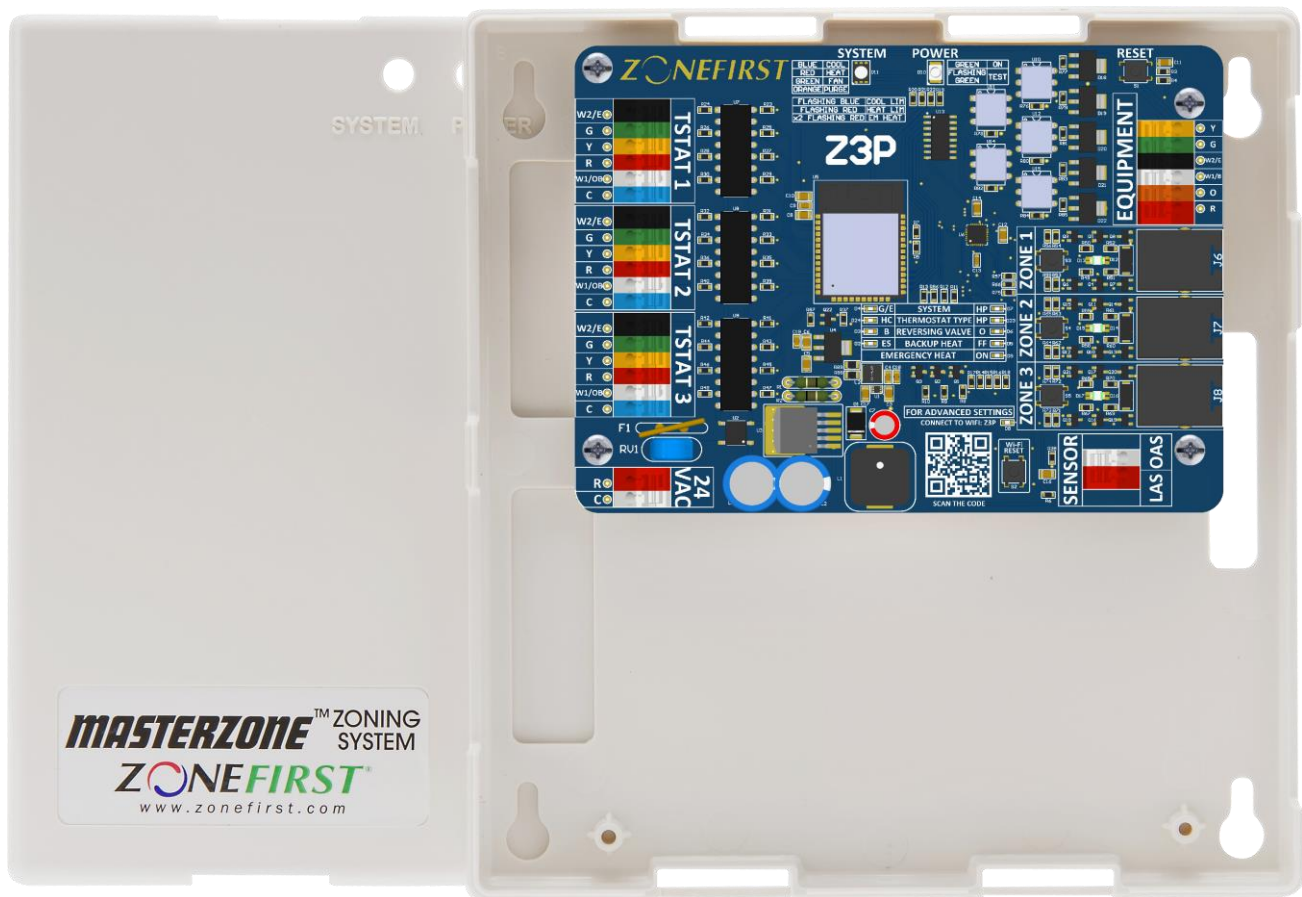


MODEL Z3P

For use with Plug-In Zone Dampers Only

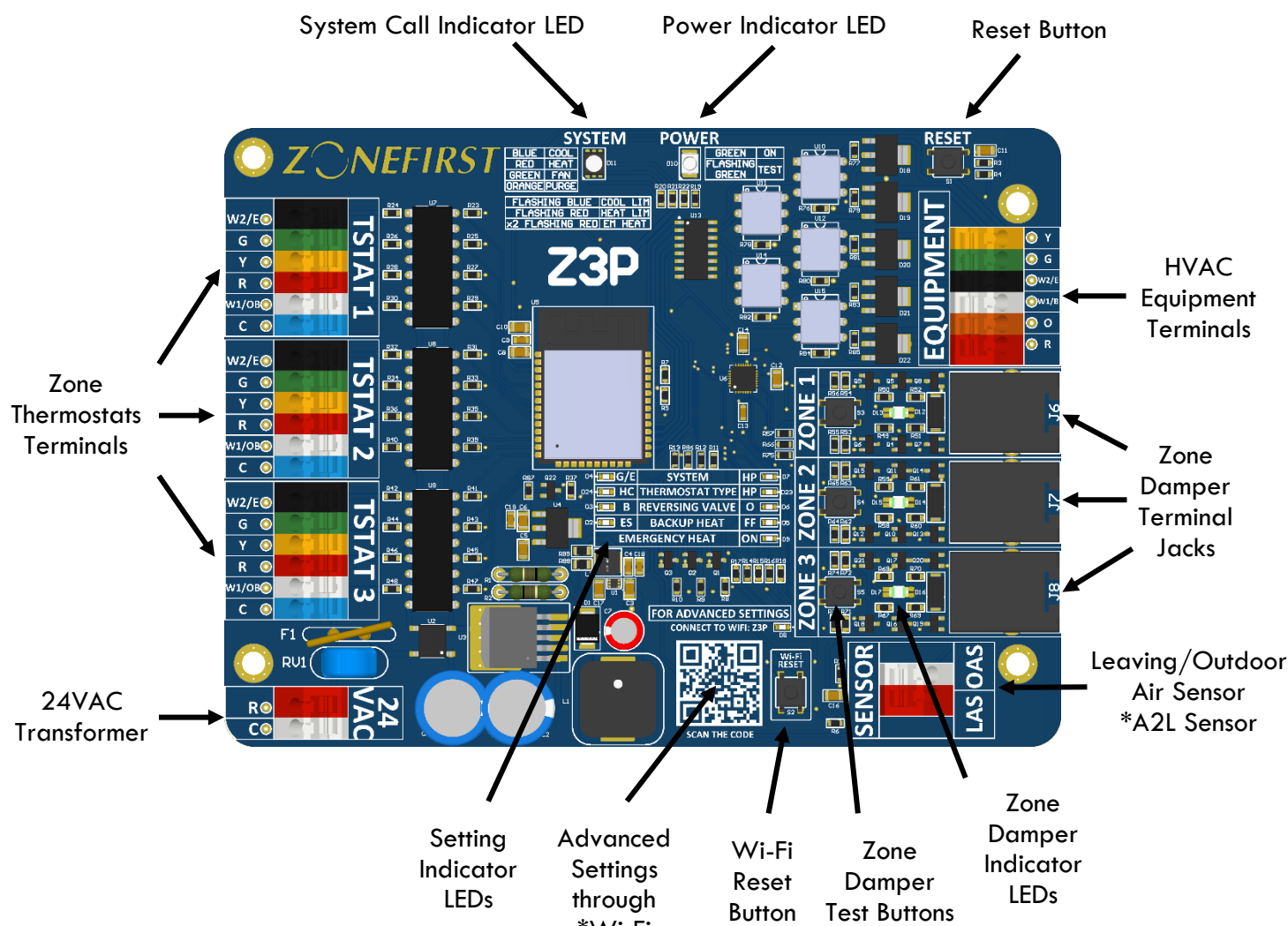


Installation and Operating Instructions



www.zonefirst.com

Z3P PANEL FEATURES



***A2L Sensor – For A2L Refrigerant Leak Sensors that only trigger by a NO or NC contact.**

***Wi-Fi – Does not connect to the internet, all settings are changed locally using a mobile device**

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INSTALLATION

The Z3P Control is a three (3) zone control panel that can be used with conventional single stage heating and cooling and heat pumps with or without dual fuel. The Z3P panel is the central control panel that all zone dampers, zone thermostats, HVAC controls, power transformer and sensors are wired.

