

Introduction

Our patented airflow technology is designed to eliminate the uneven heating and cooling found in most 2-story homes in the summer and winter if the home is heated and cooled using a single HVAC system. Comfort in a home is controlled by the thermostat that turns the equipment on and off and by the distribution of heated or cooled airflow to the spaces that need it at the time.

Ducting Controls Heated and Cooled Airflow Distribution

When the duct work is designed, it is based on the heating and cooling loads for the different spaces. The duct work may distribute the heating and cooling effectively in the fall and spring when loads are moderate but cannot adjust to the times when the upstairs cooling demand is high in the summer or the downstairs heating demand is high in the winter. The ideal duct work would increase the ducts servicing the upstairs in the summer so more cooled airflow would be directed upstairs and increase the ducts servicing the downstairs in the winter. We know ducts cannot be changed with the seasonal demands, but airflow can be changed and that's what the Comfort365 controls do using modulating dampers.

Comfort365 Manual Airflow Control

All Comfort365 controls can manually control the distribution of airflow. The homeowner sets the airflow distribution and the modulating dampers are positioned to distribute more airflow to the upstairs or downstairs. For example, if more cooled airflow is needed upstairs and the control is set to 120% Upstairs, the Upstairs damper is fully open and the Downstairs damper is closed 20%. This forces more airflow upstairs and less airflow is delivered downstairs as shown in Figure 1.

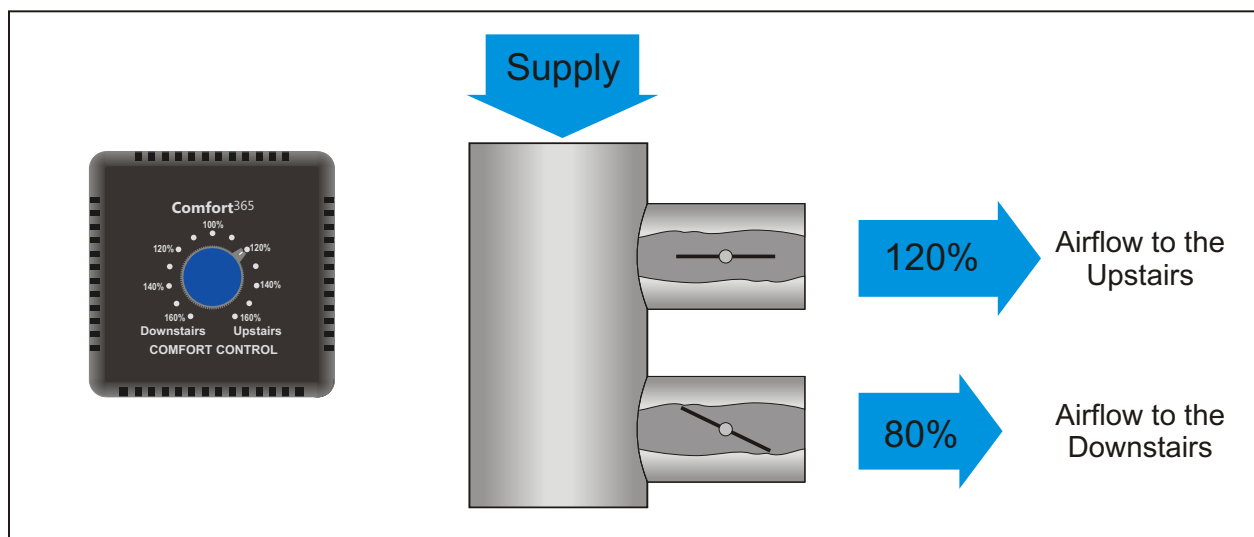


Figure 1. Modulating dampers control the airflow distribution.

Manual airflow control can be used to adjust airflow so the home is evenly heated or cooled or it can be used to direct more airflow to an occupied space such as the downstairs living space with a home office during the day - saving energy by not conditioning unoccupied space.

Comfort365 Automatic Airflow Control

Some Comfort365 controls can automatically control the distribution of airflow to provide a uniformly comfortable home. The control monitors the upstairs and downstairs temperatures and if these temperatures differ by 2 degrees or more during a heating or cooling call, the control will make a 2% adjustment in airflow every 2 minutes until the upstairs and downstairs temperatures are within 1 degree. Figure 2 illustrates Automatic airflow operation

