# **MODEL CODES**

The Horizontal Sash Sensors are used in conjunction with panel magnets to provide a resistance signal indicating the horizontal sash % open area.

### **Horizontal Sash Sensor:**

The Horizontal Sash Sensor (HSS1) contains a series of normally open reed switches and parallel resistors sealed in a low profile PVC enclosure. The HSS1 provides a resistive output signal that is proportional to the number of reed switches that are open. Each HSS1 is ordered from the factory sized to fit across the width of the horizontal glass panel. The HSS1 is sold in 1" increments and should be sized as close to the width of the glass surface of the panel to which it will be installed without exceeding the width of the panel. For glass panels with thick frames, the HSS1 shall be sized to fit inside of the frame on the glass surface.



#### Panel Magnet:

The panel magnet contains an array of magnets enclosed in a low profile PVC sleeve. The PM emits a powerful magnetic field from the top and bottom edges of the device. The PM length shall be 1/2" less than the width of the glass surface to which it will be installed. For glass panels with thick frames, the PM shall be sized to fit inside of the frame on the glass surface. The PM is sold in 0.5 inch increments. For panels magnets wider than 30", use two PMs sized to fit across the width of the sash panel glass surface.



# THEORY OF OPERATION

**Fully Closed Position** 

R<sub>⊤</sub> Max

The Horizontal Sash Sensors are used in conjunction with panel magnets to provide a resistance signal indicating the horizontal sash % open area. The most common type of horizontal sash fume hood utilizes a two-track system with either one, two or three panels installed in each track. Figure 1 shows the arrangement of the horizontal sash sensors and panel magnets on a fume hood with a 2-track 4-panel horizontal sash. For this example each HSS1 is installed on the "outside track" panels and each panel magnet is installed on the "inside track" panels.



With the panels arranged in the fully closed position as shown above, the magnetic field emanating from the panel magnets reaches the minimum number of reed switches resulting in the maximum total resistance output ( $R_{TMAX}$ ). With the panels arranged in the fully open position as below, the magnetic field reaches the maximum number of reed switches resulting in the minimum total resistance output ( $R_{T MIN}$ ).

**Fully Open Position** R<sub>⊤</sub> Min



#### **Installation Kit:**

The Horizontal Sash Sensor Installation Kit (HSSK) includes cleaning wipes provided for cleaning the glass surfaces, cable management, Spring Reels, cable anchors, cable ties, and shorting plugs required for connecting multiple HSS1s together. HSSK-Cx kits also include retractable spring reels which are provided for the purpose of managing and protecting the cable by pulling it up and away from moving parts related to the vertical sash movement.



# SPECIFICATIONS

**Horizontal Sash Sensor:** 

Electrical Cable: 2-cond., 24 AWG,

10" (254mm) Long **Enclosure: PVC Plastic** 

#### Panel Magnet:

**RoHS** Compliant

Magnet Material: Nickle-Plated Neodymium Enclosure: Heat-Shrink PVC Plastic Mounting: VHB Tape





#### THIS DOCUMENT IS SUBJECT SUBMITTAL DRAWING TO CHANGE WITHOUT NOTICE. THIS DOCUMENT OR THE CONTENTS THEREOF SHALL NOT BE MODIFIED HSS1 WITHOUT PRIOR WRITTEN PERMISSION BY ACCUTROL LLC

Accutrol Representative:

21 Commerce Dr Danbury, CT 06810 ACCUVALVE.COM

CUTRO

### DIMENSIONS

# INSTALLATION

Before installing Horizontal Sash Sensor(s) or panel magnets, determine if there is adequate clearance on the front of the hood between the vertical sash and front hood panel so that cables will not be pinched when sash is in motion, possibly damaging the Horizontal Sash Sensor(s) or their cables. If this is a concern, install the Horizontal Sash Sensors at the top of the inside panel with the HSS cables towards the center of the vertical panel, and the panel magnets on the back side of the panel on the outside track. The installation steps that follow show one example of installing the hardware with the HSS on the outside of the hood. Once the Horizontal Sash Sensor(s) locations are chosen, verify that there is a place to add the supplied cable anchors near the end of the HSS where the cable exits to add a strain relief for the cable.

1. Select the location for installing the Horizontal Sash Sensors and panel magnets. Verify there is enough clearance between the sash panels to accommodate the panel magnets provided. Reference the figure and table below.



