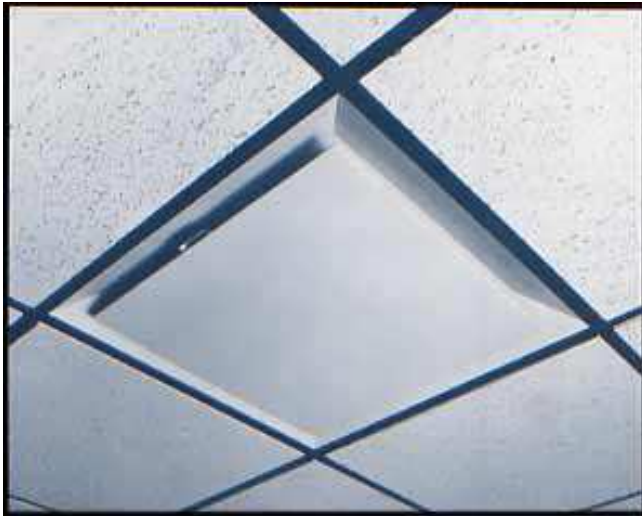


VAV SQUARE



The VARI-FLOW™ diffusers are the latest in state-of-the-art VAV technology. The VARI-FLOW™ square diffuser is a VAV ceiling diffuser designed for a grid ceiling system. It functions as an air diffuser, a zone of temperature control, and a VAV box.

The VARI-FLOW™ square (VFS-24 series) provides individual temperature control for cooling at each diffuser, adjustable from 70 to 78 degrees Fahrenheit. This will provide constant uniform temperature within a large office space or in smaller individual offices regardless of heat load conditions. The net result is uniform comfort and energy saving as none of the conditioned space is over or under cooled.

The VFS-24 diffuser is totally self-contained and self-powered by a thermal element. The thermal element functions in the unit as the thermostat and “motor” to power the unit. The principle of operation of the element is a basic and simple one, that of thermal expansion when a substance changes state, in this case from a liquid to a solid. The element uses a mixture of synthetic wax and copper powder for the medium, blended to respond in the desired operating range. The thermal element has a long proven history of reliability.

Designed in 1937, they have been in use for 50 years in a variety of industries. The elements have been used in the HVAC industry on hydronic and steam valves, in the auto-mobile industry on radiator thermostats, and air pollution controls.

FEATURES

- Totally self contained control system
- Warm-up feature provides constant volume heating
- Self-Powered, thermally actuated, individual VAV room control
- Variable discharge area
- Heating and cooling with automatic change over
- Reduces installation costs
- All controls accessible from unit face
- Saves energy on existing a new systems
- Calibrated VAV cooling setpoint
- No controls contracts
- Low profile induction guide

■ ECONOMICS ■

TEMPERATURE ADJUSTMENTS

Calibrated for dial-in temperature is an exclusive feature. Temperature setpoint adjustments and warm-up damper adjustment are conveniently located on the face of the unit under the appearance panel. The panel slides back away from the element exposing the controls. Adjustments are made with a 9/64" allen wrench. The temperature setpoint range is 70 to 78 degrees Fahrenheit.

The energy provided by the thermal element is coupled to an efficient operating mechanism to operate the damper on the unit. The temperature response or differential is equal to or less than electric or pneumatic thermostats.

Installation is as quick and easy as a conventional ceiling diffuser, as there are no electric or pneumatic connections.

The VFS-24 is an economical solution on a first cost basis and from an energy basis. Since the diffuser is self powered and self contained there are no accessory products needed.

