

# Installation & Operation Instructions

## **ZONE PAK**<sup>®</sup>



 **Arzel<sup>®</sup> Zoning**  
TECHNOLOGY

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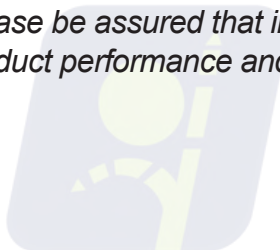
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**Thank you for choosing ZonePak®!**

*Thank you for choosing the ZonePak® HeatPumPro® zoning system for your comfort and energy efficiency needs. The HeatPumPro® 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.*



**ZONE PAK®**

# Operating your new zoning system

***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.

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 ZonePak® HeatPumPro by reviewing this entire manual. Consult your installing contractor with any questions regarding system operation. If questions are still unresolved, you may call ZonePak®'s technical support Monday-Friday 8 a.m.-6 p.m. EST. Please have your system serial number available when you call. ZonePak® support can be reached by calling 866-325-5107.



# Product Overview

*The HeatPumPro® 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 feeling of low supply air temperatures when the heat pumps 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 condenser Y1/Y2 and W1/W2 heating. Zone weight staging of the blower reduces or eliminates the need for a bypass by matching the W1/Y1 outputs to the available ductwork.

## **Broad Thermostat Compatibility**

The HeatPumPro® 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 HeatPumPro® can control 24vac humidifiers when an active heating call is being served; a solenoid and damper can be added for controlling airflow through a bypass humidifier. It can also operate the system similar to a whole house dehumidifier. By adding a dehumidistat to zone 1, the panel will output for “G” to the blower and Y1 to the condenser for an adjustable period of time when no active calls are being served. The HVAC out “D” can be connected to the furnace 24vac, “DEHUM” terminal to activate the furnace's dehumidification blower profile.

## **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 ZonePak® 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.

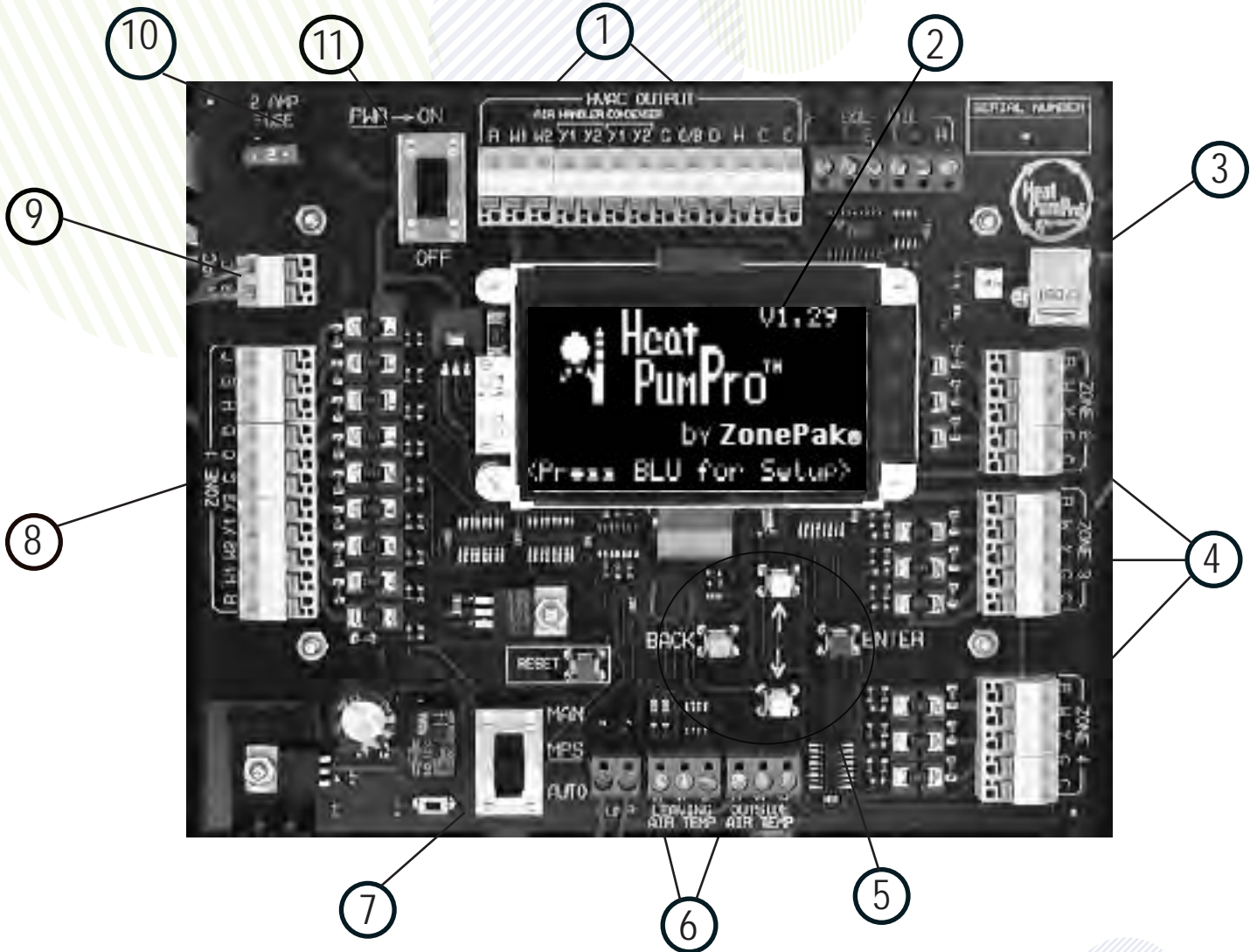
## CAUTION

1. The ZonePak® 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 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 abradable 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 (Leaving Air Temperature) 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 and 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 Secondary Purge Time (0 to 180 seconds) will continue to operate the pump to open all the zone dampers for a Soft Start™ 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	Download operation history
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 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 Dampers/Run Tubing

Dampers install directly into new or existing ductwork. Orient the tube connection port so it is pointing up-stream (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.*

## 2. Mount Control Panel

The control panel must be mounted vertically on an exterior wall to reduce noise. The wall must also be located in a non-condensing area where temperatures will not normally exceed 140° F. **DO NOT MOUNT PANEL ON DUCTWORK, HVAC EQUIPMENT, STAIRWELL, or BEDROOM WALLS.** The best method is to attach a piece of  $\frac{3}{4}$ " plywood to an exterior 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  $\frac{1}{2}$ " 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.*

## 3. Connect Thermostats

Install a thermostat for each zone observing terminal designations. Use 18 gauge, multi-conductor, solid thermostat wire to connect thermostats to the control panel. **When using a heat pump thermostat at Zone 1, “O” must be energized on a call for cooling. Zones 2, 3, 4 must be conventional Heat/Cool thermostats.** Document the location of each thermostat connected to the zones on the “Zone Layout” label on the side of the panel.

