HMS-1655L
Installation Manual
Version: 03.15.17

Triatek HMS-1655L

CONTROLLER SETTINGS

HMS-1655L Fume Hood Controller Settings

This form should be completed during the initial configuration for each fume hood controller.

Fume Hood Name / Number _____

Unit Model Number and Serial Number (ESN) _____

Sidewall Sensor Input

- Normal Operating Face Velocity _____
- Sensor Linearization (enabled or disabled) _____
- Sensor Input Mode (normal or inverted) _____
- Sensor Input Range (zero-based or offset) _____
- Occupied Mode Setpoint _____
- Unoccupied Mode Setpoint _____

Analog Output

- Operating Mode (Direct or PID) _____
- Analog Output Range (zero-based or offset) _____
- Analog Output Upper Limit (0 – 100%) _____
- Analog Output Lower Limit (0 – 100%) _____
- Analog Output Input Channel (AI-1 thru AI-4) _____
- Analog Output Action (Direct or Reverse) _____
- Analog Output Range (zero-based or offset) _____

PID Constants

- Proportional Constant (0.5 – 100.0 %) _____
- Integral Constant (0.0 – 100.0 %) _____
- Derivative Constant (0.0 – 100.0 %) _____

Alarm Limits

- Occupied Mode High Alarm Setpoint _____
- Occupied Mode High Warning Setpoint _____
- Occupied Mode Low Warning Setpoint _____
- Occupied Mode Low Alarm Setpoint _____
- Unoccupied Mode High Alarm Setpoint _____

HMS-1655L Fume Hood Controller Settings

Unoccupied Mode High Warning Setpoint _____

Unoccupied Mode Low Warning Setpoint _____

Unoccupied Mode Low Alarm Setpoint _____

Audible Alert

Enabled Input Channels (AI-1 thru AI-4) _____

Operating Mode (audible or silent) _____

Delay Time Base (secs or mins) _____

Delay Setting (0 – 60) _____

Engineering Units

Feet per Minute or Meters per Second _____

WARNING

Warning

Failure to follow the wiring diagrams could result in damage to your equipment and could void your warranty. Wiring diagrams can also be found at www.triatek.com.

Under no circumstances should a single transformer be split between actuator and controller. Doing so will damage the actuator, the transformer, the controller, or all units. A single 120/24V/30Va transformer is required for the controller and a separate 120/24V/20Va transformer is required for the actuator.

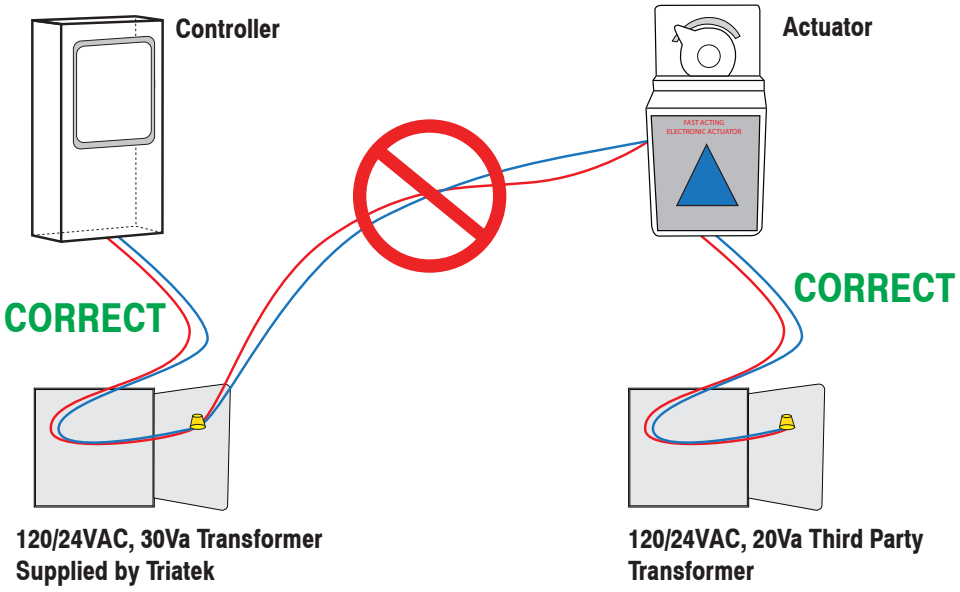


TABLE OF CONTENTS

SPECIFICATIONS

Specifications

Electrical

4 Analog Inputs.....4-20mAdc, 0-5Vdc or 0-10Vdc
4 Analog Outputs.....0-5VDC or 0-10VDC
4 Digital Inputs.....Active Low or Active High 0-30VDC Max
4 Relay Outputs .....1A@24VDC, 1A@24VAC
Control Signal Wire Size .....22-18 AWG
Input Impedance.....0-5VDC = 100K, 0-10VDC = 16K, 4-20 ma = 249 Ω
Output Impedance.....75 Ω
Power Supply..... Class 2, 24Vac ±10%, 30VA universal 120/240 to 24 Vac, 60/50 Hz, step-down isolation transformer provided

Communications

LonWorks® FTT-10A.....Two-Wire Twisted Pair
Recommended Cable Type.....
- Level IV, 22AWG Unshielded Plenum UL Type CMP (Windy City 105540; Connet Air W22IP-2001; Metro Wire MWC-1000)
- Level IV, 22AWG Shielded Plenum UL Type CMP (Windy City 106500; Connet Air W22IP-2002; Metro Wire MWC-1002)

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
Recommended Cable Type (interface between display and LonWorks® Works® controller) .....Belden 1325A

Mechanical

HMS-1655L Display Housing.....3" W x 5"H x 1.3"D
HMS-1655L Controller Housing.....4.6"W x 6.6"H x 1.9"D

Environmental

Operating Temperature..... 32° to 125° F Operating
Operating Humidity.....10% - 95% RH, Non-condensing

HMS-1655L Air Flow Sensor

Type of Sensor .....Through-the-hood ultra sensitive
Face Velocity Accuracy.....0-200 FPM ± 2 FPM*
Dimensions.....2.5"H x 4.0"W x 2.0"D

**NIST Traceable / Individual certification available as option*
At 72°F ± 5°F
Accuracy is ± 5FPM when velocity drops below 60FPM or exceeds 140 FPM

Specifications

Venturi Valve (Order Separately)

Diameter.....8", 10", 12", 14" O.D.
CFM Range.....35-2100
Materials.....Aluminum, Stainless Steel, Heresite Coating
Insulation.....Optional
Actuation.....Electronic or Pneumatic

Part Number Guide

HMS1655L - ☐ - ☐

Sensor Type
1 = single smart sidewall sensor
2 = dual smart sidewall sensor

Options for Sash Sensor
blank = sash sensor not included
S = sash position sensor included

INSTALLATION

Pre-Installation and Installation

Pre-Installation

The HMS-1655L is calibrated and programmed in the factory according to the customer specifications. Depending upon the actual model number ordered, the HMS-1655L may be accompanied by one or two sidewall sensors for measuring face velocity. The standard sidewall sensor includes a 9-pin pluggable terminal block connector. See page 14 for physical representations of the sidewall sensor.

Note: Final calibration of face velocity is usually required after installation of the HMS-1655L.

Installation

This section will illustrate a typical method of installing the HMS-1655L to a fume hood. Tools required include: drill, 3/8 drill bit, 1/8 drill bit, Phillips #2 screwdriver, standard medium blade screwdriver, and silicone sealant.

1. Proper location of the sensor is very important for the best operation of the HMS-1655L. The system uses through-the-wall sensing to measure the internal negative pressure of the fume hood to accurately determine the face velocity. The sensor must be located in a position that is least affected by turbulent air within the hood. See illustration on page 13. There are two types of fume hood arrangements which need to be considered; By-Pass and Non-By-Pass.

    a. Front-to-Back Position – With either type the sensor is best located approximately six inches back from the vertical sash track.
    b. Vertical Position (By-Pass type) – 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.
    c. Vertical Position (Non-By-Pass type) – Locate the sensor vertically six inches above the bottom of the sash in it's fully open position.

2. See page 13 for dimensions and suggested mounting arrangements of the Triatek flow sensor on the hood wall.

3. Apply silicone sealant around the sensor immediately prior to mounting the assembly to its mounting surface. Be sure to the leave red cap on, being careful to avoid getting sealant in the sensor port.

    NOTE: Be certain that sensor reference port is in laboratory room. If necessary to obtain this, use Triatek HMS-1655L-PLATE mounted on exterior panel of the fume hood.

4. See page 10 for mounting details for the HMS-1655L 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 control unit, and provisions must be made to route the cable without interference with the hood sash or sash cable. The control unit is typically placed in a convenient location on top of the fume hood.

    NOTE: Remove red cap from sensor after installation.

5. Connect the cable between the display and control unit before applying power to the control unit. Power supply connections - input voltage must be Class 2, 24 VAC or 24 VDC. An isolation stepdown transformer is supplied with the HMS-1655L. Triatek recommends that the HMS unit be powered using the supplied transformer, and that only one unit be powered with each transformer. Do not power any other device with the same transformer.

6. For standard sidewall sensor modules with the 9-pin terminal block, connect the 3-conductor signal cable as follows:

    Sensor | Controller
    Red: +Vin ► +V
    Black: GND ► GND
    Green: V_O ► AI-1

7. All wiring should conform to the local regulations and the National Electrical Code. Take care not to run sensor wiring in the same conduit as line voltage or other conductors that supply highly inductive loads such as generators, motors, solenoids or contactors, etc. Use 22 AWG or larger.

8. After installation is complete, apply power to the unit, open the sash to a normal operating position and observe the flow reading on the HMS unit.

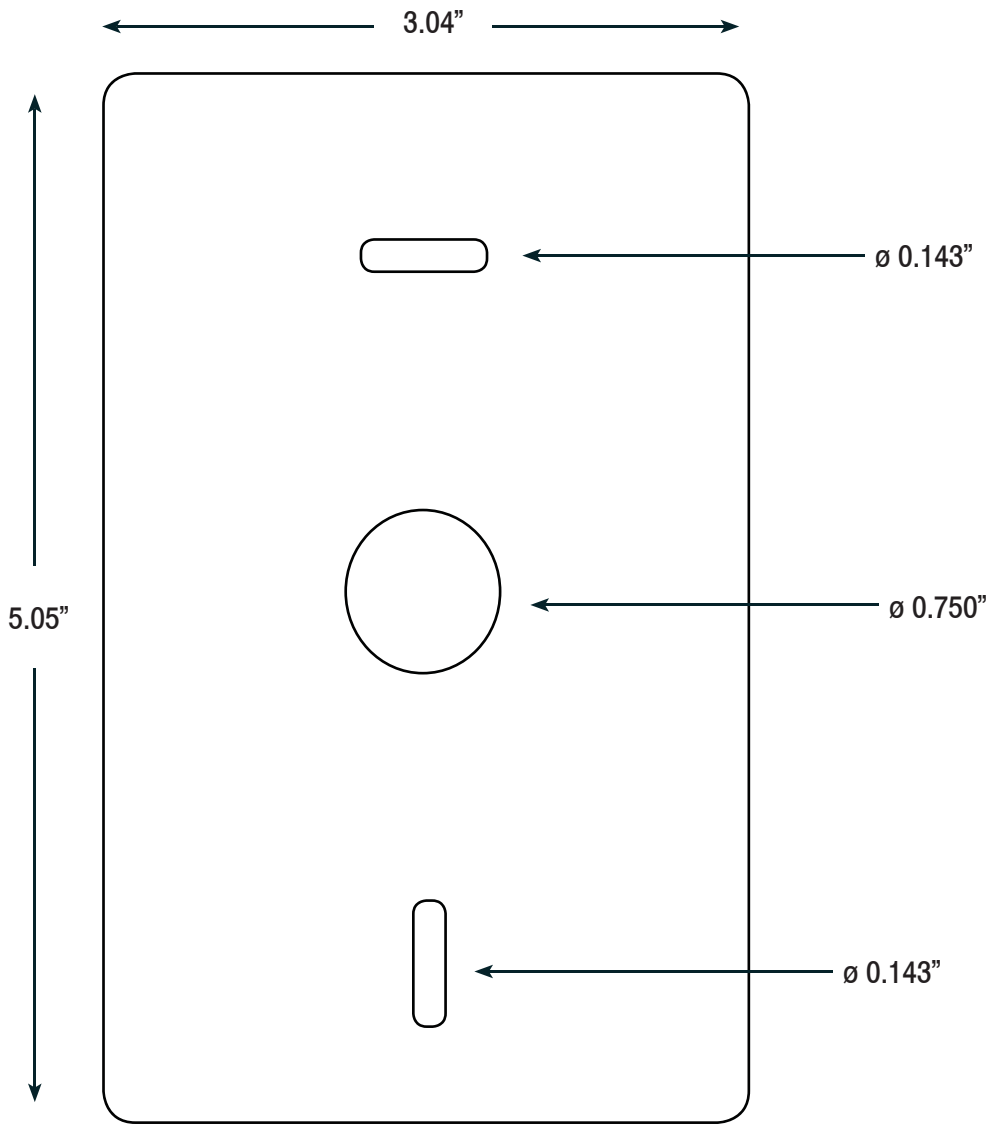
Installation

Caution:

Do not connect or disconnect the control cable from the display unit or the control unit while the unit is powered up. Doing so is likely to cause damage to either or both units, requiring repair.

