







INSTALLATION AND WIRING MANUAL

Table of Contents

GENERAL 1 - 3

 Specifications 1 - 2

 Part Number Guide 2

 Overview 3

 Installation 4

MOUNTING/WIRING 5 - 7

 Sensor Mounting Location 5 - 6

 Display Mounting Location 7

BASIC PROGRAMMING 8 - 10

 Main Display Screen 8

 Configuring the HMS-1655 LITE..... 8

 Field Calibrating the Sidewall Sensor 8 - 9

 Field Calibrating the Sash Position Sensor 9

 Setting Up Alarm Limits 10

 Configuring the Alarm Buzzer 10

 Selecting Displayed Units 10

 Configuring Display Options 10 - 11

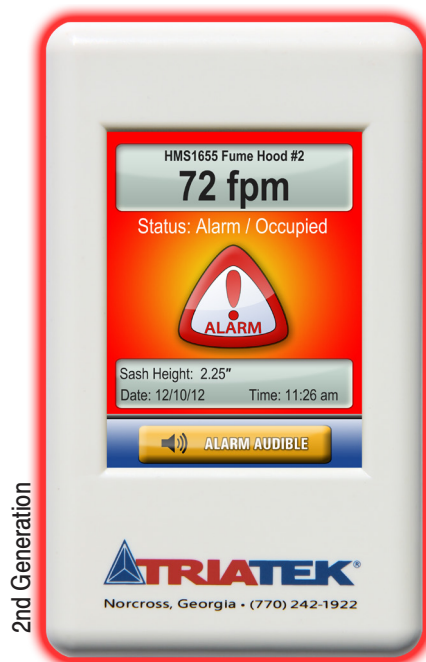
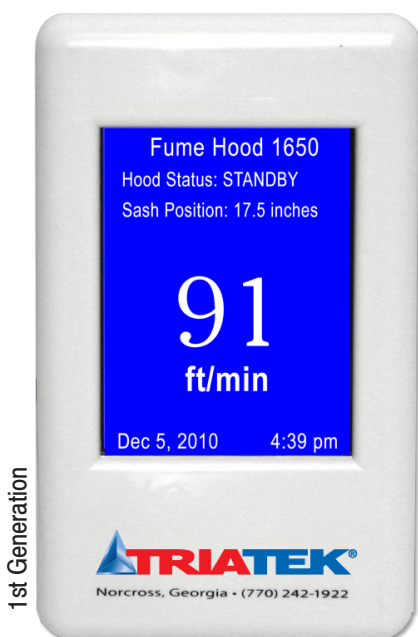
 Adding Password Security 11

CLEANING THE DISPLAY 12

SETUP MENU TREE 13 - 14

GENERAL

Specifications



GENERAL SPECIFICATIONS

Electrical

Face Velocity Range	0 – 200 ft/min
Accuracy of Measurement	±2 ft/min*
Power Supply	Class 2, 24VAC ±10%, 30VA universal 120/240 to 24 VAC, 60/50 Hz, step-down isolation transformer provided Optional 24DC .75A universal 100/240VAC, 60/50 Hz wall adapter
Recommended Cable Type	Belden 1325A

Touchscreen User Interface

LCD Size	3.2" diagonal
LCD Type	Transmissive
Resolution	240 x 320 portrait
Viewing Area	50.60 mm x 66.80 mm
Color Depth	18-bit or 262K colors
Backlight Color	White
Luminous Intensity	min 2500 cd/m2

*Accuracy is ± 5FPM when velocity drops below 60FPM or exceeds 140 FPM

Specifications

Mechanical

HMS-1655 LITE Surface-mount Enclosure	3"W x 5"H x 1.13"D
External Remote Sensor Housing	2.5"W x 4"H x 2."D
Stainless Steel Cover Plate for Flow Tube	2.7"W x 4.5"H x 0.2"D
HMS-1655 LITE with Flow Tube Cover Plate	approx. 3.5 lb.
HMS-1655 LITE with Sidewall Sensor	approx. 4.0 lb.
Flow Tube Cover Plate Mounting	Flush

Environmental

Operating Temperature	32° to 125° F Operating
Operating Humidity	10% - 95

Part Number Guide: HMS-1655 LITE -

Blank = No sash sensor with standard power supply
S = Include sash sensor with standard power supply
W =No sash sensor with wall adapterpower supply
SW = Include sash sensor with wall adapter supply

GENERAL

Overview

About

The Triatek HMS-1655 LITE Fume Hood Monitor is an ultra-sensitive instrument used to monitor the face velocity of fume hoods in laboratories and clean rooms. The HMS-1655 LITE is capable of measuring and displaying face velocities as low as 20 ft/min. Face velocities below 20 ft/min. are displayed as “No Flow.”

Key features of the HMS-1655 LITE include:

- Full-color touchscreen display with programmable display options and adjustable backlight
- Intuitive user interface which simplifies setup and configuration of unit
- Display background changes color to indicate hood status
- Patent-pending Safety Halo™ edge lighting for 180° status indication
- Audible and visual alarms
- Multi-level password protection
- Simple field calibration of sidewall sensor and sash position sensor
- Factory-calibrated analog output available for monitoring face velocity remotely

The HMS-1655 LITE is equipped with a 3.2” diagonal **Full-color Touchscreen** and displays in portrait orientation (240 pixels by 320 pixels). The password-protected menu tree is very intuitive and simplifies the setup and configuration of the unit. The menus incorporate touch-based interfaces such as sliders, radio buttons, and dialog popup windows to facilitate the ease-of-use of the HMS-1655 LITE.

The display implements bright background color changes to indicate the three different

hood statuses. These background colors indicate “**Normal**” when the face velocity at the sash opening is within defined limits, “**Warning**” when it is nearing an out-of-limits condition, and “**Alarm**” when the face velocity is outside defined acceptable limits. The face velocity ranges for these conditions are easily set by the user for the specific installation when necessary. The background color changes provide an at-a-glance view of the fume hood face velocity conditions.

