



# **Code Compliant Control of Automatic Doors in Restroom Applications**

A practical Guide for Equipment  
Specifiers and Installers

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## Introduction

The industry is currently experiencing a rapid growth in the installation of automatic operators on restroom doors, in a wider scope of building occupancies. In addition, new capabilities of traditional devices, and the introduction of completely new types of system components, are significantly improving the access to restrooms by people with disabilities. Where the control of automatic doors in restrooms have historically utilized the same components as those used in entrance/egress applications (with minor tweaks), current restroom controls utilize a range of system components that have been designed to serve these specific requirements.

This guide has been published to provide equipment specifiers and system installers with a complete reference of information for control of automatic door operators in restrooms.

The extensive range of information that is presented in this guide includes a summary of codes, the system components, a range of system design options, project specifications and point-to-point wiring schematics.

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## Codes & Standards

Barrier free access to buildings and restroom facilities is mandated across North America by state or provincial building codes. In the U.S., barrier free access is also mandated by federal law, with interpretation and enforcement by each state. In Canada, the National Building Code provides a model building code that is used where no provincial code is adopted and also forms the basis for all provincial building codes. The result of these vastly different approaches is that the Canadian requirements for automatic doors on restrooms are fairly uniform while the American requirements are vastly different from state to state.

### The Americans with Disabilities Act (ADA)

In the U.S., ADA is a federal law designed to provide equal access for all citizens. All buildings that are open to the public must provide equal access for people with disabilities. This means that all visitors and occupants must be able to safely enter and exit the building, and must also be able to move throughout the building without difficulty.

There are two key technical regulations that inform the Americans with Disability Act. These are the ADA Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standard (UFAS).

Both the ADAAG and UFAS are based in large part on the technical criteria that is specified in the national voluntary consensus standard, ANSI A117.1

### (ANSI) Standards

The American National Standard Institute (ANSI) is a private, nonprofit membership organization that provides a voluntary system for the development of standards, including those applicable to the installation of automatic doors.

There are two ANSI standards that are commonly cited by both U.S. and Canadian building codes in regards to automatic doors on restrooms:

**ANSI A117.1** is the standard for Buildings and Facilities - Providing Accessibility and Usability for Physically Disabled People.

**ANSI A156.19** is the standard for Power Assist and Low Energy Power Operated Doors.



No excerpts of these standards are presented in this guide. For more information, please purchase these publications.

## Building Codes

As stated above, each U.S. state has the power to interpret federal ADA requirements and to legislate those requirements as law. As a result, states have several different approaches to accessibility regulations.

Some states have adopted ANSI A117.1, the UFAS, ADAAG or a model building codes (such as the International Building Code or Universal Building Code), all of which are relatively similar.

Another group of states rely on one or another of those sources as a basis for their regulations but have other requirements and do not reference by name.

A third and smaller group of states have legislated their own unique standard and code requirements.

No excerpt of Building Codes or regulations is presented in this guide. For more information on the codes applicable to your project, please contact the authority having jurisdiction.

## Other Codes

In addition to the building codes discussed above, there are other codes that your restroom project may need to comply with. In particular, the NFPA National Fire Code or International Fire Code. Since restroom doors are egress doors (i.e. doors used to exit an occupied area of a building in the event of a fire), compliance will be required by your AHJ.

**An important note regarding Fire Codes and the system designs shown in this guide;** all of the system designs contained in this guide are based upon the use of fail-safe electric strikes and mechanical 'swing-free' door locking hardware (i.e. handles that do not lock on the inside of the restroom). Further, where an emergency power generator is in place to provide standby power to the automatic door operator in the case of power failure, 2hr. battery standby power should be installed to provide power to the electric strike.



# Restroom Control System Components

This section provides information for each of the control, activation and annunciation components that could be used in a restroom control application.

Each component in this section contains the Camden product model number, name/description, image, the general application and a project specification. In addition, Camden Door Controls offers restroom control kits for each design option; the list of components packaged in each kit is listed at the bottom of each system option.

## CX-33 Advanced Logic Control



**Application:** New product, specifically designed for single occupant restroom applications. Used as the door operator controller for most restroom systems.

**Specification:** The logic relay to be used throughout the site/complex shall be CAMDEN DOOR CONTROLS model CX-33. The logic relay shall provide visual responses and status information on a three segment LED display. Programming buttons shall be freely accessible to the installation technician. The LED display shall appear for 10 Seconds or more when entering program mode. The logic relay shall provide Mixed-Mode triggering. Bi-directional door sequencer with a minimum of 4 inputs shall be provided. The logic relay shall operate in 'Normally Locked' and 'Normally Unlocked' restroom modes. An output dedicated for "Occupied & Door Locked" signage shall be provided. The logic relay shall incorporate a low energy sensor inhibitor. The response time shall be not less than 5 ms. 3 variable hold timers and 3 variable delay timers shall be provided for strike, operator and lock status annunciation. A wet input shall be provided accepting 5 to 120 V AC/DC. Output contacts shall have a minimum rating of 3 A at 24 VDC. The logic relay shall carry a 3 year manufacturer's warranty.

## CX-EMF-2 Multi-Function Relay



**Application:** Used as the door operator controller where there are one or two doors entering the restroom, when 'Assistance Required' button and indicator is required or when a time-out feature is required to automatically unlock the restroom door.

**Specification:** The multi-function relay to be used throughout the site/ complex shall be CAMDEN DOOR CONTROLS model CX-EMF-2. The multi-function relay shall be able to process signals from multiple sources to control one or two doors. The multi-function relay shall provide visual indicators to determine its status. An emergency input shall be provided to allow a panic switch to unlock, open the door and send an emergency signal for assistance. The unit shall be designed to control normally unlocked or normally locked restrooms, as well as 2-door (interlocked) restrooms. The multi-function relay shall have a 15 minute automatic reset and unlock feature. All output contacts shall be rated 3 Amps @ 30 V DC minimum. Output contacts shall have adjustable time delays up 30 seconds. The multi-function relay shall operate on 12/24 V AC/DC. The warranty shall be 3 years minimum.



### CM-400/8 Mushroom Pushbutton



**Application:** Used as a basic switch to energize an electric strike and lock the restroom door.

**Specification:** The single gang, mushroom pushbutton switches to be used throughout the site/ complex shall be CAMDEN DOOR CONTROLS model CM-400/8. The pushbutton shall incorporate a large button at least 1.5” in diameter. The button shall be vandal resistant and have a free-spinning collar with a metal back ring. The switch shall be mountable in a single gang electrical box. The faceplate shall be minimum 12 AWG Stainless Steel. Output contacts shall be rated 10 AMPS @30 VDC minimum. ‘Push to Lock’ verbiage shall be permanently laser engraved or silk screened prominently on the faceplate. This pushbutton shall be UL 61056-1, CAN/CSA-C22.2 compliant. This switch shall carry a 3 year warranty.

### CM Series Push Plate Switches

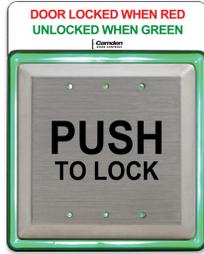


**Application:** Used as basic switch to energize the automatic door operator, to open the door from inside or outside the restroom.

**Specification:** The push plate switches to be used throughout the site/ complex shall be CAMDEN DOOR CONTROLS CM Series. The pushbutton shall incorporate a large push plate 4.5” or 6” in diameter. The switch shall be easy-to-activate and ADA compliant. Switches shall be all-active, whereby pressing any part of the faceplate will activate the device. Faceplates shall be constructed of 18-gauge stainless steel or solid brass. Switches shall use plastic spacers and rubber dampers for noise reduction. The Push Plate Switch shall be ADA compliant requiring a minimal force to activate. The Push Plate shall be constructed of Stainless Steel or Brass. Output contacts shall be rated 15 AMPS @30 VDC minimum. Graphics and text shall comply with ANSI A117.1 and be permanently laser engraved or debossed prominently on the faceplate. The switch component shall be UL 61056-1, CAN/CSA-C22.2 compliant. This switch shall carry a 3 year warranty.



## CM-45GRSE1 Illuminated Push Plate and Sign



**Application:** A new type of push plate switch and sign that has been specifically designed for restroom applications. The illumination of the switch changes color based upon the status of the electric strike, used to lock the restroom door. Different models are available, for green/red or blue/red illumination and for installation inside and outside the restroom.

**Specification:** The illuminated push plate switches to be used throughout the site/ complex shall be CAMDEN DOOR CONTROLS model CM-45GRSE1. The switch shall be easy-to-activate, ADA compliant, 4 1/2" square. Switches shall be all-active, whereby pressing any part of the faceplate will activate the device. Faceplates shall be constructed of 18-gauge stainless steel or solid brass. Switches shall use plastic spacers and rubber dampers for noise reduction. Switches shall be rated at a minimum of 15 Amps @ 30V DC. Graphics and text shall comply with ANSI A117.1 and be permanently laser engraved on the Stainless Steel or Solid Brass plate. Illuminated ring shall be 1/8" vandal resistant Lexan™. Illuminated switch shall have field selectable Green or Blue/Red color display. Either color can be defined as active or idle. Illuminated color shall change on activation and deactivation. The switch component shall be UL 61058-1, CAN/CSA-C22.2 compliant. The LED illuminated annunciators shall be 12V or 24V AC/ DC. The illuminated push plate shall carry a 3 warranty.

## CX-EU2015 and CX-EU2018 Electric Strikes



**Application:** 12VDC and 24VDC electric strikes used to electrically lock the restroom door. Compatible with centerline cylindrical locksets, with 5/8" (15.9mm) to 3/4" (19.05mm) latch projection.

**Specification:** The electric door strikes to be used throughout the site/ complex shall be CAMDEN DOOR CONTROLS model CX-EU2015 (12V) or CX-EU2018 (24V). The electric door strike shall be BHMA Grade 2 and UL/C listed. The electric strike shall operate as fail safe. The electric strike shall have an endurance rating of 1,000,000 cycles or more. The electric strike shall operate on 12 or 24 VDC and draw no more than 0.125 amps. The device shall be fully reversible for left or right hand doors. The static strength shall be no less than 1,500 LBS. The dynamic strength shall be no less than 50 FT-LB. The electric strike shall be UL 1034 listed. A minimum 3 year warranty is required.



## CM-AF500 Single Gang LED Annunciator



**Application:** A new type of illuminated sign designed specifically for restroom control applications. (4) Interchangeable message labels supplied; 'Locked When Lit', in green, 'Occupied When Lit' in green and 'Occupied/Occupe' in red and green. Other message labels available upon request.

**Specification:** The single gang, LED illuminated annunciators to be used throughout the site/complex shall be CAMDEN DOOR CONTROLS model CM-AF500. The faceplate shall be constructed of heavy gauge stainless steel and shall have a 1 3/8" square LED illuminated message, visible only when lit. When not lit, the message shall not be readily legible. The LED illuminated annunciators shall be constructed so that the message cannot be scratched or removed by vandalism. For installation outdoors, the face of the units shall be sealed and mounted to the electrical box utilizing a weatherproof rubber gasket. The unit shall be supplied with 4 insert message labels, including English only and English/French text. The unit shall be supplied with stainless steel Torx or snake eye security screws. The LED illuminated annunciators shall be 12V or 24V DC.

## CM-400/12 Mushroom Pushbutton



**Application:** Used as basic switch to activate an 'Assistance Required' signal appliance (visual indicator and/or audible sounder, supplied by others).

**Specification:** The single gang, mushroom pushbutton switches to be used throughout the site/complex shall be CAMDEN DOOR CONTROLS model CM-400/12. The pushbutton shall incorporate a large button at least 1.5" in diameter. The button shall be vandal resistant and have a free-spinning collar with a metal back ring. The switch shall be mountable in a single gang electrical box. The faceplate shall be minimum 12 AWG Stainless Steel. The pushbutton shall have "Press for Emergency Assistance" laser engraved on it. Output contacts shall be rated 10 AMPS @30 VDC minimum. This switch component shall be UL 61056-1, CAN/CSA-C22.2 compliant. This switch shall carry a 3 year warranty.



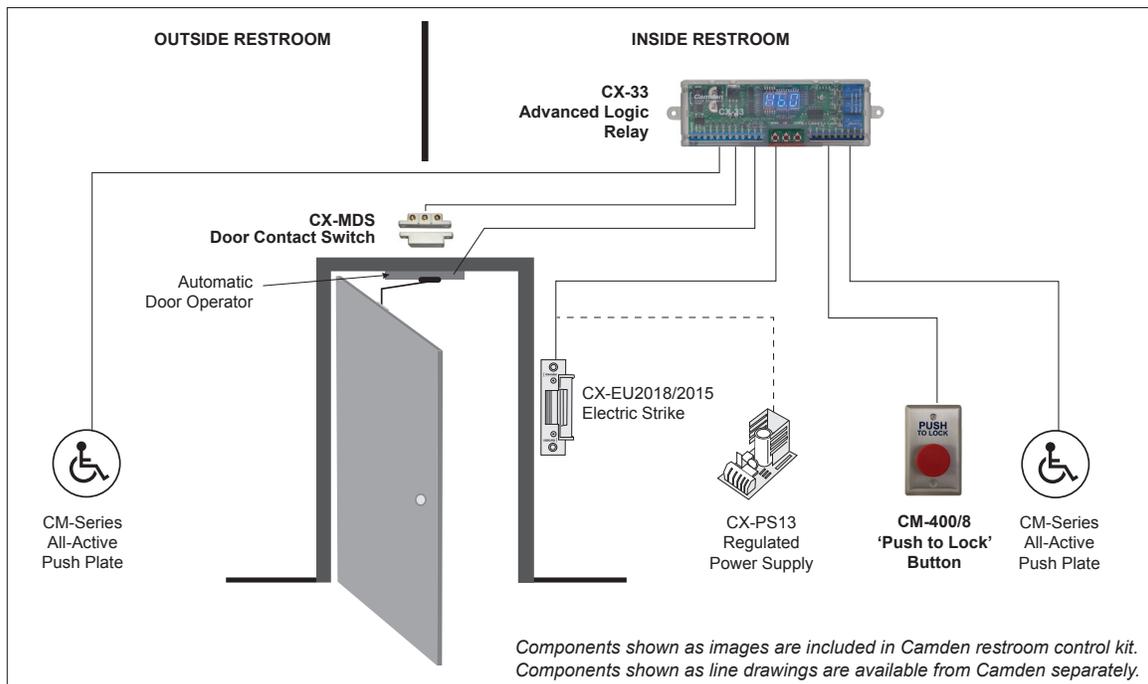
# Restroom Control Applications

This section presents a complete range of system design options for restroom control, starting with the most basic system design and ending with systems that include multiple entry doors and 'Assistance Required' notification.

Each system design is supported by title and a summary description of the sequence of operation.

In addition, Camden Door Controls offers restroom control kits for each design option; the list of components packaged in each kit is listed at the bottom of each system option.

## Basic Push Button System (CX-WC10)



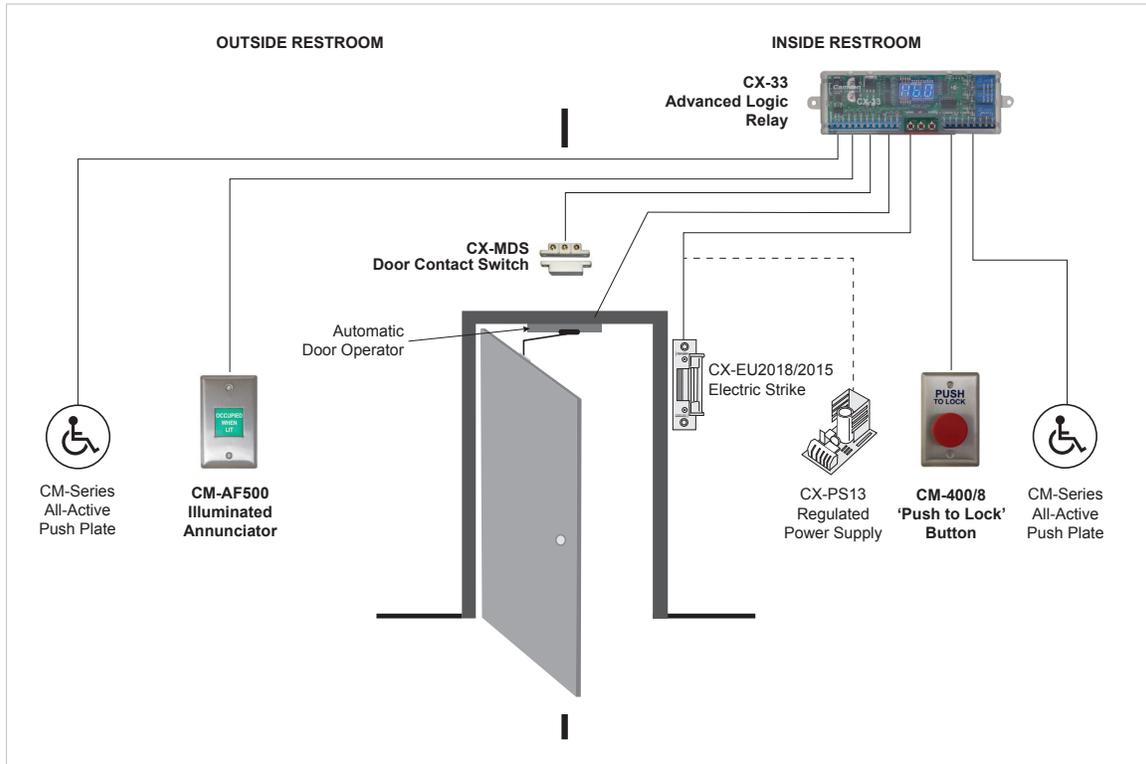
This is a basic control system where the restroom door is locked by an economical push button switch. The advanced logic relay controls the electric strike, door operator, all-Active push plate switches and the mushroom push button.

The door is normally closed and either locked or unlocked. Pressing the exterior push plate switch opens the door. Once inside and the door is closed, pressing the 'Push to Lock' mushroom push button locks the door. The electric strike is energized and the exterior push plate switch is deactivated. Press the interior push plate switch to exit the restroom and reset the system. If the door is opened manually to exit the restroom, the overhead magnetic contact switch resets the system.

### Camden CX-WC10 Restroom Control Kit:

Camden offers a restroom control kit that includes CX-33 Advanced Logic Control, CM-400/8 Mushroom Push Button and CX-MDC Magnetic Door Contact.

## Pushbutton and Annunciator System (CX-WC11)



Components shown as images are included in Camden restroom control kit.  
Components shown as line drawings are available from Camden separately.

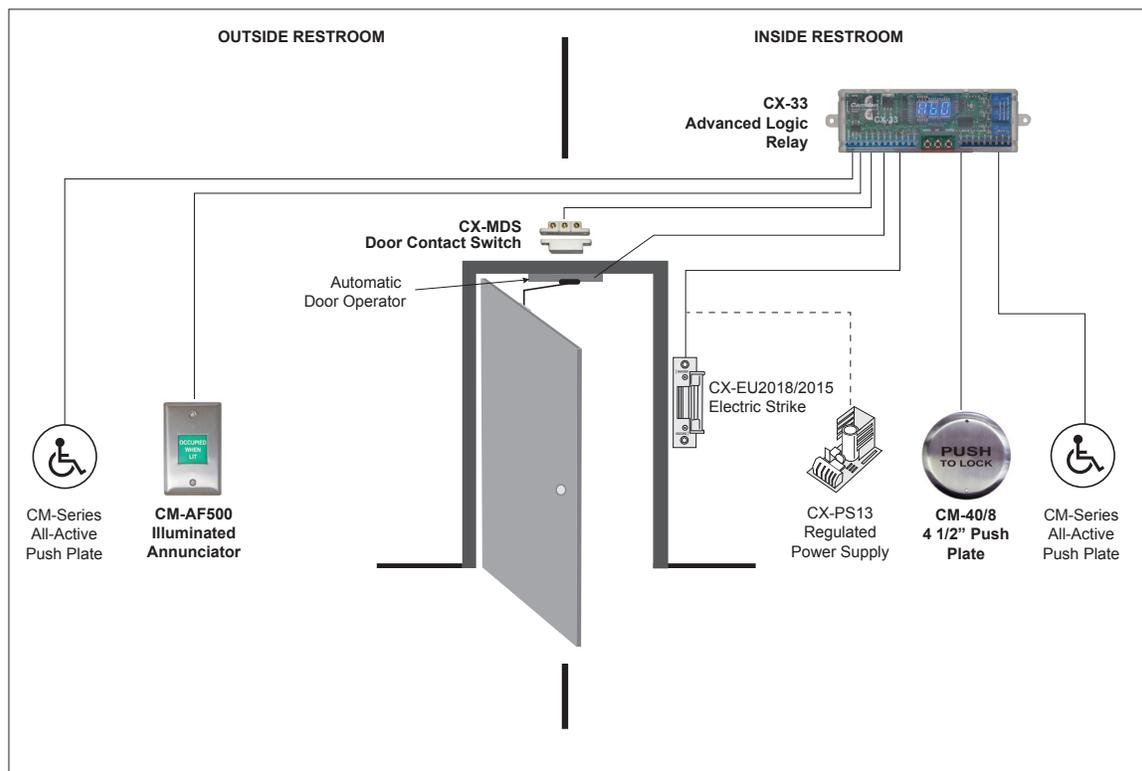
This is a control system where the restroom door is locked by 'Push to Lock' mushroom pushbutton and there is an illuminated annunciator outside the restroom providing a visual indicator that is activated when the restroom is occupied/locked. The advanced logic relay controls the electric strike, door operator, all-Active push plate switches, and the 'Push to Lock' mushroom pushbutton and the illuminated annunciator.

The door is normally closed and either locked or unlocked. Pressing the exterior push plate unlocks and opens the door. Once inside and the door is closed, pressing the 'Push to Lock' mushroom pushbutton, locks the door, disables the exterior 'Push to Open' push plate switch and illuminates the exterior annunciator to show 'Occupied when lit'. Pressing the interior push plate switch unlocks the door, deactivates the illuminated annunciator and resets the system. If the door is opened manually to exit the restroom, the overhead magnetic contact switch resets the system.

### Camden CX-WC11 Restroom Control Kit:

Camden offers a restroom control kit that includes CX-33 Advanced Logic Control, CM-400/8 Mushroom Push Button, CM-AF500 Single Gang LED Annunciator and CX-MDC Magnetic Door Contact.

## 4 1/2" Push Plate and Annunciator System (CX-WC12)



Components shown as images are included in Camden restroom control kit. Components shown as line drawings are available from Camden separately.

This is a control system where the restroom door is locked by a 4 1/2" ADA compliant push plate switch with an illuminated annunciator outside providing a visual indicator showing the restroom is occupied. The advanced logic relay controls the electric strike, door operator, all-Active push plate switches, and the 4 1/2" 'Push to Lock' push plate, and the illuminated annunciator.

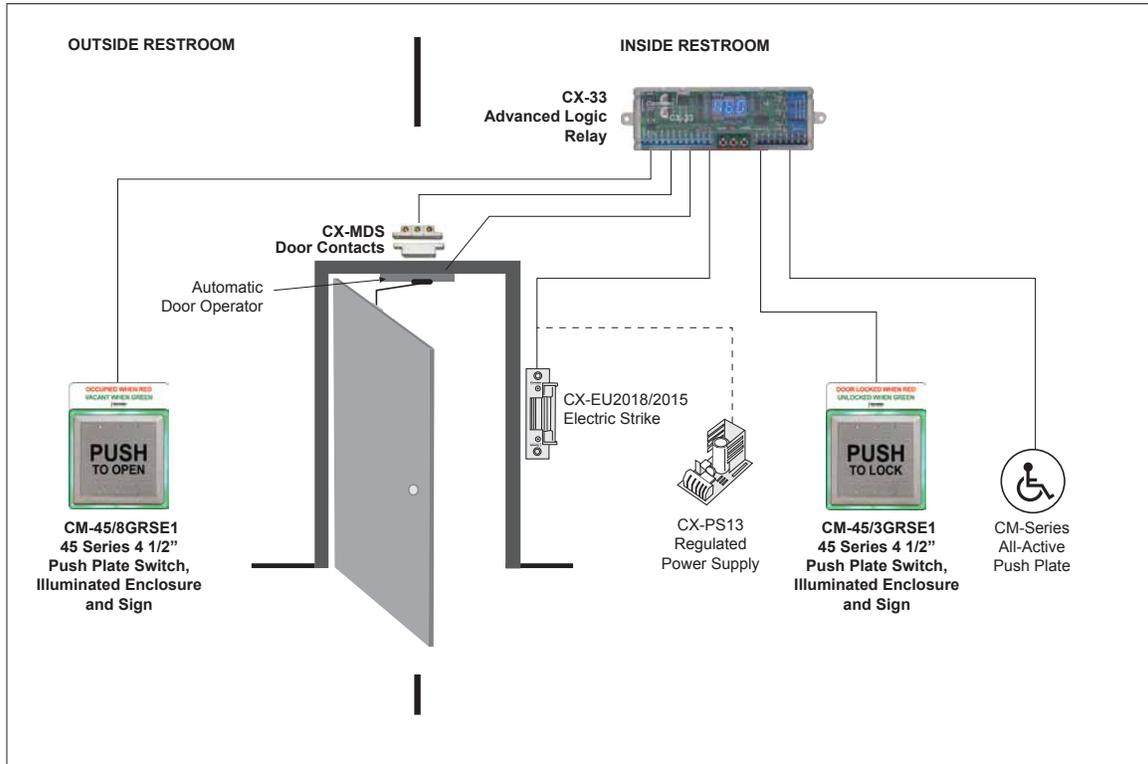
The door is normally closed and either locked or unlocked. Pressing the exterior push plate unlocks and opens the door. Once inside and the door is closed, pressing the 4 1/2" 'Push to Lock' push plate, locks the door and illuminates the exterior annunciator showing 'Occupied when lit'. Pressing the interior push plate switch unlocks the door, deactivates the illuminated annunciator and resets the system. If the door is opened manually to exit the restroom, the overhead magnetic contact switch resets the system.

### Camden CX-WC12 Restroom Control Kit:

Camden offers a restroom control kit that includes CX-33 Advanced Logic Control, CM-40/8 All Active™ Push Plate Switch, CM-AF500 Single Gang LED Annunciator and CX-MDC Magnetic Door Contact.



## Aura™ Illuminated Push Plate Switch System (CX-WC13)



Components shown as images are included in Camden restroom control kit.  
Components shown as line drawings are available from Camden separately.

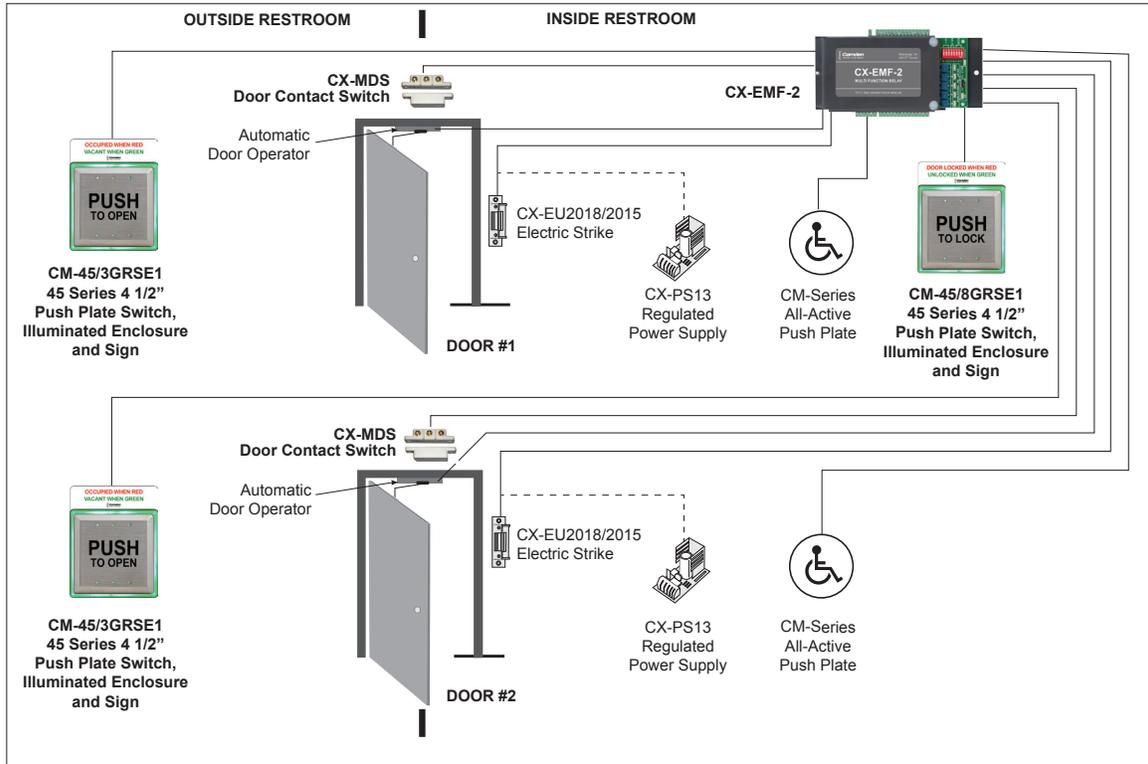
This system is for a single occupant restroom, either locked or unlocked. The CX-WC13 kit is a control system where the restroom door is opened and locked by dual color push plate switches providing visual indication and confirmation the door is locked and the restroom is occupied. The advanced logic relay controls the electric strike, door operator, All-Active push plate switches and the Aura™ illuminated push plate switches.

The door is normally closed and either locked or unlocked. Pressing the exterior 'Push to Open' Aura™ push plate opens the door. The Aura™ push plate ring turns red. Once inside and the door is closed, pressing the illuminated 'Push to Lock' Aura™ push plate, changes the color to red and locks the door. To exit, press the interior push plate to unlock the door and reset the system. The 'Push to Lock' Aura™ push plate switch illuminated ring turns green and the exterior 'Push to Open' Aura™ push plate outer ring turns green. If the door is opened manually to exit the restroom, the overhead magnetic contact switch resets the system.

### Camden CX-WC13 Restroom Control Kit:

Camden offers a restroom control kit that includes CX-33 Advanced Logic Control, CM-45/8GRSE1 4 1/2" Illuminated Push Plate Switch (PUSH to Lock), CM-45/3GRSE1 4 1/2" Illuminated Push Plate Switch (PUSH to Open) and CX-MDC Door Contact.

## Two Door Restroom System (CX-WC14)



Components shown as images are included in Camden restroom control kit. Components shown as line drawings are available from Camden separately.

This system is used in facilities that have shared restrooms between two suites. The CX-WC14 kit is a control system where the restroom doors are opened and locked by Aura™ dual color push plate switches providing visual indication and confirmation the doors are locked and the restroom is occupied. The advanced relay controls both door operators, electric strikes, All-Active push plate switches and the Aura™ illuminated push plate switches.

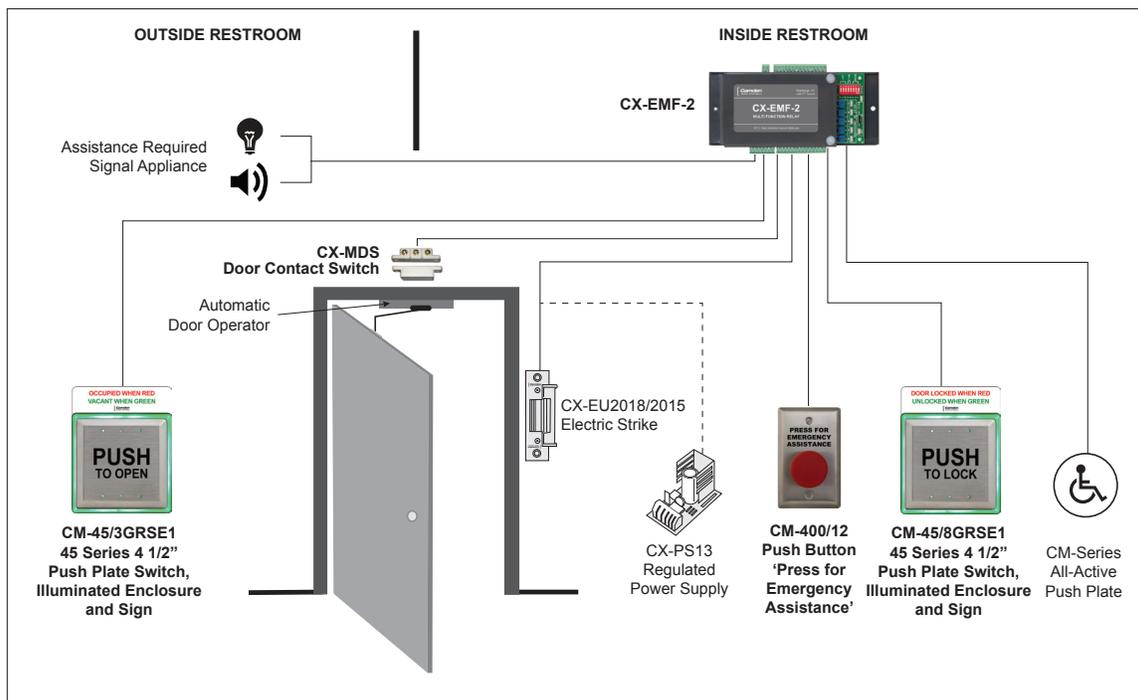
The doors are normally closed and unlocked. The exterior 'Push to Open' Aura™ illuminated push plate switches outer rings are green indicating the restroom is vacant. Pressing either 'Push to Open' switch will open the respective door. Once the door is closed, pressing the 'Push to Lock' Aura™ illuminated push plate switch will lock both doors. The 'Push to Lock' outer ring will glow red indicating the doors are locked. The exterior Aura™ illuminated push plate rings will turn red indicating the restroom is occupied. Pressing either All-Active push plate switch will open the respective door and reset the system. Aura™ illuminated push plate switches will glow green indicating the restroom is vacant. If the door is opened manually to exit the restroom, the overhead magnetic contact switch resets the system.

### Camden CX-WC14 Restroom Control Kit:

Camden offers a restroom control kit that includes CX-EMF-2 Multi-Function Relay, CM-45/8 GRSE1 4 1/2" Illuminated Push Plate Switch (PUSH to Lock), (2) CM-45/3GRSE1 4 1/2" Illuminated Push Plate Switch (PUSH to Open) and (2) CX-MDC Door Contacts.



## 'Assistance Required' Restroom System (CX-WC15)



Components shown as images are included in Camden restroom control kit.  
Components shown as line drawings are available from Camden separately.

The CX-WC15 kit is a control system where the restroom door is opened and locked by dual color push plate switches, providing visual indication and confirmation the door is locked and the restroom is occupied. This kit is unique in that it provides a push button that allows the occupant to call for emergency help by pressing a push button switch. The advanced relay controls the door operator, electric strike, All-Active push plate switches, the Aura™ illuminated push plate switches and 'Press for Emergency Assistance' push button.

The door is normally closed and unlocked. The exterior 'Push to Open' Aura™ illuminated push plate switch outer ring is green indicating the restroom is vacant. Pressing the 'Push to Open' switch will open the door. Once the door is closed, pressing the 'Push to Lock' Aura™ illuminated push plate switch will lock the doors. The 'Push to Lock' outer ring will glow red indicating the door is locked. Also, the exterior Aura™ illuminated push plate rings will glow red indicating the restroom is occupied. While the restroom is occupied, pressing the "Press for Emergency Assistance" push button will send a signal to the assistance required appliance and unlock the door. Pressing the interior All-Active push plate switch will open the door and reset the system. The exterior Aura™ illuminated push plate switches will glow green indicating the restroom is now vacant. If the door is opened manually to exit the restroom, the overhead magnetic contact switch resets the system.

If the time-out function of the CX-EMF-2 is configured, the restroom door will automatically unlock after a period of time and the 'assistance required' signal appliance will activate, allowing attendant staff (primarily in health care facilities) to intercede.

### Camden CX-WC15 Restroom Control Kit:

Camden offers a restroom control kit that includes CX-EMF-2 Multi-Function Relay, CM-45/8GRSE1 4 1/2" Illuminated Push Plate Switch (PUSH to Lock), CM-45/3GRSE1 4 1/2" Illuminated Push Plate Switch (PUSH to Open), CM-400/12 Mushroom Push Button (Press for Emergency Assistance) and CX-MDC Door Contact.

# Project Specifications

Camden Door Controls offers a complete set of project specifications, in Word™ doc. format, for each restroom control system designs contained in this guide.

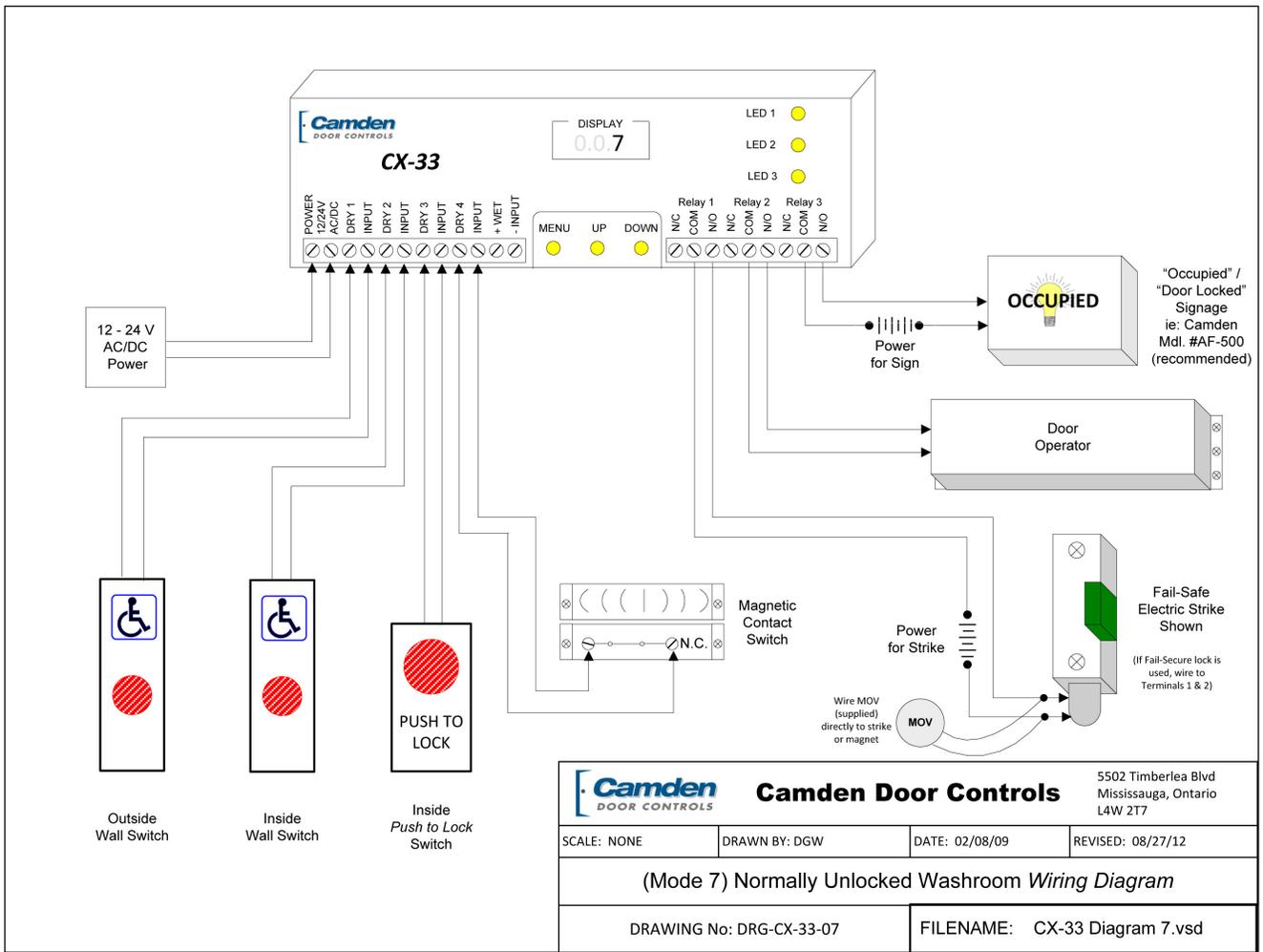
To obtain a copy, please visit [www.camdencontrols.com/restroomcontrol](http://www.camdencontrols.com/restroomcontrol) or contact our Customer Service department at 1 877 226-3369.



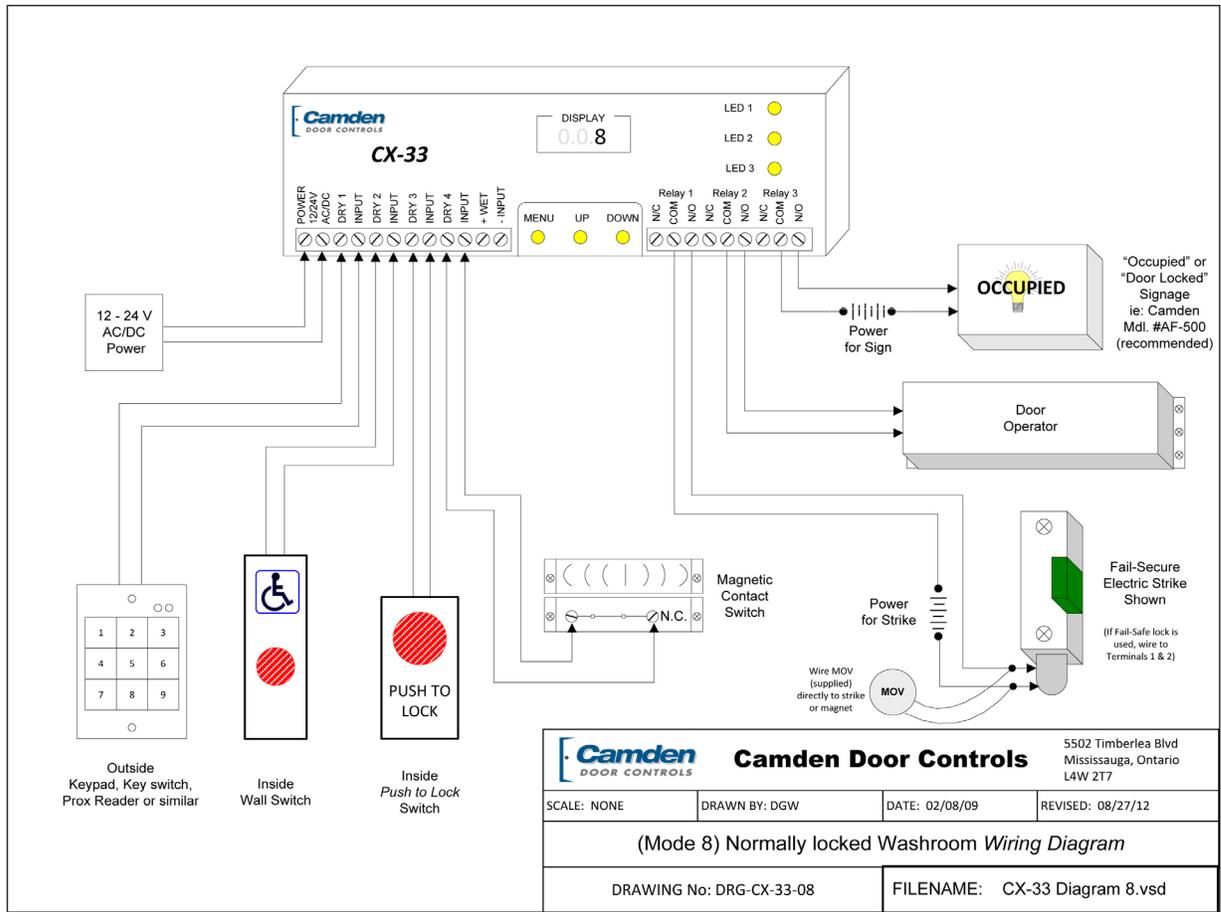
## Point to Point Wiring Diagrams

This section provides point to point wiring diagrams for restroom control systems utilizing CX-33 and CX-EMF-2 control relays.

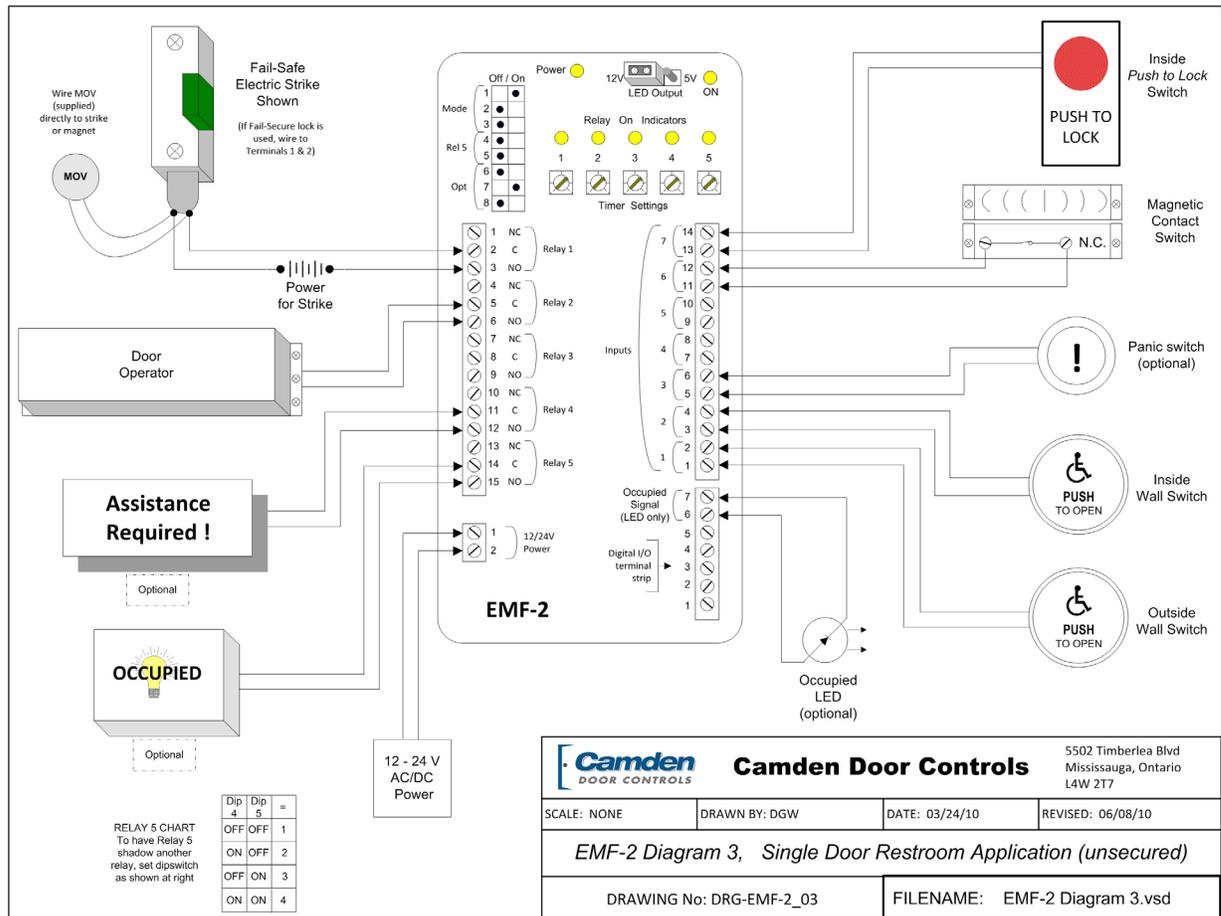
### CX-33 Advanced Logic Control



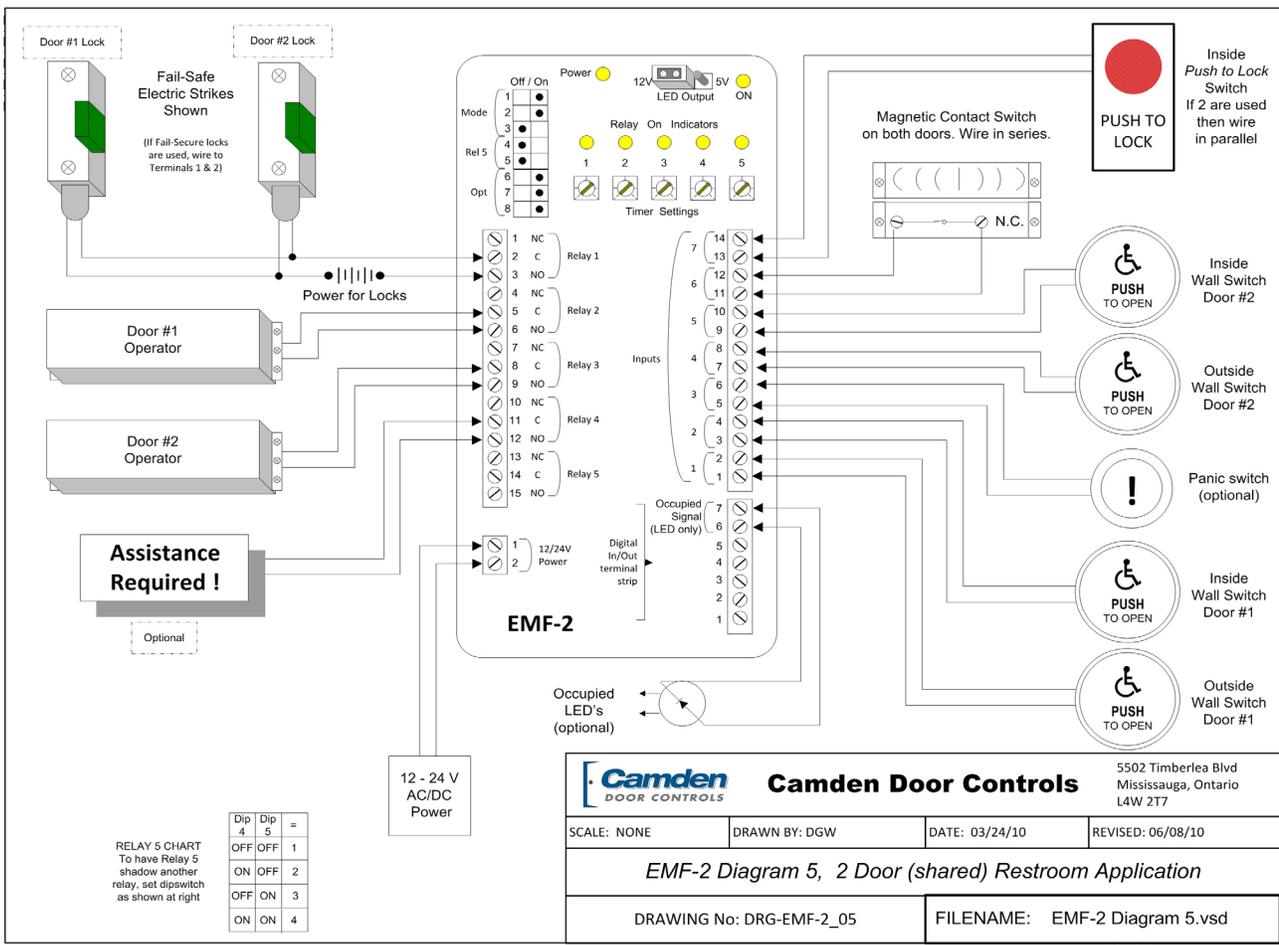
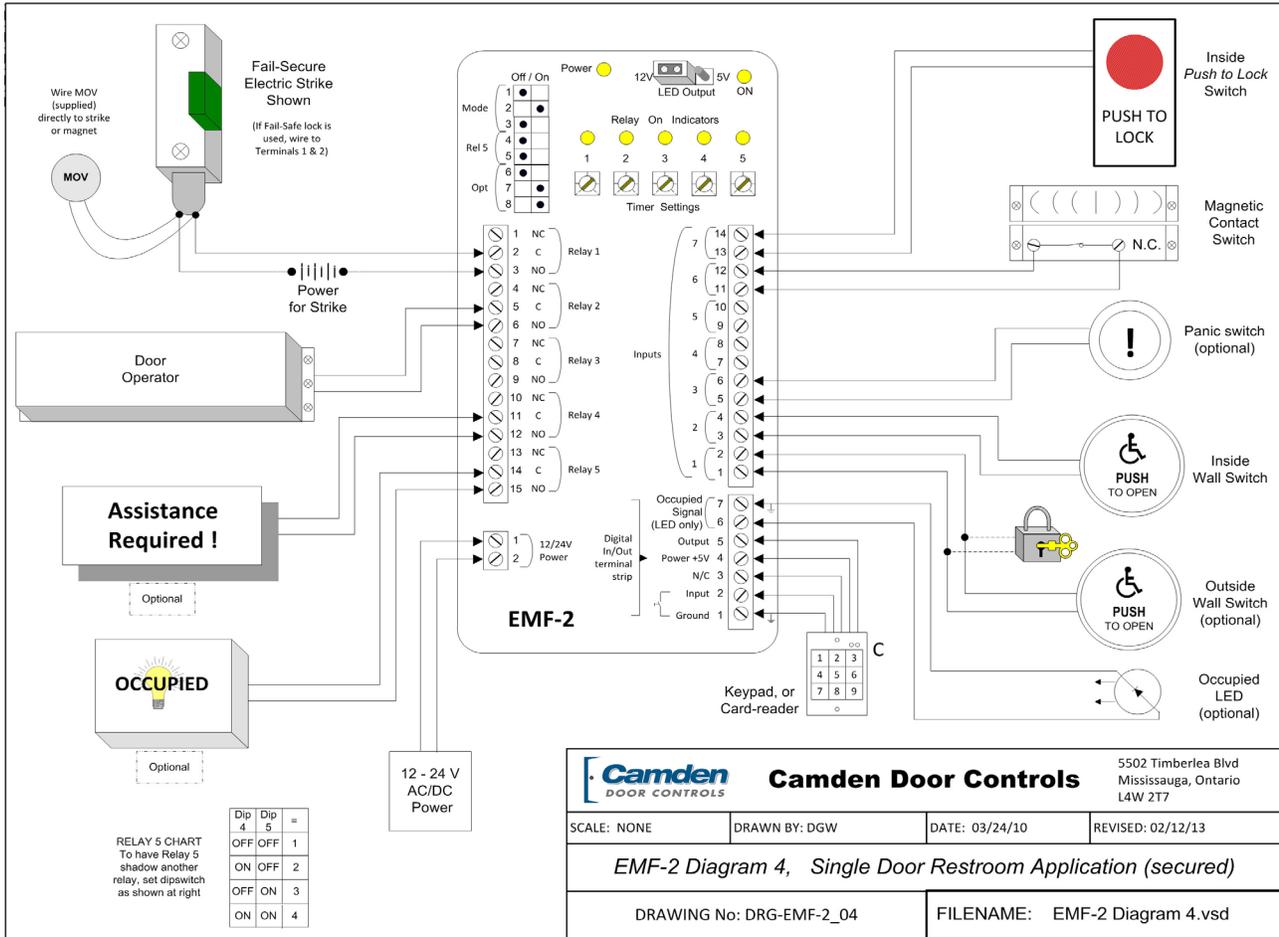
# CX-33 Advanced Logic Control



# CX-EMF-2 Multi-Function Relay



# CX-EMF-2 Multi-Function Relay



# About Camden Controls

Camden Door Controls offers the most extensive range of high quality door activating, locking, and control products to support any automatic door operator or access control application. We are ISO 9001:2008 registered, with a 20,000 ft. manufacturing facility, and an extensive network of stocking distributors across North America. Our 'Quick-Ship' warehouses in San Diego CA. and Charlotte NC, and main manufacturing facility in Toronto enables Camden to provide customers 5 day ground shipping to any location within the continental US!

## Liability Statement

Camden Door Controls has created this guide to serve as a general orientation to the topic and assumes no liability whatsoever for errors or omissions in the information contained herein, nor in how this information is understood or interpreted. In all cases, the reader is directed to consult the applicable codes, standards and laws that are in force within the country, state and municipality of their installation, and are further advised to submit their interpretation of the installation requirements to their local authority having jurisdiction (AHJ) prior to purchasing or installing equipment.

