FMS1655L - Isolation Room
0.0017" WC
Status: Normal / Positive

Humid: 28%RH

Temp: 78°F

🔊 ALARM AUDIBLE

TRIATEK®
Norcross, Georgia • (770) 242-1922

Triatek FMS-1655L

CONTROLLER SETTINGS

This form should be completed during the initial configuration for each room pressure controller.

Room Name / Number

Unit Model Number and Serial Number (ESN)

Analog Input

Normal Operating Pressure (reading with door closed)

Positive Isolation Setpoint

Negative Isolation Setpoint

Neutral Isolation Setpoint

Pressure Deadband

Analog Output

Analog Output Range (zero-based or offset)

Analog Output Upper Limit (0 – 100%)

Analog Output Lower Limit (0 – 100%)

Analog Output Action (Direct or Reverse)

PID Constants

Proportional Constant (0.5 – 100.0 %)

Integral Constant (0.0 – 100.0 %)

Derivative Constant (0.0 – 100.0 %)

Alarm Limits

Positive Isolation High Alarm Setpoint

Positive Isolation High Warning Setpoint

Positive Isolation Low Warning Setpoint

Positive Isolation Low Alarm Setpoint

Negative Isolation High Alarm Setpoint

Negative Isolation High Warning Setpoint

Negative Isolation Low Warning Setpoint

Negative Isolation Low Alarm Setpoint

Audible Alert

Operating Mode (audible or silent) _____

Delay Time Base (secs or mins) _____

Delay Setting (0 – 60)

Engineering Units
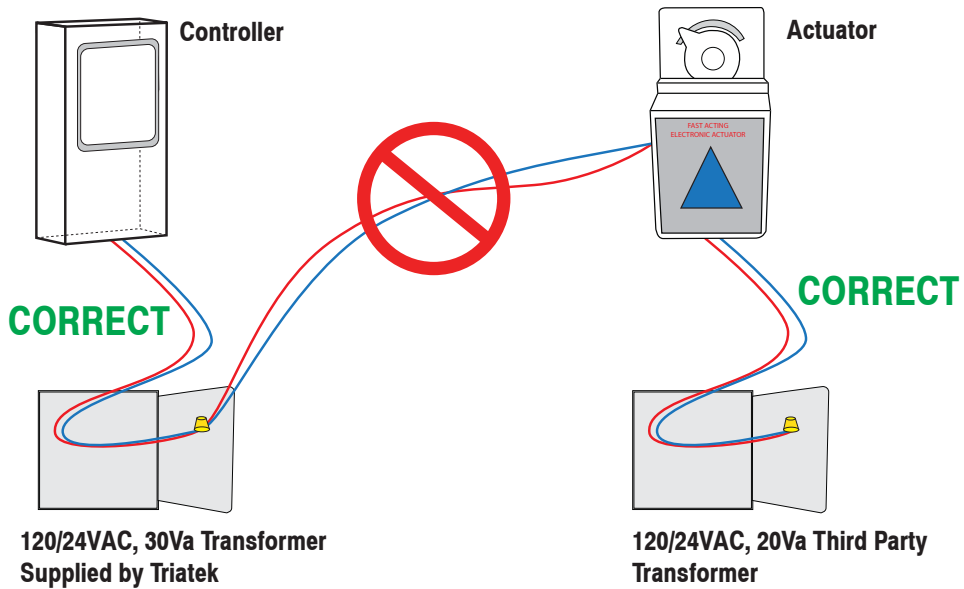
Inches of Water or Pascals _____

WARNING

Warning

Failure to follow the wiring diagrams could result in damage to your equipment and could void your warranty.

Under no circumstances should a single transformer be split between an 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.

Controller

Actuator

FAST ACTING
ELECTRONIC ACTUATOR

CORRECT

CORRECT

**120/24VAC, 30Va Transformer
Supplied by Triatek**

**120/24VAC, 20Va Third Party
Transformer**

GENERAL

Specifications

Electrical

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

Communications

LonWorks® FTT-10A peer-to-peer network...Two-Wire Twisted Pair, FTT-10A signaling
Recommended Cable Type.. Connect-Air W221p-2001 or Equivalent

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

Mechanical

FMS-1655L Display Module Housing (Surface Mount)..3"W x 5"H x 1.13"D
FMS-1655L Display Module Housing (Flush Mount)..5.6"W x 8.5"H x 0.75"D
FMS-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

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

FMS1655L - ☐ - 0- ☐

Case Style
T = thin (flush)
S = surface

# of Remote Sensors
1 = single sensor
2 = dual sensor
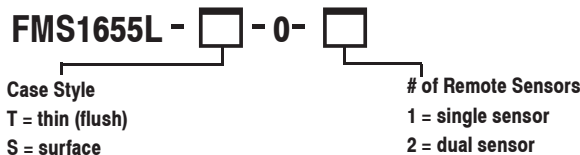
Overview

The Triatek FMS-1655L Room Pressure Controller is an ultra-sensitive instrument used to control and/or monitor air pressure in hospital rooms, labs, and clean rooms. It is capable of measuring and displaying air pressures down to 0.0001" wc.

Features include:

- Digital display of pressure with a programmable description
- Full-color touchscreen with audible and visual alarms
- Patent-pending Safety Halo™ with 180° edge lighting
- Four relay outputs for transmitting alarm conditions to a remote location such as a central monitoring station
- Auxiliary analog inputs for use with optional sensors
- Analog outputs used in control applications
- Dual sensor split screen viewing mode
- Password protection of programmed setup
- Optional keylock switch for isolation select protection
- Comprehensive real-rime diagnostics tool built into each unit

The FMS-1655L has enhanced graphics and Saftey Halo™ edge lighting that provides a full 180° of status visibility. The product is shipped with the Safety Halo™ at full brightness, but may be dimmed or even disabled completely using the *Display Setup* menu.

Bright graphical color changes are used to indicate the three different statuses of the monitored space. These graphical backgrounds indicate *Normal* when the room pressure is within defined limits, *Warning* when the room pressure is approaching an out-of-limits condition, and *Alarm* when the room pressure is outside the defined acceptable and safe limits.

The room pressure ranges are configured by the user, either directly from the display or over the network from the building management system (BMS). Room pressure selection of positive, negative, or no isolation is set using the user menu or an optional keylock switch.

Alarm conditions are defined by the user in terms of desired pressure settings for the room being monitored. When an alarm condition occurs, it can be annunciated in four ways: 1) on the display, 2) with an audible alarm, 3) transmitted via contacts to a remote monitoring station, and 4) over the LonWorks® network. The alarm will automatically reset when the unit senses that room pressure has returned to proper limits, or the attendant can mute the audible alarm by touching the *Alarm Audible* button at the bottom of the screen.

The FMS-1655L provides four relay outputs that can be used for remote alarms or pilot control functions. The operation of each relay can be configured to trigger on defined control functions of the FMS-1655L, except for Relay 2, which is reserved for the display power control.

It is often important to have room variables such as temperature or relative humidity displayed along with the room pressure. These variables can be enabled or disabled by the user in the *Display Setup* menu.

The FMS-1655L provides additional analog inputs which can be configured for 4-20 ma current or for voltage input signals. The input can be scaled as needed to display correct values, and a suitable description can be applied.
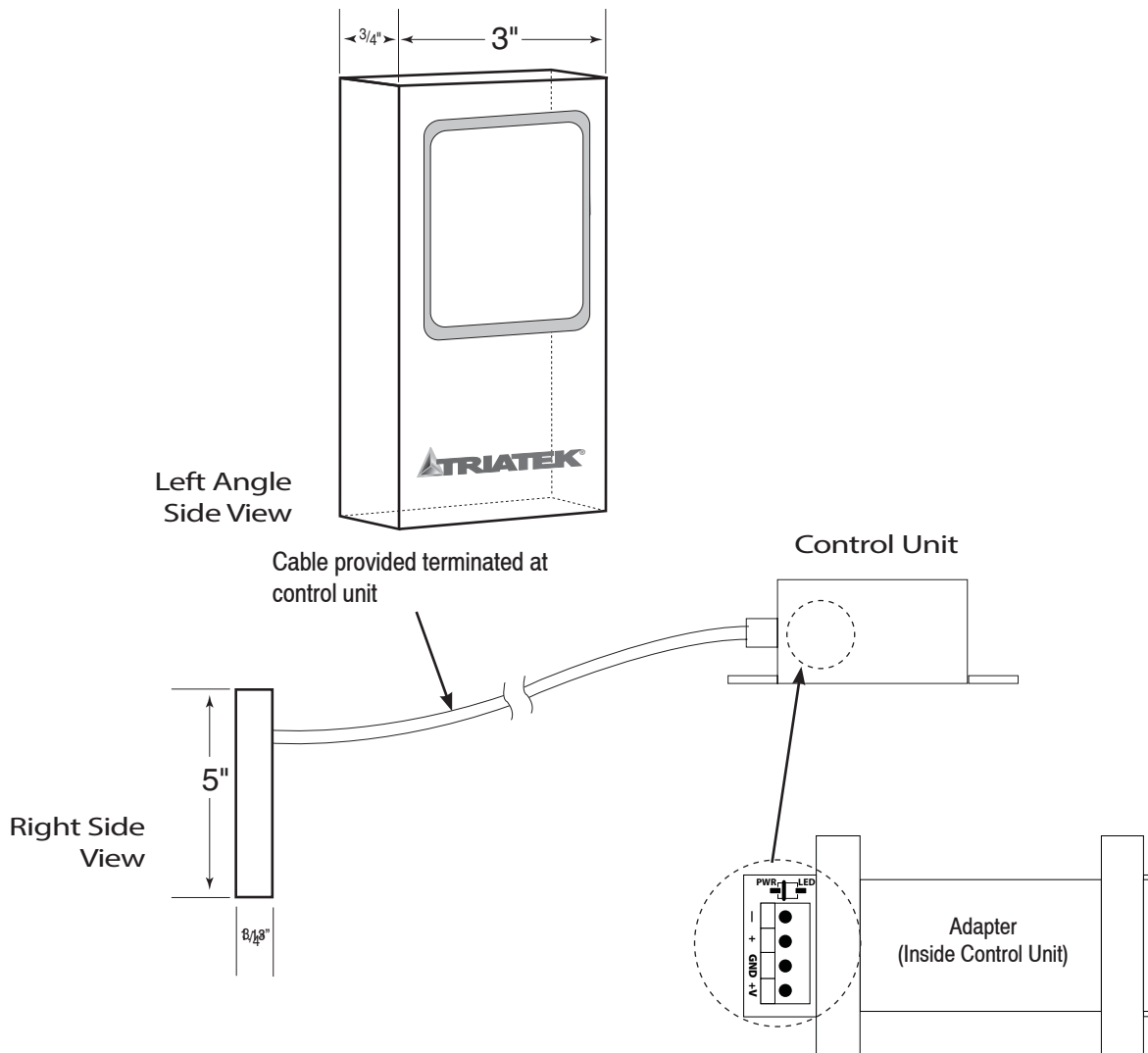
The FMS-1655L provides analog outputs which can be set up for 0-5v or 0-10v output. It can be programmed to be a proportional output for providing a linear signal to an automation system, or programmed for a PID floating point output for direct control of damper actuators, speed drives, etc.