## 4. 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.

## 5. 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:** *If you elect to not use the provided transformer, your warranty may be void. Additional surge protection is recommended.*

## 6. Connect Sensors

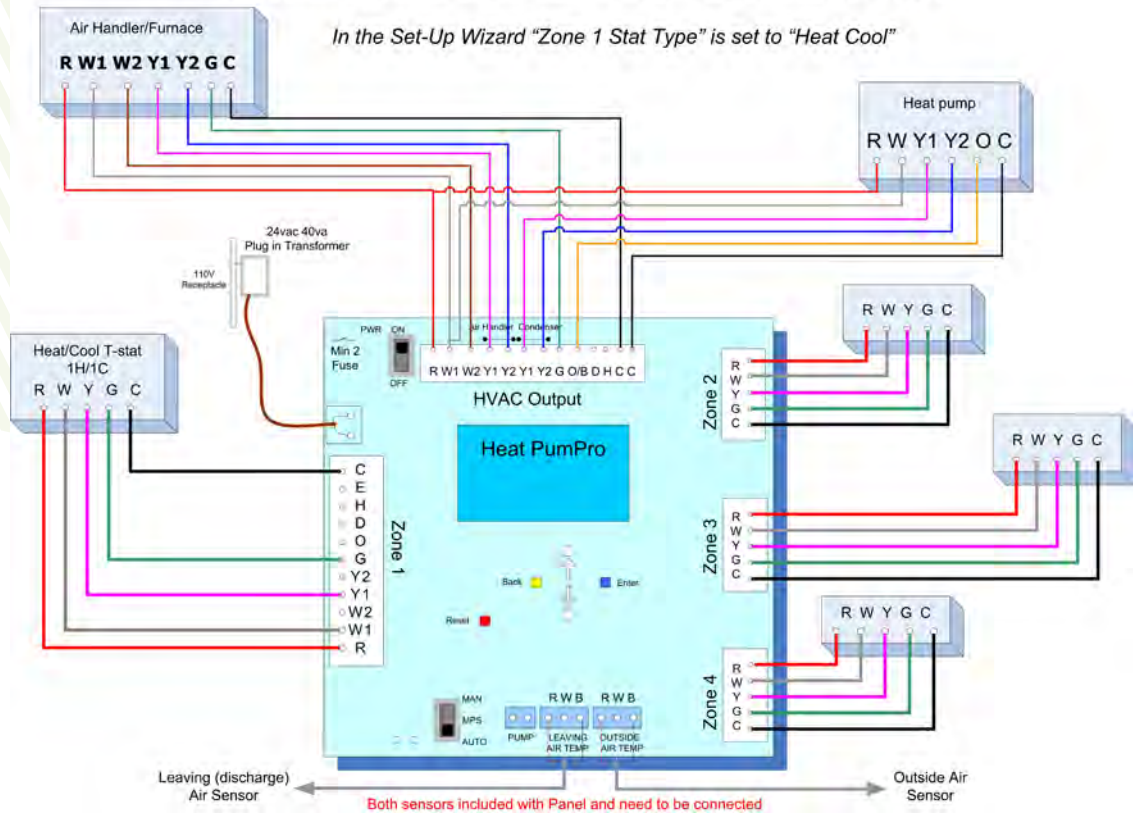
1. Install the leaving air temperature sensor in the supply duct 12 to 18 inches from the plenum and before any dampers.
2. Install the Outdoor Air Temperature sensor outdoors, preferably on the north side of the house, not in direct sunlight.
3. Wires must be connected to corresponding terminals, R-red, 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

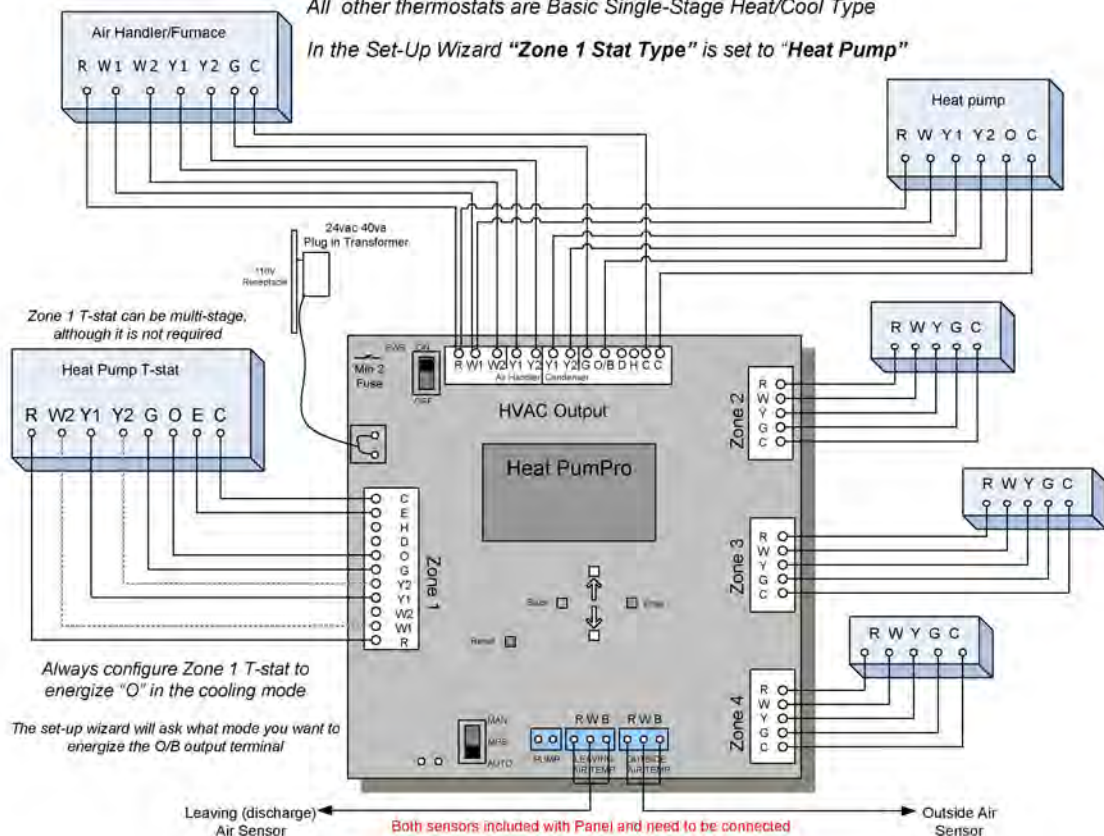
In the Set-Up Wizard "Zone 1 Stat Type" is set to "Heat Cool"



