HVAC ZONING SYSTEMS & CONTROLS

ZONEFIRST™

Controlling Temperature Room to Room

PRODUCT CATALOG

ZONEFIRST™

Controlling Temperature Room to Room

Who is ZONEFIRST?

ZONEFIRST may be unfamiliar to you however we're the first company that successfully developed and marketed HVAC Zoning Systems back in the late 1950s. Today other major zoning companies are in business due to ***ZONEFIRST***.

It was in the mid to late 1950s when Richard Foster developed the first automatic motorized dampers, registers and diffusers that were thermostatically controlled. Developing and marketing these products for another company until the early 1960s when Mr. Foster then started Trolex® Corp. He further developed, patented and marketed new zoning products when in 1999 the Trol-A-Temp® brand was acquired by Honeywell.

Since that time Trolex has continued to manufacture dampers for a number of OEMs and in 2004 re-entered the HVAC Market now under ***ZONEFIRST*** tradename. This new name signifies the many firsts in zoning by being the first company to develop the automatic dampers, registers and diffusers for the residential HVAC Market. The first zoning systems to feature normally open dampers and the first to zone heat pumps in the early 1970s.
Being FIRST is our tradition.

ZONEFIRST is now the first company to offer the new EZ Wire controls and dampers. New Color Coded Push-In wiring terminals make wiring the thermostats, transformer, sensor and HVAC Equipment fast and simple. The NEW Plug-In dampers simplify damper wiring and make connecting multiple dampers literally a snap. These new DC motors consume over 70% less energy than most other motors and the wire is included.

ZONEFIRST is also marketing the concept of designing the HVAC Zoning First and incorporating Zoning into every new HVAC System. When you think about hydronic and radiant heating, zoning is always included. Now even today's cars include dual zone climate control or individual driver and passenger temperature control in a space smaller than the smallest room in your home.

There's only one way to provide comfort throughout the home and that's with ***ZONEFIRST...Where Comfort Begins.***

What is Zoning and Zone Control?

Zoning provides individual room or zone temperature control on any central HVAC System. Zoning uses automatic dampers that open and close to control the flow of air into any room or zone. Each zone is controlled by a thermostat in the room/zone and a damper in the duct for the zone to control the air. A central control panel is also used to sequence the zone thermostat calls, zone dampers and HVAC Equipment.

Why Zoning?

More often the question should be Why Not Zoning? Zoning provides several key benefits for any HVAC System. When one looks at what an HVAC System is supposed to provide, COMFORT, one must realize that one thermostat centrally located in a main level hallway or dining room, etc., cannot properly control the temperature in an upstairs bedroom on the opposite end of the house.

One simple way to show why zoning is needed is to think why you have a light switch in every room of the home or office? You would not think of having one light switch for your entire home, however you do have often only one thermostat to control your heating and cooling for your home or office. What costs more? Electricity for lighting or the energy for HVAC? On average HVAC is 60% to 75% of most utility bills. Why waste money heating and cooling rooms that are unoccupied, or may already be comfortable when other rooms are not yet comfortable?

ZONING IS ENERGY $AVING$

Without zoning you're paying more for heating and cooling than you need to. Often homes with one central thermostat will have temperature differences between the various rooms in the house. Having only one thermostat in the home or office does not allow the flexibility of having a warmer baby's room for sleeping, while the parent's bedroom is cool and cozy. A home without zoning does not allow for more cooling needed in the kitchen and family room zone on a hot summer afternoon when no one is in the upstairs bedrooms.

There are numerous factors that affect the temperature in your home or office, such as solar gain, appliances, lighting, fireplaces, exposures, building design, etc., that

one thermostat cannot properly compensate for all of these varying factors.

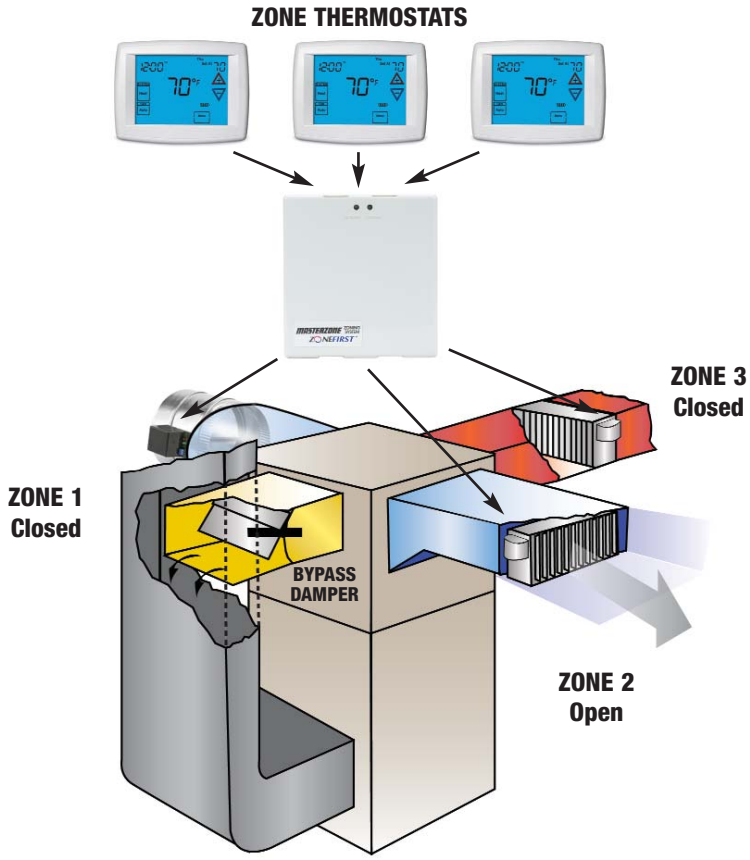
Balancing airflow with manual dampers and duct sizing does not compensate for changing occupancies and temperature loads. The only true way to do this is with Zoning.

How Does Zoning Work?

Zoning works simply by using multiple thermostats located in the various rooms or zones of the home or office to control motorized dampers and the HVAC Equipment to maintain a desired comfort level in each zone.

