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Using Wireless Sensors on Metal Doors

Kenneth Delahoussaye Consulting
www.Kadtronix.com

Wires to wireless

Wireless sensors are widely used and extremely convenient for door monitoring. Avoiding costly cable runs and unsightly wires, these sensors utilize radio-frequency signals for transmitting door status to a receiver/controller. In most cases, wireless messaging is consistent and reliable. Yet, in a handful of instances, a metal door can diminish wireless sensor signals, mildly for some, or severely for others.

A matter of inches

But why is it that some wireless installations seem to incur metal-induced interference issues, while many others do not? Metal surfaces tend to create invisible dead-spots that hinder RF signals. However, dead spots are not necessarily uniform across the entire metal surface. In fact, testing has shown that sensor placement may be the determining factor in avoiding or minimizing interference. A simple positioning adjustment as small as an inch or two can be hugely effective in avoiding a dead spot. If your installation suffers from weak or marginal signal reception, consider two possible options for resolving the issue. (Refer to subsequent sections for details.)

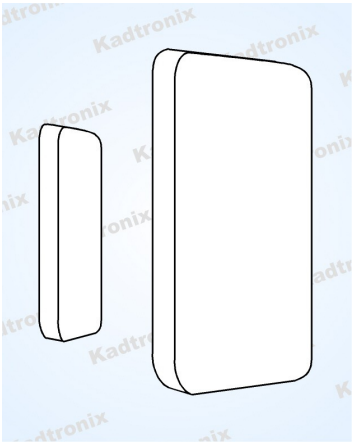
IMPORTANT (please read carefully before proceeding):

- Be sure to properly locate the receiving antenna for best reception. The antenna should be positioned at ceiling height or above, and oriented vertically. Ensure 3 ft. (minimum) separation from HVAC equipment, water heater, appliances, electrical equipment, conduits, plumbing, metal studs, and electronic devices. If your installation does not meet these requirements, you should promptly relocate the antenna.

  Hint: Oftentimes, a badly located antenna can be the cause for a poorly operating system. Proper location and positioning are vital.

- Avoid touching or holding the sensor in your hand during testing since skin is mildly conductive and will affect wireless signal transmission.
- Until you have determined the best location for the sensor (& magnet), apply masking tape or similar to allow for easy re-positioning and adjustment. (Do **not** permanently affix while testing.) Use generous lengths of masking tape to avoid incidental detachment. Once you have located a suitable location that yields consistent results, remove the masking tape and affix using 3M adhesive backing.

Option #1: Direct attach (traditional mounting)



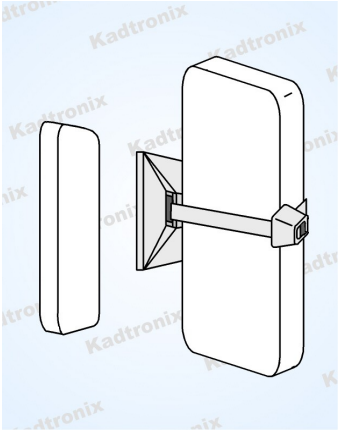
Direct attach
magnet(left), sensor (right)

Typically, the problem can be resolved with a minor repositioning adjustment of the sensor (& magnet). Just an inch or two in one direction or the other can make a huge impact. (A few minutes of trial-and-error testing may be needed.)

Hint: Use masking tape for temporary attachment to the intended surface until achieving the desired results. Avoid use of the 3M adhesive backing until achieving consistent and reliable results at the controller/receiver.

- Choose a location on the door frame for the sensor unit. Affix to the intended metal surface using masking tape. (Do **not** apply adhesive backing at this time. Instead, use masking tape to hold the unit in place temporarily.)
- Apply magnet to the door, also using masking tape.
- Test for signal reception at the controller/receiver unit, exercising the door multiple times in succession to ensure consistent, reliable results.
- If wireless signals are consistently received from the door sensor, remove masking tape and affix permanently using 3M adhesive backing. If results are unsatisfactory, re-position the sensor (& magnet) approximately one to two inches from their current location. (Small adjustments are strongly recommended.)
- If results continue to remain poor or marginal after multiple re-positioning attempts, consider Option #2 below.

Option #2: Re-orient sensor (pivot method)

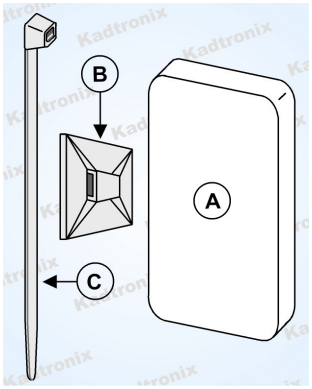


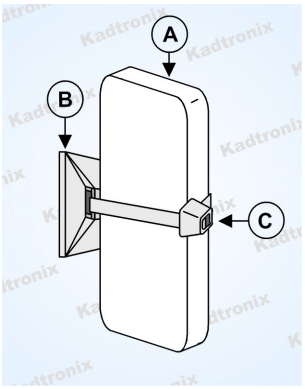
Pivot method
magnet (left), sensor (right)

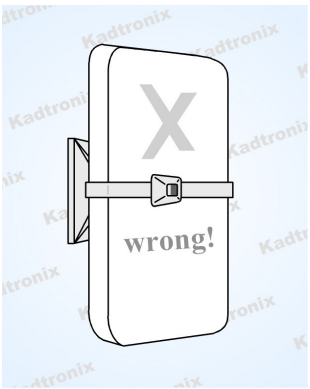
If option #1 was unsuccessful, you may find it helpful to re-orient the sensor, pivoting 90-degrees (away from the metal surface). To accomplish the pivot, a custom mount will be necessary. The diagrams below illustrate the use of a standard zip tie, coupled with adhesive-backed cable-tie mount, both made of plastic or nylon material.

Hint: While any suitable mounting method may be used, implements and fasteners having metal compositions are to be strictly avoided.

- Apply custom mount to the sensor as shown below, noting proper attachment.







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Notes

- Be sure the receiving antenna is optimally located, preferably at ceiling height or above, and with 3 ft. (minimum) separation from HVAC equipment, appliances, metal shelving, plumbing, conduits, electrical equipment, and electronic devices.
- Cable-tie mount and zip tie are comprised of plastic or nylon. (Metal compositions are to be strictly avoided.)
- Smaller devices require only a single zip-tie mount. Larger sensors may require dual mounts.
- For convenience, perform sensor registration (pairing) prior to affixing sensor(s) to the intended position.