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Achieve outstanding critical environment control

VVA fume hood control kits

Advanced Fume hood control system

Fast adjust and precision exhaust flow control ensure your laboratory safety and research integrity

Introduction

Kaseman VVA control kits provide an upgraded control solution compared to conventional fume hood controls, offering fast reaction to flow adjustments, stable exhaust flow rate control, operational status visualization, and maintenance-free integration. These features ensure the integrity of your experiments while delivering operational safety and energy savings.

Safety is Always the Priority

Proper face velocity control is crucial for protecting experimenters from potential airborne hazards in the laboratory. According to ASHRAE 110-2016, it is generally recommended that a fume hood's face velocity be maintained between 0.3 m/s (60 fpm) and 0.5 m/s (100 fpm). It is essential to keep the fume hood face velocity at the desired rate under any sash opening height during operation. Therefore, a system that reacts quickly to changes in sash position and maintains flow stability is vital for ensuring laboratory safety.

Energy Saving Through Advanced Control

Fume hoods are often considered "energy monsters" in laboratories due to their significant energy consumption. Statistically that the energy consumption of a single fume hood in daily operation is comparable to that of four households. Whether aiming to reduce your carbon footprint or lower energy bills, it is both necessary and beneficial to focus on energy-saving measures for fume hoods.

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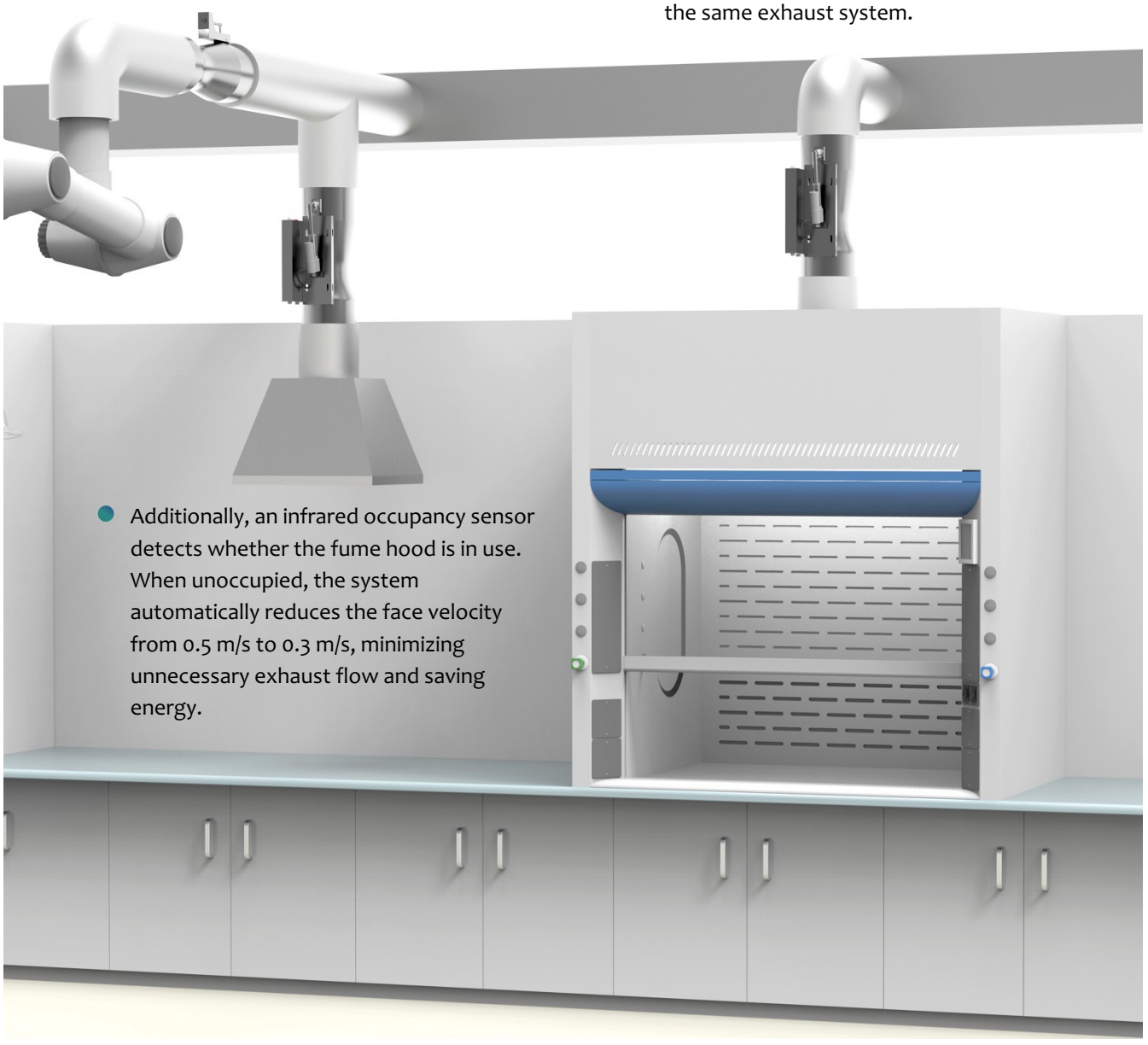
Upgrade Your Fume Hood Control Solution with an Advanced Alternative

An integrated fume hood control solution designed to enhance workplace safety and improve energy efficiency.

- The VVA venturi valve, pre-programmed for easy setup, utilizes a sash sensor to calculate the fume hood's working area based on the current sash opening height. This allows the valve to adjust the exhaust flow rate in real-time, maintaining a consistent face velocity of 0.5 m/s.
- Featuring a fast-response actuator and adjusts the flow within 1 second in response to sash movements. The venturi valve's pressure-independent feature compensates quickly for static pressure variations, ensuring a stable flow even when adjacent fume hoods operate under the same exhaust system.