When a zone thermostat calls, be it for heating or cooling, the damper to the calling zone remains open, the dampers to the zones not calling close and either the heating or cooling is brought on and is delivered through the zone damper. Once the zone thermostat satisfies by the room temperature reaching the thermostat set point, the HVAC Unit is shut off and the calling zone(s) remains open for a period of a couple of minutes to allow all the excess heated and cooled air to be directed into only the last zone(s) calling. Once this time elapses all dampers will return open and and await the next call.

Some systems may require a by-pass duct from the supply air to the return in order to by-pass excess air when a small number of zones are calling and the total capacity of the HVAC Unit cannot be directed into the calling zone(s). The By-Pass Dampers can be barometric or motorized. The barometric SPRD models operates on the air pressure in the duct and the motorized Modulating Damper requires the use of a static pressure switch (Model SPS or SPC) to more accurately sense the duct pressure and modulate the by-pass damper.



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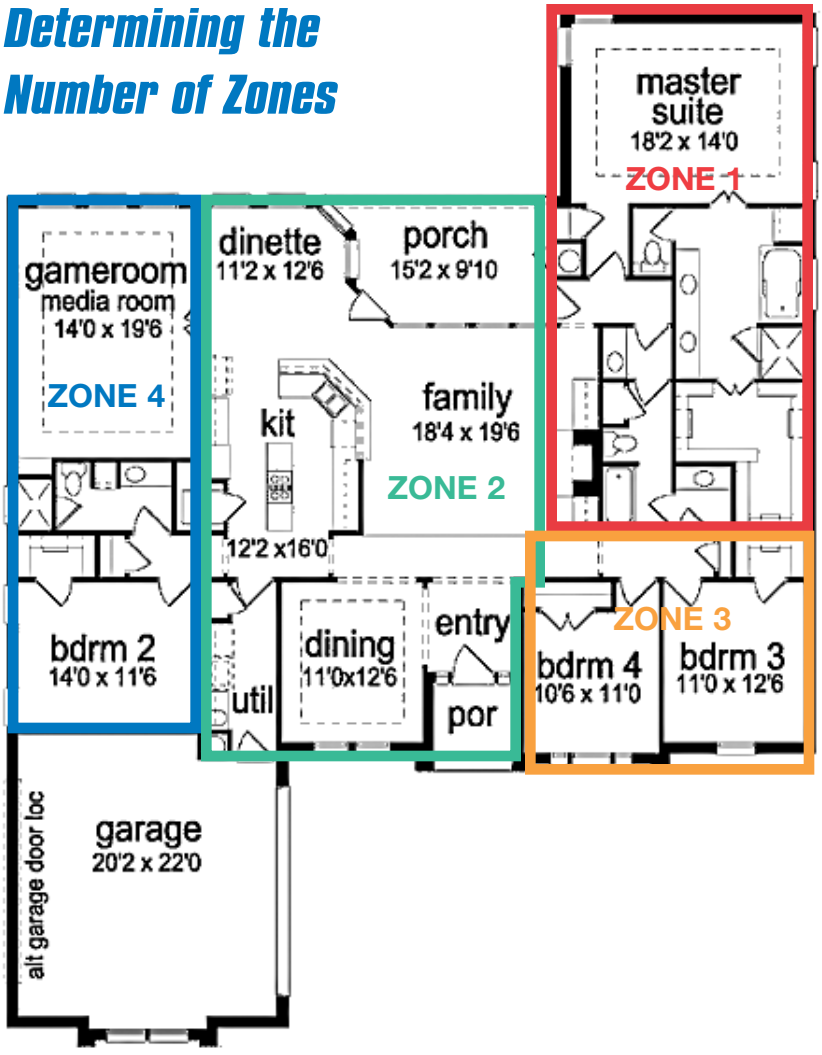
Why Should I Sell Zoning?

Your customers want it! Consumer surveys show that when told what zoning is and what the benefits are, over 62% will buy a zoning system. The problem is most homeowners do not know about zoning or the benefits. This is where zoning can help contractors and builders educate the consumer on the benefits of better comfort throughout the home; substantial energy savings up to 30%; the convenience of a thermostat in each zone and the common sense analogy of a light switch in each room, why not a thermostat?
It's just plain common sense.

Zoning provides HVAC Contractors, Installers and Home Builders to differentiate themselves from the competition who often do not offer zoning or will sell multiple units. Consumers and home buyers not knowing the tremendous savings zoning can afford over multiple HVAC Units will pay thousands more than needed for multiple units vs a single unit and zoning.

Determining the Number of Zones



Zoning System Design

Designing a system with zoning is easier than many think. Designing zoning into new construction is easy, as the duct system can be laid out specifically for zoning and wires can be run for thermostats.

Designing for retrofit is determined by the existing duct layout and accessibility. Using a little creativity and imagination there are opportunities here as well.

A home or building can have almost as many zones as one wants to pay for. The determining factor is the cost per zone. Room by Room Zoning can be a great idea however the cost may not always be practical. Also the greater number of zones, the more thought must be put into the system design, controls and installation. Typically most homes are zoned on the basis of occupancy, levels, use or exposure. Zone sizes can vary depending on the home or office and can be as small as a single room to complete floor.

Depending on the size of the home and the homeowners budget is the biggest factor in determining the number of zones. The larger the home the more zones. As homes have grown in size, often just the Master Bedroom can be its own zone. As newer homes get more feature oriented with Media Rooms, Exercise Rooms, Bonus Rooms, Home Offices, etc. the need for zoning is more crucial. The addition of such rooms requires zoning even though the amount of time and the need to condition these rooms 24/7 is far less. The need to zone is crucial and can save a homeowner thousands in upfront costs by eliminating the need for separate HVAC Units. Zoning can allow existing units

supplying other areas of the home to divert air to these zones when needed and still provide comfortable settings for the more often used zones. Zoning can provide comfort to every room of the home without costing a lot in HVAC Equipment and future utility bills.

