FMS-1655
Installation Manual
Version: 12.13.16

Triatek FMS-1655
Room Pressure Controller

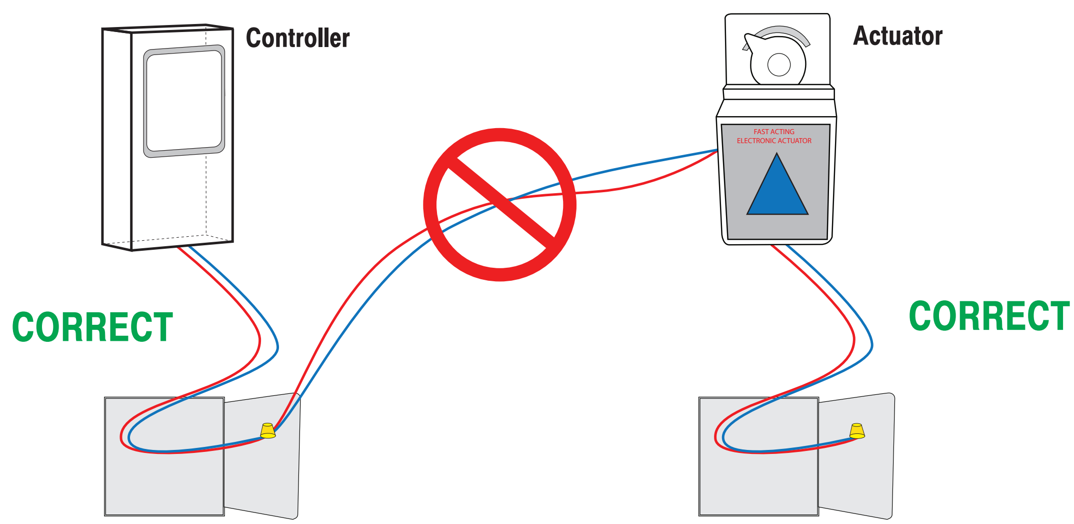
Notes

TRIATEK®

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.



120/24VAC, 30Va Transformer Supplied by Triatek

120/24VAC, 20Va Third Party Transformer

FMS-1655 Isolation Room Pressure Controller Settings

This form should be completed during the initial configuration for each room pressure controller. Be sure to configure the unit for either Positive, Negative, or both using the Isolation Mode Configuration setup procedure. See FMS-1655 Wiring and Installation Manual for details.

Room Name / Number ______________________

Unit Model Number and Serial Number (ESN) ______________________

Analog Input

- Normal Operating Pressure (reading with door closed) ______________________
- Sensor Input Mode (normal or inverted) ______________________
- Sensor Input Range (zero-based or offset) ______________________
- Sensor Pressure Range ______________________
- Positive Isolation Setpoint ______________________
- Negative Isolation Setpoint ______________________
- Neutral Isolation Setpoint ______________________
- Pressure Deadband ______________________

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, TI-1 or TI-2) ______________________
- Analog Output Action (Direct or Reverse) ______________________
- Analog Output Range (zero-based or offset) ______________________

Door Switch

- Operating Mode (normally-open or normally-closed) ______________________
- Delay Setting (0 - 240 secs) ______________________

Relay Output

- Trigger Mode (Setpoints, Isolation Mode or Occupancy) ______________________
- Input Channel (AI-1 thru AI-4, TI-1 or TI-2) ______________________
- Positive Isolation High Setpoint ______________________

FMS-1655 Isolation Room Pressure Controller Settings

Positive Isolation Low Setpoint ____________________

Negative Isolation High Setpoint ____________________

Negative Isolation Low Setpoint ____________________

Relay Acting Mode (Direct or Reverse) ____________________

Delay Setting (0 - 180 secs) ____________________

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

Enabled Input Channels (AI-1 thru AI-4, TI-1, TI-2) ____________________

Operating Mode (audible or silent) ____________________

Delay Time Base (secs or mins) ____________________

Delay Setting (0 – 60) ____________________

Alarm Quiet Period Starting Hour (0 – 23) ____________________

Alarm Quiet Period Ending Hour (0 – 23)

Engineering Units

Inches of Water or Pascals ____________________

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GENERAL

Specifications

Electrical

Optional External Remote Sensor Distance........Up to 1,000 feet
Optional External Remote Sensor........Wiring 18-22 AWG, shielded twisted pair
Power Supply........24 Vac ±10%, 30Va
Accuracy of Measurement........±0.5%FS
Pressure Range *(NIST Traceable / Individual certification available as option)*........±0.2500 "WC
Pressure/Flow........up to 0.25 "WC
4 Analog Inputs........4-20mAdc, 0-5Vdc or 0-10Vdc
4 Analog Outputs........4-20mAdc, 0-5Vdc or 0-10Vdc
2 Thermistor Inputs........NTC Type 2 or 3, 10kΩ @ 25°C
4 Digital Inputs........0-5Vdc or 0-24Vdc, Active-High or Active-Low
4 Relay Outputs........1A@24Vdc
Control Signal Wire Size........18-22 AWG
Power Supply........Class 2, 24Vac ±10%, 30VA universal 120/240 to 24 Vac, 60/50 Hz, step-down isolation transformer provided

Communications

BACnet® MS/TP network........Two-Wire Twisted Pair, RS-485 signaling
Metasys® N2 network........Two-Wire Twisted Pair, RS-485 signaling
Recommended Cable Type........ Belden 3107A

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 (applicable to surface mount models FMS-1655-s-x only)........ Belden 3125A

Mechanical

FMS-1655 Internal Sensor Flush Mount Housing (Brushed Stainless Steel) Housing........5.6"W x 8.5"H x 1.9"D
FMS-1655 Display Module Housing........3"W x 5"H x 1.13"D
Stainless Steel Cover Plate for Flow Tube........2.7"W x 4.5"H x 0.2"D
Stainless Steel Cover Plate for Remote Sensor........2.7"W x 4.5"H x 0.2"D
FMS-1655 with Flow Tube Cover Plate........approx. 3.5 lb
FMS-1655 with Optional External Remote Sensor........approx. 4.0 lb
FMS-1655 Mounting Options........Surface, Flush
Flow Tube Cover Plate Mounting........Flush

Environmental

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

Specifications

Part Number Guide

FMS1655 - ☐ - ☐ - ☐ ☐

Case Style
S = surface
F = flush
T = thin

Internal Sensor [1]
0 = no internal sensor
1 = standard internal sensor

 # Remote Sensors
0 = no remote sensors (demo)
1 = one standard remote sensor
2 = two standard remote sensors
3 = three standard remote sensors
4 = four standard remote sensors
A = optional no-flow remote sensor
B = custom remote sensor
N = no remote sensors

 # Optional Sensors [2]
Blank = no optional sensors
1 = one optional remote sensor
2 = two optional remote sensors
3 = three optional remote sensors
4 =four optional remote sensors

[1] Internal sensor option only available on flush mount model FMS1655-F-x-x
[2] This digit only applies to optional sensors specified in preceding digit

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Please Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee the interference will not occur in a particular installation. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution: To comply with the limits for an FCC Class A computing device, always use the isolated power supply module and recommended interface cables with this unit.

The Federal Communications Commission warns that changes or modifications to the unit not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

This Class-A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe-A est conforme à la norme NMB-003 du Canada.

GENERAL

Overview

The Triatek FMS-1655 Series Isolation Controller is an ultra-sensitive instrument used to monitor and/or control air pressure in hospital rooms, labs, and clean rooms. This unit is capable of measuring and displaying differential air pressures as low as 0.0001 ”WC or 0.0249 Pa. The FMS-1655 may be used to control differential pressures down to 0.0040 ”WC or 1 Pa.

Key features of the FMS-1655 include:

- Full-color touchscreen display with programmable display options and adjustable backlight
- Intuitive user interface simplifies setup and configuration of unit
- Display background changes color to indicate room status at a glance
- Patent-pending Safety Halo™ with color-coded 180° edge lighting
- Automated clean cycle with fully programmable duration for quick turnaround of patient or isolation room
- Audible and visual alarm annunciation
- Internal or remote sensor options available with up to four sensors total (one internal, three remotes OR four remotes)
- Auxiliary universal analog inputs for use with optional sensors
- Four independent PID control loops for controlling damper actuators, speed drives, hot water valves, humidifiers, etc.
- Digital input used to monitor the door switch of the monitored room
- Relay outputs used for transmitting alarm condition to remote location
- Dedicated thermistor inputs for temperature control applications
- Multi-level password protection of touchscreen user interface
- Zero calibration feature allows in-field recalibration of zero pressure reading
- Multi-protocol native (BACnet® or Metasys® N2) for easy integration with any BMS
- Manual override of analog and relay outputs assist with test and balance procedures
- Comprehensive real-time view
- Built-in diagnostics tool
- Easy-to-install backplane/backplate assembly facilitates permanent termination of all wiring

The FMS-1655 features enhanced graphics the patent-pending Safety Halo.™ This simple yet elegant feature significantly enhances the alarm status indication of the FMS-1655 by providing full 180-degree visibility. The Safety Halo™ is shipped from the factory enabled at full brightness, but may be dimmed or even disabled completely from the display setup menus.

The FMS-1655 is equipped with a 3.2” diagonal full-color touchscreen display in portrait orientation (240 x 320). The password-protected menu tree is very intuitive and simplifies the setup and configuration of the unit. The menus incorporate touch-based interfaces such as sliders, radio buttons, and dialog popups to facilitate the ease-of-use of the FMS-1655.

The display implements bright graphical color changes to indicate the three different alarm status indications of the monitored isolation room. These graphical backgrounds indicate “*Normal*” when the differential pressure is within defined limits, “*Warning*” when the differential pressure is approaching an out-of-limits condition, and “*Alarm*” when the differential pressure is outside the defined acceptable and safe limits.

The differential pressure ranges for these conditions are easily configured by the user for the specific installation when necessary, either directly from the touchscreen display or over the network from the BMS. The graphical background changes provide an at-a-glance overview of the monitored isolation room differential pressure conditions.

Alarm conditions may be defined by the user, in terms of desired differential pressure settings for the room being monitored.

When an alarm condition occurs, it may be annunciated in four user-definable ways: 1) on the display, 2) with an audible alarm, and 3) transmitted via contacts to a remote monitoring station and 4) over the BMS network. The alarm will automatically reset when the unit has sensed that the room differential pressure has returned to proper limits. The attendant may easily mute the audible alarm by touching the alarm audible button on the bottom of the display.

For many applications, it is important to have other variables such as anteroom differential pressure or relative humidity displayed along with the isolation room differential pressure. The FMS-1655 provides for this by means of three additional universal analog inputs, which may be configured for either current loop operation or voltage input operation. Each input may be scaled as needed to display correct values, and may have an engineering units selection associated. The configuration of each analog input is field selectable through the use of miniature dipswitches on the controller unit.

Overview

For those applications requiring monitoring and/or control based on temperature variances, the FMS-1655 provide two dedicated thermistor inputs in addition to the four universal analog inputs. Therefore, a total of six analog inputs are available for control applications. The two thermistor inputs may be used with negative temperature coefficient (NTC) Type 2 or Type 3 sensors.
The FMS-1655 provides four universal analog outputs, which may be configured for either current loop operation or for voltage operation.

Each analog output may be configured for proportional operation to provide a linear signal to the BMS, or for PID (proportional-integral-derivative) control operation for closed-loop feedback control of damper actuators, variable frequency (speed) drives, hot water valves, humidifiers, or other analog-controlled devices.

Each universal analog output may be field-configured for the required application using onboard configuration dipswitches on the controller module. Each analog output may also be temporarily overridden using the built-in diagnostic tools for troubleshooting during the installation and commissioning phase.

The FMS-1655 provides four digital inputs that may be used for monitoring door switches, override switches, or other devices with binary outputs. The configuration and operation of each input may be configured by the user to define the effect of a change in its state. Each digital input may have a programmable delay duration associated with it. Each digital input may be configured for either normally-closed or normally-open operation, and may also be configured to be active-high or active-low triggered. The global configuration of the digital inputs is field selectable through the use of miniature dipswitches on the controller unit.

The FMS-1655 provides four relay outputs, which may be configured for either direct-acting or reverse-acting operation, and may have a programmable delay associated to meet the specific needs of the required application.

A unique feature of the FMS-1655 is its ability to trigger a relay output based on the current mode of isolation, thereby providing support for transfer grilles, supplemental exhaust dampers, etc. Each relay output may also be temporarily overridden using the built-in diagnostic tools for troubleshooting during the installation and commissioning phase.

The user may set up multiple multi-level passwords to prevent unauthorized or casual access to the FMS-1655 configuration settings. Up to 10 passwords of up to eight digits may be programmed, with each having one of four associated access levels. Administrators and facility management personnel may have unrestricted access, while general staff may be assigned restricted access passwords which limit the functionality of the user menus.

Room pressure selection of positive, negative, or neutral isolation may be protected using limited access passwords, thereby eliminating the need for keylock switches and keys.

An optional keylock switch may be used to further control access to change in isolation modes. In some locales, it is prohibitive to allow an isolation room controller to switch between positive and negative modes of isolation. To accommodate this situation, the FMS-1655 may be configured at the factory for either positive- and neutral-isolation modes only or negative- and neutral-isolation modes.

The FMS-1655 provides native support for multiple networking protocols, including BACnet® MS/TP and Metasys® N2 Open. With multi-protocol native support, the FMS-1655 is able to communicate room status information to the building automation system, regardless of which protocol is used. (For applications requiring LonWorks® networking capability, contact the factory about Triatek's FMS-1655L series) The configuration of the desired protocol is field selectable through the use of miniature dipswitches on the controller unit.

The FMS-1655 provides a unique set of built-in diagnostics tools that are extremely valuable for facilitating the troubleshooting process during the installation and commissioning phase.

Included in these built-in diagnostics tools are manual override capabilities for both analog outputs and relay outputs, and a comprehensive real-time view capability that allows the real-time values and states of each analog and digital input and output to be displayed conveniently. This is an extremely useful tool that facilitates the verification and certification processes conducted by typical test and balance personnel during the commissioning of the system.

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.

The FMS-1655 incorporates an innovative backplane/backplate assembly which greatly facilitates the installation process and permits all wiring terminations to be permanent.
The FMS-1655 serves as a direct drop-in functional replacement for all previous models of the FMS-1600 series of isolation monitors.

FMS-1655 Flush-Mount with Internal Sensor

Introduction
The FMS-1655 flush-mount model has an integrated internal sensor and should be installed outside of the isolation room to be monitored in the corridor wall. Sensor tubing should be between this corridor and isolation room in the most direct and shortest path.

The FMS-1655 is calibrated with configuration settings programmed at the factory according to the customer specifications, if provided. Otherwise, each unit is shipped with factory-default configuration settings. The user may change these settings by following the procedures outlined in the configuration/ programming section of this manual.

The electrical connections to the FMS-1655 are made via convenient terminal block connectors on the backplane/backplate assembly as shown on page 7. All wiring should conform to local regulations and to the National Electrical Code (NEC). Precautions must be taken to avoid running sensor wiring in the same conduit as line voltage or other conductors that supply highly inductive loads such as generators, motors, solenoids, contactors, and other sources of induced noise. Use 22 AWG or larger for all electrical wiring terminations.

Following the proper installation of the FMS-1655, apply power to the unit and confirm that you hear a brief chirp at the touchscreen display, which indicates that the display module is communicating with the controller module.

There will be a six second power up delay during which the Safety Halo™ will cycle through the following colors: red, green, blue, yellow, magenta, cyan, and white. After this power up delay, the unit will display a brief five second animation of the action icons, followed by the FMS-1655 splash screen. This splash screen displays the model number, electronic serial numbers, firmware version numbers, protocol selection, and current network address. The splash screen remains displayed for about 15 seconds, and then proceeds to the main differential pressure screen.

Mounting Procedure
1. Choose a location free of airflow obstructions, and minimal air turbulence. The installation should also avoid stagnant air or "short circuiting" of the supply air to the exhaust. Typically, the FMS-1655 should be installed at eye level. It should be mounted in a location that provides convenient access such that the display may be viewed with minimal glare and the touchscreen is easily accessible to facilitate silencing the unit in the event of an alarm.

The FMS-1655 is pre-configured at the factory with the Safety Halo™ status indicator bezel connected to the internal circuitry on the display board, and has been tested for proper operation. The Safety Halo™ should not be removed from the flush mount faceplate, as it may damage the internal circuitry and/or the bezel itself. Attempting to separate the Safety Halo™ from the flush mount faceplate will void the manufacturer's warranty.

2. Before disassembling the flush-mount electronics assembly, locate the clear pressure tubing that extends from the lower corner of the metal backplate to the nipple at the inside face of the bottom of the faceplate and disconnect it. The other end of this tubing should remain attached to the right-angle barbed fitting at the lower corner of the metal backplate.

3. Disassemble the flush-mount electronics assembly by grasping the metal backplate and pulling it apart from the faceplate.

The metal backplate is attached to the backplane subassembly which incorporates all of the wiring termination points.

4. Run the conduit and all wiring according to local regulations and National Electrical Code.

IMPORTANT: Use the 24 VAC stepdown isolation transformer, provided with the unit, to power the FMS-1655; this will prevent inadvertent ground loop issues and other problems that might otherwise be encountered.

5. Pull slack from the tube on the opposite side of the wall as the backplane/backplate assembly is moved toward the wall for mounting. On the opposite side, the return air stainless base and louvered plate must be mounted as shown on page 10. Caulk behind the stainless mounting plate so that there may be no air flow through the wall. Mount the backplane/backplate assembly to the wall with the appropriate screws (and wall anchors if using the alternate installation method).

FMS-1655 Flush-Mount with Internal Sensor

6. Terminate all electrical connections at the backplane taking note of the terminal labels. Note that the power connector is distinguished as it is of a different color and separated from the other connectors. The 45-degree positioned wire openings on the connectors should greatly facilitate the wire termination process.

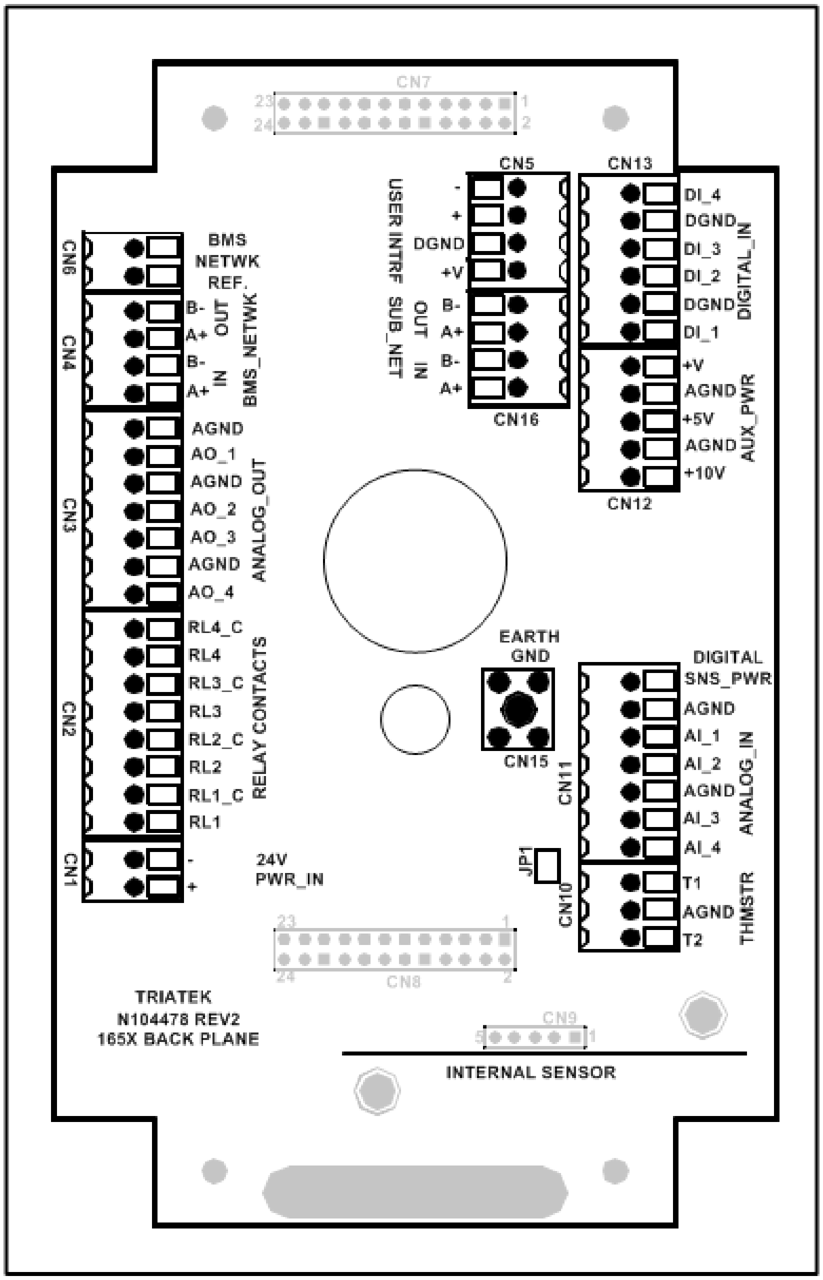
7. On the opposite side of the wall, a length of pressure tubing will be protruding from the wall. Cut the tubing as needed to leave approximately two inches protruding. Press the tubing onto the barbed fitting of the flow tube mounting plate (see page 10). Push the mounting plate and tube toward the wall, forcing the excess into the wall space. Fasten the mounting plate to the wall using appropriate hardware.

8. Mount the louvered stainless steel cover plate to the mounting plate with the screws supplied.

9. Apply power to the FMS-1655 and confirm that following a brief initialization sequence, the unit displays the room differential pressure and the Safety Halo™ status matches that of the main display screen. FMS-1655 units are shipped from the factory in neutral isolation mode.

Internal Sensor

The FMS-1655 is calibrated with settings programmed in the factory according to the customer specifications. The user can change the settings by using the instructions provided in the ***Quick Start*** section of this manual beginning on page 38.



Notes

FMS-1655 With Remote Sensor

Introduction
The flexibility of the FMS-1655 provides for several different configurations with respect to the sensor location.

FMS-1655 models without an internal sensor (FMS-1655-x-0-x) include at least one remote sensor for measuring the differential pressure of the monitored room. This remote sensor module must be installed in the wall between the monitored isolation room and the adjoining corridor or anteroom.

The remote sensor module should be installed with the attached stainless steel mounting plate facing the isolation or patient room and the reference plate facing the corridor or anteroom. Please see illustrations on pages 10 and 11 for more details.

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

A 3-conductor (22 AWG) cable MUST be connected between the remote sensor module and the main controller module for each sensor included with the unit. The length of this cable should not exceed 1,000 feet.

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

Mounting Procedure
1. Cut an opening in the wall of the isolation room to receive the supplied low voltage mounting bracket for the remote sensor electronics. Nominal hole dimensions are 3.65" H x 2.15" W.

2. Drill a 7/16" 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 included low-voltage mounting bracket in the drywall opening, and pull the 3-conductor signal cable through the mounting bracket.

