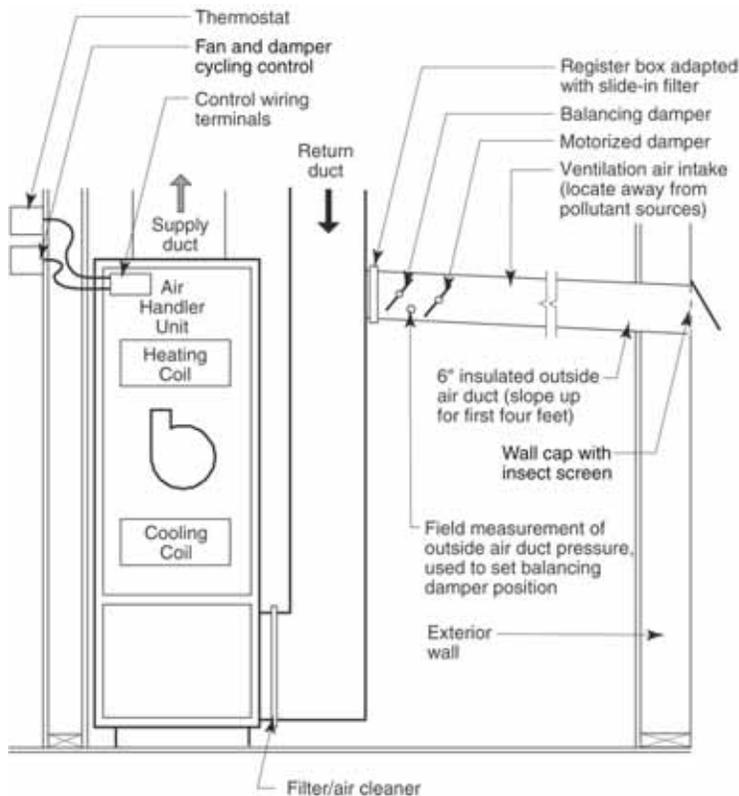


# BSC Information Central Fan Integrated Ventilation Systems *for All Climates*

## Sheet 610



- Outside air duct should be insulated and positioned so that there is a fall/slope toward the outside to drain any potential condensation due to blown snow.
- Motorized damper allows control of ventilation air duty cycle (i.e., open time) separate from air handler duty cycle (i.e. run time).
- Controller can be mounted on the air handler, or in the main space near the thermostat.
- Balancing damper adjusted to provide required air flow.
- Mixed return air (15% or less outside air mixed with 85% or more inside air) temperature should not drop below 55° Fahrenheit, or follow furnace manufacturer's instructions.

### Why a Ventilation System?

All buildings require controlled mechanical ventilation, or the controlled, purposeful introduction of outdoor air to the conditioned space. Building intentionally leaky buildings and installing operable windows does not provide sufficient outside air in a consistent manner. Building enclosures must be "built tight and then ventilated right." Why? Because before you can control air you must enclose it. Once you eliminate big holes it becomes easy to control air exchange between the inside and the outside.

With a tight building enclosure, both mechanical ventilation and pollutant source control are required to ensure that there is reasonable indoor air quality inside the house. These approaches are shown schematically in the following figures titled *Integrated Supply Ventilation System*.

### Central Fan Integrated System

One example of a ventilation system design is a central fan integrated supply (CFIS) system, which is made up of a 6-inch outdoor air intake duct connected to the return side of the air handler with a fan cycling control to make sure the fan runs a programmed minimum amount of time. This duct draws outdoor air into the air distribution system and distributes it to the various rooms in the house. The intake duct has a motorized damper also controlled by the fan cycling control to close the damper to prevent over ventilation of the house during times of significant space conditioning demands. A schematic of the CFIS system with 6-inch motorized damper is shown in figure *Outdoor Air Duct Connected to the Return of the Air Handler*.

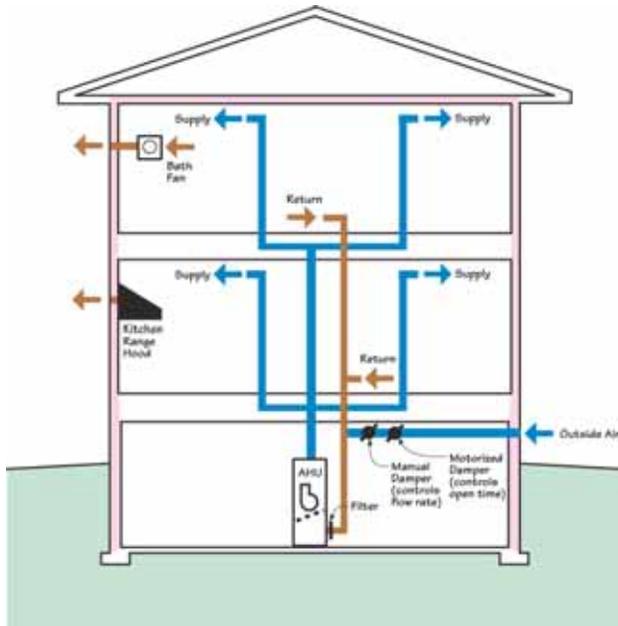
### CFIS Controllers

There are several central fan integrated ventilation system controllers commercially available on the market. A listing of products can be found on the web at the FanCycler.com website:

