



## RESIDENTIAL PRODUCT SPECIFICATIONS

## INDOOR AIR QUALITY

### LVCS

Healthy Climate®

### Lennox Ventilation Control System - 60 Hz

Bulletin No. 210406

April 2016

Supersedes May 2013

## FEATURES

### 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
- Digital Ventilation Controller is installed in the return duct of a forced air HVAC system
- Meets ASHRAE 62.2-2010 Standard for Ventilation
- Working in conjunction with the supplied damper and the Digital Ventilation Controller
- Digital Ventilation Controller determines when and how long to ventilate using 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
- Digital 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
- In very cold climates, balanced ventilation is recommended
- LVCS can be used with an exhaust fan to provide balanced ventilation per ASHRAE 62.2-2010 (very cold climates are those that have more than 900 annual heating degree-days based on 65°F day)

### WARRANTY

- All covered components:
  - Limited five years warranty in residential applications

**NOTE** - Refer to Lennox Equipment Limited Warranty certificate included with unit for specific details.

### MODE SELECTION

- The Digital Ventilation Controller operates in one of four available modes
- Modes are selected by the installer inside the Digital Ventilation Controller by means of a 4-way rotary DIP switch

#### Mode A: Timer Controlled Ventilation (no temperature or humidity limits)

- Used for time-based ventilating regardless of temperature or humidity
- This mode may be required by local codes

**NOTE** - These modes below utilize the Outdoor Temperature Sensor (furnished) to increase comfort and reduce energy costs by preventing



extreme hot, cold or humid air from being used to ventilate the house. The Digital Ventilation Controller prevents ventilation operation when indoor relative humidity is above 55% and the outside temperature is above 50°F to prevent excess indoor humidity levels.

#### Mode B: Timer Controlled Ventilation (with temperature and humidity limits)

- Uses outdoor temperature, indoor humidity, and user-adjustable timer settings to determine when ventilation is required.
- Allows normal ventilation operation down to 20°F outdoor temperature without heating and down to 0°F with heating
- Prevents ventilation operation if outdoor air temperature is above 100°F or below 0°F

#### Mode C: Timer Controlled Ventilation for Cold Climates (with temperature and humidity limits)

- Uses outdoor temperature, indoor humidity, and user-adjustable timer settings to determine when ventilation is required.
- Allows normal ventilation operation down to 0°F outdoor temperature
- Prevents ventilation operation if outdoor air temperature is above 100°F or below 0°F

#### Mode D: Timer Controlled Ventilation for Warm Climates (with temperature and humidity limits)

- Uses outdoor temperature, indoor humidity, and user-adjustable timer settings to determine when ventilation is required
- Allows normal ventilation operation down to 40°F outdoor temperature without heating and down to 0°F with heating
- Prevents ventilation operation if outdoor air temperature is above 90°F or below 0°F.

## FEATURES

### COMPONENTS

- Kit includes Digital Ventilation Controller, motorized damper, outdoor temperature sensor, and 24 VAC transformer

#### Controller

- Input: 22 to 30 VAC, 2.0VA nominal
- Damper Output: 18 to 30 VAC, 10VA nominal
- Temperature accuracy:  $\pm 5^{\circ}\text{F}$
- Relative Humidity Accuracy:  $\pm 5\%$  RH
- 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

**NOTE** - This system may not be installed with a power-robbing thermostat.

#### Controller Settings

- **Ventilation Time** - Set by the knob on front exterior of controller
  - Unlimited settings from Off to 60 minutes
- **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  $100^{\circ}\text{F}$  or below  $0^{\circ}\text{F}$ , the damper will not open

#### 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.

### VENTILATION TIME SETTING - MINUTES PER HOUR

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

NOTES - Table based on ASHRAE 62.2-2010

Based on 20 ft. flexible fresh air duct with 0.15 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

