

Fencing FACTSHEET

TRAINING, TESTING AND TROUBLE SHOOTING *Living with an Electric Fence*

This Factsheet discusses using and maintaining an electric fence. Refer to the other fencing Factsheets for detailed electric fence information, such as elk exclusion, livestock control, etc.

TRAINING LIVESTOCK

Unless an animal has had some exposure to electrified wires, they cannot be expected to respect or be controlled by them. Training requires livestock to be able to receive a shock to discover the result in touching a "hot" wire.

This should be done in a low stress, securely fenced area such as electrified offset wire on a well fenced field. Ensure full voltage on the offset wire before livestock are exposed to it for best training results.

If the controller has a fast or training speed, select it for this purpose. To attract attention and encourage touching the wire, tie tape or shiny tin foil on the wire.

Regular contact with electric fences is also important to reinforce the training experience. In other words, the more electric fencing livestock are exposed to the better it will work.

TESTING THE GROUND SYSTEM

The earth return system of grounding a fence controller relies on the soil moisture conditions for current flow and these conditions change throughout the year. To ensure continued fence performance, a yearly grounding check should be made, preferably at the driest season the fence is being used.

The following procedure should be followed (see Figure 1):

About 300 feet from the energizer connection to the fence, use 3 or 4 steel fence posts (or similar steel material) to create a dead short from an energized wire to the earth.

This will reduce the fence line voltage to less than 1000 volts and put the grounding system under load with a high flow of electrons trying to get through the soil back to the energizer.

Using a volt meter (suitable for electric fences), measure the voltage between the ground wire to the energizer and the earth at least 3 feet from any ground rod.

If the grounding system is adequate the flow will all be handled by the ground rods and the meter reading will be very low (200 volts or so).

A higher meter reading will indicate the grounding system cannot handle the flow and more ground rods are required.

Add another ground rod and repeat the test.

(An optional method is to skip the meter and simply grasp a ground rod with one hand and touch the earth with the other hand. A poor ground is indicated with a shock, the severity of which will depend upon the condition of the grounding system. This is not recommended except for the foolhardy.)

