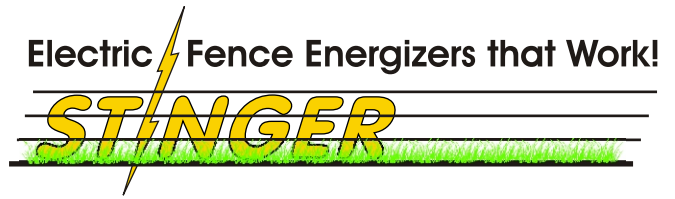


# Installation & Operation Instructions



## Warnings:

An electric fence energizer is intended to give an electrical shock to whatever touches the fence. The shock produced by Stinger Energizers is within the criteria required by CSA and UL so it is not harmful. But there are important installation issues to be aware of to ensure that a dangerous electric shock is not produced. So we have to give you these official warnings:

### **WARNING: Risk of Electric Shock!**

- Do not use a well casing, water pipe, or your power system ground as a ground rod for the fence energizer.

**Why?** The fence energizer produces very high current pulses - particularly if the fence has heavy vegetation. If the fence energizer ground is connected to your electrical system ground, the energizer ground current pulse will cause tingle currents on your power system ground and your water system. When livestock drink from a waterer they will feel the tingle currents and may be deterred from drinking.

- Do not connect the fence energizer simultaneously to a fence and any indoor device such as a cattle or poultry trainer. **Why?** If lightning was to strike the fence (or even near the fence) then some of the lightning current will be conducted or induced onto the fence wires and into areas that could cause a hazardous shock or a fire hazard.

- Do not operate a Power Line fence energizer on a 2 prong extension cord. Plug it directly into a properly installed hard-wired 3 prong grounded outlet. **Why?** The fence is a great lightning rod and if lightning was to strike even near the fence, very high voltages can be produced on the fence circuit. Power line operated energizers are connected to the Power system so this high voltage is applied across the energizer - sometimes causing breakdown of the internal insulation. The 3rd prong ground on the AC power cord is connected to a special internal shield that is designed to prevent a hazardous breakdown between the 120Vac and the fence circuit. If the 3rd prong is not properly grounded through the power cord, then the safety of the unit is seriously reduced.

- Do not operate a battery fence energizer on a battery that is being charged with a power line operated battery charger (a solar charger is OK). **Why?** If the earth ground on the fence energizer output has a poor connection, a high voltage may appear on the battery negative wire. This high voltage will break down the insulation inside a standard battery charger which could then allow 120Vac to get directly onto the fence - a very dangerous situation!!

**WARNING: Read all the instructions before use.** Save these instructions for future reference.

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## What is all this talk about lightning?

A Power line operated electric fence energizer is one of the electrical appliances that receive the most stress from lightning. Rural electrical power systems with overhead transmission lines are great attractions for lightning strikes. The lightning current has to get back to ground (earth) in as many ways as it can so any electrical appliance that is earth grounded is a good candidate. Fence Energizers and submersible water pumps are the most unfortunate subjects.

A second source of lightning stress on a fence energizer is from the fence side. The fence itself is a great attraction for lightning and there are often trees along a fence line that also attract lightning strikes. Very high voltages induced onto the fence wire will get to the fence energizer and may damage internal electronic components and the electrical insulation. The energizers are required by CSA and UL to be designed so that any number of damaged components will not cause the energizer to generate hazardous output pulses. However, if the electrical insulation was to fail, the 3rd prong grounding of power line energizers is critical to maintain safety.

Lightning induced damage to a fence energizer has been the number one cause of energizer failures. Fortunately, you have purchased a fence energizer that has been specifically designed with extra internal protection against lightning damage from both the power line side and from the fence side. Components are specifically selected and tested and then doubled to provide the industries best protection from lightning transients. Does lightning happen in the winter time? See [www.stinger-products.com](http://www.stinger-products.com) for more information.

continued:

What about lightning protectors on the fence? Energizer manufacturers often provide instructions for installing lightning diverters where the fence energizer is connected to the fence. In practical terms, the internal protection now built into Stinger energizers is better than that provided by external lightning diverters. External lightning diverters provide minimal added protection to a Stinger fence energizer - so save your money.