- Additionally, an infrared occupancy sensor detects whether the fume hood is in use. When unoccupied, the system automatically reduces the face velocity from 0.5 m/s to 0.3 m/s, minimizing unnecessary exhaust flow and saving energy.

Kaseman fume hood VVA Control Solution

Our VVA fume hood control system is engineered to deliver superior safety, stability, and energy performance. Through our integrated sensor-driven architecture, the system continuously monitors sash position and occupancy status, enabling the venturi valve to make precise, real-time airflow adjustments.

With our solution, the valve automatically reduces airflow when the sash is closed or the operator is away, and switches to a safe minimum setback airflow during unattended periods. This ensures stable face velocity at all times while significantly lowering operational energy costs — with typical savings of up to 40%.

1

VVA series venturi valve

Mechanically pressure-independent feature, stainless steel valve structure Equipped with fast move linear actuator and pre-installed fume hood control program.

2

Occupancy sensor

Monitors personnel presence. The VVA system relies on this data to determine when the fume hood is actively in use.

3

Fume hood monitor

6.8inch high resolution liquid crystal display. Support operational status display, emergency exhaust, lighting, and operational mode/alarm indication.

4

Sash sensor

Measures the sash opening height in real-time, instantly calculating the face area and allowing the system to maintain a constant, safe face velocity.

Fast and accurate exhaust flow control

Fast adjust with the flow rate accord with sash move, maintain proper face velocity for experiment's safety

Auto switch for energy saving

Save the energy when the fume hood is temporally unoccupied, effortless improve your energy efficient management

Visualize the control

Intuitive human interface display make sure every working condition is under your control

Easy to install

Easy install process with pre-programmed control devices, simple commissioning to realize advance fume hood control

Functionable color display, secure safety and let everything under your control

- 6.8-inch color high-resolution touch screen
- Slim industrial design with integrated aluminum-magnesium alloy casing
- Metric and imperial display units (English version)
- Dynamic real-time display of various parameters of the fume hood venturi valve
- Visual and auditory indicators for normal, critical, and alarm states
- Operational status illustrated with images and text
- Manual control for switching between normal/emergency/standby/shutdown modes on site
- Password protection for on-site parameter resetting

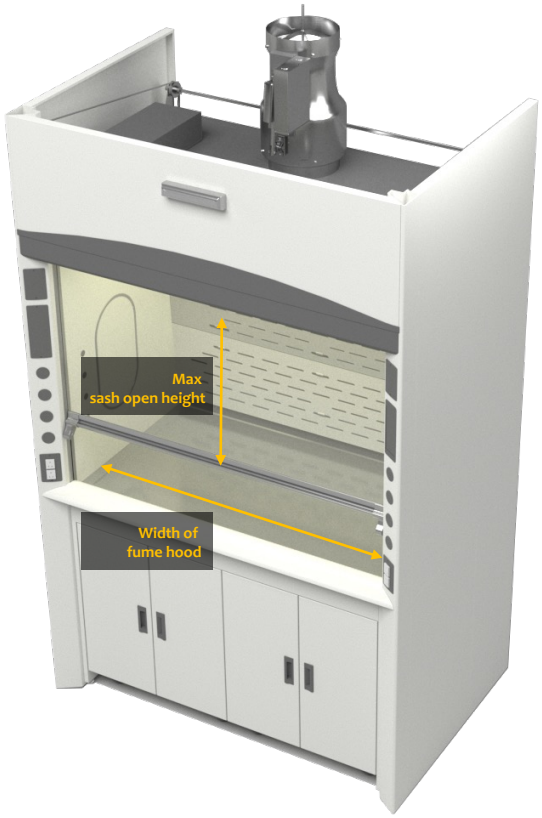
Fume Hood airflow control selection introduction

The required exhaust airflow for a laboratory fume hood is determined based on the sash opening height and the desired face velocity. Maintaining the proper face velocity ensures safe containment of contaminants and stable ventilation performance.

The exhaust airflow rate can be calculated using the following equation:

Airflow (m^3/h) = Width (m) x Sash Opening Height (m) x Face Velocity (m/s) x 3600 (sec/h)

This calculated airflow value serves as the basis for selecting a suitably sized Venturi valve or airflow control device capable of maintaining the required face velocity under varying sash positions and operating conditions.



VVA Airflow range – Standard type

Middle pressure venturi valve airlfow range - Single valve			
DN200/8”	60-1200 CMH	17-333 L/S	35-706 CFM
DN250/10”	85-1700 CMH	24-472 L/S	50-1000 CFM
DN300/12”	150-2500 CMH	42-694 L/S	88-1471 CFM
DN350/14”	340-4250 CMH	94-1181 L/S	200-2500 CFM

Low pressure venturi valve airlfow range - Single valve			
DN200/8”	60-1000 CMH	17-278 L/S	35-589 CFM
DN250/10”	90-1500 CMH	25-417 L/S	53-884 CFM
DN300/12”	150-1800 CMH	42-500 L/S	88-1060 CFM
DN350/14”	340-2400 CMH	95-667 L/S	200-1414 CFM

Notes:
1. Measure error for the airflow range would be ±5%
2. Measure in CMH, convert to L/S and CFM
3. Shut-off venturi valve, refer to the shut-off airflow range table for details