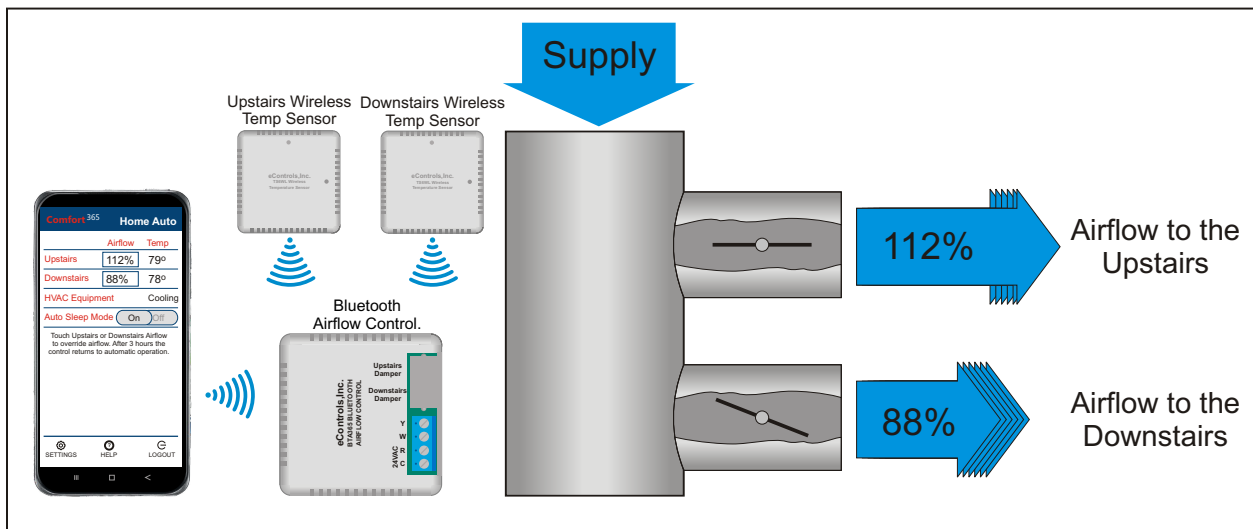


Figure 2. Automatic mode airflow distribution is dynamically adjusted.

Comfort365 Saves Energy at Night

The homeowner can direct more airflow upstairs to the sleeping space at night and less airflow will be distributed to the unoccupied downstairs. Setting the Sleeping airflow to 130% directs 30% more airflow to the sleeping space and the space will be conditioned 30% sooner and save 30% in energy at night without sacrificing comfort. If a thermostat without wireless sensors is installed downstairs, the heating and cooling temperatures can be setback at night without affecting the sleeping comfort.

Smart thermostats with wireless temperature sensors can be set to use a remote sensor in the sleeping space to control heating and cooling calls. Set the heating and cooling temperatures to the comfort setting and energy will be saved by reducing the conditioning of the unoccupied living space.

Manual or Automatic Sleep Control

In Manual Sleep Mode, the homeowner adjusts the airflow before going to bed and when they wake up. Some controls have a sleep button on the App that sets the airflow to a preset percentage and returns the control to normal operation after a preset number of hours.

Automatic Sleep Mode requires no homeowner intervention. Each night at a preset time the control changes the airflow to the sleeping airflow percentage and at a preset time in the morning the airflow returns to normal operation. The Start Sleep time, End Sleep time and the Sleep airflow percentage are set in the App settings.

No Bypass Required

The Comfort365 controls never close a damper fully. Airflow is controlled from 100% down to 40% or up to 60% of its normal airflow and typically operate in the 100 to 125% range even in very hot areas.

No Discharge Air Temperature Sensor Required

Because the Comfort365 controls do not change the airflow through the HVAC equipment or bypass airflow into the Return air duct, the temperature of the return air and therefore the discharge air is not affected by the control.

Equipment Efficiency

Because the Comfort365 controls do not change the airflow through the HVAC equipment or bypass airflow into the Return air duct, the efficiency of the equipment is not degraded.

No Separate 24VAC Transformer Required





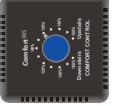

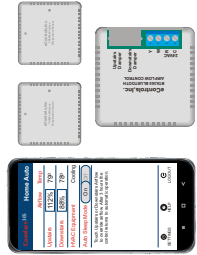
The dampers and control use less than 5VA and can be powered from equipment 24VAC transformer at the R and C terminals.

Modulating Dampers

The modulating dampers used with Comfort365 controls are not sealed dampers because they never close. The blade diameter is about 3/4-inch smaller than the damper diameter. The dampers are fabricated using a diecast blade bracket or with a square (.219-inch by .219-inch or 7/32-inch) shaft.

Modulating Damper Actuator

The A80MJ modulating actuator has been tested to over 9 million cycles. It has an IN connector for connecting to the control with the Plug&Play cable provided. Another connector marked OUT can be used to control additional dampers when multiple dampers are required to define the upstairs or downstairs space.

Mode Number	Description	Installations	Manual Airflow Control	Automatic Airflow Control	Manual Sleep Mode	Automatic Sleep Mode	Heating Cooling Control	Installation
C365T11/C365T21 	Thermostat that controls heating and cooling and airflow control.	RNC	Yes	Yes	Yes	Yes	Yes	Tstat wire
C365T21WF 	Thermostat that controls heating, cooling and airflow. With WiFi.	RNC	Yes	Yes	Yes	Yes	Yes	Tstat wire
C365R22 	Thermostat that controls heating and cooling and airflow using existing Tstat cable.	AOR	Yes	Yes	Yes	Yes	Yes	Tstat wire
C365R22WF 	Thermostat that controls heating and cooling and airflow using existing Tstat cable. With WiFi.	AOR	Yes	Yes	Yes	Yes	Yes	Tstat wire
WC365 	Wireless wall control with rotary knob for setting airflow.	AOR/RNC	Yes	No	Yes	No	No	Wireless
BTMC365 	Bluetooth control with App for controlling airflow.	AOR/RNC	Yes	No	Yes	No	No	Wireless
BTAC365 	Bluetooth control with wireless temperature sensors and App for controlling airflow.	AOR/RNC	Yes	Yes	Yes	Yes	No	Wireless