FMS-2000C

Critical Environment Controller

User Guide

LIT-12013548
July 2023

⚠ WARNING

Risk of Electric Shock.
Disconnect the power supply before making electrical connections. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

Risk of Electric Shock.
Disconnect all electric power sources from the FMS-2000C Critical Environment Controller before removing the FMS-2000C controller cover. Contact with internal components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

⚠ CAUTION

Risk of Personal Injury or Property Damage.
For use in a controlled environment only. Refer to installation instructions for environmental conditions.

NOTICE

Risk of Property Damage.
Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

Risk of Property Damage.
Do not run low-voltage cable in the same conduit or wiring troughs with high-voltage wires. Running low- and high-voltage wires in the same conduit or wiring troughs may damage the equipment or cause system malfunction.

Risk of Property Damage.
Ensure that the power source conforms to the requirements of the equipment. Failure to use a correct power source may result in permanent damage to the equipment.

Risk of Property Damage.
Do not run network communication cables in the same conduit, raceway, or panel with any high-voltage (greater than 30 VAC) wiring. Isolate all network wiring and all network devices from high-voltage wiring and equipment. Failure to isolate network wiring and network devices from high-voltage wiring and equipment can result in damage to network devices or poor network performance.

Risk of Property Damage.
Label all wires prior to disconnecting the equipment. Failure to label the wires may cause improper equipment operation after reconnecting the equipment.

Risk of Property Damage
Do not use a single transformer to power both the actuator and the controller. Use a 24 VAC minimum 30 VA Class 2, Limited Energy, or LPS for the controller, and a separate 24 VAC 20 VA Class 2, Limited Energy, or LPS for the actuator. Failure to follow the wiring diagrams may result in damage to the actuator, the transformer, the controller, or all devices and could void your warranty.

IMPORTANT: Do not install or use this FMS-2000C Critical Environment Controller in or near environments where corrosive substances or vapors could be present. Exposure of the FMS-2000C Critical Environment Controller to corrosive environments may damage the device's internal components and will void the warranty.

IMPORTANT: Do not install this FMS-2000C Critical Environment Controller in condensing, wet, or damp environments. Moisture may cause damage to the FMS-2000C controller.

IMPORTANT: Only qualified personnel should install or service Triatek products. These instructions are a guide for such personnel. Carefully follow all instructions in this document and all instructions for the FMS-2000C Critical Environment Controller.

IMPORTANT: Use copper conductors only. Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the FMS-2000C Critical Environment Controller's electrical ratings.

IMPORTANT: Do not install the FMS-2000C Critical Environment Controller where the maximum temperature exceeds 125°F (52°C). Installing the device where maximum temperatures exceed 125°F (52°C) may cause damage to the FMS-2000C Critical Environment Controller and may void the warranty.

IMPORTANT: Make all wiring connections in accordance with the National Electrical Code and local regulations. Use proper Electrostatic Discharge (ESD) precautions during installation and servicing to avoid damaging the electronic circuits of the FMS-2000C Critical Environment Controller.

IMPORTANT: Maintain proper polarity and voltage or current ratings. Improper polarity or exceeding the voltage or current ratings will void the warranty.

⚠ AVERTISSEMENT

Risque de décharge électrique.
Débrancher l'alimentation avant de réaliser tout branchement électrique. Tout contact avec des composants conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

Risque de décharge électrique.
Déconnecter toutes les sources d'alimentation électrique du FMS-2000C Critical Environment Controller avant de ouvrir le capot du FMS-2000C controller. Tout contact avec des composants internes conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

⚠ ATTENTION

Risque de blessure corporelle ou de dommages matériels.
Pour utilisation dans un environnement contrôlé uniquement. Consulter le guide d'installation pour les conditions environnementales.

AVIS

Risque de dégâts matériels.
Ne pas mettre le système sous tension avant d'avoir vérifié tous les raccords de câblage. Des fils formant un court-circuit ou connectés de façon incorrecte risquent d'endommager irrémédiablement l'équipement.

Risque de dégâts matériels.
Ne pas faire courir un câble basse tension dans les mêmes gaines ou goulottes électriques que des câbles haute tension. L'installation de fils basse tension et haute tension dans les mêmes gaines ou goulottes électriques risque d'endommager l'équipement ou de provoquer des dysfonctionnements du système.

Risque de dégâts matériels.
S'assurer que la source d'alimentation électrique est conforme aux spécifications de l'équipement. L'utilisation d'une source d'alimentation électrique inappropriée risque d'endommager irrémédiablement l'équipement.

Risque de dégâts matériels.
Ne passez pas les câbles de communication réseau dans les mêmes gaines, chemins de câbles ou panneaux que les câbles à haute tension (supérieure à 30 Vca). Isolez tous les câbles et appareils réseau des câbles et appareils à haute tension. Un défaut d'isolement des câbles et appareils à haute tension peut provoquer des dommages aux appareils réseau et réduire les performances du réseau.

Risque de dégâts matériels.
Etiquetez tous les câbles avant de débrancher l'équipement. Le non-respect de cette précaution peut amener un fonctionnement anormal après redémarrage de l'équipement.

Risque de dommage à la propriété
N'utilisez pas un seul transformateur pour alimenter à la fois l'actionneur et le régulateur. Utilisez un transformateur de classe 2 à 24 V CA minimum 30 VA, à limitation d'alimentation ou LPS pour le régulateur et un transformateur de classe 2 à 24 V CA 20 VA à limitation d'alimentation ou LPS séparé pour l'actionneur. Ne pas respecter les schémas de câblage peut causer des dommages à l'actionneur, le transformateur, le régulateur ou tous les appareils et peut annuler votre garantie.

IMPORTANT : N'installez ou n'utilisez pas FMS-2000C Critical Environment Controller dans, ou près, d'environnements où des substances ou vapeurs corrosives peuvent être présentes. L'exposition du contrôleur FMS-2000C à des environnements corrosifs peut endommager les composantes internes de l'appareil et annulera la garantie.

IMPORTANT : N'installez pas FMS-2000C Critical Environment Controller dans un environnement humide, mouillé ou il se produit de la condensation. L'humidité peut causer des dommages au contrôleur FMS-2000C.

IMPORTANT : Seul le personnel qualifié peut installer et entretenir les produits Triatek. Ces instructions constituent un guide pour ce type de personnel. Suivez attentivement toutes les instructions de ce document et toutes les instructions du FMS-2000C Critical Environment Controller.

IMPORTANT : N'utilisez que des conducteurs en cuivre. Assurez-vous que tous les branchements de câbles sont effectués selon les réglementations locales, nationales et régionales. Ne dépassez pas les spécifications électriques du FMS-2000C Critical Environment Controller.

IMPORTANT : N'installez pas le contrôleur d'environnement critique FMS-2000C où la température maximum dépasse 52 °C (125 °F). Installer l'appareil dans un environnement où la température maximum dépasse 52 °C (125 °F) peut endommager FMS-2000C Critical Environment Controller et peut annuler la garantie.

IMPORTANT : Assurez-vous que tous les branchements de câbles sont effectués selon le Code national de l'électricité et les réglementations locales. Utilisez une bonne protection contre les décharges électrostatiques (ESD) pendant l'installation et l'entretien pour éviter d'endommager les circuits électroniques du FMS-2000C Critical Environment Controller.

IMPORTANT : Conservez la bonne polarité et la bonne tension ou le bon courant. Une mauvaise polarité ou le dépassement de la tension ou du courant annulera la garantie.

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Introduction

The FMS-2000C Critical Environment Controller ensures that laboratory and healthcare settings are safe for all occupants by continuous verification of room pressure and air flow. The controller precisely controls and monitors six parameters, which includes differential pressure, temperature, humidity, CO_2, air flow, and air changes per hour. One controller controls or monitors up to four spaces simultaneously for any of the six parameters. The controller has a displayed air flow resolution down to 0.0001 in. W.C. or 0.0249 Pa and instantly updates as conditions change.

The FMS-2000C provides maximum room status awareness with color-coded visual alarms both on screen and with the 360° Safety Halo illuminated edge, which allows staff to easily monitor spaces down long corridors. You can put the audible alarm into snooze mode with one tap to the screen. There are two password-protected access levels, one for administrators and one for restricted level users, such as nurses.

Display overview

Figure 1: FMS-2000C Critical Environment Controller display

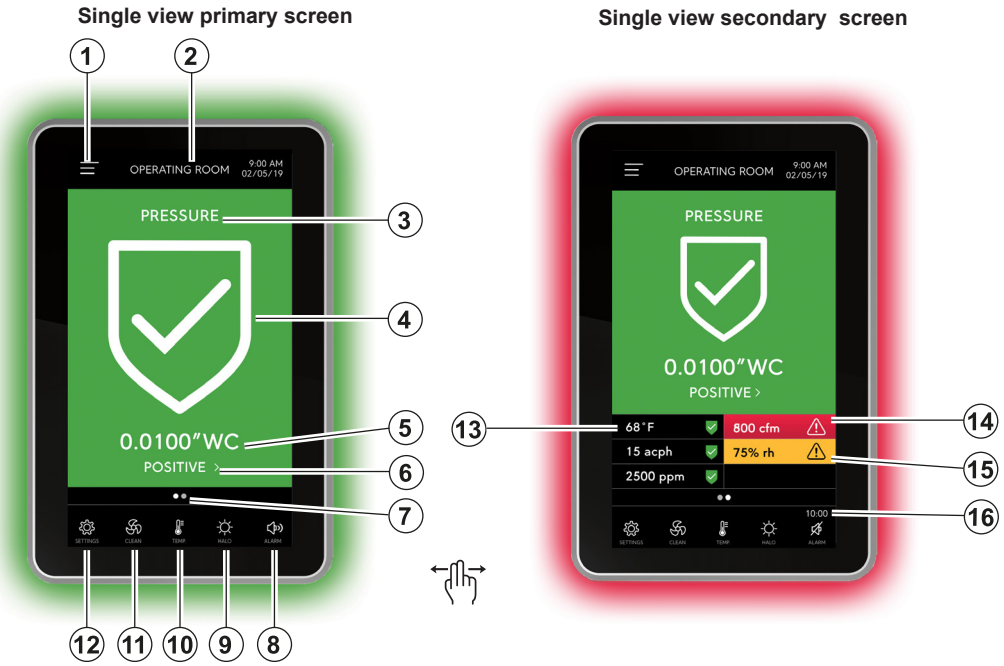


Table 1: FMS-2000C Critical Environment Controller display and icons

Number	Description
1	User menu
2	Device name
3	Analog input name
4	Parameter status icon
5	Primary sensor reading
6	Isolation mode quick link
7	Screen indicator
8	Quick access to alarm mode: audible, muted, and night mode
9	Quick access to 360° Safety Halo
10	Quick access to temperature
11	Clean room function
12	Settings menu
13	Secondary parameter with normal status
14	Secondary parameter with alarm status
15	Secondary parameter with warning status
16	Alarm snooze countdown timer

Figure 2: Warning screen

Figure 3: Alarm screen

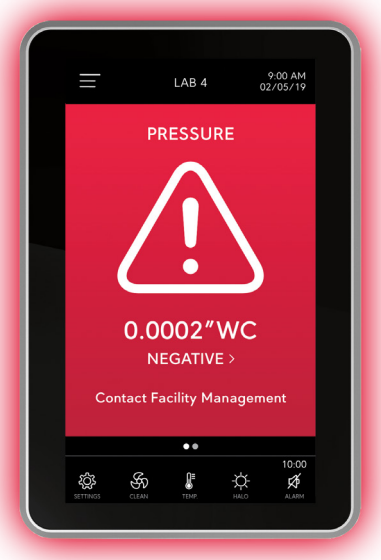


Figure 4: Neutral isolation mode

Figure 5: Cleaning mode

Figure 6: Alarms disabled

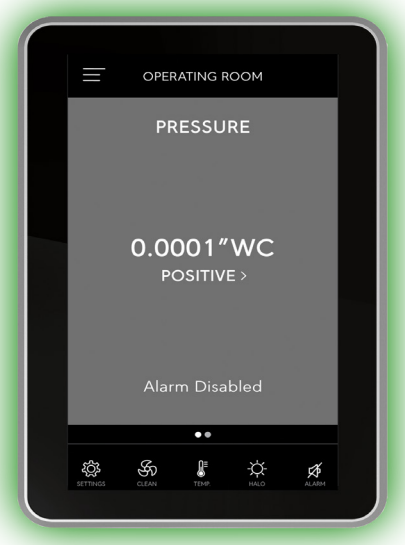


Figure 7: FMS-2000C Critical Environment Controller network overview

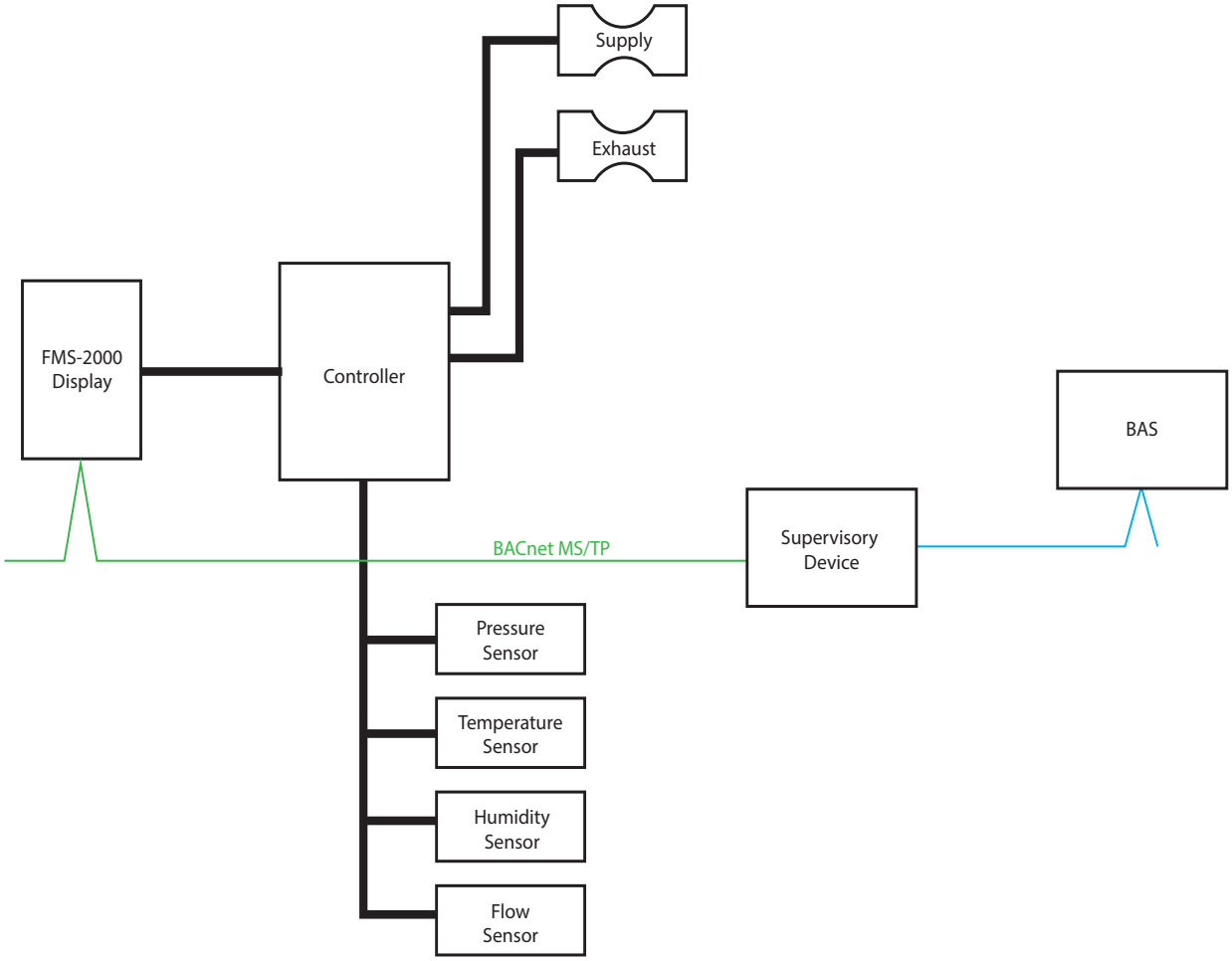


Table 2: Icon overview

Icon	Sensor descriptions
	Sensor readings in acceptable range
	Warning or alarm depending on status color
	Neutral isolation mode
	Audible alarm
	Muted alarm
	Night mode
	Home screen
	Start
	Stop
	Revert
	Information
	Switch is off
	Switch is on
	Increase temperature
	Decrease temperature
	Next
	Expand menu
	Collapse menu
	Checkmark to confirm
	Delete or cancel
	Previous page

Icon	Sensor descriptions
	Next page
	More options

Initial setup

When the FMS-2000C Critical Environment Controller starts for the first time, a setup wizard guides you through the initial setup where you can configure the device language, units of measurement, device orientation, and isolation mode. When you set up the isolation mode, you can limit the isolation modes available to restricted level users. See Table 3 for definitions of positive, negative and neutral isolation.
You can choose from the following configurations:

- Positive only
- Negative only
- Positive and negative

Note: Positive, negative, and neutral isolation mode is available for rare situations where a room can be either positive or negative.