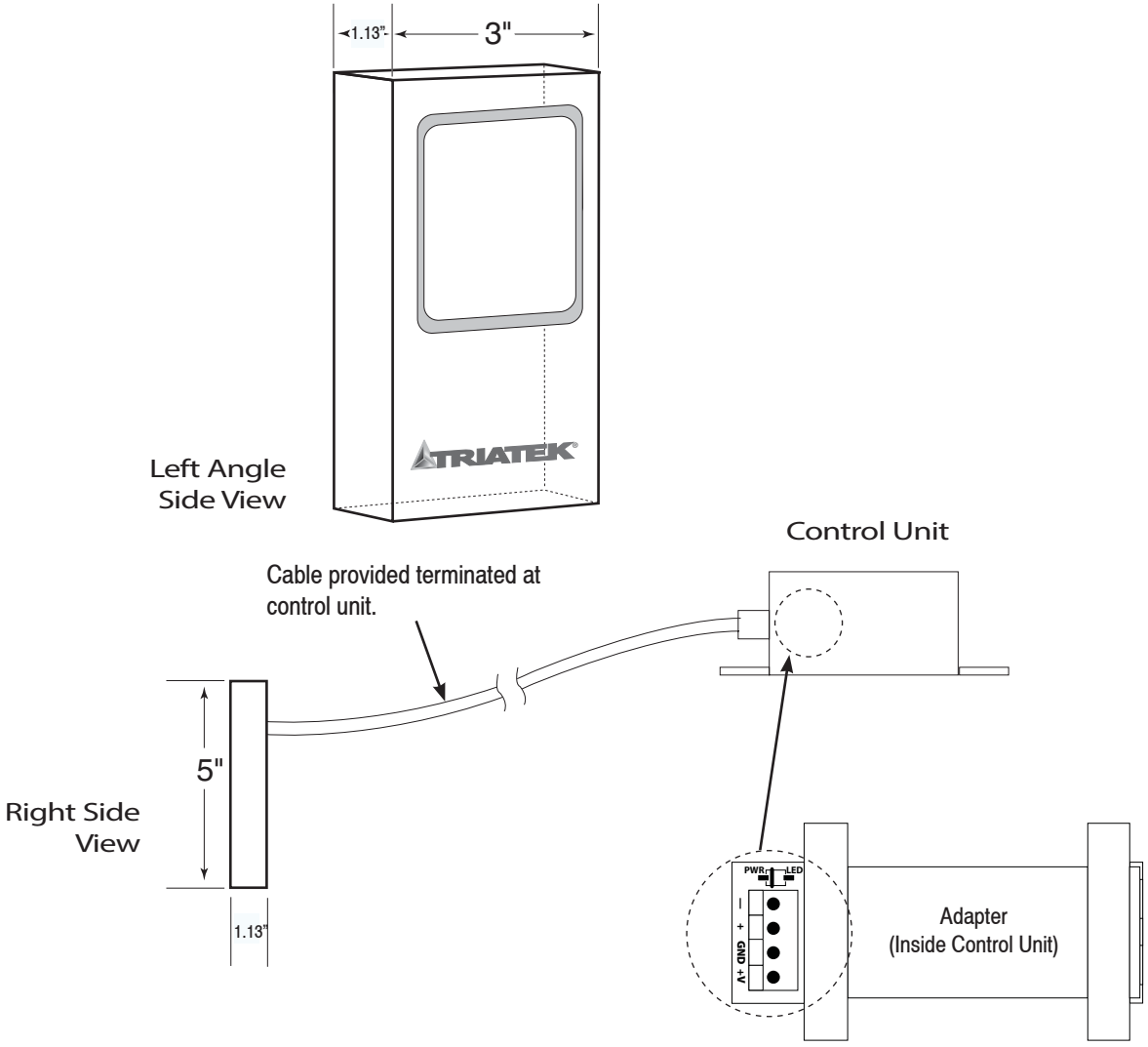
MOUNTING/WIRING

HMS-1655L Mounting Hole Pattern



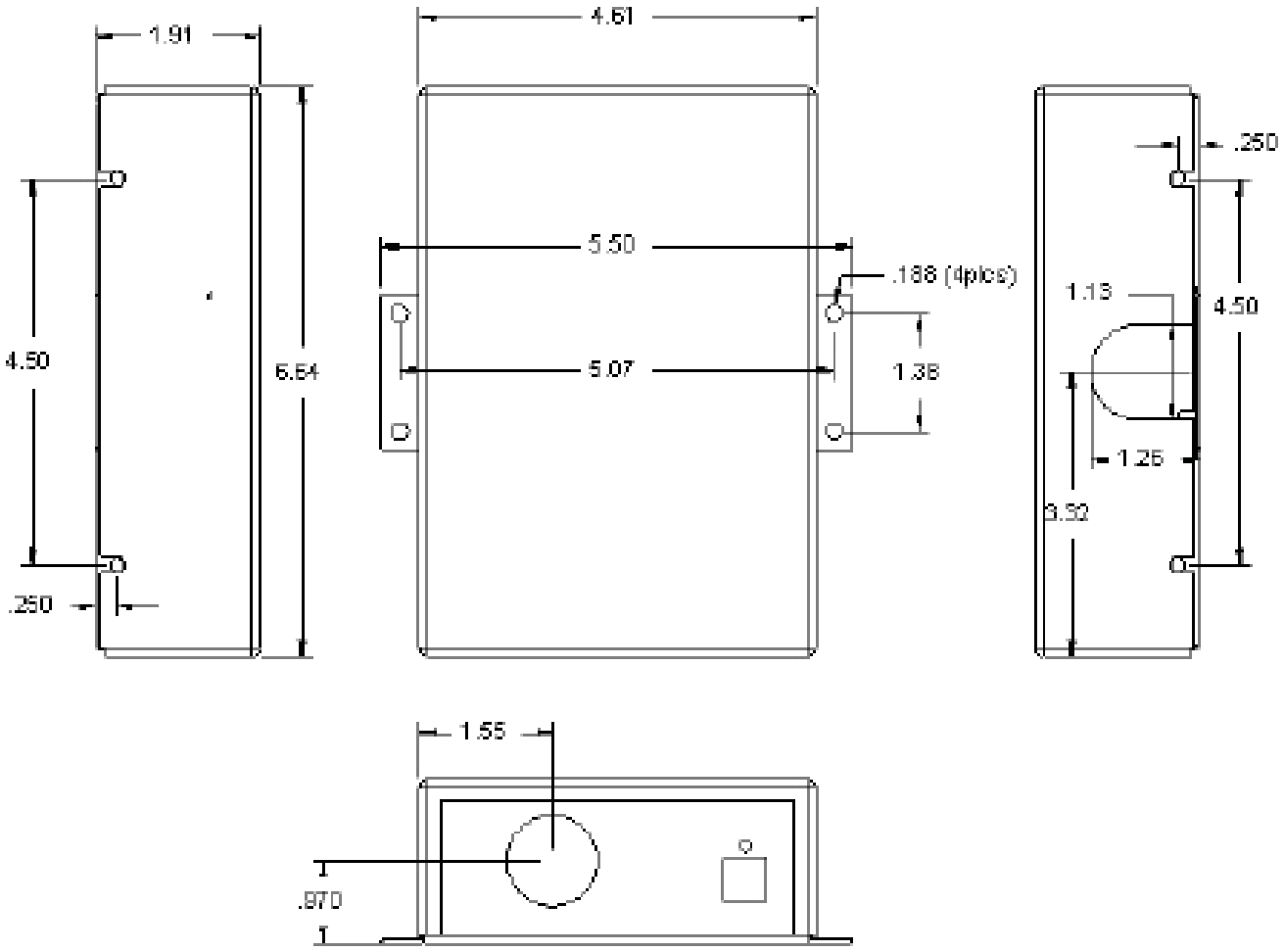
The HMS-1655L display backplate may be mounted directly to a standard single-gang wall box using the two slots along the centerline. Use the backplate as a template to mark the mounting holes and the cable access hole at the center of the backplate.

HMS-1655L Case Dimensions

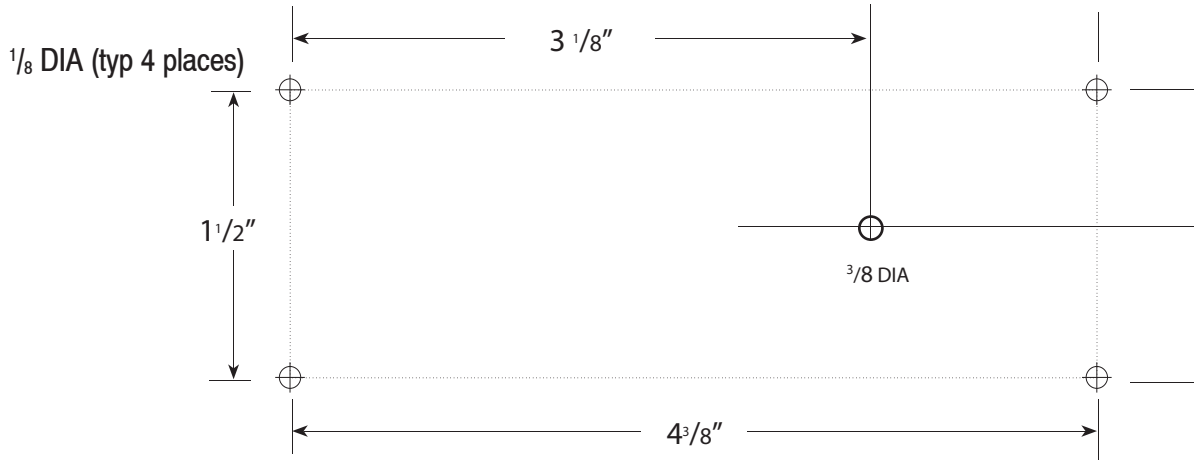


MOUNTING/WIRING

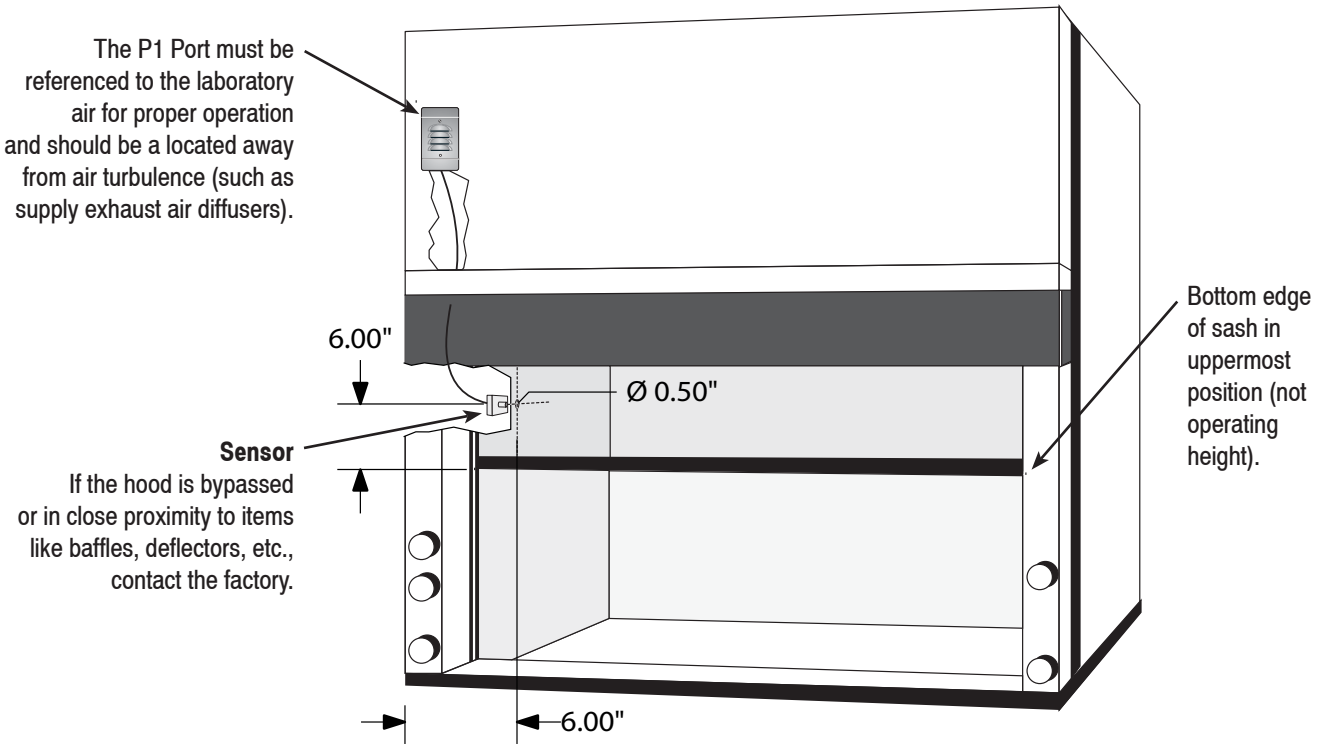
Controller Mounting Hole Pattern



Sensor Mounting Hole Pattern



Sensor Placement - Non By-Pass Type



MOUNTING/WIRING

HMS-1655L Standard Sidewall Sensor (9-pin)