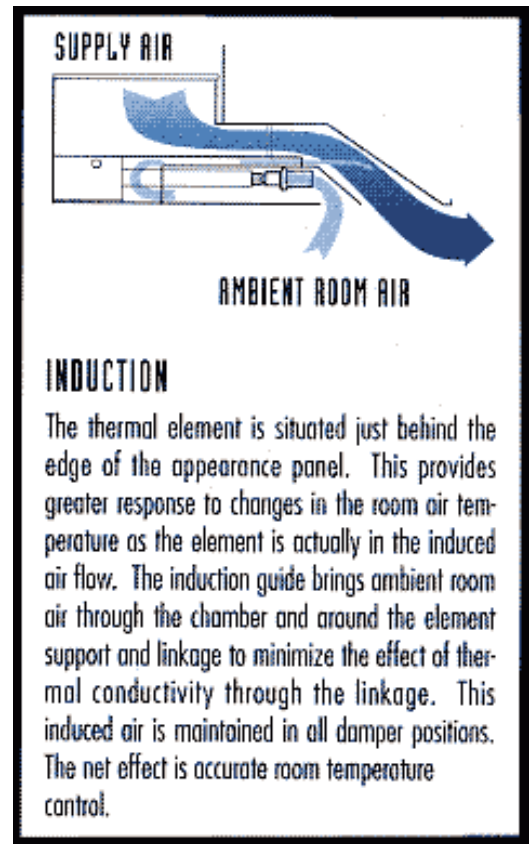
No maintenance contracts are needed. Compare the first time cost to that of a VAV system with electric or pneumatic controls. You will find that VARI-FLOW™ diffusers provide more zone control for less money.

■ SLEEVE DAMPER ■

The VFS-24 uses a unique sleeve type damper to vary the diffuser outlet area in response to the thermal element's call for more or less air. (See sketch) This moving sleeve solves the basic problem inherent to the earlier types of thermally actuated diffusers which used disk, plate or multiple diffusion blades dampers. Thermal diffusers are designed to make use of the temperature sensitive characteristic of the thermal mechanical pressure applied to the shaft of the element. The temperature operating curve of the element is stable at a constant mechanical pressure. If the pressure on the element were to vary in operation, the temperature operating band would also vary.

The force needed to move a sliding sleeve damper is not affected by changes in system air pressure on the sleeve. As a result, the air pressure merely tries to expand the cylinder---a virtual impossibility. On the other hand, a disk or plate trying to close against the velocity and static pressure in the diffuser neck is subject to widely varying forces on the relatively large surface of the disk face.

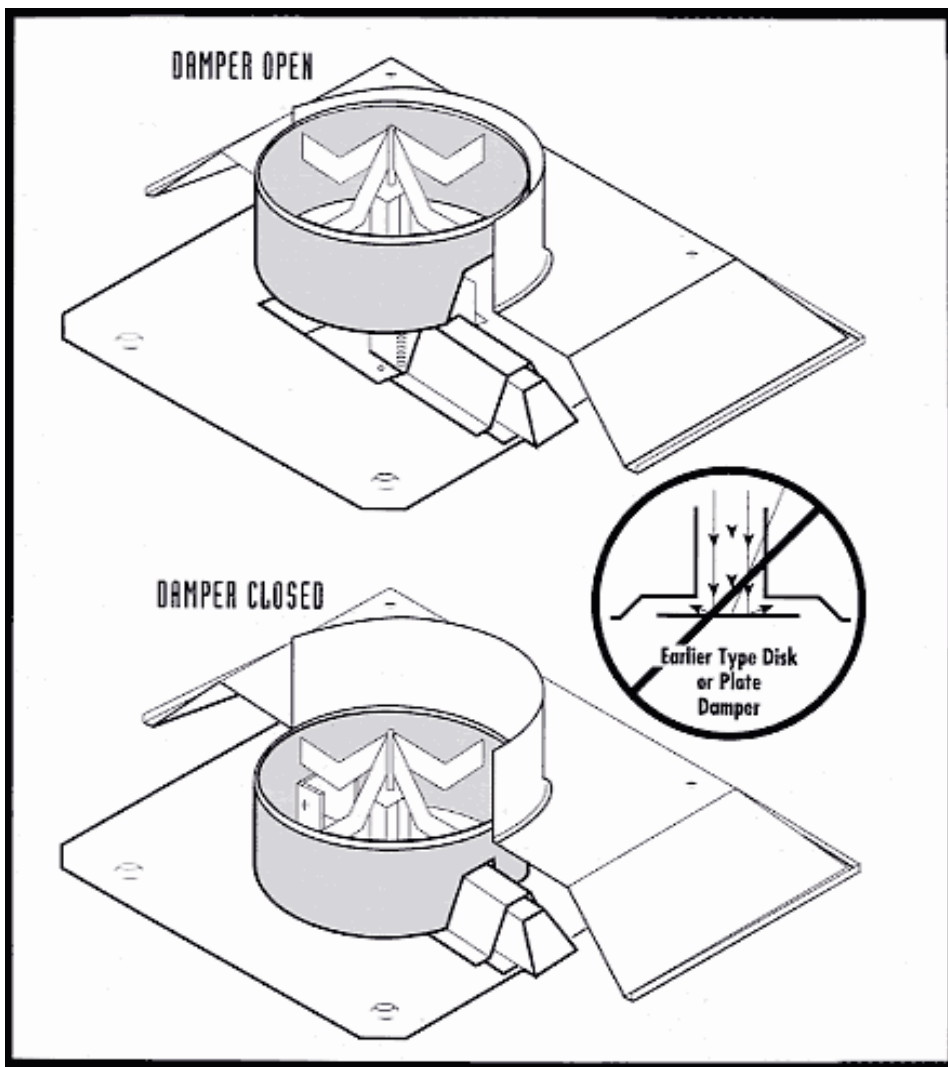
This problem is magnified due to the design of the linkage which is used to amplify the small movement of the thermal element shaft into a greater movement of the throttling disk.