5. Push a length of flow tube through the back hole on through the 7/16" hole in the opposite wall.

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-1655 backplane, assuming the colors of the 3-conductor signal cable being red, black, and green, connect the leads to the terminals as follows:

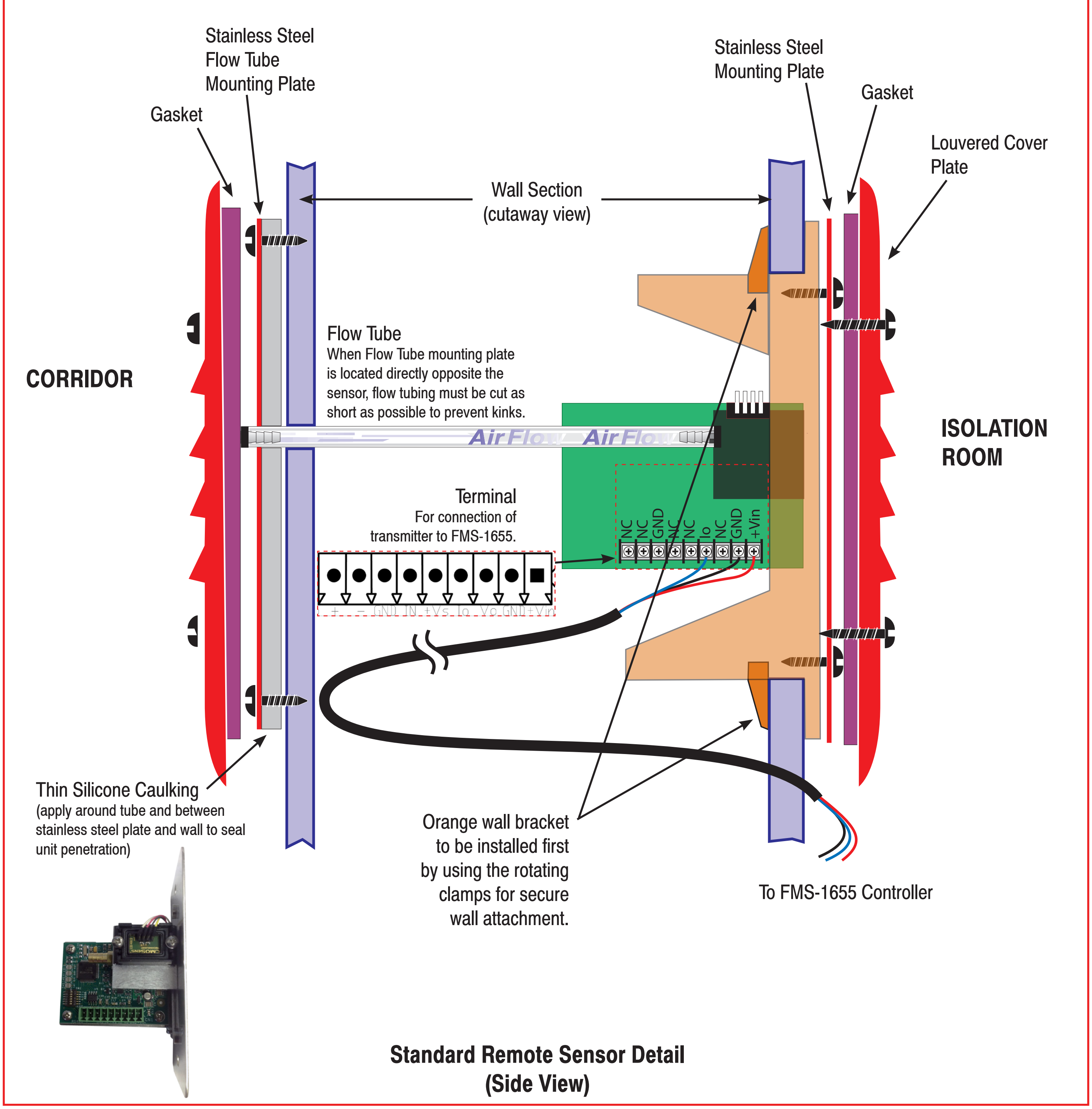
Red: **Digital SNS_PWR**
Black: **AGND**
Green: **AI_1**

If more than one remote sensor is being used with the FMS-1655, then each must be connected as above with the green leads connected to the subsequent analog input terminals AI_2 through AI_4.

12. Connect the 3-conductor signal cable to remote sensor as follows:

Red: **+Vin**
Black: **GND**
Green: **I_O**

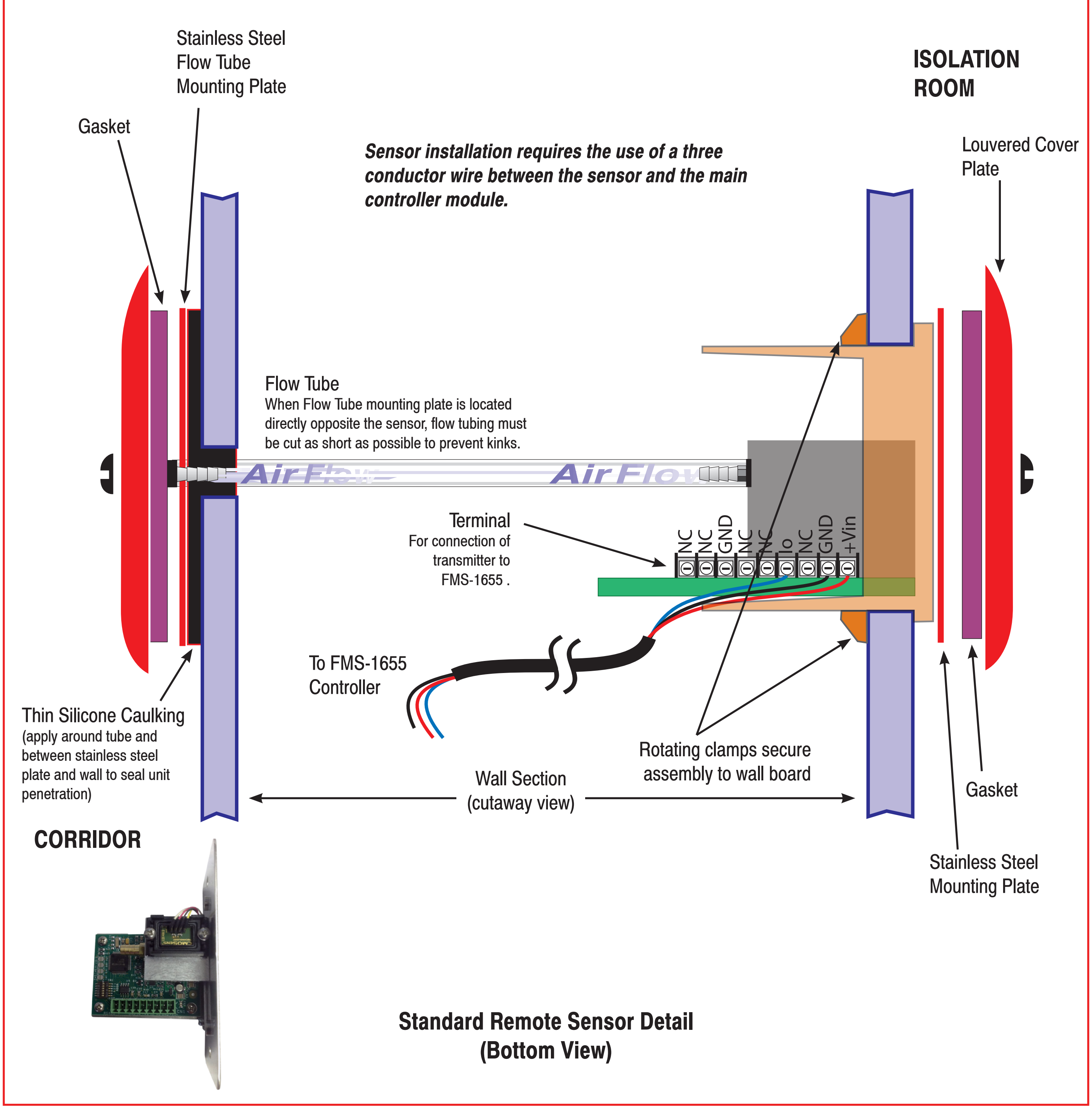
FMS-1655 with Standard Remote Sensor (9-Pin)



Standard Remote Sensor Detail
(Side View)

MOUNTING/WIRING

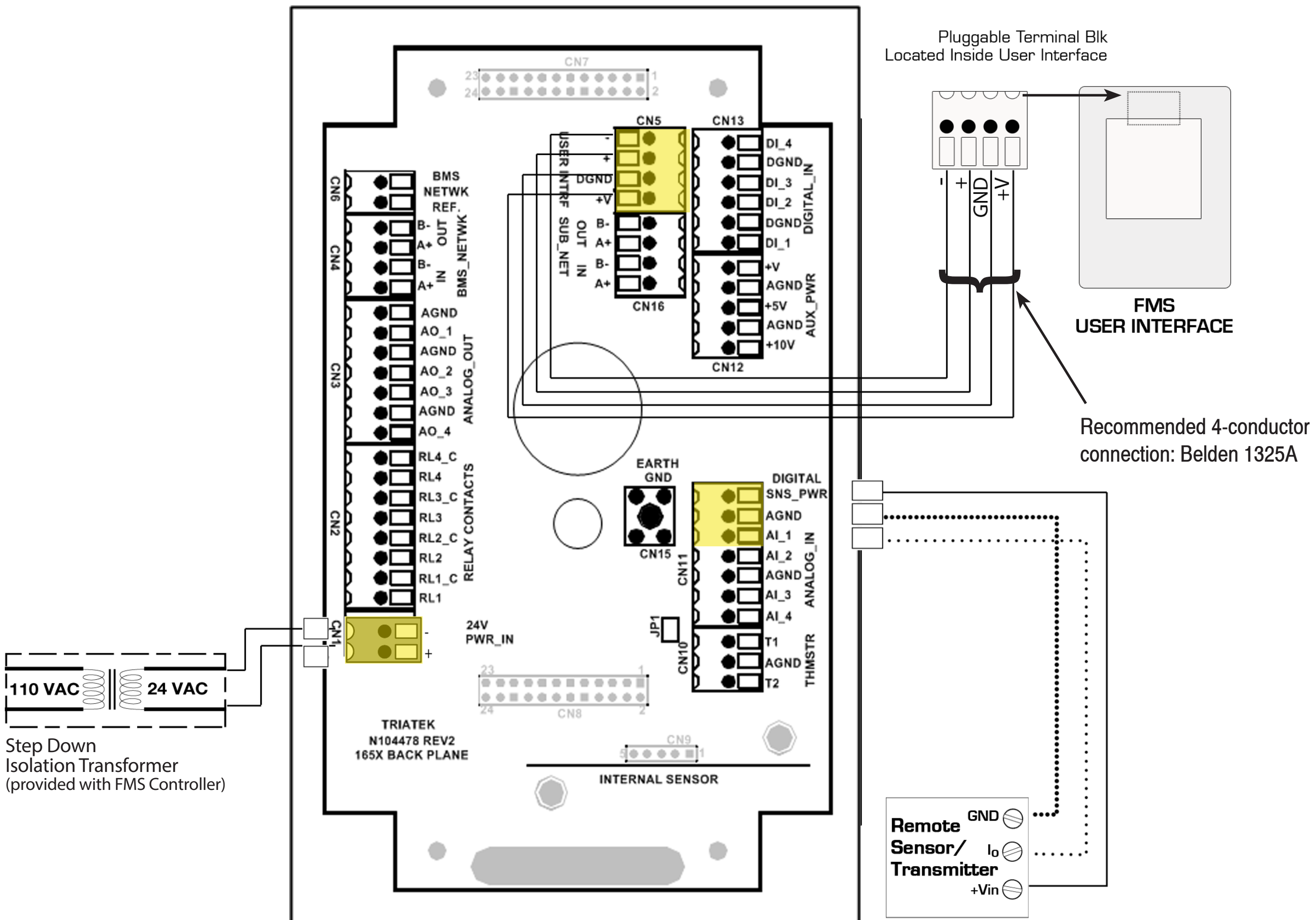
FMS-1655 with Standard Remote Sensor (9-Pin)



Standard Remote Sensor Detail (Bottom View)

Remote Sensor Configuration

The electrical connections to the FMS-1655 made via a convenient backplate/backplate assembly is shown below. All wiring should conform to the local regulations and National Electric Code. Take care not to run sensor wiring in the same conduit as the line voltage or other conductors that supply highly inductive loads such as generators, motors, solenoids, contactors, etc. Use 22AWG or larger.



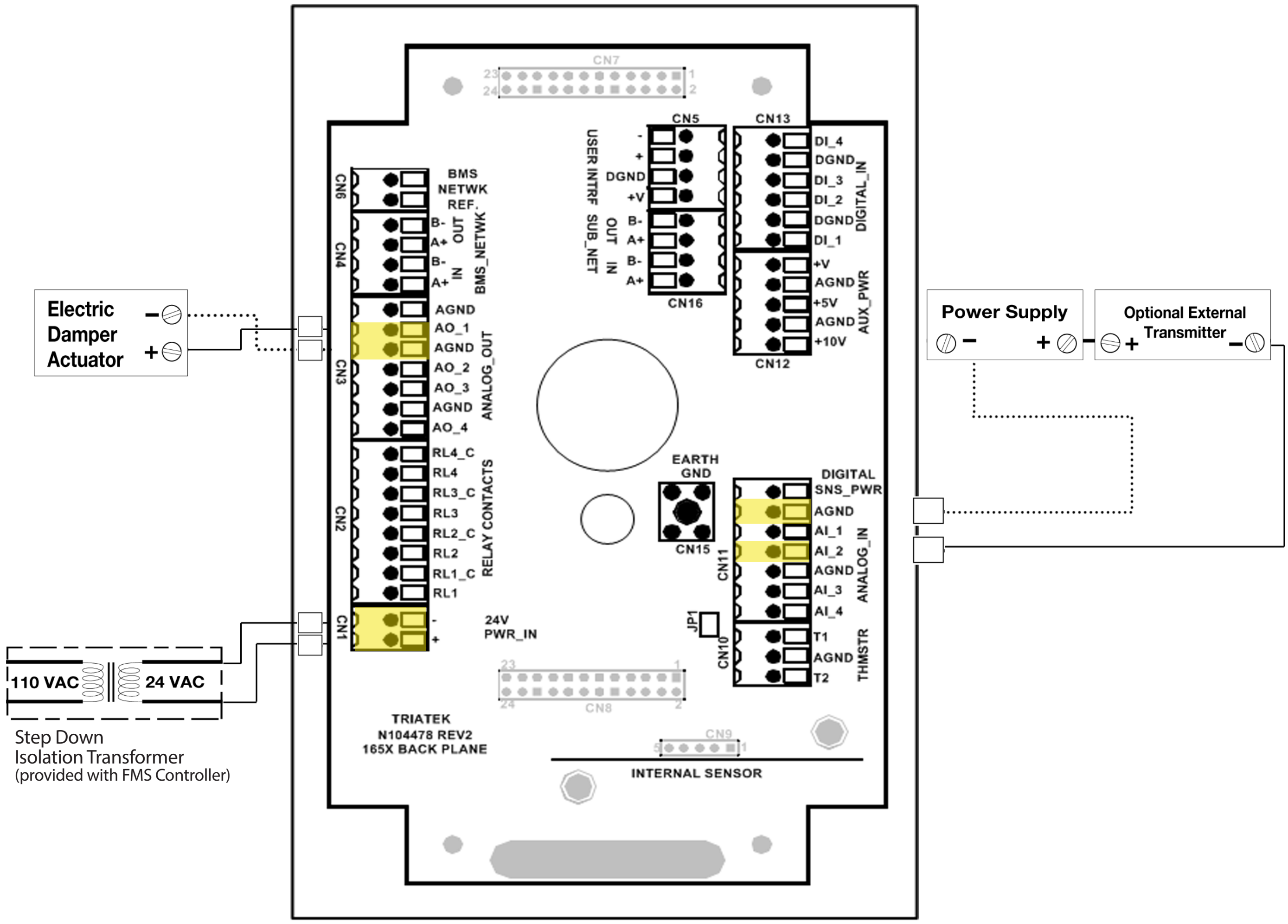
Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 1 = ON, S1 - 5 = OFF (AI - 1 set at 4 - 20mA Input)

MOUNTING/WIRING - INTERNAL SENSOR

Analog Output to Electric Damper Actuator



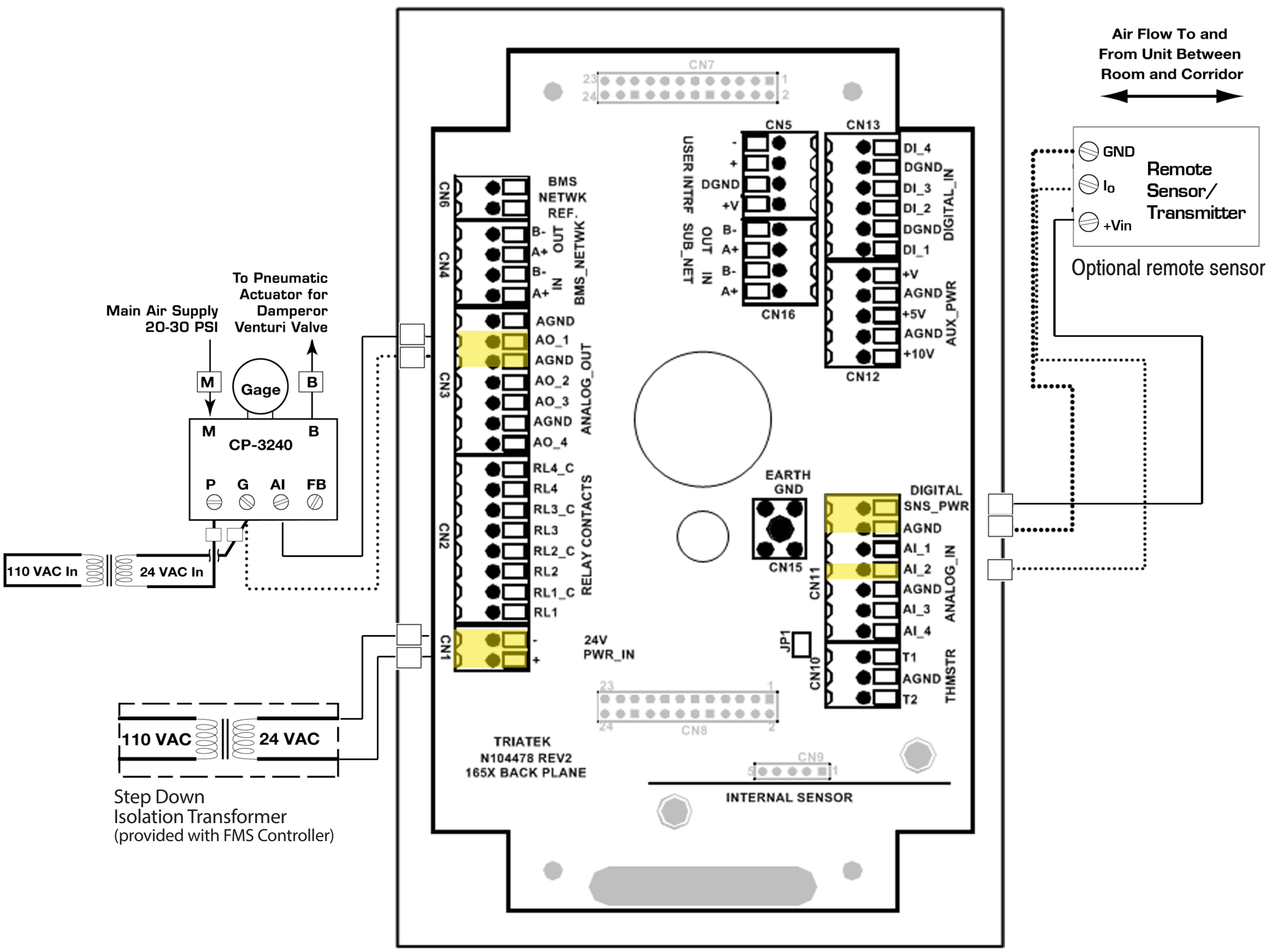
Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 2 = ON, S1 - 6 = OFF (AI - 2 set as 4 - 20mA Input)
S4 - 1 = ON (AO - 1 set as Voltage Output)

MOUNTING/WIRING - INTERNAL SENSOR

Analog Output to Pneumatic Damper Actuator



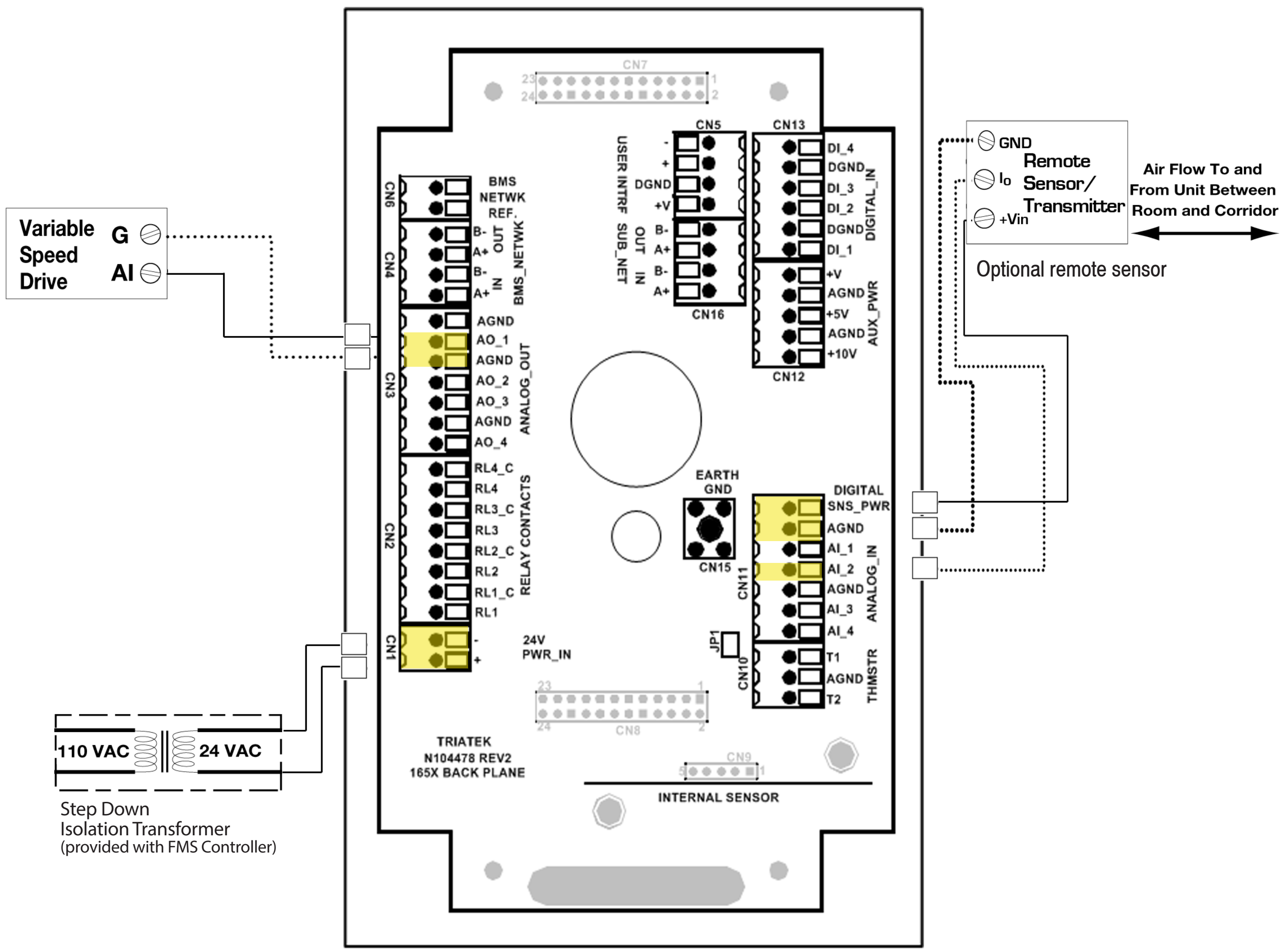
Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 2 = ON, S1 - 6 = OFF (AI - 2 set as 4 - 20mA Input)
S4 - 1 = ON (AO - 1 set as Voltage Output)