When configured for dual sensor mode (see page 35), the FMS-1655L can monitor a secondary pressure and display its real time measurement on the screen along with the primary pressure in a split screen view (see Figure 4). This secondary monitored pressure reading has no alarming capabilities and is for display purposes only. The Safety Halo™ edge lighting continuously displays the alarm status of the primary channel, and is not affected by the secondary channel.
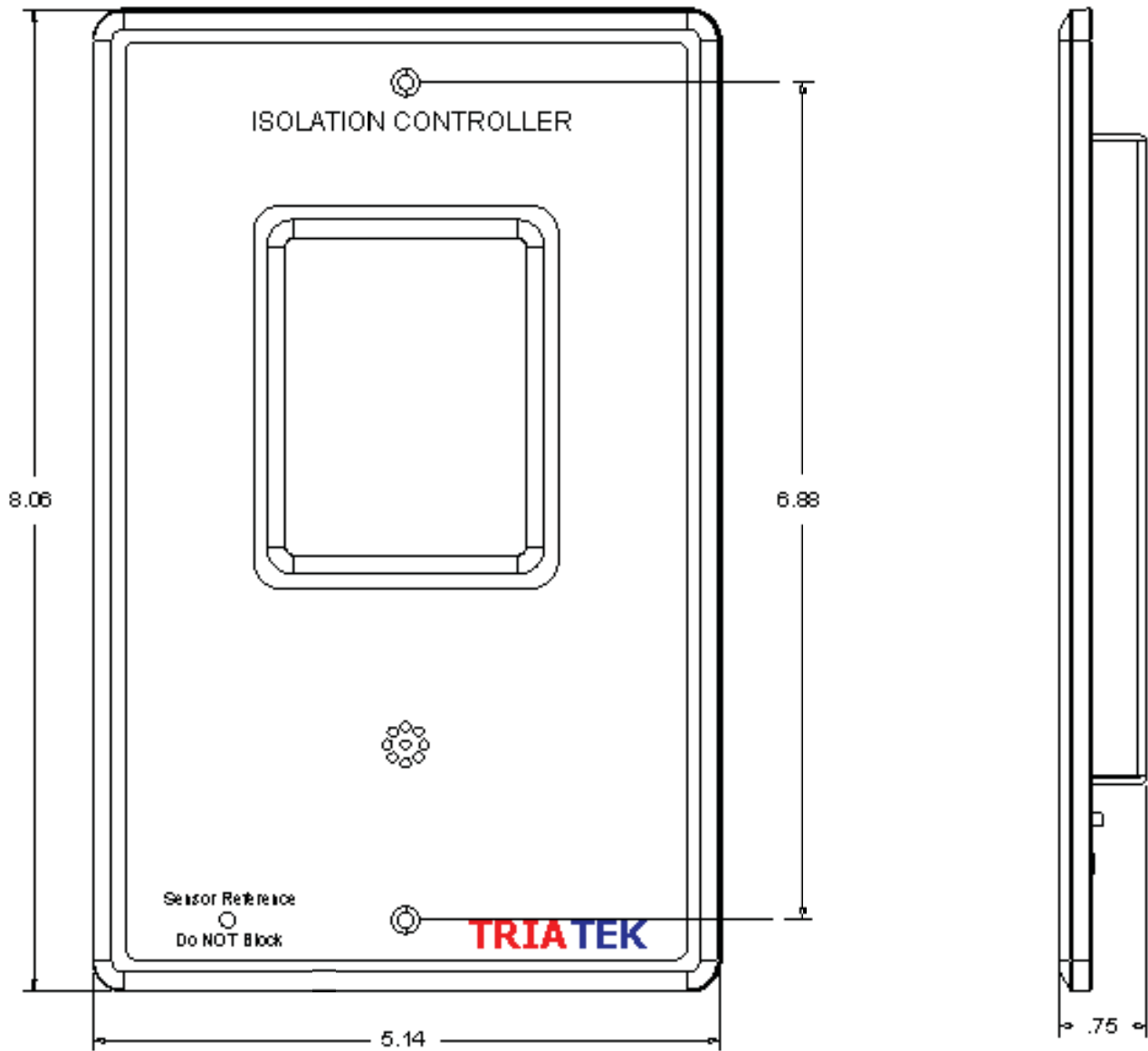
The user can set multiple access level passwords to protect against unauthorized access to the FMS-1655L.

The FMS-1655L provides built-in diagnostic tools for troubleshooting during installation, including manual override capabilities and a comprehensive real-time view that allows the real-time values and states of each analog and digital input and output to be conveniently displayed. This tool facilitates the verification and certification processes conducted by test and balance personnel during commissioning. There are also options for storing configuration settings and for restoring those settings, as well as performing a complete restoration of the factory default configuration settings.

FMS-1655L Surface Mount Case Dimensions

3/4"   3"

Left Angle
Side View

Cable provided terminated at
control unit

Control Unit

5"

Right Side
View

3 1/4"

PWR   LED

– + GND +V

Adapter
(Inside Control Unit)

FMS-1655L Flush Mount Display Dimensions

ISOLATION CONTROLLER

8.06

6.88

Sensor Reference
Do NOT Block

TRIATEK

5.14

.75

The FMS-1655L Flush Mount display is mounted flushed to the wall using the supplied retro fit ring or wall box.
Use the retro fit ring as a template to mark the wall for cutout.

MOUNTING/WIRING

FMS-1655L Surface Mount Display

3.04"

5.05"

ø 0.143"

ø 0.750"

ø 0.143"
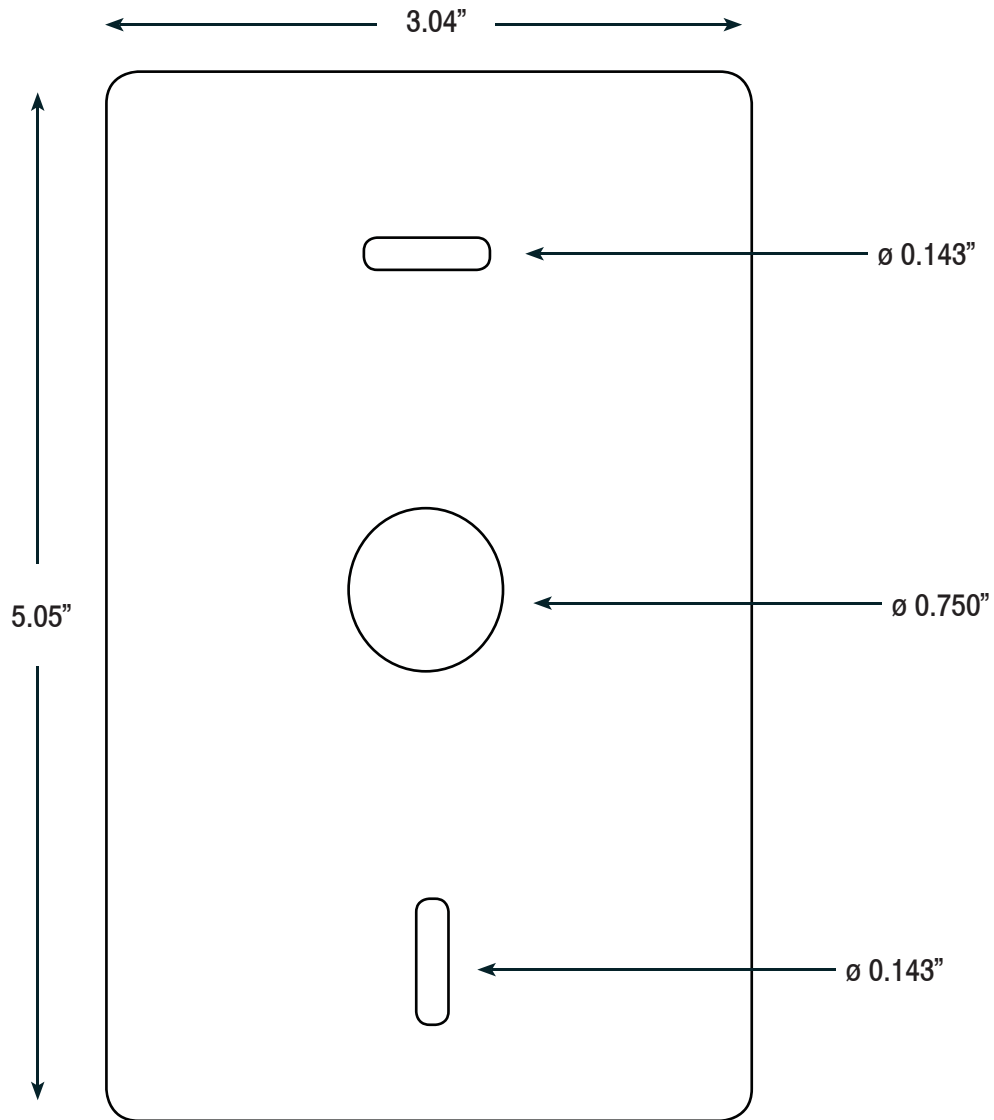
The FMS-1655L display backplate may be mounted directly to a standard single-gang wall box using the two slots along the centerline. Use the backplate as a template to mark the mounting holes and the cable access hole at the center of the backplate.

Controller Mounting Hole Patterns
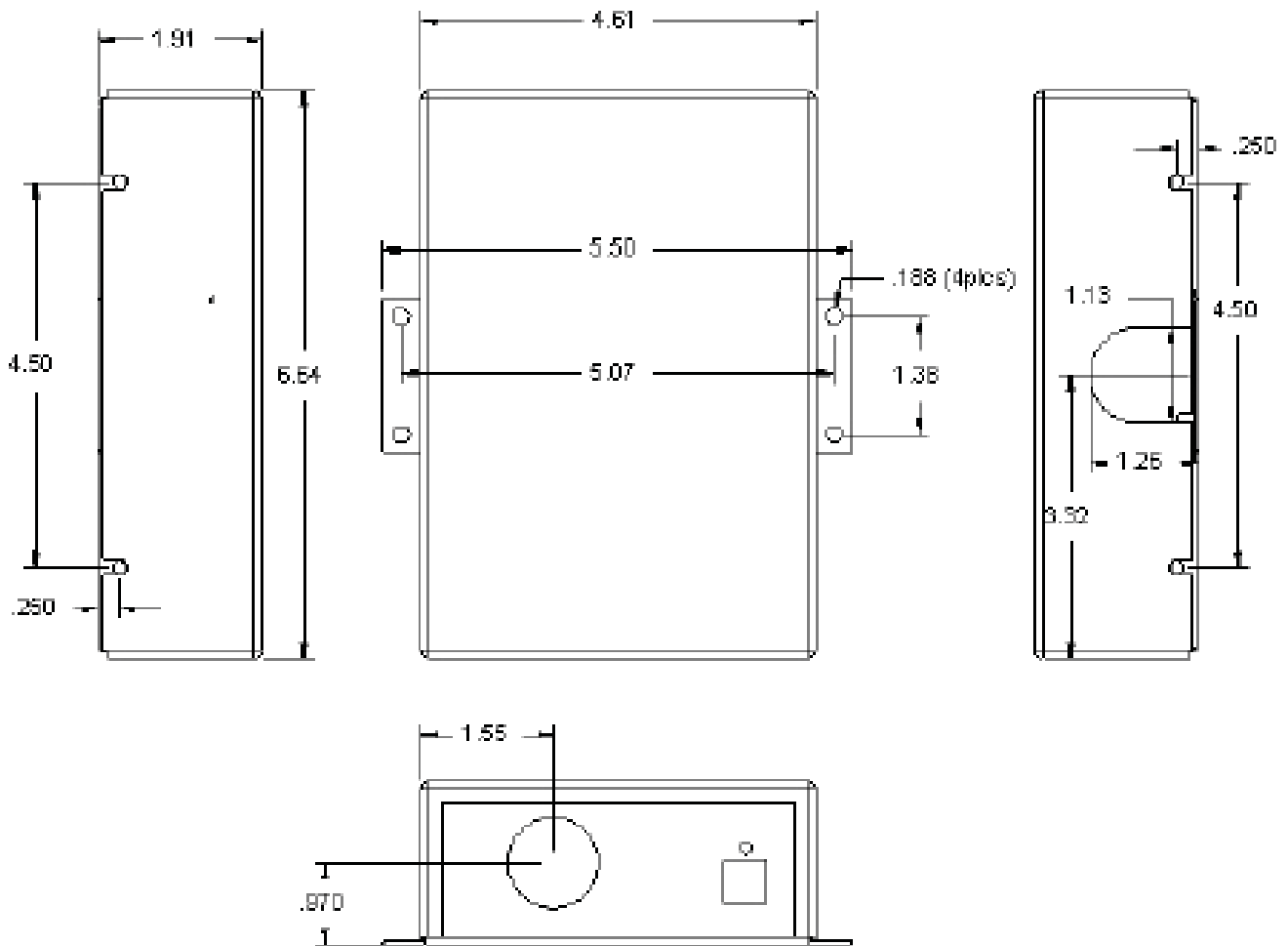
Mounting/Wiring

Remote Sensor Installation

FMS-1655L Room Pressure Controllers ordered with a remote sensor must be installed in the wall between the isolation room and the adjoining corridor. Port P1 must be oriented towards the isolation room and Port P2 toward the corridor. Please see illustration on page 13.

With this sensor orientation, a positive pressure value indicates that the isolation room is positive with respect to the corridor.

NOTE: A three conductor cable must be connected between the remote sensor and the FMS-1655L. Maximum length of this cable is 1,000 feet.

The display unit can be installed outside the room, at the nurses station, in the engineering office, or at any other location as needed.

Mounting Steps:

1. Cut an opening in the wall of the isolation room for the single-gang low voltage bracket and remote sensor electronics. Nominal hole dimensions are 3.65" H x 2.15" W.

2. Drill a 16" hole through the opposite wall for the flow tube as shown.

3. Bring the 3-conductor signal wire through the cut-out.

4. Install the single-gang low voltage mounting bracket in the cutout. Route a length of supplied flow tube through the mounting bracket and through the 7/16" hole in the opposite wall.

