Access Control 101 Training

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Access Control System

In the fields of physical security and information security, **access control** (AC) is the selective restriction of **access** to a place or other resource. The act of accessing may mean consuming, entering, or using.

Permission to **access** a resource is called Authorization.

Why Access Control?

1. **Protect Your Employees**

   Safety is of paramount importance for the stability of your business.

2. **Restrict Unauthorized Access And Reduce Theft**

3. **Electronic Visitor, History Logging And Muster Reports**

4. **Eliminate Key Problems**

   No more keys – you can use swipe cards, buttons or even fingerprints.

5. **Customize Individual Schedules**

6. **Provide Remote Access**

7. **Reduce Energy Bills And Protect The Environment**

Solution Components

Solution Components:

Reader Choices and Cards

HIGHLY ADAPTABLE AND SECURE HIGH
FREQUENCY ACCESS CONTROL SOLUTION

- Powerfully Secure – Provides layered security beyond the card media for added protection to identity data.
- Adaptable – Interoperable with a growing range of technologies and form factors including mobile.
- Interoperable – Open Supervised Device Protocol (OSDP) for secure, bidirectional communication.
- Versatile - Extended read range is available for applications such as parking and gate control solutions.

1. **Proximity Reader**
2. **Keypad**
3. **Proximity Reader with Keypad**
4. **Biometrics**
   1. **Fingerprint Reader**
   2. **Face Recognition Reader**
   3. **Palm Reader**
   4. **Iris Reader**
5. **Biometrics with Proximity Reader**
6. **Biometrics with Proximity Reader with Keypad**
7. **Long Range Reader**

Other technology added:
1. **NFC reader**
2. **Bluetooth reader**
3. **Barcode Reader**
4. **QR Code reader**

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Solution Components:

Credentials (Cards-Tags)

1. Proximity Cards
- **PVC Prox Cards**
- **Composite Prox Cards**
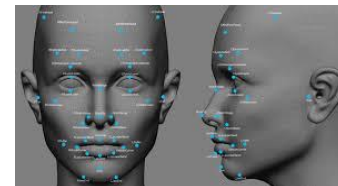- **Magnetic Stripe Cards**

2. Smart Cards
- **iClass** (2k bits up to 32kbits)
- **Mifare** 1k Byte (8k bits) or 4k Bytes (32k bits)

3. Biometric Credentials
- **Finger**
- **Hand-Palm**
- **Eyes**
- **Face**

4. Other Credentials
- **Mobile Credential**
- **QR Code**
- **Barcode**
- **Key Fob**
- **Sticker Tags**

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Solution Components:

Reader Technology Range

Typical Read Range[1]	13.56 MHz Single Technology ID-1 Cards – SIO Model Data			
	iCLASS Seos: 1.2" (3 cm) iCLASS: 3.1" (8 cm) MIFARE Classic: 2.8" (7 cm) MIFARE DESFire EV1: 1.2" (3 cm)	iCLASS Seos: 1.2" (3 cm) iCLASS: 3.1" (8 cm) MIFARE Classic: 2.8" (7 cm) MIFARE DESFire EV1: 1.2" (3 cm)	iCLASS Seos: 2.0" (5 cm) iCLASS: 4.7" (12 cm) MIFARE Classic: 4.7" (12 cm) MIFARE DESFire EV1: 2.0" (5 cm)	iCLASS Seos: 1.6" (4 cm) iCLASS: 4.7" (12 cm) MIFARE Classic: 4.3" (11 cm) MIFARE DESFire EV1: 1.6" (4 cm)
	13.56 MHz Single Technology Tags/Fobs – SIO Data Model			
	iCLASS: 1.6" (4 cm) MIFARE Classic: 1.2" (3 cm)	iCLASS: 1.6" (4 cm) MIFARE Classic: 1.2" (3 cm)	iCLASS: 2.4" (6 cm) MIFARE Classic: 2.0" (5 cm)	iCLASS: 2.8" (7 cm) MIFARE Classic: 1.6" (4 cm)
	125 kHz Single Technology ID-1 Cards			
	HID Prox: 2.8" (7 cm) Indala Prox: 1.6" (4 cm) EM4102 Prox: 4.3" (11 cm)	HID Prox: 2.8" (7 cm) Indala Prox: 1.6" (4 cm) EM4102 Prox: 4.3" (11 cm)	HID Prox: 2.8" (7 cm) Indala Prox: 2.0" (5 cm) EM4102 Prox: 4.3" (11 cm)	HID Prox: 2.8" (7 cm) Indala Prox: 2.0" (5 cm) EM4102 Prox: 3.1" (8 cm)
	125 KHz Single Technology Tags/Fobs			
	HID Prox: 1.6" (4 cm) Indala Prox: 0.8" (2 cm) EM4102 Prox: 2.8" (7 cm)	HID Prox: 2.0" (5 cm) Indala Prox: 0.8" (2 cm) EM4102 Prox: 2.8" (7 cm)	HID Prox: 2.0" (5 cm) Indala Prox: 1.2" (3 cm) EM4102 Prox: 2.8" (7 cm)	HID Prox: 1.6" (4 cm) Indala Prox: 1.2" (3 cm) EM4102 Prox: 2.4" (6 cm)

Access Control Components :

Input Devices

Release Button /
REX (request to exit button)

- This series of request to exit can be mounted directly in electrical box (Flush mount) or surface mounting Installation:

Key Switch

Door Contact

- Recessed Mount
- Surface Mount

PIR /Motion Detector

often integrated as a component of a system that automatically performs a task or alerts a user of **motion** in an area.

Panic Button

- a button for summoning help in an emergency.

Other Detectors

- Smoke Detector
- Heat Detector

Emergency Button

- The main function is to override the electrical locking/
- release devices in case of emergency. With Key to reset the switch.