Alarm conditions may be defined by the user, in terms of desired face velocity settings for the fume hood being monitored. When an alarm condition occurs, it may be annunciated in three user-definable ways: 1) on the display, 2) the Safety Halo™, and 3) with an audible alarm. The alarm will automatically reset when the unit has sensed that the fume hood face velocity has returned to proper limits. The user may easily mute the audible alarm by touching the **Alarm Audible** button at the bottom of the touchscreen display.

The HMS-1655 LITE provides an optional **Analog Input** that may be used for monitoring the sash position of the fume hood using Triatek’s sash position sensor. The sash position sensor allows the HMS-1655 LITE to monitor and display the current sash height in real-time after being field-calibrated.

Multi-level Passwords may be configured to prevent the unauthorized or casual access to the HMS-1655 LITE configuration settings. Up to ten passwords of up to eight digits may be stored, with each having one of four associated access levels. Administrators and facility management personnel may have unrestricted access, while general staff may be assigned restricted access passwords which limit the functionality of the user menus.

The HMS-1655 LITE includes its own power supply, which should be connected to the system as shown on page 6. The standard power supply includes a universal 120/240VAC-to-24VAC isolation transformer enclosed within a 4x4 electrical box with a 1A slow blow fuse. Older models may have been shipped with a pluggable wall adapter 120VAC-to-24VDC power supply that was pre-wired to the included wiring harness. This power supply also provides power to the sidewall sensor module which monitors the effective face velocity at the sash opening. A 10-foot length of 4-conductor cable is supplied with the HMS-1655 LITE to interface the sidewall sensor to the touchscreen display.

The HMS-1655 LITE includes a sidewall velocity sensor for measuring the face velocity of the monitored fume hood. This sensor must be installed at the sidewall of the monitored fume hood. Tools required for the installation include: drill, 3/4” drill bit, 3/8” drill bit, 1/4” drill bit, 1/8” drill bit, #2 Phillips screwdriver, standard medium blade screwdriver, and silicone sealant.

An interface cable is included and pre-wired to the sensor module that connects it to the touchscreen display module. If the HMS-1655 LITE was shipped with the 24VDC wall adapter power supply, and it must be plugged into a nearby electrical receptacle. The ideal location for this receptacle is on top of the fume hood cabinet. The loose end of the power supply cable from the wall adapter must be routed down to the location of the sidewall sensor. Leave the wall adapter power supply unplugged during the installation procedure.

Installation

If the HMS-1655 LITE was shipped with the standard universal isolated power supply module, then it must be connected as shown on page 6 to power the system. The output of this power supply module is 24VAC, which is polarity-independent.

The HMS-1655 LITE incorporates an additional analog output signal that may be used for monitoring the displayed face velocity remotely. This capability allows an existing controller on the building management system (BMS) to make the face velocity reading available over the network, even though the HMS-1655 LITE itself is not connected to the network. The factory-calibrated analog signal is available as either a voltage output between 0–5 Vdc or as a current output between 4–20 mA at the remote sensor connector. Refer to page 6 for more information.

NOTE: While the HMS-1655 LITE model is calibrated and programmed at the factory with default settings for typical fume hood applications, a final calibration of face velocity and sash position (if so equipped) is usually required following installation.

Installation

1. Proper location of the sensor is crucial for obtaining the best possible operation of the HMS-1655 LITE. The system uses through-the-wall sensing to measure the internal negative pressure of the fume hood to accurately determine the face velocity at the sash opening. The sensor must be located in a position that is least affected by turbulent air within the fume hood. See the illustration on page 5. There are two types of fume hood arrangements which need to be

considered: **By-Pass** and **Non-By-Pass**. With either type, the sensor is best located approximately 6 inches back from the vertical sash track.

- **By-Pass Vertical Position** – Locate the sensor vertically in the center of the region between the bottom of the sash in it's fully open position and the bottom edge of the by-pass opening.
 - **Non-By-Pass Vertical Position** – Locate the sensor vertically 6" above the bottom of the sash in it's fully open position.
2. See pages 5 and 6 for dimensions and suggested mounting arrangements of the Triatek flow sensor on the fume hood wall.
 3. Apply silicone sealant around the sensor immediately prior to mounting the assembly to its mounting surface. Be sure to leave red cap on to avoid getting sealant in the sensor port.

NOTE: Be certain that sensor reference port is in laboratory room air. If necessary to obtain this, use the louvered mounted on exterior panel of the fume hood.

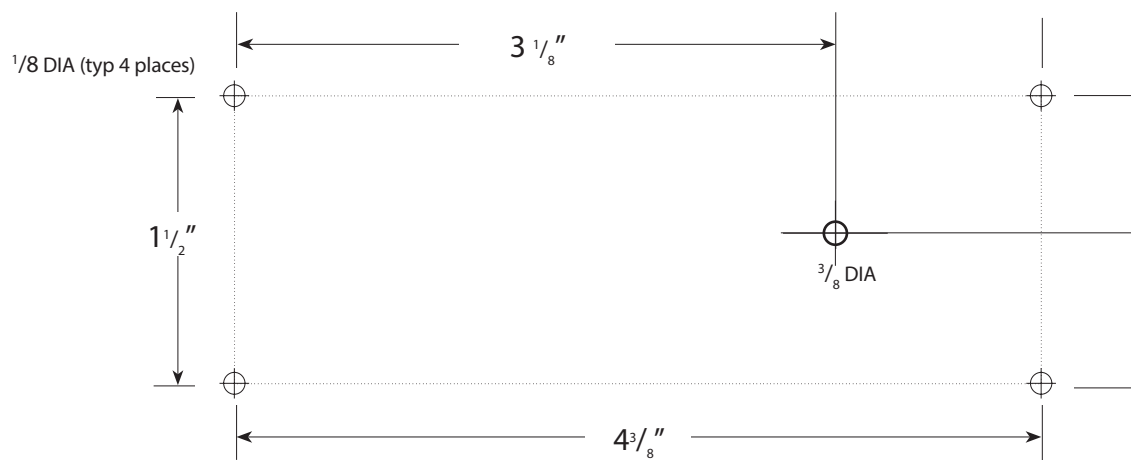
4. See page 7 for mounting details for the HMS-1655 LITE touchscreen display unit. The preferred location is eye-level, usually on one of the side bezel panels. Please note that the display unit is cable connected to the sidewall sensor module, and provisions must be made to route the cable without interference with the fume hood sash or sash cable.

