INDOOR AIR QUALITY

LVCS
HEALTHY CLIMATE®
Lennox Ventilation Control System

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PRODUCT SPECIFICATIONS

OVERVIEW

Whole-house ventilation for improved indoor air quality and comfort.

Automatic monitoring of outdoor temperature and indoor relative humidity.

Compatible with any forced air HVAC system.

Ventilation Controller is installed in the return duct of a forced air HVAC system.

Meets ASHRAE 62.2 Standard for Ventilation.

Working in conjunction with the supplied damper, the Ventilation Controller determines when and how long to ventilate. This is done through continuous monitoring of indoor relative humidity, outdoor temperature, and user-adjusted timer settings.

Indoor relative humidity is monitored to help prevent high humidity conditions inside the house. The Ventilation Controller will not open the damper to the outside air if there is a chance of raising the humidity inside the house to high levels. The Ventilation Controller is designed to prevent indoor relative humidity levels from increasing beyond 55% due to ventilation.

If the outdoor air temperature is below 0°F or above 100°F, the motorized, normally-closed damper to the outside will not be opened.

There are two adjustable settings: the cycle time and the ventilation time within cycle.

If the cycle time is set to 1 hour and the ventilation time knob to 20 minutes, there will be 20 minutes of ventilation every hour. The ventilation requirement of 20 minutes per hour in this example may be satisfied by a heating, cooling, or blower call initiated by the thermostat, or from a blower call initiated by the Ventilation Controller itself.

In very cold climates, balanced ventilation is recommended. LVCS can be used with an exhaust fan to provide balanced ventilation. Per ASHRAE 62.2, very cold climates are those that have more than 900 annual heating degree-days based on 65°F day.

WARRANTY

All covered components - two year limited warranty in residential applications.

Refer to Lennox Equipment Limited Warranty certificate included with unit for specific details.
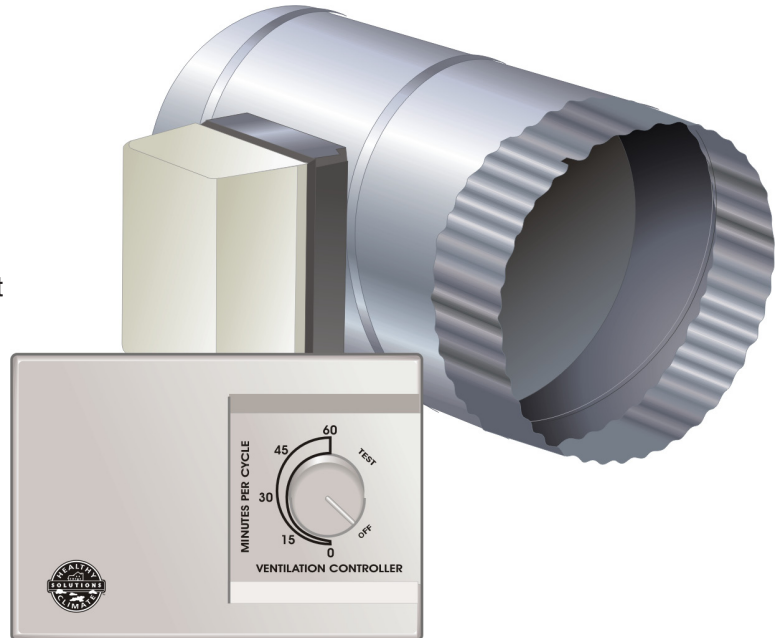
MODES OF OPERATION

The controller operates in one of three available mode:

1. **Recommended Installation**
   By connecting the Outdoor Temperature Sensor, the Controller will use outdoor temperature, indoor humidity, and user-adjustable settings to determine when to ventilate. This mode increases comfort and reduces energy costs by preventing extreme hot, cold or humid air from being used to ventilate the house.

2. By jumpering the two terminals on the controller for the Outdoor Temperature Sensor with a standard 20-gauge wire (field provided), the Controller will disregard the temperature settings and base the ventilation on the indoor humidity and user-adjustable settings to determine when to ventilate. This mode will allow ventilation regardless of temperature but prevents ventilation when the indoor relative humidity rises above 55%.

3. By connecting the "time only" resistor (provided) across the Outdoor Temperature Sensor terminals, the Controller will ignore outdoor temperature and indoor relative humidity and base ventilation solely on the user-adjustable settings.
   This mode is used for time-based ventilating regardless of temperature or humidity. This mode may be required by local codes.

