Installation & Operation Instructions

Evergreen Zoning

Arzel® Zoning Technology

Arzel® Zoning Technology, Inc.
4801 Commerce Pkwy. Cleveland, OH 44128
Ph: (216) 831-6068 or Toll-Free (800) 611-8312 Fax: (216) 831-6074
www.arzelzoning.com

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Thank you for choosing Arzel!

Thank you for choosing the Arzel® Evergreen Zoning System™ for your comfort and energy efficiency needs. The Evergreen Zoning System represents the latest in zoning technology. It is designed to both enhance your system's performance and deliver just the right amount of heating and cooling to every area of your home or building.

Please be assured that in addition to the highest in product quality, we are committed to unparalleled product performance and complete customer satisfaction.

Simple Operation Assures Comfort

Your zoning system is simple to operate and requires no maintenance.

The system will allow you to increase your comfort by directing conditioned air to separate areas (zones) based upon each zones' thermostat setting. It provides the opportunity to conserve energy by adjusting the thermostat setting in unoccupied areas to energy saving levels. The system's ability to interface with the Evergreen motor provides the most efficient blower operation to serve the actual needs of your home.

To operate the system, just set or program each zones' thermostat to your desired comfort and/or set-back settings. When there is a call for heating or cooling from any zone, the appropriate heating or cooling equipment will be turned on. The dampers in zones not requiring heating or cooling will close and the conditioned air will be directed to the calling zone(s) until the thermostat is satisfied.

The system responds to each thermostat on a first-call/ first-serve basis unless your contractor has programmed an alternate priority approach to deal with concurrent heat and cool calls with your application. The system can be set to an Automatic Priority (first-call/ first-serve), Heat Priority, Cool Priority or a Zone Weight Priority setting. Please refer to page 17 or consult your contractor for more details regarding the priority option programmed for your system.

When there is not an active call for heating or cooling, you may circulate air in individual zones by selecting the "Fan ON" function on each individual thermostat. The dampers in zones with the fan set to "Auto" will close.

Please feel free to learn more about the installation and operation of the Arzel Evergreen Zoning System by reviewing this entire manual. Consult your installing contractor with any questions regarding system operation. If questions are still unresolved, you may call Arzel's technical support Monday-Friday 8 a.m.-6 p.m. EST. Please have your system serial number available when you call. Arzel support can be reached by calling 1-800-611-8312.

Product Overview

The Evergreen Zoning System is a non-proprietary, residential and light commercial zoning system, designed for heat pump or standard heat/cool control. Innovative features provide the opportunity to customize the control to meet the needs of any forced air system and maximize its efficiency and effectiveness.

Pro-Active Staging
The system will automatically "stage-up" to avoid the feel of "cold blow", when the heat pump's capacity is not sufficient to provide heated discharge air. The user will not have to wait for the temperature in the space to continue to fall before the equipment reacts. This feature also reduces or eliminates the need for two-stage thermostats by measuring outdoor air temperature and controlling the staging decision based on the calculated heating requirements.

Staging Based upon Zone Weight
The air handler or blower "stages" independently from the compressor and electric auxiliary heaters. Zone Weight staging of the blower reduces or eliminates the need for a bypass and matches the available CFM to the percent of ductwork being served. Evergreen Zoning System can also slow the air handler speed to increase latent heat removal during dehumidification cycles.

Broad Thermostat Compatibility
The Evergreen Zoning System is compatible with any conventional 24VAC thermostat including wireless, auto/manual changeover, programmable and non-programmable. Zone 1 will accept any heat/cool or heat pump thermostat. A heat pump thermostat can be used on Zone 1 to provide convenient control of emergency heat. Zones 2-4 must use standard four or five wire single-stage heat /cool thermostats only.

Humidification and Dehumidification
With the addition of a simple humidistat the Evergreen Zoning System can control a 24vac humidifier which includes opening and closing a humidifier bypass damper. It can also control the system to act as a whole house dehumidifier. Dehumidification with a separate dehumidistat will engage low stage cooling (Y1) with low stage blower speed (G) and open all zone dampers. When used with equipment that has a dehumidification function the Evergreen Zoning System simply passes the dehumidify signal from Zone 1 through the output terminals.

Additional Built-in Controls
- Full function Dual Fuel control.
- Leaving Air Temperature settings (High/Low) provide equipment protection at reduced CFM operation and stage down capacity control.
- Outdoor Air Temperature sensor provides an outdoor reset function, balance point control, auxiliary resistant heat lock out and low ambient cooling lock out.

INSTALLATION PRECAUTIONS

Read these instructions carefully.
Failure to follow them could damage the Arzel® Zoning System and/or cause a hazardous condition.

WARNING

1. **Disconnect the power supply** to the HVAC system and the zoning system before making any wiring connections to prevent the danger of electrical shock or equipment damage.
2. Be sure the HVAC manufacturer's operating specifications are compatible with the Arzel zoning system.
3. All wiring must comply with applicable electrical codes, ordinances and regulations.
4. Use properly grounded tools, safety glasses and gloves when drilling or cutting sheet-metal ducts, fiberglass or any hard objects.
5. Follow all precautions and instructions provided with the Evergreen replacement motor.