When installing the Z3P panel it is important to pick a central location where it is most convenient to bring all the wires. Most often this is at the furnace or air handler. It is often the most convenient location and closest to power, the HVAC unit controls and the zone dampers when typically located at or near the plenum. The Z3P panel case is 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 excessive hot temperatures. The panel can be installed in an attic space or in an enclosed cabinet of a rooftop unit. Ensure the panel is 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 from the rear as well as the side making the wiring as neat as possible.

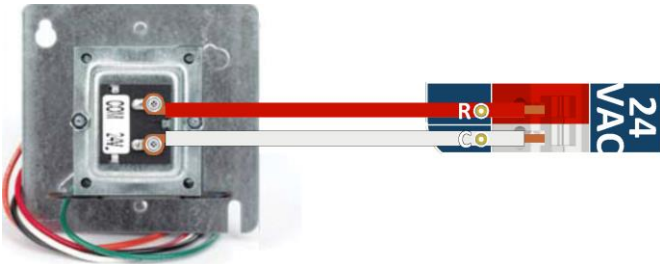
OPERATION

The Z3P can be controlled by conventional single stage or heat pump thermostats. Each thermostat can then call for heating, cooling, or the fan. When a thermostat calls the panel will keep open the damper to the calling zone, if not already open, close the dampers to the zone(s) not calling and activate the appropriate HVAC equipment. When opposite calls exist for both heating and cooling the panel will allow the zones to automatically switch between the modes. When all zones are satisfied the panel then looks for individual fan calls from any zone and controls the dampers based on these calls as well. When all zone thermostats are not calling for heating, cooling or the fan, all dampers will return to a normally open position.

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.

POWER

Powering the Z3P is just a matter of supplying 24VAC to the R and C terminals at the bottom of the board. We typically recommend a standalone 40VA transformer for the board



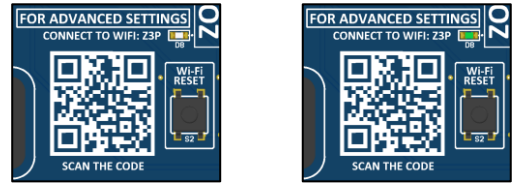
Resetting the Z3P is easy as pushing the **RESET** button at the top of the board. When there is power to the panel, the **POWER** LED at the top will be solid green. When **Test Mode** is initiated in the settings, the **POWER** LED will start to flash, indicating **Test Mode** is active. If the LED is not on, this is a clear indicator that there is a power supply issue and a confirmation of any shorts in the system should be clarified.



ADVANCED SETTINGS

The Z3P is factory set for conventional heating and cooling operation. The panel only needs to be configured when used with heat pumps or other changes need to be made.

WI-FI INTERFACE – Most of the panel configuration is done by connecting to the local Wi-Fi network on the Z3P. Enabling the Wi-Fi network on the board is straightforward. Pressing the button once will trigger the green LED to turn on. While the LED is green, head to your Wi-Fi settings on your mobile device and select the network: “**ZONEFIRST Z3P**”.



Now that you are connected to the Z3P board, open your camera and point it at the QR code located on the board. The camera will prompt you to select the link. After opening the link, you will be directed to a page with all the settings on it.

The Z3P will automatically save all the setting options regardless of a board reset or a power failure. The local Wi-Fi network will remain active for a total of 15 minutes or until the button is pushed again.

Other functions come by wiring for specific applications. Below is shown the most typical settings. Review each function for your application.