FEATURES

MODES OF OPERATION (CONTINUED)

In the recommended installation, Ventilation Controller will use Outdoor Temperature, Indoor Humidity, and user-adjustable timer settings, to determine when to ventilate. In conjunction with the timer settings, the Controller operates according to the temperature and humidity control limits shown below.
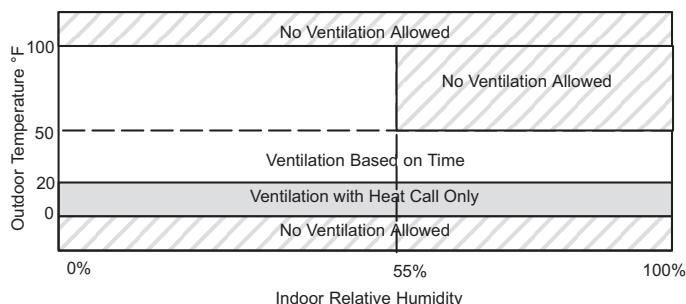
COMPONENTS

Kit includes Ventilation Controller, motorized damper, outdoor temperature sensor, "time only" resistor, and 24 VAC transformer.

Controller

Input: 18 to 30 VAC, 2.4VA nominal

Damper Output: 18 to 30 VAC, 10VA nominal

Temperature accuracy: ± 5°F

Relative Humidity Accuracy: ±5% RH

Cycle Time: 1, 2, 3, or 4 hours (selectable)

Ventilation Time: 0-60 minutes (selectable)

Must be installed at least 6 inches up-stream from fresh air intake duct, humidifier or humidifier bypass duct work.

Indoor Humidity is measured in the return duct with a sensor built into the Controller.

When installed in a system with a power-robbing thermostat, 300-ohm/5-watt load resistors (field provided) need to be placed across Y and C terminals and W and C terminals.

Controller Settings

Cycle Time - Field adjustable jumper sets the cycle time in one hour increments from 1 to 4 hours.

Ventilation Time - Set by the knob on front exterior of controller. Unlimited settings from Off to 60 minutes, labeled in 15 minute intervals.

Test - "TEST" setting is all the way clockwise on the Ventilation Time knob. This setting is used to check the Controller at installation. In Test mode the Ventilation Controller activates the HVAC blower and opens the damper for one minute or until the knob is taken off the "Test" setting, whichever occurs first. After the minute has passed, the Ventilation Controller will not work until the knob is placed in the "off" position for several seconds then setting it to the desired ventilation time.

Outdoor Temperature Sensor

Senses outdoor temperature and reports to the controller.

Sensor should be installed in the fresh air intake hood (field provided) or in the intake duct, no more than three feet from the outside wall.

If the outdoor temperature is above 100°F or below 0°F, the damper will not open.

Time Only Resistor

Bypasses the outdoor temperature and indoor relative humidity settings and allows the controller to base ventilation on the user-adjustable settings.

Damper

6 in. diameter, 10-3/4 in. length

Normally-closed, power-open

24 VAC / 0.31 amp / Two-wire

Transformer

120V primary, 24 VAC secondary

10VA output

VENTILATION TIME SETTINGS

The time settings determine when and how long to ventilate. The following chart can be used to determine the time settings. For a more precise way of determining ventilation time, see the Ventilation Worksheet on the following page.

The table indicates the minutes per cycle setting for a one hour Cycle Time. For other cycle times, multiply the minutes per hour setting in the chart by the Cycle Time Length. For example, 15 minutes per cycle for a one-hour Cycle Time is equal to 30 minutes per cycle (15 x 2) for a two-hour Cycle Time.

VENTILATION TIME SETTING - MINUTES PER HOUR

Size of House - sq. ft.	Number of Bedrooms			
	2	3	4	5
1000-1500	20	25	30	35
1501-2000	25	30	30	35
2001-2500	25	30	35	40
2501-3000	30	35	40	40
3001-3500	30	35	40	45

NOTES - Table based on ASHRAE 62.2
Based on 20 ft. flexible fresh air duct with 15 in. w.c. static pressure. A longer duct or lower return static pressure will increase the ventilation time required.
Local codes may affect the time settings.

VENTILATION WORKSHEET

Quality of air is regulated by preventing ventilation when the outside air is too hot (above 100°F), too cold (below 0°F), or could raise the relative humidity in the home above 60%.

Quantity of air is regulated by setting the Ventilation Time and Cycle Time.

CFM required is based on ASHRAE Ventilation Standard, the area and occupancy of the house.

CFM delivered is based on length of fresh air intake duct, static pressure of the return, and the type of duct.

The following three steps will help assure proper adjustment of the controller.

Step 1 - Determine Ventilation Air Required (per ASHRAE Standard 62.2)

Find square footage of house on horizontal axis.

Draw a vertical line up from the bottom to the point that intersects the line for the number of bedrooms in the house.

From the point where the house size and bedroom lines intersect, draw a horizontal line to the left (vertical) axis to determine how much ventilation air (CFM) is required.

NOTE - ASHRAE 62.2 calls for 1 CFM of ventilation per 100 square feet of house plus 7.5 CFM per bedroom plus an additional 7.5 CFM.