NOTE: Remove red cap from sensor after installation.

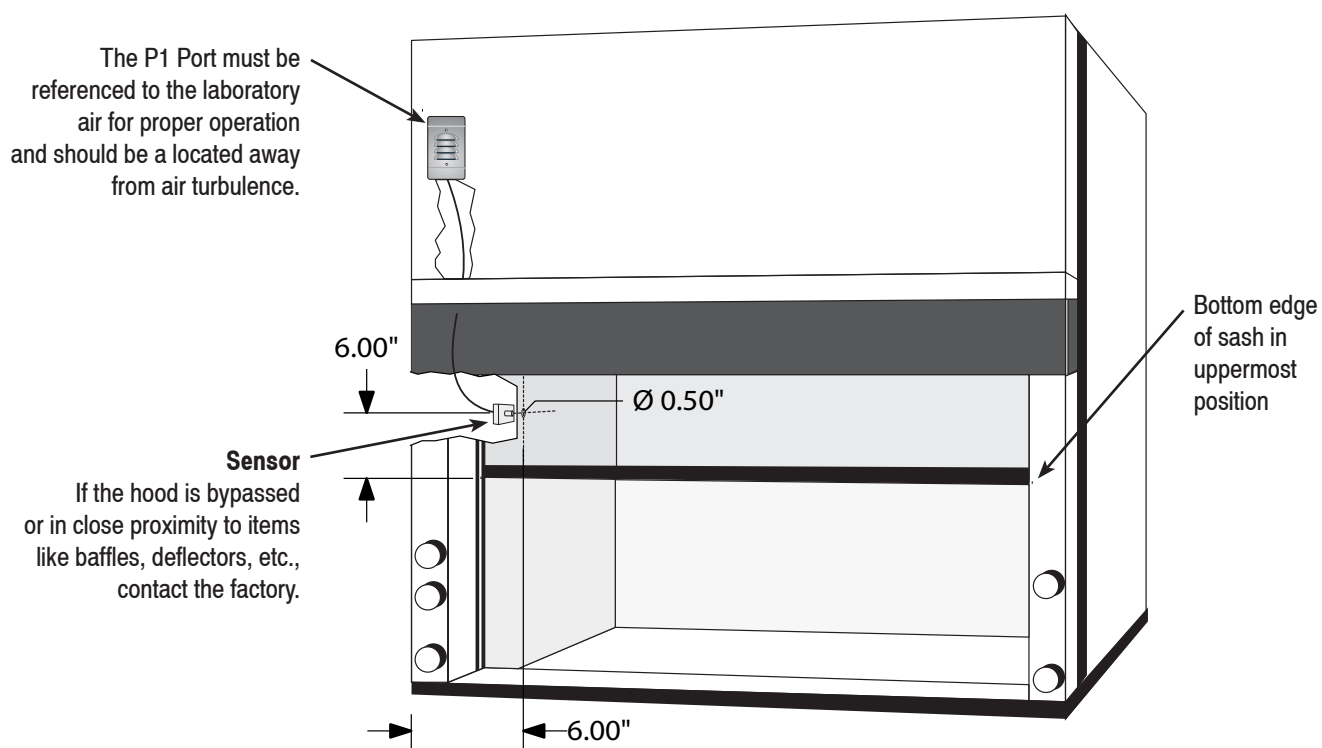
5. An optional sash position sensor may be monitored by the HMS-1655 LITE and the real-time sash position may be displayed at the touchscreen. Connect the red lead of the sash position sensor to the +Vs terminal, connect the black lead to GND, and connect the other lead (green or white) to the IN terminal.
6. To remotely monitor the face velocity displayed at the HMS-1655 LITE touchscreen, a factory-calibrated analog output is available as voltage or current at the Vo and Io terminals, respectively. The designated output (Vo or Io) should be connected to the analog input of the remotely located controller and the ground terminal (GND) should be connected to the ground of the remotely located controller.
7. Connect the interface cable between the sidewall sensor and the touchscreen display before applying power to the system. If the HMS-1655 LITE was shipped with the 24VDC wall adapter power supply, power up the system by plugging it into an available electrical receptacle, preferably located at the top of the fume hood cabinet. If the HMS-1655 LITE was shipped with the standard universal isolated power supply module, then proceed by applying line power to this power supply module.

