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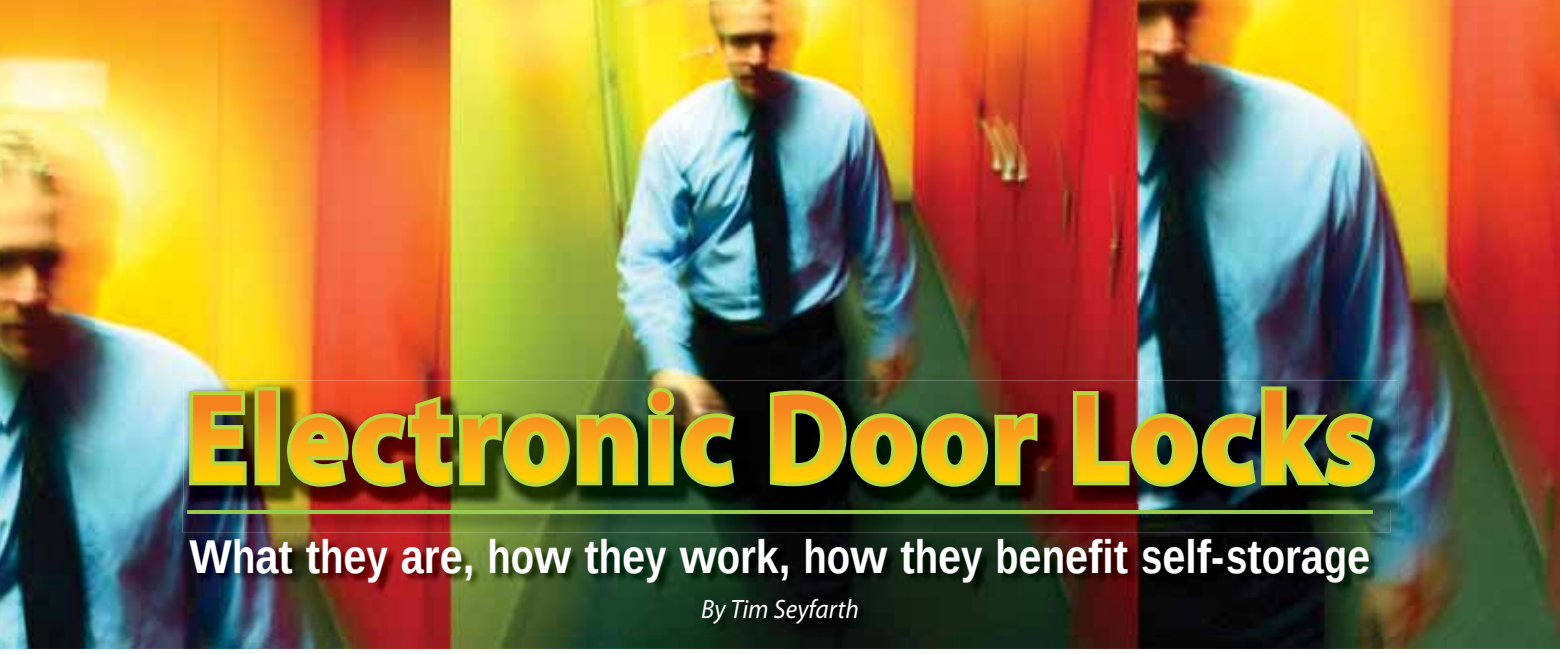


Electronic Door Locks

What they are, how they work, how they benefit self-storage

By Tim Seyfarth

Self-storage experiences growing demands from customers for increased convenience, security and accessibility. The industry is also under mounting financial pressure due to increasing fixed and variable costs. To compete, many owner/operators are entering the era of automation with technologies such as electronic door-locking systems that can supplement or even replace onsite management teams.

There are many solutions for remotely renting units, assigning gate codes and accepting payments, including call centers, the Internet and onsite, rent-it-yourself kiosks. But while these products offer options for renting units and accepting payments, they don't completely alleviate the manager's role. Typically, 10 percent to 15 percent of a self-storage site will be overlocked at any given time. The challenge for unattended operations or those that wish to reduce staffing requirements is how to apply and remove overlocks.

