MINI-MASTERZONE™ ZONING SYSTEM – 3 Zones

MMP3

For Plug-In Damper Motors

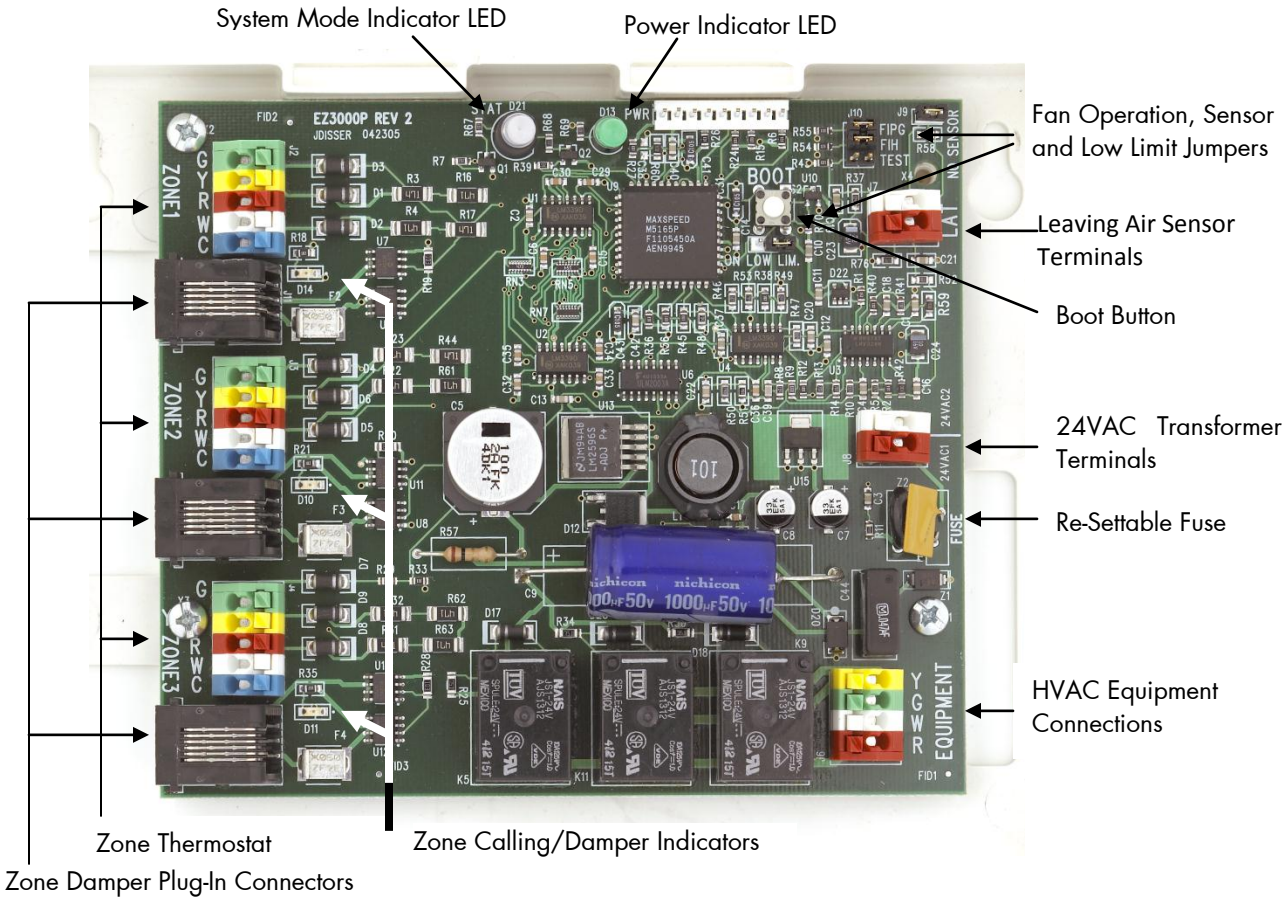


ZONEFIRST®

Controlling Your Comfort Room by Room

MINI-MASTERZONE™ ZONING SYSTEM – 3 Zones

Features



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INSTALLATION

The Mini-MasterZone™ Plug-In Damper Zoning System-3, Model MMP3, is a two (2) and three (3) zone control panel for single stage heating only, cooling only or heating and cooling. The MMP3 can control any single stage gas-oil-electric furnace, hydro-air heating and air conditioning. The MMP3 panel is the central control panel where all zone dampers, zone thermostats, HVAC Equipment and power transformer are wired.