MOUNTING/WIRING

Sensor Mounting Location

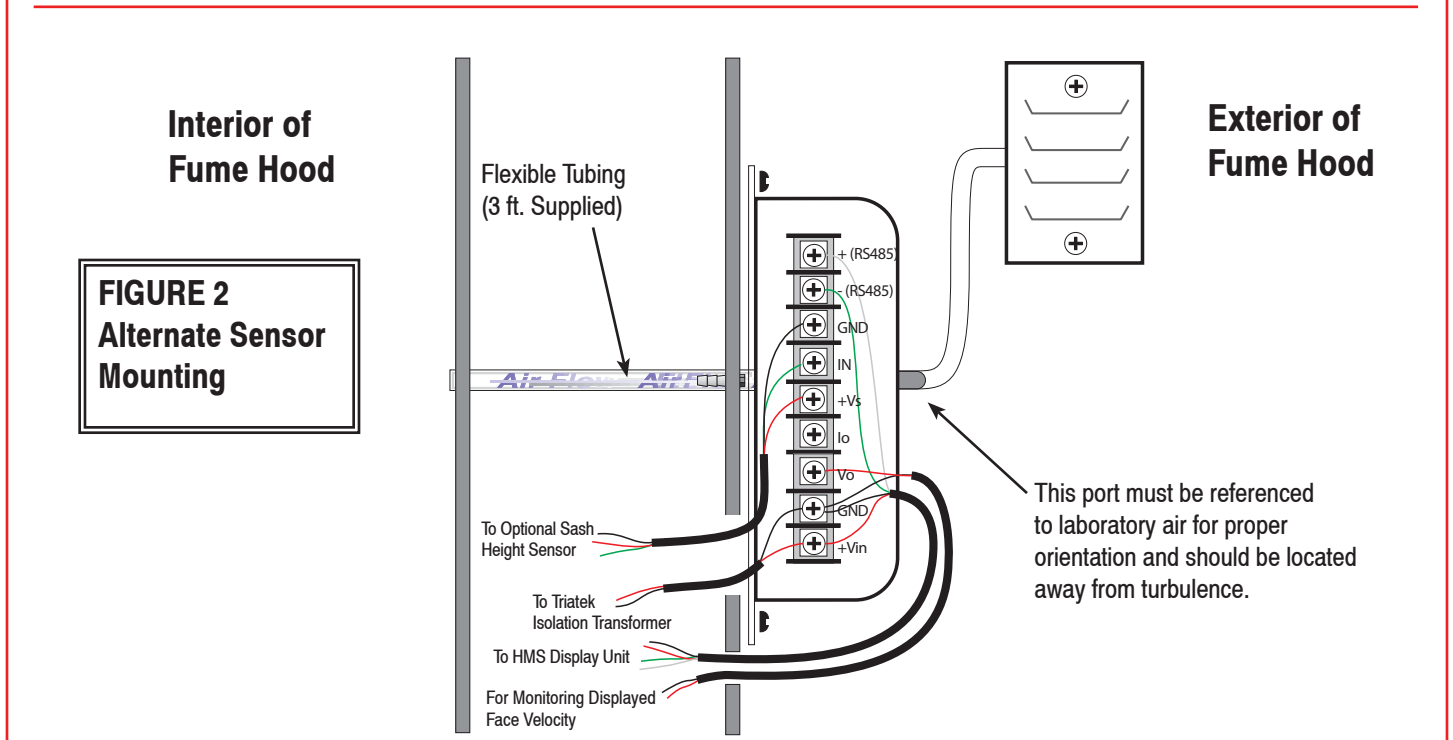
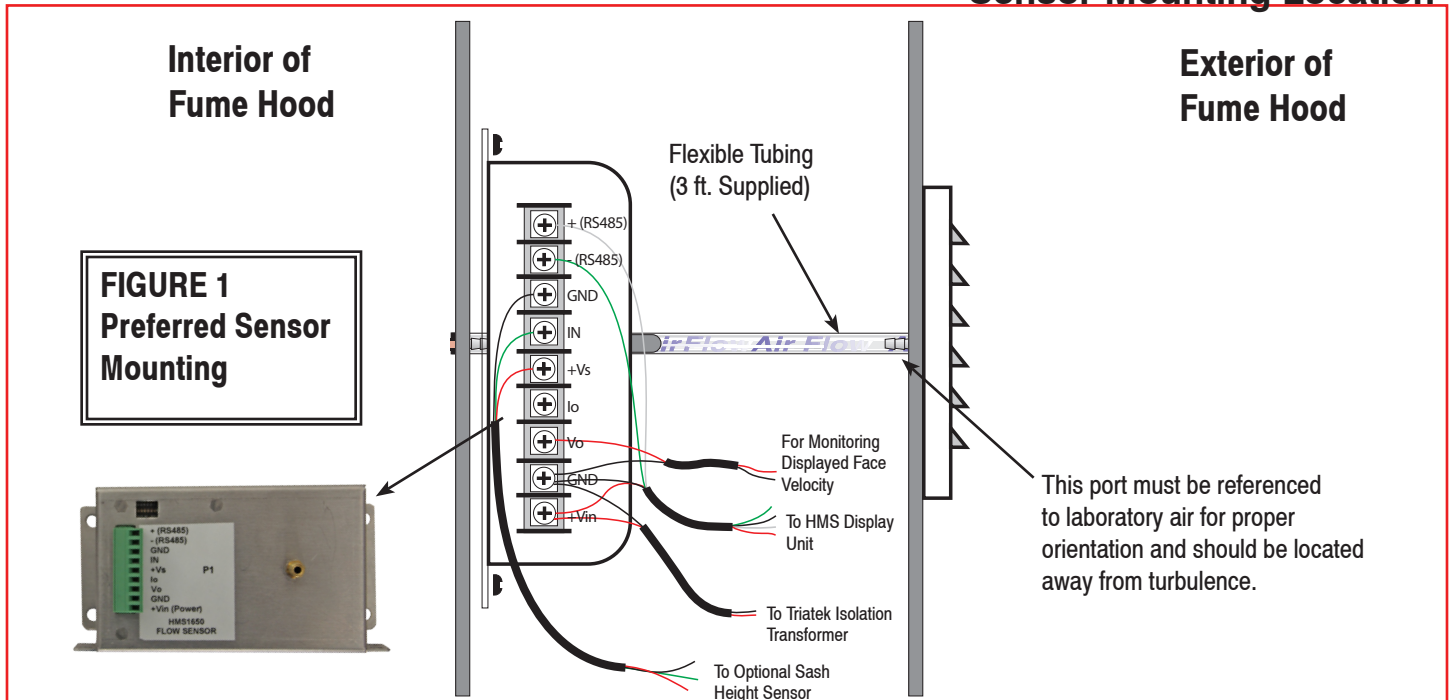


