

The Sentry Fume Hood Display is a color touch-screen display used on fume hoods with Phoenix Controls valves for airflow controls and monitoring. Airflow on these fume hoods is achieved with the use of constant volume valves (CV), two position valves, or variable air volume valves (VAV).

Fume hood users safety and rising energy costs are among the top concerns of building owners. Studies have shown that lab buildings consume up to 2/3 of the total utility spend on a campus. Consequently, many facilities have initiatives to reduce carbon footprint while maintaining lab user safety. In most cases sash management disciplines can play a key role in lowering energy costs.

Sentry is specifically designed to address safety and energy savings concerns. The easy-to-read touch display uses instinctive visual and audible alerts to notify hood operators of safe and unsafe conditions. Sentry alerts hood operators of inefficient energy usage by displaying a line of text indicating “**Energy Waste Close Sash**” urging users to take steps to save energy.

Sentry’s home screen displays the fume hood’s face velocity status, energy usage, fume hood ID, and hood certification status.

**NOTE:** Sentry comes in three models, Sentry-S, Sentry-SV, and Sentry-SE. Sentry-S is intended for applications where the primary concern is user safety. Sentry-SV satisfies safety needs as well as giving users the option to display the face velocity value. Sentry-SE is an advanced version of Sentry-SV for applications where both safety and energy savings are primary needs. Please refer to the product ordering guide for selecting the correct model for your specific needs.

## STANDARD FEATURES

- Color touch screen, 3.2" diagonal.
- Configurable display, either face velocity or airflow.
- Audible and visual alarms. When an unsafe condition is present, Sentry displays visual alerts by changing the screen background color to flashing red with associated text that identifies the type of alarm.
- Menu driven touch display for fast, instinctive configuration.
- Intelligent discovery of local valve controller (LVC) to speed up the configuration process.
- Clone configuration allows settings to be copied from one hood to the next to speed up the startup process.
- Two mechanical buttons enable users to quickly activate emergency exhaust mode and mute without the need to remove protective hand gear.



**Sentry Fume Hood Display**

- Diversity alarm alerts users when the energy demand is at peak levels and provides steps to reduce energy consumption.
- Stopwatch/timer function allows users to set reminders to take samples or end experiments.
- Hood certification and hood ID: local display of hood certification status and alerts facility staff of hood recertification schedule.
- Hood lockout/occupancy banner gives lab technicians the ability to select or enter a customized message to display on-screen.
- Software and firmware upgradable over a mini USB port, located at the bottom of the enclosure.
- Three levels of passwords to protect critical configuration parameters.

## TABLE OF CONTENTS

Standard Features .....	1
Energy Savings Features.....	2
Menu Screen Examples.....	4
Specifications.....	4
Dimensions .....	5
Ordering Guide.....	5
Applications-Hood Controls .....	8
Applications-Energy Savings.....	9

## ENERGY SAVINGS FEATURES

- Hood energy waste indicator alerts users of energy waste conditions and instructs to take action to reduce energy.
- Night energy waste alerts users when the room lights are not illuminated and instructs the user to lower the sash.
- Hood hibernation enables fume hood to reduce energy consumption when there is no safety concerns by positioning the airflow valve to minimum airflow or shut off position.

Feature/Option		Description	Sentry-S (FHD110)	Sentry-SV (FHD120)	Sentry-SE (FHD130)
Main Display	Face velocity display (FV or Airflow)	Displays the face velocity setting in either English or metric units. (Option to display face velocity or flow)		X	X
	Flow indicator	Displays flow status (Normal, Standby or Alarms) Selectable on Sentry-SV and Sentry-SE	X	X	X
	Emergency override	Indicates when the emergency exhaust button has been activated	X	X	X
	Flow alarm status	Alarm due to either pressure alarm, valve jam alarm failure	X	X	X
	Diversity (or spare)	Customer specified (spare) or diversity alarm condition has been initiated	X	X	X
	Setback mode	Setback mode has been activated	X	X	X
	Menu radio button	Enables users to perform admin functions and calibration (Password protected- 3 levels)	X	X	X
	Hood ID	Displays hood ID	X	X	X
	Configuration	Menu driven configuration done via alphanumeric keyboard (26 letters keyboard)	X	X	X
	Hood Banner (Lock out tag out)	Hood occupancy status enables users to input and display messages on screen	X	X	X
Information Zone	Stop watch/timer	Enables user to time experiments, alarms when time expires	X	X	X
	Velocity sensor (TTW)	References sash position FV value and displays alert when velocity sensor reading is different from the sash position FV value. Sensor is wired directly to the LVC (0-10V I/O) and is provided by others.	X	X	X
	Hood energy waste	Displays energy waste when sash is left open and hood operator not present and efficient energy when sash is lowered and user not present - ZPS required			X
	Hood certification status	Displays hood certification status- warning when certification is due	X	X	X
	Night energy waste	Displays alert when sash is open and room light is off (adjustable light sensitivity level)			X
Buttons	Emergency exhaust button	Provides a means of activating the emergency exhaust	X	X	X
	Mute button	Provides a means of muting the audible alarms	X	X	X

