



Zoning Made Effortless



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INTRODUCTION

The Concept of Zoning

The basic principle of forced air zoning is to allow one HVAC system to be controlled by multiple thermostats, heating and cooling a building in zones rather than as a whole. This makes homes and businesses more comfortable. When combined with setback thermostats, zone setback is possible, resulting in significant energy savings. Forced air zoning makes a common HVAC system more efficient by concentrating the unit's capacity where and when you need it instead of pouring air throughout the building regardless of the temperature in the individual rooms.

According to a 2006 American Home Comfort Study, 67% of US homeowners are uncomfortable in their homes at certain times of the year. Zoning solves this problem.

To accomplish this we utilize:

Zoning Panel—Receives requests from thermostats and coordinates the HVAC system and damper positions.

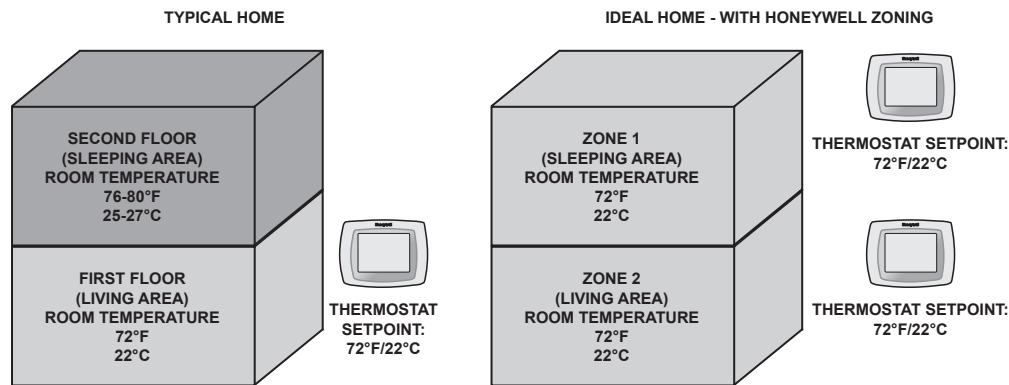
Thermostats—Requests conditioned air only in zones where required.

Duct Dampers—Directs air to rooms (zones) only when called for by a room thermostat.

A By-Pass Damper—Efficiently controls excess supply air as dampers open and close.

Discharge Air Temperature Sensor (DATS)—Avoids freeze-up and tripping on high limit by sensing the supply duct temperature. The zone panel cycles off the equipment when DATS limits are exceeded. The equipment is turned back on automatically.

Fig. 1 depicts typical home temperatures compared to those of a home with Honeywell zoning.



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Fig. 1. Typical home (no zoning) compared to ideal home with Honeywell zoning.

Need Help?

For assistance with this product please visit <http://yourhome.honeywell.com> or call Honeywell Zoning Hotline toll-free at 1-800-828-8367

INTRODUCTION

Fig. 2 depicts a typical residential layout with three zones. Zoning provides two key benefits:

- **Customer Comfort:** heating and cooling where you want it, when you want it.
- **Energy Savings:** heat and cool only zones that are occupied.

In the following pages you will learn how to apply the principles of forced air zoning in new and existing projects, creating a more comfortable indoor environment.