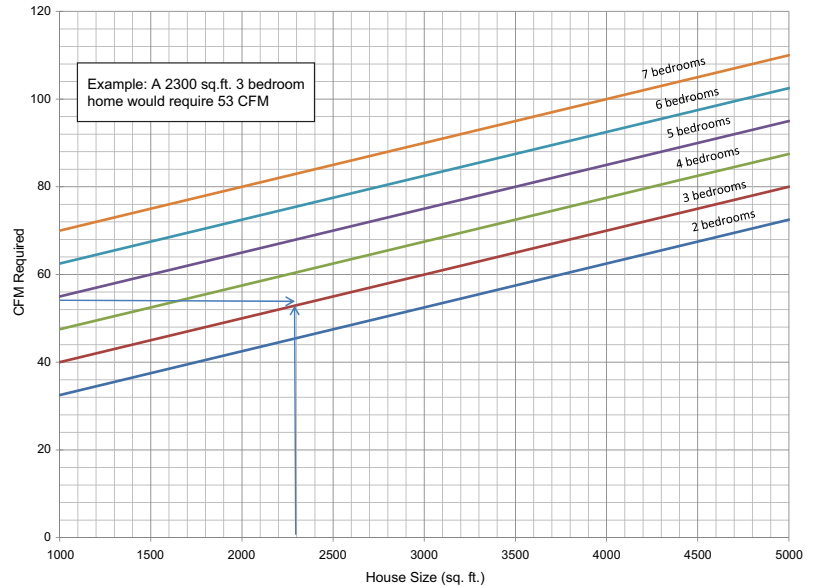
- Quality of air is regulated by preventing ventilation when the outside air is too hot, too cold, or could raise the relative humidity in the home above 55%
- Quantity of air is regulated by setting the Ventilation Time

- 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 62.2-2010)

- 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 62.2-2010 calls for 1 CFM of ventilation per 100 square feet of house plus 7.5 CFM per bedroom plus an additional 7.5 CFM



### Step 2 - Determine How Much Ventilation Air the System will Deliver

#### Ventilation Air the System Will Deliver - CFM

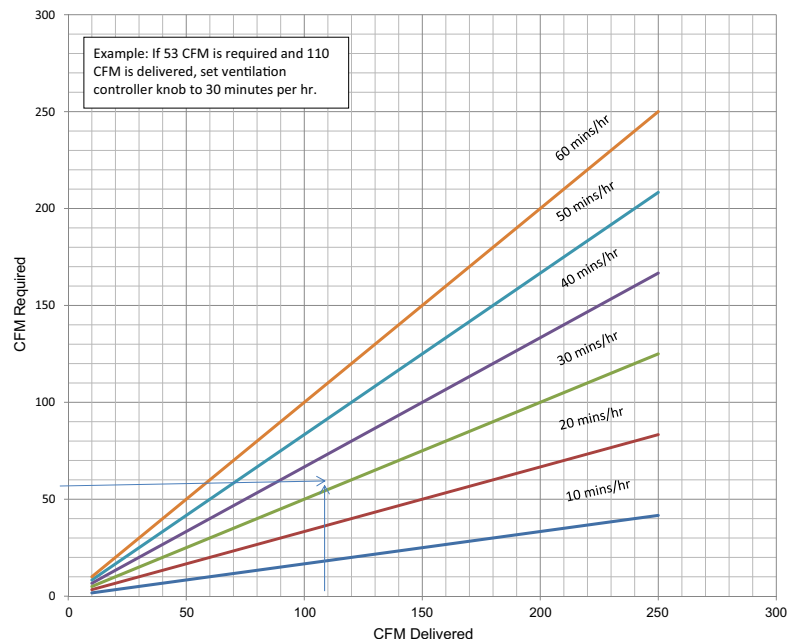
- Using the table, determine how much CFM can be brought into the house based on the length and type of fresh air duct used as well as the static pressure in the return air duct

| Length of 6 in. diameter fresh air intake duct | <sup>1</sup> 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.   | 60   | 65    | 85   | 90    | 105  | 110   | 120  | 125   | 135  | 140   | 150  | 160   |
| 20 ft.   | 55   | 60    | 80   | 85    | 100  | 105   | 115  | 120   | 130  | 135   | 140  | 150   |
| 30 ft.   | 50   | 55    | 75   | 80    | 95   | 100   | 110  | 115   | 125  | 130   | 130  | 140   |

<sup>1</sup> For the static pressure shown, the flex duct is laid loose with two wide 90° bends and the damper fully open. For rigid pipe the values are based on two 90° elbows and the damper fully open. For both types of duct the air intake is terminated with a metal vent hood with a birdscreen. Adjust airflow up or down for variations, including elbows or bends, or if the length of duct isn't listed.

### 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



**REVISIONS**

| Sections | Description of Change    |
|----------|--------------------------|
| Features | Damper actuator updated. |

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