The practice of overlocking is the first line of defense an operator has to protect his collateral—his tenants' property as described in the lease. Without a reliable means of applying the overlock, the past-due tenant, although not permitted to enter through the gate using the keypad, may easily tailgate into the property and remove his belongings, leaving nothing but a dirty unit for someone to clean.

Another common challenge operators and managers face when renting units through a source other than a manager is new tenants may occupy an incorrect unit or more than the ones they paid for. This leaves the manager with the task of cutting the lock (since those units are supposed to be vacant) and ascertaining who's stuff is in there—not to mention the serious legal issues posed!

A third problem is tenants may find vacant, unlocked units and use them as trash bins when no one is watching.

Electronic Locks to the Rescue

Electronic door locks solve these and other problems by being the onsite "always locked" overlock. With an electronic system, units are unlocked only when a tenant has entered a valid PIN at the entry keypad; overlocks are removed only when permission has been granted by the self-storage management system.

Overlocks become automatic. Just as a lockout message is supplied to a past-due tenant at the gate, the units for past-due tenants are never unlocked until the management system provides permission to the access/alarm/overlocking system. It works in exactly the same fashion as a standard gate interface. Of course, the manager or owner always has manual control over the site via the graphical user interface provided with the lock-control software (or via the Internet for an offsite owner/operator).

A screen shot showing manual lock controls.

The electronic overlocking system doesn't stop there. It's an active individual-door-alarm system as well. Each electronic lock continually monitors the position of the door and transmits this information to the computer once every second, not just when an event takes place, as most alarm systems do. If a door latch is opened or the door has been forced open, if the tenant has not entered his gate code or has tailgated in, the electronic lock reports this as an alarm condition to the computer. A siren is activated, sounding the alarm.

Remember, however, that it is always the tenant's responsibility to put his own lock on his unit too. The additional presence of an electronic lock does not relieve him of that responsibility, nor does it remove lock sales as a source of revenue from your business.

The author's son showing a unit with both a cylinder lock and e-lock.

How They Work

Electronic door locks are used for three primary purposes:

- To secure the collateral of the site owner.
- To provide individual unit alarm security.
- To increase security for the tenant by providing a supplemental lock to his existing cylinder lock.

In practice, a tenant arrives at the gate. He enters his PIN into the keypad. If he's not past-due (and, therefore, not locked out), the gate will open, the computer will instruct the lock on each his units to unlock, and the alarm will be temporarily disabled.

If the tenant is past-due and an overlock order has been given by the management system, the keypad will display a message such as, "Your account is past due. Please use our kiosk or see the manager to make a payment." Even if the tenant tailgates into the property behind another customer, he will not be able to access his unit, since the electronic overlock is applied.

The alarm feature works like any other individual door-alarm system, sounding an alarm when a unit's door is opened and the tenant has not entered his PIN at the entry keypad. The electronic-lock software goes further by being able to sound an alarm when the door opens or closes.

When a valid tenant leaves the facility, he normally enters his PIN into the exit keypad. The computer then instructs the lock on each of his units to return to the locked position and the alarm is enabled. The software also re-locks and re-arms the unit after a preset period of time (designated by the owner via a setting within the program). So even if a tenant doesn't enter his PIN at the exit keypad, the unit becomes protected again automatically.

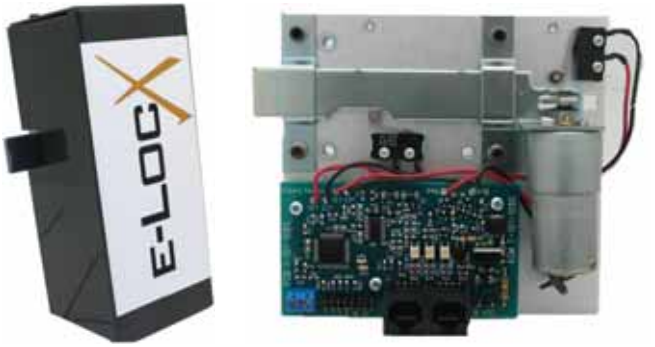
The system can also tell the owner or manager when a problem appears to exist in a unit's door-contact switches. Other features include not allowing the unit to lock if the system thinks the door is open. These and many more settings are fully adjustable by the owner or site manager.