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## Scope of this manual:

This installation manual is written for electric fence applications for **domestic cattle livestock** for summer grazing control. Fence construction concepts for winter or very dry conditions, for horses, sheep, free-range hogs, wild livestock, other wildlife, and critter control can be found on our website at [www.stinger-products.com](http://www.stinger-products.com) or call (866) 468-3373 (toll free) and we will send you the information.

Stinger Products Inc. focuses on providing state-of-the-art electric fence energizers that will provide effective animal control in heavily vegetated conditions and survive the stress of induced lighting transients. There are many electric fencing accessories available from retail distributors that can help in building your fence system.

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## Electric Fencing concepts:

The electric fence energizer is intended to cause an **electric shock** to an animal that contacts the fence. The unpleasant experience will train the animal to stay away from the fence.

If the animals do not push on the wires while grazing, the fence does not need to be as mechanically robust as if you (try to) physically restrain the animal with the strength of the fence. The fence still **must appear** as a physical barrier until the livestock are trained!

A **trained** animal will be less likely to be injured by an electric fence than if they are regularly reaching under, climbing through, or jumping over a conventional barbed wire fence.

There is more detailed information on our web site at [www.stinger-products.com](http://www.stinger-products.com) relating to the factors that make a shock effective. In order for the shock to be a deterrent, the shock current through the animal must be high enough to cause **involuntary muscle contraction**. With the same shock current available, a smaller animal will feel a stronger shock than a large animal.

See Figure 1 on the next page for the references used below. The animal must be in the **conduction path** between the charged wire and ground so that the **shock current** will flow through the animal.

The **guard voltage** on the charged wire is the pressure that will drive the shock current through the animal and through the resistance of the earth. The current will flow from the energizer (1), through the wire (2), jump through the air to the animal skin (3), through the animal to ground (4), through the ground to the ground

rod (5), and back to the energizer (6).

The guard voltage must be high enough to jump from the wire, through the thickness of hair, fur, or wool to make contact with the skin. The **guard voltage** on the fence wire needs to be **at least 3,000 Volts** (3kV) which will jump an air gap of about 1/16 inch (2mm).

In dry and frozen ground conditions, the animal's hooves also provide insulation that will significantly limit the shock current that the animal receives. Remember that birds can sit on a power line and they do not feel anything because they are not also touching earth ground - they are insulated from ground.

Likewise, if you are wearing dry insulated boots, you can touch the charged fence wire and not feel anything because you are insulated from the ground and shock current will not flow. Remember that cattle "walk" on their toe-nails. Dry hair and (toe) nails are very good electrical insulators. You rely on the earth and the feet of the cow to be damp so they are electrically conductive. (By the way, horses are better grounded because the frog of their hoofs touch the ground.)

The important criteria is to **maintain a high guard voltage** on the charged wires. Unfortunately, there is **leakage current** (7) flowing to ground all along the fence where vegetation makes contact with the charged wire. It is difficult to maintain a high guard voltage when there is high leakage current.

The energizer must provide high voltage and high current at the same time which, in electrical terms, is **peak power**. The more peak power that an energizer can produce, the better it can handle leakage currents.