Example: A 2,300 sq. ft., 3 bedroom home would require 53 CFM.
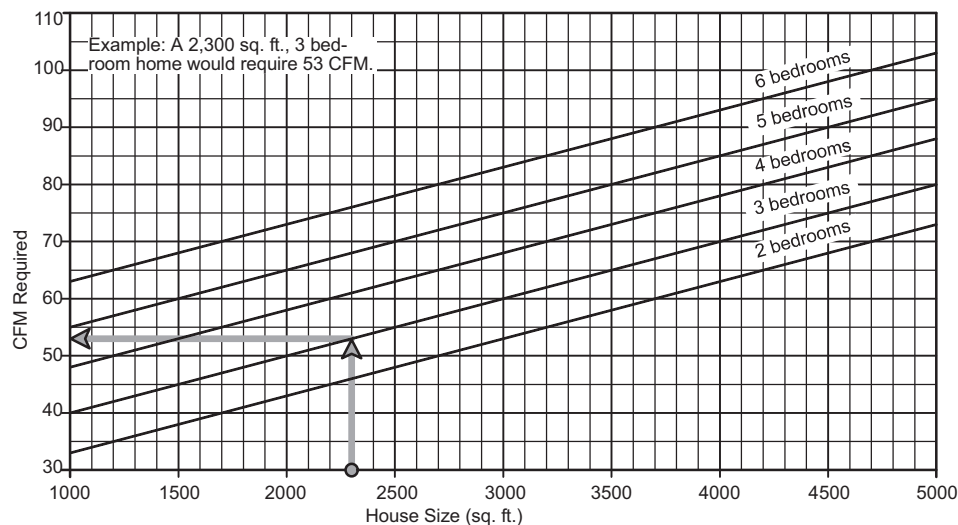
Step 2 - Determine How Much Ventilation Air the System will Deliver

Using the table, determine how much CFM can be brought into the house based on the length and type of fresh air duct used as well as the static pressure in the return air duct.
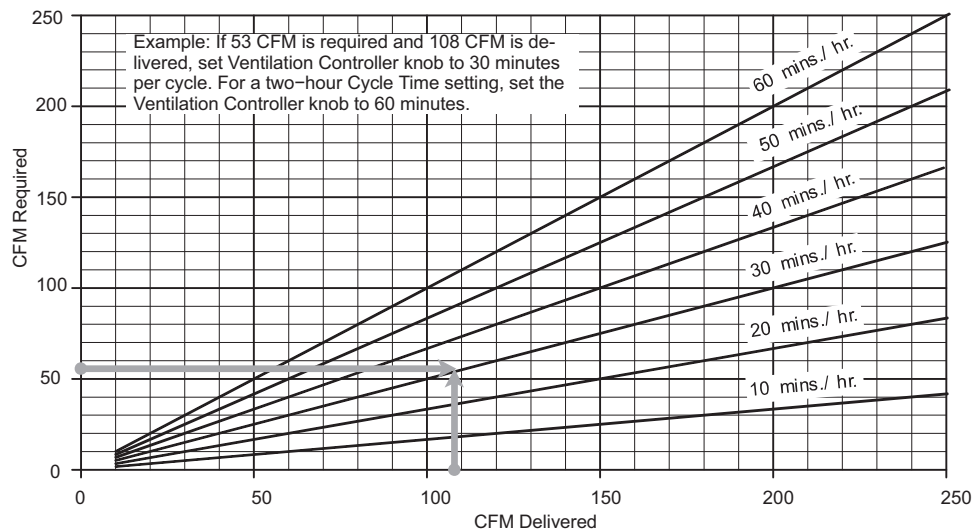
Ventilation Air the System Will Deliver - CFM

Length of 6 in. diameter fresh air intake duct	Static Pressure of Return Duct - in. w.c.											
	0.05		0.10		0.15		0.20		0.25		0.30	
	Flex	Rigid	Flex	Rigid	Flex	Rigid	Flex	Rigid	Flex	Rigid	Flex	Rigid
10 ft.	70	77	98	108	120	132	139	153	156	172	172	189
15 ft.	66	73	93	102	114	125	132	145	148	163	163	179
20 ft.	63	69	88	97	108	118	125	137	140	154	153	169
25 ft.	59	64	83	91	102	112	118	129	131	145	144	158
30 ft.	55	60	78	86	96	105	110	121	123	135	135	148

Step 3 - Ventilation Controller Setting

Using the value obtained in Step 1, locate the CFM required on the left (vertical) axis and draw a horizontal line to the end of the chart.

Using the value obtained in Step 2, locate the CFM Delivered on the horizontal axis and draw a vertical line up from the bottom to a point beyond the vertical CFM required line.

The point where the two lines intersect indicates where the Ventilation Time should be set. It may be necessary to estimate the precise setting if the intersection point falls between two lines.

Example: If 53 CFM is required and 108 CFM is delivered, set Ventilation Controller knob to 30 minutes per cycle. For a two−hour Cycle Time setting, set the Ventilation Controller knob to 60 minutes.

NOTE - The chart in Step 3 indicates the minutes per cycle setting for a one hour Cycle Time. For other cycle times, multiply the minutes per hour setting in the chart by the Cycle Time Length. For example, 15 minutes per cycle for a one-hour Cycle Time is equal to 30 minutes per cycle (15 x 2) for a two-hour Cycle Time.

REVISIONS

Sections	Description of Change
Document	Updated to new publishing software. No changes to data.