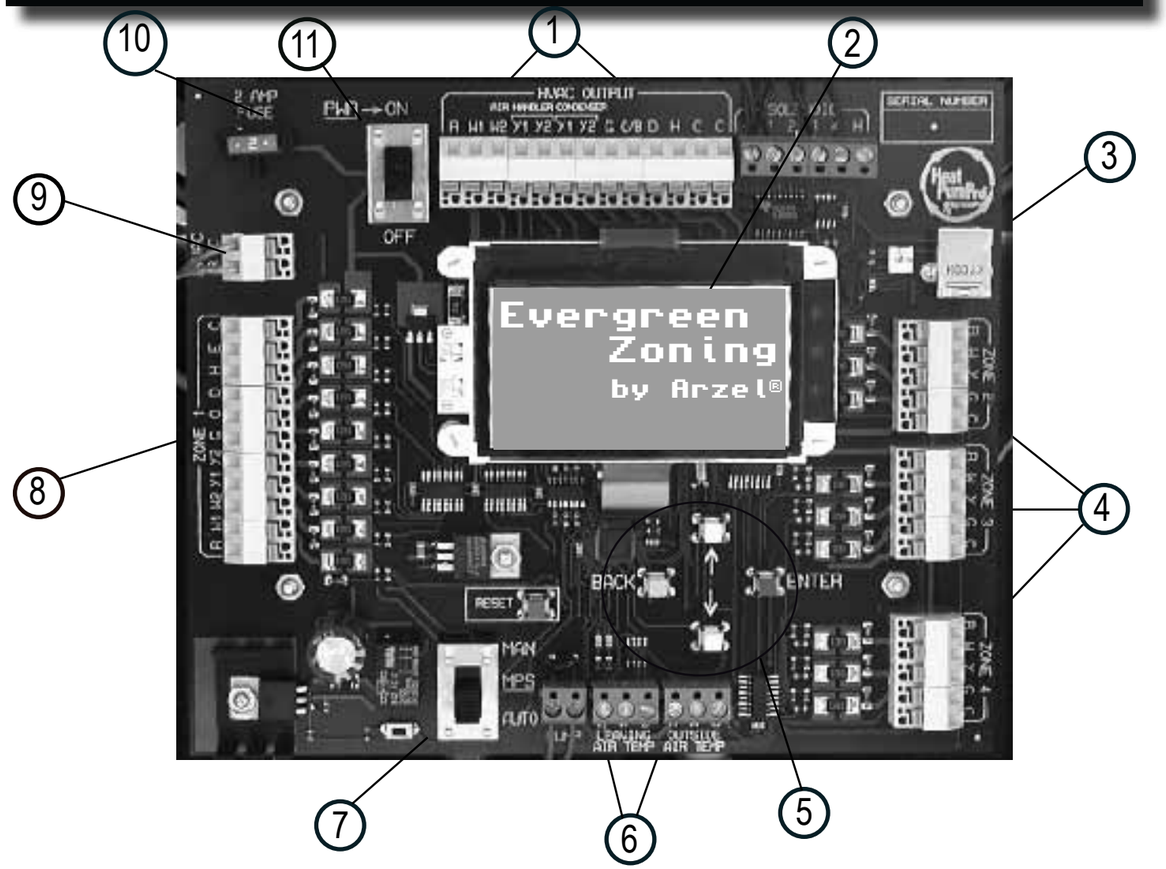
CAUTION

1. The Arzel system is designed for indoor use only.
2. You must touch a grounded metal object before handling the control panel to avoid potential loss of internal programs due to electrostatic discharge.
3. Install control panel in ambient temperature between 40° F and 140° F in a non-condensing area.
4. Check all system operations after installation is complete.
5. The damper blade gently wipes the inside of the ductwork. Insert a sleeve inside any fiberglass, or abraidable ductwork, so the blade does not abrade the materials into the air.
6. Leave these instructions with the installed system for future use.
7. There are both AC and DC terminals on the circuit board. Do not intermingle wires.
8. The purpose of the LAT (**L**eaving **A**ir **T**emperature) control is to function as an "operating limit". When set per the instructions it will add additional capacity control and prevent the equipment from operating outside the OEM's specifications.

GENERAL SYSTEM OPERATION:

A call from any zone thermostat will initiate HVAC equipment operation, position the solenoid air valve to open the damper(s) for its zone. The mini pump is energized to automatically activate the dampers, either open or closed, as required. Vacuum opens the dampers and pressure closes the dampers. When a call is satisfied, dampers are held in place for 30 seconds after compressor only operations or two minutes after auxiliary or backup heat operations. This will allow the residual conditioned air to be delivered into last zone satisfied. The adjustable End of Cycle timer (0 to 180 seconds) will continue to operate the pump to open all the zone dampers for a SofStart on the next cycle.

Board Layout



Item #	Description	Function
1	HVAC Outputs	Dry Contacts to control HVAC equipment
2	Lighted LCD Display	Provides all system information at a glance & simplifies system setup using a guided Set-Up Wizard
3	USB Port	Software revision input and data download to lap top
4	Zone 2 through Zone 4 Inputs	Four or five wire thermostat inputs (Heat/Cool Thermostats Only)
5	Navigation Buttons	Provides programming interface for Set-Up Wizard
6	Sensor Inputs	Connections for Leaving Air Temperature (LAT) and Outdoor Air Temperature (OAT) sensors. Both sensors MUST be installed for proper operations.
7	MPS Switch	Auto/Manual switch for the Mini Pump
8	Zone 1 Input Terminal	Inputs for any 24 VAC thermostat, heat pump or heat/cool
9	24VAC Power Input	Arzel transformer connections “R” & “C” (40VA)
10	2-Amp Fuse	Protects the board against thermostat wiring shorts
11	Power Switch	Controls 24VAC power source to zone control panel

Installation & Setup Instructions

1. Install Evergreen Zoning replacement motor
The Evergreen Zoning replacement motor is supplied with separate detailed installation instructions. Follow all precautions and install the motor based upon the requirements of both the equipment and zoning application.

2. Install Dampers/Run Tubing
Dampers install directly into new or existing ductwork. Orient the tube connection port so it is pointing upstream (toward the equipment). Install one main tubing run for each zone. Use connection “T’s” for multiple dampers in a zone. Arzel recommends using a different color tube for each zone. *Note: Dampers should not be concealed behind a permanent barrier such as drywall without an access panel.*

3. Mount Control Panel
The control panel must be mounted in a non-condensing area where temperatures will not normally exceed 140° F. **DO NOT MOUNT PANEL ON DUCTWORK OR THE HVAC EQUIPMENT.** The best method is to attach a piece of 3/4” plywood to a stud wall or foundation. Hold the panel level on the wall and mark the positions of the upper mounting holes. Drive two screws into the wall leaving the heads at least 1/2” out. Set the panel over the screws. Drive two screws into the lower mounting holes. Tighten the upper screws.

Note: Prior to making electrical connections, touch a mechanical ground to discharge static electricity.

4. Connect Thermostats
Install a thermostat for each zone observing the terminal designations. Use 18 gauge, multi-conductor, solid thermostat wire to connect the thermostats to the control panel. When using a heat pump thermostat in Zone 1, “O” must be set to energize for cooling calls. Zones 2, 3 and 4 must be non-heat pump models. Document the location of each thermostat connected to each zone on the “Zone Layout” label on the side of the panel.

5. Connect Equipment
Use 18 gauge, multi-conductor, solid thermostat wire to connect the HVAC outputs located along the top of the zone control panel to the HVAC equipment. Connect Y1, Y2 “Air Handler” to the blower or furnace controls and the Y1, Y2 “Condenser” to the heat pump/air conditioner controls. The two “C” terminals are for connection between the furnace/air handler transformer and the common circuit of the heat pump/air conditioner controls.

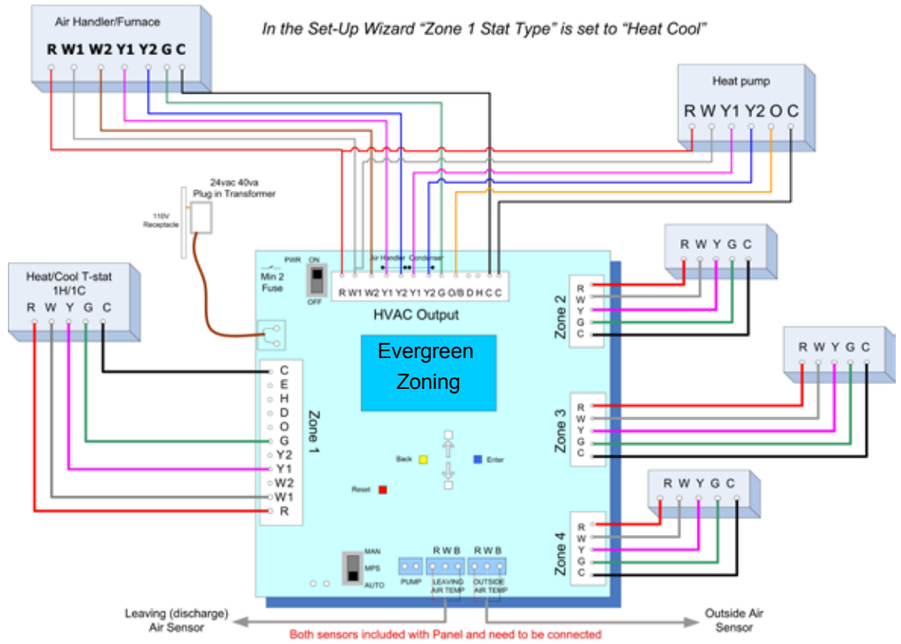
6. Connect Transformer
Use 18 gauge, 2-conductor solid wire to connect the R and C power input terminals to the mounting screws on the 40VAC self-resetting, plug-in transformer supplied with the Arzel Zoning System. Plug in the transformer to any standard 120VAC receptacle. *Note: The provided transformer also provides surge protection. If you elect to not use the provided transformer proper power conditioning is required or you warranty will be void.*

7. Connect Sensors
1. Install the leaving air temperature sensor in the supply duct 12 to 18 inches from the plenum and before any dampers.
2. Install the Outdoor Air Temperature sensor outdoors, preferably on the north side of the house, not in direct sunlight. On non-heatpump applications, the sensor can be located in the structure but must be connected.
3. Wires must be connected to corresponding terminals, R-red, W-white and B-black.

