building science.com

Central Fan Integrated Supply Ventilation—The Basics

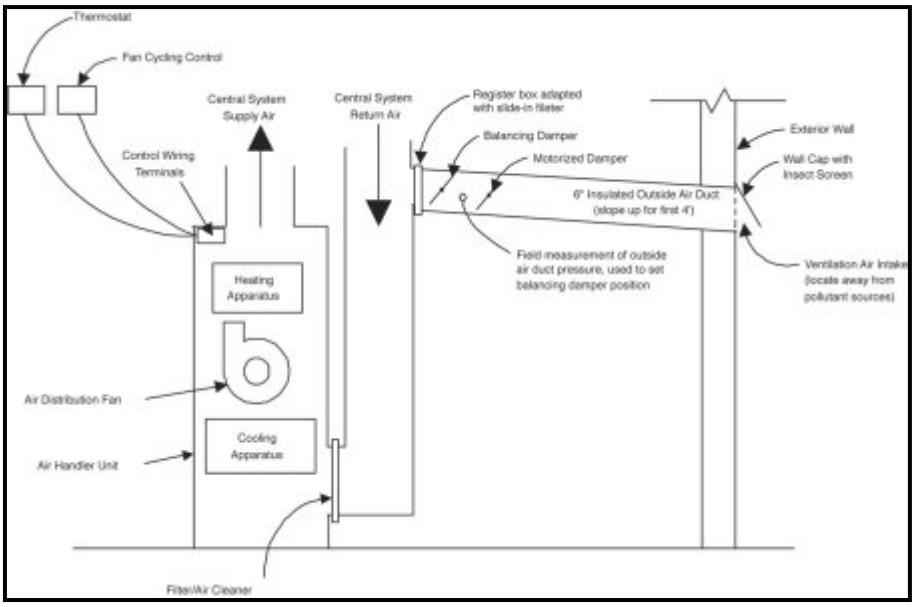
Research Report - 0304
2003
Armin Rudd

Abstract:

The simplest, most effective, and most economical way to introduce fresh air in homes with central forced air systems is to use the central fan to pull in and distribute a controlled amount of outside air.

Central Fan Integrated Supply Ventilation – The Basics[1]

The simplest, most effective, and most economical way to introduce fresh air in homes with central forced air systems is to use the central fan to pull in and distribute a controlled amount of outside air. This central fan integrated supply ventilation approach depends on two patented processes:



FAN CYCLING: Fan cycling assures that the central air handler fan will run enough to distribute ventilation air and evenly mix air throughout the house, even when there is no demand for heating or cooling. But rather than operate the fan continuously or by a simple timer, the FanCycler™ method factors in prior operation—it does not run the central fan for ventilation when operation for heating or cooling has already accomplished the necessary ventilation and mixing. In this way, the FanCycler™ method saves energy as well as wear and tear on equipment.

VENTILATION DAMPER CYCLING – Integrating a motorized ventilation damper with fan cycling limits the potential for over-ventilation and saves the energy of unnecessarily conditioning this “extra” outside air. The damper opens when the fan comes on, but if the fan stays on longer than needed for the introduction of ventilation air, the damper automatically closes. Air is simply re-cycled for as long as the fan continues to operate.

While BSC strongly recommends fan cycling with motorized damper control, the two climate regions where it is most important are hot-humid (because of the problems associated with unnecessarily introducing moisture-laden outside air) and severe cold (because of the energy penalty and potential comfort problems associated with unnecessarily introducing extremely cold outside air).

[1] The fan and damper cycling methods described here are protected by one or more of the following patents: US 5,547,017; 5,881,806; 6,431,268 CA 2,245,135.