## 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"

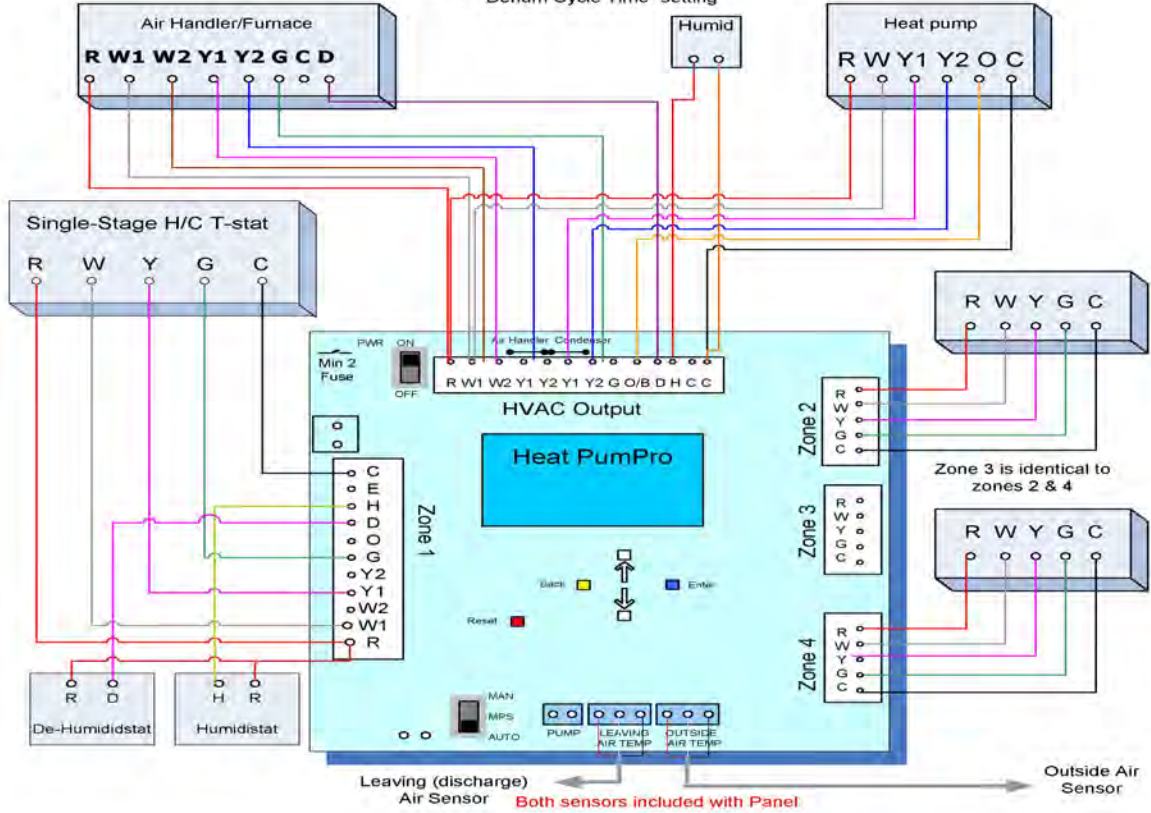




## Humidity Control with Independent Humidistat & Dehumidistat

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

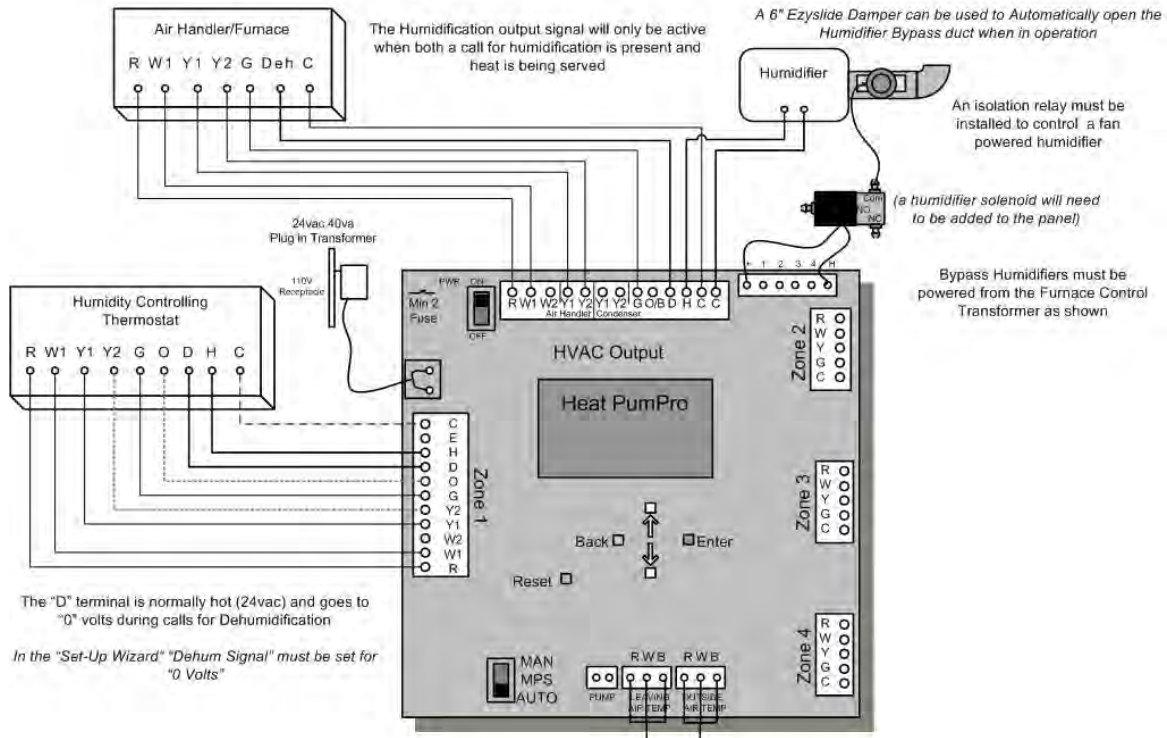
In the "Set-Up Wizard", "Dehum Signal" must be set for "24 Volts"  
 Without cooling calls, the Dehum cycle will cycle off every 5, 10 or 15 min according to the Set-Up wizard "Dehum Cycle Time" setting