VVA Airflow range – Shut-off type

Middle pressure venturi valve airlfow range - Single valve			
DN200/8”	60-1010 CMH	17-280 L/S	35-594 CFM
DN250/10”	85-1440 CMH	24-400 L/S	50-848 CFM
DN300/12”	150-2200 CMH	42-611 L/S	88-1295 CFM

Notes:
1. Measure error for the airflow range would be ±5%
2. Measure in CMH, convert to L/S and CFM
3. Standard venturi valve. Refer to the standard airflow range table for details

Part number for venturi valve

1 - Valve type
2 - Shut-off function
3 - Application and material of structure, (refer to specification for more detail)
4 - Valve body ganged
5 - Size of diameter
6 - Connection with duct
7 - Operational pressure range
8 - Insulation
9 - Airflow feedback
10 - Actuation & adjustment
11 - Number of actuator
12 - Install orientation
13 - Fail-safe option
14 - Control & communication
15 - Drop pressure alarm across valve
16 - Power-supply

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Description
VV																Versatile venturi valve, especially for fume-hood exhaust control
	A															Standard type
	S															Shut-off type
		F*														Exhaust air type
		G*														Anti-corrosion type
			1													Single valve
				08												8", DN200
				10												10",DN250
				12												12",DN300
				14*												14",DN350
					C											Circle slip connection
						M										Middle operation pressure range, 150pa-750pa
							N									No insulation wrapped
							B									10mm class B 10mm flexible close cell polyethylene insulation
								C								Calibrated airflow signal feedback
									F							Fast move actuation
										S						Single actuator
											H					Horizontal install
											U					Vertical up install
											D					Vertical down install
												L				Fail in last position
												D				Normal close or open
													M			Modbus RTU485 communication
														S		Equipped with a differential pressure switch
														T		Equipped with a differential pressure transmitter
														N		No pressure alarm
															L	24VAC, 50Hz/60Hz power supply

Notes:

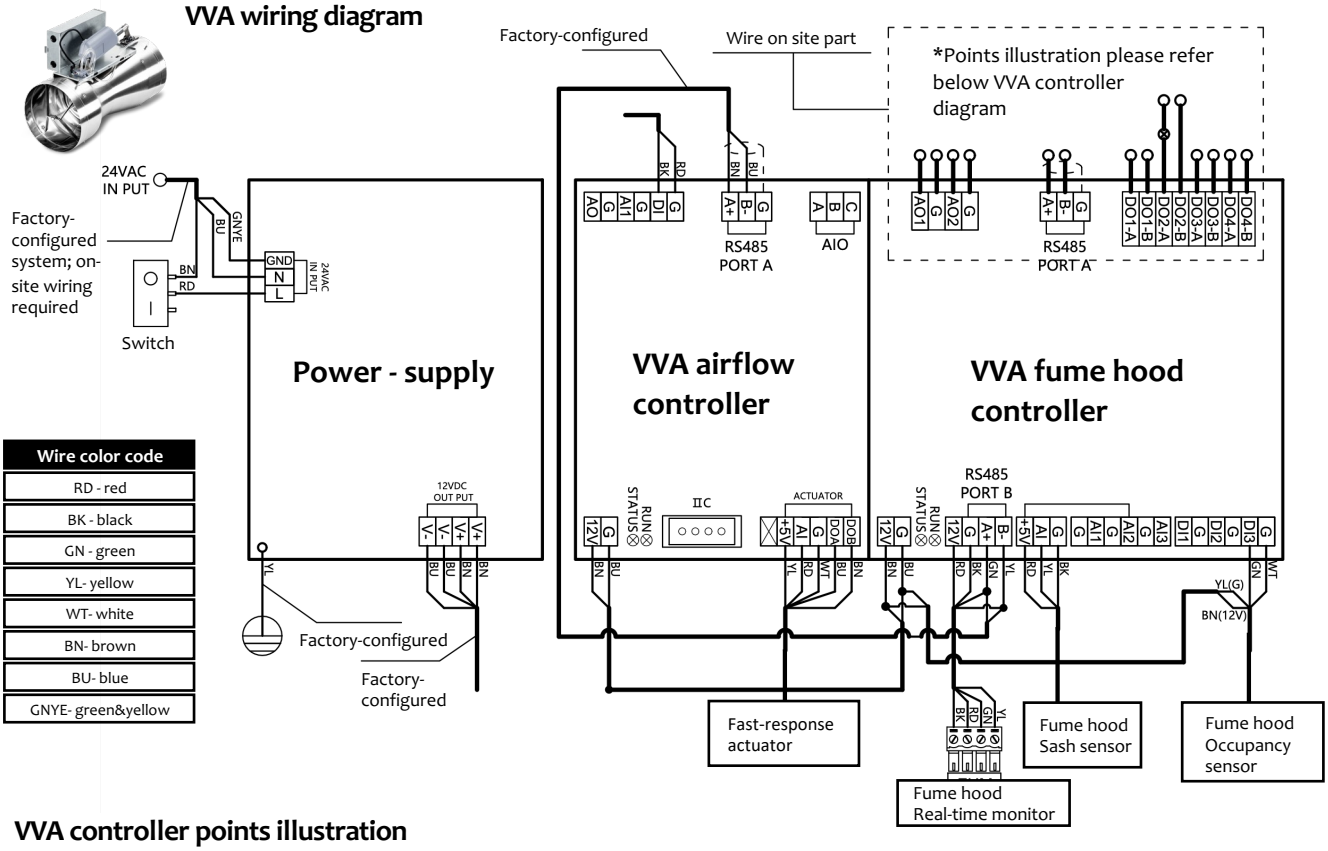
1. 2-S* : Only available for medium operating pressure UVA and VVA series
2. 3-F* : The airflow control device for non-corrosive airstreams. Valve body, valve cone, rod, and bracket are made by 316L stainless steel, rod backed-on PTFE coating
3. 3-G* : The airflow control device for corrosive airstreams. Valve body, valve cone, rod, and bracket are made by 316L stainless steel and all backed-on PTFE coating
4. 5-14*: shut off type not available on 14"(DN 350) type
5. 7-L* : Low pressure configuration is only available with standard type venturi valve
6. For room / zone control valve, please reference smart series datasheet, model code CVA/ UVA / SVA
7. See Page 16 for Fume Hood Airflow Control Selection.

