e/vent

e/vent: electronic vent

Automated Heat Register System
for Residential and Commercial
Forced-Air Heating Applications

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Automated Heat Register Systems
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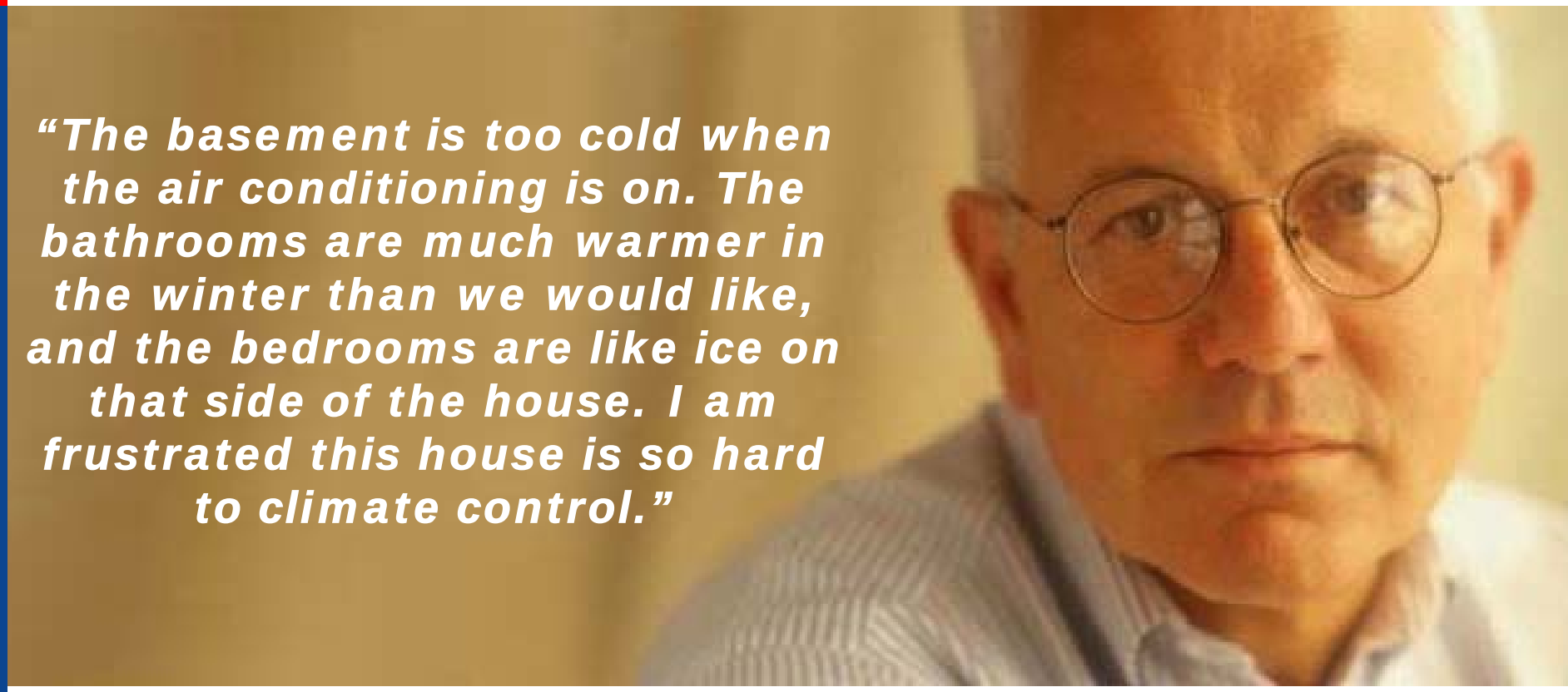

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Automated Heat Register Systems
for Residential and Commercial
Forced-Air Heating Applications

Here are some of the most significant reasons why forced-air system are so inefficient.

1. A basement will usually require more heat than the top floor of the house in the winter. The basement will not reach the optimal temperature so easily because the thermostat is likely to be situated in the core of the house unless the basement receives supplemental electric heating or takes advantage of zone heating architecture. Inversely, a basement will require less air conditioning in the summer due to below grade cooling effects.

2. The rooms furthest away from the furnace are harder to heat or cool due to the length of ducting the forced air must travel. Interior rooms receive temperatures closest to the ideal target because they are situated closest to the thermostat than those with exterior walls.

3. There is heat loss through the ducting itself before it arrives at the most distant rooms. Although the heat loss from the ductwork remains inside the house this is yet another variable why rooms have different temperatures.

4. The furnace must work harder to move the heat or air conditioning to these distant rooms thereby creating inefficiencies in the home heating/cooling paradigm.

5. Rooms that are on the north side of the house are generally the coldest because of prevalent winds and less direct solar activity therefore add inefficiencies to the home heating and cooling solution.

6. Kitchens are generally warmer due to cooking and baking activities. In the summer, the homeowner will prefer the kitchen is kept cooler than in the winter months.

In Summary

Today's home heating and air conditioning systems poorly distribute fixed temperatures throughout the home which translates to wasted and unrecoverable energy.

