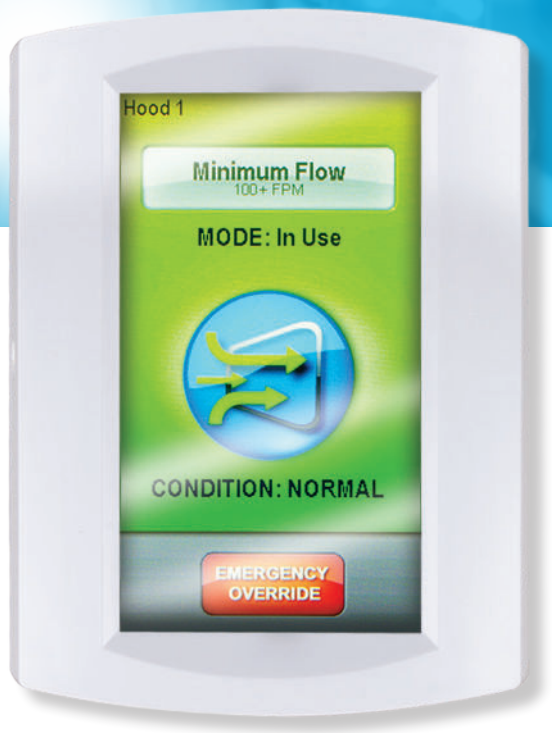
FHC

QUICKSTART GUIDE



Measure What Matters.

FUME HOOD CONTROLLER

QUICKSTART GUIDE

TABLE OF CONTENTS

IMPORTANT NOTES

⚠ CAUTION

This symbol represents important information for the Fume Hood Controller (FHC). Not following installation, wiring and setup may lead to failure. In this manual, pay close attention to all caution notes.

Additionally, **Recommendations** and ⚠ Notes are found throughout each section. Based on CRC's experiences, these recommendations are applicable in most cases, but please verify with industry standard and project requirements for final fume hood parameters.

NOTES

Before startup and commissioning, educate yourself on the FHC, controls, options and accessories for startup. All parties responsible for commissioning should have knowledge of startup procedures and have all necessary guides and tools for review.

LOCAL SUPPORT

Contact your local area CRC channel partner for product support.

Additional information can be found at criticalroom.com

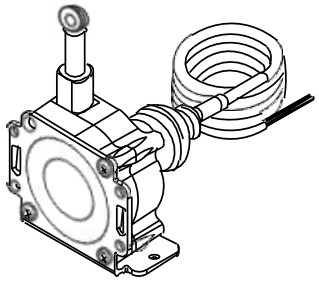
APPLICATION OVERVIEW

There are three application configurations associated with Critical Room Control's Closed Loop Venturi Fume Hood Valve (CLV-FHC): face velocity control with a vertical sash sensor (VSS), face velocity control with a sidewall velocity sensor (SVS), and constant volume control without a sash/ velocity sensor. Ensure the correct equipment is selected before configuring the FHC. See below for more details on these applications.

FACE VELOCITY CONTROL WITH VERTICAL SASH SENSOR

A VSS is used to measure the open sash area of the fume hood. This area value and the measured airflow volume through the CLV are used to calculate and control face velocity. This results in a constant face velocity, variable volume solution.

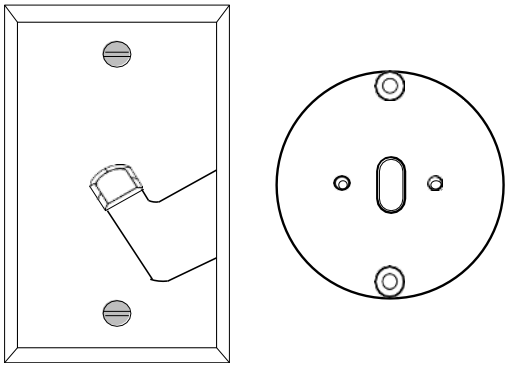
If the fume hood has a sash that opens horizontally (side to side), a VSS cannot be used.



FACE VELOCITY CONTROL WITH SIDEWALL VELOCITY SENSOR

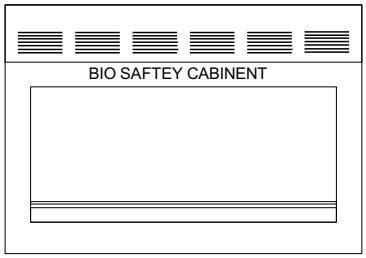
A SVS is used to measure the face velocity of the open sash area directly through a port installed on the sidewall of the fume hood. The CLV will respond to changes in face velocity. This results in a constant face velocity, variable volume solution.

The SVS can be used on a fume hood with a vertical sash, horizontal sash, and combination sash.



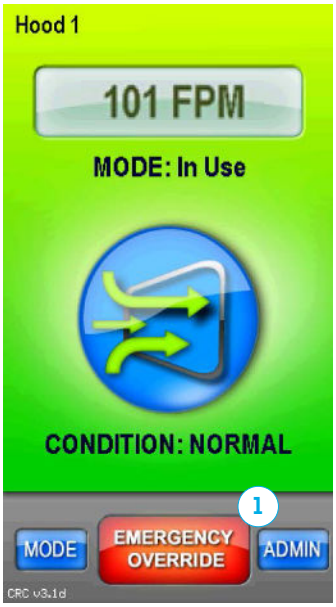
CONSTANT VOLUME CONTROL WITHOUT SENSOR

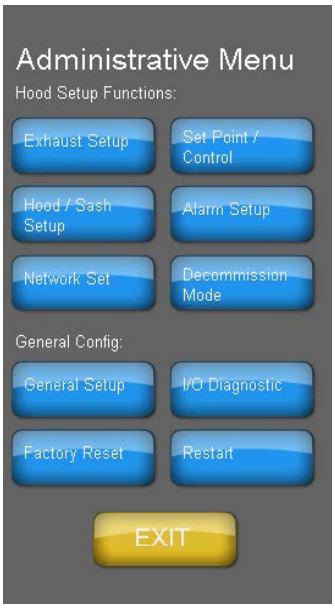
For non-traditional exhaust equipment (bio-safety cabinet, glove box, snorkel, canopy hood, etc.) and other applications without a VSS or SVS, the FHC is configured for constant volume control. The CLV will control to a constant airflow volume. Face velocity is not measured or controlled..



VERTICAL SASH SENSOR

ACCESSING THE ADMINISTRATIVE MENU

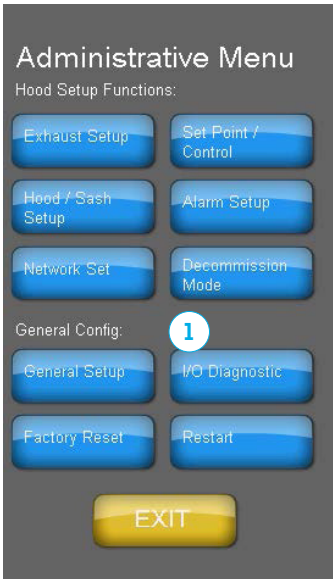


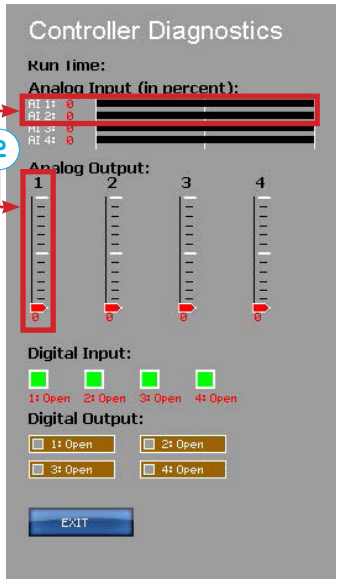


1. Touch anywhere on main screen

   When ADMIN button appears, select it to access the Administrative Menu

VERIFY WIRING WITH I/O DIAGNOSTIC





1. Touch I/O Diagnostics to access the Controller Diagnostics screen

2. **Flow Control and Flow Feedback**
   Move Analog Output 1 slider (flow control) to 0% (bottom of slider) to close hood exhaust valve. The green bar for Analog Input 1 (flow feedback) should decrease to 0.

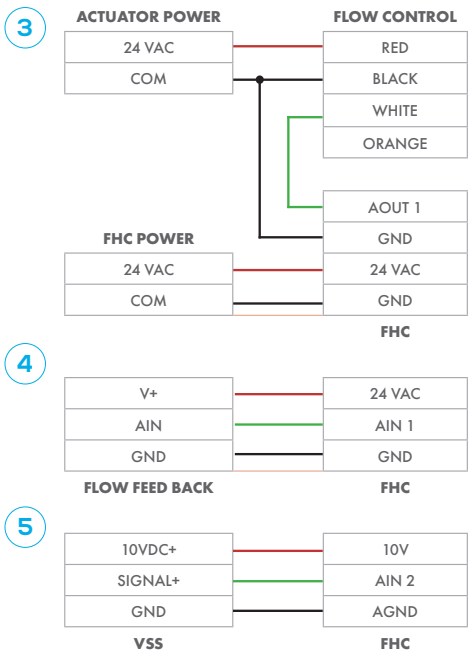
   Move Analog Output 1 slider to 100% (top of slider) to open hood exhaust valve. The green bar for Analog Input 1 should increase to a maximum value.
   If either of these responses does not occur, check the wiring for the flow control signal and flow feedback signal.

   Vertical Sash Sensor
   Observe the green bar for Analog Input 2 as you open and close the fume hood's sash. The green bar should change with the opening/closing of the sash.

   If Analog Input 2 does not change, check the wiring for the vertical sash sensor. If wiring is correct, verify the cable is pulling/retracting as the sash moves.

VERTICAL SASH SENSOR

VERIFY WIRING WITH I/O DIAGNOSTIC CONT.