Table 3: Definitions of isolation modes

Isolation mode	Definition
Positive isolation mode	The differential pressure of the monitored space is positive with respect to the reference space.
Negative isolation mode	The differential pressure of the monitored space is negative with respect to the reference space.
Neutral isolation mode	The differential pressure of the monitored space is zero or near zero with respect to the reference space.

If your FMS-2000C controller includes two or more differential pressure sensors, you can specify the isolation modes for both a primary and a secondary space. In a typical application, the FMS-2000C controller can be configured to monitor and control the differential pressure in an isolation room and an adjoining anteroom. The isolation room is the primary monitored space and the anteroom is the secondary monitored space. Use the primary sensor input or analog input 1 (AI-1) for a primary monitoring and control capability. Use the secondary sensor input or analog input 2 (AI-2) for a secondary monitoring and control capability.

Completing the initial setup

The FMS-2000C display boots up in portrait orientation by default. You can change this to landscape orientation in the initial setup in **Device Orientation**. The first screen that appears in the initial setup is the **Language** screen.

1. On the **Language** screen, scroll to your preferred language and tap the **Checkmark** icon.
2. On the **Global** screen, expand **Units** and tap to select whether values display as **Imperial** or **Metric**.
3. Expand **Device Orientation** and tap to select **Portrait** or **Landscape** screen orientation.
4. Collapse **Device Orientation** and tap the **Checkmark** icon to save the settings.
5. On the **Isolation Mode** screen, expand **Primary**. Choose from the following options:
   - **Positive Only**
   - **Negative Only**
   - **Positive and Negative**
6. Tap the **Checkmark** icon to save the settings.
7. If your FMS-2000C controller came with two or more sensors, you get the option to set up a primary and a secondary space. To set up the isolation mode for the secondary space, expand **Secondary**. Choose from the following options:
   - **Positive Only**
   - **Negative Only**
   - **Positive and Negative**
8. Collapse **Primary** and **Secondary** and tap the **Checkmark** icon to save the settings.
9. Tap **Proceed** to complete the initial setup.

Note: You can change to your initial settings in the **Settings** menu.

Configuration

After you have completed the initial setup, the settings menu appears. You can configure the following settings:

- Global
- User Accounts
- Network
- Room
- Analog I/O
- Digital Input
- Relay
- Proportional integral derivative (PID) Loop
- Display
- Alarms
- Diagnostics
- Documentation

Global settings

In Global settings you can change settings that impact the entire FMS-2000C Critical Environment Controller.

Choosing a unit of measure

1. On the home screen, tap the **Settings** icon.
2. To view global settings, tap **Global**.
3. On the **GLOBAL** screen, expand **Units** to select whether values display as **Imperial** or **Metric**.
4. To save the settings, collapse **Units**

Choosing a language

1. On the home screen, tap the **Settings** icon.
2. To view global settings, tap **Global**.
3. To view all language options, tap **Language** arrow.
4. To choose a language, scroll to your preferred language.
5. To save your language selection, tap the **Checkmark** icon.

Choosing the device orientation

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view global settings, tap **Global**.
3. On the **GLOBAL** screen, expand **Device Orientation** and tap to select **Portrait** or **Landscape**.

To save the settings, collapse **Device Orientation**.

Turn Keyboard clicks on or off

1. On the Home screen, tap the **Settings** icon to enter the Settings menu.
2. To view global settings, tap **Global**.
3. To turn the Keyboard clicks on or off, tap the toggle button.

Adjusting the screen brightness

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view global settings, tap **Global**.
3. Expand **Screen Brightness** and move the slider to increase or decrease the brightness of the screen.
4. To confirm the settings, collapse **Screen Brightness**.

User accounts

Setting up users and passwords restricts the use of the FMS-2000C Critical Environment Controller to specific groups of people. This is not mandatory, but if you do not create users and passwords, anyone can access all functions of the FMS-2000C controller. The following access levels are available:

- Admin level
- Restricted level.

Admin level users have access to the entire device. Restricted users have access to the user menu and the quick access icons on the home screen.

Admin user capabilities

When you create an admin user, follow these guidelines:

- When an admin user account has been created, you cannot delete it without first creating another admin user.
- Only an authenticated admin user can create users.
- An admin user can delete admin users, restricted users, or groups of users.
- An admin user can edit individual and groups of restricted users.
- An admin user can select all users.
- An admin user can delete multiple selected users.

Restricted user capabilities

- A user must authenticate to change set points.
- An individual user or group has to identify themselves before entering a pin.
- There cannot be duplication of user names.

User name and password requirements

To create a user name, follow these minimum requirements:

- English only
- Alphanumeric
- One letter minimum
- Three characters minimum
- 20 characters maximum
- No special characters required but the @ symbol can be used

To set up an admin password, follow these minimum requirements:

- English only
- Alphanumeric
- Six characters minimum
- 12 characters maximum
- One letter minimum
- One number minimum
- No restrictions on special characters

To set up a PIN password for a restricted user, use the following criteria:

- Zero to nine numeric only
- Four digit minimum
- Eight digit maximum

Creating the admin user account and password

The admin user is the first user who sets up the device. You must set up an admin user before you can set up a restricted user. An admin level user has access to the entire device.

1. On the home screen, tap the **Settings** icon.
2. Tap **User Accounts**.
3. On the **USER ACCOUNTS** screen, tap the **Create User** arrow.
4. To change the admin user name, tap the **User Name** arrow and enter the new user name. See *User name and password requirements* for user name requirements.
5. To select the access level for the new admin user account, expand **Access Level** and tap **Administrator.**
6. To confirm your settings, tap the **Checkmark** icon.
7. On the **Create Password** screen, enter your new password twice. See *User name and password requirements* for password requirements.
8. To complete setting up the admin user account and password, tap the **Checkmark** icon.

Creating a restricted user and PIN

A restricted user can access the user menu and quick access links on the home screen.

1. On the home screen, tap the **Settings** icon.
2. Tap **User Accounts**.
3. On the **USER ACCOUNTS** screen, tap the **Create User** arrow.
4. To change the restricted user name, tap the **User Name** arrow and enter the new user name. See *User name and password requirements* for user name requirements.
5. To select the access level for the new restricted user account, expand **Access Level** and tap **Restricted User.**
6. To confirm your settings, tap the **Checkmark** icon.
7. On the **Create PIN** screen, enter your new PIN twice. See *User name and password requirements* for PIN requirements.
8. To complete setting up the restricted user account and PIN, tap the **Checkmark** icon.

Deleting users

1. On the home screen, tap the **Settings** icon.
2. Tap **User Accounts**.
3. On the **USER ACCOUNTS** screen, expand **Manage Users**.
4. Tap the user names you want to delete and tap **Delete**.
5. **Optional:** If you want to delete all users, tap **Select All** and **Delete**.
6. On the **DELETE USER** screen, tap **Delete** to confirm your selection.

Note: When you choose the optional step of deleting all users, you delete all admin and restricted users except for the admin user account you are logged in with.

Changing a user name

1. On the home screen, tap the **Settings** icon.
2. Tap **User Accounts**.
3. To change a user name, tap **Edit** next to a user name.
4. On the **Edit User** screen, tap the **User Name** arrow and enter a different user name.
5. To confirm the new user name, tap the **Checkmark** icon.

Changing the access level of a restricted user to an admin user

1. On the home screen, tap the **Settings** icon.
2. Tap **User Accounts**.
3. To change the access level of a restricted user, tap **Edit.**
4. On the **Edit User** screen, tap **Restricted User** and select **Administrator.**
5. Tap **Create Password** and enter a new password twice.
6. To confirm the change, tap the **Checkmark** icon.

Changing the access level of an admin user to a restricted user

1. On the home screen, tap the **Settings** icon.
2. Tap **User Accounts**.
3. To change the access level of an admin user, tap **Edit.**
4. On the **Edit User** screen, tap **Administrator** and select **Restricted**.
5. Tap **Create PIN** and enter a new PIN twice.
6. To confirm the change, tap the **Checkmark** icon.

Updating the PIN of a restricted user

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view all user accounts information, tap **User Accounts**.
3. To reset the pin of a restricted user, tap **Edit**.
4. On the **Edit User** screen, tap the **Reset Pin** arrow.
5. Enter the old PIN and the new PIN twice.
6. Tap the **Checkmark** icon to confirm the reset.

Forgotten password or PIN

If restricted users forget their PIN, they can contact the facility manager to get their new PIN. Admin users can create a new PIN for restricted users.
If admin users forget their password, they have to complete the following procedure:

1. Contact support and provide them with the device identifier listed on the screen of each FMS-2000C Critical Environment Controller. See Contact information at the end of the User's Guide for more details.
2. Enter the number that support gives you into each controller to erase all user accounts.
3. See *User accounts* for information about how to set up new user accounts.

Note: You do not need to reconfigure the entire FMS-2000C controller.

Network setup

In the network menu, you can set up the network communications between the FMS-2000C Critical Environment Controller and the facility building automation system (BAS).

BACnet MS/TP network setup

On the BACnet MS/TP network, you can adjust the device ID offset, MaxMaster, baud rate, and MAC address.

Setting up the device ID

The device ID (or instance number) is a number used to identify a BACnet device object. Each BACnet device on a site must have a unique device ID. The FMS-2000C creates a default device ID of 85,000 plus the current MAC address. For example, if the MAC address is 25, the default device identifier becomes 85,025. This default number can be manually changed to any number between 0 and 4,194,303 to accommodate any device ID scheme used on the site.

To set up the device ID offset, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view network settings, tap **Network**.
3. To view the **Device ID,** tap **BACnet Protocol**.
4. To adjust the **Device ID**, tap the **Arrow** icon.
5. Enter a number between zero and 4,194,303.
6. To confirm the new settings, tap the **Checkmark** icon.

Setting up the MaxMaster

This parameter specifies the highest allowable address for a master node on the same network. The default value for this parameter is 127. When you adjust this value, you can prevent the online activation of some devices as bus masters. All devices on the bus must have the same MaxMaster attribute value to prevent the transfer of the token to a device with an address above the MaxMaster attribute value.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view network settings, tap **Network**.
3. To view the **MaxMaster**, tap **BACnet Protocol**.
4. To adjust the **MaxMaster**, move the slider towards the **Plus** or the **Minus** icon. You can also tap the **Plus** or **Minus** icon to make adjustments.
5. **Optional:** Tap the **Revert** icon to revert back to the previous setting.
6. To confirm the new settings, tap the **Checkmark** icon.

Choosing the baud rate

Complete the following steps to set the baud rate when using a BACnet MS/TP configuration:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view network settings, tap **Network**.
3. To set the **Baud Rate**, expand **Baud Rate**. The default baud rate is 38.4 kbps. The other rate options are 76.8 kbps, 19.2 kbps, or 9600 bps. Select the appropriate rate.
4. To save the new settings, collapse **Baud Rate**.
5. To ensure that the unit rejoins the MS/TP network after the baud rate change or selection, select **Reboot System** in the **Diagnostics** menu, or power cycle the system.

Note: Only change the baud rate to match an MS/TP trunk already in use. All devices on an MS/TP bus must communicate at the same baud rate.

Setting the MAC address for BACnet MS/TP

On the BACnet MS/TP protocol, you can set up a MAC address within a valid range of 4 to 127 to support master mode.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view network settings, tap **Network**.
3. On the Network screen, tap **MAC Address**.
4. To adjust the **MAC Address**, move the slider towards the **Plus** icon to increase or the **Minus** icon to decrease the parameter. You can also tap the **Plus** or **Minus** icon to make ad**justm**ents.
5. **Optional:** Tap the **Revert** icon to revert back to the previous setting.
6. To confirm the new settings, tap the **Checkmark** icon.
7. To ensure that the unit rejoins the MS/TP network after the MAC address change or selection, select **Reboot System** in the **Diagnostics** menu, or power cycle the system.

Room setup

Admin level users can set up key parameters for a monitored space including isolation mode, cleaning mode, and comfort range. The settings in the room menu limits the options available to restricted users in the user menu. For the isolation mode, you can choose from the following configurations:

- Positive Only
- Negative Only
- Positive and Negative

If your FMS-2000C Critical Environment Controller includes two or more differential pressure sensors, you can specify the isolation modes for both a primary and a secondary monitored space. In a typical application, the FMS-2000C controller can be configured to monitor and control the differential pressure in an isolation room and an adjoining anteroom. The isolation room is the primary monitored space and the anteroom is the secondary monitored space. Use the primary sensor input or AI-1 for a primary monitoring and control capability. Use the secondary sensor input or AI-2 for a secondary monitoring and control capability.

Restricting the isolation mode for the primary monitored space

Admin level users can change the isolation mode limits that were set up in the initial setup. Changes made affect the options available in the user menu. To change the isolation mode limits for the primary monitored space, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view room settings, tap **Room**.
3. To adjust the **Isolation Mode** for the **Primary** monitored space, expand **Isolation Mode** and choose from the following options:
   - **Positive Only**
   - **Negative Only**
   - **Positive and Negative**
4. To save the new settings, collapse **Isolation Mode**.

Restriciting the isolation mode for the secondary monitored space

If more than one pressure sensor is in use, a toggle button appears at the top of the screen to select the primary or secondary space.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view room settings, tap **Room**.
3. To select the secondary monitored space, tap the **Toggle** button at the top of the screen.
4. To adjust the **Isolation Mode** for the **Secondary** monitored space, expand **Isolation Mode** and choose from the following options:
   - **Positive Only**
   - **Negative Only**
   - **Positive and Negative**
5. To save the new settings, collapse **Isolation Mode**.

Setting the isolation mode for the primary and secondary spaces

To change the isolation mode from the display for the primary and secondary spaces, see *Changing the isolation mode for the primary space* and *Changing the isolation mode for the secondary space*.

Setting the clean duration for the primary monitored space

The purpose of the clean room function is to evacuate airborne contaminants from a negative pressure space between occupancies. The clean room function opens the exhaust to maximum and affects analog output AO-1, which is the default control output for pressure control applications. The default cleaning time is 30 minutes, but may be set to the desired duration to effectively clean the monitored space of all airborne contaminants.
Make sure the room is vacant and the doors are closed when you activate the clean room function. To activate the cleaning function, tap the **Fan** icon on the home screen.

To set the clean duration for the primary monitored space, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view room settings, tap **Room**.
3. On the **ROOM** screen, expand **Clean Duration** and move the slider to increase or decrease the duration you want to set for the cleaning mode.
4. To confirm your settings, collapse **Clean Duration**.