## Humidification and Dehumidification from Zone 1 T-Stat

Zone 1 "H" terminal goes to "24" volts during a call for Humidification  
 Zone 1 "D" terminal can be configured in the "Set-Up Wizard" as a "24" vac or "0" vac during a Call for Dehumidification

24 v call setting initiates a HeatPumPro Dehumidification function  
 0 v call setting initiates an equipment dehumidification function



# LAT & OAT Sensor Installation

## Installation Notes

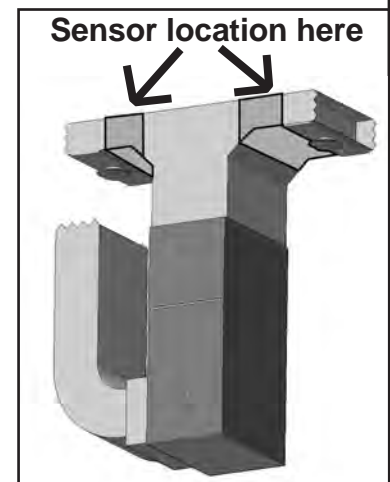
- Both sensors are identical and can be used as either the Leaving Air Temperature (LAT) or Outside Air Temperature (OAT).
- **Both sensors must be connected to the board for proper functionality;** non-heat pump applications do not require the OAT sensor to be located outside.
- If additional wire length 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
  - Preferably on the north side of the house
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.
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.*



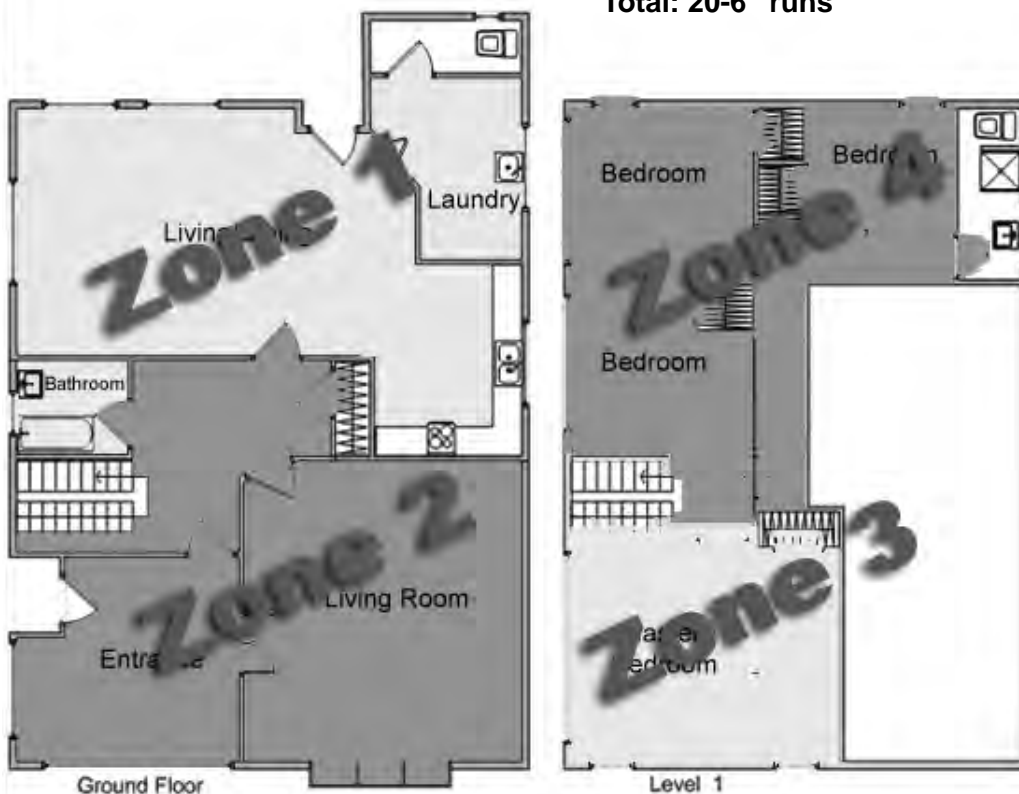
Outdoor  
Air Sensor

# 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.

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



Air Handler Y2 (High Stage) blower and Heating W2 (High Stage) will be engaged any time the accumulated, served zone weight is equal to or greater than the AH Stage Threshold setting in the Set-Up Wizard. There is a 9 minute delay for W2, however there is no delay for Air Handler Y2.

### 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 registers. Since many systems serve a single zone the majority of the time, low stage energy savings will be achieved.

# Leaving Air Temperature Controls

The HeatPumPro® uses both Leaving Air Temperature (LAT) and Outside Air Temperature (OAT) sensors to protect the HVAC equipment and proactively chooses the most appropriate mode of operation.

## BOTH SENSORS MUST BE INSTALLED FOR PROPER SYSTEM OPERATION

### **High and Low limit protection:**

There are individual high end set-points for Heat Pump heating, auxiliary heat (or FF furnace) and low temperature operating limits for cooling.

The LAT ensures that the HVAC equipment will always be operated inside the OEM specifications.

The LAT functions in a staged-manner:

As soon as the LAT exceeds the operative limit, the equipment is staged down.

If the LAT stays outside acceptable limits for three (3) minutes, then it will cycle off the equipment, leaving only the fan running.

### **Proactive Staging:**

The HeatPumPro® can handle up to four stages of heating (two-stage heat pump with two stages of electric heat strips or two stages of gas furnace operation). It handles two stages of cooling. The HeatPumPro® manages all staging with single stage inputs from all thermostats.

Staging is managed by continually comparing the Leaving Air Temperature to field adjustable heating and cooling thresholds. If the system is not maintaining the appropriate temperature then it will automatically stage up. If it starts to move to the extremes then it will stage down. The table below outlines how the system stages.

HVAC Equipment	Decision Point	Function
HeatPump Heating	Heat Stage Threshold (HST) at or above 30°F OAT	Minimum acceptable temperature in the plenum. If the system cannot maintain HST then it will automatically stage up. Note: If the OAT drops below 30°F, the HST rises 1/2°F for every 1°F below 30°F. So the system will stage more aggressively on colder days.
Fossil Fuel Furnace Auxiliary Heat Strips Multi/Variable Speed Blowers	Air Handler Staging Threshold (AHST)	For Aux heat or Furnace Operations, the system stages up and down based upon the AHST. If the system is serving more zone weight than the AHST it will stage up. If it is serving less than AHST then it will stage down.  Airflow with multi/variable speed systems is controlled in the same manner.
HeatPump A/C Cooling	Cool Stage Threshold (CST)	Maximum acceptable temperature in the plenum. If the system cannot maintain CST then it will stage up to high stage automatically.