SYSTEM TYPE – G/E or HP – This toggle sets the HVAC Output operation to either *Gas/Electric* or *Heat Pump*.



- In *G/E* position, the Y1 makes as a Cool call and W1 as a Heat call.



- In *HP* position, Y1 makes as the compressor call for both heating and cooling with respect to their reversing valve.



THERMOSTAT TYPE – HC or HP – This toggle determines if conventional *Heat/Cool* thermostats or *Heat Pump* thermostats are being used for ALL zones.



- In *HC* position, a conventional Gas/Electric thermostat would have separate W and Y output for heating and cooling calls.



- In *HP* position, a Heat Pump thermostat uses Y for both a heat and cool call and the O or B is used to determine whether the call is for Cooling (O) or Heating (B).



REVERSING VALVE – B or O – When using HP type thermostats this toggle determines if the *B* or *O* terminal is wired to the *W/OB* terminal on each thermostat to determine if the call is for Heat (*B*) or Cool (*O*).



- In *B* position, reversing valve will energize for heat.



- In *O* position, reversing valve will energize for cool.



BACKUP HEAT – ES or FF – This toggle is used to determine the equipment output when the *System Type* is set to *Heat Pump*.



- In *ES* position, the emergency heat electric strip will only turn on with a call for heat.



- In *FF* position, the emergency heat fossil (dual) fuel will turn on and turn off the main call for heat.

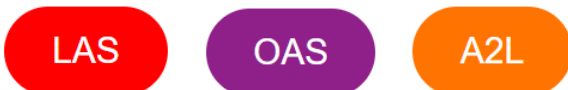


EMERGENCY HEAT – This switch sets any heat call to call for the emergency heat. The *Emergency Heat* LED on the panel will light only when this switch is *ON*. This is used when there is no *Emergency Heat* switch on the thermostats.



SENSOR TYPE – LAS or OAS or A2L – This switch allows you to change the type of sensor you can use at a time.

- LAS (Leaving Air Sensor) is used for adding a safety temperature sensor in your duct.
- OAS (Outdoor Air Sensor) is used for Heat Pumps that have a backup fossil fuel source in the event of colder temperatures.
- A2L is used for newer systems that have a newer refrigerant leak sensor (NO/NC) which is slightly flammable.



TEST MODE – This switch accelerates the panel timings in order to provide a quick checkout of all of the functions without having to wait the full time for each sequence. This allows you to run tests on the panel without waiting for excess amounts of time.



FAN IN HEAT – This switch will activate the fan on a call for heat.



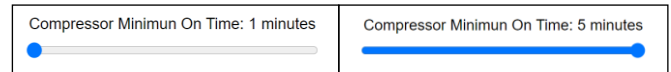
FAN IN PURGE – This switch will activate the fan during a purge call, after the end of each heat or cool call.



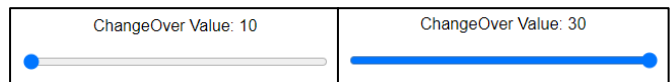
COMPRESSOR MINIMUM ON TIMER – The Z3P has a minimum on time whenever the compressor operates in order to prevent frequent short cycling. Once there is a call for cooling or the compressor on a heat pump, the Z3P will hold that call for a period of 5 minutes if this feature is *ON*.



When enabled, a slider will be available to toggle the time anywhere from 1 minute to 5 minutes with 1 minute intervals.



CHANGEOVER TIMER – Whenever a call is made for either heating or cooling, the changeover timer is activated 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 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 30 minutes. If a call has been operating for up to 30 minutes and an opposite call comes in after 30 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 *Changeover Timer* can be set anywhere between 10 and 30 minutes using the slider.