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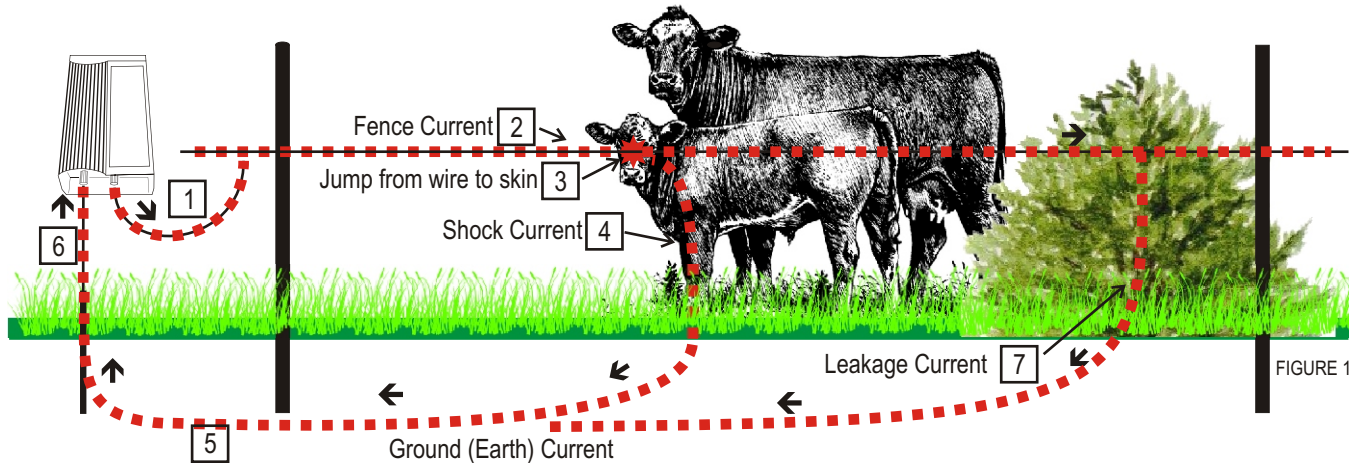
The output energy rating of a fence energizer (measured in Joules) is an indirect indicator of its ability to maintain a high guard voltage in the presence of losses due to leakage from the charged wire. If two energizers provide the same guard voltage on a specific fence, then the one with a higher Joule rating will "feel" like a stronger shock.

More information on energizer ratings is available on the web site at [www.stinger-products.com](http://www.stinger-products.com).

The **leakage current** from a charged wire **increases** with:

- more vegetation touching the wire,
- more moisture on the vegetation (mornings with dew are bad), and
- the length of the charged fence wire(s) contacting the vegetation.

Unless you are willing to keep the fence free of vegetation and use insulators and plastic posts, the "miles of fence ratings" of most energizers are useless indicators of an energizer's performance.



\* cow-calf artwork used with permission from [www.iabeef.org](http://www.iabeef.org) Iowa Beef Industry Council and the Beef Checkoff Program

## Tips for good electric fence installations:

### Mounting the energizer:

The energizer enclosure is designed to be weather resistant (this does not mean that it can be dropped into a puddle of water). Mount the energizer vertically with the fence terminals down in order to shed rain properly. Providing protection from rain and sunlight will improve the lifetime and appearance of the energizer.

A power line energizer should be mounted within reach of a permanently installed 3 prong grounded outlet. If you must use an extension cord, use a 14-3 cord with molded on 3-prong plug and socket.

A battery energizer should have the battery nearby and protect the wires from being damaged by animals. A short circuit of the battery wires before getting to the energizer could start a fire. Use a good quality deep cycle (RV or marine) battery because they can tolerate being discharged slowly for a long period of time better than standard automotive batteries. (Some people try to use a car battery that does not work for the car anymore but that is a very poor choice for running a fence energizer.)

### Ground rod:

Very high currents are conducted through the ground rod, particularly if the fence is heavily vegetated. It is imperative that the ground rod(s) be long enough to reach moist earth, preferably down to the water table. Sometimes near a building, the earth is very dry so it is best to select a location for ground rod(s) that is not in the shelter of a building. If there is a low area or slough near by, run a grounded fence wire from the energizer to ground rod(s) placed in the wet area. A pair of 5 foot (1.5m) lengths of galvanized 3/4" electrical conduit pounded into moist earth about 6 feet (2m) apart is a good start for grounding an energizer.