5. Push a length of 3-conductor cable from the FMS-1655L controller down wall to the opening of the single-gang low voltage mounting bracket. Connect cable wires to +Vin, GND, and IO at the sensor's 9 pin connector.
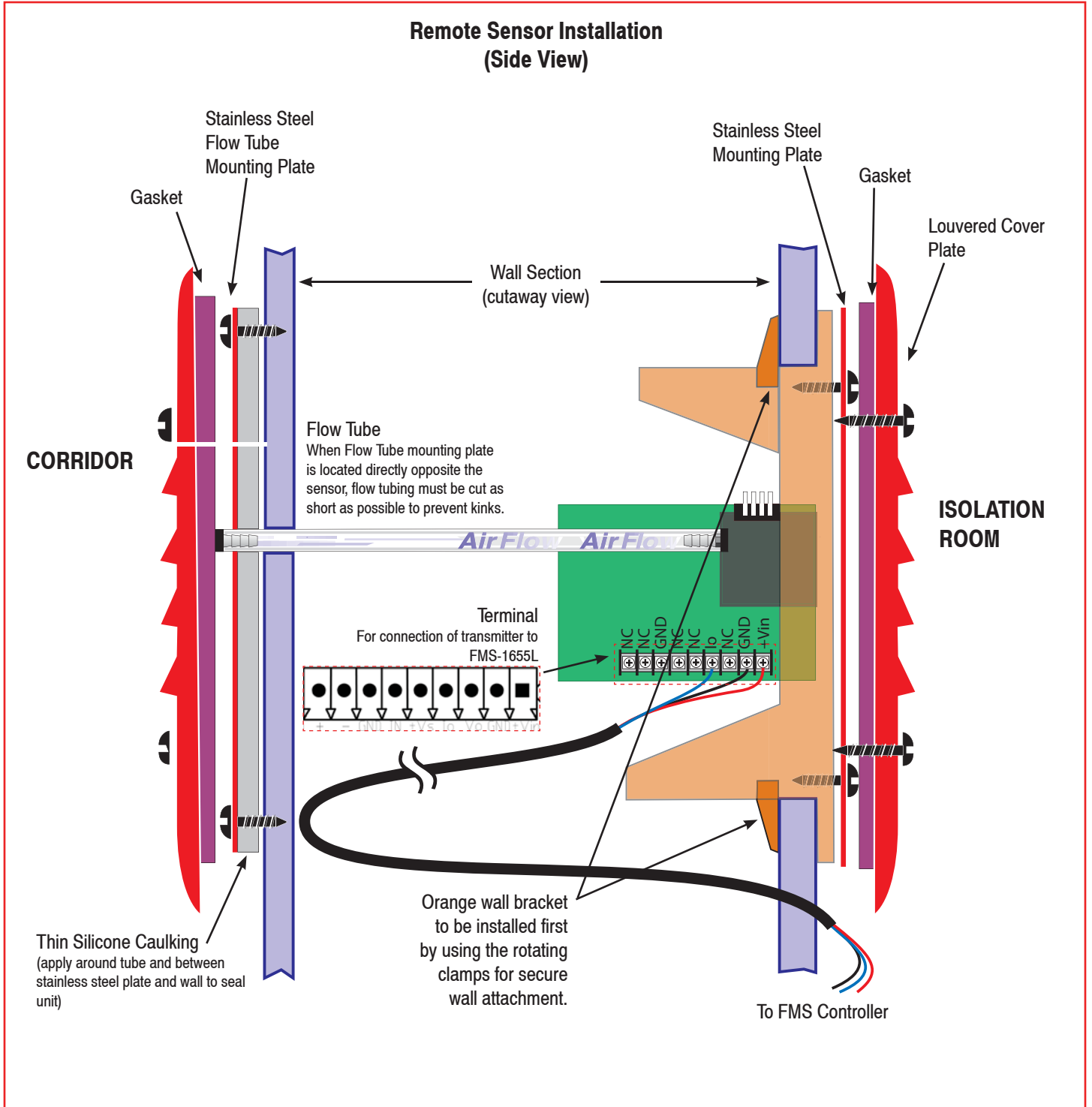
6. Attach the flow tube to the sensor port, then push the tube and sensor module into place and secure to the mounting enclosure with two 6-32 x 3/4 screws supplied.

7. Install the louvered cover plate.

8. On the opposite side (corridor) attach the flow tube to the barbed fitting of the flow tube mounting plate.

9. Press the mounting plate into place, allowing the excess tube length to go into the wall space. Secure with the screws and anchors.

10. Install the louvered cover plate.

11. At the FMS-1655L controller, connect the three leads from the remote sensor to the terminals marked +V, AI_1, and GND. Remote sensor +Vin goes to terminal +V, remote sensor IO goes to terminal AI_1, and remote sensor GND goes to controller GND.
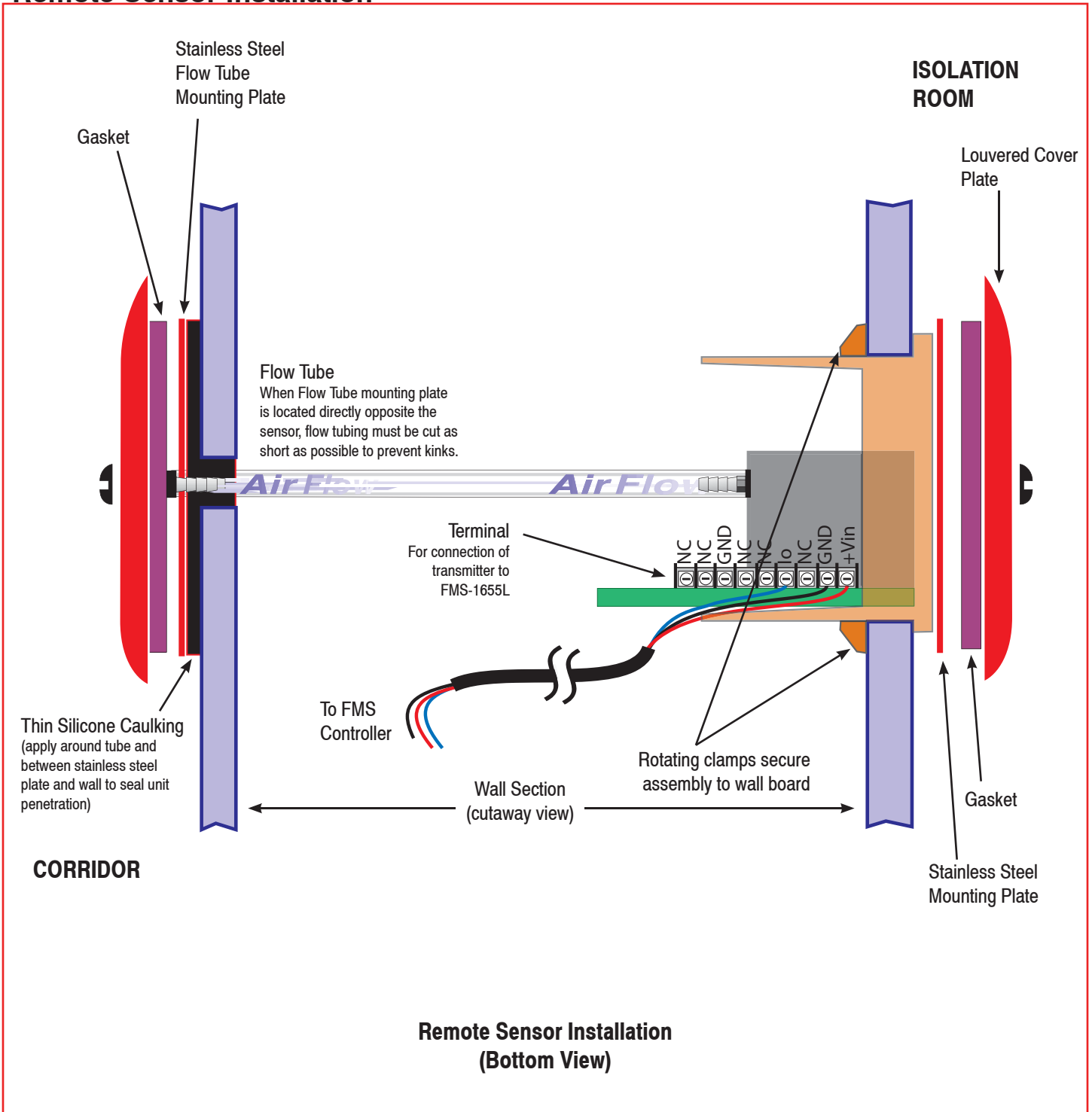
    Install jumper on pin 1 JP6 and JP3 see diagram on page 15 (If not installed at the factory).

12. If configured for dual sensor mode, repeat steps 1 through 10 for the secondary remote sensor and proceed to step 13.

13. At the FMS-1655L controller, connect the three leads from the secondary remote sensor to the terminals marked +V, AI_2, and GND. Remote sensor +Vin goes to terminal +V, remote sensor IO goes to terminal AI_2, and remote sensor GND goes to controller GND.

Remote Sensor Installation

**Remote Sensor Installation
(Side View)**

Stainless Steel
Flow Tube
Mounting Plate

Gasket

Stainless Steel
Mounting Plate

Gasket

Louvered Cover
Plate

Wall Section
(cutaway view)

CORRIDOR

Flow Tube
When Flow Tube mounting plate
is located directly opposite the
sensor, flow tubing must be cut as
short as possible to prevent kinks.

**ISOLATION
ROOM**

Terminal
For connection of transmitter to
FMS-1655L

Orange wall bracket
to be installed first
by using the rotating
clamps for secure
wall attachment.

Thin Silicone Caulking
(apply around tube and between
stainless steel plate and wall to seal
unit)

To FMS Controller

Mounting/Wiring

Remote Sensor Installation

Stainless Steel
Flow Tube
Mounting Plate

Gasket

ISOLATION
ROOM

Louvered Cover
Plate

Flow Tube
When Flow Tube mounting plate
is located directly opposite the
sensor, flow tubing must be cut as
short as possible to prevent kinks.

Terminal
For connection of
transmitter to
FMS-1655L

To FMS
Controller

Thin Silicone Caulking
(apply around tube and
between stainless steel
plate and wall to seal unit
penetration)

Wall Section
(cutaway view)

Rotating clamps secure
assembly to wall board

Gasket

CORRIDOR

Stainless Steel
Mounting Plate

**Remote Sensor Installation
(Bottom View)**

Remote Sensor Connector Strip

The electrical connections to the FMS-1655L are made via a convenient removable terminal block as shown below. All wiring should conform to the local regulations and 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, contactors, etc. Use 22 AWG or larger.
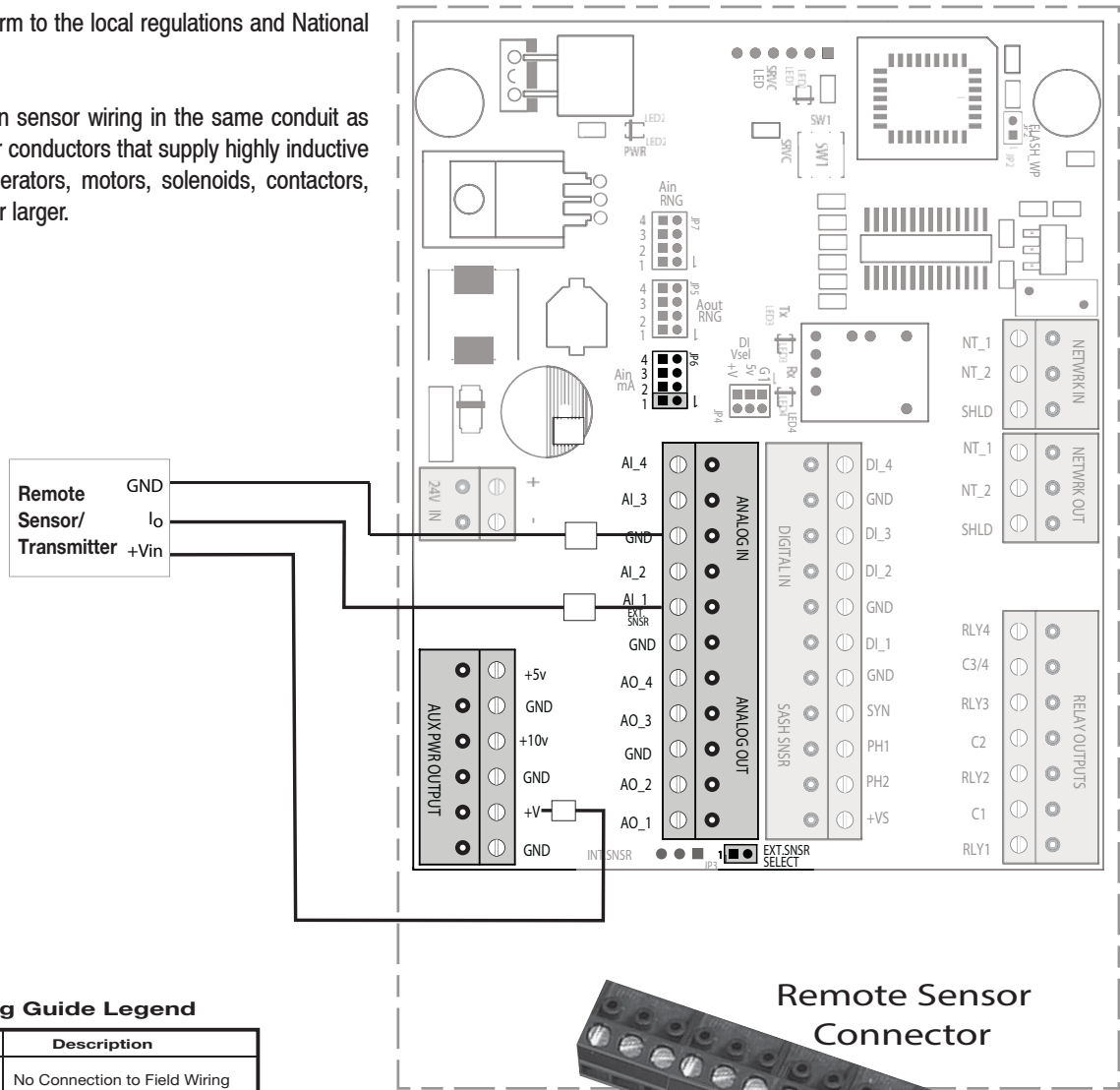
Remote Sensor/Transmitter
GND
I_O
+Vin

Remote Sensor Connector

Removable Connector for easy installation of field wiring.