Accessories
- Mounting Brackets
- Door Loop

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Access Control Components:

Output Devices

Power Supply Unit

Magnetic Lock   **Drop Bolt**   **Strike Lock**   **Mortise Lock**

- 12v /24v
- 5amps /10amps
- With Back-up Battery
- Output: 8ch and 16ch

Piezo Sounder /Siren   **Horn/Strobe**   **Strobe Light**

Accessories
- Mounting Brackets
- Door Loop

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Access Control Components:

Tripod Turnstile

- High flow rate – 40 people per minute*
- For internal or external use
- Bidirectional passage
- Single or double walkways
- Choice of static fixed arm or drop arm
- Emergency setting to allow for safe evacuation
- Stainless steel construction with a choice of finishes
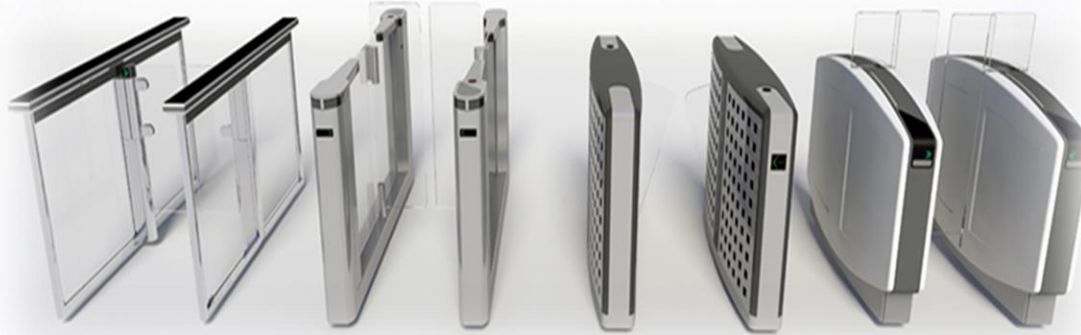
Swing & Flap Type Turnstile

- Unique algorithm for fraudulent passage detection time
- 5instrusion - **Tailgating - Crawling - Wrong Way - Leave**
- **Lane Time Out**
- High people flow: up to 40 passages per minute
- Maximum reliability with 5 million MCBF (Mean Cycles Between Failure)

Full Height Type Turnstile

- Medium flow rate – 17 people per minute*
- Internal or external installation
- Optional card reader or push button entry
- Emergency setting to allow for safe evacuation
- 90° or 120° configuration
- Bidirectional passage
- Choice of rotor designs, finishes and colours

Access Control Components:

Controller and Modules

Multi-vendor provides reliable hardware support and capable for Centralized Monitoring expansion.
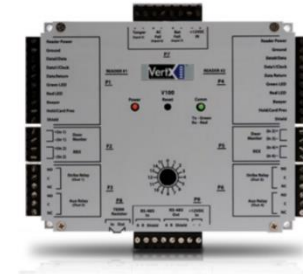
Controller *(Image of Genetec Synergis Controller)*

- **Controller PoE Ready**
- **RS-485 — 4000 feet (1220 m) to host (using Belden 3105A)**
- **9-16VDC Power Supply**
- **Windows-based**

Controller - Modules Interface *(Image of Mercury Device)*

- **Controller (accommodating 4 readers)**
  - *Reader Module Interface (Expansion)*
  - *Input Module Interface (Expansion)*
  - *Output Module Interface (Expansion)*

Modules Interface *(Image of HID Module)*

- **Reader Module Interface**
- *Input Module Interface (Expansion)*
- *Output Module Interface (Expansion)*

Access Control Components:

PoE Switch

is a technology for wired Ethernet local area networks (LANs) that allows the electrical current necessary for the operation of each device to be carried by the data cables rather than by power cords. Doing so minimizes the number of wires that must be strung in order to install the network.

Switch (L2 and L3)

A **Layer 2 switch** is a type of network **switch** or device that works on the data link layer (OSI **Layer 2**) and utilizes MAC Address to determine the path through where the frames are to be forwarded. It uses hardware based **switching** techniques to connect and transmit data in a local area network (LAN).

A **Layer 3 switch** is a specialized hardware device used in network routing. Both can support the same routing protocols, inspect incoming packets and make dynamic routing decisions based on the source and destination addresses inside.

Specs.:
- **4, 8, 16, 24, 48port**
- **Switch**
- **PoE -** 802.3af (15.5watts)
- **Hi-PoE Switch -** 802.3at (25.5watts)
- **2 or 4port SFP**

Access Control Components:

NETWORK COMMUNICATION
(Wired and/or Wireless)

Communication between the Cameras and Recorder will be wired or wireless or combination, depends on site condition.

Roughing-ins
- **Cables**
- **Pipes (Conduit)**
- **Utility Boxes / Junction Boxes**
- **Trunk / Cable tray**

Comparison

	Wireless	Wired
Installation	• Fast Deployment • PtP = **1 day** no roughing-ins needed	• Slow Deployment (Require Civil Works) • PtP = **2 days** including roughing ins
Unit Cost	Fair Cost	Cheaper Cost
Labor Cost	Low cost	High Cost
	RX – TX (25-300Mb)	Cat5e-Cat6(1Gb-10Gb)

Access Control Components:

Server

Multi-vendor hardware support, provides reliable video recording and others are capable for Centralized Monitoring expansion.

Specs.:
- **Rack mount / Tower Type/ Appliance**
- **1bay, 2bay,4bay... 24bay for HDD**
- **HDMI/VGA output display**
- **Windows-based**

Access Control Server – Rack Mount Type

Access Control Server - Appliance Based

**Access Control Server – Tower Type**

Access Control Components:

LED Monitor -Light Emitting Diode
LED display is a flat screen, flat panel computer monitor or television. It has a very short depth and is light in terms of weight. The actual difference between this and a typical LCD monitor is the backlighting. The first LCD monitors used CCFL instead of LEDs to illuminate the screen.