Adjusting the comfort range for the primary monitored space

Adjust the comfort range to restrict by how many degrees a restricted level user can adjust the thermostat.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view room settings, tap **Room**.
3. Tap the **Comfort Range** arrow and choose from the following options:

Table 4: Fahrenheit and Celsius comfort ranges

Fahrenheit	Celsius
+/- 1°F	+/- 0.5°C
+/- 2°F	+/- 1.0°C
+/- 3°F	+/- 1.5°C
+/- 4°F	+/- 2.0°C
+/- 5°F	+/- 2.5°C
+/- 10°F	+/- 5.0°C
+/- 20°F	+/- 10.0°C

4. To save the new settings, tap the checkmark icon.

Adjusting the comfort range for the secondary monitored space

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view room settings, tap **Room**.
3. To view settings for the secondary monitored space, tap **Secondary**.
4. Tap the **Comfort Range** arrow and scroll to choose from the following options:

Table 5: Fahrenheit and Celsius comfort ranges

Fahrenheit	Celsius
+/- 1°F	+/- 0.5°C
+/- 2°F	+/- 1.0°C
+/- 3°F	+/- 1.5°C
+/- 4°F	+/- 2.0°C
+/- 5°F	+/- 2.5°C
+/- 10°F	+/- 5.0°C
+/- 20°F	+/- 10.0°C

5. To save the new settings, tap the checkmark icon.

BACnet objects

Table 6: Analog inputs for integration in a BAS

Object	Analog inputs	Read or write
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

Table 7: Analog outputs for integration in a BAS

Object	Analog inputs	Read or write
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

Table 8: Binary inputs for integration in a BAS

Object	Binary inputs	Read or write
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

Table 9: Binary outputs for integration in a BAS

Object	Binary outputs	Read or write
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

Table 10: Analog values for integration in a BAS

Object	Analog values	Read or write
AV-1	AI-1 setpoint for room pressure	Read or write
AV-2	AI-2 setpoint	Read or write
AV-3	AI-3 setpoint	Read or write
AV-4	AI-4 setpoint	Read or write
AV-5	TI-1 setpoint	Read or write
AV-6	TI-2 setpoint	Read or write
AV-7	Air change rate based on flow input at AI-1	Read only
AV-8	Air change rate based on flow input at AI-2	Read only
AV-9	Air change rate based on flow input at AI-3	Read only
AV-10	Air change rate based on flow input at AI-4	Read only
AV-11	Alarm relay 1 high setpoint	Read or write

Object	Analog values	Read or write
AV-12	Alarm relay 1 low setpoint	Read or write
AV-13	Alarm relay 2 high setpoint	Read or write
AV-14	Alarm relay 2 low setpoint	Read or write
AV-15	Alarm relay 3 high setpoint	Read or write
AV-16	Alarm relay 3 low setpoint	Read or write
AV-17	Alarm relay 4 high setpoint	Read or write
AV-18	Alarm relay 4 low setpoint	Read or write
AV-19	AI-1 low alarm setpoint for low pressure alarm	Read or write
AV-20	AI-1 low warning setpoint for low pressure warning	Read or write
AV-21	AI-1 high warning setpoint for high pressure warning	Read or write
AV-22	AI-1 high alarm setpoint for high pressure alarm	Read or write
AV-23	AI-2 low alarm setpoint	Read or write
AV-24	AI-2 low warning setpoint	Read or write
AV-25	AI-2 high warning setpoint	Read or write
AV-26	AI-2 high alarm setpoint	Read or write
AV-27	AI-3 low alarm setpoint	Read or write
AV-28	AI-3 low warning setpoint	Read or write
AV-29	AI-3 high warning setpoint	Read or write
AV-30	AI-3 high alarm setpoint	Read or write
AV-31	AI-4 low alarm setpoint	Read or write
AV-32	AI-4 low warning setpoint	Read or write
AV-33	AI-4 high warning setpoint	Read or write
AV-34	AI-4 high alarm setpoint	Read or write
AV-35	TI-1 low alarm setpoint	Read or write
AV-36	TI-1 low warning setpoint	Read or write
AV-37	TI-1 high warning setpoint	Read or write
AV-38	TI-1 high alarm setpoint	Read or write
AV-39	TI-2 low alarm setpoint	Read or write
AV-40	TI-2 low warning setpoint	Read or write
AV-41	TI-2 high warning setpoint	Read or write
AV-42	TI-2 high alarm setpoint	Read or write
AV-43	Network variable humidity	Read or write
AV-44	Network variable temperature	Read or write
AV-45	Network variable air changes	Read or write
AV-46	Network variable pressure	Read or 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 or write
AV-54	AO-1 override level	Read or write
AV-55	AO-2 override level	Read or write
AV-56	AO-3 override level	Read or write

Object	Analog values	Read or write
AV-57	AO-4 override level	Read or write
AV-58	AI-1 deadband setting	Read or write
AV-59	AI-2 deadband setting	Read or write
AV-60	AI-3 deadband setting	Read or write
AV-61	AI-4 deadband setting	Read or write
AV-62	TI-1 deadband setting	Read or write
AV-63	TI-2 deadband setting	Read or write
AV-64	AI-1 override value	Read or write
AV-65	AI-2 override value	Read or write
AV-66	AI-3 override value	Read or write
AV-67	AI-4 override value	Read or write

Table 11: Multistate objects for integration in a BAS

Object	Multistate objects	Read or write
MV-1	Primary isolation mode	Read or write
MV-2	Secondary isolation mode	Read or write
MV-3	Primary alarm status	Read only
MV-4	Secondary alarm status	Read only
MV-5	AI-3 alarm status	Read only
MV-6	AI-4 alarm status	Read only
MV-7	TI-1 alarm status	Read only
MV-8	TI-2 alarm status	Read only
MV-9	Volumetric offset control status	Read only

Analog I/O

Admin users can set up AI-1 to AI-4, thermistor inputs (TI) TI-1 and TI-2, analog outputs (AO) AO-1 to AO-4 and map analog inputs to the corresponding analog outputs.

See Table 12 for more information about which parameter can be configured to which analog input or thermistor. Refer to the *FMS-2000C Critical Environment Controller Installation Guide* for more information.

Figure 8: Wiring diagram

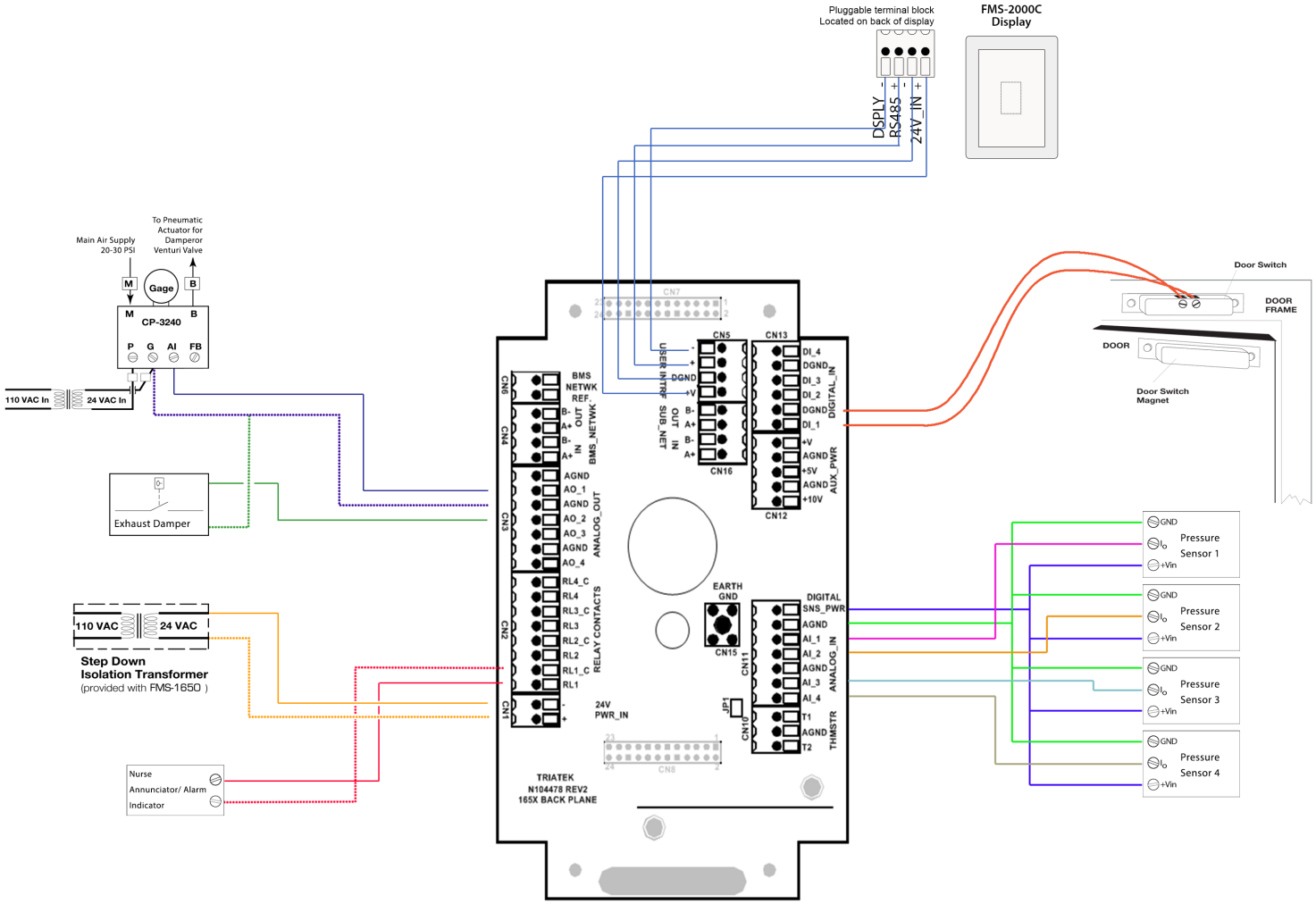


Table 12: Parameter configurations

Parameter	Analog input or thermistor
Pressure	AI-1, AI-2, AI-3, AI-4
Temperature	AI-2, AI-3, AI-4 and TI-1, TI-2
Thermostat	AI-2
Humidity	AI-2, AI-3, AI-4
Volumetric flow and air changes	AI-2, AI-3, AI-4
Volumetric offset	AI-3 and AI-4 when they are both configured for flow
CO_2	AI-3 and AI-4

Configuring analog inputs to measure pressure

To configure the FMS-2000C controller for pressure, you can use AI-1, AI-2, AI-3 and AI-4. Analog Input 1 is only configured for pressure and is pre-configured by the factory. If your FMS-2000C controller came with more than one pressure sensor, AI-2, AI-3 and AI-4 are pre-configured for pressure accordingly. If you are using a third-party pressure sensor you need to select pressure from the list of input types.

Specifying the parameter type for pressure

1. On the home screen, tap the **Settings** icon.
2. Tap **Analog I/O**.
3. On the **ANALOG 1** screen, swipe left to get to the analog input that you want to configure.
4. Tap the **Type** arrow and choose **Pressure**.
5. To confirm the settings, tap the **Checkmark** icon.

Specifying the sensor type

If you purchased a Triatek pressure sensor, the sensor type comes pre-configured as **Remote digital**. If you provide your own pressure sensor, the preset is **Third Party**.

If you are using a remote digital sensor, see *Specifying the sensor location*. If you are using a third party sensor, see *Specifying the maximum pressure input*, *Specifying the minimum pressure input*, and *Specifying the K-Factor* for more information.

Table 13: Signal range requirements for third-party sensors

Analog input	Pressure range	Voltage range
Analog input 1	+/- 0.01 in. W.C. (+/- 2.49 Pa) +/- 0.05 in. W.C. (+/- 12.45 Pa) +/- 0.10 in. W.C. (+/- 24.9 Pa) +/- 0.20 in. W.C. (+/- 49.8 Pa) +/- 0.25 in. W.C. (+/- 62.27 Pa)	4 mA - 20 mA, default 0 mA - 20mA 0 Vdc - 5 Vdc 0 Vdc - 10 Vdc 1 Vdc - 5 Vdc 2 Vdc - 10 Vdc
Analog Input 2, 3, 4	Configurable. Both unidirectional & bidirectional pressure ranges supported.	0 Vdc - 5 Vdc, default 0 Vdc - 10 Vdc 0 mA - 20 mA 1 Vdc - 5 Vdc 2 Vdc - 10 Vdc 4 mA - 20 mA

Specifying the maximum pressure input

To specify the maximum pressure input for third-party pressure sensors, complete the following steps:

1. On the home screen, tap the **Settings** icon.
2. Tap **Analog I/O**.
3. To find the analog input that you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Maximum Pressure Input** arrow.
5. Regardless of whether this pressure sensor is **unidirectional** or **bidirectional**, the maximum pressure must be entered as the positive limit of the sensor's specified range. The **Sensor Location** parameter, located in the **Analog Input Setup** menus, determines the polarity of the displayed pressure, regardless of the type of sensor installed. For negative pressure applications, the sign of the displayed pressure is inverted by toggling the **Sensor Location** parameter.
6. To confirm the settings, tap the **Checkmark** icon.

Specifying the minimum pressure input

If the pressure sensor is bidirectional, the minimum pressure input is the negative limit of the differential range. If the sensor is unidirectional, the value is zero. To specify the minimum pressure input for third-party pressure sensors, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Minimum Pressure Input** arrow.

5. If this pressure sensor is **unidirectional**, the minimum pressure must be entered as zero. If the pressure sensor is **bidirectional**, the minimum pressure must be entered as the negative limit of the sensor's specified range. The **Sensor Location** parameter determines the polarity of the displayed pressure, regardless of the type of sensor installed. For negative pressure applications, the sign of the displayed pressure can be inverted by toggling the **Sensor Location** parameter.
6. To confirm the new settings, tap the **Checkmark** icon.

Specifying the K-Factor

The default value for the K-Factor is 1.0, but the manufacturer of the sensor can provide a different K-Factor to serve as a correction factor for the actual output of the sensor. If you do not receive a different K-Factor from the manufacturer, leave the K-Factor at its default value. If you need to specify a different K-Factor, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap **K-Factor**.
5. Enter the **K-Factor** that the manufacturer provided with the sensor.
6. To confirm the settings, tap the **Checkmark** icon.

Specifying the sensor location

Specify the location of the differential pressure sensor. You can select the location within the monitored space or within the reference space.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To configure the location of the sensor, expand **Sensor Location** and choose from the following options:
   - **Reference Space**
   - **Monitored Space**
5. If the sign of the pressure reading is opposite of the actual measured pressure, the **Sensor Location** setting must be toggled. This effectively inverts the sign of the measured pressure for display purposes**.**
6. To confirm your settings, collapse **Sensor Location**.

Adjusting the positive isolation setpoint

Specify the positive isolation mode setpoint based on your application. You can find this value in the project specifications.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Positive Isolation Setpoint** arrow.
5. Enter the **Positive Isolation Setpoint** value.
6. To confirm the new settings, tap the **Checkmark** icon.
7. Depending on the configuration of the controlled air flow device, Venturi, VAV box, EcoAir, the action mode or polarity of the corresponding control output (AO) may need to be inverted for proper control to maintain the positive isolation setpoint. The default action mode for positive isolation is **Direct**.

Adjusting the negative isolation setpoint

Specify the negative isolation mode setpoint based on your application.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Negative Isolation Setpoint** arrow.
5. Enter the **Negative Isolation Setpoint** value.
6. To confirm the new settings, tap the **Checkmark** icon.
7. Depending on the configuration of the controlled air flow device (Venturi, VAV box, EcoAir), the action mode or polarity of the corresponding control output (AO) may need to be inverted for proper control to maintain the negative isolation setpoint. The default action mode for negative isolation is **Reverse.**

Adjusting the neutral isolation setpoint

Specify the neutral isolation mode setpoint based on your application.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Neutral Isolation Setpoint** arrow.
5. Enter the **Neutral Isolation Setpoint** value.
6. To confirm the new settings, tap the **Checkmark** icon.
7. Depending on the configuration of the controlled air flow device, Venturi, VAV box, EcoAir, the action mode or polarity of the corresponding control output (AO) may need to be inverted for proper control to maintain the neutral isolation setpoint. The default action mode for neutral isolation is **Direct**.

Setting up the analog input signal range

If you are using a remote digital pressure sensor, the range defaults to 4 mA to 20 mA. If you are using a third-party sensor, complete the following steps to configure the signal range:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, expand **Range** and choose from the following:
   - **0-5V, 0-10V, 0-20mA**
   - **1-5V, 2-10V, 4-20mA**
5. To save the new settings, collapse **Range**.
6. Adjust the DIP switches on the backplane to match the setting.

Setting up the Remote digital sensor range

The default sensor range is +/- 0.25 in. W.C. or ± 62.27 Pa. To configure the Remote digital sensor range, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, expand **Sensor Range** and choose from the following options:

   - +/- 0.01 in. W.C. (+/- 2.49 Pa)
   - +/- 0.05 in. W.C. (+/- 12.45 Pa)
   - +/- 0.10 in. W.C. (+/- 24.90 Pa)
   - +/- 0.20 in. W.C. (+/- 49.81 Pa)
   - +/- 0.25 in. W.C. (+/- 62.27 Pa)

5. To save the new settings, collapse **Sensor Range**.

Adjusting deadband

This parameter specifies the deadband applied to the pressure input signal for control purposes. When the input signal is within the deadband, the corresponding PID control output remains constant.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Deadband** arrow.
5. Enter the **Deadband** value.
6. To confirm the new settings, tap the **Checkmark** icon.

Zero Calibration

The **Zero Calibration** and **Reset Zero Offset** options are used to reset the zero pressure reading for a specific installation. Once the FMS-2000C controller is installed completely with any peripheral remote sensor modules, this feature is used to recalibrate the controller's zero reading to read accurately with the door to the monitored room left open.
With the door to the monitored room open, the differential pressure measured by the FMS-2000C controller usually approaches zero. However, due to imperfections in the sealing of the remote sensor enclosure and pressure accumulation in the wall dividing the monitored room and the adjacent corridor, the pressure reading does not reach zero. It is common for the differential pressure reading to be up to 0.0010 in. W.C. or 0.2490 Pa with the monitored room's door left open to allow pressure to equalize.

Creating a zero offset

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. On the **ANALOG** screen, tap the **Zero Calibration** arrow.
4. On the **ZERO CALIBRATION** screen, tap the **Create Zero Offset** arrow.
5. Follow the instructions on screen and wait for the real-time view reading on the screen to stabilize for at least 10 seconds.
6. To create a zero offset, tap **Proceed**.

Resetting the zero offset

If a zero offset is created and does not result in a reduction of the differential pressure reading to zero, you can reset any existing offset using the **Reset Zero Offset** option. Use this option before you repeat *Creating a zero offset*.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. On the **ANALOG** screen, tap the **Zero Calibration** arrow.
4. On the **ZERO CALIBRATION** screen, tap **Reset Zero Offset**.
5. On the **RESET ZERO OFFSET** screen, tap Proceed.
6. To confirm the new settings, tap the **Checkmark** icon.