VVA venturi valve control specification

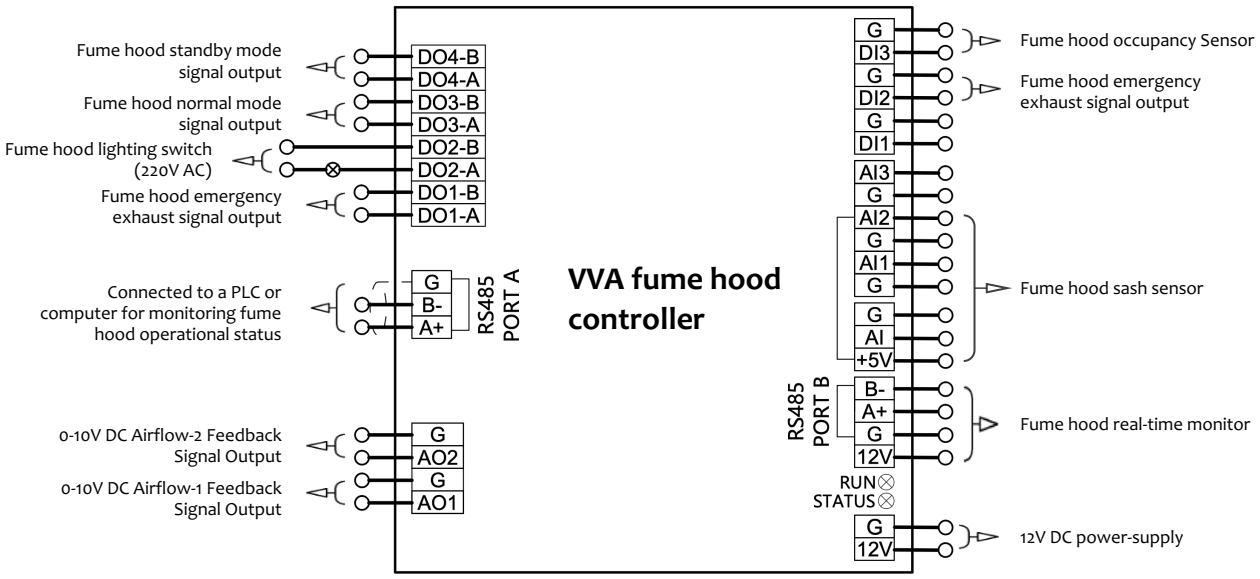
The VVA controller is specifically designed to regulate airflow in fume hood systems, ensuring stable face velocity that complies with international safety standards. It supports multiple control methods, including analog command signals (0-10VDC), digital two-state control, and Modbus RTU communication, to adjust the airflow rate as required.

Additionally, the VVA controller provides real-time airflow feedback via its 0-10VDC analog output (AO) or through Modbus RTU communication. This enables precise monitoring and control, ensuring that fume hood airflow

VVA wiring diagram



VVA controller points illustration



VVA controller Modbus communication address list (READ ONLY)

Communication protocol : Modbus RTU

Configuration : Baud rate 9600 bps, data bit 8 digits, stop bit 1 digit, parity check N/A. (9600,8,N,1)

Address : The default factory address is 1. The address can be modified using a 6.8-inch touchscreen interface, with a configurable range of 1–255.

To configure the address for connecting the fume hood system to the BMS:

1. Navigate to the User Parameter Settings menu on the controller interface
2. Select the Controller 485 Address option
3. Modify the desired address within the allowable range (1–255)
4. Save and write the new address to the controller to apply the changes

Address	Point	Point instruction	Unit
40060	Fume hood face velocity	Defines the airflow rate required to maintain stable face velocity during fume hood operation, ensuring compliance with safety standards	CMH
40061	Fume hood sash height	Indicates the current opening height of the fume hood sash. This parameter directly affects the required airflow to maintain proper face velocity	CM
40062	Fume hood sash opening area	Represents the effective operational area of the fume hood when the sash is open, calculated as the product of the sash width and height	m^2
40063	Fume hood operational state	The operational state of the fume hood is indicated by specific codes: 0: Standard Mode (normal operation) / 1: Standby Mode (reduced airflow) / 2: Minimum Exhaust Mode / 8: Sash Height Alarm (excessive opening detected) / 9: Low Pressure Warning / 10: High Pressure Warning / 13: Overlimit Warning / 14: Emergency Mode / 15: Zone Failure / 16: Displacement Failure / 17: Actuator Failure	
40067	VVA controller software version	Displays the current version of the VAV system	
40068	Fume hood real-time face velocity	Provides the current face velocity reading in real-time to ensure safe and efficient operation of the fume hood	m/s

Notes:

1. All addresses are 0-based

Mechanical installation

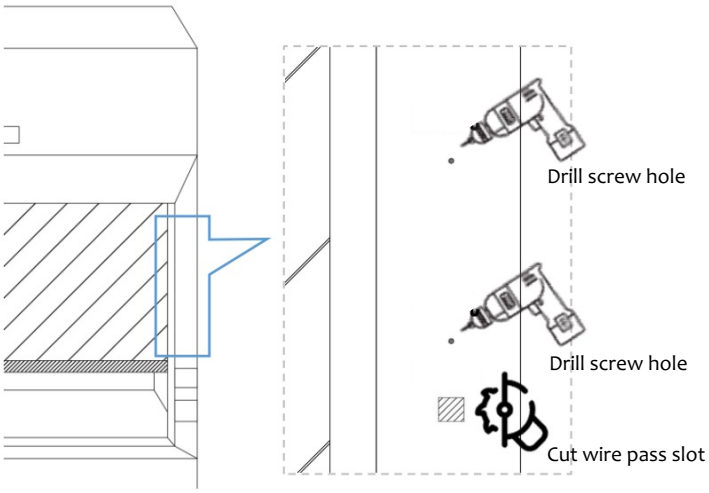
Installing the VVA Control Kits right onto the fume hood is the best practice. This provides immediate value: easy installation; increased researcher safety by optimizing the interface; and maximum energy efficiency for the lab environment.

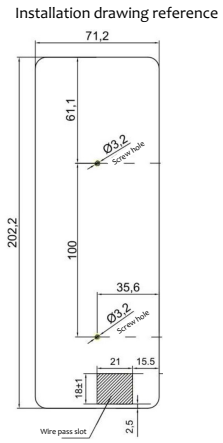
Touch screen Installation Instructions

6.8inch Monitor Specifications

- External Dimensions: 203 x 71.2 x 17.4 mm
- Display Area: 161.3 x 60.9 mm
- Working Temperature: 0 – 50 °c (32 - 122 °F)
- Working Humidity: 10% - 90% RH, non-condensing
- Power Supply: 12VDC, sourced from the venturi valve
- Communication Protocol: Modbus RTU
- Communication Port: RS485
- Baud Rate: 115,200 bps (bits per second)

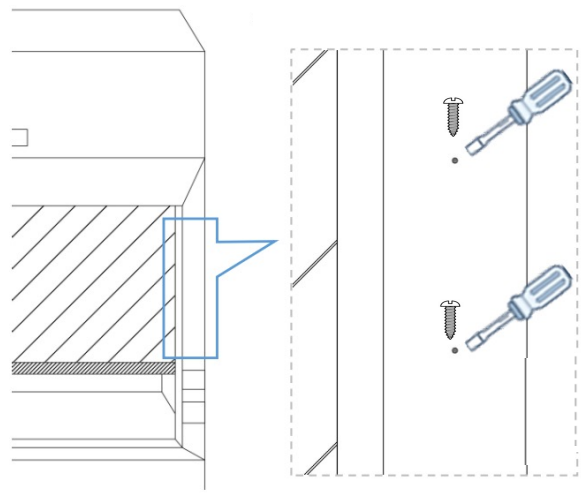
Step1 - Drill two screw holes and cut one wire pass-through slot on the side panel of the fume hood

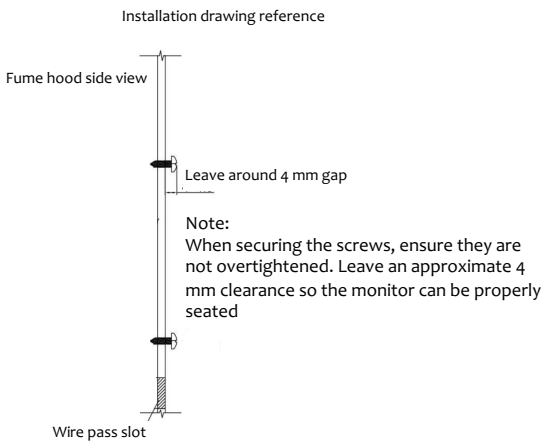




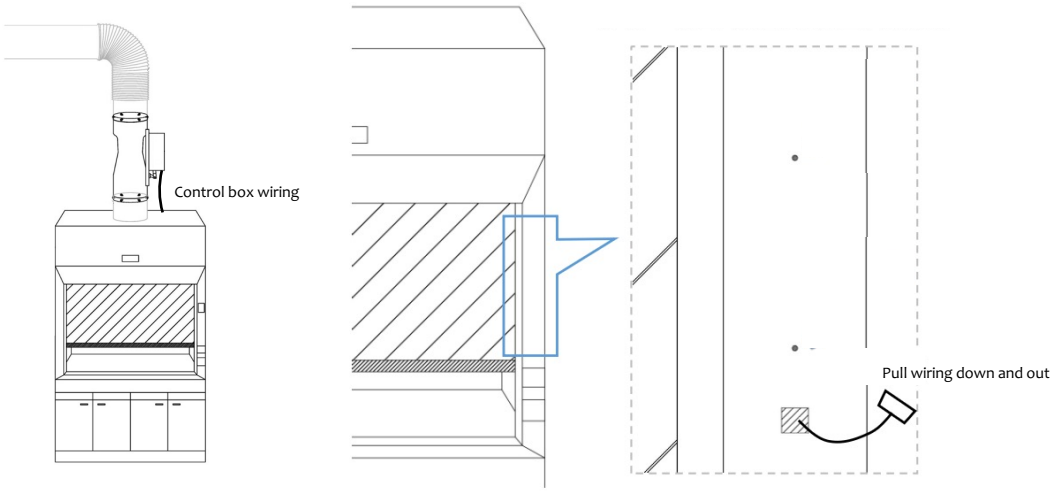
Holes Height Adjustment Note:
The mounting height should be determined based on **user preference** and **ergonomic factors**. We recommend positioning the monitor at a height that ensures **optimal visibility and comfortable operation** for the primary operator.