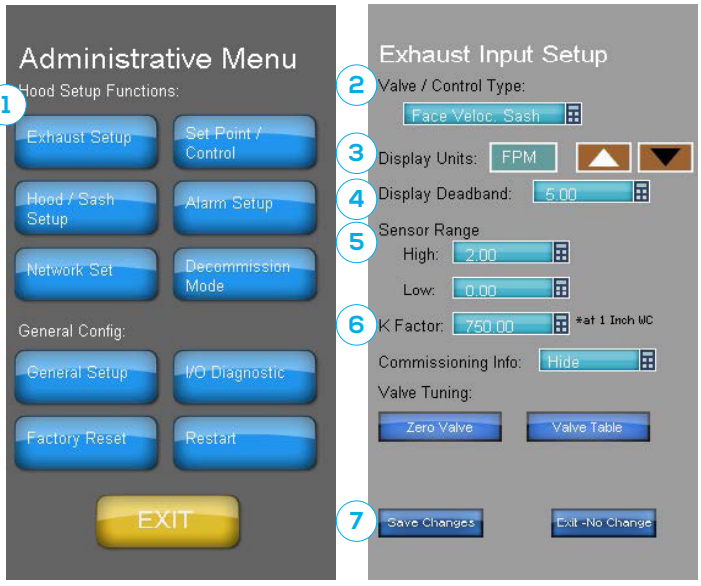
3 Wiring for Flow Control and Power

⚠ Actuator cannot be powered from FHC. Actuator and FHC must be powered from separate 24 VAC power sources.

4 Wiring for Flow Feedback

5 Wiring for Vertical Sash Sensor

EXHAUST SETUP



Spun Valve	K Factor
SP106	425
SP108	750
SP110	1160
SP112	1675
SP114	2275
SP116	2967

Stamped Valve	K Factor
ST106	425
ST108	750
ST110	1250
ST112	2600

1 Touch Exhaust Setup to access the Exhaust Input Setup screen

2 Set Valve / Control Type to Face Veloc. Sash

3 Display Units: value descriptor that appears after current value on main screen
Recommended: FPM (feet per minute)

4 Display Deadband: main screen value will not update until it exceeds current value ± Display Deadband
Recommended: 5.00 (FPM)

5 Set Sensor Range High to 2.00
Set Sensor Range Low to 0.00

6 K Factor: identify CLV model and enter default K Factor from the table on the left

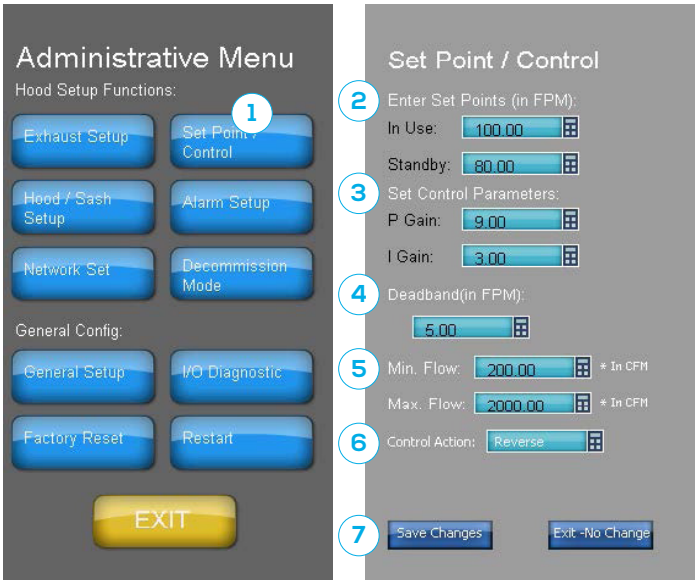
⚠ Reference CRC_CLV_Guide for more valve details.

Commissioning Info, and Valve Tuning will be discussed in the Commissioning section.

7 Save Changes

VERTICAL SASH SENSOR

SET POINT / CONTROL SETUP



1. Touch Set Point / Control to access the Set Point / Control screen
2. Enter Set Point Values (in FPM) for face velocity
   In Use: occupied mode
   Recommended: 100.00 (FPM)

   Standby: unoccupied mode / setback / energy saver
   Recommended: 80.00 (FPM)

   ⚠ Final set points to be based on project risk assessment per ANSI Z9.5
3. Set P Gain to 9.00
   Set Gain to 3.00

   ⚠ P Gain must be 3 times larger than I Gain. Changing these parameters can negatively impact fume hood control and performance.
4. Deadband (in FPM): control loop will freeze until face velocity exceeds setpoint ± Deadband
   Recommended: 5.00 (FPM)
5. Min. Flow: low flow limit (CFM) for hood valve; hood valve will control to this airflow when sash is fully closed

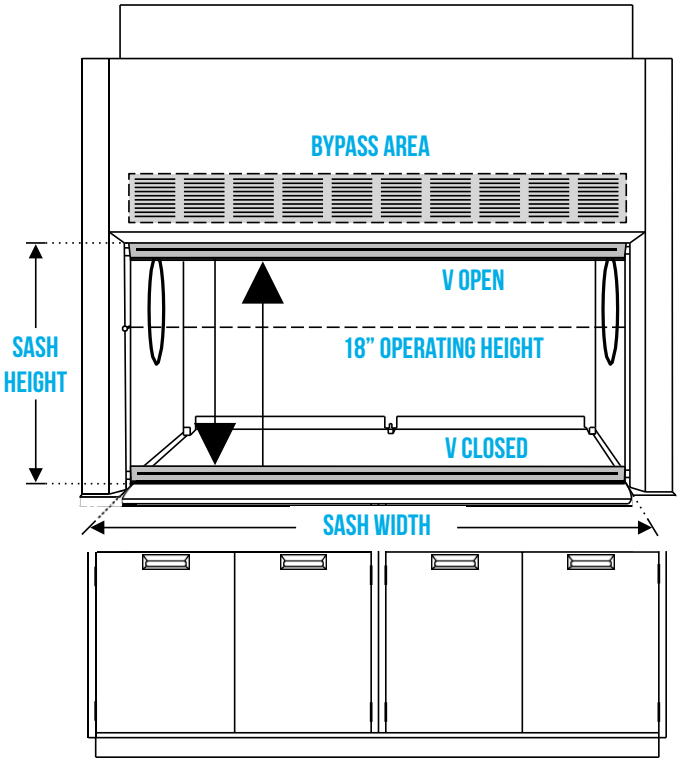
   ⚠ Must be 100 CFM or greater

   Max. Flow: high flow limit (CFM); hood valve will NOT exceed this airflow, regardless of face velocity

   ⚠ Final flow values to be based on project risk assessment per ANSI Z9.5
6. Set Control Action to Reverse
7. Save Changes

VERTICAL SASH SENSOR

HOOD / SASH SETUP



1. Touch Hood / Sash Setup to access the Sash Type Setup screen
2. Set sash type to Vertical Sash
3. Set Vertical Sash Sensor parameters; use the fume hood illustration below as reference.

   V Open: move sash to max open position (beyond safety stop); touch Calib. to calibrate

   V Closed: move sash to full closed position; touch Calib. to calibrate

   ⚠ V Open and V Closed must populate with different values. If values are equal, refer to VERIFY WIRING WITH I/O DIAGNOSTIC.

   Total Area: measure sash height and sash width; use equations below to calculate total sash area (ft^2) and enter value

   $$\textit{Using inches} \rightarrow \frac{\textit{Width x Height}}{144} = \textit{Total Area } (ft^2)$$

   $$\textit{Using feet} \rightarrow \textit{Width x Height} = \textit{Total Area } (ft^2)$$

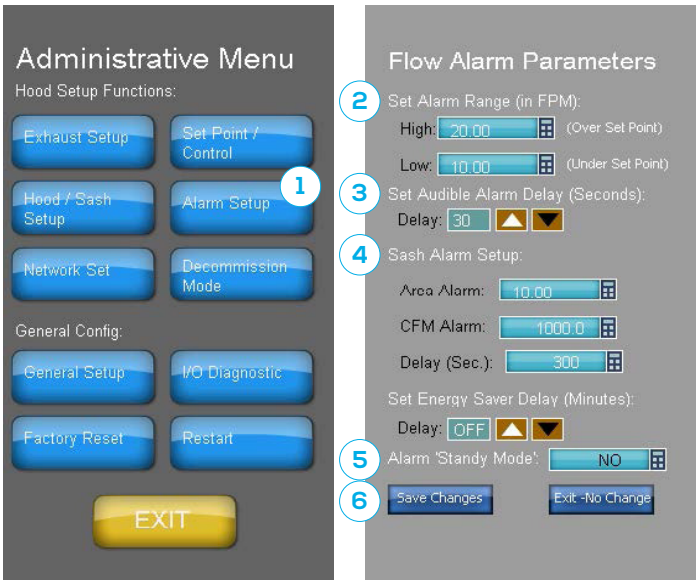
   Bypass Area: intake grille, typically found above the sash, helps maintain constant velocity while sash is closed; calculate bypass area (ft^2) and enter value

   ⚠ Commonly between 0.5 and 1.0 square feet

4. Save Changes

VERTICAL SASH SENSOR

ALARM SETUP



1. Touch Alarm Setup to access the Flow Alarm Parameters screen
2. Set Alarm Range (in FPM): allowable velocity limit over and under Set Point before alarm is triggered
   Recommended: High 20.00 and Low 10.00 (FPM)
3. Set Audible Alarm Delay (Seconds): time delay before audible alarm is triggered
   Recommended: 30 seconds
4. **Under Sash Alarm Setup**
   Area Alarm: if total sash open area (ft^2) exceeds this value, alarm is triggered
   Recommended: Verify with project requirements. If this alarm is not needed, set value to be greater than Total Area.