The Decision Points (HST, CST, and AHST) are all adjustable through the Setup Wizard. The contractor is responsible for choosing appropriate staging settings. Multistage thermostats are not required. The HeatPumPro® will stage up as required to maintain the amount of cooling or heating that is required by the space based on the Leaving Air Temperature and the Outdoor Air Temperature. It will stage the blower (Multi/Variable Speed Motors) according to the Zone Weight of the ductwork being served.

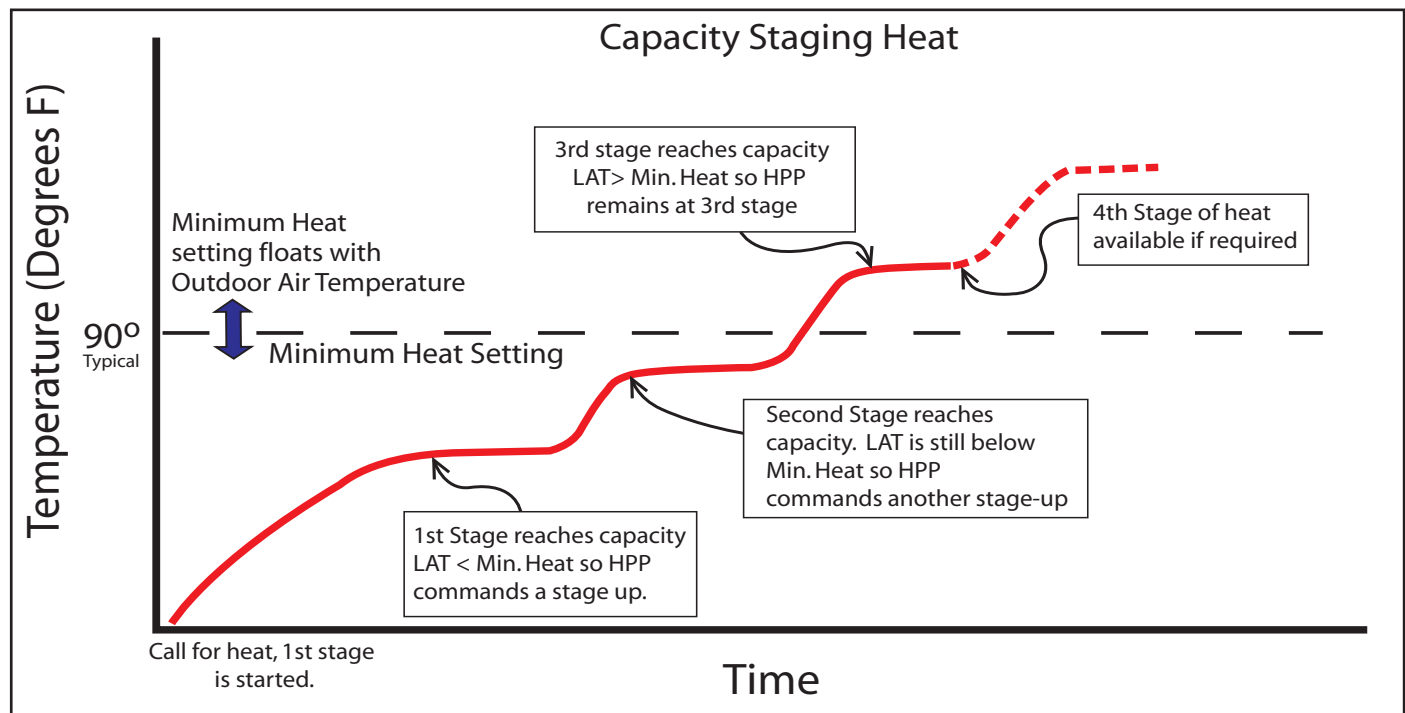
# The Pro-Active approach to “Capacity” Staging

The HeatPumPro® 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 HeatPumPro® (HPP) monitors the Leaving Air Temperature (LAT) and compares that temperature to a pre-determined “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 HPP to demand a higher LAT as the ODT drops. For every one degree drop in ODT below 30 deg F, the Htg Stg Threshold Temp is increased by 1/2 of a 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 HeatPumPro® 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 that can be set between 50 deg and 60 deg. 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.

# Pump Operation

## AIR PUMP OPERATION

Pump will start and control up to 35 actuators any time there is a call for heating, cooling, or fan operation. The pump will continue to run for two minutes plus the “Secondary Purge Time” delay. On a call for heat with type of back-up set to Fossil Fuel there is a 60 second delay before the pump will start allowing time for the blower to engage before dampers close to maintain the blower Soft Start™. Pump is designed for continuous operation.

## MANUAL PUMP SWITCH (MPS™)

The Manual Pump Switch (MPS) (Fig. 12b) is provided to test the damper system and to bypass the zoning system in case of a board emergency. This switch will start the pump manually and with the “Power” switch in the OFF position, all the zone dampers will open. This will aid in troubleshooting by allowing the operation of the HVAC system independent of the Arzel® panel, if you suspect a PC board failure.

### YOU CAN BYPASS THE ZONING SYSTEM BY FOLLOWING STEPS BELOW:

1. Turn the Arzel® PWR switch off. You must keep this switch in Off position to block ALL zone thermostats from calling for service and placing all the zone dampers in the normally open position.
2. Disconnect the wires from any one zone thermostat terminal and connect them to the HVAC Output terminals.
3. Turn the MPS switch to manual position.

The HVAC equipment will now be controlled by the one thermostat connected to the Output terminals. The pump will run continuously, holding ALL the zone dampers open.