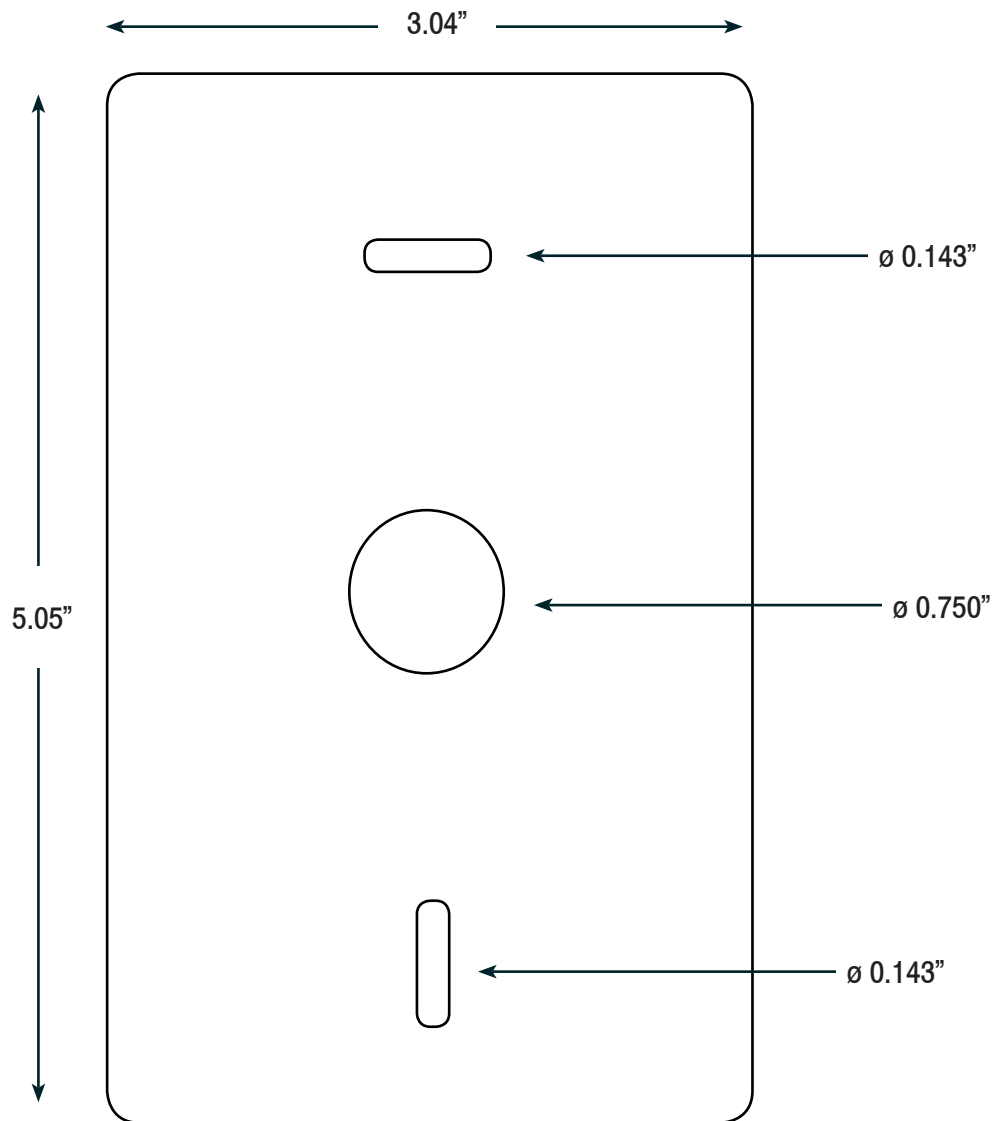
Sensor Placement - Non By-Pass Type



MOUNTING/WIRING

Sensor Mounting Location



MOUNTING/WIRING
Display Mounting Hole Pattern


The HMS-1655 LITE backplate may be mounted directly to a standard single-gang wall box using the two slots along the center line. Use the backplate as a template to mark the mounting holes and the cable access hole at the center of the backplate.

HMS-1655 LITE Basic Programming

After the HMS-1655 LITE unit has been properly installed, apply power to the unit. Upon power up, Safety Halo™ edge lighting bezel will cycle through seven colors (red, green, blue, yellow, magenta, cyan, and white), followed by three action icons (normal, caution, and alarm), and finally the Triatek splash screen indicating serial numbers, firmware version numbers, and sensor calibration date. This splash screen remains displayed for approximately 10 seconds and disappears to reveal the main display screen. This splash screen can be redisplayed using the **About this HMS** option in the **Diagnostics** menu.

Main Display Screen

All HMS-1655 LITE units are shipped from the factory in the **Standby** operating mode. The standby operating mode will be represented by the blue background (Figure 3). Information displayed on the main screen includes the following:

- Name of monitored fume hood (up to 25 characters) set by user
- Current operating mode (occupied, unoccupied, or standby)
- Current face velocity reading in selected engineering units (default is ft/min)
- Current time and date
- Sash position with optional sash sensor

While in standby operating mode, the background color of the main display screen is blue. However, while in either **Occupied** or **Unoccupied** operating modes, the background color actively represents the current status of the monitor. A green background indicates that the current face velocity is within allowable limits of the desired setpoint. A yellow background

indicates current face velocity has drifted outside of the allowable limits of the desired setpoint and are in the caution range. A red background indicates that the current face velocity has reached a critical condition and is outside of the allowable limits of the desired setpoint.



Fig 3. Standby Mode screen

The HMS-1655 LITE incorporates a full-color touchscreen and features an easy-to-use menu system that allows the user to quickly setup the monitor for immediate use. Also integrated into the HMS-1655 LITE display are several hotspots that provide quick access to various settings. See page 12 for details on using these hotspots as display settings shortcuts. Touching the screen anywhere other than one of the reserved hotspots invokes the menu system, unless one or more security passwords have been entered. These hotspots are disabled whenever the specific display option is turned off.