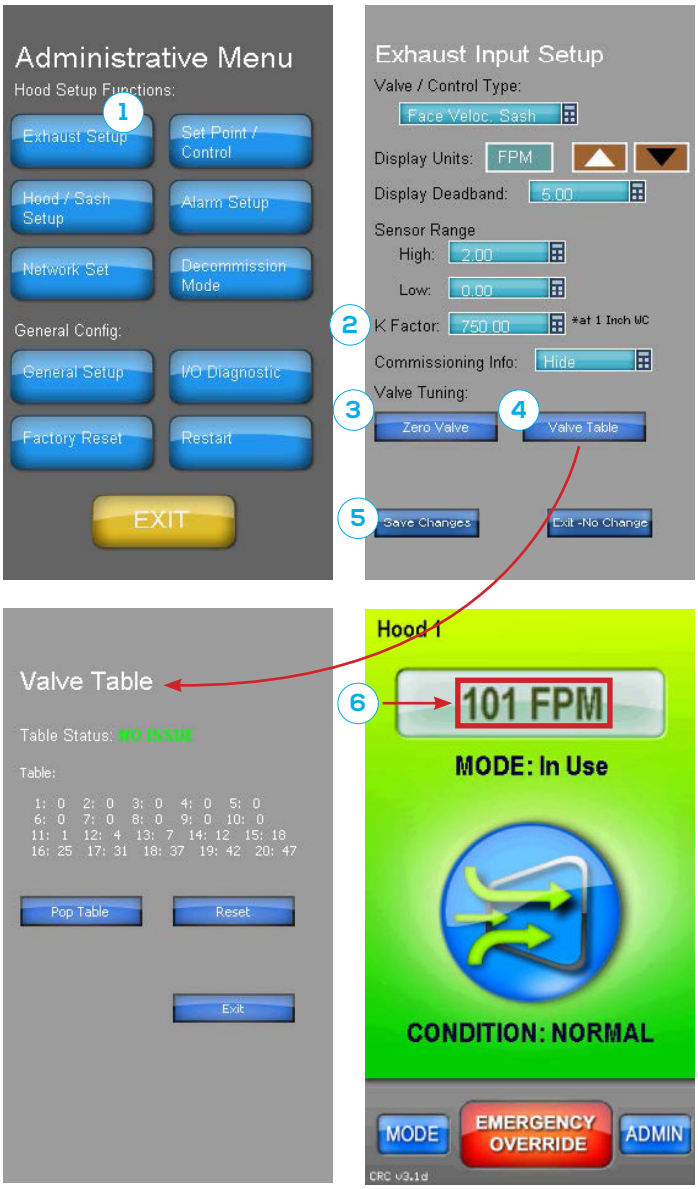
   CFM Alarm: if total flow (CFM) exceeds this value, alarm is triggered
   Recommended: Verify with project requirements. If this alarm is not needed, set value to 20,000.

   Delay (Sec.): duration before alarm is triggered
   Recommended: 300 seconds

   Energy Saver Delay will be discussed in the Energy Saver Setup section.
5. Alarm 'Standby Mode': allows user to enable/disable alarms in Standby Mode
   Recommended: No
6. Save Changes

VERTICAL SASH SENSOR

COMMISSIONING



Spun Valve	K Factor
SP106	425
SP108	750
SP110	1160
SP112	1675
SP114	2275
SP116	2967

Stamped Valve	K Factor
ST106	450
ST108	775
ST110	1250
ST112	2600

⚠ Verify exhaust system is operating at design static pressure before commissioning. For small fan systems, consider locking other exhaust valves during this process.

1. Touch Exhaust Setup to access the Exhaust Input Setup screen
2. Current K Factor used in following steps .Verify K Factor matches default for CLV model.
3. **Valve Tuning**
   Touch Zero Valve; wait 10 seconds for valve to close
   Touch Valve Table to enter Valve Table screen
4. **Valve Table**
   Touch Pop. Table and wait for the table to auto populate. Valve Table point values should gradually increase from 0 to a maximum value. Table Status should be No Issue.

   If Table Status is Zero Valve, touch Reset; verify wiring and confirm exhaust flow is present. Repeat *Step 3 and Step 4*.

   Touch Exit after Valve Table has been populated.
5. Save Changes and return to main screen
6. **Balance Hood Flow**
   Open the sash to its typical operating position and measure actual face velocity.

   View the controller's face velocity on the main screen. Use current K Factor from Exhaust Setup and the following equation to calculate new K Factor.

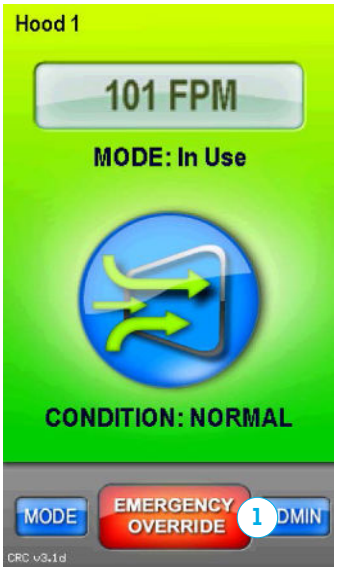
$$\frac{\textit{Measured Velocity (FPM)}}{\textit{Controller Velocity (FPM)}} \times \textit{Current K Factor} = \textit{New K Factor}$$

   Enter new K Factor on Exhaust Input Setup screen and save changes (see above). Controller will now output calibrated hood flow (CFM) for system control.

⚠ Final K Factor should be within ±5% of the default for the applicable valve size. Reference the table on the left and CRC_CLV_Guide for more valve details.

SIDEWALL VELOCITY SENSOR

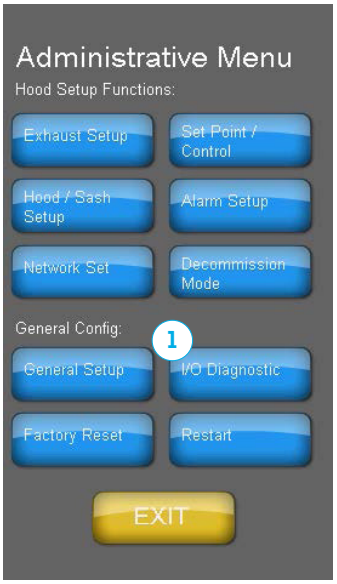
ACCESSING THE ADMINISTRATIVE MENU

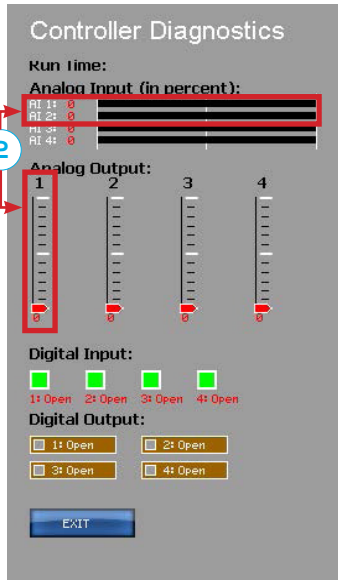


1 Touch anywhere on main screen

When ADMIN button appears, select it to access the Administrative Menu

VERIFY WIRING WITH I/O DIAGNOSTIC





1 Touch I/O Diagnostics to access the Controller Diagnostics screen

2 **Flow Control and Flow Feedback**
Move Analog Output 1 slider (flow control) to 0% (bottom of slider) to close hood exhaust valve. The green bar for Analog Input 1 (flow feedback) should decrease to 0.

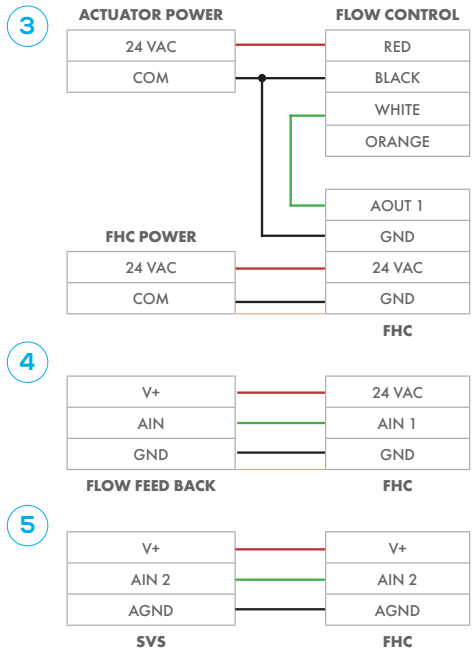
Move Analog Output 1 slider to 100% (top of slider) to open hood exhaust valve. The green bar for Analog Output 1 should increase to a maximum value. If either of these responses does not occur, check the wiring for the flow control signal and flow feedback signal.

Sidewall Velocity Sensor
Observe the green bar for Analog Input 2 as you open and close the fume hood's sash. The green bar should change with the opening/closing of the sash.

If Analog Input 2 does not change, check the wiring for the sidewall velocity sensor. If wiring is correct, verify installation meets requirements.

SIDEWALL VELOCITY SENSOR

VERIFY WIRING WITH I/O DIAGNOSTIC CONT.



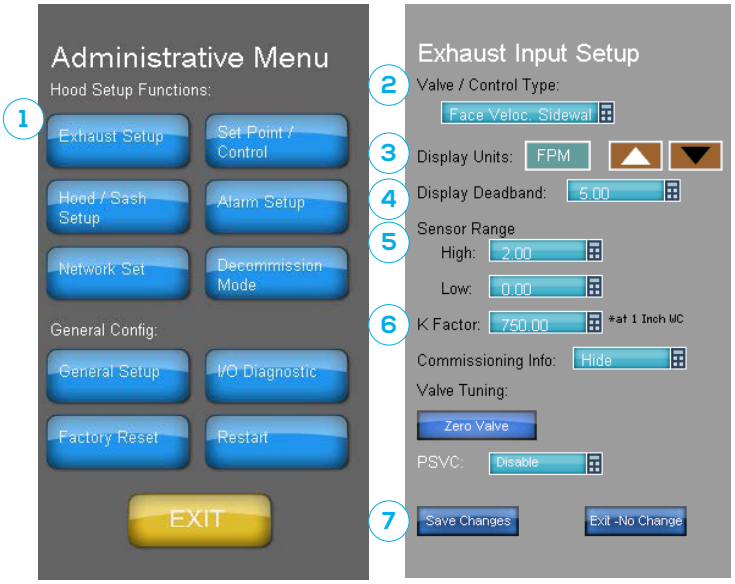
3 Wiring for Flow Control and Power

Actuator cannot be powered from FHC. Actuator and FHC must be powered from separate 24 VAC power sources.