Designing the Duct System

Most commonly homes are split into at least two zones, bedroom area and living area, or upstairs and downstairs. In these instances the design would typically be a zone duct for each zone with a damper and thermostat for each zone with a central zoning panel. In most all instances where the zones are approximately equal in size, each zone duct can be sized to handle about 2/3 of the total air flow with an adequate number of takeoffs, typically 5-6 per zone, would disperse the air nicely when both zones are open, as well as when only one zone is open. This is applicable for small two and three zone systems using a constant volume fan.

Ideally a trunk duct is run for each zone and the outlets for the same zone come off the zone trunk. This minimizes the need for additional dampers for each outlet. However in many retrofit homes where there is only one trunk duct serving all zones and the outlets are scattered, a damper can be installed for each outlet as well.

When designing the system it is important to look at each zone and the number of outlets for each zone. Consider at any time only one zone may be open and look at the smallest zone being the only one open. Determine how much air can go into that zone. Subtract this from the total CFM of the HVAC System and the excess is what will need to be by-passed.

A by-pass is required when any zone cannot handle at least 2/3 of the total CFM. A by-pass is a separate duct with either a barometric by-pass damper, Model SPRD, or a modulating by-pass, Model ZDM or RDM with a static pressure sensor, Model SPS or SPC, that opens to relieve excess air as the zone dampers close down.

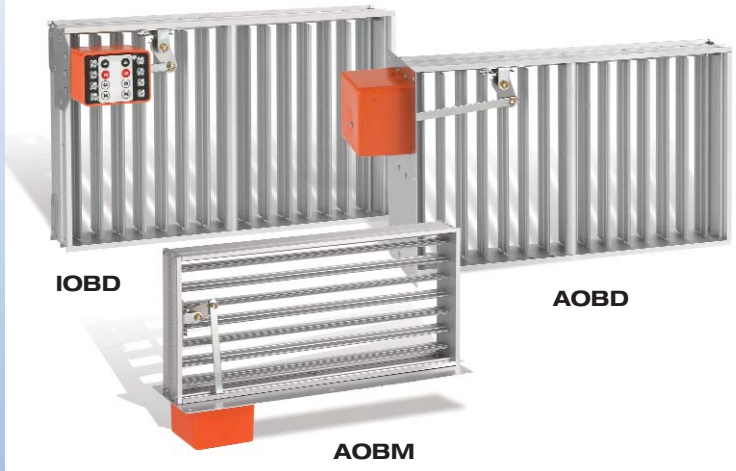
The barometric damper works strictly on air pressure in the duct and has a counter balanced weighted arm to offset the damper blade. As zone dampers close the duct pressure builds and forces the SPRD open to relieve excess air typically into the return air. The by-pass can also be ducted to bypass air into hallways, bathrooms, basements or other non-critical temperature areas.

Variable Speed HVAC

Today more and more furnaces and air handlers are coming with variable speed blowers. These increase the volume of air when the unit sees an increase in static in order to maintain the efficiency of the unit. When zoning variable speed units, the unit will see an increase in air pressure every time a zone damper closes. This will cause the blower to speed up, add noise and become drafty in the open zones. Here is where the Modulating By-Pass Damper is used with the SPS Static Pressure Switch. When zone dampers close the SPS will sense the rise in static as the blower begins to increase. The SPS will then open the modulating by-pass damper. As the by-pass opens and relieves excess air, the blower will sense this and begin to slow and the by-pass damper will modulate to seek an equilibrium with the blower as to keep a balanced airflow.

For over 50 years ***ZONEFIRST*** has lead the way in developing innovative solutions to zoning any kind of system. The importance of common sense duct design principles and creative ingenuity is what makes ***ZONEFIRST*** first choice in providing complete zoning solutions for any system.

ZONEFIRST **offers more information in its Zoning Design Manual which is available on-line at www.zonefirst.com.**



Automatic Opposed Blade Dampers

The Automatic Opposed Blade Dampers are a series of aluminum air control dampers that insert into any duct. These opposed blade dampers can be ordered in side mount, bottom mount, and internal mount of the motor depending upon the accessibility of the duct.

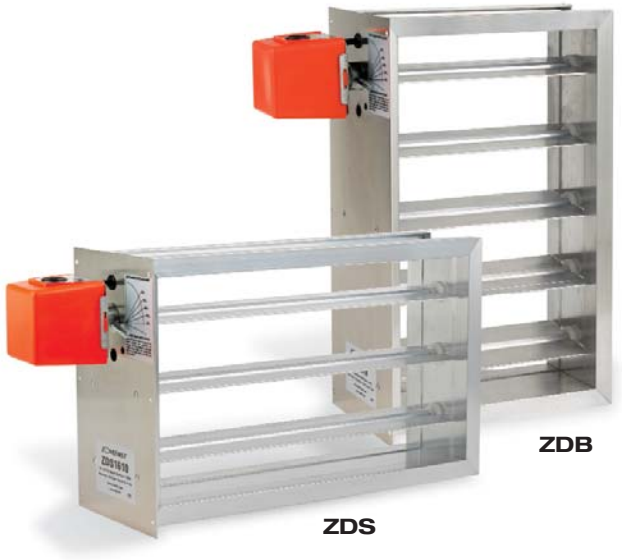
Each damper is constructed from extruded anodized aluminum and has a stainless steel draw bar that operates the damper blades and brass and zinc-plated linkage for corrosion resistance and long life. The patented gear design and counter balanced opposed blade damper design provides smooth long lasting operation. The 24 Volt AC, power open and power closed motor is also designed for long life and is only powered for 30 seconds while the motor moves between open and closed. The IOBD installs through the opening of the duct and has four mounting tabs to secure it to the inside of the duct.

The application for these dampers are many and range from controlling temperatures for zone control to just switching the flow of return air between low and high returns between seasons and solar applications. These dampers require a simple single pole-double throw switch to drive open and closed.

The AOBD is recommended for low pressure duct systems, less than 0.5" S.P. For higher pressure systems use the ZD series of dampers. The bottom mount dampers are only available from 6" x 8" to 14" x 24".