LFD Monitor - Large Format Display
Screen is different and offer various advantages from a business perspective. But, most are either LED, LCD or Plasma and can be used to **display** television through the HDMI cable, (although they do not have a TV tuner), digital signage, welcome boards and messages.
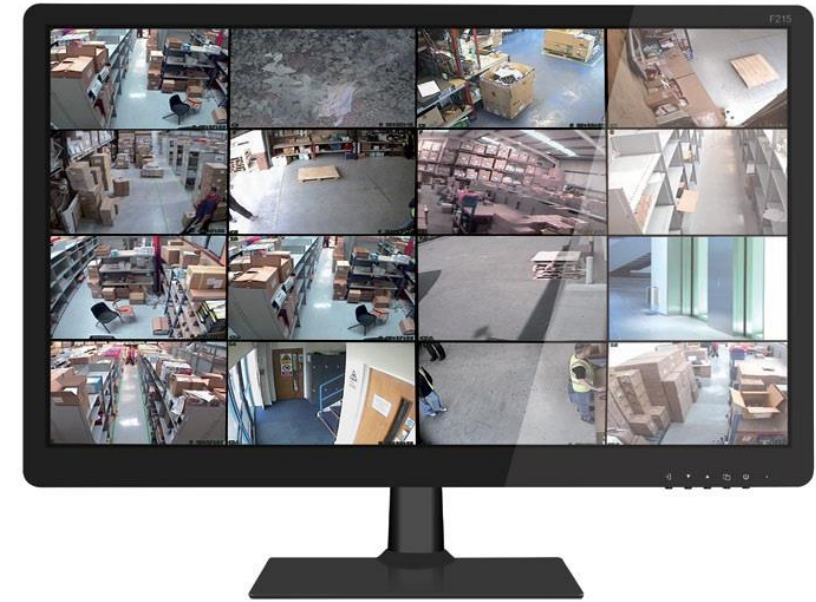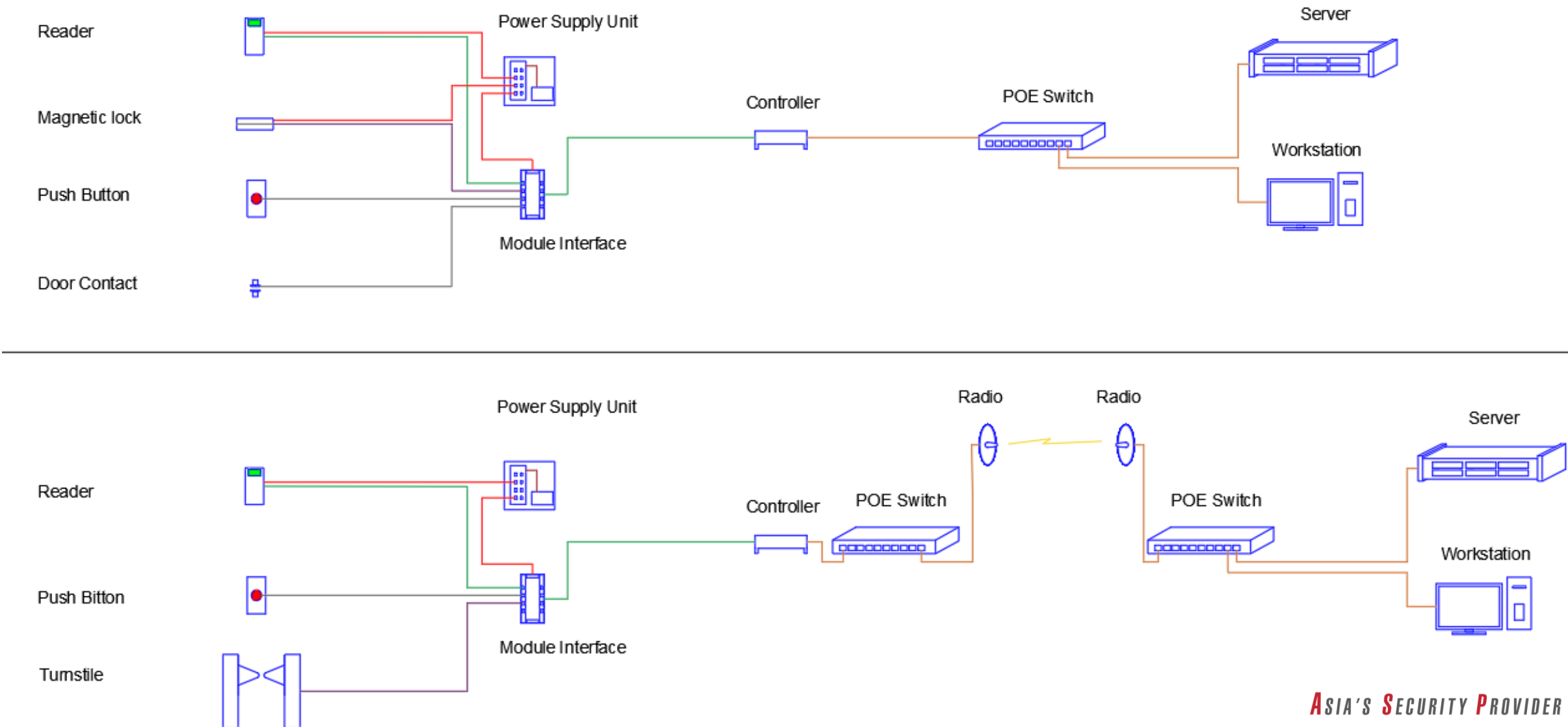
Specs.:
- **22, 32, 42, 48, 55, 65, 80 inch**
- **LED / LFD**
- **Wall mount with bracket**
- **HDMI/VGA port**
- **Indoor / Industrial**

Access Control System
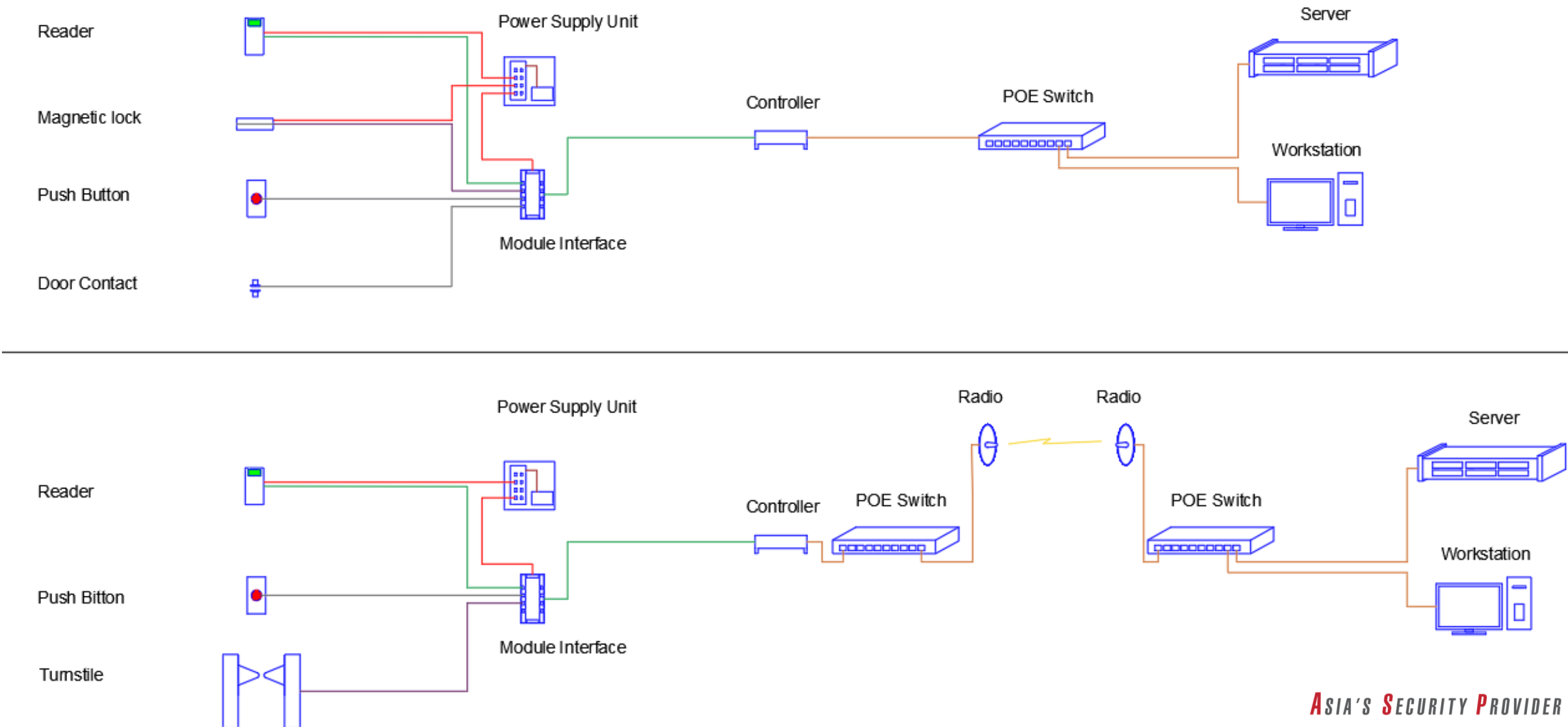## Simplified Diagram