## Wire connections:

Since the fence wire is galvanized steel, it is best to use galvanized hook-up wire and galvanized connectors. Flexible stranded 15 ½ awg galvanized wire (Maxi-Shock cable) is best for making connection to the energizer.

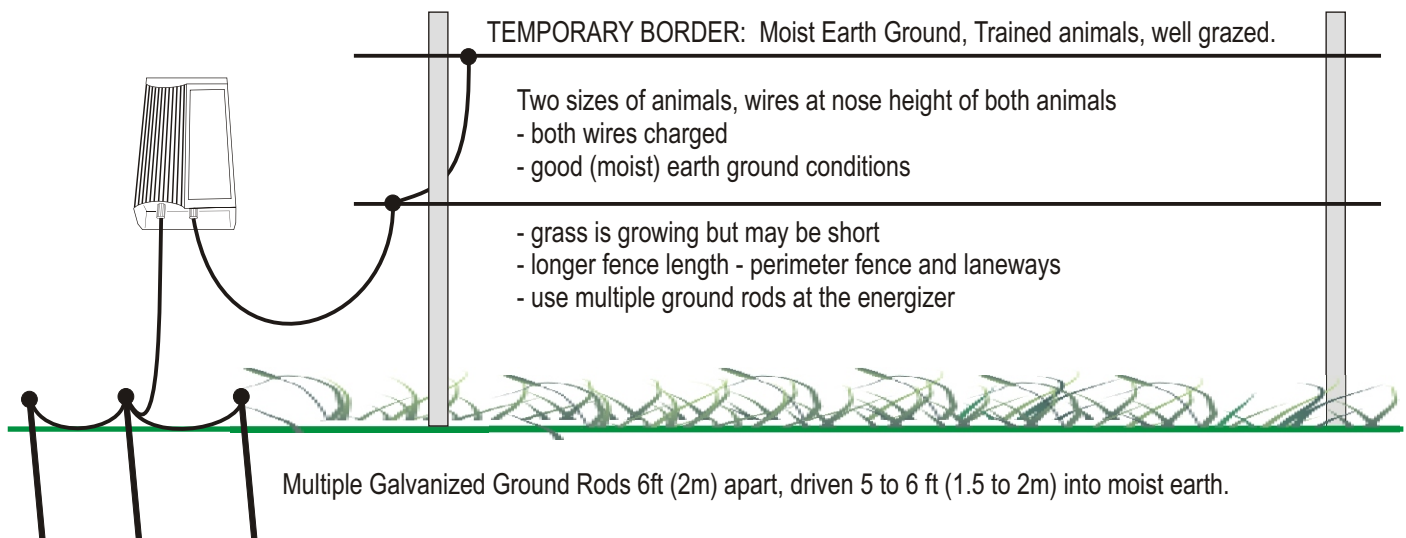
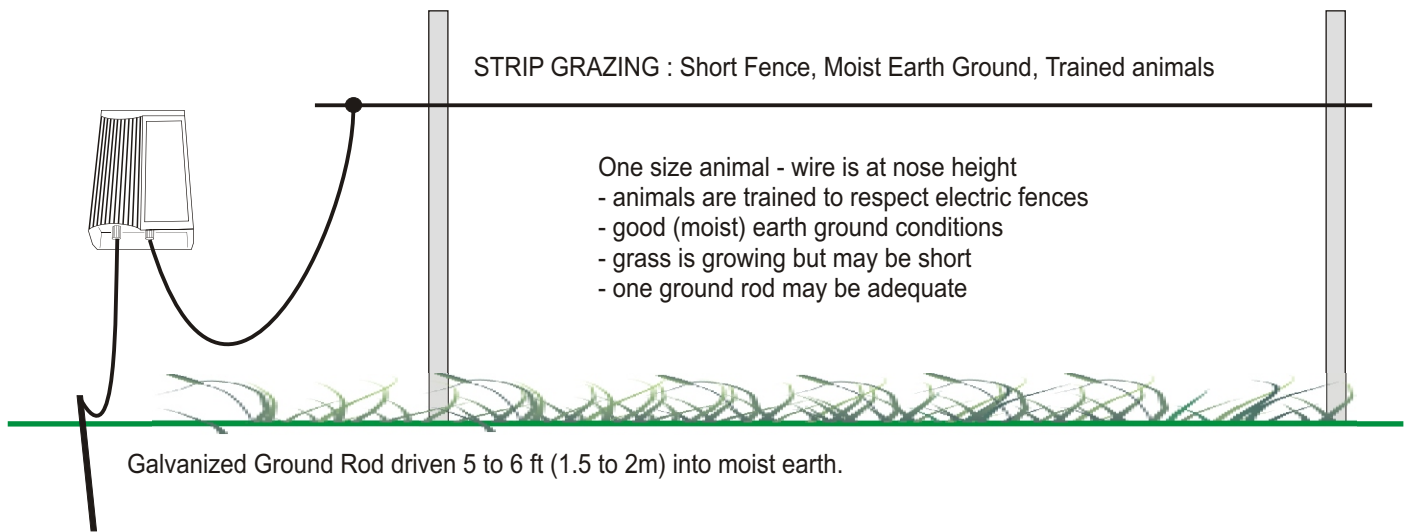
## Training the livestock:

