OPTIONS OF STATIC PRESSURE CONTROL AND PRESSURE INDEPENDENCE

Objectives of static pressure control are:

1) Provide **high enough static pressure** (.05"wg / 12 Pa or more) to obtain the required air volume at each Therma-Fuser diffuser.
2) **Limit the static pressure** at both full flow and turndown to avoid diffuser noise (.25"wg / 62 Pa for NC 35) and leakage (.40"wg / 100 Pa). When the static pressure is held constant the sound level will decrease as the Therma-Fuser dampers close.
3) **Pressure independence:** consistent operation as the system air flow changes.

Manual dampers will not satisfy these objectives because the pressure drop across them varies as the air flow changes.

These objectives can be achieved with the usual methods of automatic static pressure control; bypass dampers, discharge dampers, zone dampers, and fan control (variable speed drives, inlet vanes, etc.). In addition, R-Rings, unique to VAV diffusers, provide bypass at the diffuser where the system has a ceiling plenum return.

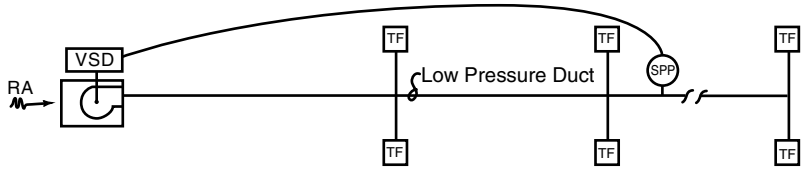
Location of the static pressure probe for all options except the R-Rings should be at least 2/3 to 3/4 down the duct from the first takeoff. Do not locate it right after the damper or fan. The down stream location provides a lower static pressure control point which results in quieter turndown operation.

Acutherm Pressure Independence Modules (PIM™) are designed for use as bypass dampers, discharge dampers and zone dampers.

For systems with part fixed diffusers, system turndown may be 30% or less. If so, static pressure control is not necessary provided the static pressure remains below .25"wg/62 Pa at the diffusers.

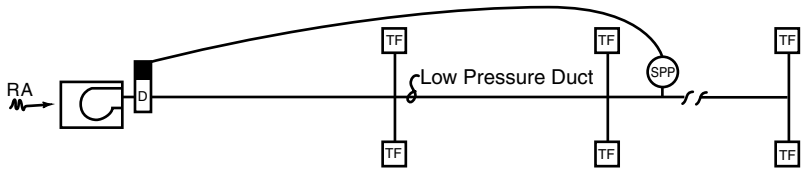
Fan Speed Control

- Do not use with constant volume DX equipment



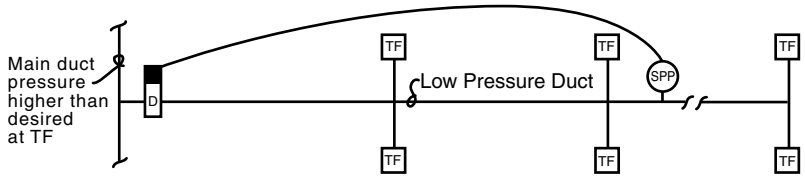
Discharge Damper

- Do not use with constant volume DX equipment.



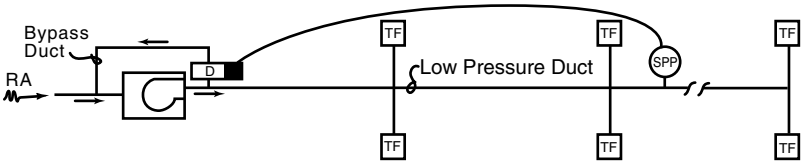
Zone Damper

- May also need static pressure control at fan.
- Sound attenuation after the damper may be required for higher pressure drops.



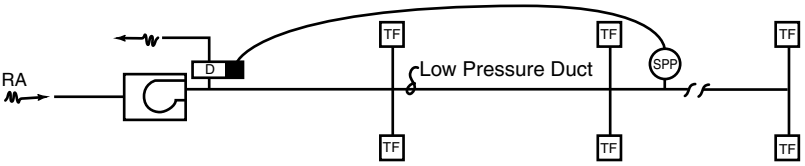
Bypass Damper—Ducted Return

- Size damper for total turndown of all Therma-Fuser diffusers.