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

Mounting / Wiring

Function Descriptions

Function	Description
AUX Power Output	Power supply outputs used for power auxiliary devices. Each is supply limited to 100 ma.
LON Communications	LON FTT-10A Free Topology Network building automation system can access the status and the configuration of the unit. Also used by configuration software to configure unit.
Analog Output	Unit has 4 analog outputs which can be configured for 0-5 VDC or 0-10VDC.
Analog Input	Unit has 4 analog inputs which can be configured for 4-20 mA, 0-5VDC, or 0-10VDC.
Power	The FMS-1655L can be powered by either 24 VAC or 24 VDC. A 120 VAC to 24 VAC Step Down Isolation Transformer is provided and recommended. This power must be from a Class 2 supply only.
Digital Input	The unit has 4 digital inputs with selectable pull-up voltages of 0V, +5V and +20V.
Relay Output	The unit has 4 SPDT relay outputs with normally open contacts.

Analog Output to Modulated Air Controller

CONNECTIONS FOR POWERED OUTPUT
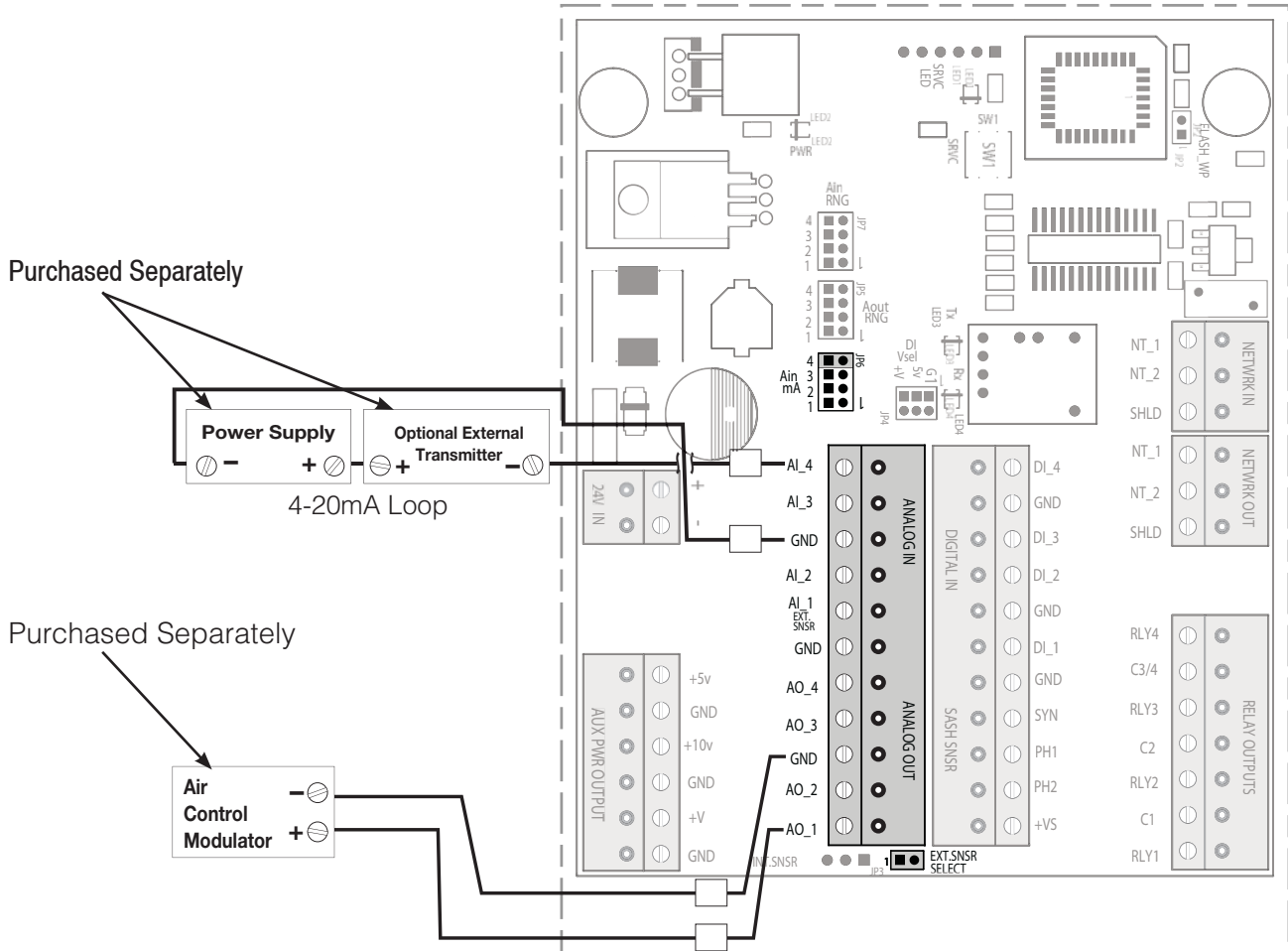
Purchased Separately

Power Supply − +   **Optional External Transmitter** − +

4-20mA Loop

Purchased Separately

Air Control Modulator − +

SRVC LED
LED1
SW1
SRVC SW1
FLASH_WP
JP2
LED2
LED2
PWR

Ain RNG
4 3 2 1
JP7

Aout RNG
4 3 2 1
JP5

DI Vsel
Tx LED3
G1
+V
Rx LED4
JP6
JP4

Ain mA
4 3 2 1

24V IN

AUX PWR OUTPUT
+5v
GND
+10v
GND
+V
GND

ANALOG IN
AI_4
AI_3
GND
AI_2
AI_1 EXT. SNSR
GND

ANALOG OUT
AO_4
AO_3
GND
AO_2
AO_1

DIGITAL IN
DI_4
GND
DI_3
DI_2
GND
DI_1
GND

SASH SNSR
SYN
PH1
PH2
+VS

EXT.SNSR
SELECT
JP3
EXT.SNSR

NETWRK IN
NT_1
NT_2
SHLD

NETWRK OUT
NT_1
NT_2
SHLD

RELAY OUTPUTS
RLY4
C3/4
RLY3
C2
RLY2
C1
RLY1

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)		Analog Input	4-20mA (JP6)		Analog Output	0-5v (JP5)		Analog Output	0-10v (JP5)
AI 4	4		AI 4	4		AO 4	4		AO 4	4
AI 3	3		AI 3	3		AO 3	3		AO 3	3
AI 2	2		AI 2	2		AO 2	2		AO 2	2
AI 1	1		AI 1	1		AO 1	1		AO 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 = JUMPER ON
3 = JUMPER OFF
2
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 Input to Remote Pressure Sensor - 4-20mA Out

4-20mA OUT

Remote Pressure Sensor — I_o, +Vin, GND

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

■ = JUMPER ON
□ = JUMPER OFF

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

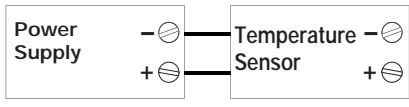| Analog Output	0-10v (JP5)
AO 4	4
AO 3	3
AO 2	2
AO 1	1

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 to 2 Remote Pressure Sensors - 4-20mA Out

4-20mA OUT

| Remote Pressure Sensor 2 | GND / I_o / +Vin |
| Remote Pressure Sensor 1 | GND / I_o / +Vin |

Wiring Guide Legend

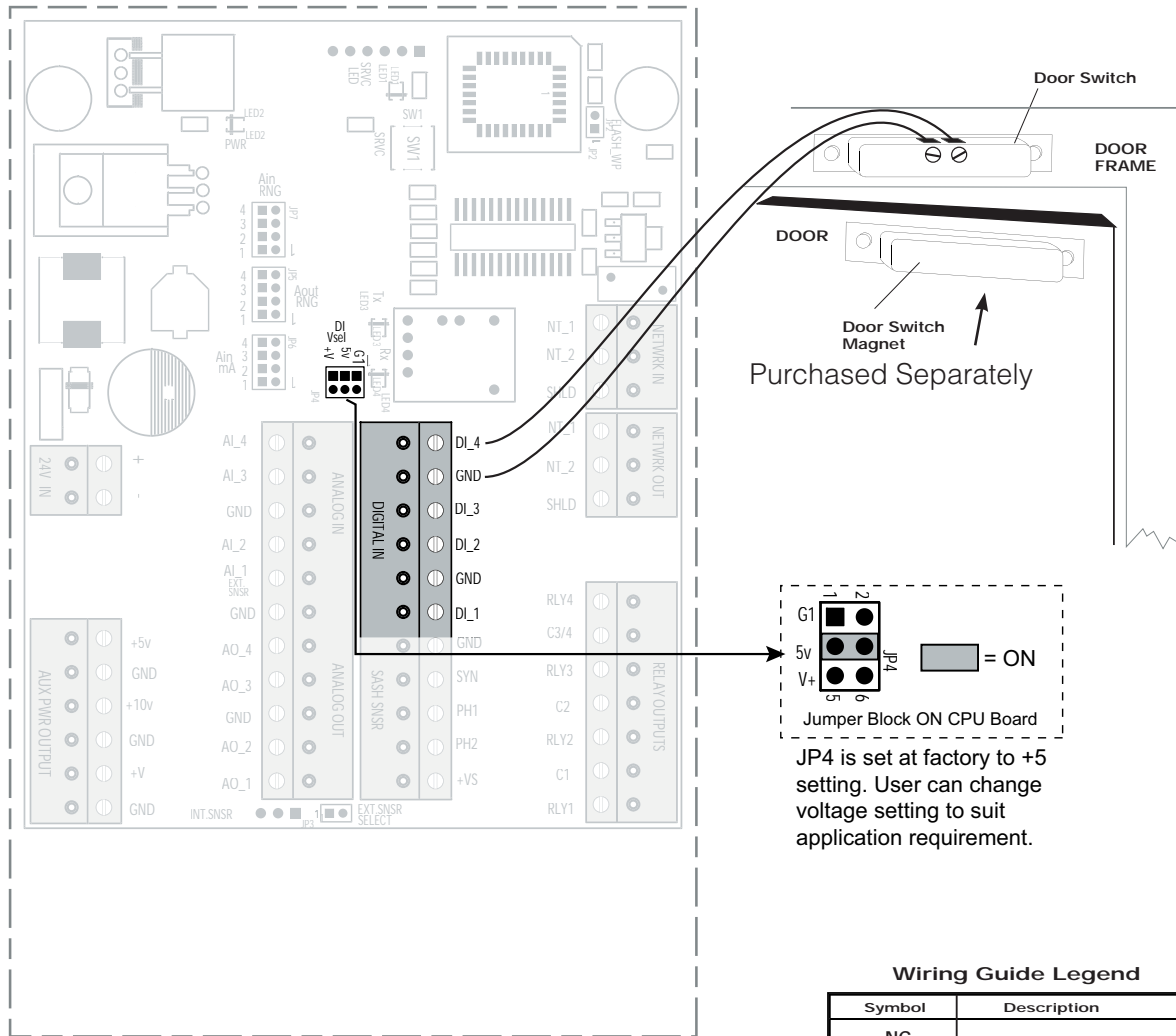| Symbol	Description
NC	No Connection to Field Wiring
	Field Wiring w/space for Number
	Internal Wiring
	Screw Terminal
	Air Flow To and From Unit Between Room and Corridor

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 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

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

= JUMPER ON
= JUMPER OFF

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 Input to Temperature Sensor

Purchased Separately

Power Supply

Temperature Sensor

24V IN

AUX PWR OUTPUT
- +5v
- GND
- +10v
- GND
- +V
- GND

AI_4
AI_3
GND
AI_2
AI_1 EXT SNSR
GND
AO_4
AO_3
GND
AO_2
AO_1

ANALOG IN
ANALOG OUT

INT.SNSR ● ● ■ 1 ■ ■ EXT.SNSR SELECT
JP3

DI_4
GND
DI_3
DI_2
GND
DI_1
GND
SYN
PH1
PH2
+VS

DIGITAL IN
SASH SNSR

NT_1
NT_2
SHLD

NETWRK IN

NT_1
NT_2
SHLD

NETWRK OUT

RLY4
C3/4
RLY3
C2
RLY2
C1
RLY1

RELAY OUTPUTS

Ain RNG JP7
Aout RNG JP5
Ain mA JP6
JP4
SW1
SRVC
SRVC LED
PWR LED2
LED2

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 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 ■■ = JUMPER ON
3 ■ ■ = JUMPER OFF