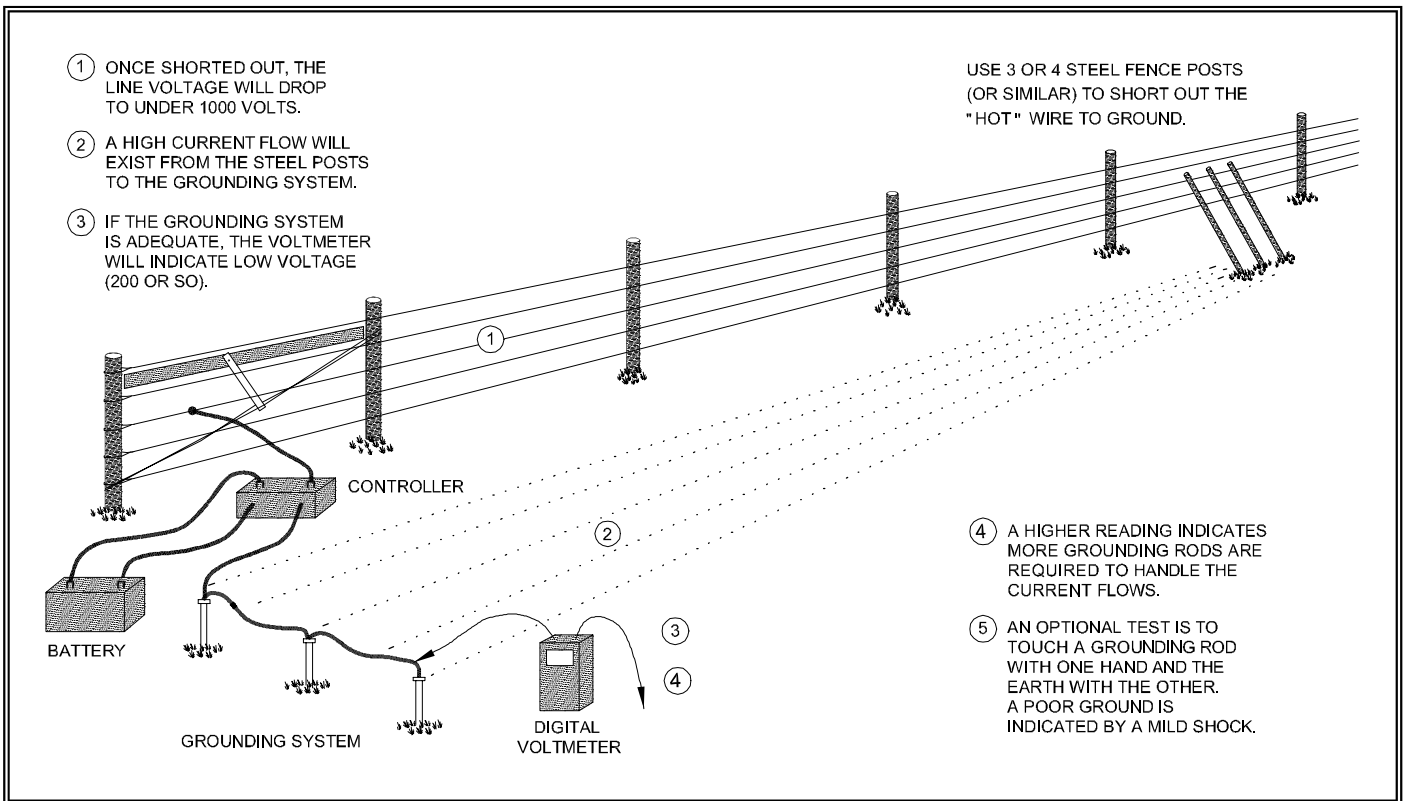


Figure 1

Testing a fence grounding system

TESTING FOR EFFECTIVE VOLTAGE

The delivery of an effective shock depends upon the proper voltage (or pressure) being present in the fence wire(s). This voltage can be:

Indicated by the use of a 2 or 3 bulb light tester (typically will only indicate low, medium or high voltage ranges).

Measured by the use of a voltmeter (which must be made especially for the pulsing, high voltage in electric fences).

Small, digital voltmeters for electric fencing are available which read peak voltage levels in kilovolts (i.e. a wire with 4500 volts would have a meter reading of 4.5). They are indispensable in testing and fault finding. Voltmeters are preferred as they give an actual voltage reading not merely a level range as do the light testers (see Figure 2).

To read the voltage on a wire, clip one of the voltmeter leads to the "hot" wire and touch the other lead to earth

or a grounded wire. The meter will indicate the voltage (or pressure) between the two points. This is the simple way to use a voltmeter to locate faults (see "Trouble Shooting - First Step" below).



Figure 2

Typical electric fence digital voltmeter

However, this reading only indicates the “steady state” condition and not voltage losses due to high resistance. A high current flow in the wire will more accurately assess resistance or faults (similarly, reading of the water pressure in a static pipeline does not indicate friction losses unless water is flowing). To find the actual conditions that are present when an animal touches a wire, use the method below, “Trouble Shooting High Resistance”.

TROUBLE SHOOTING – The Beginning

First of all, check to ensure:

- The fence controller output is correct (disconnect the fence and measure the voltage across the controller terminals).
- The grounding system is adequate (see Testing the Ground System).