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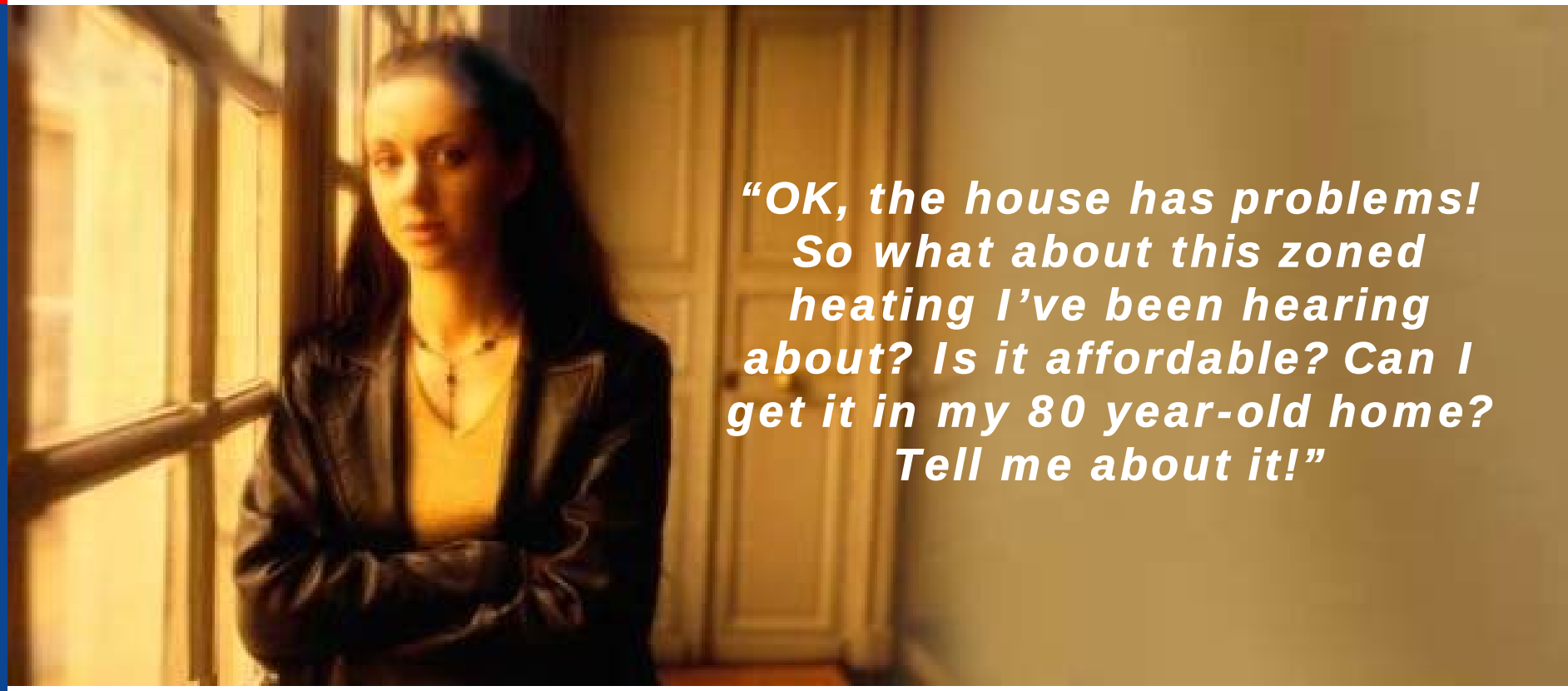
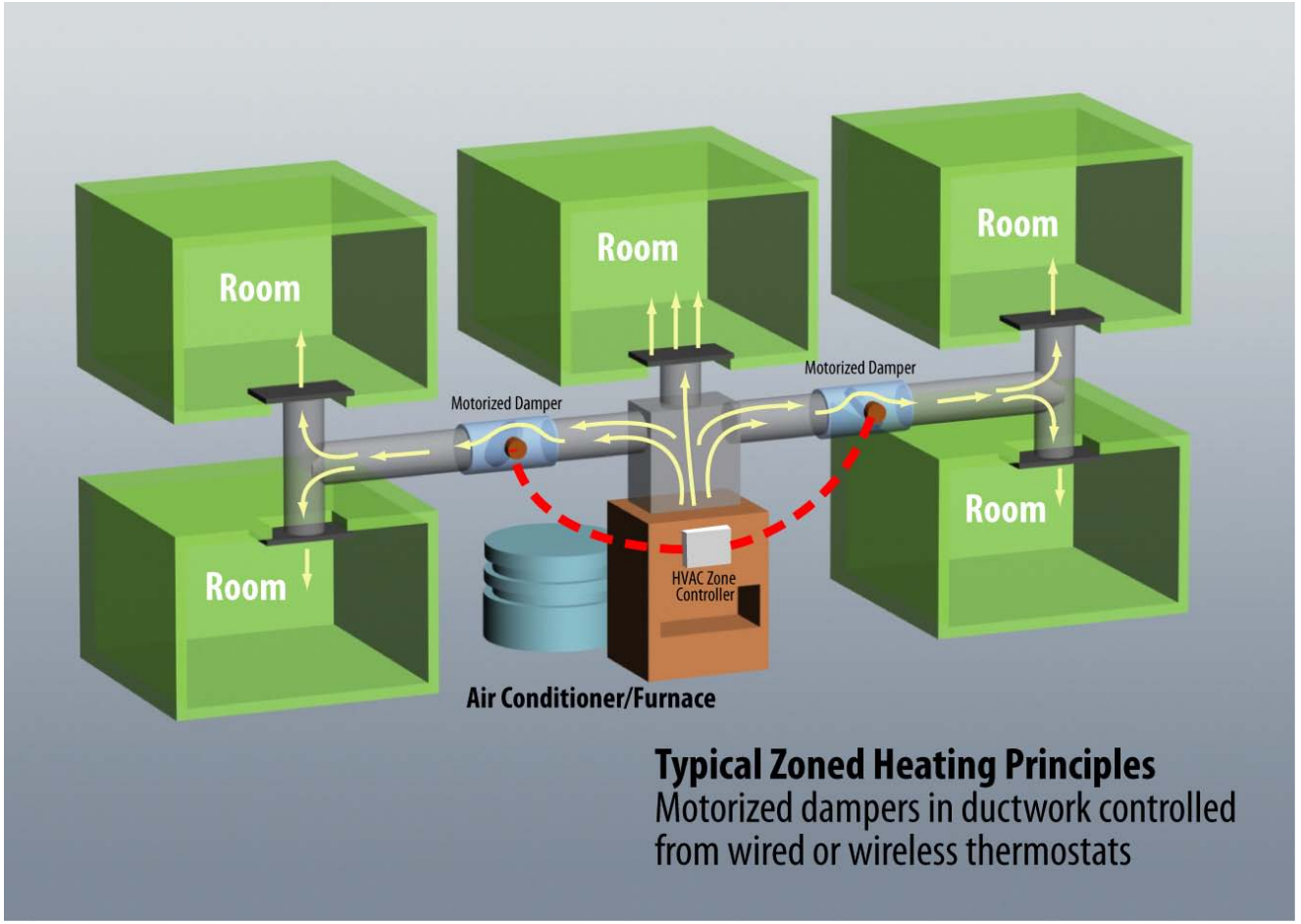