Insertable Parallel Blade Dampers

The ZD Series are extruded aluminum parallel blade dampers complete with motor actuator and ready for installation. The lightweight ZD can be installed in any position in any properly sized duct. Dampers are available in even sizes from 8" x 8" to 36" x 24". All dampers are 1/8" undersized from their listed size. ZDS dampers are for side mount, width by height and the motor and end plate will be on the smaller dimension for typical insertion into the side/shorter dimension of the duct. ZDB denotes bottom mount and is ordered height by width. The motor and end plate are on the longer dimension for typical insertion into either the bottom or top of the duct.



The ZD damper is available with three (3) different motor actuators:

ZDS and ZDB are powered by the MSS, a 24VAC Spring Return Motor. These dampers are typically Powered Closed and Spring Return Open. They can be specially ordered as Powered Open or changed in the field. These dampers can also be set for a minimum position setting.

ZDSM and ZDBM are powered by the MDM, a 24VAC Motor. This motor is a power open-power closed reversible motor. It can be used as a two-position damper controlled by a zoning panel or it can be modulating when controlled by the SPS or SPC Static Pressure Controllers. The MDM Motor has LED indicators that illuminate when the damper is Open or Closed and and can also be set for a min and max position setting.

ZDSP and ZDBP are powered by the MP12 Plug-In Damper Motor. These dampers are used soley with ZONEFIRST's Plug-In Control Panels and are power open-power closed and have LED indication of the damper position. The MP12 motor consumes less power than the other motors and has a built-in end switch that removes power from the motor, making this motor the longest lasting motor in the industry. This motor has been tested to over 1,000,000 cycles and counting.

Round Dampers

The Round Dampers are single blade galvanized steel dampers complete with motor actuator. The RD dampers can be ordered with three (3) different motor actuators depending upon the application. The models available are: RDS which has a powerful 24VAC spring return motor.

The RDS is typically sold as a Normally Open damper used with a zoning panel. The RDS can be specially ordered as Normally Closed or easily converted in the field.

The RDM is a three(3) wire power open-power closed reversing damper motor. This can be used as a zone damper with any of the 24V zone panels or controlled individually with any three wire switch or control. Most commonly the RDM is used with the SPS or SPC to control static pressure as a by-pass damper. The MDM motor used with the RDM damper has LED indicators that illuminate when the damper is in the Open or Closed position.

The RDP uses the Plug-In Damper motor that operates on 12VDC and is only used with the Plug-In Zone Control Panels. This motor also has LED illumination to indicate position.

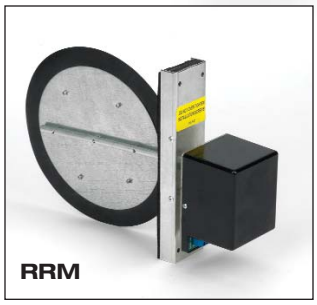
RD Dampers are available in diameters of 4”, 5”, 6”, 7”, 8”, 9”, 10”, 12” 14” 16, 18” and 20”.

NEW Retro-Round™ Zone Damper

The ***NEW*** Retro-Round™ Insertable Damper with the New Plug-In Zone Damper Motor now simplifies those hard to zone retrofit installations. The RRP is a low cost single blade damper that inserts into any branch take-off duct. It is available in 4", 5", 6" , 7" and 8" diameters.

To install, use the template provided.

1. Cut a 3/4" slot lengthwise in the duct.
2. Insert the damper and insure it is parallel with the duct.
3. Secure with the four (4) sheet metal screws supplied.


RRM

The ***NEW*** RRP is a simple low cost solution to zone individual branch runs. The additional feature of the NEW Plug-In damper motor makes the RRP even easier in terms of wiring. Using the modular cords and splitters supplied with each damper, wiring is simplified by just plugging in the damper motor and running the cord to the plug on the control panel or the ***NEW*** Dual Jack Motor. Up to 10 RRP dampers can be control from each zone. Call the factory when more are needed per zone.

A 24 Volt AC Retro-Round Damper is also available as the RRM. The RRM has a low current 24VAC Motor which allows up to 15 dampers per 40VA transformer. When using additional dampers over 15 a larger VA transformer can be used or additional 40VA transformers and 4PDR isolation relays.

Both the RRP and RRM damper motors have LED indicators that provide a positive indication of the damper being open or closed. When the LED is GREEN the damper is Open. When RED the damper is Closed.

BAROMETRIC BY-PASS DAMPERS

SPRD

The Static Pressure Regulating Dampers, Model SPRD, are barometric relief dampers used to bypass excess air pressure on zoned systems. The SPRDs automatically respond to the air pressure in duct as the various zone dampers open and close.

As zone dampers close off air to a number of zones, the supply air pressure in the duct system will increase. This increase in air pressure can also increase the noise level and reduce the flow of conditioned air through the HVAC Unit. Using the SPRD solves this by automatically compensating for the excess air pressure by opening on the increased pressure and relieving the excess air. The SPRD helps maintain a constant air pressure in the duct system. This reduces noise that is caused by high air pressures and velocities, as well as maintains a constant volume of air (CFM) through the duct system. Maintaining a constant volume of air through the HVAC System keeps the efficiency of the system at its maximum.

The SPRD is available in square/rectangular and round sizes. The chart below lists the available sizes of SPRDs and their recommended CFM capacities.

Square and Rectangular Sizes

Size	CFM	Size	CFM
12"x8"	800	20"x 8"	1,600
12"x10"	1,000	20"x10"	2,000
12"x12"	1,400	20"x12"	2,400

Round Sizes

Size (Diameter)	CFM	Size (Diameter)	CFM
7"	200	12"	1,000
8"	400	14"	1,600
9"	600	16"	2,400
10"	750	18"	3,000
20"	4,000		

Calculating Bypass Air Requirements

Determining the need for bypass air and the size of the SPRD required is very simple. It can be very easily calculated by knowing the total CFM capacity of the HVAC unit (TCFM) and subtracting the CFM capacity of the smallest zone (SCFM) will equal the CFM of air required to be bypassed (BCFM).