When installing the MMP3 panel it is important to pick a central location where it is most convenient to bring all the wires. Most often this is near the furnace or air handler and closest to power, the HVAC unit controls and the zone dampers when typically located at or near the plenum.

The MMP3 case and cover are made of sturdy ABS plastic and can be mounted to any flat surface. It is recommended that the panel be mounted to a wall or return plenum and NOT on the furnace or plenum where it will be in contact with the high heating temperatures. The panel can be located in an attic space or in an enclosed cabinet of a rooftop unit, provided the panel enclosed and not in direct exposure to the elements.

The cover easily removes from the case by pulling firmly and separating the cover from the case exposing the circuit board. There are 4 key-hole mounting points in each corner of the case. The case has openings in the rear of the case as well as the side for all wiring. Wiring can come from the back as well as the side in order to make a neat installation.

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OPERATION

The MMP3 controls single stage heating and cooling HVAC Equipment. The MMP3 is compatible with any standard single stage thermostat and setback thermostats as well. The MMP3 has various features that make installation and checkout very simple for all of the board's functionality.

The MMP3's basic function is zone control. On a call for heating or cooling, the panel will accept the first call from any zone. Upon accepting this call the MMP3 will keep open the damper(s) to the zone calling, close the damper(s) to those zones not calling, activate the needed HVAC controls for heating or cooling, whichever is being called and not accept any calls for the opposite mode.
Any calls for the opposite mode will be locked out until the initial mode is either satisfied or a period of time has elapsed that is sufficient for the first mode to satisfy, a maximum of 20 minutes. A Patent Pending sequence determines the time the unit has been running or needs to continue to run in order to adequately provide conditioning for each mode. If a particular mode has already been calling for 20 minutes or longer and an opposite call comes in the MMP3 will immediately drop the mode, enter the purge mode in order to dissipate the conditioned air into the zones calling before switching over to provide the new conditioning call to its zones.

PURGE TIME

Once a call is satisfied the MMP3 drops the call for the heating or cooling unit controls, whichever was calling and hold the damper(s) to the zone(s) that were last calling during the Purge Mode. The Purge mode is nominally 2 minutes and allows the excess conditioned air in the plenum to be distributed only to the zone(s) that were last calling. This eliminates the problem of overshooting the temperature in the satisfied zones.

During the Purge mode the panel can be set to keep the Fan running during Purge or to let the fan control in the HVAC unit to control the fan. By using the FIPG (Fan On-In Purge) jumper, on the top right corner of the control panel, this keeps the fan running until the Purge mode is over. This mode avoids the fan shutting off during the Purge mode and coming back on when another zone may be on constant fan after the Purge Mode is over. This may be more often used in commercial applications for continuous air circulation (CAC). In residential applications the fan remaining on, especially in heating, may be drafty and objectionable.

Once all zone thermostats are satisfied for heating and cooling, the MMP3 can now accept Fan calls allowing Continuous Air Circulation(CAC) in those zones where the thermostat's Fan Switch is set to ON. These zone dampers will be OPEN while the dampers to the zones where the Fan Switch is set to AUTO will be CLOSED.

When all zone thermostats are satisfied for both Heating and Cooling, and all Fan switches are set to AUTO position, the HVAC unit will be off and all zone dampers will return to a normally open position. Once a zone calls for heating, cooling or fan, the dampers to the calling zones remain open and the dampers to the zones not calling will close.

HVAC Equipment Set-Up

The MMP3 is factory set for conventional fossil fuel (oil or gas) single stage heating and cooling. The panel only needs to be configured when using with a conventional electric furnace or hydro-air system in order to bring the fan on with a call for heat.