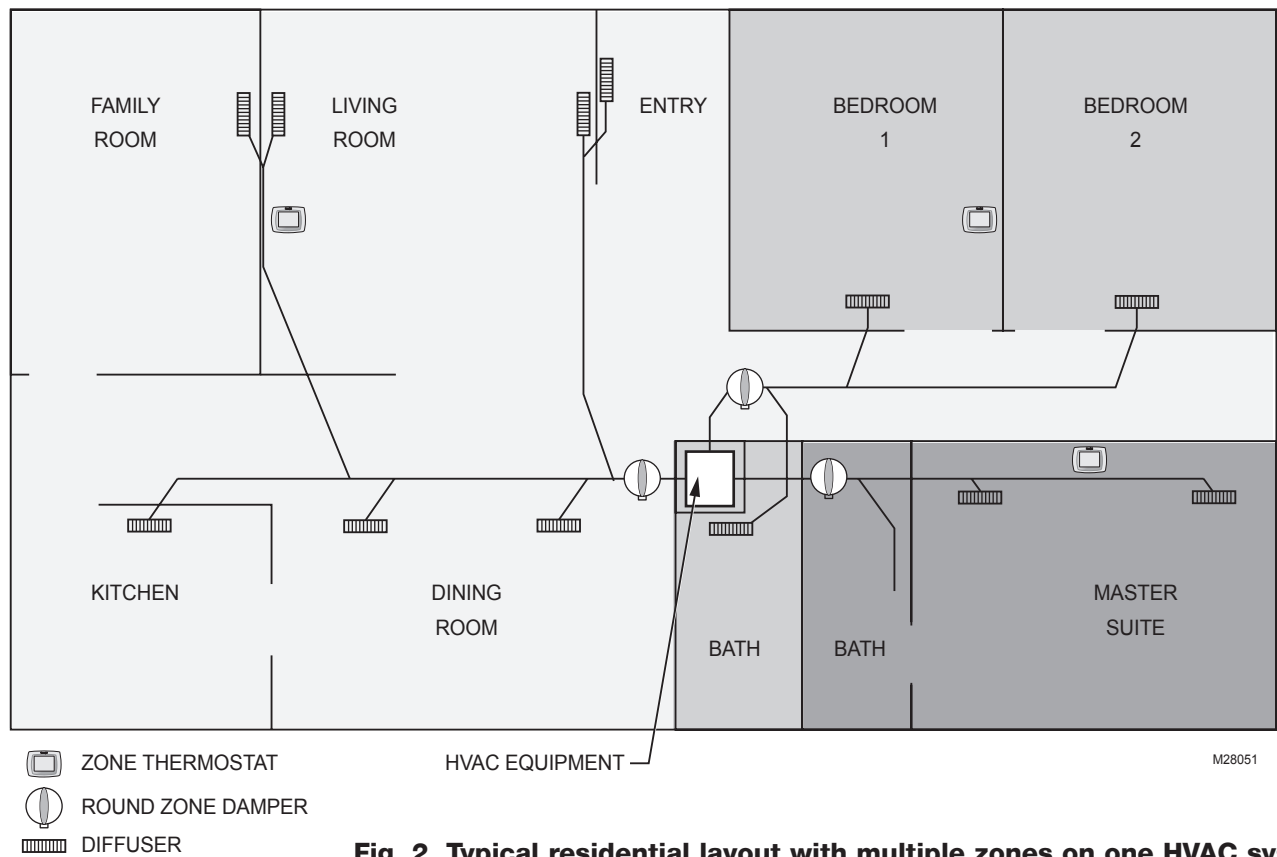


Fig. 2. Typical residential layout with multiple zones on one HVAC system.

PLAN THE ZONES

In planning a zone system, here's what you need:

Panel

- To Operate Dampers and Equipment
- Transformer to power panel



Thermostats

- Programmable or Non Programmable



Dampers

- Round/Rectangular



Bypass and Discharge Air Temperature Sensor:

- To Prevent Static Pressure Buildup
- DATS protects Equipment



1

Divide the Home Into Zones

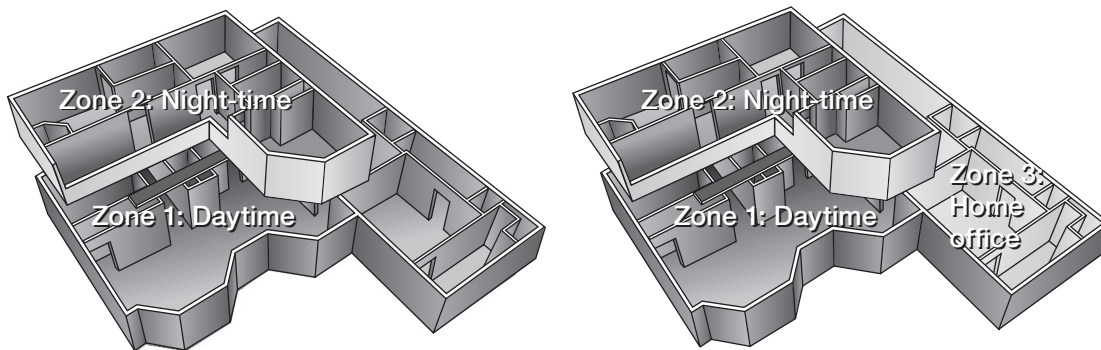
There are a number of ways to divide a house into zones: by floor, in groups of rooms adjacent to each other, rooms grouped by compass orientation—here is a typical setup:

Zone 1: areas primarily used at night (bedrooms)

Zone 2: areas primarily used during the day (living room, kitchen)

Zone 3: a third space that would benefit from its own HVAC control, such as a master bedroom suite, a basement, living space above a garage, a home office, etc.