4 Wiring for Flow Feedback

5 Wiring for Sidewall Velocity Sensor

EXHAUST SETUP



Spun Valve	K Factor
SP106	425
SP108	750
SP110	1160
SP112	1675
SP114	2275
SP116	2967

Stamped Valve	K Factor
ST106	450
ST108	775
ST110	1250
ST112	2600

1 Touch Exhaust Setup to access the Exhaust Input Setup screen

2 Set Valve / Control Type to Face Veloc. Sidewall

3 Display Units: value descriptor that appears after current value on main screen
Recommended: FPM (feet per minute)

4 Display Deadband: main screen value will not update until it exceeds current value ± Display Deadband
Recommended: 5.00 (FPM)

5 Set Sensor Range High to 2.00
Set Sensor Range Low to 0.00

6 K Factor: identify CLV model and enter default K Factor from the table on the left

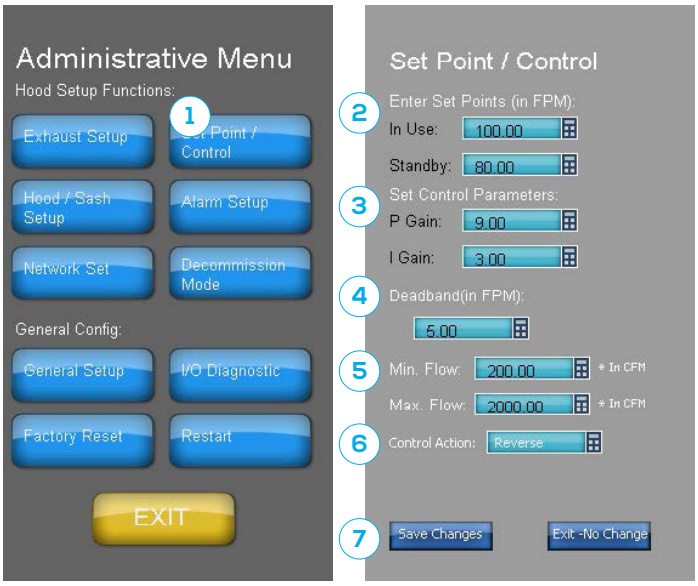
Reference CRC_CLV_Guide for more valve details.

Commissioning Info, and Valve Tuning will be discussed in the Commissioning section.

7 Save Changes

SIDEWALL VELOCITY SENSOR

SET POINT / CONTROL SETUP



1. Touch Set Point / Control to access the Set Point / Control screen

2. Enter Set Point Values (in FPM) for face velocity
   In Use: occupied mode
   Recommended: 100.00 (FPM)

   Standby: unoccupied mode / setback / energy saver
   Recommended: 80.00 (FPM)

⚠ Final set points to be based on project risk assessment per ANSI Z9.5

3. Set P Gain to 9.00
   Set Gain to 3.00

⚠ P Gain must be 3 times larger than I Gain. Changing these parameters can negatively impact fume hood control and performance.

4. Deadband (in FPM): control loop will freeze until face velocity exceeds setpoint ± Deadband
   Recommended: 5.00 (FPM)

5. Min. Flow: low flow limit (CFM) for hood valve; hood valve will control to this airflow when sash is fully closed

⚠ Must be 100CFM or greater

   Max. Flow: high flow limit (CFM); hood valve will NOT exceed this airflow, regardless of face velocity

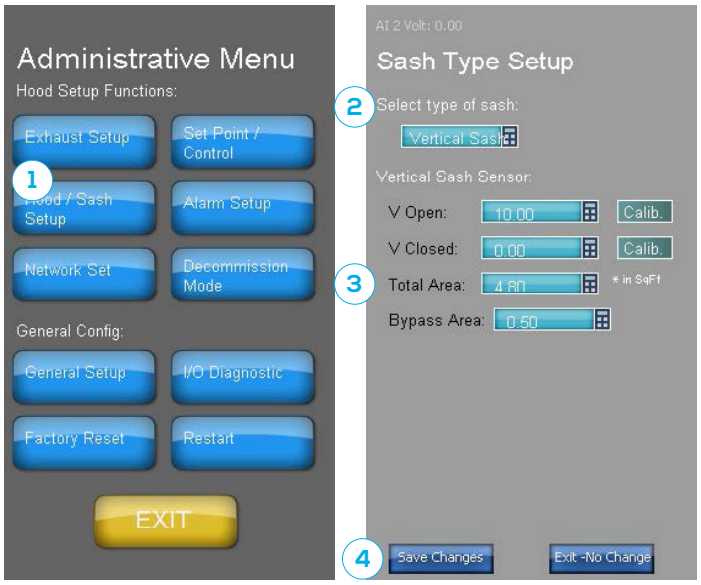
⚠ Final flow values to be based on project risk assessment per ANSI Z9.5

6. Set Control Action to Reverse

7. Save Changes

SIDEWALL VELOCITY SENSOR

SASH OPEN AREA



When using the SVS, Total Area must be calculated and entered to determine Sash Open % (AV 27). This is also useful for commissioning and balancing.

1. Touch Hood / Sash Setup to access the Sash Type Setup screen
2. Set sash type to Vertical Sash
3. Total Area: measure sash height and sash width; use equations below to calculate total sash area (ft^2) and enter value

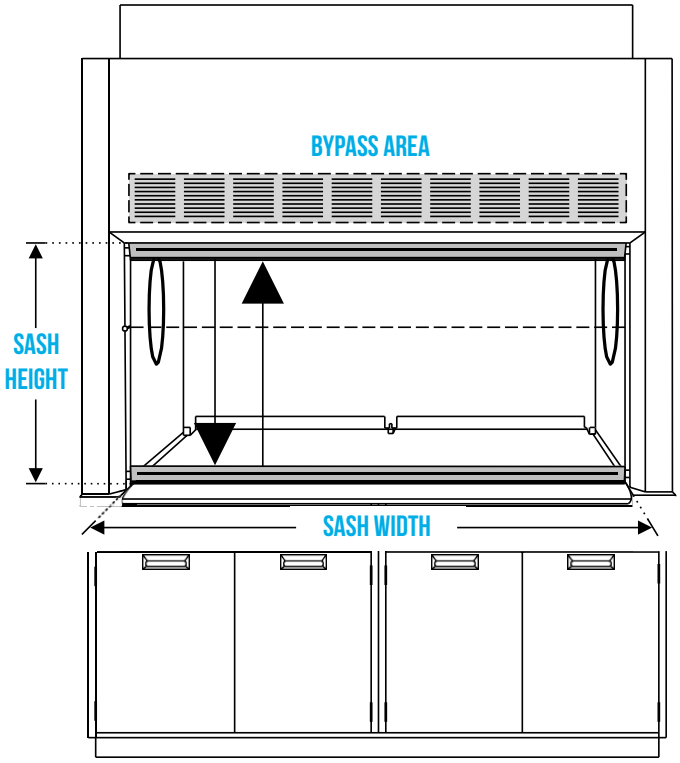
$$\textit{Using inches} \rightarrow \frac{\textit{Width x Height}}{144} = \textit{Total Area } (ft^2)$$

$$\textit{Using feet} \rightarrow \textit{Width x Height} = \textit{Total Area } (ft^2)$$

Bypass Area: intake grille, typically found above the sash, helps maintain constant velocity while sash is closed; calculate bypass area (ft2) and enter value

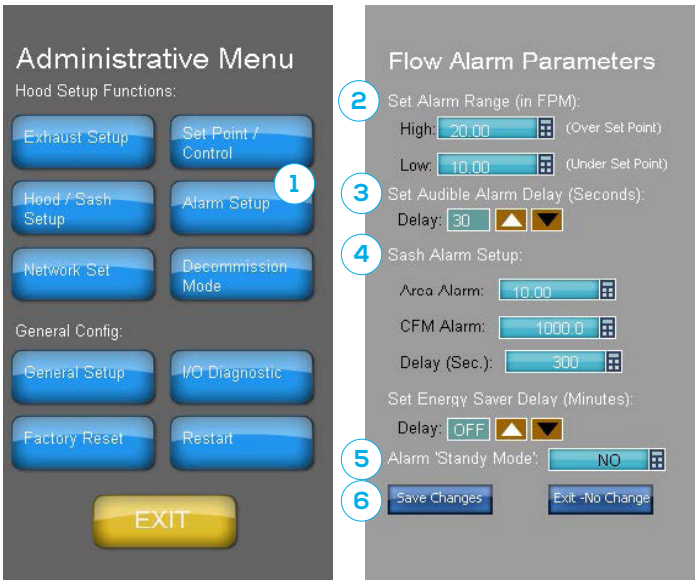
⚠ Commonly between 0.5 and 1.0 square fee

4. Save Changes



SIDEWALL VELOCITY SENSOR

ALARM SETUP



1. Touch Alarm Setup to access the Flow Alarm Parameters screen

2. Set Alarm Range (in FPM): allowable velocity limit over and under Set Point before alarm is triggered
Recommended: High 20.00 and Low 10.00 (FPM)

3. Set Audible Alarm Delay (Seconds): time delay before audible alarm is triggered
Recommended: 30 seconds

4. **Under Sash Alarm Setup**
Area Alarm: unsued

CFM Alarm: if total flow (CFM) exceeds this value, alarm is triggered
Recommended: Verify with project requirements. If this alarm is not needed, set value to 20,000.

Delay (Sec.): duration before alarm is triggered
Recommended: 300 secondss

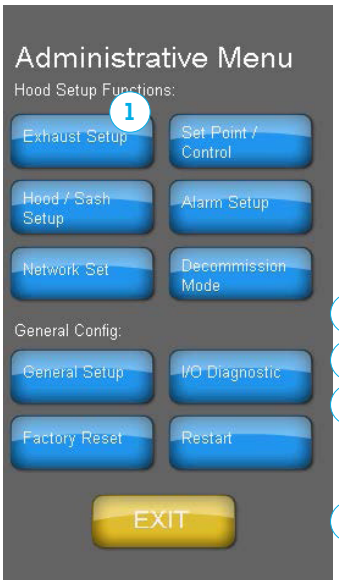
Energy Saver Delay will be discussed in the Energy Saver Setup section.