MOUNTING/WIRING - INTERNAL SENSOR

Analog Output to Variable Speed Drive



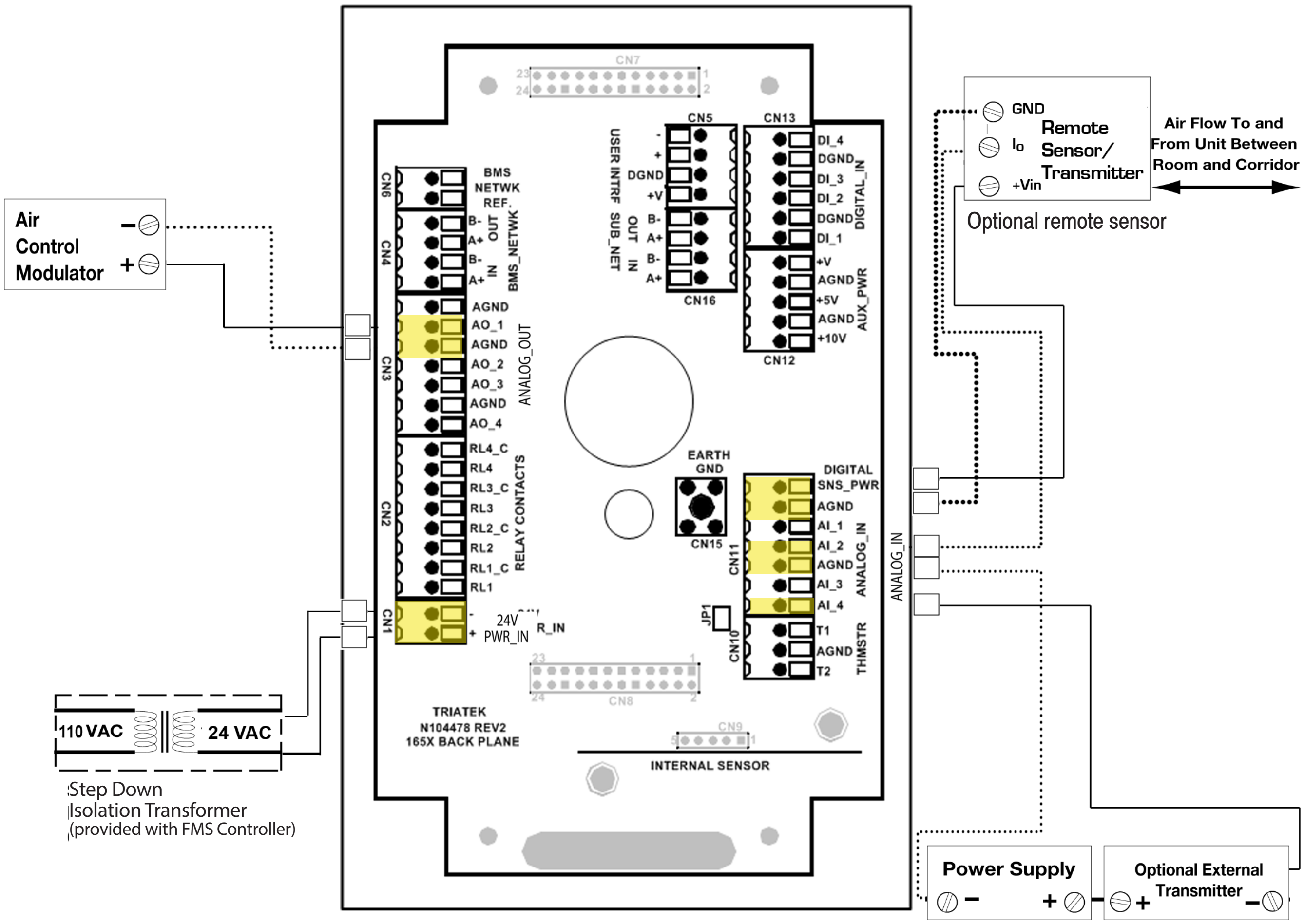
Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 2 = ON, S1 - 6 = OFF (AI - 2 set as 4 - 20mA Input)
S4 - 1 = ON (AO - 1 set as Voltage Output)

MOUNTING/WIRING - INTERNAL SENSOR

Analog Output to Modulated Air Controller



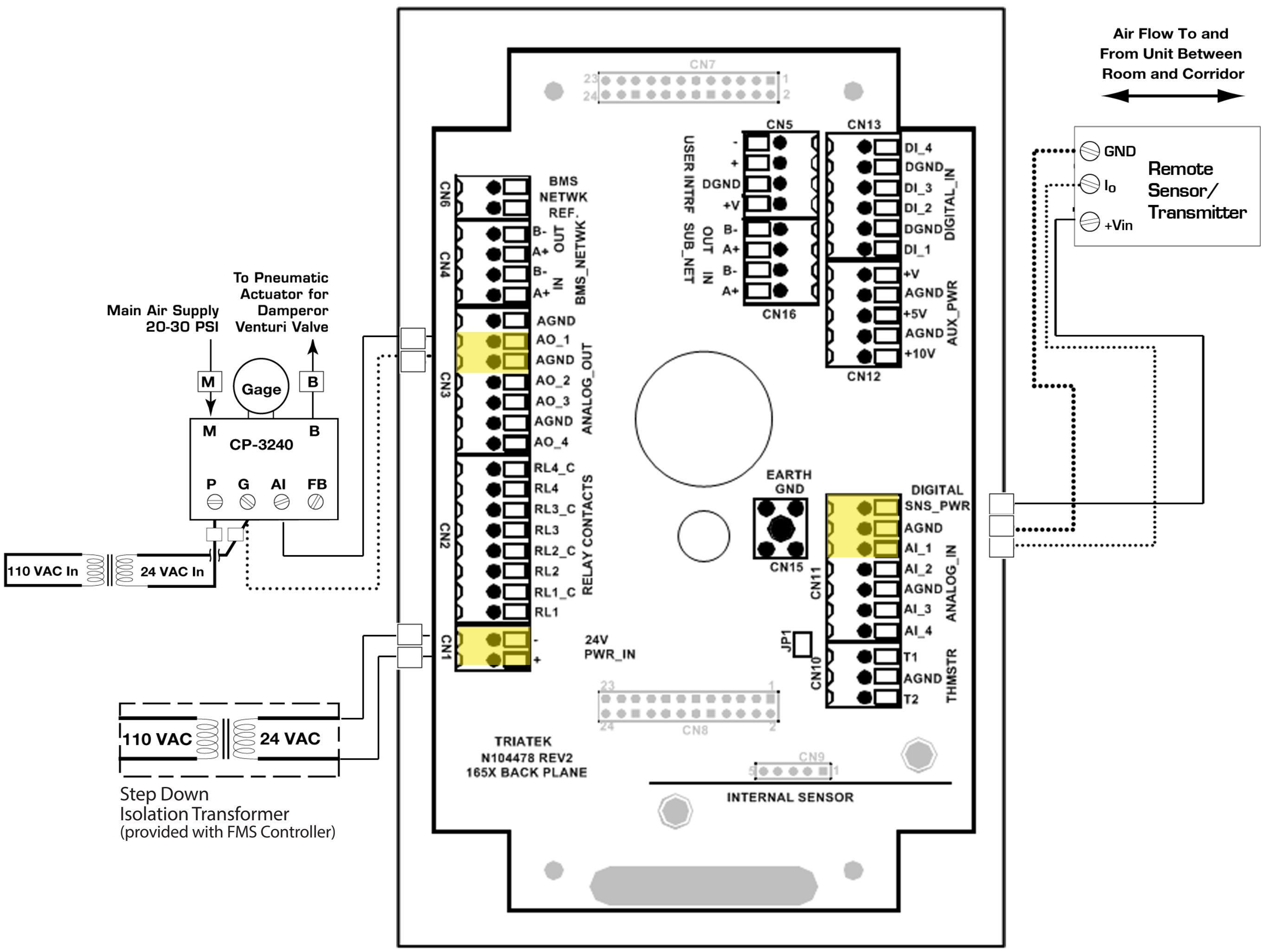
Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 2 = ON, S1 - 6 = OFF (AI - 2 set as 4 - 20mA Input)
S1 - 4 = ON, S1 - 8 = OFF (AI - 4 set as 4 - 20mA Input

MOUNTING/WIRING - REMOTE SENSOR

Analog Output to Pneumatic Damper Actuator

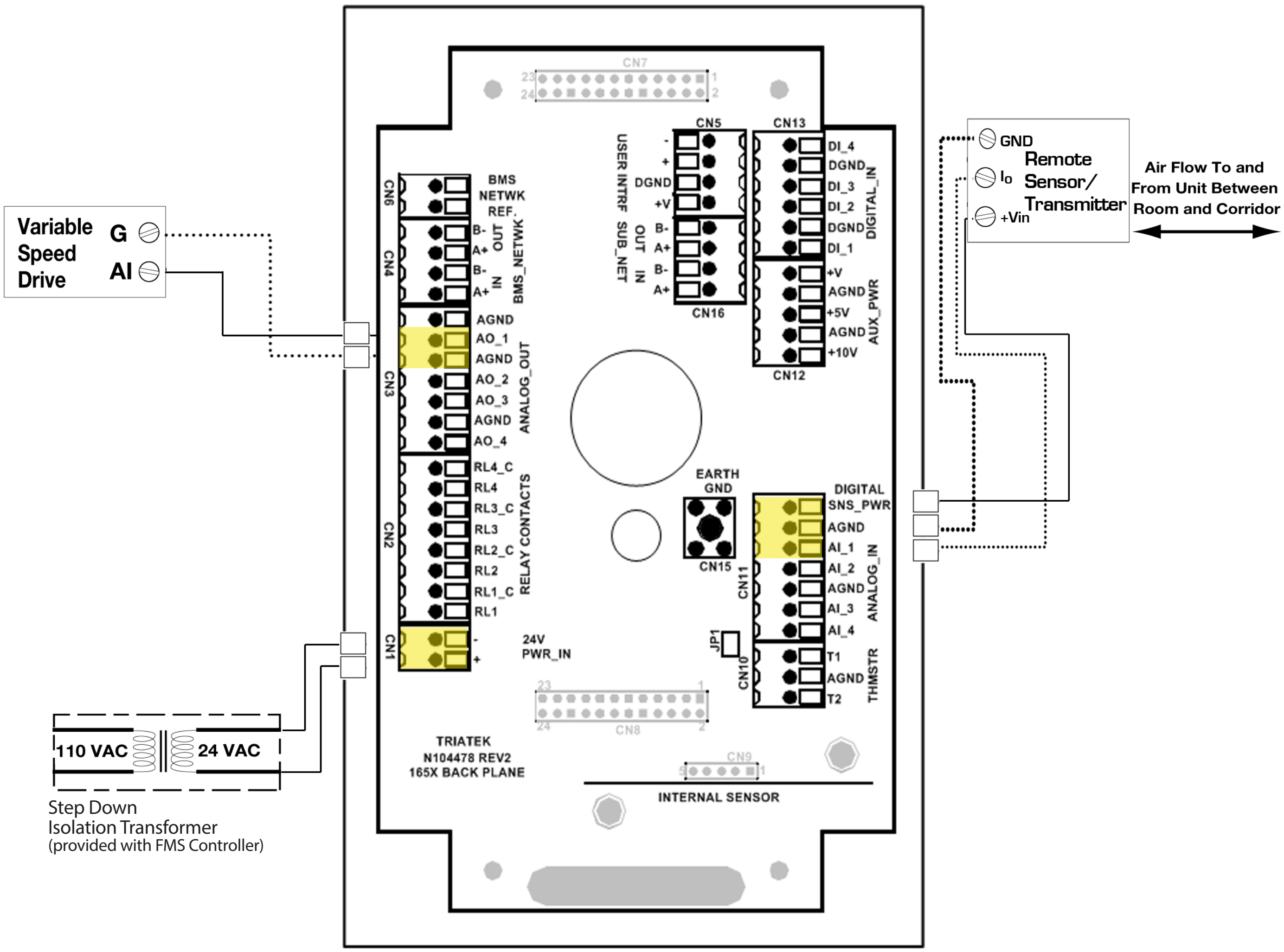


Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 1 = ON, S1 - 5 = OFF (AI - 1 set as 20mA Input)
S4 - 1 = ON (AO - 1 set as Voltage Output)

Analog Output to Variable Speed Drive

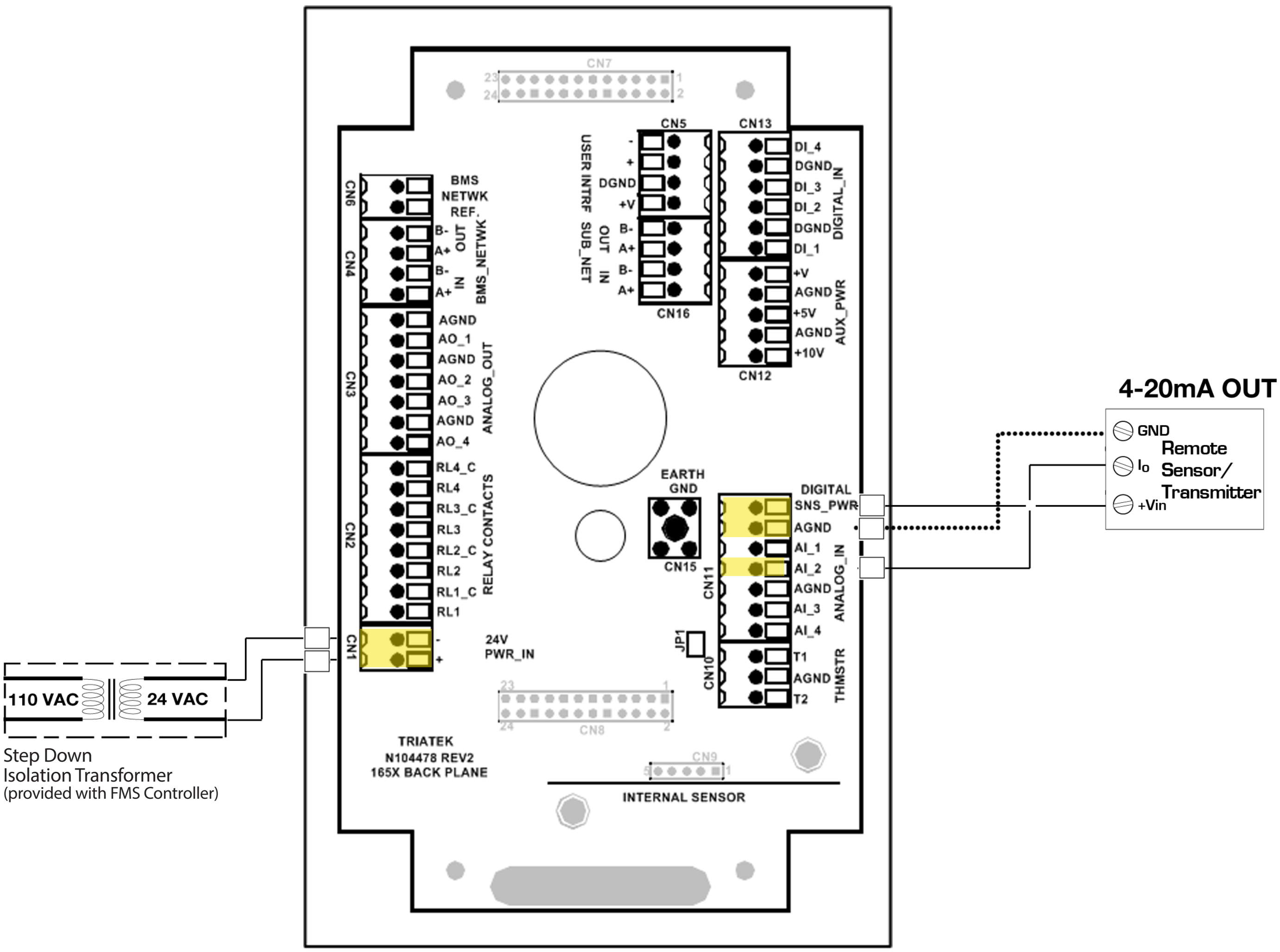


Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 1 = ON, S1 - 5 = OFF (AI - 1 set as 20mA Input)
S4 - 1 = ON (AO - 1 set as Voltage Output)

Adding Remote Pressure Sensor with 4-20mA Out to Internal Sensor Model



Wiring Guide Legend

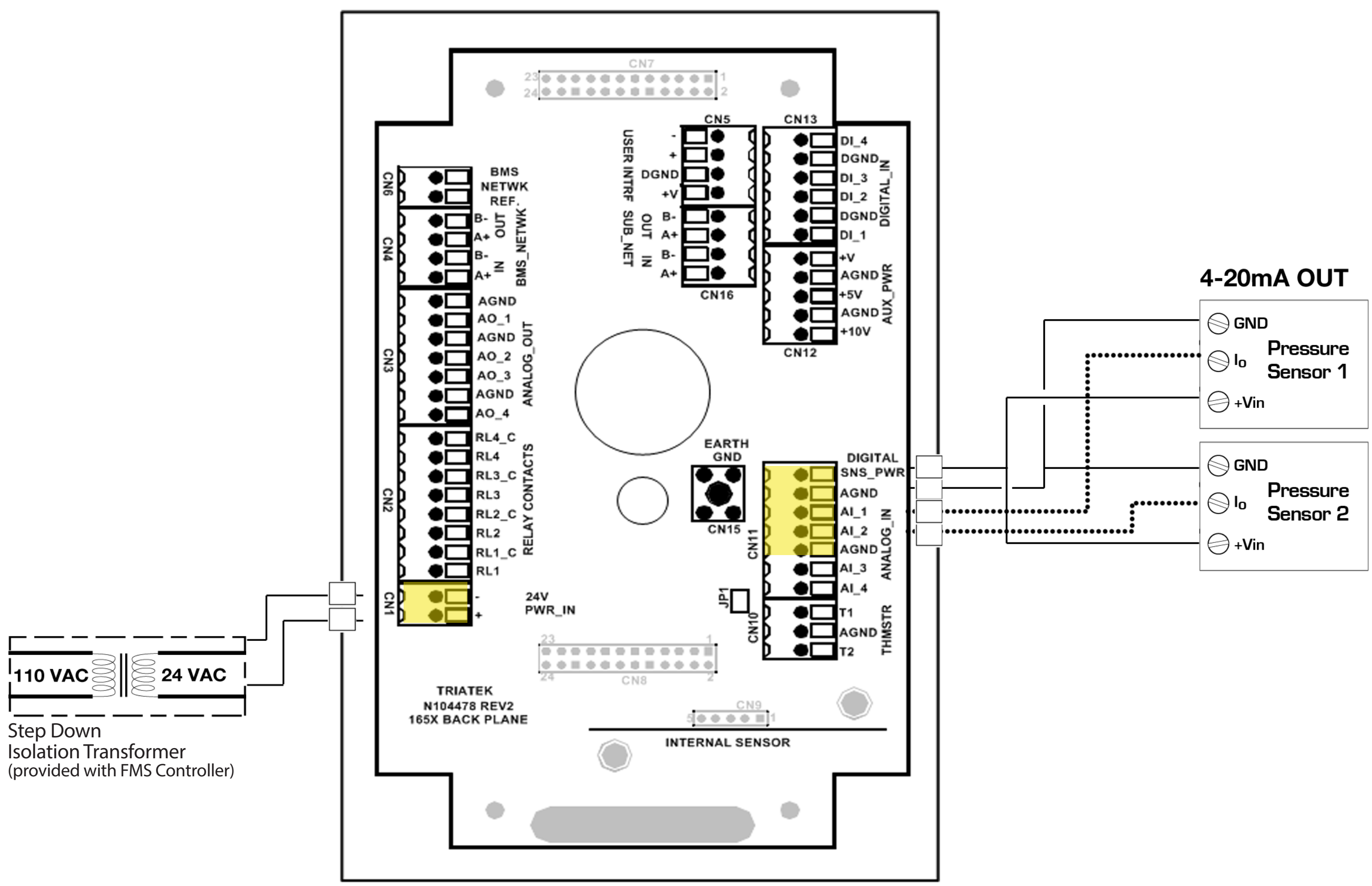
Symbol	Description
NC	No Connection to Field Wiring
	Field Wiring w/space for Number
	Internal Wiring
	Screw Terminal
	Air Flow To and From Unit Between Room and Corridor

Controller Configuration Dipswitch Settings
S1 - 2 = ON, S1 - 6 = OFF (AI - 2 set as 4 - 20mA Input)

Notes

MOUNTING/WIRING

Analog Input to 2 Remote Pressure Sensors 4-20mA Out

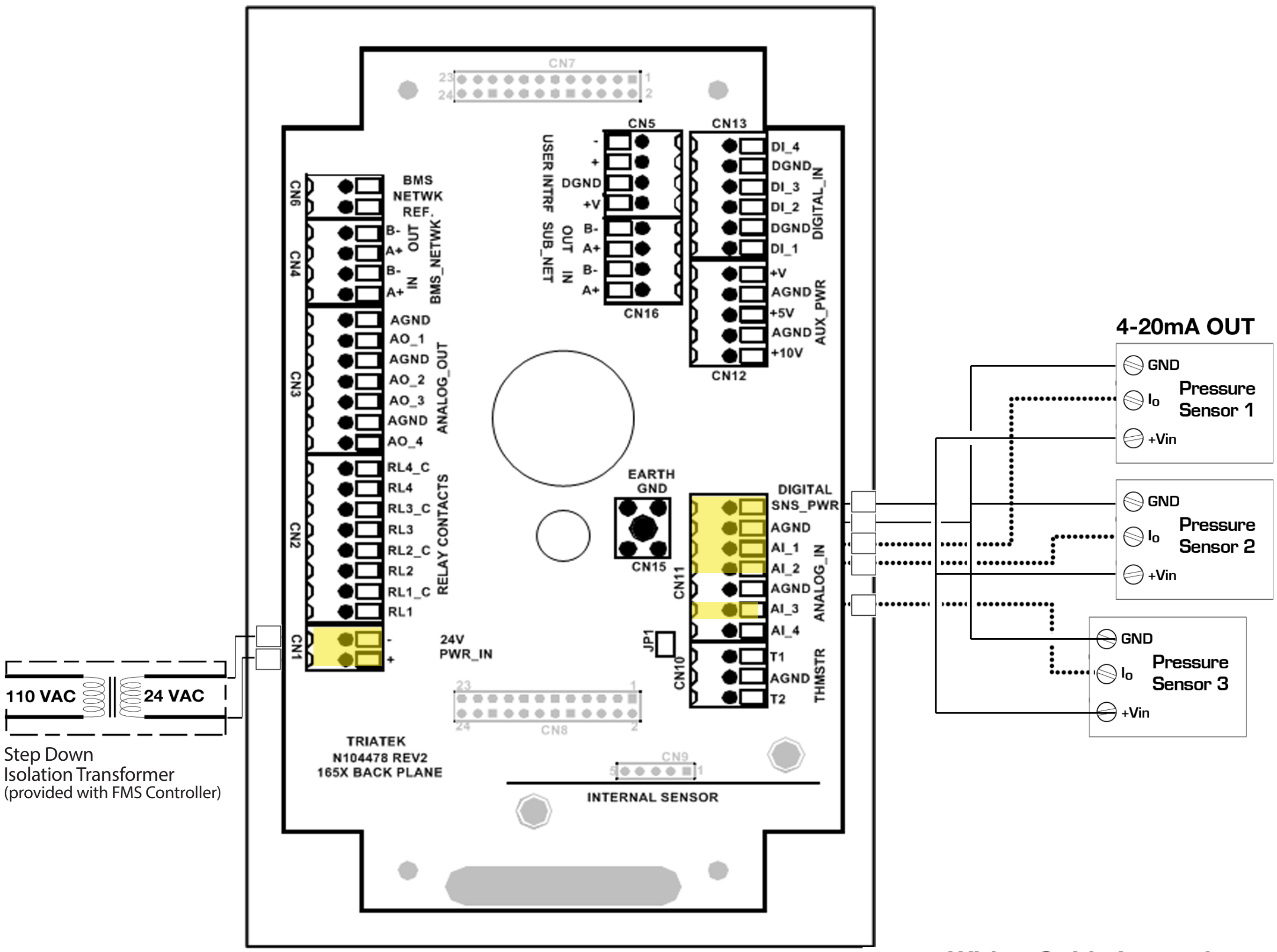


Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 1 = ON, S1 - 5 = OFF (AI - 1 set as 4 - 20mA Input)
S1 - 2 = ON, S1 - 6 = OFF (AI - 2 set as 4 - 20mA Input)

