VAV BOXES
SUBZONED WITH THERMA-FUSER™ VAV DIFFUSERS
(See other chapters for subzoning VAV Reheat and Fan Powered Boxes.)

GOALS

The goals of subzoning VAV boxes with Therma-Fuser™ diffusers may include:

1) **Individual temperature control.** A VAV box that serves more than one space is subzoned with Therma-Fuser diffusers to provide individual temperature control.
2) Vastly **improved air distribution** is provided by variable aperture Therma-Fuser diffusers as contrasted to VAV supplied through fixed opening diffusers, especially at low air volume. Therma-Fuser diffusers allow modulation down to perhaps 10% maximum flow with air distribution quality that fixed opening diffusers provide at 50% flow.
3) **Eliminate the problem of keeping air flow balanced** to all diffusers at all flow levels inherent to VAV systems which serve multiple outlets from a single terminal box.
4) Additional **energy savings** from not overcooling or overheating any of the rooms in the Therma-Fuser subzones.

METHOD OF UPGRADING

Install one or more Therma-Fuser diffusers in each room. Use type HC Therma-Fuser diffusers for systems with both cooling and heating. Use type C for cooling only systems.

Convert the VAV box into a static pressure/pressure independence station by controlling it with a static pressure signal from the duct 1/2 to 2/3 between the takeoff for the first Therma-Fuser diffuser and the takeoff for the last Therma-Fuser diffuser.

- If selecting a **new box**, use a pressure independent box with total and static pressure sensors and a differential controller.
- For existing **pressure independent boxes** with total and static pressure sensors, use the existing controller.
- For other existing pressure independent boxes and **pressure dependent boxes**, add a differential controller such as a controller for a pressure independent box or controller/actuator such as an Acutherm PIM.

Controllers may be DDC, electric analog or pneumatic. Make the same pressure sensing connections for each. Vent the low port to atmosphere and connect the high port to a new static pressure sensor located 2/3 down the duct. Set the high or maximum adjustment on the controller to 0 and adjust the static pressure setpoint with the low or minimum adjustment. With this setup, it makes no difference if the thermostat is connected or not. The thermostat must be connected when the logic is in it instead of the controller. The thermostat should also be connected if it is used for other control such as heat.

It is assumed that the **system** has an effective **discharge air temperature control** and some form of **static pressure control** at the fan such as fan speed control, effective variable inlet vanes or discharge dampers.

(Continued)

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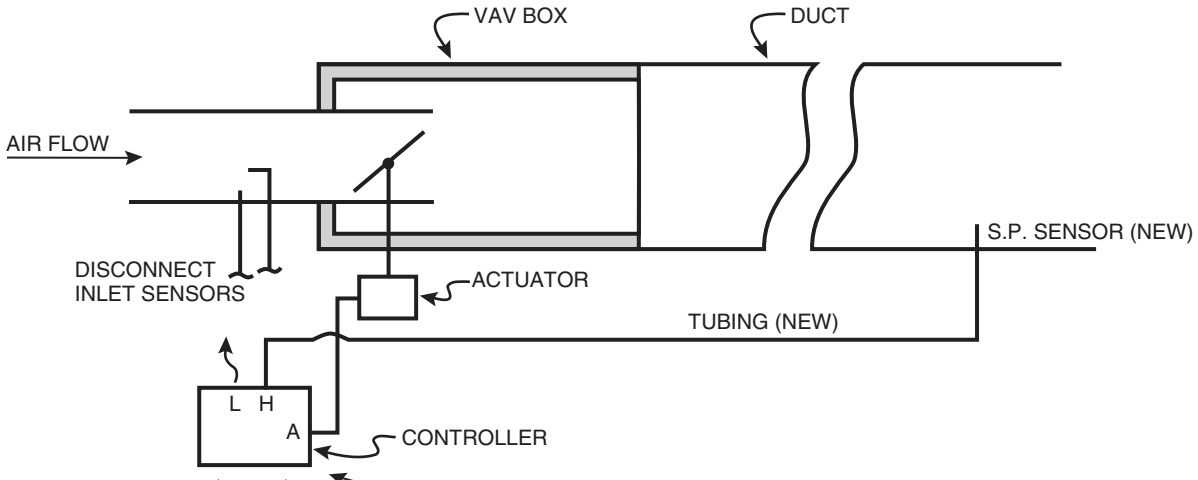
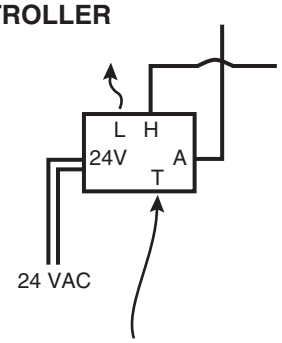
PROCEDURE FOR CONVERTING A VAV BOX TO A STATIC PRESSURE STATION

1) Remove the low connection at the inlet pickup and let it hang and sense atmosphere.
2) Install Dwyer A-308 static pressure sensing tip or other similar device in the duct at least 2/3 downstream from the box.
3) Remove high connection at the inlet pick up, extend the tubing and connect to the static pressure tip installed in step 2.
4) Use the low or minimum adjustment on the controller to adjust for the air volume with a velocity pressure equal to the required static pressure set point (usually between .10 and .25 in wg).
5) Set the high or maximum adjustment on the controller to 0 unless a thermostat is connected. If a thermostat is connected, then adjust the maximum on the controller to the same air volume used in step 4.

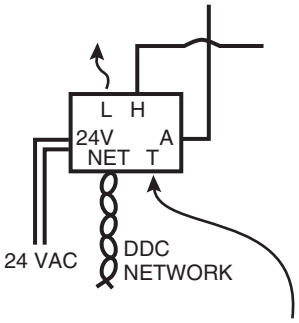


ELECTRIC ANALOG CONTROLLER



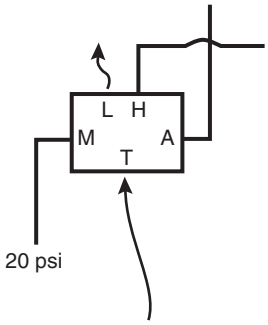
The thermostat must be connected when it, instead of the controller, contains the logic. Otherwise if it controls nothing else, the thermostat may be disconnected.

DDC CONTROLLER



Wire the sensor to the controller so that the space temperature may be monitored over the DDC network.

PNEUMATIC CONTROLLER



If the thermostat controls nothing else, remove the thermostat line from the port on the controller and vent the port to atmosphere. Cap or plug the line.

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