Commercially available controls that do both fan and damper cycling:

- Aprilaire, model 8120 controller, model 8126 kit (includes motorized damper) http://www.aprilaire.com/product.asp?ID=4BC76056DD7246EAB4AD7A01B4B4B5FD&categoryID=9DDC176A7AD948DCB0D14F348EB3FF1e
- SCI, model ERV24-HC11 FanCycler thermostat

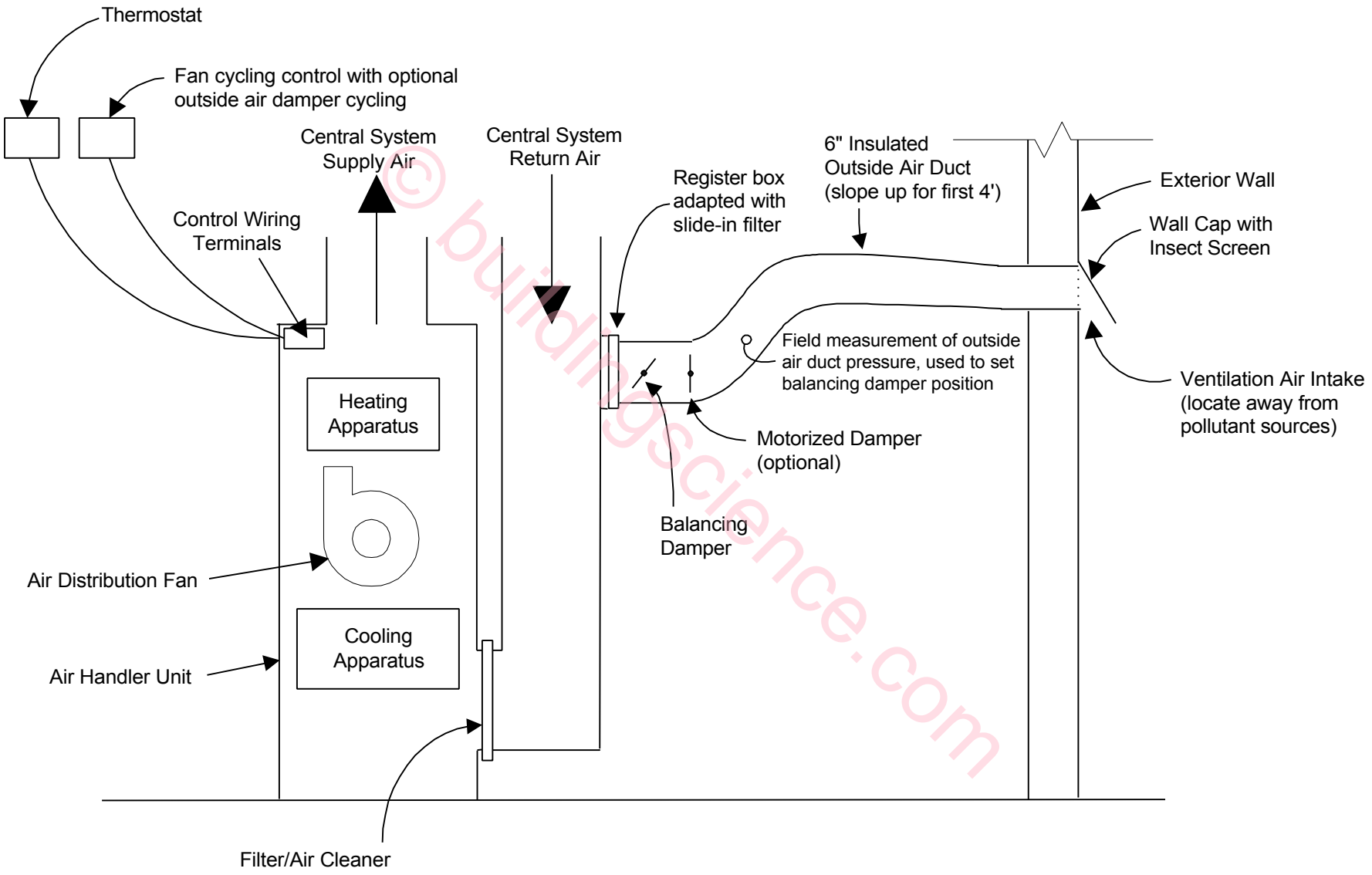
Sources for controls that do fan cycling only:

- Honeywell model PC8900/W8900 thermostat (CIRC feature) http://content.honeywell.com/yourhome/ac-automated_control/hc.htm

