

Demand Control Ventilation Using Setpoint Devices: A Lower Cost Solution for Indoor Air Quality

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Read, understand and follow the instructions before installing this product.
- Turn off all power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm power is off.

DO NOT DEPEND ON THIS PRODUCT FOR VOLTAGE INDICATION

- Only install this product on insulated conductors.

Failure to follow these instructions will result in death or serious injury.

A qualified person is one who has skills and knowledge related to the construction and operation of this electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved. NEC2009 Article 100
 No responsibility is assumed by Veris Industries for any consequences arising out of the use of this material.

The information provided herein is intended to supplement the knowledge required of an electrician trained in high voltage installations. There is no intent to foresee all possible variables in individual situations, nor to provide all training needed to perform these tasks. The installer is ultimately responsible to assure that a particular installation will be and remain safe and operable under the specific conditions encountered.

Introduction

To maintain healthy, comfortable indoor air quality (IAQ) conditions in a commercial building, the interior air must be supplemented with infusions of outdoor air to keep CO₂ levels within healthy limits. The simplest option is to have an open damper that freshens the supply air with some fixed amount of outdoor air. However, this outdoor air must be heated or cooled continuously. This temperature conditioning is the most expensive step in the ventilation process, so lowering HVAC costs starts with controlling the volume and frequency of outdoor air introduction. To this end, many building administrators employ demand control ventilation (DCV) systems, in which information gathered by sensing devices is used to create a real-time picture of the temperature and CO₂ level throughout the building, enabling smart and efficient choices about when to ventilate with outdoor air and how much conditioning the outdoor air requires. In many buildings, this means that a central control system is used to compile air quality data and control air flow. But setpoint devices offer a lower cost option for DCV without the need for a building control system.

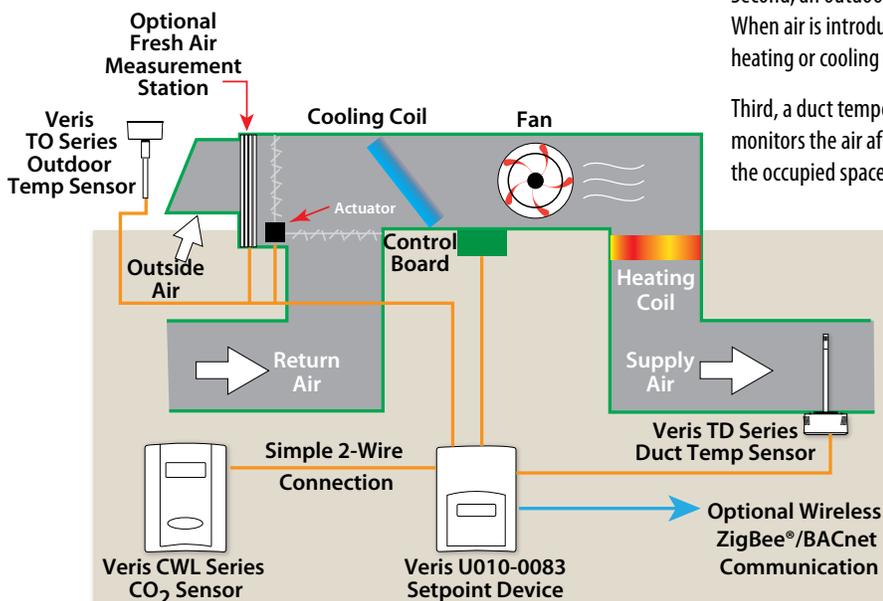
Demand Control Ventilation Using a Setpoint Device

In this system, a setpoint thermostat controls the on/off function of a single rooftop blower unit. The setpoint device is also wired to several analog sensing devices that gather data about the indoor and outdoor conditions at the site.

First, an indoor CO₂ sensor tracks the interior CO₂ level, which increases throughout the day as a result of human respiration activity. The setpoint device receives this data and determines when outdoor air is required to reduce the CO₂ level.

Second, an outdoor temperature sensor monitors the temperature of the outside air. When air is introduced into the building, this information determines the amount of heating or cooling required.

Third, a duct temperature sensor installed on the supply air side of the blower monitors the air after it is conditioned to ensure that what is being introduced into the occupied spaces meets comfort requirements.



The setpoint device collects the data from these three sensors to calculate when to turn on the blower to circulate interior air, when to open the damper to draw in outdoor air, and how to condition the air for maximum comfort. If the building has more than one rooftop blower unit, then multiple setpoint devices are needed to ensure adequate indoor air quality throughout the interior space. If networking is desired, the setpoint device is equipped with BACnet MS/TP communication capability.

In this manner, the setpoint device serves much of the same function as a full building control system at a fraction of the cost.