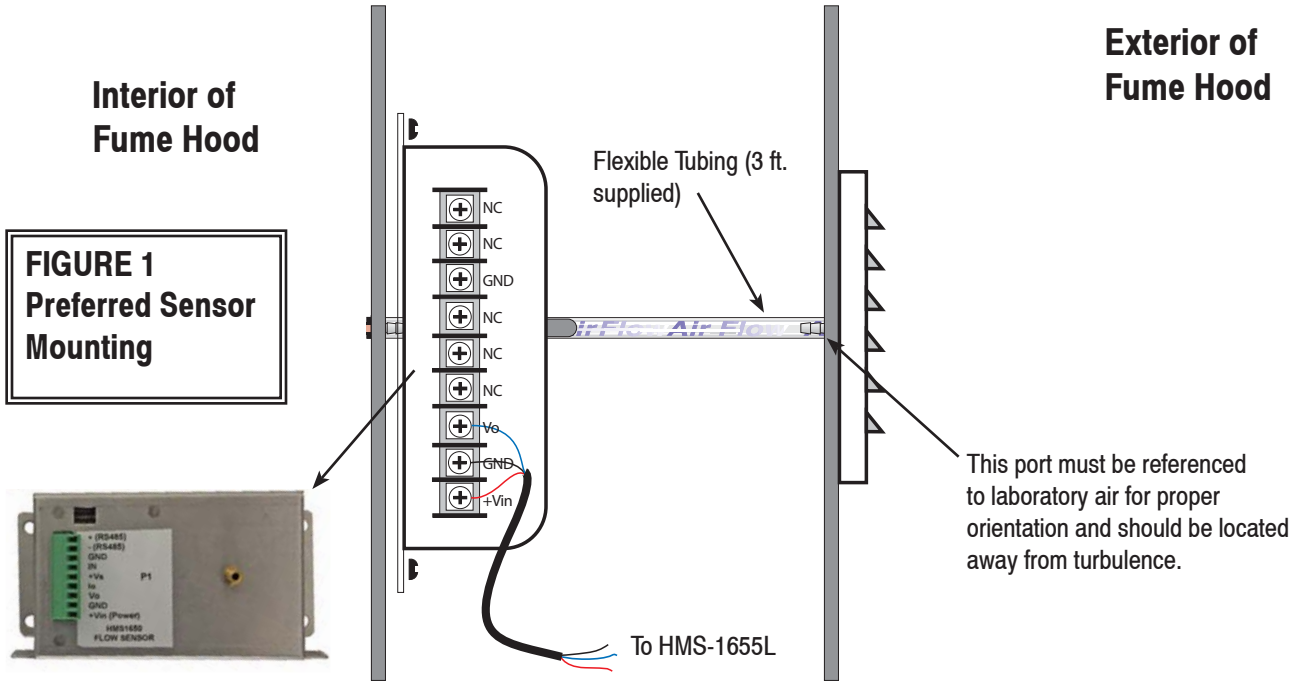


FIGURE 1
Preferred Sensor Mounting

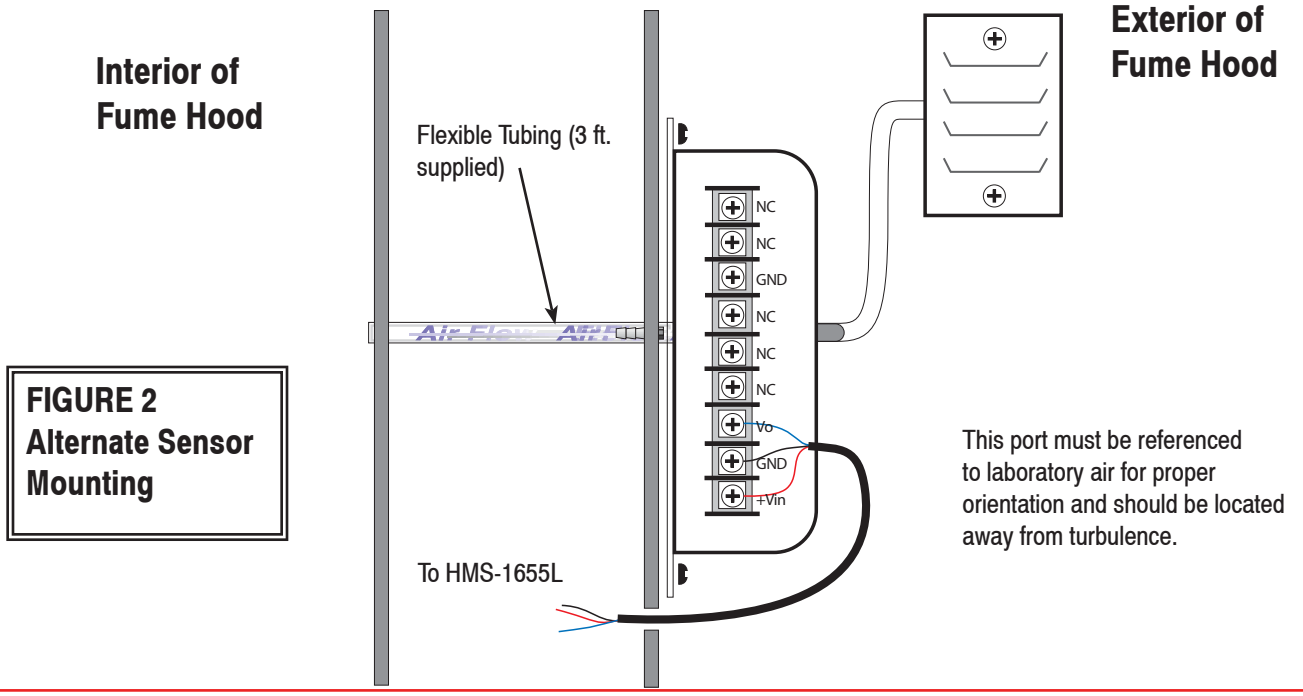
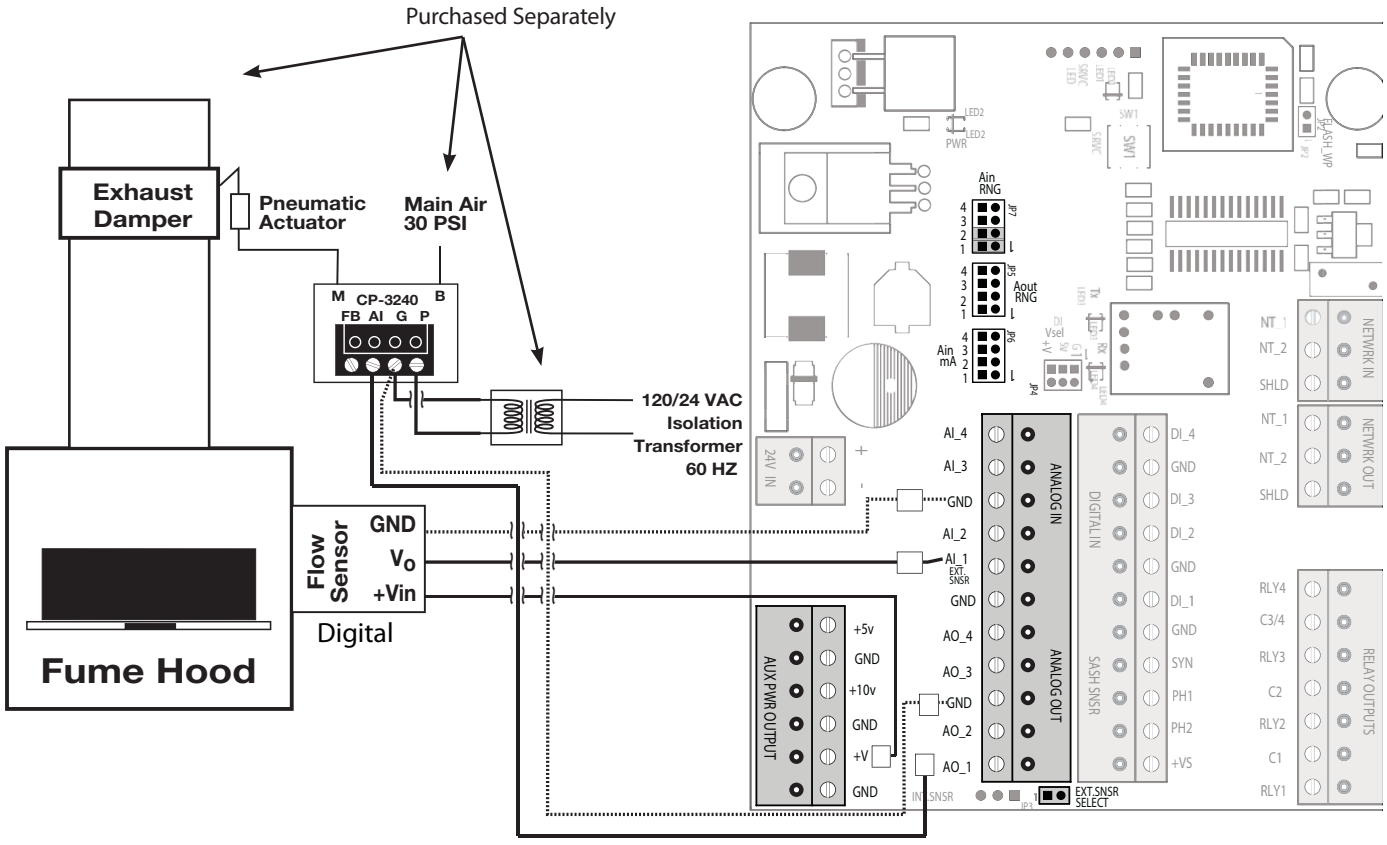


FIGURE 2
Alternate Sensor Mounting

Analog Output to Pneumatic Actuator



Wiring Guide Legend

Symbol	Description
NC	No Connection to Field Wiring
	Field Wiring w/space for Number
	Internal Wiring
	Screw Terminal
	Air Flow To and From Unit Between Room and Corridor

Jumper Setting

Analog Input	0-5v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Analog Input	4-20mA (JP6)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Note: 4-20mA can only be used if the corresponding JP7 Analog Input Jumper is set to OFF.

Analog Input	0-10v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

4 3 2 1 = JUMPER ON
= JUMPER OFF

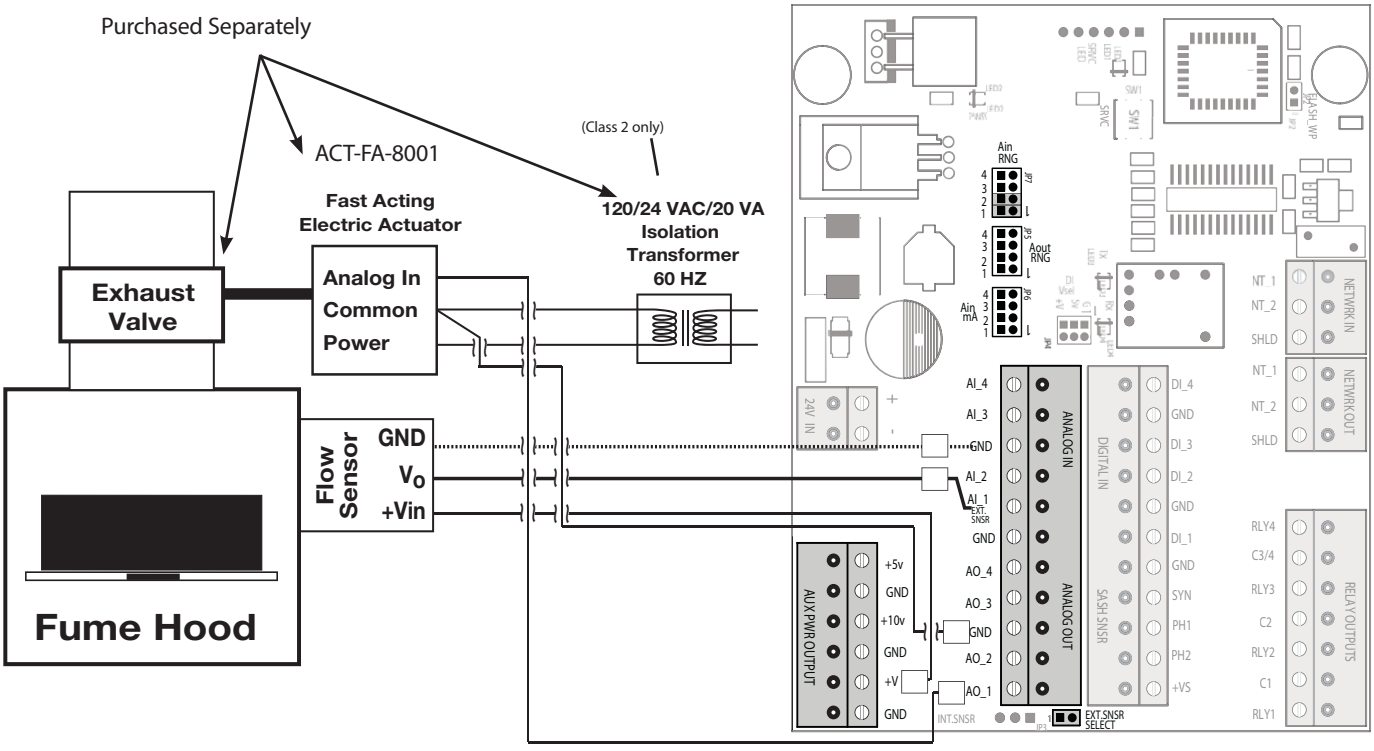
Analog Output	0-5v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Analog Output	0-10v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Note: Each Analog Input or Output value can be set independent of one another.
Example:
AI 1 can be set to 0-5v jumper OFF (JP7 PIN 1)
AI 2 can be set to 0-10v jumper ON (JP7 PIN 2)
AI 3 can be set to 4-20mA jumper ON (JP6 PIN 3) and jumper OFF (JP7 PIN 3)
AO 1 can be set to 0-10v jumper ON (JP5 PIN 1)
AO 2 0-5v can be set to 0-5v jumper OFF (JP5 PIN 2)

