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FAQs (Frequently Asked Questions)

First time buyers of security systems often ask questions about what they should buy. They ask friends who have systems and salespeople who sell them.

Very often, friends don't know whether they have a genuine system or just a collection of parts. But they do know whether the installation was neat. They also know whether their alarm company offers timely, efficient service. Yes, it's OK to disregard comments like "they wouldn't do exactly what I wanted" since these may refer to things that were **impractical**, illegal or contrary to a life safety code. But do pay attention to comments like "they finished on time and cleaned up as they worked."

The following questions and answers will help explain some of the many qualities you should look for in a security system... and separate them from the bias of sales people.



Should every door and window be protected?

Every accessible door and operable window should be protected. All glass windows should be protected with some sort of shock/audio detector. Windows can also be protected using alarm screens instead of contacts and shock/audio detectors. Obviously in a three story residence, the windows on the third floor cannot be opened by normal means; screens, vibration sensors or audio detectors should be sufficient if the windows are kept locked. Rather than contacting these third floor windows, the money could be spent on additional interior protection or other security features like fire detection. However, if you would feel unsafe with these windows uncontacted, contact them. It's your security and your peace of mind.

Garage overhead doors are a special case. A lot of people get these doors contacted and then pay extra to have the door bypassed automatically when the garage door opener is used. Since the only way to open these doors is by using the garage door opener, they are paying for the door to be protected and then paying more for it to be unprotected. Don't spend money to protect a door and then spend more to bypass the protection every time the door is used. Spend your money on additional protection or added features.

If there is no automatic opener, a contact can be useful protection on a garage door. If there is an automatic opener and you wish to protect a boat or trailer stored in the garage, there are devices designed to attach to the boat or trailer.



Should the contacts used on windows be visible or recessed in the frame?

This depends on you and your installing company. Does the burglar see the switch go elsewhere because he now knows you have more than just a sign and some decals? Can the burglar defeat the contact just because he can see it? Some people cannot tolerate the sight of normal surface mounted contacts or feel insecure because "the burglar knows what's there." Other people feel secure seeing the switches because "the burglar knows I really do have a system installed by a professional." Surface mounted switches often are easier to install. Although the price for installing recessed switches may be higher with some companies, generally prices run the same for either switch.

One hype concerning recessed switches is the size of the switch in a wooden door or wooden door frame. If the switch is recessed in the frame, you cannot see it when the door or window is closed. As long as it fits the frame properly without overlap, it does not matter what the diameter of the switch is.

In steel doors and steel door frames, the switches and magnets need to be isolated from the metal so they can work properly. These switches and magnets are usually inserted into a 3/4 inch or larger hole. The larger switches are usually used. However, plastic adapters can be used to hold a smaller switch in the hole.



What are EOL resistors and why should I have them?

An End-Of-Line resistor **supervises the wiring** between the alarm panel and the switch. Some panels have a limited number of detection zones and do not require EOL resistors. **But if the panel can use EOL resistors to supervise the wiring, the resistors should be used.** If more than one detection device is on a single detection circuit, the EOL should be at the last device. **When feasible, every alarm detection device should have an EOL resistor at the device.** If the EOL resistor is at the burglary contact on a door, the panel sees the wire open when the door is opened and sees the resistor when the door is closed. The thief who shorts wires together hides the EOL resistor from the panel, letting the panel know that something is going on. The thief who cuts the wire causes an open circuit, the same as if he had opened the door.

Hold-up alarms and Fire alarms use an "open circuit" detection scheme. The panel normally sees the EOL resistor at the end of the detection circuit. A short on the wire causes an alarm and a break in the wire causes a trouble report.

Since normally closed switches can weld due to high voltage like lightning, the normally closed switches used for burglary detection must be checked after severe weather to see that they still work properly. Since devices on a "open circuit" normally cannot weld open, lightning and power surges should not "weld" these switches into an inoperable state. Some security systems even use this high security mode for their burglary devices.



Where should EOL resistors be installed?

What makes EOL resistors so important is that they can supervise the wires only when they are at the end of the line. When properly placed in the circuit, EOL resistors prevent wire tampering on normal switches. EOL resistors in the control panel are usually ineffective. The usual net effect of putting the EOL resistors in the panel is that the panel acts as if it has no EOL resistors. Even open circuit devices like smoke detectors and hold-up buttons are not properly supervised when the EOL resistor is attached in the panel before the end of the line.

Many companies install the EOL resistors in the panel or use **panels that do not supervise the wiring.** Some alarm manufacturers show the EOL connected at the panel. One alarm company owner, in an attempt to impress us, asked if we knew the difference between End-Of-Line resistors and In-The-Panel resistors. He had been confused by drawings showing improper placement of the EOL resistors. **The proper placement of an EOL resistor** is at the End-Of-Line, the last switch

on the detection circuit. EOL resistors do not belong at the panel.