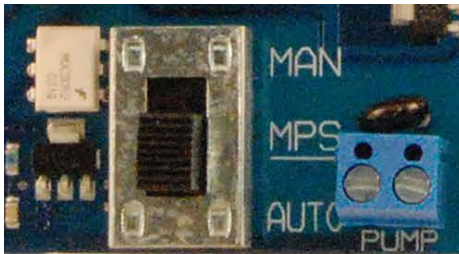
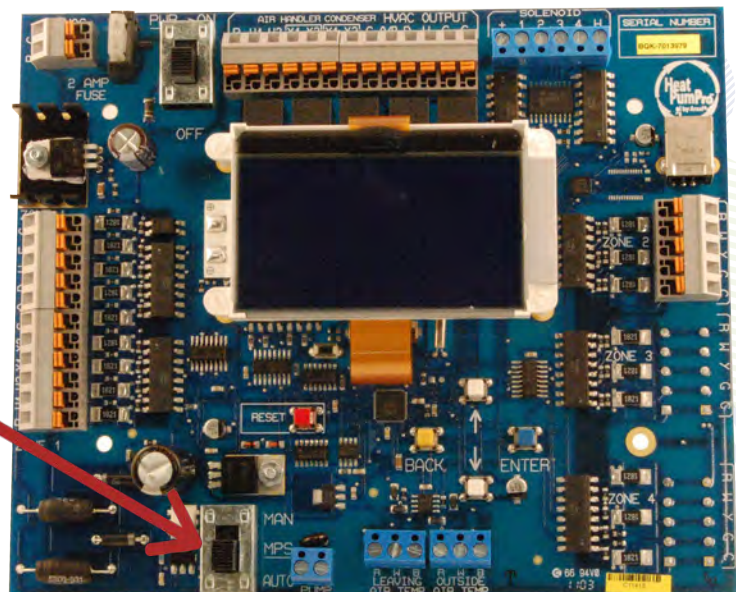


Fig. 12b



Arzel® Panel

# LCD Display Description

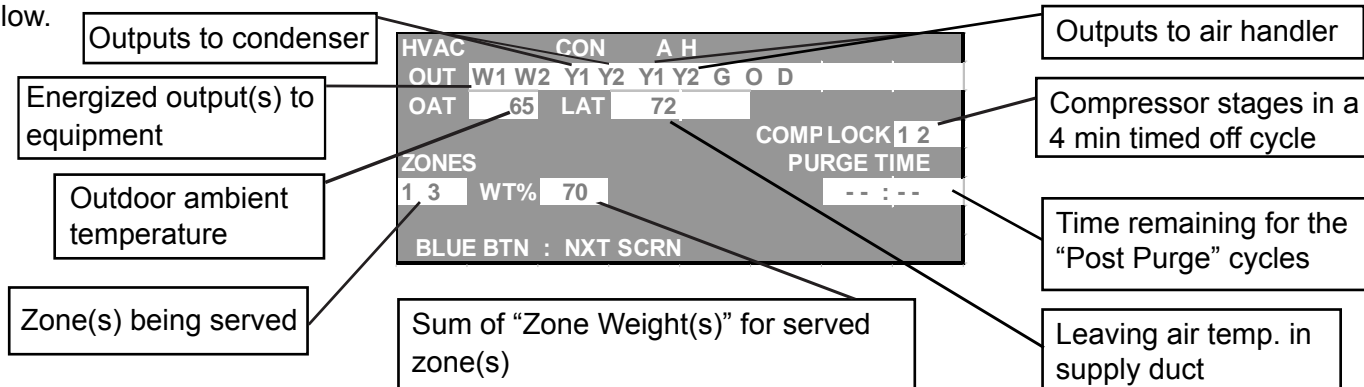
The Liquid Crystal Display (LCD) on the HeatPumPro® is your portal to customizing your zoning installations. The set-up options allow you to design the control sequence in the best interest of your customer, balancing energy usage with comfort delivery while maintaining safe equipment operation. These 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 HeatPumPro® 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.



The HeatPumPro® 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.

## 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

**Resistance Lockout OAT** - OAT is above 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 pump will start and de-energize the solenoid for the zone that is calling.

3. The HeatPumPro® 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/B will also be energized if set for Rev Valve Energized in Htg mode).
- b. If the OAT is below the BP setting then 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 in Backup Heat" 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 start to 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 plus an OAT adjustment. The threshold temperature will raise 1° for every 2° drop in OAT below 30°F.

Ex. HST = 100°F in Set-up Wizard:

30°F OAT ⇔ 100°F LAT threshold

20°F OAT ⇔ 105°F LAT threshold

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 HeatPumPro® 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 is met. With an all electric system the HeatPumPro® will stage the electric heat on with the heat pump running. With fossil fuel back-up if the heat stage threshold is not met within 6 minutes the heat pump will be turned off and the panel will start a W1 output.

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: Y1, G, O or Y1, G for zone 1 depending on the thermostat type; Y, G for zones 2, 3, or 4.

2. The pump will start and de-energize the solenoid for the zone that is calling.

3. The Y1, Y2, G signal will be sent to the air handler if the "Air Handler Stage Threshold%" (AHST) is met. Otherwise, only Y1, G will be sent to the air handler. A Y1 signal will be sent to the condenser, and an O/B will be sent if set for Rev Valve Energized in Cooling.

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 above 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 HeatPumPro® 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 setup categories in the order they appear in the software. The Setup Worksheet in the back of 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 setup, simply press the red “RESET” button and proceed through the setup categories, making any necessary changes, using the white “UP” and “DOWN” buttons.

Parameter	Description	Options	Factory Default
Show Temperature in	Determines the temperature display scale on the HeatPumPro®.	Fahrenheit Centigrade	Fahrenheit
Priority	<p>Allows specified mode to interrupt active cycle. Priority options include- Automatic, Heating, Cooling, or Zone Weight Priority.</p> <p>In Automatic Priority: Auto priority will allow the first call (either heating or 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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	Automatic Zone Weight Heating Cooling	Automatic

Parameter	Description	Options	Factory Default
Zone 1 Stat Type	Type of T-Stat used on Zone 1 Enter the type of thermostat you are connecting to Zone 1 of the HeatPumPro® panel.	Heat Pump or Heating/Cooling	Heat Cool
Zone 1 Weight %	Zone 1 relative weight Enter the percentage of available ductwork to system capacity in each zone. Ex. Calculate nominal CFM for the zone and divide by total system capacity. This can also be used to set priority to a specific zone by giving it a larger weight. <b>Sum of zones does not need to equal 100%.</b>	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%
AH Stage-up Threshold %	Air handler 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 HeatPumPro® panel will send a Y2 signal to the air handler to increase capacity or W2 signal to furnace to increase output capacity.	30-100%, 5%	50%
Heat Stage Threshold	Min leaving air temp (LAT) required for comfort at 30° F outside air temperature (OAT). This set-point adjusts by 1° for every 2° change in OAT. Sets the minimum supply air temp in the heating mode. At the factory default the HeatPumPro® will maintain a 88° supply air temp at 30° F outdoor temperature. The supply air temperature will raise or lower 1° F for every 2° F change in outdoor temperature.	80-130 degrees F, 1 degree increments	88 degrees 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 <b>Set to “Lock in Back-Up” for Non-Heatpump applications</b>	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	Lock-in Back Up Heat
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
HP LAT High 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
AUX.LAT High Limit	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	140 degree F