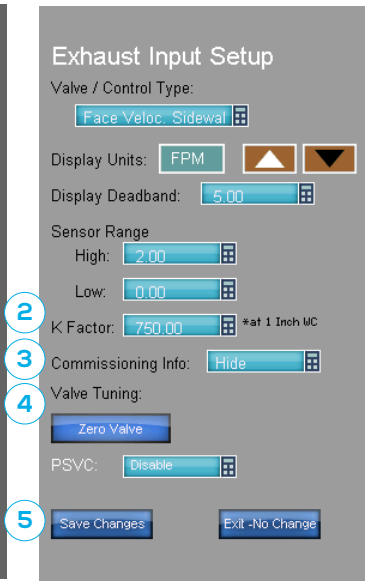
5. Alarm 'Standby Mode': allows user to enable/disable alarms in Standby Mode
Recommended: No

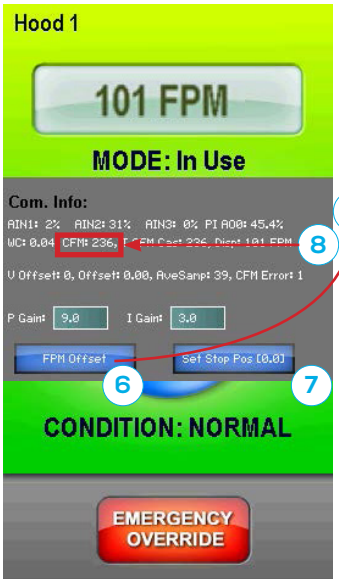
6. Save Changes

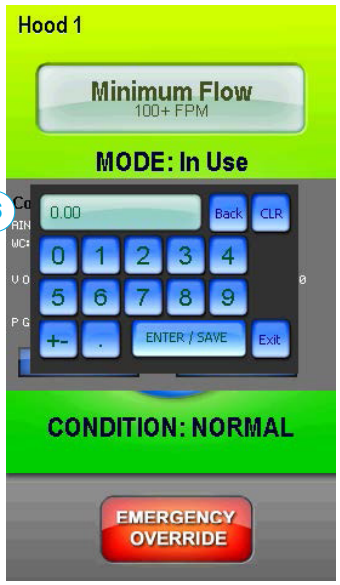
SIDEWALL VELOCITY SENSOR

COMMISSIONING









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ST106	450
ST108	775
ST110	1250
ST112	2600

⚠ Verify exhaust system is operating at design static pressure before commissioning. For small fan systems, consider locking other exhaust valves during this process.

1. Touch Exhaust Setup to access the Exhaust Input Setup screen
2. Current K Factor used in following steps. Verify K Factor matches default for CLV model.
3. Set Commissioning Info to Show
4. **Valve Tuning**
   Touch Zero Valve; wait 10 seconds for valve to close
   Set PSVC (Predictive Sash Valve Control) to Use
5. Save Changes and return to main screen
6. **Calibrate Face Velocity**
   Open the sash to its typical operating position and measure actual face velocity.

   View the controller's face velocity on the main screen. Use the following equation to calculate FPM Offset.

   Measured Velocity (FPM) - Controller Velocity (FPM)= FPM Offset

   Touch FPM Offset and enter/save the calculated value.
7. With sash open at its typical operating position, touch Set Stop Pos
8. **Balance Hood Flow**
   With sash open at its typical operating position, measure and calculate the sash open area (ft^2).

⚠ This may include bypass area, which allows additional flow to pass through the hood.

Use the sash open area and controller's face velocity to calculate measured airflow.

Open Ares (ft^2) x Controller Velocity (FPM) = Measured Flow (CFM)

Then, use Com. Info CFM, current K Factor from Exhaust Setup, and the following equation to calculate new K Factor.

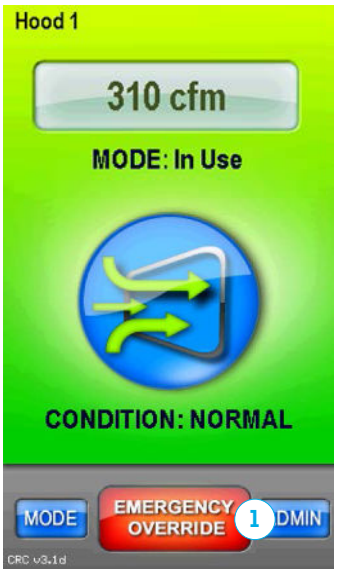
$$\frac{\textit{Measured Flow (CFM)}}{\textit{Com. Info CFM}} \times \textit{Current K Factor} = \textit{New K Factor}$$

Enter new K Factor on Exhaust Input Setup screen, set Commissioning Info to Hide, and Save Changes (see above). Controller will now output calibrated hood flow (CFM) for system control.

⚠ Final K Factor should be within ±5% of the default for the applicable valve size. Reference the table on the left and CRC_CLV_Guide for more valve details.

CONSTANT VOLUME HOOD

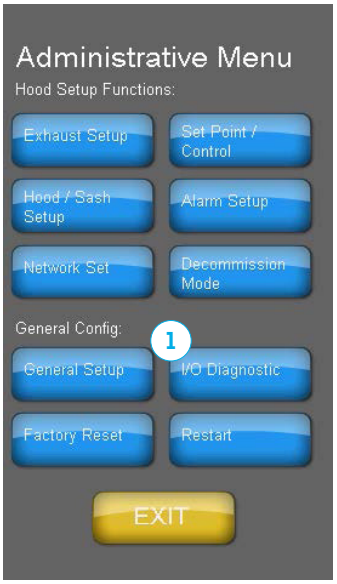
ACCESSING THE ADMINISTRATIVE MENU

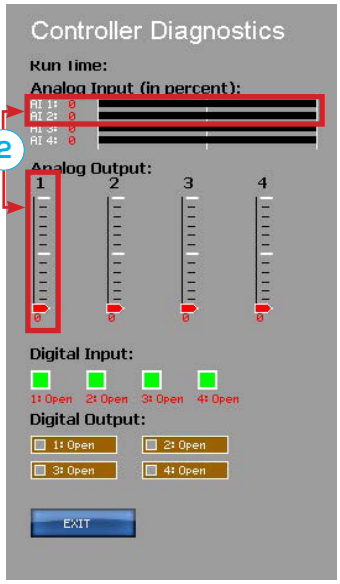


1. Touch anywhere on main screen

   When ADMIN button appears, select it to access the Administrative Menu

VERIFY WIRING WITH I/O DIAGNOSTIC





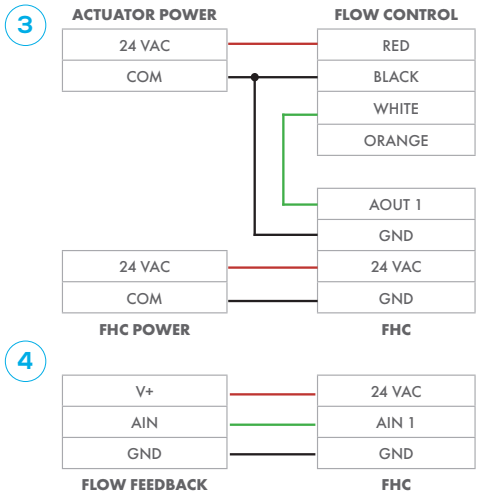
1. Touch I/O Diagnostics to access the Controller Diagnostics screen

2. **Flow Control and Flow Feedback**
   Move Analog Output 1 slider (flow control) to 0% (bottom of slider) to close hood exhaust valve. The green bar for Analog Input 1 (flow feedback) should decrease to 0.

   Move Analog Output 1 slider to 100% (top of slider) to open hood exhaust valve. The green bar for Analog Input 1 should increase to a maximum value.
   If either of these responses does not occur, check the wiring for the flow control signal and flow feedback signal.

CONSTANT VOLUME HOOD

VERIFY WIRING WITH I/O DIAGNOSTIC CONT.



3. Wiring for Flow Control and Power

⚠ Actuator cannot be powered from FHC. Actuator and FHC must be powered from separate 24 VAC power sources.

4. Wiring for Flow Feedback

EXHAUST SETUP

Spun Valve	K Factor
SP106	425
SP108	750
SP110	1160
SP112	1675
SP114	2275
SP116	2967

Stamped Valve	K Factor
ST106	425
ST108	750
ST110	1250
ST112	2600

1. Touch Exhaust Setup to access the Exhaust Input Setup screen
2. Set Valve / Control Type to Constant Volume
3. Display Units: value descriptor that appears after current value on main screen
   Recommended: CFM (cubic feet per minute)
4. Display Deadband: main screen value will not update until it exceeds current value ± Display Deadband
   Recommended: 5.00 to 20.00 (CFM)
5. Set Sensor Range High to 2.00
   Set Sensor Range Low to 0.00
6. K Factor: identify CLV model and enter default K Factor from the table on the left

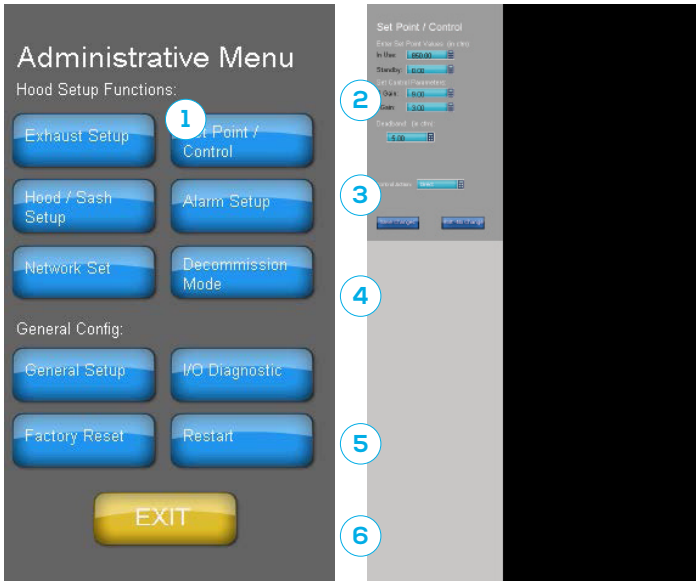
⚠ Reference CRC_CLV_Guide for more valve details.

Commissioning Info, and Valve Tuning will be discussed in the Commissioning section.