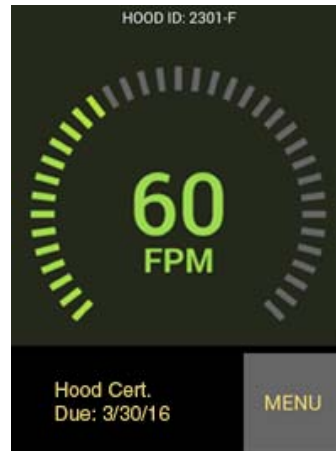
Feature/Option		Description	Sentry-S (FHD110)	Sentry-SV (FHD120)	Sentry-SE (FHD130)
Control at LVC or LRC	N.O. microswitch input	Activates the two-state command to the valves. Input at LVC/LRC	X	X	X
	Sash position input	Activates the two-state or variable air volume (VAV) command to the valves	X	X	X
	Sash opening alarm setting	Sets the sash height alarm setpoint	X	X	X
	Two position switch point setting	Sets the trip point for the two-state command operation. Input at LVC/LRC	X	X	X
	Standby mode input (e.g., ZPS)	Activates standby mode (ZPS input)	X	X	X
	Switch input for hibernation	Activates hibernation mode			X
	Emergency exhaust (locally or remotely)	Ability to activate emergency exhaust with digital input	X	X	X
	VAV drive command output	Command output to a fan drive	X	X	X
	Primary-secondary option	Configures display for either primary or secondary control of a teaching hood	X		
	Standby face velocity setting	Sets the standby mode face velocity	X	X	X
	Auto alarm mute	Audible alarms will mute automatically after 20 seconds when this function is enabled	X	X	X
	Mute duration setting	Allows for resounding audible alarms after the Mute function has been activated. Adjustable from 1-10, 15, or 20 minutes	X	X	X
	Sound volume setting	Adjust the sound volume. Four settings are available: maximum, high, medium, and low (0-80 dBA)	X	X	X
	Spare control (DI)	User-defined input that can be engaged externally by means of a digital input (DI)	X	X	X
	Broken sash alarm	Alarm is generated when the sash sensor's signal cable has been broken or when a vertical sash sensor (VSS4) retracting cable has detached	X	X	X
USB port	Enable users to perform firmware/software upgrades	X	X	X	
Monitoring	Hood exhaust emergency	Values displayed via LON communications	X	X	X
	Hood exhaust feedback	Values displayed via LON communications	X	X	X
	Alarm signal	Values displayed via LON communication: Combination of audible (beeps), and text alarm	X	X	X
	Normally open (NO) and normally closed (NC) alarm outputs	Configurable output that energizes or de-energizes during an alarm condition (LVC/LRC)	X	X	X
	Sash position	Values displayed via LON communications	X	X	X
	Hood in hibernation	Values displayed via LON communications			X
	User status	Monitors Zone Presence Sensor's (ZPS) activity via LON communications	X	X	X
	Drive command	Monitors voltage signal to drive (LRC)	X	X	X
	Drive feedback	Monitors voltage signal from drive (LRC)	X	X	X
	Through-the-wall sensor	Monitors voltage signal from TTW sensor I/O at LVC	X	X	X

## MENU SCREEN EXAMPLES

---



Initial Startup Screen



Home Screen Portrait

## SPECIFICATIONS

---

### Enclosure

- Dimensions: 2.5" W x 5" H x 0.785" D
- Color: White
- IP44 compliant design

### Touch Screen

- 3.2" LCD
- TFT Transmissive
- 240 x 320 (RGB) Display Format

### Wiring

#### Power

- 24 Vac  $\pm 15\%$ , 10 VA, 50/60Hz
- Wire: 2 conductor 18 AWG

### Communications Wiring

- Generic NEMA Level 4 cable 22 AWG or equivalent

### Communications - LON

Sentry interfaces with the Phoenix Controls Celeris® 2 valve controller over the room network.