Setting the alarms

By default, the FMS-2000C Critical Environment Controller comes preset in neutral isolation mode. You cannot set alarms in neutral isolation mode. If this is the first time you are configuring AI-1 or AI-2 for pressure, change the isolation mode for the primary or secondary space from neutral to either positive or negative before you can set the alarm. This does not apply to AI-3 or AI-4. See *Changing the alarm limits*, if this is not the first time you are setting up the alarms. Ensure alarms are enabled before configuration. If the alarms are not enabled the screen appears gray, the Safety Halo remains green, and all audible and visual alarms are disabled. See Figure 6 for a visual example. You can mute the audible alarm and allow the screen and Safety Halo to respond to the parameter status. Enable the alarms and complete the set up process before you mute the audible alarm.

Setting the alarms for the first time

1. On the home screen, tap the **Isolation Mode** quick link.
2. On the **ROOM** screen, expand **Isolation Mode** and choose from the following options:
   - **Positive Only**
   - **Negative Only**
   - **Positive and Negative**
3. **Optional:** If you have a secondary monitored space, tap **Secondary** and expand **Isolation Mode** to choose the isolation mode for the secondary monitored space.
4. To confirm the new settings, tap the **Checkmark** icon.
5. On the home screen, tap the **Settings** icon.
6. On the **SETTINGS** screen, tap **Analog I/O**.
7. To find the analog input that you want to set up the alarm for, swipe left.
8. Scroll down and tap the **Alarm Setup** arrow.
9. Switch **Alarm Enabled** on.
10. Tap the **High Alarm Setpoint** arrow.
11. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
12. Tap the **High Warning Limit** arrow.
13. Enter the **High Warning Limit** and tap the **Checkmark** to confirm your settings.
14. Tap the **Low Warning Limit** arrow.
15. Enter the **Low Warning Limit** and tap the **Checkmark** to confirm your settings.

Note: If you configure your space for both positive and negative isolation mode, repeat this process and configure an alarm for the positive and the negative isolation mode.

Changing the alarm limits

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, tap **Analog I/O**.
3. To find the analog input you want to set up the alarm for, swipe left.
4. Scroll down and tap the **Alarm Setup** arrow.
5. Switch **Alarm Enabled** on.
6. Tap the **High Alarm Setpoint** arrow.
7. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
8. Tap the **High Warning Limit** arrow.
9. Enter the **High Warning Limit** and tap the **Checkmark** to confirm your settings.
10. Tap the **Low Warning Limit** arrow.
11. Enter the **Low Warning Limit** and tap the **Checkmark** to confirm your settings.

Naming the pressure analog input

Set the name you want to appear on the home screen for a certain analog input. If you set up the FMS-2000C controller in portrait mode you can have 16 characters. In landscape mode, you can have 12 characters.

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, tap **Analog I/O**.
3. To find the analog input you want to set up a name for, swipe left.
4. Scroll down and tap the **Name** arrow.
5. Enter a name for the analog input and tap the **Checkmark** icon to confirm it.

Periodic pressure sensor calibration validation

To ensure that your pressure sensor calibration is still within tolerance, return the sensors to the factory periodically for validation. Some applications may require calibration validation quarterly. However, it is best practice to calibrate your sensors at least once a year. Contact service@triatek.com for assistance.

Configuring the analog outputs to control pressure

If you are controlling pressure, configure the corresponding analog output to the analog input as required by the specific application. Refer to the wiring diagrams in the submittal package and the *FMS-2000C Critical Environment Controller Installation Guide (LIT-12013531)* to map the output correctly.

Specifying the operating mode

You can configure each of the four analog outputs of the FMS-2000C controller for the following operating modes:

- Direct operating mode
- PID operating mode

In the direct operating mode, the output tracks the mapped analog input directly or inversely. The PID operating mode may or may not employ the proportional-integral-derivative scheme for closed-loop control of the analog output. The range of the output may or may not include an offset. This is independent of the mode that the analog output is configured to.

To change the operating mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the operating mode for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To change the operating mode, expand the **Operating Mode** arrow and tap **Direct Analog** or **PID Analog**.
6. Collapse **Operating Mode** to save the new settings.

Specifying the output range

When you select the 0-5V, 0-10V, 0-20mA range, the analog output swings from zero to the maximum specified by the hardware voltage or current DIP switch selection on the controller module. See the FMS-2000C Critical Environment Controller Installation Guide *(LIT-12013531)* for more information. The 1-5V, 2-10V, 4-20mA range includes an offset from zero. To specify the output range, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To specify the output range, expand **Range**.
6. To select a range, tap one of the following:
   - **0-5V, 0-10V, 0-20mA**
   - **1-5V, 2-10V, 4-20mA**
7. To save the new settings, collapse **Range**.

Specifying the action mode

The action mode determines the polarity of the output based on sensor input. The action mode can be used to invert the polarity of the incoming analog signal when the pressure sensor has been installed outside of the monitored space. To specify the action mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the action mode for, swipe left.
4. On the **ANALOG** screen, tap **Output**.

5. To specify the action mode, tap the **Action Mode** arrow and tap **Direct** or **Reverse**.
6. To save the new settings, collapse **Action Mode**.
7. Depending on the configuration of the controlled air flow device (Venturi, VAV box, EcoAir), the action mode or polarity of the corresponding control output (AO) is inverted for proper control to maintain the isolation setpoint. The default action mode for positive isolation is **Direct**, while the default for negative isolation is **Reverse**.

Note: When controlling to a pressure setpoint that is positive, if you switch to a negative setpoint, then you must also toggle the action mode for the control output. Similarly, when controlling to a negative pressure setpoint, if you switch to a positive setpoint, then you must also toggle the action mode for the control output.

Mapping the corresponding analog input channel to the analog output channel

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To select a corresponding analog input channel for this analog output, tap the **Input Channel** arrow.
6. Scroll to the corresponding analog input channel and tap the **Checkmark** icon to confirm your settings.

Setting limits

Limits prevent the analog output from exceeding a predetermined voltage or current output. You can specify the minimum and maximum limits for the analog output as a percentage. The default minimum is 0% and the default maximum is 100%.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view the Analog Input or Output settings, tap **Analog I/O**.
3. On the **Analog** screen, tap **Output**.
4. To find the analog output you want to change the limit for, swipe left.
5. To set an upper and lower limit, tap the **Limit** arrow.
6. Move the sliders towards the **Plus** icon to increase or towards the **Minus** icon to decrease the **Upper Limit**.
7. Move the sliders towards the **Plus** icon to increase or towards the **Minus** icon to decrease the **Lower Limit**.
8. To confirm the new settings, tap the **Checkmark** icon.

Configuring analog inputs to measure temperature with a thermistor

The FMS-2000C controller includes two dedicated thermistor inputs for measuring and monitoring resistive temperature sensors, or thermistors. When you have configured the controller for temperature using the thermistors, you can adjust the temperature setpoint on the home screen by tapping the temperature icon. You can also set a comfort range to limit how many degrees the temperature can be adjusted above or below the setpoint. After you complete the configuration of the analog input, configure the analog output for temperature. See *Configuring the analog output for temperature control* for more information.

Setting up the NTC type

Specify which type of negative temperature coefficient (NTC) thermistor connects to the FMS-2000C controller.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. **Optional:** Swipe left five times to get to the **THERMISTOR 2** screen.
5. To specify the NTC type, expand **NTC Type** and choose from the following options:
   - **NTC Type 2**
   - **NTC Type 3**
6. To save the new settings, collapse **NTC Type**.

Specifying the occupied setpoint

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. **Optional:** Swipe left five times to get to the **THERMISTOR 2** screen.
5. To adjust the temperature you want to maintain when the space is occupied, tap the **Occupied Setpoint** arrow and enter a temperature value.
6. To confirm the new settings, tap the **Checkmark** icon.

Specifying the unoccupied setpoint

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. **Optional:** Swipe left five times to get to the **THERMISTOR 2** screen.
5. To adjust the temperature you want to maintain when the space is unoccupied, tap the **Unoccupied Setpoint** arrow and enter a temperature value.
6. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the temperature offset

Adjust for any difference between the displayed temperature and the measured temperature.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. **Optional:** Swipe left five times to get to the **THERMISTOR** 2 screen.
5. To adjust the temperature offset, tap the **Temperature Offset** arrow and enter a temperature value.
6. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the comfort range

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. **Optional:** Swipe left five times to get to the **THERMISTOR 2** screen.
5. To adjust the comfort range, tap the **Comfort Range** arrow.
6. On the Comfort Range screen, scroll up or down to select a temperature range.
7. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the alarm settings

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. **Optional:** Swipe left five times to get to the **THERMISTOR 2** screen.
5. To adjust the alarm for the thermistor input, tap the **Alarm Setup** arrow.
6. On the **Alarm Setup** screen, switch **Alarm Enabled** to on.
7. Tap the **High Alarm Setpoint** arrow.
8. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
9. Tap the **High Warning Setpoint** arrow.
10. Enter the **High Warning Setpoint** and tap the **Checkmark** to confirm your settings.
11. Tap the **Low Warning Setpoint** arrow.
12. Enter the **Low Warning Setpoint** and tap the **Checkmark** to confirm your settings.
13. To confirm your **Alarm Setup** settings, tap the **Checkmark** icon.

Naming the thermistor inputs

Set up a name for the thermistor inputs you want to appear on the home screen. If your FMS-2000C controller is in portrait mode, you can have up to 16 characters. If your FMS-2000C controller is in landscape mode, you can have up to 12 characters.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. **Optional:** Swipe left five times to get to the **THERMISTOR 2** screen.
5. To set up a new name for the thermistor input, scroll down and tap the **Name** arrow.
6. On the **Name** screen enter a new name.
7. To confirm the new name, tap the **Checkmark** icon.

Refer to *Configuring the analog output for temperature control* for more information.

Configuring the analog input for use with an external thermostat

If you are using an external thermostat, you can display the temperature readings on the FMS-2000C display, but all temperature adjustments are made on the external thermostat. To use an external thermostat, use AI-2 for the thermostat and Thermistor 1 for the temperature sensor. AI-2 supports voltage or current only.

Within AI-2 you can set a comfort range that will limit the maximum and minimum temperatures for the space. Even though you can adjust the temperature beyond this range at the thermostat, the controller limits the actual temperature to either the max or min of the comfort range.

After you have completed the configuration of the analog input, configure the analog output for temperature. See *Configuring the analog output for temperature control*.

Configuring the analog input type to an external thermostat

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left once to get to the **ANALOG 2** screen.
4. To configure the analog input type to the external thermostat, tap the **Type** arrow.
5. On the **Type** screen scroll to **Thermostat**.
6. To confirm the settings, tap the **Checkmark** icon.

Adjusting the comfort range for an external thermostat

To configure the allowable temperature range for the user, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left once to get to the **ANALOG 2** screen.
4. To adjust the comfort range, tap the **Comfort Range** arrow.
5. On the **Comfort Range** screen, scroll up or down to select a temperature range.
6. To confirm the new settings, tap the **Checkmark** icon.

Naming an external thermostat

Set up a name for the external thermostat that you want to appear on the home screen. If your FMS-2000C controller is in portrait mode, you can have up to 16 characters. If your FMS-2000C controller is in landscape mode, you can have 12 characters.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left once to get to the **ANALOG 2** screen.
4. To set up a new name for the external thermostat, scroll down and tap the **Name** arrow.
5. On the **Name** screen enter a new name.
6. To confirm the new name, tap the **Checkmark** icon.

Setting up the NTC type for the thermistor inputs

Specify which type of NTC thermistor connects to the FMS-2000C controller.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. To specify the NTC Type, expand **NTC Type** and choose from the following options:
   - **NTC Type 2**
   - **NTC Type 3**
5. To save the new settings, collapse **NTC Type**.

Specifying the occupied setpoint for the thermistor inputs

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. To adjust the temperature you want to maintain when the space is occupied, tap the **Occupied Setpoint** arrow and enter a temperature value.
5. To confirm the new settings, tap the **Checkmark** icon.

Specifying the unoccupied setpoint for the thermistor inputs

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. To adjust the temperature you want to maintain when the space is unoccupied, tap the **Unoccupied Setpoint** arrow and enter a temperature value.
5. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the temperature offset for the thermistor inputs

Adjust for any difference between the displayed temperature and the measured temperature.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. To adjust the temperature offset, tap the **Temperature Offset** arrow and enter a temperature value.
5. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the alarm settings for the thermistor inputs

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. To adjust the alarm for the thermistor input, tap the **Alarm Setup** arrow.
5. On the **Alarm Setup** screen, switch **Alarm Enabled** on.
6. Tap the **High Alarm Setpoint** arrow.
7. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
8. Tap the **High Warning Setpoint** arrow.
9. Enter the **High Warning Setpoint** and tap the **Checkmark** to confirm your settings.
10. Tap the **Low Warning Setpoint** arrow.
11. Enter the **Low Warning Setpoint** and tap the **Checkmark** to confirm your settings.
12. To confirm your **Alarm Setup** settings, tap the **Checkmark** icon.

Naming the thermistor inputs

Set up a name for the thermistor inputs you want to appear on the home screen. If your FMS-2000C display is in portrait mode, you can have up to 16 characters. If your FMS-2000C display is in landscape mode, you can have 12 characters.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left four times to get to the **THERMISTOR 1** screen.
4. To set up a new name for the thermistor input, scroll down and tap the **Name** arrow.
5. On the **Name** screen enter a new name.
6. To confirm the new name, tap the **Checkmark** icon.

Refer to *Configuring the analog output for temperature control* for more information.

Configuring the analog input for precision temperature measurement

Use AI-2, AI-3, or AI-4 to measure precision temperature in applications such as refrigeration. After you have completed the configuration of the analog input, configure the analog output for temperature.
See *Configuring the analog output for temperature control*.

Configuring the analog input type for precision temperature

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left to select AI-2, AI-3, or AI-4.
4. To configure the analog input type for precision temperature, tap the **Type** arrow.
5. On the **Type** screen scroll to **Temperature**.
6. To confirm the settings, tap the **Checkmark** icon.

Specifying the maximum temperature input

To specify the maximum temperature input for third-party pressure sensors, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Maximum Temperature Input** arrow.
5. Enter the maximum temperature input specific to the sensor you are using.
6. To confirm the settings, tap the **Checkmark** icon.

Specifying the minimum temperature input

To specify the minimum temperature input for third-party pressure sensors, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Minimum Temperature Input** arrow.
5. Enter the minimum temperature input specific to the sensor you are using.
6. To confirm the new settings, tap the **Checkmark** icon.

Specifying the K-Factor for precision temperature

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left once to get to the **ANALOG 2** screen.
4. To specify the K-Factor, tap **K-Factor**.
5. Enter the **K-Factor** that the manufacturer provided with the sensor.
6. To confirm the settings, tap the **Checkmark** icon.

Setting the analog input signal range for precision temperature

If you select the 0-5V, 0-10V, 0-20mA range, the analog output changes from zero to the maximum specified by the hardware DIP switch selection. If you select the 1-5V, 2-10V, 4-20mA range, it includes an offset from zero.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left once to get to the **ANALOG 2** screen.
4. On the **ANALOG 2** screen, expand **Range** and choose from the following:
   - **0-5V, 0-10V, 0-20mA**
   - **1-5V, 2-10V, 4-20mA**
5. To save the new settings, collapse **Range**.

Adjusting the setpoint for precision temperature

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left twice to get to the **ANALOG 2** screen.
4. On the **ANALOG 2** screen, tap the **Setpoint** arrow and enter a setpoint value.
5. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the alarm settings for precision temperature

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left once to get to the **ANALOG 2** screen.
4. To adjust the alarm for precision temperature, tap the **Alarm Setup** arrow.
5. On the **Alarm Setup** screen, switch **Alarm Enabled** on.
6. Tap the **High Alarm Setpoint** arrow.
7. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
8. Tap the **High Warning Setpoint** arrow.
9. Enter the **High Warning Setpoint** and tap the **Checkmark** to confirm your settings.
10. Tap the **Low Warning Setpoint** arrow.
11. Enter the **Low Warning Setpoint** and tap the **Checkmark** to confirm your settings.
12. To confirm your **Alarm Setup** settings, tap the **Checkmark** icon.

Naming the precision temperature for the analog input

Assign a name for the analog input configured for precision temperature you want to appear on the home screen. If your FMS-2000C controller is in portrait mode, you can have up to 16 characters. If your FMS-2000C controller is in landscape mode, you can have up to 12 characters. Refer to *Configuring the analog output for temperature control* for more information.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left once to get to the **ANALOG 2** screen.
4. To set up a new name for the external thermostat, scroll down and tap the **Name** arrow.
5. On the **Name** screen enter a new name.
6. To confirm the new name, tap the **Checkmark** icon.

Configuring the analog output for temperature control

After you have set up the analog inputs for temperature, map them to the corresponding analog output. Use AO-3 for air supply.

Setting up the operating mode for temperature control

You can configure each of the four analog outputs of the FMS-2000C controller for the following operating modes:

- Direct operating mode
- PID operating mode

In direct operating mode, the output tracks the mapped analog input directly or inversely. The PID operating mode may or may not employ the proportional-integral-derivative scheme for closed-loop control of the analog output. The range of the output can or cannot include an offset. This is independent of the mode the analog output is configured to.