Access Control Connection

Legend:
- TF Wire for Power
- STP Cable for Readers – Modules - Controller
- THHN Wire for Input Devices
- UTP / LAN Cable for Network / Wireless network
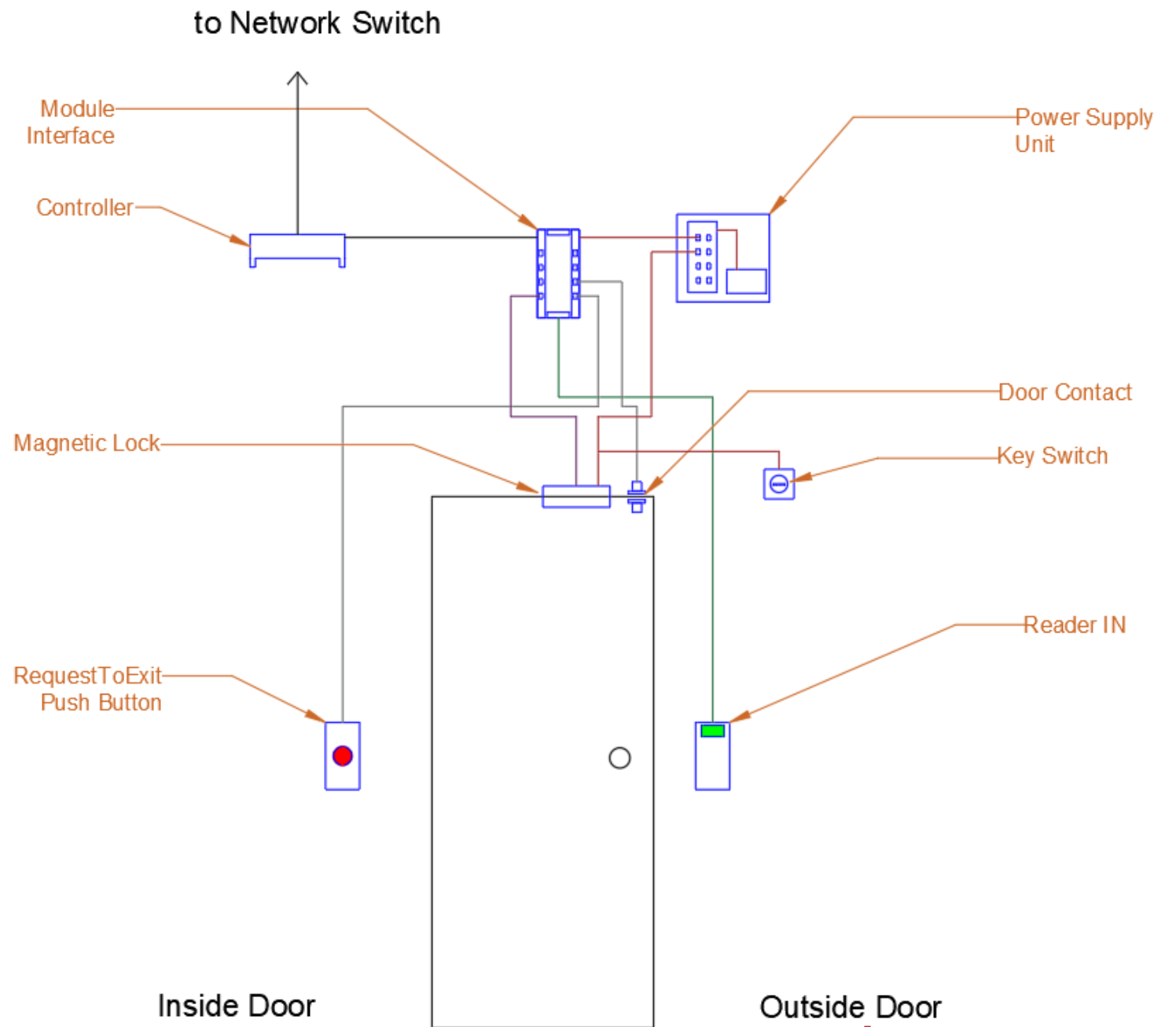- THHN Wire for Output Devices

Diagram 1:
Reader — Power Supply Unit — Module Interface — Controller — POE Switch — Server / Workstation
- Reader
- Magnetic lock
- Push Button
- Door Contact

Diagram 2:
Reader — Power Supply Unit — Module Interface — Controller — POE Switch — Radio ⟷ Radio — POE Switch — Server / Workstation
- Reader
- Push Bitton
- Turnstile

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Access Control Connection

Reader
Magnetic lock
Push Button
Door Contact

Power Supply Unit
Module Interface
Controller
POE Switch
Server
Workstation

Reader
Push Bitton
Turnstile

Power Supply Unit
Module Interface
Controller
POE Switch
Radio
Radio
POE Switch
Server
Workstation