By using the FIH (Fan On-In Heat) jumper, located on the upper right corner of the board, this allows the Fan to be activated with a call for heat. Once the heat call is satisfied the fan will shut off as well, as long as the FIPG jumper is off as well.

Other jumpers on the panel are for NO SENSOR and LOW LIMIT. The NO SENSOR jumper must be on to jumper the pins when no sensor is used. The LOW LIMIT jumper is OFF for a Heating limit of 170°F and ON for a higher heating limit temperature 180°F.

CHANGEOVER TIMER

Whenever a call is made for either heating or cooling, the changeover timer is activated in order to track the amount of time heating or cooling is on. When an opposite call is made after a first call is existing the changeover timer calculates the amount of time the unit has already been supplying the first mode in order to determine how long it will hold off the opposite call. If an opposite call is made shortly after the first call, the opposite call may be held off for as much as 20 minutes. If the first call or subsequent calls for the first call mode has had that mode operating for up to 20 minutes already and an opposite call comes in after 20 minutes, the changeover timer will immediately recognize the opposite call, shutting off the current mode, enter the purge mode and automatically switch to the opposite mode.

The longer a call has been running up to 20 minutes, the shorter the wait time will be for an opposite call. If a call is over 20 minutes and an opposite call is made the changeover will be immediate following the purge time. This intelligent changeover timing makes the MMP3 unique to any other zoning system.

CHECKOUT

The MMP3 has unique features that simplify the checkout of the system and has LED readouts that constantly indicate the system operation. Once 24 Volt Power is applied to the panel the Green Power LED will illuminate. This will stay illuminated constantly when power is applied.

The System LED will provide several different indications based upon color and if it is flashing.

Heat ON – RED
Heat Over limit – RED Flashing
Cool ON - GREEN
Cool Over limit – Green Flashing
FAN ON - AMBER
PURGE - AMBER Flashing

Each zone has its own small Green indicator LED next to each zone relay. This light is lit whenever the zone damper is to be open, either on a call or when all zones are satisfied.

WIRING

The MMP3 is very simple to wire and requires only a minimum number of connections. The MMP3 terminal blocks are screw-less and all wires can easily be pushed into their respective terminal by de-pressing the button for each point and releasing once the wire is seated. To remove the wire, just press its button again and remove the wire.

Zone Dampers – The MMP3 powers only the 12VDC plug-in dampers. Each damper comes with a modular cord and plugs (RJ11) already installed to allow each zone damper to just plug into the MMP3 panel. Additional dampers can be slaved to one another by using the splitter included with each damper. Additional dampers are connected via each splitter to "daisy chain' from one damper to the next. A maximum of 10 dampers per zone is recommended.

Upon installation it is recommended that as each motor is connected that each motor is cycled, before connecting the next motor, to insure proper operation of that motor and to minimize troubleshooting looking for a possible bad motor or wire connection.

Zone Thermostats – The thermostats wiring will for single stage can be four or five wire. The fifth wire being the C-Common terminal for 24 Volt powered thermostats. There are 5 terminals on the MMP3 for each thermostat, marked Y-G-R-W-C. This wiring is shown on Wiring Diagram 1 for single stage thermostats.

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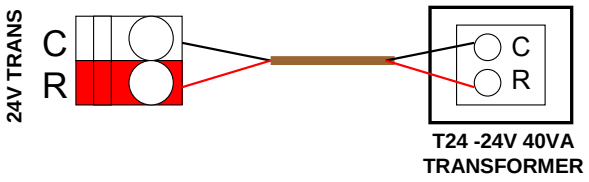
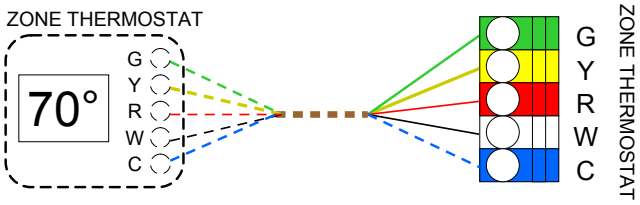
HVAC Equipment – The HVAC equipment will follow Wiring Diagram 2 for Single Stage Systems. The MMP3 can also control Heating Only and Cooling Only as well as both Heating and Cooling.

