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# INSTALLATION AND WIRING MANUAL

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Specifications

CMS-1650 Central Monitoring Station
Monitoring Capacity .................................................. Four (4) FMS-1650’s
Interface Cable ............................................................. Belden 3107A, 22 AWG minimum
Protocol ................................................................. BACnet® MS/TP
Baud Rates Supported .................................................. 76.8k, 38.4k, 19.2k, 9600
Power (may be supplied by FMS-165x or by separate power supply) .................................................. 18 to 32 Vdc

Touch Screen User Interface
LCD Size & Type ......................................................... 3.2” diagonal, transmissive
Resolution ............................................................... 240 pixels x 320 pixels, portrait mode
Viewing Area .......................................................... 50.60 mm x 66.80 mm
Color Depth ............................................................. 18-bit or 262K colors
Backlight Color ......................................................... White
Luminous Intensity .................................................... min 2500 cd/m²

Mechanical
Mounting Options ..................................................... Surface (Plastic), Flush (Brushed Stainless)
Mounting Dimensions (surface-mount) .................................................. 3”W x 5”H x ¾”D
Mounting Dimensions (flush-mount) .................................................. 5”W x 8”H x ¾”D
CMS-1650

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Specifications

Environmental
Operating Temperature ........................................................................................................... 32° to 125° F

Operating
Operating Humidity ........................................................................................................ 10% - 95% RH, Non-condensing

Ordering Codes
Surface-mount model ........................................................................................................ CMS1650-S
Flush-mount model ........................................................................................................ CMS1650-F
Overview

The TRIATEK CMS-1650 Series Central Monitoring Station is used to monitor up to four (4) FMS-1650 isolation room controllers in hospital rooms, labs, and clean rooms. This central monitoring station is capable of monitoring and displaying the critical parameters at each isolation room controller, including differential pressure, mode of isolation, and alarm status. The CMS-1650 includes both visual and audible alarms independent of the alarms on the monitored controllers.

Key features of the CMS-1650 include:

- Full-color touch screen display with programmable display options and adjustable backlight
- Intuitive user interface simplifies setup and configuration of unit
- Display background changes color to indicate room status at a glance
- Audible and visual alarm annunciation
- Up to four (4) isolation controllers monitored in real-time
- Multi-level password protection of touch screen user interface
- BACnet® MS/TP protocol for easy integration with most BMS installations
- Simple installation with 4-conductor cable attached to nearest isolation room controller
- No separate power supply required

The CMS-1650 is equipped with a 3.2” diagonal Full-color Touch Screen display in portrait orientation (240 x 320). The password-protected menu tree is very intuitive and simplifies the setup and configuration of the unit. The menus incorporate touch-based interfaces such as sliders, radio buttons, and dialog popups to facilitate the ease-of-use of the CMS-1650.

The display implements bright background color changes to indicate the three different Room Status indications of the monitored rooms. These background colors indicate “Normal” (GREEN) when pressure is within defined limits, “Warning” (YELLOW) when pressure is nearing an out-of-limits condition, and “Alarm” (RED) when pressure is outside defined acceptable limits. The pressure ranges for these conditions are easily set by the user for the specific installation when necessary. The background color changes provide an overview of the monitored rooms’ differential pressure conditions at a glance. (Figure 1)

[![Room Status Indications](image)](image)

The user may set up multiple multi-level Passwords to prevent unauthorized or casual access to the CMS-1650 configuration settings. Up to ten passwords of up to eight digits may be programmed, with each having one of four associated access levels. Administrators and Facility Management personnel may have unrestricted access, while general staff may be assigned restricted access passwords which limit the functionality of the user menus.

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Introduction
The CMS-1650 flush-mount model offers an attractive stainless steel faceplate with an ultra-thin enclosure (less than ¾” thick) that may be installed in any application where wall depth is either unknown or extremely limited. New construction applications can take advantage of the included wall box that may be installed during the rough-in phase. For retrofit applications not requiring electrical conduit termination, the unit may be installed using the innovative retrofit mounting plate that simplifies the installation process. The CMS-1650 is configured at the factory to monitor up to four (4) remote isolation room controllers (FMS-1650). The user may change the factory-default settings by following the procedures outlined in the Quick Start Guide section of this manual.

The electrical connections to the CMS-1650 are made via convenient terminal block connectors as shown on page 13. All wiring should conform to local regulations and to the National Electrical Code (NEC). Precautions must be taken to avoid running communications wiring in the same conduit as line voltage or other conductors that supply highly inductive loads such as generators, motors, solenoids, contactors, and other sources of induced noise. Use 22 AWG or larger for all electrical wiring terminations.

Mounting Procedure
1. The CMS-1650 flush-mount model (CMS1650-F) should be mounted in a location that provides convenient access such that the display may be viewed with minimal glare and the touch screen is easily accessible to facilitate silencing the unit in the event of an alarm condition at the monitored isolation room controllers.

2. If this is a new construction project and the wall box has been installed, you may skip the next two steps. If this is a retrofit application and existing drywall is in place, then proceed with the next step to prepare the opening for the CMS-1650 flush-mount model.

3. Using the retrofit mounting plate (See Figure 2) as a template, trace the inner outline onto the drywall at the desired mounting location with a pencil or marker. Also mark the location of the two mounting holes on the drywall. Cut along the traced outline with a drywall knife or saw, taking care not to make the opening too large. Drill out the two holes to clear access to the mounting clip nuts. Remove the cut section of drywall and discard. Be sure to brush off any drywall dust or remnants from the inside surface of the opening to ensure proper adhesion of the retrofit mounting plate.

4. Remove the paper backing from the two adhesive strips on the retrofit mounting plate and insert it into the cut opening of the drywall. The retrofit plate should be oriented such that the corner notch is located at the lower left corner of the opening in the drywall, with the tabs bent towards you. Using the four (4) tabs on the retrofit mounting plate as alignment guides, press the mounting plate onto the inside surface of the drywall opening firmly to ensure maximum adhesion.

5. The electrical connections must be terminated before installing the stainless steel faceplate of the CMS-1650. Run the 4-conductor, dual twisted pair, electrical connection from the nearest isolation room controller (FMS-1650). Refer to the wiring diagram shown on page 11 for details.

6. Terminate the interface cable originating from the host isolation room controller at the 4-position terminal block on the back side of the CMS-1650 display, ensuring proper electrical connections. Do not apply power until the faceplate has been securely fastened to the wall.

7. With the electrical connections properly terminated, the stainless steel faceplate may be installed using the two (2) flat head machine screws. For retrofit applications where the mounting plate has been affixed to the inside surface of the drywall, the two mounting screws thread into the clip nuts of the mounting plate. For those applications where the wall box has been installed, the two mounting screws fasten the faceplate directly.

8. With power applied, the CMS-1650 should display the offline status of four (4) monitored rooms. The addressing of the CMS-1650 may be set by following the procedures outlined in the Quick Start Guide section of this manual.

Fig 2. Mounting plate used to install flush mount model for retrofit applications
Introduction
The CMS-1650 surface-mount model incorporates a low-profile display enclosure that may be mounted to any surface using wall anchors or the appropriate fastening hardware. For new construction applications, the CMS-1650 surface-mount enclosure is designed to accommodate a standard single-gang (2x4) wall box. This allows the wall box to be installed during the rough-in phase, and the appropriate electrical conduits to be installed as necessary. The CMS-1650 is configured at the factory to monitor up to four (4) remote isolation room controllers (FMS-1650). The user may change the factory-default settings by following the procedures outlined in the Quick Start Guide section of this manual.

The electrical connections to the CMS-1650 are made via convenient terminal block connectors as shown on page 13. All wiring should conform to local regulations and to the National Electrical Code (NEC). Precautions must be taken to avoid running communications wiring in the same conduit as line voltage or other conductors that supply highly inductive loads such as generators, motors, solenoids, contactors, and other sources of induced noise. Use 22 AWG or larger for all electrical wiring terminations.

Mounting Procedure
1. The CMS-1650 surface-mount model (CMS1650-S) should be mounted in a location that provides convenient access such that the display may be viewed with minimal glare and the touch screen is easily accessible to facilitate silencing the unit in the event of an alarm condition at the monitored isolation room controllers.

2. Begin the mounting procedure by removing the surface-mount enclosure cover from the backplate. Turn the set screw at the bottom of the enclosure clockwise until it has cleared the hole in the cover, thereby allowing it to be removed from the backplate. To re-secure the cover, turn the set screw counter-clockwise until it is flush with the cover.

3. If this is a new construction project and a single-gang wall box has been installed, you may skip the next step. If this is a retrofit application and existing drywall is in place, then proceed with the next step to prepare for the mounting of the CMS-1650 surface-mount model.

4. There are two primary options for installing the CMS-1650 surface-mount model in retrofit applications. The first option is to use two (2) drywall anchors to mount the surface-mount enclosure backplate. Using the backplate as a template for marking and drilling a ¾” hole at the center, bring the low-voltage wiring required for the CMS-1650 through the center hole at the backplate. The second option is to use an “old-work” low-voltage box or bracket as shown in Figure 3 right.

5. Once the surface-mount enclosure backplate has been properly mounted, the electrical connections should be terminated before installing the cover with the display. Run the 4-conductor, dual twisted pair, electrical connection from the nearest isolation room controller (FMS-1650). Refer to the wiring diagram shown on page 11 for details.

6. Terminate the interface cable originating from the host isolation room controller at the 4-position terminal block on the back side of the CMS-1650 display, ensuring proper electrical connections. Do not apply power until the electrical connections have been verified.

7. With the electrical connections properly terminated, the low-profile surface-mount enclosure cover may be installed by sliding the two tabs at the top of the inside edge into the two slots at the top of the backplate secured to the wall. Secure the CMS-1650 enclosure cover by turning the slotted set screw at the bottom of the backplate counter-clockwise, backing it out until it is flush with the cover.

8. With power applied, the CMS-1650 should display the offline status of four (4) monitored rooms. The addressing of the CMS-1650 may be set by following the procedures outlined in the Quick Start Guide section of this manual.

Fig 3. Old Work Low-Voltage Box/Bracket
Quick Start Guide
After the CMS-1650 unit has been installed, apply power to the isolation room controller providing power to the unit. On power up, you will hear two short beeps that indicate the CMS-1650 has begun the initialization sequence. The LED backlighting will cycle through the three unit status colors (green, yellow, red) as part of the power-up initialization sequence, followed by the displaying of the Triatek splash screen indicating serial number, firmware version numbers, and the current network address. This splash screen remains displayed for approximately five seconds and then disappears to reveal the main display screen. This splash screen information can also be redisplayed using the About This CMS option on the Diagnostics menu.

Main Display Screen
All CMS-1650 units come shipped from the factory in the Quad Station Monitor mode (Figure 4). Information displayed on the main screen includes the following for each monitored controller:

- Name of monitored room (up to 15 chars)
- Current mode of isolation (positive, negative, or neutral)
- Current alarm status (normal, warning, or alarm)
- Current differential pressure reading in selected engineering units (“WC or Pa”)
- Current time and date

If a monitored isolation controller is offline, the background color of the main display screen is gray with white text. Once the monitored isolation controller comes online, if it is in neutral isolation mode, then the background color of the main display screen is blue with white text. However, while in either Positive or Negative Isolation modes, the background color actively represents that current status of the monitored controller.

A green background indicates that the differential pressure of the monitored controller is within allowable limits of the desired setpoint. A yellow background indicates one of two conditions: 1) door to the monitored space is open (if door switch is enabled), or 2) the current differential pressure has drifted outside of the allowable limits of the desired setpoint and are in the caution range. A red background indicates that the current differential pressure has reached a critical condition and is outside of the allowable limits of the desired setpoint. The CMS-1650 incorporates a full-color touch screen and includes an extensive easy-to-use menu system that allows the user to quickly setup the monitoring station for immediate use. Also integrated into the CMS-1650 display are hotspots that provide quick access to set the time and date. Touching the screen anywhere other than one of the reserved hotspots invokes the menu system, unless one or more security passwords have been entered. If the CMS-1650 resides on a network with a time server, then the time and date will automatically be synchronized with the time server over the BACnet network.

Configuring Central Monitoring Station
Configuring the CMS-1650 central monitoring station settings can be accomplished in three (3) simple steps:

1. Select monitoring mode (single, dual, triple, or quad)
2. Specify network address of each monitored controller
3. Enable alarm monitoring for each monitored controller

The CMS-1650 comes pre-configured in Quad Monitor Mode. If the specific application requires the monitoring of less than four (4) isolation room controllers, then the monitoring mode can be reconfigured in the next step.

Selecting Monitoring Mode
For those applications requiring the monitoring of less than four isolation room controllers, the monitoring mode must be configured accordingly. Select Unit Setup > Monitor Setup and the user is prompted to select one of four monitoring modes (see Figure 5).
Setting Up

Specify Network Address(es)
Once the monitoring mode is selected, the user is prompted to specify the network MAC address(es) of the monitored isolation room controller(s). Use the address sliders to specify the MAC address for each controller, and click Finish to save the new configuration settings (see Figure 6).

Fig 6. Specify MAC address for each monitored controller

Enable Alarm Monitoring
To enable alarm status monitoring for each monitored isolation room controller, select System Setup > Alarms Setup > Enable Alarms and the user is prompted to specify the alarm enable status for each monitored FMS. To individually select whether each monitored isolation room controller triggers an audible alarm, select System Setup > Alarms Setup > Audible Alert and the user is prompted to specify whether the audible alarm is enabled for each monitored isolation room controller (see Figure 7).

Fig 7. Specify individual alarm enables for each monitored controller

Changing Network Settings
Changing network settings on the CMS-1650 is extremely simply and can be accessed by selecting Unit Setup > Network Setup (see Figure 8). From this menu, the user can specify one of four (4) standard baud rates (see Figure 9), change the network address of the central monitoring station, or reconfigure BACnet-specific settings (device ID offset, MaxMaster parameter).

Fig 8. Network Setup Menu allows baud rate and address to be specified

Adding Password Security
The CMS-1650 menu system can be protected by adding up to ten (10) multi-level passwords to the system. A password entry may be created by selecting System Setup > Passwords Setup > Add Password and the user is prompted to enter a minimum of four (4) and up to eight (8) digits (see Figures 10 & 11). Once a password has been specified, the user is prompted to specify one of four access levels: Unrestricted, Standard, Basic, and Restricted. All password entries are saved to non-volatile memory. In the event that a password has been forgotten, there is a factory-default “back door” password that will provide unrestricted access to the user menu system. Please consult with the factory for more information regarding this password.

Fig 10. Manage system security at Password Setup Menu

Changing Display Settings
The CMS-1650 display screen can be customized very easily using options available under the Display Setup menu. For those customers who need support for multiple languages, the Language Options selection allows the user to change the language displayed in the menu system and on the main display screen. In addition to...
English, both French and Spanish support are available on the CMS-1650.

The brightness of the LED backlighting on the CMS-1650 can be adjusted by selecting Display Setup > Set Brightness. The brightness settings are saved in nonvolatile memory and remain in effect through a power cycle.

Finally, changing the time and date can be accomplished either by using the hotspots on the main display screen, or by selecting Display Setup > Set Time & Date. The time and date settings are dynamic and do not get saved to non-volatile memory on the CMS-1650.

**Built-in Diagnostics**
The CMS-1650 incorporates several useful diagnostic tools.

By selecting Diagnostics > Run Self-Test, the unit performs a quick self-test of the status screens and audible alert by cycling through the normal (green), warning (yellow) and alarm (red) screens while sounding the alarm buzzer. A popup is displayed showing the room(s) that caused the alarm condition to occur.

In the event that there is a need to reset the CMS-1650 central monitoring station, the user may select Diagnostics > Reset Monitor. The CMS-1650 will execute a soft-reboot and return to normal operating mode.

### Configuring Display Module Settings

**Options Dipswitch (S1) – internal use only**

1. Amulet Chip Mode Selection: OFF = Programming Mode ON = Run Mode
2. Touch Screen Calibration Mode: OFF = Force calibration ON = Auto calibration
3. Reserved
4. Reserved

**Options Dipswitch (S2) – internal use only**

1. Mode Select: OFF = FMS/HMS1650 ON = CMS1650
2. Test Mode: OFF = Inactive ON = Active
3. FMS/HMS Mode: OFF = FMS1650 ON = HMS1650
4. Operational Mode OFF = Demo Mode ON = Run Mode

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

### BACnet Objects

**Analog Input Objects**

- AI-1 Analog Input 1 – Differential Pressure Input from FMS-1
- AI-2 Analog Input 2 – Differential Pressure Input from FMS-2
- AI-3 Analog Input 3 – Differential Pressure Input from FMS-3
- AI-4 Analog Input 4 – Differential Pressure Input from FMS-4

**Analog Value Objects**

- AV-1 MAC Address FMS-1 – Current MAC address for FMS-1
- AV-2 MAC Address FMS-2 – Current MAC address for FMS-2
- AV-3 MAC Address FMS-3 – Current MAC address for FMS-3
- AV-4 MAC Address FMS-4 – Current MAC address for FMS-4

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Thin Mount Wiring Box Dimensions

FLANGES FLUSH
FOR 1/2" CONDUIT
ALL FIVE WALLS HELD IN PLACE BY 2 POINTS

1/2" CONDUIT KNOCKOUT

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WIRING CMS-1650 TO NEAREST FMS-1650

FMS-1650 Supplying Power to CMS-1650

NOTE: For optimum network communications, connect the NETWK REF terminal to the communications reference signal if available.
Unit Setup Menu

Unit Setup
- Monitor Setup
- Network Setup

Network Setup
- Back

Network Setup
- Protocol Options

Protocol Options
- Back

Protocol Options
- Device ID Offset
  - 0 - 4194000
- MaxMaster
  - 1 - 127

Set Address
- 1-127

Set Baud Rate
- 76.8k, 38.4k, 19.2k, 9600

Audible Alert
- Individual Alarm Enables
- Audible / Silent Delay Time
- Alarm Quiet Period

System Setup

Alarms Setup
- Back

Alarms Setup
- Alarm Enables
  - Enable Alarms for each FMS
- Audible Alert
  - Individual Alarm Enables
  - Audible / Silent Delay Time
  - Alarm Quiet Period

Passwords Setup
- Back

Passwords Setup
- Add Password
  - Enter Password
  - Select User Access Level
- Edit Password
  - Edit Access Level
- Delete Password
  - Confirm Deletion
- Purge All
  - Confirm Purge All

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Triatek has been a pioneer in controllers since its origins back in the 1980’s. Today, Triatek has the most complete line of controllers and monitors in the industry - the latest of which use full color touchscreens. Additionally, Triatek is unique in that the company engineers and sells both venturi valves and controllers or monitors. In other words, Triatek is the one company that can be turned to for a complete air pressure solution.