7. Turn on Panel and Run the Set-Up Wizard

Heat/Cool T-Stat at Zone 1

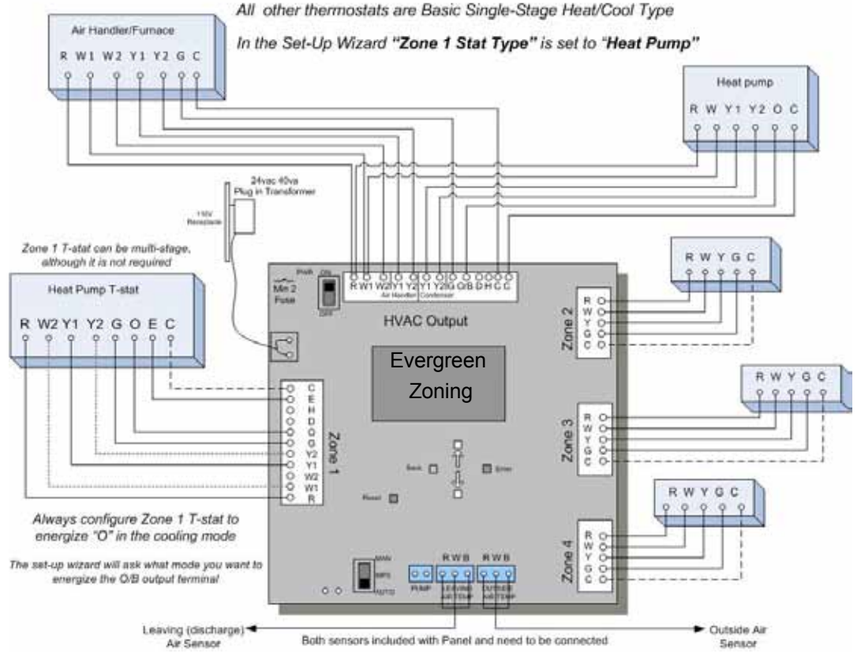
All other thermostats are Basic Single-Stage Heat/Cool Type



Heat Pump T-Stat at Zone 1

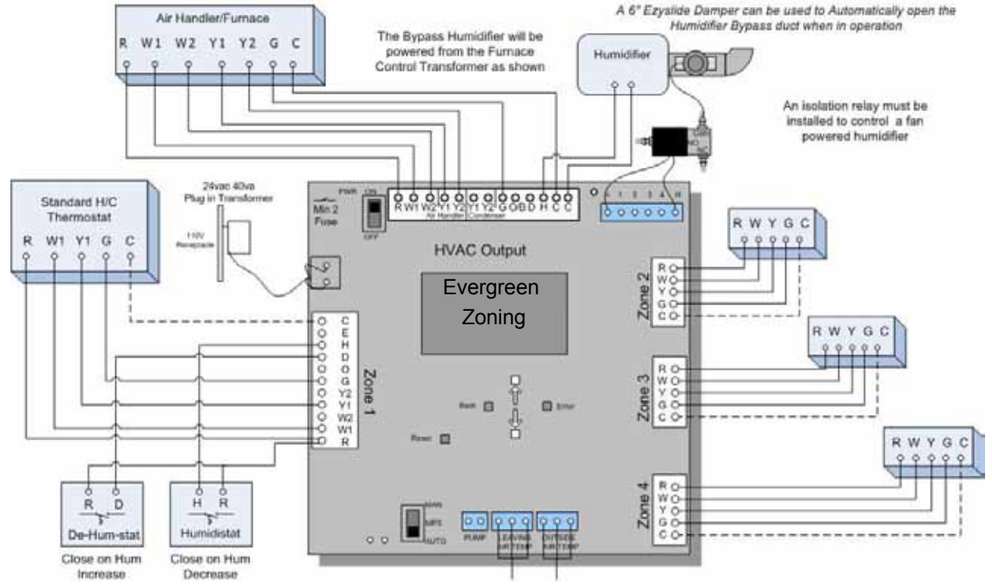
All other thermostats are Basic Single-Stage Heat/Cool Type