A good rule of thumb is to make no zone smaller than about 25% of total system capacity, measured in cubic feet/minute (CFM).



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Fig. 3. Typical residential layout with multiple zones on one HVAC system.

DUCTS AND DAMPERS

2

Size the Ductwork

In New Construction: ductwork is sized as usual for the size of the home; trunks are sized for the amount of air going to the zone.

Ductwork should be designed normally, typically .10 or .08 in. w.c./100 ft.

Proper duct design of a zoned system will:

- Maintain proper airflow through the HVAC unit when only one zone is open.
- And maintain proper airflow to all zones when all are open.

In Retrofit Applications: zones are somewhat limited by how the ducts were originally constructed, but any home can be zoned provided there is access to the ductwork. See page 10 for zoning information specific to retrofit applications.

3

Select Dampers

Use ZD dampers for rectangular ducts. Use ARD or RRD dampers for round ducts in residential systems up to 2000 CFM.

For systems over 2000 CFM or commercial systems, see page 11.

Install the Dampers

A supply air damper should not be placed closer than 6 ft. to a diffuser. The damper should also be at least 3 ft. away from the plenum. (Less than 6 ft. between damper and diffuser could create objectionable air noise in the conditioned space and 3 ft. of duct off the plenum will reduce turbulence.) These minimums are recommendations for optimal performance; however, each installation presents its own challenges, so each installation will vary. For instance, in some installations the damper may need to be mounted directly on the plenum.

Allow for Access

Dampers should be installed in a location that can be accessed for service. If a damper needs to be "buried," place a decorative register over it to provide access.

Balancing Dampers

Balancing dampers should be included in the duct work, because a zoned home needs to be balanced just as a non-zoned home does.



BYPASS DAMPERS AND DATS



Size the Bypass Damper

Install between supply and return.

All zoning systems should be installed with a supply-to-return bypass damper. A Static Pressure Regulating Damper (SPRD) is used to bypass excess airflow from the supply duct into the return duct.

Supply duct systems should be sized to handle the total airflow when all zones are open, and use a SPRD bypass capable of handling the excess air when only the smallest zone is calling. Excess air should be bypassed into the return air duct. If the space is too confined to install a bypass back to the return, excess air can also be dumped into a hallway, false ceiling, or basement.

Determine the size of the bypass as follows:

$$\begin{aligned}
 & \text{CFM System} \\
 & - \text{CFM Smallest Zone} \\
 & = \text{CFM Bypass}
 \end{aligned}$$

For example, on a 4-ton system **1600 CFM System**
 with the smallest zone designed to handle - **400 CFM Smallest Zone**
 the by-pass must be able to handle..... = **1200 CFM of airflow in bypass**

When few zones are calling, static pressure in the system increases, and air is bypassed from supply to return. This ensures that the throw of air at the register is correct whether one zone is calling or all zones are calling. This method of duct design is also a great way to control excess humidity in the home, especially in southern climates. Bypassing air from the supply duct into the return duct accelerates the dehumidification ability of the equipment, creating greater comfort for the homeowner.

Table 1. SPRD Dimensions.

Round SPRD		Rectangular SPRD	
Model Number	By-Pass	Model Number	By-Pass
SPRD7	300 CFM	SPRD12X8	1000 CFM
SPRD8	400 CFM	SPRD12X10	1200 CFM
SPRD9	600 CFM	SPRD12X12	1400 CFM
SPRD10	750 CFM	SPRD20X8	1600 CFM
SPRD12	1200 CFM	SPRD20X10	2000 CFM
SPRD14	1800 CFM	SPRD20X12	3000 CFM
SPRD16	2400 CFM		

BYPASS DAMPERS AND DATS

Alternative Bypass Methods

If there is no space for bypass ductwork, the zone dampers can be set to allow some air to leak. By setting the larger zone dampers to a minimum position, excess air pressure can be relieved even when only one zone is calling. This method does not typically affect room temperature, but the homeowner should be advised that air will be coming from these registers even when that zone is not calling.