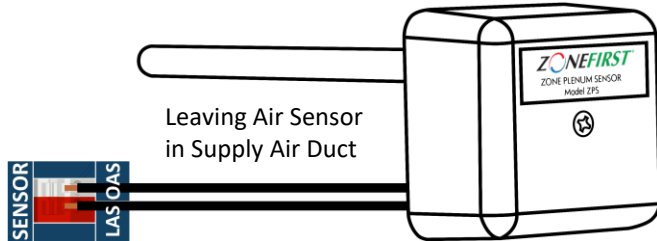
ZONE ALONE (Eliminates Zoning) – The zone one (1) thermostat becomes the controlling thermostat for the entire system. During long unoccupied periods, one thermostat (Z1) can be set back versus adjusting each zone thermostat on the system. All dampers are opened and all calls for heat, cool or fan are made from the zone one (1) thermostat. All other zone thermostats are locked out.



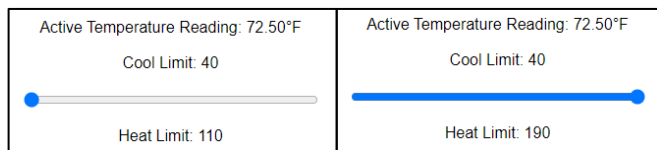
SENSORS

Leaving Air Sensor (LAS) / Zone Plenum Sensor (ZPS)

The Zone Plenum 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 ZPS protects the equipment in low air flow situations as well as when by-pass air is being directed back into the return air duct. For LAS/ZPS sensor to be active, enable the setting on the local Wi-Fi settings.

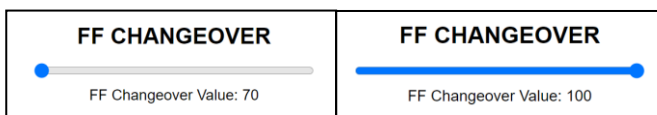


The heating limit is adjustable from 110°F to 190°F using the slider on the webpage. The cooling limit is fixed at 40°F. When the ZPS senses heating above its set point, or cooling below its set point, the ZPS will drop the call of heating or cooling. The ZPS must sense a 10°F fall for heating or rise for cooling before re-activating heating or cooling.

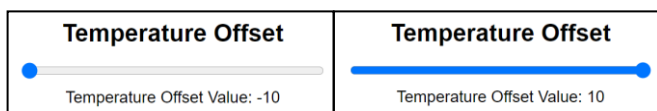


The ZPS requires two (2) wires to their respective SENSOR terminals on the Z3P panel.

FOSSIL FUEL (FF) CHANGEOVER – In this mode, the LAS is used to determine if the duct temperature is lower than the FF changeover temperature setpoint. If it is, the Z3P will shut the compressor outputs off and run the Emergency Heat (W2/E). Using the slider, the set point is adjustable from 70°F to 100°F. When enable and the LAS measured temperature is less than the FF changeover temperature, the compressor is shut down and the Emergency Heat (W2/E) is activated for the remainder of the heat calls

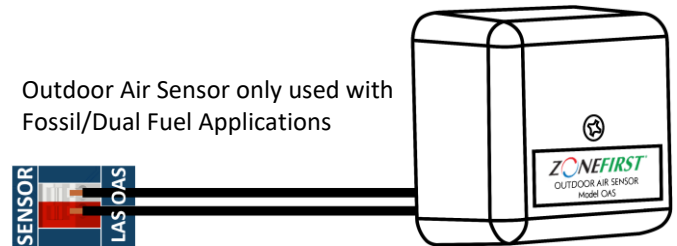


Temperature Offset – While having the setting on either LAS or OAS, you will be able to offset the temperature reading. In the event of an offset measured temperature from the space vs the temperature measured on the zone panel, an adjustment can be made to match up the values. Offset can be toggled between -10°F and +10°F with 0.5°F intervals giving you plenty of room to work with.

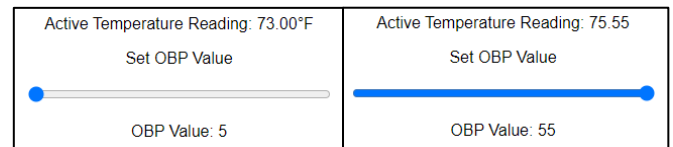


Outdoor Air Sensor (OAS)

The Outdoor Air Sensor, model OAS, is used only when using a Heat Pump with Dual/Fossil Fuel back-up furnaces. The OAS senses the outdoor air temperature and switches the heating control between the heat pump and the fossil fuel furnace.