In the Set-Up Wizard ***"Zone 1 Stat Type"*** *is set to* ***"Heat Pump"***

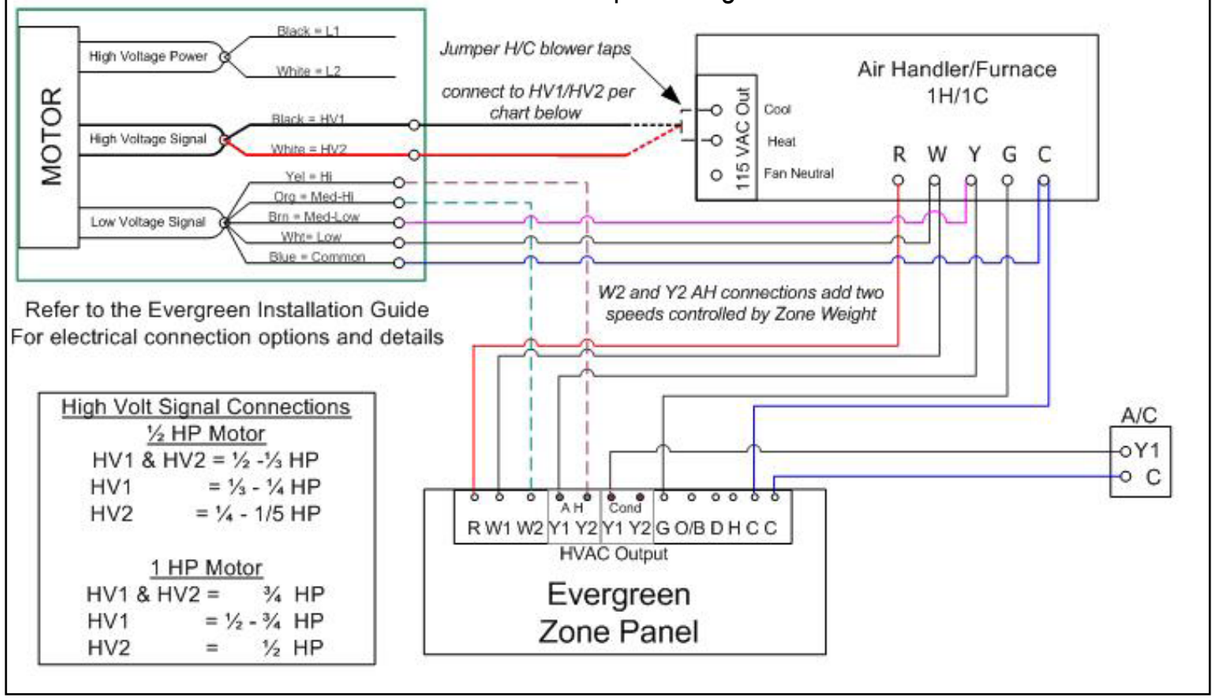


Humidity Control with Independent Humidistat & Dehumidistat

Zone 1 "H" terminal is normally at 0 vac and goes to "24" volts during a call for Humidification
Zone 1 "D" terminal is normally at 0 vac and goes to "24" volts during a call for Dehumidification
Note: A humidity controlling thermostat may also be used
In the ***"Set-Up Wizard", "Dehum Signal"*** *must be set for* ***"24 Volts"***
With out cooling calls, the Dehum cycle will cycle off every 5, 10 or 15 min according to the Set-Up wizard "Dehum Cycle Time" setting



Control Panel Output Wiring Detail



LAT & OAT Sensor Installation

Installation Notes

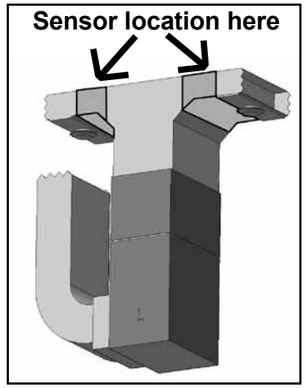
- Both sensors are identical and can be used as either the LAT or OAT.
- Both sensors must be connected to the board for proper functionality, non-heat pump applications do not require the OAT sensor to be located outside.
- If additional wire length is required on a sensor, up to 50 ft of 18-3 thermostat wire can be added.
- Keep panel power “off” while connecting sensors to the board.
- The sensors have three conductors, (red, white, black) and must be wired to the appropriate (R, W, B) terminals of the respective sensor terminals.

LAT Sensor Installation

- The sensor must be located in the supply trunk, downstream of the heat exchanger and cooling coil and before any trunk dampers.
- Do not locate the sensor in an area that is in the direct line of site of the heat exchanger, cooling coil or UV Lights, these locations can cause false readings.

OAT Sensor Installation

1. Choose a location:
   - Out of direct sunlight
   - Above maximum snow level
   - That is accessible should service be required
   - A location on the north side of the house is preferable



2. Drill a 5/16” access hole through the exterior wall aligned with one of the pre-drilled holes on the back of the enclosure body. If the sensor wire is to run along the outside of the structure, use opening located at the bottom of the enclosure.

3. Mount the sensor enclosure level over the access hole with the sensor opening on the back plate aligned with the 5/16” opening. Fasten with appropriate screws being cautious not to over tighten, flexing the box out of square.

4. Route the sensor lead into the sensor enclosure and fasten with the provided wire tie.

5. **ALTERNATIVE SENSOR MOUNTING**
   - Sensor can be mounted inside the control section of the outdoor condensing unit.
   - Ensure sensor is mounted in a location where its temperature reading will not be influenced by the equipment.

An OAT sensor enclosure is provided to protect the outdoor sensor from physical damage as well as snow, ice and solar heat influence.

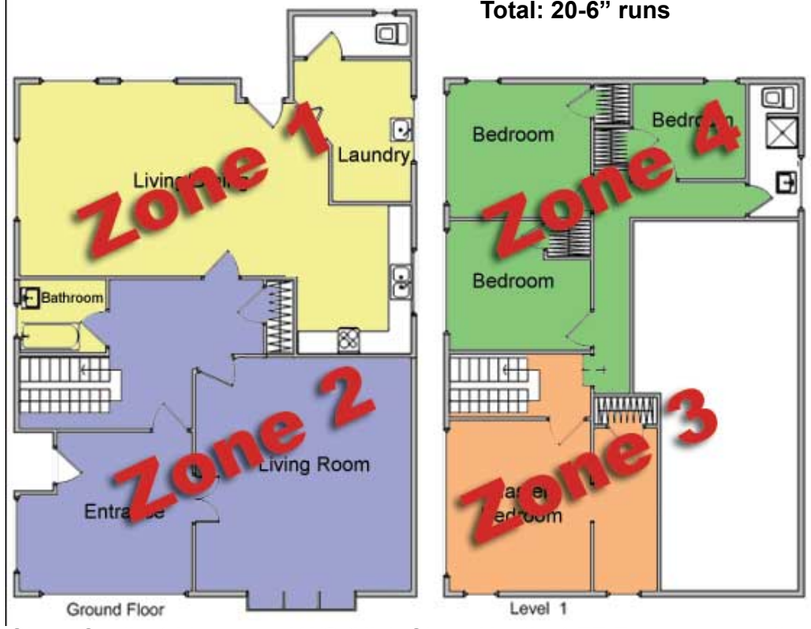
Zone Weight Calculation

The following is an example of “Zone Weight” and “Air Handler Threshold” set-up to demonstrate the functionality behind the settings you choose.

The application below is a two story home being served by four independent zones. The zone weights are determined by simply dividing the number of runs in each zone by the total number of runs in the system. Total zone weight does not need to add up to 100% and may, in fact, be over or under weighted to produce the desired results.

Zone 1	Living area, 1st Fl	(5-6” runs/20 = 25%)
Zone 2	Living area, 1st Fl	(6-6” runs/20 = 30%)
Zone 3	Master Bdrm Suite, 2nd Fl	(4-6” runs/20 = 20%)
Zone 4	Bedrooms, 2nd Fl	(5-6” runs/20 = 25%)

Total: 20-6” runs



Y2 (High Stage Cooling) blower and W2 (High Stage Heating) FF Furnace capacity will be engaged any time the
accumulated, served zone weight is equal to or greater than the AH Threshold setting in the Set-Up Wizard.

Alternate “AH Threshold” setting for the above example:

A H Threshold Set-Point	Stage-up occurs when:
100%	All 4 Zones call together
80%	Zones 1, 2 & 4 call together
70%	Any 3 Zones call together
55%	Zone 2 with either 1 or 4 call together

Zone weight settings should provide maximum airflow to zones calling, without creating objectionable air noise at the reigsters. Since many systems serve a single zone the majority of the time, low stage energy savings will be achieved.