I heard of a "smart switch," a popit switch, or a polling loop switch. What is it?

A smart switch does not just cause an open or short on the wire like a typical burglary detection switch. Normal switches can become welded into an inoperable state by high voltage like lightning striking nearby. The smart switch sends information to the panel constantly. If the switch is damaged by some high voltage event, it no longer checks in with the panel and the panel responds appropriately. Usually the panel and smart switch are integrated. The panel "polls" the smart switch and the switch sends an "I am okay" message. The panel then polls the next switch. The cycle continues with the panel constantly asking for and receiving the status of every smart switch.

If the panel is armed and the smart switch sends an "I have detected intrusion" signal, the panel responds by setting off the bells or sirens. While the system is armed, if the smart switch does not report in for any reason, the panel responds with an alarm because a switch is "missing."

While the panel is disarmed, if the smart switch does not report in for any reason, the panel responds with a trouble report instead of an alarm. Extra smart contacts added to the detection loop without being programmed for the panel, should cause a trouble condition also.

Panels that use polling loop switches, popits or smart switches are generally more expandable. The polling loop can listen to many devices, each with a unique name, on the same pair of wires. Panels that use EOL resistors must have a set of terminals at the panel for every pair of wires. Every EOL resistor must have its own pair of wires. The simplification in wiring for smart switches can sometimes cut the costs of wiring for an alarm system significantly. However, the smart panels and smart switches generally are more expensive than standard panels. Smart switches do cost more, but they offer better security than normal switches. Each smart switch has a unique name or address and checks in constantly with the panel. A smart switch damaged by lightning or other high voltage stops communicating to the panel. The alarm panel immediately responds to report the missing point of protection.



Should I get a wired system or a wireless system?

Many factors affect this choice. The major factor is the construction and decoration of the premises. Can the location be wired and how much labor will be involved in wiring for the alarm? Will wireless devices be able to communicate to the alarm panel? Plaster walls with metal lath in them can block the wireless signals. Large mirrors, foil wallpaper, metal lockers and other radio systems nearby might prevent a wireless system from working properly.

Many new systems integrate wired devices with wireless devices. The main thing to consider is whether the system meets your current needs and whether it can expand to meet your future needs.

QUESTIONS ABOUT WIRELESS SYSTEMS



How often must the batteries be changed?

Typically, alkaline batteries must be changed every year. Newer systems often use lithium batteries that should last 5 years or more.



What is the cost to replace the batteries

Alkaline batteries can be purchased at any hardware store for a few dollars. Lithium batteries are more expensive and probably must be purchased through the security company, although they are becoming more common.



Does a maintenance plan include replacing the batteries?

Depending on the cost of the plan, this can be an excellent option or it can be an expensive option. Be sure any contract for a maintenance policy has what it covers in writing. If batteries are not written into the maintenance contract, they are not covered.



Are the transmitters supervised?

Do they check in so that the panel knows they are working and whether they need a new battery?

Portable devices like pendant panic buttons should not be supervised because you often will leave the premises with them for several hours. Since they don't check in, you will have to test them manually every month or so. Smoke detectors and burglary devices should "check in" at least every hour, since these devices never leave the premises.



Should I have a light outside to tell me when the system is armed?

Should I have a light outside to tell a thief when the system is disarmed?

A lot of older systems required the system to be disarmed from outside. The owner of the property needed to know whether the system was armed or disarmed before opening the door. Lights were used to indicate whether the system was on or off. A lot of effort was spent to find a way to let the owner get into a protected property without announcing to anyone outside whether the system was armed or disarmed. The solution to the outside keystation was to program an entry delay for certain detection devices that allowed the customer time to disarm an alarm system from inside the protected area. These newer systems require a code be entered in a keypad after entering the premises. If your system uses such a keypad, we suggest not installing an outdoor "armed" light.

Some systems use wireless keys or wireless keypads to disarm the alarm system.

These devices may be the only wireless devices on a traditional wired alarm system, or they may be just part of a complete wireless alarm system. More can be read on this topic by following this link to a document on enhanced security.

If a wireless key is lost or stolen, service is required to change the "key"

immediately. A wireless key disarms the system with one press of a button; the system does not care (or know) who actually pressed the button.

Wireless keypads do not require immediate service if they are lost or stolen. Though service would be required to replace or remove the lost wireless keypad, there is no need to race to the system. Knowing the proper code would still be required to disarm a system using a wireless keypad. Bi-directional wireless keypads let you know (after pressing the correct code) whether the system is armed or disarmed. This added security should be considered when deciding whether or not to use a wireless method of arming and disarming the alarm system.