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Access Control Hardware

Single Door Configuration

Door Configuration
- 1 x Magnetic Lock
- 1 x Door Contact (Recessed Mount Type)
- 1 x Reader-IN
- 1 x Push Button to Exit – OUT
- 1 x Kill Switch
- 1 x Module Interface (Reader Module)
- 1 x Controller
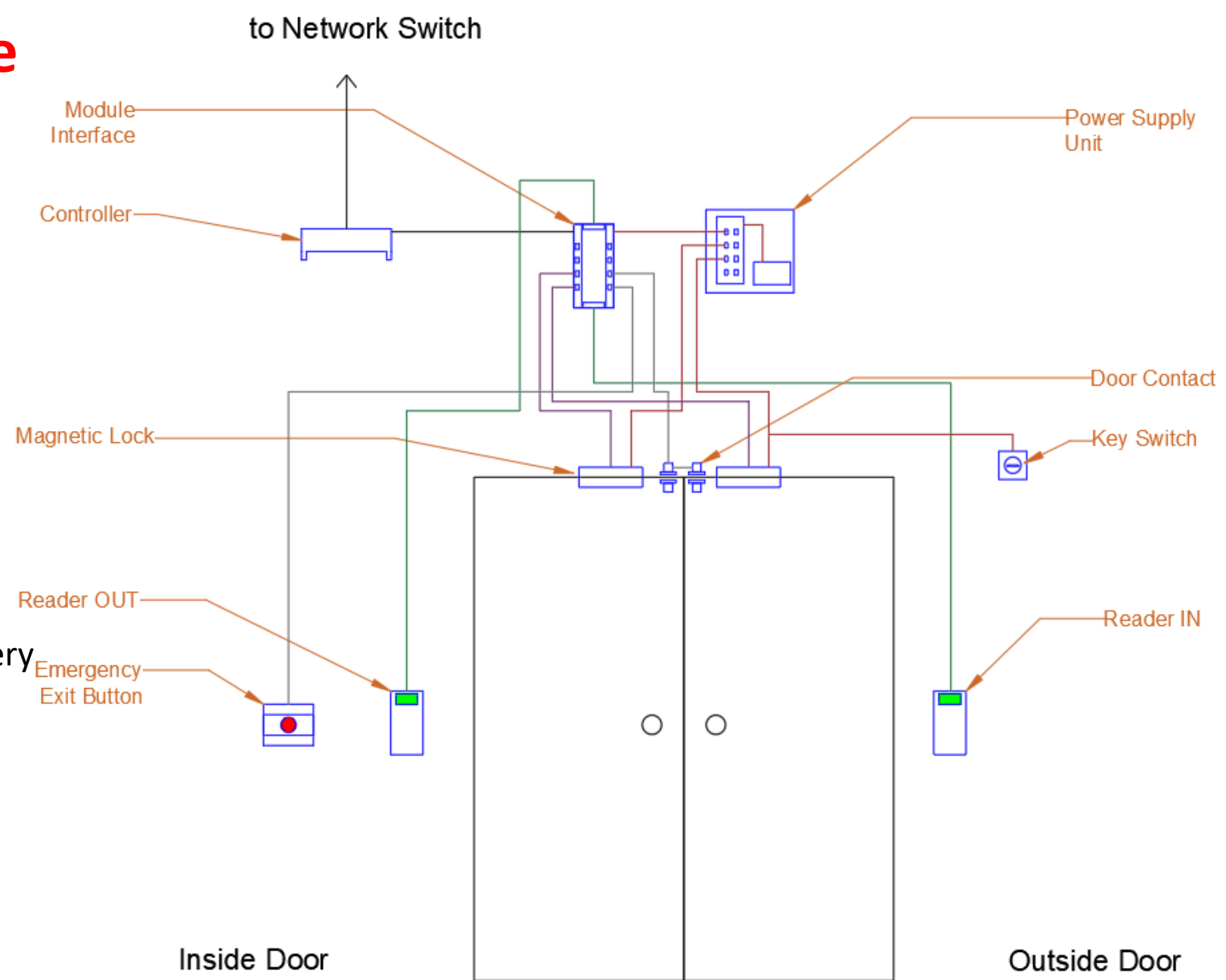- 1 x Power Supply Unit with Back-up Battery

to Network Switch

Module Interface

Controller

Power Supply Unit

Magnetic Lock

Door Contact

Key Switch

Request To Exit Push Button

Reader IN

Inside Door

Outside Door

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Access Control Hardware
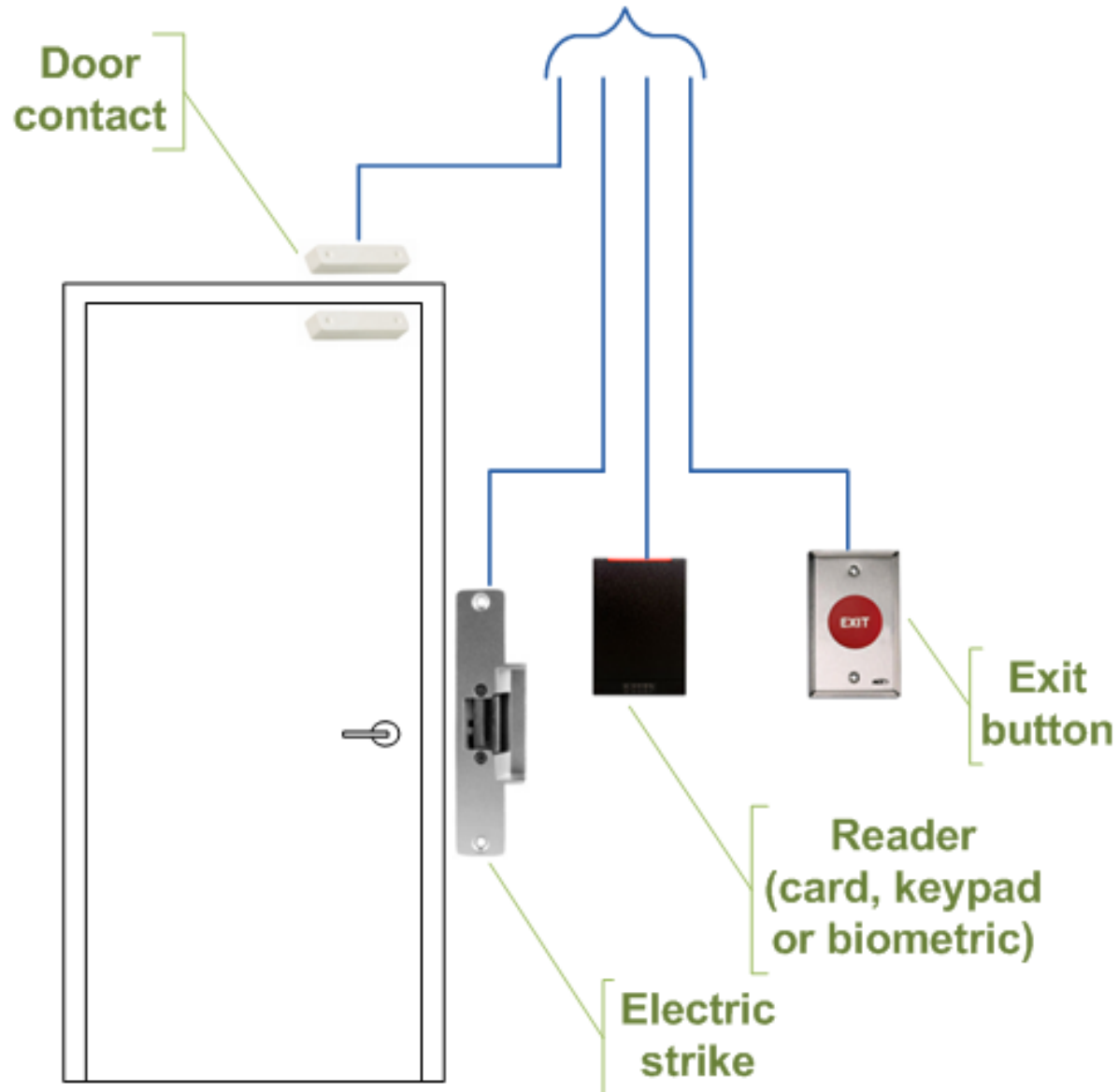
Double Door Configuration