7. Save Changes

CONSTANT VOLUME HOOD

SET POINT / CONTROL SETUP



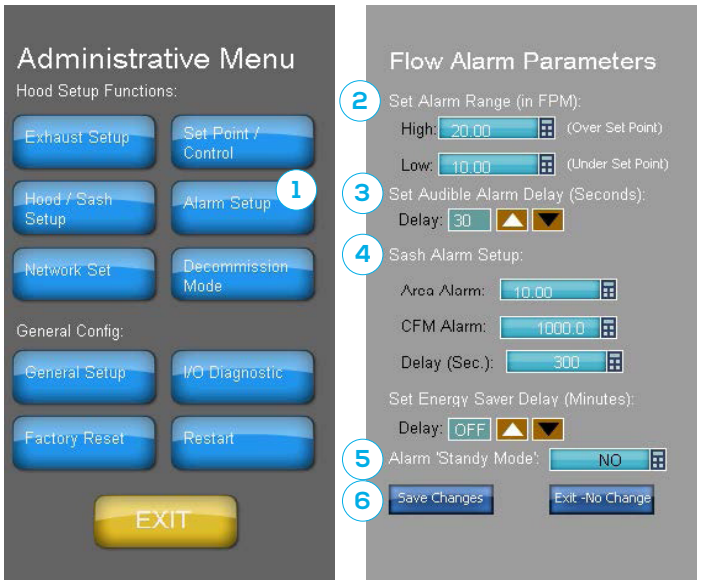
1. Touch Set Point / Control to access the Set Point / Control screen
2. Enter Set Point Values (in CFM) for hood flow
   In Use: occupied mode
   Standby: unoccupied mode / setback / energy saver

   ⚠ Final set points to be based on project risk assessment per ANSI Z9.5
3. Set P Gain to 9.00
   Set Gain to 3.00

   ⚠ P Gain must be 3 times larger than I Gain. Changing these parameters can negatively impact fume hood control and performance.
4. Deadband (in CFM): control loop will freeze until airflow volume exceeds setpoint ± Deadband
   Recommended: 5.00 to 20.00 (CFM)
5. Set Control Action to Reverse
6. Save Changes

CONSTANT VOLUME HOOD

ALARM SETUP



1. Touch Alarm Setup to access the Flow Alarm Parameters screen
2. Set Alarm Range (in CFM): allowable flow limit over and under Set Point before alarm is triggered
   Recommended: High 50.00 and Low 30.00 (CFM)
3. Set Audible Alarm Delay (Seconds): time delay before audible alarm is triggered
   Recommended: 30 seconds
4. **Under Sash Alarm Setup**
   Area Alarm: unused

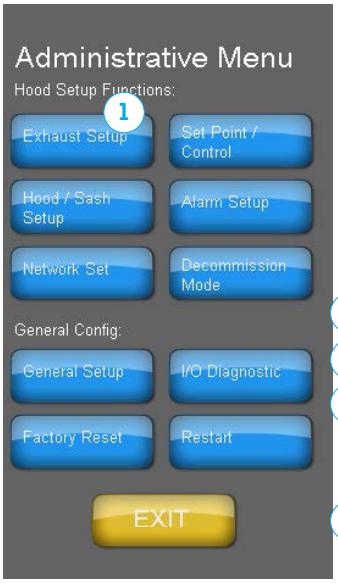
   CFM Alarm: if total flow (CFM) exceeds this value, alarm is triggered
   Recommended: Verify with project requirements. If this alarm is not needed, set value to 20,000.

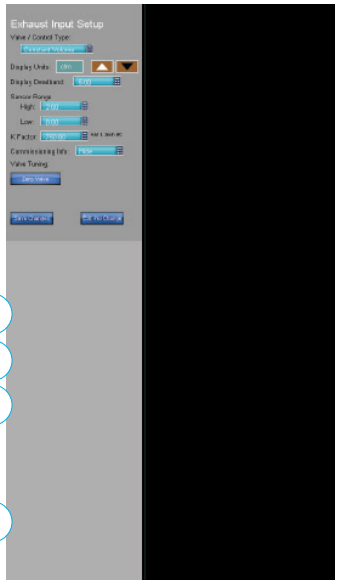
   Delay (Sec.): duration before alarm is triggered
   Recommended: 300 seconds

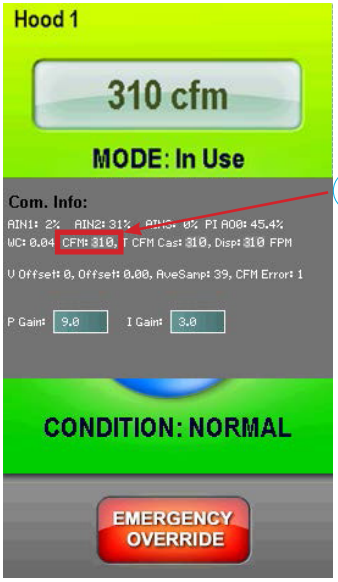
   Energy Saver Delay will be discussed in the Energy Saver Setup section.
5. Alarm 'Standby Mode': allows user to enable/disable alarms in Standby Mode
   Recommended: No
6. Save Changes

CONSTANT VOLUME HOOD

COMMISSIONING







Spun Valve	K Factor
SP106	425
SP108	750
SP110	1160
SP112	1675
SP114	2275
SP116	2967

Stamped Valve	K Factor
ST106	450
ST108	775
ST110	1250
ST112	2600

⚠ Verify exhaust system is operating at design static pressure before commissioning. For small fan systems, consider locking other exhaust valves during this process.

1. Touch Exhaust Setup to access the Exhaust Input Setup screen
2. Current K Factor used in following steps .Verify K Factor matches default for CLV model.
3. Set Commissioning Info to Show
4. **Valve Tuning**
   Touch Zero Valve; wait 10 seconds for valve to close
5. Save Changes and return to main screen
6. **Balance Hood Flow**
   Measure/calculate airflow (CFM) passing through open area of fume hood.

   Then, use Com. Info CFM, current K Factor from Exhaust Setup, and the following equation to calculate new K Factor.

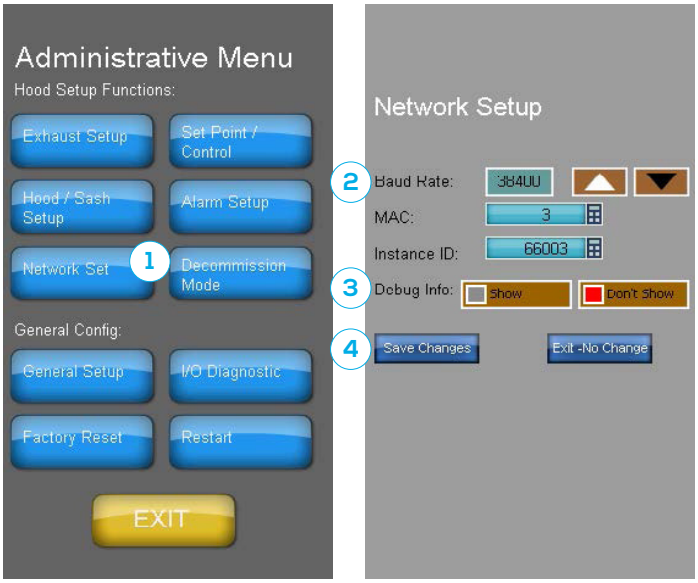
$$\frac{\textit{Measured Flow (CFM)}}{\textit{Com. Info CFM}} \textit{ x Current K Factor = New K Factor}$$

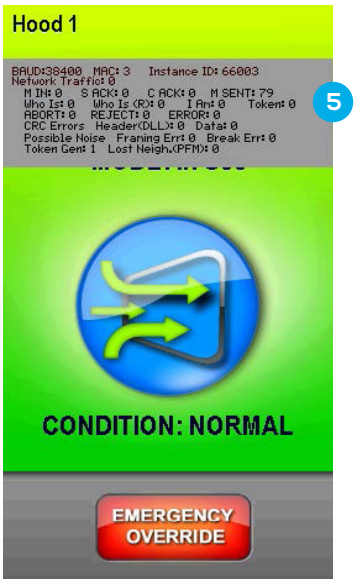
   Enter new K Factor on Exhaust Input Setup screen,set Commissioning Info to Hide, and Save Changes (see above). Controller will now output calibrated hood flow (CFM) for system control.

⚠ Final K Factor should be within ±5% of the default for the applicable valve size. Reference the table on the left and CRC_CLV_Guide for more valve details..

GENERAL HOOD SETUP

NETWORK SETUP AND TROUBLESHOOTING





1. Touch Network Set to access the Network Setup screen

2. Enter BACnet MS/TP network parameters for the device
   Baud Rate: 9600, 19200, 38400, 57600, 76800, 115200
   MAC: 0 to 254
   Instance ID: 1 to 4,194,304

⚠ All devices on trunk must have unique MAC addresses, and all devices on the BAS network must have unique Instance ID

3. Debug Info: displays the network communication information on the main screen
   Recommended: Only Show when troubleshooting communication issues (see below)

4. Save Changes

5. **Use below to troubleshoot the network:**
   Network Traffic: increases if there is any network traffic regardless if this device's baud rate is correct; if this number is not increasing, check wiring and confirm devices' network setup is accurate

   M In (Messages In): increases when this device receives a message addressed specifically to it

   S ACK (Simple Acknowledgement): increases when this device receives a message to write a value

   C ACK (Complex Acknowledgement): increases when this device responds to a request for data

   M SENT (Messages Sent): increases when this device sends out a message (including passing a token)

   Who Is: increases when this device receives Who Is message
   Who Is (R) (Ranged Who Is): increases when this device receives a Who Is request for a specific range of Instance IDs

   I Am: increases when this device sends I Am response to a Who Is request

⚠ If I AM is not increasing with Who Is, then the Who Is was likely limited to a range outside this device's Instance ID, or isn't receiving a token.

