



Electro-Mechanical Hardware

Presented by
HMA Consulting, Inc.
WMA, Inc.



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**



Electrical Basics

□ Other Switch Terminology

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



Electrical Basics

□ 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 Loop s**

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


- “Bewares”**

- 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

ELECTRIC LATCH RETRACTION



Available for all Series Devices

The ELR option provides remote Latch Retraction of exit devices. Continuous duty solenoids retract the Latchbolt(s) for momentary unlatching or continuously for egress. The ELR feature can be interfaced with automatic door operators, card readers, push buttons, toggle/key switches, and fire alarm systems.

- ELR option **REQUIRED** ELR150 Series Power Supply (see page 22).
- U.S. Listed for Panic and Fire for Class II Circuits.
- ELR can be used in combination with all Apex options including Hic Key or Cylinder Drogging. ELR option is not available for (CE) Delayed Egress Devices.

Door Widths: 3' Devices - 27" to 30" Door
4' Devices - 31" to 40" Door

The Power Supply model number is determined based on the number of devices requiring electrical power.

ELR150 - Power Supply, no control modules
ELR151 - Power Supply including (1) control module to control (1) exit device
ELR152 - Power Supply including (2) control modules to control (2) exit devices
ELR153 - Power Supply including (3) control modules to control (3) exit devices
ELR154 - Power Supply including (4) control modules to control (4) exit devices

To order power supply with Battery Backup specify suffix BT (e.g. ELR151BT)

To order, specify prefix "ELR" (e.g. ELR2100)

ELR Conversion Kit

A standard device can be retrofit to the Electric Latch Retraction option by ordering the kits listed below. A ELR Conversion Kit **REQUIRES** a ELR150 Series Power Supply (see page 22).

To Order:

| | |
|----------------------------|-------------------|
| Wide Side Devices | |
| 3'-0" | ELRK-3, ELRK7-3 |
| 4'-0" | ELRK-4, ELRK7-4 |
| Narrow Side Devices | |
| 3'-0" | NELRK-3, NELRK7-3 |
| 4'-0" | NELRK-4, NELRK7-4 |

- Power may be supplied through a 4-wire continuous circuit hinge (urnished by others).

Solenoid Specifications:

| | |
|--------------------------------|--------------------|
| Current Pulse (2 seconds max.) | 4.75 Amp. |
| Continuous | 3.8 VDC / 0.6 Amp. |

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

- Uses - Continued
 - 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 8K/9K cylindrical and 34H/35H 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 GYQS 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 for use concerning material 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.



30HW Mortise Electrically-Operated Lockset

Electric Lock
Best W Series

Electro-Mechanical Components

ELECTRIC DEVICES



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 standard 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. (FS) - power is applied to lock the trim. 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 2103, FL2103 devices to E2103, FLE2103 devices in the field. The Kit includes Trim locking assembly and Electric "E" locking assembly.

Electrical Ratings:

Switch rated to 2 Amps at 24VDC SPDT
Solenoid current draw: 0.3 Amps.

To Order:

Device: specify prefix "E" (e.g. E2103 x FSE x 3908A)
Kit: specify Kit No. (e.g. E2103K x FSE)



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 standard 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. (FS) - power is applied to lock the trim. 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 2303, FL2303 devices to E2303, FLE2303 devices in the field a Electric Mortise Lock is required. Specify EM303, EM303F, LSEM303 or LSEM303F (see below for Electric Mortise Locks).

Electrical Ratings:

Switch rated to 2 Amps at 24VDC SPDT
Solenoid current draw: 0.2 Amps.

To Order:

Device: specify prefix "E" (e.g. E2303 x FSE x 3908A)