MOUNTING/WIRING

Analog Output to Electronic Actuator



Wiring Guide Legend

Symbol	Description
NC	No Connection to Field Wiring
	Field Wiring w/space for Number
	Internal Wiring
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	Air Flow To and From Unit Between Room and Corridor

Jumper Setting

Analog Input	0-5v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Analog Input	4-20mA (JP6)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Note: 4-20mA can only be used if the corresponding JP7 Analog Input Jumper is set to OFF.

Analog Input	0-10v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

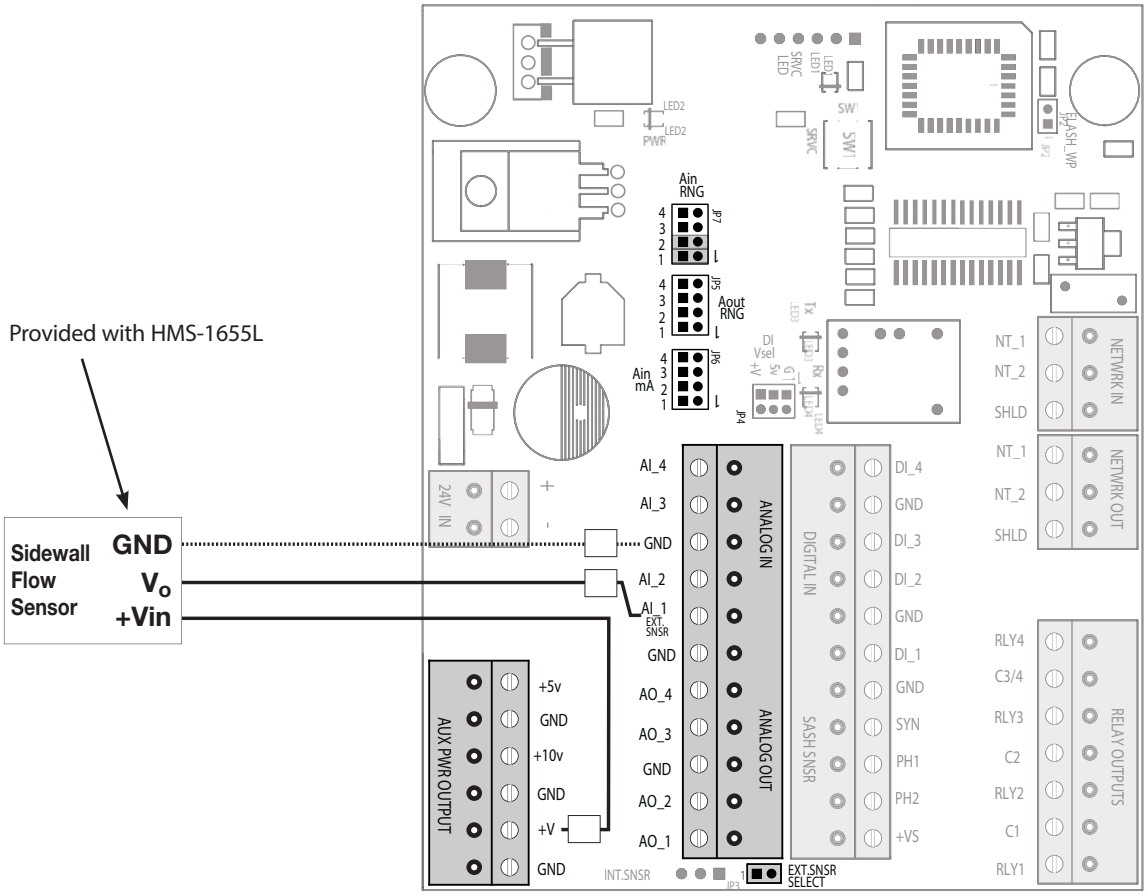
4 3 2 1 = JUMPER ON
= JUMPER OFF

Analog Output	0-5v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Analog Output	0-10v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Note: Each Analog Input or Output value can be set independent of one another.
Example:
AI 1 can be set to 0-5v jumper OFF (JP7 PIN 1)
AI 2 can be set to 0-10v jumper ON (JP7 PIN 2)
AI 3 can be set to 4-20mA jumper ON (JP6 PIN 3) and jumper OFF (JP7 PIN 3)
AO 1 can be set to 0-10v jumper ON (JP5 PIN 1)
AO 2 0-5v can be set to 0-5v jumper OFF (JP5 PIN 2)

Analog Input Single Flow Sensor



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	Field Wiring w/space for Number
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Jumper Setting

Analog Input	0-5v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Analog Input	4-20mA (JP6)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Note: 4-20mA can only be used if the corresponding JP7 Analog Input Jumper is set to OFF.

Analog Output	0-5v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Analog Output	0-10v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

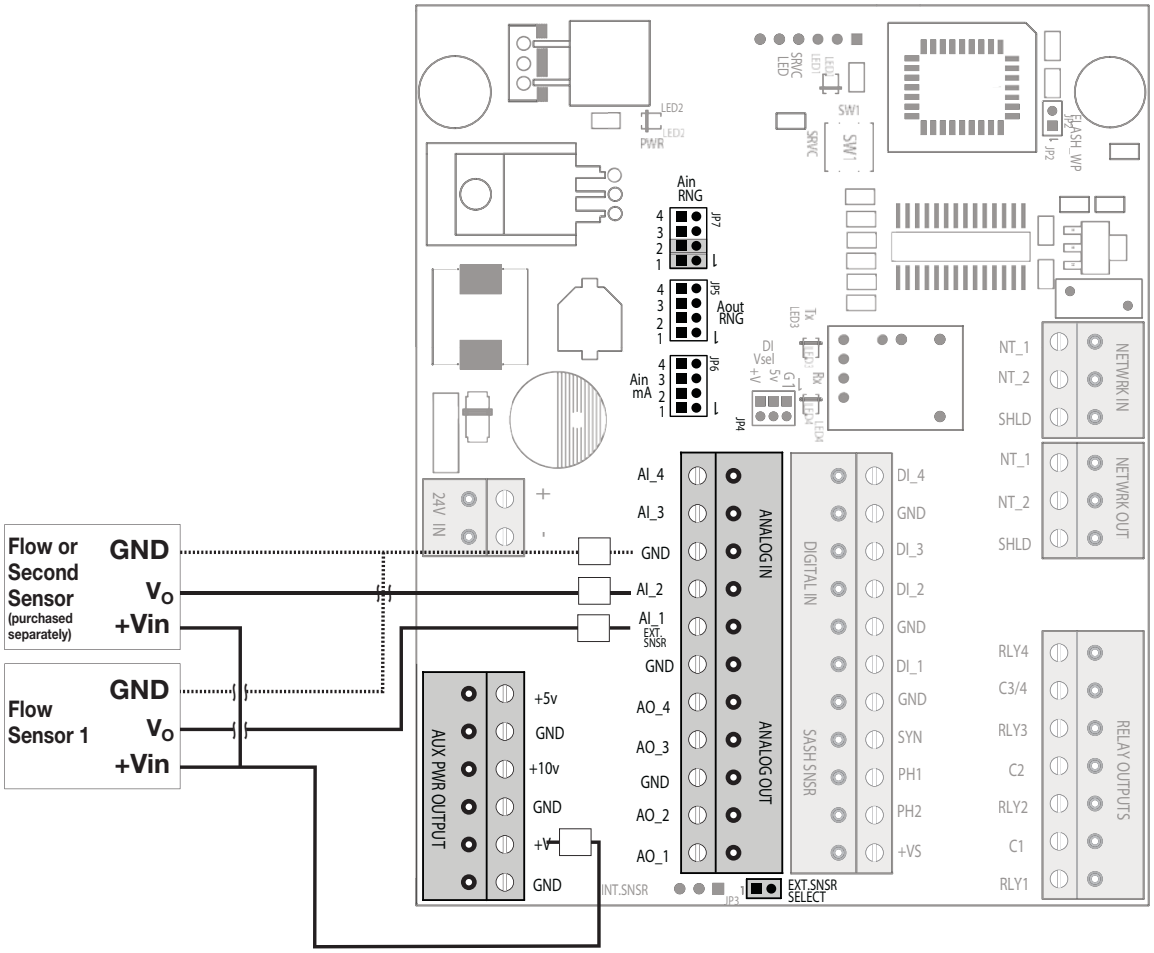
Note: Each Analog Input or Output value can be set independent of one another.
Example:
AI 1 can be set to 0-5v jumper OFF (JP7 PIN 1)
AI 2 can be set to 0-10v jumper ON (JP7 PIN 2)
AI 3 can be set to 4-20mA jumper ON (JP6 PIN 3) and jumper OFF (JP7 PIN 3)
AO 1 can be set to 0-10v jumper ON (JP5 PIN 1)
AO 2 0-5v can be set to 0-5v jumper OFF (JP5 PIN 2)

Analog Input	0-10v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

4 3 2 1 = JUMPER ON
= JUMPER OFF

MOUNTING/WIRING

Analog Input Dual Flow Sensors



Wiring Guide Legend

Symbol	Description
NC	No Connection to Field Wiring
	Field Wiring w/space for Number
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Jumper Setting

Analog Input	0-5v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Analog Input	4-20mA (JP6)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Note: 4-20mA can only be used if the corresponding JP7 Analog Input Jumper is set to OFF.