Step2 - Secure the mounting screws (provided in the packaging) to the fume hood. (These screws will support the monitor unit)

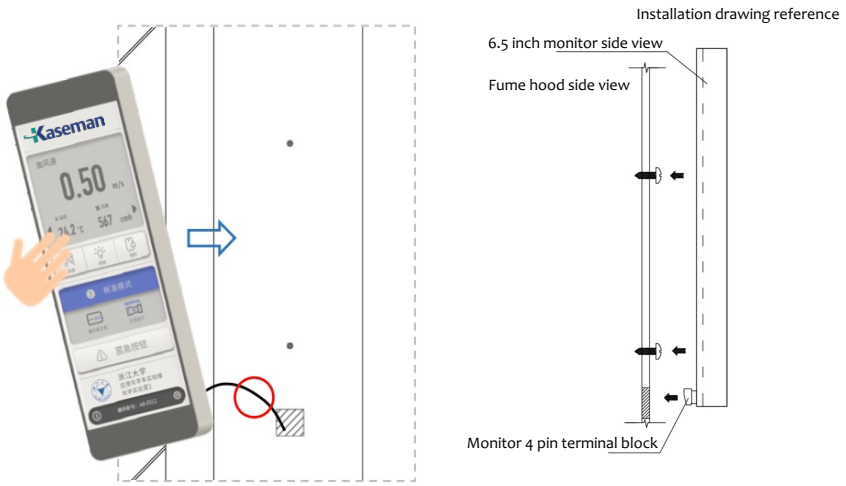




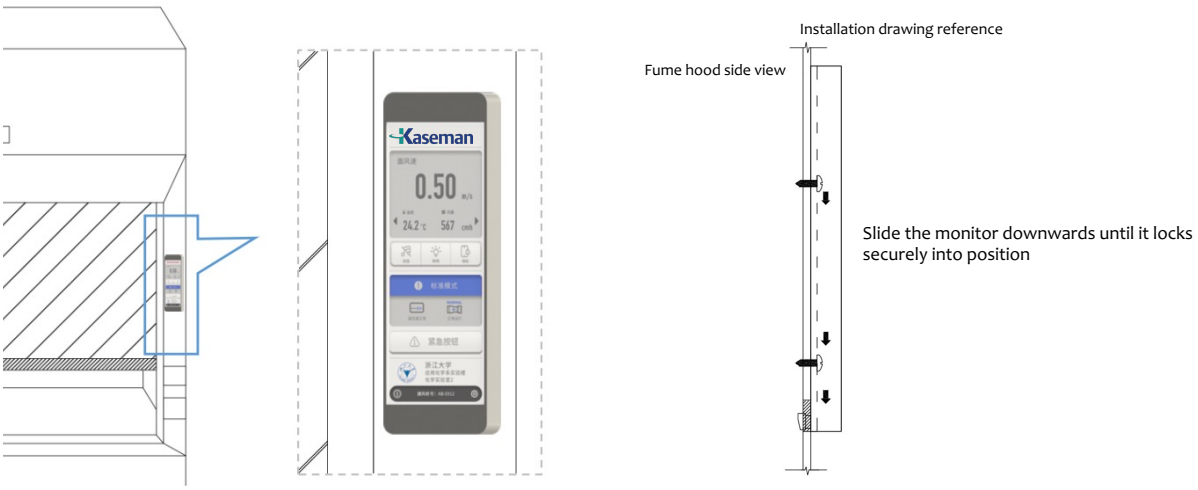
Step3 - Pull the wiring down and out from the control box of the venturi valve



Step4 - Connect the monitor unit to the wiring harness prepared in Step 3
and Hook the top edge of the monitor unit onto the mounting screws installed in Step 2.



Step5 - Gently slide the monitor downwards until it locks securely into position.



Sash Sensor Installation Instructions

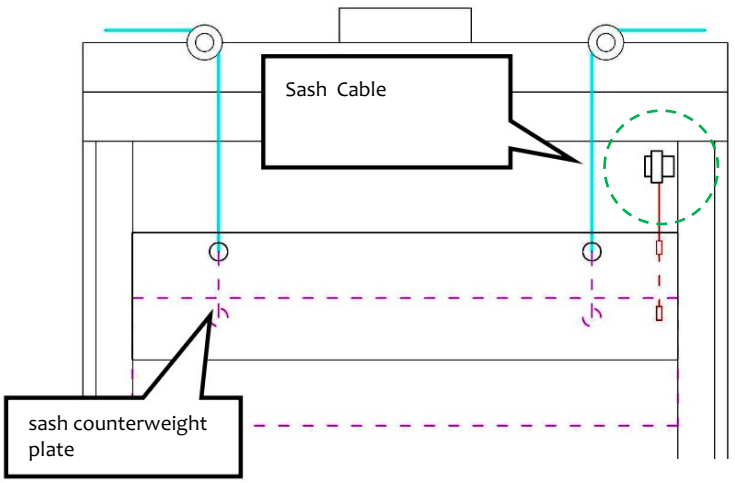
The sash sensor is a linear transducer that measures the physical displacement of the fume hood sash. It converts this movement into a precise electrical signal needed by the VAV controller to instantly calculate the face area and maintain a stable face velocity.