Zoned heating technology overview

Within the last 10 years some residential home designs have adopted zoned airflow principles for forced-air gas/electric heating and air conditioning systems. Through the use of wired and/or wireless technology, strategically located thermostats communicate with motorized dampers in the ducting system to direct and increase or reduce airflow to specified zones within the building. Zoned airflow increases the efficiency of heating and air conditioning systems with savings as much as 25%.

Note ***A zone is defined as a quadrant in the home consisting of 2 or more rooms, hallways, stairwells etc.***

Zoned heating technology overview

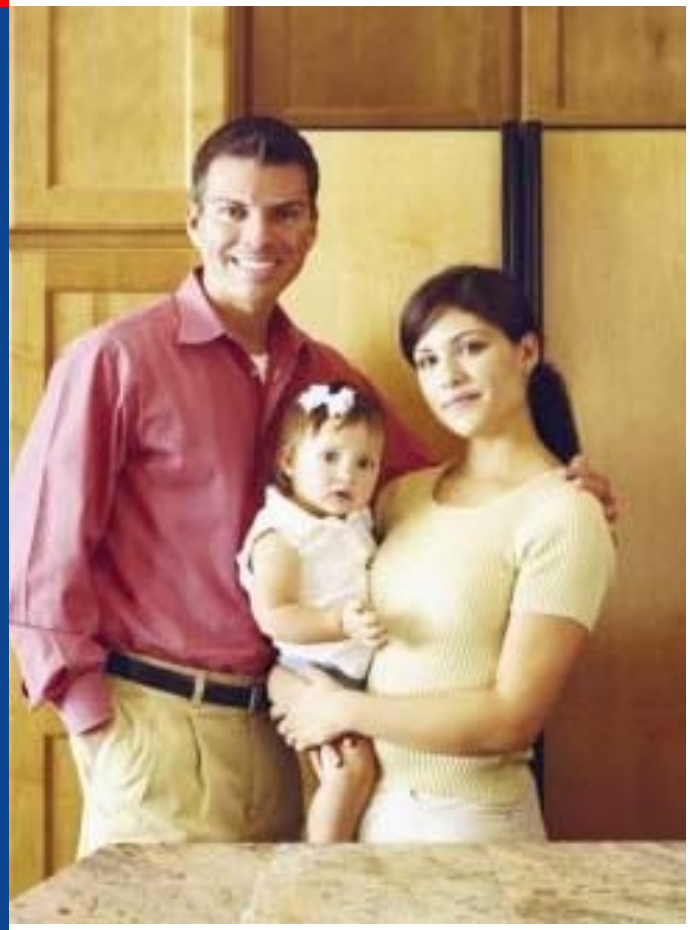


Zoned heating and cooling principles **do not** offer room-to-room climate control.