Analog Input	0-10v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

4 3 2 1 = JUMPER ON
= JUMPER OFF

Analog Output	0-5v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Analog Output	0-10v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Note: Each Analog Input or Output value can be set independent of one another.
Example:
AI 1 can be set to 0-5v jumper OFF (JP7 PIN 1)
AI 2 can be set to 0-10v jumper ON (JP7 PIN 2)
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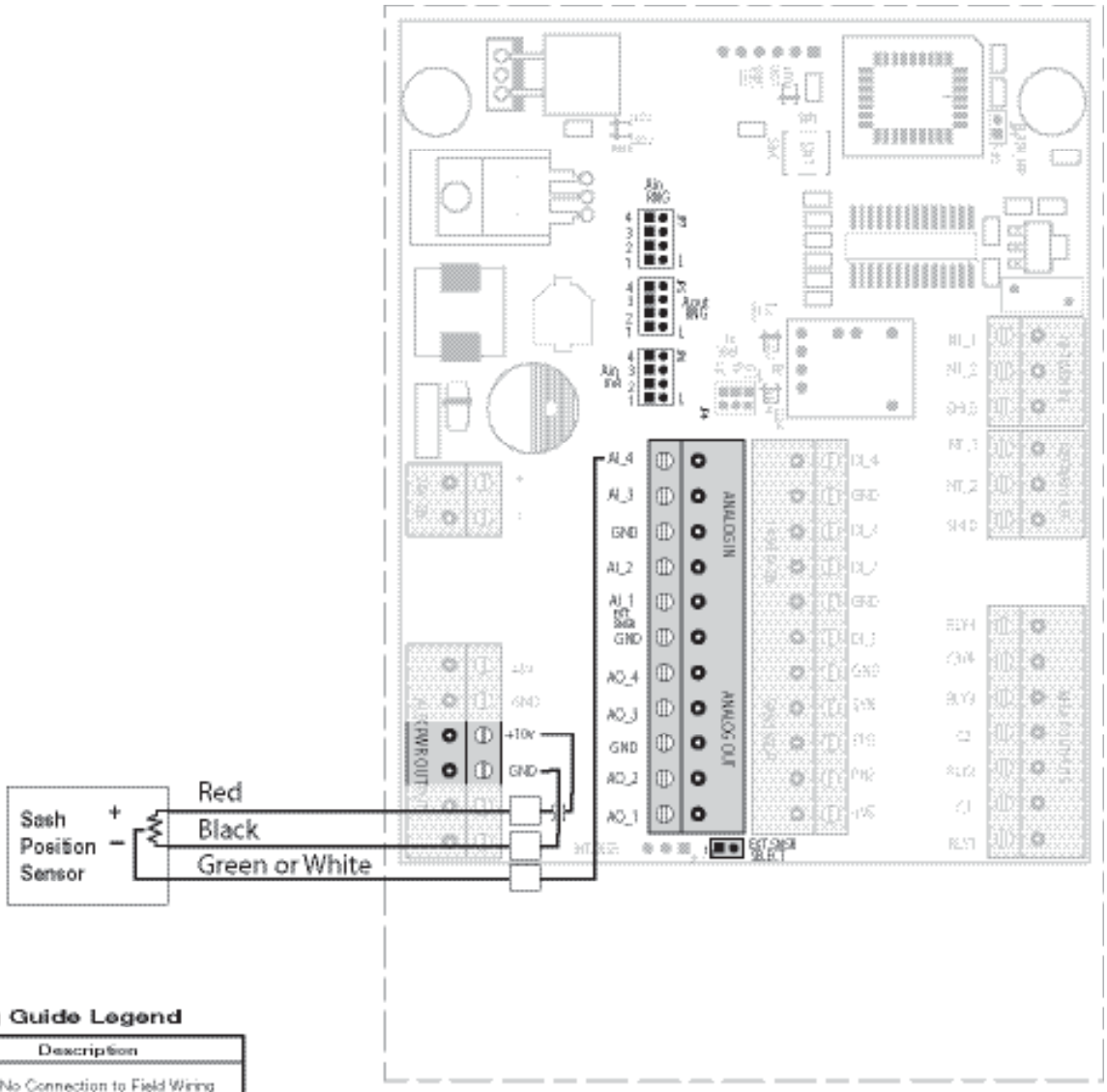
AO 1 can be set to 0-10v jumper ON (JP5 PIN 1)
AO 2 0-5v can be set to 0-5v jumper OFF (JP5 PIN 2)

Analog Input Position Sensor



Jumper Setting

Analog Input	0-5v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Analog Input	4-20mA (JP6)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Note: 4-20mA can only be used if the corresponding JP7 Analog Input Jumper is set to OFF.

Analog Input	0-10v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

4 3 2 1 = JUMPER ON
= JUMPER OFF

Analog Output	0-5v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Analog Output	0-10v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Note: Each Analog Input or Output value can be set independent of one another.
Example:
AI 1 can be set to 0-5v jumper OFF (JP7 PIN 1)
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AO 1 can be set to 0-10v jumper ON (JP5 PIN 1)
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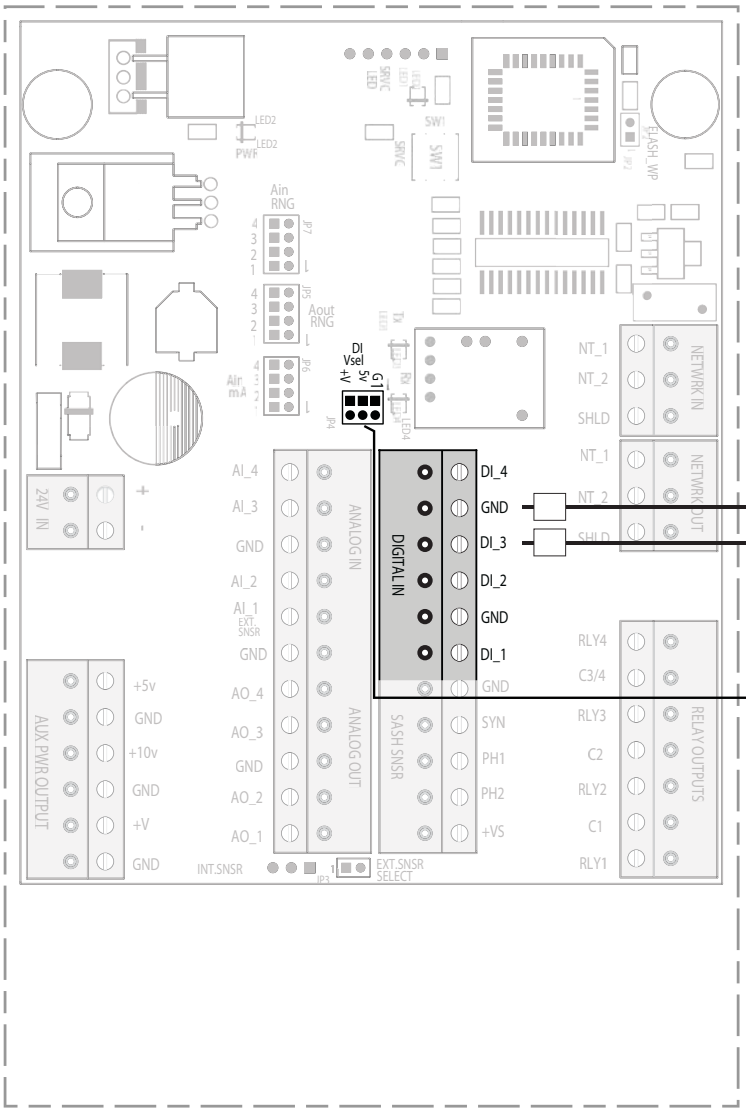
MOUNTING/WIRING

Digital Input Occupancy Sensor



JP4 is set at factory to +5 setting. User can change voltage setting to suit application requirement.

Jumper Setting

Analog Input	0-5v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Analog Input	4-20mA (JP6)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Note: 4-20mA can only be used if the corresponding JP7 Analog Input Jumper is set to OFF.

Analog Input	0-10v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

= JUMPER ON
= JUMPER OFF

Analog Output	0-5v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Analog Output	0-10v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Note: Each Analog Input or Output value can be set independent of one another.
Example:
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AO 1 can be set to 0-10v jumper ON (JP5 PIN 1)
AO 2 0-5v can be set to 0-5v jumper OFF (JP5 PIN 2)

Wiring Guide Legend

Symbol	Description
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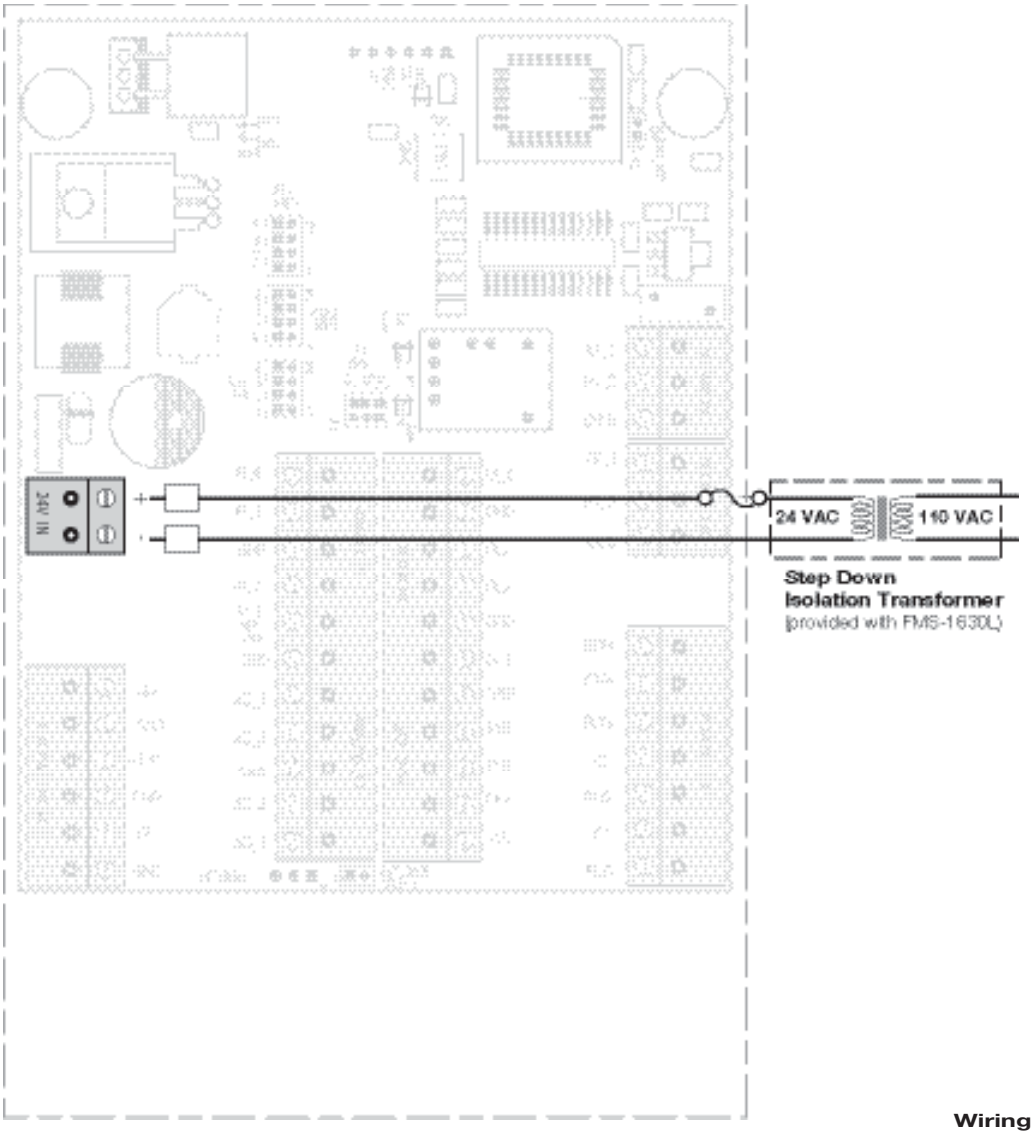
Power



Jumper Setting

Analog Input	0-5v (JP7)
AI 4	4
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AI 2	2
AI 1	1

Analog Input	4-20mA (JP6)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

Note: 4-20mA can only be used if the corresponding JP7 Analog Input Jumper is set to OFF.

Analog Input	0-10v (JP7)
AI 4	4
AI 3	3
AI 2	2
AI 1	1

4 3 2 1 = JUMPER ON
= JUMPER OFF

Analog Output	0-5v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Analog Output	0-10v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

Note: Each Analog Input or Output value can be set independent of one another.
Example:
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AO 2 0-5v can be set to 0-5v jumper OFF (JP5 PIN 2)

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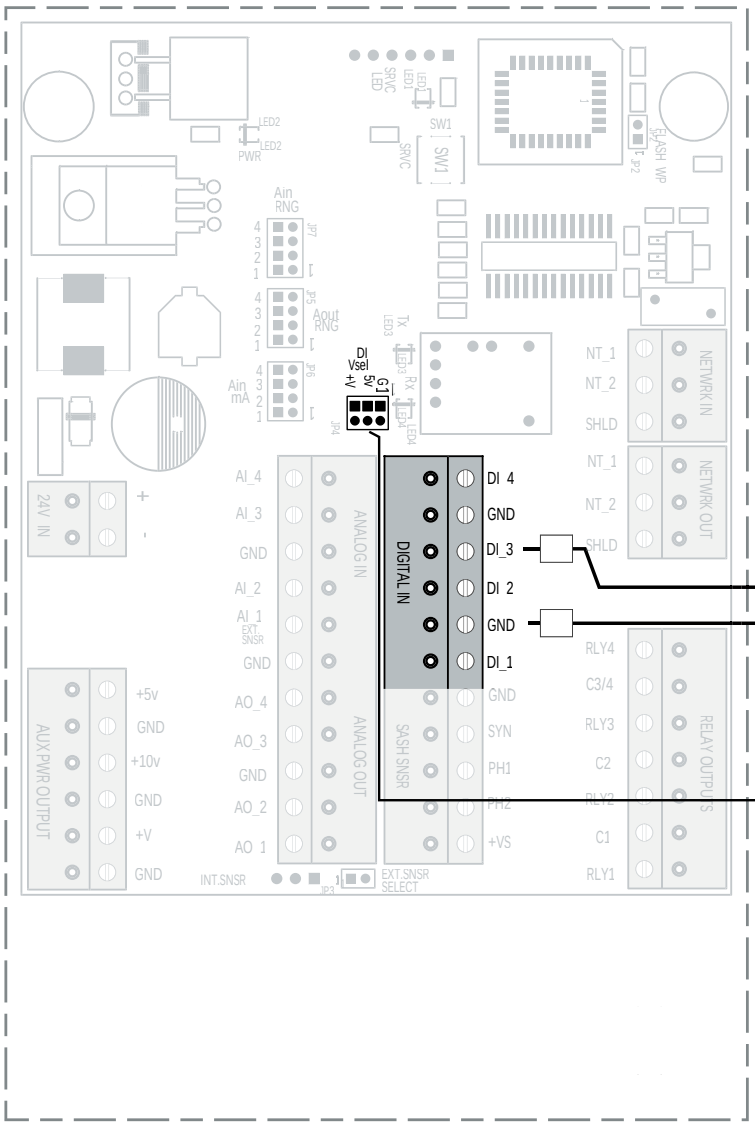
MOUNTING/WIRING

Digital Input to Flow Switch



JP4 is set at factory to +5 setting. User can change voltage setting to suit application requirement.