Sash Sensor Specifications

- Sash cable length: 2 m
- Working Temperature: 0 – 60 °c (32 - 132 °F)
- Working Humidity: 20% - 90% RH, non-condensing
- Output Signal: 0 – 10 kΩ
- Measured axis: Vertical displacement

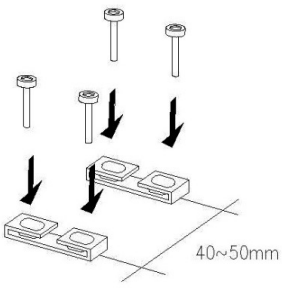
Step1 - Locate mounting position on the upper rear of the fume hood

Rear View of the Fume Hood



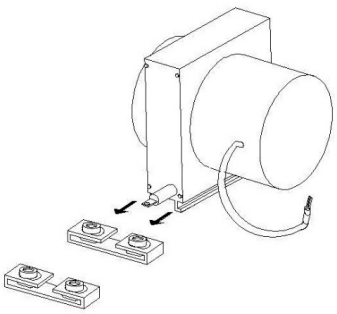
Position Note:
Select the side (left or right) that offers the most convenient wiring route to the VVA control box.

Step2 – Install sensor



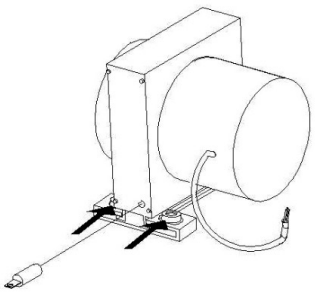
A. Drill holes and fasten the two mounting brackets

Note: Ensure the brackets are positioned 40 to 50 mm apart as shown in the diagram



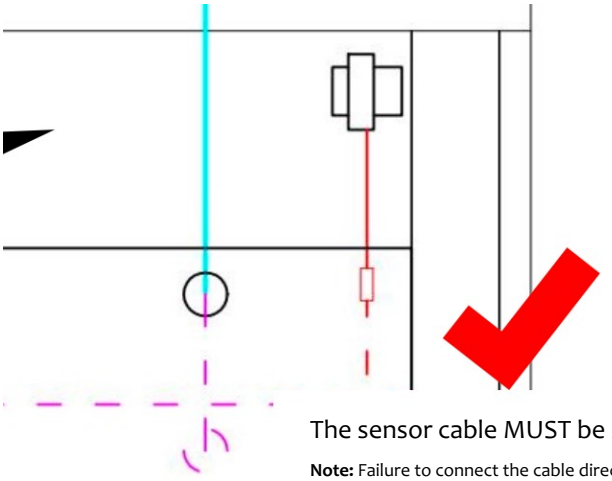
B. Slide sensor unit into the brackets

Note: Gently push down until fully seated



C. Fully secure all four screws

Step3 - Ensure the sensor cable is properly secured to the sash counterweight plate at the back of the unit.

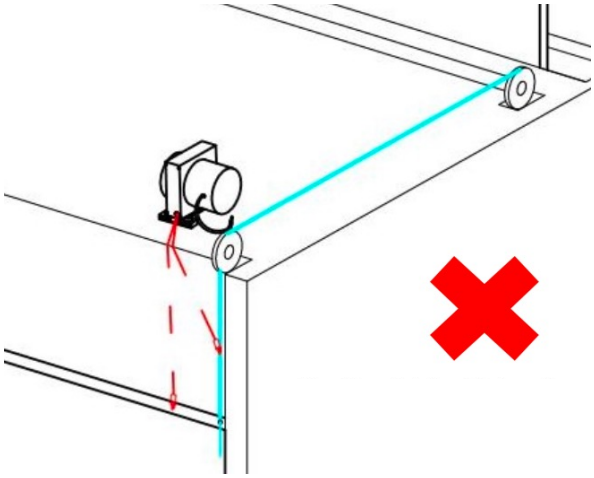


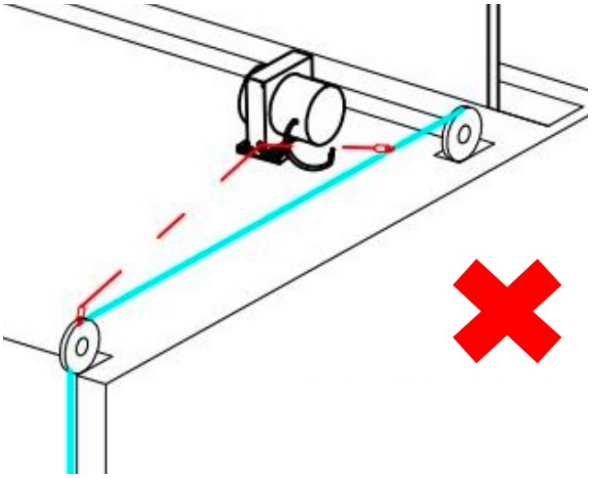
The sensor cable MUST be securely fastened to the sash counterweight plate

Note: Failure to connect the cable directly to this moving component will result in incorrect sash position feedback and compromised containment control

CAUTION: IMPROPER INSTALLATION

DO NOT mount the sensor in a way that interferes with moving parts or causes the sensor cable to extend at an angle. **(See following figure for an example of incorrect mounting.)**
Improper installation will cause position measurement errors and lead to **loss of containment** and poor system performance.