I heard that over 98 percent of all alarms that go off are false alarms. If this is true, why should I even bother to have an alarm?

On an average day in Sacramento, about 50 to 75 alarms go off and all but about one or two of them are false alarms. Many law enforcement officers report that in their entire career, they have never personally responded to an alarm that turned out to be a real burglary.

However, every day there are well over 100 real burglaries reported in Sacramento. That means burglars are not targeting locations that have an alarm. Therefore, having an alarm is obviously a great deterrent and virtually takes your property "off the market" of burglars. Since only about 20 percent of Sacramento residences have alarms, burglars have plenty of other targets.



Wouldn't the authorities charge me if they had to respond to a false alarm at my home?

There are penalties for false alarms which vary according to the jurisdiction and location. Usually there is no penalty for the first offense. What is most important, however, is that false alarms can be easily avoided. Most false alarms occur at the key pad due to pressing the wrong buttons. Make sure your alarm is easy to use and that you know how to cancel a false alarm immediately by calling your alarm monitoring station. There are usually no penalties or charges if you call right away.



Do I need to put an alarm sensor on every exterior door and window?

It depends on what you are trying to protect. Are you mainly concerned about protecting your property when you are gone? Or is personal safety while you are home your main concern?

Protecting your property can be accomplished with interior motion sensors. You will still need a contact on the main entry/exit doors but if someone comes through the window, a properly positioned motion detector will set off your alarm instantly. One such motion detector can protect many windows and most companies include at least one with their most basic system.

On the other hand, the motion detectors must be turned off while you are home. So for personal safety, you probably want to alarm some or all of your windows. A wireless panic button is also a good solution.



Wouldn't I also need an outside bell on my home?

Outside bells can provide additional peace of mind, but there are also some drawbacks:

1. Outside bells often cause complaints from the neighbours, sometimes resulting in a noise citation.
2. If your bell goes off and neighbours do respond, they could be hurt by an intruder. When the police arrive, they may confuse a neighbour for a burglar.
3. So many bells go off these days, most people tend to ignore them. Also, bells are supposed to be programmed to shut off after 10 to 15 minutes.

A great alternative would be a latching strobe, a red or blue light on the front of your house that will begin to flash if your alarm is tripped. It is less expensive than a bell and will continue to flash until you physically turn it off on the control panel. This way, when you come home, you can look at the light and know whether a burglary has happened or not. It also makes the house a little easier for the police to find at night if they are responding to an alarm.



So how much can I expect to pay for a good alarm system?

If just trying to protect the property, the average systems cost between \$400 to \$600. It should include all entry doors, as three out of four burglars gain entry that way, and at least two interior motion sensors.

If your home has 10 to 15 doors and windows and you need the full perimeter protected for your personal safety, a quality system should cost between \$1,000 to \$1,500. Monthly monitoring ranges from \$20 to \$30 per month for either kind of system.



What about fire safety?

This is a security issue that is too often overlooked. Most homes have smoke detectors installed, but what happens if no one is home when they go off? More importantly, what if you don't wake up because carbon monoxide puts you into a deeper sleep?

A simple but priceless solution is to have at least one monitored smoke/heat detector to supplement the others in the house. This way, the fire department will come whether you are able to call them or not.

The average response time in Sacramento is two to two and one-half minutes. Property and life can be saved if the fire department is notified in time.

What are End of Line Resistors and do I need them ?

Short answer:

End of line resistors (EOLR) are resistors of a specified value that are used to terminate protective loops or zones.

The purpose of EOLR's is to allow the control panel to supervise the field wiring for open or short circuit conditions. How the alarm responds to each depends on the panel as well as system zone programming, but generally speaking, an alarm views

an open circuit as a fault or alarm condition, and a short circuit as a trouble or alarm condition (if armed). The purpose of EOLR's is to allow the panel to differentiate between the two conditions by looking for a known resistance. EOLR's should be installed at the last device on the loop, electrically speaking, and not inside the control, unless special conditions are met. The benefits of EOLR's on protective zones with all concealed wiring is commonly argued by professional installers, as well as EOLR's installed inside the control unit, negating their effectiveness, as well as disabling the EOLR feature and using NC (normally closed) loops for zone definitions. The use of EOLR's is recommended and is particularly important when the field wiring is subject to damage or compromise. A fire EOLR should always be installed at the last device and never inside the control or across the zone defined as fire, as this is an inherent safety issue. Some equipment supports Double End of Line Resistors (DEOLR) to further differentiate between conditions that may exist on the loop.

Want to know more about End Of Line Resistors?

FEATURED ARTICLE

End Of Line Resistors --- The Basics

What are they, and why are they used?