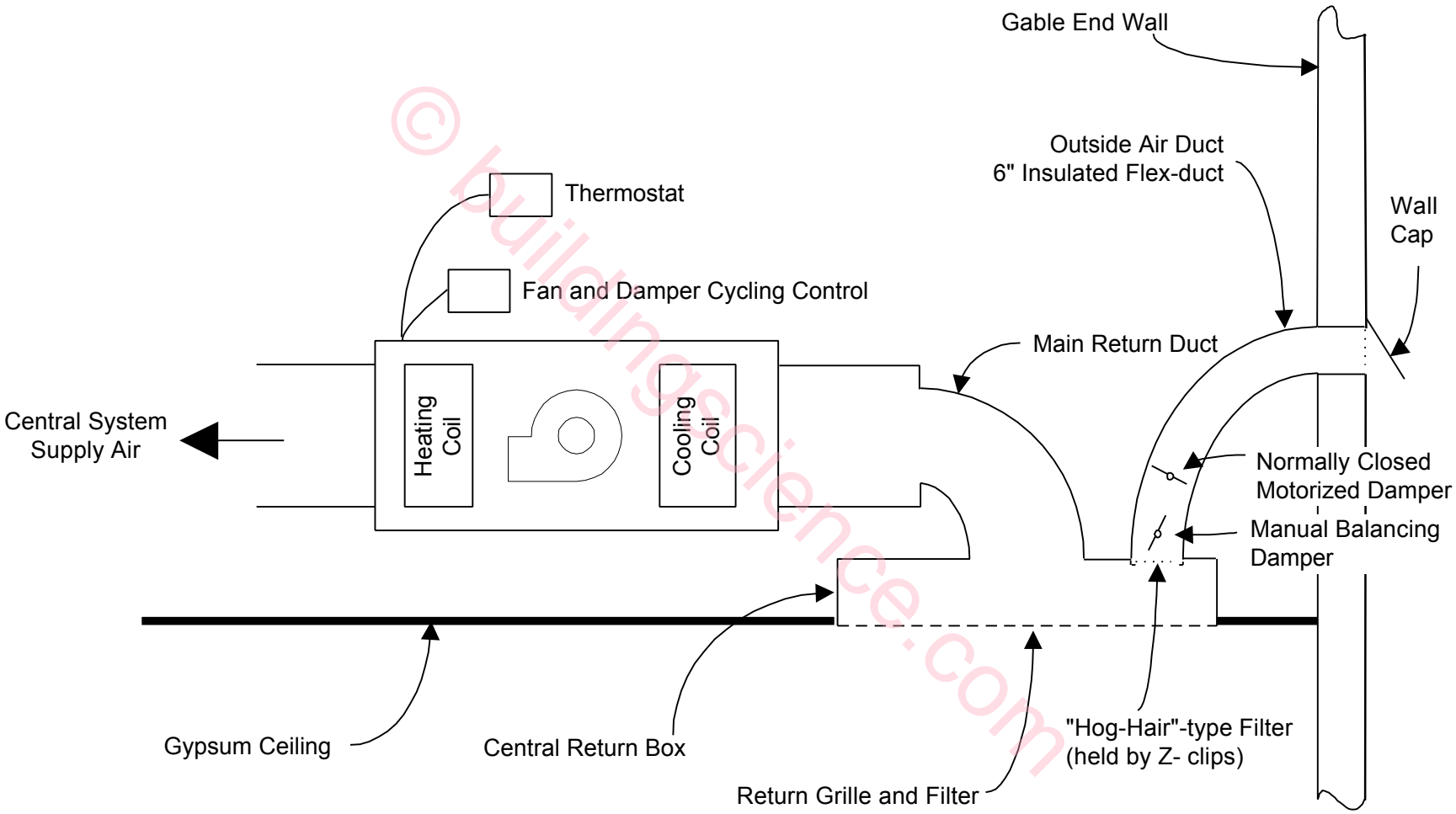
For more information on these systems, go to the following commercial web site: http://www.fancycler.com.

For more information on climate-specific mechanical ventilation, see Houses That Work: http://www.housesthatwork.com .

