Electro-Mechanical Hardware

Presented by
HMA Consulting, Inc.
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Overview

- Basic Electrical Circuit
- Electro-Mechanical Components
- Applications
Electrical Basics

The first step to confidence
Electrical Basics

The Basic Circuit

- Power Supply
- Conductor
- Switch
- Load
Electrical Basics

- **Conductors**
  - Wires Connecting All Other Components of the Circuit
  - May Be Solid or Stranded
  - Must Be Sized According to Load and Power Supply Manufacturer’s Recommendations
Electrical Basics

Switches

- **Momentary**
  - Functions similarly to a buzzer push button

- **Maintained**
  - Functions similarly to a light switch
Electrical Basics

Components That Act As Switches

- Push Buttons - Usually Momentary
- Key Switches - Momentary or Maintained
- Key Pads - Momentary or Maintained
- Card Readers - Momentary or Maintained
Other Switch Terminology

- Normally Open
  - Requires action to close the circuit
- Normally Closed
  - Requires action to break the circuit
Loads

- Components that perform actions
- Types of loads and their applications will be discussed in the next section
Electro-Mechanical Components

Building Blocks for Integrated Systems!
Electro-Mechanical Components

- **Power Supplies**
  - Non-intelligent
    - Transformer
    - Line Voltage
  - Intelligent
    - Regulated Power Supply
    - Fire Alarm Circuit
    - Seismic Sensor Circuit
    - Water Flow Sensor Circuit
Electro-Mechanical Components

- Power Transfers
  - Purpose
    - Transfer power from frame to door
  - Examples
    - Electric Through-Wire Hinge
    - Electric Power Transfers
    - Door Loops
Electro-Mechanical Components

Electric Through-Wire
Hinge

Stanley CE
Electro-Mechanical Components

Electric Power Transfer

Precision EPT
Electro-Mechanical Components

Electric Latch Retraction Exit Devices

- Purposes
  - Provide electric dogging in fire-labeled and non-labeled applications
  - Provide momentary latch retraction for card reader or keypad access control systems
  - Provide momentary latch retraction for automatic door operators
Electro-Mechanical Components

Electric Latch Retraction Exit Devices

- “Beware”
  - Fire labeled devices with electric latch retraction require a fire alarm contact connected to the power supply
  - Some electric latch retraction devices require time delay to allow for slowly retracting latch bolts
  - Some electric latch retraction devices require dedicated power supplies
Electro-Mechanical Components

Electric Latch Retraction Exit Device

Precision ELR Exit Devices
Electro-Mechanical Components

Electric Locks and Exit Devices

- **Purpose**
  - To electrically lock or unlock secure side trim

- **Types**
  - Fail-safe - Apply electricity to lock
  - Fail-secure - Apply electricity to unlock

- **Uses**
  - Stairwell doors where access is required under fire alarm conditions - Fail-safe
Electro-Mechanical Components

Electric Locks and Exit Devices

- Key pad or card reader access
- Timed unlocking of doors that you wish to remain latched
- Fire rescue entries - Fail-safe
Electro-Mechanical Components

30HW ELECTRIFIED SPECIFICATIONS

Best electromechanical locks provide a way to lock or unlock a door from a remote location for safety, convenience, or security. Best offers the 8KW/9KW cylindrical and 34HW/35HW mortise locks in fail-safe or fail-secure operation. These locksets can be controlled by an individual switch, switch lock, relay, access control or other automatic control system. As expected, the 8KW/9KW and 34HW/35HW electromechanical locks exhibit the same features and meet the same specifications as our standard 8X9XK cylindrical and 34H/35H1 mortise locksets.

NOTE: 8KW/9KW Electromechanical locksets are intended for use on 1-3/4 minimum thick doors. Consult your local BEST office when installing 8KW/9KW electromechanical locksets on doors less than 1-3/4 thick.

Types:
- 24 volts AC or DC — 0.75 amps
- EU: Electrically Unlocked (Fail Secure)
- EL: Electrically Locked (Fail Safe)

Approval Listings:
- UL listed for CYSQ Electrically-controlled singlepoint locks or latches.
- This product has been approved by the California State Fire Marshal (CSFM) pursuant to section 13144.1 of the California Health and Safety Code.
- Approved by the city of New York Board of Standards and Appeals under calendar number 49-88-SA. See CSFM listing No. 4136-1175.101 for allowable values and/or conditions to use concerning materials presented in this document. It is subject to re-examination, revisions and possible cancellation.

NOTE: A Temperature Control Module (TCM) may be needed when a lockset is energized for long periods of time. The TCM must be ordered separately for EU functions, but is automatically included with 34HW/35HW EL functions.
Electro-Mechanical Components

**E2103 Electric Rim Device**
The Electric Rim Device controls entry by remote locking or unlocking of the outside trim. In addition to a 24 VDC solenoid, the exit device is also equipped with a SPDT single pole double throw switch. The switch monitors the outside trim (locked or unlocked).

The device is furnished as Fail Secure (FSE). When power is off the trim is locked. Power is applied to unlock the trim. May be field converted to the Fail Safe (FS) mode. Specify (FS) or (FSE) mode when ordering. Specify outside trim with “08” function. The outside key cylinder retracts the latchbolt for mechanical override. If outside cylinder (mechanical override) is not required, specify outside trim with “14” function.

**E2103K Kit**
To convert E2103, FL2103 devices to E2103K, FLE2103 devices in the field. The Kit includes Trim locking assembly and Electric “E” locking assembly.

