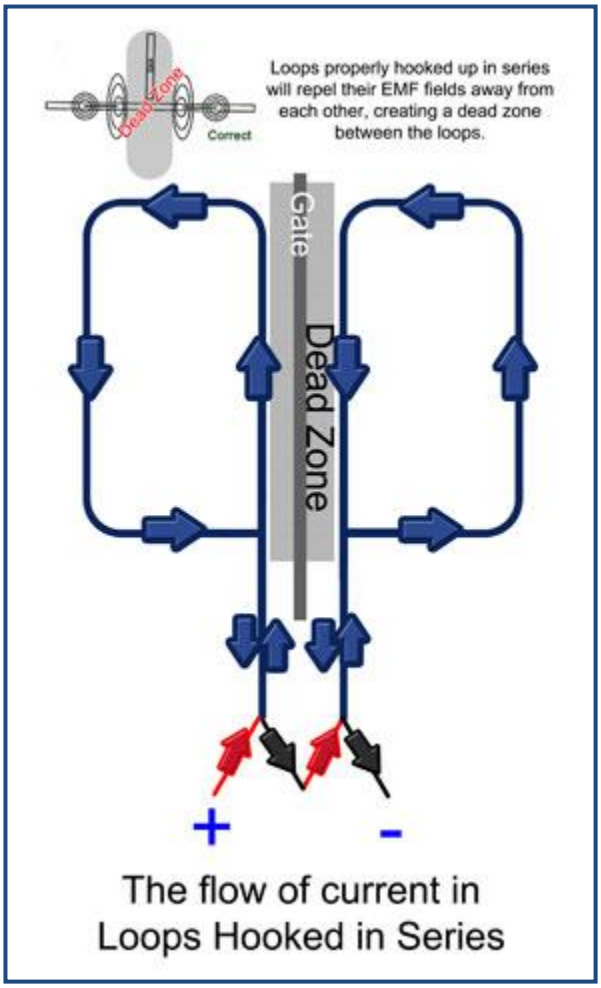
The first step to installing a worry-free access control system is understanding not just the operator, but all the accessories too! Loops, that copper wire in the ground is one of the most misunderstood pieces of any access control system. Understanding the fundamental basics of loops will allow a quick and easy installation without call-backs. Here is your guide to how inductance loops work.

When direct current passes through a wire an Electric Magnetic Field or Flux (EMF) is created around the wire. An example is when a wire is coiled around a metal rod then energized with a battery; current flows through the wire and causes the rod to act like a magnet. The more turns in the coil or increases in current flow the greater the magnetic field or pull.

If the current is removed, the magnet field collapses back into the wire. In the case of Alternating Current such as AC, the current changes direction and sets up a magnetic field opposite of the same when the current was passing in the opposite direction. In an AC circuit, the field that is collapsing is pushing against the new developing field. This "pushing back" is a form of resistance known as Inductance. Anytime you have AC passing through a wire you will have this special resistance of Inductance. All detection loops will have AC current applied to them. That is why detection loops are referred to as Inductance loops. This inductance is measured in units of Henrys. A common range of inductance for a detection loop is 40 to 300 micro Henrys.



The flow of current in Loops Hooked in Series

When a detector energizes a loop with an AC current; the size of the loop, number of winding in the loop, length of lead-in wire and wire size will determine the total resistance or inductance of the loop circuit. The detector will determine how much current is flowing through the loop and set that amount as the standard. When a metal object enters the EMF field created by the loop current, the metal object absorbs some of the collapsing EMF fields. Because some of the collapsing EMF field is now absorbed, it lowers the resistance in the loop circuit. This causes an increase in current flow through the wire that is detected by the detector. When this happens, the detector will either open or close a relay switch that activates a command in the gate operator such as open for exit, reverse for safety, or hold open or close for a swing gate with a center or shadow function.

Loop phasing comes into play when two loops are used with the same detector. A common application would be when two reverse loops are used with one on each side of a sliding or vertical gate. Proper phasing is accomplished when the loops are connected in series with each loop current flowing in the same clockwise or counter clockwise direction.

