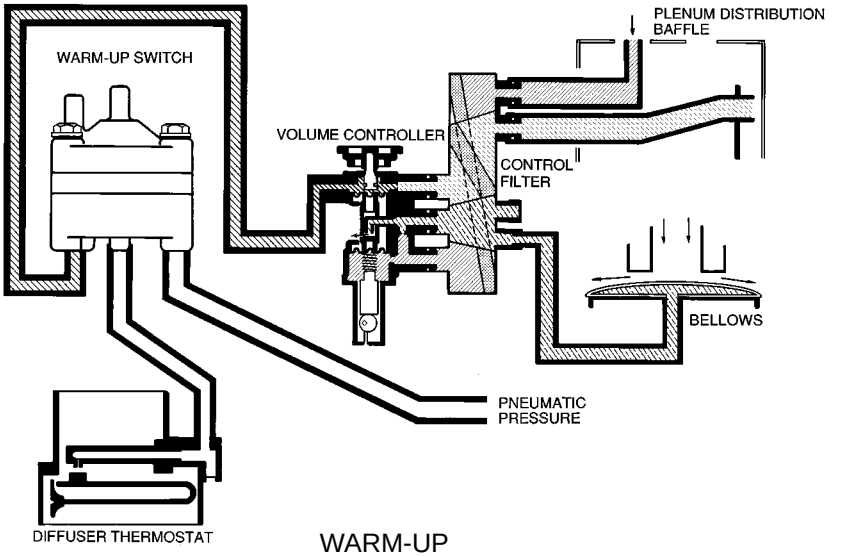
NC Warm-Up Switch;
Pneumatic Pressure in Excess of 9.0 psig;
Warm-Up Switch Open;
With System Powered Thermostat Closed, Calling for Cooling, Volume Controller Open and Bleeding, Bellows Deflated, Air Flowing

Fig. 13 — NC Warm-Up in Cooling



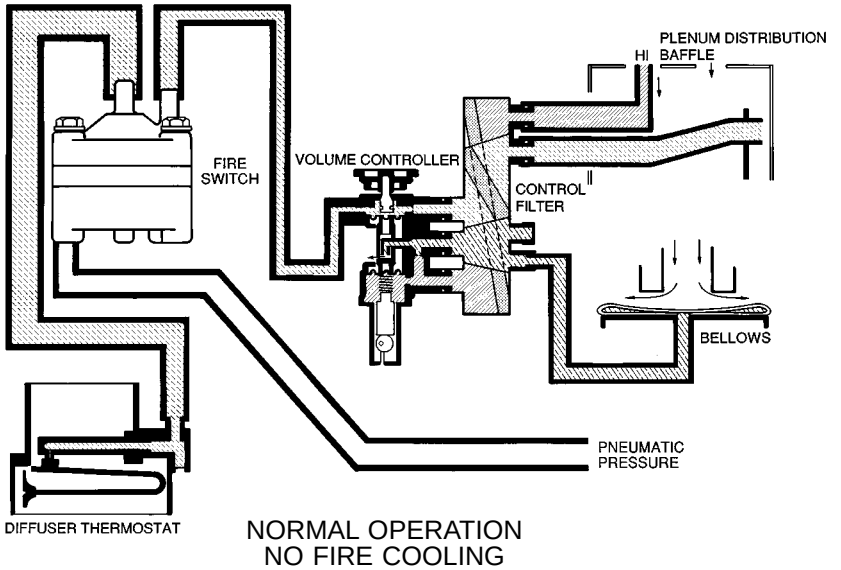
NC Warm-Up Switch;
Pneumatic Pressure in Excess of 9.0 psig;
Warm-Up Switch Open;
With System Powered Thermostat Open, Not Calling for Cooling, Thermostat Bleeds, Volume Controller Closed, Bellows Inflated, Unit Shutoff