TCFM	–	SCFM	=	BCFM
Total CFM		Smallest Zone CFM		Bypass CFM

Once the bypass amount of air is known, use the chart above to select an appropriately sized bypass damper.

It is always recommended to have a larger size bypass than having one that is too small. It is much easier to reduce bypass air through the damper or close it off than having to increase the size of the bypass duct and/or damper.

AUTOMATIC
BY-PASS DAMPERS and CONTROLS

Static Pressure Switch – SPS

This low pressure switch is used to control the modulating RDM and ZDM Damper to regulate the amount of air by-passed based on the static pressure sensed in the duct. The SPS drives the by-pass damper Open above 0.30" WC and Closes the damper below 0.2". In between the damper stops. This low cost alternative is an economical way to provide automatic by-pass control is recommended for use on variable speed HVAC Systems.

SPS

Static Pressure Control – SPC

This medium range pressure switch is used to control the modulating RDM and ZDM Dampers to regulate the amount of air by-passed based on the static pressure sensed in the duct. The SPC drives the by-pass damper Open above 0.4" WC and Closes the damper below 0.2". In between, the damper stops. This is recommended for use on light commercial duct systems of 7.5 Tons to 15 Tons.

SPC

RDM

Modulating Zone Dampers – ZDSM, ZDBM, RDM

The Modulating Zone Dampers are used with either the SPS or SPC to provide damper control of by-pass air. The quick acting, reversing motor responds quickly to the changes in air pressure in the duct in order to maintain a constant amount of static during the changing condition of various zone calls. As actual zone dampers open and close the static will vary. These dampers, in conjunction with the static pressure devices, constantly monitor and respond to the changes in damper position and in the case of variable speed equipment, with the changes in fan speed. All dampers are available in the same sizes as the ZD dampers shown on page 6.

ZDSM

ZDBM

Models MMZ3/MMP3 & H3/H3P

MMZ3/MMP3

The Mini Masterzone™ Zoning (MMZ) Panel is a 2 and 3 zone, single stage heating and cooling control panel. This electronic panel provides the simplest zoning functions and works with all standard heating and cooling thermostats.

The MMZ is designed to use a minimum of wires to make zoning simple and affordable. Each zone uses a standard 4/5 wire (Y-G-R-W-C) thermostat. All terminal blocks are push-in connection, making wiring even simpler and no need for a small screwdriver, as with all other zoning panels. The state-of-the-art surface mount technology for all electronic components makes for a highly reliable control panel.

The zoning operation is very simple and basic. Any zone can call for heating or cooling. Once the first zone calls the MMZ will only accept other calls for the same mode, either heating or cooling. Once all of these calls are satisfied, or a maximum of 20 minutes elapses, the panel will cut off the HVAC Unit, purge the conditioned air in the duct system, and then look for opposite calls. If opposite calls exist the panel will switch over and supply that mode for the zones calling. When all zones are satisfied for both heating and cooling, the panel will then accept Fan calls from each thermostat's Fan switch. This will provide for zoned air circulation. Zones where the thermostat's fan switch is ON, will have their dampers open and the fan circulating air continuously. Zones where the Fan switch is in AUTO, will close their damper until a call is needed for heating or cooling. If all thermostat Fan switches are in AUTO, the fan will be off and all dampers return to a normally open position awaiting a call.

The panel also has simple Light Emitting Diode (LED) indicators to easily monitor the system status. It can control any Gas-Oil or Electric Heating Furnace, with or without Cooling and also zone Hydro-Air Systems using a hot water coil in a cooling air handler.

NEW H3/H3P Uni-Zone™ Control Panel

The NEW H3 Uni-Zone Control Panel is a 3 zone control panel that universally controls single stage, two stage and heat pump systems. Combining the basic zoning functions of Zonefirst's other zoning systems, this new panel has multi-function capability by setting the panels DIP switches for each specific type of operation. The H3 also has a built-in fossil fuel kit for the capability of using dual fuel heat pumps. Using the optional Outdoor Air Sensor (OAS) and Leaving Air Sensor (ZPS) these sensors automatically switch between the heat pump and fossil fuel furnace. The H3 has an adjustable Outdoor Balance Point (OBP) setting for switching between the heat pump and the furnace. The ZPS is controlled by an adjustable High Limit setting to protect the heating unit from overheating.

Other H3 features provide an adjustable built-in second stage timer which eliminates the need for two stage thermostats and substantially reduce the overall cost of the zoning system. The H3 is compatible with both conventional and heat pump thermostats.

The simple H3 operation is on a call from any zone, the calling zone(s) dampers remain open and those not calling close. The HVAC is brought on to supplied the need for conditioned air to those zones calling. Once the last calling zone satisfies, the HVAC unit is shut off. The panel holds the last damper(s) open for an approximate two minute Purge mode. after which all dampers return open to await the next call. Any staging or dual fuel control is done by the panel.

The H3 has several LEDs to indicate system operation, damper position and determine the calling zones. The H3 is also available as the H3P which uses Zonefirst's new Plug-In Dampers that simplify damper wiring and extend the motor life.

Models MZS4, MZP4 & MZA2

MZS4/MZP4

The Masterzone™ Zoning System (MZS) Panel is a 2, 3 or 4 zone control panel that is capable of controlling single stage, two stage, and heat pump systems. This multi-function board uses any 4-wire thermostat. Two stage and heat pump thermostats are NOT required, however Heat Pump thermostats can be used to remotely control the Emergency Heat.

The MZS panel is the most cost effective and versatile zone controller on the market today. Using surface mount technology, its compact size is full of features not found in any other zone control panel.

The MZS provides the basic function of zoning by being the central control panel that all zone thermostats, zone damper motors, and HVAC Equipment wire into.