There are disadvantages to the zoned heating and cooling methodology

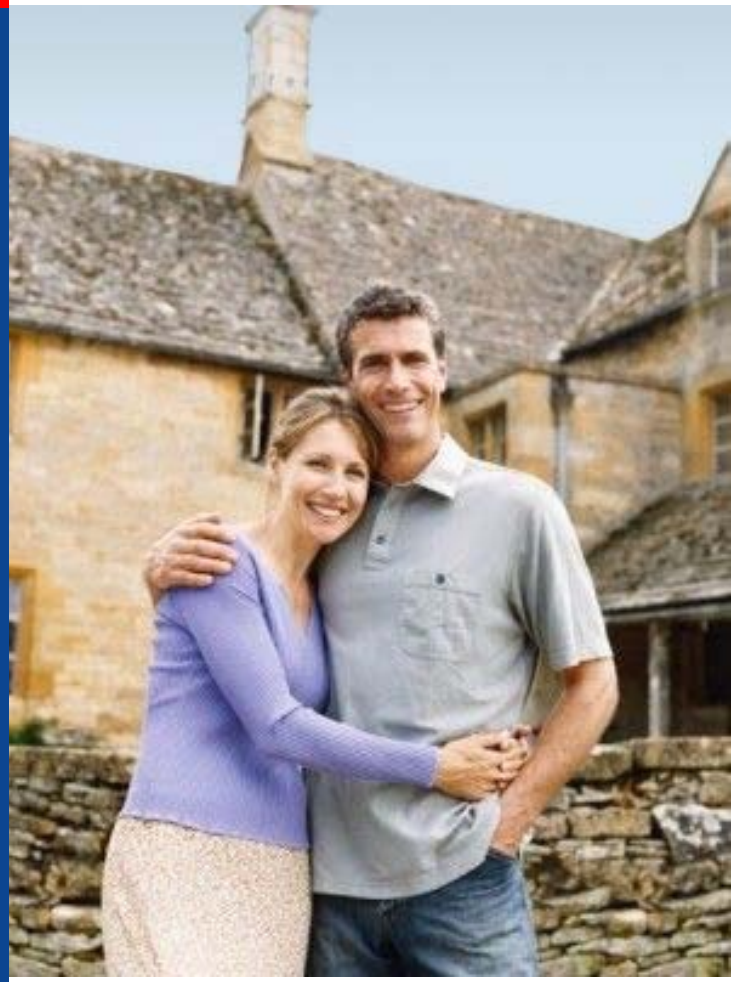
- Zoned heating/cooling principles are designed into the home at the architectural design stage where the furnace is centrally located in the home and the ductwork is efficiently designed to accommodate all zones with minimal heat or cooling loss.
- Zoned heating/cooling systems typically employ specialized design and skilled labor to install and maintain.
- Retrofitting an existing home to take advantage of zoned heating/cooling is an expensive undertaking which can take several years to recuperate the investment.
- Modern zone heating principles do not offer 'room-to-room' heating or cooling climate control.

Now there is an alternative, cost effective method of heating and cooling your home that yields up to 40% in monthly billing savings…



… A method that boosts the efficiency of your current forced-air heating and cooling system…

… A system that delivers effective 'room-to-room' personal comfort control, but best of all…



… A system that is so affordable, the homeowner can generally recoup the investment in less than 1 year.

Enjoy home comfort through an e/vent Automated Heat Register System

The e/vent solution

Enter the e/vent Automated Heat Register, a unit that can automatically adjust itself to the room comfort level of the individual while cutting back on expensive heating bills.

A heat sensor, (part of a programmable thermostat mounted on the wall of a given room) determines the current room temperature and relays this information to the thermostat. Through wireless technology the thermostat commands the heat register in that room to open allowing the temperature to go up or down depending on the heating or cooling requirements of that room. Once the desired temperature has been reached, the thermostat instructs the heat register to close. When the room's temperature changes by several degrees (a programmable value in the thermostat) the cycle repeats itself as necessary.

Two versions of this unique airflow management system are currently under consideration

Version A: Independent room controlled system

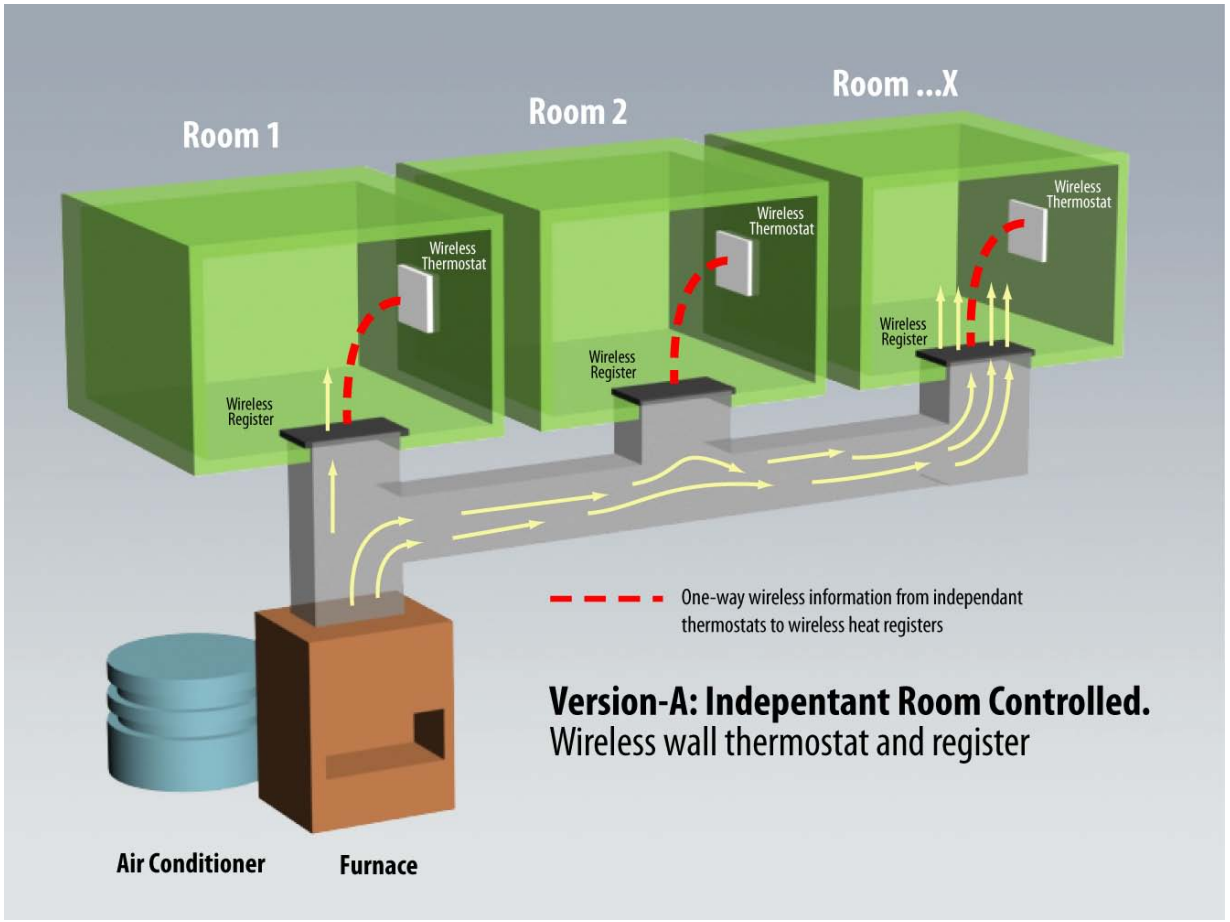
Wireless wall thermostat and automated heat register