The temperature set point for this is adjustable on the Outdoor Balance Point (OBP) slider on the webpage. It is adjustable from 5°F to 55°F. It is suggested that this be set just above freezing to avoid the heat pump from potentially going into Defrost mode.



The OAS requires two (2) wires to their respective SENSOR terminals on the Z3P panel.

Refrigerant Leak Sensor - A2L

The A2L Refrigerant Leak Sensor is used only if there is a leak sensor present on the unit. The sensor terminals accept 2 wires used for a close or open contact trigger. When triggered, this will cause the LED at the top to flash white while leaving all the dampers open. The fan will turn on for a duration of 5-10 minutes before checking for a trigger again. The NO/NC toggle will dictate which type of trigger will cause the board to go into an A2L refrigerant purge.



The time after the A2L sensor is triggered can be toggled using a slider anywhere between 5 and 10 minutes with 1 minute intervals.

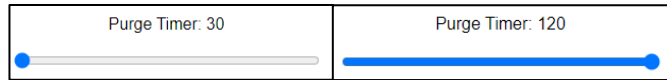


When there is a leak detected, you will see a flashing white LED for **SYSTEM**. Depending on what time you set for the trigger, the LED will continuously flash until there is no trigger present. When a leak is present, the option *Refrigerant Leak Detected:* will show *Yes*. When a leak is not present, the option *Refrigerant Leak Detected:* will show *No*.



PURGE TIME

The Z3P has a built-in Purge Time after each call is satisfied and provides a minimum off time before another call is initiated. The Purge Time can be set anywhere between 30 seconds and 120 seconds after all calls for a particular mode are satisfied or when the Changeover Timer requires a changeover due to opposing calls.



After all calls are satisfied or the changeover timer activates, the Purge Timer begins and the heating or cooling, whichever was on, is deactivated. Typically, the fan may be running during this time and the damper(s) to the last zone(s) calling will remain open to purge the conditioned air only into those zones that were calling for the conditioning. The Fan in Purge setting can be set ON to keep the Fan running during the Purge mode in order to prevent the fan cycling off and back on between modes. In the instance where the Fan staying may create a draft, and the frequency of opposite calls is minimal; this switch can be kept to OFF.

CHECKOUT

The Z3P 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.

SYSTEM MODE	COLOR LED INDICATOR	
Heat Call	Solid Red	
Heat Limit	Flashing Red	
Emergency Heat Call	x2 Flashing Red	
Cool Call	Solid Blue	
Cool Limit	Flashing Blue	
Fan Call	Solid Green	
Purge Call	Solid Orange	
A2L Triggered	Flashing White	

When accessing the advanced settings using the local Wi-Fi network, under *Zoning Status* you will find the current HVAC operation along with the open/closed zone.

The equipment status will be presented by the following indicators:

IDLE/OFF – System is currently not making any calls. All zones should be green and in the open position.

IDLE/OFF

ZONE 1

ZONE 2

ZONE 3

COOLING – System is currently making a cool call.

COOLING

HEATING – System is currently making a heat call

HEATING

PURGING – System is currently purging the previous heat/cool call

PURGING

FAN – System is currently making a call for fan

FAN

WIRING

The Z3P is very simple to wire and requires only a minimum number of connections. The Z3P terminal blocks are color coded and screwless for all wires to be easily pushed into their respective terminal by de-pressing the button for each point and releasing once the wire is seated. (Solid wire can often just be pushed into the terminal without de-pressing the button.) To remove the wire, just press its button again and remove the wire.

Terminal blocks are used on both the thermostat inputs as well as the HVAC equipment output. Depending on your install, a variation of wiring configurations can be implemented to work with a variety of different systems.

RJ-11 jacks are used for connections to our proprietary plug-in play dampers. A 25' cable is supplied with ever plug-in damper.