Early security systems used simple electrical circuits to monitor the status of doors and windows. The circuit was either closed or open, and therefore returned full voltage or no voltage at all to the control panel; that was all the system wanted or needed to know. Although such circuits are still in use today, the digital age gave manufacturers the opportunity to make systems more secure.

A resistor is a small semiconductor which *resists* the flow of electrical current. The current is permitted to flow, but is *reduced* by the value of the resistor. If a resistor is connected, in series, with a sensor on an alarm circuit, then the control panel no longer sees full voltage across the circuit, but rather a reduced voltage, when the circuit is closed. Now there are three possible conditions for the control to measure: full open-circuit voltage (if the circuit is open), reduced voltage (if the circuit is closed and secure), and no voltage if the wiring has been compromised. For if the two sides of the circuit are making contact at some point between the control and the resistor, the current has a shortcut back to the control, thus bypassing the resistor. The control will see this no voltage (or very low voltage) as a fault and will alert the user.

Where should resistors be placed?

The method just described can **ONLY** work if the resistor is placed at the end of the line. There have been many discussions about placing the resistors at the control panel ("in the can," as the professionals say). Although there may be practical reasons for doing this, it must be understood that placing resistors anywhere other than the end of the line does **NOTHING** to supervise the wiring, which is the stated reason for using resistors. A resistor can only supervise the wiring between the resistor and the control.

Why does the wiring need to be supervised? How can the circuit become shorted?

If a potential burglar were to gain access to the zone wiring, the wires could be deliberately shorted, allowing the burglar access to the building at a later time. Also, a nail or screw (for hanging a painting, photo, etc.) could conceivably pierce both the outer and inner insulation of the wires and make contact between the two conductors. While both of these are admittedly unlikely, they are not impossible.

If a shorted zone is so unlikely, are resistors really necessary?

This question has no simple answer. If it is being asked by a pro installer, there are liability issues to consider, especially if the manufacturer recommends or requires resistors. If a do-it-yourselfer is asking, then no one else can provide a satisfactory answer. A person installing a system in his/her own home must consider the potential risk of compromised wiring and then make an informed decision. Finally, there is also the question of whether a particular system will even allow the elimination of resistors. If it does not, then the only decision would be where to place them. If resistors are required, but wire supervision is deemed unnecessary, they could be placed at the control.

Resistors seem like such a sensible idea. Is there any reason NOT to use them, and place them at the end of the line as required?

There are a couple of reasons. First, although it is usually quite easy to place a resistor inside a motion detector or glass break sensor, connecting one to a magnetic contact can be a trying experience, especially with recessed contacts. The resistor must be spliced to the wire in some way, and the splice must be pushed back through the hole before the contact is inserted (preferably in such a way that it can be removed if necessary). On a surface mounted contact, the resistor and splice will be visible, and (partly depending upon the installer's skill) can be aesthetically obnoxious. Second, in the event that the control panel is replaced at some future date, the resistors will not be the correct value if a different manufacturer's equipment is used. There is not even a guarantee that the same manufacturer won't change resistor values in the future (although this seldom happens). Removing and replacing all the resistors (especially from recessed contacts) in a system has been shown to cause considerable loss of hair, sleeplessness, and outbursts of foul language.

Is there any way to place the resistor inside the can but still supervise the wiring?

Yes. By using a four conductor cable for a two wire sensor, the two free conductors can be used to extend the circuit from the sensor location to the can, through the resistor, and back to the sensor. The resistor would actually be at the end of the line, and supervision would be accomplished.

Are there any other ways in which resistors are used?

Yes. First, fire zones always use resistors, even if the other zones do not. This is because fire sensors are "Normally Open" devices; they only close the circuit when they trip. Therefore, a fire zone in its normal state would appear the same to the system as one where the wire has been cut: namely, open. To prevent this, a resistor is used to close the circuit (with reduced voltage), so that it can be supervised. Second, some manufacturers allow the use of double EOLR's. In this case, a second resistor is added across the terminals of the sensor, so that is in parallel with the circuit. If you will recall, a single resistor allows the system to sense if the circuit is secure, open, or shorted. The second resistor adds the capability of differentiating

between an open sensor and an open, or broken, circuit. Now, if the sensor opens, the current passes through both the series and parallel resistors. The panel senses the reduced voltage and knows that the sensor is, in fact open. With this configuration, zero voltage can mean only one thing: a broken circuit. This constitutes the maximum supervision of zone wiring.

Third, some manufacturers allow the use of "zone doubling," where two zones, each with a different resistor value, are connected in parallel to the same two terminals. Since they are in parallel, the system sees the total of both reduced voltages when both zones are closed. If one opens, that voltage is removed, and because of the different resistors, the system knows which one is open and which remains closed. This effectively doubles the number of zones available on the main board, although it does not change the maximum capacity of the system.