To change the operating mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left until you get to the analog input that corresponds to the analog output you want to make changes to.
4. On the **ANALOG** screen, tap **Output.**
5. On the **Output** screen, tap **Operating Mode** and choose from the following options:
   - **Direct**
   - **PID**
6. To save the new settings, collapse **Output**.

Setting the output signal range for temperature control

If you select the 0-5V, 0-10V, 0-20mA range, the analog output swings from zero to the maximum specified by the hardware DIP switch selection. If you select the 1-5V, 2-10V, 4-20mA, it includes an offset from zero.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left until you get to the analog input that corresponds to the analog output you want to make changes to.
4. On the **ANALOG** screen, tap **Output.**
5. On the **Output** screen, tap **Range** and choose from the following options:
   - **0-5V, 0-10V, 0-20mA**
   - **1-5V, 2-10V, 4-20mA**
6. To save the new settings, collapse **Range**.

Setting up the action mode

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left until you get to the analog input that corresponds to the analog output you want to make changes to.
4. On the **ANALOG** screen, tap **Output.**
5. On the **Output** screen, tap **Action Mode** and choose from the following options:
   - **Direct**
   - **Reverse**
6. To save the new settings, collapse **Action Mode**.

Selecting the corresponding analog input channel

Map the corresponding analog input channel to the analog output channel.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left until you get to the analog input that corresponds to the analog output you want to make changes to.
4. On the **ANALOG** screen, tap **Output**.
5. To select a corresponding analog input channel for this analog output, tap the **Input Channel** arrow.
6. Scroll to the corresponding analog input channel and tap the **Checkmark** icon to confirm your settings.

Setting limits

Limits prevent the analog output from exceeding a predetermined voltage or current output. You can specify the minimum and maximum limits for the analog output in percentage. The default minimum is zero and the default maximum is 100%.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. Swipe left until you get to the analog input that corresponds to the analog output you want to make changes to.
4. On the **ANALOG** screen, tap **Output**.
5. To set an upper and lower limit, tap the Limit arrow.
6. Move the sliders towards the **Plus** icon to increase or towards the **Minus** icon to decrease the **Upper** and **Lower** Limit.
7. To confirm the new settings, tap the **Checkmark** icon.

Configuring analog inputs to measure humidity

You can configure humidity on AI-2, AI-3 and AI-4. To configure the corresponding analog output, see *Configuring the analog output for humidity control*. If you only want to monitor humidity, leave the setpoint at 0% RH and do not configure an analog output.

Configuring the analog input type for humidity

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To configure the analog input type for humidity, tap the **Type** arrow.
5. On the **Type** screen, scroll to **Humidity**.
6. To confirm the settings, tap the **Checkmark** icon.

Specifying the K-Factor for humidity

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap **K-Factor**.
5. Enter the **K-Factor** that the manufacturer provided with the sensor.
6. To confirm the settings, tap the **Checkmark** icon.

Setting the setpoint to zero for humidity

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap **Setpoint**.
5. Enter zero and tap the **Checkmark** icon to confirm the settings.

Enabling the alarm and changing the alarm limits for humidity

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, tap **Analog I/O**.
3. To find the analog input you want to set up the alarm for, swipe left.
4. Scroll down and tap the **Alarm Setup** arrow.
5. Switch **Alarm Enabled** on.
6. Tap the **High Alarm Setpoint** arrow.
7. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
8. Tap the **High Warning Limit** arrow.
9. Enter the **High Warning Limit** and tap the **Checkmark** to confirm your settings.
10. Tap the **Low Warning Limit** arrow.
11. Enter the **Low Warning Limit** and tap the **Checkmark** to confirm your settings.

Naming the humidity input

Set up a name for the analog input that you want to appear on the home screen. If your FMS-2000C controller is in portrait mode, you can have up to 16 characters. If your FMS-2000C controller is in landscape mode, you can have up to 12 characters.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to set up a new name for, swipe left.
4. On the **ANALOG** screen, scroll down and tap the **Name** arrow.
5. On the **Name** screen, enter a new name.
6. To confirm the new name, tap the **Checkmark** icon.

Configuring the analog output for humidity control

After you configure an analog input to measure humidity, map it to an available analog output. The control output is used to modulate an actuator for either a humidifier, steam source, or a dehumidifier.

Changing the operating mode for humidity control

You can configure each of the four analog outputs of the FMS-2000C controller for the following operating modes:

- Direct operating mode
- PID operating mode

In direct operating mode, the output tracks the mapped analog input directly or inversely. The PID operating mode may or may not employ the proportional-integral-derivative scheme for closed-loop control of the analog output. The range of the output can or cannot include an offset. This is independent of the mode the analog output is configured to.

To change the operating mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the operating mode for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To change the operating mode, expand **Operating Mode** arrow and tap **Direct Analog** or **PID Analog**.
6. Collapse **Operating Mode** to save the new settings.

Setting the input signal range for humidity

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to adjust, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. On the **Output** screen, expand **Range** and choose from the following:
   - **0-5V, 0-10V, 0-20mA**
   - **1-5V, 2-10V, 4-20mA**
6. To save the new settings, collapse **Range**.

Specifying the action mode for humidity

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the action mode for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To specify the action mode, tap the **Action Mode** arrow and tap **Direct** or **Reverse**.
6. Collapse **Action Mode** to save the new settings.

Selecting the corresponding analog input channel for humidity

Map the corresponding analog input channel to the analog output channel.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the analog input channel for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To select a corresponding analog input channel for this analog output, tap the **Input Channel** arrow.
6. Scroll to the corresponding analog input channel and tap the **Checkmark** icon to confirm your settings.

Setting up limits for humidity

Limits prevent the analog output from going beyond a predetermined voltage or current output. You can specify the minimum and maximum limits for the analog output in percentage. The default minimum is zero and the default maximum is 100%.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the limit for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To set an upper and lower limit, tap the **Limit** arrow.
6. Move the sliders towards the **Plus** icon to increase or towards the **Minus** icon to decrease the **Upper** and **Lower** Limit.
7. To confirm the new settings, tap the **Checkmark** icon.

Configuring the analog input to measure air flow

You can calculate and display the air change rate or display room cfm in AI-2, AI-3 and AI-4 with either a DP transmitter or a flow sensor. In AI-2 only, if you choose to calculate the air changes per hour, you can also select setpoints based on different modes of occupation. Otherwise there is only one air change rate setpoint available.

Configuring the analog input to measure air flow

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To configure the analog input type for flow, tap the **Type** arrow.
5. On the **Type** screen, scroll to **Flow**.
6. To confirm the settings, tap the **Checkmark** icon.

Specifying the sensor type to measure air flow

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. Expand the **Sensor Type** and tap one of the following options:
   - **DP Transmitter**
   - **Flow Sensor**
5. To confirm the new settings, collapse **Sensor Type**.

Specifying the maximum input setting to measure air flow

If you are using a DP transmitter, set the maximum pressure input. If you are using a flow sensor, set the maximum flow input.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To change the maximum pressure input, tap the **Maximum Pressure Input** arrow.
5. To confirm the settings, tap the **Checkmark** icon.

Specifying the minimum input setting to measure air flow

If you are using a DP transmitter, set the minimum pressure input. If you are using a flow sensor, set the minimum flow input.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To change the minimum pressure input, tap the **Minimum Pressure Input** arrow.
5. To confirm the settings, tap the **Checkmark** icon.

Setting up the duct area to measure air flow

If you are using a DP transmitter, specify the cross-sectional duct area in square inches. This duct area converts a differential pressure or a velocity to a real-time volumetric flow, which is used to calculate the air change rate. For round ducts, the cross-sectional area is determined by multiplying the square of the radius by pi. As an example, the cross-sectional area of a round 12 in. (304.8 mm) duct, which has a radius of 6 in. (152.4 mm), is calculated as follows:

$$Area_{round\ duct} = \pi * r^2 \text{ . For example: } 3.1416 * (6\ in.)^2 = 113.09\ in.^2$$

For rectangular ducts, the cross-sectional area is determined by multiplying the length and width. As an example, the cross-sectional area of a duct that measures 24 in. (609.6 mm) by 12 in. (304.8 mm) is calculated as follows:

$$Area_{rectangular\ duct} = L * W. \text{ For example: } 24\ in. * 12\ in. = 288\ in.^2$$

To specify the duct area for flow, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To specify the duct area, tap the **Duct Area** arrow and enter the result of your calculation.
5. To confirm the settings, tap the **Checkmark** icon.

Specifying the K-Factor to measure air flow

The default value for the K-Factor is 1.0, but the manufacturer of the sensor can provide a different K-Factor to serve as a correction factor for the actual output of the sensor. If you do not receive a different K-Factor from the manufacturer, leave the K-Factor at its default value. If you need to specify a different K-Factor, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap K-Factor.
5. Enter the **K-Factor** that the manufacturer provided with the sensor.
6. To confirm the settings, tap the **Checkmark** icon.

Calculating air changes per hour

If you want to measure air changes based on modes of occupancy or display air changes on the home screen, calculate air changes per hour (ACH). When you enable the calculation of ACH, you have to enter the room volume and the ACH setpoints for both occupied mode and unoccupied mode.

To enter the ACH setpoints for occupied and unoccupied modes, complete the following steps:
1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To set up **ANALOG 2** for flow, swipe left once.
4. To enable the calculation of ACH, switch **Calculate ACH** on.
5. Tap the **Occupied ACH Setpoint** arrow and enter the setpoint value.
6. Tap the **Checkmark** icon to confirm your settings.
7. Tap the **Unoccupied ACH Setpoint** arrow and enter the setpoint value.
8. Tap the **Checkmark** icon to confirm your settings.

Note: The occupied and unoccupied specifications are only available in AI-2. When you set up AI-3 or AI-4 for flow, you can enter a room volume value and an ACH setpoint value only.

Calculating the room volume for ACH measurement

To calculate the room volume of a rectangular room in cubic feet, multiply the length of the room by the width and the height. For irregular shaped rooms, determine the value by breaking the room up into multiple smaller rectangular areas and summing the individual volumes to calculate the total room volume in cubic feet. An approximation is also specified for the room volume. This volume can be fine-tuned to increase the accuracy of the displayed air change rate according to the actual volumetric flow offset of the room.

To enter the room volume, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To enable the calculation of ACH, switch **Calculate ACH** on.
5. Scroll down and tap the **Room Volume** arrow.
6. Enter the room value you have calculated and tap the **Checkmark** icon to confirm your settings.

Specifying the output signal range for air flow

When you select the 0-5V, 0-10V, 0-20mA range, the analog output swings from zero to the maximum specified by the hardware dipswitch selection. The 1-5V, 2-10V, 4-20mA range includes an offset from zero. To specify the output range, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To specify the output range, expand **Range**.
5. To select a range, tap one of the following:

    - **0-5V, 0-10V, 0-20mA**
    - **1-5V, 2-10V, 4-20mA**

6. Collapse **Range** to save the new settings.

Adjusting deadband for air flow

This parameter specifies the deadband applied to the differential pressure input signal for control purposes. When the input signal is within the deadband, the corresponding PID control output remains constant.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Deadband** arrow.
5. Enter the **Deadband** value.
6. To confirm the new settings, tap the **Checkmark** icon.

Enabling the alarm and changing the alarm limits for air flow

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, tap **Analog I/O**.
3. To find the analog input you want to set up the alarm for, swipe left.
4. Scroll down and tap the **Alarm Setup** arrow.
5. Switch **Alarm Enabled** on.
6. Tap the **High Alarm Setpoint** arrow.
7. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
8. Tap the **High Warning Limit** arrow.
9. Enter the **High Warning Limit** and tap the **Checkmark** to confirm your settings.
10. Tap the **Low Warning Limit** arrow.
11. Enter the **Low Warning Limit** and tap the **Checkmark** to confirm your settings.

Naming the air flow input

Set up a name for the analog input that you want to appear on the home screen. If your FMS-2000C controller is in portrait mode, you can have up to 16 characters. If your FMS-2000C controller is in landscape mode, you can have up to 12 characters.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to set up a new name for, swipe left.
4. On the **ANALOG** screen, scroll down and tap the **Name** arrow.
5. On the **Name** screen enter a new name.
6. To confirm the new name, tap the **Checkmark** icon.

Configuring the analog inputs for volumetric offset control

Use volumetric offset control (VOC) when you want to maintain an offset setpoint between the total supply and total exhaust air flows, including any fume hoods in the monitored space. To configure the analog inputs for volumeteric offset control, configure both AI-3 and AI-4 for air flow. Use AI-3 and AI-4 for total supply and total exhaust air flows respectively.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To configure AI-3 for flow, swipe left twice.
4. On the **ANALOG 3** screen, tap the **Type** arrow.
5. On the **Type** screen, scroll to **Flow** and tap the **Checkmark** icon to confirm the new settings. Refer to *Configuring the analog input to measure air flow* to complete the setup of AI-3.
6. To configure AI-4 for flow, swipe left three times.
7. On the **ANALOG 4** screen, tap the **Type** arrow.
8. On the **Type** screen, scroll to **Flow** and tap the **Checkmark** icon to confirm the new settings. The volumetric offset switch appears on the **ANALOG 4** screen. Refer to *Configuring the analog input to measure air flow* to complete the setup of AI-4.
9. Switch volumetric offset on.
10. See *Configuring the analog input to measure air flow* to complete your setup for Volumetric Offset.

Configuring the analog output for air flow control

If you are controlling the air flow, map the analog input to the corresponding analog output as required by the specific application. Refer to the submittal package wiring diagrams to map the analog output correctly.
If you are controlling volumetric offset, map AI-3 and AI-4 to the corresponding analog outputs as required by the specific application. To map the analog output, refer to the submittal package wiring diagrams. Use AO-3 for the supply valves and AO-4 for the general exhaust.

Changing the operating mode for air flow control

Each of the four analog outputs of the FMS-2000C controller can be configured for the following operating modes:

- Direct operating mode
- PID operating mode

In direct operating mode, the output tracks the mapped analog input directly or inversely. The PID operating mode may or may not employ the proportional-integral-derivative scheme for closed-loop control of the analog output. The range of the output can or cannot include an offset. This is independent of the mode the analog output is configured to.

To change the operating mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the operating mode for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To change the operating mode, expand **Operating Mode** arrow and tap **Direct Analog** or **PID Analog**.
6. Collapse **Operating Mode** to save the new settings.

Setting the input signal range for air flow control

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to adjust, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. On the **Output** screen, expand **Range** and choose from the following:

    - **0-5V, 0-10V, 0-20mA**
    - **1-5V, 2-10V, 4-20mA**

6. To save the new settings, collapse **Range**.

Specifying the action mode for air flow control

The action mode determines the polarity of the output based on sensor input. To specify the action mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the action mode for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To specify the action mode, tap the **Action Mode** arrow and tap **Direct** or **Reverse**.
6. Collapse **Action Mode** to save the new settings.
7. Depending on the configuration of the controlled air flow device, Venturi, VAV box, EcoAir, the action mode or polarity of the corresponding control output (AO) is inverted for proper control to maintain the volumetric offset setpoint. The default action mode for positive volumetric offset is **Direct**, while the default for negative volumetric offset is **Reverse**.

Note: When controlling to a volumetric offset setpoint that is positive, if you switch to a negative setpoint, then you must also toggle the action mode for the control output. Similarly, when controlling to a negative volumetric offset setpoint, if you switch to a positive setpoint, then you must also toggle the action mode for the control output.

Selecting the corresponding analog input channel for air flow control

Map the corresponding analog input channel to the analog output channel.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the analog input channel for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To select a corresponding analog input channel for this analog output, tap the **Input Channel** arrow.
6. Scroll to the corresponding analog input channel and tap the **Checkmark** icon to confirm your settings.

Setting up limits for air flow control

Limits prevent the analog output from going beyond a predetermined voltage or current output. You can specify the minimum and the maximum limits for the analog output as a percentage. The default minimum is zero and the default maximum is 100%.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the limit for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To set an upper and lower limit, tap the Limit arrow.
6. Move the sliders towards the **Plus** icon to increase or towards the **Minus** icon to decrease the **Upper** and **Lower** Limit.
7. To confirm the new settings, tap the **Checkmark** icon.

Configuring the analog input to measure CO_2

You can configure the analog input for CO_2 on AI-3 and AI-4. To configure the corresponding analog output, see *Configuring the analog output for CO2 control*.

Configuring the analog input type to measure CO_2

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. To configure the analog input type for CO_2, tap the **Type** arrow.
5. On the **Type** screen, scroll to **CO_2**.
6. To confirm the settings, tap the **Checkmark** icon.

Specifying the maximum CO_2 input

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Maximum CO_2 Input** arrow and enter the maximum CO_2 input value.
5. To confirm the settings, tap the **Checkmark** icon.

Specifying the minimum CO_2 input

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap the **Minimum CO_2 Input** arrow and enter the minimum CO_2 input value.
5. To confirm the settings, tap the **Checkmark** icon.

Specifying the K-factor for CO_2

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to adjust, swipe left.
4. On the **ANALOG** screen, tap **K-Factor**.
5. Enter the **K-Factor** that the manufacturer provided with the sensor.
6. To confirm the settings, tap the **Checkmark** icon.

Enabling the alarm and changing the alarm limits for CO_2

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, tap **Analog I/O**.
3. To find the analog input you want to set up the alarm for, swipe left.
4. Scroll down and tap the **Alarm Setup** arrow.
5. Switch **Alarm Enabled** on.
6. Tap the **High Alarm Setpoint** arrow.
7. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
8. Tap the **High Warning Limit** arrow.
9. Enter the **High Warning Limit** and tap the **Checkmark** to confirm your settings.
10. Tap the **Low Warning Limit** arrow.
11. Enter the **Low Warning Limit** and tap the **Checkmark** to confirm your settings.

Naming the CO_2 input

Assign a name for the analog input you want to appear on the home screen. If your FMS-2000C controller is in portrait mode, you can have up to 16 characters. If your FMS-2000C controller is in landscape mode, you can have up to 12 characters.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog input you want to set up a new name for, swipe left.
4. On the **ANALOG** screen, scroll down and tap the **Name** arrow.
5. On the **Name** screen enter a new name.
6. To confirm the new name, tap the **Checkmark** icon.

Configuring the analog output for CO_2 control

If you are controlling CO_2, configure the analog input to the corresponding analog output as required by the specific application. Refer to the submittal package wiring diagrams to map the analog output correctly.

Changing the operating mode for CO_2 control

You can configure each of the four analog outputs of the FMS-2000C controller for the following operating modes:

- Direct operating mode
- PID operating mode

In direct operating mode, the output tracks the mapped analog input directly or inversely. The PID operating mode may or may not employ the proportional-integral-derivative scheme for closed-loop control of the analog output. The range of the output can or cannot include an offset. This is independent of the mode the analog output is configured to.

To change the operating mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the operating mode for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To change the operating mode, expand **Operating Mode** arrow and tap **Direct Analog** or **PID Analog**.
6. Collapse **Operating Mode** to save the new settings.

Setting the signal range for CO_2 control

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to adjust, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. On the **Output** screen, expand **Range** and choose from the following:
   - **0-5V, 0-10V, 0-20mA**
   - **1-5V, 2-10V, 4-20mA**
6. To save the new settings, collapse **Range**.

Specifying the action mode for CO_2 control

The action mode determines the polarity of the output based on sensor input. To specify the action mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the action mode for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To specify the action mode, tap the **Action Mode** arrow and tap **Direct** or **Reverse**.
6. Collapse **Action Mode** to save the new settings.

Selecting the corresponding analog input channel for CO_2 control

Map the corresponding analog input channel to the analog output channel.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the analog input channel for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To select a corresponding analog input channel for this analog output, tap the **Input Channel** arrow.
6. Scroll to the corresponding analog input channel and tap the **Checkmark** icon to confirm your settings.

Setting up limits for CO_2 control

Limits prevent the analog output from going beyond a predetermined voltage or current output. You can specify the minimum and maximum limits for the analog output as a percentage. The default minimum is zero and the default maximum is 100%.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view analog input settings, tap **Analog I/O**.
3. To find the analog output you want to change the limit for, swipe left.
4. On the **ANALOG** screen, tap **Output**.
5. To set an upper and lower limit, tap the **Limit** arrow.
6. Move the sliders towards the **Plus** icon to increase or towards the **Minus** icon to decrease the **Upper** and **Lower** Limit.
7. To confirm the new settings, tap the **Checkmark** icon.

Digital inputs

You can use digital inputs to configure the following:

- Door switch
- Occupancy switch
- Override switch

Configuring digital inputs for a door switch

To configure the door switch, use digital input 1 (DI-1), DI-2, DI-3, or DI-4. DI-1 is only configured for a door switch. When you enable a door switch, the PID loop processing for the analog input is suspended whenever the door is open. This suppresses the audible alarm indefinitely while holding the analog output fixed until the door returns to the closed position.

To configure a digital input for a door switch, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view the digital input settings, tap **Digital Input**.
3. On the **DIGITAL INPUT 1** screen, tap **Input Type**.
4. If the input is disabled, scroll to **Door Switch**.
5. To confirm the settings, tap the **Checkmark** icon.

Configuring the switch type

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view digital input settings, tap **Digital Input**.
3. On the **DIGITAL INPUT 1** screen, expand **Switch Type** and choose from the following options:
   - **Normally Open**
   - **Normally Closed**
4. To confirm the settings, collapse **Switch Type**.

Setting up a delay

To eliminate all unnecessary movement of the actuator when the door is open, you can monitor the door switch with the FMS-2000C controller. This extends the life of the actuator, while also suppressing all nuisance audible alarms. The door switch delay specifies the amount of time the FMS-2000C controller waits before resuming actuator control. This delay allows for the monitored space to return to normal operating pressure before resuming alarm status indication by the 360° Safety Halo.

To set up a delay, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view digital input settings, tap **Digital Input**.
3. On the **DIGITAL INPUT 1** screen, expand **Delay** and move the slider to choose how many seconds you want the delay to last.
4. To confirm the settings, collapse **Digital Input**.

Configuring digital inputs for Occupancy switch mode

Configure one of the secondary digital inputs for occupancy switch mode. In this mode an external signal from an occupancy switch or sensor, a physical wall-mounted button, or a relay output automatically switches the occupancy mode.
When the digital input, configured as an occupancy switch returns to the inactive state, the occupancy mode automatically switches back to the unoccupied mode.

To configure the digital input for an occupancy switch, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view digital input settings, tap **Digital Input**.
3. To find the digital input you want to configure the override switch to, swipe left.
4. On the **DIGITAL INPUT** screen, tap **Input Type** and scroll to **Occupancy Switch**.
5. To confirm the settings, tap the **Checkmark** icon.

Configuring the switch type

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view digital input settings, tap **Digital Input**.
3. To find the digital input you want to configure the override switch to, swipe left.
4. On the **DIGITAL INPUT** screen, expand **Switch Type** and choose from the following options:
   - **Normally Open**
   - **Normally Closed**
5. To confirm the settings, collapse **Switch Type**.

Setting a delay

You can set a delay of up to 240 minutes.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view digital input settings, tap **Digital Input**.
3. To find the digital input you want to configure the override switch to, swipe left.
4. On the **DIGITAL INPUT** screen, expand **Delay** and move the slider to adjust for how many seconds you want to set up the delay.
5. To confirm the settings, collapse **Digital Input**.

Configuring digital inputs for Override switch mode

Configuring digital inputs for an override switch mode

Configure one of the secondary digital inputs for override switch mode. In this mode an external signal from an occupancy switch or sensor, a physical wall-mounted button, or a relay output switches the mode of isolation between neutral and either positive or negative.

Notes:

- The preferred isolation mode needs to be active when the digital input is configured for override switch mode. If the preferred mode of isolation is not active during configuration, the digital input does not function as expected.
- When the override switch returns to the inactive state, the isolation mode automatically switches back to neutral mode when the specified delay time expires.

To configure the digital input for an override switch, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view digital input settings, tap **Digital Input**.
3. To find the digital input you want to configure the override switch to, swipe left.
4. On the **DIGITAL INPUT** screen, tap the **Input Type** arrow and scroll to **Override Switch**.
5. To confirm the settings, tap the **Checkmark** icon.

Configuring the switch type

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view digital input settings, tap **Digital Input**.
3. To find the digital input you want to configure the override switch to, swipe left.
4. On the **DIGITAL INPUT** screen, expand **Switch Type** and choose from the following options:

    - **Normally Open**
    - **Normally Closed**

5. To confirm the settings, collapse **Switch Type**.

Setting up a delay

You can set up a delay of up to 240 minutes.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view digital input settings, tap **Digital Input**.
3. To find the digital input you want to configure the override switch to, swipe left.
4. On the **DIGITAL INPUT** screen, expand **Delay** and move the slider to adjust for how many seconds you want to set up the delay.
5. To confirm the settings, collapse **Digital Input**.

Relays

The relay output is used for the following applications:

- Alarm annunciator
- Isolation mode indication
- Occupancy mode indication
- Triggering pilot relay for high-current devices based on setpoints, isolation mode, or occupancy mode
- Signaling isolation or occupancy mode to other controllers
- Activating bypass dampers
- Activating humidifiers or dehumidifiers for humidity control applications
- Activating area lighting through the pilot relay based on occupancy mode

Table 14: Relay output trigger

Trigger mode	Description
Setpoint mode	Configure this mode to trigger a pair of setpoints to determine when to activate or deactivate the alarm relay.
Isolation mode	Configure this mode to trigger the alarm relay based on the mode of isolation selected.
Occupancy mode	Configure this mode to trigger the state of occupancy to determine when the alarm relay must be active or inactive.

Configuring the trigger mode for setpoint

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view the relay settings, tap **Relay**.
3. To find the relay that you want to configure the trigger mode for, swipe left.
4. On the **RELAY** screen, expand **Trigger Mode** and tap **Setpoint**. See Table 14 for more information.
5. To confirm the settings, collapse **Trigger Mode**.

Configuring the input channel

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. To find the relay you want to configure the input channel for, swipe left.
4. On the **RELAY** screen, tap the **Input Channel** arrow and scroll to the analog input that you want to configure the relay to.
5. To confirm the settings, tap the **Checkmark** icon.

Note: Relay 1 uses AI-1 by default, but you can map it to one of the four analog inputs, or either of the two dedicated thermistor inputs.

Configuring the high and low setpoints

When using the setpoint trigger mode, the FMS-2000C controller has to be in either positive or negative isolation mode to enter the high and low relay setpoints. If the unit is in neutral isolation mode, then setpoint entry is not available. The high setpoint determines the threshold that the relay is activated if in direct acting mode, or gets deactivated if in reverse acting mode. The low setpoint determines the threshold at which the alarm relay gets deactivated if in direct acting mode, or gets activated if in reverse acting mode.

To configure the high and low setpoint for the positive isolation mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. Swipe left to find the preferred relay.
4. On the **RELAY** screen, tap the **Positive High Point** arrow and enter the high setpoint value for the positive isolation mode.
5. To confirm the new setting, tap the **Checkmark** icon.
6. Tap the **Positive Low Point** arrow and enter the low setpoint value for the positive isolation mode.
7. To confirm the new setting, tap the **Checkmark** icon.

To configure the high and low Setpoint for the negative isolation mode, complete the following steps:

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. Swipe left to find the preferred relay.
4. On the **RELAY** screen, tap the **Negative High Point** arrow and enter the high setpoint value for the negative isolation mode.
5. To confirm the new setting, tap the **Checkmark** icon.
6. Tap the **Negative Low Point** arrow and enter the low setpoint value for the negative isolation mode.
7. To confirm the new setting, tap the **Checkmark** icon.

Configuring the action mode

In direct acting mode, the alarm relay activates when the sensor input exceeds the high setpoint and deactivates when the sensor input falls below the low setpoint. In reverse acting mode, the alarm relay activates when the sensor input falls below the low setpoint and deactivates when the sensor input exceeds the high setpoint.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. To find the relay you want to configure the action mode for, swipe left.
4. On the **RELAY** screen, expand **Action Mode** and choose from the following options:
   - **Direct Acting**
   - **Reverse Acting**
5. To confirm the new setting, collapse **Action Mode**.

Setting a delay

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. To find the relay you want to set up a delay for, swipe left.
4. On the **RELAY** screen, expand **Action Mode** and move the slider to set a delay time of up to 180 seconds.
5. **Optional:** Tap the **Revert** icon to revert back to the previous delay time.
6. To confirm the new setting, collapse **Action Mode**.

Configuring the trigger mode for Isolation Mode

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. To find the relay you want to configure the trigger mode for, swipe left.
4. On the **RELAY** screen, expand **Trigger Mode** and tap **Isolation Mode**. See Table 14 for more information.
5. To confirm the new setting, collapse **Trigger Mode.**

Adjusting the type of isolation mode

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. To find the relay you want to adjust the type of isolation mode for, swipe left.
4. On the **RELAY** screen, expand **Isolation Mode** and choose from the following options:
   - **Positive**
   - **Negative**
   - **Neutral**
5. To confirm the new setting, collapse **Isolation Mode**.

Configuring the action mode

In direct acting mode, the alarm relay activates when the sensor input exceeds the high setpoint, and deactivates when the sensor input falls below the low setpoint. In reverse acting mode, the alarm relay activates when the sensor input falls below the low setpoint, and deactivates when the sensor input exceeds the high setpoint.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. To find the relay you want to configure the action mode for, swipe left.
4. On the **RELAY** screen, expand **Action Mode** and choose from the following options:
   - **Direct Acting**
   - **Reverse Acting**
5. To confirm the new setting, collapse **Action Mode**.

Setting a delay

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view relay settings, tap **Relay**.
3. To find the relay you want to set up a delay for, swipe left.
4. On the **RELAY** screen, expand **Action Mode** and move the slider to set a delay time of up to 180 seconds.
5. **Optional:** Tap the **Revert** icon to revert back to the previous delay time.
6. To confirm the new setting, collapse **Action Mode**.

Configuring the trigger mode for Occupancy Mode

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view the relay settings, tap **Relay**.
3. To find the relay you want to configure the trigger mode for, swipe left.
4. On the **Relay** screen, expand **Trigger Mode** and tap **Occupancy Mode**. See Table 14 for more information.
5. To confirm the new setting, collapse **Occupancy Mode**.

Adjusting the Occupancy mode

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view the relay settings, tap **Relay**.
3. To find the relay you want to adjust the occupancy mode for, swipe left.
4. On the **Relay** screen, expand **Occupancy** and choose from the following options:
   - Occupied
   - Unoccupied
5. To confirm the new setting, collapse **Occupancy**.

Configuring the Action mode

In direct acting mode, the alarm relay activates when the sensor input exceeds the high setpoint and deactivates when the sensor input falls below the low setpoint. In reverse acting mode, the alarm relay activates when the sensor input falls below the low setpoint and deactivates when the sensor input exceeds the high setpoint.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view the relay settings, tap **Relay**.
3. To find the relay you want to configure the action mode for, swipe left.
4. On the **RELAY** screen, expand **Action mode** and choose from the following options:
   - **Direct Acting**
   - **Reverse Acting**
5. To confirm the new setting, collapse **Action Mode**.

Setting a delay

The relay delay specifies the amount of time the FMS-2000C controller waits before it activates or deactivates the relay contacts based on the action mode.

To set up a delay for the occupancy mode, complete the following steps:
1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view the relay settings, tap **Relay**.
3. To find the relay you want to set up a delay for, swipe left.
4. On the **Relay** screen, expand **Action Mode** and move the slider to set a delay time of up to 180 seconds.
5. **Optional:** Tap the **Revert** icon to revert back to the previous delay time.
6. To confirm the new setting, collapse **Action Mode**.

Configuring the PID Loop

If you configure any of the analog outputs in PID mode, you can use the **PID Loop Setup** menu to fine-tune the PID constants that the closed-loop control scheme uses. See Table 18 for information on default values.

Setting up the proportional gain

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view the PID settings, tap **PID Loop**.
3. To find the PID Loop Setup you want to adjust the proportional gain for, swipe left.
4. On the **PID LOOP SETUP** screen, expand **Proportional** and move the slider to set the proportional gain.
5. **Optional:** Use the **Revert** icon to revert back to the previous setting.
6. To confirm the settings, collapse **Proportional**.

Setting up the integral gain

1. To view the PID settings, tap **PID Loop**.
2. To find the PID loop setup you want to adjust the integral gain for, swipe left.
3. On the **PID LOOP SETUP** screen, expand **Integral** and move the slider to set the integral gain.
4. **Optional:** Use the **Revert** icon to revert back to the previous setting.
5. To confirm the settings, collapse **Integral**.

Setting up the derivative constant

1. To view the PID settings, tap **PID Loop**.
2. To find the PID loop setup you want to adjust the derivative gain for, swipe left.
3. On the **PID LOOP SETUP** screen, expand **Derivative** and move the slider to set the derivative gain. Set the derivative constant to a default of zero for most applications.
4. **Optional:** Use the **Revert** icon to revert back to the previous setting.
5. To confirm the settings, collapse **Derivative**.

Table 15: PID default settings

PID constant	Default value
Proportional	20
Integral	5
Derivative	0

Display settings

On the Display screen you can adjust the following:

- 360° Safety Halo
- Viewing mode
- Screen brightness
- Device name

Switching on and adjusting the brightness of the 360° Safety Halo

Once you have set up the 360° Safety Halo, restricted users can adjust the settings from both the user menu and the quick access the 360° Safety Halo icon on the home screen.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view display settings, tap **Display.**
3. To adjust settings for the **Safety Halo**, tap the **Safety Halo** arrow.
4. To turn on the 360° Safety Halo, turn on **Enabled** and expand the **Brightness** slider which appears.
5. To adjust the **Brightness**, move the slider to increase or decrease the level.
6. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the screen brightness

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view display settings, tap **Display**.
3. Expand **Screen Brightness** and move the slider to increase or decrease the brightness of the screen.
4. To confirm the settings, collapse **Screen Brightness**.

Changing the device name

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view display settings, tap **Display**.
3. On the **Display** screen, tap the **Device Name** arrow.
4. Enter a device name. It can be up to fourteen characters in portrait mode and up to sixteen characters in landscape mode.
5. To confirm the new device name, tap the **Checkmark** icon.

Configuring the network variables

You can read and write to network variables for pressure, temperature, humidity, and CO_2. These variables are represented by BACnet points, but you can write over the network to display additional values.

Note: You must set up the analog input and output for pressure, temperature, humidity, and CO_2 before you configure the network variables.

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view display settings, tap **Display**.
3. To choose the viewing mode, tap **Viewing mode**.
4. Tap each parameter you want to display on the home screen.
5. Select **Network Variable** as the parameter source that the BAS reads or writes.
6. To save the settings, tap the **Checkmark** icon.

Home screen viewing modes

The viewing mode controls how the home screen looks and what parameter triggers the 360° Safety Halo. You can choose from the following viewing modes:

- Single view
- Double view
- Triple view
- Quad view

Single view

In single view, you can display up to six parameters on two separate screens. The primary parameter displays on the primary home screen. To view the secondary home screen, swipe left. It shows the status and the reading for the primary and secondary parameters. To return to the primary home screen, swipe right. When a parameter goes out of range, it triggers the audible alarm, if the audible alarm is turned on. The 360° Safety Halo changes color and the status icon changes. For the primary parameter, the screen changes color, for the secondary parameters the corresponding field changes color on the secondary home screen.

Figure 9: Single view primary screen

Figure 10: Single view secondary screen

Double view

In double view, you can display the status and sensor readings for two parameters. Use this view for applications that have an isolation room and an anteroom where both spaces have an isolation mode quick link.

Figure 11: Double view

Triple view

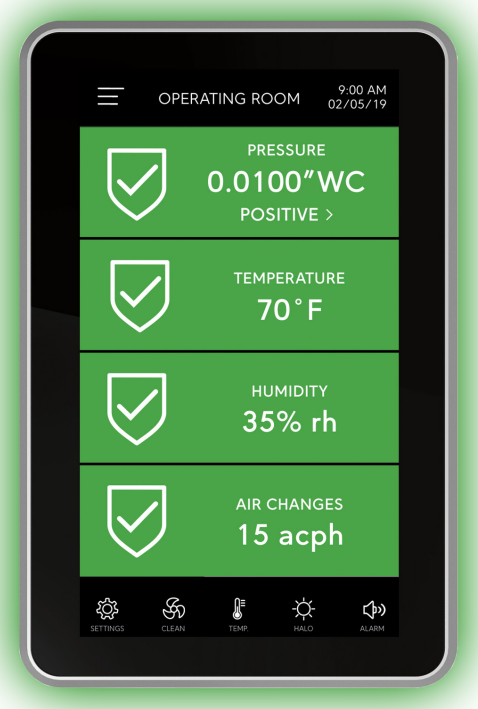
In triple view, you can display the status and sensor readings for three parameters. You can use this view for hospital applications to see pressure, temperature and humidity at the same time.

Figure 12: Triple view

Quad View

In quad view, you can display the status and sensor readings for four parameters.

Figure 13: Quad view



Setting the display for single view mode

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view display settings, tap **Display.**
3. To view the different viewing modes, tap the **Viewing Mode** arrow.
4. Tap **Single View** and the **Arrow** icon to proceed.
5. To select a primary parameter, tap to place a checkmark next to the parameter, then tap to place a star in the next column.
6. To select the corresponding source for the primary parameter, tap the **Source** arrow and scroll to the corresponding analog input. If the BAS provides the parameter reading, tap **Network Variable** in the **Source** column.
7. To confirm your new settings, tap the **Checkmark** icon.
8. To select the secondary parameters, tap to place a checkmark next to the secondary parameters you want to display.
9. To select the corresponding source, tap the **Source** arrow and scroll to the required source.
10. To confirm your new settings, tap the **Checkmark** icon.

Setting the display to double, triple, or quad viewing mode

1. On the home screen, tap the **Settings** icon to enter the **Settings** menu.
2. To view display settings, tap **Display.**
3. To view the different viewing modes, tap **Viewing Mode** and choose from one of the following options:

    - **Double View**
    - **Triple View**
    - **Quad View**

4. To select which parameters you want to display on screen, tap a viewing mode and the **Arrow** icon.
5. On the **Panel One** screen, tap the parameter you want to display in the first panel.
6. To select the corresponding source, tap the **Source** arrow and scroll to the corresponding analog input.
7. To confirm the settings, tap the **Checkmark** icon.
8. To select the parameter for the other panels, swipe left and select a parameter as in Step 5 to Step 7.
9. To confirm the new settings, tap the **Checkmark** icon.
10. On the **Display** screen, tap the home icon to view your changes.

Alarms

You can use the **Alarms** screen within the **Settings** menu as a shortcut to adjust alarms for each analog input. Ensure alarms are enabled before configuration. If the alarms are not enabled the screen appears gray, the Safety Halo remains green, and all audible and visual alarms are disabled. See Figure 6 for a visual example. You can mute the audible alarm and allow the screen and Safety Halo to respond to the parameter status. Enable the alarms and complete the set up process before you mute the audible alarm.

Setting up alarms for analog inputs

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Alarms**.
3. On the **ALARMS** screen, choose the analog input you want to adjust the alarm for and tap the **AI** arrow.
4. On the **Alarm Setup** screen, turn on **Alarm Enabled**.
5. Tap the **High Alarm Setpoint** arrow.
6. Enter the **High Alarm Setpoint** and tap the **Checkmark** to confirm your settings.
7. Tap the **High Warning Setpoint** arrow.
8. Enter the **High Warning Setpoint** and tap the **Checkmark** to confirm your settings.
9. Tap the **Low Warning Setpoint** arrow.
10. Enter the **Low Warning Setpoint** and tap the **Checkmark** to confirm your settings.
11. To confirm your **Alarm Setup** settings, tap the **Checkmark** icon.

Diagnostics

On the Diagnostics screens, you can find information about your particular FMS-2000C Critical Environment Controller model. You can also find more information to help with troubleshooting during the installation process.

Viewing the About this FMS information

When you contact technical support, use the About this FMS section to reference specific details about your controller. You can also view the present value, setpoint, deadband, and alarm settings for each of the analog inputs or thermistors you have configured.

To view the device information, complete the following steps:

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **About this FMS** arrow.
4. On the **About this FMS** screen, tap the **Device Info** arrow.
5. To view the analog input and thermistor settings, tap the **Arrow** icon.
6. To return to the **About this FMS** screen, tap the **Checkmark** icon.

Accessing the real-time view

To help with troubleshooting, use the real-time view screens to see real-time conditions. In this view, you can see the real-time conditions of each of the resources configured to the FMS-2000C controller. This includes the analog input values and their actual voltages, the analog outputs in percentage, the analog input and output pairs along with the corresponding setpoint, the digital inputs, the digital outputs, the alarm statuses, and the network variables.

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Real-Time View** arrow.
4. On the **Real-Time View** screen, you can choose the following options:
   - **Analog Inputs**
   - **Analog Outputs**
   - **Analog I/O Pairs**
   - **Digital Inputs**
   - **Relay Outputs**
   - **Alarm Status**
   - **Network Variables**
   - **Overrides**
5. Tap one of the options and tap the **Arrow** icon to toggle through to the other options.
6. To return to the **DIAGNOSTICS** screen, tap the **Checkmark** icon.

Changing the setpoints and deadband from the real-time view

On the Analog I/O Pairs screen, you can view the analog inputs alongside their associated analog outputs and their corresponding target setpoints. To change the quick isolation setpoint, complete the following steps:

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Real-Time View** arrow.
4. On the **Real-Time View** screen, tap the **Analog I/O Pairs** arrow.
5. To adjust the **Setpoint**, tap the setpoint arrow of the analog input you want to change.
6. On the **Quick Setpoint** screen, enter the new value for the setpoint and tap the **Arrow** icon.
7. On the **Quick Deadband** screen, enter the new value.
8. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the PID loop for analog output 1 in the real-time view

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Real-Time View** arrow.
4. On the **Real-Time View** screen, tap the **Analog I/O Pairs** arrow.
5. On the **Analog I/O Pairs** screen, tap the **AO-1** arrow.
6. On the **QUICK PID LOOP 1 SETUP**, expand **Proportional**, **Integral**, or **Derivative**.
7. Move the slider towards the **Plus** icon to increase or towards the **Minus** icon to decrease the proportional or integral gain, or the derivative constant.
8. **Optional:** Tap the **Revert** icon to revert back to the previous setting.
9. Expand **Action Mode** and choose from the following options:
   - **Direct Acting**
   - **Reverse Acting**
10. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the PID loop for analog outputs 2, 3, and 4 in the real-time view

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Real-Time View** arrow.
4. On the **Real-Time View** screen, tap the **Analog I/O Pairs** arrow.
5. On the **Analog I/O Pairs** screen, tap the **AO-2** arrow.
6. On the **QUICK PID LOOP 1 SETUP**, expand **Proportional**, **Integral**, or **Derivative**.
7. Move the slider towards the **Plus** icon to increase or towards the **Minus** icon to decrease the proportional or integral gain, or the derivative constant.
8. **Optional:** Tap the **Revert** icon to revert back to the previous setting.
9. Expand **Time Constant** and move the slider towards the **Plus** icon to increase or towards the **Minus** icon to decrease the time constant.
10. **Optional:** Tap the **Revert** icon to revert back to the previous setting.
11. Expand **Action Mode** and choose from the following options:
    - **Direct Acting**
    - **Reverse Acting**
12. To confirm the new settings, tap the **Checkmark** icon.

Viewing digital inputs in the real-time view

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Real-Time View** arrow.
4. On the **Real-Time View** screen, tap the **Digital Input** arrow.
5. To close the **Digital Input** screen, tap the **Checkmark** icon.

Viewing relay outputs in the real-time view

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Real-Time View** arrow.
4. On the **Real-Time View** screen, tap the **Relay Output** arrow.
5. To close the **Relay Output** screen, tap the **Checkmark** icon.

Viewing the alarm status in the real-time view

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Real-Time View** arrow.
4. On the **Real-Time View** screen, tap the **Alarm Status** arrow.

5. To close the **Alarm Status** screen, tap the **Checkmark** icon.

Overriding and locking analog outputs

Control the analog outputs manually to help verify the correct operation or allocation of the controller resources. For example, set an analog output used to control an air flow damper to a specific percentage while you manually adjust the damper. Any analog output you override remains locked until you unlock it. A yellow icon appears on the home screen as a reminder that analog outputs are locked. To lock an analog output, complete the following steps:

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Overrides** arrow.
4. To adjust analog outputs, tap the **Analog Outputs** arrow.
5. On the **Analog Outputs** screen, choose the analog output you want to override and expand it.

Figure 14: Locked screen

6. Move the slider to set the analog output to a specific percentage.
7. Tap **Lock Output**.
8. To save the new settings, collapse the **ANALOG** output and tap the **Checkmark** icon.

Unlocking the overridden analog output

To unlock the analog output and revert to its original setting, complete the following steps:

1. On the home screen, tap the **Yellow** icon.
2. On the **Analog Outputs** screen, choose the analog output you want to unlock and expand it.
3. To unlock the analog output, tap **Unlock Output**.
4. To save the new settings, collapse the **ANALOG** Output and tap the **Checkmark** icon.

Setting the actuator to auto-stroke

To determine which analog output is connected to which valve, you can set the actuator to stroke automatically.

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Overrides** arrow.
4. To adjust analog outputs, tap the **Analog Outputs** arrow.

5. On the **Analog Outputs** screen, choose an analog output you want to override.
6. To determine the valve that is connected to the analog output, tap **Auto-stroke.**
7. Once you determine which valve is connected to which analog output, tap **Unlock**.
8. To confirm the new settings, tap the **Checkmark** icon.

Overriding relay outputs

Control relay outputs manually to help verify the correct operation or allocation of the controller resources. Relay outputs remain in the override state only while the **Relay Outputs** screen displays. All relay outputs return to their original states within 60 seconds once you exit the screen. For example, use the override as a verification test and trigger remote annunciators to alert users of an alarm condition at the controller.

To switch on an override for relay outputs, complete the following steps:

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Overrides** arrow.
4. To adjust the relay outputs, tap the **Relay Outputs** arrow.
5. Switch on the **Relay** that you want to override.
6. To leave the **Relay Outputs** screen, tap the **Checkmark** or **Cancel** icon.

Saving settings

Once you have completed your configuration, save the settings for later recall if needed. Saving your settings erases any previously saved settings. To save your settings, complete the following steps:

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Settings** arrow.
4. On the **Settings** screen, tap the **Save Settings** arrow.
5. On the **SAVE SETTINGS** screen, tap **Proceed** and enter your password.
6. To confirm, tap the **Checkmark** icon twice.

Restoring settings

You can either restore your previously saved user settings or revert back to factory settings.

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Settings** arrow.
4. On the **Settings** screen, tap the **Restore Settings** arrow and choose from the following options:
   - **Factory Settings**
   - **User Settings**
5. To confirm your choice, tap the **Checkmark** icon.

Resetting the FMS-2000C controller

To perform a soft reset of the FMS-2000C controller, complete the following steps:

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Reboot Controller** arrow.
4. On the **REBOOT CONTROLLER** screen, tap **Proceed.** The FMS-2000C controller resets.

Resetting the FMS-2000C controller and display

To perform a soft reset of both the controller and the display, complete the following steps:

1. On the home screen, tap the **Settings** icon.
2. On the **SETTINGS** screen, scroll down and tap **Diagnostics**.
3. On the **DIAGNOSTICS** screen, tap the **Reboot System** arrow.
4. On the **REBOOT** screen, tap **Proceed**. The FMS-2000C controller reboots.

Troubleshooting Guide

Table 16: Troubleshooting guide

Problem	Explanation	Solution
After the MAC address is changed at the display, the unit does not come back online on the MS/TP bus or it is not discoverable.	A change to the MAC address can cause the device to not respond to the MS/TP token at its new address.	Reboot the display through the appropriate menu option or cycle power to the display.
After the baud rate of the MS/TP bus is changed at the display, the unit does not come back online or it is not discoverable.	A change to the baud rate at the display can cause the device not to respond to the MS/TP token at the new baud rate. It also does not communicate at the old baud rate. The trunk still has good communication, but the display may not rejoin the token loop.	Reboot the display through the appropriate menu option or cycle power to the display.
How do I configure the display to show a negative pressure reading when a unidirectional pressure sensor is in use?	The polarity of the displayed pressure reading depends on two factors: • The physical location of the pressure sensor itself • The Sensor Location setting at the display (Analog Input setup menus)	If the pressure sensor is installed within the monitored space, then the sensor location setting should be set to **Reference Space**. If the pressure sensor is installed outside of the monitored space, then the sensor location setting should be set to **Monitored Space**. For additional details, see Configuring analog inputs to measure pressure.
The display and the BACnet alarm status does not show when the present value of the analog input is outside of the alarm setpoints.	The alarm limits have probably been entered incorrectly.	For the alarm logic to function properly, enter the alarm limits in descending order with the High Alarm limit as the largest in magnitude. The High Alarm must be greater than or equal to the High Warning, which must be greater than or equal to the Low Warning, which must be greater than or equal to the Low Alarm. For instructions to set the alarm and warning setpoints, see *Setting up alarms for analog inputs*. For negative pressure applications, the High Alarm limit must be the largest negative value and the Low Alarm must be the smallest negative value or zero. For example: • High Alarm: -0.2000 in. W.C. (-49.82 Pa) • High Warning: -0.1500 in. W.C. (-37.36 Pa) • Low Warning: -0.0015 in. W.C. (-0.37 Pa) • Low Alarm: -0.0005 in. W.C. (-0.12 Pa)
The binary inputs and binary outputs do not show present values at the building automation system (BAS).	The binary points do not have values for the BACnet attributes of ActiveText and InactiveText. The Metays BAS has a proprietary attribute called “States Text” that defaults to Inactive or Active and masks this issue, but if the FMS-2000 is mapped to a non-Metasys supervisory device then the binary points may not show the present value.	Some building automation systems have the option to set these values from the front end. For example, the Tridium JACE has a Facets feature for the mapper object of each point and the binary point mappers have TrueText and FalseText attributes that can be edited after mapping the points. It is also possible to write the ActiveText and InactiveText values using a BACnet exploring tool such as VTS.
The action mode of the analog output configured for PID control changed polarity when the value of the setpoint changes sign, or if I change the mode of isolation at the display.	The FMS-2000C automatically changes the action mode of an analog output configured for PID control when the mode of isolation is changed from positive to negative or vice versa. The default action mode for neutral and positive isolation mode is Direct, and the default for negative isolation is Reverse. This automatic switch only occurs if you have not modified the factory default action modes.	Follow the instructions in Configuring analog inputs to measure pressure and Configuring the analog outputs to control pressure.