Transformer – A separate 24 Volt AC, 40VA Transformer is recommended to power the control panel and dampers. Often the transformer on the HVAC unit only has enough power for its own controls. Therefore it is recommended a separate transformer be used to power this panel and the dampers wired to it.

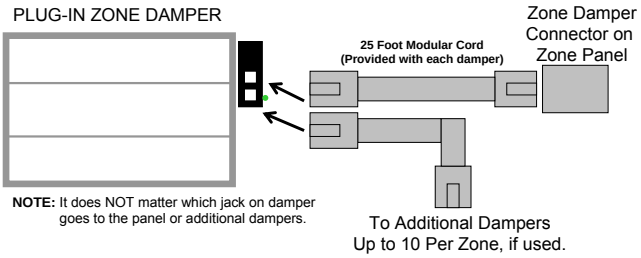
Transformer Wiring



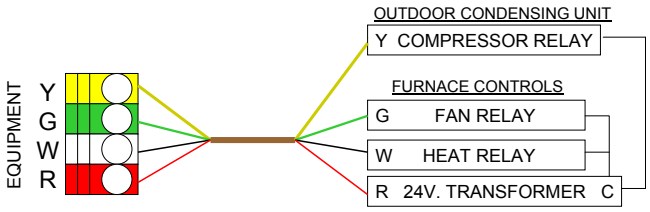
Zone Thermostat Wiring



Plug-In Damper Wiring



HVAC Equipment Wiring

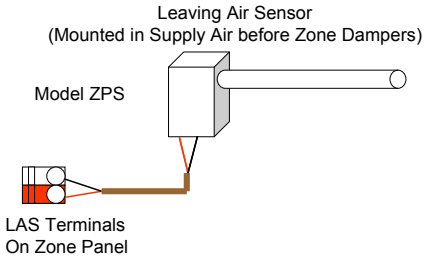


Zone Plenum Sensor

The Zone Mix-Air Sensor, Model ZPS, is a remote sensor that is located in the supply air duct to sense the leaving air temperature of the HVAC Unit. The ZPS is a high limit protection for the heating and a low limit protection for the cooling. When zoning, the airflow through the HVAC Unit is critical. The LAS protects the equipment in low air flow situations as well as when by-pass air is being directed back into the return air duct.

The heating limit is fixed at 180°F. The cooling limit is fixed at 40°F. When the ZPS senses heating above its set point, or cooling below its set point, the MMP3 will drop both stages of heating or cooling. The ZPS must sense a 10°F fall for heating or rise for cooling before re-activating the first stages of heating or cooling. If two stage heating or cooling is being used the second stage timer will start again once the first stage is re-activated.

The ZPS requires 2 wires from the sensor to the LAT terminals on the MMP3 panel. The ZPS probe can also be adjusted for length by loosening the end nut and sliding the probe thru the mounting plate in order for the probe to pass through any duct insulation



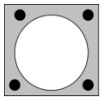
NOTE: If the ZPS is not used, the NO SENSOR jumper located just above the LAT terminals must be on the pins.

After installing the ZPS, use the chart supplied with the ZPS to check the Ohm reading for the apropraite duct temperature.

TROUBLESHOOTING

The MMP3 is a very simple control to troubleshoot, especially with the LED indicators. The only other device needed is a simple Volt/Ohm meter.

Almost all problems can be traced to an external component or wiring to the MMP3. While the MMP3 has been designed to operate under extreme voltage conditions and is fuse protected, like any computer the micro-processor can hang up and not operate properly. For these instances a BOOT button has been installed that re-boots the micro-processor just like your computer. Pressing this button for a few seconds and then release it will allow the micro-processor to re-boot and in most all cases eliminate the problem. If not the following procedure can help isolate the problem.