### Audio

- Integrated Speaker: 1.0 W  $\pm 15\%$
- Adjustable Volume:
  - 0-80db ( $\pm 2$ dB) @ 0 feet from face
  - 0-75db ( $\pm 2$ dB) @ 1 feet from face
  - 0-70db (Max.) ( $\pm 2$ dB) @ 4 feet from face

### Operating Temperature Range

32 to +122 °F (0 to 50 °C)

### Storage Temperature Range

-22 to +176 °F (-30 to +80 °C)

### Operating Humidity Range

10 to 90% RH (non-condensing)

### Display Parameters (Sentry-SE and Sentry-SV ONLY)

The display shows one of the following measurements:

- Cubic feet per minute (CFM)
- Meters cube per hour (m<sup>3</sup>/h)
- Liters per second (l/s)
- Feet per minute (fpm)
- Meters/seconds (m/s)

### Wipedown and Chemical Resistance

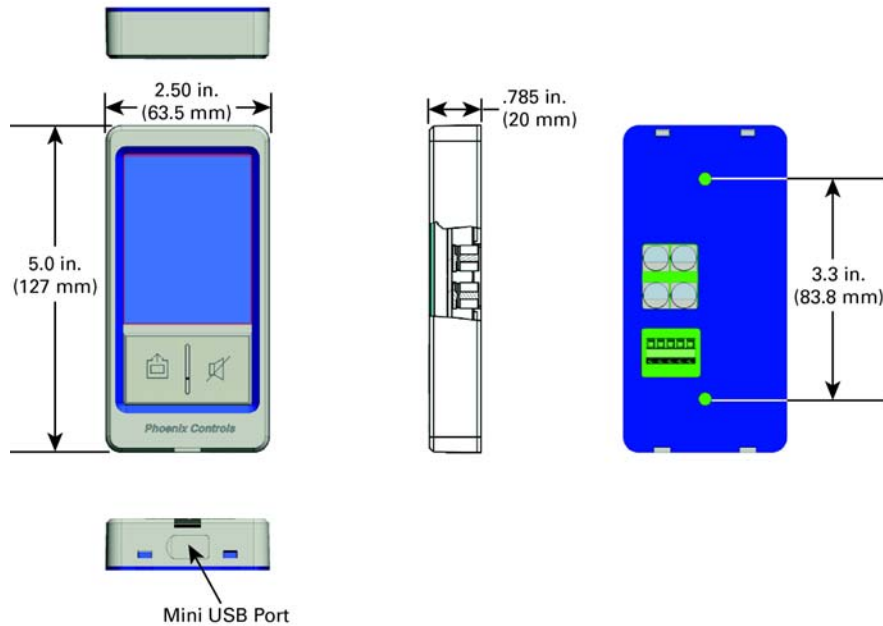
The unit is suitable for use with non-solvent wipe down and is designed to meet IP44 test standards.