Configuring the HMS-1655 LITE

Configuring the HMS-1655 LITE is extremely easy using the intuitive menus and touchscreen display. Within minutes, the HMS-1655 LITE may be configured to start displaying the real-time face velocity of the fume hood being monitored. The first step is performing a field calibration of the face velocity in the next section.

Field Calibrating the Sidewall Sensor

Selecting the **Field Calibration** option on the **Hood Setup** menu invokes the **Field Calibration** popup screen as shown in Figure 4, where the sidewall-mounted velocity sensor may be calibrated after the installation process has been completed.



Fig 4. Field Calibration screen

PROGRAMMING

HMS-1655 LITE Basic Programming

Temporarily cap the sidewall velocity sensor to inhibit air flow and wait for the reading to stabilize before continuing. Once the face velocity reads "No Flow," click the **Next** button to advance to the next step of the calibration procedure as shown in Figure 5.

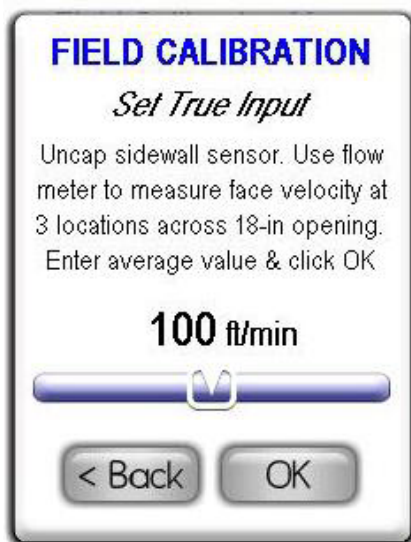


Fig 5. The average of three face velocity measurements must be entered here to complete the calibration procedure.

At this step, uncap the sidewall sensor, set the sash to a height of approximately 18 inches, and measure the face velocity at three locations across the sash opening using a calibrated flow meter.

Enter the average of the three measurements on the **Field Calibration** popup screen using the slider, and click the **OK** button to save the new calibration to non-volatile memory.

This completes the sidewall-mounted velocity sensor field calibration procedure. If the HMS-1655 LITE fume hood monitor includes a Triatek sash position sensor, it must be calibrated following installation. The next section discusses the procedure for performing a field calibration of the sash position sensor.

Field Calibrating the Sash Position Sensor

Selecting the **Field Calibration** option on the **Sash Setup** menu invokes the popup calibration screen as shown in Figure 6, where the sash position sensor may be calibrated once it has been installed at the fume hood.

Note: Sash sensor must be calibrated for the engineering units selected.

To begin the calibration procedure, set the sash to its minimum opening and measure the height. If the sash opening is completely closed, enter zero. If the sash opening is partially open, measure and enter the height at the calibration screen using the slider and click the **Next** button to advance to the next step of the sash calibration procedure (Figure 7).

Move the sash to its maximum opening, measure the height, and enter it using the slider on the **Field Calibration** popup screen. Click the **OK** button to save the new calibration to non-volatile memory. This completes the field calibration procedure for the sash position sensor.



Fig 6. If sash position sensor is connected, it must be recalibrated following installation.

Sash Heights Settings

Selecting the **Sash Heights** option in the **Sash Setup** menu invokes a popup screen prompting the user to enter a sash height position using the keypad. Enter the sash high height value and touch the **Next** button to advance to the **Sash High Delay** popup screen.

At this screen, a delay time is entered to delay the activation of the audible alarm when the sash has exceeded its high position set in the previous screen. Enter time in seconds and touch the **Next** button, which will bring up the **Sash Low Mute Level** popup screen, and the user will be prompted to enter a sash minimum height value and touch **Finish** to save all settings to the non-volatile memory.

HMS-1655 LITE Basic Programming



Fig 7. Set sash to maximum position and enter the height to complete the calibration procedure.

Setting Up Alarm Limits

To determine the various setpoints at which the unit status changes from normal to warning, and from warning to alarm, the alarm limits must be configured accordingly.

Alarm limits are only in effect while the unit is in either occupied or unoccupied operating mode, as the alarms are disabled while standby mode is active.

In order to specify the alarm limits for occupied or unoccupied operating mode, set the operating mode accordingly by selecting the **Hood Setup** option from the **Unit Setup** menu, and then select the **Operating Mode** option from the **Hood Setup** menu. Select the desired operating mode from the resulting configuration popup window.

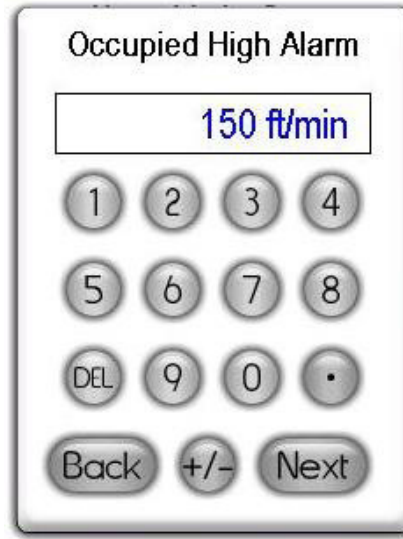


Fig 8. Enter high alarm setpoint for occupied mode using popup keyboard.

To begin specifying the alarm and warning setpoints, select the **Alarm Limits** option from the **Unit Setup** menu. The user is prompted to sequentially enter the high alarm and warning limits, followed by the low warning and alarm limits, in that order.

For example, if occupied operating mode was selected, then the configuration popup shown in Figure 8 will be displayed, prompting the user to enter the **Occupied Mode High Alarm Setpoint** using the keypad. These limits should be specified to identify the face velocity range which is considered normal, as well as the range which indicates a warning condition, and the range which is considered critical and indicates an alarm condition.

Configuring Alarm Buzzer

The HMS-1655 LITE alarm provides options for both visual and audible alerts. The **Audible Alert** option on the **Unit Setup** menu allows the alarm buzzer settings to be easily configured. Selecting this option invokes the configuration screen shown in Figure 9.