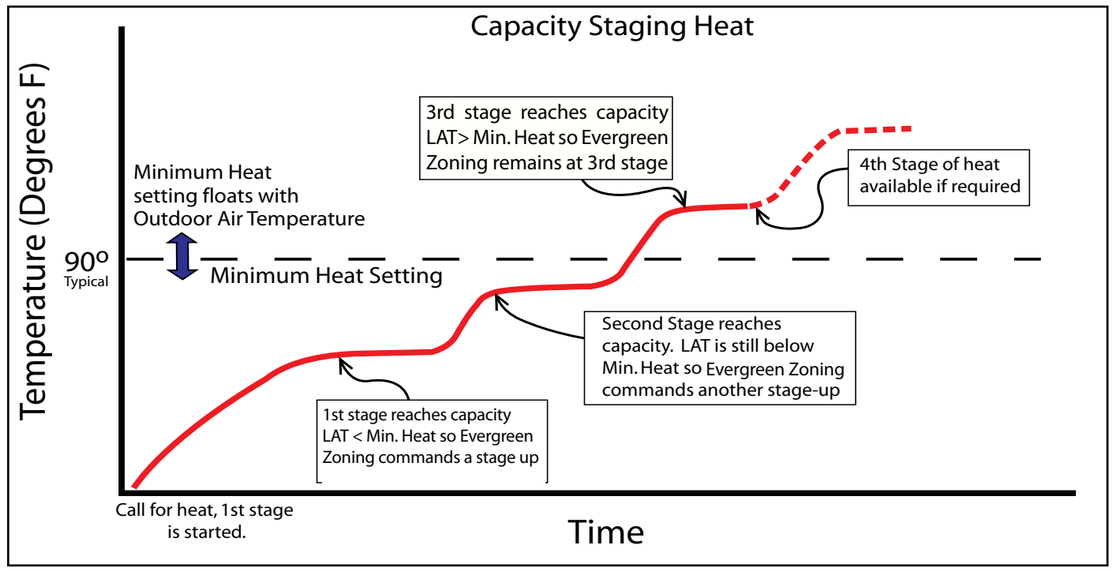
The Pro-Active approach to "Capacity" Staging

The Evergreen Zoning System™ is outfitted with both a Leaving Air Temperature (LAT) or discharge air sensor and an Outdoor Air Temperature (OAT) sensor.

During a heating cycle, the Evergreen Zoning System™ monitors the Leaving Air Temperature (LAT) and compares that temperature to a pre-selected "Heating Stage Threshold Temp". The Htg Stg Threshold Temp is determined for a 30 deg F outdoor temperature (ODT) and is continually reset as the ODT fluctuates. This allows the system to demand a higher LAT as the ODT drops. For every two degree drop in ODT below 30 deg F, the Htg Stg Threshold Temp is increased by one degree.

This feature has been designed to maintain zone by zone comfort while both minimizing high stage operation and maximizing delivered air temperature. This patented stage control also allows the use of simple single-stage thermostats, eliminating temperature drop required by 2-stage thermostats and preventing the"cold-blow" phenomenon sometimes associated with heat pumps.

The Evergreen Zoning System™ is designed to control up to four stages of heat and two stages of cooling.



The "Cool Stage Threshold" setting is a minimum supply air temperature requirement for cooling that can be set between 50° and 60°. This threshold setting will be compared to the actual LAT during the Low Stage cooling operation. If the LAT does not exceed the "Cool Stage Threshold" setting, the "Y2" output will be energized and high stage cooling operation will be initiated.

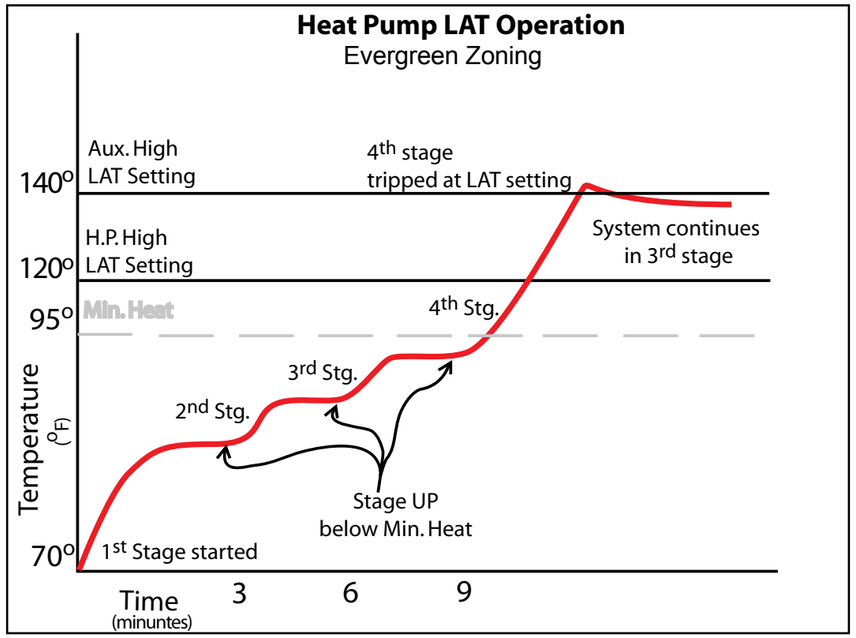
In areas where high humidity conditions exist, a lower "Cool Stage Threshold" setting might be preferable to maintain a colder coil and higher latent heat removal capacity.

Leaving Air Temperature (LAT) Controls

The LAT control stages down or cycles off the equipment to prevent operation beyond the equipment manufacturers specifications. Set the LAT parameters, both high and low, in the Set-Up Wizard.

There are three LAT settings:

1. H.P. High LAT Setting - maximum allowable temperature for heat pump only operation. (Ignored with furnace set-up.)
2. Aux. High Temperature Setting - heat pump plus backup or auxiliary heat. Furnace high limit control.
3. Cooling LAT Setting - minimum discharge temperature in the cooling mode.



This graph shows how the heating LAT system operates. If the LAT Sensor reading exceeds its set-point, the panel stages down one stage. If the temperature remains above the setting for three more minutes then it stages down again. For all-electric units the system will stage down through all four stages of heat (W2,W1,Y2,Y1).

For Dual Fuel (Hybrid) applications, the system steps down from Stage 3 (first stage burner) to a fan only output to prevent reactivating heat pump operation with a hot heat exchanger.

NOTE: All LAT controls are to be used as operating controls only and are not intended to take the place of factory limit controls. The LAT control setting must be set below the primary factory protection level.

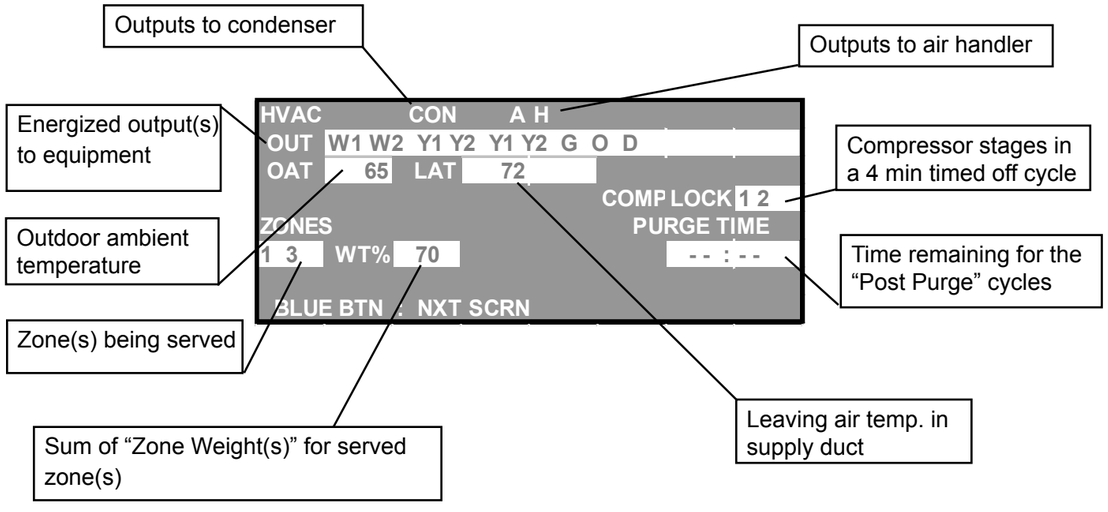
LCD Display Description

The Liquid Crystal Display (LCD) on the Evergreen Zoning System is your portal to customizing your zoning installations. The set-up options allow you to design the control sequence in the best interest of your customer, balancing energy usage with comfort delivery while maintaining safe equipment operation. These options can give energy cost priority over comfort, maximum air delivery over noise suppression or fossil fuel priority over heat pump operation. To access the Set-Up Wizard screen push the red “Reset” button just beneath the LCD, then press the blue “Enter” button.