### Agency Compliance

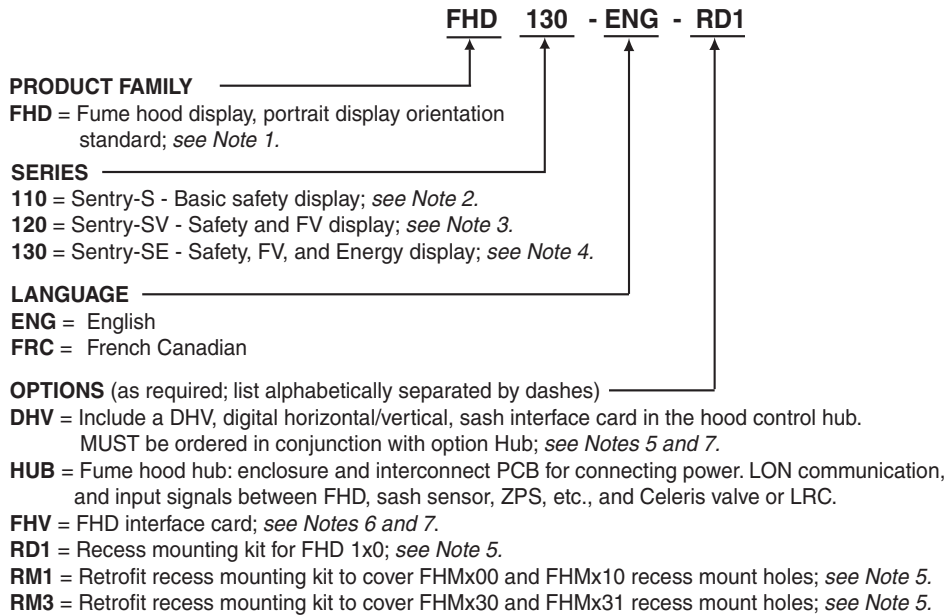


- RoHS
- WEEE
- FCC: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
  1. This device may not cause harmful interference.
  2. This device must accept any interference received, including interference that may cause undesired operation.
- UL94V0 rated
- EU Contact Address:
  - Honeywell GmbH
  - Boebinger Str. 17
  - 71101 Schoenaich
  - Germany

## DIMENSIONS



## ORDERING GUIDE



### NOTES:

1. For constant volume and variable frequency drive applications, purchase of an LRC100-SCD is necessary.
2. FHD Series 110 (Sentry-S) displays flow status as Normal or Standby.
3. FHD Series 120 (Sentry-SV) displays flow or face velocity value.
4. FHD Series 130 (Sentry-SE) displays flow or face velocity value and energy saving features.
5. To prevent a duplicate DHV from being provided with a sash sensor, when option DHV is ordered, the corresponding sash sensor catalog number may need to be changed. Refer to the *Sash Sensors with NHV* table in the Product Data Sheet. DHV should be ordered in conjunction with the Hub.
6. Will convert the resistive sash sensor input into a voltage output to the LVC UI1 (may pass through Hub along the way). This is offered free of charge.
7. Should **NOT** be ordered with the DHV.

## Changes to Sash Sensor Installations

In order to make the Sentry as small and thin as possible, the fume hood control logic was moved to the fume hood valve controller. Consequently, the sash and zone presence sensors, which used to be wired to the FHM, are now wired to the fume hood controller using the following methods:

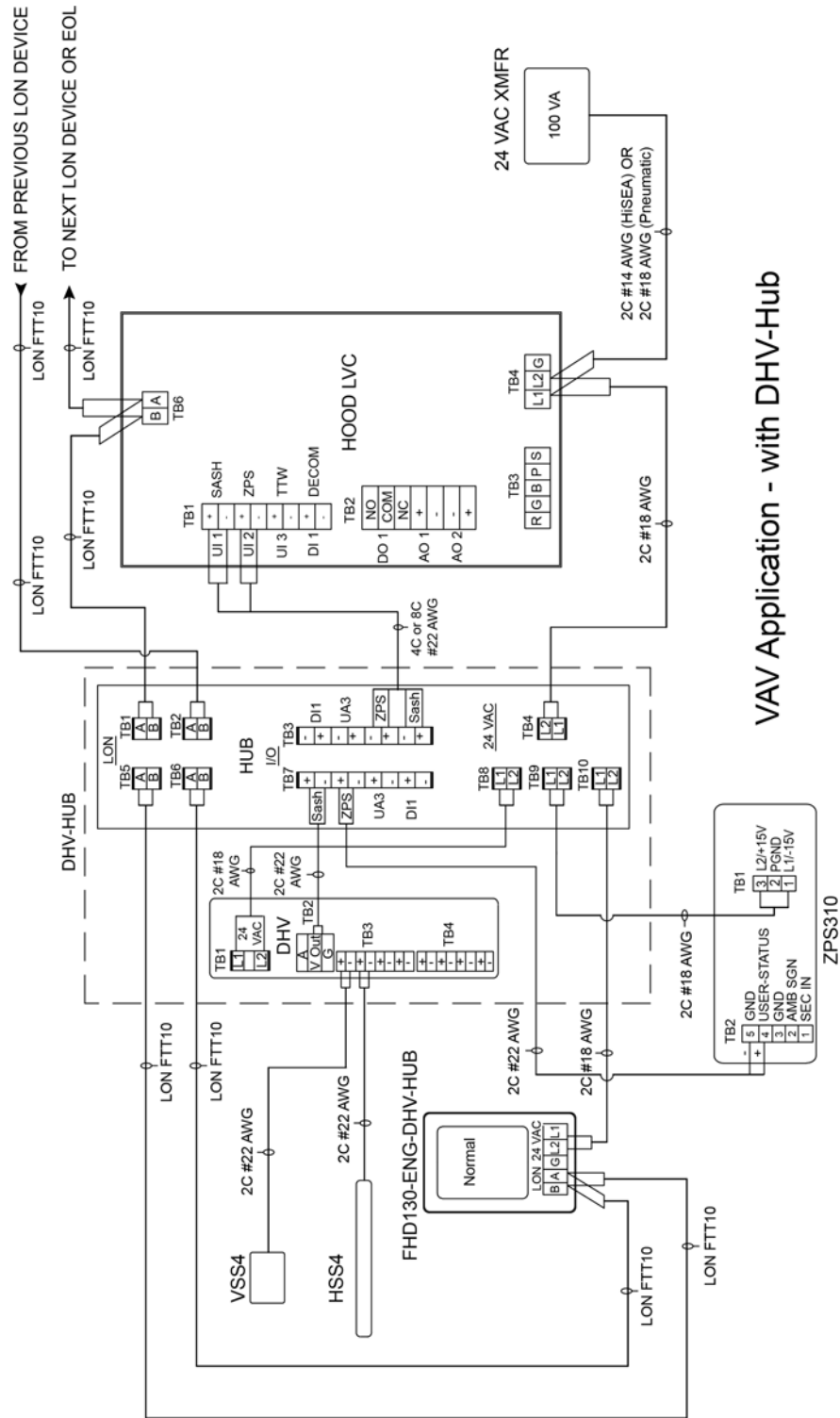
- Single vertical sash sensors, and horizontal sash sensors with total bar length less than 75", are wired to a new interface card (FHV). The FHV is then wired to the fume hood valve controller. There is no additional charge for the FHV.
- Combination sash sensors, and horizontal-only sash sensors with total bar length greater than 75", are wired to a DHV card. The DHV is then wired to the fume hood valve controller. Refer to the *Sash Sensor Product Data Sheet (MKT-0070)* for additional details.

### Sash Sensors with NHV

Sash Sensor Type	Sash Sensor Catalog Number	Sash Sensor Includes DHV	Sash Sensor Catalog Number Change*
Vertical, one sash	VSS4-0100-n	N	<i>No change</i>
Vertical, two sashes	VSS4-0200-n	Y	VSS4-0200-n-NHV
Vertical, three sashes	VSS4-0300-n	Y	VSS4-0300-n-NHV
Vertical, four sashes	VSS4-0400-n	Y	VSS4-0400-n-NHV
Vertical, five sashes	VSS4-0500-n	Y	VSS4-0500-n-NHV
Vertical, six sashes	VSS4-0600-n	Y	VSS4-0600-n-NHV
Vertical, seven sashes	VSS4-0700-n	Y	VSS4-0700-n-NHV
Vertical, eight sashes	VSS4-0800-n	Y	VSS4-0800-n-NHV
Horizontal w/ moveable bars, reverse acting	HSS4-nnnn-NnN-zzM-yyyS	N	<i>No change</i>
Horizontal w/ moveable bars, direct acting	HSS4-nnnn-NnN-zzM-yyyS-INT	Y	HSS4-nnnn-NnN-zzM-yyyS (omit the -INT)
Horizontal w/ fixed bars, sensors < 76"	HSS5-nnnn-NnN-zzM-yyyS-xxB-ww	N	<i>No change</i>
Horizontal w/ fixed bars, sensors > 75"	HSS5-nnnn-NnN-zzM-yyyS-xxB-ww-INT	Y	HSS5-nnnn-NnN-zzM-yyyS-xxB-ww-INT-NHV
Combo w/ moveable bars	CSS4-nnnn-nnA-zzM-yyyS	Y	CSS4-nnnn-nnA-zzM-yyyS-NHV
Combo w/ fixed bars	CSS5-nnnn-nnA-zzM-yyyS-xxB-ww	Y	CSS5-nnnn-nnA-zzM-yyyS-xxB-ww-NHV

\* When DHV is provided in the Hood Control Hub (i.e., Sentry1n0-ENG-DHV-HUB is ordered) the Sash Sensor Catalog Number changes .