Note: Any damper with a "P" in the model number, is plug-in ready.

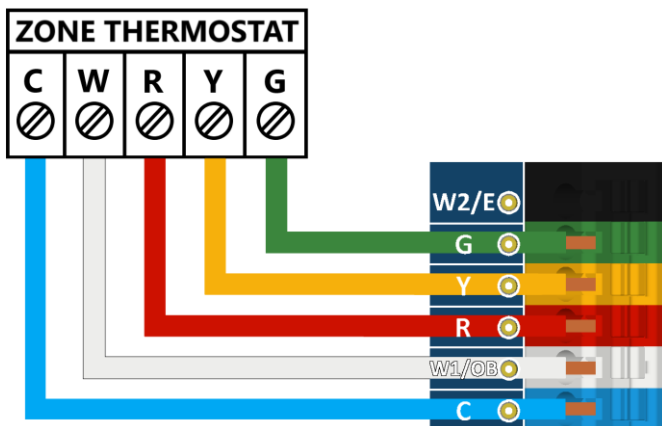
Zone Thermostats

The thermostats wiring will be for either Gas/Electric or Heat Pump. See Wiring Diagram 1 and 2 for each type of thermostat.

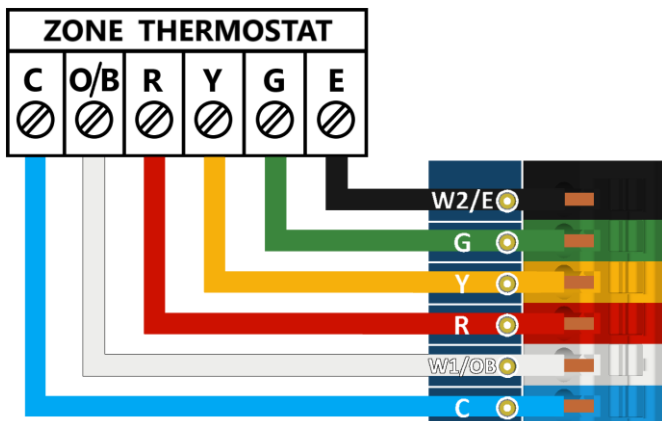
Wiring Diagram 1: Gas/Electric (G-Y-R-W-C)

Wiring Diagram 2: Heat Pump (E-G-Y-R-C and O or B)

WIRING DIAGRAM 1 – Conventional Thermostat



WIRING DIAGRAM 2 – Heat Pump Thermostat



HVAC Equipment

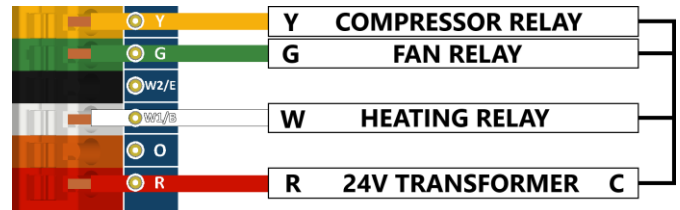
The equipment wiring will be for Single Stage Gas/Electric and Heat Pumps with either Dual Fuel or Electric Strip Back-Up. See Wiring Diagram 3, 4 and 5 for each type of equipment configuration.

Wiring Diagram 3: Single Stage Gas/Electric (Y-G-W-R),

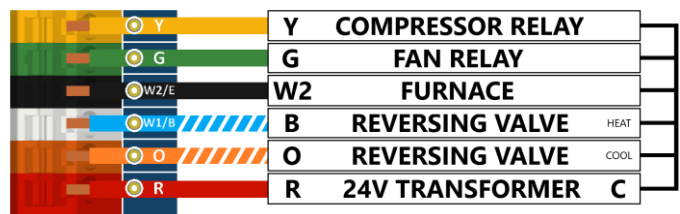
Wiring Diagram 4: Single Stage Heat Pump with Fossil Fuel Back-Up (Y-G-W2-R and O or B)

Wiring Diagram 5: Single Stage Heat Pump with Electric Strip Back-Up (Y-G-E-R and O or B).

