

Fail Safe vs. Fail Secure Electronic Locksets

Introduction

To address the wide range of functions in research facilities and the requirements for life safety and security, the two designations associated with electronic locks are fail safe and fail secure. There are many factors to consider for determining the correct designation.

Fail Safe vs. Fail Secure

All electronic door locks are power activated; The terms “safe” and “secure” indicate the condition of the door on the secure side (key side, outside). Fail safe or fail secure refers to what happens when the door controller has failed and/or there is no power to the unit. Fail safe means when no power is applied the door is unlocked; fail secure means when no power is applied the door is locked.

Key Aspects for Design Considerations

Fail-secure locks should be used for most doors except where quick entrance is needed in emergency situations. The default position prevents the circumvention of the security system. A key override may allow access by emergency personnel; otherwise emergency personnel will use the necessary tools to allow entry during emergencies.

Note that there are situations, principally high-security functions, where doors may be electrically locked even on the egress side unless credentials are scanned.

Typically fail secure items use less power because they only require power to unlock the door. Fail safe products require continual power consumption.

Device Types

Electric strikes

An electric strike replaces the mechanical strike in a lockset to electrically control access. For electric strikes on fire-rated doors, fail secure strikes must be used, per NFPA 80. Fail secure strikes are typical, except when access is required by a fire alarm. There are only a few situations where access upon fire alarm is required. The use of an electric strike does not affect access by the fire department; they can gain access with a key or access-control credential in the key box or a tool.

Electromechanical Locks

An electromechanical lock is a lockset which has been electrified so it can be controlled by a card reader, remote release, or other access control device. Most allow free passage all the time and fail safe in an emergency.

A fail secure electromechanical lockset is locked on the secure side when there is no power to the lock. To unlock it, power is applied, and

the lever can then be turned to retract the latch. The latch remains projected until the lever is turned.

Electrified Panic Hardware

Electrified panic hardware typically works on the opposite side of panic hardware or fire exit hardware, as a lever operated trim. However, since it's on the opposite side of the door, whether it is required to be fail safe or fail secure differs based on a project's requirements.

Electrified Latch Retraction (EL) and Electromagnetic Locks

An electric latch retraction is a function on panic hardware or fire exit hardware that allows for latch retraction when power is applied; when there is no power, the latch is extended. Electric latch retraction functions are therefore fail secure. The touchpad of the panic hardware provides free egress. EL devices can be used on fire doors to allow push/pull function during normal use and provide positive latching during a fire alarm; a signal from the fire alarm system to the power supply is required for this application. Electromagnetic locks are typically fail safe, requiring a release device to allow for egress (e.g. a request-to-exit switch in panic hardware, pushbutton actuator and sensor combination, or fire alarm/sprinkler system trigger).

Determination

For electronically locked doors, it is necessary to coordinate with the appropriate Authorities Having Jurisdiction (AHJs). The Division of the Fire Marshal is the fire and life safety AHJ for NIH-owned facilities, and the Division of Physical Security Management is the security AHJ for all NIH facilities, including leased. In general, all doors serving high value or hazardous areas, including animal research and biocontainment facilities, shall be fail secure while meeting egress requirements. Specialty labs shall be assessed individually to meet the requirements of safety, security, and containment.

Conclusion

Before selecting access control hardware for a specific location, ensure that its function meets the programmatic requirements of the users, AHJs, and all applicable codes.

Consideration shall be given as to whether the hardware will be used on an interior, exterior, or fire rated door, as well as the relevant life safety regulations, security requirements, and the function of the facility.

Reference

- NFPA 101 Life Safety Code – Ch. 7 - Means of Egress
- NFPA 5000 Building Construction and Safety Code – Ch. 11 - Means of Egress
- NFPA 80 Standard for Fire Doors and Other Opening Protectives – Ch. 6 – Swinging Doors with Builders Hardware

*Updated 8/5/2020