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

Electric Exit Device

Precision E Device



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

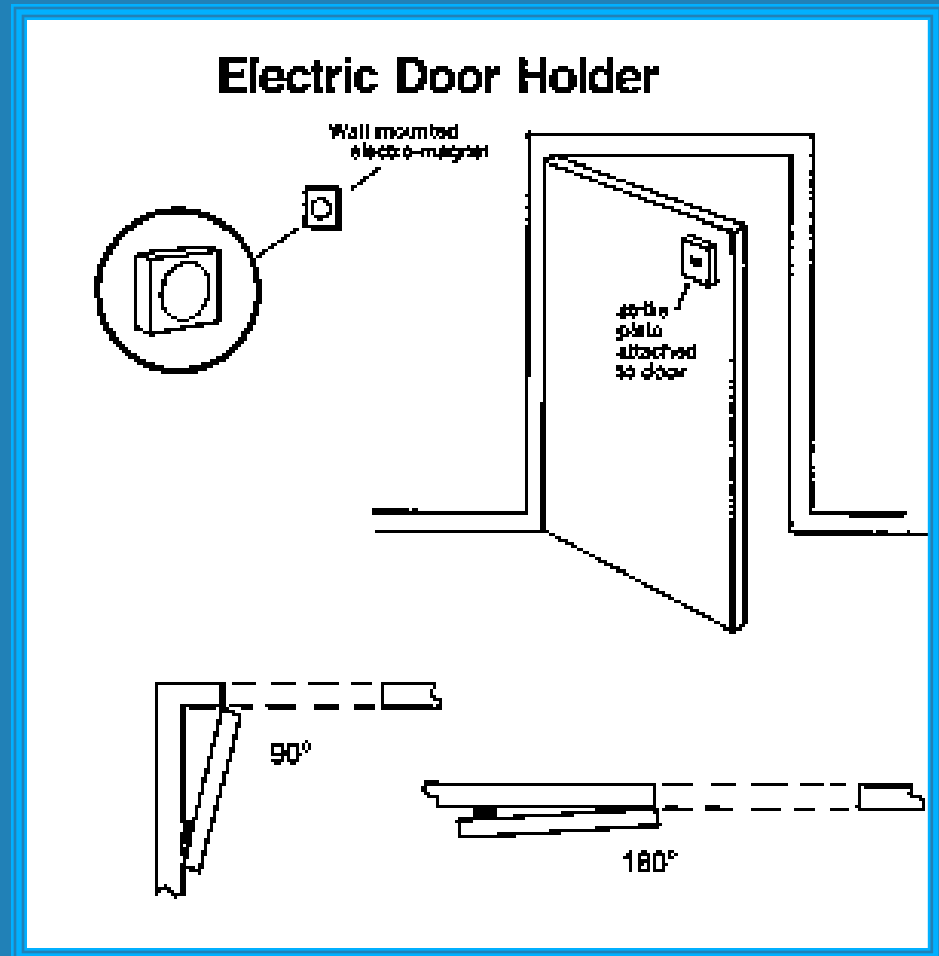
□ Electromagnetic Door Holder/Release

- “Bewares”

- Do not use wall type when door opening degree is between 110° and 179°
- 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





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.**

Electro-Mechanical Components

□ Delayed Egress Exit Devices

- “Bewares”

- 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

Pressing the push button releases the brakes on each cabinet. When both cabinets have reached bottom, the control modules release power applying with a dual contact to open the doors. The door open signal is kept until expired by the Time Delay feature on the Control Module.

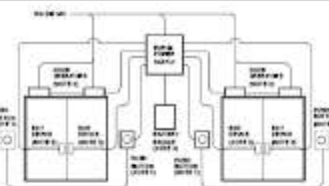
4 CONNECTIONS (24VDC) WITH TRANSFORMER REQUIRED.
24VDC TRANSFORMER RATED 100VA OR GREATER. 24VDC
CABLES ARE SHOWN IN RED ON PAGES 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.



Two Independent Pair of Doors

Each pair of doors are operated by pressing a push button which releases the brakes on each cabinet. When both cabinets have reached bottom, the control modules release the power applying with the dual contact to open the doors. The door open signal is kept until expired by the Time Delay feature on the Control Module.

4 CONNECTIONS (24VDC) WITH TRANSFORMER REQUIRED.
24VDC TRANSFORMER RATED 100VA OR GREATER. 24VDC
CABLES ARE SHOWN IN RED ON PAGES 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.



Notes:

1. Push button may be replaced with Call Button, Ring Pull, etc., providing necessary open contacts and/or change inputs. See change indicators in the BURTRONICS instructions.
2. Interlocks for Four Operations are provided by 24V contact on the Control Module. (2) wires must be run from the Power Supply to each operator requiring control.
3. Push and release signals (2) wires to control line due to the right to proper gaps and new run.
4. When Battery Backup is used, (2) 12 gauge wires, less than 5 feet long, connected between the power supply enclosure. Battery Backup has a Power Top feature that can provide a new to a Call Button, Ring Pull button, etc. See page 23 for details.

| WIRE GAUGE (FOOT) | VOLTAGE | |
|-------------------|----------------------------|----------------------------|
| | 20 ON OR POWER TRANSFORMER | 24 ON OR POWER TRANSFORMER |
| 16 | 75 | 85 |
| 18 | 125 | 75 |
| 12 | 250 | --- |