Fig. 14 — NC Warm-Up in Shutoff



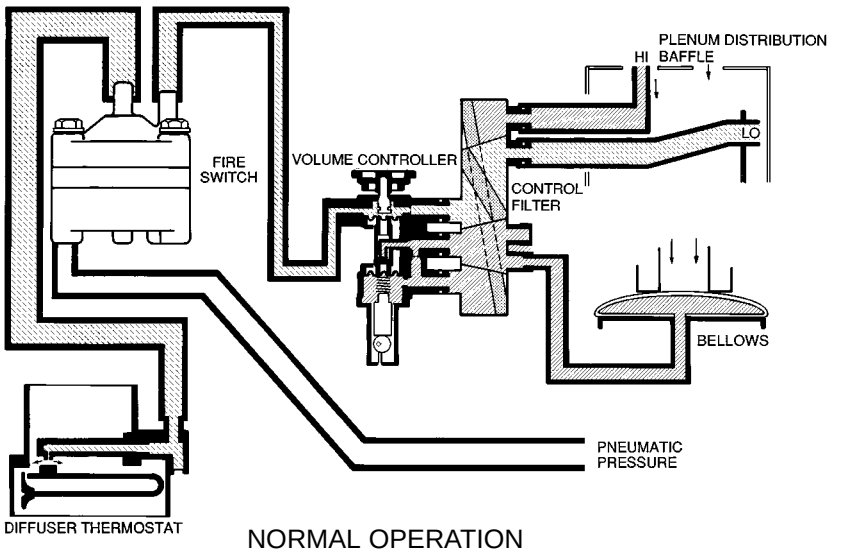
NC Warm-Up Switch;
Pneumatic Pressure Below 5.0 psig or OFF;
Warm-Up Switch Closed;
Volume Controller Bleeding, Unit Open, Air Flowing

Fig. 15 — NC Warm-Up With Warm Air Flowing



NO Fire Switch;
Pneumatic Pressure Below 6 psig or OFF;
Fire Switch Open;
With System Powered Thermostat Closed, Calling for Cooling, Volume Controller Open and Bleeding, Bellows Deflated, Air Flowing

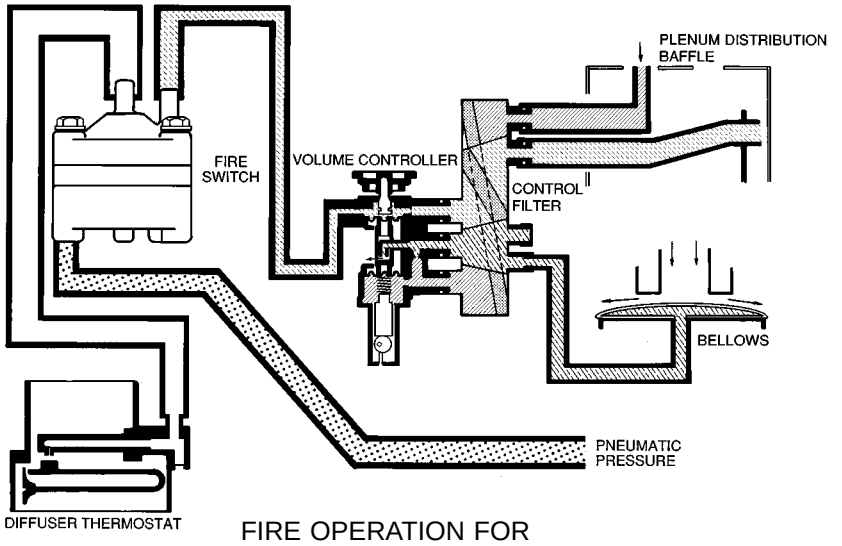
Fig. 16 — NO Fire Switch in Cooling



NO Fire Switch;
Pneumatic Pressure Below 6 psig or OFF;
Fire Switch Open;
With System Powered Thermostat Open, Not Calling for Cooling, Thermostat Bleeds, Volume Controller Closed, Bellows Inflated, Unit Shutoff

NORMAL OPERATION
NO FIRE SHUTOFF

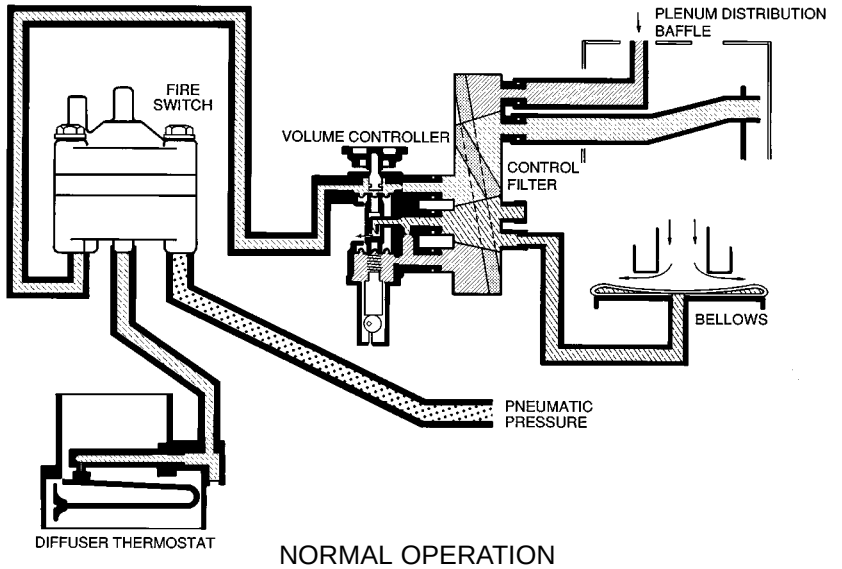
Fig. 17 — NO Fire Switch in Shutoff



NO Fire Switch;
Pneumatic Pressure in Excess of 10 psig ON;
Fire Switch is Closed;
Volume Controller Bleeding, Unit Open, Air Flowing