If the BOOT Button does not resolve the problem, turn off the power to the panel for several seconds until the LEDs got out and then turn the power back on to see if the panel resets. In many instances this resolves the problem.

The first check is for 24VAC Power to the panel. When there is power the Green Power LED will be lit. If not check the transformer and the power supply to it.

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Zone(s) Not Calling
Each zone has a Green LED next to the zone relay when it is calling. The LED being lit shows that the call is being recognized by the MMP3. If a zone is supposed to be calling and the Zone LED is not on, check for 24VAC across the thermostat terminal C and the Y, if a Cool call, W if a Heat Call, or G if a Fan call. If there is no voltage here at the panel the panel is not getting the signal from the thermostat. The problem is mis-wiring, a broken wire or a problem in the thermostat. To check the zone on the panel, place jumper from R to Y to simulate a Cool call, R to W to simulate a Heat call, or R to G to simulate a Fan call. By jumpering these terminals the zone call LED will activate.

Zone(s) Will Not Shut Off
If a zone will not stop calling, the Zone LED should still be on. Depending on the call disconnect the Y, W or G wire from the zone terminal strip on the panel. The call from that zone will drop out when the thermostat wire is removed. Check the thermostat wiring for a mis-wiring or short that keeps the zone calling.

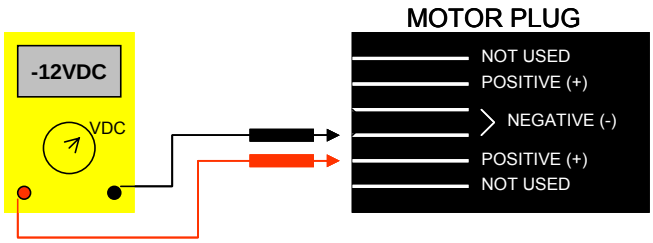
If the thermostat wire is disconnected from the proper terminal on the zone and the zone LED remains lit, re-boot the panel to see if the call drops. If the call still stays on, turn power off to the panel for 10 seconds and then turn back on. Once powered is restored and the thermostat is disconected the call should drop from the zone. If not replace panel.

Damper Motor Checkout Procedure

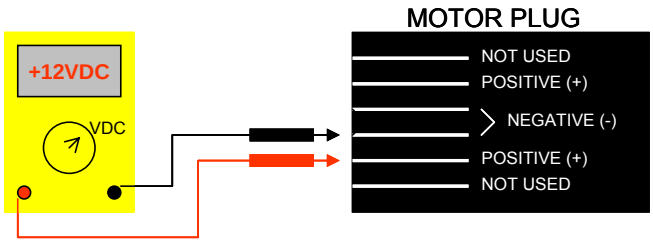
In order to determine the operation of the damper motors, the panel motor plug can be checked to determine if power is being supplied from the panel. If there is power at the motor plug, the problem may be a broken wire or poor connection in the cord or the motor itself.

To check the power to the motor from the damper plug on the panel, switch your meter to DC Volts. Note the wires on the plug and check across either Positive and Neagtive wires. Note that each plug has two positive leads and two negative leads. Both positive and both negative leads are wired together. The meter will read either Plus(+) or Minus (-) 12VDC depending if the damper is to be Open or Closed respectively.

DAMPER CLOSED



DAMPER OPEN



When using multiple dampers on a single zone, please note to have no more than 6 dampers on a single zone. Adding dampers beyond the recommended number may cause all dampers to be slow to operate and may not fully cycle between open and closed.