When any zone thermostat makes a call, for either Cooling or Heating, the MZS panel will take the first call, open the damper to that zone, if not already open, close the dampers to the zones that are not calling for the same mode and activate the appropriate heating or cooling on the HVAC Unit. If other zones call for the same mode, the MZS panel will allow these calls and open these zone dampers until all zones are satisfied, unless there are calls from other zones for the opposite mode.

When there are opposing calls the MZS panel has a patent pending design of intelligent changeover that can allow those zones to satisfy or eventually switch over to the opposite mode if the calls for the opposite mode based on the number of those zones calling.

The MZS panel also can control two-stage and heat pump systems using single stage thermostats. This substantially reduces the overall cost of the zone system by using less expensive conventional single stage thermostats. The MZS has a built-in timer. Once a call is made the timer begins and if the demand is not satisfied within that period of time the second stage will be activated until the call is satisfied. The second stage can also be activated based on the number of zones calling in place of the timer.

The panel also has simple Light Emitting Diode (LED) indicators to easily monitor the system status.

MZA2

The MasterZone™ Zone-Adder (MZA2) Panel is a 2 zone expansion panel used to add zones onto an MZS4 Zone Control Panel.The MZA requires its own separate 24 Volt AC transformer. The panel also includes a modular jack cord which connects the MZA with the main MZS panel. The MZA2 operates similarly to and only with the MZS4 as an expansion panel. It cannot operate as a stand alone panel.

When any zone thermostat calls, for either Cooling or Heating,the MZA2 panel will take the call and look at the MZS4 status. If there are no other calls, it will open the damper to that zone, if not already open, close the dampers to the zones that are not calling for the same mode, and activate the appropriate heating or cooling on the HVAC unit. If other zones call for the same mode,the MZS panel will allow these calls and open the zone dampers until all zones are satisfied, unless there are calls from other zones for the opposite mode.

The panel also has simple Light Emitting Diode (LED) indicators to easily monitor the system status. Two LED's can be seen through the panel's front cover. These monitor the basic system operation. By removing the cover, each zone has an indicator light to show when it is a calling zone. Using the zone indicator shows which zone(s) are calling and the damper(s) to the zones that are OPEN.

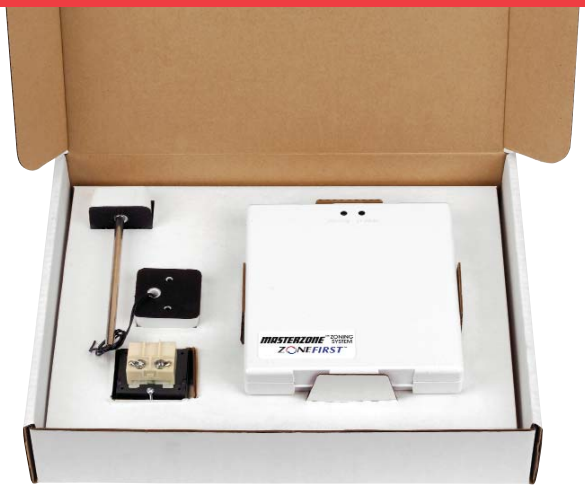
MAP2 A Zone-Adder using the new Plug-In Dampers will be available in early 2008. In the meantime a specially ordered MZA2 with a Plug and Play Adapter can be ordered using the MPA2 Model designation.

ZPS

The Zone Plenum Sensor, Model ZPS, is a duct mounted temperature probe used to provide capacity control of the heating and cooling equipment. The ZPS is used only with Zonefirst's Zone Control Panels. Mounted in the supply air duct, the ZPS senses the delivered air temperature and will cut off the heating or cooling when the delivered air temperature goes above or below normal operating limits. The heating limits are set on the zone control panel. When either limit setting is reached, the appropriate Heat or Cool Light Emitting Diode (LED) will flash on the control panel, indicating that the Heating or Cooling is shut off. The call still exists and heated or cooled air is still being supplied to the calling zones. Once the delivered air temperature drops 10° for heating, or rises 10° for cooling, the heating or cooling equipment will be brought back on. The 10 degree differential provides adequate minimum time off so as not to harm the equipment.

Location of the ZPS is critical as it should not be placed in direct line of sight of the heat exchanger or cooling coil. This can cause the ZPS to activate prematurely. It should also be located before the bypass damper, when one is used.

The ZPS requires only two wires. Typically this can be normal 18 gauge thermostat wire for short runs. If the length of wire is long or can come within 12" of any other voltage it is recommended that shielded cable be used.



System Kits

ZONEFIRST also offers a unique package System Kit which includes a zoning panel, T24 Volt 40VA transformer and appropriate sensors in one box. The system kit provides a price break for buying all components in one kit and reduces the number of items needed to stock and carry to the job.

The System Kits are offered for every main zoning panel.

MMZK – Includes:
- MMZ3 Zone Control Panel for use with 24V Dampers
- ZPS Leaving Air Sensor
- T24 Volt 4VA Transformer

MMPK – Includes:
- MMP3 Zone Control Panel for use with Plug-In Dampers
- ZPS Leaving Air Sensor
- T24 Volt 4VA Transformer

H3K – Includes:
- H3 Zone Control Panel for use with 24V Dampers
- OAS Outdoor Air Sensor
- ZPS – Leaving Air Sensor
- T24 Volt 4VA Transformer

H3PK – Includes:
- H3 Zone Control Panel for use with Plug-In Dampers
- OAS Outdoor Air Sensor
- ZPS – Leaving Air Sensor
- T24 Volt 4VA Transformer

MZSK – Includes:
- MZS4 Zone Control Panel for use with 24V Dampers
- ZPS Leaving Air Sensor
- T24 Volt 4VA Transformer

MZPK – Includes:
- MZP4 Zone Control Panel for use with Plug-In Dampers
- ZPS Leaving Air Sensor
- T24 Volt 4VA Transformer

NEW MSS

The ***NEW*** MSS actuator is the standard damper motor used on all spring return ZD and RDS dampers. This actuator features a synchronous hysteresis motor designed for long life with unique "lost motion" drive to protect the gear train from closing shock. It also has a patent pending air brake design to make the motor silent as the motor spring returns closed. The MSS has been cycle tested to over 200,000 cycles. This motor is easy secures uses a screwdriver to tighten the set screw to secure the motor to the damper. The plastic cover easy snaps on/off to cover the wiring. The wiring connections are made with wire nuts to wire leads and pass through the plastic strain relief grommet. The motor is 24 Volt, AC, 6 watts. Up to 5 MSS motors can be powered from one 24 Volt, 40 VA transformer. The MSS can also be used as the replacement damper motor for the older RDMA, RDMH, and RDMZ motors, as well as replacing many competitor motors.