Models Available

Electronic locking systems come in two standard varieties. One is for mounting inside of the unit on the right-hand roll-up door bracket. This model locks either the axle or the drum, preventing rotation or rolling of the door. The other is external and mounts to the door sill at the top right or left of the unit and locks the door curtain itself. This makes it ideal for retrofitting into existing properties where units are already rented.

Both models include features that monitor the position of the door to:

- Prevent the lock from actuating when the door is open.
- Send an alarm signal to the computer whenever a door opens or closes.
- Advise the manager of a possible faulty magnetic door switch.



Two lock models, courtesy of Global Electronics Ltd.

Integration and Off-Site Owner Access

The software that monitors and controls the electronic overlocking system can be run standalone or integrated with all major property-management systems. It can further be integrated with a kiosk. For example, Page Rush, of Cornville Country Storage in Arizona, integrated the electronic-lock security software with his management software, a self-storage kiosk and Internet tools. This allows him to access his sites' systems remotely from his fishing cabin!

Page Rush of Cornville (Ariz.) Country Storage uses electronic locks as part of a remote-management system that lets him do more fishing!

Installation

The process for installing electronic locks is simple and adopts common self-storage practices. The main locking unit is mounted to the right-hand door bracket using three high-strength socket-head cap screws and lock nuts. The "U" is specially made and heat-treated to specific hardness, allowing the part to withstand abuse. It's held in place with a single bolt that goes through the door axle.

Communication between the lock and the lock controller (which can handle up to 128 locks) travels through RS485 cable on two wires and power on another pair. They're daisy-chained, a common practice in the self-storage industry for keypads and wired alarm systems.

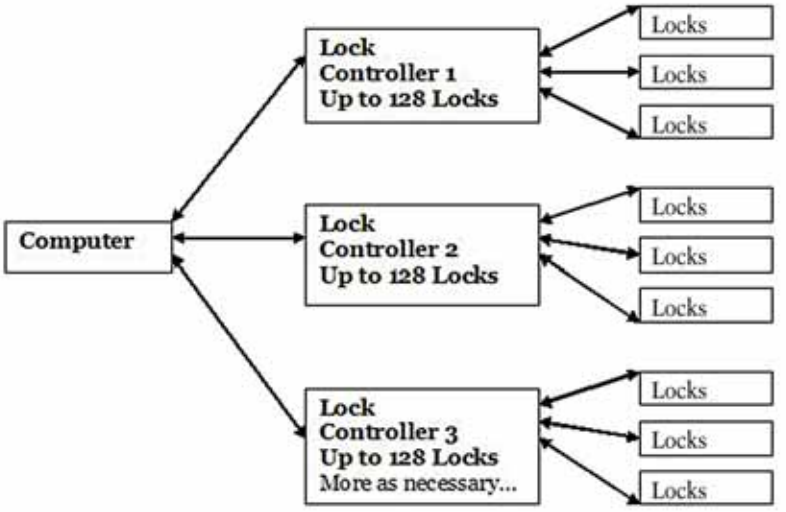
Control is distributed from the computer to one or more lock controllers (think multiplexers). These, in turn, poll each lock. A lock controller can poll 128 locks in about one second. Remote devices including the lock controller are polled up to 14 times per second! This very fast communication provides one level of positive control over the locking system. Another is the system's use of acknowledgements between devices so data is not lost during transmission.

Special Features

The electronic overlocking system has many features for redundancy, backup and fail convenient. The locks, although not prone to failure, have several built-in methods for unlocking and failing conveniently. Recognizing that the site must continue to operate even when a catastrophic failure has taken place, the system is designed to continue to allow valid tenants access to their units.

Upon detecting an AC power outage, the system uses an Intelligent Power Supply (IPS) to provide many hours of battery-backed operation. Using settings within the software, it may scramble unlocking for all units that are not in a lockout status, then monitor them as an alarm-only system—until the AC power returns.

Other system controls include the overriding of door-contact switches. For those that may be inoperable, the system can override the door-open signal and lock anyway.



Electronic door locks are helping self-storage operators maintain better control of their properties and achieve greater remote access and independence. Their use in the industry will become more prevalent as facilities adopt technology to compete in the marketplace and satisfy customer requirements for high security. **ISS**

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