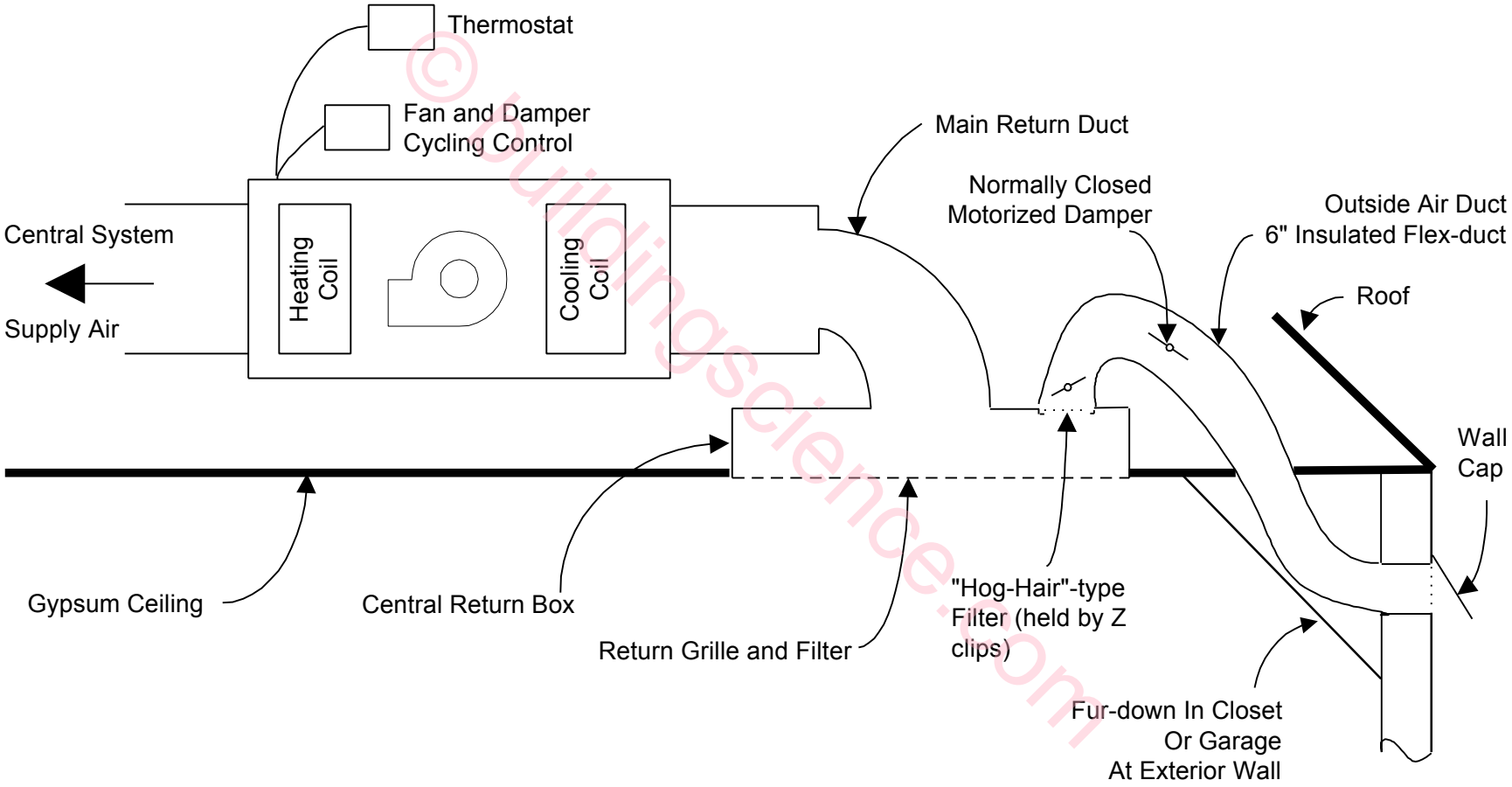
Central-fan-integrated supply ventilation
Interior closet or basement configuration