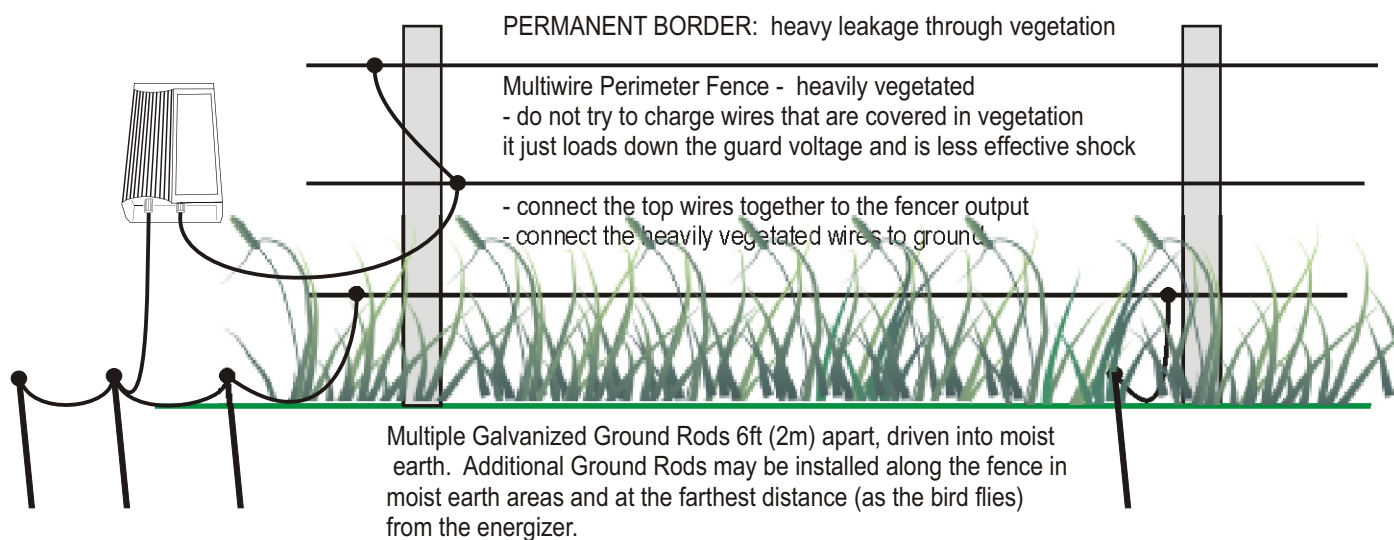
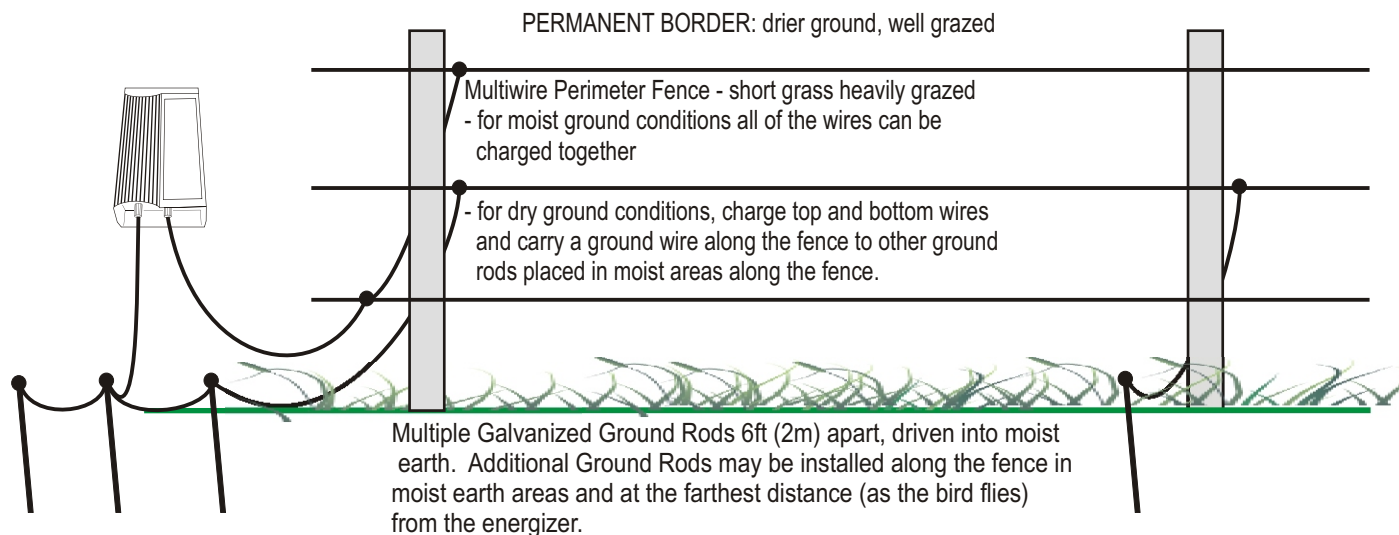
Cattle must be trained to understand what an electric fence is. If calves are short enough to walk under the charged wire, they will NOT learn that a fence is a limit to their movement. It is best to train cattle on a multi-wire fence with all of the wires charged before going to temporary electric fencing - particularly one wire fencing.