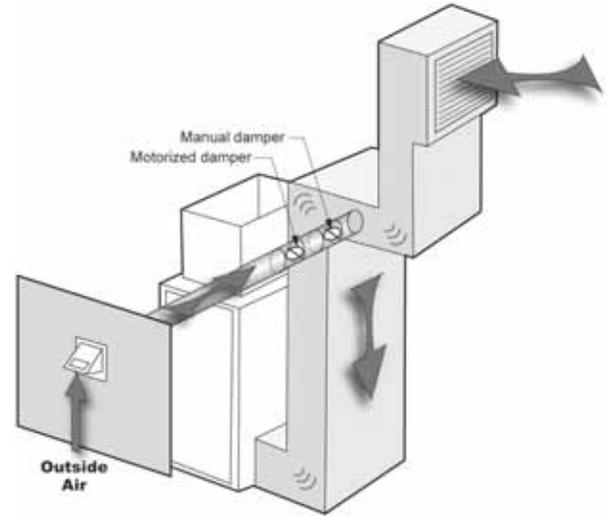
<http://fancycler.com/products/default.htm>

This website also has detailed information on the installation and commissioning of these systems.

## Integrated Supply Ventilation System with Outside Air Duct to Return

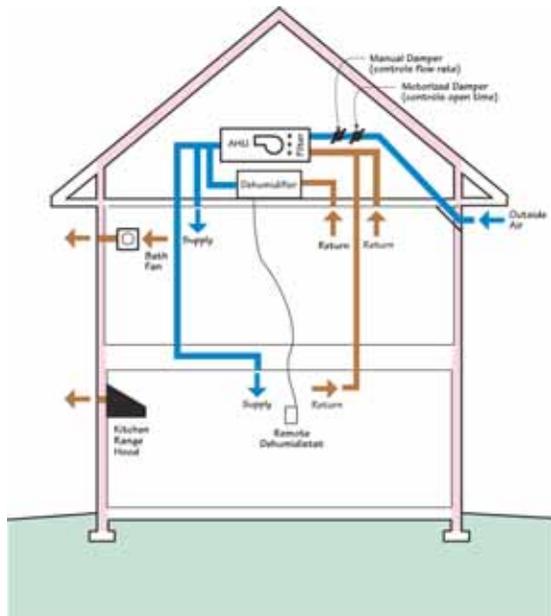


## Outdoor Air Duct Connected to the Return of the Air Handler

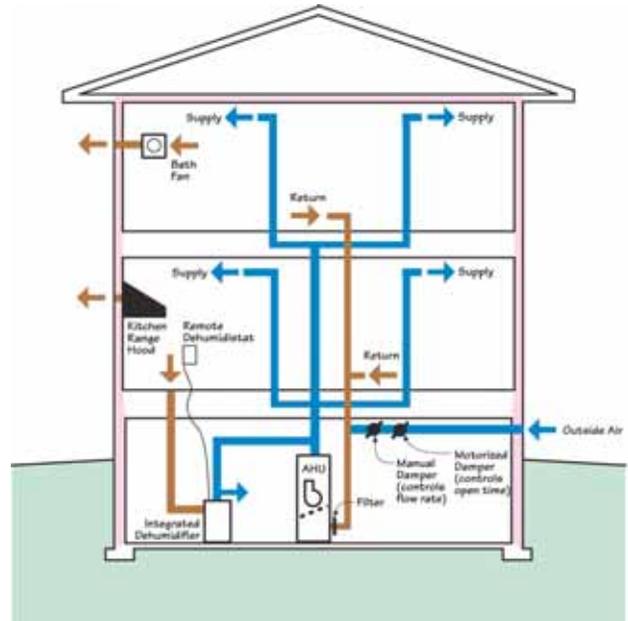


- Air handler (preferably with efficient ECM fan) operates on a 33% minimum duty cycle including calls for heating and cooling. On average over the year, this means that the fan cycling control will activate the fan about 15% of the time without coincident heating or cooling demand.
- House central forced air system provides tempering of outside air along with circulation and distribution of ventilation air for improved indoor air quality and thermal comfort.
- Point source exhaust is provided by individual bathroom fans and a kitchen range hood.
- In any supply ventilation systems, pre-filtration of outside air is recommended to protect equipment and extend the life of the air handler unit filter.

## Integrated Supply Ventilation System with Dehumidification for Warm Humid Climates



## Integrated Supply Ventilation System with Basement Dehumidification for Cool Humid Climates



- Central-fan-integrated **supply** ventilation with available continuous bathroom **exhaust** and with **integrated dehumidifier**. Outside air intake through sidewall via angled fur-down in a closet (going through a gable end is just as good but avoid going through the roof).
- Manual balancing damper in the outside air duct allows adjustment of the flow rate.
- Periodic operation of the central air handler fan assures consistent ventilation air distribution and uniform air quality. It also reduces temperature and humidity variations between rooms.
- Optional motorized damper closes the opening to outside when the fan is off, and with damper cycling control, can limit outside air intake independent of how long the fan runs.
- Keeping all ducts inside insulated space provides the best performance, such as permitted by the **unvented-cathedralized attic** shown above. Sealed and well-insulated ducts are next best.
- Supplemental dehumidification integrated with the central air distribution system provides year-around humidity control independent of cooling system operation. A stand-alone dehumidifier can indirectly serve the whole house through use of central fan cycling.