

# HIGHER STANDARDS

For Magnetic Contacts

Needed As Security

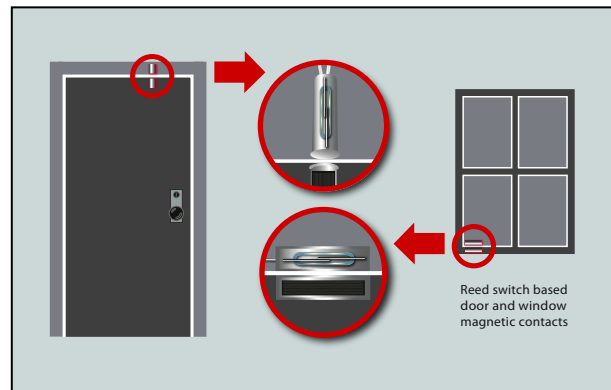
Vulnerabilities Are Exposed

WHITE PAPER

## INTRODUCTION

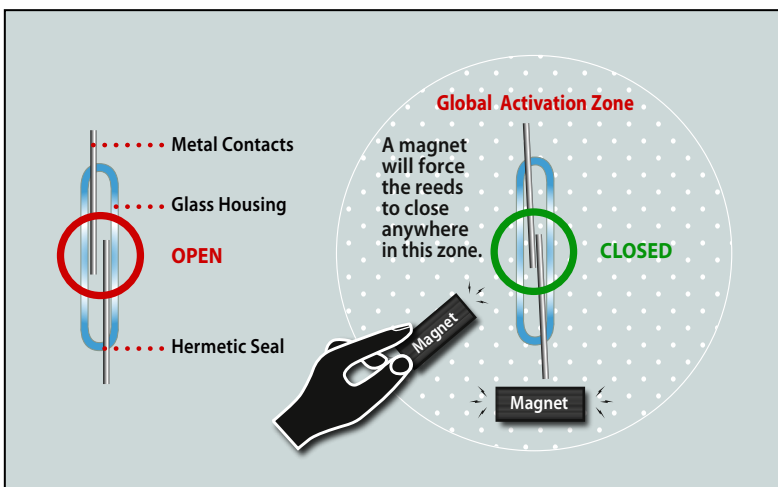
The reed switch magnetic contact serves as the first line of defense in the vast majority of all security systems. Its sole function is to detect unauthorized access through doors and windows. Despite its widespread acceptance, a vulnerability in the way a reed switch magnetic contacts operates may allow an intruder to easily bypass detection if successfully exploited. Construction weaknesses may also present unacceptable security risks.

The reed switch security vulnerability presents a serious threat to a home owner's security and a public relations and legal nightmare to the security system dealer. While all standard reed switch magnetic contacts can be exploited and bypassed – affordable and effective countermeasures are available and recommended. New and existing security system owners should be made aware of the potential risks and be given the opportunity to upgrade their systems if desired.

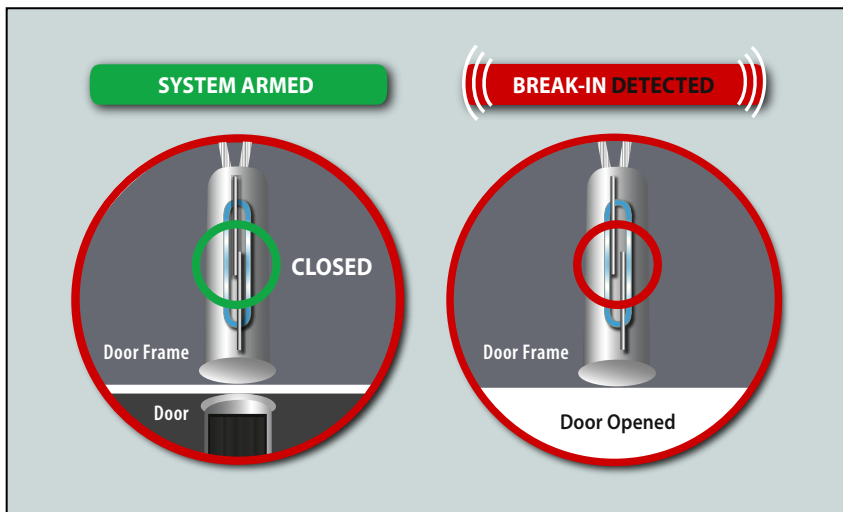


## HOW A REED SWITCH MAGNETIC CONTACT WORKS

Invented in the 1930's by Bell Laboratories for telecommunications applications, the reed switch has since been adapted for use in security systems as the inexpensive and generally reliable, switching device that (when coupled with a magnet) detects the opening and closing of doors and windows.