Analog Input to 3 Remote Pressure Sensors 4-20mA Out



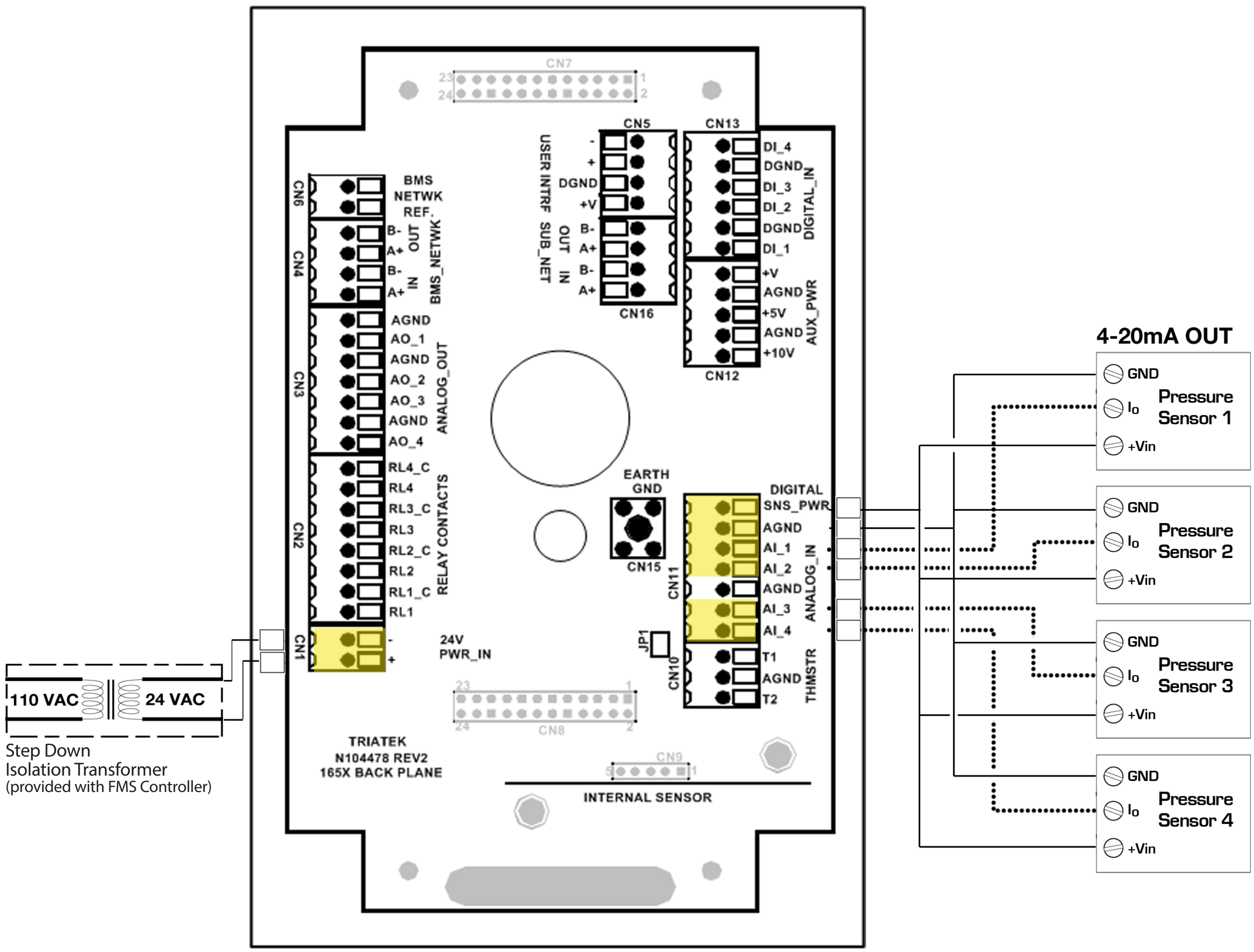
Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 1 = ON, S1 - 5 = OFF (AI - 1 set as 4 - 20mA Input)
S1 - 2 = ON, S1 - 6 = OFF (AI - 2 set as 4 - 20mA Input)
S1 - 3 = ON, S1 - 7 = OFF (AI - 3 set as 4 - 20 mA Input)

MOUNTING/WIRING

Analog Input to 4 Remote Pressure Sensors 4-20mA Out

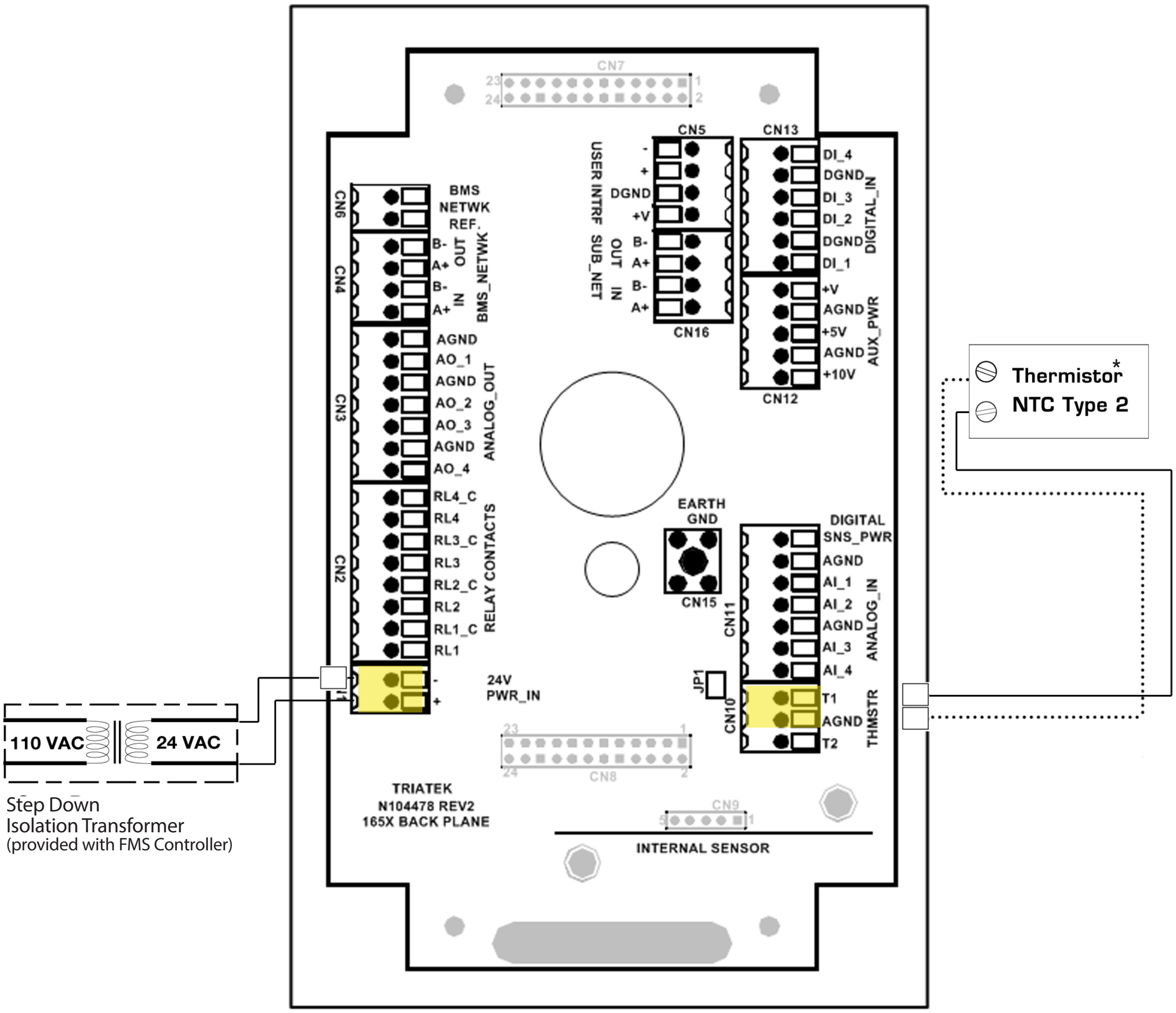


Wiring Guide Legend

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

Controller Configuration Dipswitch Settings
S1 - 1 = ON, S1 - 5 = OFF (AI - 1 set as 4 - 20mA Input)
S1 - 2 = ON, S1 - 6 = OFF (AI - 2 set as 4 - 20mA Input)
S1 - 3 = ON, S1 - 7 = OFF (AI - 3 set as 4 - 20 mA Input)
S1 - 4 = ON, S1 - 8 = OFF (AI - 4 set as 4 - 20 mA Input)

Analog Input to Temperature Sensor

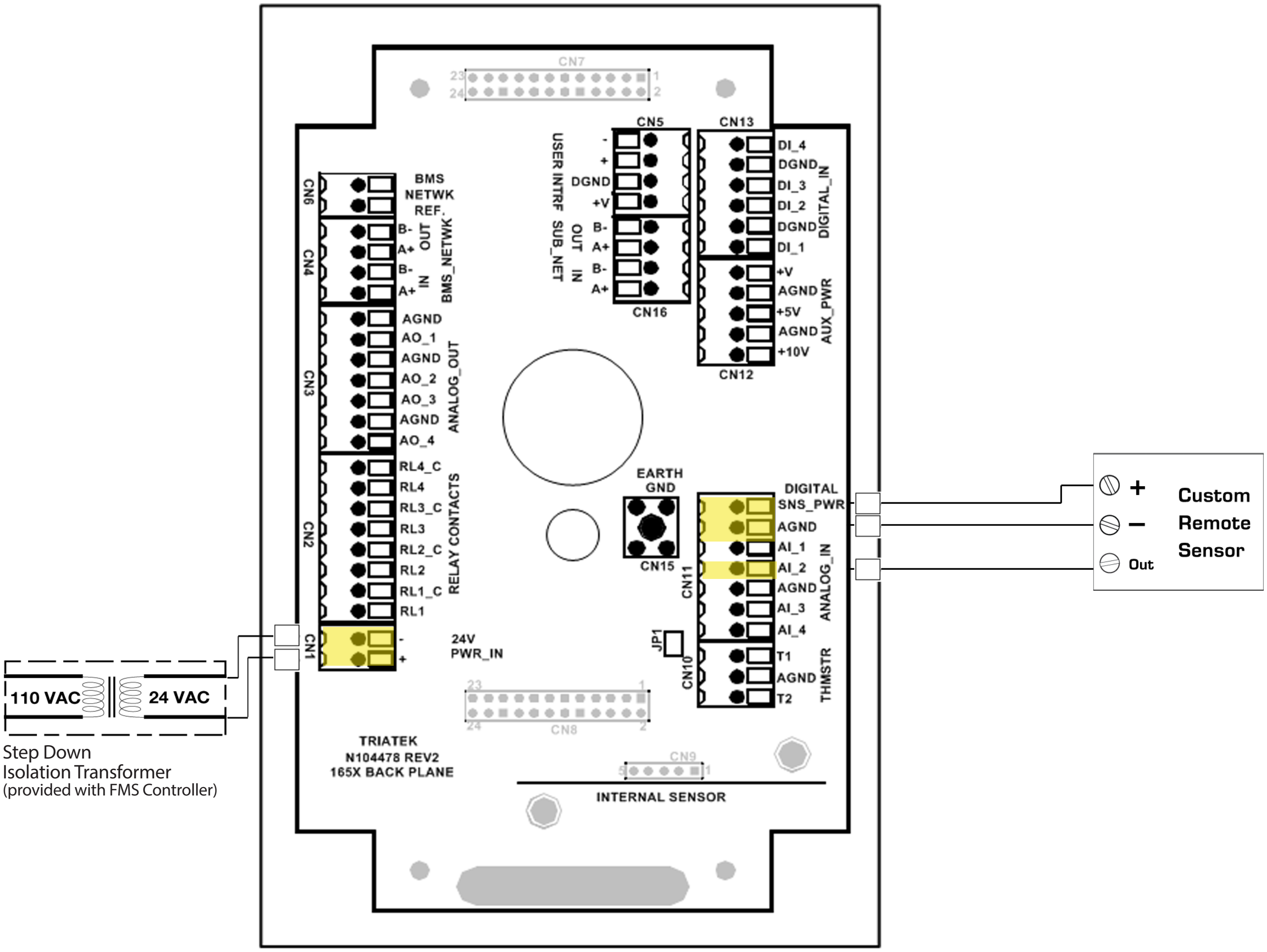


** The above example associates the Thermistor with contacts T1 and AGND for illustrative purposes only. In fact, either of the two T#s can be used.*

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

Analog Input to Custom Remote Sensor



Step Down Isolation Transformer (provided with FMS Controller)

Wiring Guide Legend

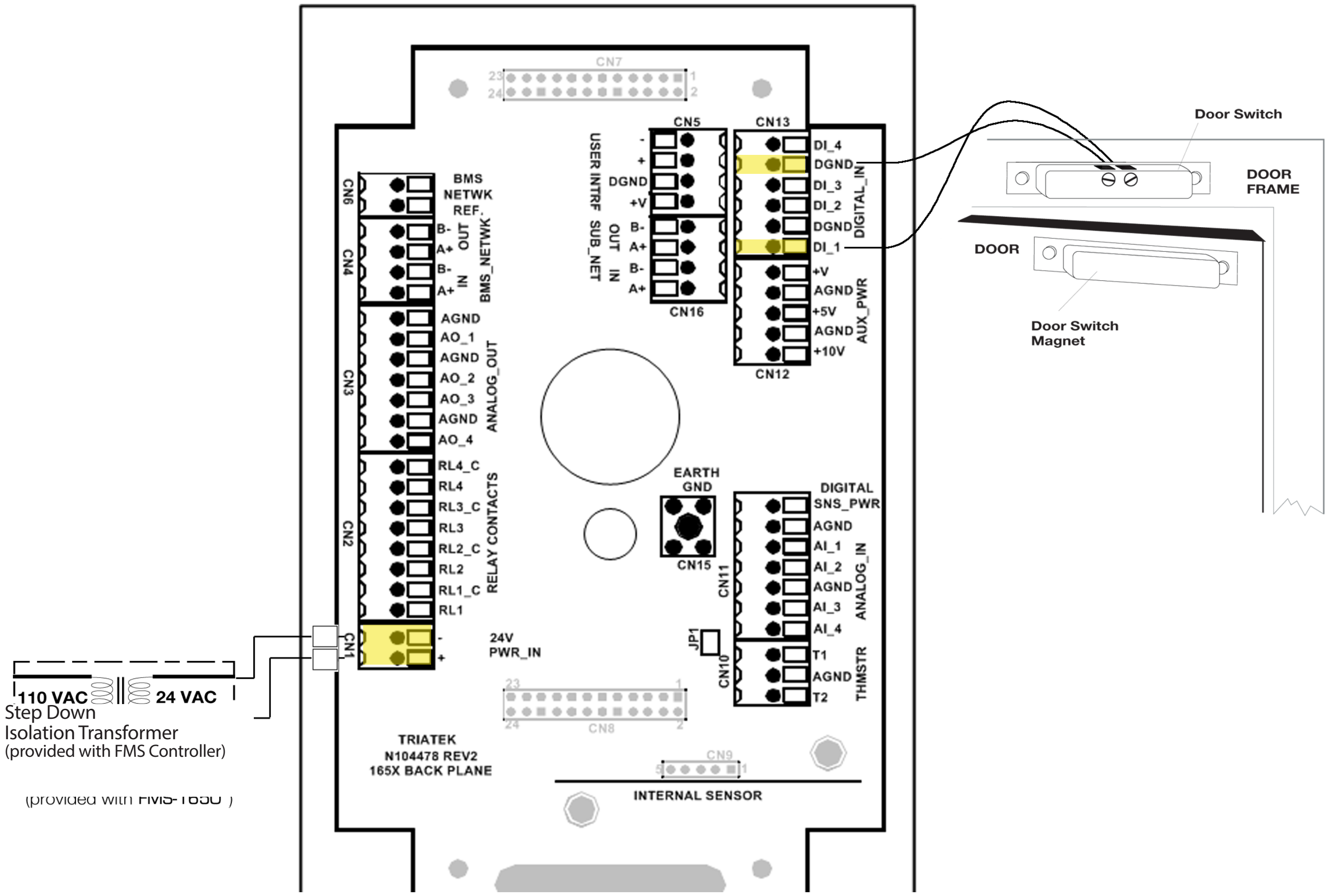
Symbol	Description
NC	No Connection to Field Wiring
─[ ]─	Field Wiring w/space for Number
────	Internal Wiring
⊘	Screw Terminal
←- - →	Air Flow To and From Unit Between Room and Corridor

Controller Configuration Dipswitch Settings
S1 - 2 = OFF, S1 - 6 = ON (AI - 2 set as 0 - 10V Input)

Digital Input to Door Switch

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

After the switch has been installed at the door and connected to the FMS unit, its operation may be programmed as described on page 39.



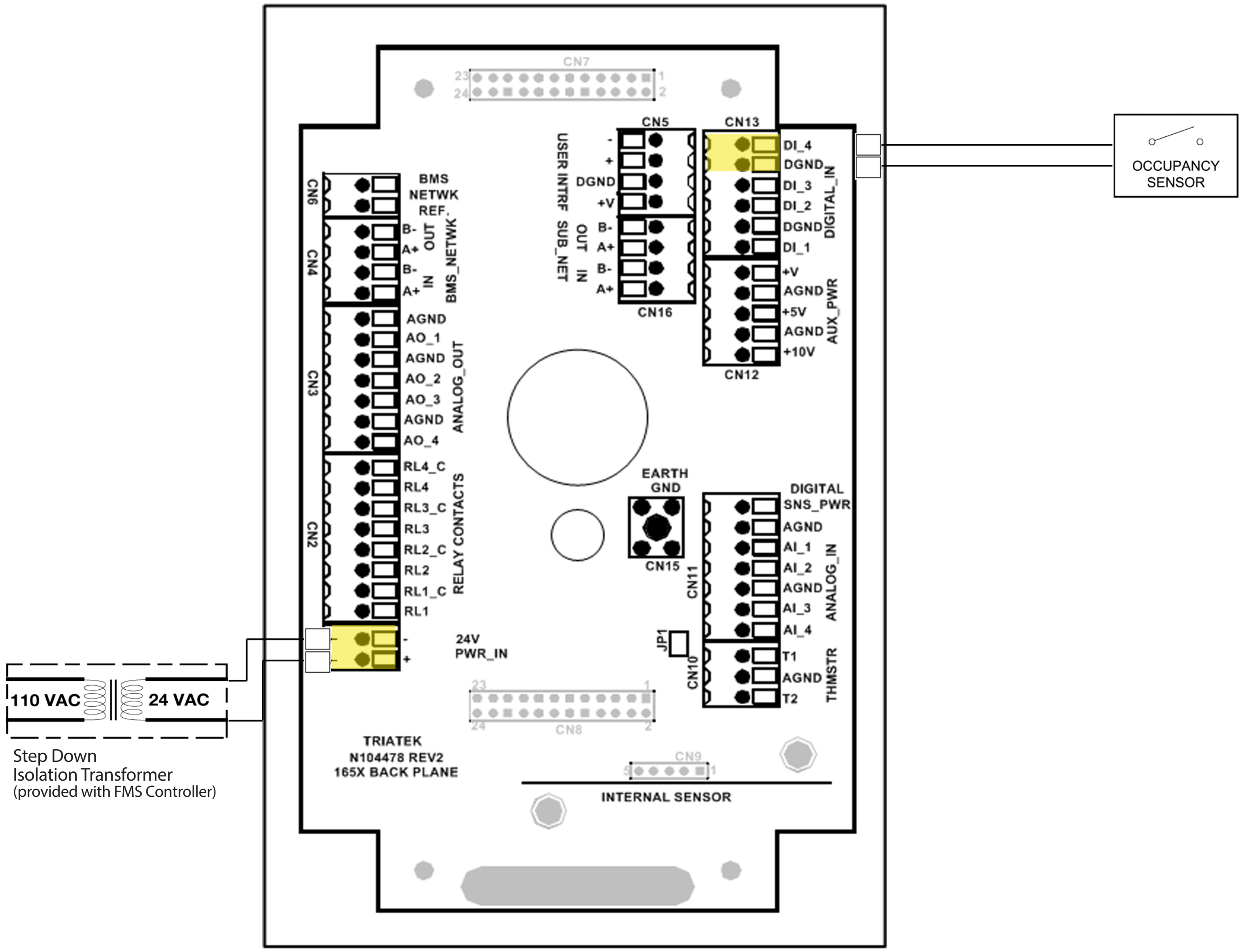
Wiring Guide Legend

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

Controller Configuration Slideswitch Settings
S5 = Left (Active - Low Digital Input)

Notes

Digital Input to Occupancy Sensor



Wiring Guide Legend

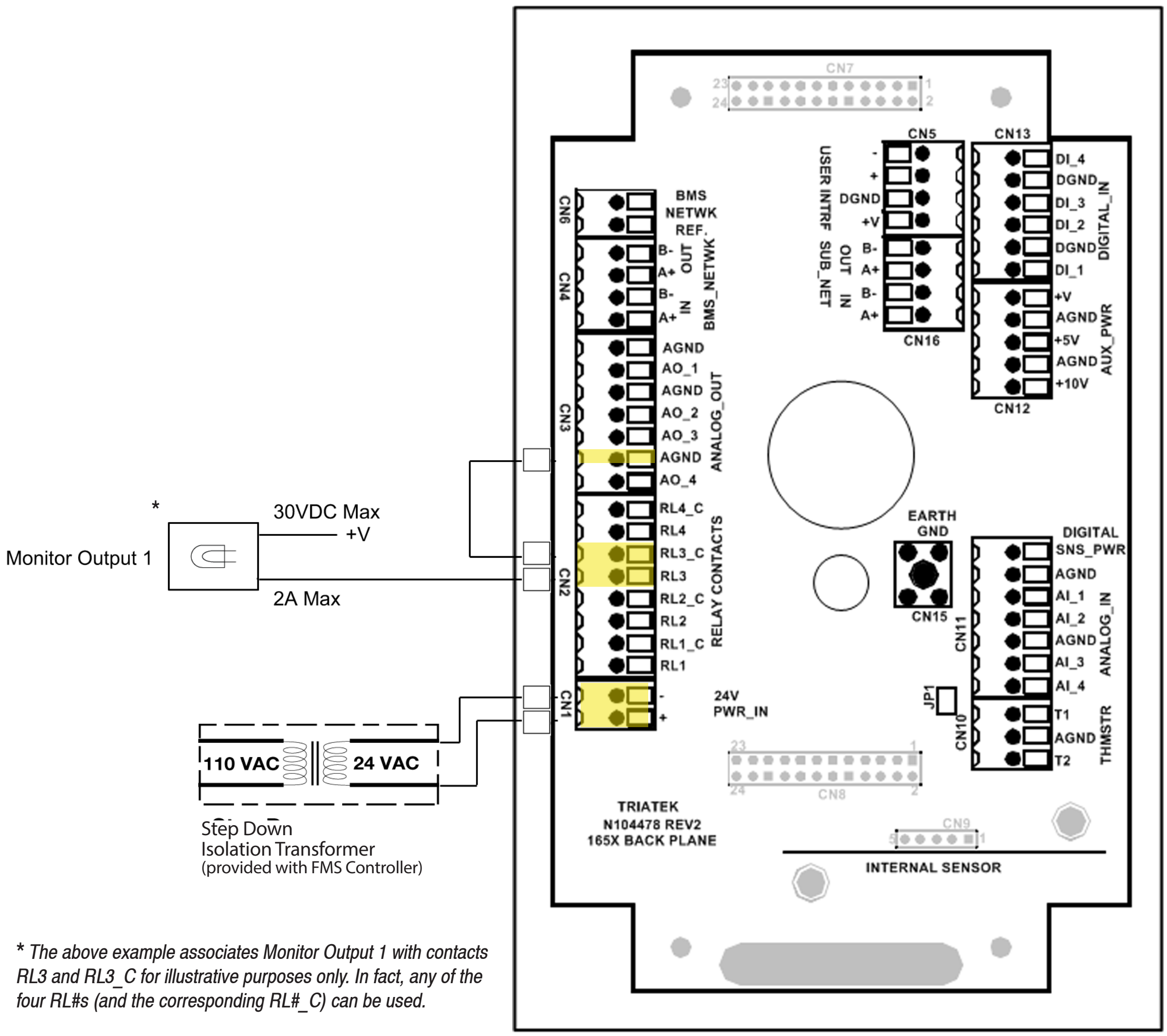
Symbol	Description
NC	No Connection to Field Wiring
	Field Wiring w/space for Number
	Internal Wiring
	Screw Terminal
	Air Flow To and From Unit Between Room and Corridor

** The above example associates the Occupancy Sensor with contacts DI4 and DGND for illustrative purposes only. In fact, any of the four DI#s can be used.*

Controller Configuration Slideswitch Settings
S5 = Left (Active - Low Digital Input)