## Fence construction:

The following diagrams show fence constructions for various applications. The criteria for a good fence includes:

- Visibility (The fence must be visible and appear to be a barrier to the animal. Choose the number of wires and spacing to suit the range of size of cattle. Ensure that vegetation does not hinder visibility.)
- High guard voltage (A fence energizer for domestic cattle should maintain at least 3,000V on the vegetation loaded fence.)
- Low vegetation loss (The fence should be free of vegetation to aid visibility and reduce vegetation loss. Disconnect sections of fence that are not being used if they have vegetation load.)





## Fence maintenance:

The important factor is to maintain a high fence guard voltage. This means minimizing the leakage through vegetation and reducing the length of the charged fence wire.

- Do not inadvertently ground the charged wires along the fence.
- Do not inadvertently connect charged and grounded wires together on multi-wire fences.
- Do not tie a charged wire to a tree or a metal post.
- Do not try to charge wires that pass through water in a creek or a slough. Install insulators in-line with wires that may become grounded in water or a slough to bypass the charged wire over a water area.
- To carry the charged wire under gateways, use double insulated polyethylene jacket under-ground galvanized wire.
- Rusty splices in the fence wires contribute to guard voltage losses.
- Dis-similar metals can cause corrosion when wet. Use galvanized hook up wire and galvanized or stainless steel clamps on galvanized ground rods.
- Disconnect sections of fence that are not presently being used for pasture to reduce the leakage current losses.