Reed switches work by magnetic induction. In the normal open position, the permeable reed-like blades remain separated. They are globally magnetic and will respond to the strongest magnetic field anywhere around the switch. As a result, when a magnet approaches the switch, the contacts pull together or close, completing an electrical circuit. Once the magnetic field is removed, the contacts are able to separate, and the circuit is reopened.

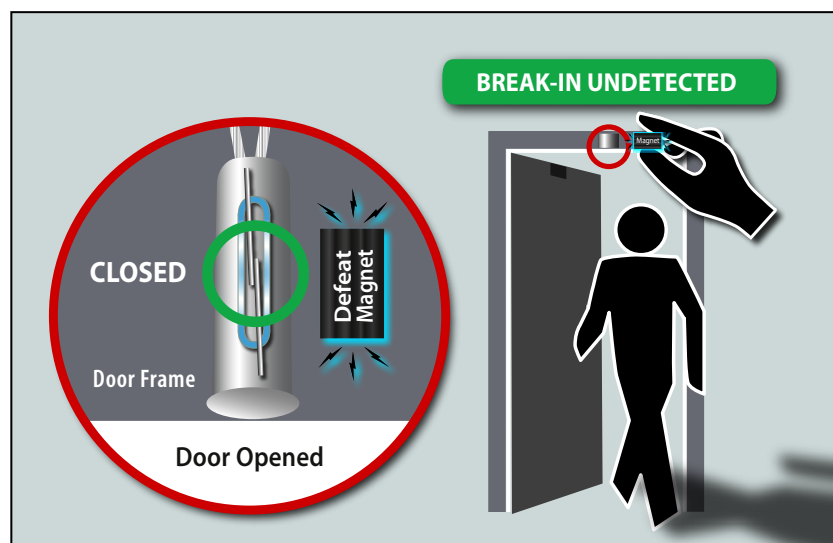


In security systems, the reed switch is enclosed in one half of the contact and an actuating magnet is enclosed in the other. When a security system is armed, the actuating magnet in the closed door (or window) keeps the reed contact blades closed. When the door (or window) is opened and the magnetic field is removed, the contacts will separate and trigger an alarm indicating a security breach.

### EXPLOITABLE SECURITY HOLE: MAGNETIC DEFEAT

Armed with a simple magnet, intruders can defeat reed switch magnetic contacts, bypass the security system, and enter almost any home undetected. Reed switch contacts can be easily defeated because they respond indiscriminately to the strongest magnetic field near the switch – not just the magnet that was intended to operate the switch. If a more powerful defeat magnet was placed near the switch, an intruder could override the weaker field in the original magnet and enter the premises undetected without opening the circuit and triggering an alarm.

It should be noted that in order to successfully defeat a reed switch contact, the location of the switch of the actuating magnet must first be determined. This can be accomplished with the help of a small compass. Once discovered, an intruder can be assured that a stronger magnetic field placed near the reed switch will allow undetected entry when the door or window is opened.

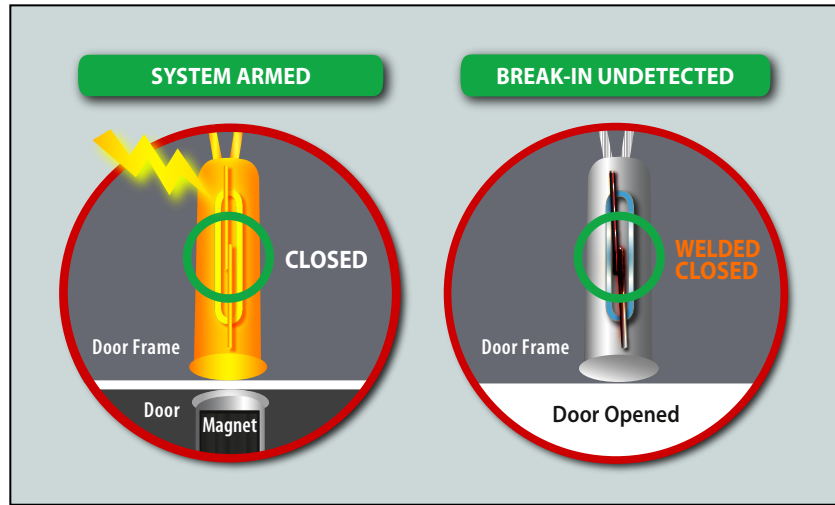


### CONSTRUCTION VULNERABILITIES: CONTACT WELDING AND BREAKAGE

The reed switch magnetic contact also has two well known construction vulnerabilities which may undermine its effectiveness and ability to maintain a security systems first line of defense. High voltage discharges from lightning, power surges, or stun guns can permanently weld reed switch magnetic contacts in a failed-closed position, rendering a security system useless when it is armed. Once the metal contacts are welded shut, the door or window contacts will indicate a secure state even when the system is armed and an opening is breached.