Parameter	Description	Options	Factory Default
Cooling LAT Low Limit	Cooling leaving air temp low limit 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	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	Fossil Fuel
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 if the Heat PumPro® needs to initiate the fan.	True or False	True
Dehum Caller Voltage	Required voltage to energize a dehumidification call. <b>(Note: Leave setting at 24v when not used.)</b> Set to the dehumidification control voltage output 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
Dehumid Cycle Time	Dehumidification "On Cycle" time limit to prevent 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 minutes
CLG Low Ambient Lock	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	50 degrees F
Rev Valve Energized	Heat pump rev valve energized in heating or cooling (Zone 1 HP stat always calls "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 Bal Pt for Elec	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 Enabled	Demo mode speeds up all timing sequences by a factor of 12. Used for demonstrations and for initial system commissioning.	True or False	False

### Suggested HeatPumpPro® Settings

	System Type Single Stage FF/AC Fahrenheit Automatic	System Type Multi Stage FF/AC Fahrenheit Automatic	System Type Multi Stage Dual Fuel Fahrenheit Automatic	System Type Single Stage HP W/Elec Fahrenheit Automatic	System Type Multi Stage HP W/Elec Fahrenheit Automatic	System Type Duel Fuel /winverter HP Fahrenheit Automatic	System Type Inverter /w Elec Fahrenheit Automatic
HPP Options							
For C							
Priority							
Zone 1 Strat Type	Heat/Cool	Heat/Cool	HP or H/C	HP or H/C	HP or H/C	HP or H/C	HP or H/C
Zone 1 Weight	Default N/A	set as needed	set as needed	Default N/A	set as needed	set as needed	set as needed
Zone 2 Weight	Default N/A	set as needed	set as needed	Default N/A	set as needed	set as needed	set as needed
Zone 3 Weight	Default N/A	set as needed	set as needed	Default N/A	set as needed	set as needed	set as needed
Zone 4 Weight	Default N/A	set as needed	set as needed	Default N/A	set as needed	set as needed	set as needed
AH Stage Threshold	Default N/A	Default N/A	88	88	88	80	80
Heat Stage	Default N/A	Default N/A	55	55	55	55	55
Cooling Stage	Default N/A	Lock-in	30	Default N/A	Default N/A	*Set as required*	30
Balance Point	Default N/A	Default N/A	Default N/A	Lock In	Lock In	*Set Equal to Balance Point*	25
Resistance Lockout	Default N/A	Default N/A	120	120	120	120	120
HP High Limit	140	140	140	140	140	140	140
Aux High Limit	42	42	42	42	42	42	42
Cooling Low Limit	Fossil Fuel	Fossil Fuel	Fossil Fuel	Electric	Electric	Electric	Electric
Backup Fuel Type	TRUE	TRUE	TRUE	FALSE	FALSE	TRUE	FALSE
Backup Control Fan	24	24	24	24	24	24	24
Dehum Voltage	60	60	60	60	60	0	0
Secondary Purge	set as needed	set as needed	set as needed	set as needed	set as needed	set as needed	set as needed
Dehum Cycle Time	50	50	50	50	50	50	50
CON Lockout Temp	Default N/A	Default N/A	set as needed	set as needed	set as needed	set as needed	set as needed
Rev Valve Energized	FALSE	FALSE	FALSE	set as needed	set as needed	set as needed	set as needed
Balance Point for Elec	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	set as needed
Demo Mode	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE

Color Legend
Must Be Set To
Suggested Set As Needed
Leave at Default, N/A

Inverter Heat Pumps are designed to run for an extended period and often lower supply temperatures, the HPP upstages to fossil fuel after 9 min run cycle if the "Heat Stage Threshold" is not met. Non standard settings are needed to overcome this, the HPP needs to think there is an electric heater providing an OAT lock-out on W1 while still changing from heat pump to fossil fuel when meeting balance point where the heat pump won't maintain.

**Balance point OAT and Resistance Lockout must be set to \*same temperature\***, Backup Fuel Type Electric, and Balance Point for Electric True. This will keep the gas furnace from engaging during extended run cycles but also provide an ODT change-over from heat pump to fossil fuel.

# System Commissioning

***To ensure the ZonePak® HeatPumPro® 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 HeatPumPro® 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 airflow 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. Set smallest zone to appropriate zone weight threshold.
2. Initiate highest expected blower operation heating or cooling call.
3. Adjust the bypass closed and have the customer determine if the air delivery noise is objectionable. The customer must be informed that elevated air delivered into the smallest zone is critical to effective system operation when a single zone call.
4. Adjust the bypass in small increments until the objectionable noise is eliminated. (Bypass is only done to eliminate objectionable air noise, consult the homeowner to determine their needs)
5. Initiate call in other small zone or zones until AH stage threshold upstages equipment and re-verify with equipment blower operating at highest capacity.

## **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 off and allow system to cycle off, do not reinstall LAT sensor at this time.
9. Reset the demo mode to FALSE in the Set-up Wizard.

***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 thermostats to OFF and install Leaving Air Temperature sensor 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.

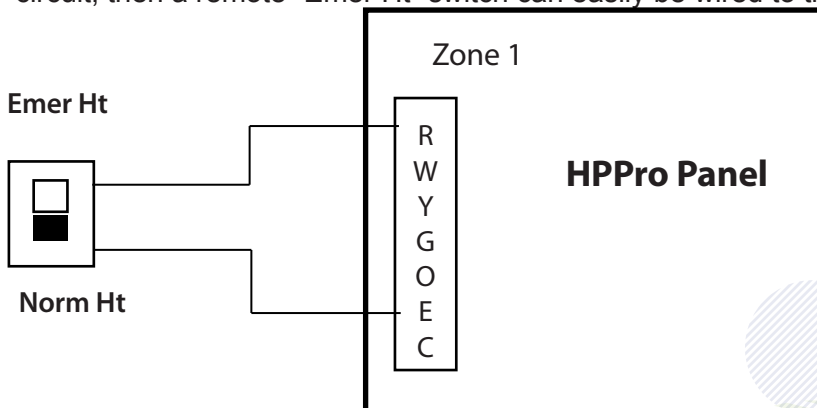
**Customer Orientation**

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.



