

# Fencing Systems for Rotational Grazing



## Protecting an Energizer from Lightning

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# **"PROTECTING AN ENERGIZER FROM LIGHTNING"**

If you are going to work with electric fencing, sooner or later you will have a run in with lightning. An electric fence is a beautiful antenna that periodically can act as a direct route for lightning to reach the earth, sometimes through your energizer. Below are a few things that can be done to protect an energizer from being damaged by an unwelcome bolt of lightning.

Let's start with a two-wire continuous ground fence first and then add a couple of things to it to protect it from lightning. In an unprotected fence, electricity is converted from a low voltage current to a high voltage-high amperage charge by a low impedance energizer (Figure 1, Item A), sent out to the fence by a lead-out wire (Item B), through a cut-off switch (Item C) and then on out onto the fence wire (Item D).

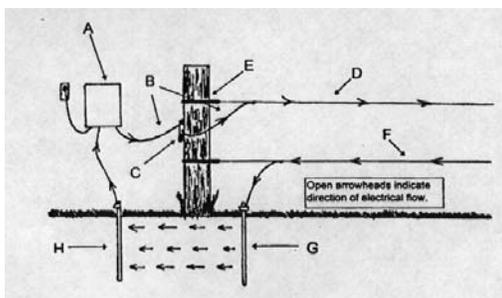


Figure 1: Two-wire continuous ground fence

The second wire on the fence (item F) is not hooked to the energizer. It is hooked up to a ground rod (Item G) that carries any electricity that reaches it into the earth. The way the electricity is supposed to reach the ground wire from the hot wire is by an animal making the connection between the two wires. Once the electricity reaches the earth it heads back to the energizer through the earth toward the energizer's earth return rod (Item H). When the electricity gets back to the energizer it has completed its circuit.

There are three ways that lightning can get to the energizer: first, through the electrical outlet that it gets its power from; second, from the hot wires on the fence; and third, from the earth return system.

## **Lightning Protection from the Fence Side of the Energizer**

There are two things that can be done to protect an energizer from the fence side. The first is a lightning arrester (Figure 2, Item I). A lightning arrester is a simple device that is hooked between the hot wire of the fence and a ground rod (Item G). There are several different styles of lightning arrestors but they all

do about the same thing. In the middle of the arrestor there are two metal leads that are kept at a specific distance apart so that electricity won't jump across the gap under normal voltages. If lightning hits the fence the electricity will arc across the gap and head to the earth through the ground rod. Just about any lightning arrestor should do the job, but, like anything, some have nicer features than others. One of those features is the ability to see if the arrestor has gotten hit by lightning. Those that are more visible tend to cost a little more but it can save some time trying to identify which arrestor took the majority of a lightning blast.



Figure 3. Porcelain lightning arrestor



Figure 4. Bell lightning arrestor

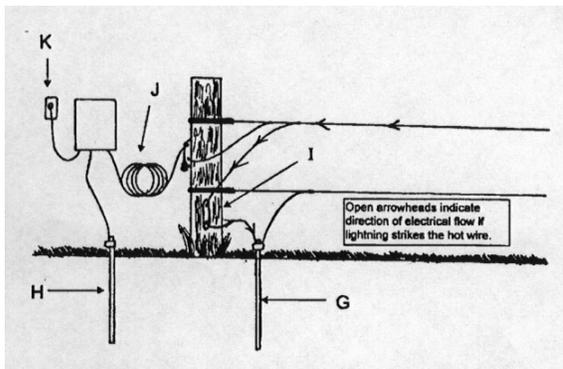


Figure 2. Lightning protection on a two-wire continuous ground fence

Another useful device is a lightning brake, or induction coil (Item J). The lightning brake is just what the name implies, it acts to slow down or stop a reverse flow of electricity on a fence. The lightning brake is nothing more than a coil of wire that develops and electromagnetic field when electricity flows through it. When the energizer is pumping out electricity an electromagnetic field is set up that goes in a circle around the coil. If electricity tries to come backward in the fence, not only does it have to resist the flow of electricity out of the energizer, it also has to reverse the electromagnetic field around the lightning brake.



Figure 5. Lightning brake

There are several different types of lightning brakes on the market today. Some are nothing more than about 40-50 feet (12-15 meters) of high-voltage insulated lead-out wire wrapped into a coil (Figure 5). Some are bare wire held apart in a coil by a fiberglass, plastic or wooden frame. Regardless of how they are made they all do about the same thing.

## Lightning Protection from the Electric Company Side of the Energizer

Probably one of the most overlooked reasons that an energizer goes down in a lightning storm is from an electrical surge from the energizer's source of power. The energizer is a natural "sink" for electricity from a lightning blast that hits a power line because of all the ground rods, earth return rods, fence wires and posts that it is hooked to. The easiest way to protect the energizer from the service side is with a surge suppressor (Figure 2, Item K).

Surge suppressors are relatively cheap and easy to install.

## Lightning Protection from the Earth Return System

It is not uncommon to see existing fences, silos and anything else made of steel to be turned into an earth return. There is one big problem with this idea from a lightning standpoint, anything that is metal and above ground becomes a direct route for lightning to reach the energizer. Remember, when the energizer is sending out electricity to the fence on one side, it is drawing it back in on the earth return side. Hooking the earth return up to anything above ground is just asking for trouble.

## You Can't Always Fool Mother Nature

Although these are few tips to help reduce the chances of any severe damage from a lightning strike, there is no sure way of being totally protected. No matter how an energizer is protected, if there is a direct hit, fences are likely to be damaged. Check with your fencing supplier regarding warranties against lightning strikes.