Door Configuration
- 2 x Magnetic Lock
- 2 x Door Contact (Recessed Mount Type)
- 2 x Reader-IN and OUT
- 1 x Kill Switch
- 1 x Emergency Exit Button (Break-Glass)
- 1 x Module Interface (Reader Module)
- 1 x Controller
- 1 x Power Supply Unit with Back-up Battery

to Network Switch

Module Interface

Power Supply Unit

Controller

Door Contact

Magnetic Lock

Key Switch

Reader OUT

Reader IN

Emergency Exit Button

Inside Door

Outside Door

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To Module and Controller

Door contact

Exit button

Reader (card, keypad or biometric)

Electric strike

Other Common Access Control Hardware

Single Door Configuration

- Electric Strike Lock
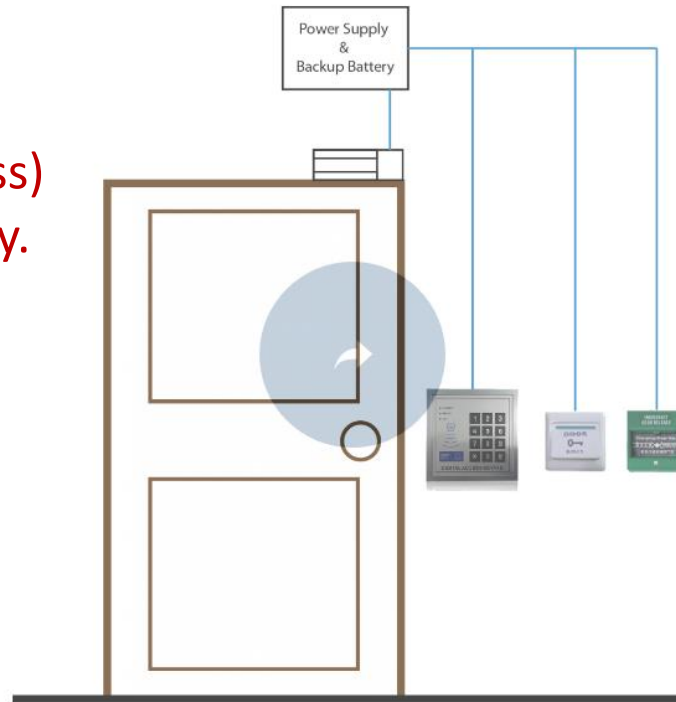- Door Contact (Surface Mount Type)
- Reader-IN
- Push Button Out

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Standalone
Access Control

Door Configuration:

- Single Door
- Reader/Biometrics Reader Controller
- Electromagnetic lock
- Door button
- Emergency exit button (break-glass)
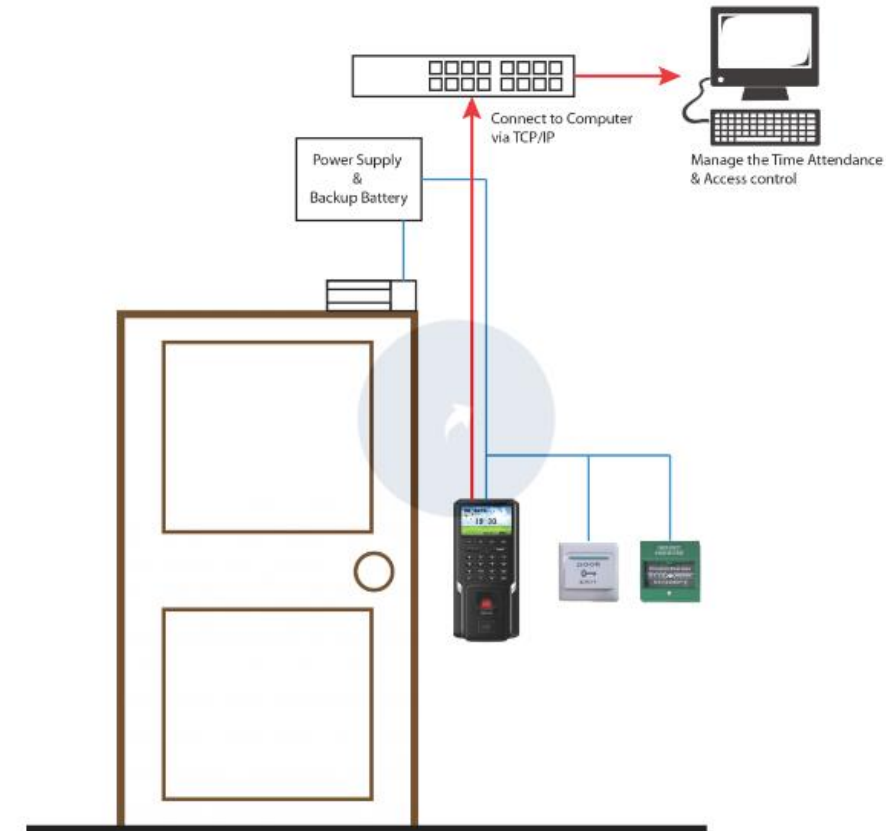- Power supply with back-up battery.