MOUNTING/WIRING

Relay Output to Alarm

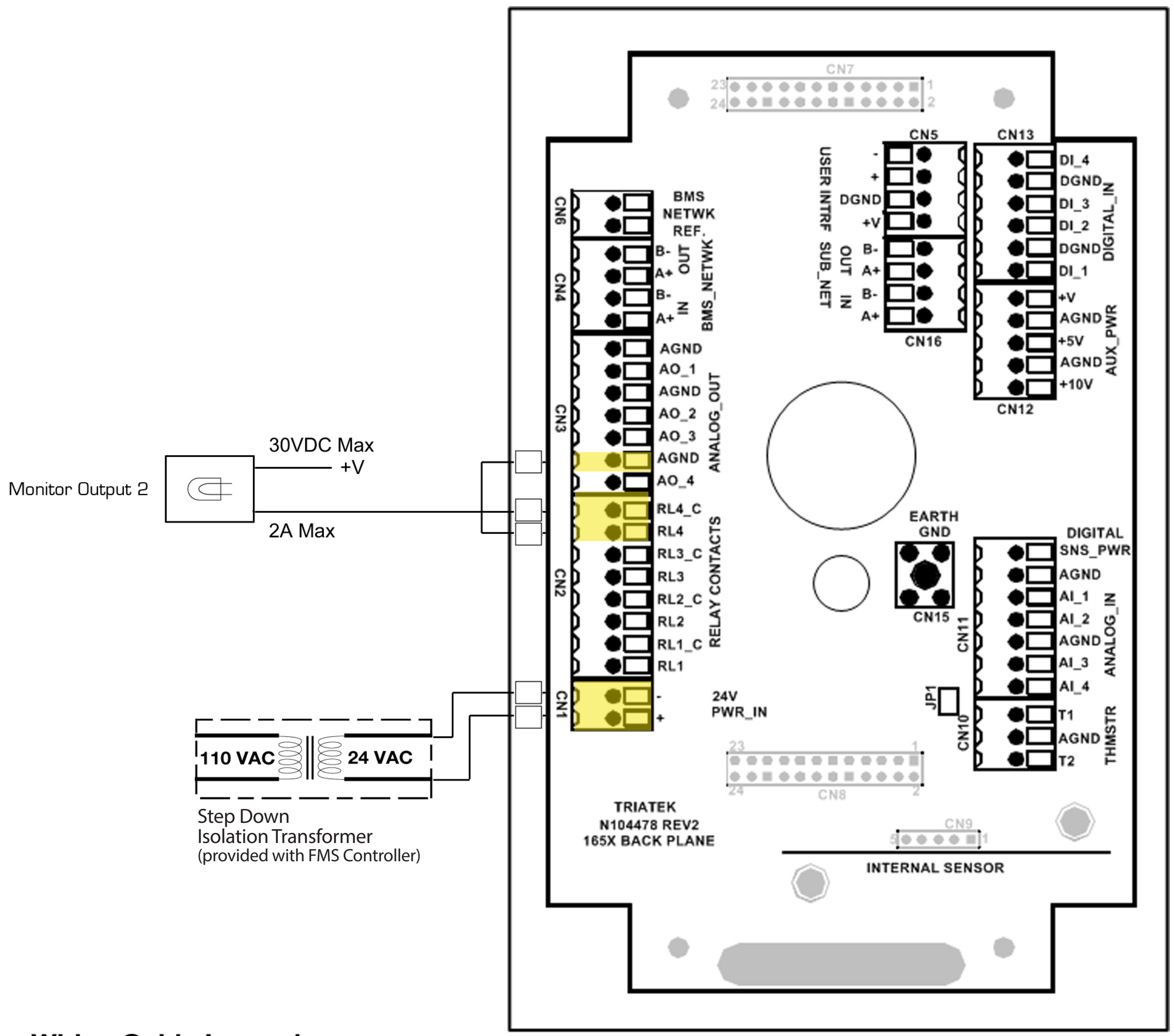


** The above example associates Monitor Output 1 with contacts RL3 and RL3_C for illustrative purposes only. In fact, any of the four RL#s (and the corresponding RL#_C) can be used.*

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

Relay Output to Warning

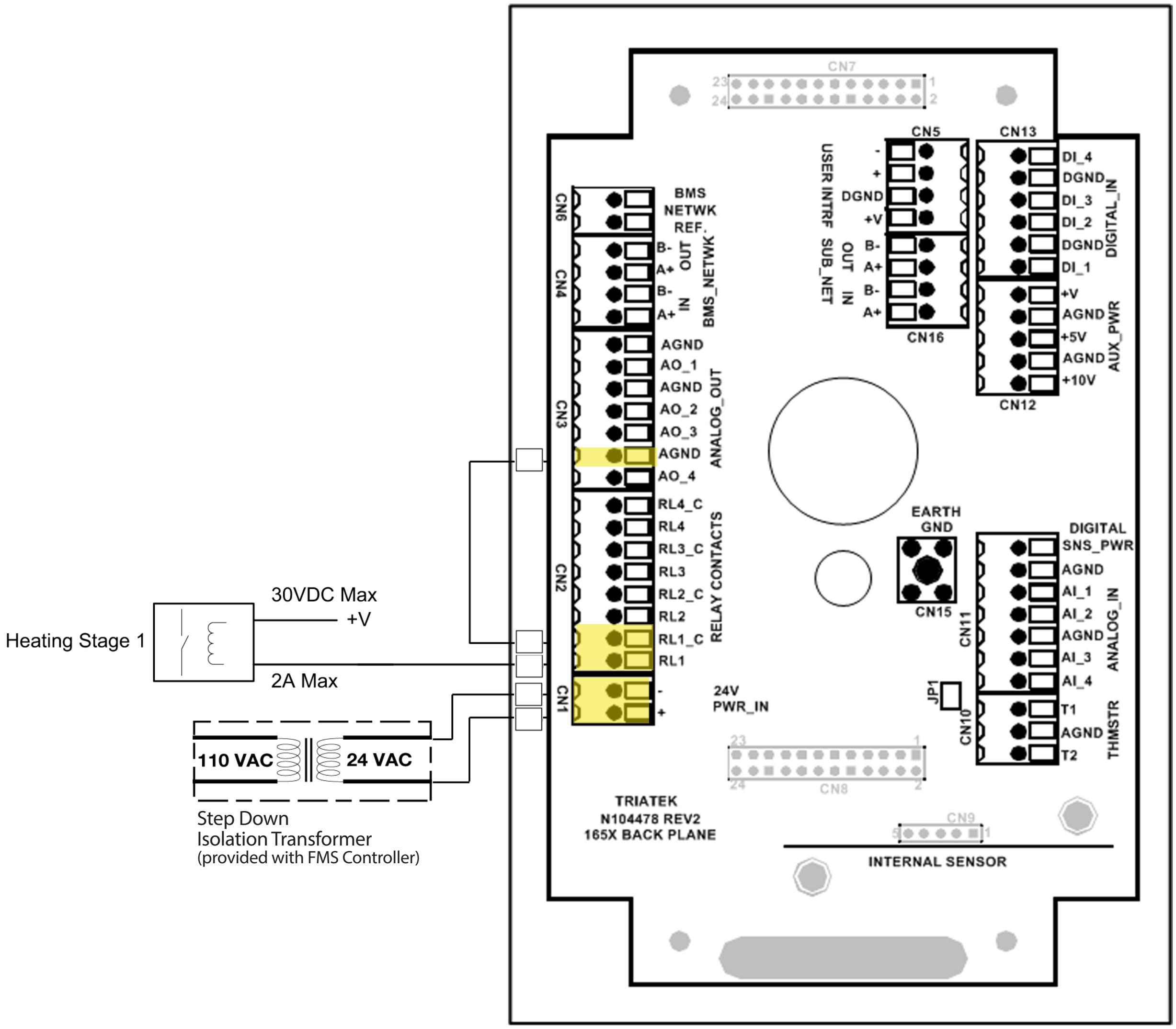


Wiring Guide Legend

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

** The above example associates Monitor Output 2 with contacts RL4 and RL4_C for illustrative purposes only. In fact, any of the four RL#s (and the corresponding RL#_C) can be used.*

Relay Output 1

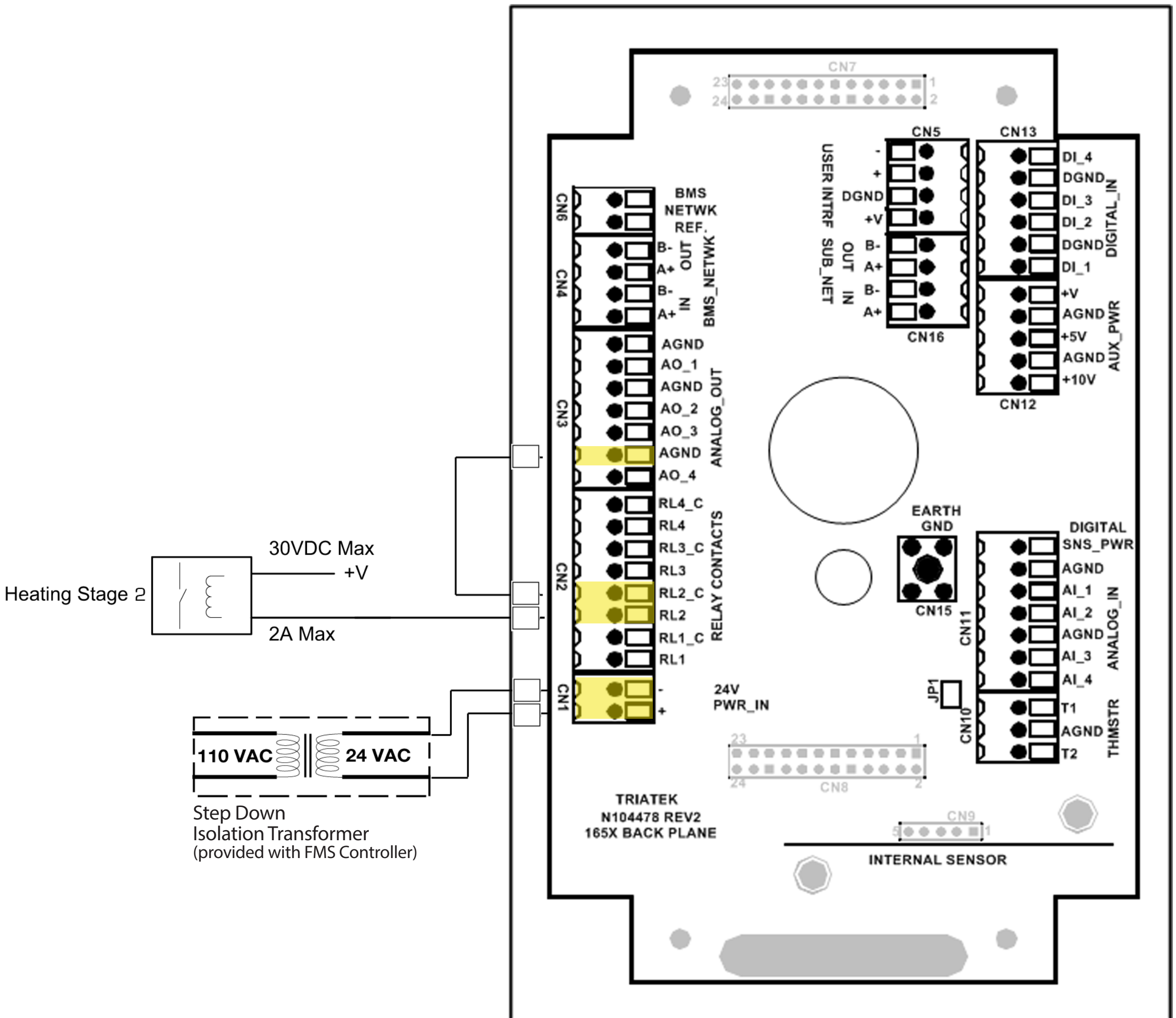


** The above example associates Heating State 1 with contacts RL1 and RL1_C for illustrative purposes only. In fact, any of the four RL#s (and the corresponding RL#_C) can be used.*

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

Relay Output 2



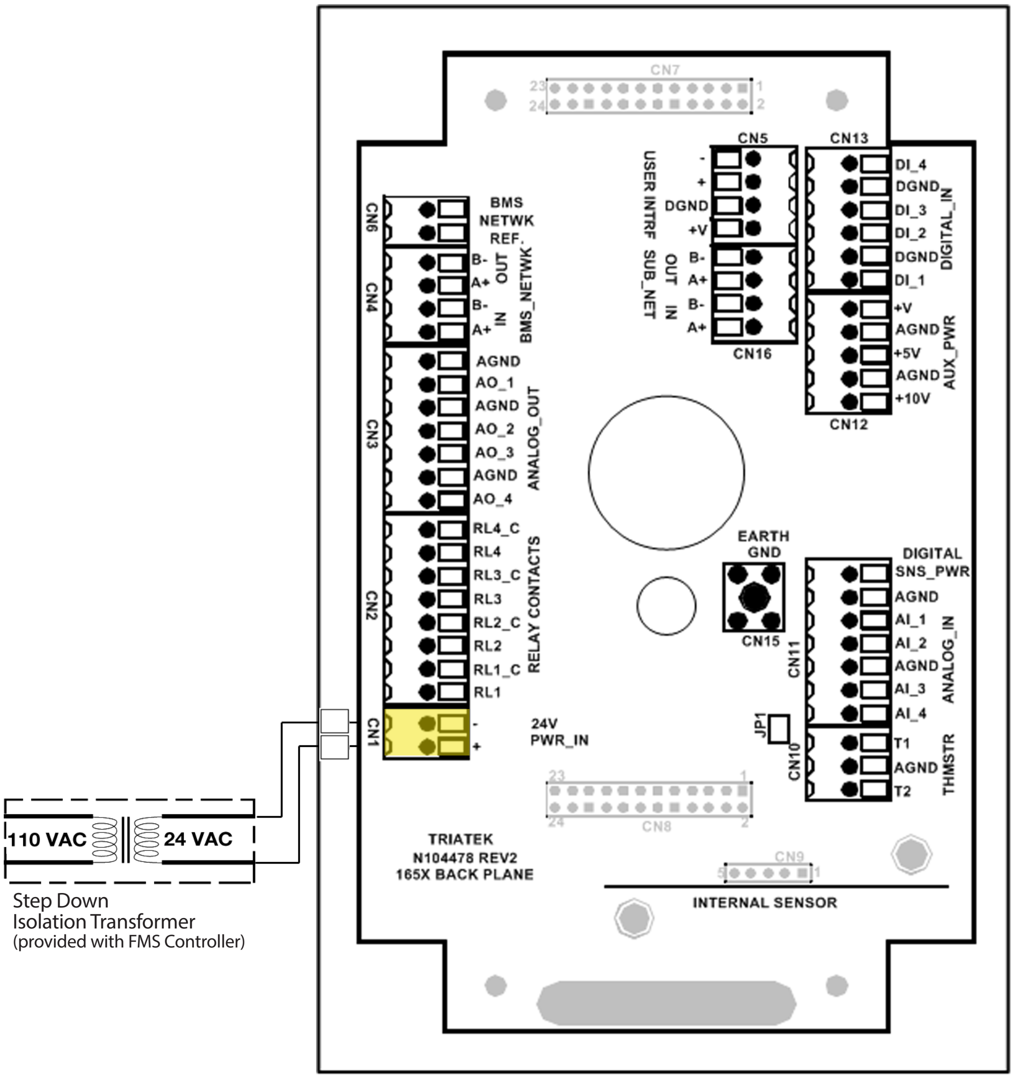
Wiring Guide Legend

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

** The above example associates Heating State 2 with contacts RL2 and RL2_C for illustrative purposes only. In fact, any of the four RL#s (and the corresponding RL#_C) can be used.*

MOUNTING/WIRING

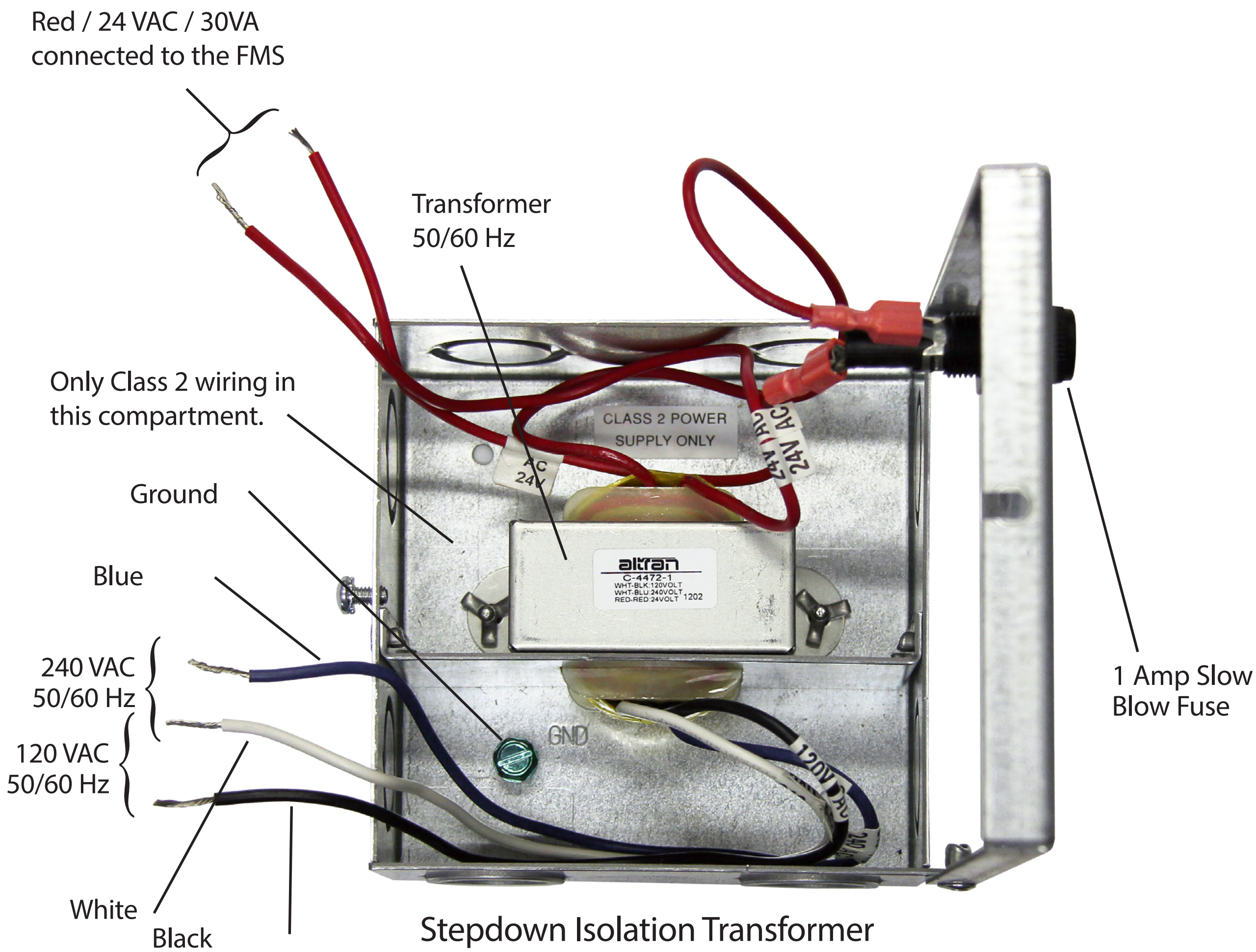
Power



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

Isolated Power Supply

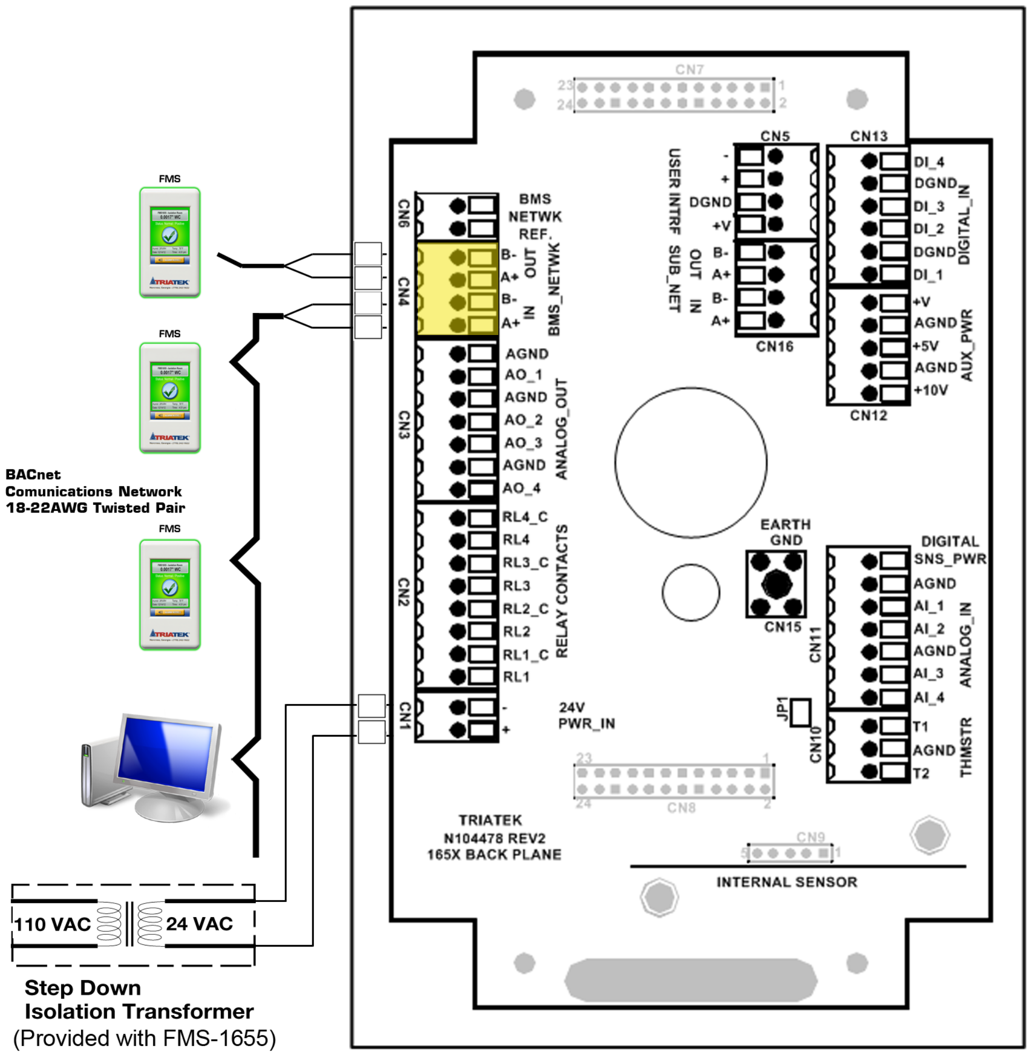


Stepdown Isolation Transformer
(provided with FMS-1655)

*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.

Notes

Wiring



NOTE: For optimum network communications, the reference signal (REF) must be connected to the "BMS NETWK REF" terminals at the backplane.