Token: increases when this device receives and passes a token; if this number is not increasing, check wiring and confirm devices' network setup is accurate

Possible Noise Framing Err Break Err: if number is increasing, there may be:

- Electrical noise on the trunk
- Multiple devices with the same MAC
- Missing reference ground for RS-485; shield can not be used for ground

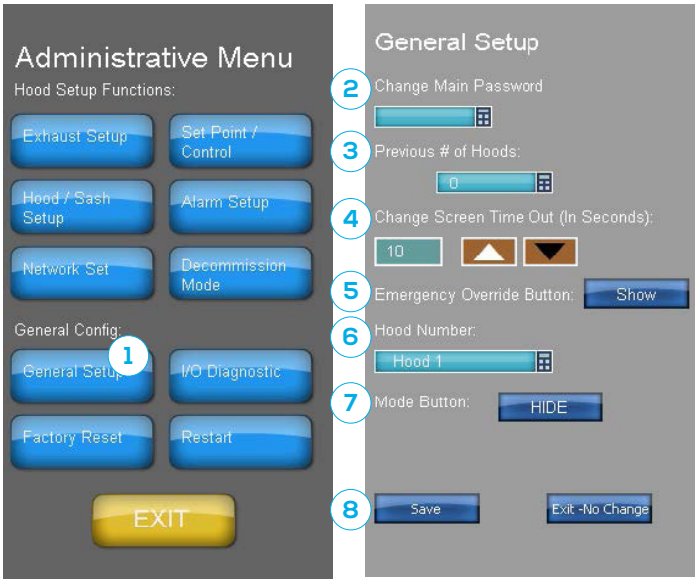
GENERAL HOOD SETUP

BACNET POINTS LIST

OBJECT	NAME	DESCRIPTION	UNITS	RANGE	WRITE SETTING
AV 0	A00	VALVE FLOW FEEDBACK SIGNAL (ANALOG INPUT 1)	%	0-1	R
AV 1	A01	VERTICAL SASH / SIDEWALL VELOCITY SIGNAL (ANALOG INPUT 2)	%	0-1	R
AV 2	A02	UNUSED	N/A	N/A	N/A
AV 3	A03	SUMMED HOOD FLOW IN SIGNAL (ANALOG INPUT 4)	%	0-1	R
AV 4	A04	IN USE SET POINT FACE VELOC. SASH & FACE VELOC. SIDEWALL SETUP CONSTANT VOLUME SETUP	FPM CFM	0-999999 0-999999	R/W
AV 5	A05	CURRENT AIR FLOW / FACE VELOCITY FACE VELOC. SASH & FACE VELOC. SIDEWALL SETUP CONSTANT VOLUME SETUP	FPM CFM	0-197 0-999999	R
AV 6	A06	STANDBY SET POINT FACE VELOC. SASH & FACE VELOC. SIDEWALL SETUP CONSTANT VOLUME SETUP	FPM CFM	0-999999 0-999999	R/W
AV 7	A07	CURRENT CFM (AIRFLOW THROUGH VALVE)	CFM	0-999999	R
AV 8	A08	CURRENT SASH AREA (FACE VELOC. SASH SETUP)	SqFt	N/A	R
AV 9	A09	MODE (0 = IN USE, 1 = STANDBY, 2 = EMERGENCY OVERRIDE, 3 = DECOMMISION)	N/A	0,1,2,3	R/W
AV 10	A10	ALARM STATE (0 = HOOD NORMAL, 1 = CAUTION, 2 = ALARM)	N/A	0,1,2	R
AV 11	A11	ALARM HIGH FACE VELOC. SASH & FACE VELOC. SIDEWALL SETUP CONSTANT VOLUME SETUP	FPM CFM	0-999999 0-999999	R/W
AV 12	A12	ALARM LOW FACE VELOC. SASH & FACE VELOC. SIDEWALL SETUP CONSTANT VOLUME SETUP	FPM CFM	0-999999 0-999999	R/W
AV 13	A13	SUMMED HOOD FLOW FROM PREVIOUS HOOD(S)	CFM	0-999999	R
AV 14	A14	CURRENT SASH OPEN PERCENT (FACE VELOC. SASH SETUP)	%	0-1	R
AV 15	A15	K FACTOR (SET DURING COMMISSIONING)	N/A	0-999999	R/W
AV 16	A16	FLOW SENSOR HIGH (SHOULD ALWAYS BE 2 inWC)	inWC	0-999999	R/W
AV 17	A17	FLOW SENSOR LOW (SHOULD ALWAYS BE 0 inWC)	inWC	0-999999	R/W
AV 18	A18	P GAIN (MUST BE 3 TIMES LARGER THAN I GAIN)	N/A	0-9999999	R/W
AV 19	A19	I GAIN (MUST BE 3 TIMES SMALLER THAN P GAIN)	N/A	0-9999999	R/W
AV 20	A20	MIN FLOW (NOT USED IN CONSTANT VOLUME SETUP)	CFM	0-99999	R/W
AV 21	A21	MAX FLOW (NOT USED IN CONSTANT VOLUME SETUP)	CFM	0-99999	R/W
AV 22	A22	SASH ALARM STATUS (FACE VELOC. SASH SETUP) 0 = NO ALARM, 1 = ALARM, 2 = ALARM MUTE	N/A	0,1,2	R
AV 23	A23	CONTROL OUTPUT (0 = CLOSED, 1 = OPEN)	%	0-1	R
AV 24	A24	READING FROM FLOW SENSOR	inWC	0-2	R
AV 25	A25	TOTAL SUMMED HOOD FLOW OUT	CFM	0-999999	R
AV 26	A26	SASH OPEN SqFt (FACE VELOCITY SIDEWALL SETUP) CFM ÷ FPM = OPEN AREA	SqFt	N/A	R
AV 27	A27	SASH OPEN PERCENTAGE (FACE VELOCITY SIDEWALL SETUP) OPEN AREA ÷ TOTAL AREA = OPEN %	%	0-1	R
AV 28	A28	EMERGENCY OVERRIDE BUTTON (0 = SHOWN, 1 = HIDDEN)	N/A	0,1	R/W
BV 0	B0	OCCUPANCY SENSOR (DIGITAL INPUT 1) 0 = CLOSED / IN USE MODE, 1 = OPEN / STAND BY MODE	N/A	0,1	R
BV 1	B1	EMERGENCY OVERRIDE SWITCH (DIGITANL INPUT 2) 0 = CLOSED / EMERGENCY OVERRIDE, 1 = OPEN	N/A	0,1	R
BV 2	B2	DECOMMISSION MODE SWITCH (DIGITAL INPUT 3) 0 = CLOSED / DECOMMISSION MODE, 1 = OPEN	N/A	0,1	R
BV 3	B3	UNUSED	N/A	N/A	N/A
BV 4	B4	SASH AREA ALARM (0 =NO ALARM, 255 = ALARM)	N/A	0,255	R
BV 5	B5	AUDIBLE ALARM (0 = MUTED ALARM, 255 = AUDIBLE ALARM)	N/A	0,255	R/W

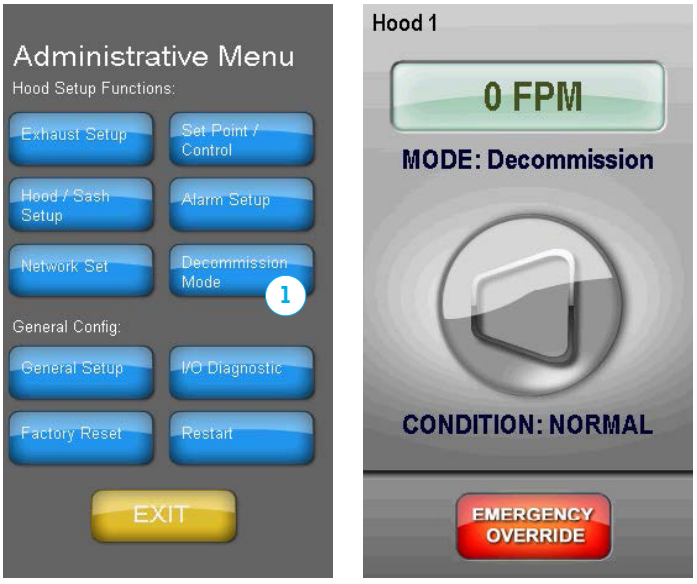
GENERAL HOOD SETUP

GENERAL SETUP SCREEN



1. Touch General Setup to access the General Setup screen
2. Change Main Password: password to access administrative menu
   Recommended: 9876; do not give out to users
3. Previous # of Hoods will be discussed in the Hood Flow Summing section
4. Change Screen Time Out (in Seconds): idle time before automatically returning to main screen
   Recommended: 10 to 30 seconds
5. Emergency Override Button: Show / Hide Emergency Override (max flow) button on main screen
6. Hood Number: identifier displayed on main screen and over network
   Recommended: Should be unique for each hood in a lab and all hoods in a building
7. Mode Button: Show / Hide allows user to switch between In Use and Standby on main screen
   Recommended: Hide
8. Save

DECOMMISSION MODE



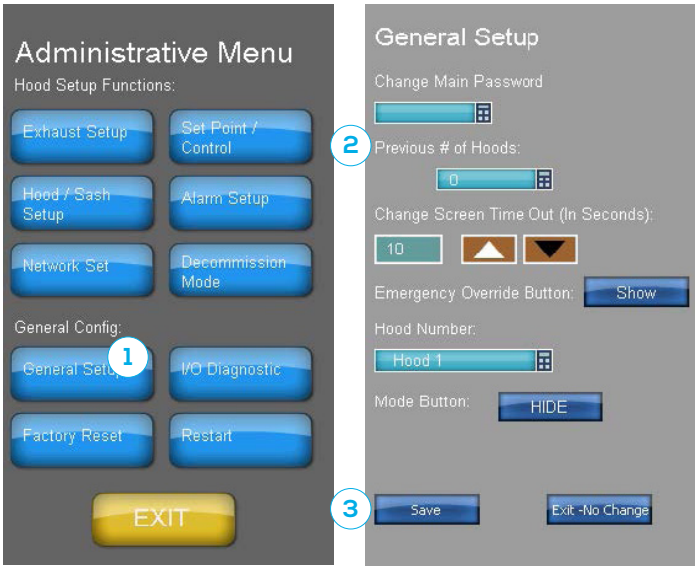
Decommission Mode: closes the hood valve to stop airflow, and disables alarms

