by Kerby Lecka

MagLock Holding Force – Security & Application

Electromagnetic locks are virtually problem-free, as long as you follow the manufacturer's installation instructions, and in most cases, allow the armature to be free to float

» *SDC 1511 electromagnetic lock*

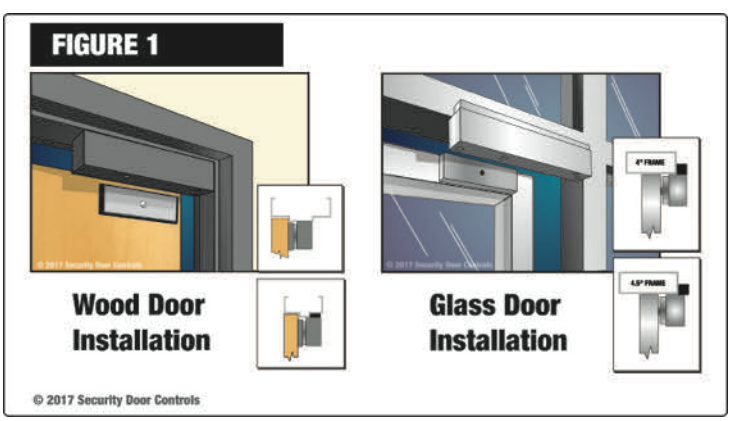
Electromagnetic locks are highly reliable, long-lasting units compared to other electric locking devices because there are no moving parts involved in their operation. They are also the staunchest of fail-safe units because there is no mechanism that can cause sticking and binding. The versatility of electromagnetic locks allows them to be used almost anywhere electric strikes and electric bolt locks are used, but with these feature advantages:

- Most secure device
- Most fail-safe device, easily adapts to meet Fire Safety requirements
- Durability – no moving parts, minimally effected by overvoltage
- Minimal maintenance
- Well adapted to poorly fitted or poorly hung doors

Holding Force & Battery Backup

Electromagnetic locks may be concealed (shear) or exposed (surface mount). Regardless of the configuration, careful concern should be given to the choice of holding force and the need for battery back-up when using electromagnetic locks for many access control applications. Manufacturers provide many choices available in different holding force and design applications. (See Chart)

Battery backup is recommended to compensate for the inherent fail-safe operation in applications with higher security requirements, particularly on interior doors. When installed on perimeter doors, building and safety codes require magnetic locks to release during a building power loss and signal from the life safety system command center.



Surface Mount Application: Traffic Control

Any magnetic lock with a holding force less than 1200 lbs. should only be used for traffic control, as would a light or medium duty electric strike. A holding force of 650 lbs. (Figure 1) is typical for most magnetic locks fit for traffic control and they may be easily defeated. However, this is a benefit compared to the use of light duty electric strikes. As the electric strike may break when forced; a low holding force magnetic lock will release without damage and the door will simply relock when closed.

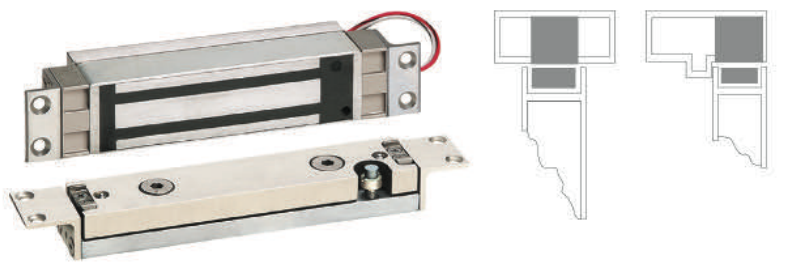
Medium Security

Magnetic locks mounted on an aluminum glass door are capable of providing medium security because the glass door is more likely to shatter before a lock with 1200 lbs. of holding force will release. For this reason, a lock with 1200 lbs. of holding force is sufficient for aluminum and glass openings and many commercial interior installations where aggressive attacks are not

Holding Force & Security Level

Holding Force (lbs)	Configuration	Security Level
650	Surface Mount	Traffic Control
1200	Surface Mount	Medium Security
1650	Surface Mount	High Security
2000	Shear or Surface Mount	High Security
2700	Shear or Surface Mount	High Security

FIGURE 2



expected, such as openings made of metal frames and wood or hollow metal doors.

High Security

It is important to note that the term 'high security' is used only in the context of a fail-safe magnetic door lock application, which cannot compare to the integrity provided by electromechanical locking devices, such as fail-safe and fail-secure electrified locksets, electric deadbolts or heavy-duty electric strikes.

For most commercial and industrial high security applications with Herculite glass doors or hollow metal frames with wood or hollow metal doors, an electromagnetic door lock with at least 1500 lbs. of holding force is recommended. When attacked with extreme force, these doors may not release, but may sustain damage.