Fig 9. Alarm buzzer may be configured for audible or silent mode.

The alarm buzzer may be selected for one of two modes of operation: **Audible** or **Silent Mode**. If audible mode is selected, a delay may be specified in seconds or minutes. If **Silent Mode** is selected, then the alarm buzzer will not sound whenever the unit encounters an alarm condition.

If **Audible Mode** is selected, users may specify an **Alarm Quiet Period**. This feature allows the audible alerts to be suppressed between the specified hours every day, thereby eliminating the potential for nuisance audible alarms.

PROGRAMMING

HMS-1655 LITE Basic Programming

Selecting Displayed Units

The HMS-1655 LITE displays face velocity readings in one of two units: ft/min or m/sec. The **Engineering Units** option on the **Unit Setup** menu allows the displayed units to be selected by the user. Selecting this option invokes the **Select Engineering Units** selection screen. If the engineering units selection is changed, the corresponding alarm setpoints are automatically converted to the newly selected units.

Configuring Display Options

The **Display Setup** menu provides support for configuring all of the display settings on the HMS-1655 LITE. Options are available for configuring the main display, setting the system time and date, adjusting the display brightness, and adjusting the Safety Halo™ edge lighting.

The **Display Options** menu allows the main display to be configured as required by the specific application. If desired, the user may individually enable or disable the fume hood status display and the time/date at the bottom of the screen.

The Safety Halo™ option on the **Display Setup** menu allows users to disable or enable this feature as well as adjust the brightness level of the halo.

The **Nightly Auto-Dim** feature can be set to dim the Safety Halo™ brightness to a user-set level at specified hours every day.

The **Set Time & Date** option on the **Display Setup** menu allows users to specify the current time and date that may be displayed at the bottom of the main display. The HMS-1655 LITE will maintain the time and date as long as the unit is not powered down.

The **Set Brightness Option** on the **Display Setup** menu allows the intensity of the display backlighting to be adjusted from very dim to very bright.

The **Brightness** settings are saved in nonvolatile memory and remain in effect through a power cycle.

Adding Password Security

Access to the HMS-1655 LITE menu system can be protected from unauthorized tampering through the use of multi-level security passwords. Up to ten individual passwords may be entered in the system, each with a specific access level.

A password entry may be created by selecting the **Passwords Setup** option from the **System Setup** menu, and then selecting the **Add Password** option. The user is prompted to enter a minimum of four and up to eight numeric digits.

Once a password has been specified, the user is prompted to specify one of four access levels: **Unrestricted**, **Standard**, **Basic**, and **Restricted**.

All password entries are saved to non-volatile memory, and remain in effect through a power failure. In the event that a password has been forgotten, there is a factory-default “back door” password that will provide unrestricted access to the user menu system. Please consult with the factory for more information regarding this password.

Note: An unrestricted password must be created first before any restricted passwords can be set.

Remotely Monitoring Face Velocity Reading

The HMS-1655 LITE provides a factory-calibrated analog output signal that linearly represents the face velocity displayed at the touchscreen. This output may be connected to an available analog input on a controller that is connected to the BMS, thereby allowing the HMS-1655 LITE's face velocity to be monitored from the BMS front-end.

There are two factory-calibrated analog output signals available at the terminal strip on the remote sensor module: Vo and Io. The voltage output signal spans from 0 to 5 Vdc and linearly represents the face velocity range from 0 fpm to 200 fpm. The current output spans from 4 to 20 mA and linearly represents the same face velocity range.

CLEANING THE DISPLAY

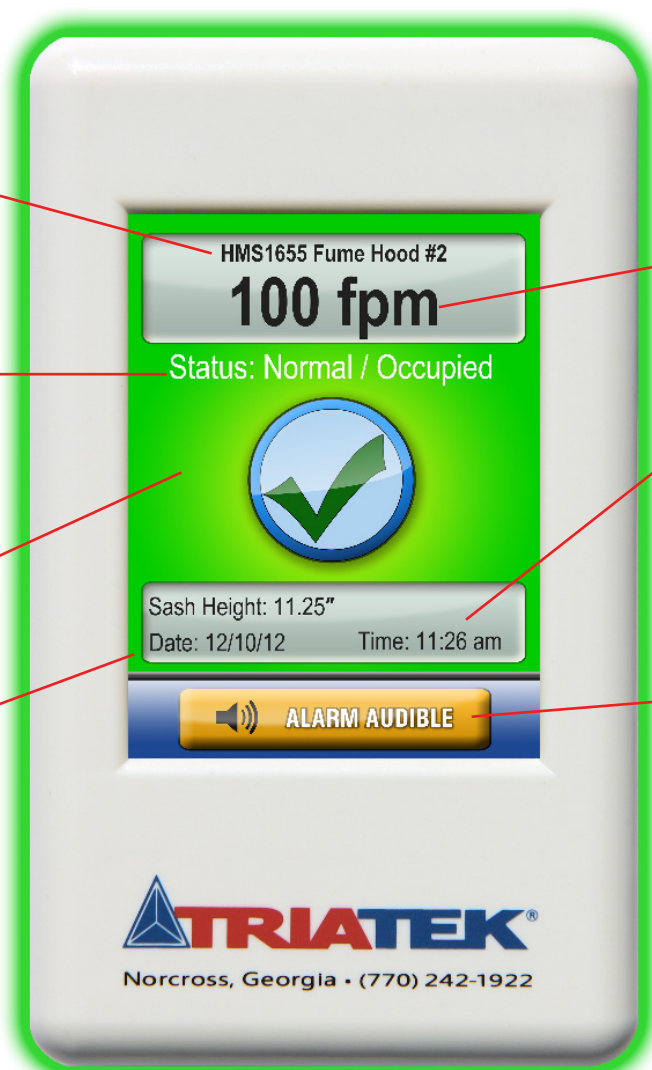
- Use a dry or lightly dampened cloth with a mild cleaner or ethanol. Be sure the cloth is only lightly dampened, not wet.
- Never apply cleaner directly to touch panel surface. If cleaner is spilled onto touch panel, soak it up immediately.
- Cleaner must be neither acid nor alkali (neutral pH).
- Never use acidic or alkaline cleaners, or organic chemicals such as: paint thinner, acetone, toluene, xylene, propyl or isopropyl alcohol, or kerosene.