This mode is typically used when a hood needs to be repaired, or when a hood is not ready to be configured/ commissioned. The hood cannot be used in this mode

1. Touch Decommission Mode to put the hood into Decommission

HOOD FLOW SUMMING

PREVIOUS # OF HOODS SETUP



4

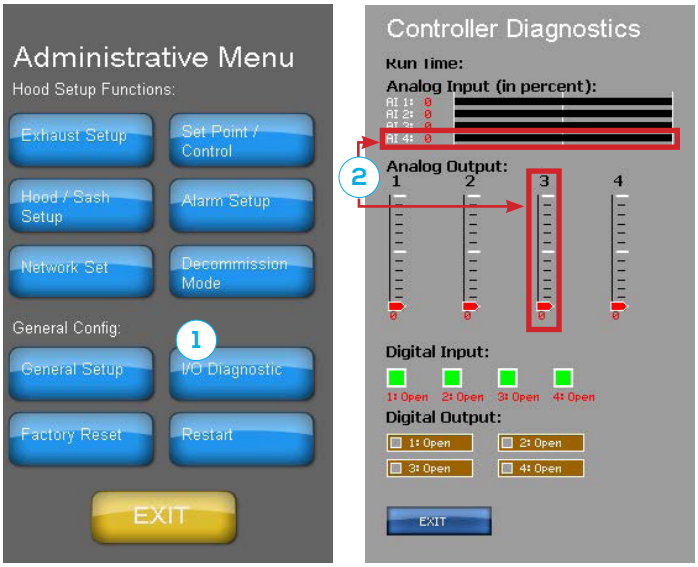
# of Hoods in Chain	PREVIOUS # OF HOODS						
	FHC 1	FHC 2	FHC 3	FHC 4	FHC 5	FHC 6	FHC 7
1 (0-2,000 CFM)	0	-	-	-	-	-	-
2 (0-4,000 CFM)	1	0	-	-	-	-	-
3 (0-6,000 CFM)	2	1	0	-	-	-	-
4 (0-8,000 CFM)	3	2	1	0	-	-	-
5 (0-10,000 CFM)	4	3	2	1	0	-	-
6 (0-12,000 CFM)	5	4	3	2	1	0	-
7 (0-14,000 CFM)	6	5	4	3	2	1	0

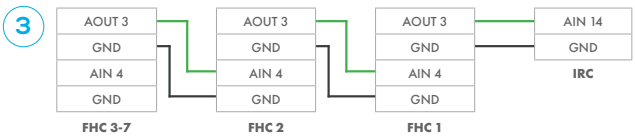
Hood Flow Summing is used to send total fume hood exhaust airflow (CFM) as a scaled voltage signal (0-10 VDC) from a FHC(s) to a room level controller. This value can then be used for volumetric offset calculations and complete system control.

1. Touch General Setup to access the General Setup screen
2. Previous # of Hoods: quantity of hoods sending their summed flow to this FHC
   Recommended: Verify with submittal and project requirements; see below for further details
3. Save
4. Previous # of Hoods Chart
   FHC 1 is the primary FHC in the chain and is the only FHC wired back to the IRC or other room control device.

⚠ Maximum hoods in a chain is 7 hoods.

VERIFY WIRING WITH I/O DIAGNOSTIC





1. Touch I/O Diagnostics to access the Controller Diagnostics screen
2. Hood Flow Summing (Example with 2 Hoods)
   Previous # of Hoods for FHC 1: 1
   Previous # of Hoods for FHC 2: 0

   On FHC 2: Move Analog Output 3 slider (summed flow) to any % value. This signal is sent to the next hood in the chain (FHC 1).

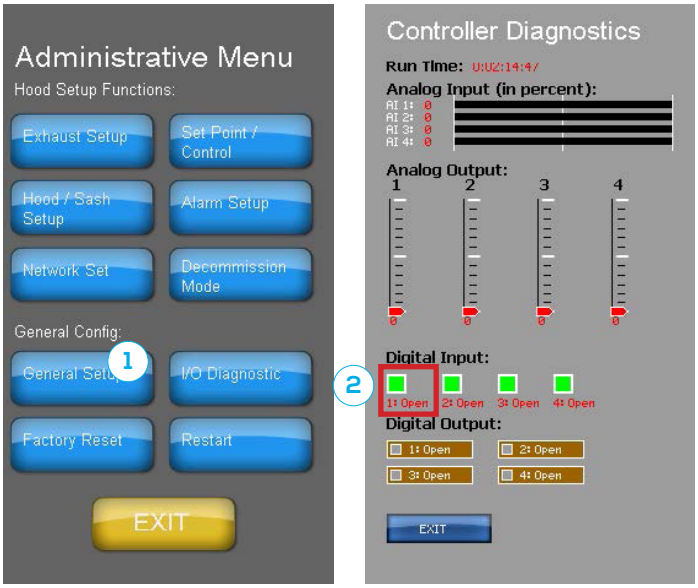
   On FHC 1: Observe green bar for Analog Input 4 (summed flow from previous hoods). It should match (±3%) the Analog Output 3 value from FHC 2.

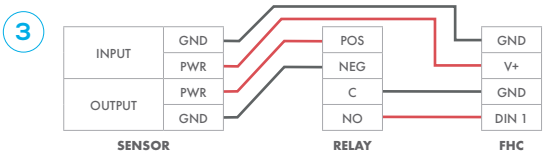
   If this response does not occur, check the wiring for the hood exhaust summing.

   Repeat steps for all FHC in the chain.
3. Wiring for Hood Exhaust Summing chain (7 FHCs)

ENERGY SAVER WITH OCCUPANCY SENSOR

VERIFY WIRING WITH I/O DIAGNOSTIC



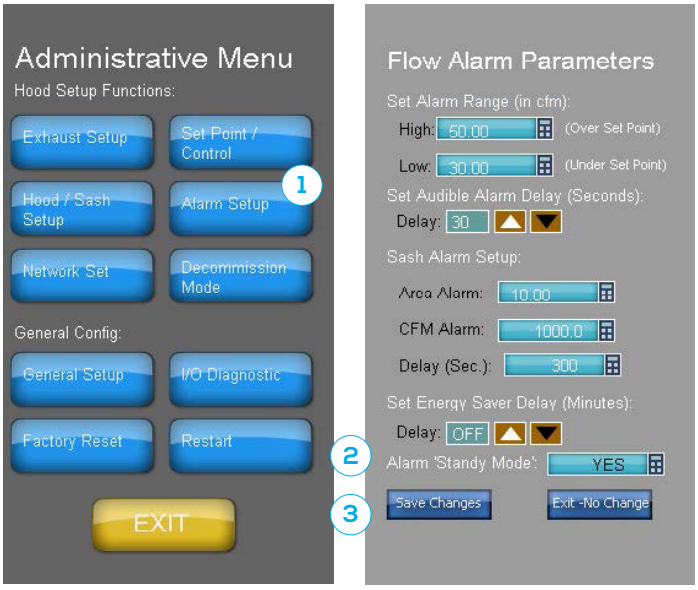


1. Touch I/O Diagnostics to access the Controller Diagnostics screen
2. **Occupancy / Zone Presence Sensor**
   Digital Input 1 will change from Open (green) to Closed (red) when sensor is activated.

   If this response does not occur, check the wiring for the occupancy / zone presence sensor.

   After wiring is confirmed, continue to Energy Saver Setup section.
3. Wiring for OCC-FH-00-0A3

ENERGY SAVER SETUP



Energy Saver should only be used when a occupancy / zone presence sensor is connected.

1. Touch Alarm Setup to access the Flow Alarm Parameters screen
2. Set Energy Saver Delay (Minutes): setting this value to be greater than 0 allows hood to switch to Standby based on occupancy status of DIN 1
   Recommended: 5 minutes. If occupancy / zone presence sensor does not detect anybody, the hood will automatically switch to Standby after 5 minutes. As soon as the sensor is triggered, the hood will automatically return to In Use.
3. Save Changes

FUME HOOD CONTROLLER

QUICKSTART GUIDE

STARTUP REPORT

CRC JOB #	
JOB NAME	
VALVE TAG	
VALVE MODEL	
HOOD NAME	

VERIFY WIRING WITH I/O DIAGNOSTIC

		✓
AIN 1	FLOW FEEDBACK	
AIN 2	VERTICAL SASH SENSOR or SIDEWALL VELOCITY SENSOR	
AIN 4	SUMMED HOOD FLOW IN	
AOUT 1	FLOW CONTROL	
AOUT 3	SUMMED HOOD FLOW OUT	
DIN 1	OCC SENSOR	
ACT POWER	VERIFIED	
CTRL POWER	VERIFIED	

EXHAUST SETUP

VALVE CONTROL TYPE	
DISPLAY UNITS	
DISPLAY DEADBAND	
SENSOR RANGE HIGH	
SENSOR RANGE LOW	
K FACTOR (Default)	

HOOD SASH SETUP

SASH TYPE	
V OPEN	
V CLOSED	
TOTAL AREA	
BYPASS AREA	

NETWORK SETUP

BAUD RATE	
MAC	
INSTANCE ID	

GENERAL SETUP

MAIN PASSWORD	
SCREEN TIMEOUT	
EMERGENCY OVERRIDE	
MODE BUTTON	
PREVIOUS # OF HOODS	

SETPOINT / CONTROL

IN USE	
STANDBY	
P GAIN	
I GAIN	
DEADBAND	
MIN FLOW	
MAX FLOW	
CONTROL ACTION	

ALARM SETUP

ALARM HIGH	
ALARM LOW	
AUDIBLE ALARM DELAY	
AREA ALARM	
CFM ALARM	
DELAY	
ENERGY SAVER DELAY	
ALARM STANDBY MODE	

DECOMMISSION MODE

ENABLED	
FUNCTION VERIFIED	

SIGNATURE	PRINTED	COMPANY	DATE

COMMISSIONING

K FACTOR	
VALVE TUNING	
FPM OFFSET	

NOTES

SIGNATURE	PRINTED	COMPANY	DATE

NOTES

criticalroom.com

Measure What Matters.

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