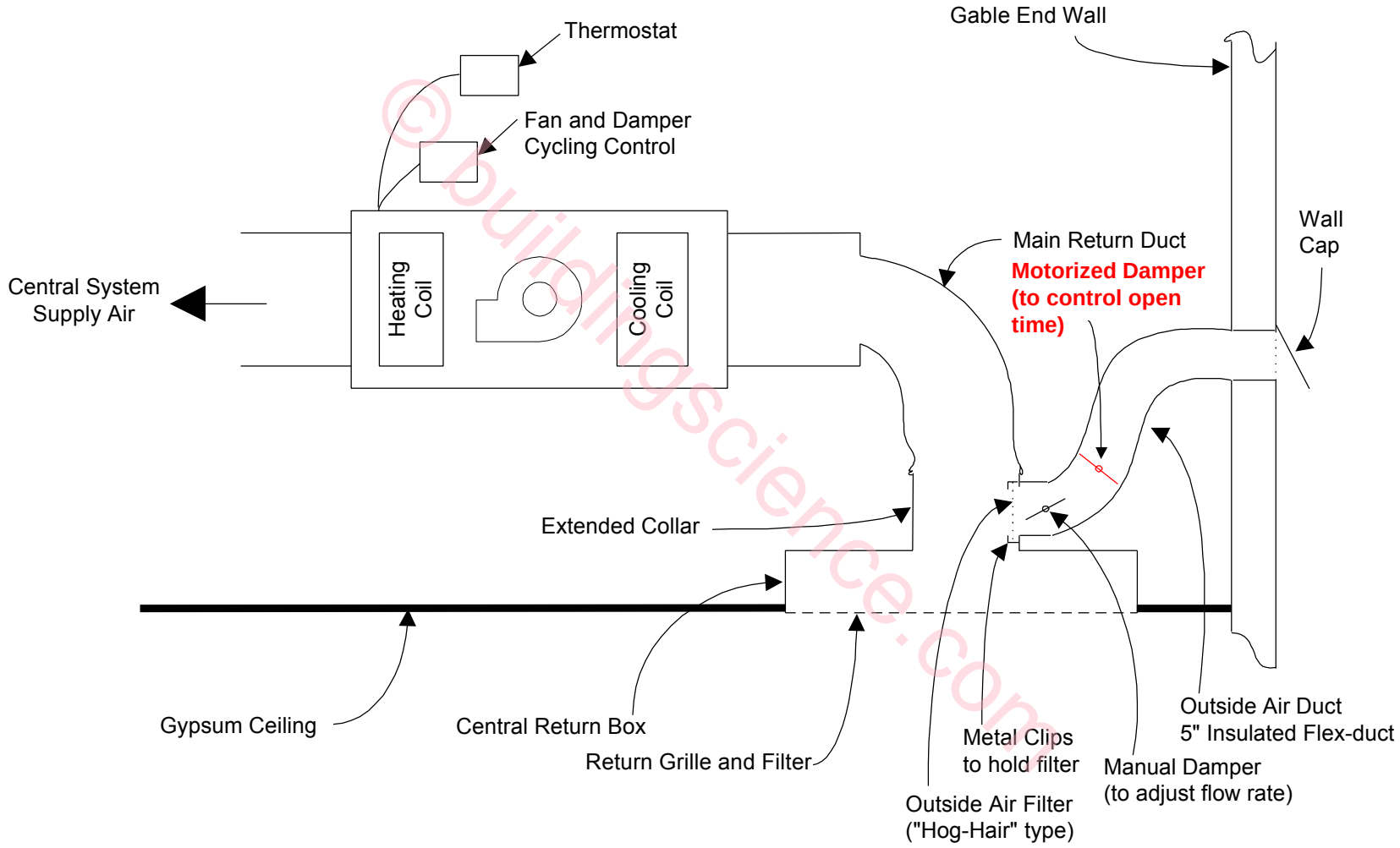
Central-fan-integrated supply ventilation
Unvented-cathedralized attic configuration
OA intake from sidewall to return box with motorized damper