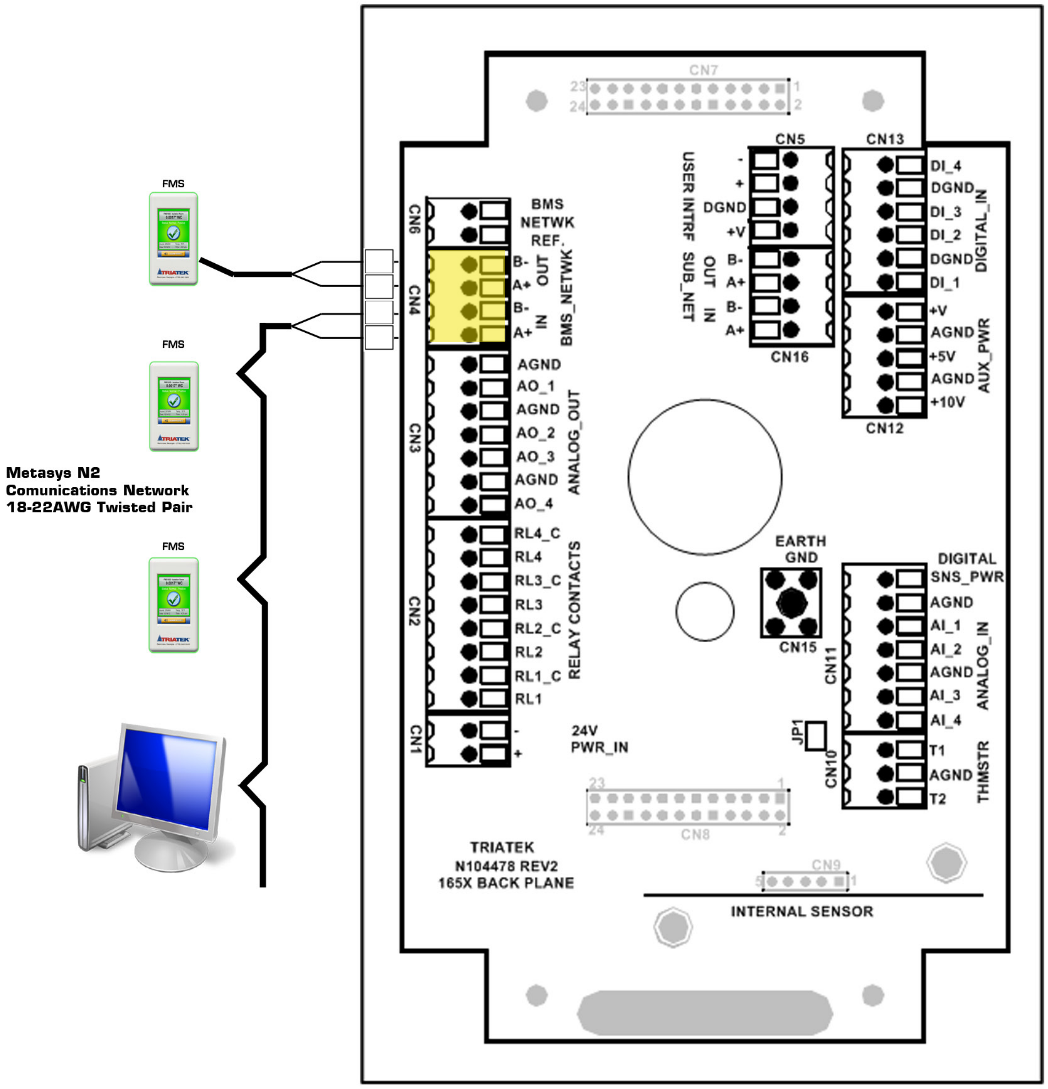
Controller Configuration Dipswitch Settings
S3 - 7 = ON, S3 - 8 = ON (BACnet MS/TP protocol selected)

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

COMMUNICATIONS - Metasys N2 Open

Wiring



NOTE: For optimum network communications, the reference signal (REF) must be connected to the "NETWK REF" terminals at the backplane.

Controller Configuration Dipswitch Settings
S3 - 7 = ON, S3 - 8 = OFF (Metasys N2 Open protocol selected)

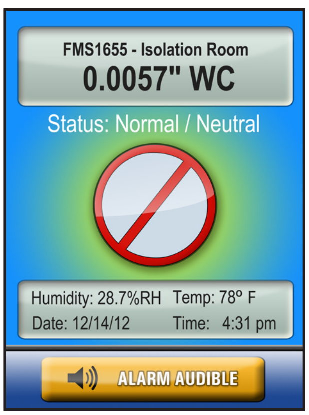
Wiring Guide Legend

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

FMS-1655 Quick Start Guide

Introduction
Following the proper installation of the FMS-1655, apply power to the unit and confirm that you hear a brief chirp at the touchscreen display, which indicates that the display module is communicating with the controller module. Upon power up, the Safety Halo™ status indication bezel will cycle through seven colors (red, green, blue, yellow, magenta, cyan, and white) followed by three action icons (normal, caution, alarm), and finally the Triatek splash screen will remain displayed for approximately 10 seconds and will then disappear 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 FMS option on the Diagnostics menu.



Each FMS-1655 comes pre-configured in neutral isolation mode.

Main Display Screen
All FMS-1655 units are shipped from the factory in the neutral isolation mode, which is represented by a blue graphical screen with a slashed circle status icon at the center of the screen as shown in the figure above. The information that is displayed on the main screen includes the following from top to bottom:

- Isolation room name in the upper window (up to 24 characters)
- Current differential pressure (default units: in WC)
- Current status and isolation mode
- Status icon centrally located
- Current temperature in the lower window (if so equipped)
- Current humidity in the lower window (if so equipped)
- Current time and date in the lower window

Located just below the lower window with the time and date display is the audible toggle button, which may be used to temporarily silence the audible alarm in the event of an alarm condition.

While in neutral isolation mode, the graphical background is blue in color. While in either positive or negative isolation, the graphical background intuitively represents the current alarm status of the unit.

A green graphical background with a checkmark at the center indicates that the current differential pressure is within allowable limits of the desired setpoint. A yellow graphical background with an exclamation point at the center indicates one of two conditions: 1) door to the monitored space is open (if door switch is enabled), or 2) the current differential pressure 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 differential pressure 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.

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

Also integrated into the FMS-1655 display are several hotspots that provide quick access to various settings. Refer to page 51 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.

Automated Clean Cycle
If this FMS-1655 is controlling the differential pressure of the monitored space, there is a convenient feature that allows quick turnover of the room referred to as auto clean cycle mode. When a patient who has been occupying an isolation room or patient room is removed, the room must be purged of all airborne contaminants in preparation for the next patient. The auto clean cycle feature of the FMS-1655 automates this cleaning process and is fully programmable. This feature may be activated from either the isolation mode hotspot on the main display screen, or via the isolation mode option on the Room Setup Menu.

Clean Cycle Mode in operation displaying time remaining for cycle completion.

FMS-1655 Quick Start Guide

When activated, *Auto Clean Cycle* opens the exhaust valve or damper to its maximum position to purge the room of any airborne contaminants. The exhaust valve or damper will remain in the maximum position for a programmable period of time while the room is being cleaned. The clean cycle duration may be configured for a minimum of 10 minutes up to 4 hours in increments of one minute. While the *Auto Clean Cycle* is in progress, a countdown timer indicates the time remaining for the process, and the Safety Halo™ will flash slowly in cyan to indicate that the monitored space is being cleaned. When the *Auto Clean Cycle* is completed, a message will appear on the screen indicating that the room has been successfully cleaned. This message will remain on the screen until it has been acknowledged by a user, at which time it returns the unit to the previously selected isolation mode.

An active *Auto Clean Cycle* may be canceled by touching the countdown timer in the upper LCD window. A message will be displayed warning the user that aborting the cleaning process may result in insufficient cleaning of the monitored room. Touching the main display screen anywhere other than the upper LCD window will result in a warning beep with no menu access. If at least one security password has been stored in the system, touching the screen to abort the *Auto Clean Cycle* that is in progress will request a valid password before aborting the mode.

Configuring Room Pressure Monitor

Configuring the FMS-1655 isolation room controller settings can be accomplished in four (4) simple steps:

1. Configure analog output
2. Configure door switch
3. Configure alarm relay output
4. Configure alarm limits

The FMS-1655 comes pre-configured with either an internal sensor or remote sensor, depending on the specific model ordered. The flush-mount models (FMS-1655-F-x-xx) incorporate an internal differential pressure sensor, while the surface-mount models (FMS-1655-S-x-xx) include a separately installed remote differential pressure sensor. In either case, the next step would be to configure the analog output that controls the damper actuator in the monitored room, if control is required. If the application only requires monitoring, then this step may be omitted.

Setting Up Analog Output

For those applications requiring control of a damper actuator, the analog output must be configured accordingly. Select *Unit Setup* > *Controller Setup* > *Analog Output* and the user is prompted to select an operating mode (direct control or PID control) and an operating range. Most applications will take advantage of the PID (proportional-integral-derivative) control mode, where the control output can be customized by varying the control loop constants. The operating range can either include an offset from zero or not, independent of whether the analog output is configured for current or voltage mode.

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. Finally, the user is prompted to enter the target setpoint for the current mode of isolation. This setpoint will be used by the FMS-1655 to dither the analog output in order to achieve the desired target differential pressure. The analog output can be configured for either direct acting or reverse acting mode. Each mode of isolation has its own setpoint and operating mode. Therefore, switching from positive isolation to negative isolation can automatically affect both the target setpoint as well as the acting mode for the analog output.

To confirm that the analog output is properly configured for the specific installation at hand, use the *Overrides* option on the *Diagnostics* menu to manually override analog output 1 which is controlling the exhaust damper actuator. Moving the slider from zero to 100 percent should cause the damper to move from closed to full open, or vice versa, depending upon the acting mode of the actuator.

Enabling Door Switch

To prevent the FMS-1655's control output from ramping up or down unnecessarily when the door of the monitored space is opened, a door switch may be configured to suspend the operation of the PID control output. This effectively "freezes" the analog output controlling the exhaust or supply damper until the door closes. The option for configuring the door switch can be found on the *Controller Setup* menu under the *Unit Setup* menu. A delay time of up to 60 minutes (in one-second increments) may be associated with the door switch, which effectively delays the return to normal PID control output mode while the monitored space resumes its positive

FMS-1655 Quick Start Guide

or negative differential pressure. If the door switch option is enabled, the main display will revert to the yellow graphical caution screen whenever the door is open and the unit is not in neutral isolation mode. Once the door closes, the door delay will count down, and then release the suspended control output once it expires.

Setting Up Alarm Relay Output
When the alarm status must be transmitted to a remote location, like a nurses' station, the alarm relay output can be configured using the following procedure. Select *Unit Setup* > *Controller Setup* > *Relay Setup* and the user is prompted to select the trigger mode (setpoints, isolation mode, or occupancy mode). The default trigger mode is *Setpoints*, which allows the alarm relay to be activated based on exceeding setpoint limits entered by the user. *Isolation Mode* and *Occupancy Mode* allow the alarm relay to be activated based on a change in the mode of isolation and state of occupancy, respectively. Once the relay trigger mode is selected, the user is prompted to enter the high and low relay setpoints using the sliders on the popup screen. Finally, the operating mode (direct or reverse acting) must be specified along with a delay time. The delay time determines how long the alarm relay output is delayed before being activated after one of the relay setpoint limits has been exceeded. The default setting for the delay time is zero seconds.

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 as follows. Select *Unit Setup* > *Controller Setup* > *Alarm Limits* and the user is prompted to specify the high and low alarm and warning limits. These limits should be specified to set the differential pressure range which is considered normal, as well as the range which indicates a warning condition, and the range which is considered critical and indicates an alarm condition.

Changing Isolation Mode
The FMS-1655 isolation room controller may be configured for *Positive*, *Negative*, or *Neutral* modes of isolation. To change the mode of isolation, select *Unit Setup* > *Room Setup* > *Isolation Mode* and select one of three isolation modes, or *Auto Clean* mode. *Auto Clean* mode automates the turnover of an isolation room that has been vacated in preparation for the next occupant. For those states or locales that have code restrictions regarding the accessible modes of isolation, the unit may be configured to allow either *Positive* and *Neutral* or *Negative* and *Neutral* modes. Changing the mode of isolation automatically selects the pre-programmed setpoints and alarm limits associated with each mode.

Invoking Auto Clean Cycle
When an isolation room has been vacated, it must be cleaned of all airborne contaminants before the next patient may occupy the room. The FMS-1655 includes a convenient feature called *Auto Clean Cycle* that automates the turnover process and cleaning of the room. *Auto Clean Cycle* may be invoked using one of two methods, either from the *Status* hotspot on the main display screen or from the *Isolation Mode* option on the *Isolation Room Setup* menu. Invoking *Auto Clean Cycle* automatically commands the exhaust valve or damper for maximum flow for the configured duration to facilitate the removal of all airborne contaminants. If the Safety Halo™ status bezel has been enabled, it will flash in cyan color to indicate that an *Auto Clean Cycle* is in progress. When the Auto Clean Cycle is completed, a message will appear on the main display screen indicating that the monitored room was successfully cleaned and is available for use. The Safety Halo™ will stop flashing but remain cyan until this message is acknowledged by the user.

Changing Network Settings
Changing network settings on the FMS-1655 can be accessed by selecting *Unit Setup* > *Network Setup*. Depending upon the protocol selected, the Network Setup menu will present the user with the available options. All FMS-1655 demo units have a default protocol selection of BACnet, and therefore the *Network Setup* menu options pertain to this protocol. From this menu, the user can select a different baud rate or change the network address of the unit.

Adding Password Security
The FMS-1655 menu system can be protected by adding up to ten (10) multi-level passwords to the system. A password entry may be created by selecting *System Setup* > *Next* > *Passwords Setup* > *Add Password* and the user is prompted to enter a minimum of four (4) and up to eight (8) digits. Once a password has been specified, the user is prompted to specify one of four access levels: *Unrestricted*, *Standard*, *Basic*, and *Restricted*. All password entries are saved to non-volatile memory. If a password is forgotten, there is a factory-default "back door" password that will provide unrestricted access to the user menu system. Please consult with the factory for more information regarding this password.

Note: The first user password is automatically saved as unrestricted.

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Changing Display Settings

The Safety Halo™ feature is exclusive to the 1655 series of controllers from Triatek, and significantly enhances the visibility of the status of individual units installed along a long corridor or hallway, and allows an unsafe condition to be immediately recognized. 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. For convenience, the Safety Halo™ status indicator incorporates a *Nightly Auto-Dim* feature which allows the brightness of the status indicator to automatically reduce in intensity at a designated hour every day, and then resume normal brightness at another designated hour. The brightness of the FMS-1655 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 *Display Modes* menu option on the *Display Setup* menu allows users to select a display mode based on the number of pressure sensors being monitored. The display mode is pre-configured at the factory based on the sensor count, but may be changed after adding or removing a sensor.

The main display screen of the FMS-1655 may be customized by using 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. Changing the time and date can be accomplished either by using the hotspots on the main display screen, or by selecting the *Set Time & Date* option. The time and date settings are volatile and are not saved to non-volatile memory on demo units. However, an operational unit connected to a controller module can retain its time and date settings for up to two hours in the event of a power failure.

Built-in Diagnostics

The FMS-1655 incorporates several useful diagnostic tools that may aid in troubleshooting the system during the installation and commissioning phase. The *Overrides* option allows both analog and relay outputs to be overridden individually. Each analog output may be locked at the overridden percentage while test and balance makes adjustments to supply or exhaust dampers, for example. While in the overridden state, the analog output is “disconnected” from its PID control loop, if enabled. Cancelling the override effectively resumes the normal PID control loop operation, again if enabled.

A unique feature of the FMS-1655 is the *Real-Time View* option, which allows the user to see in real-time the actual inputs and outputs, along with their voltage levels or states. One of the most useful tools for fine-tuning the PID loop performance is the *Analog I/O Pairs* screen, which displays the analog input and its current setpoint, along with the analog output which is mapped to it. This allows the user to see in real-time the varying analog input signal and its corresponding analog output control signal.

To preserve the configuration settings after verifying that everything is configured properly, the *Save Settings* option on the *Diagnostics* menu will take a snapshot of the current configuration settings for later retrieval. In the event that any configuration settings are inadvertently overwritten, they may be restored either to the previously saved user settings or to the factory-default settings. To help maintain the long-term accuracy of the FMS-1655 differential pressure reading, a zero calibration feature has been incorporated which allows the user to zero the display after allowing the differential pressure between the monitored room and the reference space to neutralize, e.g., door open. Once the pressure has stabilized, performing a zero calibration ensures that the display reading accurately shows that the pressure has equalized while the door to the monitored space is left open.

Volumetric Offset Control

The FMS-1655 includes the ability to control the supply and general exhaust air flow devices in a laboratory application with multiple fume hoods. This requires the use of Triatek’s Universal Valve Module (UVM1000) to bring the total supply and exhaust flows into the FMS-1655. To configure the FMS-1655 for volumetric offset control, simply configure AI-3 as the supply flow input, and AI-4 as the exhaust flow input. The volumetric offset setpoint must be entered while configuring AI-4. Be sure to select *Vol. Offset Control* on the *Flow Sensor Input* configuration screen. The volumetric offset control signal is output on AO-4, which may be daisy-chained to each of the supply air flow devices. The secondary temperature control signal for heating is output on AO-2, which may be daisy-chained to each of the reheat valves. For more information on using the FMS-1655 for volumetric offset control applications, please refer to the ***FMS-1655 Programmer’s Guide.***

Notes

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) – mode configuration 1			
1.	Product Type	OFF = FMS/HMS	ON = CMS-1655
2.	Remote Display	OFF = Disabled	ON = Enabled
3.	Mode Select	OFF = FMS-1655 / CMS-1655	ON = HMS-1655
4.	Operational Mode:	OFF = Demo Mode	ON = Run Mode

Pushbutton Switch (SW1):	Reset Button	
Pushbutton Switch (SW2):	Reserved	

Configuring Main Controller Module Settings

Analog Input Configuration Dipswitch (S1)			
1.	AI-1 Mode Selection:	OFF = voltage input	ON = current input
2.	AI-2 Mode Selection:	OFF = voltage input	ON = current input
3.	AI-3 Mode Selection:	OFF = voltage input	ON = current input
4.	AI-4 Mode Selection:	OFF = voltage input	ON = current input
5.	AI-1 Voltage Range Selection:	OFF = 0-5Vdc	ON = 0-10Vdc
6.	AI-2 Voltage Range Selection:	OFF = 0-5Vdc	ON = 0-10Vdc
7.	AI-3 Voltage Range Selection:	OFF = 0-5Vdc	ON = 0-10Vdc
8.	AI-4 Voltage Range Selection:	OFF = 0-5Vdc	ON = 0-10Vdc

NOTES: To configure FMS-1655 for an internal sensor, set dipswitch position 1 to OFF and dipswitch position 5 to OFF. To configure FMS-1655 for a remote sensor, set dipswitch position 1 to ON and dipswitch position 5 to OFF. For other inputs, see Table 1.

Analog Output Configuration Dipswitch (S3)			
1.	AO-1 Mode Selection:	OFF = current output	ON = voltage output
2.	AO-2 Mode Selection:	OFF = current output	ON = voltage output
3.	AO-3 Mode Selection:	OFF = current output	ON = voltage output
4.	AO-4 Mode Selection:	OFF = current output	ON = voltage output

Network Configuration Dipswitch (S3)			
5.	RS485 Network Termination:	OFF = disabled	ON = enabled
6.	RS485 Display Termination:	OFF = disabled	ON = enabled
7.	Protocol Select: see Table 2 below		
8.	Protocol Select: see Table 2 below		

MODULE SETTINGS

Configurations & Settings

Table 1. Analog Input Configuration Settings (S1)

Mode	S1 - 1	S1 - 2	S1 - 3	S1 - 4	S1 - 5	S1 - 6	S1 - 7	S1 - 8
AI-1 5Vdc	OFF				OFF			
AI-1 20mA	ON				OFF			
AI-1 10Vdc	OFF				ON			
Not Valid	ON				ON			
AI-2 5Vdc		OFF				OFF		
AI-2 20mA		ON				OFF		
AI-2 10Vdc		OFF				ON		
Not Valid		ON				ON		
AI-3 5Vdc			OFF				OFF	
AI-3 20mA			ON				OFF	
AI-3 10Vdc			OFF				ON	
Not Valid			ON				ON	
AI-4 5Vdc				OFF				OFF
AI-4 20mA				ON				OFF
AI-4 10Vdc				OFF				ON
Not Valid				ON				ON

Table 2. Protocol Selection Settings (S3)

Protocol Selection	S3-7	S3-8
Reserved	OFF	OFF
Metasys® N2	ON	OFF
BACnet® MS/TP (default)	ON	ON

Controller Configuration Dipswitch (S4)

1. AO-1 Voltage Range Selection:	OFF = 0-10Vdc	ON = 0 - 5Vdc
2. AO-2 Voltage Range Selection:	OFF = 0-10Vdc	ON = 0 - 5Vdc
3. AO-3 Voltage Range Selection:	OFF = 0-10Vdc	ON = 0 - 5 Vdc
4. AO-4 Voltage Range Selection:	OFF = 0-10Vdc	ON = 0 - 5 Vdc

Controller Configuration Slideswitch (S5):

LEFT = Digital Inputs pulled-high (triggered by active low input - default)
RIGHT = Digital Inputs pulled-low (triggered by active high input, up to 24Vdc)

BACnet® Objects

The following table itemizes the list of points available for integration in a building management system (BMS). This table contains the objects for open BACnet integration.

Object		Read
Analog Inputs		
AI - 1	Analog Input 1 (default: Isolation Pressure)	Read-Only
AI - 2	Analog Input 2	Read-Only
AI - 3	Analog Input 3	Read-Only
AI - 4	Analog Input 4	Read-Only
AI - 5	Thermistor Input 1	Read-Only
AI - 6	Thermistor Input 2	Read-Only
Analog Outputs		
AO - 1	Analog Output 1 (default: Damper Position)	Read-Only
AO - 2	Analog Output 2 (default: Anteroom Damper Control)	Read-Only
AO - 3	Analog Output 3 (spare control output)	Read-Only
AO - 4	Analog Output 4 (spare control output)	Read-Only
Binary Inputs		
BI - 1	Digital Input 1 (default: Door Switch)	Read-Only
BI - 2	Digital Input 2 (default: Anteroom Door Switch)	Read-Only
BI - 3	Digital Input 3 (spare digital input)	Read-Only
BI - 4	Digital Input 4 (spare digital input)	Read-Only
Binary Outputs		
BO - 1	Relay Output 1 (default: Primary Alarm Relay Output)	Read-Only
BO - 2	Relay Output 2 (default: Spare Relay Output)	Read-Only
BO - 3	Relay Output 3 (spare relay output)	Read-Only
BO - 4	Relay Output 4 (spare relay output)	Read-Only
Analog Values		
AV - 1	AI-1 Setpoint (Room Pressure)	Read/Write
AV - 2	AI-2 Setpoint	Read/Write
AV - 3	AI-3 Setpoint	Read/Write
AV - 4	AI-4 Setpoint	Read/Write

Analog Values (continued)		
AV - 5	TI-1 Setpoint	Read/Write
AV - 6	TI-2 Setpoint	Read/Write
AV - 7	Air Change Rate based on Flow Input at AI-1	Read/Write
AV - 8	Air Change Rate based on Flow Input at AI-2	Read/Write
AV - 9	Air Change Rate based on Flow Input at AI-3	Read/Write
AV - 10	Air Change Rate based on Flow Input at AI-4	Read/Write
AV - 11	Alarm Relay 1 High Setpoint	Read/Write
AV - 12	Alarm Relay 1 Low Setpoint	Read/Write
AV - 13	Alarm Relay 2 High Setpoint	Read/Write
AV - 14	Alarm Relay 2 Low Setpoint	Read/Write
AV - 15	Alarm Relay 3 High Setpoint	Read/Write
AV - 16	Alarm Relay 3 Low Setpoint	Read/Write
AV - 17	Alarm Relay 4 High Setpoint	Read/Write
AV - 18	Alarm Relay 4 Low Setpoint	Read/Write
AV - 19	AI-1 Low Alarm Setpoint (low pressure alarm)	Read/Write
AV - 20	AI-1 Low Warning Setpoint (low pressure warning)	Read/Write
AV - 21	AI-1 High Warning Setpoint (high pressure warning)	Read/Write
AV - 22	AI-1 High Alarm Setpoint (high pressure alarm)	Read/Write
AV - 23	AI-2 Low Alarm Setpoint	Read/Write
AV - 24	AI-2 Low Warning Setpoint	Read/Write
AV - 25	AI-2 High Warning Setpoint	Read/Write
AV - 26	AI-2 High Alarm Setpoint	Read/Write
AV - 27	AI-3 Low Alarm Setpoint	Read/Write
AV - 28	AI-3 Low Warning Setpoint	Read/Write
AV - 29	AI-3 High Warning Setpoint	Read/Write
AV - 30	AI-3 High Alarm Setpoint	Read/Write
AV - 31	AI-4 Low Alarm Setpoint	Read/Write

BACnet® Objects

Object		Read
Analog Values (continued)		
AV - 32	AI-4 Low Warning Setpoint	Read/Write
AV - 33	AI-4 High Warning Setpoint	Read/Write
AV - 34	AI-4 High Alarm Setpoint	Read/Write
AV - 35	TI-1 Low Alarm Setpoint	Read/Write
AV - 36	TI-1 Low Warning Setpoint	Read/Write
AV - 37	TI-1 High Warning Setpoint	Read/Write
AV - 38	TI-1 High Alarm Setpoint	Read/Write
AV - 39	TI-2 Low Alarm Setpoint	Read/Write
AV - 40	TI-2 Low Warning Setpoint	Read/Write
AV - 41	TI-2 High Warning Setpoint	Read/Write
AV - 42	TI-2 High Alarm Setpoint	Read/Write
AV - 43	Writable Network Variable – Humidity	Read/Write
AV - 44	Writable Network Variable – Temperature	Read/Write
AV - 45	Writable Network Variable – Air Changes	Read/Write
AV - 46	Writable Network Variable – Differential Pressure	Read/Write
AV - 47	Device ID Offset (range: 0 – 4,194,000)	Read/Write
AV - 48	Duct Air Flow based on AI-1 flow input	Read-Only
AV - 49	Duct Air Flow based on AI-2 flow input	Read-Only
AV - 50	Duct Air Flow based on AI-3 flow input (Supply Flow)	Read-Only
AV - 51	Duct Air Flow based on AI-4 flow input (Exhaust Flow)	Read-Only
AV - 52	Volumetric Offset (Supply Flow – Exhaust Flow)	Read-Only
AV - 53	Volumetric Offset Setpoint	Read-Write
AV - 54	AO-1 Override Level	Read-Write
AV - 55	AO-2 Override Level	Read-Write
AV - 56	AO-3 Override Level	Read-Write
AV - 57	AO-4 Override Level	Read-Write
AV - 58	AI-1 Deadband Setting	Read/Write
AV - 59	AI-2 Deadband Setting	Read/Write

Analog Values (continued)		
AV - 60	AI-3 Deadband Setting	Read/Write
AV - 61	AI-4 Deadband Setting	Read/Write
AV - 62	TI-1 Deadband Setting	Read/Write
AV - 63	TI-2 Deadband Setting	Read/Write
Multistate Objects		
MSO - 1	Primary solation Mode: 1=positive, 2=negative, 3=neutral	Read/Write
MSO - 2	Secondary Isolation Mode: 1=positive, 2=negative, 3=neutral	Read/Write
MSO - 3	Primary Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
MSO - 4	Secondary Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
MSO - 5	AI-3 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
MSO - 6	AI-4 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
MSO - 7	TI-1 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
MSO - 8	TI-2 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
MSO - 9	Offset Control Status	Read-Only

Metasys® N2 Objects

The following table itemizes the list of points available for integration in a building management system (BMS). This table contains the objects for open N2 integration.