**Electrical Ratings:**
- Switch rated to 2 Amps at 24 VDC SPDT
- Solenoid current draw: 0.3 Amps.

**To Order:**
- Device: specify prefix “E” (e.g., E2103 x FSE x 008A)
- Kit: specify Kit No. (e.g., E2103K x FSE)

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**E2303 Electric Mortise Device**
The Electric Mortise Device controls entry by remote locking or unlocking of the outside trim. In addition to a 24 VDC solenoid, the mortise lock is also equipped with a SPDT single pole double throw switch. The switch monitors the outside trim (locked or unlocked).

The device is furnished as Fail Secure (FSE). When power is off the trim is locked. Power is applied to unlock the trim. May be field converted to the Fail Safe (FS) mode. Specify (FS) or (FSE) mode when ordering. Specify outside Trim with “08” function. The outside key cylinder retracts the latchbolt for mechanical override. If outside cylinder (mechanical override) is not required, specify outside trim with “14” function.

**Field Conversion**
To convert E2303, FL2303 devices to E2303K, FLE2303 devices in the field a Electric Mortise Lock is required. Specify EM303, EM303F, LSE303 or LSE303F (see below for Electric Mortise Locks).

**Electrical Ratings:**
- Switch rated to 2 Amps at 24 VDC SPDT
- Solenoid current draw: 0.2 Amps.

**To Order:**
- Device: specify prefix “E” (e.g., E2303 x FSE x 008A)

**Note:** The exit device can be used as a conduit for wiring to the hinge side of the door.
Electro-Mechanical Components

- Magnetic Locks
  - Purpose
    - Prevent door from being opened when energized
  - Types
    - Direct Hold - magnetic field directly holds strike to magnet
    - Shear - magnetic field moves strike over protrusion in lock
Electro-Mechanical Components

- Magnetic Locks
  - Uses
    - High frequency access control situations
    - Never as the only lock on a fire door
    - Never on a means of egress without special provisions
Electro-Mechanical Components

Surface Mounted Magnetic Lock
Electro-Mechanical Components

Shear Lock
Electro-Mechanical Components

Electromagnetic Door Holder/Release

- **Purpose**
  - To hold open a door with a closer - usually a fire door

- **Types**
  - Wall mounted
    - Surface
    - Recessed
  - Floor mounted
Electro-Mechanical Components

- Electromagnetic Door Holder/Release
  - “Bewares”
    - Do not use wall type when door opening degree is between $110^0$ and $179^0$
    - Power should be provided by fire alarm circuit when used on a fire door
    - Holder acts as a door stop - be certain that door is under control
Electro-Mechanical Components

**Electromagnetic Door Holder/Release**

![Diagram of Electric Door Holder](image)
Electro-Mechanical Components

- Electric Strikes
  - Purpose
    - To allow a door to be pulled open without retracting the latch bolt
  - Types
    - Fail Secure - Only type that may be used on a fire door
    - Fail Safe - Uses are rare - Double cylinder locks, etc.
Electro-Mechanical Components

Electric Strikes

- Uses
  - Card reader and keypad access control systems
  - Desk console access control systems
Electro-Mechanical Components

“Bewares”

- Fail-safe may not be used on fire doors.
- Match strike with lock type
- Strike may have to be moved vertically to maintain standard lock height
Electro-Mechanical Components

Electric Strike
Electro-Mechanical Components

- Signaling and Monitoring Devices
  - Uses
    - Security monitoring
    - Automation of other electro-mechanical functions
    - Authorized request to exit - inhibits alarm
    - Tamper monitoring
  - Types
    - Door position switch concealed in hinge
      - Magnetic
Electro-Mechanical Components

- **Signaling and Monitoring Devices**
  - Push switch
    - Excellent aesthetics, poor security - door may be left ajar without tripping switch
  - Lock and Exit Device Monitor Switches
    - Request to exit switch
      - Monitors exit device push pad
    - Latch bolt monitor switch
      - Monitors exit device latch position
  - Monitor Strikes
    - Used as door position switch
    - May be incorporated into electric strike
Electro-Mechanical Components

- Signaling and Monitoring Devices
  - Electromagnetic Door Position Switch
    - Concealed
    - Surface Mounted
  - Key Switches
    - Allows authorized user to inhibit or reset alarms, turn system off or on
Electro-Mechanical Components

- **Automatic Operators**
  - **Purpose**
    - To open door automatically providing accessibility to facility
  - **Uses**
    - Accessible building entrances
    - Accessible interior doors
    - Specialty applications
Electro-Mechanical Components

Automatic Operators

- Types
  - Low Energy
    - ANSI A156.19
  - High Energy
    - ANSI A156.10
  - Swing Door
  - Slide Door
  - Revolve Door
Electro-Mechanical Components

Automatic Operator

Security & Safety Systems

TTX2000
Electro-Mechanical Components

- **Specialty Devices**
  - **Delayed Egress Exit Devices**
    - Prevent unauthorized egress - pilferage or escape
    - 15 Second delay - actuate push pad for 15 seconds while alarm sounds before latch bolt will retract
    - Other delay times available with letter from Authority Having Jurisdiction
    - Most are UL listed for panic and may be listed for fire exit hardware
    - Many electrical options on board - card reader interface, etc.
Delayed Egress Exit Devices

- “Beware”
  - Building must have sprinkler system and/or fire alarm system
  - All Authorities Having Jurisdiction must recognize NFPA 101 - Life Safety Code Section 5-2.1.6 “Special Locking Arrangements”
  - Must have dedicated power supply with fire alarm contact
  - Some delayed egress systems may not be UL listed for panic or fire exit hardware
Applications

ELR Application Charts

Simultaneous Pair of Doors

Two Independent Pair of Doors

Notes:
1. Push buttons can be replaced with Cool Breaker push buttons.
2. Use a 15-amp circuit breaker.
3. Electric Door Operators are not recommended for remote locations.
4. The Power Supply must be connected to the appropriate Power Source.
5. The Power Supply must be connected to the appropriate Power Source.