# Typical System Diagram

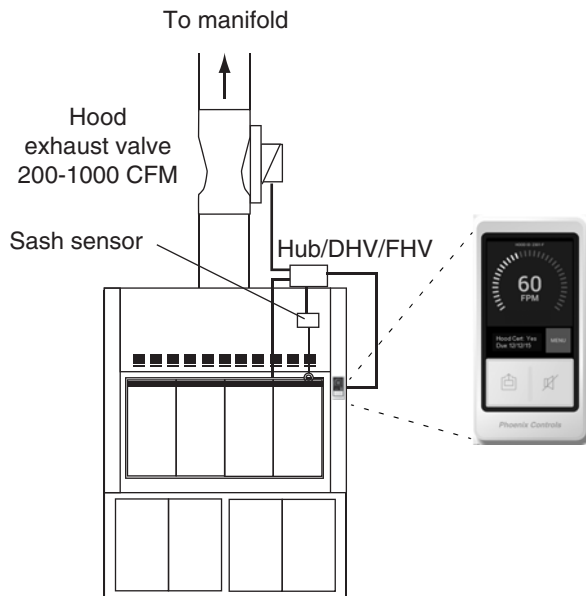


VAV Application - with DHV-Hub

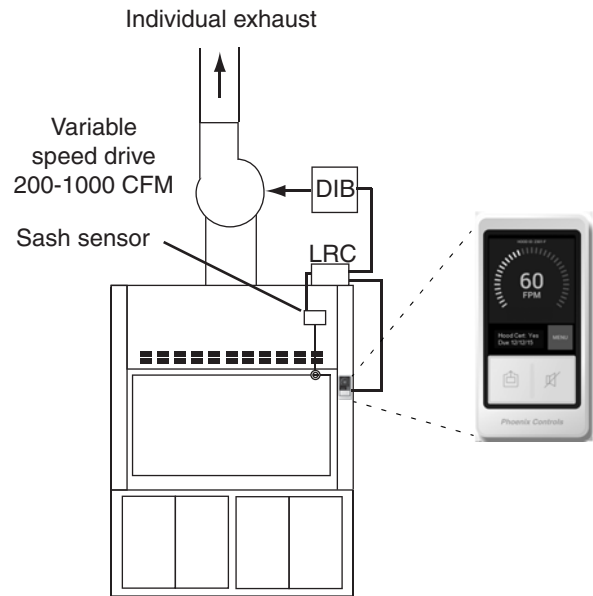
## APPLICATIONS - HOOD CONTROLS

### Variable Air Volume (VAV) Fume Hoods (Sentry-S, Sentry-SV and Sentry-SE)

Fume hood containment is accomplished by maintaining proper face velocity through the variable sash opening. Phoenix Controls fume hood displays can be used on manifolded exhaust systems (with Phoenix Controls valves) and on individual exhaust systems (with a variable speed drive by others).



Fume hood containment—valve systems



Fume hood containment—individual exhaust systems

### Functions

Constant face velocity control-The goal is to maintain a constant face velocity (FV) as the sash opening varies. Since the FV setpoint is known, a change in sash area causes a linear change in exhaust flow ( $FV \times Area = Flow \text{ command}$ ).

*Example:  $5 \text{ ft}^2 \times 100 \text{ ft}/\text{min} = 500 \text{ ft}^3/\text{min}$  (or  $0.5 \text{ m}^2 \times 0.5 \text{ m}/\text{s} \times 3600 \text{ s}/\text{hr} = 900 \text{ m}^3/\text{hr}$ )*

- **Setback of face velocity** -Under many conditions, the face velocity can be setback to provide safe containment when the hood area is vacated. Setback face velocity is adjustable to field conditions-typically between 60-100 fpm (or 0.3-0.5 m/s). (See the Zone Presence Sensor Product Data Sheet for more details.)
- **Alarms**-The Sentry-S, Sentry-SV, and Sentry-SE monitors provide indication of a fume hood's operation. Alarms include:
  - Insufficient differential static pressure as detected by the valve's pressure switch
  - Incorrect airflow alarm (sash command  $\neq$  closed-loop feedback)