Digital Input to Door Switch

A switch having normally-open or normally-closed contacts may be used with the FMS-1655L to serve as a timed alarm buzzer inhibitor, when the room door has been opened. An optional door switch (part number SWD-100) may be purchased from Triatek for this specific purpose.
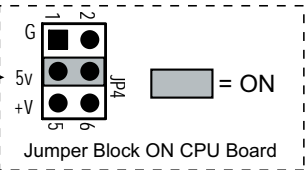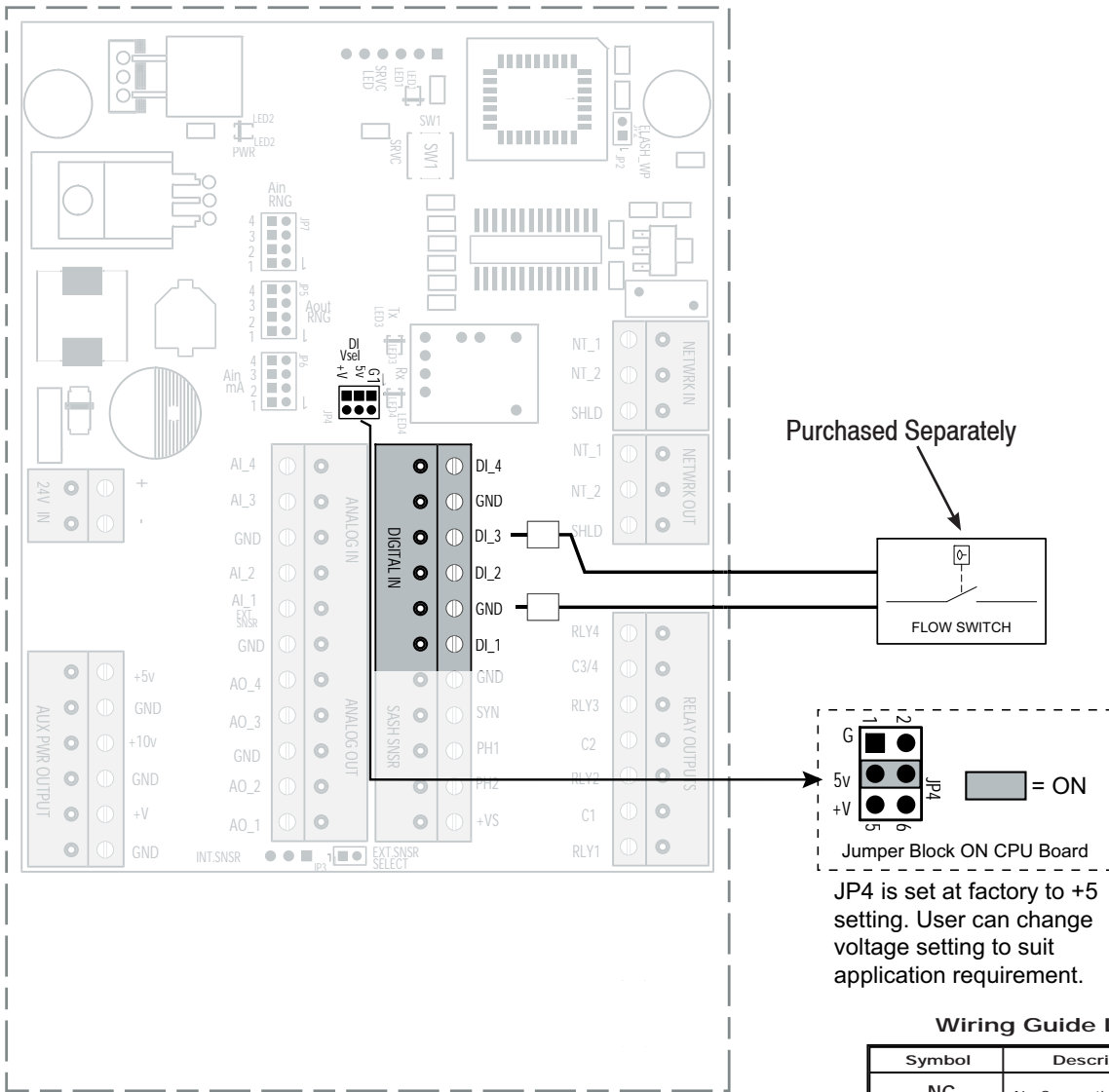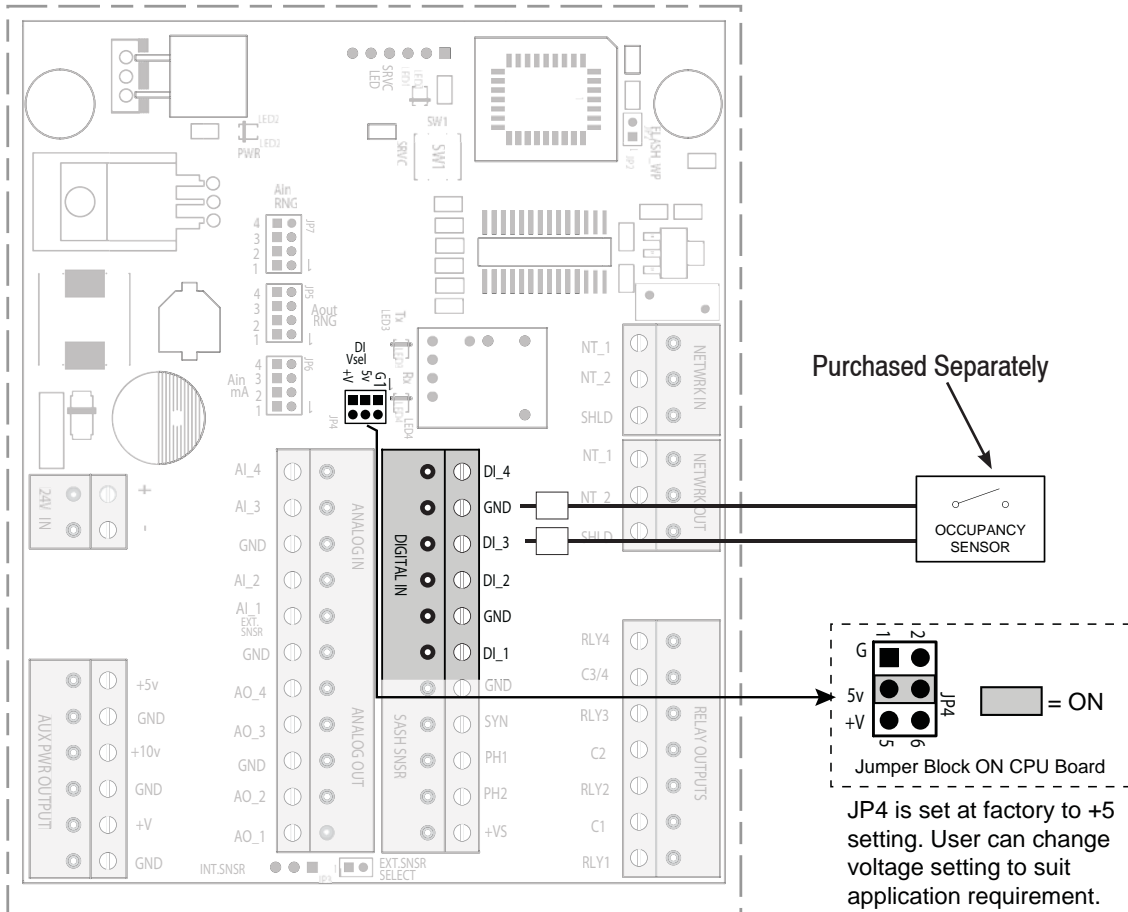

Purchased Separately

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

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

Mounting / Wiring

Digital Input to Flow Switch

Purchased Separately

FLOW SWITCH

= ON

Jumper Block ON CPU Board

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

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

Digital Input to Occupancy Sensor

Purchased Separately

OCCUPANCY SENSOR

= ON

Jumper Block ON CPU Board

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

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

Mounting / Wiring

Relay Output to Alarm

Purchased Separately

Monitor Output 1

External Power
30VDC Max

2A Max

RLY4
C3/4
RLY3
C2
RLY2
C1
RLY1

RELAY OUTPUTS
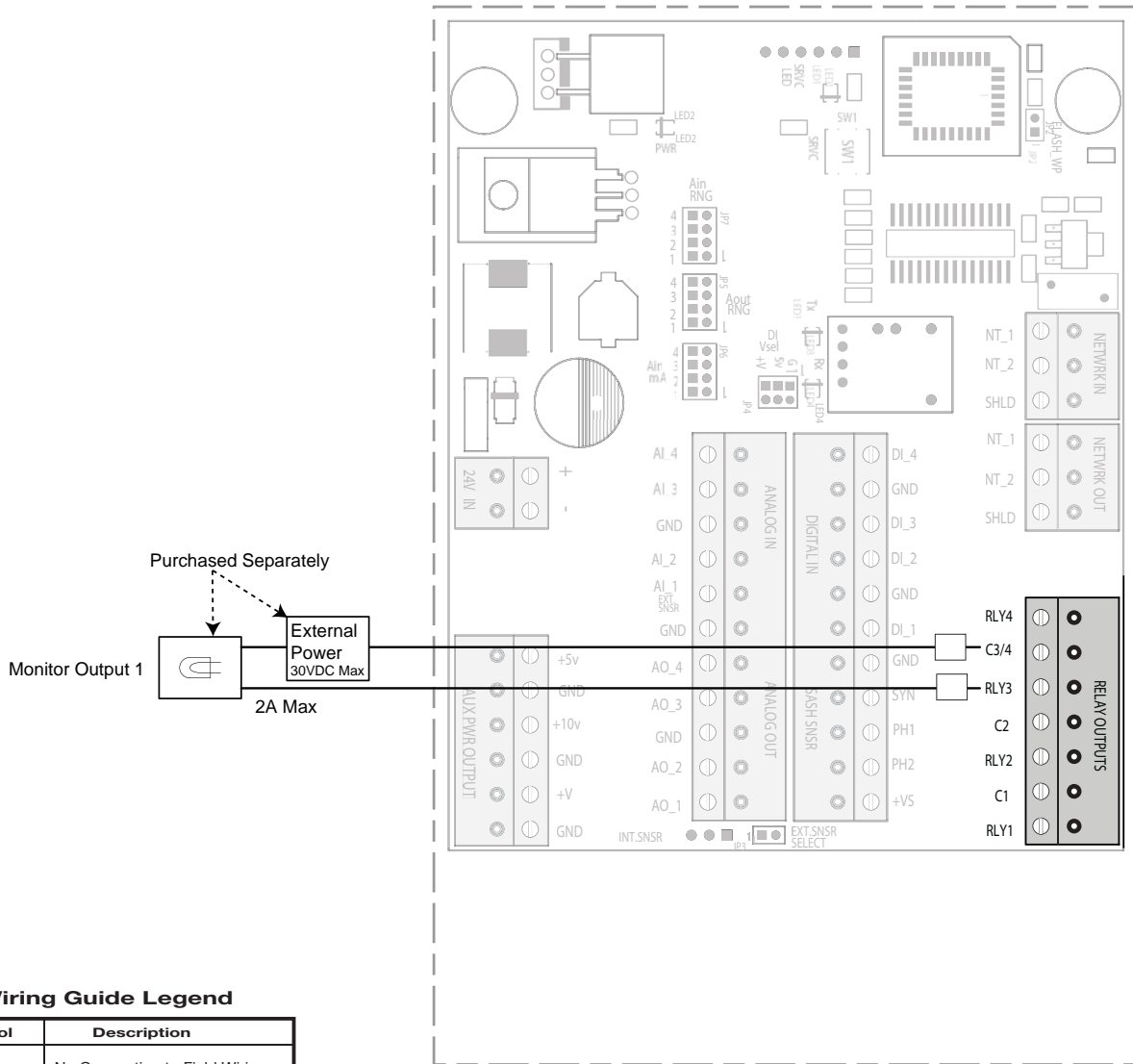
NOTE: Relay 3 & 4 Share a common contact terminal block pin, (C3/4).