## Battery energizers:

Use 12 Volt deep-cycle Recreation Vehicle or Marine batteries for best reliability. They are designed to be discharged slowly over a longer period of time. Do not let the battery discharge completely as the lifetime of the battery will be drastically reduced. Remember that if the temperature is below freezing, the battery capacity is greatly reduced. At -35degC, a lead acid battery will freeze even if it has 75% of its theoretical capacity left. In the winter time you will need to charge the battery weekly or use an adequately sized solar charger (see the website for information on solar charging).

**Model DC 2J** with the DayLight sensor will slow down its output pulse rate in the middle of the night to save battery power. For the first 24 hours after it is connected to a battery, it will use its light sensor to find the darkest time of night. 22 hours after the darkest point, the energizer will slow down for about 6 hours which is the time that domestic livestock are not usually active in the pasture. If you mount the energizer inside a building that has lights on all the time or if it is mounted in an enclosure that is dark all the time it will not be able to determine when midnight is so it will stay running at the faster rate. This model also has an indicator that blinks to show battery capacity. 3 blinks is >75%, 2 blinks is > 50% 1 blink is >25% and no blink and running at the slow rate if <25% capacity. Note that when running at the slow speed, most digital peak voltmeters will not read correctly.

## Troubleshooting:

A peak reading fence voltmeter can be handy to check the guard voltage on the fence. The neon bulb type testers will also work with a bit of practice. A piece of insulated wire with the insulation stripped at both ends is all you really need. Lay one end of the wire on the ground and step on it. Hold the other end of the wire near the charged wire. If you can draw an arc of about 1/16 inch (2mm) and get a strong "snap" sound, then the fence should work well. If you get a feeble "snap" sound, then there is too much vegetation on the fence or the ground is very dry. When the ground is too dry, you may be able to reconfigure the fence to carry both charged and grounded wires. Disconnect sections of fence that are not currently in use to reduce vegetation losses to improve the guard voltage.

Inadequate ground rod is a common source of poor electric fence performance. If you can measure any voltage (with a fence peak volt meter) between the ground rod and the earth near by, then there is too much vegetation leakage load on the fence and/or the ground rod(s) are not connecting adequately with moist earth. Multiple ground rods connected in parallel may help. Charging only the wires that are above the vegetation will help.

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## Warranty and repair:

Stinger Fence Energizers are designed to work reliably for a long time. We provide a comprehensive 3 year warranty because we are confident that our designs will even survive most lightning damage.

In YEAR 1: If the unit quits because of a manufacturing defect (component failure or assembly problem) or even from lightning damage, you can get it exchanged at your local dealer for a new one. Please provide a dated purchase receipt when returning the unit. The dealer will mark the original purchase date on the replacement unit. (If the Energizer falls into a mud puddle, gets its wires eaten off, or has the battery clips corroded, it has not failed from a manufacturing defect or lightning. Send it to the factory and get a rebuilt exchange unit for a nominal fee for shipping and handling.)

In YEARS 2 & 3: A failed unit will be exchanged with a similar rebuilt unit from the factory to get you back into the field (or keep the cows in the field) as quickly as possible. There is a nominal fee for shipping and handling. Again, please provide a dated purchase receipt.

For YEARS 4 +: If the unit dies after 3 years or for a non-warranty reason, we will repair it or exchange it with a factory rebuilt one. There is a flat rate charge for the exchange unit that depends on the model.

Call toll free to (866) 468-3373 for details on warranty and exchange procedures.

Stinger Fence Energizers are designed, manufactured, and serviced at:

Stinger Products Inc.  
2962 Parsons Road NW  
Edmonton, Alberta T6N 1B1