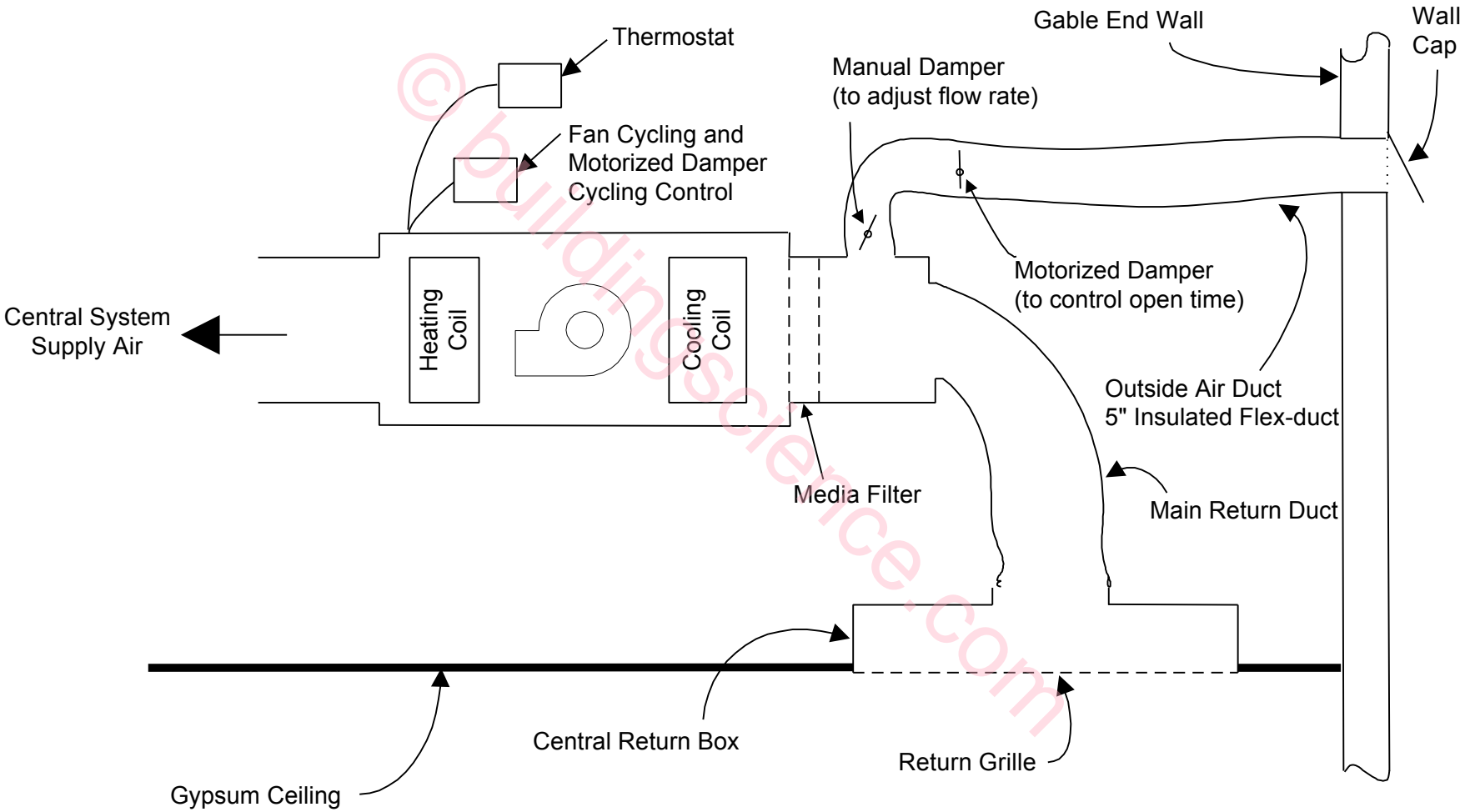
Central-fan-integrated supply ventilation
Unvented-cathedralized attic configuration
OA intake through soffit to sidewall