Since reed switches are made of fragile glass, extreme care needs to be taken when handling them - from initial manufacture through assembly into their

housings. Even if semi-flexible potting compounds are used, a reed switch contact could break by naturally occurring thermal expansion and contraction in doors and windows. Like welded contacts, broken contacts could also indicate a false secure state which could result in undetected break-ins.



### REED SWITCH MAGNETIC CONTACT: SERIOUS SECURITY THREAT

The most important function of a home security system isn't to prevent loss of property - but to protect the lives and safety of the people at home. Yet, the entire system is built around a reed switch magnetic contact that can be easily defeated with a simple magnet. At the heart of every security system lies trust; trust that the system is going to work when you really need it. Indeed, the reed switch operational flaw and construction vulnerabilities undermines that trust and puts the homeowner at risk - potentially compromising the integrity of the entire security system and the dealer that failed to warn them of the danger.

While the reed switch bypass technique may have been known by only the most sophisticated criminals in the past, it can be easily discovered in great detail on the internet. Compounding the threat to a system owner's security is the fact that the technique can be easily learned, requires no special skills or tools, and can be executed quietly and quickly without drawing anyone's attention.

Medeco, the industries leading high security lock manufacturer, cites statistics which indicate that nearly two thirds of all break-ins occur with no sign of forced entry. They concede that some of these break-ins may have resulted from an unlocked door, but they also believe that lock bumping (a new lock picking technique) or the use of an unauthorized duplicate key might be the cause. If homeowners knew that the majority of household locks could get ‘bumped open’ in a matter of seconds, and that the only thing between them and an intruder was a pair of reed switch magnetic contacts that could also be defeated - would they still trust their security system?

### **SECURITY VULNERABILITY: FULL DISCLOSURE**

Most security experts would agree that not disclosing the reed switch vulnerabilities poses a greater risk to security system owners than keeping it a secret. Why? Because if the system owner is not aware of the potential problem, they can't fix it. In turn, the criminals that are aware of the hole can continue to exploit it to their advantage without a serious countermeasure in place. Disclosing the vulnerability levels the playing field between the criminals and law-abiding security system owners.

### **SECURITY DEALER LIABILITY: FAILURE TO WARN**

While there is no evidence to suggest that the reed switch bypass technique is being widely used, the fact is - it can be easily done and the customer should be made aware of the risks. Security dealers that fail to disclose the reed switch vulnerability may be liable damages in burglaries in which the system was bypassed.

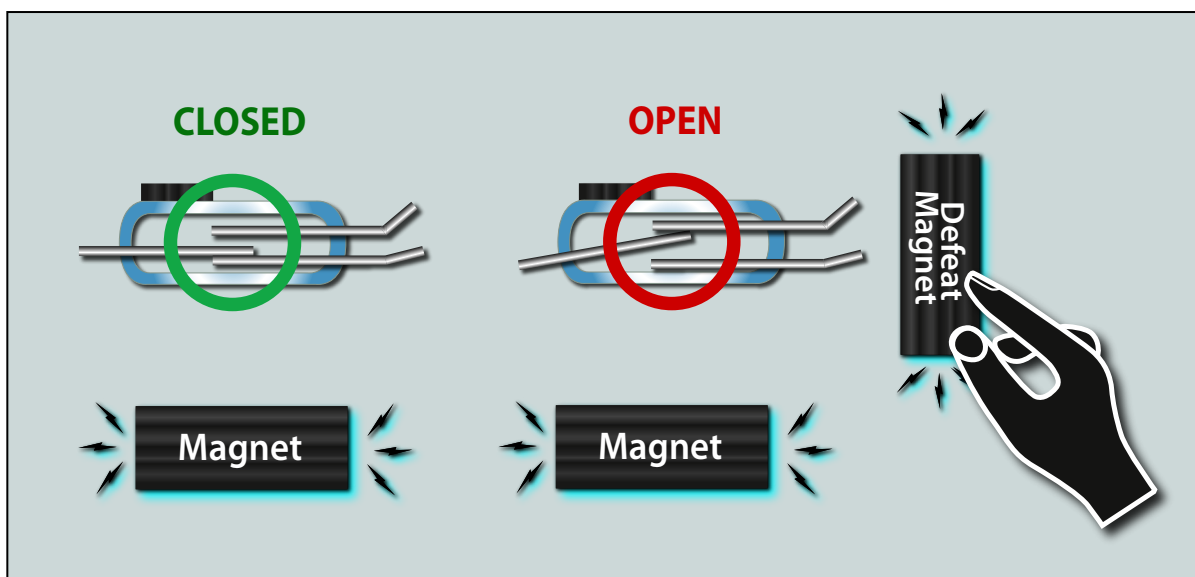
The Utah Supreme Court recently ruled that a security dealer has a duty to warn its customers of “known hazards and defects” with its products. In the case of DCR, Inc. v. Peak Alarm Co., the court concluded that the security dealer should have warned its customers of a well know deactivation technique – given that an affordable and effective remedy against the technique was available. As a result, damages in excess of the dealer's limitation of liability clause were awarded to the plaintiff.