Wiring Guide Legend

Symbol	Description
NC	No Connection to Field Wiring
(box)	Field Wiring w/space for Number
(line)	Internal Wiring
(circle)	Screw Terminal
← - - →	Air Flow To and From Unit Between Room and Corridor

Relay Output to Warning

Purchased Separately

External Power
30VDC Max

Monitor Output 2

2A Max

24V IN	+		AI_4	
	–		AI_3	ANALOG IN

RLY4
C3/4
RLY3
C2
RLY2
C1
RLY1

RELAY OUTPUTS

NETWRK IN
NT_1
NT_2
SHLD

NETWRK OUT
NT_1
NT_2
SHLD

ANALOG IN
AI_4
AI_3
GND
AI_2
AI_1 EXT.SNSR
GND

DIGITAL IN
DI_4
GND
DI_3
DI_2
GND
DI_1

AUX PWR OUTPUT
+5v
GND
+10v
GND
+V
GND

ANALOG OUT
AO_4
AO_3
GND
AO_2
AO_1

SASH SNSR
GND
SYN
PH1
PH2
+VS

INT.SNSR   EXT.SNSR SELECT

SRVC LED
SW1
SRVC
PWR
Ain RNG
Aout RNG
Ain mA
DI Vsel

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

Mounting / Wiring

Relay Output 1

Purchased Separately

External Power
30VDC Max

Heating Stage 1

2A Max

Suppression Device

Temperature Sensor

T

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

Power

24V IN + −

24 VAC 110 VAC

**Step Down
Isolation Transformer**
120V/240VAC/24VAC/30VA
(Provided by Triatek)

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

Mounting / Wiring

Isolated Power Supply

Red / 24 VAC / 30VA connected to the FMS

Transformer 50/60 Hz

Only Class 2 wiring in this compartment.

Ground

Blue

240 VAC 50/60 Hz

120 VAC 50/60 Hz

White

Black

1 Amp Slow Blow Fuse

Stepdown Isolation Transformer (provided with FMS Controller)
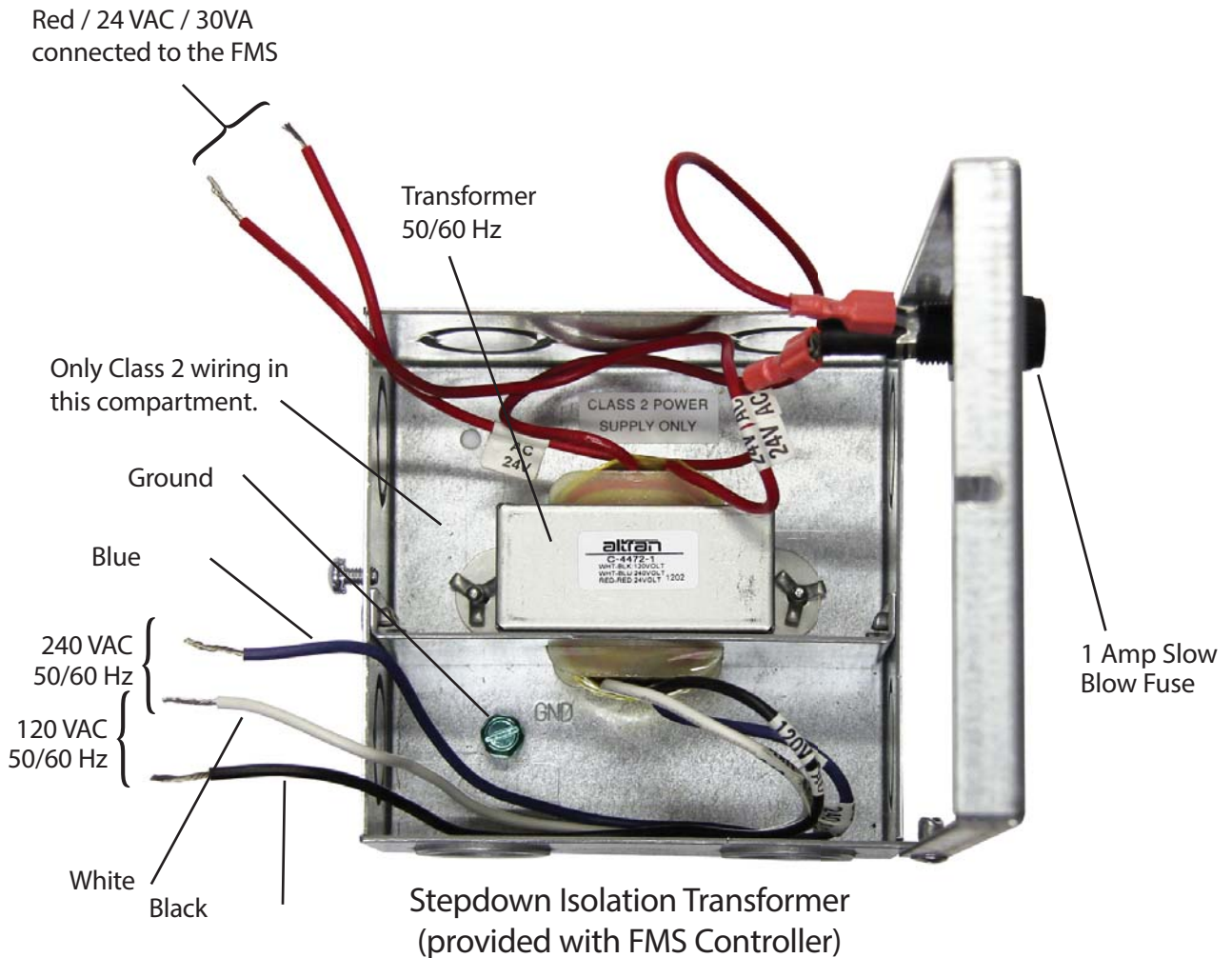
Note:

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.
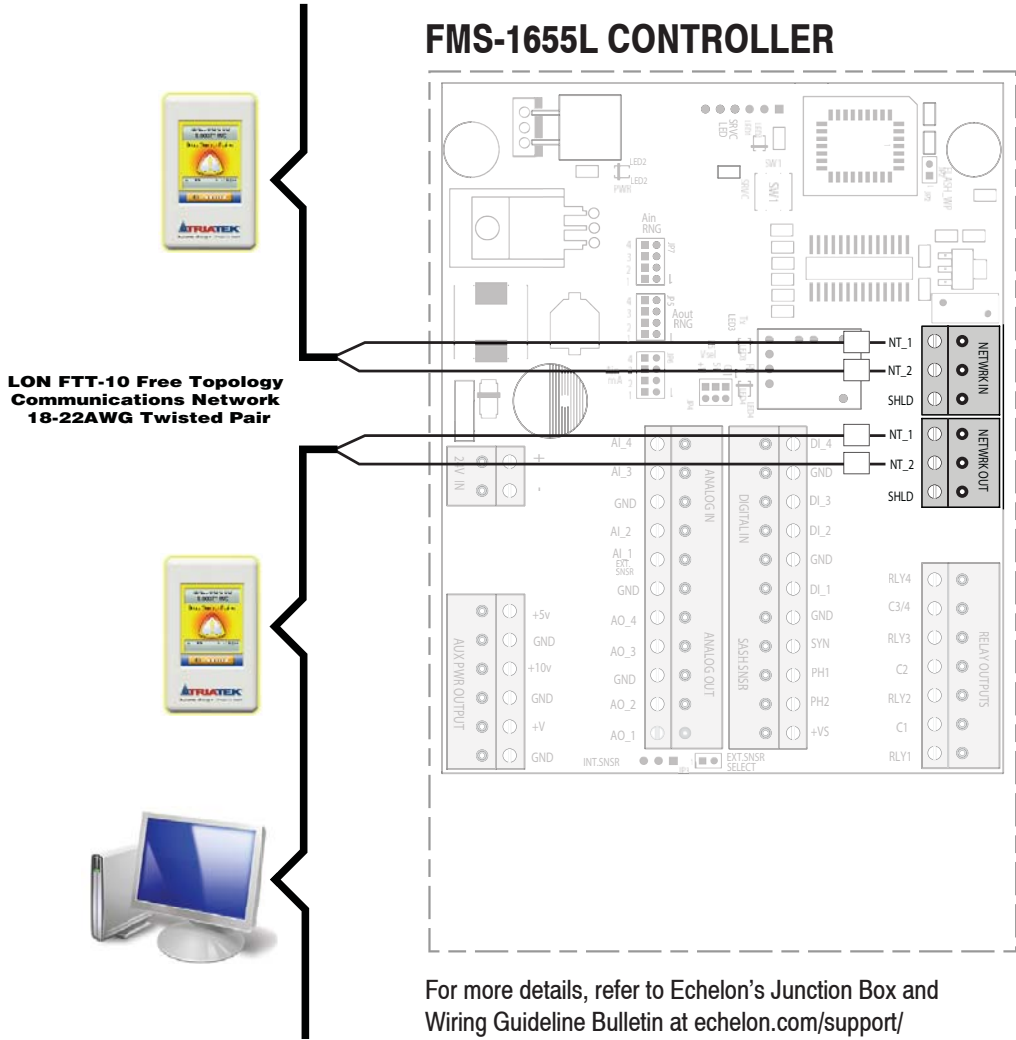
Wiring

FMS-1655L CONTROLLER

LON FTT-10 Free Topology Communications Network 18-22AWG Twisted Pair

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

Wiring Guide Legend

Symbol	Description
NC	No Connection to Field Wiring
(box)	Field Wiring w/space for Number
—	Internal Wiring
(screw)	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

COMMUNICATIONS

Wiring

LonWorks® Wiring Instructions
Communication connections require that the FMS-1655L units be connected with twisted pair communication cables to each unit in the network. The unique network address of each FMS 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 conduit of a type designed specifically for this purpose.

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

Connect a cable lead to the "NT1" terminal (#1). Connect a cable lead to the "NT2" terminal (#2).

Guidelines for Wiring
Following these guidelines will help to keep wiring-related communications problems to a minimum:

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

2. Avoid the "stub T-tap" technique of routing/connecting communications cable. 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 communications cable.

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

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

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.
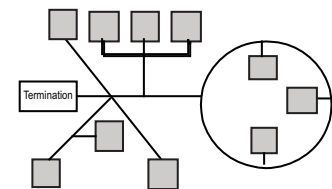

Typical Network Topologies
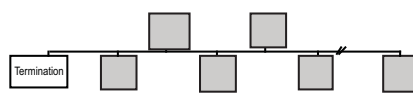
Singly Terminated Bus Topology
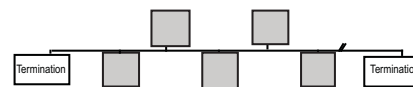
Doubly Terminated Bus Topology
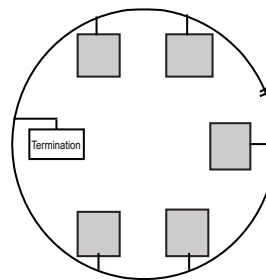
Star Topology
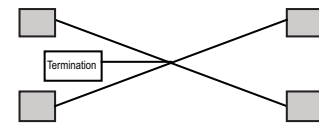
Loop Topology

Mixed Topology

Wire the LON network in accordance with LON network standards.

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

Basic Programming

Introduction

Following the installation, 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. The information displayed on the splash screen during the power up sequence may also be redisplayed using the *About This FMS* option on the *Diagnostics* menu.

The FMS-1655L incorporates a full-color touchscreen with an easy-to-use menu system that allows the user to quickly setup the controller for immediate use.

There are several hotspots that provide quick access to various settings. Refer to page 37 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.

Main Display Screen *(Single Sensor Models)*
All FMS-1655L units are shipped from the factory in the neutral isolation mode, which is represented by a blue screen with a slashed circle. The information that is displayed on the main screen includes the following from top to bottom (see Figure 1):

• Isolation room name in the upper window (up to 25 characters)
• Current differential pressure (default units: in wc)
• Current isolation mode and status
• Status icon centrally located
• Current relative humidity in the lower window (if equipped)
• Current temperature in the lower window (if equipped)

Located just below the lower window with the temperature and humidity display is the *Alarm Audible* button.

A green background with a check mark at the center indicates that the current differential pressure is within allowable limits of the desired setpoint (see Figure 2).

A yellow background with an exclamation point at the center indicates that the current differential pressure has drifted outside the allowable limits of the desired setpoint and is in the caution range (see Figure 3).
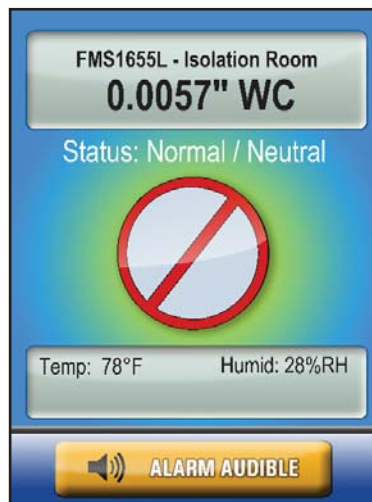

Figure 1. The main screen of the FMS-1655L in neutral mode

Figure 2. The main screen of the FMS-1655L

A red background with an exclamation point indicates that the current differential pressure has reached an unsafe condition, as it is beyond the safe operating range (see Figure 4). An alarm buzzer will sound at this screen as well providing an audible alert of the unsafe conditions.
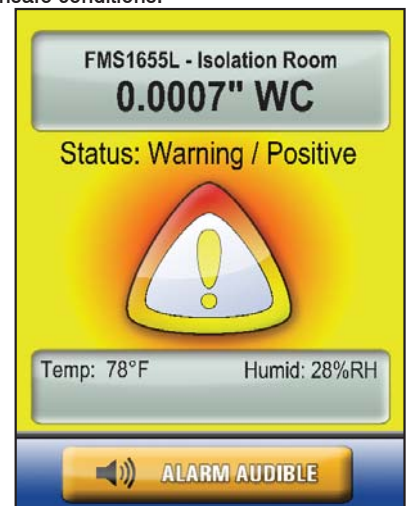

Figure 3. Warning mode

FMS-1655L PROGRAMMING
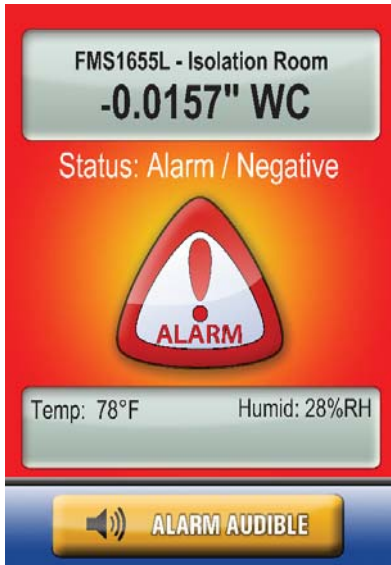
Basic Programming

Figure 4. Alarm mode

Main Display Screen *(Dual Sensor Models)*
When configured for dual sensor mode, the FMS-1655L unit is shipped with the primary sensor channel in neutral isolation mode.