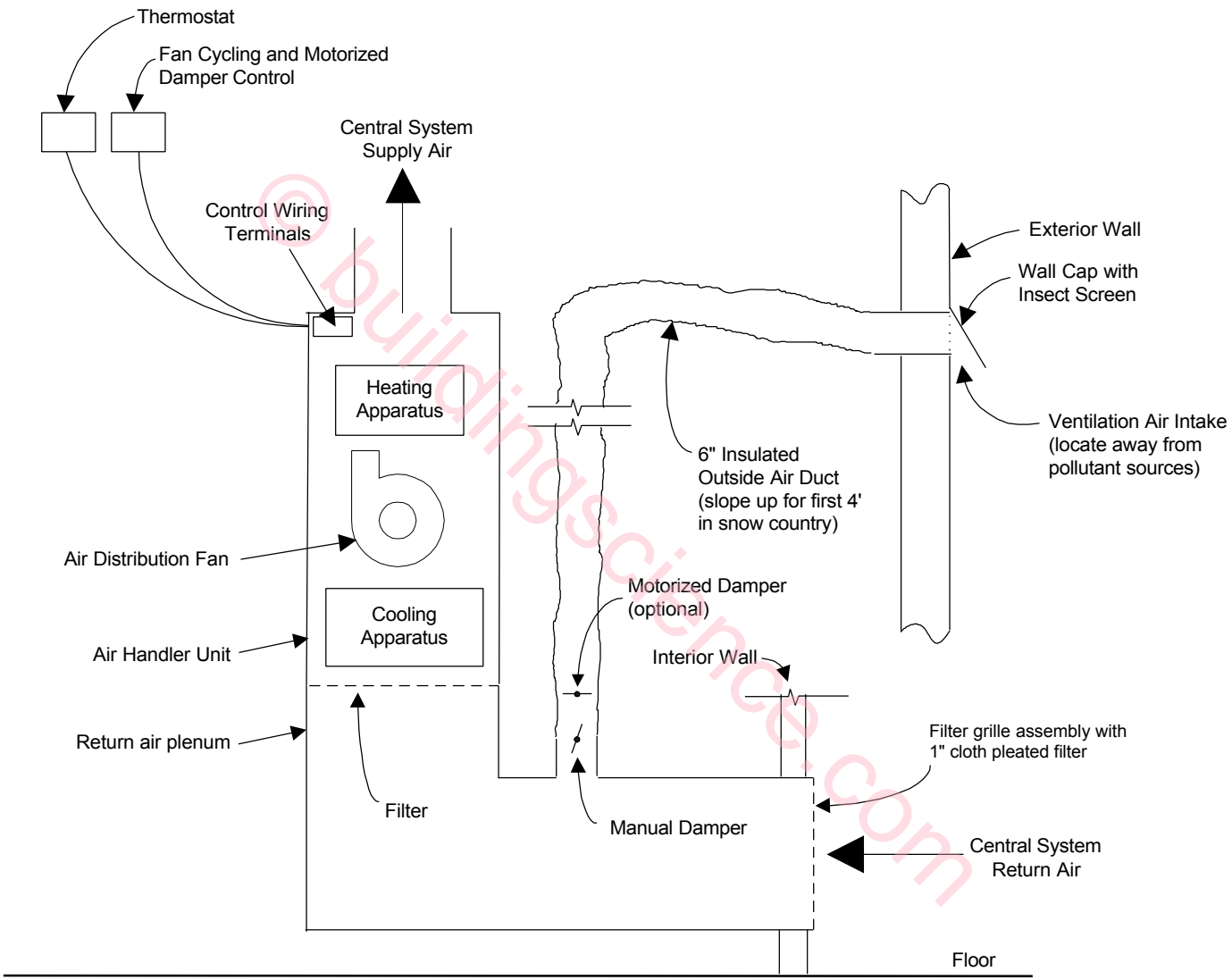
Central-fan-integrated supply ventilation
Unvented-cathedralized attic configuration
With extended return duct collar for increased OA intake