Operating software version

Pressing the blue “Enter” button accesses the “Set-Up Wizard”

The LCD screen on the Evergreen Zoning System provides a simple way to view system operations. Once the operating parameters are set in the Set-Up Wizard, the LCD display will default to the “Main Operations” screen shown below.



Outputs to condenser

Outputs to air handler

Energized output(s) to equipment

Compressor stages in a 4 min timed off cycle

Outdoor ambient temperature

Time remaining for the “Post Purge” cycles

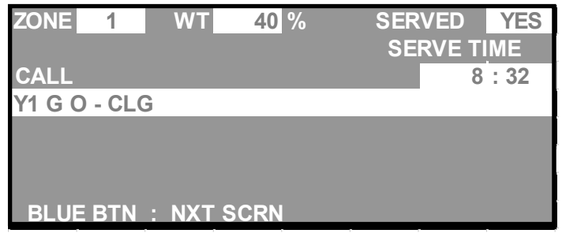
Zone(s) being served

Sum of “Zone Weight(s)” for served zone(s)

Leaving air temp. in supply duct

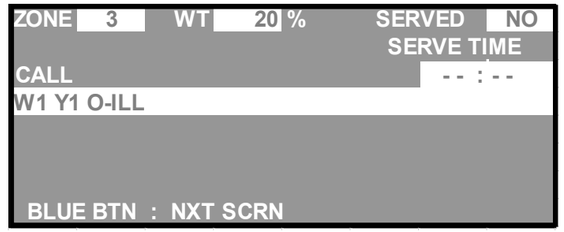
The Evergreen Zoning System provides some very useful information that makes troubleshooting simple. The Evergreen Zoning System has the ability to detect input signals from zone thermostats that do not make sense and provide a visual “ILL” (illegal) call indicator on the LCD screen.

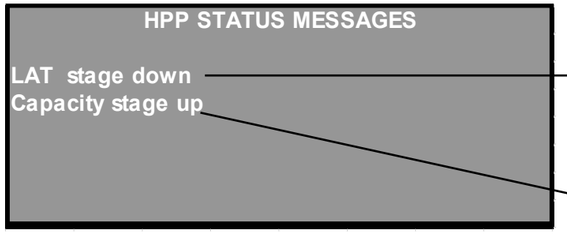
By pushing the blue “Enter” button on the board you can see what each zone is calling for and if that signal falls into the illegal category. Pushing the blue “Enter” button past the last zone will show you any “Messages” regarding staging occurrences, Balance Point status and LAT limit functions.



“Zone 1” screen showing a cooling call being served for the past 8 min 32 sec with a zone weight of 40%

“Zone 3” screen showing an illegal (W1, Y1, O) call, not being served and having a zone weight of 20%





“Message” screen showing a recent stage down due to an LAT operating limit and also a previous stage up function.

Previous status message

Status Message Menu

Below Balance Point - OAT is below the set “Balance Point”, back-up heat will be utilized

Capacity Stage-Up - Board logic has staged up to the next level of capacity

Aux Lockout OAT - OAT is below the “Aux Lock” temperature setting, Aux Heat is locked out

LAT Stage Down - LAT above “HP LAT Htg Limit”, staged down one level of capacity

Dehum Off Cycle - Dehumidification cycle is in a “timed off period” to prevent overcooling of space

Sequence of Operation

On a Call for Heat:

1. The thermostat will send the appropriate signal to the circuit board.
   Zone 1= Y1, G or W Zone 2,3,4=W
2. The control panel will start the pump and de-energize the solenoid for the zone that is calling.
3. The Evergreen Zoning System will consider the Balance Point (BP) setting if auxiliary heat is fossil fuel or Aux Balance Point is set to True:
   a. If the OAT is above the BP setting the Y1 and G signal will be sent to the air handler and a Y1 signal will be sent to the condenser (O will also be energized if set for Rev Valve Energized in the Htg mode).
   b. If the OAT is below the BP setting then the W1 will be energized to initiate back-up fuel operation, W2 will be controlled by the zone weight logic.
   c. If the BP setting is set for "Lock FF" then all heat calls will be served with a W1 output (fossil fuel) regardless of the OAT. W2 will be controlled by the zone weight logic.
4. The LAT sensor will monitor the air in the supply plenum. The sensor will be looking for the temperature set for the "Heat Stage Threshold" in the Set-Up Wizard less the outdoor reset adjustment. The threshold temperature will raise 1° for every 2° drop in outdoor temperature below 30° F. (ex. 30°OAT = 100° LAT, 20° OAT= 105° LAT)
5. The LAT sensor will continue to monitor the supply air temperature, if the temperature levels off below the heat stage threshold setting for more than three minutes the Evergreen Zoning System will send a signal to Y2 on the condenser.
6. The LAT sensor will continue to monitor the supply air temperature and continue to stage up until all stages of heat are on or the heat stage threshold temperature is met. With an all electric system the Evergreen Zoning System will stage the electric heat on with the heat pump running, with a fossil fuel back-up it will turn off the heat pump and run the back-up heat only when a W1 or W2 signal is sent.
7. If the temperature in the supply plenum reaches the auxiliary high limit it will begin to stage down the equipment while still maintaining a temperature above the Heat Stage Threshold.
8. When the zone is satisfied the equipment will turn off, the zone will stay open for two minutes and then run the pump for the time set in the secondary purge time in the Set-Up Wizard to open the rest of the dampers and allow for a "soft-start" on the next cycle.

On a Call for Cooling:

1. The thermostat will send the appropriate signal to the circuit board Zone 1=Y1,G,O Zone 2, 3,4=Y, G
2. The pump will start and de-energize the solenoid for the zone that is calling.
3. The Y1, G signal will be sent to the air handler and a Y1 signal will be sent to the condenser with an "O" if set for Rev Valve Energized in Htg mode.
4. The LAT sensor will monitor the supply air temperature in the plenum and look for the temperature set in the cool stage threshold in the Set-Up Wizard. If the LAT sensor senses a continuous decrease in temperature it will leave the system in first stage cooling.
5. If the LAT sensor senses the supply air temperature leveling off below the setting it will start a three minute timer, if the supply temperature does not reach the setting in three minutes it will send a Y2 signal to the condenser.
6. If the supply air temperature reaches the cooling low limit setting the signal to Y2 will be removed.
7. When the zone is satisfied the equipment will turn off, the zone will stay open for 30 seconds and run the pump for the time set in the secondary purge time in the Set-Up Wizard to open the rest of the dampers and allow for a "soft-start" on the next cycle.