The secondary sensor channel has no isolation mode associated with it, and is displayed with a green graphical background.

The split screen view (see Figure 5) includes the names associated with each monitored space (up to 25 characters), the current differential pressures for each space, the current status icon, and the alarm buzzer enable status at the lower right corner. The colors of the graphical background associated with the primary pressure (top view) are as described in the previous section, and represent the status of the primary monitored space.
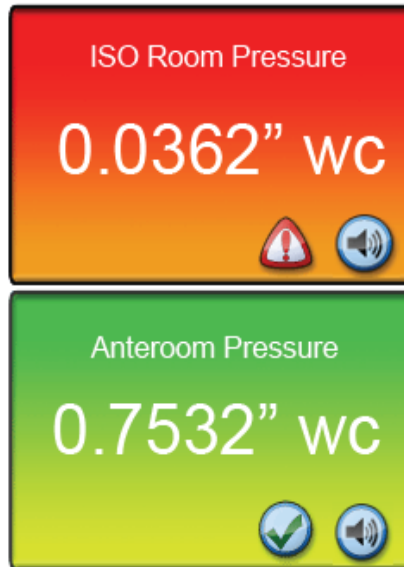
Figure 5. Dual sensor mode split screen

Configuring the FMS-1655L
Configuring the FMS-1655L settings can be accomplished in three simple steps:

1. Configure alarm limits
2. Set target setpoints
3. Setting up the analog output

The FMS-1655L comes pre-configured to operate with a remotely mounted differential pressure sensor module. The first step in configuring the FMS-1655L, following installation, is to configure the alarm and warning setpoints for each mode of isolation.

If this unit is only used for monitoring and is not used to control a damper actuator to maintain a pressure setpoint, then this is the only required step to set up the FMS-1655L.

Configuring 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 access the alarm limit settings, select the *Unit Setup* option from the *Main Setup Menu*. At the *Unit Setup* menu, select the *Alarm Limits* option. The high and low alarm limits, as well as the high and low warning limits, for the currently selected isolation mode may be specified in sequence. These limits should be specified to set the differential pressure 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.

Set Target Setpoints
If this FMS-1655L is being used for monitoring only and does not control an exhaust or supply damper actuator to maintain a specified differential pressure, then skip this step and the analog output step. Otherwise, target setpoints must be specified to allow the unit to control to specific differential pressures for each mode of isolation.

To specify the target setpoints for the FMS-1655L select the *Unit Setup* option from the *Main Setup Menu*, and then select the *Room Setup* option. At the *Isolation Room Setup* menu, select the *Edit Setpoints* option. The target setpoints for positive, negative, and neutral isolation modes may be specified in sequence for either occupied or unoccupied modes.

The final step in setting up the FMS-1655L is to configure the analog output used to control the damper actuator in the monitored isolation room.

Basic Programming

Figure 6. The Controller Setup Screen

Setting up the Analog Output
For those applications requiring control of an exhaust or supply damper actuator, the analog output must be configured accordingly.

To access the analog output configuration settings, select the *Unit Setup* option from the *Main Setup Menu*, and then select the *Controller Setup* option.

At the *Controller Setup* menu, select the *Analog Output* option (see Figure 6) to begin specifying the settings based on the specific application requirements. At the first configuration screen, the user is prompted to select an action mode (direct or reverse action), and the output range of 0-5/0-10V 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 AO-1.

Changing the Isolation Mode
The FMS-1655L can be set for positive, negative, or neutral modes of isolation. To change the isolation mode, select the *Unit Setup* option from the *Main Setup Menu*, and then select the *Room Setup* option.

At the *Isolation Room Setup* menu, select the *Isolation Mode* option which allows the user to select one of three isolation modes, unless the available modes has been restricted to either positive or negative plus neutral. Changing the mode of isolation automatically selects the pre-programmed setpoint and analog output action mode associated with each mode.

Adding Password Security
The FMS-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.

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. There is also an option that allows all of the system password entries to be purged.

Once a valid password has been specified, the user is prompted to specify one of four access levels: unrestricted, standard, basic, and restricted. The first password entry is automatically saved as unrestricted.

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.

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

Changing Display Settings
The Safety Halo™ feature significantly enhances the status visibility of individual units installed along a long corridor or hallway, and allows an unsafe condition to be immediately recognized. The Safety Halo™ display settings 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™ edge lighting. If enabled, the brightness may be adjusted from full intensity down to barely visible in daylight conditions.

FMS-1655L PROGRAMMING

Basic Programming

The brightness of the FMS-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.

When configured for single sensor mode, the main display screen may be customized 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. Dual sensor models do not have configurable display settings, other than the brightness of the Safety Halo™ settings.

Built-in Diagnostics
The FMS-1655L incorporates several diagnostic tools (see Figure 8) including an *About This FMS* option, an *Override* option, a *Real-Time View* feature, and an option to perform a *Factory Restore* of the FMS-1655L. The *About This FMS* option on the *Diagnostics* menu provides information specific to this particular unit, including the firmware versions and electronic serial number of the display module, the Neuron ID associated with the controller module, as well as its network address.

During the test and balance phase, it is often convenient to be able to adjust exhaust damper actuators 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, the *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 the PID or direct analog output control.

The FMS-1655L incorporates a convenient feature that allows the installer to view the real-time conditions of all of the hardware resources as well as several system variables. These include the analog inputs, analog outputs and digital inputs. 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.

To reset all of the modifiable configuration parameters of the FMS-1655L to their original default settings, the *Factory Restore* option on the *Diagnostics* menu may be selected.

Selecting this option invokes a warning message informing the user that all existing configuration settings will be erased and replaced with the factory-configured default settings. The user is then prompted for a password before proceeding to completely reset all configuration settings to their factory default values.

Figure 8. Built-in diagnostics

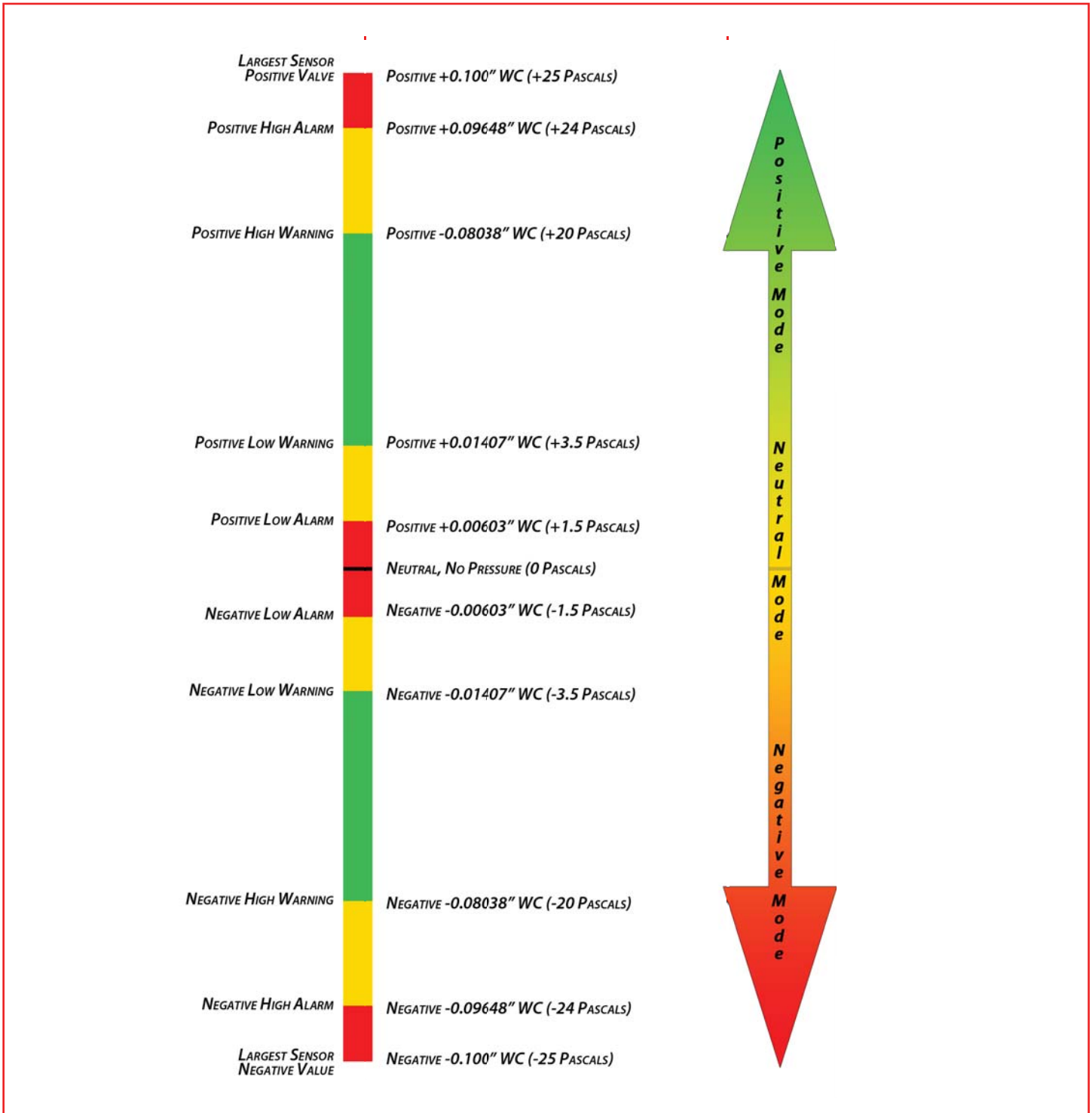## Configuring Display Module Settings

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. Test Mode	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	

MODULE SETTINGS

LARGEST SENSOR
POSITIVE VALVE — POSITIVE +0.100" WC (+25 PASCALS)

POSITIVE HIGH ALARM — POSITIVE +0.09648" WC (+24 PASCALS)

POSITIVE HIGH WARNING — POSITIVE -0.08038" WC (+20 PASCALS)

POSITIVE LOW WARNING — POSITIVE +0.01407" WC (+3.5 PASCALS)

POSITIVE LOW ALARM — POSITIVE +0.00603" WC (+1.5 PASCALS)

NEUTRAL, NO PRESSURE (0 PASCALS)

NEGATIVE LOW ALARM — NEGATIVE -0.00603" WC (-1.5 PASCALS)

NEGATIVE LOW WARNING — NEGATIVE -0.01407" WC (-3.5 PASCALS)

NEGATIVE HIGH WARNING — NEGATIVE -0.08038" WC (-20 PASCALS)

NEGATIVE HIGH ALARM — NEGATIVE -0.09648" WC (-24 PASCALS)

LARGEST SENSOR
NEGATIVE VALUE — NEGATIVE -0.100" WC (-25 PASCALS)

Positive Mode

Neutral Mode

Negative Mode

Cleaning the FMS-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 name text brings up an alphanumeric keyboard to quickly change the name of the monitored room.