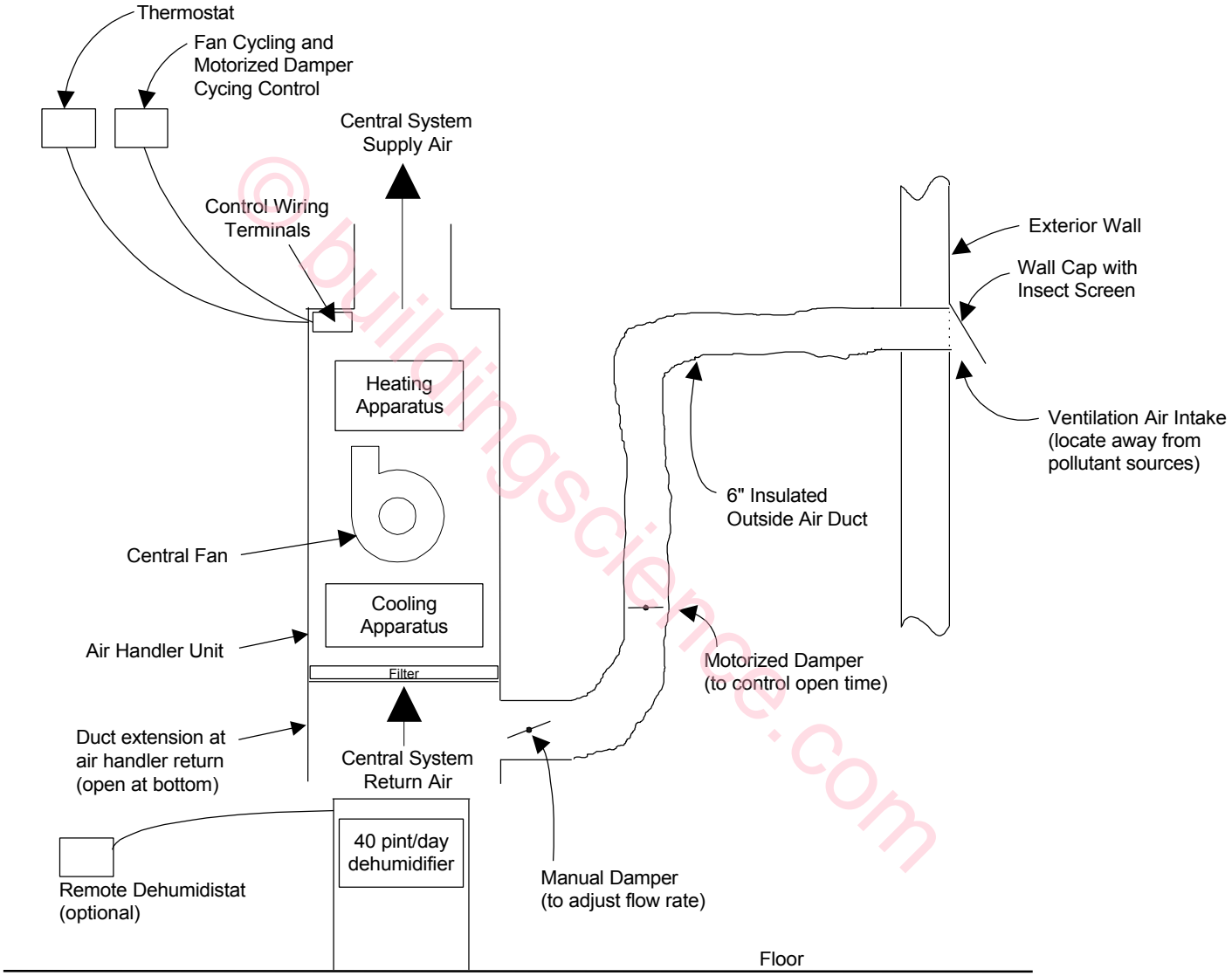
Central-fan-integrated supply ventilation
Unvented-cathedralized attic configuration
With media filter and motorized damper



Central-fan-integrated supply ventilation
Interior mechanical closet, sidewall return configuration



Central-fan-integrated supply ventilation
With dehumidification separate from cooling
Warm-humid climate, interior mechanical closet configuration



About the Author

Armin Rudd is a principal engineer at Building Science Corporation in Westford, Massachusetts. More information about Armin Rudd can be found at www.buildingscienceconsulting.com.

Direct all correspondence to: Building Science Corporation, 30 Forest Street, Somerville, MA 02143.

Limits of Liability and Disclaimer of Warranty: