

MAXIMIZING PROFIT WHILE MINIMIZING LIABILITY

When it comes to retrofitting door openings for Electronic Access Control (EAC), security, fire life safety and accessibility are of prime importance – followed by maximizing profit while minimizing liability. As a door professional, chances are that converting a door from Mechanical to EAC is not your first rodeo. This white paper is intended to serve as a primer for your reference, whatever your level of expertise, certification or experience is.

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What's the Access Control Objective?

First, you will need to understand what the access control objective is for the door, which usually falls into three main categories:

- 1. Security:** Risk and asset management, personal protection and crime prevention are security considerations.
- 2. Life Safety:** Fire, crisis management, crowd control, senior & infant protection, and hazardous material/contamination/disease control are typical life safety requirements.
- 3. Accessibility:** ADA compliance, human & vehicle traffic control and the actual building function are accessibility concerns.

Consider the profit potential

Will your solution need to integrate with other technologies to maximize the benefit? Is there an opportunity for customer revenue beyond this door from options and upselling? Is this project right for you? With an understanding of EAC objectives, you can now apply them to determine the full profit potential for the EAC retrofit project.

Determining the best suited EAC hardware is central to your profit potential and requires a review of many factors. The accompanying chart will guide you to some of the most important considerations.

EAC PROFIT, LIABILITY & APPLICATION CONSIDERATIONS

Product Availability Budget Requirements <ul style="list-style-type: none">• Timing/Delivery Affects Profits• Within Cost Parameters	Retrofit Project <ul style="list-style-type: none">• Single or Multi-Door• Standalone or Integrates into EAC System/Network
Life Safety Codes <ul style="list-style-type: none">• City• State• National• Local Jurisdiction	Type of Door & Frame <ul style="list-style-type: none">• Aluminum• Off-Set• Center Hung• Slide or Swing
Level of Security <ul style="list-style-type: none">• High Security - Failsecure• Low Security - Failsafe• Remote Monitoring Features	Aesthetics <ul style="list-style-type: none">• Concealed• Surface Mount• Architectural Housing• Availability Finishes

Consider Liability Issues

Make sure you have identified the Code Compliance requirements specific to the EAC hardware and supply them to your customer. This information may be a deterrent to having an inspector reject the installation today, or at a later date when code changes take effect. This includes any performance certifications (ANSI/BHMA), lab listings (UL), and product or service warranties. Non-compliant components could lead to potential liability should a fire or life safety emergency occur in the facility where you installed them. Know and understand the products you are installing.

Before You Continue

With the proliferation of EAC hardware, products and systems on the market, there can be confusion as to their proper use and purpose. As a manufacturer, we have encountered many instances of misapplication in the field that deviate from the intended use and under or over-utilization of the Security, Life Safety and Accessibility features designed into these EAC solutions.

Make sure you understand how the EAC solution you have identified matches the service the door opening provides. Typical door opening service types might include:

- Public or private access
- Single or multi-directional traffic control
- Restricted access or egress
- Frequency of use
- Designated egress or fire exit door
- ADA accessibility
- Traffic categories dictating special consideration, and more

A great way to understand the right questions to ask is through continuing education courses offered by EAC manufacturers and online courses like these two from industry associations like DHI.org:

1. "COR101: Fundamentals of Architectural Doors and Hardware"
2. "COR102: Introduction to Building Codes"

Retrofitting Doors for EAC

Assess the Door Opening

If you do not already use some sort of door assessment checklist to help capture the necessary details for recommending an appropriate upgrade to the door, we recommend you do. SDC has developed a comprehensive Door Checklist in both interactive (<https://sdcsecurity.com/Door-Checklist.htm>) and downloadable (<https://sdcsecurity.com/docs/door-checklist.pdf>) versions. Or start with any trade association or EAC manufacturer you deal with to find an alternate resource.



The checklist will help you capture key door details that will figure into proper application and installation of an EAC component upgrade. Door handing, type of door and size, as well as type of door header and frame are important to confirm, as well as existing lock, hinge, door closer, ceiling type and height, distance from power supply, and more.

Comprehend the Opening

While you are filling out your door checklist, it is important to note the condition of the door. Does it close properly without binding or rubbing? Does it positively center? What is the current environment and conditions the door is operating in? If there are issues, they will need to be resolved before installing the EAC upgrade.

Identify the Door's Function

To best determine the appropriate retrofit solutions, you should identify the door's function by asking the following questions:

- What is the current door hardware function: storeroom, classroom, entry, or passage?
- Can existing hardware – like a mechanical exit device – be modified for electric operation or will it need to be replaced to operate in an EAC system?
- Is a field electrification kit available?
- If adding an auxiliary electrified lock, will it integrate with existing hardware like an electric strike or electromagnetic lock?

Is a factory installed modification required to maintain a UL listing?

Fire Rated Openings

Fire rated openings are common in stairwell and elevator lobby door situations and will need to meet compliance with the Authority Having Jurisdiction (AHJ) who enforce the codes. Here, we recommend you are familiar with the NFPA 101 Life Safety code among others. Some key requirements are:

- Code requires self-closing & latching
- Free egress is critical for life safety
- Fail-safe electrified hardware is mandated
- Modifications to install hardware might require re-certification of door or frame
- Electrified hardware is typically tied into the fire system to release in the event of fire, power failure or other emergency

Identify the Electronic Access Control Solution

How will access be controlled?

In the old mechanical days, staff employees were given a key the facility and doors were manually unlocked during business hours. Today, an easy way to provide EAC now is by installing a keypad and/or reader at the door to control who can gain access by requiring a pin code, swiping or placing a credential near the reader, or using a smartphone. Keypads and readers come in standalone models or with outputs to connect them to an access control system – and usually unlock some type of electric locking hardware to gain entry.



There are also battery-powered Standalone Electric Locksets combined with keypads and readers that do not require hardwiring to an access control system. They are available in cylindrical, mortise or rim exit device configurations, as well as Bluetooth and software-enabled models.



Wall mounted key switches may be used for some applications like roll-up door or

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automatic gate operation to control access vs. keypads and readers.

Does this door opening need to be ADA compliant?

People who are physically handicapped or disabled are guaranteed equality under the Americans with Disabilities Act (ADA), a civil rights law. Title III of the law covers Public Accommodations and is a directive to ensure accessibility within public buildings. Retail storefronts, office buildings, campuses and healthcare facilities typically need to meet ADA compliance at points of access and egress.



Public door accessibility for ADA applications can be met through the use of low energy automatic door operators. ADA compliant actuators – like wireless and hardwired Push Plate Switches to activate the door opener – can be used for handicap access and request-to-exit applications.

Some ADA compliant actuators are wall mounted while others are placed within Bollard Posts at the entry or exit to the door. The use of Touchless Exit Switches to control automatic doors for a hands-free experience has increased dramatically with demands to increase public health and safety during the COVID pandemic.



Identify the Power & Door Control Solution

What lock will secure the opening?

Electric locking hardware comes in a variety of application configurations to meet local, regional and national fire and life safety code requirements. From electromagnetic locks, electric strikes, electrified locksets to electric bolt locks, and others, there's an EAC solution to meet just about any need to secure a door.

If you are or have participated in online continuing education thru DHI, the following two courses on hardware and electrified hardware applications can be of help:

1. "COR117: Door, Frame and Architectural Hardware Applications"

2. "COR133: Electrified Architectural Hardware"

Electromagnetic locks are appropriate for interior doors, perimeter exit doors and entrances that require failsafe emergency release capability. Depending on the level of security required, they usually come in several levels of holding force. Electromagnetic shear locks are available in Concealed, Semi-Concealed and Surface Mount models to provide high security with a failsafe locking mechanism for openings that require an architecturally superior appearance.



Electric strikes enable the electrical release of a locked mechanical latch or bolt and are well-matched for both new and retrofit construction. Electric strikes are available in a variety of configurations to accommodate several types of mechanical locksets and door and frame styles - as well as failsafe and failsecure applications.



Electrified cylindrical or mortise locksets are used to meet building and fire life safety code compliance for fire rated office doors, corridor doors, lobby doors, exit doors and stairwell doors. Whether failsafe or failsecure, controlled access and remote control capability is provided while the door stays latched even when unlocked, maintaining fire door integrity.



Unlike electric strikes, electric bolt locks need no other mechanical lock device to provide security.

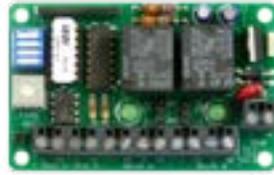
Electromechanical bolt locks are available in failsafe and failsecure modes. Applications include high security interior doors and cabinets where electromagnetic locks are not desired.



Retrofitting Doors for EAC

How will the door be controlled?

Hardware control and door control modules are offered by many manufacturers to control separate electrified locking devices, multiple doors, relay operating and system modes for lock control, monitoring, communicating door and lock system logic. They are normally installed in the power supply cabinet and provide a centralized wiring location, simplify installation and provide easy troubleshooting.



Power transfer devices are required to power EAC components and include power transfer loops, concealed power transfer hinges and devices.

Do not forget to consider the power supply itself. Door hardware and locksmith professionals should know that power requirements for EAC hardware is different from other systems such as CCTV. Access control systems require steady low-voltage DC current and generally draw higher current during access control-related events, such as when an electric strike is released.



Before selecting a power supply, plan ahead. This means you should evaluate your project carefully to avoid common installation and operating problems. Consider the following questions:

- What power is required and what power is available (if retrofitting)?
- If retrofitting, what modifications have been made over the years to affect the capacity of the power supply?
- How old is the power supply? If it's more than 10 years old, replace it.
- Do all products really work together?
- What regional and national codes might be applicable?
- Does your Authority Having Jurisdiction (AHJ) require the installation to be compliant with UL 294, which is an access control standard? Get the AHJ involved in your system design.
- How long must the system function after a power loss?

- Is a low-voltage license required in your jurisdiction?

What about PoE Solutions?

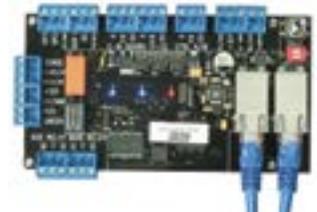
So far, our discussion has focused on retrofitting or upgrading a door opening for EAC without regards to whether it must integrate with a PC-operated access control system or network. Some of you may be adept in integrating a door opening with a larger enterprise EAC network through experience, training and/or familiarity with reselling or installing some of the many proprietary access control systems on the market today.



Some of you may feel you are the door expert, but not the IT and software expert. Perhaps you who may have the opportunity to provide retrofits for access control, but are uncomfortable when it comes to hooking up to the network. You may be reticent to take on jobs that can potentially open up a whole new bag of snakes from callbacks for software and hardware conflicts, incorrect settings, or even general liability for IT issues that may not be the result of your installation.

You have options. Not to sound redundant, but consider online training courses in order to become more proficient in the best practices for integrating door openings into an access control network. Check out the Electronic Security Association at esaweb.org, SecurityCEU.com, or even online modules offered by many of the industry's manufacturers.

As you learn and become more familiar with networks and access control, you still have some choices for integrating your door opening into an EAC system without being an enterprise IT expert. Leading among these alternatives are Power Over Ethernet (PoE) hardware and components that connect to an IP-enabled controller using the Ethernet cable that already exists in the facility - to avoid heavy cost commitments associated with complex, over-sized enterprise wide systems.



PoE solutions like these can be as simple as tapping into the nearest Ethernet connection to power and control door access via web browser and low-voltage access

Retrofitting Doors for EAC

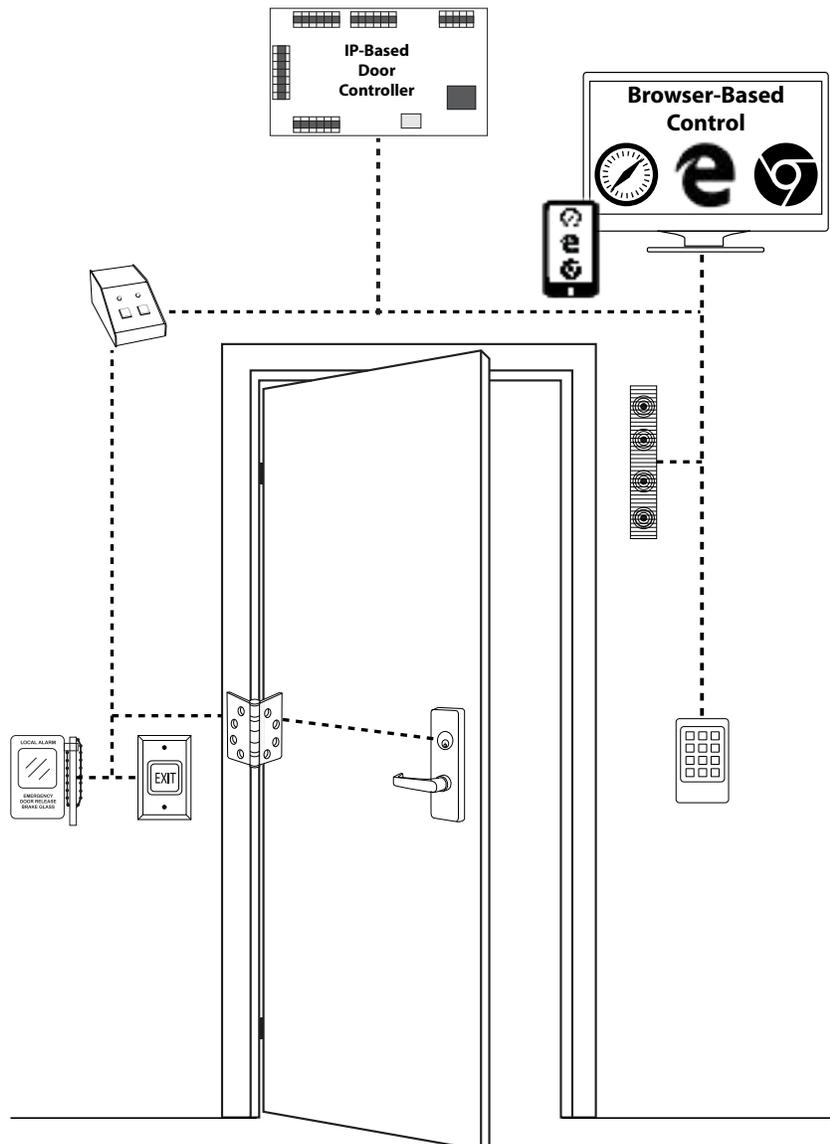
and egress devices. If you become comfortable at recommending and installing PoE solutions, you can carve out a niche serving the smaller company or single facility that doesn't require a full-blown, complex and expensive enterprise wide system, yet wants the convenience and 24/7 access of a PC-based access control system.

Most of the industry's manufacturers offer low-voltage, PoE hardware and components for access control including electromagnetic locks, key and exit switches, electrified exit devices, electrified locksets, electric bolt locks, automatic door operators, even cabinet locks to attach to a network system via Ethernet cable.

There are also several manufacturers that offer IP-based door access controllers that are powered by Ethernet cables, connect to the existing network structure, and are browser-based – requiring no software to install. Simply plug the controller into a wired LAN connection and use the web browser on a computer or smartphone to setup and manage the system. These PoE/IP-based controller solutions allow you to get in and out of a job quickly because time is money. Otherwise, it can be very time-consuming to consult with the IT Manager and find a suitable existing computer at a customer site.

Here's a typical PoE door control solution using an IP-based door control:

Single Door PoE Solution Example Using an IP-Based Door Controller



Retrofitting Doors for EAC

Physical electronic access control solutions utilizing low-voltage PoE hardware, components and IP-based door controllers are particularly suited to tenant improvement and retrofit projects, providing the ability to purchase and install just what's needed without having to invest in a more costly, enterprise system designed for larger facilities. The beauty of this approach is that they are usually easy to expand as needs grow without the front-end commitment to an over-sized solution.

Multi-door applications are also supported by several manufacturers. Some simply offer IP-based Door Controllers in 2, 4, 6, 8 door configurations that support brand-specific access and egress control hardware. Others provide the door controller and optional expansion boards for additional door openings that are non-brand specific to the access or egress control hardware. Most offer free, pre-installed software that provides the functionality of a full PC-based access control system and is managed via web

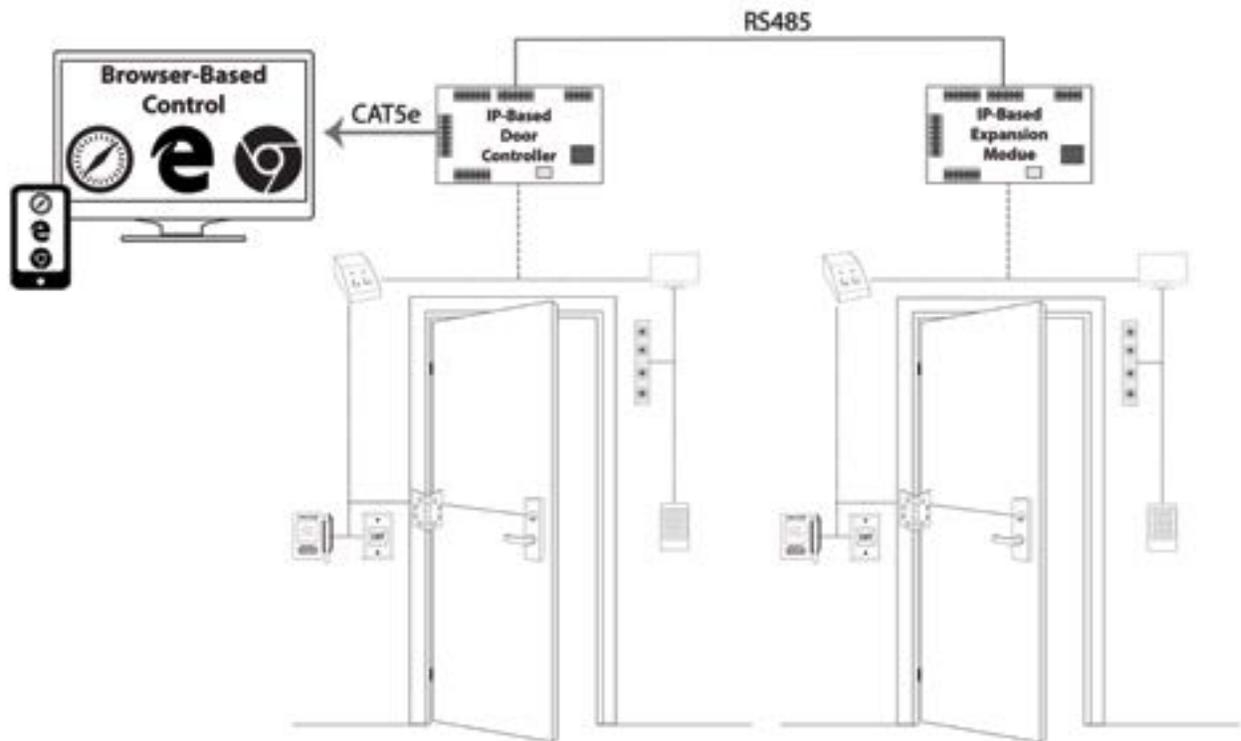
browser from a desktop, tablet, or smartphone.

You'll need to survey where the Ethernet cable is and/or where electricity is available to power the system, depending on the type of installation and whether it's a single door or multiple doors. If using the existing Ethernet cable you may need to install a PoE splitter to provide power to your components. If, in your power survey you realize that additional power is required from a Power Supply, you may need to install a PoE injector to provide the additional power to the system.

As with any tenant improvement or low-voltage implementation via Ethernet cable, we recommend that installers are comfortable with Ethernet network best practices (see our training recommendations from above), and test any installation using an inexpensive Ethernet cable tester before startup. Also, by following industry standards – ANSI/TIA-1005-M.I.C.E and ANSI/TSI-569C.0

Multi-Door PoE Solution Example Using an IP-Based Door Controller + Expansion Module

Multi-Door PoE Solution Example Using an IP-Based Door Controller + Expansion Module



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(cable lengths) – many issues can be eliminated that may be residuals of previous installations.

A word of warning: don't forget that any PoE access & egress solution using IP-based door control still needs to meet all existing Fire and Life Safety code compliance. This includes using UL 294 approved hardware where required.

Using existing, legacy Ethernet cable with PoE hardware and an IP-based controller will save time, money, manpower and will not require you to be an enterprise network expert. You may be able to bring safe, secure, easy to implement door access control to what we call the Network's edge without the headaches of costlier, more complicated enterprise solutions. And, you can usually expand from a single door up to 100 or more doors in the future depending on the manufacturer's solution you choose.

In this way you can upgrade the door without being an IT expert and use PoE capable locking hardware and IP-based door controllers to bridge the gap between traditional locking hardware and IT Networks.

Identify the Egress Control Solution

How will I get out?

Key switch assemblies provide an economical method of providing authorized control for a variety of applications and new or retrofit construction. Most use U.S.



standard, 1" and 1 3/8" mortise key cylinders and interchangeable core cylinders to maintain compatibility with a new or existing facility mechanical key system. Many manufacturers also provide a variety of exit

button and push button styles and contact configurations to fit several request-to-exit application needs. Additionally, wave-to-open switches and motion sensors provide hands free compliance and convenience for touchless applications using proven infrared detection technology.

Egress devices are designed for the release of electromagnetic locks and the activation of delayed egress locks installed on non-latching doors. Request-to-exit (REX) push bars provide uninhibited egress through

access controlled openings equipped with electromagnetic locks, while eliminating the need for prior knowledge of egress operation and enabling egress with a single natural motion. The use of (REX) push bars eliminates the need for wall mounted exit switches that required prior knowledge and a manual secondary action to unlock the door.



Exit devices are an essential hardware component found in almost every building for safety and security. Electrified exit devices allow for greater control of the opening and can interface with other electronic equipment. They can either control the latch bolt of a device or control the locking of the operating trim.

There are two ways to control the electric locking and unlocking of the exit device. First, a solenoid or motor retracts the latch (Electric Latch Retraction – ELR) and holds it retracted or in the “dogged” position until power is interrupted. The door operates in a push-pull manner. The second method controls the operating trim, allowing the exit device to remain latched. The exterior level, knob, or thumbpiece is electrically locked or unlocked for entry control in either failsafe or failsecure modes.



Electrified exit device manufacturers offer a variety of available trim options, as well as device types such as rim mount, surface vertical rod and concealed vertical rod, so that panic and fire exit device solutions are available for virtually any door opening application.



There are also cost-saving ELR Field Modification Kits available to convert existing mechanical exit devices to electronic, enabling electric access control and simultaneous latch retraction and dogging operation.

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Retrofitting Doors for EAC

Features and Functions

What else do I need?

There are remote controls and annunciators designed to meet the demands of different control and monitoring applications without PC-based access control capability.



They provide methods for central monitoring and control of openings in a facility as well as audible and/or visual status supervision and notification. They can include desktop

modules with switches to release a single opening and LED displays to indicate door position

or lock status. LED displays can also be placed at the door opening to provide visual status of the door.

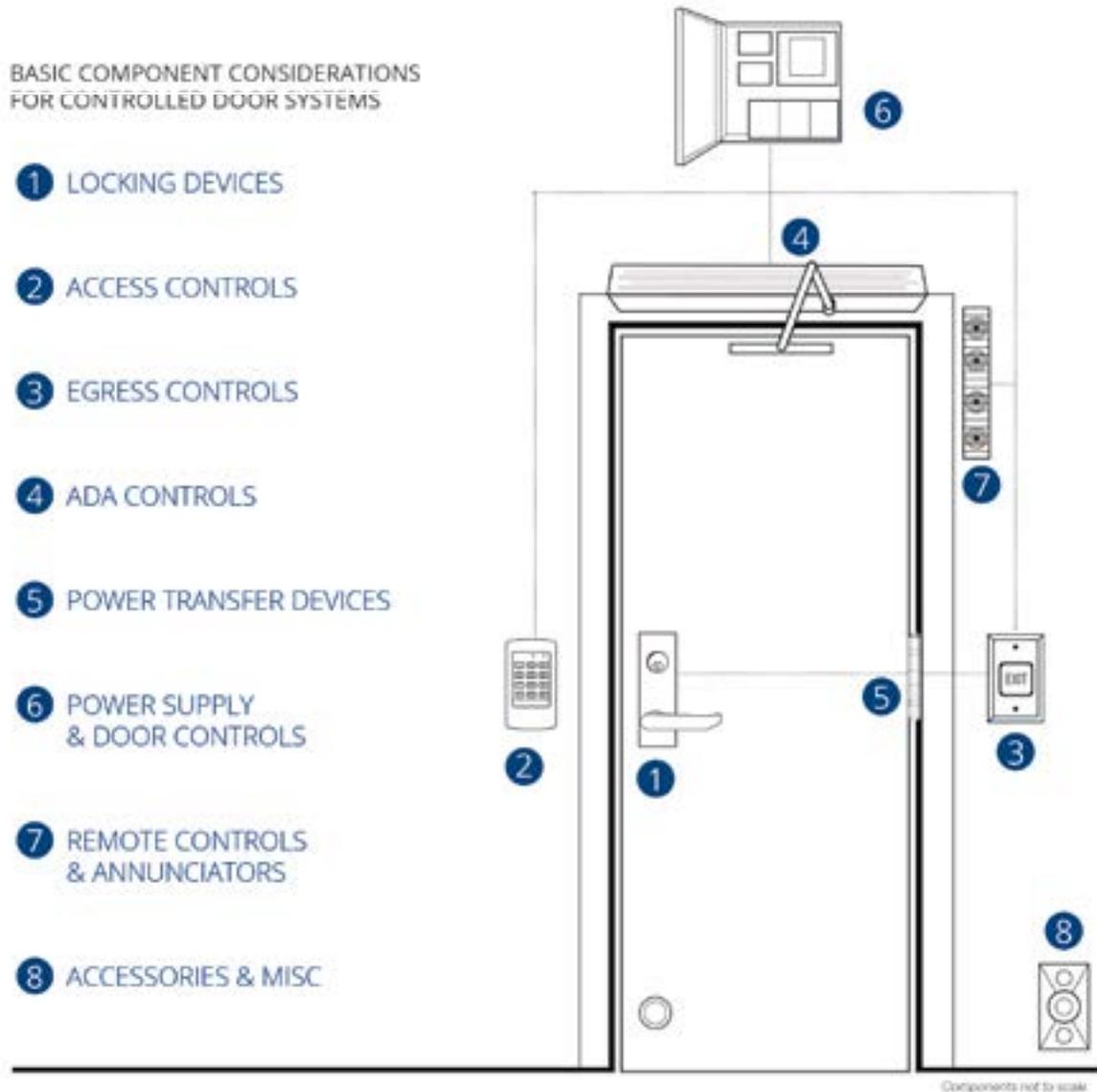
Door Prop Alarms with timed delay, LED status display, and buzzer alarm are available to prevent leaving a door open beyond a specific time to alleviate unauthorized students or employees through a controlled door opening.



Plus, there are a variety of electrified accessories and specialty items to enhance any EAC conversion solution, depending on the application. For reference, here's a visual summary of the categories of product recommendations to consider when upgrading any door from Mechanical to Electronic.

Retrofitting Doors for EAC

Basic Component Considerations for Controlled Door Systems



Hopefully, this white paper has given you some practical insights for consideration when retrofitting a door for EAC that will help to minimize liability and maximize the profit potential for the installation.

Don't forget, industry associations like ALOA (www.aloa.org), DHI (www.dhi.org), ESA (www.esaweb.org) and others, have a wealth of information, tools and training to assist you in your electrified door hardware and access control projects.

As always, consult your local Authority Having Jurisdiction (AHJ) for compliance requirements before starting any door installation project.



For more information, access our **Complete Component Considerations** brochure on line at sdsecurity.com/docs/component-considerations.pdf

Want to learn more? Sign up for our free Continuing Education class – “**Door Openings and Access Control Hardware**” worth 1 CEU – by sending an email request to: sales@sdsecurity.com. We'll notify you when the next online class is available or if the class is coming to a venue in your region.

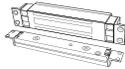


Retrofitting Doors for EAC

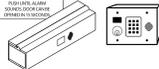
1 LOCKING DEVICES



Electromagnetic Locks



Electromagnet Shear Locks



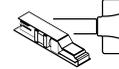
Delayed Egress Locks



Electric Strikes



Electrified Locksets



Exit Devices & Retrofit ELR Kits



Electric Bolt Locks

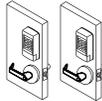
2 ACCESS CONTROLS



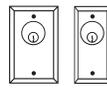
IP-Based Controllers



Keypads & Readers



Standalone Locksets

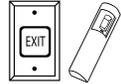


Key Switches

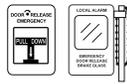
3 EGRESS CONTROLS



Egress Devices

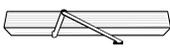


Exit Switches & Sensors



Emergency Door Releases

4 ADA CONTROLS



Low Energy Operators

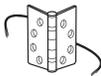


Push Plates & Panels



Bollards

5 POWER TRANSFER DEVICES



Hinges



Loops



Mortise Transfer



Wireless Transfer

6 POWER SUPPLY & DOOR CONTROLS



Power Controllers

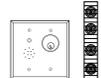


Door Controllers

7 REMOTE CONTROLS & ANNUNCIATORS



Remote Control Consoles



Door Prop Alarms & Annunciators

8 ACCESSORIES & MISC



Electromagnetic Door Holders



Door Position Monitoring



Latch & Deadbolt Monitoring Strikes



Wireless Transmitters & Receivers



Communicating Bathroom Controls