1. A room in a house receives a wireless thermostat and an automated heat register kit.
2. The thermostat is mounted on the wall away from the heat register. (The automated heat register replaces the existing register).
3. The thermostat is programmed to keep the room at 72
4. The thermostat in the room reads the temperature at 5 below optimum temperature, (a programmable variable).
5. Wireless thermostat opens the aperture on the automated heat register.
6. When the furnace comes on, the thermostat monitors the temperature of that room until optimum temperature is reached plus 2 , (a programmable variable).
7. The thermostat closes the aperture on the wireless heat register.

Note: The wireless heat register will remain closed even if the furnace continues operating resulting in optimal temperature for that room and more efficient output of the furnace while this heat registers aperture is closed. Also, if that room's door is open the thermostat will continue to monitor and adjust the temperature accordingly.

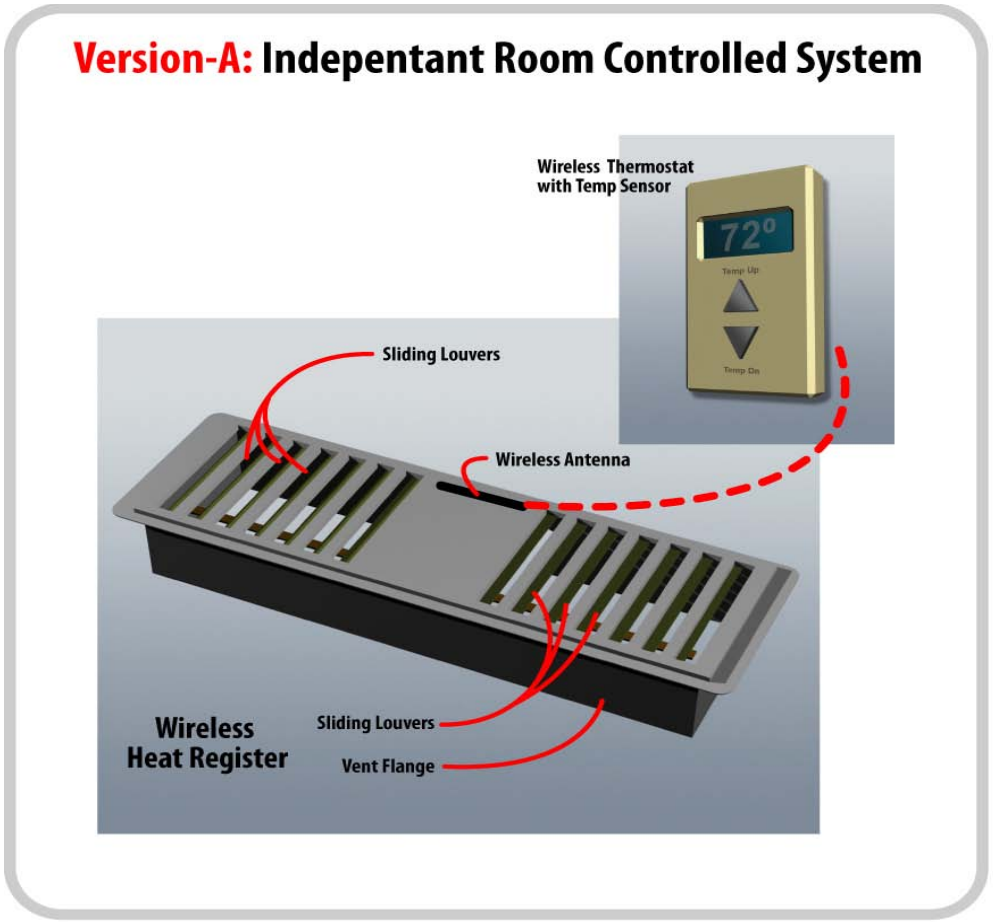
Version A: Independent room controlled system

Wireless wall thermostat and automated heat register



Version A: Independent room controlled system

Wireless wall thermostat and automated heat register



- **Chief benefits of this system allows for gradual upgrades over time, and when funds permit.**
- **A “whole-home” solution will eventually be achieved with about the same savings as the “Version-B” solution.**

Version B: Central panel controlled *Centrally located wireless control unit communicate with all rooms automated heat registers and to Wireless Command Node.*