If these two components are fully functional, then any faults are on the fence somewhere. **Trouble shooting methods are simply a process of elimination.**

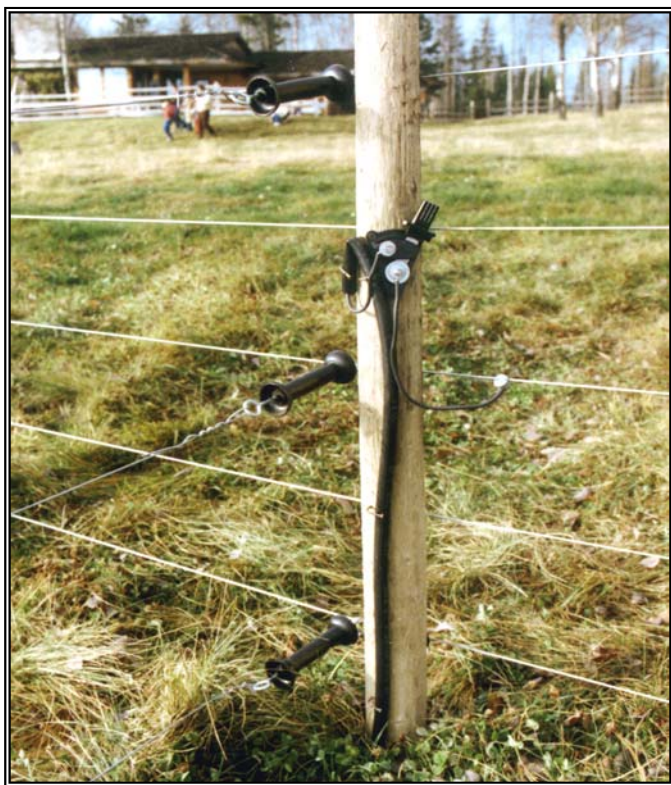


Figure 3

Typical cutout switch

For anything but the simplest of fences, trouble shooting is made easy if the fence layout allows for isolation or circuit removable of portions of the fence. This is when the use and placement of cutout switches (see Figure 3) or temporary joints becomes important.

TROUBLE SHOOTING – What To Look For

Fence line faults that will cause a loss of voltage are either:

- Faults that cause a short circuit - these provide a return circuit that does not allow the remainder of the fence to be energized, such as crossed wires, broken insulators and vegetation on the wire, or
- Faults that cause a high resistance to current flow - these reduce the voltage available to the remainder of the fence, such as poor or corroded connections.

TROUBLE SHOOTING SHORT CIRCUITS

For these common electrical faults:

- Using the cutout switches, and taking voltage readings along one section of fence at a time, faults will be indicated as a sudden drop in voltage (a drop greater than the normal drop along the same length of wire).
- Go back along the fence until the voltage rises again and the fault will be between those two points.
- If no faults are located in the first section of fence, switch on the next section and continue taking voltage readings until a voltage drop is located.
- If the voltage gradually drops along the fence line you may be approaching a dead short.

Another way of locating these types of faults is with the use of a portable radio. Tune the radio off station and walk along the fence noting the sound and volume of the “static”. This will change as a fault is passed as the fence short circuit will create an arcing sound that is picked up on the radio.

TROUBLE SHOOTING HIGH RESISTANCE

The following test will give an accurate indication of the voltages on the fence **when an animal touches the wire**. It will not be required for the routine type of faults such as short circuits.

If after checking for short circuits the fence shock still does not appear adequate or is not controlling the livestock, it may be high resistance points along the wire(s). These can be located by:

- Using a steel stake or similar material, short the “hot” wire to earth or to the grounded wire to create a flow of current (the steel stake is placed at the far end of the fence from the controller, past where the voltage is to be measured).
- Measuring the voltages along the fence, a sudden voltage drop will indicate points of high resistance (i.e. either side of a wire joint).

Note: this “complete grounding” method produces a higher current flow than would occur with an animal touching a wire so the voltages are not quite as in an “operating” situation; for actual indications of the voltages experienced by the animal, use a 500 ohm resistor instead of the steel stake.

An example of using this method would be:

- If high voltage is measured on the wire but falls when it is shorted out; wire insulation would be adequate (there was high voltage under no load) but there must be points of high resistance along the wire (as there is low voltage with current flow).

Note: if low voltage is measured initially, first check for short circuits such as vegetation on the wires or crossed wires.

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