Wiring Guide Legend

Symbol	Description
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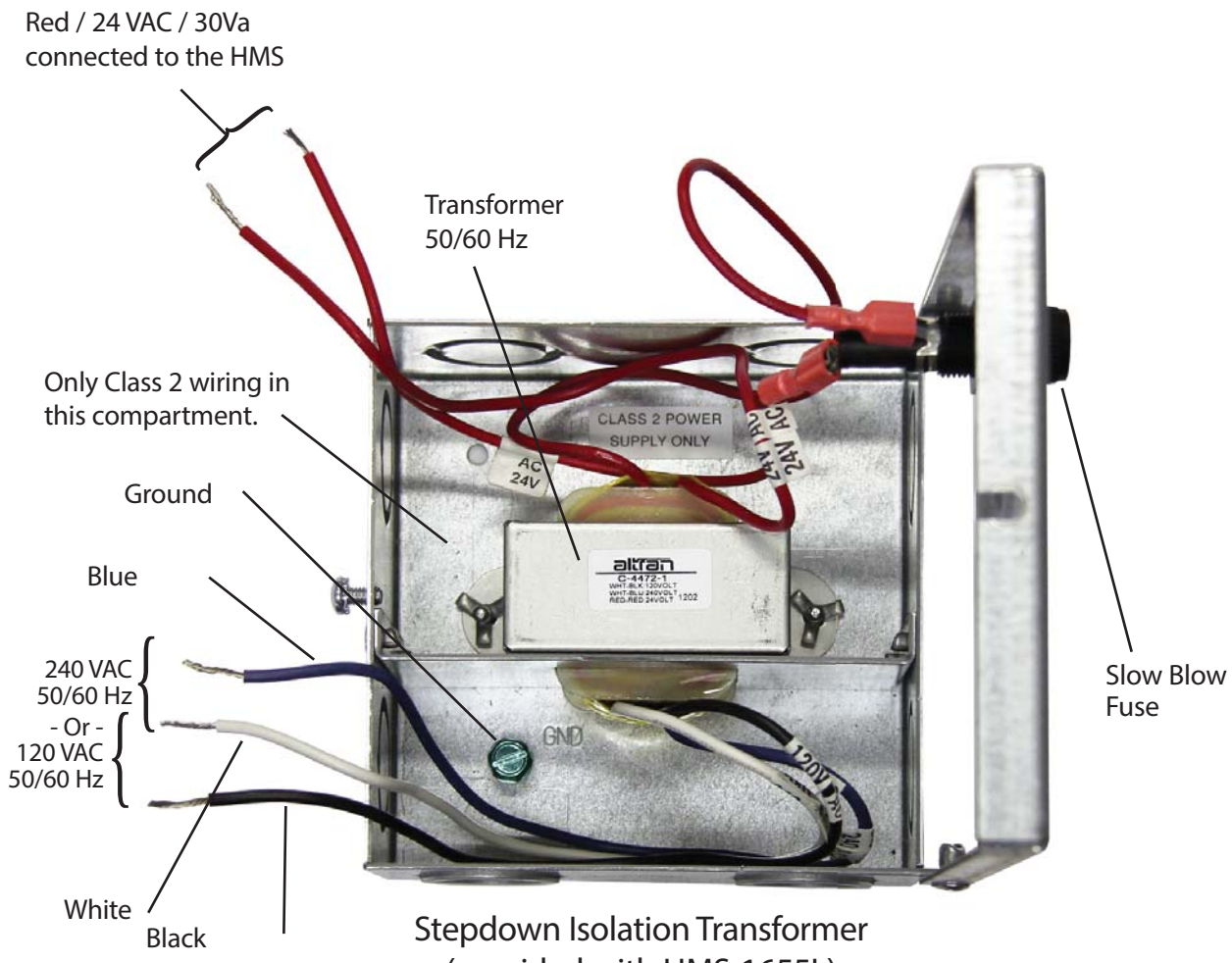
Stepdown Isolation Transformer



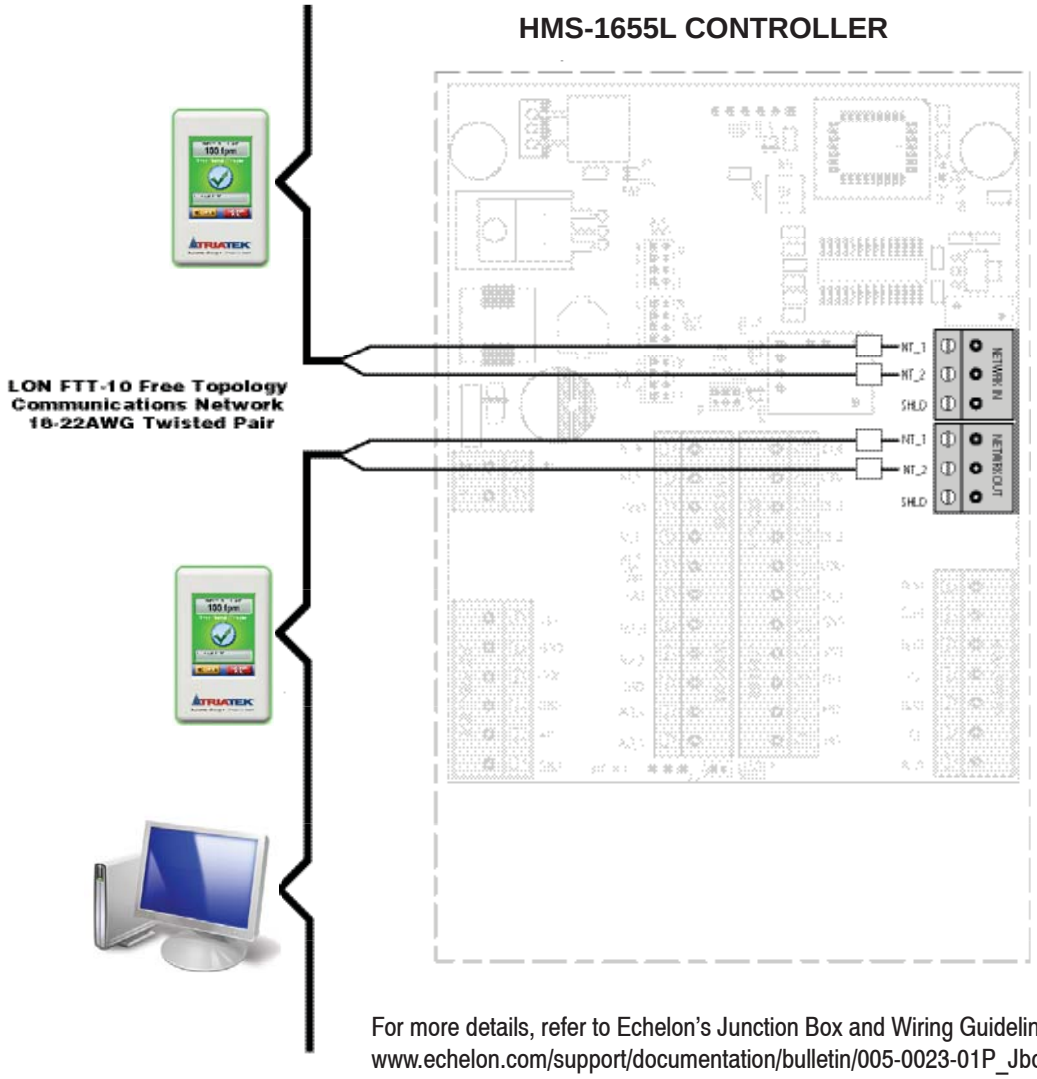
Stepdown Isolation Transformer
(provided with HMS-1655L)

Note:

This product should be installed with the manufacturer provided isolated power supply and connected to an electrical circuit protected by a minimum 20A circuit breaker. This circuit breaker should be mounted in an approved electrical enclosure located separately, but in close proximity to this product. Make sure you cap off any unused lead.

MOUNTING/WIRING

General LonWorks® Wiring



For more details, refer to Echelon's Junction Box and Wiring Guideline bulletin at www.echelon.com/support/documentation/bulletin/005-0023-01P_Jbox_wiring.pdf

Wiring Guide Legend

Symbol	Description
NC	No Connection to Field Wiring
	Field Wiring w/space for Number
	Internal Wiring
	Screw Terminal
	Air Flow To and From Unit Between Room and Corridor

Free Topology Cable Specifications

Cable Type	Maximum Node-to-Node Distance (FT)	Maximum Total Wire Length (FT)
Belden 85102	1640 ft	1640 ft
Belden 8471	1312 ft	1640 ft
Level IV, 22AWG	1312 ft	1640 ft
JY (St) Y x2x0.8	1049 ft	1640 ft
TIA Category 5	820 ft	1476 ft

*Triatek recommended cable

Notes

MOUNTING/WIRING

General LonWorks® Wiring

LonWorks® Wiring

Communications connections require that the HMS-1655L units be connected with twisted pair communication cable to each unit in the network. The unique network address of each HMS unit is set by a network management tool like LONMAKER. All wiring must be done in accordance with the National Electric Code as well as regulations of all authorities having jurisdiction, and must conform to applicable codes. When required by code, communications wiring may be installed in a conduit designed specifically for this purpose.

Wire Terminations

The HMS-1655L is provided with a removable connector block with convenient screw terminals. Make the LON FTT-10 communications connections as follows:

1 Connect a cable lead to the "NT1" terminal (#1).

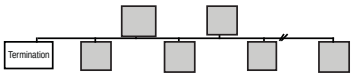
2 Connect a cable lead to the "NT2" terminal (#2)

Guidelines for Wiring

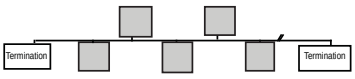
Following these guidelines will help to keep wiring-related communication problems to a minimum:

1. Do not splice communications cable or wire at any point between controllers.

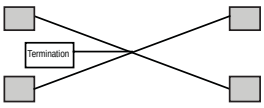
Typical Network Topologies



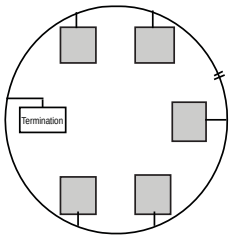
Singly Terminated Bus Topology



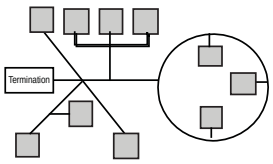
Doubly Terminated Bus Topology



Star Topology



Loop Topology



Mixed Topology

2. Avoid the "stub T-tap" technique of routing/connecting communication cables. Conductor discontinuities produced by such connections may generate RFI or other electromagnetic interference on the communications circuit.

3. Do not use wire nut devices for connecting communication cables.

4. Do not route any part of communication cables through the conduit, junction boxes, or other devices containing AC electrical wiring.

5. Do not strap communications cables to any conduit or other device containing AC electrical wiring, or run communication cables parallel to (or against) such devices.

6. Wire the LonWorks® network in accordance with LonWorks® network standards.

NOTE: AC electrical devices such as transformers, disconnects, fluorescent lighting, motor-controllers, variable frequency drives, or other high voltage power sources may generate RF interference which could cause intermittent problems in the communications network.

NOTE: Be sure to observe installation instructions regarding the possible need for a termination load or other device that may have to be attached on the end of a run.

Wiring Display to Control Unit

The HMS-1655L display is supplied with a removable 4-position terminal block connector for convenient connection to the control unit. The recommended interface cable type (Belden 1325A) should be connected as follows:

1. Connect the '+V' terminal on the display connector to the '+V' terminal on the display adapter module located inside the control unit.

2. Connect the 'GND' terminal on the display connector to the 'GND' terminal on the display adapter module.

3. Connect the '+' terminal on the display connector to the '+' terminal on the display adapter module.

4. Connect the '-' terminal on the display connector to the '-' terminal on the display adapter module.

HMS-1655L Quick Start Guide

Quick Start Guide Introduction
Following the proper installation of the HMS-1655L, apply power to the unit. Upon power up, the Safety Halo™ status indication bezel will cycle through seven colors (red, green, blue, yellow, magenta, cyan, and white), and then the Triatek splash screen indicating serial numbers, firmware version numbers, Neuron ID, Program ID, and current network address will be displayed. The splash screen remains displayed for approximately 10 seconds, and then disappears to reveal the main display screen.

NOTE: The information displayed on the splash screen during the power up sequence may also be redisplayed using the *About This HMS* option on the *Diagnostics* menu.