### **RECOMMENDATION: UPGRADE TO HIGHER SECURITY**

Security dealers should treat the reed switch security vulnerability very seriously, by offering all new and existing customers an opportunity to upgrade to magnetic sensors that provide greater protection and are not easily defeated or bypassed by criminals. The biased (balanced) magnetic reed contact and the new Magnasphere® security sensor are two alternatives offering this higher level of protection.

While these devices offer significantly higher security performance, they are also cost effective. Educating customers on the features and benefits of these two enhanced detection devices will enable them to assess their own risk and make better security decisions. In turn, dealer liability might be mitigated in the event of an incident in which the customer declined the high performance magnetic sensor in favor of the standard device.

### HOW A BIASED MAGNETIC CONTACT WORKS

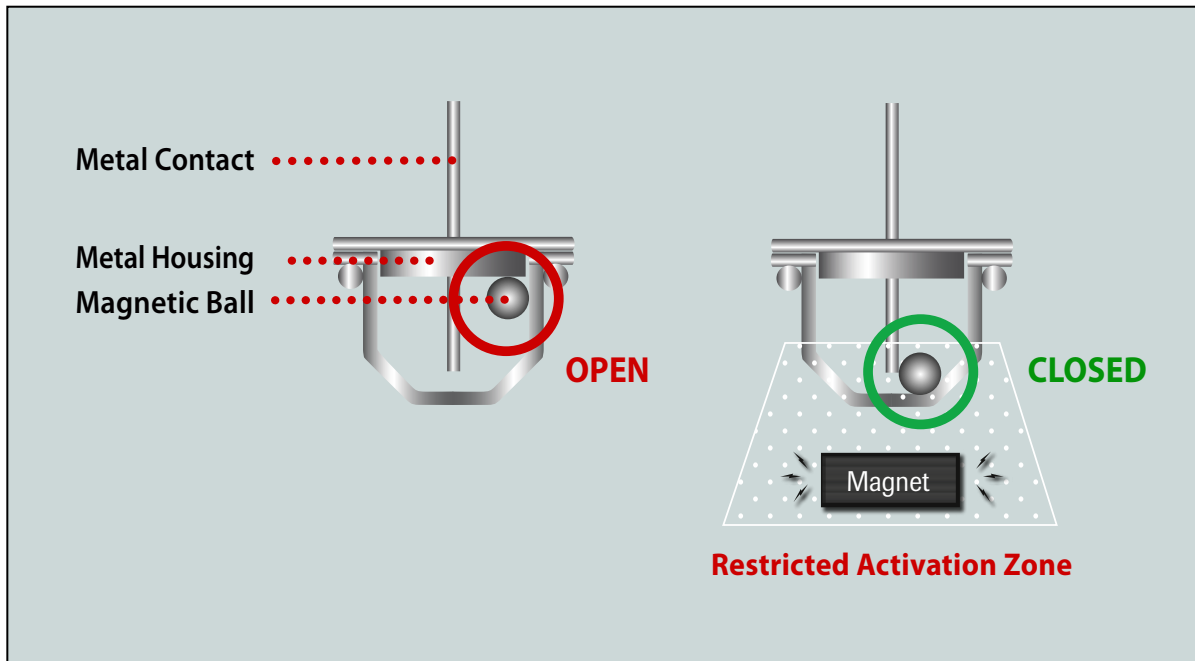


Biased magnetic contacts provide enhanced resistance to magnetic defeat by way of an additional magnet (called the bias magnet) located adjacent to the switch. When the door (or window) is closed, the reed switch is held in the balanced or center position by interacting magnetic fields. If a door is opened or an external magnet is brought near the contact in an attempt to defeat it, the switch becomes unbalanced and triggers an alarm. While this contact can still be defeated with the use of a single defeat magnet, many more steps are required which reduce the probability of its occurrence.