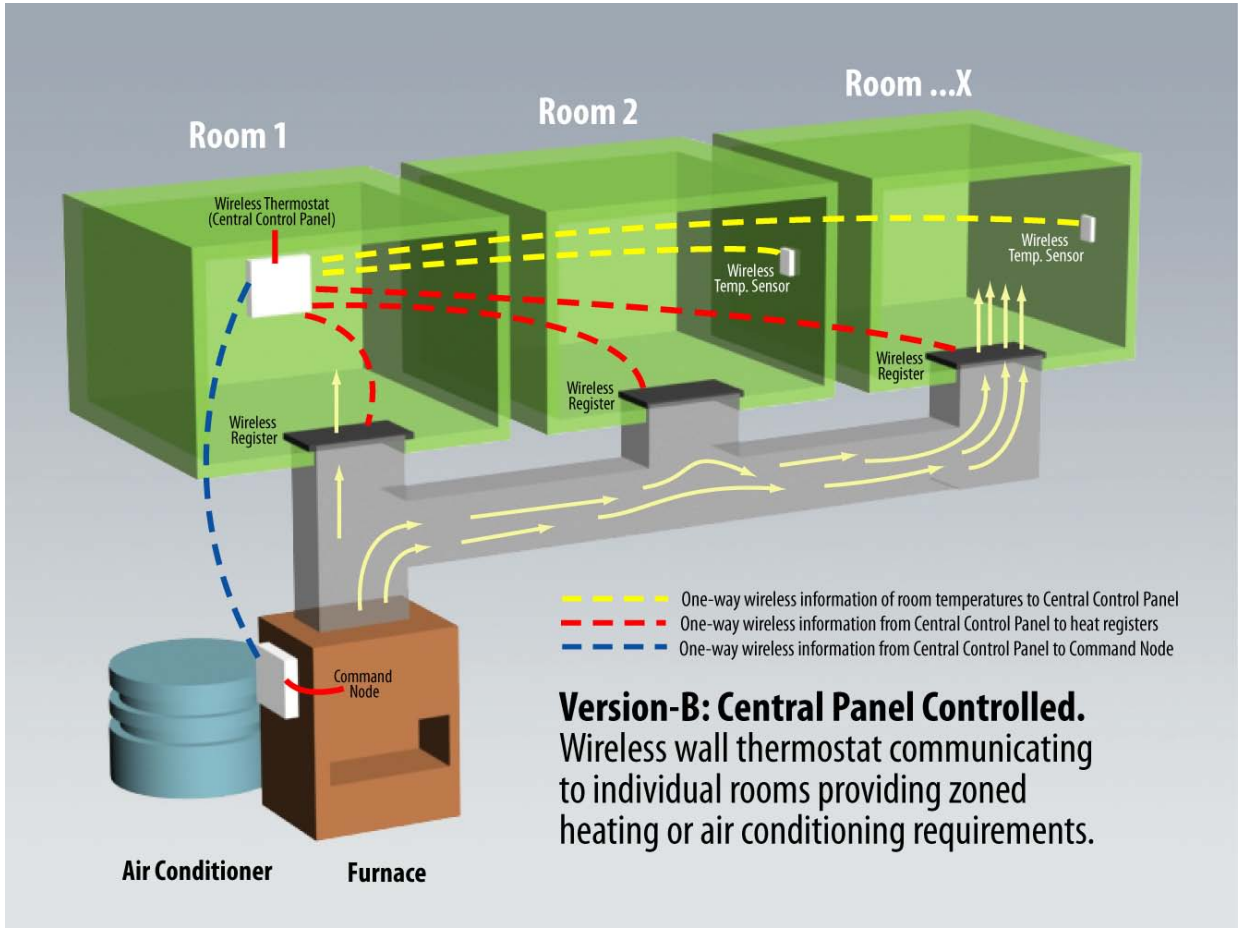
1. A Command Node is hardwired to the furnace. (This node commands the duty cycle of the furnace for heating or air conditioning and supplies current to the individual automated heat register units).

2. All rooms in the house receive a wireless thermostat and an automated heat register.

3. A (wired or wireless) programmable Central Command Panel (CCP) keypad is centrally located within the house. This is the unit that receives temperature information from all rooms and transmits open/closed data to the automated heat registers. (This CCP keypad could be a physical component of the Command Node, attached to the furnace).