Main Display Screen
All HMS-1655L units are shipped from the factory in the *Standby* operating mode, which is represented by a blue screen with a slashed circle icon at the center of the screen as shown in Figure 2. The information that is displayed on the main screen includes the following from top to bottom:(see Figure 2):

- Fume hood name in the upper window (up to 25 characters)
- Current face velocity (default units: ft/min)
- Current operating mode and status
- Intuitive status icon centrally located
- Current sash height in the lower window (default units: inches)

Located below the main screen are is audible toggle button and the emergency purge button, if it has been enabled. The emergency purge button may be used to instantaneously force the exhaust damper to the maximum open position in the event of a chemical spill or other unsafe condition at the fume hood work space.

While in standby operating mode, the graphical background is blue in color. However, while in either *Occupied* or *Unoccupied* mode, the graphical background intuitively represents the current alarm status of the unit. A green graphical background with a check mark at the center indicates that the current face velocity is within allowable limits of the desired setpoint.

A yellow graphical background with an exclamation point at the center indicates that the current face velocity has drifted outside the allowable limits of the desired setpoint and is in the caution range. A red graphical background with an exclamation point at the center indicates that the current face velocity has reached a critical unsafe condition, as it is beyond the safe operating range. An alarm buzzer will sound at this screen as well providing an audible alert of the unsafe conditions.

Figure 2. The Standby screen of the HMS-1655L

The HMS-1655L incorporates a full-color touch screen with an extensive easy-to-use menu system that allows the user to quickly setup the controller for immediate use. Also integrated into the HMS-1655L display are several hotspots that provide quick access to various settings. Refer to page 31 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.

Configuring Fume Hood Controller
Configuring the HMS-1655L fume hood controller settings can be accomplished in four simple steps:

1. Calibrate the sidewall sensor
2. Calibrate the sash position sensor
3. Configure the analog output
4. Configure alarm limits

The HMS-1655L incorporates a closed-loop control scheme which uses a flow sensor mounted in the sidewall of the fume hood to maintain

HMS-1655L Quick Start Guide

an accurate face velocity reading. This sidewall sensor comes pre-configured and pre-calibrated with the fume hood controller. However, it must be calibrated to the fume hood it has been installed in to be monitored and/or controlled. If a sash position sensor was included with the HMS-1655L, then it must also be recalibrated following installation. The field calibration menu options can be found on the *Fume Hood Setup* menu as shown in Figure 4.

Figure 3. When the face velocity drifts outside the normal operating range, the main display background turns yellow to indicate a warning condition.

Calibrating the Sidewall Sensor
To calibrate the sidewall sensor, perform the initial zeroing procedure followed by the gain and offset setting step.

Initial Zeroing
Enter the HMS-1655L user menus and select the *Unit Setup* option from the *Main Setup* menu. Select the *Hood Setup* menu. After the sidewall sensor and the controller have been installed, the first field calibration may require that the sensor output be zeroed relative to its associated controller. This would not necessarily be required for future calibrations of the same sensor / controller pair. To do this select the *Zero Calibration* option on the second page of the menu. This will require that the sensor be capped off to prevent any air movement or pressure from being measured, just the zero output value.

The sensor must be capped inside the hood, and if the sensor is not directly attached to the side of the hood with the sensor "nipple" inside the hood, but uses tubing to connect the sensor to the inside of the hood, then both the tube end inside the hood and the tube end at the reference plate must be capped or sealed to get an accurate zero reading. Follow the onscreen instructions and wait the required settling delays to take a Zero sensor reading.

Figure 4. This menu provides options for recalibrating the sidewall sensor and sash position sensor, as well as configuring the target setpoints for each operating mode.

Gain and Offset Setting
Following this, and for subsequent field calibrations, select the *Field Calibration* menu item under the *Hood Setup* menu. The on screen instructions will direct you to cap the sensor inside the hood. The capping procedure should be the same as per the zero calibration procedure, in that both ends of the sensor tubing will need to be capped if the sensor is not directly attached to the hood sidewall with the sensor "nipple" inside the hood.

Wait at least 10 seconds for the sensor output and the filtered value in the controller to settle. Tap the *Next* button to accept this and move to the next step in the calibration. Be sure to remove the cap(s) from the sensor and set the sash to the operating height (18 inches typically).

Do a traverse of the hood face, directly in the same plane as the sash, and accumulate an accurate indication of the actual hood face velocity using a accurate velocity meter. If the hood valve is not at a position to give sufficient air or gives too much air to get an accurate actual air flow reading, adjust the *Override* slider to position the valve to a better setting. Tap the *Next button* and enter the actual air velocity value on the display screen by using the input slider. Tap the *Finish* button to complete the calibration.

HMS-1655L Quick Start Guide

If a sash position sensor was NOT included with the HMS-1655L, then the following section may be omitted.

Calibrating the Sash Position Sensor
Calibrating the sash position sensor once it has been installed at the fume hood being monitored and/or controlled may be accomplished using the *Sash Setup Position* option on the *Unit Setup* menu which brings up the *Field Calibration* screen. Position the sash at the minimum position and enter the actual measured height using the slider. If the sash is closed completely, enter zero as the minimum sash height. Tap the *Next* button to advance to the next step in the calibration procedure. Set the sash to the maximum position and enter the actual measured height using the slider at the calibration screen, and tap the *OK* button to save the new calibration.

The next step is to configure the analog output that controls the exhaust damper actuator of the monitored fume hood, if control is required. If the specific application only requires monitoring, then the next step may be omitted.

Setting Up the Analog Output
For those applications requiring control of an exhaust damper actuator, the analog output must be configured accordingly. To access the analog output configuration option, select the *Unit Setup* option from the *Main Setup* menu, and then select the *Controller Setup* option.

At the first configuration screen, the user is prompted to select an action mode (direct or reverse action), and the output range (0-5/0-10) or (1-5/2-10V). The second screen allows the span of the output to be limited to a percentage of the selected range. These settings only relate to A0-1.

Once the operating mode and range are selected, the user is prompted to specify the upper and lower limits of the analog output as percentages. Most applications will use the default settings of zero and 100 percent. But for those applications where the top or bottom limits need to be tweaked, these settings may be adjusted accordingly to further limit the range of the actual analog output signal.

Setting Alarm Limits
To determine the limits at which the unit status changes from *Normal* to *Warning*, and from *Warning* to *Alarm*, the alarm limits must be configured. To configure the alarm limits for the HMS-1655L Fume Hood Controller, select the *Alarm Limits* option from the *Controller Setup* menu. The high and low alarm limits, as well as the high and low warning limits, for both occupied and unoccupied operating modes may be specified in sequence. These limits should be specified to set the face velocity range which should be considered *Normal*, as well as the range which indicates a *Warning* condition, and the range which is considered critical and indicates an *Alarm* condition.

Changing the Operating Mode
The HMS-1655L Fume Hood Controller can be set for *Occupied*, *Unoccupied*, or *Disabled* modes of operation. To change the operating mode, select the *Unit Setup* option from the *Main Setup* menu, and then select the *Hood Setup* option. At the *Hood Setup* menu, select the *Operating Mode* option which allows the user to select one of three operating modes. Changing the mode of operation automatically selects the pre-programmed setpoint and analog output action mode associated with each mode.

Adding Password Security
The HMS-1655L menu system can be protected by adding up to 10 multi-level passwords to the system. The *Password Setup* option on the *System Setup* menu allows the user to manage the security passwords. Options on the *Password Setup* menu include those for adding, editing, and deleting entries from the system as shown in Figure 7.

There is also an option that allows all of the system password entries to be purged. To add a new password entry, select the *Add Password* option from the *Password Setup* menu, which prompts the user to enter a minimum of four and up to eight digits. Once a valid password has been specified, the user is prompted to specify one of four access levels: *Unrestricted*, *Standard*, *Basic*, or *Restricted*.

All password entries are saved to non-volatile memory. In the event that a password has been forgotten, there is a factory-default password that will provide unrestricted access to the user menu system. Please consult the factory for more information regarding this password. The first password entry is automatically saved as unrestricted.

HMS-1655L Quick Start Guide

Figure 7. This menu provides options for managing the system passwords.

Changing Display Settings

The patent-pending Safety Halo™ feature is exclusive to the HMS-1655L series of controllers from Triatek, and significantly enhances the visibility of the status of individual units, and allows an unsafe fume hood to be immediately recognized from anywhere in the laboratory space. The display settings of this enhanced feature may be configured using the Safety Halo™ option on the *Display Setup* menu. This option may be disabled if not required by the installation, which simply turns off the Safety Halo™ status indicator.

If enabled, the brightness may be adjusted from full intensity down to barely visible in daylight conditions. The brightness of the HMS-1655L main display screen may also be adjusted using the *Set Brightness* option on the *Display Setup* menu. All brightness settings are stored to non-volatile memory and remain in effect through a power cycle.

The main display screen of the HMS-1655L may be customized very easily using options on the *Display Setup* menus. The *Display Options* menu option allows specific information to be individually suppressed by deselecting the unwanted items from the *Set Display Options* selection screen.

Built-in Diagnostics

The HMS-1655L incorporates several useful diagnostic tools. These include an *About this HMS* option, an override facility, a real-time view feature, and a factory restore option. The *About this HMS* option on the *Diagnostics* menu provides information specific to this particular unit, including the firmware version and electronic serial number of the display, Neuron ID of controller module, and its network address.

During the test and balance phase, oftentimes it is convenient to be able to adjust exhaust damper actuator to a specific position to force a specific airflow condition. The analog outputs may be individually overridden by selecting the *Overrides* option from the *Diagnostics* menu, *Analog Outputs* option, and then selecting the specific analog output to be overridden.

The user can then, in real-time, dynamically move the damper actuator to a specific position using the slider on the override screen. While in override mode, the selected analog output is “disconnected” from its PID control loop, if configured for PID mode. Canceling override mode effectively resumes PID or direct analog output control. AO-1 is used to position the valve for fume hood applications.

Figure 9. Built-in diagnostics may be accessed at this menu to assist with troubleshooting and initial setup of this controller.

The HMS-1655L incorporates a convenient feature that allows the installer or commissioning technician to view the real-time conditions of all of the hardware resources as well as several system variables. This includes the analog inputs, analog outputs, digital inputs, and relays.

Selecting the *Real-Time View* option from the *Diagnostics* menu allows the user to view the real-time conditions of any of the listed resources. For example, selecting the Analog Inputs option from the *Real-Time View* menu invokes the real-time view configuration screen. To skip to the next set of resources to view, tap the *Next* button. To cancel the

real-time view display at any time, tap the *Exit* button to return to the *Real-Time View* menu.

Enabling Emergency Purge Capability

The HMS-1655L may be configured to enable a convenient feature that allows the fume hood to be put into a maximum face velocity mode, or *Emergency Purge* mode, for emergency situations where the exhaust valve is forced to its maximum open position. To enable the *Emergency Purge* mode at the main display of the HMS-1655L, set the configuration dipswitch S2 accordingly (see table on page 30). Setting position 2 of S2 to the ON position enables the *Emergency Purge* feature, and results in the 'Press for *Emergency Purge*' button appearing on the as shown in Figure 10.

Figure 10. Tapping the Emergency Purge button instantly puts the fume hood in maximum face velocity mode.

MODULE SETTINGS

Configuring Display Module Settings

Options Dipswitch (S1) – internal use only			
1.	Graphics Chip Mode Selection	OFF = Programming Mode	ON = Run Mode
2.	Touch Screen Calibration Mode	OFF = Force calibration	ON = Auto calibration
3.	Reserved		
4.	Reserved		

Options Dipswitch (S2) – Product Configuration			
1.	Sensor Mode	OFF = Single	ON = Dual
2.	Emergency Purge button	OFF = Disabled	ON = Enabled
3.	Product Type	OFF = FMS-1655L	ON = HMS-1655L
4.	Operational Mode	OFF = Demo Mode	ON = Run Mode

Pushbutton Switch (SW1)	Reset Button	
Pushbutton Switch (SW2):	Options Configuration	

Cleaning the HMS-1655L Display

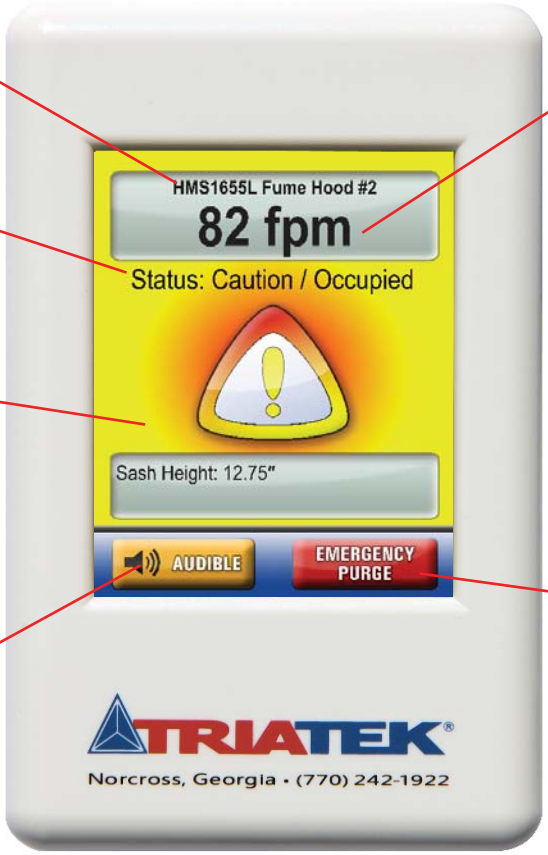
- Use a clean cloth that is dry, or lightly dampened with a mild cleaner or Ethanol. Be sure the cloth is only lightly dampened, not wet. Never apply cleaner directly to touch panel surface; if cleaner is spilled onto touch panel, soak it up immediately with absorbent cloth.
- Cleaner must be neither acid nor alkali (neutral pH).
- Wipe the surface gently; if there is a directional surface texture, wipe in the same direction as the texture.
- Never use acidic or alkaline cleaners, or organic chemicals such as: paint thinner, acetone, tolulene, xylene, propyl or isopropyl alcohol, or kerosene.