Discharge Air Temperature Sensor (DATS)

The DATS should be located in the supply trunk between the evaporator coil or heat exchanger and the first zone damper. If this is not possible, it is permissible to mount the DATS in the bypass duct.

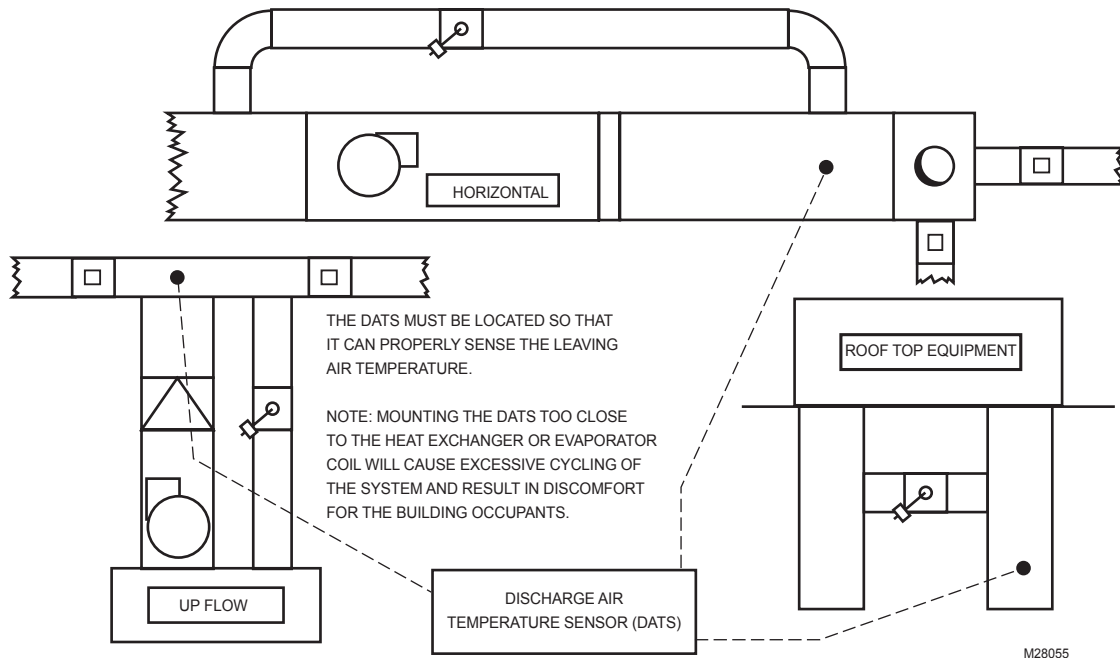


Fig. 4. DATS mounting locations.

ZONE PANEL

5

Install the Panel

Mount on return, stud, wall, or roof truss.

Zone Panels should not be exposed to weather or installed in a location where they might get wet. Like a damper, they must be accessible for service, if required. Select a conventional zone control panel or communicating zone panel using Table 2 and 3. Notice that no fossil fuel kit is necessary for the HZ432 in dual fuel applications, but is necessary for all other panels.

Table 2. Conventional Zone Panel Selection Guide.

APPLICATION	CONVENTIONAL 1-HEAT/1-COOL	CONVENTIONAL 2-HEAT/2-COOL	HEAT PUMP 2-HEAT/1-COOL	HEAT PUMP/ CONVENTIONAL 3-HEAT/2-COOL OR DUAL FUEL 2 HEAT/2-COOL
2 TO 32 ZONES	HZ432	HZ432	HZ432	HZ432
2 TO 3 ZONE	HZ322 OR HZ311	HZ322	HZ322	
WIRELESS ZONING WITH T8665A WIRELESS THERMOSTAT	HZ322 OR HZ311 with W8665E	HZ432 OR HZ322 with W8665E	HZ432 OR HZ322 with W8665E	HZ432 with W8665E

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Table 3. Networked (Communicating) Zoning Selection Guide.