Set-Up Wizard

To access the Set-Up Wizard for the Evergreen Zoning System confirm that the Power Switch is "ON", then press the red "RESET" button and immediately press the blue "ENTER" button while the start up screen is active. Use the white UP and DOWN buttons to change Options within each Category. Below are the set-up categories in the order they appear in the software. The Set-Up Worksheet in the back on the manual can be used to document your settings.

All settings are held in memory even when power is interrupted. To view options or make changes after initial set-up, simply press the red "RESET" button and proceed through the set-up categories, making any necessary changes, using the white "UP" and "Down" buttons.

Parameter	Description	Options	Factory Default
Temperature Display	Determines the temperature display scale on the Evergreen Zoning System.	Fahrenheit Centigrade	Fahrenheit
Mode Priority	Allows specified mode to interrupt active cycle. Priority options include- Automatic, Heating, Cooling, or Zone Weight Priority. In Automatic Priority: Auto priority will allow the first call (either heating and cooling) to establish the priority sequence for this cycle. A heating or cooling call will always override fan-only operation. Any zone can initiate constant fan if no other zone has a demand for either heating or cooling. In Zone Weight Priority: Zone Weight priority allows the call in the largest weighted zone(s) to have priority over any opposing calls in the smaller zones. The board continues that call until the largest weight zone is satisfied or the opposing call becomes the larger zone. In Heating Priority: Heating priority allows heating to have priority over cooling. Any zone calling for heating will be served immediately; if a cooling cycle is in process it will be terminated. The mode being served will be limited to a 20 min. cycle. In Cooling Priority: Cooling priority allows cooling to have priority over heating. Any zone calling for cooling will be served immediately if no other zone wants cooling. Any zone can have constant fan, if no other zone wants cooling or heating. Note: In Heating, Cooling and Automatic Priority the board will serve the priority caller for 20 minutes then the opposing call for 20 minutes and rotate until all calls are satisfied.	Automatic Zone Weight Heating Cooling	Automatic

Parameter	Description	Options	Factory Default
Zone 1 T-Stat	Type of T-Stat used on Zone 1 Enter the type of thermostat you are connecting to Zone 1 of the Evergreen Zoning System panel.	Heat Pump or Heating/Cooling	Heat Pump
Zone 1 Weight	Zone 1 relative weight Enter the percentage (approximate) of ductwork served in each zone. (i.e. Count the number of branch runs in each zone and divide by the total system runs) This can be manipulated to give a zone more air flow and/or priority, i.e. sum of zones does not need to equal 100%	10-90%, 5%	50%
Zone 2 Weight	Zone 2 relative weight	10-90%, 5%	50%
Zone 3 Weight	Zone 3 relative weight	10-90%, 5%	50%
Zone 4 Weight	Zone 4 relative weight	10-90%, 5%	50%
A.H. Stage-up Threshold	CFM Stage-up threshold, Y2 output to Air Handler or W2 to FF Furnace engaged when threshold % is reached Set the percentage of ductwork you would want to be open before the Evergreen Zoning System panel will send a Y2 signal to the air handler to increase CFM or W2 signal to furnace to increase output capacity and CFM.	30-100%, 5%	50%
Heat Stage Threshold	Min leaving air temp required for comfort at 30 OD Temp. This set-point resets by 1/2 degrees for every 1 degree change in ODT Sets the minimum supply air temperature in the heating mode. At the factory default the Evergreen Zoning System will maintain a 100º F supply air temperature at 30º F outdoor temperature. The supply air temperature will raise or lower a ½ º F for every 1ºF change in outdoor temperature.	80-130 degrees F, 1 degree increments	100 degree F
Cool Stage Threshold	Max cooling supply air temp, Y2 is energized if this LAT is not reached with Y1 output Sets the maximum supply air temperature allowable before bringing on second stage cooling. Does not reset with OAT.	20-60 degrees F, 1 degree increments	55 degrees F
Balance Point-OAT	Heat pump operates above BP set point and FF furnace operates below set-point Set the outdoor temperature at which you want to lock the heat pump out and have the fossil fuel back up to take over on a call for heat. This setting is overridden by the “Heat Stage Threshold” function.	0-50 degrees F, 1 degree increments or “Lock in Back-up Heat” for non-Heat Pump applications	30 degrees F
Resistance Lockout-OAT	Aux Heat (Elect Resistance) will be locked out when OAT exceeds this setting Set the outdoor temperature at which you want to lock out the electric resistance heat.	0-40 degrees F, or “Lock in Aux” To allow elect aux heat staging regardless of OAT	30 degrees F
H.P. LAT Htg. Limit	High limit of heat pump leaving air temperature Set the maximum allowable supply air temperature in heat pump mode.	100-125 degree F, 1 degree F steps	120 degree F

Parameter	Description	Options	Factory Default
AUX LAT High Temp	Aux “W” output leaving air temp high limit Set the maximum allowable supply air temperature in fossil fuel or electric resistance heat operation.	130-180 degrees F, 1 degree F steps	150 degree F
Cooling LAT Low Temp	Cooling leaving air temp low limt Set the minimum supply air temperature in the cooling cycle to prevent the coil from freezing.	34-46 degrees F, 1 degree F steps	42 degrees F
Type of Back-up Heat	Specify type of Aux “Back-Up” heat Select the type of heat that will be initiated when the heat pump can no longer maintain the setting of the heat stage threshold.	Electric or Fossil Fuel	Electric
Back-up Controls Fan	G output for fossil fuel heat operation True=”W” False=”W”, “G” Select true if the back-up heat source controls the fan internally or false it the Heat Pumpro needs to initiate the fan.	True or False	True
Dehumidifier Call Voltage	Required voltated to energize a dehumidification call. (Note: Leave setting at 24v when not used.) Set to the dehumidifcation control voltage out put on the dehumidistat control, Y	0 Volt or 24 Volt	24 Volt
Secondary Purge Time	End-of-cycle purge time to diffuse residual heating or cooling Set the amount of time in seconds to run the pump after a cycle to open all the dampers. Typically 5 seconds per damper.	0-180 seconds, 10 sec increments	60 seconds
Dehumidification Cycle Time	Dehumidification “On Cycle” time limit to proven over-cooling of space once cooling set-points are reached (off cycle is fixed at 10 min) Set the maximum “ON” time for the dehumidification cycle to prevent over cooling of the space. The “OFF” cycle is set at a fixed time of 10 minutes.	5-15 minutes, 5 minute increments	10 mintues
Cooling Low Ambient Lock-out	Minimum OAT that mechanical cooling is allowed to operate (locks out Y output) Set the outdoor temperature at which the cooling will no longer come on.	20-60, 1 degree F increments	35
Rev Valve Energized	Heat pump rev valve energize in heating or cooling (Zone 1 HP stat always callls “O” for clg call” Set the mode in which the reversing valve is energized. Note: If the heat pump thermostat has a setting for reversing valve in the configuration mode set the thermostat to energize the reversing valve in cooling.	Cooling or Heating	Cooling
Use Balance Point for Electric	Allow Balance Point to be used on all electric system. True heat pump will shut down when ODT is below Balance Point setting.	True or False	False
Demo Mode Enable	Demo mode speeds up all timing sequences by a factor of 12. Used for demonstrations and for initial system commissioning.	True or False	False

System Commissioning

To ensure the Arzel Evergreen Zoning System operates properly after completing all installation and system configuration steps, please follow the procedures below for commissioning the system.