Panel Magnet Model	Description	Panel Magnet Thickness	Minimum Clearance Required Between Panels
PM1-xRx	panel magnet, Normal Power	0.20"	0.25"
PM3-xRx	panel magnet, Medium Power	0.33"	0.38"
PM5-xRx	panel magnet, High Power	0.58"	0.63"

WARNING: Ferrous metals will interfere with the magnetic field produced by the panel magnets. For this reason, locate the HSS1 and PM away from ferrous metals.

- 2. Using the cleaning pad provided with the HSSK-xx mounting kit, clean the glass surface where the HSS1 and PMs are to be installed.
- 3. For fume hood applications that require two HSS1's, the factory will provide each HSS1 with the cable exiting opposite ends as shown below. This is done so the HSS1's can be installed with the cables positioned towards the center of the fume hood which provides for more effective cable management.



**Note 2**: For fume hoods that require three of four HSS1's, position all the HSS1's so the cables exit towards the center to lessen the strain on the cable when the panels are in motion.

4. Referencing the figure below; select the appropriate HSS1 for the left side sash panel located on the outside track. Remove the thin plastic layer from the very high bond (VHB) tape on the backside of the HSS1 to expose the adhesive. Carefully align the HSS1 over the glass mounting surface with the cable exiting the housing as shown below. Be sure the HSS1 is parallel to the top edge of the glass and hold in place applying even pressure across the enclosure for approximately 20 seconds.





Accutrol Representative:

top edge of the glass and hold in place applying even pressure across the enclosure for approximately 20 seconds. Add the cable anchors above the HSS1s pear the cable and fasten cable down with a cable tie.



the arrows pointing in the same direction otherwise the system will not function properly.



7. For applications that require more than one HSS1, the output cable of each HSS1 shall be connected in series using the shorting plug(s) provided with the installation kit as shown below. Additional shorting plugs are provided for connecting the field cable to the AVC control module shown on the following page.



SUBMITTAL DRAWING

**VSS-50** 

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

THIS DOCUMENT OR THE CONTENTS THEREOF SHALL NOT BE MODIFIED WITHOUT PRIOR WRITTEN PERMISSION BY ACCUTROL LLC.

5. Select the appropriate HSS1 for the right side sash panel located on the outside track. Remove the thin plastic layer from the VHB tape on the backside of the HSS1 to expose the adhesive. Carefully align the HSS1 over the glass mounting surface with the cable exiting the housing as shown below. Be sure the HSS1 is parallel to the

6. Install the cable tie mounts and cable ties to provide strain relief. Using the same installation technique as the HSS1's, install the panel magnets on the sash panels located on the inside track so they are positioned directly in line with the previously installed HSS1's as shown below. It's important to position each panel magnet with

	)	
	HSS1-xx	PM1-xRx
ck	Outside Track	Inside Track



#### Note 3:

The HSS1 is a resistive device therefore polarization is not required. The shorting plug connection can be made between either color wire on each HSS1.

DWG. NO:	HSS1 SUBMITTAL DWG				
<b>REVISION</b> :	В	ECN:	3064		
REV. DATE:	4-17-24	SHEET:	2	OF:	3

### **FUME HOOD CONTROL SYSTEM**

to the exhaust duct above the hood.

The system diagram below provides an example of how the Horizontal Sash Sensor System is integrated with the AVC fume hood control system on a typical combo bench type fume hood.



The total horizontal sash resistance ( $HR_T$ ) signal is used in conjunction with the total vertical sash sensor signal ( $VR_T$ ) to calculate the total sash open area of the fume hood. If the AVC detects there is a problem with the sash input signals such as a broken wire or intermittent connection, the AVC has the capability to issue a Sash Sensor Fault Alarm to the local FHM Fume Hood Monitor which will alert the laboratory occupants of the problem.

	Accutrol Representative:	SUBMITTAL DRAWING	THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.	
21 Commerce Dr, Danbury, CT 06810 ACCUVALVE.COM		HSS1	THEREOF SHALL NOT BE MODIFIED WITHOUT PRIOR WRITTEN PERMISSION BY ACCUTROL LLC.	

DWG. NO:	HSS1 SUBMITTAL DWG			
<b>REVISION</b> :	B ECN: 306		3064	
REV. DATE:	4-17-24	SHEET:	3	OF: 3