While many installers may feel that 1200 lbs. of holding force is ample for any installation, it must be noted that when these locks are overcome with force, the door will simply close and relock, with no one the wiser about the security breach. For example, in psychiatric facilities, aggressive patients have been known to force open doors equipped with 1200lbs. holding force magnetic locks. It is not uncommon for some facilities to upgrade to a 1650 lbs. holding force electromagnetic lock after experiencing more than one breach.

Concealed (Shear) Electromagnetic Locks

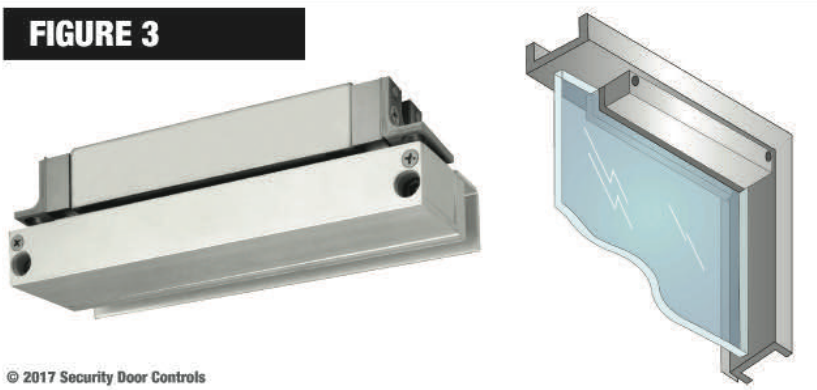
Shear magnetic shear locks (Figure 2) are generally used for openings that require an architecturally superior appearance. When installed on openings with hollow metal frames and wood or hollow metal doors, a magnetic shear lock with a holding force of 2000 lbs. or more is capable of withstanding a force that will deform or destroy the door beyond repair before it is released. However, when installed on glass doors, the contact point between the armature and magnetic lock will be exposed to tampering on both sides of the opening.

Shear locks have more critical alignment issues than typical surface mount magnetic locks. A valuable tip for trouble free shear lock installation is the use of a Positive Centering or Heavy Duty door closer for double acting aluminum glass and Herculite doors. Standard duty double acting door closers may tend to swing back and forth before resting and eventually become misaligned, requiring frequent adjustment servicing. To eliminate this problem, the installation of a heavy duty closer causes the doors to quickly rest in the center position and greatly reduce service calls. This is something that can be installed easily by most locksmiths or door professionals.

Semi-Concealed (Shear)

Semi-Concealed Shear magnetic locks (Figure 3) accommodate offset hung glass doors, plus they provide a high security alternative to standard surface mount magnetic locks when used on hollow metal frames with wood or hollow metal doors. At the same time, they still provide superior appearance while the magnet is concealed in the frame and only the small armature housing is surface mounted to the top of the door.

FIGURE 3



Surface Mount (Shear)

Almost half the size of a typical surface mount electromagnetic lock, surface mount Shear magnetic locks (Figure 4) provide a higher level of security for glass doors or metal door and frames.

Electromagnetic locks are virtually problem-free. Typically, problems arise right after installation. Ninety-five percent of the time, the problem is either improper voltage input or an improperly mounted armature. Be sure to follow the manufacturer's installation instructions, and in most cases, allow the armature to be free to float.

The overall benefits of electromagnetic locks versus other electric locking devices are that they allow fire safety requirements to be easily met while providing security and access control for a building's occupants. As always, consult the local Authority Having Jurisdiction (AHJ) for compliance requirements governing your door project.

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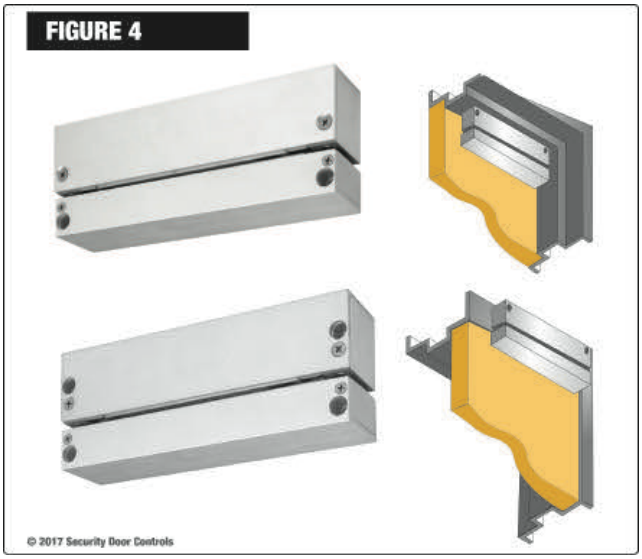
FIGURE 4



Photos and Illustrations courtesy of SDC.

John L Schum's Electronic Locking Devices from Butterworths Publishers, Geoff Craighead's High-Rise Security and Fire Life Safety from Butterworth-Heinmann, and Rick Geringer's Whitepapers: Magnetic Locks, Chapter 2 from SDC, were used as a reference for some content.