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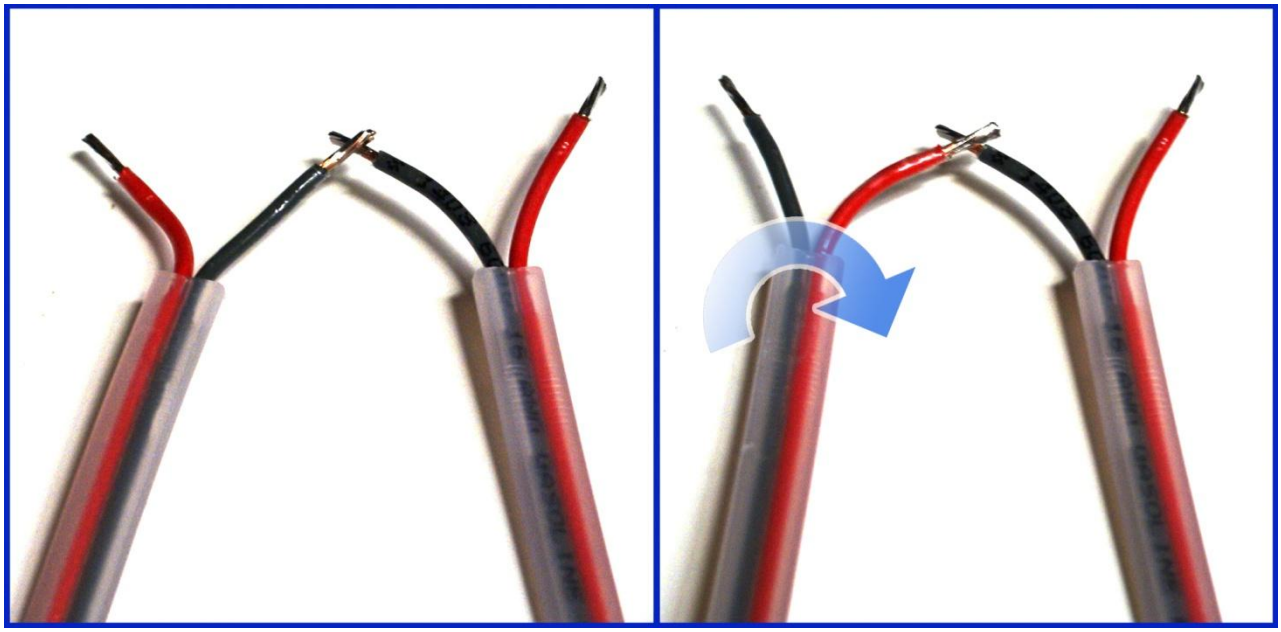
With the current flowing in the same direction in each loop, you will notice that the two loop legs nearest the gate will have currents moving in the opposite directions. This will cause what is referred to as a "Field Cancellation Effect". That is, the fields of sensitivity will both have the same magnetic polarity (North or South) toward each other. Since like fields repel, the fields of sensitivity are pushed up and away from each other, causing a dead or null field between the loops. This null or Cancellation effect will allow the loops to be placed closer to the gate without being detected. Because the fields are pushed up, they now are more sensitive next to the gate path, making for a safer reversing loop feature.

On the other hand, if the loops are connected with the current flowing in the opposite directions, the poles of each loop will have an opposite polarity, causing the fields to attract to each other. This will cause what is referred to as a "Field Enhancement Effect". This will cause the area between the two loops (the gate path) to attract to each other. This effect will increase the sensitivity in the zone where the gate travels, increasing the chance of the gate being detected as it closes. If detected, the reverse detector will keep reversing the operator as the gate tries to close, setting up the requirement to send out a service technician. By arming yourself with this knowledge you will have less repeat service calls and happier customers.



If you try to take advantage of loop phasing and discover that the loops are detecting the gate – it may mean that the loops were not properly phased. Don't worry, you don't need to pull up the loops and re-install them. You just need to take one lead-in and flip it over. Doing this will change the direction that current flows through the loop and cause the polarity of the loop to change. Hook the loops back up to your detector and see if the gate is still being detected.

Brian Dickson is the General Manager of BD Loops, a manufacturer of preformed direct burial and saw-cut inductance loops for the gate, door, and parking industries. With over 10 years in business the quality of our loops is unparalleled. BD Loops products are available through over 220 distributors nationally. BD Loops offers over 45 standard preformed loop sizes, all standard and custom loop sizes are ready to be shipped the same day. The company has several letters of recommendation testifying their professionalism and design, and is a member of the following associations: AFA, IDA, NOMMA, IPI, CODA and IMSA. Visit www.bdloops.com and use the distributor locator to find a distributor near you. If you would like to speak to Brian Dickson please call BD Loops at 714-723-0946.