Problem	Explanation	Solution
The MAC address changed back to the factory default of 127 after the unit was rebooted.	The controller has two memory partitions to store settings. During startup, the controller attempts to boot with the most recent database of configuration settings. The factory default MAC address is 127.	After you configure or make changes to any configuration settings or the MAC address, select the Save Settings option on the Diagnostics menu. For more information, see Saving settings.
The air flow device is controlled in the opposite direction to maintain my pressure setpoint.	The direction of control for an analog output configured for PID control is dependent on three factors: 1) the action mode of the analog output, 2) the sign of the associated set point, 3) the rotation of the actuator on the air flow device. These three settings must be configured correctly to allow the unit to properly control the air flow device.	The default action mode for positive setpoint configurations is Direct. If the setpoint is positive and the action mode for the associated PID control output is set to direct, but the air flow device is not correctly controlling to maintain setpoint, then you can reverse the direction of control by switching the action mode from **Direct** to **Reverse**. You can do this directly at the display and it does not require the unit to be reset.
The test system is reading a negative differential pressure, but the unit displays a positive pressure reading.	The polarity of the displayed differential pressure reading is dependent on two factors: • The physical location of the pressure sensor • The selected option for the Sensor Location setting in the Analog Input Setup menus.	If the pressure sensor is installed within the monitored space, set the Sensor Location setting to Monitored Space to properly display a negative reading. If the pressure sensor is installed outside of the monitored space, set the Sensor Location setting to Reference Space. For additional details, see Configuring analog inputs to measure pressure.

Restricted user access

Restricted level users have access to the user menu and the quick links on the home screen for isolation mode, cleaning mode, temperature, 360° Safety Halo, and alarm mode. In the user menu, restricted level users can make basic adjustments on the following features:

- Time and date
- Alarms
- 360° Safety Halo
- Temperature
- Screen brightness
- Isolation mode
- Occupancy state
- User guide demonstration video

Setting the time and date

The time and date function is not connected to the BAS. If there is a power outage, you need to update the time and date at the display. You can turn the time and date on or off at the display.

1. On the **Home** screen, in the upper-left corner, tap the **User Menu** icon.
2. On the **MENU** screen, tap **TIME and DATE**.
3. On the **TIME and DATE** screen, tap the switch to turn on the time and date function and scroll to adjust the time.
   Optional: To turn on the 24-hour clock, tap the 24 Hour switch.
4. To adjust the date, tap **Date**.
5. To choose a date format, expand **Format** and tap one of the following options:

   - **Month/Day/Year**
   - **Day/Month/Year**
   - **Year/Month/Day**

6. To change the date, scroll through the months, days and years.
7. To confirm your settings, tap the **Checkmark** icon.

Adjusting the alarm mode

When a measured parameter goes out of range, the display goes into alarm state. When you adjust the alarm mode, you can control how the display responds. See Table 17 for more information.

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Alarm**.
3. On the **ALARM** screen, expand **Alarm Mode** and choose from the following options:

   - **Audible**
   - **Mute**
   - **Night**

4. To confirm your settings, tap the **Checkmark** icon.

Table 17: Alarm modes

Alarm mode	Display response
Audible	Screen color and action icon change to red, 360° Safety Halo flashes red, audible alarm sounds
Mute	Screen color and action icon change to red, 360° Safety Halo flashes red, audible alarm is mute
Night	Screen color and action icon stay the same brightness, 360° Safety Halo dims if enabled in the Safety Halo setup, audible alarm is mute **Note:** The display responses for night mode occur during the timeframe specified in the night mode settings.

Setting the audible alarm delay

Set up a delay for the audible alarm to reduce nuisance alarms when you open the door. With the audible alarm delay, the screen and the 360° Safety Halo flash red but the alarm does not sound for the period of time you set. To set an audible alarm delay, complete the following steps:

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Alarm**.
3. On the **ALARM** screen, tap the **Audible Alarm Delay** arrow.
4. To adjust the alarm delay period up to 60 seconds, move the slider.
5. To confirm the new settings, tap the **Checkmark** icon.

Changing the audible alarm snooze

The audible alarm snooze temporarily mutes the alarm by the duration you specify. To snooze the audible alarm, tap anywhere on the home screen. While the alarm is in snooze, a timer displays over the alarm icon counting down until the alarm sounds again. To set up the audible alarm snooze time, complete the following steps:

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Alarm**.
3. On the **ALARM** screen, tap the **Audible Alarm Snooze** arrow and use the slider to change the snooze time to up to 60 minutes.

Switching on and adjusting the brightness of the 360° Safety Halo

1. On the home screen, tap the **User Menu** icon.
2. To adjust settings for the **Safety Halo**, tap the **Safety Halo Setup** arrow.
3. To turn on the 360° Safety Halo, switch on **Enabled** and expand to view the **Brightness** slider.
4. To adjust the **Brightness**, move the slider to increase or decrease the level.
5. To confirm the new settings, tap the **Checkmark** icon.

Setting the night mode

You can mute the audible alarm and dim the 360° Safety Halo during the night. The screen turns red and the 360° Safety Halo flashes red when the monitor goes into alarm mode. Night mode is only available if the time and date are turned on.

1. On the Home screen, tap the **User Menu** icon.
2. On the User menu screen, tap **Alarm**.
3. On the Alarm screen, tap the **Night Mode** arrow.
4. To set up a time period for the night mode, scroll to the preferred time under **Start Time** and **End Time**.
5. To dim the Safety Halo during night mode, turn on **Nightly Auto Dim** and move the slider.
6. To confirm your settings, tap the **Checkmark** icon.
7. To enable night mode, expand the Alarm Mode and select **Night Mode**.
8. To confirm your settings, tap the **Checkmark** icon.

Optional: To access the alarm mode quickly, tap the **Alarm** quick link on the Home screen.

Adjusting the temperature

If the FMS-2000C controller controls temperature, you can adjust the temperature within the comfort range limits. If you need to adjust the temperature outside this range, consult your facility manager.

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Temperature**.
3. To adjust the temperature, tap the **Up** or **Down** arrow icon to increase or decrease the temperature.
4. To confirm the new temperature setting, tap the **Checkmark** icon

Optional: To access the **TEMPERATURE** screen quickly, tap the **Temperature** quick link on the Home screen.

Adjusting the screen brightness

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Screen Brightness**.
3. Move the slider to increase or decrease the screen brightness.
4. To confirm the new screen brightness setting, tap the **Checkmark** icon.

Changing the isolation mode for the primary space

The isolation mode can be set at the display or written from the BAS. To change the isolation mode at the display, complete the following steps:

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Room**.
3. On the **Primary** screen, expand **Isolation Mode** and tap one of the available isolation modes.
4. To confirm the **Isolation Mode** settings, tap the **Checkmark** icon.

Note: To change the isolation mode quickly, tap the isolation mode quick link on the **Home** screen.

Changing the isolation mode for the secondary space

The isolation mode can be set at the display or written from the BAS. To change the isolation mode at the display, complete the following steps:

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Room**.
3. On the **ROOM** screen, tap **Secondary**.
4. On the **Secondary** screen, expand **Isolation Mode** and tap one of the available isolation modes.
5. To confirm the **Isolation Mode** settings, tap the **Checkmark** icon.

Note: To change the isolation mode for the secondary space quickly, tap the isolation mode quick link on the **Home** screen.

Changing the occupancy state for the primary space

Changing the occupancy state for the monitored spaces can help save energy by reducing the temperature and air changes when the room is unoccupied.

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Room**.
3. On the **Primary** screen, expand **Occupancy** and tap **Unoccupied**.
4. To confirm the new occupancy settings, tap the **Checkmark** icon.

Adjusting the occupancy state for the secondary space

1. On the home screen, tap the **User Menu** icon.
2. On the **MENU** screen, tap **Room**.
3. To switch to the secondary monitored space, tap **Secondary**.
4. On the **Secondary** screen, expand **Occupancy** and tap **Unoccupied.**
5. To confirm the new occupancy settings, tap the **Checkmark** icon.

Accessing the user guide demonstration video

The short demonstration video is aimed at the end user and highlights the basic functionality of the FMS-2000C.

1. On the Home screen, tap the **User Menu** icon.
2. Tap the **User Guide** button.
3. To watch the video, scan the QR code with a smart phone.

Quick links

Use the quick link icons on the home screen to quickly access the isolation mode, cleaning mode, temperature, 360° Safety Halo, and alarm mode.

Activating and deactivating the cleaning mode

1. On the home screen, tap the **Clean** icon to initiate the cleaning process. A **Start** and **Stop** icon appears.
2. Tap the **Start** icon to initiate the cleaning mode.
3. **Optional:** If you want to stop the cleaning process before the timer runs out, tap the **Fan** icon. On the **WARNING!** screen, tap the **Checkmark** icon to confirm that you want to stop the cleaning process.

Note: If you stop the cleaning process before its completion, the room cannot be cleaned sufficiently.

Adjusting the temperature within the comfort range

1. On the home screen, tap the **Temperature** icon.
2. To increase the temperature, tap the **Up** icon.
3. To decrease the temperature, tap the **Down** icon.
4. To save the new settings, tap the **Checkmark** icon.

Adjusting the 360° Safety Halo and brightness

1. On the home screen, tap the **Halo** icon.
2. On the **Safety Halo** screen, switch **Enabled** on and expand the Brightness slider which appears.
3. To adjust the **Brightness**, move the slider to increase or decrease the level.
4. To confirm the new settings, tap the **Checkmark** icon.

Adjusting the alarm mode quick links

1. On the home screen, tap the **Alarm** icon. A pop-up appears and you can choose from the following alarm modes:

    - **Audible Alarm**
    - **Muted Alarm**
    - **Night Mode**

2. To change the setting, tap one of the alarm modes.

Adjusting the isolation mode quick link

1. On the home screen, tap the **Isolation Mode** quick link.
2. To change the isolation mode, tap **Positive**, **Negative** or **Neutral**.
3. To confirm the new settings, tap the **Checkmark** icon.

Upgrading an existing FMS-1655 Room Pressure Controller display

If you upgrade an existing FMS-1655 Room Pressure Controller display and want to take advantage of the full FMS-2000C controller improvements, contact service@triatek.com to assist with the following:

- Update the controller firmware
- Reconfiguring the back plane board to regain the use of relay 4 and restore continuous power at the display interface terminal block. This can be accomplished by re-configuring the three jumper options JP2, JP3, and JP4 on the bottom of the back plane board.
- If the BACnet MS/TP is moved to the new display, it is necessary to remove the old device and its associated points from the BAS and remap the new device and its associated points. See the FMS-2000C Critical Environment Controller Installation Guide (*LIT-12013531*) for more information.

If you upgrade an existing FMS-1655 Room Pressure Controller display with the FMS-2000C controller display and do not plan to update the original FMS-1655 controller, the following considerations apply:

- Thermostat function with seven distinct comfort ranges is not available, which includes ± 1, ± 2, ± 3, ± 4, ± 5, ± 10, ± 20
- Relay 4 continues to be unavailable to the end user
- Power for the FMS-2000C controller display needs to be moved to +V terminal on the CN5 USER INTRF terminal block to disable the display watchdog that was originally designed for FMS-1655 controller display. See the FMS-2000C Critical Environment Controller Installation Guide (*LIT-12013531*) for more information.

Hardware resource functionality

Table 18: AI functionality

AI Functionality	AI-1	AI-2	AI-3	AI-4	TI-1	TI-2
Pressure	X	X	X	X		
Temperature					X	X
Precision temperature		X	X	X		
Thermostat		X				
Humidity		X	X	X		
Air flow		X	X	X		
Air changes		X	X	X		
CO2			X	X		

Table 19: AO functionality

AO Functionality	A0-1	A0-2	A0-3	A0-4
Direct Mode	X	X	X	X
PID Mode	X	X	X	X

Table 20: DI functionality

DI Functionality	DI-1	DI-2	DI-3	DI-4
Door switch	X	X	X	X
Occupancy switch		X	X	X
Override switch		X	X	X
Flow switch		X	X	X

Table 21: DO functionality

DO Functionality	DO-1	DO-2	DO-3	DO-4
Setpoints trigger	X	X	X	X
Isolation mode	X	X	X	X
Occupancy mode	X	X	X	X

Technical specifications

Table 22: Technical specifications

Intended use		Indoor use
Overvoltage category		II
Altitude		Up to 2000 m (6562 ft)
Pressure range		± 0.2500 in. W.C. (± 62.27 Pa)
Alarm range		± 0.2500 in. W.C. (± 62.27 Pa)
Display range		± 0.2500 in. W.C. (± 62.27 Pa)
Accuracy		± 0.5% full scale
Air flow sensor type		Digital differential pressure features no offset, zero drift and is hysteresis free
Flow control resolution		± 0.0010 in. W.C. (± 0.2491 Pa)
Displayed pressure resolution		± 0.0001 in. W.C. (± 0.0249 Pa)
Control capability		Up to 4 independent spaces
I/O Resources		4 universal inputs (0 mA – 20 mA, 4 mA – 20 mA, 0 VDC – 5 VDC, 0 VDC – 10 VDC, 1 VDC – 5 VDC, 2 VDC – 10 VDC) 2 thermistor inputs (NTC Type 2 or 3, 10K at 77° F) 4 digital inputs (active-high or active-low) 4 universal outputs (0 mA – 20 mA, 4 mA – 20 mA, 0 VDC – 5 VDC, 0 VDC – 10 VDC, 1 VDC – 5 VDC, 2 VDC – 10 VDC) 4 relay outputs (NO or NC contacts 1A at 24 VDC)
Operating temperature		32°F to 104°F (0°C to 40°C)
Operating humidity		10% to 95% relative humidity, non-condensing
Mounting		Thin mount for shallow wall cavities
Alarm indication		Safety Halo color coded visual, audible alarm
Alarm silence		Touchscreen, auto-reset
Password protection		Up to 50 user passwords with 2 access levels (administrator and restricted)
Communications protocol		BACnet® MS/TP (to BAS) 76.8k, 38.4k, 19.2k, 9600 baud
Power requirement		24 VAC (nominal, 21.6 VAC minimum/26.4 VAC maximum), 50/60 Hz 30 VA power supply, Class 2, Limited Energy, LPS, or minimum power 30 VA transformer.
Power consumption		30 VA maximum
Pollution degree		2
Display resolution		720 pixels x 1280 pixels
Pluggable screw terminal blocks		18 AWG to 22 AWG (1.0 mm to 0.6 mm diameter)
Display dimensions (height x width x depth)		5.3 in. x 3.5 in. x 1.17 in. (134.62 mm x 88.9 mm x 29.72 mm)
Mounted depth		0.58 in. (14.73 mm)
Controller dimensions (height x width x depth)		6.56 in. x 5.5 in. x 1.88 in. (166.62 mm x 139.7 mm x 47.75 mm)
Compliance	**United States**	UL Listed (E515759) to UL 61010-1; FCC 47CFR Part 15; BTL Listed (BTL-30774)
	Canada	cUL Listed (E515759) to CAN/CSA C22.2 NO. 61010-1; ICES-003
	Europe (CE)	Low Voltage Directive [2014/35/EU] per EN 61010-1 EMC Directive [2014/30/EU] per EN 61326-1 + EN 55011
	United Kingdom (UKCA)	Electrical Equipment (Safety) Regulations per EN 61010-1 EMC Regulations per EN 61326-1 + EN 55011
	International Standards	Product fulfills the requirements of IEC 61010-1 as recognized by national or regional authorities.
	BACnet International (BTL)	BACnet Testing Laboratories (BTL) 135-2021 Listed BACnet Application Specific Controller (B-ASC)

Cleaning the display

IMPORTANT:
- Do not apply cleaner directly to the touch panel surface. If cleaner spills onto the touch panel, soak up the cleaner immediately with an absorbent cloth.
- Do not use cleaner that is either acid or alkali. Use neutral pH cleaner.
- Do not use organic chemicals such as: paint thinner, acetone, tolulene, xylene, propyl or isopropyl alchohol, or kerosene.

IMPORTANT :
- N'appliquez pas de nettoyant directement sur la surface du panneau tactile. Si du nettoyant pénètre dans le panneau tactile, essuyez immédiatement le nettoyant à l'aide d'un chiffon absorbant.
- N'utilisez aucun nettoyant qui est acide ou alcalin. Utilisez un nettoyant dont le pH est neutre.
- N'utilisez pas de produits chimiques organiques comme le diluant pour peinture, l'acétone, le toluène, le xylène, l'alcool propylique ou isopropylique, ou le kérosène.

To clean the display, complete the following steps:

1. Use a dry or lightly dampened cloth with a mild cleaner or ethanol.
2. Make sure the cloth is only lightly dampened, not wet.
3. Wipe the surface gently. If there is a directional surface texture, wipe in the same direction as the texture.

North American Emissions Compliance

United States

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 when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case users will be required to correct the interference at their own expense.

Canada

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Patents

Patents: https://jcipat.com

Software terms

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Product warranty

This product is covered by a limited warranty. Contact your representative/branch for more details.

Contact information

Contact your local branch office: www.johnsoncontrols.com/locations

Contact Johnson Controls: www.johnsoncontrols.com/contact-us

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