FIRE OPERATION FOR
NON-FIRE FLOORS

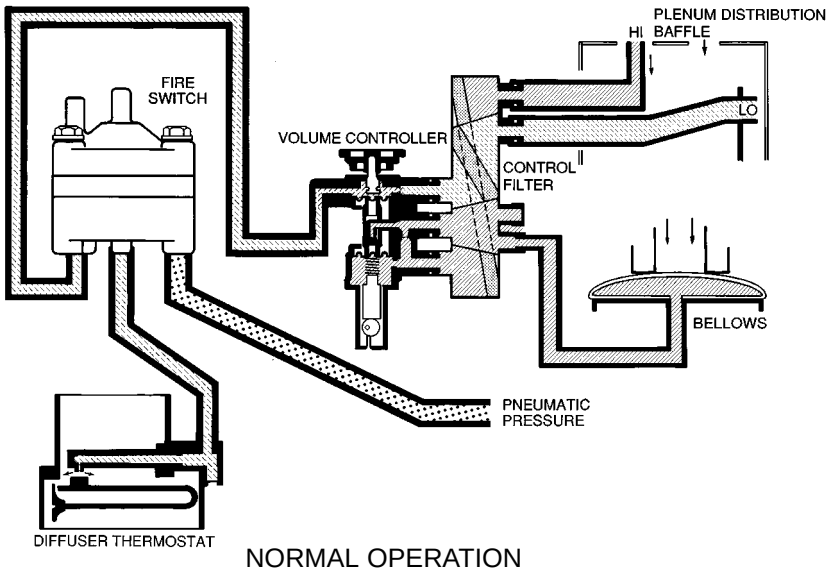
Fig. 18 — NO Fire Switch With Ventilation Air Flowing



NC Fire Switch;
Pneumatic Pressure in Excess of 9.0 psig;
Fire Switch Open;
With System Powered Thermostat Closed, Calling for Cooling, Volume Controller Open and Bleeding, Bellows Deflated, Air Flowing

NORMAL OPERATION
NO FIRE COOLING

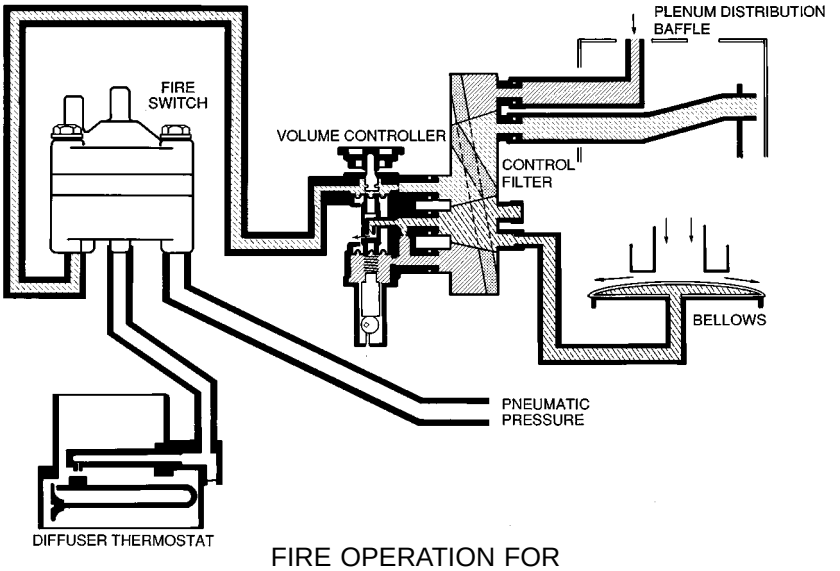
Fig. 19 — NC Fire Switch in Cooling



NORMAL OPERATION
NO FIRE SHUTOFF

NC Fire Switch;
Pneumatic Pressure in Excess of 9.0 psig;
Fire Switch Open;
With System Powered Thermostat Open, Not Calling for Cooling, Thermostat Bleeds, Volume Controller Closed, Bellows Inflated, Unit Shutoff

Fig. 20 — NC Fire Switch in Shutoff



FIRE OPERATION FOR
NON-FIRE FLOORS

NC Fire Switch;
Pneumatic Pressure Below 5.0 psig or OFF;
Fire Switch Closed;
Volume Controller Bleeding, Unit Open, Air Flowing

Fig. 21 — NC Fire Switch With Ventilation Air Flowing