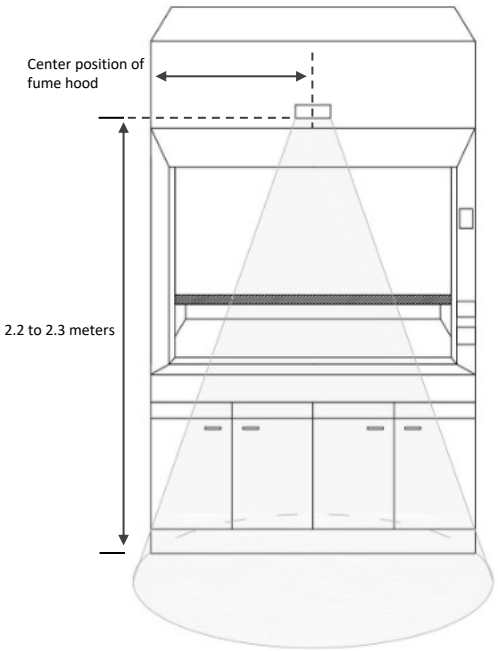
Occupancy Sensor Installation Instructions

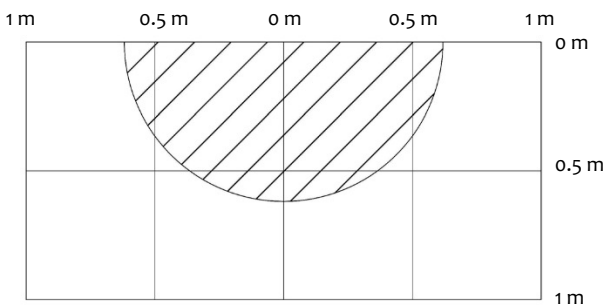
The occupancy sensor detects real-time personnel presence within the operating zone. When no occupancy is detected, the system automatically adjusts the face velocity to a reduced standby airflow level for energy efficiency while maintaining safe operating conditions.

Occupancy Sensor Specifications

- Dimensions: 230(W) x 50(D) x 49(H) mm
- Working Temperature: -20 – 55 °c (32 - 132 °F)
- Working Humidity: 0% - 90% RH, non-condensing
- Detection Mode: Micro-motion
- Detection Area: Approx. 0.6m²
- Mounting Height: 2.2- 2.3 meters (bottom edge)

Step1 - Locate mounting at the center position directly above the fume hood's operating area. The installation requires attention to height: the sensor's bottom edge must be positioned 2.2 to 2.3 meters above the finished floor.

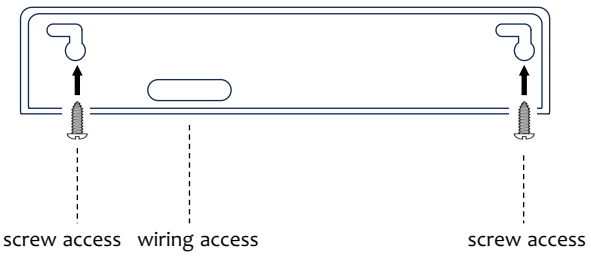


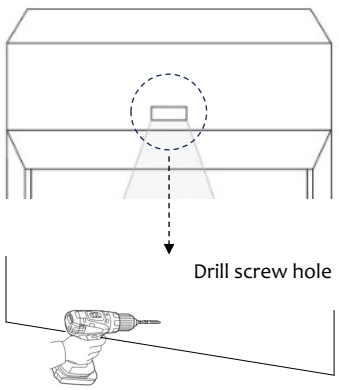


Coverage Area Diagram

Step2 - Cut an opening at the center of the fume hood front face for installation. The unit is secured with two mounting holes, and wiring is accessed through the provided cable entry cut-out.

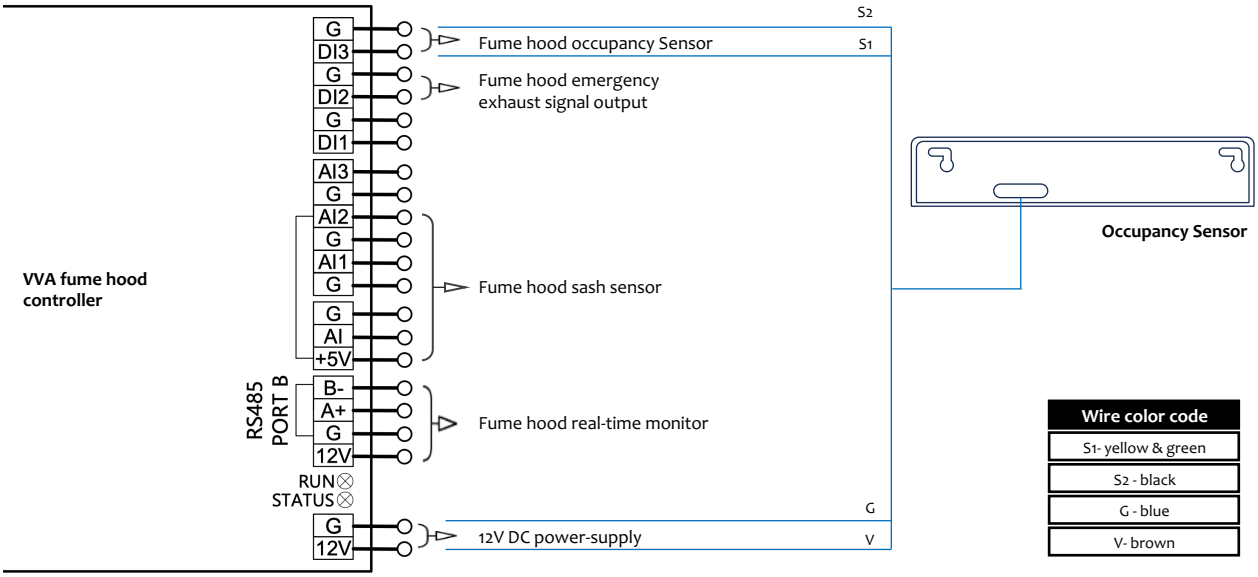
Rear View of the occupancy sensor





Step3 - Pull the wiring out from the occupancy sensor to VVA control box.

Wiring diagram



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