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

Touching the Status Line brings a popup to quickly change operating mode.

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

Touch to silence alarm. Automatically reverts back to audible mode when alarm condition is removed.



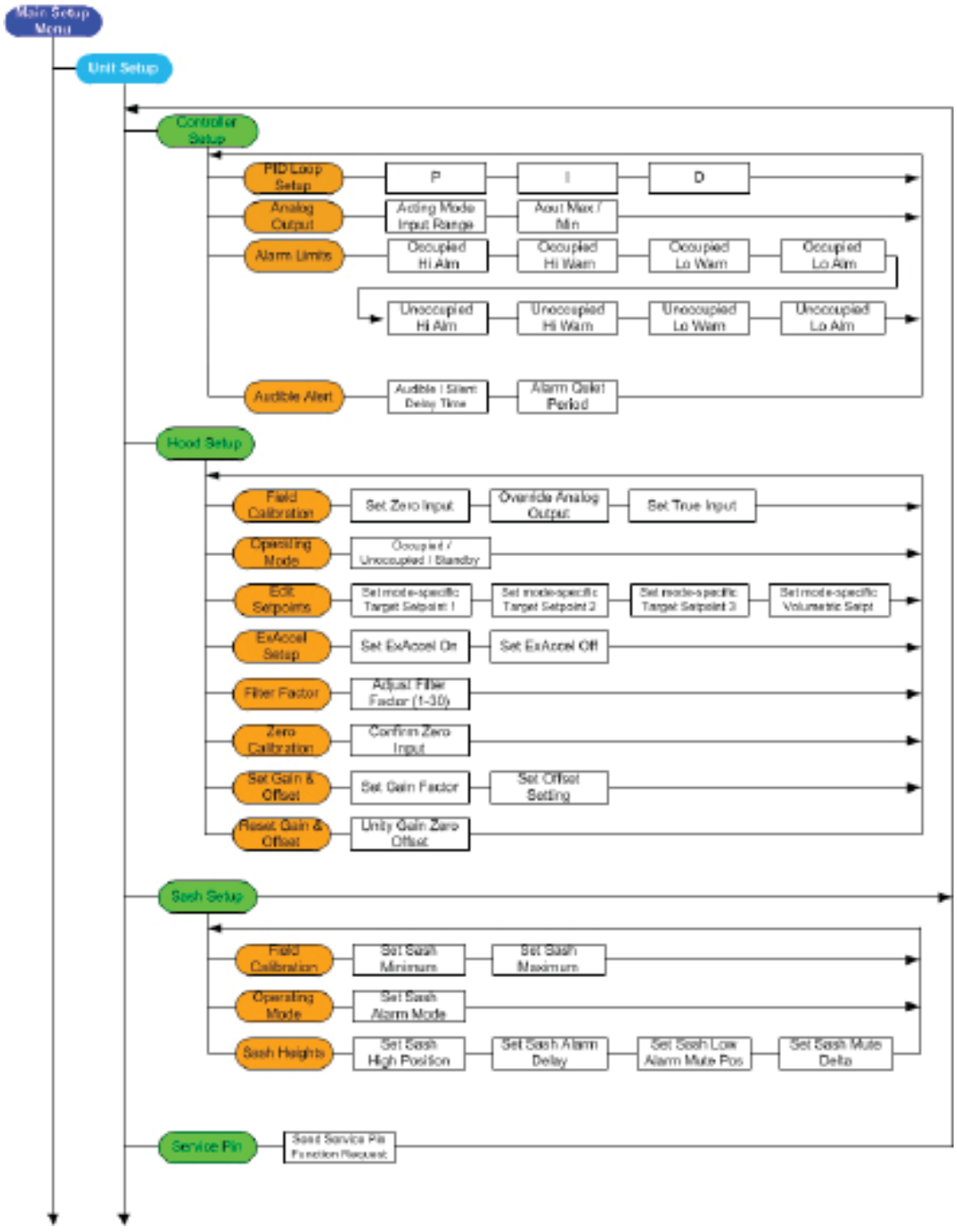
Touching the face velocity reading brings up engineering units selection popup to quickly change from English to metric units

Touch Emergency Purge to send exhaust damper to maximum open position in the event of an emergency.

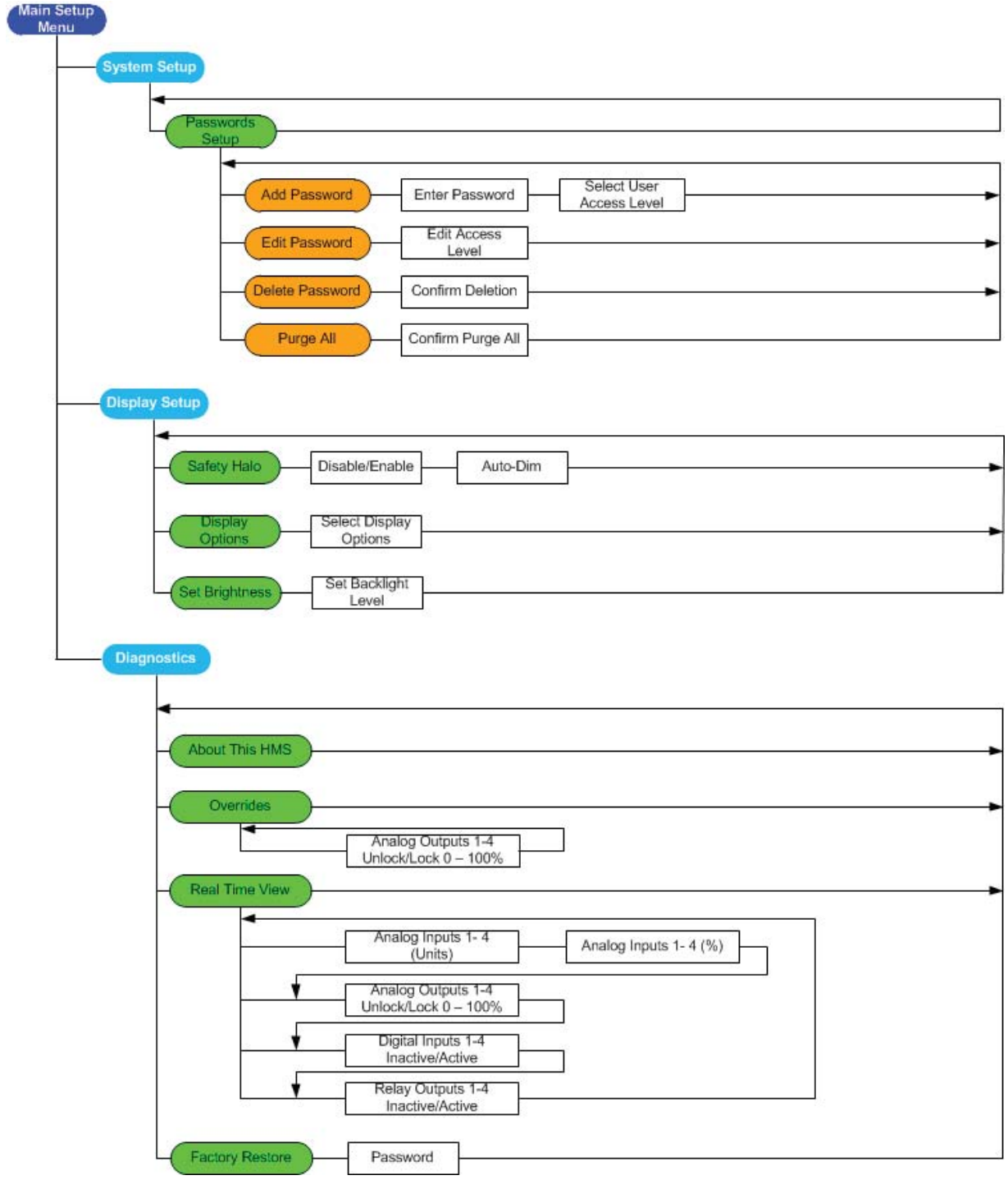
Hot-Spot Features of HMS-1655L Touchscreen Display

FLOW DIAGRAMS

Unit Setup Menu Tree

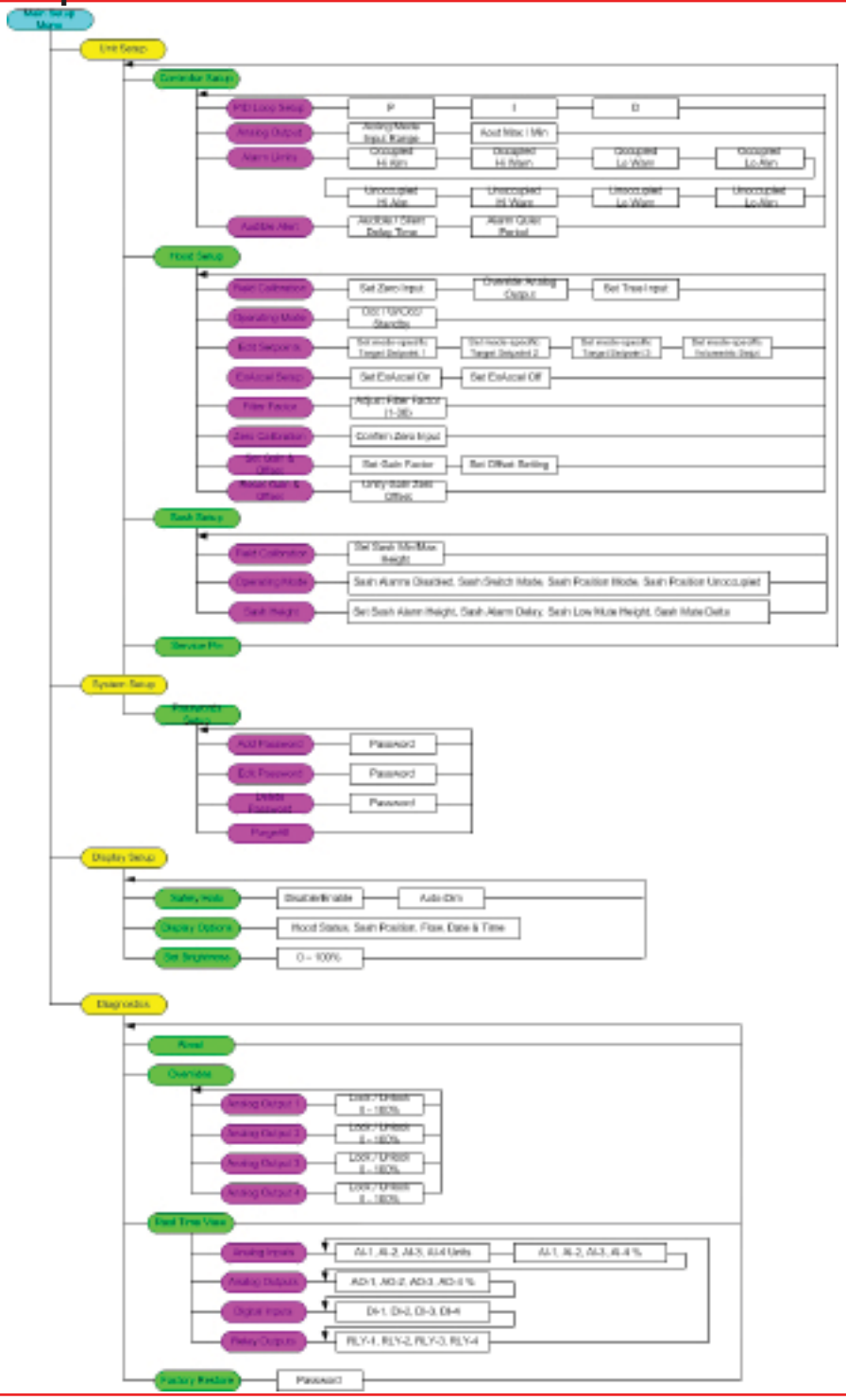


System & Display Setup Menu Trees



FLOW DIAGRAMS

Complete Tree



Notes

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 installations, 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