APPLICATION	CONVENTIONAL/ HEAT PUMP OPERATES SINGLE STAGE, MULTISTAGE, AND HEAT PUMP EQUIPMENT UP TO 3-HEAT/2-COOL
THERMOSTAT	TH9421C1004 or TH5320C1002
EQUIPMENT INTERFACE MODULE	W8835A1004
DAMPER INTERFACE MODULE UP TO 9 ZONES TOTAL	NOT NEEDED FOR ZONES 1-3 ONE W8703A FOR EVERY 3 ZONES FROM 4-9
DISCHARGE AIR TEMPERATURE SENSOR DATS	C7835A1009
TELEPHONE ACCESS MODULE	W8635D

M19801A

ZONE PANEL

The zone panel is typically installed near the indoor unit, in a garage, crawl space, basement, or attic. Zone panels are often installed on the return air duct. However, in some heat pump applications, the homeowner or building occupant may require access to the panel to change into the emergency heat mode. To meet these needs, install the panel in a utility closet or other convenient area where the panel is easily accessed.

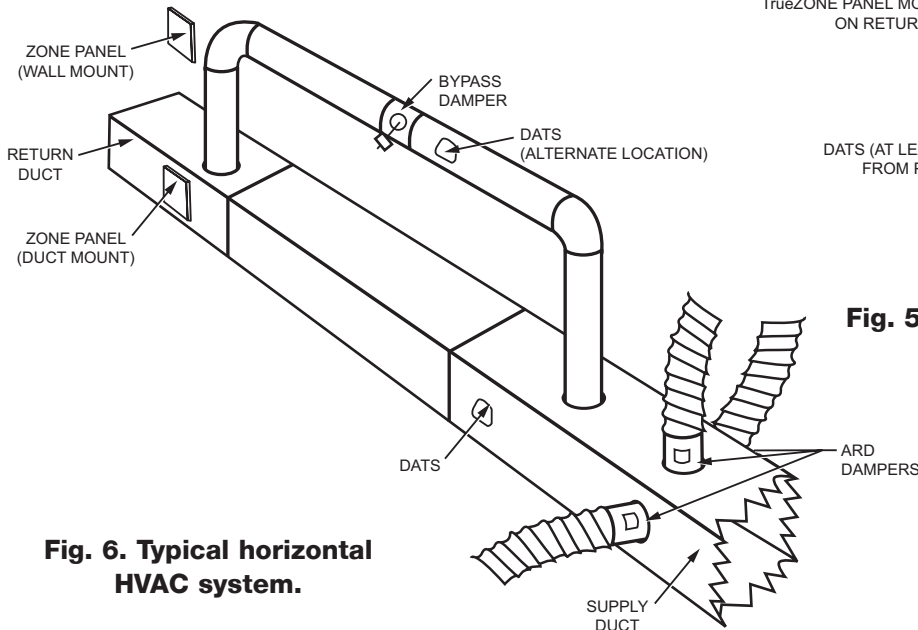


Fig. 6. Typical horizontal HVAC system.

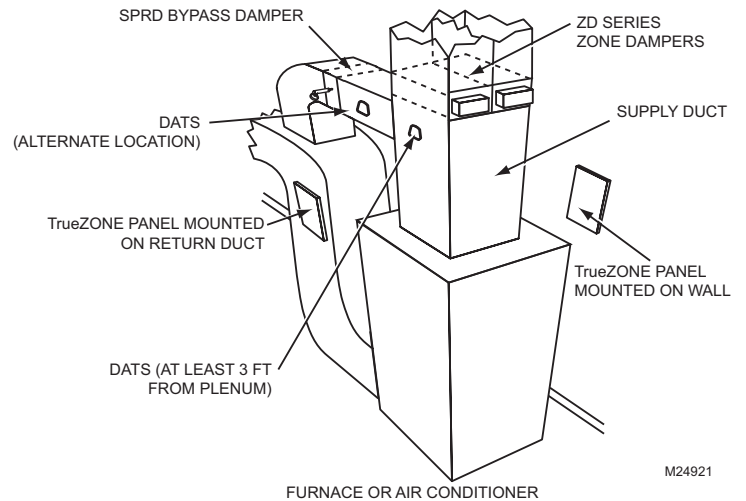


Fig. 5. Typical upflow HVAC system.

Thermostats

Install thermostats using instructions provided with thermostat. Wireless thermostats can be used to speed installation.

Transformer

Mount and wire a dedicated transformer to the zone panel. The AT140A1042 is rated to 130°F (54°C). If it is to be mounted in an attic that may get much hotter, install the AT175A1008, which is rated to provide 50 VA at 165°F (74°C). Connect power to the zone control panel after all other wires are attached.