MP12

The MP12 is the Plug-In Motor used on all of the dampers for our EZ Wire Plug-In Damper Systems. This is a 12VDC, powerful motor using very little current. On most of our zoning panels up to 10 motors can be powered from each zone. The MP12 wires with standard modular RJ11 jacks and 4 conductor telephone cord making wiring literally a snap. The MP12 also features a single, two color LED to indicate the motor position. Green indicates the damper is Open and Red indicates closed. The LED goes out when the damper is moving between positions. This motor has been life cycle tested to over 1,000,000 cycles making this the longest lasting damper motor in the world.

MPM

The Multi-Position Motor, Model MPM,is a 24 Volt,AC five-position motor. This motor is used with the Multi-Position Fresh Air Dampers, Model MPD, MPB, and MPI dampers. This motor also serves as a replacement for ZONEFIRST Multi-Position Fresh Air Dampers, Model MPFAD Series.

The MPM requires the Multi-Position Damper Control to control the damper to any one of its five positions, CLOSED-25%-50%-75%-OPEN. Once the motor reaches the position set on the MPDC, the motor's internal end switch cuts power to the motor. Therefore the MPM only uses power while moving between positions. Once the motor is stopped at one of its positions, it consumes no power.

The MPM and MST two-position motors are similar except for the internal switch and are interchangeable. The MPM also has a distinctive blue label and is numbered 1 through 8, versus the MST and its white label and different numbering. The MPM can be used to replace an MST motor and be a two-position actuator. The MST cannot be used as an MPM, as it can only operate to Open and Closed and not provide the in between positions.

MST

The Motor Switch Terminal, Model MST, is a 24 Volt, AC two-position motor. The MST motor is used with the Automatic Opposed Blade Dampers, automatic registers and diffusers. The MST requires a Single Pole-Double Throw (SPDT) switch to drive the motor to the open and closed position. Once the motor reaches the Open or Closed position, the motor's internal end switches cut power to the motor. The MST only uses power while moving between open and closed. Once the motor is in either the open or closed position it consumes no power.

The MST motor has been used on the AOBD, AOBD-BM, IOBD Dampers and the discontinued AFD, ASCD, and ARCD diffusers, and the MVRH and MVRV registers.

The MST also has auxiliary end switches that can be used to turn on the furnace, fan or cooling when the damper is open, as well as control a secondary slave damper.

AFC

The Anti-Freeze Control, Model AFC, is a low cost control designed to protect the air conditioning coil from freezing.The AFC is installed by simply snapping onto the suction line just outside the evaporator coil. When the AFC senses temperature at 38°F it breaks the circuit to the compressor relay, preventing a coil freeze-up. The AFC then remakes the compressor circuit at 48°F, allowing ample time for the compressor to be off. This differential prevents any short cycling. During the period the compressor is off, the fan is still running using the cold coil to provide cooling.

4PDT-R

The 4 Pole Double Throw Relay, Model 4PDR, is a 24 Volt AC multi-purpose control relay.The 4PDR is a plastic DIN rail or flush mounted socket and plug-in-relay.The 4 Pole Double Throw action provides four separate single pole double throw contacts that can be used for a variety of applications.

The most common use of the 4PDR is a slave damper control relay to control more than one damper from a single switch or zone on a control panel. The four contacts allow up to four separate dampers to be controlled by a single switch or control.

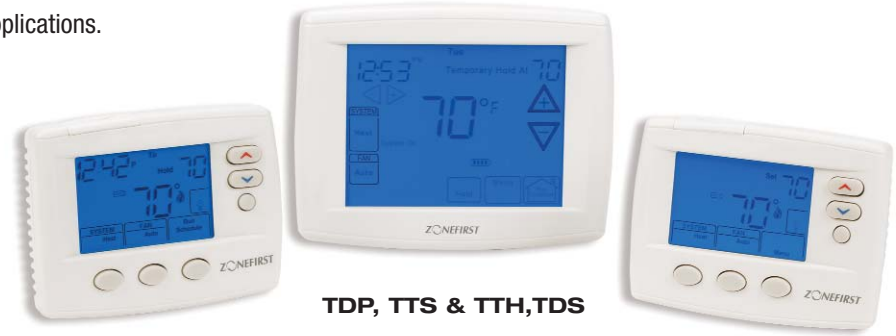
PIRR

The Plug-In Replacement Relay, Model PIRR, is a 24 Volt AC, Four Pole Double Throw Relay (4PDT).This relay is used on the 4PDR Relay Socket and is also used on the older Mastertrol Mark V, VII, VIII, X, XXX and XXXI control panels. The PIRR is the same as the RMABS.

T24

The T24 is a 120 Volt AC to 24 Volt AC, 40VA step-down transformer used to power any of ZONEFIRST's dampers and controls. The plate mounted model makes for easy installation on any standard 4" x 4" junction box.

The 6" leads connect to the 120 Volts for the transformer primary. The screw terminals provide for easy wiring of 24 gauge thermostat wire for any of ZONEFIRST's control panels or dampers.



TDP, TTS & TTH,TDS

TTS/TTH

The NEW Touchscreen Thermostats are a large attractive blue backlighted touchscreen with easy to see readout and multi-function programming. These can be used with any zoning panel and offer the ability to be programmable or non-programmable. Other features such as temperature limits and key pad lockout are just a few of the features that make these thermostats the ultimate in temperature control and appearance. There are two models offered, the TTS for single stage systems and the TTH for combination single stage or heat pump systems.