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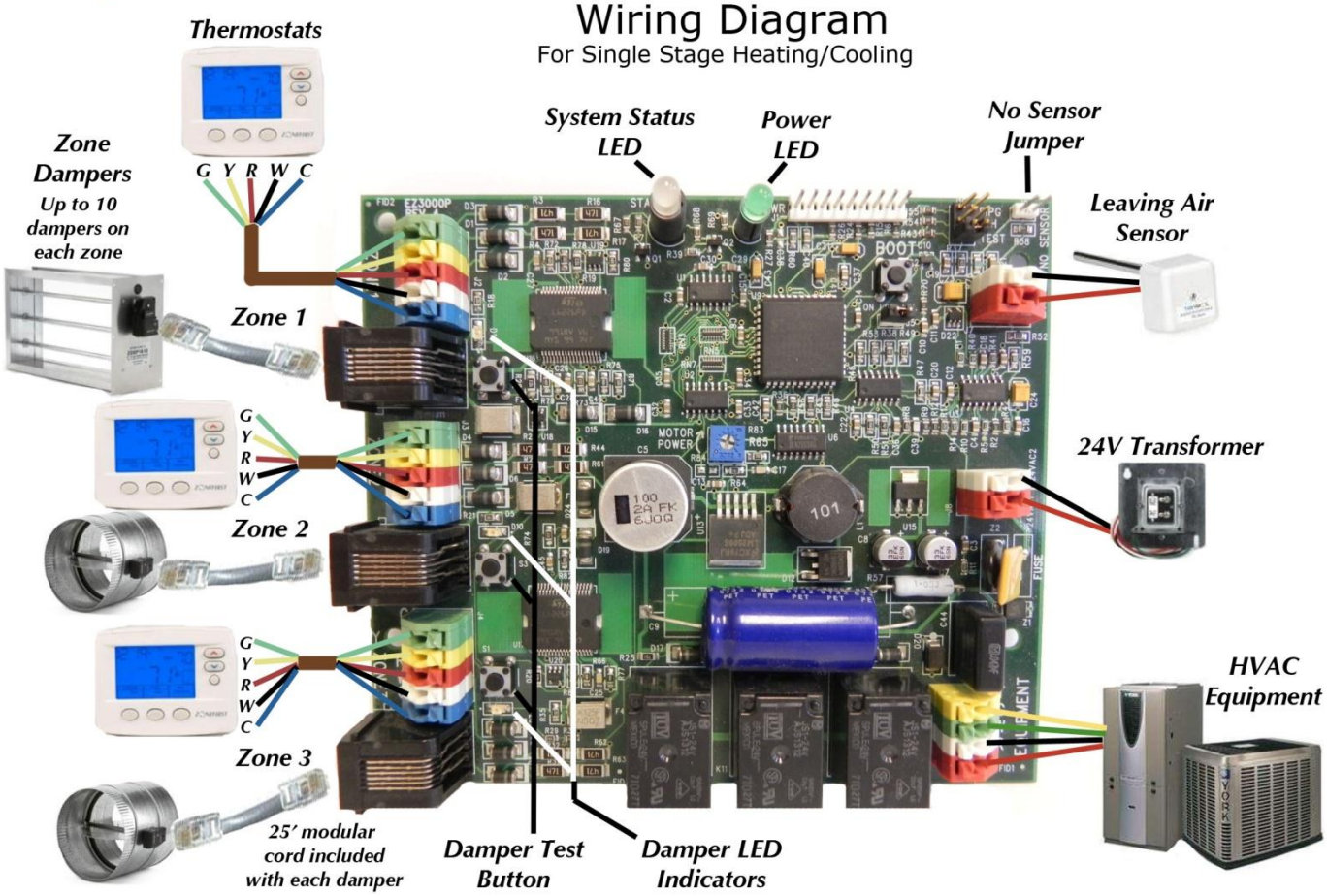
MMP3

Wiring Diagram

For Single Stage Heating/Cooling



SYSTEM OPERATION: The MMP3 Zone Control is used with conventional single stage gas, oil or electric heating and cooling. When either zone calls for heating, cooling and/or the fan only, the satisfied zone damper(s) close and the MMP3 activates the appropriate HVAC Controls. When all zones are satisfied, all dampers open. The top right LED indicates power to the panel at all times. The System LED is RED for Heat Call, Green for a Cool Call and both light Yellow for a Fan Only call or in a time delay. Each zone damper has an LED that lights whenever the zone damper is to be open. For further information refer to the installation instructions with this panel or scan the code in the top right corner. For on the job assistance call 1-877-FIRSTZONE (347-7896), M-F, 7AM-5PM, ET.

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