Variable Speed Fan

A variable speed fan or ECM blower changes blower speed to deliver a constant CFM regardless of static pressure. To use zoning with a variable speed fan, plan and install zoning normally, and use an SPRD or a MARD (round) damper with static pressure control (SPC) for bypass.

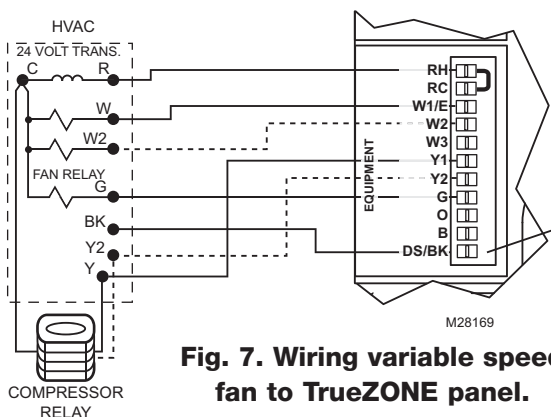


Fig. 7. Wiring variable speed fan to TrueZONE panel.

If using a Honeywell TrueZONE panel, the panel's DS/BK terminal is intended for use with a variable-speed fan. When one zone is calling (or less than 25% of capacity on systems with more than 4 zones), this terminal will be de-energized of 24 VAC. This reduces blower speed on most variable speed blowers.

RETROFIT APPLICATIONS

For retrofit applications, first you have to ensure that the duct system is adequate for room/zone loads, and that the existing HVAC system is properly sized to deliver heat/cool. After that, planning the zone system is very similar to new construction.

Rigid Duct, Rectangular Sheet Metal Duct, Knockdown (KD) Duct

Using a retrofit round damper (RRD) significantly reduces labor—it installs in a fraction of the time—and overall system installation cost. A retrofit damper slides into rigid round pipe for quick installation.

Honeywell offers dampers for rigid round duct in 5-, 6-, 7-, and 8-in. diameters. Multiple RRD dampers may be wired in parallel.

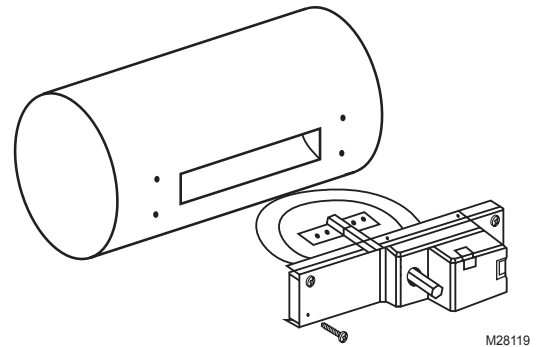


Fig. 8. Installing retrofit round damper.

Flex Duct

For retrofit applications in flex duct, use round ARD dampers. The round ARD is a galvanized steel single blade damper with a low-leakage gasket, and comes in a range of sizes from 5–20 in. You can use multiple ARDs on any duct—just wire them in parallel.

Thermostats

The existing thermostat can often be used for one zone, but as it might be difficult to run wires to the other zones, Honeywell wireless thermostats can be used.

COMMERCIAL ZONING

Zoning for commercial buildings makes just as much sense as zoning for residential buildings: in a large office building, each office suite could have its own zone, giving each occupant the ability to set the heat/cool to his or her comfort.

Zone Design

While a typical residential building might have a system of 5 tons or less, commercial buildings typically have much larger (up to 20 ton) HVAC units. A commercial zoning system will likely have more zones, and the ducts might be bigger, but the basic principles of design and the devices used to implement zoning remain the same.

Bypass Damper

The bypass damper must be a motorized damper such as the MARD, controlled by a static pressure control. Another option is a Honeywell D2 or D3 rectangular damper operated by an ML6161B2024 actuator and mounted with a 32007205-001 bracket. The MARD or D2/D3 damper is then wired to a static pressure control (SPC) to modulate the bypass air.

Zone Damper

Zone dampers must be able to handle the higher airflow and static pressure of a larger HVAC system. Use a MARD or RRD for round ducts; for rectangular ducts, use a commercial rectangular damper such as a Honeywell D2 or D3 with the same motor and bracket listed above.

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