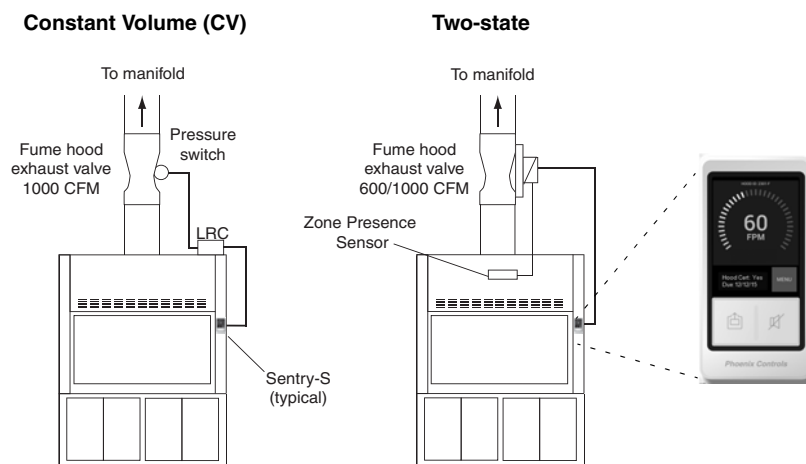


## Constant Volume (CV) and Two-state Fume Hoods (Sentry-S)

A Phoenix Controls (constant volume) CxV series airflow control valve provides the fume hood with a steady constant exhaust flow, independent of duct pressure changes. The two-state airflow control valve provides two-position exhaust control based on an operator's presence at the fume hood or sash position.

### Functions

- **Alarm-** Sentry-S, with a differential pressure switch mounted on a Phoenix Controls airflow valve, Lon Room Controller (LRC) indicates a fume hood's operation. An optional sash opening alarm may be used with a sash sensor or sash switch.
- **Two-position control (with Celeris 2 Controller)-** Sentry-S together with Zone Presence Sensor® also known as ZPS® sensor, and a Phoenix Controls airflow control valve, provides two-position exhaust control based on an operator's presence at the fume hood. Other switching mechanisms, such as a sash sensor or sash switch, may be applied.



Fume hood alarming and control—constant volume and two-state

## APPLICATIONS - ENERGY SAVINGS

### Face Velocity Setback (Sentry-S, Sentry-SV, and Sentry-SE)

Under many conditions, the face velocity can be setback to provide safe containment when the hood area is vacated. Setback face velocity is adjustable to field conditions—typically between 60-100 fpm (or 0.3-0.5 m/s). (See the Zone Presence Sensor Product Data Sheet for more details.)

### Night Energy Waste Alert (Sentry-SE, Night Energy)

Sentry-SE is equipped with an energy waste alert, indicating the sash is open and the room is dark (adjustable light intensity level). The display shows night energy waste in the information zone, and an audible alarm sounds until the sash is closed or the lights are illuminated.

### Energy Waste Alert (Sentry-SE, Sash Management)

Sentry-SE is equipped with sash management energy waste alert feature. If an operator walks away from the fume hood detection zone and leaves the sash open for a specified period of time and the ZPS lowers the face velocity to the setback value, Sentry will generate a warning in the information zone indicating energy waste.

## Fume Hood Hibernation Mode (Sentry-SE)

The fume hood hibernation mode on the Sentry-SE allows a fume hood to be powered down when it is not in use and the sash is fully closed. The exhaust flow is reduced below the fume hood's minimum to the valve's minimum flow, or shut off (e.g., 90 CFM for a 12-inch valve), and the display shows HIBERNATION. This mode can be initiated in one of three ways:

1. Through **Admin Menu** screen on the display.
2. Through the external momentary switch (by others).
3. Through the BMS network command.

The mode is exited automatically when the sash is opened.

**NOTES:** Sash *must* be closed for hibernation.

Hibernation mode cannot be used in drive applications.

Proper standard operating procedures (SOPs) must be in place to remove all chemicals from the fume hood before it is put in hibernation.

## Waste of Electrical and Electronic Equipment (WEEE)



In 2006 the European Union adopted regulations (WEEE) for the collection and recycling of all waste electrical and electronic equipment. It is no longer allowable to simply throw away such equipment. Instead, these products must enter the recycling process. To properly dispose of this product, please take it to a local recycling center.