Damper Verification

1. Set all thermostats to the OFF mode and all thermostat fan switches to AUTO.
2. Turn the HVAC system and the Evergreen Zoning System system PWR switches to ON.
3. Verify proper LAT and OAT temperature readings on the display screen.
4. Turn the Zone 1 thermostat fan switch ON. The fan in the HVAC system will turn on. Check the air flow at all registers to determine that only Zone 1 dampers are open and all other dampers are closed.
5. Follow the above procedure for all other zones.

Bypass Adjustment and Checkout

1. Raise the “Zone Weight %” of the smallest zone above the “AH Threshold %.”
2. Initiate a call for heat or cool in only that zone.
3. A Y2-AH signal will appear on the HVAC Output display screen and a call for High-CFM will be initiated.
4. Adjust the bypass closed and have the customer determine if the air delivery noise is objectionable. The customer must be informed that elevated air delivery into the smallest zone is critical to effective system operation when a single zone calls. Adjust the bypass in small increments until the objectionable noise is eliminated. Bypass CFM is only done to eliminate “Objectionable” air noise. Consult the homeowner to determine their requirements.
5. Initiate a similar call at a larger zone to verify that the bypass closes with additional duct capacity.
6. Reset the “Zone Weight %” to its original setting and return thermostats to normal settings.

Air Handler Stage Threshold and Heat Threshold Checkout

1. Set all thermostats to the OFF position. Set the demo mode to true in the Set-Up Wizard.
2. Remove the leaving air temperature (LAT) sensor from the supply ductwork.
3. Initiate a call for heat on Zone 1, a Y1 and G signal to the air handler and a Y1 signal to the condenser will appear on the display screen.
4. Initiate a call in a second zone that will raise the zone weight threshold above its setting. A Y2 signal to the air handler will appear on the display screen and blower will ramp up to second stage.
5. Allow the unit to run in heating mode, a Y2 signal will appear and the second stage on the condenser will energize.
6. Allow the unit to continue to operate and a W1 signal will appear on the display screen and energize the first stage back-up heat.
7. Allow the unit to continue to operate and a W2 signal will appear on the display screen and energize the second stage back-up heat.
8. Turn thermostats to off and allow system to cycle off, do not reinstall LAT sensor at this time.

Note: With electric resistance backup heat the outdoor air temperature must be below the temperature set for the resistance lockout temperature.

Cooling Stage threshold checkout

1. With the LAT sensor removed from the ductwork initiate a call for cooling from any zone.
2. The Y1, G and O signal will appear on the display screen and send a first stage cooling signal to the air handler and the condenser.
3. Allow the unit to continue to operate. A Y2 signal will appear on the display screen and send a second stage cooling signal to the condenser.
4. Turn the thermostat to off and install Leaving Air Temperature into the supply duct.
5. Reset the demo mode to false in the Set-Up Wizard.

Balance Point Checkout (Fossil Fuel Backup)

1. Raise the balance point temperature setting above the outdoor air temperature or submerge the outdoor air temperature sensor in a cup of ice to lower the reading.
2. Initiate a call for heat in any zone.
3. The W1 signal will appear on the display screen and initiate a call for the fossil fuel heating equipment.
4. Turn zone thermostat off and allow the heating equipment to cycle off.

Non Heat Pump Systems

1. In the Set-Up Wizard
   a. Verify that the “Balance Point” is set for “Lock in Back-up Heat”.
   b. Verify that “Type of Back-Up Heat” is set for “Fossil Fuel”
   c. Verify that “Zone 1 Stat Type” is set for “Heating/Cooling”
2. Set Zone 1 thermostat to “Heat” and raise set-point above room temperature.
   a. Push the Blue “Enter” button once
   b. Zone 1 “Call” display should read “W1-HTG”

**If not, verify wiring and configuration of zone one thermostat so that it sends a “W1” signal on a call for heat.*

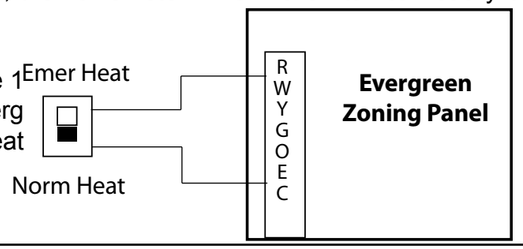
Customer Orientation

1. In an effort to eliminate end user misunderstandings and potential call-backs, review the Set-Up Wizard parameters and explain how the system should be expected to function.
2. Go over thermostat locations and functions and advise on the most energy saving set-back settings (setting back all zones during their unoccupied period will provide the best savings).
3. If Zone One thermostat is equipped with an “Emerg Heat” mode explain when and how to use it and the expected equipment operation in the Emerg Ht mode.

Remote Emergency Heat Switch

If an Emergency Heat Switch is desired and the Zone 1 thermostat is not a heat pump model or there are not enough conductors to provide an “E” circuit, then a remote “Emer Ht” switch can easily be wired to the board.

Simply wire a normally open switch across the Zone 1 “R” and “E” terminals and you can engage the Emerg Ht mode by closing the switch. This will serve all heat calls with the aux heat source.



Set-Up Worksheet

Fill in the right-hand column with the Set-Up Wizard settings that you use when programming the panel. Record the setup date. If any settings change, record those changes and the date they were made.

Function	Options	Settings			
		Initial Set-Up		Adjusted	
		Setting	Date	Setting	Date
Temperature Display	F/C				
Mode Priority	Automatic, Cooling, Heating, Zone Weight				
Zone 1 T-Stat	Heat Pump- Heating/Cooling				
Z1 Weight	Zone 1: 10%-90%				
Z2 Weight	Zone 2: 10%-90%				
Z3 Weight	Zone 3: 10%-90%				
Z4 Weight	Zone 4: 10%-90%				
Air Handler Stage-up Threshold	30%-100%				
Heat Stage Threshold	Enter Temp: 80-130				
Cool Stage Threshold	Enter Temp: 20-60				
Balance Point-OAT	Enter Temp: 0-50 of Back-up Heat				
Resistance Lockout-OAT	Enter Temp: Lock-In or 0 to 40				
H.P. LAT High Limit	Enter Temp: 100-125				
AUX LAT High Temp	Enter Temp: 130-180				
Cooling LAT Low Temp	Enter Temp: 34-46				
Type of Back-up	Electric/Fossil Fuel				
Back-up Controls Fan	True-False				
Dehumidifier Call Voltage	0 VAC/24 VAC				
Secondary Purge Time	Enter Sec: 0-180				
Dehumidification Cycle Time	Enter Min: 5-10-15				
Cooling Low Ambient Lockout	Enter Temp: 20-60				
Rev Valve Energized	Cooling/Heating				
Use balance point for electric	True-False				
Demo mode enable	True-False				

Zoning System Layout

Zone	Tube Color	Total # Dampers	T-Stat Located In
1			
2			
3			
4			

Tear Here

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