# Zoning System Layout

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

# Setup 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 Setting	Date	Adjusted 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				



# Bypass Chart

## Bypass Sizing Chart

Trunk Dampers

Smallest Zone CFM	Blower Tonnage						Round Bypass Size
	2	2.5	3	3.5	4	5	
100	8	10	10	12	12	14	
200	8	10	10	12	12	14	
300	*	*	8	10	10	12	
400	N/A	*	*	8	10	12	
500	N/A	N/A	*	*	8	10	
600	N/A	N/A	N/A	*	*	10	
700	N/A	N/A	N/A	N/A	*	8	
800	N/A	N/A	N/A	N/A	N/A	*	
900	N/A	N/A	N/A	N/A	N/A	*	
1000	No Bypass Required						

## \*Other Bypass Sizing Considerations

**Flex Duct** - Down-size the bypass by one size due to increased friction loss inherent in flex duct.

**Distant Zones** - Duct length greater than 200 ft. may require a one size decrease due to increased friction loss.

**Close Zones** - Duct length less than 50 ft. may require a one size increase.

**Special Purpose Zones** - Usage patterns may require an increase in bypass size.

- Calculate bypass from low stage CFM tonnage when combining 2-stage split systems with HeatPumPro or GTPro panels and using zone weight.
- Keep the bypass as small as possible.
- Bypass should be at least 8 ft. from the return drop when possible.

## Bypass Sizing Chart

Branch Dampers

Smallest Zone CFM	Blower Tonnage						Round Bypass Size
	2	2.5	3	3.5	4	5	
100	*	8	8	10	10	12	
200	*	*	8	8	10	10	
300	N/A	N/A	*	*	8	10	
400	N/A	N/A	N/A	*	*	8	
500	N/A	N/A	N/A	N/A	*	8	
600	N/A	N/A	N/A	N/A	N/A	*	
700	No Bypass Required						
800	No Bypass Required						
900	No Bypass Required						
1000	No Bypass Required						

## \*Other Bypass Sizing Considerations

**Flex Duct** - Down-size the bypass by one size due to increased friction loss inherent in flex duct.

**Distant Zones** - Duct length greater than 200 ft. may require a one size decrease due to increased friction loss.

**Close Zones** - Duct length less than 50 ft. may require a one size increase.

**Special Purpose Zones** - Usage patterns may require an increase in bypass size.

- Calculate bypass from low stage CFM tonnage when combining 2-stage split systems with HeatPumPro or GTPro panels and using zone weight.
- Keep the bypass as small as possible.
- Bypass should be at least 8 ft. from the return drop when possible.



# Ezy-Slide® Damper Install

A visual aid to installing both the round and rectangular Ezy-Slide® dampers.

## 1. Apply the Template

Apply template with Air Flow Arrow pointed towards register.



## 2. Cut out the Triangle

Drill a 3/4" hole at each of the three corners and connect the holes with your SNIPS.



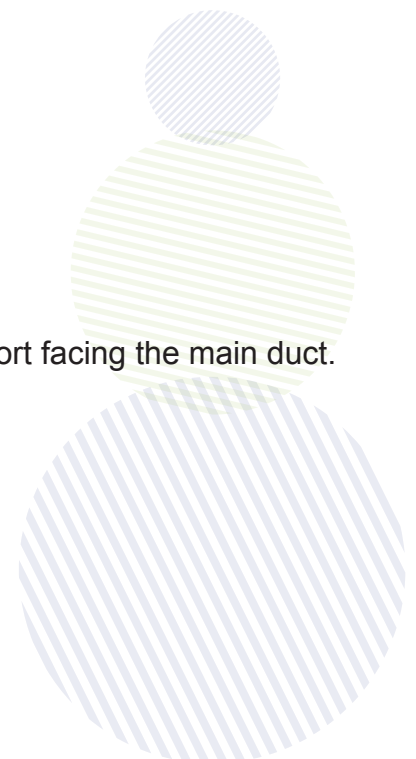
## 3. Insert the Damper

With the damper being held in the "Closed" position, insert with the blade at the wide end of the triangle.



## 4. Twist into Position

Once the blade is inserted, rotate the damper 90 degrees with the tubing port facing the main duct.



# Ezy-Slide® Damper Install cont.

## 5. Fasten with Zip Screws

Secure damper at two opposing corners. Add the two other screws. Tighten all four screws to just seal gasket.



## 6. Attach the Air Line

Cut a 3/4" section out of the "Homerun Tube" for that zone and insert a tee to connect to damper.



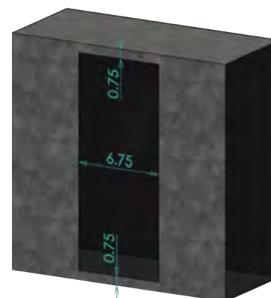
## 7. Finished!

If the tubing looks neat and well organized, the workmanship appears worthy of the investment.



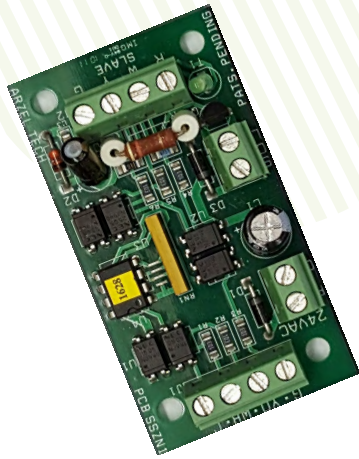
# Rectangular Damper Install

Angle Damper Blade from corner to corner, slide into opening, align it with the duct and screw it in.

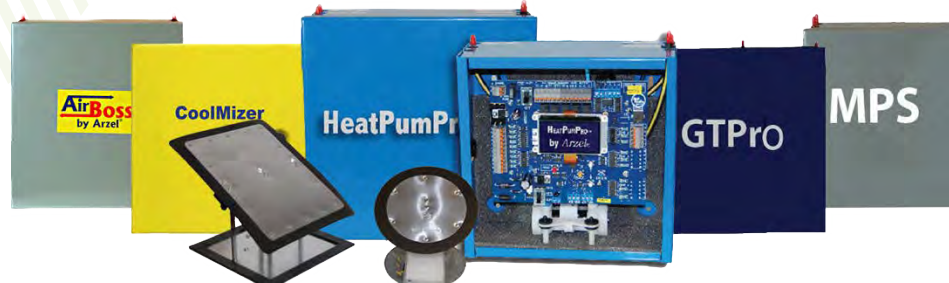


# Did you know?

WE CAN ADD FRESH AIR CONTROL (FACT) TO ANY OF OUR ZONING PANELS!



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