Object	Functional Description	Read or Write
	Analog Inputs	
AI - 1	Analog Input 1 (default: Primary Pressure)	Read-Only
AI - 17	Analog Input 2	Read-Only
AI - 18	Analog Input 3	Read-Only
AI - 19	Analog Input 4	Read-Only
AI - 20	Thermistor Input 1	Read-Only
AI - 21	Thermistor Input 2	Read-Only
	Analog Outputs	
AO - 1	Analog Output 1 (default: Primary Damper Control)	Read-Only
AO - 11	Analog Output 2 (default: Supply/Exhaust Damper	Read-Only
AO - 12	Analog Output 3 (spare control output)	Read-Only
AO - 13	Analog Output 4 (spare control output)	Read-Only
	Binary Inputs	
BI - 3	Digital Input 1 (default: Primary Room Switch)	Read-Only
BI - 4	Digital Input 2 (default: Secondary Room Door Switch)	Read-Only
BI - 5	Digital Input 3 (spare digital input)	Read-Only
BI - 6	Digital Input 4 (spare digital input)	Read-Only
	Binary Outputs	
BO - 1	Relay Output 1 (default: Primary Alarm Relay Output)	Read-Only
BO - 2	Relay Output 2 (spare relay output)	Read-Only
BO - 3	Relay Output 3 (spare relay output)	Read-Only
BO - 4	Relay Output 4 (spare relay output)	Read-Only
	Internal Float Values	
ADF - 1	PID Control Loop 1 Setpoint (Primary Pressure)	Read/Write
ADF - 2	Primary Room Alarm Relay High Setpoint	Read/Write
ADF - 3	Primary Room Alarm Relay Low Setpoint	Read/Write
ADF - 4	Secondary Room Alarm Relay High Setpoint	Read/Write

Internal Float Values (continued)		
ADF - 5	Secondary Room Alarm Relay Low Setpoint	Read/Write
ADF - 8	Primary Room Low Alarm Setpoint	Read/Write
ADF - 9	Primary Room Low Warning Setpoint	Read/Write
ADF - 10	Primary Room High Warning Setpoint	Read/Write
ADF - 11	Primary Room High Alarm Setpoint	Read/Write
ADF - 13	PID Control Loop 2 Setpoint	Read/Write
ADF - 14	PID Control Loop 3 Setpoint	Read/Write
ADF - 15	PID Control Loop 4 Setpoint	Read/Write
ADF - 16	Air Change Rate based on Flow Input at AI-1	Read-Only
ADF - 17	Air Change Rate based on Flow Input at AI-2	Read-Only
ADF - 18	Air Change Rate based on Flow Input at AI-3	Read-Only
ADF - 19	Air Change Rate based on Flow Input at AI-4	Read-Only
ADF - 20	Alarm Relay 3 High Setpoint	Read/Write
ADF - 21	Alarm Relay 3 Low Setpoint	Read/Write
ADF - 22	Alarm Relay 4 High Setpoint	Read/Write
ADF - 23	Alarm Relay 4 Low Setpoint	Read/Write
ADF - 24	AI-2 Low Alarm Setpoint	Read/Write
ADF - 25	AI-2 Low Warning Setpoint	Read/Write
ADF - 26	AI-2 High Warning Setpoint	Read/Write
ADF - 27	AI-2 High Alarm Setpoint	Read/Write
ADF - 28	AI-3 Low Alarm Setpoint	Read/Write
ADF - 29	AI-3 Low Warning Setpoint	Read/Write
ADF - 30	AI-3 High Warning Setpoint	Read/Write
ADF - 31	AI-3 High Alarm Setpoint	Read/Write
ADF - 32	AI-4 Low Alarm Setpoint	Read/Write
ADF - 33	AI-4 Low Warning Setpoint	Read/Write
ADF - 34	AI-4 High Warning Setpoint	Read/Write

Metasys® N2 Objects

Object		Read
Internal Float Values (continued)		
ADF - 35	AI-4 High Alarm Setpoint	Read/Write
ADF - 36	TI-1 Low Alarm Setpoint	Read/Write
ADF - 37	TI-1 Low Warning Setpoint	Read/Write
ADF - 38	TI-1 High Warning Setpoint	Read/Write
ADF - 39	TI-1 High Alarm Setpoint	Read/Write
ADF - 40	TI-2 Low Alarm Setpoint	Read/Write
ADF - 41	TI-2 Low Warning Setpoint	Read/Write
ADF - 42	TI-2 High Warning Setpoint	Read/Write
ADF - 43	TI-2 High Alarm Setpoint	Read/Write
ADF - 44	Humidity Network Variable (writable)	Read/Write
ADF - 45	Temperature Network Variable (writable)	Read/Write
ADF - 46	Air Changes Network Variable (writable)	Read/Write
ADF - 47	Differential Pressure Network Variable (writable)	Read/Write
ADF - 48	Air Flow based on Flow Input at AI-1	Read-Only
ADF - 49	Air Flow based on Flow Input at AI-2	Read-Only
ADF - 50	Air Flow based on Flow Input at AI-3 (default: Supply	Read-Only
ADF - 51	Air Flow based on Flow Input at AI-4 (default: Exhaust	Read-Only
ADF - 52	Volumetric Offset (Supply Flow – Exhaust Flow)	Read-Only
ADF - 53	Volumetric Offset Setpoint	Read-Write
ADF - 54	AO-1 Override Level	Read-Write
ADF - 55	AO-2 Override Level	Read-Write
ADF - 56	AO-3 Override Level	Read-Write
ADF - 57	AO-4 Override Level	Read-Write
ADF - 58	AI-1 Deadband Setting	Read-Write
ADF - 59	AI-2 Deadband Setting	Read-Write
ADF - 60	AI-3 Deadband Setting	Read-Write
ADF - 61	AI-4 Deadband Setting	Read-Write
ADF - 62	TI-1 Deadband Setting	Read-Write

Internal Float Values (continued)		
ADF - 63	TI-2 Deadband Setting	Read-Write
Internal Integer Values		
ADI - 1	AI-1 Isolation Mode: 1=positive, 2=negative, 3=neutral	Read/Write
ADI - 2	AI-1 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
ADI - 7	AI-2 Isolation Mode: 1=positive, 2=negative, 3=neutral	Read/Write
ADI - 8	AI-2 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
ADI - 9	AI-3 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
ADI - 10	AI-4 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
ADI - 11	TI-1 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only
ADI - 12	TI-2 Alarm Status: 1=normal, 2=warning, 3=alarm	Read-Only

Notes

Cleaning the FMS-1655 Display

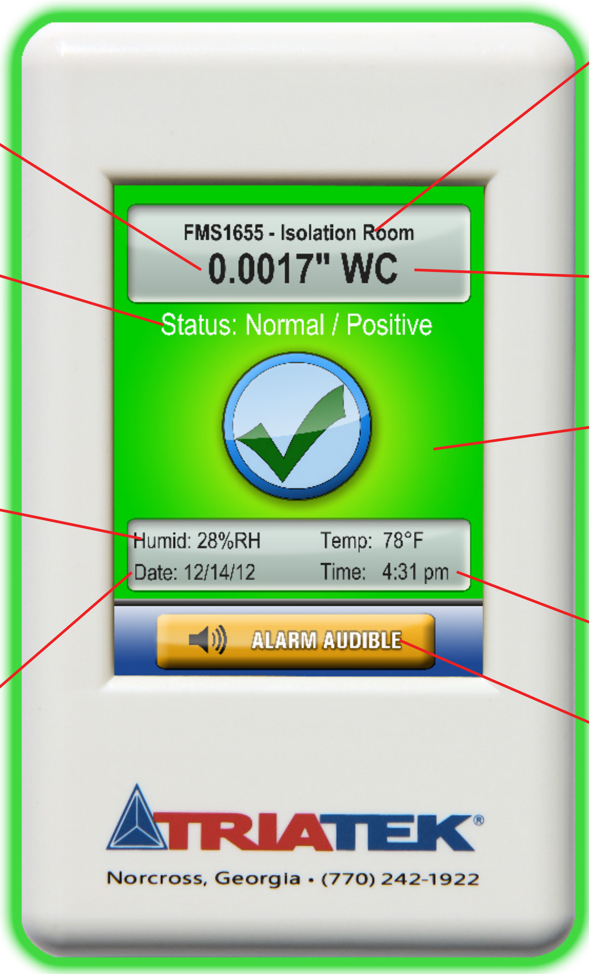
- The cloth may be used dry, or lightly dampened with a mild cleaner or Ethanol.
- Be sure the cloth is only lightly dampened, not wet. Never apply cleaner directly to touch panel surface; if cleaner is spilled onto touch panel, soak it up immediately with absorbent cloth.
- Cleaner must be neither acid 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 displayed pressure reading brings up the secondary pressure reading if the unit is in dual sensor mode

Touching STATUS invokes Isolation Mode Selection popup to quickly change the current mode of isolation, or to invoke the Auto Clean Cycle for quick room turnover.

Touching the top row of the lower LCD window brings up Display Options popup to quickly disable display of temperature or humidity if not being monitored.

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



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

Touching the differential pressure units brings up engineering units selection popup to quickly change from English to metric units.

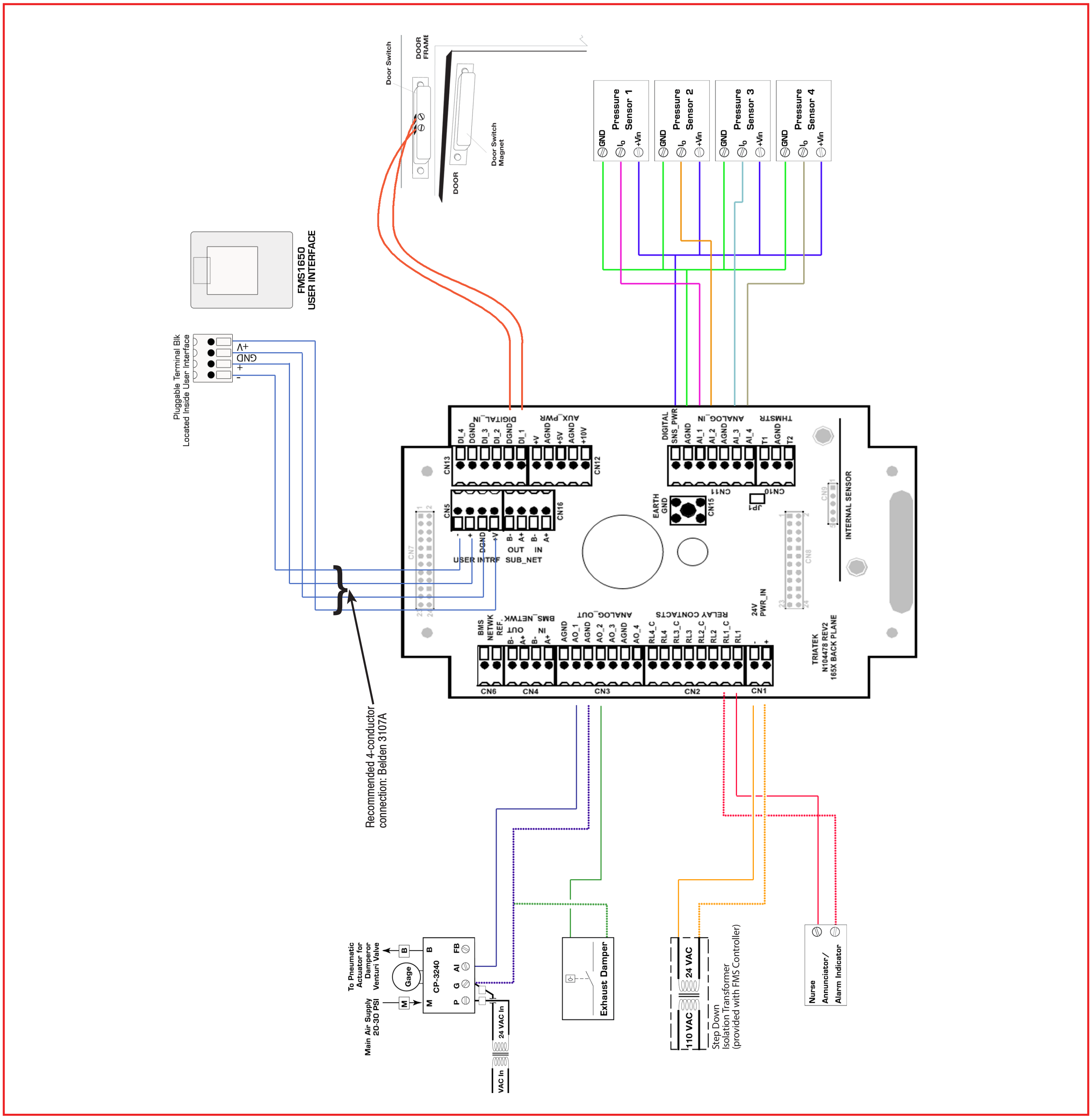
Touching anywhere else on the screen enters the Main Setup Menu if no password is stored. Otherwise, a password must be entered before the Main Setup Menu can be accessed.

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

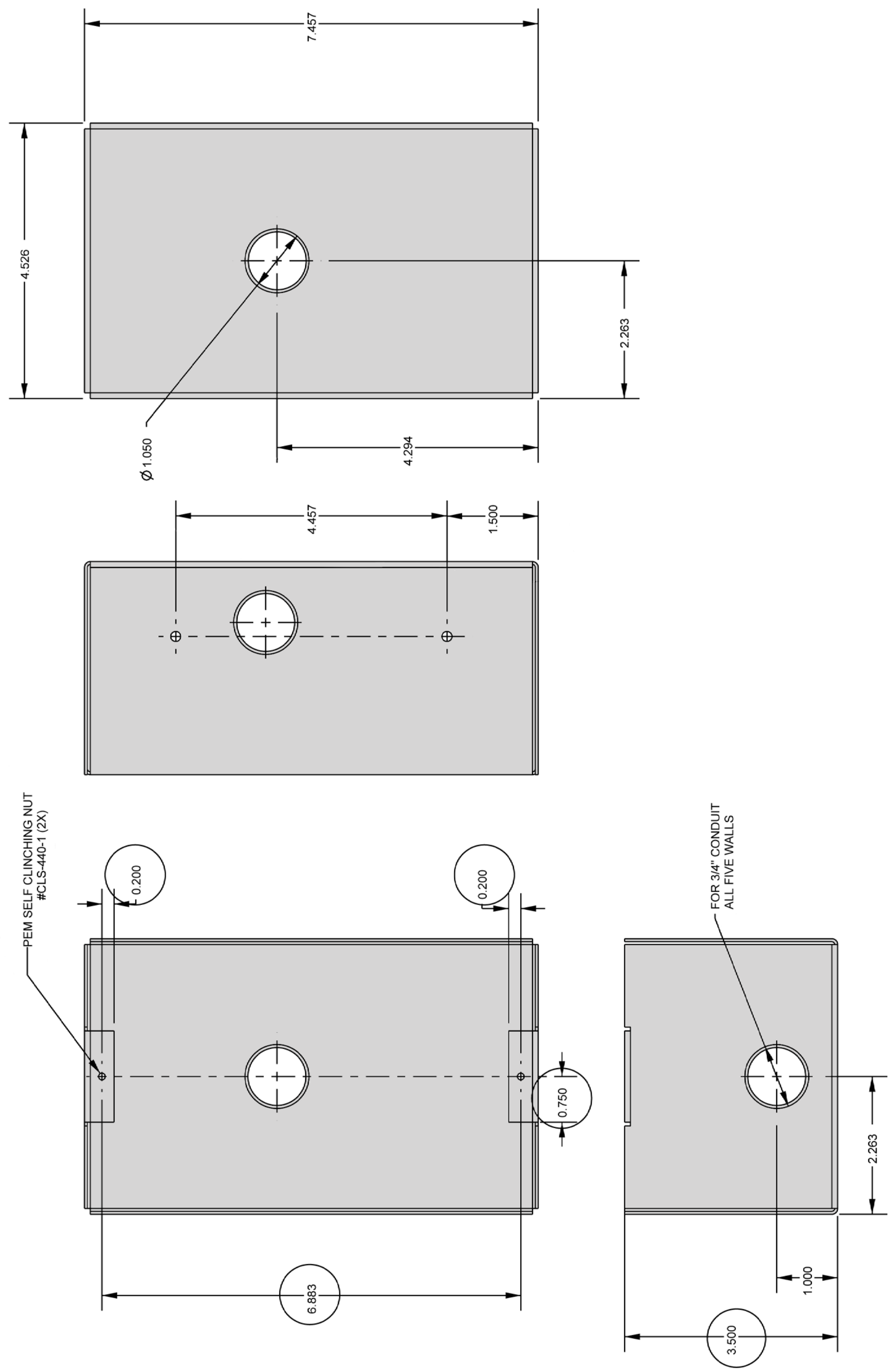
Automatically reverts back to audible mode when alarm condition is removed.

Hot-Spot Features of FMS-1655 Touch Screen Display

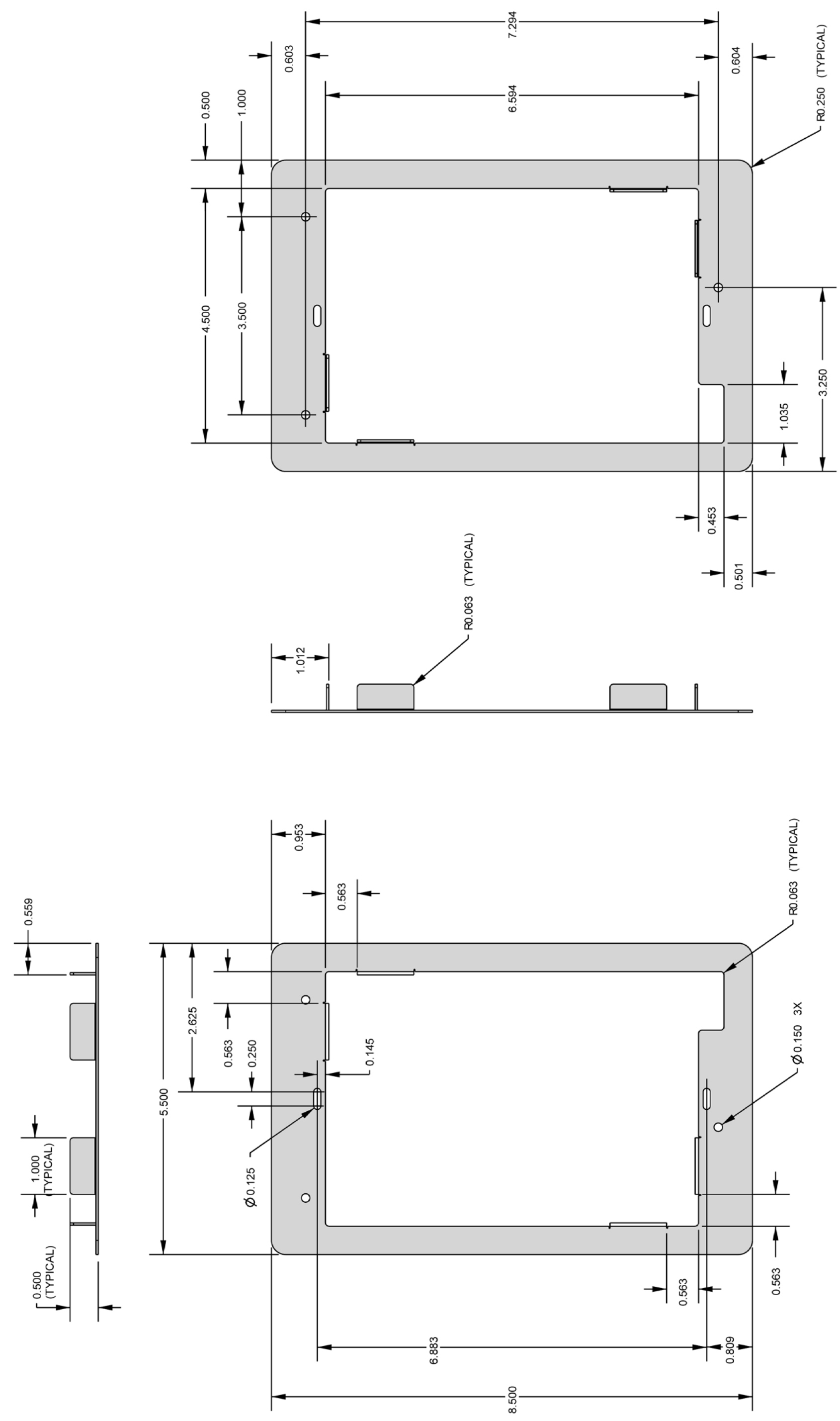
Comprehensive Wiring Diagram



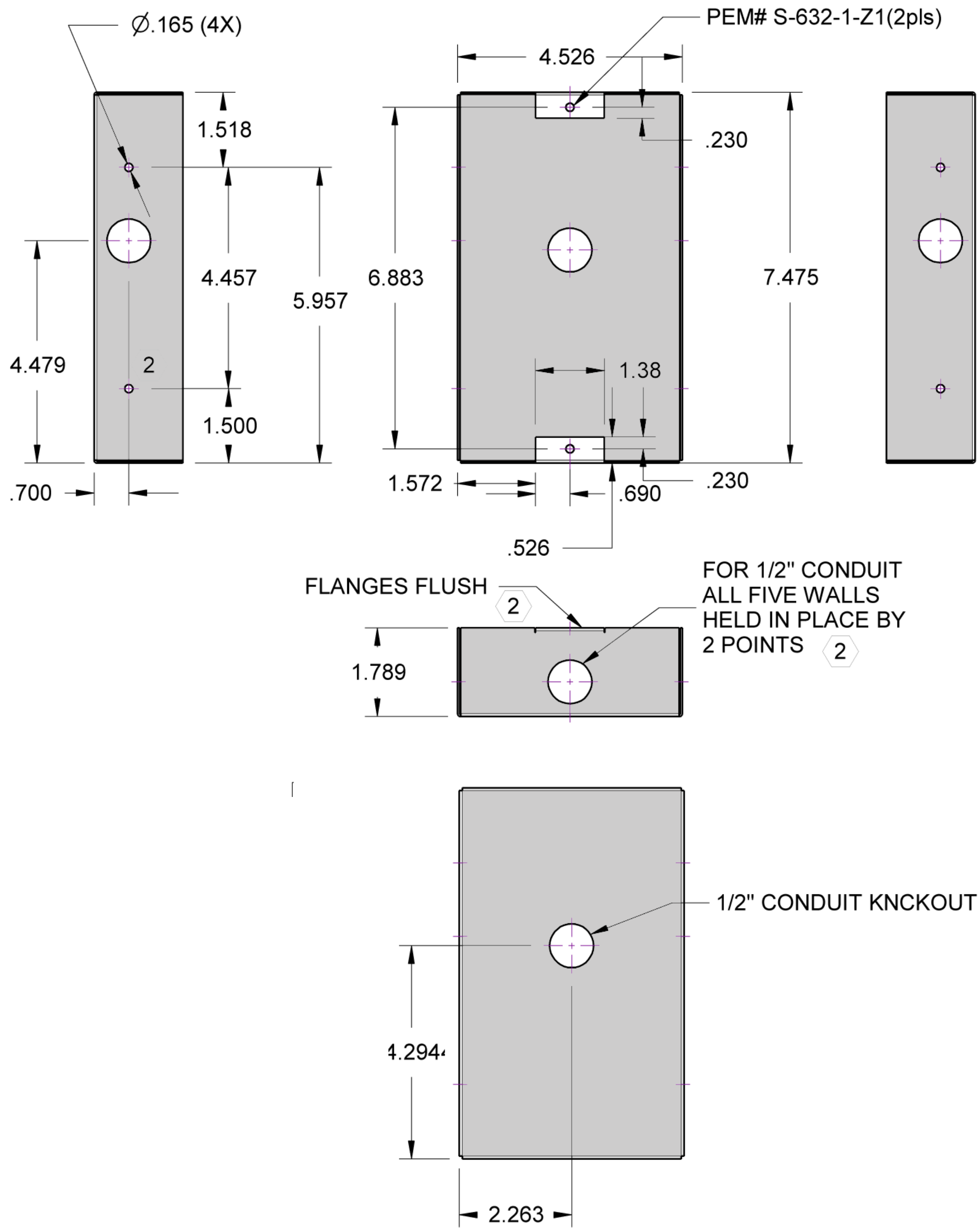
Integrated Flush Mount Wiring Box Dimensions