NOTE: All thermostat models are compatible with the older TAT zone control panels. The TDS and TDP are compatible with the older TAT control panels and also have the ability to control a single damper operation.

TDS/TDP

The TDS, Thermostat Digital Single Stage is a simple digital single stage thermostat for heating and cooling with no setback capability. It's single setpoint control is used with any of our zoning panels and can also be used to control a single damper to operate on temperature in a stand alone application. The bright blue backlight makes the settings easy to see in dark conditions.

The TDP, Thermostat, Digital Programmable, is a single stage thermostat with 5-1-1 or 5-2 programming features for setback control. This thermostat appears similar to the TDS except the display and buttons feature setback control. This is an attractive and economical thermostat for setback control.

FRESHEX®

FRESHEX Make-Up Air Control Dampers provide a simple and economical solution for providing make-up air to any residential or light commercial HVAC System. All dampers are constructed of spiral formed galvanized steel with a single blade to control the flow of air that pivots on a high quality self-lubricating bushing, designed to provide long life.

The single blade damper closes against a neoprene gasket seal. This provides a positive seal for a tight closure and minimal leakage and prevents air from entering the system unless the damper is open, providing a controlled environment for utilizing Make-Up Air.

The Make-Up Air Dampers are available in 5",6",7", and 8" diameters. The 5" and 6" sizes are complete with a plastic louver vent and integrated screen to prevent incursion by animals.

A powerful 24 Volt AC or 110 Volt AC, power open and spring closed, motor controls the damper. This low wattage motor is designed to operate off the HVAC unit transformer or line voltage,eliminating the need for additional power source. A simple two-wire design allows the damper to be connected directly to the furnace's heating controls or with the line voltage blower motor. This wiring simplifies installation and operation.

The damper is then opened every time the furnace is activated on a call for heat. The damper opens and allows outdoor air to be induced into the duct system using the furnace blower. This typically will be a small percentage of air usually less than 10%. Even when it is colder air it is mixed with the warmer return air and then heated as the furnace is on.

The outdoor air that enters through the fresh air duct helps replace some of the air that is often lost through the combustion of the furnace or vented from the house via kitchen and bathroom exhaust fans.This replacement air also helps dilute the stale indoor air, especially over the colder winter months and helps to dilute harmful gases and odors to provide a more healthy indoor air environment.

The amount of outside air brought in is determined by the size of the fresh air duct and damper in relation to the return air duct size and the blower capacity. To determine this one must be familiar with duct sizing charts. Typically smaller HVAC Systems less than 2,000 CFM would use anywhere from a 5" to 8" round diameter.

The only component needed is the Fresh Air Round Damper, Model RDF, which is the 24 Volt Round Damper, Model RDS, and the plastic louvered vent cover in the same diameter.

RMP

The Round Multi-Position damper is a single blade damper and five (5) position damper motor. The damper is controlled by the MPDC, Shown below, to one of its five positions, CLOSED-25%-50%-75% and OPEN. The RMP with the MPDC is a very simple low cost way of providing fresh air intake into any HVAC System for make-up and ventilation control.The advantage of the five position control and damper allows for you to adjust how much fresh air you desire.The RMP includes the MPM motor (page 13) and is also used on the MPD series of dampers shown on below.

Multi-Position Fresh Air Intake Damper – MPD

The Multi-Position Fresh Air Dampers (Model MPD) provide an economical way to control the intake of fresh outdoor air into any forced air ventilation system. The MPD dampers are a factory-fabricated aluminum opposed blade dampers using a 24-volt,6 watt, 5-position damper motor. The MPD is identical to the AOBD (page 6) except for the type of motor included with the damper. The damper motor is controlled by the Multi-Position Damper Control, and can control up to two MPD dampers. The MPDC is manually controlled to set the damper(s) to any one of five positions: CLOSED, 25%, 50%, 75%, OPEN. The MPDC damper controllers are ordered separately.

In small residences, usually only one damper is used to provide fresh air ventilation. On larger homes or commercial applications, it may be desirable to have one MPD in the fresh air duct and another to close off the return. In this application, the return air damper can be adjusted to operate in reverse of the fresh air damper.

As the fresh air damper opens, the return air damper will close and vice versa.

Other Models Available: MPDS, MPDB, MPDI. These are identical to the AOBD series shown on page 6, except for the multi-position damper motor, Model MPMA, in place of the 2 position, Model MST. Both motors are interchangeable and can easily make a two-position damper a five-position damper and vice versa.

Multi-Position Damper Control – MPDC

The MPDC is a 5-position rotary switch on a standard 2 x 4 polished brass wallplate. The MPDC allows manual control of the MPD dampers to any one of 5 positions: CLOSED, 25% ,50%, 75%, and OPEN. The MPDC can control up to two MPD dampers. One damper typically controls the fresh air intake and the other controls the return air. Two wires power the MPDC with 24 volts. Each motor requires a 6 conductor wire.

SYSTEM SELECTION GUIDE

DETERMINE THE NUMBER OF ZONES

TWO OR THREE ZONES

SINGLE STAGE GAS - OIL - ELECTRIC

PLUG & PLAY 24VAC

MMP3
MMZ3

HEAT PUMPS

H3P
H3

FOUR ZONES OR MORE

FOUR ZONES

MZP4
MZS4

FIVE ZONES OR MORE

MAP2
(AVAILABLE Late 2007)
MZA

ZONE DAMPERS

RECTANGULAR AND SQUARE

SIDE MOUNT BOTTOM MOUNT

PLUG & PLAY 24VAC

ZDSP
ZDS

ZDBP
ZDB

ROUND IN-LINE AND RETROFIT

RDP
RDS

RRP
RRM

BAROMETRIC

RECTANGULAR OR ROUND

SPRD

BY-PASS

MODULATING

LOW PRESSURE
5 TONS or less

SPS

OR

MEDIUM PRESSURE
7.5 TONS +

SPC

TO CONTROL MODULATING DAMPER

ZDSM

ZDBM

RDM

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