Unfortunately, this mechanical advantage also works in reverse by multiplying the pressure on the disk into a much greater pressure on the element shaft.

Thus a small fluctuation in system pressure can cause a large fluctuation in the temperature set point of the thermal element. The net effect on room temperature control is temperature resetting, varying differential, and varying hysteresis.

The VFS-24, with its sleeve damper design, assures the system designer of the full 70 to 78 degree operating range of the diffuser regardless of system pressure variations or damper position.



■ ADJUSTIBLE CONSTANT VOLUME HEATING ■

Units equipped with the optional constant volume heating feature have a change-over thermal element located on the operating mechanism in the neck of the unit. Damper opening adjustment in the heating cycle is provided on the face of the unit under the appearance panel. It is accessed by sliding the appearance panel back exposing the controls. The constant volume heating adjustment sets the damper opening and volume when the unit is in the heating cycle. The adjustability is from a full closed to a full open damper position.

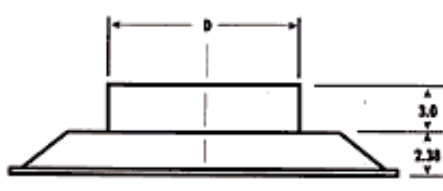
The unit goes into the heating mode when the supply air temperature is 78 degrees or higher. The change over element senses the elevated supply air temperature and opens the damper to the pre-set volume set by the constant volume heating damper adjustment. The unit will switch back to VAV cooling when the supply air temperature drops below 70 degrees Fahrenheit. The change over element sense the lower supply temperature and returns control to the room element.

PERFORMANCE DATA FOR MODEL VFS-24 CEILING DIFFUSER

| MODEL NUMBER | | | | | | |
|----------------|--------|---------------------|--|--------------------------------------|--|---|
| VF | S | 24 | A | 4 | H | 10 W |
| variable speed | square | nominal, 14" to 24" | (1) appearance panel, (2) performance face, (3) construction appearance panel, (4) 24" panel | direction of discharge — 4 face only | (1) on ceiling only, (2) on ceiling, constant volume heating | face size (10, 12, and 14) inches available |

ACCESSORIES/OPTIONS

- **Frames:** Surface mount, Spline frame or Fineline frame
- Baffle kit available to alter discharge pattern—
1, 2, 2-way corner or 3-way
- 14" x 14", 16" x 16", and 20" x 20"
nominal panels available



DIMENSIONS MEASURED IN INCHES