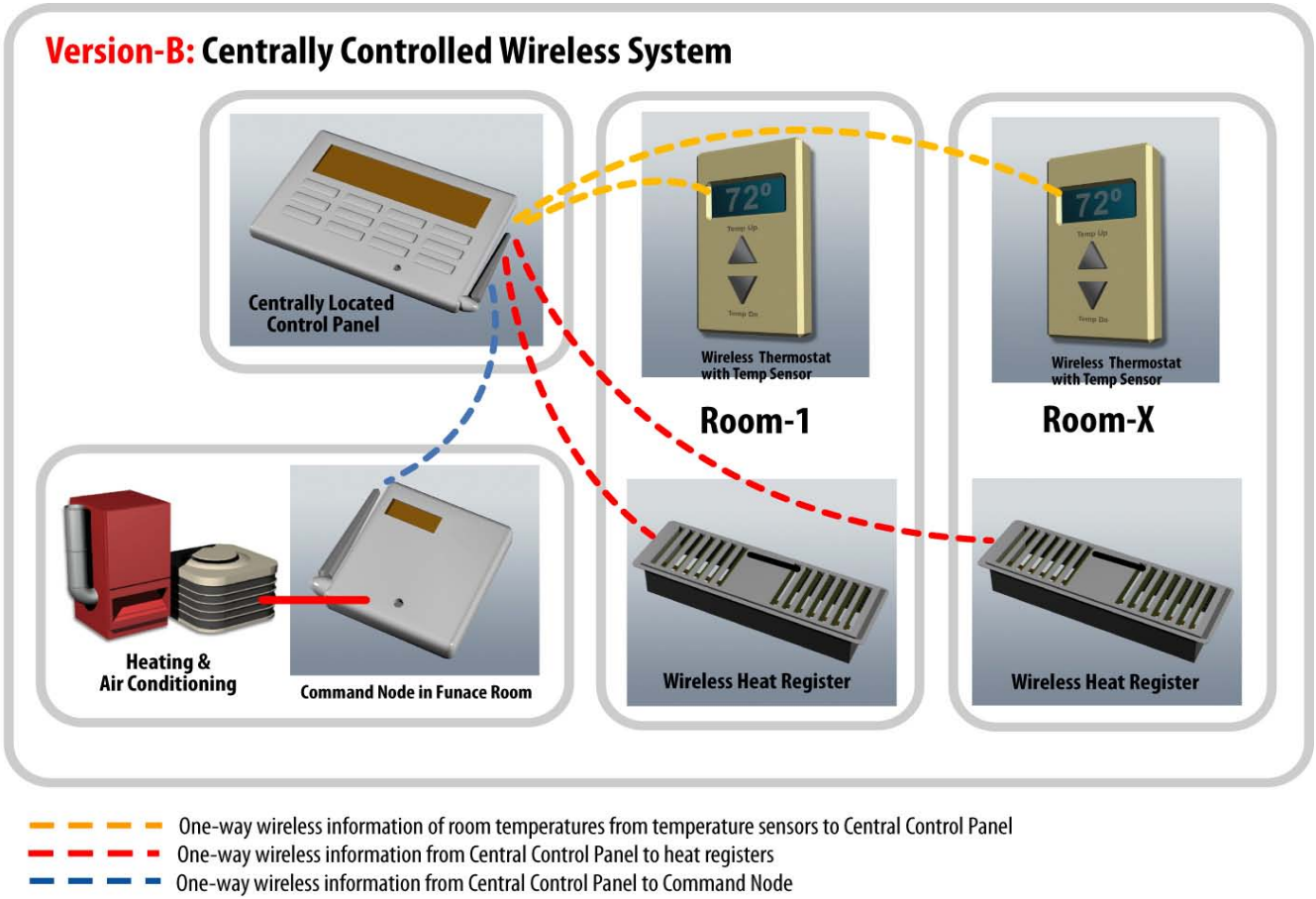
4. The keypad is programmed, entering temperature settings for the individual rooms. The duty cycle of the furnace is also programmed for heating and air conditioning by way of the Command Node.

Version B: Central panel controlled *Centrally located wireless thermostats communicate with all rooms automated heat registers and to Wireless Command Node.*



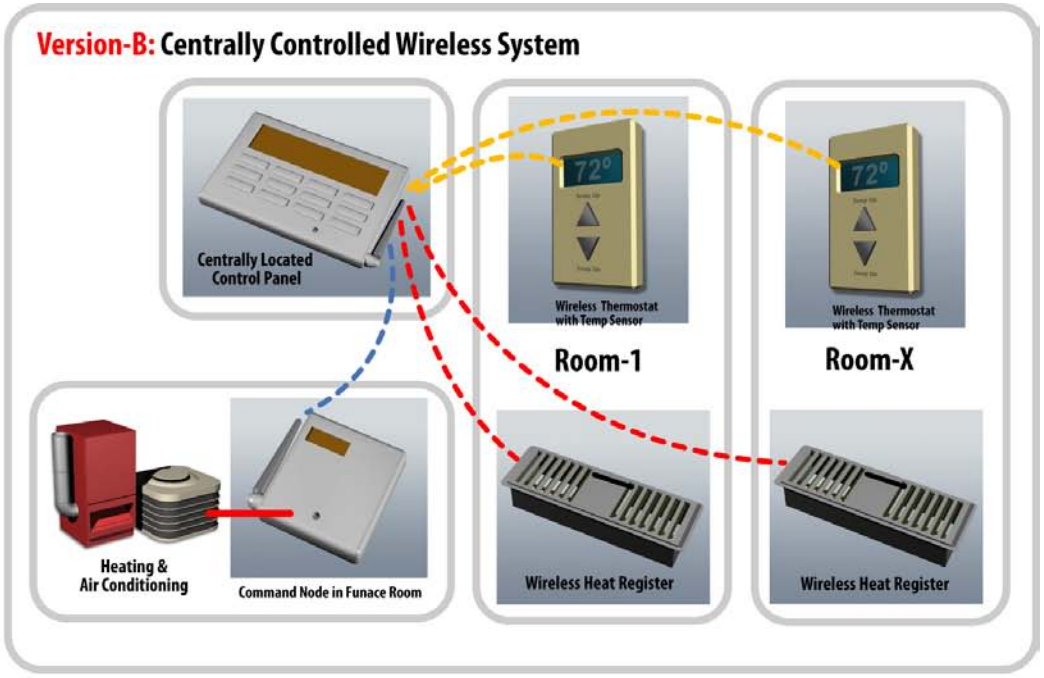
Chief benefits of this system allows for features such as:

- **Daytime programs**
- **Away time programs**
- **Automated duty-cycle of furnace and air conditioning**
- **Program wing closures for large estate homes**



A temperature sensor in any given room sends its room temperature to the central keypad intermittently. The CCP analyzes the information and opens or closes heat registers as required. If there is sufficient change in temperature, the CCP instructs the Command Node to begin its heating or air conditioning duty cycle. Some rooms will achieve optimum temperature sooner than others, in which case these rooms are instructed to close their heat registers. Once optimum temperatures are achieved for all rooms, the CCP instructs the Command Node to stop the duty cycle of the heating or air conditioning unit.