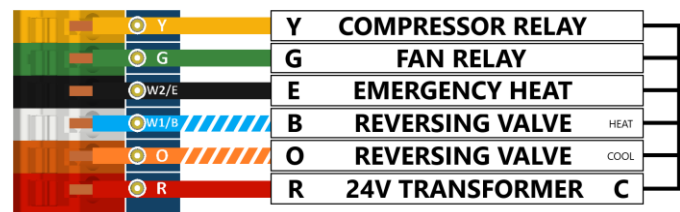
WIRING DIAGRAM 3 – Single Stage Gas Electric



WIRING DIAGRAM 4 – Single Stage Heat Pump with Fossil Fuel Back-Up

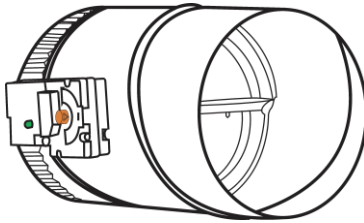
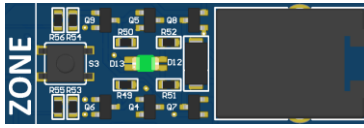


WIRING DIAGRAM 5 – Single Stage Heat Pump with Electric Strip Back-Up



ZONE DAMPERS

The Z3P provides DC power to ZONEFIRST's exclusive Plug-In Zone Dampers. These dampers use and are supplied with a modular cord that is complete with RJ11 jacks on each end of a 25' cable for each zone damper. Up to 10 dampers can be wired to each zone. The panel has a GREEN LED to indicate when the damper should be open.

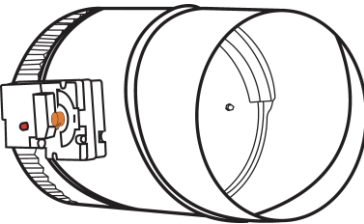
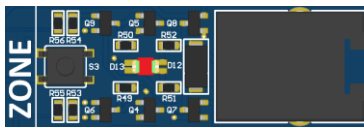


ZONE 1

ZONE 2

ZONE 3

When the damper is closed, the LED turns RED. Holding the push button down while the damper is open will trigger the damper to close; releasing it will return the damper back to the open position



ZONE 1

ZONE 2

ZONE 3

TROUBLESHOOTING

The Z3P is a very simple control to troubleshoot, especially with the LED indicators. The only other device needed is a simple multimeter. Almost all problems can be traced to an external component or wiring to the Z3P. The following procedures can help isolate the problem.

No Lights on the Panel

If the *POWER* LED is not on, then it means there's a short somewhere between *R* & *C*. The only places you will find connections for *R* & *C* are all on the left side of the panel. All three (3) zone thermostat inputs have *R* & *C* connections that all tie to the corresponding *R* & *C* terminals at the bottom left side of the Z3P. Removing all connections to the mentioned power terminals will isolate any other potential shorts. With them all removed, start by reinserting the 24VAC *R* & *C* terminals to run direct power to the panel. Going through each terminal set will let you pinpoint any shorts that are present.

Zone(s) Not Calling

Each zone has a Green LED next to the zone relay when it is calling and that calling is being recognized by the Z3P. 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*, *R* to *W* or *R* to *G* to see that the panel is operating properly. For applications using a Heat Pump thermostat, do the same tests following the Heat Pump wiring diagram shown previously.

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 terminal strip. The zone will drop out. Check the thermostat wiring for a mis-wiring or short that keeps the zone calling.

Damper Motor Checkout

To checkout the dampers, the panel has a GREEN LED for each zone. This illuminates when the dampers are to be OPEN, either on a call or when all zones are satisfied. The damper position is confirmed by the bi-color LED on the motor. When the panel is Green, the motor LED must be Green also indicating the damper being open. When the panel LED is lit Red, the motor should be closed and this is confirmed by the damper LED being Red.