1

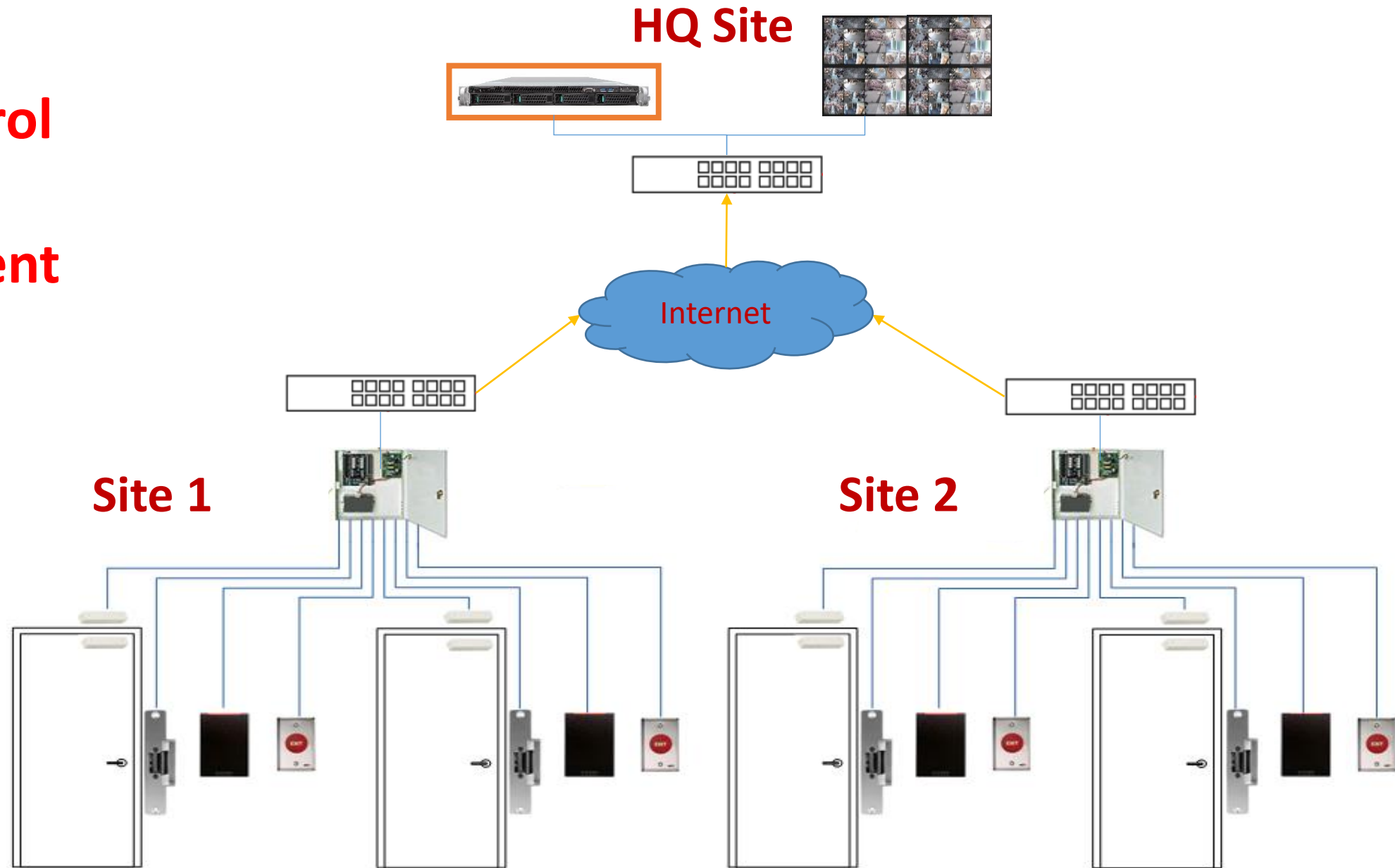Standalone Door Access
Control System via Reader
Controller Device

2

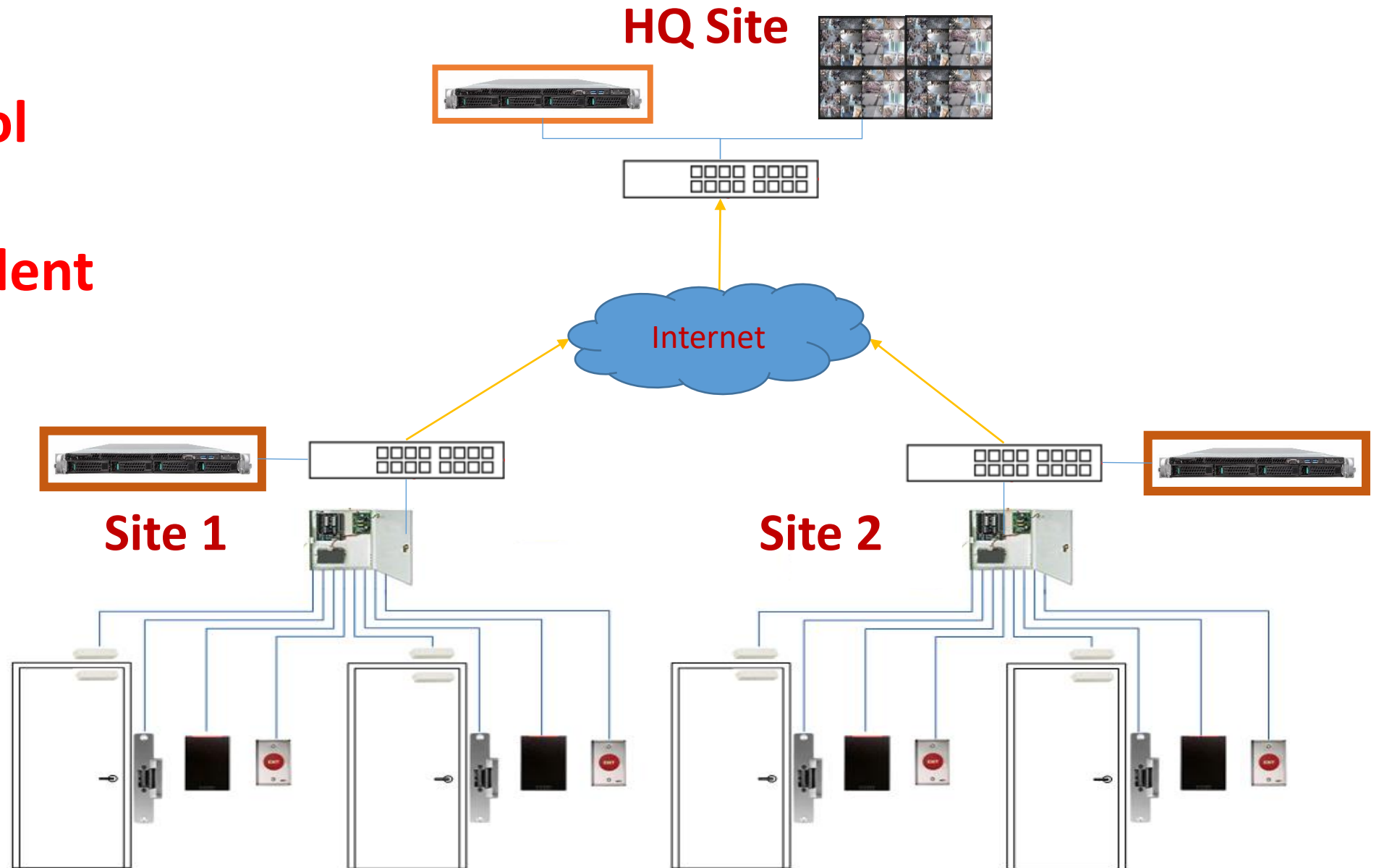Standalone Door Access
Control System via
Biometrics Controller Device