Flush Mount Bracket Dimensions

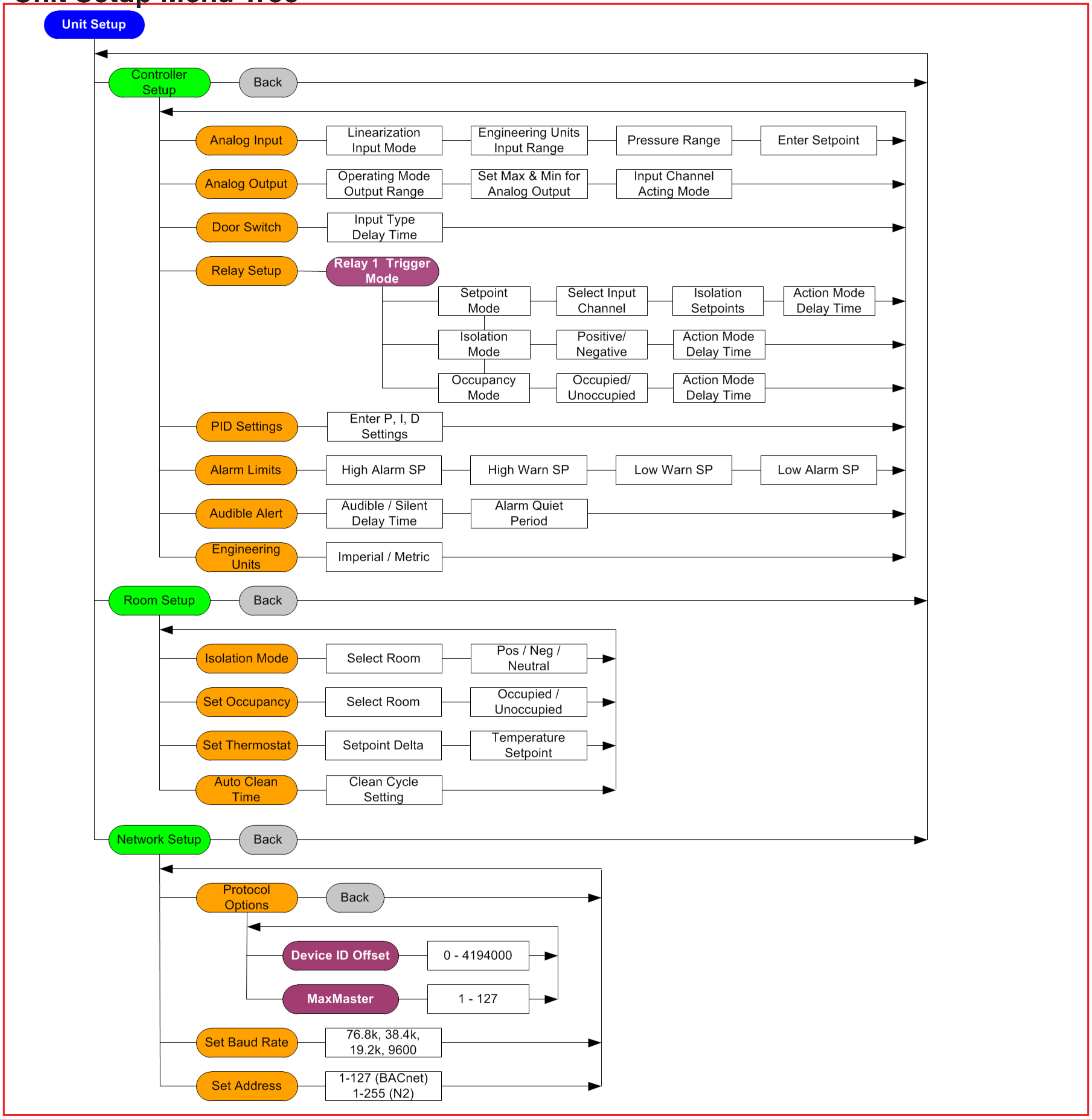


Thin Mount Wiring Box Dimensions

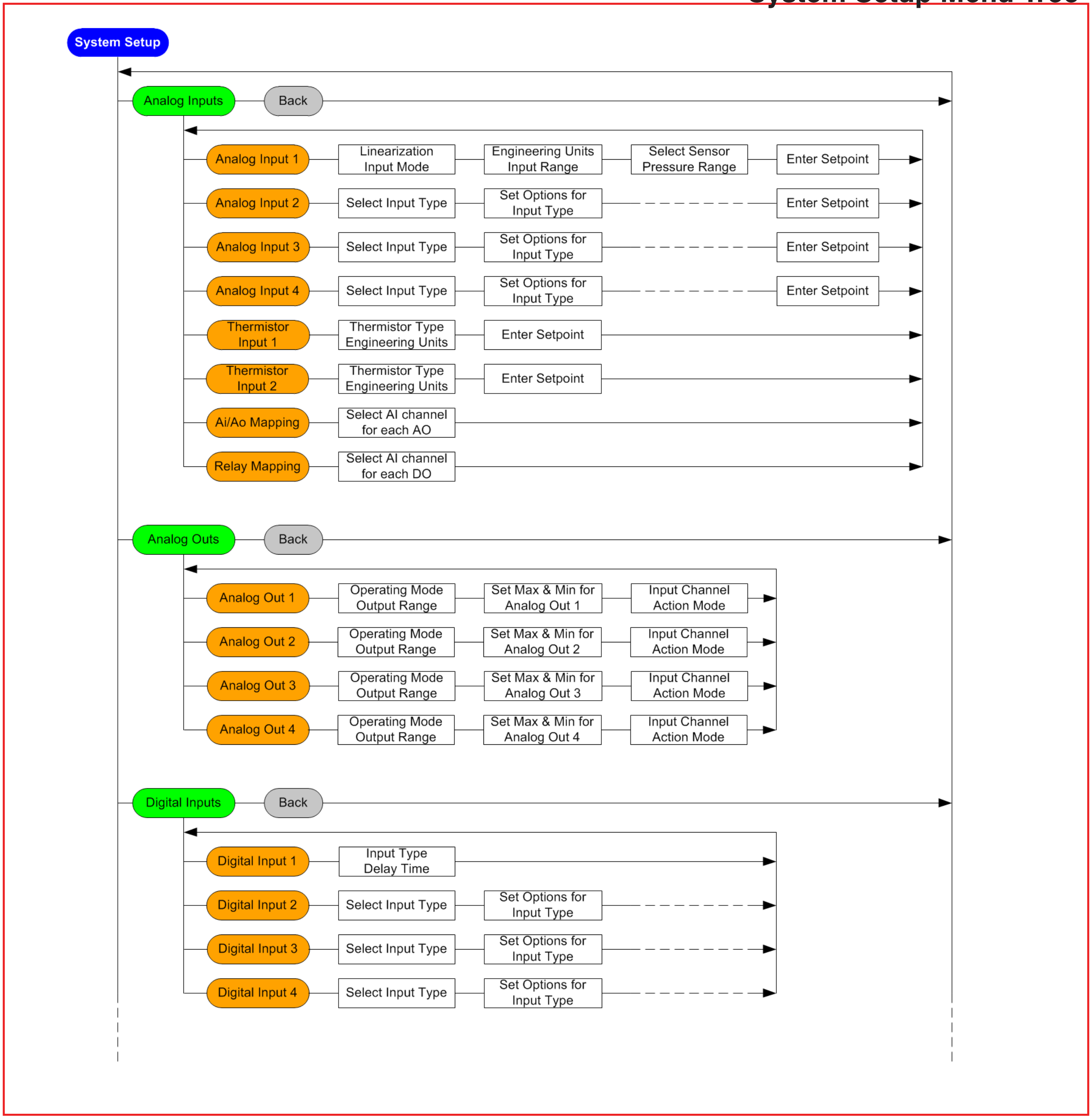


Notes

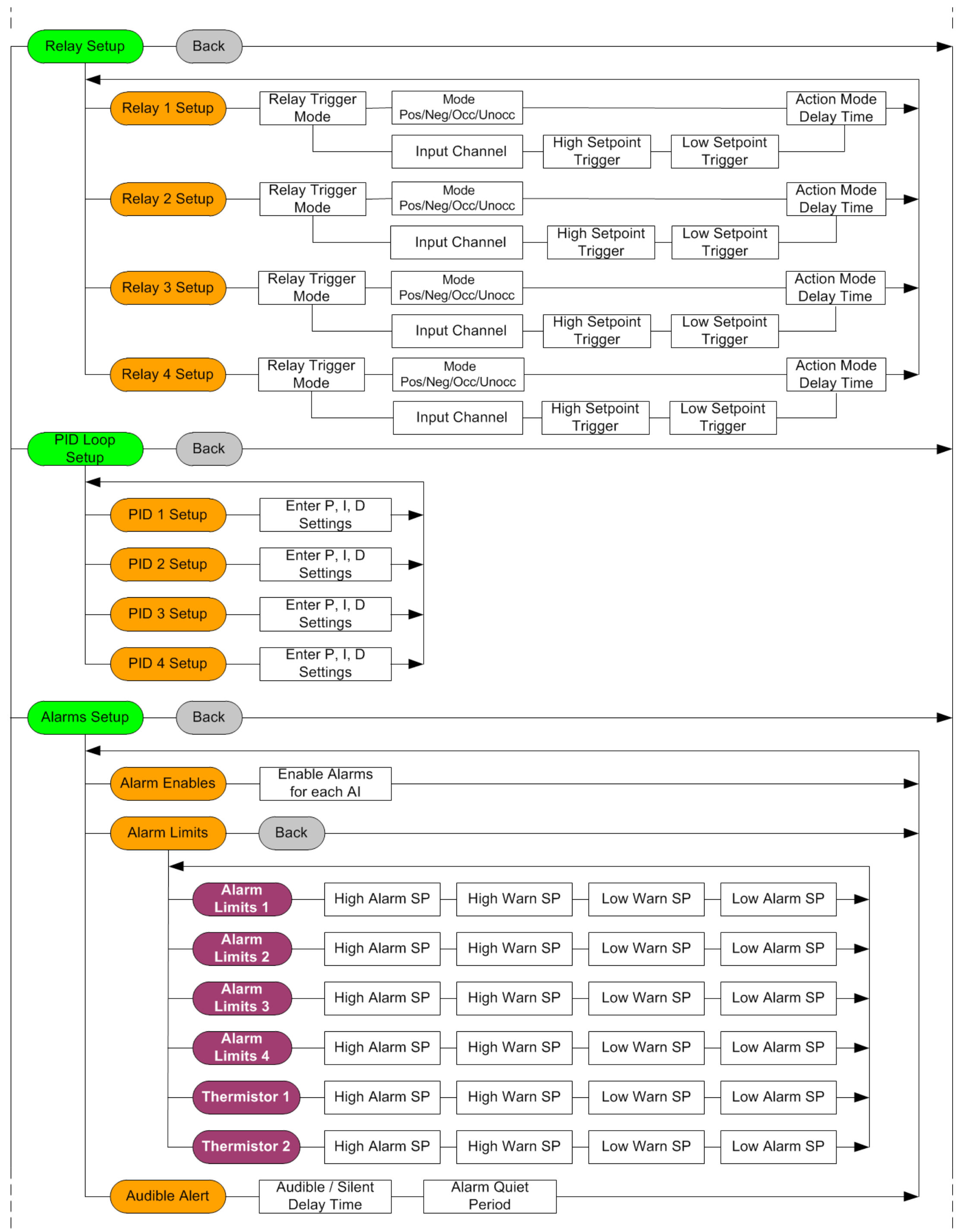
Unit Setup Menu Tree



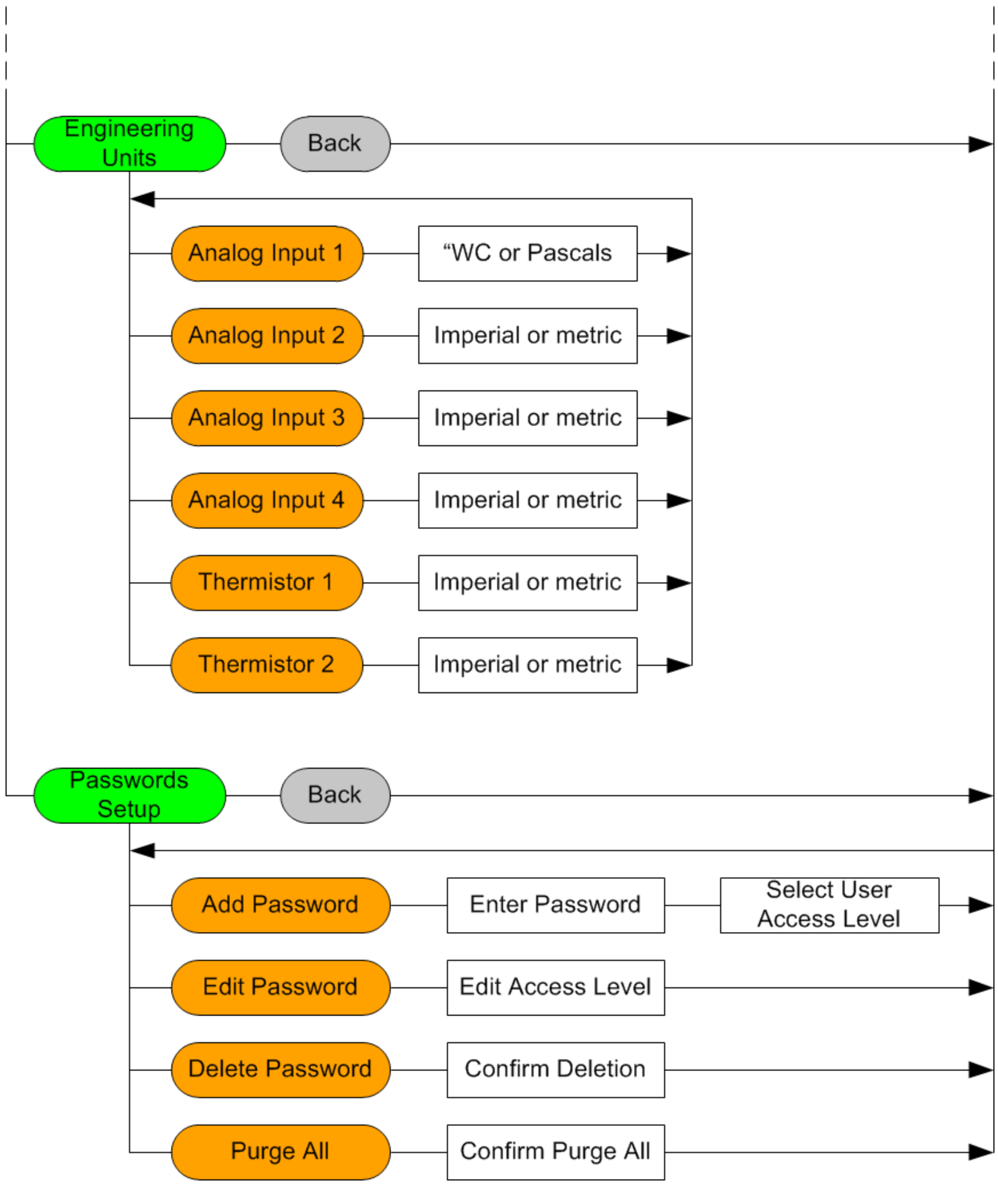
System Setup Menu Tree



System Setup Menu Tree

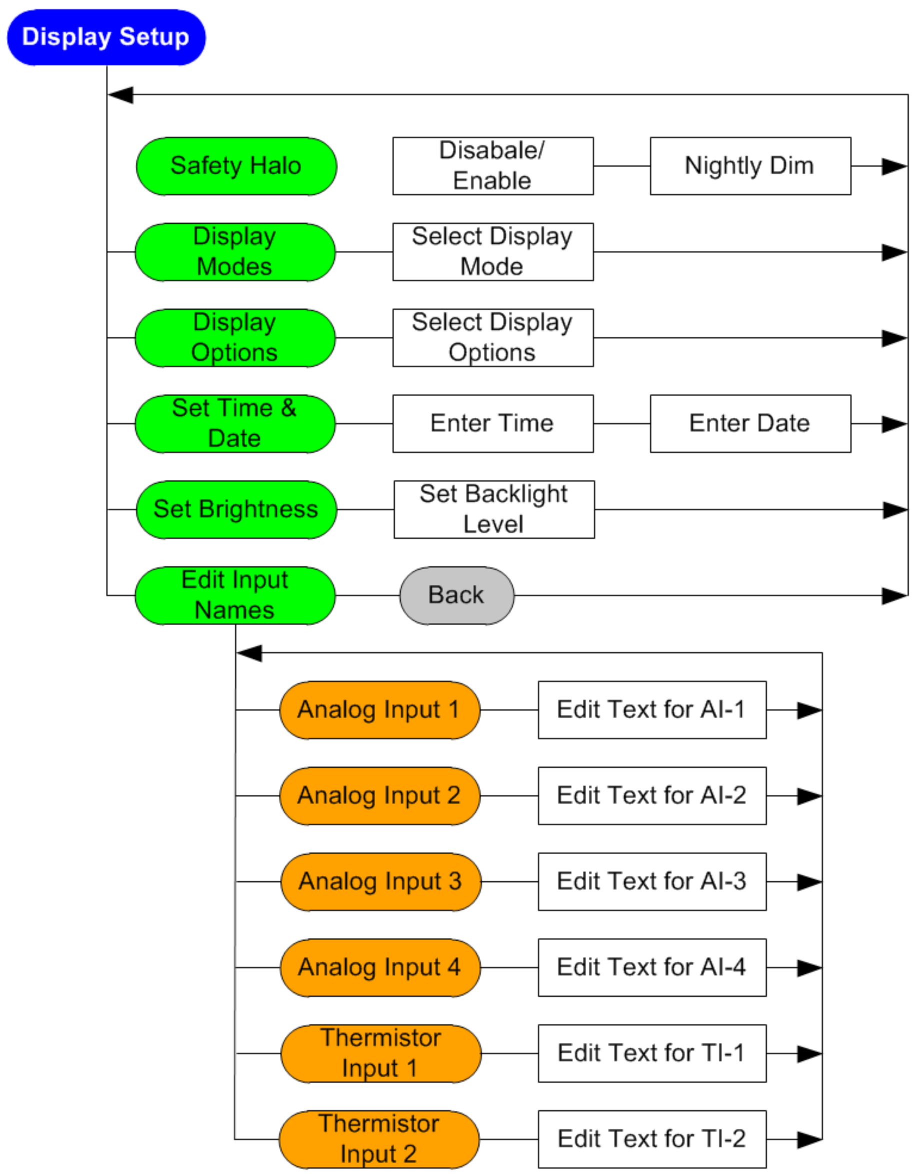


System Setup Menu Tree

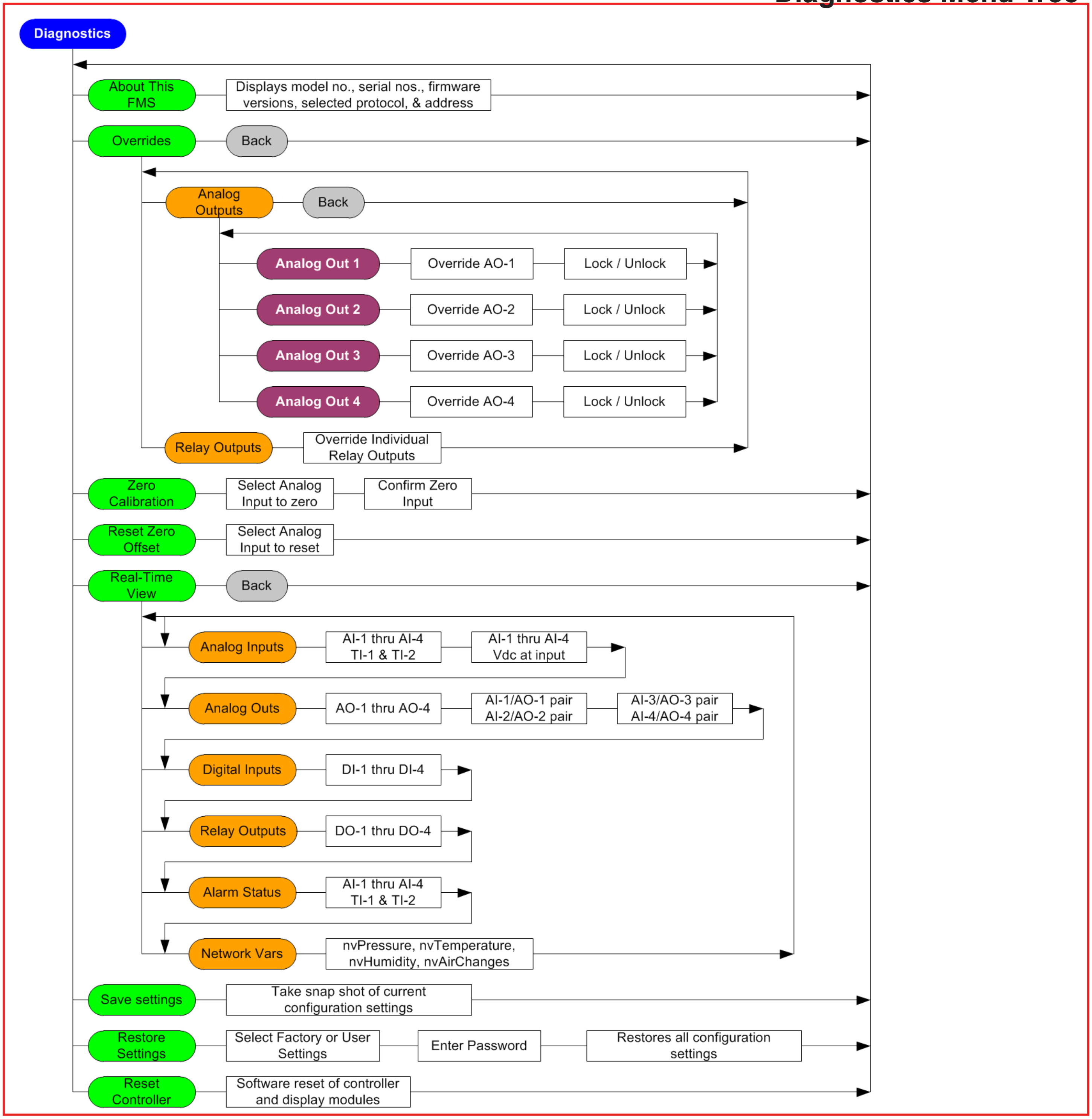


FLOW DIAGRAMS

Display Setup Menu Tree



Diagnostics Menu Tree



FMS-1655
Installation Manual
Version: 12.13.16

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 knowledgeable 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