Touching the current hood name text brings up an alphanumeric keyboard to quickly change the name of the monitored fume hood.

Touching "Status" brings up a screen to quickly set the mode of operation.

Touching anywhere else on the screen brings up the Main Setup Menu if no password is stored. Otherwise, a password must be entered before the Main Setup Menu can be accessed.

Touching "Date" brings up the Date Entry popup to quickly change the current displayed date.



Touching the engineering units selection brings up a popup to quickly change velocity measurement units.

Touching "Time" brings up Time Entry popup to quickly change the current displayed time.

Touch "ALARM AUDIBLE" to set the mode of audible alarm. It automatically reverts back to audible mode when alarm condition is removed.

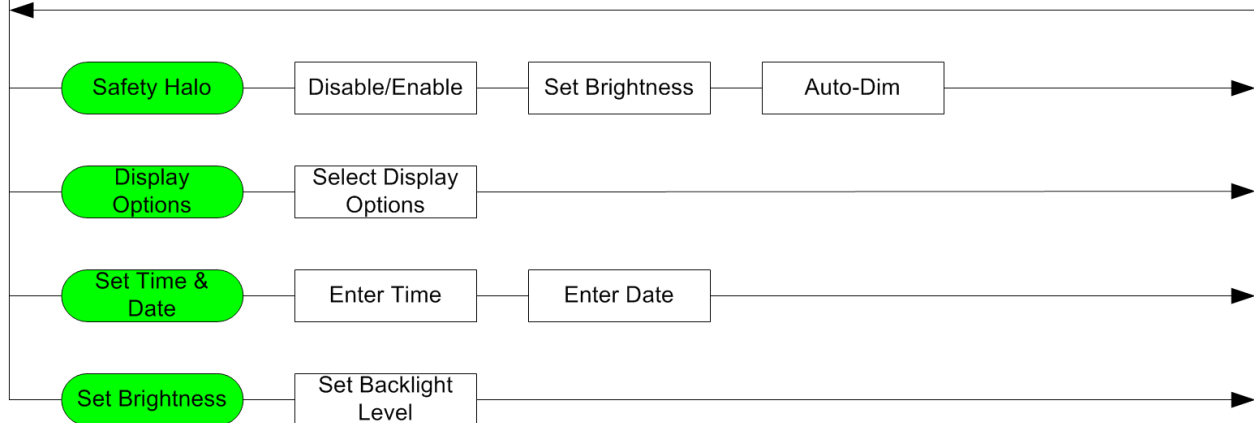
**Hot-Spot Features of HMS-1655 LITE
Touchscreen Display**

Unit Setup

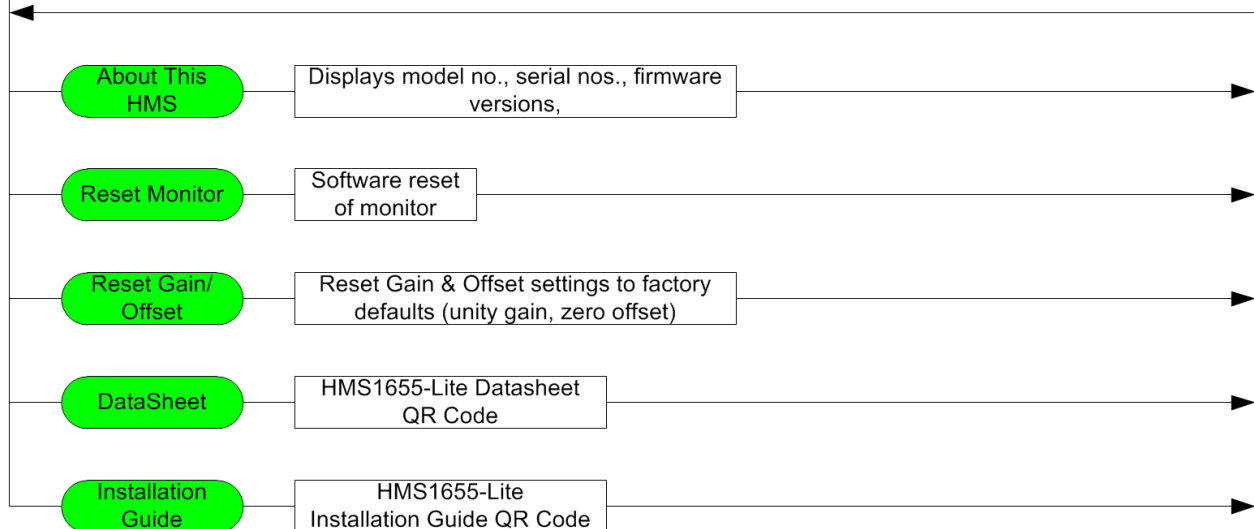


SETUP MENU TREE

Display Setup



Diagnostics



Headquartered in Norcross, Georgia, Triatek has been on the forefront of designing and manufacturing innovative airflow solutions for critical environments since 1985. Triatek provides complete end-to-end solutions for healthcare facilities and laboratories including Venturi valves, room pressure controllers, fume hood controllers, monitors, sensors, actuators, and more all designed to seamlessly integrate into a facility's building automation system.



Triatek's customer service is unparalleled. Our product support system includes on-site installatinos, phone support, repairs, calibrations, and in-depth training sessions.

From our knowledgable engineers and sales team to our talented field technicians, Triatek goes above and beyond to ensure our products are installed correctly and our customers' critical environments are working properly.

Laboratories



Classrooms



Vivariums



Hospitals