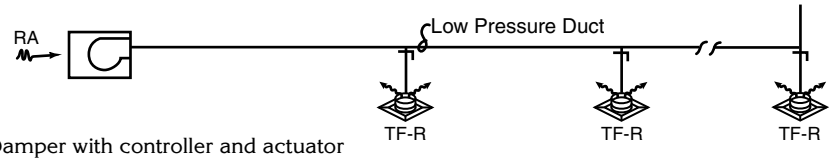
Bypass Damper—Ceiling Plenum Return

- Size damper for total turndown of all Therma-Fuser diffusers.



R-Ring Ceiling Plenum Bypass

- Do not use with ducted returns.



D: Damper with controller and actuator
TF: Therma-Fuser diffuser
TF-R: Therma-Fuser diffuser with R-Ring
SPP: Static pressure probe, locate approx. 2/3 to 3/4 down duct from first diffuser
VSD: Variable speed drive

(Continued)

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The Individual Temperature Control People

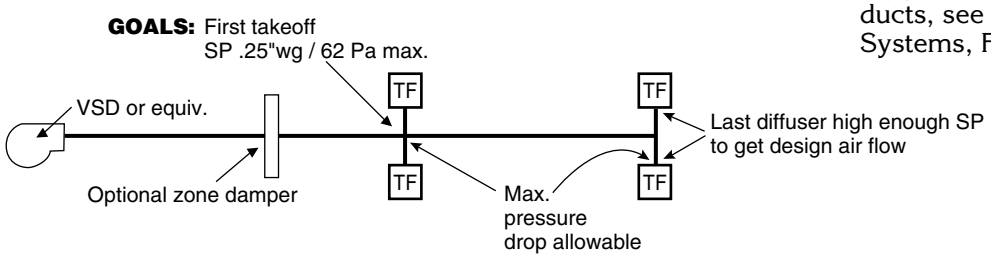
SIZING DUCTS FOR MODULAR VAV SYSTEMS

Objectives of duct sizing are:

1) Limit maximum static pressure at the inlets of all Therma-Fuser diffusers to .25"wg / 62 Pa or below at both design and turn-down conditions.

2) Maintain minimum static pressure at the diffusers especially those further away from the fan, at least .05"wg / 12 Pa or enough to provide design air flow.

To accomplish these objectives first determine the maximum pressure drop allowable between the first takeoff and last diffuser. Once maximum pressure drop is determined choose one of the duct sizing methods and assign duct sizes accordingly. For more on using existing ducts, see Designing Modular VAV Systems, Form 5.2.



Determining allowable pressure drop:

1) Locate Therma-Fuser diffusers and approximate duct runs on the building plan. Determine the air volume required for each diffuser.

2) From the performance ratings determine the static pressure for design air volume at the last diffuser furthest from fan. Sometimes selecting a larger inlet size will lower the static pressure required.

3) Determine the static pressure required at the takeoff to the first diffuser after the fan or static pressure station. This is usually .25"wg / 62 Pa – sometimes less if a lower NC is required at the first diffuser.

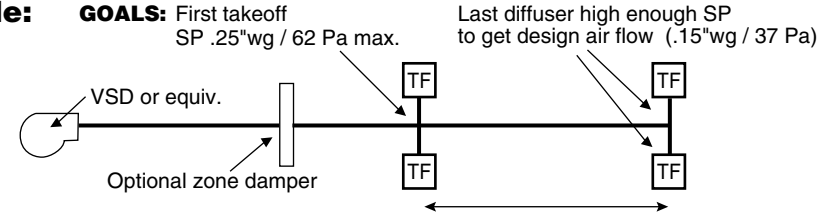
4) Subtract #2 from #3 for the pressure drop allowable.

5) Determine the equivalent length of duct, in feet or meters, from the takeoff of the first diffuser to the last diffuser. Equivalent duct length is total length of duct plus equivalent length of fittings.

6) Divide #4 x 100 by #5 for the pressure drop per 100 feet, or divide #4 by #5 for the pressure drop per meter.

7) Select duct sizing method. See Designing Modular VAV Sytems (Form 5.2) for a description of the equal friction and friction loss reduction methods of sizing ducts.

Example:



Pressure drop = .25"wg / 62 Pa - .15"wg / 37 Pa
= .10"wg / 25 Pa
If equivalent length = 100 feet / 30 m,
design for .10"wg drop per 100 feet / .82 Pa per m.
If equivalent length = 150 feet / 46 m,
design for .06"wg drop per 100 feet / .49 Pa per m.

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