In order to defeat a biased magnetic contact, an intruder must use a similar sized magnet as the actuating magnet intended to operate the switch. Then, with the help of a small compass, the polarity of the biased magnet must be determined. Lastly, the intruder must keep the defeat magnet at nearly the same distance from the switch as the original actuating magnet. While these steps may provide an impediment to some intruders, an expert could defeat this switch with a single magnet.

### HOW A MAGNASPHERE® SECURITY SENSOR WORKS

The Magnasphere® high security sensor offers the same level of magnetic defeat resistant protection that is required at the Federal Government's most secure installations, but at a fraction of the cost and size.

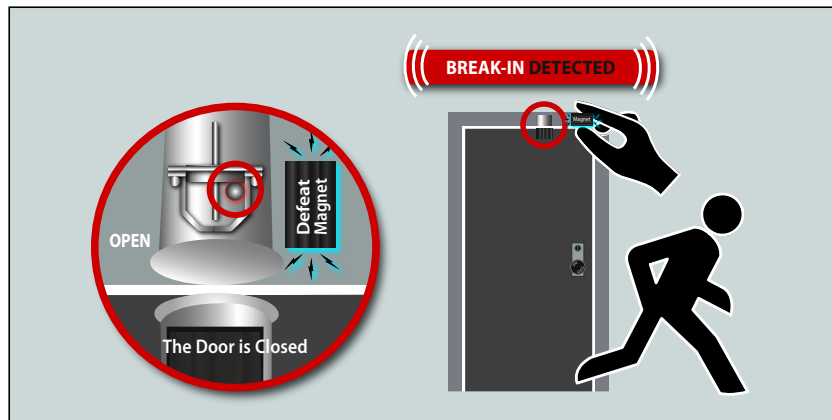


Magnasphere's® patented design won "Best Intrusion Detection" device and "Best of Show" at the Security Industry Association's acclaimed New Product Showcase, which recognizes innovations that will have a profound impact on the security industry.

The Magnasphere® switch differs from a reed switch in both construction and performance. The switch consists of a magnet ball and electrode contact sealed in a durable metal housing in an inert gas atmosphere. In the normal open position, the magnet ball is attracted to a ferromagnetic bias ring, away from the electrode. When an external magnet approaches the end of the switch opposite the electrode, the magnet ball will snap to the bottom of the case, making contact with the electrode and case, completing the electrical circuit and closing the switch.

### HOW A MAGNASPHERE® SECURITY SENSOR WORKS

Unlike a reed switch which is globally activated, Magnasphere's® technology is resistant to magnetic tampering and defeat because it has a restricted activation area and is not polarity sensitive. Magnasphere's® high security sensors will only respond to the magnet designed to operate the switch and is virtually unbeatable. If an intruder tries to defeat a Magnasphere's® sensor with a more powerful magnet from the outside, the switch will open, triggering an alarm and warning of an attempt to defeat.



For additional security, Magnasphere's® switch components resist permanent contact welding and failure when exposed to high voltage discharges – virtually eliminating false contact closures. In addition, Magnasphere's® all metal technology will not break when handled roughly before, during and after installation. As a result, a security system will not need to be periodically checked for malfunctioning switches.

In 2007, Underwriters Laboratories created a UL-634 Level 2 high security standard to help Secure Compartmented Information Facilities (SCIF's) and other high security installations identify sensors that provide the absolute highest level of intrusion detection. More stringent requirements for this new standard include external and internal resistance to magnetic defeat tampering. Magnetic contacts that do not meet these new requirements will remain as UL-634 Level 1 standard devices. In 2008, the Magnasphere® HSD was tested and certified to be the only high security sensor that is resistant to external and internal magnetic defeat tampering and meets the new UL-634 Level 2 high security standard for magnetic contacts and sensors.

### SUMMARY

The standard reed switch magnetic contact serves a critical function in a security system yet it also might be its weakest link. In the computer world, patches and upgrades are routinely offered in order to plug security holes that would allow hackers undetected access into PC's if exploited. If consumers knew that their security system had an exploitable hole that allowed intruders undetected access in their homes – why wouldn't they want to plug that hole as well? More secure, effective, and affordable alternatives to standard reed switch contacts are available and should be recommended. It's not only the right thing to do, it's the legal thing to do.

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## ACKNOWLEDGEMENTS

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