Graphical review of both systems



Value driven features

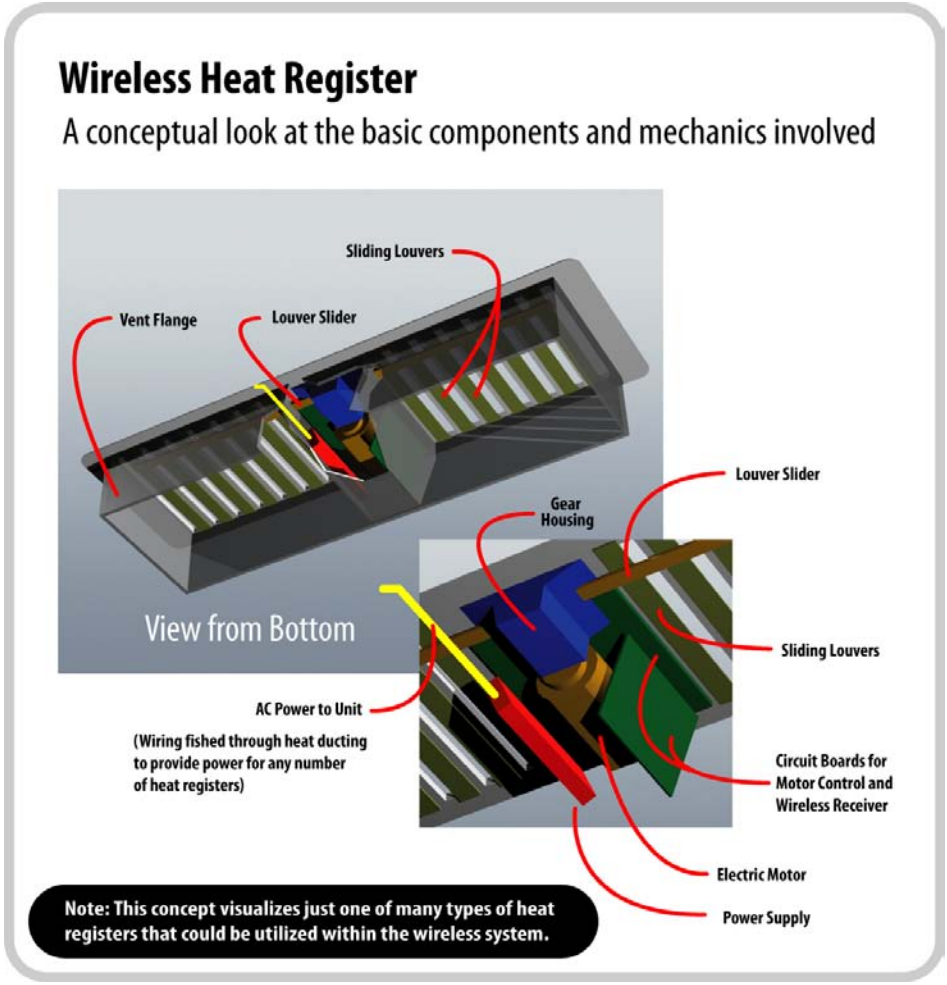
- Purchase units when funds are available
- Vents available in all stock sizes
- Distributed through retail hardware stores
- Installed by homeowner or handyman

Value driven features

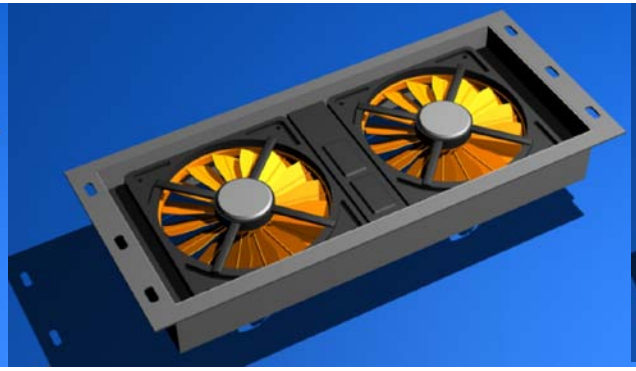
- One-shot installation for “whole-home” solution
- Vents available in all stock sizes
- Individual components distributed through retail hardware stores and/or commercial home air/heating companies
- Installed by homeowner, handyman, commercial air/heat contractor

The anatomy of an automated heat register

Heating registers haven't changed much in design over the last 40 years consisting of a simple box structure with a hand operated louver that opens and closes the vent, allowing more or less airflow into a room. The wireless version looks very much the same as its predecessors with the exception of a simple motorized mechanism to operate the vents aperture, a miniature circuit board for the wireless receiver, and a motor logic circuit. This hardware is contained in a dust-free environment fitted underneath the vents aperture. Power to the unit is supplied by 24VDC power supply from the Command Node and fed through the ductwork to the individual room.



Expected Design Consideration


A vent insert that combines several functions in one unit. The vent can be in a fully closed condition which allows no air to pass through to the room. When the furnace or air conditioning comes, on the fan inside the vent insert runs and the blades on the fan open their pitch to maximum, allowing the air from the duct to be drawn into the room, acting as a booster to the furnace fan. When the furnace or air conditioning duty cycle turns off, the motor of the fan within the vent insert also turns off and the pitch of the blades close to allow the the duct to be fully blocked.

The benefits of the automated heat register system in the home

- Room-to-room comfort control
- Personalized, programmable temperature settings of each room
- House-wide efficiency of heating and air conditioning
- The ability to close heat registers in rooms that may be closed off seasonally
- The automation of room temperatures where the homeowner will be away at length
- Hugh savings in annual heating and air conditioning bills
- Wireless technology eliminates hardwiring nightmares
- Systems can be easily installed by the homeowner
- Set and forget technology

We hope you've enjoyed this presentation!