Touch the Status line to invoke the popup screen to quickly change the isolation 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.
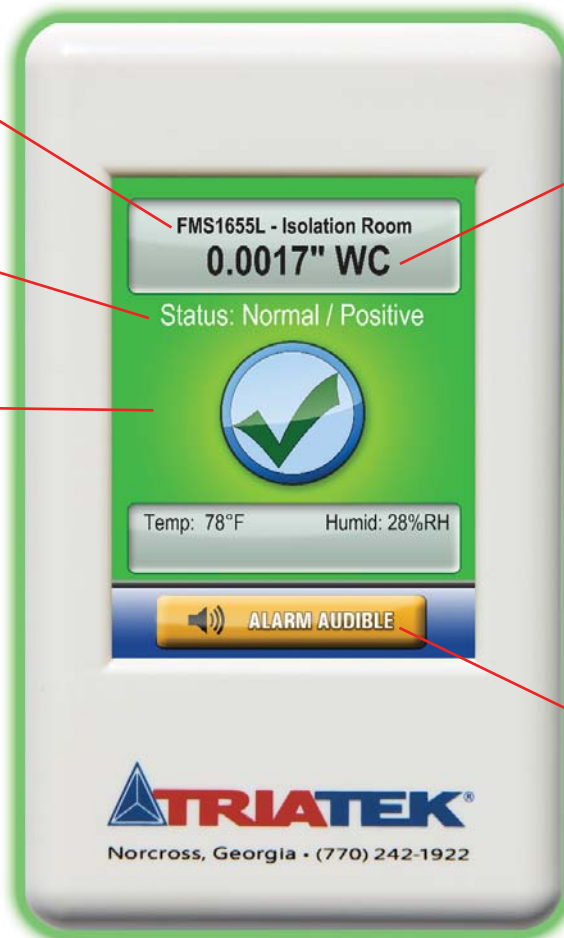
Touching the units brings up *Engineering Units* selection popup to quickly change differential pressure units.

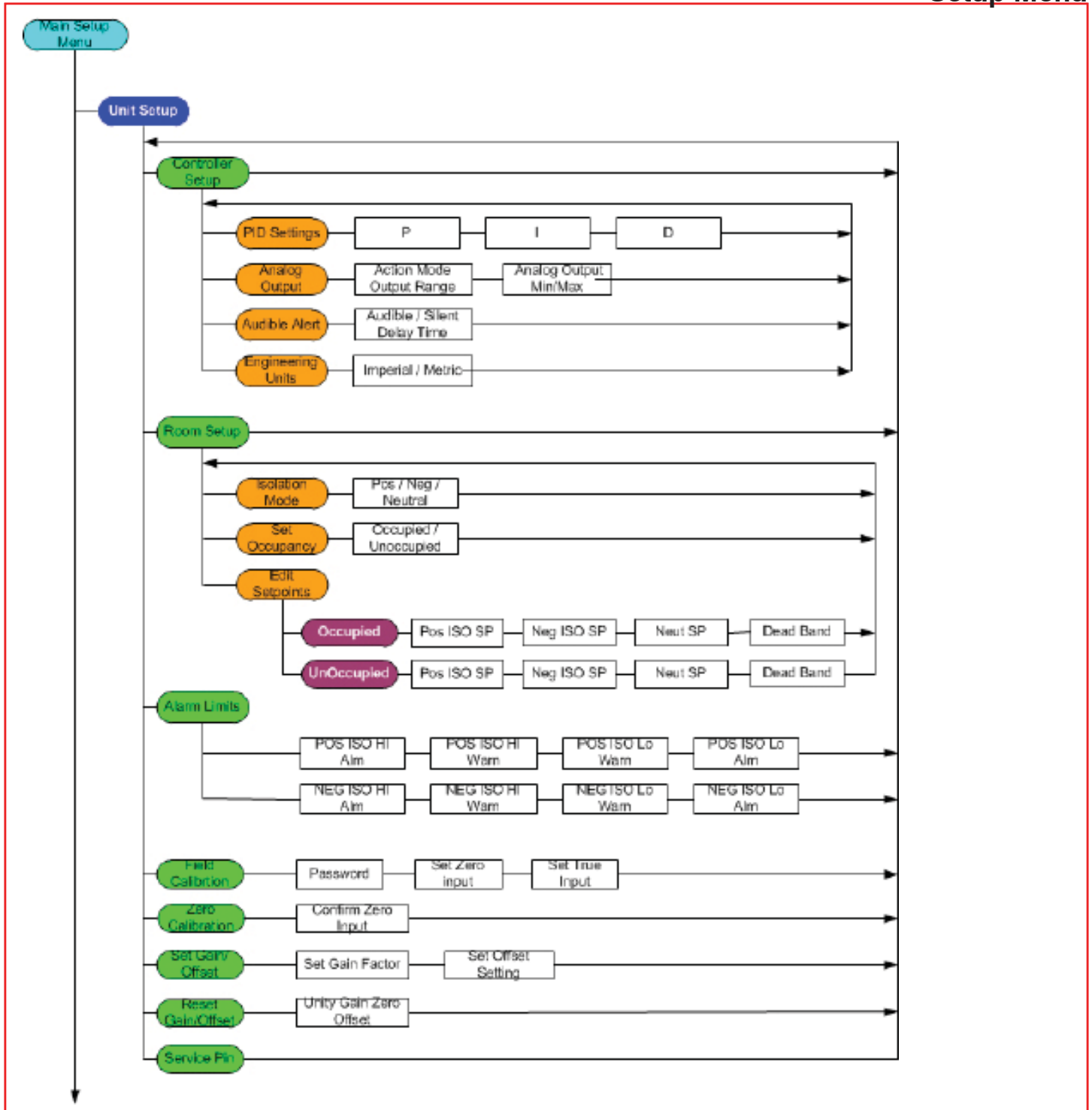Automatically reverts back to audible mode when alarm condition is removed.

FMS1655L - Isolation Room
0.0017" WC
Status: Normal / Positive
Temp: 78°F   Humid: 28%RH
ALARM AUDIBLE
TRIATEK®
Norcross, Georgia · (770) 242-1922

Hot-Spot Features of FMS-1655L Touchscreen Display
(Single sensor model)
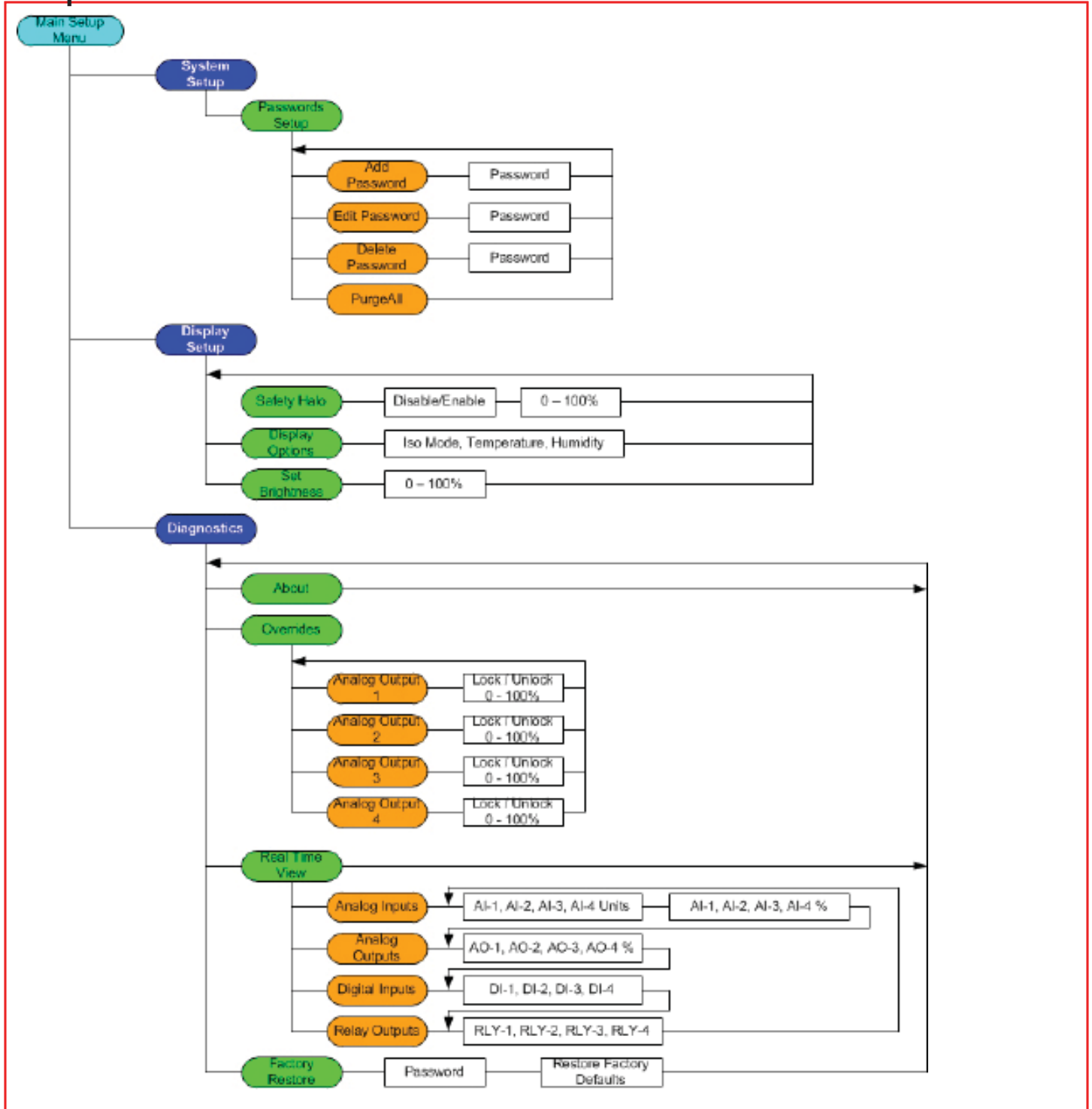
FLOW DIAGRAMS

Complete Flow Diagram
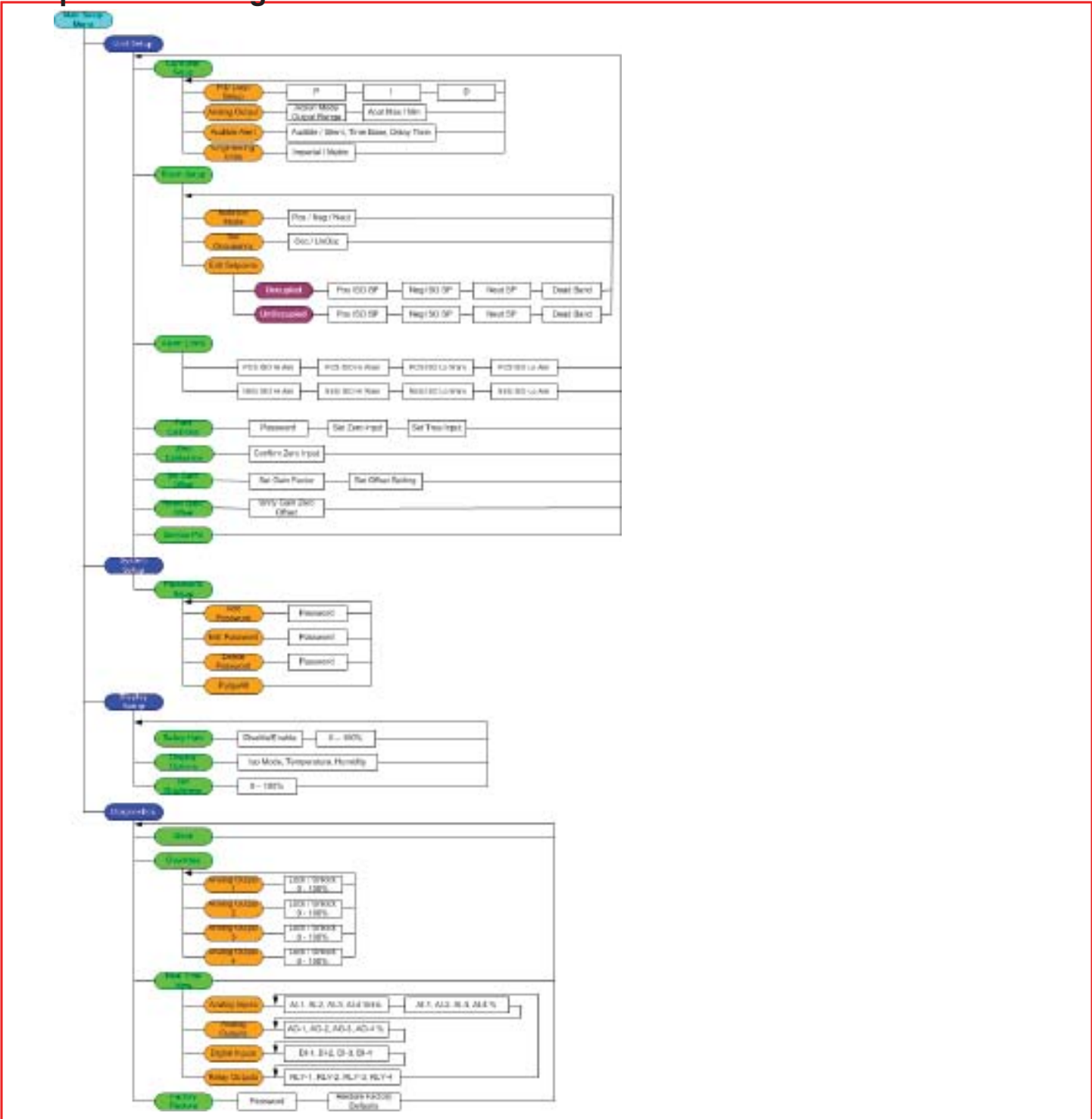
Setup Menu

FLOW DIAGRAMS

Setup Menu

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