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Centralized Access Control

HQ Dependent

HQ Site

Internet

Site 1

Site 2

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Terminology

Terminology

EM Lock

An **electromagnetic lock**, **magnetic lock**, or **maglock** is a locking device that consists of an electromagnet and an armature plate. There are two main types of electric locking devices. A fail-secure locking device remains **locked** when power is lost. Fail-safe locking devices are unlocked when de-energized.

Drop Bolt Lock

For Double Action Doors , Electric drop bolts are specially designed for use on double action doors. They can also be installed on both out and in-swinging doors.

Electric strike

Is an access control device used for doors. It replaces the fixed **strike** faceplate often used with a latch bar (also known as a keeper). Like a fixed **strike**, it normally presents a ramped surface to the locking latch allowing the **door** to close and latch just like a fixed **strike** would.

Mortise locks

A specific type of lock set which are used in the commercial security industry and is used in applications which require a lock which is both heavy duty and high frequency.

Fail safe vs Fail secure Definition:

Fail safe The lock unlocks when power is removed
Fail secure: The lock unlocks when power is applied

Proximity cards

Are part of the contactless **card** technologies. Held near an electronic **reader** for a moment they enable the identification of an encoded number. The **reader** usually produces a beep or other sound to indicate the **card** has been read.

Smart Card

A card containing a microchip that can store significantly larger amounts of data than a standard magstripe or proximity card. Bank account details, Social Security Numbers and employee identification numbers are examples of data that can be stored on a Smart Card.

Terminology

Access Card
A card, generally the size and shape of a credit card, containing encoded data. The data can be encoded in a variety of ways, sometimes including more than one encoding technology. (i.e. Magnetic Stripe, Proximity, Smart Card, Wiegand.)

Wiegand
A communication protocol widely accepted as an industry standard in the manufacturing of access control equipment. Wiegand data is typically the protocol used between the reader and the host panel.

Open Supervised Device Protocol (OSDP)
Is an access control communications standard developed by the Security Industry Association (SIA) to improve interoperability among access control and security products.

Disarm
The act of disabling or shunting a security system or portions of the system to ignore input signals that normally result in alarms. Disarming can occur with user intervention, such as pass codes entered into a keypad, or on schedule through a PC based Access Control System.

InterLock Feature
An **interlock** is a feature that makes the state of two mechanisms or functions mutually dependent. It may be used to prevent undesired states in a finite-state machine, and may consist of any electrical, electronic, or mechanical devices or **systems**.

Door Held
A door held alarm is the resulting logical alarm that occurs at a portal when the door was opened after a valid access transaction or a valid.

Door Held Time
The length of time that a portal can remain open after a valid access transaction or valid REX signal before a door held alarm is generated. (Also Door Open Time.)

Door Forced
A door forced alarm is the resulting logical alarm that occurs at a portal when the door is sensed to be in an open state without an associated valid access card transaction or an associated REX signal.

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Terminology

Duress Alarm (Panic Button)
A device, such as a push button or pull station, connected to a security system to signal an alarm when an individual is threatened or forced to do something. Bank Clerks typically have a duress alarm installed beneath their counter to signal robbery attempts.

Anti-passback
Commonly used at any entrance-exit doors. This requires that a card reader be installed on both the inside and the outside of the door. Personnel are required to both "card-in" when they enter the building and "card-out" when they leave the building. The anti-passback feature is also commonly used with turnstiles.

Man Trap
A method used to provide strict access control by preventing access at one specified entrance while another entrance is being utilized. Typically two doors, separated by an enclosed spaced, are interlocked. When one door is opened the second door is incapable of being opened.

Card Readers
Access control card readers are used in physical security systems to read a credential that allows access through access control points, typically a locked door. An access control reader can be a magnetic stripe reader, a bar code reader, a proximity reader, a smart card reader, or a biometric reader.

Biometrics
A family of products that electronically scans or reads unique traits of the human body for verification or identification purposes. Biometrics can utilize unique patterns of the iris, retina,hand geometry, or fingerprint.

Biometric Reader
A device that stores enrolled templates of a unique human trait such as a fingerprint, hand geometry, voice, or retina pattern and looks for a match against a live presentation, to grant access to a secure area. Used as an alternate to card readers.

Terminology

PIR sensor
A passive infrared sensor is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They **are** most often used in **PIR**-based motion detectors.

Door Contact or Door Switch Monitor (DSM)
A device, typically a magnetic based contact, installed in a door to detect the position of the door. The signal from a DSM is connected to a security system to report conditions such as "FORCED" and "HELD" and in instances where electrified locking hardware is included, relocking of the door.

Piezo Sounder
A **buzzer** or **beeper** is an audio signalling device, which may be mechanical, electromechanical, or **piezoelectric** (**piezo** for short).

Request to Exit (REX)
A device used to disable a door alarm, thus allowing valid exit through an access controlled door. Usually a motion detector but can also be a pushbutton.

Turnstile
A mechanical gate consisting of revolving horizontal arms fixed to a vertical post, allowing only one person at a time to pass through.

Boom Barrier
A *boom barrier*, also known as a *boom gate*, is a bar, or pole pivoted to allow the *boom* to block vehicular access through a controlled point. Typically the tip of a *boom gate* rises in a vertical arc to a near vertical position. *Boom gates* are often counterweighted, so the pole is easily tipped.

Tailgating
Following an authorized and credentialed person through an access control point without having or using a separate valid credential.